GUN & COUNTRY CLUB, ISLAMABAD

CONSTRUCTION OF GUEST UNITS – BLOCK 1 -14 AT GUN & COUNTRY CLUB, ISLAMABAD

TECHNICAL BID

BIDDING DOCUMENTS VOLUME – I

MARCH, 2026

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GUN & COUNTRY CLUB, ISLAMABAD

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VOLUME – I

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INSTRUCTIONS TO BIDDERS

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

A. GENERAL

IB.1 Scope of Bid

1.1 The Employer as defined in the Bidding Data hereinafter called "the Employer" wishes to receive bids for the construction and completion of works as described in these Bidding Documents, and summarized in the Bidding Data hereinafter referred to as the "Works".

1.2 The successful bidder will be expected to complete the Works within the time specified in the Bidding Data.

IB.2 Source of Funds

2.1 The Employer has applied for/received a funding from the source(s) in various currencies towards the cost of the project specified in the Bidding Data and it is intended that part of the proceeds of this funding will be applied to eligible payments under the Contract for which these Bidding Documents are issued.

IB.3 Eligible Bidders

3.1 This Invitation for Bids is open to all Bidders meeting the following requirements at the time of submission of Bids and thereafter:

(a) Duly prequalified for this bidding process;
(b) Duly licensed by the Pakistan Engineering Council (PEC) in the category relevant to the value of the Works in the relevant field of specialization.

However, a Foreign Constructor can submit provisional licence with its Bid but the Foreign Constructor will be required to submit standard licence after award of Contract and before start of work.

Foreign Constructor shall not be eligible to participate in bidding individually. Foreign Constructor shall enter into joint venture with Pakistani Constructor registered with the Pakistan Engineering Council in equivalent/compatible category and submit the joint venture agreement to the Employer before participating in bidding in accordance with PEC Construction and Operation of Engineering Works Bye-laws, 1987;

(c) Pakistani Constructor must be on Active Taxpayer List of the Federal Board of Revenue and provincial revenue authority/ board where applicable; and
(d) All partners constituting the Bidder including proposed subcontractors do not appear in the list of debarred/ blacklisted firms and individuals on the websites of PEC and Federal & Provincial Procurement Regulatory Authorities and have not been declared debarred/ blacklisted by foreign country, international organizations or other foreign institutions.

IB.4 Eligible Materials, Equipment and Services

4.1 All materials, equipment and services to be supplied under this Contract shall have their origin in eligible countries described under paragraph 4.4 hereunder

4.2 For purpose of this Clause, "origin" means the place where the Goods are mined, grown or produced or from where the ancillary services are supplied. Goods are produced when, through manufacturing, processing or substantial and major assembling of

components, a commercially recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

4.3 The origin of Goods and Services is distinct from the nationality of the Bidder

4.4 Eligible countries to participate in this bidding process are those which have been notified by Ministry of Interior, Government of Pakistan as Business Friendly Countries (BVL); information can be accessed through following link:

http://www.dgip.gov.pk/Files/Visa%20Categories.aspx#L

IB.5 One Bid per Bidder

5.1 Each Bidder shall submit only one Bid either by himself, or as a partner in a joint venture. A Bidder who submits or participates in more than one Bid (other than alternatives pursuant to Clause IB.17) will be disqualified.

IB.6 Site Visit

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

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

B. BIDDING DOCUMENTS

IB.7 Contents of Bidding Documents

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

1. Instructions to Bidders.
2. Bidding Data.
3. Evaluation Criteria and Qualification Updating Forms
4. General Conditions (GC).
5. Particular Conditions (PC).
   Part A - Contract Data;
   Part B - Special Provisions
6. Specifications (SP)
   Part A – Specific Provisions
   Part B – Technical Provisions
7. Letter of Bid.
8. Schedules to Bid
9. Standard Forms
   (i) Form of Bid Security;
   (ii) Letter of Acceptance;
   (iii) Form of Contract Agreement;
   (iv) Form of Performance Security;

(v) DAAB Agreement;
(vi) Form of Mobilization Advance Guarantee

10. Drawings.

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

IB.8 Clarification of Bidding Documents, Pre-Bid Meeting

8.1 Any prospective Bidder requiring any clarification(s) in respect of the Bidding Documents may notify the Employer in writing at the Employer's address indicated in the Invitation for Bids. The Employer will respond to any request for clarification which he receives earlier than the period specified in the Bidding Data, prior to the deadline for submission of bids.

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

8.3 The Employer may, on his own or at the request of any prospective Bidder(s), hold a pre-bid meeting to clarify issues and to answer any questions on matters related to the Bidding Documents. The date, time and venue of pre-bid meeting, if convened, are as stipulated in the Bidding Data. All prospective Bidders or their authorized representatives shall be invited to attend such a pre-bid meeting.

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

8.5 Minutes of the pre-bid meeting, including the text of the questions raised and the replies given, will be transmitted without delay to all purchasers of the Bidding Documents. Any modification of the Bidding Documents listed in Sub-Clause IB.7.1 hereof which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause IB.9 and not through the minutes of the pre-bid meeting.

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

IB.9 Amendment of Bidding Documents

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

9.2 Any addendum thus issued shall be part of the Bidding Documents listed in Sub-Clause IB.7.1 hereof and shall be communicated in writing to all purchasers of the Bidding Documents. Prospective Bidders shall acknowledge receipt of each addendum in writing to the Employer.

9.3 Such addendum shall be issued not later than number of days prior to the deadline for submission of bids, specified in the Bidding Data. To afford prospective Bidders reasonable time in which to take an addendum into account in preparing their bids,

the Employer may extend the deadline for submission of bids in accordance with Clause IB.20.

C. PREPARATION OF BIDS

IB.10 Cost of Bidding

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

IB.11 Language of Bid

11.1 The Bid and all correspondence and documents related to the Bid exchanged by a Bidder and the Employer shall be in the Bid language stipulated in the Bidding Data and Particular Conditions of Contract. Supporting documents and printed literature furnished by the Bidders may be in any other language provided the same are accompanied by duly certified translation of the relevant parts in the Bid language, in which case, for purposes of evaluation of the bid, the translation in Bid language shall prevail.

IB.12 Documents Comprising the Bid

12.1 Each bidder shall:

(a) submit duly filled in, signed and stamped Letter of Bid and completed Schedules to Bid as required, including priced Bill of Quantities, in accordance with Clause IB.18 hereof;

(b) submit Bid Security in accordance with Clause IB.16 hereof

(c) submit alternative proposal, if permissible in accordance with Clause IB.17

(d) submit a written power of attorney authorizing the signatory of the Bid to act for and on behalf of the Bidder. The name and position held by each person signing the authorization must be typed or printed below the signature.

(e) submit the Qualification Updating Forms duly filled in, signed and stamped along with requisite attachments, to establish that the Bidder continues to meet the Eligibility and Qualification Criteria set out in the Pre-Qualification Documents and as provided in the Section “Evaluation Criteria and Qualification Updating Forms”.

(f) furnish a technical proposal taking into account the various Schedules to Bid, specially the following:

Schedule-C to Bid, Proposed Construction Schedule;
Schedule-D to Bid, Method of Performing the Work;
Schedule-E to Bid, List of Major Equipment;
Schedule-F to Bid, Organization Chart for Supervisory Staff;

and other pertinent information, such as mobilization programme, etc

12.2 Bids submitted by a joint venture of two (2) or more firms specified in **Bidding Data**, shall comply with the following requirements:

(a) the bid, and in case of a successful bid, the Form of Contract Agreement shall be signed by all members so as to be legally binding on all partners;

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

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

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

(e) a copy of the agreement entered into by the joint venture partners shall be submitted with the bid stating the conditions under which it will function, its period of duration, the persons authorized to represent and obligate it and which persons will be directly responsible for due performance of the Contract and can give valid receipts on behalf of the joint venture, the proportionate participation and corresponding duties & responsibilities of the several firms forming the joint venture, and any other information necessary to permit a full appraisal of its functioning. No amendments/ modifications whatsoever in the joint venture agreement shall be agreed to between the joint venture partners without prior written consent of the Employer.

12.3 Bidders shall also submit proposals of work methods and schedule, in sufficient detail to demonstrate the adequacy of the Bidders' proposals to meet the technical specifications and the completion time referred to in Sub-Clause IB.1.2 hereof.

IB.13 Bid Prices

13.1 The price and discount if any quoted by the Bidders in the Letter of Bid and in the Bill of Quantity shall conform to the requirement specified below:

13.2 The Bidder shall quote any discounts and the methodology for their application.

13.3 If bids are being invited for individual lots (contracts) or for any combination of lots, the Bidders can offer discounts for the individual lots (contracts) as well as for award of more than one Contract and shall specify in their bid.

13.4 Unless stated otherwise in the Bidding Documents, the Contract shall be for the whole of the Works as described in Sub-Clause IB.1.1 hereof, based on the unit rates and/or prices.

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

13.6 All duties, taxes and other levies payable by the Contractor under the Contract, or for any other cause, as on the date 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 a Bidder.

Additional/reduced duties, taxes and levies due to subsequent additions or changes in legislation shall be reimbursed/ deducted as per Sub Clause 13.6 [*Adjustment for Changes in Laws*] of the Conditions of Contract

13.7 The rates and prices quoted by the Bidders are subject to adjustment during the performance of the Contract in accordance with the provisions of Sub-Clause 13.7 [*Adjustments for Changes in Cost*] of the General Conditions of Contract. The Bidders shall furnish the prescribed information for the price adjustment formulae in Schedule-A to Bid, and shall submit with their bids such other requisite supporting information if required under the said Schedule

IB.14 Currencies of Bid and Payment

14.1 The unit rates and the prices shall be quoted by the Bidder entirely PKR.
A Bidder expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer's country (referred to as the "Foreign Currency Requirements") shall indicate in Table III of Schedule-A to Bid the proportion of the Bid Price (excluding Provisional Sums) needed by him for the payment of such Foreign Currency Requirements; in such case the unit rates and the prices shall be quoted by the Bidder in Equivalent PKR.

14.2 The rates of exchange to be used by the Bidder for currency conversion shall be the TT Selling Rates published or authorized by the State Bank of Pakistan prevailing on the date twenty eight (28) days prior to the deadline for submission of bids. Such rates shall be notified by the Employer not later than fourteen (14) days prior to the deadline for submission of Bids.

For the purpose of payments, the exchange rates used in Bid preparation shall apply for the duration of the Contract.

IB.15 Bid Validity

15.1 Bids shall remain valid for the period stipulated in the Bidding Data after the date of Bid Opening specified in Clause IB.23.

15.2 In exceptional circumstances, prior to expiry of the original bid validity period, the Employer may request that the Bidders extend the period of validity for a specified additional period which normally may not be more than the original bid validity period. The request and the responses thereto shall be made in writing. A Bidder may refuse the request without forfeiting his Bid Security. A Bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of his Bid Security for the period of the extension, and in compliance with Clause IB.16 in all respects.

IB.16 Bid Security

16.1 Each Bidder shall furnish, as part of his bid, a Bid Security in original form in the amount stipulated in the Bidding Data in PKR or an equivalent amount in a freely convertible currency.

16.2 The Bid Security shall be, at the option of the Bidder, in the form of Call Deposit Receipt (CDR)/ Pay Order or a Security issued in 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

Company listed in the Bidding Data and rated by PACRA/VIS of rating as provided in Table below in favour of the Employer valid for a period 14 days beyond the Bid Validity date. The Bid Security of Joint Venture shall be in the name of Joint Venture or Lead/either Firm of the JV or in ratio of shares of the individual JV partners, submitting the bid.

Bid Price (In Eq. million PKR)	Minimum Rating Insurance Company
Up to 1000	A (+)
1001 to no limit	AA

[Note: Insurance Company includes Joint Venture Insurance Companies also]

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

16.4 The Bid Securities of the Bidders except the lowest three will be returned by the Employer within twenty eight (28) days from the opening of Bids, provided a Bidder requests for the return of its Bid Security, or upon the expiry of original validity of Bid Security or as extended, whichever is earlier.

16.5 The Bid Security of the lowest three Bidders including the successful Bidder will be returned when the successful Bidder has furnished the required Performance Security.

16.6 The Bid Security may be forfeited:

(a) if the Bidder withdraws his bid except as provided in Sub Clause IB.22.1;
(b) if the Bidder does not accept the correction of his Bid Price pursuant to Sub Clause IB.28.2 hereof; or
(c) in the case of successful Bidder, fails to furnish the required Performance Security.

16.7 In case of annulment, all Bids submitted and specially, Bid securities, shall be returned to the Bidders within 14 days of annulment.

IB.17 Alternate Proposals by Bidder

17.1 Unless otherwise specified in the **Bidding Data**, alternative proposal(s) shall not be considered.

17.2 Should any Bidder consider that he can offer any advantages to the Employer by a modification to the designs, specifications or other conditions, he may, in addition to his Bid to be submitted in strict compliance with the Bidding Documents, submit any alternative proposal(s) containing (a) relevant design calculations; (b) technical specifications; (c) proposed construction methodology; and (d) any other relevant details/conditions, provided always that the total sum entered on the Letter of Bid shall be that which represents complete compliance with the Bidding Documents.

17.3 Alternative proposal(s), if any, of the Bidder having submitted most advantageous Bid only may be considered by the Employer as the basis for the award of Contract to such Bidder.

IB.18 Format and Signing of Bid

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

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

18.3 No alteration is to be made in the Letter of Bid nor in the Schedules thereto except in filling up the blanks as directed. If any such alterations be made or if these instructions be not fully complied with, the Bid may be rejected.

18.4 Each Bidder shall prepare by filling in the forms completely and without alterations one (1) original and number of copies, specified in the **Bidding Data**, of the documents comprising the Bid as described in Clause IB.12 and clearly mark them "ORIGINAL" and 'COPY" as appropriate. In the event of discrepancy between them, the original shall prevail.

The Bidder shall also provide complete searchable PDF versions as well as Word, Excel, etc., versions of the Bid if so required in the **Bidding Data**.

18.5 The original of the Bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder pursuant to Sub-Clause IB.12.1(d) hereof. All pages of the Bid shall be initialled and stamped by the person or persons signing the bid.

18.6 The Bid shall contain no alterations, omissions or additions, except to comply with instructions issued by the Employer, or as are necessary to correct errors made by the Bidder, in which case such corrections shall be initialled by the person or persons signing the Bid.

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

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

18.9 All documents executed outside Pakistan required to be submitted with the Bid must be certified by Pakistani Embassy in the respective country (ies).

D. SUBMISSION OF BIDS

IB.19 Sealing and Marking of Bids

19.1 Each Bidder shall submit his Bid as under:

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

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

given in Sub Clause IB.19.2 hereof.

19.2 The inner and outer envelopes shall:
(a) be addressed to the Employer at the address provided in the **Bidding Data**;
(b) bear the specific identification of this bidding process as specified in the **Bidding Data**; and
(c) provide a warning not to open before the time and date for bid opening, as specified in the **Bidding Data**.

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

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

IB.20 Deadline for Submission of Bids

20.1 (a) Bids must be received by the Employer at the address specified no later than the time and date stipulated in the **Bidding Data**.

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

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

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

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

IB.21 Late Bids

21.1 (a) Any Bid received by the Employer after the deadline for submission of bids prescribed in Clause IB.20 shall be declared late, rejected and returned unopened to such Bidder.

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

IB.22 Modification, Substitution and Withdrawal of Bids

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

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

22.3 No Bid may be modified by a Bidder after the deadline for submission of Bids except in accordance with Sub Clauses IB.22.1 and 28.2.

22.4 Withdrawal of a Bid during the interval between the deadline for submission of Bids and the expiration of the period of Bid validity specified in the Letter of Bid may result in forfeiture of the Bid security in pursuance to Clause IB.16.

E. BID OPENING AND EVALUATION

IB.23 Bid Opening

23.1 The Employer will open the Bids including withdrawals, substitution and modifications made pursuant to Clause IB.22, in the presence of Bidders' representatives who choose to attend, at the time, date and location stipulated in the **Bidding Data**. The Bidders' representatives who are present shall sign a register evidencing their attendance.

23.2 Envelopes marked "MODIFICATION", "SUBSTITUTION" or "WITHDRAWAL" shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Clause IB.22 shall not be opened. Only bids that are opened and read out at Bid opening shall be considered further.

23.3 The Bidder's name, total Bid Price and price of any alternative proposal(s), any discounts, Bid modifications**,** substitution and withdrawals, the presence or absence of Bid security, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening of Bids. Only discounts and alternative proposals.

read out at Bid opening shall be considered for evaluation. The Letter of Bid and the Summary Bill of Quantities are to be initialled by representative(s) of the Employer attending Bid opening. The Employer shall neither discuss the merits of any Bid nor reject any Bid (except for late Bids, in accordance with Sub-Clause IB 21.1)

23.4 The Employer shall prepare minutes of the Bid opening, including the information disclosed to those present in accordance with the Sub-Clause IB.23.3.

IB.24 Process to be Confidential

24.1 Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of Contract shall not be disclosed to Bidders or any other person not officially concerned with such process before the announcement of the result of Bid evaluation in the form of final evaluation report giving justification for acceptance or rejection of Bids which shall be done at least fifteen (15) days prior to award of Contract. The announcement to all Bidders will include table(s) comprising read out prices, discounted prices, price adjustments made, final evaluated prices and recommendations against all the Bids evaluated. Any effort by a Bidder to influence the Employer's processing of Bids or Contract award decisions may result in the rejection of such Bidder's Bid. Whereas any Bidder feeling

aggrieved may lodge a written complaint not later than five (5) days after the announcement of the final evaluation report.

IB.25 Clarification of Bids

25.1 To assist in the examination, evaluation and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakdowns of unit rates and lump sum prices. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The request for clarification and the response shall be in writing. No change in the price or substance of the Bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids in accordance with Clause IB.28.

25.2 The Employer may, at his discretion, ask any Bidder for confirmation/submission of missing information to clarify its Bid. However, the Employer does not have an obligation to request any additional information or clarification with respect to missing or deficient information in a Bid. The Employer may reject any Bid as non-responsive if found materially incomplete, obscure, irregular or omitting any material information required to be submitted in accordance with the Bidding Documents.

25.3 If a Bidder does not provide clarifications of its Bid by the date and time set reasonably (not less than seven (7) days) in the Employer's request for clarification, the Employer may proceed with the evaluation based on the information submitted in the Bid without waiting for the Bidder's response.

IB.26 Examination of Bids and Determination of Responsiveness

26.1 Prior to the comparison of Bids, the Employer will determine whether each Bid is substantially responsive to the requirements of the Bidding Documents.

26.2 The Employer's determination of a Bid's responsiveness is to be based on the contents of the Bid itself, as defined in Sub- Clause IB.12.

26.3 A substantially responsive Bid is one which meets the requirements of the Bidding Documents, without material deviation, reservation or omission. A material deviation, reservation or omission is one that,

(a) if accepted, would:
  (i) affect in any substantial way the scope, quality or performance of the Works; or
  (ii) limit in any substantial way, inconsistent with the Bidding Documents, the Employer's rights or the Bidder's obligations under the proposed Contract; or

(b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.

26.4 During the evaluation of Bids, the following definitions apply:

(a) "Deviation" is a departure from the requirements specified in the Bidding Documents;
(b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Documents; and
(c) "Omission" is the failure to submit part or all of the

information or documentation required in the Bidding Documents

26.5 The Employer shall examine the technical aspects of the Bid submitted in accordance with Sub-Clause IB.12.1(f), in particular, to confirm that all requirements stated in Specifications have been met without any material deviation, reservation or omission.

26.6 If a Bid is not substantially responsive to the requirements of the Bidding Documents, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation, reservation or omission.

IB.27 Nonmaterial Nonconformities

27.1 Provided that a Bid is substantially responsive, the Employer may waive any nonconformities in the Bid.

27.2 Provided that a Bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

27.3 Provided that a Bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component, by adding the average price of the item or component quoted by other lowest two evaluated substantially responsive Bidders. If the price of the item or component cannot be derived from the price of other substantially responsive Bids, the Employer shall use a suitable CSR, adjusted to the date 28 days earlier to the Bid submission date or its best assessment.

IB.28 Correction of Errors

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

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

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

(c) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected

28.2 The amount stated in the Letter of Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and with the concurrence of the Bidder, shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected Bid Price, his Bid will be rejected, and the

Bid security shall be forfeited in accordance with Sub Clause IB.16.6(b) hereof.

IB.29 Evaluation and Comparison of Bids

29.1 The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Clause IB.26. The Employer shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be permitted.

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

(a) making any correction for arithmetic errors pursuant to Clause IB.28;
(b) price adjustment due to discounts offered in accordance with Sub-Clause IB.23.3
(c) excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities, but including competitively priced daywork;
(d) making an appropriate price adjustment for any quantifiable nonmaterial nonconformities in accordance with Sub-Clause IB.27.3; and
(e) the additional evaluation factors are specified in Section Evaluation Criteria and Qualification Updating Forms

29.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in Bids' comparison.

IB.30 Abnormally Low Bids

30.1 If the Bid Price of the successful Bidder is more than 15% below the lower of the Employer's estimate of the cost of work to be performed under the Contract or average of other lowest two evaluated substantially responsive Bids, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require an additional Performance Security by 10% of the difference of the Bid Price as determined hereinabove upto issuance of Taking Over Certificate at the expense of the successful Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract. The Bids having Bid Price lower than 25% shall be liable to be rejected.

IB. 31 Unbalanced or Front Loaded Bids

31.1 If the Bid of the successful Bidder is seriously unbalanced (Front Loaded) in relation to the average of other evaluated substantially responsive Bids, the Employer during execution of contract may pay against measured quantities of significantly higher quoted line item(s) rate(s) with respect to same line item(s) rate(s) determined from the average of other lowest two evaluated substantially responsive Bids as instructed by the Engineer. The balance line item(s) rate(s) may be paid against the same measured quantities at the time of issuance of Taking Over Certificate or as instructed by the Engineer.

F. AWARD OF CONTRACT

IB.32 Award Criteria

32.1 Subject to Clauses IB.33 and IB.39, the Employer will award the

Contract to the Bidder whose Bid has been determined as most advantageous Bid (substantially responsive to requirements of the Bidding Documents with the lowest evaluated Bid Price).

IB.33 Employer's Right to Annul the Bidding Process

33.1 Notwithstanding Clause IB.32, the Employer reserves the right to annul the bidding process and reject all Bids, at any time prior to award of Contract, without thereby incurring any liability to the affected Bidders or any obligation.

The Employer shall upon request communicate to any Bidder who submitted a Bid, the grounds for its rejection of all Bids but is not required to justify those grounds. Rejection of all Bids shall be notified to all Bidders promptly.

IB.34 Notification of Award

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

The Letter of Acceptance will also state the remedies with respect to Sub-Clauses IB.30 & IB.31 if applicable.

34.2 No negotiation with the Bidder having submitted most advantageous Bid or any other Bidder shall be permitted, however, Employer may have clarification meetings before issuing Letter of Acceptance to get clarified any item in the Bid evaluation report.

34.3 The Letter of Acceptance/ notification of award and its acknowledgement/acceptance by the Bidder will constitute the formation of the Contract, binding the Employer and the Bidder till signing of the formal Contract Agreement.

34.4 Upon furnishing by the successful Bidder of a Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful and return their Bid securities in accordance with Sub-Clause IB.16.5.

IB.35 Performance Security

35.1 The successful Bidder shall furnish to the Employer a Performance Security in the form and the amount stipulated in the Conditions of Contract and additional Performance Security if applicable under IB.30 as stated in the Letter of Acceptance, within a period of 28 days after the receipt of Letter of Acceptance.

35.2 Failure of the successful Bidder to comply with the requirements of Sub Clause IB.35.1 or Clauses IB.36 or IB.37 shall constitute sufficient grounds for the annulment of the award, forfeiture of the Bid security and to award the Contract to the Bidder having submitted next advantageous Bid.

IB.36 Signing of Contract Agreement

36.1 Within 14 days from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the Employer will notify the successful Bidder to depute its representative with appropriate Power of Attorney to sign the Contract Agreement in the form provided in the Bidding

Documents, incorporating all agreements between the parties.

36.2 The formal Agreement between the Employer and the successful Bidder shall be executed within 14 days of the receipt of the above stated notification by the successful Bidder from the Employer.

IB.37 Integrity Pact

37.1 The Bidder shall sign and stamp the Integrity Pact provided at Schedule-J to Bid in the Bidding Documents for all Federal Government procurement contracts exceeding PKR ten million. Failure to provide such Integrity Pact shall make the Bidder non-responsive.

IB.38 Instructions not part of Contract

38.1 Bids shall be prepared and submitted in accordance with the Instructions to Bidders which are provided to assist the Bidders in preparing Bids but do not constitute part of the Contract.

IB.39 Corrupt and Fraudulent Practices

39.1 The Employer will reject a Bid if it determines that the Bidder recommended for award, or any of its personnel, or its agents, or its sub-contractors, service providers, suppliers and/or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract under this bidding.

39.2 The Employer will blacklist and hence forthwith debar a Constructor or individual, at any time, in accordance with the prevailing Public Procurement Rules 2004

BIDDING DATA SHEET

BIDDING DATA

The following specific data for the Works to be bidded shall complement, amend, or supplement the provisions in the Instructions to Bidders. Wherever there is a conflict, the provisions herein shall prevail over those in the Instructions to Bidders.

Instructions to Bidders Clause Reference	
Clause IB.1	**Scope of Bid**
Sub Clause 1.1	**Name and address of the Employer**
	The Employer is: **Secretary,** **Gun & Country Club, Islamabad** (Hereinafter called "The Employer" Which expression shall include the successors, legal representatives and permitted assignees). **Employer's Representative** **Manager Administration** Gun and Country Club, Islamabad **Name of the Project and Summary of the Works** The name of the Project is: **"Construction of Guest Units – Block 1-14 at Gun & Country Club, Islamabad"** The Summary of Works: Gun & Country Club, Islamabad intends to construct Guest Units Block 1-14. The scope of works mainly comprises construction of Guest Units and related ancillary works lying within the boundaries and limits shown on the Drawings and any such additional areas adjacent thereto as may be designated by the Engineer from time to time for the construction to be performed under the Contract, and all such areas and additional areas shall comprise the Site.
Sub-Clause 1.2	**Time for Completion** 546 days
Clause IB.2	**Source of Funds**
Sub-Clause 2.1	Delete the text of Sub-Clause 2.1 and substitute with the following: The Employer has sufficient funds of its own to cover the Cost of the entire Project for which these Bidding Documents are issued.

Clause IB.3 **Eligible Bidders**

Sub-Clause 3.1 Delete the text of Sub-Clause 3.1 (a) in its entirety.

Clause IB.5 **One Bid per Bidder**

Sub-Clause 5.1 Delete the text of Sub-Clause 5.1 and substitute with the following:

Each bidder shall submit only one bid. Joint venture of firms is not allowed. A bidder who participates in more than one bid (other than alternatives pursuant to Clause IB.17) will be disqualified.

Clause IB.7 **Contents of Bidding Documents**

Sub-Clause 7.1 Delete the text of Sub-Clause 7.1 and substitute with the following:

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

Technical Bid

7.1.1 **Volume - I**

- Instruction to Bidders;
- Bidding Data;
- Evaluation Criteria and Qualification Updating Forms;
- Letter of Technical Bid;
- Schedules to Bid;
- Form of Bid Security, Form of Performance Security, Letter of Acceptance, Form of Contract Agreement, DAB Agreement, Form of Mobilization Advance Guarantee;
- General Conditions;
- Particular Conditions:
  - Part A – Contract Data;
  - Part B- Special Provisions.

7.1.2 **Volume – II**

- Specifications:
  - Part A – Specific Provisions;
  - Part B – Technical Provisions.

7.1.3 **Volume – III-A**

- Bid Drawings.

7.1.4 **Volume – III-B**

- Miscellaneous Details.

Price Bid

7.1.5 **Volume – IV**

- Letter of Price Bid;
- Preamble to Bill of Quantities;
- Bill of Quantities.

Clause IB.8 **Clarification of Bidding Documents, Pre-Bid Meeting**

Sub-Clause 8.1 **Time limit for clarification**

07 days

Sub-Clause 8.3 **Venue, time, and date of the pre-bid meeting**

The Bidder or his official representative are invited to attend a pre-bid meeting which will take as provided in Notice Inviting Bids.

Sub-Clause 8.4 The Bidders are requested to submit questions, if any, in writing so as to reach the Employer not later than five (05) days before the date given for pre-bid meeting in the Notice Inviting Bids.

Clause IB.9 **Amendment of Bidding Documents**

Sub-Clause 9.3 Number of days: 03 days

Clause IB.11 **Language of Bid**

Sub-Clause 11.1 English.

Clause IB.12 **Documents Comprising the Bid**

Sub-Clause 12.1 Delete the text of Sub-Clause 12.1 and substitute with the following:

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

Volume - I

(i) Letter of Technical Bid;
(ii) Bid Security in accordance with Clause IB.16;
(iii) Written power of attorney authorizing the signatory of the Bid;
(iv) Original Bidding Documents (Volume – I);
(v) Dully filled in Appendices to Bid (except Schedules B to Bid);
(vi) Qualification documents establishing bidders' eligibility as per Section "Evaluation Criteria and Qualification Updating Forms".

Volume – II

(i) Specifications
- Part A – Specific Provisions
- Part B – Technical Provisions

Volume – III-A

(i) Drawings

Volume – III-B

(i) Miscellaneous Details

12.1 (B) The Bidder shall submit with its **Price Bid** the following documents:

Volume – IV

(i) Letter of Price Bid
(ii) Preamble to Bill of Quantities
(iii) Schedule – B to Bid (Bill of Quantities)

Sub-Clause 12.2 Delete the Sub-Clause in its entirety**.**

Sub-Clause 12.3 The Bidder shall also submit along with the Bid the entire original document issued to him comprising Volume-I to Volume-IV.

Clause IB. 13 **Bid Prices**

Sub-Clause 13.5 Delete the text of Sub-Clause 13.5 and substitute with the following:

Bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by a bidder will not be paid for by the Employer when executed and shall be deemed covered by rates and prices for other items in the Bill of Quantities. Corrections in rates and prices, if any, shall be made by crossing out, initialing, dating and re-writing.

Sub-Clause 13.6 The Bidder shall obtain all information as to Pakistan Income Tax, Salaries Tax, Company Taxes, Municipal Octroies, Levies and any other taxes imposed by the Government of Pakistan/Provincial Governments/local bodies, export and import duties and necessary permits and conform the requirements thereof at his own responsibility and include the same in quoted Bid Price. The quoted Bid Price shall also include the cost of accepting the general risks/ liabilities and obligations set forth or implied in the Contract. No claim at any later stage on this account will be entertained.

All duties, taxes and other levies payable by the Contractor under the Contract, or for any other cause, as on the date 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 a bidder.

Additional / reduced duties, taxes and levies due to subsequent additions or changes in legislation shall be reimbursed / deducted as per Sub-Clause 13.6 of the Conditions of Contract.

Sub-Clause 13.7 Delete the text of Sub–Clause 13.7 and substitute with the following:

The rates and prices quoted by the bidders are subject to adjustment during the performance of the Contract in accordance with the provisions of Clause 13.7 of the Conditions of Contract.

Clause IB. 14 **Currencies of Bid and Payment**

Sub-Clause 14.1 Delete the text of Sub–Clause 14.1 and substitute with the following.

The unit rates and the prices shall be quoted by the Bidder entirely in PKR.

The payments to the Contractor for the works done shall be made in Pakistani Rupees

Sub-Clause 14.2 The Sub-Clause is deleted in its entirety.

Clause IB.15 **Bid Validity**

Sub-Clause 15.1 **Period of Bid validity:**

One hundred and twenty (120) days.

Clause IB. 16 **Bid Security**

Sub-Clause 16.1 **Amount of Bid Security**

Rs. 4,000,000/-

Sub-Clause 16.2 Delete the text of Sub-Clause 16.2 and substitute with the following:

The Bid Security shall be, at the option of the bidder, in the form of Call Deposit Receipt (CDR) / Pay Order in favor of the Employer valid for a period of 28 days beyond bid validity date.

Sub-Clause 16.4 Delete the text of Sub-Clause 16.4 and substitute with the following:

The Bid Securities of the Bidders except the lowest three will be returned by the Employer within twenty eight (28) days from the opening of Price Bids, provided a Bidder requests for the return of its Bid Security, or upon the expiry of original validity of Bid Security or as extended, whichever is earlier.

Clause IB.17 Alternate Proposals by Bidder

The Clause is deleted in its entirety.

Clause IB.18 Format and Signing of Bid

Sub-Clause 18.4 Delete the text of Sub–Clause 18.4 and substitute with the following:

Each bidder shall prepare and submit the original and one copy of the documents comprising the Bid as described in Clause IB-12 of the Bidding Data and clearly marked them "**ORIGINAL**" and **COPY**. In the event of discrepancy between them, the original shall prevail.

Searchable PDF versions as well as Word, Excel etc. versions of the Bid are not Required.

Sub-Clause 18.5 Delete the text of Sub–Clause 18.5 and substitute with the following:

The Bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder pursuant to Sub-Clause 12.1 hereof. All pages of the Bid shall be initialed and stamped by the person or persons signing the Bid. One (1) copy of Power of Attorney must be attached to the Bid submitted to the Employer if this Bid is signed / executed by a person other than the President, Partner or Owner of the Bidder's Company.

Clause IB.19 Sealing and Marking of Bids

Sub-Clause 19.1 Delete the text of Sub–Clause 19.1 and substitute with the following:

Each Bidder shall submit his Bid as under:

(a) The technical bid shall comprise of documents listed in IB-12.1 (A) and the price bid shall comprise of documents listed in IB-12.1 (B) which shall be placed in separate envelopes in accordance with IB-12.1.

(b) **ORIGINAL** and **COPY** of Bids comprising Volume-I, II, III-A, III-B & IV shall be separately sealed and put in two separate envelopes, sealed and marked as Such.

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

Sub-Clause 19.2 (a) Employer's address for the purpose of Bid submission is as follows:

Manager Administration
Gun and Country Club,
Islamabad

19.2 (b) Name & identification number of the Contract is as follows:

Name: "Construction of Guest Units – Block 1-14 at Gun & Country Club, Islamabad."

Identification Number : Not Applicable

Provide the following text on the larger outer envelope:

19.2 (c) **WARNING: Not to be opened before _____ *(time)* on _____ *(date).***
(The time and date shall be as provided in the Notice Inviting Bid)

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

Sub-Clause 20.1(a) Time and date of Bid submission and Bid opening shall be as per the data provided in the Notice Inviting Bids.

Clause IB.23 **Bid Opening**

Delete the text of Sub-Clause 23 and substitute with the following:

Sub-Clause 23.1 The Employer will open the Technical Bids in public at the address, date and time specified in the Notice Inviting Bids in the presence of Bidders` designated representatives who choose to attend. The Price Bids will remain unopened and will be held in custody of the Employer until the specified time of their opening.

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

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

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

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

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

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

Sub-Clause 23.6 Preliminary Examination of Technical Bids

(a) The Employer shall first examine qualification and experience Data as per Section Evaluation Criteria and Qualification Updating Forms submitted by the Bidder. The technical proposal examination of those bidders only shall be taken in hand who meet the minimum requirement as mentioned in Section Evaluation Criteria and Qualification Updating Forms. Only substantially responsive qualification shall be considered for further evaluation.

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

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

Sub-Clause 23.8 At the end of the evaluation of the Technical Bids, the Employer will invite only those bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified for award to attend the opening of the Price Bids.

The date, time, and location of the opening of Price Bids will be advised in writing by the Employer. Bidders shall be given reasonable notice for the opening of Price Bids.

Sub-Clause 23.9 The Employer will notify Bidders in writing who have been rejected on the grounds of their Technical Bids being substantially non-responsive to the requirements of the Bidding Document and return their Price Bids unopened before inviting others, who are determined as being qualified, to attend the opening of Price Bids

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

Sub-Clause 23.11 All envelopes containing Price Bids shall be opened one at a time and the following read out and recorded:

(a) The name of the Bidder;
(b) Whether there is a modification or substitution;
(c) The Bid Prices, including any discounts and alternative offers; and

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

Only Price Bids and discounts, read out and recorded during the opening of Price Bids shall be considered for evaluation. The Letter of Bid and the Summary Bill of Quantities are to be initialled by representative(s) of the Employer attending Bid opening. The Employer shall neither discuss the merits of any Bid nor reject any Bid at the time of opening of Price Bids.

Sub-Clause 23.12 The Employer shall prepare minutes of the Bid opening, including the information disclosed to those present in accordance with the Sub-Clause IB.23.1 & 23.10.

Clause 24 **Process to be Confidential**

Sub-Clause 24.1 In case of grievance, the address of Grievances Committee is:

CF&AO,
Ministry of IPC
Islamabad

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

Sub-Clause 26.3 Delete the text of Sub-Clause 26.3 and substitute with the following:

A substantially responsive bid is one which (i) meets the eligibility criteria; (ii) has been properly signed; (iii) is accompanied by the required Bid Security; Includes signed Integrity Pact where required as per clause IB.37 and (v) conforms to all the terms, conditions and specifications of the Bidding Documents, without material deviation or reservation. A material deviation or reservation is one (i) which affect in any substantial way the scope, quality or performance of the Works; (ii) which limits in any substantial way, inconsistent with the Bidding Documents, the Employer's rights or the bidder's obligations under the Contract; (iii) adoption/rectification whereof would affect unfairly the competitive position of other bidders presenting substantially responsive bids. Only substantially responsive bid shall be considered for further evaluation.

Clause IB-28 **Corrections of Arithmetic Errors**

Sub-Clause 28.1 Delete the text of Sub–Clause 28.1 and substitute with the following:

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

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

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

(c) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.

Clause IB-29 **Evaluation and Comparison of Bids**

Sub-Clause 29.1 At the end of Sub-Clause 29.1 add the following:

In evaluating the Bids the Employer shall also examine the Construction Schedule (Schedule-C to Bid) and Method of Performing the Work (Schedule-D to Bid) submitted by the Bidder along with the Bid.

Clause IB.35 **Performance Security**

Sub-Clause 35.1 Delete the text of Sub–Clause 35.1 and substitute with the following:

The successful bidder shall obtain and provide to the Employer a Performance Security and an additional Performance Security (if applicable under IB.30 as stated in Letter of Acceptance) in the prescribed Form annexed to these Bidding Documents. The said Security shall be furnished to the Employer by the successful bidder within twenty-one (21) days after the receipt of Letter of Acceptance. The Performance Security shall be of an amount equal to ten percent (10%) of the Contract Price in the currency of the Contract and, at the option of the bidder, in the form of Bank Guarantee either from any Scheduled Bank in Pakistan or from a bank located outside Pakistan duly counter-guaranteed by a Scheduled Bank in Pakistan.

Clause IB. 36 **Signing of Contract Agreement**

Sub-Clause 36.1 Delete the text of Sub–Clause 36.1 and substitute with the following:

The successful Bidder shall submit for approval by the Employer along with the Performance Security within the time period stipulated in clause IB-35.1 a draft copy of Contract Agreement as per the Form of Contract Agreement provided in the Bidding Documents, incorporating all agreements between the parties.

Sub-Clause 36.2 Delete the text of Sub–Clause 36.2 and substitute with the following:

The formal Agreement between the Employer and the successful Bidder shall be executed within 21 days from the date of furnishing of acceptable Performance Security by the successful Bidder from the Employer but not before acceptance by the Employer of the Performance Security as per Sub-Clause 35.1 hereof.

Clause IB. 37 **Integrity Pact**

Sub-Clause 37.1 Delete the text of Sub–Clause 37.1 and substitute with the following:

The successful Bidder shall sign and stamp the Integrity Pact provided at Schedule-J to Bid in the Bidding Documents for all Federal Government procurement contracts exceeding PKR ten million. Failure to provide such Integrity Pact shall make the Bidder non-responsive.

LETTER OF TECHNICAL BID
AND
SCHEDULES TO BID

LETTER OF TECHNICAL BID AND SCHEDULE TO BID
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Letter of Technical Bid

Name of Contract: **"Construction of Guest Units – Block 1-14 at Gun & Country Club, Islamabad"**

To: **Secretary**

Gun &Country Club
Islamabad

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

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

Construction of Guest Units – Block 1-14 at Gun & Country Club, Islamabad

(c) Our Bid consisting of the Technical Bid and the Price Bid shall be valid for a period of 120 days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(d) As security for due performance of the under takings and obligations of our bid, we submit here with a Bid security, in the amount specified in Bidding Data Sheet, which is valid (at least) 148 days.

(e) We are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process, other than alternative offers submitted in accordance with IB16 (as applicable).

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

Name .....

In the capacity of .....

Signed .....

.....

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

Date .....

.....

Address……

SCHEDULES TO BID

SCHEDULE OF ADJUSTMENT DATA

SCHEDULE OF COST INDEXATION – LOCAL ITEMS

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

Pn= a + b Ln / Lo + c En/ Eo + d 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 may be 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 of which is applicable to the relevant tabulated cost element on the date 28 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 of which is applicable to the relevant tabulated cost element on the Base Date i.e. prices prevalent 28 days prior to the latest day for submission of Bids.

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

The source of prices and the weightages for use in the adjustment formula shall be as follows:

SCHEDULE OF ADJUSTMENT DATA

Table I. Local Currency (LC) For Bill Nos_____.

Cost Element	Description	Weightages	Applicable Price
(i)	(ii)	(iii)	(iv)
a	Fixed Portion	0.667	
b	Labour *(Labourer (un-skilled) per day, shall be taken as representative of all types of Labour (skilled/unskilled) deployed at site)*	0.150	Government of Pakistan (GP) Federal Bureau of Statistics (FBS) Monthly Statistical Bulletin.
c	Cement *(OPC cement per bag shall be taken as representative of all types of cement used at the site)*	0.055	- do -
d	Reinforcing Steel *(½" Ø round M.S. Bars per tonne shall be taken as representative of all types and diameters of Steel Reinforcement)*	0.078	- do -
e	High Speed Diesel (HSD) *(HSD shall be taken as representative of all kind of fuels used in connection with the Contract)*	0.050	-do-
	Total	1.000	

Notes:

1) Prices for "(b)" to "(e)" shall be taken from the Government of Pakistan, Federal Bureau of Statistics. Monthly Statistical Bulletin. The base prices shall be those prevalent 28 days prior to the latest day for submission of Bids. Current date price of any element shall be those prevalent 28 days prior to the start of execution month to which a particular monthly statement is related.

2) If the Statistical Bulletin of the aforesaid month is not available at the time of Bid opening, then the Basic Prices of Specified Materials will be submitted by the Contractor at the time of their availability and shall be recommended by the Engineer and will be fixed as Basic Prices for Specified Materials for Price Adjustment.

3) The prices for the cost elements of (b) to (e) shall be used for the City where the Site is located. In case the Site is not listed in the monthly statistical Bulletin, the prices for the nearest City listed in the Bulletin shall be used.

4) Any fluctuation in the prices of materials other than those given above shall not be subject to adjustment of the Contract Price and shall be deemed to be included in the rates and prices quoted by the Bidders.

5) The prices of materials provided in this Appendix are for the purpose of price adjustment only. The Contractor shall base his rates entered in the Bill of Quantities on current market prices.

Authorized Signature and official Seal: _____

Name: _____

Date_____

SCHEDULE OF ADJUSTMENT DATA

Table II. Foreign Currency (FC)

NOT USED

Authorized Signature and official Seal: _____

Name: _____

Date_____

SCHEDULE OF ADJUSTMENT DATA

Table III. Foreign Currency Requirements

NOT USED

Authorized Signature and official Seal: _____

Name: _____

Date_____

SCHEDULE OF ADJUSTMENT DATA

Table IV. Summary of Payment Currencies

All payments shall be made in Pakistani Rupees (PKR.)

Authorized Signature and official Seal: _____

Name: _____

Date_____

CONSTRUCTION SCHEDULE

Pursuant to Sub-Clause 8.3 of the General Conditions, the whole of the Works, and each Section (if any), shall be completed within the Time for Completion for the Works or Section (as the case may be) stated as hereunder and mentioned in Contract Data.

Description	Time for Completion (days)
Whole Works – Construction of Guest Units – Block 1-14 at Gun & Country Club, Islamabad	Five hundred forty-six (546)

The Bidder shall provide, the Construction Schedule in the bar chart (CPM) showing the sequence of work items and the period of time during which he proposes to complete each work item in such a manner that his proposed programme for completion of the whole of the Works may meet Employer's completion targets in days noted above and counted from the Commencement Date (Attach sheets as required for the specified form of Construction Schedule.)

Authorized Signature and official Seal: _____

Name: _____

Date: _____

METHOD OF PERFORMING THE WORK

(to be filled and signed by the Bidder)

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

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

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

3. The method of executing the Works, the procedures for installation of equipment and machinery and transportation of equipment and materials to the site and providing all services including but not limited to supply of power, water, maintenance of facilities, safety and security and all what is required for completion of works in accordance with the Contract.

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

5. The Bidder while preparing his methodology for performing and executing the works shall also consider the following:

a) The timely completion of the Project as per the time provided in Contract Data.

b) The Contractor while filling out the list of major equipment required at site, shall ensure that the equipment requirement is in consonance with the construction requirement.

c) The Contractor is not restricted to carry out the work in single shift. The Contractor should note that if he plans to execute the work in more than single shift than all costs related to the additional superintendence to be provided by the Engineer will be borne by the Contractor. Procedure for such additional costs will be worked out and finalized between the Contractor and Engineer with the consent of the Employer.

d) The portions of the Site shall be made available to the Contractor in coordination with other Contractors working at site. The Contractor shall prepare the work programme accordingly.

Authorized Signature and official Seal: _____

Name: _____

Date: _____

LIST OF MAJOR EQUIPMENT

The Bidder will provide on Sheet E-2 of this schedule a list of all major equipment and related items, under separate heading for items owned, to be purchased or to be arranged on lease by him to carry out the Works. The information shall include make, type, capacity, and anticipated period of utilization for all equipment.

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment as per site requirements and instructions of the Engineer.

The bidder while preparing his methodology for performing and executing the works shall consider the Major Equipment to be brought/installed/erected at site required to complete the Works in the specified Time Schedule.

Authorized Signature and official Seal: _____

Name: _____

Date: _____

LIST OF MAJOR EQUIPMENT

(Owned, Purchased or Leased)

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

Authorized Signature and official Seal: _____

Name: _____

Date: _____

LIST OF MAJOR EQUIPMENT
Equipment details

Item of equipment		
Equipment information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current status	Current location	
	Details of current commitments	
Source	Indicate source of the equipment ☐ Owned ☐ Rented ☐ Leased ☐ Specially manufactured	
The following information shall not be applicable for equipment owned by the Bidder		
Owner	Name of owner	
	Address of owner	
	Telephone	Contact name and title
	Fax	Telex
Agreements	Details of rental / lease / manufacture agreements specific to the project	

[This Table shall be used for each item of Equipment separately]

Authorized Signature and official Seal: _____

Name: _____

Date: _____

ORGANIZATIONAL CHART
FOR THE
SUPERVISORY STAFF AND LABOUR

MINIMUM MANDATORY STAFF REQUIREMENT:

The Contractor shall arrange the following staff at site immediately upon commencement of works:

Designation	Nos.	Minimum Qualification	Min. Work Experience
Project Manager / Construction Manager	01	B.Sc. Civil Engineer with valid Pakistan Engineering Council Registration	12 years
Associate Engineer	01	DAE (Civil)	08 years
Associate Engineer	01	DAE (E/M)	08 years
Quantity Surveyor	01	DAE (Civil)	08 years
Surveyor	01	Survey Certificate	08 years

Authorized Signature and official Seal: _____

Name: _____

Date: _____

LIST OF SUBCONTRACTORS

(to be filled and signed by the Bidder)

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

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

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

Authorized Signature and official Seal: _____

Name: _____

Date: _____

ESTIMATED PROGRESS PAYMENTS

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

Months	% of Bided Price
(a)	(b)
1st quarter	
2nd quarter	
3rd quarter	
4th quarter	
5th quarter	
6th quarter till completion of project	
Total	100 %

CONSTRUCTION CAMP AND HOUSING FACILITIES

(to be filled and signed by the Bidder)

The Bidder in accordance with Clause 6 of the Conditions of Contract shall provide a description of his construction camp's facilities and staff housing requirements.

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

1. Site Preparation (clearing, land preparation, etc.).
2. Provision of Services.
   - *a)* Electrical power (expected power load, etc.).
   - *b)* Water (required amount and system proposed).
   - *c)* Sanitation (sewage disposal system, etc.)
3. Construction of Facilities
   - *a)* Contractor's Office. Workshop and Work Areas (areas required and proposed layout, type of construction of buildings, etc.).
   - *b)* Warehouses and Storage Areas (area required, type of construction and layout).
   - *c)* Housing and Staff Facilities (Plans for housing for proposed staff, layout, type of construction,etc.).
4. Construction Equipment Assembly and Preparation (detailed plans for carrying out this activity).
5. Other Items Proposed (Security services, etc.)

Note:

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

Authorized Signature and official Seal: _____

Name: _____

Date: _____

INTEGRITY PACT

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

Contract No._____ Dated _____
Contract Value: _____
Contract Title: _____

…… [Name of Bidder/Contractor] 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 (GoP) or any administrative subdivision or agency thereof or any other entity owned or controlled by GoP through any corrupt business practice.

Without limiting the generality of the foregoing, [Name of Bidder/ Contractor] represents and warrants that it has fully declared the brokerage, commission, fees etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultation feeor 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 Bidder/Contractor] 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, representation or warranty.

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

EVALUATION CRITERIA

Qualification of Bidders shall be evaluated on the basis of mentioned criteria with **50% score** in each category regarding the Bidder's experience record, personnel capabilities, equipment capabilities and financial soundness in addition to fulfillment of mandatory requirements.

The Employer reserves the right to waive minor deviations, if they do not materially affect the capability of the Bidder to perform the Contract.

A. Mandatory Requirements:

i. Valid registration with PEC in C-2 or above, having CE-01, CE-09, CE-10 & EE-04 as codes of specialization.
ii. An affidavit to the effect of not being debarred / blacklisted by any organization / department, prepared within the current month of submission of Bids duly attested by 1st class Magistrate.
iii. Information on any litigation or arbitration resulting from contracts completed or under execution by the Bidder. In case, the firm has never been involved in litigation, an affidavit to such effect should be provided duly attested by 1st class Magistrate.
iv. Registration with income tax department (Valid NTN).
v. Registration with Sales Tax Department (GST/PST).
vi. On Active Tax Payer's List at the time of submission of Bid.

B. Detailed Requirements:

The detailed qualification evaluation shall be carried out on the basis of the criteria for the different categories and minimum passing marks prescribed hereunder:

Sr. No.	Category	Weightage / Marks	Passing Marks (70%)
1.	Experience Record	40	20
2.	Personnel Capabilities	15	7.5
3.	Equipment Capabilities	15	7.5
4.	Financial Soundness:	30	15
	Total	**100**	**50**

B.1. Experience:

Points for experience will be given on the basis of the following criteria:

Sr. No.	Sub-Category	Maximum Marks	Marks Allocation
a)	Experience as constructor in execution of Building Works Projects completed during last ten (10) years.	24	• 12 marks will be awarded for each completed project having project cost ≥ Rs. 200M up to maximum of 24 marks. • 08 marks will be awarded for each completed project having project cost from Rs. 180M to Rs. 199.99M up to maximum of 24 marks. • 06 marks will be awarded for each completed project having project cost from Rs. 160M to 179.99M up to maximum of 24 marks. • No marks will be awarded for project having project cost < Rs. 160M.

Sr. No.	Sub-Category	Maximum Marks	Marks Allocation
b)	Experience as constructor for ongoing/in-hand Building Works Projects.	16	• 08 marks will be awarded for each in-hand project having project cost ≥ Rs. 200M up to maximum of 16 marks. • 06 marks will be awarded for each in-hand project having project cost from Rs. 180M to Rs. 199.99M up to maximum of 16 marks. • 04 marks will be awarded for each in-hand project having project cost from Rs. 160M to Rs. 179.99M up to maximum of 16 marks. • No marks will be awarded for project having project cost < Rs. 160M.
	Total Marks Allocated	**40**	

Note:

i. The applicants must provide "Letter of Award" of in- hand projects and Taking Over/Completion Certificate of completed projects. No marks will be given to the projects for which above letter/certificate is not provided.

ii. Applicant shall provide complete information of the projects including scope of Constructor and cost of works etc.

iii. Proportionate marks on the basis of share in JV agreement will be awarded for projects executed / in-hand as Joint Venture (JV).

B.2. Personnel Capabilities:

Designation	Maximum Marks	Marks Allocation
Project Manager / Construction Manager (B.Sc. Civil Engineer registered with Pakistan Engineering Council)	4	• 4 marks will be awarded for B.Sc. Civil Engineer having at least 10 years relevant experience.
Associate Engineer B-Tech / DAE Civil	3	• 3 marks will be awarded for Associate Engineer having B-Tech / DAE Civil and at least 08 years relevant experience.
Associate Engineer B-Tech / DAE (E/M)	3	• 3 marks will be awarded for Associate Engineer having B-Tech / DAE (E/M) and at least 08 years relevant experience.
Quantity Surveyor B-Tech / DAE Civil	3	• 3 marks will be awarded for Quantity Surveyor having B-Tech / DAE Civil and at least 08 years relevant experience.

Designation	Maximum Marks	Marks Allocation
Surveyor Survey Certificate	2	• 2 marks will be awarded for each Surveyor having certificate and at least 08 years relevant experience .
Total Marks	**15**	

Note:

i. The applicant must provide verifiable proof of employment (i.e. appointment letters, latest salary slips) of the staff and attach detailed CVs & valid PEC Registration Certificates / Diploma / Certificates of the Engineer, DAEs staff.

B.3. Equipment Capabilities

Sr. No	Equipment	Minimum Required	Maximum Marks
1.	Concrete Mixer Machine	2 Nos.	2
2.	Excavator	1 No.	2
3.	Dewatering Pump (3HP)	1 No.	1
4.	Hoist	1 No.	2
5.	Scaffolding	15,000 Rft	1.5
6.	Shuttering	12,000 Sft	1.5
7.	Tractor Trolley	2 Nos.	1
8.	Steel Cutting / Bending Machine	1 No.	1.5
9.	Generator Set (100 KVA)	1 No.	1.5
10.	Total Station	1 No.	1
	Total Marks Allocated		**15**

Note:

i. Proportionate marks will be awarded if minimum number of corresponding equipment is less than minimum required.

ii. Applicant must provide an undertaking to the effect that the aforementioned equipment is available with the firm and will be made available, as and when required, for the Project.

B.4. Financial Capabilities

The Bidder shall submit copies of annual audit reports for the last three years duly certified by the Chartered Accounts, Bank Line of credit and must indicate the soundness of the Applicants financial position.

The minimum annual turnover during any of the last three (03) years shall be as under:

Annual Turn Over	Marks
i. Rs. 250 million to Rs. 300 million	7.5
ii. Above Rs. 300 million	15
Maximum Marks Allocated	**15**

The minimum amount of liquid assets(current year), and Bank Line of Credit (specific in the name of this project), net of other construction commitments shall be as under:

Liquid Assets / Bank Line of Credit	Marks
i. Rs. 20 million to Rs. 40 million	7.5
ii. Above Rs. 40 million	15
Maximum Marks Allocated	**15**

Authorized Signature and official Seal: _____

Name: _____

Date: _____

LIST OF RECOMMENDED MANUFACTURERS
(to be signed by the Bidder)

CIVIL, ELECTRICAL & PLUMBING WORKS

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

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

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

Onus lies with the Contractor for establishing the genuineness of any material/product for its make and origin.

S.No.	Item	Manufacturer
(A)	**CIVIL WORKS**	
1	TERMITE PROOFING	i BIFLEX ii TERMCURE iii TERMIDOR iv AGENDA
2	CEMENT	i FAUJI ii ASKARI iii KOHAT iv BESTWAY
3	STEEL	i FAZAL STEEL ii ITTEHAD STEEL iii FF STEEL
4	CONSTRUCTION CHEMICALS / SEALANT	i SIKA PAKISTAN ii BASF iii CORMIX
5	ANCHORS FOR CONCRETE (CHEMICAL AND MECHANICAL)	i HILTI ii SPIT iii SIKA iv FISCHER
6	ALUMINIUM SECTIONS	i ALUMEX ii PRIME ALUMINIUM iii CHAWLA ALUMINIUM iv AL-FATEH v ALCOP

S.No.	Item	Manufacturer
7	ALUMINIUM COMPOSITE PANELS	i ALUCOBOND ii ALUBOND iii CHAWLA ALUMINIUM
8	PAINTS, LACQUER AND VARNISHES & COATINGS	i BERGER ii ICI iii JOTUN iv ROCK SHEILD
9	FROSTED/ SAFETY FILM	i 3M ii LLUMAR
10	PORCELAIN TILE (Local)	i SHABBIR TILES ii MASTER iii S. ABDULLAH
11	PORCELAIN TILE (Imported)	i RAK ii NIRO - CRETESOL iii WHITE HORSE iv KALE v BENITOZ
12	LAMINATED WOODEN TILES	i MARFLEX ii INTERWOOD iii AL-NOOR iv ZRK
13	PVC & ANTI-STATIC TILES	i MARFLEX ii DECORA iii ATS SYNTHETIC
14	CONCRETE TILES, PAVERS, KERB STONES, CONCRETE BLOCKS, TERRAZO TILES	i CONCRETE CONCEPTS ii IZHAR iii ENVICRETE
15	FALSE CEILING (MINERAL FIBER & ALUMINIUM	i OWA ii OWA
16	FALSE CEILING (GYPSUM BOARD)	i ELEPHANT ii UNITED
17	MARBLE / GRANITE	i PIONEER MARBLE ii UHAD MARBLE iii CAPITAL MARBLE iv HAQEEQ MARBLE v NASEEM MARBLE vi HAJWERI MARBLE

S.No.	Item	Manufacturer
18	CARPET FLOOR / TILE	i IBTERFACE ii WOODEN CARPETS iii MANNINGTON COMMERCIAL iv CARPET INTER
19	PLYWOOD	i ZRK ii FORMITE (BALUCHISTAN LAMINATE) iii BALUCHISTAN PLY
20	DOOR LOCK	i GULLI ii PROTEK DEVICES iii MALIS iv SALIM HARDWARE v BOSSATI
21	CERAMIC TILES	i MASTER ii SHABBIR iii CRETESOL
22	GLASS (LOCAL)	i TARIQ GLASS ii GUNJ GLASS iii AL-FATEH
23	GLASS (IMPORTED)	i AGC ii SAINT GOBAIN iii GUARDIAN iv PILKINGTON
24	POLYESTERENE & POLYURETHENE	i DIAMOND JUMBOLON ii THERMO FOAM iii MASTER
25	HARDWARE	i YALE ii KRB iii MANDELLI (SMC) iv AL-ASIF
26	LAMINATIONS / VENEERS / FORMICA	i FOMITE ii AL-NOOR iii SUNLIGHT iv ZRK
27	PVC & WPC Doors/ Windows	i LAKHANI ii FRAMEZ iii SKYPEN iv BURAQ
(B)	**ELECTRICAL WORKS**	
1	DISTRIBUTION BOARDS AND MAIN AND SUB MAIN PANEL BOARDS AND SUB MAIN PANEL BOARDS	i JEI ii ERCON iiI PEL iv BILAL SWITCH GEAR v LINE MAN

S.No.	Item	Manufacturer
2	CABLES AND WIRES	i PAKISTAN CABLES ii NEWAGE CABLES iii GM CABLES
3	MCCBS AND MCBS ELCBS	i SCHNEIDER ii ABB iii TERASAIKI
4	Wiring accessories (SWITCHES, SOCKETS)	i SCHNEIDER ii LEGRAND iv PHILIPS iv PAKISTAN CABLES (Switches and sockets)
5	LIGHT FIXTURES	i PHILIPS(SIGNIFY) ii FUTURE TECHNOLOGY iii SUNLIGHT iv BRITLIGHT iv PIER LIGHT
6	DATA NETWORKING SYSTEM (PASSIVE COMPONENTS)	i 3M (Corning) ii SCHNEIDER iii NORDEN
7	DATA NETWORKING SYSTEM (ACTIVE COMPONENTS)	i CISCO ii H3C iii HUAWEI
8	PVC CONDUITS, PIPES, DUCTS & ACCESSORIES	i SHAVYL ii DADEX iii ADAMJEE DURABUILT iv BETA
9	LIGHTNING PROTECTION	i LOCAL BRAND BEST QUALITY AS APPROVED BY THE ENGINEER
10	LOW VOLTAGE DG SET	i ALLIED ENGINEERING(CATERPILAR) ii S.M.JAFFER (FG WILSON) iii ORIENT ENERGY(CUMINS POWER GENERATION)

S.No.	Item	Manufacturer
11	CABLE TRAY	i JEI ii ERCON iii PEL iv Bilal Switch Gear v LINE MAN
12	FANS	i LAHORE FANS ii SK FANS iii PAK FANS
13	FIRE ALARM SYSTEM	i HONEY WELL ii COOPER-MENVIER iii BOSCH
14	UPS	i APC BY SCHNEIDER ii ABB
15	WALK THROUH GATES	i CIEA ii GARRET
16	CCTV	i WISNET ii PELCO iii BOSCH
17	PUBLIC ADDRESS SYSTEM	i BOSCH ii TOA
18	ACCESS CONTROL SYSTEM	i VIRDI ii HONEY WELL
19	MAGNETIC DOOR LOCK	i SOCA ii CEASE FIRE ITALIA
20	ELECTRIC VEHICLE CHARGER	i ABB ii SCHNEIDER
21	TRANSFORMER	i PEL

S.No.	Item	Manufacturer
(C)	**PLUMBING WORKS**	
1	SANITARY FIXTURES	i. M/S PORTA ii. M/S MARACHI (or approved equivalent)
2	SANITARY FITTINGS/ACCESSORIES (GENERAL TOILETS)	i. M/S PORTA ii. M/S ZILVER (or approved equivalent)
3	SANITARY FITTINGS/ACCESSORIES (PRIVATE TOILETS)	i. M/S GROHEE ii. M/S ROCA (or approved equivalent)
4	GRAB BARS	i. M/S PORTA ii. M/S ROCA (or approved equivalent)
5	KITCHEN SINKS	i. M/S RASHAD ii. M/S ATLAS (or approved equivalent)
6	ELECTRIC WATER HEATERS	M/S ARISTON (ITALY) i. (or approved equivalent)
7	ELECTRIC HAND DRIER	M/S SIEMENS i. (or approved equivalent)
8	DRINKING WATER DISPENSER	i. M/S ORIENT ii. M/S HAIER (or approved equivalent)
9	WATER FILTRATION PLANT	i. M/S SO-SAFE ii. M/S N-VIROPAK (or approved equivalent)
10	MS/ GI PIPES	i. M/S INTERNATIONAL INDUSTRIES LTD. ii. M/S BASHIR PIPE INDUSTRIES PVT. LTD. iii. M/S JAMAL PIPE INDUSTRIES PVT. LTD.
11	G.I.PIPE FITTINGS	i. M/S HE CHINA ii. M/S TG CHINA
12	PPR PIPES & FITTINGS	i. M/S DADEX (POLYDEX) ii. M/S VODA PIPE iii. M/S IIL KARACHI (or approved equivalent)
13	BRONZE/BRASS VALVES	i. M/S KITZ ii. M/S HONEYWELL or approved equivalent

S.No.	Item	Manufacturer
14	FIRE EQUIPMENT/ACCESSORIES	i. M/S SFFECO ii. M/S NAFFCO or approved equivalent
15	UPVC PIPES AND FITTINGS	i. M/S DADEX (NIKASI) ii. M/S VODA PIPE or approved equivalent
16	PUMPING MACHINERY	i. M/S GRUNDFOS. ii. M/S KSB. or approved equivalent
17	CAST IRON MANHOLE COVERS TRAPS ETC	i. M/S JAWS. ii. M/S ALPINE (ATIF GLOBAL). or approved equivalent
18	ELECTRIC+ GAS TWIN GEYSERS	i. M/S CORONA. ii. M/S NASGAS. or approved equivalent
19	HANGERS & SUPPORTS	i. M/S FISCHER. ii. M/S HILTI. iii. M/S SIKLA
(D)	**INFRASTRUCTURE WORKS (EXTERNAL WATER SUPPLY)**	
1	MS / G.I PIPES	i. IIL ii. Jamal Pipes iii. Bashir Pipes
2	Gate Valves and Sluice Valves	i. Kitz ii. SCON (Pakistan) iii. JAWS
3	Upvc Pipes and Fittings	i. Dadex (Polydex) Beta ii. Plasco iii. Beta iv. Hitech v. Jamal
4	Pumps for Water Supply	i. KSB (Europe/Pakistan)
5	High Density Polyethylene (HDPE) Pipes	i. Dadex ii. Plasco iii. IIL iv. HITECH v. BETA vi. Jamal
6	Fittings in Polyethylene (PE)	i. As recommended by the manufacturer.
7	CI Pipes and Fittings	i. Tepu Pipes ii. Master Key Engineering Works

Authorized Signature & Official Seal: _____

Name: _____

Date: _____

FORMS

- **BID SECURITY**
- **PERFORMANCE SECURITY**
- **LETTER OF ACCEPTANCE**
- **CONTRACT AGREEMENT**
- **DAB AGREEMENT**
- **MOBILIZATION ADVANCE GUARANTEE**

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FORM OF BID SECURITY

Security Executed on _____
(Date)

Expiry on _____
(Date)

Name of Surety with Address: _____

_____

Name of Principal (Bidder) with Address _____

_____

Penal Sum of Security PKR_____(Pak Rupees _____
_____)

Bid Reference No. _____

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

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Bidder has submitted the accompanying Bid dated_____for _____
_____(*Particulars of Bid*) to the said Employer; and

(1) WHEREAS, the Employer has required as a condition for considering said Bid that the Bidder furnishes a Bid Security in the above said sum to the Employer, conditioned as under: that the Bid Security shall remain in force for a period fourteen (14) days beyond the Bid Validity date i.e., upto_____.

(2) that the Bid Securities of the Bidders except the lowest three will be returned by the Employer within twenty eight (28) days from the opening of Bids, provided a Bidder request for the return of its Bid Security, or on the expiry of original validity of Bid Security or as extended, whichever is earlier;

(3) that the Bid Security of the lowest three Bidders comprising the successful Bidder will be returned when the successful Bidder has furnished the required Performance Security; and

(4) that in the event of failure of the successful Bidder to furnish the required Performance Security, the entire said sum be paid immediately to the said Employer pursuant to IB.16 and IB.35 of the Instructions to Bidders for the successful Bidder's failure to perform.

NOW THEREFORE, if the successful Bidder shall, within the period specified therefor, on the prescribed form presented to him for signature enter into a formal Contract with the said Employer in accordance with his Bid as accepted and furnish within twenty-one (21) days of his being requested to do so, a Performance Security with good and sufficient surety, as may be required, upon the form prescribed by the said Employer for the faithful performance and proper fulfilment of the said Contract or in the event of non-withdrawal of the said Bid within the time specified for its validity then this obligation shall be void and of no effect, but otherwise toremain in full force and effect.

PROVIDED THAT the Surety shall forthwith pay the Employer the said sum upon first written demand of the Employer (without cavil or argument) and without requiring the Employer to prove or to show grounds or reasons for such demand, notice of which shall be sent by the Employer by registered post duly addressed to the Surety at its address given above.

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

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

SURETY
(Schedule Bank)

WITNESS:

Signature _____

1. _____

Name _____

_____

Title _____

Corporate Secretary (Seal)

Corporate Guarantor (Seal)

2. _____

_____
Name, Title & Address

FORM OF PERFORMANCE SECURITY

Guarantee No._____
Executed on _____
Expiry date _____

[Letter by the Guarantor to the Employer]

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 _____ (hereinafter called the Employer) in the penal sum of the amount stated above for the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

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

_____ (*Name of Contract*) for the _____

_____ (*Name of Project*).

NOW THEREFORE, if the Principal (Contractor) shall well and truly perform and 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 sealon the date indicated above, the name and corporate seal of the Guarantor being hereto affixed andthese presents duly signed by its undersigned representative, pursuant to authority of its governingbody.

.

Guarantor
(Schedule Bank/ Insurance Company)

WITNESS:

Signature _____

1. _____

Name _____

_____
Corporate Secretary (Seal)

Title _____
Corporate Guarantor (Seal)

2. _____

_____
Name, Title & Address

Letter of Acceptance

[Letterhead paper of the Employer]

NAME OF CONTRACT:_____ CONTRACT

NUMBER:_____

TO :_____

Date:_____

Your Reference:_____

Our Reference:_____

We thank you for your Bid dated _____ for the execution and completion of the Works comprising the above-named Contract and remedying of defects therein, all in conformity with the terms and conditions contained in the Contract.

We have pleasure in accepting your Bid for the Accepted Contract Amount of:

_____
[currency and amount in figures]

_____
[currency and amount in words]

In consideration of you properly and truly performing the Contract, we agree to pay you the Accepted Contract Amount or such other sums to which you may become entitled under the terms of the Contract, at such times and as prescribed by the Contract.

We acknowledge that this Letter of Acceptance creates a binding Contract between us, and we undertake to fulfil all our obligations and duties in accordance with the terms of this Contract.

Signature:_____

Signed by: _____

For and on behalf of:_____

Date:_____

FORM OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT (hereinafter called the "Agreement") made on the _____ day of _____ (month) 20____ between _____ _____(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.,_____ _____ 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 construedas 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 - Special Provisions;
   f) The General Conditions;
   g) The Specifications Part A - Specific Provisions;
   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 along with 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 sumas 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 Contactor	Signature of Employer
(Seal)	(Seal)

Signed, Sealed and Delivered in the presence of:

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

DAB AGREEMENT

[for a one-person DAB]

Name and details of Contract _____
Name and address of Employer _____
Name and address of Contractor _____
Name and address of Member _____

Whereas the Employer and the Contractor have entered into the Contract and desire jointly to appoint the Member to act as sole adjudicator who is also called the "DAB" to adjudicate a dispute which has arisen in relation to _____*

The Employer, Contractor and Member jointly agree as follows:

1. The conditions of this Dispute Adjudication Agreement comprise the "General Conditions of Dispute Adjudication Agreement", which is appended to the General Conditions of the "Conditions of Contract for Plant and Design-Build" First Edition 1999 published by the Fédération Internationale des Ingénieurs-Conseils (FIDIC), and the following provisions. In these provisions, which include amendments and additions to the General Conditions of Dispute Adjudication Agreement, words and expressions shall have the same meanings as are assigned to them in the General Conditions of Dispute Adjudication Agreement.

2. [*Details of amendments to the General Conditions of Dispute Adjudication Agreement, if any.]*

3. In accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement, the Member shall be paid a daily fee of _____ per day.

4. In consideration of these fees and other payments to be made by the Employer and the Contractor in accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement, the Member undertakes to act as the DAB (as adjudicator) in accordance with this Dispute Adjudication Agreement.

5. The Employer and the Contractor jointly and severally undertake to pay the Member, in consideration of the carrying out of these services, in accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement.

6. This Dispute Adjudication Agreement shall be governed by the law of _____

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

*[*A brief description or name of dispute to be added.]*

[for each member of a three-person DAB]

Name and details of Contract _____
Name and address of Employer _____
Name and address of Contractor _____
Name and address of Member _____

Whereas the Employer and the Contractor have entered into the Contract and desire jointly to appoint the Member to act as one of the three persons who are jointly called the "DAB" [*and desire the Member to act as chairman of the DAB*] to adjudicate a dispute which has arisen in relation to _____*

The Employer, Contractor and Member jointly agree as follows:

1. The conditions of this Dispute Adjudication Agreement comprise the "General Conditions of Dispute Adjudication Agreement", which is appended to the General Conditions of the "Conditions of Contract for Plant and Design-Build" First Edition 1999 published by the Fédération Internationale des Ingénieurs-Conseils (FIDIC), and the following provisions. In these provisions, which include amendments and additions to the General Conditions of Dispute Adjudication Agreement, words and expressions shall have the same meanings as are assigned to them in the General Conditions of Dispute Adjudication Agreement.

2. [*Details of amendments to the General Conditions of Dispute Adjudication Agreement, if any]*

3. In accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement, the Member shall be paid a daily fee of _____ per day.

4. In consideration of these fees and other payments to be made by the Employer and the Contractor in accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement, the Member undertakes to serve, as described in this Dispute Adjudication Agreement, as one of the three persons who are jointly to act as the DAB.

5. The Employer and the Contractor jointly and severally undertake to pay the Member, in consideration of the carrying out of these services, in accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement.

6. This Dispute Adjudication Agreement shall be governed by the law of _____

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

*[*A brief description or name of dispute to be added.]*

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 the Employer agreeing to make the above advance to the Contractor, has agreed to furnish the said Guarantee.

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

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

This Guarantee shall remain in force until the advance is fully adjusted against payments from the Interim Payment Certificates of the Contractor or until_____whichever is earlier.
(Date)

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

This Guarantee shall remain valid up to the aforesaid date and shall be null and void after the aforesaid date or earlier if the advance made to the Contractor is fully adjusted against payments from Interim Payment Certificates of the Contractor provided that the Guarantor

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

Guarantor
(*Scheduled Bank/ Insurance Company*)

WITNESS:

Signature _____

1. _____

Name _____

_____

Title _____

Corporate Secretary (Seal)

Corporate Guarantor (Seal)

2. _____

_____
Name, Title & Address

GENERAL CONDITIONS

CONDITIONS OF CONTRACT

The Conditions of Contract comprise two parts:

(a) General Conditions
(b) Particular Conditions

General Conditions

These Conditions are the “General Conditions” which form part of the “FIDIC Conditions of Contractfor Construction for Building and Engineering Works Designed by the Employer Second Edition (2017 Red book, Reprinted 2022 with amendments)” published by:

International Federation of Consulting Engineers
(Fédération Internationale des Ingénieurs – Conseils) – (FIDIC)
World Trade Center II - Geneva Airport
P. O. Box 311
CH-1215 Geneva 15
Switzerland
Email: fidic@fidic.org, fidic.pub@fidic.org
Website: https://fidic.org/bookshop

The successful Bidder after award of Works shall have to provide two (02) copies of above said “General Conditions” for incorporation in the Contract.

PARTICULAR CONDITIONS OF CONTRACT

PART-A: CONTRACT DATA
PART-B: SPECIAL PROVISIONS

Particular Conditions

The Particular Conditions (PC) complement the General Conditions (GC) to specify dates, contractual requirements, and special circumstances related to the Works. The PC 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	Data to be Given	Data
1.1.27	Defects Notification Period (DNP):	365 days
1.1.31	Employer's name and address:	**Secretary** Gun & Country Club, Islamabad
1.1.35	Engineer's name and address:	National Engineering Services Pakistan (Pvt.) Limited (NESPAK) NESPAK House, G-5/2, Islamabad Ph: 051-9221910-13 Fax: 051-9221914
1.1.73	Sections:	None
1.1.84	Time for Completion:	546 days for whole of the Works
1.3(a)(ii)	agreed methods of electronic transmission:	Not Used
1.3(d)	address of Employer for communications:	**Manager Administration** Gun & Country Club, Islamabad
	address of Engineer for communications:	NESPAK House, G-5/2 Islamabad Ph: 051-9221910-13 Fax: 051-9221914
	address of Contractor for communications:	**To be inserted at the time of signing of the Contract**
1.4	Contract shall be governed by the law of:	Islamic Republic of Pakistan

Sub-Clause	Data to be Given	Data
	ruling language:	English
	language for communications:	English
1.8	number of additional paper copies of Contractor's Documents:	Six (06)
2.1	after receiving the Letter of Acceptance, the Contractor shall be given right of access to all or part of the Site within:	Within 14 days of Signing of Contract Agreement.
2.4	Employer's financial arrangements	The Employer has sufficient funds of its own to cover the Cost of the entire Project.
3.2 (e)(ii)	Engineer's Duties and Authority	Nil
4.2	Performance Security (as percentage of the Accepted Contract Amount in Currencies) percent: currency:	 Ten percent (10%) Pakistani Rupees (PKR)
4.2.1	List of Insurance Companies	Any insurance company having at least AA rating from PACRA/VIS and acceptable to the Employer.
4.7.2	period for notification of errors in the items of reference	Twenty-eight (28) days
4.19	period of payment for temporary utilities	N.A
4.20	number of additional paper copies of progress reports	Three (03)
5.1(a)	maximum allowable accumulated value of work subcontracted (as a percentage of the Accepted Contract Amount)	Twenty five percent (25%)

Sub-Clause	Data to be Given	Data
5.1(b)	parts of the Works for which subcontracting is not permitted	None
6.5	Normal working hours on the Site	Eight (08) hours
8.3	number of additional paper copies of programmes	Three (03)
8.8 & 14.15(b)	Delay Damages payable for each day of delay	0.073% of the Accepted Contract Amount for delay in completion of whole of the Works
8.8	maximum amount of Delay Damages	Ten percent (10%) of the Accepted Contract Amount
8.14	Applicability of Incentives for Early Completion	Not Applicable
12.3	Percentage profit	Ten percent (10%)
13.4.(b) (ii)	percentage rate to be applied to Provisional Sums for overhead charges, profit & taxes	Twenty five percent (25%)
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
14.2.1	List of Insurance Companies	Not Applicable
14.2.3	percentage deductions for the repayment of the Advance Payment	Deduction shall be made at the amortization rate of 20% of the value of the Works executed of each IPC as provided in paragraph (i) of Sub-Clause GCC 14.3, starting from 1st IPC against work done 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 20% in the last instalment to ensure full repayment.
14.3	period of payment	one month

Sub-Clause	Data to be Given	Data
14.3(b)	number of additional paper copies of Statements	Four (04)
14.3 (iii)	percentage of retention	Seven percent (7%)
14.3 (iii)	limit of Retention Money (as a percentage of the Contract Price)	Five percent (5%)
14.5(b) (i)	Plant and Materials for payment when shipped	Not Applicable
14.5(c)(i)	Plant and Materials for payment when delivered to the Site	Not Applicable
14.6.2	minimum amount of Interim Payment Certificate (IPC)	Rupees Ten Million (Rs. 10 million)
14.7(a)	period of payment of Advance Payment to the Contractor	14 days
14.7b(i)	period for the Employer to make interim payments to the Contractor under Sub-Clause 14.6 [*Interim Payment*]	14 days
14.7b(ii)	period for the Employer to make interim payments to the Contractor under Sub-Clause 14.13 [*Final Payment*]	28 days
14.7(c)	period for the Employer to make final payment to the Contractor	56 days
14.8	financing charges for delayed payment	Nil
14.11.1 (b)	number of additional paper copies of draft Final Statements	Four (04)
14.15	currencies of payment of Contract Price	Pakistani Rupees (PKR)
14.15(a)(i)	Proportions or amounts of Local and Foreign currencies	Local Currency: 100% Foreign Currency: Nil

Sub-Clause	Data to be Given	Data
14.15(c)	currencies and proportions for payment of Delay Damages	Currency: PKR. Proportion: 100%
14.15(f)	rates of exchange	Nil
17.2(d)	forces of nature, the risks of which are allocated to the Contractor	Nil
19.1	permitted deductible limits: i) insurance required for the Works ii) insurance required for Goods iii) insurance required for liability for breach of professional duty iv) insurance required against liability for fitness for purpose (if any is required) v) insurance required for injury to persons and damage to property vi) insurance required for injuryto employees vii) other insurances required by Laws and by local practice	 i) Ten percent (10%) of loss amount on each & every loss ii) Nil iii) Nil iv) Nil v) Nil vi) Nil vii) Nil
19.1	Periods for submission of insurance: a) evidence of insurance b) relevant policies	 Not later than the Commencement Date Within twenty-eight (28) days from the Commencement Date
19.2.1(b)	additional amount to be insured (as a percentage of the replacement value)	15% of the replacement value (Accepted Contract Amount)
19.2.2	extent of insurance required for Goods amount of insurance required for Goods	From Ex-Works (i.e., works, factory, warehouse, etc.) to delivery at the Site. Full replacement value
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	Data to be Given	Data
19.2.3(b)	insurance required against liability for fitness for purpose	Yes
19.2.3	period of insurance required for liability for breach of professional duty	Until the date of issuance of Performance Certificate
19.2.4	amount of insurance required forinjury to persons and damage to property	Injury to person and Fatal case:In accordance with Workmen Compensation Act Damage to Property: Rupees one million (Rs. 1,000,000) per occurrence with number of occurrences unlimited.
19.2.6	other insurances required by Laws and by local practice	All insurances as applicable, to theextent of execution of the project, under Federal and Provincial laws of Islamic Republic of Pakistan.
21.1	time for appointment of the DAB	As and when required (Ad-hoc DAB)
21.1	the DAB shall comprise	Sole Member
21.1	List of proposed DAB Members - proposed by Employer - proposed by Contractor	*[to be inserted at the time of signing of the Contract].* one sole member to be appointed with mutual consent of both parties
21.2	Appointing entity (official) for DAB members	Chairman Pakistan Engineering Council (PEC) from the list of PEC approved arbitrators published at its website
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: **Islamabad**

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PARTICULAR CONDITIONS

Part B - Special Provisions

1.1 Definitions

1.1.22 "DAAB or Dispute Avoidance / Adjudication Board"

Delete the text of 1.1.22 and replace with the following:

" "**Dispute Adjudication Board**" or "**DAB**" means the person so named in the Contract, or appointed under Clause 21"

1.1.23 "DAAB Agreement"

Delete the text of 1.1.23 and replace with the following:

"**DAB Agreement"** means the Agreement signed or deemed to have been signed by both parties and the sole member of the DAB in accordance with Sub-Clause 21.1. [*Constitution of DAB*] or Sub-Clause 21.2 [*Failure to Appoint DAB Member(s)*], incorporating by reference the General Conditions of DAB Agreement contained in the Appendix of these General Conditions with such amendments as are agreed.

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 - Specifications
- 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 completed Letters of Technical & Price Bid;
(d) the Particular Conditions Part A - Contract Data;
(e) the Particular Conditions Part B - Special Provisions;
(f) the General Conditions;
(g) the Specification Part A - Specific Provisions;
(h) the completed Schedules to Bid (except Schedule-B to Bid)
(i) Bill of Quantities (Appendix-D to Bid)
(j) Drawings
(k) The Specification Part B - Technical Provisions
(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

Delete the text and substitute with the following:

The Parties shall sign a Contract Agreement within 28 days after the Contractor receives the Letter of Acceptance. The costs of stamp duties and similar charges (if any) imposed by law in connection with entry into the Contract Agreement shall be borne by the Contractor. The Contractor shall prepare six (6) copies of the Contract Document (including all the volumes / documents listed in the Contract Agreement) along-with copies of all the bonds/Guarantees/Sureties, at his cost and shall submit the same to the Employer".

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) Any Change in the payment thereof under Clause 13.6 [*Adjustment for Changes in Law*].

(j) Extra payment as a result of Contractor's claims under Clause 20 [*Employer's and Contractor's Claim*].

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, issued in 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 Company listed in the Contract Data with minimum rating of AA by PACRA/VIS.

Following paragraph is added at the end of this Sub-Clause:

"The amount of Performance Security shall be reduced to 50% following issue of the Taking-Over Certificate for the whole of the Works under Clause 10 of Conditions of Contract."

The cost of complying with requirements of this Sub-Clause shall be borne by the Contractor.

4.3 Contractor's Representative

In second paragraph the 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 4th paragraph 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 6 copies 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 Shop Drawings

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

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 of this 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 summary 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):

"under Schedule 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 endeavors 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 non discrimination 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 shall be removed from the Site. If it becomes necessary to:

(i) remove any item of such Plant from the Site for the purposes of repair, the Contractor shall give a Notice, with reasons, to the Engineer requesting consent to remove the defective or damaged item off the Site. This Notice shall clearly identify the item of defective or damaged Plant, and shall give details of: the defect or damage to be repaired; the place to which defective or damaged item of Plant is to be taken for repair; the transportation to be used (and insurance cover for such transportation); the proposed inspections and testing off the Site; and the planned duration required before the repaired item of Plant shall be returned to the Site. The Contractor shall also provide any further details that the Employer may reasonably require; or

(ii) replace any item(s) of such Plant and/or Materials, the Contractor shall give a Notice, with reasons, to the Engineer clearly identifying the item(s) of Plant and/or Materials to be replaced, and giving details of the due date of delivery to the Site of the replacement item(s).

Where any item of Plant and/or Materials has become the property of the Employer under this Sub-Clause before it has been delivered to the Site, the Contractor shall ensure that such an item is not moved except for its delivery to the Site.

The Contractor shall indemnify and hold the Employer harmless against and from the consequences of any defect in title or encumbrance or charge (except any reasonable restriction arising from the intellectual property rights of the manufacturer or producer) on any item of Plant and/or Materials that has become the property of the Employer under this Sub-Clause."

The following Sub-Clause 7.9 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:

“within 14 days, 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

Not used.

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 heads namely; "Schedule of Prices Quantity", "Quantity Executed To-date", "Quantity Certified Previously" and "Net Quantity Executed under this Certificate".

12.3 Valuation of the Works

After sub-paragraph (c) delete the text of 5th paragraph "Each new rate…… …..relevant matters" and substitute with the following:

" the valuation will be carried out by the Engineer on the basis of similar items covered in the Bill of Quantities, insofar as such rates or prices apply and where such rates or prices do not directly apply, the value shall be based on the rates or prices deduced therefrom so far as it is practicable to do so. If the same is not provided in the Bill of Quantities, then the valuation will be carried out on the basis of actual with the application of current market rates for labour, material etc. No escalation on account of material, labour, POL etc. shall be allowed on such items if the valuation is carried out on the basis of current market rates and the percentage of overheads, taxes & profit, etc. to be allowed in such cases 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 DAB 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 DAB. The Contractor shall submit the DAB 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 paragraphs are 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*]."

14.2 Advance Payment

14.2.1 Advance Payment Guarantee

The entity issuing the Advance Payment Guarantee and its form shall be as under:

The Advance Payment Guarantee 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 Pakistan.

14.2.2 Advance Payment Certificate

Add the following at the end:

"The Engineer shall issue an Advance Payment Certificate for the advance payment in following two equal parts:

(i) first part within 14 days after signing of the Agreement or the date of receipt of Engineer's Notice to Commence, whichever is earlier; and

(ii) second part within 42 days from the date of payment of the first part, subject to the satisfaction of the Engineer as to the state of mobilization of the Contractor, bringing/installing/erecting of essential equipment and mobilization of minimum mandatory staff to complete the requirement for the entire work, having fulfilled his obligation under the Contract agreement for provision of facilities for the Engineer such as Site office, transport etc. and his own facilities such as contractor's camp, storage yards, etc. and having completed at least 2% of the permanent works (to be assessed by the Engineer during this time period."

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

Delete '.' At the end of last paragraph and add the words "or through crossed cheque in favour of the Contractor."

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."

15.2 Termination for Contractor' 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 made available to the Contractor in accordance with Sub-Clause 2.6 *[Employer-Supplied Materials and Employer's Equipment],* and"

15.4 Payment after Termination for Contractor's Default

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/or Employer'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/or Employer'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" are added 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 with min. rating of AA by PACRA/VIS.
21.1	**Constitution of the DAAB**	Delete the text of Sub-Clause 21.1 in its entirety and replace with the following: Disputes shall be adjudicated by a DAB in accordance with Sub-Clause 21.4 [*Obtaining DAAB's Decision*]. The Parties shall jointly appoint a DAB by the date 28 days after a Party gives notice to the other Party of its intention to refer a dispute to a DAB in accordance with Sub-Clause 21.4.

The DAB shall comprise, as stated in the Contract Data, of one suitably qualified person ("the member"). The members shall be selected from those on the list on PEC Website, other than anyone who is unable or unwilling to accept appointment to the DAB.

The agreement between the Parties and the sole member ("adjudicator") shall incorporate by reference the General Conditions of Dispute Adjudication Agreement contained in the Appendix to FIDIC Conditions of Contract for Plant Design-Build, First Edition 1999, with such amendments as are agreed between them.

The terms of the remuneration of the sole member shall be mutually agreed upon by the Parties when agreeing the terms of appointment. Each Party shall be responsible for paying one-half of this remuneration.

If at any time the Parties so agree, they may appoint a suitably qualified person to replace the member of the DAB. Unless the Parties agree otherwise, the appointment will come into effect if the member declines to act or is unable to act as a result of death, disability, resignation or termination of appointment. The replacement shall be appointed in the same manner as the replaced person was required to have been nominated or agreed upon, as described in this Sub-Clause.

The appointment of the member may be terminated by mutual agreement of both Parties, but not by the Employer or the Contractor acting alone. Unless otherwise agreed by both Parties, the appointment of the DAB (including the member) shall expire when the DAB has given its decision on the dispute referred to it under Sub- Clause 21.4 [*Obtaining DAAB's Decision*], unless other disputes have been referred to the DAB by that time under Sub-Clause 21.4, in which event the relevant date shall be when the DAB has also given decisions on those disputes.

21.3 Avoidance of Disputes

Delete the Sub-Clause 21.3 in its entirety.

21.4 Obtaining DAAB's Decision

In the 1st paragraph of Sub-Clause 21.4 after the words "if a dispute arises between the parties then, "add the following:

"after a DAB has been appointed";

Delete the words " (whether or not any informal discussions have been held under Sub-Clause 21.3 [*Avoidance of Disputes]*); .

.21.4.1 " Reference of a Dispute to the DAAB"

Delete Sub-Paragraph (a) of Sub-Clause 21.4.1.

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

The Contractor shall be liable to pay custom duty arising out of the Contract. The rates and prices as stated in the contract shall be deemed to cover all such duties.

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

GUN & COUNTRY CLUB, ISLAMABAD

CONSTRUCTION OF GUEST UNITS – BLOCK 1 - 14 AT GUN & COUNTRY CLUB, ISLAMABAD

TECHNICAL BID

BIDDING DOCUMENTS VOLUME – II

SPECIFIC PROVISIONS
TECHNICAL SPECIFICATIONS

MARCH, 2026

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD
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SPECIFICATIONS – SPECIFIC PROVISIONS

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THE SPECIFICATIONS PART A – SPECIFIC PROVISIONS

1. GENERAL

1.1 The Specifications Part A – Specific Provisions shall form an integral part of Bid and the Contract documents.

1.2 The Contractor shall notify all sub-contractors of the provisions of these Specific Provisions.

2. DESCRIPTION OF PROJECT, WORKS INVOLVED AND SITE

Gun & Country Club, Islamabad intends to construct Guest Units Block 1-14.

The scope of works mainly comprises construction of Guest Units and related ancillary works lying within the boundaries and limits shown on the Drawings and any such additional areas adjacent thereto as may be designated by the Engineer from time to time for the construction to be performed under the Contract, and all such areas and additional areas shall comprise the Site.

3. CODES, STANDARDS AND CERTIFICATES

A. Applicable Standards

Except as otherwise provided by these Specifications or the Drawings, all materials, equipment and fabrication and testing thereof shall conform to the latest applicable standards and codes referred in the Specifications.

If the Contractor, at any time and for any reason, wishes to deviate from the above standards or desires to use material or equipment not covered by the above standards, he shall state the exact nature of the changes, the reason for making the change and shall submit complete specifications of the materials and equipment to the Engineer for approval.

B. Standards other than those Specified

Where requirements for materials or equipment are specified by reference to a standard which has its origin in one country, it is not the intention to restrict the requirements solely to that standard and that country. Other standards, including standards of other countries, will be accepted provided the requirements thereof, in the sole opinion of the Engineer, are at least equal to the requirements of the standard specified. The Contractor may propose to the Engineer an equivalent standard other than that specified, in which case he shall submit the proposed standard and all other information required and shall submit written proof that his proposed standard is equivalent in all significant respects to the standard specified. All submissions must be made in the English language.

C. Codes and Standards at Site

The Contractor shall supply and have at his site office:-

a) Copies of all latest editions of codes and standards referred to in these Specifications or equivalent codes and standards as approved by the Engineer.

b) Catalogues and published recommendations from manufacturers supplying products and materials for the project.

c) The Contractor shall provide manufacturer's or supplier's materials which must meet the requirements of a specific code or standard as stated in these Specifications.

4. MANUFACTURER'S RECOMMENDATIONS

Installation of manufactured items shall be in accordance with procedures recommended by the manufacturer or as approved by the Engineer.

5. UNITS OF MEASUREMENTS

The FPS System of Units shall be used throughout the Project.

6. EXISTING CONDITION AT SITE

Drawings and information pertaining to existing project conditions are furnished for reference. Neither the Employer nor the Engineer warrants the adequacy or correctness of these. The Contractor's are encouraged to visit the project site to assess the existing site conditions.

7. PROTECTION AND PRECAUTIONS

The Contractor and his sub-contractors shall afford all necessary protection to existing structures and will be required to make good at his own expense any damage done to such structures through his own or his representatives or subcontractors' fault and negligence.

The Contractor and his sub-contractors shall afford all necessary protection to existing roads in the area . He will clear and make good at his own expense any damage to or debris on these roads through his own fault and negligence. He must at all time ensure the free and normal flow of traffic and shall not cause obstruction to the traffic system. The Contractor and his sub-contractors shall provide and maintain necessary protection an precautionary measures such as warning signs, warning lamps and barricades etc. to prevent accidents.

The Contractor shall promptly correct all such damage to original condition at no additional expense to the Employer.

The Contractor shall cooperate with trades performing work under other Contracts as necessary for completion.

8. SEQUENCE OF CONSTRUCTION

The Contractor shall submit his proposal for approval of the Engineer the sequence of Construction, prior to starting the works. The works shall be executed as per approved sequence of construction

9. LINES AND LEVELS

Survey control points will be established by the Engineer. The Contractor shall be responsible for verifying these and shall be responsible for all requirements necessary for the execution of any work to the locations, lines, and levels specified or shown on the drawings, subject to such modifications as the Engineer may require as work progresses.

10. PLANT, EQUIPMENT AND TOOLS

The Contractor shall provide at his cost modern plant, equipment and tools, adequate and befitting to the nature, magnitude and size of this Contract, in strict compliance with the requirements of the General Conditions of Contract, Conditions of Particular Applications and Technical Specifications.

11. PARTIAL POSSESSION

Whenever, as determined by the Employer any portion of work performed by the Contractor is in a condition suitable for use, the Employer may take possession of or use such portion.

Such use by the Employer shall in no instance be construed as constituting final acceptance, and shall neither relieve the Contractor of any of his responsibilities under the Contract, nor acts a waiver by the Employer of any of the conditions thereof, provided that the Contractor shall not be liable for the cost of repairs, re-work, or renewals which may be required due to ordinary wear and tear resulting from such use. However, if such use increase the cost or delays to the completion of remaining portions of work, the Contractor will be entitled to an equitable adjustment.

If, as a result of the Contractor's failure to comply with the provision of the Contract, such use proves to be unsatisfactory, the Employer will have the right to continue such use until such portion of the work can, without injury to the Employer, be taken out of service for correction of defects, errors, omissions, or replacement of unsatisfactory materials or equipment, as necessary for such work to comply with the Contract; provided that the period of such operation or use pending completion of appropriate remedial action shall not exceed twelve months unless otherwise mutually agreed upon in writing between the parties.

12. EXISTING SERVICES

The Contractor shall search for, find, locate and protect any wiring, cable, duct, pipework, etc., within or immediately adjoining the site area.

The Contractor shall take full responsibly for safety of existing service lines, utilities and utility structures uncovered or encountered during excavation and construction operations.

The Contractor shall take full responsibility for damaging any such service lines, utility/utility structure and any cost and/or expense that arises or issues from any such damage shall be borne directly by himself. Should any damage to any such service occur the Contractor shall forthwith take remedial action, initiate safety precautions, install temporary services and carryout repair all at his own cost and expense and inform the Engineer and notify all relevant authorities.

Existing utilities which are to remain in service for or after the works are to be determined by the Contractor. If any existing service lines, utilities and utility structures which are to remain in service are uncovered or encountered during these operations, they shall be safeguarded, protected from damage, and supported. The Contractor shall preserve, maintain and keep in perfect working conditions, any existing facilities required to be preserved by the Employer/the Engineer.

13. CONSTRUCTION AREA AND ACCESS

The Employer will provide the Contractor possible space within or nearby the area of site of works for the storage of plant, equipment and materials and for Contractor's temporary office, during the currency of the Contract. In case the adjacent area as required by the Contractor is not available within the Project boundary for storage of plant, equipment and machines then the Contractor shall arrange at his own expense possible space for storage of plant, equipment and machines at his own cost and expense. On no account shall such temporary installations conflict/interfere with any of the permanent installations, services and any operational function of Employer. The handling and storage of all plants, equipment and materials at site shall be the sole responsibility of the Contractor and at no risk and cost to the Employer.

The Contractor shall protect all material against corrosion, mechanical damage or deterioration during storage and erection on site. The protection methods shall be to the approval of the Engineer

14. CONSTRUCTION AND CHECKING AT SITE

The Contractor shall submit to the Engineer in due time for approval and discussion, his proposals and plans as to the method and procedure to be adopted for the temporary and permanent works involved.

The submitting to these suggestions and arrangements, and the approval thereof by the Engineer shall not relieve the Contractor of his responsibilities and duties under the Contract.

The carrying out of all work included in the Contract is to be supervised by a sufficient number of qualified representatives of the Contractor and full facilities and assistance are to be afforded by the Contractor for the Engineer or his Representative to check and examine the execution of the work.

The Engineer reserves the right to inspect all parts of the works but may at his discretion waive inspection on certain items. This shall in no way absolve the Contractor from his responsibilities. This particularly applies to the checking of materials, the accurate setting out of foundations, and to the leveling, setting and aligning of the various parts, and to the proper fitting and adjustment of manufactured and finished materials and fixtures in position.

If the Engineer or his Representative find that the work progress is slow in such a way that the works or parts thereof will not be completed in the time specified, then he shall order the Contractor to work overtime or in shifts and the Contractor shall comply. These arrangements will be free of all financial encumbrances and at no additional costs to the Employer.

In the event of night work, the Contractor shall provide sufficient and adequate lighting to the satisfaction of the Engineer or his Representative and shall supply the necessary manpower for satisfactory continuation of the work after normal hours.

15. STORAGE & HANDLING FACILITIES

The Contractor shall make his own arrangements for providing the necessary space for the storage of plant, equipment and materials and for Contractor's temporary office, in and around the site of works, during the currency of the Contract.

16. PRODUCT DATA

Manufacture’s standard schematic drawings shall be modified or deleted to indicate only information which is applicable to the project. Such standard information shall be supplemented to provide all additional applicable information.

Manufacturer's catalogue sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive literature shall be clearly marked to identify pertinent materials products or models. Dimensions and required clearances shall be indicated. Shop performance characteristics and capacities shall be noted.

17. PRODUCT QUALITY AND HANDLING

Suppliers of local and foreign products and installations specified shall have been regularly engaged in the business of manufacturing, fabricating, installing and / or servicing work required for a period not less than 5 years. In addition, the Engineer may request as appropriate a:

- list of similar installations that describes project, scope and date of completion.
- complete literature, performance data, and technical data.
- list of services record within Pakistan.
- location of service office from which this installation could be maintained.

For the actual fabrication, installation and testing of the specified work use only thoroughly trained and experienced workmen completely familiar with the items required and with the manufacturers recommended methods of installation. In acceptance or rejection, no allowance will be made for the lack of skill on the part of workmen.

Use all means necessary to protect materials before, during and after installation and to protect the installed work and materials of all other trades. In the event of damage,

immediately make all repairs and replacement necessary for approval and at no additional cost to the Employer.

18. INSPECTION & TESTS REPORTS

All equipment and materials furnished under these specifications and all work performed in connection therewith will be subject to rigid inspection by the Engineer or the Engineer's Representative. Acceptance of equipment and material or the waiving off inspection thereof shall in no way relieve the Contractor of his responsibility for meeting the requirements of the Contract.

The Contractor shall furnish the Engineer with certified true copies of test reports of all materials used in the manufacture and fabrication of all equipment and material including metal work, steel pipes, fire bricks etc. The result of these test shall be in such form as to show compliance with the applicable Specifications, standards and codes for the material used.

19. FIELD LABORATORY AND TESTING

19.1 General

The Contractor shall provide and maintain a field laboratory equipped with approved equipment to perform all the tests required by the Engineer. The quality control testing shall be performed by the Contractor's competent personnel in accordance with a site testing and quality control programme to be established by the Contractor and approved by the Engineer. The Engineer may however, require certain tests to be performed in any other laboratory designated by him.

The Contractor shall provide laboratory helpers to the Engineer for testing. The laboratory shall be run by a qualified material Engineer and Laboratory Technician to be employed by the Contractor.

The Field Laboratory, including all equipment and staff shall be placed at the disposal and direction of the Engineer during the Contract.

The Contractor shall keep a complete record of all quality tests performed on site.

All quality control and tests shall be carried out in accordance with applicable standards and codes.

19.2. Field Laboratory Equipment Requirements

The Laboratory shall be equipped with new unused and latest Equipment to perform tests as per Technical Specifications and General Conditions of Contract. Additional equipment/materials shall be supplied by the Contractor as and when required by the Engineer to perform any specified test, at no additional cost to the Employer.

The laboratory shall also be equipped with new unused furniture, fittings and fixtures. If any equipment, furniture, fitting or fixture becomes unserviceable for any reason what so ever, the Contractor shall promptly replace the same as and when directed by the Engineer.

19.3. Testing Laboratory Certificates

The Engineer may accept a certificate from a commercial testing laboratory, satisfactory to him, certifying that the product has been tested within a period acceptable to the Engineer and that it conforms to the requirements of these specifications.

19.4. Method of Payment

The cost of providing running and maintenance of the laboratory, equipment, materials and staff, testing charges for materials supplied by the Employer and all other tests to be performed in any other laboratory designated by the Engineer shall

be deemed to be included in the price quoted by the Contractor and no separate claim for payment on this account shall be entertained by the Engineer. Furthermore, the cost of any additional laboratory, field and shop tests required through the resubmission of samples because of failure of compliance with Specifications shall be borne by the Contractor.

In case the Contractor does not provide the specified equipment and testing facility, cost of testing plus 100 percent overheads shall be recovered from his bills.

20. SURVEYING INSTRUMENTS

20.1 General

The minimum quantity of survey equipment is stated below which shall be available with the Contractor at site of Works along with qualified Surveyors and Survey Helpers. The equipment shall be maintained throughout the Contract Period and replaced by the Contractor in case of damage or loss. The survey equipment shall be made available to the Engineer when requested. All surveying equipment shall be in good working condition.

20.2 Surveying Equipment Required

The Contractor shall provide and maintain the following surveying equipment at site.

a) Total Station with staff 01 No.
b) Automatic Levels with tripods & staff 01 No.
c) All other miscellaneous tools, equipment and materials required in surveying.

21. APPROVAL OF MATERIALS AND PLANT

21.1 Quality of Materials

All materials, fixtures, fittings, supplies and plant furnished under the Contract shall be new and unused, standard first grade quality and of the best workmanship and design. No inferior or low-grade materials, supplies or articles will be either approved or accepted, and all work of assembly and construction shall be done in a first-class and workmanlike manner. In asking for prices for materials intended for delivery to the Site and incorporation in the Works under any portion of these Specifications, the Contractor shall provide the manufacturer or supplier with complete information as may be necessary to secure compliance to this Clause and, in every case, he shall quote this Clause in full to each such manufacturer or supplier.

21.2 Submission of Samples and Data

21.2.1 The Contractor shall furnish for approval of the Engineer with reasonable promptness all samples as directed by the Engineer or specifically called for in the Specifications and in accordance with the time schedule provided in the schedule of submittals. The Engineer shall check and approve such samples with reasonable promptness only for conformance with the design concept of the Works and for compliance with the information given in the Contract Documents. All work shall be in accordance with approved samples.

21.2.2 Samples shall be furnished so as not to delay fabrication, allowing the Engineer reasonable time for consideration of the sample submitted.

21.2.3 Each sample shall be properly labeled with the name and quality of the material, manufacturer's name, name of the project, the Contractor's name and the date of submission, and the Specifications Article number to which the sample refers.

21.2.4 The manufacturer's installation directions shall be provided with each sample. The Contractor shall pay all transportation costs and deliver samples to the Engineer's office, Site or testing laboratory as directed by the Engineer.

21.2.5 Samples shall be of adequate size to permit proper evaluation of the material by the Engineer. Where variations in colour, texture, dimensions or other characteristics are to be expected, the Contractor shall submit samples showing the maximum range of variation. Materials exceeding the range of variation of the approved samples shall not be used on the Work.

21.2.6 In order to permit coordinated selection of colours and finishes, the Contractor shall deliver samples of all related items to the Engineer at one time. Samples of such materials will not be approved until all related samples have been submitted.

21.2.7 If both Shop Drawings and samples are required for the same item, the Engineer may require both to be submitted before approving either.

21.2.8 The Contractor shall erect Mock-up samples of finished items where specifically called for in the documents or as directed by the Engineer.

The Mock-up samples shall be preserved/protected by the Contractor till the end of the project or as directed by the Engineer.

21.2.9 No acceptance or approval of any Shop Drawings or sample, or any indication or request by the Engineer on any Shop Drawings shall constitute an authorization for any increase in the Contract Sum.

21.3 Inspection

All material and Plant furnished and all work performed under this Contract will be subject to inspection by the Employer and the Engineer at all times and in all states of completion both off-Site and on-Site. The Contractor shall furnish promptly without additional charge, all facilities, labour and materials reasonably needed for performing such inspection and testing as may be required by the Engineer.

21.4 Approved Sample At Site

The Contractor shall, at all times, keep on the Site approved samples. All such samples shall be made available to the Engineer as and when required.

22. BAR BENDING SCHEDULE

Bar bending (reinforcement bars) schedule of all structural drawings shall be prepared by the Contractor and submitted in triplicate to the Engineer for approval.

23. DRAWINGS

23.1 Bid Drawings

Bid Drawings issued with the Bid Documents, called the Bid Drawings, show scope of the work to be performed by the Contractor. The Drawings are generally in sufficient detail so as to be used as a basis for construction, fabrication and for placing orders for materials subject to corrections based on the future issue of supplementary Drawings as provided under Sub-Clause 23.2 hereof.

23.2 Construction Drawings, Supplementary Drawings

Upon commencement of the works and furnishing by the Contractor stake out survey plan and natural ground levels, the Engineer shall issue Construction Drawings to the Contractor. The Construction drawings may be issued in stages, where necessary.

The Engineer shall have authority to issue to the Contractor, from time to time, such supplementary Drawings and instructions as shall be necessary for the purpose of the proper and adequate execution and completion of the Works and the remedying of any defects therein. The Contractor shall follow these drawings.

When additional information regarding the geological formations or other conditions becomes available, the Engineer may find it desirable to change dimensions or design of one or more of the features of the Works to conform to the newly disclosed conditions. The Engineer reserves the right to make such reasonable changes, and the Contractor's operations shall be conducted so as to accommodate any such reasonable changes in the Works.

23.3 Definition of Term Drawings

The term Drawings as used in the Specifications means the Drawings referred in Clauses 23.1 and 23.2 above.

23.4 Checking of Drawings

The Contractor shall check all Drawings carefully as soon as practicable after receipt thereof, and shall promptly notify the Engineer of any errors discovered.

23.5 Copies of Drawings

Drawings will be issued to the Contractor as described below:

23.5.1 Construction Drawings

Two (2) sets of the Construction Drawings will be issued to the Contractor as stated above, free of charge. Additional sets will be provided at cost of reproduction upon written request of the Contractor.

23.5.2 Supplementary Drawings

Two (2) prints of each supplementary Drawing will be issued to the Contractor free of charge. Additional sets will be provided at cost of reproduction upon written request of the Contractor.

23.6 Drawings to Be Furnished By the Contractor

The Contractor shall submit to the Engineer for review, such drawings as are required under the Contract, sufficiently in advance of the work intended to be executed.

23.6.1 Reinforcement Drawings

Reinforcement placement drawings and bar bending schedules (to be provided by the Contractor as per clause 22 above) of all RCC work shall be prepared by the Contractor and submitted in triplicate to the Engineer for approval, sufficiently in advance of the works in which they are intended to be used.

23.6.2 Shop Drawings

(a) The Contractor shall submit to the Engineer for review three (3) copies of all drawings to be issued for setting out, fabrication, supply order and construction; based on data, requirements, dimensions, details, codes, standards and design provided in the drawings issued by the Engineer. Such drawings shall be submitted at least seven (7) days before they are required for use. If within a period of seven (7) days after submission, the Engineer notifies the Contractor that a drawing fails to comply with the relevant requirement of the Contract, it shall be rectified and resubmitted for approval at the Contractor's cost. Fabrication or construction shall not commence on any part of

the Works until the shop drawings or construction drawings for that part of the Works have been approved by the Engineer.

The Works shall be executed in accordance with the drawings as approved by the Engineer. If the Contractor wishes to modify any approved drawings, he shall immediately notify the Engineer and submit revised drawings for approval. If the Engineer instructs that further drawings are necessary for executing the Works, the Contractor shall prepare such drawings and submit them for approval.

The Contractor at his cost shall rectify errors, omission, ambiguities, inadequacies and other defects.

Approval by the Engineer, in accordance with this paragraph, shall not relieve the Contractor of any of his responsibilities under the Contract.

(b) The shop drawings shall be properly identified indicating the part of the Works, the name of the contractor / supplier etc., the date of preparation and the dates of all revisions. The Shop Drawings shall be complete and shall show the design dimensions, proposed materials to be used, finishes, type of shop paint and all other details in connection thereto.

(c) Where adjoining work requires shop drawings, the Contractor shall prepare and submit composite shop drawings, which shall show and define the work under all affected trades. If the Contractor executes work before coordinating with other trades so as to cause interference with work of those trades, he shall make changes necessary to correct the conditions without extra cost to the Employer.

(d) No changes shall be made by the Contractor in the resubmitted shop drawings in excess of the corrections spelled out by the Engineer and in a separate note on the shop drawings.

(e) No work in the shop shall be started and no material or plant ordered until the Engineer has approved the shop drawings. It shall be the responsibility of the Contractor to submit the shop drawings on a schedule that allows reasonable time for checking and approval and subsequent fabrication. Failure to submit shop drawings in ample time for checking, correcting, and rechecking will not justify extension of time for completion of the Works.

(f) The Contractor shall also check and verify all site measurements whenever requested by other Specialist Contractors or by other Sub-Contractors to enable them to prepare their own shop drawings and pass on the information with sufficient promptness, so as not to delay the work in any way. A copy of all such information passed on shall be given to the Engineer.

23.6.3 As-Built Drawings

The Contractor shall, at all times, keep on Site a separate set of prints of all drawings on which all significant changes between the work shown on the Drawings and that which is actually constructed, shall be noted neatly, accurately and promptly as the work progresses. The Subcontractor(s) for plumbing, mechanical and electrical shall, at all times, keep on Site, a separate set of prints of the drawings (showing their parts of the Works) on which all significant changes between the work shown on the Drawings and that which is actually constructed, shall be noted neatly, accurately and

promptly as the work progresses. Such drawings shall show the exact physical location and configuration of the works as actually installed.

The Contractor shall, within fourteen (14) days of issuance of Taking-Over Certificate for whole of the Works, furnish to the Engineer for his approval two (2) copies of such marked up drawings. One (1) copy of each of the marked up drawings approved by the Engineer shall be returned to the Contractor by the Engineer and these shall be used for the preparation of the As - Built Drawings.

The Contractor shall furnish to the Engineer six (6) complete sets and one reproducible copy of all As -Built Drawings within twenty eight (28) days of receipt of drawings stated above, from the Engineer.

24. PROTECTION OF THE WORKS

The Contractor shall whenever necessary cover up and protect the works from weather and damage by his own or other workmen performing subsequent operation. The Contractor shall provide all necessary dustsheets, barriers and guard rails and clear away the same at completion.

25. RESTORATION AND CLEANING

Upon completion of the works the Contractor shall restore all items covered by the Contract to the satisfaction of the Engineer.

The Contractor shall do regular cleaning and clear away all rubbish and excess materials that may accumulate from time to time on completion and before handing over. Upon completion of the works he shall obliterate all signs of temporary construction facilities such as work areas, structures, foundations of temporary structures, stock piles of excess or waste materials, or any other vestiges of construction, as directed by the Engineer. All buildings shall be cleaned; floors and paving scrubbed and the works and site shall be left in a clean and satisfactory state for immediate use and occupation. Care shall be taken not to use any cleaning materials, which may cause damage to the surface to be cleaned.

The Contractor shall also take all necessary precautions to keep the works and site free from vermin during construction and he shall leave the works vermin free on completion. Application of pest control agents shall not commence until the specific product, name, method and extent of application have been submitted to and approved of by the Engineer.

26. SITE OFFICE AND TEMPORARY FACILITIES TO BE PROVIDED BY THE CONTRACTOR

26.1 Contractor's Office, Facilities Etc.

The Contractor shall establish and maintain a Site office. The Contractor shall provide all facilities in connection with the execution, completion, of the Works, remedying defects therein and maintenance of the utilities services. The facilities shall not be limited to the Contractor's Site Office, labour camps, work yard and storage areas, temporary water supply, waste water disposal, temporary electricity, medical unit, temporary roads, fire protection and fire fighting equipment etc. The Contractor shall be solely responsible for arranging all utilities and the Contractor shall setup, maintain and operate an architectural and engineering facility at site with adequate number of technical and support staff as well as equipment required for particular nature of job covered under the Contract to prepare drawings/shop drawings for approval of the Engineer.

The Contractor shall arrange his labour camp, work yard, storage area and site office.

26.2 Temporary Roads

The Contractor shall prepare and maintain such temporary roads as may be necessary, from the site to the nearest road and also within the plot. Such roads shall be positioned

strictly in accordance with the Engineer's instructions and the Contractor shall reduce or control any dust nuisance by regularly spraying water and compaction as directed.

26.3 Temporary Services

26.3.1 Temporary Water Supply

The Contractor shall supply in sufficient quantity all necessary potable and other water for construction purposes for all trades at points within a reasonable distance of any building being constructed. The Contractor shall make arrangements and pay charges for water service installation, maintenance and removal thereof, and pay the costs of water for all trades.

At completion of the work, the temporary water services equipment and piping shall be removed by the Contractor at his own expense.

26.3.2 Temporary Electricity

The Contractor shall make all the necessary arrangements for a temporary electricity service, pay all expense in connection with the installation, operation and removal thereof and pay the costs of electricity consumed by all trades. The Contractor shall arrange and furnish an Electric Power Generating set at site and maintain the generating set in perfect working condition through-out the duration of Contract. The generating power of the set shall be sufficient to operate all plant and equipment as well as the camps and offices of the Contractor and the offices of the Engineer/Employer, during construction at site. Should the set fail to meet the required demand at site or fail to function or operate, the Contractor shall immediately replace the same with other generating set/sets to the satisfaction of the Employer as well as the Engineer.

A temporary lighting system shall be furnished, installed and maintained by the Contractor as required to satisfy the minimum requirements for safety and security and to the satisfaction of the Engineer.

When the permanent electrical power and lighting systems are in an operating condition, they may be used for temporary power and lighting for construction purposes provided that the Contractor obtains the written approval of the Engineer and the Employer and assumes full responsibility for the entire power and lighting system and pays all costs for operation and maintenance of the system.

At completion of construction work, or at such time as the Contractor makes use of permanent electrical equipment and devices, temporary electricity services shall be removed by the Contractor at his own expense.

26.3.3 Waste Disposal

The Contractor shall make such temporary provisions as may be required in order to dispose of any chemicals, fuels, oils, grease, bituminous materials, waste and soil waste and the like without causing pollution to either the site or the environment. Disposal of any materials, wastes, effluent, garbage, oil, grease, chemicals and the like shall be in areas specified by the concerned local authority proposed by the Contractor and subject to the approval of the Engineer. If any waste material is dumped in unauthorized areas the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed area. If necessary, contaminated ground shall be excavated, disposed off as directed by the Engineer and replaced with suitable fill material compacted and finished with topsoil all at the expense of the Contractor.

26.3.4 Fire Protection

The Contractor shall provide and maintain adequate fire protection in the form of barrels of water with buckets, fire bucket tanks, fire extinguisher, or other effective means ready for instant use, distributed around the project and in and about temporary inflammable structures during construction of the works.

Gasoline and other flammable liquids shall be stored in and dispensed from safety containers approved by the Engineer and storage shall not be within building.

Torch-cutting and welding operations performed by the Contractor shall have the approval of the Engineer before such work is started and a chemical extinguisher is to be available at the location where such work is in progress.

The Contractor shall follow the instructions and specifications of the Civil Defense Department or any other local department concerned with such activities.

27 CONSTRUCTION SCHEDULE

A Construction schedule shall be maintained in accordance with the provisions of the General Conditions of Contract.

The schedule shall be accompanied with sufficient data and information including all necessary particulars of constructional plant, equipment machinery, temporary Works, arrival of plant, equipment at site and their installation, method of operation, work forces employed, etc., for an activities of the Works.

Should the Engineer consider any alteration or addition in the programme and time schedule, the Contractor shall conform thereto without any cost to the Employer.

Whenever necessary and wherever the progress of the actual work shows departure, the programme and time schedule shall be undated and submitted to the Engineer for his approval.

28 SUBMISSION REQUIREMENTS

28.1 Schedule submission at least sixty days before the dates when reviewed submittals will be needed.

28.2 Submit Shop Drawings as per provision given in Sub-Clause 23.6.2 and number of copies of Product Data which the Contractor requires for distribution plus four copies which will be retained by the Engineer.

28.3 Submit three samples unless otherwise specified.

28.4 Accompany submittals with transmittal letter, in duplicate, containing:

- Date
- Project title and number
- Contractor’s name and address
- The number of each Shop Drawing, Product Data and the Sample submitted.
- Notification of deviations from Contract Documents.
- Other pertinent data.

29 RESUBMISSION REQUIREMENTS

Shop Drawings:

- Revise initial drawings as required and resubmit as specified for initial submittal.
- Indicate on drawings any changes which have been made by the Engineer.
- Product Data and Samples: Submit new data and samples as required for initial submittal.

30 MONTHLY PROGRESS REPORT AND PHTOGRAPHS

30.1 During the continuance of the Contract, the Contractor shall submit monthly progress on forms as approved by the Engineer. Such weekly reports shall show the actual progress completed as of date of the report plotted against the schedule as given by the Contractor at the start of work and shall be broken down so as to indicate status of all activities associated with mobilization, design, material procurement, manufacture, surveys works, tests with regard to the agreed contract programme.

30.2 The Employer and the Engineer reserve the right to coordinate the schedules of this Contractor and other Contractors working at the Site, and to adjust and/or change any and all such schedules as required during the course of construction in order to achieve a coordinated project in harmony with the Employer's completion date.

30.3 Commencing after the first week of construction, and continuing every week until completion, the Contractor shall take and submit photographs to the Engineer's Representative, to show progress of his work and completion of each structure or major feature.

31 CONTRACTOR TO NOTIFY DELAYS ETC.

Any delay which will affect the completion of Works shall be detailed by the Contractor who shall state the action he is taking for effective completion of the Contract programme.

The Contractor shall submit a report in respect of the various sections of the Works, the equipment in use or held in readiness, a return of labour and supervisory staff, and details of any matters arising which may generally affect the progress of the work.

The Contractor shall give a summary of the detailed progress report giving the position with regard to the agreed Contract programme.

The progress reports shall be set out in a format to the approval of the Engineer, and forwarded promptly so that on receipt the information contained therein is not more than 21 days out of date.

If during execution of the Contract, the Employer considers the progress position of any section of the work to be unsatisfactory, or for any other reason relating to the Contract, he will be at liberty to convene a meeting and the Contractor’s Representatives are to attend such meeting.

The Contractor's Site Office shall prepare and submit 6 copies of a weekly progress report to the Employer and Engineer's Site Office. This report shall summarize site activities and record and details where difficulties in maintaining the agreed programme are being experienced or are likely to cause subsequent delay.

The Contractor's Site Office shall also prepare and submit to the Engineer's Site Office 2 copies of Daily Activity Report summarizing the main activities to be undertaken each day, noting special activities such a tests, alignment checks, etc. The Contractor shall be

responsible for expediting the delivery of all material and equipment to be provided by him and his subcontractors.

32 PHOTOGRAPHS

As soon as work commences on Site, the Contractor shall provide at least 10 to 12 photographs (alongwith soft copy) of the works from positions to be selected by the Engineer. Each photographic print shall not be less than 297mm x 210mm and shall bear a printed description, a serial number and the date when taken.

The negtives/soft copy of all photographs shall be held at the Contractor's Site Office, numbered and handed over to the Employer at the completion of the Contract.

33 Sign Board

The Contractor shall erect and maintain at the Site in a location to be approved by the Engineer two (2) Sign Boards of dimensions approved by the Engineer. The Sign Boards shall be made of metal. It shall be mounted on steel posts securely anchored and braced. The Contractor shall paint on the Sign Boards, the name of the Works, and the names of the Employer, Engineer and the Contractor both in English and Urdu Language.

34 Site Office for Engineer/Engineer's Staff

The Contractor shall construct, provide, furnish and maintain for Engineer, a site office as per design provided in these documents along with stabilized access road.

The Contractor shall provide a direct telephone with internet connection for the Engineer at site up-to an average billing of Rs. 4,000/- per month, one (01) computer (Core I-7, minimum with 500 GB Hard disk, 8 Gb Ram, a DVD writer, 17" Flat Colour monitor, etc.), one flash drive of at-least 8 GB capacity each, an A3 size colour printer, stationery & pantry, a digital camera (12.5 pixel minimum), UPS, stabilizers, air conditioners, 6 cubic feet refrigerators, etc., and the site office shall be connected to the electrical system, potable water supply system and sewage disposal system.

The Contractor shall provide replacement of the equipment(s), if any of the above mentioned equipment(s) is temporarily or permanently rendered unserviceable for any reason(s) or declared to be beyond repair by the Engineer/Engineer's staff at no additional cost to the Employer.

The said offices shall be provided by the Contractor within twenty eight (28) days of the receipt by the Contractor of Engineer's Notice to Commence or twenty one (21) days of the payment of the first half of the Mobilization Advance, whichever earlier.

The site office shall be maintained by the Contractor up to a period of three hundred sixty four (364) days after the Issuance of Taking Over Certificate (DLP Period) by the Engineer.

The site office along with all fittings, fixtures and gadgets shall become property of the Employer after the completion of the project and shall be handed over to the Employer along with list of all items given for the use of Engineer. The site office shall be removed /dismantled if directed by the Engineer/Employer. In such case, the area shall be developed in accordance with the drawings or to its natural state and as per the instructions of the Engineer.

No payment shall be made to the Contractor for the works involved under this Sub-Clause

35 Transport for the Employer and The Engineer / Employer

The Contractor shall provide, operate and maintain 01 No (1,300CC), brand new latest model, air-conditioned Car along with driver for exclusive use of the Engineer / Engineer's staff, to meet the transportation needs in connection with the project. The vehicle shall be registered in the name of Employer right from start of project.

The Contractor shall furnish supply and provide, as may be necessary without specific direction of the Employer / Engineer / Engineer's staff, all fuels, lubricants, tyres and other supplies, all maintenance, repairs, comprehensive insurance cover and running costs and

suitability qualified driver at all times for running of vehicle not exceeding 4500 km per month and will provide a substitute vehicle in case of any break down.

The Contractor shall provide replacement vehicle, if the vehicle is temporarily or permanently rendered unserviceable for any reason(s) or declared to be beyond repair by the Engineer/ Engineer's representative at no additional cost to the Employer.

The Contractor shall maintain the vehicles up to a period of three hundred sixty four (364) days after the Issuance of Taking-Over Certificate (DLP Period) by The Engineer.

No separate payment shall be made to the Contractor for the facilities involved under this clause. The cost thereof shall be deemed to have been included in the price quoted by the Contractor for the works

36 Coordination of Work at Site

The Contractor shall take cognizance that during the execution of the project, other Contractor will be working concurrently on this Site.

All works of his responsibility shall be coordinated by the Contractor so as to give the necessary facilities to other Contractor or their workman or any other employ, who execute or supervise any work on the Site.
The Contractor shall ensure that the necessary safety precaution will be observed and interferences shall be avoided specially for the works executed side by side by different Contractors.

Due consideration must be given to permit access to sections of the work as required by other Contractors for the extension of their works. With a view to coordinate the works, the Engineer may from time to time direct the order of the works to be carried out.

No payment shall be made to the Contractor for the works involved under this sub clause.

37 Site Facilities to Be Provided By The Contractor

37.6.1 General

Without prejudice to the generality of the various clauses of the Contract, particular attention is drawn to the obligation of the Contractor to make his own arrangement at his own expense for the following.

37.6.2 Labour Camps and Staff Residences

The Contractor shall provide, operate and maintain labour camps and staff residences and are required for the proper and efficient progress of the work to house his own employees. For the purposes of operation and maintenance of the Camps and Residences, the Contractor shall comply with the rules of Pakistan Labour Camp Rules 1960 and all other applicable provisions of the Pakistan Labour Laws.

37.6.3 Administrative and Field Office

The Contractor shall provide, operate and maintain administrative and field offices required for his staff and would be responsible for Operation and Maintenance, furniture, equipment, appliances, janitor services and security of the same.

37.6.4 Work yards and Storage Areas

The Contractor shall provide, operate and maintain all sheds, fencing, foundations and all above ground structures required to store material or equipment brought on to the site by him. The Contractor shall be responsible for the security of his entire camps, residence, site and field offices work yard and storage area.

37.6.5 Water Supply, Sewerage System and Electricity

The Contractor shall make his own arrangement, at his own expense for provision, operation and maintenance of electric supply, reasonable supplies of raw and potable water and sewerage system at the site of works and his labour camps, staff residences and offices. The Contractor shall pay all fees, and charges (including bills) of whatsoever nature to the concerned departments (if any) in order to procure connections of the above facilities and thereafter using these facilities.

37.6.6 Medical Care

The Contractor shall arrange provision of adequate medical facilities for his employees.

Adequately equipped and properly staffed first aid stations or dispensaries shall be provided by the Contractor at camps and other strategic locations, to administer first aid treatment at all times free of charge to all persons on the Site, including personnel of the Engineer and the Employer. The nature, number and location of facilities furnished and the Contractor's staff for administering first-aid treatment shall meet the requirements of the Health Services of the Government of Pakistan and of Section III of the Manual "Safety Requirements for Construction by Contract", published by the Employer, and shall be subject to approval by the Engineer.

37.6.7 Other Facilities

The Contractor shall also be responsible for providing at his own cost other facilities for his own staff and labour such as educational, recreational, transport, telephone and catering if required.

38. CONSTRUCTION PROCEDURES

The Contractor shall advise the Engineer of proposed construction procedures in accordance with the General Conditions of Contract.

If the Engineer shall see that the work progress is slow in such a way that the work will not be completed in the time specified, then he shall order the Contractor to work overtime or in more shifts and the Contractor shall obey these orders without any additional payments and without any objections or request for compensation.

39. NOTIFICATION TO ENGINEER

The Engineer shall be notified daily in writing of the nature and location of the Works the Contractor intends to perform the next day so as to enable necessary inspection and measurement to be carried out. The Engineer may, if necessary, direct that longer notice be given of certain operations.

40. NIGHT WORK

When work is done at night the Contractor shall maintain from sunset to sunrise such lights on or about his work and plant as the Engineer may deem necessary for the proper observations of the work and the efficient execution thereof.

41. WEATHER

No work is to be undertaken when, in the opinion of the Engineer, the weather is so unsuitable that proper protection of the work cannot be ensured.

42. CO-ORDINATION WITH OTHER CONTRACTORS

It shall be the responsibility of the Contractor to keep-up good relations with other Contractors employed on site by the Employer. The Contractor shall cooperate and coordinate his work with that of the other Contractors working at the Site, to whatever extent may be necessary to complete the Project in accordance with the approved programme of the Works and in accordance with the Engineer's instructions. Should a disagreement or dispute arise between the Contractor and other contractors, the same shall be referred without delay to the Engineer for his decision. Upon such decision, the Contractor shall proceed with the work in accordance therewith. In case the access to the works of other contractors is through the Site area of the Contractor, the Contractor shall coordinate with and permit all reasonable access to other Contractors.

43. ACCIDENT PREVENTION, SAFETY MEASURES AND PROTECTIVE EQUIPMENT

The Contractor shall comply and enforce compliance by all his sub- contractors with the highest standards of safety and accident prevention in accordance with international standards and in compliance with all applicable laws, ordinances and statutory provisions.

All requisite barriers, fences, warning signs, lights and other safety precautions as required for the protection of persons and property on or adjacent to the site shall be provided at the Contractor's cost.

All false work, scaffolding and handrails shall be well constructed and secured at all times. Where overhead work is being carried out, warning signs shall be installed at ground level clearly warning of the overhead work.

All warning signs shall be in two languages, English and Urdu, and shall at all times be maintained in a clean and legible condition, to the satisfaction of the Engineer.

Trash shall be removed at frequent intervals to the satisfaction of the Engineer.

Netting shall be provided at all levels where work is in progress, all around the building.

44. SETTING OUT OF WORK AND SURVEY

44.1 Reference Points, Lines

The Contractor shall establish benchmarks and / or reference line at the Site in accordance with the instructions of the Engineer. The Contractor shall set out its work from these benchmarks and lines. The Contractor shall supply plant, equipment, materials and labour for checking if required of the survey control by the Engineer. Slope stakes will be set by the Contractor before commencement of excavation and will be re-established as required during progress of work using established bench-marks and reference points.

44.2 Verification

The Engineer may make checks as the work progress to verify lines and grades established by the Contractor and to determine the conformance of the work as it progresses with the requirements of the Drawings and Specifications. Such checking by the Engineer shall not relieve the Contractor of his responsibility to perform all work in accordance with the Drawings and Specifications and the lines and grades given therein.

Based upon the basic control, the Contractor shall provide his own primary control points, as needed for the Works, and shall preserve and maintain them until otherwise authorized.

The Contractor shall be responsible for maintaining all survey markers/monuments, and property corners. If any markers/monuments are destroyed by the Contractor, the

Contractor shall arrange, at his own cost, to retrace and replace them to the entire satisfaction of the Engineer. If a monument cannot be replaced in its original position, the Contractor shall install a witness corner. The Contractor shall complete and file monument reference cards on all monuments as per instructions of the Engineer.

The Contractor shall provide experienced construction surveyors with adequate experience in the construction surveys similar in nature as required by this Contract.

Based upon established basic control monuments the Contractor shall establish all lines and grades necessary to control the Works, and shall be responsible for all measurements that may be required for execution of the Works to the tolerance prescribed below.

The Contractor shall perform such surveys and computations as are necessary to determine quantities of work performed or placed during each progress payment period, and shall also perform all surveys necessary for the Engineer to determine final quantities of work in place. The Engineer will determine final quantities based on original ground levels determined by the Contractor and agreed by the Engineer.

The Contractor shall notify the Engineer at least 24 hours before performing a quantity survey and, unless specifically waived, quantity surveys shall be performed in the presence of an authorized representative of the Engineer.

Degree of accuracy for the survey works shall satisfy the following specified tolerances:

(a) Structure points shall be set within 0.01 foot accuracy from point to point, except where tighter tolerances are required.

(b) Cross-section points shall be located within 0.10 foot, horizontally and 0.01 foot vertically.

(c) Permissible closing error for a levelling line meant for establishing Temporary Bench Mark (TBMs) shall not exceed 0.045 x $\sqrt{}$ M foot, where M is in miles. The permissible closing error shall be duly adjusted.

The Contractor shall provide all materials, equipment and labour required for surveying work, including, but not limited to, instruments, stakes, spikes, steel pins, templates, platforms, and tools, and except as required to be incorporated in the work or left in place, all such materials and equipment, shall remain the property of the Contractor. Surveying instruments shall be in perfect working condition and shall be subject to rigid inspection for proper operation at least after every two weeks of use. Defective instruments shall be promptly replaced or repaired and adjusted to the satisfaction of the Engineer.

Survey data shall be recorded in accordance with recognized professional surveying standards. Original field notes, computations, and other surveying data shall be recorded in the Contractor furnished field books. Notes or data not in accordance with standard formats will be rejected. Illegible notes or data, or use of erasures on any page of a field book will be considered sufficient cause for rejection of part or the entire field book. Copied notes or data will not be permitted; therefore, rejection of part or all of a field book may necessitate re-surveying. Corrections by ruling or lining out errors will be satisfactory.

The cost of all materials, equipment, surveyors and labour required for surveys for the Works and quantity surveys required by this clause shall be deemed to be included in the rates and prices of the various items in the Bill of Quantities and no separate measurement and payment in their respect shall be made.

44.3 Survey Instruments

The Contractor shall maintain at the Site the requisite surveying instruments in perfect working conditions to enable the Engineer's Representative to check levels and lines of the work at all times.

45. PAYMENT OF WORK

No payment shall be made for the works involved within the scope of this section of specification unless otherwise specifically stated in the Bills of Quantities or herein.

The cost thereof shall be deemed to have been included in the total price quoted by the Contractor.

46. ENVIRONMENTAL PROTECTION

The Contractor shall exercise care to protect the natural landscape and shall conduct his construction operations so as to prevent any unnecessary destruction, scarring or defacing of the natural surroundings in the vicinity of works. Except where clearing is required for the Permanent works, approved construction roads and the Temporary Works, and for excavation operations, all trees and native vegetation shall be preserved and shall be protected from damage which may be caused by the Contractor's construction operations and equipment. On completion of the works, all work areas shall be smoothed and graded in a manner to confirm to the natural appearance of the landscape. Where unnecessary destruction, scarring, damage or defacing may occur as a result of the Contractor's operations, it shall be repaired, replanted, or otherwise corrected as directed by the Engineer at no additional cost to the Employer.

SPECIFICATIONS

SECTION - 0120

CONTRACTOR'S CAMP

1. **SCOPE**

2. **PAYMENT OF WORK**

1. SCOPE

The work to be done under this item consists of construction, erection, installation and maintenance of the Contractor's Project Site Offices or main camp and the Contractor's sub-camps or temporary camps, if any, and shall include all offices, shops, warehouses, and other operational buildings; all housing and related facilities including accommodations for the Contractor's personnel.

The location of the Contractor's camps, including all buildings, utilities and facilities thereof, and of the camps or establishments of all persons/parties in the vicinity operating or associated with the Contractor shall be subject to approval of the Engineer.

The work to be done under this item will terminate upon the actual Completion Date. However, if directed by the Engineer or the Employer, the Contractor shall continue such work to the extent required by the Contractor's personnel during the period of maintenance. No compensation shall be paid for the continued operation and maintenance of the Contractor's Camps during the period of maintenance.

Upon completion of the Works, or at such time within the period of maintenance as directed by the Engineer, the Contractor shall remove all buildings utilities and other facilities from the Site and restore all camp areas to a neat and clean condition.

The construction, operation and maintenance of all camps of the Contractor shall comply with all applicable provisions of current Pakistan Labor Camp Rules.

Adequately equipped and properly staffed portable first aid stations or dispensaries shall be provided by the Contractor at camps and other strategic locations to administer first aid treatment at any time required and free of charge to all persons on the Site, including employees of the Engineer and the Employer.

2. PAYMENT OF WORK

No payment shall be made for the work involved within the scope of this section of Specifications unless otherwise specifically stated in the Bill of Quantities or herein.

The cost thereof is included in the quoted rate of other items of the Bill of Quantities.

*** End of Section 0120 ***

SECTION - 0130

STAKE-OUT SURVEY

1. SCOPE
2. MATERIAL AND EQUIPMENT
3. SUBMITTALS
4. EXECUTION
5. PAYMENT OF WORK

1. SCOPE

Under this item the Contractor shall make the stakeout survey for construction purposes with competently qualified men, consistent with the current practices. The work shall proceed immediately upon the award of the contract and shall be expeditiously progressed to completion in a manner and at a rate satisfactory to the Engineer. The Contractor shall keep the Engineer fully informed as to the progress of the stakeout survey. The scope of this section of specifications is covered by detailed specifications as laid down herein.

2. MATERIAL AND EQUIPMENT

All instruments, equipment, stakes and other material necessary to perform all work shall be provided by the Contractor. These instruments and equipment shall be available to Engineer at all times for the purpose of checking the work of the Contract.

All stakes used shall be of a type approved by the Engineer, clearly and permanently marked so as to be legible at all times. It shall be the Contractor's responsibility to maintain these stakes in their proper position and location at all times. Any existing stakes or markers defining property lines and survey monuments which may be disturbed during construction shall be properly tied into fixed reference point before being disturbed and accurately reset in their proper position upon completion of the work.

3. SUBMITTALS

Submit all survey data, computations, field notes, drawings and all other survey records necessary to accomplish the work.

4. EXECUTION

The Contractor shall trim trees, bushes and other interfering objects, not consistent with the plan, from survey lines in advance of all survey work to permit accurate and unimpeded work by his stake-out survey crews and the Engineer's survey crews. The exact position of all work shall be established from control points, which are shown on the plans or modified by the Engineer. Any error, apparent discrepancy in or absence of data shown or required for accurately accomplishing the stakeout survey shall be referred to the Engineer for interpretation or furnishing when such is observed or required.

The Contractor shall be responsible for the accuracy of his work and shall maintain all reference points, stakes, etc. throughout the life of the contract. Damaged, destroyed or inaccessible reference points, bench marks or stakes shall be replaced by the Contractor. Existing or new control points that will be or are destroyed during construction shall be re-established and all reference ties recorded thereon shall be furnished to the Engineer. All stakeout survey work shall be referenced to the centerlines shown on the Plans. All computations necessary to establish the exact position of the work from control points shall be made and preserved by the Contractor. All computations, survey notes and other records necessary to accomplish the work shall be kept neatly and made available to the Engineer upon request and furnished to the Employer upon Contract completion.

The Engineer may check all or any portion of the stakeout survey work or notes made by the Contractor and any necessary correction to the work shall be immediately made. Such checking by the Engineer shall not relieve the Contractor of any of his responsibilities for the accuracy or completeness of his work.

Reference points, base lines, stakes and benchmarks for borrow pits shall be established by the Contractor.

All required right-of-way and easement limits shall be established, staked and referenced by the Contractor concurrent with the construction stakeout survey.

The Contractor shall place at least two offset stakes or references at each centre lines station and at such intermediate stations as the Engineer may direct. From computations and

measurements made by the Contractor, these stakes shall be clearly marked with the correct centre line, station number, offset and cut or fill so as to permit the establishment of the true centre line location during construction. He shall locate and place all cut, fill, slope, line grade or other stakes and points as the Engineer may direct to be necessary for the proper progress of the work.

5. PAYMENT OF WORK

No payment shall be made for the Works involved within the scope of this section of Specifications unless otherwise specifically stated in the Bill of Quantities or herein.

The cost thereof is included in the quoted unit rate of other items of the Bill of Quantities.

*** End of Section 0130 ***

SECTION - 0150

CLEARING AND GRUBBING

1. SCOPE

2. EXECUTION

3. PAYMENT OF WORK

1. SCOPE

The clearing and grubbing shall consist of clearing the designated area of all trees, down timber, snags, bush, other vegetation, rubbish and all other objectionable material, and shall include grubbing stumps, roots, and matted roots, and disposal of all spoil material resulting from the clearing and grubbing. It shall also include the removal and disposal of structures that protrude, encroach upon, or otherwise obstruct the work, except when otherwise provided for on the plans or directed by the Engineer to be saved.

2. EXECUTION

2.1 LOCATION OF WORKS

The Engineer will define the limit of areas where clearing and grubbing is to be done. Normally it will include all land within the right of way and all other construction area including ditches, detours, minor road crossings and other areas shown on the plans or as specified or as directed by the Engineer. The Engineer will designate the fences, structures, debris, trees and bushes to be cleared where grubbing is not required. It shall not include clearing and grubbing of borrow or other pit areas from which material is secured. It shall include the leveling or removal of all bunds or mounds within the right of way unless otherwise directed by the Engineer.

2.2 GRUBBING AND CUTTING

All roots and stumps within the limits of the Site shall be grubbed and excavated unless otherwise specified or approved by the Engineer. Unless otherwise directed, holes from grubbing up tress, bushes and other holes from which obstructions are removed, shall be filled with suitable material and compacted in an approved manner.

2.3 DISPOSAL

The Contractor shall be responsible for disposal of any material whatever not to remain on Site within fourteen (14) days after cutting or felling unless otherwise approved. No tree trunks, stumps or other debris shall be left within Site unless approved in writing by the Engineer. The location of disposal areas shall be within or outside the limits of the project or as approved in writing by the Engineer and shall be acquired by the Contractor at his own expense. Any useable material shall remain the property of the Employer, and shall be stockpiled or stored safely by the Contractor.

2.4 BURNING

There shall be no burning on or around the Site area whatever. The Contractor shall ensure that neither his Employees nor anyone whosoever burns anything on or within specified limits around the Site area.

2.5 PROTECTION AND RESTORATION

The Contractor shall prevent all damage to pipes, conduits, wires, cables or structures above or below ground. No land monuments, property markers, or official datum points shall be damaged or removed until the Engineer has witnessed or otherwise referred their location and approved their removal. The Contractor shall so control his operations as to prevent damage to trees and shrubs, which are to be preserved. Protection may include fences and boards lashed to trees to prevent damage from machine operations. The existing covered or open benchmarks should be relocated as directed by the Engineer. In the event that anything specified herein to be saved and protected is damaged by the Contractor; such damages shall immediately be repaired or replaced by the Contractor at his own cost to the satisfaction of the Engineer. All areas cleared and grubbed must be approved by the Engineer or Engineer's Representative before the start of cleaning operations.

3. PAYMENT OF WORK

No payment shall be made for the Works involved within the scope of this Section of Specifications unless otherwise specifically stated in the Bill of Quantities or herein.

The cost thereof is included in the quoted unit rate of other items of the Bill of Quantities.

*** End of Section 0150 ***

SECTION - 1100

EARTHWORKS

1. SCOPE OF WORK
2. APPLICABLE STANDARDS
3. GENERAL
4. SITE PREPARATION
5. CLASSIFICATION OF EXCAVATION
6. EMBANKMENT CONSTRUCTION
7. QUALITY CONTROL
8. EARTH WORK FOR STRUCTURES, STORM WATER DRAINS & CULVERTS
9. MEASUREMENT AND PAYMENT

SECTION – 1100

EARTHWORKS

1.0 SCOPE OF WORK

The work under this section of the specifications consists of furnishing all plant, labour, equipment, appliances and materials and in performing all operations for excavation, backfilling, construction of embankments and disposal of unsuitable and surplus excavated material as required in accordance with this section of specifications, the applicable drawings and subject to terms and conditions of the Contract.

2.0 APPLICABLE STANDARDS

Materials, construction and testing shall comply with the following codes and standards:

ASTM C 136	Sieve or screen analysis of fine and coarse aggregate
ASTM D 422	Testing for Liquid Limit of Soils
ASTM D 424	Testing for Plastic Limit and Plasticity Index on Soils
ASTM D 596	Water Analyses
ASTM D1556	Density of soil in place by the sand cone method
ASTM D1557	Moisture-Density relation of soils using 4.5kg rammer and 457mm drop
ASTM D 2167	Density of soil in place by the Rubber-Balloon method
ASTM D 2216	Moisture content of soil
ASTM D 4253	Test method for maximum Index Density and unit weight of soils
ASTM D 4254	Test method for minimum Index Density and unit weight of soils
ASTM D 1883	CBR-California Bearing Ratio test

3.0 GENERAL

3.1 The Contractor shall acquaint himself with the nature of the ground, existing structures and subsurface materials (soil / rock) which will be encountered during excavation or earthworks. The Employer does not guarantee or warrant in any way that the materials 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 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 whole risk of the nature of the subsurface materials (soil / rock) to be excavated or penetrated and the Contractor shall not be entitled to receive an extra or additional payment nor to be relieved from any of his obligations by reasons of the nature of such ground and subsurface material.

3.2 The Contractor shall submit a detailed list of plant and equipment which he shall undertake to bring to the site and to carry out the work. The list shall satisfy the Engineer as to type, size and quantity. The Contractor shall place on the site of the work all of the equipment listed and all subsequent equipment required for approval of the detailed program of work and such equipment which may be directed by the Engineer. All equipment which is proposed to be used on the work shall be sufficient size and in such mechanical condition as to meet requirement of work and produce a satisfactory quality

of work. In no case shall the Contractor remove from the site the plant and equipment without the written approval of the Engineer. The Contractor shall supply all plant and equipment necessary for the construction of each phase of the work and it must be on site, inspected and approved by the Engineer. If after use of the equipment the Engineer determines that the work provided does not meet the Contract requirement, the equipment shall be changed and the deficient work shall be removed and corrected as direct by the Engineer.

3.3 All suitable materials from stripping of top soil and excavation shall be used unless otherwise declared unsuitable by the Engineer. The suitable material shall comply with the requirements as specified in the respective clauses for various items.

3.4 The Contractor shall jointly survey the area marked for pavements utilities, service lines, buildings or other structures or any area designated by the Engineer and prepare the survey drawings showing natural ground profile and cross-section and submit to the Engineer for approval prior to start of any earthwork operation.

All suitable material from excavations shall be transported to and placed in fill areas or stockpiled at locations designated by the Engineer. Materials from excavation and stripping shall be stockpiled separately.

Existing utilities which are to remain in service or to be relocated and to remain in service until relocation are to be determined by the Contractor. They shall be safeguarded and protected from damage.

If any existing service lines, utilities and utility structures which are to remain in service are uncovered or encountered during the operations, shall be safe guarded, protected from damage and supported as directed by the Engineer.

3.5 All excavations, cut and fills 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 cuts and fills, in structures and other works, caused by slips, falls of wash-ins or any other ground movement due to the Contractor's negligence shall be made good by the contractor at his own cost.

4.0 SITE PREPARATION

4.1 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 shall appear during the progress of the works, the Contractor shall at his own expense rectify such error, to the satisfaction of the Engineer.

4.2 The Contractor shall construct and maintain accurate bench marks so that the Lines and Levels can be easily checked by the Engineer.

4.3 The Contractor shall construct and maintain such temporary drains in addition to those shown on the plans, as will adequately drain areas during construction.

4.4 The Contractor shall perform a joint survey with the Engineer's Representative, of the area where earth work is required, plot the ground levels on the drawings and obtain approval from the Engineer before starting the earth work and shall supply a copy to the Employer duly checked, signed and authenticated by the Engineer before start of work.

5.0 CLASSIFICATION OF EXCAVATION

5.1 No classification shall be made of any material excavated / cut as to its class, nature, origin or condition. The excavation will be unclassified as being carried out in all kinds of subsurface material including soil and rock.

Blasting will be permitted only when proper precautions are taken for the safety of all persons, the work, and the property. All damage done to the work or property shall be repaired at the Contractor's expense. All operations of the Contractor in connection with the transportation, storage, and use of explosives shall conform to all state and local regulations and explosive manufacturers' instructions, with applicable approved permits reviewed by the Engineer. Any approval given, however, will not relieve the Contractor of his / her responsibility in blasting operations.

In each distinct blasting area, where pertinent factors affecting blast vibrations and their effects in the area remain the same, the Contractor shall submit a blasting plan of the initial blasts to the Engineer for approval. This plan must consist of holes size, depth, spacing, burden, type of explosive, type of delay sequence, maximum amount of explosive on any one delay period, depth of rock and depth of overburden if any. The maximum explosive charge weights per delay included in the plan shall not be increased without the approval of the Engineer.

The Contractor shall keep a record of each blast fired – its date, time and location; the amount of explosives used, maximum explosive charge weight per delay period, and, where necessary, seismograph records identified by instrument number and location.

The excavation wherever required will be carried out below ground water level by dewatering the area.

The Contractor shall build, maintain and operate all berms, channels, flumes, sumps and other temporary diversion and protective works needed to divert the surface water through or around the required excavation. All excavation shall be dewatered and kept free of standing water, water seeping from the sides and bottom of excavation above, the free level. The Contractor shall furnish, install, operate and maintain all drains, sumps, pumps and other equipment needed to dewater the excavation areas. Dewatering methods that cause a loss of fines from the bottom and slopes of the excavation will not be permitted.

Prior to commencement of the work, the Contractor shall furnish the Engineer for review and comments with complete plans and sketches for diverting surface water if any and dewatering of the required excavation.

Submission for review and comments of the required plans and sketches and any approval from Engineer shall not relieve the Contractor of any of his duties and obligations under the contract.

5.2 **Tolerance**

In those areas upon which a sub-base or base course is to be placed, the top of the subgrade shall be of such smoothness that when tested with a 4.8 m (15.75 ft.) straight edge applied parallel and at right angles to the centerline, it shall not show deviation in excess of 12 mm (1/2") or shall not be more than 16 mm (5/8") from line grade as established by grade hubs or pins. Any deviation in excess of these amounts shall be corrected by loosening, adding, or removing material; reshaping; and recompacting by sprinkling and rolling.

On graded strips (safety areas) intermediate and other designated areas, the surface shall be of such smoothness that it will not vary more than 30 mm (1-1/4") from true grade as established by grade hubs.

6.0 EMBANKMENT CONSTRUCTION

6.1 General

It shall consist of construction of select embankment for paved areas and common embankment for unpaved areas. Only approved material shall be used in the construction of embankments.

All embankment construction shall be made to the lines, levels, profiles and grades as shown on the drawings or established by the Engineer. During progress of the work it may be found necessary or desirable by the Engineer to vary the levels, elevations and grades from those shown on the drawings. The Contractor shall perform the embankment construction to the revised levels, elevation as established by the Engineer.

Where embankments are to be placed in water logged areas and which are inaccessible to heavy construction equipment, a working platform shall be first established, consisting of a blanket of fill material placed on the water logged area. The thickness of the working platform shall be about 0.5 metres (1.65 feet) unless directed otherwise by the Engineer and the width shall be that of the embankment. The placement and compaction of the working platform shall be performed by use of light equipment as directed by the Engineer. No density requirements are specified for the working platform, however, subsequent layers above shall be compacted to densities specified in the relevant items.

Benching of sufficient width for slope stability and movement of equipment and machinery shall be carried out for embankment formation in areas of steep slopes.

6.2 Select Embankment

The select embankment shall be constructed under all paved areas. The area shall be prepared (after stripping of top soil) by scarifying the surface to a minimum depth of 150 mm (6”) and compacting it to densities mentioned in subsection 6.2.2.

6.2.1 Material

The suitable subsurface material obtained from excavation (except top soil) shall be used in the construction of select embankment. The material shall be A-4 or superior as per AASHTO soil classification. The soaked CBR of the material shall be equal to or greater than 6. In the top 30 cm (12 in.) the material shall be A-4 or superior and the PI ≤ 8. When excavated material consists predominately of rock fragments of such size that the material cannot be placed in layers of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in layers not exceeding 60 cm (2 ft.) in thickness. Each layer shall be leveled and smoothed with suitable leveling equipment and by distribution of spalls and finer fragments of rock. These type lifts shall not be constructed above an elevation 150 cm (5 ft) below the finished sub-grade.

6.2.2 Formation of Embankment

Embankment shall be formed in successive horizontal layers of not more than 200 mm (8 in.) in loose depth for the full width of the cross-section, unless otherwise approved by the Engineer.

The material placed in layers and the sub-grade scarified shall be compacted to the density specified below:

Depth (cm) Below Subgrade Level		**Percent of Max. dry Density as per ASTM D1557**	
Cohesive Soil	**Non-Cohesive Soil**	**Cohesive Soil**	**Non-Cohesive Soil**
0 to 30	0 to 60	95%	100%
30 to 75	60 to 100	93%	95%
Over 75	Over 100	90%	90%

Sub-grade level is the surface on which the pavement structure will be placed.

The maximum density of sand (granular) material (if used) shall also be determined as per ASTM D4253. The higher of the two values obtained from ASTM D1557 and ASTM D4253 shall be used to check the relative compaction of the in place material.

The moisture content of the material should be controlled to within ±2% of the optimum moisture content. In order to achieve a uniform moisture content throughout, the wetting and drying of the material, and manipulation shall be required when deemed necessary. Also, the California Bearing Ratio test (ASTM D1883) may be conducted on soil if instructed by the Engineer.

The embankment formed by rock fragments of such size that the material can not be placed in layers of thickness prescribed without crushing, pulverizing or further breaking down the pieces, such material may be placed in layers not exceeding 60 cm (2 ft.) of loose measurement and compacted by vibrating roller with mass as specified hereunder:

Mass per metre width of Vibrating roll	**Depth of fill layer**	**Number of passes of the roller on each layer**
2300 – 2900 kg/m 1550-1950 lbs./ft.	40 cm 16 in.	5
2900 – 3600 kg/m 1950-2400 lbs./ft.	50 cm 20 in.	5
2600 – 4300 kg/m 1750-2900 lbs./ft.	60 cm 24 in.	5

The material shall be carefully placed in layer so that all larger stones will be well distributed and voids completely filled with smaller stones, small spall and soil to form a solid mass. After placing the rock material, surface shall be covered with fine material having thickness less than 20 cm (8 in.).

Material for each layer should be consolidated with heavy weight vibratory roller until settlement as checked between two consecutive passes of roller is less than 1% of the layer thickness. When rock to be incorporated in fill is composed largely of weak or friable material, the rock shall be reduced to a maximum size not exceeding 50% of the thickness of the layer being placed.

6.3 **Common Embankment**

6.3.1 Material

The area requiring common embankment, and other unpaved areas shall be constructed from the excavated soil and rock. The top soil obtained from stripping may be used at deeper level with the approval of the Engineer.

6.3.2 Formation of Embankment

Before placing and compacting the fill material the ground shall be scarified to a depth of 15 cm (6 in.) and compacted to a dry density of 90% as per laboratory compaction test method ASTM D1557. The moisture content of soil during compaction of scarified layer and successive layers shall be within ±2% of optimum moisture content before rolling to obtain the desired density results. The successive horizontal layers shall be formed in loose depth 200mm(8 in.) for the full width of the cross section unless otherwise approved by the Engineer. Each layer will be compacted to dry density of 90% as per laboratory compaction test method ASTM D 1557.

The layer thicknesses and compaction requirements shall be the same as specified under ‘Select Embankment’ for embankment formed by rock fragments.

No rock larger than 8 cm (3 in.) in any dimension shall be placed in top 30 cm (12 in.) of embankment unless allowed by the Engineer.

6.4 **Tolerances**

Select Embankment

The grade surface of each layer excluding final layer, shall be smooth and even and tolerance from required grade shall not be more than 19 mm (3/4 in.).

Common Embankment

The grade surface of each layer including the final layer, shall be smooth and even and tolerance from required grade shall not be more than 19 mm (3/4 in.).

6.5 **Sub-grade Preparation in Cut**

The area shall be prepared (after stripping of top soil) by scarifying the surface to a minimum of 150 mm (6 in.) and compacted to density mentioned in subsection 6.2.3. In case the material below Sub-grade level is not suitable (having PI >8) then a minimum of 30 cm (12 in.) of the soil shall be improved to PI ≤ 8.

The surface of the Sub-grade level (fill & cut) shall have the following tolerances:

- Plus : 0 mm (0 in.)
- Minus : 40 mm (1-5/8 in.)

7.0 **QUALITY CONTROL**

A testing program shall be submitted by the Contractor. Tests shall be performed by the Contractor to ensure compliance with the specifications as required. A copy of all test reports shall be submitted to the Engineer for approval. The test shall be performed in accordance with the following test procedures and frequency of testing.

Prior to construction of embankment, classification and compaction tests shall be carried out on stock-piled material obtained from stripping of top soil and excavated subsurface material (soil & rock). The tests shall be carried out as per ASTM 422, ASTM 424 and ASTM D 1557. A family of laboratory compaction curves as per ASTM D 1557 representing typical material shall be developed for the fill / backfill material.

The frequency of classification tests shall be for every 1000 cu.m / 35,000 Cft. of fill material. The Engineer may alter the frequency of testing depending on the type of material and variation encountered at site.

The field density tests shall be performed as per ASTM D 1556 or ASTM D 2167. The frequency of testing shall be as under:

Select Embankment

Area requiring 90% to 93% compaction – one test in every 500 m^2 / 5000 Sft. area in each layer

Area requiring 95% & 100% compaction – one test in every 300 m^2 / 3000 Sft. area in each layer

Common Embankment

Area requiring 90% compaction – one test in every 1000 m^2 / 10000 Sft. area

The average of four tests are required to be greater than the required compaction and not more than one test be 1.8% less than required percentage of compaction. This is for 100% compaction. For 95% to 90% compaction the following is required.

%age Compaction	One test not less than
95%	93.5%
90%	89.5%

8.0 EARTH WORK FOR STRUCTURES, STORM WATER DRAINS & CULVERTS

8.1 Excavation

Excavation, including dewatering where required, for building/related structures, culverts, storm water drains etc. shall conform to the elevations and dimensions as shown on the drawings and extend to a sufficient distance to permit placing and removal of concrete formwork or other construction.

When determined by the Engineer to be insufficiently firm, excavation bottoms shall be further excavated to reach firm ground or backfilled with suitable material and compacted to 95% of maximum dry density as per ASTM D-1557.

All excavations in foundations shall be taken as 150 mm (6 in.) above the final excavation elevations shown on the drawings and the last 150 mm (6 in.) shall be trimmed carefully to a smooth surface. Immediately after trimming to final elevation, a layer of blinding concrete shall be placed to thickness shown on the drawings.

8.2 Fill and Backfill for Structures, Storm Water Drains and Culverts:

8.2.1 After completion of foundation footings, foundation walls and other construction below the elevation of the final grades and prior to start of back-filling, forms shall be removed and the excavation shall be cleaned of trash and debris.

8.2.2 The backfilling/fill shall include filling under the floors where shown or required and around the foundations.

8.2.3 The backfilling/fill shall include loading, unloading transporting, placing, stacking, spread of earth, watering, rolling, ramming and compaction etc. complete as specified herein.

8.2.4 Filling in foundations shall be placed in 200mm (8 in.) loose layers and compacted at optimum moisture content by mechanical means or other means as approved by the Engineer.

8.2.5 Material for backfilling shall be as approved by the Engineer and compacted to produce insitu dry density not less than 95% of the maximum dry density as achieved by compaction test as per ASTM D-1557.

9.0 MEASUREMENT AND PAYMENT

9.1 General

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned items related to this section. The cost thereof shall be deemed to have been included in the quoted unit rates of the items of the Bill of Quantities under this section.

9.1.1 Timber shoring, planking, strutting and providing slope for upholding the sides of excavations.

9.1.2 Benching of sufficient width for slope stability and movement of equipment and machinery.

9.1.3 De-watering where required to keep the excavated areas dry for pavements, structures, storm water drains and culverts, during construction.

9.1.4 Rolling, leveling, watering and compaction for construction of embankments to required density.

9.1.5 Any fill with approved materials necessitated by over excavation due to fault or convenience of the Contractor.

9.1.6 Stock piling the excavated materials at approved location within Contract limits and transporting back suitable material to places requiring fill or backfill.

9.1.7 Scarifying & compaction of ground.

9.1.8 Transporting & backfill the suitable material from stripping.

9.1.9 Extra excavation involved in providing adequate working space around sides of foundations and culverts.

9.1.10 Rolling, leveling, watering and compacting the fill and backfill to required density.

9.1.11 All laboratory and field tests stipulated in these specifications

9.1.12 Preparation of sub-grade

9.2 **Embankment (Select)**

9.2.1. Measurement

Measurement of acceptably completed work of constructing select embankment will be made on basis of actual volume in cubic metre / cubic feet of compacted select embankment placed in position in accordance with the lines, levels and grade as shown on drawings or as directed by the Engineer.

9.2.2 Payment

Payment will be made for acceptable measured quantity of select embankment on the basis of unit rate per cubic metre / cubic feet quoted in the relevant items of Bills of Quantities and shall constitute full compensation for all the work related to the item.

9.3 **Embankment (Common)**

9.3.1 Measurement

Measurement of acceptably completed work of constructing common embankment will be made on basis of actual volume in cubic metre / cubic feet of compacted embankment placed in position in accordance with the lines, levels and grade as shown on drawings or as directed by the Engineer.

9.3.2 Payment

Payment will be made for acceptable measured quantity of common embankment on the basis of unit rate per cubic metre / cubic feet quoted in the relevant items of Bills of Quantities and shall constitute full compensation for all the work related to the item.

9.4 **Excavation**

9.4.1 Measurement

The quantities set out for excavation and its subsequent disposal shall be deemed to be the bulk quantity before excavating and no allowance shall be made for any subsequent variations in bulk or for any extra excavation.

Measurement of acceptably completed works of excavation for structures, storm water drains and culverts will be made on the basis of actual volume in cubic metre / cubic foot of earth material excavated to the line, level and grade as shown on the drawings or as directed by the Engineer. It shall be calculated / measured from pre-work levels and levels shown on the drawing.

9.4.2 Payment

Payment will be made for acceptable measured quantity of excavation on the basis of unit rate per cubic metre / cubic foot quoted in the Bills of Quantities and shall constitute full compensation for all the work related to this item.

9.5 **Backfill/Fill**

9.5.1 Measurement

Measurement of acceptably completed works of backfill/fills for structures, storm water drains and culverts will be made on the basis of actual volume in cubic metre / cubic foot of compacted backfill/fill provided and placed in position in accordance with the lines, levels and grade as shown on the drawings or as directed by the Engineer.

9.5.2 Payment

Payment will be made for acceptable measured quantities of backfill/fills for structures, storm water drains and culverts on the basis of unit rate per cubic metre / cubic foot quoted in the respective items of Bills of Quantities and shall constitute full compensation for all the works related to the item.

*** End of Section 1100 ***

SECTION - 1600

TERMITE CONTROL TREATMENT

1. SCOPE

2. MATERIAL

3. QUALITY ASSURANCE

4. EXTENT OF APPLICATION

5. STANDARDS

6. SAMPLES AND TESTS

7. GUARANTEE

8. MEASUREMENT & PAYMENT

SECTION – 1600

TERMITE CONTROL TREATMENT

1.0 **SCOPE**

The scope of work for anti termite treatment includes injection of insecticide in sides and bottom of foundation trenches, spraying on stockpiled backfill material and injections of the insecticide in floor sub-grade of the building. The scope also covers treatment of all wood works with insecticides before installation in position.

2.0 **MATERIAL**

2.1 An emulsible concentrate insecticide shall be used for dilution with water, specially formulated to prevent infestation by termites. Fuel oil will not be permitted as a diluent. Provide a working solution of the following chemical element and concentrations.

HEPTACHLOR emulsifiable to 0.5% with clean water
or
TERMIDOR 25EC containing FIPRONIL
or
BIFLEX with Bifenthrin Tech 25.1%
Or
MIRAGE
Or
Approved Equivalent

2.2 All mixing shall be done at site and mixing proportion of insecticide with water shall be in accordance with the approved manufacturer's recommendations and shall be verified by the Engineer.

2.3 Pure turpentine shall be used for dilution of insecticide, in approved proportion for application to woodwork.

3.0 **QUALITY ASSURANCE**

3.1 In addition to the requirements of these specifications, comply with manufacturer's instructions and recommendations for the work, including preparation of substrata and application.

3.2 A professional operator shall be engaged who shall have license in accordance with regulations of governing authorities for application of soil treatment solution.

4.0 **EXTENT OF APPLICATION**

4.1 Insecticide solution shall be applied with approved pressure spraying equipment maintaining a pressure of 150 psi to all applications to, on or in earth.

4.2 Soil treatment shall begin after all work of preparation of earth prior to installation of concrete has been done. After application, no additional earth moving or work upon sub grade should be done. No covering of earth or concrete should be applied over soil treatment until at least 24 hours after treatment has been made.

4.3 Insecticide solution should not be applied during wet weather, or when the earth surface is excessively wet. Application should be made to all areas beneath concrete slabs-on-grade, including sidewalks and paving abutting buildings for distance of at least 2 metres (6.5 feet) beyond building line. Solution shall be applied in amounts of not less than 5 lit./ sq. m. or 5 lit./10.76 sq.ft. of area. If applied over gravel or sand fill, application shall not be less than 7 lit./ sq.m or 7 lit./10.76 Sq.ft. of area. Insecticide shall penetrate to a depth of 25 mm (1-

inch) minimum in porous earth at bottom and 50 mm to 75 mm (2 inch to 3 inch) at sides of excavations.

4.4 Sides of foundation excavations, grade beam, and similar areas shall be treated with solution at a rate of 0.5 lit per square feet (5 lit per square metre) upon inner sides of such excavations, and at all locations where concrete slabs for platforms and similar work abut the building. Similar treatment shall be made at all locations where expansion joints, control joints, column bases and similar work occur at or below grade slabs.

4.5 In the areas of application signs shall be fixed to show that soil treatment has been applied. Such signs shall be removed when areas are covered by other construction.

4.6 Care shall be exercised to insure that no marks or damage occurs to the finished structure as a result of the work under this section.

4.7 All woodwork for the entire project is to be insecticide treated (before application of solignum). Insecticide shall be sprayed on all surfaces of all the wooden work viz., door frames, blocking, furring, planks, boards etc. before installation. Spraying is to be done at the site, after delivery and before installation. No spraying shall be necessary after field sawing, jointing or installation of such material.

5.0 STANDARDS

All methods of termite protection used herein shall be in accordance with the standard practices of National Pest Control Association, U.S.A and the British Wood Preserving Association.

6.0 SAMPLES AND TESTS

The Contractor shall supply samples of all the materials to be used for insecticide control for approval of the Engineer and testing in accordance with the specified standards. Rejected materials shall be removed from the site immediately.

7.0 GUARANTEE

The Contractor is to guarantee that the building shall be free from termites (white ants), wood bores and other pests, 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 damaged 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.

8.0 MEASUREMENT & PAYMENT

8.1 General

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bills of Quantities. The cost there of shall be deemed to have been included in the quoted unit rate of the respective items of the Bills of Quantities.

8.1.1 Termite control treatment on wood works.

8.1.2 Turpentine & Water required for mixing insecticide solution.

8.1.3 Transportation of material and storage at site.

8.1.4 Anti-termite treatment on stock piled backfill material.

8.1.5 Termite control treatment to vertical surfaces.

8.2 **Termite Control Treatment**

8.2.1 Measurement

Measurement of acceptably completed works of termite control treatment will be made on the basis of number of square meter / square foot of plinth area treated of ground floor/lower floor by measuring the two dimensions (length & breadth) of treated area in plan. No separate measurement will be made for the vertical or horizontal surfaces of the foundations.

8.2.2 Payment

8.2.2.1 Payment will be made for acceptable measured quantity of termite control treatment on the basis of unit rate per square meter / square foot of plinth area treated for of ground floor/lower floor quoted in the relevant items of Bills of Quantities & shall constitute full compensation for all the works related to the item.

8.2.2.2 For "Termite Proofing", the rate is for the unit plinth area (measured along the outside of the external walls at DPC or peripheral plinth beam level irrespective of the number of storeys in the building) and covers the followings operations:

i. Treatment of bed and sides of excavated foundation trenches.

ii. Treatment of backfill.

iii. Treatment of filled up earth.

iv. Treatment of timber to be used.

v. Treatment of surrounding areas within 3 meters (10 feet) of the building.

vi. Any other operation which the specialized firm may deem necessary in context to their guaranteed obligations.

*** End of Section 1600 ***

SECTION - 2100

FORMWORK

1. SCOPE
2. GENERAL
3. MATERIALS
4. DELIVERY AND STORAGE
5. WORKMANSHIP
6. MEASUREMENT & PAYMENT

SECTION - 2100

FORMWORK

1.0 SCOPE

The work under this section of the Specifications consists of furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with the supply and installation of formwork for the purpose of containing concrete during placement and consolidation in the required shape and form.

2.0 GENERAL

It shall be the responsibility of the Contractor to perform the work by engaging well trained and experienced staff.

3.0 MATERIALS

The Contractor shall use the following materials for different purposes as stated below:

3.1 Timber

Form framing, sheathing and shoring.

3.2 Plywood

Form sheathing and panels.

3.3 Steel

- Heavy forms and false work
- Column and joint forms
- Permanent forms
- Welding of permanent forms

3.4 Form Ties Anchors and Hangers

For securing formwork against placing loads and pressures.

3.5 Coatings

Facilitate form removal.

3.6 Steel Joints

For formwork support.

3.7 Steel frame shoring

For formwork support.

4.0 DELIVERY AND STORAGE

4.1 Delivery

The delivery of formwork components shall be made in a manner so as not to cause damage.

4.2 **Storage**

Form work should be stored, after cleaning and preparing for re-use, if used before in such a manner that access to all different component is available.

Form work component which can be affected by weathering shall be stored in appropriate building or under covers and shade.

5.0 **WORKMANSHIP**

5.1 Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete and shall have sufficient rigidity to maintain specified tolerances.

Where required details and locations of special forms to be used are set out on the drawings. The Engineer shall reject any formwork in any part of the work which has been constructed with a non- approved formwork. Approval of form work by the Engineer shall be one of these conditions to be fulfilled before concreting. The Engineer shall reject any concreting which may not conform to the approved model.

5.2 Earth cuts shall not be used as forms for vertical surfaces of reinforced concrete work unless required as such or permitted by the Engineer.

5.3 Formwork shall be of timber, steel, plywood, proprietary building boards and such special materials, as may be approved by the Engineer, which give the required finish and shape to the surface of concrete. Wooden formwork shall be free from loose knots and shall be well seasoned.

5.4 The 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 the concrete, and shall be sufficiently tight to prevent loss of liquid from the concrete.

The design and engineering of the formwork, as well as its construction, shall be the responsibility of the Contractor. Where necessary, to maintain the specified tolerances, the formwork shall be cambered to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete and due to construction loads.

The Contractor shall establish and maintain in an undisturbed condition and until final completion and acceptance of the project, sufficient control points and bench marks to be used as references for checking upon tolerances.

5.5 Requirements for `facing materials' are given in the Section relevant to `Finishing of Formed Surfaces.'

5.6 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 will require little dressing to arrive at true surfaces. Where any as-cast finish is required, no dressing shall be permitted in the finishing operation.

5.7 Where as-cast surfaces, including natural plywood- form-finish are specified, the panels of material against which concrete is cast shall be orderly in arrangement, with joints between panels planned in approved relation to openings, building corners, and other architectural features.

5.8 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, where possible, within the joints so that patches of tie holes will not fall within the panel areas.

5.9 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 finish. Forms shall be thoroughly cleaned and properly coated before re-use.

5.10 Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Unless otherwise specified in the Contract documents chamfer strips shall be placed in the corners of forms to produce beveled edges on permanently exposed surfaces. Interior corners on such surfaces and the edges of formed joints will not require beveling unless required by the Contract documents.

5.11 Positive means such as wedges or jacks for accurate adjustment and for proper removal of shores and struts shall be provided and all settlement shall be monitored during concrete placing operation. Forms shall be securely braced against lateral deflections.

5.12 Where concreting of thin 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 concrete. Small temporary openings shall also be provided at the bottom of the formwork for columns, walls and deep beams to permit the cleaning out of debris and observation immediately before concrete is deposited.

5.13 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 and in no case shall this distance be less than 19mm (3/4 in.) when the formed face of the concrete is not to be permanently exposed to view from ties may be cut off flush with the formed surfaces.

Through bolts may 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.

5.14 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 no less than 25mm (1 in.). The forms shall be held against the hardened concrete to prevent offsets or loss of mortar at the construction joint so as to maintain a true surface.

5.15 Wood forms for wall opening shall be constructed to facilitate loosening, if necessary, to counteract swelling of the forms.

5.16 Wedges used for final adjustment of the forms prior to concrete placement shall be fastened in position after the final check.

5.17 Formwork shall be so anchored to shores or to other supporting surfaces or members that upward or lateral movement of any part of the formwork system during concrete placement will not occur.

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

5.19 All surfaces of forms and embedded materials shall be cleaned of any accumulated mortar or grout from previous concreting and of all other foreign material before placing fresh concrete.

5.20 Forms shall be sufficiently tight to prevent leakage of grout or cement paste. Board forms having joints opened by shrinkage of the wood shall be removed and replaced. Plywood and other wood surfaces not subject to shrinkage shall be sealed against

absorption of moisture from the concrete by either (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. Excess coating material shall not be allowed to stand in puddles in the forms nor allowed to come in contact with the concrete against which fresh concrete will be placed. Care shall be taken that such approved composition 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 material applied to form surfaces shall be compatible with the type of paint to be used.

5.21 For reinforced concrete, in no circumstances shall forms be struck until the concrete attains a strength of at least twice the stress to which the concrete may be exposed at the time of striking.

The strength referred to shall be that of concrete using the same cement and aggregates, with the same proportions, and cured under conditions of temperature and moisture similar to those obtaining in the work. Where possible, the formwork should be left for longer time as it would assist the curing.

In normal circumstances (generally where temperature are above 20^{O} C and where ordinary cement is used) forms may be struck after expiry of the following periods:

- Walls, columns and vertical 48 hours or as may sides of beams decided by the Engineer.

- Side of slab (shores of 6 days props left under)

- Beams soffits (shores or 12 days props left under)

- Removal of shores or props to slabs:

    1. Spanning upto 4 metre (13 ft.) 10 days.
    2. Spanning over 4 metre (13 ft.) 16 days.

- Removal of shores or props to beams:

    1. Spanning upto 6 metre (20 ft.) 18 days.
    2. Spanning over 6 metre (20 ft.) 25 days.

For rapid hardening cement 3/7 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.

The number of shores or props, their sizes and disposition shall be such as to be able to safely carry the full dead load of the slab and beams, as the case may be.

Proper allowance shall be made for the decrease in rate of hardening of concrete in cold weather and the above minimum duration must be increased when the mean daily temperature is below 20^{O} C.

5.22 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.

5.23 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 treatment required on such slopping surfaces shall be performed at once and be followed by the specified curing.

5.24 Wood forms for wall openings shall be loosened as soon as this can be accomplished without damage to the concrete.

5.25 All formwork shall be removed without such shock or vibration as would damage the reinforced concrete. Before the top plank and struts are removed, the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened. Proper precautions shall be taken to allow for the decrease in the rate of hardening that occurs with all cement in the cold weather.

5.26 When reshoring or repropping is permitted or required, the operations shall be planned in advance and shall be subject to approval. While reshoring is underway no live loads shall be permitted on the new construction.

In no case during reshoring shall concrete in beams, slab, columns or any other structural member be subjected to combined dead and construction loads in excess of the load permitted by the Engineer for the developed concrete strength at the time of reshoring.

Reshores shall be placed as soon as practicable after stripping operations are complete but in no case later than the end of working day on which stripping occurs.

Reshores shall be tightened to carry their required loads without overstressing the construction. Reshores shall remain in place at least until tests representative of the concrete being supported have reached the strength specified in sub-clause 5.23 hereof.

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

The reshoring 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 loads of the floors supporting shores or props are not exceeded.

5.28 It is generally desirable to give forms for reinforced concrete an upward camber to ensure that the beams or slabs (specially cantilever slabs) do not have a sag when they have taken up their deflection, but this should not be done unless permitted by the Engineer.

5.29 No loads, other than man and light plant required 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.

5.30 Prior to placing concrete, all forms shall be inspected and all debris and extraneous matter removed. The form oil or release agent shall not react with concrete to affect the strength nor shall it give any colour. It shall be applied in such a manner as not to contaminate the reinforcement and other fixtures to be embedded in concrete.

5.31 Formwork for concrete pavement shall be made of steel of an approved section, with a base width of at least 200 millimeters (8 in.) and the depth shall be equal to the thickness of the pavement at the edge as shown on the plans. The forms shall be staked with steel stakes, and stakes shall be of a length approved by the Engineer. Each section of forms shall have a stake pocket at each end and at intervals of not more than 1.5 meters (5 ft.) between ends. The stake pockets shall have approved devices for locking the form to the steel stakes. Each section of forms shall be straight and free from bends and warps at all times. No section shall show a variation greater than 3millimeter in 3 meters (1/8 inch in

10 ft.) from a true plane surface on the top of the form, and the inside face shall not vary more than 6 millimeters (1/4 in.) from a plane surface.

Before placing forms, the underlying base shall be to the required grade, and shall be firm and compact. The forms shall have full bearing upon the foundation throughout their length and shall be placed with exactness to the required grade and alignment of the edge of the finished pavement. They shall be so supported during the entire operation of placing, tamping and finishing the pavement that they will not deviate vertically at any time more than 3 millimeters (1/8 in.) from the proper elevation.

Forms shall not be removed for at least twelve (12) hours after the concrete has been placed. Forms shall be carefully removed in a manner to avoid damage to the pavement. Under no circumstances will the use of pry bars between the forms and the pavement be permitted. Pavement, which in the opinion of the Engineer, is damaged due to the careless removal of forms shall be repaired by the Contractor, as directed by the Engineer, at the Contractor's own expense. Forms shall be thoroughly cleaned and oiled each time they are used.

When pavement is placed adjoining existing concrete pavement upon which the finishing machine will travel, any irregularities in the old pavement shall be ground down to a true, uniform surface, of sufficient width to accommodate the wheels of the finishing equipment, if necessary to obtain proper smoothness of the pavement.

6.0 MEASUREMENT AND PAYMENT

Except otherwise specified in the Bill of Quantities no payment will be made for the works involved within the scope of this section of the specifications.

The cost thereof shall be deemed to have been included in the quoted unit rate of relevant concrete items of the Bills of Quantities.

*** End of Section 2100 ***

SECTION - 2200

REINFORCEMENT

1. **SCOPE**
2. **APPLICABLE STANDARDS**
3. **MATERIALS**
4. **COMPLIANCE WITH SPECIFICATIONS**
5. **DELIVERY & STORAGE**
6. **BAR BENDING SCHEDULES**
7. **FABRICATING, BENDING AND PLACING**
8. **MEASUREMENT & PAYMENT**

SECTION - 2200

REINFORCEMENT

1.0 SCOPE

The work under this section of specification consists of furnishing all plant, labour, equipment, appliances and materials and performing all operations in connection with the supply, transporting, cutting, bending and placing steel reinforcement, welded wire-fabric, dowels, tie-bars and assemblies in concrete structures, pavement or elsewhere, at any floor and at any height as shown in the drawings, as specified herein and as required by the site conditions or as directed by the Engineer.

2.0 APPLICABLE STANDARDS

Latest editions of the following Pakistan, British and ASTM Standards are relevant to these specifications wherever applicable.

Pakistan Standard

P.S 241 Tensile Testing of Steel.

P.S 244 Bend test for Steel

P.S 580 Rolled deformed Steel bars (intermediate grade) for concrete reinforcement.

P.S 605 Rolled deformed steel bars (hard grade) for concrete reinforcement.

P.S 606 Rolled deformed Steel bars (structural grade) for concrete reinforcement.

P.S 607 General technical delivery requirement for steel.

British Standard

B.S 4449 Carbon steel bars for reinforcement of concrete

B.S 4466 Specifications for Bending dimensions and scheduling of bars for the reinforcement of concrete.

ASTM Standard

A 185 Standard specification for welded steel wire fabric for concrete reinforcement.

A 305 Minimum requirement for the deformations of deformed steel bars for concrete reinforcement.

A 615 Standard specification for deformed and plain billet steel bars for concrete reinforcement.

ACI Codes

ACI 315 Details and Detailing of Concrete Reinforcement (ACI Publication SP-66)

ACI 318 Building Code Requirements for Reinforced Concrete.

In addition to the above, the latest editions of other Pakistan Standards, British standards, American Concrete Institute Standards, American Society for Testing and Materials Standards and other standard as may be specified by the Engineer for Special Material and construction are also relevant.

3.0 MATERIALS

3.1 Reinforcement

3.1.1 General

Reinforcement shall be obtained only from manufacturers approved by the Engineer. Each consignment of reinforcement steel shall be accompanied by the manufacturer's certificate or shall refer to a previous certificate, if the consignment is from the same batch, showing that the reinforcement steel complies with the specified requirement. If such certificate is not made available, the Engineer may direct testing of different consignments of reinforcing steel at the Contractor's cost. Should the result of such tests show that the sample does not meet with the specifications the whole consignment shall be rejected and removed from the site at the Contractor's cost.

Reinforcement shall be free from all loose or flaky rust and mill scale or coating, and any other substance that would reduce or destroy the bond. Reduced section steel reinforcement shall not be used.

3.1.2 Reinforcing Steel

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 characteristic strength of 36,000 psi (250 MPa).

Unless otherwise specified, all deformed reinforcing bars shall comply with the requirements of ASTM A-615 for deformed hot rolled new stock billet steel bars and shall have a minimum characteristic strength of 40,000 psi (276 Mpa) and 60,000 psi (414 MPa), as shown on drawings.

3.1.3 Spacers and Supports

Spacers and supports shall be approved standard products of types best suited for the purpose.

3.1.4 Welding

The bars shall not be welded, unless prior approval of the Engineer is obtained in writing. If permitted, welding shall be done in accordance with relevant codes and standards taking all necessary precautions and safeguards. Where welding is unavoidable the Engineer may require substitution of the high strength deformed bars by plain round steel bars of lower grade, conforming to BS 4449, of equivalent strength.

4.0 COMPLIANCE WITH SPECIFICATIONS

The Contractor shall submit certificates of compliance from the manufacturer stating that the supplied reinforcement conforms to the Specifications. In addition, wherever and as directed by the Engineer, conformance of the supplied reinforcing bars with the specifications shall be demonstrated by the Contractor through laboratory tests, in accordance with the relevant standards.

5.0 DELIVERY & STORAGE

5.1 Delivery

Steel reinforcement bars shall be kept in bundles firmly secured and tagged. Each bar or bundle of bars shall be identified by marks as per relevant BS standard.

5.2 Storage

The method of storage shall be approved by the Engineer. Reinforcing bars shall be stored in racks or platforms above the surface of ground and shall be protected free from scaling, rusting, oiling, coatings, damage, contamination and structural defects prior to placement in works. Bars of different diameters and grades of steel reinforcement shall be kept separately.

6.0 BAR BENDING SCHEDULES

The Contractor shall prepare bar bending schedules of all the reinforcing steel bars and shall obtain approval of the Engineer before proceeding with the work.

The Engineer's approval, however, will not relieve the Contractor of his responsibility in this regard.

7.0 FABRICATING, BENDING & PLACING

7.1 Reinforcement shall be accurately placed as shown in drawings and secured against displacement by using 16 gauge steel wire ties or suitable clips at intersections and supported from the formwork by using concrete, metal or plastic chains, 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 one part of cement to two 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 form work shall be galvanized or shall be made of plastic.

7.2 Bars used for concrete reinforcement shall be fabricated in accordance with the dimensions shown in the bar bending schedule approved by the Engineer.

7.3 The cutting tolerance for all reinforcing bars shall be 19 mm (3/4 in.).

7.4 Fabricating tolerance shall be as per ACI - 315.

7.5 Placing tolerances shall be as per ACI-318 & 317.

7.6 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, the resulting arrangement of bars shall be subject to approval of Engineer.

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

7.8 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.

Unless permitted, by Engineer, reinforcement shall not be bent after being partially embedded in hardened concrete.

7.9 No splice of reinforcement shall be made except as approved by the Engineer.

7.10 Welding of reinforcement shall not be done unless permitted and approved by the Engineer.

7.11 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 where the exposed part is to be built into later concrete.

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

7.13 All detailing shall be done as per ACI standards ACI-315, ACI-318 & ACI-350R, as and where required.

7.14 Standard or actual unit weight whichever is lesser shall be used for calculation of weights.

8.0 MEASUREMENT & PAYMENT

8.1 General

Except otherwise specified herein or elsewhere in the Contract Documents no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bills of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bills of Quantities.

8.1.1 Providing and installing chairs, supports, hooks, spacers, binding wires, corrosion protection sleeves, wire cage or basket for tie bars and dowels and laps not shown on drawings including wastage and rolling margin.

8.1.2 Testing of mild steel, deformed steel, welded wire fabric, dowels, tie bars and assemblies.

8.2 Reinforcing Bars.

8.2.1 Measurement

Measurement for acceptably completed works of reinforcement shall be made by weight in metric ton according to bar bending schedules approved by the Engineer.

8.2.2 Payment

Payment will be made for acceptable measured quantity of reinforcement provided and placed in position on the basis of unit rate per metric ton quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

*** End of Section 2200 ***

SECTION - 2300

PLAIN AND REINFORCED CONCRETE

1. SCOPE
2. APPLICABLE CODES AND STANDARDS
3. SUBMITTALS
4. MATERIALS
5. MATERIAL TESTING
6. EXECUTION
7. FINISHING OF FORMED SURFACES
8. REPAIR OF DEFECTS
9. CONCRETE CONSTRUCTION TOLERANCES
10. ACCEPTANCE OF STRUCTURE
11. MEASUREMENT & PAYMENT

SECTION - 2300

PLAIN AND REINFORCED CONCRETE

1.0 **SCOPE**

The work under this section of the specification consists of furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with the supply, manufacture, transporting, placing, consolidating, finishing and curing of plain and reinforced concrete for pavements and other structures as shown in the drawings, as specified herein and as required by the site conditions or as directed by the Engineer, for a complete job. Reinforcement does not form part of this section.

2.0 **APPLICABLE CODES AND STANDARDS**

The latest edition of following ACI, ASTM, Pakistan & British Standard are relevant to these specification wherever applicable:

2.1 ACI (American Concrete Institute)

- 117 Standard Specification for tolerances for concrete construction and materials.
- 201.2 Guide to durable concrete
- 211.1 Recommended Practice for Selecting Proportions for Normal and Heavy Weight Concrete.
- 214 Recommended Practice for Evaluation of Strength Test Results of Concrete.
- 301 Specifications for Structural Concrete for Buildings
- 304 Recommended Practice for Measuring, Mixing, Trans-porting, and Placing Concrete
- 305 Hot Weather Concreting
- 308 Recommended Practice for Curing Concrete
- 309 Recommended Practice for Consolidation of Concrete
- 315 Manual of Standard Practice for Detailing Reinforced Concrete Structures
- 318 Building Code Requirements for Reinforced Concrete
- 347 Recommended Practice for Concrete Formwork
- 350R Concrete Sanitary Engineering Structures
- 544.1R State-of-the-Art Report on Fiber Reinforced Concrete
- 544.2R Measurement of Properties of Fiber Reinforced Concrete
- SP-2 Manual of Concrete Inspection

SP-142 Fiber Reinforced Concrete Developments and Innovation

SP-155 Testing of Fiber Reinforced Concrete

SP-182 Structural Applications of Fiber Reinforced Concrete

UBC Uniform Building Code

COE CRD 48-92 Method of Test for Water Permeability of Concrete; U.S Army Corps of Engineers

NACE National Association of Corrosion Engineering

- A199.1 Construction and Industrial Plywood

2.2 ASTM (American Society for Testing and Materials)

- A 185 Standard Specification for Welded Steel Wire, Fabric for Concrete Reinforcement
- A 305 Minimum Requirements for the Deformations of Deformed Steel bars for Concrete Reinforcement
- A 499 Hot-Rolled Rail Carbon Steel Bars and Shapes
- A 615 Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- A 616 Standard Specification for Rail-Steel Deformed and Plain Bars for Concrete Reinforcement
- A 617 Standard Specification for Axle Steel Deformed and Plain Bars for Concrete Reinforcement
- A 675 Steel Bars and Bar Size Shapes, Carbon, Hot-Rolled, Special Quality, Subject to Mechanical Property Requirements
- A 615 Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- A706 Low-Alloy Steel Deformed and Pain Bars for Concrete Reinforcement
- A767 Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
- A775 Epoxy-Coated Reinforcing Steel Bars
- C 31 Making and Curing Concrete Test Specimens in the Field
- C 33 Concrete Aggregates
- C 39 Compressive Strength of Cylindrical Concrete Specimens
- C 40 Organic impurities in sand for concrete.
- C 42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- C 78 Flexural Strength of Concrete (Using Simple Beam with Third Point Loading)
- C 87 Effect of organic impurities in fine aggregates on strength of mortar.
- C 88 Soundness of Aggregates
- C 94 Ready-Mixed Concrete
- C 109 Compressive Strength of Hydraulic Cement Mortars
- C 117 Materials Finer than No.200 Sieve in Mineral Aggregates by washing.
- C 123 Light weight pieces in aggregates

- C 125 Concrete and Concrete Aggregates
- C 127 Test method for Specific Gravity and Absorption of Coarse Aggregate
- C 128 Test method for Specific Gravity and Absorption of Fine Aggregate
- C 131 Resistance to Degradation of small size Aggregate by Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine
- C 136 Sieve or Screen Analysis of Fine and Coarse Aggregates
- C 138 Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
- C 142 Clay Lumps and Friable Particles in Aggregates
- C 143 Slump of Portland Cement Concrete
- C 144 Aggregate for Masonry Mortar
- C 150 Portland Cement
- C 156 Test Method for Water Retention of Concrete Curing Materials
- C 157 Length Change of Hardened Hydraulic Cement Mortar or Concrete
- C 171 Sheet Materials for Curing Concrete
- C 172 Method of Sampling Fresh Mixed Concrete
- C 173 Air Content of Freshly Mixed Concrete by the Volumetric Method
- C 185 Air Content of Hydraulic Cement Mortar
- C 186 Heat of Hydration of Hydraulic Cement
- C 188 Density of Hydraulic Cement
- C 191 Time of Setting of Hydraulic Cement by Vicat Needle
- C 217 Weather resistance of Natural State
- C 227 Potential Alkali Reactivity of cement - Aggregate Combination.
- C 231 Air Content of Freshly Mixed Concrete by the Pressure Method
- C 260 Air-Entraining Admixtures for Concrete
- C 289 Potential reactivity of Aggregate
- C 293 Standard test method for Flexural Strength of Concrete (using simple beam with center Point Loading)
- C 309 Liquid Membrane-Forming Compounds for Curing Concrete
- C 321 Standard Test method for Bond Strength of Chemical Resistant material
- C 330 Light Aggregates for Structural Concrete
- C 332 Light weight aggregates for insulating concrete.
- C 348 Standard Test method for Flexural strength of Hydraulic Cement Mortars

- C 400 Requirements for water use in mixing and curing concrete

- C 494 Chemical Admixtures for Concrete

- C 535 Resistance to Abrasion of Large Size Coarse Aggregates

- C 595 Specification for Blended Hydraulic Cements

- C 596 Standard Test method for Drying, shrinkage of Mortar Containing Hydraulic Cement

- C 685 Concrete Made by Volumetric Batching and Continuous Mixing

- C 881 Epoxy-Resin-Base Bonding Systems for Concrete

- C 989 Ground Granulated Blast – Furnace Slag for use in Concrete

- C 995 Standard Test Method for Time of Flow of Fiber Reinforced Concrete Through Inverted Slump Cone

- C 1018 Standard Test Method for Flexural Toughness and First- Crack Strength of Fiber-Reinforced Concrete (Using Beam with Third-Point Loading)

- C1116 Standard specification for Fiber-Reinforced Concrete and Shotcrete)

- C 1399 Test Method for Obtaining Average Residual-Strength of Fiber-Reinforced Concrete

- D 75 Sampling Aggregates

- D 512 Chloride Ion in Water and Waste Water

- D 516 Sulphate Ion in Water and Waste Water

- D 596 Reporting Results of Analysis of Water

- D 1190 Concrete Joint Sealer, Hot-Poured Elastic Type

- D 1411 Water-Soluble Chlorides Present as Admixes in Graded Aggregate Road Mixes

- D 1751 Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

- D 1752 Preformed sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Concrete

- D 1850 Concrete joint sealer (cold application type)

- E 11 Wire-Cloth Sieves for Testing Purposes

- E 96 Water Vapour Transmission of Materials in Sheet Form

- E 154 Materials for Use as Vapour Barriers under Concrete Slab

- E 337 Relative Humidity by Wet and Dry Bulk Psychrometer

- CALIF 217 Method of Test for Sand Equivalent

- CALIF 227 Method of Test for Evaluating Cleanness of Coarse Aggregate

- CE CRD C 119 Method of Test for Flat and Elongated Particles in Coarse Aggregate

-CE CRD C400 Requirements for Water for Use in Mixing and Curing Concrete

- CE CRD C 513 Rubber Waterstops

- CE CRD C 572 Polyvinyl Chloride Waterstops

- CE CRD C 588 Expansive Grout

- FF MM G 650 Epoxy-Resin Grout

2.3 B.S (British Standard)

- 12 Portland cement (Ordinary & Rapid Hardening)

- 146 Portland Blast Furnace Slag Cement

- 410 Test Sieves

- 693 General Requirements for Oxy-acetylene Weld-ing

- 812 Methods for the sampling and testing of mineral aggregates, san fillers.

- 882 Coarse and fine aggregates from natural sources.

- 1305 Batch Mixer.

- 1881 Methods of Testing Concrete

- 3148 Tests for water for making concrete.

- 4027 Sulphate Resisting Portland Cement

- 4449 Carbon Steel Bars for the Reinforcement

- 4483 Steel fabric for the reinforcement of concrete

- 8110 Structural use of concrete.

In addition, the latest editions of other Pakistan Standard, ACI, ASTM & British Standard and other Standards as may be specified by the Engineer for Special Materials and construction are also relevant.

3.0 SUBMITTALS

All submittals shall be in accordance with the schedule of submittals prepared by the Contractor and approved by the Engineer.

3.1 Proposed Mix Designs

Submit proposed designs for trial design batches for each grade of concrete along with samples of proposed material.

Submit proposed final mix designs for each grade of concrete at least 7 calendar days before the date planned for the start of concrete placement, along with samples of proposed materials which differ from those submitted previously, and reports of successful 3, 7 and 28 calendar day strength tests, for Engineer's approval.

3.2 **Construction Procedure**

Submit to the Engineer procedures for the following:

a) Both hot and cold weather concreting procedures shall be submitted to the Engineer by Contractor regardless of the need for the immediate implementation of such not less than two weeks before beginning the work. Procedures shall include requirements for insulation, enclosures and the like. Finishing procedures and timing and duration of curing shall be described.

b) Contractor's construction procedures shall be computer word processed procedure and shall include charts and diagrams as applicable and necessary, to fully explain the subject procedures, methods and equipment operation in order to allow effective review by the Engineer, assist the Testing Agency's evaluation of the work, and to allow Contractor's personnel to perform work in full conformance to the Tender & Contract Document.

c) Protection of concrete against injury due to mechanical contact and construction operation.

d) Protection of work by other trades.

3.3 **Placement Schedule**

Submit a placement schedule for approval prior to start of concrete placement operations. Daily concrete pour schedules shall be submitted 24 hours in advance of planned pours.

3.4 **Formwork**

Submit for approval copies of manufacturer's data and installation instructions for proprietary materials including form coatings, manufactured form systems, ties and accessories.

3.5 **Certificates of Compliance**

Submit certificates of compliance covering cement types, reinforcement, grout materials, additives, epoxy-resin materials etc. The certificates of compliance shall include the material or product manufacturer's statements that supplied items conform to Specifications.

3.6 **Testing Programme**

Submit test programme for all specified requirements alongwith the testing schedule for approval of the Engineer.

3.7 **Test Reports**

Submit test reports showing the result of required tests and compliance with specified standards and codes, for approval. Test reports shall be certified by the Contractor and the Testing Agency.

3.8 **Samples**

Submit to the Engineer for acceptance prior to purchase, fabrication or delivery, samples of materials for his approval.

Substitute products materials or fixtures proposed by the Contractor shall be submitted as samples for approval. The samples shall be accompanied by detailed information about materials.

3.9 **Shop Drawings**

a) Shop drawings shall be submitted to the Engineer for approval in accordance with the requirements of the Contract Documents and as specified herein under:

b) Shop drawings furnished for this section shall conform to the best standards of the construction industry. Shop drawings shall be prepared under the supervision of competent engineering personnel. Prior to submittal, the Contractor shall check each shop drawing for compliance with the requirements of the Contract Documents. As evidence of conformance with this requirement, each shop drawing shall bear the seal and the self-written signature of Contractor's registered Professional Engineer.

c) Shop drawings shall include plans, elevations, sections and complete details to describe clearly, at an ample scale for all works to be provided. Drawings shall be accurately dimensioned, where applicable, and shall be noted clearly.

d) Work of Other Trades: Show in the shop drawings, and dimension thereon, holes required for passage of work of other sections through Cast-In-Place Concrete Work. Prepare and submit to the Engineer field work drawings for holes not shown in shop drawings.

e) Submit shop drawings for curved and radial concrete formwork and identify the formwork materials proposed for use.

f) Construction Joint, Expansion Joint and contraction Joint Drawings: Show all joints given in the drawings, specified herein, and required by Contractor to provide for the sequence of pourings. Submit in sufficient time to allow the orderly detailing of reinforcing steel. Reinforcement shop drawings shall be prepared in conformance with the accepted Construction Joint, Expansion Joint and contraction Joint Drawings. Measures to control cracks e.g. shrinkage strips, admixture as per relevant ACI codes shall be shown on the drawings.

g) Reinforcing Steel, including welded wire fabric (WWF), shall be detailed in strict accordance with the methods and procedures provided in "ACI Detailing Manual". Reinforcing steel drawings shall be submitted simultaneously with related shop drawings.

Prepare shop drawings which provide for reinforcement, including dowels, properly positioned in all concrete work, so that material can be properly cut, bent and placed. Form not be removed for at least twelve (12) hours after the concrete has been placed. Forms shall be carefully given in shop drawings. Reinforcing steel drawings shall show, to scale, all concrete work including pits, kerbs, trenches, pads, equipment bases, steps, slopes, radii, curves, openings, holes, blockouts and the like. Provide schedules and details showing placing sequences, bending, lengths and locations of all reinforcement.

h) Detailing: All reinforcing steel shall be detailed in strict compliance with ACI 318 and ACI 315.

3.10 **Coordination Drawings**

Submit coordinated drawings of the following:

All sleeve locations, whether round or of other shape, penetrating exterior and interior walls, pits, slabs, beams, other structural systems and pavements.

The position of all embedded items required to receive the work of other trade, including details needed to assure correct placement of both the embedded items and the reinforcing steel.

The Contractor shall coordinate and crosscheck for accuracy, completeness and correct relationship to the work of other sections, each shop drawing prepared for the work of this section, including each shop drawing prepared by nominated subcontractors. Contractor's check shall include a verification of strict compliance with the Contract Documents and shall be performed prior to submission of each shop drawing for review by the Engineer. The Contractor shall certify the co-ordination, accuracy, and Contract compliance of each shop drawing by a written statement placed in each drawing and attested by the responsible person in charge of the work for Contractor. The personally inscribed initials of the person(s) preparing each drawing as well as the detailing agency's supervisor and chief checker shall be included in the title block or similar prominent location.

3.11 **Mill Test**

Furnish the Engineer with certified mill test report for cement and for steel reinforcement, including bars, welded wire fabric, dowels, anchors and splices for approval.

3.12 **Name of Manufacturers/Suppliers**

Submit for acceptance by the Engineer:

- Aggregates
- Ready mix concrete
- Reinforcing bars
- Welded steel wire fabric
- Concrete accessories
- Cement
- Admixture
- Joint filler
- Joint sealants
- Water stops
- Membrane curing, sealing, hardening compound
- Bonding compound
- Form oil
- Anchors

4.0 **MATERIALS**

4.1 **Cement**

4.1.1 The cement shall be fresh and of approved origin and manufacturer. It shall be one of the following as may be specified by the Engineer.

- Sulphate Resistant Portland Cement (low alkali) complying with the requirements of BS-4027 or ASTM C-150 Type V.

- Ordinary Portland Cement Type II (low alkali) complying with the requirements of BS-12 or ASTM C-150.

- Portland Blast–Furnace Slag Cement shall conform to BS-146 or to ASTM C-595. Slag shall consist of finely ground granulated iron blast–furnace slag and shall conform to ASTM C-989 Grade 80, 100, or 120.

- The proportioning of OPC and Portland Blast Furnace Slag material shall be in the ratio of 60 OPC to 40 Slag or as approved by the Engineer.”

4.1.2 Unless otherwise specified, ordinary Portland Cement complying with the requirements of BS12 shall be used.

4.1.3 The Contractor shall supply to the Engineer at fortnightly intervals, reports of tests for conformance with the relevant specified standard in respect of the samples of cement from the work-site. These tests shall be carried out in a laboratory approved by the Engineer.

4.1.4 Only one brand of each type of cement shall be used for concrete in any individual member of the structure. Cement shall be used in the sequence of receipt of shipment, unless otherwise directed.

4.1.5 There shall be sufficient cement at site to ensure that each section of work is completed without interruption.

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

4.1.7 The Contractor shall provide and erect (at his cost) in a suitable plain, dry, well ventilated, weather-proof and water proof shed of sufficient capacity to store the cement.

4.1.8 The cement shall be used as soon as possible after delivery and cement which the Engineer consider has become stale or unsuitable through absorption of moisture from the atmosphere or otherwise shall be rejected and removed immediately from the site at the Contractor's expense. Any cement in containers damaged so as to allow the contents to spill or permitting access of the atmosphere prior to opening of the container at the time of concrete mixing shall be rejected and removed immediately from the site at the Contractor's expense.

4.1.9 Mixing together of different types of cement shall not be permitted.

4.2 **Aggregates**

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

Aggregates shall conform with ASTM C33 (including applicable ASTM Documents referenced therein) and as specified. Coarse aggregates shall be well graded from fine to coarse within the prescribed limits of this specification. Fine aggregate shall consist of natural sand, manufactured sand or combination of the two and shall be composed of clean, hard, and durable spherical or cubical particles. Coarse aggregate shall consist of crushed or uncrushed gravel, crushed stone, or a combination thereof and shall be clean, hard, uncoated particles of maximum nominal size as specified for each grade of concrete.

All fine and coarse aggregates shall be clean and free from clay, loam, silt and other deleterious matter. If required, the Engineer reserves the right to have them washed by the Contractor at no additional expense. 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. The materials shall be stock piled for a period before use for at least a day so as to drain nearly to constant moisture content. The grading of the coarse and fine aggregates shall be tested at least once for every 100tons supplied, to ensure that grading is uniform and same as that of the samples used in preliminary tests.

The sulphate content of aggregates shall not exceed 0.40 percent by weight for each individual source of coarse and fine aggregate. The chloride content of aggregates shall not exceed 0.05 percent by weight for each source of coarse and fine aggregate. The total sulphate content of concrete shall not exceed 4.0 percent by weight of the cement. The total chloride content of concrete shall not exceed 0.40 percent by weight of the cement.

Aggregates, when tested in accordance with CRD C119 shall contain not more than 8 percent by weight of thin, flat and elongated particles.

Petrographic analysis of aggregate shall be carried out initially for each source and periodically whenever directed by the Engineer.

The specific gravities and absorption of aggregates shall be identified in accordance with ASTM C 127 and ASTM C 128.

Prior to the initial use of each source of aggregates, certified tests shall be performed on aggregates to verify compliance with these specifications and submitted for Engineer's review and approval.

Gradation of coarse aggregates for concrete shall conform to the gradations given in Table-I.

The gradation of combined coarse and fine aggregates shall be within the grading limit specified in Table-II.

The Fineness Modulus of fine aggregate (sand) shall be not less than 2.6 nor more than 3.1. In at least four out of five successive test samples, the modulus shall vary by not more than 0.20 from the moving average for the last five tests. The gradation of the coarse aggregate will be suitable if the results of four out of the last five consecutive tests comply with the gradation requirements.

Furnish certified test reports for aggregate tests listed in Table-III, Quality Tests.

4.3 **Water**

Only clean water from the sources approved by the Engineer shall be used. The Contractor shall supply sufficient water for all purposes, including mixing the concrete, curing and cleaning plant and tools. Water analysis shall be performed in accordance with ASTMD596.

4.4 **Concrete Patching Compound**

Use an approved epoxy-resin compound applied according to manufacturer's instructions. Compound shall be paintable material which produces no evidence of bleeding and which, after final set, shall not be affected by high humidity and moisture. Epoxy-resin compound shall comply with FSMM-G-650, Type 1, Grade C.

4.5 **Fibre Reinforced Concrete**

Duracrete Polypropylene Fiber or equivalent concrete reinforcing: Concrete shall be treated with Duracrete polypropylene synthetic reinforcing fibers or equivalent when indicated on the drawings or as otherwise specified by the Architect/Consultant in accordance with the fiber manufacturer’s recommendations.

a. Synthetic reinforcing fibers shall be manufactured from virgin polypropylene.

b. The dosage rate shall be1.8 kg/cu.m (3.0 Lb/ Cu yd) of concrete.

c. Fiber supplier shall provide technical assistance, if required.

d. All fibers must meet or exceed the standards and specifications set forth in ACI 544, Fiber Reinforced Concrete.

e. Listed below are the minimum properties of the polypropylene fibers for use. All fibers must meet or exceed the characteristics described in ACI-544, IR, table 1.1, Fiber Reinforced Concrete.

    1. Tensile Strength: 4.4 grams/denier
    2. Elongation at break: 12%
    3. Fiber: 100% Fibrillated / Monofilament Polypropylene (as per site requirement)
    4. Lengths: 19 mm
    5. Absorption: Nil
    6. Specific gravity: 0.9
    7. Ignition point: 593 °C
    8. Melting point: 160-170 °C

9. Heat & UV stabilization: Long term
10. Thermal conductivity: Low
11. Electrical conductivity: Low
12. Salt resistance: High
13. Acid resistance: High
14. Alkali resistance: 100% (alkali proof)

4.6 **Additives**

All additives shall be from a manufacturer approved by the Engineer.

Air Entraining Admixtures shall conform to ASTM C 260. Other admixtures shall conform to ASTM C 494.

Liquid Crystalline Water Proofing Bitocrete C-16 for Schomberg Germeny or equivalent.

4.7 **Vapour Barrier**

Polyethylene sheeting conforming with ASTM E154 and 0.2mm thick as a minimum. Other similar material having a vapour permeance rating not exceeding 0.5per meter as determined by ASTME96, will be considered unless noted otherwise.

4.8 **Grout**

a) Damp Pack Bedding Grout: Mix of one part portland cement and 2« parts of fine aggregate proportioned by weight and not more than 4« gal. (17 liters) of water per bag of cement.

b) Pre-mixed, Non-Shrink, Non-Metallic Grout: "Masterflow 713" manufactured by Master Builders, "Euco-N.S." manufactured by the Euclid Chemical Company or other approved equal.

c) Pre-mixed, Non-Shrink, Metallic Grout: "Embeco636" manufactured by Master Builders, "Firmix" manufactured by the Euclid Chemical Co., or other approved product.

d) Expansive Grout: CE CRD-C588, Type A or M, as required.

4.9 **Cover Material for Curing**

Curing material shall conform to the following:

a) Impervious Sheeting: ASTM C171, type optional, except that polyethylene sheeting shall be 0.1mm minimum thickness, white opaque. Where the work is exposed to high winds the impervious sheeting shall not be used.

b) Burlap: Cloth made of jute or kenaf shall conform with AASHTO M182 and shall weigh a minimum 0.3kg/mý.

c) Liquid Membrane Forming Compound: ASTM C309, Type 2.

4.10 **Joint Fillers**

ASTM D 1751, preformed, resilient bituminous type or ASTM D1752, preformed sponge rubber.

4.11 **Joint Sealants**

ASTM D 1190, ASTM D 3569, ASTM D 3406, hot-pour type.

4.12 **Waterstops**

Provide flat, dumbbell type or center bulb type water stops at construction joints where shown. Web thickness not less than 6mm (1/4 in.) for units up to 125mm (5 in.) wide, and not less than 10mm (3/8 in.) for widths over 125mm (5 in.). Provide polyvinyl chloride (PVC) waterstops of approved manufacturer.

4.13 **Epoxy Resin**

ASTM C 881, type, Grade 3, Class C.

4.14 **Formwork**

a) Formwork for Concrete Pavement

Forms shall be made of steel of an approved section, with a base width of at least 200 millimeters (8 in.) and the depth shall be equal to the thickness of the pavement at the edge as shown on the plans. The forms shall be staked with steel stakes, and stakes shall be of a length approved by the Engineer. Each section of forms shall have a stake pocket at each end and at intervals of not more than 1.5 metres (5 ft.) between ends. The stake pockets shall have approved devices for locking the form to the steel stakes. Each section of forms shall be straight and free from bends and warps at all times. No section shall show a variation greater than 3 millimeter in 3 metres (1/8 inch in 10 ft.) from a true plane surface on the top of the form, and the inside face shall not vary more than 6 millimeters (1/4 in.) from a plane surface.

Before placing forms, the underlying base shall be to the required grade, and shall be firm and compact. The forms shall have full bearing upon the foundation throughout their length and shall be placed with exactness to the required grade and alignment of the edge of the finished pavement. They shall be so supported during the entire operation of placing, tamping and finishing the pavement that they will not deviate vertically at any time more than 3 millimeters (1/8 in.) from the proper elevation.

Forms shall not be removed for at least twelve (12) hours after the concrete has been placed. Forms shall be carefully removed in a manner to avoid damage to the pavement. Under no circumstances will the use of pry bars between the forms and the pavement be permitted. Pavement, which in the opinion of the Engineer, is damaged due to the careless removal of forms shall be repaired by the Contractor, as directed by the Engineer, at the Contractor's own expense.

Forms shall be thoroughly cleaned and oiled each time they are used.

When pavement is placed adjoining existing concrete pavement upon which the finishing machine will travel, any irregularities in the old pavement shall be ground down to a true, uniform surface, of sufficient width to accommodate the wheels of the finishing equipment, if necessary to obtain proper smoothness of the pavement.

b) Formwork for Structures

Material, workmanship etc. of formwork for structures, refer specification Section 2100.

4.15 **Reinforcement**

Materials for reinforcing steel, welded wire fabric, dowels and tie bars, refer specification Section 2200.

5.0 **MATERIAL TESTING**

A. Samples and Testing

Samples from stock on the site or suppliers materials shall be taken by the Contractor in presence of the Engineer. Furnish tests and certificates as specified.

B. Cement

Sampled cement shall be tested by a testing laboratory. Certified copies of laboratory test reports shall be furnished for each lot of cement and shall include all test data, results and certification that the sampling and testing procedures are in conformance with the Specifications for approval. No cement shall be used until test results are satisfactory. Cement that has been stored for more than four months after being tested shall be re-tested before use. Cement found unsatisfactory under test shall be immediately removed from the construction site or supplier stock.

C. Aggregates

Aggregate sampling shall conform to ASTM D 75. Aggregates shall be sampled and tested by a testing laboratory. No aggregate shall be used until test results are satisfactory to the Engineer.

D. Water

Water analysis shall be performed in accordance with ASTM D 596, and the report shall be submitted for Engineer's approval.

E. Admixtures

Sampling and testing of all admixtures used in concrete mix shall be in accordance with the standard procedure recommended by an approved testing laboratory. No admixture shall be used until test results are satisfactory and approval.

F. Concrete

a) Compressive Strength: The Contractor shall provide and test three sets of specimens taken under the supervision of the Engineer from each 125 cubic metres (4,500 Cft.) or not less than once a day each grade of concrete placed. Samples shall be secured in accordance with ASTM C 172. Test specimens shall be made and cured in accordance with ASTM C 31. Specimens shall be tested in accordance with ASTMC39 or ACI 214. Test specimens shall be evaluated for each grade of concrete specified in conformance with ACI318, chapter "Concrete Quality". The standard age of concrete for tests shall be 3, 7 and 28 calendar days.

b) Slump and Entrained Air: Slump test and entrained air tests shall be performed in the field under the supervision of the Engineer. Slump test shall conform to ASTM C 143 and entrained air content shall be determined in accordance with ASTM C 231 or C 173 as applicable.

c) Concrete removed for the Structure : When the results of the strength test of the specimen indicate deficiency in specified requirements or where there is other evidence that the quality of concrete is below specified requirements, core boring tests shall be made in conformance with ASTM C-42. If a deficiency is discovered, the Contractor may be allowed to make load test, at his expense, and results shall be evaluated in conformance with ACI 318, Chapter 20.

5.1 **Frequency of Testing**

a) The following tests shall be performed initially for approval and as per required frequency thereafter:

-	Aggregates	ASTM C 33	----------
-	Soundness	ASTM C 88	bi-weekly
-	Specific Gravity	ASTM C 127	weekly
-	Absorption	ASTM C 128	weekly
-	Abrasion	ASTM C 131	weekly
-	Gradation	ASTM C 136	daily
-	Sand Equivalent	ASTM C 217	weekly
-	Cleanliness	ASTM C 227	weekly
-	Elongation	CRD C 119	bi-weekly
-	Chloride Ion	ASTM D 512	bi-weekly
-	Water Analysis	ASTM D 596	bi-weekly

b) The following tests shall be performed initially for approval and thereafter as specified:

- Concrete Compressive Strength: ASTM C39. Three sets of specimens for each **75 cu.m (2,625 Cft.)** of each grade of concrete placed or at least three sets for each grade per work shift.

- Concrete Sulphate (S03), Chloride Content **and pH value**:
  One test **per month** for each grade of concrete. Broken laboratory specimens from strength tests shall be used for hardened concrete Sulphate, Chloride content and **pH Value** tests."

6.0 **EXECUTION**

6.1 **Nominal Concrete Mixes**

6.1.1 The cement, fine aggregate and the coarse aggregate shall be weighed separately. The proportions of cement to fine aggregate and coarse aggregate shall be adjusted as per ACI 211 & ACI 318 so as to provide the concrete of the required crushing strength when tested as set out in Table1.

6.1.2 The Contractor shall regulate and arrange mixing of the ingredients for the designed mix of the concrete by weight-batching.

6.1.3 Water/Cement Ratio

The quantity of water used shall be just sufficient to produce a dense concrete of the specified strength. For all exterior exposed work and foundations the water/cement ratio shall not exceed 0.45, allowance being made for any water in the fine and coarse aggregates.

6.1.4 Workability

Admixtures may be used where necessary to achieve required workability, with the Engineer's approval. For concrete pavements, the mix determined shall be workable concrete having a slump between 13mm (1/2 in.) and 50mm (2 in.), as determined by ASTMC143. For other structures the concrete shall be proportioned and produced to have a slump of 75mm (3 in.) or less if consolidation is to be by vibration, and 125mm (5 in.) or less if consolidation is to be by methods other than vibration.

6.2 **Strength and Durability Requirements for Concrete**

Strength and Durability Requirements for Concrete are given below:

Class of Concrete	Specified Cylinder Compressive Strength at 28 days MPa / psi
A1	35.0 / 5,000
A	28.0 / 4,000
B	21.0 / 3,000
C	17.0 / 2,465
D	8.0 / 1,160
E	5.0 / 725

6.2.1 The Contractor shall adopt all necessary measures as per ACI201.2, like proper grading of aggregates, control of water cement ratio and cement content, proper compaction and curing, to achieve dense and durable concrete.

6.2.2 The Contractor shall submit mix design by weight for each grade of concrete at least 45 calendar days before any placement of concrete, alongwith samples of the proposed materials. Manufacture 12nos. test cylinders 12" (305mm)x6"(152mm) in accordance with ASTMC-31, and in accordance with the mix design batching by weight and test 3 cylinders each at 3, and 28 days in the presence of Engineer's Representative, in accordance with ASTMC-39 and submit all relevant data and results of tests for approval of the Engineer. The Contractor shall obtain approval from the Engineer in writing for each mix design before producing the actual concrete for the works.

6.3 **Batching, Mixing and Delivery**

a) Batching: The Contractor shall submit to the Engineer for review the plans and capacity of the concrete batching plant and delivery equipment, which shall comply with ASTM C-94.

The Contractor shall furnish test certificates for the scales and metering devices before producing concrete and at least every six weeks thereafter.

b) Accuracy of Plant Batching: Cement measured by weight in individual batchers shall be within ñ1.0 percent of the desired intermediate and final weights in cumulative batchers. The minimum batching accuracy shall be ñ0.3 percent of scale capacity for small loads below 30 percent of scale capacity.

Aggregate measured by weight in individual batchers shall be within ñ2.0 percent of the desired weight, or within ñ1.0 percent of the desired intermediate and final weights in cumulative batchers; but in either case, the minimum batching accuracy shall be ñ0.3 percent of scale capacity for small loads below 15 percent and 30 percent of scale capacity, respectively.

Water measured by volume or by weight shall be within ñ1.0 percent of the desired amount.

Liquid admixtures measured by volume or by weight shall be within ñ1.0 percent of the desired amount.

Compensation for changes of moisture content in fine and coarse aggregate shall be made by devices which shall correct the batch water and the weight of the affected aggregate simultaneously without changing the batch setting.

c) Mixing and Delivery: Concrete shall be mixed completely in the batching plant. Records shall be kept of water added in normal batching.

Concrete shall be transported to the point of discharge in agitator-mixer trucks, or by other approved means.

Trip tickets shall be provided for each delivery. The tickets shall show the designation of the materials in each batch, measured weight or volume of materials, methods of cooling concrete, class of concrete, batch number, mixer number, batch volume, date and time water was added to the mix, time of discharge from the mixer, and delivery truck number.

When it is necessary to add water to the agitator-mixer, it shall be done in accordance with ASTM C 94 and recorded.

6.5 **Embedded Items**

6.5.1 Suitable templates or instructions or both shall be provided for setting out items not placed in the forms. Embedded items and other materials for electrical, mechanical or other operations shall have been completed, inspected tested and approved before concrete is placed.

Joints at intersections and at ends of pieces shall be made in the manner most appropriate to the material being used. Joints shall develop effective water-tightness fully equal to that of the continuous waterstop material, shall permanently develop mechanical strength not less than that of the parent section, and shall permanently retain their flexibility.

6.5.2 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 as not to impair unduly the strength of the construction; such sleeves, conduits, or pipes may be considered as replacing structurally in compression 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 50mm (2 in.) and are spaced not less than three diameters on centres. Except when plans of conduits and pipes are approved by the Engineer, embedded pipes and conduits other than those merely passing through, shall not be larger in outside diameter than one third the thickness of the slab, wall, or beams in which they are embedded nor so located as to impair unduly the strength of the construction. Sleeve pipes, or conduits of any material not harmful to concrete and within the limitations of this section may be embedded in concrete with the approval of the Engineer provided they are not considered to replace the displaced concrete.

6.5.3 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.

6.5.4 Expansion joint material, waterstops and other embedded items shall be positioned accurately and supported against displacement. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with approved readily removable material to prevent the entry of concrete into the voids.

6.5.5 Non Shrink Grout

Grout of placement under base and bearing plates of steel, machinery and equipment, for grouting anchor bars and dowels and for similar uses shall be as specified. The grout shall be used in accordance with the following and as per manufacturer's recommendations, and as directed by the Engineer.

Concrete surfaces to receive non-shrink grout shall be roughened, cleaned and dampened. Form shall be provided to retain the grout until sufficiently hard to support itself. Grout shall be poured in place and thoroughly rodded or strapped to prevent air entrapment and formation of voids. After non-shrink grout has received its initial set, it shall be kept damp for at least 24 hours.

TABLE I : Gradation of Concrete Aggregates

Particle Size Square Openings (Equivalent U.S. Sieve Designation)	Percentage by Weight Passing				
	Coarse		Fine		
	19 mm to 5 mm	25 mm to 5 mm	37.5 mm to 19 mm	50 m to 25 mm	(Sand)
	¾"-No.4	1"-No.4	1½ "-3/4"	2"-1"	
63.0 mm (2 1/2 in.)	-	-	-	100	-
50.0 mm (2 in.)	-	-	100	95 – 100	-
37.5 mm (1 1/2 in.)	-	100	90 - 100	35 – 70	-
25.0 mm (1 in.)	100	94 - 100	20 - 55	0 - 15	-
09.0 mm (3/4 in.)	090 –100	-	0 - 15	-	-
12.5 mm (1/2 in.)	-	25 - 60	-	0 - 5	-
09.5 mm (3/8 in.)	20 - 55	-	0 - 5	-	100
05.0 mm (No.4)	0 - 10	0 - 10	-	-	95 - 100
02.36 mm (No. 8)	0 - 5	0 - 5	-	-	-
1.18 mm (No. 16)	-	-	-	-	45 - 80
0.60 mm (No. 30)	-	-	-	-	25 - 55
0.30 mm (No. 50)	-	-	-	-	10 - 30
0.15 mm (No. 100)	-	-	-	-	02 - 10

TABLE II : Gradation of Combined Coarse and Fine Aggregates for Concrete

Particle Size Square Openings (Equivalent U.S. Sieve Designation)	Percentage by Weight Passing Sieves Maximum Aggregate Size				
	50mm	37.5mm	25mm	19mm	9.5mm
63.00 mm (2 1/2 in.)	100	-	-	-	-
50.00 mm (2 in.)	90 - 100	100	-	-	-
37.05 mm (1 1/2 in.)	70 – 90	90-100	100	-	-
25.00 mm (1 in.)	50 - 75	50 - 86	90 - 100	100	-

Particle Size Square Openings (Equivalent U.S. Sieve Designation)	Percentage by Weight Passing Sieves Maximum Aggregate Size 50mm	37.5mm	25mm	19mm	9.5mm
19.00 mm (3/4 in.)	45 - 70	45 - 75	55 - 100	90 -100	-
12.05 mm (1/2 in.)	-	-	-	-	100
09.05 mm (3/8 in.)	38 - 55	38 - 55	45 - 75	60 - 80	90 - 100
05.00 mm (No. 4)	30 - 45	30 - 45	35 - 60	40 - 60	50 - 85
02.36 mm (No. 8)	22 - 35	23 - 38	27 - 45	30 - 45	37 - 52
01.18 mm (No. 16)	15 - 27	17 - 33	20 - 35	20 - 35	25 - 40
00.60 mm (No. 30)	10 - 18	10 - 22	12 - 25	13 - 23	15 - 25
00.30 mm (No. 50)	4 - 10	4 - 10	5 - 15	5 – 15	5 - 15
00.15 mm (No. 100)	1 - 3	1 - 3	1 - 5	1 - 5	1 - 5
0.075 mm (No. 200)	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2

TABLE III : Quality Tests For Aggregates

Material	Test	Requirement	Test Designation
Coarse	Abrasion	Loss 40% max.	ASTM C 131
Coarse	Absorption	2.0% max.	ASTM C 127
Coarse	Clay Lumps	1.0% max.	ASTM C 142
Coarse	Surface Coating	0.5% max.	ASTM C 117
Coarse and Fine	Soundness	Loss 10% max.	ASTM C 88
Coarse and Fine	Sieve	As specified	ASTM C 136
Fine	Absorption	4.0% max.	ASTM C 128
Coarse	Cleanness	75% min.	CALIF 227
Fine	Sand equivalent	70% min.	CALIF 217

6.5 **Concrete for Structures**

6.5.1 Placing

6.5.1.1 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 shall be placed into the foundation pits and trenches until the ground to receive the same has been examined and approved by the Engineer for this purpose.

6.5.1.2 Concrete shall be deposited continuously, or in layer of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, construction joints shall be located as shown in the Contract Documents or as approved by the Engineer. Placing shall be carried out at such a rate that the concrete, which is being integrated with fresh concrete, is still plastic. Concrete, which has partially hardened, shall not be deposited. Temporary spreaders in forms shall be removed when the concrete placing has reached an elevation rendering their services unnecessary. They may remain embedded in the concrete only if made of metal or concrete and if prior approval has been obtained.

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

6.5.1.4 The concrete shall be placed as soon after it has been mixed 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 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.

The Contractor shall ensure that the delay between mixing and placing does not exceed 45 minutes under any circumstances. Any concrete, which does not satisfy this requirement shall be discarded.

6.5.1.5 Concrete shall be deposited as nearly as possible in its final position to avoid re-handling. In no circumstances may concrete be railed or made to flow along the forms by the use of vibrators. Concreting shall be carried on as a continuous operation using methods, which shall prevent segregation or loss of ingredients.

6.5.1.6 The free fall of concrete shall not be allowed to exceed two metre and where it is necessary for the concrete to be placed more than this depth, it shall not be dropped into its final position, but shall be placed through pipes fed by a hopper. When a pipe is used for placing concrete the lower end shall be kept inside, or close to the freshly deposited concrete. The diameter of the pipe shall be not less than 225 mm (9 in.).

6.5.1.7 Workmen carrying concrete to the site, and all other workmen, shall move only along runways or planks placed for the purpose and no person shall be allowed to walk on the reinforcement.

6.5.2 Consolidation

6.5.2.1 All concrete shall be consolidated by vibration, spading, rodding or forking so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. Only competent workmen shall operate vibrators. Use of vibrators to transport within forms shall not be allowed.

Vibrators shall be inserted and withdrawn at points approximately 450 mm (18 in.) apart. At each insertion, the duration shall be sufficient to consolidate the concrete but not excessive so as to cause segregation, generally from 5 to 15 sec. A spare Vibrator shall be kept on the job site during all concrete placing 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.

6.5.2.2 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 effect an improvement in the quality of the concrete to the satisfaction of the Engineer and in conformity with the provisions of Clause 5.

6.5.2.3 Vibrator shall not be allowed to contact the formwork for exposed concrete surfaces.

6.5.2.4 Mechanical vibrators shall be of a type approved by the Engineer to suit particular conditions.

6.5.3.5 Over-vibration or vibration of very wet mixes shall be avoided.

6.5.3 Curing and Protection

6.5.3.1 Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures and mechanical injury, and shall be maintained with minimum 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 the Engineer.

6.5.3.2 For concrete surfaces not in contact with forms, one of the following procedures shall be applied immediately after completion of placement and finishing, as approved by the Engineer.

- Ponding or continuous sprinkling.
- Application of absorptive mats or fabric kept continuously wet.
- Application of waterproof sheet materials approved by the Engineer.
- Application of other moisture-retaining covering as approved.
- Application of a curing compound conforming to ASTM C309.

The compound shall be applied in accordance with the recommendations of the manufacturer immediately after any water sheet, which may develop after finishing has disappeared from the concrete surface. It shall not be used on any surface against which additional concrete or other material is 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 areas to receive bonded applications.

6.5.3.3 Moisture loss from surface placed against wooden forms or metal forms, and exposed to heating by the sun, shall be minimized by keeping the forms wet until they can be safely removed. After form removal, the concrete shall be cured until the end of the time prescribed as follows by one of the methods specified above.

6.5.3.4 Curing in accordance with sub-clauses above shall be continued for at least 10 days in the case of all concrete except concrete with rapid-hardening Portland Cement, for which the period shall be at least 3 days. Alternatively, if tests are made of cubes kept adjacent to the structure and cured by the same methods and to the same intensity, moisture retention measures may be terminated when the average compressive strength has reached 70 percent of the minimum specified works cube strength. If one of the first four curing procedures specified above is used initially, it may be replaced by one of the other specified procedures any time after the concrete is one day old provided the concrete is not permitted to become surface dry during the transition.

6.5.4.5 When the mean daily outdoor temperature is less than 5^{o}C (41^{O}F), temperature of the concrete shall be maintained between 10 and 20 degrees C (50^{O}F-68^{O}F) for the required curing period specified above.

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 with measures to avoid concentration of heat. Combustion heaters shall not be used during the first 24 hours, unless precautions are taken to prevent exposure of the concrete to exhaust gasses, which contain carbon dioxide.

6.5.4.6 When necessary, provision for wind-breaks, shading, spraying, sprinkling, ponding or wet covering with a light coloured material shall be made in advance of placement, and such protective measures shall be taken as quickly as concrete hardening and finishing operation will allow.

6.5.4.7 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 3°C (5.4°F) in any one hour or 10°C (18°F) in any 24 hour period.

6.5.4.8 Concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock and excessive vibrations, during the curing period. All finished concrete surfaces shall be protected from damage by construction equipment, materials or methods by application of curing procedures, and by rain or running water. Self-supporting structures shall not be loaded in such a way as to overstress the concrete.

6.5.5 **Works in Extreme Weather**

6.5.5.1 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.

6.5.5.2 When the temperature of the surrounding air is expected to be below 5°C during placing or within 24 hours thereafter, the temperature of the plastic concrete, as placed, shall be no lower than 13°C for sections less than 300 mm (12 in.) in any dimensions nor 10°C for any other sections.

When necessary, concrete material should be heated before mixing and carefully protected after placing. In general, heating of mixing water alone to about 60°C may be sufficient for this purpose. Dependence should not be placed on slat or other chemicals. Calcium chloride up to a maximum of 1-1/2 percent of the weight of cement may be used to accelerate the rate of hardening only with prior written permission of the Engineer. Use of calcium chloride in excess of 1-1/2 percent is harmful. No frozen material or 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 25 litres per bag of cement.

If water of aggregate is heated above 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 38°C.

6.5.5.3 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 32°C. For mass concreting, this temperature should not exceed 21°C. When the temperature of the concrete exceeds 32°C, precautionary measures approved by the Engineer shall be put into effect. When the temperature of the steel is greater than 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 ice flakes, or well crushed ice may be substituted for all 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 305 shall also be adopted.

6.5.6 **Construction Joints**

6.5.6.1 Concreting shall be carried out continuously up to construction joints, the position and arrangement of which shall be approved by the Engineer.

6.5.6.2 Joints not shown on the drawings shall be so made and located as to least impair the strength of the structures and shall need prior approval of the 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 a distance equal to twice the width of the secondary beam. Joints in walls and columns shall be at the underside of floor slabs or beams, and at the top of footings or floor slabs. Beams, brackets, column, capitals, haunches and drop panels shall be placed at the same time as slabs. Joints shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.

6.5.6.3 Reinforcing steel shall continue across the joints. Key and inclined dowels shall be provided as, and where directed by Engineer. Longitudinal keys at least 40 mm (1-5/8 in.) deep shall be provided in all joints in walls and between walls and slabs or footings.

6.5.6.4 When the work has 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.

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

6.5.6.6 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 similar in proportions to the mortar in the concrete. The grout shall be as thick as possible on vertical surfaces and at least 13 mm (1/2 in.) thick on horizontal surfaces. The fresh concrete shall be placed before the grout has attained initial set.

6.5.6.7 When the concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle, and brushed, care being taken to avoid dislodgement 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 150 mm (6 in.) in thickness, and shall be well rammed against old work, particular attention being paid to corners and closed spots.

6.5.6.8 Stop ends for movement joints or construction joints shall be made by splitting them along the lines of reinforcement passing through them, so that each portion can be positioned and removed separately without disturbance or shock to the 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 the 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.

6.5.7 Expansion Joints

Expansion joints shall be provided wherever indicated on the Drawings or as directed by the Engineer. In no case shall the reinforcement, or other embedded items be run continuous or through an expansion joint. All expansion joints shall be carefully placed so as not to be displaced during concreting. The method of placing the expansion joints shall be strictly in accordance with the Drawings and/or as directed by the Engineer. All materials for use in the expansion joints shall have, prior approval of the Engineer before placing order for supply.

6.5.8 Embedded Items

6.5.8.1 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.

6.5.8.2 All embedded items shall be positioned accurately and supported against displacement. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with approved readily removable material to prevent the entry of concrete into the voids.

7.0 FINISHING OF FORMED SURFACES

7.1 General

7.1.1 After removal of forms, the surfaces of concrete shall be given one or more of the finishes specified below in locations designated by the Contract Documents.

7.1.2 When finishing is required to match a small sample furnished to the Contractor, the sample finish shall be reproduced on an area at least 10 square metres (108 Sft.) in an inconspicuous location Designated by the Engineer before proceeding with the finish in the specified location.

7.1.3 Allowable deviations from plumb or level and from the alignment, profile grades, and dimensions are specified in Clause 9. Tolerances for concrete construction defined as ‘tolerances’, are to be distinguished from irregularities in finish as described herein. The finish requirements for concrete surfaces shall be as generally specified in this clause and as indicated on the Drawings. Finishing of concrete surfaces shall be performed only by workmen who are skilled in concrete finishes. The Contractor shall keep the Engineer informed as to when finishing of concrete will be performed. Unless inspection is waived in each specific case, finishing of concrete shall be performed only in the presence of the Engineer. Concrete surfaces will be tested by the Engineer where necessary to determine whether surface irregularities are within the limits herein after specified.

Surface irregularities are classified as abrupt or gradual. Offsets caused by displaced or misplaced form sheathing or lining or sections, or otherwise defective form lumber will be considered as abrupt irregularities, and will be tested by direct measurements. All other irregularities will be considered as gradual irregularities, and will be tested by use of a template, consisting of a straight edge or the equivalent thereof for curved surfaces. The length of the template will be 2 metres (6.5 ft.) for testing of formed surfaces and 3 metres (10 ft.) for testing of unformed surfaces.

7.2 As-cast Finishes

Unless otherwise specified or indicated on the Drawings the classes of finish shall apply as follows:

7.2.1 Rough form finish:

No selected form facing materials shall be specified for rough form finish surfaces. The holes and defects shall be patched. Fins exceeding 6 mm (1/4 in.) in height shall be chipped off or rubbed off. Otherwise, surfaces shall be left with the texture imparted by the forms.

7.2.2 Fair face finish:

Fair face finish applies to concrete formed surfaces, the appearance of which is considered by the Engineer to be of special importance, such as surfaces of structures prominently exposed to public view. Location of surfaces of concrete structures requiring fair face finish are shown in the Drawings. Surface irregularities, measured as described in sub-clause 7.2.1, 'Rough form finish', all not exceed 6 mm (1/4 in.) for gradual irregularities and 3 mm (1/8 in.) for abrupt irregularities, except that abrupt irregularities will not be permitted at construction joints. Abrupt irregularities at construction joints and elsewhere in excess of 3 mm (1/8 in.) and gradual irregularities in excess of 6 mm (1/4 in.) shall be reduced by grinding so as to conform to the

specified limits. Abrupt irregularities at construction joints shall be ground on 1 to 20 ratio of height to length.

Unless otherwise approved, repair of imperfections in formed concrete shall be completed within 24 hours after removal of forms. The form facing material shall produce a smooth, hard, uniform texture on the concrete. It may be plywood, hardboard, metal, plastic paper, or other approved material capable of producing the desired fair face 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. The holes and defects shall be patched. All fins shall be completely removed.

8.0 REPAIR OF DEFECTS

8.1 General

8.1.1 Any concrete failing to meet the specified strength or not formed as shown on drawings, concrete out of alignment, concrete with surfaces beyond required tolerances or with defective surfaces which cannot be properly repaired or patched in the opinion of the Engineer shall be removed at Contractor's cost.

The Engineer may reject any defective concrete and order it to be cut out in part or in whole and replace at the Contractor's expense.

8.1.2 All ties, bolt holes, and all repairable defective areas shall be patched immediately after form removal.

8.2 Repair of Defective Areas

8.2.1 Defective and honeycombed concrete shall be removed down to sound concrete. The area to be patched and an area at least 150 mm (6 in.) 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 passing No.25 BS Sieve and shall then be well brushed into the surface.

8.2.2 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 less than 1 part cement to 2-1/2 parts sand by weight. White Portland cement shall be substituted for a part of the gray Portland cement on exposed concrete in order to produce a colour matching the color of the surrounding concrete, as determined by a trial patch.

8.2.3 The quantity of mixing water shall be no 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.

8.2.4 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 patch slightly higher than the surrounding surface to permit initial shrinkage; it shall be left undisturbed for at least 1 hour before being finally finished. The patched area shall be kept damp for at least 7days. Metal tools shall not be used in finishing a patch in a formed wall, which will be exposed.

8.2.5 Where as-cast finishes are specified, the quantity of patched area shall be strictly limited. The combined total of patched areas in as-cast surfaces shall not exceed 0.2 square metre (2 square foot) in each 100 square metres (1076 square foot) of as-cast surface. This is in addition to form tie patches, if the project design permits ties to fall within as-cast areas.

8.2.6 Any patches in as-cast architectural concrete shall be indistinguishable from surrounding surfaces. The mix formula for patching mortar shall be determined by trail to obtain a good colour match with the concrete when both patch and concrete are cured and dry. After initial set, surfaces of patches shall be dressed manually to obtain the same texture as surrounding surfaces.

8.2.7 Patches in architectural concrete surfaces shall be cured for at least 7 days. Patches shall be protected from premature drying to the same extent as the body of the concrete.

8.3 **Tie and Bolt Holes**

After being cleaned and thoroughly dampened, the tie and bolt holes shall be filled solid with patching mortar. If architectural appearance requires, these holes may be filled partially creating the desired round clear holes pattern on surfaces exposed to view.

8.4 **Proprietary Materials**

If permitted or required by the 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 recommendations with prior approval of the Engineer.

9.0 **CONCRETE CONSTRUCTION TOLERANCES**

All tolerances shall be as per ACI 317.

Where tolerances are not stated in the specifications or drawings for any individual structure or feature thereof, 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 complete work within tolerance limits. These allowable tolerances shall not relieve the Contractor of his responsibility for correct fitting of indicated materials and components. These tolerances are not cumulative.

9.1 Variation from the plumb (or the specified batter for inclined walls). (allowable variation)

9.1.1 In the lines and surfaces of columns and walls, and in arises

In any 3 metres (10 ft.) of length or height	6 mm (1/4 in.)
Maximum for the entire length or height	25 mm (1 in.)

9.1.2 For exposed corner columns, control joint grooves and other conspicuous lines

In any bay or 6 metres (20 ft.) maximum	6 mm (1/4 in.)
Maximum for the entire length or height	13 mm (1/2 in.)

9.2 Variation from the level or from the grades indicated on the drawings.

9.2.1 In beam soffits, and in arises measured before removal of supporting shores.

In any 3 metres (10 ft.) of length	6 mm (1/4 in.)
In any bay or in any 6 metres (20 ft.) maximum	10 mm (3/8 in.)
Maximum for the entire length	19 mm (3/4 in.)

9.3 Variation of the linear structure lines from established position in plan and related position of columns and walls.

In any bay or 6 metres	± 13 mm (± 1/2 in)
Maximum for the entire length	± 25 mm (± 1 in.)

9.4 Variation in cross-sectional dimensions of columns and beams and in the thickness of slabs and walls.

Up to 12" (300mm)	- 6 mm (- ¼ in.) +10 mm (+ 3/8 in.)
More than 12" (300mm)	- 10 mm (- 3/8 in.) +13 mm (+ ½ in.)

9.5 **Footings**

9.5.1 Variation in dimensions in plan

Minus	13mm (1/2 in.)
Plus (plus variation applied to concrete only, not to the reinforcing bars or dowels). (formed)	50mm (2 in.)

9.5.2 Misplacement or eccentricity

2 percent of the footing width in the direction of misplacement but not more than (applies to concrete only, not to reinforcing bars or dowels).	+ 50mm (+ 2 in.)

9.5.3 Reduction in thickness

Minus 5 percent of specified thickness

10.0 ACCEPTANCE OF STRUCTURE

10.1 General

10.1.1 Completed concrete work, which meets all applicable requirements will be accepted subject to the other terms of the Contract Documents.

10.1.2 Completed concrete work, which fails to meet one or more of the requirements and which has been repaired to bring it into compliance will be accepted subject to the other terms of the Contract Documents.

10.1.3 Completed concrete work, which fails to meet one or more of the 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 may be required to assure that remaining work complies with the requirements.

10.2 Dimensional Tolerances

10.2.1 Formed surfaces resulting in concrete outlines smaller than permitted by the tolerances of clause 9 shall be considered potentially deficient in strength and subject to the provisions of sub clause 10.4.

10.2.2 Formed surfaces resulting in concrete outlines larger than permitted by the tolerances of clause 9 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 clause.

10.2.3 Concrete members cast in the wrong location may be rejected if the strength, appearance or function of the structure is adversely affected as decided by the Engineer or if misplaced items interfere with other construction.

10.2.4 Inaccurately formed concrete surfaces exceeding the limits of Clause 9 or of Clause 6.5 of Section 'Formwork' shall be removed and replaced, and those that are exposed to view, may be rejected, or shall be repaired, or removed and replaced, as directed by the Engineer.

10.3 **Appearance**

10.3.1 Architectural concrete with surface defects exceeding the limitations described in relevant Clauses of this section shall be removed and replaced.

10.3.2 Other concrete exposed to view with defects which adversely affect the appearance of the specified finish may be repaired only by approved methods.

10.3.3 Concrete not exposed to view is not subject to rejection for reason of defective appearance.

10.4 **Strength of Structure**

10.4.1 Strength of the structure in place will be considered potentially deficient if it fails to comply with any requirement which is relevant to 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 Clause 6 hereof.
- Reinforcing steel size, quantity, strength, position or arrangement at variance with the requirements as specified under section 'Reinforcement' or in 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 extremes of temperature during early stages of hardening and strength development.
- Mechanical injury, construction fires, premature removal of formwork, likely to result in deficient strength.
- Poor workmanship likely to result in deficient strength.

10.4.2 Structural computations and/or additional testing may be required when the strength of the structure is considered potentially deficient.

10.4.3 Core tests may be required when the strength of the concrete in place is considered deficient.

10.4.4 If core tests are inconclusive or impractical to obtain or if structural computations do not confirm the safety of the structure, load tests may be required and their results evaluated, in accordance with ACI Standard 318.

10.4.5 Concrete work judged inadequate by structural computations or by results of a load test shall be reinforced with additional construction, if so directed by the Engineer or shall be replaced, at the Contractor's expense.

10.4.6 The Contractor shall bear all costs incurred in providing the additional testing and/or computations required by this section.

11.0 MEASUREMENT AND PAYMENT

11.1 General

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

11.1.1 All types of formwork including shoring/bracing/scaffolding etc.

11.1.2 All types of expansion, construction and contraction joints

11.1.3 All sampling, mixing and testing as specified.

11.1.4 Concrete mix design.

11.1.5 Vapour barrier.

11.1.6 Impervious sheeting, burlap covering, liquid membranes compound, additives, non-shrink grout and epoxy resins.

11.1.7 Anchor bolts and other embedded parts.

11.1.8 All submittals including shop drawings, co-ordination drawings etc.

11.1.9 Repair and replacement of defective work.

11.1.10 Surface texture, skid resistant surfaces & surface test.

11.1.11 Curing

11.1.12 Installation / fixing in position of all precast / prefabricated concrete elements, as shown on drawings.

11.1.13 Tie bars, dowel bars, dowel bar sleeves and welded wire mesh.

11.1.14 Concrete Admixtures

11.2 Plain and Reinforced Concrete

11.2.1 Measurement

Measurement of acceptably completed works of plain and reinforced concrete will be made on the basis of number of cubic metre / cubic foot of concrete actually provided, placed, consolidated, finished, cured in position, complete as shown on drawings or as directed.

11.2.2 Payment

Payment will be made for the acceptable measured quantity of plain and reinforced concrete on the basis of unit rate per cubic metre / cubic foot quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

11.3 **Water Stopper**

11.3.1 Measurement

Measurement of acceptably completed works of water stopper will be made on the basis of running metre / running foot of water stopper actually provided, placed in position, complete as shown on drawings or as directed.

11.3.2 Payment

Payment will be made for the acceptable measured quantity of water stopper on the basis of unit rate per running metre / running foot quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

11.4 **C.C Jali**

11.4.1 Measurement

Measurement of acceptably completed works of c.c jali will be made on the basis of square metre / square foot of cement concrete jail actually provided, placed in position, complete as shown on drawings or as directed.

11.4.2 Payment

Payment will be made for the acceptable measured quantity of c.c jali on the basis of unit rate per square metre / square foot quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

*** End of Section 2300 ***

SECTION - 2450

FENCING

1. SCOPE
2. SUBMITTALS
3. MATERIAL
4. EXECUTION
5. MEASUREMENT AND PAYMENT

1. SCOPE

The Work under this section of specifications consists of furnishing all material, plant, labour, equipment, appliances and performing all operations in connection with supply and installation of chain link fence, barbed wire, reinforced concrete posts and foundations complete, in accordance with this section of specification and applicable drawing and/or as directed by the Engineer.

2. SUBMITTALS

The Contractor shall submit prior to construction and for the approval of the Engineer:

- Layout showing the location and spacing of fence posts and brace posts.
- Shop drawings that detail all components of fences.

Contractor will provide samples of all components of fence and submit for approval prior to fabrication and shipment. Any material found not to be in compliance with the herein described Specifications shall be removed and replaced at the Contractor's expenses.

3. MATERIALS

3.1 General

Unless otherwise stated in this section, all steel parts shall be galvanized by the Hot-Dip process in accordance with the relevant ASTM Specification:

ASTM A 90-69	Weight of Zinc-Coating
ASTM A 121,	Class 3 Barbed Wire
ASTM A 123-73	Zinc (Hot Galvanized) coatings on Product fabricated from rolled, pressed and forged steel shapes, plates, bars and strip.
ASTM A 392	Chain Link Fabric

3.2 Chain Link Fabric

The chain link fabric shall be of the following type as approved by the Engineer.

- The chain link fabric shall be woven into a 50 mm diamond mesh in which the individual pickets are helically woven and interwoven in the form of a continuous chain link mesh, using good commercial quality 9 gauge steel wire galvanized after weaving by the hot-dip process to give a minimum of 370 gr. Zinc per square metre of wire surface distributed over the entire fabric including the cut ends, as per ASTM A 392, class 1. The minimum breaking strength shall be 585 kg as per U.S. Govt. spec. RR-F-191/1A.

3.3 Tension Wire

Three tension wires of 7 gauge galvanized coil spring wire shall be provided to the top, the centre and the bottom of the chain link fabric. The fabric shall be fastened to the tension wires at intervals of 60 cm with hog rings. Tension wire shall have a minimum tensile strength of 5,620 kg/sq.cm.

3.4 Fastenings

Zinc-coated tension bars, bands and hog rings shall be used to attach fabric to line posts etc.

3.5 Barbed Wire

Barbed wire shall be the high security double strand type with 4 point barbs spaced 7.5 cm apart. The barbs shall be sharp and tightly wrapped about the uniformly twisted 12.5 gauge line wires which are coated with zinc in accordance with ASTM A 121, Class 3.

3.6 Extension Arms for Barbed Wire

Reinforced concrete extension arms shall be set at 45o outward angle at corner posts for supporting 3 strands of barbed wire and shall be of sufficient strength to withstand a weight of 100 kg.

3.7 Concrete Fence Posts

The fence posts shall be made of reinforced concrete according to the sizes, dimensions and shapes shown on the drawings. They shall be cast in good quality moulds and shall have smooth finished surface. All necessary hooks, hog rings etc. to attach tension-wire and barbed wire shall be embedded at the time of casting.

The material shall conform to the Specification requirement of Section 2300 “Plain and Reinforced Concrete” and 2200 “Reinforcement”.

4. EXECUTION

4.1 General

Installation of chain link fence, barbed wire fence and gates shall be in accordance with manufacturer’s recommendations and/or in accordance with the Specifications and drawings.

4.2 Fence Posts

Fence posts shall be spaced not more than 3 metres on centres in the line of fence. They shall be plumb with tops properly aligned. Brace posts shall be installed for chain link fence at intervals of 30 metres, at corners and at points of deflection greater than 30 degree in the line of fence and also at all points where there are abrupt changes in grade.

4.3 Fence Posts Foundation

The fence posts shall be installed and set into concrete foundations as shown on the drawings.

4.4 Chain Link Fabric

The fabric shall be stretched tight and securely fastened to the post and the tension wires by means of the wire clips at intervals not exceeding 60 centimeters and so as to avoid bulging or sagging. In addition the bottom of the fabric shall be fastened to the strip foundation so that it cannot be lifted. Fabric shall be cut and attached independently of all corner parts with tension bars. Rolls of chain link fabric shall be joined by means of tension bars and only at the centres of posts.

4.5 Barbed Wire

The barbed wire shall be fixed to columns or extension arms, stretched tight to avoid sagging. The number of barbed wire strands shall be as shown on the drawings and as may be directed by the Engineer.

4.6 Clean Up

The Contractor shall promptly remove from the job site all excess excavated materials and other debris resulting from fence construction.

5. MEASUREMENT AND PAYMENT

5.1 General

Except otherwise specified herein or elsewhere in the Contract drawings/ documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

a) Earth work, foundation, all precast and cast-in-place concrete, reinforcement, moulds, bitumen coating on concrete surfaces in contact with earth, formwork and curing etc.

b) Galvanizing, Chain link fabric, tension wire, fastenings and barbed wired with all accessories.

c) Surface preparation and painting to all structural steel components

5.2 Chain link Fencing

5.2.1 Measurement

Measurement of acceptably completed works of fencing will be made on the basis of actual length in running meter / running foot of fencing provided and installed in position, complete, as specified herein, as shown on the drawings and/or as directed by the Engineer.

5.2.2 Payment

Payment will be made for acceptable measured quantity of fencing on the basis of unit rate per running metre / running foot quoted in the respective item of Bill of Quantities and shall constitute full compensation for all the works related to the item.

5.3 Steel Gates in Fencing

5.3.1 Measurement

Measurement of acceptably completed works of Steel Gates will be made on the basis of actual number provided and installed in position, complete, as specified herein, as shown on the drawings and/or as directed by the Engineer.

5.3.2 Payment

Payment will be made for acceptable measured quantity of Steel Gate on the basis of unit rate per number quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

*** End of Section 2450 ***

SECTION - 3000

STRUCTURAL STEEL WORKS

1. SCOPE
2. APPLICABLE CODES AND STANDARDS
3. MATERIALS
4. CONNECTIONS
5. ALLOWABLE STRESSES
6. SHOP DRAWINGS
7. FABRICATION
8. WELDER QUALIFICATIONS
9. WELDERS IDENTIFICATION
10. TEST ASSEMBLY
11. SURFACE PREPARATION AND PAINTING
12. INSPECTION AND TESTS
13. ERECTION
14. MEASUREMENT AND PAYMENT

SECTIONS – 3000

STRUCTURAL STEEL WORKS

1.0 SCOPE

The work under this section consists of furnishing all material, labour, plant, equipment and appliances, fabricating, erecting, installing, testing, painting and all other items incidental to steel work for a complete job as shown on the drawings, specified herein and/or as directed by the Engineer.

2.0 APPLICABLE CODES AND STANDARDS

Latest edition of the following codes and standards are applicable to the work of this section:

AISC	Specifications for the design, fabrication and erection of structural steel for buildings.
ANSI / AISC 360	Manual of steel construction, LRFD & ASD.
AISC 303	Code of Standard Practice, for Steel Buildings and Bridges.
AISC	Specifications for structural joints using ASTM A325 or A490 bolts.
AISC	Guide to shop painting of Structural Steel.
ASTM A6	Standard specifications for general requirements for rolled steel plates, shapes, sheets, piling and bars for structural use.
ASTM A36	Standard Specifications for Carbon Structural Steel.
ASTM A53	Standard Specifications for Pipe, Steel, Black & Hot Dipped, Zinc Coated, Welded and Seamless
ASTM A307	Carbon steel externally and internally threaded standard fasteners.
ASTM A325	High strength bolts for structural steel joints including suitable nuts and plain hardened washers.
ASTM A446	Specifications for steel sheet zinc coated (galvanized) by the hot dipped process.
ASTM A490	Quenched and tempered alloy steel bolts for structural steel joints.
ASTM A501	Hot formed welded and seamless carbon steel structural tubing.
ANSI / NAAMM MBG 531	Metal Bar Grating
ASTM A563	Carbon and alloy steel nuts.
ASTM A572	Standard Specifications for High - Strength Low - Alloy Columbium – Vanadium Structural Steel
ASTM E109	Dry powder magnetic particle inspection.
AWS D1.1	Specifications for welding of steel structures.

ANSI
B 18.2.2.1 Plain Washers.

SSPC – SP6 Steel structures painting council – surface preparation specifications.

3.0 MATERIALS

Except otherwise stated on the drawings, the material specifications shall conform to the following. Wherever necessary the Contractor may use equivalent alternative material subject to approval of the Engineer.

3.1 Structural Steel

- Structural steel shall conform to the requirements of ASTM A-36, or ASTM A-572.

- Steel pipes shall conform to the requirements of ASTM A 53 Class B, ASTM A501 or shall be made of plates spirally welded.

- All material shall be supplied chirpy V-Notch testing in accordance with ASTM A6, Supplementary Requirement S5.

- Grating shall conform to ANSI / NAAMM MBG 531.

3.2 Welding

Welding electrodes shall match the base metal and shall conform to the requirements of AWS D1.1 specifications.

3.3 High Strength Bolts

All shop connections, except as noted herein or on the drawings, shall be made with High Strength Bolts in friction type connections, or by welding.

High strength bolts, heavy hexagonal nuts and hardened washers shall conform to the requirements of ASTM A325. All field connections, except noted, shall be made with high strength bolts in friction type connection.

3.4 Washers

Washers shall conform to the requirements of ANSI B18.2.2.1 and shall be of structural grade steel appropriate for the type of bolts for which they are used. For oversized holes, the washers shall be large enough to cover the entire hole by at least 6mm (1/4 in.) or as directed by the Engineer.

3.5 Studies

Steel Studies Shear Connectors shall conform to the requirements of Structural Welding Code-Steel, AWS D1.1.

4.0 CONNECTIONS

All connections shall be designed and detailed for 75% of the effective capacity of the member. A minimum of two bolts or equivalent welding shall be used per connection.

Shop connection may be welded or bolted. Field connections shall be bolted unless noted otherwise on design drawings or approved by the engineer.

5.0 ALLOWABLE STRESSES

Allowable design stresses for structural steel members and their connections, including temporary bracings and shorings shall be in accordance with AISC Specifications.

6.0 SHOP DRAWINGS

6.1 Shop drawings shall be submitted by the Contractor, for structural steel works, for acceptance in accordance with the requirements or the Contract Documents.

6.2 Shop drawings furnished for this section shall conform to the best standards of the construction industry. Shop drawings shall be prepared by and under the supervision of competent engineering personnel. Prior to submittal, the Contractor shall check each shop drawing for compliance with the requirements of the Contract Documents.

6.3 Shop drawings shall include plans, elevations, sections and complete details to describe clearly, at an ample scale, all work to be provided. Drawings shall be accurately dimensioned and shall be noted clearly.

6.4 All connections shall be designed and detailed as, per sub-section 4 above, by the contractor on the shop drawings. Design calculations for connections shall be made as per AISC specifications and shall be submitted along with the shop drawings after checking and signing by the Contractor for approval of the Engineer.

6.5 The shop drawings shall include

(i) An erection scheme, in suitable size, having the following information:

- Location of erection elements in respect of axis and Marks as well as picking points of these elements with respect to each other or with the existing steel or reinforced concrete structures.
- Joints showing erection welding sizes and lengths, bolts diameter and numbers.
- Chart showing list of assembling marks having columns such as Mark, Description, Quantity, Weight of each Mark, total weight and Remarks with grand total in the end.
- Chart showing List of Erection Bolts, Nuts and Washers in tabulated form, detailing information such as size, quantity, weight and their grand totals.
- Quality of materials.
- Quality and type of welding electrodes.
- Measures to be adopted against unscrewing of bolts.
- Painting instructions.
- Erection sequence.
- References to relevant drawings.

- Except in special cases all scheme drawings shall be made in single fairly thick lines.

- The recommended scale of erection scheme is 1:50, 1:100, 1:200, for joints 1:5, 1:10 or 1:20.

(ii) Fabrication drawings in suitable size shall contain the following information:

- Each Shop Assembly (Mark) shall be drawn separately showing necessary lines, elevations, sections with reference to axis, center lines, location of holes, cleats, plates, lugs etc. fully dimensioned with part numbers.

- Bolts and holes sizes.

- Welding symbols and welded joints requirements, in accordance with AISC manual of steel construction and AWS specifications.

- Geometrical Setting out dimensions necessary for the assembly of an element. Location and details of joints as calculated by the Contractor.

- Instruction for welding, dimensions of weld, edge preparations methods of welding, and methods for control of distortions.

- List of symbols for bolts and holes uses.

- List of symbols for welds used.

- Edge distance (general).

- Welding sizes and lengths (general).

- Standards and quality of materials.

- Type and quality of welding electrodes.

- Tests for welding.

- Reference to related erection scheme drawings.

- Reference to design and working drawings.

- Part list.

- Instructions for surface preparation, painting, primer and finish coats.

Recommended scales for fabrication drawings are preferably 1:10 or 1:20, and for joints and details 1:1, 1:2, or 1:5.

7.0 **FABRICATION**

The Contractor shall notify the Engineer about any problems or doubts/errors, if any, in the drawings for clarifications/rectification well in time to prevent any fabrication errors. Fabrication shall not be commenced until approval has been obtained from the Engineer.

7.1 Straightening of Material

Rolled material, before being worked upon shall be straightened within tolerances as per ASTM specifications A6. Straightening, necessarily shall be done by mechanical means or by the application of a limited amount of localized heat. The temperature of heated areas, as measured by approved methods, shall not exceed 1200 ^{0} F.

7.2 Cutting

As far as practicable cutting shall be done by shearing. Oxygen cutting shall be done where shear cutting is not practicable and shall preferably be done by Machine. All edges shall be free from notches or burs. If necessary, the same shall be removed by grinding.

7.3 Holes Punching/Drilling

Holes shall be punched where thickness of the material is not greater than the diameter of bolt + 3mm (+ 1/8 in.). Where the thickness of the material is greater the holes shall either be drilled or sub-punched and reamed to size. The die for all sub-punched holes and the drill for all sub-drilled holes shall be at least 2mm smaller than the nominal diameter of the rivet or bolt.

7.4 Welding

7.4.1 All execution and inspection of welding shall be done in accordance with the provisions of the American Welding Society Specifications. No welding for piping/electrical supports shall be made transversely to any tension flanges or beams or columns.

7.4.2 Maximum and minimum size and lengths of fillet welds shall be in accordance with AISC specifications, or as mentions on drawing.

7.4.3 Surface to be welded shall be free from loose scale, slag, rust, grease, paint or any other foreign matter.

7.4.4 Butt welds shall be full penetration welds, unless otherwise specified and permitted.

7.4.5 Avoid the use of temporary welded attachments during fabrication as much as possible. After fabrication is completed, remove flush with the base material without encroaching on the minimum required base material thickness. After the surface has been restored, examine all areas from which temporary attachments have been removed by the same methods required for permanent fillet welds.

7.4.6 Do not begin structural welding until joint elements are tacked in intimate contact and adjusted to dimensions shown with allowance for any weld shrinkage that is expected. Weld heavy sections and those having a high degree of restraint with low hydrogen type electrodes. No member shall be spliced without approval.

7.4.7 For notch-toughness specified material, all weld metal, processes and preheat requirements shall be compatible to assure notch-tough composite weld metal.

7.4.8 Shop splices of webs and flanges in built-up girder shall be made before the webs and flanges are joined to each other.

7.5 **Tolerances**

Tolerances for Structural Steel be as per AISC Specifications unless noted otherwise.

8.0 WELDER QUALIFICATIONS

8.1 All welders contracted to perform work shall be required to show written evidence that they have been properly tested in compliance with the approved welding procedures.

8.2 Welders shall have been qualified in the proposed procedure by an established laboratory acceptable to the Engineer within the preceding 90 days.

8.3 All welders shall be qualified for the type of weldment, grade of steel, thickness of steel, welding process and welding position that they are employed to weld. Welders and welding operators that have not been performance qualified, for all material and thickness ranges used on the job, shall be restricted to welding only that portion of the work for which they are qualified.

8.4 Engineer reserves the right to have welders or welding operators requalified or removed from the job as he deems necessary during the progress of work. Engineer's decision regarding the qualifications of any welder shall be final.

9.0 WELDERS IDENTIFICATION

9.1 Each welder shall be assigned a unique identifying number or symbol that he shall use to identify all welding resulting from his skills.

9.2 Stenciled markings shall be applied within 40mm (1-5/8 in.) of the weld using low stress concentration dies. Written symbols are also acceptable.

9.3 A record shall be kept of these symbols by the Contractor. The records shall show welder's name, symbol assigned, procedures to which qualified, employment and test dates. This record shall be available to the Engineer's Representative at all times.

10.0 TEST ASSEMBLY

10.1 Fabricated components such as Beams Girders, Bracing, as and where required by planning, shall be test assembled in the shop prior to transportation to site.

10.2 Test assembly work and procedure should be planned during fabrication process.

10.3 Each test assembly shall be got inspected from the Engineer's Representative and shall be dismantled only after his approval in writing.

11.0 SURFACE PREPARATION AND PAINTING

Surface preparation and painting shall be in accordance with the provisions of the Code of Standard Practice of the American Institute of Steel Construction, Inc.

11.1 **Surface Preparation**

a) All steel shall be cleaned free from loose scale, rust, burrs slag, etc. by means of sand blasting and/or other approved means as recommended by the manufacturer of paint.

b) The sand used for this purpose shall conform to the type as specified in SSPC-SP.6. It should be free from earth, dust, clay and moisture. For this, the Contractor shall submit the gradation (no less than that passing through a 16 mesh screen U.S. sieve series) and source of sand along with the sample for approval by the Engineer prior to commencing the sand blasting operation.

c) The size of sand particles, air pressure and size of the hose nozzle shall be correlated to give proper and acceptable surface.

d) Material which is to be used for fabrication of components to be galvanized later on shall not be cleaned (See clause 11.3).

11.2 **Painting**

a) After fabrication, assembly and surface preparation all assembled units shall be given two shop coats of epoxy primer and two coats of epoxy enamel paint in the fabrication shop.

b) One final coat of epoxy enamel paint shall be applied after erection of all components.

c) The thickness of each coat of paint shall be in accordance with the paint manufacturer's recommendation.

d) All other requirements for the specified paint system shall be in accordance with the paint manufacturer's specifications/ recommendations.

e) The type of primer & paints to be applied shall be as specified in clause 11.2.1.

f) The Contractor shall use the best quality of the type of paint specified and shall get the same approved by the Engineer.

g) Steel work/Surfaces not to be painted

i) Steel work to be encases/embedded in concrete or surface in contact with concrete or grout shall not be painted, but shall be given a cement wash after surface preparation.

ii) Machined finished surfaces shall not be painted but shall be coated with rust preventive compound, approved by the Engineer immediately after finishing. Such surfaces shall also be protected with wooden pads or other suitable means for transportation. Unassembled pins, keys, and bolt thread shall be greased and wrapped with moisture resistant paper.

iii) Contact surfaces of connections using high strength bolts in friction type connections shall not be painted. Such surfaces of all components after fabrication shall be cleaned free of paint. No coating whatsoever then shall be applied to such surface. The surface roughness for high strength friction grip holts is a

very important factor therefore components shall not be erected unless approved by the Engineer.

11.2.1 **Primer and Paint**

11.2.1.1 **Primer:**

Primer shall be epoxy primer of a proven quality. The type of primer to be used shall be approved by the Engineer.

11.2.1.2 **Paint:**

Paint shall be epoxy enamel of a proven quality. The type of paint to be used shall be approved by the Engineer.

11.3 **Galvanizing (Zinc Coating)**

Galvanizing, wherever specified, shall be applied in a manner and of a thickness and quality conforming to the requirements of ASTM A123 standard specifications for zinc (Hot galvanized) coating on products fabricated from rolled, pressed and forged steel shapes, plates, bars and strips.

Components shall be galvanized i.e. zinc coated after complete fabrication i.e. welding, drilling etc. the process shall consist of removal of rust and mill scale by pickling in hydrochloric acid or sulphuric acid followed by water wash and prefluxing in tanks containing zinc ammonium chloride and then fluxing with ammonium chloride. The fluxed components shall then be passed through a drying oven prior to immersion in a bath of virtually pure molten zinc.

12.0 INSPECTION AND TESTS

12.1 Manufacturer's Test Certificate for all material used shall be furnished by the Contractor for Engineer's scrutiny and approval.

12.2 Rolling tolerance of all shapes and profile according to AISC shall be in accordance with the provisions of ASTM A6 specifications. These shall be checked by the Contractor before commencing work and shall be rejected if found not within limits.

12.3 Materials shall be tested for conformance with the specified standards at an approved testing laboratory as and when directed by Engineer.

12.4 Contract surfaces of connections using high strength bolts in friction type connections shall be got inspected and approved from the Engineer before bolting.

12.5 All bolted connections shall be got inspected and approved from the Engineer for types, size, number of bolts and installation including tightening.

12.6 Inspection and Testing - Welding

12.6.1 General

Welding shall be inspected and tested by an approved testing laboratory during fabrication and erection of structural steel as follows:

The testing laboratory shall be responsible for conducting and interpreting the tests. It shall state in each report whether or not the test

specimens conform to all requirements of the Contract Document and shall specifically note any deviations therefrom.

Certify all welders and make 100 percent visual inspections and tests as follows:

- Record types and locations of all defects found in the welding work.
- The measures required and performed to correct such defects.

In addition to the requirements of AWS D 1.1, paragraph 8.15, each weld shall be visually free of slag, inclusions and porosity.

In addition to visual inspection of all welds magnetic particle, ultra-sonic and radiographic inspection shall be made of all welds as specified below. Magnetic particle tests shall be made on the root pass and finished weld.

The method of magnetic particle test shall be in accordance with ASTM E109. Any type of crack or zone of in-complete fusion or penetration shall not be acceptable.

Radiographic testing technique and standards of acceptance shall be in accordance with AWS D 1.1.

Ultra-sonic testing shall be performed in accordance with AWS D 1.1.

Welding inspection and test report showing evidence of the quality of welding shall be submitted by the Contractor. For each section of weld inspected and tested, furnish a report which clearly identifies the work, the welder's identification, the areas of inspections and test, the acceptability of the welds, and signature of the inspector or laboratory incharge. Each report shall be completed at the time of inspection or test. For radiographic examination, furnish a complete set of radiographs in addition to the reports. All inspection and testing shall be carried out in presence of the Engineer or his representative.

12.6.2 Test Methods

Use the following test methods as specified. The following list is in descending order. When a particular test method is specified for a joint and the method is impractical to use, use the next highest method practicable. The alternative method will be subject to approval, NDT procedures and techniques shall be in accordance with AWS D 1.1, section 6.7.

a) Radiographic Method: In addition to the requirements of AWS D 1.1, comply with ASTM E94.

b) Ultrasonic method.

c) Magnetic particle method.

d) Liquid Penetration Method: Visible-dye, solvent removable method only.

12.6.3 Members Designated for Tests

a) Built – up Members:

Examine 100 percent of flange-to-flange and web-to-web welding by the radiographic method. For all web-to-flange and pipe column seam welding, examine ten percent of each welder's work as follows:

- Full penetration groove welds by the ultrasonic.

- fillet welds and partial penetration groove welds by the magnetic particle method.

b) Moment Connection Joints:

- Examine 100 percent of all flange-to-flange and web-to-web welding as follows:

  Full penetration groove welds by the ultrasonic method or other method as designated by the Engineer.

  Fillet welds and partial penetration groove welds by the magnetic particle method.

- For all web-to-flange welding, examine ten percent of each welder's work as follows:

  Full penetration groove welds by the ultrasonic method or radiographic method as approved by the Engineer.

  Fillet welds and partial penetration groove welds by the magnetic particle method.

c) Column Base Plates.

Examine 100% of all welding for connection of base plate to column.

d) Bracing Connections: Examine 100 percent of all welding for connection of diagonal bracing as follows:

- Groove welds by the ultrasonic method.

- Fillet welds by the magnetic particle method.

12.6.4 Requirement for ten percent Examination

a) Examine a 300mm (12 in.) section of weld in each 3m (10 ft.) increment of each welder's work as directed by the Engineer. If the examination meets the acceptance standards of AWS D 1.1, the 3m (10 ft.) of weld represented will be accepted.

b) if the examination fails to meet the acceptance standards, examine two additional 300mm (12 in.) sections in the 3m (10 ft.) increment as directed by the Engineer. If both of these examinations meet the acceptance a standards, the 3m of weld represented will be accepted. Repair the defects detected in the first examination and re-examine.

c) If one or both of the examinations fails to meet the acceptance standards, examine the remaining weld of the 3m (10 ft.) increment. Repair the areas that do not meet the acceptance standards and re-examine.

12.6.5 Repair and Re-Testing of Welds

Repair defective welds in accordance with AWS D 1.1, or replace the weld, and Re-test repaired and replaced welds by the same method and acceptance standard used to examine the original weld. In addition, when defective welds are found, the testing laboratory shall determine the cause of the defective welding and institute immediate corrective action.

All defective welding shall be repaired or replaced at the Contractor's expense.

12.7 **Rejection**

Neither the fact that the materials have been tested nor that the manufacturers test certificates have been furnished shall effect the liberty of the Engineer to reject material found not according to these specifications.

Materials or workmanship not in conformance with the provisions of these specifications shall be rejected at any time, after delivery or during the progress of the work or the completion and erection at site.

13.0 ERECTION

13.1 **Bracing**

All steel structures shall be carried up true and plumb within the limits defined in the AISC code of standard practice, and temporary bracing shall be introduced wherever necessary to take care or all construction loads to which the structure may be subjected including the equipment and the operation of the same. Such bracing shall be left in place as long as required for safety.

Wherever piles of materials, erection equipment and other loads are carried during erection, proper provision shall be made by the Contractor to take care of the stresses resulting form such loads.

13.2 **Alignment**

No permanent bolting or welding shall be done at site during erection until as much of the structure as will be stiffened thereby has been properly aligned and approved by the Engineer.

13.3 **Joints Using High Strength Bolts**

All structural joints using high strength bolts shall be executed and inspected in accordance with "AISC Specification for structural joints using ASTM A325 or A490 bolts". High strength bolts and nuts, loosened after tightening, shall be discarded and replaced with unused bolts and nuts.

14.0 MEASUREMENT AND PAYMENT

14.1 **General**

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost there of shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

14.1.1 Nuts, bolts, screws, washers, weld metal and welding rods.

14.1.2 Testing of materials and welds, and repair of defects.

14.1.3 Surface preparation including cleaning with sand blasting.

14.1.4 Painting system including primer coats.

14.1.5 Galvanizing

14.1.6 Fabrication

14.1.7 Erection

14.2 Structural Steel Works

14.2.1 Measurement

Measurement of acceptably completed works of structural steel will be made on the basis of weight in kilogram, according to approved shop drawings, after verification at site to the satisfaction of the Engineer that the items fabricated, supplied and erected in position conform with the contract and approved shop drawings.

14.2.2 Payment

Payment will be made for acceptable measured quantity of structural steel works on the basis of unit rate per kilogram quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

14.3 MS Railing

14.3.1 Measurement

Measurement of acceptably completed works of MS railing will be made on the basis of actual length in running meter/ running foot, according to approved shop drawings, after verification at site to the satisfaction of the Engineer that the items fabricated, supplied and erected in position conform with the contract and approved shop drawings.

14.3.2 Payment

Payment will be made for acceptable measured quantity of MS railing works on the basis of unit rate per running meter / running foot quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

14.4 Steel Door

14.4.1 Measurement

Measurement of acceptably completed works of Steel door will be made on the basis of net actual area in square meter / square foot, according to approved shop drawings, after verification at site to the satisfaction of the Engineer that the items fabricated, supplied and erected in position conform with the contract and approved shop drawings.

14.4.2 Payment

Payment will be made for acceptable measured quantity of Steel door on the basis of unit rate per square meter / square foot quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

14.5 **Steel Grating**

14.5.1 Measurement

Measurement of acceptably completed works of Steel grating will be made on the basis of number of gratings, according to approved shop drawings, after verification at site to the satisfaction of the Engineer that the items fabricated, supplied and erected in position conform with the contract and approved shop drawings.

14.5.2 Payment

Payment will be made for acceptable measured quantity of Steel grating on the basis of number of gratings quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

14.6 **Steel Gate**

14.4.1 Measurement

Measurement of acceptably completed works of Steel Gate will be made on the basis of number of Gates, according to approved shop drawings, after verification at site to the satisfaction of the Engineer that the items fabricated, supplied and erected in position conform with the contract and approved shop drawings.

14.4.2 Payment

Payment will be made for acceptable measured quantity of Steel Gate on the basis of number of Gates quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

*** End of Section 3000 ***

SECTION - 4100

CEMENT CONCRETE BLOCK MASONRY

1. SCOPE
2. APPLICABLE STANDARDS
3. PRODUCT, DELIVERY, STORAGE AND HANDLING
4. MATERIALS
5. CONCRETE BLOCK MAKING
6. PROPERTIES OF BLOCK
7. SOLUBLE SALT CONTENT
8. REINFORCING AND ANCHORS
9. INSPECTION
10. ERECTION
11. SCAFFOLDING
12. JOINTING
13. DAMP PROOF COURSE
14. PROTECTION OF WORK
15. BUILT-IN WORK
16. CHASES
17. STRIKING OF JOINTS AND CLEANING
18. CURING AND REPAIRS
19. TOLERANCES
20. MEASUREMENT AND PAYMENT

SECTION - 4100

CEMENT CONCRETE BLOCK MASONRY

1.0 SCOPE

The work under this section of the Specifications consists of furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with the supply and installation of cement concrete block masonry walls grouting of pressed steel door/panel frames occurring in concrete masonry walls and partitions including wall ties, anchors, damp-proof courses, complete in strict accordance with this section of the Specifications and applicable drawings, and subject to the terms and conditions of the Contract.

2.0 APPLICABLE STANDARDS

Latest editions of following Pakistan, ACI, British and ASTM Standards are applicable to these specifications.

2.1 PS (Pakistan Standards)

232 Ordinary Portland Cement.
419 Properties & Specifications of blocks

2.2 ACI (American Concrete Institute).

530 Building Code requirements for masonry structures.
531.1 Specifications for concrete masonry construction.

2.3 ASTM (American Society for Testing and Material)

C129 Non-Load Bearing Concrete Masonry Units
C140 Sampling and testing of concrete masonry units.
C144 Aggregate for masonry mortar.
C145 Solid load bearing concrete masonry units.
C149 Bond strength of mortar to masonry units.
C270 Mortar for concrete masonry
C331 Lightweight aggregate for concrete masonry units.
C404 Aggregates for Masonry Grout.
C426 Test method for Drying Shrinkage of Concrete Block.
C150 Portland cement.
C90 Specification for Load Bearing Concrete Masonry Units.
C476 Specification for Grout for Masonry

2.4 BSI (British Standards Institution)

743 Materials for Damp-proof Courses.
3148 Tests for water for making concrete.
1243 Specification for Metal Ties for Cavity Wall Construction
4887 Mortar Plasticizer.
1221 Pt-1 Brick and Block Masonry
122 Pt-2 Walls and Partitions of Blocks and Slabs

All design detailing, materials and workmanship shall conform to ACI-530.

3.0 PRODUCT, DELIVERY, STORAGE AND HANDLING

3.1 Deliver concrete masonry units stacked on pallets.

3.2 Store units above ground on level platforms allowing air circulation under stacked units. Cover and protect units against wetting prior to use.

3.3 Handle units on pallets of flat bed barrows. Do not permit free discharge from conveyor units or transporting in mortar trays.

4.0 MATERIALS

Materials for masonry shall conform to the requirements as specified herein, or on the drawings, whichever are more stringent.

