



BIDDING DOCUMENTS

FOR

**CONSTRUCTION OF SOLAR BASED IRRIGATION TUBE WELL &
SOLARIZATION OF EXISTING ELECTRICITY TUBE WELLS IN
MERGED DISTRICTS ON NEED BASIS ADP NO.250066-2026-27**

Package-02, ADP No. 250066 (2026-27). E/Cost: 18.155 (M)

(Single Stage Single Envelope)

Notified vide Notification No. S.R.O (29)/Vol:1-40/2025-26
Dated Peshawar the August 21, 2025

**KHYBER PAKHTUNKHWA PUBLIC PROCUREMENT
REGULATORY AUTHORITY (KP-PPRA)**



**IRRIGATION DEPARTMENT, GOVERNEMENT
OF KHYBER PAKHTUNKHWA**



OFFICE OF THE EXECUTIVE ENGINEER **IRRIGATION DIVISION DISTRICT ORAKZAI**

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GOVERNMENT OF KHYBER PAKHTUNKHWA **IRRIGATION DIVISION DISTRICT ORAKZAI** **NOTICE INVITING E-BIDDING (SINGLE STAGE SINGLE ENVELOPE) EPAD SYSTEM**

Irrigation Department, Government of Khyber Pakhtunkhwa, Orakzai Irrigation Division invites (Electronic Bids) on EPAD System Single Stage Single Envelope procedure for the following works from the eligible firms /contractors who have renewed their enlistment and PEC license in relevant category for the year 2026-27, registered with the Khyber Pakhtunkhwa Revenue Authority (KPRA) and active tax payer list of Income Tax Department.

S#	Name of Work/Sub Work.	E/Cost (Rs. In M)	2% E/Money + Stamp Duty (in Rs)	Cost Tender Form Fee @0.03% (in Rs)	Category / PEC Relevant Code
A	CONSTRUCTION OF SOLAR BASED IRRIGATION TUBE WELL & SOLARIZATION OF EXISTING ELECTRICITY TUBE WELLS IN MERGED DISTRICTS ON NEED BASIS ADP NO.250066-2026-27				
1	Package-01, ADP No. 250066(2026-27).	29.309	626180	8793	C5 & above (CE-04, EE-11)
2	Package-02, ADP No. 250066(2026-27).	18.155	403100	5446	C6 & above (CE-04, EE-11)

TERMS AND CONDITIONS

1. Last date & time for submission of Bids is 08-09-2026 at 12:00 (Noon) and will be opened on the same day at 12:30 PM.
2. Bidding Solicitation Documents alongwith the bidding criteria and instruction to bidders and Terms & Conditions can be downloaded from official EPADS website and Irrigation Department website (www.irrigation.gkp.pk) as well as KPPRA website (kppra.gov.pk).
3. Original Call Deposit from schedule bank, attested copy of PEC registration, CNIC, NTN, and KPPRA Registration must be submitted in sealed envelope by post/courier/representative so as to reach to the office of undersigned on or before the fixed date and time as mentioned above.
4. For Additional Security in case of abnormally low bids KAPRA Notification S.R.O (14)/Vol:1- 24/2021-22, Dated: 10-05-2022 shall be enforced.
5. Pre-bid meeting will be held on 27-08-2026 at 11:30 AM in the office of the undersigned.
6. If the evaluated electronic bid costs of two or more than two bidders are equal, then the successful bid will be declared through draw.
7. Bid will be valid for 90 Days.
8. As per KPPRA Notification No. S.R.O (29)/Vol:1-40/2025-26/699-711, dated: 29.10.2025, all conditions of the notification regarding debarred and blacklisting would be applicable.
9. All the prevailing KPPRA rules / Act and other Govt: notifications issued from time to time shall be applicable.
10. Bid shall be accompanied with 0.03% of Estimated Cost as tender entry fee in a shape of separate CDR which is non-refundable. Non submission would lead to bid rejection.

EXECUTIVE ENGINEER
IRRIGATION DIVISION
DISTRICT ORAKZAI
(PHONE No.0925-690184)

P R E F A C E

The Khyber Pakhtunkhwa Standard Bidding Documents (KP-SBDs) have prepared, intended to be used by Procuring Entities as defined in the KP Procurement Rules, 2014, and other users according to their requirements. document is envisaged for National Competitive Bidding (NCB), and Competitive Bidding (ICB), meant for Small Works up to Rs. Million (constructors registered with PEC and the Procuring Entity having work capacity / of construction cost up to Rs. 100 Million), and may be tailored according to the of work as well as procurement on International Competitive (ICB) funded by international financial institutions / donors, with payments in currencies. The users are then to tailor the relevant clauses to suit their requirements including appropriate modification in the relevant sections of the documents.

The Procuring Entity is expected to manage the contract itself, and the role of an Engineer may be added by the users, if the Procuring Entity wishes to engage a Consultant. The role of an Engineer with specific delegated powers under various clauses of Instructions to Bidders (IB), such as clarifications of bid solicitation documents, amendment of bid solicitation documents, evaluation of bids etc., and to administer the contract under various clauses of Conditions of Contract (CoC) should be specified.

This document is harmonized with the KP Public Procurement Rules, 2014, and Pakistan Engineering Council (PEC) Guidelines.

This document is prepared under Section 5(b) of the KPPRA Act, 2012, approved by the Board of Directors of the KP-PPRA, and notified by the KP-PPRA vide its Notification No. KPPRA/M&E/SBDs/1-1/2015, Dated Peshawar the May 03, 2016.

It is, therefore, mandatory for all procuring entities in the Khyber Pakhtunkhwa to use this document for procurement of works for smaller contracts/projects up to Rs. 100 Million.

Any suggestions for improvement shall be appreciated. These may be addressed to the Managing Director KPPRA Government of Khyber Pakhtunkhwa Peshawar (e-mail).

KPPRA NOTIFICATION
(Updated from Time to Time)



GOVERNMENT OF KHYBER PAKHTUNKHWA,
KHYBER PAKHTUNKHWA
PUBLIC PROCUREMENT REGULATORY AUTHORITY

Peshawar, the May 10, 2022 / 6

NOTIFICATION

S.R.O. (14)/Vol: 1-24/2021-22: In exercise of the powers conferred under Section 35-A of the Khyber Pakhtunkhwa Public Procurement Regulatory Authority Act, 2012 (Khyber Pakhtunkhwa Act No. XI of 2012) the Authority has been pleased to issue the following regulation, namely: -

1. **Short title and commencement.-** (i) This regulation may be called the Khyber Pakhtunkhwa Public Procurement Regulation No. XIV 2022.
(ii) This shall come into force at once.
2. **Matters pertaining to Additional Security in case of abnormally low bids.-** This regulation relates to the matters pertaining to Additional Security submitted by the bidders in procurement of works.
 - i. The contractors quoting their bids up to a limit of 10% below Engineer estimate shall submit bid security @ 2% only of Engineer Estimate.
 - ii. The contractors quoting their bids more than 10% below upto 20% below on Engineers' Estimate shall submit along with their bids 8% Additional Security of Engineer's Estimated cost in addition to 2% bid security. If the bid is not accompanied with the required amount of additional security then it will be considered as non-responsive and the 2% bid security shall be forfeited in favour of Government and the second lowest bidder and so on will be considered accordingly.
 - iii. [Similarly, a contractor quoting bid more than 20% below shall submit with his bid an additional security on Engineer's Estimated cost equal to the differential amount of submitted bid and Engineers' Estimate along with detailed rate analysis]¹. In case of more than 20% below bids, if the bid is not accompanied by the detailed rate analysis and / or required amount of additional security, then the said bid shall be considered as non-responsive. All the securities submitted along with such non-responsive bid shall be forfeited in favour of Government and the 2nd lowest bidder and so on will be considered accordingly.
 - iv. In case detailed rate analysis submitted with the bids is, in view of the Procuring Entity, not convincing, the Head of the Procuring Entity may declare such bid as non-responsive without any forfeiture of bid securities and record reasons thereof.
 - v. The procuring entity may offer the contract to next lowest bidder after due diligence in the context of financial difference between such two bids or may advertise procurement opportunity afresh.

¹ Differential amount; if a contractor quote, e.g. 25% below engineer estimate bid then he has to deposit along with his bid 2% bid security and 25% additional security of engineer estimate.

- vi. After commencements of work by the successful bidder, the procuring entity may replace the Additional Security with a bank guarantee of the same amount from the scheduled bank; if the already deposited security is not in the form of bank guarantee.
- vii. The Additional Security shall be released to the contractor in four installments i.e. 1st installment of 25% to be released upon completion of 25% of the project, 2nd installment of 25% to be released upon completion of 50% of the project, 3rd installment of 25% to be released upon completion of 75% of the project and the 4th installment of 25% to be released after 100% completion of the project.
- viii. All previous orders, instructions and regulations issued regarding additional security shall stand superseded.

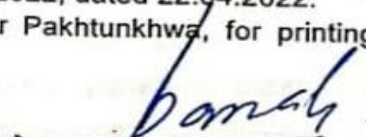
-SD-
Managing Director
KPPRA

ENDST: No. As above:

Peshawar, the May 10, 2022

Copy forwarded to:-

1. The Additional Chief Secretary (P&D) Department, Govt. of Khyber Pakhtunkhwa.
2. The Administrative Secretaries (C&W, Irrigation, Public Health Engineering and Local Government, Elections & Rural Development Department) Khyber Pakhtunkhwa with request to circulate the same to their downstream formations for compliance.
3. The Principal Secretary to Governor, Khyber Pakhtunkhwa.
4. The Principal Secretary to Chief Minister, Khyber Pakhtunkhwa.
5. The Inspector General of Police, Khyber Pakhtunkhwa.
6. The Secretary Provincial Assembly, Khyber Pakhtunkhwa.
7. The Accountant General, Khyber Pakhtunkhwa.
8. The Registrar, Peshawar High Court, Peshawar.
9. All Commissioners and Deputy Commissioners in Khyber Pakhtunkhwa.
10. PSO to Chief Secretary, Govt. of Khyber Pakhtunkhwa.
11. All Heads of Autonomous/Semi-Autonomous Bodies in Khyber Pakhtunkhwa.
12. Director, Treasuries & Accounts with request to circulate the same to all DAOs & Treasuries Officers in Khyber Pakhtunkhwa.
13. The Section Officer (Admn), Finance Department, Govt. of Khyber Pakhtunkhwa with respect to his office letter No. SO(A)/FD/1-40/2022, dated 22.04.2022.
14. Manager, Stationery and Printing Press Khyber Pakhtunkhwa, for printing in the official gazette.