4.1 For Block

Cement, aggregates and water for concrete blocks shall conform to the requirements as specified in the section for plain and reinforced concrete or as approved by the Engineer.

4.2 For Mortar

4.2.1 Aggregate

Aggregate for mortar shall comply with the requirements of ASTM C144. Sand that has been in contact with seawater shall not be used unless it has been thoroughly washed to the satisfaction of the Engineer.

4.2.2 Cement

Cement shall be Ordinary Portland Cement conforming to BS-12.

4.2.3 Water

Water shall be clean and free from any harmful impurity. Where the quality of the water is doubtful, it shall be tested in accordance with BS-3148.

4.2.4 Additives

Additives where used, shall be proprietary products used the proportions and manner recommended by the manufacturer. The additives shall in no way adversely affect the mortar strength or contain chemicals, which may be harmful to other building materials. To add gypsum to cement is strictly forbidden.

4.2.5 Mortars and Grout

Materials for mortar, sand binding agent and water, shall be mixed by volume or by weight for at least 3 minutes with the minimum amount of water to produce a correctly mixed mortar or grout of workable consistency in a mechanical batch mixer. For small jobs, hand mixing may be permitted, the ingredients being mixed with sufficient water to produce a correctly mixed workable mortar.

Mortar used in masonry construction shall conform to ASTM C270 types, having average compressive strength of 50 mm (2 in.) cube of mortar as 12.5 MPa.

Grout shall conform to ASTM C-476 and shall be proportioned by volume as shown in Table 2 of Standard ASTM C-476.

Mortars shall be mixed in batches, which can be used within a period before the setting process commences. Once a mix begins drying off, it shall be rejected. No ingredients shall be added to it once the setting process has begun.

5.0 CONCRETE BLOCK MAKING

5.1 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.

5.2 The blocks shall be continuously water cured by sprinkling water for a minimum of 10 days and covered between sprinkling operations with 4 mils thick polyethylene sheeting. After the 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 surfaces of the block will be allowed to dry.

5.3 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.

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

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

6.0 PROPERTIES OF BLOCKS

6.1 All blocks shall be of the size and shape required to complete the work shown in the Drawings or as instructed by the Engineer.

6.2 The cement, sand and coarse aggregate shall be volume batched and their proportion may be adjusted so as to provide the concrete of the required strength when tested and shall be mixed in a concrete mixer in accordance with clause 5.4 of the section “Plain and Reinforced Concrete”.

6.3 All blocks shall conform to ASTM C-90 Standard type N-II, normal weight. The compressive strength based on gross area shall be minimum $7MP_a$ (1000 psi) for an average of 3 blocks and minimum $5.5MP_a$ (800 psi) for individual blocks, 28 days after casting cement concrete blocks.

6.4 The Contractor shall provide test certificates showing the average minimum crushing strength of the blocks prior to the commencement of the construction. Further test certificates shall be provided as required by the Engineer, to ensure that all batches of blocks have the minimum specified crushing strength. The block strengths are to be determined in accordance with ASTM C - 140 Standard.

6.5 The test shall be carried out by a laboratory approved by the Engineer. Evidence shall be produced that the block manufacturer has an efficient method of quality control. The Engineer will require to test samples of blocks periodically and the Contractor shall make necessary arrangements accordingly. The method of sampling for all tests shall be in accordance with ASTM C-140.

6.6 All properties or specifications of blocks, not explained in these Specifications or ASTM C145/C129/C90 shall comply with the requirements of PS 419, as directed by the Engineer.

7.0 SOLUBLE SALT CONTENT

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

8.0 **REINFORCING AND ANCHORS**

8.1 **For Solid Block**

Two # 3 bars shall be provided at every fourth course for anchoring of block masonry to columns. Two # 3 bars at every fifth block length shall be provided for anchoring masonry walls to plinth beam/floor beam, as shown on the drawing.

All block masonry shall be bonded to concrete columns / walls / beams with steel anchors as per details provided in the drawings.

9.0 **INSPECTION**

Condition of Surfaces to receive Masonry: Inspect foundations and slabs to assure surfaces to support masonry are as follows:

9.1 To proper grades and elevations.

9.2 Free of dirt and other deleterious materials.

9.3 Surfaces not properly prepared have been reported to the Engineer in writing and have been satisfactorily corrected.

10.0 **ERECTION**

10.1 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 centre of units in alternate courses below. Vertical joints shall be buttered in the entire height of blocks. Each course shall be bonded at corners and at intersections of walls and shall be properly bonded. Courses of block shall be kept plumb throughout and corner reveals shall be true and in plumb.

Standard width of mortar joints for both horizontal and vertical joints shall be 10 mm (3/8 in.) (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. Blocks terminating against soffits of beam or slab construction shall be wedged tight with wedges and the joints shall be packed solidly with mortar between the top of the block and the bottom of slab or beam. Control 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 Class 'C' 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.

10.2 The block work shall be carried up in a uniform manner and no portion shall be carried more than one metre 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.

10.3 Sleeves, Chases, holes, sinking and mortises for other trades shall be correctly located and formed to the sizes as required by the relevant trades. Chiseling of completed walls or the formation of holes shall only be carried out with the approval of the Engineer.

10.4 Walls of blocks indicated as being non-load bearing shall be constructed on the insitu concrete floor slab unit after the floor formwork is struck and the concrete has obtained sufficient strength to support their weight. Tooting into load-bearing walls shall not be permitted.

10.5 All bolts, anchors, ties, pipe sleeves, flushing metal attachments, lintels and the like required to be built into the work shall be correctly inserted and executed as the work proceeds.

10.6 Walls or partitions abutting concrete columns or walls shall be securely anchored and tied with metal anchors or ties at not more than 450 mm (18 in.) vertical centres. Wall ties cast in with concrete shall be bent down after the removal of formwork and shall be securely jointed into the mortar beds of walling.

11.0 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.

12.0 JOINTING

Jointing is the forming of joints as work proceeds. Joints shall be as follows:

12.1 Exterior exposed joints shall be tightly formed to weather joint with the point of the trowel.

12.2 Interior exposed joints shall be tightly formed to a concave joint.

12.3 Joints which are subsequently covered with plaster or other finish materials shall be struck flush.

13.0 DAMP PROOF COURSE

Damp-proof course shall be laid on an even mortar bed, free from projections, which may puncture the material. Where the damp-proof course is to be stepped, only flexible membrane shall be used. All damp proof courses, unless otherwise specified, shall consist of class 'C' cement concrete 50 mm thick, mixed with 2.5 kg. Of pudlo per bag of cement or other approved quality water proofing compound as per manufacturer’s specifications and shall be laid at required levels as per drawings and instructions of the Engineer. The D.P.C shall be tamped, consolidated, leveled, edges and corners made to the requirements of concerned drawings including finishing and curing complete.

14.0 PROTECTION OF WORK

14.1 Protect surrounding work from mortar dripping or other damage during construction.

14.2 Remove misplaced mortar or grout immediately.

14.3 Cover top of walls with non-staining waterproof coverings when work is not in progress.

15.0 BUILT-IN WORK

15.1 Avoid cutting and patching.

15.2 Install bolts, anchors, nailing blocks, inserts, frames, reinforcements, and other built-in items as masonry work progresses.

15.3 Solidly grout voids and spaces around built-in items and metal doorframes.

16.0 **CHASES**

16.1 Build in chases, do not out block or cut in after lying.

16.2 Chases shall be plumb and be minimum one-unit length from jambs of openings.

17.0 **STRIKING OF JOINTS AND CLEANING**

17.1 At final completion of masonry work, fill holes in joints and strike with tool.

17.2 Cut out and re-point defective joints.

17.3 Dry brush masonry surface after final striking of joint when mortar has set.

17.4 Leave work and surrounding surfaces clean and free of mortar spots and drippings.

18.0 **CURING AND REPAIRS**

18.1 All block masonry shall be water cured and shall be kept wet for at least seven days, by an approved method which will keep all surfaces to be cured continuously wet. Water used for curing shall meet the requirements of the specifications for water used in the manufacture of blocks.

18.2 If, after the completion of any block masonry, the work is not in alignment or level, or does not conform to the lines and grades shown on the drawings or shows a defective surface, it shall be removed and replaced by the Contractor at his expense unless the Engineer grants permission, in writing, to patch or replace the defective area.

19.0 **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 one mm in one metre. The maximum tolerance in the length, height or width of any single masonry wall shall be $\pm$ 3mm.

20.0 **MEASUREMENT AND PAYMENT**

20.1 **General**

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

20.1.1 Chiseling of masonry, wherever required.

20.1.2 Providing and fixing all horizontal/vertical reinforcing bars and steel anchors.

20.1.3 Providing and laying damp proof courses.

20.1.4 Provide & apply setting mortar

20.1.5 Scaffolding & other supports to carry out work.

20.1.6 Raking out joint and cleaning

20.1.7 Curing and repairs

20.1.8 Class-B nominal concrete mix used in making up short fall in height of wall, filling of specified hollow blocks around door/window/openings, as shown on the drawing.

20.1.9 Insulation

20.1.10 Reinforced concrete members such as stiffener columns and tie beams.

20.2 **Block Masonry**

20.2.1 Measurement

Measurement for acceptably completed works of block masonry will be made on the basis of actual volume in cubic metre / cubic foot of masonry provided and installed in position as shown on the drawings or as directed by the Engineer. Each measurement shall be taken to the nearest 10mm (3/8 in.). All openings left in the masonry wall shall be deducted.

20.2.2 Payment

Payment will be made for acceptable measured quantity of block masonry work on the basis of unit rate per cubic metre / cubic foot quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

20.3 **Pigmented Split Block Masonry**

20.2.1 Measurement

Measurement for acceptably completed works of block masonry will be made on the basis of actual area in square metre / square foot of masonry provided and installed in position as shown on the drawings or as directed by the Engineer. Each measurement shall be taken to the nearest 10mm (3/8 in.). All openings left in the masonry wall shall be deducted.

20.2.2 Payment

Payment will be made for acceptable measured quantity of block masonry work on the basis of unit rate per square metre / square foot quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

*** End of Section 4100 ***

SECTION - 4200

BRICK MASONRY

1. SCOPE

The work under this section of the specifications consists of furnishing all plant, labour, equipment, appliances and materials and performing all operations in any floor and at any height in connection with furnishing and installing brick masonry in position including portland cement and sand for mortar & masonry, complete in strict accordance with this section of the specifications and applicable drawings and subject to the terms and conditions of the Contract.

2. MATERIALS

2.1 Portland cement for mortar shall conform to the applicable requirements specified in the section "Plain and Reinforced Concrete".

2.2 Sand for mortar shall be furnished by the Contractor and shall conform to the applicable requirements for sand specified in the section "Plain and Reinforced Concrete".

2.3 Water used in the manufacture of bricks and in the preparation of mortar shall be free from objectionable quantities of silt, organic matter, alkali, salts and other impurities, and will be tested and approved by the Engineer.

2.4 Bricks shall be the best available bricks in and around Islamabad/Rawlalpindi District. In case satisfactory quality is not available the Engineer may ask for bricks from areas around Islamabad/Rawalpindi. Bricks/tiles for facing work shall be Fire bricks/tiles manufactured in accordance with relevant ASTM/BS standards.

3. MORTAR

3.1 Mortar for first class brick masonry, except where otherwise directed by the Engineer, shall consist of one part Portland cement to three parts of damp loose mortar sand by volume and sufficient water to produce proper consistency for the intended use. Where directed by the Engineer for increased workability, hydrated lime putty, approved by the Engineer, shall be added to the mortar but shall not exceed 25 percent, by volume of the dry cement.

Mortar for second class brick masonry shall be one part portland cement and six parts of mortar sand.

Mortar to be used in Fire bricks and tiles shall consist of one part coment, one part lime and four and half part sand blended with fine, grinded backed clay at 500 to 600 degree centigrade used for the manufacturing of fire bricks and colour pigment to match the colour of tiles and bricks.

3.2 Methods and equipment used for mixing mortar be such as will accurately determine and control the amount of each separate ingredient entering into the mortar and shall be subject to the approval of the Engineer. Mortar shall be mixed only in sufficient quantities for immediate use and all mortar not used within 30 minutes after addition of water to the mix shall be rejected. Re-tempering of mortar shall not be allowed.

4. BRICK

4.1 All bricks shall be of first class quality made from good brick earth, free from saline deposit and shall be hand moulded. They shall be thoroughly burnt without being vitrified, shall be regular, uniform in shape and size with sharp and square edges, parallel faces and of deep red or copper colour. First class bricks shall be homogeneous in texture and shall emit a clear ringing sound when struck, and shall be free from flaws, cracks, chips, stones and modules of lime. First class brick in an oven dried condition shall not absorb more than 1/5 of its weight of water when immersed one hour in water at 21 to 27 degrees centigrade and shall show no signs of efflorescence on subsequent

drying. The average compressive strength of five representative first class bricks shall be not less than 2000 psi and not less than 1700 psi for any individual brick.

4.2 All bricks shall be manufactured by the Trench Kiln Method or other standard methods approved by the Engineer. The earth used in manufacturing bricks shall be carefully selected and shall be free from objectionable quantities of lime, gravel coarse sand, roots, or other organic matter. Salts shall not exceed 0.3 percent and calcium carbonate shall not exceed 2.0 percent.

4.3 The moulds used in the manufacture of bricks shall be thoroughly sanded before each use and shall be sufficiently larger than the size of the bricks being manufactured to allow for shrinkage in drying and burning. Over-size, irregular and worn moulds shall be destroyed. Each finished brick for brick masonry shall be 9" by 4-1/2" by 3" in size and shall weigh between 7 lb. to 9 lb. All bricks shall have a "frog" 1/4" deep on one face.

4.4 Samples of first class bricks shall be submitted to the Engineer with test reports for his approval. Bricks of approved samples shall only be used in the works. If at any time, during the progress of the work, use of sub-standard material is found by the Engineer, such work shall be rejected and the Contractor shall replace the rejected work at his cost.

4.5 Samples of Fire bricks and tiles shall be submitted to the Engineer for approval. The Contractor shall ensure that only approved shade and size of tiles and bricks shall be used in the project.

5. PLACING

5.1 The methods and equipment used for transporting the bricks and mortar shall be such as will not damage the brick nor delay the use of mixed mortar. Brick shall not be placed during rains sufficiently heavy or prolonged to wash the mortar from the brick. Mortar already spread which becomes diluted by rain shall be removed and replaced before continuing with the work. All brick to be used in brick masonry shall be moistened with water for three to four hours before they are used by a method which will ensure that each brick is thoroughly and uniformly wetted. All bricks shall be free from water adhering to their surface when they are placed in the brick masonry.

5.2 Bricks shall be laid "frog" upward with mortar joints and in English and Flemish bond as shown on the Drawings or as directed by the Engineer. Both bed and vertical joints shall be 3/8" in thickness completely filled with cement mortar as specified herein, and each brick shall be bedded by firmly tapping with the handle of the trowel. All horizontal joints shall be parallel and all vertical joints in alternate courses shall be directly over one another. Excess mortar at the outer edges shall be removed and joints drawn straight with the edge of a trowel and a straight edge. All anchors and similar work required to be embedded in the brick masonry shall be installed as the work progresses. At the completion of the work all holes or defective mortar joints shall be cut out and repainted.

5.3 Te external face of Fire brick masonry and tile work shall be finished by deep struck pointing as the work proceeds. The joints shall be struck by the help of a pointing tool to provide a notch in the green mortar after the brick work has been laid. Horizontal joints shall be struck to form a weathered joint and vertical joints shall be struck with a V notch. Care shall be taken that the striking tools do not develop a cutting edge as the object of striking the joint is to compress the mortar into the joints. The curing of fire bricks and tiled surfaces shall begin after 36 hours of their laying.

5.5 Anchoring

All brick masonry shall be bonded to concrete columns/walls/beams with steel anchors as per details provided in drawing.

6. CURING AND REPAIR

6.1 All brick masonry shall be water cured and shall be kept wet for at least seven days by an approved method which will keep all surfaces to be cured continuously wet. Water used for curing shall meet the requirements of the Specifications for water used in the manufacture of bricks.

6.2 If, after the completion of any brick masonry work, the brick is not in alignment or level, or does not conform to the lines and levels shown on the Drawings, or shows a defective surface, it shall be removed and replaced by the Contractor at his expense unless the Engineer grants permission, in writing, to patch or replace the defective area.

6.3 Curing for Fire bricks and tiles shall start after 36 hours of their placement. The Contractor shall arrange his schedule in this regard to strictly ensure this requirement.

7. 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 cause shall be repaired by the Contractor at his own cost.

8. TOLERANCES

All brick work shall be erected plumb and true to line and level with maximum variation in any storey height or any length of wall being 1/8" in 10 feet. The maximum tolerance in the length, height or width of any single masonry unit shall be ± 1/8".

9. DAMP PROOF COURSE

All damp proof course unless otherwise specified shall consist of class 'C' cement concrete 2" thick, mixed with 5.5 lb of pudlo/bag of cement or other approved quality water proofing compound as per manufacturer's specifications and shall be laid at required levels as per drawings and instructions of the Engineer. The D.P.C shall be tamped, consolidated, leveled and edges and corners made to the requirements of the relevant drawings including finishing and curing complete. All damp proof courses shall be laid over approved water proofing materials as specified on the Drawings.

10. MEASUREMENT AND PAYMENT

10.1 General

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bills of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bills of Quantities.

The rates quoted by the Contractor in the Bill of Quantities shall include work to be executed under these specification in any floor and at any height except where otherwise specifically stated in the relevant item of Bill of Quantities and the Contractor shall not be entitled to any claim or claim any compensation on this account.

10.1.1 Cutting & chiseling of masonry wherever required.

10.1.2 Cement sand mortar used in laying bricks including wastage.

10.1.3 Curing and repairing the masonry work.

10.1.4 All steel anchor bars/dovetail anchors etc. in masonry work.

10.1.5 Damp proof course of class 'C' concrete including water proofing agent.

10.1.6 Cutting and grinding of fire tiles/bricks where required with cutting machines

10.1.7 Cement, lime, sand, pigment and fine powdered clay mortar used in laying fire bricks and tiles including deep struck pointing and wastage.

10.2 Brick Masonry

10.2.1 Measurement

In case of different thickness of slab in different areas or room or for any other reason whatsoever, if chiseling of 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 actual height shall be made good with 1:2:4 nominal mix concrete. This concrete shall neither be measured nor be paid under item of concrete but will be paid for under item of wall masonry. Similarly where the 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.

Measurement of acceptably completed works of respective type of brick masonry will be made on the basis of number of cubic feet provided & installed in position as shown on the Drawing or as directed by the Engineer.

10.2.2 Payment

Payment will be made for acceptable measured quantity of respective type of brick masonry on the basis of unit rate per cubic feet quoted in the Bills of Quantities against the respective item and shall constitute full compensation for all the works related to the item.

SECTION - 4600

CARPENTRY AND JOINERY

1. SCOPE
2. MATERIALS
3. SAMPLES
4. FABRICATIONS
5. PROTECTION & MATERIALS
6. WOODEN DOORS
7. WOODEN RAILING
8. KITCHEN CABINETS
9. WOODEN FLOOR & WALL PANELING
10. SS & GLASS RAILING
11. DEFECTIVE WORK
12. SURFACE PREPARATION
13. MOCK-UP SAMPLE
14. MEASUREMENT & PAYMENT

SECTION - 4600

CARPENTRY AND JOINERY

1. SCOPE

The work covered under this section of Specifications consists of providing all material, labour, plant, equipment, appliances and performing all operations in any floor and at any height connected with the fabrication and erection of all woodwork, mill work, construction assembly, surface finish treatment and building in of all cabinet type items, supports etc. of wood or metal and incidentals, associated woodwork appurtenances, procuring and applying preservatives, installation of "Finish Hard Ware" in connection with finish woodwork as per details shown on the Drawings or as directed by the Engineer.

2. MATERIALS

2.1 Timber

2.1.1 Hard Wood :

Hard wood shall comprise of Oak, beech, Walnut Mahogany, Teak, Iroko and Sheesham.

2.1.2 Soft Wood :

All soft wood shall consist of pines, spruce, hemlock and douglas fir or cedrous deodar (referred in the document as deodar), wood locally known as 'Partal' to be used in shutter core where specified.

2.1.3 General Characteristics :

All the timber shall be in accordance with the requirements of BSI No: 1186, 'Quality of Timber and Workmanship in Joinery'.

The whole of the timber shall be from the heart of sound and fully grown tree, uniform in substance, straight in fibre, first class quality properly seasoned, free from large or loose dead-knots, open shakes and excessive sapwood. The scantlings of all timbers shall be bright, sound and square edged. The moisture content of timber shall not be more than 10 (ten) percent in case of soft wood and 7 (seven) percent in case of hard wood.

2.1.4 Preservation of Wood :

Prior to installation of all finish wood works in their respective positions, preservatives shall be applied to safeguard the wood work against fungus, termite and bores.

The preservatives shall be of the best available quality as approved by the Engineer. The method of application shall be strictly in accordance with the manufacturer's instructions. The treatment and application of all the preservatives shall comply with the requirements of BS-CP 98:1964.

2.1.5 Adhesive :

The adhesives shall conform to the requirements of BSI No. 745 "Animal Glues for Wood" manufactured by M/s Hoest shall be considered approved for this Project or as directed and approved by the Engineer.

2.1.6 Nails and Screws :

All nails and screws shall comply with requirements of BSI NO. 1202 and BSI NO. 1210 respectively.

2.2 Ply Wood

The ply wood shall comply in all respects with BSI No. 1455:1963. All the ply wood shall only be obtained from KDC Board (Pvt.) Limited, Jhelum as approved by the Engineer. All plywood shall be manufactured with phenol pharamaldihide or any other approved water proof adhesive but not with urea pharamaldihide.

Ply wood used for doors, and other similar works shall be to the thickness and size as shown on the Drawings or as directed by the Engineer. The grade shall be first quality and the face and back shall be free from end joints, dead knots, overlaps, patches and other similar defects. The surfaces shall be free, smooth for painting or polishing.

2.3 High Density Fibre (MDF) Board

Medium density fibre board to be used on the project shall be LASANI of thicknesses as specified in the drawings. Board shall be manufactured with water proof resinous glues and shall be guaranteed by the manufacturer. All boards MDF/Partical required for the exterior surfaces shall be laminated in approved colour and texture in factory as specified elsewhere.

3. SAMPLES

All samples of the material used for the work under this Section of Specification shall be approved by the Engineer and same type of material shall be used throughout the work. If the Engineer desires to get the material tested, this will be got done by the Contractor at his own cost from a laboratory approved by the Engineer.

3.1 Samples of Materials

All samples of the material used for the work under this Section of Specification shall be approved by the Engineer and same type of material shall be used throughout the work. If the Engineer desires to get the material tested, this will be got done by the Contractor at his own cost from a laboratory approved by the Engineer.

3.2 Shop Drawings

The Contractor shall submit detailed shop Drawings on the basis of the drawings, specifications including fittings, fixtures and hardwares to the Engineer before fabrication.

3.3 Mock-up Sample

After approval of shop drawings and tests etc., the contractor shall submit at his own cost one mock-up sample of each type of wood works complete with all fixing, fixtures accessories prior to the actual fabrication of the bulk.The samples shall be returned to the Contractor for incorporation in the works after installation of at least 80% of the works.

4. FABRICATION

4.1 General

'Unwrought' timber shall be used. Sawing shall be done true to the size and dimensions to finally meet the requirements of specified sizes and dimensions of the finished work. All framing shall be joined as shown on the Drawings or as directed by the Engineer. All joints shall be secured with sufficient number of nails. The Contractor shall perform all necessary mortising, tensioning, grooving, matching, tonguing, housing, rebating and all operations required for the correct jointing. The Contractor shall also provide all metal plates, screws, nails and other fixing material that may be ordered by the Engineer for the proper execution of the joinery work.

Fabrication that develop defects due to bad workmanship or unsound materials not conforming to these specifications and the directions of the Engineer, shall be cut out and replaced at Contractor's own expense before the expiry of the maintenance period.

4.2 Doors

4.1.1 Verify design and size of doors required for each opening. Door thicknesses shall be 40 mm unless otherwise indicated.

4.1.2 Fabricate flush wood doors in accordance with the following requirements.

Cores: Edging of doors and shutters shall be of hard wood and cores shall be soft wood (solid core) planed to a smooth uniform thickness. All doors and shutters shall have teak wood lipping on all edges.

4.1.3 Face Panels

Door facing on each side of shutter shall consist of three or more veneered plies of commercial ply/teak ply or Sheesham ply as shown on the Drawings

Veneer plies shall have total minimum thickness of 3mm before sanding.

Door veneers shall be bonded to each other, and to core unit with approved adhesive and machine compressed.

5. PROTECTION OF MATERIALS

All materials and assembled units shall be protected from weather and stored in such a way as to prevent decay, warping and attack by fungus and termites.

6. WOODEN DOORS

6.1 Materials

6.1.1 First class Deodar wood as approved by the Engineer shall be used for door frames and door shutters except the core of shutters which shall be partal wood as specified and shown on drawings.

6.1.2 Architraves, beads, lippings shall be of Deodar wood of specified sizes and fixed as per details shown on Drawings.

6.2 Ground, Blocking & Nailing Strips

Ground, blocking and nailing strips shall be provided as necessary to receive the work included herein and as required for the work of other trades.

Except as otherwise shown or specified, ground blocking and nailing strips shall be secured in place as follows:

6.2.1 To steel--- by means of 3/8" diameter bolts spaced not over 3 feet.

6.2.2 To brick wall ---- by the use of cut nails spaced not more than 1.5 feet apart and driven directly into the block.

6.2.3 To poured concrete ---- by means of 1/4" diameter galvanized expansion bolts spaced not more than 1.5 feet part or by any approved method.

6.3 Exterior and Interior Door Frames

All exterior and interior door frames shall be fabricated of wooden sections of first class deodar wood frame as shown on drawings.

All exposed surfaces of frames and architraves/beads shall be painted with synthetic matt finished enamel paint of approved shade as per the instructions of the Engineer.

The door frames shall be secured in place by means of 4 inches screws and matching Rawal plugs and built into the plastered masonry after the same has dried. 4 number screws in each jamb and 2 number for upto 3.5 feet width and 3 number for upto 5 feet width of doors in the head shall be used.

6.4 Door Shutters

The shutters will be fixed to the frames with approved quality fittings as per hardware schedule.

6.4.1 All doors, shutters shall be fabricated in a workman like manner strictly to the correct sizes and shapes as shown on the Drawings or as directed by the Engineer.

6.4.2 The door shutters shall be built in sections, properly jointed and glued together. The surfaces shall be prepared for painting or polishing.

6.4.3 All door shutters shall be paneled, fabricated from first class deodar wood as shown on drawings.

6.4.4 Each door shall be constructed so as to permit the installation of hinges, knobs and locks in the position shown on the Drawings.

6.4.5 Completed doors shall be sound, rigid and free from defects and warp. All edges shall be aligned and smooth, joints shall be close fitting, hard wood doweled or mortised framed and of a strength to maintain frame and of strength to maintain the structural properties of the member connected. All adjoining faces and edges shall be flush and smooth. Edges shall be rectangular and solid.

6.4.6 All exposed surfaces of wooden frames and wooden shutters shall be painted with synthetic matt finished enamel paint of approved shade as per the instructions of the Engineer.

6.4.7 Chamfers shall be made as shown on the drawings or as directed by the Engineer.

6.5 Fitting, Hanging and trimming

All the doors shall be fitted, hung and trimmed as hereinafter specified and as indicated on the Drawings.

Doors shall have a clearance of 1/8" at sides and top unless otherwise directed by the Engineer and shall have 3/16" clearance at bottom. Doors shall be hung and trimmed with hardware as specified. All the locks shall be installed at the same height and shall be located at height as directed by the Engineer. Where directed by the Engineer margin for carpet shall be incorporated in the door shutter.

6.6 Hardware

Hardware shall be of best quality local make extra heavy duty and first class finished material. The Contractor shall obtain prior approval from the Engineer for quality, shape, pattern, and brand of all the hardware materials by providing samples and catalogues, etc., and shall provide and fix only the approved hardware materials. The fittings shall included but not necessarily be limited to the following:-

Sr. No.	Items	Shutters		Remarks
		Single	Double	
1.	Brass push plate	one	two	225mmx 300mm 18 gauge
2.	Brass Kick plate	two	four	
3.	Mortice lock (Japanese origin)	one	one	Except W C Doors
4.	Brass Tower/Sliding Bolt	one	one	W. C Doors single side only
5.	Brass Hinges	Four	Eight	
6.	Room number Brass (65mm x 65mm)	one	one	Except Toilets.
7.	Door Closer	One	Two	Except W. C Doors.
8.	Door Stoper	One	Two	Except attached Toilets & W.C Doors.

Hardware shall be carefully and securely fitted. Upon handing over the work, hardware shall be demonstrated to operate freely. Keys shall be placed into respective locks and upon acceptance of the work keys shall be tagged and delivered to the Engineer.

6.7 Quality Assurance

6.7.1 Tolerances: Doors shall be fabricated to following tolerances

- Size: Plus or minus 1/16 in overall dimensions
- Maximum Warp: 1/8"
- Squareness: Maximum diagonal difference 1/8" of (between length of diagonal measured on face of door from upper right corner to lower left corner and length of diagonal measured from upper left corner to lower right corner).

6.7.2 Manufacturer's Qualifications: The manufacturer of doors herein specified shall have been in business of manufacturing doors of type specified for minimum period of five years.

6.8 Submittal

6.8.1 Provide manufacturer's literature completely describing products.

6.8.2 Provide shop drawings showing door types, details and locations, referred to the door type and hardware group shown on door and hardware schedules.

6.8.3 Provide certificates stating that doors were constructed with timber of the species specified having moisture content and meeting equilibrium and relative humidity requirements.

6.8.4 Submit samples of plywood for selection of colour and grain.

6.8.5 Procurement of materials shall be made only after the shop drawings and samples have been approved by the Engineer.

6.9 Product Delivery, Storage and Handling

6.9.1 Deliver and store products in waterproof, protective containers with seals unbroken and labels intact until time to use.

6.9.2 Keep products dry, stack products off ground on level platforms, fully protected from weather, including direct sunlight.

6.9.3 Identify type, size and location of each door before delivery in order to permit installation at correct location.

6.10 Installation

6.10.1 Install doors at correct openings and assure smooth swing and proper closer with frames.

6.10.2 Install finish hardware in accordance with manufacturer directions.

7. WOODEN RAILING

Material for wooden hand railing in stairs shall be superior quality teak wood/ deodar wood & 1½ inch dia mild steel pipes. It shall be fabricated and installed in accordance with the design shown on the drawings/details and as per the instructions of the Engineer. Sample of railing shall be fabricated & mock up samples installed at locations designated by the Engineer for approval, prior to starting work at site. Shop/detail drawing indicating the basic details at various locations including details at turnings shall be submitted by the Contractor for Engineer's approval. Hand railing shall be installed to line level and plumb. The surface of railing in stairs shall be prepared for polishing. The railing shall be polished/painted with clear lacquer and the steel surfaces shall be painted with matt finished enamel paint.

8. KITCHEN CABINET

All wooden kitchen cabinet works shall be fabricated by approved sub-contractor/manufacturer and shall be of best quality.

8.1 Shop Drawings

The details of these items shown on the drawing are tentative and shows basic configuration and design of these items

The contractor shall submit detailed shop drawings of these items on the basis of tentative detail shown on the drawings including all fitting, fixtures and hardware for the proper execution of kitchen cabinets for the approval of the Engineer before fabrication..

8.2 Installation

All the works, shall be installed in position by the manufacturer's skilled workmen specialized in the job. Works shall be executed in accordance with approved shop drawings and or as directed by the Engineer.

All work shall be thoroughly protected from damage at all times by suitable methods approved by the Engineer. Adjacent works shall similarly be protected from damage. Any damage or disfigurement shall immediately made good at Contractor's expense.

9. WOODEN FLOOR & WALL PANELING

Wooden floor & Wall Paneling works shall be fabricated by approved sub-contractor/ manufacturer and shall be of best quality.

9.1 Shop Drawings

The details of these items shown on the drawing or as BOQ are tentative and shows basic configuration and design of these items

The contractor shall submit detailed shop drawings of these items on the basis of tentative detail shown on the drawings or as BOQ including all fitting, fixtures and hardware for the proper execution of Wooden floor & Wall Paneling for the approval of the Engineer before fabrication..

9.2 Installation

All the works, shall be installed in position by the manufacturer's skilled workmen specialized in the job. Works shall be executed in accordance with approved shop drawings and or as directed by the Engineer.

All work shall be thoroughly protected from damage at all times by suitable methods approved by the Engineer. Adjacent works shall similarly be protected from damage. Any damage or disfigurement shall immediately made good at Contractor's expense.

10. SS & GLASS RAILING

Material for hand railing in stairs shall be 3” dia stainless steel pipe handrail, 1” dia stainless steel balustrades, ½” thick unbreakable security glass and clamps including all fixing accessories complete in all respect as shown on the drawings, It shall be fabricated and installed in accordance with the design shown on the drawings/details and as per the instructions of the Engineer. Sample of railing shall be fabricated & mock up samples installed at locations designated by the Engineer for approval, prior to starting work at site. Shop/detail drawing indicating the basic details at various locations including details at turnings shall be submitted by the Contractor for Engineer's approval. Hand railing shall be installed to line level and plumb.

11. DEFECTIVE WORK

In the event of non-conformance to specification and drawings, the wood works shall be rejected by the Engineer and the Contractor shall remove and replace the rejected work by new work of same specifications.

12. SURFACE PREPARATION

The surfaces of all wood works shall be prepared in the manner as directed by the Engineer for polishing or painting.

13. MOCK-UP SAMPLE

After approval of shop drawings and tests etc., the contract shall submit at his own cost one mock-up sample of each type of wood works complete with all fixing, fixtures accessories prior to the actual fabrication of the bulk.

The samples shall be returned to the Contractor for incorporation in the works after installation of at least 80% of the works.

14. MEASUREMENT & PAYMENT

13.1 General

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective/items of the Bills of Quantities.

The rates quoted by the Contractor in the Bill of Quantities shall include work to be executed under these specification in any floor and at any height except where otherwise specifically stated in the relevant item of Bill of Quantities and the Contractor shall not be entitled to any claim or claim any compensation on this account.

13.1.1 Glazing where required and all finished hardware fittings in carpentry and joinery works, including locks, kick and push plate, architrave, beading, handles, locking arrangements etc.

13.1.2 Prime coat, painting with synthetic enamel paint/lacquer polish in carpentry and joinery works/hand railing.

13.1.3 Anti termite treatment to wood works and adhesives

13.1.4 SS / Steel balusters, steel base and steel strip for wooden railing.

13.1.5 Deodar wood blocking, shipping & base frame work in cabinets/hand railing.

13.1.6 SS Plate in the door bottom.

13.2 Wooden Door

13.2.1 Measurement

Measurement of acceptably completed works of all types of wooden doors will be made on the basis of net actual area in square foot fabricated and installed in position as shown on the Drawings or as directed by the Engineer. Net area will be measured in accordance with plastered masonry opening in between jambs and plastered head and bottom of shutter.

13.2.2 Payment

Payment will be made for acceptable measured quantity of all types of wooden doors on the basis of unit rate per square foot quoted in the Bill of Quantities against respective item and shall constitute full compensation for all the works including all hardwares & fittings like locks, tower bolts, push plates etc. as per details mentioned in Volume IV of Tender & Contract Document related to the item.

13.3 Kitchen Cabinets

13.3.1 Measurement

Measurement of acceptably completed work of kitchen cabinets will be made on the basis of net actual square foot of kitchen cabinets provided and installed in position as shown on the Drawings or as directed by the Engineer.

13.3.2 Payment

Payment will be made for acceptable measured quantity of kitchen cabinets on the basis of unit rate per square foot quoted in the Bill of Quantities. Payment shall constitute full compensation for all the works related to the item.

13.4 Railing

13.4.1 Measurement

Measurement of acceptably completed work of railing comprising all accessories will be made on the basis of net actual running foot of railing provided and installed in position as shown on the Drawings or as directed by the Engineer.

13.4.2 Payment

Payment will be made for acceptable measured quantity of railing on the basis of unit rate per running foot quoted in the Bill of Quantities. Payment shall constitute full compensation for all the works related to the item.

SECTION - 6220

ALUMINUM WORKS

1. SCOPE
2. APPLICABLE STANDARDS
3. GENERAL
4. MATERIAL
5. DESIGN REQUIREMENT
6. WORKMANSHIP
7. PRODUCT DELIVERY AND STORAGE
8. ERECTION
9. PROTECTION AND CLEANING
10. DEFECTIVE WORK
11. GUARANTEE
12. MEASUREMENT & PAYMENT

SECTION - 6220

ALUMINUM WORKS

1.0 SCOPE

The work under this section of specification includes furnishing all labour, equipment, appliances and materials and performing all operations in carrying out the work of aluminium doors, windows, ventilators and louvers. All related items such as sealants, rubber gasket for glazing, fly proofing, rollers, latches, fastenings, glazing, anchor bolts and all items supplied by other trades and customarily built in and/or installed in strict accordance with this section of the specifications and the applicable drawings and subject to the terms and conditions of the Contract.

2.0 APPLICABLE STANDARDS

Latest editions of following ISO and British Standards are relevant to these Specifications wherever applicable.

2.1 ISO (International Organisation for Standardisation

1804 Doors - Terminology

6442 Door Leaves - Measurement of defects of general flatness.

6443 Door Leaves - Measurement of dimensions and defects of squareness.

6444 Door Leaves - Test of behaviour under humidity variations (successive uniform climates)

6612 Windows & Doors - wind resistance tests.

6613 Windows & Door - Air permeability test.

2.2 BSI (British Standard Institution)

1227 Hinges

4873 Aluminium alloy windows.

3.0 GENERAL

3.1 Doors, windows and ventilators to be provided shall be aluminium doors, windows and ventilators of profile, pattern and design shown on drawings and shop drawings as approved by the Engineer. The Contractor shall provide manufacture literature completely describing the product instructions for installation and maintenance.

3.2 All the sections used for doors, windows and ventilators shall be of best quality aluminium products such as equal and unequal angles, channels, tubes, corrugated strips, mouldings etc., in accordance with International standards conforming to ASTM B 308 & B 221.

3.3 All doors, windows and ventilators, shall be of type and size indicated on drawings and shall conform to the requirements shown and specified herein.

3.4 Contractor shall arrange tests and analysis if directed by the Engineer of scaled models of each doors, windows and ventilators type at the maker's works or any laboratory specified by the Engineer for the material supplied by him to be tested in the presence of the Engineer's Inspector, to whom test certificates, proof sheets, etc. shall be furnished.

The models shall be submitted to the Engineer for approval prior to testing. Nevertheless, neither the fact that the materials have been tested in the presence of the Inspector nor that the Engineer may have been furnished with test certificates in lieu of sending an inspector to the works shall affect the liberty of the Engineer to reject, after delivery of materials found not in accordance with these specifications.

3.5 The contractor shall submit shop drawings which shall show full construction details, quantities and locations, fastenings and attachment to adjacent construction and materials. Shop drawings shall be submitted at the proper time to allow for checking, revisions, agreement and to permit manufacturer's product delivery and start of site work to suit the building programme. The Contractor shall submit representative samples of finished doors, windows and ventilators anchoring mechanism, embedded parts, fastenings, glass panes, accessories and other materials for the Engineer's approval.

After approval of shop drawings and tests etc., the Contractor shall submit at his own cost one mock-up sample of each type of aluminium works complete with glazing, all components assembly method and required fittings and accessories prior to the actual fabrication of the bulk. The samples shall be returned to the Contractor for incorporation in the works after installation of at least 80% of the works.

Fabricate and assemble all work in the shop of the approved manufacturer to reduce field fabrication to a minimum unless otherwise directed by the Engineer.

3.6 The glass shall conform to specification laid down under chapter 'Glazing' and shall be free from all blemishes, bubbles, distortions and other flaws of any kind and shall be properly cut to size as shown on drawings, so as to fit the grooves in ventilators members. All the glass shall be best quality of approved manufacture or equivalent standard as approved by the Engineer.

3.7 The structural shape of the aluminium members shall be of uniform quality, colour and temper, clean, round, commercially straight and free from injurious defects.

3.8 All doors, windows and ventilators shall be fabricated as a complete unit, fully airtight and watertight, including rubber gasket for glazing, rollers, latch, anodized in specified colour, inclusive of glass sheet, all as approved by the Engineer.

3.9 Contractor shall, on request, get certificate signed by the manufacturer stating that each lot has been sampled, tested and inspected and has met the requirements in accordance with these specifications, and the same shall be furnished to the Engineer.

3.10 The shop drawings shall clearly show that there shall be no penetration of rainwater from the exterior to the interior in case of severe wind and rainstorm. This has to be specially ensured in cill section.

4.0 MATERIAL

4.1 Frames/shutters

The frames of aluminium door, windows and ventilator shall be formed from rolled, strip or extruded aluminium. The thickness of sectional members shall be at least 1.6 mm. All outer / frame sections of openable / fixed windows. Ventilators and louvers curtain wall shall be 3” (75 mm) minimum in width. The Frames for doors and door/windows curtain wall shall be at least 3” (75 mm) in width.

4.2 As shown on the drawings, aluminium frames shall be provided as per international standard approved by the engineer.

4.3 Fasteners shall be stainless steel of a type selected to prevent galvanic action with the components fastened.

4.4 Gaskets shall be vinyl glazing channel gasket to commercial standard CS-230-60.

4.5 Hardware shall be manufacturer's standard hardware. Flush to match doors, windows, ventilators and louvers finish. Floor mounted concealed type double action/swing imported door closures shall be provided to all doors. Heavy-duty in-matching finish stays shall be provided to all openable windows, ventilators and louvers. Stays shall be attached to the window frame so as could be replaced easily.

4.6 Joint sealant shall be approved elastomer.

4.7 All aluminium sections shall be powder coated in accordance with the standards of Aluminium Association of USA. The anodisation shall be of not less than 70-90 microns. The anodic oxide surface shall be properly sealed.

4.8 For powder coated finish aluminium sections to be coated shall be mill finish. The sections shall be firstly degreased with a degreasing chemical to remove all/any stains. The sections will then be given a chromating coating and electro static powder coating in the desired colour with a powder-coating machine. After colour coating the sections will be baked at baking temperature of 220 degree Centigrade for 25 minutes.

4.9 All sliding/openable windows shall have sliding/openable wire/fly screen shutters in window matching finish with wire/fly screen of size so as not to permit the entry of flies and mosquitoes. The wire mesh shall be 30 SWG. 14 mesh (14 x 14 openings per square inch).

4.10 Composite Aluminium Cladding: Composite aluminium cladding material shall be from approved manufacturer.

5.0 DESIGN REQUIREMENT

The Contractor shall design the installation to meet or excell the following requirements.

5.1 Tolerances

The Contractor shall be responsible for agreeing to all dimensions with the Engineer before proceeding with the manufacture and for making provision to allow for building tolerances required by the Engineer. Contractor shall also take site measurements of the structure completed before manufacturing.

5.2 Thermal & Seismic Movements

The window and glazing assemblies are to be constructed and installed in the openings with sufficient tolerance and, where necessary, to provide for joints incorporated in couplings, to provide for expansion and contraction as will be caused by the local seismic and climatic conditions and temperature changes, winter to summer - day to night without buckling, distortion of joints, or other harmful effects.

6.0 WORKMANSHIP

The Contractor shall be responsible for the protection and installation of all items furnished. All items shall be installed plumb and square and shall be solidly anchored in a good workman like manner in accordance with the manufacturer's instruction and as specified herein. The Contractor shall be responsible for the protection of installed items from damage by other trades. All items shall be left in operating, neat and clean condition, free from dirt, finger marks, etc. The Contractor shall be responsible for final cleaning before the final acceptance.

The glass panes shall firmly be secured in the rebates with the rubber gasket. Ensure that the beads and grooves are clean, dry and unobstructed at the time of glazing. The complete unit shall be airtight and watertight on completion. No ventilator shall be

considered complete until and unless the fingerprints and other stains and marks have been removed from the surface of glass and aluminium.

7.0 PRODUCT DELIVERY AND STORAGE

7.1 Deliver doors, windows and ventilators in a manner preventing damage to units. Store materials off the ground under cover in a manner preventing deterioration or damage.

7.2 All embedded parts and anchor bolts shall be delivered to the site carefully and keeping the fabricated shape and configuration. All these parts shall be suitably marked for identification.

8.0 ERECTION

Rawlplugs and anchoring bolts shall be embedded into the concrete or block masonry for holding the doors, windows and ventilators in their correct positions.

Care shall be taken to install the doors, windows and ventilator in line and plumb & solidly anchored in a good workman like manner in accordance with the drawings. Should any scale or scratch appears on the surface of doors, windows and ventilators, the contractor shall at his own expense and at the Engineer's direction have all exposed surfaces cleaned to bare bright specified colour.

All works shall be installed strictly in accordance with the manufacturer's printed instructions.

9.0 PROTECTION AND CLEANING

9.1 Temporary protection shall be achieved by applying water soluble protective coating capable of withstanding the action of lime mortar.

9.2 Apply coating in the manufacturer's plant to the exposed surfaces of all components.

9.3 Before application of coating, remove all fabrication compounds, moisture and dirt accumulations.

10.0 DEFECTIVE WORK

In the event of non-conformance to specifications and drawings the aluminium work shall be rejected by the Engineer and the Contractor shall remove and replace the rejected works by new work of same specifications.

11.0 GUARANTEE

11.1 The manufacturer shall furnish his standard written guarantee against leakage of rain, excessive infiltration of dust and air and all defects in materials and workmanship covering all work under this section.

11.2 Such guarantee shall be in addition to and not in lieu of all other liabilities which manufacturers and the Contractor may have by law or by other provisions of the Contract Documents.

12.0 MEASUREMENT AND PAYMENT

12.1 General

Except otherwise specified herein or else where in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

12.1.1 Providing and fixing glazings.

12.1.2 Powder coating of Aluminium works.

12.1.3 Anodizing of Aluminium works.

12.1.4 Rawlplugs, brackets, rubber gasket, sealants, rollers, vetting latches and any other embedded fixture required for fixing the ventilators.

12.1.5 Providing & fixing locks, door closures, and other hardware as approved by the Engineer.

12.1.6 Fly proof shutters and screens for Doors & windows.

12.1.7 All samples and tests.

12.1.8 Insulation, structural steel for framing etc. for cladding.

12.2 **Aluminium Works**

12.2.1 Measurement

Measurement of acceptably completed works of aluminium doors, windows, ventilators and louvers will be made on the basis of actual area in square meter / square foot of door, windows and ventilators provided and installed in position as shown on drawings or as directed by the Engineer.

12.2.2 Payment

Payment will be made for acceptable measured quantity of aluminium door, windows, ventilators and louvers on the basis of unit rate per square meter / square foot quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

*** End of Section 6220 ***

SECTION - 6250

GLAZING

1. SCOPE
2. APPLICABLE STANDARDS
3. GENERAL
4. DELIVERY, STORAGE AND HANDLING
5. MATERIALS
6. INSTALLATION OF GLAZING
7. PROTECTION AND CLEANING OF GLAZING
8. MEASUREMENT & PAYMENT

SECTION - 6250

GLAZING

1.0 **SCOPE**

The work under this section of the Specifications consists of furnishing all labour, equipment, tools, appliances, scaffoldings and providing glass gaskets, sealants, compound and other materials required for performing all operations in connection with the installation and setting of all types of glass, glazing and glass blocks complete in every respect in accordance with the Drawings or as directed by the Engineer. The scope of this section of Specifications is covered with detailed Specifications as laid down herein.

2.0 **APPLICABLE STANDARDS**

Latest editions of following British Standards are relevant to these Specifications wherever applicable.

2.1 **BSI (British Standards Institution)**

952 Glass for glazing

5051 Security glazing part I & II

CP.152 Glazing

3.0 **GENERAL**

3.1 Each type of glass shall have the manufacturer's label on each pane, and the labels shall remain on the glass until final cleaning.

3.2 Glazing sealant shall be as recommended by the manufacturer for the particular application.

3.3 Spacer shims (distance pieces) shall be plasticised polyvinyl chloride (PVC.) Thickness shall be equal to space shown on drawings between glass and rebates, bead or cleat. Depth shall give not less than 6 mm cover of glazing sealant.

3.4 Contractor shall submit samples for each type of glass, minimum 1200 mm x 1200 mm (4 ft. x 4 ft.) in size with protective edges. Samples of glazing sealant minimum 0.1 liter of specified types shall be submitted. Samples of minimum of three glass blocks shall also be submitted.

3.5 Contractor shall submit 300mm (12 in.) long sample of each type of glazing gasket.

3.6 Contractor shall also submit printed materials manufacturer's installation instructions for specified glazing gaskets, compounds sealant and accessories including description of required equipment and procedures and precautions to be observed.

4.0 **DELIVERY, STORAGE AND HANDLING**

4.1 Contractor shall deliver materials in manufacturer's original, unopened containers clearly labeled with manufacturer's name and address, material, brand, type, class and rating as applicable.

4.2 Contractor shall store the materials in original unopened containers with labels intact/protected from ground contact and from elements, which may damage glass.

4.3 Contractor shall handle the materials in a manner to prevent breakage of glass and damage to surfaces.

5.0 MATERIALS

5.1 General

Glass shall be free from all blemishes, bubbles, distortions and other flaws of any kind and shall be properly cut to fit the rebates so as to have a uniform clearance of 1.6mm round the panes between the edges of glass and the rebates.

5.2 Sheet glass

It shall be first quality clear glass conforming to the applicable requirements of B.S 952 " Glass for Glazing". Unless otherwise indicated glass shall be 5mm thick glass for exterior window except where obscure glass is specified. Glass shall be free from specks, bubbles, deterioration and flows of every kind.

5.3 Frosted Glass

Frosted Glass shall be 5mm thick except as otherwise indicated. Glass shall be of approved pattern.

5.4 Glazing Sealants and Compounds

Contractor shall provide material colored to match frame in which glass is installed. Provide only compounds known to be fully compatible with surfaces which they will contact as follows.

5.5 Tinted Glass

Glass for windows ventilator & door shall be of 5mm(1/4”) thickness and of make approved by the Engineer.

6.0 INSTALLATION OF GLAZING

6.1 Glazing shall comply with the recommendations contained in the "MANUAL of GLAZING" of the Glass Marketing Association or as specifically recommended otherwise by the glass and glazing materials manufacturers.

6.2 Examine each piece of glass and discard and replace glass with edge damage or face imperfection. All glazing shall be wind tight and fully water tight on completion.

6.3 Clean glazing channels and other framing members indicated to receive glass. Remove coatings which are not firmly bonded to the substrate, Remove lacquer from metal surfaces wherever electrometric sealants are to be used. Apply primer and sealer to joint surfaces wherever recommended by the sealant manufacturer and as shown on the drawings.

6.4 Trim and clean excess glazing materials from surrounding surfaces immediately after installation and eliminate stains and discolorations.

6.5 Cure glazing, sealants and compounds in compliance with manufacturer's instructions to obtain high early bond strength internal cohesive strength and surface durability.

6.6 While glazing operation is in progress great care shall be taken to avoid breakage or damage to the glass and adjoining glazing. The Contractor shall make good at his own cost, all glass broken by his workmen while cleaning or carrying out other operations. On the completion of the glazing work, all glass that has been set by the Contractor shall, if it becomes loose, within the maintenance period, be prefixed at Contractor's expanse.

6.7 No glazing shall be considered complete until and unless paint and other stains have been removed from the surface of the glass and checked by the Engineer for water tightness.

7.0 PROTECTION AND CLEANING OF GLAZING

7.1 Remove all smears, labels and excess glazing sealant, Leave clean inside and outside free from scratches. The Contractor shall be responsible for the protection of installed glass. Before final acceptance, damaged or broken glass shall be removed and replaced with new glass at no additional expense to the Employer.

7.2 All glass surfaces shall be washed clean both inside and outside within two weeks prior to final acceptance by the Employer.

8.0 MEASUREMENT AND PAYMENT

No payment shall be made for the works involved within the scope of this section of specifications unless otherwise specifically stated in the Bill of Quantities or herein. The cost thereof shall be deemed to be included in the quoted unit rates of the relevant item of the Bill of Quantities.

*** End of Section 6250 ***

SECTION - 6411

WATER PROOFING/EXPANSION JOINT FILLING & BUILT UP ROOFING

1. **SCOPE**
2. **SUBMITTAL**
3. **MATERIALS**
4. **DELIVERY, STORAGE AND HANDLING**
5. **PREPARATORY WORK**
6. **WATER PROOFING TREATMENT IN FOUNDATIONS AND SURFACES IN CONTACT WITH EARTH**
7. **APPLICATION OF WATER PROOFING TO UNDERGROUND WATER RETAINING STRUCTURES**
8. **EXPANSION JOINT FILLING**
9. **MEASUREMENT & PAYMENT**

SECTION - 6411

WATER PROOFING/ EXPANSION JOINT FILLING & BUILT-UP ROOFING

1.0 **SCOPE**

The work under this section of the Specifications consists of furnishing all plant, labour, equipment, appliances and materials and in performing all operations in any floor and at any height in connection with water-proofing and built-up roofing, including water proof treatment to foundations and basement structures complete in strict accordance with this section of the specifications and the applicable drawings and subject to the terms and conditions of the Contract.

2.0 **SUBMITTAL**

2.1 Shop Drawings: Shop drawings shall be submitted showing layout and all the details for construction.

2.2 Samples of all materials proposed for use under this section, shall be submitted to the Engineer for approval.

3.0 **MATERIALS**

3.1 Bitumen 10/20 grade shall be according to BSS.

3.2 Bitumen priming oil shall be of the approved manufacturer.

3.3 Flexible cementitious water proofing AQUAFIN-TC 07 & AQUAFIN -2K/M or approved equivalent

3.4 Polyethylene building film visqueen standard or approved equal. The film shall be 150 micron thick.

3.5 Cement and aggregates shall be in accordance with specifications for "Plain and reinforced concrete".

3.6 Geotextile with density 125 g/m^2.

3.7 Brick clay tiles shall conform to the specifications for “Brick Masonry”.

3.8 Puddled earth shall be composed of stiff clay to which an equal amount of chopped rice husk/bhoosa shall be added.

3.9 Polysulphide sealant of approved manufacturers

3.10 Aluminum Flashing

3.11 Water proofing agent shall be in accordance with specifications or as directed by the Engineer.

4.0 **DELIVERY STORAGE AND HANDLING**

Materials shall be protected from damage during loading shipment delivery and storage Non-staining materials shall be used for blocking and packing.

5.0 **PREPARATORY WORK**

5.1 All scuppers and roof drains shall be placed and metal flashing flanges etc. shall be provided in time to be installed alongwith the roofing assembly.

5.2 All surfaces, to be treated shall be dust free and dry. Application of roof finishes shall not start unless the preparatory work has been inspected and approved by the Engineer.

6.0 WATER PROOFING TREATMENT IN FOUNDATIONS AND SURFACES IN CONTACT WITH EARTH

All surfaces to be bitumen painted shall be thoroughly cleaned of any accretion, dust, dirt etc. by scraping, wire brushing or as directed by the Engineer. The surface shall be primed with a coat or asphalt oil used at the rate of not less than 1 gallon /100 square feet. Two coats of hot bitumen paint shall be applied at the rate of 1 kg/Sq.m. each coat. The first coat shall be allowed to dry for about 6 hours before applying the second coat. During operation of painting great care shall be taken to avoid air bubbles. The manufacturers shall be taken to avoid air bubbles. The manufacturer's instructions and Engineer's directions shall be followed.

7.0 APPLICATION OF WATER PROOFING TO UNEDERGROUND WATER RETAINING STRUCTURES

7.1 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.

7.2 Cementitious based water proofing shall be applied as per manufacturer’s recommendation and to the satisfaction of the Engineer.

8.0 EXPANSION JOINT FILLING

Before filling of Expansion Joint the surface shall be thoroughly cleaned and filling/packing material removed up to a depth of 50mm (2 in.). Backer Rod shall then be inserted throughout the length of joint and pressed in. The joint shall then be sealed with 2 part polyurethane sealant. The expansion joint shall be covered with 22 SWG GI Flashing sheet of shape and size shown on drawings.

9.0 MEASUREMENT AND PAYMENT

9.1 General

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bills of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bills of Quantities.

The rates quoted by the Contractor in the Bill of Quantities shall include work to be executed under these specification in any floor and at any height except where otherwise specifically stated in the relevant item of Bill of Quantities and the Contractor shall not be entitled to any claim or claim any compensation on this account.

9.1.1 All preparatory work, scrapping, scratching, cleaning, cant strips, gravel strips, etc.

9.1.2 Formwork

9.1.3 Roof treatment including Class ‘C’ cement concrete

9.1.4 Coats of bitumen.

9.1.5 Polyethylene sheet including laps/overlaps and joints.

9.1.6 Class 'C' cement concrete cant strip.

9.2 **Bitumen Painting/Coating**

9.2.1 Measurement

Measurement of acceptably completed works of bitumen painting/coating will be made on the basis of net actual area in square meter / square foot as shown on the Drawings or as directed by the Engineer.

9.2.2 Payment

Payment will be made for acceptable measured quantity of bitumen painting/coating on the basis of unit rate per square meter / square foot quoted in the Bills of Quantities. The unit rate shall include all cost of surface preparation and shall constitute full compensation for all the works related to the item.

9.3 **Waterproofing and Built-Up Roofing**

9.3.1 Measurement

Measurement of acceptably completed works of Waterproofing and Built-Up Roofing will be made on the basis of net actual area in square meter / square foot as shown on the Drawings or as directed by the Engineer.

9.3.2 Payment

Payment will be made for acceptable measured quantity of Waterproofing and Built-Up Roofing on the basis of unit rate per square meter / square foot quoted in the respective items of Bills of Quantities. The unit rate shall include all cost of surface preparation and shall constitute full compensation for all the works related to the item.

9.4 **Expansion Joint**

9.4.1 Measurement

Measurement of acceptably completed works of expansion joint will be made on the basis of actual length of treated expansion joint in running meter / running foot as shown on the Drawings or as directed by the Engineer.

9.4.2 Payment

Payment will be made for acceptable measured quantity of expansion joint on the basis of unit rate per running meter / running foot quoted in the respective items of Bills of Quantities. The unit rate shall include all cost of surface preparation and shall constitute full compensation for all the works related to the item.

*** End of Section 6411 ***

SECTION - 6521

CEMENT PLASTER

1. SCOPE
2. GENERAL
3. MATERIAL
4. PROPORTIONING AND MIXING
5. PREPARATION OF SURFACE TO BE PLASTERED
6. APPLICATION OF PLASTER
7. METAL LATH
8. ANGLE AND BEADS
9. INTERNAL / EXTERNAL PLASTER
10. CLEANING AND PROTECTION
11. TOLERANCES
12. MEASUREMENT AND PAYMENT

SECTION - 6521

CEMENT PLASTER

1.0 **SCOPE**

The work under this section of the Specifications consists of furnishing all plant, labour, equipment, appliances, and materials and in performing all operations in any floor and at any height connection with providing and installation of cement plaster, and specified external rendering complete in strict accordance with this section of the Specifications and the applicable drawings and subject to the terms and conditions of the Contract.

2.0 **GENERAL**

2.1 Except as may be otherwise shown on surfaces specified, all plaster work, both internal and external shall be ordinary Portland Cement plaster of the required thickness as shown on the drawings.

2.2 Plastering shall not commence until all electric conduits, drainage and sanitary pipes, inlets to tanks, brackets, clamps, doors and window frames and all sorts of inserts and embedded items are fixed in position. It shall be the responsibility of the Contractor to make sure that all such work is carried out by other contractors before starting of plaster work. Chiseling and repairing of cement plaster shall not be permitted without the approval of the Engineer.

2.3 Sample of materials shall be submitted to the Engineer for his approval prior to use in the works.

3.0 **MATERIAL**

3.1 Cement for plaster shall be Ordinary Portland Cement (B.S 12 or P.S 232) or Sulphate resisting cement (B.S 4027 or P.S. 612) as specified and shall conform to requirements specified in the section "Plain and Reinforced Concrete".

3.2 Sand for plaster shall comply with the requirements of BS 1199, BS 1200 or the draft Pakistan Standard "Sand for Plaster" as directed by the Engineer.

3.3 Water for plaster shall conform to requirements specified in the section for "plain and reinforced concrete".

3.4 All materials and workmanship for plaster, not explained in these Specifications, shall comply with the requirements of relevant BS CP 211 and CP 221 as directed by the Engineer.

4.0 **PROPORTIONING AND MIXING**

4.1 Measurement of materials by volume shall be by containers of known capacity to maintain consistent proportions. No lumpy or caked material shall be used. Mixing equipment boxes and tools shall be clean. Materials shall be proportioned as specified on the Drawings, in the Bill of Quantities or as directed by the Engineer. Mixing shall be continuous until all ingredients are evenly distributed and thoroughly mixed.

4.2 Only limited water shall be added for proper workability and such quantity of mortar shall be prepared which can be consumed in thirty minutes after preparation. Preparation of mortar in bulk quantity for use during the entire day or for any other time more than that stipulated above is expressly prohibited. Retempering shall not be permitted and all mortar which has begun to stiffen shall be discarded.

4.3 Plaster ingredients shall be thoroughly mixed either by hand on a clean cement concrete platform or by a mechanical mixer, as directed by the Engineer.

5.0 PREPARATION OF SURFACE TO BE PLASTERED

5.1 Concrete surface to be plastered shall be cleaned to remove all grease, form oil and other surface impurities, which will otherwise adversely affect the adhesion of plaster to the surface concerned. The surface of all-concrete ceilings, beams and columns shall be lightly hacked by approved means to give the required key for plastering.

5.2 All masonry surfaces to be plastered shall be cleaned to remove all matter, which will otherwise adversely affect the adhesion of plaster to the surface concerned. The surface shall be washed with clean water and kept damp for 24 hours before further treatment. The surface thus prepared shall be treated uniformly with cement and sand slurry. The slurry to be used shall be one part cement to one part sand by volume with water added to make a stiff creamy mix. The slurry shall be applied with a stiff brush on surface, which has previously been well wetted. The surface so treated shall be left to cure for 3 days.

6.0 APPLICATION OF PLASTER

6.1 The plaster of thickness less than the specified thickness shall be rejected. If the plaster is to be more than 13mm (1/2 in.) thick, it shall be done in two coats. The surface of first coat shall be made rough before the second coat is applied.

The plaster shall not have wavy surface and shall be perfectly in plumb. The edges and corners shall represent a straight line. The plaster shall be kept wet continuously for at least ten (10) days. No extra payment shall be allowed for jambs, junctions, corners, edges, round surfaces or for more than one layer of plaster required due to any unevenness in the work done by the Contractor. The plasterwork is to cover all conduits, pipes etc fixed in the walls and ceiling. Wherever specified, metal lath shall be nailed firmly before plastering is commenced. The plaster surface shall be tested frequently with a 10 feet straight edge and plumb bob.

6.2 Plaster containing cracks, blisters, pits, discolouration or any defects shall not be acceptable. Any such plaster or loose plaster shall be removed & replaced with plaster in conformity with these specifications and as additionally directed by the Engineer.

Contractor shall cut out and patch all defective work at his own cost. All damaged plaster shall be patched as directed by the Engineer. Patching plaster shall match appearance of and shall be finished level with adjoining plaster.

7.0 METAL LATH

Metal lathing shall be fabricated from sheet steel and shall be of uniform quality and free from flaws broken strands, cracks and corrosive pitting, shall be rectangular and true to shape and shall comply with BS-1369.

All lathing shall be galvanized. Where plastering material depends entirely on the lathing for its key, these shall be not less than two complete mesh openings per 28 mm (1-1/8")in one direction and the width of the aperture shall not be less than 5mm (3/16").

Sheets shall not be less than 1.6 kg/sq.m (0.15 kg/Sft.) when fabricated, using 0.7 mm thick steel sheet. Where used on smooth surfaces to form a key it shall be not less than 1.2 kg/sq.mm when fabricated, using 0.5 mm thick steel sheet. Tying wire shall be 1.2 mm diameter galvanized annealed iron wire.

Sheets shall be welded to angle iron frame as shown on drawings.

8.0 ANGLE AND BEADS

Angle beads, stop beads, depth gauge beads, edging profiles, plaster dividing profiles, interior angle profiles, plaster borders and the like shall all be manufactured from sheet steel and galvanized after fabrication, all beads shall be perforated at edges to ensure good

adhesion of the plaster work. Thickness and dimensions shall suit particular locations and plaster thickness.

All angle beads, stop beads, depth gauge beads and the like are to be fixed in accordance with the manufacturer's instructions, at all corners, stops, joints, etc. as per directions of Engineer In-charge.

9.0 INTERNAL/EXTERNAL PLASTER

9.1 Where specified in the Drawings external surface shall have an average 20mm (3/4 in.) thick plaster finish, consisting of a base coat of 1:4 cement sand mortar in Grey cement and the finish coat of smooth plaster as shown on the Drawings and as directed by the Engineer. Wherever shown on drawings, grooves shall be provided with aluminum U/Y channels.

9.2 Where specified in the Drawings all internal plaster shall have an average 13mm (1/2 in.) thick consisting of base coat of 1:4 cement sand mortar in grey cement and finish coat of smooth plaster as shown on the Drawings and as directed by the Engineer.

9.3 Textured Plaster

Wherever specified in the drawings external textured plaster shall consist of 1:2, one part white cement & 2 parts approved shade of marble chips zero size mixed with approved pigment to achieve desired shade. Wherever shown on drawings, groves shall be provided with aluminum U/Y channels. The Contractor shall prepare mockup samples of textured plaster for the approval of Engineer. The plaster shall be applied with machines and the final rough surface/texture/shade shall be as per the approved sample, direction and approval of the Engineer.

10.0 CLEANING AND PROTECTION

10.1 Rubbish and debris shall be removed as necessary to make way for work of other trades and as directed by the Engineer. As each room or space is completed all rubbish, debris, scaffolding and tools should be removed to leave the room clean.

10.2 Prior to plastering all aluminum windows, finished metals should be covered by sheet of plastic or tarpaulin to protect it from damage.

10.3 Protect finished plaster from injury by any source. Contractor shall also protect walls, floors and work of other trades from plaster materials.

11.0 TOLERANCES

Surfaces of plaster work shall be finished with a true plane to correct line and level with all angle and corners to a right angle unless otherwise specified and with walls and reveals plumb and square.

Maximum permitted tolerances shall not exceed 3mm in 1.75m (1/8" in 6 feet) variation from plumb or level in any exposed line or surface and 1.5mm (1/16") variation between planes of abutting edges or ends.

12.0 MEASUREMENT AND PAYMENT

12.1 General

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective item of the Bill of Quantities.

The rates quoted by the Contractor in the Bill of Quantities shall include work to be executed under these specification in any floor and at any height except where otherwise specifically stated in the relevant item of Bill of Quantities and the Contractor shall not be entitled to any claim or claim any compensation on this account.

12.1.1 Metal lath over reinforced concrete and masonry joint.

12.1.2 Joints, junctions, corners, beads, drip course edge, roundings, and aluminum U/Y channels in groves. Etc.

12.1.3 More than one layer due to any unevenness in the finished works and base coat plaster in textured plaster including marble chips/colour pigments.

12.1.4 Cutting & patching of all defective works.

12.1.5 Surface preparation, cleaning and protection as specified.

12.1.6 Marble chips & pigments in textured plaster.

12.1.7 Roughening of first coat of plaster before application of 2nd coat incase where overall required plaster thickness exceeds 13mm (1/2 in.).

12.1.8 Aluminum U/Y channels

12.2 **Plain Plaster/Textured plaster**

12.2.1 Measurement

Deductions shall not be made for ends of joints, beam posts, etc., and openings not exceeding 5 square feet each and no addition shall be made for reveals, jambs, soffits, sills, etc. of these openings non for finishing the plaster around ends of joints, beams posts, etc.

In case of opening of area exceeding 5 square feet each, deduction shall be made for the openings and also no addition shall be made for reveals jambs, soffits, sills, etc., of these openings.

Measurement of acceptably completed works of plaster will be made on the basis of number of square meter / square foot of the surface area plaster as shown on the Drawings, or as directed by the Engineer.

12.2.2 Payment

Payment will be made for acceptable measured quantity of plaster on the basis of unit rate per square meter / square foot quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

*** End of Section 6521 ***

SECTION - 6531

MARBLE WORKS

1. **SCOPE**
2. **SUBMITTALS**
3. **DELIVERY, STORAGE AND HANDLING**
4. **MATERIALS**
5. **EXECUTION**
6. **MEASUREMENT AND PAYMENT**

SECTION - 6531

MARBLE WORKS

1.0 SCOPE

The work under this section of specifications, consists of providing all material, labour, plant, equipment, appliances in any floor and at any height and performing all operations required for providing and installing marble natural stone slab for toilet counters, where shown on the drawings, complete in strict accordance with this section of the specification and the applicable Drawings.

2.0 SUBMITTALS

The Contractor shall submit manufacturer's specifications and other product data for each type of marble stone and fixtures required, including instructions for handling, storage, installation and protection.

Shop Drawings shall be submitted showing sizes, dimensions, sections and profiles of slab, arrangement and provisions for jointing, anchoring, fastening and supports and other necessary fixing details. Indicate locations, layouts and pattern arrangements for each stone type and colour.

Submit three ranges samples 300mm x 300mm (12 in. x 12 in.) in size of each type of stone showing colour, grade, finishing and texture for approval of the Engineer.

3.0 DELIVERY, STORAGE AND HANDLING

Materials shall be protected from damage during loading, shipment, delivery and storage. Non-staining materials for blocking and packing shall be used. Stack marble at site in accordance with manufacturer's recommendations and as required to prevent staining, scratching, etching or breakage.

4. MATERIALS

4.1 General

Marble shall be compact, dense, metamorphic rock of lime stone origin obtained from quarries within Pakistan. It shall have a specific gravity of 2.7 and hardness number on Moh's scale shall range from 3 to 4.

Obtain each marble stone type from a single quarry and ensure consistent colour range and texture throughout the work. All pieces shall be of uniform thickness and truly square in shape.

Provide marble slabs/sills and tiles of specified sizes in floors, stair tread & risers and counter tops as shown on drawings.

Provide marble slabs/sills and tiles of type, colour and finish for each area as directed by the Engineer.

Provide stone of specified thickness. Saw cut the back surfaces that are meant to be concealed in finished work.

Provide irregular shaped units, staircase units and skirting base units to the profiles of required shapes & sizes and polished exposed surfaces wherever specified.

4.2 Marble Stone Type

All marble stone types are to be selected and approved by the Engineer for quality, colour and texture.

Marble: Marble of approved type and colour of local origin, first class quality and high class finish acceptable to the Engineer.

4.3 Beds and Backings

Where applicable, standard cementious screed and mortar beds and backings, mixed and proportioned by volume shall be as follows: -

Grey ordinary Portland Cement	: 1 part
Sand	: 2 parts
Water	: Clean, fresh and free from deleterious substances

4.4 Adhesives, Grouts and Sealants

Proprietary adhesives, joint grouts and sealants of approved type as required and recommended by the manufacturer for specific application shall be used. The colour of the joint grout and the sealants shall match with the colour of stone.

5.0 EXECUTION

5.1 Flooring, Skirting, Dado and Stair/Counter tops

Apply cement slurry coat over surfaces of concrete substrate immediately prior to placing setting bed which shall comprise cement sand mortar 1:2 and shall be 1" thick or as specified and shall be spread uniformly. Limit area of application to avoid premature drying out. Install setting bed of required thickness and set stone units before initial set occurs. Apply a thin layer of cement paste to bottom of each unit. Set tamps and level units immediately so that cement mortar slurry rises up in the joint. Set units in required pattern with uniform joint widths. The levels and lines shall be checked with very fine twine and the defects removed immediately. After the tiles/slabs have initially set, the joints shall be raked out and coloured cement of required shade shall be spread in the form of slurry to fill all joints.

Point joints as soon as possible after initial set. Force grout into joints, strike flush and tool slightly concave.

Remove mortar and grout from surfaces while still moist and as the work progresses.

Do not permit traffic on finished surface during setting and for a minimum of 24 hours after final pointing of joints.

5.2 Marble Toilet Counters

Marble toilet counter tops of the specified size shall be installed in areas shown on Drawings with M.S. angle framing and fixing accessories in accordance with approved shop drawing. Joints shall be cement grouted with matching colour or with matching colour sealant.

5.3 Repair and Cleaning

Remove and replace stone units which are broken, chipped, stained or otherwise damaged. Where directed, remove and replace units which do not match adjoining stonework or are not in line and level as shown on Drawings. Provide new matching units, install and point joints to eliminate evidence of replacement. Repoint defective and unsatisfactory joints to provide neat, uniform appearance.

Clean stonework not less than 6 days after completion of work, using clean water and bristle brushes. Do not use wire brushes, acid or caustic type cleaning agents or other cleaning compounds which may be detrimental to the stone finish or joint grout.

5.4 Protection

Provide covers, boards, supports and all other necessary materials to protect finished work from collapse, deterioration, discolouration or damage during installation and until contract completion.

5.5 Polishing

The finished surface after drying shall be grinded and chemically polished, acceptable to the Engineer.

The finished surface shall not show any depressions in individual tiles or any undulation in the floor.

Do not permit traffic on finished surface during setting and for a minimum of 72 hours.

6. MEASUREMENT AND PAYMENT

6.1 General

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

The rates quoted by the Contractor in the Bill of Quantities shall include work to be executed under these specification in any floor and at any height except where otherwise specifically stated in the relevant item of Bill of Quantities and the Contractor shall not be entitled to any claim or claim any compensation on this account.

6.1.1 Finishing, washing, polishing, repair cleaning and protection of marble stone/tiles in position.

6.1.2 Proprietary adhesives, joint grouts and sealants for fixing marble stone where specified on the Drawings or directed by the Engineer.

6.1.3 Class 'C' cement concrete screed bed and 1:2 cement sand mortar for marble stone/tiles in floors, skirting, steps, etc.

6.1.4 Preparation of concrete substrate for laying marble sills/slabs and tiles.

6.1.5 M.S. angle framing and fixing accessories for marble counters.

6.1.6 Chemical polishing on marble surfaces.

6.2 Marble Flooring, Dado and Stair/Counter tops

6.2.1 Measurement

Measurement of acceptably completed works of marble Flooring, Dado and Stair/Counter tops will be made on the basis of net actual area in square meter / square foot of marble Flooring, Dado and Stair/Counter tops provided and installed in position as shown on the Drawings or as directed by the Engineer.

6.2.2 Payment

Payment will be made for acceptable measured quantity of marble Flooring, Dado and Stair/Counter tops on the basis of unit rate per square meter / square foot quoted in the respective items of Bills of Quantities and shall constitute full compensation for all the works related to the item.

6.3 Marble Skirting

6.3.1 Measurement

Measurement of acceptably completed works of marble skirting will be made on the basis of actual length in running meter / running foot of marble skirting provided and installed in position as shown on the Drawings or as directed by the Engineer.

6.3.2 Payment

Payment will be made for acceptable measured quantity of marble skirting on the basis of unit rate per running meter / running foot quoted in the respective items of Bills of Quantities and shall constitute full compensation for all the works related to the item.

6.4 Marble Vanity Top

6.4.1 Measurement

Measurement of acceptably completed works of marble vanity top including precast slab, masonry and other related civil works, will be made on the basis of net actual area in square meter / square foot of marble vanity top provided and installed in position as shown on the Drawings or as directed by the Engineer.

6.4.2 Payment

Payment will be made for acceptable measured quantity of marble vanity top including precast slab, masonry and other related civil works, on the basis of unit rate per square meter / square foot quoted against respective item in the Bills of Quantities and shall constitute full compensation for all the works related to the item.

*** End of Section 6531 ***

SECTION - 6560

FALSE CEILING

1. SCOPE
2. GENERAL
3. MATERIALS
4. SUBMITTALS
5. PRODUCT DELIVERY, STORAGE AND HANDLING
6. JOB SITE CONDITIONS
7. INSTALLATION AND WORKMANSHIP
8. FIXTURES
9. FINISHING
10. MEASUREMENT AND PAYMENT

SECTION - 6560

FALSE CEILING

1.0 SCOPE

The work under this section of the specifications, consists of furnishing all plant, labour, equipment, appliances and materials in any floor and at any height and in performing all operations in connection with providing and installing different types of false ceiling including suspension system complete, in strict accordance with this section of the specifications and the applicable drawings and subject to the terms and conditions of the Contract.

2.0 GENERAL

False ceiling shall be installed wherever indicated on the drawings by skilled technicians experienced in this type of work. Installation shall not commence in any room or space before completion of plasterwork on structural roofing/internal walling/external surfaces.

3.0 MATERIALS

3.1 Tiles

Tiles shall be of approved size, shape and colour as shown on drawing or as approved by the Engineer shall be used.

All four edges shall be revealed to be installed by an approved recessed suspension system, strictly in accordance with the approved shop drawings, manufacturer's recommendations or instructions of the Engineer.

3.2 Aluminum Panels

Aluminum panel ceiling (1 hour fire rated) shall be linear or flat, perforated or un-perforated with grooved joints and sound insulation, as specified, manufactured by DAMPA (Denmark), OWA or DAIKEN (Japan).

3.3 Hardwood Ceiling

This ceiling shall comprise of decorative geometrical patterned hardwood, gypsum plaster relief panels infill and stainless steel panels with cut mirrors and itched glass panels.

3.4 Suspension System

The suspension system for all types of false ceiling shall be in accordance with the recommendations of the approved false ceiling manufacturer and approved shop drawings, consisting of aluminum universal U-channels/ main T/Cross-T Bars, wall mouldings/ edge trims, hold down/adjustment clips, galvanized hanger strips with adjustment mechanism, etc.

4.0 SUBMITTALS

4.1 Shop drawings shall be submitted showing reflected ceiling plan, locations of built in products and access facilities, dimensions, layout arrangements, hanger locations, structural connection, details of level changes, direction of pattern and panel joint details. The shop drawings shall be got approved by the Contractor from the Engineer in advance of under taking this item of works.

4.2 No materials shall be procured prior to approval of shop drawings and details.

4.3 The Contractor shall incorporate the required access panels of false ceiling as per approved shop drawings.

5.0 PRODUCT DELIVERY, STORAGE AND HANDLING

5.1 Material shall be delivered in original, unopened, protective packaging, with manufacturer's labels indicating brand name, pattern, size, thickness and fire rating.

5.2 Material shall be stored in original protective packaging to prevent soiling, physical damage or wetting.

5.3 Cartons shall be stored in the installation area, opened at each end to stabilize moisture content and temperature, for 48 hours prior to installation.

6.0 JOB SITE CONDITIONS

6.1 Work which will be concealed by false ceilings shall be completed, tested, inspected and accepted before ceiling work is started.

6.2 False ceiling installation shall not begin until the area has been closed in, and temperature and humidity approximate occupancy conditions. Wet work shall be cured and dry before ceiling work is started.

6.3 Surface which will support the ceilings, and those to which the ceiling abut, shall be inspected and accepted for completeness and adequacy to receive the ceilings before the work begins.

7.0 INSTALLATION AND WORKMANSHIP

False ceiling suspension system and panels shall be installed in accordance with the requirements of BSI-CP.290 and with the manufacturer's recommendations as approved by the Engineer.

7.1 Suspension System

The hangers as specified shall be evenly disposed as per drawings, details and place and position as indicated. The suspension system should be installed by making holes directly in the roof and shall be made good as directed by the Engineer. Their lengths clear of roofing slab shall be as per shop drawing details.

The framing of the specified section and run at spacing as per shop drawings. The jointing of runners to hangers shall be as per approved shop drawing details. The extra framing if required shall be provided for light receptacles as per approved shop drawing details.

Wall hangers shall be positively and rigidly connected to the structure and to cross runners.

7.2 False Ceiling tiles

Tiles shall be installed in the grid system after completion of installation of the suspension of lighting and air conditioning fixtures.

Forming ceiling panels shall be laid out in pattern including border of uniform width around all sides of each ceiling area. The pattern shall be as per shop drawings approved by the Engineer.

All panels shall be furnished and installed in an approved manner and as per approved types, sizes and surface design.

8.0 FIXTURES

Light fixtures shall be installed as per approved pattern and supported in accordance with manufacturer's recommendations.

9.0 FINISHING

After installation, dirty, soiled or discoloured surfaces shall be cleaned and left free from defects and ready to receive any painted finish if required.

The panels which are damaged or improperly installed shall be removed and replaced by the Contractor at his cost.

10.0 MEASUREMENT AND PAYMENT

10.1 General

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

- The rates quoted by the Contractor in the Bill of Quantities shall include work to be executed under these specification in any floor and at any height except where otherwise specifically stated in the relevant item of Bill of Quantities and the Contractor shall not be entitled to any claim or claim any compensation on this account.

- Aluminum approved suspension system including main channels, main tee/cross tee bars, wall moulding and edge trims, hanger strips and accessories, hold down clips, Aluminum tiles / strips etc. complete for aluminum tile / strips ceiling.

10.2 False Ceiling

10.2.1 Measurement

Measurement of acceptably completed works of respective types of false ceiling will be made on the basis of net actual area in square meter / square foot of false ceiling provided and installed in position as shown on the Drawings or as directed by the Engineer.

10.2.2 Payment

Payment will be made for acceptable measured quantity of respective type of false ceiling on the basis of unit rate per square meter / square foot quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

*** End of Section 6560 ***

SECTION - 6600

FLOOR AND WALL FINISHES

1. **SCOPE**
2. **MATERIALS**
3. **CEMENT CONCRETE FLOORING**
4. **INSTALLATION OF TILE FLOORING**
5. **IRONITE FLOOR TOPPING**
6. **MEASUREMENT AND PAYMENT**

SECTION - 6600

FLOOR AND WALL FINISHES

1.0 SCOPE

The work under this section of the Specification consists of furnishing all plant, labour, equipment, appliances and materials and performing all operations in any floor and at any height in connection with the installation of cement concrete floors and floor finishes including bases, skirting and external surface treatments, complete in strict accordance with this section of the specifications and the applicable drawings and subject to the terms and conditions of the Contract.

2.0 MATERIALS

2.1 Cement

Cement shall be ordinary Portland cement conforming to B.S. 12 or PS 232.

2.2 Sand

All fine sand shall be obtained from sources approved by the Engineer. The grading shall conform to B.S 882 Grading Zone 1 and 2 of which the gradation limits are as follows:

Percentage (by weight) passing

B.S. Sieve	Grading Zone 1	Grading Zone 2
3/8" (9.53 mm)	100	100
3/16" (4.765 mm)	90-100	90-100
No. 7	60-95	75-100
No. 14	30-70	55-90
No. 25	15-34	35-59
No. 52	5-20	8-30
No. 100	0-10	0-10

2.3 Coarse Aggregate

Coarse aggregate shall be crushed or uncrushed gravel or crushed stone, angular or rounded in shape and shall have granular, crystalline or smooth surface free from friable, flaky and laminated pieces, mica and shale. It shall not contain matters injurious to concrete. All coarse aggregate shall conform to BSS NO.882 and shall be graded as follows:

B.S. Sieve	% Passing by weight
1" (25.40 mm)	100
3/4" (19.05 mm)	90-100
3/8" (9.53 mm)	20-55
3/16"(4.765 mm)	0-10

The aggregate shall be stored on properly constructed paving or as directed by the Engineer.

There shall be a physical partition between the stockpiles of coarse and fine aggregate. If required aggregates shall be washed and screened to the satisfaction of the Engineer. Sieve analysis of all the aggregates to be used in the works shall be carried out as and when required by the Engineer. All aggregate shall be subject to the approval of the Engineer.

Any aggregates not found to be of the specified/approved standard shall be rejected by the Engineer and all such rejected material shall be removed from site with-out delay.

Floors, sub-base or base constructed with rejected aggregates shall be dismantled and rebuilt at the expense of the Contractor.

2.4 **Stone Ballast**

50 mm (2 in.) and down gauge graded Stone ballast shall be used under flooring.

2.5 **Water**

Water used for mixing concrete, curing or any other operation of the works specified herein shall be fresh, clean and free from organic or inorganic matters in solutions or in suspension. Only water of the approved quality shall be used for all constructional purposes:

2.6 **Ceramic/Porcelain tiles**

Ceramic tiles shall be local, premium quality, plain, white/colored or printed from one of the approved manufacturer. The ceramic tile shall be acid resistant, glazed or non skid tiles as shown on drawings. Porcelain tiles shall be imported best quality plain colored / textured from one of the approved manufacturers. The tiles shall be of sizes as specified on the drawings and shall conform to BS 1281 as per samples.

2.7 **Cleaning Compound**

The compound used for all cleaning of terrazzo shall be an approved neutral chemical cleaner free from acid and alkali or any other material that will affect the colour or otherwise damage the terrazzo and shall not affect the conductivity of terrazzo floors.

2.8 **Terrazzo Tiles**

Terrazzo tiles shall be first grade mechanically compressed type conforming to PS-531. Tiles shall be 30x30xcm (12 in. x 12 in.) with a topping of 19mm (3/4 in.) thickness composed of 1:2 cement marble chips the bases being 1:2 cement mortar. The colour, quality and size of chips shall be as per Engineer’s direction.

2.9 **Ironite Floor Hardener Topping**

Ironite Floor Hardener Topping shall be a graded, processed, non-oxidizing, non-rusting, inert metallic aggregate compatible with ordinary Portland cement designed for use in industrial pavings and floors to produce heavy duty, dense and tough floor surfaces able to wear, abrasion and dusting.

2.10 **Concrete Split Block**

Concrete split block shall be of Primecrete or Envicrete make or approved equivalent.

3.0 **CEMENT CONCRETE FLOORING**

The materials for C.C flooring shall be same as already specified under clause 3, "Materials".

3.1 **Composition of Concrete**

Concrete shall be composed of Portland Cement, sand, coarse, aggregate and water, all well mixed and brought to the proper consistency. The Contractor shall mix the ingredients as indicated on the Drawings. The proportions of the various ingredients shall be determined from time to time during the progress of the work and tests shall be made of

samples of the aggregates and the resulting concrete. The mix proportions and appropriate water-cement ratio will be determined on the basis of the production of concrete having required workability, density, impermeability, durability and required strength.

3.2 Mixing Concrete

The concrete ingredients shall be mixed in a batch mixer for not less than 1-1/2 minutes after all ingredients, except the full amount of water, are in the mixer. The Engineer reserves the right to increase the mixing time when the charging and mixing operations fail to produce a concrete batch in which the ingredients are uniformly distributed and the consistency is not uniform. The concrete shall be uniform in composition and consistency from batch to batch except when changes in composition or consistency are required. Water shall be added prior to, during and following the mixer charge. Excessive over-mixing requiring addition of water to preserve the required concrete consistency will not be permitted. The concrete ingredients shall be mixed by volumetric measurement in purpose made boxes approved by the Engineer.

3.3 Construction

The base course of the floor shall comprise of stone ballast of 2 inches (approx: 50 mm) mesh size. The base course shall be thoroughly compacted by suitable power rammers to the total consolidated thickness as shown on the Drawings and as approved by the Engineer. The interstices shall be filled with smaller size stones. The base course shall be blinded with sand and the whole surface watered. Over the well compacted base course, a layer of concrete of the required grade and thickness shall be laid, in panels of the sizes as indicated on the Drawing and as approved by the Engineer.

After the C.C bed has been cured, as directed by the Engineer, it shall be roughened and well watered before floor finishing is laid. The floor finish shall comprise of cement concrete of required grade and shall be laid in panels to the required thickness as shown on the Drawings or as directed by the Engineer. The concrete after laying will be thoroughly rammed and mortar worked up to the top and smoothed with a steel trowel. The edge of each section into which the floor is divided should be defined by wooden screeds of the approved width and of a depth equal to the depth of the floor concrete.

Freshly placed concrete floor and completed floor portions as finished shall be protected to prevent loss of water by covering with damp hessian, water proof paper, damp sand or other approved material, and shall be kept constantly damp for a period of four days or longer after concreting as directed by the Engineer. The concrete shall be allowed to dry out slowly over a period of three days after wet curing is completed.

The expansion joints shall be filled in with hot bitumen, of the approved grade, as directed by the engineer.

4.0 INSTALLATION OF TILE FLOORING

When setting out the tiles, care shall be taken to establish the correct elevation for the floor. A gauge rod shall be used, indicating the overall measurement of a given number of tiles with specified joint width to reduce cutting.

After the floor has been machine finished, it should be covered with white, non-staining sand or rags to protect it while other work is being done. After removal, the floor shall be thoroughly scrubbed.

4.1 General

The base shall be prepared by laying cement concrete of specified grade and of thickness as shown on the drawings, or specified in the Bill of Quantities.

The curing period of the setting bed shall be as directed by the Engineer. As large an area of setting bed shall be spread at one time as can be covered with tiles before the mortar has set. Surplus mortar shall be removed. The thickness of setting bed in any space shall not be less than 13mm (1/2").

Floor and wall surfaces to receive the tiles shall be thoroughly cleaned of all dirt, dust, oil and other objectionable matters. Tiles shall be laid out from the centre line of each space in an outward direction and the pattern should be made symmetrical with a minimum number of cut tiles as directed by the engineer.

Joints between the tiles shall be of uniform width. Tiles shall be cut with a suitable cutting tool and rough edges shall be rubbed smooth. Tiles shall be laid to the straight edges.

4.2 Ceramic/Porcelain Tiles

The ceramic/porcelain tiles shall be laid to the required lines, levels and grades over a setting bed of cement sand mortar comprising of one part of cement and 4 parts of sand by volume and the joints filled with neat white or grey cement including vertical and horizontal covers. The tile floor shall be kept wet for at least 72 hours and no traffic should be allowed on the tiles during curing period.

4.3 Terrazzo Tiles Flooring

The tiles shall be well soaked in water and kept in a vertical position to drain out all surplus water. The bed over which the tiles would be laid shall be 25mm thick cement sand mortar as specified by the Engineer. The cement sand mortar shall be prepared and mixed with clean granular sand in the proportion of 1:2 and spread uniformly on the thoroughly wetted and moist surface. The tiles shall be laid on this cement mortar slurry rises up in the joint. The tiles shall be laid in the pattern as specified by the Engineer. The levels and lines shall be checked with very fine twine and the defects removed then and there. After 3 or 4 days the slurry from the joints shall be raked out and colored cement of required shade shall be spread in the form of slurry to fill all joints. It shall be neatly wiped out of the surface when still wet. After about 10 days the area shall be rubbed and ground with Carborundum stone and the whole surface rendered smooth and washed with plenty of water. After allowing to dry the surface shall be wax polished. The finished surface shall not show any depressions in individual tiles or undulations in the floor.

5.0 IRONITE FLOOR TOPPING

5.1 Base Preparation

Ironite (floor hardener) flooring is directly laid over fresh green concrete. The base concrete shall be placed in accordance with good concrete practice and extra care should be exercised at corners and edges to obtain good compaction. Any free water from the surface of the base slab shall be removed prior to the application of ironite topping.

5.2 Mixing & Application

The floor hardener shall be mixed well with cement in a ratio as specified by the manufacturer. The water cement ratio of ironite topping shall be kept as low as per site conditions. Ironite topping shall be laid within three hours of laying of the base slab. Surface shall be toweled till all pores and pinholes thus formed have disappeared. Final toweling shall be delayed for as long as possible.

5.3 Curing

Ironite flooring shall be cured for at least 14 days with a spray of clean water or a suitable curing compound. During the curing period the surface should be protected from traffic and other potential hazards.

6. MEASUREMENT AND PAYMENT

6.1 General

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities.

The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

6.1.1 Loss and wastage of material due to consolidation, erosion and settlement.

6.1.2 All type of joints (expansion, contraction and construction joint etc.).

6.1.3 Class 'C' cement concrete screed base and 1:4 cement sand mortar under floor.

6.1.4 Rough plaster base under skirting / dado.

6.1.5 Finishing/grinding, washing & polishing works of ceramic, concrete, terrazzo tile, terrazzo floors and marble tiles.

6.1.6 Marble strips in terrazzo floors

6.1.7 1:2 and 1:4 cement sand rough cast plaster.

6.1.8 Sand cushion under concrete pavers

6.1.9 Pigmented grouting.

6.1.10 Cleaning of tiles after installation.

6.1.11 Bull-nozing, chamfering of edges of marble tops including base mortar and making holes for wash basin including all necessary fixing accessories.

6.1.12 Liquid water proofing, if required.

6.2 Cement Concrete Floor

6.2.1 Measurement

Measurement of acceptably completed works of cement concrete floor steel trowelled finish will be made on the basis of net actual area in square meter / square foot laid in position as shown on the Drawings or as directed by the Engineer.

6.2.2 Payment

Payment will be made for acceptable measured quantity of cement concrete floor steel trowelled finish on the basis of unit rate per square meter / square foot quoted in the respective items of Bills of Quantities and shall constitute full compensation for all the works related to the item.

6.3 Ceramic/Porcelain Tile Floor

6.3.1 Measurement

Measurement of acceptably completed works of ceramic/porcelain tile in floor will be made on the basis of net actual area in square meter / square foot of floor laid in position as shown on the drawing or as directed by the Engineer.

6.3.2 Payment

Payment will be made for acceptable measured quantity of ceramic/porcelain tile floor on the basis of unit rate per square meter / square foot quoted in the respective items of Bills of Quantities and shall constitute full compensation for all the works related to the item.

6.4 Ceramic/Porcelain Tile Dado/Skirting/Cladding

6.4.1 Measurement

Measurement of acceptably completed works of ceramic/Porcelain tile in dado/skirting/cladding will be made on the basis of net actual area in square meter / square foot of dado/skirting laid in position as shown on the Drawing or as directed by the Engineer.

6.4.2 Payment

Payment will be made for acceptable measured quantity of ceramic/porcelain tile in dado/skirting/cladding on the basis of unit rate per square meter / square foot quoted in the respective items of Bills of Quantities. The unit rate shall include all cost of cement, sand, mortar and shall constitute full compensation for all the works related to the items.

6.5 Terrazzo Tile Floor/skirting/dado

6.5.1 Measurement

Measurement of acceptably completed works of terrazzo tile in floor/skirting/dado will be made on the basis of net actual area in square meter / square foot of floor laid in position as shown on the Drawing or as directed by the Engineer.

6.5.2 Payment

Payment will be made for acceptable measured quantity of terrazzo tile in floor/skirting/dado on the basis of unit rate per square meter / square foot quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

6.6 Ironite Floor Topping

6.6.1 Measurement

Measurement of acceptably completed works of ironite floor topping will be made on the basis of net actual area in square meter / square foot laid in position as shown on the Drawings or as directed by the Engineer.

6.6.2 Payment

Payment will be made for acceptable measured quantity of ironite floor topping on the basis of unit rate per square meter / square foot quoted in the respective items of Bills of Quantities and shall constitute full compensation for all the works related to the item.

6.7 Concrete Split Block Cladding

6.7.1 Measurement

Measurement of acceptably completed works of pigmented concrete split block cladding will be made on the basis of net actual area in square meter / square foot laid in position as shown on the Drawings or as directed by the Engineer.

6.7.2 Payment

Payment will be made for acceptable measured quantity of pigmented split block cladding on the basis of unit rate per square meter / square foot quoted in the respective items of Bills of Quantities and shall constitute full compensation for all the works related to the item.

6.8 **Concrete Skirting**

6.8.1 Measurement

Measurement of acceptably completed works of concrete in skirting will be made on the basis of net actual area in square meter / square foot of dado/skirting laid in position as shown on the Drawing or as directed by the Engineer.

6.8.2 Payment

Payment will be made for acceptable measured quantity of concrete in skirting on the basis of unit rate per square meter / square foot quoted in the respective items of Bills of Quantities. The unit rate shall include all cost of cement, sand, mortar and shall constitute full compensation for all the works related to the items.

*** End of Section 6600 ***

SECTION - 6700

PAINTING

1. SCOPE
2. APPLICABLE STANDARDS
3. GENERAL
4. MATERIALS
5. DELIVERY, STORAGE AND CONTAINER SIZES
6. SURFACE PREPARATION
7. APPLICATION
8. JOB CONDITIONS
9. QUALITY ASSURANCE
10. SCHEDULE OF MEASUREMENT OF PAINT AREA
11. MEASUREMENT AND PAYMENT

SECTION - 6700

PAINTING

1.0 **SCOPE**

The work under this section of the Specifications consists of furnishing all materials, plant, labour, equipment, appliances and performing all operations in any floor and at any height in connection with surface preparation, mixing, painting concrete works, gates, frames, walls, ceilings and all such surfaces as shown on the Drawings and/or as directed by the Engineer. The scope of this section of specification is covered with detailed specifications as laid down herein.

2.0 **APPLICABLE STANDARDS**

Latest editions of following British Standards are relevant to these specifications wherever applicable.

2.1 **BSI (British Standards Institution**)

245	Specification for mineral solvents (white spirits and related hydrocarbon solvents) for paints and other purposes.
2521	Lead-based priming paint for wood work.
2523	Lead based priming paint for iron and steel.
2569	Sprayed metal coatings.
4800	Paint colours for building purposes.
CP.231	Painting of building.
CP.3012	Cleaning and preparation of metal surfaces.

3.0 **GENERAL**

3.1 Except as otherwise specified, all painting shall be applied in conformity with BS CP 231 "Painting of Building" as applicable to the work.

3.2 The Contractor shall repair at his own expense all damaged or defective areas of shop-painted metal work and structural steel work. Metal surfaces against which concrete is to be placed will be furnished shop-painted and shall be cleaned prior to being embedded in concrete.

3.3 Except as otherwise specified all concrete and plastered surfaces are to be painted.

3.4 The Engineer will furnish a schedule of colours for each area and surface. All colours shall be mixed in accordance with the manufacturer's instructions.

3.5 Colours of priming coat (and body coat) where specified, shall be lighter than those of finish coat. The Engineer shall have unlimited choice of colours.

3.6 Samples of all colours, and finishes shall be prepared in advance of requirement so as not to delay work and shall be submitted to the Engineer for approval before any work is commenced. Any work done without such approval shall be redone to the Engineer's satisfaction, without additional expense to the Employer. Samples of each type of paint shall be on separate 12" x 12" x 1/8" tempered hard board panels. Manufacturer's colour chart shall be submitted for colour specifications and selection.

4.0 MATERIALS

4.1 All materials shall be acceptable, proven, first grade products and shall meet or exceed the minimum standards of reputable manufacturers as approved by the Engineer.

4.2 Colours shall be pure, non-fading pigments, mildew-proof sun-proof, finely ground in approved medium. Colours used on-plaster and concrete surfaces shall be lime-proof. All materials shall be subject to the Engineer's approval.

4.3 All synthetic enamel paints and primers for structural steel works, metal work and wood works will be the best available of its type and shall be approved by the Engineer prior to its procurement.

4.4 Approved quality Weather Shield/Weather Coat paint shall be used for painting the exteriors of the structures or other surfaces where specified on the drawings as directed by the Engineer.

4.5 The plastic emulsion paint, vinyl emulsion paint or similar as approved by the Engineer shall be used for interior surfaces.

4.6 Texture coating wherever specified shall be acrylic resin based coating composed of acrylic copolymers, natural quartz, natural marble chips, metallic oxides, antibacterial and antifungal additives, and expanders, foaming and setting agents and shall be applied in-accordance with approved manufacturer’s recommendations.

4.7 Only paints manufactured by ICI, Berger, Nippon Paints or approved equivalent shall be used in this Project.

4.8 All material shall be delivered to site in their original unbroken containers or packages & bear the manufacturer's name, label, brand & formula & will be mixed and applied in accordance with his directions.

5.0 DELIVERY STORAGE AND CONTAINER SIZES

Paints shall be delivered to the site in sealed containers, which plainly show the type of paint, colour (formula or specifications number) batch number, quantity, date of manufacture, name of manufacturer and instructions for use. Pigmented paints shall be supplied in containers not larger than 20 liters. All materials shall be stored under cover in a clean storage space, which should be accessible at all times to the Engineer. If storage is allowed inside the building, floors shall be kept clean and free from paint spillage.

6.0 SURFACE PREPARATION

6.1 All oil, grease, dirt, dust, loose mill scale and any other foreign substance shall be removed from the surface to be painted, polished and white washed by the use of a solvent and clean wiping material. Following the solvent cleaning, the surfaces shall be cleaned by scrapping, chipping, blasting, wire brushing or other effective means as approved by the Engineer.

6.2 In the event the surfaces become otherwise contaminated in the interval between cleaning and painting, re-cleaning will be done by the Contractor at no additional cost.

6.3 Surfaces of stainless steel, aluminum, bronze, and machined surfaces adjacent to metal work being cleaned or painted shall be protected by effective masking or other suitable means, during the cleaning and painting operations.

6.4 All the surfaces to be painted with approved quality paint shall be free from dust, dirt, fungus, lichen, algae etc. Oil paint, varnish and lime wash should always be removed by scraping and washing.

6.5 All surfaces to be bitumen painted shall be thoroughly cleaned of any accretion, dust, dirt etc. by scraping, wire-brushing or as directed by the Engineer. The surface shall be primed with a coat of asphalt oil used at the rate of not less than 0.50 pound per square foot.

No work in this section shall be allowed until all surfaces or conditions have been inspected and approved by the Engineer.

7.0 APPLICATION

7.1 All paint and coating materials shall be in a thoroughly mixed condition at the time of application. All work shall be done in a workman like manner, leaving the finished surface free from drips, ridges, waves, laps, and brush marks. All paints shall be applied under dry and dust free conditions. Unless approved by the Engineer paint shall not be applied when the temperature of the metal or of the surrounding air is below 7 degrees Centigrade. Surfaces shall be free from moisture at the time of painting.

All primary paint shall be applied by brushing. The first coat of paint shall be applied immediately after cleaning. When paint is applied by spraying, suitable measures shall be taken to prevent segregation of the paint in the container during painting operation.

Effective means shall be adopted for removing all free oil and moisture from the air supply lines of the spraying equipment. Each coat of paint shall be allowed to dry or harden thoroughly before the succeeding coat is applied. Surfaces to be painted that will be inaccessible after installation shall be completely painted prior to installation.

Coats of Weather Shield/Weather Coat paint shall be applied in accordance with the manufacturer's instructions or as directed by the Engineer.

Only as much material should be mixed as can be used up in one hour. Over-thinning will not be permitted. After the first coat the surfaces will be soaked evenly four or five times and the second coat shall be applied after leaving for at least overnight.

7.2 Where shown on Drawings all exterior finishes shall be painted with Weather Shield/weather coat paint or acrylic based textured coating (graffito) as shown on drawings in approved colours as per manufacturer's specifications. The number of coats shall be as shown on the drawings or as directed by the Engineer.

7.3 Plastic emulsion paint, vinyl emulsion paint or matt enamel paint of the approved make and shade shall be applied to surfaces as shown on Drawings as per manufacturer's instructions. The number of coat shall be as indicated on the Drawings or as directed by the Engineer.

8.0 JOB CONDITIONS

8.1 Observe manufacturer's recommended minimum and maximum temperature but do not apply paint or finish to any surface unless ambient temperature is 10 degree C or above and less than 43 degree C. No painting shall be done above 90% relative humidity.

8.2 Place drop cloths to adequately protect all finished work.

8.3 Remove and replace all items of finish hardware, device plates, accessories, lighting fixtures or other removable items.

8.4 In no case shall any finish hardware or other finished item that is already fitted into place be painted, unless otherwise specified.

9.0 **QUALITY ASSURANCE**

All paint for any one surface shall be top quality, of one manufacturer and approved by the Engineer. Deep tone accent colours shall be used and the unavailability of final coat colours may be the basis for rejecting materials for any one surface.

10.0 **SCHEDULE OF MEASUREMENT OF PAINT AREA:**

10.1 Irrespective of prime coats and number of paint coats applied to exposed painting surface area of column, walls, projections, ceilings, false ceilings and other surfaces (Except gates, doors windows and ventilators) shall be measured as per actual paint surface area for single time only and paid in accordance with quoted rate of Bill of Quantities.

11. **MEASUREMENT AND PAYMENT**

11.1 **General**

Except otherwise specified herein or elsewhere in Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of Bill of Quantities.

The rates quoted by the Contractor in the Bill of Quantities shall include work to be executed under these specification in any floor and at any height except where otherwise specifically stated in the relevant item of Bill of Quantities and the Contractor shall not be entitled to any claim or claim any compensation on this account.

11.1.1 Preparatory works, including preparatory materials, scraping, scratching, sand blasting, cleaning, prime coating, priming, protection of finished works etc.

11.1.2 Polishing works, including preparatory materials, scraping, cleaning, sanding etc.

11.1.3 Before application of paint on existing surface the old paint surface shall be removed existing paint, filling of cracks, surface preparation and application of primer coat, if any.

11.2 **Painting / Acrylic based textured Coating**

11.2.1 Measurement

Measurement of acceptably completed respective type of painting works / Acrylic based textured coating (graffito) will be made on the basis of net actual length in square meter / square foot of the surface painted / coated as shown on the Drawings or as directed by the Engineer.

11.2.2 Payment

Payment will be made for acceptable measured quantity of respective type of painting / acrylic based textured coating (graffito) on the basis of unit rate per square meter / square foot quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

*** End of Section 6700 ***

SECTION - 5100

PLUMBING

1.0 SCOPE

2.0 APPLICABLE STANDARDS

3.0 SUBMITTALS AND SHOP DRAWINGS

4.0 MATERIAL AND EQUIPMENT

5.0 EXECUTION

6.0 TESTING AND COMMISSIONING

7.0 MEASUREMENT AND PAYMENT

1.0 SCOPE

The work under this section consists of providing all material and equipment and performing all the work necessary for the complete execution (jointing, clamping, cleaning, painting etc. both above and underground and embedded in walls) and completion, including testing and commissioning of all systems of plumbing works as shown on the Drawings and/or as specified herein and/or as directed by the Engineer. The system includes plumbing works as follows:

i) Cold and Hot Water Supply
ii) Building Drainage
ii) Rain Water Drainage

All the above named systems shall be completed in all respects including extension of these internal systems upto the specified limits outside the building as indicated on the drawings.

2.0 APPLICABLE STANDARDS

G. I. Pipes	BS- 1387 (1985) Medium duty
Polypropylene Random (PPR) pipes	DIN 8077-78
C. I. Pipes	BS- 416 & 2494
uPVC Pipes (Building)	ISO- 3633 & BS- 4514/ 5255.
uPVC Pipes (External)	BS-5481/ BS-4660 (EN-1401)

3.0 SUBMITTALS & SHOP DRAWINGS

All the materials and equipment shall be of the specifications mentioned herein and the Contractor shall submit the sample, necessary catalogues, sketches, the name of manufacturer and guarantee if necessary, before installation. The system shall be installed after the Engineer approves it. All material and equipment shall be new and unused.

It is specifically intended and must be agreed to by each Contractor submitting a bid, that any material or labor which is usually furnished as a part of such equipment and which is necessary for its proper completion and best operation shall be furnished as a part of this Contract without any additional cost whether or not shown in detail on the drawings or described in detail, in the specifications.

Approval of material and equipment by the Engineer shall not absolve the Contractor of the responsibility of furnishing the same of proper size, quantity, quality and all performance characteristics to efficiently fulfill the requirements and intent of the Contract Documents.

Prior to commencement of works on site and at least 3 weeks in advance of all the drawing being required for actual execution the Contractor shall submit on larger scale as approved by Engineer, shop drawings in triplicate for approval to the Engineer. The Engineer shall review the drawing and (i) approve the drawing or, (ii) approve the drawing with comments or, (iii) disapproved the drawings with comments for rectification/revision of the drawing and resubmit 3 copies to the Consultant for approval. On a drawing being approved, the Contractor shall submit 6 copies for formal approval and distribution to relevant offices.

All drawings shall have plan and section and with sufficient details to clearly reflect the installation of the system. All material specifications shall be provided on the drawings. All information required for preparing suitable foundation, for providing suitable access to the system, for making openings in building structure, for coordination with electrical, air-conditioning and other designs etc., shall be clearly provided.

Installation shall not be allowed to commence unless approved shop drawings are in possession of the Contractor, for which purpose shop drawings shall be submitted by the Contractor to the Engineer 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 drawings on time.

Each shop drawing submitted by the Contractor shall include a certificate by the Contractor that all related conditions on site relevant to that particular installation have been checked and that no conflict exists.

Any expenses resulting from an error mistake or omission in or delay in delivery of the drawings and information mentioned above shall be borne by the Contractor.

Drawings approved shall not be departed from except on the instructions of the Engineer.

The approval by the Engineer for 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 of any error in the submitted data and workings, brought to light at any time subsequent to any approvals.

Relevant specified imported item, model cuts will be available with the authority concern for execution of work for contractor to check the models for fabrication or import.

4.0 MATERIAL & EQUIPMENT

4.1 G.I. COLD, HOT WATER PIPES AND FITTINGS

The galvanized pipes shall be of medium grade and conform to British Standard Specifications 1387 for "Steel Tubes and Tubular suitable for screwing to BS 21 pipe threads".

All screwed tubes and sockets shall have BS pipes thread in accordance with BS 21. In order to prevent damage to the leading thread, the ends of the sockets shall be chamfered internally.

A complete and uniform adherent coating of zinc will be provided for galvanized pipes.

Every tube shall be tested at the manufacturer's works to a hydraulic test pressure of 4.90 MPa (710psi) and shall be maintained at the test pressure sufficiently long for proof and inspection.

Tubes which are bundled shall be secured together by rope or soft iron or other suitable material.

The threads of all tubes shall be effectively covered with a good quality grease or other suitable compound, and each tube above 50 mm nominal bore shall have a protecting ring affixed to the unsocketed screwed end.

All pipe fittings upto 75 mm dia. shall conform to BS 21 and shall be of malleable cast iron. Pipe fittings above 75 mm dia. shall be of approved material and specifications as decided by the Engineer.

4.2 POLYPROPYLENE RANDOM (PPR) PIPES AND FITTINGS

Polypropylene Random Pipes and fittings shall conform to the following standard

DIN	8077-8078	Resistible to all chemical elements
DIN	16961	Smooth inner surface
DIN	19560	Usability for hot water all levels
DIN	4279	Durable to inner pressure
DIN	16962	Conforms to connections by welding process

4.3 SOIL, WASTE, VENT & RAIN WATER DRAINAGE PIPES & PIPE FITTINGS (C.I. & uPVC)

a. Cast Iron (CI) PIPES & FITTINGS

The cast iron pipe shall conform to British Standard Specifications No.416 for "Cast Iron spigot and socket soil, waste and vent pipes and fittings with spigot and socket or hubless ends. The joint shall be lead caulked or elastomeric (Rubber rings) to BS- 2494.

Cast iron pipes shall be centrifugally (SPUN) cast.

The quality of material shall be according to B.S.S. No.1452 for Grade 10.

The contractor shall supply coated pipes and fittings. The coating composition shall be of tar basis or a mixture of natural bitumen with a suitable hardener and natural asphalt. The coatings shall be smooth, tenacious, sufficiently hard, not to flow when exposed to a temperature of 63 Degrees Celsius and not so brittle at zero degrees Celsius that it chips soft when scribed lightly with the point of a pen knife.

Every pipe shall be tested at the manufacturer's work to a hydraulic test pressure of 0.07 MPa (10psi). Every pipe and fitting shall ring clearly when tested for soundness by being struck all over with a light hammer.

b. uPVC PIPES & FITTINGS

The material shall substantially consist of un-plasticized poly vinyl chloride (PVC) as per the requirements of aforesaid standard. Pipes

and fittings shall be sufficiently stabilized against thermal ageing and ultraviolet (UV) light.

uPVC Pipes

- There are two types of pipes and fittings, type A and type B, as per ISO 3633 for drainage systems. Only type B shall be used for soil, waste and venting systems.
- As per BS4514/5255, sanitary pipes and fittings shall be class "A" wall thickness 3.2mm.

uPVC Fittings

All fittings shall be compatible with the pipe material as recommended by the pipe manufacturer. However, there are two types of fittings available as per ISO 3633:

- uPVC fittings with Solvent Cement (SC) socket joint conforming to ISO 3633:1991.
- uPVC fittings with rubber ring socket joint conforming to DIN 19560, which is compatible with ISO 3633/PS 3214.

Rubber Rings

The rubber rings may either be Synthetic or natural conforming to PS 1915:1987 & ISO 4633/1983 (E).

The material shall consist substantially of poly vinyl chloride (PVC) to which may be added only those additives that are needed to facilitate the manufacture of pipes and fittings having good mechanical strength and opacity.

The pipes and fittings shall be tested mechanically and physically in accordance with the relevant Standards as and when directed by the Engineer, before and during installation.

4.4 PLUMBING FIXTURES

4.4.1 General Requirements

Materials shall conform to the latest referenced standard specifications and other provisions stipulated herein and shall be new and unused.

All fixtures shall be of the best quality and finish.

Prior to procurement of the materials, the Contractor shall be required to prepare and submit to the Engineer for his approval, a complete schedule of materials to be used in the works together with a list of the names and addresses of the manufacturers and the trade names of the materials. The schedule shall include diagrams, drawings and such other technical data as may be required by the Engineer to satisfy himself as to the suitability, durability, quality and usefulness of the material to be purchased.

Approval of the schedule shall not be construed as authorizing any deviations from the specifications unless the attention of the Engineer has been invited to the specific changes. If the material or equipment offered under this provision is, in the opinion of the Engineer, equal to or better than specified, it will be given consideration.

Plumbing fixtures shall have smooth impervious surfaces, be free from defects and concealed fouling surface. They shall be true to line, angles, curves and colour etc. Normally they shall be of local make and of the best quality available, provided.

All taps and cocks to be installed with plumbing fixtures shall be chrome plated (CP) and shall be of appropriate class to work without damage or leakage on the specified pressure of potable water system, which is 0.88 MPa (128 psi). The taps and cocks shall be of the best quality locally manufactured.

When any fixture is provided with an overflow, the waste shall be so arranged that the standing water in the fixture cannot rise in the over flow when the stopper is closed or remain in the overflow when the fixture is empty.

Plumbing fixtures shall be installed in a manner to afford easy access for cleaning. The space between the fixture and the wall shall be closely fitted and pointed so that there is no chance for dirt or vermin to collect.

When practical, all pipes from fixtures shall be run to the nearest wall. Where fixture comes in contact with wall and floors, the joint shall be watertight.

Wall hung fixtures shall be rigidly supported by metal supporting members so that no strain is transmitted to the connections. Flush tanks and similar appurtenances shall be secured by approved non-corrosive screws or bolts.

Fixtures shall be set level and in proper alignment with reference to adjacent walls. No water closet shall be set closer than 400 mm from its centre to any side wall. No urinal shall be set neither closer than 300 mm from its centre to any side wall or partition nor closer than 600 mm centre to centre. The supply lines or fittings for every plumbing fixture shall be so installed as to prevent backflow. All cuttings, making holes etc. and making it good shall be included in the work.

Other physical/chemical properties of the fixtures are as below:

S. No.	Physical/Chemical Properties	Pakistan Standards	European Standards
1	Water absorption	Less than 0.50%	Maximum 0.50%
2	Scratch Resistance	Maximum 5.5 MOH's scale	Maximum 5 MOH's scale
3	Resistance to Chemicals	Resistant to acids, alkalies, bases & other household cleaning chemicals	Resistant to chemicals.
4	Crazing Resistance	Crazing "NIL"	Crazing "NIL"
5	Warpage	Maximum 5.5-6mm	Maximum 6mm
6	Strength against bending	More than 700 kg/cm	450kg/cm - 700 kg/cm
7	Thermal shock	More than 10 cycles of thermal shock from hot to cold water 15^{o}C-200^{o}C	More than 2 cycles of thermal shock from hot to cold water 20^{o}C-110^{o}C
8	Durability	Permanently durable	Durable for ever

4.4.2 **Wash Basins**

Wash basin shall be vitreous China, best quality, local make of colour, size and type as approved by the Engineer. It shall be installed as a complete unit including 15 mm mixer for hot and cold water supply or CP brass faucet for cold water only, 15 mm stop-cocks, C.P brass chain with 32 mm rubber plug, C.P brass bottle trap for individual wash basin and C.P brass P trap for battery of wash basins as applicable, C.P brass strainer, heavy duty cast iron brackets with bolts, screws etc. approved water inlet connection pipe, waste pipe, jointing and sealing material, etc., with all other minor accessories required to complete the job in all respect.

4.4.3 **Vanity Wash Basins & laboratory sink**

Wash basin Vanity type & Laboratory Sink shall be vitreous China, best quality, local make of colour, size and type as approved by the Engineer. Other necessary fittings shall be same as described for above Wash basin.

4.4.4 **Water Closets (European type)**

European type water closet shall be best quality local make of colour, size and type as approved by the Engineer. It shall be installed as a complete unit including all accessories. Flush tank (13.5 liters) shall be of low level type - it shall be fitted with either

single push button or double push button type. Trap shall be cast integral with pan. The seat shall be of smooth non-combustible non-absorbent materials like Bakulite and of the open front type fixed to the pan with hinges. The fittings shall also include approved water inlet connection pipe, nuts bolts, 15mm dia stop cock etc. required for complete installation.

4.4.5 **Water Closets (Orissa)**

Squatting (Asian/Orissa) type water closet shall be vitreous China, best quality local make of colour, size and type approved by the Engineer. It shall be installed as a complete unit including, 15 mm stop cock, approved water inlet connection pipe, low level or high level Flush tank (13.5 liters), as required. All fittings shall be installed at low level, or high level as required including interconnecting flush piping. Foot rests, cast iron P trap, making joints, jointing and sealing materials, 15mm dia stop cock etc. with all other minor accessories for complete installation.

4.4.6 **Kitchen Sinks**

Kitchen sink shall be stainless steel of best quality local make of colour, and type as approved by the Engineer, single bowl or double bowl with integral drain board of at least 1000 x 500 mm size. It shall be installed as a complete unit with arrangement for both cold and hot water supply, 15 mm C.P. mixer for cold and hot water, approved water inlet connection C.P. brass strainer, waste outlet pipe, heavy duty cast iron brackets with bolts screws etc., jointing & sealing material, etc., with all other minor accessories required for complete installation.

4.4.7 **Shower Tray**

Shower trays shall be of glass reinforced polyester with hard glass finish best quality local make of colour and type as approved by the Engineer. It shall be installed as a complete unit including C.P. brass strainer, waste outlet pipe, bolts screws, jointing & sealing material, etc.

4.4.8 **Shower Head**

Shower head shall be installed on the wall at a suitable height including installation of chromium plated extension pipe, C.P. brass Mixer for cold & hot water etc. with all other minor accessories required for complete installation.

4.4.9 **Bath Tub**

Bath Tub shall be of the approved material such as Fiberglass, cast iron or acrylic. It shall be installed as a complete unit including chromium plated brass overflow sluice 1-1/4" in dia., chromium plated waste 1-1/2" dia. with chromium plated chain & rubber stopper (Plug), etc. complete in all respects for complete installation. Its colour shall match with that of other fixtures in the toilet.

4.4.10 Urinals

Urinals shall be vitreous China of approved make and size and of wall hung type either with integral water seal trap or with separate brass P-Trap. The complete unit shall be installed including 15mm Tee-stop cock, plastic water inlet/outlet connections, CP Flush Valve or 13.5 liters flushing cistern, heavy duty CI brackets, bolts, screws, and all internal accessories or; CP steel flush pipe. CP steel waste pipe, joints, jointing and sealing materials etc. with all other minor accessories.

4.5 MISCELLANEOUS ITEMS

4.5.1 Taps and Cocks

All taps and cocks shall be of brass, gun metal or other equally suitable corrosion resisting alloy conforming to BS 1010 and shall be best quality local make. The nominal size specified shall be the nominal bore of the seating. Washers for cold water cocks shall be of specially selected leather, rubber asbestos composition or other equally suitable material. Washers for hot water cocks shall be of good quality fiber, rubber - asbestos composition or other equally suitable material. Every tap/cock shall be tested, complete with its component parts, to a hydraulic pressure of at least 1.96 MPa (284.4 psi) During test it shall neither leak nor sweat.

4.5.2 Floor traps/drains

Floor traps/drains shall be of cast iron or uPVC or of other anti-corrosive material, compatible with the material of pipe. They shall have minimum water seal of 40 mm and shall be provided with removable metal/uPVC strainers. The traps shall be of self-clearing type. The open area of the strainer shall be greater than the cross section area of the drain line to which it connects. Floor traps shall be well set in position so that there is no leakage at the joint between trap and the floor.

4.5.3 Roof Drains

Roof drains shall be of bitumen coated cast iron, compatible with the material of pipe. They shall have strainers extending at least 15 mm above the roof surface immediately adjacent to them, when installed on flat part. Bottom of strainer shall be flush with the roof surface, when installed on vertical part. Strainer shall have an available inlet area, above roof level, of not less than 1-1/2 times the area of the down-pipe to which the drain is connected.

The connection between roof and roof drain shall be made watertight by the use of proper flashing material.

4.5.4 Cleanouts

Cleanout shall be of the same nominal size as that of the pipe on which it is installed. Cast Iron Cleanout shall consist of tapped

heavy duty cast iron ferrule caulked into cast iron fitting and heavy duty brass tapered even plug. uPVC cleanout shall consist of either two 45^{o} bends or one long radius bend both with a removable end cap and other necessary fittings/material for complete installation in floor Cleanouts shall be turned up through floors by long sweep fittings, wherever the space so permits. Top finish of cleanout shall be flush with the floor by means of finished metal plate secured in position and screwed firmly to the plug. Cleanout shall be so installed that there is a clearance of at least 300 mm for pipes less than 75 mm diameter and at least 457 mm for pipes of 75 mm and larger diameter, for the purpose of Roding.

Pipe used with cleanout shall be measured and paid under pipe item. All other work of ferrule, plug, concrete work, frame and cover etc. shall be measured and paid under cleanout item.

4.5.5 Grease Trap/Interceptor

a. The grease trap shall be of stainless steel of specified capacity with cover, baffles and strainers to separate grease from water effectively. The grease trap shall be of approved make or equivalent and installed in the position as shown on drawings or as specified by the Engineer.

or

b. The grease interceptor shall be built in masonry or reinforced cement concrete as per relevant drawings including excavation, RCC class “C”, steel reinforcement, PCC class “E”, 15mm thick cement sand plaster in 1:3 c/s, 15mm thick C.I. trap & plate having holes (screen) 25mm c/c of standard diameter, 20mm G.I. pipe for lifting trap, inlet & outlet connections, 600x600 mm C.I. cover with frame, 25mm legs for supporting screen system, painting three coats to steel works with synthetic enamel paint, nuts, bolts etc. complete in all respects as desired by the engineer.

4.5.6 Glass Mirror

The glass mirror shall be of specified size, 5 mm thick, securely fixed on hard board packing and of best quality Belgium make. The mirror shall be fixed on wall as shown on the drawing or as directed by the Engineer. All accessories required for complete fixing of mirror on wall shall be included in Contractor's scope of work.

4.5.7 Towel Rail, Toilet Paper Holder, Soap Trays, Mirror Trays

The towel rail, toilet paper holder, soap trays & mirror trays shall be of best quality All accessories for complete installation of towel rail, toilet paper holder, soap tray and mirror tray shall be included in the Contractor's scope of work.

4.5.8 **Gully Trap**

Gully trap shall be of cast iron with specified size outlet. The inlet shall be provided with cast iron, medium duty grating. The open area of the grating shall be at least 1-1/2 times the area of the outlet. The trap shall be of P-Type with a minimum water seal of 50 mm. It shall be installed as a complete unit including all civil works as shown on relevant details and drawings.

4.5.9 **Cast Iron Grating**

Cast iron grating shall be of the specified size. The specified size shall mean the clear span. Cast iron grating shall be complete with frame. They shall be of Light/medium duty type to resist normal traffic loads, the casting shall be sound and free from all defects. The frame shall be set in place at the time of pouring of concrete. Openings in grating shall be in approved pattern.

4.5.10 **Electric Water Cooler**

Cabinet shall be of heavy gauge mild steel construction painted with non-corrosive paint from inside and with special hammer finish paint from outside.

Push button type water taps shall be chrome plated. Drain pot shall be made of hard plastic with stain-less steel tray. Back panel shall be easily remove-able for cleaning and servicing top cover shall be of scratch proof Formica.

Water storage tank shall be either of stainless steel or copper alloy, tinned inside and outside with present insulation to maintain water temperature, with special arrangement for cleaning the tank.

Condensing unit shall be heavy duty, hermetically sealed with thermal overload protection for refrigerant F-12 and capillary expansion with valves for easy gas charging. Thermostat and other control necessary for proper functioning of the unit shall be provided. The thermostat shall control the temperature of cooled water between + 11^{o}C & + 20^{o}C.

4.5.11 **Water Filters**

Water filters shall be installed on wall near the water coolers. Each filter shall have a crystal housing of a durable material. The flow rate shall be 2 to 6 gpm with a maximum pressure of 70psi and a temperature of 35^{o}F to 100^{o}F.

Stage 1:- Stage 1 shall use a “poly propylene Yarn Indepth Sediment filter cartridge”, for removal of dust, rust, silt, scale and unseen suspended particles. It shall have a filtration rating of 5-micron.

Stage 2:- In this stage a “Granular Activated Carbon (GAC) cartridge” equipped with a post-filter of 1-micron is recommended, for removal of chemicals and unpleasant taste and odor.

Stage 3:- This stage must provide 30,000 MW.sec/sq.cm energy to guarantee 100% sterilization and ensure effective control of microbiological contamination.

4.5.12 **Gas or Electric Water Heaters**

Water heater shall be of automatic storage type Electric or Gas operated, including all necessary fittings for complete installation & operation. The heater shall be of best quality, local make as approved by the Engineer.

The working and test pressure of the heater to be of 6 bar and 10 bar respectively and shall deliver water at 150 ^{o}F. It shall be capable to reach the peak demand, storage capacity.

Heater shall be provided with following accessories.

i) Thermostatic control
ii) Temperature & pressure relief valve
High limit Control.

Other specifications of **Water Heater** are as given below:

Inner tank shall be extra heavy gauge anti-rust G.I. sheet metal to hold maximum inside water pressure. As an insulation, imported genuine glass wool shall be used to maintain the desired temperature that controls the liting up of the burner. The outer body shall be made of requisite gauge M.S. sheet shaped into reinforced circumference. Flow and delivery pipes shall be of high quality G.I. pipes fabricated with heavy gauge anti-rust baffle plate. *The thermostat shall be of Robershaw (U.S.A) make or approved equivalent.* The burner shall be made of cast iron with drilled ports. It shall be easy to be detached. Special anti-rust-baked primer-heavy coated stoved enamel paint with high gloss automative shine shall be used on sheet metal.

Standard type gas water heaters shall have following specs:

Capacity	Inner Tank	Outer body
8-15 gallons	G.I. sheet 14-16 swg	M.S sheet painted 22 swg
30 gallons	G.I. sheet 14-16 swg	M.S sheet painted 22 swg
50 gallons	G.I. sheet 14 swg	M.S sheet painted 22 swg
100 gallons	G.I. sheet 8-10 swg	M.S sheet painted 22 swg

5.0 EXECUTION

5.1 GENERAL

The Contractor shall be responsible for his work until its completion and final acceptance, and shall replace any of those that may be damaged, lost or stolen without any additional cost.
All openings left in floor for passage of lines of water supply, soil, waste, vent, etc. shall be covered and protected.

All open ends of pipes shall be properly plugged to prevent any foreign material from entering the pipe. Misuse of plumbing fixtures to be

installed under this Contract is prohibited during the currency of the contract.

All metal fixture trimmings shall be thoroughly covered with non-corrosive grease which shall be maintained until all work is completed.

Upon the completion of work, all fixtures and trimmings shall be thoroughly cleaned, polished and left in first class condition.

Before erection, all pipes, valves, fittings, etc. shall be thoroughly cleaned of oil, grease or other material.
All special tools for proper operation and maintenance of the equipment provided under this Contract shall be delivered at no additional cost.

The Contractor shall allow in his bid for cost of all cutting, making holes and subsequent making it good to the desired finish as per approval of the Engineer. No separate payment shall be made for this item.

The Contractor shall allow in his bid for the cost of providing protective painting or coating as specified in the relevant sections and no claim shall be entertained for this item.

All pipes shall be properly installed as shown on the drawings and/or as directed by the Engineer, and shall be as straight as possible forming right angles and parallel lines with the walls and other pipelines. The position, gradients, alignment and inverts shall be as shown on the drawings and/or as directed in writing and set out by the Engineer.

The arrangement, positions and connections of pipe fittings and appurtenances shall be as shown on the drawings. The Engineer reserves the right to change the location etc. Special precautions shall be taken for the installation of concealed pipes as shown on the drawings and/or as required. Should it be necessary to correct piping so installed, the Contractor shall be held liable for any injury caused to other works in the correction of piping. The Contractor shall closely coordinate with other works during the entire stage of execution.

A minimum distance between different services shall be maintained as shown on the Drawings and/or as approved by the Engineer.

Pipes should be installed in such a manner that minimum distance should always be maintained between pipe and wall, beams, columns, etc. Pipes shall be supported on hangers and brackets as shown on the drawings or as directed by the Engineer.

Waste-water outlet from each fixture shall be individually trapped. Each vent terminal shall extend to the outer air and be so installed as to minimize the possibilities of clogging and the return of foul air to the building.

When the roughing-in is completed, the plumbing system shall be subjected to test prior to concealing the roughing-in, in order to ascertain that all threads and connections are watertight.

Cast iron soil and drainage fittings for change in direction shall be used as follows:-

*Vertical to horizontal: short sweep or long-turn for diameter 75 mm and larger; long sweep or extra-long-turn for less than 75 mm. dia.

*Horizontal to vertical: quarter bend or short turn.

All fittings with hubs shall be aligned so that the hub faces upstream. No drainage or vent piping shall be drilled.

All exterior openings provided for the passage of piping shall be properly sealed with snugly fitting collars of metal or other approved rodent-proof material securely fastened into place.

Joints at the roof, around vent pipes, shall be made water-tight by the use of lead, copper, galvanized iron, or other approved flashing or flashing material. Exterior wall openings shall be made watertight.

Each length of pipe & each pipe fitting, trap, fixture, & device used in a plumbing system shall have cast, stamped or indelibly marked on it the maker's mark or name, the weight, type & classes of the product, when such marking is required by the approved standard that applies.

Where different sizes of pipes, or pipes and fittings are to be connected, the proper size increasers or reducers or reduced fittings shall be used between the two sizes.

Any fitting or connection which has an enlargement, chamber, or recess with a ledge, shoulder, or reduction of pipe area that offers an obstruction to flow through the drain pipe is prohibited. The vertical distance from the fixture outlet to the trap weir shall not exceed 600 mm. Each fixture trap shall have a water seal of not less than 50 mm and not more than 100 mm.

Full S, bell, crown vented traps and traps/depending for their seal upon the action of movable parts are prohibited. No fixture shall be double trapped. Where fixture comes in contact with wall and floors, the joint shall be water-tight. Piping in ground shall be laid on a firm bed for its entire length.

Piping in the plumbing system shall be installed without undue strains and stresses. Vertical piping shall be securely held to keep the pipe in alignment and carry the weight of the pipe and contents. Horizontal piping shall be supported to keep it in alignment and prevent sagging. Hangers and anchors shall be of metal of sufficient strength to maintain their proportional share of pipe alignments and prevent rattling. Hangers and anchors shall be securely attached to the building under construction. It must be clearly understood that the Contractor shall be fully responsible for hangers and supports and shall obtain prior approval of design as to the shape, material, dimensions, spacing etc.

Piping in concrete or masonry walls or footings shall be placed or installed in sleeves which will permit access to the piping for repair or replacement.

5.2 G.I. COLD, HOT WATER PIPES AND FITTINGS

The run and arrangement of all pipes shall be as shown on the Drawings and as directed during installation. All vertical pipes shall be erected plumb and shall be parallel to wall and other pipes. All horizontal runs of piping shall be kept close to walls. If required to change the location etc. during the currency of the work, the Contractor will do so at no additional cost. Screwed joints in G.I. pipes shall be made perfectly tight, without the use of any filler except approved jointing compound or tape. Wherever required to make flanged joints, they shall conform to BS 10 Table D.

Furnish and install all pipe passing through floors and walls with sleeves of G.I. sheet, 18 gauge, the inside dia. of which shall be at least 1/2" greater than the outside dia of the pipe passing through it. Sleeves in exterior walls and pits shall have anchor flanges and space between pipe and sleeve shall be caulked and sealed watertight. At waterproof locations, an approved water-proof type pipe sleeve shall be provided.

All embedded water supply piping shall be wrapped with approved anti-corrosion polyethylene tape. All exposed piping shall be painted with two coats of enamel paint over a coat of red oxide.

Pipes laid in trenches (external) shall be protected by applying coating of primer grade 10/20 bitumin+hyacinth cloth mopped with bitumen (50% grade 80/100 & 50% grade 10/20).

Insulation

All hot water supply and return piping shall be insulated as specified herein. Prior to insulation the pipes shall be hydraulically tested and cleaned.

Nominal Pipe Dia. (mm)	**Thickness of per-form Fiber glass pipe insulation. (mm)**
15 (1/2")	25
20 (3/4")	25
25 (1")	25
32 (1-1/4")	25
40 (1-1/2")	25
50 (2")	25
65 (2-1/2")	25
75 (3")	25

Insulation shall consist of pre-formed fiberglass pipe insulation, with factory applied reinforced aluminum vapor barrier, single layer in semi-circular halves, consisting of long, fine glass fibers, bonded with a temperature resistant binder, free from shot or coarse fibers, damage resistant, light in weight, easy to handle, cut and fit. The product shall comply with the requirements of B.S. 3958: Part 4. The insulation shall be rotproof, odorless, non-hygroscopic, and shall not sustain vermin. The fiberglass insulation shall be covered with a layer of approved polyethylene tape in the field. Further reinforcement shall be provided by the use of 20 mm wide soft aluminum bands, generally spaced at 457

mm and on either side of elbows and tees. All butt joints shall be sealed with self-adhesive type of approved quality adhesive tape.

All trimmed sections shall be secured by wrapping of approved type of self adhesive tape to form a complete waterproof seal. All work shall be done in a neat and workmanlike manner, and should reflect recommended practice.

All Hot water and Hot water return lines concealed in walls only, shall be provided with Glass wool blanket insulation.

Pipe work Supports

All supports, clips, steel rods and hangers shall be of mild steel painted with two coats of approved metallic zinc primer. All clips and brackets shall be equipped with 9 mm sectional rubber liners (shore-hardness A 40+5^{o}).

Pipe work supports shall be installed in order to allow free movement due to expansions and contraction. Supports shall be arranged adjacent to joints, changes of direction and branches. Each support shall carry the overall weight of pipe work and water to be borne by it. The intervals between pipe supports shall not exceed the following:

Maximum interval between supports (metres)

Nominal Dia mm	Steel pipes	
	Horizontal	Vertical
10	1.7	1.7
15	2.0	2.0
20	2.4	2.4
25	2.7	2.7
32	2.7	2.7
40	3.0	3.5
50	3.4	3.9
65	3.7	4.3
80	3.7	4.3
100	4.1	4.6

Dimensions of Support Materials

Nominal Dia mm	Flat iron bands mm	Support rods mm	U-bolts mm
10	25 x 3	6	6
15	25 x 3	6	6
20	25 x 3	6	6
25	25 x 3	6	6
32	40 x 5	10	10
40	40 x 5	10	10
50	40 x 5	10	10
65	50 x 6	12	12

80	50 x 6	12	12
100	50 x 6	12	12

Single pipes hung from floor slabs shall be supported on rod hangers. Where two or more pipes are involved a channel or angle from shall be fitted to the underside of slab by two hangers and the pipes shall be supported from the channel iron by rod hangers and flat iron hands.

All hanger rods shall have double nuts and beveled washers to allow the hanger rod to swing.

Multiple pipe runs along walls shall be supported on purpose made substantial angle and channel frames securely fixed to the wall, floor and ceiling as necessary. All pipes shall be arranged to slide on the steel supports and U-bolts shall be provided to form a rigid guide.

Exposed pipe work shall be supported on channel, angle iron or with U-bolts to form a rigid guide.

All U-bolts, except used as anchors, shall have a pair of nut and washers on each leg with the supporting steel flange clamped tight between the pair of nuts to form a rigid guide and allowing the pipe to slide axially,. U-bolts shall be provided on alternate pipe bracket.

Small pipe work running along skirting shall be supported by standard built-in or screw-on type clips.

Pipes shall be individually supported. Pipes shall not hung from other pipes.

Points at which pipes pass through walls, floors, connections to plant, equipment and heat emitters, etc. do not constitute points of supports for the pipes.

Vertical pipes shall be supported at the base or at anchor points to withstand the total weight of the riser. Brackets from risers shall not be used as a means-of support for the riser.

Vibration isolators to be provided with the hangers as approved by the Engineer.

5.3 POLYPROPYLENE RANDOM PIPES & JOINTING

5.3.1 Jointing Techniques

The surfaces of the pipes and fittings must be clean and without impurities. Pipe ends must be clean, cut at right angles. It is recommended to cut 1cm from the pipe ends in order to prevent possible micro-cracking due to incautious handling.

Before carrying out the welding, check that the poly-fusion device operates correctly and that it reaches the required welding temperature ($260^{o}C \pm 5$).

Jointing is done by heat fusion (welding) by means of welding machine. Welding is carried out by means of heating simultaneously the male and female parts to be joined together, once the welding temperature is reached the joint is made and held for cooling time. (see table I below)

5.3.2 **Welding Instructions Using Socket Welding Machine**

i. Check whether the welding tool corresponds to the size you need to join.
ii. The welding tool/device has reached the necessary operating temperature of 260^{o}C $\pm$10
iii. Cut the pipe at right angles to the pipe axis by using cutter or a hack saw.
iv. Clean the pipe from burrs, cutting and chips
v. Mark the welding depths at the end or pipe
vi. Push the end of pipe up to the marked welding depths in the welding tool, at the same time push the fitting, into the welding tool.
vii. After the stipulated heating time quickly remove pipe and fitting from the welding tools and join them immediately, forcing the pipe into the fitting until the marked welding depth is covered by the bead of Polypropylene from the fitting
viii. The joint elements have to be fixed and aligned within the specified assembly time.
ix. After the cooling time the fused joint is ready for use. The heating time starts when pipe and fitting have been pushed to the correct welding depth in the welding tool

Est. Diameter (mm)	**Welding Depth (mm)**	**Heating Time DVS 2207* (sc).**		**Heating time (sc.)**	**Cooling Time (min.)**
20	14.0	5	8	4	2
25	15.0	7	11	4	2
32	16.5	8	12	6	4
40	18.0	12	18	6	4
50	20.0	18	27	6	4
63	24.0	24	36	8	6

The heating time have to be increased 50% if average temperature is under + 5^{o}C

5.3.3 **Welding of PPR Pipes**

i. Cutting of pipe at right angle with a cutter.
ii. Marking of welding depth on the pipe end.
iii. Simultaneous heating of both pipe and fittings according to required heating time (as per given data).
iv. Pushing of pipe end into the fitting and alignment of the assembly within specified time period
v. Finish joint.

5.3.4 **Installation Principles**

5.3.4.1 Fastening technique for open installation

The selection of fastening material and its application have to be determined as:-

- Fixed Point
- Sliding Point

Pipe clamps are such as to meet all requirements and ensure that no mechanical damage on the pipe surface can occur.

5.3.4.2 Fixed Point

Valves and connections resisting to bending stresses have to be fastened by means of points. In particular cases the fixed points are to be positioned closed to branches or wall passages. The axial expansion will be compensated between two points. The assess the resistance of the fixed points one has to take into account the stresses to which they will be subjected, caused by linear expansion, weight of the piping and weight of the transportation fluid. Fixed points should be delimited on both sides of the clamp, availing oneself of the rim fittings or valves.

5.3.4.3 Sliding Point

The sliding points must keep the system aligned and support it, and allow the axial sliding of the piping as well. The sliding are to be firmly mounted in order to prevent vibration and transmission of noise.

Distance between the supports points in cm.

Pipe diameter	***Temperature in °C***		
	20	50	80
20mm	85	70	60
25mm	85	80	70
32mm	100	85	85
40mm	110	100	90
50mm	125	110	90
65mm	140	125	105

5.4 WATER PIPES AND FITTINGS OUTSIDE BUILDING (EXTERNAL WORKS)

5.4.1 **Handling**

Pipe and accessories shall be handled in such a manner as to ensure their delivery to the trench in sound, un-damaged condition. If any pipe or fitting is damaged, the repair or

replacement shall be made by the Contractor at his expenses in a satisfactory manner. No other pipe or material of any kind shall be placed inside of a pipe or fittings. Pipe shall be carried into position and not dragged. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material without additional expense to the Employer. Rubber gaskets that are not to be installed immediately shall be stored in a cool dark place and protected against the direct rays of the sun.

5.4.2 **Cutting of Pipe**

This shall be done in a neat and workman-like manner without damage to the pipe. Unless otherwise authorized by the Engineer or recommended by the manufacturer, cutting shall be done with a mechanical cutter of approved type. Wheel cutters shall be used wherever practicable.

5.4.3 **Location**

Where the location of the water pipe is not clearly defined by dimensions on the Drawings, the water pipe shall be located as directed by the Engineer.

5.4.4 **Deflection**

Maximum allowable deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets will be 2^{o} degrees unless otherwise recommended by the manufacturer. If the alignment requires deflections in excess of the specified limitations, special bends or a sufficient number of shorter lengths of pipe shall be furnished to provide angular deflections within the limit set forth, as approved.

5.4.5 **Placing and Laying**

Pipe and accessories shall be carefully lowered into the trench by means of derrick ropes, belt slings, or other suitable equipment. Under no circumstances shall any of the water line materials be dropped or dumped into the trench. Care shall be taken to avoid abrasion of the pipe coating. Poles used as levers shall be of wood and shall have broad flat faces to prevent damage to the pipe. Except where necessary in making connections with other lines or authorized by the Engineer pipe shall be laid with the bells facing in the direction of laying. The full length of each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate bell coupling and joints. Pipe that has the grade or the joint disturbed after laying shall be taken out and re-laid. Pipe shall not be laid in water shall be kept out of the trench until the materials in the joints have hardened or until caulking or jointing is completed. When work is not in progress, open ends of

pipe, fittings, and valves shall be securely closed so that no trench water, earth, or other substances will enter the pipes or fittings. Where any part of a coating or lining is damaged, the repair shall be made by the Contractor at his expense in a satisfactory manner. Pipes shall be installed in accordance with recommendations of the pipe manufacturer. Pipe ends left for future connections shall be valved, plugged or capped, and anchored, as shown or as directed, where connections shall be made by using specials and fittings to suit the actual conditions.

5.4.6 **Jointing**

The joints shall be in accordance with the recommendations of the manufacturer or as approved by the Engineer.

Connections between different types of pipes and accessories shall be made with transition fittings where recommended by the pipe manufacturer.

Service connections shall be made as indicated and in accordance with the recommendations of the pipe manufacturer.

5.4.7 **Thrust Blocks**

Plugs, caps, tees, bends and fire hydrants shall be provided with concrete thrust blocks. Backing shall be placed between solid ground and the hydrant or fitting to be anchored. The area of bearing shall be as shown on the Drawing. The backing shall be so placed that fitting joints shall be accessible for repair. The concrete shall be class C plain cement concrete.

5.4.8 **Pipe Bedding**

Fine sand as pipe bedding material shall be used for bedding of pipes and fittings. The sand shall be free from clay, site, salts, organic impurities and debris. Approval of pipe bedding materials shall be obtained by the site Engineer prior to placing.

5.4.9 **Flushing**

The Contractor shall provide facilities for flushing the line. Water for flushing the line shall be arranged by the Contractor. Flushing of line shall be done section by section. For each valved section of pipeline the Contractor shall make a temporary hose connection between the water pipeline and the pipeline under test. Water shall be pumped into the section flushed. Other arrangements for storing and pumping of water shall be subject to the approval of Engineer. Due precautions shall be taken by the Contractor for the disposal of water. The pipeline shall be flushed by keeping all the branching pipes open. Flushing shall be continued until clean water starts flowing through the other end. Section by section, the entire pipeline shall be flushed at a minimum flushing velocity of 2.5 ft./sec.

5.4.10 **Pipeline Disinfection**

The Contractor shall furnish all equipment, labour and material for the proper disinfection of the pipeline. Disinfection shall be accomplished by chlorination after the lines have been tested for leakage but before they have been connected to the main system. Disinfections of the pipelines shall be done in the presence of the Engineer's representative with equipment approved by him.

- **Chlorination** A chlorine and water mixture shall be supplied by means of a solution feed chlorination device. The chlorine solution shall be applied at one end of the pipeline through a trap, in such a manner that as the pipeline is filled with water, the dosage applied to the water entering the pipe shall be atleast (25 p.p.m) or enough to meet the requirements given hereinafter.

- **Retention Period** Chlorination water shall be retained in the pipeline for a period of at least 24 hours. After the chlorine treated water has been retained for the required time, the chlorine residual at the pipe extremities and at such other representative points shall be at least 10 parts per million. This procedure shall be repeated until the required residual chlorine concentration is obtained.

- **Chlorination of Valves** During the process of chlorination the pipeline, all valves or other appurtenances shall be operated while the pipeline is filled with the heavily chlorinated water.

5.4.11 **Final Flushing**

Following complete disinfection of the pipeline, all treated water shall be thoroughly flushed from the pipeline at its extremities. Treated water and water used for flushing the pipelines shall be disposed of in a manner instructed by the Engineer. Fresh treated water shall be filled in the line and water tested from presence of coliform. The test result should indicate negative coliform presence. If the test indicates any positive coliform, the entire process of disinfection shall be repeated or improved upon until coliform free samples are obtained.

5.4.12 **Sampling And Testing**

Disinfection of the pipeline and appurtenances shall be the responsibility of the Contractor. The first set of samples will be collected for analysis by the Engineer. Should the samples reveal presence of coliform the Contractor shall again disinfect the pipeline and appurtenances at no extra cost to the Employer for sampling and testing for subsequent retests until coliform free samples are obtained? The charges for re-sampling and retesting shall be recovered from the Contractor.

5.4.13 **Clean-Up**

Upon completion of the installation of the water supply lines, distribution system and appurtenances, all debris and surplus materials resulting from the work will be removed and disposed off in a manner satisfactory to the Engineer

5.5 SOIL, WASTE, VENT & RAIN WATER DRAINAGE PIPES & PIPE FITTINGS (C. I. & uPVC)

All cast iron soil pipes and fittings shall be installed to the lines and grades shown on the drawings or as directed by the Engineer. When required to be installed above ground floor level, suitable and substantial number of hangers and supports of approved type and make shall be provided. No piping shall be hung from the piping of other systems. Clamps shall be provided on not more than 1.5 meter centres or a minimum of one hanger per each length of pipe whichever is smaller. Where excessive numbers of fittings are installed, additional clamps will be provided.

All steel clamps, hangers and support etc. shall be given one coat of red oxide primer and two coats of synthetic enamel paint. All exposed C.I. soil/vent pipes shall be given two coats of synthetic enamel paint. Materials for painting shall be high quality product of well-known manufacturer and will be approved by the Engineer before using. The instructions of the manufacturer regarding all painting work shall strictly be adhered to Pipes passing through walls, floors, etc. shall be provided with sleeves of approved design. All vent pipes to be installed in the system shall be provided with approved cowl and will rise at least 0.70 meter above the roof.

Caulked joints for cast iron bell-and-spigot soil pipe shall be firmly packed with oakum or kemp and filled with molten lead not less than 22 mm deep and not to extend more than 3 mm below the rim of the hub. Rubber ring joints shall also be allowed. No paint, varnish, or other coatings shall be permitted on the jointing material unit after the joint has been tested and approved

Pipes passing through walls, floors, etc. shall be provided with sleeves of approved design. All vent pipe to the installed in the system shall be provided with approved cowl and will rise at least 0.70 meter above the roof.

Special requirements for *uPVC pipes and fittings* are as under:

Maximum Interval between Supports (m)
(Support centers for uPVC pipe work systems)*

Nominal Diameter, d_e	**Pipe Works**	
	Horizontal ($10xd_e$)	**Vertical**
(mm)	(m)	(m)
40	0.40	1.2
50	0.50	1.5
75	0.75	2.0
110	1.10	2.0

* The values shown are for general installations only. Attention is drawn to special requirements that may be needed in more demanding applications.

All steel clamps, hangers, supports etc. shall be given one coat of red oxide primer and two coats of synthetic enamel paint.

All exposed uPVC pipes shall be given two coats of approved colour water based emulsion paint (note that oil based paints must be avoided.

PRECAUTIONS

Following points describe how an uPVC must be cared of:

a. The depth of concrete cover above uPVC pipe depends on the pipe gradient. However, a minimum of 1 (one) inch concrete cover must be provided.
b. When using cemented joints, the adhesive should be given sufficient opportunity to harden before the pipe is concreted in.
c. Horizontal lines that are concreted-in should be anchored against upward movement and should be adequately secured while the concrete is being poured.
d. During the pouring and setting of concrete, necessary care shall be taken to prevent physical damage to the pipes.
e. When using heated concrete or when steaming the concrete, the sensitivity of uPVC material to temperature changes should be borne in mind.
f. Concrete mortar that is used before concreting-in shall include no sharp-edged material.
g. Avoid excessive misalignment of the pipes.
h. Avoid excessive tightness of joints.
i. Provide sufficient expansion joints to allow thermal movement or regression.
j. Use only allowed cleaning & descaling techniques for different situations & locations (as described in ISO/TR 7024-1985E) when a pipeline gets choked or blocked.

DELIVERY CONDITIONS

The internal and external surfaces of pipes and fittings shall be smooth and free from grooving, blistering and any other surface defect. The materials shall not contain visible impurities or pores. Pipe ends shall be cleanly cut, and the ends of pipes and fittings shall be square with the axis of the pipe

MARKINGS

Pipes, fittings and sealing rings shall be marked clearly and indelibly so that legibility is maintained for the life of products under normal conditions of storage, weather and use.

The markings may be integral with the product or on a label. The markings shall not damage the product.

PIPES

Pipes shall be marked with at least the following information:

a. Manufacturer's name or trade mark;
b. Pipe material;
c. Nominal diameter of pipe;
d. Nominal wall thickness of pipe
e. Manufacturing information, in plain text or in code, providing tractability of the production period to within the year and month and the production site if the manufacturer is producing at several national or international sites.
f. The number of this International Standard.

Pipes with a nominal laying length up to and including z_2 meters shall be marked with at least once. Pipes with a nominal laying length greater than z_2 meters shall be marked at intervals of z_3 meters at the most. The values of z_2 and z_3 shall be as specified by the authorities in each country.

FITTINGS

Fittings shall be marked with at least the following information:

a. Manufacturer's name or trade mark;
b. Fitting material (may be given on packing only in the case of PVC, provided this information is not required on each article by national authorities);
c. Nominal diameter of fitting;
d. Classification (where applicable)
e. Values of angles, if any;
f. Manufacturing information, in plain text or in code, providing tractability of the production period to within the year and month and the production site if the manufacturer is producing at several national or international sites (may be given on packing only, provided this information is not required on each article by national authorities);
g. The number of this International Standard (may be given on packing only, provided this information is not required on each article by national authorities).

SEALING RINGS

Sealing rings shall be marked with at least the following information:

a. Manufacturer's name or trade mark;
b. Nominal diameter of ring;
c. Manufacturing information, in plain text or in code, providing traceability of the production period to within the year and month and the production site if the manufacturer is producing at several national or international sites.

6.0 TESTING AND COMMISSIONING

6.1 G.I. & PPR COLD AND HOT WATER PIPES

All water distribution system shall be tested whole or in part to 2 times the working pressure with a minimum test pressure of 100psi. The contractor shall pay for all device, materials, supplies, labor and power required for the test. The test will be run for two hours at the specified pressure and there should be no leakage in the system. Defects revealed by the test shall be repaired and the whole test rerun until the system proves to be satisfactory.

After all the pipes and fixtures have been properly laid and tested, they shall be flushed clean with water and then disinfected with water solution of chlorine of at least 50 ppm strength for a contact period of 6 hours. The system will be finally flushed with clean water.

6.2 SOIL, WASTE, VENT & RAIN WATER DRAINAGE PIPES & PIPE FITTINGS (C. I. & uPVC)

The entire system of drains, waste, and vent piping inside the building shall be tested by this Contractor under a water test. Every portion of the system shall be tested to a hydrostatic pressure equivalent to at least 3-meter head of water. After filling this Contractor shall shut off water supply and shall allow it to stand two hours, under test during which time there shall be no loss or leakage.

The Contractor shall furnish and pay for all devices, materials, supplies, labor and power required in connection with all tests. All tests shall be made in the presence of and to the satisfaction of the Engineer.
The Contractor shall also be responsible for the repair of this work & other trades work that may be damaged or disturbed by the tests. Defects disclosed by the tests repaired. Work shall be replaced with new work without extra cost to the Employer. Tests shall be repeated as directed, until all work is proven satisfactory.

All fixtures shall be tested for soundness, stability, support and satisfactory operation.

7.0 MEASUREMENT AND PAYMENT

7.1 COLD & HOT WATER PIPE

7.1.1 Measurement

Measurement for acceptably completed works of supply and installation of cold and hot water pipes shall be in running meter length.

a. In building works, no measurement shall be made for earthworks, pipe fittings, jointing, hangers, clamps, brackets, sleeves, insulation, cutting and breaking concrete and then making it good, applying protective painting, coating, cleaning, testing and disinfecting etc. and the measurement will be for the full work specified herein.

b. In external works, no measurement shall be made for pipe fittings, jointing, insulation, cutting and breaking concrete and then making it good, applying protective painting, coating, cleaning, flushing, testing and disinfecting etc. and the measurement will be for the full work specified herein. However, earthworks (excavation, backfilling, sand bedding), and thrust blocks shall be paid separately as specified in Bill of Quantities.

7.1.2 **Payment**

Payment for acceptable measured quantity will be made at the unit rate per running Foot length of cold and hot water pipes quoted in the Bill of Quantities. The amount bid shall be the full payment for completion of the work in all respects as specified herein.

7.2 uPVC and C.I. SOIL, WASTE & VENT PIPES

7.2.1 **Measurement**

Measurement for acceptably completed works of supply and installation of uPVC & C.I. pipes, will be in running Feet length and the work to be done shall include all pipe fittings, jointing, hangers, clamps, brackets, sleeves, cutting and breaking concrete and then making it good, applying protective painting, coating, cleaning and testing.

7.2.2 **Payment**

Payment will be made at the unit rate of bid per running Feet length of pipe acceptably supplied and installed. The amount bid shall be full payment for the work specified herein.

7.3 PLUMBING FIXTURES

7.3.1 **Measurement**

Measurement for plumbing fixtures will be made as per actual number acceptably installed. The Contractor's bid against these items shall include installation of complete unit as specified herein, inclusive of all work from inlet connection of water supply to outlet connection with the sanitary system, complete as per Contract Documents and/or as directed by the Engineer.

7.3.2 **Payment**

Payment for plumbing fixtures shall be made at the applicable unit price per number bid for the respective item in the Bill of Quantities. The amount bid shall be full payment for the work specified herein.

7.4 MISCELLANEOUS ITEMS

7.4.1 **Measurement**

Measurement for acceptably completed works of floor drains, roof drains, cleanouts, glass mirror, towel rail, toilet paper holder, soap

trays, mirror trays, water coolers, water heaters, etc. shall be made on the basis of actual number acceptably installed in position. The Contractor's bid against these items shall include installation complete as specified herein and/or as shown on the Drawings.

7.4.2 **Payment**

Payment for acceptably measured quantity of floor drains, roof drains, cleanouts, glass mirrors, towel rails, toilet paper holders, soap trays, mirror trays electric water coolers, water heaters, etc. shall be made at the applicable unit rate per number quoted in the Bill of Quantities. The bid amount shall be full payment for the works specified herein and as shown on the Drawings.

*** End of Section 5100 ***

SECTION 5220

VALVES AND APPURTENANCES

1.0 SCOPE

2.0 APPLICABLE STANDARDS

3.0 SUBMITTALS

4.0 MATERIAL AND EQUIPMENT

5.0 DELIVERY, STORAGE AND HANDLING

6.0 MEASUREMENT AND PAYMENT

1.0 SCOPE

The work under this section of the specification consists of furnishing all plant, labour, equipment, appliances, materials and performing all operations required as specified herein, as shown on the drawings, or as directed by the Engineer, in connection with installation of valves.

2.0 APPLICABLE STANDARDS

Cast Iron gate valves	BS-5163
Cast iron check valves	BS- 5153
Bronze gate valves	BS- 5154
Bronze check valves	BS- 5152
Flexible rubber joint	BS- 5155
Float valves	BS- 1212

3.0 SUBMITTALS

The contractor shall submit technical brochures and samples of all the items mentioned in the Specifications from approved manufactures or as directed by the Engineer

4.0 MATERIAL & EQUIPMENT

4.1 DESCRIPTION

All valves shall be of renowned manufacturer as specified. Valve material shall be suitable for installation on potable water lines, sewage line or sludge piping. Service rating of the valves shall be at least 7 bars to 16 bars. The interior of all valves shall be cleaned of all foreign material before installation.

Valves shall be installed at the position indicated in the Contract Documents or as directed by the Engineer. Valves shall be adequately supported. Installed valves shall be subjected to pressure and leakage tests and no leakage shall be observed under these tests. End joints, flanges, etc., shall be of the appropriate class and material.

Valves shall be installed either in chambers or above grade on line as shown in the Contract documents and/or as specified herein. Valves shall be securely anchored.

Open and closed position indicator shall be provided for all valves. If installed in valve chambers, the indicator shall not extend above ground and shall not interfere with opening or closing of the valve. The indicator design shall be approved by the Engineer before installation.

4.2 CAST IRON GATE VALVES

Cast iron gate valves shall have flanged ends and wheel handle and shall conform to B.S.5163 "Specifications for Double Flanged Cast Iron Wedge Gate Valves for Waterworks purposes". Flanges shall be drilled to B.S. 4504 Part 1. Valves shall be rated for a working/service pressure of 16 bars for water supply system and 25 bars for firefighting system. Valves shall close in clockwise direction.

The valve parts shall be of the following materials.

- Valve body shall be of cast iron.
- Flanges shall be of cast iron.
- Shaft shall be of stainless steel.
- Disc shall be of stainless steel with bronze trim.
- Seat shall be of cast iron with bronze trim.

4.3 CAST IRON CHECK VALVES

Cast iron check valves shall be of non-slam, swing type with flanged ends and shall conform to B.S. 5153, "Specifications for Cast Iron Check Valves for General Purposes". Flanges shall be drilled to B.S. 4504 Part 1. Valves shall be rated for a working/service pressure of 16 bars. The direction of flow shall be permanently marked on the body of the valve.

The valve parts shall be of the following materials.

- Valve body shall be of cast iron.
- Flanges shall be of cast iron.
- Shaft and spring shall be of stainless steel.
- Disc and seat shall be of stainless steel with bronze trim.
- Disc and shaft seal shall be of rubber (O-ring type).
- Wheel handle shall be of cast iron.

Valve parts in contact with water shall be of corrosion resistant material, free from toxic substances and shall not foster microbiological growth or impart taste, odor, turbidity or color to the water.

Inside surfaces of valves shall be enameled and outside surfaces shall be epoxy coated.

4.4 BRONZE GATE VALVE

Bronze gate valves shall conform to B.S. 5154, "Specifications for Copper Alloy. Globe, Globe Stop, Check and Gate Valves for General Purposes". Valves shall be rated for a working/service pressure of 16 bars. Valve ends shall be screwed or flanged as shown on the drawings. Threads shall be to B.S. 21 and flanges shall be drilled to B.S. 4504 Part 1. Valves shall close in clockwise direction. Open and shut indicators shall be marked on the wheel handle.

4.5 BRONZE CHECK VALVES

Check valves shall conform to B.S. 5152 "Specifications for bronze check valves for general purposes". The service rating shall be 16 bars. The direction of flow shall be permanently marked on the body of the valve. Body of valve shall be tested to 1-1/2 times the service rating and seat shall be tested to service rating. No leakage shall be permitted under the above tests check valves shall be of swing type.

End of the valves shall be flanged to joint with the standard fittings. Flanges shall be of appropriate class and material. Valves shall be installed at positions shown on the drawings the interior shall be cleaned

of all foreign matter before installation. They shall be inspected to ensure that all components are sound and in working condition.

4.6 AUTOMATIC AIR VENT VALVE

Automatic Air Vent valve shall be of PN-16 Brass or bronze body (made in Italy), of specified size for automatic discharge of air and for automatic breaking of vacuum in a pressure main. The material used shall be corrosion resisting, growth. Each valve shall be installed with an isolating gate valve, stand pipe, clamp and connection with the line.

4.7 FLEXIBLE RUBBER JOINT

Flexible rubber joint shall be threaded union type of PN-16 conforming to BS 5155, of specified size for installation in water supply line crossing building expansion joint or at the locations as marked on drawings or as directed by the Engineer. The material used shall be corrosion resisting.

4.8 FLOAT VALVE

Float valve shall be of copper alloy, piston type and shall conform to B.S. 1212. Float shall be of copper and shall conform to B.S. 1968.

4.9 SINGLE ACTING AIR VALVE

Air release valves shall be single acting (air cum vacuum release) type suitable for the liquid for which it is used. Valves body and cover shall be of malleable iron. Float and valve seat shall be of stainless steel. Valve head shall be of Viton (Synthetic Rubber). Valve ends shall be screwed or flanged as shown on the drawings. Threads shall be to B.S. 21 and flanges shall be drilled to B.S. 4504 Part 1.

Air release valve shall be provided at all high points to ensure adequate venting of the piping system.

4.10 WATER METER

Water meter shall be of turbine/ vane type .the body shall be of fine grained cast iron with black enamel coating. Ends shall be flange shall be rated for 16 bars working pressure. The normal flow rate shall range from 50 cu.m/hr. to 300 cu.m/hr.

4.11 INSTALLATION OF VALVES, TESTING & COMMISSIONING

Valves shall be installed either in chambers or above grade on line as shown on the drawings and as directed by the Engineer. Before installation, the interior surfaces of valves shall be cleaned of all foreign matters, inspected to ensure that all components are sound and in working condition and tested to 1-1/2 times the working pressure or the service pressure whichever is greater. After installation, valves shall be securely anchored; tested, retouched where paints have been damaged and labeled.

5.0 DELIVERY, STORAGE & HANDLING

Valves should be handled and stored properly to avoid any damage and slippage of threads especially during installation.

6.0 MEASUREMENT AND PAYMENT

6.1 General

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost therefore shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

a. Jointing arrangement of pipe on both ends of valves, including gaskets, nuts, bolts etc.
b. Valves and appurtenances supports and anchors
c. Keys for operation of valves
d. Steel embedded parts and label plates
e. Manufacturer's literature and operation manual for valves and appurtenances
f. Painting of valves, water meter and appurtenances
g. Stand pipe and coupling for underground fire hydrants

6.2 Measurement:

Measurement of acceptable completed works of all types of valves, water meter and above ground fire hydrants will be made on the basis of actual number of valves and above ground fire hydrants provided and installed in position as shown on the drawings, and as directed by the Engineer.

6.3 Payment:

Payment for the acceptable measured quantity of all types of valves, water meter and above ground fire hydrants will be made on the basis of unit rate per number quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

*** End of Section 5220***

SECTION – 5216

WATER SUPPLY PIPES, PIPE LAYING AND APPURTENANCES

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5216 WATER SUPPLY PIPES, PIPE LAYING AND APPURTENANCES

5217 SCOPE

The work covered by this Section of the specification consists in furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with water supply lines and appurtenances in strict accordance with this section of the specifications and the applicable Drawings.

5218 MATERIALS

Material shall conform to the respective specifications and other requirements specified hereinafter and shall be new and unused.

01 Cast Iron Pipes and Fittings

Cast iron pipes and fittings shall comply with ISO 13-1978 (E) or B.S. 78 for spigot and socket vertically cast pipes, B.S.1211 for spigot and socket spun iron pipes and B.S. 2035 for flanged pipes.

02 Asbestos Cement pipes, Fittings and Specials

These shall conform to International Organization for Standardization Recommendation R160 "Asbestos Cement Pressure Pipe and joints" or British Standard Specification 486 "Asbestos Cement Pressure Pipe" or to Pakistan standard specification No. PS. 428 : 1984 of the class capable of withstanding a 400 ft. head test pressure. Short lengths of pipe machined overall shall be used at fittings for tying in.

The fittings and specials for asbestos cement pipes shall be cast-iron conforming to British Standard Specification 78: PART 2 Fittings: "Cast Iron Spigot and Socket Fittings", Class AV, except that the fittings and specials shall have the shapes, dimensions and tolerance required to fit the asbestos-cement pipes. Fittings and specials for asbestos-cement pipe shall be supplied by the manufacturer of the asbestos-cement pipe.

Rubber ring shall conform to Pakistan standard specification No. PS. 1915: 1987.

03 Galvanized Iron Pipes and Fittings

The galvanized iron pipes shall strictly conform to B.S. 1387 Specifications for "Steel Tubes and Tubulars suitable for screwing to B.S. 21 pipe threads" and shall be of medium grade. All screwed pipes and sockets shall conform B.S. 1740. A complete and uniform adherent coating of zinc white will be provided for galvanized iron pipes and fittings.

04 **M.S Pipe**

All mild steel pipes shall conform to ASTM designation A53, schedule 40 "standard specification for welded and stainless steel pipe". All pipes shall be internally cement mortars lined and externally bituminous coated.

M.S. short pieces shall be flanged at both ends. The flanges shall conform to B.S. 4504, part 3 (PN 16). M.S. pipe pieces shall be externally protected by applying two coats of red oxides (of approved quality) and bituminous coating (grade 10/20) at the rate of 0.4 lb/Sq.ft.

05 **Unplasticised Polyvinyl Chloride Pipe and Fittings**

Unplasticised polyvinyl chloride (uPVC) and fittings if approved by the Engineer shall confirm to BS 3505 pipes shall be class C: Pipe and fittings shall not be stored directly exposed to sunlight handled or laid in conditions where ambient temperatures may cause distortion or damage. In extreme conditions, pipe and fittings may have to be stored under water.

06 **Joints for Unplasticised Chloride Pipe**

Joints for unplasticised polyvinyl chloride pipe shall be the Z type consisting of a socket with rubber gasket, or approved equal, and assembled in accordance with the pipe manufacture's recommendations.

07 **Polyethylene (P.E.) Pipes and Fittings**

High-density polyethylene pipes (HDPE) and fittings shall conform to ISO 4427/DIN 8075 standards. Material, diameters, wall thickness shall be as indicated in 4427/DIN 8074. Tests to be performed for pipes shall be Heat revision, Short term hydrostatic pressure test and Tensile strength and for P.E. compounds shall be Elongation at break, Melt flow rate and Density test.

Warning tape shall be provided for lying over P.E. pipes. It should be single fold, 0.02 inch thick and 2 inch wide, with warning for digging continuously printed in Urdu language. The tape shall be placed one foot above the P.E. pipe.

Bricks on edge shall be placed on the P.E. pipes along its edge after it is laid in order to avoid any damage to the pipe.

08 **Sluice (Gate) Valve**

Valves shall be wedge gate valves conforming to British Standard Specification 5163. Ends of valves shall be suitable for the type of pipe to which the valves will be connected.

09 **Check Valves**

Check valve shall comply with the requirements of BS 5153 latest revision for pressure rating of 16 bar. The valve shall be of swing type and shall be of quick acting single door type.

10 **Fire Hydrants**

The metal of the fire hydrant shall conform to B.S. 750 and shall be of screw down streamline pattern. The body shall be best quality, closed grain, grey cast iron with spindle of manganese bronze having tensile strength of not less than 11.0 tons per square inch machined from solid rolled bars, the seating valves and other parts shall be of best quality gun metal with Brinell Hardness No. 80. The direction of closing shall be by clockwise rotation and outlet shall have screwed joint for accommodation 2 1/2" dia hose connection. Inlet flanges of hydrant shall be suitable for jointing with flanges of hydrant bends and tees. All fire hydrants shall be coated with three coats of solution from an approved manufacturer to give a uniform protective coating on cast iron.

5219 APPROVAL OF MATERIALS AND EQUIPMENT

As soon as practicable but within 30 days after receipt of notice to proceed and before any materials or equipment are purchased, the Contractor shall submit for approval by the Engineer a complete schedule, in triplicate, of materials and equipment to be incorporated in the work, together with the names and addresses of the manufacturers and their catalogue cuts, diagrams, drawings, and such other descriptive data as may be required by the Engineer. No consideration will be given to partial lists submitted from

time to time. Approval of materials and equipment under deviations from the specifications shall not be granted unless the attention of the Engineer has been directed to the specific deviations. Laboratory results and certifications, specified or otherwise required, shall be submitted prior to delivery of the material and equipment to site.

5220 INSTALLATION

01 Handling

Pipe and accessories shall be handled in such a manner as to ensure their delivery to the trench in sound, un-damaged condition. If any pipe or fitting is damaged, the repair or replacement shall be made by the Contractor at his expenses in a satisfactory manner. No other pipe or material of any kind shall be placed inside of a pipe or fittings. Pipe shall be carried into position and not dragged. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material without additional expense to the Employer. Rubber gaskets that are not to be installed immediately shall be stored in a cool dark place and protected against the direct rays of the sun.

02 Cutting of Pipe

This shall be done in a neat and workman-like manner without damage to the pipe. Unless otherwise authorized by the Engineer or recommended by the manufacturer, cutting shall be done with a mechanical cutter of approved type. Wheel cutters shall be used wherever practicable.

03 Location

Where the location of the water pipe is not clearly defined by dimensions on the Drawings, the water pipe shall be located as directed by the Engineer.

04 Deflection

Maximum allowable deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets will be 2^{O}

degrees for Asbestos Cement Pipe unless other- wise recommended by the manufacturer. If the alignment requires deflections in excess of the specified limitations, special bends or a sufficient number of shorter lengths of pipe shall be furnished to provide angular deflections within the limit setforth, as approved.

05 **Placing and Laying**

Pipe and accessories shall be carefully lowered into the trench by means of derrick ropes, belt slings, or other suitable equipment. Under no circumstances shall any of the water line materials be dropped or dumped into the trench. Care shall be taken to avoid abrasion of the pipe coating. Poles used as levers shall be of wood and shall have broad flat faces to prevent damage to the pipe. Except where necessary in making connections with other lines or authorized by the Engineer pipe shall be laid with the bells facing in the direction of laying. The full length of each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate bell coupling and joints. Pipe that has the grade or the joint disturbed after laying shall be taken out and relaid. Pipe shall not be laid in water shall be kept out of the trench until the materials in the joints have hardened or until chaulking or jaunting is completed. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no trench water, earth, or other substances will enter the pipes or fittings. Where any part of a coating or lining is damaged, the repair shall be made by the Contractor at his expense in a satisfactory manner. Pipes shall be installed in accordance with recommendations of the pipe manufacturer. Pipe ends left for future connections shall be valved, plugged or capped, and anchored, as shown or as directed, where connections shall be made by using specials and fittings to suit the actual conditions.

06 **Jointing**

The joints shall be in accordance with the recommendations of the manufacturer or as approved by the Engineer.

Connections between different types of pipes and accessories shall be made with transition fittings where recommended by the pipe manufacturer.

Service connections shall be made as indicated and in accordance with the recommendations of the pipe manufacturer.

07 **Setting of Fire Hydrants, Valves and Surface Boxes**

Fire hydrants shall be located and installed, as shown. Hydrants shall be set plumb and in accordance with the manufacturer's instructions.

Valves and surface boxes shall be installed as shown or directed, and shall be set plumb. Surface shall be centered on the stems or operators. Concrete, concrete pipe, brick, brick ballast used in chambers shall conform to the relevant clause of the Specification. Where feasible, valves or operators shall be located outside the area of roads and streets. Earth fill shall be carefully tamped around each valve box to the satisfaction of Engineer on all sides of the box, or to the undisturbed trench face if less than 4 ft.

Hydrants and valves shall have the interiors cleaned of all foreign matter before installation. Surface boxes shall be lighted and the hydrant or valve shall be inspected in open and closed positions to ensure that all parts are in working condition.

08 **Thrust Blocks**

Plugs, caps, tees, bends and fire hydrants shall be provided with concrete thrust blocks. Backing shall be placed between solid ground and the hydrant or fitting to be anchored. The area of bearing shall be as shown on the Drawing. The backing shall be so placed that fitting joints shall be accessible for repair. The concrete shall be class C plain cement concrete.

09 **Pipe Bedding**

Fine sand as pipe bedding material shall be used for A.C. pipe and C.I. fittings. The sand shall be free from clay, site, salts, organic impurities and debris. Approval of pipe bedding materials shall be obtained by the site Engineer prior to placing.

10 **Pavement Restoration**

The Contractor shall restore paved surface which have been cut under this contract, as part of the work under the excavation items and at no extra cost to the owner/employer.

5221 FLUSHING

The Contractor shall provide facilities for flushing the line. Water for flushing the line shall be arranged by the Contractor. Flushing of line shall be done section by section. For each valved section of pipeline the Contractor shall make a temporary hose connection between the water pipeline and the

pipeline under test. Water shall be pumped into the section flushed. Other arrangements for storing and pumping of water shall be subject to the approval of Engineer. Due precautions shall be taken by the Contractor for the disposal of water. The pipeline shall be flushed by keeping all the branching pipes open. Flushing shall be continued until clean water starts flowing through the other end. Section by section, the entire pipeline shall be flushed at a minimum flushing velocity of 2.5 ft./sec.

5222 LEAKAGE TEST

Flushing of the pipeline shall be followed by a leakage test. The Contractor shall provide facilities for performing the leakage test. Water and pumping facilities shall be provided by the Contractor. Before the testing of pipeline the Contractor shall ensure that concrete backing blocks have been provided where necessary. The test shall be performed only after all concrete work in contact with pipe to be tested has set for a minimum of 24 hours. All joints shall be left exposed. Leakage test shall be performed by keeping the end of the pipeline closed by proper plugs blocked to resist 150 per cent of the working pressure. While filling the line all valves and openings shall be kept open and water shall be filled in slowly. When the pipeline is completely filled with water and all air expelled, water shall be pumped into the pipeline to a minimum pressure of 150 percent of actual working pressure and the test pressure shall be maintained for at least 1 hour. Each and every joint shall be inspected for leaks and for all visible leakage and displacement leakage test shall be performed by the Contractor, for the newly laid pipeline. A measured quantity of water shall be pumped into the pipeline. No piping installation will be accepted until the leakage is equal or less than the number of imperial gallons per hour as determined by the formula:

L = 0.00054 ND / P
L = Leakage in Imperial Gallons
N = Number of joints
D = Nominal diameter of pipe in inches
P = Average test pressure (psi) during test

In the event of the pipeline failing the leakage test, the Contractor shall locate and repair the defective pipe, fitting or joint at his expenses. For dewatering the line for repairs the Contractor shall follow the instructions given by the Engineer for disposal of water. After repairs of the line, the Contractor shall retest the line. The line will not be accepted until it passes the leakage test.

5223 RETESTING AFTER BACKFILL

After the pipe trench has been backfilled, the entire length shall be subjected to a leakage test as a whole unit. The Contractor shall repair the line if it fails to pass the leakage test requirements specified hereinbefore. The test shall be repeated and repairs effected until the pipeline passes the leakage test.

5224 PIPELINE DISINFECTION

01 General

The Contractor shall furnish all equipment, labour and material for the proper disinfection of the pipeline. Disinfection shall be accomplished by chlorination after the lines have been tested for leakage but before they have been connected to the main system. Disinfections of the pipelines shall be done in the presence of the Engineer's representative with equipment approved by him.

02 Chlorination

A chlorine and water mixture shall be supplied by means of a solution feed chlorination device. The chlorine solution shall be applied at one end of the pipeline through a trap, in such a manner that as the pipeline is filled with water, the dosage applied to the water entering the pipe shall be atleast (25 p.p.m) or enough to meet the requirements given hereinafter.

03 Retention Period

Chlorination water shall be retained in the pipeline for a period of at least 24 hours. After the chlorine treated water has been retained for the required time, the chlorine residual at the pipe extremities and at such other representative points shall be at least 10 parts per million. This procedure shall be repeated until the required residual chlorine concentration is obtained.

04 Chlorination of Valves

During the process of chlorination the pipeline, all valves or other appurtenances shall be operated while the pipeline is filled with the heavily chlorinated water.

5225 FINAL FLUSHING

Following complete disinfection of the pipeline, all treated water shall be thoroughly flushed from the pipeline at its extremities. Treated water and water used for flushing the pipelines shall be disposed of in a manner instructed by the Engineer. Fresh treated water shall be filled in the line and water tested from presence of coliform. the test result should indicate negative coliform presence. If the test indicates any positive coliform, the entire process of disinfection shall be repeated or improved upon until coliform free samples are obtained.

5226 SAMPLING AND TESTING

Disinfection of the pipeline and appurtenances shall be the responsibility of the Contractor. The first set of samples will be collected for analysis by the Engineer. Should the samples reveal presence of coliform the Contractor shall again disinfect the pipeline and appurtenances at no extra cost to the Employer for sampling and testing for subsequent retests until coliform free samples are obtained. The charges for resampling and retesting shall be recovered from the Contractor.

5227 CLEAN-UP

Upon completion of the installation of the water supply lines, distribution system and appurtenances, all debris and surplus materials resulting from the work will be removed and disposed off in a manner satisfactory to the Engineer

5228 INDICATION PLATES

The indication plates shall be installed in accordance with the drawings and as directed by the Engineer.

5229 WASHOUTS

The design and locations of washouts shall be illustrated on the Drawings to be approved by the Engineer. Exact positioning shall be determined with regard to topography and to the approval of the Engineer. At least 10 ft. of the washout pipework, inclusive of the isolating valve, measured from the centre line of the pipeline, shall be laid at the same time as the pipeline and suitably capped to preventingress of foreign material. The minimum gradient for the washout pipework shall be 1 in 100.

5230 AIR VALVES

a) **Double orifice Air Valves**

These shall be designed to meet the following conditions:

- expulsion of air during charging of the pipeline

- admit air during emptying of the pipeline to avoid the occurrence of negative pressure

- expulsion of air accumulated at summit points along the pipeline under normal operating conditions

First two conditions shall be met by the employment of a large orifice capable of handling large volumes of air at high flow rate, and the third condition by a small orifice capable of discharging small quantities of air as they accumulate.

The large orifice shall be sealed by a buoyant rigid ball and the chamber housing shall be designed to avoid premature closing of the valve by the air whilst being discharged. The small orifice shall be sealed by a buoyant ball at all pressures above atmospheric except when air accumulates in the valve chamber.

b) **Single Orifice Air Valves**

These shall be designed to carry out the function described above. Each valve shall be provided with only a small orifice which shall operate in the same manner as that in a double acting air valve.

Valves with air intake or exhaust facilities shall have approved screening arrangements to prevent the ingress of air borne sand.

The nominal pressure shall range between NP 16 and 25.

Body ends shall be flanged with raised faces and drilled according to BS 4504 for the nominal pressure specified or indicated in the Drawings.

The materials for the valves shall be as follows:

Cast iron body cover and cowl: for small orifice, cast iron with gunmetal seat with rubber covered ball or other approved; for large orifice, cast iron with rubber seat and vulcanate covered ball or other approved.

5231 MEASUREMENT AND PAYMENT

Measurement and payment of pipework, fittings, specials and appurtenances will be made in accordance with the provisions of this clause specified hereinafter.

01) **Pipe work**

a) **Method of Measurement:** Measurement will be made for the number of running feet of Asbestos cement, uPVC, cast iron and M.S. pipes including fittings, accessories and flanges acceptably installed complete in all respects as per relevant Drawings or as directed by the Engineer.

b) **Basis of Payment:** Payment will be made for the running feet of pipework as measured above at the Contract Unit price and shall constitute full compensation to provide, handle, lay and joint asbestos cement, uPVC and cast iron pipes including fittings, flushing, leakage testing before & after backfilling, final flushing and all other work related to the item.

02 **Service Connection**

i) G.I. Pipe and Fittings

a) **Method of Measurement:** Measurement will be made for the number of linear feet of galvanized iron pipe including fittings acceptably installed complete in all respects as per relevant Drawings or as directed by the Engineer.

b) **Basis of Payment:** Payment will be made for the number of linear feet of galvanized iron pipework as measured above at the Contract Unit Price of each unit and shall constitute full compensation to provide, handle, lay, joint and test galvanized iron pipe, fittings, including sleeves, nuts, sockets, plugs, bitumen coating with Polyethelene tape and all other work related to the item.

ii) Ferrule Assembly

a) **Method of Measurement:** Measurement shall be made for the number of ferrules acceptably installed complete in all respects as per relevant Drawings or specifications.

b) **Basis of Payments:** Payment shall be made for the number of ferrules measured as above at the contract unit price for each unit and shall constitute full compensation for providing,

tapping, drilling, fixing including M.S. straps, Saddles, and all other work related to the item to make complete house connection.

03 **Pipe Fittings and Specials**

a) **Method of Measurement:** Measurement will be made for the number of pounds of fittings and specials acceptably installed in pipework complete in all respects as per relevant drawings or as directed by the Engineer.

b) **Basis of Payment:** Payment will be made for the number of pounds of fittings/specials as provided above at the Contract Unit Price and shall constitute full compensation for the cost of providing, handling, fixing, jointing, disinfecting, respective type of fitting/special, and all other work related to the item.

04 **Sluice (Gate) Valves**

a) **Method of Measurement:** Measurement will be made for the number of sluice (gate) valves acceptably installed complete in all respects as per relevant Drawings.

b) **Basis of Payment:** Payment will be made for the number of sluice (gate) valves measured as above at the Contract Unit Price for each unit and shall constitute full compensation for providing, handling, fixing and jointing and all other work related to the item including construction of chamber as shown on drawings.

05 **Check Valves**

a) **Method of Measurement:** Measurement will be made for the number of check valves acceptably installed complete in all respects as per relevant Drawings.

b) **Basis of Payment:** Payment will be made for the number of check valves measured as above at the Contract Unit Price for each unit and shall constitute full compensation for providing, handling, fixing and jointing and all other work related to the item including construction of chamber as shown on drawings.

06 **Fire Hydrants**

a) **Method of Measurement:** Measurement shall be made for the number of fire hydrants acceptably installed complete in all respects as per relevant Drawings.

b) **Basis of Payment:** Payment will be made for the number of fire hydrants measured as above at the Contract Unit Price for each unit and shall constitute full compensation for providing, handling, fixing and jointing and all other work related to the item including construction of chamber.

07 **Indication Plates**

a) **Measurement** will be made for the number of indication plates acceptably installed complete in all respects as per relevant drawings.

b) **Basis of Payment:** Payment will be made for the number of indication plates measured as above at the contract unit price for each unit and shall constitute full compensation for providing handling, fixing and all other work related to the item.

08 **Washouts**

a) **Method of Measurement:** Measurement will be made for the number of washouts acceptably installed including construction chamber complete in all respects and as approved by the Engineer.

b) **Basis of Payment:** Payment will be made for the number of washouts measured as above at the contract unit price for each unit and shall constitute full compensation for providing handling, fixing and all other work related to the item including construction of chamber.

09 **Air Valves**

a) **Method of Measurement:** Measurement will be made for the number of air valves acceptably installed complete in all respects and as approved by the Engineer.

b) **Basis of Payment:** Payment will be made for the number of air valves measured as above at the contract unit price for each unit and shall constitute full compensation for providing

handling, fixing and jointing related to the item including construction of chamber.

10 **Sand Cushion**

a) **Method of Measurement:** Measurement will be made for the number of cubic foot of sand acceptably placed complete in all respects and as approved by the Engineer.

b) **Basis of Payment:** Payment shall be made for the number of cu.ft of sand measured as provided above at the contract unit price per cu.ft and shall constitute full compensation for all work related to the item.

11 **Thrust Blocks**

a) **Method of Measurement:** Measurement will be made for the number of cubic foot of class 'C' concrete acceptably placed complete in all respects and as approved by the Engineer.

b) **Basis of Payment:** Payment shall be made for the number of cu.ft of class 'C' concrete measured as provided above at the contract unit price per cu.ft and shall constitute full compensation for all work related to the item.

12 **Concrete Encasement**

a) **Method of Measurement:** Measurement will be made for the number of cubic foot of class C concrete acceptably placed complete in all respects and as approved by the Engineer.

b) **Basis of Payment:** Payment shall be made for the number of cu.ft of class C concrete measured as provided above at the contract unit price per cu.ft and shall constitute full compensation for all work related to the item.

SECTION 5220

VALVES

1. SCOPE

2. APPLICABLE STANDARDS

3. SUBMITTALS

4. MATERIAL AND EQUIPMENT

5. DELIVERY, STORAGE AND HANDLING

6. TESTING AND COMMISSIONING

7. MEASUREMENT AND PAYMENT

1. SCOPE

The work under this section of the specification consists of furnishing all plant, labour, equipment, appliances, materials and performing all operations required as specified herein, as shown on the drawings, or as directed by the Engineer, in connection with installation of valves.

2. APPLICABLE STANDARDS

Cast Iron gate valves	BS-5163
Brass gate valves	BS- 1952
Cast iron check valves	BS- 4090
Brass check valves	BS-5152
Float valves	BS- 1212

3. SUBMITTALS

The contractor shall submit technical brochures and samples of all the items mentioned in the Specifications from approved manufactures or as directed by the Engineer

4. MATERIAL & EQUIPMENT

4.1 DESCRIPTION

All valves shall be of renowned manufacture as specified. Valve material shall be suitable for installation on potable water lines, sewage line or sludge piping. Service rating of the valves shall be at least 7 bars. The interior of all valves shall be cleaned of all foreign material before installation.

Valves shall be installed at the position indicated in the Contract Documents or as directed by the Engineer. Valves shall be adequately supported. Installed valves shall be subjected to pressure and leakage tests and no leakage shall be observed under these tests. End joints, flanges, etc., shall be of the appropriate class and material.

Valves shall be installed either in chambers or above grade on line as shown in the Contract documents and/or as specified herein. Valves shall be securely anchored.

Open and closed position indicator shall be provided for all valves. If installed in valve chambers, the indicator shall not extend above ground and shall not interfere with opening or closing of the valve. The indicator design shall be approved by the Engineer before installation.

4.2 CAST IRON GATE VALVES

All gate valves shall be of cast iron body and shall conform to B.S.5163 "Specifications for Double Flanged Cast Iron Wedge Gate Valves for Waterworks purposes". Body of the valve shall be tested to 1-1/2 times the service pressure and the seat shall be tested at maximum service pressure. No leakage shall be observed under the above tests. The material used shall be observed under the above tests. The material used shall be corrosion resisting, free from toxic substances and shall not foster microbiological growth Valves to be installed underground are to be provided with caps for opening with a valve key. The external surface of the valves shall be painted with a minimum of two coats of black bituminastic enamel paint.

4.3 CAST IRON CHECK VALVES

Check Valves shall conform to B.S.No.4090 "Specifications for Cast Iron Check Valves for general purposes" The service rating shall be 7 bars. The direction of flow shall be permanently marked on the body of the valve. Body of the valve shall be tested to 1-1/2 times the service rating and seat shall be tested at the pressure of service rating. No leakage shall be permitted under the above tests. The check valves shall be lift type.

Ends of the valves shall be flanged to join with the standard fittings. Flanges shall be of appropriate class and material.

Valves shall be installed at positions shown on the Drawings. The interior shall be cleaned of all foreign matter before installation. They shall be inspected to ensure that all the components are sound and in working condition. Valves shall be adequately supported, wherever required.

4.4 BRONZE GATE VALVE

All gate valves of 75 mm and below shall be of bronze conforming to BS-1952 and shall be of appropriate class for the working pressure of the system on which they are installed. Open and shut indicators shall be marked on the handle. The ends may be screwed or flanged. The valves are to be installed inclusive of all fittings and accessories required for complete installation.

4.5 BRONZE CHECK VALVES

Check valves shall conform to B.S. 5152 "Specifications for bronze check valves for general purposes". The service rating shall be 10 Kg/cm2. The direction of flow shall be permanently marked on the body of the valve. Body of valve shall be tested to 11/2 times the service rating and seat shall be tested to service rating. No leakage shall be permitted under the above tests check valves shall be of swing type.

End of the valves shall be flanged to joint with the standard fittings. Flanges shall be of appropriate class and material. Valves shall be installed at positions shown on the drawings the interior shall be cleaned of all foreign matter before installation. They shall be inspected to ensure that all components are sound and in working condition.

4.6 AIR VALVES

Air valves shall be of cast iron, of specified size for automatic discharge of air and for automatic breaking of vacuum in a pressure main. They shall be suitable for installing on water mains of 7 bars working pressure. The material used shall be corrosion resisting, growth. Each valve shall be installed with an isolating gate valve, stand pipe, clamp and connection with the line.

4.7 FLOAT VALVE

Float valve shall be of copper alloy, piston type and shall conform to B.S. 1212. Float shall be of copper and shall conform to B.S. 1968.

5. DELIVERY, STORAGE & HANDLING

Valves should be handled and stored properly to avoid any damage and slippage of threads especially during installation.

6. TESTING & COMMISSIONING

Valves shall be tested to ascertain their proper working under test and working pressures.

7. MEASUREMENT AND PAYMENT

9.1 MEASUREMENT

Measurement of acceptably completed works of valves, will be made on the basis of actual number of valves installed in position as shown on the Drawing or as directed by the Engineer including jointing arrangement of pipe on both end of valves gaskets, nuts, bolts, etc., anchoring of valve in concrete, steel embedded parts and indicators, wire mesh screen on washout and Painting.

9.2 PAYMENT

Payment will be made for acceptable measured quantity of valves, on the basis of unit rate per number quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

SECTION - 8211

HIGH TENSION CABLES

1.0 SCOPE OF WORK

The work under this section consists of Excavation and backfilling of cable trenches, as per WAPDA's requirements, for HT single circuit and double circuits, supply, installation, testing and commissioning of High tension (HT) cables and supply, installation, testing and commissioning of HT Straight-Through Joint (if required), HT termination kits, cable markers and all other accessories as specified herein and as shown on the Tender Drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at site with other services for exact route, location and position of the electrical lines.

The excavation and backfilling of cable trenches as per WAPDA's requirements, for HT single circuit and double circuits, supply, installation, testing and commissioning of high tension (HT) cables and supply, installation, testing and commissioning of HT Straight-Through Joint (if required), HT termination kits, cable markers and all other accessories shall also comply with the General Specifications for Electrical Works Section-8001 and other relevant provisions of the Tender Documents.

2.0 GENERAL

The excavation and backfilling of cable trenches for HT single circuit and double circuits, supplying, installing, testing and commissioning of High tension (HT) cables and supplying, installing, testing and commissioning of HT Straight-Through Joint (if required), HT termination kits, cable markers and all other accessories shall be carried in strict compliance with the WAPDA's technical specifications, standards and requirements.

The cable manufacturer shall be certification holder of ISO-9002 and shall be approved by the Engineer. The cable shall be suitable for nominal service voltage of 11 kV, have Aluminum conductor and be cross-linked polyethylene (XLPE) insulated, shielded, armored and sheathed. It shall be suitable for indoor and outdoor use in the transmission and distribution of electrical energy.

3.0 APPLICABLE STANDARD/CODES

Latest editions of the all relevant international standards and codes shall be applicable for the excavation and backfilling of cable trenches, as per WAPDA's requirements, for HT single circuit and double circuits, supplying, installing, testing and commissioning of high tension (HT) Straight- Through Joint (if required), HT termination kits, cable markers and all other accessories with in the scope of this Section.

Latest editions of the following standards and codes shall be applicable for the materials within the scope of this Section:

- IEC 60183 - Guide to the selection of HV cables.
- IEC 60502 - Extruded solid electric insulated power cable for rated voltage from 1kV to 30 kV
- IEC 60540 - Test methods for insulation and sheaths of electric cables and chords.

4.0 MATERIAL

4.1 HT Cable

The cable shall meet the following specifications:

• Nominal/System Voltage	-	11 kV
• Frequency	-	50 HZ
• System	-	3 phase
• Conductor Size	-	As given in BOQ and as shown on drawings
• Cores	-	3 numbers
• Rated Voltage	-	15 kV phase to phase 8.76 KV phase to ground
• Continuous Operating temperature of conductor	-	90^0C
• Conductor material	-	Copper stranded
• Insulation	-	Cross-linked polyethylene
• Shielding	-	Copper tape
• Jacket	-	PVC
• Armoring	-	Galvanized wire
• Over sheathing	-	Extruded PVC
• Phase identification	-	Red, Yellow and Blue

4.1.1 Conductor Material

The conductors shall be of high conductivity Aluminum stranded in accordance with specified standard.

4.1.2 Insulation

The insulation shall be cross-linked polyethylene (XLPE) extruded over the conductor. The insulation shall be laid to avoid any gap/air pockets between the conductor and insulation.

The insulation shall be easy to strip from individual conductors and to separate for jointing/termination purposes.

4.1.3 Shielding

Each core shall be shielded by a layer of semi-conducting material applied directly over the insulation. The semi-conducting insulation shall be covered by a bare copper tape applied with suitable overlapping.

Phase identification tape of red, yellow, and blue color shall be wrapped over the copper shield.

4.1.4 Assembly

The three insulated conductors shall be assembled with PVC or any non-hygroscopic filler and bound with tape. The tape binder shall then be covered with extruded PVC jacket. The PVC jacket shall be padded with a suitable material before application of armor.

4.1.5 Armor

Armoring shall be provided with single layer of galvanized steel wire to provide cable protection and also act as a low resistance earth return path. The armoring shall be covered with binder tape. The armor shall be of appropriate size to carry the system fault current.

4.1.6 Over sheath

The entire cable assembly shall be covered with a PVC jacket of thickness not less than 2.5 mm. The color of the jacket shall be black. In addition to any other marking proposed by manufacturer, the size of cable and voltage grade shall be given on the over sheath at every 3 meters interval.

4.2 **Cable Reels**

The cable shall be supplied in non-returnable, mechanically strong, sea/rail/road worthy, wooden or metallic cable drums, protected against weather. The cable drum should bear the markings for cable type, cable size, voltage grade, year of manufacture, name of manufacturer, direction of unreeling and any other additional marking normally provided by the

manufacturer. Cable ends on cable reels shall be protected by means of suitable seal.

4.3 Factory Tests

Physical and electrical acceptance tests in accordance with applicable standard shall be carried out at the manufacturer works. Three copies of test reports will be furnished to the Engineer, which shall include brief description of tests, test records and results.

4.4 Straight-Through Joint

The joint-boxes for the cable shall be cable manufacturer's recommended boxes for indoor or outdoor installation in accordance with the system requirements, and approved by the Engineer.

The joint boxes shall be horizontal, straight through, split type. Where installed underground, these shall be suitably protected against corrosion and ingress of moisture. At least two venting holes with plugs shall be provided for compound filling and inspection. Ground straps shall be furnished on the inside of joint box for ground continuity of the cable armor.

4.5 HT Termination Kits

The HT termination kits shall be indoor type recommended by cable manufacturer and as approved by Engineer. The termination kits shall be complete with all materials.

4.6 Cable Marker

Cable marker shall be made from sheet steel 1/8 inch thick and 10" x 12" in size. The cable marker shall be finished in gray heavy enamel paint over two base coats of antirust red oxide paint.

5.0 INSTALLATION

5.1 General

All installation material, labour, tools and accessories for cable installation shall be furnished by the Contractor. The cable and accessories shall be installed as described in accordance with the installation instructions given in the Section for Low Tension Cable of these Specifications, drawings and in accordance with manufacturer's instructions. Prior to installation of jointing and termination kits, the cable lengths shall be checked and tested to ensure that the cables are in sound condition and no damage has been done during handling and installation. After the HT cable and jointing/termination kits are installed, it shall again be tested prior to commissioning and in accordance with recommendations of standard to which the cable is manufactured.

The exact cut lengths for the cable shall be confirmed by the Contractor by actual measurements at site and keeping in view the extra loops required at terminations prior to the commencement of manufacturing. The cable lengths where shown on the drawing are tentative and only for general guidance. The Contractor shall be solely responsible for furnishing correct lengths of cable to avoid joints in cable length except where necessary, after obtaining approval of the Engineer.

5.2 Underground Cables

The cables to be installed directly underground shall be laid in trenches in single tiers. Unless shown specifically on the drawing the depth of cable below finished ground level shall be four feet minimum, measured from the top of the largest cable to the general ground level and as per WAPDA's requirements. The burial depth may be increased as required due to site conditions or when crossing other service pipes and roads. Burial depth less than or more than four feet shall require Engineer's approval.

When cables cross road, paved area, other services or other cables, they shall be laid in protective pipes. The protective pipe ends, after installation of HT cables, shall be plugged water tight by means of bituminized hessian or equivalent method as approved by the Engineer. A minimum clearance of 12 inches vertically and 18 inches horizontally and per WAPDA's requirements shall be maintained between cables and other services.

The cable trench shall be excavated as per route and location shown on the drawing. Before lying of cables in the trench, the bed of the trench shall be leveled and filled with a four inch thick layer of fine sand (1.3 mm diameter maximum particles size). The sand layer shall be leveled and the cables placed thereon. The cables shall be covered with a layer of fine sand four inch thick measured above the top of the largest cable. The cable protective bricks place above the top of sand cover shall be of class-C cement concrete, minimum 2 inch thick and 12 inches square or as per WAPDA's requirements. The bricks shall be placed over the sand layer end to end to cover the entire length and breadth of the cable trench. After the concrete bricks are placed, the remainder of the trench shall be backfilled with earth in layer 12 inches. Each layer shall be thoroughly tamped and compacted.

Cable identification tags of corrosion resistant material shall be tied to cables with bronze wire at a maximum of 65 feet interval along the cable length for identification of cable and circuit. The earth continuity conductor shall be laid in the trench with the cables. The Contractor shall submit to the Engineer for approval, schedule of cable markers showing location of marker and instructions on each.

Sufficient slack shall be left in cables for which purpose the cut lengths of cables shall allow about 3% more in the measured lengths between terminations. At underground joint box, ample slack shall be left to prevent straining of cable joints due to settlement of the cable trench. The cut lengths of cables wherever stated are only as a guide. The Contractor shall measure lengths between terminations of each circuit and if the discrepancy between measured lengths at site and where given on the drawing differ by more than

5%, the Contractor shall report to Engineer and act as directed. Cables, whether installed underground, or in cement concrete trenches, shall not be bent to a radius less than that recommended by the cable manufacturers.

5.3 Cable Marker

Above ground, cable markers shall be erected at 100 feet intervals along the straight trench, and at each bend and joint box for indication of presence of underground cable. For more than one meter wide trenches, cable markers shall be provided at both edges of the trench. The cable marker shall bear the necessary instructions indicated in approved colors. The Contractor shall furnish samples of cable marker for approval of Engineer before installation. The marker shall be welded to 2” x 2” x 1/8” angle iron fixed to the ground on a cement concrete base or as directed by the Engineer.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against each item of Bill of Quantities as given below shall include Excavation and backfilling of cable trenches, as per WAPDA’s requirements, for HT single circuit and double circuits, supplying, installation, testing, commissioning and of High tension (HT) cables and supplying, installing, testing and commissioning of HT Straight-Through Joint (if required), HT tension kits, cable markers and all other accessories for all work specified herein and as shown on the Tender Drawing related to the item.

6.2 HT Cable

6.2.1 Measurement

Measurement shall be made for the total number of running meters or running feet of HT cable acceptably supplied and installed by the Contractor and which has satisfactorily passed all the required tests prior to and after installation.

6.2.2 Payment

Payment shall be made for the total number of running feet of the HT cable, as provided above, at the Contract unit price and shall constitute full compensation for supply, installation, connection, testing and commissioning of the HT cable.

6.3 HT Termination Kit

6.3.1 Measurement

Measurement shall be made for each type and size of HT termination kit acceptably supplied, installed, tested and commissioned by the Contractor as a complete unit.

6.3.2 Payment

Payment shall be made for the total number of units measured, as provided above, at the Contract unit price and shall constitute full compensation for supply, installation, connection, testing and commissioning of the HT cable termination kits as required.

6.4 Cable Marker

6.4.1 Measurement

Measurement shall be made for each type of cable marker acceptably supplied and installed by the Contractor as a complete unit.

6.4.2 Payment

Payment shall be made for the number of units measured as provided above, at the Contract unit each and shall constitute full compensation for fabrication, supply & installation of cable markers as per specifications.

6.5 Excavation & Backfilling

6.5.1 Measurement

Measurement shall be made for the number of cubic meters of excavation & backfilling work and shall include excavation above water table and excavation below water table. No extra payment for dewatering work shall be made. The cost of dewatering work shall be included within the cost of excavation work items. Quantities of excavation, earthwork, etc. shall be calculate/measured from the pre-work levels taken jointly by the Contractor and the Engineer before commencement of the work. The quantities set out for excavation and its 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 excavation / backfilling.

6.5.2 Payment

Payment shall be made for the total number of cubic meter of work done as per drawing and these specifications and certified by the Engineer at the Contract unit price and shall constitute full compensation for transportation of approved quality earth within the 300 meter haulage limit, sand bed, sand cover, protective bricks, backfilling of excavated earth, compaction, consolidating, etc. as per WAPDA’s requirements and as per Engineer’s approval.

SECTION - 8218

HIGH TENSION (H.T.) CABLE TERMINATION KITS

1.0 SCOPE OF WORK

The work under this section consists of supplying of High Tension (HT) cable Termination Kits as specified herein and given in the Bill of Quantities.

2.0 GENERAL

The HT cable termination kits shall be suitable for HT 8.76/15 kV, XLPE copper conductor cables. It shall be suitable for indoor, outdoor and underground installations.

3.0 APPLICABLE STANDARD/CODES

The Latest editions of the relevant standards and codes shall be applicable for the materials within the scope of this Section.

4.0 MATERIAL

4.1 Termination Kits for 8.76/15 kV HT Cables

The termination kits shall be suitable for indoor, outdoor and underground installations. The termination kits shall be complete with all materials.

The HT termination kits shall be from special Silicon skirted or tubular EPDM rubbers.

The tubes shall be pre-stretched to avoid the use of torches or external heat sources.

The HT termination kits shall be supplied complete with stress control tape with a di-electric constant of 30 minimum.

The HT termination kits shall be supplied with all required mounting, installation and operational accessories.

4.2 Straight - Through Joint

The joint-boxes for the cable shall be suitable for indoor or outdoor installation in accordance with the system requirements.

The joint boxes shall be horizontal, straight through, split type. Where installed underground, these shall be suitably protected against corrosion and ingress of moisture. At least two venting holes with plugs shall be provided for compound filling and inspection. Ground straps shall be furnished on the inside of joint box for ground continuity of the cable armor.

4.3 Factory Tests

Physical and electrical acceptance tests in accordance with applicable standard shall be carried out at the manufacturer works. Three copies of test reports will be furnished to the Owner, which shall include brief description of tests, test records and results.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against each item of Bill of Quantities as given below shall include supply, installation, testing, commissioning and completion for all work specified herein and/or as shown on the Tender Drawing related to the item.

6.2 HT Termination Kit and Straight through Joints

6.2.1 Measurement

Measurement shall be made for each type of HT termination kit/straight through joint acceptably supplied by the manufacturer/supplier as a complete unit.

6.2.2 Payment

Payment be made for the number of units measured, as provided above, at the Contract unit price each and shall constitute full compensation for supply of HT termination kits/straight through joints including all installation accessories, support for joint as required.

SECTION - 8240

EARTHING

1.0 SCOPE OF WORK

The work under this section consists of supplying, installing, testing and commissioning of all material and services of the complete Earthing system as specified herein, as shown on the Tender Drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at Site with other services for exact route, location and position of the earth electrode and ECC etc.

The Earthing system shall also comply with the General Specifications for Electrical Works Section - 8001 and with other relevant provisions of the Tender Documents.

2.0 GENERAL

The earthing system consists of earth electrodes, earthing leads, earth connecting points, earth continuity conductors and all accessories necessary for the satisfactory operation of the associated electrical system.

3.0 APPLICABLE STANDARDS/CODES

The latest editions of following standards / codes shall be applicable for the materials specified within the scope of this section:

- BS 951 - Earthing clamps
- CP 1013 - Earthing
- BS 2874 - Nuts, bolts, washers, screws and rivets fixing for use on copper
- BS 6346 - PVC insulated cables

4.0 MATERIAL

4.1 **Earth Electrode**

4.1.1 Plate Type

The plate type earth electrode shall comprise a 600 x 600 x 3mm electrolytic copper plate. The surface of the plate shall be tinned for protection. The plate shall have four terminals for connecting the earthing leads. Nuts bolts and washers shall be either of brass or tinned copper. A 50mm dia. G.I. pipe shall be provided from inspection chamber to earth plate for watering purpose. This pipe shall have 10mm dia. holes at 500mm centre to centre all along the length.

At the ground level an inspection chamber with cast iron cover shall be constructed having dimensions as shown on the drawings. The inspection chamber shall have a cover supported on angle iron frame. The cover shall be hinged type, as approved by the Engineer and shall finish flush with the ground level.

4.1.2 Copper Clad Steel Rod Type

This type of earth electrode shall comprise a 3 meter long, 20 mm dia. copper clad steel rod having flat head at drive end and pointed conical tip at the driven end. The tip shall be hardened to facilitate driving. At the top of the rod, a brass clamp for bolted connections shall be provided suitable for connection to the down conductor or earthing lead as required.

The inspection chamber with C.I. cover shall be provided as instructed by the Engineer.

4.2 Earthing Lead

The earthing lead shall connect the earth electrode to earth connecting point or equipment in the building. It shall be of stranded bare electrolytic copper of size shown on the drawings. The cost of earthing leads deemed to have been included in the price of earth electrode and no separate payment shall be made for it.

4.3 Earth Continuity Conductor

Earth continuity conductor (ECC) shall be stranded bare copper wire or single core PVC insulated copper conductor cable of sizes indicated on the drawings. All thimbles, lugs, sockets, nuts, washers & other accessories necessary for the complete installation of ECC shall be provided by the Contractor without any extra cost.

The specifications for single core PVC insulated cables used as ECC shall be same as those given in section "LT Cables" of the technical specifications. PVC insulated cables when used as ECC shall be green or green/yellow.

4.4 Earth Connecting Point

Earth connecting points shall comprise tinned copper bar, rectangular in shape, having dimensions of 300 x 50 x 6 mm. At least six terminals for connection shall be arranged on the bar, which can be increased or decreased as required by the Engineer.

The terminals shall have brass or tinned copper bolts, nuts and washers for protection against corrosion. Two holes shall be provided off centre of the copper bar for fixing to the wall by means of 10 mm dia. nut and bolt and shall be insulated by means of rubber gaskets/washers.

5.0 INSTALLATION

5.1 General

Complete earthing systems as shown on the drawing shall be installed by the Contractor. The earthing system shall give earth resistance, including the resistance of soil, earth leads and ECC equal to or less than one ohm.

At all connections of earth continuity conductor to Generator, Transformer, LT Switch Board, LT Distribution Board, or any other metallic body, proper size copper or brass sockets, thimbles or lugs shall be used to which the copper wire shall be connected by copper brazing. The soldering of copper wire at joints or terminations shall not be allowed. All tee-off connections shall be by copper brazing using suitable socket and clamps. After brazing, the jointed surface shall be protected by oxide inhibiting compound of low electrical resistance. For connections to metallic body, the surface shall be thoroughly cleaned before bolting the lug or socket.

The earth continuity conductor shall in general run in cable trench or in conduits/pipes as shown on the drawings. For under floor runs, these shall be installed in pipe/conduit of appropriate sizes. Where laid along underground cables, these shall be laid directly underground in unpaved areas and in pipes under paved areas.

The earthing system shall be tested after complete installation of earth electrodes.

5.2 Earth Electrode

5.2.1 Plate Type

The electrode plate shall be installed at a minimum depth of 5 meters from finished ground level or 1 meter below permanent water level whichever is less. The minimum horizontal distance between earth electrodes shall be 3 meters. Proper mixture of lime and charcoal shall be made and buried along with the copper plate in the ground to increase the soil conductivity. The electrode shall be installed as per details shown on the drawings. The inspection chambers shall be constructed at locations approved by the Engineer.

5.2.2 Copper Clad Steel Rod Type

In case the soil conditions at site permit and approved by the Engineer this type of earth electrode may be installed by hammering the electrode in soil, until the top of the rod is about 300 mm below the proposed finished ground level. If hammering down of rod is not possible due to site conditions, a pit shall be first excavated in bare ground upto the required depth and electrode shall be installed upright in the pit. The excavated pit shall be backfilled in layers of 500 mm, each layer tamped and compacted.

5.3 Earth Continuity Conductor

The earth continuity conductor of sizes shown on the drawing shall be installed all along the cable runs and connected to the earthing bar/terminals provided in equipment. The body of generator, transformer and all switchboards shall also be connected to earth by specified size of ECC. All other metal work shall also be connected to earth by specified size of ECC.

At any joint or terminations, the ECC shall be connected using proper accessories. No connection shall be made by twisting of earth conductors.

5.4 Earth Connecting Point

The earth connecting point shall be installed at locations shown on the drawings. It shall be fixed on wall surface by means of brass screws with nuts, washers and other insulating material as instructed by the Engineer.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against each Bill of Quantities item as given below shall include supplying, installation, testing, and commissioning of all work specified herein, as shown on the Tender drawing related to the item.

6.2 Earth Electrode

6.2.1 Measurement

Measurement shall be made for the total no. of each type of earth electrode acceptably supplied and installed by the Contractor as a complete unit.

6.2.2 Payment

Payment shall be made for the number of units measured, as provided above, at the Contract unit price each, and shall constitute full compensation for supplying, installing, testing, commissioning and completion of earth electrodes including copper plate or copper clad steel rod, earthing leads, excavation, backfilling, lime and charcoal, inspection chamber with cover, GI pipes for earthing leads/watering, nuts, bolts, washers, lugs, brazing and all related civil works.

6.3 Earth Continuity Conductor (ECC)

6.3.1 Measurement

Measurement shall be made for the total running feet of each size and type of earth continuity conductor (ECC) acceptably supplied and installed by the Contractor.

6.3.2 Payment

Payment shall be made for the total running feet of each size and type of ECC measured, as provided above, at the Contract unit price and shall constitute full compensation for supplying, installing, connecting, testing and completing of ECC including all accessories such as sockets, thimbles, lugs, bolts, nuts, washers, brazing, etc.

6.4 Earth Connecting Point

6.4.1 Measurement

Measurement shall be made for the total no. of earth connecting points acceptably supplied and installed by the Contractor as a complete unit.

6.4.2 Payment

Payment shall be made for the total number of units measured, as provided above, at the Contract unit price each and shall constitute full compensation for supplying, installing and completion of earth connecting point and all other associated accessories such as nuts, bolts, washers, lugs, etc.

SECTION – 8001

GENERAL SPECIFICATIONS FOR ELECTRICAL WORKS

1.0 SCOPE OF WORK

2.0 RULES & REGULATIONS

3.0 AMBIENT CONDITIONS

4.0 STANDARDS

5.0 SYSTEM DATA

6.0 EQUIPMENT

7.0 DRAWINGS AND DATA TO BE FURNISHED BY THE CONTRACTOR

8.0 MANUFACTURER'S INSTRUCTIONS

9.0 GUARANTEE

10.0 DANGER BOARDS WITH SIGNS, DESIGNATION AND SHOCK / FIRST AID CHARTS AND FIRE FIGHTING EQUIPMENT

11.0 ASSOCIATED CIVIL WORKS

12.0 INSTALLATION INSTRUCTIONS - GENERAL

13.0 FACTORY TESTS

14.0 TESTING - GENERAL

15.0 APPENDICES TO BE FILLED IN BY THE BIDDER

16.0 PAYMENT

1.0 SCOPE OF WORK

The works related to the electrical system which is included in the Scope of this Contract as shown on the Drawings, stated in the Specifications and Bill of Quantities and explained in these Specifications. The works shall broadly include but not limited to the following:

- General Specifications for Electrical Works
- Power Transformer
- LT Distribution Boards
- Light Fixtures
- Low Tension Cables
- Wiring Accessories
- Conduits and Pipes
- Earthing
- Lightning Protection System
- Miscellaneous Items
- Structured Cabling Network
- Fire Alarm System
- Closed Circuit Television System
- Public Address System
- Cable Antenna TV System

The Contractor shall also be responsible to supply any other equipment not specifically mentioned in these Documents but which is necessary for proper operation of the works/system included in the scope of this Contract. The Contractor shall solely be responsible for ensuring proper functional requirements of different equipment. He shall also be responsible for furnishing any additional piece of equipment and for making modification in the equipment as desired and/or approved by the Engineer to achieve proper co-ordination with various equipment offered in the bid and also with those installed by others.

2.0 RULES & REGULATIONS

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

All works shall be carried out in accordance with the latest edition of the Regulations of the Electrical Equipment of Buildings issued by the Institute of Electrical Engineers-London, the Contract Documents, The Electricity Rules 1937 and bye-laws that are in force from time to time. Any discrepancy between these Specifications and any other rules and regulations shall be brought to the notice of Engineer for his instructions and the discussion of the accepting/controlling shall be final and conclusive.

The Contractor shall be responsible for completing all formalities and submitting

the test certificates as per prevailing rules and regulations, and shall have the installation passed by the Government Electric Inspector of that region. All requirements of the Electric Inspector and the WAPDA / DISCO shall be complied with.

3.0 AMBIENT CONDITIONS

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

Maximum indoors ambient temperature	:	45-Degree Celsius
Minimum indoors ambient temperature	:	Zero Degrees Celsius
Maximum outdoors-ambient temperature	:	50-Degree Celsius
Minimum outdoors-ambient temperature	:	Zero Degrees Celsius
Maximum Relative humidity	:	100 Percent
Maximum Altitude of project	:	220 meters above the mean sea level.

The atmospheric conditions are tropical and highly humid.

4.0 STANDARDS

The latest standards and codes of reputable organisations shall be applicable for the material and equipment specified herein and for installation work. Such organisations to be BSS, VDE, NFPA 99, NEC Article 517 etc. In case the Specifications laid down herein differ from those given in the standards, then the equivalent or better specifications shall govern. Wherever applicable the equipment shall also conform to the requirements of Pakistan Standard Institution (PSI).

Contractor shall maintain at the site office one copy of the standards / codes applicable to the works.

5.0 SYSTEM DATA

Unless otherwise specified elsewhere, all equipment and material shall be designed to operate satisfactorily with the following minimum requirements without any de-rating.

a) Voltage rating of equipment :	HT :	11 kV, 3 phase, +/- 10%
	LT :	400 V, 3 phase, +/- 10%
		230 V, 1 phase, +/- 10%
b) Frequency	:	50Hz $\pm$ 2Hz

In general, the electrical colour coding of switchgear cubicles, control panels, desks etc., shall be in accordance with the respective IEC Recommendations.

Live parts of electrical connections shall be colour coded according to IEC 446 as follows:

	Conductor Designation	Coding Alphanumeric	Colour
A.C. Network	Phase 1	L 1	red
	Phase 2	L 2	yellow
	Phase 3	L 3	blue
	Neutral	N	black
D.C. Network	Positive	L+	white
	Negative	L-	black
Earthing	Protective Earth	PE	green/yellow
	Earth	E	green/yellow

The colour coding for the secondary circuits of isolated power panel board is as follows:

Orange-Isolated Phase Conductor
Brown- Isolated Neutral Conductor
Green-Isolated Ground Conductor

Conductor insulation of secondary circuits of isolated power panel board shall be XLPE and PVC sheathed.

Control Cables

The Control Cables shall be manufactured according to specifications for L.T. Cables. The Control Cables shall be of multi-core, PVC insulated type withstanding without deterioration the conditions prevailing at the place of installation. The cross section of cable shall be as per the requirement of the system.

All the cores should be numbered and/or colour coded or otherwise properly identified. At-least 20% spare cores shall be provided in all Control Cables.
No separate payment is admissible for supplying, installing, testing and commissioning of control cables and is deemed to have been included in the BOQ rates of the respective equipment.

Distance in between power, communication and control cables shall be kept as per requirements laid down by NEC800, NFPA 70 and EN50174-2.

6.0 EQUIPMENT

6.1 IP Degree of Protection

The equipment shall have IP degree of protection as follows, unless mentioned other wise:

- IP 20 for indoor areas
- IP 42 for indoor damp areas
- IP 54 for outdoor areas

If properly rated equipment is not available, the Contractor shall provide field enclosures to attain the required IP degree of protection. If necessary cooling/exhaust fans and / or anti condensate heaters shall also be provided. No separate payment shall be made to attain the required IP degree of protection.

6.2 Identification & Labelling

All devices, meters, cabling, wiring and auxiliaries shall be properly labeled for identification. Labeling of equipment shall be done by means of flameproof material using indelible ink/marking. The labeling shall be such as to ensure uniformity and shall facilitate study of control diagrams/ drawings during operation and maintenance.

All labeling shall be of suitable size to be visible from the operating conditions/positions at site.

6.3 Lamp Test Facility

All equipment / switchboards, etc. shall be provided with common lamp test facility.

7.0 DRAWINGS AND DATA TO BE FURNISHED BY THE CONTRACTOR

The shop drawings, as-built drawings and/or technical data to be furnished by the Contractor for each electrical equipment, LT cable distribution layout & shall include, but not limited to the following:

(a) Structural drawings showing foundations, RCC details dimensional plans, elevation and sections on a suitable scale.

(b) Electrical drawings showing:

- Line diagrams of Switchboards, Motor Control Centres, distribution boards and isolated power panels with detailed wiring diagrams, elevations/internal component layout and other

standard details.

- LT Cabling, Grounding/Earthing including all cable routing and support details.
- Necessary execution details such as no. of cable/wires, size of conduits, cable routes, cable trays and cable trenches, etc.
- Substation and Generator Room Equipment installation detail.
- Manhole/Duct works.

(c) Layouts of all LT cable routes with coordinates and levels.

(d) Technical literature and manufacturer's characteristic data with the description of materials and weights of all equipment as instructed by the Engineer.

At least three (3) copies of the shop drawings and/or technical data of the equipment shall be submitted to the Engineer for checking and approval.

8.0 MANUFACTURER'S INSTRUCTIONS

The Contractor shall supply to the Engineer in properly bound form six (6) copies of manufacturer's instruction manuals for installation, testing, commissioning, operation and maintenance of the specified equipment including manuals of spare parts and tools of the equipment. At least two copies of the documents shall be submitted in original. The installation instructions shall be submitted 2 weeks prior to commencement of installation of each equipment, and operation and maintenance instruction at the time of commissioning. If the Contractor fails to provide the documents the Engineer shall withhold issuance of requisite certificates and deduct suitable amount from the payments to the Contractor.

9.0 GUARANTEE

The Contractor shall furnish written guarantee of the manufacturer or supplier with respect to satisfactory performance of each equipment. Guarantee shall be given for replacement and repair of part or whole of the equipment, which may be found defective in material or workmanship. The guarantee shall cover the duration of Maintenance Period as defined in the Conditions of Contract. This guarantee shall not relieve the Contractor of his obligations and he will be fully responsible for the repair or replacement of any defective material in time, so as not to cause any undue delay in carrying out the repairs and/or replacements.

10.0 DANGER BOARDS WITH SIGNS, DESIGNATION AND SHOCK / FIRST AID CHARTS AND FIRE FIGHTING EQUIPMENT

Danger Boards having signs and designation of the room shall be installed on the external door of HT, LT, Power transformer, Low Voltage DG Set Rooms. Shock/First Aid Charts shall be installed in H.T, L.T and Low Voltage DG Set Rooms.

Potable fire fighting extinguisher suitable to control electrical fire shall be provided in H.T, L.T, Power Transformer and Low Voltage DG Set Rooms.

All the above items shall also be provided, wherever required to comply the requirements of the Pakistan Electricity Rules/Electric Inspector.

Laminated single line and adequate detail drawings on proper boards highlighting the main system features shall be displayed/ fixed in respective electrical and communication rooms.

11.0 ASSOCIATED CIVIL WORKS

Except where separately stated in the Bill of Quantities the cost of all civil works associated with any BOQ item of electrical works, such as excavation and back filling of earth, compaction of the earth, foundation pads, chiselling, making openings, etc. shall be included in the price quoted against respective items. No separate payment for such works will be made. Such works will also include repair of any damage to civil works caused by the Contractor during electrical installation.

12.0 INSTALLATION INSTRUCTIONS - GENERAL

The Contractor shall furnish all labour, materials, tools and equipment required to install, connect, test and commission all electrical equipment specified herein, whether or not such equipment is furnished by him or by others.
For all equipment to be installed by the Contractor, the Contractor shall supply and install all erection materials such as foundation bolts, washers, nuts, etc. as required and without any additional costs.

The Contractor shall set out the works himself as per Specifications and Drawings and shall properly position the equipment on specified foundation/location. In general, the manufacturer's instructions for installation shall be followed. Any defect or faulty operation of equipment due to the Contractor not following the manufacturer's instructions shall be corrected and repaired by the Contractor at his own cost.

For any deviation from the working drawings or specification that are deemed necessary by the Contractor due to site conditions, he shall submit the details and obtain the Engineer approval before starting such works.

13.0 FACTORY TESTS

All type and routine tests on Low Voltage D.G Set, Power Transformer, H.T Switchboards, LT Switchboards, Motor Control Centre, H.T Cables, LT Cables, and all other equipment shall be performed at the manufacturer's works in the presence of the Engineer or his Representative. Type tests may be waived off in case test certificates are submitted as certified by an Engineer approved standard laboratory of international repute; but merely producing the test type certificates will not relieve the manufacturer to carry out the required standard/routine tests.

The Contractor shall inform the Engineer about the date and time of test of each equipment at least two weeks in advance. This shall, however, be done after the Contractor has got the test procedures duly approved by the Engineer. The witnessing of test by the Engineer and the Employer shall not absolve the Contractor from his responsibility for the proper functioning of the equipment, and for furnishing the guarantees referred to in clause 9.0. All test results shall be supplied in quadruplicate. All expenses for carrying out the tests as incurred by the Engineer and the Employer to witness it shall be borne by the Contractor and deemed to have been included in the bid. Provision for at least two person's visit for Factory Acceptance Tests shall be made to include one representative each from the Employer and the Consultant/Engineer. The contractor shall undertake all formalities as may be required for the Engineer or his representative to enable him make the visit.

14.0 TESTING - GENERAL

14.1 Scope

Upon completion of the installation, the Contractor shall perform field tests on all equipment, materials and systems. All tests shall be conducted in the presence of the Engineer for the purpose of demonstrating equipment or system compliance with Specifications. The Contractor shall submit for Engineer's approval complete details of tests to be performed describing the procedure, test observations and expected results.

The Contractor shall furnish all tools, instruments, test equipment, materials, etc., and all qualified personnel required for the testing, setting and adjustment of all electrical equipment and material including putting the same into operation.

All tests shall be made with proper regard for the protection of the personnel and equipment and the Contractor shall be responsible for adequate protection of all personnel and equipment during such tests. The cost of any damages or rectification work due to any accident during the tests shall be the sole responsibility of Contractor.

The Contractor shall record all test values of the tests made by him on all equipment. Four (4) copies of all test data and results certified by the Engineer shall be given to the Engineer for record purposes. These shall also include details of testing method, testing equipment, diagrams, etc.

The witnessing of any tests by the Engineer does not relieve the Contractor of his guarantees for materials, equipment and workmanship, or as any other obligations of Contract.

14.2 **Low Voltage D.G. Set**

Prior to the tests, the contractor shall submit manufacturer's recommended detailed description of the test procedures to be conducted for Engineer's approval.

The Contractor shall carry out full site load and no load tests in accordance with IEC, ISO or BS Specifications for site commissioning. The inspection and tests shall include but not be limited to:

Basic Tests:	Insulation Resistance Earth Continuity Earth Loop Impedance Polarity Phase Rotation Voltage and Frequency Starting System Protection Equipment
Battery:	Nominal Voltage Discharge Voltage Specific Gravity of Electrolyte Level of Electrolyte Charging System
Lubrication:	Check as required by manufacturer
Operational Check at Start-up	Oil Pressure Fuel Oil Leaks Operation of Safety Devices Operational Speed Automatic Control Instrument Check Exhaust Check Undue Vibration
Operational Check After one hour's run:	Oil Pressure Oil Leaks Cooling System Oil Temperature

Commissioning Test:	25% of full load	2 hrs.
	50% of full load	5 hrs.
	75% of full load	8 hrs.
	100% of full load	8 hrs.
	110% of full load	1 hr.

All commissioning and test results shall be recorded and compared with design data. A retest/commissioning shall take place if results are not satisfactory. All the tools, labour, POL, required for the testing and commissioning shall be provided by the Contractor at no extra cost. If required load is not available at site for testing the generators, the Contractor shall provide dummy load at site at no extra cost to the Employer. The correct functioning of the control equipment shall also be proved.

Battery Charger

Battery charger shall be static type and shall provide for both trickle and boost charging of the batteries when the engine is not in operation. The charger shall be of suitable capacity to fully recharge the completely discharged batteries within four hours at boost charge.

Control Panel

The Control Panel shall provide all the necessary control and monitoring devices of the Diesel Generating Sets. All the control and monitoring of the safety devices, alarms, protections, meters, lamps, etc. as mentioned in this Specifications and required as per good engineering practices for such an installation shall be provided in the Control Panel.

14.3 Transformer Tests

In addition to the insulation resistance test of the transformer, a polarity and phase rotation test shall also be made. Buchholz relay shall be tested for proper operation. Di-electric test shall be carried out on transformer oil prior to putting the same in operation.

14.4 HT / LT Switchboards

Each circuit breaker shall be operated electrically and mechanically. All interlocks and control circuits shall be checked for proper connections in accordance with the wiring diagrams given by the manufacturer.
The Contractor shall properly identify the phases of all switchgear and cables for connections to give proper phase sequence.

Trip circuits shall be checked for correct operation and rating of

equipment served. The correct size and function of fuses, disconnect switches, number of interlocks, indicating lights, alarms and remote control devices shall be in accordance with approved manufacturer drawings. Nameplates shall be checked for proper designation of equipment served. Protective relays shall be tested and set at site prior to commissioning of the equipment.

14.5 Insulation Resistance Test

Insulation resistance test shall be made on all electrical equipment by using a meggar of 500 volts for circuits upto 250 volts and 1000 volt for circuits between 250 and 500 volts. For testing of 11 kV circuits, upto 5 kV meggar shall be used; the exact voltage shall be as advised by the equipment manufacturer unless otherwise advised by the Engineer.

The insulation resistance values of cables, transformer, switchgears, etc., shall be as per BSS, IEEE, NEC, ICEA and Pakistan Electricity Rules.

Before making connections at the ends of each cable run or joint between cables, the insulation resistance test of each cable section shall be made. H.T. cables shall be subjected to high voltage test as per recommendations of standard to which the cable is manufactured. Each conductor of a multi-core cable shall be tested individually with each of the other conductor of the group and also with earth. If insulation resistance test readings are found to be less than the specified minimum in any conductor, the entire cable shall be replaced and tests repeated on new cable. If cable joint is provided, then each cable section shall be tested, and joint made only after the tests have been made satisfactorily. Finally the completed cable length including the joints shall be tested.
The transformer and switchgears shall be given an insulation resistance measurement test after installation, but before any wiring is connected. Insulation tests shall be made between open contacts of circuit breakers, switches and between each phase and earth.

If the insulation resistance of the circuit under test is less than the specified value, the cause of the low reading shall be determined and removed. Corrective measures shall include dry-out procedure by means of heaters, if equipment is found to contain moisture. Where corrective measures are carried out, the insulation resistance readings shall be taken after the correction has been made and repeated twice at 12 hours interval. The maximum range for each reading in the three successive tests shall not exceed 20% of the average value. After all tests have been made, the equipment shall be reconnected as required. Polarity test shall be made on single pole switching devices.

14.6 **Earth Resistance Test**

The Contractor shall make Earth resistance tests on the Earthing system, separating and reconnecting each earth connection.

If it is indicated that soil treatment or other corrective measures are required to lower the ground resistance values, the Engineer will determine the extent of such corrective measures.

The electrical resistance of the ECC together with the resistance of the Earthing leads measured from the connection with earth electrode to any other position in the complete installation shall not exceed one ohm.

Earth resistance test shall be performed as per Electrical Inspector's requirements. Where more than one earth electrodes are installed, the earth resistance test of each electrode shall be measured by means of resistance bridge instrument.

The complete lightning protection system shall be tested for continuity and earth resistance. The combined earth resistance at any point in the lightning protection system shall not exceed 10 ohms.

14.7 **Completed Tests**

After any equipment has been tested, checked for operation, etc., and is accepted by the Engineer the Contractor shall be responsible for the proper protection of that equipment so that subsequent testing of other equipment do not cause any damage to the already tested equipment.

14.8 **Expenses**

All expenses, i.e., travelling, boarding and lodging for carrying out the tests and witnessing by the Engineer shall be borne by the Contractor and are deemed to have been included in the BOQ rates of the respective equipment(s) by the Contractor.

14.9 **Spare Parts**

Contractor shall provide spare parts as identified in relevant appendix. The cost of each spare parts shall be carried over to relevant BOQ item and no extra payment shall be admissible in this regard.

14.10 **Special Tools**

Contractor shall provide special tools as indicated in Appendix-IV and as may be deemed essential for assembly, adjustment, dismantling, installation and maintenance reasons.

No separate payment shall be made for any special tools and cost shall be deemed to be included in the cost of the Contract.

15.0 APPENDICES TO BE FILLED IN BY THE BIDDER

The details regarding equipment manufacturers, deviations, etc., are to be furnished in the appendices attached with form of Bids, in accordance with the provisions of the clause "Requirements of Electrical Works" given in the instructions to Bidder, Volume - I.

16.0 PAYMENT

No separate payment shall be made for work involved within the scope of this section unless specifically stated in the Bill of Quantities or herein.

*** End of Section 8001 ***

SECTION – 8111

LOW VOLTAGE D.G. SET

1.0 SCOPE OF WORK

2.0 GENERAL

3.0 APPLICABLE STANDARDS/CODES

4.0 MATERIAL

5.0 INSTALLATIONS & TESTING

6.0 MEASUREMENT AND PAYMENT

1.0 SCOPE OF WORK

The work under this section consists of supply, installation, testing and commissioning of all material and services of the complete Diesel generator set, Auto Main Failure (AMF) Panel and other equipment, as specified herein, shown on the Tender Drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at Site with other services for exact location and position of the Diesel Generator Set, Auto-Main Failure (AMF) Panel, underground / above ground storage tanks and routing of cables.

The Diesel generator set, Instrument/Control Panel, auto main failure panel and accessories shall comply with the General Specifications for Electrical Works, Section-8001, and other relevant provisions of the Tender Document.

2.0 GENERAL

The Diesel generator set shall be a standard design of reputed manufacturer, who shall have similar units in operations for similar applications and field conditions. The manufacturer shall also have adequate maintenance facilities in the vicinity of Project with technically qualified and experienced personnel trained for operation and on-site maintenance of equipment offered by the Contractor in the tender bid.

The set shall be rated for continuous duty and suitable for indoor installation with protection rating IP23. It shall be capable for unbalance loads upto 30% of actual load and for continuous part load operation. The set shall be capable of starting and operation at the rated output at $0^{o}C$ and at an altitude of 15 meters above mean sea level. The ratings must be substantiated with manufacturer's standard published data.

The Diesel Generator set shall, after reducing the power absorbed by the auxiliaries, deliver continuously rated power output under the site conditions. All auxiliaries, accessories and connections between systems alongwith all necessary cables, fittings, hardware, etc., for complete installation of Diesel Engine, Generator, Control / Instrument Panel, Auto-Main Failure (AMF) Panel, Duty Selection Switch, Fuel and Oil Storage, Batteries, Exhaust System, etc., shall be furnished by the Contractor.

The engine shall be directly coupled to the generator, and shall have a rated speed of 1500 rpm. The set shall be capable of sustaining without damage, 15% over speed under any abnormal operating condition.

The engine-generator set shall be mounted on suitable rigid steel frame skid with vibration isolators. Heavy duty lifting eyes and jacking screws shall be provided on the skid. The foundation bolts and all other material/hardware for complete

installation of the set shall be furnished with the set. Any excessive torsional vibration shall be avoided for both engine and alternator.

The set shall be suitable for full load starting. When the generator is operating at no-load, the application of full load current, taking into account the surge due to starting of equipment, should be possible with maximum transient voltage drop of 15% of the rated voltage, and the time taken to restore the generator voltage to 97% of rated value should not exceed 1.5 seconds.

The set shall be capable for parallel operation.

The Contractor shall submit the equipment layout and other installation details as per manufacturer's recommendations for approval of the Engineer at least 60 days prior to the installation of the set.

Necessary provision, including connections and a Local / OFF / Remote control switch shall be made in the Generator Panel of each of the D.G. Set. The cost of such provision, connection, testing and commissioning are deemed to be included in the Cost of D.G. Sets and no separate payment shall be made against such works.

3.0 APPLICABLE STANDARDS/CODES

The Diesel engine and generator shall conform to the following standards as applicable.

- BS 5514 - Reciprocating Internal Combustion Engine.
- BS 4999 - General Requirements for Rotating Electrical Machines.
- BS 5000-99 - Rotating Electrical Machines of particular types or for Particular application.

For other equipment and materials related to the Diesel generator set, the Contractor shall follow relevant international standards, details of which shall be submitted to the Engineer for approval.

4.0 MATERIAL

4.1 Diesel Engine

The Diesel Engine shall be four strokes, compression ignition, suitable for continuous duty.
Starting shall be through electric starter motor operated on DC supply from lead acid batteries mounted on the skid. The batteries shall be furnished with the set.

The engine shall be equipped with an alternator type automatic charging system to charge the batteries during running of engine. A static battery charger installed in the control panel shall also be provided to charge the batteries when the engine is not running. Suitable interlocks shall be provided to prevent simultaneous operation of both charging systems.

The batteries shall be adequate to satisfy the following requirements:

a. Crank the engine at firing speed for at least 15 seconds.

b. If the engine does not start on the first attempt, crank the engine two more times for the above duration at an interval of 30 seconds between each cranking operation.
Engine shall be rated for continuous duty with overload capability for operating at least 10% above the rated capacity for 1 hour continuously in any 12 hours operation.

4.1.1 Air Intake

Air intake shall be through turbo charger and equipped with dry type filter. Suitable attenuators shall be installed to reduce noise at the air inlet.

4.1.2 Engine Lubrication

A gear type positive pressure lubrication pump shall be provided with efficient filtration arrangement for the lubrication system.

The heater shall be designed for automatic switching to ensure that temperature of oil is maintained for proper operation of the engine.

Engine shall have a constant oil level regulator, gravity fed from an engine mounted lube oil reservoir. Reservoir shall be equipped with an oil level gauge. Size of the reservoir should be suitable for 30 days continuous operation at full load.

A crankcase pressure release valve shall be provided to operate during excess pressure.

4.1.3 Engine Cooling

Engine shall have a forced air draft, water-cooled radiator supplied with a core guard. Cooling system shall have an engine driven centrifugal pump for cooling water circulation. Cooling shall be thermostatically controlled. An engine shut down timer shall be provided to keep the engine running on no-load after any operation of set, so that the engine is sufficiently cooled to start again instantly, if required, without rise in temperature above safe limits.

4.1.4 Exhaust System, Noise, Pollution

Exhaust system shall be equipped with a residential type silencer complete with muffler, exhaust manifold, flexible connector, exhaust elbow, exhaust pipe, rain cap, and associated fittings. The exhaust line shall be taken outside the building through the shortest possible and practical route, without any undue bends. This exhaust line shall be adequately covered with thermal insulation material over its entire length i.e. from the engine to the termination point. All supports for exhaust system shall be furnished.

The sound level in the diesel generator room shall not exceed the values of the noise rating curve NRC 95 to ISO TI 43-1961 standard, measured at 1 m distance from the object but in no case greater than 85 dB (A) under all operating conditions.

The exhaust fumes shall be burnt completely and be free of solid matters before escaping to the air.

4.1.5 Speed Governor

The speed governor shall be electronic type. Governor shall regulate engine speed so as to maintain the generator frequency within plus or minus 0.25% of the rated frequency. Stable engine speed shall be attained within 15 seconds after the engine has been started. Stable engine speed shall be restored within 10 seconds of any sudden change in load, from no load to full load. During this change of load or surge, the speed shall not vary by more than plus or minus 5% of the rated speed.

4.2 **Fuel System**

The engine generator fuel day tank for each D.G. Set shall have capacity to store fuel for 24 hours operation of the set at the rated output. The tank shall have level switch for monitoring low fuel level in the tank. The low level switch shall provide an annunciation and prevent starting of set and to stop the set when the fuel in storage tank is at this level. The tank shall be provided with overflow, vent, supply and discharge valves, inspection cover, drain valve and glass sight gauge.

Engine of the generator shall operate on commercial high speed Diesel oil. A fuel oil strainer/filter shall be provided in the fuel line. Fuel system for Diesel engine shall be through explosion proof self-priming pump. The fuel system shall comprise:

- Underground fuel storage tank. (Common for both D.G. Sets)
- Fuel transfer pump(s). (Separate for each D.G. Set)
- Fuel piping network. (Separate for each D.G. Set)
- Fuel day tank. (For each D.G. Set)

4.2.1 Underground Fuel Storage Tank

The underground outdoor fuel storage tank shall have the capacity as mentioned in BOQ item or shown on the drawings to store fuel for operation of the set at the rated output. The tank shall have high and low level float switches for monitoring the fuel level in the tank. The high and low level switches shall provide an annunciation while the low level switch shall in addition to above annunciation also prevent starting of set and to stop the set when the fuel in storage tank is at this level. The tank shall be provided with overflow, vent, supply and discharge valves, inspection cover, drain valve and glass sight gauge.

The fuel storage tank shall be of mild steel plates and shall be designed, fabricated and finished in accordance with the requirements of DIN 6608 - Horizontal Steel Tanks for underground storage of Petroleum Products in Liquid Form.

Underground fuel storage tank and supports shall be fabricated in accordance with the specified code and the following:

- Tank shall be capable to withstand maximum loads encountered during installation and operation for all conditions from empty tank to tank filled to capacity or overflow.

- Tanks shall be capable to withstand safely the forces and moments imposed by connecting piping.

- The buried tank shall be capable of sustaining lateral backfilling load of equivalent fluid pressure.

- The tank shall be capable of resisting flotation by providing concrete beams or saddles installed over the top of the tank or by hold-down straps bolted to a concrete foundation pad.

- The thickness of tank elements shall be increased over the thickness required by code requirements by 2mm for corrosion allowances.

- The tanks shall be provided with at least two lifting eyes.

- A nameplate shall be attached to manhole flange marked in accordance with the requirements of the code, and shall include following information:

    - Manufacturer's name/mark and year of fabrication,

    - Manufacturer's serial number,

    - Design gauge pressure,

    - Test gauge pressure,

    - Design temperature,

    - Applicable code stamp,

    - Fluid stored,

    - Storage capacity,

    - Tank size.

Welding procedure qualifications, electrodes, preheat, post weld treatment, welder performance tests and submittals shall be in accordance with relevant international codes and standards.

Shell plate joints shall be butt welded with complete penetration and fusion. All joints in the attachments to the shell shall be fully seal welded to prevent rust staining.

Sharp welds and sharp corners shall be ground smooth and blended into the base material. All bottoms of the shell connections shall be flush with the inside of the shell unless otherwise indicated.

The interior surfaces of the tank shall be cleaned of all mill scale, cuttings, weld spatter and other foreign matter and shall receive a commercial sandblast in accordance with SSPC-SP 5.
All openings shall be sealed immediately after the last shell joint is made.

The exterior surfaces of all tank and piping shall be given a protective coating of the epoxy-phenolic-amine type.

All interconnecting steel pipes shall be seamless in accordance with ASTM-A 53 or approved equivalent. Pipe fittings shall be butt-welded type according with ASTM-A 53. All underground pipe and fittings shall be buried in accordance with ASTM D 1557. The pipe surface shall be given a protective coating of the epoxy-phenolic-amine type.

Welds shall be inspected in accordance with section VIII of the ASME Code, DIV-I.

Non-destructive examination procedures shall be submitted for approval before they are implemented.

Results of non-destructive inspection shall be submitted prior to installation as per requirement of section VIII, DIV-I of the ASME Code.

Tank shall be hydrostatically shop tested as required by ASME code, section VIII DIV-I, and shall be dried immediately after the test.

Before a hydrostatic test procedure is implemented it shall be submitted for approval, and shall include the recommended minimum and maximum hydro-test pressure with the corresponding minimum and maximum temperature.

4.2.2 Fuel Transfer Pumps

An explosion proof electric self-priming, fuel pump of suitable capacity to fill the fuel day tank from the outdoor underground fuel storage tank in 30 minutes or lesser time shall be provided. A manual fuel pump shall also be furnished and connected in parallel to the electric fuel pump, with a capacity to fill the tank in 2 hours maximum. All interconnected piping, valves, etc., for

parallel connection of the two pumps shall be furnished. The electric starter, circuit breaker, wiring, etc., for the electric pump shall be provided alongwith the Fuel Storage Tank by the Contractor without any extra cost.

4.2.3 Fuel Piping Network

The fuel piping network separate for each D.G. Set to be furnished shall include fuel supply pipe from storage tank to day tank in the skid of the D.G. set, over flow pipe from the tank to the set, drain pipe from the tank to a location approved by the Engineer.

The arrangement of pipe work with respect to the location of equipment shall be prepared by the Contractor and submitted to Engineer for approval. A full flow oil filter shall be installed in the fuel supply lines with a by-pass arrangement.

4.3 Generator

Generator shall be synchronous. The generator shall be capable of carrying continuously for 1 hour in every 12 hours, overload equal to 10% of rated output with field set for normal rated load excitation.

4.3.1 Excitation

Excitation shall be from brushless rotating diodes mounted on the main shaft for 3-phase full wave rectification.

4.3.2 Windings

Alternator windings shall have Class-F insulation and shall be impregnated for tropical use. The temperature rise of winding under normal operating conditions and at rated load shall not exceed the limits specified for Class-B insulation. Anti-condensate heaters shall be provided for windings. The heaters shall be thermostatically controlled for switching ON after the set has stopped. The thermostat range shall be adjustable and set to prevent overheating of windings. For protection of windings from damage due to overheating, thermistors shall be embedded to stop the set in case the temperature of winding rises above the safe value.

4.3.3 Voltage Regulation

Voltage regulator shall be solid state with provision for manual setting. Regulator shall be so designed to protect the exciter when the set is running at reduced speed during starting or idling of the prime mover.

Voltage regulation shall be plus or minus 0.25% from no-load to full load. Transient voltage drop shall be less than 15% at full load and 0.8 power factor. Time required to restore to steady state conditions after transient voltage fluctuation shall not exceed 10 seconds.

4.3.4 Short Circuit Capability

Generator shall be capable of withstanding without injury, a 30 seconds three-phase short circuit at its terminal when operating at rated output and power factor with fixed excitation.

4.3.5 Deviation Factor

The deviation factor of the open-circuit line-to-line terminal voltage shall not exceed 0.1

4.4 Control / Instrument Panels

The Control / Instrument Panel for each generator shall be designed for front access, completely assembled, wired and tested. The control panel shall conform to the constructional requirements as stated in these specifications for Switchboards. The panel shall comprise but not limited to the following main components.

4.4.1 Generator Panel

This shall incorporate protection and control equipment, measuring instruments, control and instrument transformers, voltage regulator, governor controls, battery charger, indicating lamps, etc.

4.4.1.2 Instruments

i) Ammeter with selector switch.
ii) Voltmeter with selector switch.
iii) Frequency meter.
iv) Kilowatt-meter.
v) Local / OFF / Remote Control Switch.

4.4.2 Engine Panel

An instrument panel on the skid shall have calibrated gauges/meters to measure the following:

i) Engine speed.
ii) Lube oil pressure.
iii) Lube oil temperature.
iv) Engine running hours

4.4.3 Safety Devices

Following safety devices shall be provided. The audible alarm shall operate on any fault condition and shall be resetable manually and automatically through a timer after 15 minutes whichever is earlier:

A = Alarm SD = Shutdown TD = Adjustable Time Delay

i)	Engine Over speed	A SD
ii)	Low lube oil pressure	A SD
iii)	High water temperature	A SD
iv)	Over voltage	A SD (TD=0-30 Sec)
v)	Under voltage	A -
vi)	Low level in fuel day tank	A SD (TD=0-5 min.)
vii)	High level in fuel day tank	A -
viii)	Charger failure	A -
ix)	Over crank	A SD
x)	Low crankcase oil level	A -
xi)	High crankcase oil level	A -
xii)	Charging alternator failure	A -

After shut down, the set shall lockout and it shall not be possible to start it unless manually reset after the cause of fault has been removed.

4.4.3 Batteries & Battery Charger

The batteries provided with each D.G. Set shall be of sufficient capacity to perform all required functions; including the operation and control of AMF Panel and Automatic Transformer Switch (ATS).

Battery charger shall be static type and shall provide for both trickle and boost charging of the batteries when the engine is not in operation. The charger shall be of suitable capacity to fully recharge the completely discharged batteries within four hours at boost charge.

4.4.5 Lamp Test Facility

A common lamp test facility shall be provided for each control panel/instrument panel.

4.5 **Automatic Transfer Switch (ATS)**

The Automatic Transfer Switch shall be 4 pole and rated for cumulative capacity of the two generators. ATS shall employ two numbers motorized Air Circuit Breakers to feed the load from the main supply or generators.

5.0 INSTALLATIONS & TESTING

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

All installation materials for physically installing the Diesel generator set and associated equipment, such as bolts, nuts, washers, supporting steel, etc., shall be provided and installed by the Contractor. The generator shall be installed upright and in level and shall be firmly and rigidly bolted to the steel frame skid with vibration isolators.

The Diesel generator set shall be completely erected as per manufacturer's instructions and as approved by the Engineer. Loose parts dispatched by the manufacturer shall be installed and connected as per assembly drawing provided by the manufacturer. Any safety locking of meter, relays, etc., provided by the manufacturer for safe transport shall be released only after the generator/ control panel is erected in position.

The incoming and outgoing cables shall be connected as recommended by cable manufacturer. The cable armour shall be connected effectively to ground.

The Diesel generator and associated equipment body shall be connected to earth as per instructions given in section “Earthing" of these Specifications. The Diesel generator set shall be tested and commissioned in the presence of the Engineer. The tests to be carried out are described in article “Testing" of General Specifications for Electrical Works, Section-8001 of these Specifications.

The tank shall be installed in accordance with best engineering practice/international codes, the approved shop drawings, applicable code requirements and manufacturer's instructions.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against each item of Bill of Quantities as given below shall include supply, installation, testing, commissioning and completion for all work specified herein and/or as shown on the Tender Drawing/B.O.Q. related to the item.

6.2 Diesel Generator Set

6.2.1 Measurement

Measurement shall be made for each Diesel Generator Set including Fuel Day Tank, Control/Instrument Panel, Gravity Louvers, and Control Wiring to Control/Instrument Panel of other generator, AMF Panel, L.T switchboard etc. acceptably supplied and installed by the Contractor as a complete job.

6.2.2 Payment

Payment shall be made for the number of jobs measured as provided above at the Contract unit price each for supply, installation, testing, commissioning and completion of the Diesel Generator Set, including its reinforced concrete foundation, Fuel Day Tank, Gravity Louvers matching with radiator, Control / Instrument Panels and accessories, control wiring between D.G. set and Control/Instrument Panel, AMF Panel, L.T switchboard fixing arrangements, all testing arrangements, etc.

6.3 **Fuel System**

6.3.1 Measurement:

Measurement shall be made for Fuel System comprising underground Fuel Storage Tank of capacity mentioned in BOQ/drawings including pumps all accessories and piping acceptably supplied and installed by the Contractor as a complete Job.

6.3.2 Payment

Payment shall be made for the number of jobs measured, as provided above at the Contract unit price each and shall constitute full compensation for supply, installation, testing and commissioning of underground fuel storage tank with excavation, backfilling, sand filling, reinforced concrete foundation/structure (including reinforcement) and fixing / supporting structure and all other accessories complete with all type of valves, fuel transfer pumps (both electric and manual) float switches control / power wiring, control panel for automatic operation of the pumps, for each generator fuel piping network with required filters for each generator as per Specifications and required for normal operation of both D.G. set.

6.4 **Spare Parts**

6.4.1 Measurement

Measurement shall be made for the spare parts of Diesel generator set as listed in form of Tender Volume-I, acceptably supplied by the Contractor as a complete lot.

6.5.2 Payment

Payment will be made for the complete job of spare parts as provided above at the Contract unit price and shall constitute full compensation for supply, tagging, and packing of spare parts including wooden/steel storage boxes as required.

*** End of Section 8111 ***

SECTION - 8111

LOW VOLTAGE D.G. SETS

1.0 SCOPE

The work under this section consists of supplying, installing, testing and commissioning of all material and services of the complete Diesel generator sets including Generators Control, AMF/Synch Panel (GCP) and other equipment, as specified herein, shown on the Tender Drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at Site with other services for exact location and position of the electrical equipments, underground storage tanks and routing of cables.

The Diesel generator sets, Instrument/Control Panel, Generators Control, AMF/Synch Panel (GCP) and accessories shall comply with the General Specifications for Electrical Works, Section-8001, and other relevant provisions of the Tender Document.

2.0 GENERAL

The Diesel generator sets shall be a standard design of reputed manufacturer, who shall have similar units in operations for similar applications and field conditions. The manufacturer shall also have adequate maintenance facilities in the vicinity of Project with technically qualified and experienced personnel trained for operation and on-site maintenance of equipment offered by the Contractor in the tender bid.

The D.G. sets shall be rated for continuous duty and suitable for indoor installation with protection rating IP23. It shall be capable for unbalance loads upto 30% of actual load and for continuous part load operation. The sets shall be capable of starting and operation at the rated output at 50^{o} Centigrade and at an altitude of 1673 feet above mean sea level. The ratings must be substantiated with manufacturer's standard published data.

The Diesel Generator sets shall, after reducing the power absorbed by the auxiliaries, deliver continuously rated power output under the site conditions. All auxiliaries, accessories and connections between systems alongwith all necessary cables, fittings, hardware, etc., for complete installation of Diesel Engine, Generator, Control / Instrument Panel, Generators Control, AMF/Synch Panel (GCP), Duty Selection Switch, Fuel and Oil Storage, Batteries, Exhaust System, etc., shall be furnished by the Contractor.

The engine shall be directly coupled to the generator, and shall have a rated speed of 1500 rpm. The set shall be capable of sustaining without damage, 25% over speed under any abnormal operating condition.

The engine-generator set shall be mounted on suitable rigid steel frame skid with vibration isolators. Heavy duty lifting eyes and jacking screws shall be

provided on the skid. The foundation bolts and all other material/hardware for complete installation of the set shall be furnished with the set. Any excessive torsional vibration shall be avoided for both engine and alternator.

The D.G. sets shall be suitable for full load starting. When the generator is operating at no-load, the application of full load current, taking into account the surge due to starting of equipment, should be possible with maximum transient voltage drop of 15% of the rated voltage, and the time taken to restore the generator voltage to 97% of rated value should not exceed 1.5 seconds.

The D.G. sets shall be capable for parallel operation.

The Contractor shall submit the equipment layout and other installation details as per manufacturer's recommendations for approval of the Engineer at least 30 days prior to the installation of the set.

Necessary provision, including connections and a Local / OFF / Remote control switch shall be made in the Generator Panel of each of the D.G. Set. The cost of such provision, connection, testing and commissioning are deemed to be included in the Cost of D.G. Sets and no separate payment shall be made against such works.

3.0 APPLICABLE STANDARDS/CODES

The Diesel engine and generator shall conform to the following standards as applicable.

BS 5514 - Reciprocating Internal Combustion Engine.

BS 4999 - General Requirements for Rotating Electrical Machines.

BS 5000-99 - Rotating Electrical Machines of particular types or for particular application.

For other equipment and materials related to the Diesel generator set, the Contractor shall follow relevant international standards, details of which shall be submitted to the Engineer for approval.

4.0 MATERIAL

4.1 Diesel Engine

The Diesel Engine shall be four strokes, compression ignition, suitable for continuous duty.

Starting shall be through electric starter motor operated on DC supply from lead acid batteries mounted on the skid. The batteries shall be furnished with the set.

The engine shall be equipped with an alternator type automatic charging system to charge the batteries during running of engine. A static battery charger installed in the control panel shall also be provided to charge the batteries when the engine is not running. Suitable interlocks shall be provided to prevent simultaneous operation of both charging systems.

The batteries shall be adequate to satisfy the following requirements:

a. Crank the engine at firing speed for at least 15 seconds.

b. If the engine does not start on the first attempt, crank the engine two more times for the above duration at an interval of 30 seconds between each cranking operation.

Engine shall be rated for continuous duty with overload capability for operating at least 10% above the rated capacity for 1 hour continuously in any 12 hours operation.

4.1.1 Air Intake

Air intake shall be through turbo charger and equipped with dry type filter. Suitable attenuators shall be installed to reduce noise at the air inlet.

4.1.2 Engine Lubrication

A gear type positive pressure lubrication pump shall be provided with efficient filtration arrangement for the lubrication system. A 230V AC mains operated heater with thermostat shall be provided in the crankcase.

The heater shall be designed for automatic switching to ensure that temperature of oil is maintained for proper operation of the engine.

Engine shall have a constant oil level regulator, gravity fed from an engine mounted lube oil reservoir. Reservoir shall be equipped with an oil level gauge.

A crankcase pressure release valve shall be provided to operate during excess pressure.

4.1.3 Engine Cooling

Engine shall have a forced air draft, water-cooled radiator supplied with a core guard. Cooling system shall have an engine driven centrifugal pump for cooling water circulation. Cooling shall be thermostatically controlled. An engine shut down timer shall be provided to keep the engine running on no-load after any operation of set, so that the engine is sufficiently cooled to start

again instantly, if required, without rise in temperature above safe limits.

4.1.4 Exhaust System, Noise, Pollution

Exhaust system shall be equipped with a residential type silencer complete with muffler, exhaust manifold, flexible connector, exhaust elbow, exhaust pipe, rain cap, and associated fittings. The exhaust line shall be taken outside the Basement through the shortest possible and practical route, without any undue bends to avoid exceeding optimum. Exhaust Back pressure should be kept as low as possible to avoid poor engine performance and poor durability. The Back pressure limit for the engine should be according to as recommended by the engine manufacturer. The Contractor has to submit the exhaust Back pressure calculations for Engineer's approval. The exhaust line shall be adequately covered with thermal insulation material over its entire length i.e. from the engine to the termination point. All supports for exhaust system shall be furnished by the Contractor.

The sound level in the diesel generator room shall not exceed the values of the noise rating curve NRC 95 to ISO T1 43-1961 standard, measured at 1 meter distance from the object but in no case greater than 90 dB(A) under all operating conditions.

The exhaust fumes shall be burnt completely and be free of solid matters before escaping to the air. Necessary protection arrangement is to be provided to avoid soot deposit on adjacent building.

4.1.5 Speed Governor

Governor shall regulate engine speed so as to maintain the generator frequency within plus or minus 2% of the rated frequency. Stable engine speed shall be attained within 15 seconds after the engine has been started. Stable engine speed shall be restored within 10 seconds of any sudden change in load, from no load to full load. During this change of load or surge, the speed shall not vary by more than plus or minus 5% of the rated speed

4.2 **Fuel System**

Engine of the generator shall operate on commercial high speed Diesel oil. A fuel oil strainer/filter shall be provided in the fuel line. Fuel system for Diesel engine shall be through explosion proof self-priming pump. The fuel system shall comprise:

- Underground fuel storage tank. (Common for all D.G. Sets)

- Fuel transfer pump(s). (Separate for each D.G. Set)
- Fuel piping network. (Separate for each D.G. Set)
- Fuel day tank. (Separate for each D.G. Set)

4.2.1 Underground Fuel Storage Tank

The underground outdoor fuel storage tank shall have the capacity as mentioned in BOQ item or shown on the drawings to store fuel for operation of the set at the rated output. The tank shall have high and low level float switches for monitoring the fuel level in the tank. The high and low level switches shall provide an annunciation while the low level switch shall in addition to above annunciation also prevent starting of set and to stop the set when the fuel in storage tank is at this level. The tank shall be provided with overflow, vent, supply and discharge valves, inspection cover, drain valve and glass sight gauge.

The fuel storage tank shall be of mild steel plates and shall be designed, fabricated and finished in accordance with the requirements of DIN 6608 - Horizontal Steel Tanks for underground storage of Petroleum Products in Liquid Form.

Underground fuel storage tank and supports shall be fabricated in accordance with the specified code and the following:

- Tank shall be capable to withstand maximum loads encountered during installation and operation for all conditions from empty tank to tank filled to capacity or overflow.
- Tank shall be in accordance with the relevant BOCA or UBC code requirement for seismic load which ever is more stringent.
- Tanks shall be capable to withstand safely the forces and moments imposed by connecting piping.
- The buried tank shall be capable of sustaining lateral backfilling load of equivalent fluid pressure.
- The tank shall be capable of resisting flotation by providing concrete beams or saddles installed over the top of the tank or by hold-down straps bolted to a concrete foundation pad.
- The thickness of tank elements shall be increased over the thickness required by code requirements by 2mm for corrosion allowances.

- The tanks shall be of welded construction in compliance with specified DIN standard and/or section VIII of the ASME code, DIV I.

- The tanks shall be provided with at least two lifting eyes.

- A nameplate shall be attached to manhole flange marked in accordance with the requirements of the code, and shall include following information:

  Manufacturer's name/mark and year of fabrication,

  Manufacturer's serial number,

  Design gauge pressure,

  Test gauge pressure,

  Design temperature,

  Applicable code stamp,

  Fluid stored,

  Storage capacity,

  Tank size.

Welding procedure qualifications, electrodes, preheat, post weld treatment, welder performance tests and submittals shall be in accordance with relevant international codes and standards.

Shell plate joints shall be butt welded with complete penetration and fusion. All joints in the attachments to the shell shall be fully seal welded to prevent rust staining.

Sharp welds and sharp corners shall be ground smooth and blended into the base material. All bottoms of the shell connections shall be flush with the inside of the shell unless otherwise indicated.

The interior surfaces of the tank shall be cleaned of all mill scale, cuttings, weld spatter and other foreign matter and shall receive a commercial sandblast in accordance with SSPC-SP 5.

All openings shall be sealed immediately after the last shell joint is made.

The exterior surfaces of all tank and piping shall be given a protective coating of the epoxy-phenolic-amine type.

All interconnecting steel pipes shall be seamless in accordance with ASTM-A 53 or approved equivalent. Pipefittings shall be

butt-welded type according with ASTM-A 53. All underground pipe and fittings shall be buried in accordance with ASTM D 1557. The pipe surface shall be given a protective coating of the epoxy-phenolic-amine type.

Welds shall be inspected in accordance with section VIII of the ASME Code, DIV-I.

Non-destructive examination procedures shall be submitted for approval before they are implemented.

Results of non-destructive inspection shall be submitted prior to installation as per requirement of section VIII, DIV-I of the ASME Code.

Tank shall be hydrostatically shop tested as required by ASME code, section VIII DIV-I, and shall be dried immediately after the test.

Before a hydrostatic test procedure is implemented it shall be submitted for approval, and shall include the recommended minimum and maximum hydro-test pressure with the corresponding minimum and maximum temperature.

All test results shall be submitted.

4.2.2 Fuel Transfer Pumps

An explosion proof electric self-priming, fuel pump of suitable capacity to fill the fuel day tank from the outdoor underground fuel storage tank in 30 minutes or lesser time shall be provided. A manual fuel pump shall also be furnished and connected in parallel to the electric fuel pump, with a capacity to fill the tank in 2 hours maximum. All interconnected piping, valves, etc., for parallel connection of the two pumps shall be furnished. The electric starter, circuit breaker, wiring, etc., for the electric pump shall be provided alongwith the Fuel Storage Tank by the Contractor without any extra cost.

4.2.3 Fuel Piping Network

The fuel piping network separate for each D.G. set to be furnished shall include fuel supply pipe from storage tank to day tank in the skid of the D.G. set, over flow pipe from the tank to the set, drain pipe from the tank to a location approved by the Engineer.

The arrangement of pipe work with respect to the location of equipment shall be prepared by the Contractor and submitted to Engineer for approval. A full flow oil filter shall be installed in the fuel supply lines with a by-pass arrangement.

4.2.4 Fuel Day Tank

The engine generator skid mounted fuel day tank for each D.G. Set shall have capacity to store fuel for 8 hours operation of the set at the rated output. The tank shall have level switch for monitoring low fuel level in the tank. The low level switch shall provide an annunciation and prevent starting of set and to stop the set when the fuel in storage tank is at this level. The tank shall be provided with overflow, vent, supply and discharge valves, inspection cover, drain valve and glass sight gauge.

4.3 Generator

Generator shall be synchronous. The generator shall be capable of carrying continuously for 1 hour in every 12 hours, overload equal to 10% of rated output with field set for normal rated load excitation.

4.3.1 Excitation

Excitation shall be from brush less rotating diodes mounted on the main shaft for 3-phase full wave rectification.

4.3.2 Windings

Alternator windings shall have Class-F insulation and shall be impregnated for tropical use. The temperature rise of winding under normal operating conditions and at rated load shall not exceed the limits specified for Class-B insulation. Anti-condensate heaters shall be provided for windings. The heaters shall be thermostatically controlled for switching ON after the set has stopped. The thermostat range shall be adjustable and set to prevent overheating of windings. For protection of windings from damage due to overheating, thermistors shall be embedded to stop the set in case the temperature of winding rises above the safe value.

4.3.3 Voltage Regulation

Voltage regulator shall be solid state with provision for manual setting. Regulator shall be so designed to protect the exciter when the set is running at reduced speed during starting or idling of the prime mover.

Voltage regulation shall be plus or minus 2.5% from no-load to full load. Transient voltage drop shall be less than 15% at full load and 0.8 power factor. Time required to restore to steady

state conditions after transient voltage fluctuation shall not exceed 10 seconds.

4.3.4 Short Circuit Capability

Generator shall be capable of withstanding without injury, a 30 seconds three-phase short circuit at its terminal when operating at rated output and power factor with fixed excitation.

4.3.5 Deviation Factor

The deviation factor of the open-circuit line-to-line terminal voltage shall not exceed 0.1

4.4 Control / Instrument Panels

The Control / Instrument Panel for the generator shall be designed for front access, completely assembled, wired and tested. The control panel shall conform to the constructional requirements as stated in these Specifications Section – 8132 for LT Switchboards. The panel shall comprise but not limited to the following main components.

4.4.1 Generator Panel

This shall incorporate protection and control equipment, measuring instruments, control and instrument transformers, voltage regulator, governor controls, battery charger, indicating lamps, etc.

4.4.1.1 Circuit Breaker

The circuit breaker shall be four pole with adjustable releases for thermal overload, instantaneous over current, under voltage and over voltage protections.

4.4.1.2 Instrumentation

LED/LCD display with adjustable contrast and backlight with auto power off providing following details:

AC metering

i) Volts 3-phase (L-L & L-N)
ii) Amps (per phase & Average)
iii) Frequency (Hz)
iv) kW (total & per phase)
v) kVA (total & per phase)
vi) kVAr (total & per phase)
vii) Power Factor (overall & per phase)
viii) kW hours
ix) kVAr hours

An kWh (energy meter) shall be provided in compliance to the requirements of Electrical Inspector covering the region (area), in addition to the above mentioned metering.

DC metering

i) Battery Volts
ii) Engine hours run
iii) Engine Jacket Water Temperature
iv) Lube Oil Pressure
v) Lube Oil Temperature
vi) Crank attempt counter
vii) Start counter
viii) Engine Speed
ix) Fuel Oil Level

4.4.3 Safety Devices (Protections)

Following safety devices shall be provided. The audible alarm shall operate on any fault condition and shall be resetable manually and automatically through a timer after 15 minutes whichever is earlier:

A = Alarm SD = Shutdown TD = Adjustable Time Delay

i)	Engine Over speed/under speed	A SD
ii)	Low lube oil pressure	A SD
iii)	High water temperature	A SD
iv)	Over voltage	A SD (TD=0-30 Sec)
v)	Under voltage	A -
vi)	Short circuit and tripping of circuit breaker	A SD (TD=0-1 min.)
vii)	Low level in fuel day tank	A SD (TD=0-5 min.)
viii)	High level in fuel day tank	A -
ix)	Battery Charger failure	A -
x)	Winding temperature high	A SD (TD=0-2 min.)
xi)	Over crank – Fail to start	A SD
xii)	Under/Over frequency	A SD
xiii)	Low/High battery voltage	A -
xiv)	Charging alternator failure	A -

After shut down, the set shall lockout and it shall not be possible to start it unless manually reset after the cause of fault has been removed.

4.4.4 Controls

Following Controls shall be provided as a minimum:

i) Auto-Manual-Test-Stop key with LED indicator
ii) Lamp test key
iii) Alarm acknowledge key
iv) Status indicators (1 red shutdown, 1 amber warning)
v) Lock down emergency stop push button.

4.4.5 Battery Charger

Battery charger shall be static type and shall provide for both trickle and boost charging of the batteries when the engine is not in operation. The charger shall be of suitable capacity to fully recharge the completely discharged batteries within four hours at boost charge. Charger shall operate on 220V, 50 Hz power supply.

4.5 Generators Control, AMF/Synch Panel (GCP)

Three diesel generator sets are provided to supply power in case of Mains (utility) power supply failure. The sets shall be capable for parallel operation and will share the load to meet the system load demand.

The Generators Control, AMF/Synch Panel (GCP) shall be broadly designed for the following operations.

a) When the mains supply fails or main supply voltage drops to 360 volts or rises to 440 volts (the setting voltages shall be adjustable within –5% and +5% respectively for the lower and upper ranges), the generator sets shall start immediately and synchronize. If the sets fail to start in first attempt then two successive attempts shall be made.

b) Incoming ACB's of Transformers T1, and T2 in LT Switchboard (MLTP) shall be opened.

c) As the D.G. Sets are synchronized on common bus and are ready to take load after rated speed/frequency and voltage have been achieved, the ACB's of Main LT Switchboard (MLTP) which are fed from Generators Control, AMF/Synch Panel (GCP) shall be closed in sequence. All loads shall be transferred to the Generators.

d) All the generator sets assume their proportional share of the total load on the bus based on the percentage adjustable load sharing.

e) If the total load on the bus can safely be carried out by lesser number of generator sets then the generator sets in reverse order of duty shall shut down automatically.

f) If the load increases or on failure of an operating generator set the idle unit(s) shall automatically start, parallel and share system load as per values set through load sharing.

g) The system shall transfer the load from the generator to main supply whenever the voltage returns and persists for at least 3 minutes.

h) The system shall be self-resetting after each cycle of operation.

i) A four-position selector switch shall be provided for selecting the operation mode i.e. Test-Manual-Automatic-Stop/Maintenance mode to facilitate the following operation:-

i) Automatic

As described above.

ii) Manual

Manual starting of the sets and load transfer from transformer to generator and vice versa.

iii) Test

Testing the changeover operation when so desired, and also for starting and running the set without interrupting the normal operation. In case of failure of main supply during testing, the set shall automatically revert to automatic mode of operation.

iv) Stop/Maintenance

Provision shall be made to isolate the system for troubleshooting and maintenance without interruption of mains power supply. The set shall not be capable of starting in this condition.

j) The Duty Selection Switch shall be provided so that either of the five generators can be used as Duty-I or Duty-II or Duty III or Duty IV & Duty-V Generator. In case if load demand is only for the smaller D.G. Set then the smaller D.G. Set shall continue to run till the Normal Power Supply restores.

k) Two normally open and two normally close potential free contacts rated for 3 Amps at 230V AC shall be provided, which shall operate when the set is started with the operation mode selector switch in auto or manual position. The contacts shall be wired upto the terminal block in panel.

All necessary controls and instruments including the Synchronizing device, synchroscope, power factor meters, voltmeters, percentage

adjustable Load Sharing device, etc. shall be provided with the Generators Control, AMF/synch Panel (GCP).

All necessary coordination, provision and connections for control logic of the above Diesel Generator Sets with the Main LT Switchboard (MLTP) shall be made by the Contractor. Programmable logic circuit (PLC) equipment shall be provided for controls with manual by-pass facility, which shall be utilized in case of PLC equipment maintenance / failure.

Specification Section – 8132 for LT Switchboards shall be applicable for the constructional requirements/component Specifications of the Generators Control, AMF/Synch Panel (GCP).

The manufacturer shall discuss the scheme with the Engineer and obtain approval prior to manufacturing, final testing and commissioning.

4.6 Generator Neutral Disconnecting Switch

A motorized switch for generator neutral disconnection shall be provided for each D.G. Set neutral earthing. The switch shall be rated for the maximum current carrying capacity expected through the path during operation.

It is desirable to operate with only one generator neutral disconnecting switch closed at a time during operation of D.G. Sets, to eliminate any circulating harmonics or zero sequence currents through neutral.

5.0 INSTALLATION & TESTING

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

All installation materials for physically installing the Diesel generator set and associated equipment, such as bolts, nuts, washers, supporting steel, etc., shall be provided and installed by the Contractor. The generator shall be installed upright and in level and shall be firmly and rigidly bolted to the steel frame skid with vibration isolators.

The Diesel generator set shall be completely erected as per manufacturer's instructions and as approved by the Engineer. Loose parts dispatched by the manufacturer shall be installed and connected as per assembly drawing provided by the manufacturer. Any safety locking of meter, relays, etc., provided

by the manufacturer for safe transport shall be released only after the generator/ control panel is erected in position.

The incoming and outgoing cables shall be connected as recommended by cable manufacturer. The cable armour shall be connected effectively to ground.

The Diesel generator and associated equipment body shall be connected to earth as per instructions given in section "Earthing" of these Specifications. The Diesel generator set shall be tested and commissioned in the presence of the Engineer. The tests to be carried out are described in article "Testing" of General Specifications for Electrical Works, Section-8001 of these Specifications.

The tank shall be installed in accordance with best engineering practice/international codes, the approved shop drawings, applicable code requirements and manufacturer's instructions.

The piping shall be hydrostatically shop tested as required by ASME code, section VIII, DIV-I and will be dried immediately after the test.

No separate payment is admissible for testing and commissioning of low voltage D.G. set, associated equipment and piping and is deemed to have been included in the BOQ rates of the Low voltage D.G. set and fuel system.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against each item of Bill of Quantities as given below shall include supply, installation, testing, commissioning and completion for all work specified herein and/or as shown on the Tender Drawing/B.O.Q. related to the item.

6.2 Diesel Generator Sets

6.2.1 Measurement

Measurement shall be made for Diesel Generator Set with all accessories including Fuel Day Tank, Control/Instrument Panel, motorized generator neutral disconnecting switch, Control Wiring to Control/Instrument Panel, GCP, LT switchboard etc. acceptably supplied and installed by the Contractor as a complete job.

6.2.2 Payment

Payment shall be made for the number of jobs measured as provided above at the Contract unit price each for supplying, installing, testing, commissioning and completion of the Diesel Generator Set, reinforced concrete foundation, Fuel Day Tank, Control / Instrument Panels and accessories, motorized generator neutral disconnecting switch, control wiring between D.G. set and Control/Instrument Panel, GCP, LT Switchboard, motorized generator neutral disconnecting switch, fixing arrangements, all testing arrangements with load bank, etc.

6.3 Fuel System

6.3.1 Measurement:

Measurement shall be made for Fuel System comprising underground Fuel Storage Tank of capacity mentioned in BOQ/drawings including pumps, all accessories and piping acceptably supplied and installed by the Contractor as a complete Job.

6.3.2 Payment

Payment shall be made for the number of jobs measured, as provided above at the Contract unit price each and shall constitute full compensation for supplying, installing, testing and commissioning of underground fuel storage tank with excavation, backfilling, sand/gravel filling, reinforced concrete foundation/ structure (including reinforcement) and fixing/supporting structure and all other accessories complete with all type of valves, fuel transfer pumps (both electric and manual) float switches control/power wiring, control panel for automatic operation of the pumps, for each generator fuel piping network with required filters for each generator as per Specifications and required for normal operation of the D.G. sets.

6.4 Generators Control, AMF/Synch Panel (GCP)

6.4.1 Measurement

Measurement shall be made for Generators Control, AMF/Synch Panel (GCP) as given in BOQ acceptably supplied and installed by the Contractor as a complete job.

6.4.2 Payment

Payment shall be made for the total number of job measured, as provided above, at the Contract unit price each and shall constitute full compensation of design, fabricating, supplying, installing, connecting, testing, commissioning of GCP with all

erecting material such as foundation bolts, supporting steel channel, nuts, washers, cable glands etc including all coordination, provision and connections of PLC equipment with manual by-pass switch for control logic of Diesel Generator Sets with the Main LT Switchboard (MLTP) including any wiring, required components, auxiliary switches, contacts etc. to be provided in the Main LT Switchboard.

6.5 Spare Parts

6.5.1 Measurement

Measurement shall be made for the spare parts of Diesel generator set as listed in Schedule J-5 in form of Tender Volume-I, acceptably supplied by the Contractor as a complete lot.

6.5.2 Payment

Payment will be made for the complete job of spare parts as provided above at the Contract unit price and shall constitute full compensation for supplying, tagging, packing of spare parts including wooden/steel storage boxes as required.

SECTION – 8111

LOW VOLTAGE D.G. SET

1.0 SCOPE OF WORK

2.0 GENERAL

3.0 APPLICABLE STANDARDS/CODES

4.0 MATERIAL

5.0 INSTALLATIONS & TESTING

6.0 MEASUREMENT AND PAYMENT

1.0 SCOPE OF WORK

The work under this section consists of supply, installation, testing and commissioning of all material and services of the complete Diesel generator set, Auto Main Failure (AMF) Panel and other equipment, as specified herein, shown on the Tender Drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at Site with other services for exact location and position of the Diesel Generator Set, Auto-Main Failure (AMF) Panel, underground / above ground storage tanks and routing of cables.

The Diesel generator set, Instrument/Control Panel, auto main failure panel and accessories shall comply with the General Specifications for Electrical Works, Section-8001, and other relevant provisions of the Tender Document.

2.0 GENERAL

The Diesel generator set shall be a standard design of reputed manufacturer, who shall have similar units in operations for similar applications and field conditions. The manufacturer shall also have adequate maintenance facilities in the vicinity of Project with technically qualified and experienced personnel trained for operation and on-site maintenance of equipment offered by the Contractor in the tender bid.