SANA ULLAH
Assistant Director (M&E), KPPRA

**INSTRUCTIONS TO
USERS OF THIS DOCUMENT**

INSTRUCTIONS TO USERS OF THIS DOCUMENT
(Not to be included in Bid Solicitation Documents)

A. Basis of Documents

This Document has been prepared, intended to be used by users/procuring entities according to their requirements in the Khyber Pakhtunkhwa. This document is envisaged for NCB and ICB, meant for use in Works costing up to Rs. 100 Million, and may be tailored according to the scope of works as well as in case of contracts on International Competitive Bidding (ICB) basis, funded by international financial institutions/donors, with payments in foreign currencies. The users/ procuring entities are then to tailor the relevant clauses to suit their requirements including appropriate modifications in the relevant sections of the documents in the light of this document.

The Procuring Entity is expected to manage the Contract itself. The role of an Engineer may be added by the user/procuring entity, if the Procuring Entity wishes to engage a consultant. The role of an Engineer with specific delegated powers under various clauses of Instructions to Bidders such as clarifications of bid solicitation documents, amendment of bid solicitation documents, evaluation of Bids etc., and to administer the Contract under various clauses of Conditions of Contract (CoC) should have been specified.

B. Contents of Documents

As stated in Clause IB.4 of Instructions to Bidders, the complete Bidding Documents in addition to Invitation for Bids shall comprise items listed therein including any addendum to Bidding Documents issued in accordance with Clause IB.6. The Standard Form of Bidding Documents (For Smaller Contracts) includes the following:

1. Instructions to Bidders & Bidding Data
2. Form of Bid & Schedules to Bid
3. Conditions of Contract & Contract Data
4. Standard Forms
5. Specifications
6. Drawings, if any

In addition, instructions to users are also provided at various locations of this document within parenthesis or as a Note(s). Users are expected to edit or finalize this document accordingly, by filling all the blank spaces and forms, deleting all notes and instructions intended to help the users.

The user is required to prepare the following for completion of the Bidding Documents:

- (i) Invitation for Bids
- (ii) Bidding Data
- (iii) Schedules to Bid (Samples)

- (iv) Schedule of Prices (Format)
- (v) Contract Data
- (vi) Specifications
- (vii) Drawings, if any

The User's attention is drawn to the following while finalizing the Bidding Documents.

C. Invitation for Bids

1. The "Invitation for Bids" is meant for publication in the national/international newspapers, as well as on website of the KP-PPRA (www.kppra.gov.pk), and the procuring entity's website.
2. As per Rule 19 (1) of the KP Public Procurement Rules, 2014, Procurement from Rs. 0.5 Million to Rs. 5 million shall be posted on the procuring entity's website and the KP-PPRA's website. These procurement opportunities may also be advertised in print media, if deemed necessary by the procuring entity.
3. The blank spaces wherever shown are required to be filled by the procuring entity before issuance of Bid Solicitation Documents.
4. The Procuring Entity may modify para-1 of Invitation for Bids as per its requirement including the requirement of the KP-PPRA therein.
5. The notice should be published so as to give the prospective bidders sufficient working period for preparation, and submission of their bids. However, under no circumstances the response time shall be less than fifteen days for NCB, and thirty days for ICB from the date of publication of advertisement on the KP-PPRA's website or notice in the newspaper, whichever is later, as the case maybe.
6. The eligible bidders are defined in Clause IB 2 of Instructions to Bidders. The text of Clause can be amended by the Procuring Entity as deemed appropriate.
7. The non-refundable fee for the sale of Bid Solicitation Documents should be nominal, so as to cover printing/reproduction costs, and to ensure that only bona-fide bidders will apply.
- 8.
9. The amount of Bid Security should be 2% of the estimated cost, as per Rule 20(1) of the KP Public Procurement Rules, 2014, and should be in accordance with Sub-clause 13.1 of Instructions to Bidders.
10. If the venue of receipt of bids and the opening of bids is the same, the times for receipt and opening of bids are to be entered in last para of the Invitation to Bidders, otherwise indicate the name, address and exact location for the opening of bids. However, the last date for the receipt and the opening of bids shall be same, as per Rule 37(6) of the KP Public Procurement Rules, 2014.

D. Instructions to Bidders

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

The Instructions to Bidders can be used as given. Users may have to make changes under Bidding Data.

The Procuring Entity/Engineer's Representative, if any, shall exercise powers of the Engineer/under and in connection with Clauses IB.5, IB.6, IB.16, etc. In case an Engineer has been appointed by the Procuring Entity, the aforesaid clauses may be modified accordingly to specify the role of the Engineer by the Procuring Entity, otherwise the Engineer's reference wherever exist, except Sub-Clause 1.1.20 & Clause 15 of Conditions of Contract and Item 1.1.20 of Contract Data, shall be deleted.

E. Bidding Data

The blank spaces wherever shown in Bidding Data are required to be filled by the Engineer/Procuring Entity before issuance of Bid Solicitation Documents.

1. Sub-Clause 10.3 of Instructions to Bidders may be retained or modified by the Procuring Entity.
2. Procuring Entity should insert required experience in Sub-Clause 11.2.
3. Referring to Sub-Clause 14.1 of Instructions to Bidders, the period of bid validity may range from 60 to 90 days for procurement of Small Works. Number of days would be filled in as per Procuring Entity requirements.
4. Sub-Clauses 16.3 to 16.9 of Instructions to Bidders may be retained or modified by the Procuring Entity in accordance with his requirements, particularly Sub-Clause 16.8 may be modified in case deviation in payment schedule is acceptable.

F. Schedules to Bid

1. Specimen of Schedules to Bid including format of Schedule of Prices are provided in this document. The Procuring Entity can add/delete/modify as per its requirement
2. The blank spaces wherever shown are required to be filled by the Engineer/Procuring Entity before issuance of Bid Solicitation Documents except those required to be provided by the bidder(s).

G. Conditions of Contract

The User's attention is drawn to the Preface and it is once again emphasized that while preparing Contract Data, no Clause of Conditions of Contract should be deleted and that the changes included in Contract Data should be such as not to change the spirit of the document. Any adjustment or change in clauses of Conditions of Contract to meet specific project features shall be made with care and incorporated in Contract Data.

H. Contract Data

The blank spaces wherever shown are required to be filled by the Engineer/Procuring Entity before issuance of Bid Solicitation Documents.

Referring to Sub-Clause 1.1.1 of Conditions of Contract, the Engineer/Procuring Entity may add, in order of priority, such other documents as form part of the Contract, in Sub-Clause 1.3 of the Contract Data.

- 2 The Procuring Entity's Representative, if any, shall exercise powers of the Procuring Entity under and in connection with Sub-Clauses 1.3, 2.3, 4.2, 4.3, 5.1, 7.3, 8.2, 9.1, 9.2, 10.1, 10.2, 10.5, 11.1, 11.5, 12.1, 13.2 and 14.1 of the Conditions of Contract. In case an Engineer has been appointed by the Procuring Entity, the aforesaid clauses may be modified accordingly by the Procuring Entity.
- 3 The sum insured for different insurances including minimum amount of third party insurance should be assessed by the Engineer/Procuring Entity and entered in Contract Data.
- 4 The time for completion of the whole of the Works should be assessed by the Engineer/Procuring Entity and entered in the Contract Data.
5. The Conditions of Contract contain no overall limit on the Contractor's liability. The amount of liquidated damages per day of delay shall be entered by the Engineer/Procuring Entity in Contract Data. Usually the liquidated damages are set between 0.05 percent to 0.10 percent per day, and the maximum limit is 10 percent of the Contract Price.
- 5 Any amendment and/or additions to the Conditions of the Contract that are specific to a given Bid/Contract should be included by the User/Procuring Entity. Terms of Payment should be prepared and incorporated in Contract Data by the Engineer/Procuring Entity.
 - a) The Engineer/Procuring Entity to make sure that all taxes and duties are included by the Bidders/Contractors in their prices.

I. Specifications

To be prepared and incorporated by the Engineer/Procuring Entity

J. Drawings

To be prepared and incorporated by the Engineer/Procuring Entity, if required.

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**INVITATION
FOR
BIDS**

INVITATION FOR BIDS

Date: _____

Bid Reference No.: _____

1. The Executive Engineer, Irrigation Division District Orakzai, invites sealed bids from eligible bidders licensed by the Pakistan Engineering Council in the appropriate category, *and/or duly pre-qualified (if pre-qualification is done for specific scheme/project)* with the Procuring Entity for the Works **as per NIT**. And which will be completed in _____ days.
2. A complete set of Bid Solicitation documents may be obtained by interested bidders on submission of a written application to the office address given below, and upon payment of a non-refundable fee of Rs. 0.03% of the Estimated Cost in shape of Call Deposit Receipt, Demand Draft or Pay Order, favoring XEN Irrigation Division Orakzai to be issued by a scheduled Bidders may collect the Bid Solicitation Documents Irrigation Or KPPRA Official Website.
3.  All bids must be accompanied by a Bid Security @ 2% of the estimated cost in shape of Call Deposit Receipt issued from the bank account of the bidder, and must be delivered to (Office of the Executive Engineer, Irrigation Division District Orakzai on or before on (08/09/2026 12:00 PM). Bids will be opened at 12:30 PM on the same day.
4.  proposals at any time prior to the acceptance of a bid or proposal under Rule 47 of the KP Public Procurement Rules, 2014.

- Note:
1. The Procuring Entity to enter the requisite information in blank spaces.
 2. The bid shall be opened at least thirty minutes after the deadline for submission of bids.

**INSTRUCTIONS
TO BIDDERS
&
BIDDING DATA**

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INSTRUCTIONS TO BIDDERS

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

A. GENERAL

IB.1 Scope of Bid & Source of Funds

1.1 Scope of Bid

The Procuring Entity as defined in the Bidding Data (hereinafter called “the Procuring Entity”) wishes to receive Bids for the Works summarized in the Bidding Data (hereinafter referred to as “the Works”).

Bidders must quote for the complete scope of work. Any Bid covering partial scope of work will be rejected as non-responsive.

1.2 Source of Funds

The Procuring Entity has arranged funds from its own sources. [or any other source which may be indicated accordingly] ADP Government Khyber Pakhtunkhwa.

IB.2 Eligible Bidders

Bidding is opened to all bidders meeting the following requirements:

duly licensed by the Pakistan Engineering Council (PEC) in the appropriate category for value of Works (if applicable).

duly registered with the Khyber Pakhtunkhwa Revenue Authority for the purpose Sales Tax on Services.