The set shall be rated for continuous duty and suitable for indoor installation with protection rating IP23. It shall be capable for unbalance loads upto 30% of actual load and for continuous part load operation. The set shall be capable of starting and operation at the rated output at $0^{o}C$ and at an altitude of 15 meters above mean sea level. The ratings must be substantiated with manufacturer's standard published data.

The Diesel Generator set shall, after reducing the power absorbed by the auxiliaries, deliver continuously rated power output under the site conditions. All auxiliaries, accessories and connections between systems alongwith all necessary cables, fittings, hardware, etc., for complete installation of Diesel Engine, Generator, Control / Instrument Panel, Auto-Main Failure (AMF) Panel, Duty Selection Switch, Fuel and Oil Storage, Batteries, Exhaust System, etc., shall be furnished by the Contractor.

The engine shall be directly coupled to the generator, and shall have a rated speed of 1500 rpm. The set shall be capable of sustaining without damage, 15% over speed under any abnormal operating condition.

The engine-generator set shall be mounted on suitable rigid steel frame skid with vibration isolators. Heavy duty lifting eyes and jacking screws shall be provided on the skid. The foundation bolts and all other material/hardware for complete

installation of the set shall be furnished with the set. Any excessive torsional vibration shall be avoided for both engine and alternator.

The set shall be suitable for full load starting. When the generator is operating at no-load, the application of full load current, taking into account the surge due to starting of equipment, should be possible with maximum transient voltage drop of 15% of the rated voltage, and the time taken to restore the generator voltage to 97% of rated value should not exceed 1.5 seconds.

The set shall be capable for parallel operation.

The Contractor shall submit the equipment layout and other installation details as per manufacturer's recommendations for approval of the Engineer at least 60 days prior to the installation of the set.

Necessary provision, including connections and a Local / OFF / Remote control switch shall be made in the Generator Panel of each of the D.G. Set. The cost of such provision, connection, testing and commissioning are deemed to be included in the Cost of D.G. Sets and no separate payment shall be made against such works.

3.0 APPLICABLE STANDARDS/CODES

The Diesel engine and generator shall conform to the following standards as applicable.

- BS 5514 - Reciprocating Internal Combustion Engine.
- BS 4999 - General Requirements for Rotating Electrical Machines.
- BS 5000-99 - Rotating Electrical Machines of particular types or for Particular application.

For other equipment and materials related to the Diesel generator set, the Contractor shall follow relevant international standards, details of which shall be submitted to the Engineer for approval.

4.0 MATERIAL

4.1 Diesel Engine

The Diesel Engine shall be four strokes, compression ignition, suitable for continuous duty.
Starting shall be through electric starter motor operated on DC supply from lead acid batteries mounted on the skid. The batteries shall be furnished with the set.

The engine shall be equipped with an alternator type automatic charging system to charge the batteries during running of engine. A static battery charger installed in the control panel shall also be provided to charge the batteries when the engine is not running. Suitable interlocks shall be provided to prevent simultaneous operation of both charging systems.

The batteries shall be adequate to satisfy the following requirements:

a. Crank the engine at firing speed for at least 15 seconds.

b. If the engine does not start on the first attempt, crank the engine two more times for the above duration at an interval of 30 seconds between each cranking operation.
Engine shall be rated for continuous duty with overload capability for operating at least 10% above the rated capacity for 1 hour continuously in any 12 hours operation.

4.1.1 Air Intake

Air intake shall be through turbo charger and equipped with dry type filter. Suitable attenuators shall be installed to reduce noise at the air inlet.

4.1.2 Engine Lubrication

A gear type positive pressure lubrication pump shall be provided with efficient filtration arrangement for the lubrication system.

The heater shall be designed for automatic switching to ensure that temperature of oil is maintained for proper operation of the engine.

Engine shall have a constant oil level regulator, gravity fed from an engine mounted lube oil reservoir. Reservoir shall be equipped with an oil level gauge. Size of the reservoir should be suitable for 30 days continuous operation at full load.

A crankcase pressure release valve shall be provided to operate during excess pressure.

4.1.3 Engine Cooling

Engine shall have a forced air draft, water-cooled radiator supplied with a core guard. Cooling system shall have an engine driven centrifugal pump for cooling water circulation. Cooling shall be thermostatically controlled. An engine shut down timer shall be provided to keep the engine running on no-load after any operation of set, so that the engine is sufficiently cooled to start again instantly, if required, without rise in temperature above safe limits.

4.1.4 Exhaust System, Noise, Pollution

Exhaust system shall be equipped with a residential type silencer complete with muffler, exhaust manifold, flexible connector, exhaust elbow, exhaust pipe, rain cap, and associated fittings. The exhaust line shall be taken outside the building through the shortest possible and practical route, without any undue bends. This exhaust line shall be adequately covered with thermal insulation material over its entire length i.e. from the engine to the termination point. All supports for exhaust system shall be furnished.

The sound level in the diesel generator room shall not exceed the values of the noise rating curve NRC 95 to ISO TI 43-1961 standard, measured at 1 m distance from the object but in no case greater than 85 dB (A) under all operating conditions.

The exhaust fumes shall be burnt completely and be free of solid matters before escaping to the air.

4.1.5 Speed Governor

The speed governor shall be electronic type. Governor shall regulate engine speed so as to maintain the generator frequency within plus or minus 0.25% of the rated frequency. Stable engine speed shall be attained within 15 seconds after the engine has been started. Stable engine speed shall be restored within 10 seconds of any sudden change in load, from no load to full load. During this change of load or surge, the speed shall not vary by more than plus or minus 5% of the rated speed.

4.2 **Fuel System**

The engine generator fuel day tank for each D.G. Set shall have capacity to store fuel for 24 hours operation of the set at the rated output. The tank shall have level switch for monitoring low fuel level in the tank. The low level switch shall provide an annunciation and prevent starting of set and to stop the set when the fuel in storage tank is at this level. The tank shall be provided with overflow, vent, supply and discharge valves, inspection cover, drain valve and glass sight gauge.

Engine of the generator shall operate on commercial high speed Diesel oil. A fuel oil strainer/filter shall be provided in the fuel line. Fuel system for Diesel engine shall be through explosion proof self-priming pump. The fuel system shall comprise:

- Underground fuel storage tank. (Common for both D.G. Sets)
- Fuel transfer pump(s). (Separate for each D.G. Set)
- Fuel piping network. (Separate for each D.G. Set)
- Fuel day tank. (For each D.G. Set)

4.2.1 Underground Fuel Storage Tank

The underground outdoor fuel storage tank shall have the capacity as mentioned in BOQ item or shown on the drawings to store fuel for operation of the set at the rated output. The tank shall have high and low level float switches for monitoring the fuel level in the tank. The high and low level switches shall provide an annunciation while the low level switch shall in addition to above annunciation also prevent starting of set and to stop the set when the fuel in storage tank is at this level. The tank shall be provided with overflow, vent, supply and discharge valves, inspection cover, drain valve and glass sight gauge.

The fuel storage tank shall be of mild steel plates and shall be designed, fabricated and finished in accordance with the requirements of DIN 6608 - Horizontal Steel Tanks for underground storage of Petroleum Products in Liquid Form.

Underground fuel storage tank and supports shall be fabricated in accordance with the specified code and the following:

- Tank shall be capable to withstand maximum loads encountered during installation and operation for all conditions from empty tank to tank filled to capacity or overflow.

- Tanks shall be capable to withstand safely the forces and moments imposed by connecting piping.

- The buried tank shall be capable of sustaining lateral backfilling load of equivalent fluid pressure.

- The tank shall be capable of resisting flotation by providing concrete beams or saddles installed over the top of the tank or by hold-down straps bolted to a concrete foundation pad.

- The thickness of tank elements shall be increased over the thickness required by code requirements by 2mm for corrosion allowances.

- The tanks shall be provided with at least two lifting eyes.

- A nameplate shall be attached to manhole flange marked in accordance with the requirements of the code, and shall include following information:

    - Manufacturer's name/mark and year of fabrication,

    - Manufacturer's serial number,

    - Design gauge pressure,

    - Test gauge pressure,

    - Design temperature,

    - Applicable code stamp,

    - Fluid stored,

    - Storage capacity,

    - Tank size.

Welding procedure qualifications, electrodes, preheat, post weld treatment, welder performance tests and submittals shall be in accordance with relevant international codes and standards.

Shell plate joints shall be butt welded with complete penetration and fusion. All joints in the attachments to the shell shall be fully seal welded to prevent rust staining.

Sharp welds and sharp corners shall be ground smooth and blended into the base material. All bottoms of the shell connections shall be flush with the inside of the shell unless otherwise indicated.

The interior surfaces of the tank shall be cleaned of all mill scale, cuttings, weld spatter and other foreign matter and shall receive a commercial sandblast in accordance with SSPC-SP 5.
All openings shall be sealed immediately after the last shell joint is made.

The exterior surfaces of all tank and piping shall be given a protective coating of the epoxy-phenolic-amine type.

All interconnecting steel pipes shall be seamless in accordance with ASTM-A 53 or approved equivalent. Pipe fittings shall be butt-welded type according with ASTM-A 53. All underground pipe and fittings shall be buried in accordance with ASTM D 1557. The pipe surface shall be given a protective coating of the epoxy-phenolic-amine type.

Welds shall be inspected in accordance with section VIII of the ASME Code, DIV-I.

Non-destructive examination procedures shall be submitted for approval before they are implemented.

Results of non-destructive inspection shall be submitted prior to installation as per requirement of section VIII, DIV-I of the ASME Code.

Tank shall be hydrostatically shop tested as required by ASME code, section VIII DIV-I, and shall be dried immediately after the test.

Before a hydrostatic test procedure is implemented it shall be submitted for approval, and shall include the recommended minimum and maximum hydro-test pressure with the corresponding minimum and maximum temperature.

4.2.2 Fuel Transfer Pumps

An explosion proof electric self-priming, fuel pump of suitable capacity to fill the fuel day tank from the outdoor underground fuel storage tank in 30 minutes or lesser time shall be provided. A manual fuel pump shall also be furnished and connected in parallel to the electric fuel pump, with a capacity to fill the tank in 2 hours maximum. All interconnected piping, valves, etc., for

parallel connection of the two pumps shall be furnished. The electric starter, circuit breaker, wiring, etc., for the electric pump shall be provided alongwith the Fuel Storage Tank by the Contractor without any extra cost.

4.2.3 Fuel Piping Network

The fuel piping network separate for each D.G. Set to be furnished shall include fuel supply pipe from storage tank to day tank in the skid of the D.G. set, over flow pipe from the tank to the set, drain pipe from the tank to a location approved by the Engineer.

The arrangement of pipe work with respect to the location of equipment shall be prepared by the Contractor and submitted to Engineer for approval. A full flow oil filter shall be installed in the fuel supply lines with a by-pass arrangement.

4.3 Generator

Generator shall be synchronous. The generator shall be capable of carrying continuously for 1 hour in every 12 hours, overload equal to 10% of rated output with field set for normal rated load excitation.

4.3.1 Excitation

Excitation shall be from brushless rotating diodes mounted on the main shaft for 3-phase full wave rectification.

4.3.2 Windings

Alternator windings shall have Class-F insulation and shall be impregnated for tropical use. The temperature rise of winding under normal operating conditions and at rated load shall not exceed the limits specified for Class-B insulation. Anti-condensate heaters shall be provided for windings. The heaters shall be thermostatically controlled for switching ON after the set has stopped. The thermostat range shall be adjustable and set to prevent overheating of windings. For protection of windings from damage due to overheating, thermistors shall be embedded to stop the set in case the temperature of winding rises above the safe value.

4.3.3 Voltage Regulation

Voltage regulator shall be solid state with provision for manual setting. Regulator shall be so designed to protect the exciter when the set is running at reduced speed during starting or idling of the prime mover.

Voltage regulation shall be plus or minus 0.25% from no-load to full load. Transient voltage drop shall be less than 15% at full load and 0.8 power factor. Time required to restore to steady state conditions after transient voltage fluctuation shall not exceed 10 seconds.

4.3.4 Short Circuit Capability

Generator shall be capable of withstanding without injury, a 30 seconds three-phase short circuit at its terminal when operating at rated output and power factor with fixed excitation.

4.3.5 Deviation Factor

The deviation factor of the open-circuit line-to-line terminal voltage shall not exceed 0.1

4.4 Control / Instrument Panels

The Control / Instrument Panel for each generator shall be designed for front access, completely assembled, wired and tested. The control panel shall conform to the constructional requirements as stated in these specifications for Switchboards. The panel shall comprise but not limited to the following main components.

4.4.1 Generator Panel

This shall incorporate protection and control equipment, measuring instruments, control and instrument transformers, voltage regulator, governor controls, battery charger, indicating lamps, etc.

4.4.1.2 Instruments

i) Ammeter with selector switch.
ii) Voltmeter with selector switch.
iii) Frequency meter.
iv) Kilowatt-meter.
v) Local / OFF / Remote Control Switch.

4.4.2 Engine Panel

An instrument panel on the skid shall have calibrated gauges/meters to measure the following:

i) Engine speed.
ii) Lube oil pressure.
iii) Lube oil temperature.
iv) Engine running hours

4.4.3 Safety Devices

Following safety devices shall be provided. The audible alarm shall operate on any fault condition and shall be resetable manually and automatically through a timer after 15 minutes whichever is earlier:

A = Alarm SD = Shutdown TD = Adjustable Time Delay

i)	Engine Over speed	A SD
ii)	Low lube oil pressure	A SD
iii)	High water temperature	A SD
iv)	Over voltage	A SD (TD=0-30 Sec)
v)	Under voltage	A -
vi)	Low level in fuel day tank	A SD (TD=0-5 min.)
vii)	High level in fuel day tank	A -
viii)	Charger failure	A -
ix)	Over crank	A SD
x)	Low crankcase oil level	A -
xi)	High crankcase oil level	A -
xii)	Charging alternator failure	A -

After shut down, the set shall lockout and it shall not be possible to start it unless manually reset after the cause of fault has been removed.

4.4.3 Batteries & Battery Charger

The batteries provided with each D.G. Set shall be of sufficient capacity to perform all required functions; including the operation and control of AMF Panel and Automatic Transformer Switch (ATS).

Battery charger shall be static type and shall provide for both trickle and boost charging of the batteries when the engine is not in operation. The charger shall be of suitable capacity to fully recharge the completely discharged batteries within four hours at boost charge.

4.4.5 Lamp Test Facility

A common lamp test facility shall be provided for each control panel/instrument panel.

4.5 **Automatic Transfer Switch (ATS)**

The Automatic Transfer Switch shall be 4 pole and rated for cumulative capacity of the two generators. ATS shall employ two numbers motorized Air Circuit Breakers to feed the load from the main supply or generators.

5.0 INSTALLATIONS & TESTING

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

All installation materials for physically installing the Diesel generator set and associated equipment, such as bolts, nuts, washers, supporting steel, etc., shall be provided and installed by the Contractor. The generator shall be installed upright and in level and shall be firmly and rigidly bolted to the steel frame skid with vibration isolators.

The Diesel generator set shall be completely erected as per manufacturer's instructions and as approved by the Engineer. Loose parts dispatched by the manufacturer shall be installed and connected as per assembly drawing provided by the manufacturer. Any safety locking of meter, relays, etc., provided by the manufacturer for safe transport shall be released only after the generator/ control panel is erected in position.

The incoming and outgoing cables shall be connected as recommended by cable manufacturer. The cable armour shall be connected effectively to ground.

The Diesel generator and associated equipment body shall be connected to earth as per instructions given in section “Earthing" of these Specifications. The Diesel generator set shall be tested and commissioned in the presence of the Engineer. The tests to be carried out are described in article “Testing" of General Specifications for Electrical Works, Section-8001 of these Specifications.

The tank shall be installed in accordance with best engineering practice/international codes, the approved shop drawings, applicable code requirements and manufacturer's instructions.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against each item of Bill of Quantities as given below shall include supply, installation, testing, commissioning and completion for all work specified herein and/or as shown on the Tender Drawing/B.O.Q. related to the item.

6.2 Diesel Generator Set

6.2.1 Measurement

Measurement shall be made for each Diesel Generator Set including Fuel Day Tank, Control/Instrument Panel, Gravity Louvers, and Control Wiring to Control/Instrument Panel of other generator, AMF Panel, L.T switchboard etc. acceptably supplied and installed by the Contractor as a complete job.

6.2.2 Payment

Payment shall be made for the number of jobs measured as provided above at the Contract unit price each for supply, installation, testing, commissioning and completion of the Diesel Generator Set, including its reinforced concrete foundation, Fuel Day Tank, Gravity Louvers matching with radiator, Control / Instrument Panels and accessories, control wiring between D.G. set and Control/Instrument Panel, AMF Panel, L.T switchboard fixing arrangements, all testing arrangements, etc.

6.3 **Fuel System**

6.3.1 Measurement:

Measurement shall be made for Fuel System comprising underground Fuel Storage Tank of capacity mentioned in BOQ/drawings including pumps all accessories and piping acceptably supplied and installed by the Contractor as a complete Job.

6.3.2 Payment

Payment shall be made for the number of jobs measured, as provided above at the Contract unit price each and shall constitute full compensation for supply, installation, testing and commissioning of underground fuel storage tank with excavation, backfilling, sand filling, reinforced concrete foundation/structure (including reinforcement) and fixing / supporting structure and all other accessories complete with all type of valves, fuel transfer pumps (both electric and manual) float switches control / power wiring, control panel for automatic operation of the pumps, for each generator fuel piping network with required filters for each generator as per Specifications and required for normal operation of both D.G. set.

6.4 **Spare Parts**

6.4.1 Measurement

Measurement shall be made for the spare parts of Diesel generator set as listed in form of Tender Volume-I, acceptably supplied by the Contractor as a complete lot.

6.5.2 Payment

Payment will be made for the complete job of spare parts as provided above at the Contract unit price and shall constitute full compensation for supply, tagging, and packing of spare parts including wooden/steel storage boxes as required.

*** End of Section 8111 ***

SECTION - 8131

HT SWITCHBOARDS

1.0 SCOPE

The work under this section consists of supplying, installing, testing, connecting, commissioning of all material and services of the complete HT switchboards as specified herein or stated on the Tender Drawings and in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at site with other services for exact location and position of the HT Switchboards.

The HT switchboard with accessories shall also comply with the General Specifications for Electrical Works Section-8001 and with other relevant provisions of the Tender Document.

2.0 GENERAL

2.1 H.T. Switchboards

The HT switchboards shall be sheet steel fabricated, floor mounting cubicle type, indoor, totally enclosed, dust tight and vermin proof, and shall have protection class IP-42. It shall be complete in all respect with material and accessories, factory assembled, tested and finished according to the specifications and to the normal requirements.

The switchboard shall be suitable for front operation only and shall:

- be suitable for addition of units, on either side, in future.
- be provided with adequate clearance from live parts so that flashovers cannot be caused by switching surges, vermin, pests, etc.
- be designed for flush mounting of all instruments on the front side.
- have all incoming and outgoing connections from the bottom.
- have the components mounted so as to facilitate ease of maintenance from the front.
- have provision for lamp test, alarm test, alarm accept and reset facility.
- be mounted on cable trenches having their own supporting structure of angular or U steel profiles.
- be provided with anti-condensate heater, in each individual enclosure controlled automatically through adjustable humidistat

for maintaining required safe operating condition inside the panel and also avoid condensation. The heater shall also be manually operable and provided with protective miniature circuit breaker and ON indication lamp.

- have stainless steel name plat.
- have bus bar chamber and instrument chamber.
- have pocket for wiring diagram in suitable location / door of instruments chamber.

All pertinent details and drawings shall be provided to the Engineer for approval prior to manufacturing. The HT Switchboard shall be manufactured in conformity with the requirements of power supply utility company such as KESC, WAPDA, IESCO, etc, so that approval of power supply connection can be obtained.

3.0 APPLICABLE STANDARDS/CODES

The latest editions of the following standards and codes shall be applicable for the materials within the scope of this section:

IEC 62271-100		High voltage AC circuit breakers
IEC 62271-102		High voltage AC disconnectors and earthing switches
IEC 62271-103		High voltage switches for rated voltage above 1 kV and less than 52 kV
IEC 62271-200		Metal enclosed switchgear and controlgear for rated voltage up to and including 38 kV
IEC 60694	-	Common specifications for high voltage switchgear and controlgear standards
IEC 60044-1	-	Instrument transformers – Current transformers
IEC 60044-2	-	Instrument transformers – Inductive voltage transformers
IEC 60051-1, 2, 3, 5 & 8	-	Direct acting indicating analogue electrical measuring instruments and their accessories.
IEC 60099-4	-	Surge arresters: Metal oxide surge arresters without gaps for ac system

4.0 MATERIAL

4.1 HT Switchboards

The switchboards shall be fabricated with angle-iron framework, welded, grinded, finished and cladded with 12 SWG sheet steel. It shall be suitably divided into panels and compartments for accommodating the required number of circuit components, instruments and accessories.

Each cubicle shall be divided in four (04) compartments:

- breaker compartment
- busbar compartment
- H.T. cable connection compartment
- low voltage compartment to accommodate instruments

All instruments, relays, control and selector switches, indicating lamp, push buttons and trip levers shall be flush mounted and located at convenient heights on the front doors of switchgear in logical and clear manner. Means shall be provided to limit the opening angle of doors to about 100^{o}.

The switchboard shall be supplied complete with foundation bolts and other installation materials as recommended by the manufacturer. Proper size cable clamping channels shall be provided for fixing required size of 15 kV XLPE cable. Adequate number of eye bolts shall be provided to facilitate handling.

An earth bar of appropriate cross section to safely carry the fault current shall be provided on full length of H.T switchboard and connected to the body of all sections of the switchboard. The external earth terminal shall be provided for main earth connection. The doors shall be grounded by flexible strap of copper braids.

The control cabling inside the switchboard shall be suitably numbered and harnessed by means of straps or cords. All indicating, selecting and control equipment shall be suitably arranged and clearly labelled with flameproof material using indelible ink/marking, indicating the rating and designation of fuses, switches etc. The nameplates shall be provided on the front of panel for each circuit and component, which is accessible from outside. The nameplates shall be of stainless steel with engraved equipment designation having minimum width of 5mm. Other labeling on the switchboard such as danger signs, voltages, switchboard/panel identification shall be of sufficient size to be legible from a distance of 5 metres.

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

4.1.1 Capacity and Basic Data

The switchboard shall be designed to conform to the following requirements:

Rated Current	:	As shown on drawings.
Rated Nominal Voltage	:	11 kV
Rated Maximum Voltage	:	12 kV
Rated Power Frequency Withstand Voltage (r.m.s.)	:	36 kV for 1 minute
Rated Short Circuit Capacity	:	500 MVA at 11 kV for one second.
Rated Symmetrical Breaking Current (1 second rating)	:	25 kA
Rated Peak withstand Current	:	2.55 times rated symmetrical breaking current.
Operating Duty	:	B-0.3”-MB-3' -MB
Rated Basic Impulse Level (BIL)		95 kV
Control Voltage :		
a) Indication/Metering	:	110 volt a.c. from secondary of P.T.
b) Tripping :		Series tripping or 110 volt D.C. from capacitor trip unit
Heaters and audible alarm	:	220 V AC from substation LT switchboard.
Auxiliary Contacts	:	Provision for remote indication and/or as required.

4.1.2 Interlocking

Any interlocking if required inside the HT switchboard and between HT switchboard and other equipment shall be provided as stated on the drawings.

4.2 Bus Bars

The bus bars shall be made of high conductivity electrolytic tinned copper conductors, suitably protected against corrosion, and shall be completely insulated by heat shrink coloured sleeves of specified voltage and mechanically braced to safely withstand the stresses due to short-

time momentary current under the fault conditions. The phase identification of bus bars shall be red, yellow and blue. The clearances shall not be reduced on account of the bus bar insulation or the phase barriers.

4.3 Circuit Breakers

The circuit breakers shall be triple pole, with drawable type, with arc interruption in vacuum. The operating characteristics and technical data shall be as given in art. 4.1.1 of this section. The bidder shall submit with his offer the type and details of equipment proposed.

The circuit breakers shall have trip free, direct acting and manually operated drive mechanism. For manual operation a handle shall be provided. The units shall have rollout trucks and channels for horizontal withdrawal. Interlocking device shall be provided such that the breakers can be closed only when it is in fully plugged-in or fully withdrawn position, and withdrawal of circuit breakers is only possible in the open or isolated position. Safety shutters shall be provided which will automatically cover the live contact as the circuit breaker is withdrawn. Other interlocks as essentially required for safe and proper operation of circuit breaker shall be provided. The circuit breaker phases shall be separated by barriers of approved heat resisting, non-tracking insulating material.

Each circuit breaker shall have a device to register the number of closing operation.

A triple pole grounding switch shall be provided for cable and bus bars earthing, complete with mechanism for interlocking it with the circuit breaker and the roll-out truck, and mechanical indication to show the position of grounding switch. The grounding switch shall be rated to safely carry the fault current due to inadvertent closing of supply circuit breaker and also for making duty on the fault.

The circuit breakers shall have automatic, mechanically operated `ON' and `OFF' position indications. The circuit breakers shall be provided with ON-OFF push buttons.

Luminous indications shall be provided on all incoming and outgoing panels, which shall include but not limited to following:

- Circuit Breaker ON
- Circuit Breaker OFF
- Circuit Breaker TRIPPED
- Heater ON

Outgoing panel shall additionally be provided with following luminous indications:

- Buchholz Alarm
- Buchholz Trip
- Temperature Alarm
- Temperature Trip

Each circuit breaker shall be provided with at least three normally closed and three normally open potential free auxiliary contacts rated for 10 Amp, 230V AC as spares. Provision shall be made for remote indication of the circuit breakers position/status.

A test position shall also be provided to facilitate testing operation of circuit breakers manually and by protective relays. Test socket with plug shall be provided for testing the relays.

The circuit breakers shall be complete with necessary secondary wiring with ferrules to indicate the circuit. Protection shall also be provided for all control circuits.

4.4 Current Transformers

Each circuit breaker shall be provided with current transformers (CT) having following ratings and characteristics:

-	Type	:	Cast resin
-	Number	:	Three single phase units
-	Burden	:	Suitable for load of protection and instrumentation circuits.
-	Accuracy	:	5P 20 for protection and 1.0 for measuring with security factor 5.
-	Duty	:	For operating relays/meters and instruments.
-	CT ratio	:	As shown on the Tender Drawings.
-	No. of cores	:	1 or 2 as required and as shown on Tender drawings.
-	Rating and Insulation requirement	:	As shown on drawings and/or specification in Article 4.1.1
-	Rated dynamic current	:	2.55 times rated symmetrical short circuit current.

4.5 Potential Transformers

Potential transformers (PT) shall be provided as shown on the Tender Drawings and having the following ratings and characteristics:

- Type : Cast resin
- Number : Three single phase units.
- Burden : Suitable for load of protection and instrumentation circuits.
- Accuracy : Class 1.0
- Duty : For operating relays/meters and instruments.

PTs shall be designed to have either two independent secondary windings of specified ratio for connection in star or open delta or with a single secondary windings as required and as shown on single line diagram.

- Voltage ratio : $\frac{11\ kV}{\sqrt{3}} / \frac{110V}{\sqrt{3}} / \frac{110V}{\sqrt{3}}$ for double secondary winding
  : $\frac{11\ kV}{\sqrt{3}} / \frac{110V}{\sqrt{3}}$ for single secondary winding
- Rated voltage factor : 1.2 continuous and 1.5 for 30 seconds.
- Rating & insulation requirements : As shown on drawings and/or specification in Article 4.1.1

4.6 **Protective relays**

The circuit breakers shall be provided with inverse definite minimum time directional or non-directional over-current relays for phase and earth fault protection as shown on drawings. The relays shall have the following common characteristics, unless otherwise specifically mentioned:

- Phase fault over current setting range
  - Inverse : 50-200% of CT secondary rating
  - Instantaneous : 200-800% of CT secondary rating. The instantaneous elements shall also have infinity setting to block their operation, if necessary.

-	Ground-fault	:	20-80% of CT secondary rating with instantaneous element as for phase fault unit.
-	Time setting range	:	0-1 second
-	Connection	:	5 Amp secondary of CT
	Tripping	:	110 Volts DC from capacitor trip unit in each breaker panel or series tripping.
-	Indications/Control	:	110 V AC from secondary of P.T.

The relays shall preferably be triple pole type and have positive action without chatter.

4.7 Capacitor Shunt Trip Unit

In case series tripping is not provided, then each circuit breaker in the H.T. switchboard shall be provided with 110 volts direct current trip coils, which will be supplied power through the capacitor trip units. The trip coils shall be fed through the relay contacts and the 'OFF' push buttons.

The capacitor trip unit will be fed from 110 volts secondary of potential transformer. The capacitor trip unit shall be suitable for performing two successive tripping operations carried out within five minutes. Every circuit breaker shall be provided with a separate capacitor trip unit.

4.8 Meters & Selector Switches

The meters to be provided on HT switchboard are shown on drawings and shall be as specified below:

4.8.1 Ammeter and Voltmeter

The ammeter and voltmeter shall be moving iron spring controlled having front dimensions of 96 x 96 mm. Voltmeters shall have measuring range of 0-15 kV and ammeters measuring range shall be as shown on the drawings. Ammeters and voltmeters shall conform to B.S.S. accuracy class 1.5 and suitable for connection to the secondary of PTs and CTs installed on the switchboard.

4.8.2 Selector Switches

Ammeter selector switch shall be R-Y-B-OFF and voltmeter selector switch RY-YB-BR-OFF. The selector switches shall be complete with front plate and operating lever.

4.8.3 kWh and kVArh Meters

Kilowatt-hour (kWh) and reactive Kilovolt ampere-hour (kVArh) meters shall be suitable for 3 phase, 3 wire, 50 cycles balanced and unbalanced loads. The kWh meter shall also be provided with maximum demand indicator and built in switch for operation at an interval of 30 minutes.

4.8.4 Alarm Indication

On occurrence of any fault in the system and subsequent tripping of circuit breakers, audio alarm shall be provided on the HT Switchboard. Push buttons shall be provided on HT Panel for independent resetting of the audio alarm and fault-indicating lamp. At least two potential free contacts rated 10 Amp AC or DC shall be available for remote connection.

4.9 Surge Protection

Surge Arresters shall be provided in HT switchboard, wherever required, as shown on drawings. The 11 kV surge arresters shall have the following characteristics:

- Voltage Class (highest system voltage) : 12 kV rms
- Service (rated voltage) : 11 / 1.732 kV rms
- Peak Current Surge : 65 kA

This equipment will be tested in accordance with the relevant IEC Standards.

4.10 Tools

One complete set of tools for routine operation, setting and maintenance of HT switchboard including protective relays as recommended by manufacturer of each component shall be furnished within the price quoted for the HT Switchboard.

HT switchboard shall be provided with independent set of tools placed in suitable box. Details of tools shall be furnished by the bidder with his offer in the relevant schedule of the form of tender volume - I.

4.11 Insulation Mat

Insulation mat shall be placed in front of the HT panels all along the length. They shall be one meter wide and 6 mm thick and suitable for providing insulation for 15 kV working.

4.12 Danger Boards with Signs & Designation and Shock / First Aid Charts

As per requirements of Pakistan Electricity Rules/Electric Inspector, Danger Boards having signs and designation of the room shall be installed on the external door of each room of the Substation.

Shock/First Aid Charts shall be installed in HT, LT, Generators and Transformers Rooms.

5.0 INSTALLATION

The HT switchboard shall be installed at location shown on the drawing. The cable trenches shall be constructed as part of civil works. The Contractor shall co-ordinate with the civil works for providing any openings, holes, etc., in time to avoid any breakage/damage to completed works. In case such provisions in civil works for installation of electrical equipment are not made or made incorrect, the same shall be rectified by the electrical Contractor at his own cost and to the satisfaction and approval of Engineer.

The Contractor shall provide foundation bolts and grout them in cement concrete floor using non-shrinkable material approved by the Engineer. All installation materials for physically erecting the switchboard, such as bolts, nuts, washers, supporting steel, etc. shall be provided and installed by the Contractor. The switchboard shall be installed upright and in level and shall be firmly and rigidly bolted on the floor and concrete supports. All wiring external from HT Switchboard to alarm indication control unit protection interlock circuits and for auxiliary power supply for heaters, etc., will be furnished and installed by the Contractor in consultation with the Engineer.

The switchboard shall be erected as per manufacturer's instructions and as approved by the Engineer. Loose parts dispatched by the manufacturer shall be installed and connected as per assembly drawing provided by the manufacturer. Any safety locking of meters, relays, etc., provided by the manufacturer for safe transport shall be released only after the switchboard is erected in position.

Necessary provision shall be made in the HT switchboard for incoming/outgoing cables, and installation of cable termination kits, keeping in view both cable and switchboard manufacturer's recommendations. The cable armour shall be connected to the earth system.

The switchboard body shall be connected to earth as per instructions given in section "Earthing" of these Specifications. The switchboard shall be tested and commissioned in the presence of the Engineer. The tests to be carried out shall be as recommended by the International standard to which the switchboard is manufactured and/or as recommended by manufacturer; but as a minimum the tests given in article "Testing" of General Specifications for Electrical Works, section 8001 of these Specifications shall be carried out.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against each Bill of Quantities item as given below shall include design, supply, installation, testing, commissioning and completion for all work specified herein and/or as shown on the Tender Drawing related to the item.

6.2 HT Switchboards

6.2.1 Measurement

Measurement shall be made for the complete job of HT Switchboard acceptably supplied and installed by the Contractor, as a complete job.

6.2.2 Payment

Payment shall be made for the number of jobs measured as provided above at the Contract unit price each and shall constitute full compensation for supplying, installing, connecting, testing, commissioning and completion of the HT switchboard including all connections, installation materials, such as foundation bolts, supporting steel, nuts, washers etc. wiring for control and auxiliary circuits, tools, etc.

6.3 HT Insulation Mat

6.3.1 Measurement

Measurement shall be made for the complete job of Insulating Mat acceptably supplied and installed by the Contractor.

6.3.2 Payment

Payment shall be made for the number of job measured as provided above at the Contract unit price and shall constitute full compensation for supplying and installing and proper placing of insulation mat.

6.4 Danger Boards with Signs & Designations and Shock / First Aid Charts

6.4.1 Measurement

Measurement shall be made for complete job of Danger Board with Signs & Designation and Shock / First Aid Charts acceptably supplied and installed by the Contractor as a complete job in

accordance with the provisions of Pakistan Electricity Rules and requirements of Electric Inspector.

6.4.2 Payment

Payment shall be made for the number of jobs measured as provided above at the Contract unit price each and shall constitute full compensation for supplying and installing the danger boards with signs and designation and shock/first aid charts including all accessories screws, nuts, bolts, etc.

6.5 Spare Parts

6.5.1 Measurement

Measurement shall be made for the complete job of spare parts of HT switchboard as per list in Schedule J-5 given in form of tender Volume - 1, acceptably supplied by the Contractor as a complete lot.

6.5.2 Payment

Payment shall be made for the complete job of spare parts as provided above, at the Contract Unit Price each and shall constitute full compensations for supplying, tagging, packing of spare parts including wooden / steel storage boxes.

SECTION – 8132

LT SWITCHBOARDS

1.0 SCOPE OF WORK

2.0 GENERAL

3.0 APPLICABLE STANDARDS/CODES

4.0 MATERIAL

5.0 INSTALLATIONS

6.0 MEASUREMENT AND PAYMENT

1.0 SCOPE OF WORK

The work under this section consists of supplying, installing, testing, connecting, commissioning of all material and services of the complete LT Switchboards as specified herein and/or shown on the Bidding Drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and coordinate at site with other services for exact route, location and position of the LT Switchboards.

The LT Switchboards shall also comply with the General Specifications for Electrical Works Section-8001 and with other relevant provisions of the Bidding Documents.

2.0 GENERAL

The LT Switchboards shall be of sheet steel fabricated, floor mounting, cubicle type, totally enclosed, dust tight and vermin proof. It shall be complete in all respect with material and accessories, factory assembled, tested and finished all according to the specifications and to the normal requirements. The IP rating of LT Switchboards shall be at least IP54.

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

- have a rated service short circuit breaking capacity, (Ics) at 415 V AC conforming to IEC 60947-2 as shown on the drawings.

- be provided with adequate clearance from live parts so that flashovers cannot be caused by switching, vermin, pests, etc.

- have all components rated for insulation class of 600-volt minimum.

- be designed for flush mounting of all instruments on the front side.

- have all incoming and outgoing connection from the top or bottom as required.

- have the components mounted so as to facilitate ease of maintenance from the front.

- have common lamp test facility for all lamps.

- have wiring diagram in the pocket on the inside of each door of the panel.

- be suitable for 415 volts AC, 3 phase 4 wire, 50 Hz system.

- be labeled with stainless steel nameplate on the front side of door for each incoming and outgoing circuit.

- have doors grounded by flexible copper cable/strip.

- have arrangements for extension of panel in future.

3.0 APPLICABLE STANDARDS/CODES

The latest editions of the following standards and codes shall be applicable for the materials specified within the scope of this Section:

IEC 60947-3	-	Low Voltage Switchgear and Control Gear-Switches, Disconnector, Switch-disconnector and Fuse Combination Units.
IEC 60947-2	-	Low Voltage Switchgear and Control Gear-Circuit Breakers
IEC 60831	-	Power Capacitors
IEC 60439	-	Low Voltage Switchgear and Control gear Assemblies
IEC 60073	-	Colours for indicator lights and push buttons
BS EN 60529	-	Specifications for degrees of protection provided by enclosures (IP Code).
IEC 60044-1	-	Instrument Transformers - Current Transformers
IEC 60044-2	-	Instrument Transformers – Inductive Voltage Transformers
IEC 60051-1, 2, 3, 5 & 8	-	Direct acting indicating analogue electrical measuring instruments and their accessories
BS 88	-	Cartridge fuses for voltage upto and including 1000 V a.c and 1500 V d.c

4.0 MATERIAL

4.1 Sheet Metal Work

The LT Switchboards shall be fabricated, welded, grinded, finished with angle iron framework and cladded with 14/16 SWG MS sheet. It shall be suitably divided into panels and compartments for accommodating the required number of circuit components, instruments and accessories.

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

cable glands respectively for unarmoured and armoured cables shall be provided. All holes, cutout shall be tool or jib manufactured and free from burrs and rough edges. An earth bar of appropriate cross section shall be provided and connected to the bodies of all sections of the switchboard. Two external earth terminals shall be provided for main earth connection to the body of switchboard. The doors shall be earthed by means of flexible copper strip**.** Means shall be provided to limit the opening angle of doors to about 100^0.

The cabling inside the switchboard shall be suitably numbered and harnessed by means of straps or cords. Wiring to door mounted components shall be in flexible PVC conduit. All indicating, selecting and control equipment shall be suitably arranged and clearly labelled by means of flame proof material using indelible ink/marking indicating the rating of fuse, switches, etc. The nameplates provided on the front of panel shall be of flame retardant material preferably stainless steel. Use of plastic or any inflammable material shall not be permitted for nameplates.

All metalwork of the switchboards shall be cleaned down to bare shining metal phosphated and the surfaces chemically prepared for powder coating. Then these shall be coated with powder of colour RAL 7032 and then baked in oven. The thickness of powder coating shall not be less than 100 microns.

4.2 **Components**

The switchboards shall be provided with all components as specified or shown on the Drawings and as necessary for the satisfactory operation of the switchboard and of the electrical system. Typical specifications are given hereunder.

4.2.1 Bus Bars

The bus bars shall be made of 99.99% pure high conductivity electrolytic tinned copper and shall be completely isolated and mechanically braced for the specified fault level according to relevant IEC standard. The phase identification of bus bars shall be by providing colours sleeves on bus bars ends and these shall be red, yellow and blue for phase and black for neutral. The earth bus bar shall be green.

The bus bars shall be triple pole, neutral & earth and shall be of appropriate size to meet the electrical and mechanical requirements of the system. The temperature rise shall not exceed 30^0C at rated current.

Neutral bus bar shall be of the same cross section as phase bus bars. Earth bus bar shall be of half cross section area as phase bus bars.

4.2.2 Circuit Breakers

The circuit breaker shall be triple pole, current limiting type, manually operated or motor operated, spring charged type as shown on the drawings with front drive grip handle. ON-TRIP-OFF indication shall be provided on circuit breakers. The all circuit breakers shall have the following protections and setting range unless otherwise shown on the drawings:

- Adjustable three pole, manual reset thermal overload release of setting range 80 to 100% of rated current.

- Magnetic triple pole short circuit release having range according to manufacturer's standard range.

The incoming circuit breakers of main LT panel (normal and emergency) shall be air circuit breakers whereas outgoing circuit breakers shall be moulded case type, unless stated otherwise on the drawings.

The incoming circuit breaker shall have two numbers normally open and two numbers normally closed auxiliary contacts rated for 2 Amp, 230 VAC. The incoming circuit breaker shall also have ON-TRIP-OFF indicating lamps. Where shown on the drawings indication lamps shall also be provided for outgoing circuit breakers. The circuit breaker shall have specified rupturing capacity without the use of back-up fuses. Auxiliary release and trip coils shall be provided for desired operation and/or interlockings as stated on the drawings.

The motor operated, spring charged type circuit breakers shall be provided with anti-pumping circuit to prevent repeating cycle of TRIP reset and ON even if the close command is given while the circuit breaker has tripped due to fault.

4.2.3 Switch - Fuse Units

The switch-fuse unit shall comprise a triple pole on load isolating switch with HRC fuses. The fuse shall be supplied complete with the fuse base and shall conform to BS-88 Class Q1 with a fusing factor of 1.5.

4.2.4 Ammeters and Voltmeters

All meters shall be flush mounting, moving iron, spring controlled. The front dimensions shall be 96 x 96 mm for meters.

The meters shall be of accuracy class 1.5 according to relevant IEC standard. The ammeter shall be suitable for connection to 5 Amps secondary of current transformers or directly through shunt as shown on drawings. The ammeters and voltmeters shall have measuring range as indicated on the drawings.

4.2.5 Current Transformers

Air-cooled, ring type current transformers shall be provided having transformation ratio as indicated on the drawings. The current transformers shall be of suitable burden having accuracy class 1.0 according to relevant IEC standard. The current transformers shall have 5 amps secondary.

4.2.6 Selector Switches

Ammeter and voltmeter selector switches shall be complete with front plate and grip handle. R-Y-B and OFF position for ammeters and RY-YB-BR-RN-YN-BN and OFF position for voltmeters shall be marked on the respective selector switches.

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

4.2.7 Air Break Contactors

The contactors shall be air break, triple pole 400 VAC type and suitable for the AC3 type of duty to be performed. The main contacts shall be silver tipped, butt type with double break per pole. Each contactor shall be provided with single phase 230 VAC operating coil and minimum one spare normally open and one normally closed auxiliary contact. The number of working auxiliary contacts shall be provided according to the system requirements.

4.2.8 Push Buttons

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

4.2.9 HRC Fuses

HRC fuses shall be provided complete with fuse bases, fuse etc. The fuses shall have a fusing factor as specified for class Q1 in accordance with BS 88.

4.2.10 Indicating Lamps

Indicating lamps shall be suitable for flush mounting, complete with base, 230 volt AC incandescent lamp and shall have rosettes of suitable colour.

4.2.11 Line up Terminals

Line up terminals wherever provided for control and power circuits shall be suitable for voltage and size of conductors as indicated on drawing.

The line-up terminals for controls shall be suitable for channel mounting. All necessary accessories such as end plates, fixing clips, transparent label holder caps and label sheets with marking shall be provided.

4.2.12 Power Factor Improvement Plant

The power factor improvement plant shall be used for improving the power factor of the system on 415 Volts side. The plant shall be automatic-cum-manual.

The power factor improvement plant shall be aligned with the Main LT Switchboard. The control panel for the plant shall be a part of Main LT Switchboard, whereas the power factor correction capacitors shall be mounted in a separate ventilated panel. The capacitors shall be suitable for three phase, 440/415 volts, 50 Hz system and shall be self cooled, designed for indoor use in tropical climate for maximum ambient temperature as specified in section - 8001, General Specifications for Electrical Works. The capacitors shall be in the form of banks divided for required stages. Each capacitor bank unit shall be of kVar capacity as shown on drawings. Each capacitor unit shall be complete with discharge resistors and internal fuses and shall be connected with control panel with proper size of single core PVC insulated cables.

The control panel of the plant with all accessories shall be installed within LT Switchboard. The panel shall be supplied complete with a set of 3-phase, full capacity, insulated copper busbars, interconnections, risers, designation labels, cable

sockets, holdings down bolts, wiring with cleats and ferrules, earthing sockets and studs, etc. The control panel shall at least accommodate, but not limited to the following:

- 1 No. Multi-stage power factor correction relay for automatic/manual control.

- 1 No. 3-phase, 4 wire, 415 volts, unbalanced load power factor indicator.

- 1 No. Current transformer with 5 amps secondary current, having suitable output burden and accuracy.

- 3 Nos. Instrument potential fuses.

Following equipment shall be provided for every capacitor bank:

- 1 No. triple pole 415 volts air break contactor with auxiliary contacts (125/63/40 amps for 50/25/12.5 kV Air bank respectively).

- 1 Set 3 Nos. HRC back-up fuses with base and carrier having the fuse factor as required for capacitors in accordance with BS- 88 (125/63/40 amps for 50/25/12.5 kVA bank respectively).

- 1 No. Auto-Off-Manual selector switch.

- 1 No. Red lamp for 'ON' indication of the contactor.

The cost of control panel and power factor connection capacitors panel shall deemed to be included in relevant BOQ item for LT Switchboard and no extra payment shall be admissible in this regard.

5.0 INSTALLATION

The LT Switchboards shall be installed at location shown on the drawing or as advise by the Engineer. The concrete pedestal shall be constructed as per relevant specifications for civil works. The Contractor shall be responsible to ensure co-ordination with the civil works for providing any openings, holes, etc., to avoid any breakage to completed works. In case the provisions in civil works for installation of electrical equipment are not made or made incorrect the same shall be rectified by the Contractor at his own cost and to the satisfaction of Engineer.

The Contractor shall provide foundation bolts and grout them in cement concrete floor using non-shrinkable material with the approval of Engineer.

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

The switchboard shall be completely erected as per manufacturer's instructions and as approved by the Engineer. Loose parts dispatched by the manufacturer shall be installed and connected as per assembly drawing provided by the manufacturer. Any safety locking of meter, relays, etc., provided by the manufacturer for safe transport shall be released only after the switchboard is erected in position. The incoming and outgoing cables shall be connected as recommended by cable manufacturer. The cable armour shall be connected effectively to ground.

The switchboard body shall be connected to earth as per instructions given in section "Earthing" of these Specifications. The switchboard shall be tested and commissioned in the presence of the Engineer.

The LT Switchboards shall be tested before energizing as per instructions contained in article "Testing" of General Specifications for Electrical Works, Section-8001 of these Specifications.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against Bill of Quantities item as given below shall include design, fabrication, supply, installation, testing, commissioning and completion for all works specified herein and as shown on the Bidding Drawings related to the item.

6.2 LT Switchboards

6.2.1 Measurement:

Measurement shall be made for the number of each LT Switchboards given in BOQ acceptably supplied and installed by the Contractor as a complete job.

6.2.2 Payment:

Payment shall be made for the total number of each type of job measured, as provided above, at the Contract unit price each and shall constitute full compensation for design, fabricating, supplying, installing, connecting, testing and commissioning of the LT Switchboards as per single line diagram shown on the drawing including Power Factor Improvement Plant (including complete control panel and power factor connection capacitor's

panel), all erecting material such as foundations bolts, supporting steel channels, nuts, washers, cable glands etc., complete with foundation and all related Civil works.

*** End of Section 8132***

SECTION – 8133

LT DISTRIBUTION BOARDS

1.0 SCOPE OF WORK

2.0 GENERAL

3.0 APPLICABLE STANDARDS/CODES

4.0 MATERIAL

5.0 INSTALLATIONS

6.0 MEASUREMENT AND PAYMENT

1.0 SCOPE OF WORK

The work under this section consists of supplying, installing, testing, and commissioning of all material and services of the complete Low Tension (LT) Distribution Boards as specified herein and/or shown on the Bidding Drawings and stated in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at site with other services for exact location and position of the each L.T. Distribution Board.

The Low Tension Distribution Board with accessories shall also comply with the General Specifications for Electrical Works, Section - 8001 and with other relevant provisions of the Bidding Document.

2.0 GENERAL

The Low Tension Distribution Board (DB) shall be sheet steel fabricated suitable for surface/recessed mounting on wall or floor standing totally enclosed, dust tight and vermin proof. It shall be complete in all respect with material and accessories, factory assembled and finished according to the Specifications and to the normal requirements. The LT Distribution Board shall have protection class IP-20 for indoor installation, class IP-42 for indoor damp areas and class IP-54 for outdoor area.

The Low Tension Distribution Board shall be front operation type and shall:

- have a rated service short circuit breaking capacity (Ics), conforming to IEC 60947-2 and as shown on the drawings.

- be provided with adequate clearance from live parts so that the flashovers can not be caused by switching, vermin, pests etc.

- be suitable for 400 Volts, 3 phase 4 wire, 50 Hz system.

- be designed for flush mounting of all instruments on the front side.

- have incoming and outgoing cable termination arrangement, terminal block/line up terminals.

- be provided with stainless steel name plate on the front side of door.

- have all incoming and outgoing connections from top or bottom as per requirement of site conditions.

- have door grounded by flexible copper strip/cable.

- have wiring diagram in the pocket inside the door of Distribution Board

3.0 APPLICABLE STANDARDS/CODES

The latest editions of the following standards and codes shall be applicable for the materials specified within the scope for this section:

IEC 60051	-	Direct setting electrical measuring instruments
IEC 60073	-	Colours for indicator lights and push buttons
IEC 60947-2	-	Low voltage switchgear and control gear
IEC 60439	-	Low Voltage Switchgear and Control gear Assemblies.
BS 4752	-	Circuit Breaker
BS 3871	-	Miniature & Moulded Case Circuit Breakers
BS 88	-	HRC fuses
BS 89/90	-	Ammeters and Voltmeters
BS 3938	-	Low voltage current transformers
BS 1432	-	Bus Bars

4.0 MATERIAL

4.1 Sheet Metal Work

The Low Tension Distribution Board (DB) shall be fabricated with 16 SWG/14SWG sheet steel recess / surface mounting as approved by the Engineer. All the components shall be installed on a common component mounting plate inside the enclosure and protected from the front with screwed sheet steel front plate. The enclosure shall be provided with rubber gasketting and a lockable hinged door with cam fastener.

The distribution board shall be supplied complete with all installation materials as recommended by the manufacturer. The incoming and outgoing cable connections shall be according to the wiring requirements. If required, an adapter box for accommodating the cables and conduits may be provided. The box shall be of the same material and finish as the DB. All holes, cut-out etc. shall be tool and free from burrs and rough edges.

The cabling inside the DB shall be suitably harnessed by means of straps or cords. Colour sleeves shall be provided on each cable lugs connected to the bus bars, circuit breakers or terminals for phase identification. An

earth bar shall be provided for connection of incoming and outgoing earth conductors. The earth bar shall be permanently connected to the body of DB at two points. Flexible copper strip shall be provided for earthing of the door of DB.

Circuit numbers/ designation on all circuits shall be conspicuously marked to facilitate connection and maintenance.

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

4.2 Components

The Low Tension Distribution Boards (DB) shall be provided with components as specified, as shown on the Bidding Drawings and required for the satisfactory operation of the distribution board and of the electrical system.

Typical component specifications are given below:

4.2.1 Bus Bars

The Bus bars shall be made of 99.99% pure high conductivity electrolytic tinned copper and shall be completely isolated and mechanically braced for the specified fault level. The identification of bus bars shall be by providing colours sleeves on bus bar ends and these shall be red, yellow and blue for phases and black for neutral. The earth bus bar shall be green.

The bus bars shall be for three phase, neutral and earth and shall be of appropriate size to meet the electrical and mechanical requirements of the system. The temperature rise shall not exceed 30^{o}C at rated current.

4.2.2 Moulded Case Circuit Breaker (MCCB)

The MCCBs shall be moulded case triple pole 440 Volts or single/double pole 250 Volts of current ratings as shown on the drawings. These shall have fixed magnetic short circuit and adjustable/fixed thermal overload protection.

Under voltage and shunt trip etc. shall also be provided when so required for safe operation and interlock.

The MCCBs shall be installed such that their switching levers are

accessible through the front plate for operation.

The single and triple pole MCCBs shall have short circuit rupturing capacity suitable for the distribution system as approved by the Engineer or as shown on the drawings. The MCCBs shall be suitable for working on lighting and power circuits.

4.2.3 Ammeters and Voltmeters

All meters shall be flush mounting, moving iron, spring controlled. The front dimensions shall be 96 x 96 mm for meters.

The meters shall be of accuracy class 1.5 according to BS-89 and 90. The ammeter shall be suitable for connection to 5 Amps secondary of current transformers or directly through shunt as shown on drawings. The ammeters and voltmeters shall have measuring range as indicated on the drawings.

4.2.4 Current Transformers

Air cooled, ring type current transformers shall be provided having transformation ratio as indicated on the drawings. The current transformers shall be of suitable burden having accuracy class 1.0 according to BS 3938. The current transformers shall have 5 amps secondary.

4.2.5 Selector Switches

The ammeter and voltmeter selector switches shall be complete with front plate, grip handle, R-Y-B and OFF position for ammeters, and RY-YB-BR-RN-YN-BN and OFF position for voltmeters shall be marked on the respective selector switches.

4.2.6 Air Break Contactors

The contactors shall be air break, triple pole 400 VAC type and suitable for the type of duty (at least utilization Category AC3) to be performed. The main contacts shall be silver tipped, butt type with double break per pole. Each contactor shall be provided with single phase 230 VAC operating coil and minimum one spare normally open and one normally closed auxiliary contact. The number of working auxiliary contacts shall be provided according to the system requirements.

4.2.7 Push Buttons

The push buttons shall be illuminated, momentary make/break

contact type or latch type (push-on/push-off) as required and approved by the Engineer and suitable for flush mounting. The push button for ON and OFF switching shall be red and green respectively. They shall be provided as shown on the drawing.

4.2.8 Indicating Lamps

Indicating lamps shall be LED type suitable for flush mounting, complete with base. They shall be suitable for operation on 230 V AC and it shall have rosettes of suitable colours as approved by the Engineer. These shall be provided for R, Y, B phases on each distribution board.

4.2.9 Impulse Relay

Impulse Relay shall be 1 or 2 pole, 250 V rated and be provided with latching mechanism.

4.2.10 Line up Terminals

Line up terminals wherever provided for control or power circuits shall be suitable for voltage and size of conductors as indicated on drawing.

The line-up terminals for controls shall be suitable for channel mounting. All necessary accessories such as end plates, fixing clips, transparent label holder caps and label sheets with marking shall be provided.

5.0 INSTALLATION

The location of low tension distribution boards (DB) are shown diagramatically on the drawings. The actual location shall be determined at site, keeping in view the site conditions and in co-ordination with other equipment, as approved by the Engineer.

Low tension distribution board for recessed mounting in wall shall be installed such that the door shall finish flush with the surface of wall. The recess mounted distribution board shall be installed before the plastering of walls. The DB shall be protected to avoid any damage due to the civil work. Any cuttings, dismantling of the existing wall required for fixing the DB shall be coordinated at site with the approval of Engineer. Any damage done to civil structure shall be made good by the Contractor.

All loose parts dispatched separately with the DB shall be installed as per manufacturer instructions and all adjustments or setting shall be made as required. All screws, nuts and bolts used for fixing the distribution board shall be

galvanized.

The distribution boards' installation shall include connecting all incoming and outgoing cables. The cable entry in the boards shall be provided from top or bottom as required and/or as approved by the Engineer.

The distribution boards shall be tested as per instructions contained in article "Testing" of General Specifications for Electrical Works, Section-8001 of these Specifications.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against each item of Bill of Quantities as given below shall include design, fabrication, supply, installation, testing, commissioning and completion for all works specified herein and/or as shown on the Bidding Drawings related to the item.

6.2 LT Distribution Boards (DBs)

6.2.1 Measurement:

Measurement shall be made for the number of each LT Distribution Board acceptably supplied and installed by the Contractor as a complete job.

6.2.2 Payment:

Payment shall be made for the number of jobs measured, as provided above, at the Contract unit price each and shall constitute full compensation for design, fabricating, supplying, installing, connecting, testing and commissioning of the LT Distribution Boards, including fixing arrangement, adapter box and other components/accessories for complete installation.

*** End of Section 8133 ***

SECTION – 8150

LIGHT FIXTURES

1.0 SCOPE OF WORK

2.0 GENERAL

3.0 APPLICABLE STANDARDS/CODES

4.0 MATERIAL

5.0 INSTALLATIONS

6.0 MEASUREMENT AND PAYMENT

1.0 SCOPE OF WORK

The work under this section consists of supplying, installing, testing and commissioning of all material and accessories of the complete Light fixtures as specified herein and/or shown on the Tender drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at Site with other services for exact locations and positions of the light fixtures.

The lighting fixtures with accessories shall also comply with the General Specifications for Electrical Works, Section-8001 and with other relevant provisions of the Tender Document.

2.0 GENERAL

The description of light fixtures is given in the bill of quantities, and stated on the drawings, and all relevant material is described in this Section. The determination of quality is based on certified photo-metric data covering the coefficient of utilisation, light distribution curves, construction material, shape, finish, operation, etc.

The Contractor shall submit at least two samples of each and every light fixture specified and obtain approval of the Engineer before purchasing. The quality and finishes of the local make light fixtures (if mentioned in BOQ) shall be same as that of standard manufacturer. The accessories such as ballast, LED drivers, lamps, ignitors, etc., for all type of light fixtures shall be of make as stated in list of approved manufacturers. Approved equivalent against those specified will be accepted if the specified one is/will not be available. For any substitution the Engineer's approval is necessary.

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

3.0 APPLICABLE STANDARDS/CODES

The latest editions of the following standards/codes shall be applicable to the material specified within the scope of this section:

IEC 60598-2-1-		Particular requirement- Fixed general purpose luminaire
IEC 60598-2-2-		Electrical Insulation Class I
IEC 62471	-	Photo biological Safety of lamps and lamps system
IEC 62031	-	LED modules for general lighting – Safety specifications

IESNA LM80	-	Testing report for LED Chips with TM21 extrapolation graph
IEC 61048 & 61049	-	Capacitors for use in TL, HP mercury and LP sodium vapour discharge lamp circuits.
IEC 60598 & BS EN 60598	-	Luminaires
BS 2560	-	Exit Signs
ISO 7010	-	Signs for the purposes of accident prevention, Fire protection, health hazard information and Emergency evacuation.

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4.0 MATERIAL

4.1 LED Essential/Waterproof Batten Light Fixture:

The Contractor shall furnish and install the complete LED Batten luminaires replacement for complete single conventional 1x18W TL-D/1x36W TL-D & double 2x36W TL-D fluorescent batten. The batten light fixtures shall be of proper rating as shown on the drawings. The LED batten light fixture shall be 1200mm long for 36/28watts and 600mm long for 14watts respectively as specified.

The luminaire shall be cool white, with colour rendering and light colour of 840 characteristics. The luminaire shall have such distribution to achieve general lighting application parameters. The luminaire shall use high efficiency diffuser to achieve at least 50% energy savings compared to conventional fluorescent and waterproof light fixture. The luminaire shall offer a composite system efficiency of at least 100 Lumen/Watt for Essential LED batten and at least 100 Lumen/Watt for Waterproof LED batten having an average lumen package of up to:

3800 lumens (±5%) in 36W replacement for 2x36W waterproof TL-D Batten
2700 lumens (±5%) in 28W replacement for 2x36W fluorescent TL-D Batten
1350 lumens (±5%) in 14W replacement for 1x36W fluorescent TL-D Batten

The LED luminaire shall be designed for lumen maintenance of L70 or 70% at the end of useful life at ambient temperature of 25 deg. C. The complete luminaire shall have a useful life of 40,000 burning hours. The luminaire shall be suitable for ambient temperature range of between -20 to +40 degrees Celsius. Third party IEC 60598 Test Report shall be

measured/corrected for Ta = 25 degrees Celsius. The luminaire including the driver will include a warranty of at least 3 years against manufacturing defects.

The housing of Essential LED Batten light fixture will include integrated heat sink and optical system. The housing will be made of galvanized sheet having white Powder coated & suitable for indoor & semi-indoor environment. The optical cover made up of Polycarbonate with UV Protected Shielding cover. The fixing mechanism will be through clip made of Stainless steel. Appropriate size bushed wire entry holes, fixing holes, and earth terminal shall be provided. The driver shall be integrated within the luminaire.

The housing of Waterproof LED Batten light fixture will be made of Polycarbonate & extrusion process & suitable for outdoor environment. The optical cover made up of Polycarbonate with UV Protected Shielding cover. The product shall be protected against harsh industry environments IP65 rating for dust & water protection. The luminaire shall have no harmful effect against water projected from any direction. The luminaire shall have impact protection classified as IK07 operating temperature. The driver shall be integrated with the luminaire in a separate gear compartment with similar Index protection.

The internal wiring of LED batten light fixtures shall be done with heat resistant wires at the manufacturer's factory. The internal wiring shall be clipped properly and heat resistant sleeves be provided on cables passing near driver. Connectors suitable for connecting 2.5 sq.mm cable conductors shall be provided for supply connections. An earth terminal for connection to 2.5-sq.mm cable conductor shall be provided.

The light fixtures shall be furnished with Perspex diffusing panels "040 opal acrylic" (minimum sheet thickness 3mm) etc. as specified on the drawings or in BOQ. The luminaire shall have provision of both surface, Suspended mounting with dimension compatible to conventional florescent fixture. Mounting Clips for installation must be available.

IP degree of Protection shall comply with the requirements laid down in Section 8001. Standard luminaries with manufacturer’s recommended modifications, such as additional gasket, etc., shall be provided to attain required protection level.

4.2 **LED Smart Panel Light Fixture:**

The Contractor shall furnish and install the complete LED Panel luminaires as replacement for complete double conventional 2x36W TL-D fluorescent light fixture. The Smart Panel shall be of proper rating as shown on the drawings. The LED Panel shall have dimensions of 297 x 1197 x 75mm/595 x 595 x 75mm for 36 watts respectively as specified.

The luminaire shall be cool white, with colour rendering and light colour of 840 characteristics. The LED shall have a colour consistency preferably within 5 SDCM (standard deviation of colour matching) as defined by McAdam. The colour temperature variation should be restricted as per ANSI C78.377A with CCT variation limiting within 500K for nominal CCT of 4000K / 6500K.

The luminaire shall offer a composite system efficiency of at least 110 Lumen/Watt and a lumen package of up to 3,800 lumens (±5%) in 36W replacement for 2x36W conventional TL-D fluorescent fixture. The luminaire shall use high efficiency diffuser and reflector to achieve at least 50% energy savings compared to conventional fluorescent light fixture.

The system should be designed for fully office lighting & possess higher uniformity to have a smooth white light of high colour consistency & high system efficiency. For the better UGR control one, the luminaire optics should fully comply with lighting norms with UGR value (Unified Glare Rating) < 25. The beam angle of the optic should be around 140º.

The LED luminaire shall be designed for lumen maintenance of L70 or 70% at the end of useful life at ambient temperature of 25 deg. C. The complete luminaire shall have a useful life of 50,000 burning hours. The luminaire shall be suitable for ambient temperature range of between -20 to +40 degrees Celsius. Third party IEC60598 Test Report shall be measured/corrected for Ta = 25 degrees Celsius. The luminaire including the driver will include a warranty of at least 3 years against manufacturing defects.

The housing will include integrated heat sink and optical system. The housing will be made of electrogalvanized cold rolled steel sheet, pre-treated, painted and stove enamelled in white colour & the fixture will be provided with a plastic cover that is aesthetical for the environment. The heat sink will design in such way to create better air-flow for better heat transfer. The light cover is made up of PMMA optics lens with PS diffuser & a suitable reflector for the best uniformity. Appropriate size bushed wire entry holes, fixing holes, and earth terminal shall be provided. The driver shall be integrated within the luminaire.

The internal wiring of LED batten light fixtures shall be done with heat resistant wires at the manufacturer's factory. The internal wiring shall be clipped properly and heat resistant sleeves be provided on cables passing near driver. Connectors suitable for connecting 2.5 sq.mm cable conductors shall be provided for supply connections. An earth terminal for connection to 2.5-sq.mm cable conductor shall be provided.

The luminaire shall have provision of recessed, surface or suspended mounting etc. as specified on the drawings or in BOQ with dimension

compatible to conventional florescent fixture. Mounting Clips for installation must be available. Shop drawings shall be submitted by contractor for approval of Engineer.

4.3 LED Down Light Fixtures

The Contractor shall furnish and install the surface mounted LED Downlight luminaires as replacement for single 1x18W or double conventional 2x18W PL-C incandescent/ compact fluorescent light fixture. The LED downlights shall be of proper rating as shown on the drawings. The LED Downlights shall have dimensions of 122/167/218mm dia. for 7/11.5/16 watts respectively as specified.

The luminaire shall be cool white, with colour rendering index greater than 80 and light colour of 840 characteristics. The Downlighter must be provided with a polycarbonate diffuser having high haze and light transmission for uniform light output. The beam angle must be in the ranges in between 95 to 100 degrees for better illumination.

The LED downlights shall have minimum system efficacy of at least 100 lm/W with 55% energy-saving as compared with conventional compact fluorescent lamp downlight fixtures and shall have a useful life of 50,000 burning hours for 70% lumen maintenance at the end of useful life at ambient temperature of 25 deg. C.

The downlighter shall have high reflectance white painted polycarbonate front element or High purity aluminium with high reflectance coated reflector along with tempered glass on the front cover. The housing will include integrated heat sink and optical system. The heat sink made with Die Cast Aluminum should be design in such way to create better air-flow for better heat transfer as furnished by the manufacturer or as specified in the drawings or BOQ. The fixing mechanism of recessed down light will be through spring fasteners.

Where surface mounted downlights are used, the housing will be made of Plastic and enclosed in white powder coated die-cast aluminium body for surface mounting installation. The body shall have fins as heat sink.

The types of fixtures with manufacturer's catalogue reference are given on the fixture schedule and in bill of quantities. Equivalent fixture may be acceptable provided that the contractor submits for review all necessary data indicating photometric curves to show that the fixture proposed are of the same type, construction and quality.

4.4 Compact Fluorescent Light Fixtures

The compact fluorescent light fixtures shall be as stated on drawings and bill of quantities. The light fixture shall be finished in standard colours

unless otherwise stated on drawings or directed by Engineer. All compact fluorescent light fixtures shall be of international standard and quality.

The lamps for compact fluorescent light fixtures shall be CFL type with normal or electronic control gear and shall be supplied and installed according to the wattage/type as indicated on drawings.

Weatherproof bulkhead incandescent/compact fluorescent light fixture shall comprise of plastic body and gasketted clear glass cover secured to the body by means of wing nuts/screws to give a weatherproof and watertight fit. The gasket shall be weather resistance type. The lamp holder shall be of bi-pin brass having porcelain outer ring or 2/4-pin base for compact fluorescent lamps with normal control gear as per requirements.

The glass shade of the light fixtures shall be opal white or clear as furnished by the manufacturer with the light fixture unless specified and free from any air bubbles or voids. The shade may be spherical, cylindrical, flattened bottom or any other shape as specified in the drawings or BOQ.

4.5 Exit Sign – Emergency Light Fixture

The exit sign emergency light fixture shall be maintained type with self contained, polycarbonate body, Gear Type and sealed nickel metal hydride batteries providing a backup of at least 3 hours if not mentioned otherwise elsewhere. The light fixture shall have steel body powder coated in perma white finish, complete with screen printed acrylic legend panel. 2 X High Power 1W LED lamp and give 20 m route space. Legend panel shall be bottom entry for case of installation near walls. The legend pictogram shall be green colour and as approved by the Engineer.

4.6 LED Flood Light Fixture

The Contractor shall furnish and install the complete Boundary Wall luminaires maintaining avg. 30 lux for existing outdoor mixed traffic area, fully IP 66 with corrosion resistant die cast aluminum housing, silicon gas kit, thermally hardened glass complete with LED drivers, surge protection and all accessories/ components required for the proper operation of the system. The luminaries shall be fully flexible for future upgrades and easy replacements for maintenance purposes.

The luminaire shall have such distribution to achieve flood lighting application parameters. The luminaire shall offer a composite system efficiency of at least 100 Lumen/Watt and a lumen package of up to 13,000 for 120W+/-5W. The light fixture has three different optical beam angles Symmetric Wide Beam & Asymmetric Medium Beam & Narrow Beam optics according to application.

The LED light fixture should be designed for lumen maintenance of L70 or 70% at the end of useful life at ambient temperature of 45 ºC and shall be capable to operate efficiently within the temperature limit of -40 ºC to 50 ºC. The complete light fixture should have useful life of 50,000 burning hours.

4.7 High Pressure Sodium Lamp

The high-pressure sodium SON-T plus lamp shall be of increased output tubular of rating 70 Watt and 400 watt as shown on the drawings. The base of the lamp shall be E40 with 6600 and 55,000 lumens output for 70 Watt and 400 Watt lamps respectively. The colour-rendering index Ra shall be 23. These lamps shall comply with EN60662.

4.8 Ballast for High Pressure Sodium Lamps

The ballast for high pressure Sodium lamps shall be polyester resin filled, totally encapsulated electromagnetic of copper / iron construction with leak proof body for use in combination with an external ignitor. The ballast shall fully comply with international Standards on Safety and performance, design compliance to IEC 60922/60923. The ballast shall be suitable for application in luminaries or poles under normal humid conditions. The ballast shall conform to the characteristics and wattage of the lamps. The wattage of lamp and ballast and a wiring diagram and other relevant data shall be printed on the body of the ballast. The power loss of the ballast shall not be more than 13.5-Watts for 70-Watts lamp and 28-Watts for 400-Watts lamp. The ballast shall be provided with insulated block of terminals for connecting up to 6 sq.mm cable with separate earth terminal.

4.9 Electronic Ignitors for High Pressure Sodium Lamps

The electronic ignitors for high-pressure sodium lamps shall be compact and light in weight with reliable and smooth starting behaviour. The ignitors shall be suitable for specified wattage of high-pressure sodium lamps and other requirements. The ignitors shall fully comply with IEC 60662 and EN 60926 regulations. The ignitors shall be provided with screw terminal / blocks and simple stud or screw mounting arrangement.

4.10 Capacitors for High Pressure Sodium Lamps

The capacitors for use in combination with high-pressure sodium lamp circuits shall be high-quality electrolytic capacitors for correction of power factor. The capacitors shall be of appropriate rating and type for the relevant lamp wattage. All capacitors shall be fitted with an internal discharge resistor, have a fuse fitted and be of self-healing type. Capacitor shall conform to IEC 61048/61049.

4.11 Flood Light Lanterns

The flood light lanterns shall have lamps of ratings specified in BOQ/ Drawings and shall be fully equipped with high grade reflector, corrosion proof housing with integral gear box, (Double insulation Class-II), compensated electrical control gear etc. complete with all internal wiring.

The flood light lanterns shall have non-corrosive, injection moulded, heat and UV-stabilized body, hammered aluminium reflector brightened and anodised, thermally – hardened 5 mm minimum glass, stainless steel snap-on hinged-clips, stainless steel protractor, hot dipped galvanized steel mounting brackets and stainless steel fixing accessories.

The housing shall be dust proof and jet proof to IP66, such that no internal cleaning shall be required.

4.12 LED Street Light Fixture

The road light fixture shall be an attractive modern appearance, high performance lantern suitable for 90W or 200W LED lamp as given in the BOQ/drawing.

Light fixture shall be provided with solid die cast aluminium housing, heat resistant silicon rubber gasket in optical LED compartment, DME type optic, tampered glass cover and shall be coated with powder of colour RAL 7040 ensuring no discoloration when exposed to UV light.

The light fixture shall be designed to receive power either from the battery or from the AC source. The light fixture shall have the following characteristics:

Voltage	=	220-240 VAC
Surge Protector	=	10 kV
Power Factor	>	0.9 (nominal power)

The light fixture shall have IP 66 protection to ensure long reliable performance and minimize maintenance requirement and an Impact resistance of IK 08 with insulation Class I. Use of chemical glue shall NOT be allowed to avoid probable breakdown of water-proof and dust-proof seal.

The light fixture should have a minimum color rendering index (Ra) of 70 + 5 and a color temperature of 4000K for maximum efficacy with an average output of at least 10,000 lumens for 90 Watt and 22,000 lumens for 200 Watt LED Fixture. The LED should have a color consistency within 5 SDCM (Standard Deviation of Color Matching). The color temperature variation of the LEDs should be restricted as per ANSI

C78.377A with CCT variation limiting within 500K for nominal CCT of 4000K.

The LED light fixture should be designed for lumen maintenance of L70 or 70% at the end of useful life at ambient temperature of 45 ºC and shall be capable to operate efficiently within the temperature limit of -40 ºC to 55 ºC. The complete light fixture should have useful life of 50,000 burning hours.

The light fixture shall be fully compatible with future LED upgrades when they become available. It shall have a modular design to upgrade / replace with new LED modules or LED drivers at site conveniently with minimum effort. All electronic components/drivers shall be mounted on a separate removable gear tray. Light fixture housing shall have a tool less access by opening the cover.

The proposed LED road lighting light fixture shall be provided with in-built surge protection system to protect the electronic driver and LED system. Minimum surge protection rating is 10kV.

The housing shell, under the circuit board, shall be specially designed to ensure perfect contact between the circuit board and the light fixture housing for efficient heat dissipation. Only Metal Core PCBs shall be used to maximize heat transfer process and to offer reinforced electrical insulation via di-electric layer. The Metal Core PCB should be mounted on the housing using a highly efficient thermal interface material.

The optical LED compartment shall have a thermally hardened glass cover and high quality silicon gasket. The Glass cover will be tightly secured with the housing. The light fixture should have flexible optical system to achieve lighting parameters for required class of roads. The light fixture should offer a composite system efficiency of at least 100 lumen/Watt.

Specially designed lens system with unique inner and outer profile for high efficiency LED shall be provided to ensure maximum spacing between the poles and cover higher road widths. Multi layer optics design to ensure adequate luminance and luminance uniformity in the unlikely event of individual LED failure. The light fixture should offer choice of narrow, medium and wide beam light distribution.

The lamp position shall be adjustable to at least three positions to facilitate the changing of photometric distributions.. The photometric data of the lantern shall be authenticated by an Internationally Accredited Lighting Organisation.

Luminance level calculation with average luminance of the road surface, overall uniformity of road luminance, threshold increment, longitudinal

uniformity of road surface luminance and surround ratio achieved shall be submitted by the Contractor / manufacturer for verifying conformance to international lighting standards and approval of the Engineer.

4.13 LED Chips and Driver

The LED chip shall be from Cree / Nichia / Lumileds make or approved equivalent. The LED driver shall be designed to operate large array of high power LED's through current controlled output. The driver shall be suitable for operate up to 250VAC 50/60Hz mains supply. The LED driver shall have an efficiency of at least 90%. Fixed Output LED Driver (PSU) shall be integrated within each LED luminaire. The Driver compartment cavity and gear tray shall be designed with tool-less access for maintenance and replacement.

The light fixtures including the driver will include a warranty of at least 3 years against manufacturing defects. The cost of such provision will deemed to have been respective BOQ item of light fixture and no separate payment shall be admissible in this regard.

The LED driver shall fully conform to following specifications:-

1) BS-EN 61347-1 - General and safety requirements.
2) BS-EN 61347-2-13 - Particular requirements for DC or AC supplied electronic control gear for LED modules.
3) BS EN 55015: 2013 – Emission – Electrical lighting and similar equipment
4) BS EN 61547: 2009 – Immunity – Equipment for general lighting purpose
5) BS EN 61000-3-2: 2009 – Limits for harmonic currents emissions.
6) BS EN 61000-3-3: 2008 – Limits for voltage fluctuation and flicker.
7) BS EN 62493 – Assessment of lighting equipment related to human exposure to electromagnetic fields

5.0 INSTALLATION

5.1 General

The mounting heights of light fixtures are indicated on the drawings, and positions of fixtures are according to the mentioned scale.

The Contractor must ensure that the light fixtures are installed uniformly with respect to the dimensions of the area. Any modifications due to site conditions may be made with the approval of Engineer. All fixtures shall be carefully aligned before fixing in position.

The wiring between ceiling rose or terminal box and the fixture shall be carried out with 3-core 1.0 sq.mm and 1.5-sq.mm flexible copper

conductor PVC/PVC cable respectively for circuits protected by 10 amps and 15/20 amps MCBs. The wiring inside light fixture body shall be done with heat resistant cables or PVC insulated cable in heat resistant sleeves as approved by the Engineer.

Glasses, shades, reflectors, diffusers, etc., must be in a clear condition after installation. All light fixtures shall be earthed by an earth wire connected to the earth terminal in the fixture.

5.2 Street Light / Flood Light Fixture

The proposed street light fixture / flood light fixture shall be installed on the light pole/mast as per manufacturer's installation instructions. The road light fixture shall be properly levelled and the lamp adjusted to the appropriate position and all screws, bolts checked for tightness, etc. The light fixture shall be connected to the supply and earth at the proper terminals in the fixture.

5.3 Flood Light Lanterns

The flood light lanterns shall be installed on truss/G.I. bracket as per details shown on the drawing. Manufacturer’s installation instructions shall be followed. The G.I. bracket shall be installed on column as shown on drawing. The exact location, rating and tilt/pan angles of light fixtures shall be finalized at site to suit the flood lighting requirements. Engineer’s decision will be binding and final.

5.4 LED Batten / Panel Light Fixture:

LED Batten or Panel light fixtures on the surface of ceiling shall be installed with the back of the body flush with the ceiling surface, and in a manner so as to facilitate wiring. Nylon plugs and galvanized steel bolts or screws shall be used for fixing the light fixture to the ceiling. For light fixtures installation on false ceiling the installation method/detail shall be coordinated with ceiling design and submitted for approval of Engineer. Care shall be taken to prevent the weight of the fixture from being transferred to the false ceiling.
Pendant light fixtures shall have two holes in the top of each casing for supporting to the ceiling by a 3/4" dia. galvanized pipe or any other standard method as approved by the Engineer. Wiring from ceiling rose to the fixture shall be done through the pipe. Proper arrangements such as long threads with check nuts, etc. for minor adjustment in the mounting heights of the fixtures shall also be provided.

5.5 LED Down Light Fixture

LED downlight fixtures shall be installed on the surface of ceiling or wall by means of nylon plugs and galvanized steel screws, such that their

back finish flush with the surface for exposed conduits and flush with outlet box for concealed conduit system. Wherever convenient, screws for fixing light fixtures shall be screwed into the holes of the outlet box. The lights on false ceiling shall be installed in a manner as described for LED Panel light fixture.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against each Bill of Quantities item as given below shall include supply, installation, testing, commissioning and completion for all work specified herein and/or shown on the Bidding Drawings related to the item.

6.2 LED Batten / LED Smart Panel / LED Downlight / LED Exit Light / CFL Bulkhead / LED or Conventional Flood Light/ LED Street Light Fixture

The Contractor's bid amount against each Bill of Quantities item as given below shall include supply, installation, testing, commissioning and completion for all work specified herein and/or shown on the Bidding Drawings related to the item.

6.2.1 Measurement

Measurement shall be made for each type of light fixture including all accessories acceptably supplied and installed by the Contractor as complete unit.

6.2.2 Payment

Payment shall be made for the number of units measured as provided above at the contract unit price each and constitute full compensation for supplying, installing, connecting, testing and completion of LED Battens / LED Smart Panel / LED Downlight / LED Exit Sign / compact fluorescent Bulkhead including all accessories such as capacitors , LED drivers, LED Chips, LED optics, connecting cables & connectors, suspension rods and pendent arrangement, GI pipe bracket, ceiling supports, internal wiring, nuts, bolts, screws, etc., as required and complete in all respects.

6.3 High Pressure Sodium Flood Light/ LED Flood Light / LED Street Light Fixture

The Contractor's bid amount against each Bill of Quantities item as given below shall include supply, installation, testing,

commissioning and completion for all work specified herein and/or shown on the Bidding Drawings related to the item.

6.3.1 Measurement

Measurement shall be made for each type of light fixture including all accessories acceptably supplied and installed by the Contractor as complete unit.

6.3.2 Payment

Payment shall be made for the number of units measured as provided above at the contract unit price each and constitute full compensation for supplying, installing, connecting, testing and completion of High Pressure Sodium Flood Light / LED Flood Light Fixtures/ LED Street lights including all accessories such as ballasts, capacitors, igniters, LED drivers, nuts, bolts, screws, etc., including PVC pipe, foundation etc., as required and complete in all respects.

*** End of Section 8150***

SECTION – 8212

LOW TENSION CABLES

1.0 SCOPE OF WORK

2.0 GENERAL

3.0 APPLICABLE STANDARDS/CODES

4.0 MATERIAL

5.0 INSTALLATIONS

6.0 MEASUREMENT AND PAYMENT

1.0 SCOPE OF WORK

The work under this section consists of supplying, installing, testing and commissioning of all material and services of low tension (LT) cables and the accessories as specified herein or as shown on the Bidding Drawings and stated in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and coordinate at site with other services for exact route, location and position of the L.T. cables.

The LT cables with accessories shall also comply with the General Specifications for Electrical Works, Section-8001 and with other relevant provisions of the Bidding Document.

2.0 GENERAL

All multi-core and single core PVC insulated and sheathed cables LSZH for light circuits, socket outlets and circuits operating upto 250 volts shall be 300/500 volts grade. All single core PVC insulated, non-sheathed cables shall be of 450/750-volt grade. Power cables for main feeders, main to sub main feeders, power equipment, etc., armoured or unarmoured shall be of 600/1000 volt grad/XLPE. Armouring of multi-core/ single core cables shall be done with appropriate size galvanized steel/aluminium wire as per relevant codes.

The conductors shall be stranded high conductivity, soft annealed copper. Conductors of single core cables shall be circular, whereas of multi-core cables may be circular or shaped according to standard practices and codes. The PVC insulation, bedding and overall sheath shall be of extruded PVC compound having good flexibility, resistance to ageing and ability to withstand deformation at high temperatures. Non-hygroscopic filler shall be provided in multicore cable to fill empty gaps between the cores to make the cable a smooth round finish. In all shaped cables a non-hygroscopic high strength binding tape shall be provided on the core assembly. All cables shall be treated for vermin proofing and be protected against rodents during storage, laying and all protective pipe/sleeves shall be plugged to attain the same after installation.

Embossed marking on the oversheath at 3 meters intervals shall give the following information:

- name of Manufacturer
- year of Manufacture
- No. of cores and size of cable in sq.mm.
- voltage grade
- type of cable i.e. Cu./PVC/SWA/PVC

3.0 APPLICABLE STANDARDS/CODES

The latest editions of the following standards and codes shall be applicable for the materials specified within the scope of this section:

BS 6004	-	Electric cables PVC insulated, non armoured cables for voltages upto and including 450/750 volts for electric power, lighting and internal wiring
BS 6346	-	Electric cables PVC insulated, armoured cables for voltages of 600/1000 V and 1900/3300 V
BS 6746	-	PVC insulation for electrical cables
BS 60228	-	Copper conductors of insulated cables
BS 6500	-	Insulated flexible cords
BS 7846	-	Electric cables 600/1000 V armoured fire resistant cables having thermosetting insulation and low emission of smoke and corrosive gases when affected by fire
BS 7889	-	Electric cables. Thermosetting insulated, unarmoured cables for a voltage of 600/1000 V
BS EN 50266	-	Common test methods for cables under fire conditions

4.0 MATERIAL

4.1 General

The power, lighting and control cables shall be furnished and installed in accordance with the routes and requirements shown on the drawings.

All cables shall have phase identification colours on insulation of each core. The colour code for three phase circuits shall be red, yellow and blue for phase conductors and black for neutral conductor. Where insulated earth conductor is installed, it shall have green or green-yellow colour insulation.

Single-phase circuits shall have insulation of red colour for phase/line, black colour for neutral and green or green-yellow colour for earth conductor. All DC circuits shall have insulation of white colour for positive, black colour for negative and green or green-yellow colour for earth conductor.

The ends of each length of multi-core armoured or unarmoured cables shall be properly marked for clock-wise and anti clock-wise sequence of core colours.

4.2 Cables for Conduit or Channel Wiring

All cables/wiring in concealed or surface mounted PVC conduits or in covered channel shall be single core PVC insulated LSZH of specified grade and size, unless specifically shown on the drawings or given in BOQ.

The contractor shall wire all power receptacles/points from the panels using copper stranded conductor having proper insulation and PVC sheathing. Under no circumstances shall wire pulling compound be used when pulling the wire for isolated circuits. All wiring shall be color-coded in accordance with applicable standards.

4.3 Cables on surface/concrete trenches/cable trays

Cables for distribution system to be installed on surface, in cable ducts, in concrete trenches or on trays shall be single or multi-core PVC insulated and PVC sheathed of specified voltage grade and size, unless specifically shown on the drawings or given in BOQ.

4.4 Cable Accessories

All cable accessories shall be provided for the complete cabling and wiring system without any additional cost unless specifically mentioned in BOQ. These shall include but not limited to the items such as saddles, clamps, fixing channels, connectors, cable joints (where necessary and as approved by the Engineer), clips, lugs, colour sleeves, identification tags, bushes, glands, etc.

5.0 INSTALLATION

5.1 General

All installation material, labour, tools, cable rollers and accessories for cable installation shall be furnished by the Contractor. The cable and accessories shall be installed as described in accordance with these Specifications, drawings and manufacturer's instructions.

The Contractor shall confirm the exact cut lengths for cable by actual measurements at site prior to the ordering. The cable lengths where shown on the drawings or in BOQ are tentative and only for general guidance. The Contractor shall be solely responsible for furnishing

correct lengths of cable to avoid joints in cable length except where necessary, after obtaining approval of the Engineer.

No separate payment for such joints is admissible.

Necessary precautions for safety of cables shall be taken during the laying of cables to avoid scratches/ cuts to the cable surface. Pulling force on cable at all times shall remain well within the manufacturer's recommended limits.

Prior to installation of jointing and termination kits, the cable lengths shall be checked and tested to ensure that the cables are in sound condition, and no damage has been done during handling and installation. After installation, these shall again be tested prior to commissioning as per recommendations of the standards according to which the cable is manufactured.

5.2 Conduit or Channel Wiring

The wiring through conduit shall be started only after the conduit and channel system is completely installed and all outlet boxes, junction boxes, etc., are fixed in position.
The wires shall be pulled in conduit or channel with care, preferably without the use of any lubricant. Where necessary and if approved by the Engineer, the cable manufacturer's recommended lubricant may be used. Where several wires are to be installed in the same conduit, they shall be pulled together along with the earth conductor. All wires of same circuit shall be run in one conduit.

The wires shall not be bent to a radius less than ten times the overall diameter of the wire, if otherwise recommended by the manufacturer.

The wiring shall be continuous between terminations and looping-in system shall be followed throughout. Any joint in wires shall not be allowed. The use of connectors shall only be allowed at locations where looping-in is rendered difficult. The consent of the Engineer shall be required for using connectors. The connector shall be of suitable rating having porcelain body with sunk-in screw terminals. The connector shall be wrapped with PVC insulation tape after its installation. A minimum of 150 mm extra length of cable/wire shall be provided at each termination to facilitate repairs in future.

5.3 Cables on Surface/Trenches/Cable Trays

All cables for installation on surface of wall, column, ceiling, trenches, etc., shall be fixed to the surface by means of galvanized steel clips secured to a steel channel using suitable stud plate, nuts and washers. The distance between each cable clip shall be such so as to support the

entire weight of the cable and that distance between the cable & surface and also the vertical clearance between two adjacent cables at any point is 50mm minimum. Common mounting channels are to be furnished for cable along the same route. The Contractor can offer alternate cable fixing arrangement, which shall be approved by the Engineer before commencement of installation.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against each Bill of Quantities item as given below shall include supply, installation, testing, commissioning and completion for all work specified herein and/or as shown on the Bidding Drawing related to the item.

6.2 Light Circuit Wiring

6.2.1 Measurement

Measurement shall be made for the total number of light circuit wiring from LT distribution board to point/switch/push button including wiring between switches/push buttons on the same circuit, acceptably carried out by the Contractor as a complete unit.

6.2.2 Payment

Payment shall be made for the total number of units measured, as provided above, at the Contract unit price each and shall constitute full compensation for supplying, installing, connecting, testing, commissioning and completion of the circuit wiring from the LT distribution board to point/switch/push button including wiring between switches/push buttons on the same circuit complete with specified type of surface mounted/concealed conduit, (PVC or steel) required No. specified size single core PVC insulated cable, earth continuity conductor, accessories, etc.

6.3 Wiring of Light/Fan Point (Point to Switch/ Impulse Relay, Point to Point, or Group Controlled Light Points)

6.3.1 Measurement

Measurement shall be made for the total no. of wiring of light/fan points (point to switch, point to point, or group controlled light point), acceptably carried out by the Contractor as a complete unit.

6.3.2 Payment

Payment shall be made for the total number of units measured, as provided above, at the Contract unit price each, and shall constitute full compensation for supplying, installing, connecting, testing, commissioning and completion of the wiring between light point to switch/ impulse relay, point to point or group controlled points including required no. of specified size single core PVC insulated cable, specified type of surface mounted/concealed conduit (PVC or Steel), earth continuity conductor, flexible cable, ceiling rose, one way or two way 10A light control switch, sheet steel box and other accessories, etc.

6.4 Wiring of Power Circuits (Distributor to socket outlets & between sockets)

6.4.1 Measurement

Measurement shall be made for the total number of each type of wiring acceptably carried out by the Contractor as a complete unit.

6.4.2 Payment:

Payment shall be made for the total number of units measured, as provided above, at the Contract unit price each and shall constitute full compensation for supplying, installing, connecting, testing, commissioning and completion of wiring of socket outlets etc. from distributor to sockets or between sockets with specified size and number of single core PVC cables LSZH cables including specified type of surface mounted / concealed conduit (PVC or Steel), ECC and all other accessories etc.

6.5 LT Cables

6.5.1 Measurement:

Measurement shall be made for the total running feet for each size and type of LT cable acceptably supplied and installed by the Contractor.

6.5.2 Payment:

Payment shall be made for the total running feet of each size and type of LT cable measured, as provided above, at the Contract unit price each and shall constitute full compensation for supplying, installing, connecting, testing and commissioning of the LT cables including all accessories such as cable joints, lugs,

colour sleeves, glands, bush, etc. complete with plugging of protective pipe/ sleeve ends for water tightening.

*** End of Section 8212 ***

SECTION – 8220

WIRING ACCESSORIES

1.0 SCOPE OF WORK

2.0 GENERAL

3.0 APPLICABLE STANDARDS/CODES

4.0 MATERIAL

5.0 INSTALLATIONS

6.0 MEASUREMENT AND PAYMENT

1.0 SCOPE OF WORK

The work under this Section consists of supplying, installing, and commissioning of all material and services of the complete Wiring Accessories including switches, switch sockets, etc., as specified herein and/or shown on the Bidding drawings and stated in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and coordinate at Site with other services for exact location and position of all wiring accessories.

The wiring accessories such as switches, switch socket outlets, socket outlets and ceiling roses, etc. shall also comply with the General Specifications for Electrical Works Section 8001 and with other relevant provisions of the Bidding Documents.

2.0 GENERAL

The locations of the wiring accessories such as switches, sockets, etc. are tentatively shown on the drawings. The Contractor shall ensure the exact positions and locations of wiring accessories in coordination with other services drawings, as per site requirements and as directed by the Engineer. The Contractor shall be responsible for proper functioning of wiring accessories after installation and commissioning.

The description of switches, switch sockets, socket outlets etc. are given in the Bill of Quantities, stated as drawings and in this section. The Contractor shall submit sample of each and every item of wiring accessories for the approval of the Engineer.

3.0 APPLICABLE STANDARDS/CODES

The latest edition of following standards & codes shall be applicable for the materials specified within the scope of this section :

BS 3676	-	Switches for domestic and similar purposes.
BS 4343	-	Industrial plugs, socket outlets and couplers for AC and DC supplies.
BS 2135	-	Capacitors for radio interference suppression.
BS 67	-	Ceiling roses.
BS 546	-	2-pole and earthing pin plugs, socket outlets and socket outlet adaptors.
BS 1362	-	Specification for general purpose fuse links for domestic and similar purposes.

BS 1363 (Part 4-1995)	-	Specification for 13A fused connection units: switched and unswitched.
BS 5733 (1995)	-	Specification for general requirements for electrical accessories.
DIN EN 60669-1	-	Switches for household and similar fixed electrical installations.

4.0 MATERIAL

4.1 Switches/Blank Face Plates

Switches for controlling light and fan points shall be single pole, rated for 10 Amps, 250 volts AC. The body of the switches shall be of thermoplastic with faceplate suitable for flush mounting and colour as approved by the Engineer. The switches shall be gang type having silver tipped contacts and shall operate with snap action.

Unless otherwise specified wherever switches control only the light points, these shall be plate type gang switches installed on common outlet boxes. Where only sheet steel back box is indicated on drawings, blank face plates shall be provided of same make and model as that of switches.

Where specified weather proof or metal front plates shall be used with single grid type switches. The plate shall be finished in specified colour or as otherwise directed by the Engineer.

The bell push switches shall be spring loaded type with the identification symbol embossed on it.

Two-way and intermediate switches shall be used to control lights from two or more different locations particularly in staircase as shown on the drawings.

4.2 13A Switch-Socket/Socket Outlets

Switch socket/Socket units shall be 3 pin, 13 A 250V, AC with faceplate of colour as approved by Engineer. The outlets shall be heavy-duty type suitable for mounting on sheet steel outlet box. The 13 Amps Switch socket/Socket outlets shall have sheltered live contacts and designed such that the earth pin of plug is engaged to socket earth before making of live contacts.

Where metal plate switches are installed, the switch socket units shall also be provided with front plate of similar design.

4.3 15A Socket Outlets

15 Amps Socket Outlets shall be 2 pin + earth, 250V AC socket outlets with faceplate of colour as approved by the Engineer.

The outlets shall be heavy-duty type suitable for mounting on sheet steel outlet box. The 15 Amps Socket Outlets shall be designed such that the earth pin of plug is engaged to socket earth prior to making contact to the live contacts.

4.4 32A Industrial Socket Outlet

The 32A, industrial socket outlet shall be weather proof conforming to the standard and requirements of relevant IEC codes.

The socket outlets shall be of heavy-duty type suitable for outdoor installation. The socket outlet shall be mounted on polycarbonate enclosure and have gasketed cover and window, captive cover screw type. All socket outlets shall be supplied with matching plugs.

4.5 64A Industrial Socket Outlet

The 64A, industrial socket outlet shall be weather proof conforming to the standard and requirements of relevant IEC codes.

The socket outlets shall be of heavy-duty type suitable for outdoor installation. The socket outlet shall be mounted on polycarbonate enclosure and have gasketed cover and window, captive cover screw type. All socket outlets shall be supplied with matching plugs.

4.6 Connection Unit

Connection Unit shall be used to supply to appliances where so specified or shown on drawings. (Air conditioner/Hand drier / Water heaters etc.).

It shall be rated for 20A, 250V AC or as shown on drawings/BOQ. The body shall be of thermoplastic material. Installation shall be surface/ concealed as required.

Face plate and colour to be as per approval of Engineer.

Connectors shall be of best quality (for Phase, Neutral and Earth) and suitable for the size of wiring.

The connection unit shall have the following features as per requirement in B.O.Q or as shown on drawing.

- 20 A Double Pole Switch
- Fuse – Rating as per requirement of appliance
- Neon Indication light
- Grommetted outlet on face plate suitable for flexible wiring connection to appliance

4.7 Fan Dimmers

The fan regulator/dimmer shall be made of low voltage electronic components with essential radio frequency compressor and shall be designed for smooth speed control/variation of fans. The regulators/dimmer and fan control switches shall be of same make and colour as that of the approved wiring accessories. The regulator/dimmer and fan-controlling switch shall preferably be mounted on same face plate. They shall be suitable for flush mounting on a sheet steel outlet back box.

4.8 Sheet Steel Back Boxes

The sheet steel boxes for installation of switches, fan dimmers, socket, outlets and blank face plates shall be made of 16 SWG sheet steel having appropriate dimensions. The box shall have suitable arrangement for receiving the conduit(s). An earth terminal shall be provided for connecting at least three earth wires of 4-sq.mm size. The outlet box shall be finished in powder-coated paint. The sheet steel back box shall be as approved by the Engineer.

4.9 Ceiling Roses

The ceiling roses shall be suitable for 5 amps 250 volts single-phase ac. It shall have white plastic moulded base plate and copper or brass terminals suitable for connecting at least two wires of 2.5 sq. mm size. The ceiling rose shall have a cover with cable inlet hole suitable for multicore PVC insulated and PVC sheathed cable.

5.0 INSTALLATION

5.1 General

The mounting heights of all wiring accessories are stated on the drawings. In case the mounting height is not mentioned, the instructions of the Engineer shall be obtained before fixing.

5.2 **Wiring Accessories Installation**

All wiring accessories such as Switches, Blank Face Plates, 13/15A Switch Socket, 32/64/125A Industrial Socket Outlet, Connection Units & ground jack modules shall be installed on 1.63 mm (16 SWG) thick sheet steel box recessed in wall/column/floor. The faceplate shall be fixed on sheet steel box by means of flat head galvanized or brass screws sunk in the faceplate so as to finish flush with the surface. Matching screw caps shall be installed on the opening for screw in faceplates.

6.0 MEASUREMENT AND PAYMENT

6.1 **General**

The Contractor's bid amount against each Bill of Quantities item as given below shall include supply, installation, testing, commissioning and completion for all work specified herein and/or as shown on the Bidding Drawing related to the item.

6.2 **13A Switch Socket/Socket Outlets, 15 Amps Switch Socket/Socket Outlets, 32/64/125A Industrial Socket Outlet & Connection Units**

6.2.1 Measurement:

Measurement shall be made for the total number of each type of socket outlet complete with sheet steel back boxes, polycarbonate enclosure and all accessories acceptably supplied and installed by the Contractor as a complete unit.

6.2.2 Payment:

Payment shall be made for the total number of units measured, as provided above, at the Contract unit price each and shall constitute full compensation for supplying, installing, connecting, testing and completion of each type and rating of outlet including screws, screw caps, sheet steel box, polycarbonate enclosure, nuts, bolts and other accessories as required.

*** End of Section 8220***

SECTION – 8262

POLES FOR STREET LIGHTING

1.0 SCOPE OF WORK

2.0 APPLICABLE STANDARDS/CODES

3.0 CONSTRUCTION OF STREET LIGHTING POLES

4.0 INSTALLATION

5.0 TESTS

6.0 MEASUREMENT AND PAYMENT

1.0 SCOPE OF WORK

The work under this section consists of manufacturing, supplying, installation testing and commissioning of the street lighting poles and accessories as specified herein, or as shown on the Bid Drawings and given in the Schedule of Prices.

The Contractor shall discuss the electrical layout with the Engineer and coordinate at site with other services for exact location and position of the electrical poles.

The poles with accessories shall also comply with the requirements of Special Provisions and with other relevant provisions of the Bid Documents.

2.0 APPLICABLE STANDARDS/CODES

The latest editions of the following standards/codes shall be applicable to the material specified within the scope of this Section:

- BS 5649 - Specification for lighting columns
- NV 65 - Specification for lighting columns
- CM 66 - Specification for lighting columns
- XP P 97 406-1 - Specification for lighting columns

3.0 CONSTRUCTION OF STREET LIGHTING POLES

The galvanized steel poles shall be of mild steel as shown on drawing from base plate to lantern connection, well-proportioned and neatly finished. The height of the pole from the centre line of the spigot for lantern connection to the ground line and out-reach of each arm from the vertical centre line of the pole to the tip of the spigot for lantern attachment shall be as shown on Drawing. Approval of the Engineer shall be obtained before ordering the poles for manufacturing.

The pole (vertical portion) along with base plate shall preferably be in one piece. But if manufacturing in one length is not possible, it can be in two or three pieces with force fit lap joint.

The steel poles after fabrication shall be galvanized by hot dip process both in and outside as per BS-729 `Hot Dip Galvanized Coatings on Iron and Steel Articles'. The poles shall be prepared before galvanizing by removing grease, burs and slag etc. so that zinc coating is adherent, dense, smooth, continuous and uniform. The Contractor shall ensure before placing of order that the firm has adequate facility for hot dip galvanizing process as per standard practice. The steel used in the manufacture of poles shall be made by open hearth or electric furnace process.

The steel for poles shall have the following requirements:

Tensile Strength

- Minimum = 39.9 kg/mm^2
- Maximum Yield Point = 56.3 kg/mm^2

Yield Point

- Minimum Elongation = 24.7 kg/mm^2

Elongation

- for a 200mm sample = 20% min.

The straight portion of the pole shall be truly vertical and no deviation more than 100 mm in the entire length shall be accepted.

Other tolerances shall be as follows:

- Outside diameter = +/- 1%
- Wall thickness = +/- 10%
- Overall length of pole = +/- 0.5%
- Weight = - 0.3% + not limited.

The pole and the bracket shall be so designed that when subjected to wind at a velocity of 160 km/hour on the full projected area of pole, bracket and the lantern a factor of safety of 3 on minimum tensile strength of the material shall be obtained. In addition, the temporary horizontal deflections at the lantern position shall not exceed 1/40 of the length of the pole above ground at aforementioned wind velocity.

The poles shall have a base compartment, designed to accommodate a loop-in services cutout for 4 core PVC/SWA/PVC cables of given sizes. An 8 mm stainless steel stud complete with nut and washers shall be provided in the base compartment of the pole for earthing purpose.

The edges of the door opening on the pole shall be reinforced with a 10 mm thick M.S. square bar to reinstate the strength of pole at this location. The opening cover shall consist of weather proof hinged door. The door shall be provided with a heavy duty non-rusting lock.

Flag brackets shall be fitted to poles if shown on the drawing and shall be as approved by the Engineer.

4.0 INSTALLATION

Lighting poles shall be handled / transported and erected in such a way so as to avoid any damages. Any damage to pole or galvanizing shall be made good to the satisfaction of the Engineer.

The lighting poles shall be stored clear of soil, ground water or other rust producing materials. The fixing of poles shall be carried out in accordance with manufacturer's instructions and good engineering practice.

The poles shall be erected in a true vertical position. The contractor shall be responsible until completion of the maintenance period for correcting the alignment of any pole/bracket from its original position except where it is due to vehicle impact.

Where lighting poles are to be installed in the vicinity of overhead power lines, the Contractor shall inform the Engineer and act as directed. He shall maintain clearances as per WAPDA requirements from the power lines.

The Contractor shall number all the poles with high quality paint using stencil for 50 mm high lettering. The numbering shall be at 1200 mm from the bottom of pole towards the road. The numbering shall be in a manner as directed by the Engineer.

Earth backfill around pole foundation shall be done in 150 mm thick layers and shall be well rammed and compacted to provide full lateral support.

4.1 Data to be submitted

Before manufacturing, the Contractor shall submit for approval of the Engineer, the shop drawing of the pole anchor bolts, base plate and pole bracket together with details of the base compartment, cover and the means adopted for making it waterproof and tamperproof. Design calculation sheets for the poles from manufacturer shall also be submitted by the contractor to show that poles/foundations are safe for all specified stresses.

5.0 TESTS

5.1 General

The poles shall be tested and the results recorded for each test by the manufacturer in the presence of an authorized representative of the Owner or Engineer as stated below.

5.2 Inspection

The material, weight and dimensions of poles as specified shall be certified by the manufacturer. The poles shall be inspected and in case being found below the limits of tolerance as aforementioned, shall be rejected.

5.3 Loading Test

The pole shall be cantilevered horizontally, rigidly supported at base plate and loads applied at right angle to the axis of the pole at the required point, i.e. at some distance from top. The test items shall be as follows:

- Deflection test.
- Permanent set test
- Breaking load test.

Sample comprising four poles shall be selected at random out of each lot of 1000 and subjected to deflection test. One pole per thousand shall be tested for permanent set test and breaking load test. When the poles in Contact are limited in number, the manufacturer may avoid these tests and supply results of tests already done for prototype testing on such poles or supply calculation based results.

5.4 Galvanizing

Weight, uniformity of coating and other requirements shall be strictly inspected in accordance with BS-729 or other relevant international standards.

5.5 Service Cutouts

Each pole shall be provided with a waterproof and dust tight loop-in-service cutout accommodated in the base compartment of the pole.

The junction box shall comprise two (2) 6A MCBs for double arm poles and one (1) 6A MCB for single arm poles, a solid neutral link and an earthing terminal. It shall incorporate arrangements for looping "IN" and "OUT" for 4 core up to 25 mm^2 PVC/SWA/PVC cable having Aluminum conductor. The earth terminals, nuts and washers shall be adequately sized to take the earth continuity conductors with tight connections.

Dimensional drawings and details of the junction cutout box of pole shall be submitted for approval to the Engineer.

6.0 MEASUREMENT AND PAYMNET

6.1 Measurement:

Measurement shall be made for the number of poles including all accessories and foundation block acceptably supplied and installed by the Contractor as shown on the drawing.

6.2 Payment:

Payment shall be made for the number of units measured, as provided above, at the contract unit price each, and shall constitute full compensation for supplying, installing, connecting, testing and commissioning of each pole including junction cutout box.

*** End of Section 8262***

SECTION – 8290

MISCELLANEOUS ITEMS

1.0 SCOPE OF WORK

2.0 GENERAL

3.0 APPLICABLE STANDARDS/CODES

4.0 MATERIAL

5.0 INSTALLATIONS

6.0 MEASUREMENT AND PAYMENT

1.0 SCOPE OF WORK

The work under this section consists of supplying, installing, testing and commissioning of all material and accessories for Miscellaneous Items as specified herein and/or shown on the Bidding drawings and stated in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and coordinate at site with other services for exact locations and positions of the Miscellaneous Items.

The Miscellaneous Items with accessories shall also comply with the General Specifications for Electrical Works, Section - 8001 and with other relevant provisions of the Bidding Document.

2.0 GENERAL

The Miscellaneous Items as described in this section shall comply with other sections of these specifications as applicable. The Contractor shall ensure that all the miscellaneous items be supplied/fabricated from the reputable manufacturers, who have already supplied/fabricated similar items.

3.0 APPLICABLE STANDARDS/CODES

The latest editions of the following standards/codes shall be applicable to the material specified within the scope of this section:

IEC 60947-2	-	Low Voltage Switch Gear and Control Gear.
BS 729	-	Hot dip galvanization
BS 4934	-	Safety requirements for electric fans and regulators.
BS 5060	-	Performance of circulating fans and their regulators.
BS EN 50085	-	Cable trunking and cable ducting systems for electrical installations.
BS EN 61537	-	Cable tray systems and cable ladder systems for cable management

4.0 MATERIAL

4.1 MCCB / MCB Enclosed in Sheet Steel Box

The single / double pole 250 volts miniature circuit breaker (MCB) and triple pole 500 volts moulded case circuit breakers (MCCB) are used for supplying single phase and three phase power respectively to the equipment shown on the drawings and given in the Bill of Quantities.

The MCCB/MCB shall conform to the same specifications as given in section LT switchboards and LT distribution boards of these specifications. It shall be installed in a 16 SWG sheet steel box of such a size, which can easily accommodate the MCCB/MCB and incoming/

outgoing wires or cables. Sufficient numbers of PVC connectors shall also be provided inside the sheet steel box for terminating the earth continuity conductors and neutral wires. The front plate fixed on the sheet steel box shall be of white plastic fixed with G.I. screws having an opening for operating the ON-OFF lever of MCCB / MCB.

4.2 Load Break Switch Enclosed in Sheet Steel Box

Single pole 250 Volts and triple pole 500 Volts Load Break Switch Enclosed in Sheet Steel Box are used for supplying single phase and three phase power respectively to the equipment shown on the drawings and given in the Bill of Quantities.

The load break switch shall conform to the same Specifications as given in section LT switchboard and LT distribution boards of these Specifications. It shall be housed in a, manufacturer's standard and in such a size of box which can easily accommodate the load break switch and incoming / outgoing wires along with the earth continuity conductor and neutral wires terminals.

4.3 Exhaust Fans

Exhaust fans shall be three blade or multi blade type of metal / PVC construction as approved by the Engineer.

Fans shall be direct driven and supplied complete with electric motor, back draft dampers and anti-vermin screen.

The bearings shall be ball roller or sleeves type of permanently lubricated and sealed type.

Wheels shall be heavily and rigidly constructed and accurately balanced both statically and dynamically and be free from objectionable vibration or noises.

4.4 Cable Trays / Trunking

Where specified, the cables shall run on cable trays/trunking supported to the wall and/or ceiling. The tray shall be of appropriate dimensions to ensure minimum clearance of 50mm between the cables. Tray and trunking shall be provided with complete accessories such as straight through joint, flexible expansion coupler, tee, cross, internal and external bend, cover etc. complete with proper support and fixing accessories, GI nuts, bolts washer etc.

The cable tray/ trunking length shall be fabricated in sections not exceeding 3.0 metres.

4.4.1 M.S. (Mild Steel) Cable Trunking

The M.S. cable trunking (with cover) shall be 16 SWG M.S. sheets. Suitable trunking design shall be provided for bends, crossings, etc., keeping in view allowable bending radius of cables.

Arrangement shall be provided to secure the cables in position on the trunking. After fabrication of each trunking and cover section, the metalwork shall be cleaned down to bare shining metal phosphated and the surface chemically prepared for powder coating. Then these shall be coated with powder of RAL colour as approved by the Engineer and then baked in oven. The thickness of powder coating shall not be less than 100 microns.

4.4.2 G.I. (Galvanized Iron) Trays/Cable Trunking

The G.I. trays/cable trunking shall comprise of 16 SWG perforated G.I. Sheets with solid cover, bend to shape and having required dimensions and all accessories shall be compatible with the tray to make a smooth medium.

Cables laid on tray or trunking shall be properly fixed or clamped, with smooth finished split pieces with bore diameter to suit the cable. Supports shall be arranged as far as practicable for easy removal of any cable without disturbing other cables.

Flexible copper braid connections shall be provided at every joint, fixing accessories of cable tray to ensure continuity.

5.0 INSTALLATION

5.1 General

The mounting heights, depths and other dimensions of all the Miscellaneous Items are stated on the drawings or in general notes. In case of any discrepancy, the instructions of the Engineer shall be obtained before fixing the item.

5.2 MCCB / MCB Enclosed in Sheet Steel Box

The triple pole moulded case circuit breakers (MCCB) single/double pole miniature circuit breakers (MCB) shall be installed on 1.63 mm (16 SWG) thick sheet steel box with screws or some suitable arrangements as approved by Engineer. White faceplate for sheet steel box shall be fixed by means of flat head galvanized screws sunk in the plastic plate so as to finish flush with the wall surface. The edges of the plate shall be champhered.

5.3 Load Break Switch Enclosed in Sheet Steel Box

The load break switch shall be installed as per manufacturer's recommendation and site conditions following good engineering practice.

5.4 Exhaust Fan

The propeller exhaust fan shall be installed in the opening already made in the wall and shall be firmly fixed by means of flat and head galvanized screws.

Wiring between the ceiling rose and the fan terminals shall be with atleast three core 2.5 sq.mm PVC insulated PVC sheathed flexible cables.

5.5 Cable Trays/Trunking

The cable trays/trunking shall be installed on supports fixed to the wall and/or ceilings/trusses. The supports shall be fixed by means of Rawal bolts suitable to carry maximum expected load. The additional hangers and other metalwork required for the installation of the trays / trunking shall be galvanized / painted and finished by method as specified for the cable tray / trunking.

The distance between alternate supports (span) in straight runs shall be finalized as per loading and in no case shall exceed 1.2 metres. In addition to these, supports shall be provided near each bend or change in direction or at the end of trunking / tray.

The straight jointing, bends and other accessories shall be fixed with cable tray/ trunking in such a manner that they are in one line with no sharp edges/ protruded surfaces. Rivet head nuts shall be installed on inner side of tray/ trunking.

On straight lengths (Over 20 meters) and at every building expansion joint suitable flexible expansion couplers shall be provided.

At each joint, bend earth continuity shall be ensured by using copper earth braid and copper lugs in electro-tinned finish.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against each Bill of Quantities item as given below shall include supply, installation, testing, commissioning and completion for all work specified herein, as shown on the Bidding Drawings and given in the Bill of Quantities related to the item.

6.2 MCCB / MCB and Load Break Switch Enclosed in Sheet Steel Box

6.2.1 Measurement:

Measurement shall be made for the number of each item acceptably supplied and installed by the Contractor as a complete unit.

6.2.2 Payment:

Payment shall be made for the number of units measured as provided above at the Contract unit price each and shall constitute full compensation for supplying, installing, connecting, testing and completion of each item including sheet steel outlet box, plate and accessories as required.

6.3 Exhaust Fan

6.3.1 Measurement:

Measurement shall be made for exhaust fan & Accessories acceptably supplied and installed by the Contractor as a complete unit.

6.3.2 Payment:

Payment shall be made for the number of units measured as provided above at the Contract unit price each and shall constitute full compensation for supplying, installing, connecting, testing and commissioning of exhaust fans including mounting accessories, nuts, bolts, etc. and wiring between ceiling rose and fan terminals complete in all respects.

6.4 Cable Trays/Cable Trunking

6.4.1 Measurement:

Measurement shall be made of the total running feet of each size of cable tray/cable trunking with cover and all accessories acceptably supplied and installed by the contractor.

6.4.2 Payment:

Payment shall be made for the total running feet as provided above at the contract unit price and shall constitute full compensation for supplying, installing, and completion of each size of cable tray/cable trunking with cover complete with all

installation material and accessories such as mounting brackets, bends, elbows, nuts and bolts etc.

*** End of Section 8290***

SECTION - 8230

CONDUITS AND PIPES

1.0 SCOPE OF WORK

2.0 GENERAL

3.0 APPLICABLE STANDARDS/CODES

4.0 MATERIAL

5.0 INSTALLATION

6.0 MEASUREMENT AND PAYMENT

1.0 SCOPE

The work under this section consists of supplying, installing and commissioning of all material and services of the complete Conduits and Pipes as specified herein and/or shown on Tender Drawings and stated in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at Site with other services for exact route, location and position of the conduits and pipes.

The conduits and pipes with accessories shall also comply with the General Specifications for Electrical Works, Section-8001 and with other relevant provisions of the Tender Document.

2.0 GENERAL

The extent of works shown on the drawing does not indicate the exact position of conduits and pipes. The Contractor shall ensure exact location and route of conduit and pipes in coordination with other services drawings, as per site requirements and as directed by the Engineer.

The conduit system shall be continuous with manufacturer's recommended accessories.

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

Pull wire shall be laid in all empty conduits.

3.0 APPLICABLE STANDARD/CODES

The latest edition of the following standards and codes shall be applicable for the materials specified within the scope of this section:

BS 31	-	Steel conduits and fittings for Electrical Wiring.
BS 4607	-	Non-metallic conduits and fittings for electrical installations.
BS 1387	-	Galvanized Iron (GI) pipes and fittings.
BS 3505	-	uPVC pressure pipe and fittings.

4.0 MATERIAL

4.1 PVC Conduit and Accessories

The PVC conduits and accessories for lighting and power circuits shall be furnished by the Contractor as shown on the drawings or given in BOQ. The PVC bends shall have enlarged ends to receive conduit without any reduction in the internal diameter at joint. Manufactured smooth bends shall be used where conduit changes direction. Bending of conduits by heating or otherwise will be allowed in special situations only for which the consent of the Engineer shall be required. The use of sharp 90 degree bends and tees will not be allowed for concealed wiring.

The round PVC junction boxes for ceiling light or fan points shall have minimum dimensions of 63 mm diameter and depth. The junction boxes for wall light points shall have minimum dimensions of 63 mm diameter and 38 mm deep. Round junction boxes shall be provided with one piece PVC cover plate fixed to the box by means of brass screws.

4.2 Inspection/Pull and Adaptable Boxes

Inspection/Pull boxes and adaptable boxes shall be provided in conduit runs wherever required to facilitate pulling operation. The drawings are diagrammatic and do not indicate the position and spacing of inspection/pull boxes or adaptable boxes. However, these shall be as per Engineer's approval.

4.3 uPVC Pipes and fittings

Unplasticised PVC pressure pipes and fittings shall conform to BS 3505:1968 and shall be of class-D (working pressure - 12 bars). The buried uPVC pipes should be able to withstand the external load acting upon it by continuous movements of heavy duty vehicles such as trucks, cranes, forklift etc. where pipe changes direction, manufacturer smooth bend shall be used.

Fittings and accessories for use with uPVC pressure pipes shall be of the same class and manufacture as the pipe and shall have the required shapes and dimensions of turned ends to fit the uPVC pressure pipes. uPVC pipes and accessories shall be suitable for jointing with rubber rings or solvent.

Bending of pipes by heating or otherwise will not be allowed. The use of sharp 90 degree bends and tees will not be allowed. The bends shall conform to same specifications as given for PVC conduits. For joining of pipe all precautions and procedures recommended by manufacturer shall be allowed.

Hard PVC or reinforced concrete pipe range spacers shall be used if there is more than one pipe running in parallel. The distance between range spacers shall be maximum 2 meters. Range spacers shall be prefabricated/precast and decay resistant.

Flexible pipes shall be used as deemed essential or as approved by the Engineer.

5.0 INSTALLATION

5.1 PVC Conduits and Accessories

5.1.1 Concealed Conduit

Where concealed conduit system is shown on drawings/ mentioned in BOQ, the conduit shall be installed concealed in roof, wall, column, etc. Conduits shall be laid under floor only where specifically stated. The entire conduit system shall be installed and checked before wring is carried out. Any obstruction found shall be cleared before the installation of cable.

When concealed, the conduit shall have a minimum of 32mm cover of concrete measured from the top of conduit to finished surface. In the reinforced cement concrete (RCC) work the conduit shall be laid before pouring of concrete. Under no circumstances shall chases be made in the RCC structure for concealing conduit and accessories after pouring of concrete. The conduit shall be supported on top of bottom reinforcement of slab. All outlet boxes to be firmly supported and installed such that they finish flush with the soffit of slab or beam.

Where conduits have to be concealed in cement concrete (CC) work after concreting or in block masonry, chase shall be made with appropriate tools and shall not be made deeper than required. The conduit shall then be fixed firmly in the recess and covered with cement concrete mixture. The work of cutting in the cement concrete work or block masonry work shall be coordinated with the civil work. The Contractor shall obtain approval from the Engineer before starting chasing and cutting.

The termination of conduits at or near the equipment / switchboard is shown diagrammatically on the drawings. The exact locations of the termination shall be coordinated with the equipment/switchboard to be installed. Any extension of conduit to suit the site condition shall be made without any extra cost.

Conduit ends pointing upwards or downwards shall be properly plugged in order to present the entry of foreign materials. All openings through which concrete may leak shall be carefully plugged in order to prevent the entry of foreign materials. All opening through which concrete may leak shall be carefully plugged and boxes shall be suitably protected against filling with concrete. At all terminations of conduit, sharp edges of conduit ends shall be prevented to avoid the cutting or damaging of wires or cables during pulling through the conduits.

Under floor conduit shall be installed at a minimum depth of 2 inch from the finished floor level or as shown on the drawings. The conduits shall be installed empty, before finishing of floor or in RCC work, with an 18 SWG steel wire drawn through the conduit for pulling cable. No conduits shall be laid under floor in bathroom.

5.1.2 Surface Conduits

The surface conduits shall be installed where shown on drawings mentioned in BOQ. The conduits shall be installed parallel or perpendicular to the surface of wall, structural members, ceiling, etc., by means of PVC saddles and clamps of approved design. The conduits shall be kept at least 150 mm away from parallel runs of flues, steam pipes and hot water pipes.

The saddles shall be installed on surface by means of nylon or wooden plugs and galvanized screws. Appropriate size of holes in structure shall made by drilling, the thickness of saddles and clamps shall be at appropriate thickness and prime quality. The surface conduits shall be supported at maximum of one meter spacing along horizontal and vertical runs. The Contractor shall provide all accessories for complete installing of conduit system. The pull boxes, etc. as stated for concealed conduits shall also be applicable for surface conduit system.

5.2 uPVC Pipe and Fittings

uPVC pipes shall be installed as shown in the drawings. The depth of the pipe shall vary according to the conditions at site, and approval of Engineer shall be obtained prior to installation. In general the pipes shall be installed underground at the following depths measured from the top of the pipe.

- Under roads/pavement : 900 mm below finished surface.

- When crossing other services : 250/500 mm vertical/horizontal.

The trench of required dimensions shall be excavated and the bottom of trench cleaned and leveled. A 100 mm bed of fine sand shall be provided over which the PVC pipes installed after proper alignment. Where two or more pipes are installed in the same trench the clearance between pipes shall not less than 50 mm. This shall be done by the provision of pipe range spacers as per Engineers approval. After laying of pipe the trench shall be backfilled with clean screened sand at least 100 mm above the top most pipes. The remaining portion of trench shall be backfilled with selected earth in layers well compacted.

After installation, the ends of the pipe shall be plugged with manufactured end cap impervious to water and chemicals. All joints shall be sealed adequately not only to prevent entry of foreign elements but water tightness shall be ensured.

The installation of pipes shall be completed in all respects including its fixing at terminations, before cabling work is started. All sharp edges and burrs shall be removed by using reamer or any approved device. The pipe shall be through cleaned of dirt and dust from inside, the pipes shall be installed in proper co-ordination with other works.

The protective PVC pipe for cable entering building shall be installed so as to lead cable into the cable trench. The required number of pipes shall be fixed before completing the work in the plinth. If an opening is provided to the cable trench from outside, the required number of pipes shall be installed and part of the opening remained unutilized shall be properly packed and sealed using suitable packing material impervious to water and chemical to make it completely water-tight.
Spare pipes shall be provided with 5 mm dia rope pulled from end to end and plugged with manufactured end cap.

Flexible pipes of compatible material and size shall be used wherever deemed essential.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractors bid amount against each item of Bill of Quantities as given below shall include supply, installation, testing, commissioning and completion for all work specified herein and/or as shown on the Tender Drawings related to the item.

6.2 Conduits PVC / Pipes PVC and Accessories

6.2.1 **Measurement:** Measurement shall be made for the total running feet of each type and size of conduits / pipes and accessories acceptably supplied and installed by the Contractor according to specification and as shown on drawings.

6.2.2 **Payment:** Payment shall be made for the total running feet of each type and size of conduits or pipes measured as provided above at the contract unit price each and shall constitute full compensation for supplying, installing and completion of the laying of the conduits and pipes including all accessories related to the item.

No separate payments shall be made for the under mentioned specified work related to the supply and installation of conduit and pipe. The cost thereof shall be deemed to have been included in the quoted rates of above work.

- Excavation and backfilling.
- Dewatering during excavation and backfilling.
- Providing and filling of fine sand in trenches.
- Providing pipe range spacers.
- Providing flexible pipes and accessories, jointing material/ compound, saddles, sockets, elbows, bend, junction boxes reducers, 16SWG GI pull wire for empty conduit, and 5 mm rope for empty pipe, soft metal bush, making threads and plugging of pipe with manufactured end cap etc. whether used or left spare.
- Compacted backfilling of trenches with specified material and disposal of surplus and rejected material.
- Watertight sealing of any unutilized opening to the buildings after installing the protective pipes entering the buildings.

*** End of Section 8230 ***

GUN & COUNTRY CLUB, ISLAMABAD

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

TECHNICAL BID

BIDDING DOCUMENTS
VOLUME – III-A

DRAWINGS

MARCH, 2026

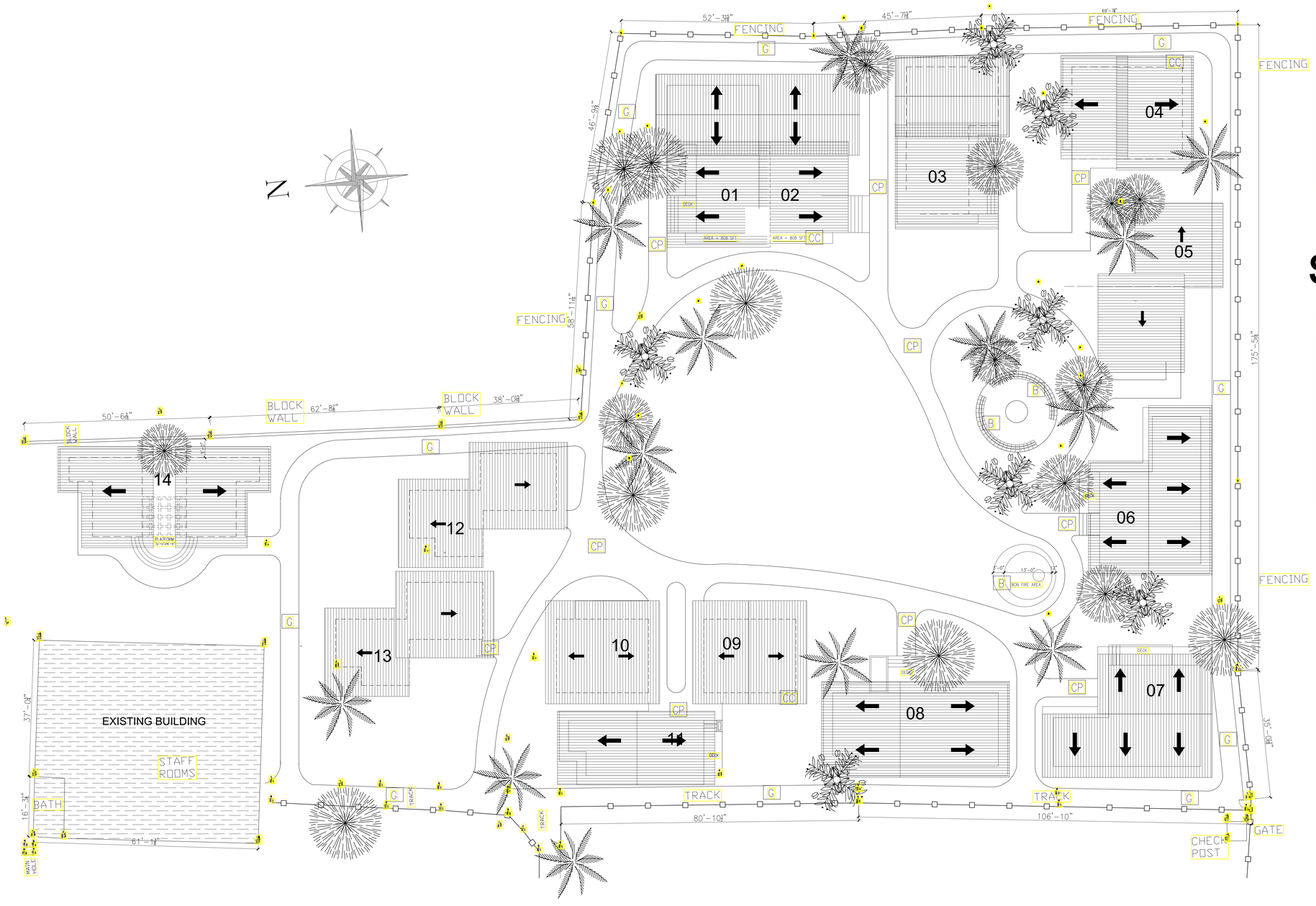
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD
NESPAK House, Sector G-5/2, Islamabad, Tel: 051-9221910-13, Fax: 051-9221914.

LEGEND

S NO.	BLOCK NAME IN SITE PLAN	UNITS	AREA SQFT	TYPE
01	01,02,03	3	808x3 = 2,424	2 BED , LOUNGE , 2 BATH
02	04	1	676x1 = 676	1 BED , LOUNGE , 1 BATH
03	05,12,13	3	628x3 = 1,884	1 BED , LOUNGE , 1 BATH
04	06,07	2	886x2 = 1,772	2 BED , LOUNGE , 2 BATH
05	08	1	879x1 = 879	2 BED , LOUNGE , 2 BATH
06	09,10	2	500x2 = 1,000	1 BED , LOUNGE , 1 BATH
07	11	1	520x1 = 520	1 BED , LOUNGE , 1 BATH
08	14	1	663x1 = 663	KITCHEN , LAUNDRY ,SERVANT ,BATH
TOTAL		14	9,821 SQFT	

SCHEDULE OF FINISHES

S NO.	PLANS	FINISHES	
01	ENTRANCE , STEPS , DECK	CONCRETE TILES	
02	BED ROOM , LOUNGE	PORCELAIN TILES (6"X4'-0")	
03	BATH	CERAMIC TILES	CERAMIC TILES
04	PLAT FORM , PODIUM	CONCRETE PAVERS	CP
05	PLAT FORM , PODIUM	CONCRETE CHEQUERED TILES	CC
05	PLAT FORM , PODIUM	GRAVEL ON COMPACTED EARTH (JOGGING TRACK)	G
05	PLAT FORM , PODIUM	BRICK LINING	B



REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

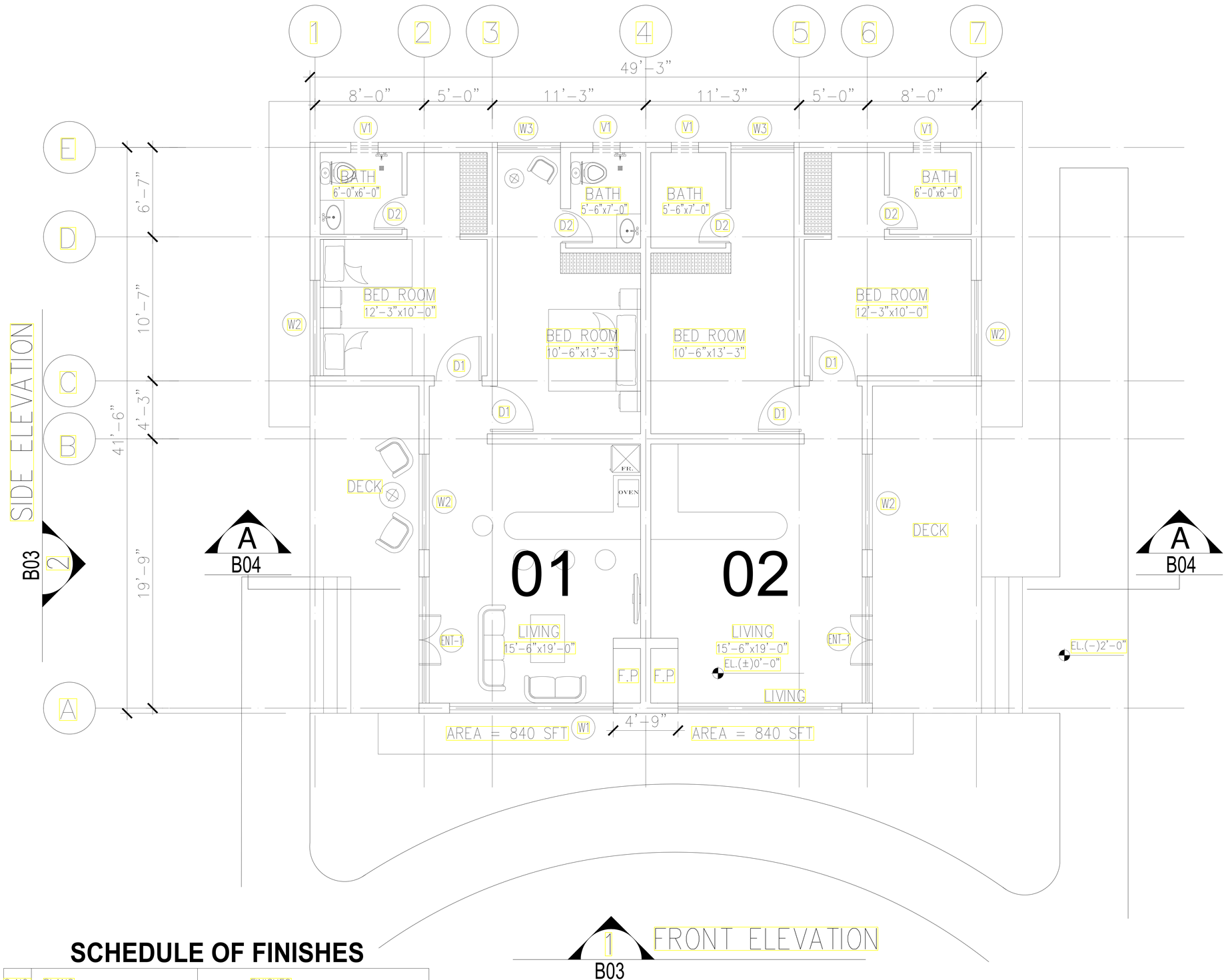
GUN AND COUNTRY CLUB

GUEST UNITS

MASTER PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
CKD. WAJIHA REHAN	DATE	DRAWING NO.	REV.
SUBM.	FEB. 2026	156/322/TD/00B01	0



1 FRONT ELEVATION

B03

SCALE: 1/8"=1'-0"

SCHEDULE OF FINISHES

S NO.	PLANS	FINISHES
01	ENTRANCE , STEPS , DECK	CONCRETE TILES
02	BED ROOM , LOUNGE	PORCELAIN TILES (6"X4'-0")
03	BATH	CERAMIC TILES
04	PLAT FORM , PODIUM	CONCRETE PAVERS

GUN AND COUNTRY CLUB

GUEST UNITS

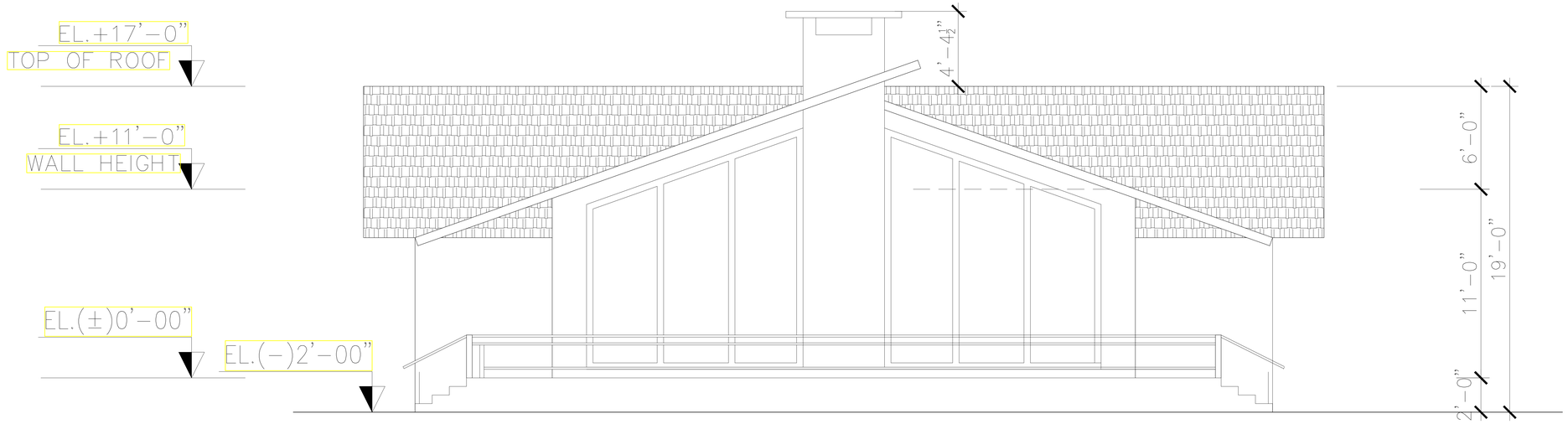
BLOCK - 1 & 2

GROUND FLOOR PLAN

NES PAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE			
CKD. WAJIHA REHAN	DATE	DRAWING NO.	REV.
SUBM.	FEB. 2026	156/322/TD/01B02	0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



1 B02 FRONT ELEVATION



2 B02 SIDE ELEVATION

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 1 & 2

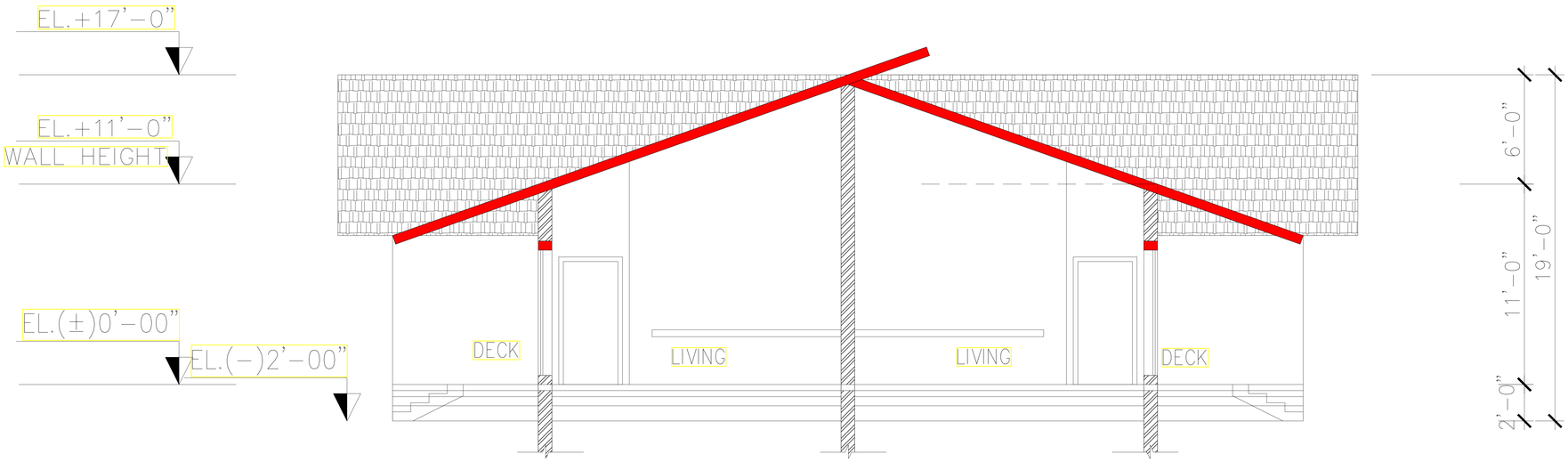
ELEVATIONS

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE			
CKD. WAJIHA REHAN			
SUBM.			

DATE	DRAWING NO.	REV.
FEB. 2026	156/322/TD/01B03	0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



A SECTION A-A

B02

SCALE: 1/8"=1'-0"

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

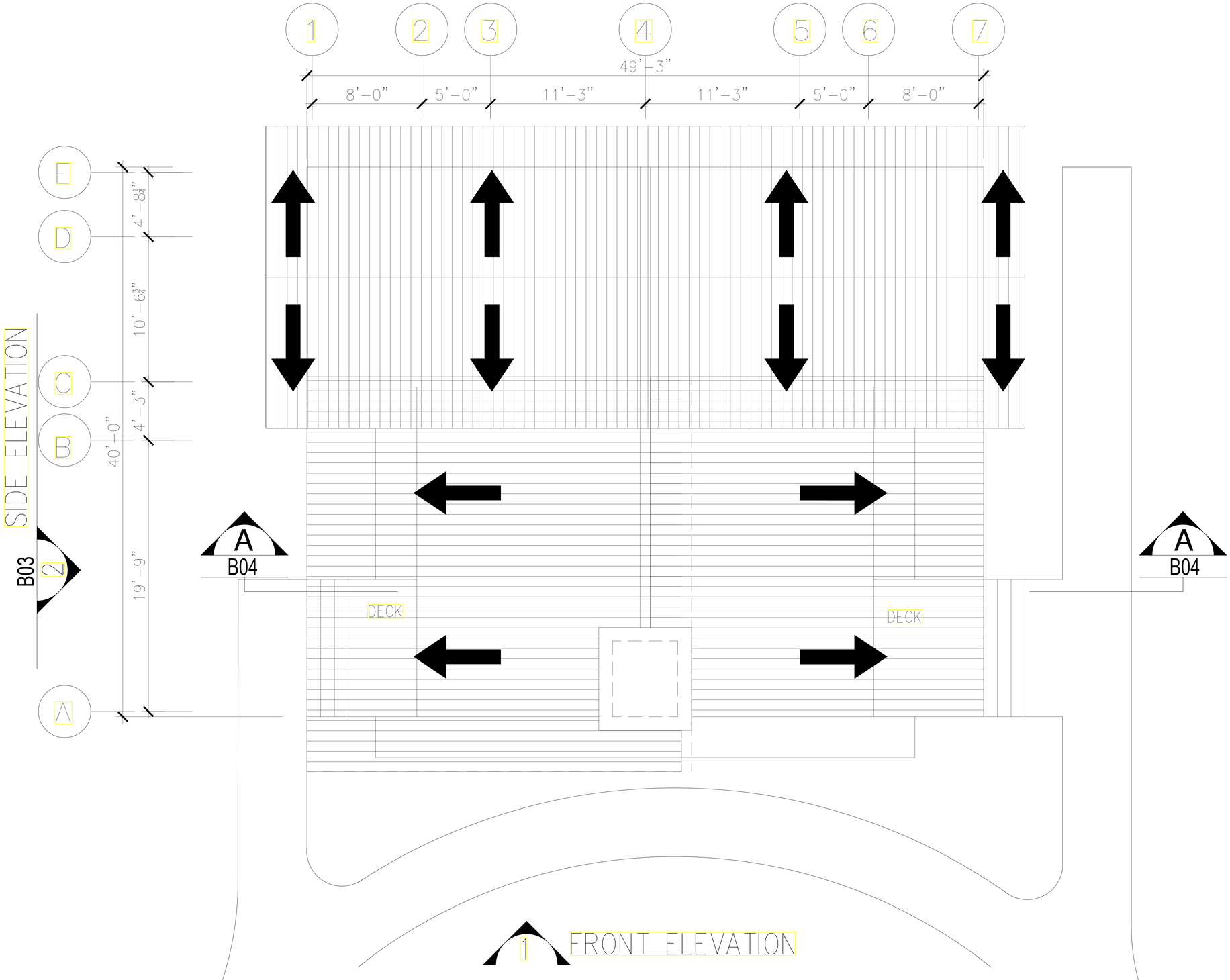
GUEST UNITS

BLOCK - 1 & 2

SECTION A-A

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/01B04	0
SUBM.			



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 1 & 2

ROOF PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

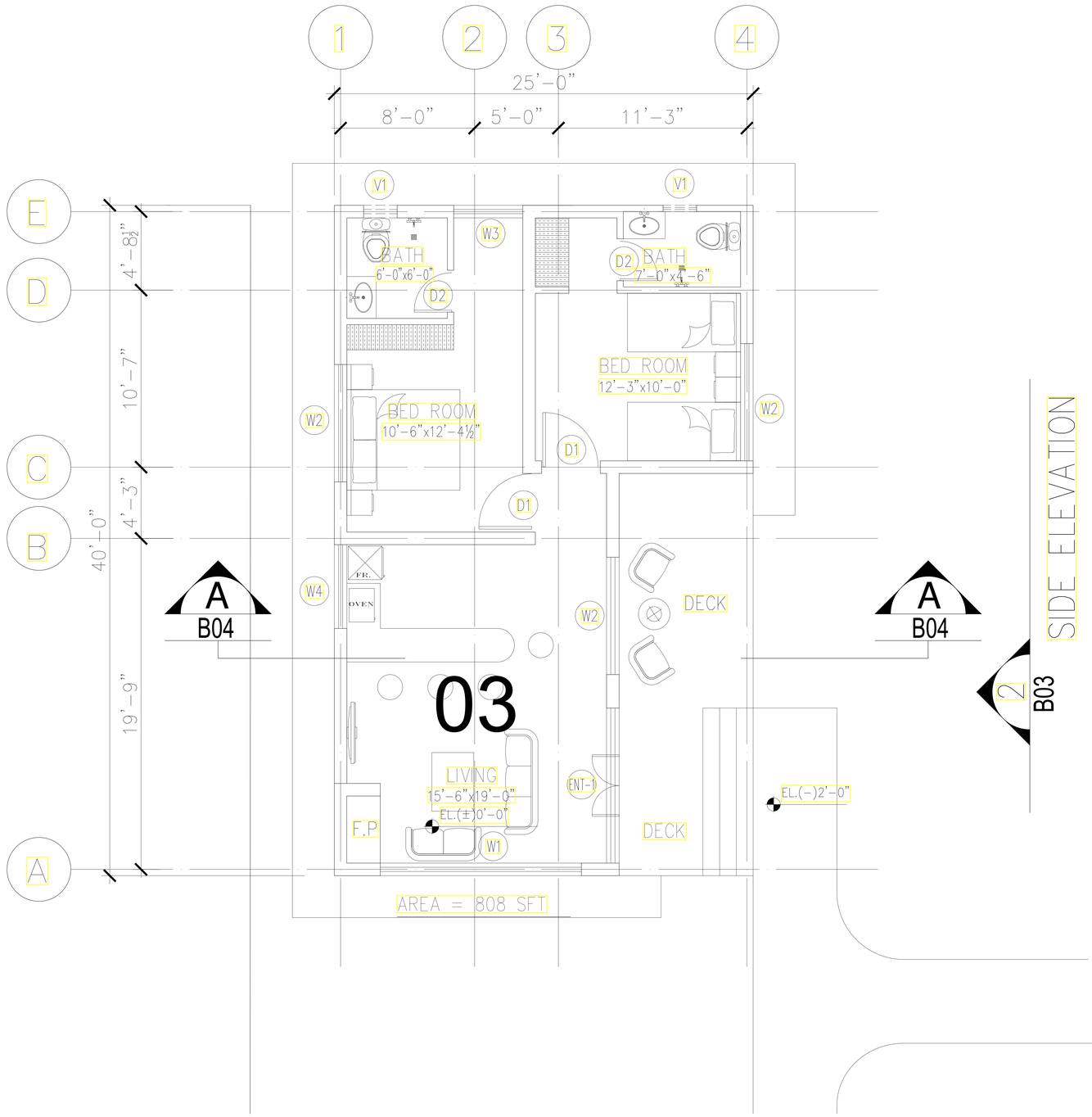
	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE			
CKD. WAJIHA REHAN			
SUBM.			

DATE	DRAWING NO.	REV.
FEB. 2026	156/322/TD/01B05	0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	PD-DL-FL	9'-3"	8'-0"													
D1	PD-DL-FL	3'-0"	8'-0"	DW	DW	LP	LP	F1	H2	L1	TB			DC		
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	12'-0"	10'-9"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	7'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	4'-7½"	8'-0"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	2'-0"	2'-0"	AL	AL-GL	PC	PC-TG									



SCHEDULE OF FINISHES

S NO.	PLANS	FINISHES
01	ENTRANCE , STEPS , DECK	CONCRETE TILES
02	BED ROOM , LOUNGE	PORCELAIN TILES (6"X4'-0")
03	BATH	CERAMIC TILES
04	PLAT FORM , PODIUM	CONCRETE PAVERS

1 FRONT ELEVATION
B03

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

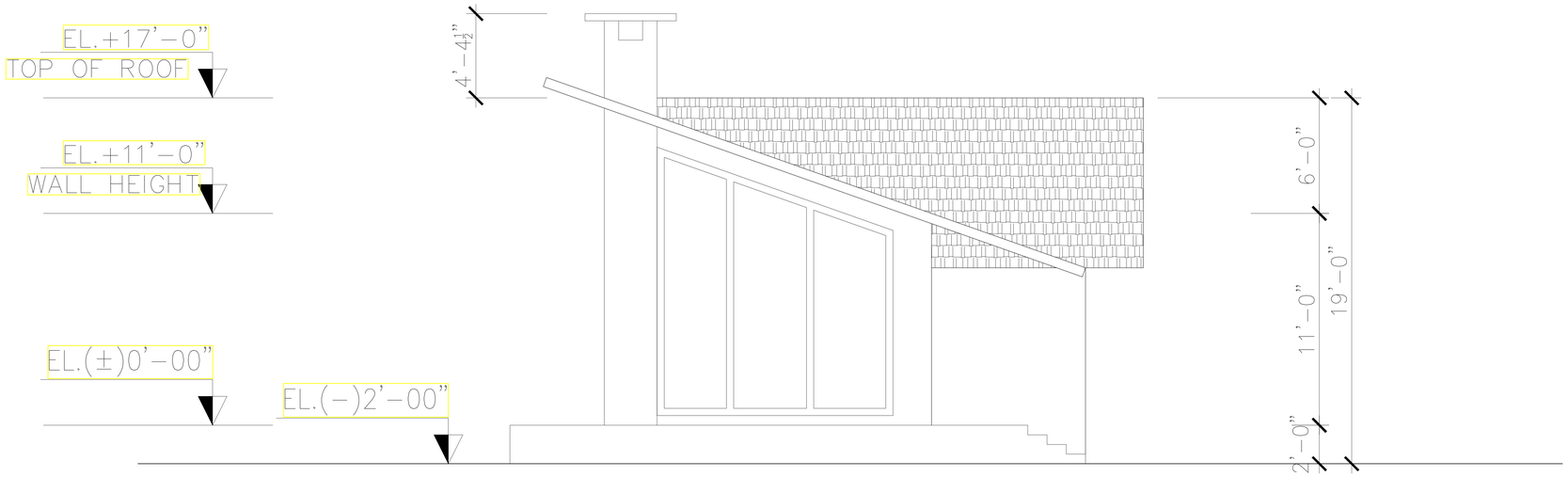
BLOCK - 3

GROUND FLOOR PLAN

NES PAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/02B02	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



1 FRONT ELEVATION
B02



2 SIDE ELEVATION
B02

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

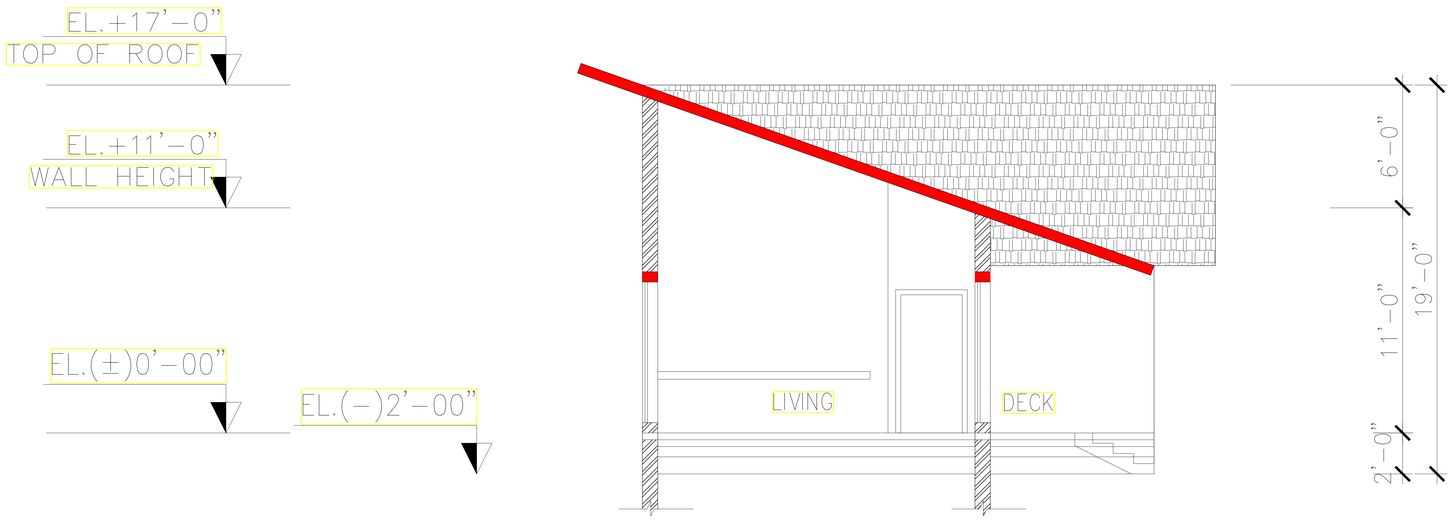
BLOCK - 3

ELEVATIONS

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/02B03	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



A SECTION A-A

B02

SCALE: 1/8"=1'-0"

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

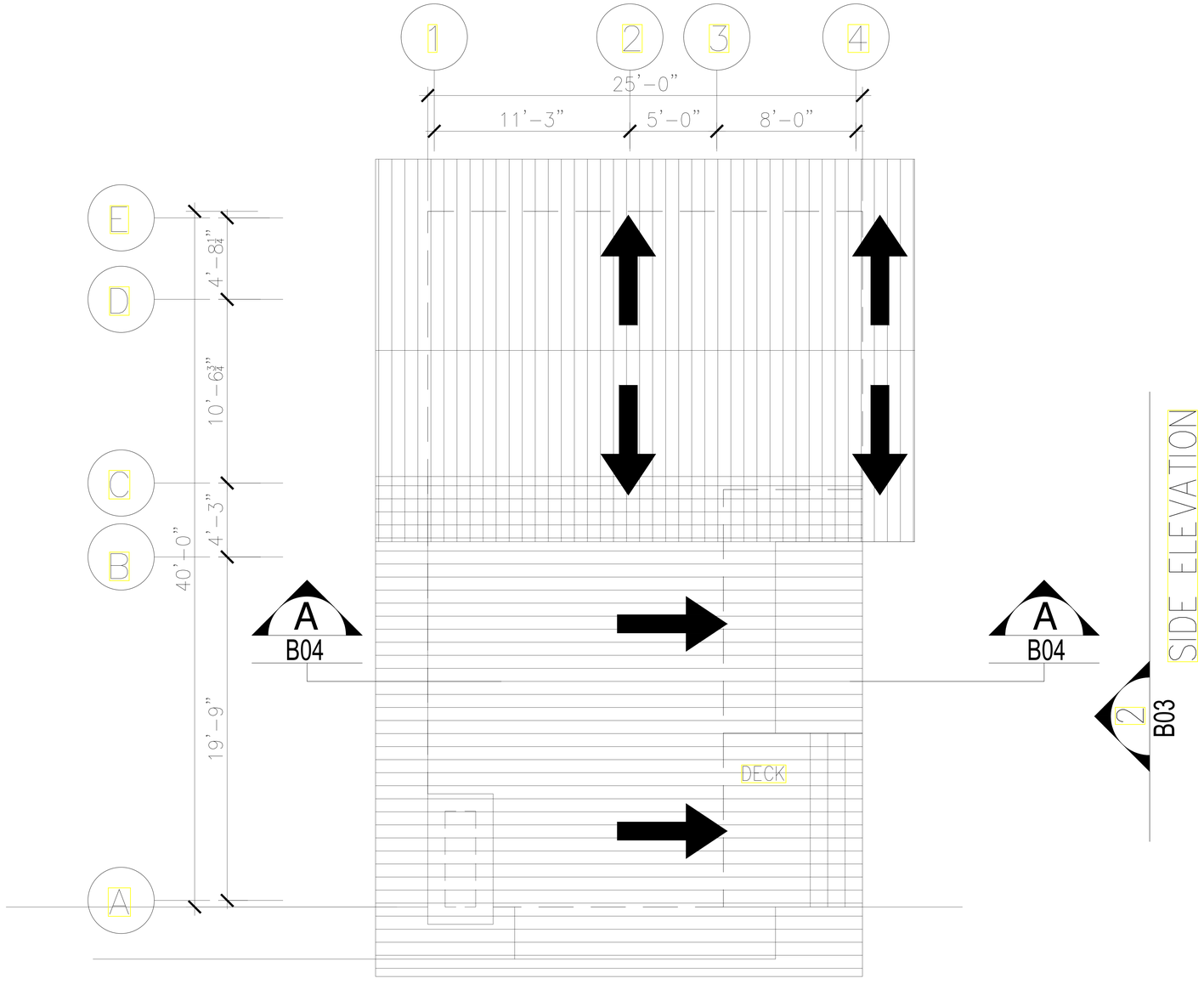
GUEST UNITS

BLOCK - 3

ELEVATIONS

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/02B04	0
SUBM.			



SIDE ELEVATION

1 B03 FRONT ELEVATION

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 3

ROOF PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/02B05	0
SUBM.			

REFERENCE DRAWINGS	REV.	DATE	DESCRIPTION	BY	CKD.	APPR.
	NIL					

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	PD-DL-FL	9'-3"	8'-0"													
D1	PD-DL-FL	3'-0"	8'-0"	DW	DW	LP	LP	F1	H2	L1	TB			DC		
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	12'-0"	10'-9"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	7'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	4'-1½"	8'-0"	AL	AL-GL	PC	PC-TG									
W4	AL-S-FP	5'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	2'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

PROJECT

GUN AND COUNTRY CLUB
APARTMENT BLOCK 3

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

TITLE

SCHEDULE OF DOORS
DOORWINDOWS,WINDOWS,VENTILATOR

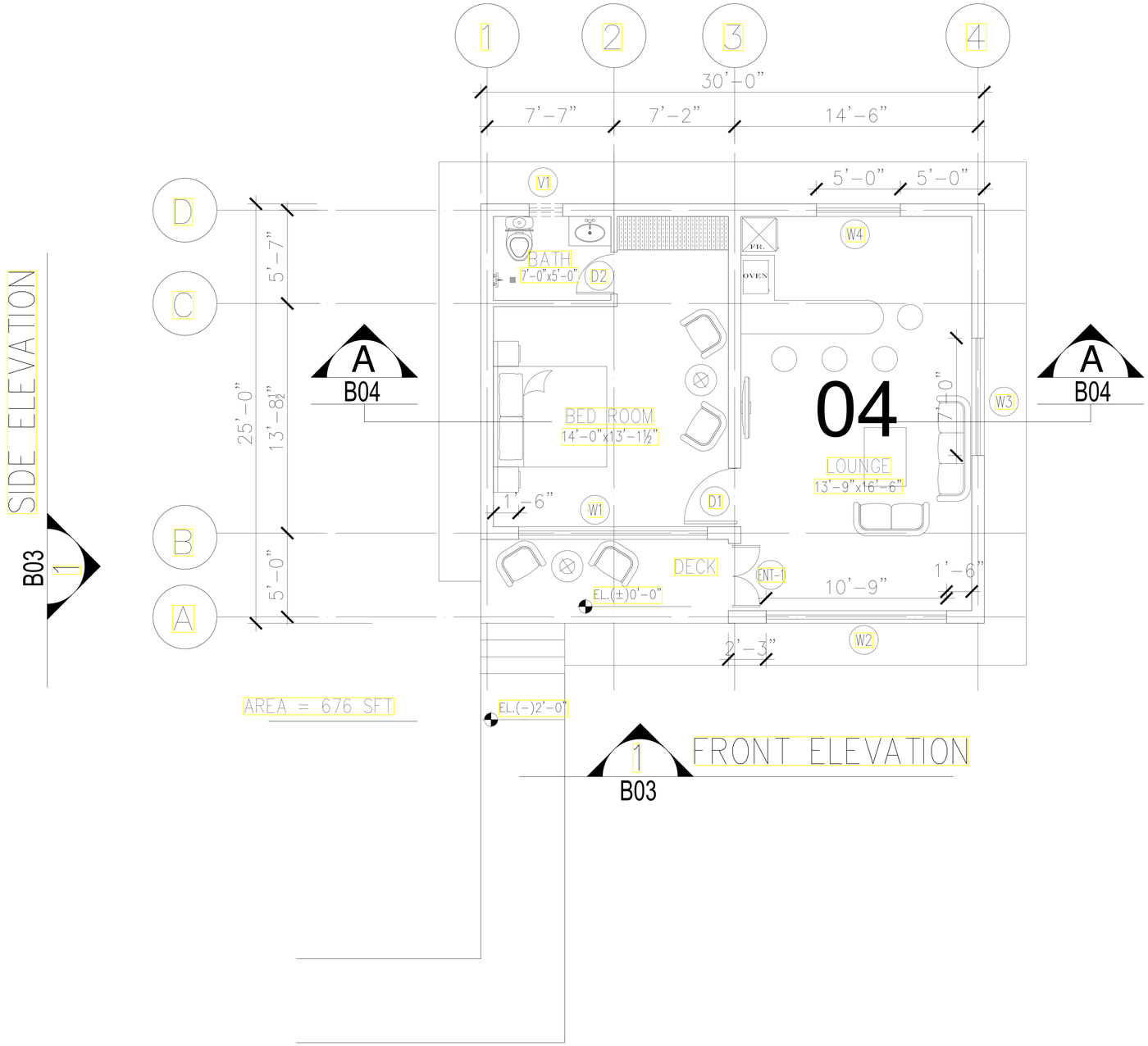
SCALE N.T.S

DATE FEB.,2026

NO. 156/322/TD/J01

REV. 0

0-00-00-00



SCHEDULE OF FINISHES

S NO.	PLANS	FINISHES
01	ENTRANCE , STEPS , DECK	CONCRETE TILES
02	BED ROOM , LOUNGE	PORCELAIN TILES (6"X4'-0")
03	BATH	CERAMIC TILES
04	PLAT FORM , PODIUM	CONCRETE PAVERS

SCALE: 1/8"=1'-0"

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

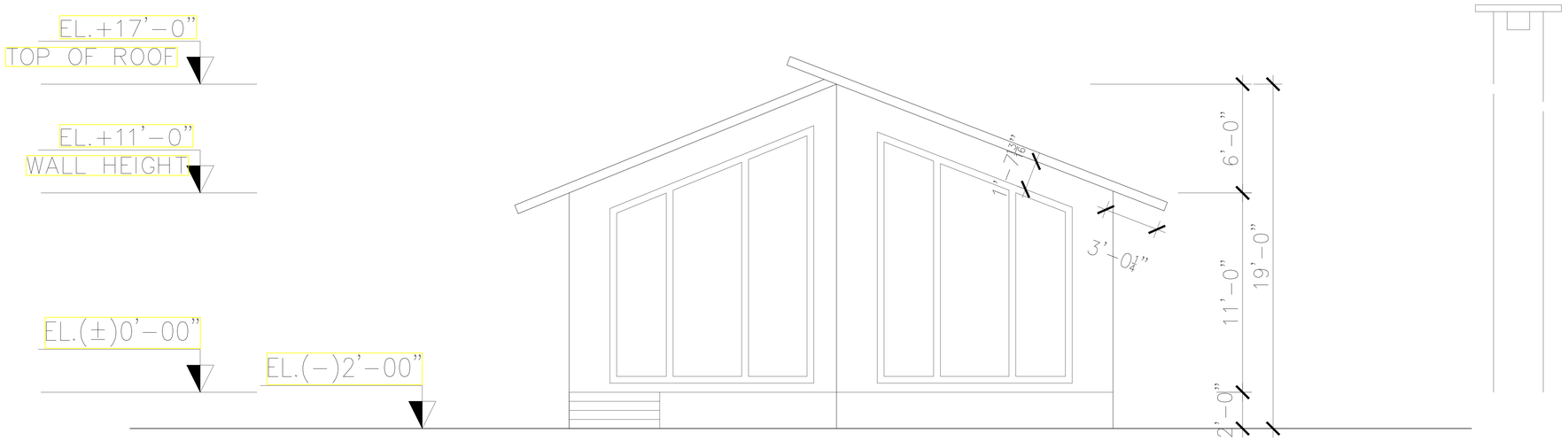
GUEST UNITS

BLOCK - 4

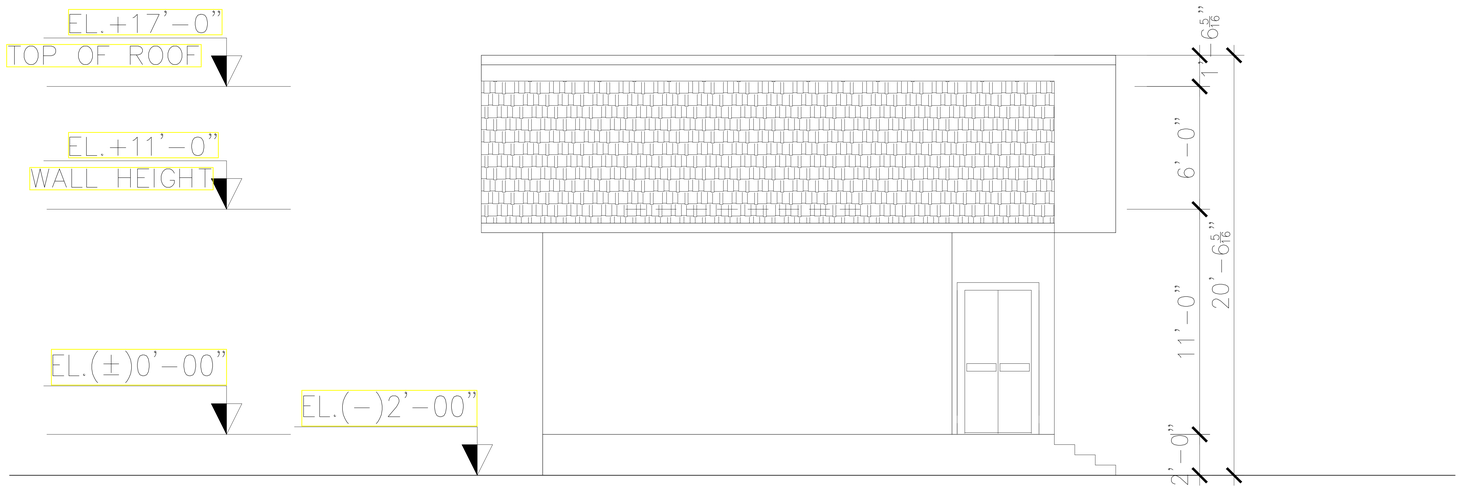
GROUND FLOOR PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/03B02	0
SUBM.			



1 FRONT ELEVATION
B02



2 SIDE ELEVATION
B02

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

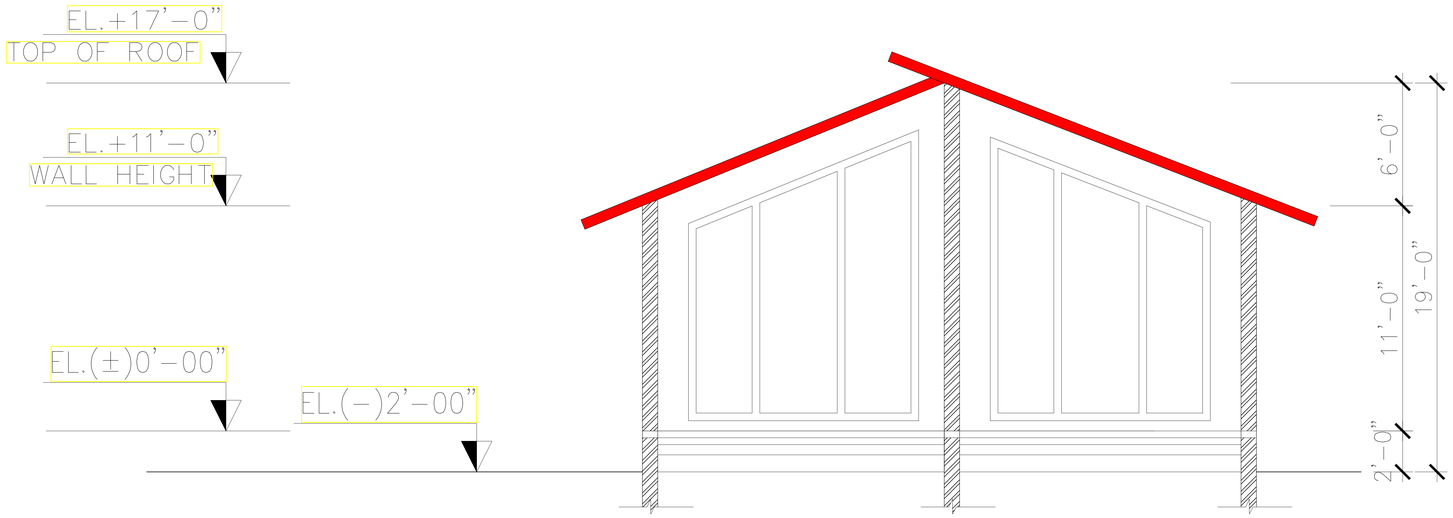
BLOCK - 4

ELEVATIONS

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/03B03	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



A SECTION A-A

B02

SCALE: 1/8"=1'-0"

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

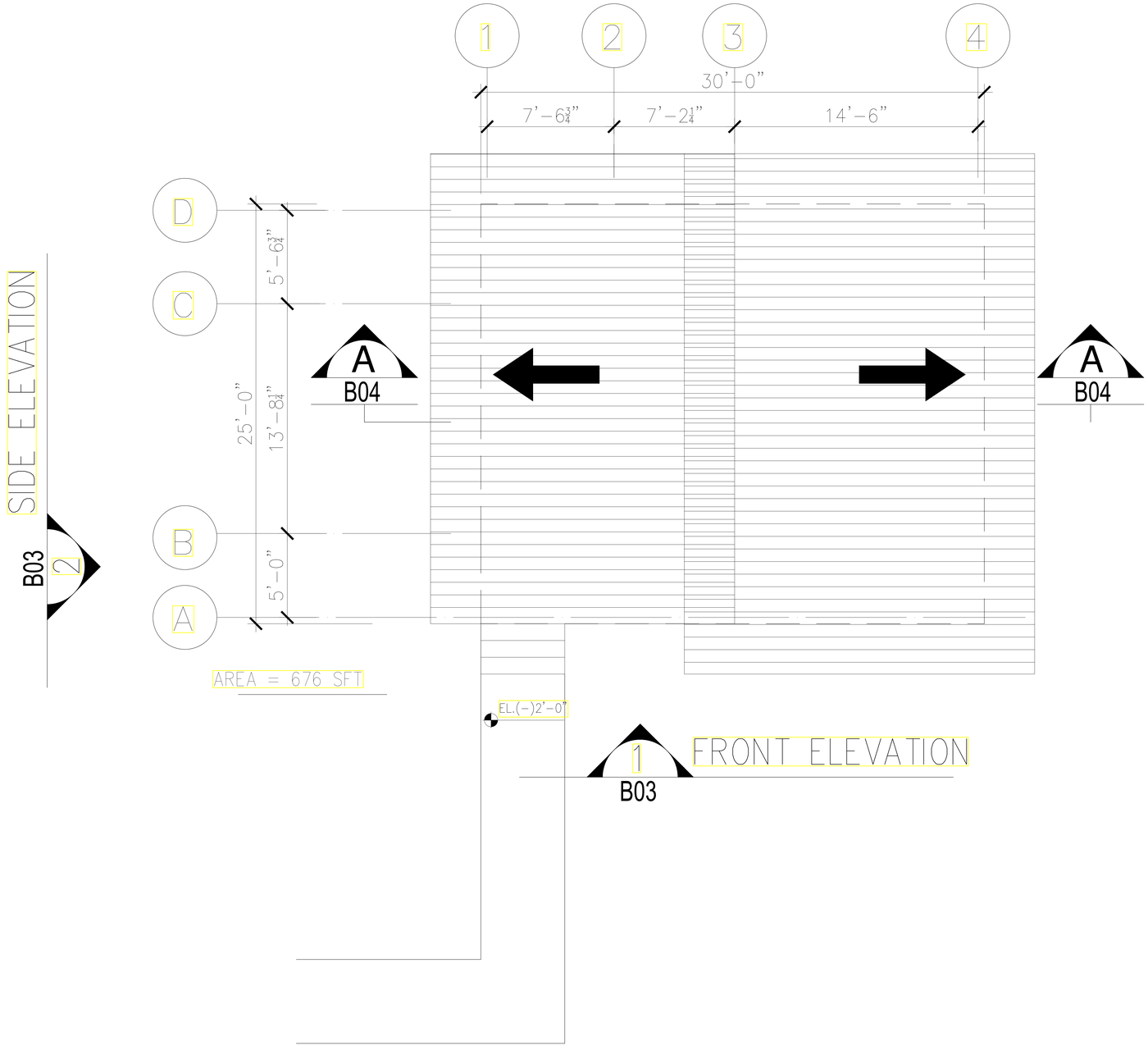
GUEST UNITS

BLOCK - 4

SECTION A-A

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/03B04	0
SUBM.			



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 4

ROOF PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/03B05	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	PD-DL-FL	4'-0"	8'-0"													
D1	PD-DL-FL	3'-0"	8'-0"	DW	DW	LP	LP	F1	H2	L1	TB			DC		
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	11'-3"	12'-0"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	10'-9"	12'-0"	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	7'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
W4	AL-S-FP	5'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	2'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

PROJECT

GUN AND COUNTRY CLUB
APARTMENT BLOCK 4

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

TITLE

SCHEDULE OF DOORS
DOORWINDOWS,WINDOWS,VENTILATOR

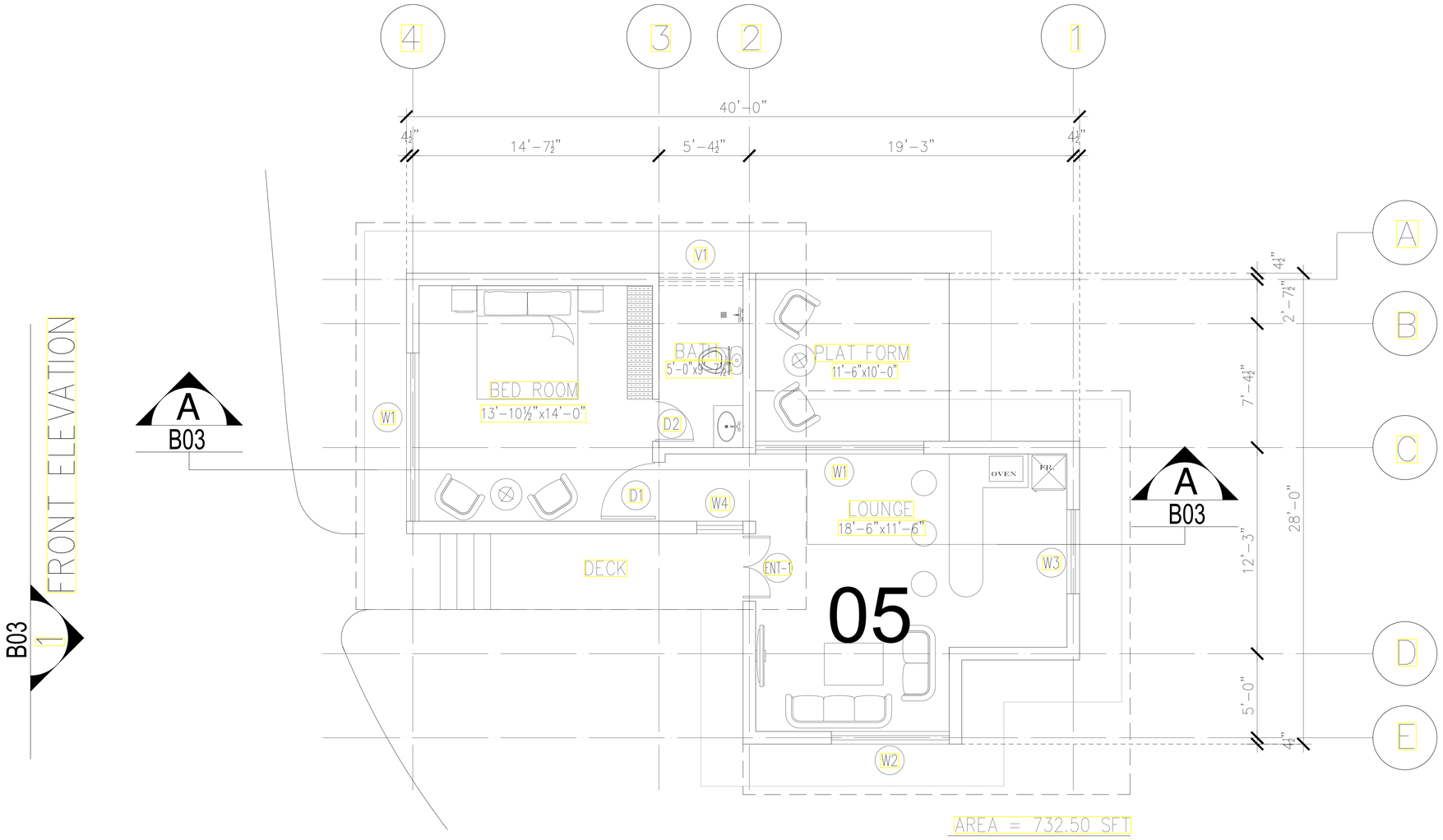
SCALE N.T.S

DATE FEB.,2026

NO. 156/322/TD/J01

REV. 0

0-00-00-00



SIDE ELEVATION 2 B03

SCALE: 1/8"=1'-0"

SCHEDULE OF FINISHES

S NO.	PLANS	FINISHES
01	ENTRANCE , STEPS , DECK	CONCRETE TILES
02	BED ROOM , LOUNGE	PORCELAIN TILES (6"X4'-0")
03	BATH	CERAMIC TILES
04	PLAT FORM , PODIUM	CONCRETE PAVERS

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

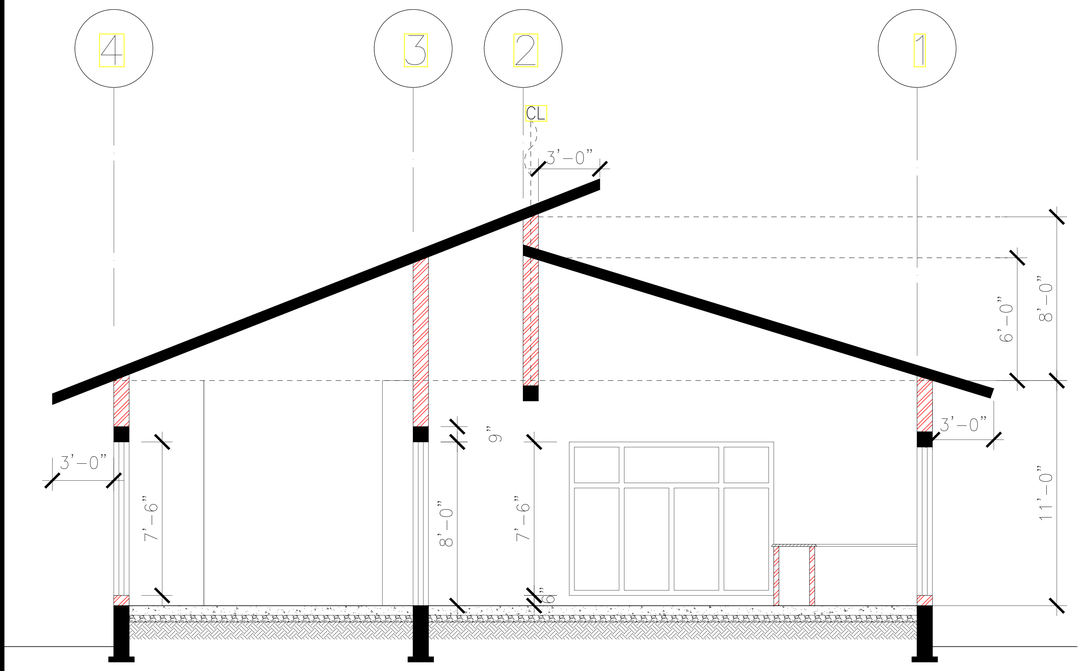
GUEST UNITS

BLOCK - 5

FLOOR PLAN

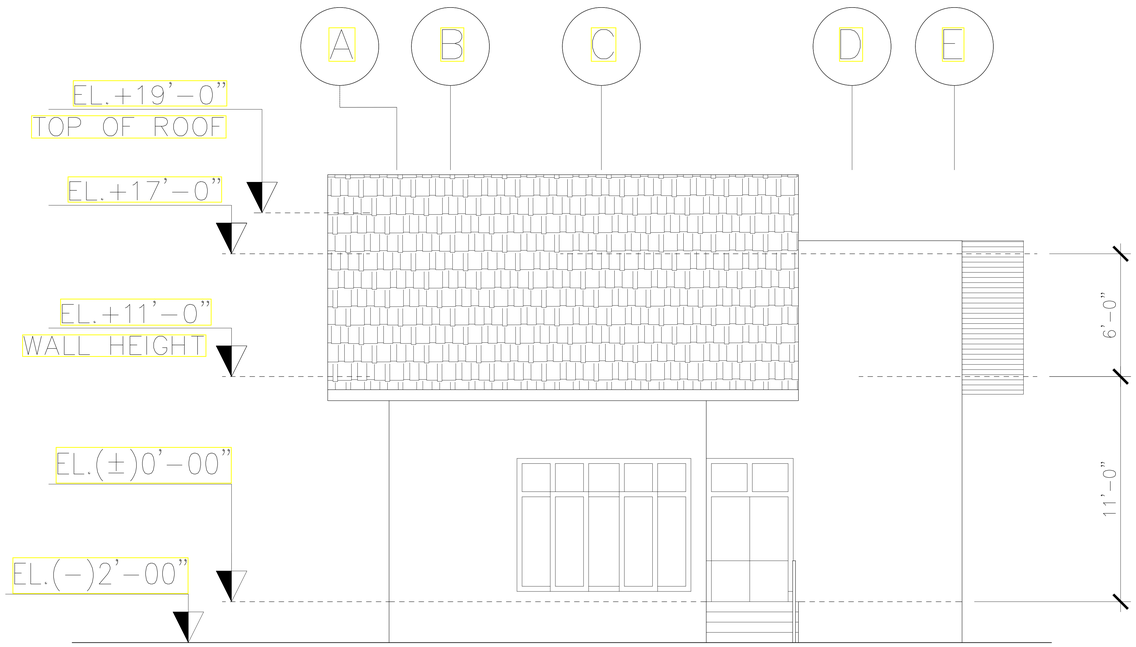
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/04B02	0
SUBM.			



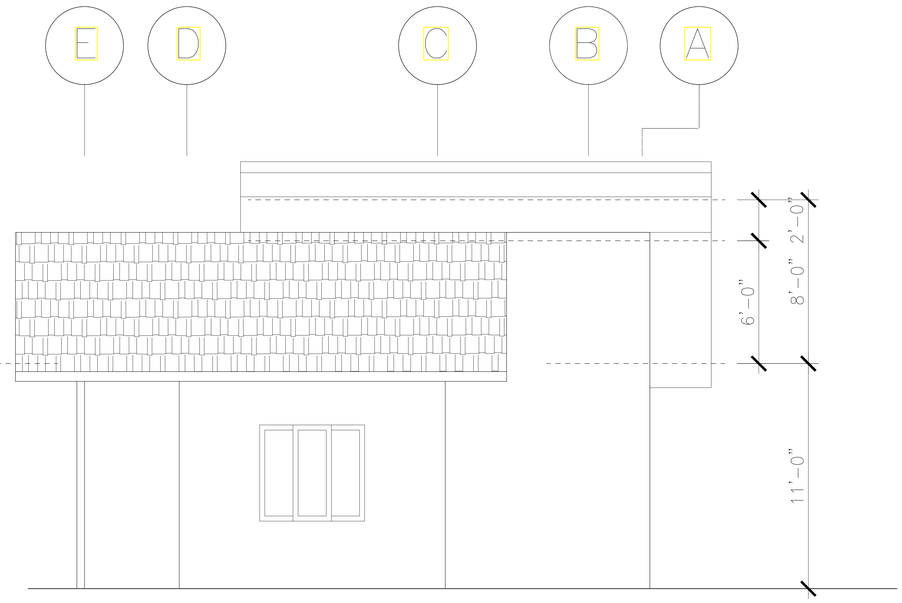
SECTION A-A 1

B00

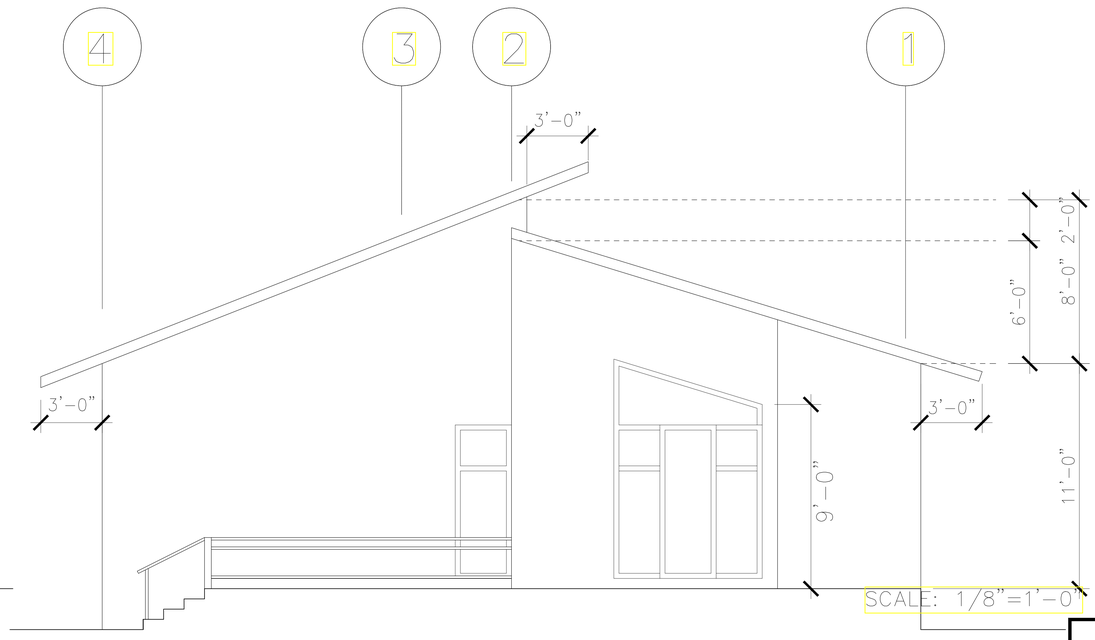


FRONT ELEVATION 1

B00



SIDE ELEVATION 3



SIDE ELEVATION 2

GUN AND COUNTRY CLUB

GUEST UNITS

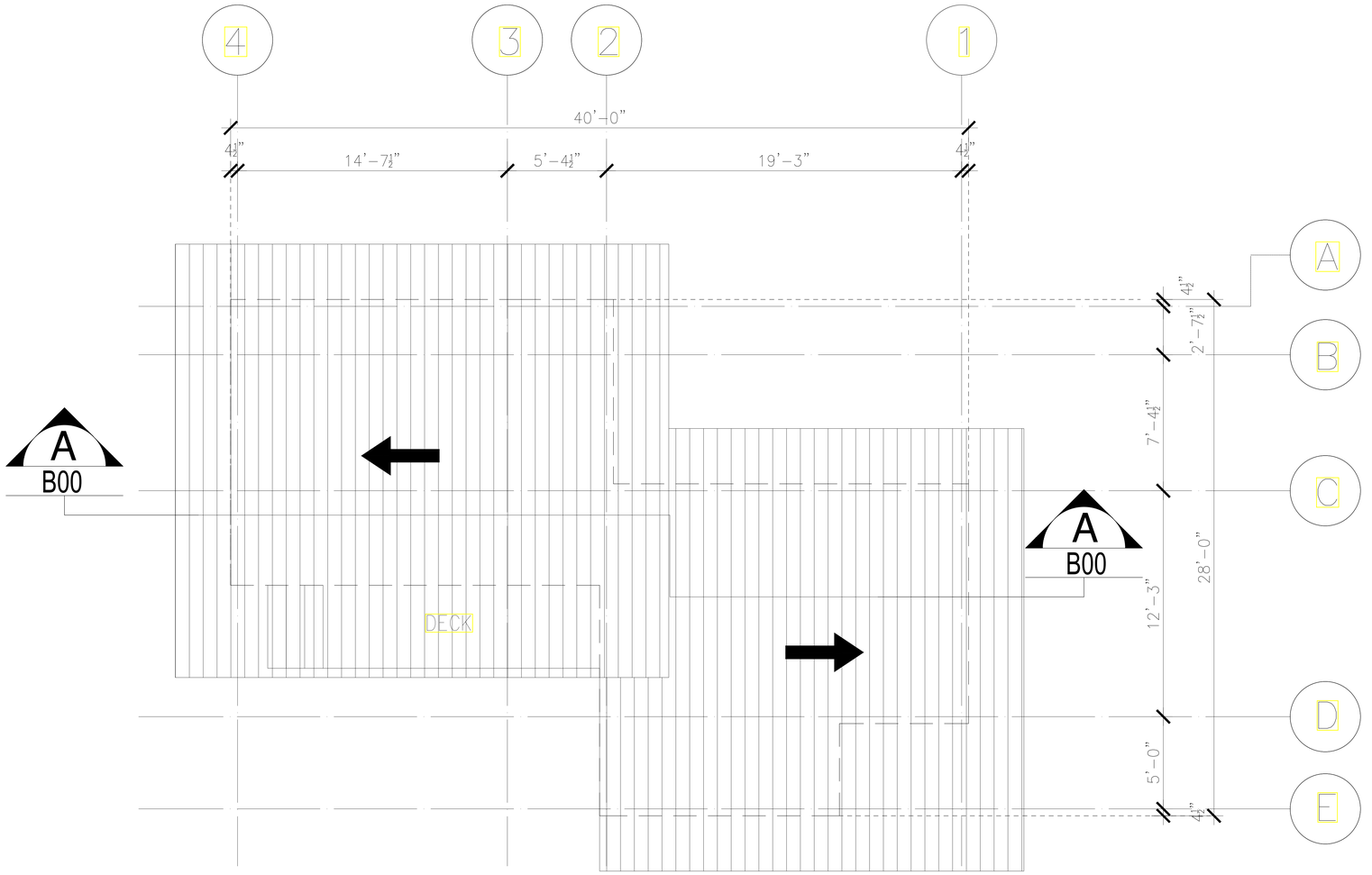
BLOCK - 12 & 13

ELEVATIONS AND SECTION A-A

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/04B03	0
SUBM.			



ROOF PLAN

SCALE: 1/8"=1'-0"

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 12 & 13

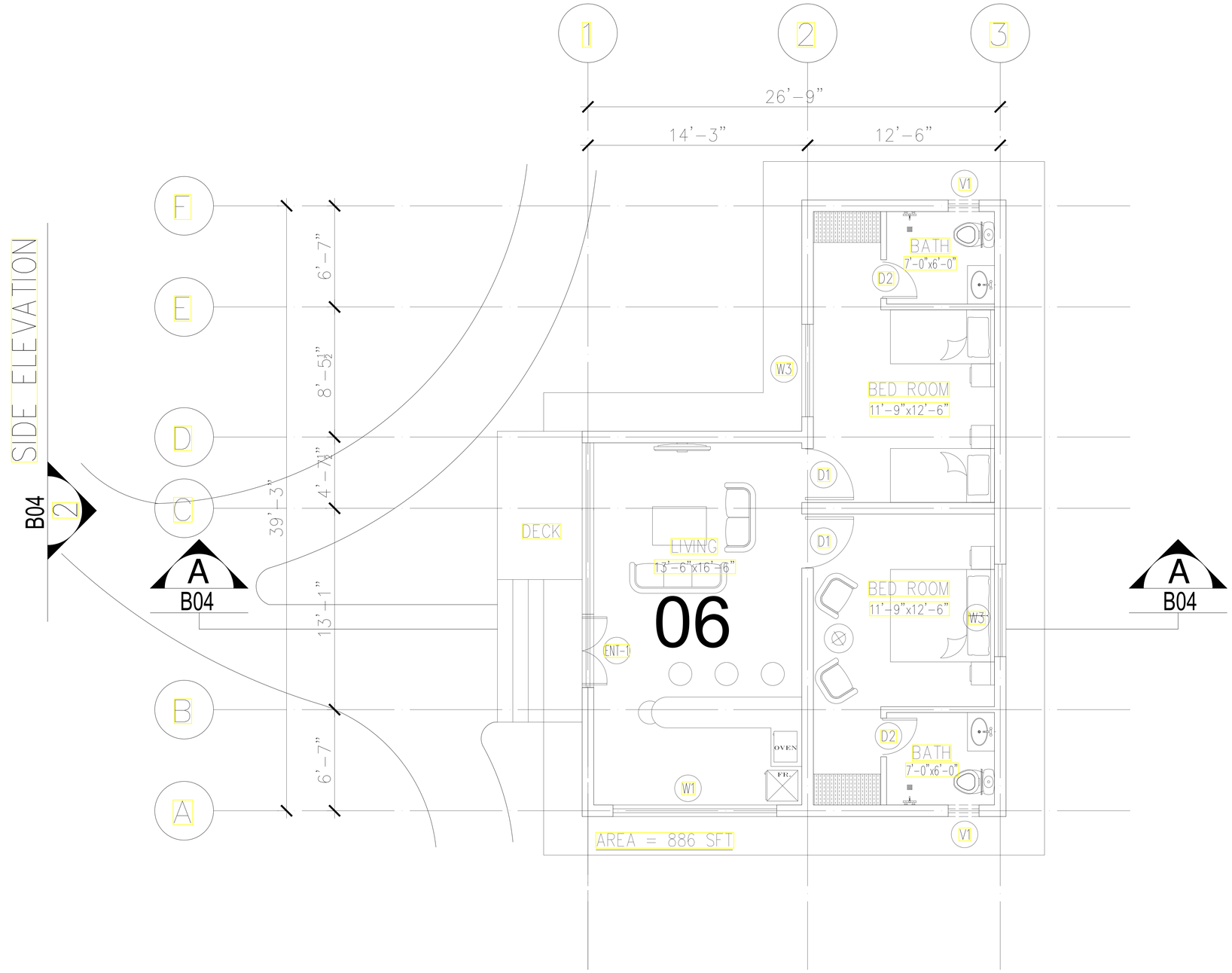
SECTION A-A

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/04B04	0
SUBM.			

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	PD-DL-FL	4'-0"	8'-0"													
D1	PD-DL-FL	3'-0"	8'-0"	DW	DW	LP	LP	F1	H2	L1	TB			DC		
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	10'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	7'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	5'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
W4	AL-S-FP	2'-9"	8'-0"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	5'-0"	2'-0"	AL	AL-GL	PC	PC-TG									



1 FRONT ELEVATION
B04

SCALE: 1/8"=1'-0"

SCHEDULE OF FINISHES

S NO.	PLANS	FINISHES
01	ENTRANCE , STEPS , DECK	CONCRETE TILES
02	BED ROOM , LOUNGE	PORCELAIN TILES (6"X4'-0")
03	BATH	CERAMIC TILES
04	PLAT FORM , PODIUM	CONCRETE PAVERS

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

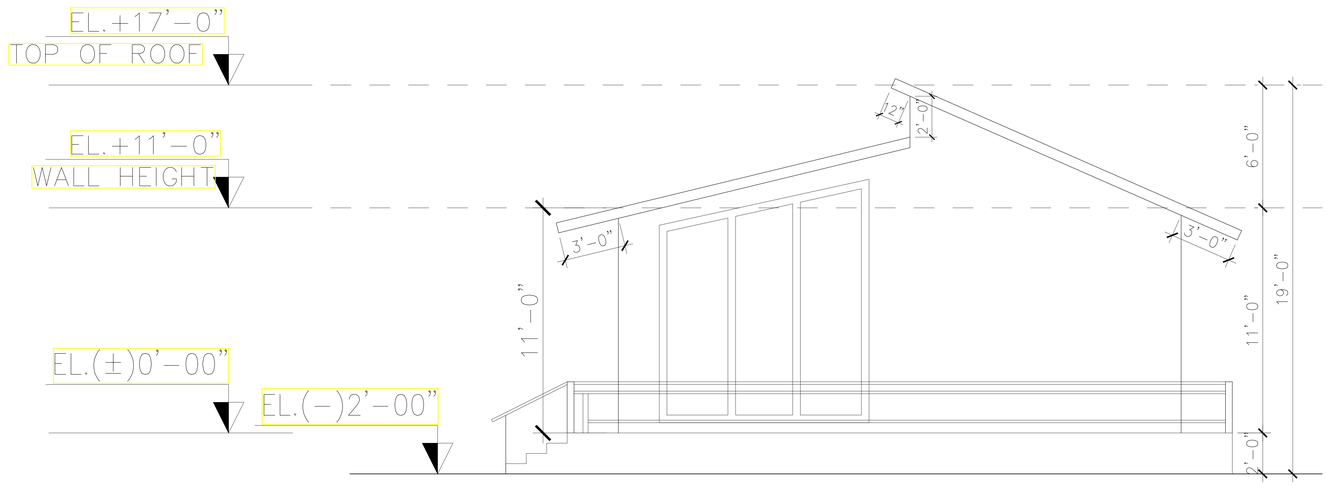
GUEST UNITS

BLOCK - 06

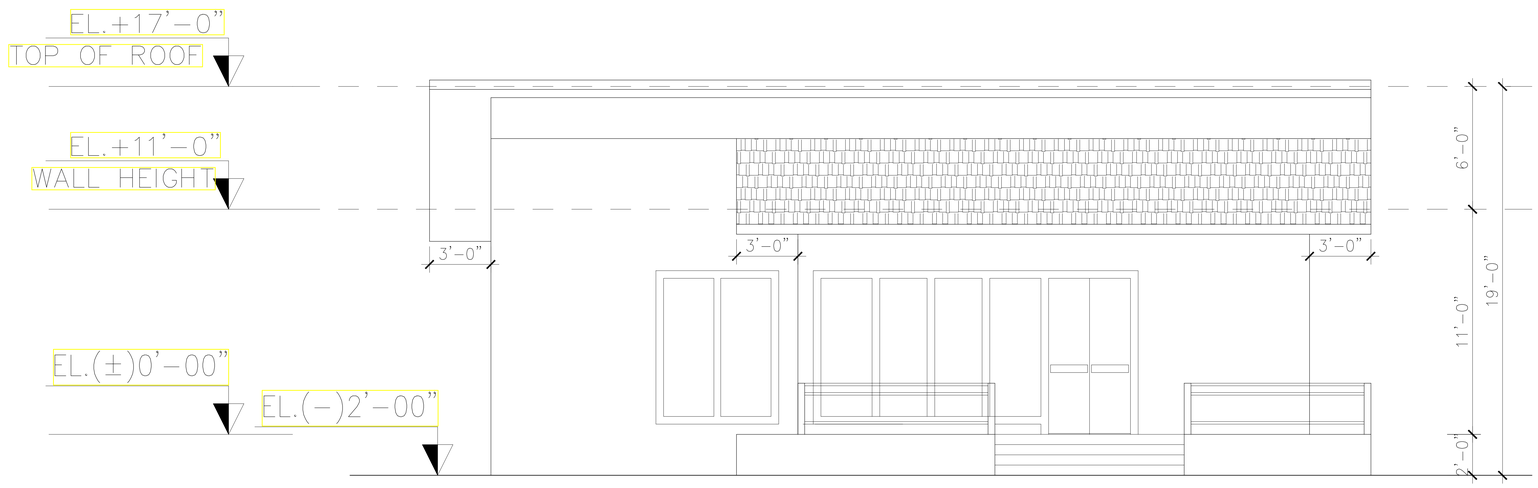
GROUND FLOOR PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE			
CKD. WAJIHA REHAN	DATE	DRAWING NO.	REV.
SUBM.	FEB. 2026	156/322/TD/05B02	0



1 FRONT ELEVATION
B02



2 SIDE ELEVATION
B02

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

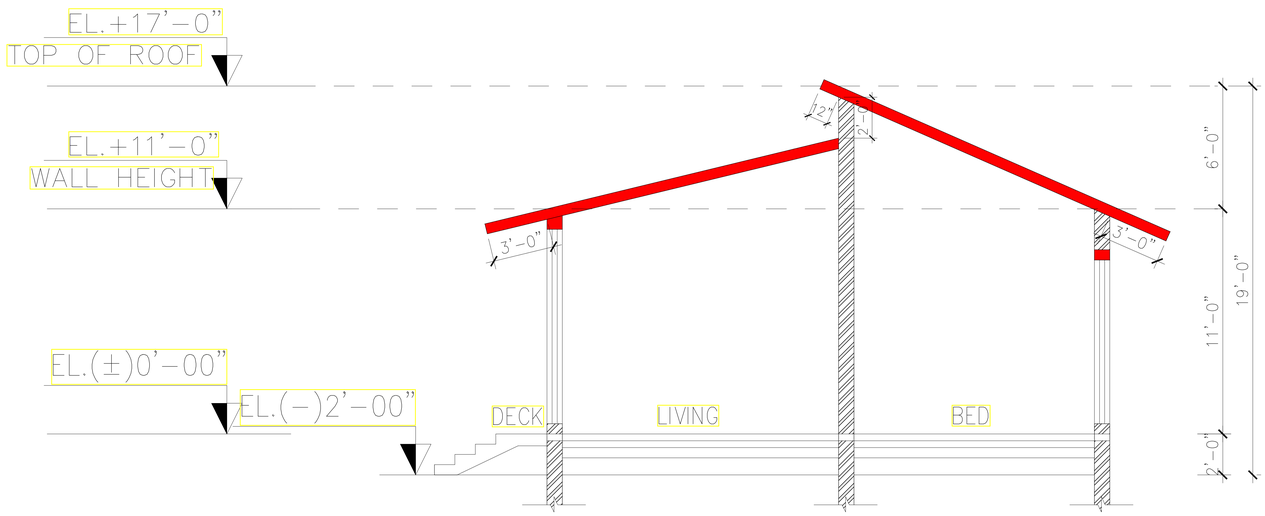
BLOCK - 06

ELEVATIONS

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/05B03	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



A SECTION A-A

B02

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

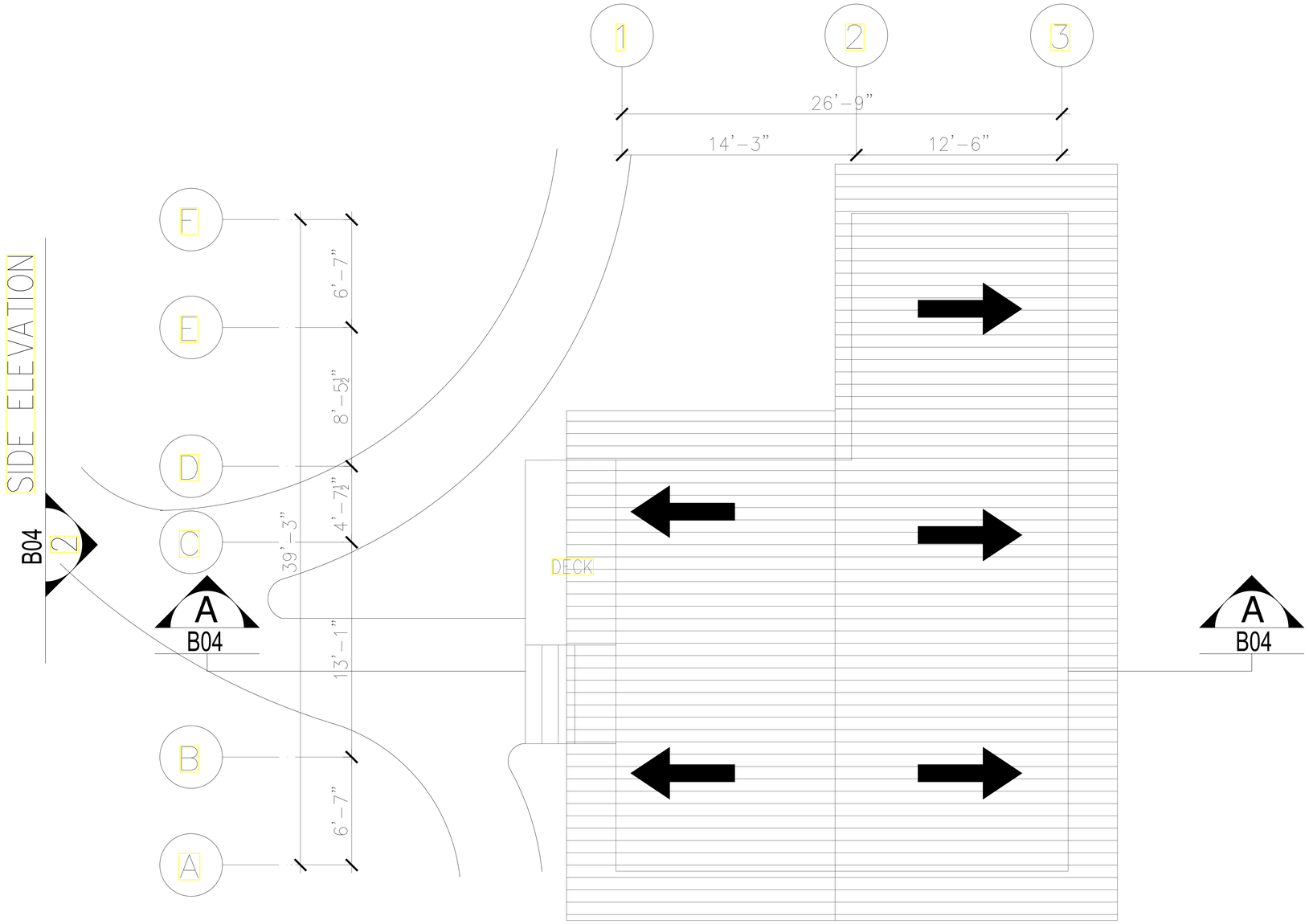
BLOCK - 06

SECTION A-A

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/05B04	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



1 FRONT ELEVATION
B04

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 06

ROOF PLAN

NES PAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

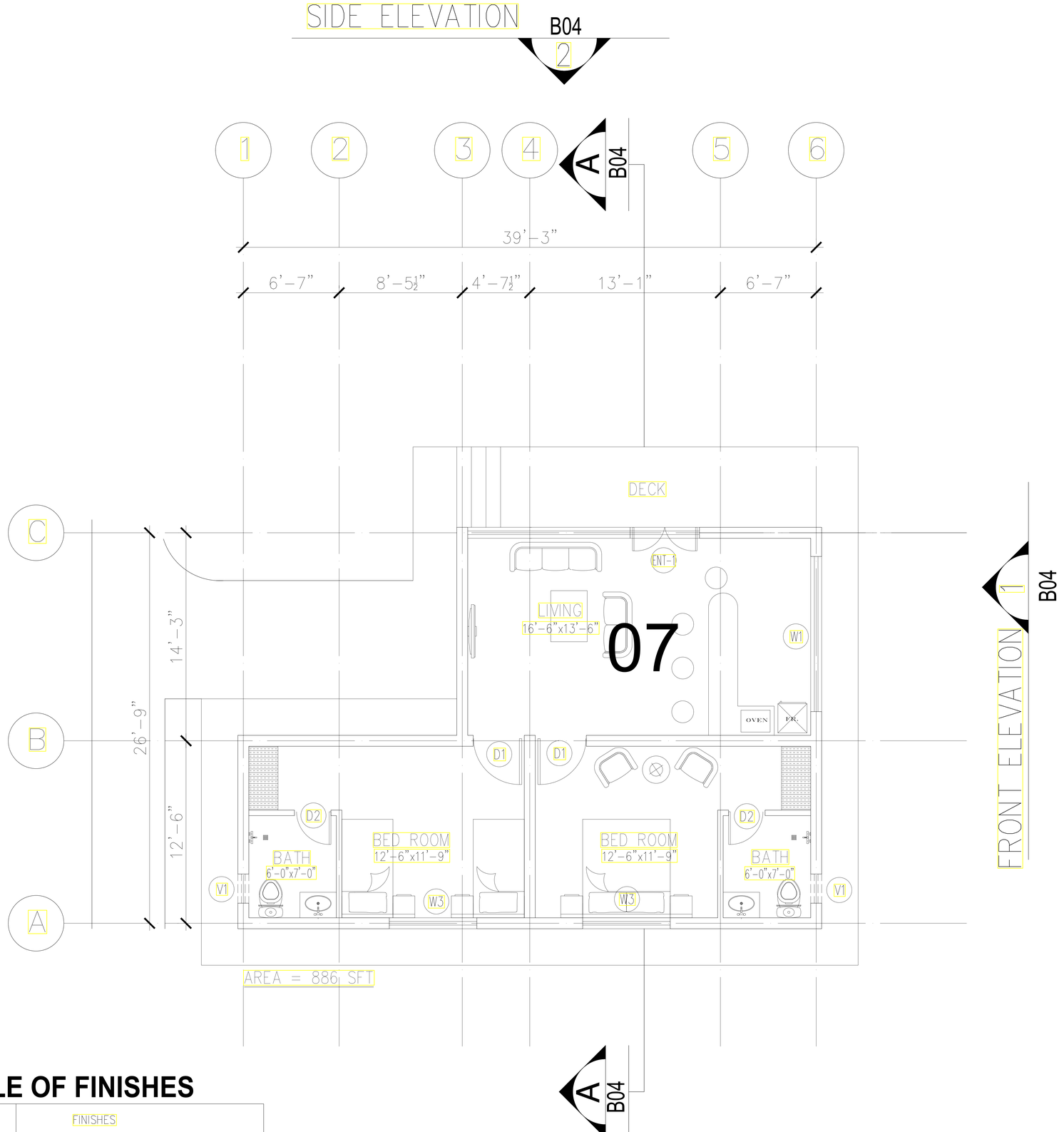
	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE			
CKD. WAJIHA REHAN			
SUBM.			

DATE	DRAWING NO.	REV.
FEB. 2026	156/322/TD/05B05	0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	PD-DL-FL	16'-0"	8'-0"													
D1	PD-DL-FL	3'-0"	8'-0"	DW	DW	LP	LP	F1	H2	L1	TB			DC		
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	10'-7½"	10'-9"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	—	—	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	6'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	2'-0"	2'-0"	AL	AL-GL	PC	PC-TG									



SCHEDULE OF FINISHES

S NO.	PLANS	FINISHES
01	ENTRANCE , STEPS , DECK	CONCRETE TILES
02	BED ROOM , LOUNGE	PORCELAIN TILES (6"X4'-0")
03	BATH	CERAMIC TILES
04	PLAT FORM , PODIUM	CONCRETE PAVERS

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

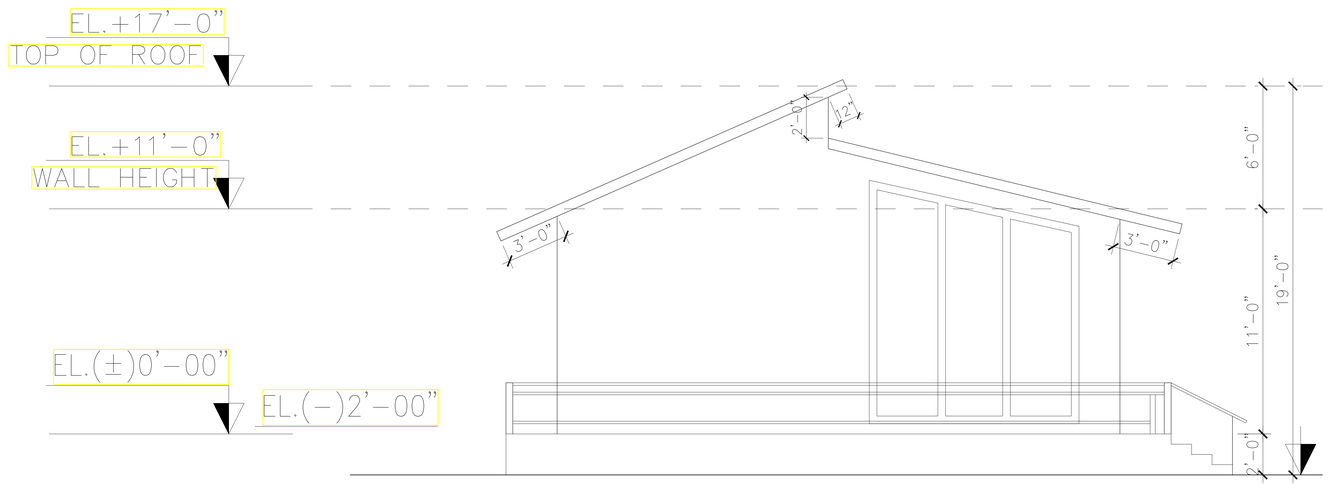
BLOCK - 07

GROUND FLOOR PLAN

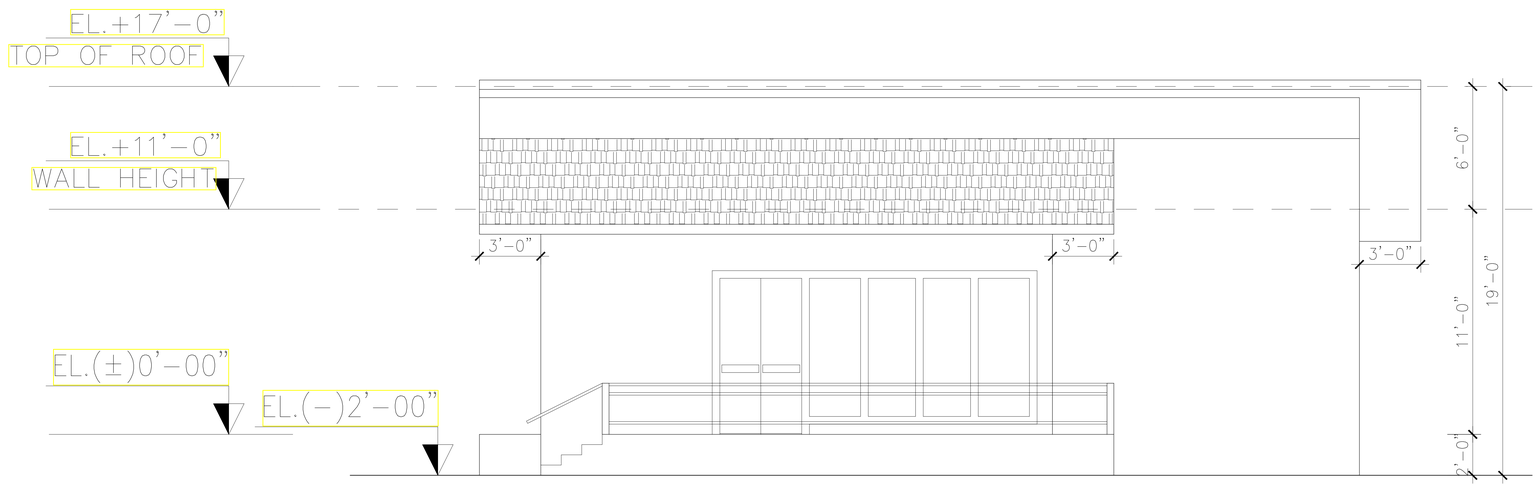
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.			
FILE			
CKD. WAJIHA REHAN	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
SUBM.	DATE FEB. 2026	DRAWING NO. 156/322/TD/06B02	REV. 0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



1 FRONT ELEVATION
B02



2 SIDE ELEVATION
B02

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

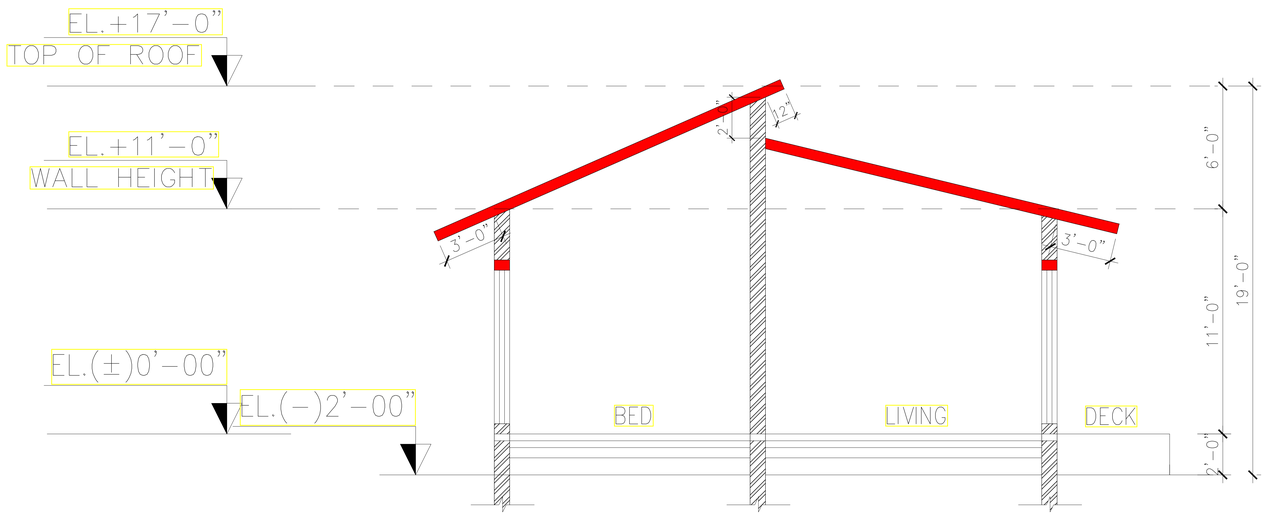
BLOCK - 07

ELEVATIONS

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/06B03	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



A SECTION A-A

B02

SCALE: 1/8"=1'-0"

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

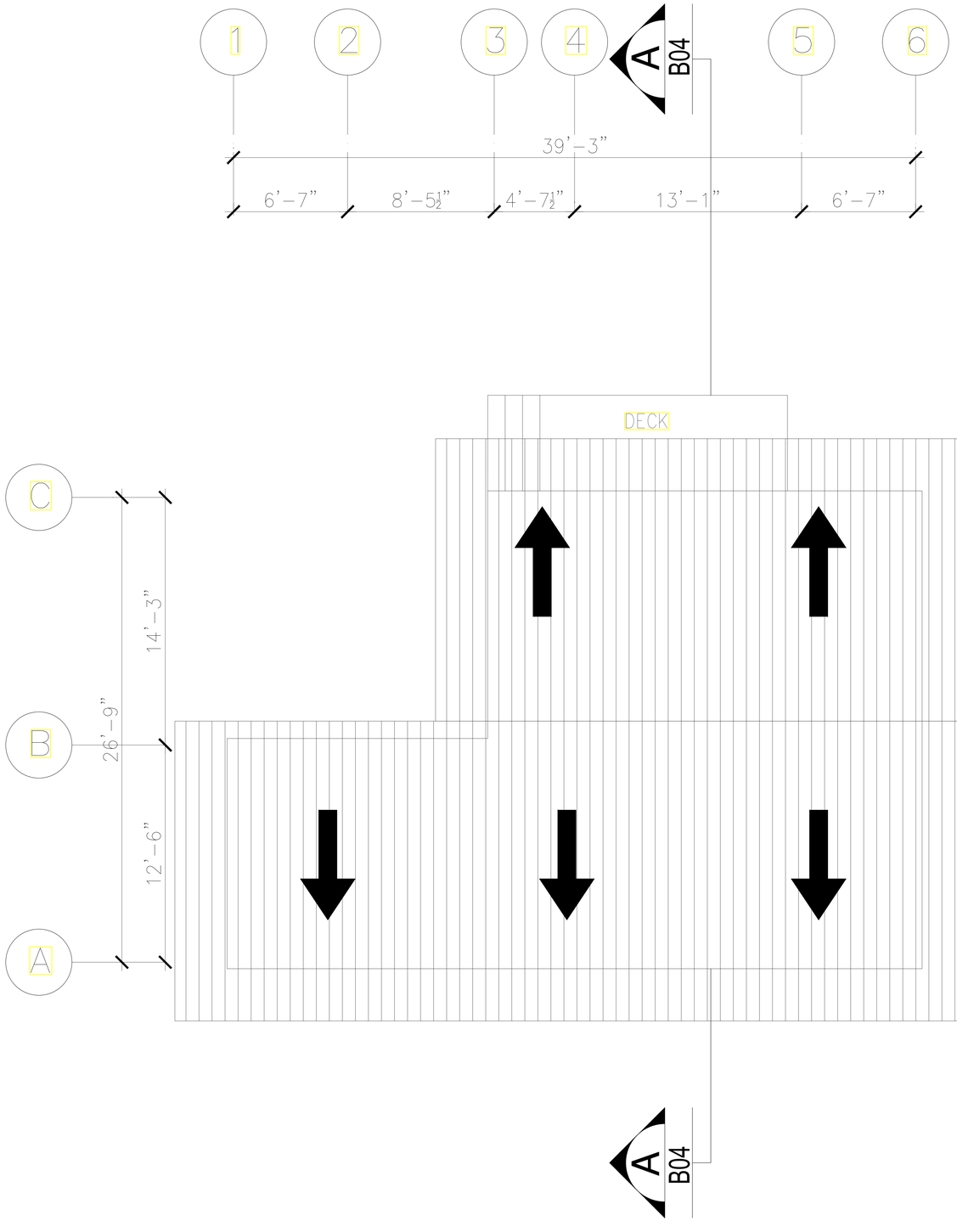
BLOCK - 07

SECTION A-A

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/06B04	0
SUBM.			

SIDE ELEVATION 2 B04





SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 07

ROOF PLAN

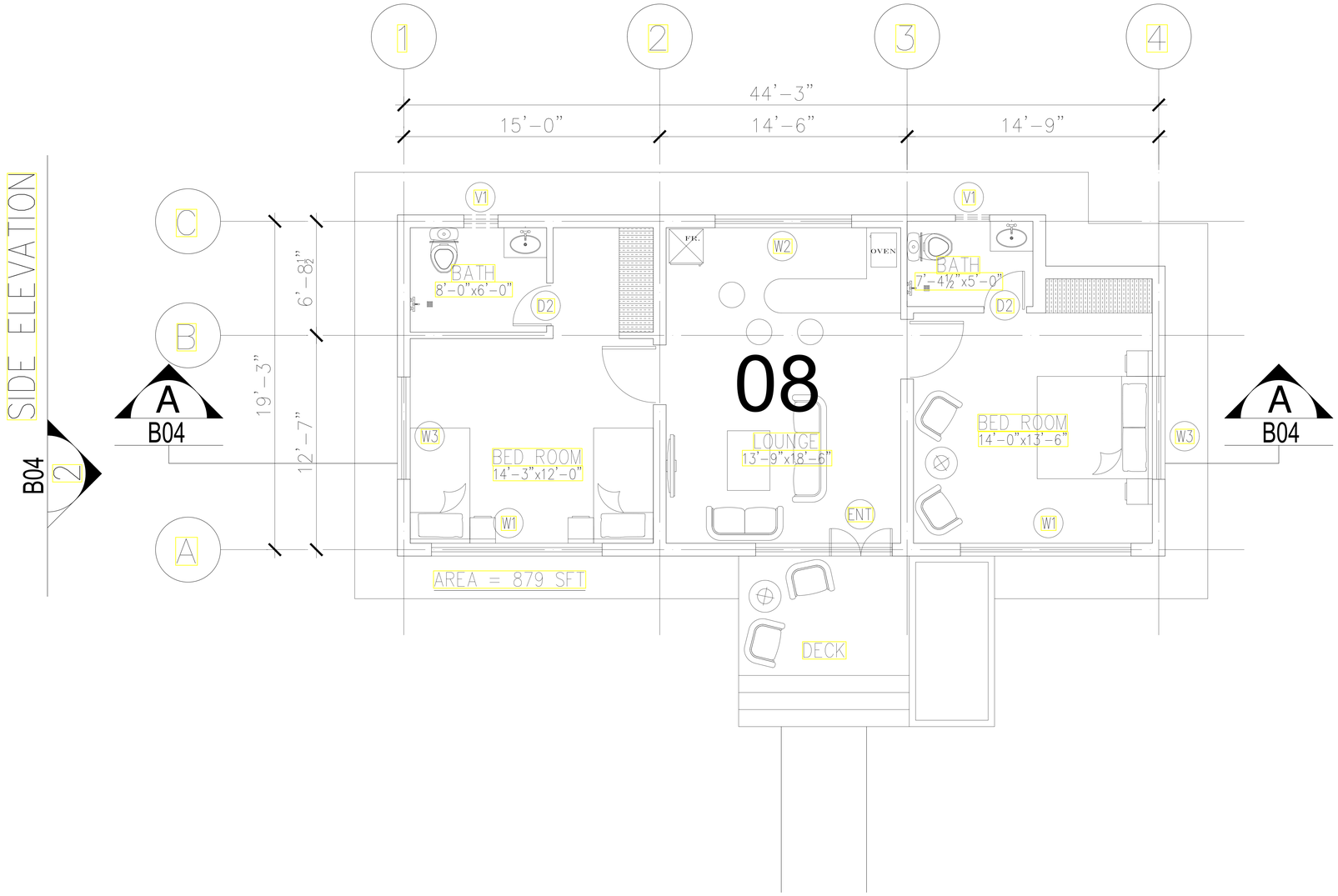
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE			
CKD. WAJIHA REHAN	DATE	DRAWING NO.	REV.
SUBM.	FEB. 2026	156/322/TD/06B05	0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	PD–DL–FL	16'–0"	8'–0"													
D1	PD–DL–FL	3'–0"	8'–0"	DW	DW	LP	LP	F1	H2	L1	TB			DC		
D2	FD–SL	2'–6"	8'–0"	DW	CP	LP	LP									
W1	AL–S–FP	10'–7½"	10'–9"	AL	AL–GL	PC	PC–TG									
W2	AL–S–FP	—	—	AL	AL–GL	PC	PC–TG									
W3	AL–S–FP	6'–0"	8'–0"	AL	AL–GL	PC	PC–TG									
V1	AL–S–FP	2'–0"	2'–0"	AL	AL–GL	PC	PC–TG									



1 FRONT ELEVATION
B04

SCALE: 1/8"=1'-0"

SCHEDULE OF FINISHES

S NO.	PLANS	FINISHES
01	ENTRANCE , STEPS , DECK	CONCRETE TILES
02	BED ROOM , LOUNGE	PORCELAIN TILES (6"X4'-0")
03	BATH	CERAMIC TILES
04	PLAT FORM , PODIUM	CONCRETE PAVERS

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

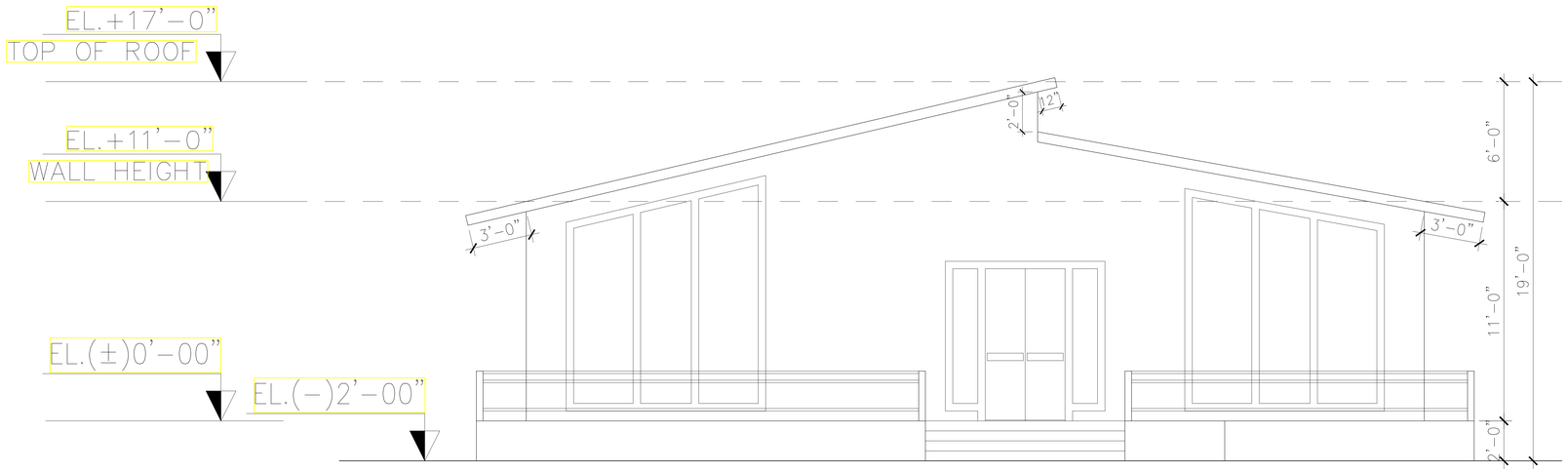
GUEST UNITS

BLOCK - 08

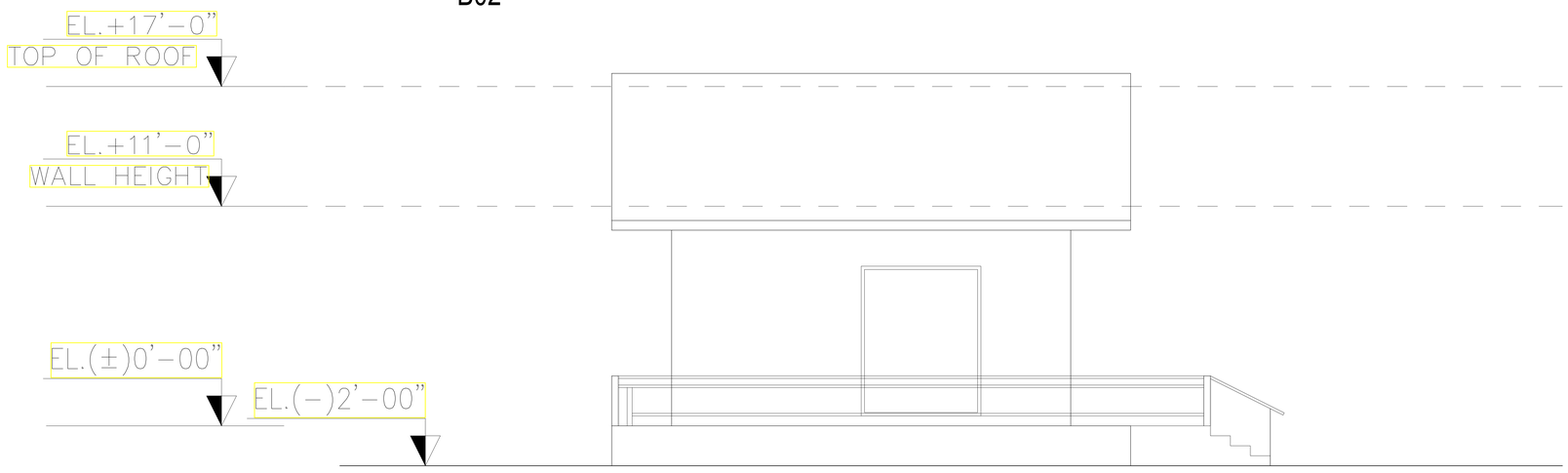
GROUND FLOOR PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/07B02	0
SUBM.			



1 FRONT ELEVATION
B02



2 SIDE ELEVATION
B02

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

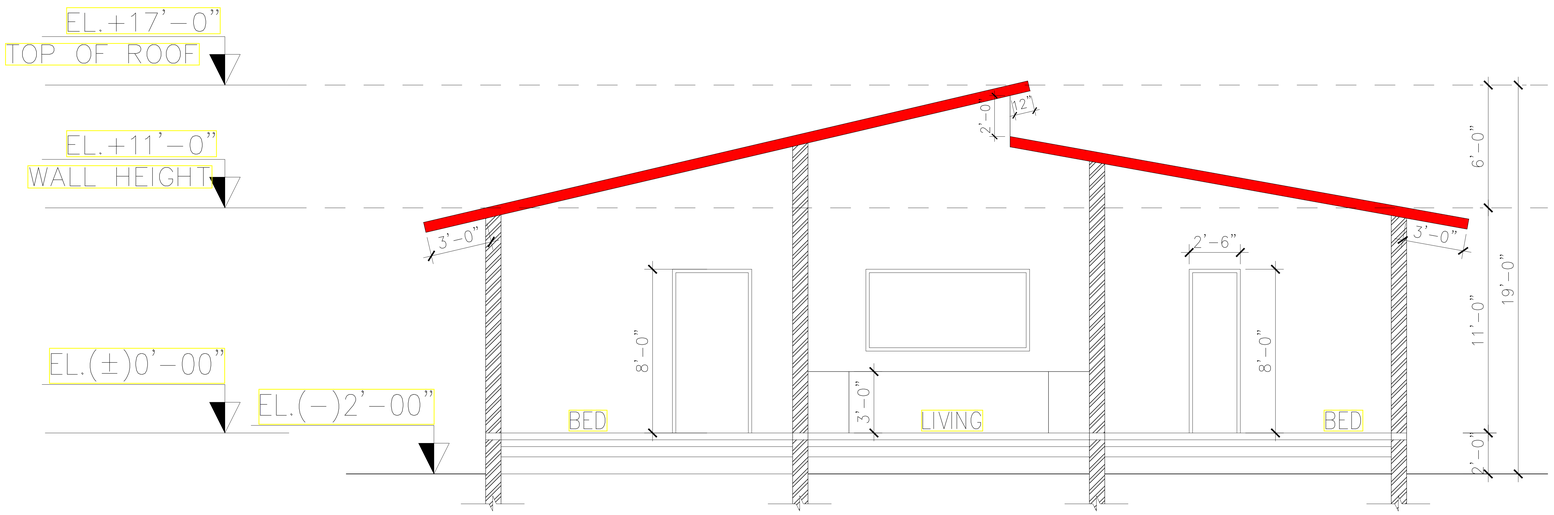
BLOCK - 08

ELEVATIONS

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/07B03	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



A SECTION A-A

B02

SCALE: 1/8"=1'-0"

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

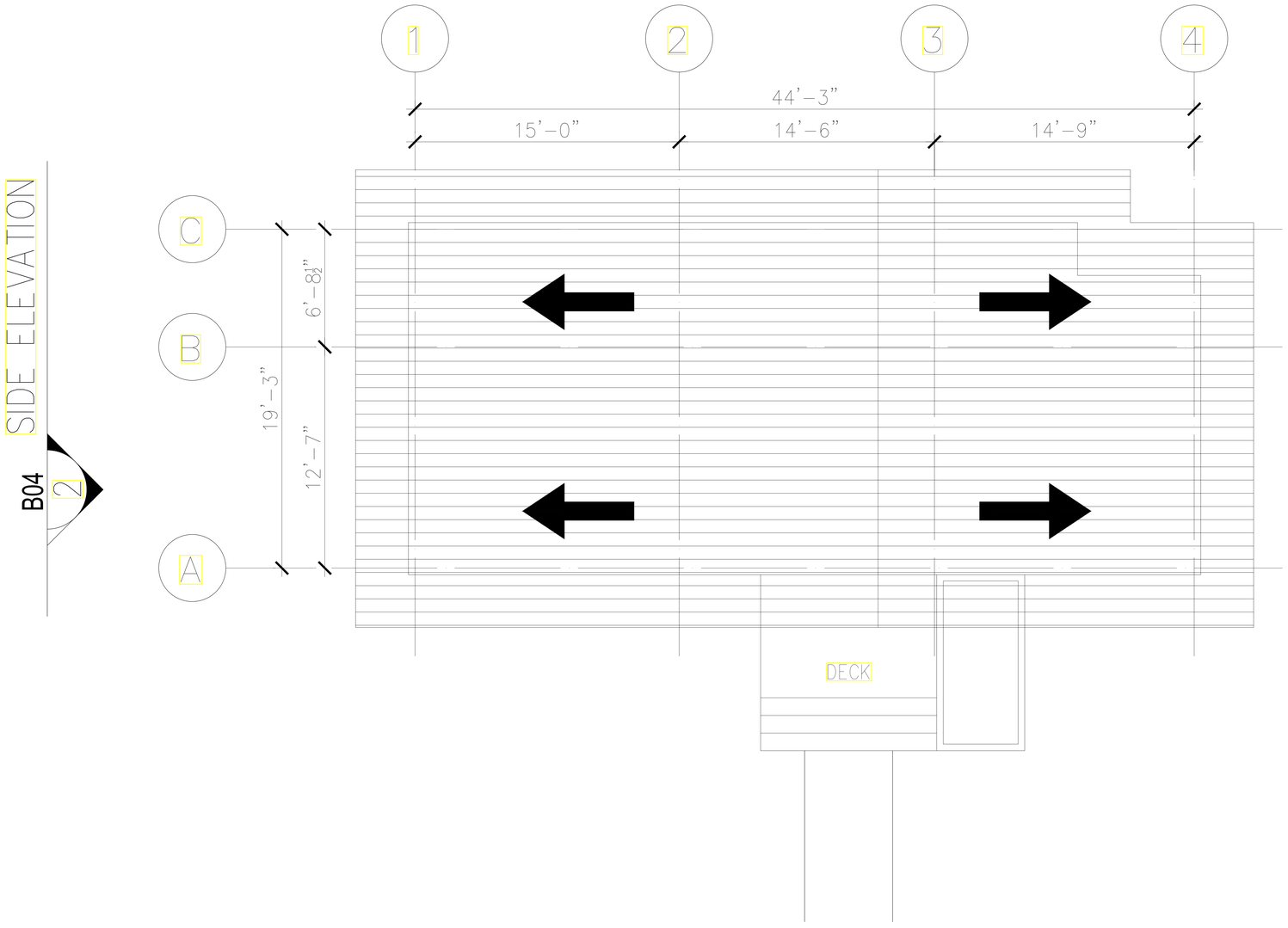
GUEST UNITS

BLOCK - 08

SECTION A-A

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/07B04	0
SUBM.			



B04 2 SIDE ELEVATION

1 FRONT ELEVATION
B04

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 08

ROOF PLAN

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE			
CKD. WAJIHA REHAN			
SUBM.			

DATE	DRAWING NO.	REV.
FEB. 2026	156/322/TD/07B05	0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	PD-DL-FL	8'-0"	8'-0"													
D1	PD-DL-FL	3'-0"	8'-0"	DW	DW	LP	LP	F1	H2	L1	TB			DC		
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	10'-0"	10'-0"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	8'-0"	4'-0"	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	6'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	2'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

PROJECT

GUN AND COUNTRY CLUB
APARTMENT BLOCK 8

TITLE

SCHEDULE OF DOORS
DOORWINDOWS, WINDOWS, VENTILATOR

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

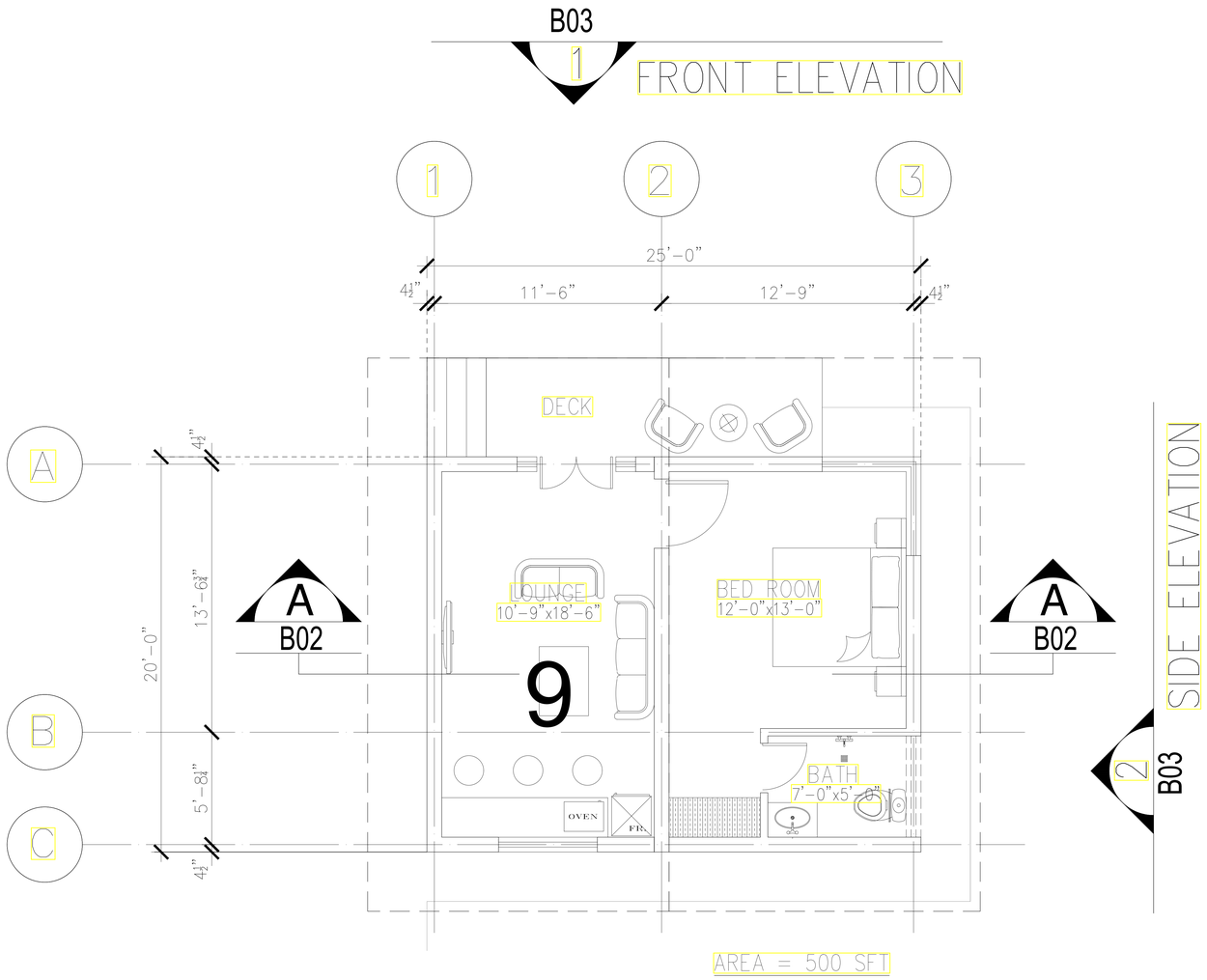
SCALE N.T.S

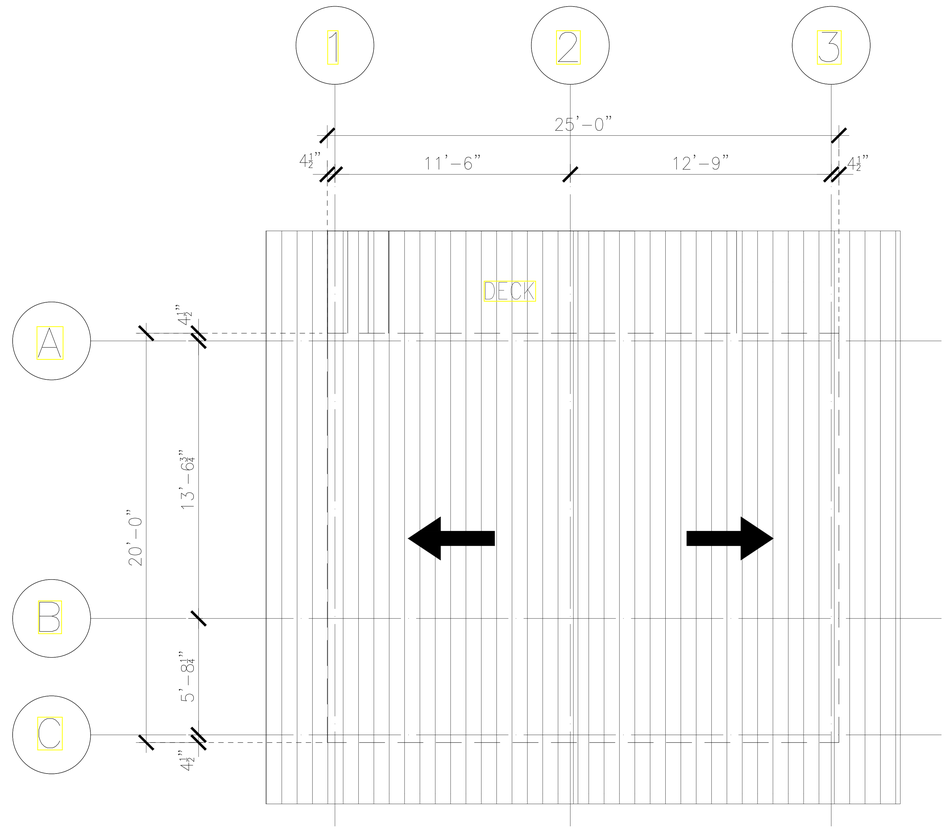
DATE FEB.,2026

NO. 156/322/TD/J01

REV. 0

0-00-00-00





SCALE: 1/8"=1'-0"

SCHEDULE OF FINISHES

S NO.	PLANS	FINISHES
01	ENTRANCE , STEPS , DECK	CONCRETE TILES
02	BED ROOM , LOUNGE	PORCELAIN TILES (6"X4'-0")
03	BATH	CERAMIC TILES
04	PLAT FORM , PODIUM	CONCRETE PAVERS

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

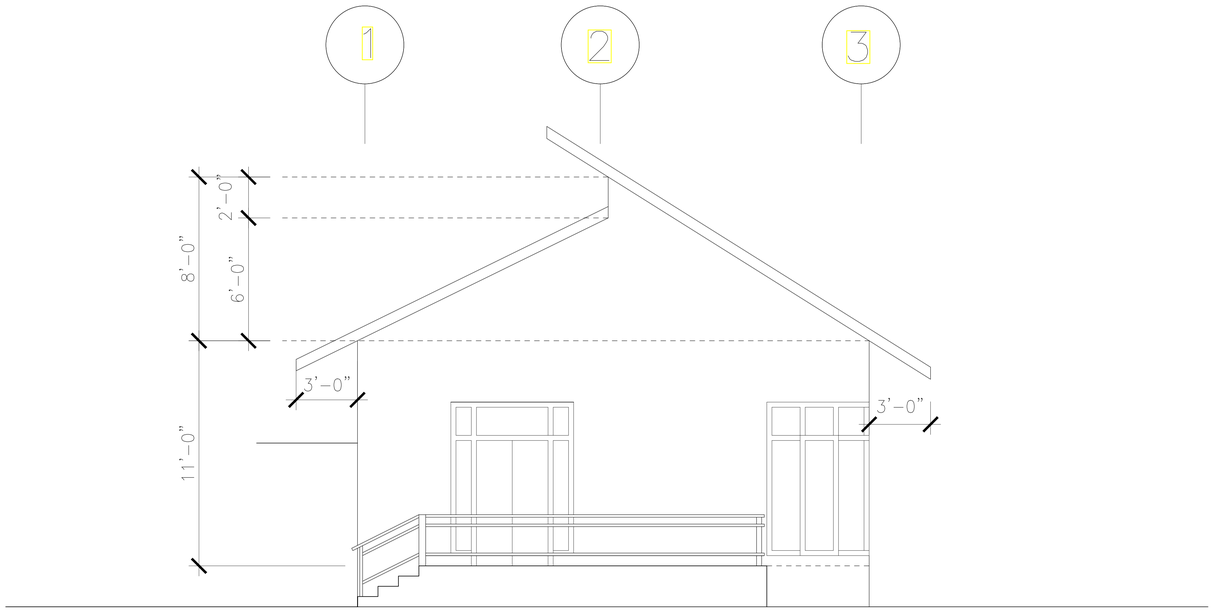
GUEST UNITS

BLOCK - 09

FLOOR PLAN AND ROOF PLAN

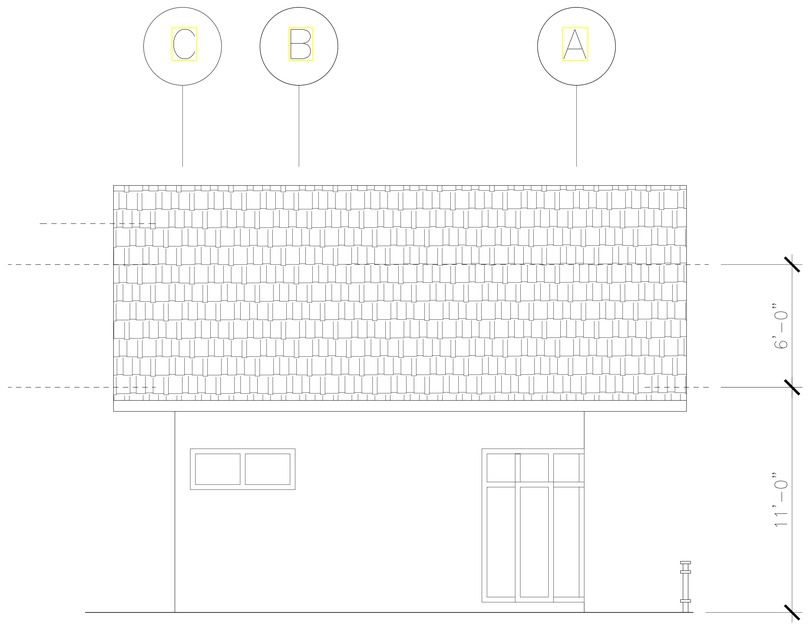
NES PAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE			
CKD. WAJIHA REHAN	DATE	DRAWING NO.	REV.
SUBM.	FEB. 2026	156/322/TD/08B02	0



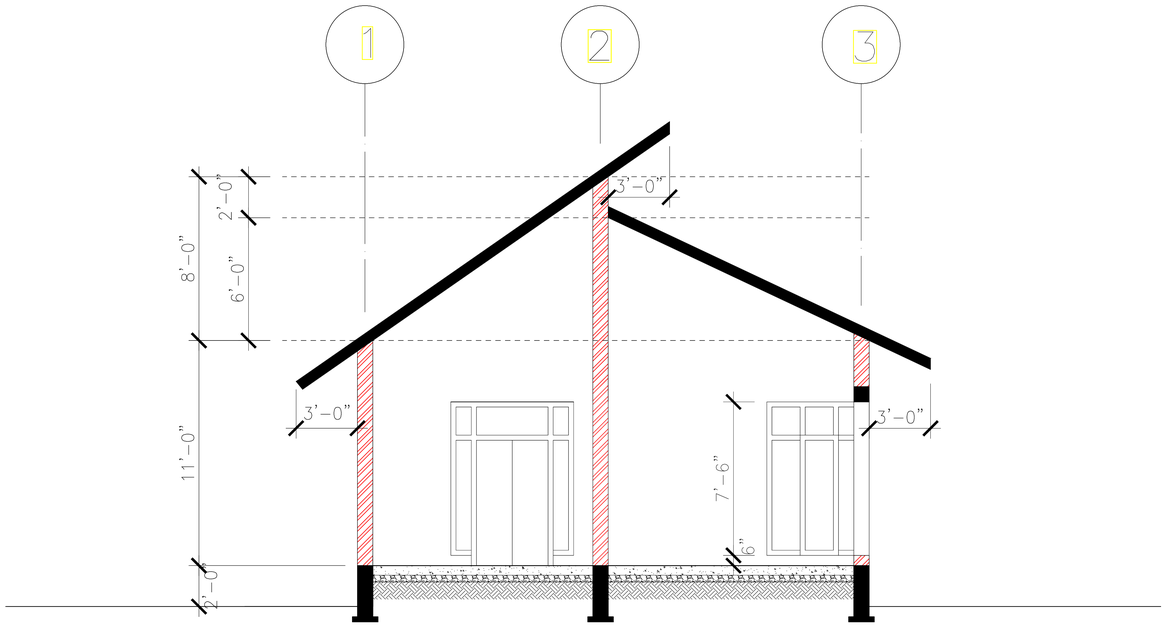
1 FRONT ELEVATION

B00



2 SIDE ELEVATION

B00



1 SECTION A–A

B00

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 09

FLOOR PLAN AND ROOF PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/08B03	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
DW1	PD-DL-FL	10'-0"	7'-6"													
D1	FD-SL	3'-6"	8'-0"	DW	DW	LP	LP	F1	H2	L1	TB			DC		
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	10'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	5'-0"	4'-6"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	5'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

PROJECT

GUN AND COUNTRY CLUB
APARTMENT BLOCK 10

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

TITLE

SCHEDULE OF OPENING
DOOR,WINDOWS AND VENTILATOR

SCALE N.T.S

DATE FEB.,2026

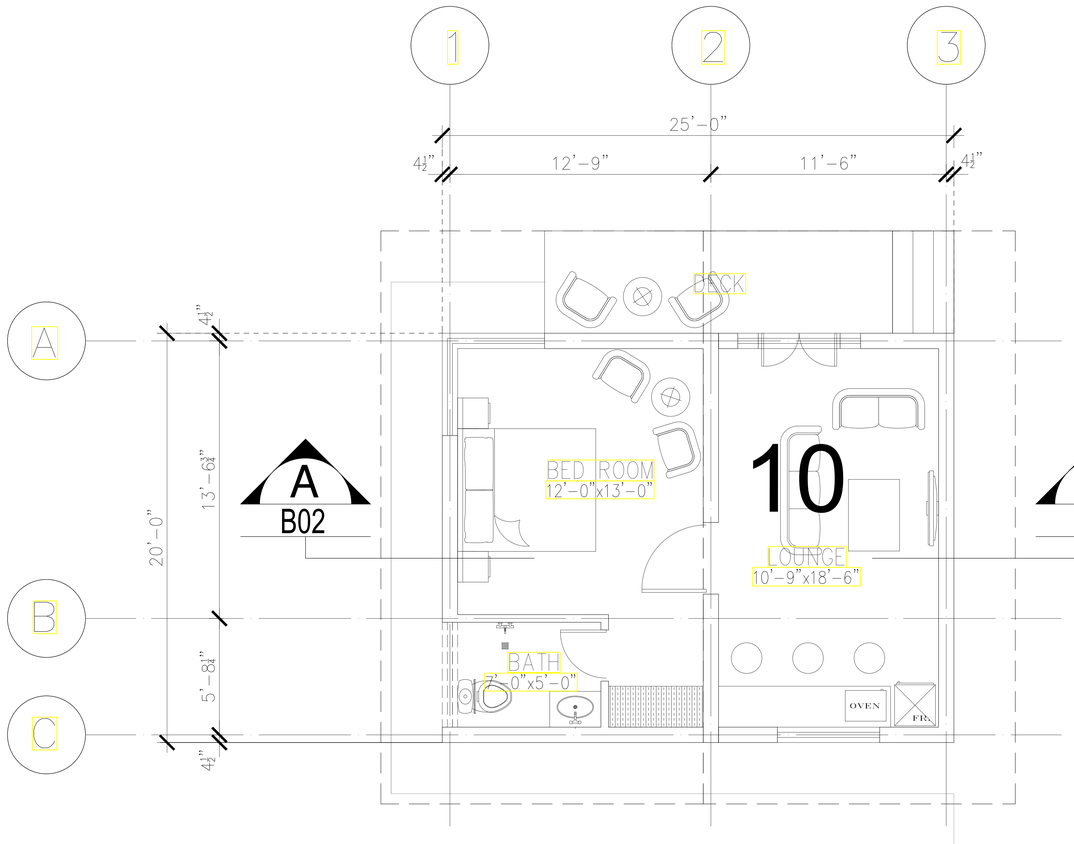
NO. 156/322/TD/J09

REV. 0

0-00-00-00

B03

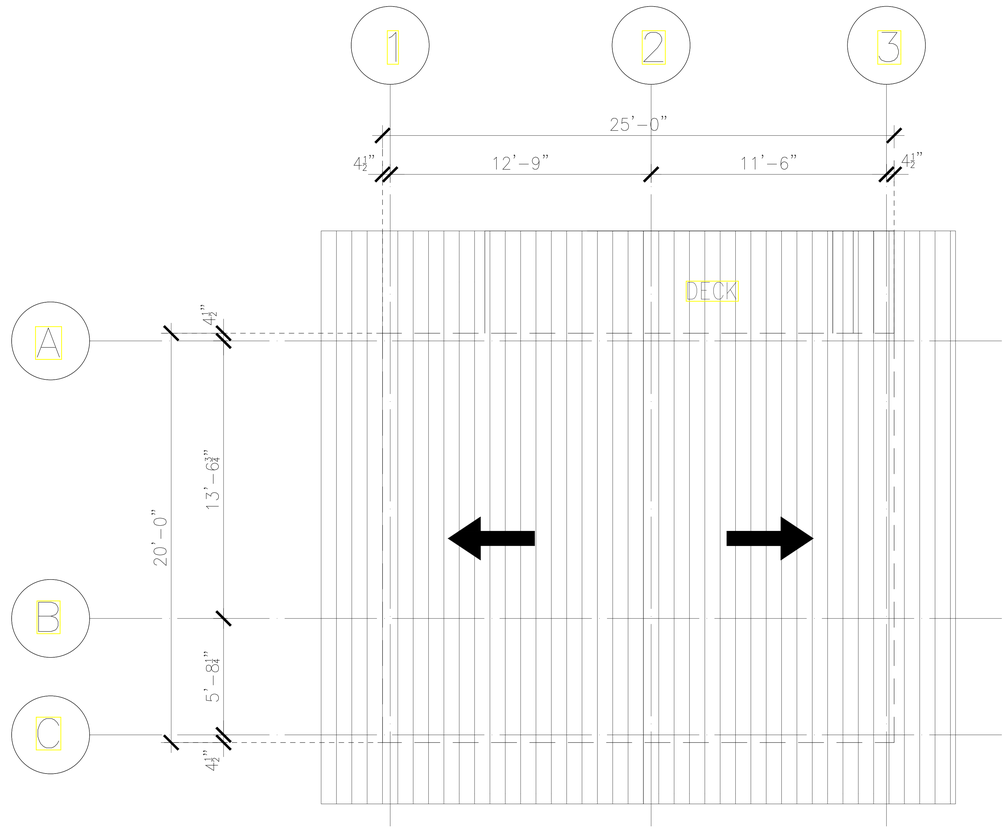
FRONT ELEVATION 1



SIDE ELEVATION

B02 2

AREA = 500 SFT



SCALE: 1/8"=1'-0"

SCHEDULE OF FINISHES

S NO.	PLANS	FINISHES
01	ENTRANCE , STEPS , DECK	CONCRETE TILES
02	BED ROOM , LOUNGE	PORCELAIN TILES (6"X4'-0")
03	BATH	CERAMIC TILES
04	PLAT FORM , PODIUM	CONCRETE PAVERS

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

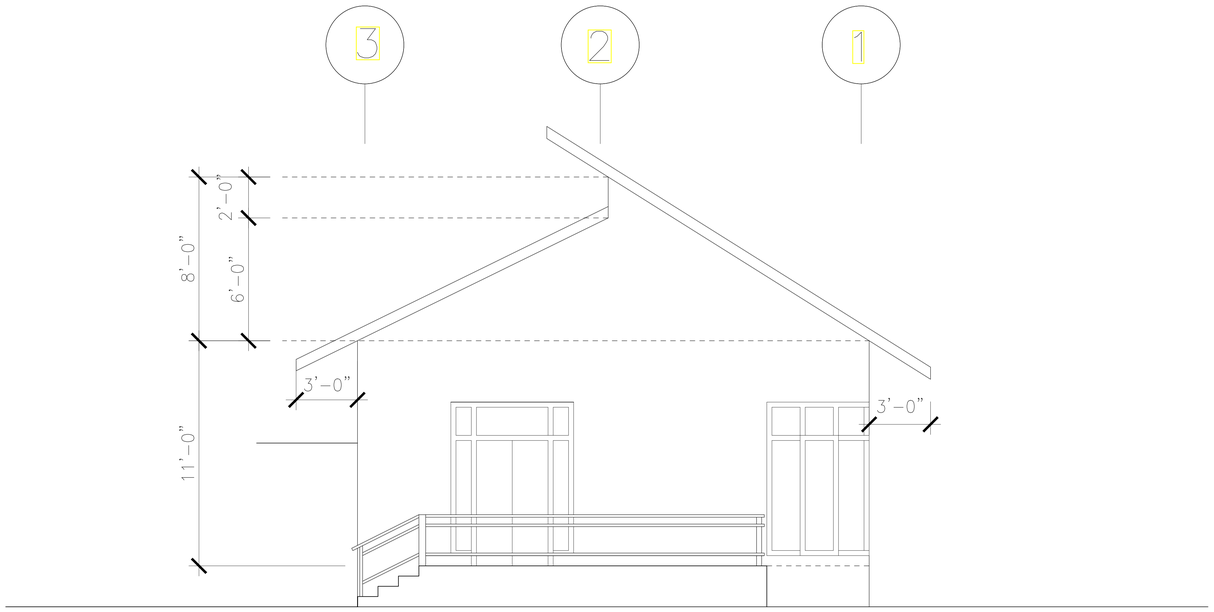
GUEST UNITS

BLOCK - 10

FLOOR PLAN AND ROOF PLAN

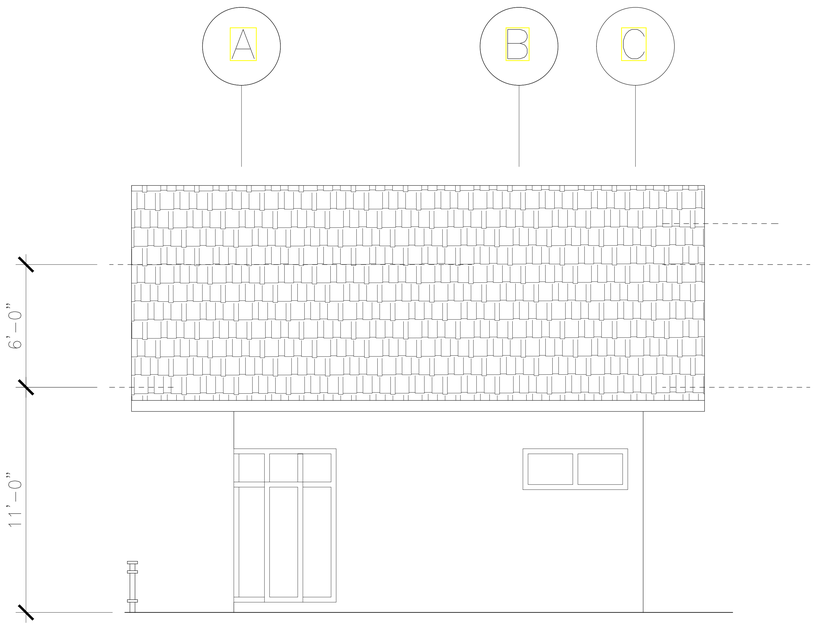
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
CKD. WAJIHA REHAN	DATE	DRAWING NO.	REV.
SUBM.	FEB. 2026	156/322/TD/09B02	0



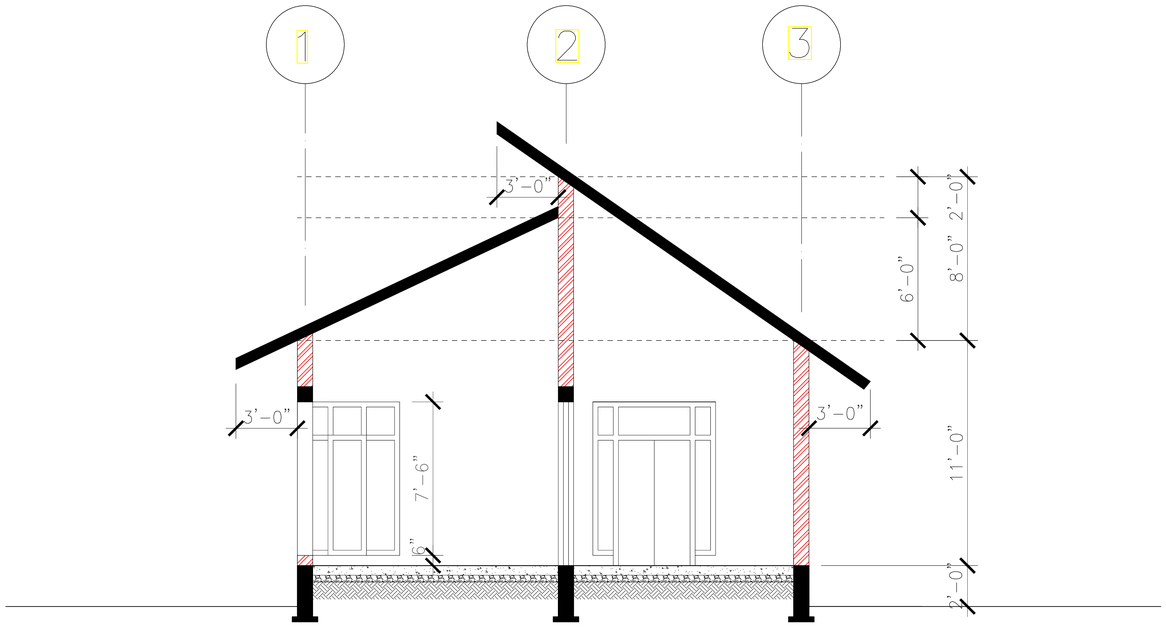
1 FRONT ELEVATION

B00



2 SIDE ELEVATION

B00



1 SECTION A–A

B00

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 10

FLOOR PLAN AND ROOF PLAN

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/09B03	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
DW1	PD-DL-FL	10'-0"	7'-6"													
D1	FD-SL	3'-6"	8'-0"	DW	DW	LP	LP	F1	H2	L1	TB			DC		
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	10'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	5'-0"	4'-6"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	5'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

PROJECT

GUN AND COUNTRY CLUB
APARTMENT BLOCK 10

TITLE

SCHEDULE OF OPENING
DOOR,WINDOWS AND VENTILATOR

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

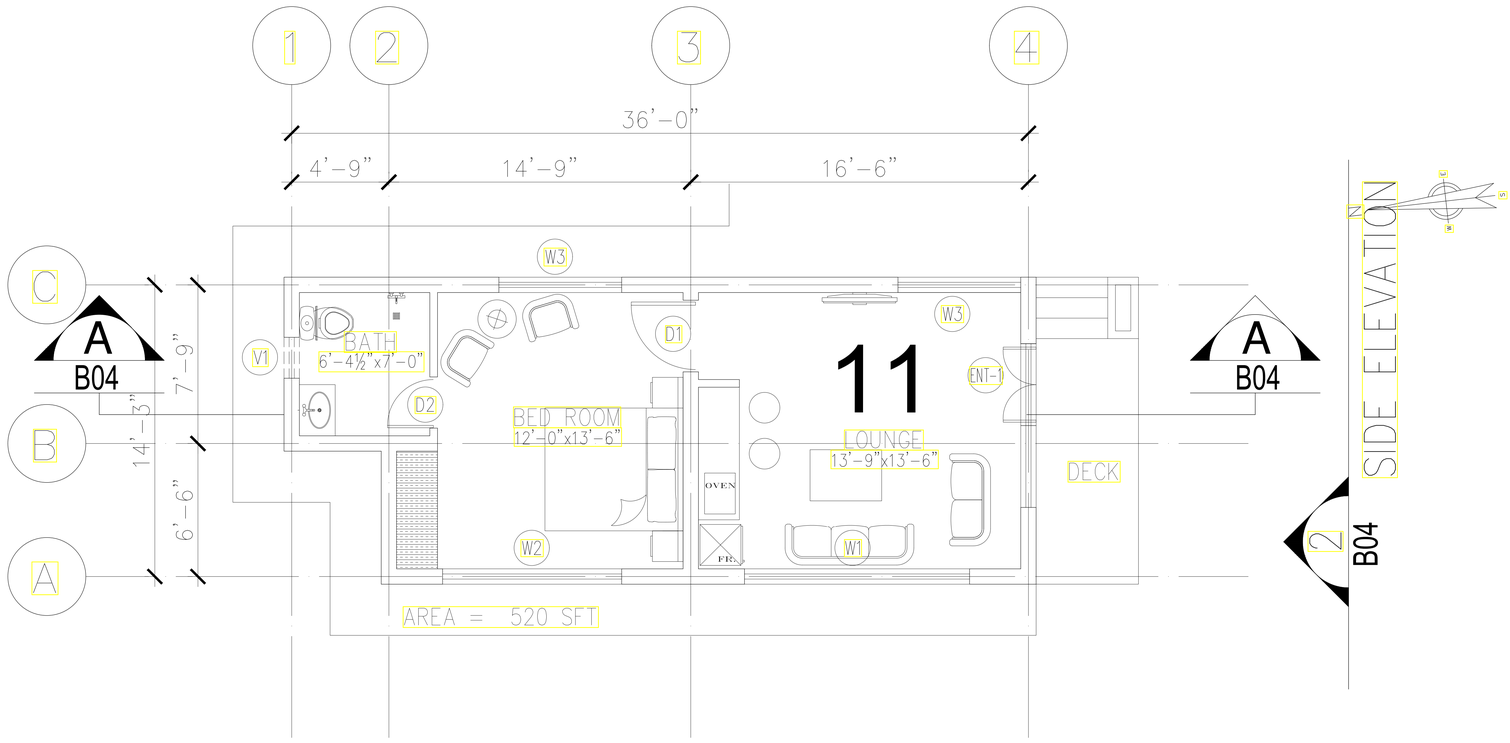
SCALE N.T.S

DATE FEB.,2026

NO. 156/322/TD/J01

REV. 0

0-00-00-00



SCHEDULE OF FINISHES

S NO.	PLANS	FINISHES
01	ENTRANCE , STEPS , DECK	CONCRETE TILES
02	BED ROOM , LOUNGE	PORCELAIN TILES (6"X4'-0")
03	BATH	CERAMIC TILES
04	PLAT FORM , PODIUM	CONCRETE PAVERS

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

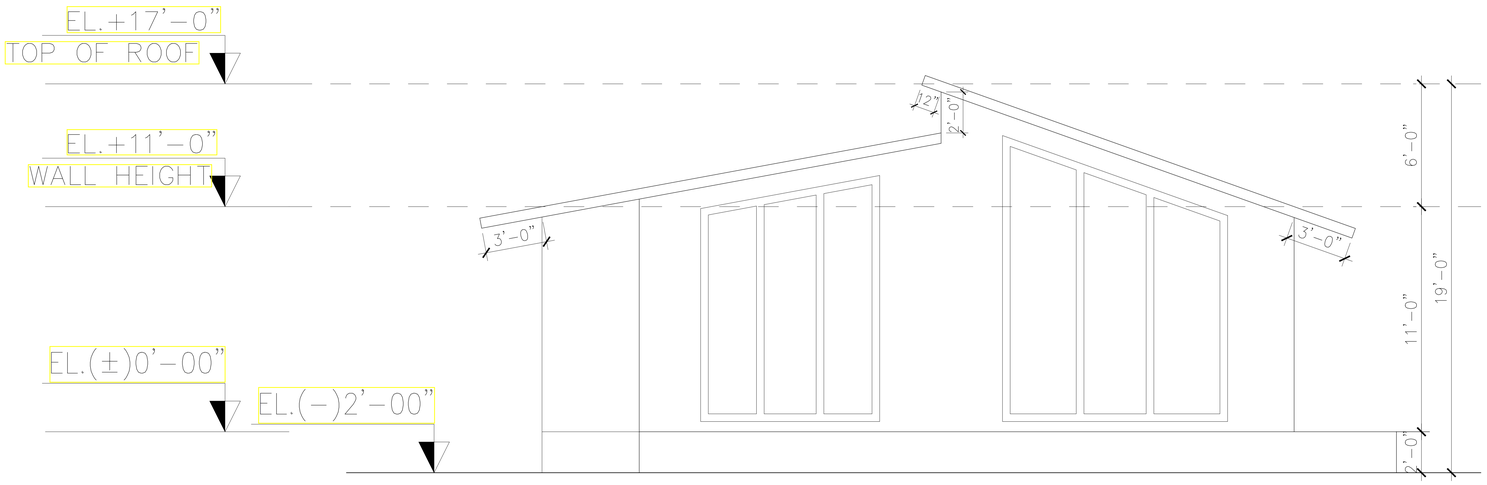
BLOCK - 11

GROUND FLOOR PLAN

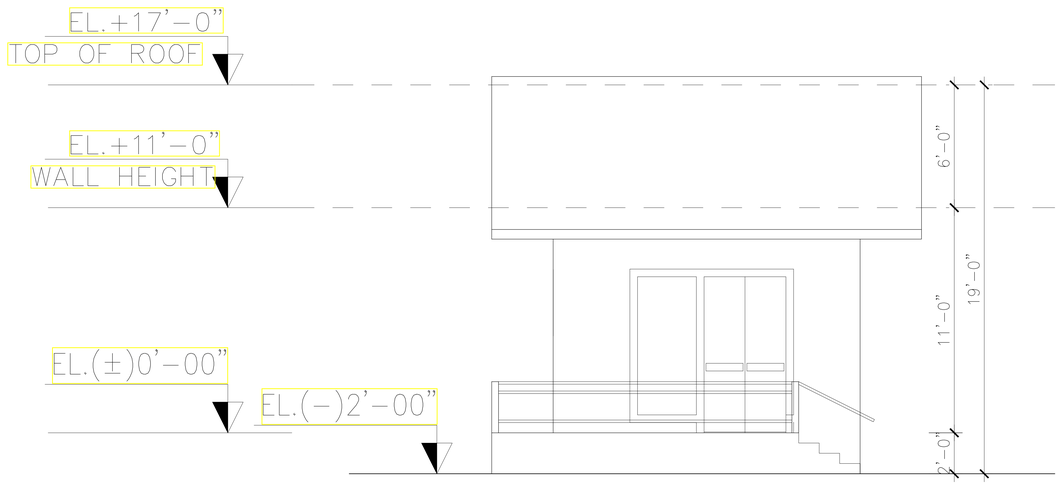
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE			
CKD. WAJIHA REHAN	DATE	DRAWING NO.	REV.
SUBM.	FEB. 2026	156/322/TD/10B02	0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



1 FRONT ELEVATION
B02



2 SIDE ELEVATION
B02

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

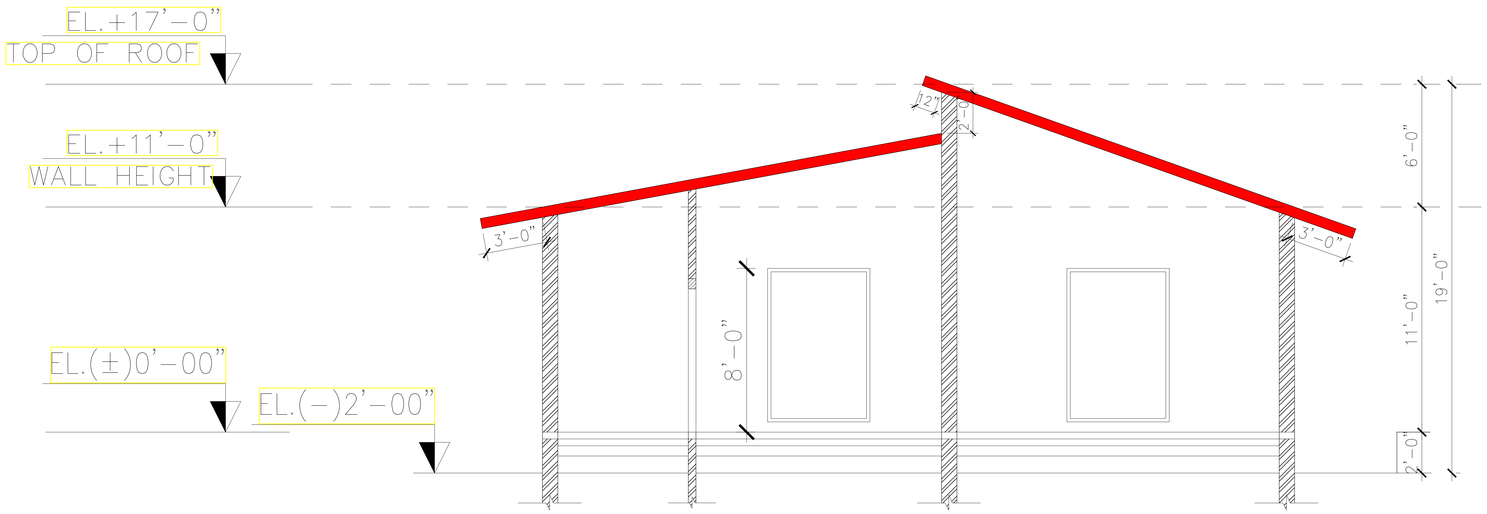
BLOCK - 11

ELEVATIONS

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE			
CKD. WAJIHA REHAN	DATE	DRAWING NO.	REV.
SUBM.	FEB. 2026	156/322/TD/10B03	0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



A SECTION A-A

B02

SCALE: 1/8"=1'-0"

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

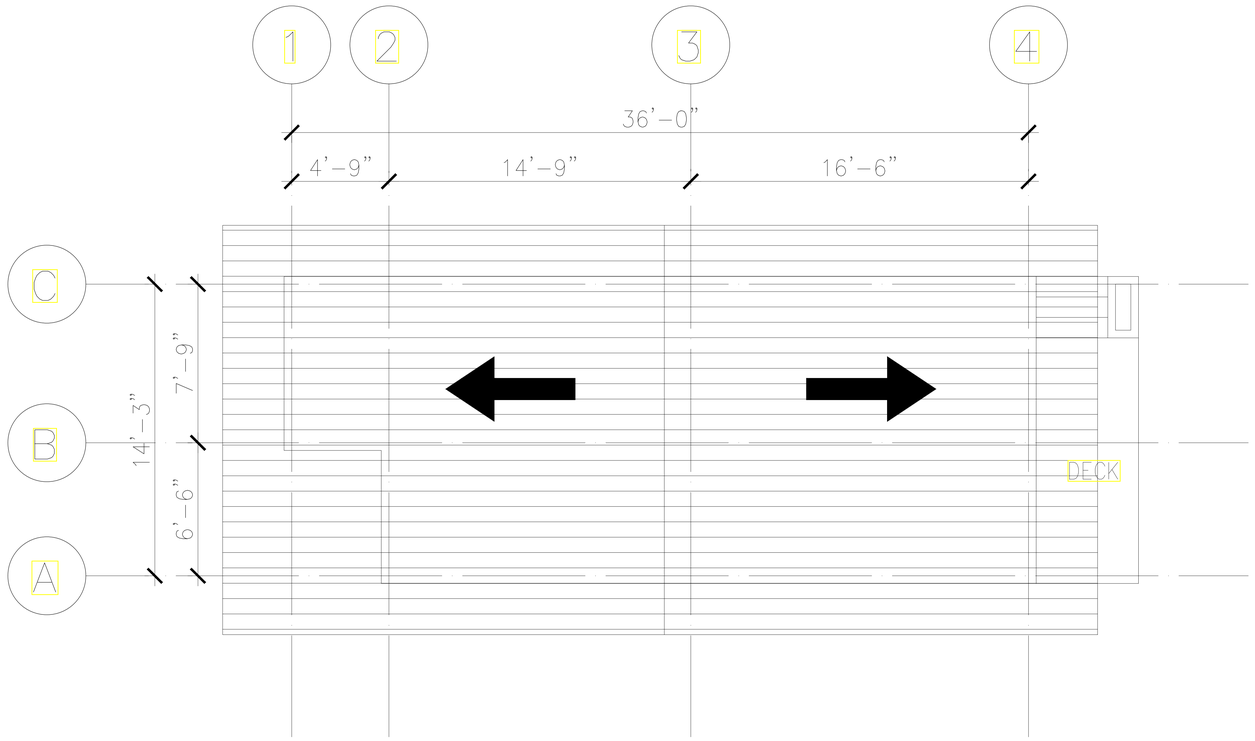
GUEST UNITS

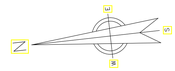
BLOCK - 11

SECTION A-A

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/10B04	0
SUBM.			





SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 11

ROOF PLAN

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/10B05	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	PD-DL-FL	6'-0"	8'-0"													
D1	PD-DL-FL	3'-0"	8'-0"	DW	DW	LP	LP	F1	H2	L1	TB			DC		
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	11'-0"	12'-0"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	8'-9"	11'-0"	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	6'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	2'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

PROJECT

GUN AND COUNTRY CLUB
APARTMENT BLOCK 11

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

TITLE

SCHEDULE OF DOORS
DOORWINDOWS,WINDOWS,VENTILATOR

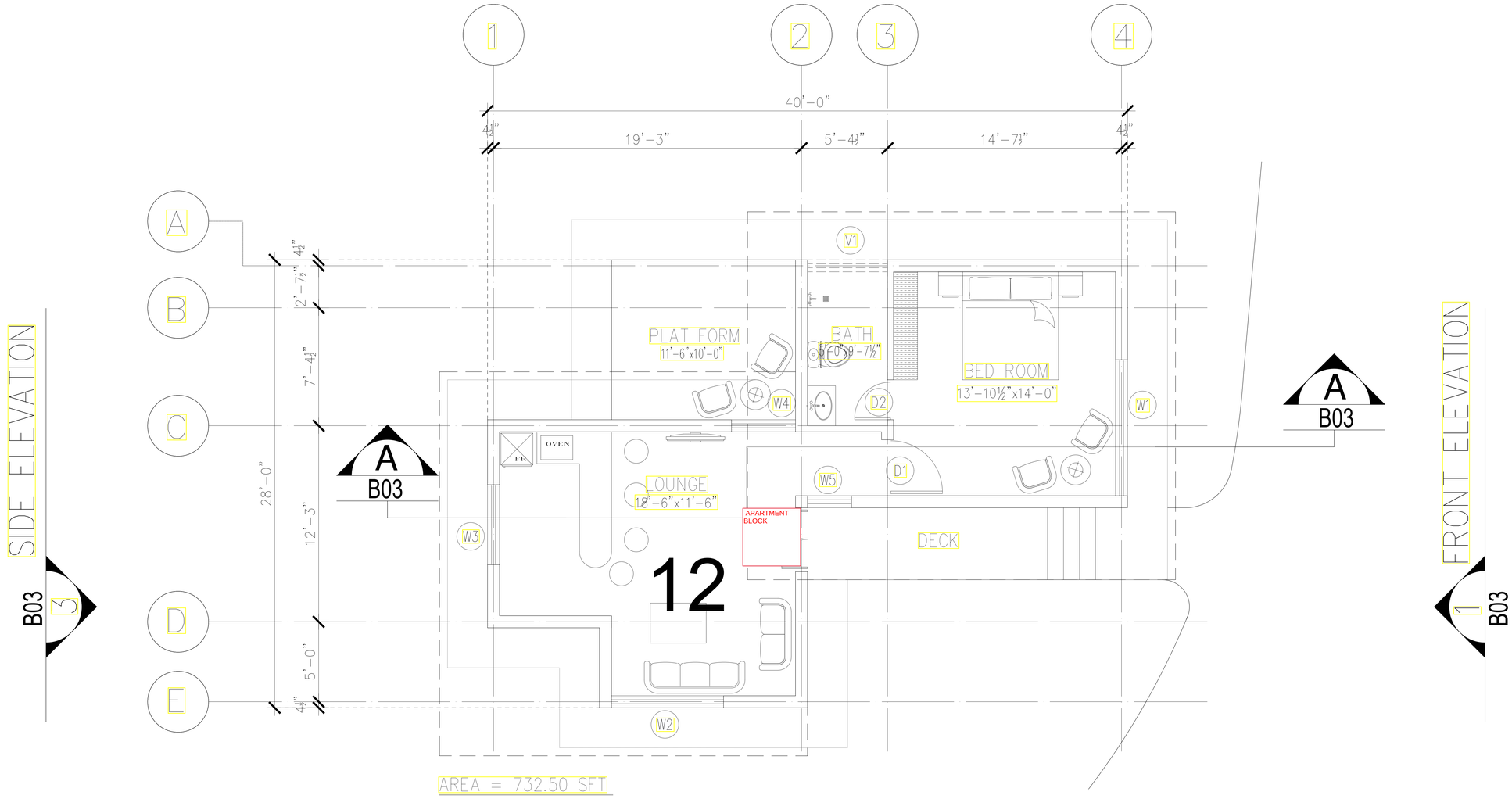
SCALE N.T.S

DATE FEB.,2026

NO. 156/322/TD/J01

REV. 0

0-00-00-00



SCHEDULE OF FINISHES

S NO.	PLANS	FINISHES
01	ENTRANCE , STEPS , DECK	CONCRETE TILES
02	BED ROOM , LOUNGE	PORCELAIN TILES (6"X4'-0")
03	BATH	CERAMIC TILES
04	PLAT FORM , PODIUM	CONCRETE PAVERS

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

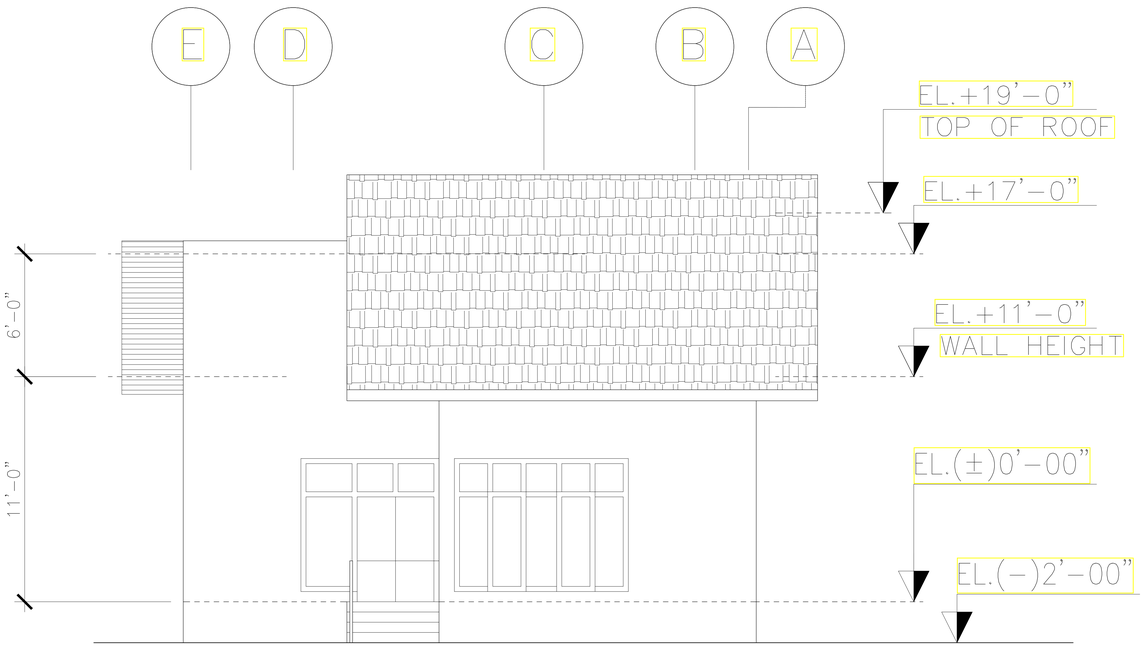
BLOCK - 12 & 13

FLOOR PLAN

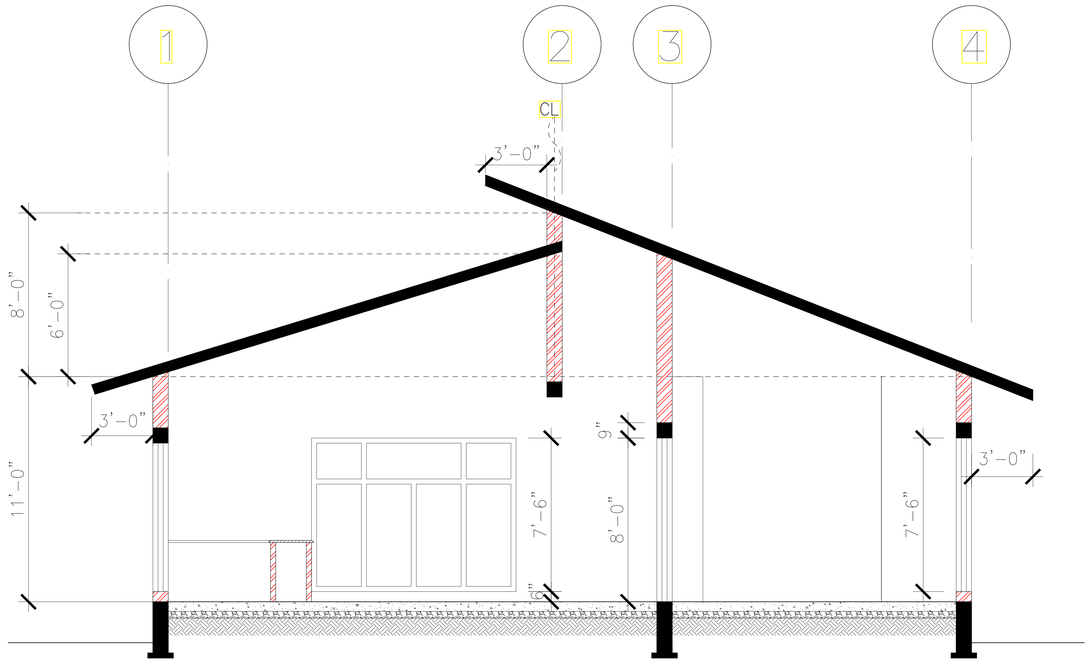
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE			
CKD. WAJIHA REHAN	DATE	DRAWING NO.	REV.
SUBM.	FEB. 2026	156/322/TD/11B02	0

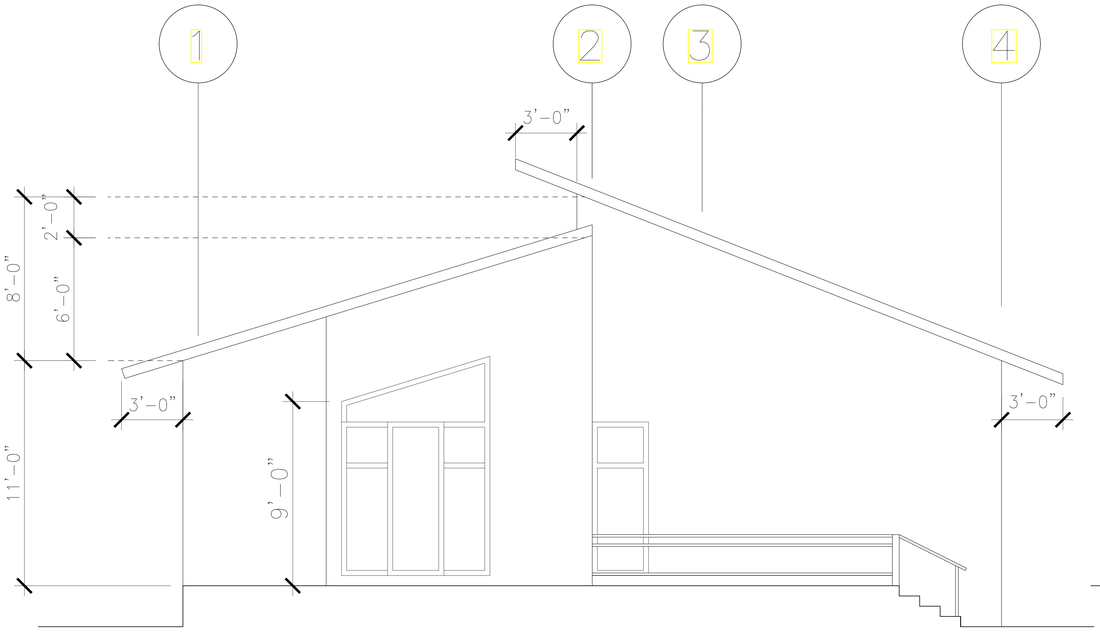
REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



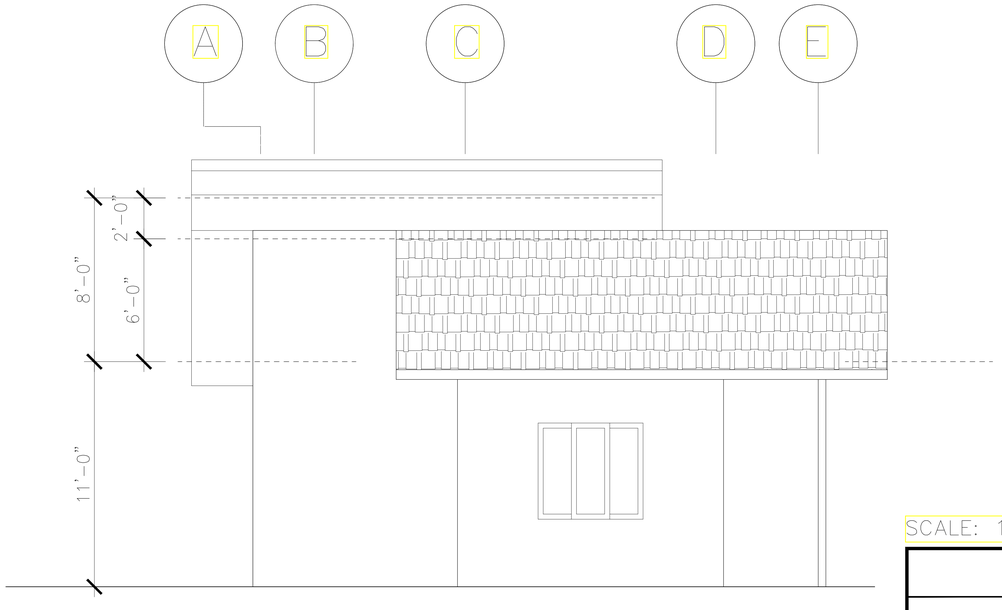
1 FRONT ELEVATION
B00



1 SECTION A-A
B00



2 SIDE ELEVATION



3 SIDE ELEVATION

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

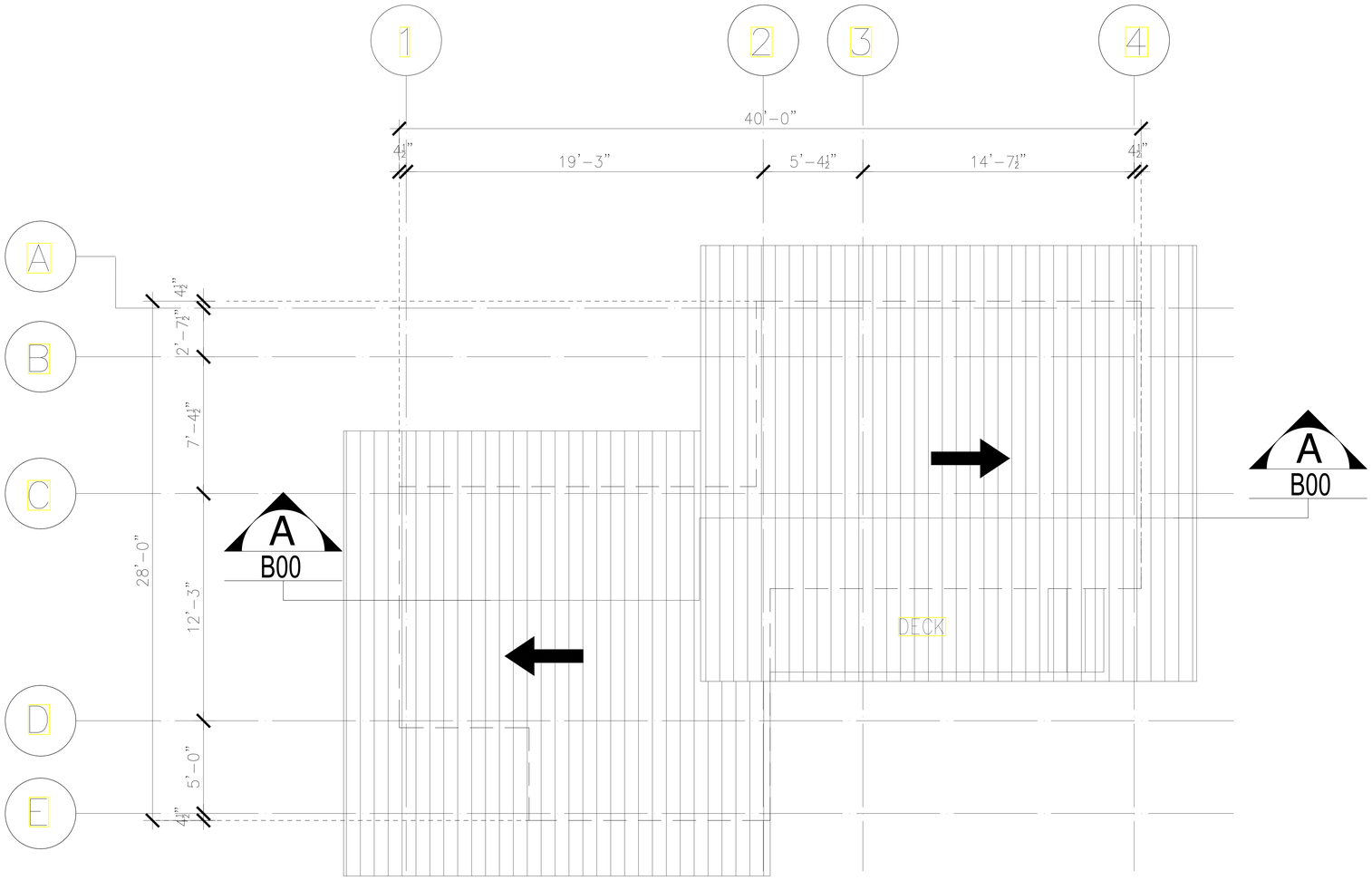
BLOCK - 12 & 13

ELEVATIONS AND SECTION A-A

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/11B03	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



ROOF PLAN

SCALE: 1/8"=1'-0"

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 12 & 13

SECTION A-A

NES PAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/11B04	0
SUBM.			

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
DW1	PD-DL-FL	10'-0"	7'-6"													
DW2	PD-DL-FL	6'-9"	8'-0"													
D1	FD-SL	3'-6"	8'-0"	DW	DW	LP	LP	F1	H2	L1	TB			DC		
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	8'-6"	8'-0"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	7'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	5'-0"	5'-0"	AL	AL-GL	PC	PC-TG									
W4	AL-S-FP	5'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
W5	AL-S-FP	2'-9"	8'-0"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	5'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

PROJECT

GUN AND COUNTRY CLUB
APARTMENT BLOCK 12,13

TITLE

SCHEDULE OF OPENING
DOOR,WINDOWS AND VENTILATOR

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

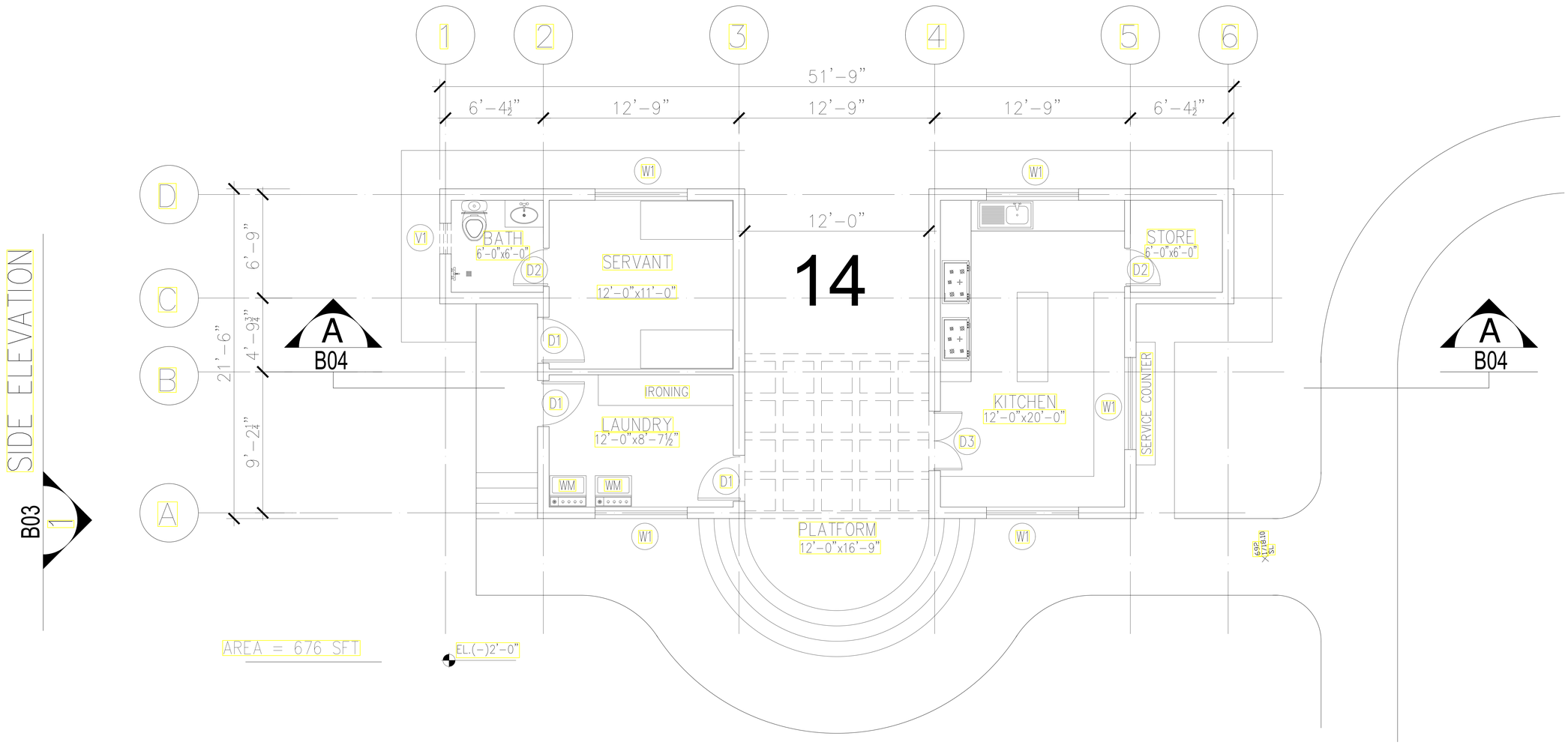
SCALE N.T.S

DATE FEB.,2026

NO. 156/322/TD/J01

REV. 0

0-00-00-00



1 FRONT ELEVATION
B03

SCALE: 1/8"=1'-0"

SCHEDULE OF FINISHES

S NO.	PLANS	FINISHES
01	ENTRANCE , STEPS , DECK	CONCRETE TILES
02	BED ROOM , LOUNGE	PORCELAIN TILES (6"X4'-0")
03	BATH	CERAMIC TILES
04	PLAT FORM , PODIUM	CONCRETE PAVERS

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

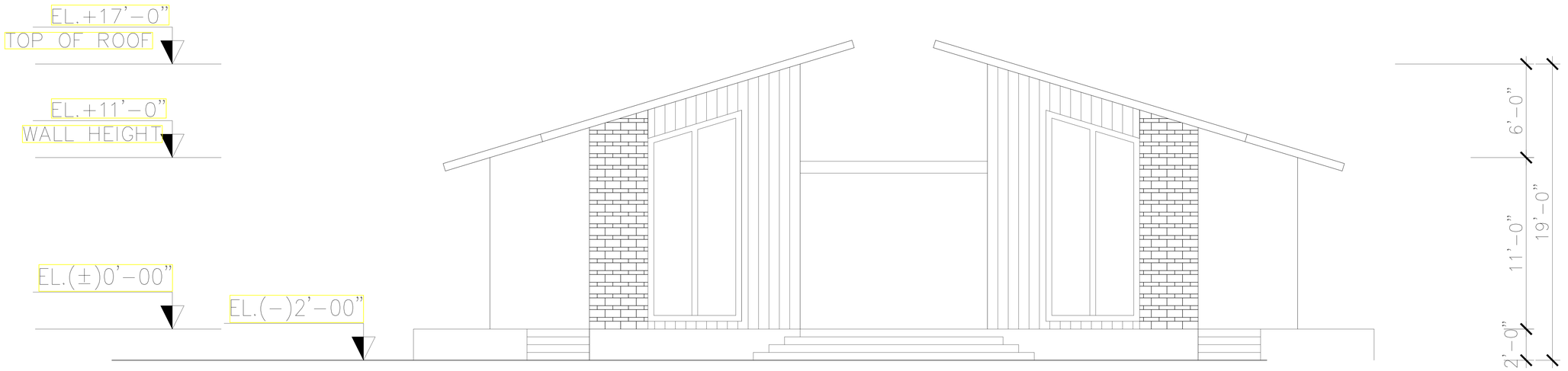
GUEST UNITS

BLOCK - 14 (SERVICES BLOCK)

GROUND FLOOR PLAN

NES PAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/12B02	0
SUBM.			



1 FRONT ELEVATION
B02

SCALE: 1/8"=1'-0"

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

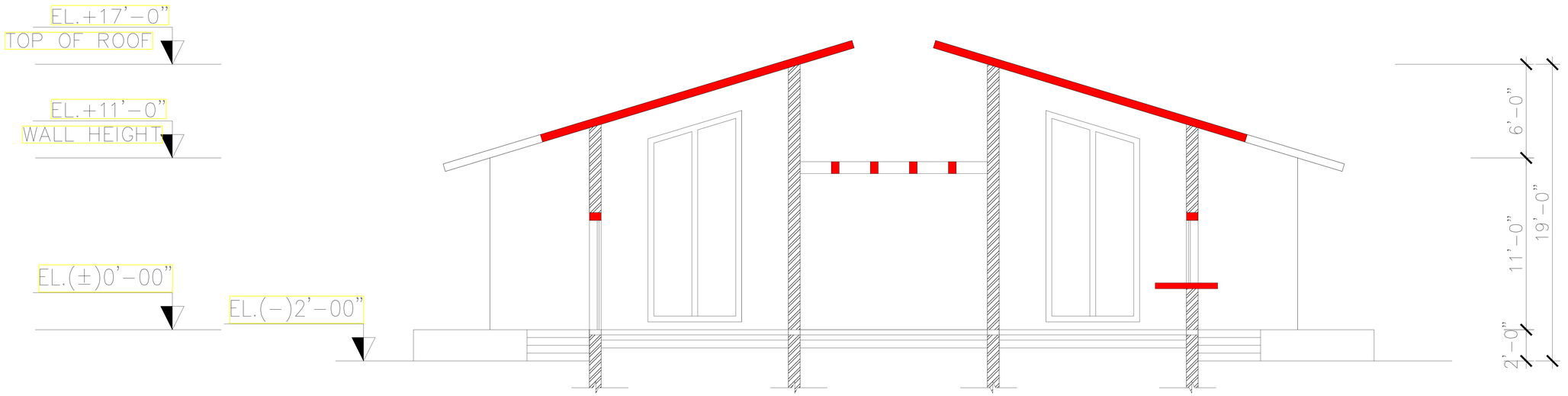
GUEST UNITS

BLOCK - 14 (SERVICES BLOCK)

ELEVATION

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/12B03	0
SUBM.			



A SECTION A-A

B02

SCALE: 1/8"=1'-0"

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

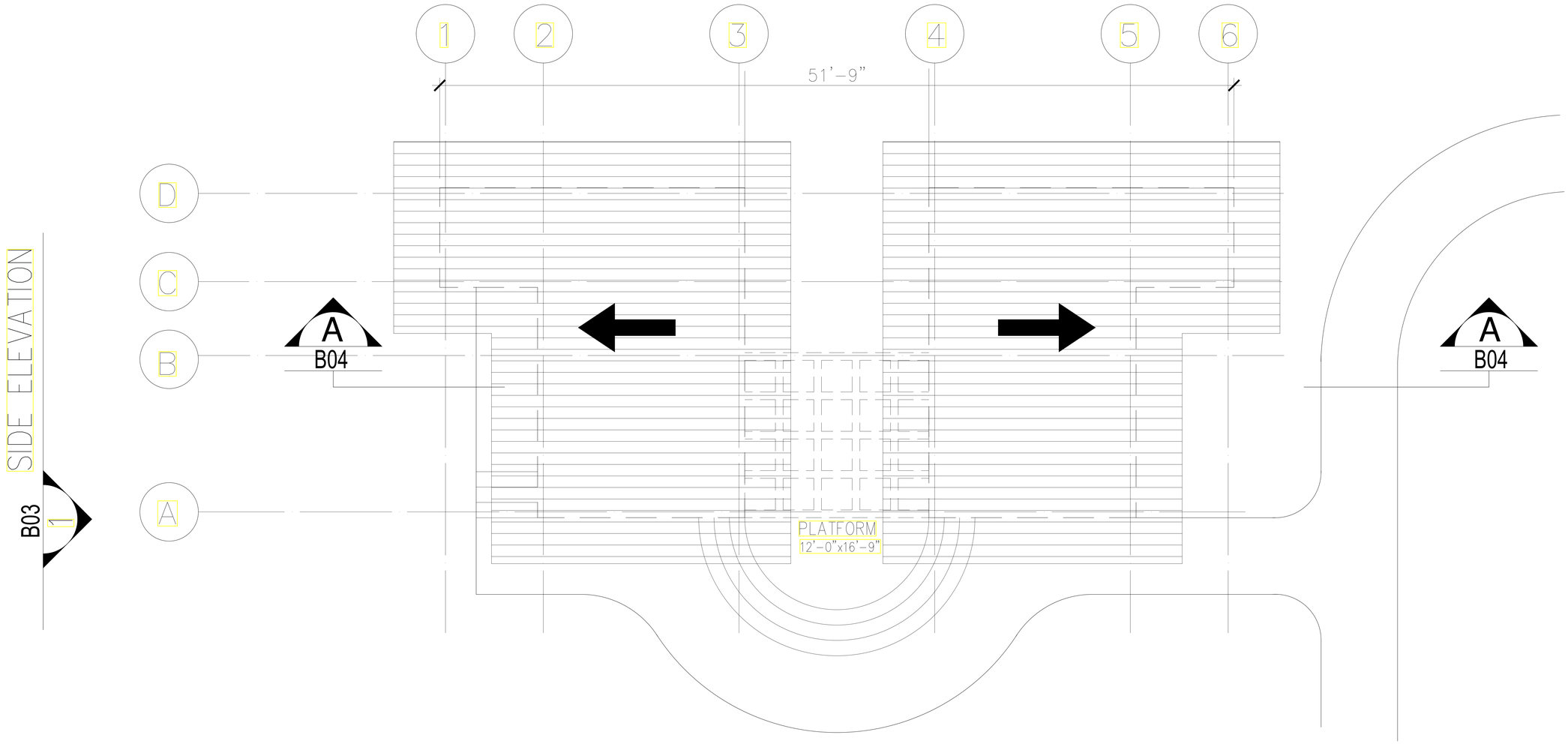
GUEST UNITS

BLOCK - 14 (SERVICES BLOCK)

SECTION A-A

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/12B04	0
SUBM.			



1 FRONT ELEVATION
B03

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 14 (SERVICES BLOCK)

ROOF PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	JUNAID ABBAS SHAH	WAJIHA REHAN	WAJIHA REHAN
FILE	DATE	DRAWING NO.	REV.
CKD. WAJIHA REHAN	FEB. 2026	156/322/TD/12B05	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	PD-DL-FL	4'-0"	8'-0"													
D1	PD-DL-FL	3'-0"	8'-0"	DW	DW	LP	LP	F1	H2	L1	TB			DC		
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
D3	FD-SL	4'-0"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	6'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	2'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

A. GENERAL

1. NOTES GIVEN ON THIS DRAWING ARE APPLICABLE TO ALL STRUCTURAL DRAWINGS UNLESS OTHERWISE NOTED. NOTES WRITTEN ON ANY OTHER DRAWING SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS REFERRED.
2. SYSTEM OF UNITS IS FPS.
3. ALL LEVELS MARKED ON THE DRAWINGS ARE LEVELS OF STRUCTURAL ELEMENTS. FINISH LEVELS SHALL BE IN ACCORDANCE WITH THE ARCHITECTURAL DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE STRUCTURE AND ALL TEMPORARY WORKS DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
6. THE CONTRACTOR SHALL CO-ORDINATE ALL DRAWINGS OF ALL DISCIPLINES FOR ALL ITEMS INCLUDING BUT NOT LIMITED TO SIZES AND LOCATION OF ALL OPENINGS REQUIRED FOR DUCTS, PIPES AND PIPE SLEEVES, ELECTRICAL CONDUITS AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE OR OTHERWISE INCORPORATED IN STRUCTURAL WORK AND SHALL BRING TO THE NOTICE OF THE ENGINEER DISCREPANCIES, IF ANY, FOR HIS INSTRUCTIONS, PRIOR TO THE START OF WORK.
7. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
8. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE CLIENT AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
9. THE CONTRACTOR SHALL COORDINATE SCHEDULE OF CONSTRUCTION WITH SUPPLY AND INSTALLATION OF EQUIPMENT.
10. PROVISIONS SHALL BE MADE FOR INSTALLATION OF EQUIPMENT AS PER MANUFACTURER'S RECOMMENDATIONS.
11. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/ DEVIATIONS MAY LEAD TO REJECTION/ REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
12. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO SPECIFICATIONS OF THE CONTRACT. IN ABSENCE OF ANY EXPRESS OR IMPLIED SPECIFICATION IN THE CONTRACT, ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO RELEVANT AMERICAN STANDARDS AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
13. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF SHOP DRAWINGS AND BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.

B. FOUNDATION AND EARTHWORK

1. THE CONTRACTOR SHALL STUDY THE AVAILABLE GEOTECHNICAL INVESTIGATION REPORT BEFORE COMMENCING THE WORK.
2. FOUNDATION DESIGN IS BASED ON PARAMETERS PROVIDED IN GEOTECH. INVESTIGATION REPORT.
3. FOUNDATION IS TO BE PLACED 3'-0" (0.93m) BELOW F.G.L. OR N.S.L WHICHEVER IS LOWER.
4. TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.
5. THE TYPE AND COMPACTION OF SOIL BELOW GRADE SLAB SHALL BE AS PER JOB SPECIFICATIONS. NO FOOTING SHALL BE PLACED ON FILL. HOWEVER, AREAS WHERE FILLING BELOW THE FOOTINGS BECOMES INEVITABLE DUE TO OVER-EXCAVATION (IF ANY), SHALL BE FILLED WITH P.C.C. (1:4:8) WITH PRIOR APPROVAL OF THE ENGINEER, AT NO EXTRA COST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING SYSTEM IF AND WHERE SO REQUIRED DURING CONSTRUCTION.
7. ALL STRUCTURAL CONCRETE SURFACES AGAINST WHICH EARTH IS TO BE FILLED SHALL BE COATED WITH TWO COATS OF HOT BITUMEN (10/20 GRADE) APPLIED AT THE RATE OF 0.49 kg/sqm PER COAT, EXCEPT FOR P.C.C. (1:3:6) AND P.C.C. (1:4:8).
8. BACKFILLING AND COMPACTION SHALL BE CARRIED OUT EQUALLY ON BOTH SIDES OF PLINTH BEAMS TO AVOID IMBALANCE OF LATERAL EARTH PRESSURE.
9. THE CONTRACTOR SHALL SUPPLY AND ERECT ADEQUATE SHORING AND SUPPORT THE SIDES OF ALL EXCAVATIONS WHERE REQUIRED TO SAFEGUARD WORKMEN AND PROTECT ANY ADJACENT STRUCTURES.
10. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.
11. EXCAVATIONS ADJACENT TO EXISTING STRUCTURES AND/OR UNDERGROUND SERVICES SHALL BE MADE BY HAND.

C. REINFORCED CONCRETE/ PLAIN CEMENT CONCRETE

1. ALL CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022, OR ANY OTHER RELEVANT SPECS GIVEN IN CONTRACT.
2. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & SPECIFICATIONS AND THE MINIMUM CUBE CRUSHING STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	NOMINAL MIX RATIO	CUBE STRENGTH AT 28-DAYS (psi.)
A	1:1:2	4,500
B	1:1½:3	3,750
C	1:2:4	3,000
D	1:3:6	2,000
E	1:4:8	1,200

C. REINFORCED / PLAIN CEMENT CONCRETE (CONTINUED)

3. CLASS OF CONCRETE FOR DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE AS FOLLOWS UNLESS NOTED OTHER WISE:

COMPONENT	CONCRETE CLASS
MASONRY WALL FOUNDATION	C
FOUNDATION OF RCC COLUMNS	C
COLUMNS, SLABS & BEAMS,VCE	C
P.C.C. STEPS	D
LEAN CONCRETE	E

4. ORDINARY PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETE WORKS.
5. AN INTEGRAL WATER PROOFING AGENT SHALL BE USED IN CONCRETE THAT IS CONSTANTLY OR INTERMITTENTLY IN CONTACT WITH WATER AS PER MANUFACTURER'S RECOMMENDATIONS
6. CONCRETE CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

STRUCTURAL MEMBER / ELEMENT	MINIMUM COVER (INCHES)
FOUNDATIONS (ALL TYPES)	2"
COLUMNS & BEAMS	1½"
RETAINING WALLS	1½"
SLABS	¾"
PLINTH / LINTEL BAND	¾"

7. ALL REINFORCING STEEL SHALL BE DEFORMED, HOT ROLLED BILLET STEEL BARS CONFORMING TO ASTM A-615 GRADE-60 WITH SPECIFIED YIELD STRENGTH OF NOT LESS THAN 60,000 psi.
8. THE NUMBER INDICATES THE BAR DIAMETER/SIZE, AS UNDER:

BAR NUMBER	DIAMETER (INCHES)
3	⅜"
4	½"
5	⅝"
6	¾"
8	1"

9. ALL DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315, ACI-318 & ACI-350R.
10. ALL REINFORCING STEEL SHALL BE HELD FIRMLY IN PLACE BEFORE AND DURING THE PLACING OF CONCRETE BY MEANS OF WIRES AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.

D. CONCRETE CONSTRUCTION

1. THE CONTRACTOR SHALL SUBMIT CONCRETE POURING SCHEDULE FOR ENGINEER'S APPROVAL. NO CONCRETE SHALL BE POURED UNTIL ITS FORMWORK AND REINFORCEMENT HAS BEEN INSPECTED AND APPROVED BY THE ENGINEER.
2. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BLOCKS ETC. SHOULD BE AVOIDED ON SLAB PANELS.

D. CONT. CONCRETE 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, AND DOWELS FOR STRUCTURAL MEMBERS AND/OR MASONRY ARE PROPERLY LOCATED IN PLACE.

E. CONSTRUCTION JOINTS

1. JOINTS, NOT SHOWN ON THE DRAWING, SHALL BE SO MADE AND LOCATED AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED NEAR THE MIDDLE OF THE SPANS OF SLAB & BEAMS. JOINTS IN WALLS & COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOORS, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.
2. JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS THE JOINTS.
3. JOINTS IN BASE SLAB & WALLS AND ROOF SLAB, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS SHALL BE BORNE BY THE CONTRACTOR. BEAMS & BRACKETS SHALL BE PLACED AT THE SAME TIME AS SLABS.

F. ELECTRICAL CONDUITS

1. CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS & SLABS AND WITHIN THE MIDDLE HALF OF THE THICKNESS. SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6"(150 MM).

G. PROPS, FORMWORK & CURING

1. SHORE & BRACE ALL PARTS OF THE BUILDING DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. SEQUENCE OF REMOVAL OF FORMWORK SHALL BE APPROVED BY THE ENGINEER.
3. AT LEAST ONE LOWER FLOOR SHALL REMAIN PROPPED UNTILL THE UPPER FLOOR IS CAST AND CURED.

H. BRICK MASONRY WORKS

1. ALL BRICK WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022.
2. ALL BRICK SHALL BE SOUND, HARD, WELL BURNT AND OF UNIFORM SIZE,COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 1/8".
3. ALL BRICK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 1/8" IN 10'-0".
4. MORTAR USED IN MASONRY CONSTRUCTION SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 12 MPa (1800Psi) AND SHALL CONFORM TO ASTM C270.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 1 & 2

GENERAL NOTES & TYPICAL DETAILS (SHEET 1 OF 3)

[redacted] NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/01G01	0
SUBM.	FEB 2026		

J. STRUCTURAL STEEL WORKS

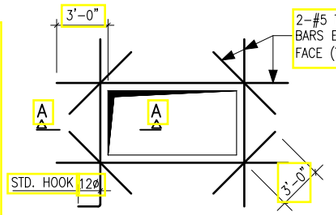
1. ALL STRUCTURAL STEEL WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES–2022.
2. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS.
3. ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A–36 OR EQUIVALENT.
4. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY, AWS, SPECIFICATIONS USING ELECTRODES E70XX.
5. ALL BOLTS SHALL CONFORM TO ASTM A307 OR A325.
6. SURFACE PREPARATION OF ALL STRUCTURAL STEEL FOR PAINTING SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF "STEEL STRUCTURES PAINTING COUNCIL" SPECIFICATIONS SSPC–SP6 FOR COMMERCIAL BLAST CLEANING.
7. ALL STEEL SHALL BE GIVEN ONE SHOP COAT OF RED LEAD OXIDE PRIMER AND FIELD TOUCHUP EXCEPT FOR SURFACES TO BE EMBEDDED IN CONCRETE OR CONTACT SURFACES OF FRICTION BOLTED CONNECTIONS.

K. COLUMN CONFINEMENT

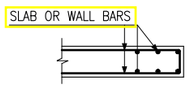
1. IN ORDER TO ATTAIN AN EFFECTIVE BOND BETWEEN THE CONFINING ELEMENTS AND THE MASONRY, THE CONCRETE OF THE CONFINING ELEMENTS SHALL BE CAST AFTER THE MASONRY HAS BEEN BUILT WITH PROPER TOOTHING IN PLACE.
2. CLEAN THE COLUMN SPACE OF ALL RUBBISH BEFORE ADDING THE FORMWORK.
3. POUR THE CONCRETE FOR THE BANDS AND THE COLUMNS AT THE SAME TIME.
4. COMPACT THE CONCRETE WITH VIBRATOR.
5. REMOVE THE FORMWORK NOT EARLIER THAN 03 DAYS.

L. SEISMIC PARAMETERS

1. DESIGN OF STRUCTURE HAS BEEN CARRIED OUT BASED ON SEISMIC PARAMETERS OF ZONE 2B WITH PGA VALUE OF 0.16g to 0.24g & STIFF SOIL PROFILE (SD), ACCORDING TO BUILDING CODE OF PAKISTAN.



WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

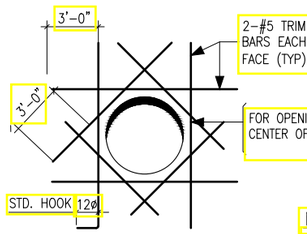


SECTION A–A

NOTES

- FOR OPENING WITH MAXIMUM DIMENSION OVER 5'–0" REFER TO OTHER DETAILS.
- USE THIS DETAILS IF NOT SHOWN IN DESIGN DRAWINGS

REINFORCEMENT DETAIL AT OPENING IN SLAB & WALLS (TYP)



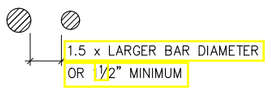
FOR OPENING 1'–0" DIA ADD DIAGONAL BARS CENTER OF SLAB OR WALL SAME SIZE AS LARGEST MAIN BARS

WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

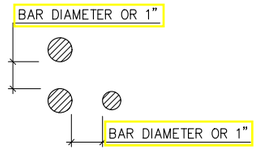
NOTES

MAXIMUM DIAMETER OF SLEVE IS 1'–0" FOR TRIM BARS BARS AROUND LARGE SLEEVE REFER TO OTHER DETAILS

REINFORCEMENT AROUND SLEEVE IN SLABS & WALLS (TYP.)



VERTICAL BAR SPACING



BAR SPACING IN BEAM

LEGEND

MS	MILD STEEL
PVC	POLYVINYL CHLORIDE
C.G.I	CORRUGATED GALVANIZED IRON
G.I	GALVANIZED IRON
SQ	SQUARE
C.Jt	CONSTRUCTION JOINT
T&B	TOP AND BOTTOM
EF	EACH FACE
BF	BOTH FACES
ø/db/#	DIAMETER OF BAR
@	AT THE RATE OF
B	BOTTOM
C/C	CENTER TO CENTER
B.W	BOTHWAYS
E.G.F	ENGINEERED GRANULAR FILL
E.G.L	EXCAVATED GROUND LEVEL
E.L.	STRUCTURAL ELEVATION
EQ.	EQUAL
F.D.T	FIELD DENSITY TEST
F.F.L	FINISH FLOOR LEVEL
F.G.L.	FINISH GROUND LEVEL
F.B.L.	FOUNDATION BED LEVEL
G.W.T.	GROUND WATER TABLE
N.S.L.	EXISTING NATURAL SURFACE LEVEL
N.T.S.	NOT TO SCALE
SMRF	SPECIAL MOMENT RESISTING FRAME
STYP	SOIL PROFILE TYPE
ST.	STIRRUPS
T	TOP
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
N.T.S.	NOT TO SCALE
	LEVEL ON PLAN
℄	CENTER LINE

SPLICE LENGHTH (LS) AND DEVELOPMENT LENGHT (LD) (fc'=3 ksi, fy=40 ksi)

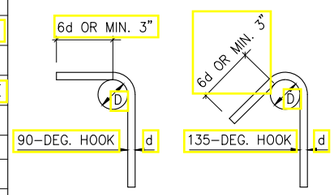
BAR DIA	#3	#4	#5	#6	#7	#8	#10	#12
DEVELOPMENT LENGTH ℓd (Inches)	18	24	30	36	42	47	53	59
SPLICE LENGTH (Inches)	24	32	39	47	55	62	69	77

LAP SPLICE ARE NOT TO BE USED:
- WITHIN JOINTS
- WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH.
- FROM THE FACE OF THE JOINT.

CURTAILMENT LENGTH SHOULD BE EXTEND UPTO L/16,12db OR d, (WHICHEVER GREATER) BEYOND L/3
WHERE:
L–GREATER CLEAR SPAN, db–DIAMETER OF BAR,
d–EFFECTIVE DEPTH.
THE FIRST HOOP SHALL BE LOCATED NOT MORE THAN 2" FROM THE FACE OF THE SUPPORTING MEMBER.

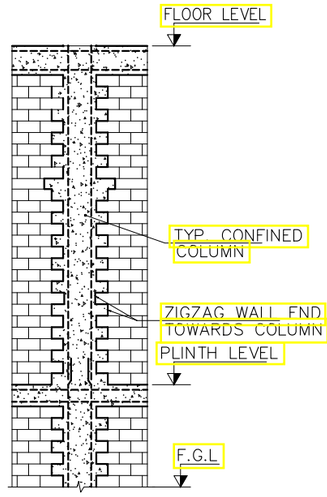
* ALL LAP SPLICE SHALL BE STAGGARED BY AT LEAST 50 %

BAR DIA	D
#3	2½"
#4	3"
#5	4"
#6	4"
#8	6"
#9	7"
#11	8½"



STIRRUPS AND TIE HOOKS

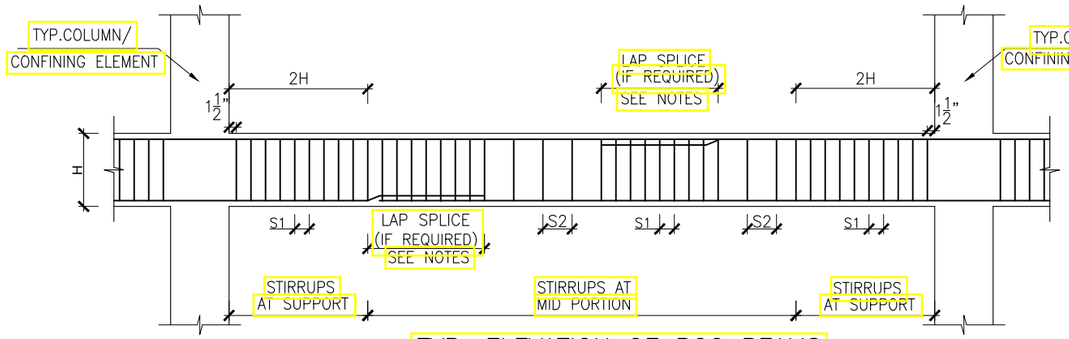
BAR DIA	D
#3	1½"
#4	2"
#5	2½"



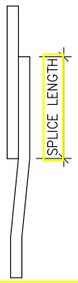
TYPICAL ELEVATION OF CONFINED COLUMN (SHOWING TOOTHING)



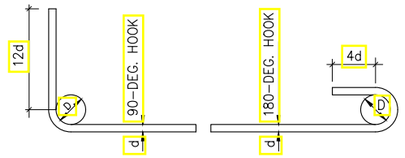
BEAM SPLICE (TYP.)



TYP. ELEVATION OF RCC BEAMS



COLUMN SPLICE (TYP.)



STANDARD BAR HOOKS (MAIN BARS)

LEGENDS

S1	STIRRUPS SPACING IN BEAM NEAR SUPPORTS & LAP SPLICES
S2	STIRRUPS SPACING IN BEAM IN MIDSPAN
h	DEPTH OF BEAM
db	DIAMETER OF BAR
d	EFFECTIVE DEPTH OF BEAM

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

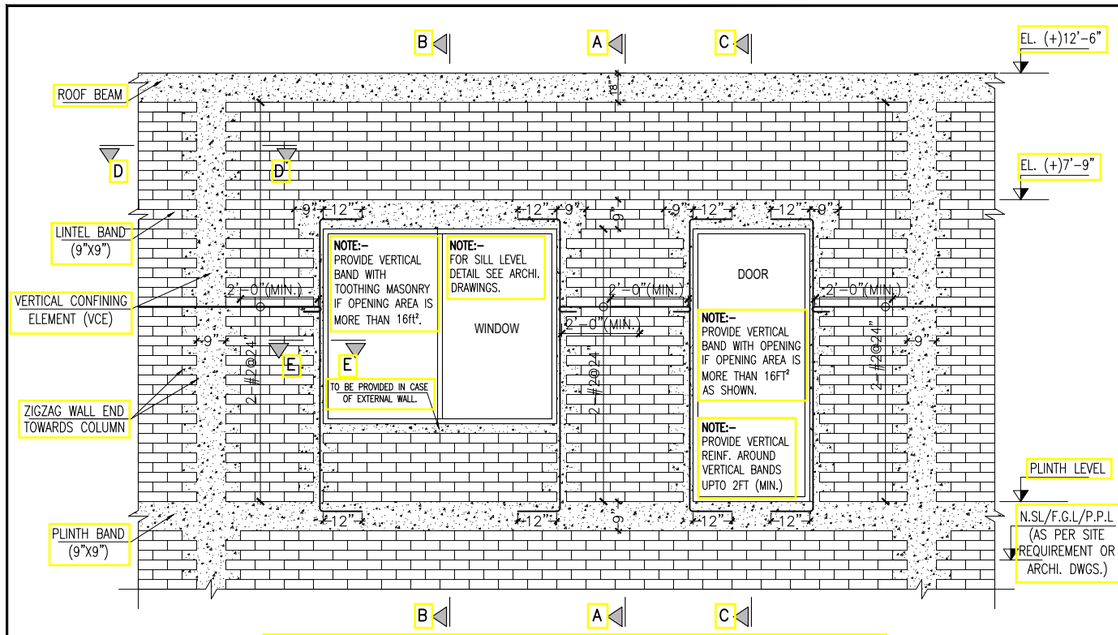
GUEST UNITS

BLOCK - 1 & 2

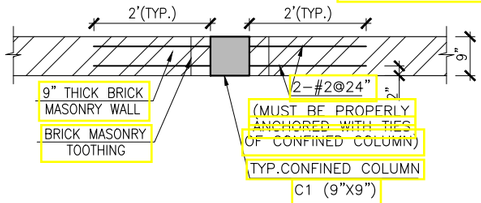
GENERAL NOTES & TYPICAL DETAILS (SHEET 2 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

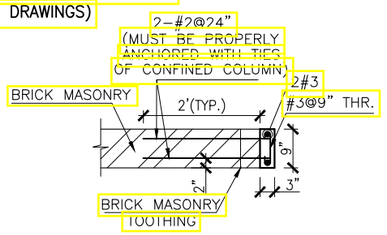
DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
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FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/01G02	0
SUBM.	FEB 2026		



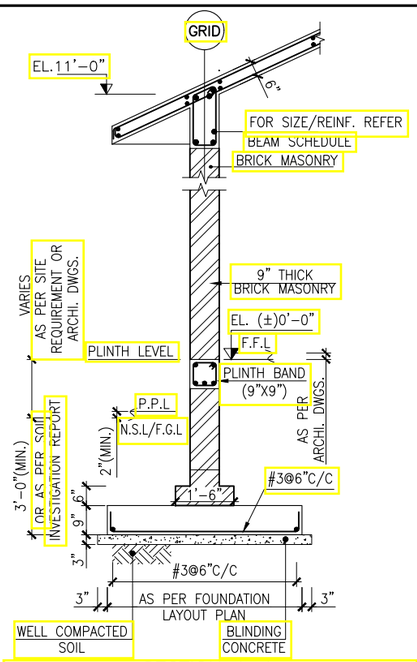
TYPICAL ELEVATION OF 9" THICK CONFINED BRICK MASONRY WALL SINGLE STOREY WALL MASONRY
(FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS)



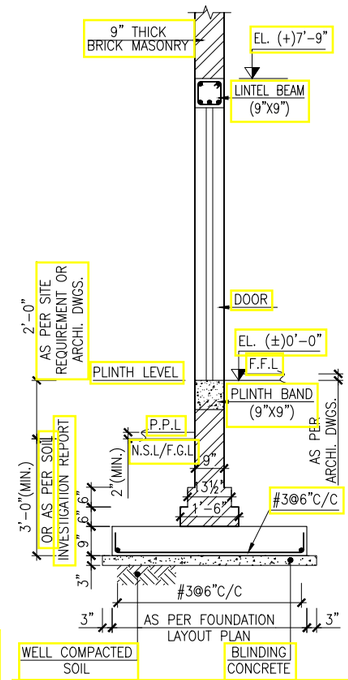
SECTION D–D



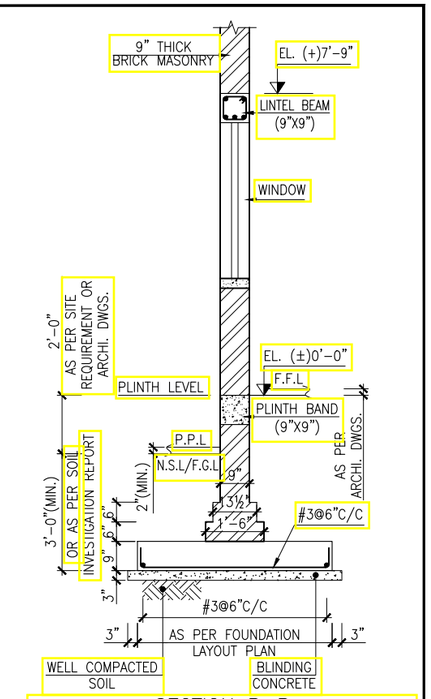
SECTION E–E



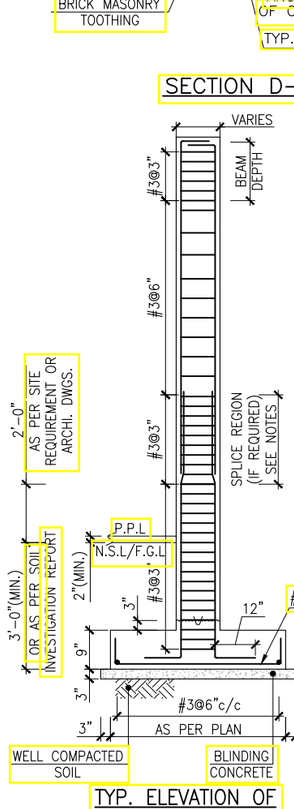
SECTION A–A
TYP. FOOTING SECTION OF EXTERNAL/ INTERNAL WALL WITHOUT OPENING



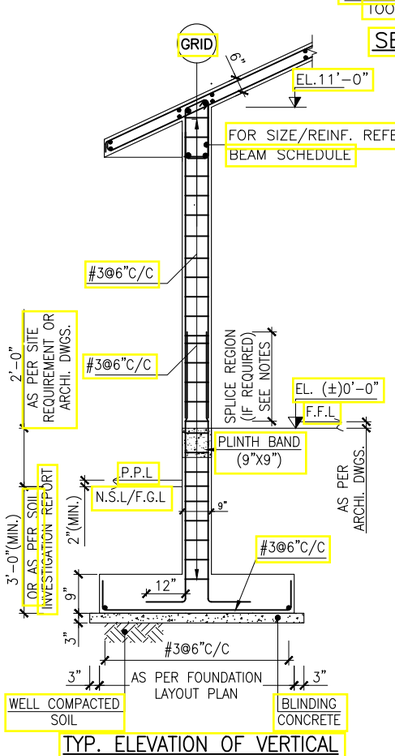
SECTION C–C
TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT DOOR



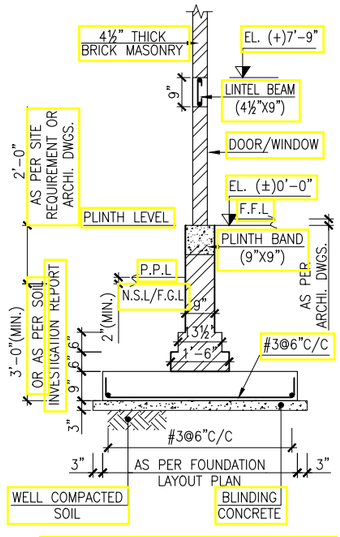
SECTION B–B
TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT WINDOW



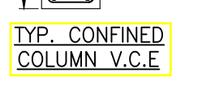
TYP. ELEVATION OF COLUMN C–1



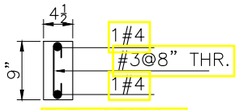
TYP. ELEVATION OF VERTICAL CONFINING ELEMENT (VCE)



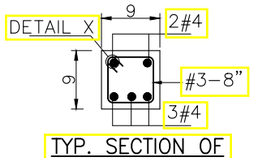
TYP. FOOTING SECTION OF 4½" THICK MASONRY WALL



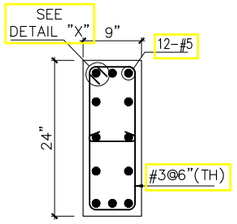
TYP. CONFINED COLUMN V.C.E



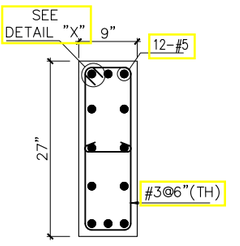
TYP. SECTION OF RB–3



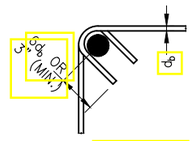
TYP. SECTION OF LINTEL BEAM 9" THICK BRICK WALL



TYP. SECTION OF COLUMN (C–1)



TYP. SECTION OF COLUMN (C–2)



DETAIL–X
TYP. 135° HOOK DETAIL FOR TIES & STIRRUPS

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

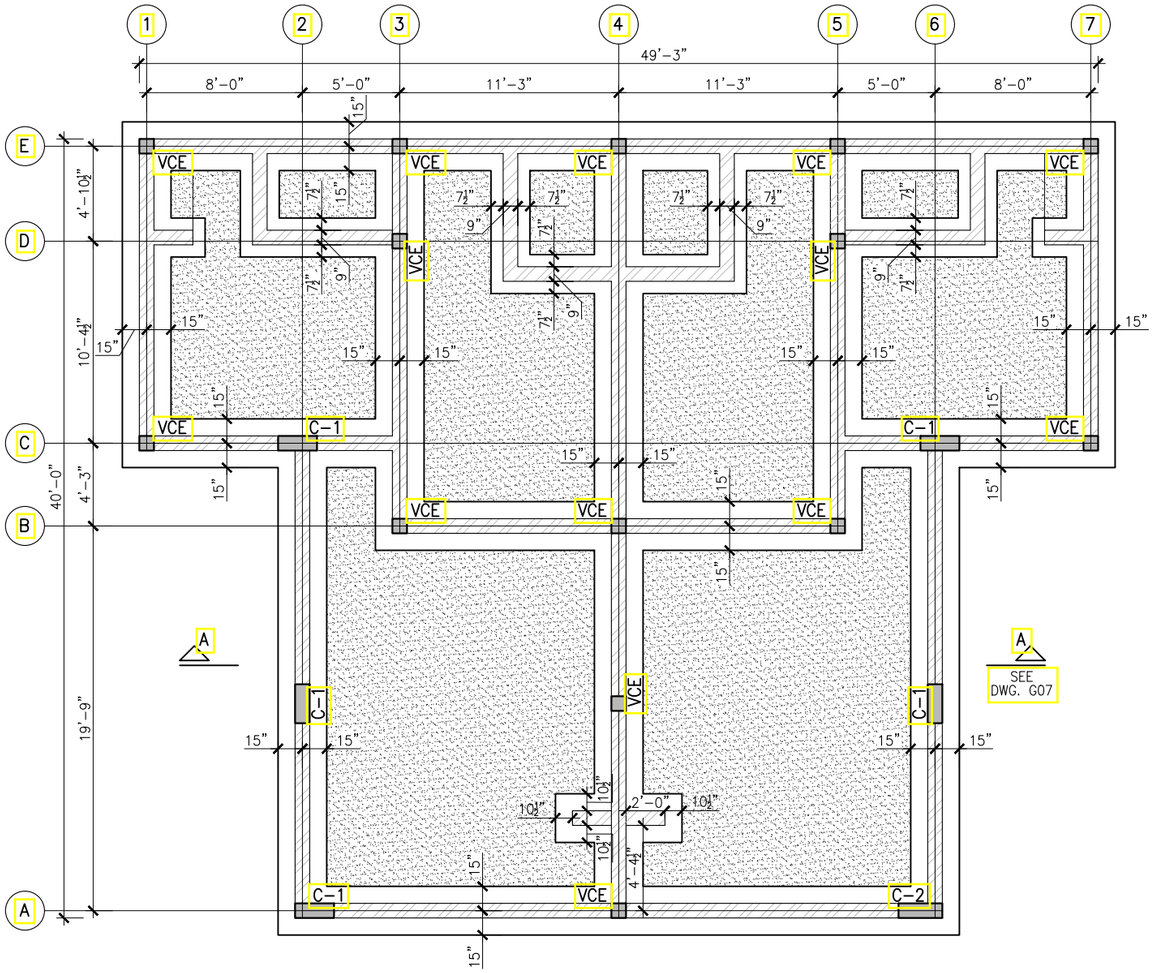
GUEST UNITS

BLOCK - 1 & 2

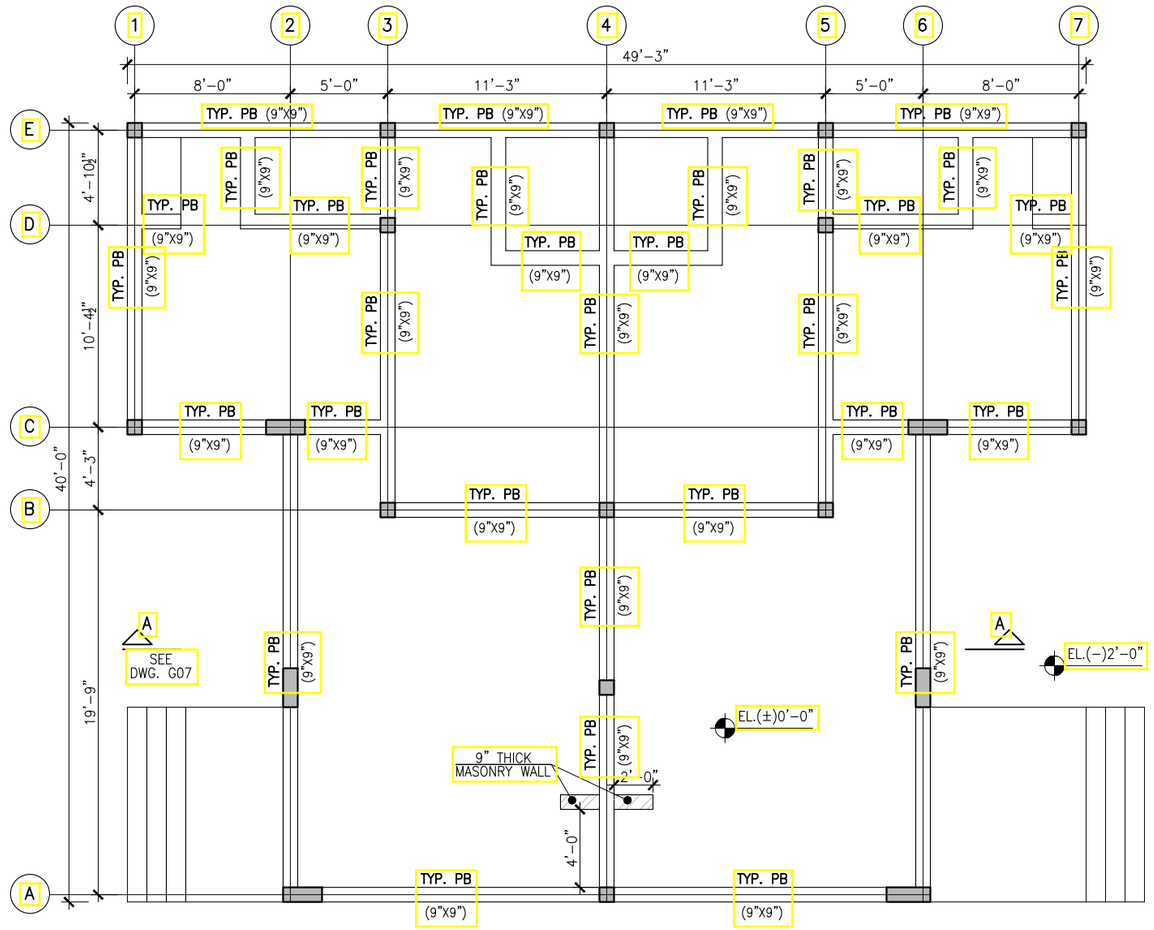
GENERAL NOTES & TYPICAL DETAILS
(SHEET 3 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/01G03	0
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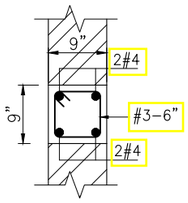


FOUNDATION & COLUMN LAYOUT PLAN

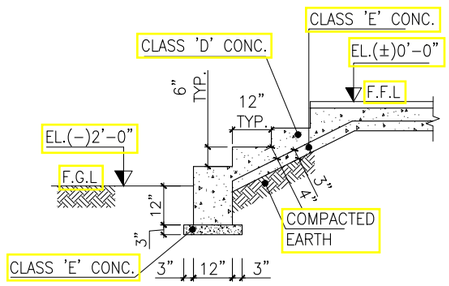


PLINTH BAND LAYOUT PLAN AT EL. (±)0'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS



TYPICAL SECTION OF PLINTH BAND (TYP. PB)



TYPICAL SECTION OF P.C.C STEPS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
4. THE FOUNDATION HAS BEEN DESIGNED ON GROSS ALLOWABLE BEARING CAPACITY OF 0.75 TON/SFT AT A DEPTH OF 3'-0" BELOW N.S.L OR F.G.L WHICH EVER IS LOWER.
5. IF COMPETENT BEARING STRATA IS NOT FOUND AT INDICATED DEPTH, THE ENGINEER SHALL BE NOTIFIED FOR HIS PRIOR INSTRUCTIONS.
6. BOTTOM OF FOOTING SHOULD BE PROVIDED 3'-0" BELOW NSL OR F.G.L WHICH EVER IS LOWER.
7. FOR EL. ±0'-0", REFER MASTER PLAN.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

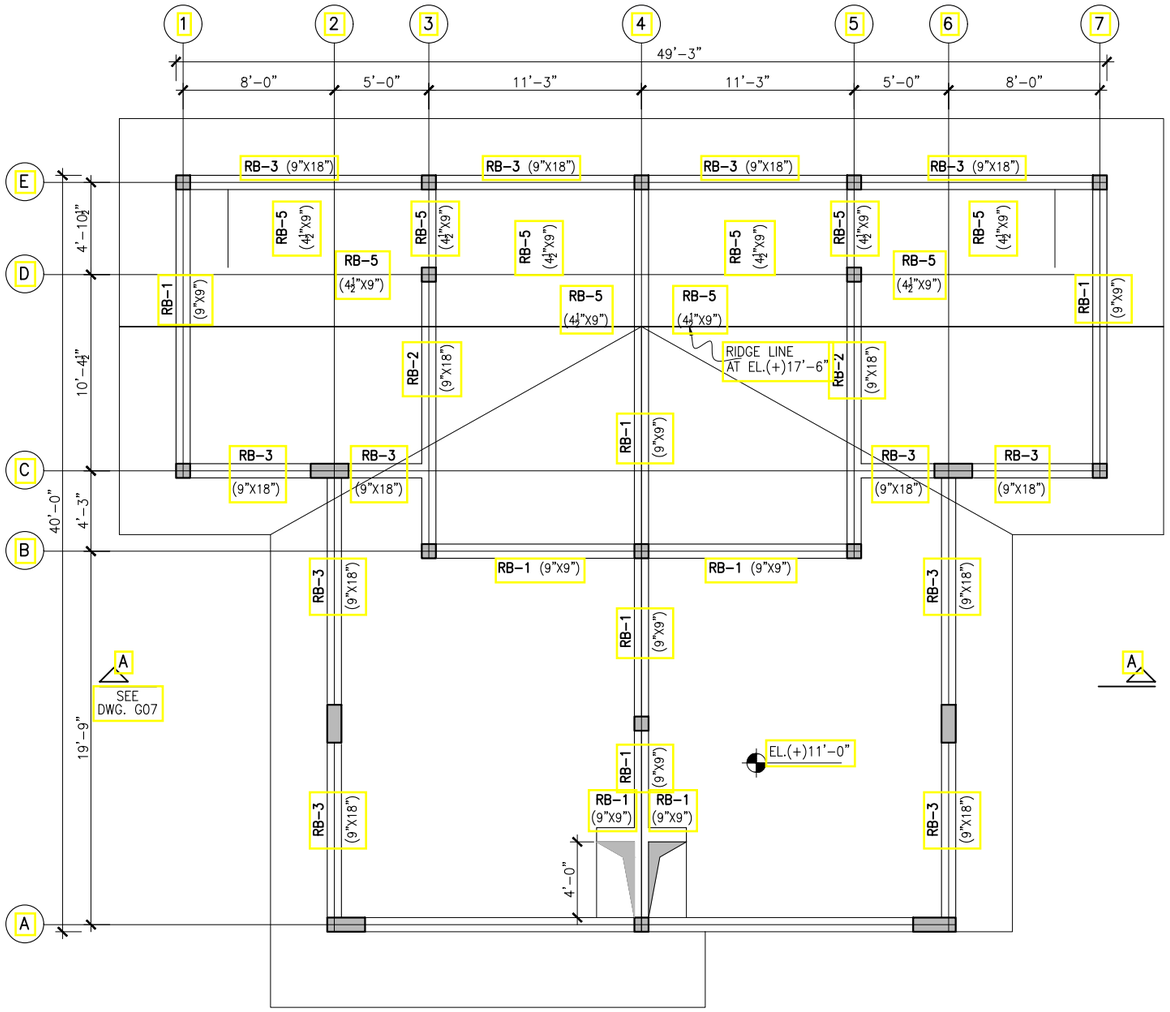
GUEST UNITS

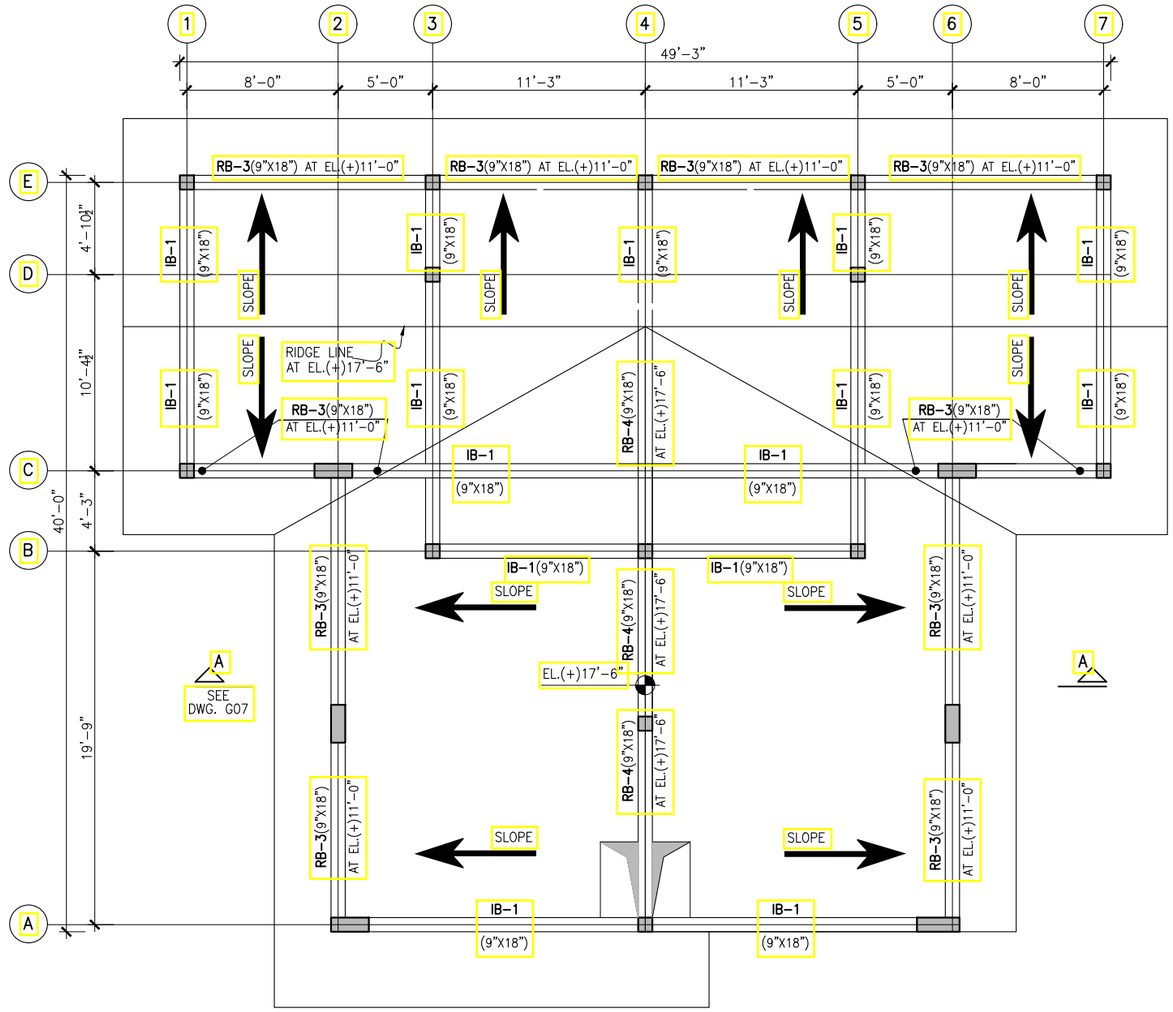
BLOCK - 1 & 2

FOUNDATION & COLUMN LAYOUT PLAN AND PLINTH BAND LAYOUT PLAN

[redacted] NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

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CKD.	FEB 2026	156/328/TD/01G04	0
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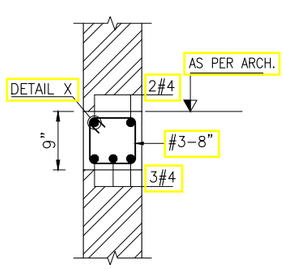


ROOF BEAM LAYOUT PLAN AT EL. (+)11'-0"

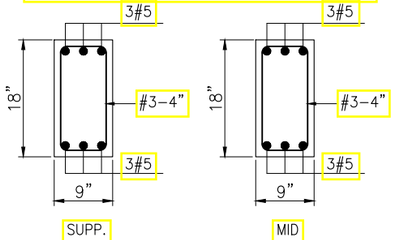
FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS

INCLINED BEAM LAYOUT PLAN FROM EL. (+)11'-0" TO 17'-6"

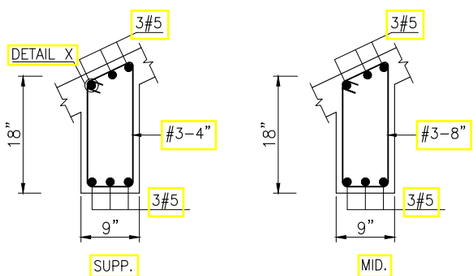
FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS



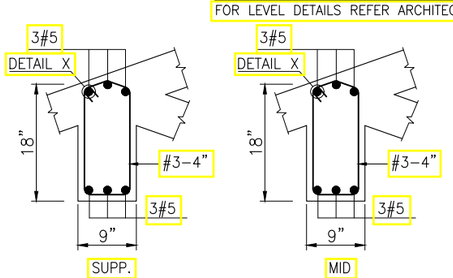
TYP. SEC. OF RB-1



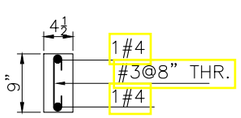
TYPICAL SECTION OF RB-2



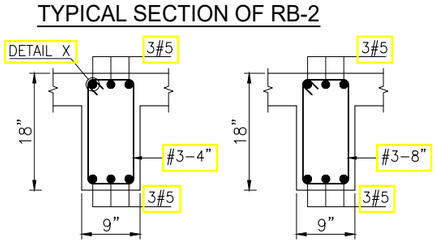
TYPICAL SECTION OF RB-3



TYPICAL SECTION OF RB-4



TYP. SECTION OF RB-3



TYPICAL SECTION OF IB-1

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

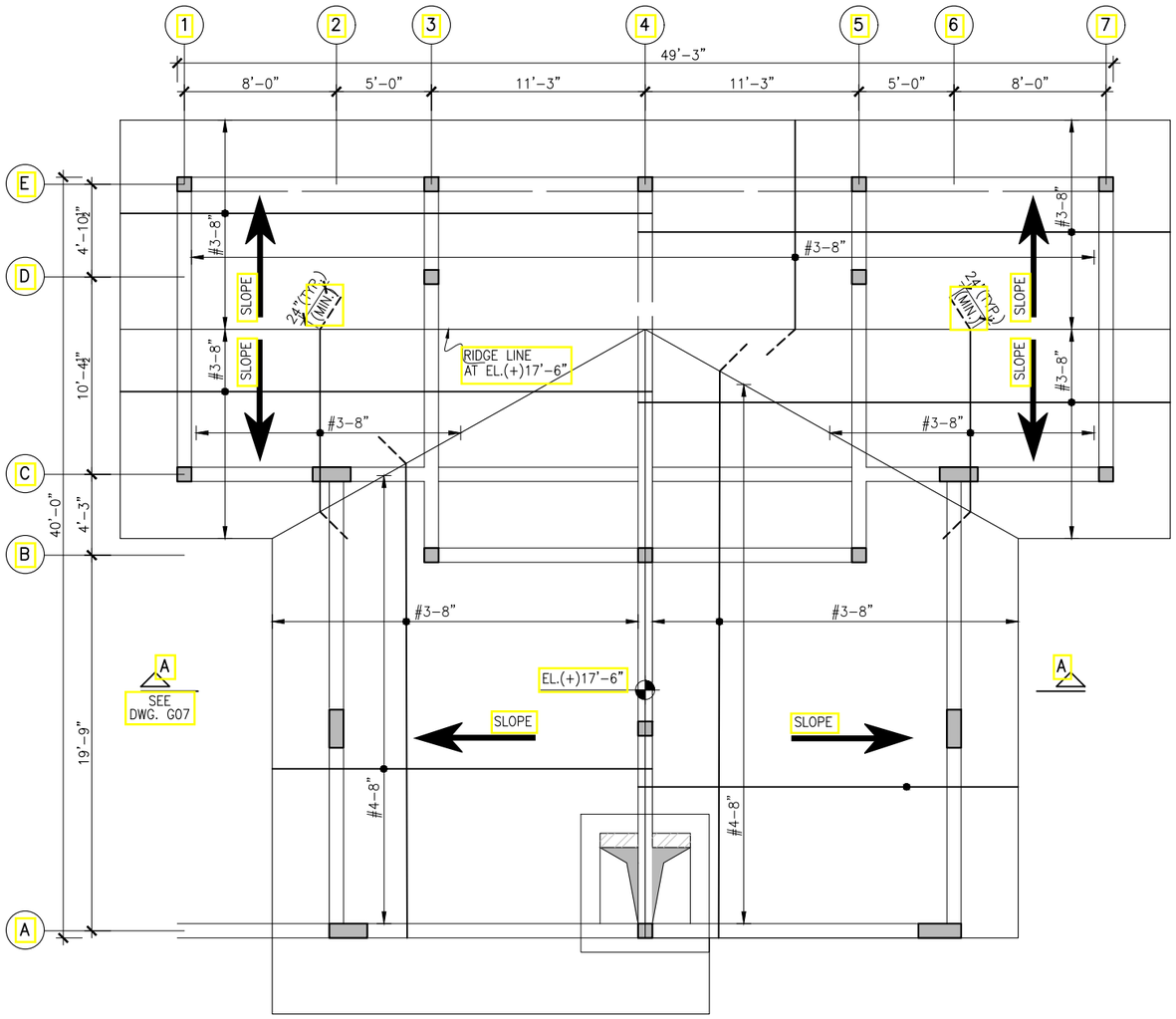
GUEST UNITS

BLOCK - 1 & 2

FRAMING PLAN AT EL.(+)11'-0" & FROM EL.(+)11'-0" TO EL.(+)17'-6"

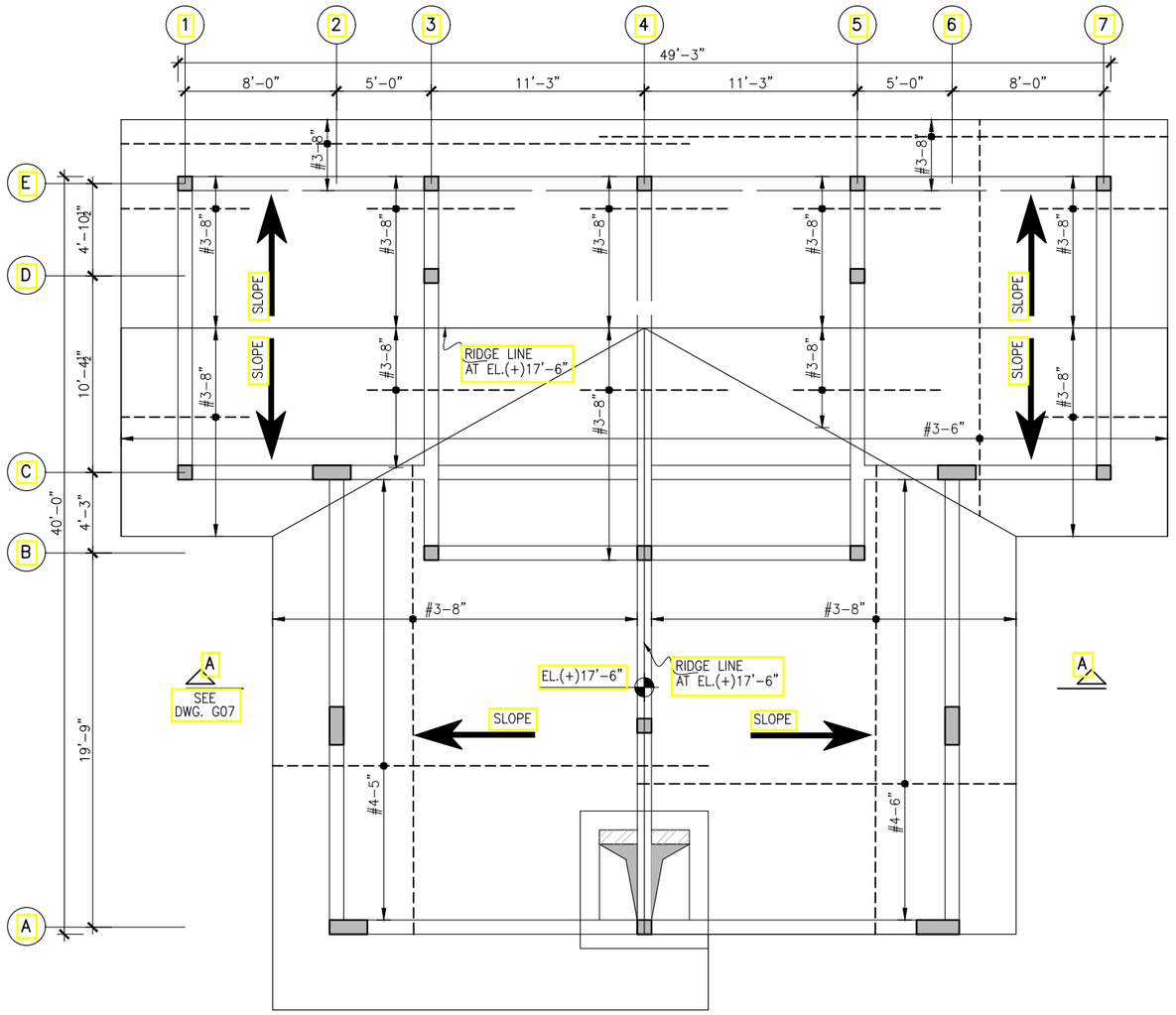
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

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DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/01G05	0
SUBM.	FEB 2026		



BOTTOM REINFORCEMENT PLAN OF INCLINED SLAB FROM EL. (+)11'-0" TO 17'-6"

ALL SLOPING SLABS ARE 6" THICK UNLESS NOTED OTHERWISE



TOP REINFORCEMENT PLAN OF INCLINED SLAB FROM EL. (+)11'-0" TO 17'-6"

ALL SLOPING SLABS ARE 6" THICK UNLESS NOTED OTHERWISE

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
3. FOR FRAMING PLANS AT EL. (+)11'–0" & FROM EL.(+)11'–0" TO EL.(+)17'–6", REFER DWG. NO. 156/328/TD/G05.

LEGEND

— — — — — — TOP BARS

——————— BOTTOM BARS

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

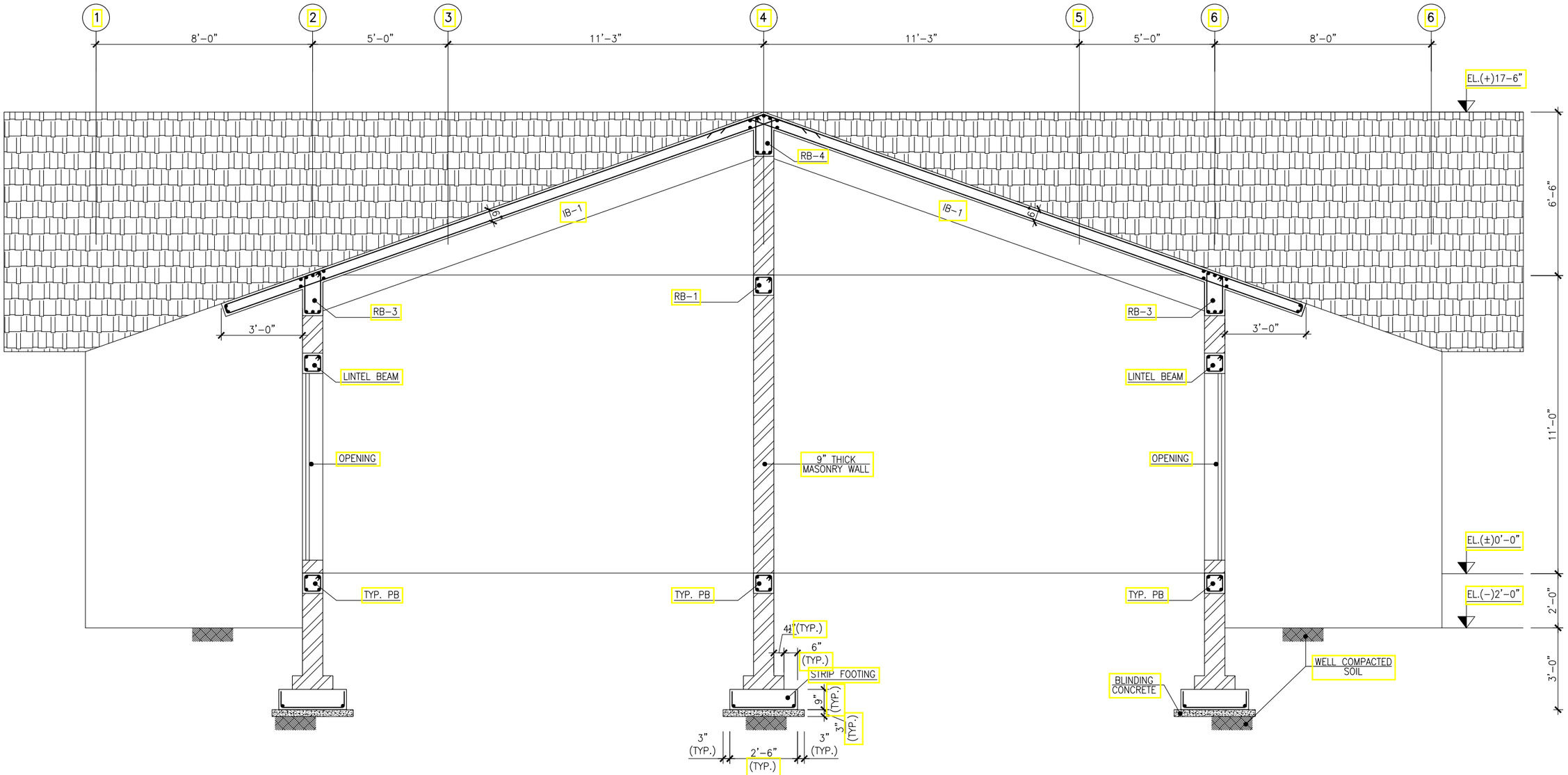
BLOCK - 1 & 2

REINF. PLAN OF INCLINED SLAB

[redacted] NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE			
CKD.			
SUBM.			

DATE	DRAWING NO.	REV.
FEB 2026	156/328/TD/01G06	0



SECTION A-A

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 1 & 2

SECTION A-A

[redacted] NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
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CKD.		156/328/TD/01G07	0
SUBM.	FEB 2026		

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

A. GENERAL

1. NOTES GIVEN ON THIS DRAWING ARE APPLICABLE TO ALL STRUCTURAL DRAWINGS UNLESS OTHERWISE NOTED. NOTES WRITTEN ON ANY OTHER DRAWING SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS REFERRED.
2. SYSTEM OF UNITS IS FPS.
3. ALL LEVELS MARKED ON THE DRAWINGS ARE LEVELS OF STRUCTURAL ELEMENTS. FINISH LEVELS SHALL BE IN ACCORDANCE WITH THE ARCHITECTURAL DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE STRUCTURE AND ALL TEMPORARY WORKS DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
6. THE CONTRACTOR SHALL CO-ORDINATE ALL DRAWINGS OF ALL DISCIPLINES FOR ALL ITEMS INCLUDING BUT NOT LIMITED TO SIZES AND LOCATION OF ALL OPENINGS REQUIRED FOR DUCTS, PIPES AND PIPE SLEEVES, ELECTRICAL CONDUITS AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE OR OTHERWISE INCORPORATED IN STRUCTURAL WORK AND SHALL BRING TO THE NOTICE OF THE ENGINEER DISCREPANCIES, IF ANY, FOR HIS INSTRUCTIONS, PRIOR TO THE START OF WORK.
7. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
8. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE CLIENT AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
9. THE CONTRACTOR SHALL COORDINATE SCHEDULE OF CONSTRUCTION WITH SUPPLY AND INSTALLATION OF EQUIPMENT.
10. PROVISIONS SHALL BE MADE FOR INSTALLATION OF EQUIPMENT AS PER MANUFACTURER'S RECOMMENDATIONS.
11. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/ DEVIATIONS MAY LEAD TO REJECTION/ REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
12. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO SPECIFICATIONS OF THE CONTRACT. IN ABSENCE OF ANY EXPRESS OR IMPLIED SPECIFICATION IN THE CONTRACT, ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO RELEVANT AMERICAN STANDARDS AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
13. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF SHOP DRAWINGS AND BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.

B. FOUNDATION AND EARTHWORK

1. THE CONTRACTOR SHALL STUDY THE AVAILABLE GEOTECHNICAL INVESTIGATION REPORT BEFORE COMMENCING THE WORK.
2. FOUNDATION DESIGN IS BASED ON PARAMETERS PROVIDED IN GEOTECH. INVESTIGATION REPORT.
3. FOUNDATION IS TO BE PLACED 3'-0" (0.93m) BELOW F.G.L. OR N.S.L WHICHEVER IS LOWER.
4. TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.
5. THE TYPE AND COMPACTION OF SOIL BELOW GRADE SLAB SHALL BE AS PER JOB SPECIFICATIONS. NO FOOTING SHALL BE PLACED ON FILL. HOWEVER, AREAS WHERE FILLING BELOW THE FOOTINGS BECOMES INEVITABLE DUE TO OVER-EXCAVATION (IF ANY), SHALL BE FILLED WITH P.C.C. (1:4:8) WITH PRIOR APPROVAL OF THE ENGINEER, AT NO EXTRA COST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING SYSTEM IF AND WHERE SO REQUIRED DURING CONSTRUCTION.
7. ALL STRUCTURAL CONCRETE SURFACES AGAINST WHICH EARTH IS TO BE FILLED SHALL BE COATED WITH TWO COATS OF HOT BITUMEN (10/20 GRADE) APPLIED AT THE RATE OF 0.49 kg/sqm PER COAT, EXCEPT FOR P.C.C. (1:3:6) AND P.C.C. (1:4:8).
8. BACKFILLING AND COMPACTION SHALL BE CARRIED OUT EQUALLY ON BOTH SIDES OF PLINTH BEAMS TO AVOID IMBALANCE OF LATERAL EARTH PRESSURE.
9. THE CONTRACTOR SHALL SUPPLY AND ERECT ADEQUATE SHORING AND SUPPORT THE SIDES OF ALL EXCAVATIONS WHERE REQUIRED TO SAFEGUARD WORKMEN AND PROTECT ANY ADJACENT STRUCTURES.
10. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.
11. EXCAVATIONS ADJACENT TO EXISTING STRUCTURES AND/OR UNDERGROUND SERVICES SHALL BE MADE BY HAND.

C. REINFORCED CONCRETE/ PLAIN CEMENT CONCRETE

1. ALL CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022, OR ANY OTHER RELEVANT SPECS GIVEN IN CONTRACT.
2. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & SPECIFICATIONS AND THE MINIMUM CUBE CRUSHING STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	NOMINAL MIX RATIO	CUBE STRENGTH AT 28-DAYS (psi.)
A	1:1:2	4,500
B	1:1½:3	3,750
C	1:2:4	3,000
D	1:3:6	2,000
E	1:4:8	1,200

C. REINFORCED / PLAIN CEMENT CONCRETE (CONTINUED)

3. CLASS OF CONCRETE FOR DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE AS FOLLOWS UNLESS NOTED OTHER WISE:

COMPONENT	CONCRETE CLASS
MASONRY WALL FOUNDATION	C
FOUNDATION OF RCC COLUMNS	C
COLUMNS, SLABS & BEAMS,VCE	C
P.C.C. STEPS	D
LEAN CONCRETE	E

4. ORDINARY PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETE WORKS.
5. AN INTEGRAL WATER PROOFING AGENT SHALL BE USED IN CONCRETE THAT IS CONSTANTLY OR INTERMITTENTLY IN CONTACT WITH WATER AS PER MANUFACTURER'S RECOMMENDATIONS
6. CONCRETE CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

STRUCTURAL MEMBER / ELEMENT	MINIMUM COVER (INCHES)
FOUNDATIONS (ALL TYPES)	2"
COLUMNS & BEAMS	1½"
RETAINING WALLS	1½"
SLABS	¾"
PLINTH / LINTEL BAND	¾"

7. ALL REINFORCING STEEL SHALL BE DEFORMED, HOT ROLLED BILLET STEEL BARS CONFORMING TO ASTM A-615 GRADE-60 WITH SPECIFIED YIELD STRENGTH OF NOT LESS THAN 60,000 psi.
8. THE NUMBER INDICATES THE BAR DIAMETER/SIZE, AS UNDER:

BAR NUMBER	DIAMETER (INCHES)
3	⅜"
4	½"
5	⅝"
6	¾"
8	1"

9. ALL DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315, ACI-318 & ACI-350R.
10. ALL REINFORCING STEEL SHALL BE HELD FIRMLY IN PLACE BEFORE AND DURING THE PLACING OF CONCRETE BY MEANS OF WIRES AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.

D. CONCRETE CONSTRUCTION

1. THE CONTRACTOR SHALL SUBMIT CONCRETE POURING SCHEDULE FOR ENGINEER'S APPROVAL. NO CONCRETE SHALL BE POURED UNTIL ITS FORMWORK AND REINFORCEMENT HAS BEEN INSPECTED AND APPROVED BY THE ENGINEER.
2. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BLOCKS ETC. SHOULD BE AVOIDED ON SLAB PANELS.

D. CONT. CONCRETE 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, AND DOWELS FOR STRUCTURAL MEMBERS AND/OR MASONRY ARE PROPERLY LOCATED IN PLACE.

E. CONSTRUCTION JOINTS

1. JOINTS, NOT SHOWN ON THE DRAWING, SHALL BE SO MADE AND LOCATED AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED NEAR THE MIDDLE OF THE SPANS OF SLAB & BEAMS. JOINTS IN WALLS & COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOORS, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.
2. JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS THE JOINTS.
3. JOINTS IN BASE SLAB & WALLS AND ROOF SLAB, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS SHALL BE BORNE BY THE CONTRACTOR. BEAMS & BRACKETS SHALL BE PLACED AT THE SAME TIME AS SLABS.

F. ELECTRICAL CONDUITS

1. CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS & SLABS AND WITHIN THE MIDDLE HALF OF THE THICKNESS. SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6"(150 MM).

G. PROPS, FORMWORK & CURING

1. SHORE & BRACE ALL PARTS OF THE BUILDING DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. SEQUENCE OF REMOVAL OF FORMWORK SHALL BE APPROVED BY THE ENGINEER.
3. AT LEAST ONE LOWER FLOOR SHALL REMAIN PROPPED UNTILL THE UPPER FLOOR IS CAST AND CURED.

H. BRICK MASONRY WORKS

1. ALL BRICK WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022.
2. ALL BRICK SHALL BE SOUND, HARD, WELL BURNT AND OF UNIFORM SIZE,COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 1/8".
3. ALL BRICK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 1/8" IN 10'-0".
4. MORTAR USED IN MASONRY CONSTRUCTION SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 12 MPa (1800Psi) AND SHALL CONFORM TO ASTM C270.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 14

GENERAL NOTES & TYPICAL DETAILS (SHEET 1 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

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CKD.			
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DATE	DRAWING NO.	REV.
FEB 2026	156/328/TD/14G01	0

J. STRUCTURAL STEEL WORKS

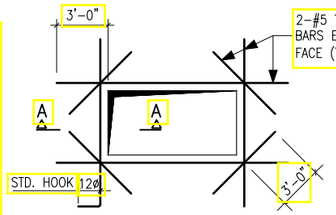
1. ALL STRUCTURAL STEEL WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES–2022.
2. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS.
3. ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A–36 OR EQUIVALENT.
4. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY, AWS, SPECIFICATIONS USING ELECTRODES E70XX.
5. ALL BOLTS SHALL CONFORM TO ASTM A307 OR A325.
6. SURFACE PREPARATION OF ALL STRUCTURAL STEEL FOR PAINTING SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF "STEEL STRUCTURES PAINTING COUNCIL" SPECIFICATIONS SSPC–SP6 FOR COMMERCIAL BLAST CLEANING.
7. ALL STEEL SHALL BE GIVEN ONE SHOP COAT OF RED LEAD OXIDE PRIMER AND FIELD TOUCHUP EXCEPT FOR SURFACES TO BE EMBEDDED IN CONCRETE OR CONTACT SURFACES OF FRICTION BOLTED CONNECTIONS.

K. COLUMN CONFINEMENT

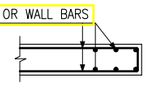
1. IN ORDER TO ATTAIN AN EFFECTIVE BOND BETWEEN THE CONFINING ELEMENTS AND THE MASONRY, THE CONCRETE OF THE CONFINING ELEMENTS SHALL BE CAST AFTER THE MASONRY HAS BEEN BUILT WITH PROPER TOOTHING IN PLACE.
2. CLEAN THE COLUMN SPACE OF ALL RUBBISH BEFORE ADDING THE FORMWORK.
3. POUR THE CONCRETE FOR THE BANDS AND THE COLUMNS AT THE SAME TIME.
4. COMPACT THE CONCRETE WITH VIBRATOR.
5. REMOVE THE FORMWORK NOT EARLIER THAN 03 DAYS.

L. SEISMIC PARAMETERS

1. DESIGN OF STRUCTURE HAS BEEN CARRIED OUT BASED ON SEISMIC PARAMETERS OF ZONE 2B WITH PGA VALUE OF 0.16g to 0.24g & STIFF SOIL PROFILE (SD), ACCORDING TO BUILDING CODE OF PAKISTAN.



WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

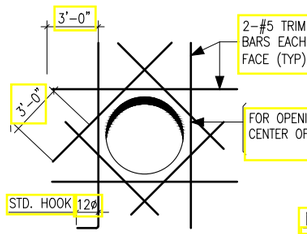


SECTION A–A

NOTES

- FOR OPENING WITH MAXIMUM DIMENSION OVER 5'–0" REFER TO OTHER DETAILS.
- USE THIS DETAILS IF NOT SHOWN IN DESIGN DRAWINGS

REINFORCEMENT DETAIL AT OPENING IN SLAB & WALLS (TYP)



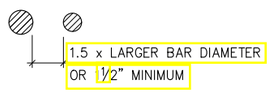
FOR OPENING 1'–0" DIA ADD DIAGONAL BARS CENTER OF SLAB OR WALL SAME SIZE AS LARGEST MAIN BARS

WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

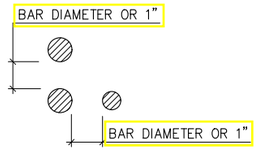
NOTES

MAXIMUM DIAMETER OF SLEVE IS 1'–0" FOR TRIM BARS BARS AROUND LARGE SLEEVE REFER TO OTHER DETAILS

REINFORCEMENT AROUND SLEEVE IN SLABS & WALLS (TYP.)



VERTICAL BAR SPACING



BAR SPACING IN BEAM

LEGEND

MS	MILD STEEL
PVC	POLYVINYL CHLORIDE
C.G.I	CORRUGATED GALVANIZED IRON
G.I	GALVANIZED IRON
SQ	SQUARE
C.Jt	CONSTRUCTION JOINT
T&B	TOP AND BOTTOM
EF	EACH FACE
BF	BOTH FACES
ø/db/#	DIAMETER OF BAR
@	AT THE RATE OF
B	BOTTOM
C/C	CENTER TO CENTER
B.W	BOTHWAYS
E.G.F	ENGINEERED GRANULAR FILL
E.G.L	EXCAVATED GROUND LEVEL
E.L.	STRUCTURAL ELEVATION
EQ.	EQUAL
F.D.T	FIELD DENSITY TEST
F.F.L	FINISH FLOOR LEVEL
F.G.L.	FINISH GROUND LEVEL
F.B.L.	FOUNDATION BED LEVEL
G.W.T.	GROUND WATER TABLE
N.S.L.	EXISTING NATURAL SURFACE LEVEL
N.T.S.	NOT TO SCALE
SMRF	SPECIAL MOMENT RESISTING FRAME
STYP	SOIL PROFILE TYPE
ST.	STIRRUPS
T	TOP
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
N.T.S.	NOT TO SCALE
	LEVEL ON PLAN
℄	CENTER LINE

SPLICE LENGHTH (LS) AND DEVELOPMENT LENGHT (LD) (fc'=3 ksi, fy=40 ksi)

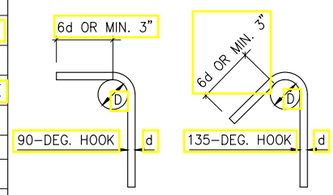
BAR DIA	#3	#4	#5	#6	#7	#8	#10	#12
DEVELOPMENT LENGTH ℓd (Inches)	18	24	30	36	42	47	53	59
SPLICE LENGTH (Inches)	24	32	39	47	55	62	69	77

LAP SPLICE ARE NOT TO BE USED:
- WITHIN JOINTS
- WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH.
- FROM THE FACE OF THE JOINT.

CURTAILMENT LENGTH SHOULD BE EXTEND UPTO L/16,12db OR d, (WHICHEVER GREATER) BEYOND L/3
WHERE:
L–GREATER CLEAR SPAN, db–DIAMETER OF BAR,
d–EFFECTIVE DEPTH.
THE FIRST HOOP SHALL BE LOCATED NOT MORE THAN 2" FROM THE FACE OF THE SUPPORTING MEMBER.

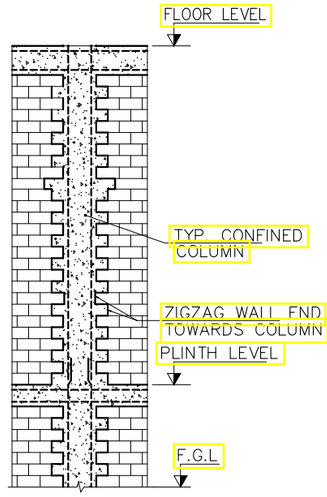
* ALL LAP SPLICE SHALL BE STAGGARED BY AT LEAST 50 %

BAR DIA	D
#3	2½"
#4	3"
#5	4"
#6	4"
#8	6"
#9	7"
#11	8½"

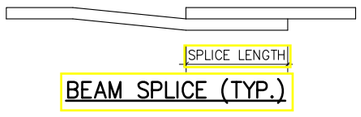


STIRRUPS AND TIE HOOKS

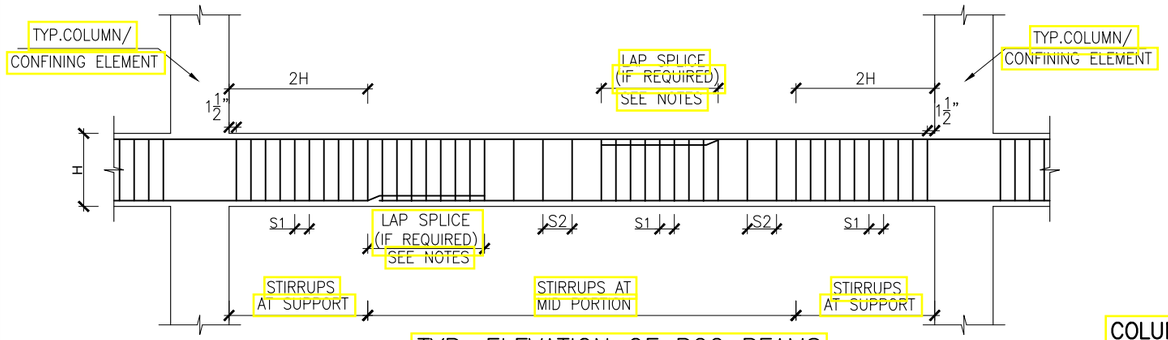
BAR DIA	D
#3	1½"
#4	2"
#5	2½"



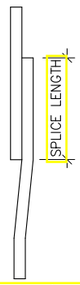
TYPICAL ELEVATION OF CONFINED COLUMN (SHOWING TOOTHING)



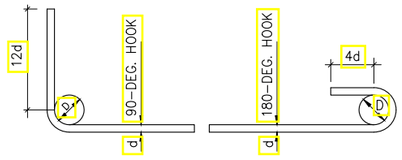
BEAM SPLICE (TYP.)



TYP. ELEVATION OF RCC BEAMS



COLUMN SPLICE (TYP.)



STANDARD BAR HOOKS (MAIN BARS)

LEGENDS

S1	STIRRUPS SPACING IN BEAM NEAR SUPPORTS & LAP SPLICES
S2	STIRRUPS SPACING IN BEAM IN MIDSPAN
h	DEPTH OF BEAM
db	DIAMETER OF BAR
d	EFFECTIVE DEPTH OF BEAM

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

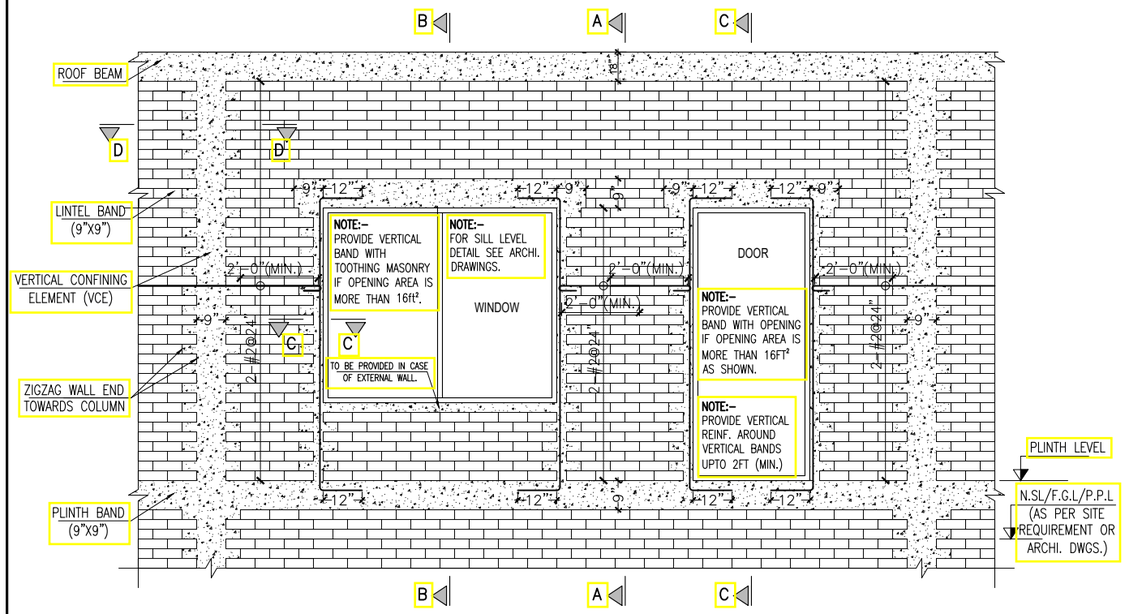
GUEST UNITS

BLOCK - 14

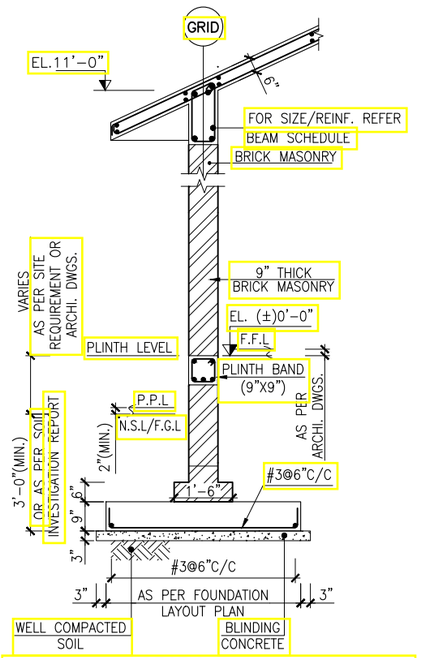
GENERAL NOTES & TYPICAL DETAILS (SHEET 2 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

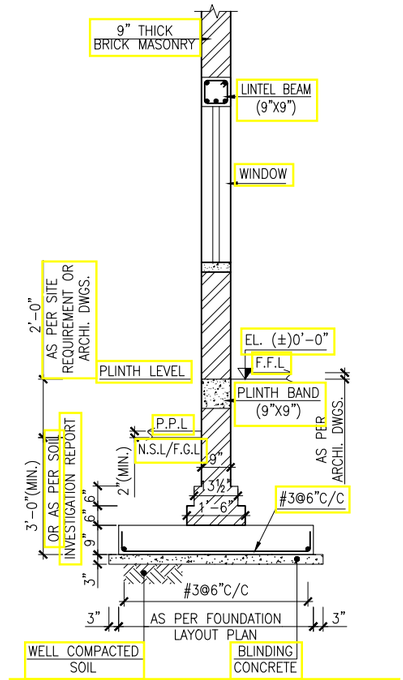
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DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/14G02	0
SUBM.			



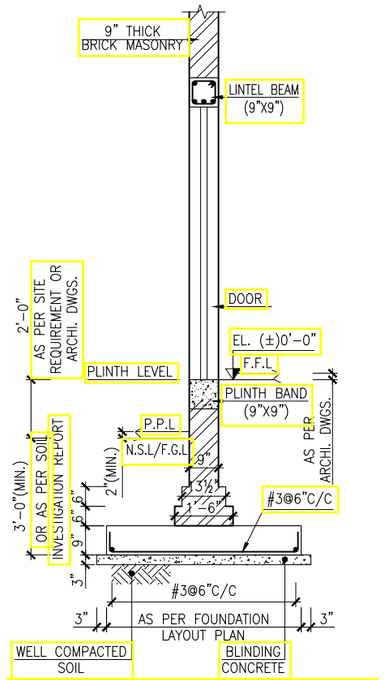
TYPICAL ELEVATION OF 9" THICK CONFINED BRICK MASONRY WALL SINGLE STOREY WALL MASONRY
(FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS)



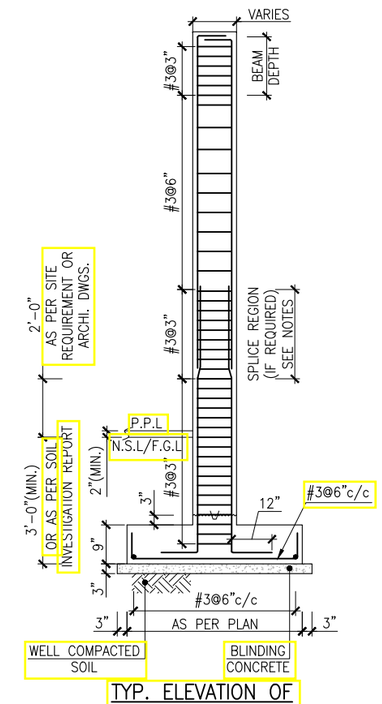
SECTION A–A
TYP. FOOTING SECTION OF EXTERNAL/ INTERNAL WALL WITHOUT OPENING



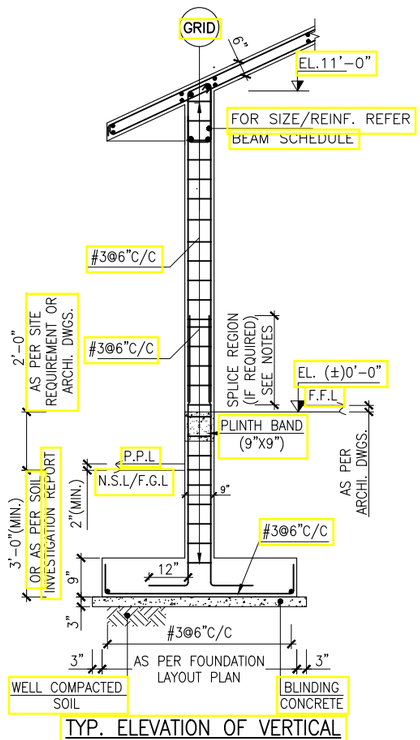
SECTION B–B
TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT WINDOW



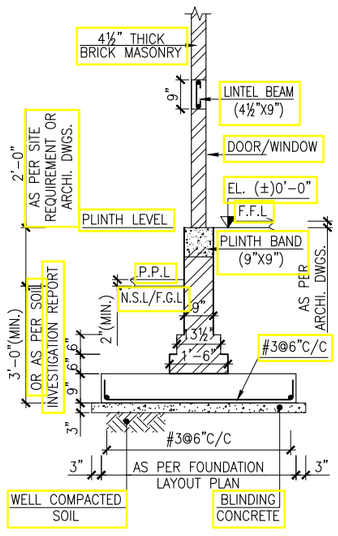
SECTION C–C
TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT DOOR



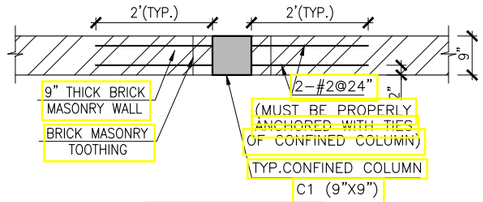
TYP. ELEVATION OF COLUMN C–1



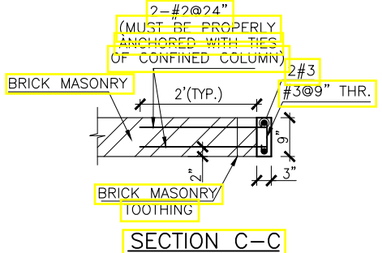
TYP. ELEVATION OF VERTICAL CONFINING ELEMENT (VCE)



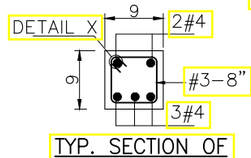
TYP. FOOTING SECTION OF 4½" THICK MASONRY WALL



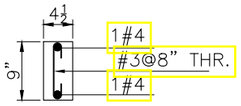
SECTION D–D



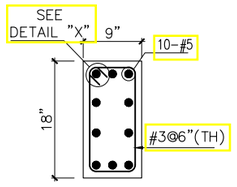
SECTION C–C



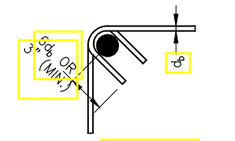
TYP. SECTION OF LINTEL BEAM 9" THICK BRICK WALL

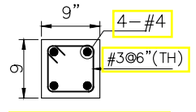


TYP. SECTION OF RB–5



TYP. SECTION OF COLUMN (C–1)





TYP. CONFINED COLUMN V.C.E

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

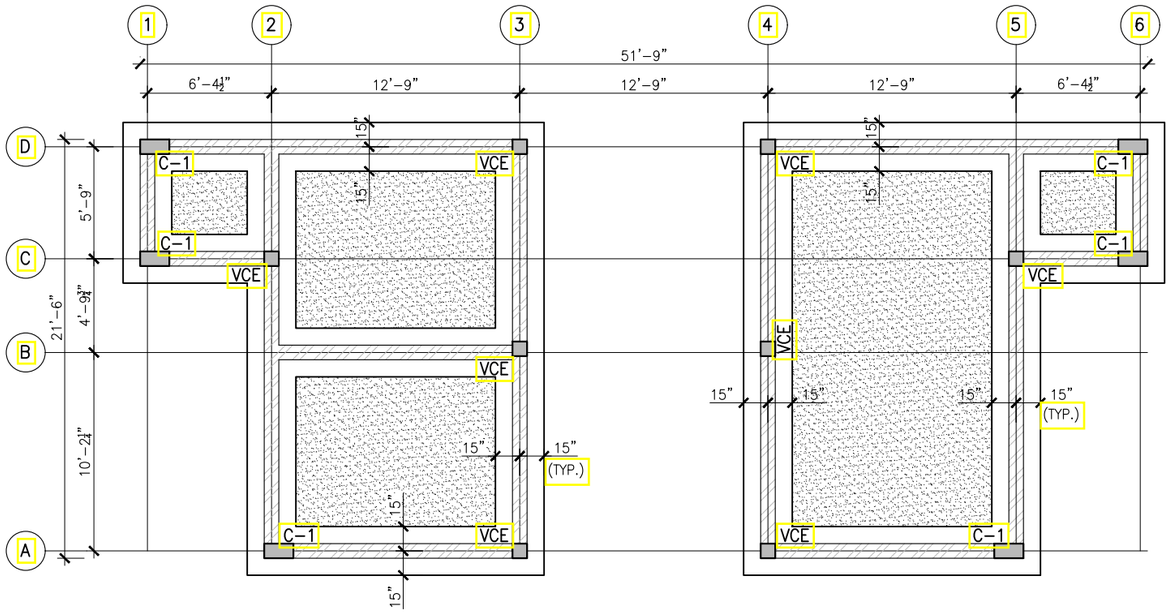
GUEST UNITS

BLOCK - 14

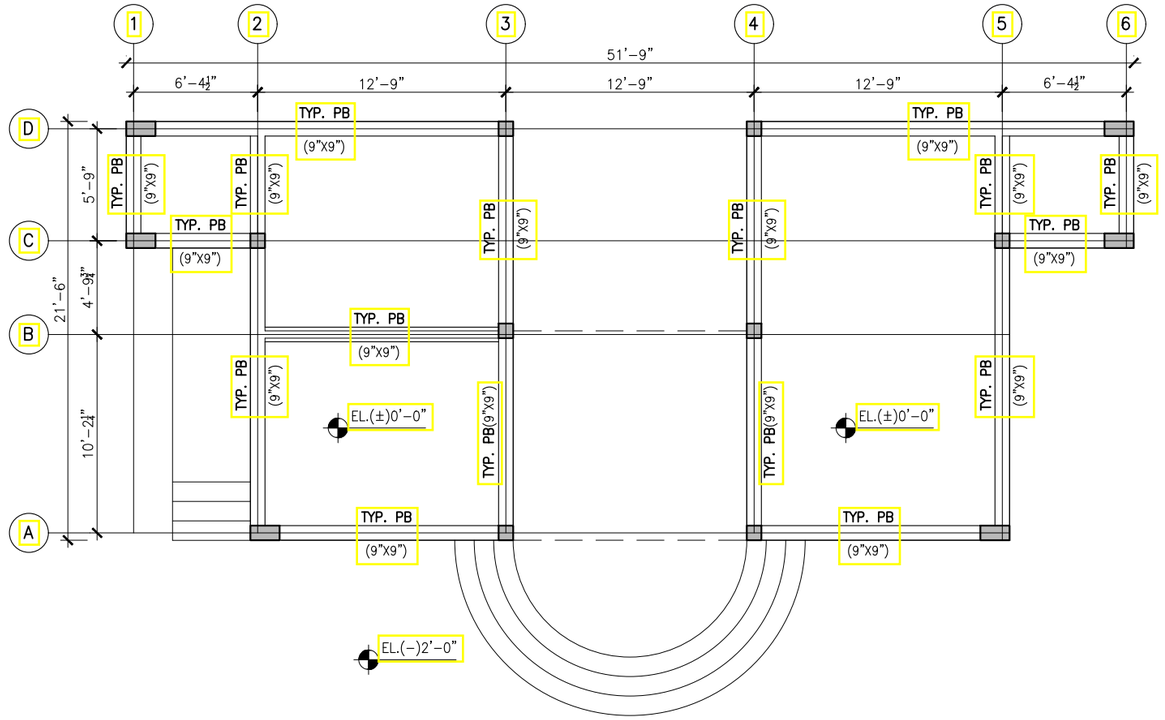
GENERAL NOTES & TYPICAL DETAILS (SHEET 3 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE			
CKD.			
SUBM.	DATE FEB 2026	DRAWING NO. 156/328/TD/14G03	REV. 0

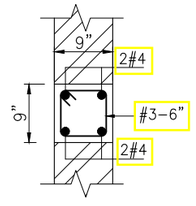


FOUNDATION & COLUMN LAYOUT PLAN

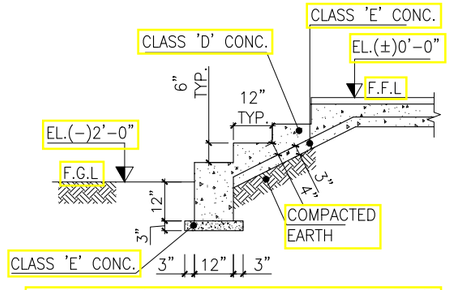


PLINTH BAND LAYOUT PLAN AT EL. (±)0'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS



TYPICAL SECTION OF PLINTH BAND (TYP. PB)



TYPICAL SECTION OF P.C.C STEPS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
4. THE FOUNDATION HAS BEEN DESIGNED ON GROSS ALLOWABLE BEARING CAPACITY OF 0.75 TON/SFT AT A DEPTH OF 3'-0" BELOW N.S.L OR F.G.L WHICH EVER IS LOWER.
5. IF COMPETENT BEARING STRATA IS NOT FOUND AT INDICATED DEPTH, THE ENGINEER SHALL BE NOTIFIED FOR HIS PRIOR INSTRUCTIONS.
6. BOTTOM OF FOOTING SHOULD BE PROVIDED 3'-0" BELOW NSL OR F.G.L WHICH EVER IS LOWER.
7. FOR EL. ±0'-0", REFER MASTER PLAN.

SCALE 1/8" = 1'-0"

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

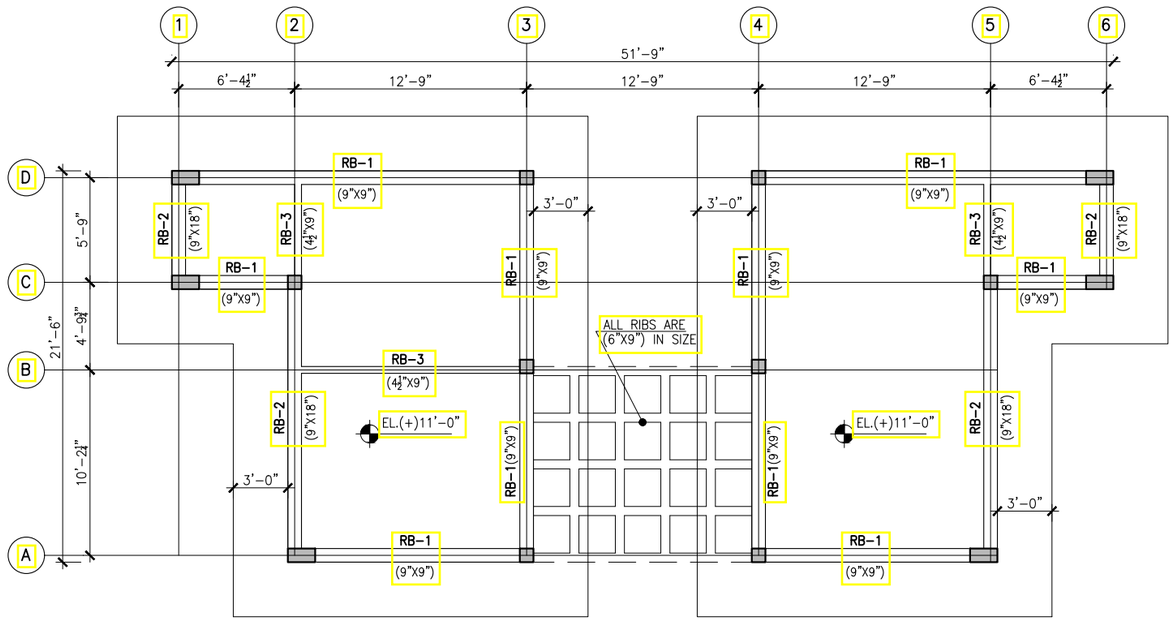
GUEST UNITS

BLOCK - 14

FOUNDATION & COLUMN LAYOUT PLAN AND PLINTH BAND LAYOUT PLAN

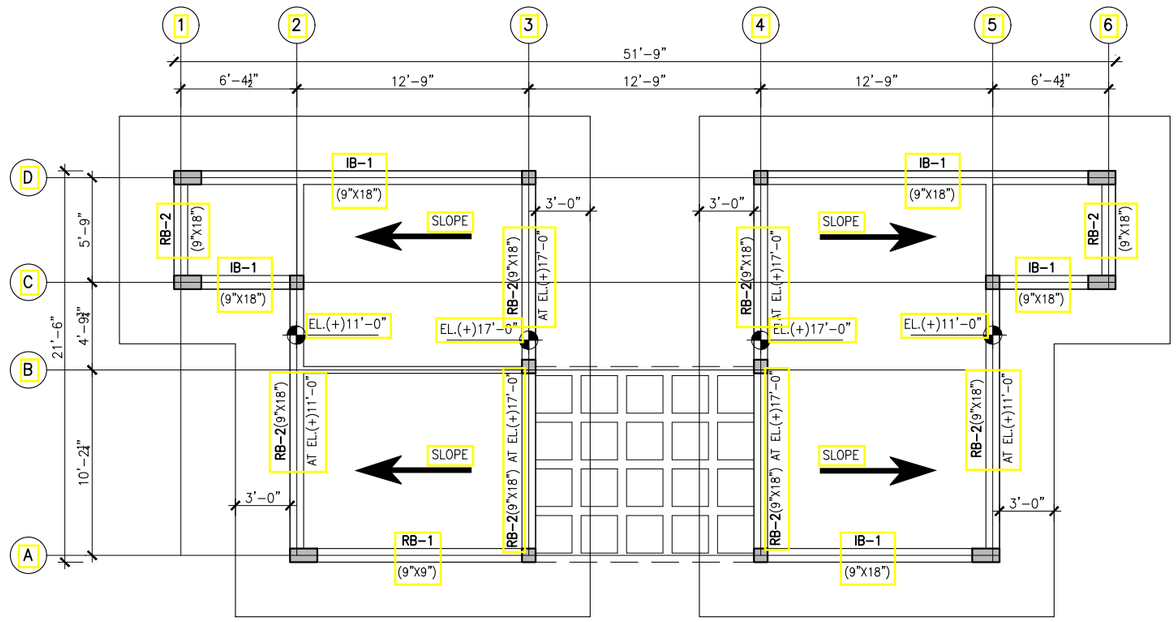
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/14G04	0
SUBM.	FEB 2026		



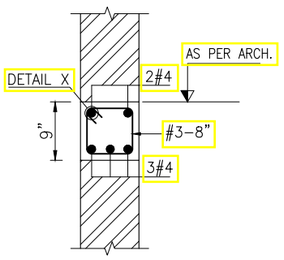
ROOF BEAM LAYOUT PLAN AT EL. (+)11'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS

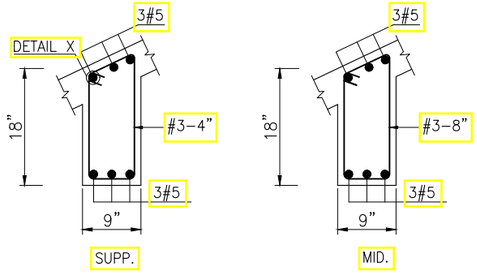


INCLINED ROOF FRAMING PLAN FROM EL.(+)11'-0" TO EL.(+)17'-0"

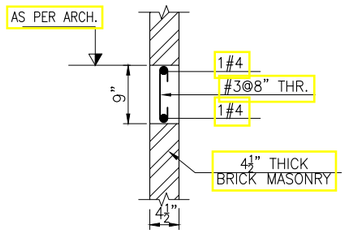
ALL SLOPING SLABS ARE 6" THICK UNLESS NOTED OTHERWISE



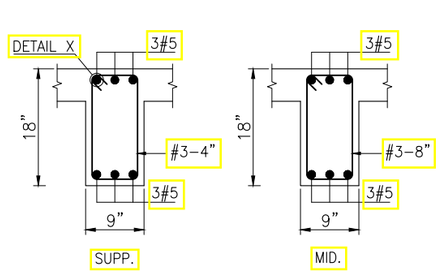
TYP. SEC. OF RB-1



TYPICAL SECTION OF RB-2



SEC. OF RB-3
4½" THICK BRICK WALL



TYPICAL SECTION OF IB-1

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 14

FRAMING PLAN AT EL. (+)11'-0" & FROM EL.(+)11'-0" TO EL.(+)17'-0"

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

		RECOMMENDED	VER./CKD.	APPROVED
DESN.	NESPAK			
DWN.				
FILE				
CKD.				
SUBM.				

DATE	DRAWING NO.	REV.
FEB 2026	156/328/TD/14G05	0

A. GENERAL

1. NOTES GIVEN ON THIS DRAWING ARE APPLICABLE TO ALL STRUCTURAL DRAWINGS UNLESS OTHERWISE NOTED. NOTES WRITTEN ON ANY OTHER DRAWING SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS REFERRED.
2. SYSTEM OF UNITS IS FPS.
3. ALL LEVELS MARKED ON THE DRAWINGS ARE LEVELS OF STRUCTURAL ELEMENTS. FINISH LEVELS SHALL BE IN ACCORDANCE WITH THE ARCHITECTURAL DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE STRUCTURE AND ALL TEMPORARY WORKS DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
6. THE CONTRACTOR SHALL CO-ORDINATE ALL DRAWINGS OF ALL DISCIPLINES FOR ALL ITEMS INCLUDING BUT NOT LIMITED TO SIZES AND LOCATION OF ALL OPENINGS REQUIRED FOR DUCTS, PIPES AND PIPE SLEEVES, ELECTRICAL CONDUITS AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE OR OTHERWISE INCORPORATED IN STRUCTURAL WORK AND SHALL BRING TO THE NOTICE OF THE ENGINEER DISCREPANCIES, IF ANY, FOR HIS INSTRUCTIONS, PRIOR TO THE START OF WORK.
7. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
8. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE CLIENT AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
9. THE CONTRACTOR SHALL COORDINATE SCHEDULE OF CONSTRUCTION WITH SUPPLY AND INSTALLATION OF EQUIPMENT.
10. PROVISIONS SHALL BE MADE FOR INSTALLATION OF EQUIPMENT AS PER MANUFACTURER'S RECOMMENDATIONS.
11. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/ DEVIATIONS MAY LEAD TO REJECTION/ REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
12. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO SPECIFICATIONS OF THE CONTRACT. IN ABSENCE OF ANY EXPRESS OR IMPLIED SPECIFICATION IN THE CONTRACT, ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO RELEVANT AMERICAN STANDARDS AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
13. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF SHOP DRAWINGS AND BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.

B. FOUNDATION AND EARTHWORK

1. THE CONTRACTOR SHALL STUDY THE AVAILABLE GEOTECHNICAL INVESTIGATION REPORT BEFORE COMMENCING THE WORK.
2. FOUNDATION DESIGN IS BASED ON PARAMETERS PROVIDED IN GEOTECH. INVESTIGATION REPORT.
3. FOUNDATION IS TO BE PLACED 3'-0" (0.93m) BELOW F.G.L. OR N.S.L WHICHEVER IS LOWER.
4. TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.
5. THE TYPE AND COMPACTION OF SOIL BELOW GRADE SLAB SHALL BE AS PER JOB SPECIFICATIONS. NO FOOTING SHALL BE PLACED ON FILL. HOWEVER, AREAS WHERE FILLING BELOW THE FOOTINGS BECOMES INEVITABLE DUE TO OVER-EXCAVATION (IF ANY), SHALL BE FILLED WITH P.C.C. (1:4:8) WITH PRIOR APPROVAL OF THE ENGINEER, AT NO EXTRA COST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING SYSTEM IF AND WHERE SO REQUIRED DURING CONSTRUCTION.
7. ALL STRUCTURAL CONCRETE SURFACES AGAINST WHICH EARTH IS TO BE FILLED SHALL BE COATED WITH TWO COATS OF HOT BITUMEN (10/20 GRADE) APPLIED AT THE RATE OF 0.49 kg/sqm PER COAT, EXCEPT FOR P.C.C. (1:3:6) AND P.C.C. (1:4:8).
8. BACKFILLING AND COMPACTION SHALL BE CARRIED OUT EQUALLY ON BOTH SIDES OF PLINTH BEAMS TO AVOID IMBALANCE OF LATERAL EARTH PRESSURE.
9. THE CONTRACTOR SHALL SUPPLY AND ERECT ADEQUATE SHORING AND SUPPORT THE SIDES OF ALL EXCAVATIONS WHERE REQUIRED TO SAFEGUARD WORKMEN AND PROTECT ANY ADJACENT STRUCTURES.
10. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.
11. EXCAVATIONS ADJACENT TO EXISTING STRUCTURES AND/OR UNDERGROUND SERVICES SHALL BE MADE BY HAND.

C. REINFORCED CONCRETE/ PLAIN CEMENT CONCRETE

1. ALL CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022, OR ANY OTHER RELEVANT SPECS GIVEN IN CONTRACT.
2. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & SPECIFICATIONS AND THE MINIMUM CUBE CRUSHING STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	NOMINAL MIX RATIO	CUBE STRENGTH AT 28-DAYS (psi.)
A	1:1:2	4,500
B	1:1½:3	3,750
C	1:2:4	3,000
D	1:3:6	2,000
E	1:4:8	1,200

C. REINFORCED / PLAIN CEMENT CONCRETE (CONTINUED)

3. CLASS OF CONCRETE FOR DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE AS FOLLOWS UNLESS NOTED OTHER WISE:

COMPONENT	CONCRETE CLASS
MASONRY WALL FOUNDATION	C
FOUNDATION OF RCC COLUMNS	C
COLUMNS, SLABS & BEAMS,VCE	C
P.C.C. STEPS	D
LEAN CONCRETE	E

4. ORDINARY PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETE WORKS.
5. AN INTEGRAL WATER PROOFING AGENT SHALL BE USED IN CONCRETE THAT IS CONSTANTLY OR INTERMITTENTLY IN CONTACT WITH WATER AS PER MANUFACTURER'S RECOMMENDATIONS
6. CONCRETE CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

STRUCTURAL MEMBER / ELEMENT	MINIMUM COVER (INCHES)
FOUNDATIONS (ALL TYPES)	2"
COLUMNS & BEAMS	1½"
RETAINING WALLS	1½"
SLABS	¾"
PLINTH / LINTEL BAND	¾"

7. ALL REINFORCING STEEL SHALL BE DEFORMED, HOT ROLLED BILLET STEEL BARS CONFORMING TO ASTM A-615 GRADE-60 WITH SPECIFIED YIELD STRENGTH OF NOT LESS THAN 60,000 psi.
8. THE NUMBER INDICATES THE BAR DIAMETER/SIZE, AS UNDER:

BAR NUMBER	DIAMETER (INCHES)
3	3/8"
4	1/2"
5	5/8"
6	3/4"
8	1"

9. ALL DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315, ACI-318 & ACI-350R.
10. ALL REINFORCING STEEL SHALL BE HELD FIRMLY IN PLACE BEFORE AND DURING THE PLACING OF CONCRETE BY MEANS OF WIRES AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.

D. CONCRETE CONSTRUCTION

1. THE CONTRACTOR SHALL SUBMIT CONCRETE POURING SCHEDULE FOR ENGINEER'S APPROVAL. NO CONCRETE SHALL BE POURED UNTIL ITS FORMWORK AND REINFORCEMENT HAS BEEN INSPECTED AND APPROVED BY THE ENGINEER.
2. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BLOCKS ETC. SHOULD BE AVOIDED ON SLAB PANELS.

D. CONT. CONCRETE CONSTRUCTION

1. BEFORE CASTING OF ANY STRUCTURAL MEMBER, THE CONTRACTOR SHALL ENSURE THAT ALL EMBEDDED ITEMS FOR ELECTRICAL, MECHANICAL, HVAC, PLUMBING, STRUCTURAL STEEL AND OTHER WORKS, AND DOWELS FOR STRUCTURAL MEMBERS AND/OR MASONRY ARE PROPERLY LOCATED IN PLACE.

E. CONSTRUCTION JOINTS

1. JOINTS, NOT SHOWN ON THE DRAWING, SHALL BE SO MADE AND LOCATED AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED NEAR THE MIDDLE OF THE SPANS OF SLAB & BEAMS. JOINTS IN WALLS & COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOORS, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.
2. JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS THE JOINTS.
3. JOINTS IN BASE SLAB & WALLS AND ROOF SLAB, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS SHALL BE BORNE BY THE CONTRACTOR. BEAMS & BRACKETS SHALL BE PLACED AT THE SAME TIME AS SLABS.

F. ELECTRICAL CONDUITS

1. CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS & SLABS AND WITHIN THE MIDDLE HALF OF THE THICKNESS. SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6"(150 MM).

G. PROPS, FORMWORK & CURING

1. SHORE & BRACE ALL PARTS OF THE BUILDING DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. SEQUENCE OF REMOVAL OF FORMWORK SHALL BE APPROVED BY THE ENGINEER.
3. AT LEAST ONE LOWER FLOOR SHALL REMAIN PROPPED UNTILL THE UPPER FLOOR IS CAST AND CURED.

H. BRICK MASONRY WORKS

1. ALL BRICK WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022.
2. ALL BRICK SHALL BE SOUND, HARD, WELL BURNT AND OF UNIFORM SIZE,COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 1/8".
3. ALL BRICK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 1/8" IN 10'-0".
4. MORTAR USED IN MASONRY CONSTRUCTION SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 12 MPa (1800Psi) AND SHALL CONFORM TO ASTM C270.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 12 & 13

GENERAL NOTES & TYPICAL DETAILS
(SHEET 1 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE			
CKD.			
SUBM.	DATE FEB 2026	DRAWING NO. 156/328/TD/12G01	REV. 0

J. STRUCTURAL STEEL WORKS

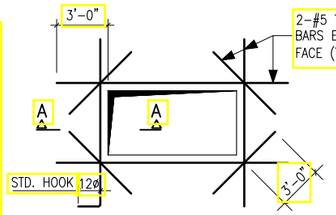
1. ALL STRUCTURAL STEEL WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES–2022.
2. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS.
3. ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A–36 OR EQUIVALENT.
4. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY, AWS, SPECIFICATIONS USING ELECTRODES E70XX.
5. ALL BOLTS SHALL CONFORM TO ASTM A307 OR A325.
6. SURFACE PREPARATION OF ALL STRUCTURAL STEEL FOR PAINTING SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF "STEEL STRUCTURES PAINTING COUNCIL" SPECIFICATIONS SSPC–SP6 FOR COMMERCIAL BLAST CLEANING.
7. ALL STEEL SHALL BE GIVEN ONE SHOP COAT OF RED LEAD OXIDE PRIMER AND FIELD TOUCHUP EXCEPT FOR SURFACES TO BE EMBEDDED IN CONCRETE OR CONTACT SURFACES OF FRICTION BOLTED CONNECTIONS.

K. COLUMN CONFINEMENT

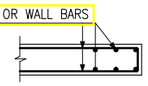
1. IN ORDER TO ATTAIN AN EFFECTIVE BOND BETWEEN THE CONFINING ELEMENTS AND THE MASONRY, THE CONCRETE OF THE CONFINING ELEMENTS SHALL BE CAST AFTER THE MASONRY HAS BEEN BUILT WITH PROPER TOOTHING IN PLACE.
2. CLEAN THE COLUMN SPACE OF ALL RUBBISH BEFORE ADDING THE FORMWORK.
3. POUR THE CONCRETE FOR THE BANDS AND THE COLUMNS AT THE SAME TIME.
4. COMPACT THE CONCRETE WITH VIBRATOR.
5. REMOVE THE FORMWORK NOT EARLIER THAN 03 DAYS.

L. SEISMIC PARAMETERS

1. DESIGN OF STRUCTURE HAS BEEN CARRIED OUT BASED ON SEISMIC PARAMETERS OF ZONE 2B WITH PGA VALUE OF 0.16g to 0.24g & STIFF SOIL PROFILE (SD), ACCORDING TO BUILDING CODE OF PAKISTAN.



WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

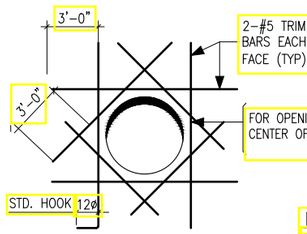


SECTION A–A

NOTES

- FOR OPENING WITH MAXIMUM DIMENSION OVER 5'–0" REFER TO OTHER DETAILS.
- USE THIS DETAILS IF NOT SHOWN IN DESIGN DRAWINGS

REINFORCEMENT DETAIL AT OPENING IN SLAB & WALLS (TYP)

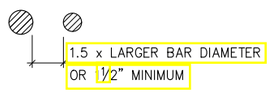


WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

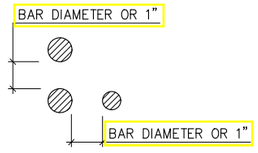
NOTES

MAXIMUM DIAMETER OF SLEVE IS 1'–0" FOR TRIM BARS BARS AROUND LARGE SLEEVE REFER TO OTHER DETAILS

REINFORCEMENT AROUND SLEEVE IN SLABS & WALLS (TYP.)



VERTICAL BAR SPACING



BAR SPACING IN BEAM

LEGEND

MS	MILD STEEL
PVC	POLYVINYL CHLORIDE
C.G.I	CORRUGATED GALVANIZED IRON
G.I	GALVANIZED IRON
SQ	SQUARE
C.Jt	CONSTRUCTION JOINT
T&B	TOP AND BOTTOM
EF	EACH FACE
BF	BOTH FACES
ø/db/#	DIAMETER OF BAR
@	AT THE RATE OF
B	BOTTOM
C/C	CENTER TO CENTER
B.W	BOTHWAYS
E.G.F	ENGINEERED GRANULAR FILL
E.G.L	EXCAVATED GROUND LEVEL
E.L.	STRUCTURAL ELEVATION
EQ.	EQUAL
F.D.T	FIELD DENSITY TEST
F.F.L	FINISH FLOOR LEVEL
F.G.L.	FINISH GROUND LEVEL
F.B.L.	FOUNDATION BED LEVEL
G.W.T.	GROUND WATER TABLE
N.S.L.	EXISTING NATURAL SURFACE LEVEL
N.T.S.	NOT TO SCALE
SMRF	SPECIAL MOMENT RESISTING FRAME
STYP	SOIL PROFILE TYPE
ST.	STIRRUPS
T	TOP
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
N.T.S.	NOT TO SCALE
	LEVEL ON PLAN
℄	CENTER LINE

SPLICE LENGHTH (LS) AND DEVELOPMENT LENGHT (LD) (fc'=3 ksi, fy=40 ksi)

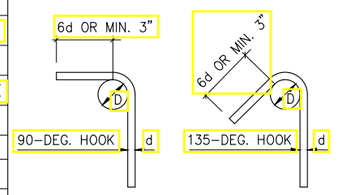
BAR DIA	#3	#4	#5	#6	#7	#8	#10	#12
DEVELOPMENT LENGTH ℓd (Inches)	18	24	30	36	42	47	53	59
SPLICE LENGTH (Inches)	24	32	39	47	55	62	69	77

LAP SPLICE ARE NOT TO BE USED:
- WITHIN JOINTS
- WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH.
- FROM THE FACE OF THE JOINT.

CURTAILMENT LENGTH SHOULD BE EXTEND UPTO L/16,12db OR d, (WHICHEVER GREATER) BEYOND L/3
WHERE:
L–GREATER CLEAR SPAN, db–DIAMETER OF BAR,
d–EFFECTIVE DEPTH.
THE FIRST HOOP SHALL BE LOCATED NOT MORE THAN 2" FROM THE FACE OF THE SUPPORTING MEMBER.

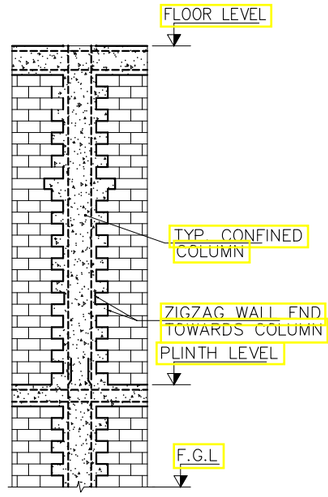
* ALL LAP SPLICE SHALL BE STAGGARED BY AT LEAST 50 %

BAR DIA	D
#3	2½"
#4	3"
#5	4"
#6	4"
#8	6"
#9	7"
#11	8½"

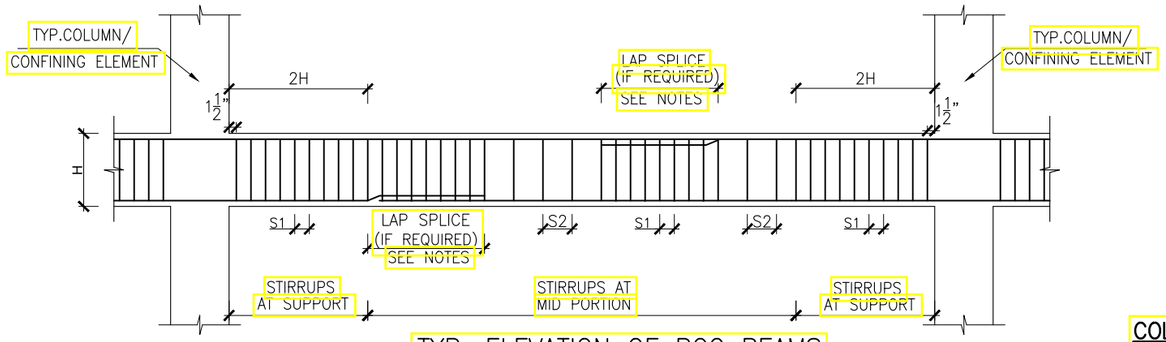


STIRRUPS AND TIE HOOKS

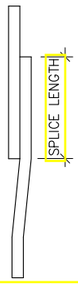
BAR DIA	D
#3	1½"
#4	2"
#5	2½"



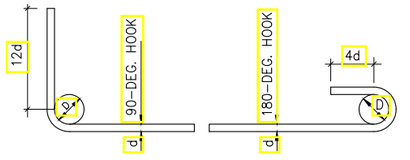
TYPICAL ELEVATION OF CONFINED COLUMN (SHOWING TOOTHING)



TYP. ELEVATION OF RCC BEAMS



COLUMN SPLICE (TYP.)



STANDARD BAR HOOKS (MAIN BARS)



BEAM SPLICE (TYP.)

LEGENDS

S1	STIRRUPS SPACING IN BEAM NEAR SUPPORTS & LAP SPLICES
S2	STIRRUPS SPACING IN BEAM IN MIDSPAN
h	DEPTH OF BEAM
db	DIAMETER OF BAR
d	EFFECTIVE DEPTH OF BEAM

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

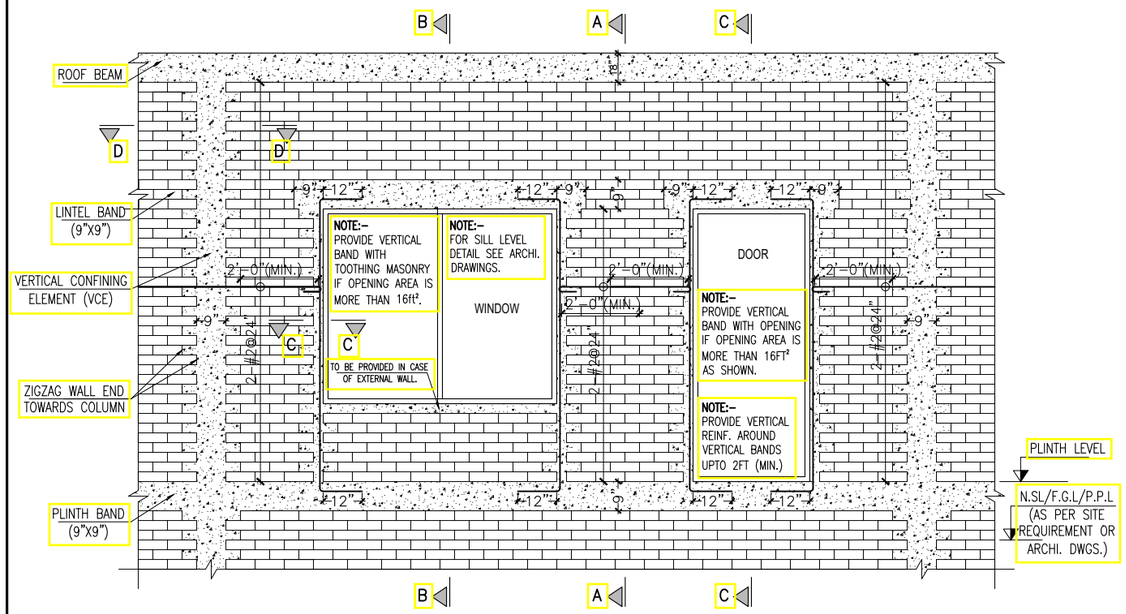
GUEST UNITS

BLOCK - 12 & 13

GENERAL NOTES & TYPICAL DETAILS (SHEET 2 OF 3)

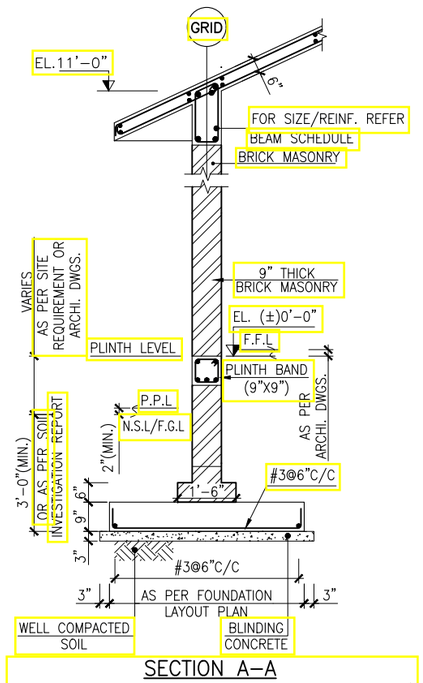
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/12G02	0
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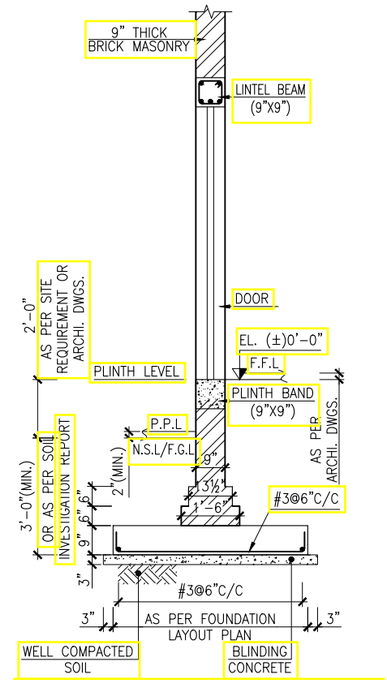
TYPICAL ELEVATION OF 9" THICK CONFINED BRICK MASONRY WALL SINGLE STOREY WALL MASONRY

(FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS)



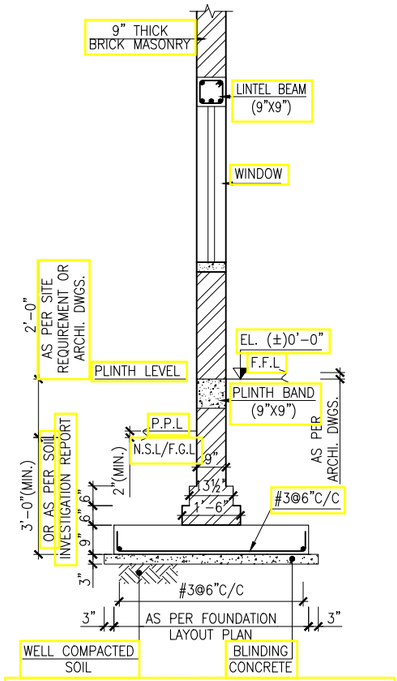
SECTION A–A

TYP. FOOTING SECTION OF EXTERNAL/ INTERNAL WALL WITHOUT OPENING



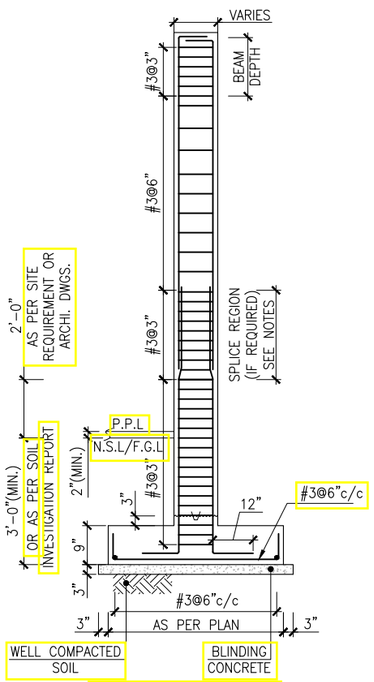
SECTION C–C

TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT DOOR

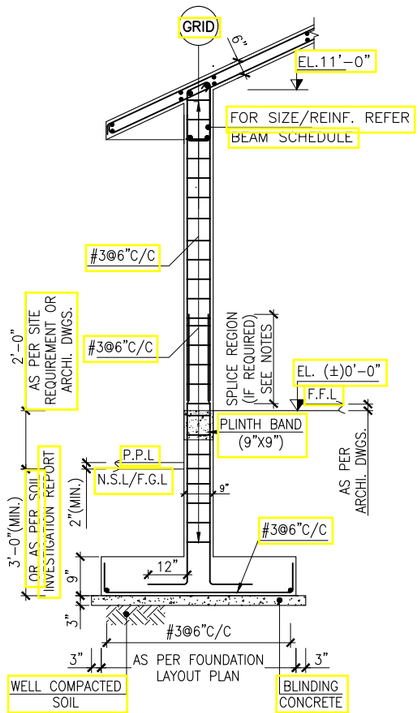


SECTION B–B

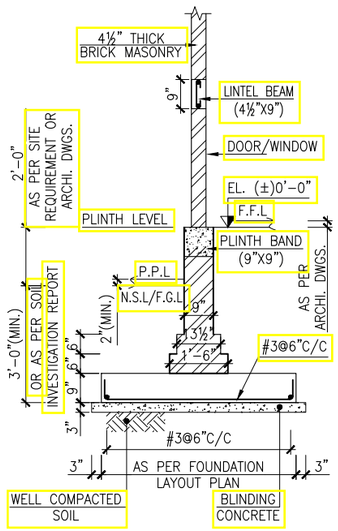
TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT WINDOW



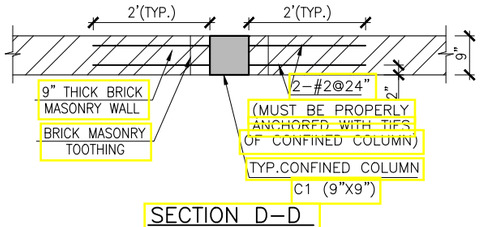
TYP. ELEVATION OF COLUMN C–1



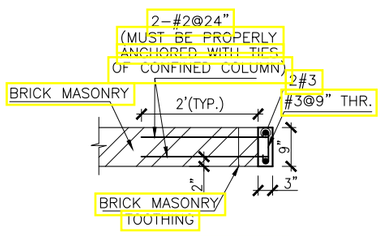
TYP. ELEVATION OF VERTICAL CONFINING ELEMENT (VCE)



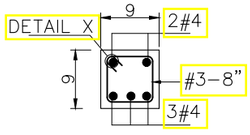
TYP. FOOTING SECTION OF 4½" THICK MASONRY WALL



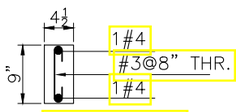
SECTION D–D



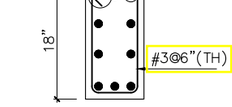
SECTION C–C



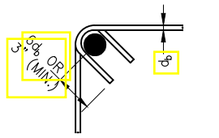
TYP. SECTION OF LINTEL BEAM 9" THICK BRICK WALL



TYP. SECTION OF RB–5

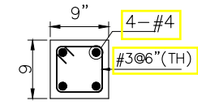


TYP. SECTION OF COLUMN (C–1)



DETAIL–X

TYP. 135° HOOK DETAIL FOR TIES & STIRRUPS



TYP. CONFINED COLUMN V.C.E

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

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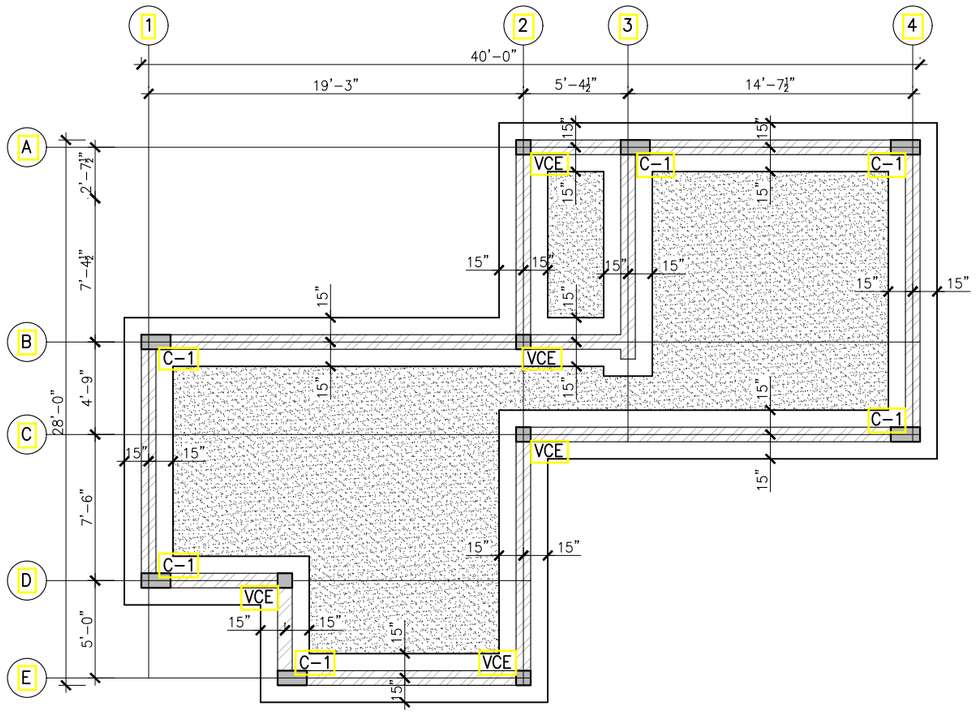
GUEST UNITS

BLOCK - 12 & 13

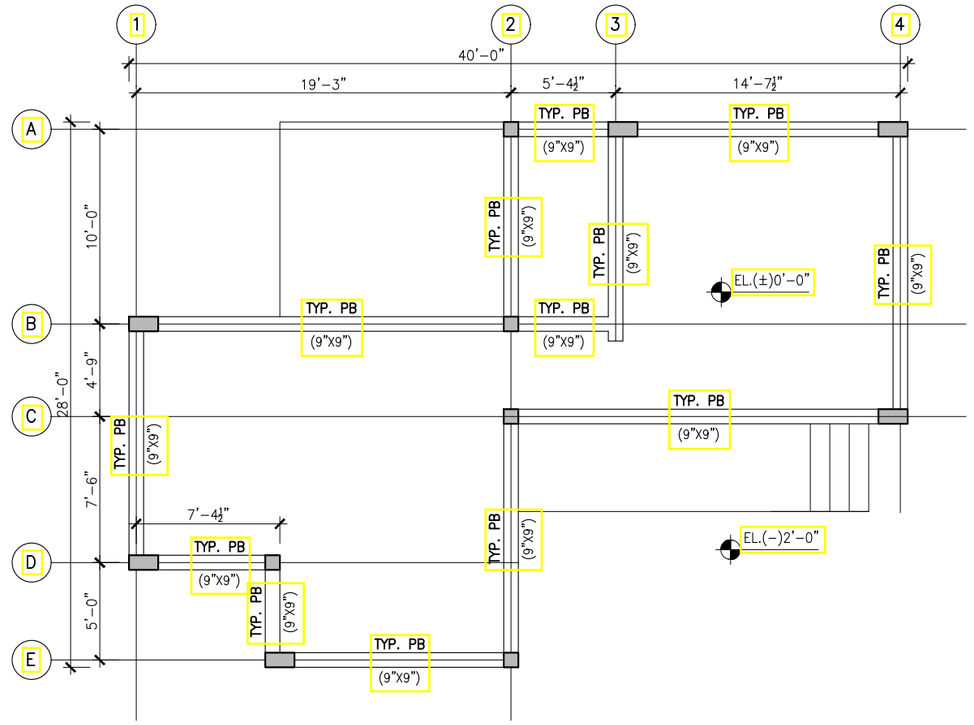
GENERAL NOTES & TYPICAL DETAILS (SHEET 3 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
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FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/12G03	0
SUBM.	FEB 2026		

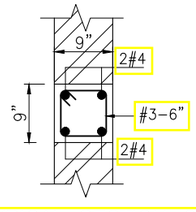


FOUNDATION & COLUMN LAYOUT PLAN

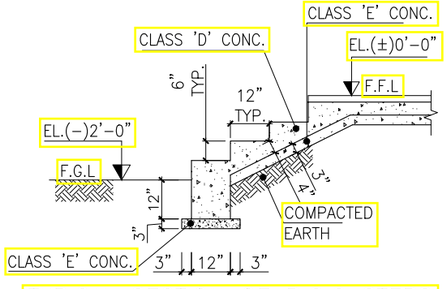


PLINTH BAND LAYOUT PLAN AT EL. (±)0'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS



TYPICAL SECTION OF PLINTH BAND (TYP. PB)



TYPICAL SECTION OF P.C.C STEPS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
4. THE FOUNDATION HAS BEEN DESIGNED ON GROSS ALLOWABLE BEARING CAPACITY OF 0.75 TON/SFT AT A DEPTH OF 3'-0" BELOW N.S.L OR F.G.L WHICH EVER IS LOWER.
5. IF COMPETENT BEARING STRATA IS NOT FOUND AT INDICATED DEPTH, THE ENGINEER SHALL BE NOTIFIED FOR HIS PRIOR INSTRUCTIONS.
6. BOTTOM OF FOOTING SHOULD BE PROVIDED 3'-0" BELOW NSL OR F.G.L WHICH EVER IS LOWER.
7. FOR EL. ±0'-0", REFER MASTER PLAN.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

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GUEST UNITS

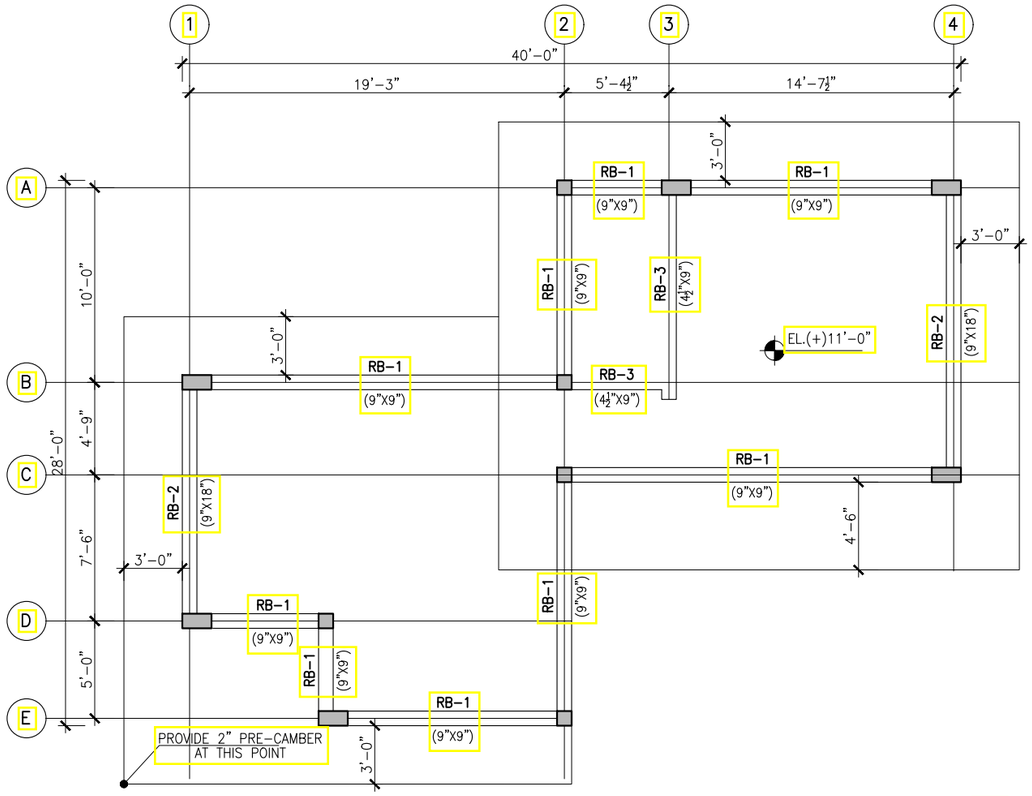
BLOCK - 12 & 13

FOUNDATION & COLUMN LAYOUT PLAN AND PLINTH BAND LAYOUT PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

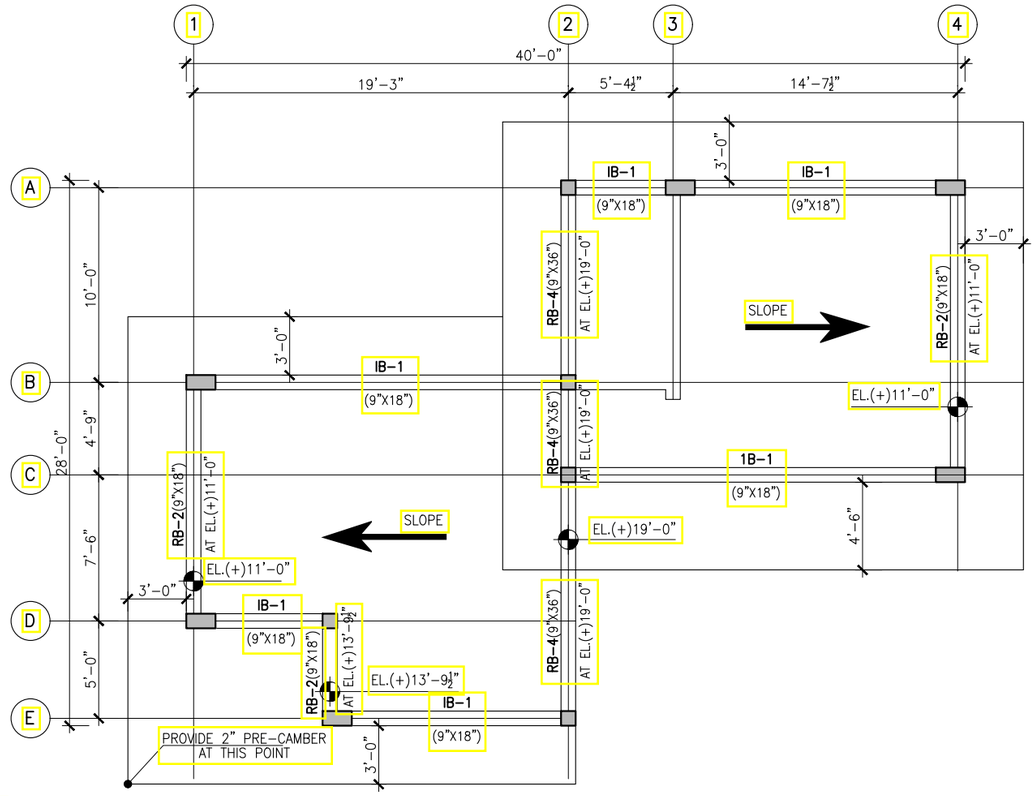
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DESN.	NESPAK			
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DATE	DRAWING NO.	REV.
FEB 2026	156/328/TD/12G04	0



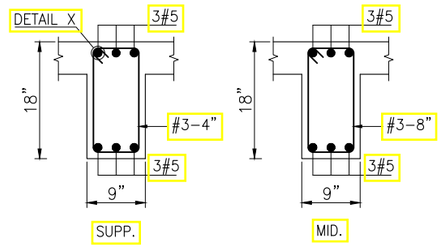
ROOF BEAM LAYOUT PLAN AT EL. (+)11'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS

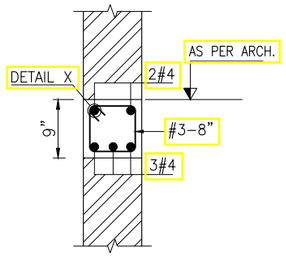


INCLINED ROOF FRAMING PLAN FROM EL.(+)11'-0" TO EL.(+)19'-0"

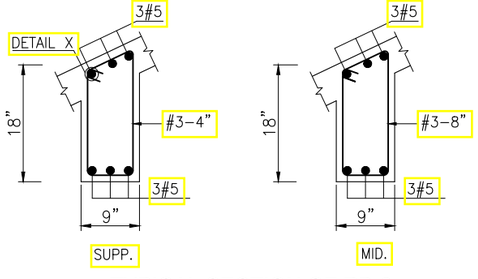
ALL SLOPING SLABS ARE 6" THICK UNLESS NOTED OTHERWISE



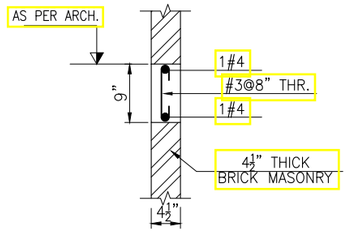
TYPICAL SECTION OF IB-1



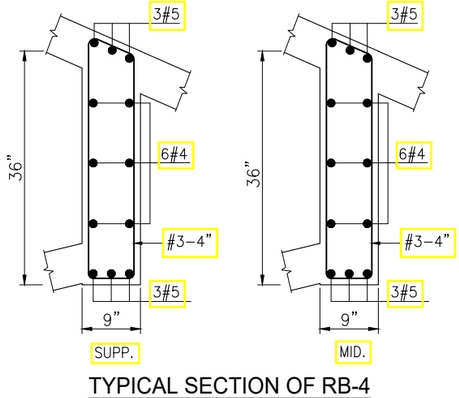
TYP. SEC. OF RB-1



TYPICAL SECTION OF RB-2



SEC. OF RB-3
4½" THICK BRICK WALL



TYPICAL SECTION OF RB-4

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 12 & 13

FRAMING PLAN AT EL. (+)11'-0" & FROM EL.(+)11'-0" TO EL.(+)19'-0"

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE			
CKD.	DATE	DRAWING NO.	REV.
SUBM	FEB 2026	156/328/TD/12G05	0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

A. GENERAL

1. NOTES GIVEN ON THIS DRAWING ARE APPLICABLE TO ALL STRUCTURAL DRAWINGS UNLESS OTHERWISE NOTED. NOTES WRITTEN ON ANY OTHER DRAWING SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS REFERRED.
2. SYSTEM OF UNITS IS FPS.
3. ALL LEVELS MARKED ON THE DRAWINGS ARE LEVELS OF STRUCTURAL ELEMENTS. FINISH LEVELS SHALL BE IN ACCORDANCE WITH THE ARCHITECTURAL DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE STRUCTURE AND ALL TEMPORARY WORKS DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
6. THE CONTRACTOR SHALL CO-ORDINATE ALL DRAWINGS OF ALL DISCIPLINES FOR ALL ITEMS INCLUDING BUT NOT LIMITED TO SIZES AND LOCATION OF ALL OPENINGS REQUIRED FOR DUCTS, PIPES AND PIPE SLEEVES, ELECTRICAL CONDUITS AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE OR OTHERWISE INCORPORATED IN STRUCTURAL WORK AND SHALL BRING TO THE NOTICE OF THE ENGINEER DISCREPANCIES, IF ANY, FOR HIS INSTRUCTIONS, PRIOR TO THE START OF WORK.
7. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
8. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE CLIENT AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
9. THE CONTRACTOR SHALL COORDINATE SCHEDULE OF CONSTRUCTION WITH SUPPLY AND INSTALLATION OF EQUIPMENT.
10. PROVISIONS SHALL BE MADE FOR INSTALLATION OF EQUIPMENT AS PER MANUFACTURER'S RECOMMENDATIONS.
11. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/ DEVIATIONS MAY LEAD TO REJECTION/ REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
12. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO SPECIFICATIONS OF THE CONTRACT. IN ABSENCE OF ANY EXPRESS OR IMPLIED SPECIFICATION IN THE CONTRACT, ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO RELEVANT AMERICAN STANDARDS AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
13. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF SHOP DRAWINGS AND BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.

B. FOUNDATION AND EARTHWORK

1. THE CONTRACTOR SHALL STUDY THE AVAILABLE GEOTECHNICAL INVESTIGATION REPORT BEFORE COMMENCING THE WORK.
2. FOUNDATION DESIGN IS BASED ON PARAMETERS PROVIDED IN GEOTECH. INVESTIGATION REPORT.
3. FOUNDATION IS TO BE PLACED 3'-0" (0.93m) BELOW F.G.L. OR N.S.L WHICHEVER IS LOWER.
4. TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.
5. THE TYPE AND COMPACTION OF SOIL BELOW GRADE SLAB SHALL BE AS PER JOB SPECIFICATIONS. NO FOOTING SHALL BE PLACED ON FILL. HOWEVER, AREAS WHERE FILLING BELOW THE FOOTINGS BECOMES INEVITABLE DUE TO OVER-EXCAVATION (IF ANY), SHALL BE FILLED WITH P.C.C. (1:4:8) WITH PRIOR APPROVAL OF THE ENGINEER, AT NO EXTRA COST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING SYSTEM IF AND WHERE SO REQUIRED DURING CONSTRUCTION.
7. ALL STRUCTURAL CONCRETE SURFACES AGAINST WHICH EARTH IS TO BE FILLED SHALL BE COATED WITH TWO COATS OF HOT BITUMEN (10/20 GRADE) APPLIED AT THE RATE OF 0.49 kg/sqm PER COAT, EXCEPT FOR P.C.C. (1:3:6) AND P.C.C. (1:4:8).
8. BACKFILLING AND COMPACTION SHALL BE CARRIED OUT EQUALLY ON BOTH SIDES OF PLINTH BEAMS TO AVOID IMBALANCE OF LATERAL EARTH PRESSURE.
9. THE CONTRACTOR SHALL SUPPLY AND ERECT ADEQUATE SHORING AND SUPPORT THE SIDES OF ALL EXCAVATIONS WHERE REQUIRED TO SAFEGUARD WORKMEN AND PROTECT ANY ADJACENT STRUCTURES.
10. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.
11. EXCAVATIONS ADJACENT TO EXISTING STRUCTURES AND/OR UNDERGROUND SERVICES SHALL BE MADE BY HAND.

C. REINFORCED CONCRETE/ PLAIN CEMENT CONCRETE

1. ALL CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022, OR ANY OTHER RELEVANT SPECS GIVEN IN CONTRACT.
2. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & SPECIFICATIONS AND THE MINIMUM CUBE CRUSHING STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	NOMINAL MIX RATIO	CUBE STRENGTH AT 28-DAYS (psi.)
A	1:1:2	4,500
B	1:1½:3	3,750
C	1:2:4	3,000
D	1:3:6	2,000
E	1:4:8	1,200

C. REINFORCED / PLAIN CEMENT CONCRETE (CONTINUED)

3. CLASS OF CONCRETE FOR DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE AS FOLLOWS UNLESS NOTED OTHER WISE:

COMPONENT	CONCRETE CLASS
MASONRY WALL FOUNDATION	C
FOUNDATION OF RCC COLUMNS	C
COLUMNS, SLABS & BEAMS,VCE	C
P.C.C. STEPS	D
LEAN CONCRETE	E

4. ORDINARY PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETE WORKS.
5. AN INTEGRAL WATER PROOFING AGENT SHALL BE USED IN CONCRETE THAT IS CONSTANTLY OR INTERMITTENTLY IN CONTACT WITH WATER AS PER MANUFACTURER'S RECOMMENDATIONS
6. CONCRETE CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

STRUCTURAL MEMBER / ELEMENT	MINIMUM COVER (INCHES)
FOUNDATIONS (ALL TYPES)	2"
COLUMNS & BEAMS	1½"
RETAINING WALLS	1½"
SLABS	¾"
PLINTH / LINTEL BAND	¾"

7. ALL REINFORCING STEEL SHALL BE DEFORMED, HOT ROLLED BILLET STEEL BARS CONFORMING TO ASTM A-615 GRADE-60 WITH SPECIFIED YIELD STRENGTH OF NOT LESS THAN 60,000 psi.
8. THE NUMBER INDICATES THE BAR DIAMETER/SIZE, AS UNDER:

BAR NUMBER	DIAMETER (INCHES)
3	⅜"
4	½"
5	⅝"
6	¾"
8	1"

9. ALL DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315, ACI-318 & ACI-350R.
10. ALL REINFORCING STEEL SHALL BE HELD FIRMLY IN PLACE BEFORE AND DURING THE PLACING OF CONCRETE BY MEANS OF WIRES AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.

D. CONCRETE CONSTRUCTION

1. THE CONTRACTOR SHALL SUBMIT CONCRETE POURING SCHEDULE FOR ENGINEER'S APPROVAL. NO CONCRETE SHALL BE POURED UNTIL ITS FORMWORK AND REINFORCEMENT HAS BEEN INSPECTED AND APPROVED BY THE ENGINEER.
2. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BLOCKS ETC. SHOULD BE AVOIDED ON SLAB PANELS.

D. CONT. CONCRETE 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, AND DOWELS FOR STRUCTURAL MEMBERS AND/OR MASONRY ARE PROPERLY LOCATED IN PLACE.

E. CONSTRUCTION JOINTS

1. JOINTS, NOT SHOWN ON THE DRAWING, SHALL BE SO MADE AND LOCATED AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED NEAR THE MIDDLE OF THE SPANS OF SLAB & BEAMS. JOINTS IN WALLS & COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOORS, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.
2. JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS THE JOINTS.
3. JOINTS IN BASE SLAB & WALLS AND ROOF SLAB, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS SHALL BE BORNE BY THE CONTRACTOR. BEAMS & BRACKETS SHALL BE PLACED AT THE SAME TIME AS SLABS.

F. ELECTRICAL CONDUITS

1. CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS & SLABS AND WITHIN THE MIDDLE HALF OF THE THICKNESS. SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6"(150 MM).

G. PROPS, FORMWORK & CURING

1. SHORE & BRACE ALL PARTS OF THE BUILDING DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. SEQUENCE OF REMOVAL OF FORMWORK SHALL BE APPROVED BY THE ENGINEER.
3. AT LEAST ONE LOWER FLOOR SHALL REMAIN PROPPED UNTILL THE UPPER FLOOR IS CAST AND CURED.

H. BRICK MASONRY WORKS

1. ALL BRICK WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022.
2. ALL BRICK SHALL BE SOUND, HARD, WELL BURNT AND OF UNIFORM SIZE,COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 1/8".
3. ALL BRICK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 1/8" IN 10'-0".
4. MORTAR USED IN MASONRY CONSTRUCTION SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 12 MPa (1800Psi) AND SHALL CONFORM TO ASTM C270.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

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GUEST UNITS

BLOCK - 3

GENERAL NOTES & TYPICAL DETAILS
(SHEET 1 OF 3)

[redacted] NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
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DATE	DRAWING NO.	REV.
FEB 2026	156/328/TD/03G01	0

J. STRUCTURAL STEEL WORKS

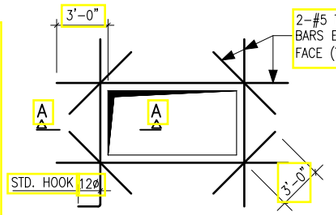
1. ALL STRUCTURAL STEEL WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES–2022.
2. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS.
3. ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A–36 OR EQUIVALENT.
4. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY, AWS, SPECIFICATIONS USING ELECTRODES E70XX.
5. ALL BOLTS SHALL CONFORM TO ASTM A307 OR A325.
6. SURFACE PREPARATION OF ALL STRUCTURAL STEEL FOR PAINTING SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF "STEEL STRUCTURES PAINTING COUNCIL" SPECIFICATIONS SSPC–SP6 FOR COMMERCIAL BLAST CLEANING.
7. ALL STEEL SHALL BE GIVEN ONE SHOP COAT OF RED LEAD OXIDE PRIMER AND FIELD TOUCHUP EXCEPT FOR SURFACES TO BE EMBEDDED IN CONCRETE OR CONTACT SURFACES OF FRICTION BOLTED CONNECTIONS.

K. COLUMN CONFINEMENT

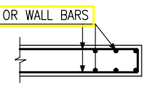
1. IN ORDER TO ATTAIN AN EFFECTIVE BOND BETWEEN THE CONFINING ELEMENTS AND THE MASONRY, THE CONCRETE OF THE CONFINING ELEMENTS SHALL BE CAST AFTER THE MASONRY HAS BEEN BUILT WITH PROPER TOOTHING IN PLACE.
2. CLEAN THE COLUMN SPACE OF ALL RUBBISH BEFORE ADDING THE FORMWORK.
3. POUR THE CONCRETE FOR THE BANDS AND THE COLUMNS AT THE SAME TIME.
4. COMPACT THE CONCRETE WITH VIBRATOR.
5. REMOVE THE FORMWORK NOT EARLIER THAN 03 DAYS.

L. SEISMIC PARAMETERS

1. DESIGN OF STRUCTURE HAS BEEN CARRIED OUT BASED ON SEISMIC PARAMETERS OF ZONE 2B WITH PGA VALUE OF 0.16g to 0.24g & STIFF SOIL PROFILE (SD), ACCORDING TO BUILDING CODE OF PAKISTAN.



WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

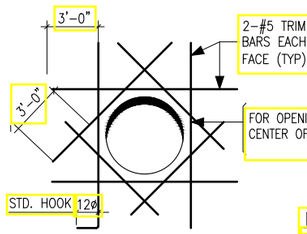


SECTION A–A

NOTES

- FOR OPENING WITH MAXIMUM DIMENSION OVER 5'–0" REFER TO OTHER DETAILS.
- USE THIS DETAILS IF NOT SHOWN IN DESIGN DRAWINGS

REINFORCEMENT DETAIL AT OPENING IN SLAB & WALLS (TYP)



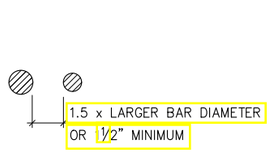
FOR OPENING 1'–0" DIA ADD DIAGONAL BARS CENTER OF SLAB OR WALL SAME SIZE AS LARGEST MAIN BARS

WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

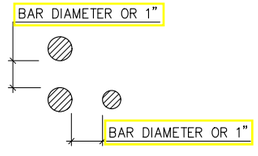
NOTES

MAXIMUM DIAMETER OF SLEVE IS 1'–0" FOR TRIM BARS BARS AROUND LARGE SLEEVE REFER TO OTHER DETAILS

REINFORCEMENT AROUND SLEEVE IN SLABS & WALLS (TYP.)



VERTICAL BAR SPACING



BAR SPACING IN BEAM

LEGEND

MS	MILD STEEL
PVC	POLYVINYL CHLORIDE
C.G.I	CORRUGATED GALVANIZED IRON
G.I	GALVANIZED IRON
SQ	SQUARE
C.Jt	CONSTRUCTION JOINT
T&B	TOP AND BOTTOM
EF	EACH FACE
BF	BOTH FACES
ø/db/#	DIAMETER OF BAR
@	AT THE RATE OF
B	BOTTOM
C/C	CENTER TO CENTER
B.W	BOTHWAYS
E.G.F	ENGINEERED GRANULAR FILL
E.G.L	EXCAVATED GROUND LEVEL
E.L.	STRUCTURAL ELEVATION
EQ.	EQUAL
F.D.T	FIELD DENSITY TEST
F.F.L	FINISH FLOOR LEVEL
F.G.L.	FINISH GROUND LEVEL
F.B.L.	FOUNDATION BED LEVEL
G.W.T.	GROUND WATER TABLE
N.S.L.	EXISTING NATURAL SURFACE LEVEL
N.T.S.	NOT TO SCALE
SMRF	SPECIAL MOMENT RESISTING FRAME
STYP	SOIL PROFILE TYPE
ST.	STIRRUPS
T	TOP
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
N.T.S.	NOT TO SCALE
	LEVEL ON PLAN
℄	CENTER LINE

SPLICE LENGHTH (LS) AND DEVELOPMENT LENGHT (LD) (fc'=3 ksi, fy=40 ksi)

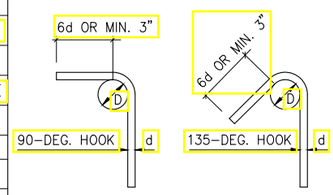
BAR DIA	#3	#4	#5	#6	#7	#8	#10	#12
DEVELOPMENT LENGTH ℓd (Inches)	18	24	30	36	42	47	53	59
SPLICE LENGTH (Inches)	24	32	39	47	55	62	69	77

LAP SPLICE ARE NOT TO BE USED:
- WITHIN JOINTS
- WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH.
- FROM THE FACE OF THE JOINT.

CURTAILMENT LENGTH SHOULD BE EXTEND UPTO L/16,12db OR d, (WHICHEVER GREATER) BEYOND L/3
WHERE:
L–GREATER CLEAR SPAN, db–DIAMETER OF BAR,
d–EFFECTIVE DEPTH.
THE FIRST HOOP SHALL BE LOCATED NOT MORE THAN 2" FROM THE FACE OF THE SUPPORTING MEMBER.

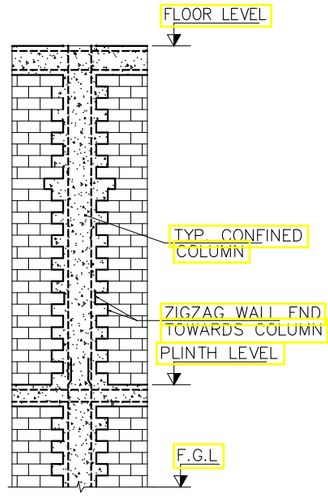
* ALL LAP SPLICE SHALL BE STAGGARED BY AT LEAST 50 %

BAR DIA	D
#3	2½"
#4	3"
#5	4"
#6	4"
#8	6"
#9	7"
#11	8½"



STIRRUPS AND TIE HOOKS

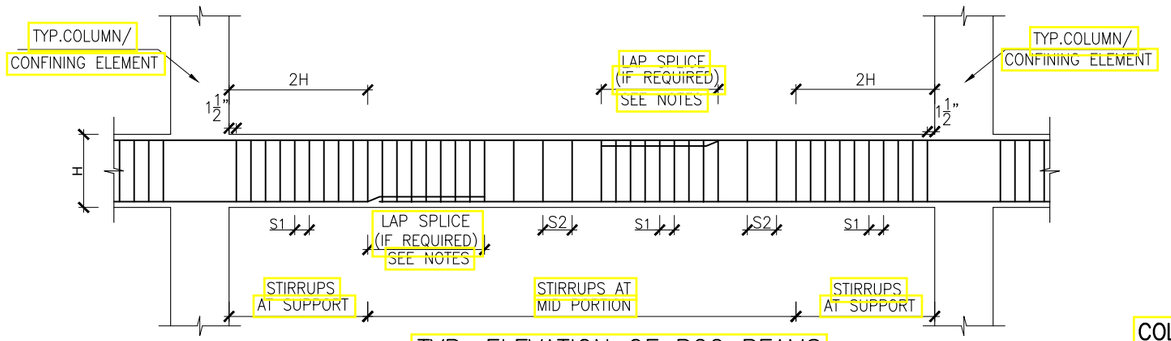
BAR DIA	D
#3	1½"
#4	2"
#5	2½"



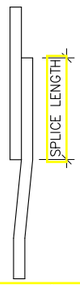
TYPICAL ELEVATION OF CONFINED COLUMN (SHOWING TOOTHING)



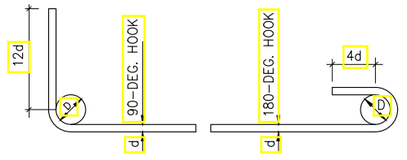
BEAM SPLICE (TYP.)



TYP. ELEVATION OF RCC BEAMS



COLUMN SPLICE (TYP.)



STANDARD BAR HOOKS (MAIN BARS)

LEGENDS

S1	STIRRUPS SPACING IN BEAM NEAR SUPPORTS & LAP SPLICES
S2	STIRRUPS SPACING IN BEAM IN MIDSPAN
h	DEPTH OF BEAM
db	DIAMETER OF BAR
d	EFFECTIVE DEPTH OF BEAM

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

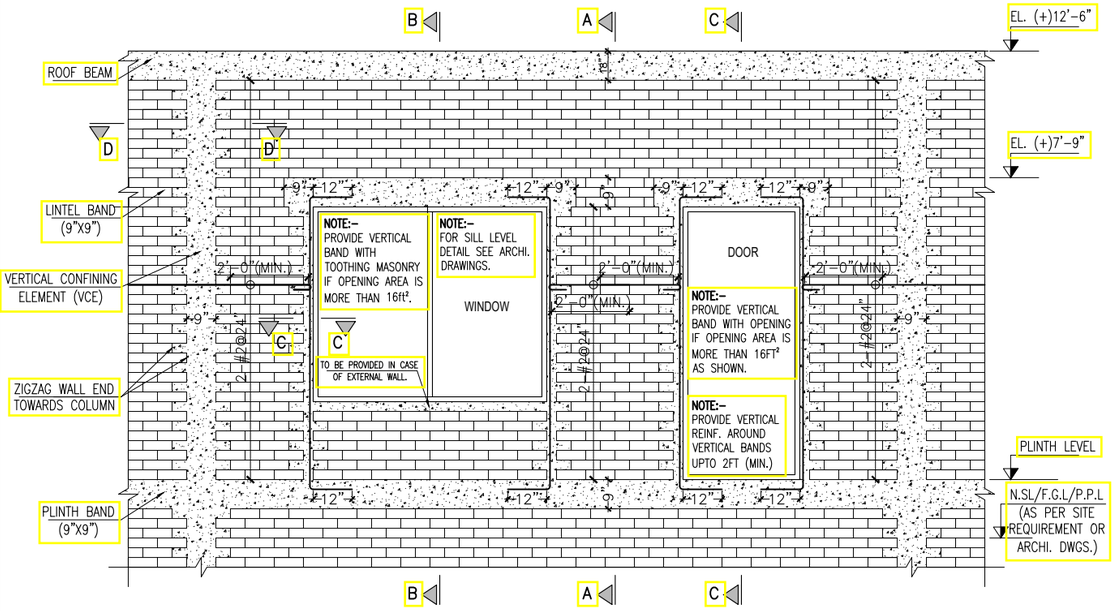
GUEST UNITS

BLOCK - 3

GENERAL NOTES & TYPICAL DETAILS (SHEET 2 OF 3)

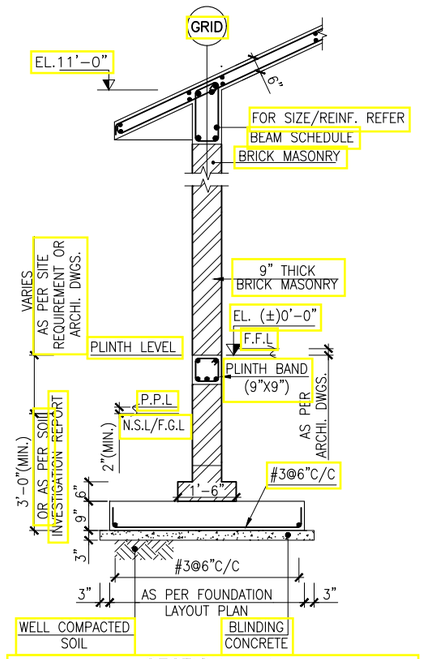
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/03G02	0
SUBM.	FEB 2026		



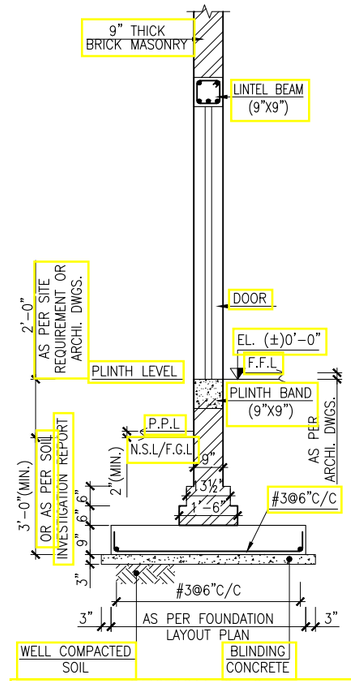
TYPICAL ELEVATION OF 9" THICK CONFINED BRICK MASONRY WALL SINGLE STOREY WALL MASONRY

(FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS)



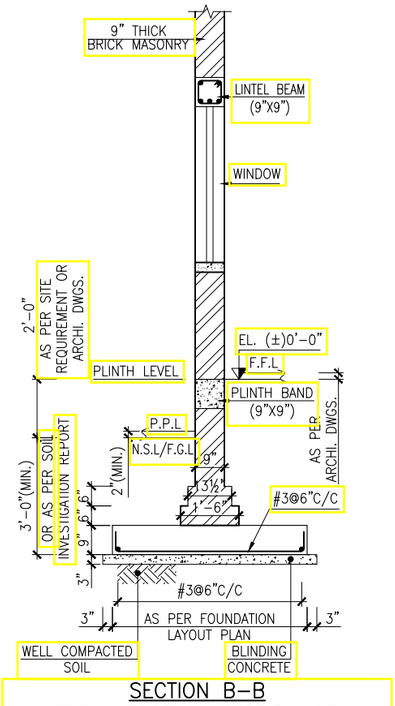
SECTION A–A

TYP. FOOTING SECTION OF EXTERNAL/ INTERNAL WALL WITHOUT OPENING



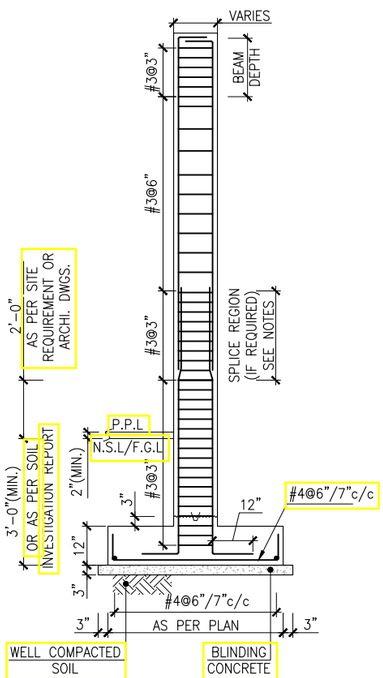
SECTION C–C

TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT DOOR

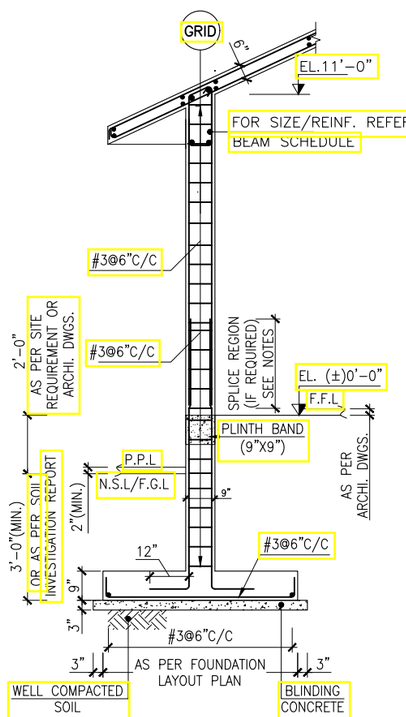


SECTION B–B

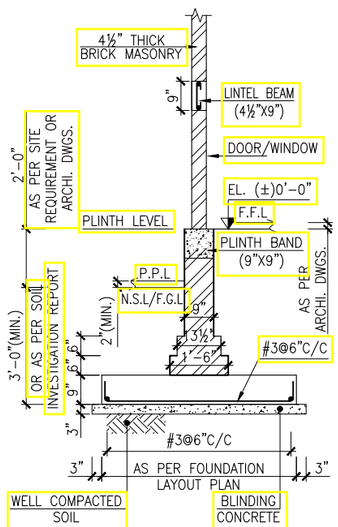
TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT WINDOW



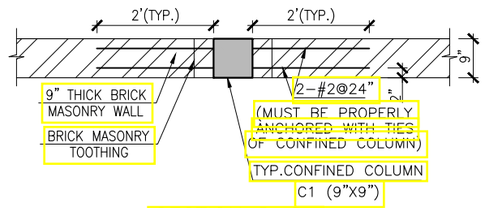
TYP. ELEVATION OF COLUMN C–1 & C–2



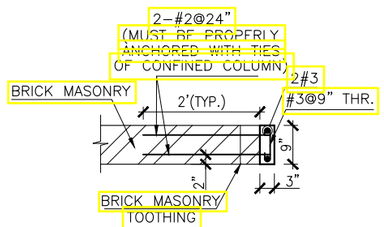
TYP. ELEVATION OF VERTICAL CONFINING ELEMENT (VCE)



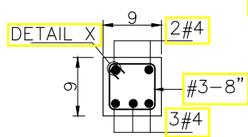
TYP. FOOTING SECTION OF 4½" THICK MASONRY WALL



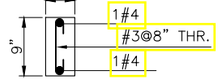
SECTION D–D



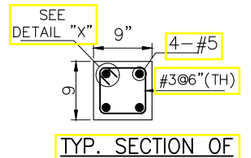
SECTION C–C



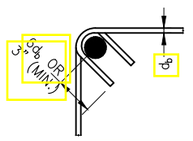
TYP. SECTION OF LINTEL BEAM 9" THICK BRICK WALL



TYP. SECTION OF LINTEL BEAM 4½" THICK BRICK WALL

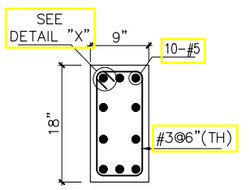


TYP. SECTION OF COLUMN (C–1)

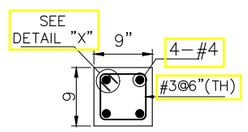


DETAIL–X

TYP. 135° HOOK DETAIL FOR TIES & STIRRUPS



TYP. SECTION OF COLUMN (C–2)



TYP. CONFINED COLUMN V.C.E

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

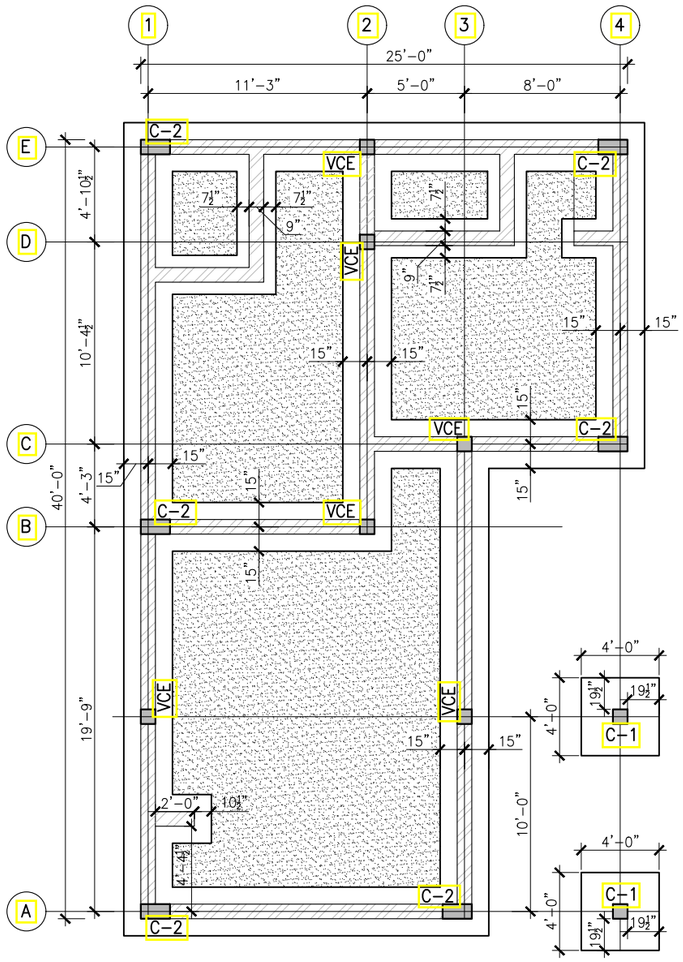
BLOCK - 3

GENERAL NOTES & TYPICAL DETAILS

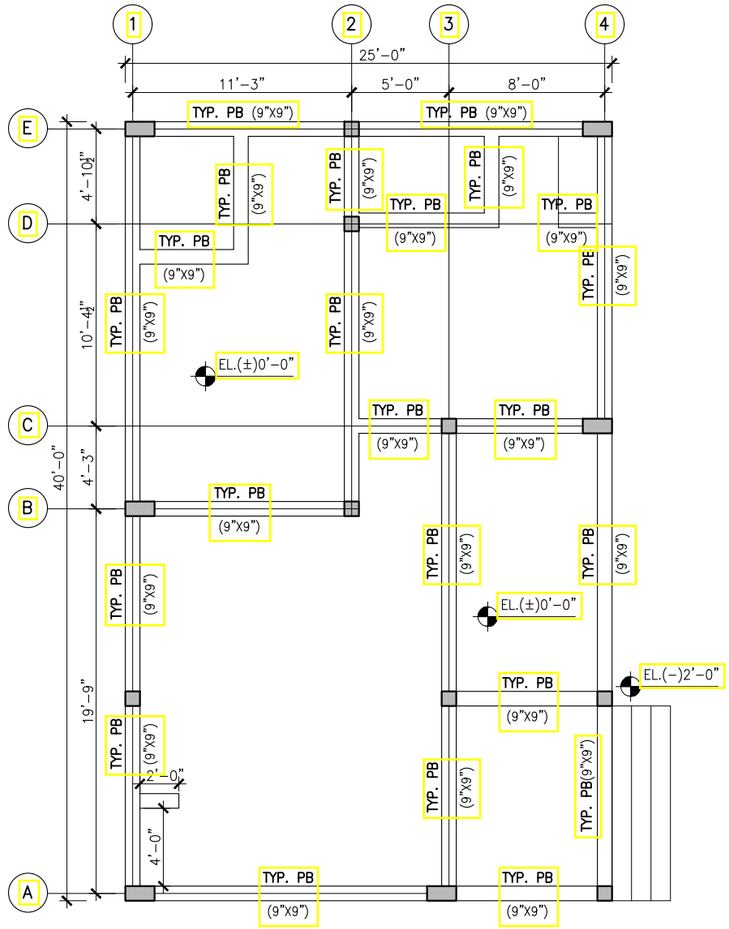
(SHEET 2 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/03G03	0
SUBM.			

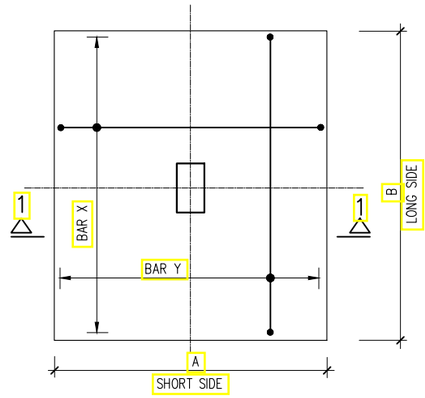


FOUNDATION & COLUMN LAYOUT PLAN

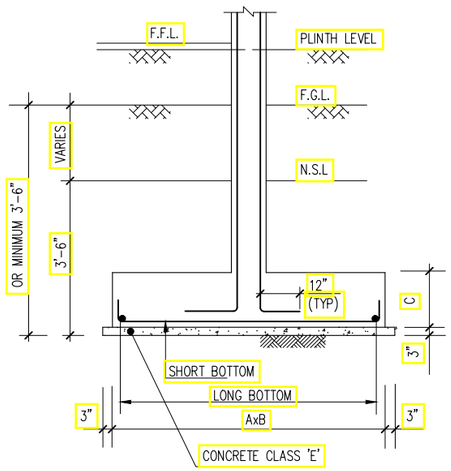


PLINTH BAND LAYOUT PLAN AT EL. (±)0'-0"

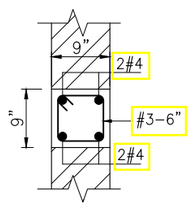
FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS



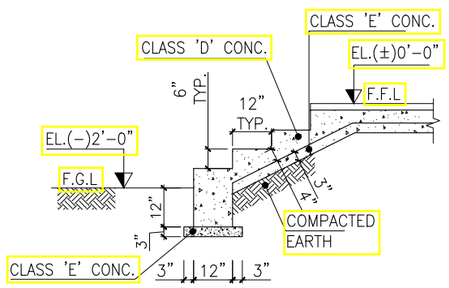
PLAN OF ISOLATED FOOTING



SECTION OF ISOLATED FOOTING (TYP)
(SECTION 1-1)



TYPICAL SECTION OF PLINTH BAND (TYP. PB)



TYPICAL SECTION OF P.C.C STEPS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
4. THE FOUNDATION HAS BEEN DESIGNED ON GROSS ALLOWABLE BEARING CAPACITY OF 0.75 TON/SFT AT A DEPTH OF 3'-0" BELOW N.S.L OR F.G.L WHICH EVER IS LOWER.
5. IF COMPETENT BEARING STRATA IS NOT FOUND AT INDICATED DEPTH, THE ENGINEER SHALL BE NOTIFIED FOR HIS PRIOR INSTRUCTIONS.
6. BOTTOM OF FOOTING SHOULD BE PROVIDED 3'-0" BELOW NSL OR F.G.L WHICH EVER IS LOWER.
7. FOR EL. ±0'-0", REFER MASTER PLAN.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

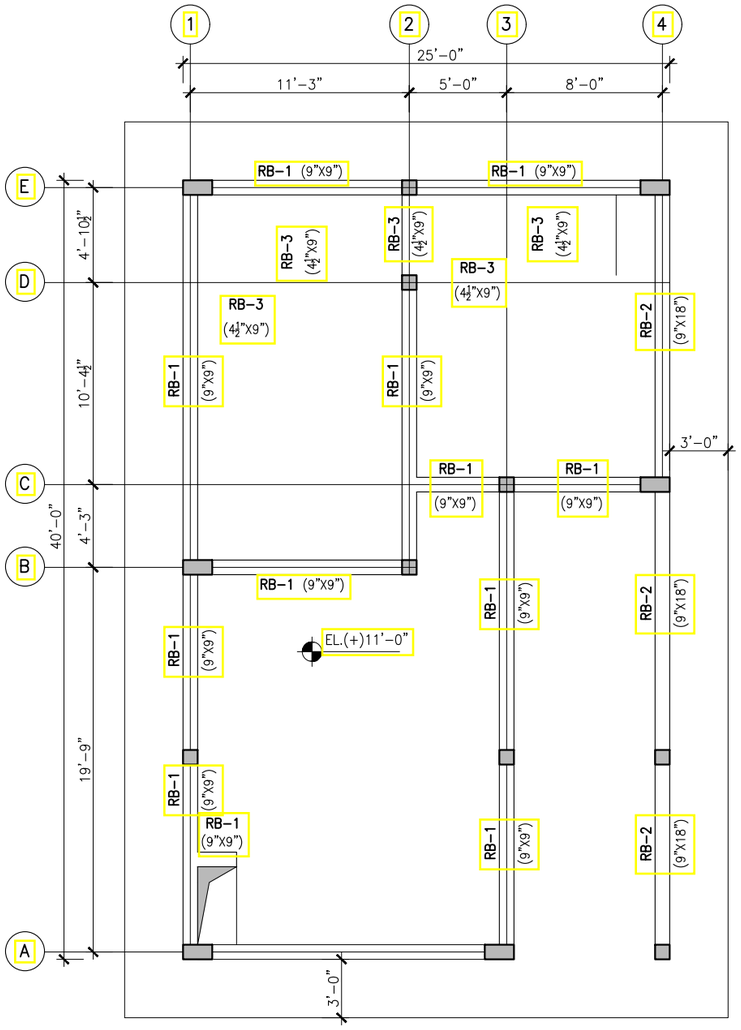
GUEST UNITS

BLOCK - 3

FOUNDATION & COLUMN LAYOUT PLAN AND PLINTH BAND LAYOUT PLAN

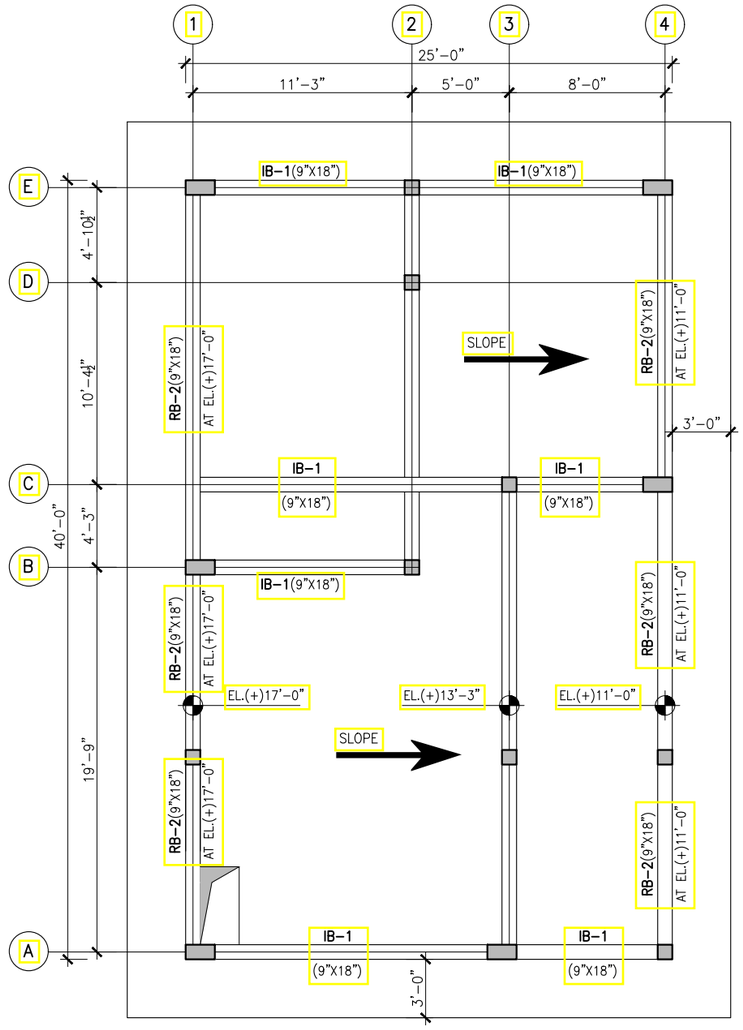
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.			
SUBM.	FEB 2026	156/328/TD/03G04	0



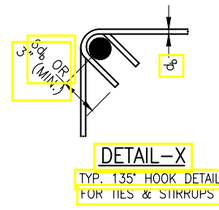
ROOF BEAM LAYOUT PLAN AT EL. (+)11'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS



INCLINED BEAM LAYOUT PLAN FROM EL. (+)11'-0" TO 17'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS

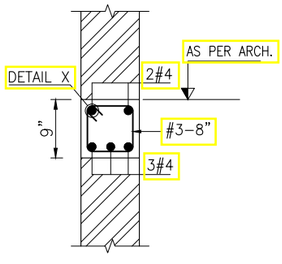


DETAIL–X

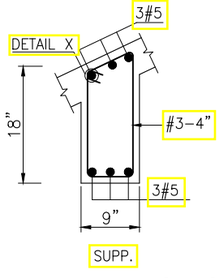
TYP. 135° HOOK DETAIL FOR TIES & STIRRUPS

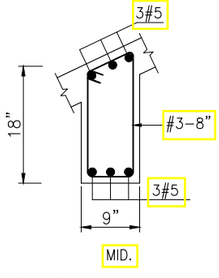
NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.

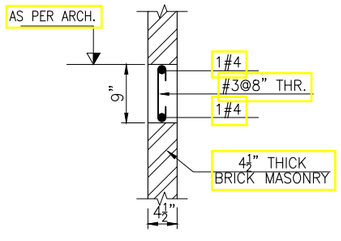


TYP. SEC. OF RB-1

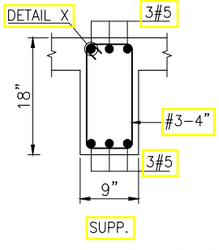


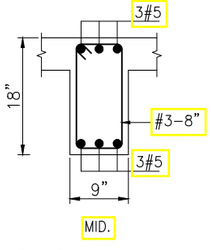


TYPICAL SECTION OF RB-2



TYPICAL SECTION OF RB-3





TYPICAL SECTION OF IB-1

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 3

FRAMING & REINF. PLAN AT EL. (+)11'-0" & FROM EL.(+)11'-0" TO EL.(+)17'-6"

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.			
FILE			
CKD.			
SUBM.			

DATE	DRAWING NO.	REV.
FEB 2026	156/328/TD/03G05	0

A. GENERAL

1. NOTES GIVEN ON THIS DRAWING ARE APPLICABLE TO ALL STRUCTURAL DRAWINGS UNLESS OTHERWISE NOTED. NOTES WRITTEN ON ANY OTHER DRAWING SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS REFERRED.
2. SYSTEM OF UNITS IS FPS.
3. ALL LEVELS MARKED ON THE DRAWINGS ARE LEVELS OF STRUCTURAL ELEMENTS. FINISH LEVELS SHALL BE IN ACCORDANCE WITH THE ARCHITECTURAL DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE STRUCTURE AND ALL TEMPORARY WORKS DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
6. THE CONTRACTOR SHALL CO-ORDINATE ALL DRAWINGS OF ALL DISCIPLINES FOR ALL ITEMS INCLUDING BUT NOT LIMITED TO SIZES AND LOCATION OF ALL OPENINGS REQUIRED FOR DUCTS, PIPES AND PIPE SLEEVES, ELECTRICAL CONDUITS AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE OR OTHERWISE INCORPORATED IN STRUCTURAL WORK AND SHALL BRING TO THE NOTICE OF THE ENGINEER DISCREPANCIES, IF ANY, FOR HIS INSTRUCTIONS, PRIOR TO THE START OF WORK.
7. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
8. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE CLIENT AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
9. THE CONTRACTOR SHALL COORDINATE SCHEDULE OF CONSTRUCTION WITH SUPPLY AND INSTALLATION OF EQUIPMENT.
10. PROVISIONS SHALL BE MADE FOR INSTALLATION OF EQUIPMENT AS PER MANUFACTURER'S RECOMMENDATIONS.
11. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/ DEVIATIONS MAY LEAD TO REJECTION/ REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
12. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO SPECIFICATIONS OF THE CONTRACT. IN ABSENCE OF ANY EXPRESS OR IMPLIED SPECIFICATION IN THE CONTRACT, ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO RELEVANT AMERICAN STANDARDS AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
13. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF SHOP DRAWINGS AND BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.

B. FOUNDATION AND EARTHWORK

1. THE CONTRACTOR SHALL STUDY THE AVAILABLE GEOTECHNICAL INVESTIGATION REPORT BEFORE COMMENCING THE WORK.
2. FOUNDATION DESIGN IS BASED ON PARAMETERS PROVIDED IN GEOTECH. INVESTIGATION REPORT.
3. FOUNDATION IS TO BE PLACED 3'-0" (0.93m) BELOW F.G.L. OR N.S.L WHICHEVER IS LOWER.
4. TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.
5. THE TYPE AND COMPACTION OF SOIL BELOW GRADE SLAB SHALL BE AS PER JOB SPECIFICATIONS. NO FOOTING SHALL BE PLACED ON FILL. HOWEVER, AREAS WHERE FILLING BELOW THE FOOTINGS BECOMES INEVITABLE DUE TO OVER-EXCAVATION (IF ANY), SHALL BE FILLED WITH P.C.C. (1:4:8) WITH PRIOR APPROVAL OF THE ENGINEER, AT NO EXTRA COST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING SYSTEM IF AND WHERE SO REQUIRED DURING CONSTRUCTION.
7. ALL STRUCTURAL CONCRETE SURFACES AGAINST WHICH EARTH IS TO BE FILLED SHALL BE COATED WITH TWO COATS OF HOT BITUMEN (10/20 GRADE) APPLIED AT THE RATE OF 0.49 kg/sqm PER COAT, EXCEPT FOR P.C.C. (1:3:6) AND P.C.C. (1:4:8).
8. BACKFILLING AND COMPACTION SHALL BE CARRIED OUT EQUALLY ON BOTH SIDES OF PLINTH BEAMS TO AVOID IMBALANCE OF LATERAL EARTH PRESSURE.
9. THE CONTRACTOR SHALL SUPPLY AND ERECT ADEQUATE SHORING AND SUPPORT THE SIDES OF ALL EXCAVATIONS WHERE REQUIRED TO SAFEGUARD WORKMEN AND PROTECT ANY ADJACENT STRUCTURES.
10. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.
11. EXCAVATIONS ADJACENT TO EXISTING STRUCTURES AND/OR UNDERGROUND SERVICES SHALL BE MADE BY HAND.

C. REINFORCED CONCRETE/ PLAIN CEMENT CONCRETE

1. ALL CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022, OR ANY OTHER RELEVANT SPECS GIVEN IN CONTRACT.
2. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & SPECIFICATIONS AND THE MINIMUM CUBE CRUSHING STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	NOMINAL MIX RATIO	CUBE STRENGTH AT 28-DAYS (psi.)
A	1:1:2	4,500
B	1:1½:3	3,750
C	1:2:4	3,000
D	1:3:6	2,000
E	1:4:8	1,200

C. REINFORCED / PLAIN CEMENT CONCRETE (CONTINUED)

3. CLASS OF CONCRETE FOR DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE AS FOLLOWS UNLESS NOTED OTHER WISE:

COMPONENT	CONCRETE CLASS
MASONRY WALL FOUNDATION	C
FOUNDATION OF RCC COLUMNS	C
COLUMNS, SLABS & BEAMS,VCE	C
P.C.C. STEPS	D
LEAN CONCRETE	E

4. ORDINARY PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETE WORKS.
5. AN INTEGRAL WATER PROOFING AGENT SHALL BE USED IN CONCRETE THAT IS CONSTANTLY OR INTERMITTENTLY IN CONTACT WITH WATER AS PER MANUFACTURER'S RECOMMENDATIONS
6. CONCRETE CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

STRUCTURAL MEMBER / ELEMENT	MINIMUM COVER (INCHES)
FOUNDATIONS (ALL TYPES)	2"
COLUMNS & BEAMS	1½"
RETAINING WALLS	1½"
SLABS	¾"
PLINTH / LINTEL BAND	¾"

7. ALL REINFORCING STEEL SHALL BE DEFORMED, HOT ROLLED BILLET STEEL BARS CONFORMING TO ASTM A-615 GRADE-60 WITH SPECIFIED YIELD STRENGTH OF NOT LESS THAN 60,000 psi.
8. THE NUMBER INDICATES THE BAR DIAMETER/SIZE, AS UNDER:

BAR NUMBER	DIAMETER (INCHES)
3	⅜"
4	½"
5	⅝"
6	¾"
8	1"

9. ALL DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315, ACI-318 & ACI-350R.
10. ALL REINFORCING STEEL SHALL BE HELD FIRMLY IN PLACE BEFORE AND DURING THE PLACING OF CONCRETE BY MEANS OF WIRES AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.

D. CONCRETE CONSTRUCTION

1. THE CONTRACTOR SHALL SUBMIT CONCRETE POURING SCHEDULE FOR ENGINEER'S APPROVAL. NO CONCRETE SHALL BE POURED UNTIL ITS FORMWORK AND REINFORCEMENT HAS BEEN INSPECTED AND APPROVED BY THE ENGINEER.
2. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BLOCKS ETC. SHOULD BE AVOIDED ON SLAB PANELS.

D. CONT. CONCRETE 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, AND DOWELS FOR STRUCTURAL MEMBERS AND/OR MASONRY ARE PROPERLY LOCATED IN PLACE.

E. CONSTRUCTION JOINTS

1. JOINTS, NOT SHOWN ON THE DRAWING, SHALL BE SO MADE AND LOCATED AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED NEAR THE MIDDLE OF THE SPANS OF SLAB & BEAMS. JOINTS IN WALLS & COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOORS, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.
2. JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS THE JOINTS.
3. JOINTS IN BASE SLAB & WALLS AND ROOF SLAB, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS SHALL BE BORNE BY THE CONTRACTOR. BEAMS & BRACKETS SHALL BE PLACED AT THE SAME TIME AS SLABS.

F. ELECTRICAL CONDUITS

1. CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS & SLABS AND WITHIN THE MIDDLE HALF OF THE THICKNESS. SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6"(150 MM).

G. PROPS, FORMWORK & CURING

1. SHORE & BRACE ALL PARTS OF THE BUILDING DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. SEQUENCE OF REMOVAL OF FORMWORK SHALL BE APPROVED BY THE ENGINEER.
3. AT LEAST ONE LOWER FLOOR SHALL REMAIN PROPPED UNTILL THE UPPER FLOOR IS CAST AND CURED.

H. BRICK MASONRY WORKS

1. ALL BRICK WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022.
2. ALL BRICK SHALL BE SOUND, HARD, WELL BURNT AND OF UNIFORM SIZE,COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 1/8".
3. ALL BRICK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 1/8" IN 10'-0".
4. MORTAR USED IN MASONRY CONSTRUCTION SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 12 MPa (1800Psi) AND SHALL CONFORM TO ASTM C270.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 4

GENERAL NOTES & TYPICAL DETAILS (SHEET 1 OF 3)

[redacted] NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/04G01	0
SUBM.			

J. STRUCTURAL STEEL WORKS

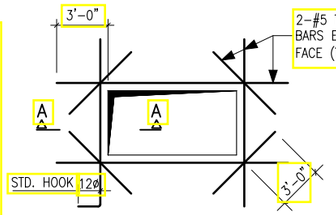
1. ALL STRUCTURAL STEEL WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES–2022.
2. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS.
3. ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A–36 OR EQUIVALENT.
4. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY, AWS, SPECIFICATIONS USING ELECTRODES E70XX.
5. ALL BOLTS SHALL CONFORM TO ASTM A307 OR A325.
6. SURFACE PREPARATION OF ALL STRUCTURAL STEEL FOR PAINTING SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF "STEEL STRUCTURES PAINTING COUNCIL" SPECIFICATIONS SSPC–SP6 FOR COMMERCIAL BLAST CLEANING.
7. ALL STEEL SHALL BE GIVEN ONE SHOP COAT OF RED LEAD OXIDE PRIMER AND FIELD TOUCHUP EXCEPT FOR SURFACES TO BE EMBEDDED IN CONCRETE OR CONTACT SURFACES OF FRICTION BOLTED CONNECTIONS.

K. COLUMN CONFINEMENT

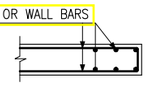
1. IN ORDER TO ATTAIN AN EFFECTIVE BOND BETWEEN THE CONFINING ELEMENTS AND THE MASONRY, THE CONCRETE OF THE CONFINING ELEMENTS SHALL BE CAST AFTER THE MASONRY HAS BEEN BUILT WITH PROPER TOOTHING IN PLACE.
2. CLEAN THE COLUMN SPACE OF ALL RUBBISH BEFORE ADDING THE FORMWORK.
3. POUR THE CONCRETE FOR THE BANDS AND THE COLUMNS AT THE SAME TIME.
4. COMPACT THE CONCRETE WITH VIBRATOR.
5. REMOVE THE FORMWORK NOT EARLIER THAN 03 DAYS.

L. SEISMIC PARAMETERS

1. DESIGN OF STRUCTURE HAS BEEN CARRIED OUT BASED ON SEISMIC PARAMETERS OF ZONE 2B WITH PGA VALUE OF 0.16g to 0.24g & STIFF SOIL PROFILE (SD), ACCORDING TO BUILDING CODE OF PAKISTAN.



WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

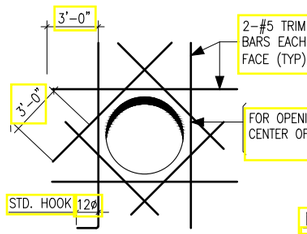


SECTION A–A

NOTES

- FOR OPENING WITH MAXIMUM DIMENSION OVER 5'–0" REFER TO OTHER DETAILS.
- USE THIS DETAILS IF NOT SHOWN IN DESIGN DRAWINGS

REINFORCEMENT DETAIL AT OPENING IN SLAB & WALLS (TYP)



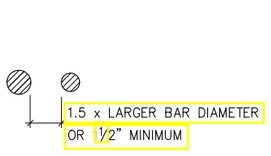
FOR OPENING 1'–0" DIA ADD DIAGONAL BARS CENTER OF SLAB OR WALL SAME SIZE AS LARGEST MAIN BARS

WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

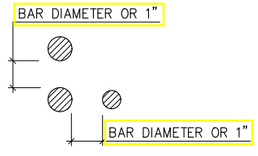
NOTES

MAXIMUM DIAMETER OF SLEVE IS 1'–0" FOR TRIM BARS BARS AROUND LARGE SLEEVE REFER TO OTHER DETAILS

REINFORCEMENT AROUND SLEEVE IN SLABS & WALLS (TYP.)



VERTICAL BAR SPACING



BAR SPACING IN BEAM

LEGEND

MS	MILD STEEL
PVC	POLYVINYL CHLORIDE
C.G.I	CORRUGATED GALVANIZED IRON
G.I	GALVANIZED IRON
SQ	SQUARE
C.Jt	CONSTRUCTION JOINT
T&B	TOP AND BOTTOM
EF	EACH FACE
BF	BOTH FACES
ø/db/#	DIAMETER OF BAR
@	AT THE RATE OF
B	BOTTOM
C/C	CENTER TO CENTER
B.W	BOTHWAYS
E.G.F	ENGINEERED GRANULAR FILL
E.G.L	EXCAVATED GROUND LEVEL
E.L.	STRUCTURAL ELEVATION
EQ.	EQUAL
F.D.T	FIELD DENSITY TEST
F.F.L	FINISH FLOOR LEVEL
F.G.L.	FINISH GROUND LEVEL
F.B.L.	FOUNDATION BED LEVEL
G.W.T.	GROUND WATER TABLE
N.S.L.	EXISTING NATURAL SURFACE LEVEL
N.T.S.	NOT TO SCALE
SMRF	SPECIAL MOMENT RESISTING FRAME
STYP	SOIL PROFILE TYPE
ST.	STIRRUPS
T	TOP
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
N.T.S.	NOT TO SCALE
	LEVEL ON PLAN
℄	CENTER LINE

SPLICE LENGHTH (LS) AND DEVELOPMENT LENGHT (LD) (fc'=3 ksi, fy=40 ksi)

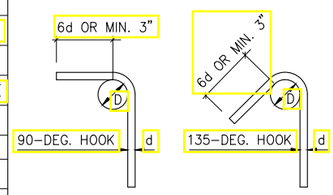
BAR DIA	#3	#4	#5	#6	#7	#8	#10	#12
DEVELOPMENT LENGTH ℓd (Inches)	18	24	30	36	42	47	53	59
SPLICE LENGTH (Inches)	24	32	39	47	55	62	69	77

LAP SPLICE ARE NOT TO BE USED:
- WITHIN JOINTS
- WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH.
- FROM THE FACE OF THE JOINT.

CURTAILMENT LENGTH SHOULD BE EXTEND UPTO L/16,12db OR d, (WHICHEVER GREATER) BEYOND L/3
WHERE:
L–GREATER CLEAR SPAN, db–DIAMETER OF BAR,
d–EFFECTIVE DEPTH.
THE FIRST HOOP SHALL BE LOCATED NOT MORE THAN 2" FROM THE FACE OF THE SUPPORTING MEMBER.

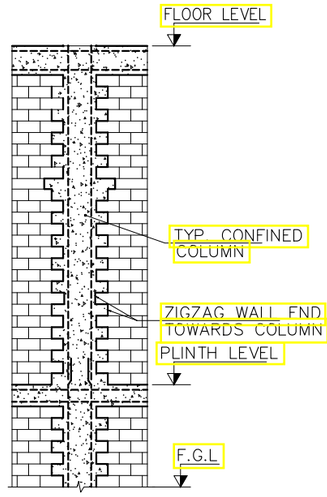
* ALL LAP SPLICE SHALL BE STAGGARED BY AT LEAST 50 %

BAR DIA	D
#3	2½"
#4	3"
#5	4"
#6	4"
#8	6"
#9	7"
#11	8½"



STIRRUPS AND TIE HOOKS

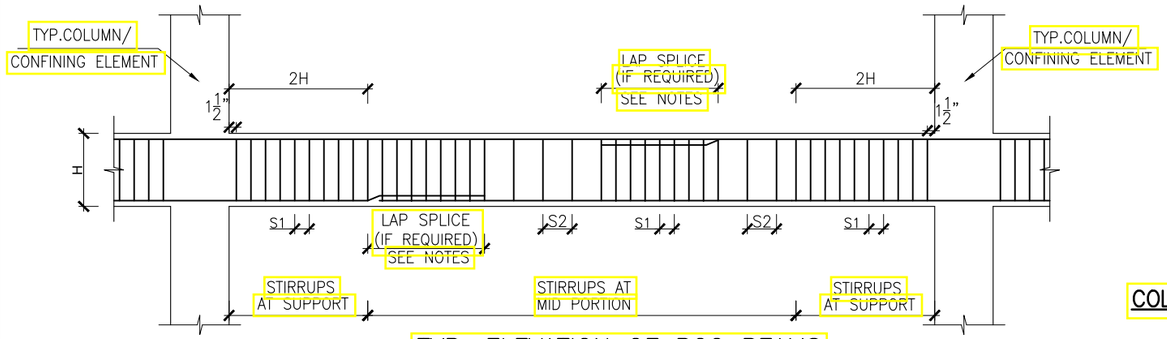
BAR DIA	D
#3	1½"
#4	2"
#5	2½"



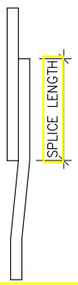
TYPICAL ELEVATION OF CONFINED COLUMN (SHOWING TOOTHING)



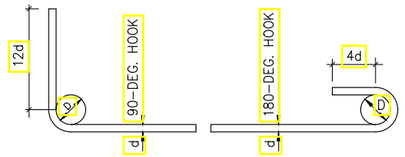
BEAM SPLICE (TYP.)



TYP. ELEVATION OF RCC BEAMS



COLUMN SPLICE (TYP.)



STANDARD BAR HOOKS (MAIN BARS)

LEGENDS

S1	STIRRUPS SPACING IN BEAM NEAR SUPPORTS & LAP SPLICES
S2	STIRRUPS SPACING IN BEAM IN MIDSPAN
h	DEPTH OF BEAM
db	DIAMETER OF BAR
d	EFFECTIVE DEPTH OF BEAM

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

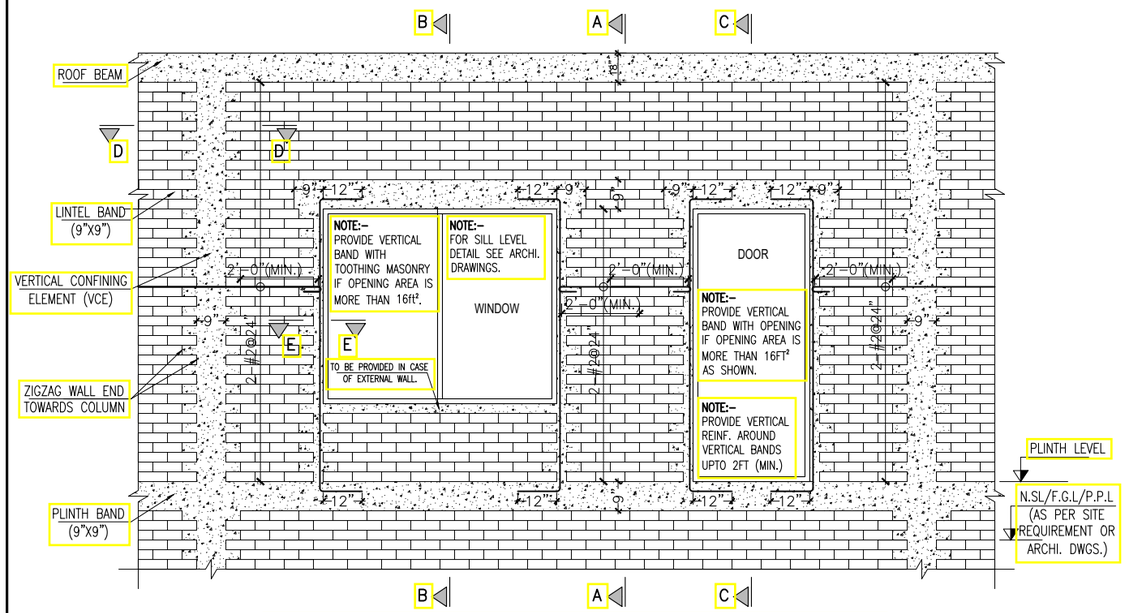
GUEST UNITS

BLOCK - 4

GENERAL NOTES & TYPICAL DETAILS (SHEET 2 OF 3)

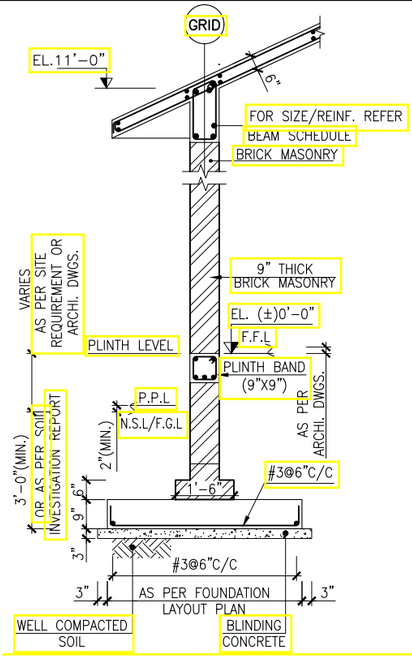
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
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SUBM.	FEB 2026		



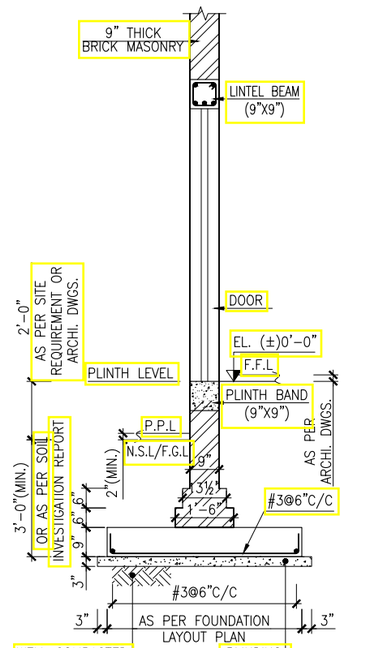
TYPICAL ELEVATION OF 9" THICK CONFINED BRICK MASONRY WALL SINGLE STOREY WALL MASONRY

(FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS)



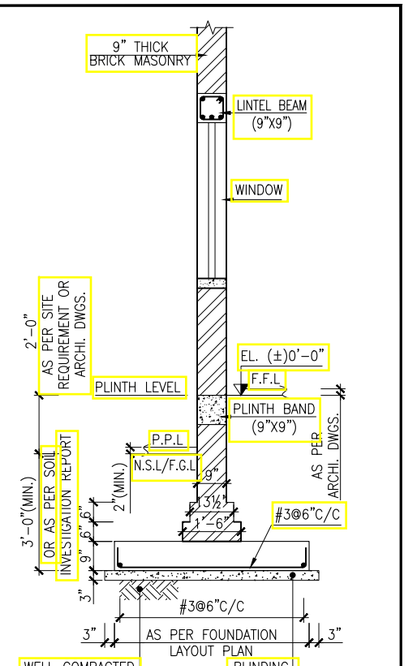
SECTION A–A

TYP. FOOTING SECTION OF EXTERNAL/ INTERNAL WALL WITHOUT OPENING



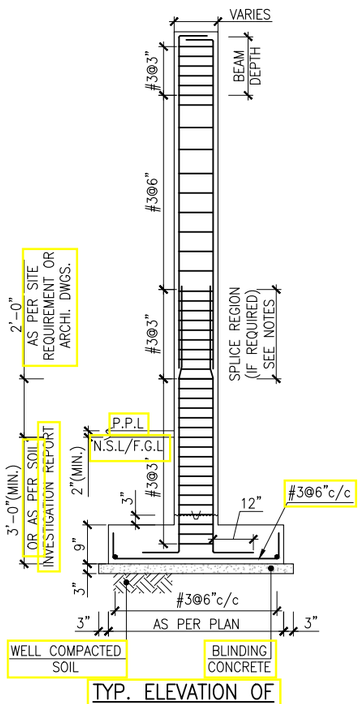
SECTION C–C

TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT DOOR

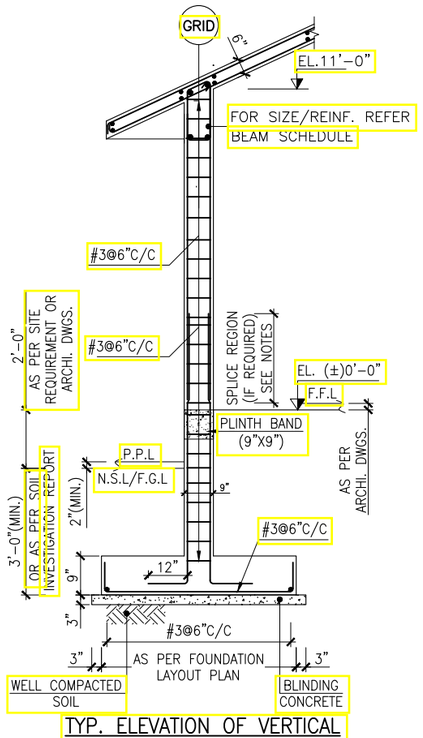


SECTION B–B

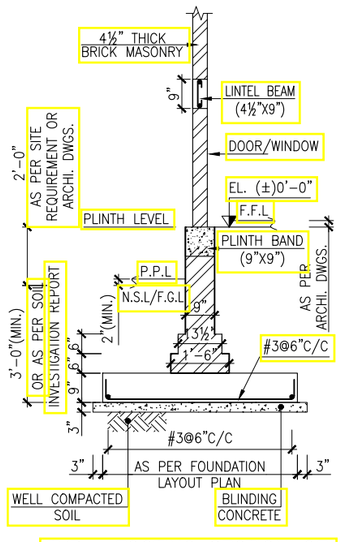
TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT WINDOW



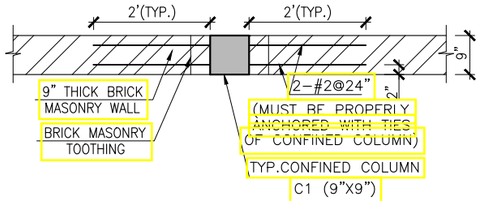
TYP. ELEVATION OF COLUMN C–1



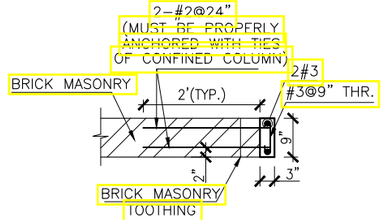
TYP. ELEVATION OF VERTICAL CONFINING ELEMENT (VCE)



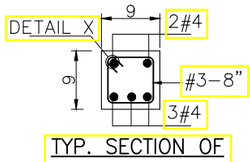
TYP. FOOTING SECTION OF 4½" THICK MASONRY WALL



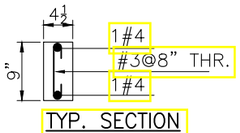
SECTION D–D



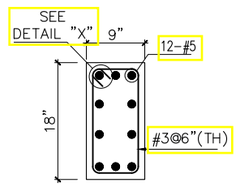
SECTION E–E



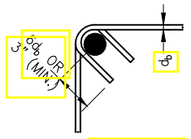
TYP. SECTION OF LINTEL BEAM 9" THICK BRICK WALL



TYP. SECTION OF RB–3

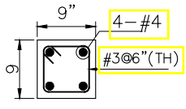


TYP. SECTION OF COLUMN (C–1)



DETAIL–X

TYP. 135° HOOK DETAIL FOR TIES & STIRRUPS



TYP. CONFINED COLUMN V.C.E

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

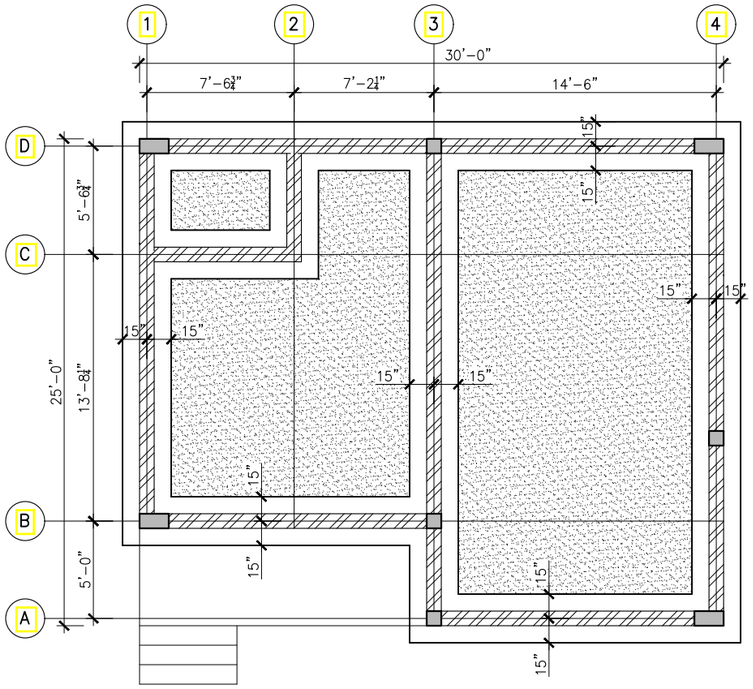
BLOCK - 4

GENERAL NOTES & TYPICAL DETAILS

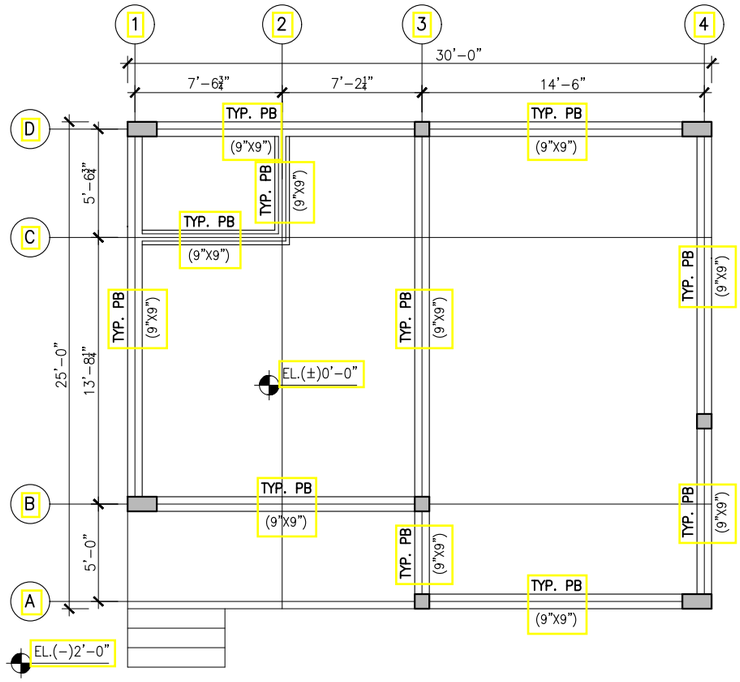
(SHEET 3 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/04G03	0
SUBM.			

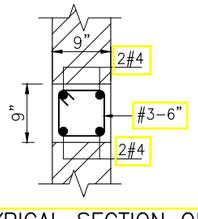


FOUNDATION & COLUMN LAYOUT PLAN

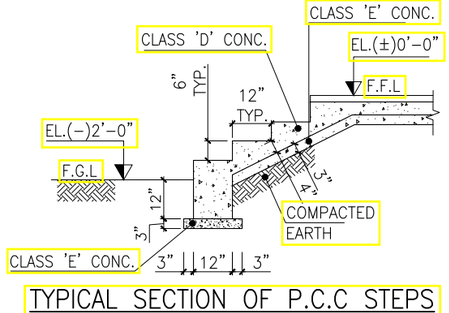


PLINTH BAND LAYOUT PLAN AT EL. (±)0'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS



TYPICAL SECTION OF PLINTH BAND (TYP. PB)



TYPICAL SECTION OF P.C.C STEPS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
4. THE FOUNDATION HAS BEEN DESIGNED ON GROSS ALLOWABLE BEARING CAPACITY OF 0.75 TON/SFT AT A DEPTH OF 3'-0" BELOW N.S.L OR F.G.L WHICH EVER IS LOWER.
5. IF COMPETENT BEARING STRATA IS NOT FOUND AT INDICATED DEPTH, THE ENGINEER SHALL BE NOTIFIED FOR HIS PRIOR INSTRUCTIONS.
6. BOTTOM OF FOOTING SHOULD BE PROVIDED 3'-0" BELOW NSL OR F.G.L WHICH EVER IS LOWER.
7. FOR EL. ±0'-0", REFER MASTER PLAN.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

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GUEST UNITS

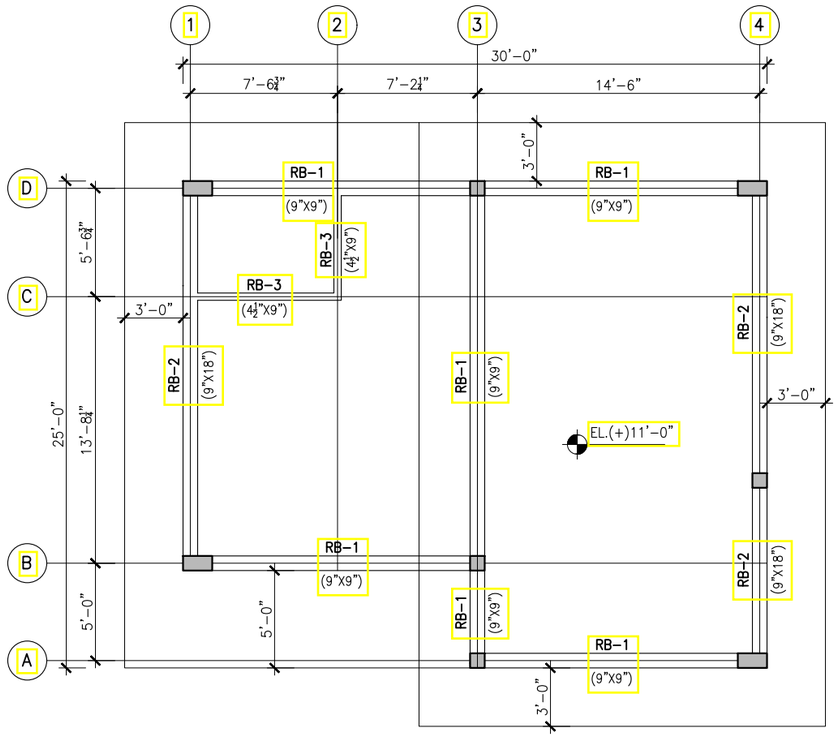
BLOCK - 4

FOUNDATION & COLUMN LAYOUT PLAN AND PLINTH BAND LAYOUT PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

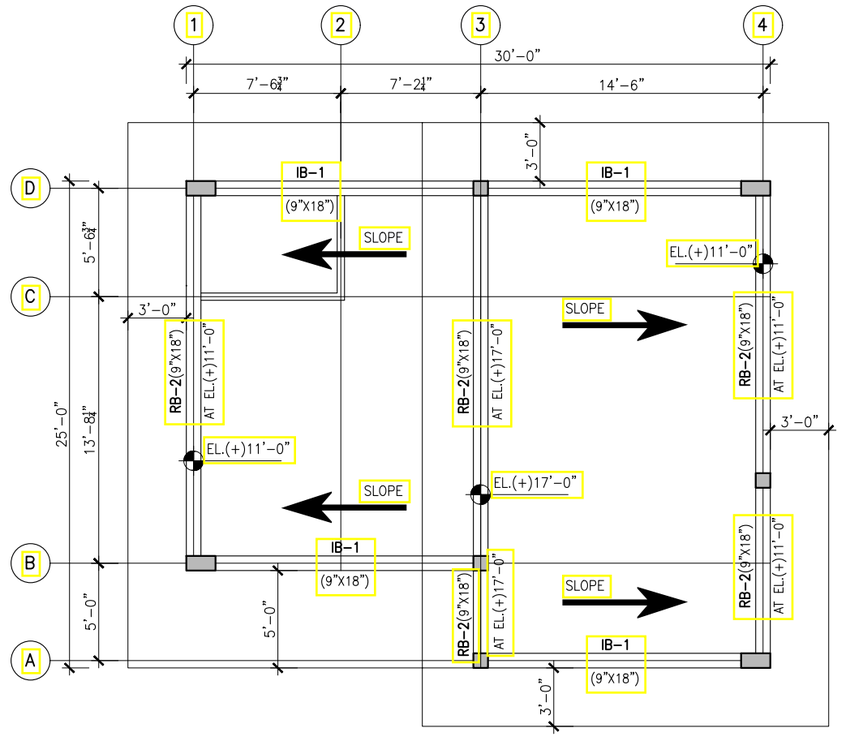
DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE			
CKD.			
SUBM.			

DATE	DRAWING NO.	REV.
FEB 2026	156/328/TD/04G04	0



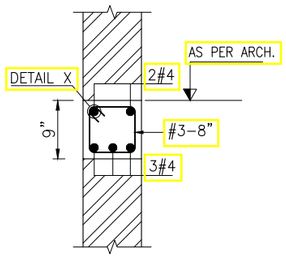
ROOF BEAM LAYOUT PLAN AT EL. (+)11'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS

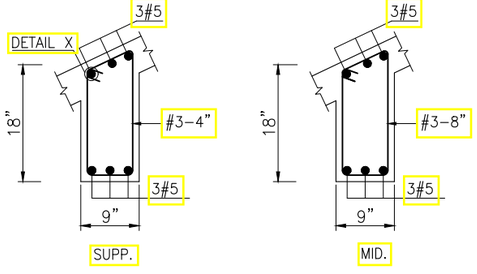


INCLINED BEAM LAYOUT PLAN FROM EL. (+)11'-0" TO EL.(+)17'-0"

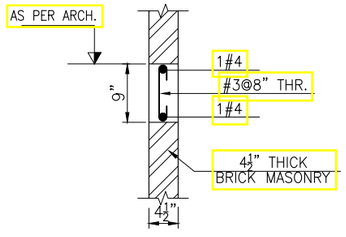
ALL SLOPING SLABS ARE 6" THICK UNLESS NOTED OTHERWISE



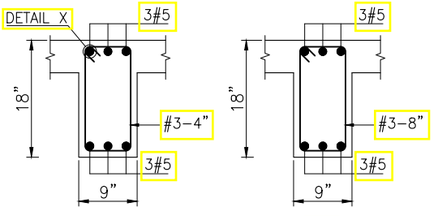
TYP. SEC. OF RB-1



TYPICAL SECTION OF RB-2



SEC. OF RB-3
4½" THICK BRICK WALL



TYPICAL SECTION OF IB-1

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.

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GUEST UNITS

BLOCK - 4

FRAMING PLAN AT EL.(+)11'-0" & FROM EL.(+)11'-0" TO EL.(+)17'-0"

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE			
CKD.			
SUBM.	DATE FEB 2026	DRAWING NO. 156/328/TD/04G05	REV. 0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

A. GENERAL

1. NOTES GIVEN ON THIS DRAWING ARE APPLICABLE TO ALL STRUCTURAL DRAWINGS UNLESS OTHERWISE NOTED. NOTES WRITTEN ON ANY OTHER DRAWING SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS REFERRED.
2. SYSTEM OF UNITS IS FPS.
3. ALL LEVELS MARKED ON THE DRAWINGS ARE LEVELS OF STRUCTURAL ELEMENTS. FINISH LEVELS SHALL BE IN ACCORDANCE WITH THE ARCHITECTURAL DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE STRUCTURE AND ALL TEMPORARY WORKS DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
6. THE CONTRACTOR SHALL CO-ORDINATE ALL DRAWINGS OF ALL DISCIPLINES FOR ALL ITEMS INCLUDING BUT NOT LIMITED TO SIZES AND LOCATION OF ALL OPENINGS REQUIRED FOR DUCTS, PIPES AND PIPE SLEEVES, ELECTRICAL CONDUITS AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE OR OTHERWISE INCORPORATED IN STRUCTURAL WORK AND SHALL BRING TO THE NOTICE OF THE ENGINEER DISCREPANCIES, IF ANY, FOR HIS INSTRUCTIONS, PRIOR TO THE START OF WORK.
7. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
8. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE CLIENT AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
9. THE CONTRACTOR SHALL COORDINATE SCHEDULE OF CONSTRUCTION WITH SUPPLY AND INSTALLATION OF EQUIPMENT.
10. PROVISIONS SHALL BE MADE FOR INSTALLATION OF EQUIPMENT AS PER MANUFACTURER'S RECOMMENDATIONS.
11. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/ DEVIATIONS MAY LEAD TO REJECTION/ REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
12. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO SPECIFICATIONS OF THE CONTRACT. IN ABSENCE OF ANY EXPRESS OR IMPLIED SPECIFICATION IN THE CONTRACT, ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO RELEVANT AMERICAN STANDARDS AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
13. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF SHOP DRAWINGS AND BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.

B. FOUNDATION AND EARTHWORK

1. THE CONTRACTOR SHALL STUDY THE AVAILABLE GEOTECHNICAL INVESTIGATION REPORT BEFORE COMMENCING THE WORK.
2. FOUNDATION DESIGN IS BASED ON PARAMETERS PROVIDED IN GEOTECH. INVESTIGATION REPORT.
3. FOUNDATION IS TO BE PLACED 3'-0" (0.93m) BELOW F.G.L. OR N.S.L WHICHEVER IS LOWER.
4. TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.
5. THE TYPE AND COMPACTION OF SOIL BELOW GRADE SLAB SHALL BE AS PER JOB SPECIFICATIONS. NO FOOTING SHALL BE PLACED ON FILL. HOWEVER, AREAS WHERE FILLING BELOW THE FOOTINGS BECOMES INEVITABLE DUE TO OVER-EXCAVATION (IF ANY), SHALL BE FILLED WITH P.C.C. (1:4:8) WITH PRIOR APPROVAL OF THE ENGINEER, AT NO EXTRA COST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING SYSTEM IF AND WHERE SO REQUIRED DURING CONSTRUCTION.
7. ALL STRUCTURAL CONCRETE SURFACES AGAINST WHICH EARTH IS TO BE FILLED SHALL BE COATED WITH TWO COATS OF HOT BITUMEN (10/20 GRADE) APPLIED AT THE RATE OF 0.49 kg/sqm PER COAT, EXCEPT FOR P.C.C. (1:3:6) AND P.C.C. (1:4:8).
8. BACKFILLING AND COMPACTION SHALL BE CARRIED OUT EQUALLY ON BOTH SIDES OF PLINTH BEAMS TO AVOID IMBALANCE OF LATERAL EARTH PRESSURE.
9. THE CONTRACTOR SHALL SUPPLY AND ERECT ADEQUATE SHORING AND SUPPORT THE SIDES OF ALL EXCAVATIONS WHERE REQUIRED TO SAFEGUARD WORKMEN AND PROTECT ANY ADJACENT STRUCTURES.
10. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.
11. EXCAVATIONS ADJACENT TO EXISTING STRUCTURES AND/OR UNDERGROUND SERVICES SHALL BE MADE BY HAND.

C. REINFORCED CONCRETE/ PLAIN CEMENT CONCRETE

1. ALL CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022, OR ANY OTHER RELEVANT SPECS GIVEN IN CONTRACT.
2. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & SPECIFICATIONS AND THE MINIMUM CUBE CRUSHING STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	NOMINAL MIX RATIO	CUBE STRENGTH AT 28-DAYS (psi.)
A	1:1:2	4,500
B	1:1½:3	3,750
C	1:2:4	3,000
D	1:3:6	2,000
E	1:4:8	1,200

C. REINFORCED / PLAIN CEMENT CONCRETE (CONTINUED)

3. CLASS OF CONCRETE FOR DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE AS FOLLOWS UNLESS NOTED OTHER WISE:

COMPONENT	CONCRETE CLASS
MASONRY WALL FOUNDATION	C
FOUNDATION OF RCC COLUMNS	C
COLUMNS, SLABS & BEAMS,VCE	C
P.C.C. STEPS	D
LEAN CONCRETE	E

4. ORDINARY PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETE WORKS.
5. AN INTEGRAL WATER PROOFING AGENT SHALL BE USED IN CONCRETE THAT IS CONSTANTLY OR INTERMITTENTLY IN CONTACT WITH WATER AS PER MANUFACTURER'S RECOMMENDATIONS
6. CONCRETE CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

STRUCTURAL MEMBER / ELEMENT	MINIMUM COVER (INCHES)
FOUNDATIONS (ALL TYPES)	2"
COLUMNS & BEAMS	1½"
RETAINING WALLS	1½"
SLABS	¾"
PLINTH / LINTEL BAND	¾"

7. ALL REINFORCING STEEL SHALL BE DEFORMED, HOT ROLLED BILLET STEEL BARS CONFORMING TO ASTM A-615 GRADE-60 WITH SPECIFIED YIELD STRENGTH OF NOT LESS THAN 60,000 psi.
8. THE NUMBER INDICATES THE BAR DIAMETER/SIZE, AS UNDER:

BAR NUMBER	DIAMETER (INCHES)
3	3/8"
4	1/2"
5	5/8"
6	3/4"
8	1"

9. ALL DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315, ACI-318 & ACI-350R.
10. ALL REINFORCING STEEL SHALL BE HELD FIRMLY IN PLACE BEFORE AND DURING THE PLACING OF CONCRETE BY MEANS OF WIRES AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.

D. CONCRETE CONSTRUCTION

1. THE CONTRACTOR SHALL SUBMIT CONCRETE POURING SCHEDULE FOR ENGINEER'S APPROVAL. NO CONCRETE SHALL BE POURED UNTIL ITS FORMWORK AND REINFORCEMENT HAS BEEN INSPECTED AND APPROVED BY THE ENGINEER.
2. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BLOCKS ETC. SHOULD BE AVOIDED ON SLAB PANELS.

D. CONT. CONCRETE CONSTRUCTION

1. BEFORE CASTING OF ANY STRUCTURAL MEMBER, THE CONTRACTOR SHALL ENSURE THAT ALL EMBEDDED ITEMS FOR ELECTRICAL, MECHANICAL, HVAC, PLUMBING, STRUCTURAL STEEL AND OTHER WORKS, AND DOWELS FOR STRUCTURAL MEMBERS AND/OR MASONRY ARE PROPERLY LOCATED IN PLACE.

E. CONSTRUCTION JOINTS

1. JOINTS, NOT SHOWN ON THE DRAWING, SHALL BE SO MADE AND LOCATED AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED NEAR THE MIDDLE OF THE SPANS OF SLAB & BEAMS. JOINTS IN WALLS & COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOORS, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.
2. JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS THE JOINTS.
3. JOINTS IN BASE SLAB & WALLS AND ROOF SLAB, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS SHALL BE BORNE BY THE CONTRACTOR. BEAMS & BRACKETS SHALL BE PLACED AT THE SAME TIME AS SLABS.

F. ELECTRICAL CONDUITS

1. CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS & SLABS AND WITHIN THE MIDDLE HALF OF THE THICKNESS. SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6"(150 MM).

G. PROPS, FORMWORK & CURING

1. SHORE & BRACE ALL PARTS OF THE BUILDING DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. SEQUENCE OF REMOVAL OF FORMWORK SHALL BE APPROVED BY THE ENGINEER.
3. AT LEAST ONE LOWER FLOOR SHALL REMAIN PROPPED UNTILL THE UPPER FLOOR IS CAST AND CURED.

H. BRICK MASONRY WORKS

1. ALL BRICK WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022.
2. ALL BRICK SHALL BE SOUND, HARD, WELL BURNT AND OF UNIFORM SIZE,COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 1/8".
3. ALL BRICK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 1/8" IN 10'-0".
4. MORTAR USED IN MASONRY CONSTRUCTION SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 12 MPa (1800Psi) AND SHALL CONFORM TO ASTM C270.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 5

GENERAL NOTES & TYPICAL DETAILS
(SHEET 1 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE			
CKD.	DATE	DRAWING NO.	REV.
SUBM.	FEB 2026	156/328/TD/05G01	0

J. STRUCTURAL STEEL WORKS

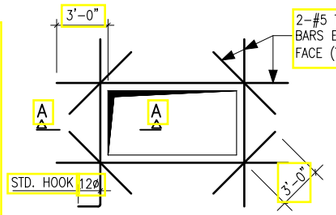
1. ALL STRUCTURAL STEEL WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES–2022.
2. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS.
3. ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A–36 OR EQUIVALENT.
4. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY, AWS, SPECIFICATIONS USING ELECTRODES E70XX.
5. ALL BOLTS SHALL CONFORM TO ASTM A307 OR A325.
6. SURFACE PREPARATION OF ALL STRUCTURAL STEEL FOR PAINTING SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF "STEEL STRUCTURES PAINTING COUNCIL" SPECIFICATIONS SSPC–SP6 FOR COMMERCIAL BLAST CLEANING.
7. ALL STEEL SHALL BE GIVEN ONE SHOP COAT OF RED LEAD OXIDE PRIMER AND FIELD TOUCHUP EXCEPT FOR SURFACES TO BE EMBEDDED IN CONCRETE OR CONTACT SURFACES OF FRICTION BOLTED CONNECTIONS.

K. COLUMN CONFINEMENT

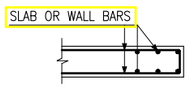
1. IN ORDER TO ATTAIN AN EFFECTIVE BOND BETWEEN THE CONFINING ELEMENTS AND THE MASONRY, THE CONCRETE OF THE CONFINING ELEMENTS SHALL BE CAST AFTER THE MASONRY HAS BEEN BUILT WITH PROPER TOOTHING IN PLACE.
2. CLEAN THE COLUMN SPACE OF ALL RUBBISH BEFORE ADDING THE FORMWORK.
3. POUR THE CONCRETE FOR THE BANDS AND THE COLUMNS AT THE SAME TIME.
4. COMPACT THE CONCRETE WITH VIBRATOR.
5. REMOVE THE FORMWORK NOT EARLIER THAN 03 DAYS.

L. SEISMIC PARAMETERS

1. DESIGN OF STRUCTURE HAS BEEN CARRIED OUT BASED ON SEISMIC PARAMETERS OF ZONE 2B WITH PGA VALUE OF 0.16g to 0.24g & STIFF SOIL PROFILE (SD), ACCORDING TO BUILDING CODE OF PAKISTAN.



WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

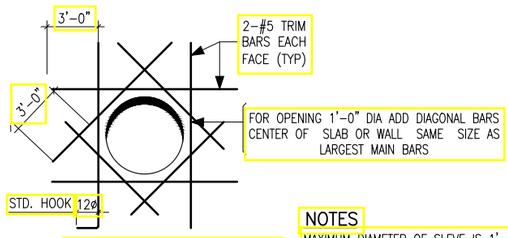


SECTION A–A

NOTES

- FOR OPENING WITH MAXIMUM DIMENSION OVER 5'–0" REFER TO OTHER DETAILS.
- USE THIS DETAILS IF NOT SHOWN IN DESIGN DRAWINGS

REINFORCEMENT DETAIL AT OPENING IN SLAB & WALLS (TYP)

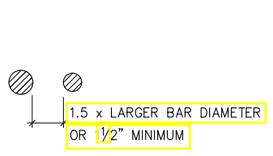


WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

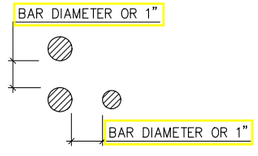
NOTES

MAXIMUM DIAMETER OF SLEVE IS 1'–0" FOR TRIM BARS BARS AROUND LARGE SLEEVE REFER TO OTHER DETAILS

REINFORCEMENT AROUND SLEEVE IN SLABS & WALLS (TYP.)



VERTICAL BAR SPACING



BAR SPACING IN BEAM

LEGEND

MS	MILD STEEL
PVC	POLYVINYL CHLORIDE
C.G.I	CORRUGATED GALVANIZED IRON
G.I	GALVANIZED IRON
SQ	SQUARE
C.Jt	CONSTRUCTION JOINT
T&B	TOP AND BOTTOM
EF	EACH FACE
BF	BOTH FACES
ø/db/#	DIAMETER OF BAR
@	AT THE RATE OF
B	BOTTOM
C/C	CENTER TO CENTER
B.W	BOTHWAYS
E.G.F	ENGINEERED GRANULAR FILL
E.G.L	EXCAVATED GROUND LEVEL
E.L.	STRUCTURAL ELEVATION
EQ.	EQUAL
F.D.T	FIELD DENSITY TEST
F.F.L	FINISH FLOOR LEVEL
F.G.L.	FINISH GROUND LEVEL
F.B.L.	FOUNDATION BED LEVEL
G.W.T.	GROUND WATER TABLE
N.S.L.	EXISTING NATURAL SURFACE LEVEL
N.T.S.	NOT TO SCALE
SMRF	SPECIAL MOMENT RESISTING FRAME
STYP	SOIL PROFILE TYPE
ST.	STIRRUPS
T	TOP
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
N.T.S.	NOT TO SCALE
	LEVEL ON PLAN
℄	CENTER LINE

SPLICE LENGHTH (LS) AND DEVELOPMENT LENGHT (LD) (fc'=3 ksi, fy=40 ksi)

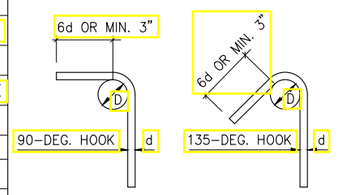
BAR DIA	#3	#4	#5	#6	#7	#8	#10	#12
DEVELOPMENT LENGTH ℓd (Inches)	18	24	30	36	42	47	53	59
SPLICE LENGTH (Inches)	24	32	39	47	55	62	69	77

LAP SPLICE ARE NOT TO BE USED:
- WITHIN JOINTS
- WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH.
- FROM THE FACE OF THE JOINT.

CURTAILMENT LENGTH SHOULD BE EXTEND UPTO L/16,12db OR d, (WHICHEVER GREATER) BEYOND L/3
WHERE:
L–GREATER CLEAR SPAN, db–DIAMETER OF BAR,
d–EFFECTIVE DEPTH.
THE FIRST HOOP SHALL BE LOCATED NOT MORE THAN 2" FROM THE FACE OF THE SUPPORTING MEMBER.