1. Duly valid licensed by the Pakistan Engineering Council (PEC) in the appropriate
2. category for value of Work & having Specialization Code (mentioned as per NIT/BSD)
3. Duly enlisted with the Provincial Government (Works Deptt:)
4. NTN Register with Up to date online / Active Status.
5. Bidder are required to submit relevant documents to the department along with above documents for the purpose of evaluation.

Cost of Bidding-

- 3.1 The bidder shall bear all costs including bid solicitation documents fee (nominal so as to cover printing/reproduction and mailing costs) and other costs associated with the preparation and submission of its bid and the Procuring Entity will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

B. BIDDING DOCUMENTS

IB.4 Contents of Bidding Documents

In addition to Invitation for Bids, Bid Solicitation Documents are those stated below, and should be read in conjunction with any Addendum/Corrigendum issued in accordance with Sub- Clause IB.6.1

1. Instructions to Bidders & Bidding Data
2. Form of Bid & Schedules to Bid
Schedules to Bid comprise the following:
 - (i) Schedule A: Schedule of Prices
 - (ii) Schedule B: Specific Works Data
 - (iii) Schedule C: Works to be Performed by Subcontractors
 - (iv) Schedule D: Proposed Program of Works
 - (v) Schedule E: Method of Performing Works
 - (vi) Schedule F: Integrity Pact
3. Conditions of Contract & Contract Data
 - (i) General Conditions of Contract, Part-I (GCC)
 - (ii) Particular Conditions of Contract, Part-II (PCC).
4. Standard Forms:
 - (i) Form of Bid Security
 - (ii) Form of Performance Security
 - (iv) Form of Bank Guarantee for Advance Payment
5. Specifications
 - (i) Special Provisions
 - (ii) Technical Provisions
6. Bill of Quantity
7. Drawings, if any

IB.5 Clarification of Bid Solicitation Documents

- 5.1 A prospective bidder requiring any clarification(s) in respect of the Bid Solicitation Documents may notify the Engineer/Procuring Entity at the Procuring Entity's/Engineer's address indicated in the Bidding Data.
8. The Engineer/Procuring Entity will respond to any request for clarification(s), which it receives earlier than seven (7) days prior to the deadline for the submission of Bids. Copies of the Engineer's/Procuring Entity's response will be forwarded to all prospective bidders, at least five (5) days prior to dead line for submission of Bids, who have received the Bid Solicitation Documents including a description of the enquiry but without identifying its source.

IB.6 Amendment of Bid Solicitation Documents

- 61 At any time prior to the deadline for submission of Bids, the Procuring Entity may, for any reason, whether at its own initiative or in response to a clarification(s) requested by a prospective bidder, modify the Bid Solicitation Documents by issuing addendum/corrigendum.
- 62 Any addendum/corrigendum thus issued shall be part of the Bid Solicitation Documents pursuant to Sub- Clause 6.1 hereof, and shall be communicated in writing to all buyers of the Bid Solicitation Documents.
- 63 To afford prospective bidders reasonable time in which to take an addendum/corrigendum into account in preparing their Bids, the Procuring Entity may at its discretion extend the deadline for submission of Bids.

C. PREPARATION OF BIDS

IB.7 Language of Bid

- 7.1 The bid prepared by the bidder and all correspondence and documents relating to the Bid, exchanged by the bidder and the Procuring Entity shall be written in the English language, provided that any printed literature furnished by the bidder may be written in another language so long as accompanied by an English translation of its pertinent passages in which case, for purposes of interpretation of the Bid, the English translation shall govern.

IB.8 Documents Accompanying the Bid

- 8.1 The bid prepared by the bidder shall comprise the following components:
- (a) Submit a written power of attorney authorizing the signatory of the bid to act for and on behalf of the bidder (if any);
 - (b) update the information indicated and listed in the Bidding Data and previously submitted with the application for prequalification, and continue to meet the minimum criteria set out in the prequalification documents which as a minimum, would include the following:
 - (i) Evidence of access to financial resources along with average annual construction turnover;
 - (ii) Financial predictions for the current year and the two following years including the effect of known commitments;
 - (iii) Work commitments since prequalification;
 - (iv) Current litigation information; and
 - (v) Availability of critical equipment. and
 - (b) furnish a technical proposal taking into account the various Appendices to Bid specially the following:

Appendix-E to Bid Proposed Construction
Schedule Appendix-F to Bid Method of
Performing the Work Appendix-G to Bid List
of Major Equipment Appendix-K to Bid
Organization Chart for Supervisory Staff
and other pertinent information such as mobilization program etc;

- (c) Furnish a technical proposal considering the various Appendices to Bid specially the following:
 - (d) Appendix-E to Bid Proposed Construction Schedule Appendix-F to Bid Method of Performing the Work Appendix-G to Bid List of Major Equipment Appendix-K to Bid Organization Chart for Supervisory Staff and other pertinent information such as mobilization program etc;
- 8.2 Bids submitted by a joint venture of two (2) or more firms shall comply with the following requirements:
- (a) the bid and in case of a successful bid, the Form of Contract Agreement shall be signed 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;
 - the partner-in-charge shall always be duly authorized to deal with the Procuring Entity 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;
 - (c) all partners of the joint venture shall at all times and under all circumstances be liable jointly and severally for the execution of the Contract in accordance with the Contract terms and a statement to this effect shall be included in the authorization mentioned under Sub-Para(b) above as well as in the Form of Bid and in the Form of Contract Agreement (in case of a successful bid); and
 - (c) 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 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 partner without prior written consent of the Procuring Entity.

- 8.3 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 1.2 hereof.

IB.9 Sufficiency of Bid

- 91 Each bidder shall satisfy himself before bidding as to the correctness and sufficiency of his Bid and of the rates and prices entered in the Schedule of Prices, which rates and prices shall except in so far as it is otherwise expressly provided in the Contract, cover all his obligations under the Contract and all matters and things necessary for the proper completion of the Works.
- 92 The bidder is advised to obtain for himself at his own cost and responsibility all information that may be necessary for preparing the bid and entering into a Contract for execution of the Works.

IB.10 Bid Prices, Currency of Bid and Payment

- 101 The bidder shall fill up the Schedule of Prices (Schedule A to Bid) indicating the unit rates and prices of the Works to be performed under the Contract. Unit rate offered for an item shall be considered upto two significant decimal places for evaluation purposes by the Procuring Entity. Prices in the Schedule of Prices shall be entered keeping in view the instructions contained in the Preamble to Schedule of Prices.
- 102 Unless otherwise stipulated in the Conditions of Contract, prices quoted by the bidder shall remain fixed during the bidder's performance of the Contract and not subject to variation on any account.
- 103 The unit rates and prices in the Schedule of Prices shall be quoted by the bidder in the currency as stipulated in Bidding Data.

IB.11 Documents Establishing Bidder's Eligibility and Qualifications

- 111 Pursuant to Clause IB.8, the bidder shall furnish, as part of its bid, documents establishing the bidder's eligibility to bid and its qualifications to perform the Contract if its bid is accepted.
- 112 Bidder/Manufacturer must possess and provide evidence of its capability and the experience as stipulated in Bidding Data and the Qualification Criteria stipulated in the Bid Solicitation Documents.

IB.12 Documents Establishing Works' Conformity to Bidding Documents

- 113 The documentary evidence of the Works' conformity to the Bid Solicitation Documents may be in the form of literature, drawings, and data, and the bidder shall furnish documentation as set out in Bidding Data.
- 121 The bidder shall note that standards for workmanship, material and equipment and references to brand names or catalogue numbers if any, designated by the Procuring Entity in the Technical Provisions are intended to be descriptive only and not restrictive.

IB.13 Bid Security

- 131 Each bidder shall furnish, as part of his bid, a Bid Security as stipulated in Bidding Data in the form of Call Deposit Receipt or a Bank Guarantee issued by a Scheduled Bank in Pakistan, in favour of the XEN Irrigation Division District Orakzai valid for a period up to twenty-eight (28) days beyond the bid validity date. The bid security shall be submitted from the account of the bidder, who submits the bid. Any bid not accompanied by an acceptable Bid Security shall be rejected by the Procuring Entity as non-responsive.
- 132 The bid securities of unsuccessful bidders will be returned upon award of contract to the successful bidder or on the expiry of validity of Bid Security whichever is earlier.
- 133 The bid security of successful bidder be retained with the Procuring Entity till completion of the defect liability period and the amount of guarantee will be reduced by an equivalent amount.
- 134 The Bid Security may be forfeited:
- (a) if a bidder withdraws his bid during the period of bid validity; or
 - (b) if a bidder does not accept the correction of his Bid Price, pursuant to Sub-Clause 16.4 (b) hereof; or
 - (c) in the case of a successful bidder, if he fails to:
 - (i) furnish the required Performance Security in accordance with Clause IB.21, or
 - (ii) sign the Contract Agreement, in accordance with Sub-Clauses IB.20.2 & 20.3.

IB.14 Validity of Bids, Format, Signing and Submission of Bid

- 14.1 Bids shall remain valid for the period stipulated in the Bidding Data after the date of bid opening.
- 14.2 All Schedules to Bid are to be properly completed and signed.
- 14.3 No alteration is to be made in the Form of Bid except in filling up the blanks as directed. If any alteration be made or if these instructions be not fully complied with, the bid may be rejected.
- 14.4 Each bidder shall prepare Original and number of copies specified in the Bidding Data of the documents comprising the bid as described in Clause IB.8 and clearly mark them “ORIGINAL” and “COPY” as appropriate. In the event of discrepancy between them, the original shall prevail.

² Inserted by KPPRA Notification No. KPPRA/M&E/Estt:/1-12/2017-18 dated April 05, 2018.

- 14.5 The original and all copies of the bid shall be typed or written in indelible ink and

shall be signed by a person or persons duly authorized to sign (in the case of copies, Photostats are also acceptable). This shall be indicated by submitting a written Power of Attorney authorizing the signatory of the bidder to act for and on behalf of the bidder. All pages of the bid shall be initialed and official seal be affixed by the person or persons signing the bid.

- 14.6 The Bid shall be delivered in person, through courier service or sent by registered mail, or as specifically instructed by the Procuring Entity otherwise, at the address to Procuring Entity as given in Bidding Data.

D. SUBMISSION OF BID

IB.15 Deadline for Submission, Modification & Withdrawal of Bids

- 151 Bids must be received by the Procuring Entity at the address provided in Bidding Data not later than the time and date stipulated therein. In the event of the specified date for the submission of bids declared a holiday for the Procuring Entity, the Bids will be received up to the appointed time on the next working day.
- 152 Bids submitted through telegraph, telex, fax or e-mail shall not be considered.
- 153 Any bid received by the Procuring Entity after the deadline for submission prescribed in Bidding Data will be returned unopened to such bidder.
- 154 Any bidder may modify or withdraw his bid after bid submission provided that the modification or written notice of withdrawal is received by the Procuring Entity prior to the deadline for submission of bids.
- 155 Withdrawal of a bid during the interval between the deadline for submission of bids and the expiration of the period of bid validity specified in the Form of Bid may result in forfeiture of the Bid Security pursuant to Sub-Clause IB.13.5(a).

E. BID OPENING AND

EVALUATION IB.16 Bid Opening, Clarification and

Evaluation

- 16.1 The Procuring Entity will open the bids, in the presence of bidders or their representatives, who choose to attend, at the time, date, and venue stipulated in the Bid Solicitation Documents.
- 16.2 The name of the bidder, bid modifications, discounts or withdrawals, presence of bid security or affidavit as the case may be and the total amount of each bid and any alternatives, if so permitted, shall be read out aloud and recorded, and a copy of the record shall be made available to any bidder on request. The Procuring Entity will record the minutes of the bid opening meeting. Bidders or their representatives, who choose to attend the bid opening meeting, shall sign the attendance sheet. To assist in the examination, evaluation and comparison of Bids the Engineer/Procuring Entity may, at its discretion, ask the bidder for a clarification of its Bid. The request for clarification and the response shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted.

- (a) Prior to the detailed evaluation, pursuant to Sub-Clauses IB.16.7 to 16.9, the Engineer/Procuring Entity will determine the substantial responsiveness of each bid to the Bid Solicitation Documents. For purpose of these Clauses, a substantially responsive bid is one which conforms to all the terms and conditions of the Bid Solicitation Documents without material deviations. It will include to determine the requirements listed in Bidding Data.
- (b) Arithmetical errors will be rectified on the following basis:
If the bidder does not accept the corrected amount of Bid, his Bid will be rejected, and his Bid Security will be forfeited.
- 16.3 A Bid determined as substantially non-responsive will be rejected and will not subsequently be made responsive by the bidder by correction of then on- conformity.
- 16.4 Any minor informality or non-conformity or irregularity in a Bid, which does not constitute a material deviation may be waived by Procuring Entity, provided such waiver does not prejudice or affect the relative ranking of other bidders.
- 16.5 The Engineer/Procuring Entity will evaluate and compare only the bids previously determined to be substantially responsive pursuant to Sub-Clauses IB.16.4 to 16.6 as per requirements given hereunder. Bids will be evaluated for complete scope of works. The prices will be compared on the basis of the Evaluated Bid Price pursuant to Sub-Clause 16.6 herein below.
- (a) 16.7 It will be examined in detail whether the Works offered by the bidder complies with the Technical Provisions of the Bid Solicitation Documents.
- (b) It will be examined in detail whether the bids comply with the commercial /contractual conditions of the Bid Solicitation Documents. It is expected that no material deviation / stipulation shall be taken by the bidders.
- 16.8 Evaluated Bid Price
In evaluating the bids, the Engineer / Procuring Entity will determine for each bid in addition to the Bid Price, the following factors (adjustments) in the manner and to the extent indicated below to determine the Evaluated Bid Price:
 - (i) making any correction for arithmetic errors pursuant to Sub-Clause 16.4 hereof.
 - (ii) making an appropriate price adjustment for any other acceptable variation or deviation.
 - (iii) making an appropriate price adjustment for deviations in terms of Payments(if any and acceptable to the Procuring Entity).
 - (iv) discount, if any, offered by the bidders as also read out and recorded at

the time of bid opening.

16.9 Evaluation Methods

Pursuant to Sub-Clause 16.8, Para (ii), and (iii) following evaluation methods for price adjustments will be followed:

(i) Price Adjustment for Technical Compliance

The cost of making good any deficiency resulting from technical noncompliance will be added to the Corrected Total Bid Price for comparison purposes only. The adjustments will be applied taking the highest price quoted by other bidders being evaluated in detail in their original Bids for corresponding item. In case of non-availability of price from other bidders, the price will be estimated by the Engineer/Procuring Entity.

(ii) Price Adjustment for Commercial Compliance

The cost of making good any deficiency resulting from any quantifiable variations and deviations from the Bid Schedules and Conditions of Contract, as determined by the Engineer/Procuring Entity will be added to the Corrected Total Bid Price for comparison purpose only. Adjustment for commercial compliance will be added to the Corrected Total Bid Prices.

(iii) Price Adjustment for Deviation in Terms of Payments Refer to Bidding Data

IB.17 Process to be Confidential

- 17.1 Subject to Sub-Clause IB.16.3 heretofore, no bidder shall contact Engineer/Procuring Entity on any matter relating to its Bid from the time of the Bid opening to the time the bid evaluation result is announced by the Procuring Entity. The evaluation result shall be announced at least ten (10) 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.

- 17.2 Any effort by a bidder to influence Engineer/Procuring Entity in the Bid evaluation, Bid comparison or Contract Award decisions may result in the rejection of his Bid. A complaint, against any decision, action or omission in the procurement process till the announcement of final results of the bids evaluation under Rule 45 of the KP Public Procurement Rules, 2014 may be made within ten (10) days of making it public in terms of Rule 45 of the Rules *ibid*. Provided that no complaint shall lie against selection of a procurement method and decision to reject all tenders, quotations or proposals, as specified under the KPPRA Act, 2012, and KP Public Procurement Rules, 2014, respectively.

F. AWARD OF CONTRACT

IB.18. Post Qualification

- 181 The Procuring Entity, at any stage of the bid evaluation, having credible reasons for or *prima facie* evidence of any defect in supplier's or contractor's capacities, may require the suppliers or contractors to provide information concerning their professional, technical, financial, legal or managerial competence whether already pre-qualified or not:

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

- 182 The determination will take into account the bidder's financial and technical capabilities. It will be based upon an examination of the documentary evidence of the bidders' qualifications submitted under Clause IB.11, as well as such other information required in the Bidding Documents.

IB.19 Award Criteria & Procuring Entity's Right

- 201 Subject to Sub-Clause IB.19.2, the Procuring Entity will award the Contract to the bidder, whose bid has been determined to be substantially responsive to the Bid Solicitation Documents, and who has offered lowest responsive financial bid amongst technically responsive bids, provided that such bidder has been determined to be qualified to satisfactorily perform the Contract in accordance with the provisions of Clause IB.18.
- 202 Notwithstanding Sub-Clause IB.19.1, the Procuring Entity reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to the acceptance of a bid or proposal under Rule 47(1) of the KP Public Procurement Rules, 2014, without thereby incurring any liability to the affected bidders or any obligation to inform the affected bidders of the grounds for the Procuring Entity's action except that the grounds for its rejection of all bids shall upon request be communicated, to any bidder who submitted a bid, without justification of the grounds. Notice of the rejection of all the bids shall be given promptly to all the bidders.

IB.20 Notification of Award & Signing of Contract Agreement

- 203 Prior to expiration of the period of bid validity prescribed by the Procuring Entity, the Procuring Entity will notify the successful bidder in writing (“Letter of Acceptance”) that his bid has been accepted.
- 204 Within seven (7) days from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the Procuring Entity will send the successful bidder the Form of Contract Agreement provided in the Bid Solicitation Documents, incorporating all agreements between the parties.
- 205 The formal Agreement between the Procuring Entity and the successful bidder shall be executed within seven (7) days of the receipt of Form of Contract Agreement by the successful bidder from the Procuring Entity.

IB.21 Performance Security

- 21.1 The successful bidder shall furnish to the Procuring Entity a Performance Security in the form and the amount stipulated in the Conditions of Contract within a period of fourteen (14) days after the receipt of Letter of Acceptance.
- 21.2 Failure of the successful bidder to comply with the requirements of Sub-Clauses IB.20.2 & 20.3 or 21.1 or Clause IB.22 shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security

IB.22 Integrity Pact

The Bidder shall sign and stamp the Form of Integrity Pact provided at Schedule-F to Bid in the Bid Solicitation Documents for all procurement contracts. Failure to provide such Integrity Pact shall make the bid non-responsive.

BIDDING DATA

(This section should be filled in by the Engineer/Procuring Entity before issuance of the Bid Solicitation Documents. The following specific data for the Works to be tendered 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**

1.1 Name of Procuring Entity

Executive Engineer Irrigation Division, District Orakzai.

Name of Work: As per NIT

-
- 5.1 (a) Procuring Entity's address: O/O the Office of the Executive Engineer
Irrigation Division, District Orakzai 0925-690184
irrigation.orakzai@gmail.com Baber Mela DC Head Quarter Orakzai

(Insert name of the Procuring Entity)

(Insert address of the Procuring Entity with telephone, fax No. & email address).

- (b) Engineer's address:
As Above
-

(Insert name and address of the Engineer, if any, with telephone, fax No and email address).

10.3 Bid shall be quoted entirely in Pak. Rupees. The payment shall be made in Pak. Rupees.

11.2 The bidder/manufacturer has the financial, technical and production capability necessary to perform the Contract as follows:-

12.1 (a) A detailed description of the Works, essential technical and performance characteristics.

(b) Complete set of technical information, description data, literature and drawings as required in accordance with Schedule B to Bid, Specific Works Data. This will include but not be limited to a sufficient number of drawings, photographs, catalogues, illustrations and such other information as is necessary to illustrate clearly the significant characteristics such as general construction dimensions and other relevant information about the works to be performed.

(c) Furnish Technical Proposal:

The Bidder shall submit with its Technical Bid the following documents (as mentioned in Appendix-M):

- (i) Letter of Technical Bid
- (ii) Written power of attorney authorizing the signatory of the Bid
- (iii) Original Bidding Documents
- (iv) Dully filled in Schedules to Bid (except Appendix-D to Bid)
- (v) Qualification documents establishing bidders' eligibility as per Appendix M.