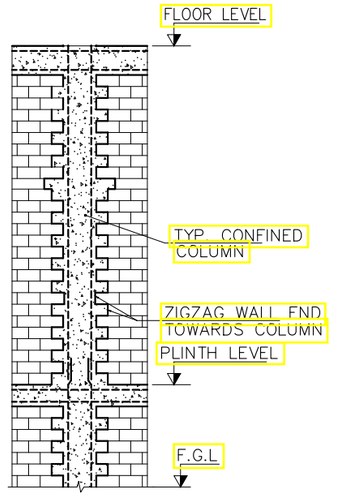
* ALL LAP SPLICE SHALL BE STAGGARED BY AT LEAST 50 %

BAR DIA	D
#3	2½"
#4	3"
#5	4"
#6	4"
#8	6"
#9	7"
#11	8½"

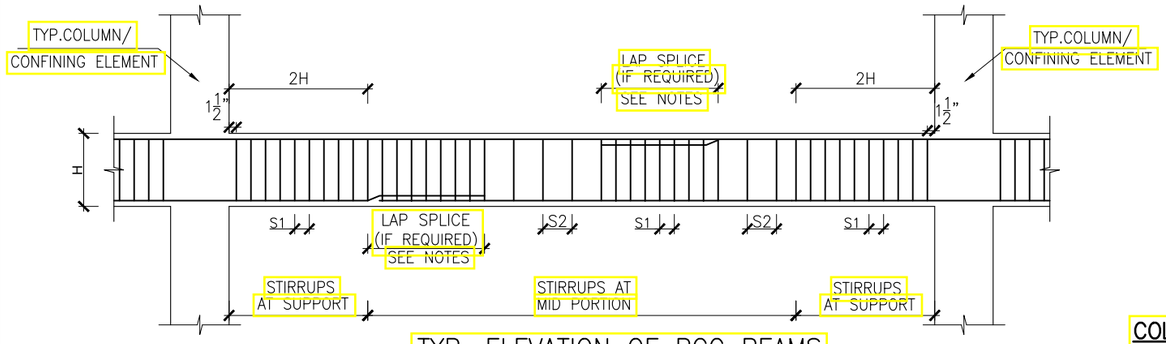


STIRRUPS AND TIE HOOKS

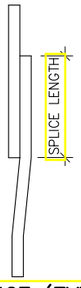
BAR DIA	D
#3	1½"
#4	2"
#5	2½"



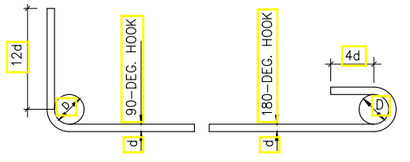
TYPICAL ELEVATION OF CONFINED COLUMN (SHOWING TOOTHING)



TYP. ELEVATION OF RCC BEAMS



COLUMN SPLICE (TYP.)



STANDARD BAR HOOKS (MAIN BARS)



BEAM SPLICE (TYP.)

LEGENDS

S1	STIRRUPS SPACING IN BEAM NEAR SUPPORTS & LAP SPLICES
S2	STIRRUPS SPACING IN BEAM IN MIDSPAN
h	DEPTH OF BEAM
db	DIAMETER OF BAR
d	EFFECTIVE DEPTH OF BEAM

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

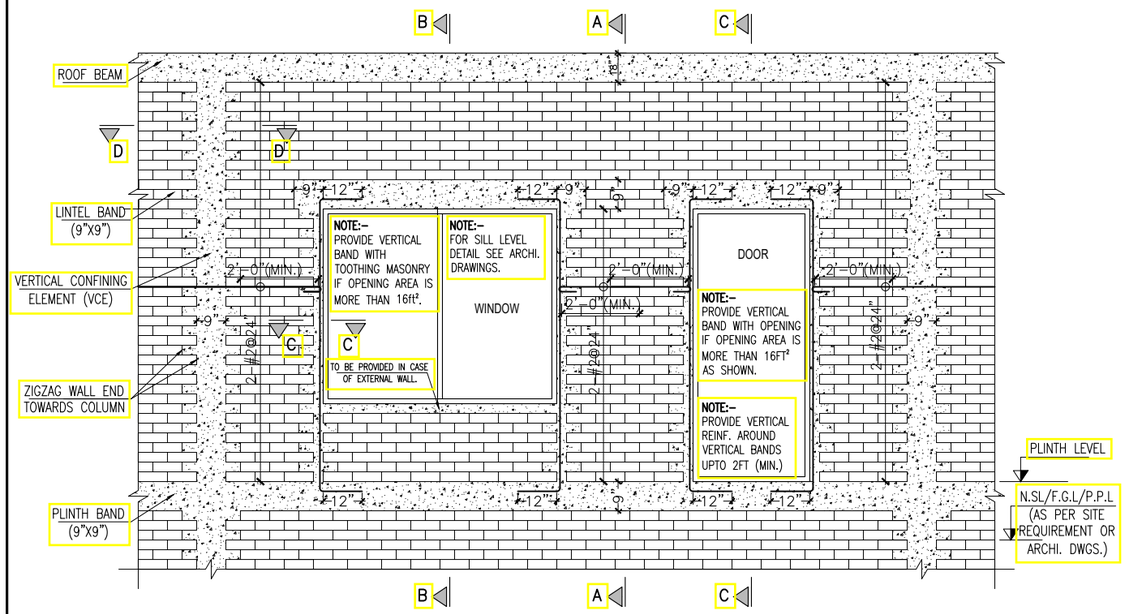
GUEST UNITS

BLOCK - 5

GENERAL NOTES & TYPICAL DETAILS (SHEET 2 OF 3)

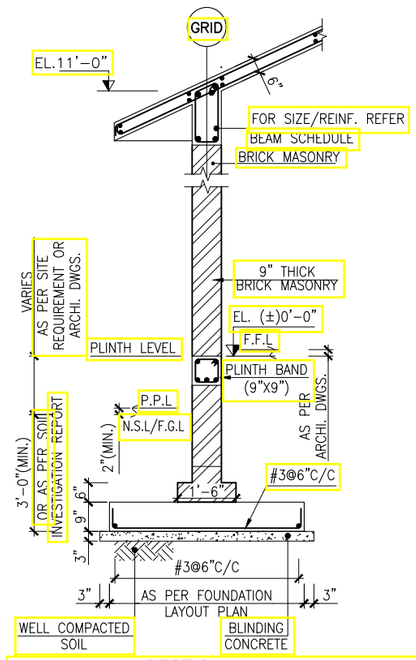
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/05G02	0
SUBM.			



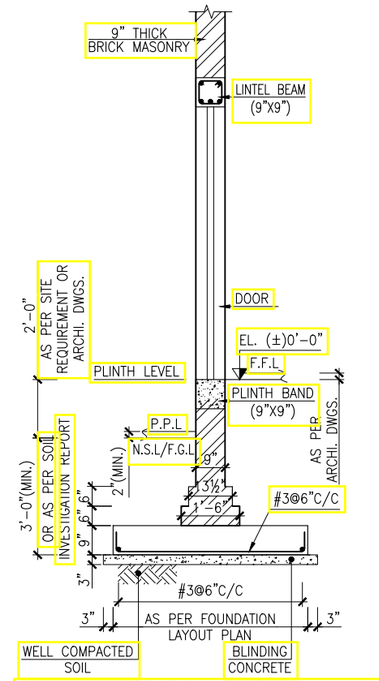
TYPICAL ELEVATION OF 9" THICK CONFINED BRICK MASONRY WALL SINGLE STOREY WALL MASONRY

(FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS)



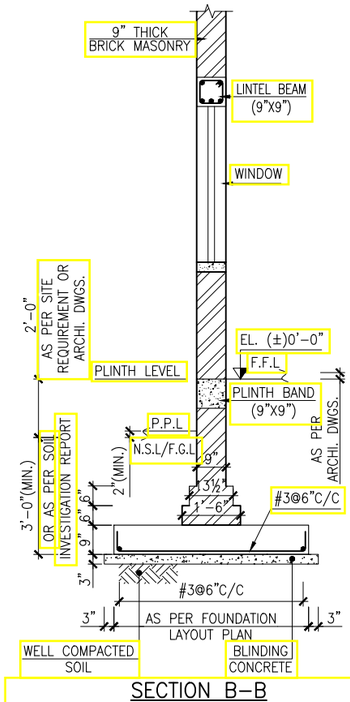
SECTION A–A

TYP. FOOTING SECTION OF EXTERNAL/ INTERNAL WALL WITHOUT OPENING



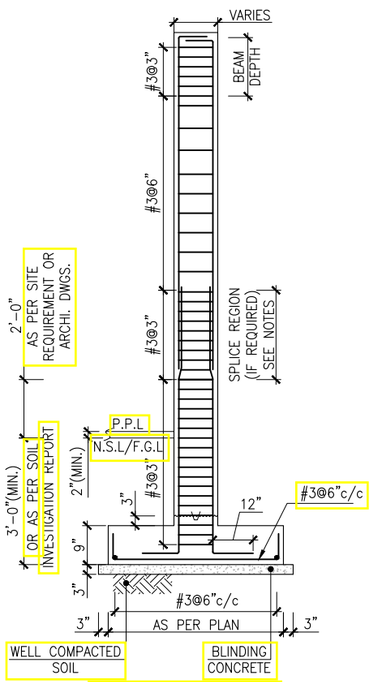
SECTION C–C

TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT DOOR

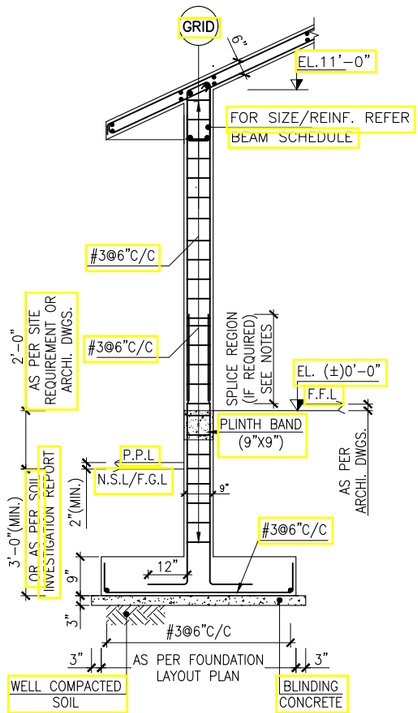


SECTION B–B

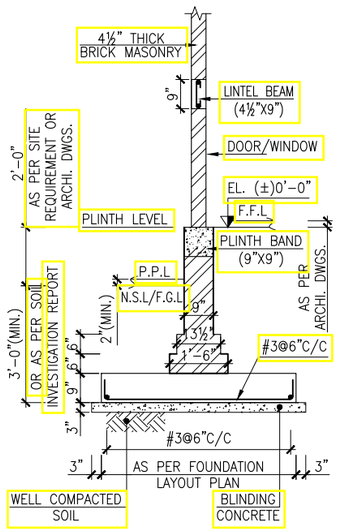
TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT WINDOW



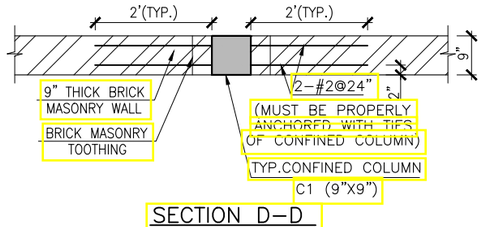
TYP. ELEVATION OF COLUMN C–1



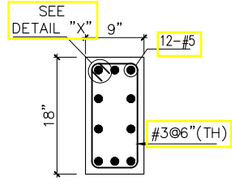
TYP. ELEVATION OF VERTICAL CONFINING ELEMENT (VCE)



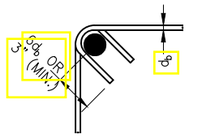
TYP. FOOTING SECTION OF 4½" THICK MASONRY WALL

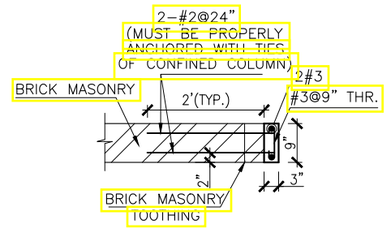


SECTION D–D

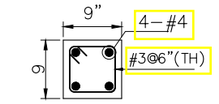


TYP. SECTION OF COLUMN (C–1)

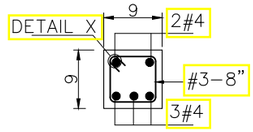




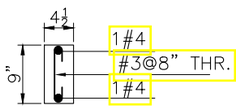
SECTION C–C



TYP. CONFINED COLUMN V.C.E



TYP. SECTION OF LINTEL BEAM 9" THICK BRICK WALL



TYP. SECTION OF RB–5

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

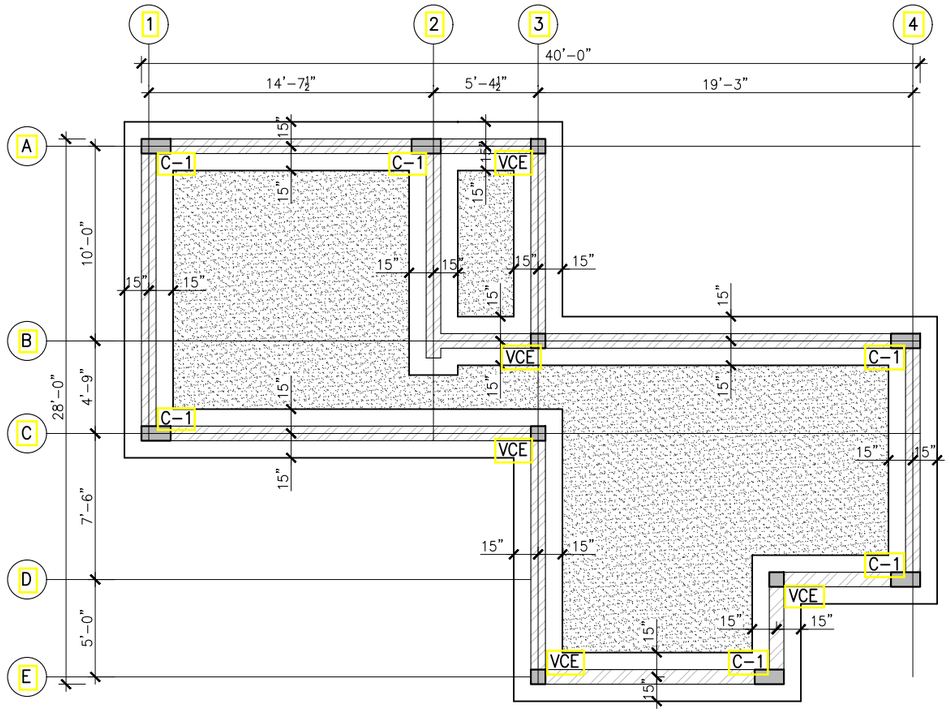
GUEST UNITS

BLOCK - 5

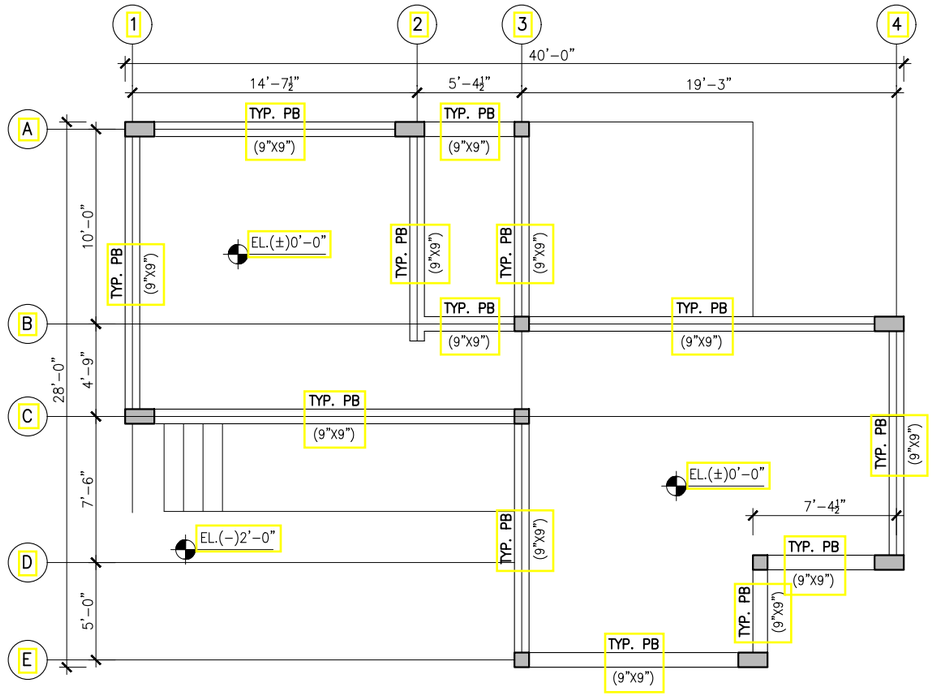
GENERAL NOTES & TYPICAL DETAILS
(SHEET 3 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/05G03	0
SUBM.	FEB 2026		



FOUNDATION & COLUMN LAYOUT PLAN

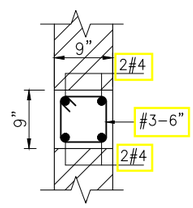


PLINTH BAND LAYOUT PLAN AT EL. (±)0'-0"

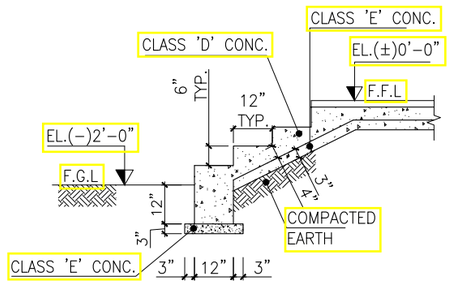
FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
4. THE FOUNDATION HAS BEEN DESIGNED ON GROSS ALLOWABLE BEARING CAPACITY OF 0.75 TON/SFT AT A DEPTH OF 3'-0" BELOW N.S.L OR F.G.L WHICH EVER IS LOWER.
5. IF COMPETENT BEARING STRATA IS NOT FOUND AT INDICATED DEPTH, THE ENGINEER SHALL BE NOTIFIED FOR HIS PRIOR INSTRUCTIONS.
6. BOTTOM OF FOOTING SHOULD BE PROVIDED 3'-0" BELOW NSL OR F.G.L WHICH EVER IS LOWER.
7. FOR EL. ±0'-0", REFER MASTER PLAN.



TYPICAL SECTION OF PLINTH BAND (TYP. PB)



TYPICAL SECTION OF P.C.C STEPS

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

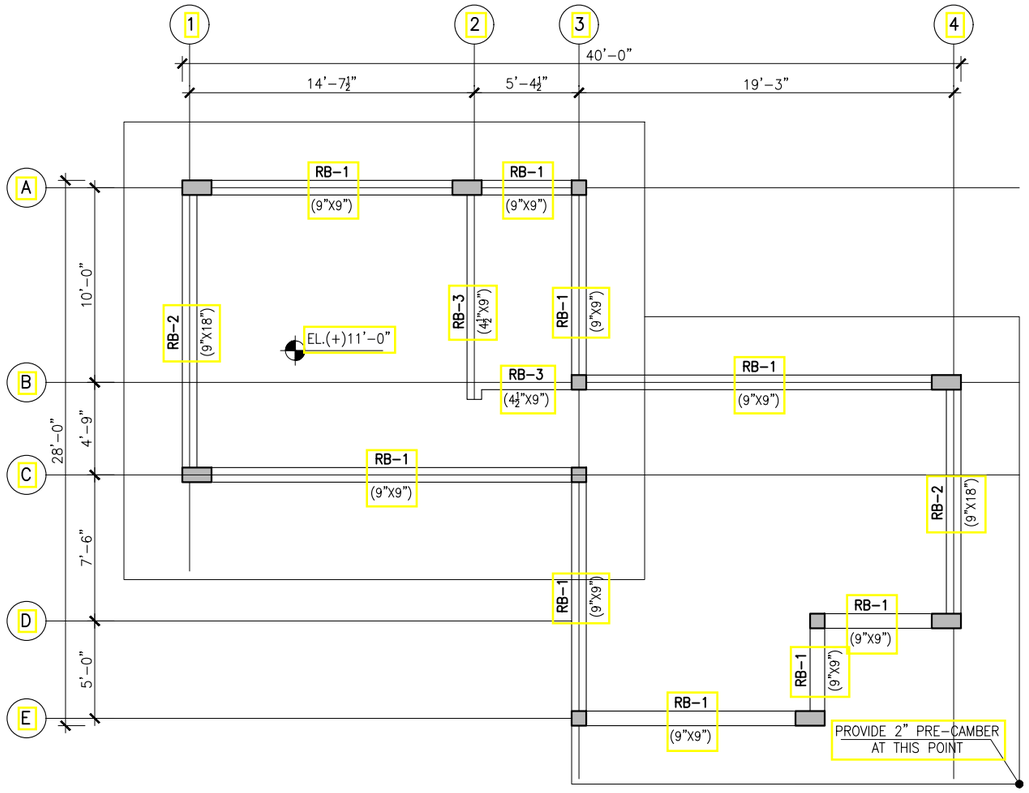
BLOCK - 5

FOUNDATION & COLUMN LAYOUT PLAN AND PLINTH BAND LAYOUT PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

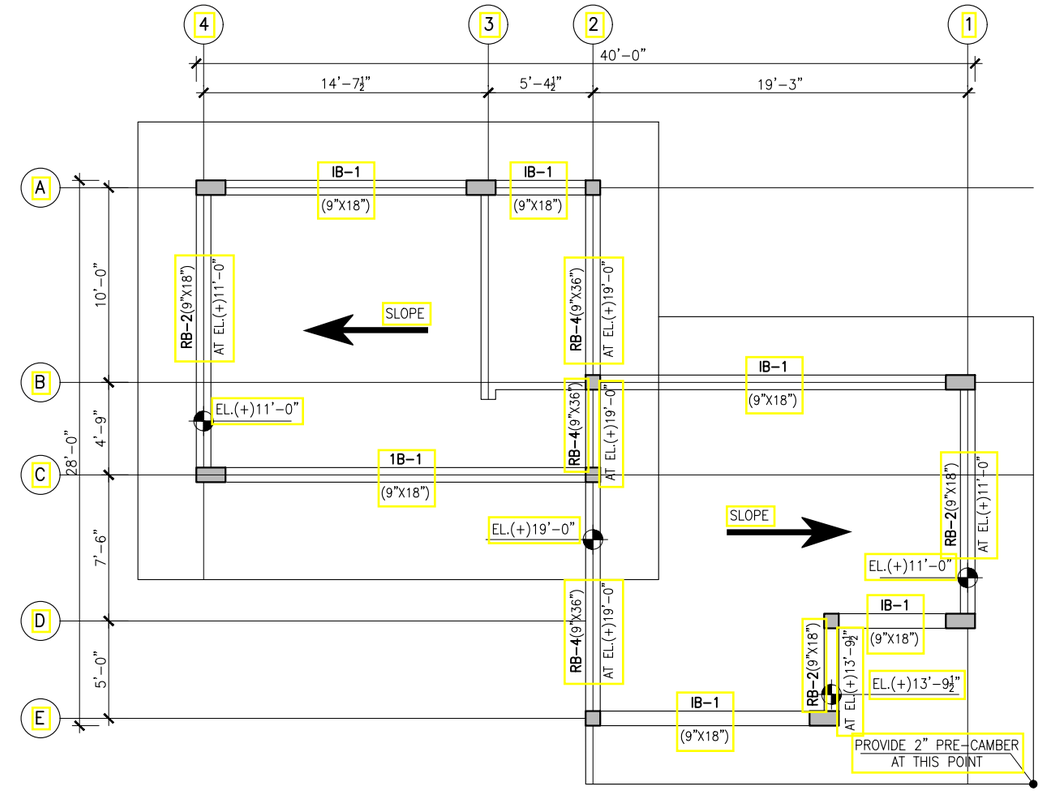
DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE			
CKD.			
SUBM.			

DATE	DRAWING NO.	REV.
FEB 2026	156/328/TD/05G04	0



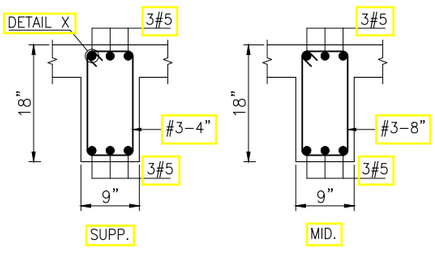
ROOF BEAM LAYOUT PLAN AT EL. (+)11'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS

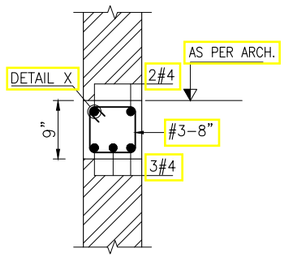


INCLINED ROOF FRAMING PLAN FROM EL.(+)11'-0" TO EL.(+)19'-0"

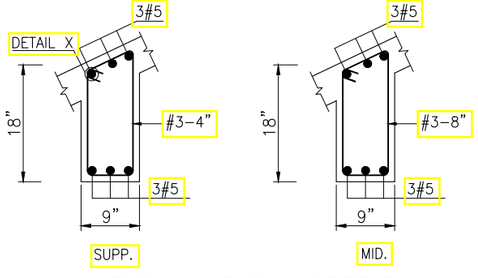
ALL SLOPING SLABS ARE 6" THICK UNLESS NOTED OTHERWISE



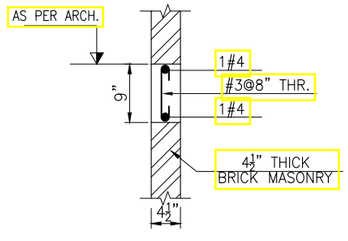
TYPICAL SECTION OF IB-1



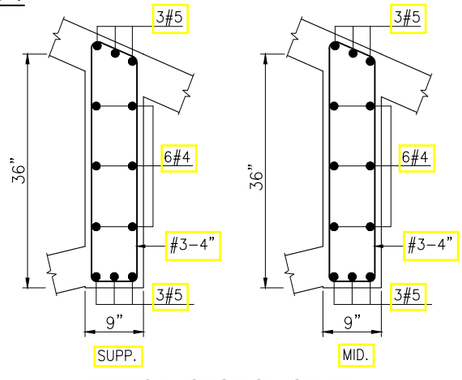
TYP. SEC. OF RB-1



TYPICAL SECTION OF RB-2



SEC. OF RB-3
4½" THICK BRICK WALL



TYPICAL SECTION OF RB-4

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 5

FRAMING PLAN AT EL. (+)11'-0" & FROM EL.(+)11'-0" TO EL.(+)19'-0"

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.			
SUBM.	FEB 2026	156/328/TD/05G05	0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

A. GENERAL

1. NOTES GIVEN ON THIS DRAWING ARE APPLICABLE TO ALL STRUCTURAL DRAWINGS UNLESS OTHERWISE NOTED. NOTES WRITTEN ON ANY OTHER DRAWING SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS REFERRED.
2. SYSTEM OF UNITS IS FPS.
3. ALL LEVELS MARKED ON THE DRAWINGS ARE LEVELS OF STRUCTURAL ELEMENTS. FINISH LEVELS SHALL BE IN ACCORDANCE WITH THE ARCHITECTURAL DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE STRUCTURE AND ALL TEMPORARY WORKS DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
6. THE CONTRACTOR SHALL CO-ORDINATE ALL DRAWINGS OF ALL DISCIPLINES FOR ALL ITEMS INCLUDING BUT NOT LIMITED TO SIZES AND LOCATION OF ALL OPENINGS REQUIRED FOR DUCTS, PIPES AND PIPE SLEEVES, ELECTRICAL CONDUITS AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE OR OTHERWISE INCORPORATED IN STRUCTURAL WORK AND SHALL BRING TO THE NOTICE OF THE ENGINEER DISCREPANCIES, IF ANY, FOR HIS INSTRUCTIONS, PRIOR TO THE START OF WORK.
7. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
8. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE CLIENT AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
9. THE CONTRACTOR SHALL COORDINATE SCHEDULE OF CONSTRUCTION WITH SUPPLY AND INSTALLATION OF EQUIPMENT.
10. PROVISIONS SHALL BE MADE FOR INSTALLATION OF EQUIPMENT AS PER MANUFACTURER'S RECOMMENDATIONS.
11. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/ DEVIATIONS MAY LEAD TO REJECTION/ REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
12. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO SPECIFICATIONS OF THE CONTRACT. IN ABSENCE OF ANY EXPRESS OR IMPLIED SPECIFICATION IN THE CONTRACT, ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO RELEVANT AMERICAN STANDARDS AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
13. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF SHOP DRAWINGS AND BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.

B. FOUNDATION AND EARTHWORK

1. THE CONTRACTOR SHALL STUDY THE AVAILABLE GEOTECHNICAL INVESTIGATION REPORT BEFORE COMMENCING THE WORK.
2. FOUNDATION DESIGN IS BASED ON PARAMETERS PROVIDED IN GEOTECH. INVESTIGATION REPORT.
3. FOUNDATION IS TO BE PLACED 3'-0" (0.93m) BELOW F.G.L. OR N.S.L WHICHEVER IS LOWER.
4. TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.
5. THE TYPE AND COMPACTION OF SOIL BELOW GRADE SLAB SHALL BE AS PER JOB SPECIFICATIONS. NO FOOTING SHALL BE PLACED ON FILL. HOWEVER, AREAS WHERE FILLING BELOW THE FOOTINGS BECOMES INEVITABLE DUE TO OVER-EXCAVATION (IF ANY), SHALL BE FILLED WITH P.C.C. (1:4:8) WITH PRIOR APPROVAL OF THE ENGINEER, AT NO EXTRA COST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING SYSTEM IF AND WHERE SO REQUIRED DURING CONSTRUCTION.
7. ALL STRUCTURAL CONCRETE SURFACES AGAINST WHICH EARTH IS TO BE FILLED SHALL BE COATED WITH TWO COATS OF HOT BITUMEN (10/20 GRADE) APPLIED AT THE RATE OF 0.49 kg/sqm PER COAT, EXCEPT FOR P.C.C. (1:3:6) AND P.C.C. (1:4:8).
8. BACKFILLING AND COMPACTION SHALL BE CARRIED OUT EQUALLY ON BOTH SIDES OF PLINTH BEAMS TO AVOID IMBALANCE OF LATERAL EARTH PRESSURE.
9. THE CONTRACTOR SHALL SUPPLY AND ERECT ADEQUATE SHORING AND SUPPORT THE SIDES OF ALL EXCAVATIONS WHERE REQUIRED TO SAFEGUARD WORKMEN AND PROTECT ANY ADJACENT STRUCTURES.
10. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.
11. EXCAVATIONS ADJACENT TO EXISTING STRUCTURES AND/OR UNDERGROUND SERVICES SHALL BE MADE BY HAND.

C. REINFORCED CONCRETE/ PLAIN CEMENT CONCRETE

1. ALL CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022, OR ANY OTHER RELEVANT SPECS GIVEN IN CONTRACT.
2. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & SPECIFICATIONS AND THE MINIMUM CUBE CRUSHING STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	NOMINAL MIX RATIO	CUBE STRENGTH AT 28-DAYS (psi.)
A	1:1:2	4,500
B	1:1½:3	3,750
C	1:2:4	3,000
D	1:3:6	2,000
E	1:4:8	1,200

C. REINFORCED / PLAIN CEMENT CONCRETE (CONTINUED)

3. CLASS OF CONCRETE FOR DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE AS FOLLOWS UNLESS NOTED OTHER WISE:

COMPONENT	CONCRETE CLASS
MASONRY WALL FOUNDATION	C
FOUNDATION OF RCC COLUMNS	C
COLUMNS, SLABS & BEAMS,VCE	C
P.C.C. STEPS	D
LEAN CONCRETE	E

4. ORDINARY PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETE WORKS.
5. AN INTEGRAL WATER PROOFING AGENT SHALL BE USED IN CONCRETE THAT IS CONSTANTLY OR INTERMITTENTLY IN CONTACT WITH WATER AS PER MANUFACTURER'S RECOMMENDATIONS
6. CONCRETE CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

STRUCTURAL MEMBER / ELEMENT	MINIMUM COVER (INCHES)
FOUNDATIONS (ALL TYPES)	2"
COLUMNS & BEAMS	1½"
RETAINING WALLS	1½"
SLABS	¾"
PLINTH / LINTEL BAND	¾"

7. ALL REINFORCING STEEL SHALL BE DEFORMED, HOT ROLLED BILLET STEEL BARS CONFORMING TO ASTM A-615 GRADE-60 WITH SPECIFIED YIELD STRENGTH OF NOT LESS THAN 60,000 psi.
8. THE NUMBER INDICATES THE BAR DIAMETER/SIZE, AS UNDER:

BAR NUMBER	DIAMETER (INCHES)
3	⅜"
4	½"
5	⅝"
6	¾"
8	1"

9. ALL DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315, ACI-318 & ACI-350R.
10. ALL REINFORCING STEEL SHALL BE HELD FIRMLY IN PLACE BEFORE AND DURING THE PLACING OF CONCRETE BY MEANS OF WIRES AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.

D. CONCRETE CONSTRUCTION

1. THE CONTRACTOR SHALL SUBMIT CONCRETE POURING SCHEDULE FOR ENGINEER'S APPROVAL. NO CONCRETE SHALL BE POURED UNTIL ITS FORMWORK AND REINFORCEMENT HAS BEEN INSPECTED AND APPROVED BY THE ENGINEER.
2. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BLOCKS ETC. SHOULD BE AVOIDED ON SLAB PANELS.

D. CONT. CONCRETE 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, AND DOWELS FOR STRUCTURAL MEMBERS AND/OR MASONRY ARE PROPERLY LOCATED IN PLACE.

E. CONSTRUCTION JOINTS

1. JOINTS, NOT SHOWN ON THE DRAWING, SHALL BE SO MADE AND LOCATED AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED NEAR THE MIDDLE OF THE SPANS OF SLAB & BEAMS. JOINTS IN WALLS & COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOORS, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.
2. JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS THE JOINTS.
3. JOINTS IN BASE SLAB & WALLS AND ROOF SLAB, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS SHALL BE BORNE BY THE CONTRACTOR. BEAMS & BRACKETS SHALL BE PLACED AT THE SAME TIME AS SLABS.

F. ELECTRICAL CONDUITS

1. CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS & SLABS AND WITHIN THE MIDDLE HALF OF THE THICKNESS. SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6"(150 MM).

G. PROPS, FORMWORK & CURING

1. SHORE & BRACE ALL PARTS OF THE BUILDING DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. SEQUENCE OF REMOVAL OF FORMWORK SHALL BE APPROVED BY THE ENGINEER.
3. AT LEAST ONE LOWER FLOOR SHALL REMAIN PROPPED UNTILL THE UPPER FLOOR IS CAST AND CURED.

H. BRICK MASONRY WORKS

1. ALL BRICK WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022.
2. ALL BRICK SHALL BE SOUND, HARD, WELL BURNT AND OF UNIFORM SIZE,COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 1/8".
3. ALL BRICK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 1/8" IN 10'-0".
4. MORTAR USED IN MASONRY CONSTRUCTION SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 12 MPa (1800Psi) AND SHALL CONFORM TO ASTM C270.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 6

GENERAL NOTES & TYPICAL DETAILS (SHEET 1 OF 3)

[redacted] NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/06G01	0
SUBM.			

J. STRUCTURAL STEEL WORKS

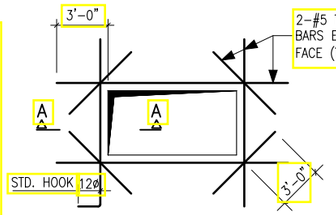
1. ALL STRUCTURAL STEEL WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES–2022.
2. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS.
3. ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A–36 OR EQUIVALENT.
4. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY, AWS, SPECIFICATIONS USING ELECTRODES E70XX.
5. ALL BOLTS SHALL CONFORM TO ASTM A307 OR A325.
6. SURFACE PREPARATION OF ALL STRUCTURAL STEEL FOR PAINTING SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF "STEEL STRUCTURES PAINTING COUNCIL" SPECIFICATIONS SSPC–SP6 FOR COMMERCIAL BLAST CLEANING.
7. ALL STEEL SHALL BE GIVEN ONE SHOP COAT OF RED LEAD OXIDE PRIMER AND FIELD TOUCHUP EXCEPT FOR SURFACES TO BE EMBEDDED IN CONCRETE OR CONTACT SURFACES OF FRICTION BOLTED CONNECTIONS.

K. COLUMN CONFINEMENT

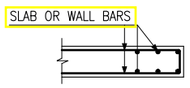
1. IN ORDER TO ATTAIN AN EFFECTIVE BOND BETWEEN THE CONFINING ELEMENTS AND THE MASONRY, THE CONCRETE OF THE CONFINING ELEMENTS SHALL BE CAST AFTER THE MASONRY HAS BEEN BUILT WITH PROPER TOOTHING IN PLACE.
2. CLEAN THE COLUMN SPACE OF ALL RUBBISH BEFORE ADDING THE FORMWORK.
3. POUR THE CONCRETE FOR THE BANDS AND THE COLUMNS AT THE SAME TIME.
4. COMPACT THE CONCRETE WITH VIBRATOR.
5. REMOVE THE FORMWORK NOT EARLIER THAN 03 DAYS.

L. SEISMIC PARAMETERS

1. DESIGN OF STRUCTURE HAS BEEN CARRIED OUT BASED ON SEISMIC PARAMETERS OF ZONE 2B WITH PGA VALUE OF 0.16g to 0.24g & STIFF SOIL PROFILE (SD), ACCORDING TO BUILDING CODE OF PAKISTAN.



WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

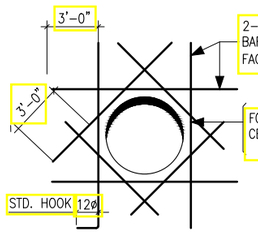


SECTION A–A

NOTES

- FOR OPENING WITH MAXIMUM DIMENSION OVER 5'–0" REFER TO OTHER DETAILS.
- USE THIS DETAILS IF NOT SHOWN IN DESIGN DRAWINGS

REINFORCEMENT DETAIL AT OPENING IN SLAB & WALLS (TYP)



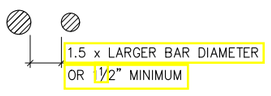
FOR OPENING 1'–0" DIA ADD DIAGONAL BARS CENTER OF SLAB OR WALL SAME SIZE AS LARGEST MAIN BARS

WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

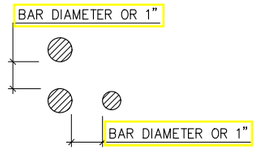
NOTES

MAXIMUM DIAMETER OF SLEVE IS 1'–0" FOR TRIM BARS BARS AROUND LARGE SLEEVE REFER TO OTHER DETAILS

REINFORCEMENT AROUND SLEEVE IN SLABS & WALLS (TYP.)



VERTICAL BAR SPACING



BAR SPACING IN BEAM

LEGEND

MS	MILD STEEL
PVC	POLYVINYL CHLORIDE
C.G.I	CORRUGATED GALVANIZED IRON
G.I	GALVANIZED IRON
SQ	SQUARE
C.Jt	CONSTRUCTION JOINT
T&B	TOP AND BOTTOM
EF	EACH FACE
BF	BOTH FACES
ø/db/#	DIAMETER OF BAR
@	AT THE RATE OF
B	BOTTOM
C/C	CENTER TO CENTER
B.W	BOTHWAYS
E.G.F	ENGINEERED GRANULAR FILL
E.G.L	EXCAVATED GROUND LEVEL
E.L.	STRUCTURAL ELEVATION
EQ.	EQUAL
F.D.T	FIELD DENSITY TEST
F.F.L	FINISH FLOOR LEVEL
F.G.L.	FINISH GROUND LEVEL
F.B.L.	FOUNDATION BED LEVEL
G.W.T.	GROUND WATER TABLE
N.S.L.	EXISTING NATURAL SURFACE LEVEL
N.T.S.	NOT TO SCALE
SMRF	SPECIAL MOMENT RESISTING FRAME
STYP	SOIL PROFILE TYPE
ST.	STIRRUPS
T	TOP
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
N.T.S.	NOT TO SCALE
	LEVEL ON PLAN
℄	CENTER LINE

SPLICE LENGHTH (LS) AND DEVELOPMENT LENGHT (LD) (fc'=3 ksi, fy=40 ksi)

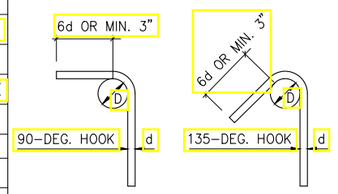
BAR DIA	#3	#4	#5	#6	#7	#8	#10	#12
DEVELOPMENT LENGTH ℓd (Inches)	18	24	30	36	42	47	53	59
SPLICE LENGTH (Inches)	24	32	39	47	55	62	69	77

LAP SPLICE ARE NOT TO BE USED:
- WITHIN JOINTS
- WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH.
- FROM THE FACE OF THE JOINT.

CURTAILMENT LENGTH SHOULD BE EXTEND UPTO L/16,12db OR d, (WHICHEVER GREATER) BEYOND L/3
WHERE:
L–GREATER CLEAR SPAN, db–DIAMETER OF BAR,
d–EFFECTIVE DEPTH.
THE FIRST HOOP SHALL BE LOCATED NOT MORE THAN 2" FROM THE FACE OF THE SUPPORTING MEMBER.

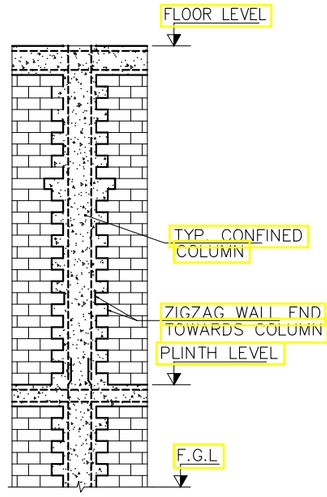
* ALL LAP SPLICE SHALL BE STAGGARED BY AT LEAST 50 %

BAR DIA	D
#3	2½"
#4	3"
#5	4"
#6	4"
#8	6"
#9	7"
#11	8½"



STIRRUPS AND TIE HOOKS

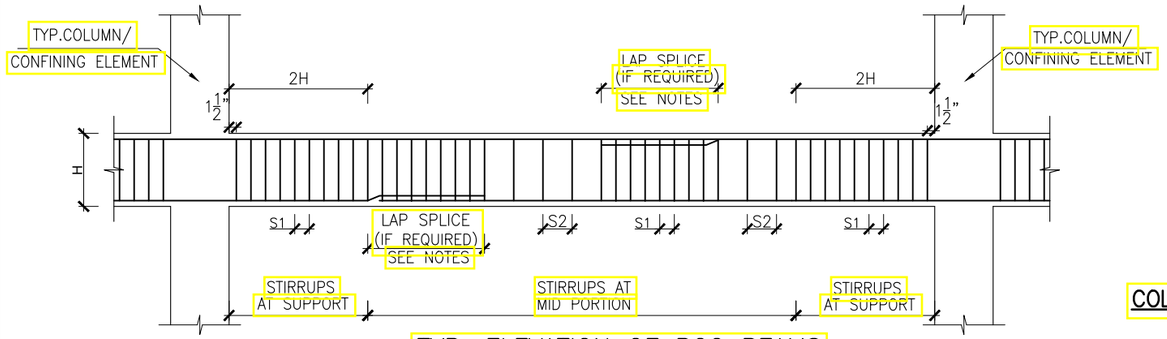
BAR DIA	D
#3	1½"
#4	2"
#5	2½"



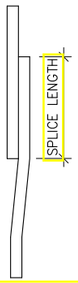
TYPICAL ELEVATION OF CONFINED COLUMN (SHOWING TOOTHING)



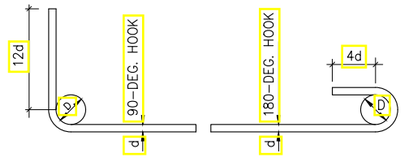
BEAM SPLICE (TYP.)



TYP. ELEVATION OF RCC BEAMS



COLUMN SPLICE (TYP.)



STANDARD BAR HOOKS (MAIN BARS)

LEGENDS

S1	STIRRUPS SPACING IN BEAM NEAR SUPPORTS & LAP SPLICES
S2	STIRRUPS SPACING IN BEAM IN MIDSPAN
h	DEPTH OF BEAM
db	DIAMETER OF BAR
d	EFFECTIVE DEPTH OF BEAM

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

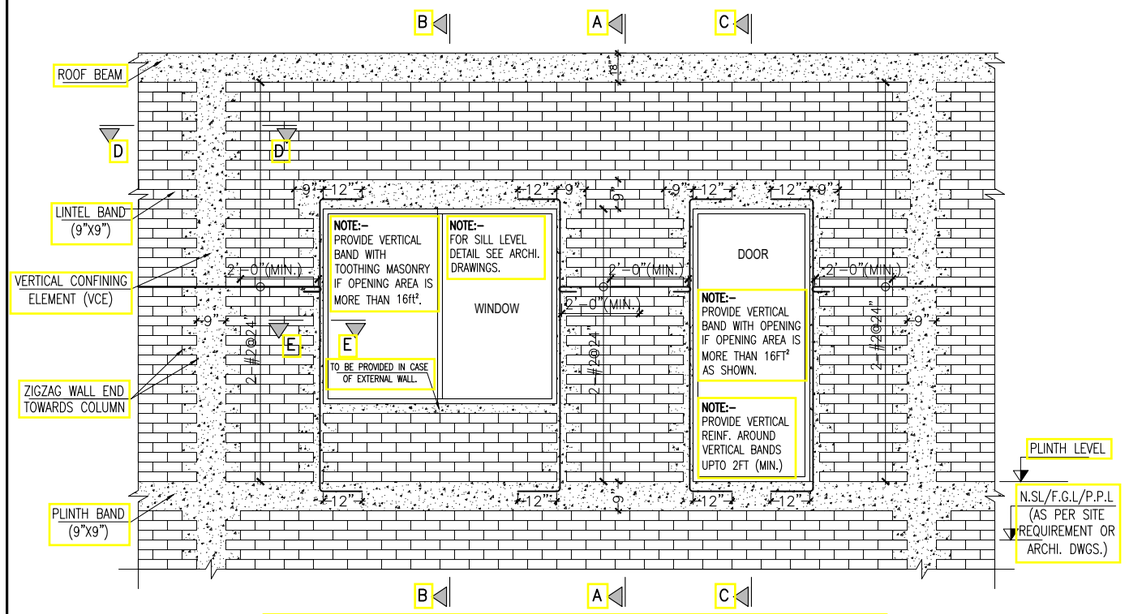
GUEST UNITS

BLOCK - 6

GENERAL NOTES & TYPICAL DETAILS (SHEET 2 OF 3)

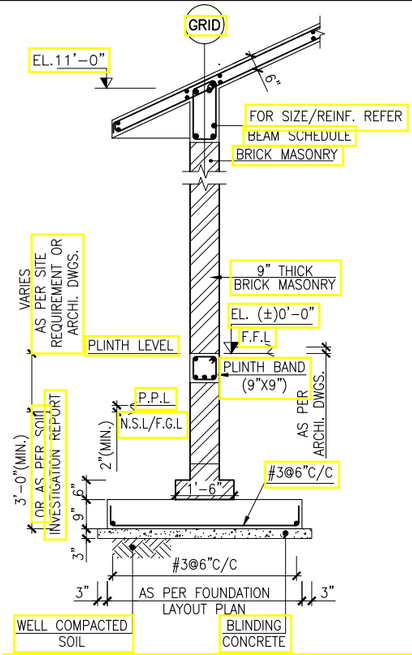
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
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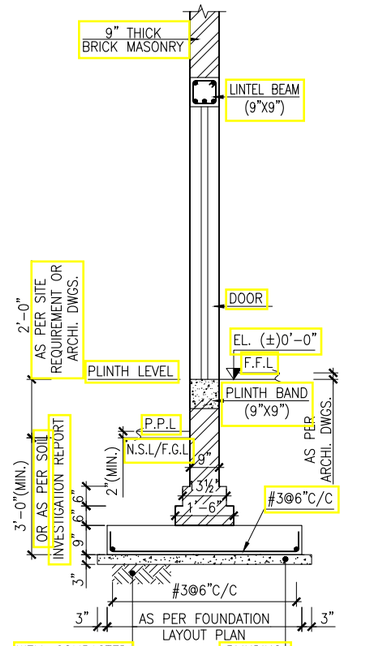
TYPICAL ELEVATION OF 9" THICK CONFINED BRICK MASONRY WALL SINGLE STOREY WALL MASONRY

(FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS)



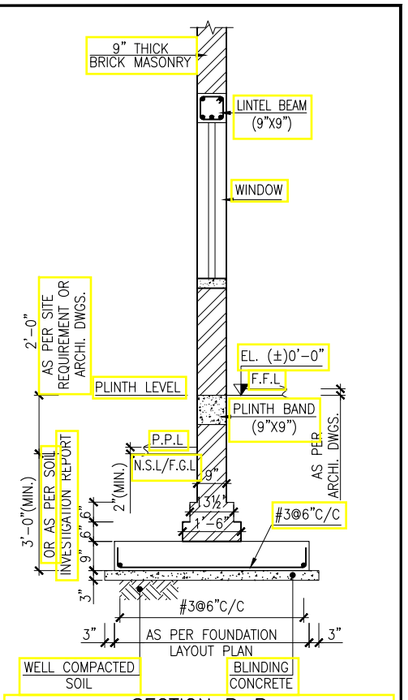
SECTION A–A

TYP. FOOTING SECTION OF EXTERNAL/ INTERNAL WALL WITHOUT OPENING



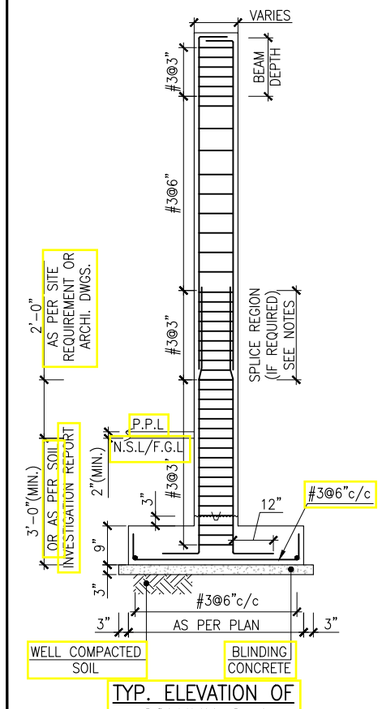
SECTION C–C

TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT DOOR

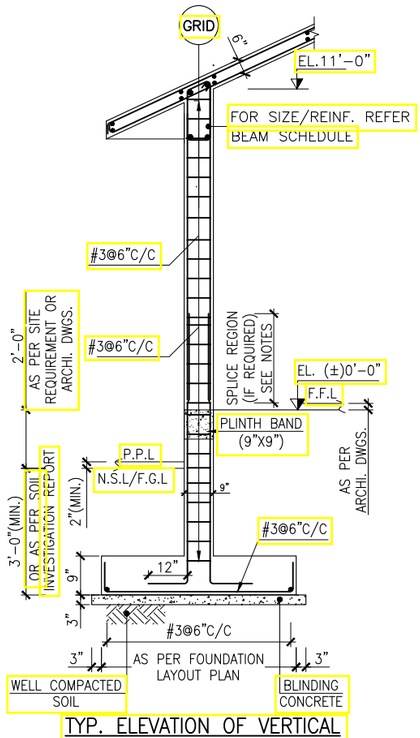


SECTION B–B

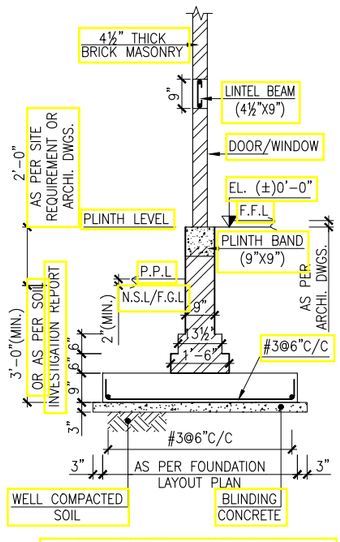
TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT WINDOW



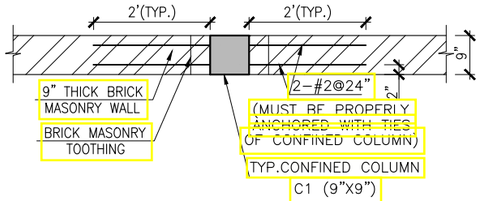
TYP. ELEVATION OF COLUMN C–1



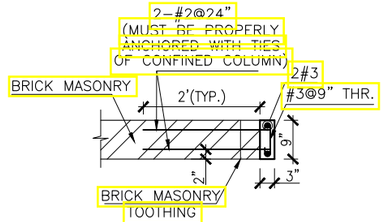
TYP. ELEVATION OF VERTICAL CONFINING ELEMENT (VCE)



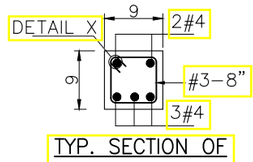
TYP. FOOTING SECTION OF 4½" THICK MASONRY WALL



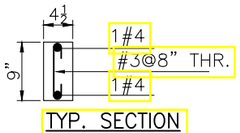
SECTION D–D



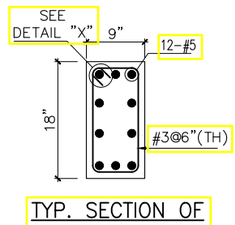
SECTION E–E



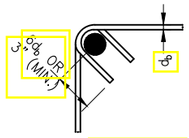
TYP. SECTION OF LINTEL BEAM 9" THICK BRICK WALL



TYP. SECTION OF RB–3

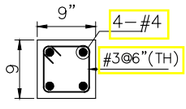


TYP. SECTION OF COLUMN (C–1)



DETAIL–X

TYP. 135° HOOK DETAIL FOR TIES & STIRRUPS



TYP. CONFINED COLUMN V.C.E

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

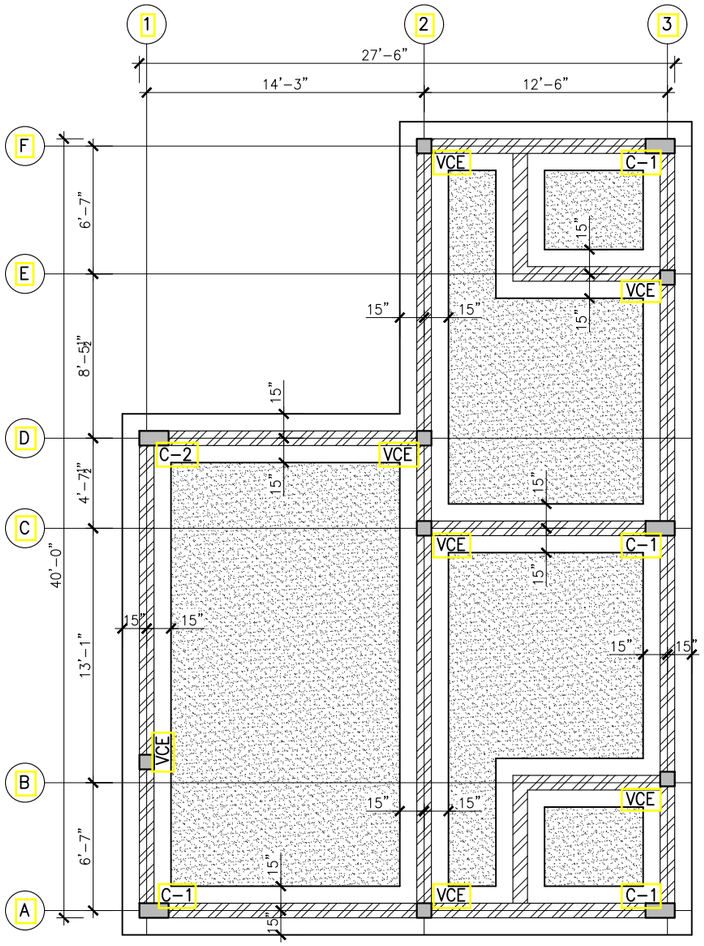
BLOCK - 6

GENERAL NOTES & TYPICAL DETAILS

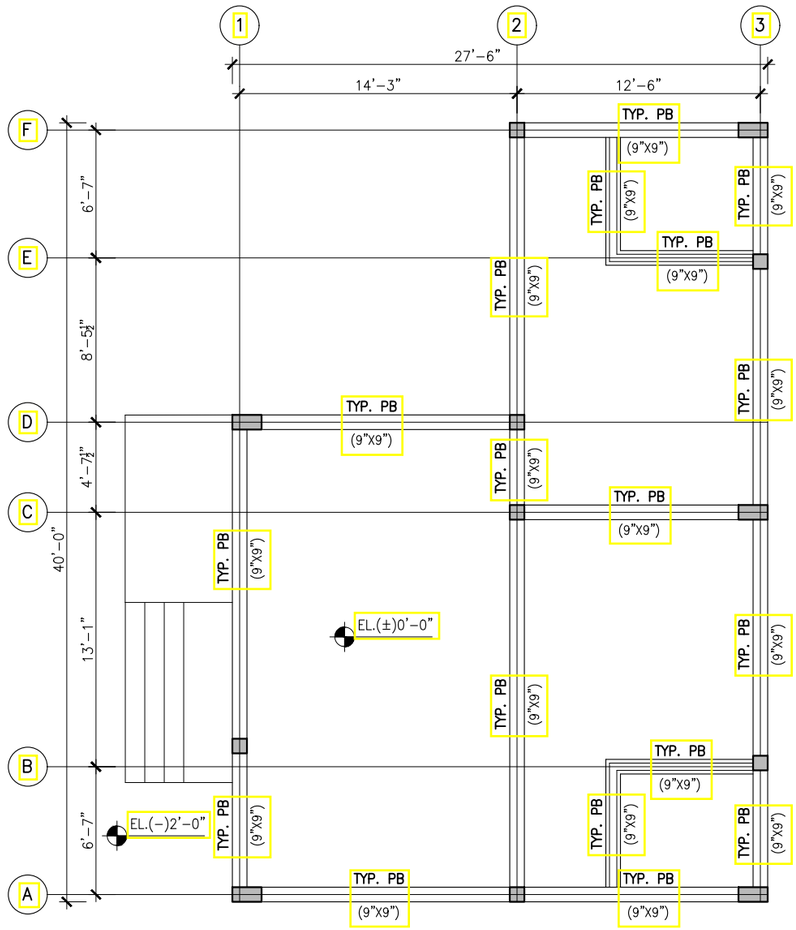
(SHEET 3 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/06G03	0
SUBM.			

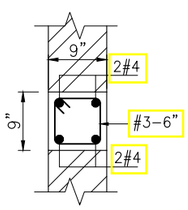


FOUNDATION & COLUMN LAYOUT PLAN

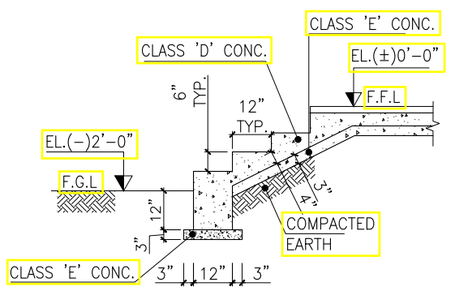


PLINTH BAND LAYOUT PLAN AT EL. (±)0'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS



TYPICAL SECTION OF PLINTH BAND (TYP. PB)



TYPICAL SECTION OF P.C.C STEPS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
4. THE FOUNDATION HAS BEEN DESIGNED ON GROSS ALLOWABLE BEARING CAPACITY OF 0.75 TON/SFT AT A DEPTH OF 3'-0" BELOW N.S.L OR F.G.L WHICH EVER IS LOWER.
5. IF COMPETENT BEARING STRATA IS NOT FOUND AT INDICATED DEPTH, THE ENGINEER SHALL BE NOTIFIED FOR HIS PRIOR INSTRUCTIONS.
6. BOTTOM OF FOOTING SHOULD BE PROVIDED 3'-0" BELOW NSL OR F.G.L WHICH EVER IS LOWER.
7. FOR EL. ±0'-0", REFER MASTER PLAN.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

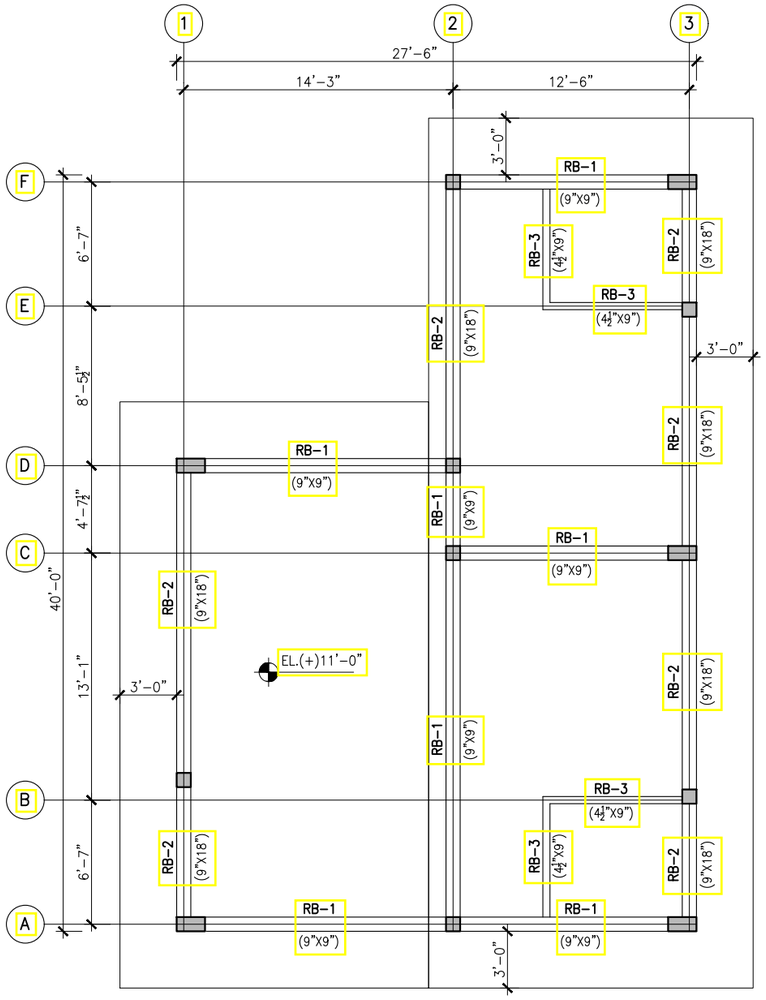
BLOCK - 6

FOUNDATION & COLUMN LAYOUT PLAN AND PLINTH BAND LAYOUT PLAN

[redacted] NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

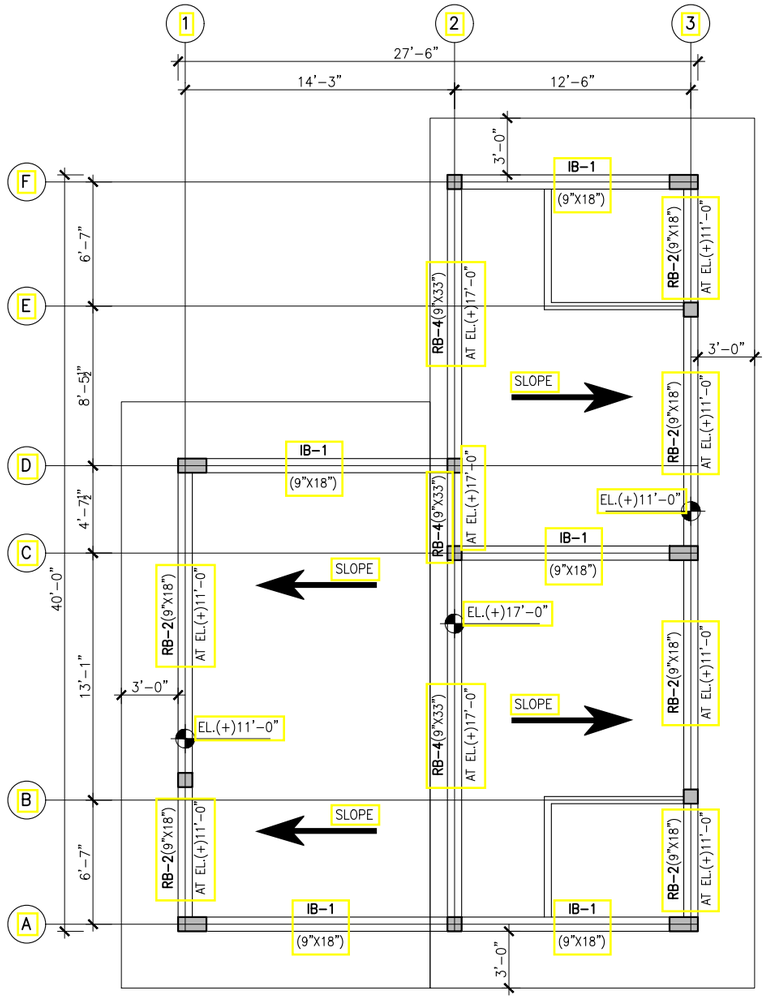
	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.			
FILE			
CKD.			
SUBM.			

DATE	DRAWING NO.	REV.
FEB 2026	156/328/TD/06G04	0



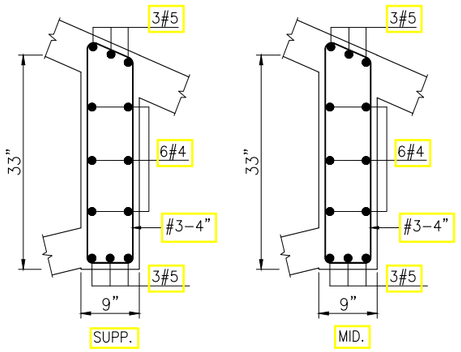
ROOF BEAM LAYOUT PLAN AT EL. (+)11'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS

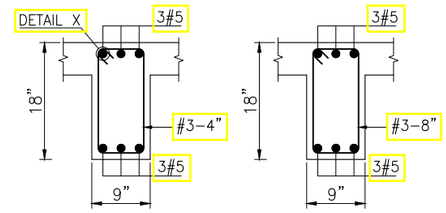


INCLINED BEAM LAYOUT PLAN FROM EL. (+)11'-0" TO EL.(+)17'-0"

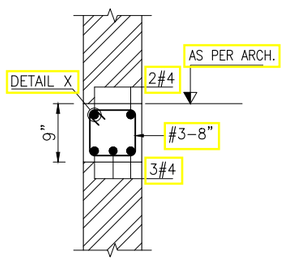
ALL SLOPING SLABS ARE 6" THICK UNLESS NOTED OTHERWISE



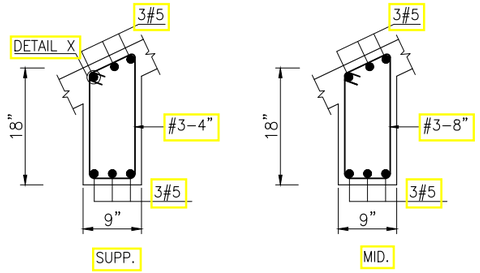
TYPICAL SECTION OF RB-4



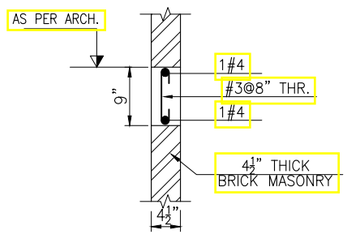
TYPICAL SECTION OF IB-1



TYP. SEC. OF RB-1



TYPICAL SECTION OF RB-2



SEC. OF RB-3 4½" THICK BRICK WALL

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 6

FRAMING PLAN AT EL.(+)11'-0" & FROM EL.(+)11'-0" TO EL.(+)17'-0"

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/06G05	0
SUBM.			

A. GENERAL

1. NOTES GIVEN ON THIS DRAWING ARE APPLICABLE TO ALL STRUCTURAL DRAWINGS UNLESS OTHERWISE NOTED. NOTES WRITTEN ON ANY OTHER DRAWING SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS REFERRED.
2. SYSTEM OF UNITS IS FPS.
3. ALL LEVELS MARKED ON THE DRAWINGS ARE LEVELS OF STRUCTURAL ELEMENTS. FINISH LEVELS SHALL BE IN ACCORDANCE WITH THE ARCHITECTURAL DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE STRUCTURE AND ALL TEMPORARY WORKS DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
6. THE CONTRACTOR SHALL CO-ORDINATE ALL DRAWINGS OF ALL DISCIPLINES FOR ALL ITEMS INCLUDING BUT NOT LIMITED TO SIZES AND LOCATION OF ALL OPENINGS REQUIRED FOR DUCTS, PIPES AND PIPE SLEEVES, ELECTRICAL CONDUITS AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE OR OTHERWISE INCORPORATED IN STRUCTURAL WORK AND SHALL BRING TO THE NOTICE OF THE ENGINEER DISCREPANCIES, IF ANY, FOR HIS INSTRUCTIONS, PRIOR TO THE START OF WORK.
7. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
8. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE CLIENT AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
9. THE CONTRACTOR SHALL COORDINATE SCHEDULE OF CONSTRUCTION WITH SUPPLY AND INSTALLATION OF EQUIPMENT.
10. PROVISIONS SHALL BE MADE FOR INSTALLATION OF EQUIPMENT AS PER MANUFACTURER'S RECOMMENDATIONS.
11. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/ DEVIATIONS MAY LEAD TO REJECTION/ REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
12. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO SPECIFICATIONS OF THE CONTRACT. IN ABSENCE OF ANY EXPRESS OR IMPLIED SPECIFICATION IN THE CONTRACT, ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO RELEVANT AMERICAN STANDARDS AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
13. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF SHOP DRAWINGS AND BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.

B. FOUNDATION AND EARTHWORK

1. THE CONTRACTOR SHALL STUDY THE AVAILABLE GEOTECHNICAL INVESTIGATION REPORT BEFORE COMMENCING THE WORK.
2. FOUNDATION DESIGN IS BASED ON PARAMETERS PROVIDED IN GEOTECH. INVESTIGATION REPORT.
3. FOUNDATION IS TO BE PLACED 3'-0" (0.93m) BELOW F.G.L. OR N.S.L WHICHEVER IS LOWER.
4. TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.
5. THE TYPE AND COMPACTION OF SOIL BELOW GRADE SLAB SHALL BE AS PER JOB SPECIFICATIONS. NO FOOTING SHALL BE PLACED ON FILL. HOWEVER, AREAS WHERE FILLING BELOW THE FOOTINGS BECOMES INEVITABLE DUE TO OVER-EXCAVATION (IF ANY), SHALL BE FILLED WITH P.C.C. (1:4:8) WITH PRIOR APPROVAL OF THE ENGINEER, AT NO EXTRA COST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING SYSTEM IF AND WHERE SO REQUIRED DURING CONSTRUCTION.
7. ALL STRUCTURAL CONCRETE SURFACES AGAINST WHICH EARTH IS TO BE FILLED SHALL BE COATED WITH TWO COATS OF HOT BITUMEN (10/20 GRADE) APPLIED AT THE RATE OF 0.49 kg/sqm PER COAT, EXCEPT FOR P.C.C. (1:3:6) AND P.C.C. (1:4:8).
8. BACKFILLING AND COMPACTION SHALL BE CARRIED OUT EQUALLY ON BOTH SIDES OF PLINTH BEAMS TO AVOID IMBALANCE OF LATERAL EARTH PRESSURE.
9. THE CONTRACTOR SHALL SUPPLY AND ERECT ADEQUATE SHORING AND SUPPORT THE SIDES OF ALL EXCAVATIONS WHERE REQUIRED TO SAFEGUARD WORKMEN AND PROTECT ANY ADJACENT STRUCTURES.
10. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.
11. EXCAVATIONS ADJACENT TO EXISTING STRUCTURES AND/OR UNDERGROUND SERVICES SHALL BE MADE BY HAND.

C. REINFORCED CONCRETE/ PLAIN CEMENT CONCRETE

1. ALL CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022, OR ANY OTHER RELEVANT SPECS GIVEN IN CONTRACT.
2. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & SPECIFICATIONS AND THE MINIMUM CUBE CRUSHING STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	NOMINAL MIX RATIO	CUBE STRENGTH AT 28-DAYS (psi.)
A	1:1:2	4,500
B	1:1½:3	3,750
C	1:2:4	3,000
D	1:3:6	2,000
E	1:4:8	1,200

C. REINFORCED / PLAIN CEMENT CONCRETE (CONTINUED)

3. CLASS OF CONCRETE FOR DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE AS FOLLOWS UNLESS NOTED OTHER WISE:

COMPONENT	CONCRETE CLASS
MASONRY WALL FOUNDATION	C
FOUNDATION OF RCC COLUMNS	C
COLUMNS, SLABS & BEAMS,VCE	C
P.C.C. STEPS	D
LEAN CONCRETE	E

4. ORDINARY PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETE WORKS.
5. AN INTEGRAL WATER PROOFING AGENT SHALL BE USED IN CONCRETE THAT IS CONSTANTLY OR INTERMITTENTLY IN CONTACT WITH WATER AS PER MANUFACTURER'S RECOMMENDATIONS
6. CONCRETE CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

STRUCTURAL MEMBER / ELEMENT	MINIMUM COVER (INCHES)
FOUNDATIONS (ALL TYPES)	2"
COLUMNS & BEAMS	1½"
RETAINING WALLS	1½"
SLABS	¾"
PLINTH / LINTEL BAND	¾"

7. ALL REINFORCING STEEL SHALL BE DEFORMED, HOT ROLLED BILLET STEEL BARS CONFORMING TO ASTM A-615 GRADE-60 WITH SPECIFIED YIELD STRENGTH OF NOT LESS THAN 60,000 psi.
8. THE NUMBER INDICATES THE BAR DIAMETER/SIZE, AS UNDER:

BAR NUMBER	DIAMETER (INCHES)
3	⅜"
4	½"
5	⅝"
6	¾"
8	1"

9. ALL DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315, ACI-318 & ACI-350R.
10. ALL REINFORCING STEEL SHALL BE HELD FIRMLY IN PLACE BEFORE AND DURING THE PLACING OF CONCRETE BY MEANS OF WIRES AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.

D. CONCRETE CONSTRUCTION

1. THE CONTRACTOR SHALL SUBMIT CONCRETE POURING SCHEDULE FOR ENGINEER'S APPROVAL. NO CONCRETE SHALL BE POURED UNTIL ITS FORMWORK AND REINFORCEMENT HAS BEEN INSPECTED AND APPROVED BY THE ENGINEER.
2. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BLOCKS ETC. SHOULD BE AVOIDED ON SLAB PANELS.

D. CONT. CONCRETE 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, AND DOWELS FOR STRUCTURAL MEMBERS AND/OR MASONRY ARE PROPERLY LOCATED IN PLACE.

E. CONSTRUCTION JOINTS

1. JOINTS, NOT SHOWN ON THE DRAWING, SHALL BE SO MADE AND LOCATED AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED NEAR THE MIDDLE OF THE SPANS OF SLAB & BEAMS. JOINTS IN WALLS & COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOORS, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.
2. JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS THE JOINTS.
3. JOINTS IN BASE SLAB & WALLS AND ROOF SLAB, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS SHALL BE BORNE BY THE CONTRACTOR. BEAMS & BRACKETS SHALL BE PLACED AT THE SAME TIME AS SLABS.

F. ELECTRICAL CONDUITS

1. CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS & SLABS AND WITHIN THE MIDDLE HALF OF THE THICKNESS. SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6"(150 MM).

G. PROPS, FORMWORK & CURING

1. SHORE & BRACE ALL PARTS OF THE BUILDING DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. SEQUENCE OF REMOVAL OF FORMWORK SHALL BE APPROVED BY THE ENGINEER.
3. AT LEAST ONE LOWER FLOOR SHALL REMAIN PROPPED UNTILL THE UPPER FLOOR IS CAST AND CURED.

H. BRICK MASONRY WORKS

1. ALL BRICK WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022.
2. ALL BRICK SHALL BE SOUND, HARD, WELL BURNT AND OF UNIFORM SIZE,COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 1/8".
3. ALL BRICK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 1/8" IN 10'-0".
4. MORTAR USED IN MASONRY CONSTRUCTION SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 12 MPa (1800Psi) AND SHALL CONFORM TO ASTM C270.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 7

GENERAL NOTES & TYPICAL DETAILS (SHEET 1 OF 3)

[redacted] NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/07G01	0
SUBM.	FEB 2026		

J. STRUCTURAL STEEL WORKS

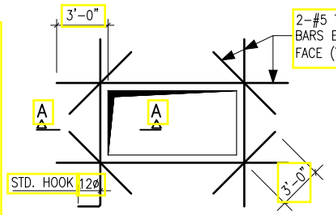
1. ALL STRUCTURAL STEEL WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES–2022.
2. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS.
3. ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A–36 OR EQUIVALENT.
4. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY, AWS, SPECIFICATIONS USING ELECTRODES E70XX.
5. ALL BOLTS SHALL CONFORM TO ASTM A307 OR A325.
6. SURFACE PREPARATION OF ALL STRUCTURAL STEEL FOR PAINTING SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF "STEEL STRUCTURES PAINTING COUNCIL" SPECIFICATIONS SSPC–SP6 FOR COMMERCIAL BLAST CLEANING.
7. ALL STEEL SHALL BE GIVEN ONE SHOP COAT OF RED LEAD OXIDE PRIMER AND FIELD TOUCHUP EXCEPT FOR SURFACES TO BE EMBEDDED IN CONCRETE OR CONTACT SURFACES OF FRICTION BOLTED CONNECTIONS.

K. COLUMN CONFINEMENT

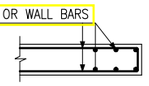
1. IN ORDER TO ATTAIN AN EFFECTIVE BOND BETWEEN THE CONFINING ELEMENTS AND THE MASONRY, THE CONCRETE OF THE CONFINING ELEMENTS SHALL BE CAST AFTER THE MASONRY HAS BEEN BUILT WITH PROPER TOOTHING IN PLACE.
2. CLEAN THE COLUMN SPACE OF ALL RUBBISH BEFORE ADDING THE FORMWORK.
3. POUR THE CONCRETE FOR THE BANDS AND THE COLUMNS AT THE SAME TIME.
4. COMPACT THE CONCRETE WITH VIBRATOR.
5. REMOVE THE FORMWORK NOT EARLIER THAN 03 DAYS.

L. SEISMIC PARAMETERS

1. DESIGN OF STRUCTURE HAS BEEN CARRIED OUT BASED ON SEISMIC PARAMETERS OF ZONE 2B WITH PGA VALUE OF 0.16g to 0.24g & STIFF SOIL PROFILE (SD), ACCORDING TO BUILDING CODE OF PAKISTAN.



WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

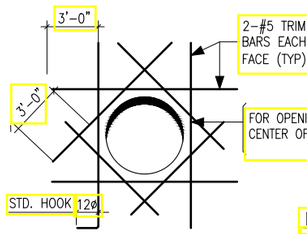


SECTION A–A

NOTES

- FOR OPENING WITH MAXIMUM DIMENSION OVER 5'–0" REFER TO OTHER DETAILS.
- USE THIS DETAILS IF NOT SHOWN IN DESIGN DRAWINGS

REINFORCEMENT DETAIL AT OPENING IN SLAB & WALLS (TYP)



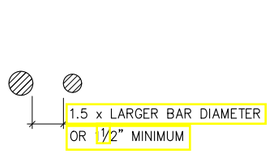
FOR OPENING 1'–0" DIA ADD DIAGONAL BARS CENTER OF SLAB OR WALL SAME SIZE AS LARGEST MAIN BARS

WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

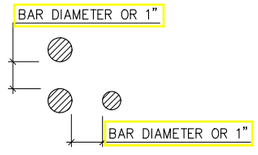
NOTES

MAXIMUM DIAMETER OF SLEVE IS 1'–0" FOR TRIM BARS BARS AROUND LARGE SLEEVE REFER TO OTHER DETAILS

REINFORCEMENT AROUND SLEEVE IN SLABS & WALLS (TYP.)



VERTICAL BAR SPACING



BAR SPACING IN BEAM

LEGEND

MS	MILD STEEL
PVC	POLYVINYL CHLORIDE
C.G.I	CORRUGATED GALVANIZED IRON
G.I	GALVANIZED IRON
SQ	SQUARE
C.Jt	CONSTRUCTION JOINT
T&B	TOP AND BOTTOM
EF	EACH FACE
BF	BOTH FACES
ø/db/#	DIAMETER OF BAR
@	AT THE RATE OF
B	BOTTOM
C/C	CENTER TO CENTER
B.W	BOTHWAYS
E.G.F	ENGINEERED GRANULAR FILL
E.G.L	EXCAVATED GROUND LEVEL
E.L.	STRUCTURAL ELEVATION
EQ.	EQUAL
F.D.T	FIELD DENSITY TEST
F.F.L	FINISH FLOOR LEVEL
F.G.L.	FINISH GROUND LEVEL
F.B.L.	FOUNDATION BED LEVEL
G.W.T.	GROUND WATER TABLE
N.S.L.	EXISTING NATURAL SURFACE LEVEL
N.T.S.	NOT TO SCALE
SMRF	SPECIAL MOMENT RESISTING FRAME
STYP	SOIL PROFILE TYPE
ST.	STIRRUPS
T	TOP
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
N.T.S.	NOT TO SCALE
	LEVEL ON PLAN
℄	CENTER LINE

SPLICE LENGHTH (LS) AND DEVELOPMENT LENGHT (LD) (fc'=3 ksi, fy=40 ksi)

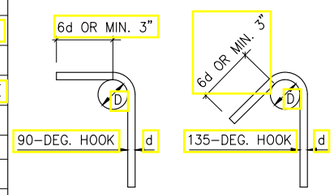
BAR DIA	#3	#4	#5	#6	#7	#8	#10	#12
DEVELOPMENT LENGTH ℓd (Inches)	18	24	30	36	42	47	53	59
SPLICE LENGTH (Inches)	24	32	39	47	55	62	69	77

LAP SPLICE ARE NOT TO BE USED:
- WITHIN JOINTS
- WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH.
- FROM THE FACE OF THE JOINT.

CURTAILMENT LENGTH SHOULD BE EXTEND UPTO L/16,12db OR d, (WHICHEVER GREATER) BEYOND L/3
WHERE:
L–GREATER CLEAR SPAN, db–DIAMETER OF BAR,
d–EFFECTIVE DEPTH.
THE FIRST HOOP SHALL BE LOCATED NOT MORE THAN 2" FROM THE FACE OF THE SUPPORTING MEMBER.

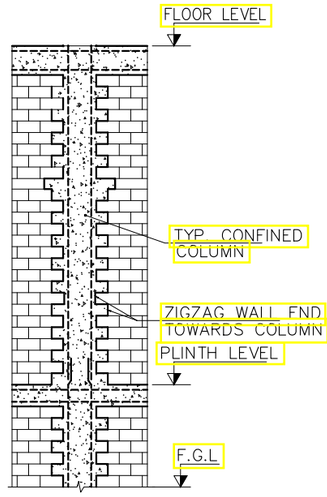
* ALL LAP SPLICE SHALL BE STAGGARED BY AT LEAST 50 %

BAR DIA	D
#3	2½"
#4	3"
#5	4"
#6	4"
#8	6"
#9	7"
#11	8½"



STIRRUPS AND TIE HOOKS

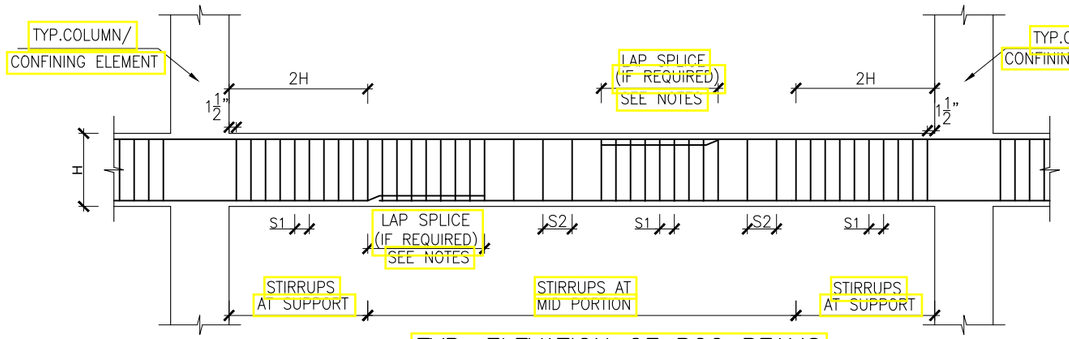
BAR DIA	D
#3	1½"
#4	2"
#5	2½"



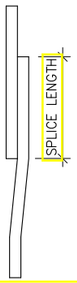
TYPICAL ELEVATION OF CONFINED COLUMN (SHOWING TOOTHING)



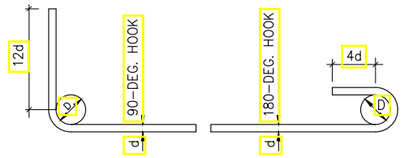
BEAM SPLICE (TYP.)



TYP. ELEVATION OF RCC BEAMS



COLUMN SPLICE (TYP.)



STANDARD BAR HOOKS (MAIN BARS)

LEGENDS

S1	STIRRUPS SPACING IN BEAM NEAR SUPPORTS & LAP SPLICES
S2	STIRRUPS SPACING IN BEAM IN MIDSPAN
h	DEPTH OF BEAM
db	DIAMETER OF BAR
d	EFFECTIVE DEPTH OF BEAM

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

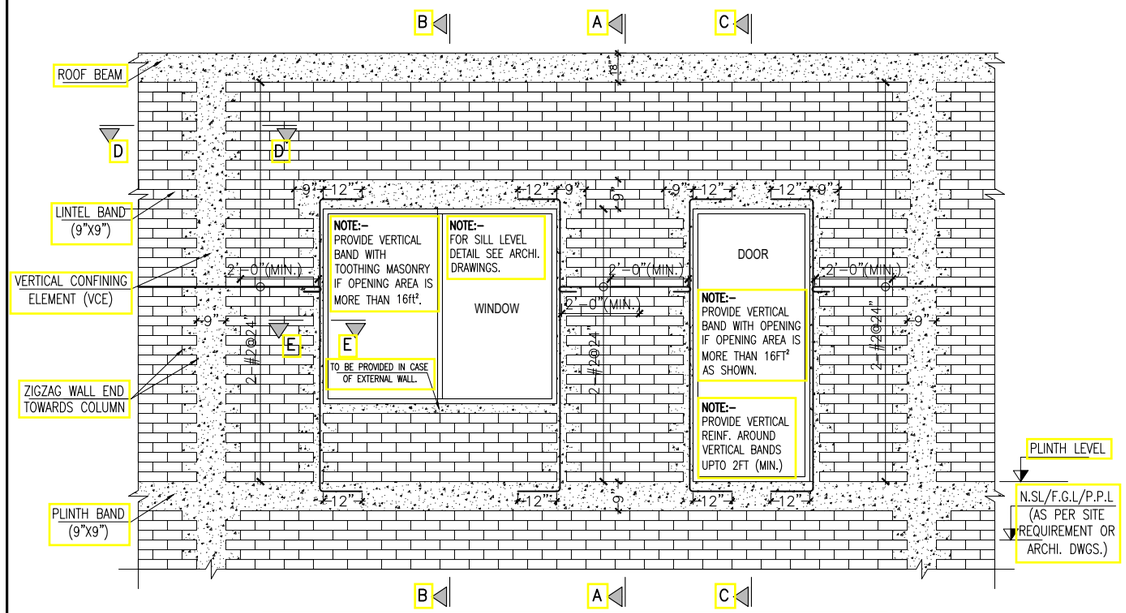
GUEST UNITS

BLOCK - 7

GENERAL NOTES & TYPICAL DETAILS (SHEET 2 OF 3)

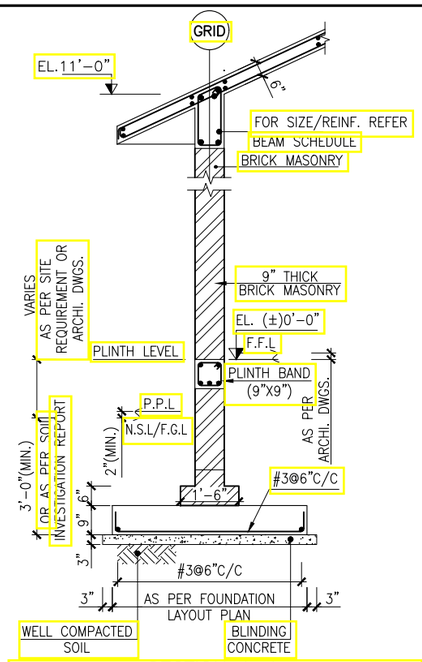
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/07G02	0
SUBM.	FEB 2026		



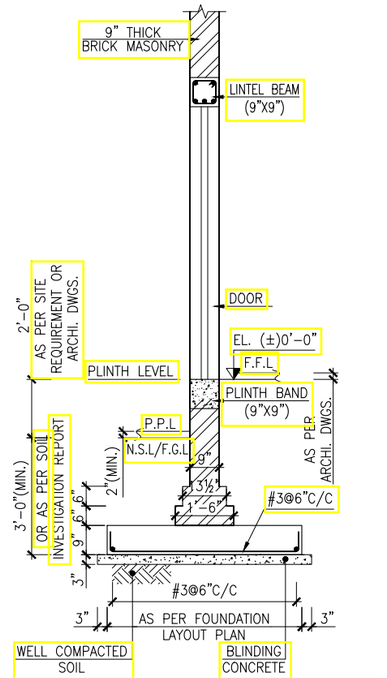
TYPICAL ELEVATION OF 9" THICK CONFINED BRICK MASONRY WALL SINGLE STOREY WALL MASONRY

(FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS)



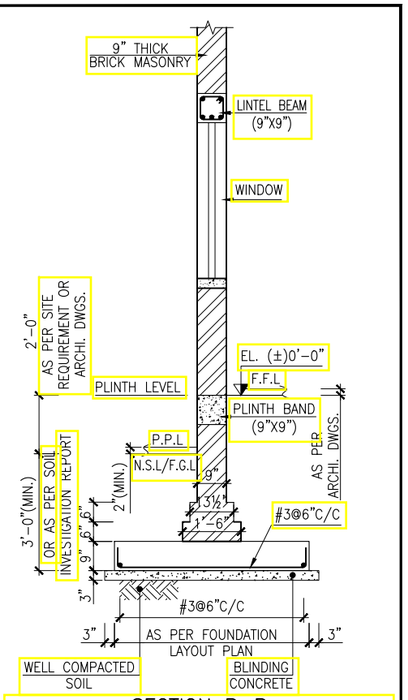
SECTION A–A

TYP. FOOTING SECTION OF EXTERNAL/ INTERNAL WALL WITHOUT OPENING



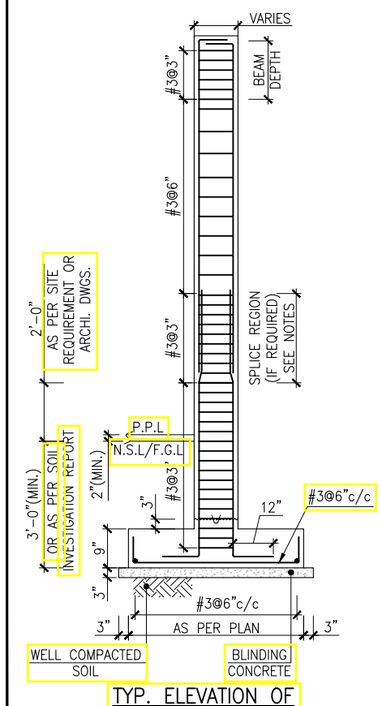
SECTION C–C

TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT DOOR

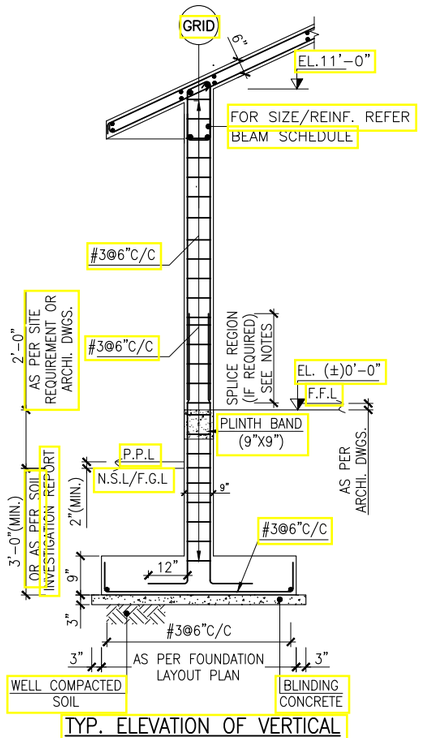


SECTION B–B

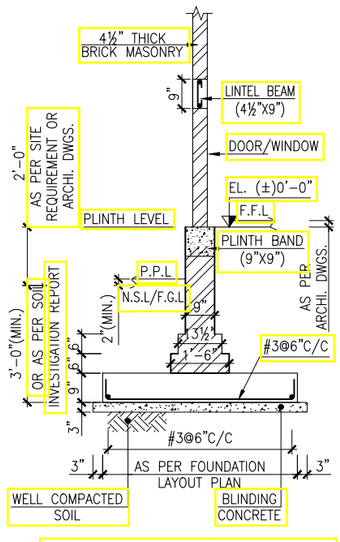
TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT WINDOW



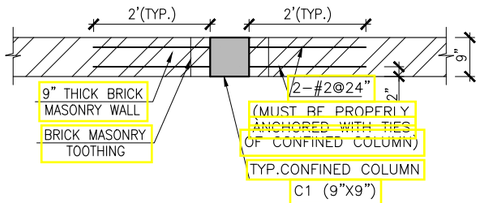
TYP. ELEVATION OF COLUMN C–1



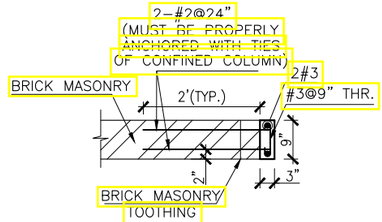
TYP. ELEVATION OF VERTICAL CONFINING ELEMENT (VCE)



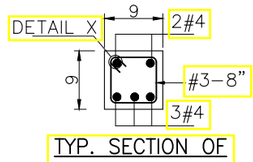
TYP. FOOTING SECTION OF 4½" THICK MASONRY WALL



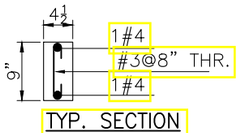
SECTION D–D



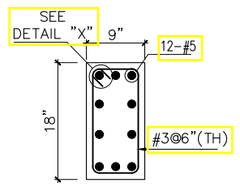
SECTION E–E



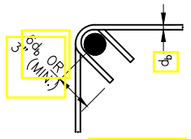
TYP. SECTION OF LINTEL BEAM 9" THICK BRICK WALL



TYP. SECTION OF RB–3

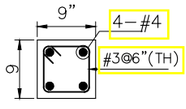


TYP. SECTION OF COLUMN (C–1)



DETAIL–X

TYP. 135° HOOK DETAIL FOR TIES & STIRRUPS



TYP. CONFINED COLUMN V.C.E

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

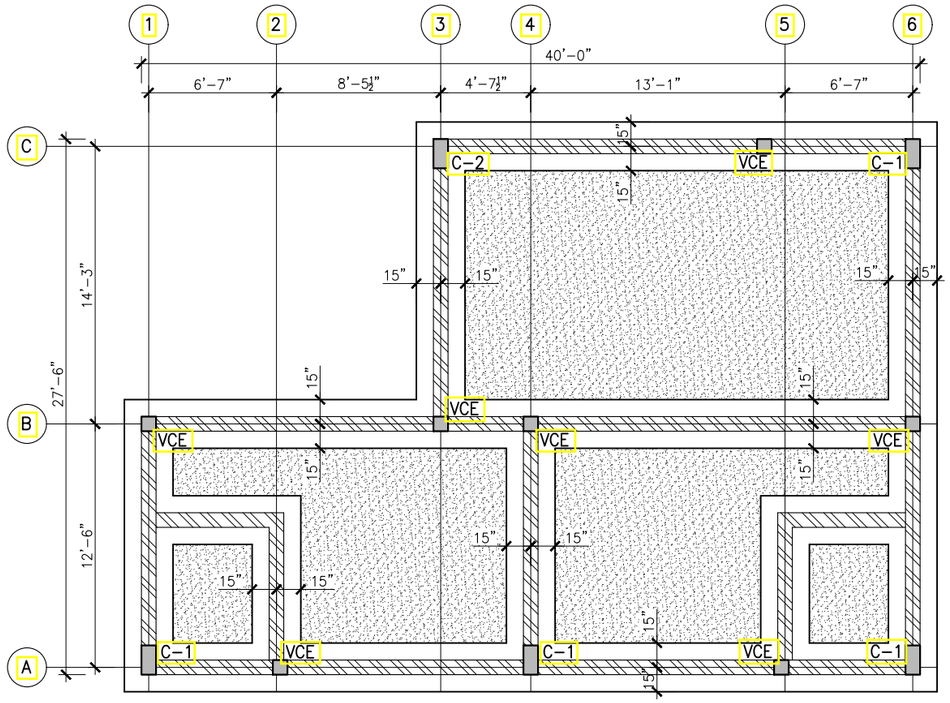
BLOCK - 7

GENERAL NOTES & TYPICAL DETAILS

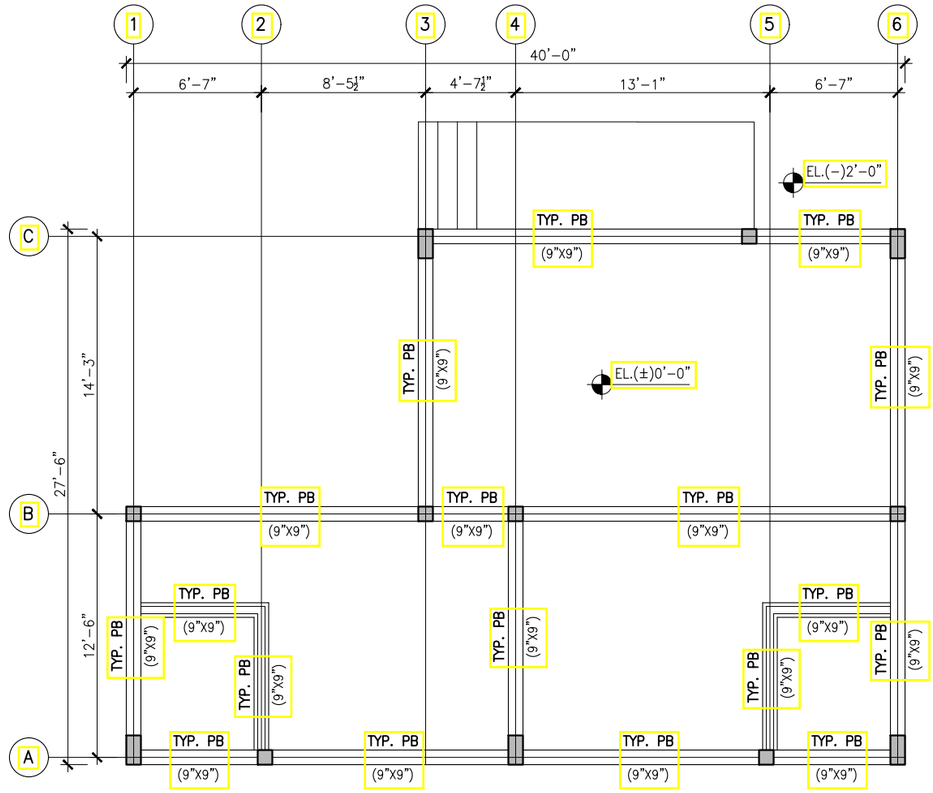
(SHEET 3 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/07G03	0
SUBM.			

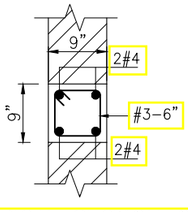


FOUNDATION & COLUMN LAYOUT PLAN

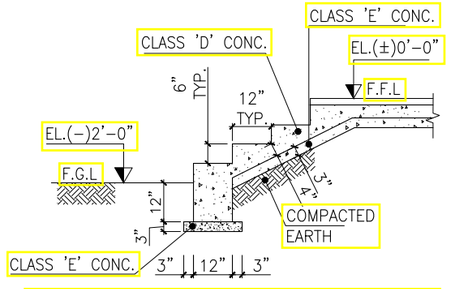


PLINTH BAND LAYOUT PLAN AT EL. (±)0'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS



TYPICAL SECTION OF PLINTH BAND (TYP. PB)



TYPICAL SECTION OF P.C.C STEPS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
4. THE FOUNDATION HAS BEEN DESIGNED ON GROSS ALLOWABLE BEARING CAPACITY OF 0.75 TON/SFT AT A DEPTH OF 3'-0" BELOW N.S.L OR F.G.L WHICH EVER IS LOWER.
5. IF COMPETENT BEARING STRATA IS NOT FOUND AT INDICATED DEPTH, THE ENGINEER SHALL BE NOTIFIED FOR HIS PRIOR INSTRUCTIONS.
6. BOTTOM OF FOOTING SHOULD BE PROVIDED 3'-0" BELOW NSL OR F.G.L WHICH EVER IS LOWER.
7. FOR EL. ±0'-0", REFER MASTER PLAN.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

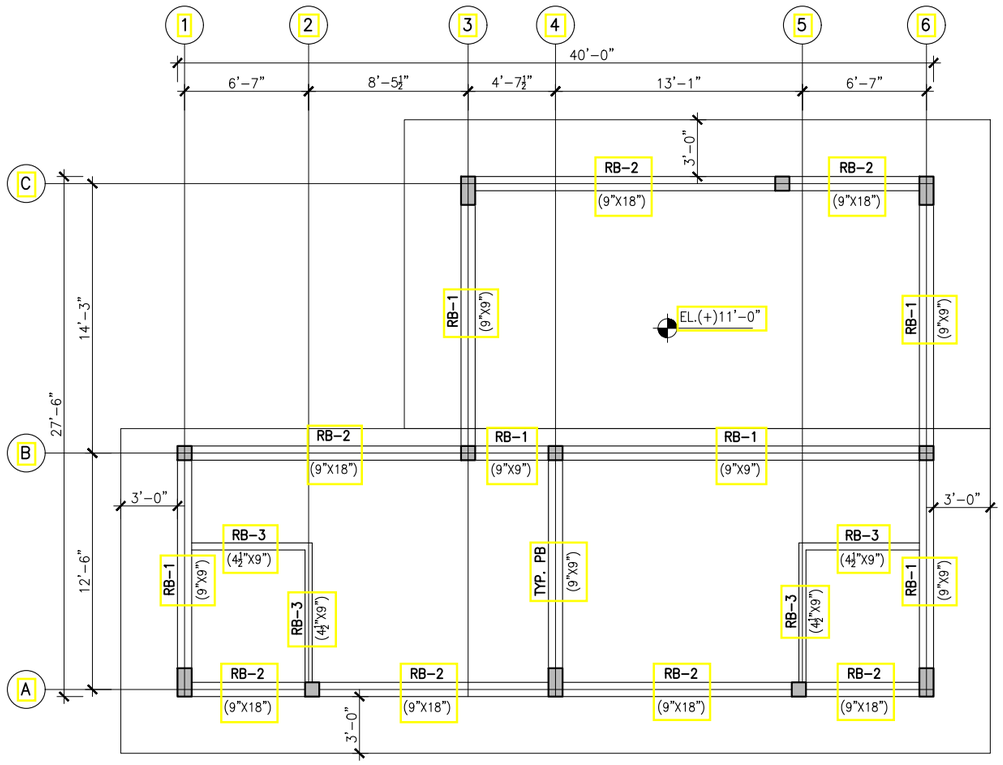
GUEST UNITS

BLOCK - 7

FOUNDATION & COLUMN LAYOUT PLAN AND PLINTH BAND LAYOUT PLAN

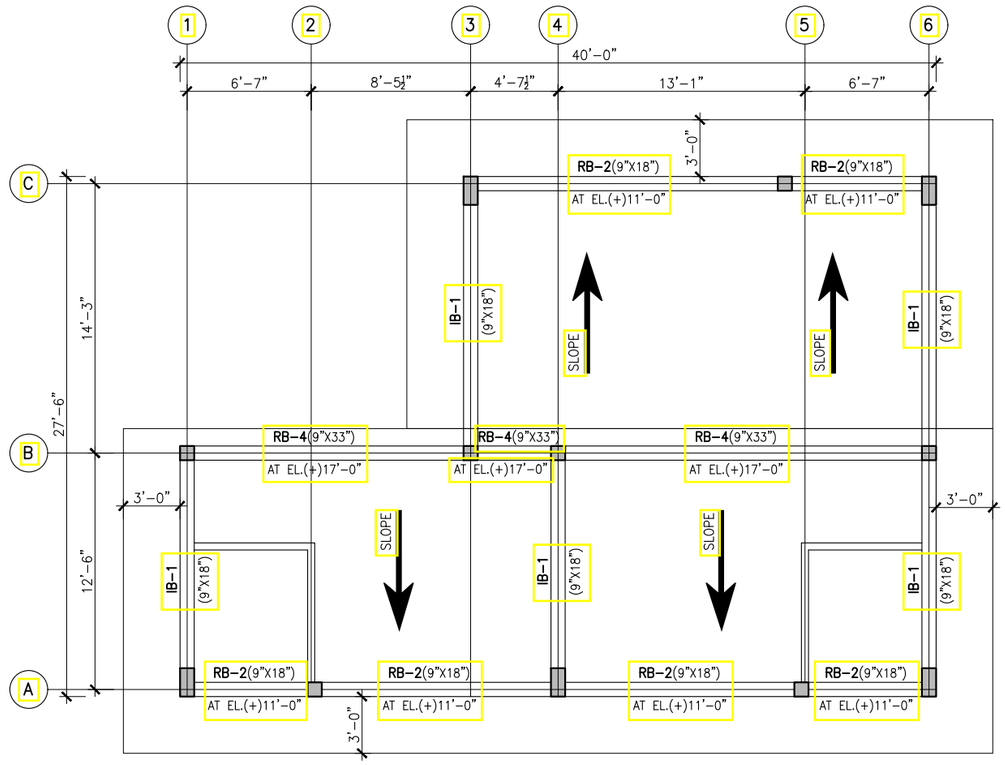
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DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/07G04	0
SUBM.	FEB 2026		



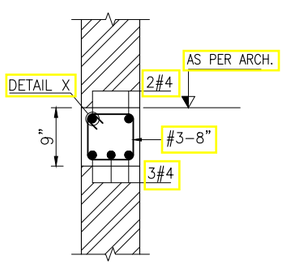
ROOF BEAM LAYOUT PLAN AT EL. (+)11'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS

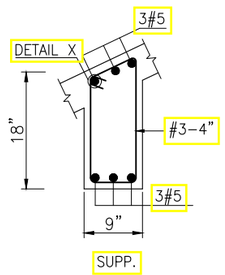


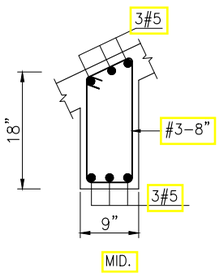
INCLINED BEAM LAYOUT PLAN FROM EL. (+)11'-0" TO EL.(+)17'-0"

ALL SLOPING SLABS ARE 6" THICK UNLESS NOTED OTHERWISE

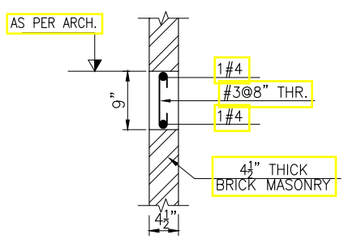


TYP. SEC. OF RB-1

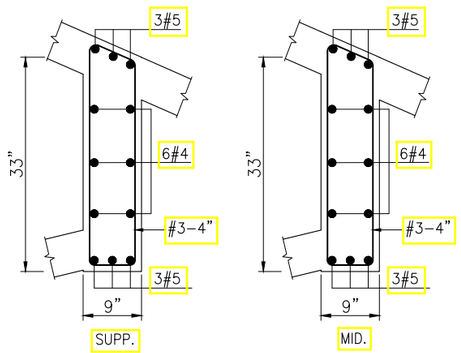




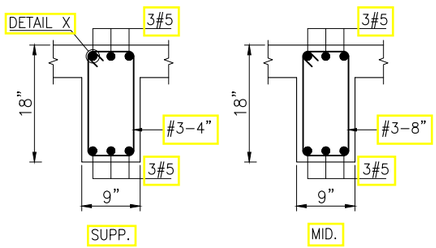
TYPICAL SECTION OF RB-2



SEC. OF RB-3
4½" THICK BRICK WALL



TYPICAL SECTION OF RB-4



TYPICAL SECTION OF IB-1

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 7

FRAMING PLAN AT EL.(+)11'-0" & FROM EL.(+)11'-0" TO EL.(+)17'-0"

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/07G05	0
SUBM.			

A. GENERAL

1. NOTES GIVEN ON THIS DRAWING ARE APPLICABLE TO ALL STRUCTURAL DRAWINGS UNLESS OTHERWISE NOTED. NOTES WRITTEN ON ANY OTHER DRAWING SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS REFERRED.
2. SYSTEM OF UNITS IS FPS.
3. ALL LEVELS MARKED ON THE DRAWINGS ARE LEVELS OF STRUCTURAL ELEMENTS. FINISH LEVELS SHALL BE IN ACCORDANCE WITH THE ARCHITECTURAL DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE STRUCTURE AND ALL TEMPORARY WORKS DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
6. THE CONTRACTOR SHALL CO-ORDINATE ALL DRAWINGS OF ALL DISCIPLINES FOR ALL ITEMS INCLUDING BUT NOT LIMITED TO SIZES AND LOCATION OF ALL OPENINGS REQUIRED FOR DUCTS, PIPES AND PIPE SLEEVES, ELECTRICAL CONDUITS AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE OR OTHERWISE INCORPORATED IN STRUCTURAL WORK AND SHALL BRING TO THE NOTICE OF THE ENGINEER DISCREPANCIES, IF ANY, FOR HIS INSTRUCTIONS, PRIOR TO THE START OF WORK.
7. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
8. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE CLIENT AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
9. THE CONTRACTOR SHALL COORDINATE SCHEDULE OF CONSTRUCTION WITH SUPPLY AND INSTALLATION OF EQUIPMENT.
10. PROVISIONS SHALL BE MADE FOR INSTALLATION OF EQUIPMENT AS PER MANUFACTURER'S RECOMMENDATIONS.
11. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/ DEVIATIONS MAY LEAD TO REJECTION/ REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
12. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO SPECIFICATIONS OF THE CONTRACT. IN ABSENCE OF ANY EXPRESS OR IMPLIED SPECIFICATION IN THE CONTRACT, ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO RELEVANT AMERICAN STANDARDS AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
13. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF SHOP DRAWINGS AND BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.

B. FOUNDATION AND EARTHWORK

1. THE CONTRACTOR SHALL STUDY THE AVAILABLE GEOTECHNICAL INVESTIGATION REPORT BEFORE COMMENCING THE WORK.
2. FOUNDATION DESIGN IS BASED ON PARAMETERS PROVIDED IN GEOTECH. INVESTIGATION REPORT.
3. FOUNDATION IS TO BE PLACED 3'-0" (0.93m) BELOW F.G.L. OR N.S.L WHICHEVER IS LOWER.
4. TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.
5. THE TYPE AND COMPACTION OF SOIL BELOW GRADE SLAB SHALL BE AS PER JOB SPECIFICATIONS. NO FOOTING SHALL BE PLACED ON FILL. HOWEVER, AREAS WHERE FILLING BELOW THE FOOTINGS BECOMES INEVITABLE DUE TO OVER-EXCAVATION (IF ANY), SHALL BE FILLED WITH P.C.C. (1:4:8) WITH PRIOR APPROVAL OF THE ENGINEER, AT NO EXTRA COST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING SYSTEM IF AND WHERE SO REQUIRED DURING CONSTRUCTION.
7. ALL STRUCTURAL CONCRETE SURFACES AGAINST WHICH EARTH IS TO BE FILLED SHALL BE COATED WITH TWO COATS OF HOT BITUMEN (10/20 GRADE) APPLIED AT THE RATE OF 0.49 kg/sqm PER COAT, EXCEPT FOR P.C.C. (1:3:6) AND P.C.C. (1:4:8).
8. BACKFILLING AND COMPACTION SHALL BE CARRIED OUT EQUALLY ON BOTH SIDES OF PLINTH BEAMS TO AVOID IMBALANCE OF LATERAL EARTH PRESSURE.
9. THE CONTRACTOR SHALL SUPPLY AND ERECT ADEQUATE SHORING AND SUPPORT THE SIDES OF ALL EXCAVATIONS WHERE REQUIRED TO SAFEGUARD WORKMEN AND PROTECT ANY ADJACENT STRUCTURES.
10. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.
11. EXCAVATIONS ADJACENT TO EXISTING STRUCTURES AND/OR UNDERGROUND SERVICES SHALL BE MADE BY HAND.

C. REINFORCED CONCRETE/ PLAIN CEMENT CONCRETE

1. ALL CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022, OR ANY OTHER RELEVANT SPECS GIVEN IN CONTRACT.
2. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & SPECIFICATIONS AND THE MINIMUM CUBE CRUSHING STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	NOMINAL MIX RATIO	CUBE STRENGTH AT 28-DAYS (psi.)
A	1:1:2	4,500
B	1:1½:3	3,750
C	1:2:4	3,000
D	1:3:6	2,000
E	1:4:8	1,200

C. REINFORCED / PLAIN CEMENT CONCRETE (CONTINUED)

3. CLASS OF CONCRETE FOR DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE AS FOLLOWS UNLESS NOTED OTHER WISE:

COMPONENT	CONCRETE CLASS
MASONRY WALL FOUNDATION	C
FOUNDATION OF RCC COLUMNS	C
COLUMNS, SLABS & BEAMS,VCE	C
P.C.C. STEPS	D
LEAN CONCRETE	E

4. ORDINARY PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETE WORKS.
5. AN INTEGRAL WATER PROOFING AGENT SHALL BE USED IN CONCRETE THAT IS CONSTANTLY OR INTERMITTENTLY IN CONTACT WITH WATER AS PER MANUFACTURER'S RECOMMENDATIONS
6. CONCRETE CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

STRUCTURAL MEMBER / ELEMENT	MINIMUM COVER (INCHES)
FOUNDATIONS (ALL TYPES)	2"
COLUMNS & BEAMS	1½"
RETAINING WALLS	1½"
SLABS	¾"
PLINTH / LINTEL BAND	¾"

7. ALL REINFORCING STEEL SHALL BE DEFORMED, HOT ROLLED BILLET STEEL BARS CONFORMING TO ASTM A-615 GRADE-60 WITH SPECIFIED YIELD STRENGTH OF NOT LESS THAN 60,000 psi.
8. THE NUMBER INDICATES THE BAR DIAMETER/SIZE, AS UNDER:

BAR NUMBER	DIAMETER (INCHES)
3	⅜"
4	½"
5	⅝"
6	¾"
8	1"

9. ALL DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315, ACI-318 & ACI-350R.
10. ALL REINFORCING STEEL SHALL BE HELD FIRMLY IN PLACE BEFORE AND DURING THE PLACING OF CONCRETE BY MEANS OF WIRES AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.

D. CONCRETE CONSTRUCTION

1. THE CONTRACTOR SHALL SUBMIT CONCRETE POURING SCHEDULE FOR ENGINEER'S APPROVAL. NO CONCRETE SHALL BE POURED UNTIL ITS FORMWORK AND REINFORCEMENT HAS BEEN INSPECTED AND APPROVED BY THE ENGINEER.
2. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BLOCKS ETC. SHOULD BE AVOIDED ON SLAB PANELS.

D. CONT. CONCRETE 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, AND DOWELS FOR STRUCTURAL MEMBERS AND/OR MASONRY ARE PROPERLY LOCATED IN PLACE.

E. CONSTRUCTION JOINTS

1. JOINTS, NOT SHOWN ON THE DRAWING, SHALL BE SO MADE AND LOCATED AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED NEAR THE MIDDLE OF THE SPANS OF SLAB & BEAMS. JOINTS IN WALLS & COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOORS, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.
2. JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS THE JOINTS.
3. JOINTS IN BASE SLAB & WALLS AND ROOF SLAB, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS SHALL BE BORNE BY THE CONTRACTOR. BEAMS & BRACKETS SHALL BE PLACED AT THE SAME TIME AS SLABS.

F. ELECTRICAL CONDUITS

1. CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS & SLABS AND WITHIN THE MIDDLE HALF OF THE THICKNESS. SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6"(150 MM).

G. PROPS, FORMWORK & CURING

1. SHORE & BRACE ALL PARTS OF THE BUILDING DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. SEQUENCE OF REMOVAL OF FORMWORK SHALL BE APPROVED BY THE ENGINEER.
3. AT LEAST ONE LOWER FLOOR SHALL REMAIN PROPPED UNTILL THE UPPER FLOOR IS CAST AND CURED.

H. BRICK MASONRY WORKS

1. ALL BRICK WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022.
2. ALL BRICK SHALL BE SOUND, HARD, WELL BURNT AND OF UNIFORM SIZE,COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 1/8".
3. ALL BRICK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 1/8" IN 10'-0".
4. MORTAR USED IN MASONRY CONSTRUCTION SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 12 MPa (1800Psi) AND SHALL CONFORM TO ASTM C270.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 8

GENERAL NOTES & TYPICAL DETAILS (SHEET 1 OF 3)

[redacted] NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/08G01	0
SUBM.	FEB 2026		

J. STRUCTURAL STEEL WORKS

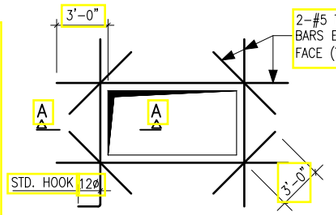
1. ALL STRUCTURAL STEEL WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES–2022.
2. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS.
3. ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A–36 OR EQUIVALENT.
4. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY, AWS, SPECIFICATIONS USING ELECTRODES E70XX.
5. ALL BOLTS SHALL CONFORM TO ASTM A307 OR A325.
6. SURFACE PREPARATION OF ALL STRUCTURAL STEEL FOR PAINTING SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF "STEEL STRUCTURES PAINTING COUNCIL" SPECIFICATIONS SSPC–SP6 FOR COMMERCIAL BLAST CLEANING.
7. ALL STEEL SHALL BE GIVEN ONE SHOP COAT OF RED LEAD OXIDE PRIMER AND FIELD TOUCHUP EXCEPT FOR SURFACES TO BE EMBEDDED IN CONCRETE OR CONTACT SURFACES OF FRICTION BOLTED CONNECTIONS.

K. COLUMN CONFINEMENT

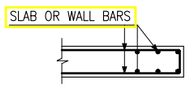
1. IN ORDER TO ATTAIN AN EFFECTIVE BOND BETWEEN THE CONFINING ELEMENTS AND THE MASONRY, THE CONCRETE OF THE CONFINING ELEMENTS SHALL BE CAST AFTER THE MASONRY HAS BEEN BUILT WITH PROPER TOOTHING IN PLACE.
2. CLEAN THE COLUMN SPACE OF ALL RUBBISH BEFORE ADDING THE FORMWORK.
3. POUR THE CONCRETE FOR THE BANDS AND THE COLUMNS AT THE SAME TIME.
4. COMPACT THE CONCRETE WITH VIBRATOR.
5. REMOVE THE FORMWORK NOT EARLIER THAN 03 DAYS.

L. SEISMIC PARAMETERS

1. DESIGN OF STRUCTURE HAS BEEN CARRIED OUT BASED ON SEISMIC PARAMETERS OF ZONE 2B WITH PGA VALUE OF 0.16g to 0.24g & STIFF SOIL PROFILE (SD), ACCORDING TO BUILDING CODE OF PAKISTAN.



WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

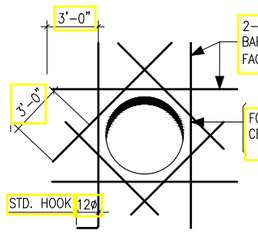


SECTION A–A

NOTES

- FOR OPENING WITH MAXIMUM DIMENSION OVER 5'–0" REFER TO OTHER DETAILS.
- USE THIS DETAILS IF NOT SHOWN IN DESIGN DRAWINGS

REINFORCEMENT DETAIL AT OPENING IN SLAB & WALLS (TYP)



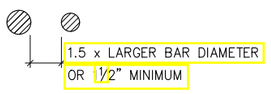
FOR OPENING 1'–0" DIA ADD DIAGONAL BARS CENTER OF SLAB OR WALL SAME SIZE AS LARGEST MAIN BARS

WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

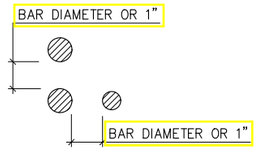
NOTES

MAXIMUM DIAMETER OF SLEVE IS 1'–0" FOR TRIM BARS BARS AROUND LARGE SLEEVE REFER TO OTHER DETAILS

REINFORCEMENT AROUND SLEEVE IN SLABS & WALLS (TYP.)



VERTICAL BAR SPACING



BAR SPACING IN BEAM

LEGEND

MS	MILD STEEL
PVC	POLYVINYL CHLORIDE
C.G.I	CORRUGATED GALVANIZED IRON
G.I	GALVANIZED IRON
SQ	SQUARE
C.Jt	CONSTRUCTION JOINT
T&B	TOP AND BOTTOM
EF	EACH FACE
BF	BOTH FACES
ø/db/#	DIAMETER OF BAR
@	AT THE RATE OF
B	BOTTOM
C/C	CENTER TO CENTER
B.W	BOTHWAYS
E.G.F	ENGINEERED GRANULAR FILL
E.G.L	EXCAVATED GROUND LEVEL
E.L.	STRUCTURAL ELEVATION
EQ.	EQUAL
F.D.T	FIELD DENSITY TEST
F.F.L	FINISH FLOOR LEVEL
F.G.L.	FINISH GROUND LEVEL
F.B.L.	FOUNDATION BED LEVEL
G.W.T.	GROUND WATER TABLE
N.S.L.	EXISTING NATURAL SURFACE LEVEL
N.T.S.	NOT TO SCALE
SMRF	SPECIAL MOMENT RESISTING FRAME
STYP	SOIL PROFILE TYPE
ST.	STIRRUPS
T	TOP
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
N.T.S.	NOT TO SCALE
	LEVEL ON PLAN
℄	CENTER LINE

SPLICE LENGHTH (LS) AND DEVELOPMENT LENGHT (LD) (fc'=3 ksi, fy=40 ksi)

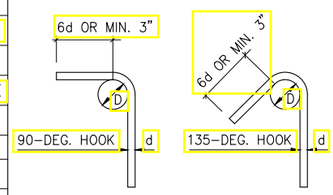
BAR DIA	#3	#4	#5	#6	#7	#8	#10	#12
DEVELOPMENT LENGTH ℓd (Inches)	18	24	30	36	42	47	53	59
SPLICE LENGTH (Inches)	24	32	39	47	55	62	69	77

LAP SPLICE ARE NOT TO BE USED:
- WITHIN JOINTS
- WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH.
- FROM THE FACE OF THE JOINT.

CURTAILMENT LENGTH SHOULD BE EXTEND UPTO L/16,12db OR d, (WHICHEVER GREATER) BEYOND L/3
WHERE:
L–GREATER CLEAR SPAN, db–DIAMETER OF BAR,
d–EFFECTIVE DEPTH.
THE FIRST HOOP SHALL BE LOCATED NOT MORE THAN 2" FROM THE FACE OF THE SUPPORTING MEMBER.

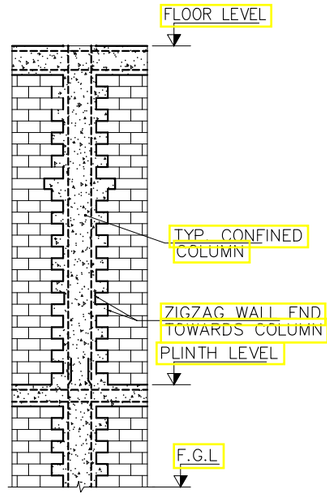
* ALL LAP SPLICE SHALL BE STAGGARED BY AT LEAST 50 %

BAR DIA	D
#3	2½"
#4	3"
#5	4"
#6	4"
#8	6"
#9	7"
#11	8½"



STIRRUPS AND TIE HOOKS

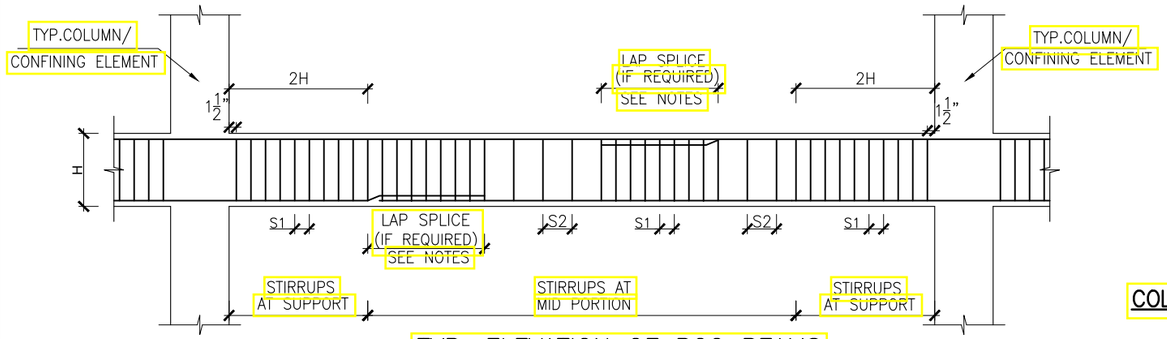
BAR DIA	D
#3	1½"
#4	2"
#5	2½"



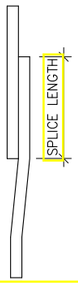
TYPICAL ELEVATION OF CONFINED COLUMN (SHOWING TOOTHING)



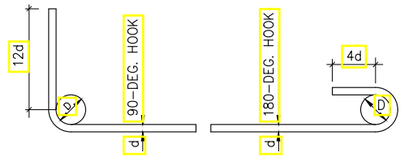
BEAM SPLICE (TYP.)



TYP. ELEVATION OF RCC BEAMS



COLUMN SPLICE (TYP.)



STANDARD BAR HOOKS (MAIN BARS)

LEGENDS

S1	STIRRUPS SPACING IN BEAM NEAR SUPPORTS & LAP SPLICES
S2	STIRRUPS SPACING IN BEAM IN MIDSPAN
h	DEPTH OF BEAM
db	DIAMETER OF BAR
d	EFFECTIVE DEPTH OF BEAM

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

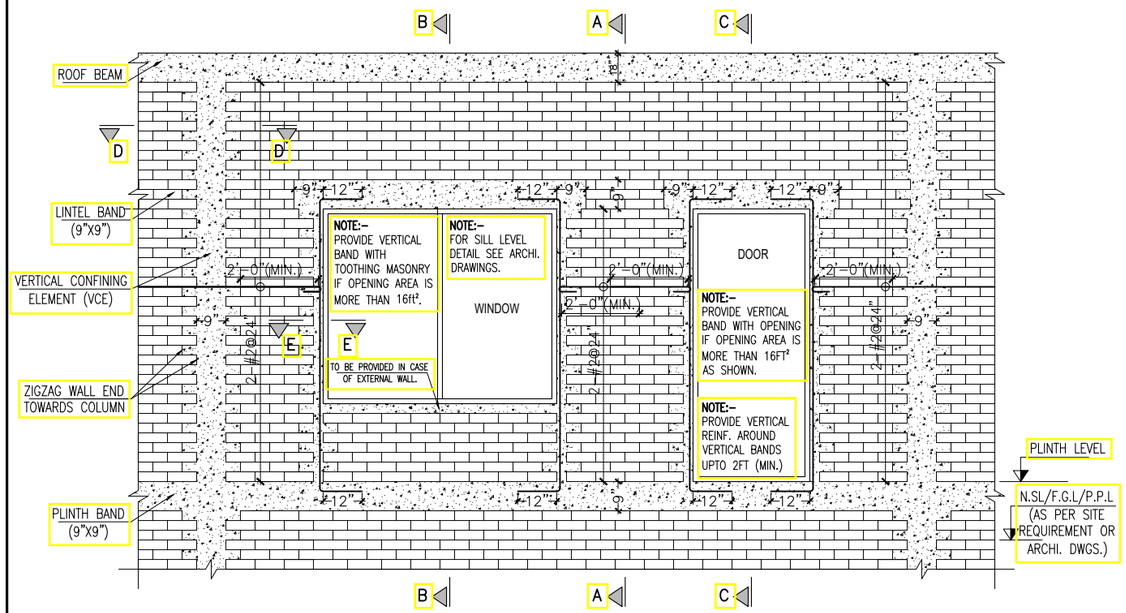
GUEST UNITS

BLOCK - 8

GENERAL NOTES & TYPICAL DETAILS (SHEET 2 OF 3)

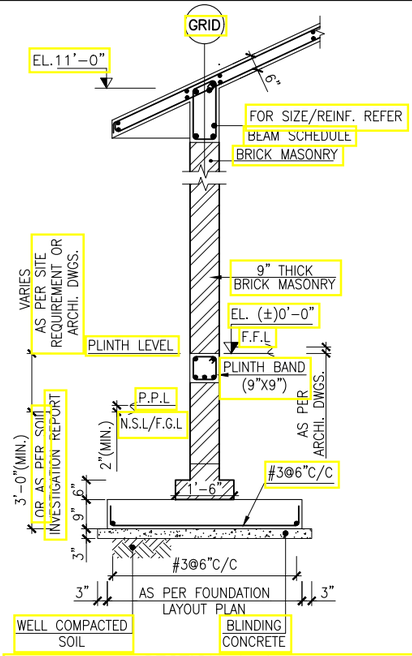
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/08G02	0
SUBM.	FEB 2026		



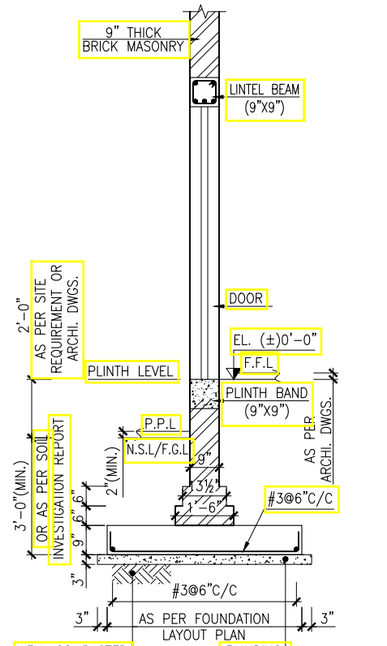
TYPICAL ELEVATION OF 9" THICK CONFINED BRICK MASONRY WALL SINGLE STOREY WALL MASONRY

(FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS)



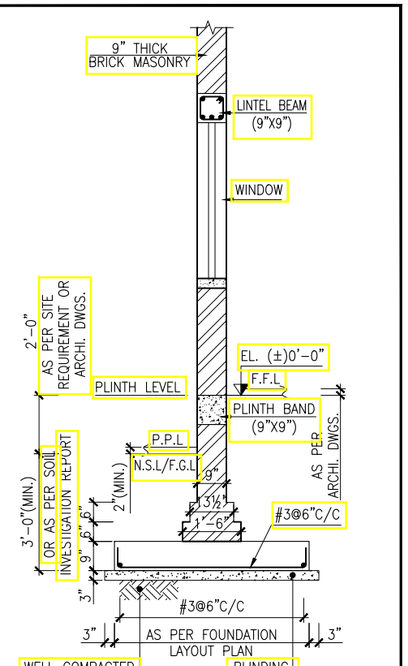
SECTION A–A

TYP. FOOTING SECTION OF EXTERNAL/ INTERNAL WALL WITHOUT OPENING



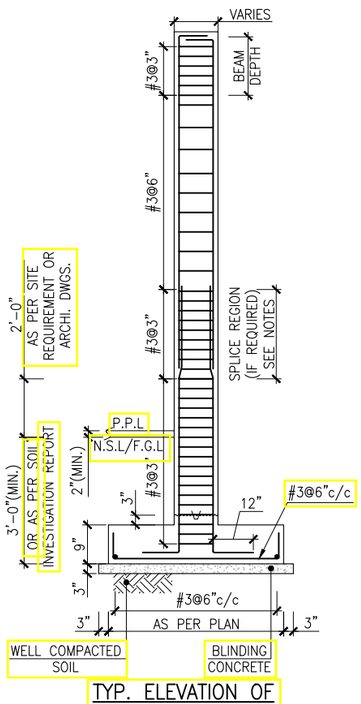
SECTION C–C

TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT DOOR

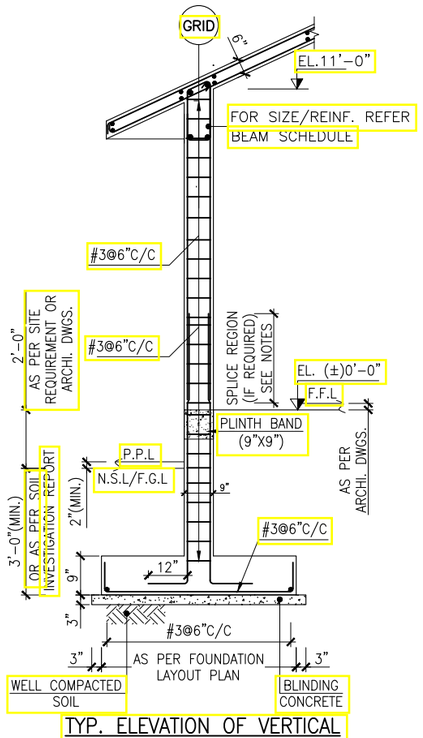


SECTION B–B

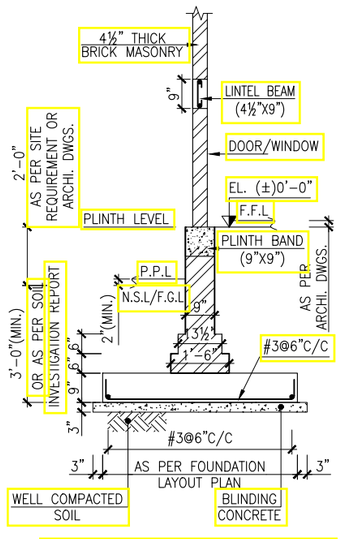
TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT WINDOW



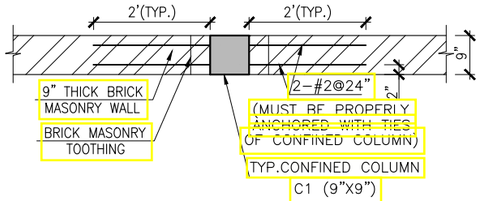
TYP. ELEVATION OF COLUMN C–1



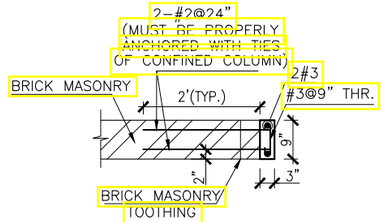
TYP. ELEVATION OF VERTICAL CONFINING ELEMENT (VCE)



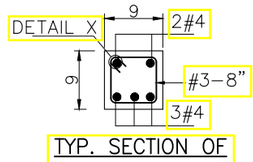
TYP. FOOTING SECTION OF 4½" THICK MASONRY WALL



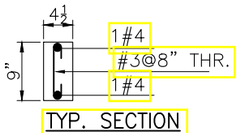
SECTION D–D



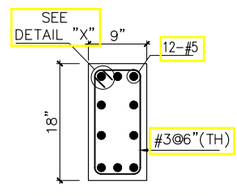
SECTION E–E



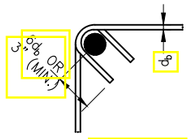
TYP. SECTION OF LINTEL BEAM 9" THICK BRICK WALL



TYP. SECTION OF RB–3

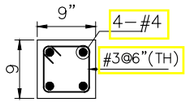


TYP. SECTION OF COLUMN (C–1)



DETAIL–X

TYP. 135° HOOK DETAIL FOR TIES & STIRRUPS



TYP. CONFINED COLUMN V.C.E

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

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GUEST UNITS

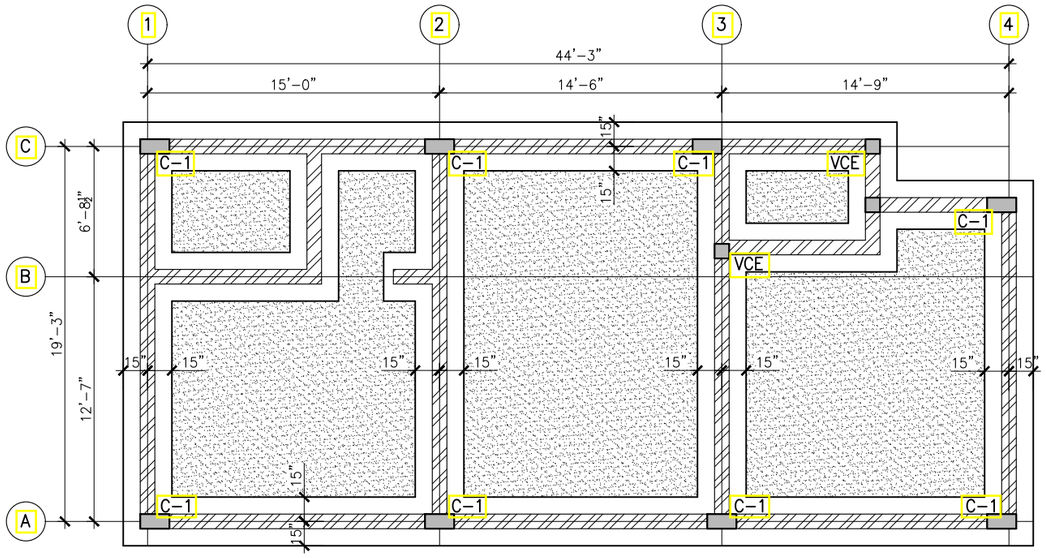
BLOCK - 8

GENERAL NOTES & TYPICAL DETAILS

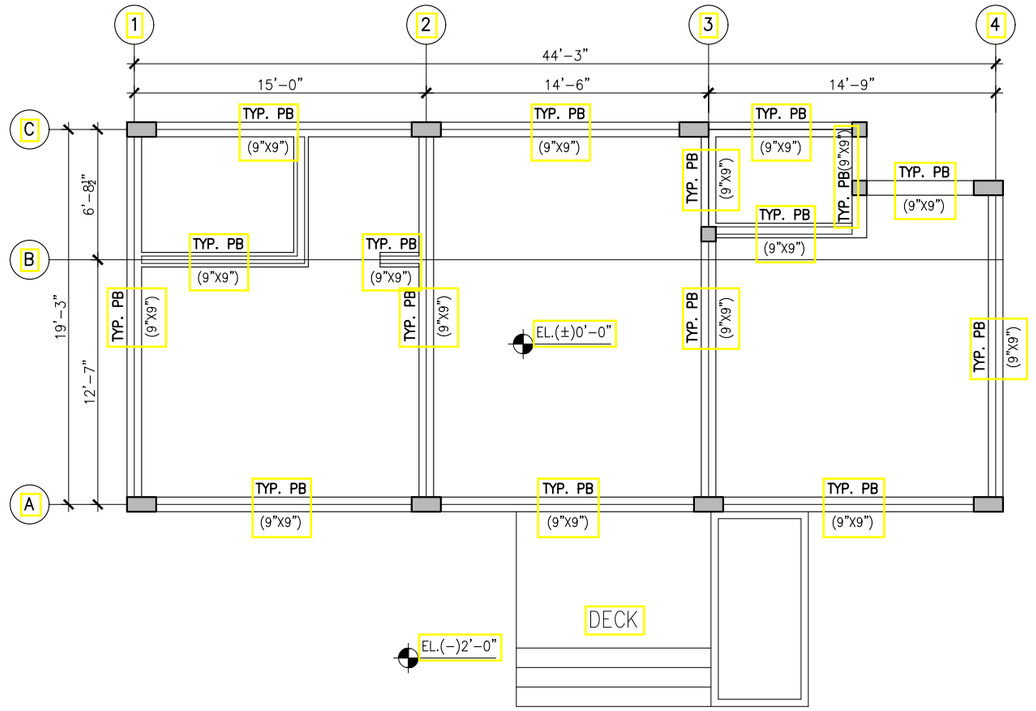
(SHEET 3 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/08G03	0
SUBM.			

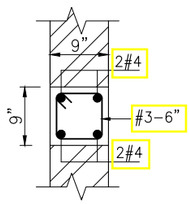


FOUNDATION & COLUMN LAYOUT PLAN

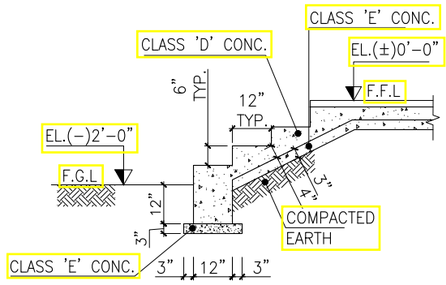


PLINTH BAND LAYOUT PLAN AT EL. (±)0'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS



TYPICAL SECTION OF PLINTH BAND (TYP. PB)



TYPICAL SECTION OF P.C.C STEPS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
4. THE FOUNDATION HAS BEEN DESIGNED ON GROSS ALLOWABLE BEARING CAPACITY OF 0.75 TON/SFT AT A DEPTH OF 3'-0" BELOW N.S.L OR F.G.L WHICH EVER IS LOWER.
5. IF COMPETENT BEARING STRATA IS NOT FOUND AT INDICATED DEPTH, THE ENGINEER SHALL BE NOTIFIED FOR HIS PRIOR INSTRUCTIONS.
6. BOTTOM OF FOOTING SHOULD BE PROVIDED 3'-0" BELOW NSL OR F.G.L WHICH EVER IS LOWER.
7. FOR EL. ±0'-0", REFER MASTER PLAN.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

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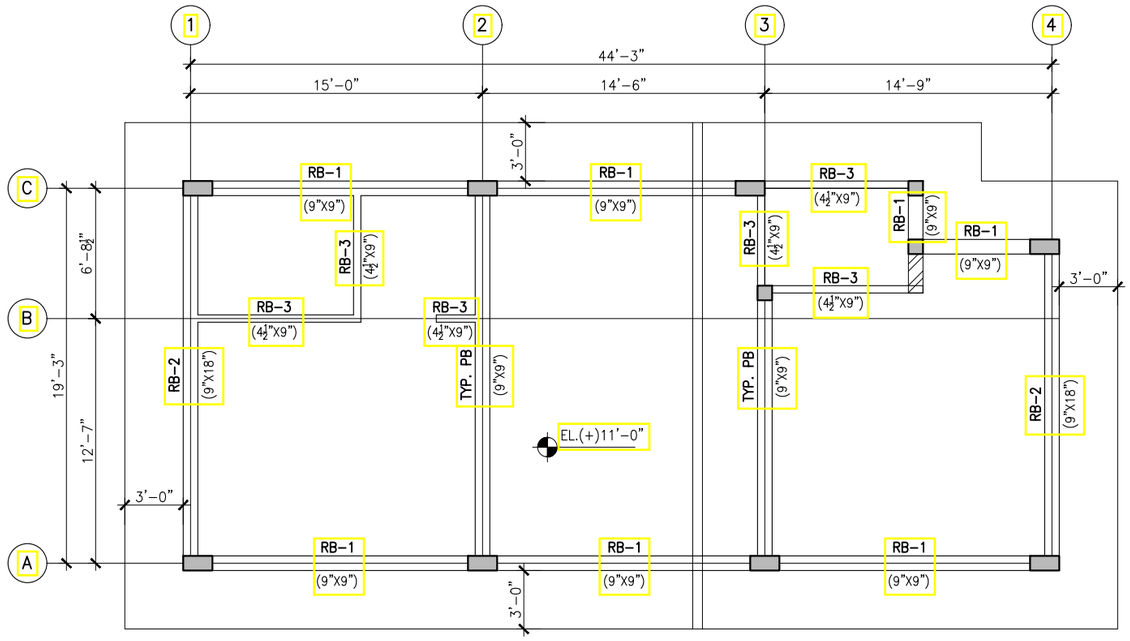
GUEST UNITS

BLOCK - 8

FOUNDATION & COLUMN LAYOUT PLAN AND PLINTH BAND LAYOUT PLAN

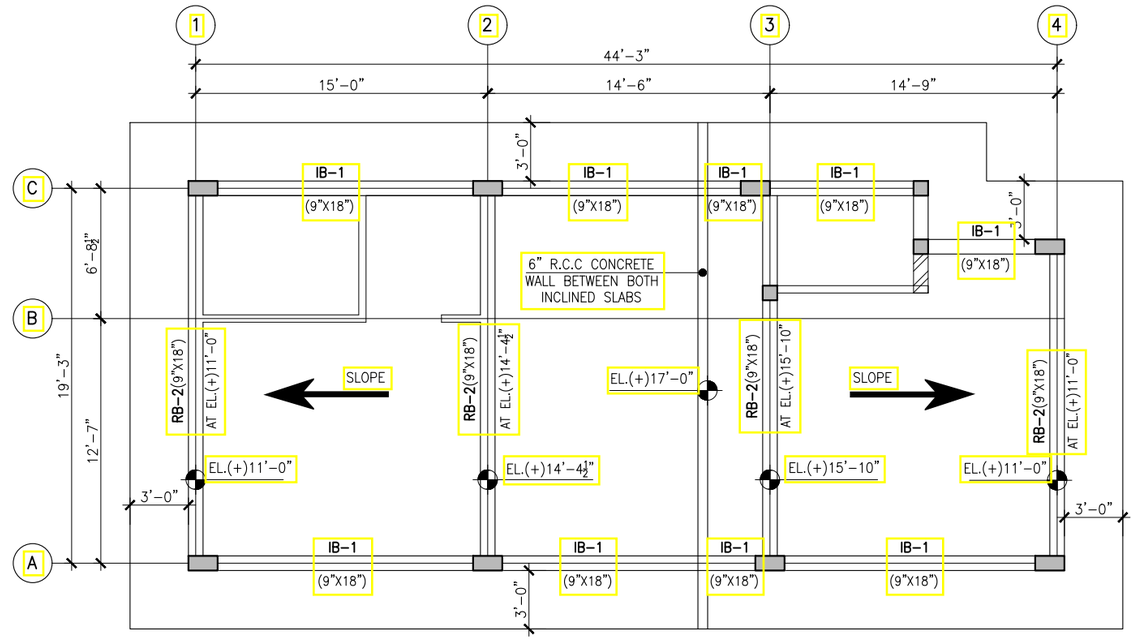
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.			
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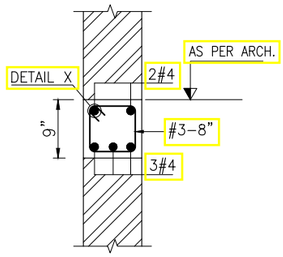
ROOF BEAM LAYOUT PLAN AT EL. (+)11'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS

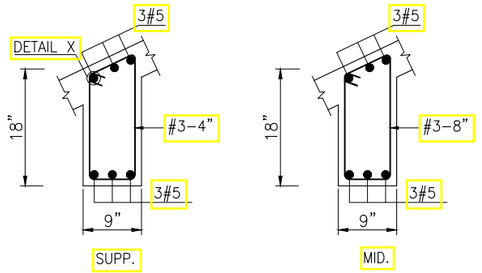


INCLINED BEAM LAYOUT PLAN FROM EL. (+)11'-0" TO EL.(+)17'-0"

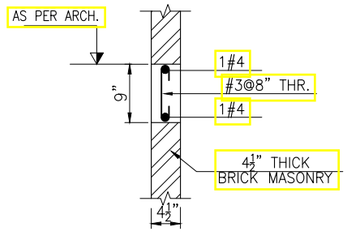
ALL SLOPING SLABS ARE 6" THICK UNLESS NOTED OTHERWISE



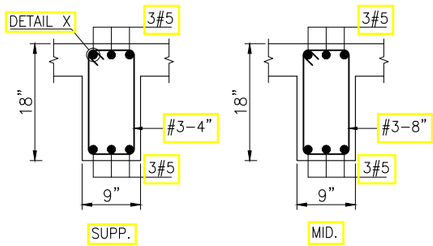
TYP. SEC. OF RB-1



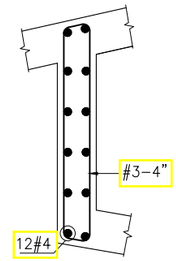
TYPICAL SECTION OF RB-2



SEC. OF RB-3
4½" THICK BRICK WALL



TYPICAL SECTION OF IB-1



TYPICAL SECTION OF
6" THICK R.C.C WALL
BETWEEN BOTH SLABS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 8

**FRAMING PLAN AT EL.(+)11'-0" &
FROM EL.(+)11'-0" TO EL.(+)17'-0"**

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.			
SUBM.	FEB 2026	156/328/TD/08G05	0

A. GENERAL

1. NOTES GIVEN ON THIS DRAWING ARE APPLICABLE TO ALL STRUCTURAL DRAWINGS UNLESS OTHERWISE NOTED. NOTES WRITTEN ON ANY OTHER DRAWING SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS REFERRED.
2. SYSTEM OF UNITS IS FPS.
3. ALL LEVELS MARKED ON THE DRAWINGS ARE LEVELS OF STRUCTURAL ELEMENTS. FINISH LEVELS SHALL BE IN ACCORDANCE WITH THE ARCHITECTURAL DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE STRUCTURE AND ALL TEMPORARY WORKS DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
6. THE CONTRACTOR SHALL CO-ORDINATE ALL DRAWINGS OF ALL DISCIPLINES FOR ALL ITEMS INCLUDING BUT NOT LIMITED TO SIZES AND LOCATION OF ALL OPENINGS REQUIRED FOR DUCTS, PIPES AND PIPE SLEEVES, ELECTRICAL CONDUITS AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE OR OTHERWISE INCORPORATED IN STRUCTURAL WORK AND SHALL BRING TO THE NOTICE OF THE ENGINEER DISCREPANCIES, IF ANY, FOR HIS INSTRUCTIONS, PRIOR TO THE START OF WORK.
7. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
8. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE CLIENT AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
9. THE CONTRACTOR SHALL COORDINATE SCHEDULE OF CONSTRUCTION WITH SUPPLY AND INSTALLATION OF EQUIPMENT.
10. PROVISIONS SHALL BE MADE FOR INSTALLATION OF EQUIPMENT AS PER MANUFACTURER'S RECOMMENDATIONS.
11. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/ DEVIATIONS MAY LEAD TO REJECTION/ REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
12. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO SPECIFICATIONS OF THE CONTRACT. IN ABSENCE OF ANY EXPRESS OR IMPLIED SPECIFICATION IN THE CONTRACT, ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO RELEVANT AMERICAN STANDARDS AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
13. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF SHOP DRAWINGS AND BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.

B. FOUNDATION AND EARTHWORK

1. THE CONTRACTOR SHALL STUDY THE AVAILABLE GEOTECHNICAL INVESTIGATION REPORT BEFORE COMMENCING THE WORK.
2. FOUNDATION DESIGN IS BASED ON PARAMETERS PROVIDED IN GEOTECH. INVESTIGATION REPORT.
3. FOUNDATION IS TO BE PLACED 3'-0" (0.93m) BELOW F.G.L. OR N.S.L WHICHEVER IS LOWER.
4. TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.
5. THE TYPE AND COMPACTION OF SOIL BELOW GRADE SLAB SHALL BE AS PER JOB SPECIFICATIONS. NO FOOTING SHALL BE PLACED ON FILL. HOWEVER, AREAS WHERE FILLING BELOW THE FOOTINGS BECOMES INEVITABLE DUE TO OVER-EXCAVATION (IF ANY), SHALL BE FILLED WITH P.C.C. (1:4:8) WITH PRIOR APPROVAL OF THE ENGINEER, AT NO EXTRA COST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING SYSTEM IF AND WHERE SO REQUIRED DURING CONSTRUCTION.
7. ALL STRUCTURAL CONCRETE SURFACES AGAINST WHICH EARTH IS TO BE FILLED SHALL BE COATED WITH TWO COATS OF HOT BITUMEN (10/20 GRADE) APPLIED AT THE RATE OF 0.49 kg/sqm PER COAT, EXCEPT FOR P.C.C. (1:3:6) AND P.C.C. (1:4:8).
8. BACKFILLING AND COMPACTION SHALL BE CARRIED OUT EQUALLY ON BOTH SIDES OF PLINTH BEAMS TO AVOID IMBALANCE OF LATERAL EARTH PRESSURE.
9. THE CONTRACTOR SHALL SUPPLY AND ERECT ADEQUATE SHORING AND SUPPORT THE SIDES OF ALL EXCAVATIONS WHERE REQUIRED TO SAFEGUARD WORKMEN AND PROTECT ANY ADJACENT STRUCTURES.
10. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.
11. EXCAVATIONS ADJACENT TO EXISTING STRUCTURES AND/OR UNDERGROUND SERVICES SHALL BE MADE BY HAND.

C. REINFORCED CONCRETE/ PLAIN CEMENT CONCRETE

1. ALL CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022, OR ANY OTHER RELEVANT SPECS GIVEN IN CONTRACT.
2. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & SPECIFICATIONS AND THE MINIMUM CUBE CRUSHING STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	NOMINAL MIX RATIO	CUBE STRENGTH AT 28-DAYS (psi.)
A	1:1:2	4,500
B	1:1½:3	3,750
C	1:2:4	3,000
D	1:3:6	2,000
E	1:4:8	1,200

C. REINFORCED / PLAIN CEMENT CONCRETE (CONTINUED)

3. CLASS OF CONCRETE FOR DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE AS FOLLOWS UNLESS NOTED OTHER WISE:

COMPONENT	CONCRETE CLASS
MASONRY WALL FOUNDATION	C
FOUNDATION OF RCC COLUMNS	C
COLUMNS, SLABS & BEAMS,VCE	C
P.C.C. STEPS	D
LEAN CONCRETE	E

4. ORDINARY PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETE WORKS.
5. AN INTEGRAL WATER PROOFING AGENT SHALL BE USED IN CONCRETE THAT IS CONSTANTLY OR INTERMITTENTLY IN CONTACT WITH WATER AS PER MANUFACTURER'S RECOMMENDATIONS
6. CONCRETE CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

STRUCTURAL MEMBER / ELEMENT	MINIMUM COVER (INCHES)
FOUNDATIONS (ALL TYPES)	2"
COLUMNS & BEAMS	1½"
RETAINING WALLS	1½"
SLABS	¾"
PLINTH / LINTEL BAND	¾"

7. ALL REINFORCING STEEL SHALL BE DEFORMED, HOT ROLLED BILLET STEEL BARS CONFORMING TO ASTM A-615 GRADE-60 WITH SPECIFIED YIELD STRENGTH OF NOT LESS THAN 60,000 psi.
8. THE NUMBER INDICATES THE BAR DIAMETER/SIZE, AS UNDER:

BAR NUMBER	DIAMETER (INCHES)
3	⅜"
4	½"
5	⅝"
6	¾"
8	1"

9. ALL DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315, ACI-318 & ACI-350R.
10. ALL REINFORCING STEEL SHALL BE HELD FIRMLY IN PLACE BEFORE AND DURING THE PLACING OF CONCRETE BY MEANS OF WIRES AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.

D. CONCRETE CONSTRUCTION

1. THE CONTRACTOR SHALL SUBMIT CONCRETE POURING SCHEDULE FOR ENGINEER'S APPROVAL. NO CONCRETE SHALL BE POURED UNTIL ITS FORMWORK AND REINFORCEMENT HAS BEEN INSPECTED AND APPROVED BY THE ENGINEER.
2. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BLOCKS ETC. SHOULD BE AVOIDED ON SLAB PANELS.

D. CONT. CONCRETE 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, AND DOWELS FOR STRUCTURAL MEMBERS AND/OR MASONRY ARE PROPERLY LOCATED IN PLACE.

E. CONSTRUCTION JOINTS

1. JOINTS, NOT SHOWN ON THE DRAWING, SHALL BE SO MADE AND LOCATED AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED NEAR THE MIDDLE OF THE SPANS OF SLAB & BEAMS. JOINTS IN WALLS & COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOORS, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.
2. JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS THE JOINTS.
3. JOINTS IN BASE SLAB & WALLS AND ROOF SLAB, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS SHALL BE BORNE BY THE CONTRACTOR. BEAMS & BRACKETS SHALL BE PLACED AT THE SAME TIME AS SLABS.

F. ELECTRICAL CONDUITS

1. CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS & SLABS AND WITHIN THE MIDDLE HALF OF THE THICKNESS. SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6"(150 MM).

G. PROPS, FORMWORK & CURING

1. SHORE & BRACE ALL PARTS OF THE BUILDING DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. SEQUENCE OF REMOVAL OF FORMWORK SHALL BE APPROVED BY THE ENGINEER.
3. AT LEAST ONE LOWER FLOOR SHALL REMAIN PROPPED UNTILL THE UPPER FLOOR IS CAST AND CURED.

H. BRICK MASONRY WORKS

1. ALL BRICK WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022.
2. ALL BRICK SHALL BE SOUND, HARD, WELL BURNT AND OF UNIFORM SIZE,COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 1/8".
3. ALL BRICK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 1/8" IN 10'-0".
4. MORTAR USED IN MASONRY CONSTRUCTION SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 12 MPa (1800Psi) AND SHALL CONFORM TO ASTM C270.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

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GUEST UNITS

BLOCK - 9

GENERAL NOTES & TYPICAL DETAILS (SHEET 1 OF 3)

[redacted] NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/09G01	0
SUBM.			

J. STRUCTURAL STEEL WORKS

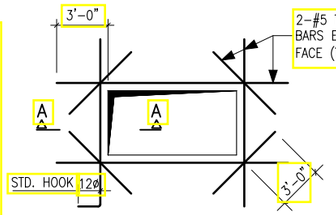
1. ALL STRUCTURAL STEEL WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES–2022.
2. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS.
3. ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A–36 OR EQUIVALENT.
4. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY, AWS, SPECIFICATIONS USING ELECTRODES E70XX.
5. ALL BOLTS SHALL CONFORM TO ASTM A307 OR A325.
6. SURFACE PREPARATION OF ALL STRUCTURAL STEEL FOR PAINTING SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF "STEEL STRUCTURES PAINTING COUNCIL" SPECIFICATIONS SSPC–SP6 FOR COMMERCIAL BLAST CLEANING.
7. ALL STEEL SHALL BE GIVEN ONE SHOP COAT OF RED LEAD OXIDE PRIMER AND FIELD TOUCHUP EXCEPT FOR SURFACES TO BE EMBEDDED IN CONCRETE OR CONTACT SURFACES OF FRICTION BOLTED CONNECTIONS.

K. COLUMN CONFINEMENT

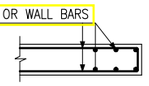
1. IN ORDER TO ATTAIN AN EFFECTIVE BOND BETWEEN THE CONFINING ELEMENTS AND THE MASONRY, THE CONCRETE OF THE CONFINING ELEMENTS SHALL BE CAST AFTER THE MASONRY HAS BEEN BUILT WITH PROPER TOOTHING IN PLACE.
2. CLEAN THE COLUMN SPACE OF ALL RUBBISH BEFORE ADDING THE FORMWORK.
3. POUR THE CONCRETE FOR THE BANDS AND THE COLUMNS AT THE SAME TIME.
4. COMPACT THE CONCRETE WITH VIBRATOR.
5. REMOVE THE FORMWORK NOT EARLIER THAN 03 DAYS.

L. SEISMIC PARAMETERS

1. DESIGN OF STRUCTURE HAS BEEN CARRIED OUT BASED ON SEISMIC PARAMETERS OF ZONE 2B WITH PGA VALUE OF 0.16g to 0.24g & STIFF SOIL PROFILE (SD), ACCORDING TO BUILDING CODE OF PAKISTAN.



WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

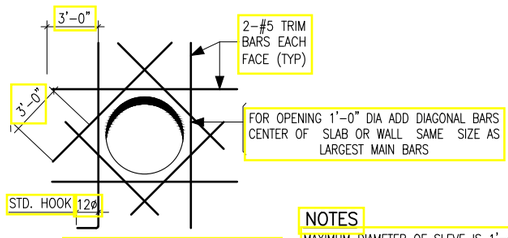


SECTION A–A

NOTES

- FOR OPENING WITH MAXIMUM DIMENSION OVER 5'–0" REFER TO OTHER DETAILS.
- USE THIS DETAILS IF NOT SHOWN IN DESIGN DRAWINGS

REINFORCEMENT DETAIL AT OPENING IN SLAB & WALLS (TYP)

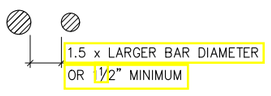


WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

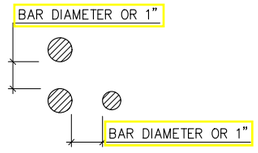
NOTES

MAXIMUM DIAMETER OF SLEVE IS 1'–0" FOR TRIM BARS BARS AROUND LARGE SLEEVE REFER TO OTHER DETAILS

REINFORCEMENT AROUND SLEEVE IN SLABS & WALLS (TYP.)



VERTICAL BAR SPACING



BAR SPACING IN BEAM

LEGEND

MS	MILD STEEL
PVC	POLYVINYL CHLORIDE
C.G.I	CORRUGATED GALVANIZED IRON
G.I	GALVANIZED IRON
SQ	SQUARE
C.Jt	CONSTRUCTION JOINT
T&B	TOP AND BOTTOM
EF	EACH FACE
BF	BOTH FACES
ø/db/#	DIAMETER OF BAR
@	AT THE RATE OF
B	BOTTOM
C/C	CENTER TO CENTER
B.W	BOTHWAYS
E.G.F	ENGINEERED GRANULAR FILL
E.G.L	EXCAVATED GROUND LEVEL
E.L.	STRUCTURAL ELEVATION
EQ.	EQUAL
F.D.T	FIELD DENSITY TEST
F.F.L	FINISH FLOOR LEVEL
F.G.L.	FINISH GROUND LEVEL
F.B.L.	FOUNDATION BED LEVEL
G.W.T.	GROUND WATER TABLE
N.S.L.	EXISTING NATURAL SURFACE LEVEL
N.T.S.	NOT TO SCALE
SMRF	SPECIAL MOMENT RESISTING FRAME
STYP	SOIL PROFILE TYPE
ST.	STIRRUPS
T	TOP
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
N.T.S.	NOT TO SCALE
	LEVEL ON PLAN
℄	CENTER LINE

SPLICE LENGHTH (LS) AND DEVELOPMENT LENGHT (LD) (fc'=3 ksi, fy=40 ksi)

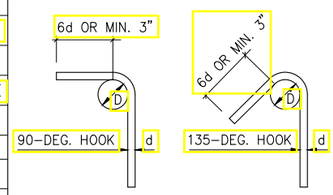
BAR DIA	#3	#4	#5	#6	#7	#8	#10	#12
DEVELOPMENT LENGTH ℓd (Inches)	18	24	30	36	42	47	53	59
SPLICE LENGTH (Inches)	24	32	39	47	55	62	69	77

LAP SPLICE ARE NOT TO BE USED:
- WITHIN JOINTS
- WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH.
- FROM THE FACE OF THE JOINT.

CURTAILMENT LENGTH SHOULD BE EXTEND UPTO L/16,12db OR d, (WHICHEVER GREATER) BEYOND L/3
WHERE:
L–GREATER CLEAR SPAN, db–DIAMETER OF BAR,
d–EFFECTIVE DEPTH.
THE FIRST HOOP SHALL BE LOCATED NOT MORE THAN 2" FROM THE FACE OF THE SUPPORTING MEMBER.

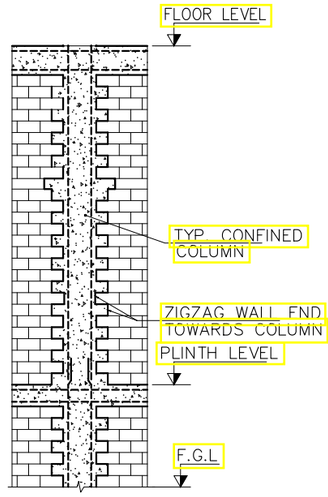
* ALL LAP SPLICE SHALL BE STAGGARED BY AT LEAST 50 %

BAR DIA	D
#3	2½"
#4	3"
#5	4"
#6	4"
#8	6"
#9	7"
#11	8½"



STIRRUPS AND TIE HOOKS

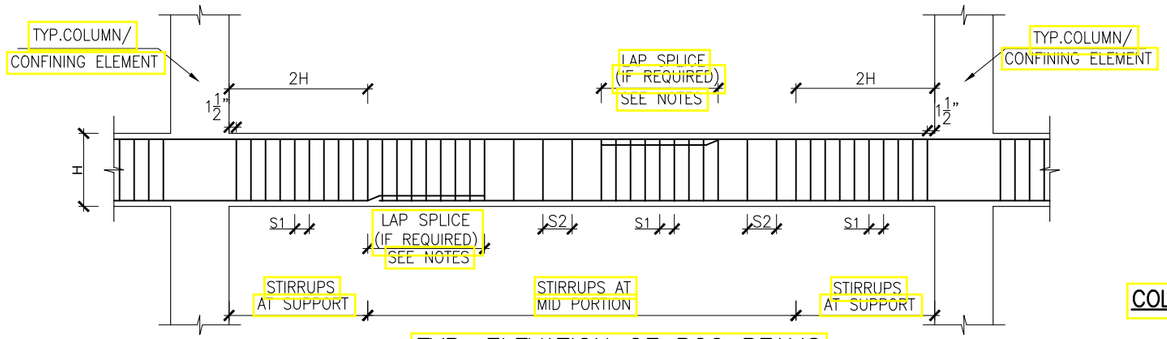
BAR DIA	D
#3	1½"
#4	2"
#5	2½"



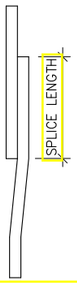
TYPICAL ELEVATION OF CONFINED COLUMN (SHOWING TOOTHING)



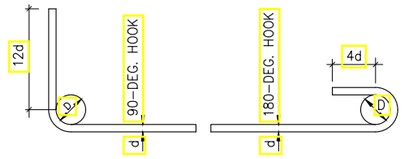
BEAM SPLICE (TYP.)



TYP. ELEVATION OF RCC BEAMS



COLUMN SPLICE (TYP.)



STANDARD BAR HOOKS (MAIN BARS)

LEGENDS

S1	STIRRUPS SPACING IN BEAM NEAR SUPPORTS & LAP SPLICES
S2	STIRRUPS SPACING IN BEAM IN MIDSPAN
h	DEPTH OF BEAM
db	DIAMETER OF BAR
d	EFFECTIVE DEPTH OF BEAM

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

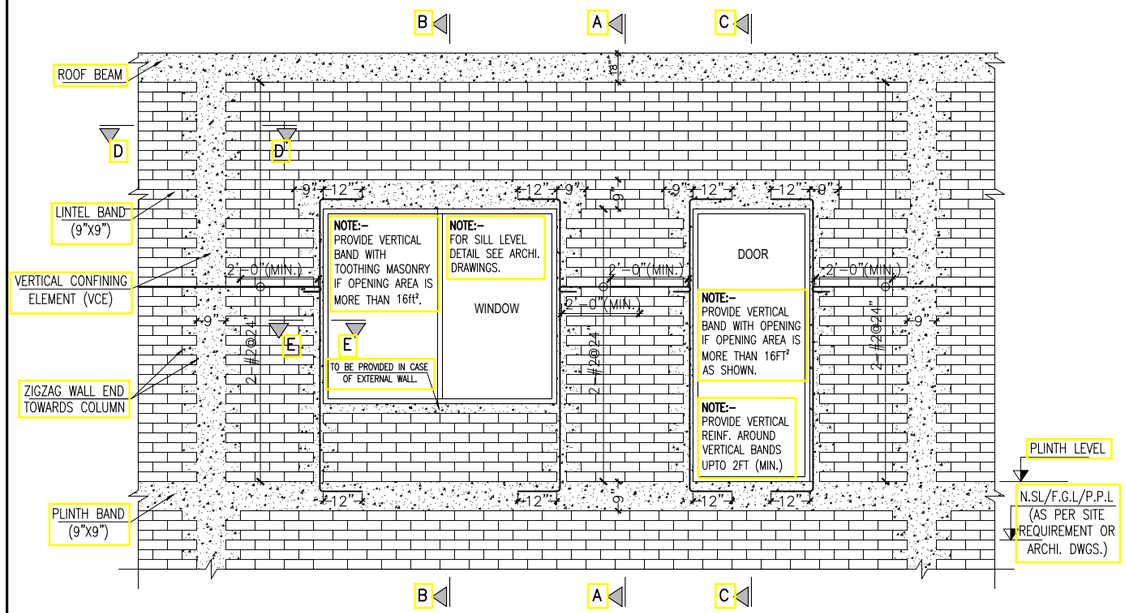
GUEST UNITS

BLOCK - 9

GENERAL NOTES & TYPICAL DETAILS (SHEET 2 OF 3)

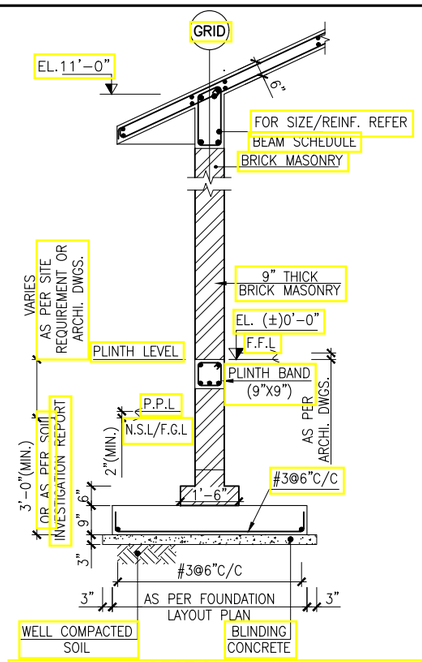
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
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SUBM.	FEB 2026		



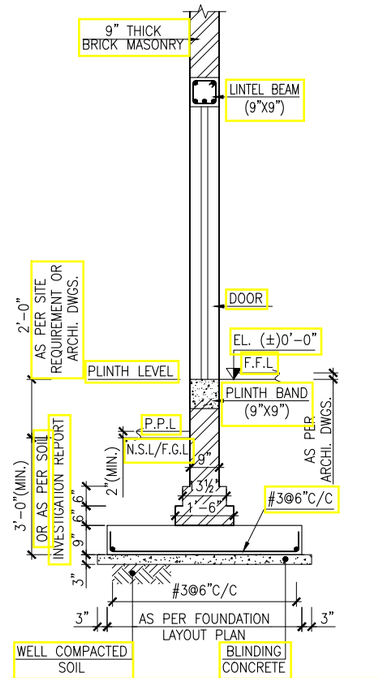
TYPICAL ELEVATION OF 9" THICK CONFINED BRICK MASONRY WALL SINGLE STOREY WALL MASONRY

(FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS)



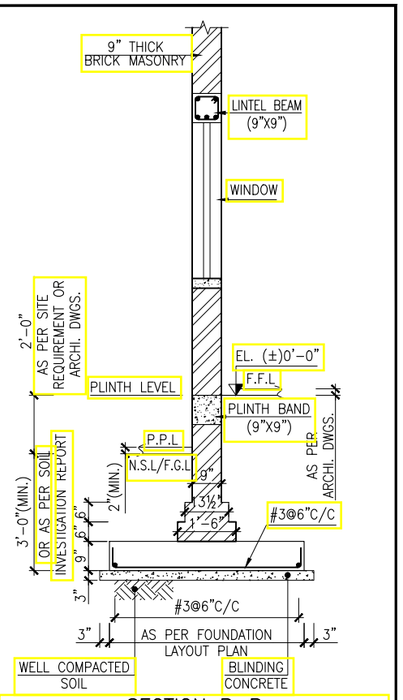
SECTION A–A

TYP. FOOTING SECTION OF EXTERNAL/ INTERNAL WALL WITHOUT OPENING



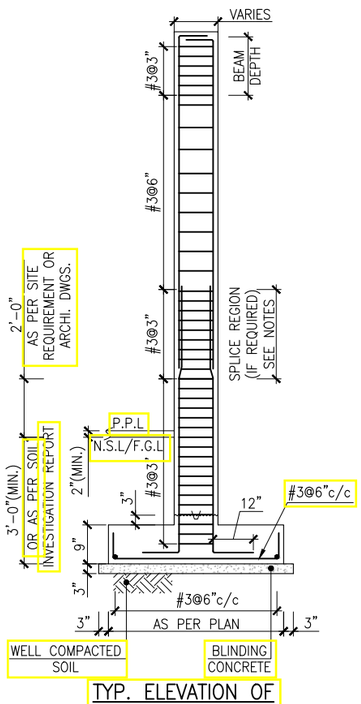
SECTION C–C

TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT DOOR

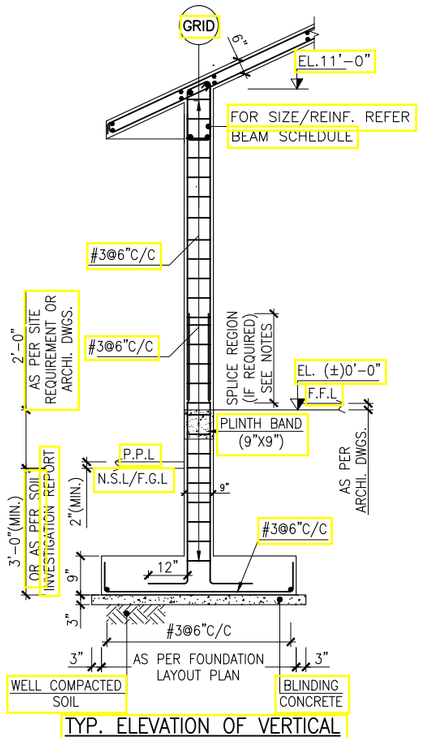


SECTION B–B

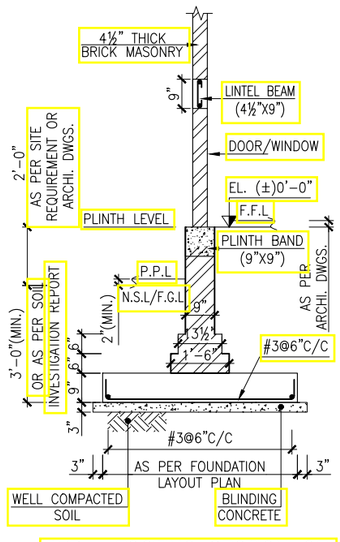
TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT WINDOW



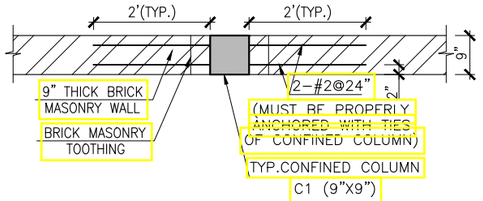
TYP. ELEVATION OF COLUMN C–1



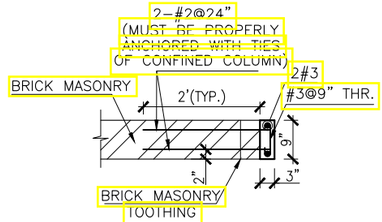
TYP. ELEVATION OF VERTICAL CONFINING ELEMENT (VCE)



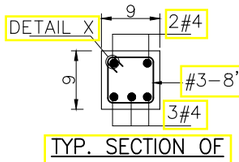
TYP. FOOTING SECTION OF 4½" THICK MASONRY WALL



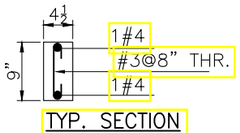
SECTION D–D



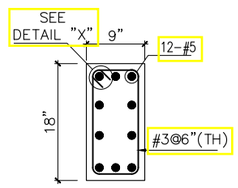
SECTION E–E



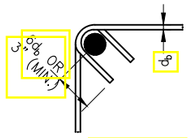
TYP. SECTION OF LINTEL BEAM 9" THICK BRICK WALL



TYP. SECTION OF RB–3

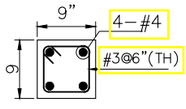


TYP. SECTION OF COLUMN (C–1)



DETAIL–X

TYP. 135° HOOK DETAIL FOR TIES & STIRRUPS



TYP. CONFINED COLUMN V.C.E

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

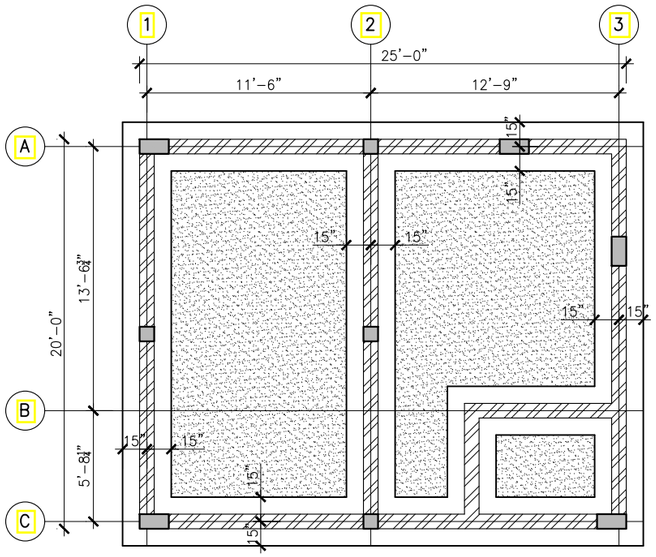
BLOCK - 9

GENERAL NOTES & TYPICAL DETAILS

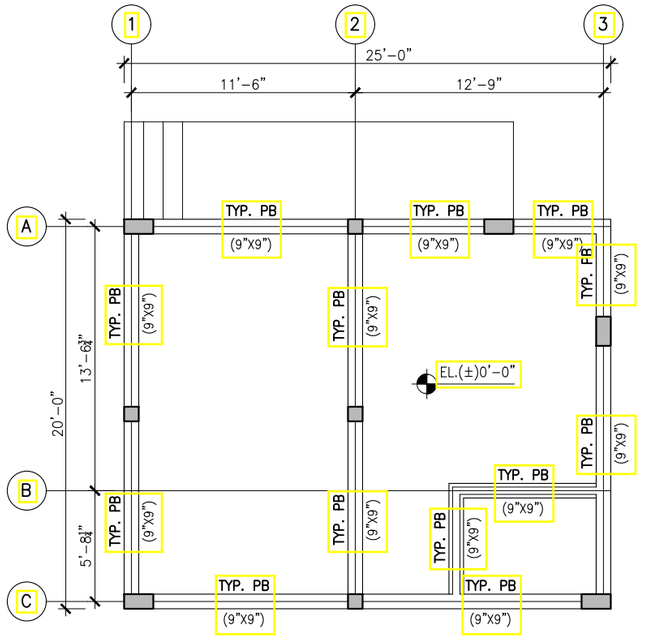
(SHEET 3 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

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DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/09G03	0
SUBM.			

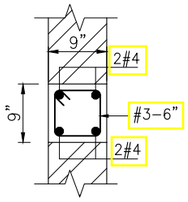


FOUNDATION & COLUMN LAYOUT PLAN

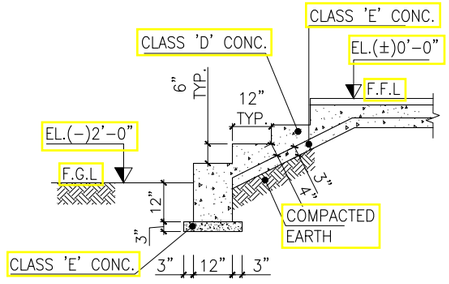


PLINTH BAND LAYOUT PLAN AT EL. (±)0'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS



TYPICAL SECTION OF PLINTH BAND (TYP. PB)



TYPICAL SECTION OF P.C.C STEPS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
4. THE FOUNDATION HAS BEEN DESIGNED ON GROSS ALLOWABLE BEARING CAPACITY OF 0.75 TON/SFT AT A DEPTH OF 3'-0" BELOW N.S.L OR F.G.L WHICH EVER IS LOWER.
5. IF COMPETENT BEARING STRATA IS NOT FOUND AT INDICATED DEPTH, THE ENGINEER SHALL BE NOTIFIED FOR HIS PRIOR INSTRUCTIONS.
6. BOTTOM OF FOOTING SHOULD BE PROVIDED 3'-0" BELOW NSL OR F.G.L WHICH EVER IS LOWER.
7. FOR EL. ±0'-0", REFER MASTER PLAN.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

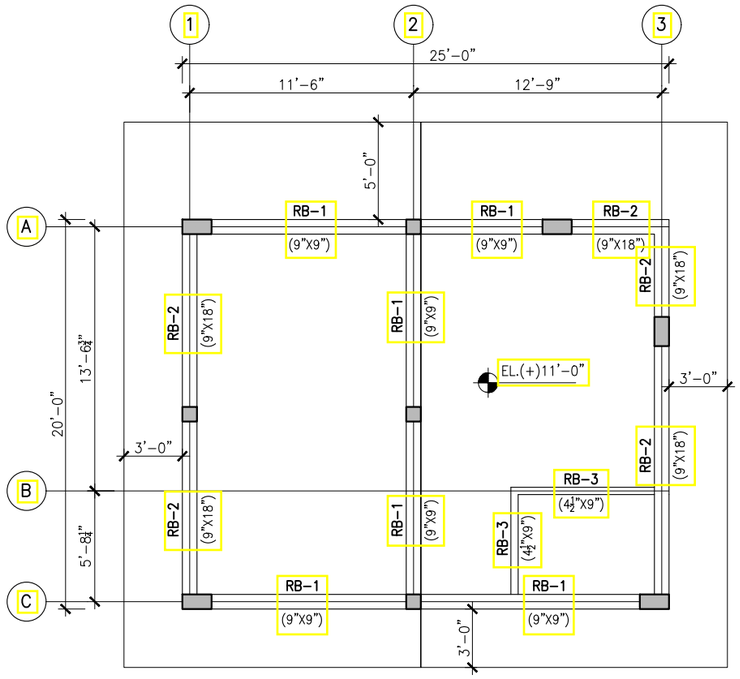
GUEST UNITS

BLOCK - 9

FOUNDATION & COLUMN LAYOUT PLAN AND PLINTH BAND LAYOUT PLAN

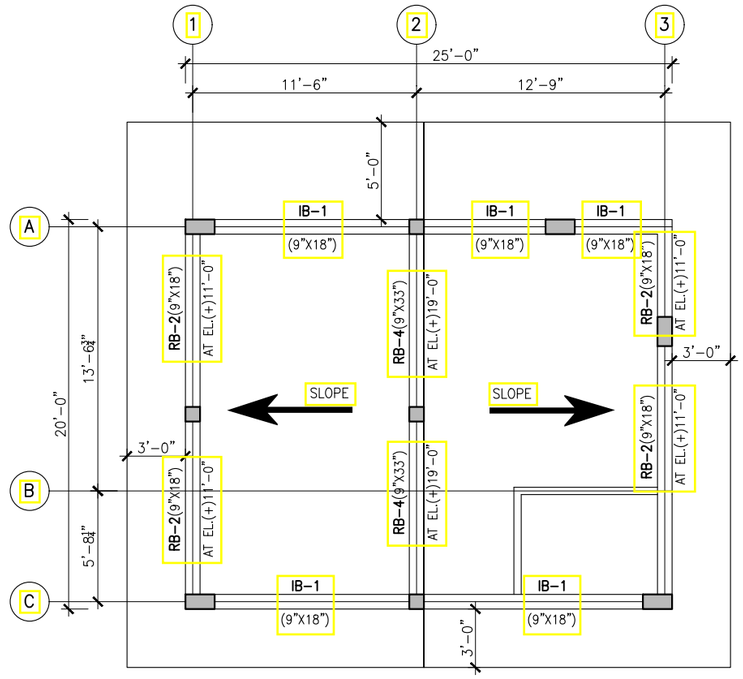
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/09G04	0
SUBM.			



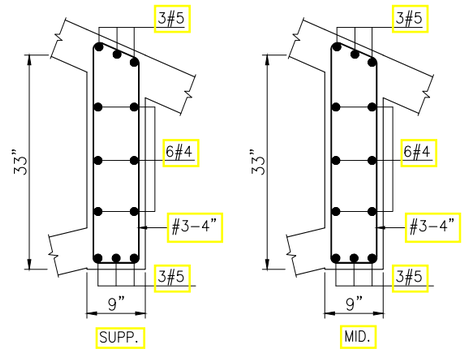
ROOF BEAM LAYOUT PLAN AT EL. (+)11'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS

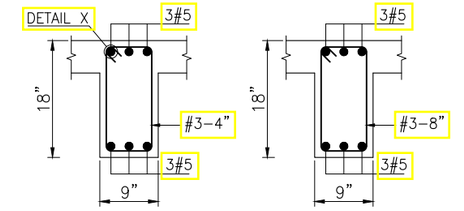


INCLINED BEAM LAYOUT PLAN FROM EL. (+)11'-0" TO EL.(+)17'-0"/(+)19'-0"

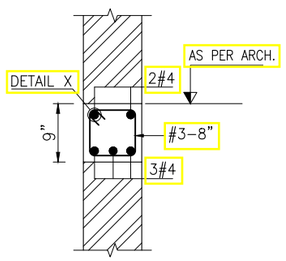
ALL SLOPING SLABS ARE 6" THICK UNLESS NOTED OTHERWISE



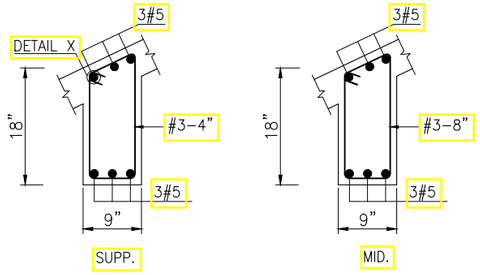
TYPICAL SECTION OF RB-4



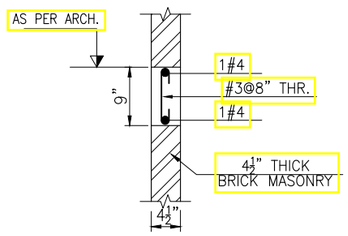
TYPICAL SECTION OF IB-1



TYP. SEC. OF RB-1



TYPICAL SECTION OF RB-2



SEC. OF RB-3
4½" THICK BRICK WALL

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 9

FRAMING PLAN AT EL.(+)11'-0" & FROM EL.(+)11'-0" TO EL.(+)17'-0"/(+)19'-0"

[redacted] NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/09G05	0
SUBM.	FEB 2026		

A. GENERAL

1. NOTES GIVEN ON THIS DRAWING ARE APPLICABLE TO ALL STRUCTURAL DRAWINGS UNLESS OTHERWISE NOTED. NOTES WRITTEN ON ANY OTHER DRAWING SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS REFERRED.
2. SYSTEM OF UNITS IS FPS.
3. ALL LEVELS MARKED ON THE DRAWINGS ARE LEVELS OF STRUCTURAL ELEMENTS. FINISH LEVELS SHALL BE IN ACCORDANCE WITH THE ARCHITECTURAL DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE STRUCTURE AND ALL TEMPORARY WORKS DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
6. THE CONTRACTOR SHALL CO-ORDINATE ALL DRAWINGS OF ALL DISCIPLINES FOR ALL ITEMS INCLUDING BUT NOT LIMITED TO SIZES AND LOCATION OF ALL OPENINGS REQUIRED FOR DUCTS, PIPES AND PIPE SLEEVES, ELECTRICAL CONDUITS AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE OR OTHERWISE INCORPORATED IN STRUCTURAL WORK AND SHALL BRING TO THE NOTICE OF THE ENGINEER DISCREPANCIES, IF ANY, FOR HIS INSTRUCTIONS, PRIOR TO THE START OF WORK.
7. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
8. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE CLIENT AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
9. THE CONTRACTOR SHALL COORDINATE SCHEDULE OF CONSTRUCTION WITH SUPPLY AND INSTALLATION OF EQUIPMENT.
10. PROVISIONS SHALL BE MADE FOR INSTALLATION OF EQUIPMENT AS PER MANUFACTURER'S RECOMMENDATIONS.
11. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/ DEVIATIONS MAY LEAD TO REJECTION/ REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
12. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO SPECIFICATIONS OF THE CONTRACT. IN ABSENCE OF ANY EXPRESS OR IMPLIED SPECIFICATION IN THE CONTRACT, ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO RELEVANT AMERICAN STANDARDS AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
13. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF SHOP DRAWINGS AND BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.

B. FOUNDATION AND EARTHWORK

1. THE CONTRACTOR SHALL STUDY THE AVAILABLE GEOTECHNICAL INVESTIGATION REPORT BEFORE COMMENCING THE WORK.
2. FOUNDATION DESIGN IS BASED ON PARAMETERS PROVIDED IN GEOTECH. INVESTIGATION REPORT.
3. FOUNDATION IS TO BE PLACED 3'-0" (0.93m) BELOW F.G.L. OR N.S.L WHICHEVER IS LOWER.
4. TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.
5. THE TYPE AND COMPACTION OF SOIL BELOW GRADE SLAB SHALL BE AS PER JOB SPECIFICATIONS. NO FOOTING SHALL BE PLACED ON FILL. HOWEVER, AREAS WHERE FILLING BELOW THE FOOTINGS BECOMES INEVITABLE DUE TO OVER-EXCAVATION (IF ANY), SHALL BE FILLED WITH P.C.C. (1:4:8) WITH PRIOR APPROVAL OF THE ENGINEER, AT NO EXTRA COST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING SYSTEM IF AND WHERE SO REQUIRED DURING CONSTRUCTION.
7. ALL STRUCTURAL CONCRETE SURFACES AGAINST WHICH EARTH IS TO BE FILLED SHALL BE COATED WITH TWO COATS OF HOT BITUMEN (10/20 GRADE) APPLIED AT THE RATE OF 0.49 kg/sqm PER COAT, EXCEPT FOR P.C.C. (1:3:6) AND P.C.C. (1:4:8).
8. BACKFILLING AND COMPACTION SHALL BE CARRIED OUT EQUALLY ON BOTH SIDES OF PLINTH BEAMS TO AVOID IMBALANCE OF LATERAL EARTH PRESSURE.
9. THE CONTRACTOR SHALL SUPPLY AND ERECT ADEQUATE SHORING AND SUPPORT THE SIDES OF ALL EXCAVATIONS WHERE REQUIRED TO SAFEGUARD WORKMEN AND PROTECT ANY ADJACENT STRUCTURES.
10. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.
11. EXCAVATIONS ADJACENT TO EXISTING STRUCTURES AND/OR UNDERGROUND SERVICES SHALL BE MADE BY HAND.

C. REINFORCED CONCRETE/ PLAIN CEMENT CONCRETE

1. ALL CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022, OR ANY OTHER RELEVANT SPECS GIVEN IN CONTRACT.
2. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & SPECIFICATIONS AND THE MINIMUM CUBE CRUSHING STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	NOMINAL MIX RATIO	CUBE STRENGTH AT 28-DAYS (psi.)
A	1:1:2	4,500
B	1:1½:3	3,750
C	1:2:4	3,000
D	1:3:6	2,000
E	1:4:8	1,200

C. REINFORCED / PLAIN CEMENT CONCRETE (CONTINUED)

3. CLASS OF CONCRETE FOR DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE AS FOLLOWS UNLESS NOTED OTHER WISE:

COMPONENT	CONCRETE CLASS
MASONRY WALL FOUNDATION	C
FOUNDATION OF RCC COLUMNS	C
COLUMNS, SLABS & BEAMS,VCE	C
P.C.C. STEPS	D
LEAN CONCRETE	E

4. ORDINARY PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETE WORKS.
5. AN INTEGRAL WATER PROOFING AGENT SHALL BE USED IN CONCRETE THAT IS CONSTANTLY OR INTERMITTENTLY IN CONTACT WITH WATER AS PER MANUFACTURER'S RECOMMENDATIONS
6. CONCRETE CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

STRUCTURAL MEMBER / ELEMENT	MINIMUM COVER (INCHES)
FOUNDATIONS (ALL TYPES)	2"
COLUMNS & BEAMS	1½"
RETAINING WALLS	1½"
SLABS	¾"
PLINTH / LINTEL BAND	¾"

7. ALL REINFORCING STEEL SHALL BE DEFORMED, HOT ROLLED BILLET STEEL BARS CONFORMING TO ASTM A-615 GRADE-60 WITH SPECIFIED YIELD STRENGTH OF NOT LESS THAN 60,000 psi.
8. THE NUMBER INDICATES THE BAR DIAMETER/SIZE, AS UNDER:

BAR NUMBER	DIAMETER (INCHES)
3	⅜"
4	½"
5	⅝"
6	¾"
8	1"

9. ALL DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315, ACI-318 & ACI-350R.
10. ALL REINFORCING STEEL SHALL BE HELD FIRMLY IN PLACE BEFORE AND DURING THE PLACING OF CONCRETE BY MEANS OF WIRES AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.

D. CONCRETE CONSTRUCTION

1. THE CONTRACTOR SHALL SUBMIT CONCRETE POURING SCHEDULE FOR ENGINEER'S APPROVAL. NO CONCRETE SHALL BE POURED UNTIL ITS FORMWORK AND REINFORCEMENT HAS BEEN INSPECTED AND APPROVED BY THE ENGINEER.
2. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BLOCKS ETC. SHOULD BE AVOIDED ON SLAB PANELS.

D. CONT. CONCRETE 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, AND DOWELS FOR STRUCTURAL MEMBERS AND/OR MASONRY ARE PROPERLY LOCATED IN PLACE.

E. CONSTRUCTION JOINTS

1. JOINTS, NOT SHOWN ON THE DRAWING, SHALL BE SO MADE AND LOCATED AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED NEAR THE MIDDLE OF THE SPANS OF SLAB & BEAMS. JOINTS IN WALLS & COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOORS, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.
2. JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS THE JOINTS.
3. JOINTS IN BASE SLAB & WALLS AND ROOF SLAB, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS SHALL BE BORNE BY THE CONTRACTOR. BEAMS & BRACKETS SHALL BE PLACED AT THE SAME TIME AS SLABS.

F. ELECTRICAL CONDUITS

1. CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS & SLABS AND WITHIN THE MIDDLE HALF OF THE THICKNESS. SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6"(150 MM).

G. PROPS, FORMWORK & CURING

1. SHORE & BRACE ALL PARTS OF THE BUILDING DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. SEQUENCE OF REMOVAL OF FORMWORK SHALL BE APPROVED BY THE ENGINEER.
3. AT LEAST ONE LOWER FLOOR SHALL REMAIN PROPPED UNTILL THE UPPER FLOOR IS CAST AND CURED.

H. BRICK MASONRY WORKS

1. ALL BRICK WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022.
2. ALL BRICK SHALL BE SOUND, HARD, WELL BURNT AND OF UNIFORM SIZE,COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 1/8".
3. ALL BRICK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 1/8" IN 10'-0".
4. MORTAR USED IN MASONRY CONSTRUCTION SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 12 MPa (1800Psi) AND SHALL CONFORM TO ASTM C270.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 10

GENERAL NOTES & TYPICAL DETAILS (SHEET 1 OF 3)

[redacted] NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/10G01	0
SUBM.	FEB 2026		

J. STRUCTURAL STEEL WORKS

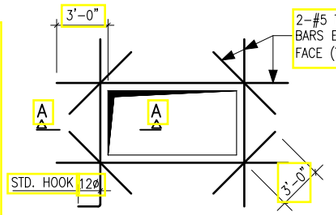
1. ALL STRUCTURAL STEEL WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES–2022.
2. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS.
3. ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A–36 OR EQUIVALENT.
4. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY, AWS, SPECIFICATIONS USING ELECTRODES E70XX.
5. ALL BOLTS SHALL CONFORM TO ASTM A307 OR A325.
6. SURFACE PREPARATION OF ALL STRUCTURAL STEEL FOR PAINTING SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF "STEEL STRUCTURES PAINTING COUNCIL" SPECIFICATIONS SSPC–SP6 FOR COMMERCIAL BLAST CLEANING.
7. ALL STEEL SHALL BE GIVEN ONE SHOP COAT OF RED LEAD OXIDE PRIMER AND FIELD TOUCHUP EXCEPT FOR SURFACES TO BE EMBEDDED IN CONCRETE OR CONTACT SURFACES OF FRICTION BOLTED CONNECTIONS.

K. COLUMN CONFINEMENT

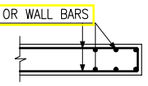
1. IN ORDER TO ATTAIN AN EFFECTIVE BOND BETWEEN THE CONFINING ELEMENTS AND THE MASONRY, THE CONCRETE OF THE CONFINING ELEMENTS SHALL BE CAST AFTER THE MASONRY HAS BEEN BUILT WITH PROPER TOOTHING IN PLACE.
2. CLEAN THE COLUMN SPACE OF ALL RUBBISH BEFORE ADDING THE FORMWORK.
3. POUR THE CONCRETE FOR THE BANDS AND THE COLUMNS AT THE SAME TIME.
4. COMPACT THE CONCRETE WITH VIBRATOR.
5. REMOVE THE FORMWORK NOT EARLIER THAN 03 DAYS.

L. SEISMIC PARAMETERS

1. DESIGN OF STRUCTURE HAS BEEN CARRIED OUT BASED ON SEISMIC PARAMETERS OF ZONE 2B WITH PGA VALUE OF 0.16g to 0.24g & STIFF SOIL PROFILE (SD), ACCORDING TO BUILDING CODE OF PAKISTAN.



WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

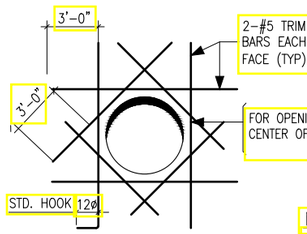


SECTION A–A

NOTES

- FOR OPENING WITH MAXIMUM DIMENSION OVER 5'–0" REFER TO OTHER DETAILS.
- USE THIS DETAILS IF NOT SHOWN IN DESIGN DRAWINGS

REINFORCEMENT DETAIL AT OPENING IN SLAB & WALLS (TYP)



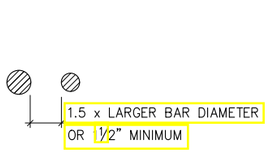
FOR OPENING 1'–0" DIA ADD DIAGONAL BARS CENTER OF SLAB OR WALL SAME SIZE AS LARGEST MAIN BARS

WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

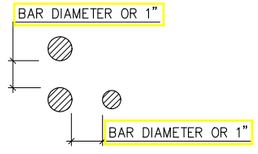
NOTES

MAXIMUM DIAMETER OF SLEVE IS 1'–0" FOR TRIM BARS BARS AROUND LARGE SLEEVE REFER TO OTHER DETAILS

REINFORCEMENT AROUND SLEEVE IN SLABS & WALLS (TYP.)



VERTICAL BAR SPACING



BAR SPACING IN BEAM

LEGEND

MS	MILD STEEL
PVC	POLYVINYL CHLORIDE
C.G.I	CORRUGATED GALVANIZED IRON
G.I	GALVANIZED IRON
SQ	SQUARE
C.Jt	CONSTRUCTION JOINT
T&B	TOP AND BOTTOM
EF	EACH FACE
BF	BOTH FACES
ø/db/#	DIAMETER OF BAR
@	AT THE RATE OF
B	BOTTOM
C/C	CENTER TO CENTER
B.W	BOTHWAYS
E.G.F	ENGINEERED GRANULAR FILL
E.G.L	EXCAVATED GROUND LEVEL
E.L.	STRUCTURAL ELEVATION
EQ.	EQUAL
F.D.T	FIELD DENSITY TEST
F.F.L	FINISH FLOOR LEVEL
F.G.L.	FINISH GROUND LEVEL
F.B.L.	FOUNDATION BED LEVEL
G.W.T.	GROUND WATER TABLE
N.S.L.	EXISTING NATURAL SURFACE LEVEL
N.T.S.	NOT TO SCALE
SMRF	SPECIAL MOMENT RESISTING FRAME
STYP	SOIL PROFILE TYPE
ST.	STIRRUPS
T	TOP
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
N.T.S.	NOT TO SCALE
	LEVEL ON PLAN
℄	CENTER LINE

SPLICE LENGHTH (LS) AND DEVELOPMENT LENGHT (LD) (fc'=3 ksi, fy=40 ksi)

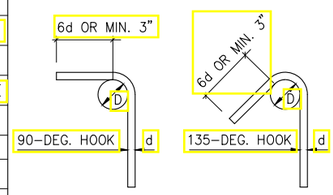
BAR DIA	#3	#4	#5	#6	#7	#8	#10	#12
DEVELOPMENT LENGTH ℓd (Inches)	18	24	30	36	42	47	53	59
SPLICE LENGTH (Inches)	24	32	39	47	55	62	69	77

LAP SPLICE ARE NOT TO BE USED:
- WITHIN JOINTS
- WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH.
- FROM THE FACE OF THE JOINT.

CURTAILMENT LENGTH SHOULD BE EXTEND UPTO L/16,12db OR d, (WHICHEVER GREATER) BEYOND L/3
WHERE:
L–GREATER CLEAR SPAN, db–DIAMETER OF BAR,
d–EFFECTIVE DEPTH.
THE FIRST HOOP SHALL BE LOCATED NOT MORE THAN 2" FROM THE FACE OF THE SUPPORTING MEMBER.

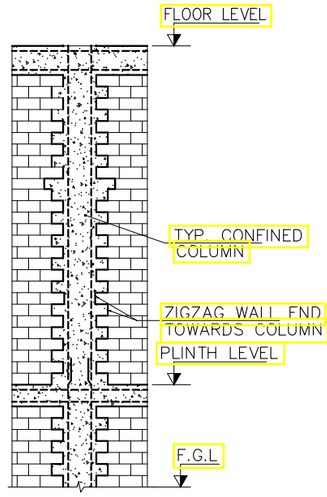
* ALL LAP SPLICE SHALL BE STAGGARED BY AT LEAST 50 %

BAR DIA	D
#3	2½"
#4	3"
#5	4"
#6	4"
#8	6"
#9	7"
#11	8½"



STIRRUPS AND TIE HOOKS

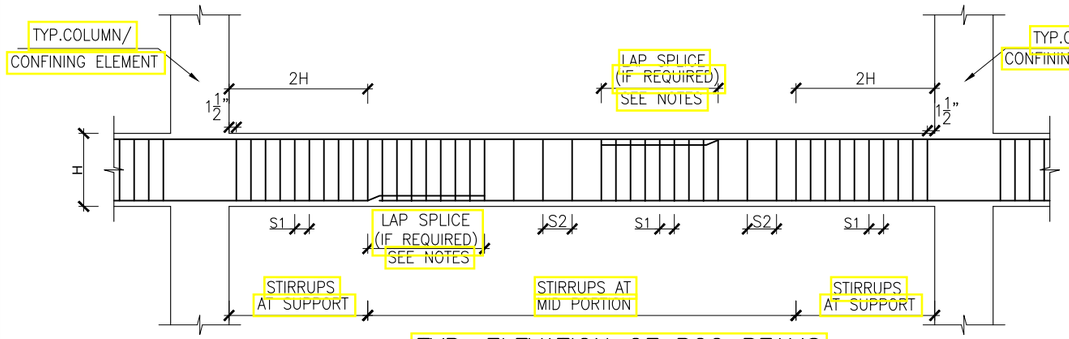
BAR DIA	D
#3	1½"
#4	2"
#5	2½"



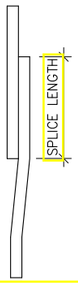
TYPICAL ELEVATION OF CONFINED COLUMN (SHOWING TOOTHING)



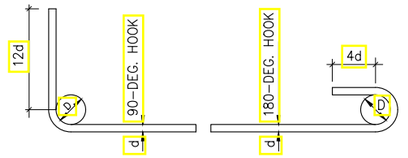
BEAM SPLICE (TYP.)



TYP. ELEVATION OF RCC BEAMS



COLUMN SPLICE (TYP.)



STANDARD BAR HOOKS (MAIN BARS)

LEGENDS

S1	STIRRUPS SPACING IN BEAM NEAR SUPPORTS & LAP SPLICES
S2	STIRRUPS SPACING IN BEAM IN MIDSPAN
h	DEPTH OF BEAM
db	DIAMETER OF BAR
d	EFFECTIVE DEPTH OF BEAM

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

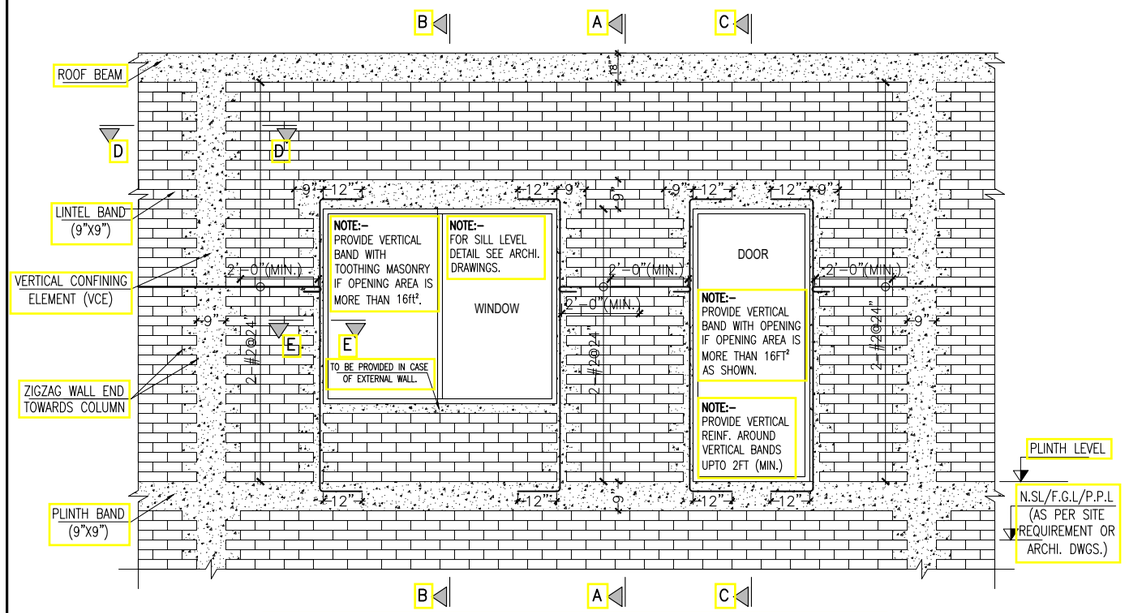
GUEST UNITS

BLOCK - 10

GENERAL NOTES & TYPICAL DETAILS (SHEET 2 OF 3)

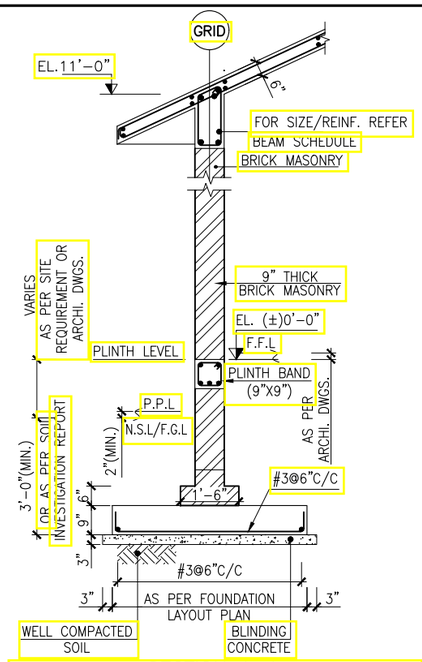
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/10G02	0
SUBM.	FEB 2026		



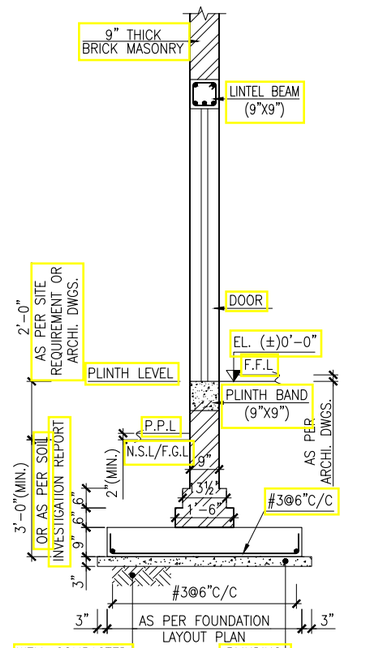
TYPICAL ELEVATION OF 9" THICK CONFINED BRICK MASONRY WALL SINGLE STOREY WALL MASONRY

(FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS)



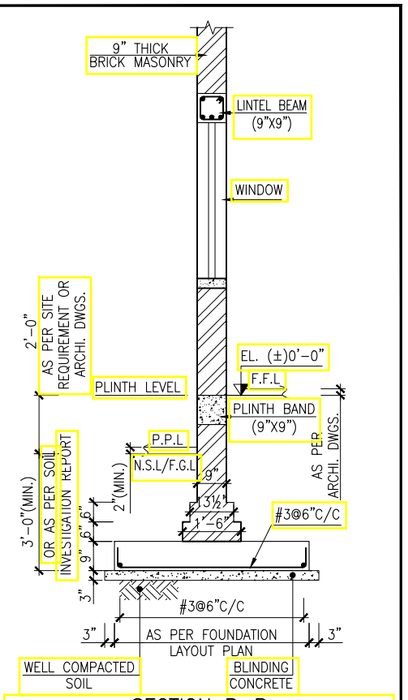
SECTION A–A

TYP. FOOTING SECTION OF EXTERNAL/ INTERNAL WALL WITHOUT OPENING



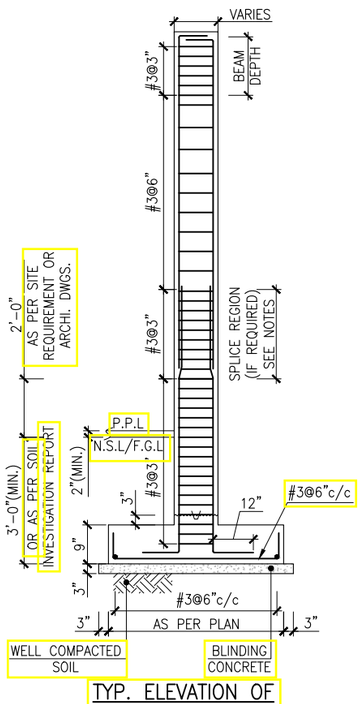
SECTION C–C

TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT DOOR

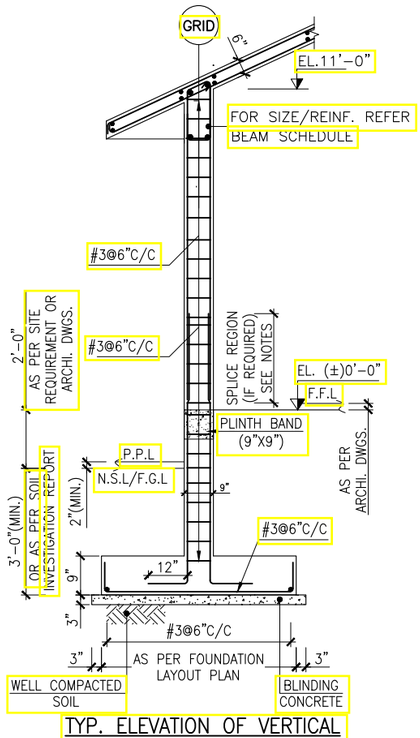


SECTION B–B

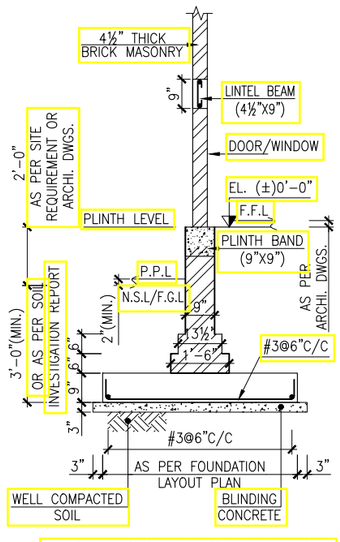
TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT WINDOW



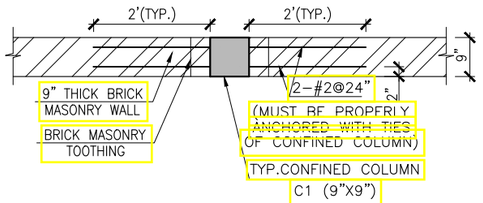
TYP. ELEVATION OF COLUMN C–1



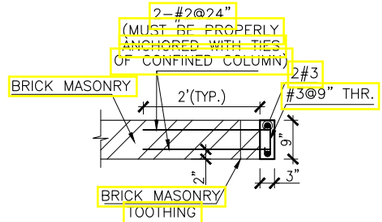
TYP. ELEVATION OF VERTICAL CONFINING ELEMENT (VCE)



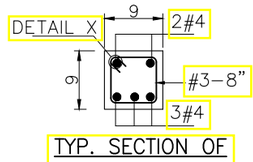
TYP. FOOTING SECTION OF 4½" THICK MASONRY WALL



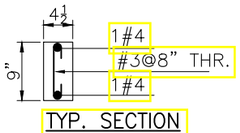
SECTION D–D



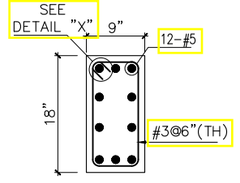
SECTION E–E



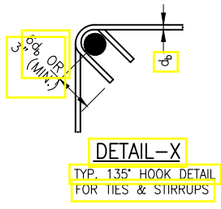
TYP. SECTION OF LINTEL BEAM 9" THICK BRICK WALL



TYP. SECTION OF RB–3

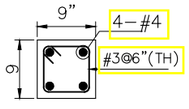


TYP. SECTION OF COLUMN (C–1)



DETAIL–X

TYP. 135° HOOK DETAIL FOR TIES & STIRRUPS



TYP. CONFINED COLUMN V.C.E

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

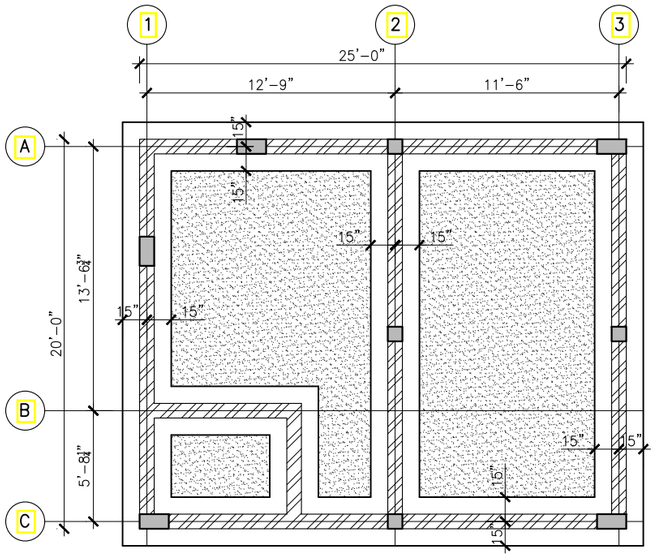
BLOCK - 10

GENERAL NOTES & TYPICAL DETAILS

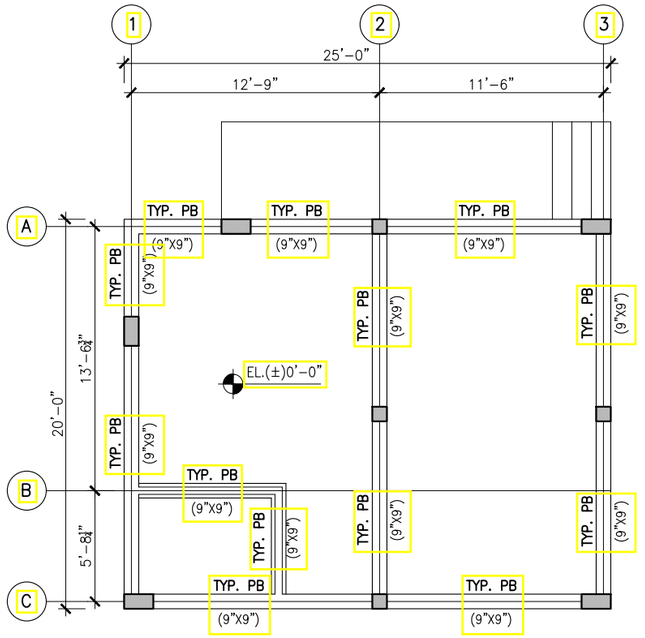
(SHEET 3 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
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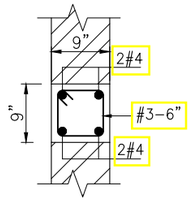


FOUNDATION & COLUMN LAYOUT PLAN

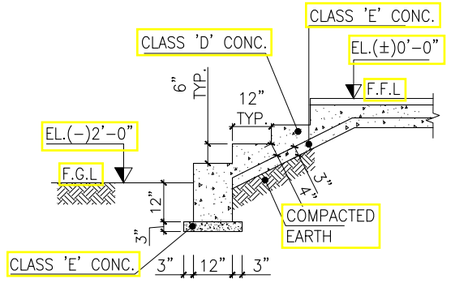


PLINTH BAND LAYOUT PLAN AT EL. (±)0'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS



TYPICAL SECTION OF PLINTH BAND (TYP. PB)



TYPICAL SECTION OF P.C.C STEPS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
4. THE FOUNDATION HAS BEEN DESIGNED ON GROSS ALLOWABLE BEARING CAPACITY OF 0.75 TON/SFT AT A DEPTH OF 3'-0" BELOW N.S.L OR F.G.L WHICH EVER IS LOWER.
5. IF COMPETENT BEARING STRATA IS NOT FOUND AT INDICATED DEPTH, THE ENGINEER SHALL BE NOTIFIED FOR HIS PRIOR INSTRUCTIONS.
6. BOTTOM OF FOOTING SHOULD BE PROVIDED 3'-0" BELOW NSL OR F.G.L WHICH EVER IS LOWER.
7. FOR EL. ±0'-0", REFER MASTER PLAN.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

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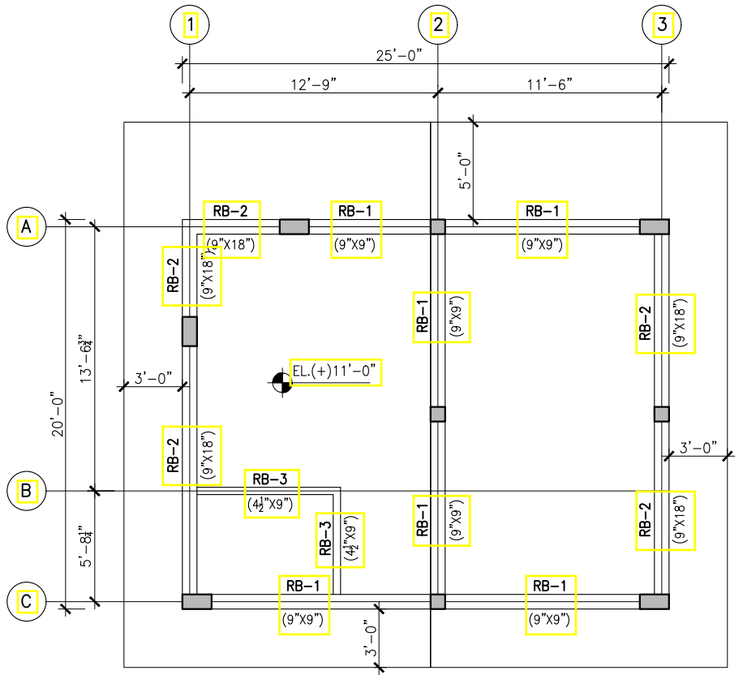
GUEST UNITS

BLOCK - 10

FOUNDATION & COLUMN LAYOUT PLAN AND PLINTH BAND LAYOUT PLAN

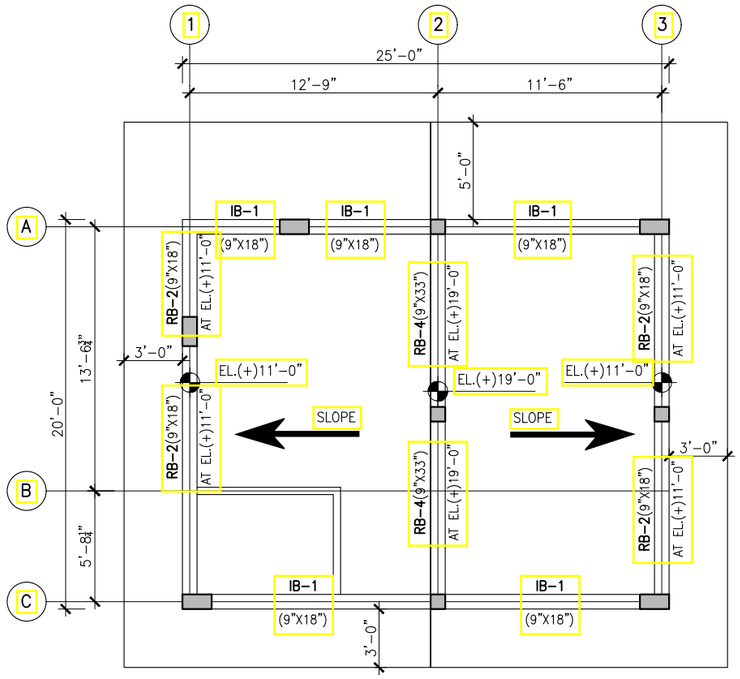
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/10G04	0
SUBM.			



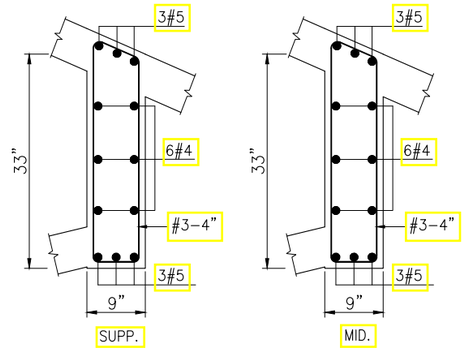
ROOF BEAM LAYOUT PLAN AT EL. (+)11'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS

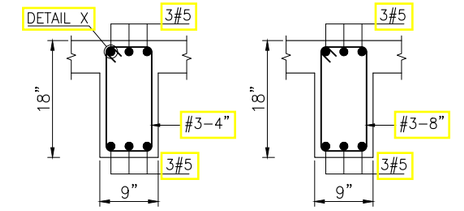


INCLINED BEAM LAYOUT PLAN FROM EL. (+)11'-0" TO EL.(+)17'-0"/(+)19'-0"

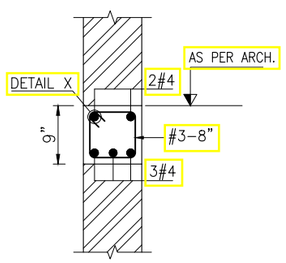
ALL SLOPING SLABS ARE 6" THICK UNLESS NOTED OTHERWISE



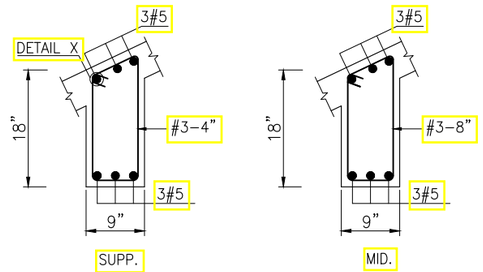
TYPICAL SECTION OF RB-4



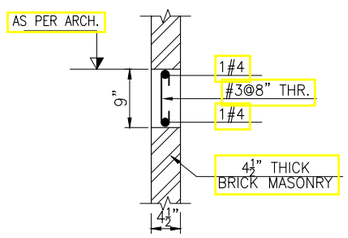
TYPICAL SECTION OF IB-1



TYP. SEC. OF RB-1



TYPICAL SECTION OF RB-2



SEC. OF RB-3 4½" THICK BRICK WALL

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 10

FRAMING PLAN AT EL.(+)11'-0" & FROM EL.(+)11'-0" TO EL.(+)17'-0"/(+)19'-0"

[redacted] NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/10G05	0
SUBM.			

A. GENERAL

1. NOTES GIVEN ON THIS DRAWING ARE APPLICABLE TO ALL STRUCTURAL DRAWINGS UNLESS OTHERWISE NOTED. NOTES WRITTEN ON ANY OTHER DRAWING SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS REFERRED.
2. SYSTEM OF UNITS IS FPS.
3. ALL LEVELS MARKED ON THE DRAWINGS ARE LEVELS OF STRUCTURAL ELEMENTS. FINISH LEVELS SHALL BE IN ACCORDANCE WITH THE ARCHITECTURAL DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE STRUCTURE AND ALL TEMPORARY WORKS DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
6. THE CONTRACTOR SHALL CO-ORDINATE ALL DRAWINGS OF ALL DISCIPLINES FOR ALL ITEMS INCLUDING BUT NOT LIMITED TO SIZES AND LOCATION OF ALL OPENINGS REQUIRED FOR DUCTS, PIPES AND PIPE SLEEVES, ELECTRICAL CONDUITS AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE OR OTHERWISE INCORPORATED IN STRUCTURAL WORK AND SHALL BRING TO THE NOTICE OF THE ENGINEER DISCREPANCIES, IF ANY, FOR HIS INSTRUCTIONS, PRIOR TO THE START OF WORK.
7. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
8. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE CLIENT AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
9. THE CONTRACTOR SHALL COORDINATE SCHEDULE OF CONSTRUCTION WITH SUPPLY AND INSTALLATION OF EQUIPMENT.
10. PROVISIONS SHALL BE MADE FOR INSTALLATION OF EQUIPMENT AS PER MANUFACTURER'S RECOMMENDATIONS.
11. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/ DEVIATIONS MAY LEAD TO REJECTION/ REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
12. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO SPECIFICATIONS OF THE CONTRACT. IN ABSENCE OF ANY EXPRESS OR IMPLIED SPECIFICATION IN THE CONTRACT, ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO RELEVANT AMERICAN STANDARDS AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
13. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF SHOP DRAWINGS AND BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.

B. FOUNDATION AND EARTHWORK

1. THE CONTRACTOR SHALL STUDY THE AVAILABLE GEOTECHNICAL INVESTIGATION REPORT BEFORE COMMENCING THE WORK.
2. FOUNDATION DESIGN IS BASED ON PARAMETERS PROVIDED IN GEOTECH. INVESTIGATION REPORT.
3. FOUNDATION IS TO BE PLACED 3'-0" (0.93m) BELOW F.G.L. OR N.S.L WHICHEVER IS LOWER.
4. TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.
5. THE TYPE AND COMPACTION OF SOIL BELOW GRADE SLAB SHALL BE AS PER JOB SPECIFICATIONS. NO FOOTING SHALL BE PLACED ON FILL. HOWEVER, AREAS WHERE FILLING BELOW THE FOOTINGS BECOMES INEVITABLE DUE TO OVER-EXCAVATION (IF ANY), SHALL BE FILLED WITH P.C.C. (1:4:8) WITH PRIOR APPROVAL OF THE ENGINEER, AT NO EXTRA COST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING SYSTEM IF AND WHERE SO REQUIRED DURING CONSTRUCTION.
7. ALL STRUCTURAL CONCRETE SURFACES AGAINST WHICH EARTH IS TO BE FILLED SHALL BE COATED WITH TWO COATS OF HOT BITUMEN (10/20 GRADE) APPLIED AT THE RATE OF 0.49 kg/sqm PER COAT, EXCEPT FOR P.C.C. (1:3:6) AND P.C.C. (1:4:8).
8. BACKFILLING AND COMPACTION SHALL BE CARRIED OUT EQUALLY ON BOTH SIDES OF PLINTH BEAMS TO AVOID IMBALANCE OF LATERAL EARTH PRESSURE.
9. THE CONTRACTOR SHALL SUPPLY AND ERECT ADEQUATE SHORING AND SUPPORT THE SIDES OF ALL EXCAVATIONS WHERE REQUIRED TO SAFEGUARD WORKMEN AND PROTECT ANY ADJACENT STRUCTURES.
10. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.
11. EXCAVATIONS ADJACENT TO EXISTING STRUCTURES AND/OR UNDERGROUND SERVICES SHALL BE MADE BY HAND.

C. REINFORCED CONCRETE/ PLAIN CEMENT CONCRETE

1. ALL CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022, OR ANY OTHER RELEVANT SPECS GIVEN IN CONTRACT.
2. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & SPECIFICATIONS AND THE MINIMUM CUBE CRUSHING STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	NOMINAL MIX RATIO	CUBE STRENGTH AT 28-DAYS (psi.)
A	1:1:2	4,500
B	1:1½:3	3,750
C	1:2:4	3,000
D	1:3:6	2,000
E	1:4:8	1,200

C. REINFORCED / PLAIN CEMENT CONCRETE (CONTINUED)

3. CLASS OF CONCRETE FOR DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE AS FOLLOWS UNLESS NOTED OTHER WISE:

COMPONENT	CONCRETE CLASS
MASONRY WALL FOUNDATION	C
FOUNDATION OF RCC COLUMNS	C
COLUMNS, SLABS & BEAMS,VCE	C
P.C.C. STEPS	D
LEAN CONCRETE	E

4. ORDINARY PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETE WORKS.
5. AN INTEGRAL WATER PROOFING AGENT SHALL BE USED IN CONCRETE THAT IS CONSTANTLY OR INTERMITTENTLY IN CONTACT WITH WATER AS PER MANUFACTURER'S RECOMMENDATIONS
6. CONCRETE CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

STRUCTURAL MEMBER / ELEMENT	MINIMUM COVER (INCHES)
FOUNDATIONS (ALL TYPES)	2"
COLUMNS & BEAMS	1½"
RETAINING WALLS	1½"
SLABS	¾"
PLINTH / LINTEL BAND	¾"

7. ALL REINFORCING STEEL SHALL BE DEFORMED, HOT ROLLED BILLET STEEL BARS CONFORMING TO ASTM A-615 GRADE-60 WITH SPECIFIED YIELD STRENGTH OF NOT LESS THAN 60,000 psi.
8. THE NUMBER INDICATES THE BAR DIAMETER/SIZE, AS UNDER:

BAR NUMBER	DIAMETER (INCHES)
3	⅜"
4	½"
5	⅝"
6	¾"
8	1"

9. ALL DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315, ACI-318 & ACI-350R.
10. ALL REINFORCING STEEL SHALL BE HELD FIRMLY IN PLACE BEFORE AND DURING THE PLACING OF CONCRETE BY MEANS OF WIRES AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.

D. CONCRETE CONSTRUCTION

1. THE CONTRACTOR SHALL SUBMIT CONCRETE POURING SCHEDULE FOR ENGINEER'S APPROVAL. NO CONCRETE SHALL BE POURED UNTIL ITS FORMWORK AND REINFORCEMENT HAS BEEN INSPECTED AND APPROVED BY THE ENGINEER.
2. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BLOCKS ETC. SHOULD BE AVOIDED ON SLAB PANELS.

D. CONT. CONCRETE 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, AND DOWELS FOR STRUCTURAL MEMBERS AND/OR MASONRY ARE PROPERLY LOCATED IN PLACE.

E. CONSTRUCTION JOINTS

1. JOINTS, NOT SHOWN ON THE DRAWING, SHALL BE SO MADE AND LOCATED AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED NEAR THE MIDDLE OF THE SPANS OF SLAB & BEAMS. JOINTS IN WALLS & COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOORS, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.
2. JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS THE JOINTS.
3. JOINTS IN BASE SLAB & WALLS AND ROOF SLAB, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS SHALL BE BORNE BY THE CONTRACTOR. BEAMS & BRACKETS SHALL BE PLACED AT THE SAME TIME AS SLABS.

F. ELECTRICAL CONDUITS

1. CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS & SLABS AND WITHIN THE MIDDLE HALF OF THE THICKNESS. SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6"(150 MM).

G. PROPS, FORMWORK & CURING

1. SHORE & BRACE ALL PARTS OF THE BUILDING DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. SEQUENCE OF REMOVAL OF FORMWORK SHALL BE APPROVED BY THE ENGINEER.
3. AT LEAST ONE LOWER FLOOR SHALL REMAIN PROPPED UNTILL THE UPPER FLOOR IS CAST AND CURED.

H. BRICK MASONRY WORKS

1. ALL BRICK WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES-2022.
2. ALL BRICK SHALL BE SOUND, HARD, WELL BURNT AND OF UNIFORM SIZE,COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 1/8".
3. ALL BRICK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 1/8" IN 10'-0".
4. MORTAR USED IN MASONRY CONSTRUCTION SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 12 MPa (1800Psi) AND SHALL CONFORM TO ASTM C270.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

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GUEST UNITS

BLOCK - 11

GENERAL NOTES & TYPICAL DETAILS (SHEET 1 OF 3)

[redacted] NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
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FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/11G01	0
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J. STRUCTURAL STEEL WORKS

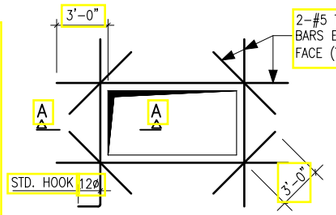
1. ALL STRUCTURAL STEEL WORKS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS FOR BUILDING AND ROAD WORKS GOVERNMENT OF PAKISTAN, PAKISTAN PUBLIC WORKS DEPARTMENT, BEING REFERENCE SPECIFICATIONS FOR SCHEDULE OF RATES–2022.
2. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS.
3. ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A–36 OR EQUIVALENT.
4. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY, AWS, SPECIFICATIONS USING ELECTRODES E70XX.
5. ALL BOLTS SHALL CONFORM TO ASTM A307 OR A325.
6. SURFACE PREPARATION OF ALL STRUCTURAL STEEL FOR PAINTING SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF "STEEL STRUCTURES PAINTING COUNCIL" SPECIFICATIONS SSPC–SP6 FOR COMMERCIAL BLAST CLEANING.
7. ALL STEEL SHALL BE GIVEN ONE SHOP COAT OF RED LEAD OXIDE PRIMER AND FIELD TOUCHUP EXCEPT FOR SURFACES TO BE EMBEDDED IN CONCRETE OR CONTACT SURFACES OF FRICTION BOLTED CONNECTIONS.

K. COLUMN CONFINEMENT

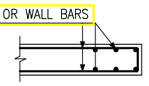
1. IN ORDER TO ATTAIN AN EFFECTIVE BOND BETWEEN THE CONFINING ELEMENTS AND THE MASONRY, THE CONCRETE OF THE CONFINING ELEMENTS SHALL BE CAST AFTER THE MASONRY HAS BEEN BUILT WITH PROPER TOOTHING IN PLACE.
2. CLEAN THE COLUMN SPACE OF ALL RUBBISH BEFORE ADDING THE FORMWORK.
3. POUR THE CONCRETE FOR THE BANDS AND THE COLUMNS AT THE SAME TIME.
4. COMPACT THE CONCRETE WITH VIBRATOR.
5. REMOVE THE FORMWORK NOT EARLIER THAN 03 DAYS.

L. SEISMIC PARAMETERS

1. DESIGN OF STRUCTURE HAS BEEN CARRIED OUT BASED ON SEISMIC PARAMETERS OF ZONE 2B WITH PGA VALUE OF 0.16g to 0.24g & STIFF SOIL PROFILE (SD), ACCORDING TO BUILDING CODE OF PAKISTAN.



WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

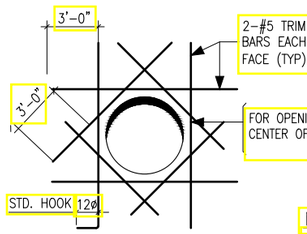


SECTION A–A

NOTES

- FOR OPENING WITH MAXIMUM DIMENSION OVER 5'–0" REFER TO OTHER DETAILS.
- USE THIS DETAILS IF NOT SHOWN IN DESIGN DRAWINGS

REINFORCEMENT DETAIL AT OPENING IN SLAB & WALLS (TYP)

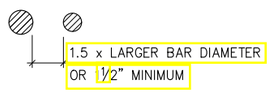


WHERE BAR EXTENSION CANNOT BE OBTAINED EXTENDED BARS AS FAR AS POSSIBLE & HOOK

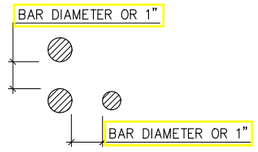
NOTES

MAXIMUM DIAMETER OF SLEVE IS 1'–0" FOR TRIM BARS BARS AROUND LARGE SLEEVE REFER TO OTHER DETAILS

REINFORCEMENT AROUND SLEEVE IN SLABS & WALLS (TYP.)



VERTICAL BAR SPACING



BAR SPACING IN BEAM

LEGEND

MS	MILD STEEL
PVC	POLYVINYL CHLORIDE
C.G.I	CORRUGATED GALVANIZED IRON
G.I	GALVANIZED IRON
SQ	SQUARE
C.Jt	CONSTRUCTION JOINT
T&B	TOP AND BOTTOM
EF	EACH FACE
BF	BOTH FACES
ø/db/#	DIAMETER OF BAR
@	AT THE RATE OF
B	BOTTOM
C/C	CENTER TO CENTER
B.W	BOTHWAYS
E.G.F	ENGINEERED GRANULAR FILL
E.G.L	EXCAVATED GROUND LEVEL
E.L.	STRUCTURAL ELEVATION
EQ.	EQUAL
F.D.T	FIELD DENSITY TEST
F.F.L	FINISH FLOOR LEVEL
F.G.L.	FINISH GROUND LEVEL
F.B.L.	FOUNDATION BED LEVEL
G.W.T.	GROUND WATER TABLE
N.S.L.	EXISTING NATURAL SURFACE LEVEL
N.T.S.	NOT TO SCALE
SMRF	SPECIAL MOMENT RESISTING FRAME
STYP	SOIL PROFILE TYPE
ST.	STIRRUPS
T	TOP
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
N.T.S.	NOT TO SCALE
	LEVEL ON PLAN
℄	CENTER LINE

SPLICE LENGHTH (LS) AND DEVELOPMENT LENGHT (LD) (fc'=3 ksi, fy=40 ksi)

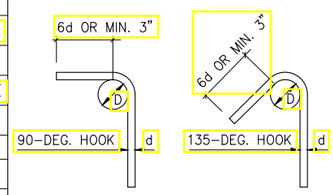
BAR DIA	#3	#4	#5	#6	#7	#8	#10	#12
DEVELOPMENT LENGTH ℓd (Inches)	18	24	30	36	42	47	53	59
SPLICE LENGTH (Inches)	24	32	39	47	55	62	69	77

LAP SPLICE ARE NOT TO BE USED:
- WITHIN JOINTS
- WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH.
- FROM THE FACE OF THE JOINT.

CURTAILMENT LENGTH SHOULD BE EXTEND UPTO L/16,12db OR d, (WHICHEVER GREATER) BEYOND L/3
WHERE:
L–GREATER CLEAR SPAN, db–DIAMETER OF BAR,
d–EFFECTIVE DEPTH.
THE FIRST HOOP SHALL BE LOCATED NOT MORE THAN 2" FROM THE FACE OF THE SUPPORTING MEMBER.

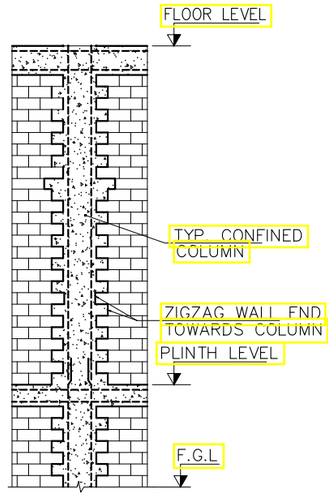
* ALL LAP SPLICE SHALL BE STAGGARED BY AT LEAST 50 %

BAR DIA	D
#3	2½"
#4	3"
#5	4"
#6	4"
#8	6"
#9	7"
#11	8½"



STIRRUPS AND TIE HOOKS

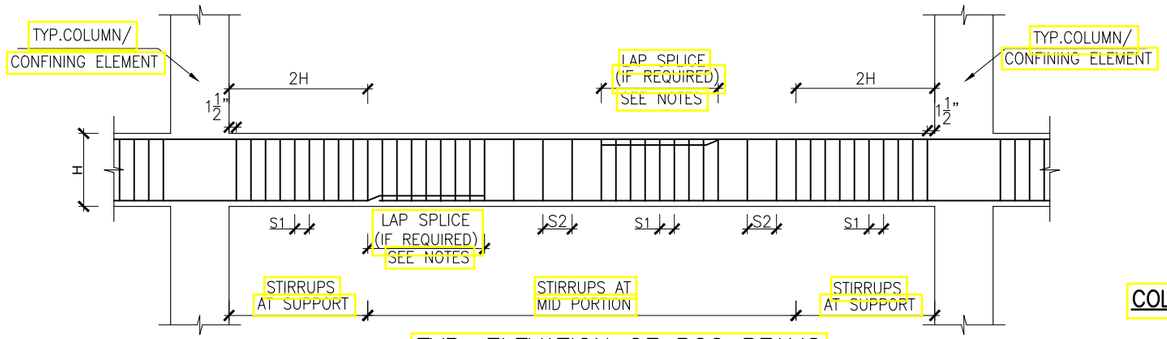
BAR DIA	D
#3	1½"
#4	2"
#5	2½"



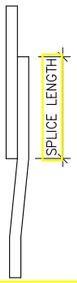
TYPICAL ELEVATION OF CONFINED COLUMN (SHOWING TOOTHING)



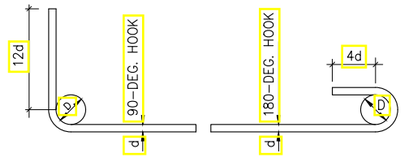
BEAM SPLICE (TYP.)



TYP. ELEVATION OF RCC BEAMS



COLUMN SPLICE (TYP.)



STANDARD BAR HOOKS (MAIN BARS)

LEGENDS

S1	STIRRUPS SPACING IN BEAM NEAR SUPPORTS & LAP SPLICES
S2	STIRRUPS SPACING IN BEAM IN MIDSPAN
h	DEPTH OF BEAM
db	DIAMETER OF BAR
d	EFFECTIVE DEPTH OF BEAM

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

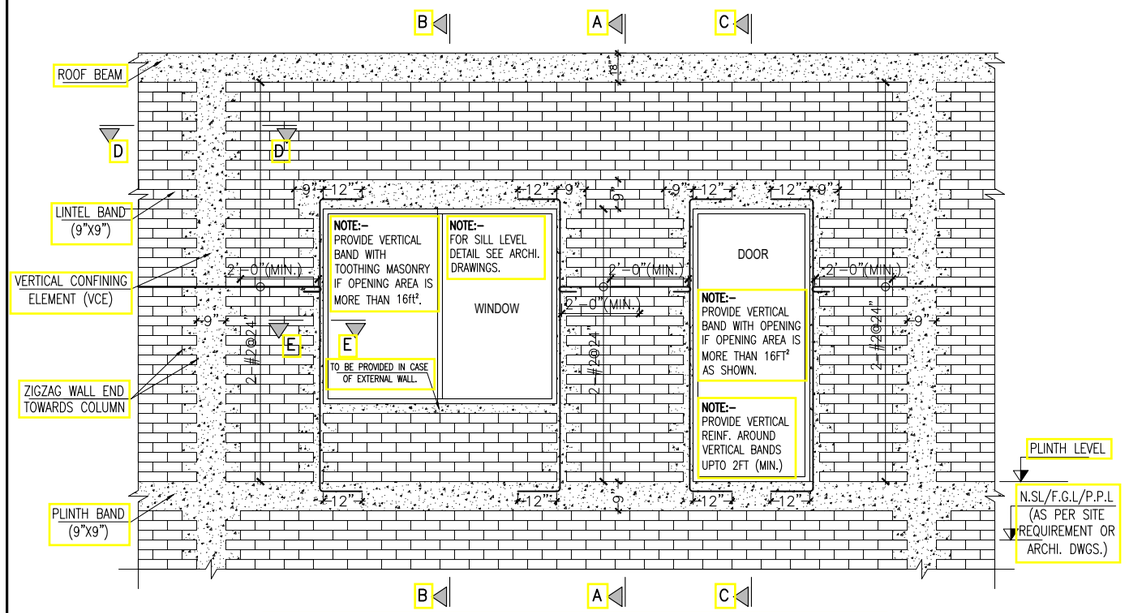
GUEST UNITS

BLOCK - 11

GENERAL NOTES & TYPICAL DETAILS (SHEET 2 OF 3)

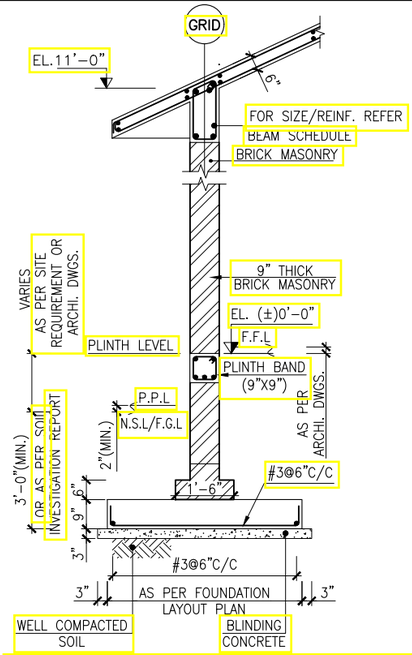
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.		156/328/TD/11G02	0
SUBM.	FEB 2026		



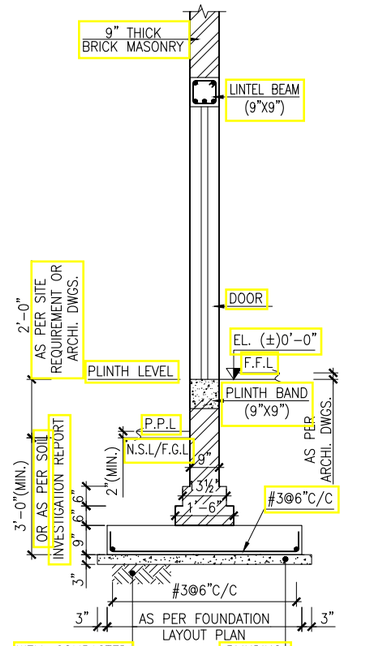
TYPICAL ELEVATION OF 9" THICK CONFINED BRICK MASONRY WALL SINGLE STOREY WALL MASONRY

(FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS)



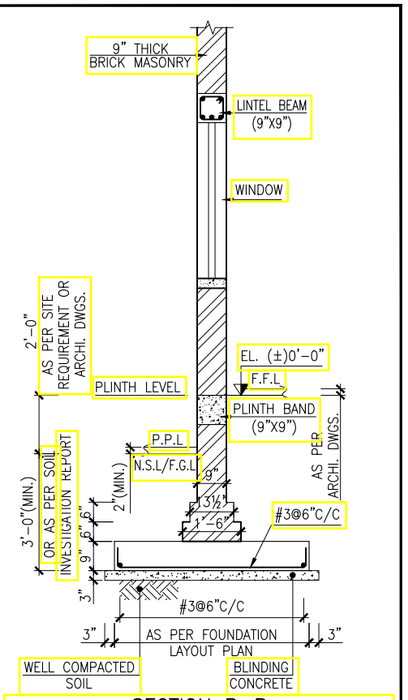
SECTION A–A

TYP. FOOTING SECTION OF EXTERNAL/ INTERNAL WALL WITHOUT OPENING



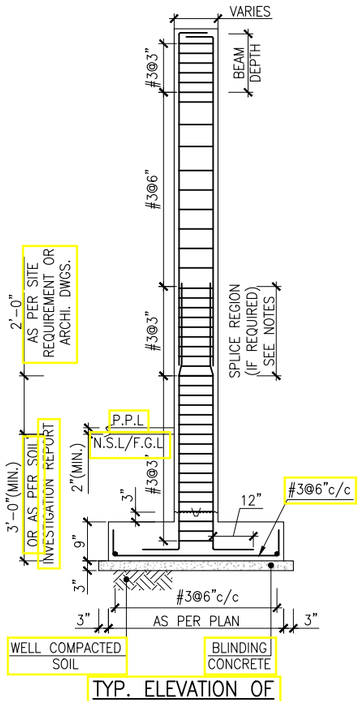
SECTION C–C

TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT DOOR

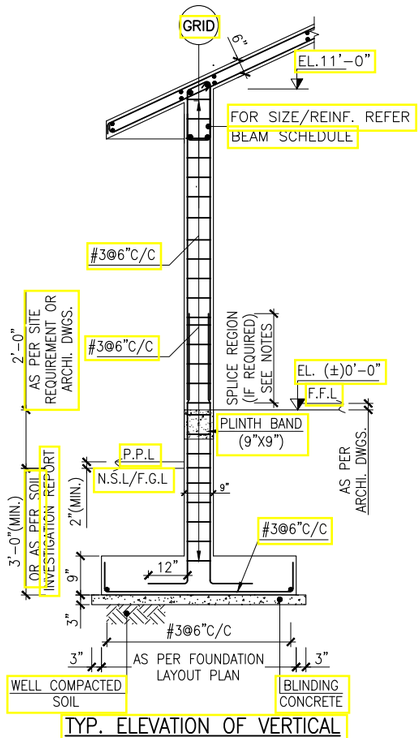


SECTION B–B

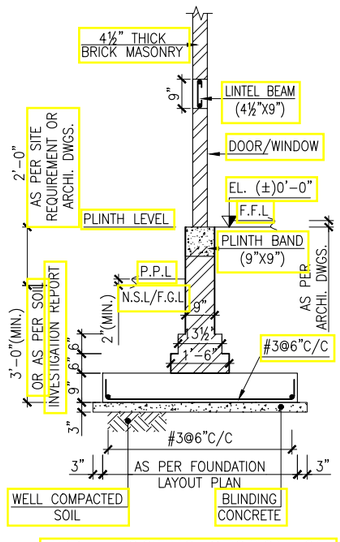
TYP. FOOTING SECTION OF EXTERNAL/INTERNAL WALL AT WINDOW



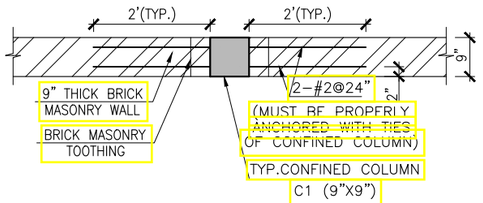
TYP. ELEVATION OF COLUMN C–1



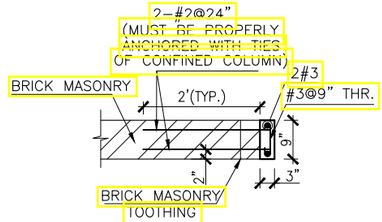
TYP. ELEVATION OF VERTICAL CONFINING ELEMENT (VCE)



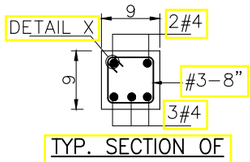
TYP. FOOTING SECTION OF 4½" THICK MASONRY WALL



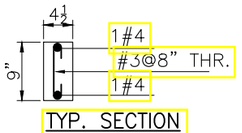
SECTION D–D



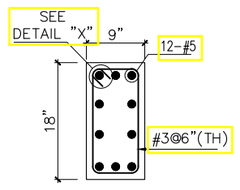
SECTION E–E



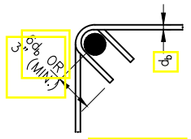
TYP. SECTION OF LINTEL BEAM 9" THICK BRICK WALL



TYP. SECTION OF RB–3

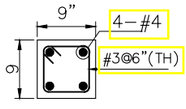


TYP. SECTION OF COLUMN (C–1)



DETAIL–X

TYP. 135° HOOK DETAIL FOR TIES & STIRRUPS



TYP. CONFINED COLUMN V.C.E

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

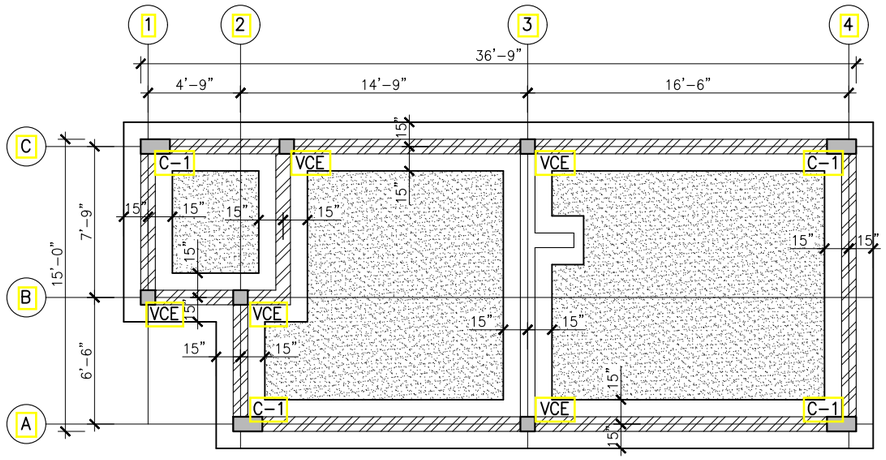
BLOCK - 11

GENERAL NOTES & TYPICAL DETAILS

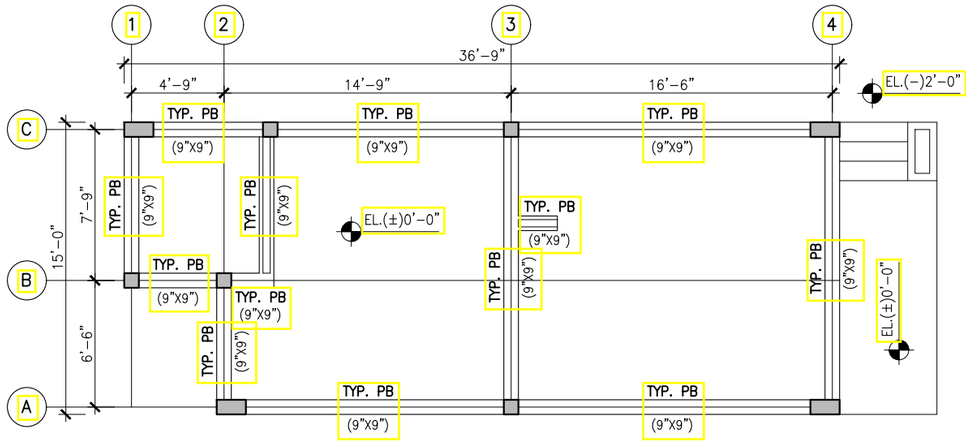
(SHEET 3 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/11G03	0
SUBM.			

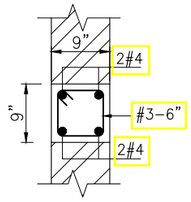


FOUNDATION & COLUMN LAYOUT PLAN

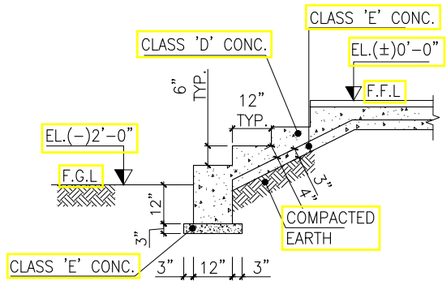


PLINTH BAND LAYOUT PLAN AT EL. (±)0'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS



TYPICAL SECTION OF PLINTH BAND (TYP. PB)



TYPICAL SECTION OF P.C.C STEPS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
4. THE FOUNDATION HAS BEEN DESIGNED ON GROSS ALLOWABLE BEARING CAPACITY OF 0.75 TON/SFT AT A DEPTH OF 3'-0" BELOW N.S.L OR F.G.L WHICH EVER IS LOWER.
5. IF COMPETENT BEARING STRATA IS NOT FOUND AT INDICATED DEPTH, THE ENGINEER SHALL BE NOTIFIED FOR HIS PRIOR INSTRUCTIONS.
6. BOTTOM OF FOOTING SHOULD BE PROVIDED 3'-0" BELOW NSL OR F.G.L WHICH EVER IS LOWER.
7. FOR EL. ±0'-0", REFER MASTER PLAN.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

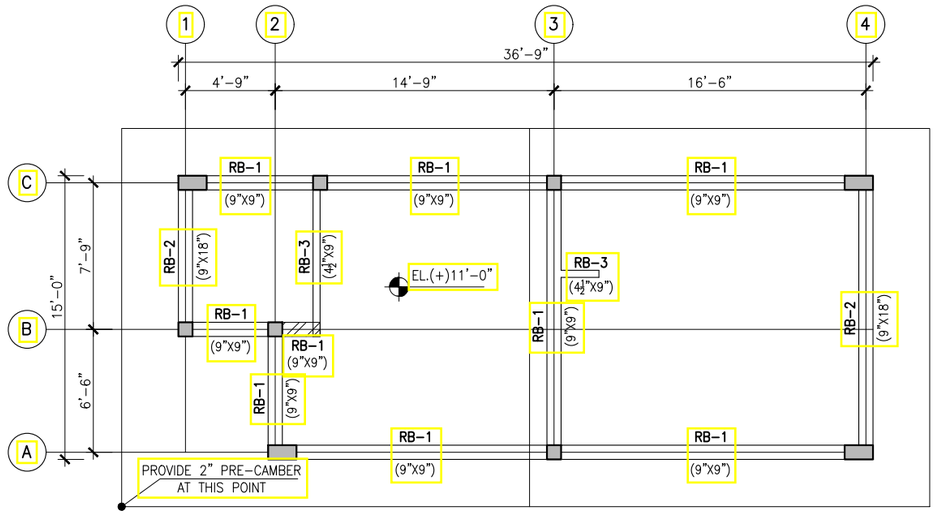
GUEST UNITS

BLOCK - 11

FOUNDATION & COLUMN LAYOUT PLAN AND PLINTH BAND LAYOUT PLAN

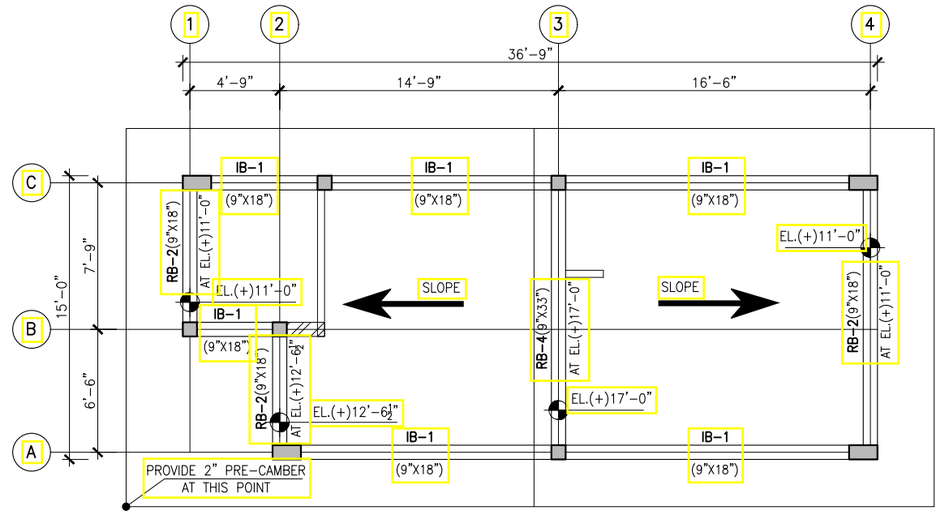
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/328/TD/11G04	0
SUBM.			



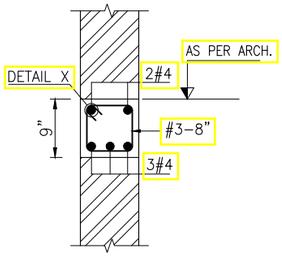
ROOF BEAM LAYOUT PLAN AT EL. (+)11'-0"

FOR LEVEL DETAILS REFER ARCHITECTURE DRAWINGS

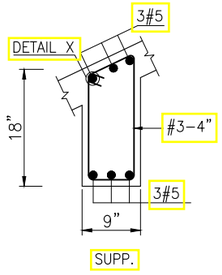


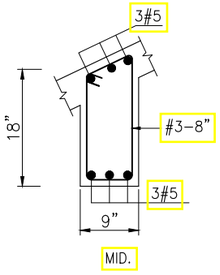
INCLINED BEAM LAYOUT PLAN FROM EL. (+)11'-0" TO EL.(+)17'-0"

ALL SLOPING SLABS ARE 6" THICK UNLESS NOTED OTHERWISE

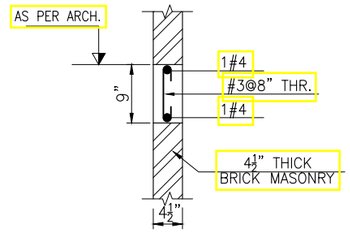


TYP. SEC. OF RB-1

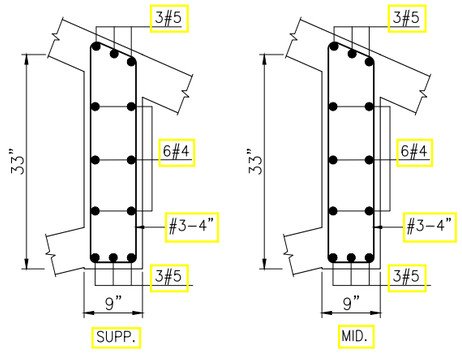




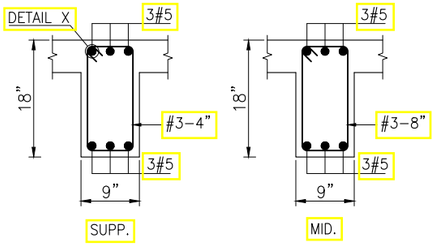
TYPICAL SECTION OF RB-2



SEC. OF RB-3
4½" THICK BRICK WALL



TYPICAL SECTION OF RB-4



TYPICAL SECTION OF IB-1

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/G01 & G02.
2. FOR TYPICAL COLUMN ELEVATION & OTHER TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/G03.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

BLOCK - 11

FRAMING PLAN AT EL.(+)11'-0" & FROM EL.(+)11'-0" TO EL.(+)17'-0"

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

		RECOMMENDED	VER./CKD.	APPROVED
DESN.	NESPAK			
DWN.				
FILE				
CKD.				
SUBM.				

DATE	DRAWING NO.	REV.
FEB 2026	156/328/TD/11G05	0

1. GENERAL

1. READ ALL DRAWINGS IN CONJUNCTION WITH ARCHITECTURAL, GEOTECHNICAL, PLUMBING, MECHANICAL, ELECTRICAL & ANY OTHER RELEVANT DRAWINGS.
2. NOTES GIVEN IN THIS DRAWING ARE APPLICABLE TO ALL DRAWINGS UNLESS MENTIONED OTHERWISE. NOTES WRITTEN ON A DRAWING, SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS-REFERRED.
3. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE SPECIFICATIONS OF THE CONTRACT DOCUMENTS. IN ABSENCE OF ANY SPECIFICATIONS , ALL MATERIALS & WORKMANSHIP SHALL CONFORM TO RELEVANT ACI/BRITISH CODES AND SHALL BE SUBJECTED TO APPROVAL OF THE ENGINEER.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE STRUCTURES DURING CONSTRUCTION. HE SHALL ALSO VERIFY ALL DIMENSIONS AND LEVELS BEFORE EXECUTION OF WORK. ANY DISCREPANCY, ERROR OR OMISSION, IF FOUND, SHALL BE BROUGHT TO THE NOTICE OF THE ENGINEER FOR CORRECTION AND APPROVAL.
5. THE CONTRACTOR SHALL CO-ORDINATE WITH VARIOUS SERVICES DRAWINGS FOR SIZES & LOCATION OF ALL STRUCTURAL MEMBERS, FLOORS,WALLS,OPENINGS, FLOOR FINISHES, PIPES ETC.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE EXECUTION OF DEWATERING SYSTEM WHERE SO REQUIRED DURING CONSTRUCTION.
7. ALL DIMENSIONS AND LEVELS ARE IN FEET & INCHES.
8. DO NOT SCALE THE DRAWINGS. DIMENSIONS, GIVEN ON THE DRAWING, SHALL GOVERN.
9. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST APPLICABLE ACI/BRITISH SPECIFICATIONS.
10. BACKFILLING AROUND FOUNDATIONS AND WALLS SHALL BE WELL COMPACTED LAYERS NOT EXCEEDING 6 INCHES IN THICKNESS.
11. IT IS STRONGLY RECOMMENDED TO RECONFIRM THE SITE PLAN BEFORE START OF EXECUTION AT SITE.THE SITE SHOULD BE EXAMINED FOR CLEARANCE WITH RESPECT TO LOCAL/SEISMIC HAZARDS.
12. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
13. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
14. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE OWNER AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
15. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/DEVIATIONS MAY LEAD TO REJECTION/REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
16. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF SHOP DRAWINGS AND BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.

2. FOUNDATIONS

1. FOUNDATION IS DESIGNED FOR MINIMUM ALLOWABLE BEARING CAPACITY OF 0.75 T/SFT AND IS APPLICABLE FOR (B.C) OF 0.75 T/SFT AND ABOVE. THIS VALUE SHOULD BE VERIFIED BY CONTRACTOR BEFORE PLACEMENT OF FOUNDATION. IF THE ACTUAL BEARING CAPACITY IS FOUND DIFFERENT, FOUNDATION DESIGN SHOULD BE REVIEWED BY THE ENGINEER.
2. FOUNDATION SHALL BE PLACED AT MINIMUM DEPTH OF 7'-0" BELOW TOP OF NSL OR FGL WHICH EVER IS LOWER OR AS PER GEOTECHNICAL RECOMMENDATIONS. TOTAL TOLERABLE SETTLEMENT FOR THE FOUNDATIONS WILL BE 1 INCHES.
3. AFTER EXCAVATION TO F.B.L. ALL FOUNDATIONS SHOULD BE PHYSICALLY EXAMINED BY ENGINEERING GEOLOGIST/GEOTECHNICAL ENGINEER FOR THE CONFIRMATION OF ORIGINAL SOIL/ROCK CONDITIONS.
4. UNDER ANY CIRCUMSTANCES, FOUNDATIONS SHOULD NOT BE LAID UPON ANY TYPES/FORMS OF NATURAL FILL OR SLOPE WASH DEPOSITS.
5. IF THE ORIGINAL SOIL COMPRISES COHESIVE(CLAY-RICH) NON-GRAVELLY AND/OR SLIGHT TO MODERATELY GRAVELLY SOIL(GRAVELS<35%) WITH ABUNDANCE OF FINER(COHESIVE) MATRIX AT F.B.L., SUCH SOILS SHOULD BE REPLACED BY 3FT THICK CUSHION OF E.G.F. OF GRADATION APPROVED BY THE ENGINEER. E.G.F. SHOULD BE PLACED IN THREE EQUAL LAYERS OF 1FT COMPACTED THICKNESS. COMPACTION SHOULD BE CONFIRMED BY IN-SITU F.D.T. PRIOR TO PLACEMENT OF THE NEXT LAYER AND SHOULD NOT BE LESS THAN 95% OF MODIFIED AASHTO DENSITY.
6. RECOMMENDED Q(NET ALLOWABLE) FOR THE DESIGN OF FOUNDATIONS ON SUCH E.G.F. SHOULD BE 0.75 T/SFT.
7. HOWEVER, IF SOUND BEDROCK CONDITIONS (WITH THE EXCEPTION OF SHALE & CLAYSTONE) ENCOUNTERED AT F.B.L., THE FOOTINGS SHOULD BE EXTENDED TO ENSURE 1.5FT EMBEDMENT DEPTH IN SOUND BEDROCK CONSIDERING Q(ALLOWABLE) 3.00T/SFT.
8. DETAILED GEOTECHNICAL INVESTIGATIONS SHOULD BE CARRIED OUT IF BUILDING IS CLOSE TO A SLOPE, SLOPE STABILITY STUDIES TO BE CARRIED OUT AND APPROPRIATE MEASURES TO BE ADOPTED EVALUATION TO BE MADE AS TO PRESENCE OF FILLS,LIQUIFIABLE SOILS ETC.
9. ALL FOUNDATIONS SHALL BE PLACED ON FIRM BEARING STRATA.IF ACCEPTABLE BEARING STRATA IS NOT FOUND AT INDICATED DEPTHS OF FOUNDATION, THE ENGINEER SHALL NOTIFY IN WRITING FOR HIS INSTRUCTIONS.
10. THE BED OF FOUNDATION SHOULD BE THOROUGHLY COMPACTED PRIOR TO LAYING FOUNDATION. ANY LOOSE,WET,SOFT OR OVER-MOIST SOIL, ORGANIC SOILS, PEAT/FAT CLAY SHOULD BE REMOVED AND REPLACED WITH WELL-COMPACTED ENGINEERED GRANULAR FILL OF GRADATION APPROVED BY THE ENGINEER AND COMPACTED TO 95% MODIFIED AASHTO DENSITY.
11. THE FOUNDATION BED SOIL SHOULD BE PROTECTED FROM INGRESS OF MOISTURE FROM ANY SOURCE BY PROVIDING ADEQUATE SURFACE DRAINAGE SYSTEM AND ENSURING LEAK PROOF JOINTING OF SEWERAGE AND WATER SUPPLY LINES. EXCESSIVE AND UNCONTROLLED WATERING FOR CURING AND COMPACTION OF BACKFILL MATERIAL SHOULD BE AVOIDED.
12. ANY SPRINGS/SEEPS ENCOUNTERED NEAR OR AT THE FOUNDATION LEVEL WITHIN THE BUILDING FOOT PRINTS SHOULD BE ADDRESSED PROPERLY BY ADOPTING SUITABLE DE-WATERING MEASURES.
13. THE EXCAVATION LINES AND SLOPES ARE NOT SHOWN ON THE DRAWINGS. IT IS CONTRACTOR'S RESPONSIBILITY TO MAKE THE EXCAVATION ON STABLE SLOPE AND MAINTAIN THE STABILITY OF THE CUT SLOPES.
14. AS AND WHEN REQUIRED APPROPRIATE SLOPE PROTECTION SHOULD BE PROVIDED AROUND THE PROPOSED BUILDING.
15. IF NEAR SLOPE,THE STRUCTURE SHOULD BE SET BACK BY A MINIMUM DISTANCE EQUAL TO 3 TIMES OF THE FOUNDATION WIDTH.
16. TO ENSURE UNIFORM ENGINEERING BEHAVIOR OF SUB-GRADE, LITHOLOGIC HOMOGENEITY OF SUCH SOILS SHOULD BE CAREFULLY EXAMINED. ANY LARGE SIZE ROCK FRAGMENTS SUCH AS ERRATICS, BOULDERS, LARGE COBBLES AND ANY OTHER ROCK FRAGMENTS HAVING DIMENSIONS EXCEEDING 6 IN. SHOULD BE REMOVED UNDERNEATH THE FOUNDATIONS AND ITS CLOSE (<1.5 FT) VICINITY.
17. TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.
18. NO FOOTING SHALL BE PLACED ON FILL. HOWEVER, AREAS WHERE FILLING BELOW THE FOOTINGS BECOMES INEVITABLE OR, OVER-EXCAVATION, IF ANY, SHALL BE FILLED WITH ENGINEERED GRANULAR FILL AS PER GEOTECHNICAL RECOMMENDATIONS OR CONCRETE CLASS 'E'. ALL THIS TO BE DONE WITH PRIOR APPROVAL OF THE ENGINEER.
19. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.
20. EXCAVATIONS ADJACENT TO EXISTING STRUCTURES AND/OR UNDERGROUND SERVICES SHALL BE MADE BY HAND.

3. REINFORCED CONCRETE

1. STRUCTURAL DESIGN IS BASED ON THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE OF AMERICAN CONCRETE INSTITUTE (ACI 318-02).
2. ALL STRUCTURAL CONCRETE SHALL CONFORM TO AMERICAN CONCRETE INSTITUTE (ACI) REQUIREMENTS.
3. CONCRETE MIX TO BE DESIGNED ON THE BASIS OF ACI 211 OR EQUIVALENT. TRIAL STRENGTH RESULTS TO BE SUBMITTED BY THE CONTRACTOR FOR REVIEW AND APPROVAL BEFORE CONCRETING.
4. NO CONCRETING SHALL BE CARRIED OUT UNTIL PERMISSION IS GIVEN IN WRITING.
5. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & AS WRITTEN IN SPECIFICATIONS AND THE MINIMUM CYLINDER CRUSHING STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	MIN. CYLINDER CRUSHING STRENGTH AT 28 DAYS (psi).
A	4,000
B	3,000
C	2,400
D	1,200
E	800

6. CLASS OF CONCRETE FOR DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE AS FOLLOWS UNLESS NOTED OTHER WISE:

COMPONENT	CONCRETE CLASS
FOUNDATION,COLUMNS & WALLS	CLASS 'A'
SLABS & BEAMS	CLASS 'A'
PCC STEPS	CLASS 'D'
LEAN / BLINDING CONCRETE	CLASS 'E'

7. ORDINARY PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETE WORKS.
8. AN INTEGRAL WATER PROOFING AGENT SHALL BE USED IN CONCRETE THAT IS CONSTANTLY OR INTERMITTENTLY IN CONTACT WITH WATER AS PER MANUFACTURER'S RECOMMENDATIONS (GENCON GENPRUF RMC OR PENETRON ADMIX OR EQUIVALENT).
9. WATER CEMENT RATIO FOR WATERTIGHT STRUCTURAL CONCRETE SHALL NOT EXCEED 0.45 AND 0.5 FOR ALL OTHER STRUCTURAL CONCRETE.
10. MINIMUM CEMENT CONTENT FOR STRUCTURAL CONCRETE SHALL NOT BE LESS THAN 356 Kg./cum. OF CONCRETE.
11. ALL DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315, ACI-318 & ACI-350R.

4. SHORING AND BRACING

1. SHORE & BRACE ALL PARTS OF THE STRUCTURE DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE SLOPES AND SHALL PROVIDE SHORING AND BRACING DURING EXCAVATION AND CONSTRUCTION, WHEREVER AND WHENEVER REQUIRED.
3. SEQUENCE OF REMOVAL OF FORMWORK SHALL BE APPROVED BY THE ENGINEER.
4. AT LEAST ONE LOWER FLOOR SHALL REMAIN PROPPED UNTIL THE UPPER FLOOR IS CAST AND CURED.

5. REINFORCING STEEL

1. ALL REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM-A615 GRADE 60 HAVING A MINIMUM YIELD STRENGTH OF 60,000 PSI. FOR STIRRUPS, TIES AND #3 BARS USE ASTM A615, GRADE 40 HAVING MINIMUM YIELD STRENGTH OF 40,000 PSI.
2. THE ACTUAL YIELD STRENGTH BASED ON MILL TESTS DOES NOT EXCEED THE SPECIFIED STRENGTH BY MORE THAN 18,000 PSI (RETESTS SHALL NOT EXCEED THIS VALUE BY MORE THAN AN ADDITIONAL 3000 PSI)
3. THE RATIO OF THE ACTUAL ULTIMATE TENSILE STRENGTH TO THE ACTUAL TENSILE YIELD STRENGTH IS NOT LESS THAN 1.25
4. CLEAR COVER TO REINFORCEMENT SHALL BE: (inches)

STRUCTURAL ELEMENT	COVER (INCHES)
FOOTINGS	2"
BEAMS	1½"
COLUMNS	1½"
SLABS	3/4"
BASEMENT WALLS	2" - EARTHSIDE FACE 3/4" - INNER FACE
WALLS EXPOSED TO WATER	2½" - WATERSIDE FACE 3/4" - OTHER/OUTER FACE

5. DEVELOPMENT & SPLICE LENGTHS FOR FOUNDATIONS, BEAMS & SLABS (FOR fy=60 ksi and fc'= 4 ksi)

BAR DIA	#3*	#4	#5	#6	#7	#8
DEVELOPMENT LENGTH ℓ_d (Inches) (BOTTOM BARS)	12	23	28	34	48	55
SPLICE LENGTH (Inches) (BOTTOM BARS)	16	30	37	44	63	72
DEVELOPMENT LENGTH ℓ_d (Inches) (TOP BARS)	16	28	36	43	63	72
SPLICE LENGTH (Inches) (TOP BARS)	21	37	46	55	82	94

*-fy=40 ksi FOR #3 BAR.

6. DEVELOPMENT & SPLICE LENGTHS FOR COLUMNS (FOR fy=60 ksi and fc'= 4 ksi)

BAR DIA	#3*	#4	#5	#6	#7	#8
DEVELOPMENT LENGTH ℓ_d (Inches)	12	23	28	34	48	55
SPLICE LENGTH (Inches)	16	30	37	44	63	72

*-fy=40 ksi FOR #3 BAR.

- THE LOCATION OF LAPS SHOWN ARE INDICATED IN TYPICAL ELEVATIONS OF BEAMS & COLUMNS, AND MAY BE ELIMINATED.
- LAPS (IF REQUIRED.) SHALL BE PROVIDED AT LOCATION SHOWN ON THE TYPICAL ELEVATIONS USING MAXIMUM AVAILABLE LENGTH.
- SPLICE LENGTH = $1.3x\ell_d$
- WHERE TWO DIFFERENT DIAMETER BARS SPLICING WITH EACH OTHER, SPLICE LENGTH OF LARGER BAR DIAMETER SHALL BE PROVIDED.
- LAP SPLICE ARE NOT TO BE USED:
  - WITHIN JOINTS
  - WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH FROM THE FACE OF THE JOINT.
- CURTAILMENT LENGTH SHOULD BE EXTEND UPTO L/16,12db OR d, (WHICHEVER GREATER) BEYOND L/3, WHERE: L-GREATER CLEAR SPAN, db-DIAMETER OF BAR,d-EFFECTIVE DEPTH
- THE FIRST HOOP SHALL BE LOCATED NOT MORE THAN 2" FROM THE FACE OF THE SUPPORTING MEMBER.

5. REINFORCING STEEL (CONTINUED)

7. 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.
8. LINTELS ARE EXTENDED AT 9 (INCHES) FROM BOTH SIDES OF OPENING.
9. PROVIDE 135° HOOK IN ADJACENT STIRRUPS ON ALTERNATE SIDES.

6. CONCRETE CONSTRUCTION

1. ALL STRUCTURAL SURFACES, AGAINST WHICH EARTH IS TO BE FILLED, SHALL BE COATED WITH TWO COATS OF HOT BITUMEN OF 10/20 GRADE AT THE RATE OF 0.2 lbs/ft /coat.
2. PROVIDE POLYTHENE SHEET OVER TWO COATS OF HOT BITUMEN AT TOP OF PLINTH BEAM/DPC FOR EXTERIOR WALLS.
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.
4. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BLOCKS, etc. SHOULD BE AVOIDED ON SLAB PANELS.
5. UNLESS OTHERWISE NOTED IN PLANS OR SPECIFICATIONS, CAMBER ALL R.C.C. BEAMS AT LEAST ⅜" FOR EVERY 13'-0" OF CLEAR SPAN EXCEPT CANTILEVERS WHICH SHALL BE 2" FOR EVERY 10'-0" OF CLEAR SPAN OR AS APPROVED BY ENGINEER. ALL CAMBERING WORK SHOULD BE DONE WITH PRIOR APPROVAL OF ENGINEER.
6. UNLESS OTHERWISE NOTED IN PLANS OR SPECIFICATIONS, CAMBER ALL R.C.C. SLABS AT LEAST 5/16" PER 10'-0" OF SHORTER SPAN AND 3/16" FOR EVERY 6'-6" OF SLABS CANTILEVER SPAN OR AS APPROVED BY ENGINEER. ALL CAMBERING WORK SHOULD BE DONE WITH PRIOR APPROVAL OF ENGINEER.

7. BLOCK WORK

1. ALL BLOCK WORK SHALL CONFORM TO SPECIFICATIONS GIVEN IN THE CONTRACT DOCUMENT.
2. ALL BLOCK SHALL BE SOUND, HARD AND OF UNIFORM SIZE, COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 1/8". BLOCKS SHOULD BE IN ACCORDANCE WITH SPECIFICATIONS AND SHOULD CONFIRM TO ASTM C129 FOR NON-LOADBEARING CONCRETE MASONRY UNITS.
3. ALL BLOCK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 1/8" IN 10'-0".
4. MORTAR USED IN MASONRY CONSTRUCTION SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 12 MPa (1800Psi) AND SHALL CONFORM TO ASTM C270.
5. COMPRESSIVE STRENGTH OF BLOCK MASONRY AVERAGE OF 5 UNITS AT 28 DAYS SHALL NOT BE LESS THAN AS SPECIFIED IN SPECIFICATION AND SHALL CONFORM TO RELEVANT ASTM STANDARD.
6. ALL DESIGN, DETAILING, MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH RELEVANT ACI, ASTM, AND UBC CODES AND STANDARDS.
7. BLOCKS SHOULD BE SOAKED WITH WATER PROPERLY BEFORE USE.
8. VERTICAL JOINTS SHOULD BE STAGGERED.
9. ALL MASONRY WALLS SHALL BE ANCHORED TO STRUCTURAL FRAME WORK AS INDICATED ON THE DRAWINGS.

8. CONSTRUCTION JOINTS

1. JOINTS, NOT SHOWN ON THE DRAWING, SHALL BE SO MADE AND LOCATED AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED NEAR THE MIDDLE OF THE SPANS OF SLAB & BEAMS. JOINTS IN WALLS & COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOORS, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.
2. JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS THE JOINTS.
3. JOINTS IN BASE SLAB & WALLS AND ROOF SLAB, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS SHALL BE BORNE BY THE CONTRACTOR. BEAMS & BRACKETS SHALL BE PLACED AT THE SAME TIME AS SLABS.

9. ELECTRICAL CONDUITS

1. CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS AND WITHIN THE MIDDLE HALF OF THE THICKNESS IN SLABS.SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6 INCHES.

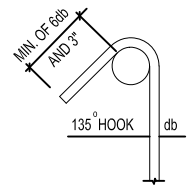
10. SEISMIC & LOADING PARAMETERS

1. THE FOLLOWING ARE SEISMIC PARAMETERS ASSUMED IN THE STRUCTURAL DESIGN (BCP-SP-2007)
   - SEISMIC ZONE FACTOR = ZONE 3
   - WITH MAXIMUM PGA VALUE = 0.24g to 0.32g
   - SEISMIC ZONE FACTOR = 0.3
   - IMPORTANCE FACTOR (I) = 1.00
   - RW IN BOTH HORIZONTAL DIRECTIONS (RW) = 8.5 (FOR SMRF)
   - SOIL PROFILE TYPE (STYP) = SB (ROCK PROFILE)
   - CT VALUE = 0.030
2. THE FOLLOWING ARE LOADING PARAMETERS ASSUMED IN THE STRUCTURAL DESIGN (BCP-SP-2007)
   - INFILL MASONRY WALL LOAD ON BEAMS = NO LOAD CONSIDERED
   - FLOOR FINISHES = 30 PSF
   - DEPTH OF WATER (CONSIDERED) = 5 FT
   - DENSITY OF WATER (CONSIDERED) = 62.4 PCF
   - DYNAMIC EFFECTS OF LATERAL FORCES HAVE NOT BEEN CONSIDERED.
   - POINT LOADS AND FREQUENCY OF VIBRATIONS HAVE NOT BEEN CONSIDERED.

   LIVE LOADS
   - ROOF LIVE LOAD = 20 PSF
3. NO OTHER LOADS THAN MENTIONED ABOVE INCLUDING ACCIDENTAL HAVE BEEN CONSIDERED IN DESIGN.



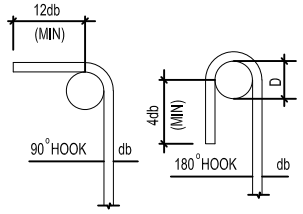
VERTICAL BAR SPACING IN COLUMN



STIRRUPS/TIES HOOKS DETAIL

LEGEND

MS	MILD STEEL
PVC	POLYVINYL CHLORIDE
C.G.I	CORRUGATED GALVANIZED IRON
G.I	GALVANIZED IRON
SQ	SQUARE
C.Jt	CONSTRUCTION JOINT
T&B	TOP AND BOTTOM
EF	EACH FACE
BF	BOTH FACES
Ø/db/#	DIAMETER OF BAR
@	AT THE RATE OF
B	BOTTOM
C/C	CENTER TO CENTER
B.W	BOTHWAYS
E.L.	STRUCTURAL ELEVATION
EQ.	EQUAL
F.F.L	FINISH FLOOR LEVEL
F.G.L.	FINISH GROUND LEVEL
F.B.L.	FOUNDATION BED LEVEL
N.S.L.	EXISTING NATURAL SURFACE LEVEL
N.T.S.	NOT TO SCALE
ST.	STIRRUPS
T	TOP
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
N.T.S.	NOT TO SCALE
	LEVEL ON PLAN
℄	CENTER LINE

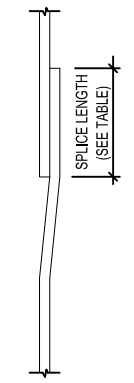


MAIN BARS HOOKS DETAIL

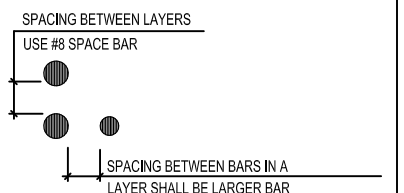
HOOK LENGTH FOR MAIN BARS		
BAR DIA	4db	12db
#3	2 1/2"	4 1/2"
#4	2 1/2"	6"
#5	2 1/2"	7 1/2"
#6	3"	9"

HOOK LENGTH FOR STIRRUPS/TIES	
BAR DIA	6db
#3	3"
#4	3"
#5	3 3/4"
#6	4 1/2"

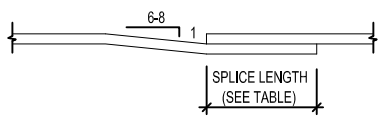
MINIMUM DIAMETERS OF BEND 'D' FOR STANDARD HOOKS	
BAR DIA.	MIN. DIA.
#3 THR. #8	6db
#9 THR. #11	8db
#14 THR. #18	10db



COLUMN SPLICE (TYP.)



BAR SPACING IN BEAM



BEAM SPLICE (TYP.)

REFERENCE DRAWINGS		REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

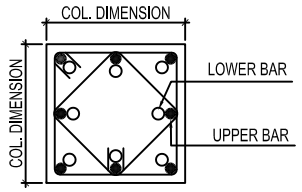
OVERHEAD WATER TANK

(CAPACITY=10,000 GALLONS)

GENERAL NOTES

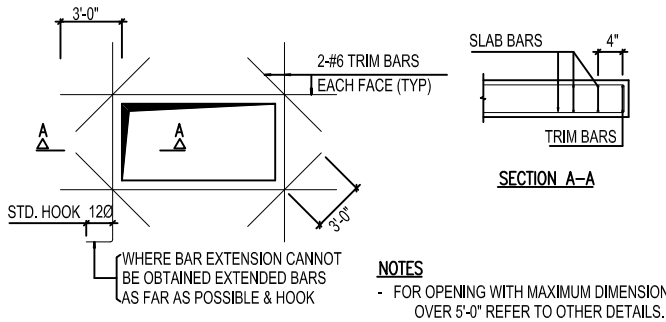
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB. 2026	156/328/TD/OHWTG01	0
SUBM.			



SECTION 1-1

TYP. LAP SPLICE DETAIL

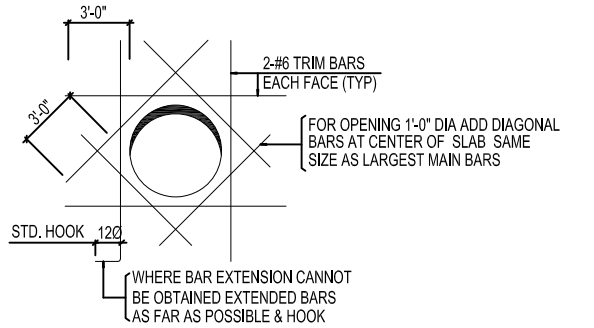


SECTION A–A

NOTES

- FOR OPENING WITH MAXIMUM DIMENSION OVER 5'-0" REFER TO OTHER DETAILS.
- USE THIS DETAILS IF NOT SHOWN IN DESIGN DRAWINGS

REINFORCEMENT DETAIL AT OPENING IN SLAB (TYP)



NOTES

MAXIMUM DIAMETER OF SLEVE IS 1'-0" FOR TRIM BARS
BARS AROUND LARGE SLEEVE REFER TO OTHER DETAILS

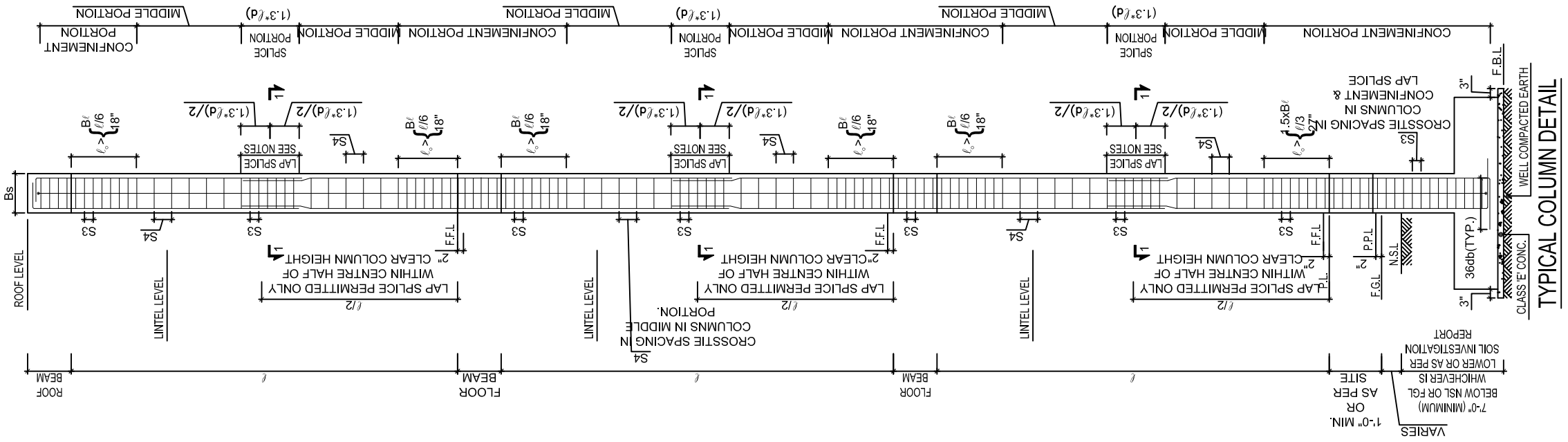
REINFORCEMENT AROUND SLEEVE IN SLAB (TYP)

LEGENDS

S1	STIRRUPS SPACING IN BEAM NEAR SUPPORTS & LAP SPLICES
S2	STIRRUPS SPACING IN BEAM IN MIDSPAN
S3	CROSSTIE SPACING IN COLUMNS IN CONFINEMENT & LAP SPLICE
S4	CROSSTIE SPACING IN COLUMNS IN MIDDLE PORTION.
h	DEPTH OF BEAM
db	DIAMETER OF BAR
Bs	LEAST LATERAL DIMENSION OF COLUMN
B_ℓ	GREATER LATERAL DIMENSION OF COLUMN
ℓ	CLEAR HEIGHT OF COLUMN
ℓ_o	LENGTH OF CONFINEMENT PORTION
ℓ_d	DEVELOPMENT LENGTH FOR STEEL BAR
d	EFFECTIVE DEPTH OF BEAM

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/OHWTG01.
2. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT



TYPICAL COLUMN DETAIL

GUN AND COUNTRY CLUB

OVERHEAD WATER TANK

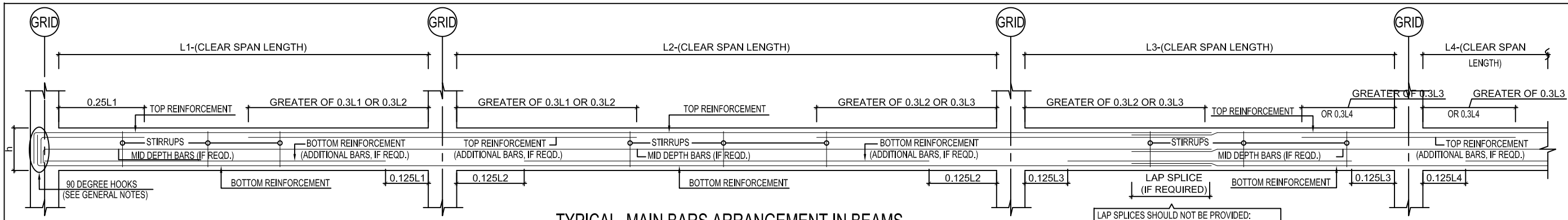
(CAPACITY=10,000 GALLONS)

TYPICAL DETAILS (SHEET 1 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

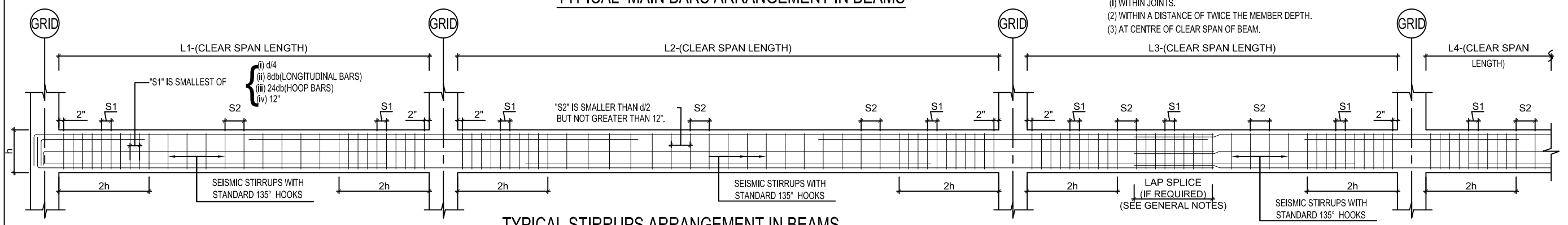
DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB. 2026	156/328/TD/OHWTG02(A)	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

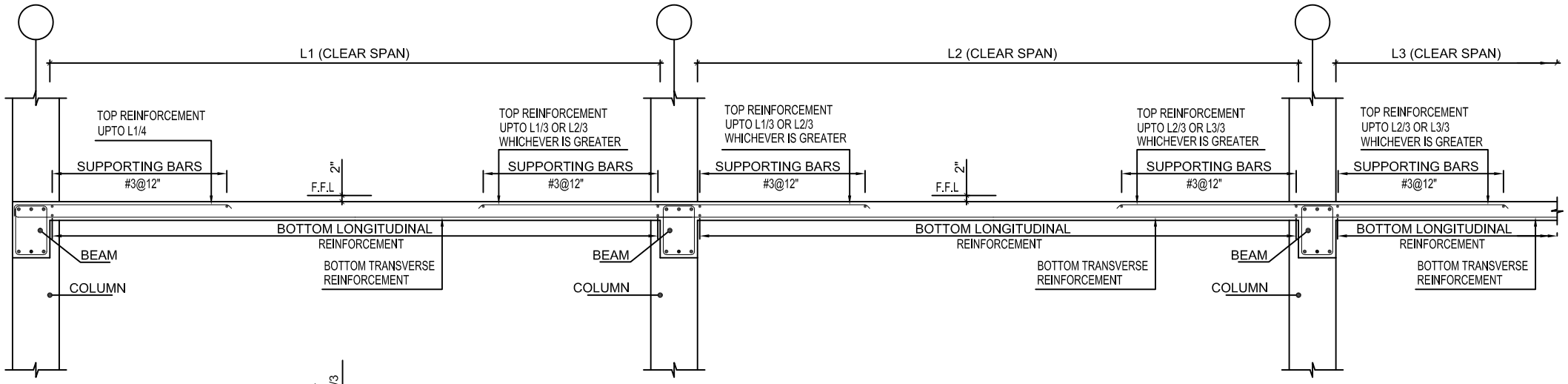


TYPICAL MAIN BARS ARRANGEMENT IN BEAMS

LAP SPLICES SHOULD NOT BE PROVIDED:
(I) WITHIN JOINTS.
(2) WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH.
(3) AT CENTRE OF CLEAR SPAN OF BEAM.

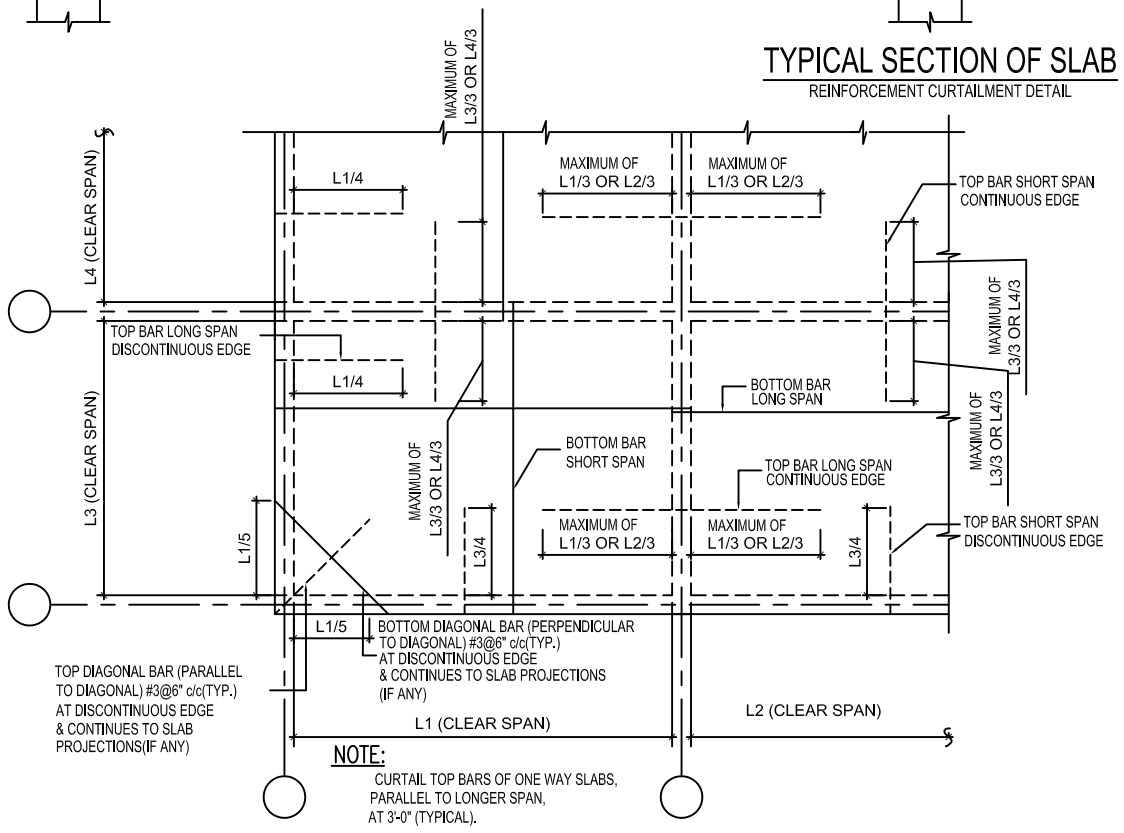


TYPICAL STIRRUPS ARRANGEMENT IN BEAMS



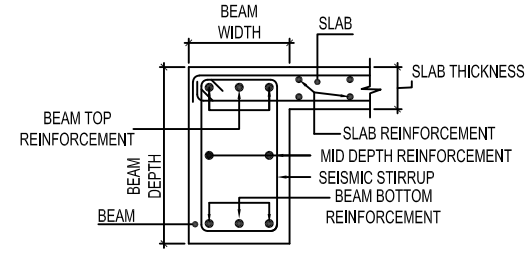
TYPICAL SECTION OF SLAB

REINFORCEMENT CURTAILMENT DETAIL

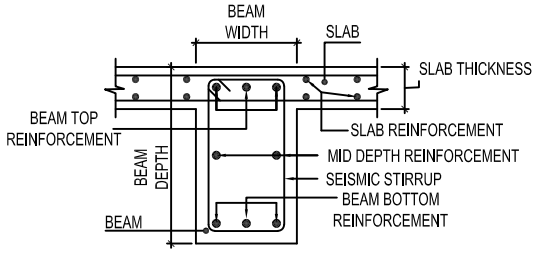


NOTE:
CURTAIL TOP BARS OF ONE WAY SLABS, PARALLEL TO LONGER SPAN, AT 3'-0" (TYPICAL).

TYP. TWO WAY SLAB REINFORCEMENT CURTAILMENT DETAIL



TYP. SECTION OF EXTERNAL BEAM (L-SHAPED)



TYP. SECTION OF INTERNAL BEAM (T-SHAPED)

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/OHWTG01.
2. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.

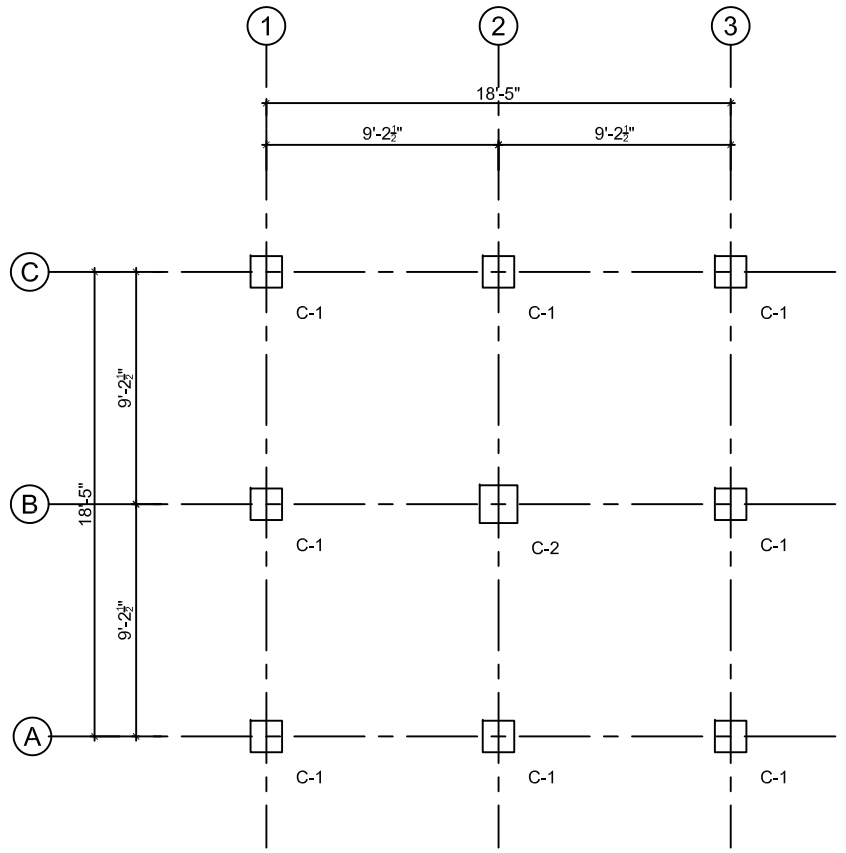
REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

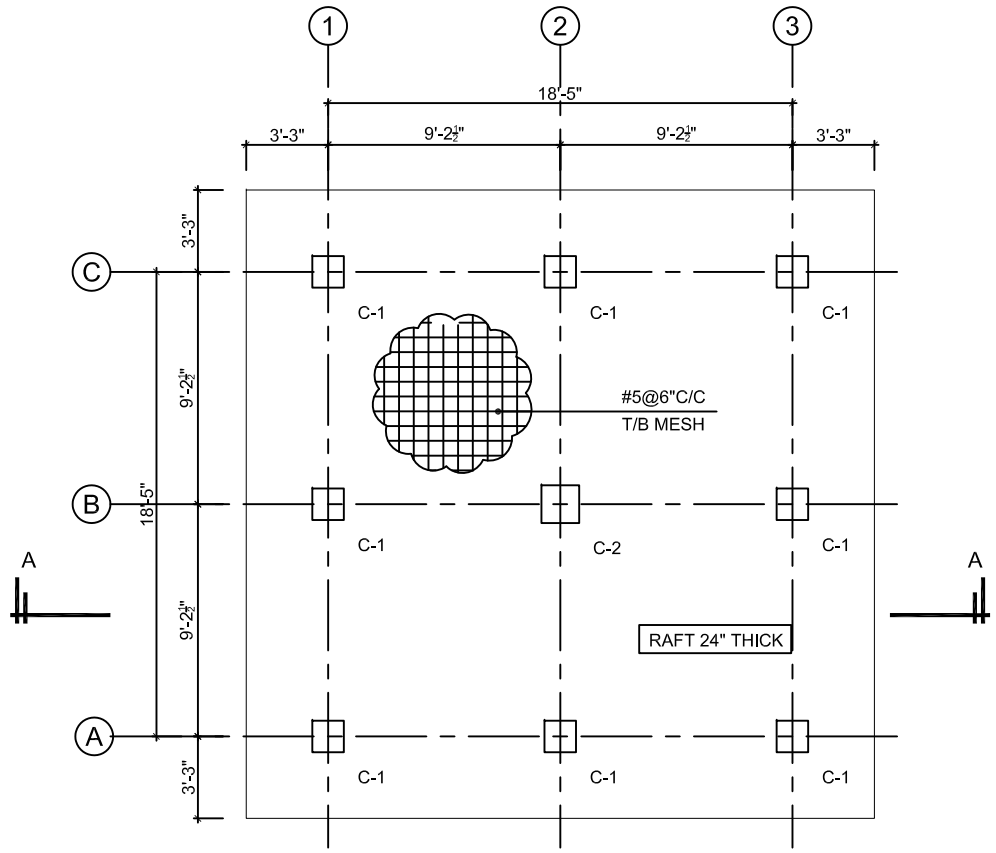
OVERHEAD WATER TANK
(CAPACITY=10,000 GALLONS)
TYPICAL DETAILS (SHEET 2 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

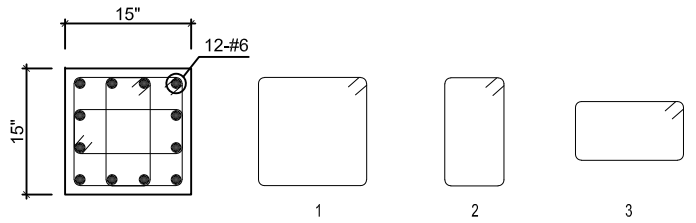
DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE			
CKD.	DATE	DRAWING NO.	REV.
SUBM.	FEB. 2026	156/328/TD/OHWTG02(B)	0



COLUMN LAYOUT PLAN

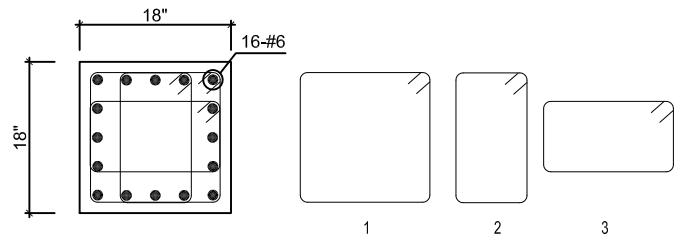


FOUNDATION LAYOUT PLAN



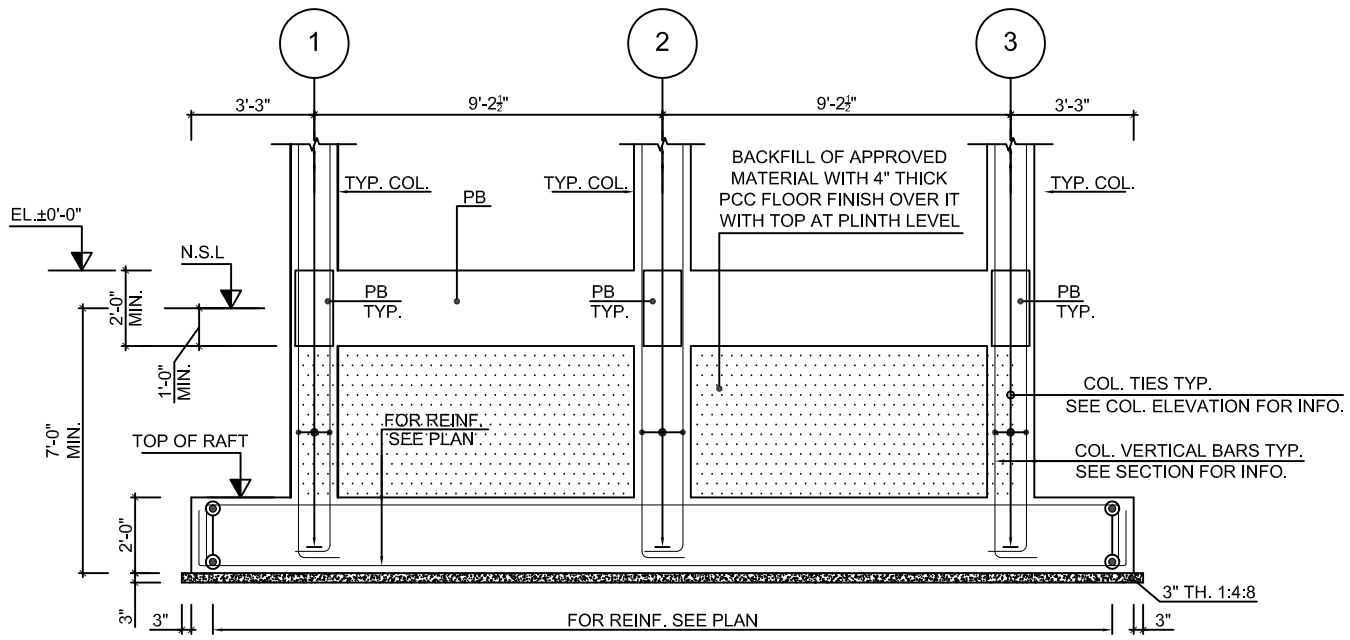
TYP. COLUMN C-1

12-#6 VERTICAL BARS (FROM TOP OF FOOTING UP TO E.L.(+)36'-6")
SEE TYP. COLUMN ELEVATION FOR TIES SPACING PATTERN
S3=#3@4", S4=#3@4½"



TYP. COLUMN C-2

12-#6 VERTICAL BARS (FROM TOP OF FOOTING UP TO E.L.(+)36'-6")
SEE TYP. COLUMN ELEVATION FOR TIES SPACING PATTERN
S3=#3@4", S4=#3@4½"



SECTION A-A
TYPICAL SECTION OF RAFT

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/OHWTG01.
2. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
3. THE FOUNDATION HAS BEEN DESIGNED ON ALLOWABLE BEARING CAPACITY OF 0.75 TON/SFT AT A DEPTH OF 7'-0" BELOW N.S.L.
4. IF COMPETENT BEARING STRATA IS NOT FOUND AT INDICATED DEPTH, THE ENGINEER SHALL BE NOTIFIED FOR HIS PRIOR INSTRUCTIONS.
5. BOTTOM OF FOOTING SHOULD BE PROVIDED 7'-0" BELOW NSL OR FGL WHICH EVER IS LOWER.
6. FOR EL. ±0'-0", REFER MASTER PLAN
7. ALL COLUMNS ARE CENTERED WITH GRIDS UNLESS NOTED OTHERWISE ON PLAN.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

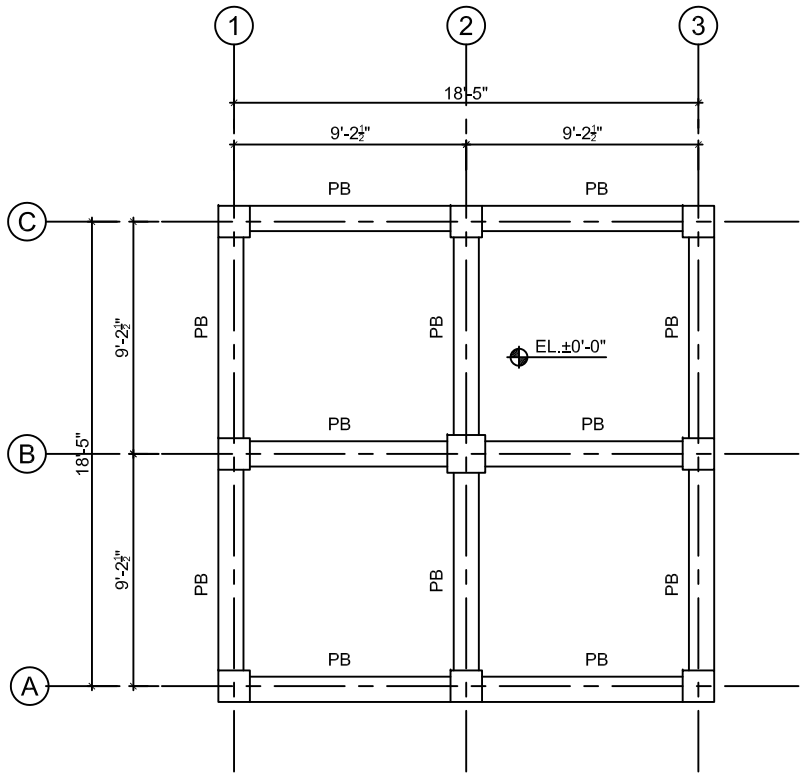
OVERHEAD WATER TANK

(CAPACITY=10,000 GALLONS)

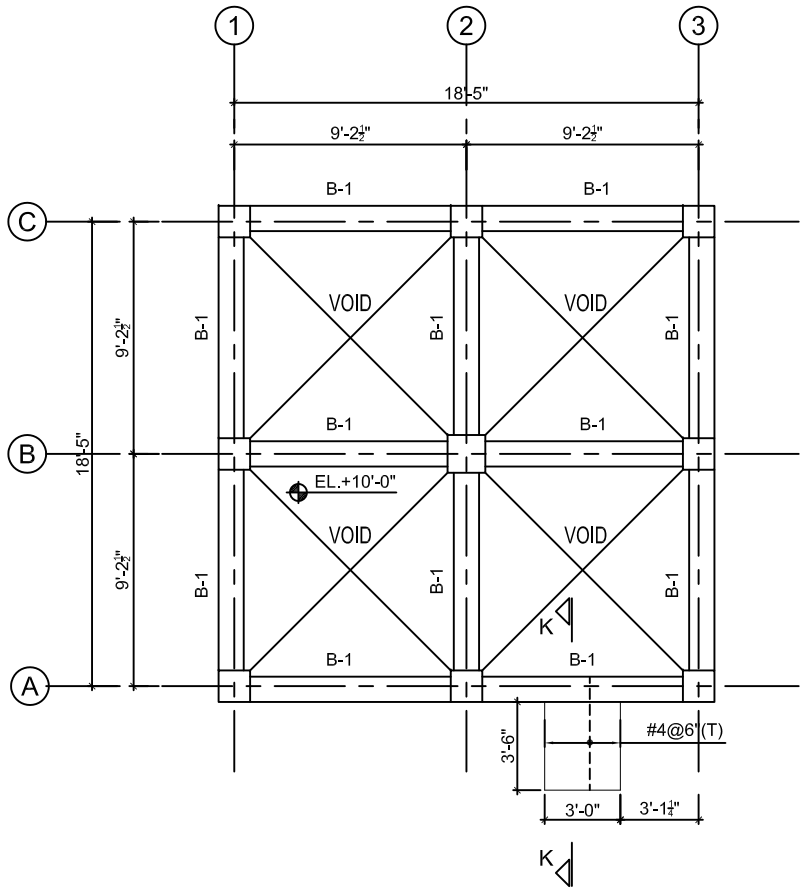
FOUNDATIONS & COLUMNS LAYOUT PLAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

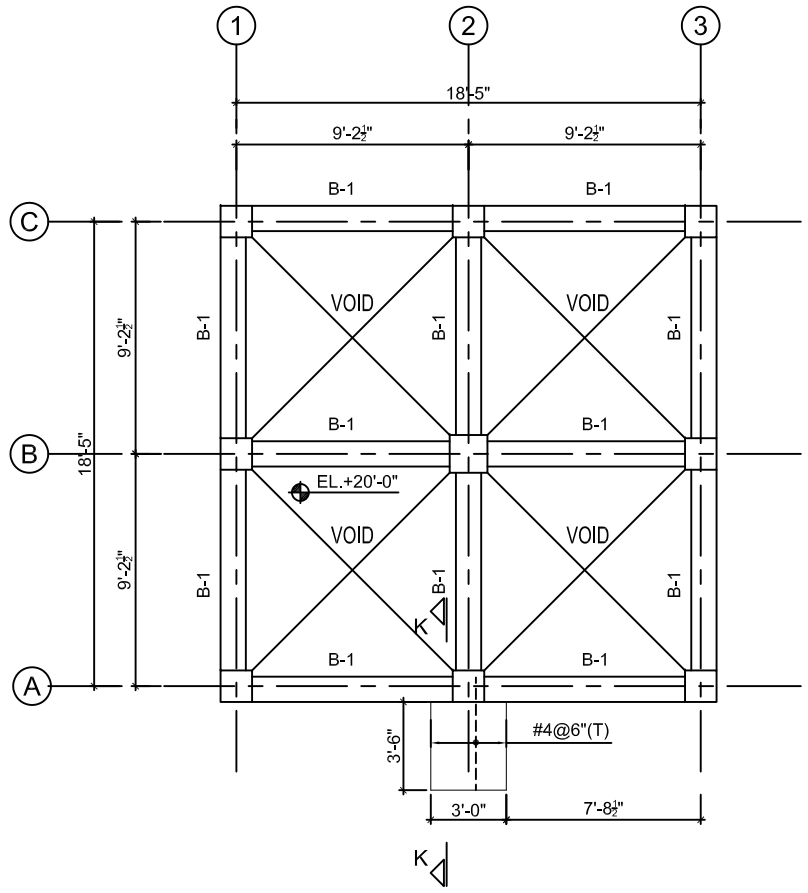
DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB. 2026	156/328/TD/OHWTG03	0
SUBM.			



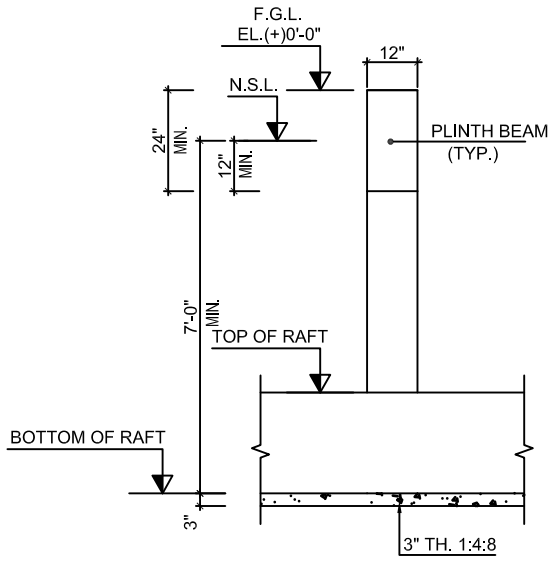
PLINTH BEAM PLAN AT EL.±0'-0"



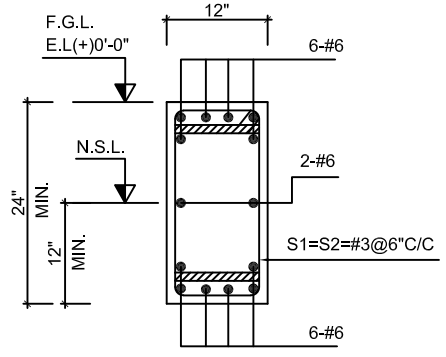
FRAMING PLAN AT EL.+10'-0"



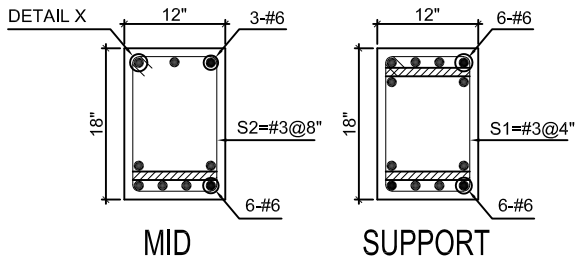
FRAMING PLAN AT EL.+20'-0"



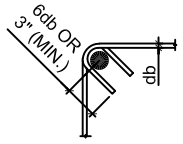
TYP. PLINTH BEAM DETAIL



TYP. PLINTH BEAM SECTION



TYPICAL SEC. OF B-1



DETAIL-X

TYP. 135° HOOK DETAIL
FOR TIES & STIRRUPS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/OHWTG01.
2. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
3. FOR TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/OHWTG02(A) & G02(B).
4. FOR SECTION K-K, REFER DWG. NO. 156/328/TD/OHWTG07.

REFERENCE DRAWINGS		REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

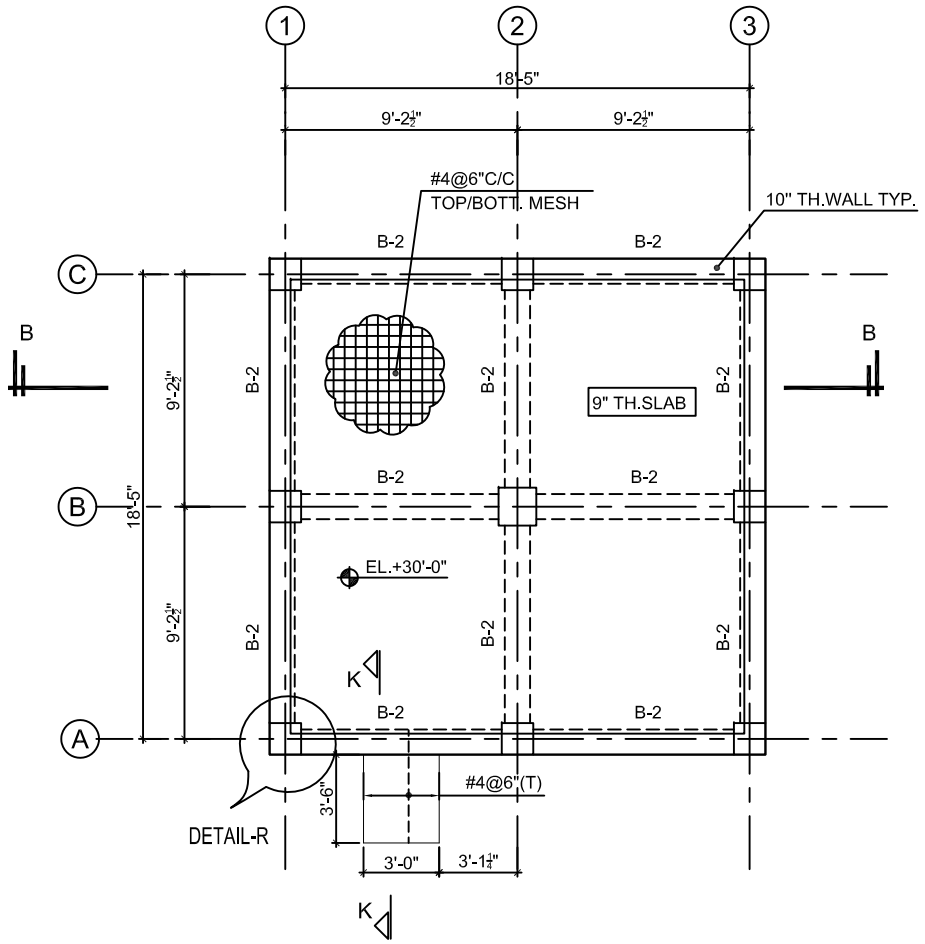
OVERHEAD WATER TANK

(CAPACITY=10,000 GALLONS)

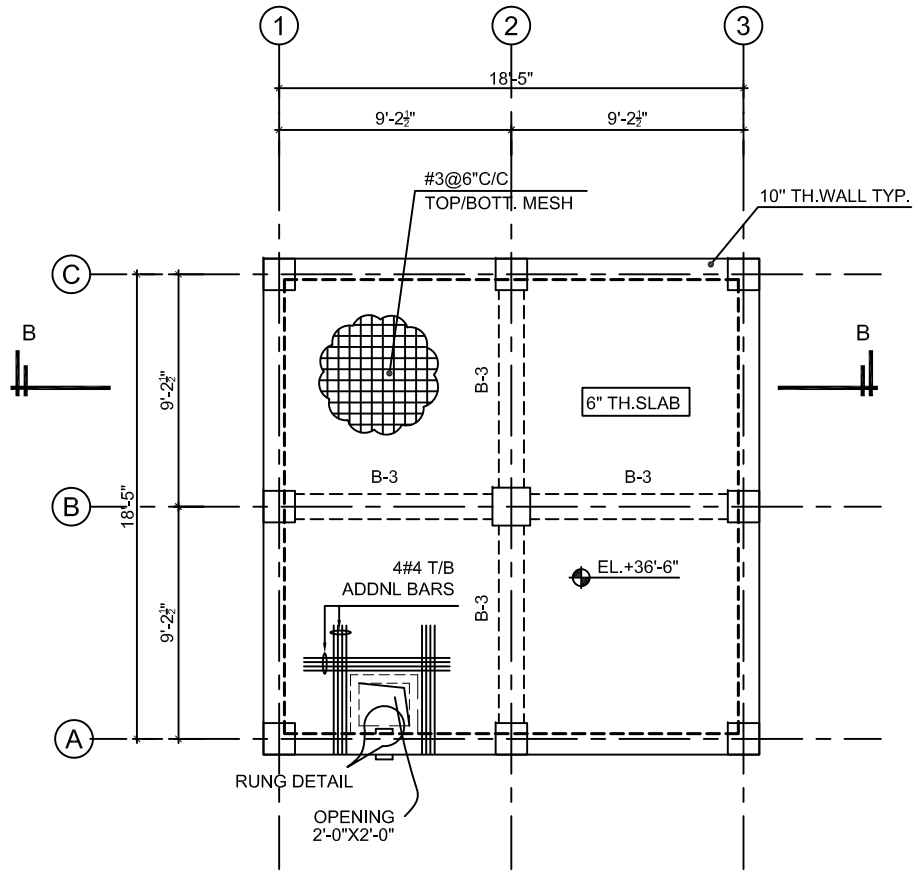
FRAMING PLAN AT EL.+0'-0", 10'-0" & 20'-0"

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

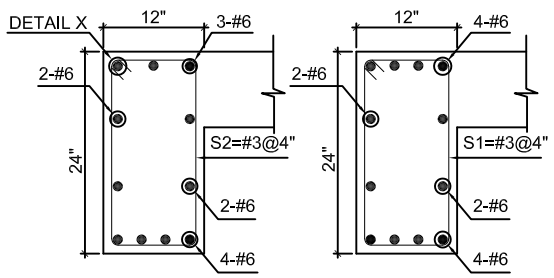
DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB. 2026	156/328/TD/OHWTG04	0
SUBM.			



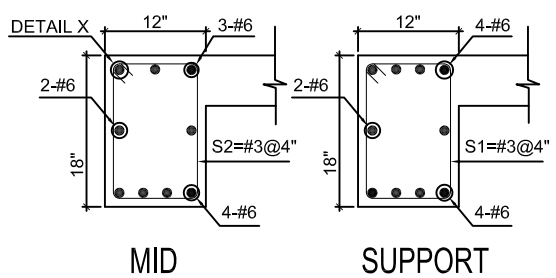
FRAMING PLAN AT EL.+30'-0"
(BOTTOM SLAB OF O.H.W.TANK)



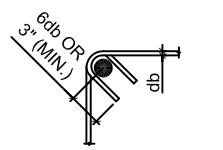
FRAMING PLAN AT EL.+36'-6"
(TOP SLAB OF O.H.W.TANK)



TYPICAL SEC. OF B-2



TYPICAL SEC. OF B-3



DETAIL-X
TYP. 135° HOOK DETAIL
FOR TIES & STIRRUPS

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/OHWTG01.
2. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
3. FOR TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/OHWTG02(A) & G02(B).
4. FOR SECTION K-K, REFER DWG. NO. 156/328/TD/OHWTG07.
5. FOR SECTION B-B, JOINT, RUNGS & OTHER DETAILS, REFER DWG. NO. 156/328/TD/OHWTG06.
6. BOTTOM SLAB OF OVERHEAD WATER TANK IS 9" THICK.

REFERENCE DRAWINGS		REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

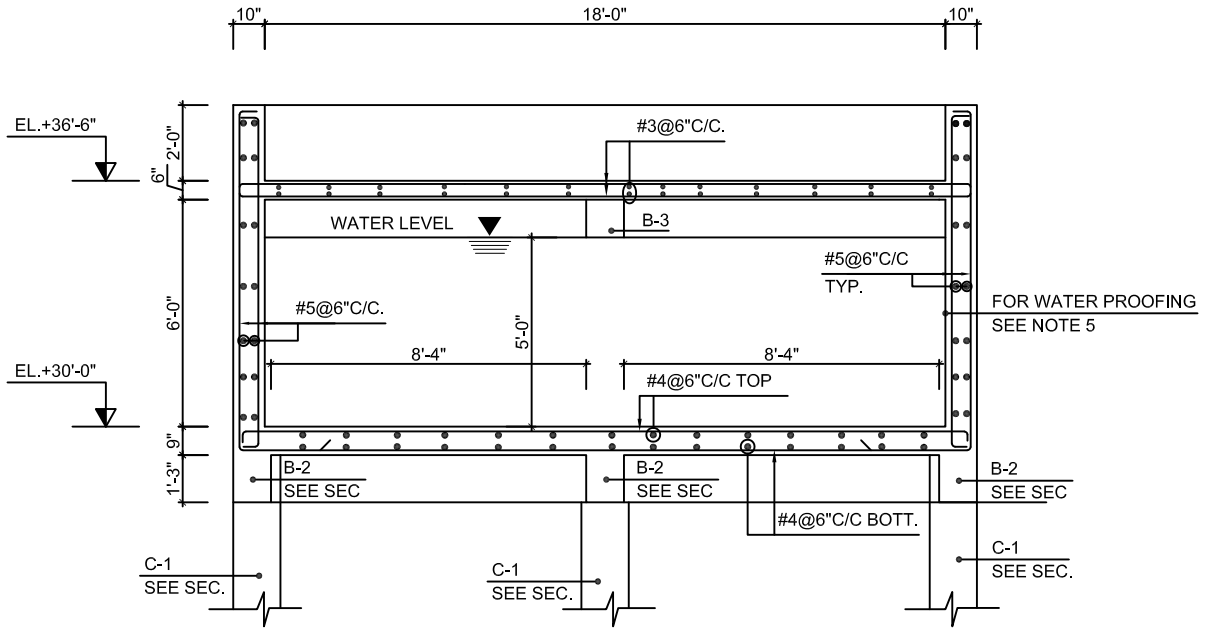
OVERHEAD WATER TANK
(CAPACITY=10,000 GALLONS)

FRAMING PLAN AT EL.+30'-0" & 36'-6"

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE			
CKD.			
SUBM.			

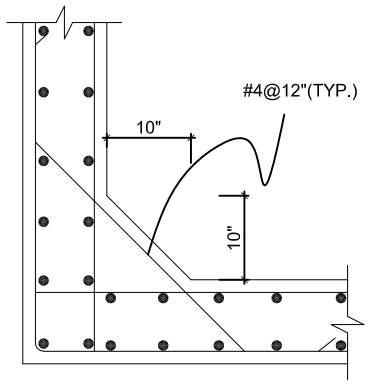
DATE	DRAWING NO.	REV.
FEB. 2026	156/328/TD/OHWTG05	0



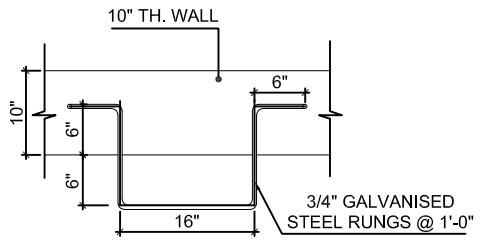
SECTION B-B

NOTES:

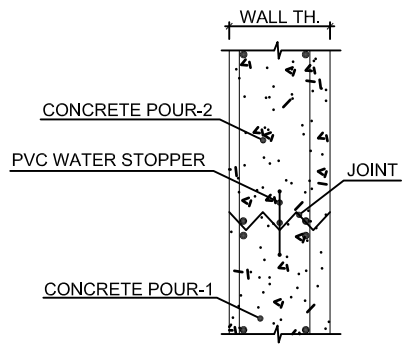
1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/OHWTG01.
2. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
3. FOR TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/OHWTG02(A) & G02(B).
4. TOP SLAB OF OVERHEAD WATER TANK IS 6" THICK.
5. PROVIDE WATER PROOFING PLASTER OF 1½" THICK ON ALL SIDES/FACES OF WATER TANK EXPOSED TO WATER.
6. SITE ENGINEER SHALL FIX THE LOCATION AND ORIENTATION OF CONSTRUCTION JOINTS. THE DETAILS ARE JUST FOR REFERENCE ONLY.



DETAIL-R



RUNG DETAIL



CONSTRUCTION JOINT IN WALLS (TYP.)

GUN AND COUNTRY CLUB

OVERHEAD WATER TANK

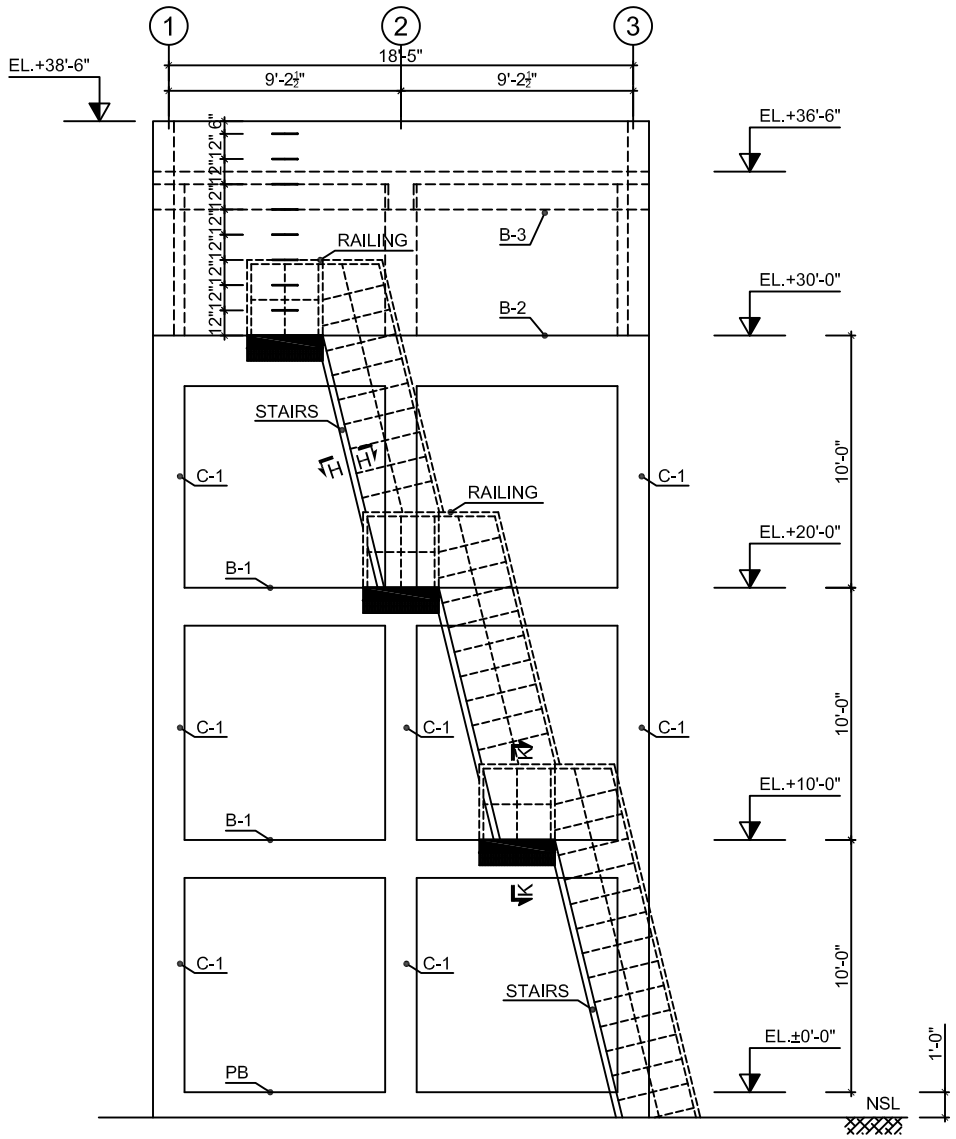
(CAPACITY=10,000 GALLONS)

SECTION B-B & DETAILS

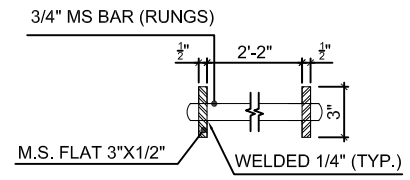
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB. 2026	156/328/TD/OHWTG06	0
SUBM.			

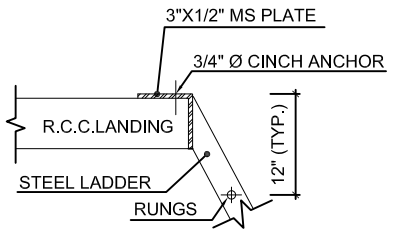
REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



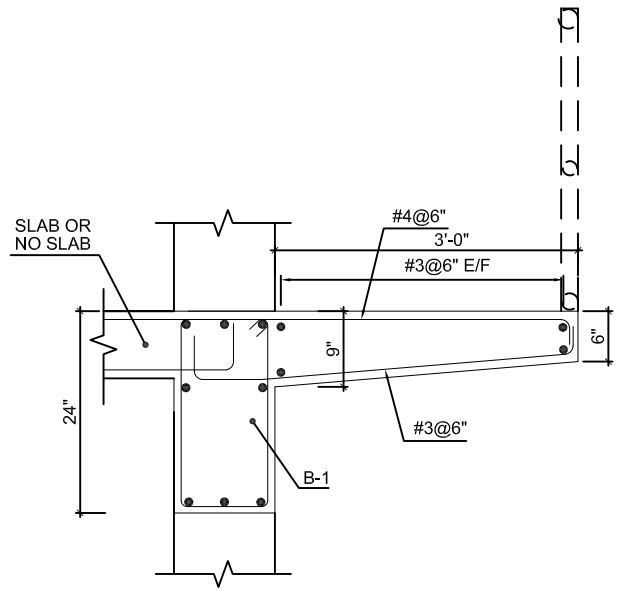
ELEVATION OF TANK



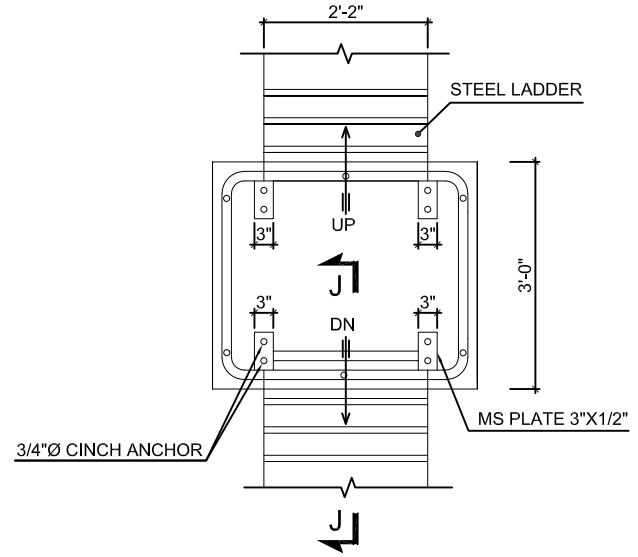
SECTION H-H



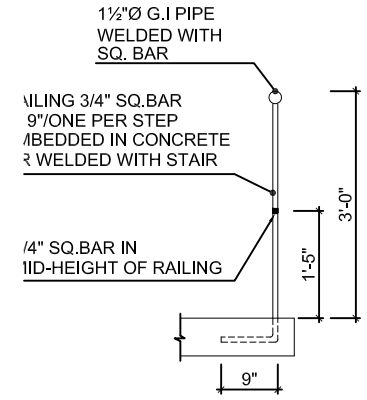
SECTION J-J



SECTION K-K



PLAN OF STAIR LANDING



RAILING DETAIL (TYP.)

NOTES:

1. FOR GENERAL NOTES, REFER DRAWING NO. 156/328/TD/OHWTG01.
2. READ THIS DRAWING IN CONJUNCTION WITH ALL THE RELEVANT PROJECT DWG.
3. FOR TYPICAL DETAILS, REFER DRAWING NO. 156/328/TD/OHWTG02(A) & G02(B).

REFERENCE DRAWINGS		REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

OVERHEAD WATER TANK

(CAPACITY=10,000 GALLONS)

ELEVATION OF O.H.W.TANK & STAIR DETAILS

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB. 2026	156/328/TD/OHWTG07	0
SUBM.			

1. GENERAL

1. READ ALL DRAWINGS IN CONJUNCTION WITH ARCHITECTURAL, GEOTECHNICAL, PLUMBING, MECHANICAL, ELECTRICAL & ANY OTHER RELEVANT DRAWINGS.
2. NOTES GIVEN IN THIS DRAWING ARE APPLICABLE TO ALL DRAWINGS UNLESS MENTIONED OTHERWISE. NOTES WRITTEN ON A DRAWING, SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS-REFERRED.
3. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE SPECIFICATIONS OF THE CONTRACT DOCUMENTS. IN ABSENCE OF ANY SPECIFICATIONS , ALL MATERIALS & WORKMANSHIP SHALL CONFORM TO RELEVANT ACI/BRITISH CODES AND SHALL BE SUBJECTED TO APPROVAL OF THE ENGINEER.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE STRUCTURES DURING CONSTRUCTION. HE SHALL ALSO VERIFY ALL DIMENSIONS AND LEVELS BEFORE EXECUTION OF WORK. ANY DISCREPANCY, ERROR OR OMISSION, IF FOUND, SHALL BE BROUGHT TO THE NOTICE OF THE ENGINEER FOR CORRECTION AND APPROVAL.
5. THE CONTRACTOR SHALL CO-ORDINATE WITH VARIOUS SERVICES DRAWINGS FOR SIZES & LOCATION OF ALL STRUCTURAL MEMBERS, FLOORS,WALLS,OPENINGS, FLOOR FINISHES, PIPES ETC.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE EXECUTION OF DEWATERING SYSTEM WHERE SO REQUIRED DURING CONSTRUCTION.
7. ALL DIMENSIONS AND LEVELS ARE IN FEET & INCHES.
8. DO NOT SCALE THE DRAWINGS. DIMENSIONS, GIVEN ON THE DRAWING, SHALL GOVERN.
9. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL IS TO BE DONE IN ACCORDANCE WITH THE LATEST APPLICABLE ACI/BRITISH SPECIFICATIONS.
10. BACKFILLING AROUND FOUNDATIONS AND WALLS SHALL BE WELL COMPACTED LAYERS NOT EXCEEDING 6 INCHES IN THICKNESS.
11. IT IS STRONGLY RECOMMENDED TO RECONFIRM THE SITE PLAN BEFORE START OF EXECUTION AT SITE.THE SITE SHOULD BE EXAMINED FOR CLEARANCE WITH RESPECT TO LOCAL/SEISMIC HAZARDS.
12. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
13. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
14. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE OWNER AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
15. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/DEVIATIONS MAY LEAD TO REJECTION/REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
16. THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN HIS APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF SHOP DRAWINGS AND BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.

2. FOUNDATIONS

1. FOUNDATION IS DESIGNED FOR MINIMUM ALLOWABLE BEARING CAPACITY OF 0.75 T/SFT AND IS APPLICABLE FOR (B.C) OF 0.75 T/SFT AND ABOVE. THIS VALUE SHOULD BE VERIFIED BY CONTRACTOR BEFORE PLACEMENT OF FOUNDATION. IF THE ACTUAL BEARING CAPACITY IS FOUND DIFFERENT, FOUNDATION DESIGN SHOULD BE REVIEWED BY THE ENGINEER.
2. FOUNDATION SHALL BE PLACED AT MINIMUM DEPTH OF 7'-0" BELOW TOP OF NSL OR FGL WHICH EVER IS LOWER OR AS PER GEOTECHNICAL RECOMMENDATIONS. TOTAL TOLERABLE SETTLEMENT FOR THE FOUNDATIONS WILL BE 1 INCHES.
3. AFTER EXCAVATION F.B.L. ALL FOUNDATIONS SHOULD BE PHYSICALLY EXAMINED BY ENGINEERING GEOLOGIST/GEOTECHNICAL ENGINEER FOR THE CONFIRMATION OF ORIGINAL SOIL/ROCK CONDITIONS.
4. UNDER ANY CIRCUMSTANCES, FOUNDATIONS SHOULD NOT BE LAID UPON ANY TYPES/FORMS OF NATURAL FILL OR SLOPE WASH DEPOSITS.
5. IF THE ORIGINAL SOIL COMPRISES COHESIVE(CLAY-RICH) NON-GRAVELLY AND/OR SLIGHT TO MODERATELY GRAVELLY SOIL(GRAVELS<35%) WITH ABUNDANCE OF FINER(COHESIVE) MATRIX AT F.B.L., SUCH SOILS SHOULD BE REPLACED BY 3FT THICK CUSHION OF E.G.F. OF GRADATION APPROVED BY THE ENGINEER. E.G.F. SHOULD BE PLACED IN THREE EQUAL LAYERS OF 1FT COMPACTED THICKNESS. COMPACTION SHOULD BE CONFIRMED BY IN-SITU F.D.T. PRIOR TO PLACEMENT OF THE NEXT LAYER AND SHOULD NOT BE LESS THAN 95% OF MODIFIED AASHTO DENSITY.
6. RECOMMENDED Q(NET ALLOWABLE) FOR THE DESIGN OF FOUNDATIONS ON SUCH E.G.F. SHOULD BE 0.75 T/SFT.
7. HOWEVER, IF SOUND BEDROCK CONDITIONS (WITH THE EXCEPTION OF SHALE & CLAYSTONE) ENCOUNTERED AT F.B.L., THE FOOTINGS SHOULD BE EXTENDED TO ENSURE 1.5FT EMBEDMENT DEPTH IN SOUND BEDROCK CONSIDERING Q(ALLOWABLE) 3.00T/SFT.
8. DETAILED GEOTECHNICAL INVESTIGATIONS SHOULD BE CARRIED OUT IF BUILDING IS CLOSE TO A SLOPE, SLOPE STABILITY STUDIES TO BE CARRIED OUT AND APPROPRIATE MEASURES TO BE ADOPTED EVALUATION TO BE MADE AS TO PRESENCE OF FILLS,LIQUIFIABLE SOILS ETC.
9. ALL FOUNDATIONS SHALL BE PLACED ON FIRM BEARING STRATA.IF ACCEPTABLE BEARING STRATA IS NOT FOUND AT INDICATED DEPTHS OF FOUNDATION, THE ENGINEER SHALL NOTIFY IN WRITING FOR HIS INSTRUCTIONS.
10. THE BED OF FOUNDATION SHOULD BE THOROUGHLY COMPACTED PRIOR TO LAYING FOUNDATION. ANY LOOSE,WET,SOFT OR OVER-MOIST SOIL, ORGANIC SOILS, PEAT/FAT CLAY SHOULD BE REMOVED AND REPLACED WITH WELL-COMPACTED ENGINEERED GRANULAR FILL OF GRADATION APPROVED BY THE ENGINEER AND COMPACTED TO 95% MODIFIED AASHTO DENSITY.
11. THE FOUNDATION BED SOIL SHOULD BE PROTECTED FROM INGRESS OF MOISTURE FROM ANY SOURCE BY PROVIDING ADEQUATE SURFACE DRAINAGE SYSTEM AND ENSURING LEAK PROOF JOINTING OF SEWERAGE AND WATER SUPPLY LINES. EXCESSIVE AND UNCONTROLLED WATERING FOR CURING AND COMPACTION OF BACKFILL MATERIAL SHOULD BE AVOIDED.
12. ANY SPRINGS/SEEPS ENCOUNTERED NEAR OR AT THE FOUNDATION LEVEL WITHIN THE BUILDING FOOT PRINTS SHOULD BE ADDRESSED PROPERLY BY ADOPTING SUITABLE DE-WATERING MEASURES.
13. THE EXCAVATION LINES AND SLOPES ARE NOT SHOWN ON THE DRAWINGS. IT IS CONTRACTOR'S RESPONSIBILITY TO MAKE THE EXCAVATION ON STABLE SLOPE AND MAINTAIN THE STABILITY OF THE CUT SLOPES.
14. AS AND WHEN REQUIRED APPROPRIATE SLOPE PROTECTION SHOULD BE PROVIDED AROUND THE PROPOSED BUILDING.
15. IF NEAR SLOPE,THE STRUCTURE SHOULD BE SET BACK BY A MINIMUM DISTANCE EQUAL TO 3 TIMES OF THE FOUNDATION WIDTH.
16. TO ENSURE UNIFORM ENGINEERING BEHAVIOR OF SUB-GRADE, LITHOLOGIC HOMOGENEITY OF SUCH SOILS SHOULD BE CAREFULLY EXAMINED. ANY LARGE SIZE ROCK FRAGMENTS SUCH AS ERRATICS, BOULDERS, LARGE COBBLES AND ANY OTHER ROCK FRAGMENTS HAVING DIMENSIONS EXCEEDING 6 IN. SHOULD BE REMOVED UNDERNEATH THE FOUNDATIONS AND ITS CLOSE (<1.5 FT) VICINITY.
17. TERMITE CONTROL TREATMENT SHALL BE CARRIED OUT AS PER SPECIFICATIONS.
18. NO FOOTING SHALL BE PLACED ON FILL. HOWEVER, AREAS WHERE FILLING BELOW THE FOOTINGS BECOMES INEVITABLE OR, OVER-EXCAVATION, IF ANY, SHALL BE FILLED WITH ENGINEERED GRANULAR FILL AS PER GEOTECHNICAL RECOMMENDATIONS OR CONCRETE CLASS 'E'. ALL THIS TO BE DONE WITH PRIOR APPROVAL OF THE ENGINEER.
19. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.
20. EXCAVATIONS ADJACENT TO EXISTING STRUCTURES AND/OR UNDERGROUND SERVICES SHALL BE MADE BY HAND.

3. REINFORCED CONCRETE

1. STRUCTURAL DESIGN IS BASED ON THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE OF AMERICAN CONCRETE INSTITUTE (ACI 318-02).
2. ALL STRUCTURAL CONCRETE SHALL CONFORM TO AMERICAN CONCRETE INSTITUTE (ACI) REQUIREMENTS.
3. CONCRETE MIX TO BE DESIGNED ON THE BASIS OF ACI 211 OR EQUIVALENT. TRIAL STRENGTH RESULTS TO BE SUBMITTED BY THE CONTRACTOR FOR REVIEW AND APPROVAL BEFORE CONCRETING.
4. NO CONCRETING SHALL BE CARRIED OUT UNTIL PERMISSION IS GIVEN IN WRITING.
5. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & AS WRITTEN IN SPECIFICATIONS AND THE MINIMUM CYLINDER CRUSHING STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	MIN. CYLINDER CRUSHING STRENGTH AT 28 DAYS (psi).
A	4,000
B	3,000
C	2,400
D	1,200
E	800

6. CLASS OF CONCRETE FOR DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE AS FOLLOWS UNLESS NOTED OTHER WISE:

COMPONENT	CONCRETE CLASS
FOUNDATION,COLUMNS & WALLS	CLASS 'A'
SLABS & BEAMS	CLASS 'A'
PCC STEPS.	CLASS 'D'
LEAN / BLINDING CONCRETE	CLASS 'E'

7. ORDINARY PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETE WORKS.
8. AN INTEGRAL WATER PROOFING AGENT SHALL BE USED IN CONCRETE THAT IS CONSTANTLY OR INTERMITTENTLY IN CONTACT WITH WATER AS PER MANUFACTURER'S RECOMMENDATIONS (GENCON GENPRUF RMC OR PENETRON ADMIX OR EQUIVALENT).
9. WATER CEMENT RATIO FOR WATERTIGHT STRUCTURAL CONCRETE SHALL NOT EXCEED 0.45 AND 0.5 FOR ALL OTHER STRUCTURAL CONCRETE.
10. MINIMUM CEMENT CONTENT FOR STRUCTURAL CONCRETE SHALL NOT BE LESS THAN 356 Kg./cum. OF CONCRETE.
11. ALL DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315, ACI-318 & ACI-350R.

4. SHORING AND BRACING

1. SHORE & BRACE ALL PARTS OF THE STRUCTURE DURING CONSTRUCTION, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE SLOPES AND SHALL PROVIDE SHORING AND BRACING DURING EXCAVATION AND CONSTRUCTION, WHEREVER AND WHENEVER REQUIRED.
3. SEQUENCE OF REMOVAL OF FORMWORK SHALL BE APPROVED BY THE ENGINEER.
4. AT LEAST ONE LOWER FLOOR SHALL REMAIN PROPPED UNTIL THE UPPER FLOOR IS CAST AND CURED.

5. REINFORCING STEEL

1. ALL REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM-A615 GRADE 60 HAVING A MINIMUM YIELD STRENGTH OF 60,000 PSI. FOR STIRRUPS, TIES AND #3 BARS USE ASTM A615, GRADE 40 HAVING MINIMUM YIELD STRENGTH OF 40,000 PSI.
2. THE ACTUAL YIELD STRENGTH BASED ON MILL TESTS DOES NOT EXCEED THE SPECIFIED STRENGTH BY MORE THAN 18,000 PSI (RETESTS SHALL NOT EXCEED THIS VALUE BY MORE THAN AN ADDITIONAL 3000 PSI)
3. THE RATIO OF THE ACTUAL ULTIMATE TENSILE STRENGTH TO THE ACTUAL TENSILE YIELD STRENGTH IS NOT LESS THAN 1.25
4. CLEAR COVER TO REINFORCEMENT SHALL BE: (inches)

STRUCTURAL ELEMENT	COVER (INCHES)
FOOTINGS	2"
BEAMS	1½"
COLUMNS	1½"
SLABS	3/4"
BASEMENT WALLS	2" - EARTHSIDE FACE 3/4" - INNER FACE
WALLS EXPOSED TO WATER	2½" - WATERSIDE FACE 3/4" - OTHER/OUTER FACE

5. DEVELOPMENT & SPLICE LENGTHS FOR FOUNDATIONS, BEAMS & SLABS (FOR fy=60 ksi and fc'= 4 ksi)

BAR DIA	#3*	#4	#5	#6	#7	#8
DEVELOPMENT LENGTH ℓ_d (Inches) (BOTTOM BARS)	12	23	28	34	48	55
SPLICE LENGTH (Inches) (BOTTOM BARS)	16	30	37	44	63	72
DEVELOPMENT LENGTH ℓ_d (Inches) (TOP BARS)	16	28	36	43	63	72
SPLICE LENGTH (Inches) (TOP BARS)	21	37	46	55	82	94

*-fy=40 ksi FOR #3 BAR.

6. DEVELOPMENT & SPLICE LENGTHS FOR COLUMNS (FOR fy=60 ksi and fc'= 4 ksi)

BAR DIA	#3*	#4	#5	#6	#7	#8
DEVELOPMENT LENGTH ℓ_d (Inches)	12	23	28	34	48	55
SPLICE LENGTH (Inches)	16	30	37	44	63	72

*-fy=40 ksi FOR #3 BAR.

- THE LOCATION OF LAPS SHOWN ARE INDICATED IN TYPICAL ELEVATIONS OF BEAMS & COLUMNS, AND MAY BE ELIMINATED.
- LAPS (IF REQUIRED.) SHALL BE PROVIDED AT LOCATION SHOWN ON THE TYPICAL ELEVATIONS USING MAXIMUM AVAILABLE LENGTH.
- SPLICE LENGTH = $1.3x\ell_d$
- WHERE TWO DIFFERENT DIAMETER BARS SPLICING WITH EACH OTHER, SPLICE LENGTH OF LARGER BAR DIAMETER SHALL BE PROVIDED.
- LAP SPLICE ARE NOT TO BE USED:
  - WITHIN JOINTS
  - WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH FROM THE FACE OF THE JOINT.
- CURTAILMENT LENGTH SHOULD BE EXTEND UPTO L/16,12db OR d, (WHICHEVER GREATER) BEYOND L/3, WHERE: L-GREATER CLEAR SPAN, db-DIAMETER OF BAR,d-EFFECTIVE DEPTH
- THE FIRST HOOP SHALL BE LOCATED NOT MORE THAN 2" FROM THE FACE OF THE SUPPORTING MEMBER.

5. REINFORCING STEEL (CONTINUED)

7. 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.
8. LINTELS ARE EXTENDED AT 9 (INCHES) FROM BOTH SIDES OF OPENING.
9. PROVIDE 135° HOOK IN ADJACENT STIRRUPS ON ALTERNATE SIDES.

6. CONCRETE CONSTRUCTION

1. ALL STRUCTURAL SURFACES, AGAINST WHICH EARTH IS TO BE FILLED, SHALL BE COATED WITH TWO COATS OF HOT BITUMEN OF 10/20 GRADE AT THE RATE OF 0.2 lbs/ft /coat.
2. PROVIDE POLYTHENE SHEET OVER TWO COATS OF HOT BITUMEN AT TOP OF PLINTH BEAM/DPC FOR EXTERIOR WALLS.
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.
4. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, BLOCKS, etc. SHOULD BE AVOIDED ON SLAB PANELS.
5. UNLESS OTHERWISE NOTED IN PLANS OR SPECIFICATIONS, CAMBER ALL R.C.C. BEAMS AT LEAST 3/8" FOR EVERY 13'-0" OF CLEAR SPAN EXCEPT CANTILEVERS WHICH SHALL BE 2" FOR EVERY 10'-0" OF CLEAR SPAN OR AS APPROVED BY ENGINEER. ALL CAMBERING WORK SHOULD BE DONE WITH PRIOR APPROVAL OF ENGINEER.
6. UNLESS OTHERWISE NOTED IN PLANS OR SPECIFICATIONS, CAMBER ALL R.C.C. SLABS AT LEAST 5/16" PER 10'-0" OF SHORTER SPAN AND 3/16" FOR EVERY 6'-6" OF SLABS CANTILEVER SPAN OR AS APPROVED BY ENGINEER. ALL CAMBERING WORK SHOULD BE DONE WITH PRIOR APPROVAL OF ENGINEER.

7. BLOCK WORK

1. ALL BLOCK WORK SHALL CONFORM TO SPECIFICATIONS GIVEN IN THE CONTRACT DOCUMENT.
2. ALL BLOCK SHALL BE SOUND, HARD AND OF UNIFORM SIZE, COLOUR AND TEXTURE. DIMENSIONAL VARIATION IN SIZES SHALL NOT EXCEED 1/8". BLOCKS SHOULD BE IN ACCORDANCE WITH SPECIFICATIONS AND SHOULD CONFIRM TO ASTM C129 FOR NON-LOADBEARING CONCRETE MASONRY UNITS.
3. ALL BLOCK WORK SHALL BE ERECTED PLUMB AND TRUE TO LINE AND LEVEL. THE MAXIMUM VARIATION IN ANY STOREY HEIGHT OR ANY LENGTH OF WALL SHALL BE 1/8" IN 10'-0".
4. MORTAR USED IN MASONRY CONSTRUCTION SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF NOT LESS THAN 12 MPa (1800Psi) AND SHALL CONFORM TO ASTM C270.
5. COMPRESSIVE STRENGTH OF BLOCK MASONRY AVERAGE OF 5 UNITS AT 28 DAYS SHALL NOT BE LESS THAN AS SPECIFIED IN SPECIFICATION AND SHALL CONFORM TO RELEVANT ASTM STANDARD.
6. ALL DESIGN, DETAILING, MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH RELEVANT ACI, ASTM, AND UBC CODES AND STANDARDS.
7. BLOCKS SHOULD BE SOAKED WITH WATER PROPERLY BEFORE USE.
8. VERTICAL JOINTS SHOULD BE STAGGERED.
9. ALL MASONRY WALLS SHALL BE ANCHORED TO STRUCTURAL FRAME WORK AS INDICATED ON THE DRAWINGS.

8. CONSTRUCTION JOINTS

1. JOINTS, NOT SHOWN ON THE DRAWING, SHALL BE SO MADE AND LOCATED AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL NEED PRIOR APPROVAL OF THE ENGINEER. THEY SHALL BE LOCATED NEAR THE MIDDLE OF THE SPANS OF SLAB & BEAMS. JOINTS IN WALLS & COLUMNS SHALL BE AT THE UNDER-SIDE OF FLOORS, SLABS OR BEAMS AND AT THE TOP OF FOOTINGS OR FLOOR SLABS.
2. JOINTS SHALL BE PERPENDICULAR TO MAIN REINFORCEMENT. ALL REINFORCING STEEL SHALL BE CONTINUED ACROSS THE JOINTS.
3. JOINTS IN BASE SLAB & WALLS AND ROOF SLAB, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS SHALL BE BORNE BY THE CONTRACTOR. BEAMS & BRACKETS SHALL BE PLACED AT THE SAME TIME AS SLABS.

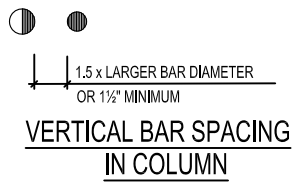
9. ELECTRICAL CONDUITS

1. CONDUITS, FOR ELECTRICAL WORKS, SHALL BE PLACED WITHIN THE REINFORCED CONCRETE. THEY SHALL BE PLACED WITHIN THE MIDDLE THIRD OF THE SECTION IN BEAMS AND WITHIN THE MIDDLE HALF OF THE THICKNESS IN SLABS.SPACING BETWEEN PARALLEL CONDUITS SHALL NOT BE LESS THAN 6 INCHES.

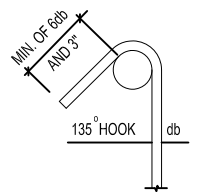
10. SEISMIC & LOADING PARAMETERS

1. THE FOLLOWING ARE SEISMIC PARAMETERS ASSUMED IN THE STRUCTURAL DESIGN (BCP-SP-2007)

SEISMIC ZONE FACTOR	=	ZONE 2B
WITH MAXIMUM PGA VALUE	=	0.16g to 0.24g
SEISMIC ZONE FACTOR	=	0.2
IMPORTANCE FACTOR (I)	=	1.00
SOIL PROFILE TYPE (STYP)	=	SD (STIFF SOIL PROFILE)
CT VALUE	=	0.030



VERTICAL BAR SPACING IN COLUMN



STIRRUPS/TIES HOOKS DETAIL

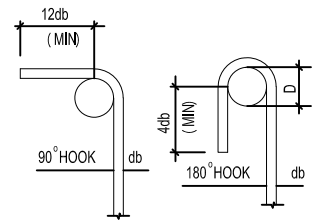
LEGEND

MS	MILD STEEL
PVC	POLYVINYL CHLORIDE
C.G.I	CORRUGATED GALVANIZED IRON
G.I	GALVANIZED IRON
SQ.	SQUARE
C.Jt	CONSTRUCTION JOINT
T&B	TOP AND BOTTOM
EF	EACH FACE
BF	BOTH FACES
∅/db/#	DIAMETER OF BAR
@	AT THE RATE OF
B	BOTTOM
C/C	CENTER TO CENTER
B.W	BOTHWAYS
E.L.	STRUCTURAL ELEVATION
EQ.	EQUAL
F.F.L	FINISH FLOOR LEVEL
F.G.L.	FINISH GROUND LEVEL
F.B.L.	FOUNDATION BED LEVEL
N.S.L.	EXISTING NATURAL SURFACE LEVEL
N.T.S.	NOT TO SCALE
ST.	STIRRUPS
T	TOP
TYP.	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
N.T.S.	NOT TO SCALE
⊕	LEVEL ON PLAN
℄	CENTER LINE

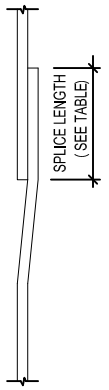
HOOK LENGTH FOR MAIN BARS		
BAR DIA	4db	12db
#3	2 1/2"	4 1/2"
#4	2 1/2"	6"
#5	2 1/2"	7 1/2"
#6	3"	9"

HOOK LENGTH FOR STIRRUPS/TIES	
BAR DIA	6db
#3	3"
#4	3"
#5	3 3/4"
#6	4 1/2"

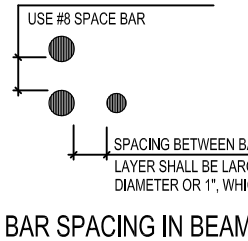
MINIMUM DIAMETERS OF BEND 'D' FOR STANDARD HOOKS	
BAR DIA.	MIN. DIA.
#3 THR. #8	6db
#9 THR. #11	8db
#14 THR. #18	10db



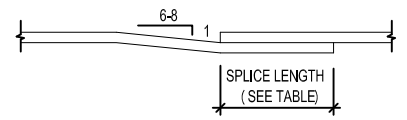
MAIN BARS HOOKS DETAIL



COLUMN SPLICE (TYP.)



BAR SPACING IN BEAM



BEAM SPLICE (TYP.)

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

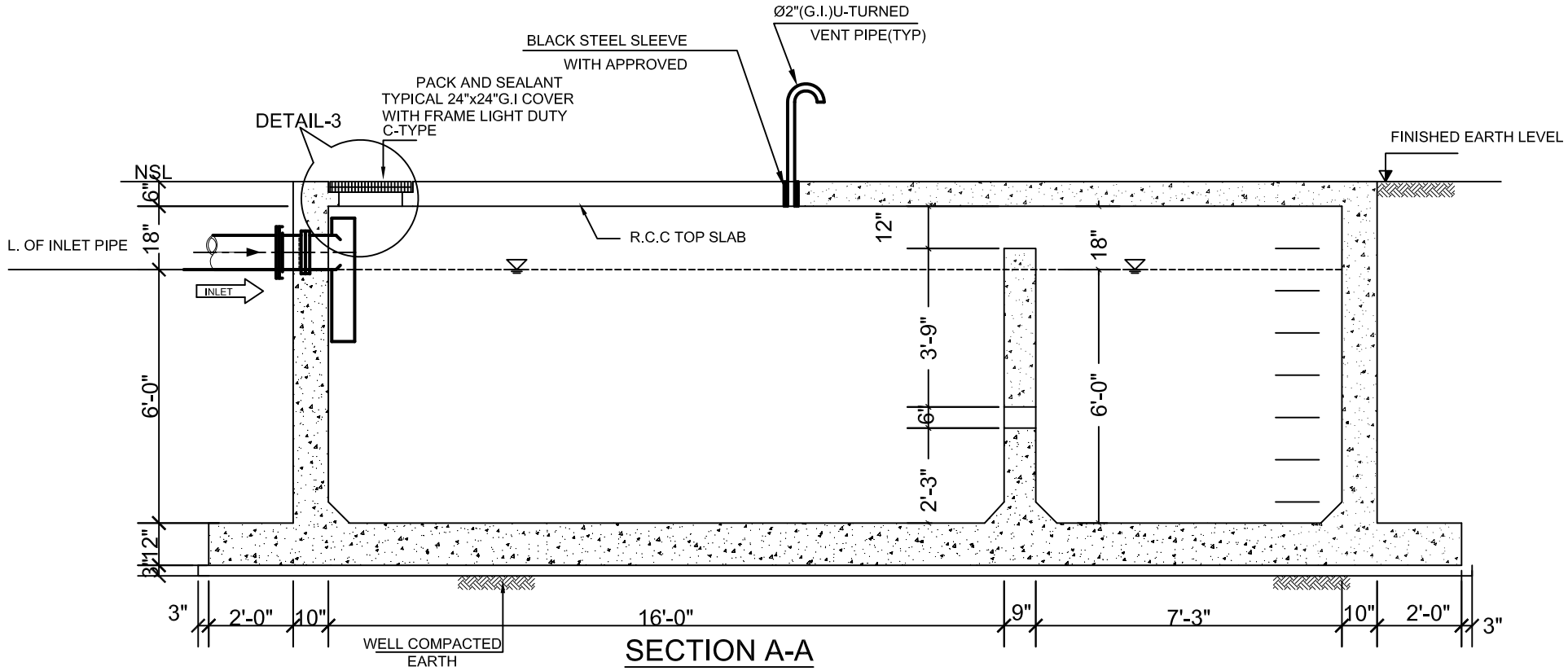
SEPTIC TANK

(23'-3"x12'-0"x6'-0")

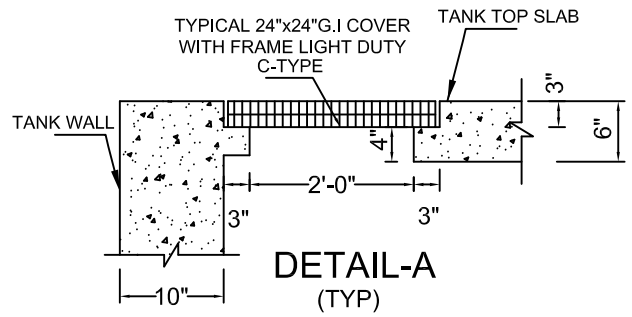
GENERAL NOTES

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

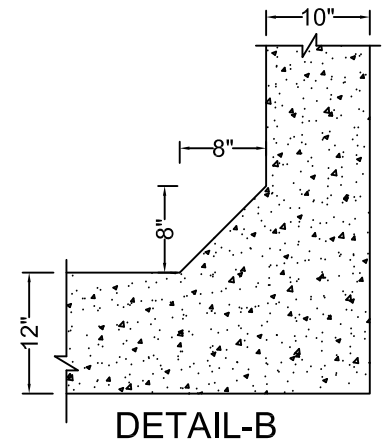
DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB. 2026	156/328/TD/STG01	0
SUBM.			



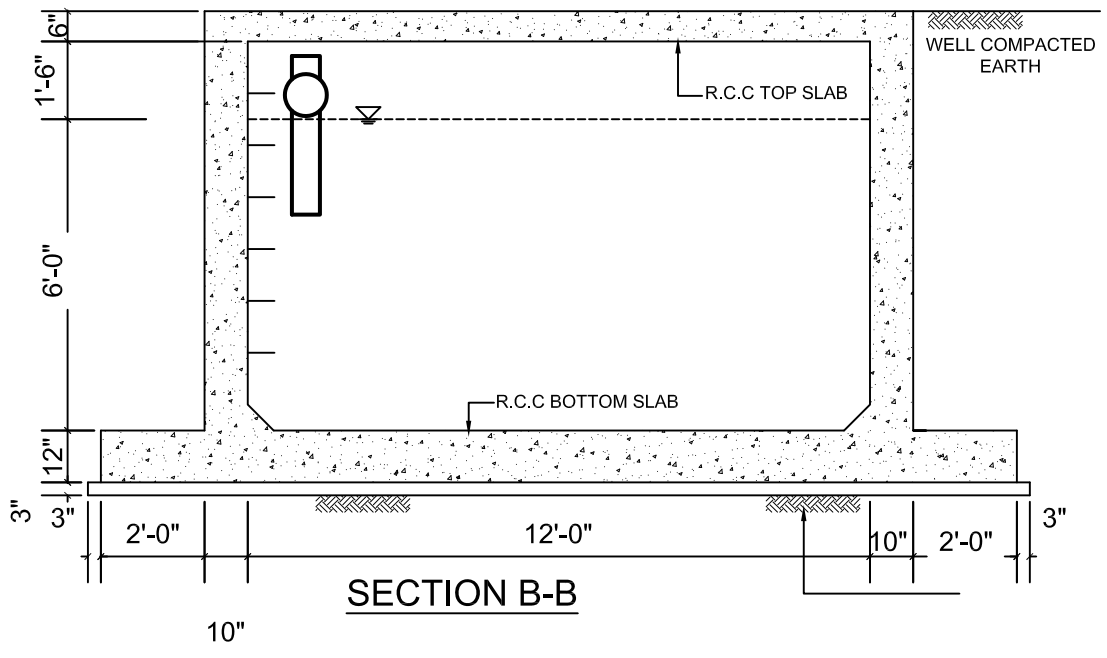
SECTION A-A



DETAIL-A
(TYP)



DETAIL-B
(TYP)



SECTION B-B

NOTES

1- FOR GENERAL NOTES REFER DWG. NO.156/328/TD/STG01.
2- READ THIS DRAWING IN CONJUNCTION WITH ALL RELEVANT PROJECT DRAWINGS.
3- NO VEHICLE SHOULD BE ALLOWED ON THIS TANK.
4- TANK HAS BEEN DESIGNED ON ASSUMED BEARING CAPACITY OF 0.75 T/SFT.
5- PROPER WATERPROOFING WORKS OF TANK SHOULD BE CARRIED OUT AT SITE.
6- NO BACKFILL AGAINST TANK WALL SHOULD BE DONE ALSO TANK SHOULD NOT BE FILLED WITH WATER UNTIL TOP SLAB IS PROPERLY CAST & CURED.
7- HANGER BARS ARE AT #3@12" C/C.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

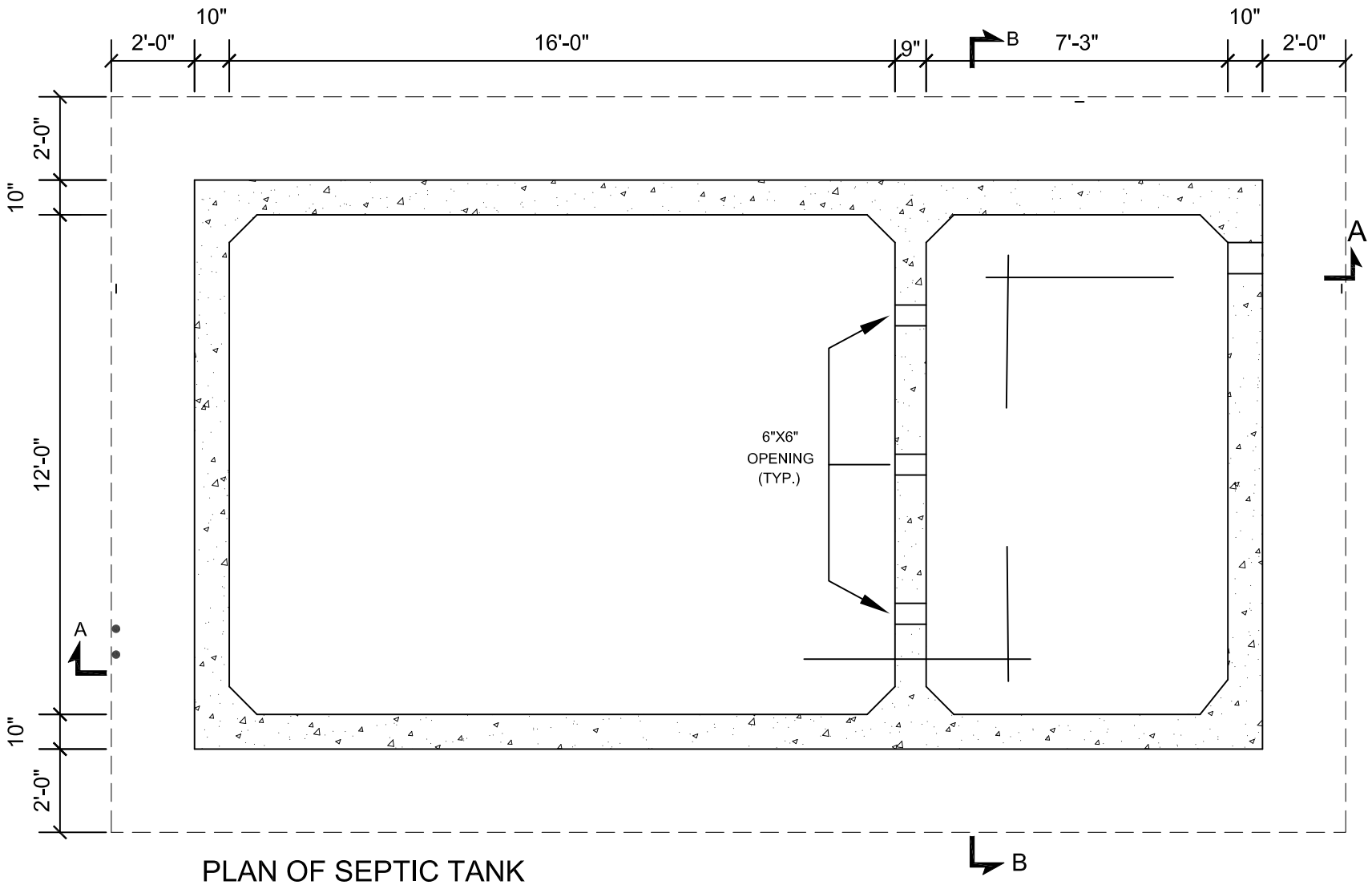
GUN AND COUNTRY CLUB

SEPTIC TANK

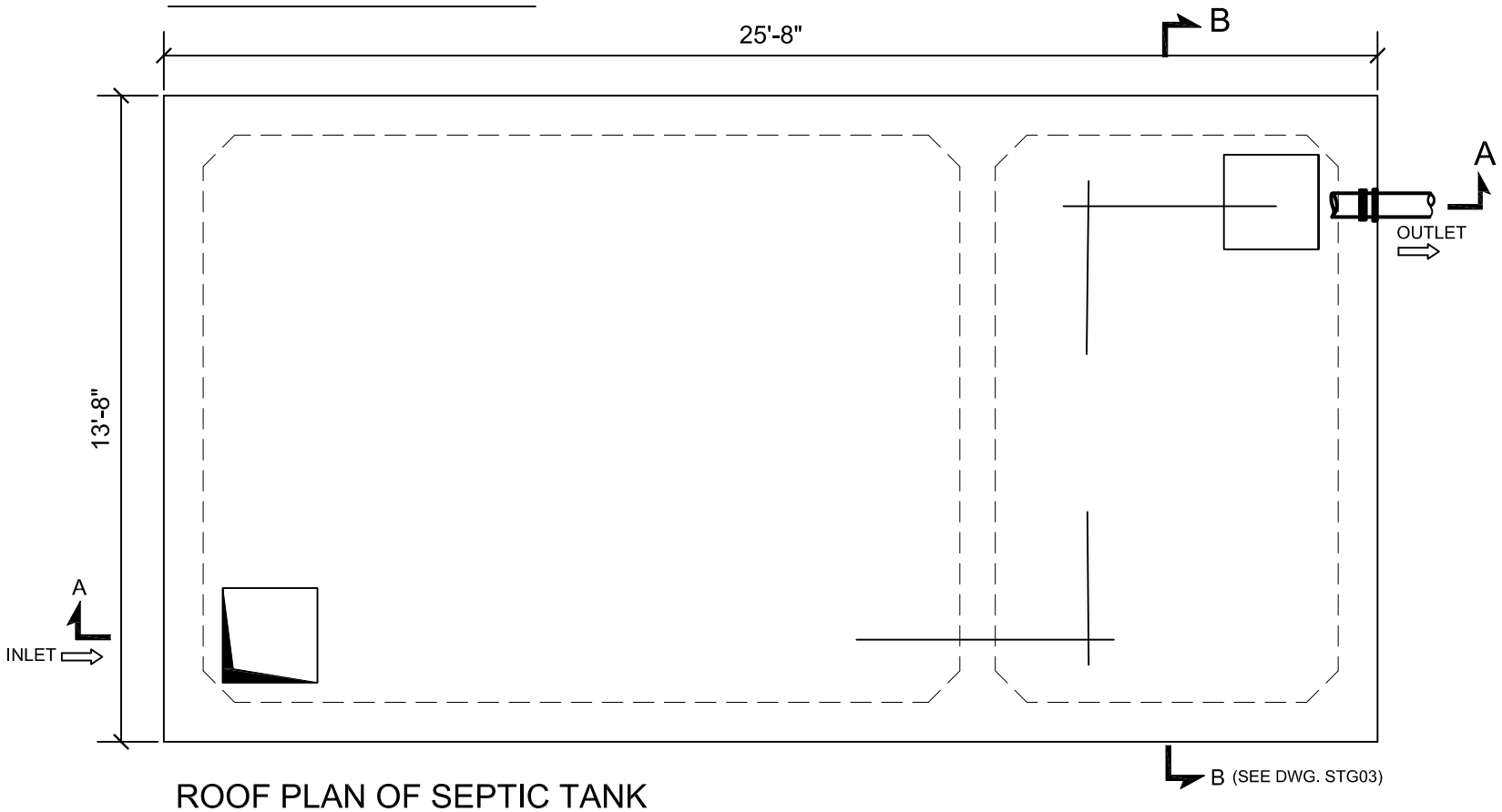
(23'-3"x12'-0"x6'-0")
REINFORCEMENT DETAILS
SECTION AA,BB & DETAILS

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

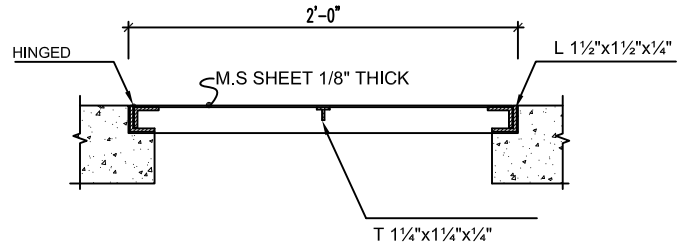
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DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB. 2026	156/328/TD/STB02	0
SUBM.			



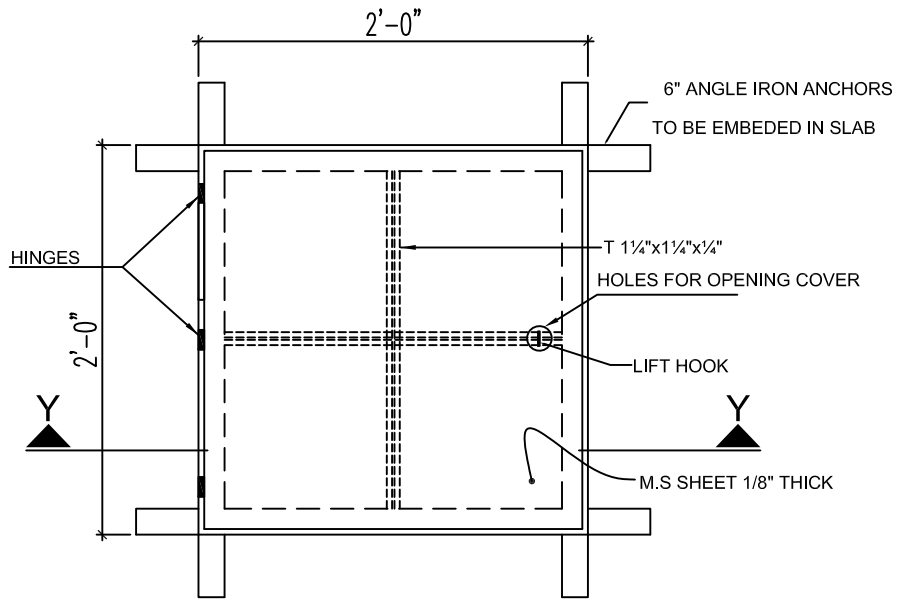
PLAN OF SEPTIC TANK



ROOF PLAN OF SEPTIC TANK



SECTION Y-Y



DETAIL -B (M.S. COVER)

NOTES

1- FOR GENERAL NOTES REFER DWG. NO.156/328/TD/STG01.
2- READ THIS DRAWING IN CONJUNCTION WITH ALL RELEVANT PROJECT DRAWINGS.
3- NO VEHICLE SHOULD BE ALLOWED ON THIS TANK.
4- TANK HAS BEEN DESIGNED ON ASSUMED BEARING CAPACITY OF 0.75 T/SFT.
5- PROPER WATERPROOFING WORKS OF TANK SHOULD BE CARRIED OUT AT SITE.
6- NO BACKFILL AGAINST TANK WALL SHOULD BE DONE ALSO TANK SHOULD NOT BE FILLED WITH WATER UNTIL TOP SLAB IS PROPERLY CAST & CURED.
7- HANGER BARS ARE AT #3@12" C/C.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

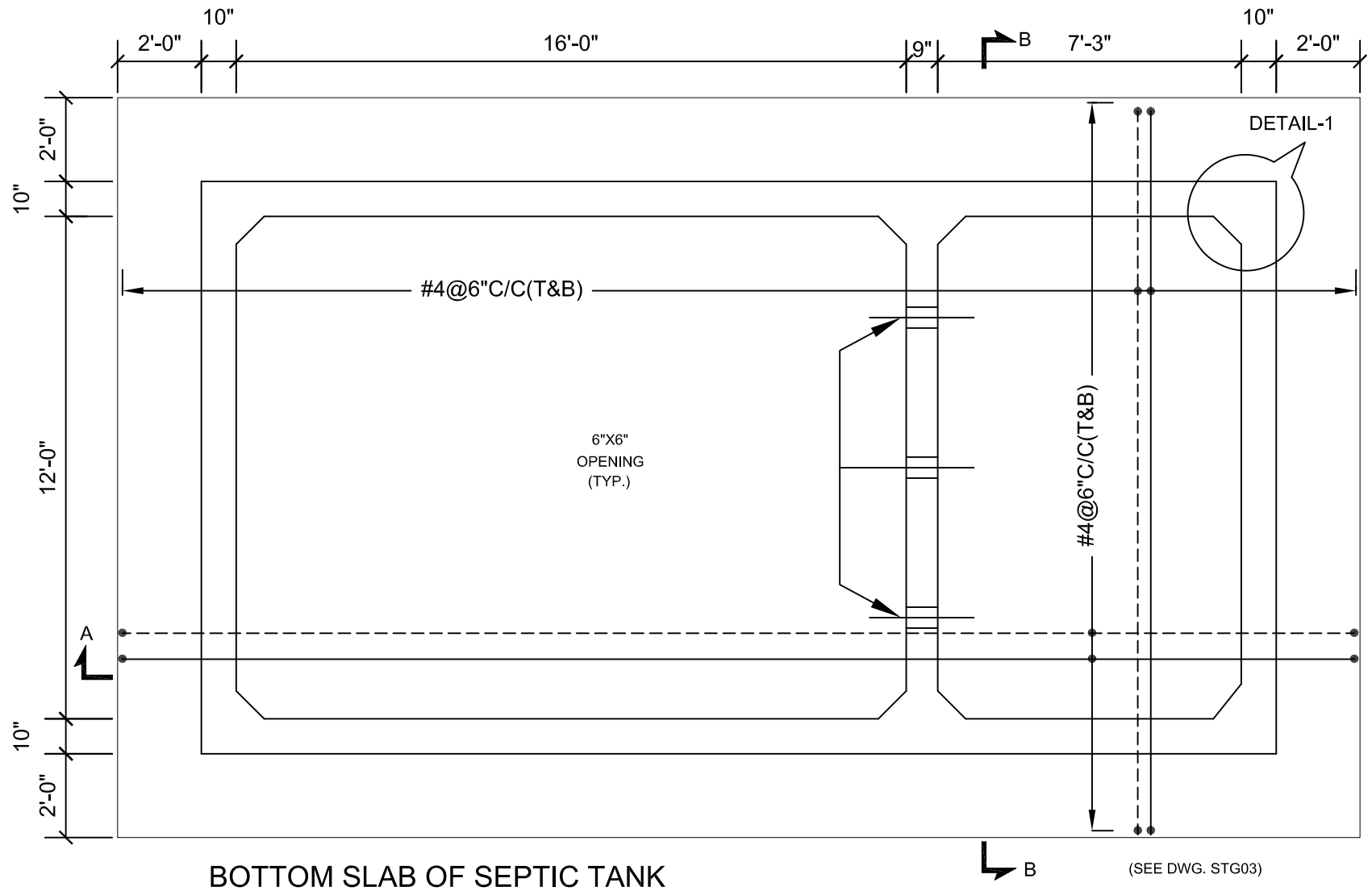
SEPTIC TANK

(23'-3"x12'-0"x6'-0")

CONCRETE OUTLINE PLANS AND DETAILS

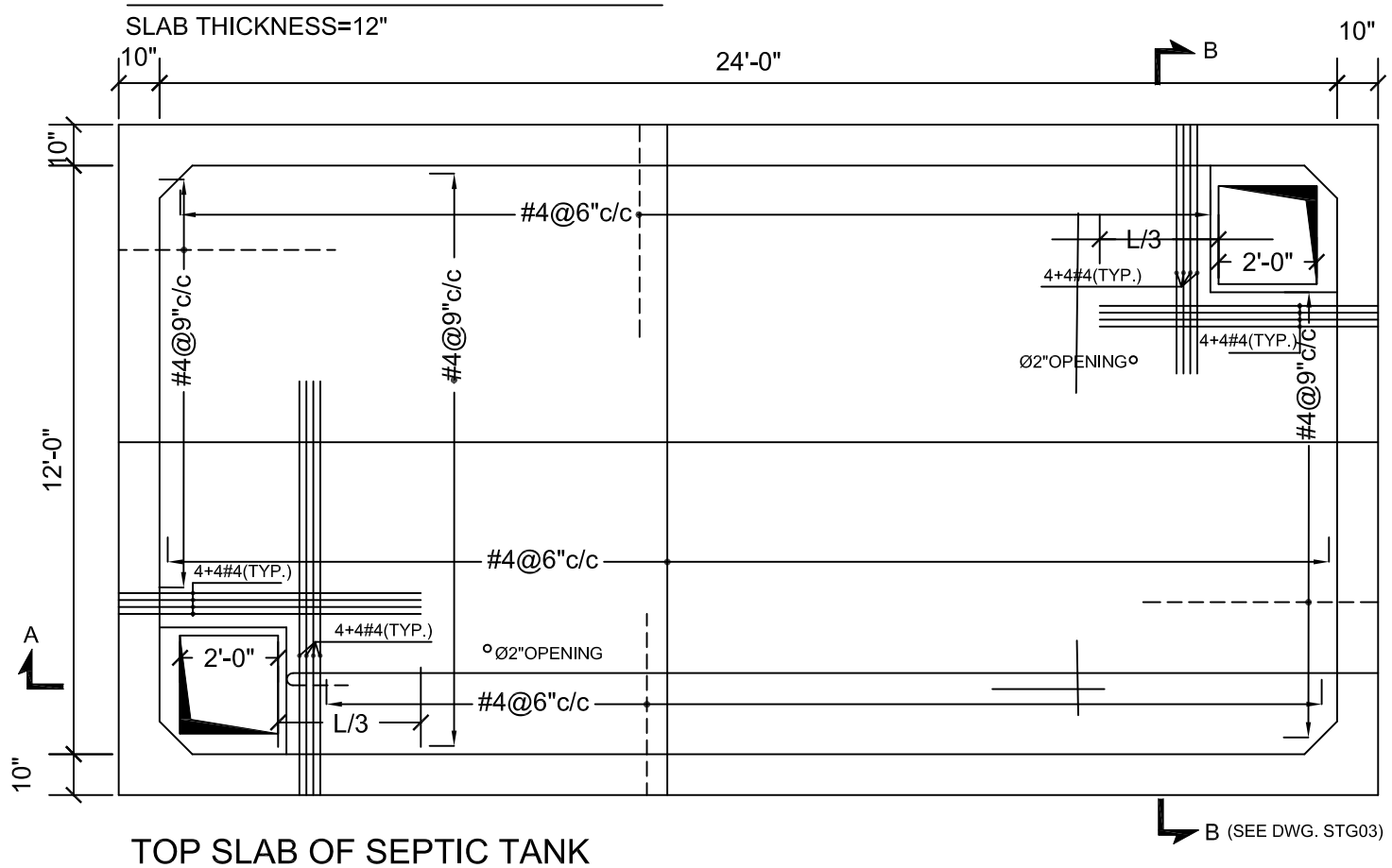
NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB. 2026	156/328/TD/STB01	0
SUBM.			

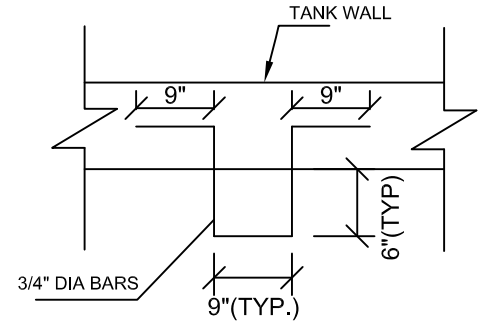


BOTTOM SLAB OF SEPTIC TANK

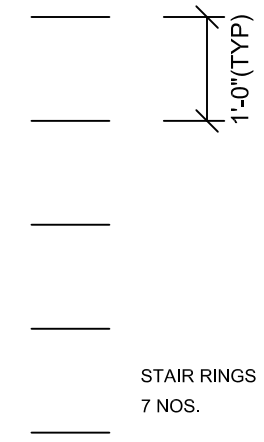
SLAB THICKNESS=12"



TOP SLAB OF SEPTIC TANK



RUNGS/LADDER PLAN



RUNGS/LADDER DETAIL

NOTES

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7- HANGER BARS ARE AT #3@12" C/C.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

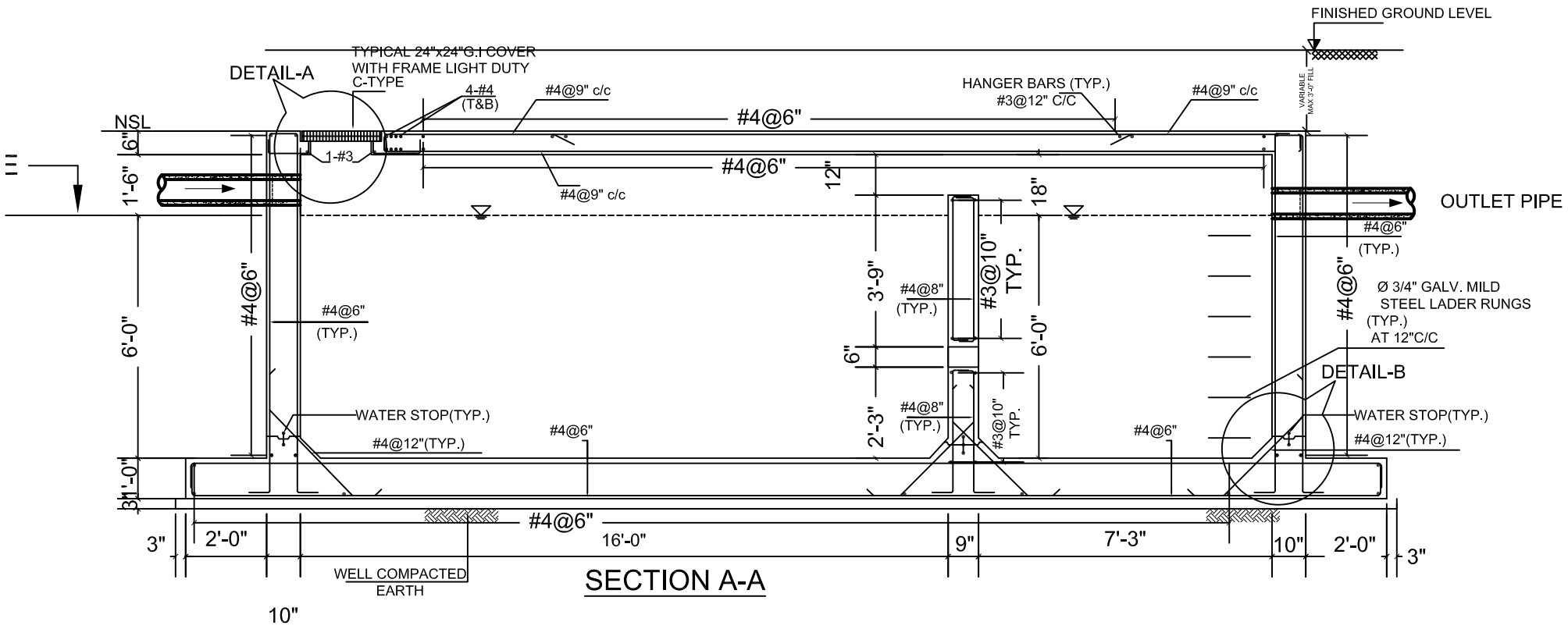
GUN AND COUNTRY CLUB

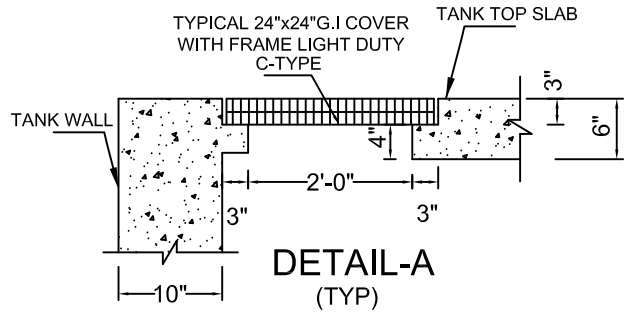
SEPTIC TANK

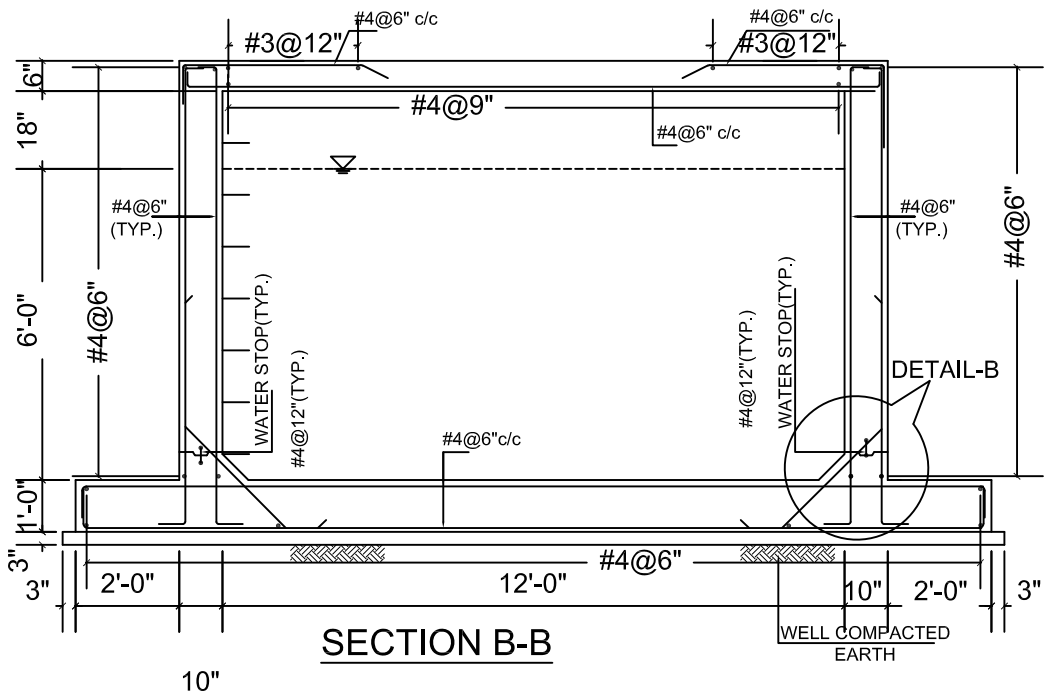
(23'-3"x12'-0"x6'-0")
REINFORCEMENT DETAILS
TOP / BOTTOM SLAB & DETAILS

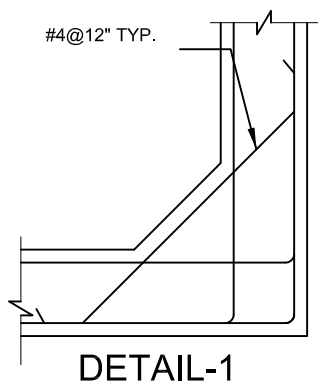
NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

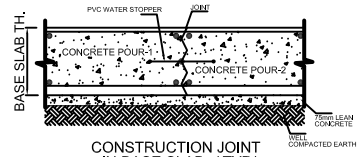
DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB. 2026	156/328/TD/STG02	0
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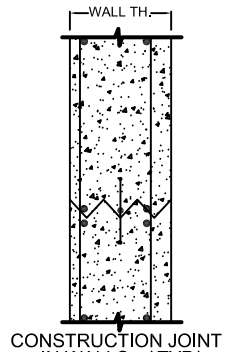


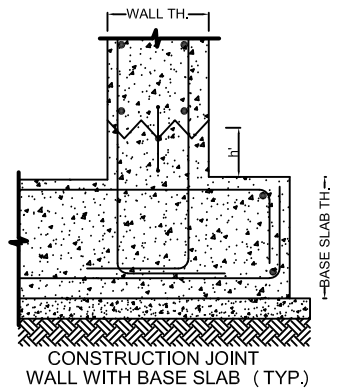












NOTES

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REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

SEPTIC TANK

(23'-3"x12'-0"x6'-0")

REINFORCEMENT DETAIL

SECTION AA / BB & DETAILS

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB. 2026	156/328/TD/STG03	0
SUBM.			

SYMBOLS AND DESCRIPTIONS

ELECTRICAL WORKS

S. #	SYMBOL	DESCRIPTION	STATUS
1		MSB -- MAIN SWITCH BOARD	
2		DB -- DISTRIBUTION BOARD	
3		TRIPLE POLE, 500 VOLTS, MOULDED CASE CIRCUIT BREAKER (RUPTURING CAPACITY INDICATED ON THE DRAWINGS & MENTIONED IN THE RELEVANT BOQ ITEM)	
4		SINGLE POLE, 250 VOLTS, MINIATURE CIRCUIT BREAKER (RUPTURING CAPACITY INDICATED ON THE DRAWINGS & MENTIONED IN THE RELEVANT BOQ ITEM)	
5		SURGE PROTECTION DEVICE CLASS-2 40KA RATED	
6		INSTRUMENTS PROTECTION FUSE (ONE NO.)	
7		INSTRUMENTS PROTECTION FUSES (THREE NOS.)	
8	VSS	VSS – VOLTMETER SELECTOR SWITCH (RY-YB-BR-OFF-RN)	
9	ASS	ASS – AMMETER SELECTOR SWITCH (R-Y-B-OFF)	
10	A	DIGITAL AC AMMETER	
11	V	DIGITAL AC VOLTMETER	
12		THREE NOS. SINGLE PHASE CURRENT TRANSFORMERS (TRANSFORMATION RATIOS INDICATED ON DRAWINGS)	
13		PHASE INDICATION LAMPS R – RED Y – YELLOW B – BLUE	
14		56" CEILING FAN	
15		EXHAUST FAN	
16		WALL BRACKET FAN	
17		LIGHT CONTROL SWITCHES AND FAN DIMMERS	
18		13Amp SOCKET WIRED WITH 2.5 SQ.mm PVC COPPER CABLE	
19		15Amp SOCKET WIRED WITH 4 SQ.mm PVC COPPER CABLE	
20		20Amp SOCKET WIRED WITH 6 SQ.mm PVC COPPER CABLE	

LIGHTING FIXTURES

S. #	SYMBOL	DESCRIPTION	STATUS
1		TUBE LIGHT FIXTURE WITH WITH 1x28W T-5 LAMP & PRISMATIC DIFFUSER	
2		7W CEILING MOUNTED DOWN LIGHTER	
3		12W CEILING MOUNTED DOWN LIGHTER	
4		15W CEILING MOUNTED DOWN LIGHTER	
5		4' LENGTH LED PANEL LIGHT	
6		BULKHEAD WITH 18W LED BULB	
7		WALL BRACKET LIGHT	
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			

COMMUNICATIONS SYSTEMS

S. #	SYMBOL	DESCRIPTION	STATUS
1	C	RJ 45 OUTLET FOR DATA	
2		TELEPHONE POINT	
3		TV ANTENA POINT	
4	SD	SMOKE DETECTOR	
5	HD	HEAT DETECTOR	
6	M	MANUAL CALL POINT	
7	FACP	FIRE ALARM CONTROL PANEL	
8			
9			
10			
11			
12			
13			
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17			
18			
19			

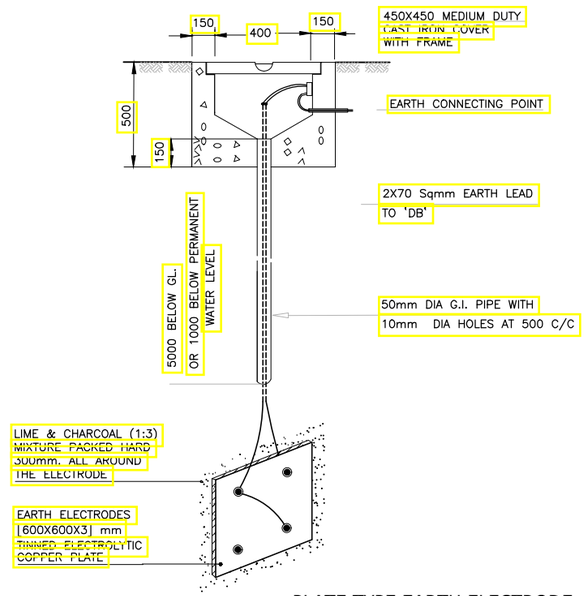


PLATE TYPE EARTH ELECTRODE
N.T.S.

GENERAL NOTES

ELECTRICAL SYSTEMS

1. FOLLOWING NOTES SHALL IN GENERAL APPLY TO ALL ELECTRICAL DRAWINGS. THE INSTRUCTIONS IN THESE NOTES SHALL BE FOLLOWED UNLESS STATED OTHERWISE.
2. THESE NOTES SHALL BE APPLICABLE TO THE ENTIRE ELECTRICAL WORKS. IF THE SITE CONDITIONS NECESSITATE ANY ALTERATIONS OR DEVIATIONS THE DIRECTIONS OF THE ENGINEER SHALL BE OBSERVED AS FINAL INSTRUCTIONS.
3. ALL ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH BOQ, TECHNICAL SPECIFICATIONS, ARCHITECTURAL, STRUCTURAL, PLUMBING AND HVAC DRAWINGS & ALL OTHER RELEVANT DETAILS.
4. DIMENSIONS/MEASUREMENTS GIVEN IN LAYOUT AND DETAILED DRAWINGS ARE APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE TO CALCULATE THE ACTUAL DIMENSIONS/ MEASUREMENTS ACCORDING TO STRUCTURAL AND ARCHITECTURAL DRAWINGS.
5. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH ALL RELEVANT DETAILS TO THE ENGINEER FOR APPROVAL ACCORDING TO THE GENERAL CONDITIONS OF CONTRACT WELL IN TIME BEFORE COMMENCEMENT OF THAT WORK.
6. PROPER CO-ORDINATION OF ELECTRICAL WORKS WITH OTHER SERVICES SHALL BE CARRIED OUT AT SITE.
7. ALL NON – CURRENT CARRYING PARTS i.e. OUTER CASINGS OF EQUIPMENT SUCH AS HT & LT PANELS, DISTRIBUTIONS BOARDS, CABLE TRAYS, AUXILIARY CONSTRUCTIONS FOR EQUIPMENT ETC., SHALL BE CONNECTED TO THE GROUNDING/ EARTHING SYSTEM AT REQUIRED NUMBER OF POINTS WITH SPECIFIED SIZES OF CONDUCTORS. WATER PIPES ALONG ELECTRICAL LINE SHALL BE BONDED TO THE EARTHING SYSTEM WITH 10 sq.mm. SINGLE CORE, COPPER CONDUCTOR PVC CABLE.
8. ELECTRICAL POINTS FOR EQUIPMENT SHALL BE INSTALLED IN CO-ORDINATION WITH THE RELEVANT DRAWINGS OF OTHER SERVICES, SUCH AS COMMUNICATION SYSTEMS, HVAC, PLUMBING ETC. THE LOCATION ON ELECTRICAL DRAWINGS IS ONLY INDICATIVE.
9. ARRANGEMENT OF ELECTRICAL EQUIPMENTS ON ELECTRICAL DRAWINGS ARE TENTATIVE, EXACT ARRANGEMENT OF EQUIPMENTS SHALL BE MADE IN VIEW OF ITS PHYSICAL DIMENSIONS AND EASE OF MAINTENANCE.
10. LOADS ON ALL PHASES SHALL BE BALANCED AT THE TESTING/ COMMISSIONING STAGE.
11. CONDUIT/DUCT RUN UNDER FLOOR SHALL HAVE A MINIMUM COVER OF TWO INCHES FROM TOP OF CONDUIT/DUCT TO FINISH FLOOR LEVEL.
12. RUN GREEN-YELLOW OR GREEN SINGLE CORE PVC INSULATED COPPER CONDUCTOR CABLE OF SPECIFIED SIZES AS PROTECTIVE EARTH CONDUCTOR (ECC) ALL ALONG LIGHT AND POWER WIRING. WHEREVER THE SIZE IS NOT SPECIFIED THE FOLLOWING CRITERIA SHALL BE OBSERVED TO DETERMINE MINIMUM CROSS SECTIONAL AREA OF EARTH CONTINUITY CONDUCTOR (ECC) IN RELATION TO THE AREA OF ITS PHASE CONDUCTORS. RUN SEPARATE ECC FOR EACH CIRCUIT.
    - ECC & PHASE CONDUCTOR OF SAME SIZE FOR UPTO AND INCLUDING 16 SQMM CABLES
    - 16 SQMM ECC FOR PHASE CONDUCTOR OF 16 SQMM, 25SQMM & 35 SQMM CABLES
    - FOR CABLES OF 50 SQMM AND ABOVE SIZES, ECC IS HALF SIZE OF PHASE CONDUCTOR.
    - MAXIMUM SIZE OF ECC IS 70 SQMM.
13. THE MAXIMUM CAPACITY OF PVC CONDUITS FOR SIMULTANEOUS DRAWING OF PVC INSULATED CABLES SHALL BE DETERMINED AS PER BS 4607/. THE FOLLOWING TABLE SHALL BE USED TO DETERMINE THE MAXIMUM NUMBER OF CABLES.

S. #	NOMINAL CROSS SECTIONAL AREA (mm²)	NO. & DIA OF WIRES	NOMINAL OVERALL DIA (mm)	20 mm DIA (3/4" DIA)	25 mm DIA (1" DIA)	32 mm DIA (1 1/4" DIA)
1	1.5	1/1.38	3.1	10	18	30
2	2.5	1/1.78	3.5	8	14	23
3	2.5	7/0.67	3.8	7	12	20
4	4	7/0.85	4.3	5	9	15
5	6	7/1.04	4.9	4	7	12
6	10	7/1.35	6.2	2	4	7
7	16	7/1.70	7.3	–	3	5
8	25	7/2.14	9.0	–	2	3
9	35	19/1.53	10.3	–	–	2

14. NORMAL & EMERGENCY CIRCUITS SHALL RUN IN SEPARATE CONDUITS.
15. ALL WIRING FOR CONTROLS SHALL BE CARRIED OUT WITH 1 CORE PVC CABLES OF SPECIFIED VOLTAGE GRADE AND SIZES.
16. THE WIRING SHALL BE CONTINUOUS LOOPING-IN TYPE AND NO JOINT IN WIRES SHALL BE ALLOWED.
17. THE WIRING SYSTEM SHALL BE CARRIED OUT ONLY AFTER THE CONDUIT SYSTEM IS COMPLETELY INSTALLED AND ALL OUTLET BOXES, ETC. ARE FIXED IN POSITION.
18. MOUNTING HEIGHTS OF ELECTRICAL FITTINGS WHEN MEASURED FROM FINISHED FLOOR LEVEL (F.F.L.) TO THE BOTTOM OF FITTINGS SHALL BE AS UNDER, UNLESS OTHERWISE SHOWN OR INSTRUCTED.

MAIN SWITCH BOARD	48 INCHES
DISTRIBUTION BOARD	48 INCHES
CONTROL PANEL	48 INCHES
ON/OFF PUSH BUTTON STATION	48 INCHES
DIMMER CONTROL UNIT	48 INCHES
LIGHT CONTROL SWITCH (ONE WAY/TWO WAY)	48 INCHES
5A SOCKET OUTLETS IN GENERAL AREAS	10 INCHES
15A SOCKET OUTLETS IN GENERAL AREAS	10 INCHES
20A SOCKET OUTLETS IN GENERAL AREAS	10 INCHES
15A SOCKET OUTLETS IN KITCHEN (ABOVE COUNTER)	10 INCHES
15A SOCKET OUTLETS IN TOILETS	66 INCHES
16A TP 5PIN INDUSTRIAL SOCKET OUTLETS IN LABS.	48 INCHES
32A TP 5PIN INDUTRIAL SOCKET OUTLETS IN LABS	48 INCHES
63A TP 5PIN INDUTRIAL SOCKET OUTLETS IN LABS.	48 INCHES
CEILING FAN	96 INCHES
WALL FAN	84 INCHES
EXHAUST FAN	REFER ARCH. DRGS.

COMMUNICATION SYSTEMS

1. FOLLOWING NOTES SHALL IN GENERAL APPLY TO ALL COMMUNICATION SYSTEMS DRAWINGS. THE INSTRUCTIONS IN THESE NOTES SHALL BE FOLLOWED UNLESS STATED OTHERWISE.
2. THESE NOTES SHALL BE APPLICABLE TO THE ENTIRE COMMUNICATION SYSTEMS WORKS. IF THE SITE CONDITIONS NECESSITATE ANY ALTERATIONS OR DEVIATIONS THE DIRECTIONS OF THE ENGINEER SHALL BE OBSERVED AS FINAL INSTRUCTIONS.
3. ALL COMMUNICATION SYSTEMS DRAWINGS SHALL BE READ IN CONJUNCTION WITH TECHNICAL SPECIFICATIONS, ITEMS OF B.O.Q., ARCHITECTURAL, STRUCTURAL, HVAC, PLUMBING DRAWINGS AND ALL OTHER RELEVANT DETAILS.
4. DIMENSIONS/MEASUREMENTS GIVEN IN LAYOUT AND DETAILED DRAWINGS ARE APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE TO CALCULATE THE ACTUAL DIMENSIONS/MEASUREMENTS ACCORDING TO STRUCTURAL AND ARCHITECTURAL DRAWINGS.
5. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH ALL RELEVANT DETAILS TO THE ENGINEER FOR APPROVAL ACCORDING TO THE GENERAL CONDITIONS OF CONTRACT WELL IN TIME BEFORE COMMENCEMENT OF THAT WORK.
6. PROPER CO-ORDINATION OF COMMUNICATION SYSTEMS WORKS WITH OTHER SERVICES SHALL BE CARRIED OUT AT SITE.
7. TELEPHONE SYSTEM SHALL BE COMPLETE WITH INSTRUMENTS, EQUIPMENT AND INTERCONNECTING WIRING, TELEPHONE EXCHANGE, TELEPHONE OUTLETS, JUNCTION BOXES, CONDUITS OF SPECIFIED SIZES IN THE BUILDING AND UNDERGROUND PIPES OF SPECIFIED SIZES SHOWN ON DRAWINGS SHALL BE PROVIDED. WHERE SIZE OF CONDUIT/PIPE IS NOT SPECIFIED SUITABLE SIZE SHALL BE INSTALLED AS DIRECTED BY THE ENGINEER.
8. POINTS FOR COMMUNICATION SYSTEMS EQUIPMENT SHALL BE INSTALLED IN CO-ORDINATION WITH THE RELEVANT DRAWINGS OF OTHER SERVICES, SUCH AS ELECTRICAL, HVAC, PLUMBING ETC. THE LOCATION ON COMMUNICATION SYSTEMS DRAWINGS IS ONLY INDICATIVE.
9. ARRANGEMENT OF COMMUNICATION SYSTEMS EQUIPMENTS ON DRAWINGS ARE TENTATIVE, EXACT ARRANGEMENT OF EQUIPMENTS SHALL BE MADE IN VIEW OF ITS PHYSICAL DIMENSIONS AND EASE OF MAINTENANCE.
10. CONDUIT/DUCT RUN UNDER FLOOR SHALL HAVE A MINIMUM COVER 2 INCHES FROM TOP OF CONDUIT/DUCT TO FINISH FLOOR LEVEL.
11. RUN GREEN-YELLOW OR GREEN SINGLE CORE PVC INSULATED COPPER CONDUCTOR CABLE OF SPECIFIED SIZES AS PROTECTIVE EARTH CONDUCTOR (ECC) ALL ALONG COMMUNICATION SYSTEMS WIRING.
12. ALL WIRING FOR CONTROLS SHALL BE CARRIED OUT WITH 1 CORE PVC CABLES OF SPECIFIED VOLTAGE GRADE AND SIZES.
13. THE WIRING SHALL BE CONTINUOUS LOOPING-IN TYPE AND NO JOINT IN WIRES SHALL BE ALLOWED.
14. THE WIRING SYSTEM SHALL BE CARRIED OUT ONLY AFTER THE CONDUIT SYSTEM IS COMPLETELY INSTALLED AND ALL OUTLET BOXES, ETC. ARE FIXED IN POSITION.
15. MOUNTING HEIGHTS OF ELECTRICAL FITTINGS WHEN MEASURED FROM FINISHED FLOOR LEVEL (F.F.L.) TO THE BOTTOM OF FITTINGS SHALL BE AS UNDER, UNLESS OTHERWISE SHOWN OR INSTRUCTED.

TELEPHONE JUNCTION BOX	10 INCHES
TELEPHONE OUTLET	10 INCHES
INTERCOM CONTROL PACK	10 INCHES
INTERCOM STATION (WALL MOUNTED)	36 INCHES
PA SYSTEM CONTROL PANEL	36 INCHES
PA SYSTEM JUNCTION BOX	10 INCHES
MANUAL CALL STATION	42 INCHES
AUDIO ALARM	100 INCHES

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

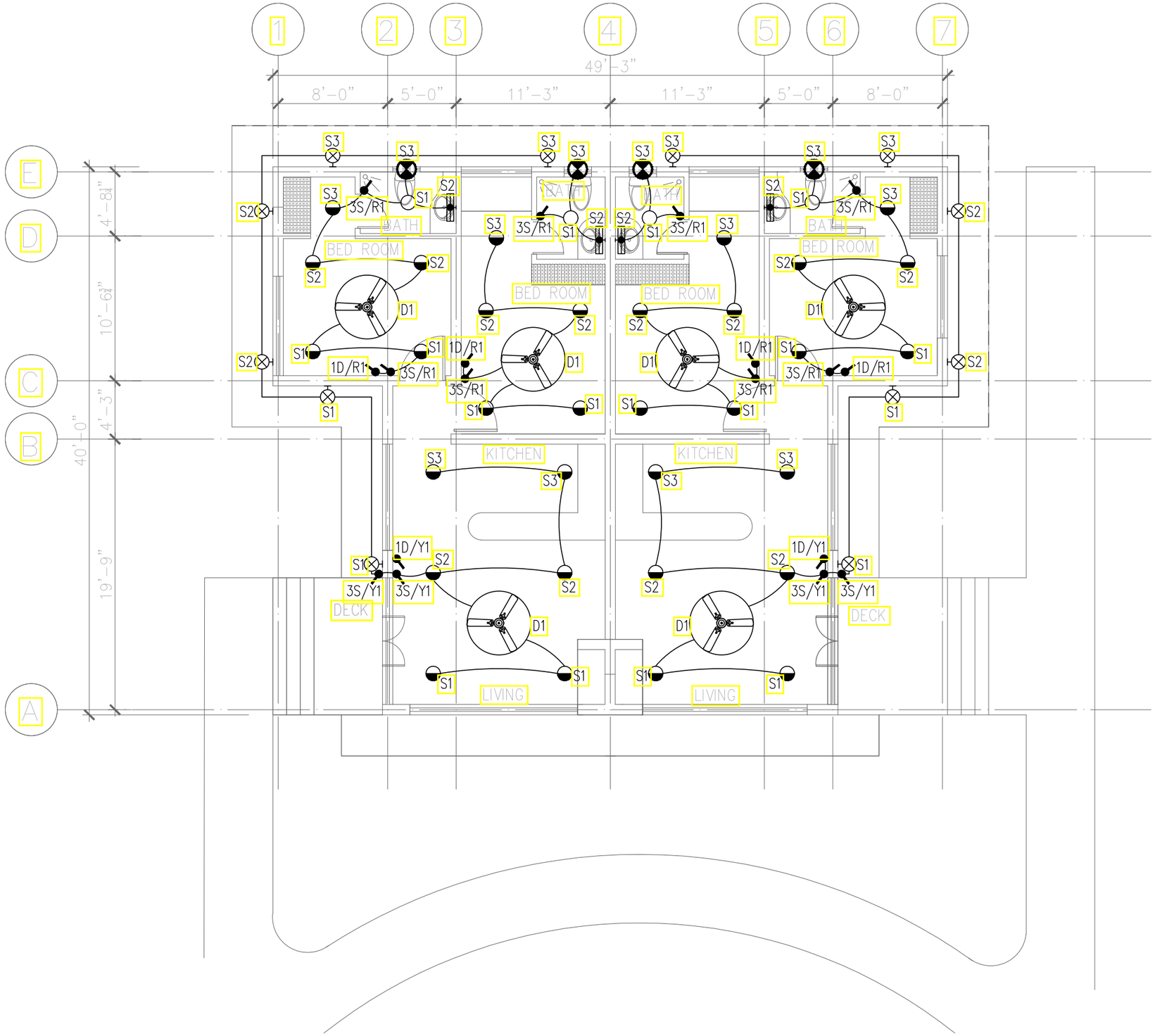
APARTMENT BLOCK 1 & 2

LEGEND & GENERAL NOTES

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	KALEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.		156/325/TD/01E01	0
SUBM.	FEB 2026		

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

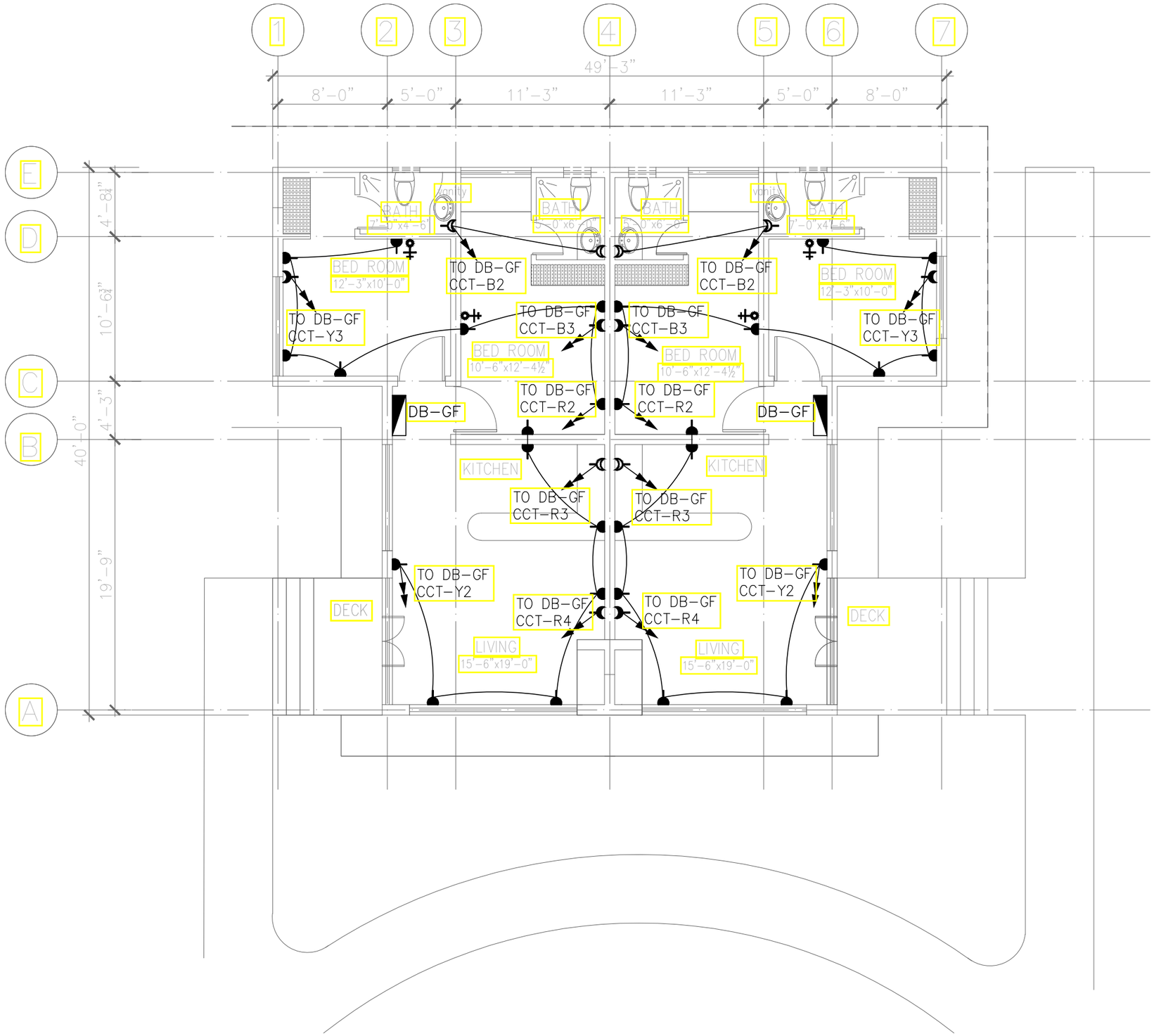
APARTMENT BLOCK 1 & 2

LIGHTING LAYOUT

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	RAZEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/325/TD/01E02	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

APARTMENT BLOCK 1 & 2

POWER LAYOUT

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RAZEEM ULLAH	JEHANZEB	AMENAH
FILE			
CKD.			
SUBM.	DATE FEB. 2026	DRAWING NO. 156/325/TD/01E03	REV. 0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

DB-GF

2 CORE 4mm² CU/PVC/PVC CABLE
WITH 1 CORE 4mm² CU/PVC AS
ECC

16 SWG SHEET STEEL, POWDER PAINTED, RECESSED IN WALL

3x2/2A

FF

V.S.S

V 0–500 VAC

32 AMPS
DP MCB
RC=6KA

3x2/2A 'R' 'Y' 'B'

In = 40 AMPS, Isc = 6KA

415VAC TP N & E COPPER
BUS BARS 50 HZ, 6KA

10 AMPS
SP MCB
RC=6KA

20 AMPS
SP MCB
RC=6KA

20 AMPS
SP MCB
RC=6KA

20 AMPS
SP MCB
RC=6KA

6 NOS.
FOR LIGHTS &
FANS

6 NOS.
FOR 13A SOCKETS

6 NOS.
FOR 15A SOCKETS

6 NOS.
FOR ACs

SCALE: 1/8"=1'–0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

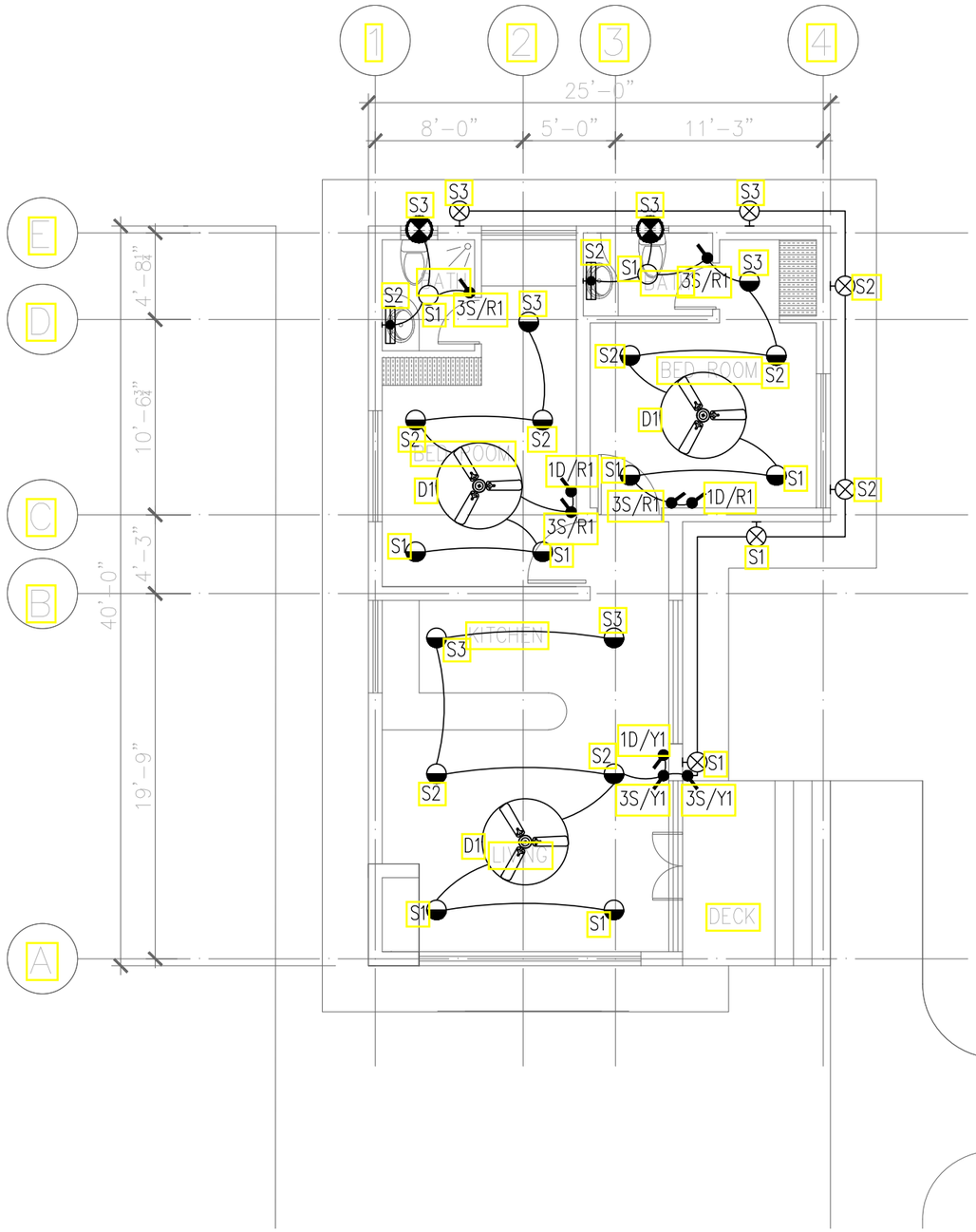
APARTMENT BLOCK 1 & 2

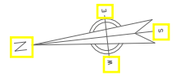
SINGLE LINE DIAGRAM

NES PAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RAZEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.		156/325/TD/01E04	0
SUBM.	FEB 2026		

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.





SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

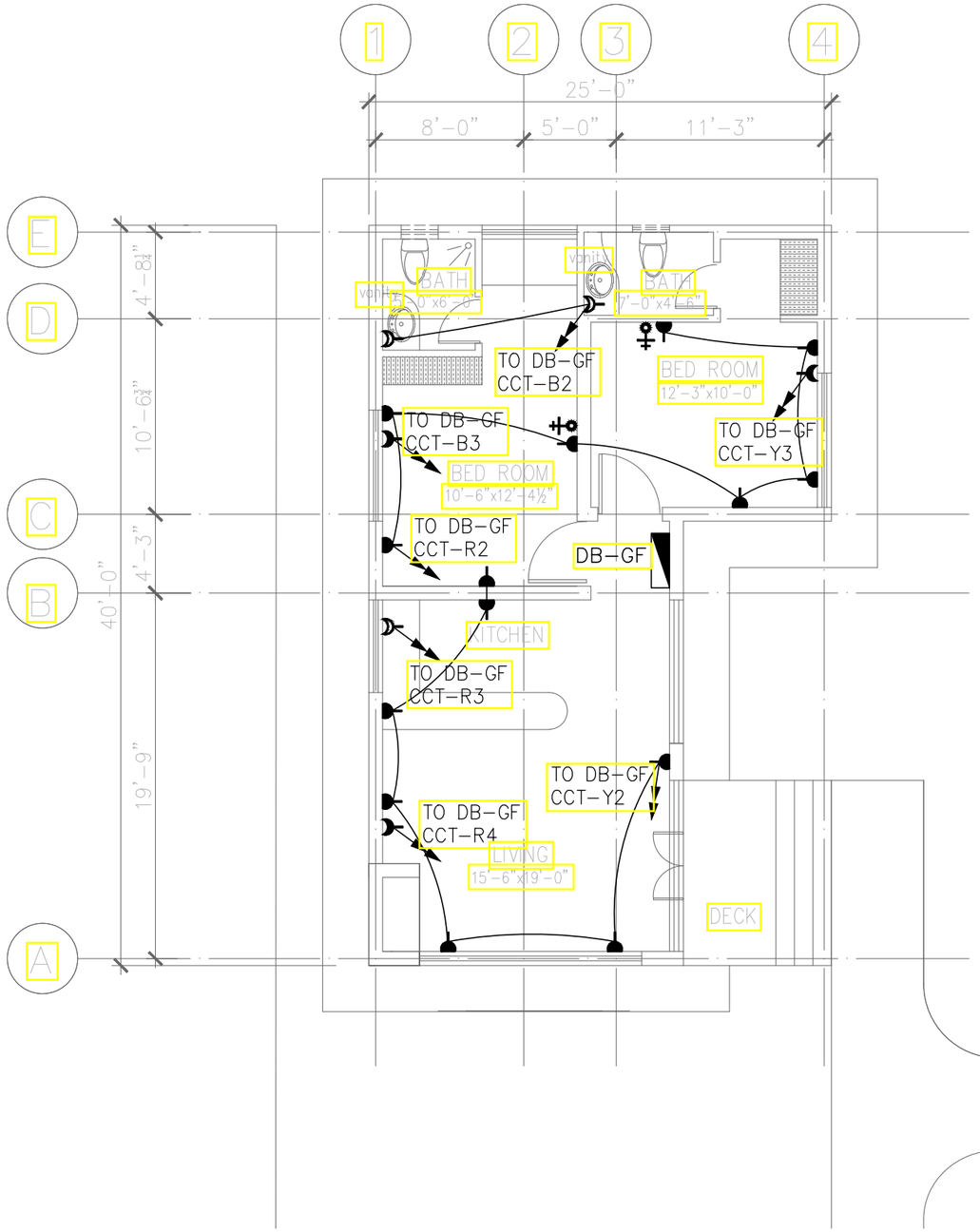
APARTMENT BLOCK 3

LIGHTING LAYOUT

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RAZEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/325/TD/01E02	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

APARTMENT BLOCK 3

POWER LAYOUT

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RALEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.			
SUBM.	FEB 2026	156/325/TD/01E03	0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

DB-GF

2 CORE 4mm² CU/PVC/PVC CABLE
WITH 1 CORE 4mm² CU/PVC AS
ECC

16 SWG SHEET STEEL, POWDER PAINTED, RECESSED IN WALL

3x2/2A

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V 0–500 VAC

32 AMPS
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BUS BARS 50 HZ, 6KA

10 AMPS
SP MCB
RC=6KA

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6 NOS.
FOR LIGHTS &
FANS

6 NOS.
FOR 13A SOCKETS

6 NOS.
FOR 15A SOCKETS

6 NOS.
FOR ACs

SCALE: 1/8"=1'–0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

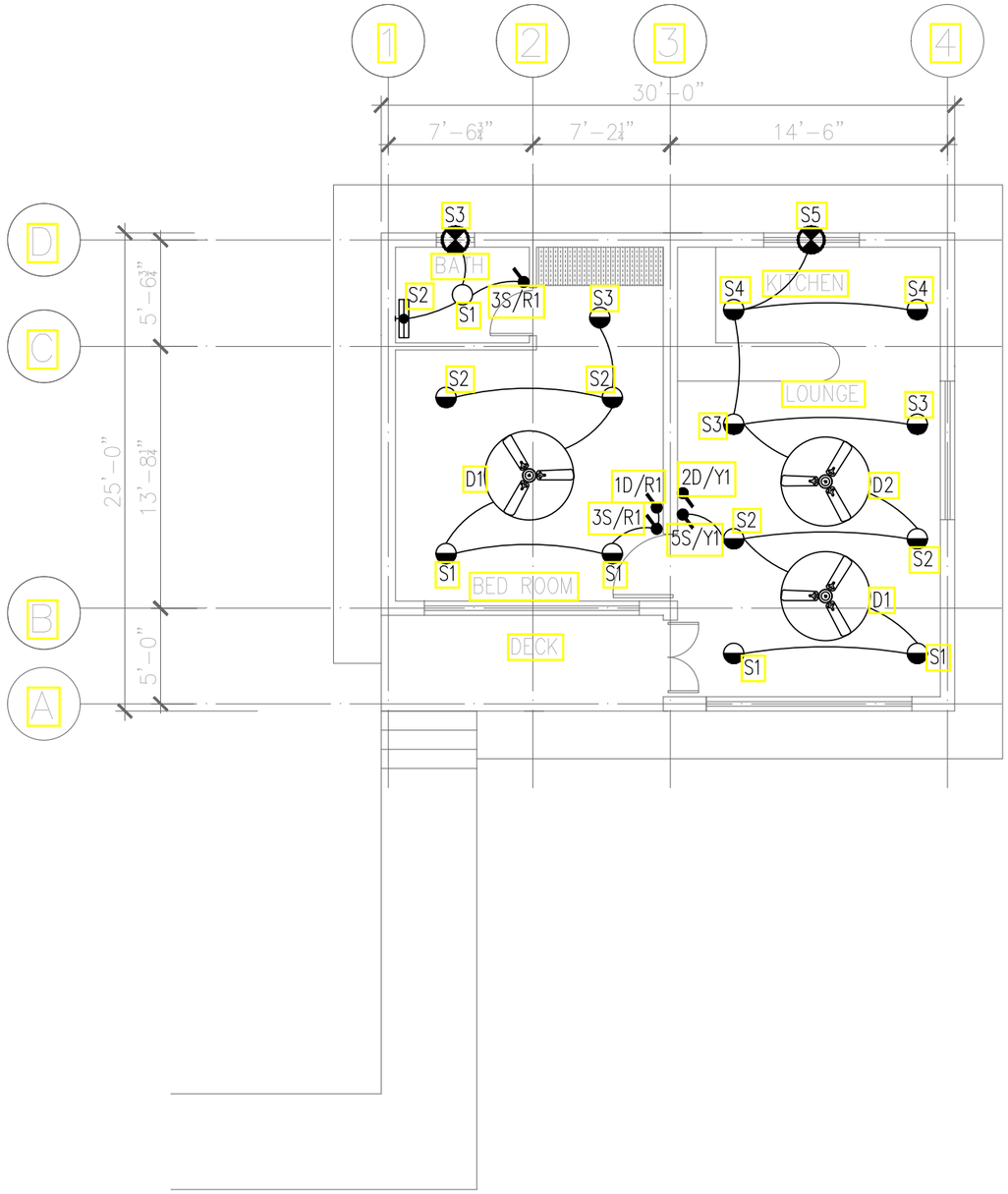
APARTMENT BLOCK 3

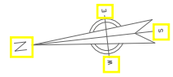
SINGLE LINE DIAGRAM

NESPAK NATIONAL ENGINEERING SERVICES
PAK PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RAZEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.		156/325/TD/01E04	0
SUBM.	FEB 2026		

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.





SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

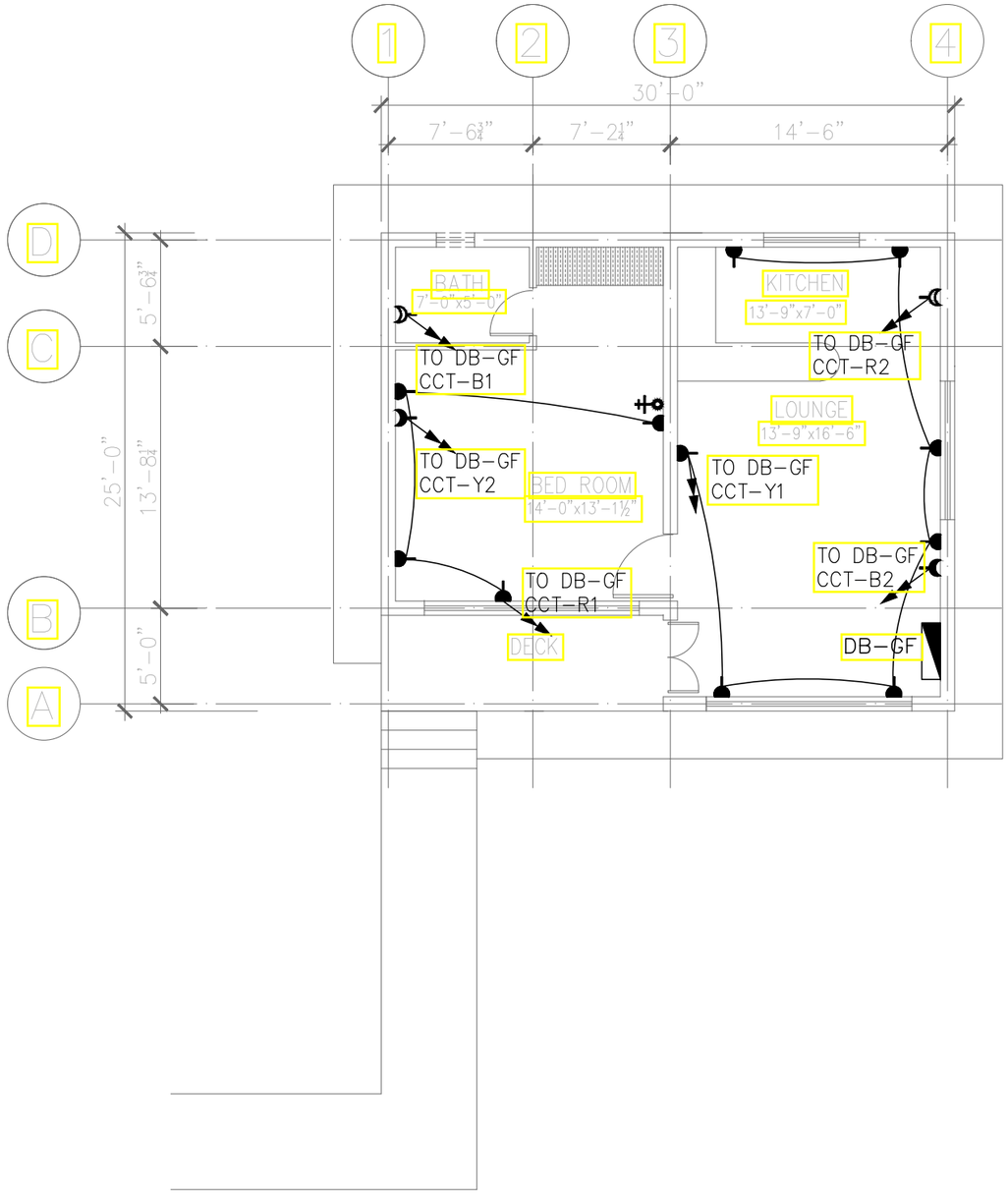
APARTMENT BLOCK 4

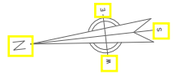
LIGHTING LAYOUT

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	KALEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/325/TD/01E02	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.





SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

APARTMENT BLOCK 4

POWER LAYOUT

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	KALEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/325/TD/01E03	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

DB-GF

2 CORE 4mm² CU/PVC/PVC CABLE
WITH 1 CORE 4mm² CU/PVC AS
ECC

16 SWG SHEET STEEL, POWDER PAINTED, RECESSED IN WALL

3x2/2A

V.S.S

V 0–500 VAC

32 AMPS
DP MCB
RC=6KA

3x2/2A 'R' 'Y' 'B'

In = 40 AMPS, Isc = 6KA

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6 NOS.
FOR LIGHTS &
FANS

6 NOS.
FOR 13A SOCKETS

6 NOS.
FOR 15A SOCKETS

6 NOS.
FOR ACs

SCALE: 1/8"=1'–0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

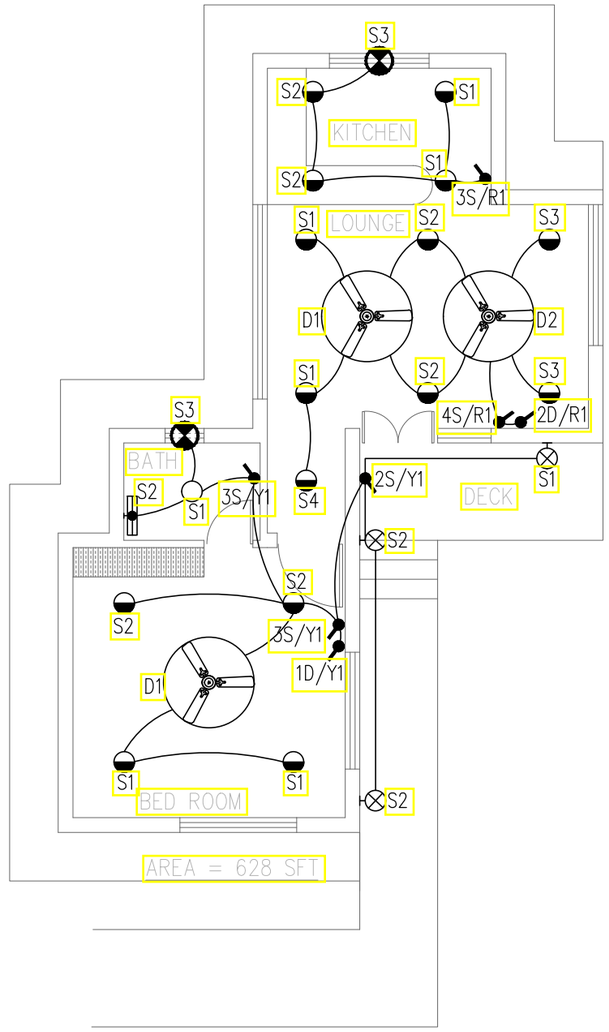
APARTMENT BLOCK 4

SINGLE LINE DIAGRAM

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RAZEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.		156/325/TD/01E04	0
SUBM.	FEB 2026		

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

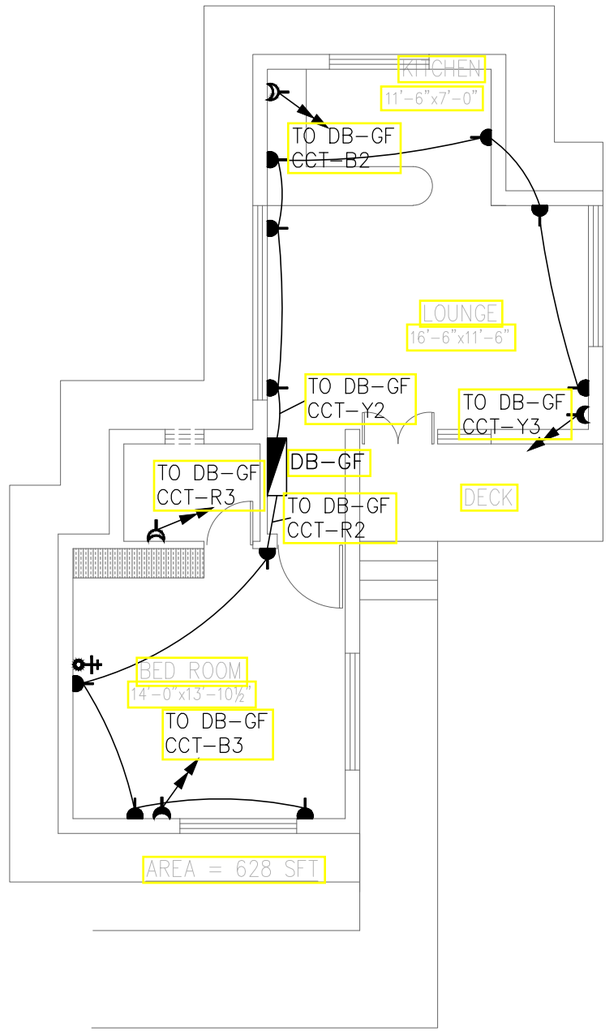
APARTMENT BLOCK 5

LIGHTING LAYOUT

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RAZEEM ULLAH	JEHANZED	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.			
SUBM.	FEB. 2026	156/325/TD/01E02	0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

APARTMENT BLOCK 5

POWER LAYOUT

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RAZEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/325/TD/01E03	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

DB-GF

2 CORE 4mm² CU/PVC/PVC CABLE
WITH 1 CORE 4mm² CU/PVC AS
ECC

16 SWG SHEET STEEL, POWDER PAINTED, RECESSED IN WALL

3x2/2A

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SP MCB
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6 NOS.
FOR LIGHTS &
FANS

6 NOS.
FOR 13A SOCKETS

6 NOS.
FOR 15A SOCKETS

6 NOS.
FOR ACs

SCALE: 1/8"=1'–0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

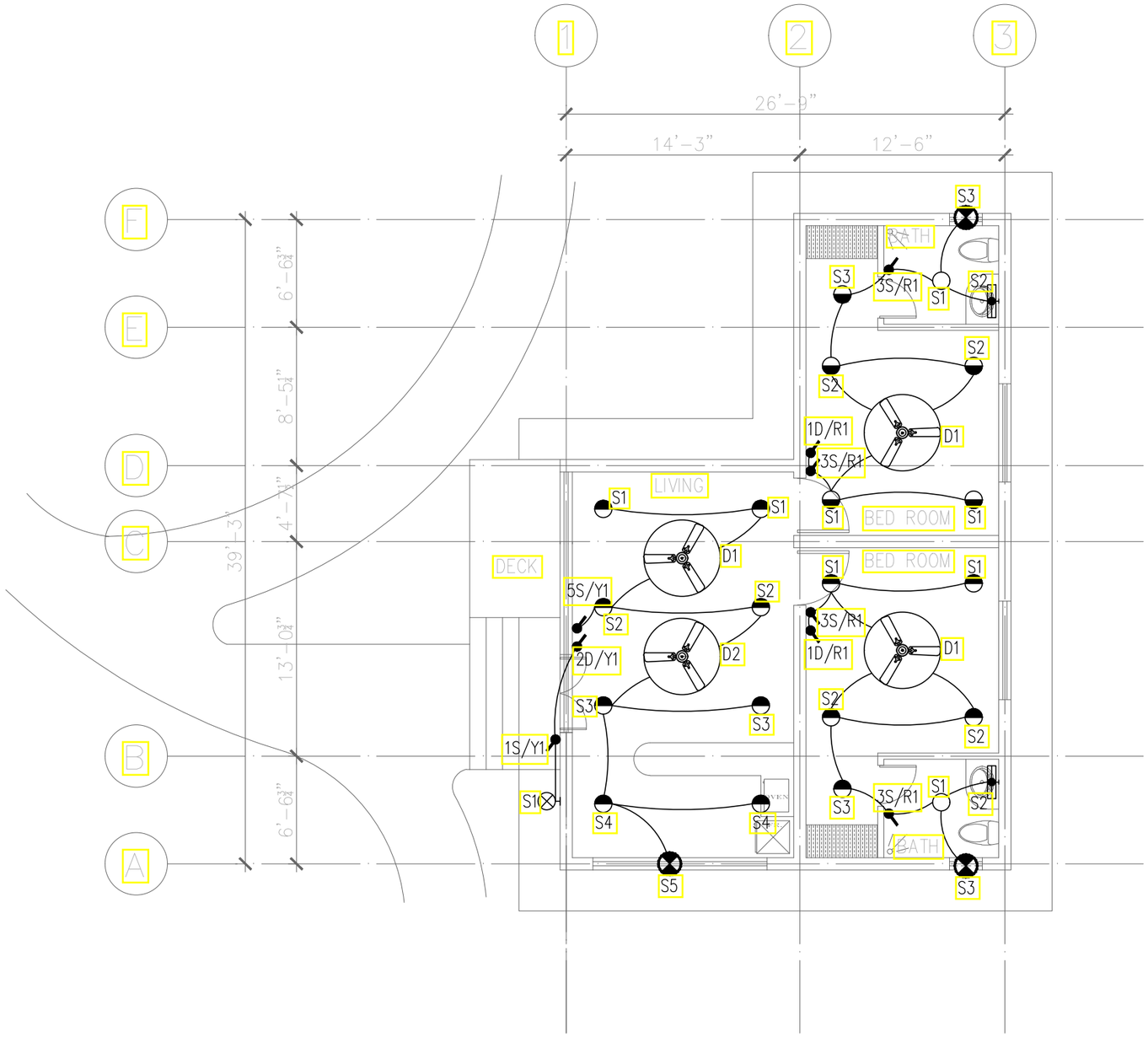
APARTMENT BLOCK 5

SINGLE LINE DIAGRAM

NESPAK NATIONAL ENGINEERING SERVICES
PAK PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RAJEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.		156/325/TD/01E04	0
SUBM.	FEB 2026		

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

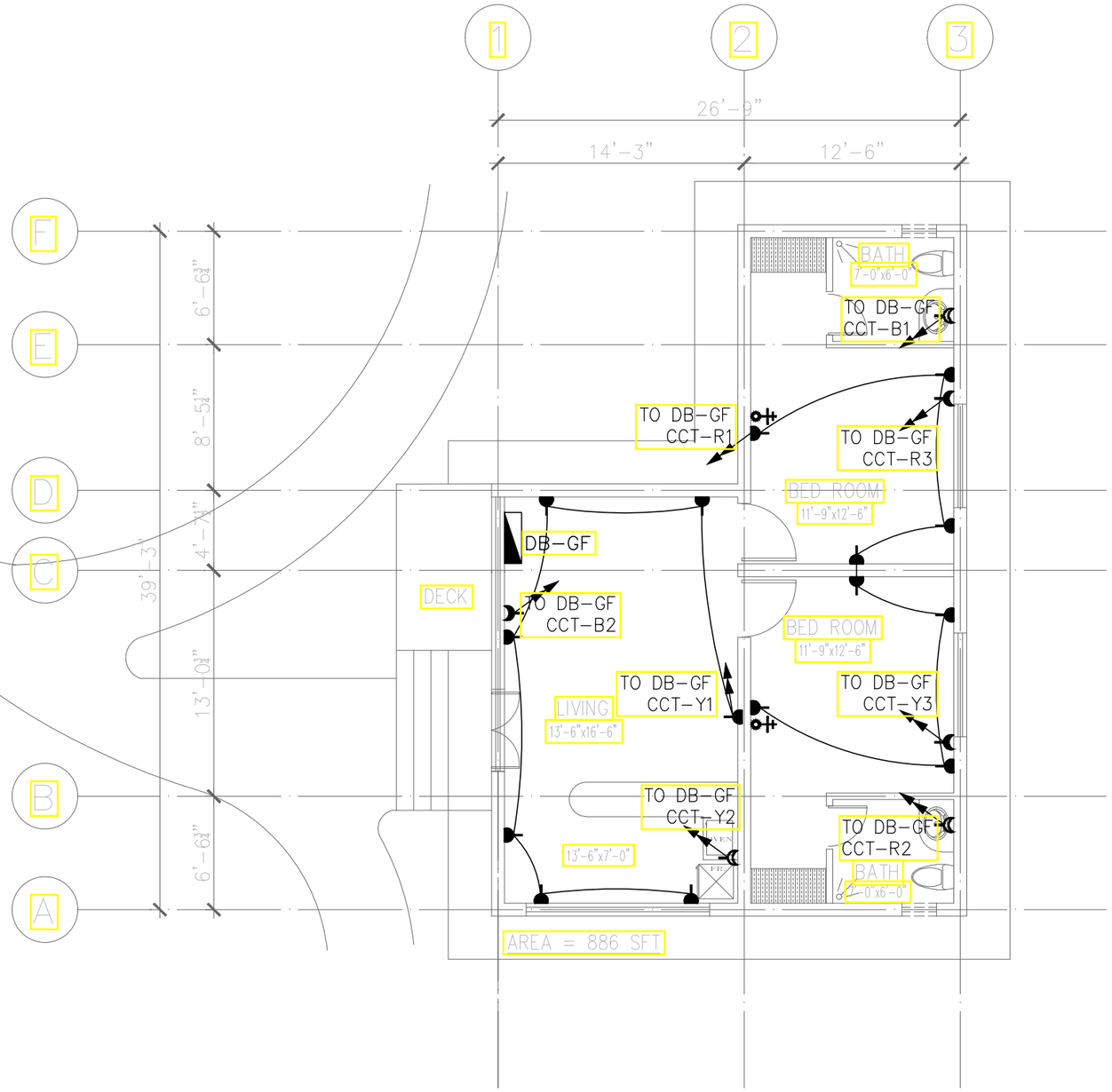
APARTMENT BLOCK 6

LIGHTING LAYOUT

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	KALEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB. 2026	156/325/TD/01E02	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

APARTMENT BLOCK 6

POWER LAYOUT

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

		RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK				
DWN.		RAZEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.		REV.
CKD.		156/325/TD/01E03		0
SUBM.	FEB 2026			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

DB-GF

2 CORE 4mm² CU/PVC/PVC CABLE
WITH 1 CORE 4mm² CU/PVC AS
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16 SWG SHEET STEEL, POWDER PAINTED, RECESSED IN WALL

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SP MCB
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20 AMPS
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RC=6KA

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SP MCB
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6 NOS.
FOR LIGHTS &
FANS

6 NOS.
FOR 13A SOCKETS

6 NOS.
FOR 15A SOCKETS

6 NOS.
FOR ACs

SCALE: 1/8"=1'–0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

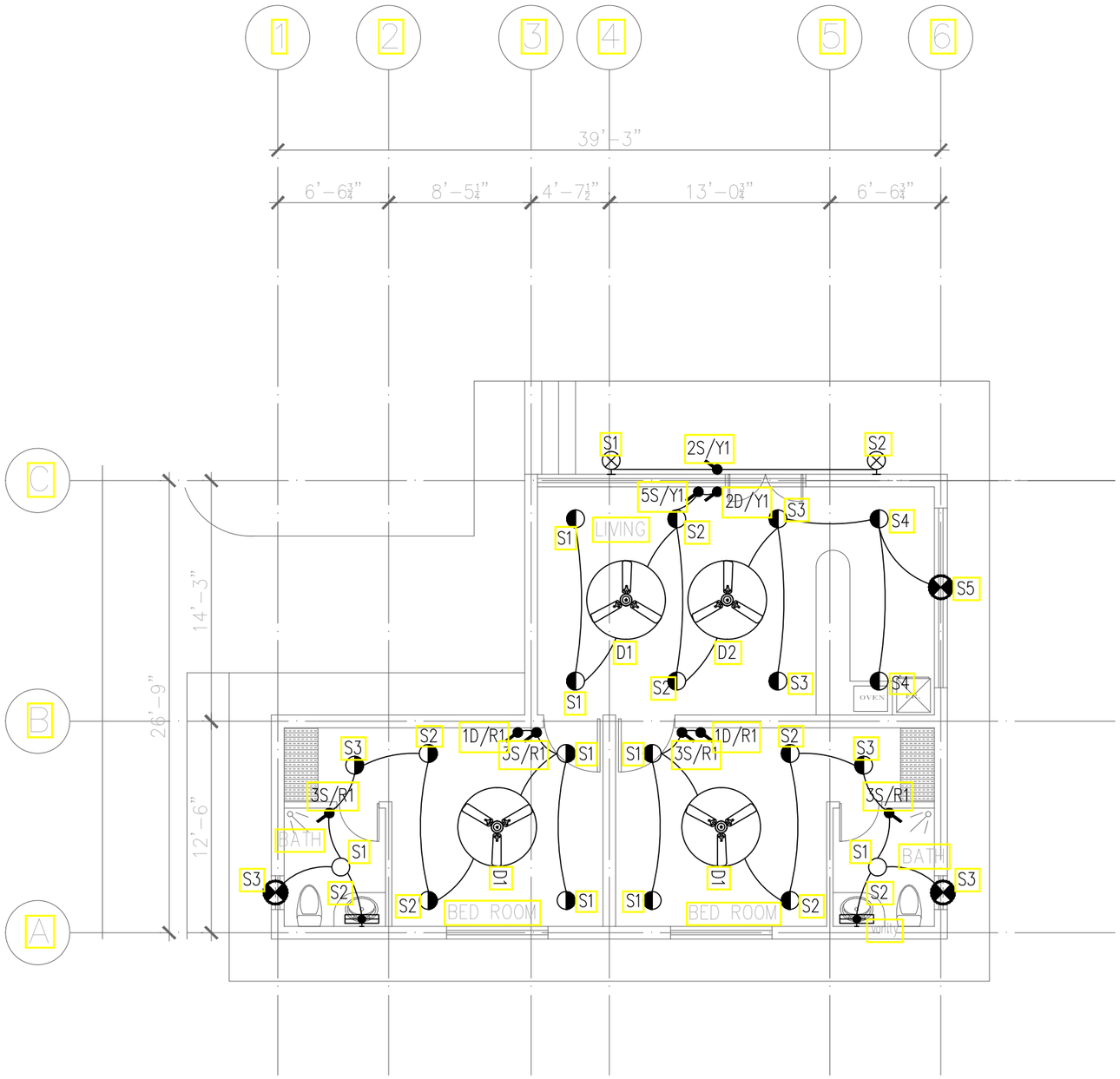
APARTMENT BLOCK 6

SINGLE LINE DIAGRAM

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RAZEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/325/TD/01E04	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

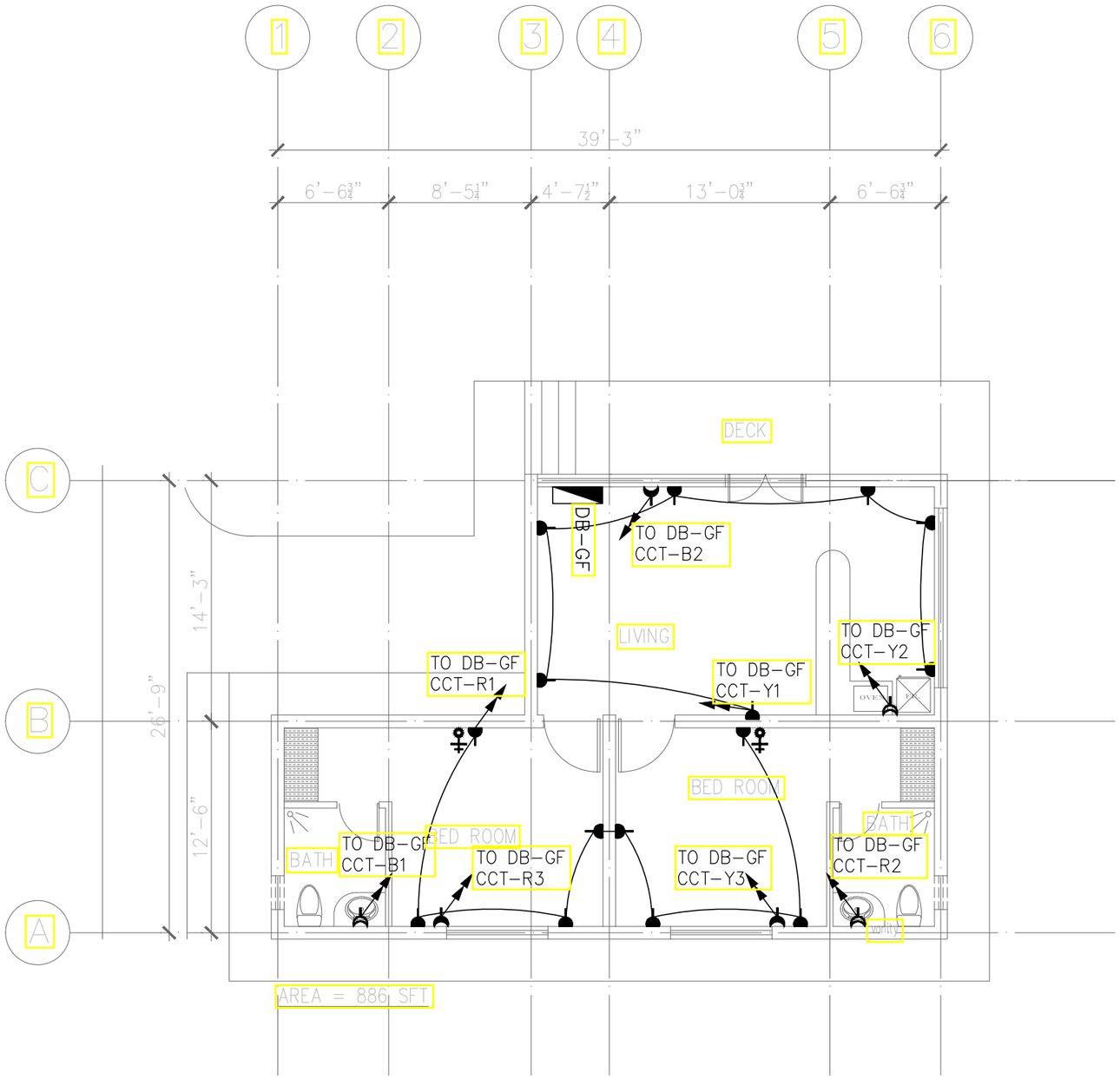
APARTMENT BLOCK 7

LIGHTING LAYOUT

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RALEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/325/TD/01E02	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

APARTMENT BLOCK 7

POWER LAYOUT

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	KALEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/325/TD/01E03	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

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2 CORE 4mm² CU/PVC/PVC CABLE
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FOR 15A SOCKETS

6 NOS.
FOR ACs

SCALE: 1/8"=1'–0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

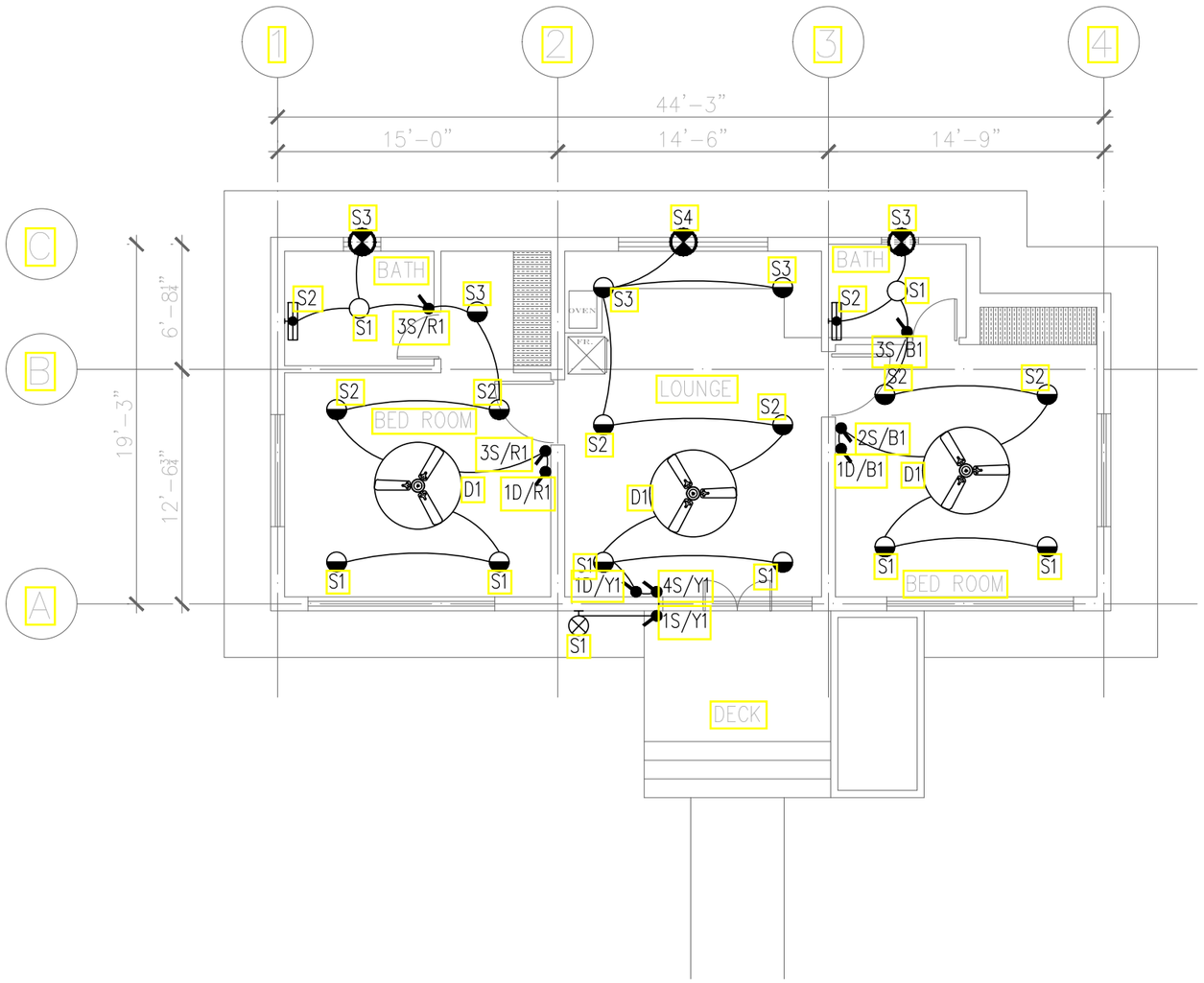
APARTMENT BLOCK 7

SINGLE LINE DIAGRAM

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.	RAZEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/325/TD/01E04	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

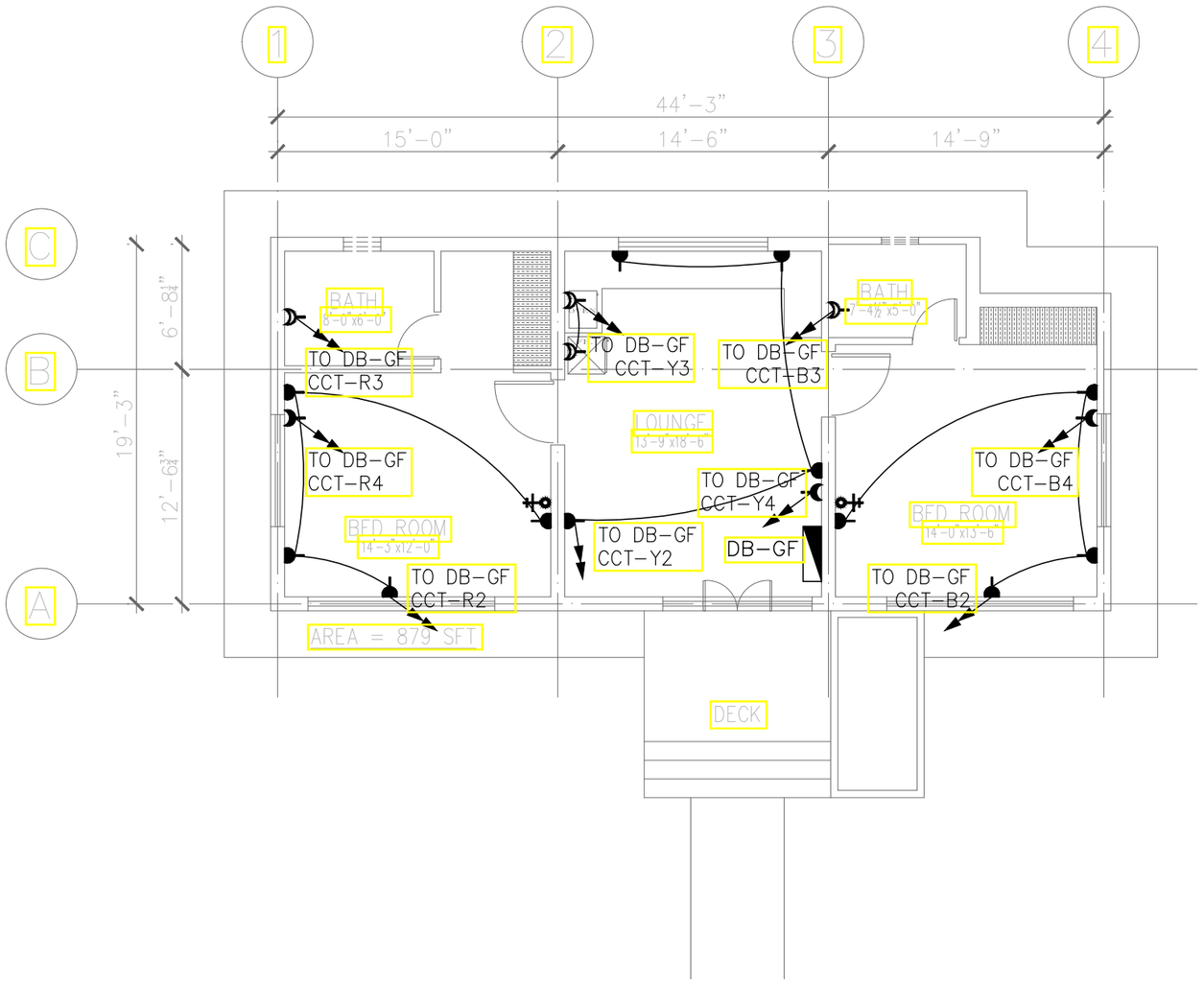
APARTMENT BLOCK 8

LIGHTING LAYOUT

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RALEEM ULLAH	JEHANZED	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/325/TD/01E02	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

APARTMENT BLOCK 8

POWER LAYOUT

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RALEEM ULLAH	JEHANZED	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/325/TD/01E03	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

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SCALE: 1/8"=1'–0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

APARTMENT BLOCK 8

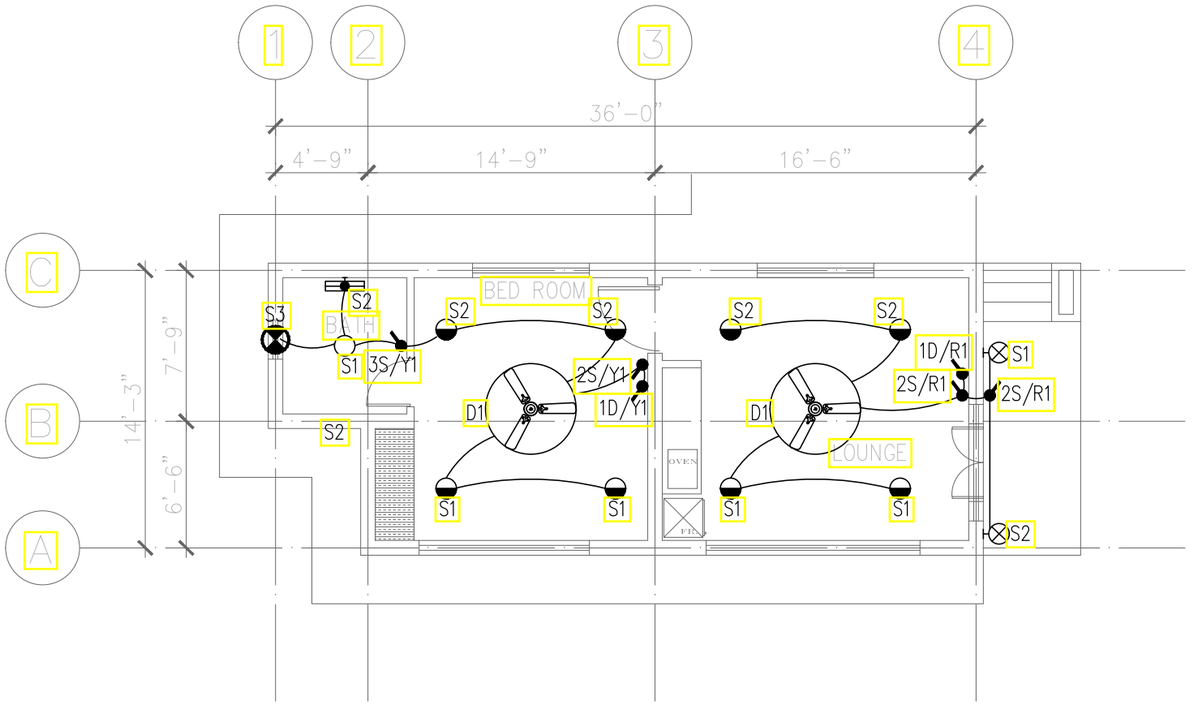
SINGLE LINE DIAGRAM

NESPAK NATIONAL ENGINEERING SERVICES
PAK PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RAZEEM ULLAH	JEHANZEB	AMENAH
FILE			
CKD.			
SUBM.			

DATE	DRAWING NO.	REV.
FEB 2026	156/325/TD/01E04	0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

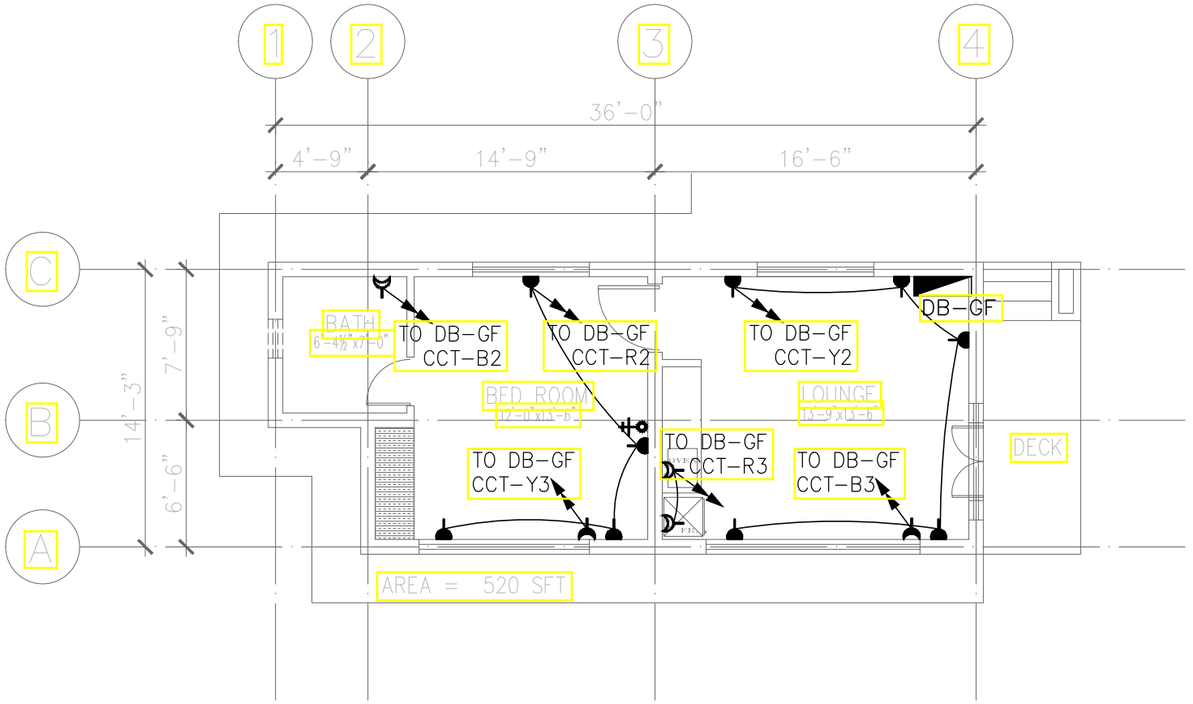
APARTMENT BLOCK 9, 10, 11

LIGHTING LAYOUT

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RALEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.			
SUBM.	FEB. 2026	156/325/TD/01E02	0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

APARTMENT BLOCK 9, 10, 11

POWER LAYOUT

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	KALEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB, 2026	156/325/TD/01E03	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

DB-GF

2 CORE 4mm² CU/PVC/PVC CABLE
WITH 1 CORE 4mm² CU/PVC AS
ECC

16 SWG SHEET STEEL, POWDER PAINTED, RECESSED IN WALL

3x2/2A

FF

V.S.S

V 0–500 VAC

32 AMPS
DP MCB
RC=6KA

3x2/2A 'R' 'Y' 'B'

In = 40 AMPS, Isc = 6KA

415VAC TP N & E COPPER
BUS BARS 50 HZ, 6KA

10 AMPS
SP MCB
RC=6KA

20 AMPS
SP MCB
RC=6KA

20 AMPS
SP MCB
RC=6KA

20 AMPS
SP MCB
RC=6KA

6 NOS.
FOR LIGHTS &
FANS

6 NOS.
FOR 13A SOCKETS

6 NOS.
FOR 15A SOCKETS

6 NOS.
FOR ACs

SCALE: 1/8"=1'–0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

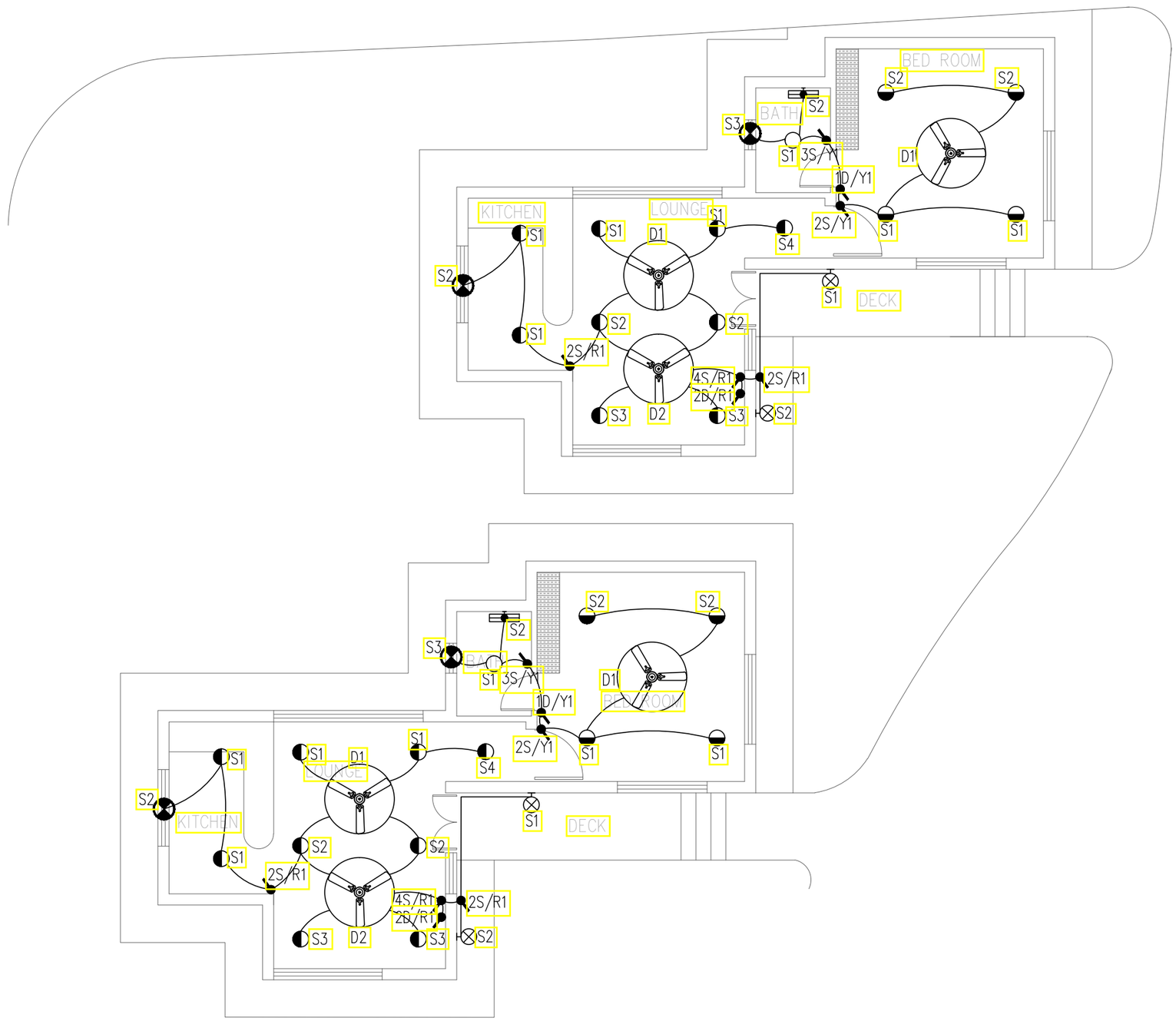
APARTMENT BLOCK 9, 10, 11

SINGLE LINE DIAGRAM

NESPAK NATIONAL ENGINEERING SERVICES
PAK PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RAQEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.		156/325/TD/01E04	0
SUBM.	FEB 2026		

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

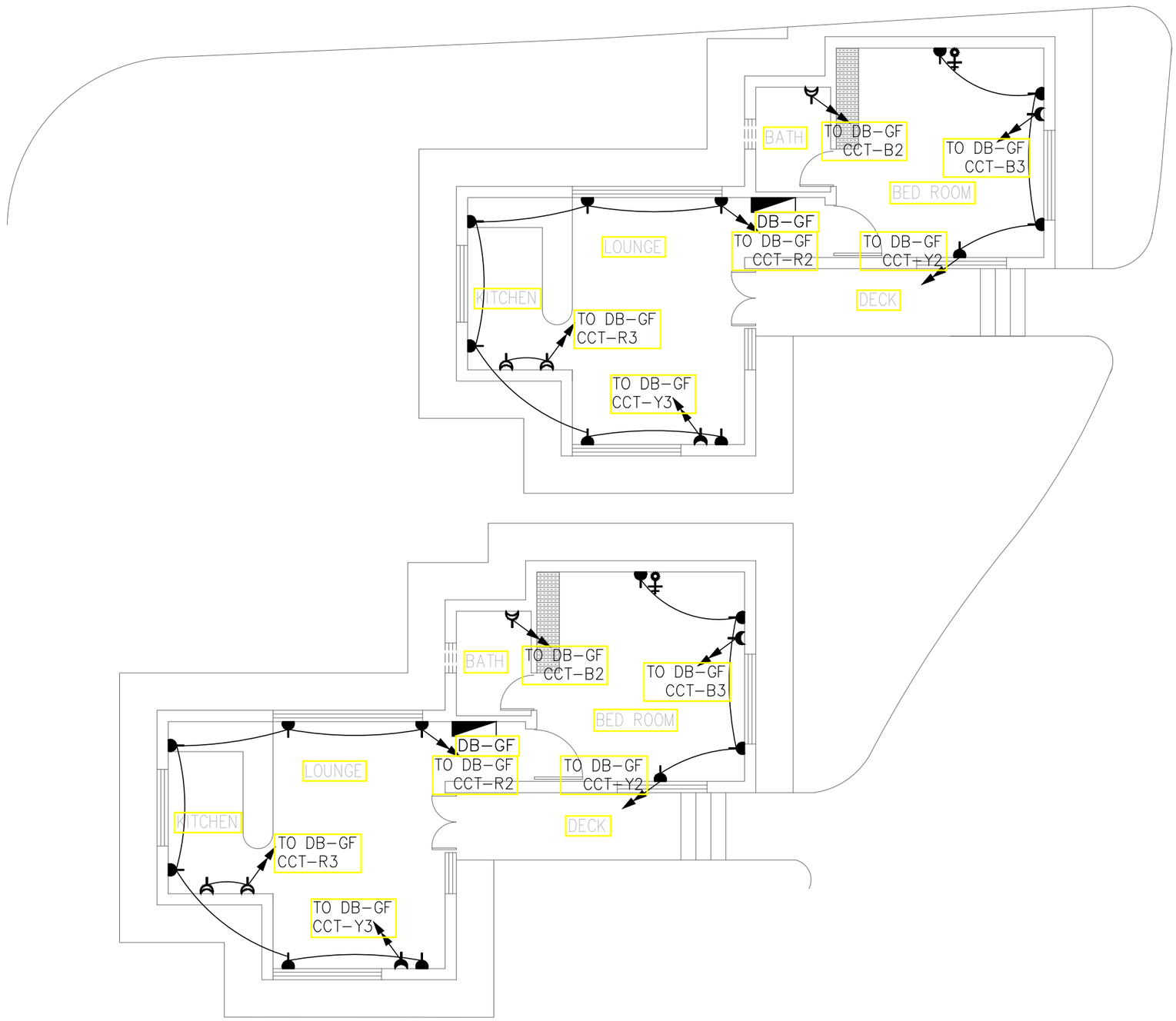
APARTMENT BLOCK 12, 13

LIGHTING LAYOUT

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	KALEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/325/TD/01E02	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

APARTMENT BLOCK 12, 13

POWER LAYOUT

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	KALEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB 2026	156/325/TD/01E03	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

DB-GF

2 CORE 4mm² CU/PVC/PVC CABLE
WITH 1 CORE 4mm² CU/PVC AS
ECC

16 SWG SHEET STEEL, POWDER PAINTED, RECESSED IN WALL

3x2/2A

FF

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FOR LIGHTS &
FANS

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FOR 13A SOCKETS

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FOR 15A SOCKETS

6 NOS.
FOR ACs

SCALE: 1/8"=1'–0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

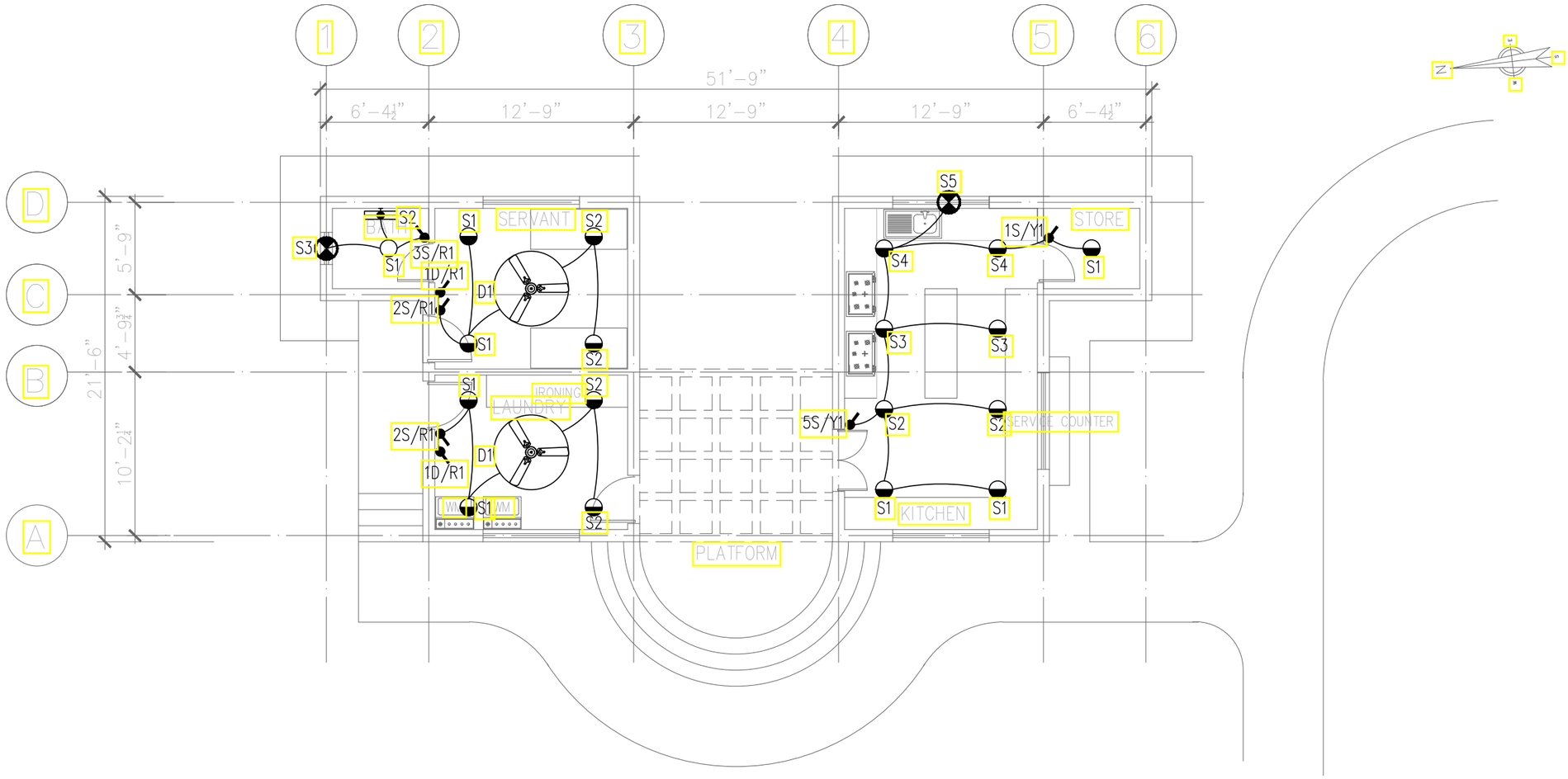
APARTMENT BLOCK 12, 13

SINGLE LINE DIAGRAM

NESPAK NATIONAL ENGINEERING SERVICES
PAK PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
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DWN.	RAZEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
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SUBM.	FEB 2026		

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

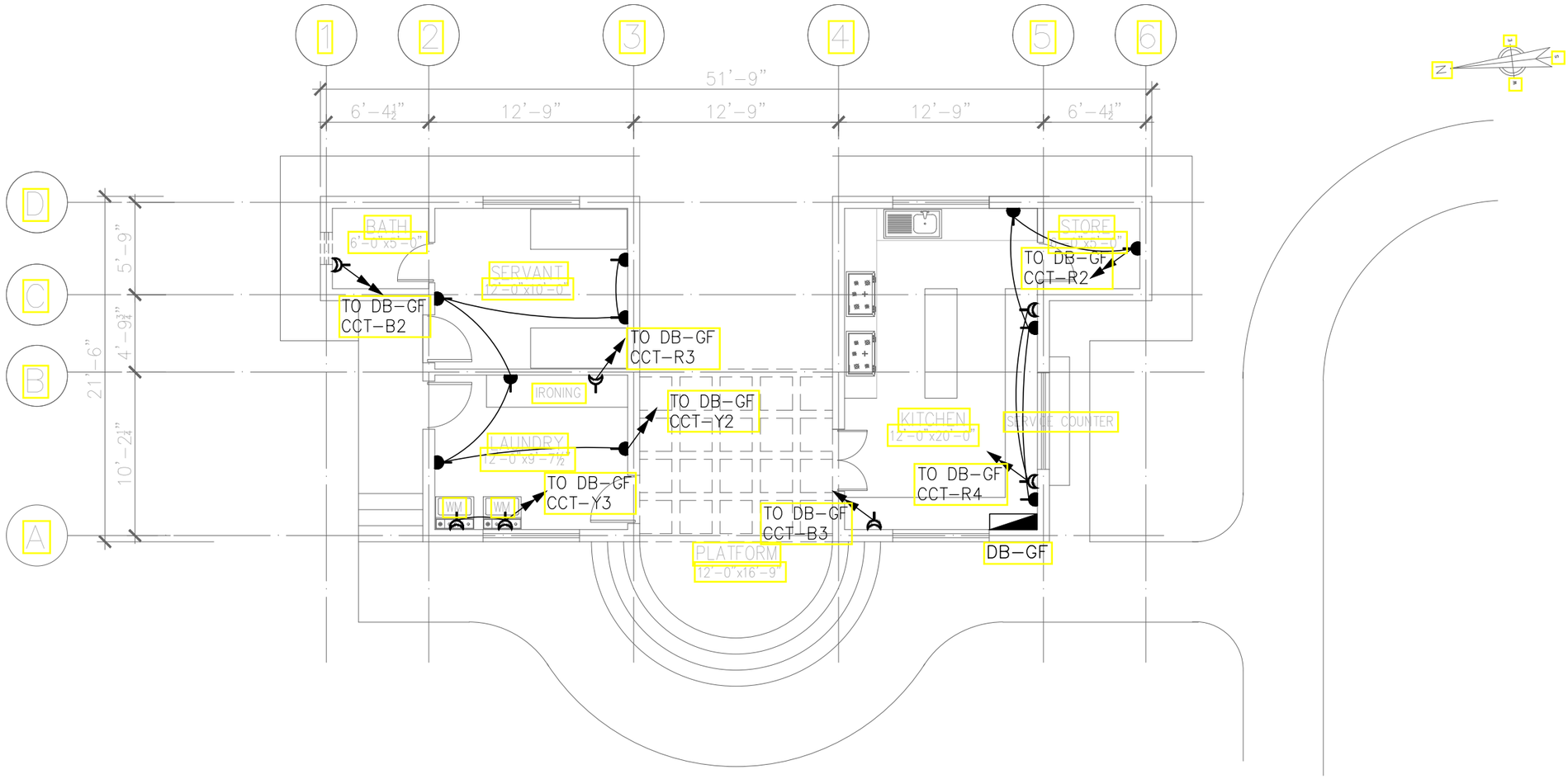
KITCHEN , LAUNDRY UNIT HUT AT BLOCK 14

LIGHTING LAYOUT

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RALEEM ULLAH	JEHANZEB	AMENAH
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB. 2026	156/325/TD/01E02	0
SUBM.			

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

KITCHEN , LAUNDRY UNIT
HUT AT BLOCK 14

LIGHTING LAYOUT

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RALEEM ULLAH	JEHANZEB	AMENAH
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FOR ACs

SCALE: 1/8"=1'–0"

GUN AND COUNTRY CLUB

RESIDENCE UNIT

KITCHEN , LAUNDRY UNIT
HUT AT BLOCK 14

SINGLE LINE DIAGRAM

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

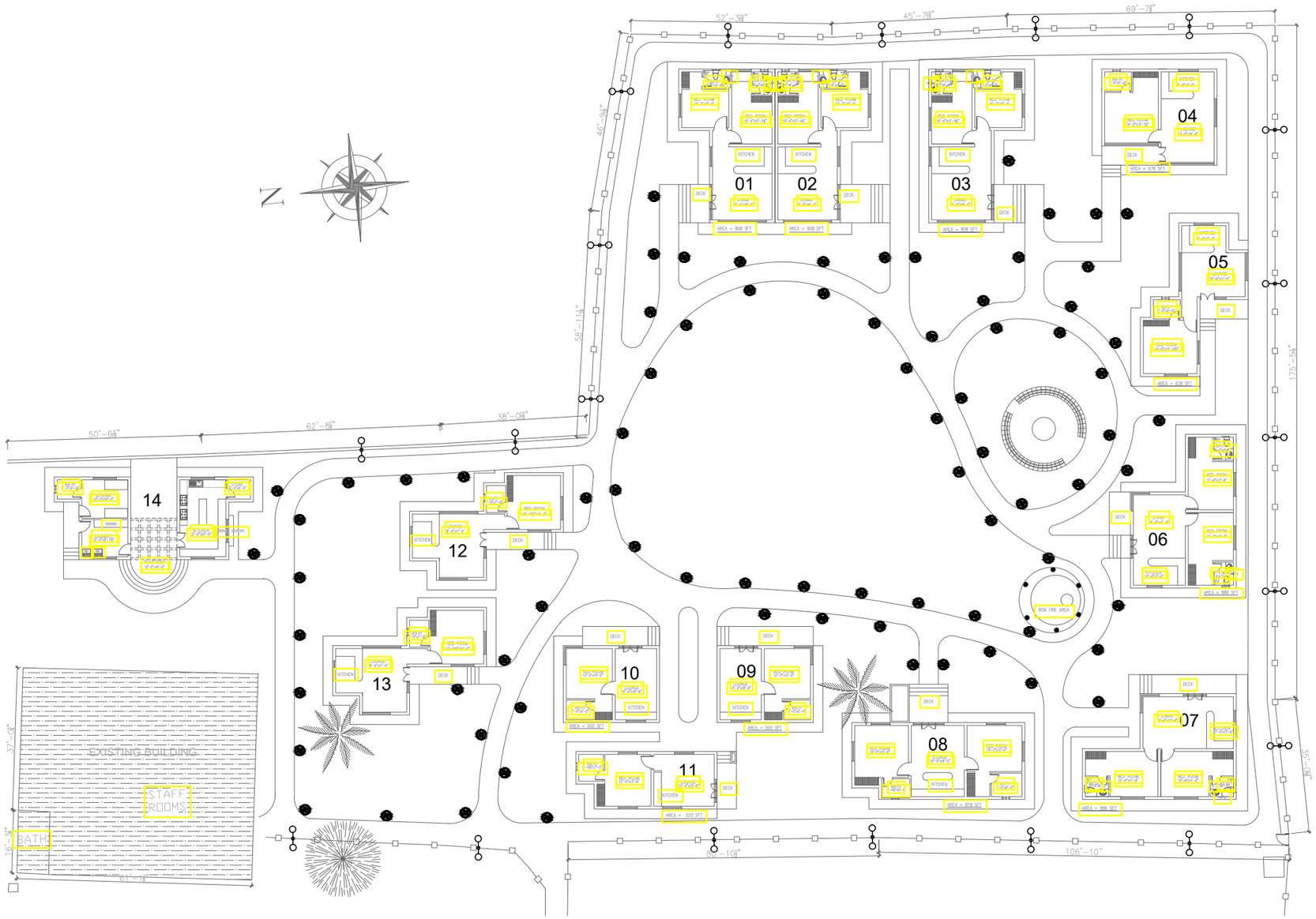
	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.	RAZEEM ULLAH	JEHANZEB	AMENAH
FILE			
CKD.			
SUBM.			

DATE: FEB 2026

DRAWING NO.: 156/325/TD/01E04

REV.: 0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.



LEGEND:

- STREET LIGHT POLE (12M)
- BOLLARD (1 METER)
- LIGHT
- STREET LIGHT CONTROL PANEL

SCALE: 1/8"=1'-0"

GUN AND COUNTRY CLUB

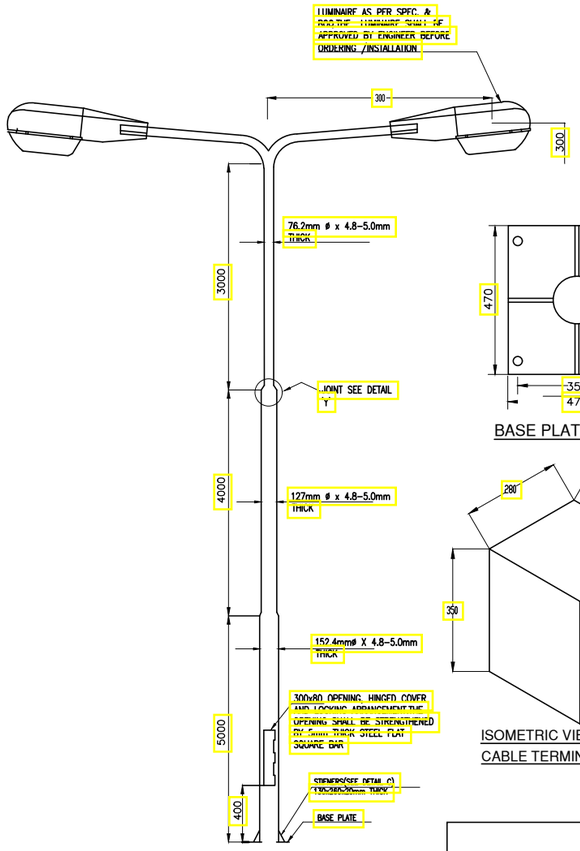
RESIDENTIAL UNIT

SITE PLAN
LIGHTING LAYOUT

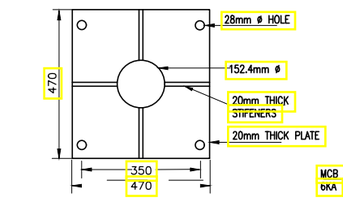
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN.			
FILE	DATE	DRAWING NO.	REV.
CKD.	FEB, 2026	156/325/TD/01E01	0
SUBM.			

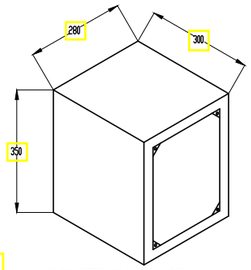
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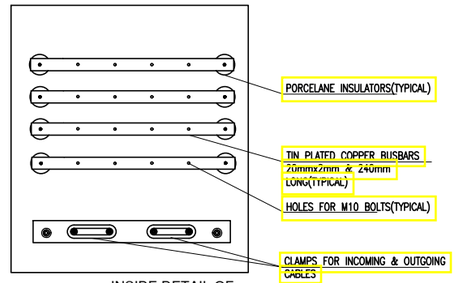
FOUR ARM LUMINAIRE GALVANIZED TUBULAR (12M)



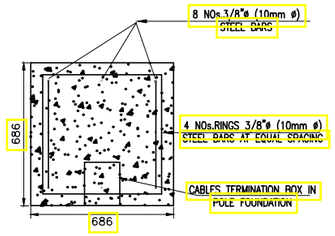
BASE PLATE FOR POLES



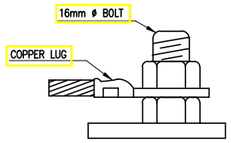
ISOMETRIC VIEW OF CABLE TERMINATION BOX



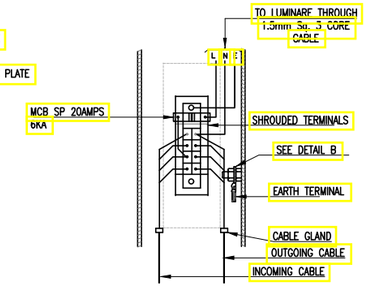
INSIDE DETAIL OF CABLE TERMINATION BOX



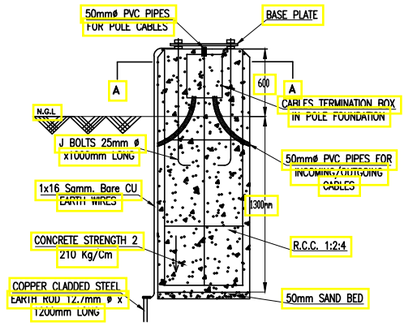
SECTION-A-A



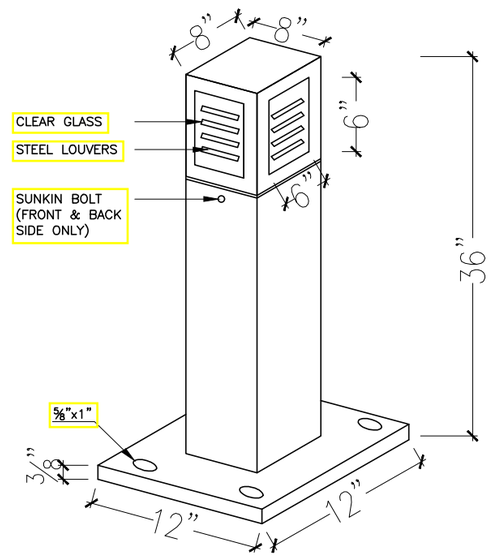
DETAIL-'B'



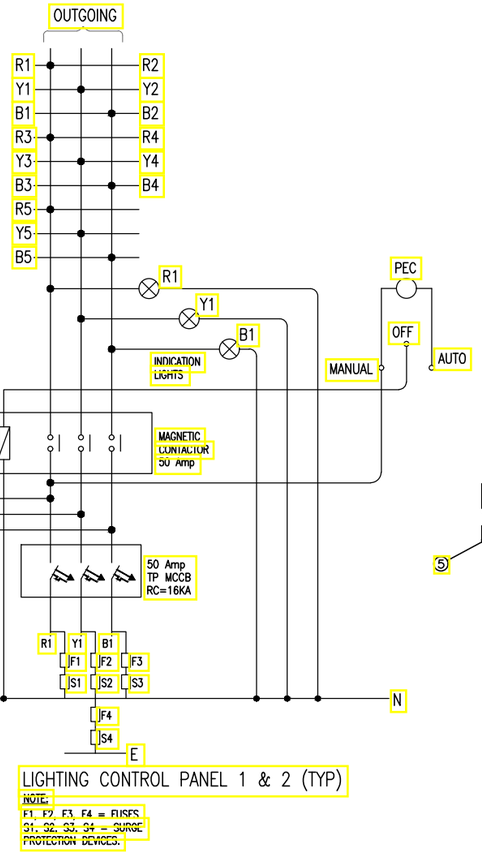
DETAIL OF INSPECTION/ CONNECTION CHAMBER



POLE FOUNDATION

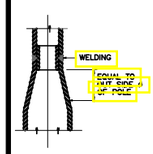


SQUARE SHAPE BOLARD LIGHT

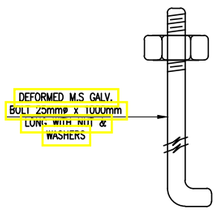


LIGHTING CONTROL PANEL 1 & 2 (TYP)

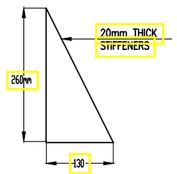
NOTE:
F1, F2, F3, F4 = FUSES
S1, S2, S3, S4 = SURGE PROTECTION DEVICES.



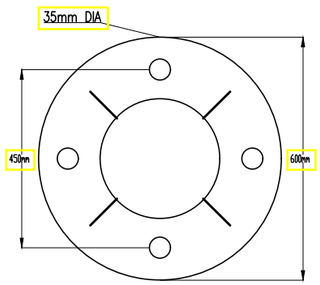
DETAIL-'Y'



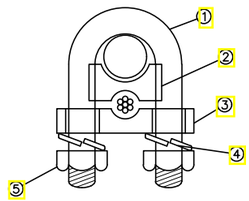
J-BOLT



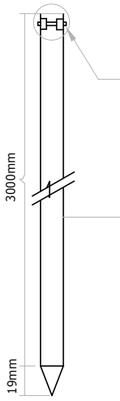
DETAIL-'C'



BASE PLATE TOP VIEW



DETAIL -B



16mm ø CU. DEPOSITED STEEL EARTHING ROD

DANGER OF SHOCK MAY PERSIST IF EARTH LEADS ARE LOOSE/ BROKEN AT THE ENDS

ROD TYPE EARTHING FOR POLES

ITEM NO.	ITEM NAME	MATERIAL
1	U-BOLT	MILD STEEL
2	SPACER	CAST IRON
3	BASE	MILD STEEL
4	SPRING WASHER	CARBON STEEL
5	NUT	MILD STEEL

GUN AND COUNTRY CLUB

RESIDENTIAL UNIT

SITE PLAN
STREET LIGHTS POLE DETAIL

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN.			
FILE			
CKD.			
SUBM.			

DATE: FEB, 2026

DRAWING NO. 156/325/TD/01E01

REV. 0

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GENERAL NOTES.

1 - PIPE PASSING THROUGH WALL, FLOOR OR ROOF SHALL BE PROTECTED WITH SLEEVES

2 - CLEANOUT OR ACCESS DOOR SHALL BE PROVIDED AT THE BASE OF ALL DRAINAGE STACK AND AT EACH FLOOR LEVEL.

3 - DRAINAGE STACKS SHALL BE CONNECTED TO HORIZONTAL FIXTURE DRAIN PIPES BY 90° SWEEP TEE OR Y AND 45° BEND.

4 - DRAINAGE STACKS SHALL BE CONNECTED TO UNDERGROUND DRAIN PIPE BY EITHER 90° LARGE/LONG RADIUS BEND OR TWO 45° BENDS, AS SUITED AS PER SITE.

5 - PIPE SIZES ARE IN INCHES. UNLESS OTHERWISE STATED

6 - PLUMBING SERVICES, SHALL BE CO-ORDINATED WITH OTHER SERVICES SUCH AS ELECTRICAL, HVAC ETC. TO AVOID CONFLICT OR INTERFERENCE WITH THEM.

7 - SIZE OF FLOOR DRAIN UNLESS OTHERWISE STATED SHALL BE SAME AS THE SIZE OF OUTLET DRAIN PIPE.

8 - WHEREVER FLOOR DRAIN/TRAP IS SHOWN, SLOPE FLOOR TOWARDS DRAIN/TRAP.

9 - HORIZONTAL DRAINAGE PIPING OF 3 INCH DIAMETER & LESS SHALL BE INSTALLED WITH A SLOPE OF NOT LESS THEN 1/4 INCH PER FOOT, LARGER ONES WITH A SLOPE OF NOT LESS THEN 1/8 INCH PER FOOT.

10 - EXTENSION OF VENT PIPES THROUGH A ROOF SHALL BE TERMINATED AT LEAST 6 INCHES ABOVE FINISHED ROOF LEVEL. EACH VENT TERMINAL SHALL BE MADE WATER TIGHT WITH THE ROOF BY PROPER FLASHING

11 - THE "VERTICAL DISTANCE" FROM FIXTURE OUTLET TO THE TRAP WEIR SHALL PREFERABLY BE NOT MORE THAN 12 INCHES. HOWEVER, THIS "VERTICAL DISTANCE" FROM THE FIXTURE OUTLET TO THE TRAP WEIR SHALL NOT EXCEED 24 INCHES.

12 - WHERE THE CHANGE OF DIRECTION IS 45° OR LESS, IT IS NOT NECESSARY TO PROVIDE A CLEAN OUT BUT WHEN THE CHANGE IN DIRECTION IS MORE THAN 45°, A CLEAN OUT SHOULD BE REQUIRED.

13 - CLEANOUTS SHALL BE SO INSTALLED THAT THERE IS A CLEARANCE OF NOT LESS THAN 18 INCHES FOR THE PURPOSE OF RODDING.

14 - ALL TRAPS AND FLOOR DRAINS SHALL HAVE A WATER SEAL NOT LESS THAN 2 INCHES.

15 - NO "T"-CONNECTION IS ALLOWED IN SOIL AND WASTE PIPING.

16 - ALL PLUMBING DUCTS MUST BE PLASTERED WITH 1:3 C/S WATER PROOF CHEMICAL BEFORE PIPE INSTALLATION.

17 - ALL PLUMBING DUCTS MUST HAVE ACCESS PANELS AT EACH FLOOR.

ABBREVIATION	DESCRIPTION
Ø	DIAMETER OF PIPE
CW	COLD WATER PIPE
HW	HOT WATER PIPE
HWR	HOT WATER RETURN
SP	SOIL PIPE
WP	WASTE PIPE
VP	VENT PIPE
S/S	SOIL STACK
W/S	WASTE STACK
V/S	VENT STACK
T/A	TO ABOVE
T/B	TO BELOW
F/A	FROM ABOVE
F/B	FROM BELOW
WT	WATER TAP
U/G.	UNDER GROUND
U/F.	UNDER FLOOR
GWH	GAS WATER HEATER
EWH	ELECTRIC WATER HEATER
EWC	ELECTRIC WATER COOLER

ABBREVIATION	DESCRIPTION
RWP	RAIN WATER PIPE
MH	MANHOLE
D/S	DRAINAGE STACK
GI	GALVANIZED IRON
PRV	PRESSURE REDUCING VALVE
HWL	HIGHEST WATER LEVEL
GWH	GAS WATER HEATER
GV	GATE VALVE
CV	CHECK VALVE
MS	MUSLIM SHOWER
FHC	FIRE HYDRANT CABINET
FF/C	FROM FALSE CEILING
AF/C	ABOVE FALSE CEILING
(TYP)	TYPICAL
FT	FLOOR TRAP
COP	CLEAN OUT PLUG
U/F	UNDER FLOOR / LOW LEVEL
FHC	FIRE HOSE CABINET
WC	WATER CLOSET
N.T.S.	NOT TO SCALE

SYMBOL	DESCRIPTION
	COLD WATER PIPE
	HOT WATER PIPE
	SOIL PIPE
	WASTE PIPE
	VENT PIPE
	GATE VALVE ON HORIZONTAL PIPE
	GATE VALVE ON VERTICAL PIPE
	CHECK VALVE OR NON-RETURN VALVE
CO	FLOOR CLEAN OUT
COP	FLOOR CLEAN OUT PLUG
MFT	MULTI FLOOR TRAP
FT	FLOOR TRAP
	DIRECTION OF FLOW
MS	MUSLIM SHOWER
WT	WATER TAP
	GULLY TRAP
GEWH	GAS& ELECTRIC TWIN WATER HEATER
EWH	ELECTRIC WATER HEATER
	PLUGGED
	WATER PUMP
MH	MANHOLE WITH BLIND COVER
CP	RAIN CATCH PIT WITH GRATING COVER
	KHURA WITH PARKING DRAIN
	KHURA WITH ROOF DRAIN
	STORM DRAIN WITH GRATING COVER
PRV	PRESSURE REDUCING VALVE

NOTE:-

1-READ THIS DRAWING IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT DRAWINGS.

SCALE: NTS

GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

GENERAL NOTES,SYMBOLS & ABBREVIATION

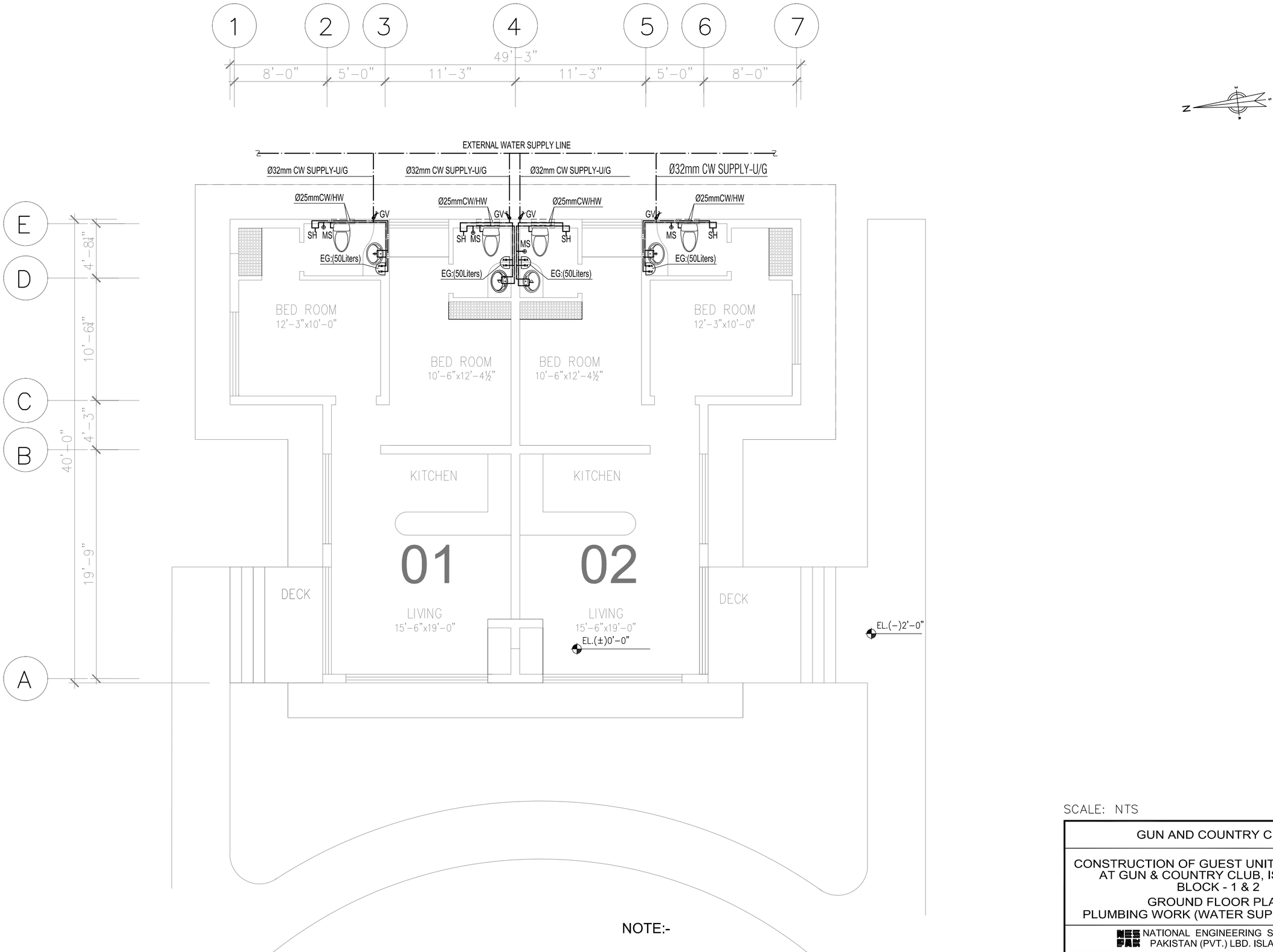
PLUMBING WORKS

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN. HASNAT			
FILE			
CKD. M.A.JAVED			
SUBM. M.A.JAVED			

DATE	DRAWING NO.	REV.
MAR. 2026	156/326/TD/01F01	0



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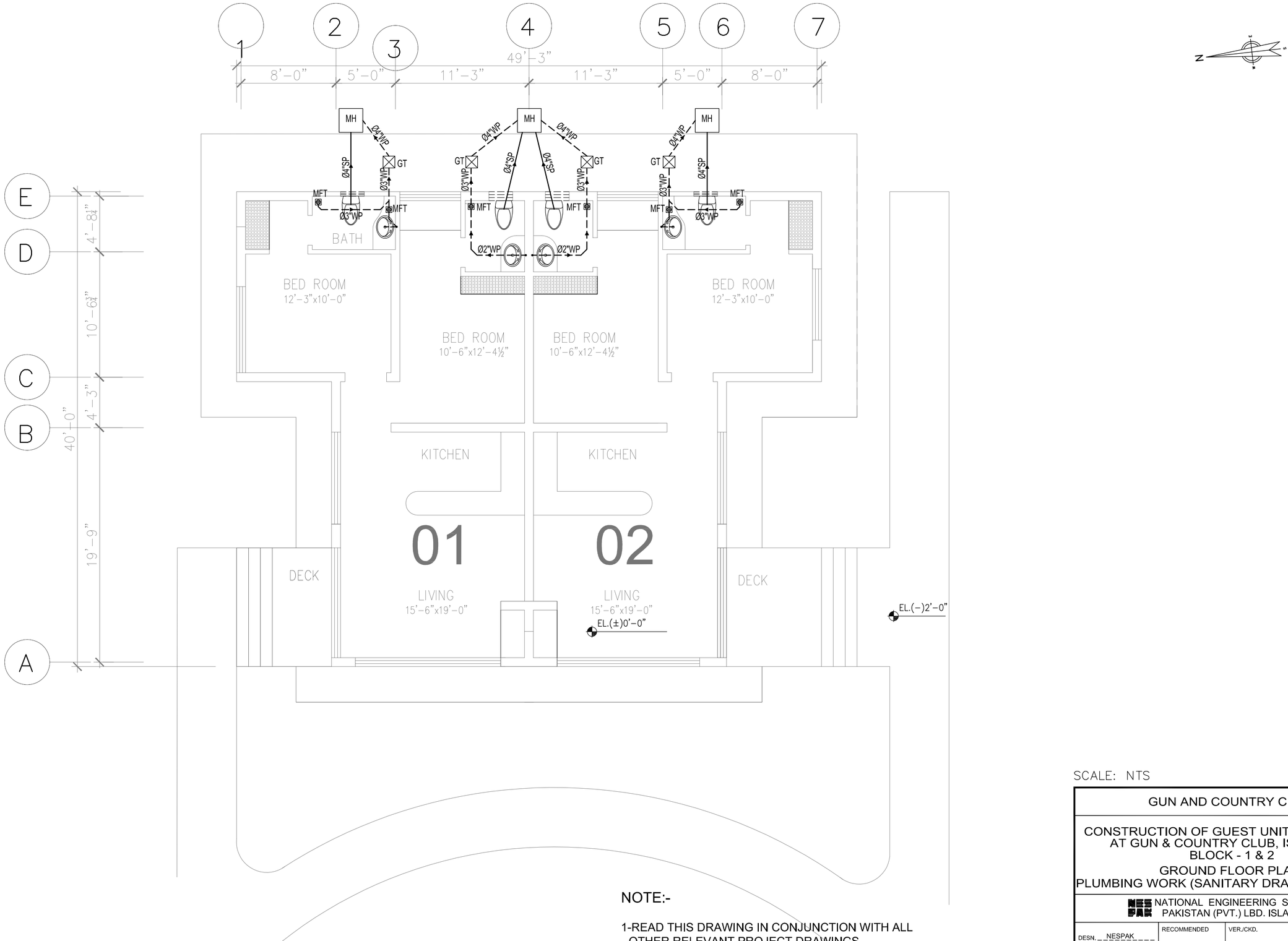
REFERENCE DRAWINGS		REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 1 & 2
GROUND FLOOR PLAN
PLUMBING WORK (WATER SUPPLY LAYOUT)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE			
CKD. M.A.JAVED	DATE	DRAWING NO.	REV.
SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F02	0



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SCALE: NTS

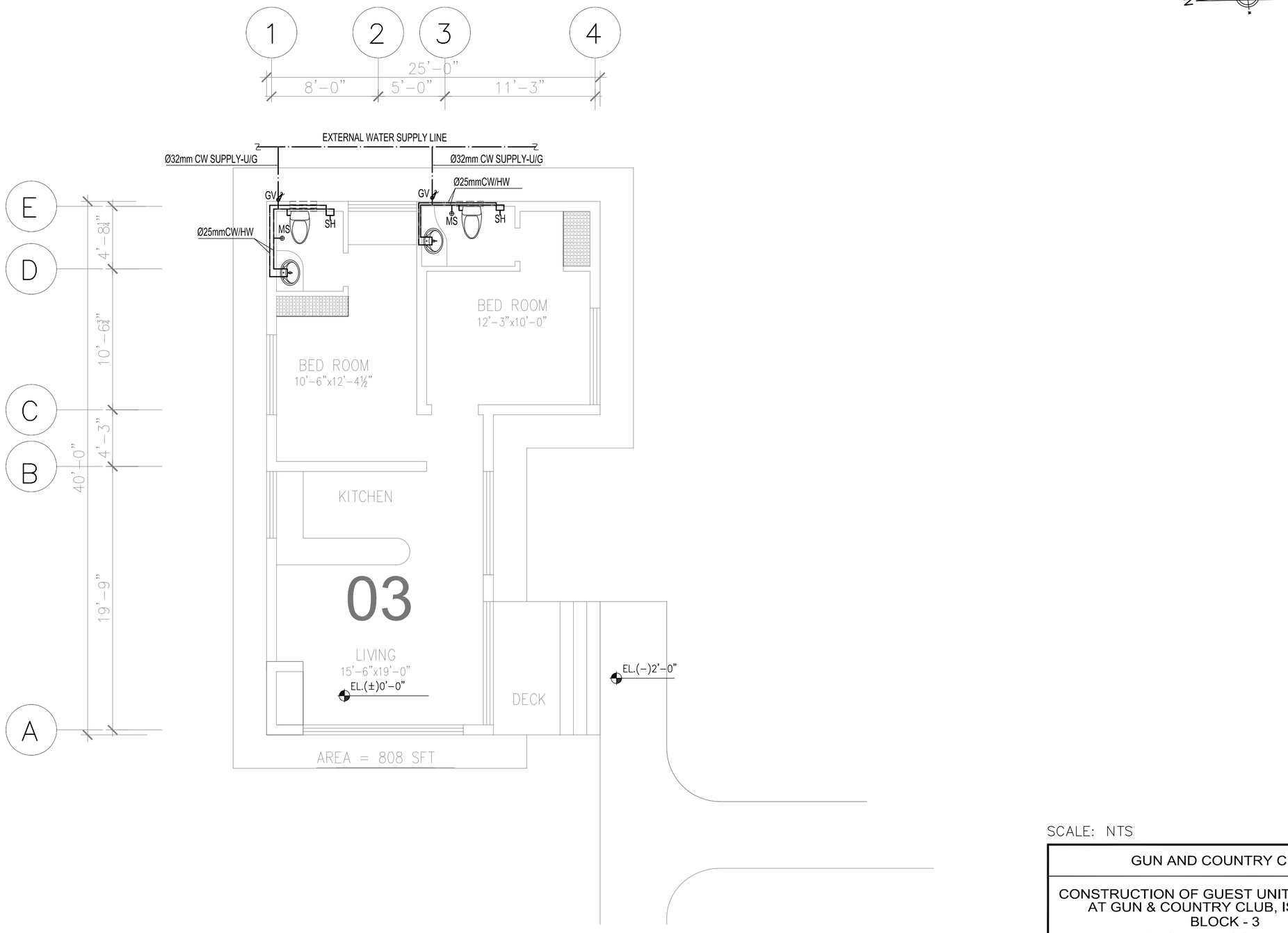
REFERENCE DRAWINGS		REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 1 & 2
GROUND FLOOR PLAN
PLUMBING WORK (SANITARY DRAINAGE LAYOUT)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE			
CKD. M.A.JAVED	DATE	DRAWING NO.	REV.
SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F03	0



SCALE: NTS

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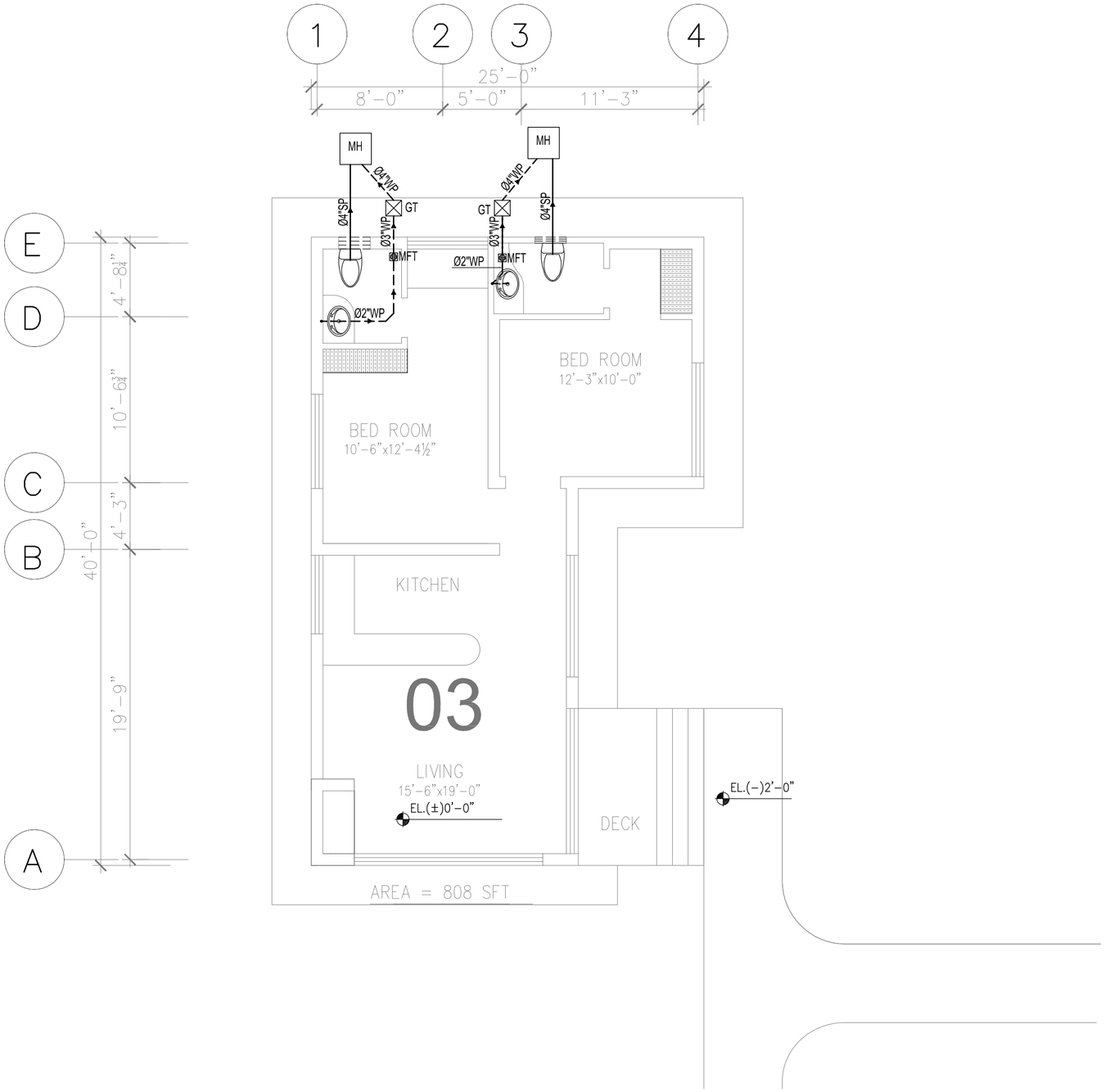
GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 3
GROUND FLOOR PLAN
PLUMBING WORK (WATER SUPPLY LAYOUT)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN. HASNAT			
FILE			
CKD. M.A.JAVED			
SUBM. M.A.JAVED			

DATE	DRAWING NO.	REV.
MAR. 2026	156/326/TD/01F04	0



N W E S

SCALE: NTS

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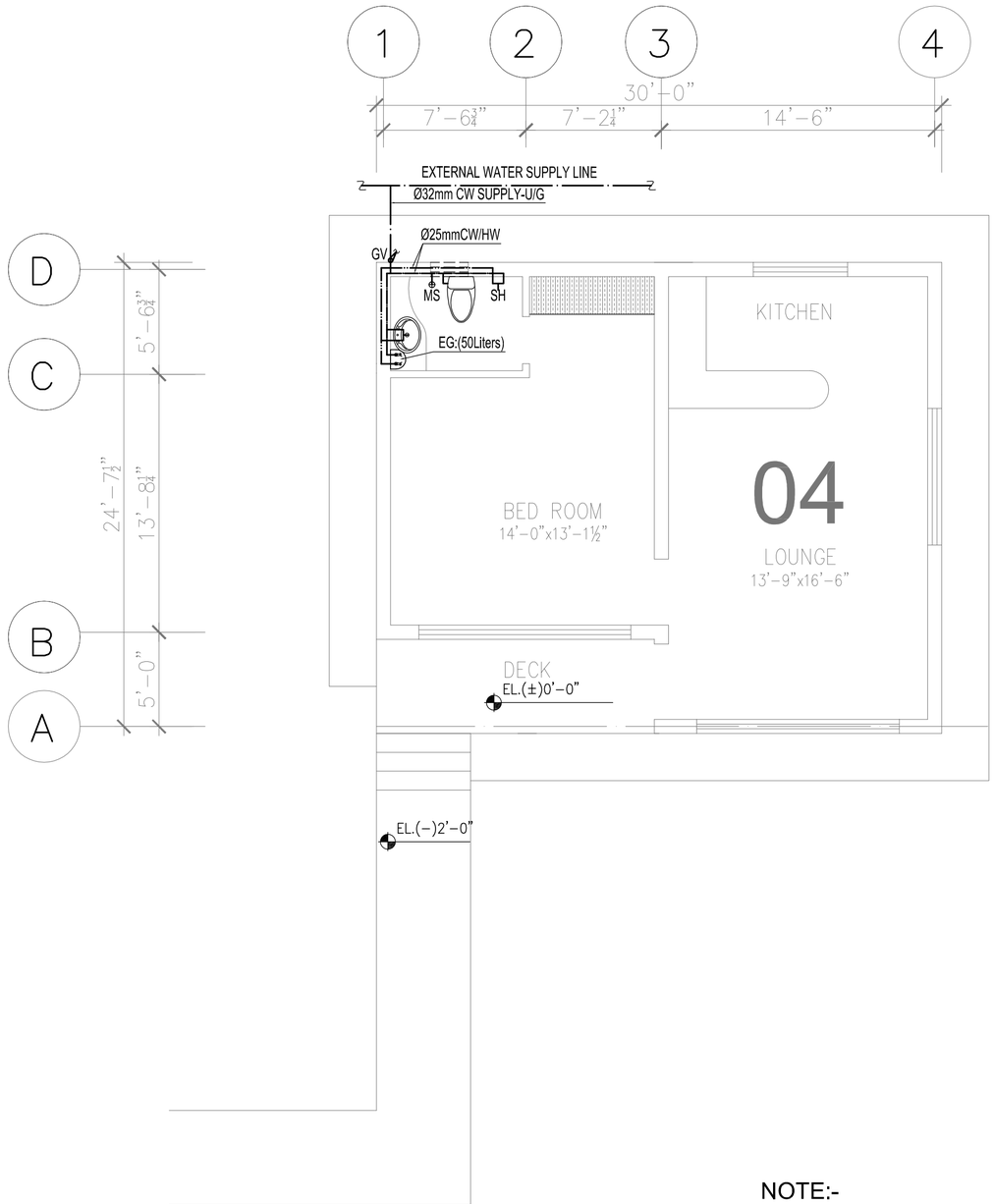
REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 3
GROUND FLOOR PLAN
PLUMBING WORK (SANITARY DRAINAGE LAYOUT)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE			
CKD. M.A.JAVED	DATE	DRAWING NO.	REV.
SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F05	0



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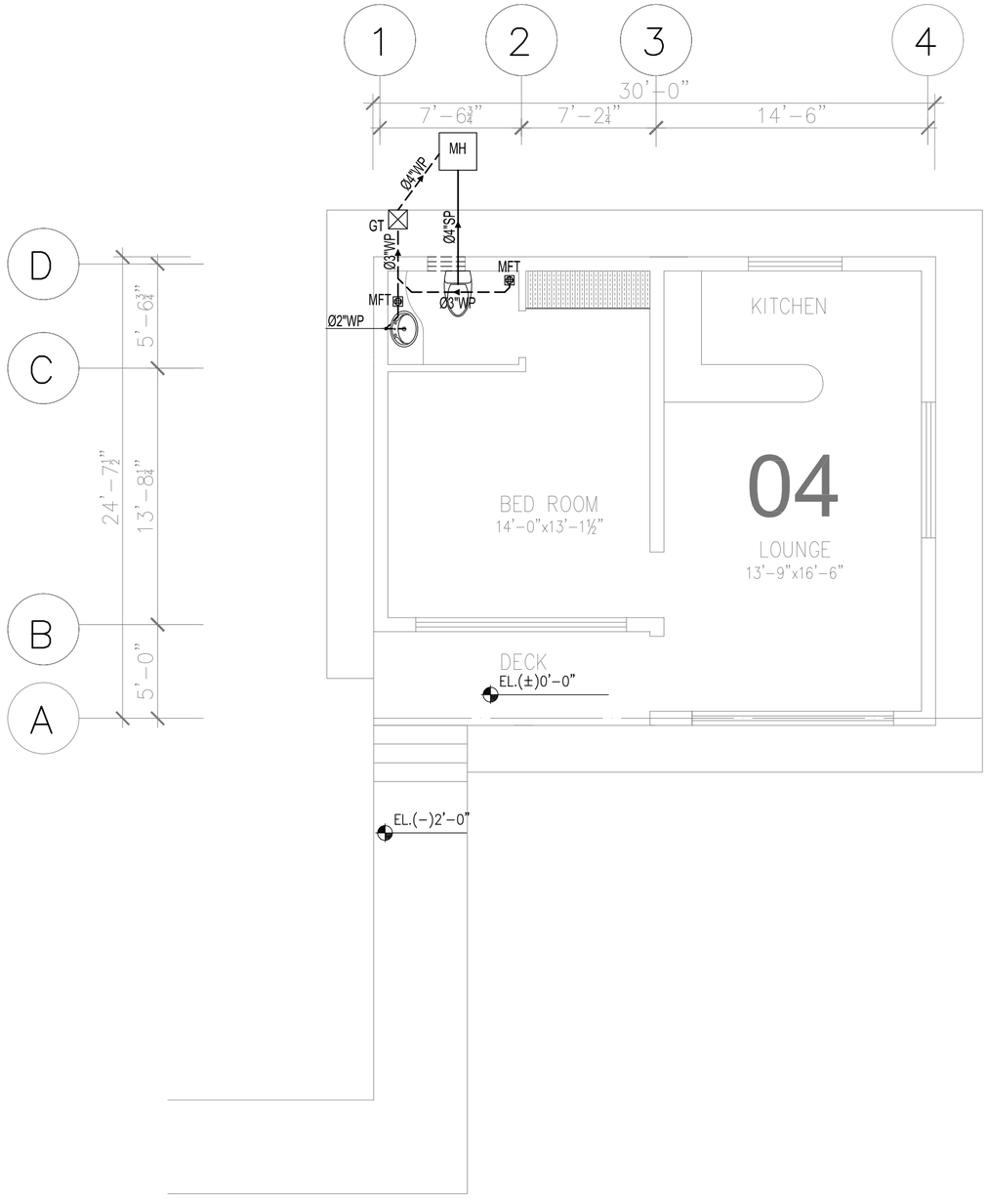
GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 4
GROUND FLOOR PLAN
PLUMBING WORK (WATER SUPPLY LAYOUT)

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE			
CKD. M.A.JAVED			
SUBM. M.A.JAVED			

DATE	DRAWING NO.	REV.
MAR. 2026	156/326/TD/01F06	0



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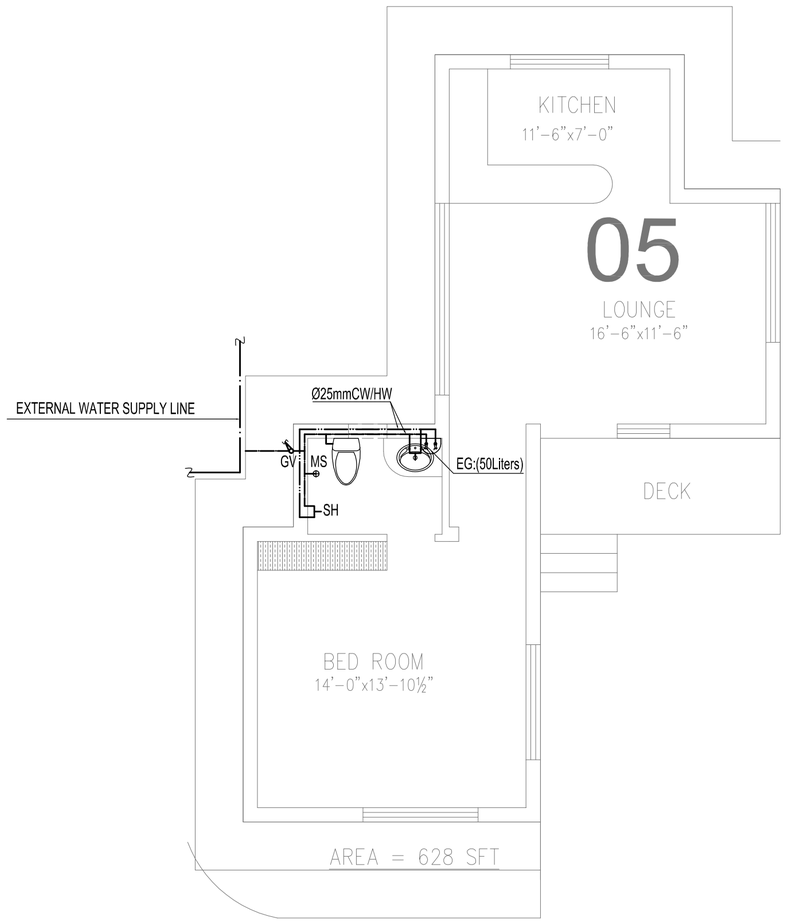
GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 4
GROUND FLOOR PLAN
PLUMBING WORK (SANITARY DRAINAGE LAYOUT)

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE	DATE	DRAWING NO.	REV.
CKD. M.A.JAVED			
SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F07	0

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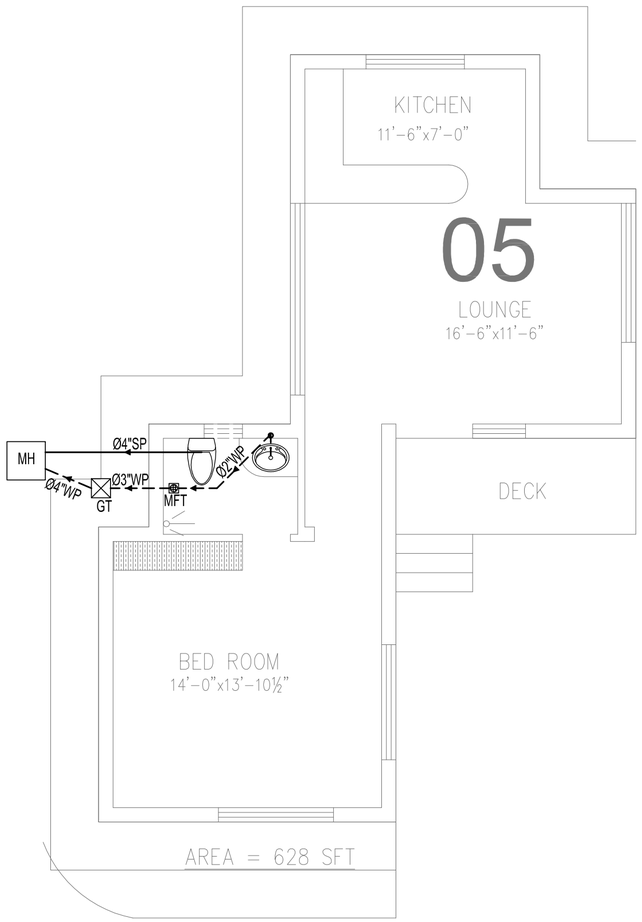
SCALE: NTS

GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 5
GROUND FLOOR PLAN
PLUMBING WORK (WATER SUPPLY LAYOUT)

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE			
CKD. M.A.JAVED	DATE	DRAWING NO.	REV.
SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F08	0



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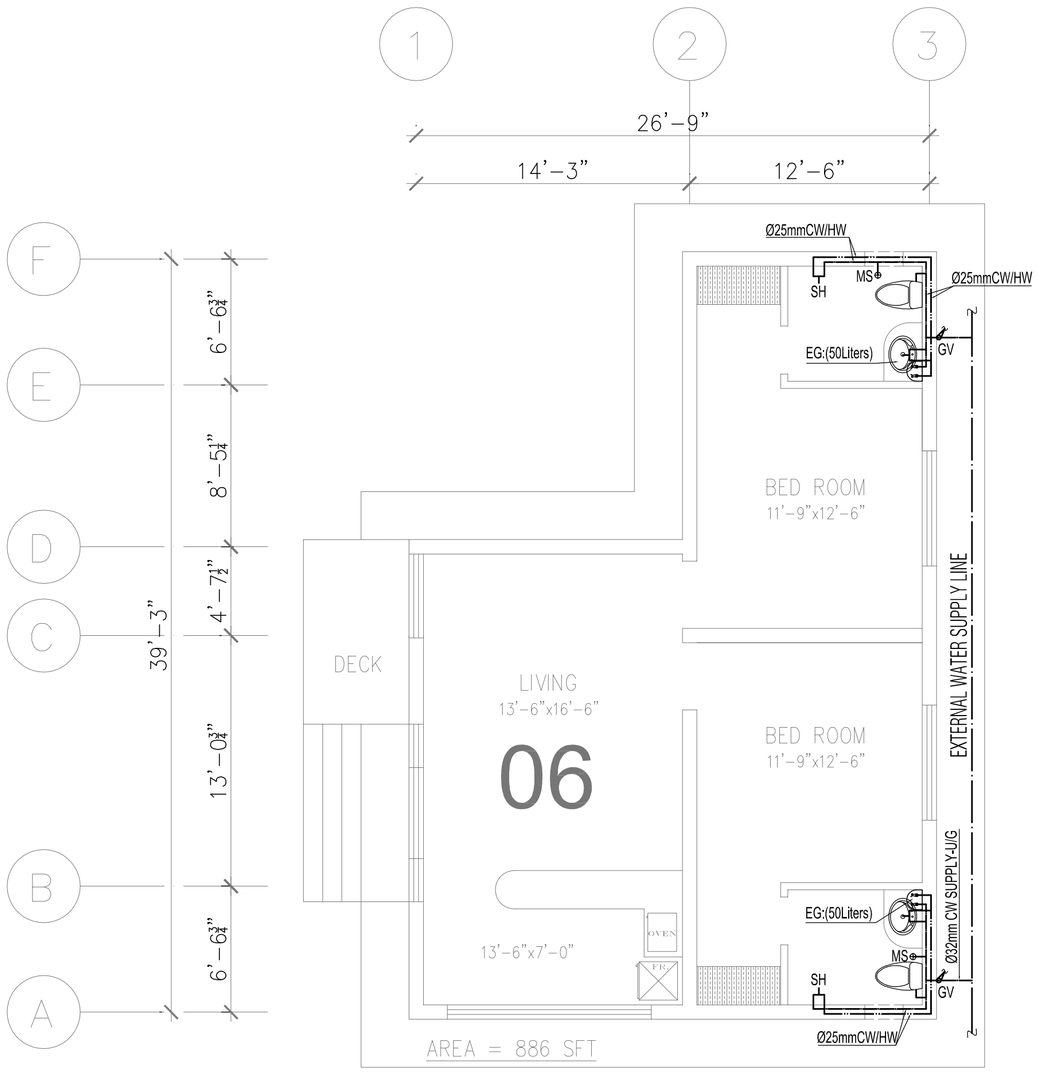
GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 5
GROUND FLOOR PLAN
PLUMBING WORK (SANITARY DRAINAGE LAYOUT)

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN. HASNAT			
FILE			
CKD. M.A.JAVED			
SUBM. M.A.JAVED			

DATE	DRAWING NO.	REV.
MAR. 2026	156/326/TD/01F09	0



SCALE: NTS

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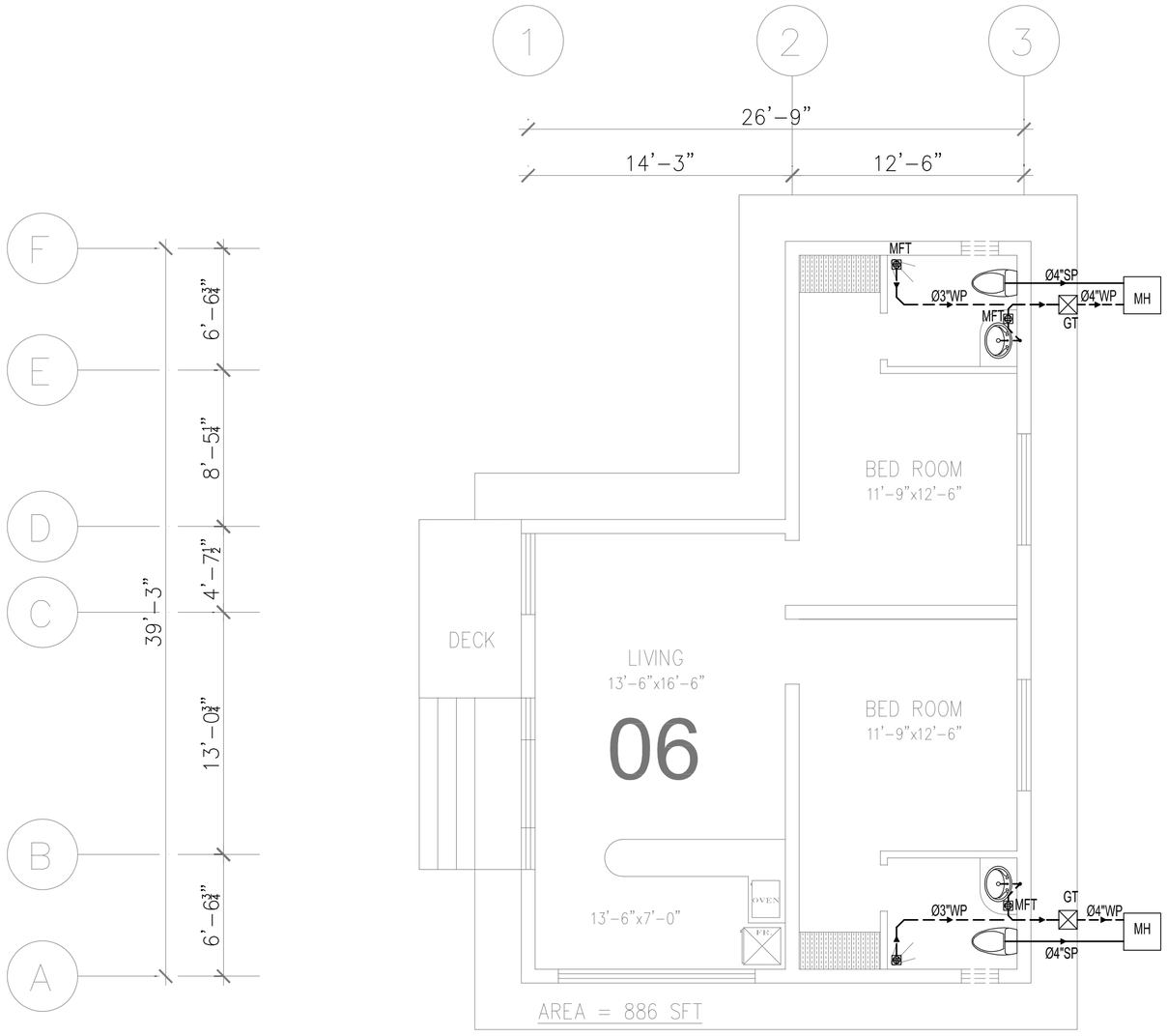
GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 6
GROUND FLOOR PLAN
PLUMBING WORK (WATER SUPPLY LAYOUT)

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN. HASNAT			
FILE			
CKD. M.A.JAVED			
SUBM. M.A.JAVED			

DATE	DRAWING NO.	REV.
MAR. 2026	156/326/TD/01F10	0



SCALE: NTS

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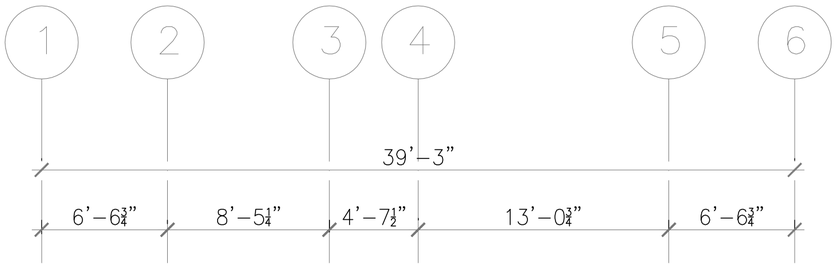
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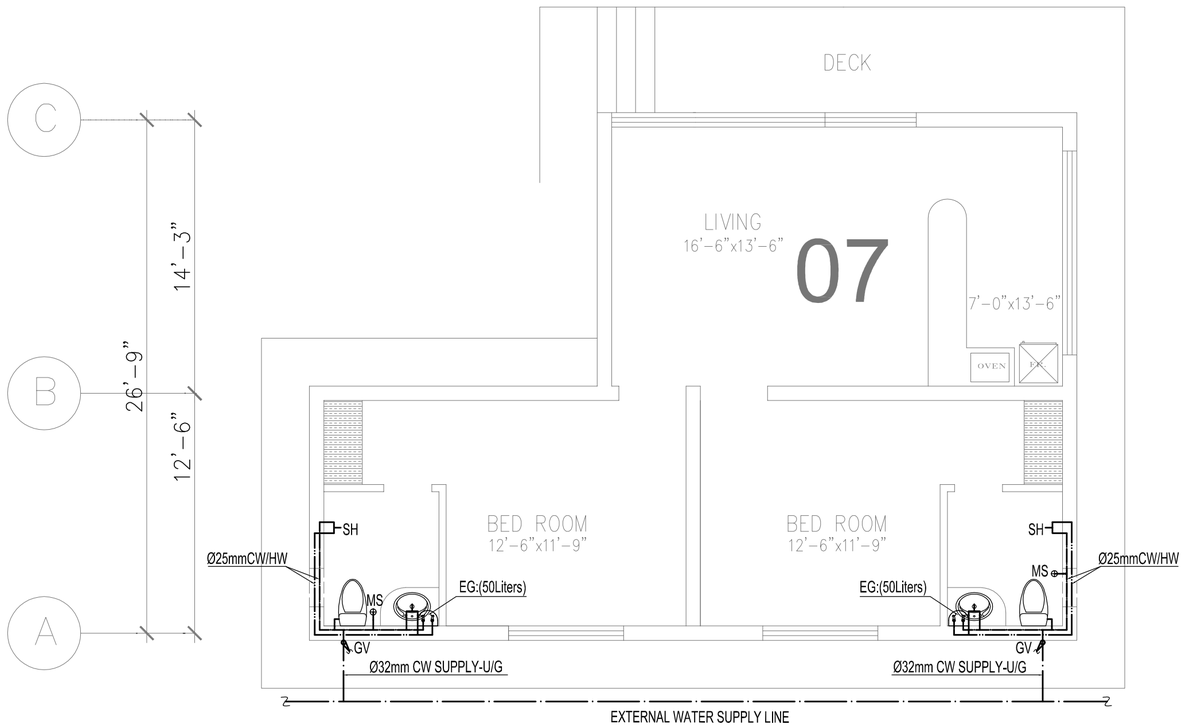
GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 6
GROUND FLOOR PLAN
PLUMBING WORK (SANITARY DRAINAGE LAYOUT)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE	DATE	DRAWING NO.	REV.
CKD. M.A.JAVED			
SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F11	0





SCALE: NTS

NOTE:-

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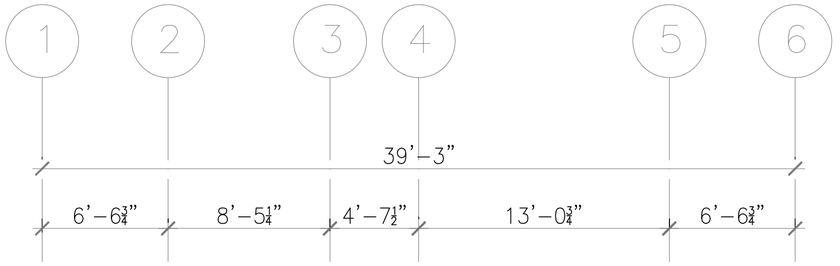
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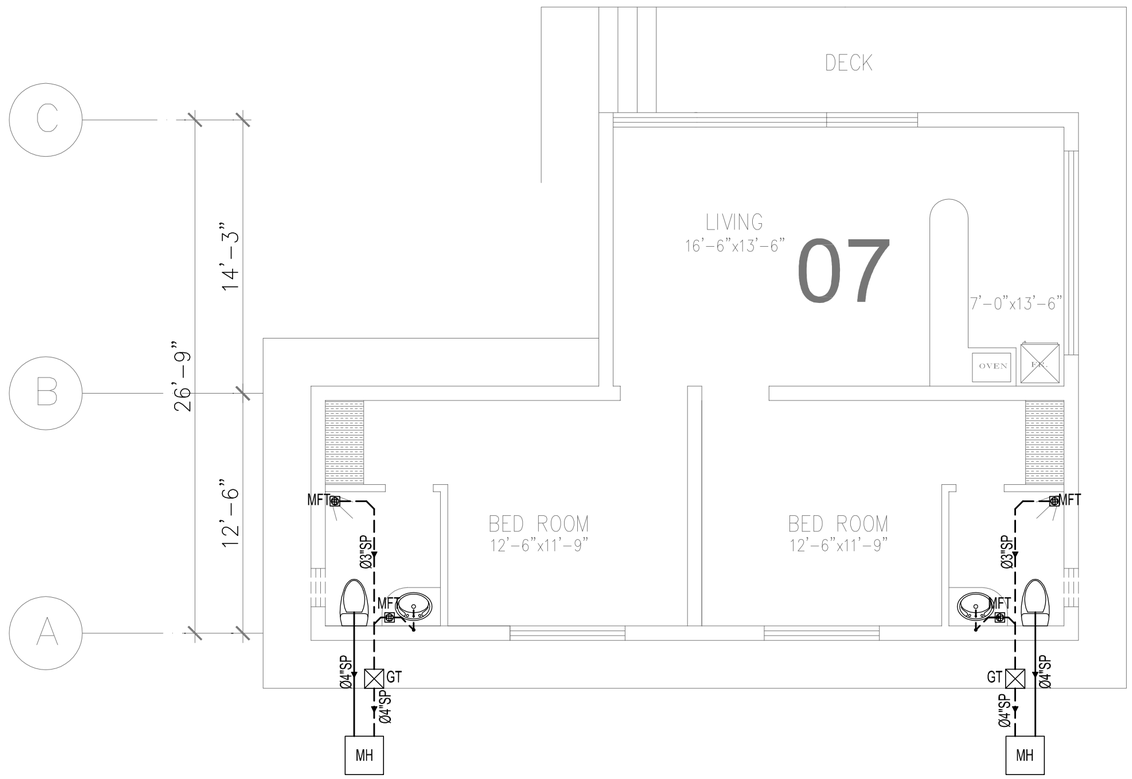
GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 7
GROUND FLOOR PLAN
PLUMBING WORK (WATER SUPPLY LAYOUT)

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE			
CKD. M.A.JAVED	DATE	DRAWING NO.	REV.
SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F12	0





SCALE: NTS

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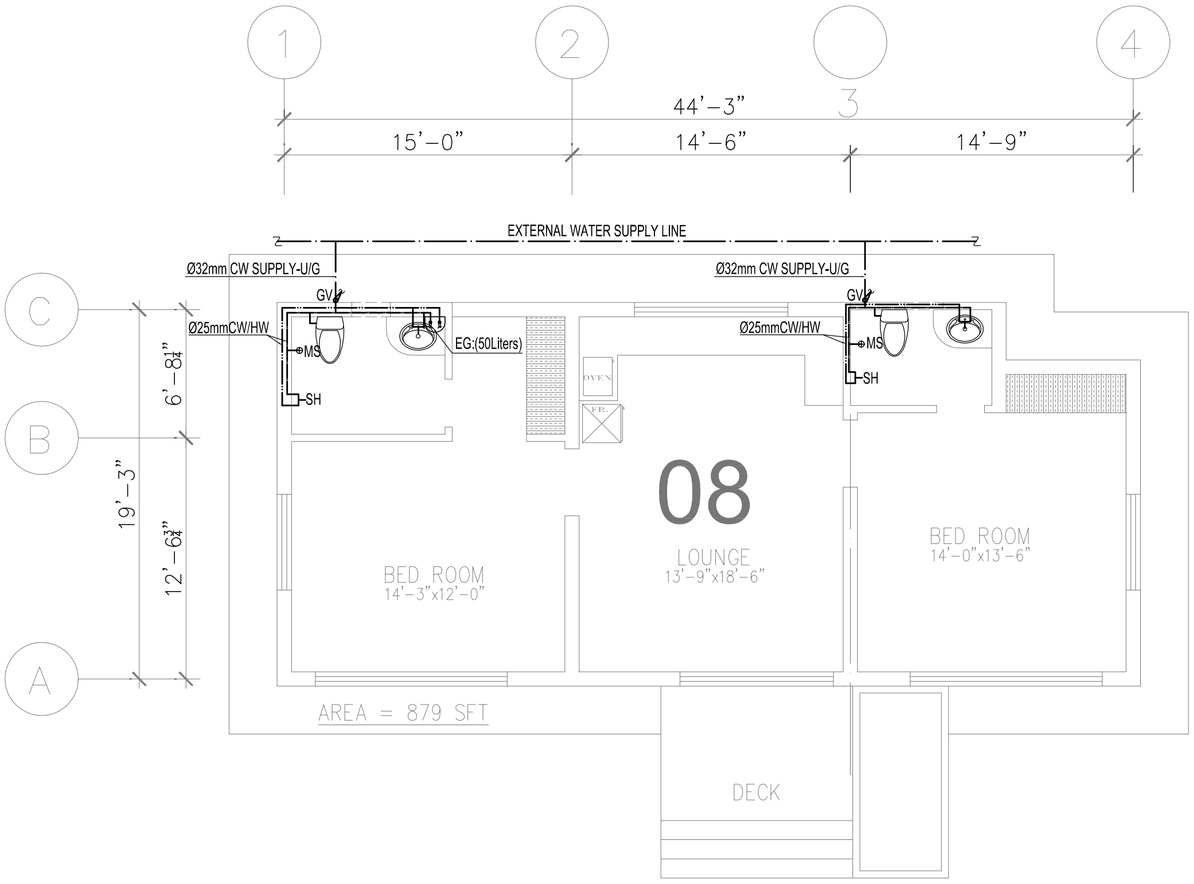
REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 7
GROUND FLOOR PLAN
PLUMBING WORK (SANITARY DRAINAGE LAYOUT)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE			
CKD. M.A.JAVED	DATE	DRAWING NO.	REV.
SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F13	0



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SCALE: NTS

GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 8

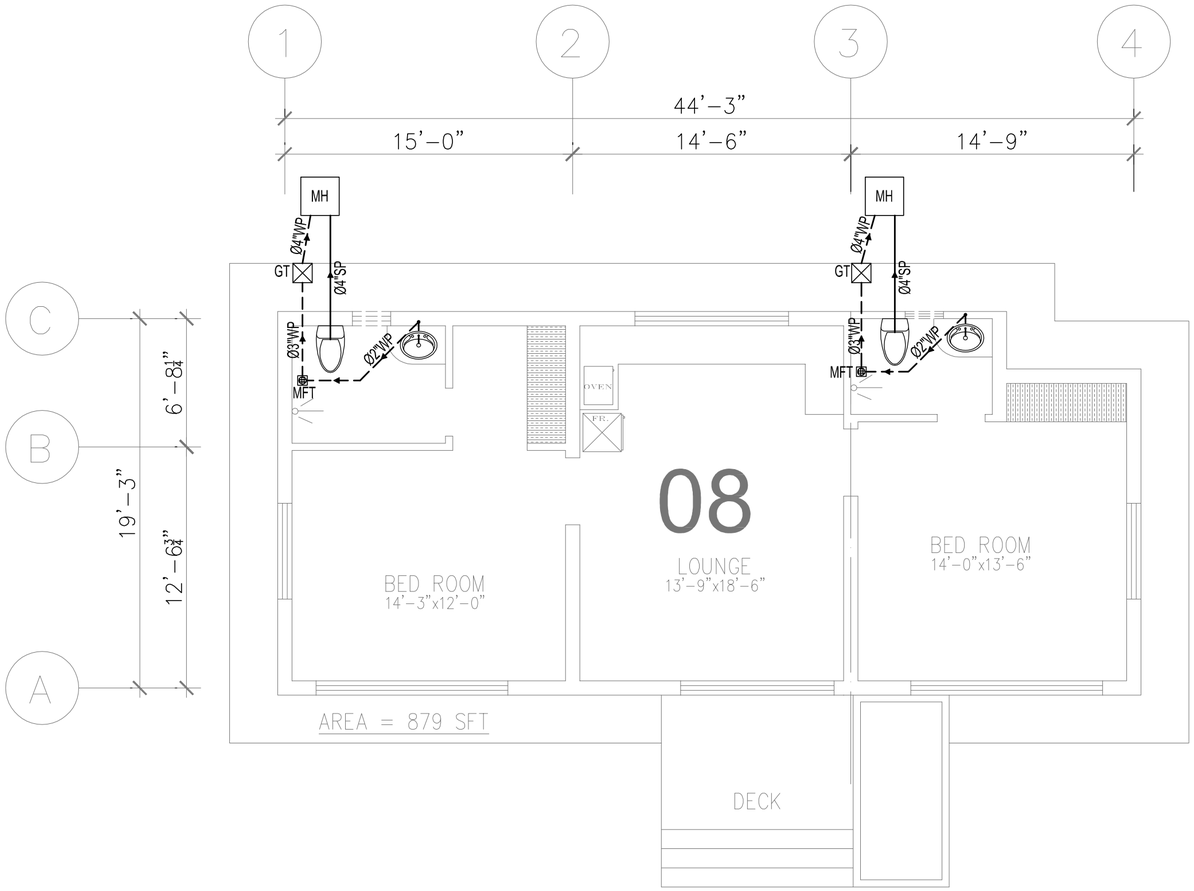
GROUND FLOOR PLAN
PLUMBING WORK (WATER SUPPLY LAYOUT)

NESPAK NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN. HASNAT			
FILE			
CKD. M.A.JAVED			
SUBM. M.A.JAVED			

DATE	DRAWING NO.	REV.
MAR. 2026	156/326/TD/01F14	0

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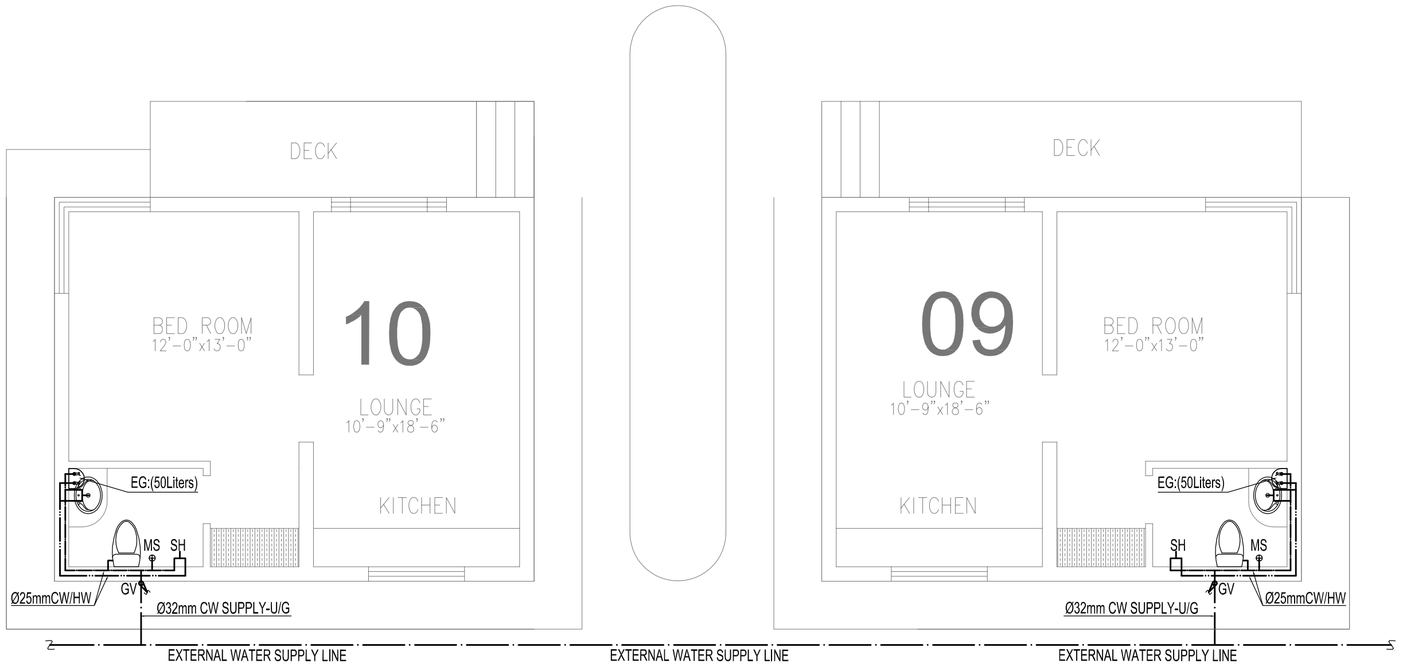
GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 8

GROUND FLOOR PLAN
PLUMBING WORK (SANITARY DRAINAGE LAYOUT)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE			
CKD. M.A.JAVED	DATE	DRAWING NO.	REV.
SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F15	0



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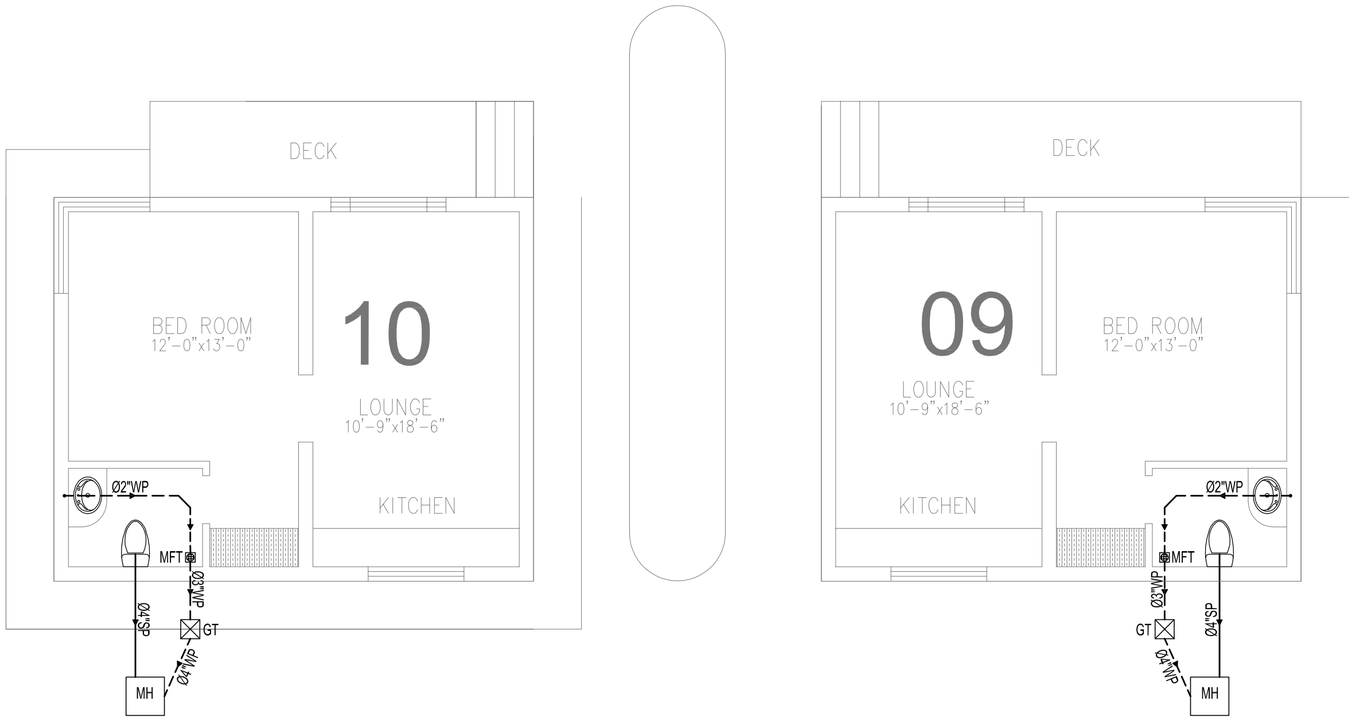
GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 9&10
GROUND FLOOR PLAN
PLUMBING WORK (WATER SUPPLY LAYOUT)

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN. HASNAT			
FILE			
CKD. M.A.JAVED			
SUBM. M.A.JAVED			

DATE	DRAWING NO.	REV.
MAR. 2026	156/326/TD/01F16	0



NOTE:-

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SCALE: NTS

GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 9&10

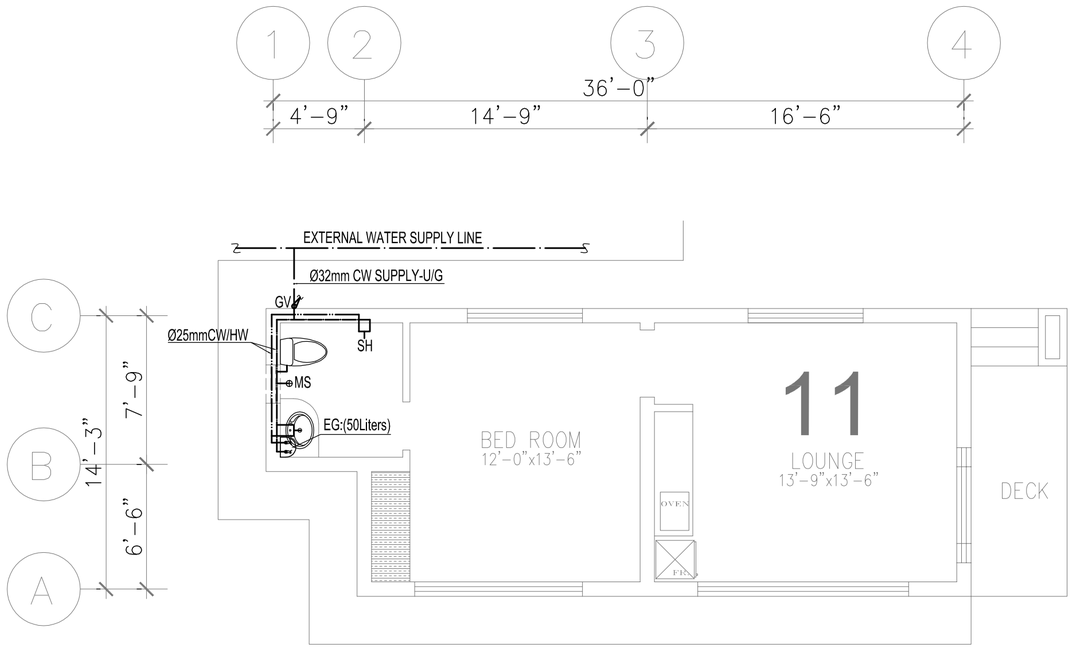
GROUND FLOOR PLAN
PLUMBING WORK (SANITARY DRAINAGE LAYOUT)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN. HASNAT			
FILE			
CKD. M.A.JAVED			
SUBM. M.A.JAVED			

DATE	DRAWING NO.	REV.
MAR. 2026	156/326/TD/01F17	0

REFERENCE DRAWINGS	REV. NO	DATE	DESCRIPTION	BY	CKD.	APPR.