The Bidder shall submit with its Financial Bid the following documents:

- (i) Letter of Price Bid
- (ii) 2% Bid Security of the estimated cost
- (iii) Additional Security as per KPPRA rules (if applicable)
- (iv) Appendix – D to Bid (Estimate)

13.1 **Amount of Bid Security**
2% of the estimated Cost

(Fill in lump sum amount or 2% of the estimated cost of work)

14.1 **Period of Bid Validity**
90 days

(Fill in “number of days” ranging from 60 to 90, as required)

14.4 **Number of Copies of the Bid to be Submitted**

One original Copy

14.6 (a) Procuring Entity's Address for the Purpose of Bid Submission
office of the Executive Engineer Irrigation Division Orakzai

(insert postal address or specify venue of bid box for delivery by hand)

15.1 Deadline for Submission of Bids

16.1 Venue, Time, and Date of Bid Opening

Venue: Office of the Executive
Engineer Irrigation Division Orakzai

Time: 12:30 PM

Date: 08-09-2026

16.2 Responsiveness of Bids

- (i) the Bid is valid till required period,
- (ii) the Bid prices are firm during currency of contract (if it is a fixed price bid)
- (iii) completion period offered is within specified limits,
- (iv) the Bidder/Manufacturer is eligible to Bid and possesses the requisite experience, capability and qualification.
- (v) the Bid does not deviate from basic technical requirements and
- (vi) the Bids are generally in order, etc.

16.3 Price Adjustment:

- (iii) Price Adjustment for Deviations in Terms of Payment

If a bid deviates from the terms of payment/payment conditions as specified in the Conditions of Contract and if such deviation is considered acceptable to the Procuring Entity, mark-up earned for any earlier payments involved in the terms outlined in the Bid as compared to those stipulated in the Conditions of Contract shall be calculated at the mark-up rate per annum (insert rate) and shall be added to the Corrected Total Bid Price for comparison purposes only.

FORM OF BID AND SCHEDULES TO BID

FORM OF BID
(LETTER OF OFFER)

Bid Reference No. _____

To:

Gentlemen,

1. Having examined the Bidding Documents including Instructions to Bidders, Bidding Data, Conditions of Contract, Contract Data, Specifications, Drawings, if any, Schedule of Prices and Addenda Nos.
_____ for the execution of the above-named Works, we, the undersigned, being a company doing business under the name of and address _____ and being duly incorporated under the laws of Pakistan hereby offer to execute and complete such Works and remedy any defects therein in conformity with the said Documents including Addenda thereto for the Total Bid Price of Rs _____ (Rupees _____) or such other sum as may be ascertained in accordance with the said Documents.
2. We understand that all the Schedules attached hereto form part of this Bid.
3. As security for due performance of the undertakings and obligations of this Bid, we submit herewith a Bid Security in the amount of _____ drawn in your favour or made payable to you and valid for a period of twenty eight (28) days beyond the period of validity of Bid.
4. We undertake, if our Bid is accepted, to commence the Works and to deliver and complete the Works comprised in the Contract within the time(s) stated in Contract Data.
5. We agree to abide by this Bid for the period of _____ days from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
6. 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.
7. We undertake, if our Bid is accepted, to execute the Performance Security

referred to in Conditions of Contract for the due performance of the Contract.

- 8 We understand that you are not bound to accept the lowest or any bid you may receive.
- 9 We do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other person or persons making a bid for the Works.

Dated this _____ day of _____, 2026

Signature _____

in the capacity of _____ duly authorized to sign bid for and on behalf of

(Name of Bidder in Block Capitals) _____

(Seal)

Address

Witness:

(Signature) _____

Name: _____ NIC No. _____

Address: _____

[SCHEDULES TO BID INCLUDE THE FOLLOWING:

- ☐ Schedule A to Bid: Schedule of Prices
- ☐ Schedule B to Bid: Specific Works Data
- ☐ Schedule C to Bid: Works to be performed by Subcontractors
- ☐ Schedule D to Bid: Proposed Program of Works
- ☐ Schedule E to Bid: Method of Performing Works
- ☐ Schedule F to Bid: Integrity Pact]

SCHEDULE – A TO BID

SCHEDULE OF PRICES

<u>Sr. No.</u>		<u>Page No.</u>
1.	Preamble to Schedule of Prices	29
2.	Schedule of Prices	31
	*(a) Summary of Bid Prices	
	* (b) Detailed Schedule of Prices	
	* [To be prepared by the Engineer/Procuring Entity]	

PREAMBLE TO SCHEDULE OF PRICES

1. General

- 1.1** The Schedule of Prices shall be read in conjunction with the Conditions of Contract, Contract Data together with the Specifications and Drawings, if any.
- 1.2** The Contract shall be for the whole of the Works as described in these Bidding Documents. Bids must be for the complete scope of works.

2. Description

The general directions and descriptions of works and materials are not necessarily repeated nor summarized in the Schedule of Prices. References to the relevant sections of the Bid Solicitation Documents shall be made before entering prices against each item in the Schedule of Prices.

3. Units & Abbreviations

- 3.1** Units of measurement, symbols and abbreviations expressed in the Bid Solicitation Documents shall comply with the System International Unites (SI Units).
-

(Note: The abbreviations to be used in the Schedule of Prices to be defined by the Procuring Entity).

4. Rates and Prices

- 4.1** Except as otherwise expressly provided under the Conditions of Contract, the rates and amounts entered in the Schedule of Prices shall be the rates at which the Contractor shall be paid and shall be the full inclusive value of the works set forth or implied in the Contract; except for the amounts reimbursable, if any to the Contractor under the Contract.
- 4.2** Unless otherwise stipulated in the Contract Data, the rates and prices entered by the bidder shall not be subject to adjustment during the performance of the Contract.
- 4.3** All duties, taxes and other levies payable by the Contractor shall be included in the rates and prices.
- 4.4** The whole cost of complying with the provisions of the Contract shall be included in the items provided in the Schedule of Prices, and where no items are provided, the cost shall be deemed to be distributed

SCHEDULE - A TO BID

among the rates and prices entered for the related items of the Works and no separate payment will be made for those items.

The rates, prices and amounts shall be entered against each item in the Schedule of Prices. Any item against which no rate or price is entered by the bidder will not be paid for by the Procuring Entity when executed and shall be deemed covered by the rates and prices for other items in the Schedule of Prices.

- 4.5 (a) The bidder shall be deemed to have obtained all information as to and all requirements related thereto which may affect the bid price.

*(b) The Contractor shall be responsible to make complete arrangements for the transportation of the Plant to the Site.

*(Procuring Entity may modify as appropriate)

- 4.6 The Contractor shall provide for all parts of the Works to be completed in every respect. Notwithstanding that any details, accessories, etc. required for the complete installation and satisfactory operation of the Works, are not specifically mentioned in the Specifications, such details shall be considered as included in the Contract Price.

5. Bid Prices

5.1 Break-up of Bid Prices

The various elements of Bid Prices shall be quoted as detailed by the Procuring Entity in the format of Schedule of Prices.

The bidder shall recognize such elements of the costs which he expects to incur the performance of the Works and shall include all such costs in the rates and amounts entered in the Schedule of Prices.

5.2 Total Bid Price

The total of bid prices in the Schedule of Prices shall be entered in the Summary of Bid Prices.

6. Provisional Sums

- 6.1 Provisional Sums included and so designated in the Schedule of Prices if any, shall be expended in whole or in part at the direction and discretion of the Engineer/Procuring Entity. The Contractor will only receive payment in respect of Provisional Sums if he has been instructed by the Engineer/Procuring Entity to utilize such sums.

SCHEDULE OF PRICES – SUMMARY OF BID PRICES

Bill No.	Description	Total Amount (Rs)
1.		
	Total Bid Price (The amount to be entered in Paragraph 1 of the Form of Bid) (In words).	

SCHEDULE OF PRICES

Item No.	Description	Quantity	Unit Rate (Rs)	Total Amount (Rs)
1.				
Total (to be carried to Summary of Bid Price)				

SCHEDULE - B TO BID

***SPECIFIC WORKS DATA**

(To be prepared and incorporated by the Procuring Entity)

*(Note: The Procuring Entity shall spell out the information & data required to be filled out by the bidder and to furnish complementary information).

SCHEDULE – C TO BID

WORKS TO BE PERFORMED BY SUBCONTRACTORS

The bidder will do the work with his own forces except the work listed below which he intends to sub-contract.

Items of Works to be Sub-Contracted	Name and address of Sub-Contractors	Statement of similar works previously executed (attach evidence)
--	--	---

Note:

1. No change of Sub-Contractors shall be made by the bidder without prior approval of the Procuring Entity.
2. The truthfulness and accuracy of the statement as to the experience of Sub-Contractors is guaranteed by the bidder. The Procuring Entity's judgment shall be final as to the evaluation of the experience of Sub-Contractors submitted by the bidder.
3. Statement of similar works shall include description, location & value of works, year completed and name & address of the clients.

SCHEDULE – D TO BID

PROPOSED PROGRAM OF WORKS

Bidder shall provide a program in a bar-chart showing the sequence of work items by which he proposes to complete the Works of the entire Contract. The program should indicate the sequence of work items and the period of time during which he proposes to complete the Works including the activities like designing, schedule of submittal of drawings, ordering and procurement of materials, manufacturing, delivering, construction of civil works, erection, testing and commissioning of Works to be supplied under the Contract.

SCHEDULE – E TO BID

METHOD OF PERFORMING WORKS

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

- The sequence and methods in which he proposes to carry out the Works, including the number of shifts per day and hours per shift, he expects to work.
- A list of all major items of constructional and erectional plant, tools and vehicles proposed to be used in delivering/carrying out the Works at Site
- The procedure for installation of equipment and transportation of equipment and materials to the site.
- Organization chart indicating head office & field office personnel involved in management, supervision and engineering of the Works to be done under the Contract.

SCHEDULE – F TO BID

(INTEGRITY PACT)

DECLARATION OF FEES, COMMISSION, AND BROKERAGE ETC. PAID IN WORKS CONTRACTS

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

..... [name of the Bidder] 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 Khyber Pakhtunkhwa or any administrative subdivision or agency thereof or any other entity owned or controlled by Government of Khyber Pakhtunkhwa through any corrupt business practice.

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

[name of the Bidder] 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 GoKP and has not taken any action or will not take any action to circumvent the above declaration, representation or warranty.

[name of the Bidder] 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 GoKP under any law, contract or other instrument, be voidable at the option of GoKP.

Notwithstanding any rights and remedies exercised by GoKP in this regard, [name of the Bidder] agrees to indemnify GoKP for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoKP in an amount equivalent to ten times the sum of any commission, gratification, bribe, finder's fee or kickback given by [name of the Bidder] 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 GoKP.