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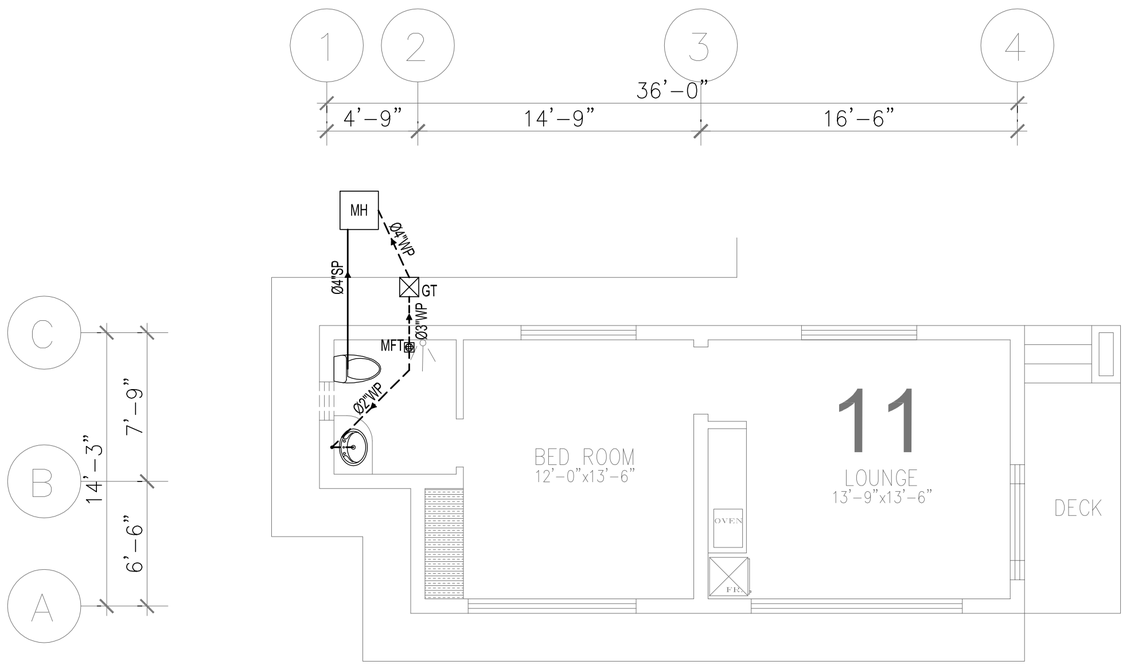
GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 11

GROUND FLOOR PLAN
PLUMBING WORK (WATER SUPPLY LAYOUT)

NESPAK NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE			
CKD. M.A.JAVED	DATE	DRAWING NO.	REV.
SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F18	0



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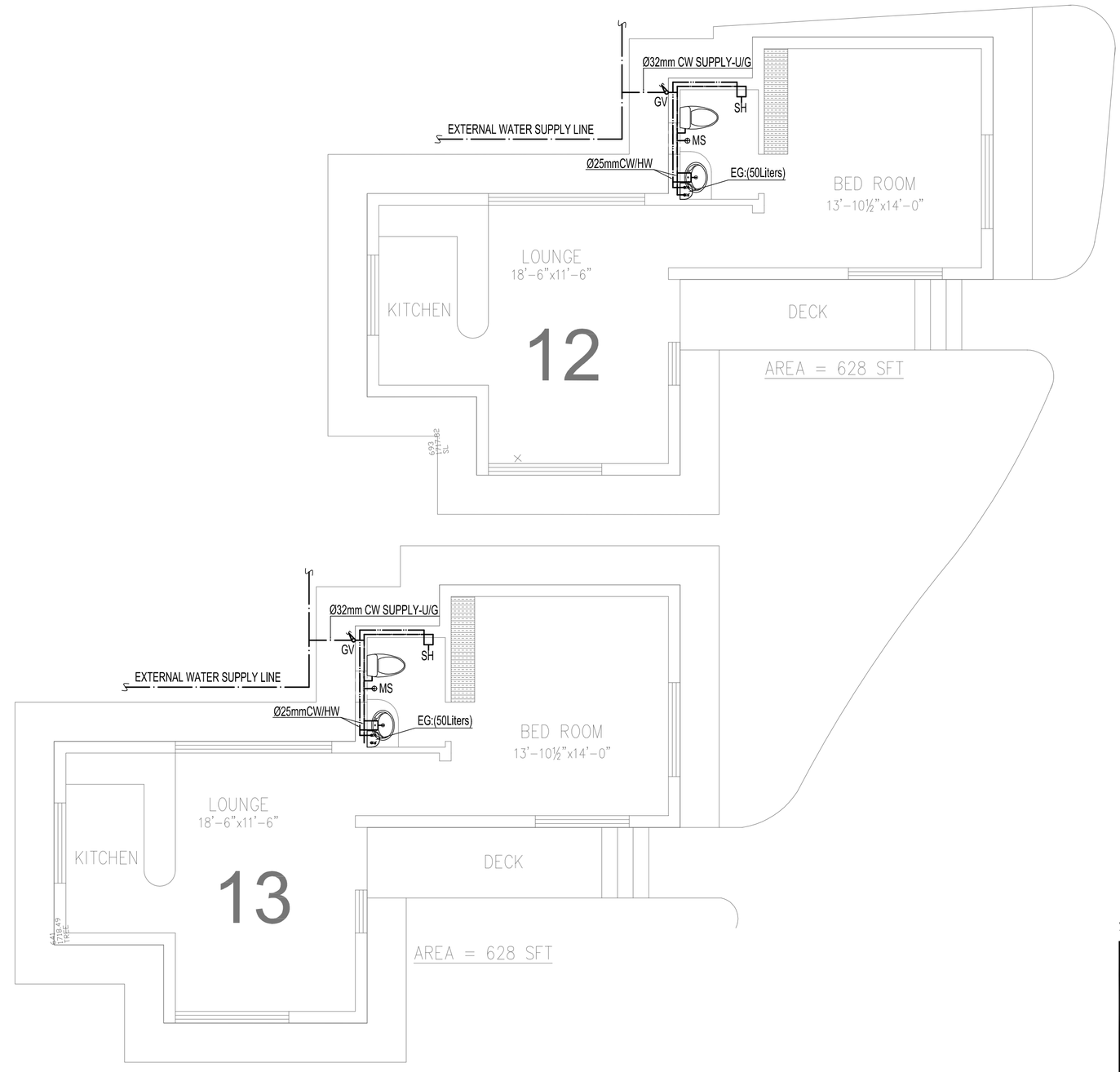
GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 11

GROUND FLOOR PLAN
PLUMBING WORK (SANITARY DRAINAGE LAYOUT)

NESPAK NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE			
CKD. M.A.JAVED	DATE	DRAWING NO.	REV.
SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F19	0



SCALE: NTS

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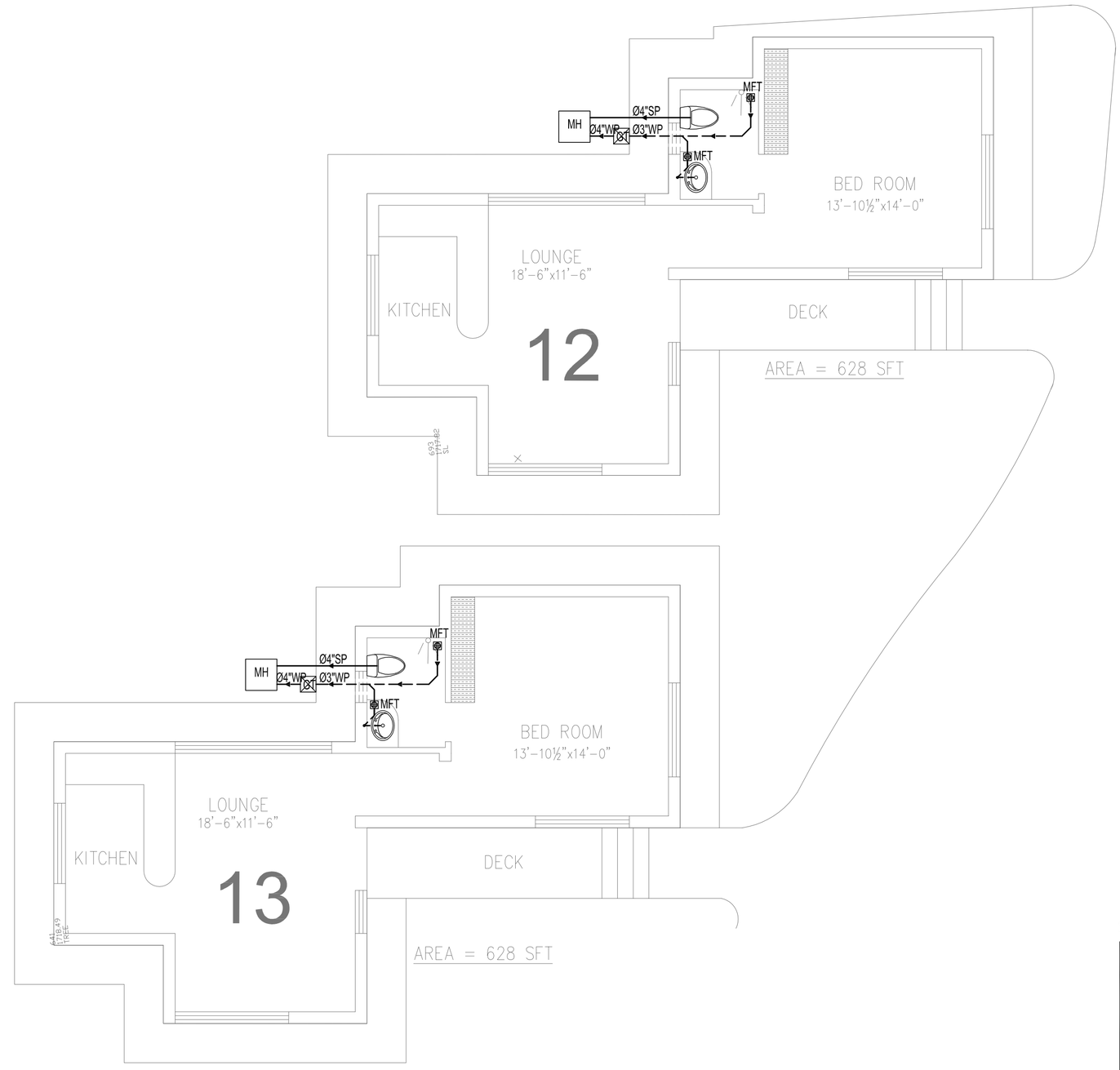
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GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 12&13
GROUND FLOOR PLAN
PLUMBING WORK (WATER SUPPLY LAYOUT)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE	DATE	DRAWING NO.	REV.
CKD. M.A.JAVED			
SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F20	0



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1-READ THIS DRAWING IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT DRAWINGS.

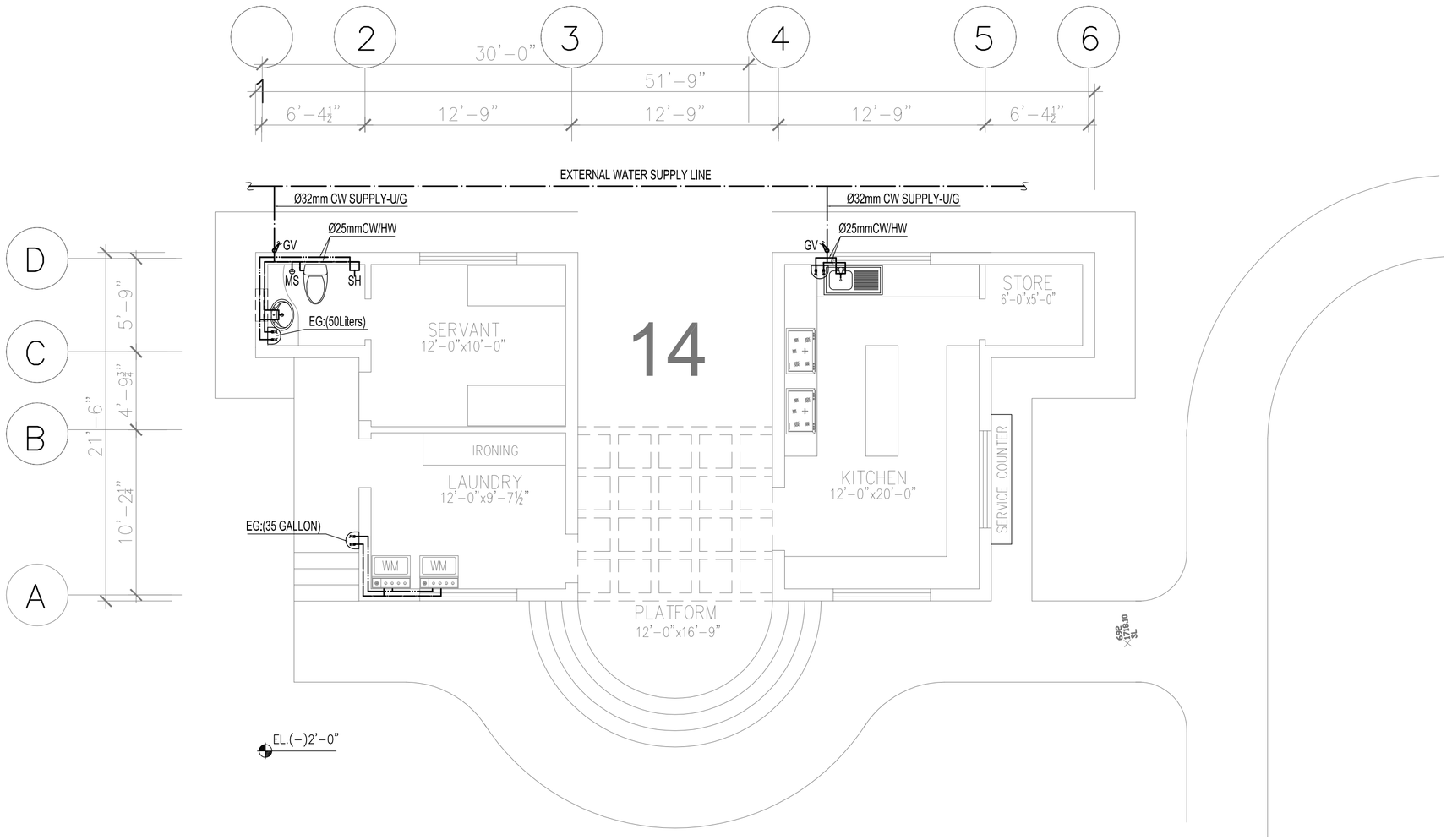
REFERENCE DRAWINGS		REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 12&13
GROUND FLOOR PLAN
PLUMBING WORK (SANITARY DRAINAGE LAYOUT)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE	DATE	DRAWING NO.	REV.
CKD. M.A.JAVED			
SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F21	0



SCALE: NTS

NOTE:-

1-READ THIS DRAWING IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT DRAWINGS.

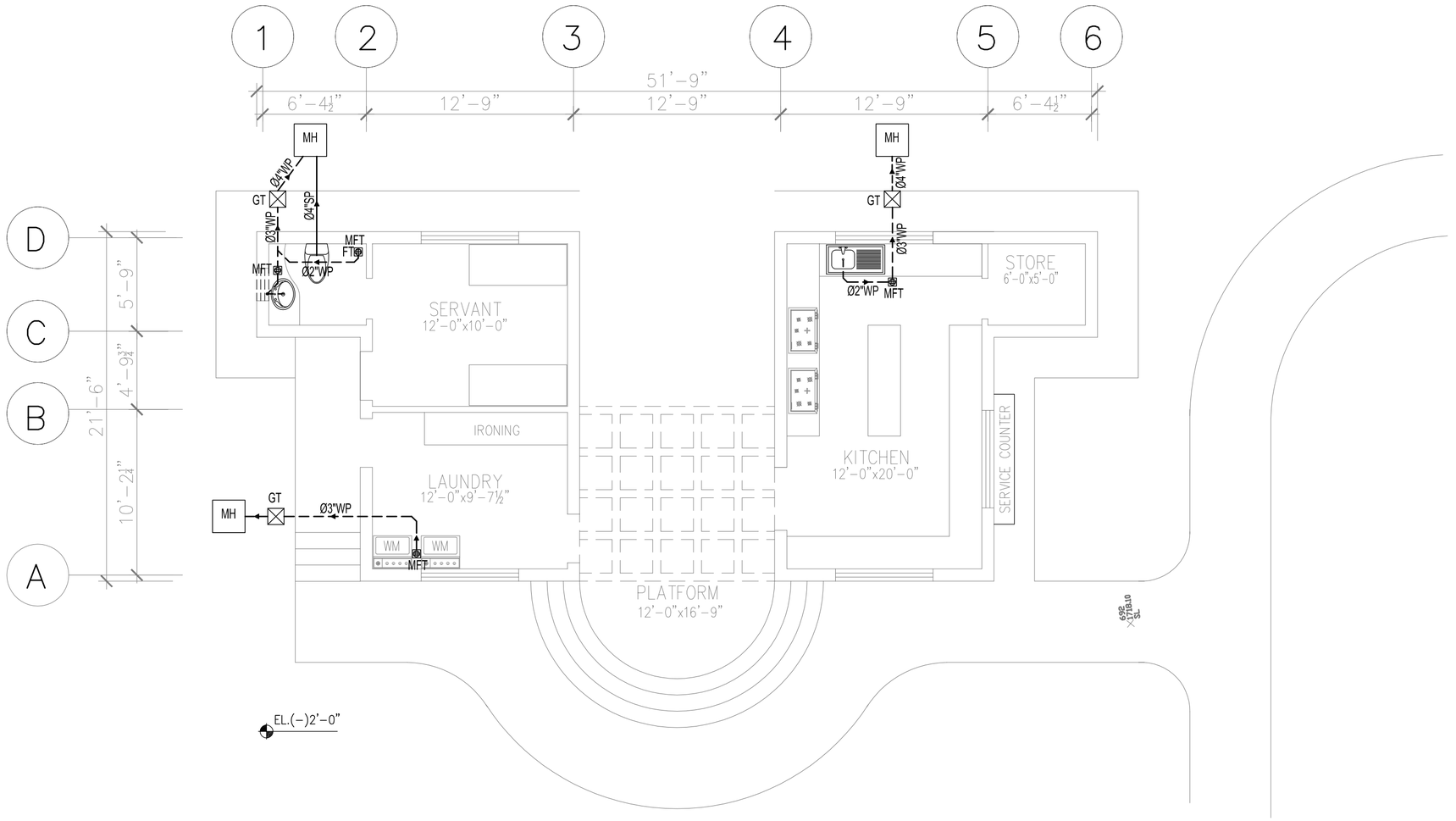
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GUN AND COUNTRY CLUB

CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 14
GROUND FLOOR PLAN
PLUMBING WORK (WATER SUPPLY LAYOUT)

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. HASNAT			
FILE	DATE	DRAWING NO.	REV.
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SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F22	0



SCALE: NTS

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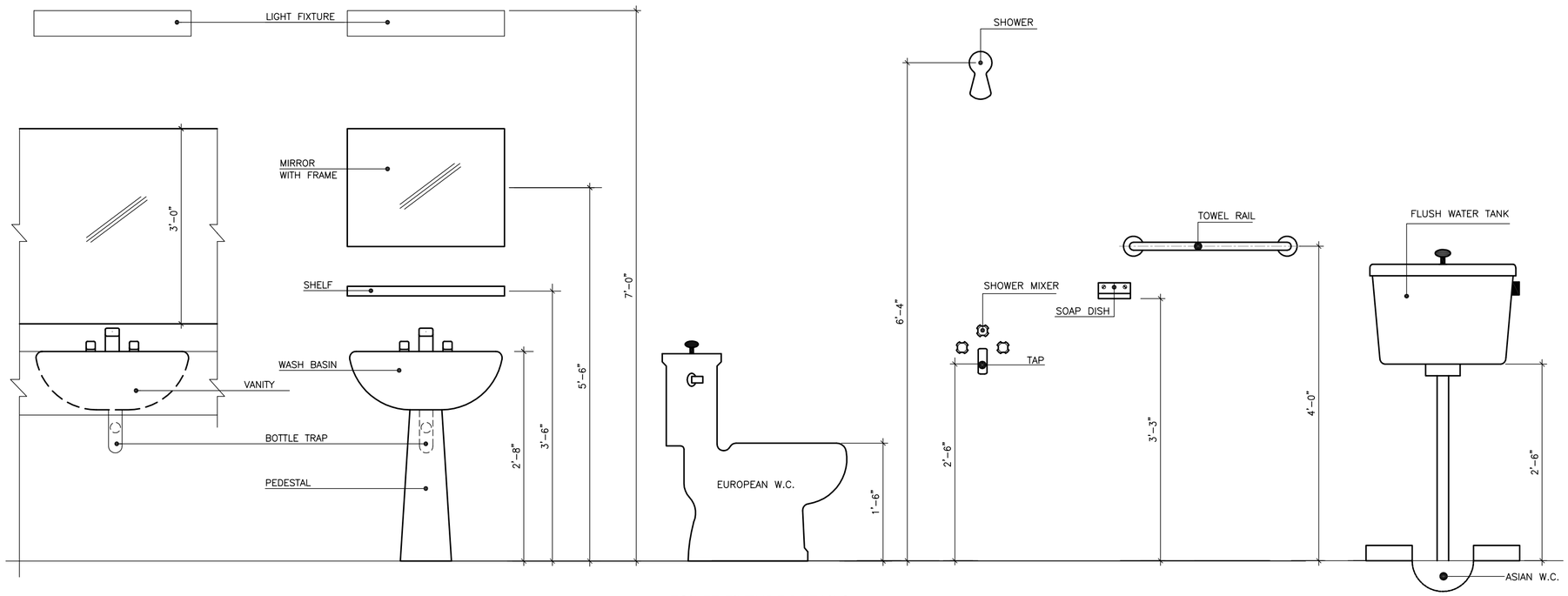
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GUN AND COUNTRY CLUB

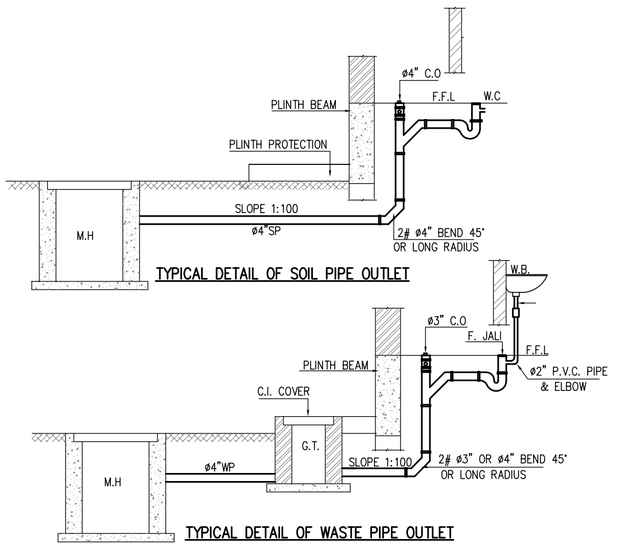
CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD
BLOCK - 14
GROUND FLOOR PLAN
PLUMBING WORK (SANITARY DRAINAGE LAYOUT)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
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CKD. M.A.JAVED	DATE	DRAWING NO.	REV.
SUBM. M.A.JAVED	MAR. 2026	156/326/TD/01F23	0

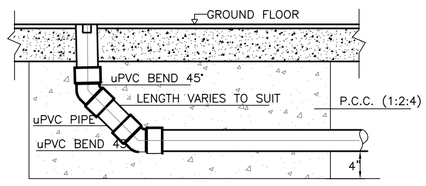


TOILET FIXTURE DETAILS

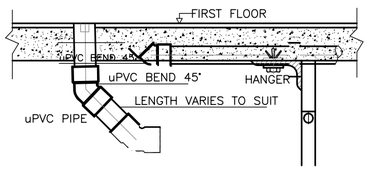


TYPICAL DETAIL OF SOIL PIPE OUTLET

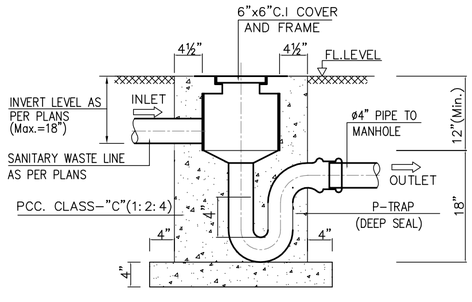
TYPICAL DETAIL OF WASTE PIPE OUTLET



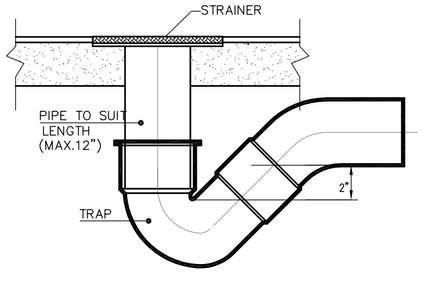
DETAIL OF FLOOR CLEANOUT



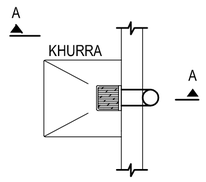
CLEANOUT INSTALLATION
IN FALSE CEILING



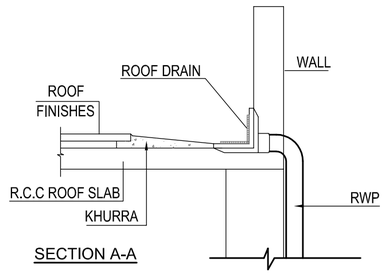
DETAILS OF GULLY TRAP



DETAIL OF FLOOR TRAP



PLAN



SECTION A-A

ANGLE TYPE ROOF DRAIN
(ADJACENT TO DUCT WALL)

SCALE: NTS

NOTE:-

1-READ THIS DRAWING IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT DRAWINGS.

REFERENCE DRAWINGS	REV. No.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

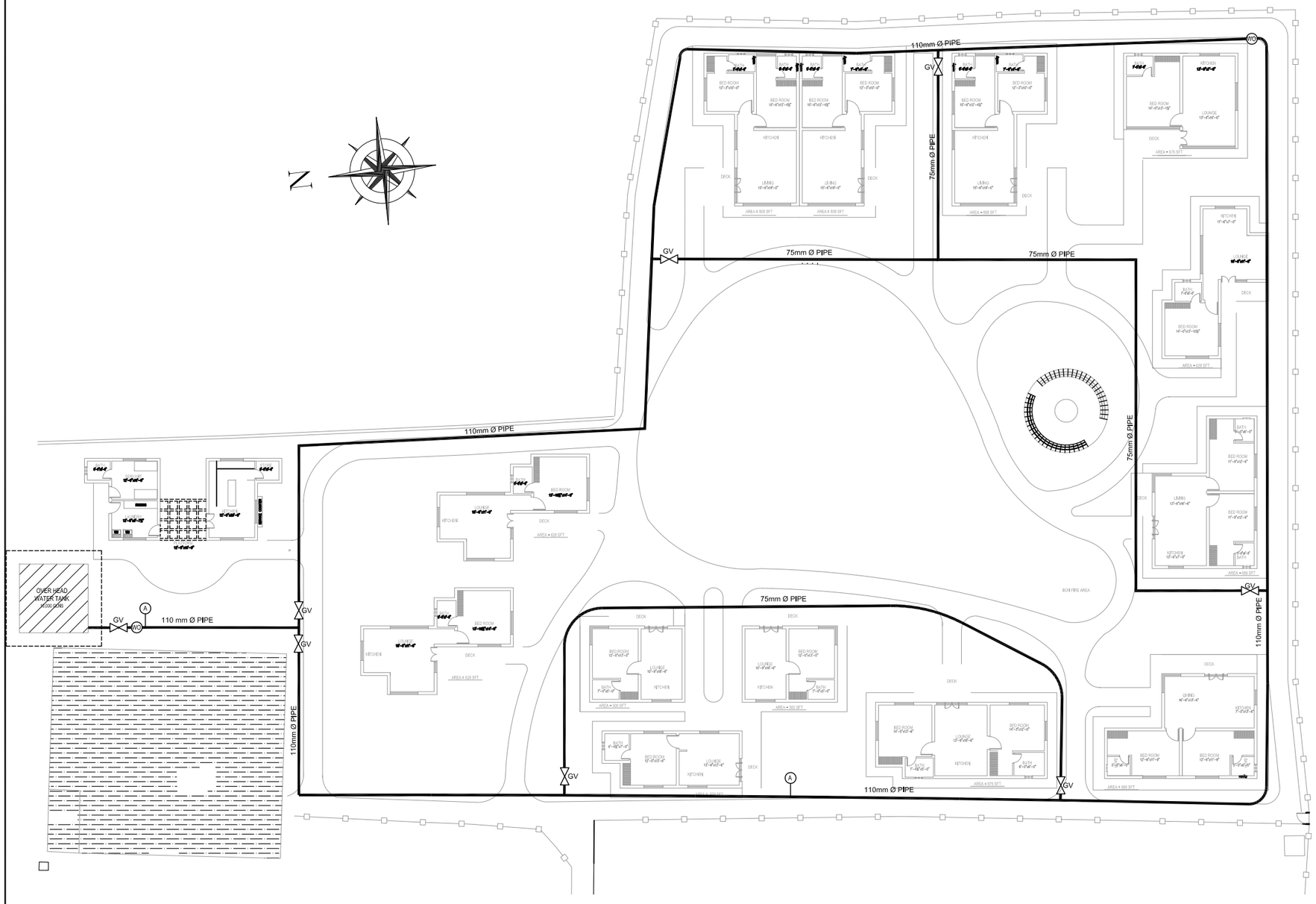
CONSTRUCTION OF GUEST UNITS BLOCK 1-14
AT GUN & COUNTRY CLUB, ISLAMABAD

MISCELLANEOUS DETAILS PLUMBING WORKS

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

	RECOMMENDED	VER./CKD.	APPROVED
DESN. NESPAK			
DWN. HASNAT			
FILE			
CKD. M.A.JAVED			
SUBM. M.A.JAVED			

DATE	DRAWING NO.	REV.
MAR. 2026	156/326/TD/01F24	0



NOTES:

1- ALL DIMENSIONS ARE IN FPS SYSTEM EXCEPT PIPE DIAMETERS.

2- READ THIS DRAWING IN CUNJUCTION WITH ALL OTHER PROJECT DRAWINGS.

3- HDPE PIPE (PE-100,PN-8,SDR-21) CONFIRMING TO DIN 8074/DIN-8075/ 1SO-4427 WILL BE USED IN WATER SUPPLY NETWORK.

4- FOR SERVICE CORRIDORS REFER TYPICAL CROSS SECTION OF RESPECTIVE ROAD/STREET.

5- EXACT LOCATION VALVES/ THRUST & ANCHOR BLOCKS SHALL BE DECIDED AS PER SITE CONDITIONS

6- EXACT LOCATION OF OVER HEAD WATER TANK SHALL ALSO BE DECIDED AS PER SITE.

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

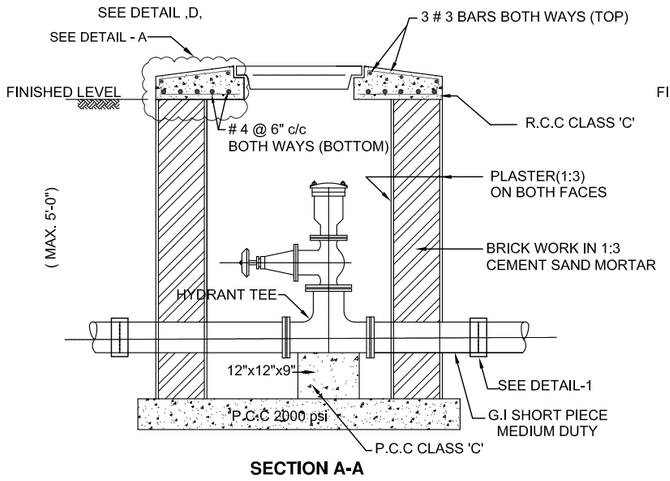
GUN AND COUNTRY CLUB

GUEST UNITS

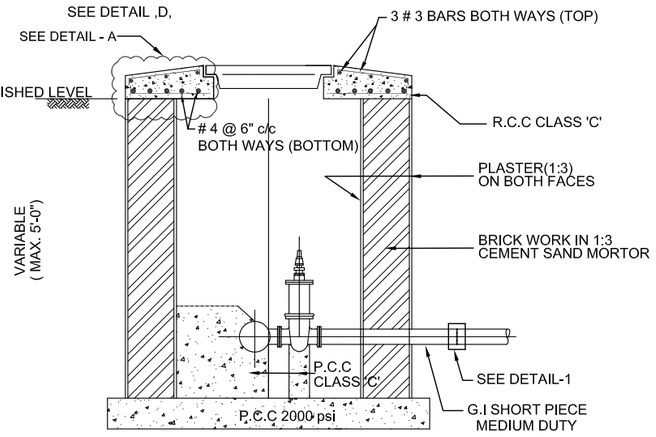
EXTERNAL WATER SUPPLY NETWORK

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LBD. ISLAMABAD

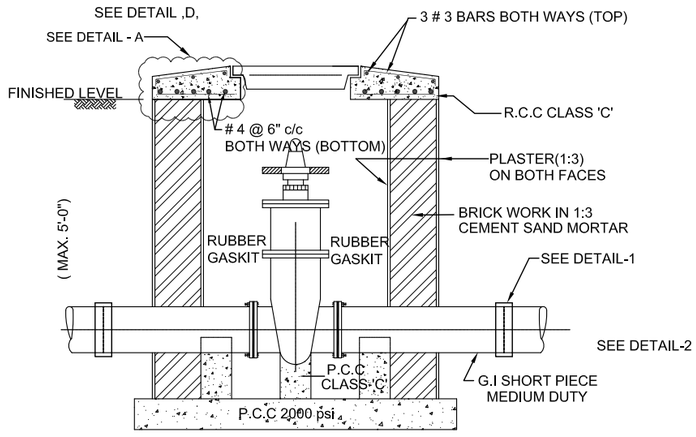
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FILE			
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SUBM.	DATE FEB. 2026	DRAWING NO. 156/324/TD/04W01	REV. 0



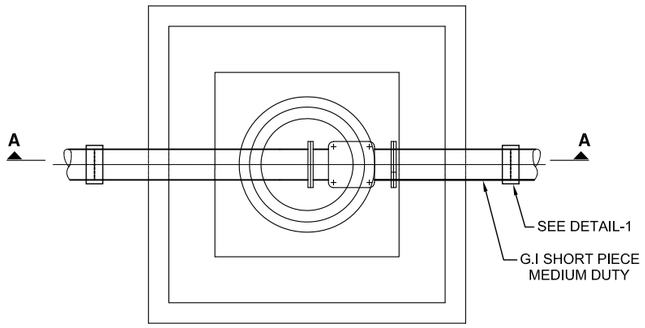
SECTION A-A



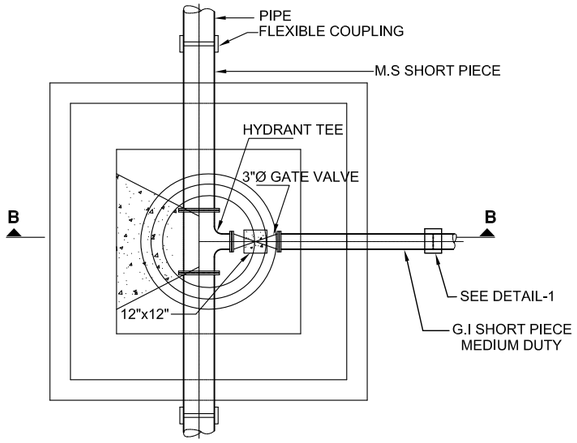
SECTION B-B



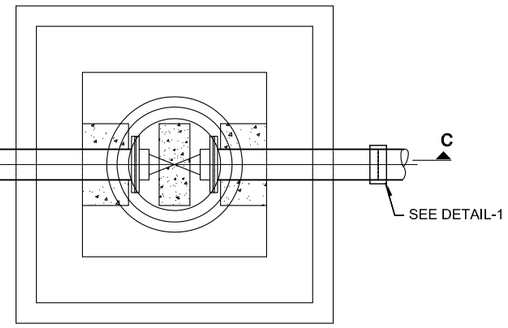
SECTION C-C



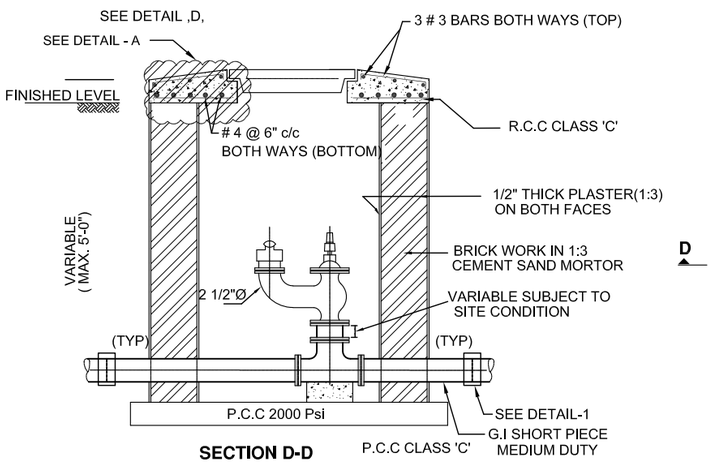
SECTIONAL PLAN OF AIR VALVE CHAMBER



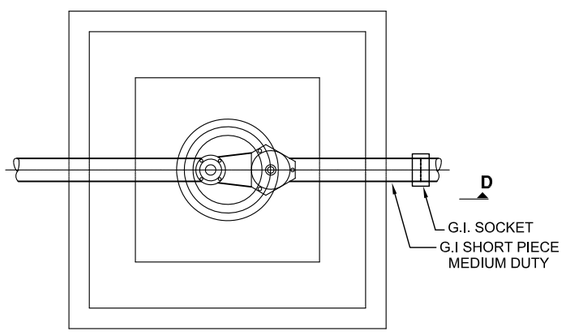
SECTIONAL PLAN OF WASHOUT CHAMBER



SECTIONAL PLAN OF GATE / SLUICE VALVE CHAMBER



SECTION D-D



PLAN OF FIRE HYDRANT TYPICAL

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

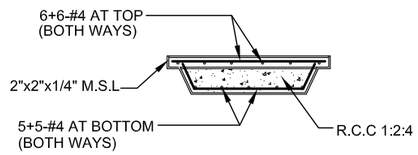
GUN AND COUNTRY CLUB

GUEST UNITS

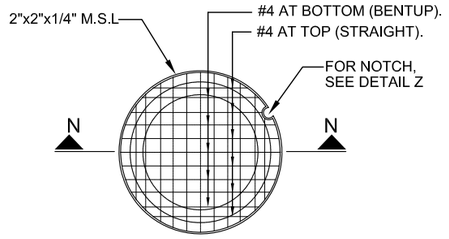
TYPICAL DETAILS OF VALVE CHAMBER

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

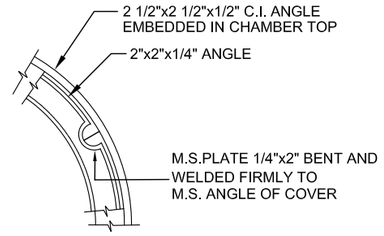
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FILE	DATE	DRAWING NO.	REV.
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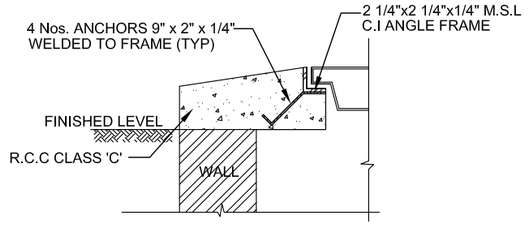
SECTION N-N



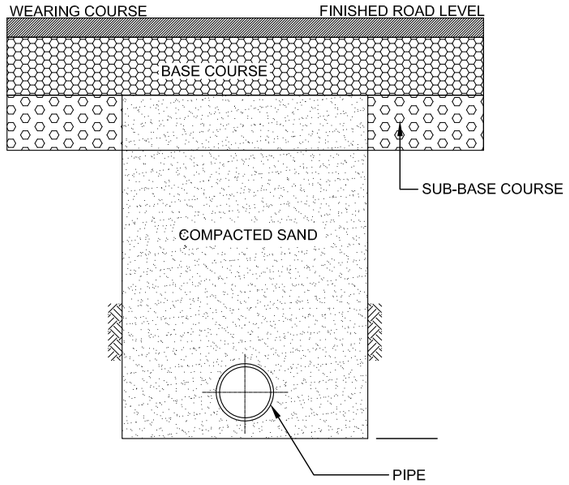
DETAIL D
MANHOLE COVER PLAN



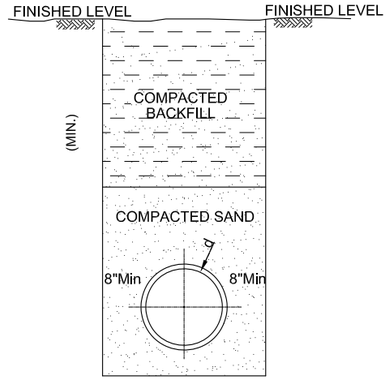
DETAIL-Z



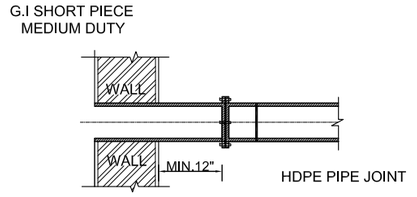
DETAIL - A



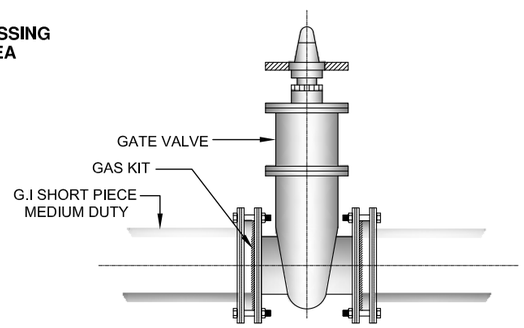
DETAIL FOR PIPE CROSSING
UNDER PAVED AREA



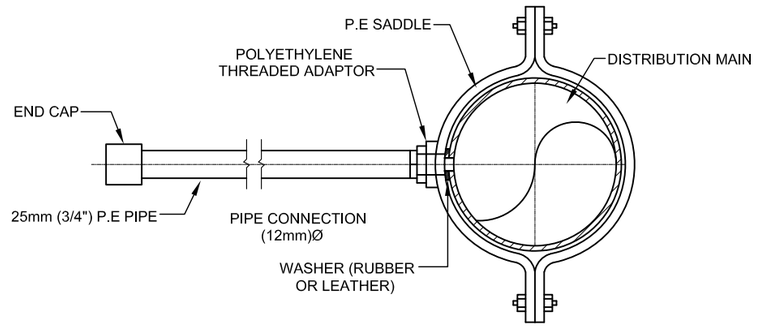
TRENCH DETAIL



DETAIL-1
CONNECTION DETAIL
OF G.I & HDPE PIPE



DETAIL-2



HOUSE CONNECTION DETAIL
FOR RESIDENTIAL BUILDING

TRENCH WIDITH SCHEDULE	
NOMINAL INTERNAL DIA OF PIPE	MIN-TRENCH WIDTH A
3"	24"
4"	24"
6"	30"
8"	30"
10"	36"
12"	36"

REFERENCE DRAWINGS	REV. NO.	DATE	DESCRIPTION	BY	CKD.	APPR.

GUN AND COUNTRY CLUB

GUEST UNITS

MISCELLANEOUS DETAILS
WATERSUPPLY SYSTEM

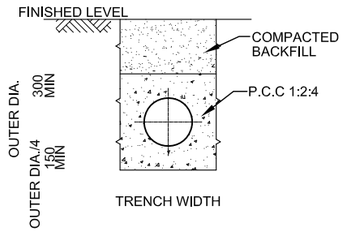
NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

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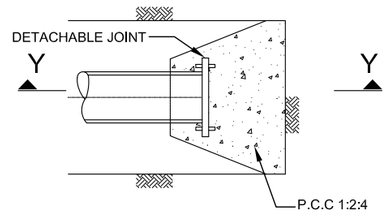
ANCHOR BLOCK DIMENSIONS FOR PIPE FITTINGS

DIA IN INCH	AT TEES AND DEAD ENDS				AT 9O° BENDS				AT 45° BENDS				AT 22 1/2° BENDS			
	C	B	D	L	C	B	D	L	C	B	D	L	C	B	D	L
3	4	12	12	12	2	12	24	12	4	12	12	12	6	12	12	12
4	6	12	12	12	2	12	24	18	4	12	12	12	6	12	12	12
6	8	12	15	24	2	18	24	30	4	12	18	18	6	12	18	12
8	12	12	18	33	6	18	27	36	12	12	21	24	18	12	18	21
10	12	12	24	42	8	27	27	48	14	12	27	30	18	12	24	21
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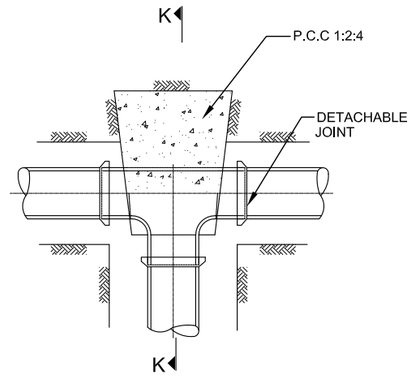
NOTE:- ALL DIMENSIONS ARE IN INCHES.



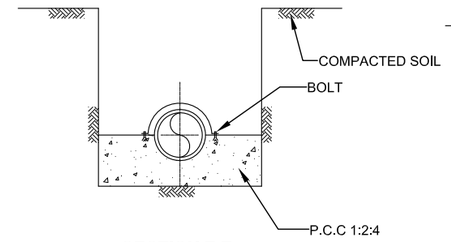
CONCRETE ENCASEMENT
(ONLY AT LOCATIONS APPROVED BY THE ENGINEER)



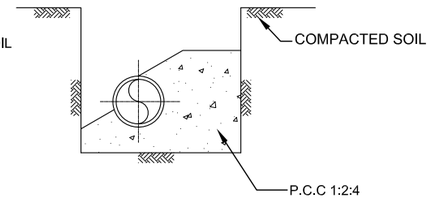
PLAN DEAD END BLOCK



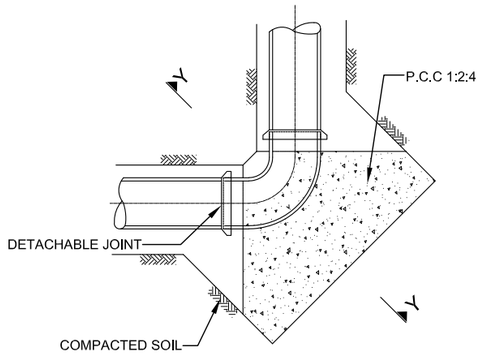
PLAN TEE



SECTION Z-Z

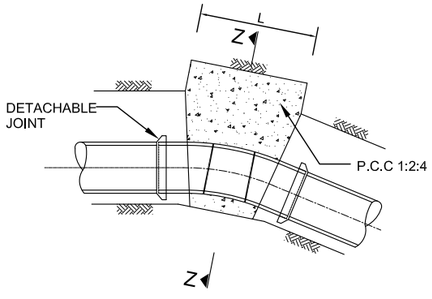


SECTION X-X

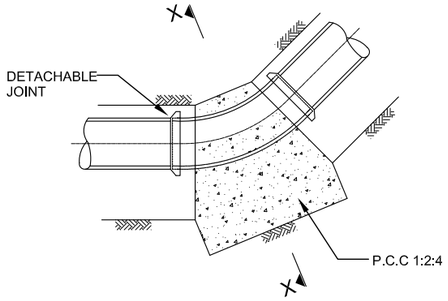


PLAN 90° BEND

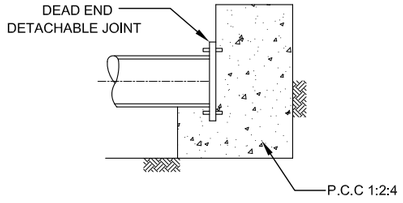
SECTION K-K



PLAN 22 1/2° BEND



PLAN 45° BEND



SECTION Y-Y

GUN AND COUNTRY CLUB

GUEST UNITS

BENDS DETAILS
WATERSUPPLY SYSTEM

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LBD. ISLAMABAD

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GUN & COUNTRY CLUB, ISLAMABAD

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

TECHNICAL BID

BIDDING DOCUMENTS VOLUME – III-B

MISCELLANEOUS DETAILS

MARCH, 2026

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD
NESPAK House, Sector G-5/2, Islamabad, Tel: 051-9221910-13, Fax: 051-9221914.

ARCHITECTURAL DETAILS

ABBREVIATIONS

AD	ALUMINIUM DOOR
AL	ALUMINIUM
BA	BRONZE ANODIZED
CG	CLEAR GLASS 5mm THICK
CP	COMMERCIAL PLY
D	DOOR
DH	DOOR HANDLE
DL	DOUBLE LEAF
DS	DOUBLE SWING
DW	DEODAR WOOD
EL	STRUCTURAL LEVEL
F	FIXED GLASS
EQ	EQUAL
FD	FLUSH DOOR
FFL	FINISHED FLOOR
FG	FROSTED GLASS
FL	FAN LIGHT
FO	FOLDING DOOR
FP	FLY PROOFING
FV	FORMICA VENEERED
FW	FIXED WINDOW
GI	GALVANIZED IRON SHEET
GL	GLASS
LD	L DROP (SLIDING BOLT)
LP	LACQUER POLISH
LW	LASANI WOOD
MS	MILD STEEL
O	OPENABLE
P	PAINT
PC	POWDER COATED
FD	PANELED DOOR
PW	PARTAL WOOD
RS	ROOLUP SHUTTER
S	SLIDING
SBS	STEEL BOX SECTION
SD	STEEL DOOR
SDL	STEEL DOOR LOUVERED
SL	SINGLE LEAF
SS	STAINLESS STEEL
ST	STEEL
TH	TOP HUNG
TG	TINTED GLASS
TS	TWO SHUTTERS (ONE PANELED & ONE FLY PROOF)
TW	TEAK WOOD
V	VENTILATOR
VG	VIEWING GLASS
W	WINDOW

PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

TITLE

ABBREVIATIONS

SCALE N.T.S

DATE FEB.,2026

NO. 156/322/TD/J01

REV. 0

CAD by M.IRFAN

ARCHITECTURAL DETAILS

HARDWARE

F1	1/8" x 1 1/2" x 10" CRANK SHAPED M.S. HOLD FAST
H1	BRASS HINGE 5" LONG
H2	STEEL HINGE 6" LONG (HEAVY DUTY)
H3	FLOOR MOUNTED DOUBLE ACTION CONCEALED HINGE
H4	STRIP HINGE
TB	6" LONG BRASS TOWER BOLT HEAVY DUTY
KP	9" x WIDTH OF DOOR SHUTTER KICK PLATE BOTH SIDES
PP	4"x 8" PUSH PLATE
L1	HEAVY DUTY CYLINDRICAL KNOB SETS, KEY OPENABLE OPERATION OUTSIDE (IMPORTED)
L2	HEAVY DUTY CYLINDRICAL KNOB SETS, KEY OPENABLE OPERATION OUTSIDE WITH PUSH BUTTON LOCKING ARRANGEMENT INSIDE (IMPORTED)
L3	HEAVY DUTY CYLINDRICAL KNOB SETS, KEY OPENABLE OPERATION OUTSIDE/INSIDE (IMPORTED)
L4	DOOR LATCH FOR TOILET DOORS
L5	SLIDING BOLT
DC	HYDRAULIC DOOR CLOSER
DH	DOOR HANDLE

PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

TITLE

HARDWARE

SCALE N.T.S

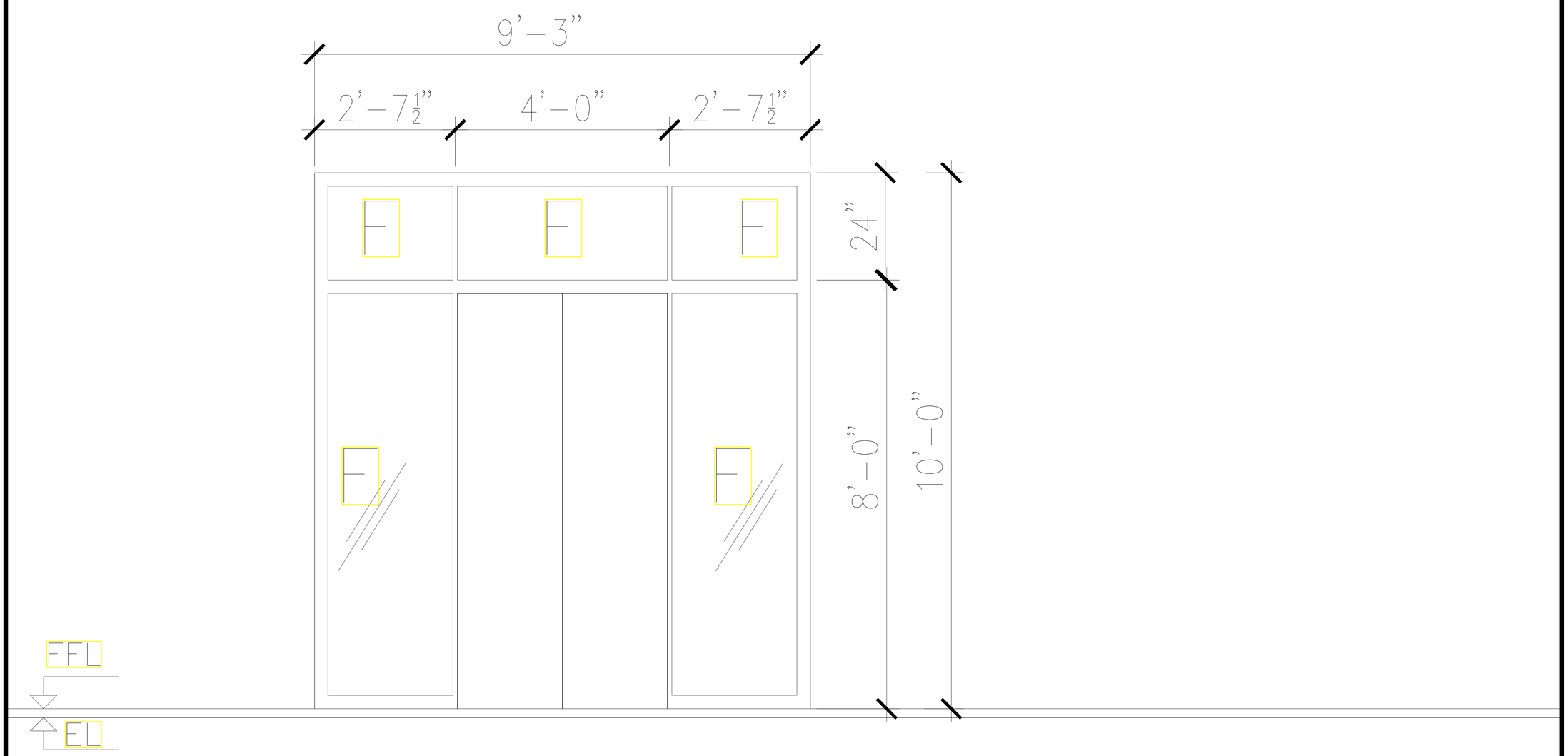
DATE FEB.,2026

NO. 156/322/TD/J02

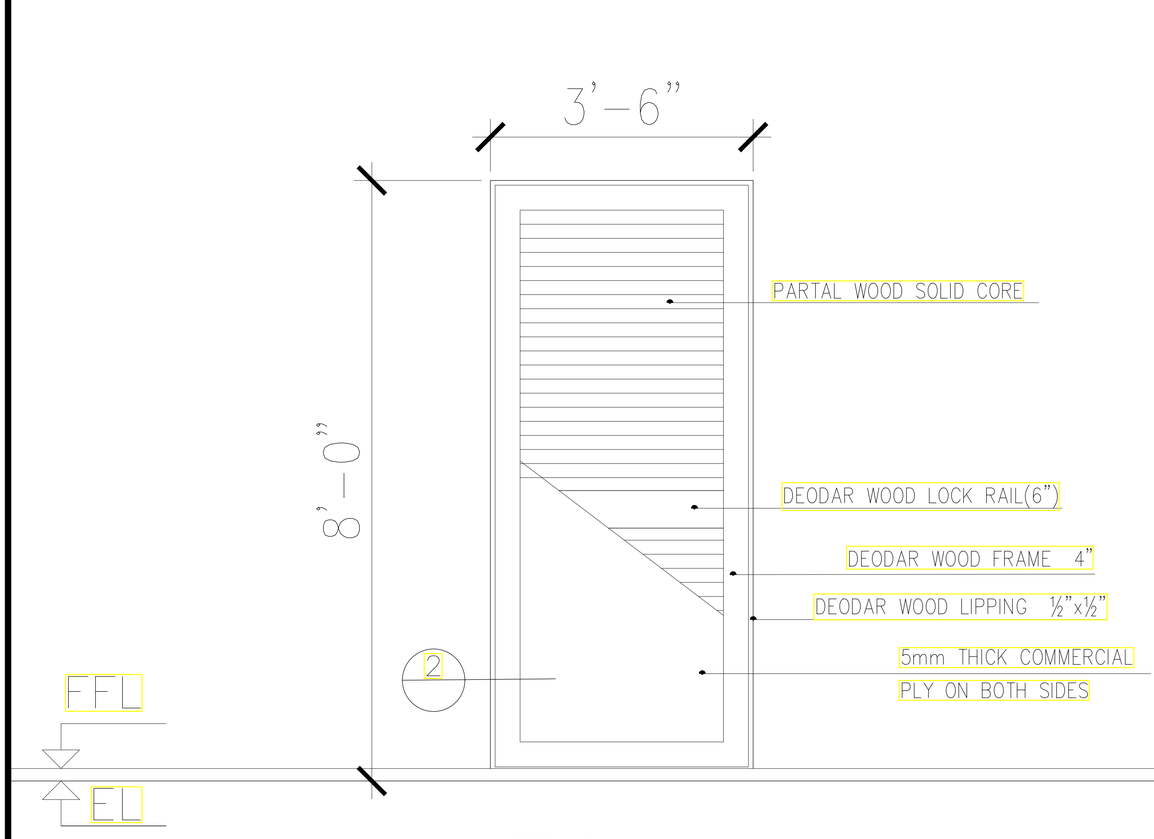
REV. 0

CAD by M.IRFAN

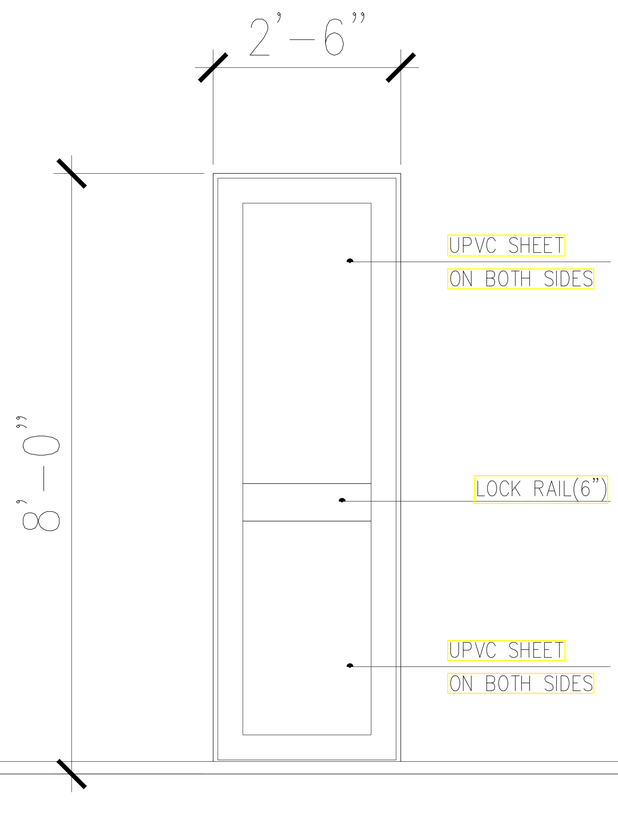
ARCHITECTURAL DETAILS



ENT-1



D1



D2

PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS BLOCK – 1 & 2

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

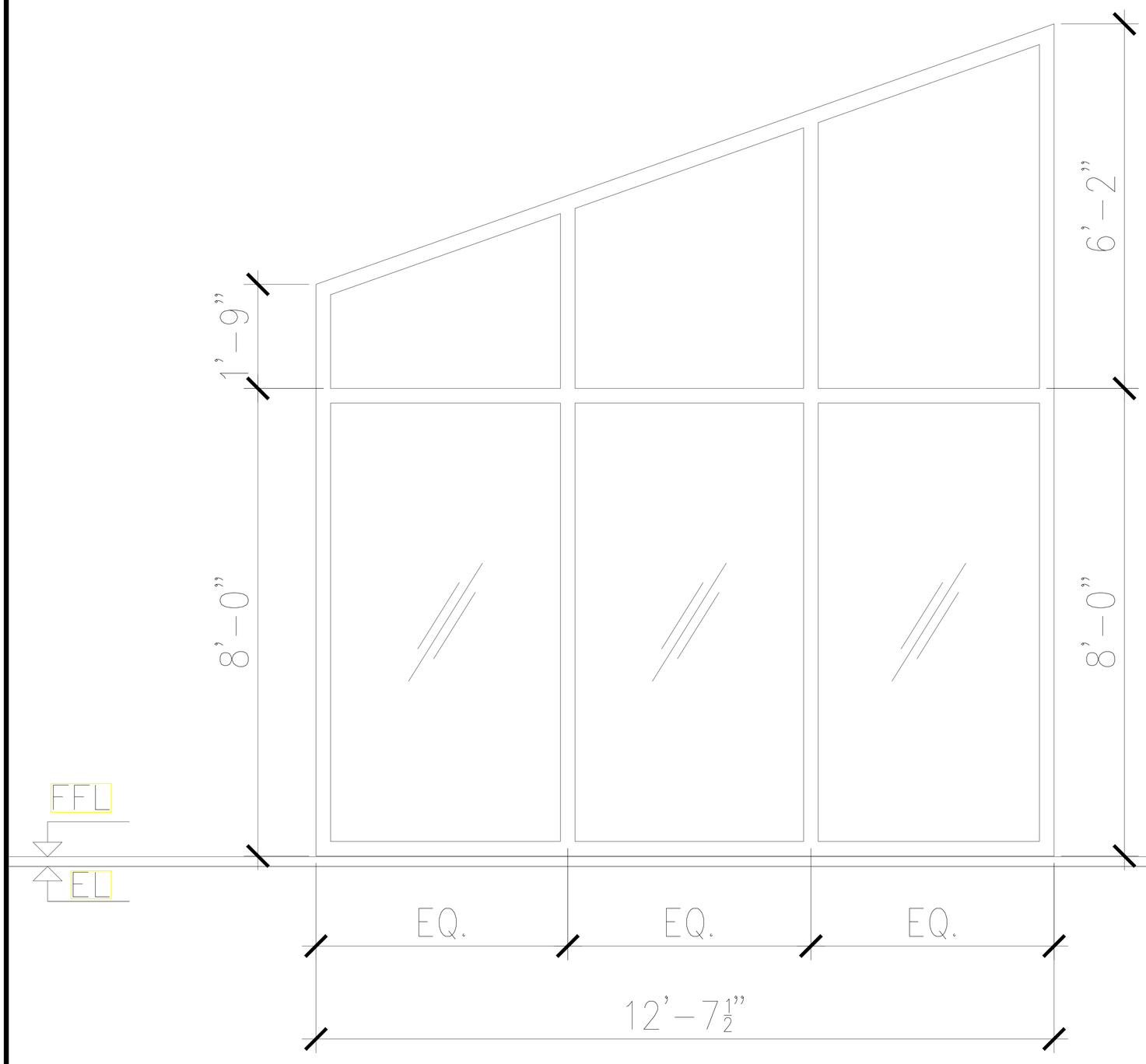
TITLE

DOOR ELEVATIONS
ENT1 –D1 – D2

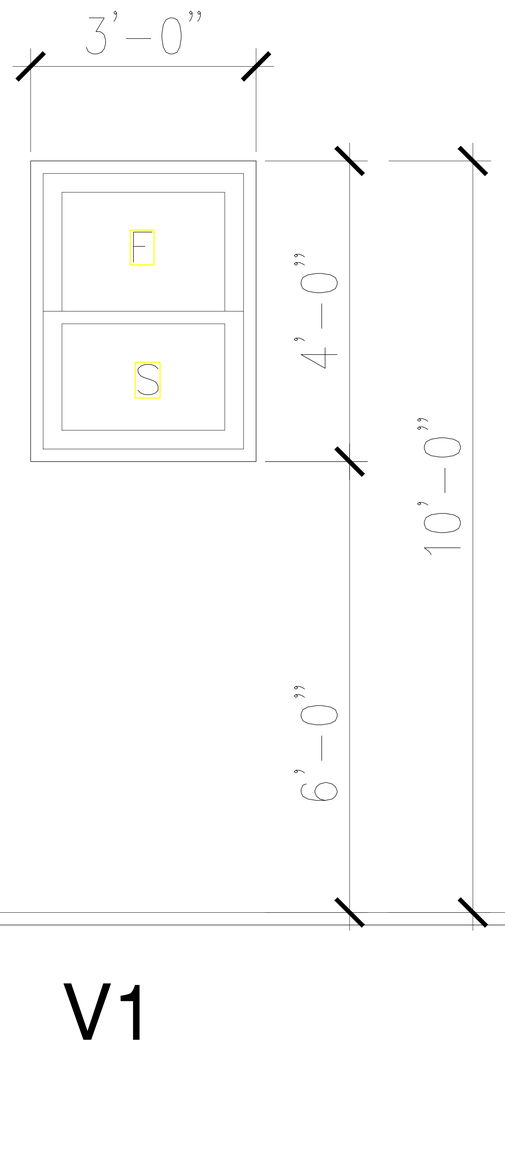
SCALE	NO.	REV.
N.T.S	156/322/TD/J01	0
DATE FEB.,2026		

0-00-00-00

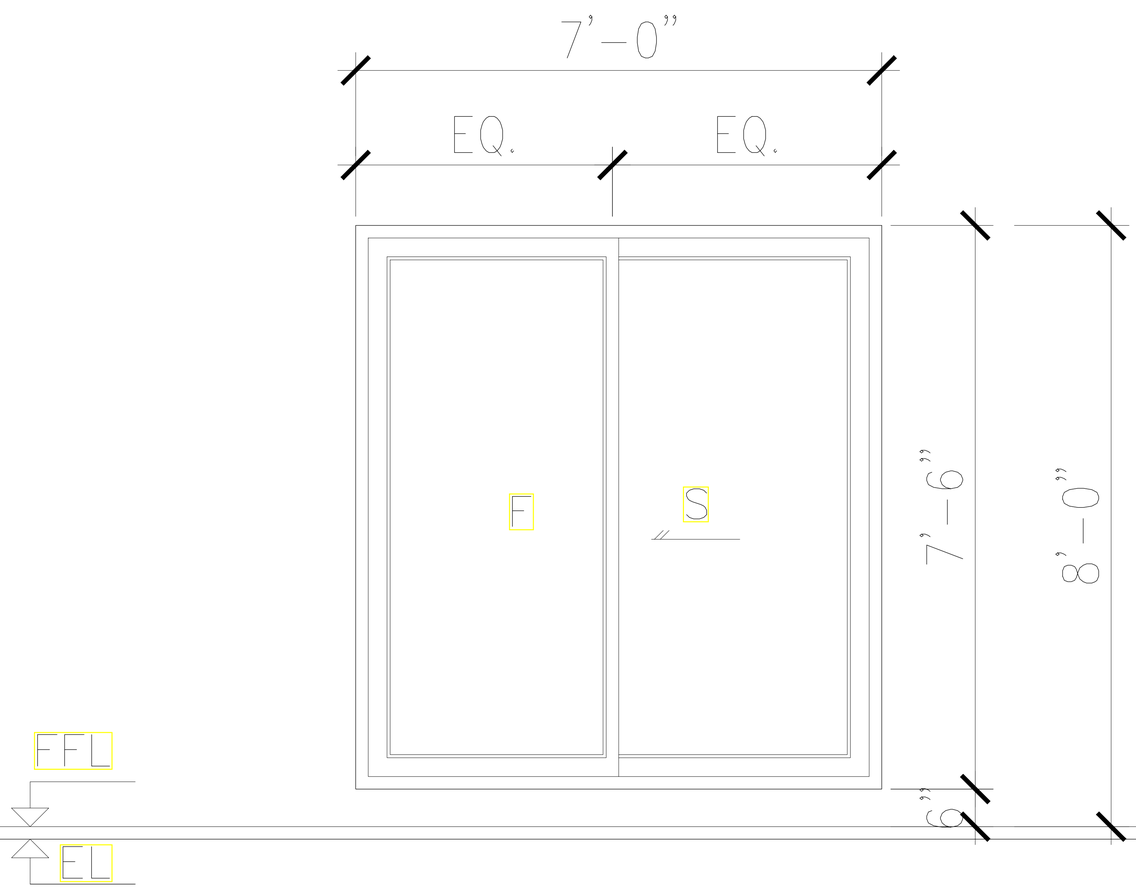
ARCHITECTURAL DETAILS



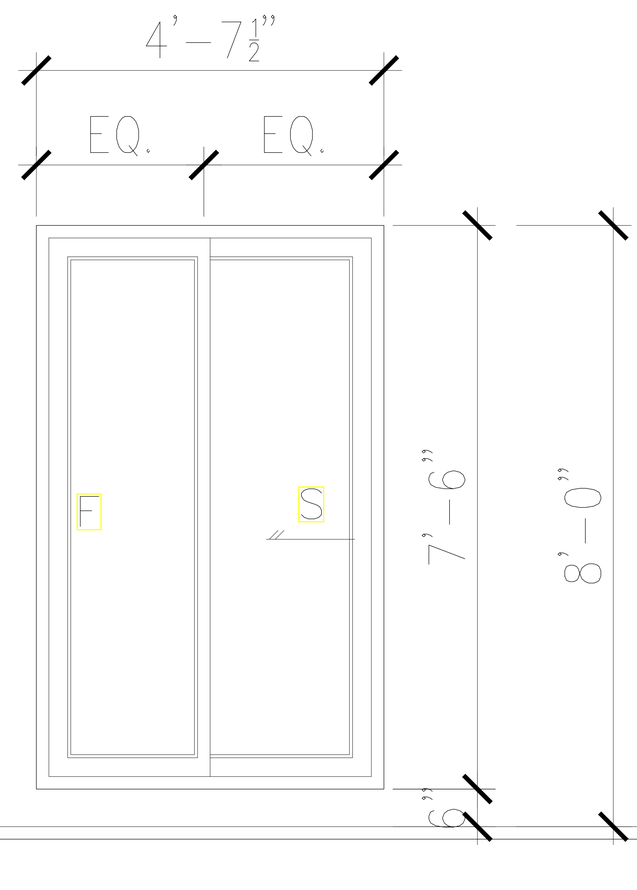
W1



V1



W2



W3

PROJECT	GUN AND COUNTRY CLUB GUEST UNITS BLOCK – 1 & 2
	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD
TITLE	DOOR ELEVATIONS W1 – W2 – W3
SCALE	N.T.S
DATE	FEB.,2026
NO.	156/322/TD/J01
REV.	0

0-00-00-00

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	AL-GL-DL-FL	9'-3"	10'-0"													
D1	PD-SL	3'-6"	8'-0"	DW	DW	LP	LP							DC		
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	12'-0"	AS PER DESIGN	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	7'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	4'-7½"	7'-6"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	3'-0"	4'-0"	AL	AL-GL	PC	PC-TG									

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	AL-GL-DL-FL	9'-3"	8'-0"													
D1	PD-SL	3'-6"	8'-0"	DW	DW	LP	LP									
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	12'-0"	10'-9"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	7'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	4'-1½"	7'-6"	AL	AL-GL	PC	PC-TG									
W4	AL-S-FP	5'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	2'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS, BLOCK 3

TITLE

SCHEDULE OF DOORS
DOORWINDOWS,WINDOWS,VENTILATOR

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

SCALE N.T.S

DATE FEB.,2026

NO. 156/322/TD/J08

REV. 0

0-00-00-00

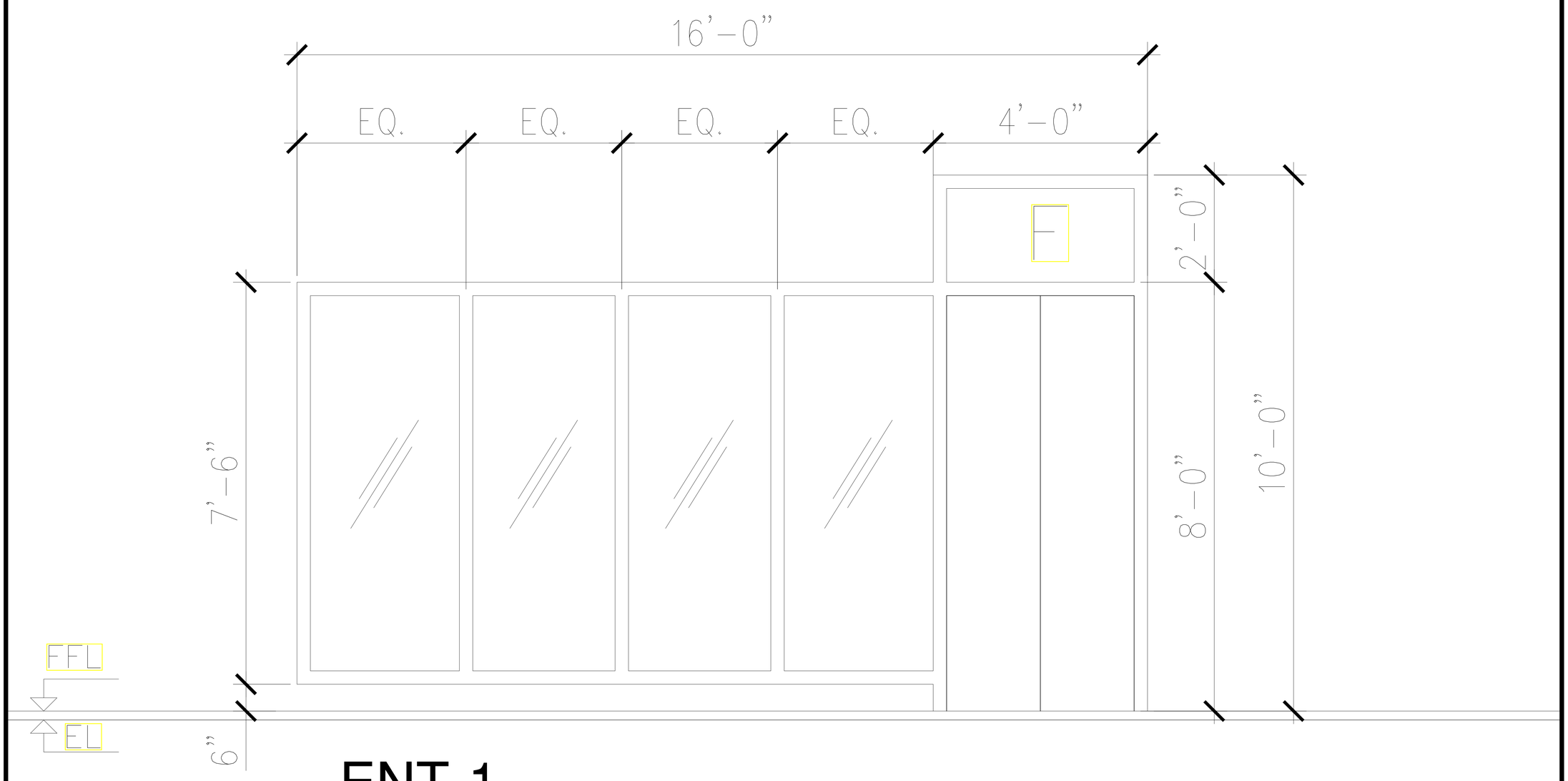
ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	AL-GL-DL-FL	4'-0"	8'-0"													
D1	PD-SL	3'-6"	8'-0"	DW	DW	LP	LP									
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	11'-3"	12'-0"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	10'-9"	12'-0"	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	7'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
W4	AL-S-FP	5'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	2'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

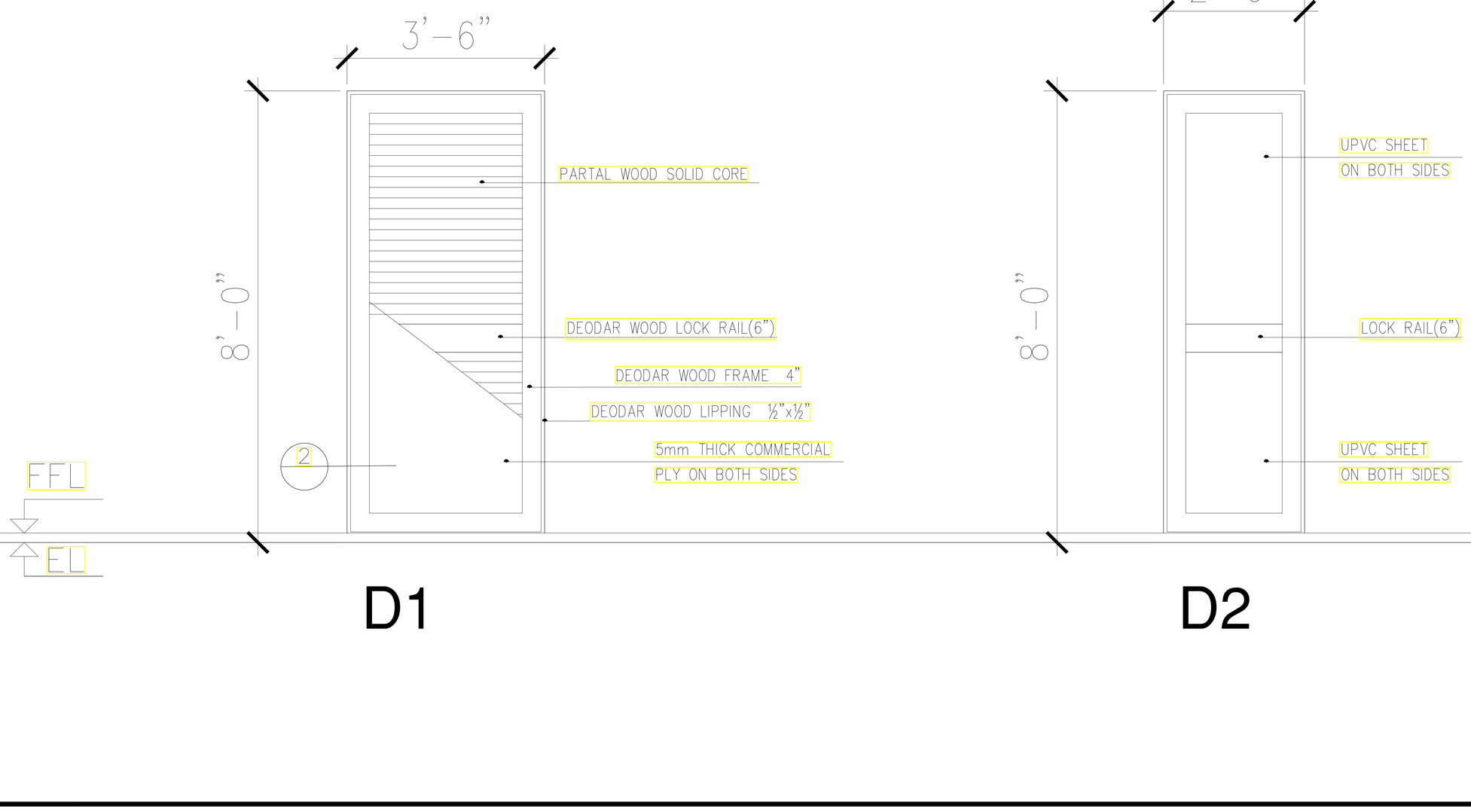
ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	AL-GL-DL-FL	4'-0"	8'-0"													
D1	PD-SL	3'-6"	8'-0"	DW	DW	LP	LP									
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	10'-0"	8'-0"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	7'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	5'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
W4	AL-S-FP	2'-9"	7'-6"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	5'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

ARCHITECTURAL DETAILS



ENT-1



D1

D2

PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS, BLOCK- 6

TITLE

DOOR ELEVATIONS
ENT1 -D1 - D2

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

SCALE N.T.S

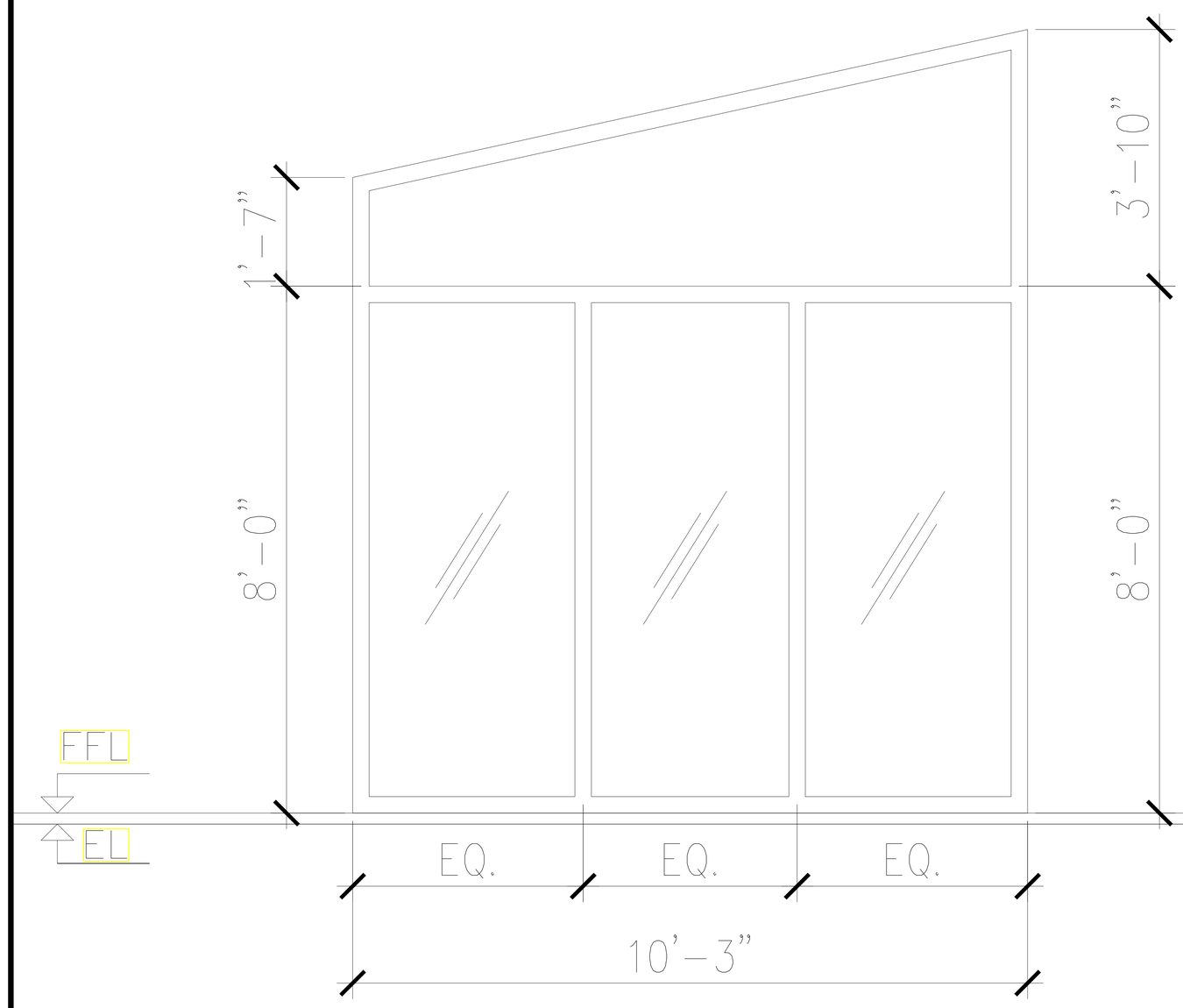
DATE FEB.,2026

NO. 156/322/TD/J015

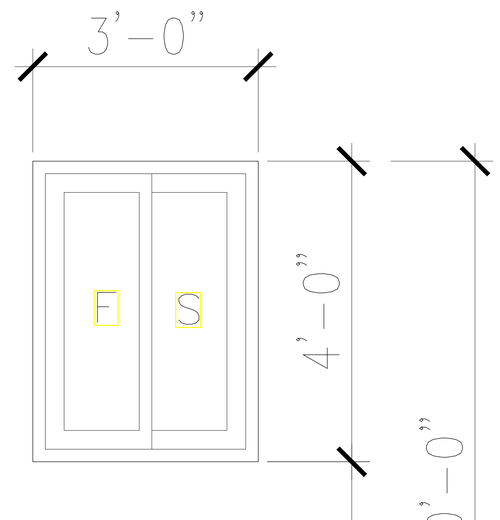
REV. 0

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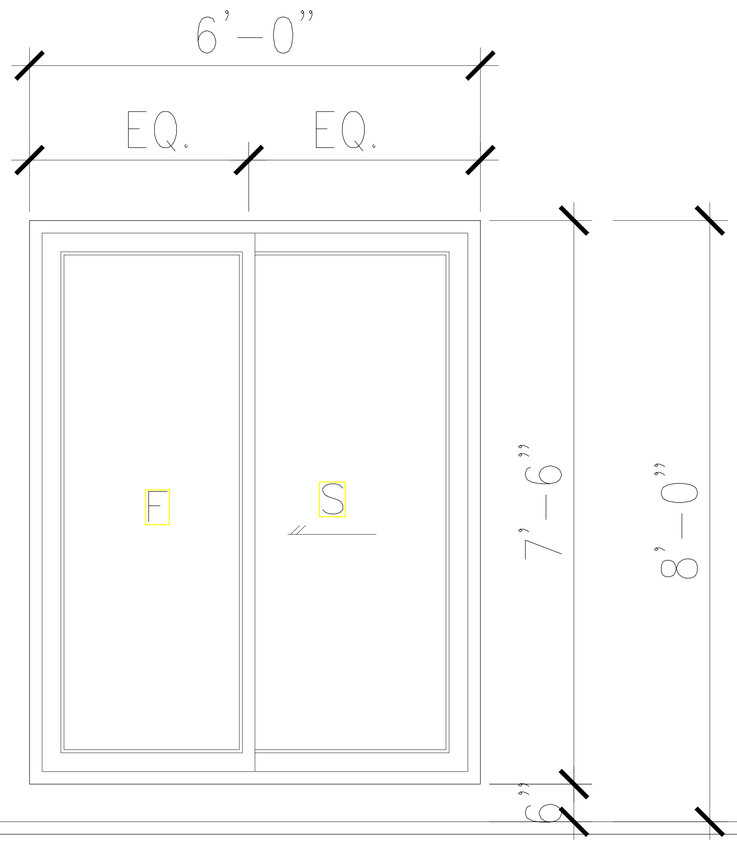
ARCHITECTURAL DETAILS



V1



W1



W3

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS, BLOCK 6		TITLE: DOOR ELEVATIONS W1 – W2 – W3	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB.,2026	NO.: 156/322/TD/J16	REV.: 0

0-00-00-00

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	AL-GL-DL-FL	16'-0"	10'-0"													
D1	PD-SL	3'-6"	8'-0"	DW	DW	LP	LP									
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	10'-7½"	10'-9"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	—		AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	6'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	3'-0"	4'-0"	AL	AL-GL	PC	PC-TG									

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	AL-GL-DL-FL	16'-0"	8'-0"													
D1	PD-SL	3'-6"	8'-0"	DW	DW	LP	LP									
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	10'-7½"	10'-9"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	—	—	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	6'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	2'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	AL-GL-DL-FL	8'-0"	8'-0"													
D1	PD-SL	3'-6"	8'-0"	DW	DW	LP	LP									
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	10'-0"	10'-0"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	8'-0"	4'-0"	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	6'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	2'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS, BLOCK 8

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

TITLE

SCHEDULE OF DOORS
DOORWINDOWS,WINDOWS,VENTILATOR

SCALE N.T.S

DATE FEB.,2026

NO. 156/322/TD/J23

REV. 0

0-00-00-00

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
DW1	AL-GL-DL-FL	10'-0"	7'-6"													
D1	PD-SL	3'-6"	8'-0"	DW	DW	LP	LP									
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	10'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	5'-0"	4'-6"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	5'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS, BLOCK 10

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

TITLE

SCHEDULE OF OPENING
DOOR,WINDOWS AND VENTILATOR

SCALE N.T.S

DATE FEB.,2026

NO. 156/322/TD/J26

REV. 0

0-00-00-00

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
DW1	AL-GL-DL-FL	10'-0"	7'-6"													
D1	PD-SL	3'-6"	8'-0"	DW	DW	LP	LP									
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	10'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	5'-0"	4'-6"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	5'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS, BLOCK 10

TITLE

SCHEDULE OF OPENING
DOOR,WINDOWS AND VENTILATOR

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

SCALE N.T.S

DATE FEB.,2026

NO. 156/322/TD/J29

REV. 0

0-00-00-00

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
ENT	AL-GL-DL-FL	6'-0"	8'-0"													
D1	PD-SL	3'-6"	8'-0"	DW	DW	LP	LP									
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	11'-0"	12'-0"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	8'-9"	11'-0"	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	6'-0"	6'-6"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	2'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
DW1	PD-DL-FL	10'-0"	7'-6"													
DW2	PD-DL-FL	6'-9"	8'-0"													
D1	FD-SL	3'-6"	8'-0"	DW	DW	LP	LP									
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	8'-6"	7'-6"	AL	AL-GL	PC	PC-TG									
W2	AL-S-FP	7'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
W3	AL-S-FP	5'-0"	5'-0"	AL	AL-GL	PC	PC-TG									
W4	AL-S-FP	5'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
W5	AL-S-FP	2'-9"	7'-6"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	5'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS, BLOCK 12,13

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

TITLE

SCHEDULE OF OPENING
DOOR,WINDOWS AND VENTILATOR

SCALE N.T.S

DATE FEB.,2026

NO. 156/322/TD/J35

REV. 0

0-00-00-00

ARCHITECTURAL DETAILS

TYPE	DESCRIPTION	MASONRY OPENING		MATERIAL		FINISHES		HARDWARE								
		WIDTH	HEIGHT	FRAME	SHUTTER	FRAME	SHUTTER	HOLD FAST	HINGES	LOCKS	TOWER BOLTS	PUSH PLATE	KICK PLATE	DOOR CLOSER	DOOR HANDLE	L DROP
D1	PD-SL	3'-6"	8'-0"	DW	DW	LP	LP									
D2	FD-SL	2'-6"	8'-0"	DW	CP	LP	LP									
D3	PD-DL-DS	4'-0"	8'-0"	DW	CP	LP	LP									
W1	AL-S-FP	6'-0"	7'-6"	AL	AL-GL	PC	PC-TG									
V1	AL-S-FP	2'-0"	2'-0"	AL	AL-GL	PC	PC-TG									

PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS, BLOCK 14

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

TITLE

SCHEDULE OF DOORS
DOORWINDOWS, WINDOWS, VENTILATOR

SCALE N.T.S

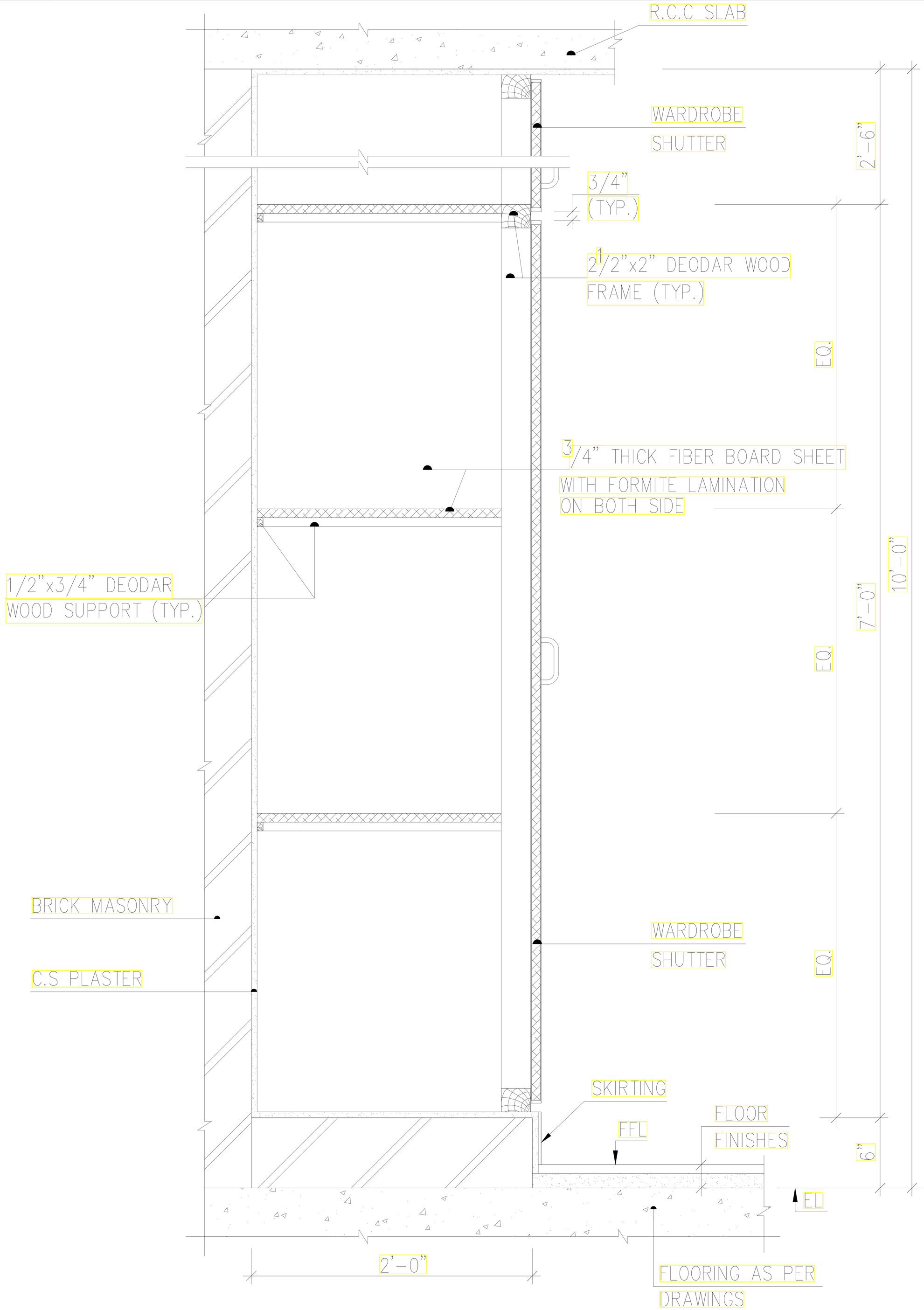
DATE FEB.,2026

NO. 156/322/TD/J38

REV. 0

0-00-00-00

ARCHITECTURAL DETAILS



PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS

DETAIL 2
OF WARDROBE

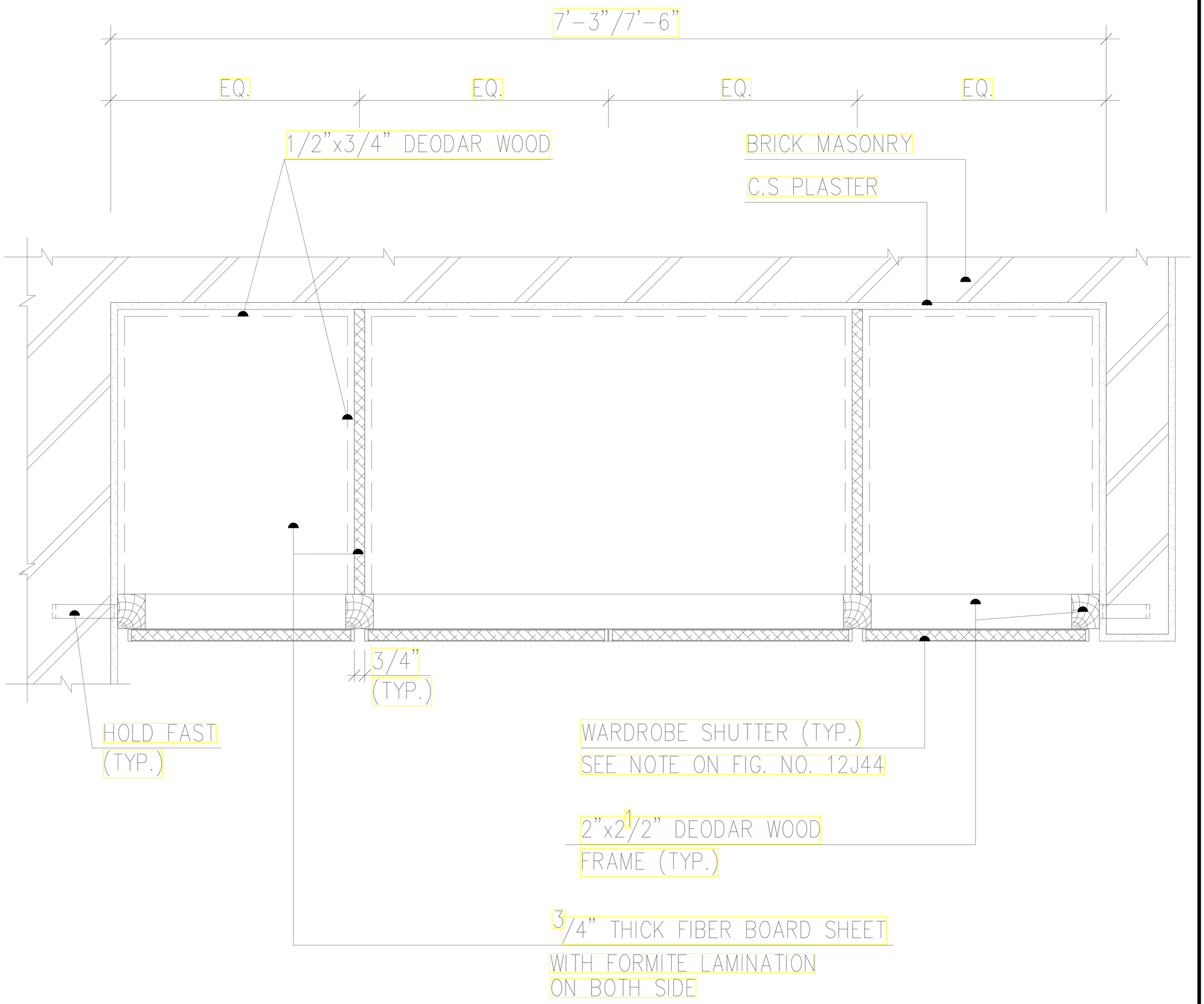
NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

SCALE	NO.	REV.
N.T.S	156/322/TD/J39	0
DATE FEB,.2026		

P-PN-DN-00

CAD by M.IRFAN

ARCHITECTURAL DETAILS

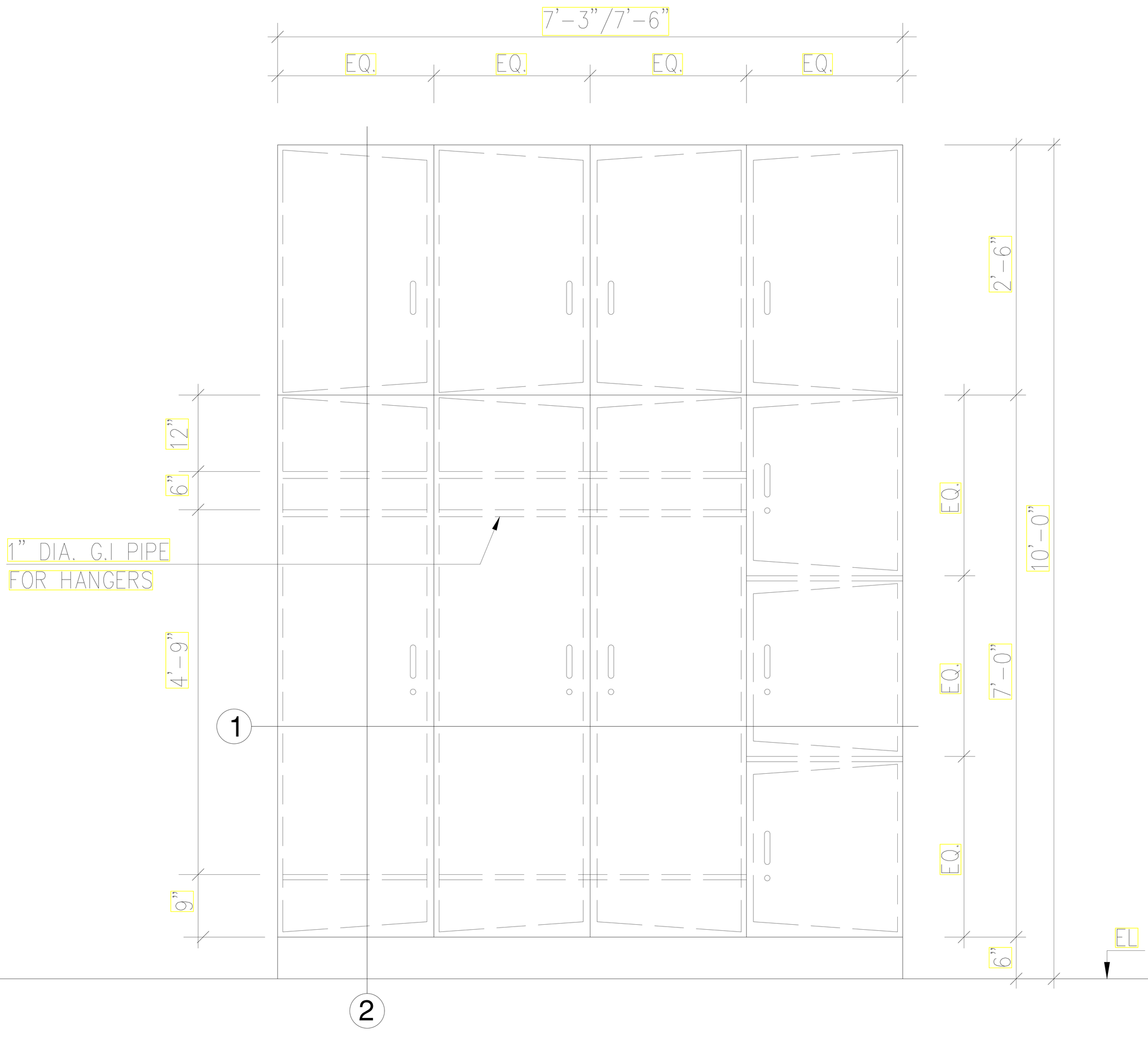


PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	DETAIL 1 OF WARDROBE	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB,.2026	NO.: 156/322/TD/J40 — REV.: 0

P-PN-DN-00

CAD by M.IRFAN

ARCHITECTURAL DETAILS



NOTES

- ALL SHUTTERS ARE MADE OF 3/4' FIBER BOARD SHEET WITH FORMITE LAMINATION ON BOTH SIDES & DEODAR WOOD LIPPING ALL AROUND.
- SHUTTERS ARE TO BE FIXED WITH STRIP HINGES.
- ALL WOODEN & BOARD SURFACE INSIDE & WOODEN SURFACE OUT SIDE SHALL BE PAINTED WITH ENAMAL PAINT.
- BEST QUALITY LOCKS & HANDELS SHALL BE PROVIDED.
- APPROVED MATERIALS SHALL BE USED TO THE ENTIRE SATISFACTION OF THE ENGINEER.

PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS

TYPICAL ELEVATION OF WARDROBE

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

SCALE N.T.S

DATE FEB,.2026

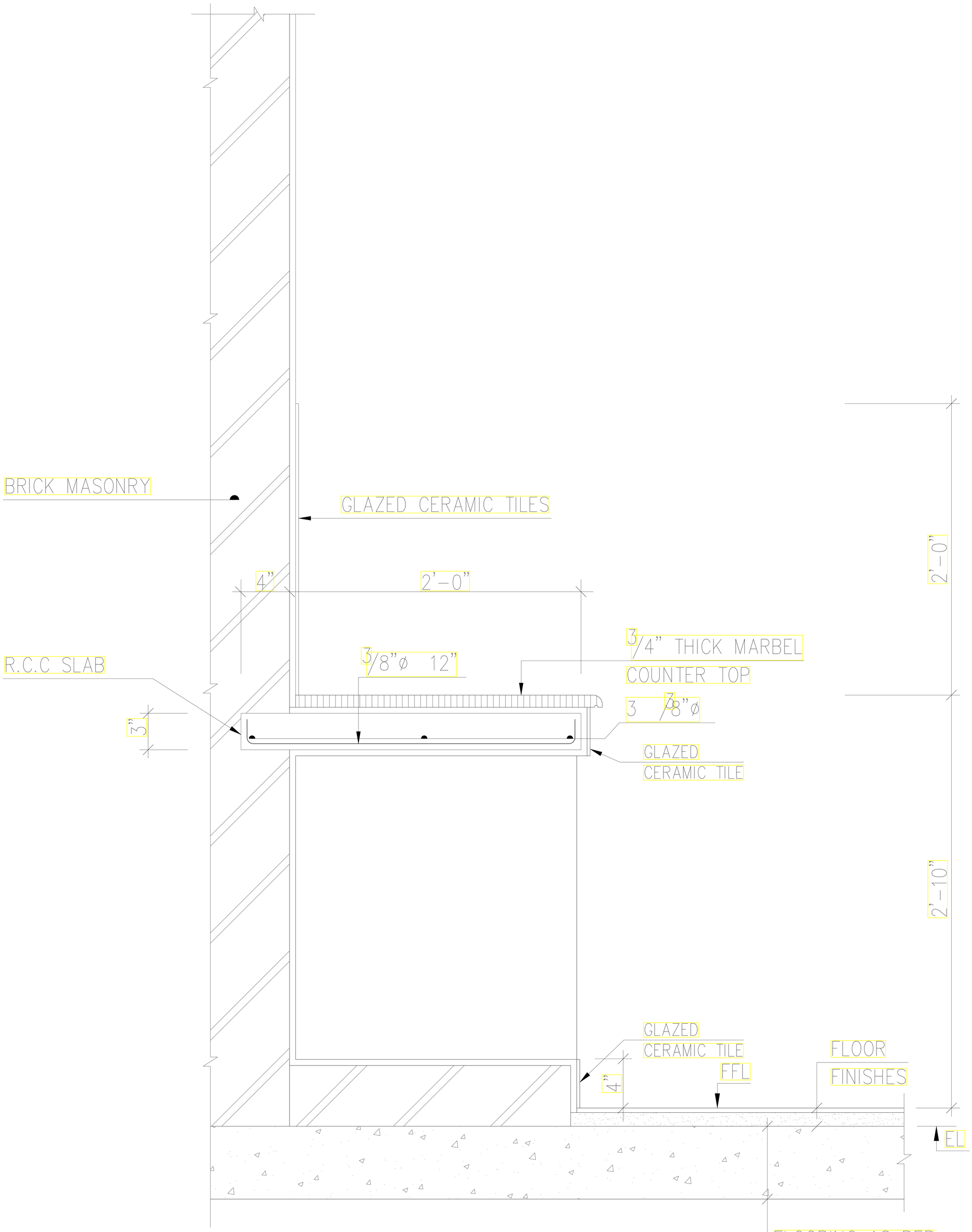
NO. 156/322/TD/J41

REV. 0

P-PN-DN-00

CAD by M.IRFAN

ARCHITECTURAL DETAILS



PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS

TYPICAL SECTION
FOR KITCHEN COUNTER

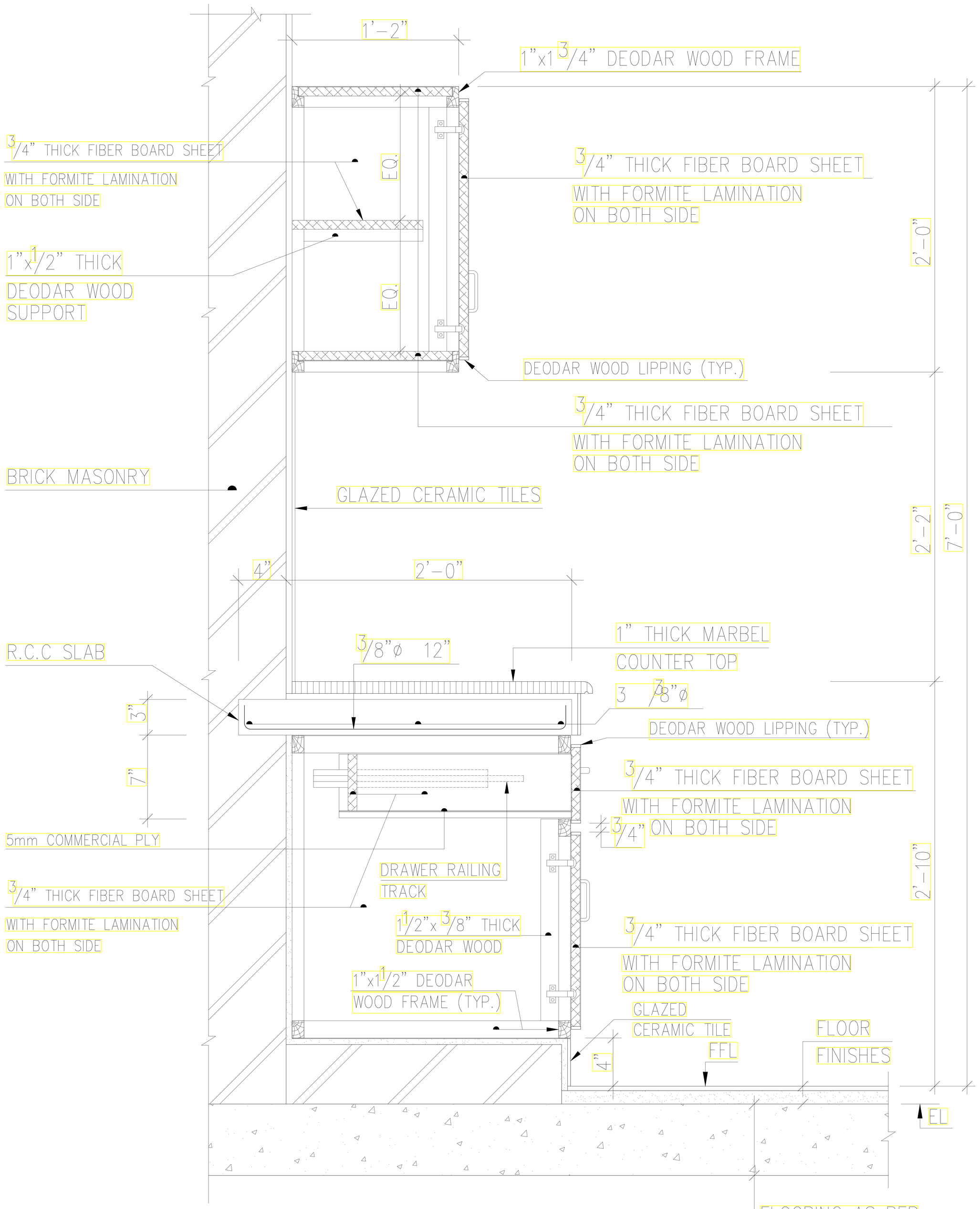
NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

SCALE	NO.	REV.
N.T.S	156/322/TD/J42	0
DATE FEB,.2026		

P-PN-DN-00

CAD by M.IRFAN

ARCHITECTURAL DETAILS



NOTE

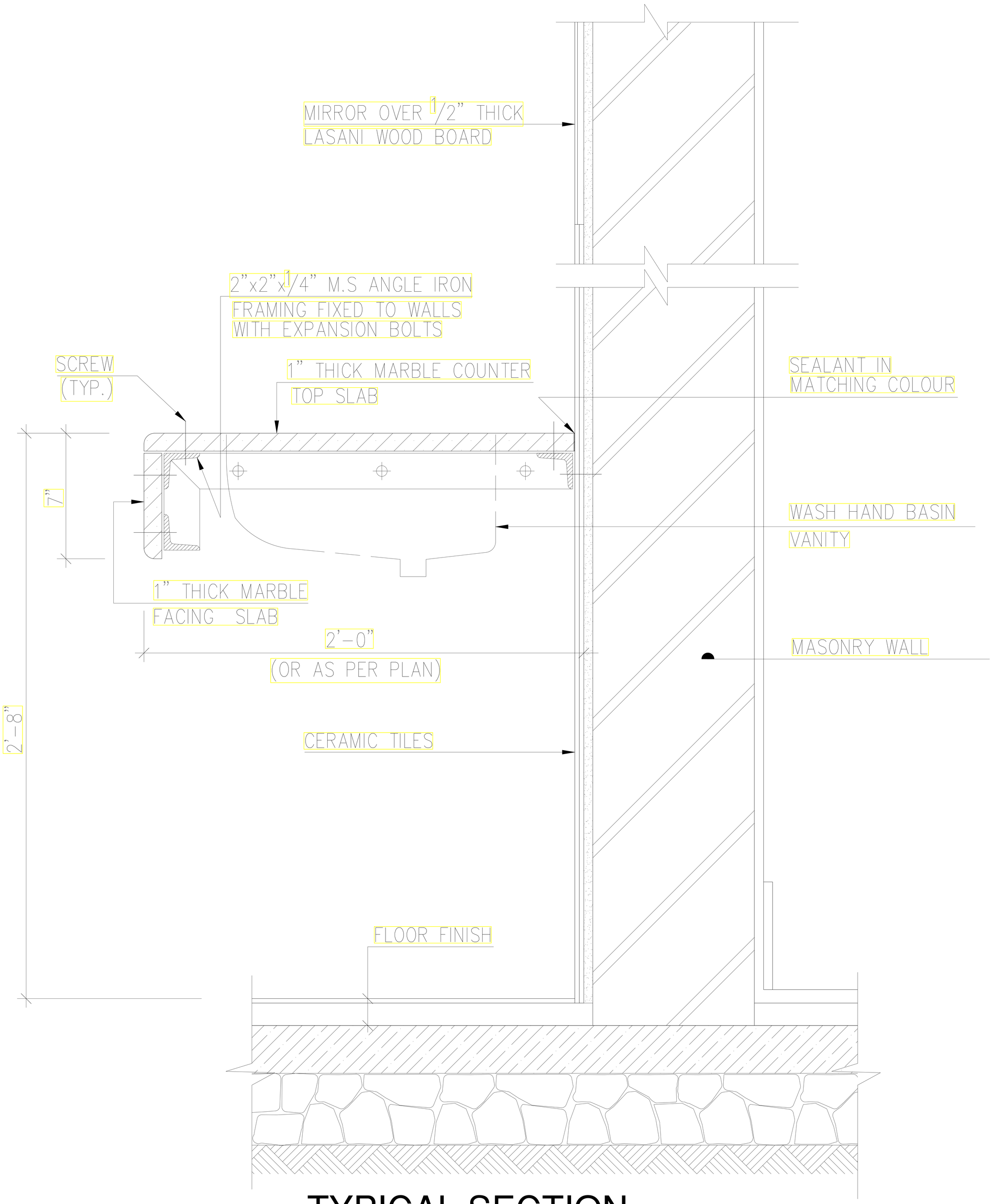
ALL WOODEN, PLY & BOARD SURFACES INSIDE CABINET SHALL BE PAINTED WITH ENAMEL PAINT.

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TYPICAL SECTION THROUGH KITCHEN CABINET
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB,.2026 NO.: 156/322/TD/J43 REV.: 0

P-PN-DN-00

CAD by M.IRFAN

ARCHITECTURAL DETAILS

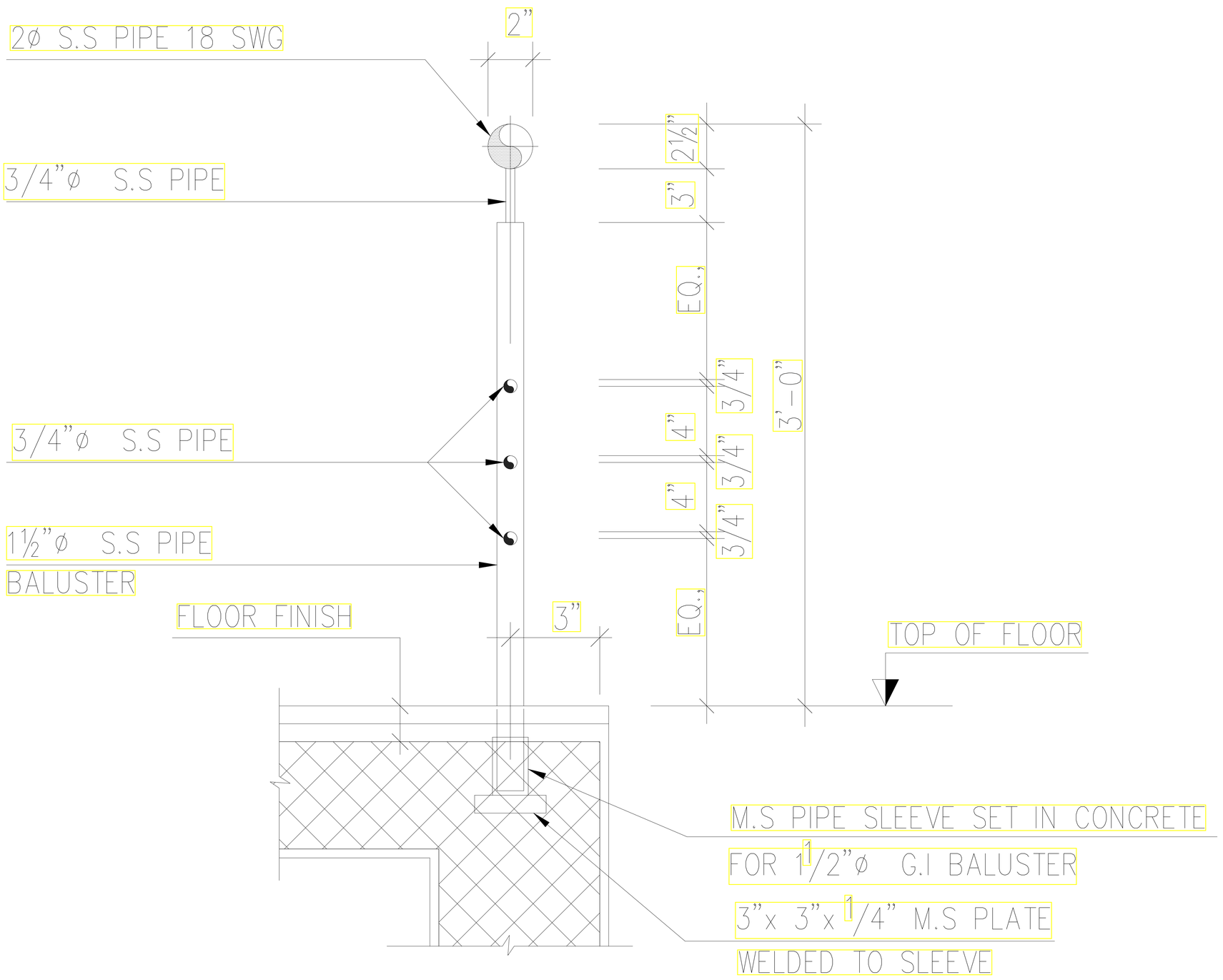


TYPICAL SECTION

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: COUNTER VANITY TOP DETAIL	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB,.2026	NO.: 156/322/TD/J44 — REV.: 0

CAD by M.IRFAN

ARCHITECTURAL DETAILS



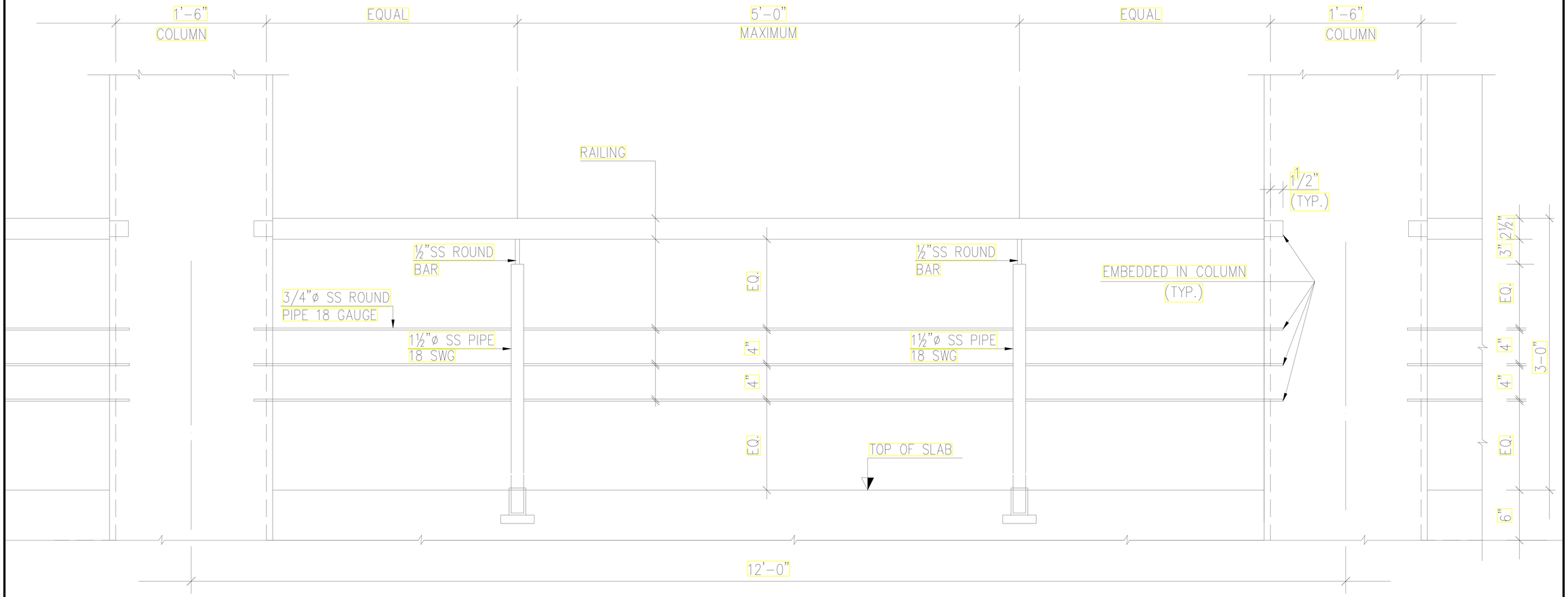
SECTION (R-2)

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS		TITLE: PIPE RAILING DETAIL (R-2)	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB,.2026	NO.: 156/322/TD/J45	REV.: 0

P-PN-DN-00

CAD by M.IRFAN

ARCHITECTURAL DETAILS



ELEVATION OF RAILING-2

NOTE

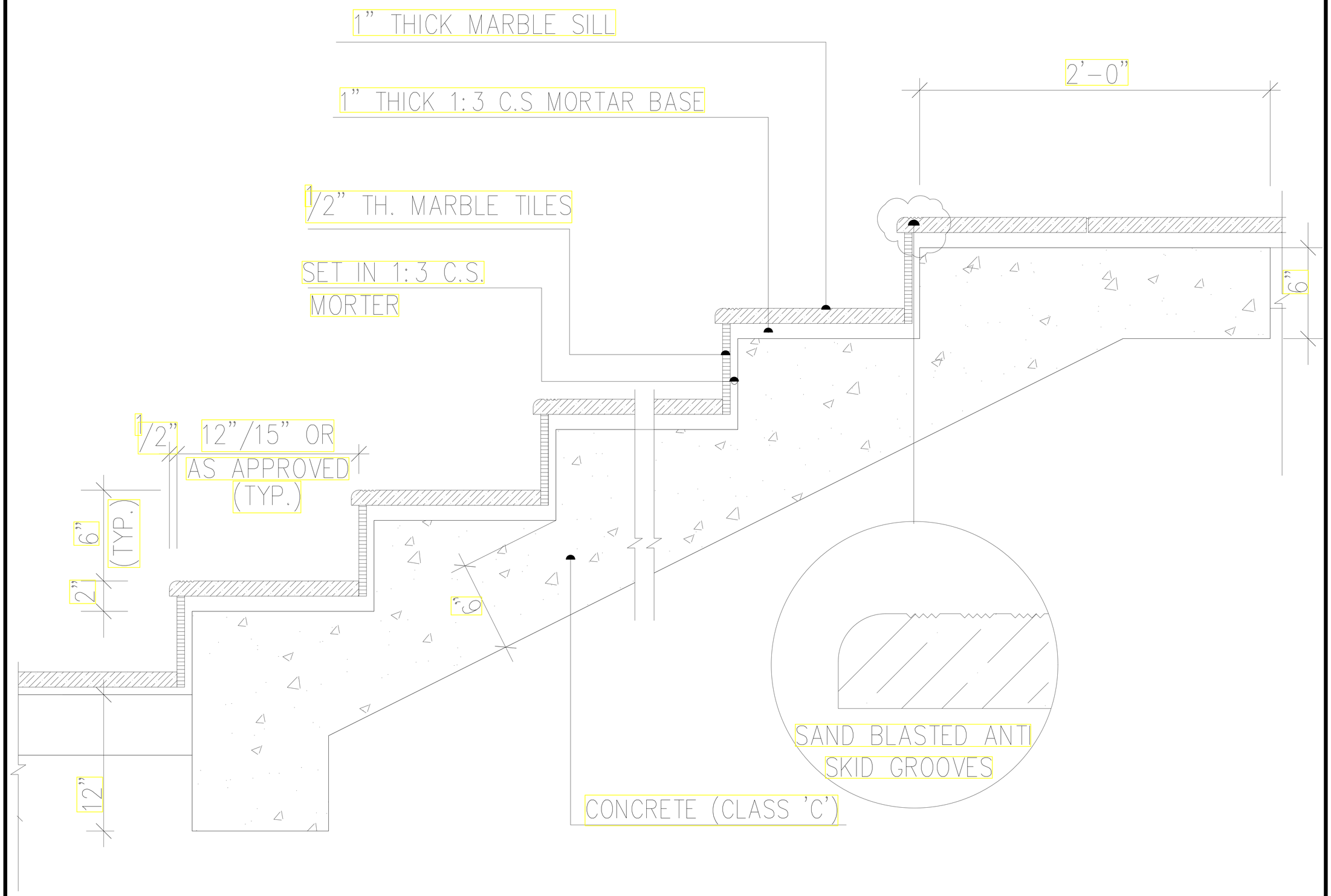
FOR FURTHER DETAILS REFER TYPICAL SECTION OF RAILING IN THIS VOLUME.

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	NEW CAMPUS WOMEN'S HOSTEL CAMPUS DEVELOPMENT PLAN IIU CAMPUS. SECTOR H-10, ISLAMABAD	TITLE: RAILING DETAIL 2	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD		SCALE: N.T.S DATE: FEB,.2026	NO.: 156/322/TD/J46 REV.: 0

P-PN-DN-00

CAD by M.IRFAN

DETAILS



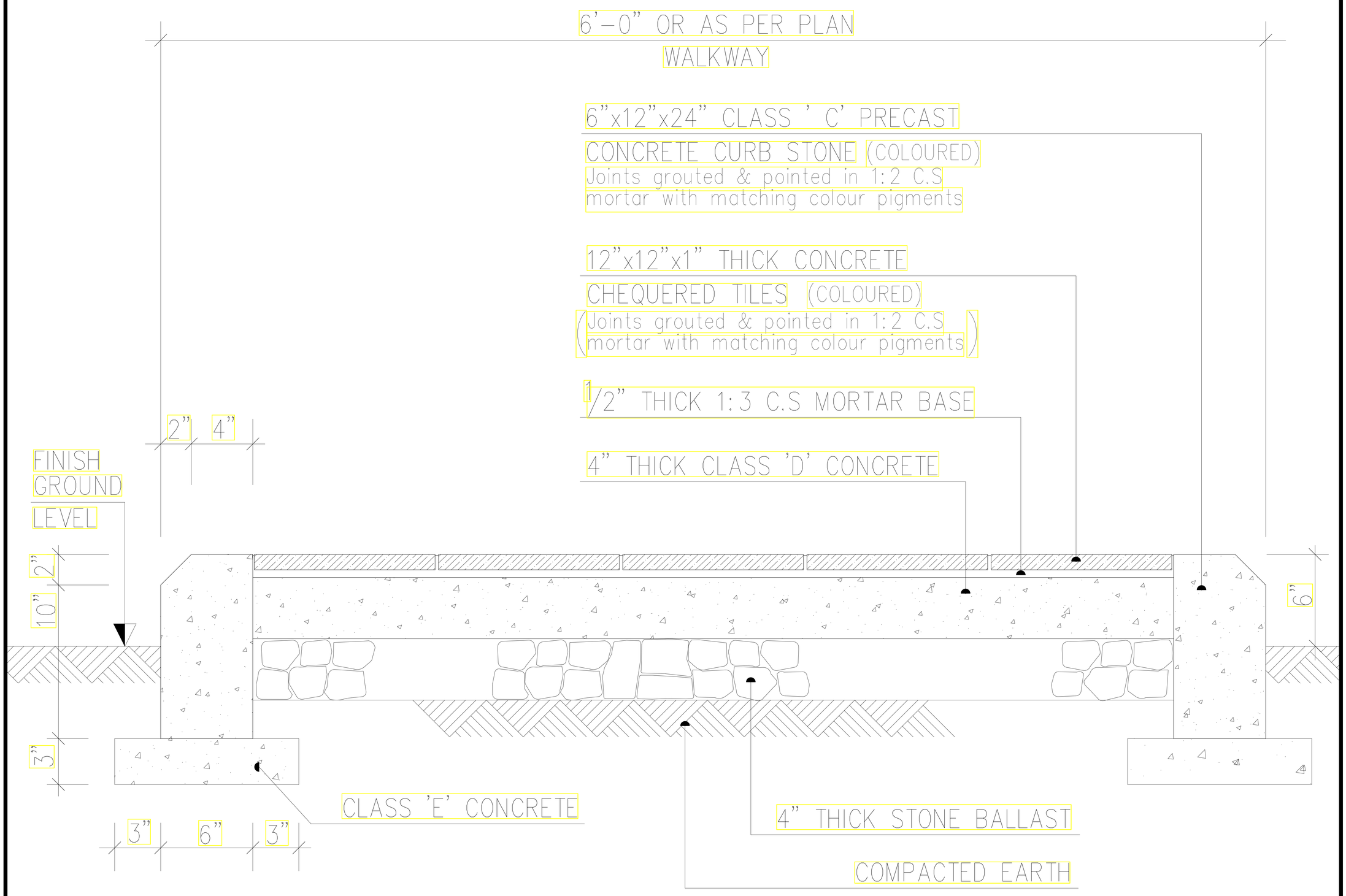
DETAIL OF MARBLE STEPS(EXTERNAL)

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS		TITLE: MARBLE STEPS DETAIL (EXTERNAL)	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB., 07	NO.: 156/322/TD/J47	REV.: 0

PTET-2672-FF-35

CAD by M.IRFAN

ARCHITECTURAL DETAILS

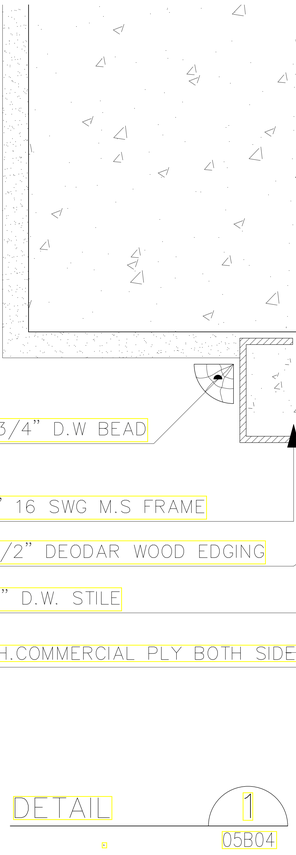


TYPICAL DETAIL OF WALKWAY
WITH CURB STONE TYPE-3

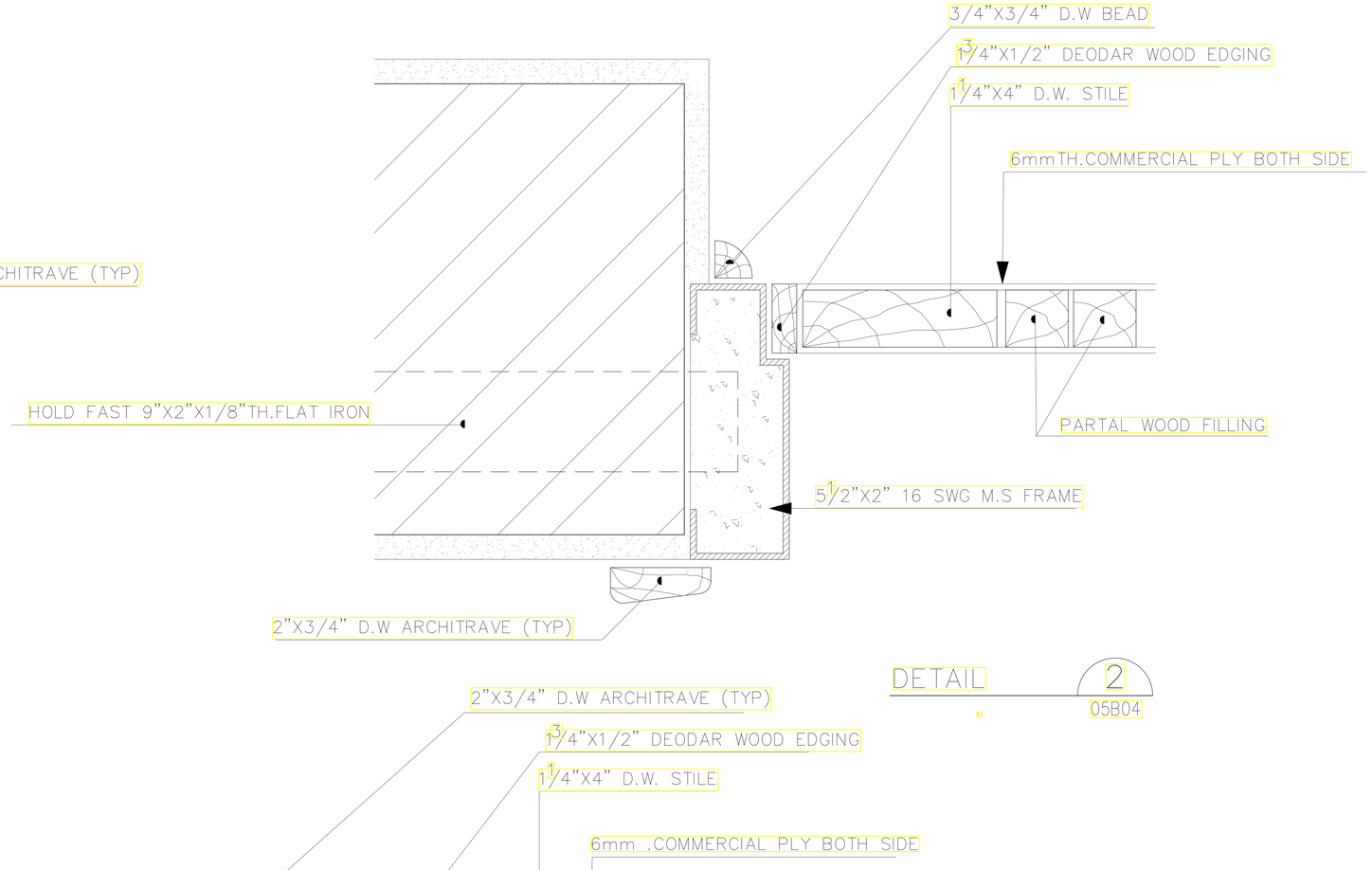
PROJECT: GUN AND COUNTRY CLUB GUEST UNITS		TITLE: TYPICAL DETAIL OF WALKWAY	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB,.2026	NO.: 156/322/TD/J48	REV.: 0

CAD by M.IRFAN

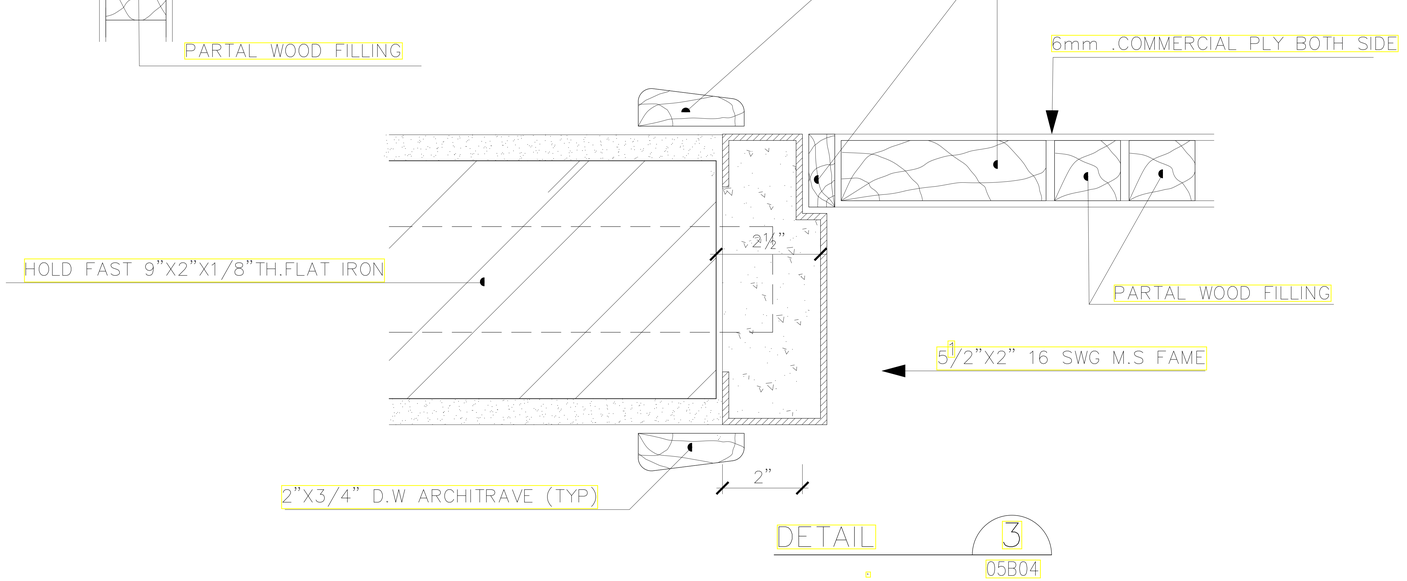
SCHEDULE OF OPENINGS



DETAIL 1 05B04



DETAIL 2 05B04



DETAIL 3 05B04

PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

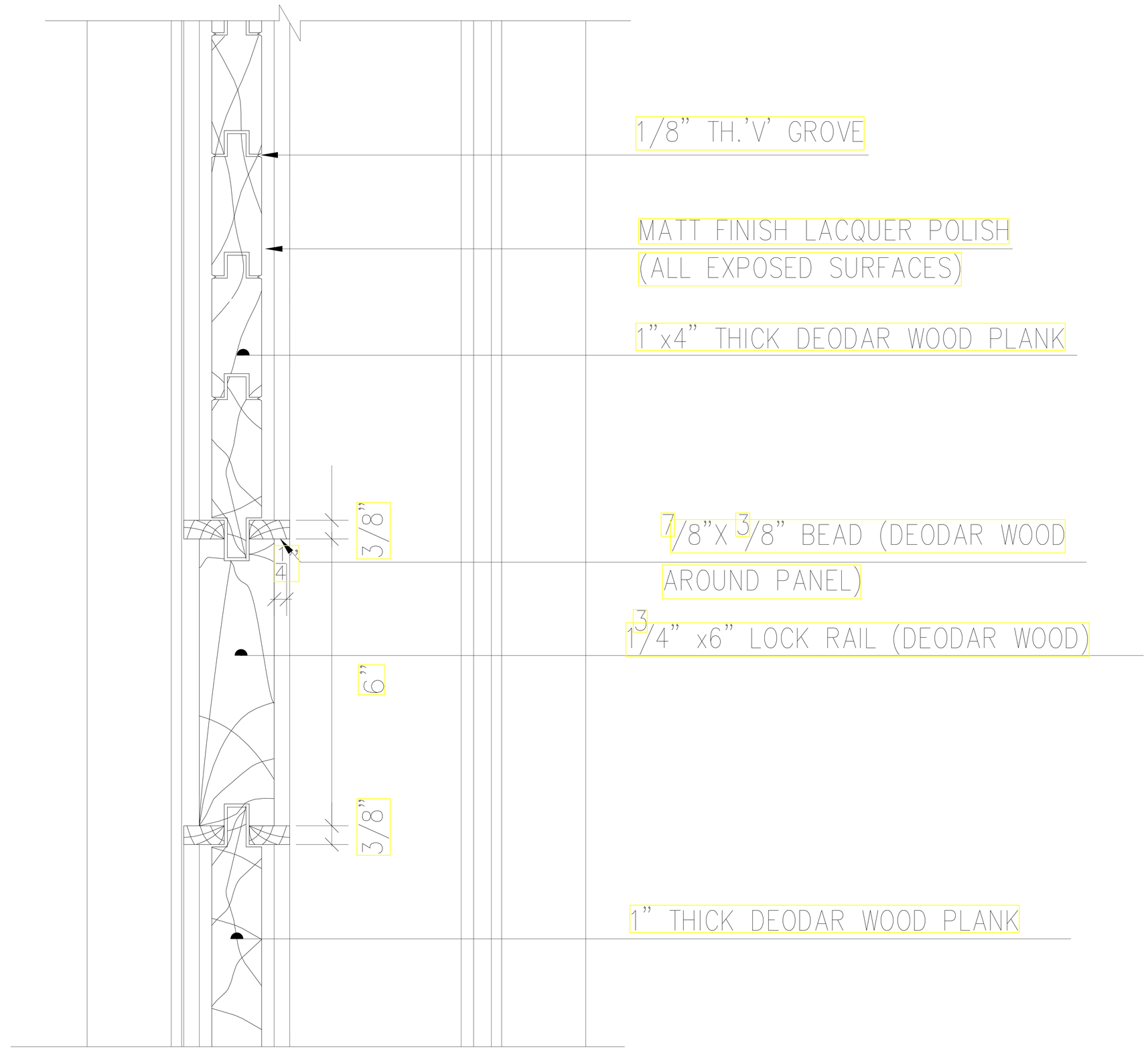
TITLE

DOOR FRAME DETAILS

SCALE	NO.	REV.
N.T.S	156/322/TD/J49	01
DATE JUN.'13		

CAD by M.IRFAN

ARCHITECTURAL DETAILS



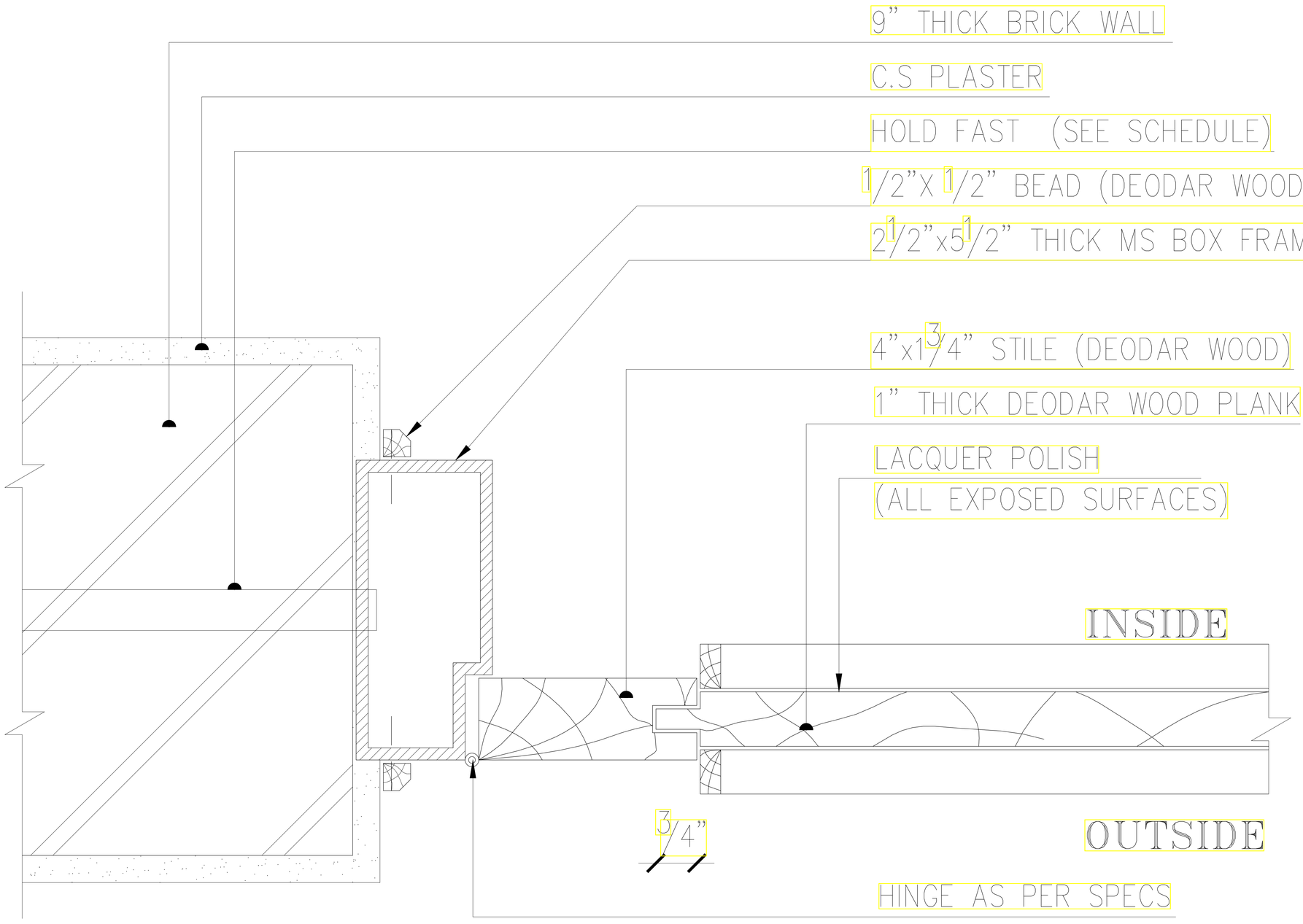
DETAIL-2

FOR DEODAR WOOD

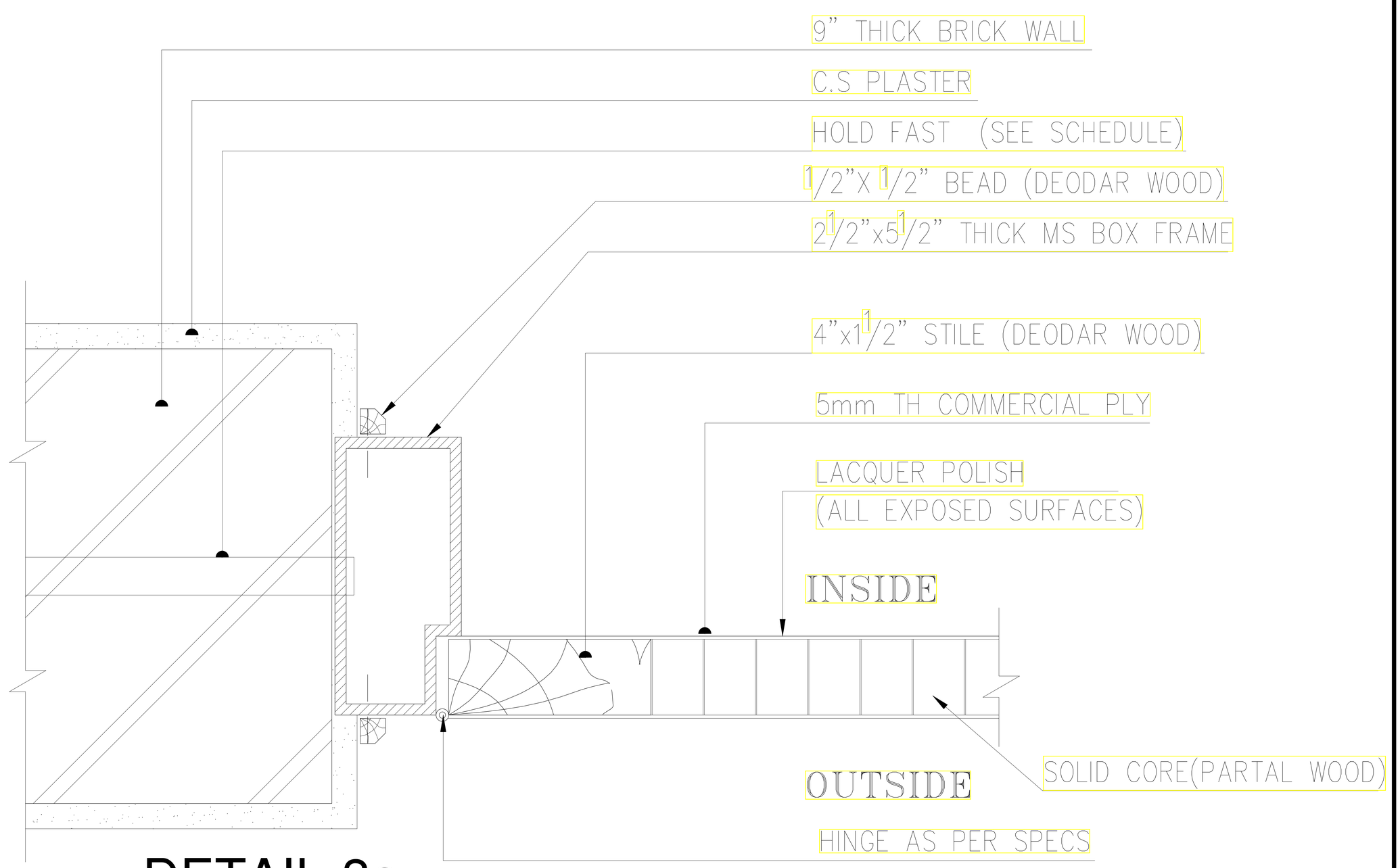
PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: LOCK RAIL DETAIL DETAIL – 2		
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S	NO.: 156/322/TD/J50	REV.: 0
	DATE: OCT.2022		

CAD by FAROOQ

ARCHITECTURAL DETAILS



DETAIL-3



DETAIL-3a

FOR 9" & ABOVE TH. WALL

PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS

TITLE

DETAIL -3 (FLUSH DOOR)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

SCALE N.T.S

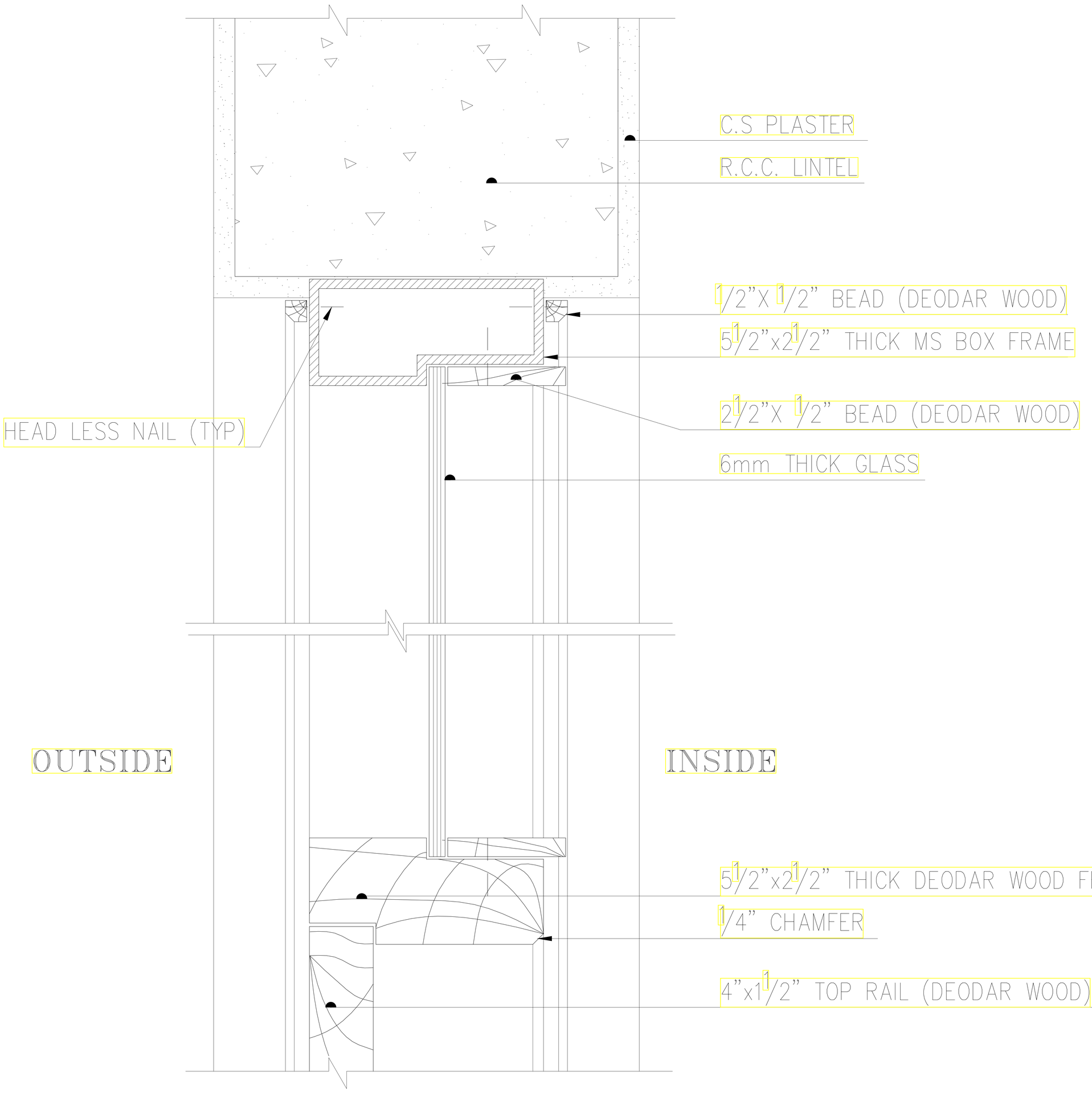
DATE OCT.2022

NO. 156/322/TD/J51

REV. 0

CAD by FAROOQ

ARCHITECTURAL DETAILS



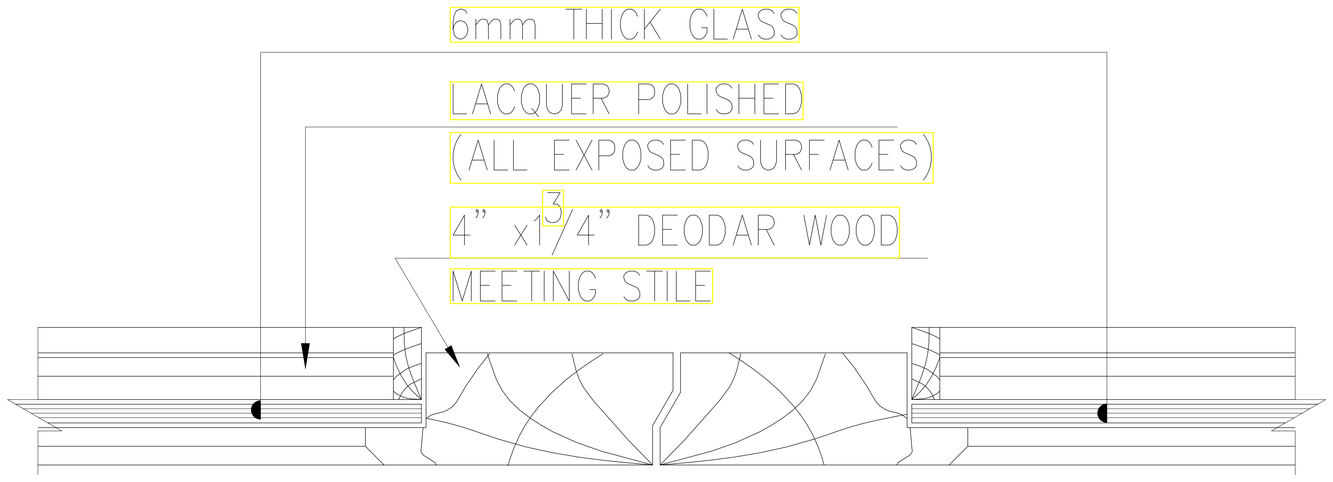
DETAIL-4

FOR 9" & ABOVE TH. WALL

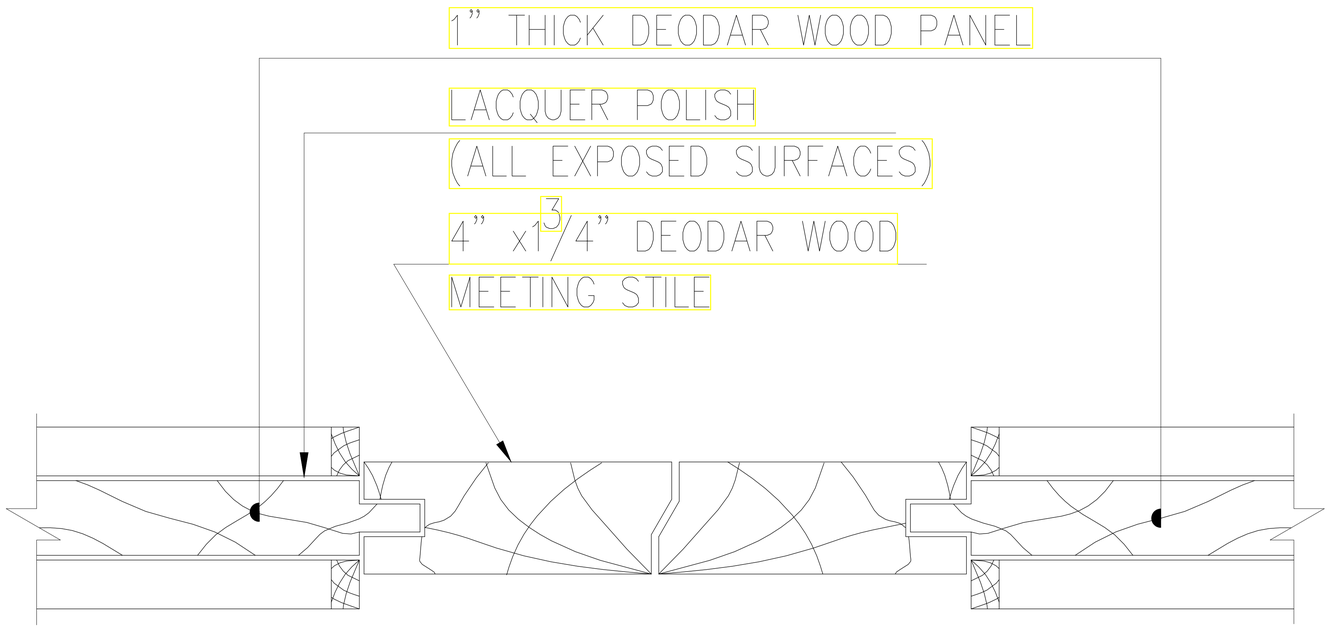
PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: DETAIL –4		
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: OCT.2022	NO.: 156/322/TD/J52	REV.: 0

CAD by FAROOQ

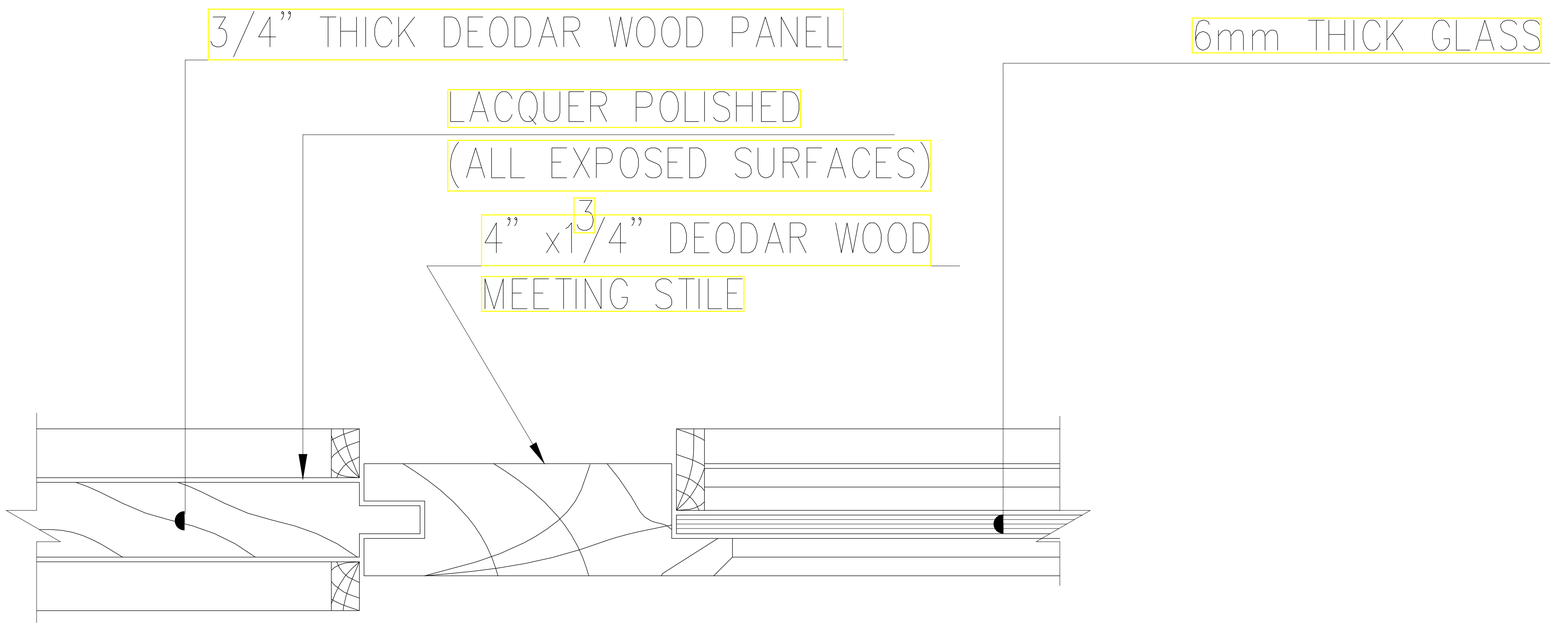
ARCHITECTURAL DETAILS



DETAIL-5



DETAIL-6

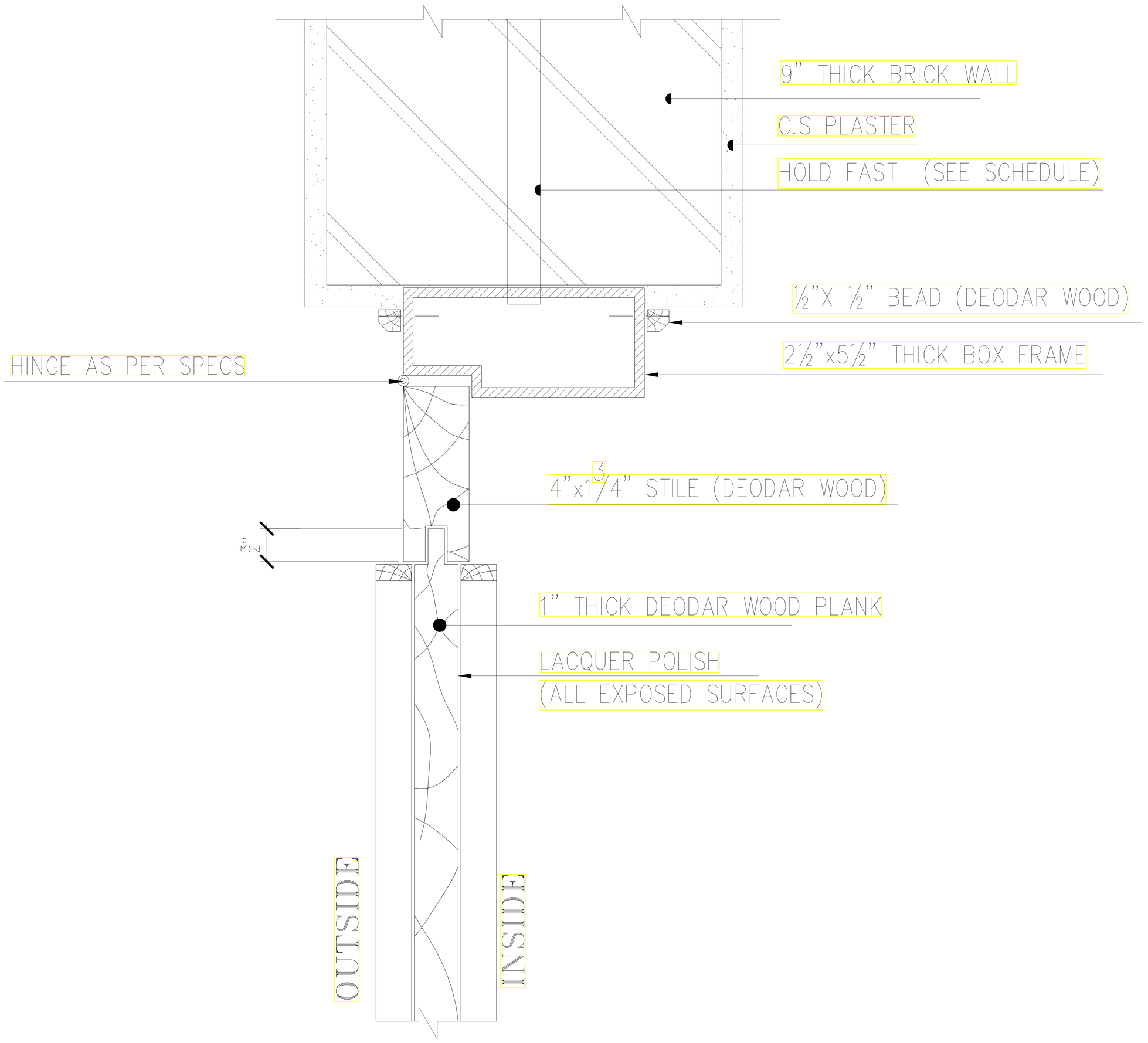


DETAIL-7

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS		TITLE: DETAIL – 5,6 & 7	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD		SCALE: N.T.S DATE: OCT.2022	NO.: 156/322/TD/J53 — REV.: 0

CAD by FAROOQ

ARCHITECTURAL DETAILS

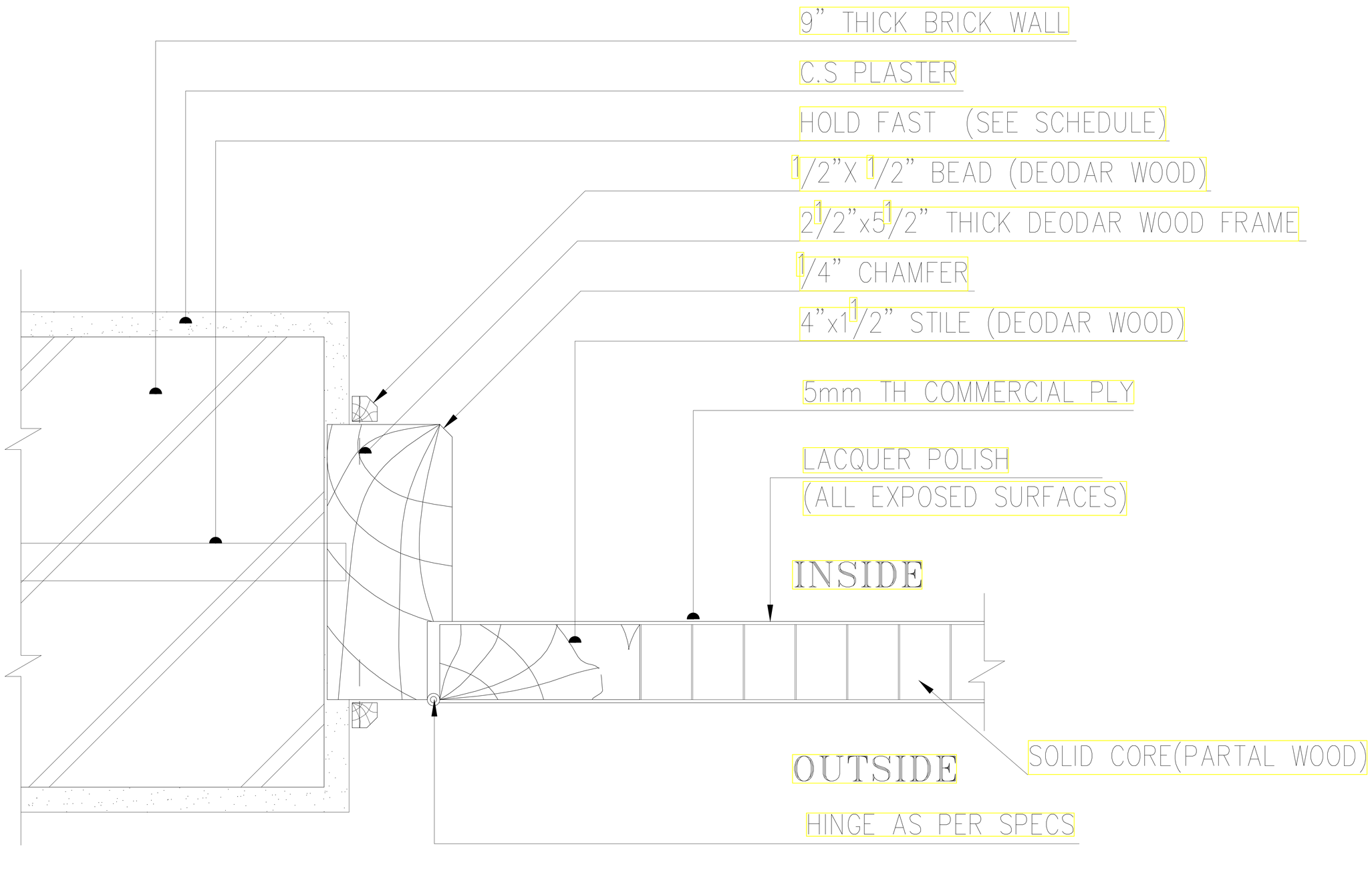


FOR 9" & ABOVE TH. WALL

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS		TITLE: DETAIL – 8	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD		SCALE: N.T.S DATE: OCT.2022	NO.: 156/322/TD/J54 — REV.: 0

CAD by FAROOQ

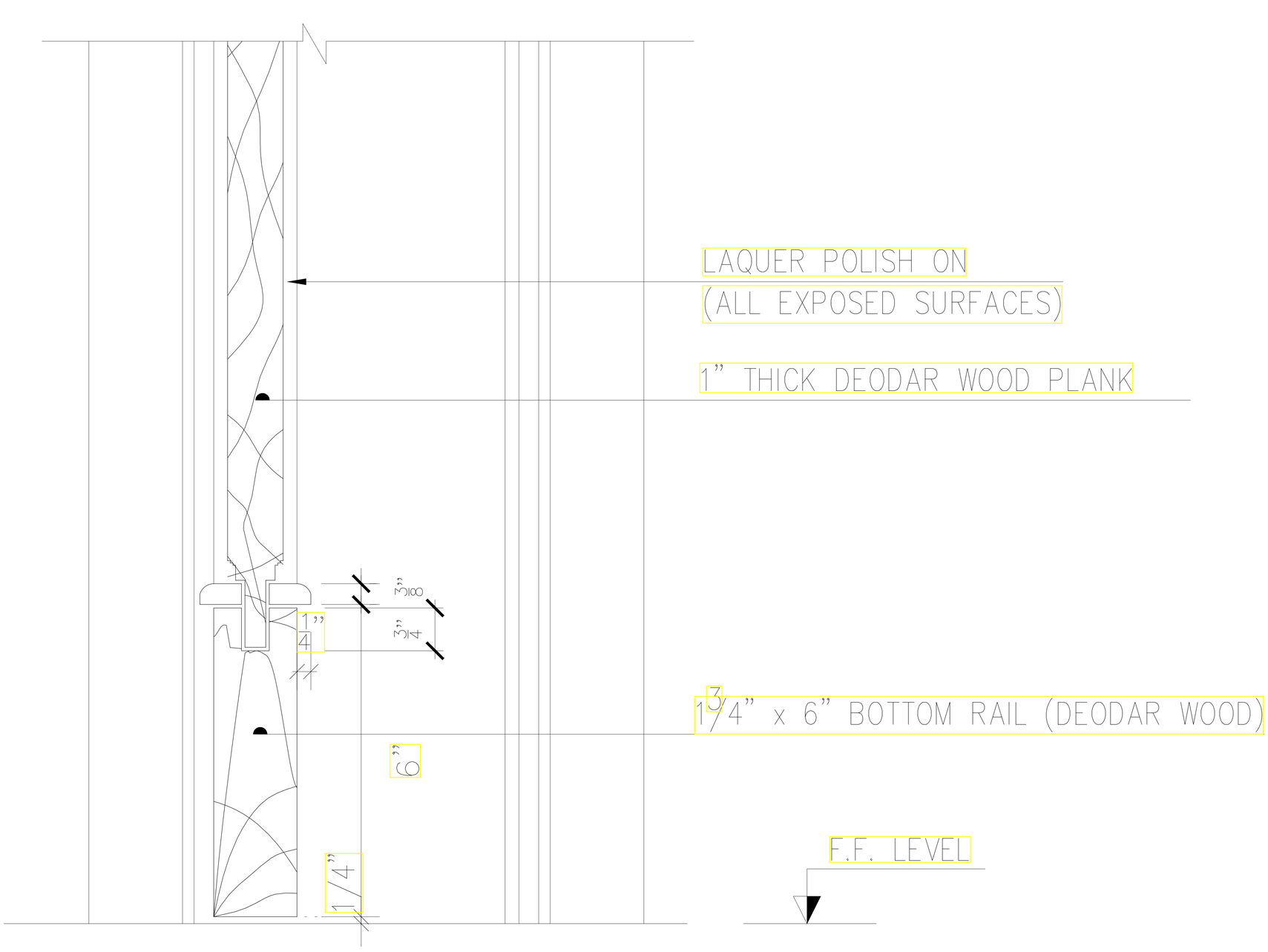
ARCHITECTURAL DETAILS



PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: DETAIL -2 (FLUSH DOOR)		
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB,.2026	NO.: 156/322/TD/J55	REV.: 0

0-00-00-00

DETAILS



DETAIL-1

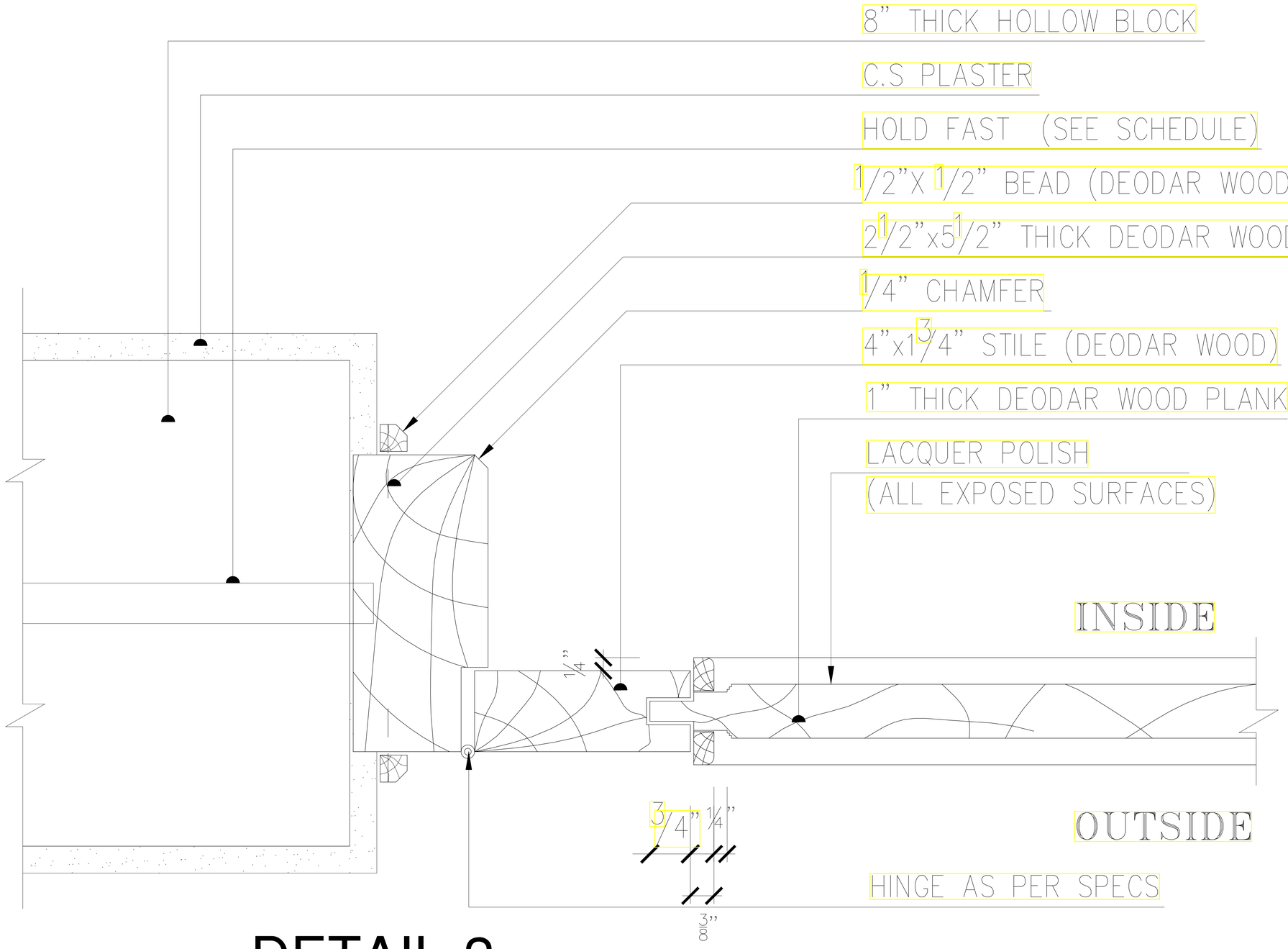
NOTE:- ALL PANELED DOORS ARE LACQUER POLISH EXCEPT W.C DOORS(PAINTED)

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: TYPICAL DOOR DETAIL DETAIL – 1		
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S	NO.: 156/322/TD/J56	REV.: 0
	DATE: FEB., 07		

PTET-2672-DWD-19

CAD by M.IRFAN

DETAILS



DETAIL-2

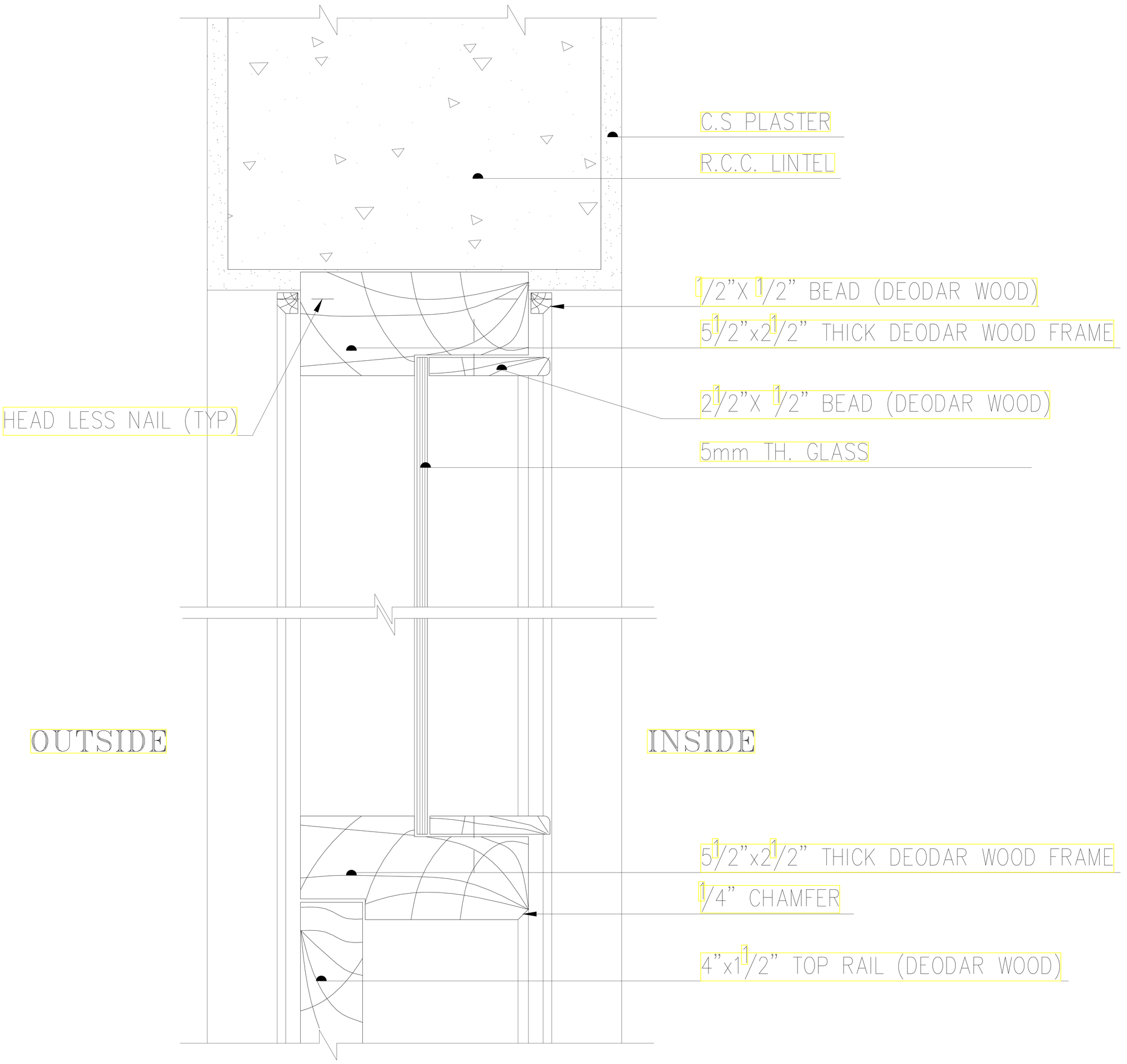
NOTE:- ALL PANELED DOORS ARE LACQUER POLISH EXCEPT W.C DOORS(PAINTED)

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: TYPICAL DOOR DETAIL DETAIL – 2	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB., 07	NO.: 156/322/TD/J57 — REV.: 0

PTET-2672-DWD-20

CAD by M.IRFAN

DETAILS



DETAIL-3

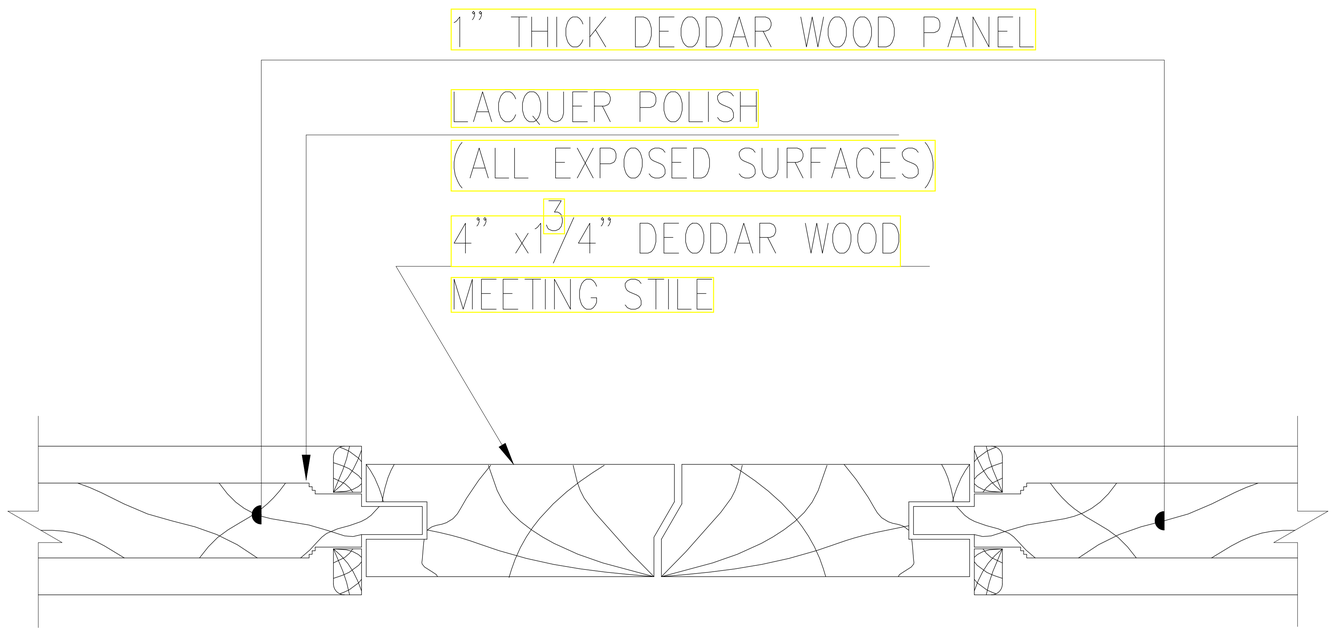
NOTE:- ALL PANELED DOORS ARE LACQUER POLISH EXCEPT W.C DOORS(PAINTED)

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS		TITLE: TYPICAL DOOR DETAIL DETAIL – 3	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB., 07	NO.: 156/322/TD/J58	REV.: 0

PTET-2672-DWD-21

CAD by M.IRFAN

DETAILS



DETAIL-4

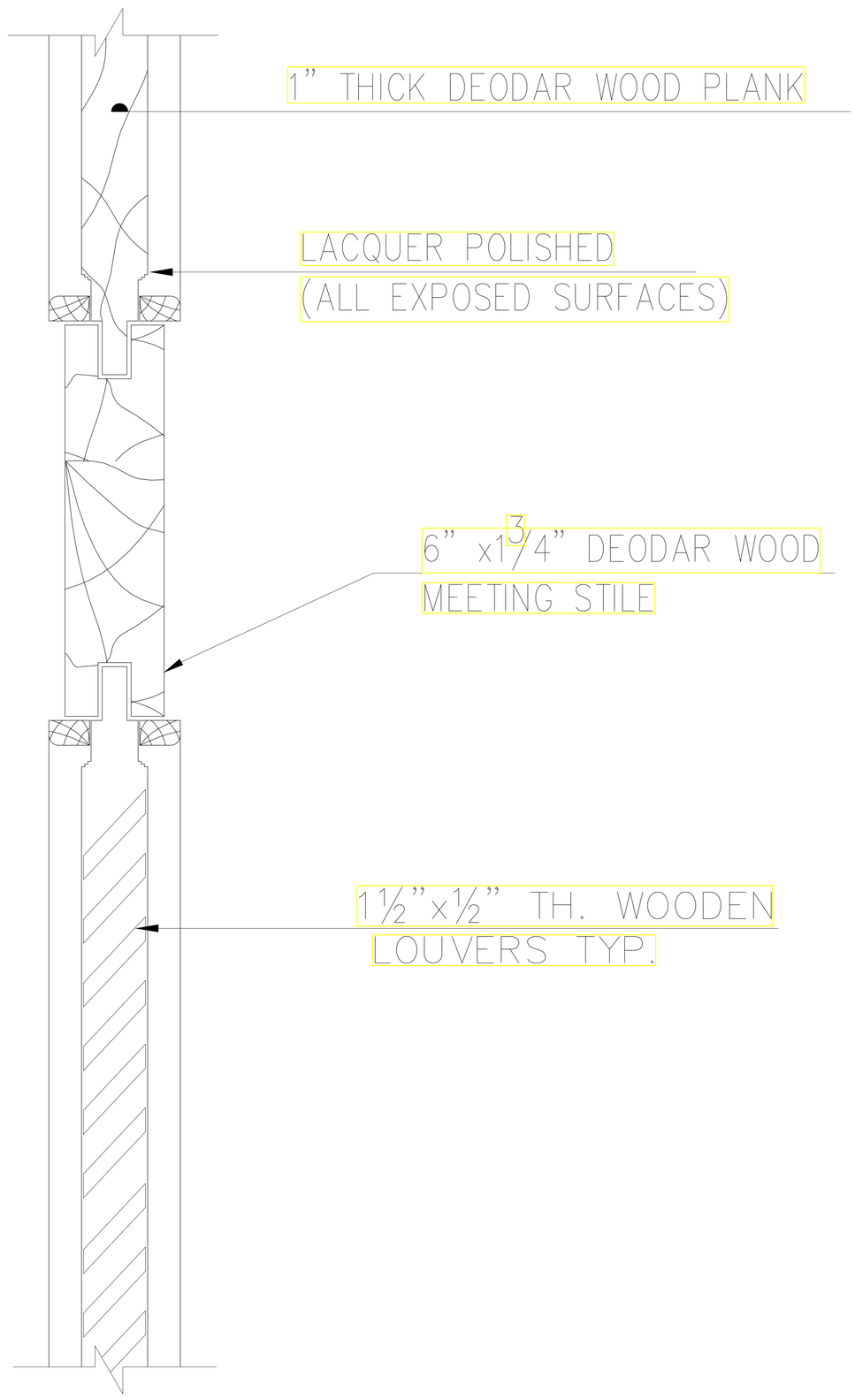
NOTE:- ALL PANELED DOORS ARE LACQUER POLISH EXCEPT W.C DOORS(PAINTED)

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: TYPICAL DOOR DETAIL DETAIL – 4		
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB., 07	NO.: 156/322/TD/J59	REV.: 0

PTET-2672-DWD-22

CAD by M.IRFAN

DETAILS



DETAIL-5

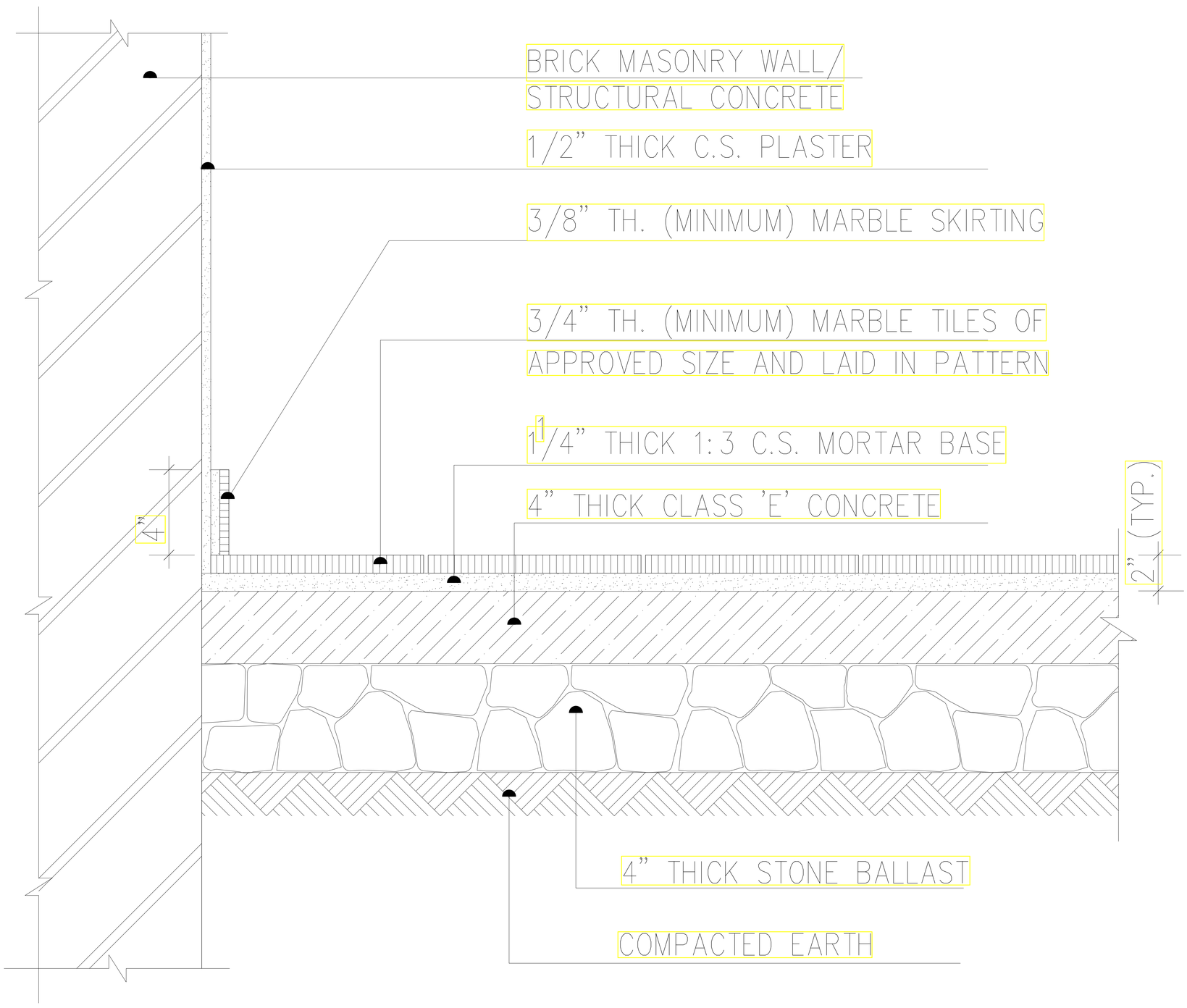
NOTE:- ALL PANELED DOORS ARE LACQUER POLISH EXCEPT W.C DOORS(PAINTED)

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: TYPICAL DOOR DETAIL DETAIL – 5	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB., 07	NO.: 156/322/TD/J60 — REV.: 0

PTET-2672-DWD-23

CAD by M.IRFAN

ARCHITECTURAL DETAILS

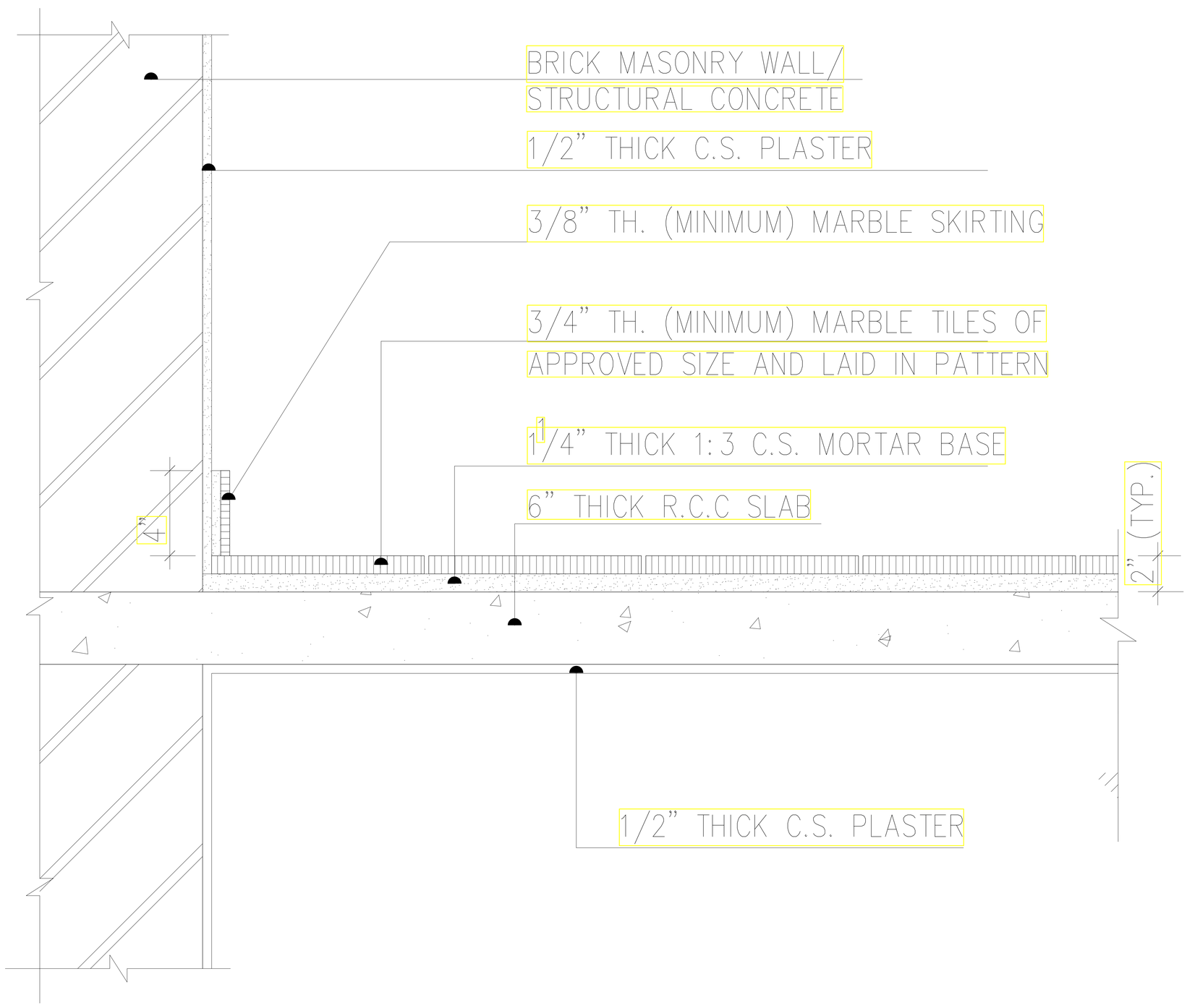


MARBLE / GRANITE FLOORING DETAIL

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: GRANITE TILE FLOORING/SKIRTING (GROUND FLOOR)	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB,.2026	NO.: 156/322/TD/J61 — REV.: 0

CAD BY: M.SALEEM

ARCHITECTURAL DETAILS



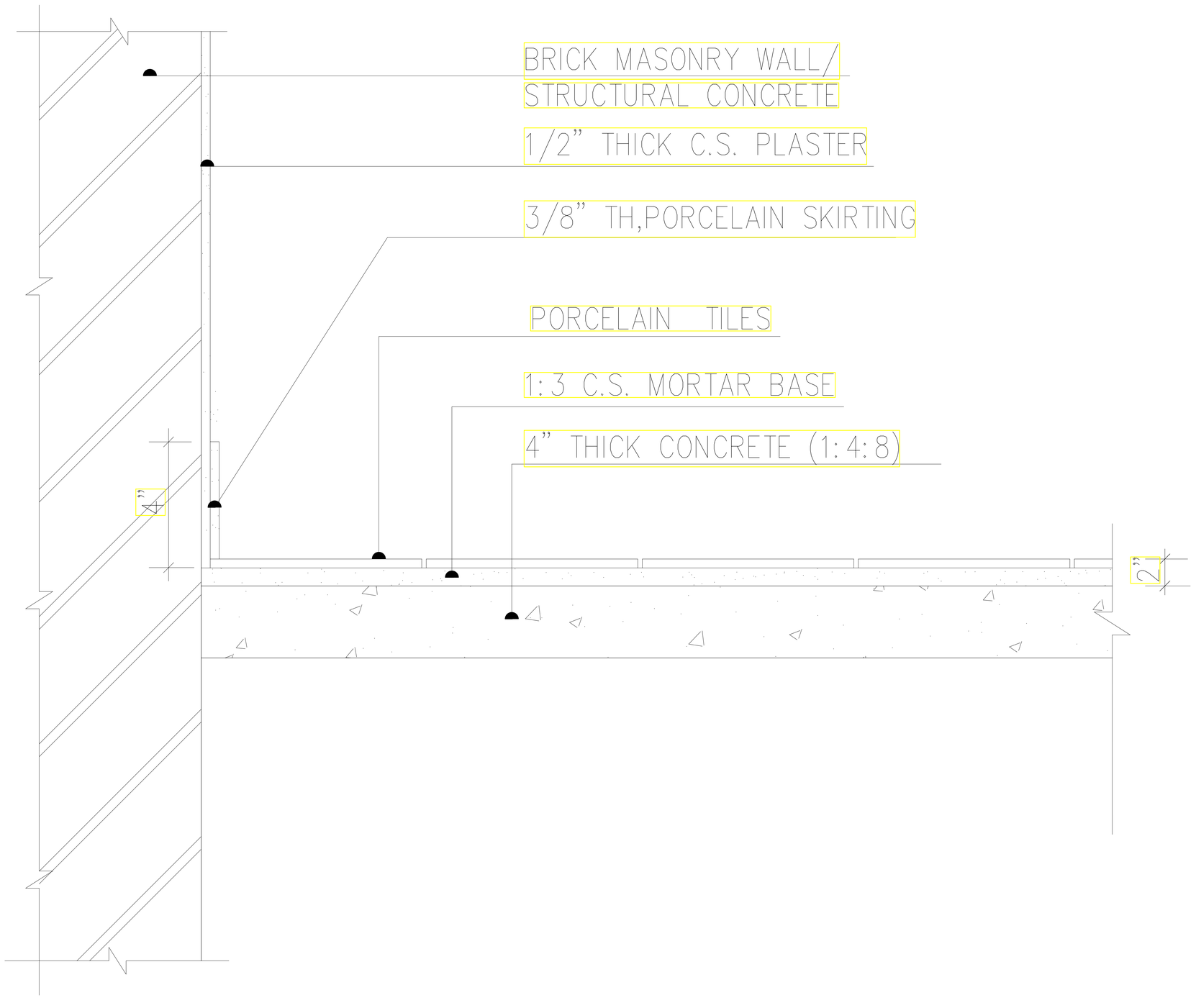
MARBLE / GRANITE FLOORING DETAIL

FOR FIRST FLOOR AND ABOVE

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: GRANITE TILE FLOORING/SKIRTING (FIRST FLOOR AND ABOVE)	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB,.2026	NO.: 156/322/TD/J62 — REV.: 0

CAD BY: M.SALEEM

ARCHITECTURAL DETAILS

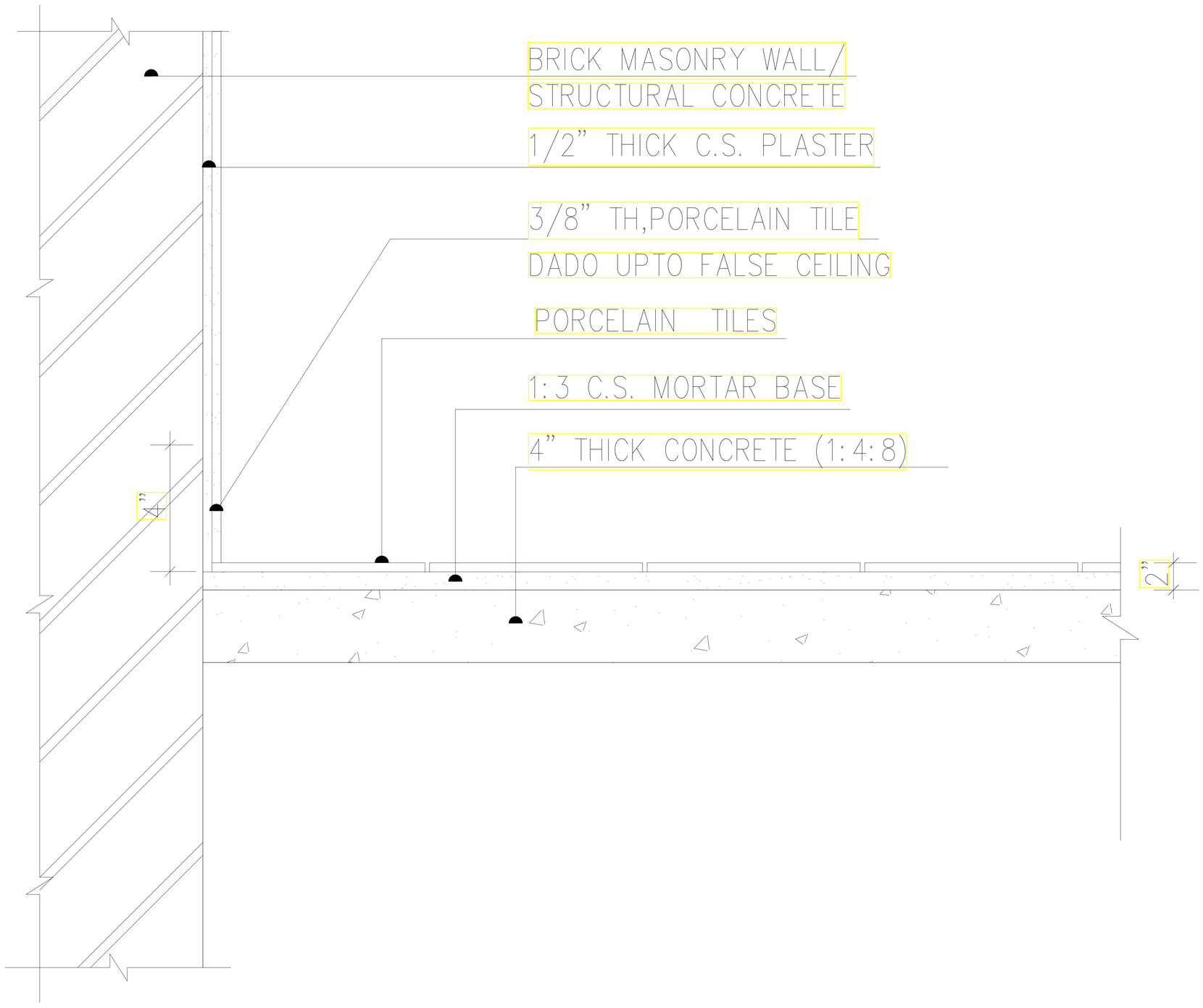


PORCELAIN TILES DETAIL

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: PORCELAIN TILES FLOORING/ SKIRTING(GROUND FLOOR)	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB,.2026	NO.: 156/322/TD/J63 — REV.: 0

CAD BY: M.SALEEM

ARCHITECTURAL DETAILS

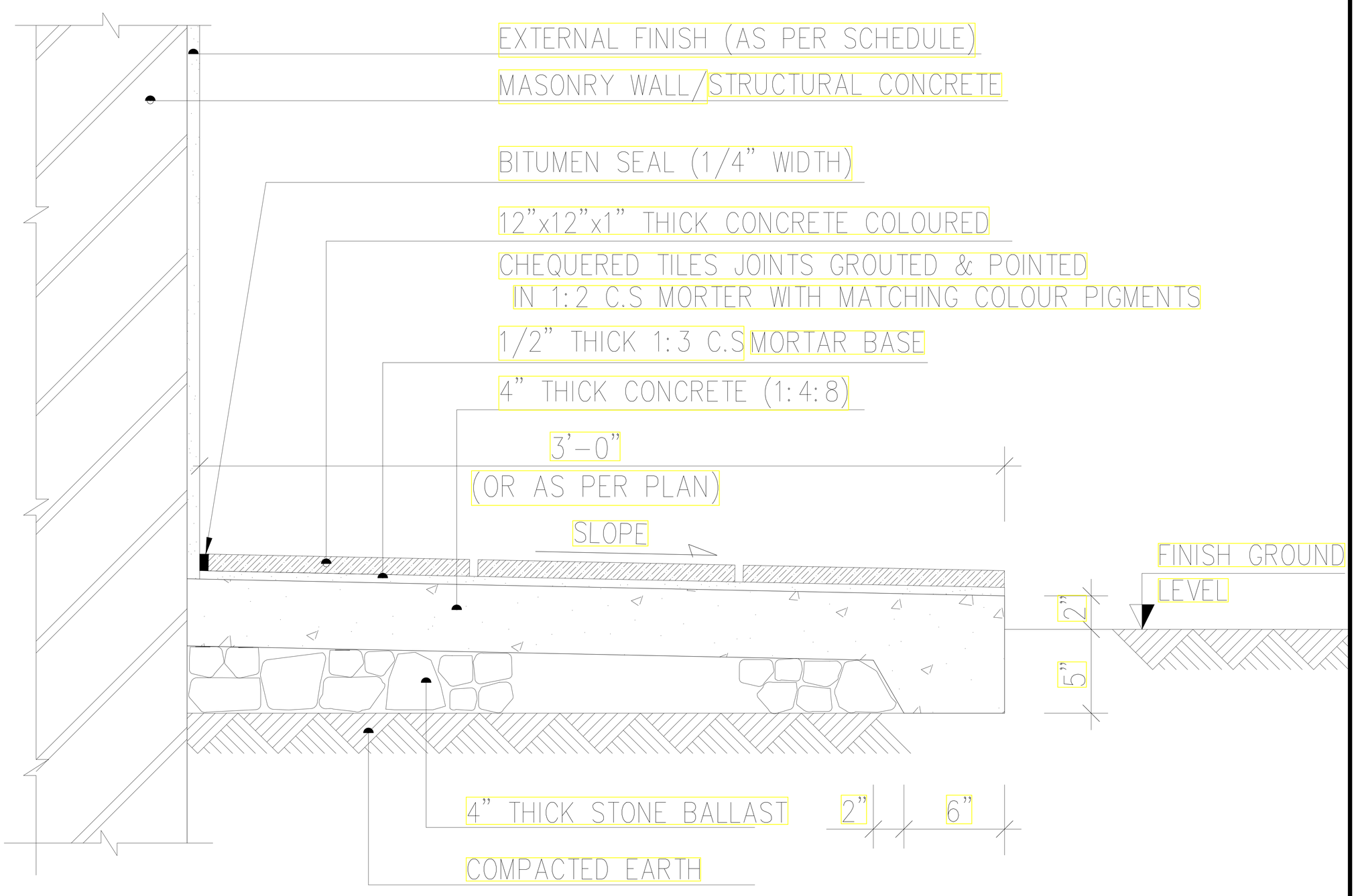


PORCELAIN TILES DETAIL

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS		TITLE: PORCELAIN TILES FLOORING/ SKIRTING(GROUND FLOOR)	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB,.2026	NO.: 156/322/TD/J64	REV.: 0

CAD BY: M.SALEEM

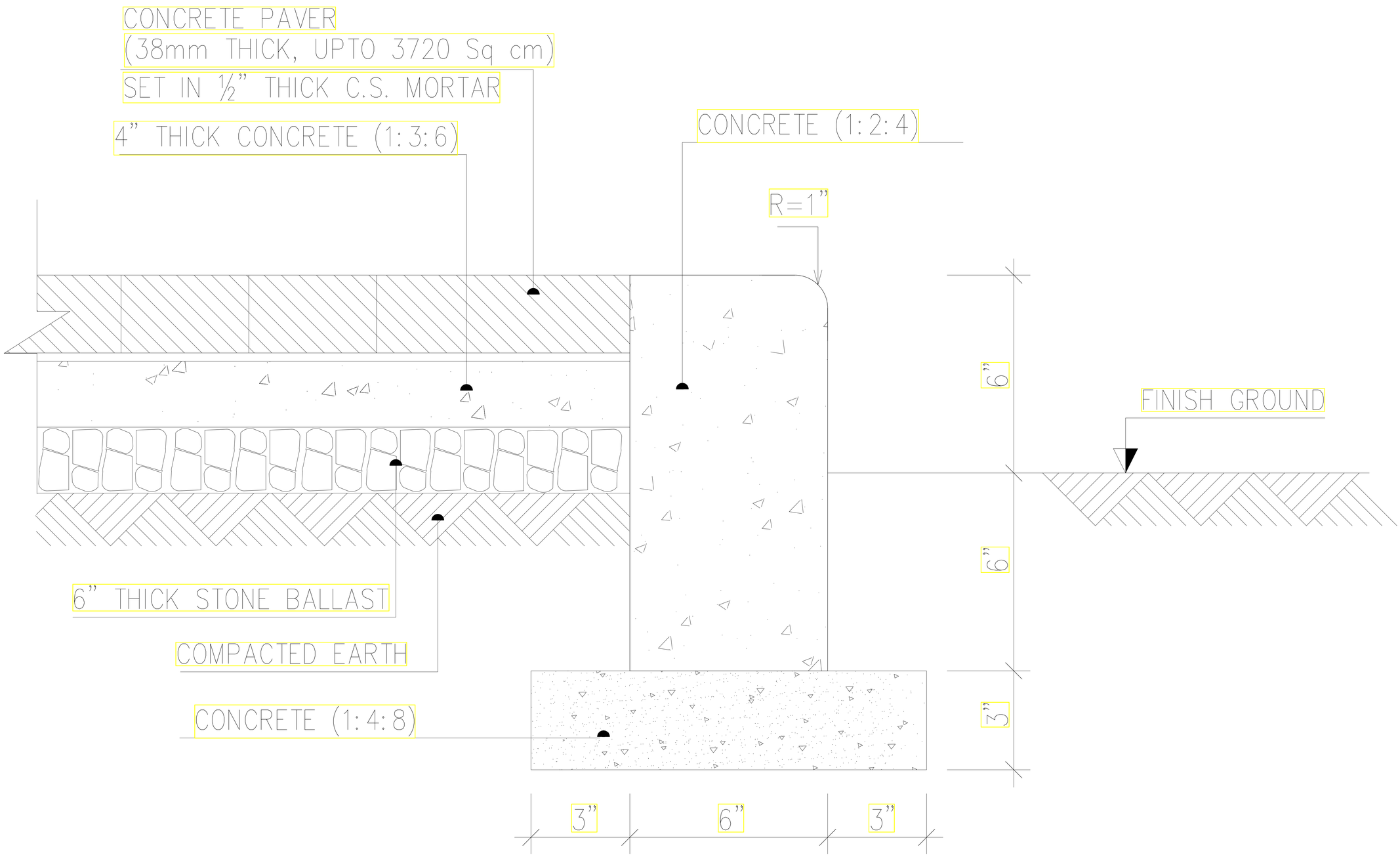
ARCHITECTURAL DETAILS



PLINTH PROTECTION DETAIL

PROJECT: FEDERAL URDU UNIVERSITY FOR ARTS ,SCIENCE AND TECHNOLOGY (FUUAST) ISLAMABAD CAMPUS		TITLE: DETAIL OF PLINTH PROTECTION	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: OCT.2022	NO.: 156/322/TD/J65	REV.: 0

ARCHITECTURAL DETAILS

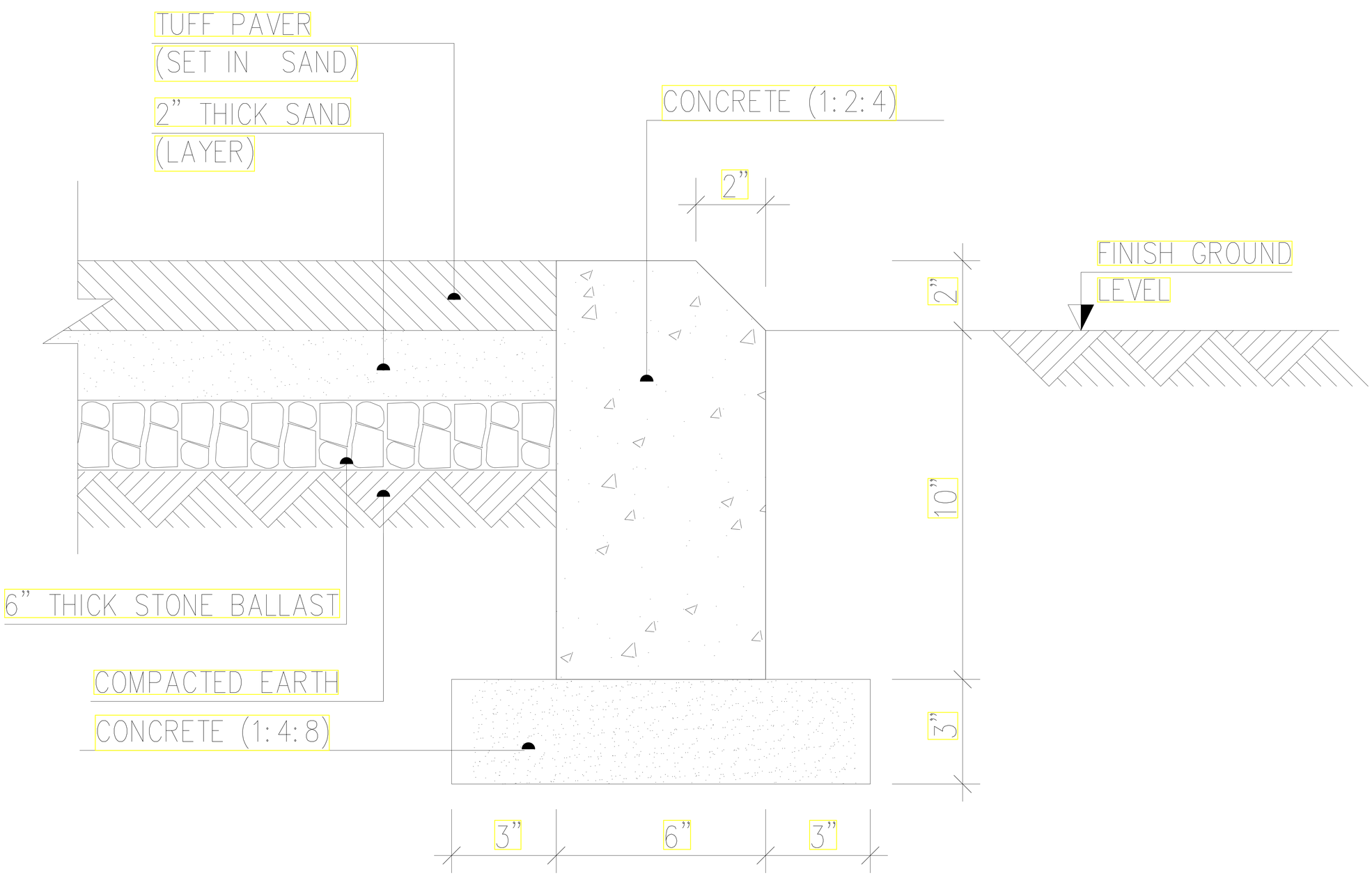


TYPICAL SECTION

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: EXTERNAL PAVED AREA (TYPE-I)	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB,.2026	NO.: 156/322/TD/J66 — REV.: 0

0-00-00-00

ARCHITECTURAL DETAILS

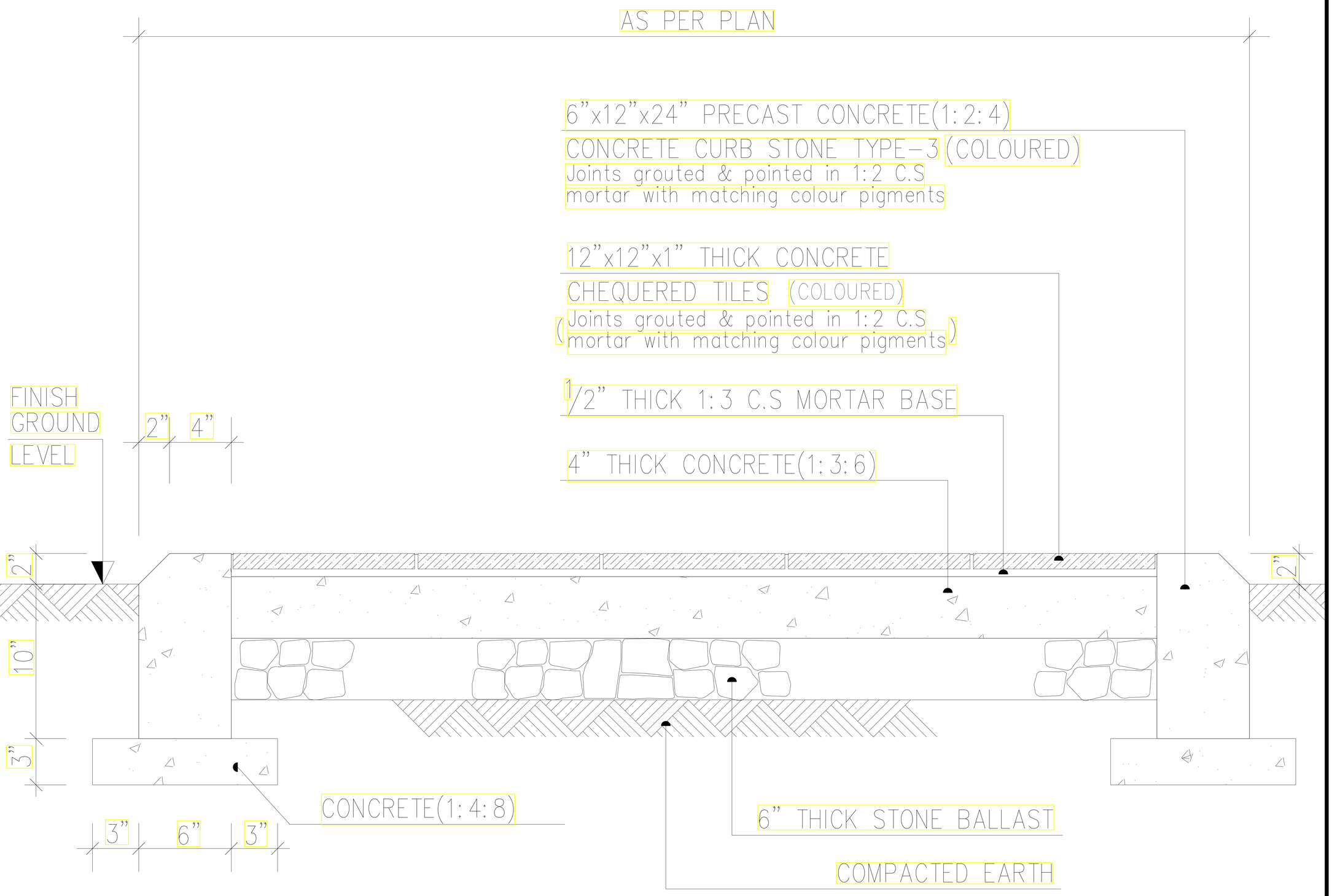


TYPICAL SECTION

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: EXTERNAL PAVED AREA (TYPE-2)	
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S DATE: FEB,.2026	NO.: 156/322/TD/J67 — REV.: 0

0-00-00-00

ARCHITECTURAL DETAILS

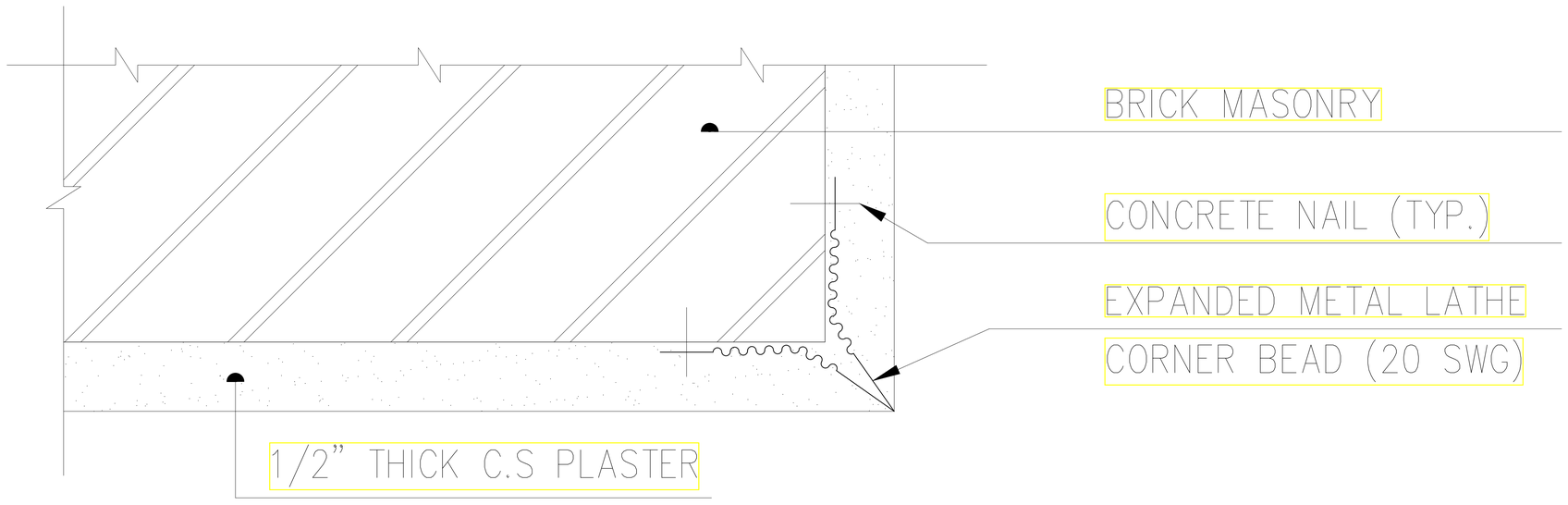


WALKWAY DETAIL

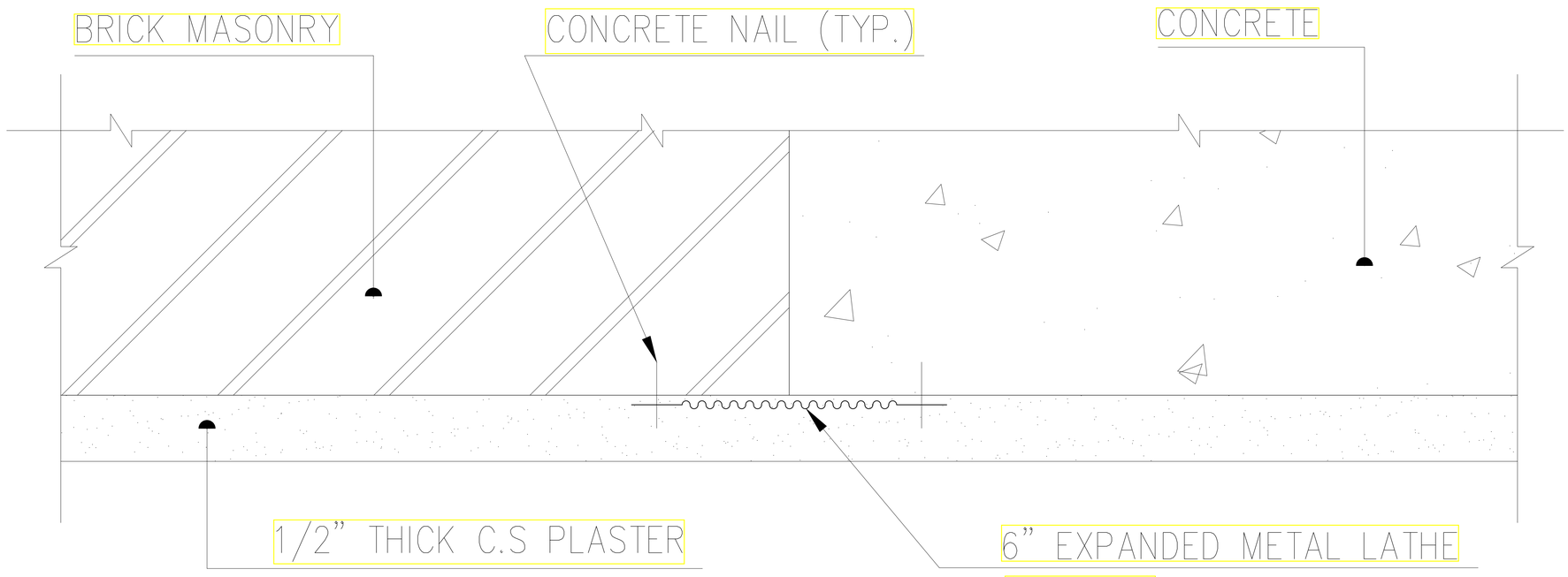
PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: DETAIL OF WALKWAY		
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S	NO.: 4125/322/C/J68	REV.: 0
	DATE: FEB,.2026		

CAD BY: M.SALEEM

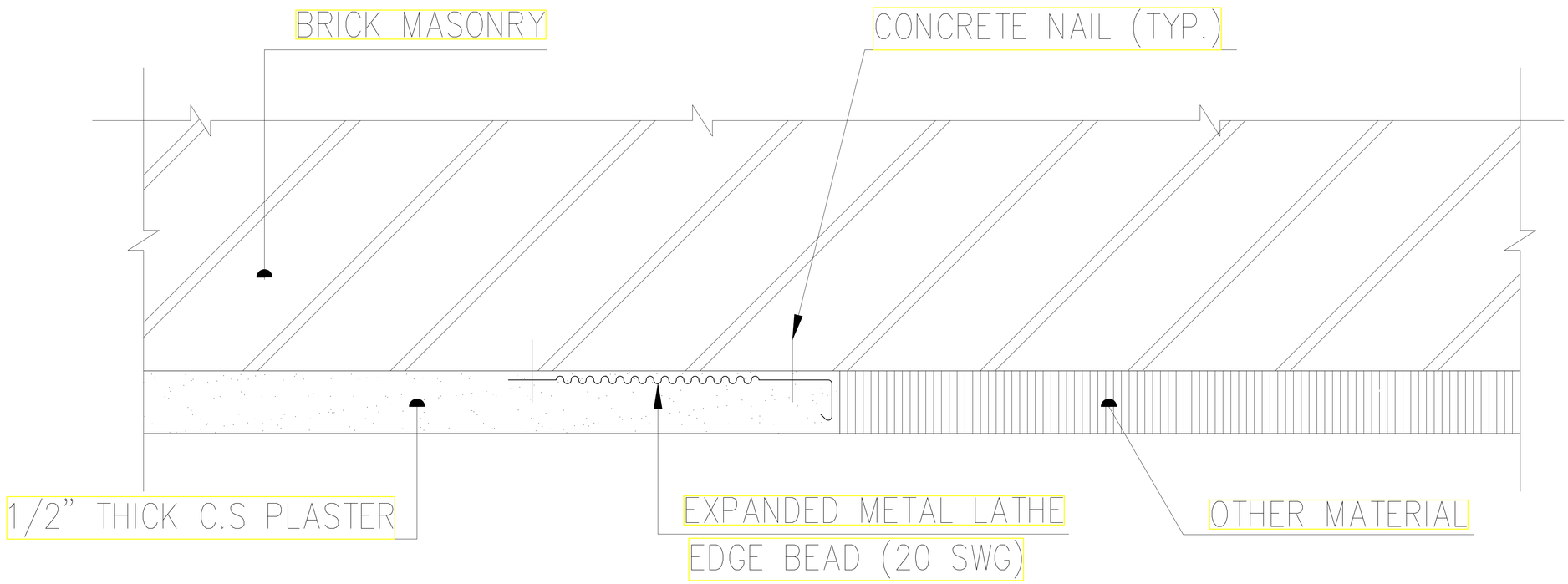
ARCHITECTURAL DETAILS



CORNER BEAD DETAIL



CONCRETE & MASONARY JOINT DETAIL

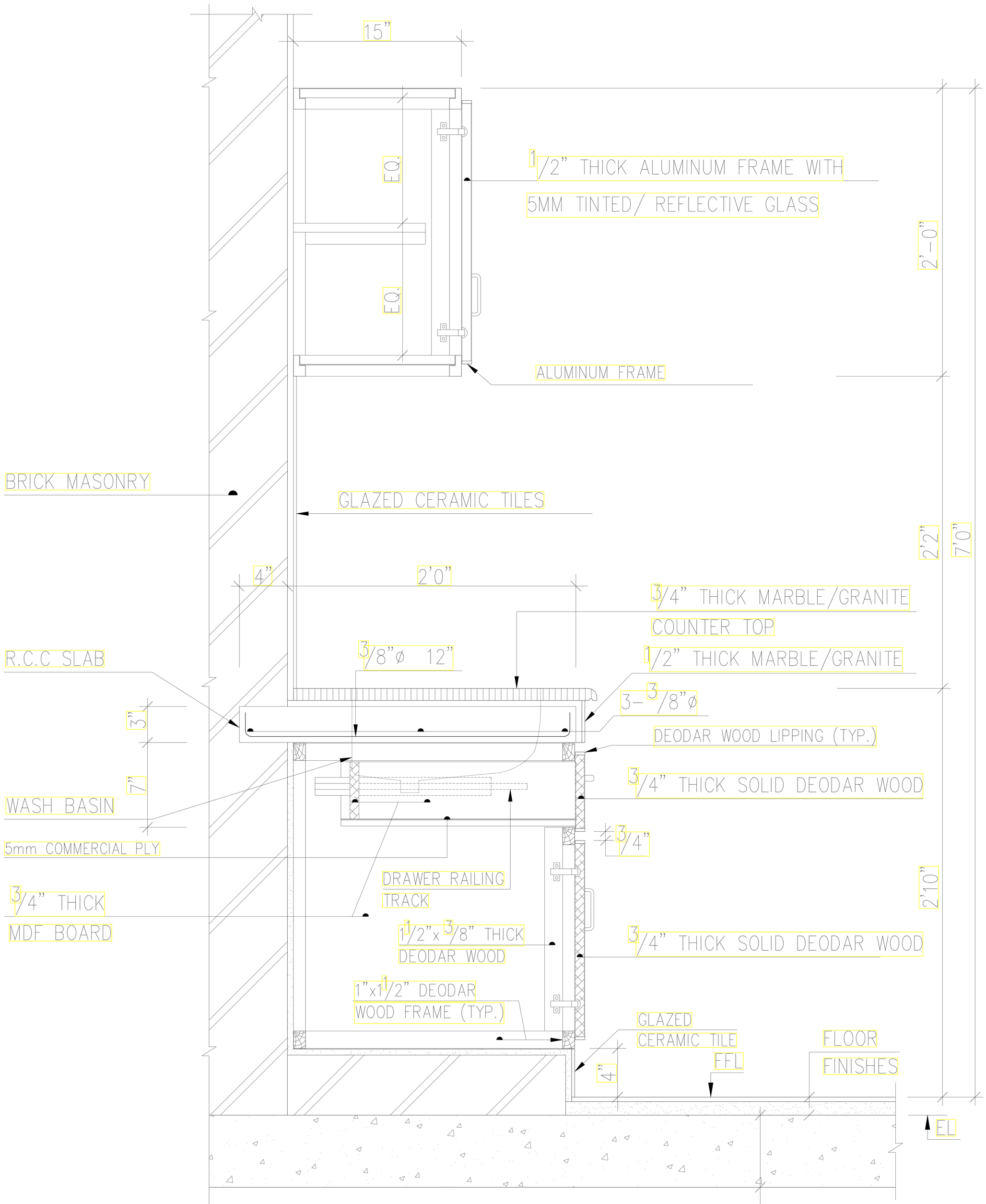


PLASTER EDGE BEAD DETAIL

PROJECT: GUN AND COUNTRY CLUB GUEST UNITS	TITLE: PLASTER BEADS		
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD	SCALE: N.T.S	NO.: 156/322/TD/J69	REV.: 0
	DATE: FEB,.2026		

CAD BY: M.SALEEM

ARCHITECTURAL DETAILS



NOTE

ALL WOODEN, PLY & BOARD SURFACES INSIDE CABINET SHALL BE PAINTED WITH ENAMEL PAINT.

PROJECT

GUN AND COUNTRY CLUB
GUEST UNITS

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

TITLE

TYPICAL SECTION
THROUGH KITCHEN CABINET

SCALE	NO.	REV.
N.T.S	156/322/TD/J70	0
DATE FEB,.2026		

CAD BY: M.SALEEM

GUN & COUNTRY CLUB, ISLAMABAD

CONSTRUCTION OF GUEST UNITS – BLOCK 1 -14 AT GUN & COUNTRY CLUB, ISLAMABAD

PRICE BID

BIDDING DOCUMENTS VOLUME – IV

LETTER OF PRICE BID
PREAMBLE TO BOQ
BILL OF QUANTITIES

MARCH, 2026

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD
NESPAK House, Sector G-5/2, Islamabad, Tel: 051-9221910-13, Fax: 051-9221914.

LETTER OF PRICE BID AND BILL OF QUANTITIES

TABLE OF CONTENTS

BID AND APPENDICES	Page No.
Letter of Price Bid	LPB-1
Preamble to Bill of Quantities	BD-1 to BD-2
Summary of Cost	BD-4
Bill of Quantities	As per Contents

Letter of Price Bid

Name of Contract: **"Construction of Guest Units – Block 1-14 at Gun & Country Club, Islamabad"**

To: **Secretary**

Gun &Country Club
Islamabad

We, the undersigned, declare that:

1. Having examined the Bidding Documents including Instructions to Bidders, Bidding Data, Conditions of Contract, Specifications, Schedules to Bid including Bill of Quantities, Drawings and Addenda Nos._____for the execution of the above-named Works, we, the undersigned, offer to execute and complete such Works and remedy any defects therein in conformity with the said Bidding Documents and Addenda for the sum of Equivalent PKR_____(Eq. Pak Rupees __._____) or such other sum as may be ascertained in accordance with the said conditions.

2. We meet the eligibility requirements in accordance with IB.3.

3. We, including any Subcontractors for any part of the Contract, are not debarred/ blacklisted by the Employer, any Government/Semi Government/Public Department in Pakistan or foreign country, international organizations or other foreign institutions.

4. Our subcontractors or suppliers for any part of the Contract, if any, shall have nationalities from eligible countries, in accordance with IB.4.4.

5. We understand that all the Schedules attached hereto form part of this Bid.

6. We undertake, if our Bid is accepted, to commence the Works and to complete the whole of the Works comprised in the Contract within the time stated in Contract Data.

7. We agree to abide by this Bid for the period of 120 days, exclusive of 28 days beyond Bid validity period and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

8. Unless and until a formal Agreement is prepared and executed, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

9. We do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other Bidder for the Works.

10. We understand that you are not bound to accept the lowest or any Bid you may receive.

11. We undertake that all the information and documents submitted with the Bid are genuine, and in case of incorrect information of fake documents we shall be liable for punitive action under the Applicable Law.

Name .....

In the capacity of .....

Signed .....

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

Date .....

Address……..

BILL OF QUANTITIES

(to be signed by the bidder)

PREAMBLE

1. The Bill of Quantities shall be read in conjunction with the Conditions of Contract, Specifications and Drawings.

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

3. The rates and prices as given in the priced Bill of Quantities shall, except insofar as it is otherwise provided under the Contract include all costs of Contractor's plant, labour, supervision, materials, execution, insurance, profit, taxes and duties, together with all general risks, liabilities and obligations set out or implied in the Contract. Furthermore, all duties, taxes and other levies payable by the Contractor under the Contract, or for any other cause, as on the date 28 days prior to deadline for submission of Bids, shall be included in the rates and prices and the total Bid Price submitted by the Bidder.

4. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of items against which the Contractor will have failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.

5. The whole cost of complying with the provisions of the Contract shall be included in the items provided in the priced Bill of Quantities, and where no items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related items of the Works, or the same shall be determined by the Engineer in accordance with Clause 13, General Conditions.

6. General directions and description of work and materials are not necessarily repeated nor summarised in the Bill of Quantities. References to the relevant sections of the Bidding Documents shall be made before entering prices against each item in the Bill of Quantities.

7. Provisional sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Engineer in accordance with Sub- Clause 13.4 of General Conditions of Contract.

8. The following abbreviations for units have been used in Bill of Quantities:

Units	Abbreviations
Running feet	Rft.
Square feet	Sft.
Cubic feet	Cft.
Kilogram	Kg.
Per Number	Each, Number, No.
Lump Sum Job	Job, Lot

Authorized Signature and official Seal: _____

Name: _____

Date: _____

CONSTRUCTION OF GUEST UNITS – BLOCK 1 – 14 AT GUN & COUNTRY CLUB, ISLAMABAD

BILL OF QUANTITIES

TABLE OF CONTENTS

BILL No.	BILL DESCRIPTION	PAGE No.
1	**Civil Works**	
i)	Block 1 & 2	C-B1 – B2 1 of 7
ii)	Block 3	C-B3 1 OF 7
iii)	Block 4	C-B4 1 OF 7
iv)	Block 5	C-B5 1 OF 7
v)	Block 6	C-B6 1 OF 7
vi)	Block 7	C-B7 1 OF 7
vii)	Block 8	C-B8 1 OF 7
viii)	Block 9	C-B9 1 OF 7
ix)	Block 10	C-B10 1 OF 7
x)	Block 11	C-B11 1 OF 7
xi)	Block 12	C-B12 1 OF 7
xii)	Block 13	C-B13 1 OF 7
xiii)	Block 14	C-B14 1 OF 6

2	**Plumbing Works**	
i)	Block 1	P-B1 1 of 3
ii)	Block 2	P-B2 1 of 3
iii)	Block 3	P-B3 1 of 3
iv)	Block 4	P-B4 1 of 3
v)	Block 5	P-B5 1 of 3
vi)	Block 6	P-B6 1 of 3
vii)	Block 7	P-B7 1 of 3
viii)	Block 8	P-B8 1 of 3
ix)	Block 9	P-B9 1 of 3
x)	Block 10	P-B10 1 of 3
xi)	Block 11	P-B11 1 of 3
xii)	Block 12	P-B12 1 of 3
xiii)	Block 13	P-B13 1 of 3
xiv)	Block 14	P-B14 1 of 4
3	**Electrical Works**	
i)	Block 1	E-B1 1 of 3
ii)	Block 2	E-B2 1 of 3
iii)	Block 3	E-B3 1 of 3

iv)	Block 4	E-B4 1 of 3
v)	Block 5	E-B5 1 of 3
vi)	Block 6	E-B6 1 of 3
vii)	Block 7	E-B7 1 of 3
viii)	Block 8	E-B8 1 of 3
ix)	Block 9	E-B9 1 of 3
x)	Block 10	E-B 10 1 of 3
xi)	Block 11	E-B 11 1 of 3
xii)	Block 12	E-B12 1 of 3
xiii)	Block 13	E-B13 1 of 3
xiv)	Block 14	E-B14 1 of 3
xv)	External Electrical Works	EE-B1-14 1 of 5
4	External Development Works	
i)	Walkways & Jogging Tracks	EE-WJ 1 of 2
ii)	Storm Water Collection & Disposal Works	EE-SWDW 1 of 2
iii)	Soakage Wells	EE-SW 1 of 3
vi)	Sanitary Sewerage Works	EE-SSW 1 of 2
5	Infrastructure Development Works	
v)	Water Distribution Network	Page 1 of 10

vi)	Overhead Water Tank	Page 1 of 3
vii)	Septic Tank	Page 1 of 3
6	Furniture Works	
i)	Furniture Works	FW 1 of 4

Authorized Signature and official Seal: _____

Name: _____

Date: _____

CONSTRUCTION OF GUEST UNITS – BLOCK 1 – 14 AT GUN & COUNTRY CLUB, ISLAMABAD

SUMMARY OF COST

1. COST OF WORKS:

S/N	Description of Works	Unit	Price
A)	**RESIDENTIAL UNITS**		
i)	**BLOCK 1**		
a)	Civil (Block 1 & 2)	Rs.	
b)	Plumbing	Rs.	
c)	Electrical	Rs.	
	Total i) = (a + b + c)	**Rs.**	
ii)	**BLOCK 2**		
a)	Plumbing	Rs.	
b)	Electrical	Rs.	
	Total ii) = (a + b)	**Rs.**	
iii)	**BLOCK 3**		
a)	Civil	Rs.	
b)	Plumbing	Rs.	
c)	Electrical	Rs.	
	Total iii) = (a + b + c)	**Rs.**	
iv)	**BLOCK 4**		
a)	Civil	Rs.	
b)	Plumbing	Rs.	
c)	Electrical	Rs.	
	Total iv) = (a + b + c)	**Rs.**	

v)	**BLOCK 5**		
a)	Civil	Rs.	
b)	Plumbing	Rs.	
c)	Electrical	Rs.	
	Total v) = (a + b + c)	**Rs.**	
vi)	**BLOCK 6**		
a)	Civil	Rs.	
b)	Plumbing	Rs.	
c)	Electrical	Rs.	
	Total vi) = (a + b + c)	**Rs.**	
vii)	**BLOCK 7**		
a)	Civil	Rs.	
b)	Plumbing	Rs.	
c)	Electrical	Rs.	
	Total vii) = (a + b + c)	**Rs.**	
viii)	**BLOCK 8**		
a)	Civil	Rs.	
b)	Plumbing	Rs.	
c)	Electrical	Rs.	
	Total viii) = (a + b + c)	**Rs.**	
ix)	**BLOCK 9**		
a)	Civil	Rs.	
b)	Plumbing	Rs.	
c)	Electrical	Rs.	
	Total ix) = (a + b + c)	**Rs.**	

x)	**BLOCK 10**		
a)	Civil	Rs.	
b)	Plumbing	Rs.	
c)	Electrical	Rs.	
	Total x) = (a + b + c)	**Rs.**	
xi)	**BLOCK 11**		
a)	Civil	Rs.	
b)	Plumbing	Rs.	
c)	Electrical	Rs.	
	Total xi) = (a + b + c)	**Rs.**	
xii)	**BLOCK 12**		
a)	Civil	Rs.	
b)	Plumbing	Rs.	
c)	Electrical	Rs.	
	Total xii) = (a + b + c)	**Rs.**	
xiii)	**BLOCK 13**		
a)	Civil	Rs.	
b)	Plumbing	Rs.	
c)	Electrical	Rs.	
	Total xiii) = (a + b + c)	**Rs.**	

xiv)	**BLOCK 14**		
a)	Civil	Rs.	
b)	Plumbing	Rs.	
c)	Electrical	Rs.	
	Total xiv) = (a + b + c)	**Rs.**	
	SUB-TOTAL A) = i) + ii) + iii) + iv) + v) + vi) + vii) + viii) + ix) + x) + xi) + xii) + xiii) + xiv)	**Rs.**	
B)	**External Development Works**		
i)	**Walkways & Jogging Tracks**	Rs.	
ii)	**Storm Water Collection & Disposal Works**	Rs.	
iii)	**Soakage Wells**	Rs.	
vi)	**Sanitary Sewerage Works**	Rs.	
	SUB-TOTAL B) = i) + ii) + iii) + iv)	**Rs.**	
C)	**Infrastructure Development Works**		
i)	**Water Distribution Network**	Rs.	
ii)	**Overhead Water Tank**	Rs.	
iii)	**Septic Tank**	Rs.	
	SUB-TOTAL C) = i) + ii) + iii)	**Rs.**	
D)	**Furniture Works**		
i)	**Furniture Works**	Rs.	
	Total D) = (i)	**Rs.**	
	NET TOTAL (A + B + C+D)	**Rs.**	

Total A+B+C+D (Residential Units + External Development Works + Infrastructure Development Works + Furniture Works)

=_____

E: Sales Tax **@ …….. = Rs.**

_____

Total A+B+C+D+E (Residential Units + External Development Works + Infrastructure Development Works + Furniture Works + Sales Tax)

=_____

In Words:

(_____)

Note: The Bidder shall carry over the quoted percentage to Letter of Price Bid page **LPB-1.**

A. PROVISIONAL SUM:

i. DAB **Rs. 1,000,000/-**

Note-2: The Bidder shall not consider the amount stated against the Provisional Sum while quoting his Bid. All Provisional Sums amount are to be expended in whole or, in part at the direction and discretion of the Engineer in accordance with Sub- Clause 13.4 of the General Conditions except with respect to DAB fees and the expenses in accordance with GC Clause 21.

Authorized Signature and official Seal: _____

Name: _____

Date: _____

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 1 & 2

BILL OF QUANTITIES

CIVIL WORKS

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	EARTH WORK (EXCAVATION & EMBANKMENT)				
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling in layers around structure with excavated earth, watering and ramming lead upto one chain (30 m) lift upto 5 ft (1.5m) 1) a) By Manual (iii) Hard soil or Soft murum	1000 Cft	3.27		
2	Filling, watering and ramming earth under floors. i) with surplus earth from foundation, etc.	1000 Cft	3.14		
	CONCRETE				
3	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	7.05		
4	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate)				
	Ratio 1:3:6	100 Cft	0.75		
	Ratio 1:4:8	100 Cft	9.65		
5	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.).				
	a.) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects. (3) Type C (nominal mix 1: 2: 4)	Per Cft	2,096.00		
	(c) (iii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a) (i)&(ii) above not requiring form work (i.e. horizontal shuttering) complete in all respects:-				
	(3) Type C (nominal mix 1: 2: 4)	Per Cft	605.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
6	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars). (b) Deformed bars ii) (Grade-60)	100kg	76.00		
	BRICK WORK				
7	Pacca brick work in foundation and plinth in 1:4 C/S mortar	100 Cft	11.60		
8	Pacca brick work in 1:4 C/S mortar in Ground floor	100 Cft	19.80		
9	Pacca brick work in 1:4 C/S mortar.'Add extra labour on item No. 5 for brickwork in (i) first floor:-	100 Cft	5.94		
	ROOFING				
10	Providing and laying high density single profile spanish glazed tappered barrel type of 4"- 5-1/2" dia Terra Cotta Khaprail Tile dipped or sealed with a water repellent, with Terra Cotta base plate (10"x16"), resistant to salt attack laid with laps and duly interlocked on slopping roof over 1/2" thick (1:3) cement sand mortar i/c cost of all material and labour complete in all respect as approved and directed by the Engineer Incharge.	Per Sft	2,670.00		
	FLOORING				
11	Providing and laying superb quality Ceramic tiles floor of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	130.00		
12	Providing and laying superb quality Ceramic tiles dado of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge.				

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	1,040.00		
13	Supplying and filling sand under floor; or plugging in wells.	100 Cft	0.50		
14	Cement concrete tiles laid in 1:2 cement mortar, over 3/4" (20 mm) thick bed of cement mortar 1:2:-				
	(a) 12"x12"x1" (300 x 300 x 25 mm)	100 Sft	5.45		
15	Providing and laying 3/4" thick full width Prepolished Marble slab for Vanities / Shelves / Treads/Window Cills , having Uniform texture (Spotless) with adhesive bond over 3/4" thick (1:2) cement sand mortor i/c the cost of matching sealer complete in all respects as approved and directed by the Engineer Incharge ii) Ziarat White	Per Sft	370.00		
	SURFACE RENDERING				
16	Cement plaster 1:4 upto 20' (6.00 m) height: b) ½" (13 mm) thick	100 Sft	74.20		
17	Cement plaster 1:4 upto 20' (6.00 m) height: c) ¾" (20 mm) thick	100 Sft	2.00		
18	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C.roof slabs only, upto 20' height. b) 1:3	100 Sft	8.55		
19	Extra for lime, mud or cement plaster and pointing from 20' (6.00 m) and above for each additional 10' (3.00 m) height or part thereof.	100 Sft	1.00		
20	Providing and fixing 3/4"(19mm) thick Sand Stone (12"x24") on interior and exterior wall and cladding of approved quality and shade, laid over pre-plastered surface with adhesive bond complete in all respect i/c the cost of matching sealer to finish the joints as approved and directed by the Engineer Incharge	Per Sft	1,700.00		
	DOORS AND WINDOWS				
21	P/F 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressure i/c the cost of nails, tower bolt , handles, glue, sawing charges and lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge.	Per Sft	105.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
22	Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1-1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6-Nos) welded/ screwed, punching of lock hole covered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge				
	ii) 10.5 " wide	Per Sft	105.00		
23	Providing and fixing wooden box type wardrobe 22" (550mm) deep including ¾" (20 mm) thick boxing and shelves, hanger rods,hard board back drawers, brass fittings, locking arrangements handles, internal bolts, shoe rods, etc. including three coats of enamel paint: i) Partal wood boxing and deodar wood shelves and leaves, etc.	Per Sft	120.00		
24	Providing and fixing all types of partly fixed and partly openable glazed anodised/ powder coated aluminium doors 1.6mm, using delux section of M/s Al-Cop or Pakistan Cables, having chowkat frame of size 40 x 100 mm (1½" x 4") and leaf frame of 60x40mm (2½"x1½") wide sections including the cost of specified thickness tempered glass with aluminium triangular gola and rubber gasket to support the glass and leaf edging, using approved standard fittings, locks, 3" (75 mm) wide long handles etc., and hardware any required as approved by the Engineer in-charge. i) 5mm thick Glass	Per Sft.	190.00		
25	Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge	Per Sft.	655.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
26	Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge. complete in all respect.	Per Sft.	327.50		
	WPC DOORS				
27	Providing and fixing 38mm (min) factory made Premium WPC Doors (waterproof, Termite-resistant, Fire retardant) of ESTA, Greendoors or approved equivalent with WPC door frame (chowkat) and WPC architrave on both sides, including the cost of polishing, with hinges, T-lock, tower bolt, handle & all hardware's accessories complete in all respect as per approved specifications and as approved by the Engineer incharge.				
	ii) WPC Door 8mm wall thickness	Per Sft.	75.00		
	PAINTING AND VARNISHING				
28	Painting new surface:- d) Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:-				
	i) priming coat	100 Sft	2.00		
	ii) each subsequent coat of paint.(Two Coat)	100 Sft	4.00		
29	Bitumen coating to plastered or cement concrete surface:-				
	i) 20 lbs. per 100 Sft. (9.07 Kg per Sq.m)	100 Sft	12.75		
30	Preparing surface and painting emulsion paint :				
	a) 1st coat	100 Sft	45.85		
	b) 2nd & each subsequent coat.	100 Sft	91.70		
31	Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: upto 20' heigh				
	i) 1st coat	100 Sft	8.55		
	ii) 2nd & each subsequent coat.	100 Sft	17.10		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	IRON WORKS				
32	Providing and fixing 2'-9" high stair railing comprising of non magnetic (304) Stain less steel 2" dia pipe railing of 18 SWG welded with vertical posts of 2" dia stainless steel round/ Squar pipe/ Tong (chimta) @ 2-ft c/c fixed on alternate steps with 3" long steel screws and brass rawal plugs , 3-Nos diagonal stainless steel pipes of 1/2" dia passes through goties fixed on vertical post, i/c stainles steel welding, fixing & polishing complete	Per Rft	40.00		
	MISCELLANEOUS				
33	Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspension concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250) = 540 Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect .as approved by the Engineer Incharge	Sft	2,520.00		
	CEILING & STEEL WORK **Ref. Spec. No. 3000, 6560**				
34	Providing and fixing 0.7 mm thick 600x600mm aluminum false (Douglas) with suspension system GI Channel, GI wall U angle,threaded Rod M6, Anchor bolt M6, Nut M6, Hanger clip, jointing clip,Screws and nail,fixing labour and carriage complete in all respects as per design shown on drawings.	Sft	130		
35	Provide & fix expended metal 1/2" to 3/4", 22 guage fixed walls or on area as required and specified on drawings with steel nails with washers complete in all respects.	Sft	745		
	FLOOR & WALL FINISHES **Ref. Spec. No. 6531, 6600**				
36	Supply and installation of WPC Ceiling Strip as per approved sample,with supension system GI channel ,threaded rod,all necessary hardware, fixing labour & carriage complete in all respects.	Sft	1,350		
37	Supply and installation of WPC (Wood Plastic Composite) louvres, manufactured from weather resistant composite material, durable, moisture-proof, termite-proof, and low maintenance. Suitable for interior and exterior applications, providing ventilation and aesthetic enhancement.	Sft	1,134		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
38	Providing and fixing of 0'-6"x 4'-0" or approved size matt porcelain wooden texture tiles imported / Local or equivalent on floor & wall with approved make dry bond over average 1" thick cement mortar (1:3) including curing and filling the joints with approved matching colour grouting material etc complete as per drawings specifications and as directed by the Architects/Engineer.(pattern, size and colour as per approved sample).	Sft	1,405		
	Water Proofing Treatement				
39	Providing and Laying of CWS 100 or equlivent gel based water proofing seal static cracks upto 2.2mm makes concrete harder upto 9 moh complete as per drawings specifications and as directed by the Architects/Engineer.(Roof Water proofing).	Sft	2,670		
40	Application of Water Proofing coating on concrete / plater surfaces with high performance flexible cement coating for dampness protection as per manufacturer's recommendation and as directed by the Engineer.	Sft	1,700		
				TOTAL COST Rs.	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 3

BILL OF QUANTITIES

CIVIL WORKS

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	EARTH WORK (EXCAVATION & EMBANKMENT)				
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling in layers around structure with excavated earth, watering and ramming lead upto one chain (30 m) lift upto 5 ft (1.5m) 1) a) By Manual (iii) Hard soil or Soft murum	1000 Cft	1.64		
2	Filling, watering and ramming earth under floors. i) with surplus earth from foundation, etc.	1000 Cft	1.57		
	CONCRETE				
3	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	3.55		
4	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate)				
	Ratio 1:3:6	100 Cft	0.40		
	Ratio 1:4:8	100 Cft	4.85		
5	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.).				
	a.) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects. (3) Type C (nominal mix 1: 2: 4)	Per Cft	1,085.00		
	(c) (iii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a) (i)&(ii) above not requiring form work (i.e. horizontal shuttering) complete in all respects:-				
	(3) Type C (nominal mix 1: 2: 4)	Per Cft	350.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
6	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars). (b) Deformed bars ii) (Grade-60)	100kg	41.00		
	BRICK WORK				
7	Pacca brick work in foundation and plinth in 1:4 C/S mortar	100 Cft	6.40		
8	Pacca brick work in 1:4 C/S mortar in Ground floor	100 Cft	11.50		
9	Pacca brick work in 1:4 C/S mortar.'Add extra labour on item No. 5 for brickwork in (i) first floor:-	100 Cft	3.45		
	ROOFING				
10	Providing and laying high density single profile spanish glazed tappered barrel type of 4"- 5-1/2" dia Terra Cotta Khaprail Tile dipped or sealed with a water repellent, with Terra Cotta base plate (10"x16"), resistant to salt attack laid with laps and duly interlocked on slopping roof over 1/2" thick (1:3) cement sand mortar i/c cost of all material and labour complete in all respect as approved and directed by the Engineer Incharge.	Per Sft	1,390.00		
	FLOORING				
11	Providing and laying superb quality Ceramic tiles floor of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	65.00		
12	Providing and laying superb quality Ceramic tiles dado of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	520.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
13	Supplying and filling sand under floor; or plugging in wells.	100 Cft	0.25		
14	Cement concrete tiles laid in 1:2 cement mortar, over 3/4" (20 mm) thick bed of cement mortar 1:2:-				
	(a) 12"x12"x1" (300 x 300 x 25 mm)	100 Sft	3.05		
15	Providing and laying 3/4" thick full width Prepolished Marble slab for Vanities / Shelves / Treads/Window Cills , having Uniform texture (Spotless) with adhesive bond over 3/4" thick (1:2) cement sand mortor i/c the cost of matching sealer complete in all respects as approved and directed by the Engineer Incharge ii) Ziarat White	Per Sft	187.00		
	SURFACE RENDERING				
16	Cement plaster 1:4 upto 20' (6.00 m) height: b) ½" (13 mm) thick	100 Sft	38.15		
17	Cement plaster 1:4 upto 20' (6.00 m) height: c) ¾" (20 mm) thick	100 Sft	1.00		
18	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C.roof slabs only, upto 20' height. b) 1:3	100 Sft	5.30		
19	Extra for lime, mud or cement plaster and pointing from 20' (6.00 m) and above for each additional 10' (3.00 m) height or part thereof.	100 Sft	0.60		
20	Providing and fixing 3/4"(19mm) thick Sand Stone (12"x24") on interior and exterior wall and cladding of approved quality and shade, laid over pre-plastered surface with adhesive bond complete in all respect i/c the cost of matching sealer to finish the joints as approved and directed by the Engineer Incharge	Per Sft	950.00		
	DOORS AND WINDOWS				
21	P/F 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressure i/c the cost of nails, tower bolt , handles, glue, sawing charges and lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge.	Per Sft	52.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
22	Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1-1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6-Nos) welded/ screwed, punching of lock hole covered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge				
	ii) 10.5 " wide	Per Sft	52.00		
23	Providing and fixing wooden box type wardrobe 22" (550mm) deep including ¾" (20 mm) thick boxing and shelves, hanger rods,hard board back drawers, brass fittings, locking arrangements handles, internal bolts, shoe rods, etc. including three coats of enamel paint: i) Partal wood boxing and deodar wood shelves and leaves, etc.	Per Sft	60.00		
24	Providing and fixing all types of partly fixed and partly openable glazed anodised/ powder coated aluminium doors 1.6mm, using delux section of M/s Al-Cop or Pakistan Cables, having chowkat frame of size 40 x 100 mm (1½" x 4") and leaf frame of 60x40mm (2½"x1½") wide sections including the cost of specified thickness tempered glass with aluminium triangular gola and rubber gasket to support the glass and leaf edging, using approved standard fittings, locks, 3" (75 mm) wide long handles etc., and hardware any required as approved by the Engineer in-charge. i) 5mm thick Glass	Per Sft.	95.00		
25	Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge	Per Sft.	326.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
26	Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge. complete in all respect.	Per Sft.	163.00		
	WPC DOORS				
27	Providing and fixing 38mm (min) factory made Premium WPC Doors (waterproof, Termite-resistant, Fire retardant) of ESTA, Greendoors or approved equivalent with WPC door frame (chowkat) and WPC architrave on both sides, including the cost of polishing, with hinges, T-lock, tower bolt, handle & all hardware's accessories complete in all respect as per approved specifications and as approved by the Engineer incharge.				
	ii) WPC Door 8mm wall thickness	Per Sft.	37.00		
	PAINTING AND VARNISHING				
28	Painting new surface:- d) Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:-				
	i) priming coat	100 Sft	1.00		
	ii) each subsequent coat of paint.(Two Coat)	100 Sft	2.00		
29	Bitumen coating to plastered or cement concrete				
	i) 20 lbs. per 100 Sft. (9.07 Kg per Sq.m)	100 Sft	7.40		
30	Preparing surface and painting emulsion paint :				
	a) 1st coat	100 Sft	22.95		
	b) 2nd & each subsequent coat.	100 Sft	45.90		
31	Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: upto 20' heigh				
	i) 1st coat	100 Sft	5.30		
	ii) 2nd & each subsequent coat.	100 Sft	10.60		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	IRON WORKS				
32	Providing and fixing 2'-9" high stair railing comprising of non magnetic (304) Stain less steel 2" dia pipe railing of 18 SWG welded with vertical posts of 2" dia stainless steel round/ Squar pipe/ Tong (chimta) @ 2-ft c/c fixed on alternate steps with 3" long steel screws and brass rawal plugs , 3-Nos diagonal stainless steel pipes of 1/2" dia passes through goties fixed on vertical post, i/c stainles steel welding, fixing & polishing complete	Per Rft	20.00		
	MISCELLANEOUS				
33	Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspension concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250) = 540 Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect .as approved by the Engineer Incharge	Sft	1,260.00		
	CEILING & STEEL WORK **Ref. Spec. No. 3000, 6560**				
34	Providing and fixing 0.7 mm thick 600x600mm aluminum false (Douglas) with suspension system GI Channel, GI wall U angle,threaded Rod M6, Anchor bolt M6, Nut M6, Hange clip, jointing clip,Screws and nail,fixing labor and carriage complete in all respects as per design shown on drawings.	Sft	65		
35	Provide & fix expended metal 1/2" to 3/4", 22 guage fixed walls or on area as required and specified on drawings with steel nails with washers complete in all respects.	Sft	375		
	FLOOR & WALL FINISHES **Ref. Spec. No. 6531, 6600**				
36	Supply and installation of WPC Ceiling Strip as per approved sample,with supension system GI channel ,threaded rod,all necessary hardware, fixing labour & carriage complete in all respects.	Sft	655		
37	Supply and installation of WPC (Wood Plastic Composite) louvres, manufactured from weather resistant composite material, durable, moisture-proof, termite-proof, and low maintenance. Suitable for interior and exterior applications, providing ventilation and aesthetic enhancement.	Sft	568		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
38	Providing and fixing of 0'-6"x 4'-0" or approved size matt porcelain wooden texture tiles imported / Local or equivalent on floor & wall with approved make dry bond over average 1" thick cement mortar (1:3) including curing and filling the joints with approved matching colour grouting material etc complete as per drawings specifications and as directed by the Architects/Engineer.(pattern, size and colour as per approved sample).	Sft	705		
	Water Proofing Treatement				
39	Providing and Laying of CWS 100 or equlivent gel based water proofing seal static cracks upto 2.2mm makes concrete harder upto 9 moh complete as per drawings specifications and as directed by the Architects/Engineer.(Roof Water proofing).	Sft	1,390		
40	Application of Water Proofing coating on concrete / plater surfaces with high performance flexible cement coating for dampness protection as per manufacturer's recommendation and as directed by the Engineer.	Sft	950		
				TOTAL COST Rs.	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 4

BILL OF QUANTITIES

CIVIL WORKS

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	EARTH WORK (EXCAVATION & EMBANKMENT)				
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling in layers around structure with excavated earth, watering and ramming lead upto one chain (30 m) lift upto 5 ft (1.5m) 1) a) By Manual (iii) Hard soil or Soft murum	1000 Cft	1.46		
2	Filling, watering and ramming earth under floors. i) with surplus earth from foundation, etc.	1000 Cft	1.35		
	CONCRETE				
3	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	3.25		
4	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate)				
	Ratio 1:3:6	100 Cft	0.40		
	Ratio 1:4:8	100 Cft	5.05		
5	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.).				
	a.) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects. (3) Type C (nominal mix 1: 2: 4)	Per Cft	991.00		
	(c) (iii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a) (i)&(ii) above not requiring form work (i.e. horizontal shuttering) complete in all respects:-				
	(3) Type C (nominal mix 1: 2: 4)	Per Cft	265.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
6	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars). (b) Deformed bars ii) (Grade-60)	100kg	34.60		
	BRICK WORK				
7	Pacca brick work in foundation and plinth in 1:4 C/S mortar	100 Cft	4.41		
8	Pacca brick work in 1:4 C/S mortar in Ground floor	100 Cft	7.80		
9	Pacca brick work in 1:4 C/S mortar.'Add extra labour on item No. 5 for brickwork in (i) first floor:-	100 Cft	2.34		
	ROOFING				
10	Providing and laying high density single profile spanish glazed tappered barrel type of 4"- 5-1/2" dia Terra Cotta Khaprail Tile dipped or sealed with a water repellent, with Terra Cotta base plate (10"x16"), resistant to salt attack laid with laps and duly interlocked on slopping roof over 1/2" thick (1:3) cement sand mortar i/c cost of all material and labour complete in all respect as approved and directed by the Engineer Incharge.	Per Sft	1,215.00		
	FLOORING				
11	Providing and laying superb quality Ceramic tiles floor of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	40.00		
12	Providing and laying superb quality Ceramic tiles dado of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	300.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
13	Supplying and filling sand under floor; or plugging in wells.	100 Cft	0.40		
14	Cement concrete tiles laid in 1:2 cement mortar, over 3/4" (20 mm) thick bed of cement mortar 1:2:-				
	(a) 12"x12"x1" (300 x 300 x 25 mm)	100 Sft	3.70		
15	Providing and laying 3/4" thick full width Prepolished Marble slab for Vanities / Shelves / Treads/Window Cills , having Uniform texture (Spotless) with adhesive bond over 3/4" thick (1:2) cement sand mortor i/c the cost of matching sealer complete in all respects as approved and directed by the Engineer Incharge ii) Ziarat White	Per Sft	155.00		
	SURFACE RENDERING				
16	Cement plaster 1:4 upto 20' (6.00 m) height: b) ½" (13 mm) thick	100 Sft	34.20		
17	Cement plaster 1:4 upto 20' (6.00 m) height: c) ¾" (20 mm) thick	100 Sft	1.50		
18	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C.roof slabs only, upto 20' height. b) 1:3	100 Sft	5.15		
19	Extra for lime, mud or cement plaster and pointing from 20' (6.00 m) and above for each additional 10' (3.00 m) height or part thereof.	100 Sft	0.50		
20	Providing and fixing 3/4"(19mm) thick Sand Stone (12"x24") on interior and exterior wall and cladding of approved quality and shade, laid over pre-plastered surface with adhesive bond complete in all respect i/c the cost of matching sealer to finish the joints as approved and directed by the Engineer Incharge	Per Sft	790.00		
	DOORS AND WINDOWS				
21	P/F 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressure i/c the cost of nails, tower bolt , handles, glue, sawing charges and lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge.	Per Sft	26.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
22	Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1-1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6-Nos) welded/ screwed, punching of lock hole covered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge				
	ii) 10.5 " wide	Per Sft	26.00		
23	Providing and fixing wooden box type wardrobe 22" (550mm) deep including ¾" (20 mm) thick boxing and shelves, hanger rods,hard board back drawers, brass fittings, locking arrangements handles, internal bolts, shoe rods, etc. including three coats of enamel paint: i) Partal wood boxing and deodar wood shelves and leaves, etc.	Per Sft	73.00		
24	Providing and fixing all types of partly fixed and partly openable glazed anodised/ powder coated aluminium doors 1.6mm, using delux section of M/s Al-Cop or Pakistan Cables, having chowkat frame of size 40 x 100 mm (1½" x 4") and leaf frame of 60x40mm (2½"x1½") wide sections including the cost of specified thickness tempered glass with aluminium triangular gola and rubber gasket to support the glass and leaf edging, using approved standard fittings, locks, 3" (75 mm) wide long handles etc., and hardware any required as approved by the Engineer in-charge. i) 5mm thick Glass	Per Sft.	36.00		
25	Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge	Per Sft.	361.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
26	Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge. complete in all respect.	Per Sft.	180.50		
	WPC DOORS				
27	Providing and fixing 38mm (min) factory made Premium WPC Doors (waterproof, Termite-resistant, Fire retardant) of ESTA, Greendoors or approved equivalent with WPC door frame (chowkat) and WPC architrave on both sides, including the cost of polishing, with hinges, T-lock, tower bolt, handle & all hardware's accessories complete in all respect as per approved specifications and as approved by the Engineer incharge.				
	ii) WPC Door 8mm wall thickness	Per Sft.	18.00		
	PAINTING AND VARNISHING				
28	Painting new surface:- d) Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:-				
	i) priming coat	100 Sft	1.00		
	ii) each subsequent coat of paint.(Two Coat)	100 Sft	2.00		
29	Bitumen coating to plastered or cement concrete				
	i) 20 lbs. per 100 Sft. (9.07 Kg per Sq.m)	100 Sft	4.75		
30	Preparing surface and painting emulsion paint :				
	a) 1st coat	100 Sft	15.90		
	b) 2nd & each subsequent coat.	100 Sft	31.80		
31	Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: upto 20' heigh				
	i) 1st coat	100 Sft	5.15		
	ii) 2nd & each subsequent coat.	100 Sft	10.30		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	IRON WORKS				
32	Providing and fixing 2'-9" high stair railing comprising of non magnetic (304) Stain less steel 2" dia pipe railing of 18 SWG welded with vertical posts of 2" dia stainless steel round/ Squar pipe/ Tong (chimta) @ 2-ft c/c fixed on alternate steps with 3" long steel screws and brass rawal plugs , 3-Nos diagonal stainless steel pipes of 1/2" dia passes through goties fixed on vertical post, i/c stainles steel welding, fixing & polishing complete in all respects as approved and directed by the Engineer Incharge.	Per Rft	21.00		
	MISCELLANEOUS				
33	Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspension concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250) = 540 Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect .as approved by the Engineer Incharge	Sft	745.00		
	CEILING & STEEL WORK **Ref. Spec. No. 3000, 6560**				
34	Providing and fixing 0.7 mm thick 600x600mm aluminum false (Douglas) with suspension system GI Channel, GI wall U angle,threaded Rod M6, Anchor bolt M6, Nut M6, Hange clip, jointing clip,Screws and nail,fixing labor and carriage complete in all respects as per design shown on drawings.	Sft	37		
35	Provide & fix expended metal 1/2" to 3/4", 22 guage fixed walls or on area as required and specified on drawings with steel nails with washers complete in all respects.	Sft	345		
	FLOOR & WALL FINISHES **Ref. Spec. No. 6531, 6600**				
36	Supply and installation of WPC Ceiling Strip as per approved sample,with supension system GI channel ,threaded rod,all necessary hardware, fixing labour & carriage complete in all respects.	Sft	625.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
37	Supply and installation of WPC (Wood Plastic Composite) louvres, manufactured from weather resistant composite material, durable, moisture-proof, termite-proof, and low maintenance. Suitable for interior and exterior applications, providing ventilation and aesthetic enhancement.	Sft	530.00		
38	Providing and fixing of 0'-6"x 4'-0" or approved size matt porcelain wooden texture tiles imported / Local or equivalent on floor & wall with approved make dry bond over average 1" thick cement mortar (1:3) including curing and filling the joints with approved matching colour grouting material etc complete as per drawings specifications and as directed by the Architects/Engineer.(pattern, size and colour as per approved sample).	Sft	690.00		
	Water Proofing Treatement				
39	Providing and Laying of CWS 100 or equlivent gel based water proofing seal static cracks upto 2.2mm makes concrete harder upto 9 moh complete as per drawings specifications and as directed by the Architects/Engineer.(Roof Water proofing).	Sft	1,215.00		
40	Application of Water Proofing coating on concrete / plater surfaces with high performance flexible cement coating for dampness protection as per manufacturer's recommendation and as directed by the Engineer.	Sft	790		
				TOTAL COST Rs.	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 5

BILL OF QUANTITIES

CIVIL WORKS

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	EARTH WORK (EXCAVATION & EMBANKMENT)				
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling in layers around structure with excavated earth, watering and ramming lead upto one chain (30 m) lift upto 5 ft (1.5m) 1) a) By Manual (iii) Hard soil or Soft murum	1000 Cft	1.65		
2	Filling, watering and ramming earth under floors. i) with surplus earth from foundation, etc.	1000 Cft	1.12		
	CONCRETE				
3	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	3.20		
4	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate)				
	Ratio 1:3:6	100 Cft	0.45		
	Ratio 1:4:8	100 Cft	5.30		
5	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.).				
	a.) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects. (3) Type C (nominal mix 1: 2: 4)	Per Cft	1,090.00		
	(c) (iii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a) (i)&(ii) above not requiring form work (i.e. horizontal shuttering) complete in all respects:-				
	(3) Type C (nominal mix 1: 2: 4)	Per Cft	300.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
6	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars). (b) Deformed bars ii) (Grade-60)	100kg	40.00		
	BRICK WORK				
7	Pacca brick work in foundation and plinth in 1:4 C/S mortar	100 Cft	4.90		
8	Pacca brick work in 1:4 C/S mortar in Ground floor	100 Cft	8.60		
9	Pacca brick work in 1:4 C/S mortar.'Add extra labour on item No. 5 for brickwork in (i) first floor:-	100 Cft	2.58		
	ROOFING				
10	Providing and laying high density single profile spanish glazed tappered barrel type of 4"- 5-1/2" dia Terra Cotta Khaprail Tile dipped or sealed with a water repellent, with Terra Cotta base plate (10"x16"), resistant to salt attack laid with laps and duly interlocked on slopping roof over 1/2" thick (1:3) cement sand mortar i/c cost of all material and labour complete in all respect as approved and directed by the Engineer Incharge.	Per Sft	1,200.00		
	FLOORING				
11	Providing and laying superb quality Ceramic tiles floor of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	50.00		
12	Providing and laying superb quality Ceramic tiles dado of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge.				

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	360.00		
13	Supplying and filling sand under floor; or plugging in wells.	100 Cft	0.25		
14	Cement concrete tiles laid in 1:2 cement mortar, over 3/4" (20 mm) thick bed of cement mortar 1:2:-				
	(a) 12"x12"x1" (300 x 300 x 25 mm)	100 Sft	4.85		
15	Providing and laying 3/4" thick full width Prepolished Marble slab for Vanities / Shelves / Treads/Window Cills , having Uniform texture (Spotless) with adhesive bond over 3/4" thick (1:2) cement sand mortor i/c the cost of matching sealer complete in all respects as approved and directed by the Engineer Incharge ii) Ziarat White	Per Sft	130.00		
	SURFACE RENDERING				
16	Cement plaster 1:4 upto 20' (6.00 m) height: b) ½" (13 mm) thick	100 Sft	42.15		
17	Cement plaster 1:4 upto 20' (6.00 m) height: c) ¾" (20 mm) thick	100 Sft	1.00		
18	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C.roof slabs only, upto 20' height. b) 1:3	100 Sft	6.00		
19	Extra for lime, mud or cement plaster and pointing from 20' (6.00 m) and above for each additional 10' (3.00 m) height or part thereof.	100 Sft	0.50		
20	Providing and fixing 3/4"(19mm) thick Sand Stone (12"x24") on interior and exterior wall and cladding of approved quality and shade, laid over pre-plastered surface with adhesive bond complete in all respect i/c the cost of matching sealer to finish the joints as approved and directed by the Engineer Incharge	Per Sft	1,065.00		
	DOORS AND WINDOWS				
21	P/F 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressure i/c the cost of nails, tower bolt , handles, glue, sawing charges and lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge.	Per Sft	26.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
22	Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1-1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6-Nos) welded/ screwed, punching of lock hole covered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge				
	ii) 10.5 " wide	Per Sft	26.00		
23	Providing and fixing wooden box type wardrobe 22" (550mm) deep including ¾" (20 mm) thick boxing and shelves, hanger rods,hard board back drawers, brass fittings, locking arrangements handles, internal bolts, shoe rods, etc. including three coats of enamel paint: i) Partal wood boxing and deodar wood shelves and leaves, etc.	Per Sft	75.00		
24	Providing and fixing all types of partly fixed and partly openable glazed anodised/ powder coated aluminium doors 1.6mm, using delux section of M/s Al-Cop or Pakistan Cables, having chowkat frame of size 40 x 100 mm (1½" x 4") and leaf frame of 60x40mm (2½"x1½") wide sections including the cost of specified thickness tempered glass with aluminium triangular gola and rubber gasket to support the glass and leaf edging, using approved standard fittings, locks, 3" (75 mm) wide long handles etc., and hardware any required as approved by the Engineer in-charge. i) 5mm thick Glass	Per Sft.	60.00		
25	Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge	Per Sft.	285.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
26	Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge. complete in all respect.	Per Sft.	142.50		
	WPC DOORS				
27	Providing and fixing 38mm (min) factory made Premium WPC Doors (waterproof, Termite-resistant, Fire retardant) of ESTA, Greendoors or approved equivalent with WPC door frame (chowkat) and WPC architrave on both sides, including the cost of polishing, with hinges, T-lock, tower bolt, handle & all hardware's accessories complete in all respect as per approved specifications and as approved by the Engineer incharge.				
	ii) WPC Door 8mm wall thickness	Per Sft.	18.00		
	PAINTING AND VARNISHING				
28	Painting new surface:- d) Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:-				
	i) priming coat	100 Sft	1.00		
	ii) each subsequent coat of paint.(Two Coat)	100 Sft	2.00		
29	Bitumen coating to plastered or cement concrete				
	i) 20 lbs. per 100 Sft. (9.07 Kg per Sq.m)	100 Sft	5.65		
30	Preparing surface and painting emulsion paint :				
	a) 1st coat	100 Sft	18.40		
	b) 2nd & each subsequent coat.	100 Sft	36.80		
31	Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: upto 20' heigh				
	i) 1st coat	100 Sft	6.00		
	ii) 2nd & each subsequent coat.	100 Sft	12.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	IRON WORKS				
32	Providing and fixing 2'-9" high stair railing comprising of non magnetic (304) Stain less steel 2" dia pipe railing of 18 SWG welded with vertical posts of 2" dia stainless steel round/ Squar pipe/ Tong (chimta) @ 2-ft c/c fixed on alternate steps with 3" long steel screws and brass rawal plugs , 3-Nos diagonal stainless steel pipes of 1/2" dia passes through goties fixed on vertical post, i/c stainles steel welding, fixing & polishing complete in all respects as approved and directed by the Engineer Incharge.	Per Rft	21.00		
	MISCELLANEOUS				
33	Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspension concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250) = 540 Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect .as approved by the Engineer Incharge	Sft	710.00		
	CEILING & STEEL WORK **Ref. Spec. No. 3000, 6560**				
34	Providing and fixing 0.7 mm thick 600x600mm aluminum false (Douglas) with suspension system GI Channel, GI wall U angle,threaded Rod M6, Anchor bolt M6, Nut M6, Hange clip, jointing clip,Screws and nail,fixing labor and carriage complete in all respects as per design shown on drawings.	Sft	50		
35	Provide & fix expended metal 1/2" to 3/4", 22 guage fixed walls or on area as required and specified on drawings with steel nails with washers complete in all respects.	Sft	420		
	FLOOR & WALL FINISHES **Ref. Spec. No. 6531, 6600**				
36	Supply and installation of WPC Ceiling Strip as per approved sample,with supension system GI channel ,threaded rod,all necessary hardware, fixing labour & carriage complete in all respects.	Sft	510.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
37	Supply and installation of WPC (Wood Plastic Composite) louvres, manufactured from weather resistant composite material, durable, moisture-proof, termite-proof, and low maintenance. Suitable for interior and exterior applications, providing ventilation and aesthetic enhancement.	Sft	725.00		
38	Providing and fixing of 0'-6"x 4'-0" or approved size matt porcelain wooden texture tiles imported / Local or equivalent on floor & wall with approved make dry bond over average 1" thick cement mortar (1:3) including curing and filling the joints with approved matching colour grouting material etc complete as per drawings specifications and as directed by the Architects/Engineer.(pattern, size and colour as per approved sample).	Sft	565		
	Water Proofing Treatement				
39	Providing and Laying of CWS 100 or equlivent gel based water proofing seal static cracks upto 2.2mm makes concrete harder upto 9 moh complete as per drawings specifications and as directed by the Architects/Engineer.(Roof Water proofing).	Sft	1,200		
40	Application of Water Proofing coating on concrete / plater surfaces with high performance flexible cement coating for dampness protection as per manufacturer's recommendation and as directed by the Engineer.	Sft	1,065		
				TOTAL COST Rs.	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 6

BILL OF QUANTITIES

CIVIL WORKS

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	EARTH WORK (EXCAVATION & EMBANKMENT)				
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling in layers around structure with excavated earth, watering and ramming lead upto one chain (30 m) lift upto 5 ft (1.5m)				
	1) a) By Manual (iii) Hard soil or Soft murum	1000 Cft	2.04		
2	Filling, watering and ramming earth under floors. i) with surplus earth from foundation, etc.	1000 Cft	1.52		
	CONCRETE				
3	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	3.75		
4	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate)				
	Ratio 1:3:6	100 Cft	0.50		
	Ratio 1:4:8	100 Cft	6.10		
5	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.).				
	a.) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects. (3) Type C (nominal mix 1: 2: 4)	Per Cft	2,602.00		
	(c) (iii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a) (i)&(ii) above not requiring form work (i.e. horizontal shuttering) complete in all respects:- (3) Type C (nominal mix 1: 2: 4)	Per Cft	370.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
6	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars). (b) Deformed bars ii) (Grade-60)	100kg	45.50		
	BRICK WORK				
7	Pacca brick work in foundation and plinth in 1:4 C/S mortar	100 Cft	6.45		
8	Pacca brick work in 1:4 C/S mortar in Ground floor	100 Cft	12.40		
9	Pacca brick work in 1:4 C/S mortar.'Add extra labour on item No. 5 for brickwork in (i) first floor:-	100 Cft	3.72		
	ROOFING				
10	Providing and laying high density single profile spanish glazed tappered barrel type of 4"- 5-1/2" dia Terra Cotta Khaprail Tile dipped or sealed with a water repellent, with Terra Cotta base plate (10"x16"), resistant to salt attack laid with laps and duly interlocked on slopping roof over 1/2" thick (1:3) cement sand mortar i/c cost of all material and labour complete in all respect as approved and directed by the Engineer Incharge.	Per Sft	1,361.00		
	FLOORING				
11	Providing and laying superb quality Ceramic tiles floor of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	90.00		
12	Providing and laying superb quality Ceramic tiles dado of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	630.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
13	Supplying and filling sand under floor; or plugging in wells.	100 Cft	0.50		
14	Cement concrete tiles laid in 1:2 cement mortar, over 3/4" (20 mm) thick bed of cement mortar 1:2:-				
	(a) 12"x12"x1" (300 x 300 x 25 mm)	100 Sft	4.45		
15	Providing and laying 3/4" thick full width Prepolished Marble slab for Vanities / Shelves / Treads/Window Cills , having Uniform texture (Spotless) with adhesive bond over 3/4" thick (1:2) cement sand mortor i/c the cost of matching sealer complete in all respects as approved and directed by the Engineer Incharge ii) Ziarat White	Per Sft	166.00		
	SURFACE RENDERING				
16	Cement plaster 1:4 upto 20' (6.00 m) height: b) ½" (13 mm) thick	100 Sft	46.90		
17	Cement plaster 1:4 upto 20' (6.00 m) height: c) ¾" (20 mm) thick	100 Sft	2.00		
18	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C.roof slabs only, upto 20' height. b) 1:3	100 Sft	6.20		
19	Extra for lime, mud or cement plaster and pointing from 20' (6.00 m) and above for each additional 10' (3.00 m) height or part thereof.	100 Sft	1.00		
20	Providing and fixing 3/4"(19mm) thick Sand Stone (12"x24") on interior and exterior wall and cladding of approved quality and shade, laid over pre-plastered surface with adhesive bond complete in all respect i/c the cost of matching sealer to finish the joints as approved and directed by the Engineer Incharge	Per Sft	1,050.00		
	DOORS AND WINDOWS				
21	P/F 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressure i/c the cost of nails, tower bolt , handles, glue, sawing charges and lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge.	Per Sft	51.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
22	Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1-1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6-Nos) welded/ screwed, punching of lock hole covered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge				
	ii) 10.5 " wide	Per Sft	51.00		
23	Providing and fixing wooden box type wardrobe 22" (550mm) deep including ¾" (20 mm) thick boxing and shelves, hanger rods,hard board back drawers, brass fittings, locking arrangements handles, internal bolts, shoe rods, etc. including three coats of enamel paint:				
	i) Partal wood boxing and deodar wood shelves and leaves, etc.	Per Sft	96.00		
24	Providing and fixing all types of partly fixed and partly openable glazed anodised/ powder coated aluminium doors 1.6mm, using delux section of M/s Al-Cop or Pakistan Cables, having chowkat frame of size 40 x 100 mm (1½" x 4") and leaf frame of 60x40mm (2½"x1½") wide sections including the cost of specified thickness tempered glass with aluminium triangular gola and rubber gasket to support the glass and leaf edging, using approved standard fittings, locks, 3" (75 mm) wide long handles etc., and hardware any required as approved by the Engineer in-charge.				
	i) 5mm thick Glass	Per Sft.	133.00		
25	Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge	Per Sft.	225.00		
26	Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge, complete in all respect.	Per Sft.	112.50		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	WPC DOORS				
27	Providing and fixing 38mm (min) factory made Premium WPC Doors (waterproof, Termite-resistant, Fire retardant) of ESTA, Greendoors or approved equivalent with WPC door frame (chowkat) and WPC architrave on both sides, including the cost of polishing, with hinges, T-lock, tower bolt, handle & all hardware's accessories complete in all respect as per approved specifications and as approved by the Engineer incharge.				
	ii) WPC Door 8mm wall thickness	Per Sft.	37.00		
	PAINTING AND VARNISHING				
28	Painting new surface:- d) Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:-				
	i) priming coat	100 Sft	1.00		
	ii) each subsequent coat of paint.(Two Coat)	100 Sft	2.00		
29	Bitumen coating to plastered or cement concrete				
	i) 20 lbs. per 100 Sft. (9.07 Kg per Sq.m)	100 Sft	6.70		
30	Preparing surface and painting emulsion paint :				
	a) 1st coat	100 Sft	23.30		
	b) 2nd & each subsequent coat.	100 Sft	46.60		
31	Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: upto 20' heigh				
	i) 1st coat	100 Sft	6.20		
	ii) 2nd & each subsequent coat.	100 Sft	12.40		
	IRON WORKS				
32	Providing and fixing 2'-9" high stair railing comprising of non magnetic (304) Stain less steel 2" dia pipe railing of 18 SWG welded with vertical posts of 2" dia stainless steel round/ Squar pipe/ Tong (chimta) @ 2-ft c/c fixed on alternate steps with 3" long steel screws and brass rawal plugs , 3-Nos diagonal stainless steel pipes of 1/2" dia passes through goties fixed on vertical post, i/c stainles steel welding, fixing & polishing complete in all respects as approved and directed by the Engineer Incharge.				
		Per Rft	20.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	MISCELLANEOUS				
33	Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspension concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250) = 540 Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect .as approved by the Engineer Incharge	Sft	975.00		
	CEILING & STEEL WORK **Ref. Spec. No. 3000, 6560**				
34	Providing and fixing 0.7 mm thick 600x600mm aluminum false (Douglas) with suspension system GI Channel, GI wall U angle,threaded Rod M6, Anchor bolt M6, Nut M6, Hange clip, jointing clip,Screws and nail,fixing labor and carriage complete in all respects as per design shown on drawings.	Sft	90		
35	Provide & fix expended metal 1/2" to 3/4", 22 guage fixed walls or on area as required and specified on drawings with steel nails with washers complete in all respects.	Sft	470		
	FLOOR & WALL FINISHES **Ref. Spec. No. 6531, 6600**				
36	Supply and installation of WPC Ceiling Strip as per approved sample,with supension system GI channel ,threaded rod,all necessary hardware, fixing labour & carriage complete in all respects.	Sft	675.00		
37	Supply and installation of WPC (Wood Plastic Composite) louvres, manufactured from weather resistant composite material, durable, moisture-proof, termite-proof, and low maintenance. Suitable for interior and exterior applications, providing ventilation and aesthetic enhancement.	Sft	700.00		
38	Providing and fixing of 0'-6"x 4'-0" or approved size matt porcelain wooden texture tiles imported / Local or equivalent on floor & wall with approved make dry bond over average 1" thick cement mortar (1:3) including curing and filling the joints with approved matching colour grouting material etc complete as per drawings specifications and as directed by the Architects/Engineer.(pattern, size and colour as per approved sample).	Sft	730		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	Water Proofing Treatement				
39	Providing and Laying of CWS 100 or equlivent gel based water proofing seal static cracks upto 2.2mm makes concrete harder upto 9 moh complete as per drawings specifications and as directed by the Architects/Engineer.(Roof Water proofing).	Sft	1,360		
40	Application of Water Proofing coating on concrete / plater surfaces with high performance flexible cement coating for dampness protection as per manufacturer's recommendation and as directed by the Engineer.	Sft	1,050		
				TOTAL COST Rs.	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 7

BILL OF QUANTITIES

CIVIL WORKS

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	EARTH WORK (EXCAVATION & EMBANKMENT)				
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling in layers around structure with excavated earth, watering and ramming lead upto one chain (30 m) lift upto 5 ft (1.5m)				
	1) a) By Manual (iii) Hard soil or Soft murum	1000 Cft	2.04		
2	Filling, watering and ramming earth under floors. i) with surplus earth from foundation, etc.	1000 Cft	1.52		
	CONCRETE				
3	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	3.75		
4	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate)				
	Ratio 1:3:6	100 Cft	0.50		
	Ratio 1:4:8	100 Cft	6.10		
5	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.).				
	a.) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects. (3) Type C (nominal mix 1: 2: 4)	Per Cft	2,602.00		
	(c) (iii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a) (i)&(ii) above not requiring form work (i.e. horizontal shuttering) complete in all respects:- (3) Type C (nominal mix 1: 2: 4)	Per Cft	370.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
6	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars). (b) Deformed bars ii) (Grade-60)	100kg	45.50		
	BRICK WORK				
7	Pacca brick work in foundation and plinth in 1:4 C/S mortar	100 Cft	6.45		
8	Pacca brick work in 1:4 C/S mortar in Ground floor	100 Cft	12.40		
9	Pacca brick work in 1:4 C/S mortar.'Add extra labour on item No. 5 for brickwork in (i) first floor:-	100 Cft	3.72		
	ROOFING				
10	Providing and laying high density single profile spanish glazed tappered barrel type of 4"- 5-1/2" dia Terra Cotta Khaprail Tile dipped or sealed with a water repellent, with Terra Cotta base plate (10"x16"), resistant to salt attack laid with laps and duly interlocked on slopping roof over 1/2" thick (1:3) cement sand mortar i/c cost of all material and labour complete in all respect as approved and directed by the Engineer Incharge.	Per Sft	1,361.00		
	FLOORING				
11	Providing and laying superb quality Ceramic tiles floor of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	90.00		
12	Providing and laying superb quality Ceramic tiles dado of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	630.00		
13	Supplying and filling sand under floor; or plugging in wells.	100 Cft	0.50		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
14	Cement concrete tiles laid in 1:2 cement mortar, over 3/4" (20 mm) thick bed of cement mortar 1:2:-				
	(a) 12"x12"x1" (300 x 300 x 25 mm)	100 Sft	4.45		
15	Providing and laying 3/4" thick full width Prepolished Marble slab for Vanities / Shelves / Treads/Window Cills , having Uniform texture (Spotless) with adhesive bond over 3/4" thick (1:2) cement sand mortor i/c the cost of matching sealer complete in all respects as approved and directed by the Engineer Incharge ii) Ziarat White	Per Sft	166.00		
	SURFACE RENDERING				
16	Cement plaster 1:4 upto 20' (6.00 m) height: b) ½" (13 mm) thick	100 Sft	46.90		
17	Cement plaster 1:4 upto 20' (6.00 m) height: c) ¾" (20 mm) thick	100 Sft	2.00		
18	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C.roof slabs only, upto 20' height. b) 1:3	100 Sft	6.20		
19	Extra for lime, mud or cement plaster and pointing from 20' (6.00 m) and above for each additional 10' (3.00 m) height or part thereof.	100 Sft	1.00		
20	Providing and fixing 3/4"(19mm) thick Sand Stone (12"x24") on interior and exterior wall and cladding of approved quality and shade, laid over pre-plastered surface with adhesive bond complete in all respect i/c the cost of matching sealer to finish the joints as approved and directed by the Engineer Incharge	Per Sft	1,050.00		
	DOORS AND WINDOWS				
21	P/F 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressure i/c the cost of nails, tower bolt , handles, glue, sawing charges and lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge.	Per Sft	51.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
22	Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1-1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6-Nos) welded/ screwed, punching of lock hole covered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge				
	ii) 10.5 " wide	Per Sft	51.00		
23	Providing and fixing wooden box type wardrobe 22" (550mm) deep including ¾" (20 mm) thick boxing and shelves, hanger rods,hard board back drawers, brass fittings, locking arrangements handles, internal bolts, shoe rods, etc. including three coats of enamel paint:				
	i) Partal wood boxing and deodar wood shelves and leaves, etc.	Per Sft	96.00		
24	Providing and fixing all types of partly fixed and partly openable glazed anodised/ powder coated aluminium doors 1.6mm, using delux section of M/s Al-Cop or Pakistan Cables, having chowkat frame of size 40 x 100 mm (1½" x 4") and leaf frame of 60x40mm (2½"x1½") wide sections including the cost of specified thickness tempered glass with aluminium triangular gola and rubber gasket to support the glass and leaf edging, using approved standard fittings, locks, 3" (75 mm) wide long handles etc., and hardware any required as approved by the Engineer in-charge.				
	i) 5mm thick Glass	Per Sft.	133.00		
25	Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge	Per Sft.	225.00		
26	Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge, complete in all respect.	Per Sft.	112.50		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	WPC DOORS				
27	Providing and fixing 38mm (min) factory made Premium WPC Doors (waterproof, Termite-resistant, Fire retardant) of ESTA, Greendoors or approved equivalent with WPC door frame (chowkat) and WPC architrave on both sides, including the cost of polishing, with hinges, T-lock, tower bolt, handle & all hardware's accessories complete in all respect as per approved specifications and as approved by the Engineer incharge.				
	ii) WPC Door 8mm wall thickness	Per Sft.	37.00		
	PAINTING AND VARNISHING				
28	Painting new surface:- d) Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:-				
	i) priming coat	100 Sft	1.00		
	ii) each subsequent coat of paint.(Two Coat)	100 Sft	2.00		
29	Bitumen coating to plastered or cement concrete				
	i) 20 lbs. per 100 Sft. (9.07 Kg per Sq.m)	100 Sft	6.70		
30	Preparing surface and painting emulsion paint :				
	a) 1st coat	100 Sft	23.30		
	b) 2nd & each subsequent coat.	100 Sft	46.60		
31	Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: upto 20' heigh				
	i) 1st coat	100 Sft	6.20		
	ii) 2nd & each subsequent coat.	100 Sft	12.40		
	IRON WORKS				
32	Providing and fixing 2'-9" high stair railing comprising of non magnetic (304) Stain less steel 2" dia pipe railing of 18 SWG welded with vertical posts of 2" dia stainless steel round/ Squar pipe/ Tong (chimta) @ 2-ft c/c fixed on alternate steps with 3" long steel screws and brass rawal plugs , 3-Nos diagonal stainless steel pipes of 1/2" dia passes through goties fixed on vertical post, i/c stainles steel welding, fixing & polishing complete in all respects as approved and directed by the Engineer Incharge.				
		Per Rft	20.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	MISCELLANEOUS				
33	Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspension concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250) = 540 Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect .as approved by the Engineer Incharge	Sft	975.00		
	CEILING & STEEL WORK **Ref. Spec. No. 3000, 6560**				
34	Providing and fixing 0.7 mm thick 600x600mm aluminum false (Douglas) with suspension system GI Channel, GI wall U angle,threaded Rod M6, Anchor bolt M6, Nut M6, Hange clip, jointing clip,Screws and nail,fixing labor and carriage complete in all respects as per design shown on drawings.	Sft	90		
35	Provide & fix expended metal 1/2" to 3/4", 22 guage fixed walls or on area as required and specified on drawings with steel nails with washers complete in all respects.	Sft	470		
	FLOOR & WALL FINISHES **Ref. Spec. No. 6531, 6600**				
36	Supply and installation of WPC Ceiling Strip as per approved sample,with supension system GI channel ,threaded rod,all necessary hardware, fixing labour & carriage complete in all respects.	Sft	675.00		
37	Supply and installation of WPC (Wood Plastic Composite) louvres, manufactured from weather resistant composite material, durable, moisture-proof, termite-proof, and low maintenance. Suitable for interior and exterior applications, providing ventilation and aesthetic enhancement.	Sft	700.00		
38	Providing and fixing of 0'-6"x 4'-0" or approved size matt porcelain wooden texture tiles imported / Local or equivalent on floor & wall with approved make dry bond over average 1" thick cement mortar (1:3) including curing and filling the joints with approved matching colour grouting material etc complete as per drawings specifications and as directed by the Architects/Engineer.(pattern, size and colour as per approved sample).	Sft	730		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	Water Proofing Treatement				
39	Providing and Laying of CWS 100 or equlivent gel based water proofing seal static cracks upto 2.2mm makes concrete harder upto 9 moh complete as per drawings specifications and as directed by the Architects/Engineer.(Roof Water proofing).	Sft	1,360		
40	Application of Water Proofing coating on concrete / plater surfaces with high performance flexible cement coating for dampness protection as per manufacturer's recommendation and as directed by the Engineer.	Sft	1,050		
				TOTAL COST Rs.	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 8

BILL OF QUANTITIES

CIVIL WORKS

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	EARTH WORK (EXCAVATION & EMBANKMENT)				
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling in layers around structure with excavated earth, watering and ramming lead upto one chain (30 m) lift upto 5 ft (1.5m)				
	1) a) By Manual	1000			
	(iii) Hard soil or Soft murum	Cft	1.99		
2	Filling, watering and ramming earth under floors.	1000			
	i) with surplus earth from foundation, etc.	Cft	1.46		
	CONCRETE				
3	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	3.80		
4	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate)				
	Ratio 1:3:6	100 Cft	0.46		
	Ratio 1:4:8	100 Cft	6.12		
5	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.).				
	a.) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects.				
	(3) Type C (nominal mix 1: 2: 4)	Per Cft	1,251.00		
	(c) (iii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a) (i)&(ii) above not requiring form work (i.e. horizontal shuttering) complete in all respects:-				
	(3) Type C (nominal mix 1: 2: 4)	Per Cft	360.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
6	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars). (b) Deformed bars ii) (Grade-60)	100kg	45.60		
	BRICK WORK				
7	Pacca brick work in foundation and plinth in 1:4 C/S mortar	100 Cft	6.40		
8	Pacca brick work in 1:4 C/S mortar in Ground floor	100 Cft	12.91		
9	Pacca brick work in 1:4 C/S mortar.'Add extra labour on item No. 5 for brickwork in (i) first floor:-	100 Cft	3.87		
	ROOFING				
10	Providing and laying high density single profile spanish glazed tappered barrel type of 4"- 5-1/2" dia Terra Cotta Khaprail Tile dipped or sealed with a water repellent, with Terra Cotta base plate (10"x16"), resistant to salt attack laid with laps and duly interlocked on slopping roof over 1/2" thick (1:3) cement sand mortar i/c cost of all material and labour complete in all respect as approved and directed by the Engineer Incharge.	Per Sft	1,371.00		
	FLOORING				
11	Providing and laying superb quality Ceramic tiles floor of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	95.00		
12	Providing and laying superb quality Ceramic tiles dado of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	575.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
13	Supplying and filling sand under floor; or plugging in wells.	100 Cft	0.40		
14	Cement concrete tiles laid in 1:2 cement mortar, over 3/4" (20 mm) thick bed of cement mortar 1:2:-				
	(a) 12"x12"x1" (300 x 300 x 25 mm)	100 Sft	4.50		
15	Providing and laying 3/4" thick full width Prepolished Marble slab for Vanities / Shelves / Treads/Window Cills , having Uniform texture (Spotless) with adhesive bond over 3/4" thick (1:2) cement sand mortor i/c the cost of matching sealer complete in all respects as approved and directed by the Engineer Incharge ii) Ziarat White	Per Sft	165.00		
	SURFACE RENDERING				
16	Cement plaster 1:4 upto 20' (6.00 m) height: b) ½" (13 mm) thick	100 Sft	44.76		
17	Cement plaster 1:4 upto 20' (6.00 m) height: c) ¾" (20 mm) thick	100 Sft	1.50		
18	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C.roof slabs only, upto 20' height. b) 1:3	100 Sft	6.00		
19	Extra for lime, mud or cement plaster and pointing from 20' (6.00 m) and above for each additional 10' (3.00 m) height or part thereof.	100 Sft	0.50		
20	Providing and fixing 3/4"(19mm) thick Sand Stone (12"x24") on interior and exterior wall and cladding of approved quality and shade, laid over pre-plastered surface with adhesive bond complete in all respect i/c the cost of matching sealer to finish the joints as approved and directed by the Engineer Incharge	Per Sft	955.00		
	DOORS AND WINDOWS				
21	P/F 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressure i/c the cost of nails, tower bolt , handles, glue, sawing charges and lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge.	Per Sft	51.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
22	Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1-1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6 Nos) welded/ screwed, punching of lock hole covered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge				
	ii) 10.5 " wide	Per Sft	51.00		
23	Providing and fixing wooden box type wardrobe 22" (550mm) deep including ¾" (20 mm) thick boxing and shelves, hanger rods,hard board back drawers, brass fittings, locking arrangements handles, internal bolts, shoe rods, etc. including three coats of enamel paint:				
	i) Partal wood boxing and deodar wood shelves and leaves, etc.	Per Sft	138.00		
24	Providing and fixing all types of partly fixed and partly openable glazed anodised/ powder coated aluminium doors 1.6mm, using delux section of M/s Al-Cop or Pakistan Cables, having chowkat frame of size 40 x 100 mm (1½" x 4") and leaf frame of 60x40mm (2½"x1½") wide sections including the cost of specified thickness tempered glass with aluminium triangular gola and rubber gasket to support the glass and leaf edging, using approved standard fittings, locks, 3" (75 mm) wide long handles etc., and hardware any required as approved by the Engineer in-charge.				
	i) 5mm thick Glass	Per Sft.	71.00		
25	Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge	Per Sft.	366.00		
26	Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge, complete in all respect.	Per Sft.	183.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	WPC DOORS				
27	Providing and fixing 38mm (min) factory made Premium WPC Doors (waterproof, Termite-resistant, Fire retardant) of ESTA, Greendoors or approved equivalent with WPC door frame (chowkat) and WPC architrave on both sides, including the cost of polishing, with hinges, T-lock, tower bolt, handle & all hardware's accessories complete in all respect as per approved specifications and as approved by the Engineer incharge.				
	ii) WPC Door 8mm wall thickness	Per Sft.	37.00		
	PAINTING AND VARNISHING				
28	Painting new surface:-				
	d) Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:-				
	i) priming coat	100 Sft	1.00		
	ii) each subsequent coat of paint.(Two Coat)	100 Sft	2.00		
29	Bitumen coating to plastered or cement concrete				
	i) 20 lbs. per 100 Sft. (9.07 Kg per Sq.m)	100 Sft	6.70		
30	Preparing surface and painting emulsion paint :				
	a) 1st coat	100 Sft	22.95		
	b) 2nd & each subsequent coat.	100 Sft	45.90		
31	Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: upto 20' heigh				
	i) 1st coat	100 Sft	6.00		
	ii) 2nd & each subsequent coat.	100 Sft	12.00		
	IRON WORKS				
32	Providing and fixing 2'-9" high stair railing comprising of non magnetic (304) Stain less steel 2" dia pipe railing of 18 SWG welded with vertical posts of 2" dia stainless steel round/ Squar pipe/ Tong (chimta) @ 2-ft c/c fixed on alternate steps with 3" long steel screws and brass rawal plugs , 3-Nos diagonal stainless steel pipes of 1/2" dia passes through goties fixed on vertical post, i/c stainles steel welding, fixing & polishing complete in all respects as approved and directed by the Engineer Incharge.	Per Rft	28.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	MISCELLANEOUS				
33	Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspension concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250) = 540 Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect .as approved by the Engineer Incharge	Sft	970.00		
	CEILING & STEEL WORK **Ref. Spec. No. 3000, 6560**				
34	Providing and fixing 0.7 mm thick 600x600mm aluminum false (Douglas) with suspension system GI Channel, GI wall U angle,threaded Rod M6, Anchor bolt M6, Nut M6, Hange clip, jointing clip,Screws and nail,fixing labor and carriage complete in all respects as per design shown on drawings.	Sft	92		
35	Provide & fix expended metal 1/2" to 3/4", 22 guage fixed walls or on area as required and specified on drawings with steel nails with washers complete in all respects.	Sft	450		
	FLOOR & WALL FINISHES **Ref. Spec. No. 6531, 6600**				
36	Supply and installation of WPC Ceiling Strip as per approved sample,with supension system GI channel ,threaded rod,all necessary hardware, fixing labour & carriage complete in all respects.	Sft	610.00		
37	Supply and installation of WPC (Wood Plastic Composite) louvres, manufactured from weather resistant composite material, durable, moisture-proof, termite-proof, and low maintenance. Suitable for interior and exterior applications, providing ventilation and aesthetic enhancement.	Sft	635.00		
38	Providing and fixing of 0'-6"x 4'-0" or approved size matt porcelain wooden texture tiles imported / Local or equivalent on floor & wall with approved make dry bond over average 1" thick cement mortar (1:3) including curing and filling the joints with approved matching colour grouting material etc complete as per drawings specifications and as directed by the Architects/Engineer.(pattern, size and colour as per approved sample).	Sft	740		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	Water Proofing Treatement				
39	Providing and Laying of CWS 100 or equlivent gel based water proofing seal static cracks upto 2.2mm makes concrete harder upto 9 moh complete as per drawings specifications and as directed by the Architects/Engineer.(Roof Water proofing).	Sft	1,370.00		
40	Application of Water Proofing coating on concrete / plater surfaces with high performance flexible cement coating for dampness protection as per manufacturer's recommendation and as directed by the Engineer.	Sft	955		
				TOTAL COST Rs.	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 9

BILL OF QUANTITIES

CIVIL WORKS

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	EARTH WORK (EXCAVATION & EMBANKMENT)				
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling in layers around structure with excavated earth, watering and ramming lead upto one chain (30 m) lift upto 5 ft (1.5m) 1) a) By Manual (iii) Hard soil or Soft murum	1000 Cft	1.25		
2	Filling, watering and ramming earth under floors. i) with surplus earth from foundation, etc.	1000 Cft	0.88		
	CONCRETE				
3	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	2.20		
4	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate)				
	Ratio 1:3:6	100 Cft	0.50		
	Ratio 1:4:8	100 Cft	3.85		
5	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.).				
	a.) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects. (3) Type C (nominal mix 1: 2: 4)	Per Cft	809.00		
	(c) (iii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a) (i)&(ii) above not requiring form work (i.e. horizontal shuttering) complete in all respects:-				
	(3) Type C (nominal mix 1: 2: 4)	Per Cft	225.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
6	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars). (b) Deformed bars ii) (Grade-60)	100kg	29.10		
	BRICK WORK				
7	Pacca brick work in foundation and plinth in 1:4 C/S mortar	100 Cft	3.85		
8	Pacca brick work in 1:4 C/S mortar in Ground floor	100 Cft	7.05		
9	Pacca brick work in 1:4 C/S mortar.'Add extra labour on item No. 5 for brickwork in (i) first floor:-	100 Cft	2.12		
	ROOFING				
10	Providing and laying high density single profile spanish glazed tappered barrel type of 4"- 5-1/2" dia Terra Cotta Khaprail Tile dipped or sealed with a water repellent, with Terra Cotta base plate (10"x16"), resistant to salt attack laid with laps and duly interlocked on slopping roof over 1/2" thick (1:3) cement sand mortar i/c cost of all material and labour complete in all respect as approved and directed by the Engineer Incharge.	Per Sft	926.00		
	FLOORING				
11	Providing and laying superb quality Ceramic tiles floor of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	37.00		
12	Providing and laying superb quality Ceramic tiles dado of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge.				

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	300.00		
13	Supplying and filling sand under floor; or plugging in wells.	100 Cft	0.50		
14	Cement concrete tiles laid in 1:2 cement mortar, over 3/4" (20 mm) thick bed of cement mortar 1:2:-				
	(a) 12"x12"x1" (300 x 300 x 25 mm)	100 Sft	2.75		
15	Providing and laying 3/4" thick full width Prepolished Marble slab for Vanities / Shelves / Treads/Window Cills , having Uniform texture (Spotless) with adhesive bond over 3/4" thick (1:2) cement sand mortor i/c the cost of matching sealer complete in all respects as approved and directed by the Engineer Incharge ii) Ziarat White	Per Sft	163.00		
	SURFACE RENDERING				
16	Cement plaster 1:4 upto 20' (6.00 m) height: b) ½" (13 mm) thick	100 Sft	31.33		
17	Cement plaster 1:4 upto 20' (6.00 m) height: c) ¾" (20 mm) thick	100 Sft	2.00		
18	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C.roof slabs only, upto 20' height. b) 1:3	100 Sft	4.30		
19	Extra for lime, mud or cement plaster and pointing from 20' (6.00 m) and above for each additional 10' (3.00 m) height or part thereof.	100 Sft	1.00		
20	Providing and fixing 3/4"(19mm) thick Sand Stone (12"x24") on interior and exterior wall and cladding of approved quality and shade, laid over pre-plastered surface with adhesive bond complete in all respect i/c the cost of matching sealer to finish the joints as approved and directed by the Engineer Incharge	Per Sft	735.00		
	DOORS AND WINDOWS				
21	P/F 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressure i/c the cost of nails, tower bolt , handles, glue, sawing charges and lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge.	Per Sft	26.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
22	Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1-1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6-Nos) welded/ screwed, punching of lock hole covered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge				
	ii) 10.5 " wide	Per Sft	26.00		
23	Providing and fixing wooden box type wardrobe 22" (550mm) deep including ¾" (20 mm) thick boxing and shelves, hanger rods,hard board back drawers, brass fittings, locking arrangements handles, internal bolts, shoe rods, etc. including three coats of enamel paint: i) Partal wood boxing and deodar wood shelves and leaves, etc.	Per Sft	51.00		
24	Providing and fixing all types of partly fixed and partly openable glazed anodised/ powder coated aluminium doors 1.6mm, using delux section of M/s Al-Cop or Pakistan Cables, having chowkat frame of size 40 x 100 mm (1½" x 4") and leaf frame of 60x40mm (2½"x1½") wide sections including the cost of specified thickness tempered glass with aluminium triangular gola and rubber gasket to support the glass and leaf edging, using approved standard fittings, locks, 3" (75 mm) wide long handles etc., and hardware any required as approved by the Engineer in-charge. i) 5mm thick Glass	Per Sft.	58.00		
25	Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge	Per Sft.	124.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
26	Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge. complete in all respect.	Per Sft.	62.00		
	WPC DOORS				
27	Providing and fixing 38mm (min) factory made Premium WPC Doors (waterproof, Termite-resistant, Fire retardant) of ESTA, Greendoors or approved equivalent with WPC door frame (chowkat) and WPC architrave on both sides, including the cost of polishing, with hinges, T-lock, tower bolt, handle & all hardware's accessories complete in all respect as per approved specifications and as approved by the Engineer incharge.				
	ii) WPC Door 8mm wall thickness	Per Sft.	18.00		
	PAINTING AND VARNISHING				
28	Painting new surface:- d) Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:-				
	i) priming coat	100 Sft	1.00		
	ii) each subsequent coat of paint.(Two Coat)	100 Sft	2.00		
29	Bitumen coating to plastered or cement concrete				
	i) 20 lbs. per 100 Sft. (9.07 Kg per Sq.m)	100 Sft	4.20		
30	Preparing surface and painting emulsion paint :				
	a) 1st coat	100 Sft	14.85		
	b) 2nd & each subsequent coat.	100 Sft	29.70		
31	Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: upto 20' heigh				
	i) 1st coat	100 Sft	4.30		
	ii) 2nd & each subsequent coat.	100 Sft	8.60		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	IRON WORKS				
32	Providing and fixing 2'-9" high stair railing comprising of non magnetic (304) Stain less steel 2" dia pipe railing of 18 SWG welded with vertical posts of 2" dia stainless steel round/ Squar pipe/ Tong (chimta) @ 2-ft c/c fixed on alternate steps with 3" long steel screws and brass rawal plugs , 3-Nos diagonal stainless steel pipes of 1/2" dia passes through goties fixed on vertical post, i/c stainles steel welding, fixing & polishing complete in all respects as approved and directed by the Engineer Incharge.	Per Rft	32.00		
	MISCELLANEOUS				
33	Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspension concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250) = 540 Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect .as approved by the Engineer Incharge	Sft	550.00		
	CEILING & STEEL WORK **Ref. Spec. No. 3000, 6560**				
34	Providing and fixing 0.7 mm thick 600x600mm aluminum false (Douglas) with suspension system GI Channel, GI wall U angle,threaded Rod M6, Anchor bolt M6, Nut M6, Hange clip, jointing clip,Screws and nail,fixing labor and carriage complete in all respects as per design shown on drawings.	Sft	37		
35	Provide & fix expended metal 1/2" to 3/4", 22 guage fixed walls or on area as required and specified on drawings with steel nails with washers complete in all respects.	Sft	315		
	FLOOR & WALL FINISHES **Ref. Spec. No. 6531, 6600**				
36	Supply and installation of WPC Ceiling Strip as per approved sample,with supension system GI channel ,threaded rod,all necessary hardware, fixing labour & carriage complete in all respects.	Sft	400.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
37	Supply and installation of WPC (Wood Plastic Composite) louvres, manufactured from weather resistant composite material, durable, moisture-proof, termite-proof, and low maintenance. Suitable for interior and exterior applications, providing ventilation and aesthetic enhancement.	Sft	490.00		
38	Providing and fixing of 0'-6"x 4'-0" or approved size matt porcelain wooden texture tiles imported / Local or equivalent on floor & wall with approved make dry bond over average 1" thick cement mortar (1:3) including curing and filling the joints with approved matching colour grouting material etc complete as per drawings specifications and as directed by the Architects/Engineer.(pattern, size and colour as per approved sample).	Sft	440		
	Water Proofing Treatement				
39	Providing and Laying of CWS 100 or equlivent gel based water proofing seal static cracks upto 2.2mm makes concrete harder upto 9 moh complete as per drawings specifications and as directed by the Architects/Engineer.(Roof Water proofing).	Sft	930.00		
40	Application of Water Proofing coating on concrete / plater surfaces with high performance flexible cement coating for dampness protection as per manufacturer's recommendation and as directed by the Engineer.	Sft	735		
				TOTAL COST Rs.	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 10

BILL OF QUANTITIES

CIVIL WORKS

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	EARTH WORK (EXCAVATION & EMBANKMENT)				
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling in layers around structure with excavated earth, watering and ramming lead upto one chain (30 m) lift upto 5 ft (1.5m) 1) a) By Manual (iii) Hard soil or Soft murum	1000 Cft	1.25		
2	Filling, watering and ramming earth under floors. i) with surplus earth from foundation, etc.	1000 Cft	0.88		
	CONCRETE				
3	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	2.20		
4	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate)				
	Ratio 1:3:6	100 Cft	0.50		
	Ratio 1:4:8	100 Cft	3.85		
5	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.).				
	a.) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects. (3) Type C (nominal mix 1: 2: 4)	Per Cft	809.00		
	(c) (iii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a) (i)&(ii) above not requiring form work (i.e. horizontal shuttering) complete in all respects:-				
	(3) Type C (nominal mix 1: 2: 4)	Per Cft	225.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
6	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars). (b) Deformed bars ii) (Grade-60)	100kg	29.10		
	BRICK WORK				
7	Pacca brick work in foundation and plinth in 1:4 C/S mortar	100 Cft	3.85		
8	Pacca brick work in 1:4 C/S mortar in Ground floor	100 Cft	7.05		
9	Pacca brick work in 1:4 C/S mortar.'Add extra labour on item No. 5 for brickwork in (i) first floor:-	100 Cft	2.12		
	ROOFING				
10	Providing and laying high density single profile spanish glazed tappered barrel type of 4"- 5-1/2" dia Terra Cotta Khaprail Tile dipped or sealed with a water repellent, with Terra Cotta base plate (10"x16"), resistant to salt attack laid with laps and duly interlocked on slopping roof over 1/2" thick (1:3) cement sand mortar i/c cost of all material and labour complete in all respect as approved and directed by the Engineer Incharge.	Per Sft	926.00		
	FLOORING				
11	Providing and laying superb quality Ceramic tiles floor of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	37.00		
12	Providing and laying superb quality Ceramic tiles dado of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	300.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
13	Supplying and filling sand under floor; or plugging in wells.	100 Cft	0.50		
14	Cement concrete tiles laid in 1:2 cement mortar, over 3/4" (20 mm) thick bed of cement mortar 1:2:-				
	(a) 12"x12"x1" (300 x 300 x 25 mm)	100 Sft	2.75		
15	Providing and laying 3/4" thick full width Prepolished Marble slab for Vanities / Shelves / Treads/Window Cills , having Uniform texture (Spotless) with adhesive bond over 3/4" thick (1:2) cement sand mortor i/c the cost of matching sealer complete in all respects as approved and directed by the Engineer Incharge ii) Ziarat White	Per Sft	163.00		
	SURFACE RENDERING				
16	Cement plaster 1:4 upto 20' (6.00 m) height: b) ½" (13 mm) thick	100 Sft	31.33		
17	Cement plaster 1:4 upto 20' (6.00 m) height: c) ¾" (20 mm) thick	100 Sft	2.00		
18	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C.roof slabs only, upto 20' height. b) 1:3	100 Sft	4.30		
19	Extra for lime, mud or cement plaster and pointing from 20' (6.00 m) and above for each additional 10' (3.00 m) height or part thereof.	100 Sft	1.00		
20	Providing and fixing 3/4"(19mm) thick Sand Stone (12"x24") on interior and exterior wall and cladding of approved quality and shade, laid over pre-plastered surface with adhesive bond complete in all respect i/c the cost of matching sealer to finish the joints as approved and directed by the Engineer Incharge	Per Sft	735.00		
	DOORS AND WINDOWS				
21	P/F 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressure i/c the cost of nails, tower bolt , handles, glue, sawing charges and lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge.	Per Sft	26.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
22	Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1-1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6-Nos) welded/ screwed, punching of lock hole covered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge				
	ii) 10.5 " wide	Per Sft	26.00		
23	Providing and fixing wooden box type wardrobe 22" (550mm) deep including ¾" (20 mm) thick boxing and shelves, hanger rods,hard board back drawers, brass fittings, locking arrangements handles, internal bolts, shoe rods, etc. including three coats of enamel paint:				
	i) Partal wood boxing and deodar wood shelves and leaves, etc.	Per Sft	51.00		
24	Providing and fixing all types of partly fixed and partly openable glazed anodised/ powder coated aluminium doors 1.6mm, using delux section of M/s Al-Cop or Pakistan Cables, having chowkat frame of size 40 x 100 mm (1½" x 4") and leaf frame of 60x40mm (2½"x1½") wide sections including the cost of specified thickness tempered glass with aluminium triangular gola and rubber gasket to support the glass and leaf edging, using approved standard fittings, locks, 3" (75 mm) wide long handles etc., and hardware any required as approved by the Engineer in-charge.				
	i) 5mm thick Glass	Per Sft.	58.00		
25	Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge	Per Sft.	124.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
26	Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge. complete in all respect.	Per Sft.	62.00		
	WPC DOORS				
27	Providing and fixing 38mm (min) factory made Premium WPC Doors (waterproof, Termite-resistant, Fire retardant) of ESTA, Greendoors or approved equivalent with WPC door frame (chowkat) and WPC architrave on both sides, including the cost of polishing, with hinges, T-lock, tower bolt, handle & all hardware's accessories complete in all respect as per approved specifications and as approved by the Engineer incharge.				
	ii) WPC Door 8mm wall thickness	Per Sft.	18.00		
	PAINTING AND VARNISHING				
28	Painting new surface:- d) Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:-				
	i) priming coat	100 Sft	1.00		
	ii) each subsequent coat of paint.(Two Coat)	100 Sft	2.00		
29	Bitumen coating to plastered or cement concrete				
	i) 20 lbs. per 100 Sft. (9.07 Kg per Sq.m)	100 Sft	4.20		
30	Preparing surface and painting emulsion paint :				
	a) 1st coat	100 Sft	14.85		
	b) 2nd & each subsequent coat.	100 Sft	29.70		
31	Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: upto 20' heigh				
	i) 1st coat	100 Sft	4.30		
	ii) 2nd & each subsequent coat.	100 Sft	8.60		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	IRON WORKS				
32	Providing and fixing 2'-9" high stair railing comprising of non magnetic (304) Stain less steel 2" dia pipe railing of 18 SWG welded with vertical posts of 2" dia stainless steel round/ Squar pipe/ Tong (chimta) @ 2-ft c/c fixed on alternate steps with 3" long steel screws and brass rawal plugs , 3-Nos diagonal stainless steel pipes of 1/2" dia passes through goties fixed on vertical post, i/c stainles steel welding, fixing & polishing complete in all respects as approved and directed by the Engineer Incharge.	Per Rft	32.00		
	MISCELLANEOUS				
33	Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspension concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250) = 540 Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect .as approved by the Engineer Incharge	Sft	550.00		
	CEILING & STEEL WORK **Ref. Spec. No. 3000, 6560**				
34	Providing and fixing 0.7 mm thick 600x600mm aluminum false (Douglas) with suspension system GI Channel, GI wall U angle,threaded Rod M6, Anchor bolt M6, Nut M6, Hange clip, jointing clip,Screws and nail,fixing labor and carriage complete in all respects as per design shown on drawings.	Sft	37		
35	Provide & fix expended metal 1/2" to 3/4", 22 guage fixed walls or on area as required and specified on drawings with steel nails with washers complete in all respects.	Sft	315		
	FLOOR & WALL FINISHES **Ref. Spec. No. 6531, 6600**				
36	Supply and installation of WPC Ceiling Strip as per approved sample,with supension system GI channel ,threaded rod,all necessary hardware, fixing labour & carriage complete in all respects.	Sft	400.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
37	Supply and installation of WPC (Wood Plastic Composite) louvres, manufactured from weather resistant composite material, durable, moisture-proof, termite-proof, and low maintenance. Suitable for interior and exterior applications, providing ventilation and aesthetic enhancement.	Sft	490.00		
38	Providing and fixing of 0'-6"x 4'-0" or approved size matt porcelain wooden texture tiles imported / Local or equivalent on floor & wall with approved make dry bond over average 1" thick cement mortar (1:3) including curing and filling the joints with approved matching colour grouting material etc complete as per drawings specifications and as directed by the Architects/Engineer.(pattern, size and colour as per approved sample).	Sft	440		
	Water Proofing Treatement				
39	Providing and Laying of CWS 100 or equlivent gel based water proofing seal static cracks upto 2.2mm makes concrete harder upto 9 moh complete as per drawings specifications and as directed by the Architects/Engineer.(Roof Water proofing).	Sft	930.00		
40	Application of Water Proofing coating on concrete / plater surfaces with high performance flexible cement coating for dampness protection as per manufacturer's recommendation and as directed by the Engineer.	Sft	735		
				TOTAL COST Rs.	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 11

BILL OF QUANTITIES

CIVIL WORKS

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	EARTH WORK (EXCAVATION & EMBANKMENT)				
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling in layers around structure with excavated earth, watering and ramming lead upto one chain (30 m) lift upto 5 ft (1.5m) 1) a) By Manual (iii) Hard soil or Soft murum	1000 Cft	1.34		
2	Filling, watering and ramming earth under floors. i) with surplus earth from foundation, etc.	1000 Cft	0.86		
	CONCRETE				
3	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	2.30		
4	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate)				
	Ratio 1:3:6	100 Cft	0.35		
	Ratio 1:4:8	100 Cft	3.86		
5	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.).				
	a.) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects. (3) Type C (nominal mix 1: 2: 4)	Per Cft	837.00		
	(c) (iii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a) (i)&(ii) above not requiring form work (i.e. horizontal shuttering) complete in all respects:-				
	(3) Type C (nominal mix 1: 2: 4)	Per Cft	240.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
6	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars). (b) Deformed bars ii) (Grade-60)	100kg	30.60		
	BRICK WORK				
7	Pacca brick work in foundation and plinth in 1:4 C/S mortar	100 Cft	4.11		
8	Pacca brick work in 1:4 C/S mortar in Ground floor	100 Cft	7.15		
9	Pacca brick work in 1:4 C/S mortar.'Add extra labour on item No. 5 for brickwork in (i) first floor:-	100 Cft	2.15		
	ROOFING				
10	Providing and laying high density single profile spanish glazed tappered barrel type of 4"- 5-1/2" dia Terra Cotta Khaprail Tile dipped or sealed with a water repellent, with Terra Cotta base plate (10"x16"), resistant to salt attack laid with laps and duly interlocked on slopping roof over 1/2" thick (1:3) cement sand mortar i/c cost of all material and labour complete in all respect as approved and directed by the Engineer Incharge.	Per Sft	910.00		
	FLOORING				
11	Providing and laying superb quality Ceramic tiles floor of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	50.00		
12	Providing and laying superb quality Ceramic tiles dado of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	290.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
13	Supplying and filling sand under floor; or plugging in wells.	100 Cft	0.40		
14	Cement concrete tiles laid in 1:2 cement mortar, over 3/4" (20 mm) thick bed of cement mortar 1:2:-				
	(a) 12"x12"x1" (300 x 300 x 25 mm)	100 Sft	3.00		
15	Providing and laying 3/4" thick full width Prepolished Marble slab for Vanities / Shelves / Treads/Window Cills , having Uniform texture (Spotless) with adhesive bond over 3/4" thick (1:2) cement sand mortor i/c the cost of matching sealer complete in all respects as approved and directed by the Engineer Incharge ii) Ziarat White	Per Sft	115.00		
	SURFACE RENDERING				
16	Cement plaster 1:4 upto 20' (6.00 m) height: b) ½" (13 mm) thick	100 Sft	28.35		
17	Cement plaster 1:4 upto 20' (6.00 m) height: c) ¾" (20 mm) thick	100 Sft	1.50		
18	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C.roof slabs only, upto 20' height. b) 1:3	100 Sft	4.85		
19	Extra for lime, mud or cement plaster and pointing from 20' (6.00 m) and above for each additional 10' (3.00 m) height or part thereof.	100 Sft	0.50		
20	Providing and fixing 3/4"(19mm) thick Sand Stone (12"x24") on interior and exterior wall and cladding of approved quality and shade, laid over pre-plastered surface with adhesive bond complete in all respect i/c the cost of matching sealer to finish the joints as approved and directed by the Engineer Incharge	Per Sft	730.00		
	DOORS AND WINDOWS				
21	P/F 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressure i/c the cost of nails, tower bolt , handles, glue, sawing charges and lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge.	Per Sft	26.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
22	Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1-1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6-Nos) welded/ screwed, punching of lock hole covered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge				
	ii) 10.5 " wide	Per Sft	26.00		
23	Providing and fixing wooden box type wardrobe 22" (550mm) deep including ¾" (20 mm) thick boxing and shelves, hanger rods,hard board back drawers, brass fittings, locking arrangements handles, internal bolts, shoe rods, etc. including three coats of enamel paint:				
	i) Partal wood boxing and deodar wood shelves and leaves, etc.	Per Sft	63.00		
24	Providing and fixing all types of partly fixed and partly openable glazed anodised/ powder coated aluminium doors 1.6mm, using delux section of M/s Al-Cop or Pakistan Cables, having chowkat frame of size 40 x 100 mm (1½" x 4") and leaf frame of 60x40mm (2½"x1½") wide sections including the cost of specified thickness tempered glass with aluminium triangular gola and rubber gasket to support the glass and leaf edging, using approved standard fittings, locks, 3" (75 mm) wide long handles etc., and hardware any required as approved by the Engineer in-charge.				
	i) 5mm thick Glass	Per Sft.	50.00		
25	Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge				
		Per Sft.	345.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
26	Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge. complete in all respect.	Per Sft.	172.50		
	WPC DOORS				
27	Providing and fixing 38mm (min) factory made Premium WPC Doors (waterproof, Termite-resistant, Fire retardant) of ESTA, Greendoors or approved equivalent with WPC door frame (chowkat) and WPC architrave on both sides, including the cost of polishing, with hinges, T-lock, tower bolt, handle & all hardware's accessories complete in all respect as per approved specifications and as approved by the Engineer incharge.				
	ii) WPC Door 8mm wall thickness	Per Sft.	18.00		
	PAINTING AND VARNISHING				
28	Painting new surface:- d) Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:-				
	i) priming coat	100 Sft	1.00		
	ii) each subsequent coat of paint.(Two Coat)	100 Sft	2.00		
29	Bitumen coating to plastered or cement concrete				
	i) 20 lbs. per 100 Sft. (9.07 Kg per Sq.m)	100 Sft	4.50		
30	Preparing surface and painting emulsion paint :				
	a) 1st coat	100 Sft	11.35		
	b) 2nd & each subsequent coat.	100 Sft	22.70		
31	Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: upto 20' heigh				
	i) 1st coat	100 Sft	4.85		
	ii) 2nd & each subsequent coat.	100 Sft	9.70		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	IRON WORKS				
32	Providing and fixing 2'-9" high stair railing comprising of non magnetic (304) Stain less steel 2" dia pipe railing of 18 SWG welded with vertical posts of 2" dia stainless steel round/ Squar pipe/ Tong (chimta) @ 2-ft c/c fixed on alternate steps with 3" long steel screws and brass rawal plugs , 3-Nos diagonal stainless steel pipes of 1/2" dia passes through goties fixed on vertical post, i/c stainles steel welding, fixing & polishing complete in all respects as approved and directed by the Engineer Incharge.	Per Rft	18.00		
	MISCELLANEOUS				
33	Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspension concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250) = 540 Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect .as approved by the Engineer Incharge	Sft	575.00		
	CEILING & STEEL WORK **Ref. Spec. No. 3000, 6560**				
34	Providing and fixing 0.7 mm thick 600x600mm aluminum false (Douglas) with suspension system GI Channel, GI wall U angle,threaded Rod M6, Anchor bolt M6, Nut M6, Hange clip, jointing clip,Screws and nail,fixing labor and carriage complete in all respects as per design shown on drawings.	Sft	50		
35	Provide & fix expended metal 1/2" to 3/4", 22 guage fixed walls or on area as required and specified on drawings with steel nails with washers complete in all respects.	Sft	285		
	FLOOR & WALL FINISHES **Ref. Spec. No. 6531, 6600**				
36	Supply and installation of WPC Ceiling Strip as per approved sample,with supension system GI channel ,threaded rod,all necessary hardware, fixing labour & carriage complete in all respects.	Sft	365.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
37	Supply and installation of WPC (Wood Plastic Composite) louvres, manufactured from weather resistant composite material, durable, moisture-proof, termite-proof, and low maintenance. Suitable for interior and exterior applications, providing ventilation and aesthetic enhancement.	Sft	490.00		
38	Providing and fixing of 0'-6"x 4'-0" or approved size matt porcelain wooden texture tiles imported / Local or equivalent on floor & wall with approved make dry bond over average 1" thick cement mortar (1:3) including curing and filling the joints with approved matching colour grouting material etc complete as per drawings specifications and as directed by the Architects/Engineer.(pattern, size and colour as per approved sample).	Sft	430		
	Water Proofing Treatement				
39	Providing and Laying of CWS 100 or equlivent gel based water proofing seal static cracks upto 2.2mm makes concrete harder upto 9 moh complete as per drawings specifications and as directed by the Architects/Engineer.(Roof Water proofing).	Sft	910		
40	Application of Water Proofing coating on concrete / plater surfaces with high performance flexible cement coating for dampness protection as per manufacturer's recommendation and as directed by the Engineer.	Sft	730		
				TOTAL COST Rs.	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 12

BILL OF QUANTITIES

CIVIL WORKS

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	EARTH WORK (EXCAVATION & EMBANKMENT)				
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling in layers around structure with excavated earth, watering and ramming lead upto one chain (30 m) lift upto 5 ft (1.5m) 1) a) By Manual (iii) Hard soil or Soft murum	1000 Cft	1.65		
2	Filling, watering and ramming earth under floors. i) with surplus earth from foundation, etc.	1000 Cft	1.12		
	CONCRETE				
3	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	3.20		
4	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate)				
	Ratio 1:3:6	100 Cft	0.45		
	Ratio 1:4:8	100 Cft	5.30		
5	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.).				
	a.) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects. (3) Type C (nominal mix 1: 2: 4)	Per Cft	1,090.00		
	(c) (iii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a) (i)&(ii) above not requiring form work (i.e. horizontal shuttering) complete in all respects:-				
	(3) Type C (nominal mix 1: 2: 4)	Per Cft	300.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
6	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars). (b) Deformed bars ii) (Grade-60)	100kg	40.00		
	BRICK WORK				
7	Pacca brick work in foundation and plinth in 1:4 C/S mortar	100 Cft	4.90		
8	Pacca brick work in 1:4 C/S mortar in Ground floor	100 Cft	8.60		
9	Pacca brick work in 1:4 C/S mortar.'Add extra labour on item No. 5 for brickwork in (i) first floor:-	100 Cft	2.58		
	ROOFING				
10	Providing and laying high density single profile spanish glazed tappered barrel type of 4"- 5-1/2" dia Terra Cotta Khaprail Tile dipped or sealed with a water repellent, with Terra Cotta base plate (10"x16"), resistant to salt attack laid with laps and duly interlocked on slopping roof over 1/2" thick (1:3) cement sand mortar i/c cost of all material and labour complete in all respect as approved and directed by the Engineer Incharge.	Per Sft	1,200.00		
	FLOORING				
11	Providing and laying superb quality Ceramic tiles floor of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	50.00		
12	Providing and laying superb quality Ceramic tiles dado of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge.				

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	360.00		
13	Supplying and filling sand under floor; or plugging in wells.	100 Cft	0.25		
14	Cement concrete tiles laid in 1:2 cement mortar, over 3/4" (20 mm) thick bed of cement mortar 1:2:-				
	(a) 12"x12"x1" (300 x 300 x 25 mm)	100 Sft	4.85		
15	Providing and laying 3/4" thick full width Prepolished Marble slab for Vanities / Shelves / Treads/Window Cills , having Uniform texture (Spotless) with adhesive bond over 3/4" thick (1:2) cement sand mortor i/c the cost of matching sealer complete in all respects as approved and directed by the Engineer Incharge ii) Ziarat White	Per Sft	130.00		
	SURFACE RENDERING				
16	Cement plaster 1:4 upto 20' (6.00 m) height: b) ½" (13 mm) thick	100 Sft	42.15		
17	Cement plaster 1:4 upto 20' (6.00 m) height: c) ¾" (20 mm) thick	100 Sft	1.00		
18	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C.roof slabs only, upto 20' height. b) 1:3	100 Sft	6.00		
19	Extra for lime, mud or cement plaster and pointing from 20' (6.00 m) and above for each additional 10' (3.00 m) height or part thereof.	100 Sft	0.50		
20	Providing and fixing 3/4"(19mm) thick Sand Stone (12"x24") on interior and exterior wall and cladding of approved quality and shade, laid over pre-plastered surface with adhesive bond complete in all respect i/c the cost of matching sealer to finish the joints as approved and directed by the Engineer Incharge	Per Sft	1,065.00		
	DOORS AND WINDOWS				
21	P/F 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressure i/c the cost of nails, tower bolt , handles, glue, sawing charges and lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge.	Per Sft	26.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
22	Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1-1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6-Nos) welded/ screwed, punching of lock hole covered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge				
	ii) 10.5 " wide	Per Sft	26.00		
23	Providing and fixing wooden box type wardrobe 22" (550mm) deep including ¾" (20 mm) thick boxing and shelves, hanger rods,hard board back drawers, brass fittings, locking arrangements handles, internal bolts, shoe rods, etc. including three coats of enamel paint:				
	i) Partal wood boxing and deodar wood shelves and leaves, etc.	Per Sft	75.00		
24	Providing and fixing all types of partly fixed and partly openable glazed anodised/ powder coated aluminium doors 1.6mm, using delux section of M/s Al-Cop or Pakistan Cables, having chowkat frame of size 40 x 100 mm (1½" x 4") and leaf frame of 60x40mm (2½"x1½") wide sections including the cost of specified thickness tempered glass with aluminium triangular gola and rubber gasket to support the glass and leaf edging, using approved standard fittings, locks, 3" (75 mm) wide long handles etc., and hardware any required as approved by the Engineer in-charge.				
	i) 5mm thick Glass	Per Sft.	60.00		
25	Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge	Per Sft.	285.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
26	Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge. complete in all respect.	Per Sft.	142.50		
	WPC DOORS				
27	Providing and fixing 38mm (min) factory made Premium WPC Doors (waterproof, Termite-resistant, Fire retardant) of ESTA, Greendoors or approved equivalent with WPC door frame (chowkat) and WPC architrave on both sides, including the cost of polishing, with hinges, T-lock, tower bolt, handle & all hardware's accessories complete in all respect as per approved specifications and as approved by the Engineer incharge.				
	ii) WPC Door 8mm wall thickness	Per Sft.	18.00		
	PAINTING AND VARNISHING				
28	Painting new surface:- d) Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:-				
	i) priming coat	100 Sft	1.00		
	ii) each subsequent coat of paint.(Two Coat)	100 Sft	2.00		
29	Bitumen coating to plastered or cement concrete				
	i) 20 lbs. per 100 Sft. (9.07 Kg per Sq.m)	100 Sft	5.65		
30	Preparing surface and painting emulsion paint :				
	a) 1st coat	100 Sft	18.40		
	b) 2nd & each subsequent coat.	100 Sft	36.80		
31	Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: upto 20' heigh				
	i) 1st coat	100 Sft	6.00		
	ii) 2nd & each subsequent coat.	100 Sft	12.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	IRON WORKS				
32	Providing and fixing 2'-9" high stair railing comprising of non magnetic (304) Stain less steel 2" dia pipe railing of 18 SWG welded with vertical posts of 2" dia stainless steel round/ Squar pipe/ Tong (chimta) @ 2-ft c/c fixed on alternate steps with 3" long steel screws and brass rawal plugs , 3-Nos diagonal stainless steel pipes of 1/2" dia passes through goties fixed on vertical post, i/c stainles steel welding, fixing & polishing complete in all respects as approved and directed by the Engineer Incharge.	Per Rft	21.00		
	MISCELLANEOUS				
33	Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspension concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250) = 540 Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect .as approved by the Engineer Incharge	Sft	710.00		
	CEILING & STEEL WORK **Ref. Spec. No. 3000, 6560**				
34	Providing and fixing 0.7 mm thick 600x600mm aluminum false (Douglas) with suspension system GI Channel, GI wall U angle,threaded Rod M6, Anchor bolt M6, Nut M6, Hange clip, jointing clip,Screws and nail,fixing labor and carriage complete in all respects as per design shown on drawings.	Sft	50		
35	Provide & fix expended metal 1/2" to 3/4", 22 guage fixed walls or on area as required and specified on drawings with steel nails with washers complete in all respects.	Sft	420		
	FLOOR & WALL FINISHES **Ref. Spec. No. 6531, 6600**				
36	Supply and installation of WPC Ceiling Strip as per approved sample,with supension system GI channel ,threaded rod,all necessary hardware, fixing labour & carriage complete in all respects.	Sft	510.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
37	Supply and installation of WPC (Wood Plastic Composite) louvres, manufactured from weather resistant composite material, durable, moisture-proof, termite-proof, and low maintenance. Suitable for interior and exterior applications, providing ventilation and aesthetic enhancement.	Sft	725.00		
38	Providing and fixing of 0'-6"x 4'-0" or approved size matt porcelain wooden texture tiles imported / Local or equivalent on floor & wall with approved make dry bond over average 1" thick cement mortar (1:3) including curing and filling the joints with approved matching colour grouting material etc complete as per drawings specifications and as directed by the Architects/Engineer.(pattern, size and colour as per approved sample).	Sft	565		
	Water Proofing Treatement				
39	Providing and Laying of CWS 100 or equlivent gel based water proofing seal static cracks upto 2.2mm makes concrete harder upto 9 moh complete as per drawings specifications and as directed by the Architects/Engineer.(Roof Water proofing).	Sft	1,200		
40	Application of Water Proofing coating on concrete / plater surfaces with high performance flexible cement coating for dampness protection as per manufacturer's recommendation and as directed by the Engineer.	Sft	1,065		
				TOTAL COST Rs.	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 13

BILL OF QUANTITIES

CIVIL WORKS

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	EARTH WORK (EXCAVATION & EMBANKMENT)				
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling in layers around structure with excavated earth, watering and ramming lead upto one chain (30 m) lift upto 5 ft (1.5m)				
	1) a) By Manual	1000			
	(iii) Hard soil or Soft murum	Cft	1.65		
2	Filling, watering and ramming earth under floors.	1000			
	i) with surplus earth from foundation, etc.	Cft	1.12		
	CONCRETE				
3	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	3.20		
4	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate)				
	Ratio 1:3:6	100 Cft	0.45		
	Ratio 1:4:8	100 Cft	5.30		
5	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.).				
	a.) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects.				
	(3) Type C (nominal mix 1: 2: 4)	Per Cft	1,090.00		
	(c) (iii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a) (i)&(ii) above not requiring form work (i.e. horizontal shuttering) complete in all respects:-				
	(3) Type C (nominal mix 1: 2: 4)	Per Cft	300.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
6	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars). (b) Deformed bars ii) (Grade-60)	100kg	40.00		
	BRICK WORK				
7	Pacca brick work in foundation and plinth in 1:4 C/S mortar	100 Cft	4.90		
8	Pacca brick work in 1:4 C/S mortar in Ground floor	100 Cft	8.60		
9	Pacca brick work in 1:4 C/S mortar.'Add extra labour on item No. 5 for brickwork in (i) first floor:-	100 Cft	2.58		
	ROOFING				
10	Providing and laying high density single profile spanish glazed tappered barrel type of 4"- 5-1/2" dia Terra Cotta Khaprail Tile dipped or sealed with a water repellent, with Terra Cotta base plate (10"x16"), resistant to salt attack laid with laps and duly interlocked on slopping roof over 1/2" thick (1:3) cement sand mortar i/c cost of all material and labour complete in all respect as approved and directed by the Engineer Incharge.	Per Sft	1,200.00		
	FLOORING				
11	Providing and laying superb quality Ceramic tiles floor of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	50.00		
12	Providing and laying superb quality Ceramic tiles dado of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	360.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
13	Supplying and filling sand under floor; or plugging in wells.	100 Cft	0.25		
14	Cement concrete tiles laid in 1:2 cement mortar, over 3/4" (20 mm) thick bed of cement mortar 1:2:-				
	(a) 12"x12"x1" (300 x 300 x 25 mm)	100 Sft	4.85		
15	Providing and laying 3/4" thick full width Prepolished Marble slab for Vanities / Shelves / Treads/Window Cills , having Uniform texture (Spotless) with adhesive bond over 3/4" thick (1:2) cement sand mortor i/c the cost of matching sealer complete in all respects as approved and directed by the Engineer Incharge ii) Ziarat White	Per Sft	130.00		
	SURFACE RENDERING				
16	Cement plaster 1:4 upto 20' (6.00 m) height: b) ½" (13 mm) thick	100 Sft	42.15		
17	Cement plaster 1:4 upto 20' (6.00 m) height: c) ¾" (20 mm) thick	100 Sft	1.00		
18	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C.roof slabs only, upto 20' height. b) 1:3	100 Sft	6.00		
19	Extra for lime, mud or cement plaster and pointing from 20' (6.00 m) and above for each additional 10' (3.00 m) height or part thereof.	100 Sft	0.50		
20	Providing and fixing 3/4"(19mm) thick Sand Stone (12"x24") on interior and exterior wall and cladding of approved quality and shade, laid over pre-plastered surface with adhesive bond complete in all respect i/c the cost of matching sealer to finish the joints as approved and directed by the Engineer Incharge	Per Sft	1,065.00		
	DOORS AND WINDOWS				
21	P/F 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressure i/c the cost of nails, tower bolt , handles, glue, sawing charges and lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge.	Per Sft	26.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
22	Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1-1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6 Nos) welded/ screwed, punching of lock hole covered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge				
	ii) 10.5 " wide	Per Sft	26.00		
23	Providing and fixing wooden box type wardrobe 22" (550mm) deep including ¾" (20 mm) thick boxing and shelves, hanger rods,hard board back drawers, brass fittings, locking arrangements handles, internal bolts, shoe rods, etc. including three coats of enamel paint: i) Partal wood boxing and deodar wood shelves and leaves, etc.	Per Sft	75.00		
24	Providing and fixing all types of partly fixed and partly openable glazed anodised/ powder coated aluminium doors 1.6mm, using delux section of M/s Al-Cop or Pakistan Cables, having chowkat frame of size 40 x 100 mm (1½" x 4") and leaf frame of 60x40mm (2½"x1½") wide sections including the cost of specified thickness tempered glass with aluminium triangular gola and rubber gasket to support the glass and leaf edging, using approved standard fittings, locks, 3" (75 mm) wide long handles etc., and hardware any required as approved by the Engineer in-charge. i) 5mm thick Glass	Per Sft.	60.00		
25	Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge	Per Sft.	285.00		
26	Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge, complete in all respect.	Per Sft.	142.50		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	WPC DOORS				
27	Providing and fixing 38mm (min) factory made Premium WPC Doors (waterproof, Termite-resistant, Fire retardant) of ESTA, Greendoors or approved equivalent with WPC door frame (chowkat) and WPC architrave on both sides, including the cost of polishing, with hinges, T-lock, tower bolt, handle & all hardware's accessories complete in all respect as per approved specifications and as approved by the Engineer incharge.				
	ii) WPC Door 8mm wall thickness	Per Sft.	18.00		
	PAINTING AND VARNISHING				
28	Painting new surface:- d) Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:-				
	i) priming coat	100 Sft	1.00		
	ii) each subsequent coat of paint.(Two Coat)	100 Sft	2.00		
29	Bitumen coating to plastered or cement concrete				
	i) 20 lbs. per 100 Sft. (9.07 Kg per Sq.m)	100 Sft	5.65		
30	Preparing surface and painting emulsion paint :				
	a) 1st coat	100 Sft	18.40		
	b) 2nd & each subsequent coat.	100 Sft	36.80		
31	Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: upto 20' heigh				
	i) 1st coat	100 Sft	6.00		
	ii) 2nd & each subsequent coat.	100 Sft	12.00		
	IRON WORKS				
32	Providing and fixing 2'-9" high stair railing comprising of non magnetic (304) Stain less steel 2" dia pipe railing of 18 SWG welded with vertical posts of 2" dia stainless steel round/ Squar pipe/ Tong (chimta) @ 2-ft c/c fixed on alternate steps with 3" long steel screws and brass rawal plugs , 3-Nos diagonal stainless steel pipes of 1/2" dia passes through goties fixed on vertical post, i/c stainles steel welding, fixing & polishing complete in all respects as approved and directed by the Engineer Incharge.				
		Per Rft	21.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	MISCELLANEOUS				
33	Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspension concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250) = 540 Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect .as approved by the Engineer Incharge	Sft	710.00		
	CEILING & STEEL WORK **Ref. Spec. No. 3000, 6560**				
34	Providing and fixing 0.7 mm thick 600x600mm aluminum false (Douglas) with suspension system GI Channel, GI wall U angle,threaded Rod M6, Anchor bolt M6, Nut M6, Hange clip, jointing clip,Screws and nail,fixing labor and carriage complete in all respects as per design shown on drawings.	Sft	50		
35	Provide & fix expended metal 1/2" to 3/4", 22 guage fixed walls or on area as required and specified on drawings with steel nails with washers complete in all respects.	Sft	420		
	FLOOR & WALL FINISHES **Ref. Spec. No. 6531, 6600**				
36	Supply and installation of WPC Ceiling Strip as per approved sample,with supension system GI channel ,threaded rod,all necessary hardware, fixing labour & carriage complete in all respects.	Sft	510.00		
37	Supply and installation of WPC (Wood Plastic Composite) louvres, manufactured from weather resistant composite material, durable, moisture-proof, termite-proof, and low maintenance. Suitable for interior and exterior applications, providing ventilation and aesthetic enhancement.	Sft	725.00		
38	Providing and fixing of 0'-6"x 4'-0" or approved size matt porcelain wooden texture tiles imported / Local or equivalent on floor & wall with approved make dry bond over average 1" thick cement mortar (1:3) including curing and filling the joints with approved matching colour grouting material etc complete as per drawings specifications and as directed by the Architects/Engineer.(pattern, size and colour as per approved sample).	Sft	565		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	Water Proofing Treatement				
39	Providing and Laying of CWS 100 or equlivent gel based water proofing seal static cracks upto 2.2mm makes concrete harder upto 9 moh complete as per drawings specifications and as directed by the Architects/Engineer.(Roof Water proofing).	Sft	1,200		
40	Application of Water Proofing coating on concrete / plater surfaces with high performance flexible cement coating for dampness protection as per manufacturer's recommendation and as directed by the Engineer.	Sft	1,065		
				TOTAL COST Rs.	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 14

BILL OF QUANTITIES

CIVIL WORKS

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	EARTH WORK (EXCAVATION & EMBANKMENT)				
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling in layers around structure with excavated earth, watering and ramming lead upto one chain (30 m) lift upto 5 ft (1.5m) 1) a) By Manual (iii) Hard soil or Soft murum	1000 Cft	1.91		
2	Filling, watering and ramming earth under floors. i) with surplus earth from foundation, etc.	1000 Cft	1.18		
	CONCRETE				
3	Dry rammed brick or stone ballast, 1½" to 2"(40 mm to 50 mm) gauge.	100Cft	3.10		
4	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate)				
	Ratio 1:3:6	100 Cft	1.65		
	Ratio 1:4:8	100 Cft	6.75		
5	Providing and laying reinforced cement concrete (including prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.).				
	a.) (i) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects. (3) Type C (nominal mix 1: 2: 4)	Per Cft	1,230.00		
	(c) (iii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a) (i)&(ii) above not requiring form work (i.e. horizontal shuttering) complete in all respects:-				
	(3) Type C (nominal mix 1: 2: 4)	Per Cft	340.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
6	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars). (b) Deformed bars ii) (Grade-60)	100kg	44.70		
	BRICK WORK				
7	Pacca brick work in foundation and plinth in 1:4 C/S mortar	100 Cft	6.05		
8	Pacca brick work in 1:4 C/S mortar in Ground floor	100 Cft	10.15		
9	Pacca brick work in 1:4 C/S mortar.'Add extra labour on item No. 5 for brickwork in (i) first floor:-	100 Cft	3.05		
	ROOFING				
10	Providing and laying high density single profile spanish glazed tappered barrel type of 4"- 5-1/2" dia Terra Cotta Khaprail Tile dipped or sealed with a water repellent, with Terra Cotta base plate (10"x16"), resistant to salt attack laid with laps and duly interlocked on slopping roof over 1/2" thick (1:3) cement sand mortar i/c cost of all material and labour complete in all respect as approved and directed by the Engineer Incharge.	Per Sft	1,295.00		
	FLOORING				
11	Providing and laying superb quality Ceramic tiles floor of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	610.00		
12	Providing and laying superb quality Ceramic tiles dado of Master/ Composite Rate Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture of approved Color and Shade as per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge. i) 12"x18"/ 12"x24"/ 10"x24" / 8"x24"/ 12"x36"	Per Sft	395.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
13	Supplying and filling sand under floor; or plugging in wells.	100 Cft	0.25		
14	Cement concrete tiles laid in 1:2 cement mortar, over 3/4" (20 mm) thick bed of cement mortar 1:2:-				
	(a) 12"x12"x1" (300 x 300 x 25 mm)	100 Sft	6.50		
15	Providing and laying 3/4" thick full width Prepolished Marble slab for Vanities / Shelves / Treads/Window Cills , having Uniform texture (Spotless) with adhesive bond over 3/4" thick (1:2) cement sand mortor i/c the cost of matching sealer complete in all respects as approved and directed by the Engineer Incharge ii) Ziarat White	Per Sft	525.00		
	SURFACE RENDERING				
16	Cement plaster 1:4 upto 20' (6.00 m) height: b) ½" (13 mm) thick	100 Sft	45.50		
17	Cement plaster 1:4 upto 20' (6.00 m) height: c) ¾" (20 mm) thick	100 Sft	1.50		
18	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C.roof slabs only, upto 20' height. b) 1:3	100 Sft	9.80		
22	Extra for lime, mud or cement plaster and pointing from 20' (6.00 m) and above for each additional 10' (3.00 m) height or part thereof.	100 Sft	0.50		
23	Providing and fixing 3/4"(19mm) thick Sand Stone (12"x24") on interior and exterior wall and cladding of approved quality and shade, laid over pre-plastered surface with adhesive bond complete in all respect i/c the cost of matching sealer to finish the joints as approved and directed by the Engineer Incharge	Per Sft	1,265.00		
	DOORS AND WINDOWS				
24	P/F 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressure i/c the cost of nails, tower bolt , handles, glue, sawing charges and lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge.	Per Sft	51.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
25	Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1-1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6-Nos) welded/ screwed, punching of lock hole covered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge				
	ii) 10.5 " wide	Per Sft	51.00		
26	Providing and fixing Vin board cabinet 3/4" thick with drawers 3"deep in 'Kitchen including termite proofing and polishing with synthetic enamel as specified, with handles hinges,screws etc., complete in all respects.				
	iii) 2' deep,without back	Per Sft	111.00		
	iv) 2' deep,with back	Per Sft	74.00		
27	Providing and fitting all types of glazed aluminium windows of anodised/ powder coated partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 30 mm (4"x1-1/4") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge	Per Sft.	350.00		
28	Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge. complete in all respect.	Per Sft.	175.00		
	WPC DOORS				
29	Providing and fixing 38mm (min) factory made Premium WPC Doors (waterproof, Termite-resistant, Fire retardant) of ESTA, Greendoors or approved equivalent with WPC door frame (chowkat) and WPC architrave on both sides, including the cost of polishing, with hinges, T-lock, tower bolt, handle & all hardware's accessories complete in all respect as per approved specifications and as approved by the Engineer incharge.				
	ii) WPC Door 8mm wall thickness	Per Sft.	81.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	PAINTING AND VARNISHING				
30	Painting new surface:- d) Preparing surface and painting guard bars, gates of iron bars, gratings, railing (including standards, braces, etc.) and in similar open work:-				
	i) priming coat	100 Sft	1.00		
	ii) each subsequent coat of paint.(Two Coat)	100 Sft	2.00		
31	Bitumen coating to plastered or cement concrete i) 20 lbs. per 100 Sft. (9.07 Kg per Sq.m)	100 Sft	6.55		
32	Preparing surface and painting emulsion paint : a) 1st coat	100 Sft	14.65		
	b) 2nd & each subsequent coat.	100 Sft	29.30		
33	Providing and applying weather shield paint of approved quality on external surface of building including preparation of surface, application of primer complete in all respect: upto 20' heigh				
	i) 1st coat	100 Sft	9.80		
	ii) 2nd & each subsequent coat.	100 Sft	19.60		
	IRON WORKS				
34	Providing and fixing 2'-9" high stair railing comprising of non magnetic (304) Stain less steel 2" dia pipe railing of 18 SWG welded with vertical posts of 2" dia stainless steel round/ Squar pipe/ Tong (chimta) @ 2-ft c/c fixed on alternate steps with 3" long steel screws and brass rawal plugs , 3-Nos diagonal stainless steel pipes of 1/2" dia passes through goties fixed on vertical post, i/c stainles steel welding, fixing & polishing complete in all respects as approved and directed by the Engineer Incharge.	Per Rft	27.00		
	MISCELLANEOUS				
35	Spraying termite proofing by using liquid FMC/ Biflex/ Terminex Exin/ Ms Hextar or equivalent @ specified suspension concenterate (SC), Mixing Ability-HEXTAR with Ratio (1:250) = 540 Sft or equivalent approved liquid applying with shower and certificate will be provided by the contractor for 10-years complete in all respect .as approved by the Engineer Incharge	Sft	730.00		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	CEILING & STEEL WORK **Ref. Spec. No. 3000, 6560**				
36	Providing and fixing 0.7 mm thick 600x600mm aluminum false (Douglas) with suspension system GI Channel, GI wall U angle,threaded Rod M6, Anchor bolt M6, Nut M6, Hange clip, jointing clip,Screws and nail,fixing labor and carriage complete in all respects as per design shown on drawings.	Sft	35		
37	Provide & fix expended metal 1/2" to 3/4", 22 guage fixed walls or on area as required and specified on drawings with steel nails with washers complete in all respects.	Sft	455		
	FLOOR & WALL FINISHES **Ref. Spec. No. 6531, 6600**				
38	Supply and installation of WPC Ceiling Strip as per approved sample,with supension system GI channel ,threaded rod,all necessary hardware, fixing labour & carriage complete in all respects.	Sft	365.00		
39	Supply and installation of WPC (Wood Plastic Composite) louvres, manufactured from weather resistant composite material, durable, moisture-proof, termite-proof, and low maintenance. Suitable for interior and exterior applications, providing ventilation and aesthetic enhancement.	Sft	845.00		
	Water Proofing Treatement				
40	Providing and Laying of CWS 100 or equlivent gel based water proofing seal static cracks upto 2.2mm makes concrete harder upto 9 moh complete as per drawings specifications and as directed by the Architects/Engineer.(Roof Water proofing).	Sft	1,295		
41	Application of Water Proofing coating on concrete / plater surfaces with high performance flexible cement coating for dampness protection as per manufacturer's recommendation and as directed by the Engineer.	Sft	1,265		
				TOTAL COST Rs.	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-1

BILL OF QUANTITIES
PLUMBING WORKS

BLOCK-1

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

A. PLUMBING WORKS

SANITARY FIXTURES AND FITTINGS
(Ref. Specs 5100)

BP-01	European water closet with flushing cistern water saving dual flush type (one piece wc), vitreous china, including hydraulic seat & cover, CP tee stop cock, flexible connection etc. complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	2		
BP-02	Vanity type wash hand basin (under counter), vitreous china, including CP lever type hot & cold water mixer, CP 1.25" waste, CP bottle trap with union 1.25", CP Tee stop cocks, flexible connections, jointing and sealing material, etc. Complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	2		
BP-03	CP Lever type Bath shower of open wall installation style of approved make, model & size, jointing and sealing material, fixed to concrete, brick, stone or wood work complete in all respects.	Each.	2		
BP-04	CP Muslim shower combined with double bib cock including all fittings.	Each.	2		
BP-05	CP Bib cock including all fittings for complete installation.	Each.	1		
BP-06	CP Towel Rail 600 mm long, with fixing plugs and screws etc. of approved make fixed to concrete, brick, stone or wood work, complete in all respects.	Each	2		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
BP-07		CP Toilet paper holder of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects.	Each	2		
BP-08		CP Soap Dish of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects .	Each	2		
BP-09		Small hook of any size and shape, of approved make, complete with plugs and screws etc., fixed to concrete, brick stone or wood work, complete in all respects.	Each	2		
BP-10		05 mm thick Glass mirror, Belgium make or approved equivalent, including heavy duty mirror mounting clips/studs/screws and all other fittings for complete installation	Sft	20		
BP-11		Electric water heater (fast) of 50Liters capacity heavy duty, including tee stop cocks,flexible steel connections, automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	2		
		WATER SUPPLY PIPES AND FITTINGS (Ref. Specs 5100, 5220)				
		G.I. water pipes conforming to BS-1387/BS EN-10255, Medium Grade, I/c all fittings, wrapping polythene tape, giving anticorrosion treatment, applying protective painting, clamps, hangers & supports, making holes in concrete or masonry and then repairing holes, flushing, disinfecting, testing and commissioning etc. of approved make, of the following diameters, complete in all respects.				
BP-12	(a)	3/4 inch	Rft	20		
BP-13	(b)	01 inch	Rft	5		
		PPR water pipes PN-20 (for water supply), inside building (un-exposed to sunlight conditions) conforming to DIN 8077-78, I/c all fittings (PN-25), clamps, hangers & supports, cutting, jointing, making holes in concrete or masonry and then repairing holes, etc., of approved make of the following diameters.				
BP-14	(a)	25mm	Rft	70		
BP-15	(b)	32mm	Rft	20		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		Brass gate valves, PN-16 conforming to BS standards of approved make or equivalent, including unions and jointing arrangement of pipes on both ends of valves; nuts, bolts etc. complete in all respects, of following diameters.				
BP-16	(a)	3/4 inch	Each	2		
BP-17	(b)	01 inch	Each	1		
		SOIL, WASTE AND VENT PIPES & FITTINGS (Ref. Specs 5100)				
		uPVC Soil, Waste and vent pipes conforming to ISO:3633 type "B" or BS-4514/5255 class "A" of the following diameters, including imported rubber ring/solvent cement fittings, jointing, cutting, clamps, hangers & supports, breaking concrete/masonry and then making it good, core cutting & filling with non shrink grout of approved manufacturer wherever required and applying painting, cleaning and testing etc. complete in all respects.				
BP-18	(a)	2 inches	Rft	20		
BP-19	(b)	3 inches	Rft	30		
BP-20	(c)	4 inches	Rft	30		
BP-21	(d)	6 inches	Rft	5		
BP-22		uPVC Multi Floor Trap (110x75mm) with CP Top Tile strainer; supports; making required number of connections; breaking concrete or masonry work & then making it good; etc.	Each	3		
		Cowl on vent pipes of the following diameter.				
BP-23	(a)	3 inches	Each	2		
BP-24		Construction of Gully Trap Chamber (12" x12" clear) including supply & fixing of 4" deep seal C.I. gully trap, construction of 4-1/2" thick brick masonry in 1:4 c/s mortar, 3" thick 1:4:8 P.C.C at bottom, 1:3:6 P.C.C around trap, (12" x 12") CI cover with frame (15 Kg), 1/2" thick 1:3 c/s plaster on inner face, etc. complete in all respects as shown in drawings or as directed.	Each	2		
BP-25		Dry chemical powder (DCP) Type Fire Extinguisher of 06kg Capacity.	Each	1		
					Total Amount :	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-2

BILL OF QUANTITIES
PLUMBING WORKS

BLOCK-2

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

A. PLUMBING WORKS

SANITARY FIXTURES AND FITTINGS
(Ref. Specs 5100)

BP-01	European water closet with flushing cistern water saving dual flush type (one piece wc), vitreous china, including hydraulic seat & cover, CP tee stop cock, flexible connection etc. complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	2
BP-02	Vanity type wash hand basin (under counter), vitreous china, including CP lever type hot & cold water mixer, CP 1.25" waste, CP bottle trap with union 1.25", CP Tee stop cocks, flexible connections, jointing and sealing material, etc. Complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	2
BP-03	CP Lever type Bath shower of open wall installation style of approved make, model & size, jointing and sealing material, fixed to concrete, brick, stone or wood work complete in all respects.	Each.	2
BP-04	CP Muslim shower combined with double bib cock including all fittings.	Each.	2
BP-05	CP Bib cock including all fittings for complete installation.	Each.	1
BP-06	CP Towel Rail 600 mm long, with fixing plugs and screws etc. of approved make fixed to concrete, brick, stone or wood work, complete in all respects.	Each	2

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
BP-07		CP Toilet paper holder of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects.	Each	2		
BP-08		CP Soap Dish of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects .	Each	2		
BP-09		Small hook of any size and shape, of approved make, complete with plugs and screws etc., fixed to concrete, brick stone or wood work, complete in all respects.	Each	2		
BP-10		05 mm thick Glass mirror, Belgium make or approved equivalent, including heavy duty mirror mounting clips/studs/screws and all other fittings for complete installation	Sft	20		
BP-11		Electric water heater (fast) of 50Liters capacity heavy duty, including tee stop cocks,flexible steel connections, automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	2		
		WATER SUPPLY PIPES AND FITTINGS (Ref. Specs 5100, 5220)				
		G.I. water pipes conforming to BS-1387/BS EN-10255, Medium Grade, I/c all fittings, wrapping polythene tape, giving anticorrosion treatment, applying protective painting, clamps, hangers & supports, making holes in concrete or masonry and then repairing holes, flushing, disinfecting, testing and commissioning etc. of approved make, of the following diameters, complete in all respects.				
BP-12	(a)	3/4 inch	Rft	20		
BP-13	(b)	01 inch	Rft	5		
		PPR water pipes PN-20 (for water supply), inside building (un-exposed to sunlight conditions) conforming to DIN 8077-78, I/c all fittings (PN-25), clamps, hangers & supports, cutting, jointing, making holes in concrete or masonry and then repairing holes, etc., of approved make of the following diameters.				
BP-14	(a)	25mm	Rft	70		
BP-15	(b)	32mm	Rft	20		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		Brass gate valves, PN-16 conforming to BS standards of approved make or equivalent, including unions and jointing arrangement of pipes on both ends of valves; nuts, bolts etc. complete in all respects, of following diameters.				
BP-16	(a)	3/4 inch	Each	2		
BP-17	(b)	01 inch	Each	1		
		SOIL, WASTE AND VENT PIPES & FITTINGS (Ref. Specs 5100)				
		uPVC Soil, Waste and vent pipes conforming to ISO:3633 type "B" or BS-4514/5255 class "A" of the following diameters, including imported rubber ring/solvent cement fittings, jointing, cutting, clamps, hangers & supports, breaking concrete/masonry and then making it good, core cutting & filling with non shrink grout of approved manufacturer wherever required and applying painting, cleaning and testing etc. complete in all respects.				
BP-18	(a)	2 inches	Rft	20		
BP-19	(b)	3 inches	Rft	30		
BP-20	(c)	4 inches	Rft	30		
BP-21	(d)	6 inches	Rft	5		
BP-22		uPVC Multi Floor Trap (110x75mm) with CP Top Tile strainer; supports; making required number of connections; breaking concrete or masonry work & then making it good; etc.	Each	3		
		Cowl on vent pipes of the following diameter.				
BP-23	(a)	3 inches	Each	2		
BP-24		Construction of Gully Trap Chamber (12" x12" clear) including supply & fixing of 4" deep seal C.I. gully trap, construction of 4-1/2" thick brick masonry in 1:4 c/s mortar, 3" thick 1:4:8 P.C.C at bottom, 1:3:6 P.C.C around trap, (12" x 12") CI cover with frame (15 Kg), 1/2" thick 1:3 c/s plaster on inner face, etc. complete in all respects as shown in drawings or as directed.	Each	2		
BP-25		Dry chemical powder (DCP) Type Fire Extinguisher of 06kg Capacity.	Each	1		
					Total Amount :	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-3

BILL OF QUANTITIES
PLUMBING WORKS

BLOCK-3

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

A. PLUMBING WORKS

SANITARY FIXTURES AND FITTINGS
(Ref. Specs 5100)

BP-01	European water closet with flushing cistern water saving dual flush type (one piece wc), vitreous china, including hydraulic seat & cover, CP tee stop cock, flexible connection etc. complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	2		
BP-02	Vanity type wash hand basin (under counter), vitreous china, including CP lever type hot & cold water mixer, CP 1.25" waste, CP bottle trap with union 1.25", CP Tee stop cocks, flexible connections, jointing and sealing material, etc. Complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	2		
BP-03	CP Lever type Bath shower of open wall installation style of approved make, model & size, jointing and sealing material, fixed to concrete, brick, stone or wood work complete in all respects.	Each.	2		
BP-04	CP Muslim shower combined with double bib cock including all fittings.	Each.	2		
BP-05	CP Bib cock including all fittings for complete installation.	Each.	1		
BP-06	CP Towel Rail 600 mm long, with fixing plugs and screws etc. of approved make fixed to concrete, brick, stone or wood work, complete in all respects.	Each	2		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
BP-07		CP Toilet paper holder of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects.	Each	2		
BP-08		CP Soap Dish of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects .	Each	2		
BP-09		Small hook of any size and shape, of approved make, complete with plugs and screws etc., fixed to concrete, brick stone or wood work, complete in all respects.	Each	2		
BP-10		05 mm thick Glass mirror, Belgium make or approved equivalent, including heavy duty mirror mounting clips/studs/screws and all other fittings for complete installation	Sft	20		
BP-11		Electric water heater (fast) of 50Liters capacity heavy duty, including tee stop cocks,flexible steel connections, automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	2		
		WATER SUPPLY PIPES AND FITTINGS (Ref. Specs 5100, 5220)				
		G.I. water pipes conforming to BS-1387/BS EN-10255, Medium Grade, I/c all fittings, wrapping polythene tape, giving anticorrosion treatment, applying protective painting, clamps, hangers & supports, making holes in concrete or masonry and then repairing holes, flushing, disinfecting, testing and commissioning etc. of approved make, of the following diameters, complete in all respects.				
BP-12	(a)	3/4 inch	Rft	20		
BP-13	(b)	01 inch	Rft	5		
		PPR water pipes PN-20 (for water supply), inside building (un-exposed to sunlight conditions) conforming to DIN 8077-78, I/c all fittings (PN-25), clamps, hangers & supports, cutting, jointing, making holes in concrete or masonry and then repairing holes, etc., of approved make of the following diameters.				
BP-14	(a)	25mm	Rft	70		
BP-15	(b)	32mm	Rft	20		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		Brass gate valves, PN-16 conforming to BS standards of approved make or equivalent, including unions and jointing arrangement of pipes on both ends of valves; nuts, bolts etc. complete in all respects, of following diameters.				
BP-16	(a)	3/4 inch	Each	2		
BP-17	(b)	01 inch	Each	1		
		SOIL, WASTE AND VENT PIPES & FITTINGS (Ref. Specs 5100)				
		uPVC Soil, Waste and vent pipes conforming to ISO:3633 type "B" or BS-4514/5255 class "A" of the following diameters, including imported rubber ring/solvent cement fittings, jointing, cutting, clamps, hangers & supports, breaking concrete/masonry and then making it good, core cutting & filling with non shrink grout of approved manufacturer wherever required and applying painting, cleaning and testing etc. complete in all respects.				
BP-18	(a)	2 inches	Rft	20		
BP-19	(b)	3 inches	Rft	30		
BP-20	(c)	4 inches	Rft	30		
BP-21	(d)	6 inches	Rft	5		
BP-22		uPVC Multi Floor Trap (110x75mm) with CP Top Tile strainer; supports; making required number of connections; breaking concrete or masonry work & then making it good; etc.	Each	3		
		Cowl on vent pipes of the following diameter.				
BP-23	(a)	3 inches	Each	2		
BP-24		Construction of Gully Trap Chamber (12" x12" clear) including supply & fixing of 4" deep seal C.I. gully trap, construction of 4-1/2" thick brick masonry in 1:4 c/s mortar, 3" thick 1:4:8 P.C.C at bottom, 1:3:6 P.C.C around trap, (12" x 12") CI cover with frame (15 Kg), 1/2" thick 1:3 c/s plaster on inner face, etc. complete in all respects as shown in drawings or as directed.	Each	2		
BP-25		Dry chemical powder (DCP) Type Fire Extinguisher of 06kg Capacity.	Each	1		
					Total Amount :	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-4

BILL OF QUANTITIES
PLUMBING WORKS

BLOCK-4

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

A. PLUMBING WORKS

SANITARY FIXTURES AND FITTINGS
(Ref. Specs 5100)

BP-01	European water closet with flushing cistern water saving dual flush type (one piece wc), vitreous china, including hydraulic seat & cover, CP tee stop cock, flexible connection etc. complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-02	Vanity type wash hand basin (under counter), vitreous china, including CP lever type hot & cold water mixer, CP 1.25" waste, CP bottle trap with union 1.25", CP Tee stop cocks, flexible connections, jointing and sealing material, etc. Complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-03	CP Lever type Bath shower of open wall installation style of approved make, model & size, jointing and sealing material, fixed to concrete, brick, stone or wood work complete in all respects.	Each.	1		
BP-04	CP Muslim shower combined with double bib cock including all fittings.	Each.	1		
BP-05	CP Bib cock including all fittings for complete installation.	Each.	1		
BP-06	CP Towel Rail 600 mm long, with fixing plugs and screws etc. of approved make fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
BP-07		CP Toilet paper holder of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		
BP-08		CP Soap Dish of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects .	Each	1		
BP-09		Small hook of any size and shape, of approved make, complete with plugs and screws etc., fixed to concrete, brick stone or wood work, complete in all respects.	Each	1		
BP-10		05 mm thick Glass mirror, Belgium make or approved equivalent, including heavy duty mirror mounting clips/studs/screws and all other fittings for complete installation	Sft	10		
BP-11		Electric water heater (fast) of 50Liters capacity heavy duty, including tee stop cocks,flexible steel connections, automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	1		
		WATER SUPPLY PIPES AND FITTINGS (Ref. Specs 5100, 5220)				
		G.I. water pipes conforming to BS-1387/BS EN-10255, Medium Grade, I/c all fittings, wrapping polythene tape, giving anticorrosion treatment, applying protective painting, clamps, hangers & supports, making holes in concrete or masonry and then repairing holes, flushing, disinfecting, testing and commissioning etc. of approved make, of the following diameters, complete in all respects.				
BP-12	(a)	3/4 inch	Rft	10		
BP-13	(b)	01 inch	Rft	5		
		PPR water pipes PN-20 (for water supply), inside building (un-exposed to sunlight conditions) conforming to DIN 8077-78, I/c all fittings (PN-25), clamps, hangers & supports, cutting, jointing, making holes in concrete or masonry and then repairing holes, etc., of approved make of the following diameters.				
BP-14	(a)	25mm	Rft	40		
BP-15	(b)	32mm	Rft	10		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		Brass gate valves, PN-16 conforming to BS standards of approved make or equivalent, including unions and jointing arrangement of pipes on both ends of valves; nuts, bolts etc. complete in all respects, of following diameters.				
BP-16	(a)	3/4 inch	Each	1		
BP-17	(b)	01 inch	Each	1		
		SOIL, WASTE AND VENT PIPES & FITTINGS (Ref. Specs 5100)				
		uPVC Soil, Waste and vent pipes conforming to ISO:3633 type "B" or BS-4514/5255 class "A" of the following diameters, including imported rubber ring/solvent cement fittings, jointing, cutting, clamps, hangers & supports, breaking concrete/masonry and then making it good, core cutting & filling with non shrink grout of approved manufacturer wherever required and applying painting, cleaning and testing etc. complete in all respects.				
BP-18	(a)	2 inches	Rft	10		
BP-19	(b)	3 inches	Rft	15		
BP-20	(c)	4 inches	Rft	15		
BP-21	(d)	6 inches	Rft	5		
BP-22		uPVC Multi Floor Trap (110x75mm) with CP Top Tile strainer; supports; making required number of connections; breaking concrete or masonry work & then making it good; etc.	Each	2		
		Cowl on vent pipes of the following diameter.				
BP-23	(a)	3 inches	Each	1		
BP-24		Construction of Gully Trap Chamber (12" x12" clear) including supply & fixing of 4" deep seal C.I. gully trap, construction of 4-1/2" thick brick masonry in 1:4 c/s mortar, 3" thick 1:4:8 P.C.C at bottom, 1:3:6 P.C.C around trap, (12" x 12") CI cover with frame (15 Kg), 1/2" thick 1:3 c/s plaster on inner face, etc. complete in all respects as shown in drawings or as directed.	Each	1		
BP-25		Dry chemical powder (DCP) Type Fire Extinguisher of 06kg Capacity.	Each	1		
					Total Amount :	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-5

BILL OF QUANTITIES
PLUMBING WORKS

BLOCK-5

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

A. PLUMBING WORKS

SANITARY FIXTURES AND FITTINGS
(Ref. Specs 5100)

BP-01	European water closet with flushing cistern water saving dual flush type (one piece wc), vitreous china, including hydraulic seat & cover, CP tee stop cock, flexible connection etc. complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-02	Vanity type wash hand basin (under counter), vitreous china, including CP lever type hot & cold water mixer, CP 1.25" waste, CP bottle trap with union 1.25", CP Tee stop cocks, flexible connections, jointing and sealing material, etc. Complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-03	CP Lever type Bath shower of open wall installation style of approved make, model & size, jointing and sealing material, fixed to concrete, brick, stone or wood work complete in all respects.	Each.	1		
BP-04	CP Muslim shower combined with double bib cock including all fittings.	Each.	1		
BP-05	CP Bib cock including all fittings for complete installation.	Each.	1		
BP-06	CP Towel Rail 600 mm long, with fixing plugs and screws etc. of approved make fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
BP-07		CP Toilet paper holder of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		
BP-08		CP Soap Dish of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects .	Each	1		
BP-09		Small hook of any size and shape, of approved make, complete with plugs and screws etc., fixed to concrete, brick stone or wood work, complete in all respects.	Each	1		
BP-10		05 mm thick Glass mirror, Belgium make or approved equivalent, including heavy duty mirror mounting clips/studs/screws and all other fittings for complete installation	Sft	10		
BP-11		Electric water heater (fast) of 50Liters capacity heavy duty, including tee stop cocks,flexible steel connections, automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	1		
		WATER SUPPLY PIPES AND FITTINGS (Ref. Specs 5100, 5220)				
		G.I. water pipes conforming to BS-1387/BS EN-10255, Medium Grade, I/c all fittings, wrapping polythene tape, giving anticorrosion treatment, applying protective painting, clamps, hangers & supports, making holes in concrete or masonry and then repairing holes, flushing, disinfecting, testing and commissioning etc. of approved make, of the following diameters, complete in all respects.				
BP-12	(a)	3/4 inch	Rft	10		
BP-13	(b)	01 inch	Rft	5		
		PPR water pipes PN-20 (for water supply), inside building (un-exposed to sunlight conditions) conforming to DIN 8077-78, I/c all fittings (PN-25), clamps, hangers & supports, cutting, jointing, making holes in concrete or masonry and then repairing holes, etc., of approved make of the following diameters.				
BP-14	(a)	25mm	Rft	40		
BP-15	(b)	32mm	Rft	10		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		Brass gate valves, PN-16 conforming to BS standards of approved make or equivalent, including unions and jointing arrangement of pipes on both ends of valves; nuts, bolts etc. complete in all respects, of following diameters.				
BP-16	(a)	3/4 inch	Each	1		
BP-17	(b)	01 inch	Each	1		
		SOIL, WASTE AND VENT PIPES & FITTINGS (Ref. Specs 5100)				
		uPVC Soil, Waste and vent pipes conforming to ISO:3633 type "B" or BS-4514/5255 class "A" of the following diameters, including imported rubber ring/solvent cement fittings, jointing, cutting, clamps, hangers & supports, breaking concrete/masonry and then making it good, core cutting & filling with non shrink grout of approved manufacturer wherever required and applying painting, cleaning and testing etc. complete in all respects.				
BP-18	(a)	2 inches	Rft	10		
BP-19	(b)	3 inches	Rft	15		
BP-20	(c)	4 inches	Rft	15		
BP-21	(d)	6 inches	Rft	5		
BP-22		uPVC Multi Floor Trap (110x75mm) with CP Top Tile strainer; supports; making required number of connections; breaking concrete or masonry work & then making it good; etc.	Each	2		
		Cowl on vent pipes of the following diameter.				
BP-23	(a)	3 inches	Each	1		
BP-24		Construction of Gully Trap Chamber (12" x12" clear) including supply & fixing of 4" deep seal C.I. gully trap, construction of 4-1/2" thick brick masonry in 1:4 c/s mortar, 3" thick 1:4:8 P.C.C at bottom, 1:3:6 P.C.C around trap, (12" x 12") CI cover with frame (15 Kg), 1/2" thick 1:3 c/s plaster on inner face, etc. complete in all respects as shown in drawings or as directed.	Each	1		
BP-25		Dry chemical powder (DCP) Type Fire Extinguisher of 06kg Capacity.	Each	1		
					Total Amount :	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-6

BILL OF QUANTITIES
PLUMBING WORKS

BLOCK-6

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

A. PLUMBING WORKS

SANITARY FIXTURES AND FITTINGS
(Ref. Specs 5100)

BP-01	European water closet with flushing cistern water saving dual flush type (one piece wc), vitreous china, including hydraulic seat & cover, CP tee stop cock, flexible connection etc. complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	2		
BP-02	Vanity type wash hand basin (under counter), vitreous china, including CP lever type hot & cold water mixer, CP 1.25" waste, CP bottle trap with union 1.25", CP Tee stop cocks, flexible connections, jointing and sealing material, etc. Complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	2		
BP-03	CP Lever type Bath shower of open wall installation style of approved make, model & size, jointing and sealing material, fixed to concrete, brick, stone or wood work complete in all respects.	Each.	2		
BP-04	CP Muslim shower combined with double bib cock including all fittings.	Each.	2		
BP-05	CP Bib cock including all fittings for complete installation.	Each.	1		
BP-06	CP Towel Rail 600 mm long, with fixing plugs and screws etc. of approved make fixed to concrete, brick, stone or wood work, complete in all respects.	Each	2		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
BP-07		CP Toilet paper holder of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects.	Each	2		
BP-08		CP Soap Dish of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects .	Each	2		
BP-09		Small hook of any size and shape, of approved make, complete with plugs and screws etc., fixed to concrete, brick stone or wood work, complete in all respects.	Each	2		
BP-10		05 mm thick Glass mirror, Belgium make or approved equivalent, including heavy duty mirror mounting clips/studs/screws and all other fittings for complete installation	Sft	20		
BP-11		Electric water heater (fast) of 50Liters capacity heavy duty, including tee stop cocks,flexible steel connections, automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	2		
		WATER SUPPLY PIPES AND FITTINGS (Ref. Specs 5100, 5220)				
		G.I. water pipes conforming to BS-1387/BS EN-10255, Medium Grade, I/c all fittings, wrapping polythene tape, giving anticorrosion treatment, applying protective painting, clamps, hangers & supports, making holes in concrete or masonry and then repairing holes, flushing, disinfecting, testing and commissioning etc. of approved make, of the following diameters, complete in all respects.				
BP-12	(a)	3/4 inch	Rft	20		
BP-13	(b)	01 inch	Rft	5		
		PPR water pipes PN-20 (for water supply), inside building (un-exposed to sunlight conditions) conforming to DIN 8077-78, I/c all fittings (PN-25), clamps, hangers & supports, cutting, jointing, making holes in concrete or masonry and then repairing holes, etc., of approved make of the following diameters.				
BP-14	(a)	25mm	Rft	70		
BP-15	(b)	32mm	Rft	20		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		Brass gate valves, PN-16 conforming to BS standards of approved make or equivalent, including unions and jointing arrangement of pipes on both ends of valves; nuts, bolts etc. complete in all respects, of following diameters.				
BP-16	(a)	3/4 inch	Each	2		
BP-17	(b)	01 inch	Each	1		
		SOIL, WASTE AND VENT PIPES & FITTINGS (Ref. Specs 5100)				
		uPVC Soil, Waste and vent pipes conforming to ISO:3633 type "B" or BS-4514/5255 class "A" of the following diameters, including imported rubber ring/solvent cement fittings, jointing, cutting, clamps, hangers & supports, breaking concrete/masonry and then making it good, core cutting & filling with non shrink grout of approved manufacturer wherever required and applying painting, cleaning and testing etc. complete in all respects.				
BP-18	(a)	2 inches	Rft	20		
BP-19	(b)	3 inches	Rft	30		
BP-20	(c)	4 inches	Rft	30		
BP-21	(d)	6 inches	Rft	5		
BP-22		uPVC Multi Floor Trap (110x75mm) with CP Top Tile strainer; supports; making required number of connections; breaking concrete or masonry work & then making it good; etc.	Each	3		
		Cowl on vent pipes of the following diameter.				
BP-23	(a)	3 inches	Each	2		
BP-24		Construction of Gully Trap Chamber (12" x12" clear) including supply & fixing of 4" deep seal C.I. gully trap, construction of 4-1/2" thick brick masonry in 1:4 c/s mortar, 3" thick 1:4:8 P.C.C at bottom, 1:3:6 P.C.C around trap, (12" x 12") CI cover with frame (15 Kg), 1/2" thick 1:3 c/s plaster on inner face, etc. complete in all respects as shown in drawings or as directed.	Each	2		
BP-25		Dry chemical powder (DCP) Type Fire Extinguisher of 06kg Capacity.	Each	1		
					Total Amount :	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-7

BILL OF QUANTITIES
PLUMBING WORKS

BLOCK-7

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

A. PLUMBING WORKS

SANITARY FIXTURES AND FITTINGS
(Ref. Specs 5100)

BP-01	European water closet with flushing cistern water saving dual flush type (one piece wc), vitreous china, including hydraulic seat & cover, CP tee stop cock, flexible connection etc. complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	2		
BP-02	Vanity type wash hand basin (under counter), vitreous china, including CP lever type hot & cold water mixer, CP 1.25" waste, CP bottle trap with union 1.25", CP Tee stop cocks, flexible connections, jointing and sealing material, etc. Complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	2		
BP-03	CP Lever type Bath shower of open wall installation style of approved make, model & size, jointing and sealing material, fixed to concrete, brick, stone or wood work complete in all respects.	Each.	2		
BP-04	CP Muslim shower combined with double bib cock including all fittings.	Each.	2		
BP-05	CP Bib cock including all fittings for complete installation.	Each.	1		
BP-06	CP Towel Rail 600 mm long, with fixing plugs and screws etc. of approved make fixed to concrete, brick, stone or wood work, complete in all respects.	Each	2		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
BP-07		CP Toilet paper holder of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects.	Each	2		
BP-08		CP Soap Dish of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects .	Each	2		
BP-09		Small hook of any size and shape, of approved make, complete with plugs and screws etc., fixed to concrete, brick stone or wood work, complete in all respects.	Each	2		
BP-10		05 mm thick Glass mirror, Belgium make or approved equivalent, including heavy duty mirror mounting clips/studs/screws and all other fittings for complete installation	Sft	20		
BP-11		Electric water heater (fast) of 50Liters capacity heavy duty, including tee stop cocks,flexible steel connections, automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	2		
		WATER SUPPLY PIPES AND FITTINGS (Ref. Specs 5100, 5220)				
		G.I. water pipes conforming to BS-1387/BS EN-10255, Medium Grade, I/c all fittings, wrapping polythene tape, giving anticorrosion treatment, applying protective painting, clamps, hangers & supports, making holes in concrete or masonry and then repairing holes, flushing, disinfecting, testing and commissioning etc. of approved make, of the following diameters, complete in all respects.				
BP-12	(a)	3/4 inch	Rft	20		
BP-13	(b)	01 inch	Rft	5		
		PPR water pipes PN-20 (for water supply), inside building (un-exposed to sunlight conditions) conforming to DIN 8077-78, I/c all fittings (PN-25), clamps, hangers & supports, cutting, jointing, making holes in concrete or masonry and then repairing holes, etc., of approved make of the following diameters.				
BP-14	(a)	25mm	Rft	70		
BP-15	(b)	32mm	Rft	20		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		Brass gate valves, PN-16 conforming to BS standards of approved make or equivalent, including unions and jointing arrangement of pipes on both ends of valves; nuts, bolts etc. complete in all respects, of following diameters.				
BP-16	(a)	3/4 inch	Each	2		
BP-17	(b)	01 inch	Each	1		
		SOIL, WASTE AND VENT PIPES & FITTINGS (Ref. Specs 5100)				
		uPVC Soil, Waste and vent pipes conforming to ISO:3633 type "B" or BS-4514/5255 class "A" of the following diameters, including imported rubber ring/solvent cement fittings, jointing, cutting, clamps, hangers & supports, breaking concrete/masonry and then making it good, core cutting & filling with non shrink grout of approved manufacturer wherever required and applying painting, cleaning and testing etc. complete in all respects.				
BP-18	(a)	2 inches	Rft	20		
BP-19	(b)	3 inches	Rft	30		
BP-20	(c)	4 inches	Rft	30		
BP-21	(d)	6 inches	Rft	5		
BP-22		uPVC Multi Floor Trap (110x75mm) with CP Top Tile strainer; supports; making required number of connections; breaking concrete or masonry work & then making it good; etc.	Each	3		
		Cowl on vent pipes of the following diameter.				
BP-23	(a)	3 inches	Each	2		
BP-24		Construction of Gully Trap Chamber (12" x12" clear) including supply & fixing of 4" deep seal C.I. gully trap, construction of 4-1/2" thick brick masonry in 1:4 c/s mortar, 3" thick 1:4:8 P.C.C at bottom, 1:3:6 P.C.C around trap, (12" x 12") CI cover with frame (15 Kg), 1/2" thick 1:3 c/s plaster on inner face, etc. complete in all respects as shown in drawings or as directed.	Each	2		
BP-25		Dry chemical powder (DCP) Type Fire Extinguisher of 06kg Capacity.	Each	1		
					Total Amount :	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-8

BILL OF QUANTITIES
PLUMBING WORKS

BLOCK-8

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

A. PLUMBING WORKS

SANITARY FIXTURES AND FITTINGS
(Ref. Specs 5100)

BP-01	European water closet with flushing cistern water saving dual flush type (one piece wc), vitreous china, including hydraulic seat & cover, CP tee stop cock, flexible connection etc. complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	2		
BP-02	Vanity type wash hand basin (under counter), vitreous china, including CP lever type hot & cold water mixer, CP 1.25" waste, CP bottle trap with union 1.25", CP Tee stop cocks, flexible connections, jointing and sealing material, etc. Complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	2		
BP-03	CP Lever type Bath shower of open wall installation style of approved make, model & size, jointing and sealing material, fixed to concrete, brick, stone or wood work complete in all respects.	Each.	2		
BP-04	CP Muslim shower combined with double bib cock including all fittings.	Each.	2		
BP-05	CP Bib cock including all fittings for complete installation.	Each.	1		
BP-06	CP Towel Rail 600 mm long, with fixing plugs and screws etc. of approved make fixed to concrete, brick, stone or wood work, complete in all respects.	Each	2		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
BP-07		CP Toilet paper holder of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects.	Each	2		
BP-08		CP Soap Dish of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects .	Each	2		
BP-09		Small hook of any size and shape, of approved make, complete with plugs and screws etc., fixed to concrete, brick stone or wood work, complete in all respects.	Each	2		
BP-10		05 mm thick Glass mirror, Belgium make or approved equivalent, including heavy duty mirror mounting clips/studs/screws and all other fittings for complete installation	Sft	20		
BP-11		Electric water heater (fast) of 50Liters capacity heavy duty, including tee stop cocks,flexible steel connections, automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	2		
		WATER SUPPLY PIPES AND FITTINGS (Ref. Specs 5100, 5220)				
		G.I. water pipes conforming to BS-1387/BS EN-10255, Medium Grade, I/c all fittings, wrapping polythene tape, giving anticorrosion treatment, applying protective painting, clamps, hangers & supports, making holes in concrete or masonry and then repairing holes, flushing, disinfecting, testing and commissioning etc. of approved make, of the following diameters, complete in all respects.				
BP-12	(a)	3/4 inch	Rft	20		
BP-13	(b)	01 inch	Rft	5		
		PPR water pipes PN-20 (for water supply), inside building (un-exposed to sunlight conditions) conforming to DIN 8077-78, I/c all fittings (PN-25), clamps, hangers & supports, cutting, jointing, making holes in concrete or masonry and then repairing holes, etc., of approved make of the following diameters.				
BP-14	(a)	25mm	Rft	70		
BP-15	(b)	32mm	Rft	20		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		Brass gate valves, PN-16 conforming to BS standards of approved make or equivalent, including unions and jointing arrangement of pipes on both ends of valves; nuts, bolts etc. complete in all respects, of following diameters.				
BP-16	(a)	3/4 inch	Each	2		
BP-17	(b)	01 inch	Each	1		
		SOIL, WASTE AND VENT PIPES & FITTINGS (Ref. Specs 5100)				
		uPVC Soil, Waste and vent pipes conforming to ISO:3633 type "B" or BS-4514/5255 class "A" of the following diameters, including imported rubber ring/solvent cement fittings, jointing, cutting, clamps, hangers & supports, breaking concrete/masonry and then making it good, core cutting & filling with non shrink grout of approved manufacturer wherever required and applying painting, cleaning and testing etc. complete in all respects.				
BP-18	(a)	2 inches	Rft	20		
BP-19	(b)	3 inches	Rft	30		
BP-20	(c)	4 inches	Rft	30		
BP-21	(d)	6 inches	Rft	5		
BP-22		uPVC Multi Floor Trap (110x75mm) with CP Top Tile strainer; supports; making required number of connections; breaking concrete or masonry work & then making it good; etc.	Each	3		
		Cowl on vent pipes of the following diameter.				
BP-23	(a)	3 inches	Each	2		
BP-24		Construction of Gully Trap Chamber (12" x12" clear) including supply & fixing of 4" deep seal C.I. gully trap, construction of 4-1/2" thick brick masonry in 1:4 c/s mortar, 3" thick 1:4:8 P.C.C at bottom, 1:3:6 P.C.C around trap, (12" x 12") CI cover with frame (15 Kg), 1/2" thick 1:3 c/s plaster on inner face, etc. complete in all respects as shown in drawings or as directed.	Each	2		
BP-25		Dry chemical powder (DCP) Type Fire Extinguisher of 06kg Capacity.	Each	1		
					Total Amount :	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-9

BILL OF QUANTITIES
PLUMBING WORKS

BLOCK-9

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

A. PLUMBING WORKS

SANITARY FIXTURES AND FITTINGS
(Ref. Specs 5100)

BP-01	European water closet with flushing cistern water saving dual flush type (one piece wc), vitreous china, including hydraulic seat & cover, CP tee stop cock, flexible connection etc. complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-02	Vanity type wash hand basin (under counter), vitreous china, including CP lever type hot & cold water mixer, CP 1.25" waste, CP bottle trap with union 1.25", CP Tee stop cocks, flexible connections, jointing and sealing material, etc. Complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-03	CP Lever type Bath shower of open wall installation style of approved make, model & size, jointing and sealing material, fixed to concrete, brick, stone or wood work complete in all respects.	Each.	1		
BP-04	CP Muslim shower combined with double bib cock including all fittings.	Each.	1		
BP-05	CP Bib cock including all fittings for complete installation.	Each.	1		
BP-06	CP Towel Rail 600 mm long, with fixing plugs and screws etc. of approved make fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
BP-07		CP Toilet paper holder of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		
BP-08		CP Soap Dish of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects .	Each	1		
BP-09		Small hook of any size and shape, of approved make, complete with plugs and screws etc., fixed to concrete, brick stone or wood work, complete in all respects.	Each	1		
BP-10		05 mm thick Glass mirror, Belgium make or approved equivalent, including heavy duty mirror mounting clips/studs/screws and all other fittings for complete installation	Sft	10		
BP-11		Electric water heater (fast) of 50Liters capacity heavy duty, including tee stop cocks,flexible steel connections, automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	1		
		WATER SUPPLY PIPES AND FITTINGS (Ref. Specs 5100, 5220)				
		G.I. water pipes conforming to BS-1387/BS EN-10255, Medium Grade, I/c all fittings, wrapping polythene tape, giving anticorrosion treatment, applying protective painting, clamps, hangers & supports, making holes in concrete or masonry and then repairing holes, flushing, disinfecting, testing and commissioning etc. of approved make, of the following diameters, complete in all respects.				
BP-12	(a)	3/4 inch	Rft	10		
BP-13	(b)	01 inch	Rft	5		
		PPR water pipes PN-20 (for water supply), inside building (un-exposed to sunlight conditions) conforming to DIN 8077-78, I/c all fittings (PN-25), clamps, hangers & supports, cutting, jointing, making holes in concrete or masonry and then repairing holes, etc., of approved make of the following diameters.				
BP-14	(a)	25mm	Rft	40		
BP-15	(b)	32mm	Rft	10		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		Brass gate valves, PN-16 conforming to BS standards of approved make or equivalent, including unions and jointing arrangement of pipes on both ends of valves; nuts, bolts etc. complete in all respects, of following diameters.				
BP-16	(a)	3/4 inch	Each	1		
BP-17	(b)	01 inch	Each	1		
		SOIL, WASTE AND VENT PIPES & FITTINGS (Ref. Specs 5100)				
		uPVC Soil, Waste and vent pipes conforming to ISO:3633 type "B" or BS-4514/5255 class "A" of the following diameters, including imported rubber ring/solvent cement fittings, jointing, cutting, clamps, hangers & supports, breaking concrete/masonry and then making it good, core cutting & filling with non shrink grout of approved manufacturer wherever required and applying painting, cleaning and testing etc. complete in all respects.				
BP-18	(a)	2 inches	Rft	10		
BP-19	(b)	3 inches	Rft	15		
BP-20	(c)	4 inches	Rft	15		
BP-21	(d)	6 inches	Rft	5		
BP-22		uPVC Multi Floor Trap (110x75mm) with CP Top Tile strainer; supports; making required number of connections; breaking concrete or masonry work & then making it good; etc.	Each	2		
		Cowl on vent pipes of the following diameter.				
BP-23	(a)	3 inches	Each	1		
BP-24		Construction of Gully Trap Chamber (12" x12" clear) including supply & fixing of 4" deep seal C.I. gully trap, construction of 4-1/2" thick brick masonry in 1:4 c/s mortar, 3" thick 1:4:8 P.C.C at bottom, 1:3:6 P.C.C around trap, (12" x 12") CI cover with frame (15 Kg), 1/2" thick 1:3 c/s plaster on inner face, etc. complete in all respects as shown in drawings or as directed.	Each	1		
BP-25		Dry chemical powder (DCP) Type Fire Extinguisher of 06kg Capacity.	Each	1		
					Total Amount :	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-10

BILL OF QUANTITIES
PLUMBING WORKS

BLOCK-10

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

A. PLUMBING WORKS

SANITARY FIXTURES AND FITTINGS
(Ref. Specs 5100)

BP-01	European water closet with flushing cistern water saving dual flush type (one piece wc), vitreous china, including hydraulic seat & cover, CP tee stop cock, flexible connection etc. complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-02	Vanity type wash hand basin (under counter), vitreous china, including CP lever type hot & cold water mixer, CP 1.25" waste, CP bottle trap with union 1.25", CP Tee stop cocks, flexible connections, jointing and sealing material, etc. Complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-03	CP Lever type Bath shower of open wall installation style of approved make, model & size, jointing and sealing material, fixed to concrete, brick, stone or wood work complete in all respects.	Each.	1		
BP-04	CP Muslim shower combined with double bib cock including all fittings.	Each.	1		
BP-05	CP Bib cock including all fittings for complete installation.	Each.	1		
BP-06	CP Towel Rail 600 mm long, with fixing plugs and screws etc. of approved make fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
BP-07		CP Toilet paper holder of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		
BP-08		CP Soap Dish of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects .	Each	1		
BP-09		Small hook of any size and shape, of approved make, complete with plugs and screws etc., fixed to concrete, brick stone or wood work, complete in all respects.	Each	1		
BP-10		05 mm thick Glass mirror, Belgium make or approved equivalent, including heavy duty mirror mounting clips/studs/screws and all other fittings for complete installation	Sft	10		
BP-11		Electric water heater (fast) of 50Liters capacity heavy duty, including tee stop cocks,flexible steel connections, automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	1		
		WATER SUPPLY PIPES AND FITTINGS (Ref. Specs 5100, 5220)				
		G.I. water pipes conforming to BS-1387/BS EN-10255, Medium Grade, I/c all fittings, wrapping polythene tape, giving anticorrosion treatment, applying protective painting, clamps, hangers & supports, making holes in concrete or masonry and then repairing holes, flushing, disinfecting, testing and commissioning etc. of approved make, of the following diameters, complete in all respects.				
BP-12	(a)	3/4 inch	Rft	10		
BP-13	(b)	01 inch	Rft	5		
		PPR water pipes PN-20 (for water supply), inside building (un-exposed to sunlight conditions) conforming to DIN 8077-78, I/c all fittings (PN-25), clamps, hangers & supports, cutting, jointing, making holes in concrete or masonry and then repairing holes, etc., of approved make of the following diameters.				
BP-14	(a)	25mm	Rft	40		
BP-15	(b)	32mm	Rft	10		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		Brass gate valves, PN-16 conforming to BS standards of approved make or equivalent, including unions and jointing arrangement of pipes on both ends of valves; nuts, bolts etc. complete in all respects, of following diameters.				
BP-16	(a)	3/4 inch	Each	1		
BP-17	(b)	01 inch	Each	1		
		SOIL, WASTE AND VENT PIPES & FITTINGS (Ref. Specs 5100)				
		uPVC Soil, Waste and vent pipes conforming to ISO:3633 type "B" or BS-4514/5255 class "A" of the following diameters, including imported rubber ring/solvent cement fittings, jointing, cutting, clamps, hangers & supports, breaking concrete/masonry and then making it good, core cutting & filling with non shrink grout of approved manufacturer wherever required and applying painting, cleaning and testing etc. complete in all respects.				
BP-18	(a)	2 inches	Rft	10		
BP-19	(b)	3 inches	Rft	15		
BP-20	(c)	4 inches	Rft	15		
BP-21	(d)	6 inches	Rft	5		
BP-22		uPVC Multi Floor Trap (110x75mm) with CP Top Tile strainer; supports; making required number of connections; breaking concrete or masonry work & then making it good; etc.	Each	2		
		Cowl on vent pipes of the following diameter.				
BP-23	(a)	3 inches	Each	1		
BP-24		Construction of Gully Trap Chamber (12" x12" clear) including supply & fixing of 4" deep seal C.I. gully trap, construction of 4-1/2" thick brick masonry in 1:4 c/s mortar, 3" thick 1:4:8 P.C.C at bottom, 1:3:6 P.C.C around trap, (12" x 12") CI cover with frame (15 Kg), 1/2" thick 1:3 c/s plaster on inner face, etc. complete in all respects as shown in drawings or as directed.	Each	1		
BP-25		Dry chemical powder (DCP) Type Fire Extinguisher of 06kg Capacity.	Each	1		
					Total Amount :	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-11

BILL OF QUANTITIES
PLUMBING WORKS

BLOCK-11

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

A. PLUMBING WORKS

SANITARY FIXTURES AND FITTINGS
(Ref. Specs 5100)

BP-01	European water closet with flushing cistern water saving dual flush type (one piece wc), vitreous china, including hydraulic seat & cover, CP tee stop cock, flexible connection etc. complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-02	Vanity type wash hand basin (under counter), vitreous china, including CP lever type hot & cold water mixer, CP 1.25" waste, CP bottle trap with union 1.25", CP Tee stop cocks, flexible connections, jointing and sealing material, etc. Complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-03	CP Lever type Bath shower of open wall installation style of approved make, model & size, jointing and sealing material, fixed to concrete, brick, stone or wood work complete in all respects.	Each.	1		
BP-04	CP Muslim shower combined with double bib cock including all fittings.	Each.	1		
BP-05	CP Bib cock including all fittings for complete installation.	Each.	1		
BP-06	CP Towel Rail 600 mm long, with fixing plugs and screws etc. of approved make fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
BP-07		CP Toilet paper holder of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		
BP-08		CP Soap Dish of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects .	Each	1		
BP-09		Small hook of any size and shape, of approved make, complete with plugs and screws etc., fixed to concrete, brick stone or wood work, complete in all respects.	Each	1		
BP-10		05 mm thick Glass mirror, Belgium make or approved equivalent, including heavy duty mirror mounting clips/studs/screws and all other fittings for complete installation	Sft	10		
BP-11		Electric water heater (fast) of 50Liters capacity heavy duty, including tee stop cocks,flexible steel connections, automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	1		
		WATER SUPPLY PIPES AND FITTINGS (Ref. Specs 5100, 5220)				
		G.I. water pipes conforming to BS-1387/BS EN-10255, Medium Grade, I/c all fittings, wrapping polythene tape, giving anticorrosion treatment, applying protective painting, clamps, hangers & supports, making holes in concrete or masonry and then repairing holes, flushing, disinfecting, testing and commissioning etc. of approved make, of the following diameters, complete in all respects.				
BP-12	(a)	3/4 inch	Rft	10		
BP-13	(b)	01 inch	Rft	5		
		PPR water pipes PN-20 (for water supply), inside building (un-exposed to sunlight conditions) conforming to DIN 8077-78, I/c all fittings (PN-25), clamps, hangers & supports, cutting, jointing, making holes in concrete or masonry and then repairing holes, etc., of approved make of the following diameters.				
BP-14	(a)	25mm	Rft	40		
BP-15	(b)	32mm	Rft	10		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		Brass gate valves, PN-16 conforming to BS standards of approved make or equivalent, including unions and jointing arrangement of pipes on both ends of valves; nuts, bolts etc. complete in all respects, of following diameters.				
BP-16	(a)	3/4 inch	Each	1		
BP-17	(b)	01 inch	Each	1		
		SOIL, WASTE AND VENT PIPES & FITTINGS (Ref. Specs 5100)				
		uPVC Soil, Waste and vent pipes conforming to ISO:3633 type "B" or BS-4514/5255 class "A" of the following diameters, including imported rubber ring/solvent cement fittings, jointing, cutting, clamps, hangers & supports, breaking concrete/masonry and then making it good, core cutting & filling with non shrink grout of approved manufacturer wherever required and applying painting, cleaning and testing etc. complete in all respects.				
BP-18	(a)	2 inches	Rft	10		
BP-19	(b)	3 inches	Rft	15		
BP-20	(c)	4 inches	Rft	15		
BP-21	(d)	6 inches	Rft	5		
BP-22		uPVC Multi Floor Trap (110x75mm) with CP Top Tile strainer; supports; making required number of connections; breaking concrete or masonry work & then making it good; etc.	Each	2		
		Cowl on vent pipes of the following diameter.				
BP-23	(a)	3 inches	Each	1		
BP-24		Construction of Gully Trap Chamber (12" x12" clear) including supply & fixing of 4" deep seal C.I. gully trap, construction of 4-1/2" thick brick masonry in 1:4 c/s mortar, 3" thick 1:4:8 P.C.C at bottom, 1:3:6 P.C.C around trap, (12" x 12") CI cover with frame (15 Kg), 1/2" thick 1:3 c/s plaster on inner face, etc. complete in all respects as shown in drawings or as directed.	Each	1		
BP-25		Dry chemical powder (DCP) Type Fire Extinguisher of 06kg Capacity.	Each	1		
					Total Amount :	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-12

BILL OF QUANTITIES
PLUMBING WORKS

BLOCK-12

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

A. PLUMBING WORKS

SANITARY FIXTURES AND FITTINGS
(Ref. Specs 5100)

BP-01	European water closet with flushing cistern water saving dual flush type (one piece wc), vitreous china, including hydraulic seat & cover, CP tee stop cock, flexible connection etc. complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-02	Vanity type wash hand basin (under counter), vitreous china, including CP lever type hot & cold water mixer, CP 1.25" waste, CP bottle trap with union 1.25", CP Tee stop cocks, flexible connections, jointing and sealing material, etc. Complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-03	CP Lever type Bath shower of open wall installation style of approved make, model & size, jointing and sealing material, fixed to concrete, brick, stone or wood work complete in all respects.	Each.	1		
BP-04	CP Muslim shower combined with double bib cock including all fittings.	Each.	1		
BP-05	CP Bib cock including all fittings for complete installation.	Each.	1		
BP-06	CP Towel Rail 600 mm long, with fixing plugs and screws etc. of approved make fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
BP-07		CP Toilet paper holder of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		
BP-08		CP Soap Dish of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects .	Each	1		
BP-09		Small hook of any size and shape, of approved make, complete with plugs and screws etc., fixed to concrete, brick stone or wood work, complete in all respects.	Each	1		
BP-10		05 mm thick Glass mirror, Belgium make or approved equivalent, including heavy duty mirror mounting clips/studs/screws and all other fittings for complete installation	Sft	10		
BP-11		Electric water heater (fast) of 50Liters capacity heavy duty, including tee stop cocks,flexible steel connections, automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	1		
		WATER SUPPLY PIPES AND FITTINGS (Ref. Specs 5100, 5220)				
		G.I. water pipes conforming to BS-1387/BS EN-10255, Medium Grade, I/c all fittings, wrapping polythene tape, giving anticorrosion treatment, applying protective painting, clamps, hangers & supports, making holes in concrete or masonry and then repairing holes, flushing, disinfecting, testing and commissioning etc. of approved make, of the following diameters, complete in all respects.				
BP-12	(a)	3/4 inch	Rft	10		
BP-13	(b)	01 inch	Rft	5		
		PPR water pipes PN-20 (for water supply), inside building (un-exposed to sunlight conditions) conforming to DIN 8077-78, I/c all fittings (PN-25), clamps, hangers & supports, cutting, jointing, making holes in concrete or masonry and then repairing holes, etc., of approved make of the following diameters.				
BP-14	(a)	25mm	Rft	40		
BP-15	(b)	32mm	Rft	10		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		Brass gate valves, PN-16 conforming to BS standards of approved make or equivalent, including unions and jointing arrangement of pipes on both ends of valves; nuts, bolts etc. complete in all respects, of following diameters.				
BP-16	(a)	3/4 inch	Each	1		
BP-17	(b)	01 inch	Each	1		
		SOIL, WASTE AND VENT PIPES & FITTINGS (Ref. Specs 5100)				
		uPVC Soil, Waste and vent pipes conforming to ISO:3633 type "B" or BS-4514/5255 class "A" of the following diameters, including imported rubber ring/solvent cement fittings, jointing, cutting, clamps, hangers & supports, breaking concrete/masonry and then making it good, core cutting & filling with non shrink grout of approved manufacturer wherever required and applying painting, cleaning and testing etc. complete in all respects.				
BP-18	(a)	2 inches	Rft	10		
BP-19	(b)	3 inches	Rft	15		
BP-20	(c)	4 inches	Rft	15		
BP-21	(d)	6 inches	Rft	5		
BP-22		uPVC Multi Floor Trap (110x75mm) with CP Top Tile strainer; supports; making required number of connections; breaking concrete or masonry work & then making it good; etc.	Each	2		
		Cowl on vent pipes of the following diameter.				
BP-23	(a)	3 inches	Each	1		
BP-24		Construction of Gully Trap Chamber (12" x12" clear) including supply & fixing of 4" deep seal C.I. gully trap, construction of 4-1/2" thick brick masonry in 1:4 c/s mortar, 3" thick 1:4:8 P.C.C at bottom, 1:3:6 P.C.C around trap, (12" x 12") CI cover with frame (15 Kg), 1/2" thick 1:3 c/s plaster on inner face, etc. complete in all respects as shown in drawings or as directed.	Each	1		
BP-25		Dry chemical powder (DCP) Type Fire Extinguisher of 06kg Capacity.	Each	1		
					Total Amount :	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-13

BILL OF QUANTITIES
PLUMBING WORKS

BLOCK-13

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

A. PLUMBING WORKS

SANITARY FIXTURES AND FITTINGS
(Ref. Specs 5100)

BP-01	European water closet with flushing cistern water saving dual flush type (one piece wc), vitreous china, including hydraulic seat & cover, CP tee stop cock, flexible connection etc. complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-02	Vanity type wash hand basin (under counter), vitreous china, including CP lever type hot & cold water mixer, CP 1.25" waste, CP bottle trap with union 1.25", CP Tee stop cocks, flexible connections, jointing and sealing material, etc. Complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-03	CP Lever type Bath shower of open wall installation style of approved make, model & size, jointing and sealing material, fixed to concrete, brick, stone or wood work complete in all respects.	Each.	1		
BP-04	CP Muslim shower combined with double bib cock including all fittings.	Each.	1		
BP-05	CP Bib cock including all fittings for complete installation.	Each.	1		
BP-06	CP Towel Rail 600 mm long, with fixing plugs and screws etc. of approved make fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
BP-07		CP Toilet paper holder of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		
BP-08		CP Soap Dish of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects .	Each	1		
BP-09		Small hook of any size and shape, of approved make, complete with plugs and screws etc., fixed to concrete, brick stone or wood work, complete in all respects.	Each	1		
BP-10		05 mm thick Glass mirror, Belgium make or approved equivalent, including heavy duty mirror mounting clips/studs/screws and all other fittings for complete installation	Sft	10		
BP-11		Electric water heater (fast) of 50Liters capacity heavy duty, including tee stop cocks,flexible steel connections, automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	1		
		WATER SUPPLY PIPES AND FITTINGS (Ref. Specs 5100, 5220)				
		G.I. water pipes conforming to BS-1387/BS EN-10255, Medium Grade, I/c all fittings, wrapping polythene tape, giving anticorrosion treatment, applying protective painting, clamps, hangers & supports, making holes in concrete or masonry and then repairing holes, flushing, disinfecting, testing and commissioning etc. of approved make, of the following diameters, complete in all respects.				
BP-12	(a)	3/4 inch	Rft	10		
BP-13	(b)	01 inch	Rft	5		
		PPR water pipes PN-20 (for water supply), inside building (un-exposed to sunlight conditions) conforming to DIN 8077-78, I/c all fittings (PN-25), clamps, hangers & supports, cutting, jointing, making holes in concrete or masonry and then repairing holes, etc., of approved make of the following diameters.				
BP-14	(a)	25mm	Rft	40		
BP-15	(b)	32mm	Rft	10		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		Brass gate valves, PN-16 conforming to BS standards of approved make or equivalent, including unions and jointing arrangement of pipes on both ends of valves; nuts, bolts etc. complete in all respects, of following diameters.				
BP-16	(a)	3/4 inch	Each	1		
BP-17	(b)	01 inch	Each	1		
		SOIL, WASTE AND VENT PIPES & FITTINGS (Ref. Specs 5100)				
		uPVC Soil, Waste and vent pipes conforming to ISO:3633 type "B" or BS-4514/5255 class "A" of the following diameters, including imported rubber ring/solvent cement fittings, jointing, cutting, clamps, hangers & supports, breaking concrete/masonry and then making it good, core cutting & filling with non shrink grout of approved manufacturer wherever required and applying painting, cleaning and testing etc. complete in all respects.				
BP-18	(a)	2 inches	Rft	10		
BP-19	(b)	3 inches	Rft	15		
BP-20	(c)	4 inches	Rft	15		
BP-21	(d)	6 inches	Rft	5		
BP-22		uPVC Multi Floor Trap (110x75mm) with CP Top Tile strainer; supports; making required number of connections; breaking concrete or masonry work & then making it good; etc.	Each	2		
		Cowl on vent pipes of the following diameter.				
BP-23	(a)	3 inches	Each	1		
BP-24		Construction of Gully Trap Chamber (12" x12" clear) including supply & fixing of 4" deep seal C.I. gully trap, construction of 4-1/2" thick brick masonry in 1:4 c/s mortar, 3" thick 1:4:8 P.C.C at bottom, 1:3:6 P.C.C around trap, (12" x 12") CI cover with frame (15 Kg), 1/2" thick 1:3 c/s plaster on inner face, etc. complete in all respects as shown in drawings or as directed.	Each	1		
BP-25		Dry chemical powder (DCP) Type Fire Extinguisher of 06kg Capacity.	Each	1		
					Total Amount :	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-14

BILL OF QUANTITIES
PLUMBING WORKS

BLOCK-14

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

A. PLUMBING WORKS

SANITARY FIXTURES AND FITTINGS
(Ref. Specs 5100)

BP-01	European water closet with flushing cistern water saving dual flush type (one piece wc), vitreous china, including hydraulic seat & cover, CP tee stop cock, flexible connection etc. complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-02	Vanity type wash hand basin (under counter), vitreous china, including CP lever type hot & cold water mixer, CP 1.25" waste, CP bottle trap with union 1.25", CP Tee stop cocks, flexible connections, jointing and sealing material, etc. Complete in all respects, of approved make, model & size, fixed to concrete, brick or stone work.	Each	1		
BP-04	CP Lever type Bath shower of open wall installation style of approved make, model & size, jointing and sealing material, fixed to concrete, brick, stone or wood work complete in all respects.	Each.	1		
BP-04	Stainless Steel Kitchen sink, single bowl including swan neck CP sink mixer, CP waste 1-1/2" dia., heavy duty MS painted brackets etc., of approved make, model & size complete in all respects, fixed to concrete, brick or stone work.	Each	1		
BP-05	CP Muslim shower combined with double bib cock including all fittings.	Each.	1		
BP-06	CP Bib cock including all fittings for complete installation.	Each.	4		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
BP-07		CP Towel Rail 600 mm long, with fixing plugs and screws etc. of approved make fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		
BP-08		CP Toilet paper holder of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects.	Each	1		
BP-09		CP Soap Dish of any shape, pattern and size, of approved make, complete with plugs, screws etc., fixed to concrete, brick, stone or wood work, complete in all respects .	Each	1		
BP-10		Small hook of any size and shape, of approved make, complete with plugs and screws etc., fixed to concrete, brick stone or wood work, complete in all respects.	Each	1		
BP-11		05 mm thick Glass mirror, Belgium make or approved equivalent, including heavy duty mirror mounting clips/studs/screws and all other fittings for complete installation	Sft	10		
BP-12		Electric water heater (fast) of 50Liters capacity heavy duty, including tee stop cocks,flexible steel connections, automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	2		
BP-13		Twin type (Electric+Gas) water heater of 35 Gallons capacity heavy guage, including gate valves, check valve automatic temperature/ pressure relief valve on outlet and all other accessories for complete installation.	Each.	1		
		<u>WATER SUPPLY PIPES AND FITTINGS</u> (Ref. Specs 5100, 5220) G.I. water pipes conforming to BS-1387/BS EN-10255, Medium Grade, l/c all fittings, wrapping polythene tape, giving anticorrosion treatment, applying protective painting, clamps, hangers & supports, making holes in concrete or masonry and then repairing holes, flushing, disinfecting, testing and commissioning etc. of approved make, of the following diameters, complete in all respects.				
BP-14	(a)	3/4 inch	Rft	30		
BP-15	(b)	01 inch	Rft	5		

ITEM NO.		DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		PPR water pipes PN-20 (for water supply), inside building (un-exposed to sunlight conditions) conforming to DIN 8077-78, I/c all fittings (PN-25), clamps, hangers & supports, cutting, jointing, making holes in concrete or masonry and then repairing holes, etc., of approved make of the following diameters.				
BP-16	(a)	25mm	Rft	100		
BP-17	(b)	32mm	Rft	40		
		Brass gate valves, PN-16 conforming to BS standards of approved make or equivalent, including unions and jointing arrangement of pipes on both ends of valves; nuts, bolts etc. complete in all respects, of following diameters.				
BP-18	(a)	3/4 inch	Each	3		
BP-19	(b)	01 inch	Each	1		
		SOIL, WASTE AND VENT PIPES & FITTINGS (Ref. Specs 5100)				
		uPVC Soil, Waste and vent pipes conforming to ISO:3633 type "B" or BS-4514/5255 class "A" of the following diameters, including imported rubber ring/solvent cement fittings, jointing, cutting, clamps, hangers & supports, breaking concrete/masonry and then making it good, core cutting & filling with non shrink grout of approved manufacturer wherever required and applying painting, cleaning and testing etc. complete in all respects.				
BP-20	(a)	2 inches	Rft	20		
BP-21	(b)	3 inches	Rft	50		
BP-22	(c)	4 inches	Rft	30		
BP-23	(d)	6 inches	Rft	5		
BP-24		uPVC Multi Floor Trap (110x75mm) with CP Top Tile strainer; supports; making required number of connections; breaking concrete or masonry work & then making it good; etc.	Each	4		
		Cowl on vent pipes of the following diameter.				
BP-25	(a)	3 inches	Each	3		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
BP-26	Construction of Gully Trap Chamber (12" x12" clear) including supply & fixing of 4" deep seal C.I. gully trap, construction of 4-1/2" thick brick masonry in 1:4 c/s mortar, 3" thick 1:4:8 P.C.C at bottom, 1:3:6 P.C.C around trap, (12" x 12") CI cover with frame (15 Kg), 1/2" thick 1:3 c/s plaster on inner face, etc. complete in all respects as shown in drawings or as directed.	Each	3		
BP-27	Dry chemical powder (DCP) Type Fire Extinguisher of 06kg Capacity.	Each	1		
				Total Amount :	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 1

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - A **WIRING IN CONCEALED CONDUITS** **Ref. Spec. Sec. No.8001, 8220**				
E -01	Wiring of Circuit from DB to switch with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	2.00		
E -02	Wiring from switch to light or fan point with 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20/25mm PVC Conduit.	Each	21.00		
E -03	Wiring from light point to light point 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	12.00		
E -04	Wiring of Circuit from DB to 13A 3 pin Pin Socket with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	2.00		
E -05	Wiring from 13Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	12.00		
E -06	Wiring of Circuit from DB to Power Socket 15/20 Amps with 2 nos. single core 4 sqmm with 1 nos 2.5sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 25mm PVC Conduit.	Each	5.00		
E -07	Wiring from 15Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	1.00		
	SECTION - B **LT CABLES** **Ref. Spec. Sec. 8001, 8212**				
E -08	4 core 10 sqmm CU/PVC/PVC stranded copper conductor cable, 600/1000 V grade Including Cost of 50 mm PVC conduit with Excavation and back filling.	Rft	100.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -09	1 core 10 sqmm green/yellow PVC insulated stranded copper conductor cable, 450/750V grade in Existing PVC conduit.	Rft	50.00		
	SECTION - C **WIRING ACCESSORIES** **Ref. Spec. Sec. 8001, 8220**				
E -10	10 Amps, 250 Volts one way, 3 gang light control switches including concealed back box.	No.	6.00		
E -11	10 Amps, 250 Volts one way, 2 gang light control switches including concealed back box.	No.	1.00		
E -12	13 Amps universal Socket, 250 Volts 3 pin switch socket unit including concealed back box.	No.	14.00		
E -13	20A DP Switch for Acs 250 Volts including concealed back box.	No.	3.00		
E -14	200 watts Fan speed controller including Saperate concealed back box.	No.	3.00		
E -15	Providing & installing 40 Cm (12") sweep,body Exhaust fan complete with blades	No.	2.00		
	SECTION - D **LIGHT FIXTURES** **Ref. Spec. Sec. No.8001,8150** Supply, installation, testing & commissioning of the following types of light fixtures including low loss electromagnetic ballast, internal wiring complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptibly supplied and installed and as approved by the Engineer.				
E -16	Surface/Recessed Mounted Down lighter Led 12-15 W approved equivalent	No.	20.00		
E -17	Surface/Recessed Mounted Down lighter Led 7-8 W approved equivalent	No.	2.00		
E -18	Hanging Globe Light 15-20w approved equivalent	No.	6.00		
E -19	Bulk Head Light 10-15w or approved equivalent	No.	6.00		
E -20	Mirror Light 600mm 10-12w or approved equivalent	No.	2.00		
	SECTION - E **MISCELLANEOUS ITEMS** **Ref. Spec. Sec. 8001, 8290**				

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -21	Supply, installation, testing & commissioning of 56 inch (1400 mm) dia Ceiling fan. The 56" dia ceiling fan shall be suitable to give an air displacement of minimum 11700 Cu. Ft/min. The ceiling fan shall comprise circular fan body metallic fan blades, down rod of suitable dia and length, AC capacitor, internal wiring, terminals all installation & operational accessories Fan Box as per tender specifications, as per site requirements and as directed by the Engineer.	No.	2.00		
E -22	Supply & Erection of TV socket with Back Box for TV/satellite cable RG 6 complete.	No.	2.00		
	SECTION - F **DISTRIBUTION BOARD ,EARTHING** **Ref. Spec. Sec. 8001, 8290**				
E -23	Following L.T. Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects. 1 no TP MCCB 32A 15ka 6 no SP MCB 10A 10KA 18 no SP MCB 20A 10KA 3 No indication light 3 no Fuse 1 no Volt meter with Selector Switch	Job	1.00		
E -24	Earth electrode for building Earthing system comprise 1/2" dia, 10' long Copper deposited steel rod, including appropriate clamp for clamping of the . The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface.	Job	2.00		
	IP CCTV SYSTEM **(Ref. Spec. Nos. 8001, 8335)**				
E-25	Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects.	Each	2.00		
				Total Amount:	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - 2

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - A **WIRING IN CONCEALED CONDUITS** **Ref. Spec. Sec. No.8001, 8220**				
E -01	Wiring of Circuit from DB to switch with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -02	Wiring from switch to light or fan point with 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20/25mm PVC Conduit.	Each	294.00		
E -03	Wiring from light point to light point 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -04	Wiring of Circuit from DB to 13A 3 pin Pin Socket with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -05	Wiring from 13Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -06	Wiring of Circuit from DB to Power Socket 15/20 Amps with 2 nos. single core 4 sqmm with 1 nos 2.5sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 25mm PVC Conduit.	Each	70.00		
E -07	Wiring from 15Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	14.00		
	SECTION - B **LT CABLES** **Ref. Spec. Sec. 8001, 8212**				
E -08	4 core 10 sqmm CU/PVC/PVC stranded copper conductor cable, 600/1000 V grade Including Cost of 50 mm PVC conduit with Excavation and back filling.	Rft	1,400.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -09	1 core 10 sqmm green/yellow PVC insulated stranded copper conductor cable, 450/750V grade in Existing PVC conduit.	Rft	700.00		
	SECTION - C **WIRING ACCESSORIES** **Ref. Spec. Sec. 8001, 8220**				
E -10	10 Amps, 250 Volts one way, 3 gang light control switches including concealed back box.	No.	84.00		
E -11	10 Amps, 250 Volts one way, 2 gang light control switches including concealed back box.	No.	14.00		
E -12	13 Amps universal Socket, 250 Volts 3 pin switch socket unit including concealed back box.	No.	196.00		
E -13	20A DP Switch for Acs 250 Volts including concealed back box.	No.	42.00		
E -14	200 watts Fan speed controller including Saperate concealed back box.	No.	42.00		
E -15	Providing & installing 40 Cm (12") sweep,body Exhaust fan complete with blades	No.	28.00		
	SECTION - D **LIGHT FIXTURES** **Ref. Spec. Sec. No.8001,8150**				
	Supply, installation, testing & commissioning of the following types of light fixtures including low loss electromagnetic ballast, internal wiring complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptibly supplied and installed and as approved by the Engineer.				
E -16	Surface/Recessed Mounted Down lighter Led 12-15 W approved equivalent	No.	280.00		
E -17	Surface/Recessed Mounted Down lighter Led 7-8 W approved equivalent	No.	28.00		
E -18	Hanging Globe Light 15-20w approved equivalent	No.	84.00		
E -19	Bulk Head Light 10-15w or approved equivalent	No.	84.00		
E -20	Mirror Light 600mm 10-12w or approved equivalent	No.	28.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - E **MISCELLANEOUS ITEMS** **Ref. Spec. Sec. 8001, 8290**				
E -21	Supply, installation, testing & commissioning of 56 inch (1400 mm) dia Ceiling fan. The 56" dia ceiling fan shall be suitable to give an air displacement of minimum 11700 Cu. Ft/min. The ceiling fan shall comprise circular fan body metallic fan blades, down rod of suitable dia and length, AC capacitor, internal wiring, terminals all installation & operational accessories Fan Box as per tender specifications, as per site requirements and as directed by the Engineer.	No.	28.00		
E -22	Supply & Erection of TV socket with Back Box for TV/satellite cable RG 6 complete.	No.	28.00		
	SECTION - F **DISTRIBUTION BOARD ,EARTHING** **Ref. Spec. Sec. 8001, 8290**				
E -23	Following L.T. Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects. 1 no TP MCCB 32A 15ka 6 no SP MCB 10A 10KA 18 no SP MCB 20A 10KA 3 No indication light 3 no Fuse 1 no Volt meter with Selector Switch	Job	14.00		
E -24	Earth electrode for building Earthing system comprise 1/2" dia, 10' long Copper deposited steel rod, including appropriate clamp for clamping of the . The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface.	Job	2.00		
E-25	Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects.	Each	2.00		
				Total Amount:	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 3

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - A **WIRING IN CONCEALED CONDUITS** **Ref. Spec. Sec. No.8001, 8220**				
E -01	Wiring of Circuit from DB to switch with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -02	Wiring from switch to light or fan point with 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20/25mm PVC Conduit.	Each	294.00		
E -03	Wiring from light point to light point 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -04	Wiring of Circuit from DB to 13A 3 pin Pin Socket with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -05	Wiring from 13Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -06	Wiring of Circuit from DB to Power Socket 15/20 Amps with 2 nos. single core 4 sqmm with 1 nos 2.5sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 25mm PVC Conduit.	Each	70.00		
E -07	Wiring from 15Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	14.00		
	SECTION - B **LT CABLES** **Ref. Spec. Sec. 8001, 8212**				
E -08	4 core 10 sqmm CU/PVC/PVC stranded copper conductor cable, 600/1000 V grade Including Cost of 50 mm PVC conduit with Excavation and back filling.	Rft	1,400.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -09	1 core 10 sqmm green/yellow PVC insulated stranded copper conductor cable, 450/750V grade in Existing PVC conduit.	Rft	700.00		
	SECTION - C **WIRING ACCESSORIES** **Ref. Spec. Sec. 8001, 8220**				
E -10	10 Amps, 250 Volts one way, 3 gang light control switches including concealed back box.	No.	84.00		
E -11	10 Amps, 250 Volts one way, 2 gang light control switches including concealed back box.	No.	14.00		
E -12	13 Amps universal Socket, 250 Volts 3 pin switch socket unit including concealed back box.	No.	196.00		
E -13	20A DP Switch for Acs 250 Volts including concealed back box.	No.	42.00		
E -14	200 watts Fan speed controller including Saperate concealed back box.	No.	42.00		
E -15	Providing & installing 40 Cm (12") sweep,body Exhaust fan complete with blades	No.	28.00		
	SECTION - D **LIGHT FIXTURES** **Ref. Spec. Sec. No.8001,8150**				
	Supply, installation, testing & commissioning of the following types of light fixtures including low loss electromagnetic ballast, internal wiring complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptibly supplied and installed and as approved by the Engineer.				
E -16	Surface/Recessed Mounted Down lighter Led 12-15 W approved equivalent	No.	280.00		
E -17	Surface/Recessed Mounted Down lighter Led 7-8 W approved equivalent	No.	28.00		
E -18	Hanging Globe Light 15-20w approved equivalent	No.	84.00		
E -19	Bulk Head Light 10-15w or approved equivalent	No.	84.00		
E -20	Mirror Light 600mm 10-12w or approved equivalent	No.	28.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - E **MISCELLANEOUS ITEMS** **Ref. Spec. Sec. 8001, 8290**				
E -21	Supply, installation, testing & commissioning of 56 inch (1400 mm) dia Ceiling fan. The 56" dia ceiling fan shall be suitable to give an air displacement of minimum 11700 Cu. Ft/min. The ceiling fan shall comprise circular fan body metallic fan blades, down rod of suitable dia and length, AC capacitor, internal wiring, terminals all installation & operational accessories Fan Box as per tender specifications, as per site requirements and as directed by the Engineer.	No.	28.00		
E -22	Supply & Erection of TV socket with Back Box for TV/satellite cable RG 6 complete.	No.	28.00		
	SECTION - F **DISTRIBUTION BOARD ,EARTHING** **Ref. Spec. Sec. 8001, 8290**				
E -23	Following L.T. Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects. 1 no TP MCCB 32A 15ka 6 no SP MCB 10A 10KA 18 no SP MCB 20A 10KA 3 No indication light 3 no Fuse 1 no Volt meter with Selector Switch	Job	14.00		
E -24	Earth electrode for building Earthing system comprise 1/2" dia, 10' long Copper deposited steel rod, including appropriate clamp for clamping of the . The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface.	Job	2.00		
E-25	Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects.	Each	2.00		
				Total Amount:	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 4

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - A **WIRING IN CONCEALED CONDUITS** **Ref. Spec. Sec. No.8001, 8220**				
E -01	Wiring of Circuit from DB to switch with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -02	Wiring from switch to light or fan point with 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20/25mm PVC Conduit.	Each	294.00		
E -03	Wiring from light point to light point 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -04	Wiring of Circuit from DB to 13A 3 pin Pin Socket with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -05	Wiring from 13Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -06	Wiring of Circuit from DB to Power Socket 15/20 Amps with 2 nos. single core 4 sqmm with 1 nos 2.5sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 25mm PVC Conduit.	Each	70.00		
E -07	Wiring from 15Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	14.00		
	SECTION - B **LT CABLES** **Ref. Spec. Sec. 8001, 8212**				
E -08	4 core 10 sqmm CU/PVC/PVC stranded copper conductor cable, 600/1000 V grade Including Cost of 50 mm PVC conduit with Excavation and back filling.	Rft	1,400.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -09	1 core 10 sqmm green/yellow PVC insulated stranded copper conductor cable, 450/750V grade in Existing PVC conduit.	Rft	700.00		
	SECTION - C **WIRING ACCESSORIES** **Ref. Spec. Sec. 8001, 8220**				
E -10	10 Amps, 250 Volts one way, 3 gang light control switches including concealed back box.	No.	84.00		
E -11	10 Amps, 250 Volts one way, 2 gang light control switches including concealed back box.	No.	14.00		
E -12	13 Amps universal Socket, 250 Volts 3 pin switch socket unit including concealed back box.	No.	196.00		
E -13	20A DP Switch for Acs 250 Volts including concealed back box.	No.	42.00		
E -14	200 watts Fan speed controller including Saperate concealed back box.	No.	42.00		
E -15	Providing & installing 40 Cm (12") sweep,body Exhaust fan complete with blades	No.	28.00		
	SECTION - D **LIGHT FIXTURES** **Ref. Spec. Sec. No.8001,8150** Supply, installation, testing & commissioning of the following types of light fixtures including low loss electromagnetic ballast, internal wiring complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptibly supplied and installed and as approved by the Engineer.				
E -16	Surface/Recessed Mounted Down lighter Led 12-15 W approved equivalent	No.	280.00		
E -17	Surface/Recessed Mounted Down lighter Led 7-8 W approved equivalent	No.	28.00		
E -18	Hanging Globe Light 15-20w approved equivalent	No.	84.00		
E -19	Bulk Head Light 10-15w or approved equivalent	No.	84.00		
E -20	Mirror Light 600mm 10-12w or approved equivalent	No.	28.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - E **MISCELLANEOUS ITEMS** **Ref. Spec. Sec. 8001, 8290**				
E -21	Supply, installation, testing & commissioning of 56 inch (1400 mm) dia Ceiling fan. The 56" dia ceiling fan shall be suitable to give an air displacement of minimum 11700 Cu. Ft/min. The ceiling fan shall comprise circular fan body metallic fan blades, down rod of suitable dia and length, AC capacitor, internal wiring, terminals all installation & operational accessories Fan Box as per tender specifications, as per site requirements and as directed by the Engineer.	No.	28.00		
E -22	Supply & Erection of TV socket with Back Box for TV/satellite cable RG 6 complete.	No.	28.00		
	SECTION - F **DISTRIBUTION BOARD ,EARTHING** **Ref. Spec. Sec. 8001, 8290**				
E -23	Following L.T. Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects. 1 no TP MCCB 32A 15ka 6 no SP MCB 10A 10KA 18 no SP MCB 20A 10KA 3 No indication light 3 no Fuse 1 no Volt meter with Selector Switch	Job	14.00		
E -24	Earth electrode for building Earthing system comprise 1/2" dia, 10' long Copper deposited steel rod, including appropriate clamp for clamping of the . The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface.	Job	2.00		
E-25	Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects.	Each	2.00		
				Total Amount:	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 5

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - A **WIRING IN CONCEALED CONDUITS** **Ref. Spec. Sec. No.8001, 8220**				
E -01	Wiring of Circuit from DB to switch with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -02	Wiring from switch to light or fan point with 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20/25mm PVC Conduit.	Each	294.00		
E -03	Wiring from light point to light point 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -04	Wiring of Circuit from DB to 13A 3 pin Pin Socket with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -05	Wiring from 13Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -06	Wiring of Circuit from DB to Power Socket 15/20 Amps with 2 nos. single core 4 sqmm with 1 nos 2.5sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 25mm PVC Conduit.	Each	70.00		
E -07	Wiring from 15Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	14.00		
	SECTION - B **LT CABLES** **Ref. Spec. Sec. 8001, 8212**				
E -08	4 core 10 sqmm CU/PVC/PVC stranded copper conductor cable, 600/1000 V grade Including Cost of 50 mm PVC conduit with Excavation and back filling.	Rft	1,400.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -09	1 core 10 sqmm green/yellow PVC insulated stranded copper conductor cable, 450/750V grade in Existing PVC conduit.	Rft	700.00		
	SECTION - C **WIRING ACCESSORIES** **Ref. Spec. Sec. 8001, 8220**				
E -10	10 Amps, 250 Volts one way, 3 gang light control switches including concealed back box.	No.	84.00		
E -11	10 Amps, 250 Volts one way, 2 gang light control switches including concealed back box.	No.	14.00		
E -12	13 Amps universal Socket, 250 Volts 3 pin switch socket unit including concealed back box.	No.	196.00		
E -13	20A DP Switch for Acs 250 Volts including concealed back box.	No.	42.00		
E -14	200 watts Fan speed controller including Saperate concealed back box.	No.	42.00		
E -15	Providing & installing 40 Cm (12") sweep,body Exhaust fan complete with blades	No.	28.00		
	SECTION - D **LIGHT FIXTURES** **Ref. Spec. Sec. No.8001,8150** Supply, installation, testing & commissioning of the following types of light fixtures including low loss electromagnetic ballast, internal wiring complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptibly supplied and installed and as approved by the Engineer.				
E -16	Surface/Recessed Mounted Down lighter Led 12-15 W approved equivalent	No.	280.00		
E -17	Surface/Recessed Mounted Down lighter Led 7-8 W approved equivalent	No.	28.00		
E -18	Hanging Globe Light 15-20w approved equivalent	No.	84.00		
E -19	Bulk Head Light 10-15w or approved equivalent	No.	84.00		
E -20	Mirror Light 600mm 10-12w or approved equivalent	No.	28.00		
	SECTION - E **MISCELLANEOUS ITEMS**				

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

Ref. Spec. Sec. 8001, 8290

E -21 Supply, installation, testing & commissioning of 56 inch (1400 mm) dia Ceiling fan. The 56" dia ceiling fan shall be suitable to give an air displacement of minimum 11700 Cu. Ft/min. The ceiling fan shall comprise circular fan body metallic fan blades, down rod of suitable dia and length, AC capacitor, internal wiring, terminals all installation & operational accessories Fan Box as per tender specifications, as per site requirements and as directed by the Engineer. — No. — 28.00

E -22 Supply & Erection of TV socket with Back Box for TV/satellite cable RG 6 complete. — No. — 28.00

SECTION - F
DISTRIBUTION BOARD ,EARTHING
Ref. Spec. Sec. 8001, 8290

E -23 Following L.T. Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects.

1 no TP MCCB 32A 15ka
6 no SP MCB 10A 10KA
18 no SP MCB 20A 10KA
3 No indication light
3 no Fuse
1 no Volt meter with Selector Switch — Job — 14.00

E -24 Earth electrode for building Earthing system comprise 1/2" dia, 10' long Copper deposited steel rod, including appropriate clamp for clamping of the . The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface. — Job — 2.00

E-25 Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects. — Each — 2.00

Total Amount:

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 6

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - A **WIRING IN CONCEALED CONDUITS** **Ref. Spec. Sec. No.8001, 8220**				
E -01	Wiring of Circuit from DB to switch with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -02	Wiring from switch to light or fan point with 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20/25mm PVC Conduit.	Each	294.00		
E -03	Wiring from light point to light point 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -04	Wiring of Circuit from DB to 13A 3 pin Pin Socket with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -05	Wiring from 13Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -06	Wiring of Circuit from DB to Power Socket 15/20 Amps with 2 nos. single core 4 sqmm with 1 nos 2.5sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 25mm PVC Conduit.	Each	70.00		
E -07	Wiring from 15Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	14.00		
	SECTION - B **LT CABLES** **Ref. Spec. Sec. 8001, 8212**				
E -08	4 core 10 sqmm CU/PVC/PVC stranded copper conductor cable, 600/1000 V grade Including Cost of 50 mm PVC conduit with Excavation and back filling.	Rft	1,400.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -09	1 core 10 sqmm green/yellow PVC insulated stranded copper conductor cable, 450/750V grade in Existing PVC conduit.	Rft	700.00		
	SECTION - C **WIRING ACCESSORIES** **Ref. Spec. Sec. 8001, 8220**				
E -10	10 Amps, 250 Volts one way, 3 gang light control switches including concealed back box.	No.	84.00		
E -11	10 Amps, 250 Volts one way, 2 gang light control switches including concealed back box.	No.	14.00		
E -12	13 Amps universal Socket, 250 Volts 3 pin switch socket unit including concealed back box.	No.	196.00		
E -13	20A DP Switch for Acs 250 Volts including concealed back box.	No.	42.00		
E -14	200 watts Fan speed controller including Saperate concealed back box.	No.	42.00		
E -15	Providing & installing 40 Cm (12") sweep,body Exhaust fan complete with blades	No.	28.00		
	SECTION - D **LIGHT FIXTURES** **Ref. Spec. Sec. No.8001,8150**				
	Supply, installation, testing & commissioning of the following types of light fixtures including low loss electromagnetic ballast, internal wiring complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptibly supplied and installed and as approved by the Engineer.				
E -16	Surface/Recessed Mounted Down lighter Led 12-15 W approved equivalent	No.	280.00		
E -17	Surface/Recessed Mounted Down lighter Led 7-8 W approved equivalent	No.	28.00		
E -18	Hanging Globe Light 15-20w approved equivalent	No.	84.00		
E -19	Bulk Head Light 10-15w or approved equivalent	No.	84.00		
E -20	Mirror Light 600mm 10-12w or approved equivalent	No.	28.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

SECTION - E
MISCELLANEOUS ITEMS
Ref. Spec. Sec. 8001, 8290

E -21	Supply, installation, testing & commissioning of 56 inch (1400 mm) dia Ceiling fan. The 56" dia ceiling fan shall be suitable to give an air displacement of minimum 11700 Cu. Ft/min. The ceiling fan shall comprise circular fan body metallic fan blades, down rod of suitable dia and length, AC capacitor, internal wiring, terminals all installation & operational accessories Fan Box as per tender specifications, as per site requirements and as directed by the Engineer.	No.	28.00		
E -22	Supply & Erection of TV socket with Back Box for TV/satellite cable RG 6 complete.	No.	28.00		

SECTION - F
DISTRIBUTION BOARD ,EARTHING
Ref. Spec. Sec. 8001, 8290

E -23	Following L.T. Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects. 1 no TP MCCB 32A 15ka 6 no SP MCB 10A 10KA 18 no SP MCB 20A 10KA 3 No indication light 3 no Fuse 1 no Volt meter with Selector Switch	Job	14.00		
E -24	Earth electrode for building Earthing system comprise 1/2" dia, 10' long Copper deposited steel rod, including appropriate clamp for clamping of the . The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface.	Job	2.00		
E-25	Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects.	Each	2.00		
				Total Amount:	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 7

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - A **WIRING IN CONCEALED CONDUITS** **Ref. Spec. Sec. No.8001, 8220**				
E -01	Wiring of Circuit from DB to switch with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -02	Wiring from switch to light or fan point with 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20/25mm PVC Conduit.	Each	294.00		
E -03	Wiring from light point to light point 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -04	Wiring of Circuit from DB to 13A 3 pin Pin Socket with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -05	Wiring from 13Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -06	Wiring of Circuit from DB to Power Socket 15/20 Amps with 2 nos. single core 4 sqmm with 1 nos 2.5sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 25mm PVC Conduit.	Each	70.00		
E -07	Wiring from 15Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	14.00		
	SECTION - B **LT CABLES** **Ref. Spec. Sec. 8001, 8212**				
E -08	4 core 10 sqmm CU/PVC/PVC stranded copper conductor cable, 600/1000 V grade Including Cost of 50 mm PVC conduit with Excavation and back filling.	Rft	1,400.00		

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -09	1 core 10 sqmm green/yellow PVC insulated stranded copper conductor cable, 450/750V grade in Existing PVC conduit.	Rft	700.00		
	SECTION - C **WIRING ACCESSORIES** **Ref. Spec. Sec. 8001, 8220**				
E -10	10 Amps, 250 Volts one way, 3 gang light control switches including concealed back box.	No.	84.00		
E -11	10 Amps, 250 Volts one way, 2 gang light control switches including concealed back box.	No.	14.00		
E -12	13 Amps universal Socket, 250 Volts 3 pin switch socket unit including concealed back box.	No.	196.00		
E -13	20A DP Switch for Acs 250 Volts including concealed back box.	No.	42.00		
E -14	200 watts Fan speed controller including Saperate concealed back box.	No.	42.00		
E -15	Providing & installing 40 Cm (12") sweep,body Exhaust fan complete with blades	No.	28.00		
	SECTION - D **LIGHT FIXTURES** **Ref. Spec. Sec. No.8001,8150**				
	Supply, installation, testing & commissioning of the following types of light fixtures including low loss electromagnetic ballast, internal wiring complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptibly supplied and installed and as approved by the Engineer.				
E -16	Surface/Recessed Mounted Down lighter Led 12-15 W approved equivalent	No.	280.00		
E -17	Surface/Recessed Mounted Down lighter Led 7-8 W approved equivalent	No.	28.00		
E -18	Hanging Globe Light 15-20w approved equivalent	No.	84.00		
E -19	Bulk Head Light 10-15w or approved equivalent	No.	84.00		
E -20	Mirror Light 600mm 10-12w or approved equivalent	No.	28.00		

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - E **MISCELLANEOUS ITEMS** **Ref. Spec. Sec. 8001, 8290**				
E -21	Supply, installation, testing & commissioning of 56 inch (1400 mm) dia Ceiling fan. The 56" dia ceiling fan shall be suitable to give an air displacement of minimum 11700 Cu. Ft/min. The ceiling fan shall comprise circular fan body metallic fan blades, down rod of suitable dia and length, AC capacitor, internal wiring, terminals all installation & operational accessories Fan Box as per tender specifications, as per site requirements and as directed by the Engineer.	No.	28.00		
E -22	Supply & Erection of TV socket with Back Box for TV/satellite cable RG 6 complete.	No.	28.00		
	SECTION - F **DISTRIBUTION BOARD ,EARTHING** **Ref. Spec. Sec. 8001, 8290**				
E -23	Following L.T. Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects. 1 no TP MCCB 32A 15ka 6 no SP MCB 10A 10KA 18 no SP MCB 20A 10KA 3 No indication light 3 no Fuse 1 no Volt meter with Selector Switch	Job	14.00		
E -24	Earth electrode for building Earthing system comprise 1/2" dia, 10' long Copper deposited steel rod, including appropriate clamp for clamping of the . The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface.	Job	2.00		
E-25	Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects.	Each	2.00		
				Total Amount:	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 8

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

SECTION - A
WIRING IN CONCEALED CONDUITS
Ref. Spec. Sec. No.8001, 8220

E -01	Wiring of Circuit from DB to switch with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -02	Wiring from switch to light or fan point with 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20/25mm PVC Conduit.	Each	294.00		
E -03	Wiring from light point to light point 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -04	Wiring of Circuit from DB to 13A 3 pin Pin Socket with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -05	Wiring from 13Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -06	Wiring of Circuit from DB to Power Socket 15/20 Amps with 2 nos. single core 4 sqmm with 1 nos 2.5sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 25mm PVC Conduit.	Each	70.00		
E -07	Wiring from 15Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	14.00		

SECTION - B
LT CABLES
Ref. Spec. Sec. 8001, 8212

E -08	4 core 10 sqmm CU/PVC/PVC stranded copper conductor cable, 600/1000 V grade Including Cost of 50 mm PVC conduit with Excavation and back filling.	Rft	1,400.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -09	1 core 10 sqmm green/yellow PVC insulated stranded copper conductor cable, 450/750V grade in Existing PVC conduit.	Rft	700.00		
	SECTION - C **WIRING ACCESSORIES** **Ref. Spec. Sec. 8001, 8220**				
E -10	10 Amps, 250 Volts one way, 3 gang light control switches including concealed back box.	No.	84.00		
E -11	10 Amps, 250 Volts one way, 2 gang light control switches including concealed back box.	No.	14.00		
E -12	13 Amps universal Socket, 250 Volts 3 pin switch socket unit including concealed back box.	No.	196.00		
E -13	20A DP Switch for Acs 250 Volts including concealed back box.	No.	42.00		
E -14	200 watts Fan speed controller including Saperate concealed back box.	No.	42.00		
E -15	Providing & installing 40 Cm (12") sweep,body Exhaust fan complete with blades	No.	28.00		
	SECTION - D **LIGHT FIXTURES** **Ref. Spec. Sec. No.8001,8150**				
	Supply, installation, testing & commissioning of the following types of light fixtures including low loss electromagnetic ballast, internal wiring complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptibly supplied and installed and as approved by the Engineer.				
E -16	Surface/Recessed Mounted Down lighter Led 12-15 W approved equivalent	No.	280.00		
E -17	Surface/Recessed Mounted Down lighter Led 7-8 W approved equivalent	No.	28.00		
E -18	Hanging Globe Light 15-20w approved equivalent	No.	84.00		
E -19	Bulk Head Light 10-15w or approved equivalent	No.	84.00		
E -20	Mirror Light 600mm 10-12w or approved equivalent	No.	28.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

SECTION - E
MISCELLANEOUS ITEMS
Ref. Spec. Sec. 8001, 8290

E -21	Supply, installation, testing & commissioning of 56 inch (1400 mm) dia Ceiling fan. The 56" dia ceiling fan shall be suitable to give an air displacement of minimum 11700 Cu. Ft/min. The ceiling fan shall comprise circular fan body metallic fan blades, down rod of suitable dia and length, AC capacitor, internal wiring, terminals all installation & operational accessories Fan Box as per tender specifications, as per site requirements and as directed by the Engineer.	No.	28.00		
E -22	Supply & Erection of TV socket with Back Box for TV/satellite cable RG 6 complete.	No.	28.00		

SECTION - F
DISTRIBUTION BOARD ,EARTHING
Ref. Spec. Sec. 8001, 8290

E -23	Following L.T. Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects. 1 no TP MCCB 32A 15ka 6 no SP MCB 10A 10KA 18 no SP MCB 20A 10KA 3 No indication light 3 no Fuse 1 no Volt meter with Selector Switch	Job	14.00		
E -24	Earth electrode for building Earthing system comprise 1/2" dia, 10' long Copper deposited steel rod, including appropriate clamp for clamping of the . The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface.	Job	2.00		
E-25	Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects.	Each	2.00		
				Total Amount:	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 9

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - A **WIRING IN CONCEALED CONDUITS** **Ref. Spec. Sec. No.8001, 8220**				
E -01	Wiring of Circuit from DB to switch with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -02	Wiring from switch to light or fan point with 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20/25mm PVC Conduit.	Each	294.00		
E -03	Wiring from light point to light point 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -04	Wiring of Circuit from DB to 13A 3 pin Pin Socket with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -05	Wiring from 13Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -06	Wiring of Circuit from DB to Power Socket 15/20 Amps with 2 nos. single core 4 sqmm with 1 nos 2.5sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 25mm PVC Conduit.	Each	70.00		
E -07	Wiring from 15Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	14.00		
	SECTION - B **LT CABLES** **Ref. Spec. Sec. 8001, 8212**				
E -08	4 core 10 sqmm CU/PVC/PVC stranded copper conductor cable, 600/1000 V grade Including Cost of 50 mm PVC conduit with Excavation and back filling.	Rft	1,400.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -09	1 core 10 sqmm green/yellow PVC insulated stranded copper conductor cable, 450/750V grade in Existing PVC conduit.	Rft	700.00		
	SECTION - C **WIRING ACCESSORIES** **Ref. Spec. Sec. 8001, 8220**				
E -10	10 Amps, 250 Volts one way, 3 gang light control switches including concealed back box.	No.	84.00		
E -11	10 Amps, 250 Volts one way, 2 gang light control switches including concealed back box.	No.	14.00		
E -12	13 Amps universal Socket, 250 Volts 3 pin switch socket unit including concealed back box.	No.	196.00		
E -13	20A DP Switch for Acs 250 Volts including concealed back box.	No.	42.00		
E -14	200 watts Fan speed controller including Saperate concealed back box.	No.	42.00		
E -15	Providing & installing 40 Cm (12") sweep,body Exhaust fan complete with blades	No.	28.00		
	SECTION - D **LIGHT FIXTURES** **Ref. Spec. Sec. No.8001,8150**				
	Supply, installation, testing & commissioning of the following types of light fixtures including low loss electromagnetic ballast, internal wiring complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptibly supplied and installed and as approved by the Engineer.				
E -16	Surface/Recessed Mounted Down lighter Led 12-15 W approved equivalent	No.	280.00		
E -17	Surface/Recessed Mounted Down lighter Led 7-8 W approved equivalent	No.	28.00		
E -18	Hanging Globe Light 15-20w approved equivalent	No.	84.00		
E -19	Bulk Head Light 10-15w or approved equivalent	No.	84.00		
E -20	Mirror Light 600mm 10-12w or approved equivalent	No.	28.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

SECTION - E
MISCELLANEOUS ITEMS
Ref. Spec. Sec. 8001, 8290

E -21	Supply, installation, testing & commissioning of 56 inch (1400 mm) dia Ceiling fan. The 56" dia ceiling fan shall be suitable to give an air displacement of minimum 11700 Cu. Ft/min. The ceiling fan shall comprise circular fan body metallic fan blades, down rod of suitable dia and length, AC capacitor, internal wiring, terminals all installation & operational accessories Fan Box as per tender specifications, as per site requirements and as directed by the Engineer.	No.	28.00		
E -22	Supply & Erection of TV socket with Back Box for TV/satellite cable RG 6 complete.	No.	28.00		

SECTION - F
DISTRIBUTION BOARD ,EARTHING
Ref. Spec. Sec. 8001, 8290

E -23	Following L.T. Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects. 1 no TP MCCB 32A 15ka 6 no SP MCB 10A 10KA 18 no SP MCB 20A 10KA 3 No indication light 3 no Fuse 1 no Volt meter with Selector Switch	Job	14.00		
E -24	Earth electrode for building Earthing system comprise 1/2" dia, 10' long Copper deposited steel rod, including appropriate clamp for clamping of the . The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface.	Job	2.00		
E-25	Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects.	Each	2.00		
				Total Amount:	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 10

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - A **WIRING IN CONCEALED CONDUITS** **Ref. Spec. Sec. No.8001, 8220**				
E -01	Wiring of Circuit from DB to switch with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -02	Wiring from switch to light or fan point with 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20/25mm PVC Conduit.	Each	294.00		
E -03	Wiring from light point to light point 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -04	Wiring of Circuit from DB to 13A 3 pin Pin Socket with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -05	Wiring from 13Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -06	Wiring of Circuit from DB to Power Socket 15/20 Amps with 2 nos. single core 4 sqmm with 1 nos 2.5sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 25mm PVC Conduit.	Each	70.00		
E -07	Wiring from 15Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	14.00		
	SECTION - B **LT CABLES** **Ref. Spec. Sec. 8001, 8212**				
E -08	4 core 10 sqmm CU/PVC/PVC stranded copper conductor cable, 600/1000 V grade Including Cost of 50 mm PVC conduit with Excavation and back filling.	Rft	1,400.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -09	1 core 10 sqmm green/yellow PVC insulated stranded copper conductor cable, 450/750V grade in Existing PVC conduit.	Rft	700.00		
	SECTION - C **WIRING ACCESSORIES** **Ref. Spec. Sec. 8001, 8220**				
E -10	10 Amps, 250 Volts one way, 3 gang light control switches including concealed back box.	No.	84.00		
E -11	10 Amps, 250 Volts one way, 2 gang light control switches including concealed back box.	No.	14.00		
E -12	13 Amps universal Socket, 250 Volts 3 pin switch socket unit including concealed back box.	No.	196.00		
E -13	20A DP Switch for Acs 250 Volts including concealed back box.	No.	42.00		
E -14	200 watts Fan speed controller including Saperate concealed back box.	No.	42.00		
E -15	Providing & installing 40 Cm (12") sweep,body Exhaust fan complete with blades	No.	28.00		
	SECTION - D **LIGHT FIXTURES** **Ref. Spec. Sec. No.8001,8150**				
	Supply, installation, testing & commissioning of the following types of light fixtures including low loss electromagnetic ballast, internal wiring complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptibly supplied and installed and as approved by the Engineer.				
E -16	Surface/Recessed Mounted Down lighter Led 12-15 W approved equivalent	No.	280.00		
E -17	Surface/Recessed Mounted Down lighter Led 7-8 W approved equivalent	No.	28.00		
E -18	Hanging Globe Light 15-20w approved equivalent	No.	84.00		
E -19	Bulk Head Light 10-15w or approved equivalent	No.	84.00		
E -20	Mirror Light 600mm 10-12w or approved equivalent	No.	28.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - E **MISCELLANEOUS ITEMS** **Ref. Spec. Sec. 8001, 8290**				
E -21	Supply, installation, testing & commissioning of 56 inch (1400 mm) dia Ceiling fan. The 56" dia ceiling fan shall be suitable to give an air displacement of minimum 11700 Cu. Ft/min. The ceiling fan shall comprise circular fan body metallic fan blades, down rod of suitable dia and length, AC capacitor, internal wiring, terminals all installation & operational accessories Fan Box as per tender specifications, as per site requirements and as directed by the Engineer.	No.	28.00		
E -22	Supply & Erection of TV socket with Back Box for TV/satellite cable RG 6 complete.	No.	28.00		
	SECTION - F **DISTRIBUTION BOARD ,EARTHING** **Ref. Spec. Sec. 8001, 8290**				
E -23	Following L.T. Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects. 1 no TP MCCB 32A 15ka 6 no SP MCB 10A 10KA 18 no SP MCB 20A 10KA 3 No indication light 3 no Fuse 1 no Volt meter with Selector Switch	Job	14.00		
E -24	Earth electrode for building Earthing system comprise 1/2" dia, 10' long Copper deposited steel rod, including appropriate clamp for clamping of the . The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface.	Job	2.00		
E-25	Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects.	Each	2.00		
				Total Amount:	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 11

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - A **WIRING IN CONCEALED CONDUITS** **Ref. Spec. Sec. No.8001, 8220**				
E -01	Wiring of Circuit from DB to switch with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -02	Wiring from switch to light or fan point with 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20/25mm PVC Conduit.	Each	294.00		
E -03	Wiring from light point to light point 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -04	Wiring of Circuit from DB to 13A 3 pin Pin Socket with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -05	Wiring from 13Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -06	Wiring of Circuit from DB to Power Socket 15/20 Amps with 2 nos. single core 4 sqmm with 1 nos 2.5sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 25mm PVC Conduit.	Each	70.00		
E -07	Wiring from 15Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	14.00		
	SECTION - B **LT CABLES** **Ref. Spec. Sec. 8001, 8212**				
E -08	4 core 10 sqmm CU/PVC/PVC stranded copper conductor cable, 600/1000 V grade Including Cost of 50 mm PVC conduit with Excavation and back filling.	Rft	1,400.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -09	1 core 10 sqmm green/yellow PVC insulated stranded copper conductor cable, 450/750V grade in Existing PVC conduit.	Rft	700.00		
	SECTION - C **WIRING ACCESSORIES** **Ref. Spec. Sec. 8001, 8220**				
E -10	10 Amps, 250 Volts one way, 3 gang light control switches including concealed back box.	No.	84.00		
E -11	10 Amps, 250 Volts one way, 2 gang light control switches including concealed back box.	No.	14.00		
E -12	13 Amps universal Socket, 250 Volts 3 pin switch socket unit including concealed back box.	No.	196.00		
E -13	20A DP Switch for Acs 250 Volts including concealed back box.	No.	42.00		
E -14	200 watts Fan speed controller including Saperate concealed back box.	No.	42.00		
E -15	Providing & installing 40 Cm (12") sweep,body Exhaust fan complete with blades	No.	28.00		
	SECTION - D **LIGHT FIXTURES** **Ref. Spec. Sec. No.8001,8150**				
	Supply, installation, testing & commissioning of the following types of light fixtures including low loss electromagnetic ballast, internal wiring complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptibly supplied and installed and as approved by the Engineer.				
E -16	Surface/Recessed Mounted Down lighter Led 12-15 W approved equivalent	No.	280.00		
E -17	Surface/Recessed Mounted Down lighter Led 7-8 W approved equivalent	No.	28.00		
E -18	Hanging Globe Light 15-20w approved equivalent	No.	84.00		
E -19	Bulk Head Light 10-15w or approved equivalent	No.	84.00		
E -20	Mirror Light 600mm 10-12w or approved equivalent	No.	28.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

SECTION - E
MISCELLANEOUS ITEMS
Ref. Spec. Sec. 8001, 8290

E -21	Supply, installation, testing & commissioning of 56 inch (1400 mm) dia Ceiling fan. The 56" dia ceiling fan shall be suitable to give an air displacement of minimum 11700 Cu. Ft/min. The ceiling fan shall comprise circular fan body metallic fan blades, down rod of suitable dia and length, AC capacitor, internal wiring, terminals all installation & operational accessories Fan Box as per tender specifications, as per site requirements and as directed by the Engineer.	No.	28.00		
E -22	Supply & Erection of TV socket with Back Box for TV/satellite cable RG 6 complete.	No.	28.00		

SECTION - F
DISTRIBUTION BOARD ,EARTHING
Ref. Spec. Sec. 8001, 8290

E -23	Following L.T. Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects. 1 no TP MCCB 32A 15ka 6 no SP MCB 10A 10KA 18 no SP MCB 20A 10KA 3 No indication light 3 no Fuse 1 no Volt meter with Selector Switch	Job	14.00		
E -24	Earth electrode for building Earthing system comprise 1/2" dia, 10' long Copper deposited steel rod, including appropriate clamp for clamping of the . The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface.	Job	2.00		
E-25	Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects.	Each	2.00		
				Total Amount:	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 12

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - A **WIRING IN CONCEALED CONDUITS** **Ref. Spec. Sec. No.8001, 8220**				
E -01	Wiring of Circuit from DB to switch with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -02	Wiring from switch to light or fan point with 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20/25mm PVC Conduit.	Each	294.00		
E -03	Wiring from light point to light point 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -04	Wiring of Circuit from DB to 13A 3 pin Pin Socket with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -05	Wiring from 13Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -06	Wiring of Circuit from DB to Power Socket 15/20 Amps with 2 nos. single core 4 sqmm with 1 nos 2.5sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 25mm PVC Conduit.	Each	70.00		
E -07	Wiring from 15Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	14.00		
	SECTION - B **LT CABLES** **Ref. Spec. Sec. 8001, 8212**				
E -08	4 core 10 sqmm CU/PVC/PVC stranded copper conductor cable, 600/1000 V grade Including Cost of 50 mm PVC conduit with Excavation and back filling.	Rft	1,400.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -09	1 core 10 sqmm green/yellow PVC insulated stranded copper conductor cable, 450/750V grade in Existing PVC conduit.	Rft	700.00		
	SECTION - C **WIRING ACCESSORIES** **Ref. Spec. Sec. 8001, 8220**				
E -10	10 Amps, 250 Volts one way, 3 gang light control switches including concealed back box.	No.	84.00		
E -11	10 Amps, 250 Volts one way, 2 gang light control switches including concealed back box.	No.	14.00		
E -12	13 Amps universal Socket, 250 Volts 3 pin switch socket unit including concealed back box.	No.	196.00		
E -13	20A DP Switch for Acs 250 Volts including concealed back box.	No.	42.00		
E -14	200 watts Fan speed controller including Saperate concealed back box.	No.	42.00		
E -15	Providing & installing 40 Cm (12") sweep,body Exhaust fan complete with blades	No.	28.00		
	SECTION - D **LIGHT FIXTURES** **Ref. Spec. Sec. No.8001,8150**				
	Supply, installation, testing & commissioning of the following types of light fixtures including low loss electromagnetic ballast, internal wiring complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptibly supplied and installed and as approved by the Engineer.				
E -16	Surface/Recessed Mounted Down lighter Led 12-15 W approved equivalent	No.	280.00		
E -17	Surface/Recessed Mounted Down lighter Led 7-8 W approved equivalent	No.	28.00		
E -18	Hanging Globe Light 15-20w approved equivalent	No.	84.00		
E -19	Bulk Head Light 10-15w or approved equivalent	No.	84.00		
E -20	Mirror Light 600mm 10-12w or approved equivalent	No.	28.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

SECTION - E
MISCELLANEOUS ITEMS
Ref. Spec. Sec. 8001, 8290

E -21	Supply, installation, testing & commissioning of 56 inch (1400 mm) dia Ceiling fan. The 56" dia ceiling fan shall be suitable to give an air displacement of minimum 11700 Cu. Ft/min. The ceiling fan shall comprise circular fan body metallic fan blades, down rod of suitable dia and length, AC capacitor, internal wiring, terminals all installation & operational accessories Fan Box as per tender specifications, as per site requirements and as directed by the Engineer.	No.	28.00		
E -22	Supply & Erection of TV socket with Back Box for TV/satellite cable RG 6 complete.	No.	28.00		

SECTION - F
DISTRIBUTION BOARD ,EARTHING
Ref. Spec. Sec. 8001, 8290

E -23	Following L.T. Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects. 1 no TP MCCB 32A 15ka 6 no SP MCB 10A 10KA 18 no SP MCB 20A 10KA 3 No indication light 3 no Fuse 1 no Volt meter with Selector Switch	Job	14.00		
E -24	Earth electrode for building Earthing system comprise 1/2" dia, 10' long Copper deposited steel rod, including appropriate clamp for clamping of the . The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface.	Job	2.00		
E-25	Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects.	Each	2.00		
				Total Amount:	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 13

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

SECTION - A
WIRING IN CONCEALED CONDUITS
Ref. Spec. Sec. No.8001, 8220

E -01	Wiring of Circuit from DB to switch with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -02	Wiring from switch to light or fan point with 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20/25mm PVC Conduit.	Each	294.00		
E -03	Wiring from light point to light point 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -04	Wiring of Circuit from DB to 13A 3 pin Pin Socket with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -05	Wiring from 13Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -06	Wiring of Circuit from DB to Power Socket 15/20 Amps with 2 nos. single core 4 sqmm with 1 nos 2.5sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 25mm PVC Conduit.	Each	70.00		
E -07	Wiring from 15Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	14.00		

SECTION - B
LT CABLES
Ref. Spec. Sec. 8001, 8212

E -08	4 core 10 sqmm CU/PVC/PVC stranded copper conductor cable, 600/1000 V grade Including Cost of 50 mm PVC conduit with Excavation and back filling.	Rft	1,400.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -09	1 core 10 sqmm green/yellow PVC insulated stranded copper conductor cable, 450/750V grade in Existing PVC conduit.	Rft	700.00		
	SECTION - C **WIRING ACCESSORIES** **Ref. Spec. Sec. 8001, 8220**				
E -10	10 Amps, 250 Volts one way, 3 gang light control switches including concealed back box.	No.	84.00		
E -11	10 Amps, 250 Volts one way, 2 gang light control switches including concealed back box.	No.	14.00		
E -12	13 Amps universal Socket, 250 Volts 3 pin switch socket unit including concealed back box.	No.	196.00		
E -13	20A DP Switch for Acs 250 Volts including concealed back box.	No.	42.00		
E -14	200 watts Fan speed controller including Saperate concealed back box.	No.	42.00		
E -15	Providing & installing 40 Cm (12") sweep,body Exhaust fan complete with blades	No.	28.00		
	SECTION - D **LIGHT FIXTURES** **Ref. Spec. Sec. No.8001,8150** Supply, installation, testing & commissioning of the following types of light fixtures including low loss electromagnetic ballast, internal wiring complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptibly supplied and installed and as approved by the Engineer.				
E -16	Surface/Recessed Mounted Down lighter Led 12-15 W approved equivalent	No.	280.00		
E -17	Surface/Recessed Mounted Down lighter Led 7-8 W approved equivalent	No.	28.00		
E -18	Hanging Globe Light 15-20w approved equivalent	No.	84.00		
E -19	Bulk Head Light 10-15w or approved equivalent	No.	84.00		
E -20	Mirror Light 600mm 10-12w or approved equivalent	No.	28.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)

SECTION - E
MISCELLANEOUS ITEMS
Ref. Spec. Sec. 8001, 8290

E -21	Supply, installation, testing & commissioning of 56 inch (1400 mm) dia Ceiling fan. The 56" dia ceiling fan shall be suitable to give an air displacement of minimum 11700 Cu. Ft/min. The ceiling fan shall comprise circular fan body metallic fan blades, down rod of suitable dia and length, AC capacitor, internal wiring, terminals all installation & operational accessories Fan Box as per tender specifications, as per site requirements and as directed by the Engineer.	No.	28.00		
E -22	Supply & Erection of TV socket with Back Box for TV/satellite cable RG 6 complete.	No.	28.00		

SECTION - F
DISTRIBUTION BOARD ,EARTHING
Ref. Spec. Sec. 8001, 8290

E -23	Following L.T. Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects. 1 no TP MCCB 32A 15ka 6 no SP MCB 10A 10KA 18 no SP MCB 20A 10KA 3 No indication light 3 no Fuse 1 no Volt meter with Selector Switch	Job	14.00		
E -24	Earth electrode for building Earthing system comprise 1/2" dia, 10' long Copper deposited steel rod, including appropriate clamp for clamping of the . The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface.	Job	2.00		
E-25	Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects.	Each	2.00		
				Total Amount:	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK- 14

BILL OF QUANTITIES

ELECTRICAL WORKS

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - A **WIRING IN CONCEALED CONDUITS** **Ref. Spec. Sec. No.8001, 8220**				
E -01	Wiring of Circuit from DB to switch with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -02	Wiring from switch to light or fan point with 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20/25mm PVC Conduit.	Each	294.00		
E -03	Wiring from light point to light point 3 nos. single core 1.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -04	Wiring of Circuit from DB to 13A 3 pin Pin Socket with 3 nos. single core 2.5 sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 20mm PVC Conduit including wiring between Switches .	Each	28.00		
E -05	Wiring from 13Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	168.00		
E -06	Wiring of Circuit from DB to Power Socket 15/20 Amps with 2 nos. single core 4 sqmm with 1 nos 2.5sqmm PVC insulated 450/750 Volts grade solid or stranded copper conductor cables in 25mm PVC Conduit.	Each	70.00		
E -07	Wiring from 15Amps, 3 pin socket to socket with 3 Nos. one core 2.5 sqmm PVC insulated 450/750 volts grade solid or stranded copper conductor cables 20mm PVC Conduit.	Each	14.00		
	SECTION - B **LT CABLES** **Ref. Spec. Sec. 8001, 8212**				
E -08	4 core 10 sqmm CU/PVC/PVC stranded copper conductor cable, 600/1000 V grade Including Cost of 50 mm PVC conduit with Excavation and back filling.	Rft	1,400.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
E -09	1 core 10 sqmm green/yellow PVC insulated stranded copper conductor cable, 450/750V grade in Existing PVC conduit.	Rft	700.00		
	SECTION - C **WIRING ACCESSORIES** **Ref. Spec. Sec. 8001, 8220**				
E -10	10 Amps, 250 Volts one way, 3 gang light control switches including concealed back box.	No.	84.00		
E -11	10 Amps, 250 Volts one way, 2 gang light control switches including concealed back box.	No.	14.00		
E -12	13 Amps universal Socket, 250 Volts 3 pin switch socket unit including concealed back box.	No.	196.00		
E -13	20A DP Switch for Acs 250 Volts including concealed back box.	No.	42.00		
E -14	200 watts Fan speed controller including Saperate concealed back box.	No.	42.00		
E -15	Providing & installing 40 Cm (12") sweep,body Exhaust fan complete with blades	No.	28.00		
	SECTION - D **LIGHT FIXTURES** **Ref. Spec. Sec. No.8001,8150**				
	Supply, installation, testing & commissioning of the following types of light fixtures including low loss electromagnetic ballast, internal wiring complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptibly supplied and installed and as approved by the Engineer.				
E -16	Surface/Recessed Mounted Down lighter Led 12-15 W approved equivalent	No.	280.00		
E -17	Surface/Recessed Mounted Down lighter Led 7-8 W approved equivalent	No.	28.00		
E -18	Hanging Globe Light 15-20w approved equivalent	No.	84.00		
E -19	Bulk Head Light 10-15w or approved equivalent	No.	84.00		
E -20	Mirror Light 600mm 10-12w or approved equivalent	No.	28.00		

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION - E **MISCELLANEOUS ITEMS** **Ref. Spec. Sec. 8001, 8290**				
E -21	Supply, installation, testing & commissioning of 56 inch (1400 mm) dia Ceiling fan. The 56" dia ceiling fan shall be suitable to give an air displacement of minimum 11700 Cu. Ft/min. The ceiling fan shall comprise circular fan body metallic fan blades, down rod of suitable dia and length, AC capacitor, internal wiring, terminals all installation & operational accessories Fan Box as per tender specifications, as per site requirements and as directed by the Engineer.	No.	28.00		
E -22	Supply & Erection of TV socket with Back Box for TV/satellite cable RG 6 complete.	No.	28.00		
	SECTION - F **DISTRIBUTION BOARD ,EARTHING** **Ref. Spec. Sec. 8001, 8290**				
E -23	Following L.T. Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects. 1 no TP MCCB 32A 15ka 6 no SP MCB 10A 10KA 18 no SP MCB 20A 10KA 3 No indication light 3 no Fuse 1 no Volt meter with Selector Switch	Job	14.00		
E -24	Earth electrode for building Earthing system comprise 1/2" dia, 10' long Copper deposited steel rod, including appropriate clamp for clamping of the . The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface.	Job	2.00		
E-25	Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects.	Each	2.00		
				Total Amount:	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

RESIDENTIAL UNIT - BLOCK-1 to 14

BILL OF QUANTITIES

EXTERNAL ELECTRICAL WORKS

ITEM No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	Supply, installation, testing and commissioning of the following items of work (unless specifically stated otherwise) including all material, labour, tools, plant, accessories, related civil works, etc., required for proper completion of each item as per specifications (Section-8001 "General Specifications for Electrical Works" shall be applicable to all BOQ items).				
	PVC CONDUIT & DUCT				
E -01	Supply and fixing 50mm (2") dia pvc conduit with all especial such as bends, sockets, junction etc Fitted on surface as required	P/Rft	500		
E -02	Supply and fixing 30mm (1-1/4") dia pvc conduit with all especial such as bends, sockets, junction etc recessed in the wall or column as required	P/Rft	500		
	CLIPSAL ACCESSORIES ON RESSED METAL BOARD				
E -03	Providing & fixing Polycarbonate flame retardant, 400 watts fan dimmer with plate fixed on die fabricated, powder coated, metal board recessed in the wall or column including connection as required.	Each	4		
	ELECTRIC FANS				
	Ceiling Fan				
E -04	Providing & installing 140 Cm (56") sweep ceiling fan with blades, canopy, standard length of down rod including connection with 14.0076" flexable wire complete as required. (without regulator) Millat/Pak/Asia/Younas/ Climax/Royal.	Each	4		
	Wall Bracket Fan				
E -05	Providing & installing 35 Cm (14") sweep Plastic body Louvre wall bracket fan complete with blades, regulator & moveing grill with motor, fitted on wall or column with GI clip including connection with 14.0076" flexible wire complete as required. Millat / Pak / Asia / Younas / Climax / Royal.	Each	4		

ITEM No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	Fan Clamps				
E -06	Providing & fixing 3"x4"x5" size (14 SWG) thick recessed type fan clamp box with 1/2" dia MS bar fan clamp fixed in roof at casting time as required.	Each.	4		
	Double Action Plastic BodyExhaust Fans				
E -07	Providing & installing 25 Cm (10") sweep Plastic body Louvre wall bracket fan complete with blades, regulator & moveing grill with motor, fitted on wall or column with GI clip including connection with 14.0076" flexible wire complete as required. Millat / Pak / Asia / Younas / Climax / Royal.	Each	2		
	(Sunlight , Piere Light , Future Technology)				
E -08	Supply installation testing & commisioning of recessed / surface mounted Ceiling light/down light including driver having war/ netural white / cool white colour 80-90 lm/ watt effeciency .9 or above power factor , 20000-25000 hours life cycle including connection complete in all respect as approved by the Engineer incharge. (18-20) Watts	Each	20		
	CIVIL WORKS				
	EXCAVATION				
E -09	Excavation in soft soil including lift upto 5ft and filling excavated earth including breaking clods dressing, watering, consolidation and ramming in layers to full compaction i/c disposal of surplus excavated stuff as directed as required.	P/CFT	1,000		
E -10	Excavation in Hard soil including lift up to 5ft and filling excavated earth including ,breaking clods, dressing ,watering, consolidation and ramming: in layers to full compaction l/c disposal of surplus us excavated stuff as directed.	P/CFT	1,000		

ITEM No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	LT UN ARMOURED CABLE IN EXISTING CONDUIT OR CABLE DUCT				
E -11	Providing & laying 2 core, 10 mm², PVC insulated & PVC sheathed, 600/1000 volts grade with stranded copper conductor , un armoured, L.T cable in existing all kind of conduit or cable duct as per Pak. P.W.D specification as required.	P/Rft	4,000		
E -12	Providing & laying 4 core, 50 mm², PVC insulated & PVC sheathed, 600/1000 volts grade with stranded copper conductor , un armoured, L.T cable in existing all kind of conduit or cable duct as per Pak. P.W.D specification as required.	P/Rft	500		
	Pad Mounted Transformer				
E -13	Providing fixing and commisioning in door / pad mounted step down 11000/400 volts three phase 50 hz , transformer as per electricity code complete in all respect as required (200 KVA)	Each	1		
	CABLE PULLING PIT (6'X6'X7')				
E -14	Cable pulling pit (6' X 6' X 7') made of RCC(1:2:4) and RCC cover with MS angle frame for easy pulling of cables including all accessories located as per drawings.	No	2		
E -15	Sealing of conduits after cable pulling with jute & Plaster of Paris as per Engineer's Instructions.	No.	6		
	HT & LT CABLES & SYSTEMS **HT 11 KV CABLE**				
E -16	Supply & Installation of 3 core, 120 mm^2 8.7/15 kV Aluminum conductors, XLPE cable laid in already installed uPVC conduits in already excavated cable trenches as per requirements of the MV distribution system as per WAPDA standards.	Rft	600		
E -17	Supply & Installation of 15kV termination kits suitable for following size 3 core, 120 mm^2 8.7/15 kV Aluminum conductors, XLPE including all accessories, complete in all respects for Transformers	No	5		

ITEM No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	L.T SWITCHBOARDS / **SUB MAIN DISTRIBUTION BOARDS** Ref. Spec. Sec. 8133, 8212, 8240 Following L.T. Switchboard 150Ampere and Submain Distribution Boards, (as per single line diagram shown on the drawing), including all control wiring, foundation, related civil works and all accessories, complete in all respects.				
E -18	DB-EXT-01	Job	2		
E -19	Light Control Panel (LCP) including MCCB, MCB, Panel Photocell timer, MC Outdoor type	Job	1		
	EXTERNAL POLES & LIGHTS Following Epoxy Painted, Hot Dipped Galvanized steel lighting columns, including pole cap, base plate, shim plates, clamps, cable connection box with one mcb for each light fixtures and all other accessories, RCC foundation and all related civil works, numbering, etc. complete in all respects.				
E -20	7 M high column with Double arms.	Nos.	20		
E -21	Rod Type Earth comprising of 12.7mm dia, 3m long Copper deposited steel rod, including appropriate clamp for clamping of the down conductor. The copper deposited steel rod shall be hammered into the ground to the depth of 300mm below the ground surface. The earth electrode includes excavation, backfilling, etc.	Job	20		
	Supply, installation, testing & commissioning of the following types of LED light fixtures including, internal wiring(light to cable termination box) including cable termination box with circuit breaker complete with all mounting accessories as per architectural arrangements/ requirements, dust & moisture protected and corrosion proof and suitable for this area as acceptably supplied and installed as per sample per specifications approved by the Engineer.				
E -22	1m high Decorative led Bollard type light with foundation.	No.	80		
E -23	Decorative gate light fixture	No.	4		
E -24	Decorative Planter Light	No.	20		

ITEM No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	CONDUITS & PIPES **(Ref. Spec. Sec. 8001 8230)**				
E -25	Supply and Installation of 4" dia PVC Class 'D' pipe for Power cables undeground and sealing the space around pipe.	Rft	300.00		
E -26	Supply and Installation of 2" dia PVC Class 'D' pipe for Power cables undeground and sealing the space around pipe.	Rft	1500.00		
	LOW VOLTAGE D.G. SET **Ref. Spec. Sec. 8001, 8111, 8240.**				
E -27	200 kVA, Prime Rating 415 volt D.G. Set skid mounted including control / Instrument Panels, generator Panel, fuel day tank and all accessories along with Sound proof Canopy, locally manufactured for 200 kVA Prime D.G. Set. etc. complete in all respect including factory testing expenditure as mentioned in Clause 13 of Section 8001.	Job.	1.00		
E -28	AMF/ATS panel commissioning of suitable free standing panel for 200 kVA D.G. Set consisting of all controls, mains failure sensing equipment MOR, 40 kA Class II SPDs, Phase Failure/Phase Rotation Relay, monitoring instruments, AMF/ATS Module Card, motorized changeover circuit breakers of suitable rating and rupturing capacity (contactor not acceptable), auto start/stop, auto synchronizing and auto load sharing system, suitable for **200 KVA** generator set, internal wiring, all necessary accessories complete in all respects. In case of failure of WAPDA, ATS should have the provision of shifting the load manually.	Job.	1.00		
E-25	Supply at site, installation, testing & commissioning of Network TDN WDR IR Rugged Dome/Bullet Camera, 1/2.9" CMOS, 4 MP, 2.7-12mm MFZ, 4 High Power LEDs,VARIFOCAL DC IRIS NS, PoE, H.264, microSD, 128 GB max, IP 54 or better,IK 10, built in cyber security feature including mounting bracket, all fixing and mounting accessories, complete in all respects., complete in all respects.	Each	22.00		
				Total Amount:	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

WALKWAYS & JOGGING TRACKS

BILL OF QUANTITIES

ITEM No.	ITEM DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	GENERAL NOTE				
	Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per specifications and as approved by the Engineer.				
	SECTION-A: EARTHWORKS				
A-1	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor. *(respective distance shall be used from the schedule)*				
	1st Km	Km	18,657		
	2nd Km	Km	7,996		
A-2	Earthowrk in ordinary soil for embankments lead upto 100ft. (30 m), including ploughing and mixing with blade grade or disc harrow or other suitable equipment, and compaction by mechanical means at optimum moisture content and dressing to designed section, complete in all respects:-				
	95% to 100% Maximum modified AASHTO dry density	1000 Cft	26,860		
A-3	Earthwork excavation by mechanical means in open cutting upto 5'-0" (1.5 m) depth for storm water channels, drains, sullage drains in open areas, roads, streets, lanes, including under pinning of walls and shoring to protect existing works, shuttering and timbering the trenches, dressed to designed level and dimensions, trimming, removal of surface water from trenches, back filling and surplus excavated material disposed of and dressed within 50 ft. (15 m) lead:-				
	Ordinary	1000 Cft	27,843		
	Gravel & shingle	1000 Cft	11,933		
A-4	Excavation in shingle or gravel formation and rock, not requiring blasting, undressed lead upto 100 ft (30 m)				
	Dry	1000 Cft	11,933		
A-5	Transportation of earth all types when the total distance including the lead covered in the item of work, is more than 1000 ft. (300 m)				
	a) Upto ¼ mile (400 m).	1000 Cft	27,843		

ITEM No.	ITEM DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
A-6	Clearing and Grubbing	1000 Sft	13,430		
A-7	Supplying and filling sand under floor; or plugging in wells	100 Cft	4,133		
A-8	Providing, laying, watering and ramming brick or stone ballast 1½" to 2" (40 mm to 50 mm) gauge mixed with 25% sand, for floor foundation, complete in all respects.	100 Cft	163		
	SECTION-B: CEMENT CONCRETE WORKS				
B-1	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):				
	Ratio 1:2:4	100 Cft	172		
	Ratio 1:4:8	100 Cft	3,358		
B-2	Providing and fixing precast Edge Kerb Stone (6" thick), of 3500 PSI Compressive Strength, embeded in PCC 1:2:4 over lean concrete 1:4:8 etc complete in all respect.				
	a) With Painting (iii) (300 x 150 x 350mm high)	Rft	4,999		
B-3	Providing and laying Tuff pavers, having 7000PSI, crushing strength of approved manufacturer, over 2" to 3" sand cushion i/c grouting with sand in joints i/c finishing to require slope . complete in all respect. (50% Grey / 50% Coloured)				
	c) 80-mm thick	P.Sft	12,791		
	SECTION-C: MISCELLANEOUS WORKS				
C-1	Dismantling cement concrete Plain	100 Cft	131		
C-2	a) Providing and laying base course of crushed stone aggregate of approved quality and grade, and supply and spreading of stone screening, including placing, mixing, spreading and compaction of base course material to required depth, camber and grade to achieve 100% maximum modified AASHO dry density, including carriage of all materials to site of work except gravel and aggregate.	100 Cft	6,715		
			GRAND TOTAL (A+B+C) =		

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

STORM WATER COLLECTION & DISPOSAL WORKS

BILL OF QUANTITIES

ITEM No.	ITEM DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	GENERAL NOTE				
	Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per specifications and as approved by the Engineer.				
	SECTION-A: EARTHWORKS				
A-1	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor. *(respective distance shall be used from the schedule)*				
	1st Km	Km	2,694		
	2nd Km	Km	674		
A-2	Earthwork excavation by mechanical means in open cutting upto 5'-0" (1.5 m) depth for storm water channels, drains, sullage drains in open areas, roads, streets, lanes, including under pinning of walls and shoring to protect existing works, shuttering and timbering the trenches, dressed to designed level and dimensions, trimming, removal of surface water from trenches, back filling and surplus excavated material disposed of and dressed within 50 ft. (15 m) lead:-				
	Ordinary	1000 Cft	7,858		
	Gravel & shingle	1000 Cft	2,245		
A-3	Excavation in shingle or gravel formation and rock, not requiring blasting, undressed lead upto 100 ft (30 m)				
	Dry	1000 Cft	1,123		
A-4	Transportation of earth all types when the total distance including the lead covered in the item of work, is more than 1000 ft. (300 m)				
	a) Upto ¼ mile (400 m).	1000 Cft	7,858		
A-5	Clearing and Grubbing	1000 Sft	2,566		
A-6	Supplying and filling sand under floor; or plugging in wells	100 Cft	0		
A-7	Providing, laying, watering and ramming brick or stone ballast 1½" to 2" (40 mm to 50 mm) gauge mixed with 25% sand, for floor foundation, complete in all respects.	100 Cft	5,132		
				Total (A) =	

ITEM No.	ITEM DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION-B: CEMENT CONCRETE WORKS				
B-1	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):				
	Ratio 1:2:4	100 Cft	428		
	Ratio 1:4:8	100 Cft	748		
B-2	Providing and laying reinforced cement concrete (including prestressed concrete), using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-				
	(a) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in made units. situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-				
	(3) Type C (nominal mix 1: 2: 4)	Cft	1,225		
	(b) Reinforced cement concrete in retaining / shear walls laid insitu or precast laid in position or prestressed members cast insitu.(form work on both sids), complete in all respects:-				
	(3-i) Type C (nominal mix 1: 2: 4) upto 9" thick	Cft	2,041		
	(c) Reinforced cement concrete in Pile cap, slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a-d) above not requiring form work (i.e. horizontal shuttering)				
	(3) Type C (nominal mix 1: 2: 4)	Cft	1,225		
				Total (B) =	
				Grand Total (A+B) =	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

SOAKAGE WELLS

BILL OF QUANTITIES

ITEM No.	ITEM DESCRIPTION	UNIT		QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)		(d)	(e)	(f)
	GENERAL NOTE					
	Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per specifications and as approved by the Engineer.					
	SCHEDULED ITEMS					
	SECTION-A: EARTHWORKS					
A-01	Excavation in shingle or gravel formation and rock, not requiring blasting, undressed lead upto 100 ft (30 m).					
	Wet	1000	Cft	2,038		
A-02	Earth work Excavation in open cutting for water supply pipe lines sewer lines and manholes as shown in drawing incl back filling shuttering of wooden vertical planks struts and beams incl dressing to correct section and dimentions according to template and level and removing of surface water in all type of soil except shingle graval and rock complete with all respects.					
	0 ft to 7.0 ft (0 to 2.10 m) depth	1000	Cft	3,473		
	7-01 ft to 15.0 ft (2.15 to 4.5 m) depth	1000	Cft	2,769		
	above 15.0 ft (4.5 m) depth	1000	Cft	3,462		
A-02	Clearing and Grubbing	1000	Sft	1,600		
A-02	Dry rammed stone ballast, 1½" to 2"(40 mm to 50mm) gauge.	100	Cft	503		
A-02	Supplying and filling sand under floor; or plugging in wells	100	Cft	105		
					Total (A) =	
	SECTION-B: CEMENT CONCRETE, MASONRY & MISC WORKS					
B-01	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					

ITEM No.	ITEM DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	(f) Ratio 1:2:4	100 Cft	13		
	(i) Ratio 1:4:8	100 Cft	58		
B-02	Providing and laying reinforced cement concrete (including prestressed concrete), using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-				
	(a) Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in made units. situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-				
	(3) Type C (nominal mix 1: 2: 4)	Cft	481		
B-03	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):				
	(b-ii) Grade-60	CWT	19.00		
B-04	Pacca brick work in mud mortar other than building upto 20ft (6.1m) height / depth	100 Cft	1,681		
B-05	Providing and laying RCC pipe with cement concrete 1:1/2:3 with spygot coller joint etc incl cost of reinforcement conforming to B.S 5911 PART 1:1981 class L' incl carriage of pipe factory to site lowring in trenches to correct allignment cutting pipe where require complete				
	150 mm (6") i/d	Rft	20		
	225 mm (9:) i/d	Rft	20		
B-06	Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels.	Each	10.00		

ITEM No.	ITEM DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
B-07	Providing and fixing, 6" (150 mm) thick R.C.C. manhole cover with 3"x3"x¼" (75x75x6mm) angle iron frame, 22"(550 mm) i/d as per standard drawing STD/PD No. 7 of 1977, complete in all respects.	Each	3.00		
B-08	Boring in all types of soils from ground level to specific depth for sampling of sub soil strata, collecting soil samples at every 5ft depth packing in polythene bags for review of geotechnical team complete having 6" (150 mm) i/d.	Rft	25		
B-09	Conducting Soil Permeability Test in authorized laboratory with undisturbed samples collected from well site using 1'x1'x1' mould at half and full depths of the well for review of the geotechnical engineer complete.	Job	2		
				SubTotal (B) =	
				Grand Total (A+B) =	
				Total for 02 Nos wells =	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

SANITARY SEWERAGE WORKS

BILL OF QUANTITIES

ITEM No.	ITEM DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	GENERAL NOTE				
	Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per specifications and as approved by the Engineer.				
	SECTION-A: EARTHWORKS				
A-1	Carriage of 100 Cft. (2.83 cu.m) of all materials like stone aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor. *(respective distance shall be used from the schedule)*				
	1st Km	Km	23,863		
	2nd Km	Km	10,227		
A-2	Earth work Excavation in open cutting for water supply pipe lines sewer lines and manholes as shown in drawing incl back filling shuttering of wooden vertical planks struts and beams incl dressing to correct section and dimentions according to template and level and removing of surface water in all type of soil except shingle graval and rock complete with all respects.				
	0 ft to 7.0 ft (0 to 2.10 m) depth	1000 Cft	42,380		
A-3	Excavation in shingle or gravel formation and rock, not requiring blasting, undressed lead upto 100 ft (30 m)				
	Dry	1000 Cft	21,114		
A-4	Transportation of earth all types when the total distance including the lead covered in the item of work, is more than 1000 ft. (300 m)				
	a) Upto ¼ mile (400 m).	1000 Cft	66,238		
A-5	Supplying and filling sand under floor; or plugging in wells	100 Cft	29,706		
A-6	Providing, laying, watering and ramming brick or stone ballast 1½" to 2" (40 mm to 50 mm) gauge mixed with 25% sand, for floor foundation, complete in all respects.	100 Cft	3,000		
				Total (A) =	

ITEM No.	ITEM DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
	SECTION-B: CEMENT CONCRETE & MASONRY WORKS				
B-1	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):				
	Ratio 1:2:4	100 Cft	2,927		
	Ratio 1:4:8	100 Cft	2,000		
	Pacca brick work in foundation and plinth in:-				
	Cement Sand mortar 1:3	100 Cft	4,700		
B-2	Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels.	Each	210		
B-3	Providing and fixing, 6" (150 mm) thick R.C.C. manhole cover with 3"x3"x¼" (75x75x6mm) angle iron frame, 22"(550 mm) i/d as per standard drawing STD/PD No. 7 of 1977, complete in all respects.	Each	50.00		
B-4	Cement plaster 1:3 upto 20' (6.00 m) height:				
	(b) ½" (13 mm) thick	100 Sft	14,500		
B-5	Bitumen coating to plastered or cement concrete surface:				
	iii) 10 lbs. per 100 Sft. (4.54 Kg per Sq.m)	100 Sft	29,200		
				Total (B) =	
				Grand Total (A+B) =	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS

BILL OF QUANTITIES

WATER DISTRIBUTION NETWORK

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)

WATER SUPPLY PIPES

SECTION - A
EARTHWORK, BACK FILLING & SAND FILLING
Specs, Ref # 1100

WS-A-01 Earth work excavation in open cutting for water supply lines, sewers and manholes including backfilling, shuttering of wooden vertical planks, struts and beams, dressing to correct section and dimension according to templates and levels and removing surface water i/c back filling in all types of soil except shingle, gravel and rock, complete in all respect.

By Mechanical Means

0 ft. to 7.0 ft. (0 to 2.10 m) depth

Ordinary soil	1000 Cft		10.06
Hard soil or soft murum	1000 Cft		1.12

WS-A-02 Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m)

Upto ¼ mile (400 m).	1000 Cft		1.12

WS-A-03 Supplying and filling sand under floor; or plugging in wells. 100 Cft 49.08

SECTION - B
HDPE PIPES
Specs, Ref # 5216

WS-B-01 Providing, laying, cutting, jointing, testing and disinfecting High Density Polyethylene Pipe (HDPE-100) working presure pipe conforming to standard ISO 4427, DIN 8074 / 8075, PS 3580, Beta/ Dadex / Popular/ IIL or approved equivalent manufacturer, including the cost of specials, intrenches, as approved & directed by the Engineer incharge, complete in all respects.

PN-8 (SDR-21)

75 mm	Rft		546.00
110 mm	Rft		992.00

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	SLUICE VALVE CHAMBER				
	SECTION - C				
	EARTHWORK & BACK FILLING				
	Specs, Ref # 1100				
WS-C-01	Earth work excavation in open cutting for water supply lines, sewers and manholes including backfilling, shuttering of wooden vertical planks, struts and beams, dressing to correct section and dimension according to templates and levels and removing surface water i/c back filling in all types of soil except shingle, gravel and rock, complete in all respect.				
	By Mechanical Means				
	0 ft. to 7.0 ft. (0 to 2.10 m) depth				
	Ordinary soil	1000 Cft	1.16		
	Hard soil or soft murum	1000 Cft	0.13		
WS-C-02	Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m)				
	Upto ¼ mile (400 m).	1000 Cft	0.13		
	SECTION - D				
	REINFORCEMENT				
	Specs, Ref # 2300				
WS-D-01	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings,including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-				
	Deformed bars (Grade-40)	100 Kg	2.68		
	SECTION - E				
	PLAIN & REINFORCED CEMENT CONCRETE				
	Specs, Ref # 2300				
WS-E-01	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):				
	Ratio 1: 2: 4	100 Cft	1.26		
	Ratio 1: 4: 8	100 Cft	0.27		

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
WS-E-02	Providing and laying reinforced cement concrete (including prestressed concrete), using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-				
	Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all				
	Type C (nominal mix 1: 2: 4)	Cft	74.00		
	SECTION - F **BRICK MASONRY** **Specs, Ref # 4200**				
WS-F-01	Pacca brick work in foundation and plinth in:- Cement, sand mortar:- Ratio 1:3	100 Cft	4.92		
	SECTION - G **PLASTER** **Specs, Ref # 6600**				
WS-G-01	Cement plaster 1:3 upto 20' (6.00 m) height:-				
	½" (13 mm) thick	100 Sft	5.24		
	¾" (20 mm) thick	100 Sft	8.65		
	SECTION - H **SLUICE VALVE** **Specs, Ref # 5216, 5220**				
WS-H-01	Providing and fixing sluice valve of B.S.S. quality and weight, Class `B', for cast iron pipe line, and Asbestos cement pipe line (including cost of				
	3" i/d (75 mm)	Each	6.00		
	4" i/d (110 mm)	Each	3.00		
	SECTION - I **MANHOLE COVER** **Specs, Ref # 5230**				
WS-I-01	Providing and fixing, 6" (150 mm) thick R.C.C. manhole cover with 3"x3"x¼" (75x75x6mm) angle iron frame, 22" (550 mm) i/d as per standard drawing STD/PD No. 7 of 1977, complete in all	Per Set	9.00		

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)

WASHOUT CHAMBER

SECTION - J
EARTHWORK & BACK FILLING
Specs, Ref # 1100

WS-J-01	Earth work excavation in open cutting for water supply lines, sewers and manholes including backfilling, shuttering of wooden vertical planks, struts and beams, dressing to correct section and dimension according to templates and levels and removing surface water i/c back filling in all types of soil except shingle, gravel and rock, complete in all respect.				
	By Mechanical Means				
	0 ft. to 7.0 ft. (0 to 2.10 m) depth				
	Ordinary soil	1000 Cft	0.26		
	Hard soil or soft murum	1000 Cft	0.03		
WS-J-02	Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m)				
	Upto ¼ mile (400 m).	1000 Cft	0.03		

SECTION - K
REINFORCEMENT
Specs, Ref # 2300

WS-K-01	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings,including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-				
	Deformed bars (Grade-40)	100 Kg	0.56		

SECTION - L
PLAIN & REINFORCED CEMENT CONCRETE
Specs, Ref # 2300

WS-L-01	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):				
	Ratio 1: 2: 4	100 Cft	0.28		
	Ratio 1: 4: 8	100 Cft	0.07		

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
WS-L-02	Providing and laying reinforced cement concrete (including prestressed concrete), using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-				
	Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all				
	Type C (nominal mix 1: 2: 4)	Cft	16.00		
	SECTION - M **BRICK MASONRY** **Specs, Ref # 4200**				
WS-M-01	Pacca brick work in foundation and plinth in:- Cement, sand mortar:-				
	Ratio 1:3	100 Cft	1.09		
	SECTION - N **PLASTER** **Specs, Ref # 6600**				
WS-N-01	Cement plaster 1:3 upto 20' (6.00 m) height:-				
	½" (13 mm) thick	100 Sft	1.17		
	¾" (20 mm) thick	100 Sft	1.92		
	SECTION - O **SLUICE VALVE** **Specs, Ref # 5216, 5220**				
WS-O-01	Providing and fixing sluice valve of B.S.S. quality and weight, Class `B', for cast iron pipe line, and Asbestos cement pipe line (including cost of				
	3" i/d (75 mm)	Each	2.00		
	SECTION - P **MANHOLE COVER** **Specs, Ref # 5230**				
WS-P-01	Providing and fixing, 6" (150 mm) thick R.C.C. manhole cover with 3"x3"x¼" (75x75x6mm) angle iron frame, 22" (550 mm) i/d as per standard drawing STD/PD No. 7 of 1977, complete in all	Per Set	2.00		

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	AIR VALVE CHAMBER				
	SECTION - Q **EARTHWORK & BACK FILLING** **Specs, Ref # 1100**				
WS-Q-01	Earth work excavation in open cutting for water supply lines, sewers and manholes including backfilling, shuttering of wooden vertical planks, struts and beams, dressing to correct section and dimension according to templates and levels and removing surface water i/c back filling in all types of soil except shingle, gravel and rock, complete in all respect. By Mechanical Means 0 ft. to 7.0 ft. (0 to 2.10 m) depth				
	Ordinary soil	1000 Cft	0.26		
	Hard soil or soft murum	1000 Cft	0.03		
WS-Q-02	Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m)				
	Upto ¼ mile (400 m).	1000 Cft	0.03		
	SECTION - R **REINFORCEMENT** **Specs, Ref # 2300**				
WS-R-01	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings,including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-				
	Deformed bars (Grade-40)	100 Kg	0.56		
	SECTION - S **PLAIN & REINFORCED CEMENT CONCRETE** **Specs, Ref # 2300**				
WS-S-01	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):				
	Ratio 1: 2: 4	100 Cft	0.28		
	Ratio 1: 4: 8	100 Cft	0.07		

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
WS-S-02	Providing and laying reinforced cement concrete (including prestressed concrete), using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-				
	Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all				
	Type C (nominal mix 1: 2: 4)	Cft	16.00		
	SECTION - T **BRICK MASONRY** **Specs, Ref # 4200**				
WS-T-01	Pacca brick work in foundation and plinth in:- Cement, sand mortar:-				
	Ratio 1:3	100 Cft	1.09		
	SECTION - U **PLASTER** **Specs, Ref # 6600**				
WS-U-01	Cement plaster 1:3 upto 20' (6.00 m) height:-				
	½" (13 mm) thick	100 Sft	1.17		
	¾" (20 mm) thick	100 Sft	1.92		
	SECTION - V **SLUICE VALVE** **Specs, Ref # 5216, 5220**				
WS-V-01	Providing and fixing sluice valve of B.S.S. quality and weight, Class `B', for cast iron pipe line, and Asbestos cement pipe line (including cost of				
	3" i/d (75 mm)	Each	2.00		
	SECTION - W **AIR RELEASE VALVE** **Specs, Ref # 5216**				
WS-W-01	Providing and fixing, air valve 2½ (65mm) dia of B.S.S. quality and weight (complete with jointing material).				
	double	Each	2.00		

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	SECTION - X **MANHOLE COVER** **Specs, Ref # 5230**				
WS-X-01	Providing and fixing, 6" (150 mm) thick R.C.C. manhole cover with 3"x3"x¼" (75x75x6mm) angle iron frame, 22" (550 mm) i/d as per standard drawing STD/PD No. 7 of 1977, complete in all respects	Per Set	2.00		
	PIPE CROSSING UNDER PAVED AREA				
	SECTION - Y **EARTHWORK, BACK FILLING & SAND FILLING** **Specs, Ref # 1100**				
WS-Y-01	Earth work excavation in open cutting for water supply lines, sewers and manholes including backfilling, shuttering of wooden vertical planks, struts and beams, dressing to correct section and dimension according to templates and levels and removing surface water i/c back filling in all types of soil except shingle, gravel and rock, complete in all respect.				
	By Mechanical Means				
	0 ft. to 7.0 ft. (0 to 2.10 m) depth				
	Ordinary soil	1000 Cft	3.29		
	Hard soil or soft murum	1000 Cft	0.37		
WS-Y-02	Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m)				
	Upto ¼ mile (400 m).	1000 Cft	0.37		
WS-Y-03	Supplying and filling sand under floor; or plugging in wells.	100 Cft	14.13		
	SECTION - Z **SUB BASE COURSE** **Specs, Ref # 2320**				
WS-Z-01	Providing and laying sub-base course of stone product of approved quality and grade, including placing, mixing, spreading and compaction of sub-base material to required depth, camber, grade to achieve 100% maximum modified AASHO dry density, including carriage of all material to site of work except gravel and. aggregate.				
	Crushed stone aggregate.	100 Cft	10.61		

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	SECTION - AA **BASE COURSE** **Specs, Ref # 2320**				
WS-AA-01	Providing and laying base course of crushed stone aggregate of approved quality and grade, and supply and spreading of stone screening, including placing, mixing, spreading and compaction of base course material to required depth, camber and grade to achieve 100% maximum modified AASHO dry density, including carriage of all materials to site of work except gravel and aggregate.	100 Cft	8.80		
	SECTION - BB **BITUMENEOUS TACK COAT** **Specs, Ref # 2330**				
WS-BB-01	Providing and laying bituminous tack coat, using 5 lbs. of bitumen per 100 Sft (0.27 Kg of bitumen per sq.m.)	100 Sft	10.61		
	SECTION - CC **ASPHAL CONCRETE WEARING COURSE** **Specs, Ref # 2300, 2330**				
WS-CC-01	Providing and laying conglomerate flooring (two coat work) with top layer of ½"(13mm) thick wearing surface, consisting of one part of cement and 2 parts of stonechips passing 3/16" (6 mm) sieve, over bottom layer of cement concrete 1:3:6, including surface finishing and dividing in panels:-				
	2"(50 mm) thick	100 Sft	10.61		
	THRUST BLOCKS				
	SECTION - DD **PLAIN CEMENT CONCRETE** **Specs, Ref # 2300**				
WS-DD-01	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): Ratio 1: 2: 4	100 Cft	0.21		
				Total Cost ((Rs.) Schedule Items	

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	SECTION - EE **HOUSE/SERVICE CONNECTIONS** **Specs, Ref # 5216**				
WS-EE-01	Providing, laying and Testing House/Service connection, Comprising of saddle clamp of Specified Dia, 25mm Dia male threaded adapter, 25mm Dia equal tee, 25mm Dia HDPE pipe piece with 25mm Dia end cap etc, complete in all respects and as approved by the Engineer. **(Excavation, backfilling and carriage of surplus materials will be paid separately)**				
	75 mm Dia Pipe	No	12.00		
	110 mm Dia Pipe	No	16.00		
				Total Cost ((Rs.) Non Schedule Items	
				Total Cost ((Rs.) Schedule + Non Schedule Items	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS

BILL OF QUANTITIES

OVER HEAD WATER TANK

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)

WATER SUPPLY PIPES

SECTION - A
EARTHWORK, BACK FILLING & SAND FILLING
Specs, Ref # 1100

WT-A-01 Earth work excavation in open cutting for water supply lines, sewers and manholes including backfilling, shuttering of wooden vertical planks, struts and beams, dressing to correct section and dimension according to templates and levels and removing surface water i/c back filling in all types of soil except shingle, gravel and rock, complete in all respect.

By Mechanical Means
0 ft. to 7.0 ft. (0 to 2.10 m) depth
Ordinary soil

1000 Cft 4.27

Hard soil or soft murum

1000 Cft 0.48

WT-A-02 Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m)
Upto ¼ mile (400 m).

1000 Cft 0.48

WT-A-03 Filling, watering and ramming earth under floors:-

With surplus earth from foundation, etc.

1000 Cft 2.44

SECTION - B
REINFORCEMENT
Specs, Ref # 2300

WT-B-01 Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings,including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-

Deformed bars
(Grade-40) 100 Kg 105.70
(Grade-60) 100 Kg 29.63

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	SECTION - C				
	PLAIN, REINFORCED CEMENT CONCRETE & BITUMEN COATING				
	Specs, Ref # 2300, 2330				
WT-C-01	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):				
	Ratio 1: 4: 8	100 Cft	1.70		
WT-C-02	Providing and laying reinforced cement concrete (including prestressed concrete), using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-				
	Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all				
	Type C (nominal mix 1: 2: 4)	Cft	1,291.33		
	Reinforced cement concrete in Pile cap, slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in				
	Type C (nominal mix 1: 2: 4)	Cft	1,558.57		
WT-C-03	Providing and laying bituminous tack coat, using 5 lbs. of bitumen per 100 Sft (0.27 Kg of bitumen per sq.m.)	100 Sft	15.20		
	SECTION - D				
	PVC WATER STOPPER				
	Specs, Ref # 2300				
WT-D-01	Providing and embedding 10"(250mm)wide PVC water stopper in expansion joints of RCC structures (Retaining walls, watertanks, Slabs) complete in all respect.				
	10 mm thick	Rft	79.01		

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	SECTION - E **MANHOLE COVER** **Specs, Ref # 5230**				
WT-E-01	Providing and fixing, 6" (150 mm) thick R.C.C. manhole cover with 3"x3"x¼" (75x75x6mm) angle iron frame, 22" (550 mm) i/d as per standard drawing STD/PD No. 7 of 1977, complete in all	Per Set	1.00		
	SECTION - F **LADDER RUNGS** **Specs, Ref # 3000**				
WT-F-01	Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels.	Each	14.00		
	SECTION - G **MS RAILING** **Specs, Ref # 3000**				
WT-G-01	Providing/fixing stair railing consisting of M.S. Box section size 1-1/2"x3" of 16 SWG welded with M.S. flat 1"x1/8" continuously and welded over M.S. square bars 5/8"x5/8" punched in M.S. flat 2 ¾' high @ 5½" c/c fixed in steps of stair I/C painting 3 coats complete.	Rft	75.00		
	SECTION - H **INTERNAL FLOORING** **Specs, Ref # 6600**				
WT-H-01	Providing and laying ½" thick washed Terrazzo on walls in required colour & shade with one part of cement and marble powder 3:1 and two parts of marble chips, using white cement with additives laid over pre-plastered surface i/c cost of all types of labour, scaffolding, applying at any height in any floor over well cleaned plastered surface i/c preparation and cleaning the surface, complete in all respect, as per specifications, as approved and directed by the Engineer Incharge.	Sft	794.43		

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	SECTION - I **GALVANIZED IRON PIPE** **Specs, Ref # 5216**				
WT-I-01	Providing, laying, cutting, jointing, testing and disinfecting G.I. pipeline in trenches,using G.I. pipes of B.S.S. 1387-1967 complete in all respects, with specials and valves. Medium Quality 4" i/d (100 mm) 4.5mm thick	Rft	155.40		
	SECTION - J **SLUICE VALVE** **Specs, Ref # 5216, 5220**				
WT-J-01	Providing and fixing sluice valve of B.S.S. quality and weight, Class `B', for cast iron pipe line, and Asbestos cement pipe line (including cost of 4" i/d (110 mm)	Each	3.00		
	SECTION - K **MISCELLNEOUS** **Specs, Ref # 3000**				
WT-K-01	Small iron work, such as gusset plates, knees, bends, stirrups, straps, rings, etc. including cutting, drilling, riveting, handling, assembling and fixing; but excluding erection in position.	Kg	0.88		
	SECTION - L **AIR RELEASE VALVE** **Specs, Ref # 5216**				
WT-L-01	Providing and fixing, air valve 2½ (65mm) dia of B.S.S. quality and weight (complete with jointing material). double	Each	1.00		
				Total Cost ((Rs.) Schedule Items	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS

BILL OF QUANTITIES

SEPTIC TANK

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)

SCHEDULED ITEMS

SECTION - A
EARTHWORK & BACK FILLING
Specs, Ref # 1100

ST-A-01 Earth work excavation in open cutting for water supply lines, sewers and manholes including backfilling, shuttering of wooden vertical planks, struts and beams, dressing to correct section and dimension according to templates and levels and removing surface water i/c back filling in all types of soil except shingle, gravel and rock, complete in all respect.
By Mechanical Means
0 ft. to 7.0 ft. (0 to 2.10 m) depth
Ordinary soil — 1000 Cft — 4.44

Hard soil or soft murum — 1000 Cft — 0.49

ST-A-02 Transportation of earth all types when the total distance, including the lead covered in the item of work, is more than 1000 ft. (300 m)
Upto ¼ mile (400 m). — 1000 Cft — 0.49

SECTION - B
REINFORCEMENT
Specs, Ref # 2300

ST-B-01 Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings,including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-

Deformed bars
(Grade-40) — 100 Kg — 27.09

SECTION - C
PLAIN, REINFORCED CEMENT CONCRETE & BITUMEN COATING
Specs, Ref # 2300

ST-C-01 Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):
Ratio 1: 4: 8 — 100 Cft — 1.44

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
ST-C-02	Providing and laying reinforced cement concrete (including prestressed concrete), using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-				
	Reinforced cement concrete in roof slab, beams, columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all				
	Type C (nominal mix 1: 2: 4)	Cft	184.00		
	Reinforced cement concrete in Pile cap, slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in				
	Type C (nominal mix 1: 2: 4)	Cft	966.00		
ST-C-03	Providing and laying bituminous tack coat, using 5 lbs. of bitumen per 100 Sft (0.27 Kg of bitumen per sq.m.)	100 Sft	6.67		
	SECTION - D **PVC WATER STOPPER** **Specs, Ref # 2300**				
ST-D-01	Providing and embedding 10"(250mm)wide PVC water stopper in expansion joints of RCC structures (Retaining walls, watertanks, Slabs) complete in all respect.				
	10 mm thick	Rft	79.09		
	SECTION - E **MANHOLE COVER** **Specs, Ref # 5230**				
ST-E-01	Providing and fixing, 6" (150 mm) thick R.C.C. manhole cover with 3"x3"x¼" (75x75x6mm) angle iron frame, 22" (550 mm) i/d as per standard drawing STD/PD No. 7 of 1977, complete in all	Each	2.00		

S.No	DESCRIPTION	UNIT	QTY	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(c)	(d)	(e)	(f)	(g)
	SECTION - F **LADDER RUNGS** **Specs, Ref # 3000**				
ST-F-01	Providing and fixing 1¼"x1¼"x3/16" (31x31x5 mm) angle iron step, in manhole chambers, including carriage and setting the same in work to correct lines and levels.	Each	5.00		
	SECTION - G **INTERNAL FLOORING** **Specs, Ref # 6600**				
ST-G-01	Providing and laying ½" thick washed Terrazzo on walls in required colour & shade with one part of cement and marble powder 3:1 and two parts of marble chips, using white cement with additives laid over pre-plastered surface i/c cost of all types of labour, scaffolding, applying at any height in any floor over well cleaned plastered surface i/c preparation and cleaning the surface, complete in all respect, as per specifications, as approved and directed by the Engineer Incharge.	Sft	831.60		
	SECTION - H **VENT PIPES** **Specs, Ref # 5216**				
ST-G-01	Providing, fixing, testing and commissioning of µ-PVC (Unplasticized polyvinyl Chloride) Nikasi/ waste pipe Fittings make of Dadex /Popular/Beta or approved equivalent manufacturer, conforming to BS 4514 / BS 5255 including the cost of Solvents complete in all respect as approved and directed by the Engineer Incharge. Vent Cowel 4" dia	Each	2.00		
				TOTAL SCHEDULED ITEMS =	

CONSTRUCTION OF GUEST UNITS - BLOCK 1-14 AT GUN & COUNTRY CLUB, ISLAMABAD

FURNITURE WORKS

BILL OF QUANTITIES

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
1	**Size (inches): 44 W | 80 D | 31 H** Striking appearance with fully upholstered headboard in dark grey jute fabric and contrasting sideboard/footboard. Elegant design featuring dark grey jute fabric, light oak MFC, and grey powder-coated metallic legs for sturdiness. Crafted from high-quality MFC for durability, longevity, and easy maintenance. Floor glides at the base protect floors and ease movemen	**Each**	**14**		
2	**DOUBLE BED** **Bed Size (inches): 74 W | 80 D | 39 H** Fully upholstered headboard in dark grey jute fabric with light oak sideboard and footboard for a chic modern look. A charming combination of dark grey and light oak. Hairpin-designed metallic legs with a grey powder coat give stability and a modern flair. High-quality MFC construction ensures durability and ease of maintenance. Floor glides protect floors from damage while allowing easy movement.	**Each**	**13**		
3	**SINGLE BED Mattress** **Recommended Mattress (inches): 78 W | 42 D | 9.5 H** Premium knitted fabric, plush Polyfil quilting, and resilient THT pocketed springs for balanced comfort and long-lasting support. A high-pressure foam layer adds supportive ease, while deep tack and jump quilting preserves the mattress's shape and refined appearance.	**Each**	**14**		
4	**DOUBLE BED Mattress** **Recommended Mattress (inches): 78 L | 72 W | 9.5 H** Premium knitted fabric, plush Polyfil quilting, and resilient THT pocketed springs for balanced comfort and long-lasting support. A high-pressure foam layer adds supportive ease, while deep tack and jump quilting preserves the mattress's shape and refined appearance.	**Each**	**13**		
5	**Pillow** **Size: 29x19 inches** Pillow combines generous microfiber fill with smooth satin cotton for a luxuriously composed sleep experience. The fine stripe design adds quiet elegance, while its breathable structure ensures balanced support and softness—ideal for all sleep preferences.	**Each**	**80**		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
6	**Bedside Table** Size: 20 W | 17 D | 16 H (Inches) Elegant combination of light oak and charcoal grey finishes adds a modern touch. Sleek metallic handles with a silver chrome finish provide a contemporary accent. Premium MFC construction ensures durability and a sleek appearance. Two spacious drawers offer ample storage for bedside essentials, keeping your space organized. Generous table top allows for easy display of lamps, clocks, or decorative items, adding both style and functionality.	**Each**	**40**		
7	**Barstool** Size: 18 W | 30 D | 43 H (Inches) Seating Height: 32 H (Inches) Fabric covered plywood shell seat for comfort and style. Modern aesthetics with smoke white shell and black stain-finished wooden legs Stainless-steel foot support for added comfort. Versatile uses with kitchen counters or islands, bar-style counters, or even high tables in entertainment rooms, making it ideal for any living space. Durable construction with mahogany wood legs for lasting stability and longevity. Carpet glides on feet ensure smooth movement without scratching floors.	**Each**	**52**		
8	**Sofa Three Seater** Size: 84 W | 30 D | 31 H (Inches) Luxurious fabric / soft polyester fabric upholstery for exquisite comfort. Plush cushioning with super flex foam on the seat and back offers luxurious softness, and a cloud-like comfort and support. Gently slanted tufted backrest and flared armrests for chic and modern appeal. Sturdy structure with high-quality plywood and tapered beech wooden legs with walnut finish. colors to match interior approved by Architect	**Each**	**13**		
9	**Sofa Two Seater** Size: 60.5 W | 30 D | 31 H (Inches) Luxurious fabric / soft polyester fabric upholstery for exquisite comfort. Plush cushioning with super flex foam on the seat and back offers luxurious softness, and a cloud-like comfort and support. Gently slanted tufted backrest and flared armrests for chic and modern appeal. Sturdy structure with high-quality plywood and tapered beech wooden legs with walnut finish. colors to match interior approved by Architect	**Each**	**13**		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
10	**Nest of Tables** Center Table Size (inches): 28 Dia X 16 H Second Table Size (inches): 35 Dia X 12 H Simple and Minimal Design Round metal frame for supporting the top gives it strength and sturdy look. Seamless closing at the top of the leg with M.S sheet gives it a neat and seamless look. Nest of Tables in the place of center table, provides a modern look.	**Each**	**13**		
11	**Cofee Table** Size (inches): 18 Dia. x 18 H Simple and Minimal Design Round metal frame for supporting the top gives it strength and sturdy look. Seamless closing at the top of the leg with M.S sheet gives it a neat and seamless look.	**Each**	**13**		
12	**Lounge Chair** Size: 21 W | 22 D | 35 H (Inches) Material: Velvet (Approved colour) & Leatherette (Black) Legs: Wooden Legs' Finish: Black & Golden Paint Material: Fabric (Greige boucle) & Leatherette (Coffee brown) Legs: Beech Legs' Finish: walnut paint	**Each**	**26**		
13	**Deck Chair rattan style pure plastic with cushion** H 36 x W 22.5 x D 25 (inches)	**Each**	**26**		
14	**Pure Plastic Single Shelf Rattan Table** H 17 x W 35 x D 23.5 (inches)	**Each**	**13**		
15	**40" LED TV**	**Each**	**13**		
16	**Microwave Oven (25 Litres)**	**Each**	**13**		
17	**Room Fridge (Small)**	**Each**	**13**		
18	**Table Lamps**	**Each**	**27**		
19	**Electric Kettle**	**Each**	**13**		
20	**Electric Iron**	**Each**	**4**		
21	**Double Washer**	**Each**	**2**		
22	**Iron Table**	**Each**	**2**		
23	**Washing Dryer**	**Each**	**1**		

Item No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)
24	Oven + Stove (Gas)	Each	2		
25	Fridge (Large)	Each	1		
26	Deep Freezer Full Size	Each	1		
27	Cold Drink Chiller	Each	1		
				Total (Rs.)	