Name of the Procuring Entity: Name of the Bidder:
Signature: Signature:

Seal]

[Seal]

TECHNICAL EVALUATION CRITERIA

LIST OF MAJOR EQUIPMENT – RELATED ITEMS

(to be signed by the Bidder)

The Bidder will provide on Sheet 2 of this Appendix a list of all major equipment and related items, under separate heading for items owned, to be purchased or to be arranged on lease by him to carry out the Works. The information shall include make, type, capacity, and anticipated period of utilization for all equipment which shall be in sufficient detail to demonstrate fully that the equipment will meet all requirements of the Specifications.

Minimum Mandatory Equipment Requirement to be brought / installed / erected at site are as follows:

Sr. No.	Description	Nos.
1	Excavators	02
2	viberator	01
3	Dumper Truck	02
6	Tractor with blades & trolley	02
7	Concrete Mixers	03

Note:

The bidder while preparing his methodology for performing and executing the works and listing out Major Equipment (required to complete the Works in the specified Time Schedule) in this Appendix shall consider the above-mentioned minimum requirement of Construction Equipment to be brought/installed/erected at site.

LIST OF MAJOR EQUIPMENT

(to be filled and signed by the Bidder)

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						

**LIST OF
SUBCONTRACTORS**

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

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

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

Appendix-J to Bid**ESTIMATED PROGRESS PAYMENTS**

(to be filled and signed by the Bidder)

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 Estimate, expressed in percentage of Bided Price (excluding Provisional Lump Sum Amount, if any):

Months	% of Bided Price
(a)	(b)
1st Month	
2nd Month	
3rd Month	
4th Month	
5th Month	
6th Month	
7th Month	
8th Month	
9th Month	
10th Month	
11th Month	
12th Month	
13th Month	
14th Month	
15th Month	
16th Month till completion of Project	
Total	100 %

Appendix-K to Bid

ORGANIZATIONAL CHART FOR THE SUPERVISORY STAFF AND LABOUR

(to be signed by the Bidder)

MINIMUM MANDATORY STAFF REQUIREMENT:

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

Designation	Nos.	Minimum Qualification	Min. Relevant Working Experience
Project Manager	01	B.Sc. Civil Engr. with valid PEC Regd.	5-10 years or above for B.Sc. Civil or 6 years or above for M.Sc. Civil & PhD in Civil Engineer
Site Engineer(s)	01	B.Sc. Civil Engr. with valid PEC Registration or	5 years or above
Site Supervisor (Civil)	02	DAE Civil	5 years or above
Quantity Surveyor	01	DAE Civil	5 years or above
Lab Technician	02	DAE Civil	5 years or above
Surveyor	02	DAE Civil / having certificate	5 years or above

QUALIFICATION CRITERIA

Qualification of Bidders shall be evaluated on the basis of mentioned criteria with at least **60% marks on aggregate and 50% score in each category** regarding the Bidder's financial soundness, experience record, personnel capabilities and equipment capabilities, 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 (failing to meet any one of the following will lead to disqualification)

- i. Valid registration with PEC as mentioned in NIT. In case of JV the lead partner should also be the same as above.
- ii. Enlistment with Irrigation Department in relevant category.
- iii. Valid Registration with KPRA.
- iv. Affidavit, on judicial stamp paper attested in presence of oath commissioner, of no blacklisting within the current month of submission of bidding document, and details also mentioned if ever blacklisted in past – deduction of 05 marks from overall score (including JV – if any) will be made during evaluation.
- v. 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. Deduction of 05 marks from overall score (including JV – if any) will be made during evaluation if firm is in ongoing litigation with the department.
- vi. In case of more than 20% below bids, if the bid is not accompanied by the detailed rate analysis and/ or required amount of additional security, then the said bid will be dealt as per KPPRA Notification: S.R.O (14) /vol: 1-24/2021-22: dated May 10.2022.
- vii. In Case detailed rate analysis submitted with the bids is, in view of the procuring Entity not convincing, the Head of the procuring Entity may declare such bid as non- responsive.
- viii. Audit Reports of last 03 years.
- ix. Average Annual Construction Turnover of Rs. 100.000 million.
- x. Registration with income tax department (Valid NTN) & Tax Returns of last 03 years.
- xi. JV Agreement (if applicable) with clearly stating the share of each member, for details refer to IB 11.2.
- xii. Any fake / forged document attached in the Technical Proposal will lead towards exclusion of the bidder from bidding process as mentioned in NIT.

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 (Minimum 50% in each Category with 60% Overall)
1.	Experience Record	40	Equal to or greater than 50%
2.	Personnel Capabilities	20	Equal to or greater than 50%
3.	Equipment Capabilities	10	Equal to or greater than 50%
4.	Financial Soundness:	30	Equal to or greater than 50%
Total:		100	Overall not less than 60%

1. Experience:

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

Sr. No.	Category	Description	Maximum Marks	Marks Allocation / Criteria
1	General Experience (Completed Schemes)	Experience as Prime Constructor in execution of completed projects during the last five (05) years	05	• 05 marks will be awarded for one (01) completed scheme • The scheme must have been completed within the last five (05) years • Cost of the scheme must be equal to or more than the package applied for • Schemes costing less than the package cost shall not be considered
2	General Experience (Schemes In-Hand)	Experience as Prime Constructor in execution of ongoing projects	05	• 05 marks will be awarded for one (01) ongoing scheme • Cost of the scheme must be equal to or more than the package applied for • Schemes costing less than the package cost shall not be considered
3	Similar Nature Experience (Completed Schemes)	Experience as Prime Constructor in execution of similar nature works i.e. Irrigation Channels, Check Dams and Storage Reservoirs	15	• 05 marks will be awarded for each similar nature completed scheme • Maximum three (03) schemes will be considered • Each scheme must have been completed within the last five (05) years • Cost of each scheme must be equal to or more than the package applied for • Similar nature works costing less than the package cost shall not be considered
4	Similar Nature Experience (Schemes In-Hand)	Experience as Prime Constructor in execution of similar nature works currently in hand	15	• 05 marks will be awarded for each similar nature ongoing scheme • Maximum three (03) schemes will be considered • Cost of each scheme must be equal to or more than the package applied for • Similar nature works costing less than the package cost shall not be considered
Grand Total :-			40	—

Note:

- i. The applicants must provide “Letter of Award” of in- hand projects and “Letter of Award” and Taking Over/Completion Certificate of completed projects. No marks will be given to the projects for which above letter/certificate is not provided. Completion certificate must be from the same authority who issued the work order – certificates other than those will not be accepted.
- ii. Applicant shall provide complete information of the projects including scope, cost etc.
- iii. **The applicant shall provide all the information based on facts beyond any doubt. Any misrepresentation, false statement and fake document would make a ground for rejection of the bid during analysis / scrutinizing or evaluation of the proposal. Any fake document or misrepresentation detected during the currency of the contract, will lead to forfeiture of all the securities of the Firm and render the Firm to be blacklisted and would be reported to the PEC for cancellation of their registration / license.**

2. Personnel Capabilities:

Designation	Maximum Marks	Marks Allocation
Project Manager B.Sc. Civil registered with Pakistan Engineering Council	8	• 05 Marks for PhD in civil Engineering with 01-02 years' experience. • 06 Marks for MSc Civil Engineer with minimum 02-04 years' experience. • 5 Marks for BSc Civil Engineer with minimum 05-09 Years' Experience. • 08 Marks for BSc Civil Engineer with minimum 10 years' experience. • 08 Marks for MSc Civil Engineer with minimum 06 years' experience. • 08 Marks for PhD in civil Engineering with 03 years' experience.
Site Engineer B.Sc. Civil registered with Pakistan Engineering Council	3	• 3 Marks will be awarded for B.Sc. Civil Engineer registered with PEC having at least 05 years relevant experience. • 2 Marks for BSc Civil with less than 05 years.
Site Supervisor DAE Civil	3	• 1.5 marks will be awarded for each Associate Engineer with a DAE (Civil), having at least 5 years of relevant experience, with a maximum of 3 marks.
Quantity Surveyor DAE Civil	3	• 3 marks will be awarded for quantity surveyor DAE (Civil) having at least 5 years relevant experience.
Surveyor DAE Civil / Having Certificate	3	• 3 marks will be awarded surveyor having DAE Civil / Certificate and at least 5 years relevant experience.
Total Marks Allocated	20	

Note:

The applicant must provide verifiable proof of employment of the staff and attach detailed as follows:

- i. CV's (with picture on right top corner of first page) duly signed by proposed candidates
- ii. Attested Photocopy of highest qualification degree
- iii. Photocopy of PEC card or equivalent (for Engr. Only)
- iv. If the above documents are not provided with bidding documents, the proposed staff shall not be given marks.

3. Equipment Capabilities

No.	Description	Nos.	Marks Assigned	Explanation for Marks Obtained
1	Excavators	02	02	- If the available quantity of each equipment is less than specified limit give weightage as. - Assign marks x (A / Required Quantity) - If the available quantity of each equipment is more than the minimum equipment requirement full marks will be given. A = Available quantity of each equipment of each Item. R = Required quantity of equipment's. Total Marks = A/R x Marks assigned
2	(Vibrator / Static)	01	01	
3	Dumper Truck	02	02	
4	Tractor with blades & trolley	02	02	
5	Concrete Mixers	03	03	
Total Points:			10	

- Machinery/equipment must be in good working conditions.
- Ownership/rent/lease of the equipment/machinery must be declared on judicial stamp paper by the Applicant(s).
- The client may ask for inspection before the financial bid opening, the costs shall be bear by the bidder.
- No marks shall be given if the Applicant(s) fail to provide judicial stamp paper (in original) of ownership documents/availability/under-taking of rented machinery whatsoever the case may be.

4. Financial Capabilities

The Bidder must submit copies of annual account/audit reports for the last three years duly certified by the Chartered Accounts/ Bank, line(s) of credits and must indicate the soundness of the Applicants financial position.

Sr. No.	Description	Marks Assigned	Criteria for Marks Obtained
a)	Available Bank Credit Line	10	5 Marks if credit line is equal to Rs. 50 million. - If credit line is more than Rs. 50 million and less than Rs. 100 million then the marks can be calculated as under: $A/100 \times 10$ - Full marks for credit line equal to or more than Rs. 100 million where A = Available credit line in million (Note: Proof shall be obtained from the Bank along with the Bank statement within the dates after issue of advertisement. Bank statement varied from these dates will not be entertained)
b)	Working Capital in last three years	10	5 Marks if the available average working capital for the last three years is equal to Rs. 50 million. - For capital more than Rs. 50 million and less than Rs. 100 million, the marks can be calculated as under: $B/100 \times 10$ - Full marks for average working capital during last three years equal to or more than Rs. 100 million B = Average working capital during last three years.
c)	Annual Construction Turnover	10	10 Marks will be awarded if average annual construction turnover of last 3 years is 100 M or above. 5 Marks will be awarded if average construction turnover of last 3 years is equal to 50 M. - No Marks for less than 50 M.
Total Marks Allocated		30	

C. Joint Venture (JV)

1. Joint Venture must comply with the following requirements: -
 - 1.1 The minimum qualification requirements are as follows: -
 - i) The lead partner shall meet not less than 50 percent of each qualifying criteria given in para B above.
 - ii) Each of the partner shall meet not less than 25 percent of each qualifying criteria given in Para B above.
 - iii) The joint venture must collectively satisfy the criteria of para A, B, C, D, E & F for which purpose the relevant figures for each of the partners shall be added together (after assigning the weightage agreed in the JV agreement) to arrive at the JV's total capacity. Individual members must satisfy each of the requirements of para A & E heretofore.
 - 1.2 Any change in a JV after qualification, shall be subject to the written approval of the Employer. Such approval may be denied if: -
 - i) Partner(s) withdraw from a JV and remaining partners do not meet the qualifying requirements;
 - ii) The new partners to a JV are not qualified individually or as another JV; or
 - iii) In the opinion of the Employer, a substantial reduction in competition would result.
 - 1.3 Bid shall be signed by all members in the JV so as to legally bind all partners, jointly and severally, and any bid shall be submitted with a copy of the JV agreement providing the joint and several liabilities with respect to the contract.
2. The post qualification of a JV does not necessarily post qualify any of its partners individually or as a partner in any other JV or association. In case of dissolution of a JV, each one of the constituent firms may post qualify if they meet all the post qualification requirements and any partner of J.V has requested/shall request for the same and then his post qualification shall be subject to the written approval of the Employer.

D. Conflict of Interest

The Applicant (including all members of a JV) must not be associated, nor have been associated in the past, with the consultant or any other entity that has prepared the design, specifications, and other prequalification and bidding documents for the project, or was proposed as Engineer for the contract, over the last five years. Any such association may result in disqualification of the Applicant.

E. Other Factors

- 1) Price Bids of only firms and JVs that have been post qualified under this procedure shall be opened. A qualified firm or a member of a qualified JV may participate only in one bid for the contract. If a firm submits more than one bid, singly or as a JV, all bids including that bidder will be rejected. This rule will not apply in respect of bids which include specialist sub-contractors who are used by more than one bidder.
- 2) The Employer reserves the right to:-

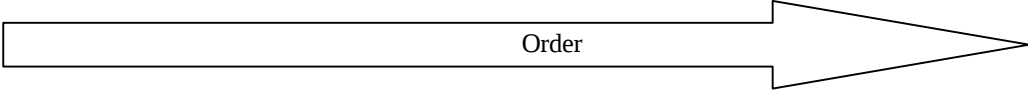
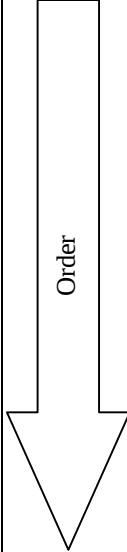
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Appendix-M to Bid

- a) Amend the scope and value of any contract(s) to be bid, in which event the bidder(s) will only bid among those post qualified bidders who meet the requirements of the contract(s) as amended. However, the Employer has to review the disqualified bids who originally do not meet the specified criteria for post -qualification.
- b) Reject or accept any application; and
- c) Cancel the post qualification process and reject all applications.

The Employer shall neither be liable for any such actions nor be under any obligation to inform the Applicant of the grounds for rejection, however, may be debriefed if solicited.

F. Presentation of Technical Proposal

The technical proposal must contain mentioned sections with the visible separators. Sequence must be as mentioned here below. Submission of irrelevant documents will lead to disqualification. All pages must be attested by the contractor/JV.

					
	Certificates	All the required certificates			
	Section - 1 (Firm Experience)	Annex-1	Work Order for In-hand Schemes	Completion Certificate for Completed Schemes	
	Section - 2 (Staff)	Annex-2	CV (clearly mentioning overall experience & academic qualification at top)	Degree/ Certificates	PEC Card - if applicable
	Section - 3 (Equipment)	Affidavit that all the machinery is available, the client may ask for inspection before the financial bid opening, the costs shall be bear by the bidder.			
	Section - 4 (Financial Capability)	Bank Statement	Last three years audit reports		

IN-HAND SCHEMES

Sr.No.	Name of Scheme	Bid Cost (Rs. M)	Client	Work Order at Page No.

COMPLETED SCHEMES

Sr.No.	Name of Scheme	Bid Cost (Rs. M)	Client	Completion Certificate at Page No.

Annex-II**DETAIL OF STAFF**

Sr.No.	Name of Person	Highest Qualification	Total Experience	Position Assigned

CONDITIONS OF CONTRACT

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CONDITIONS OF CONTRACT

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CONDITIONS OF CONTRACT

1 GENERAL PROVISIONS

1.1 Definitions

In the Contract as defined below, the words and expressions defined shall have the following meanings assigned to them, except where the context requires otherwise:

The Contract

1.1.1 “Contract” means the Contract Agreement and the other documents listed in the Contract Data.

1.1.2 “Specifications” means the document as listed in the Contract Data, including Procuring Entity’s requirements in respect of design to be carried out by the Contractor (if any), and any Variation to such document.

1.1.3 “Drawings” means the Procuring Entity’s drawings of the Works as listed in the Contract Data, and any Variation to such drawings.

Persons

1.1.4 “Procuring Entity” means the person named in the Contract Data and the legal successors in title to this person, but not (except with the consent of the Contractor) any assignee.

1.1.5 “Contractor” means the person named in the Contract Data and the legal successors in title to this person, but not (except with the consent of the Procuring Entity) any assignee.

1.1.6 “Party” means either the Procuring Entity or the Contractor.

Dates, Times and Periods

1.1.7 “Commencement Date” means the date fourteen (14) days after the date the Contract comes into effect or any other date named in the Contract Data.

1.1.8 “Day” means a calendar day

1.1.9 “Time for Completion” means the time for completing the Works as stated in the Contract Data (or as extended under Sub-Clause 7.3), calculated from the Commencement Date.

Money and Payments

1.1.10 “Cost” means all expenditure properly incurred (or to be incurred) by the Contractor, whether on or off the Site, including overheads and similar charges but does not include any allowance for profit.

Other Definitions

1.1.11 “Contractor’s Equipment” means all machinery, apparatus and other things required for the execution of the Works but does not include Materials or Plant intended to form part of the Works.

- 1.1.12 “Country” means the Islamic Republic of Pakistan.
- 1.1.13 “Province” means Khyber Pakhtunkhwa.
- 1.1.14 “Procuring Entity’s Risks” means those matters listed in Sub-Clause 6.1.
- 1.1.14 “Force Majeure” means an event or circumstance which makes performance of a Party’s obligations illegal or impracticable and which is beyond that Party’s reasonable control.
- 1.1.15 “Materials” means things of all kinds (other than Plant) to be supplied and incorporated in the Works by the Contractor.
- 1.1.16 “Plant” means the machinery and apparatus intended to form or forming part of the Works.
- 1.1.17 “Site” means the places provided by the Procuring Entity where the Works are to be executed, and any other places specified in the Contract as forming part of the Site.
- 1.1.18 “Variation” means a change which is instructed by the Engineer/Procuring Entity under Sub-Clause 10.1.
- 1.1.19 “Works” means any or all the works whether Supply, Installation, Construction etc. and design (if any) to be performed by the Contractor including temporary works and any variation thereof.
- 1.1.20 “Engineer” means the person, if any, notified by the Procuring Entity to act as Engineer for the purpose of the Contract and named as such in Contract Data.

1.2 Interpretation

Words importing persons or parties shall include firms and organizations. Words importing singular or one gender shall include plural or the other gender where the context requires.

1.3 Priority of Documents

The documents forming the Contract are to be taken as mutually explanatory of one another. If an ambiguity or discrepancy is found in the documents, the priority of the documents shall be in accordance with the order as listed in the Contract Data.

1.4 Law

The law of the Contract is the relevant Law of Khyber Pakhtunkhwa Province,

1.5 Communications

All Communications related to the Contract shall be in English language.

1.6 Statutory Obligations

The Contractor shall comply with the Laws of Islamic Republic of Pakistan and shall give all notices and pay all fees and other charges in respect of the Works.

2 THE PROCURING ENTITY

2.1 Provision of Site

The Procuring Entity shall provide the clear Site, and right of access thereto at the times stated in the Contract Data.

2.2 Permits etc.

The Procuring Entity shall, if requested by the Contractor, assist him in applying for permits, licenses or approvals which are required for the Works.

2.3 Engineer's/Procuring Entity's Instructions

The Contractor shall comply with all instructions given by the Procuring Entity or the Engineer, if notified by the Procuring Entity, in respect of the Works including the suspension of all or part of the Works.

2.4 Approvals

No approval or consent or absence of comment by the Engineer/Procuring Entity shall affect the Contractor's obligations.

3 ENGINEER'S/PROCURING ENTITY'S REPRESENTATIVES

3.1 Authorized Person

The Procuring Entity shall appoint a duly authorized person to act for him and on his behalf for the purposes of this Contract. Such authorized person shall be duly identified in the Contract Data or otherwise notified in writing to the Contractor as soon as he is so appointed. In either case the Procuring Entity shall notify the Contractor, in writing, the precise scope of the authority of such authorized person at the time of his appointment.

3.2 Engineer's/Procuring Entity's Representative

The name and address of Engineer's/Procuring Entity's Representative is given in Contract Data. However, the Contractor shall be notified by the Engineer/Procuring Entity, the delegated duties and authority before the Commencement of Works.

4 THE CONTRACTOR

4.1 General Obligations

The Contractor shall carry out the Works properly and in accordance with the Contract. The Contractor shall provide all supervision, labour, Materials, Plant and Contractor's Equipment which may be required.

4.2 Contractor's Representative

The Contractor shall appoint a representative at site on full time basis to supervise the execution of work and to receive instructions on behalf of the Contractor but only after obtaining the consent of the Procuring Entity for such appointment which consent shall not be unreasonable withheld by the Procuring Entity. Such authorized representative may be substituted/replaced by the Contractor at any time during the Contract Period but only after obtaining the consent of the Procuring Entity as aforesaid.

4.3 Subcontracting

The Contractor shall not subcontract the whole of the Works. The Contractor shall not subcontract any part of the Works without the consent of the Procuring Entity.

4.4 Performance Security

The Contractor shall furnish to the Procuring Entity within fourteen (14) days after receipt of Letter of Acceptance, a Performance Security in the form, amount, and validity stipulated in the Conditions of Contract. The Performance Guarantee shall be of an amount not exceeding 10% of the Contract Price prescribed in Bid Solicitation Documents/ Letter of Acceptance. Such guarantee shall be acceptable in any of the following forms:

bank guarantee from any Scheduled Bank in Pakistan or bank guarantee from a bank located outside Pakistan duly counter-guaranteed by a Scheduled Bank in Pakistan.

5 DESIGN BY CONTRACTOR

5.1 Contractor's Design

The Contractor shall carry out design to the extent specified, as referred to in the Contract Data. The Contractor shall promptly submit to the Engineer/Procuring Entity all designs prepared by him. Within fourteen (14) days of receipt the Engineer/Procuring Entity shall notify any comments or, if the design submitted is not in accordance with the Contract, shall reject it stating the reasons. The Contractor shall not construct any element of the Works designed by him within fourteen (14) days after the design has been submitted to the Engineer/Procuring Entity or which has been rejected. Design that has been rejected shall be promptly amended and resubmitted. The Contractor shall resubmit all designs commented on taking these comments into account as necessary.

5.2 Responsibility for Design

The Contractor shall remain responsible for his bided design and the design under this Clause, both of which shall be fit for the intended purposes defined in the Contract and he shall also remain responsible for any infringement of any patent or copyright in respect of the same. The Engineer/Procuring Entity shall be responsible for the Specifications and Drawings.

6 PROCURING ENTITY'S RISKS

6.1 The Procuring Entity's Risks

The Procuring Entity's Risks are:-

- a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies, within the Country;
- b) rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war, within the Country;
- c) riot, commotion or disorder by persons other than the Contractor's personnel and other employees including the personnel and employees of Sub-Contractors, affecting the Site and/or the Works;
- d) Ionizing radiations, or contamination by radio-activity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosive, or other hazardous properties of any explosive nuclear assembly or nuclear component of such an assembly, except to the extent to which the Contractor/Sub-Contractors may be responsible for the use of any radio-active material;
- e) Pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds;
- f) use or occupation by the Procuring Entity of any part of the Works, except as may be specified in the Contract;
- g) late handing over of sites, anomalies in drawings, late delivery of designs and drawings of any part of the Works by the Procuring Entity's personnel or by others for whom the Procuring Entity is responsible;
- h) a suspension under Sub-Clause 2.3 unless it is attributable to the Contractor's failure; and
- i) physical obstructions or physical conditions other than climatic conditions, encountered on the Site during the performance of the Works, for which the Contractor immediately notified to the Procuring Entity and accepted by the Procuring Entity.

7 TIME FOR COMPLETION

7.1 Execution of the Works

The Contractor shall commence the Works on the Commencement Date and shall proceed expeditiously and without delay and shall complete the Works, subject to Sub-Clause 7.3 below, within the Time for Completion.

7.2 Program

Within the time stated in the Contract Data, the Contractor shall submit to the Engineer / Procuring Entity a program for the Works in the form stated in the Contract Data.

7.3 Extension of Time

The Contractor shall, within such time as may be reasonable under the circumstances, notify the Procuring Entity/Engineer of any event(s) falling within the scope of Sub-Clause 6.1 or 10.3 of these Conditions of Contract and request the Procuring Entity/Engineer for a reasonable extension in the time for the completion of Works. Subject to the aforesaid, the Procuring Entity/Engineer shall determine such reasonable extension in the time for the completion of Works as may be justified in the light of the details/particulars supplied by the Contractor in connection with the such determination by the Procuring Entity/Engineer within such period as may be prescribed by the Procuring Entity/Engineer for the same; and the Procuring Entity shall extend the Time for Completion as determined.

7.4 Late Completion

If the Contractor fails to complete the Works within the Time for Completion, the Contractor's only liability to the Procuring Entity for such failure shall be to pay the amount stated in the Contract Data for each day for which he fails to complete the Works.

8 TAKING-OVER

8.1 Completion

The Contractor may notify the Engineer/Procuring Entity when he considers that the Works are complete.

8.2 Taking-Over Notice

Within fourteen (14) days of the receipt of the said notice of completion from the Contractor the Procuring Entity/Engineer shall either takeover the completed Works and issue a Certificate of Completion to that effect or shall notify the Contractor his reasons for not taking-over the Works. While issuing the Certificate of Completion as aforesaid, the Procuring Entity/Engineer may identify any outstanding items of work which the Contractor shall undertake during the Maintenance Period.

9 REMEDYING DEFECTS

9.1 Remedying Defects

The Contractor shall for a period stated in the Contract Data from the date of issue of the Certificate of Completion carry out, at no cost to the Procuring Entity, repair and rectification work which is necessitated by the earlier execution of poor quality of work or use of below specifications material in the execution of Works and which is so identified by the Procuring Entity/Engineer in writing within the said period.

Upon expiry of the said period, and subject to the Contractor's faithfully performing his aforesaid obligations, the Procuring Entity/Engineer shall issue a Maintenance Certificate whereupon all obligations of the Contractor under this Contract shall come to an end.

Failure to remedy any such defects or complete outstanding work within a reasonable time shall entitle the Procuring Entity to carry out all necessary works at the Contractor's cost. However, the cost of remedying defects not attributable to the Contractor shall be valued as a Variation.

9.2 Uncovering and Testing

The Engineer/Procuring Entity may give instruction as to the uncovering and/or testing of any work. Unless as a result of an uncovering and/or testing it is established that the Contractor's design, Materials, Plant or workmanship are not in accordance with the Contract, the Contractor shall be paid for such uncovering and/or testing as a Variation in accordance with Sub-Clause 10.2.

10. VARIATIONS AND CLAIMS

10.1 Right to Vary

The Procuring Entity/Engineer may issue Variation Order(s) in writing. where for any reason it has not been possible for the Procuring Entity/Engineer to issue such Variations Order(s), the Contractor may confirm any verbal orders given by the Procuring Entity/Engineer in writing and if the same are not refuted/denied by the Procuring Entity/Engineer within seven (7) days of the receipt of such confirmation the same shall be deemed to be a Variation Orders for the purposes of this Sub-Clause.

10.2 Valuation of Variations

Variations shall be valued as follows:

- a) at a lump sum price agreed between the Parties, or
- b) where appropriate, at rates in the Contract, or
- c) in the absence of appropriate rates, the rates in the Contract shall be used as the basis for valuation, or failing which
- d) at appropriate new rates, as may be agreed or which the Engineer/Procuring Entity considers appropriate, or
- e) if the Engineer/Procuring Entity so instructs, at day work rates set out in the Contract Data for which the Contractor shall keep records of hours of labour and Contractor's Equipment, and of Materials, used.

10.3 Early Warning

The Contractor shall notify the Engineer/Procuring Entity in writing as soon as he is aware of any circumstance which may delay or disrupt the Works, or which may

give rise to a claim for additional payment.

To the extent of the Contractor's failure to notify, which results to the Engineer/Procuring Entity being unable to keep all relevant records or not taking steps to minimize any delay, disruption, or Cost, or the value of any Variation, the Contractor's entitlement to extension of the Time for Completion or additional payment shall be reduced/rejected.

10.4. Valuation of Claims

If the Contractor incurs Cost as a result of any of the Procuring Entity's Risks, the Contractor shall be entitled to the amount of such Cost. If as a result of any Procuring Entity's Risk, it is necessary to change the Works, this shall be dealt with as a Variation subject to Contractor's notification for intention of claim to the Engineer/Procuring Entity within fourteen (14) days of the occurrence of cause.

10.5 Variation and Claim Procedure

The Contractor shall submit to the Engineer / Procuring Entity an itemized make-up of the value of variations and claims within twenty-eight (28) days of the instruction or of the event giving rise to the claim. The Engineer/Procuring Entity shall check and if possible, agree the value. In the absence of agreement, the Procuring Entity shall determine the value.

11. CONTRACT PRICE AND PAYMENT

11.1 (a) Terms of Payments

The amount due to the Contractor under any Interim Payment Certificate issued by the Engineer pursuant to this Clause, or to any other terms of the Contract, shall, subject to Clause 7.4 of Conditions of Contract (CoC) be paid by the Procuring Entity to the Contractor within 30 days after such Interim Payment Certificate has been jointly verified by Procuring Entity and Contractor, or, in the case of the Final Certificate referred to in Sub Clause 11.5 of CoC, within 60 days after such Final

Payment Certificate has been jointly verified by Procuring Entity and Contractor; Provided that the Interim Payment shall be caused in 42 days and Final Payment in 60 days in case of foreign funded project. In the event of the failure of the Procuring Entity to make payment within the times stated, the Procuring Entity shall pay to the Contractor compensation at the 28 days rate of KIBOR+2% per annum in local currency and LIBOR+1% for foreign currency, upon all sums unpaid from the date by which the same should have been paid. The provisions of this Sub-Clause are without prejudice to the Contractor's entitlement under Clause 12.2 CoC.

(b) Valuation of the Works

The Works shall be valued as provided for in the Contract Data, subject to Clause 10.

11.2 Monthly Statements

The Contractor shall be entitled to be paid at monthly intervals:

- a) the value of the Works executed; and
- b) The percentage of the value of Materials and Plant reasonably delivered to the Site, as stated in the Contract Data, subject to any additions or deductions which may be due.

The Contractor shall submit each month to the Engineer/Procuring Entity a statement showing the amounts to which he considers himself entitled.

11.3 Interim Payments

Within a period not exceeding seven (7) days from the date of submission of a statement for interim payment by the Contractor, the Engineer / Procuring Entity shall verify the same and within a period not exceeding thirty (30) days from the said date of submission by the Contractor, the Procuring Entity shall pay to the Contractor the sum verified by the Engineer less retention money at the rate stated in the Contract Data.

11.4 Retention

Retention money shall be paid by the Procuring Entity to the Contractor within fourteen (14) days after either the expiry of the period stated in the Contract Data, or the remedying of notified defects, or the completion of outstanding work, all as referred to in Sub-Clause 9.1, whichever is the later.

11.5 Final Payment

Within twenty-one (21) days from the date of issuance of the Maintenance Certificate the Contractor shall submit a final account to the Engineer to verify and the Engineer shall verify the same within fourteen (14) days from the date of submission and forward the same to the Procuring Entity together with any documentation reasonably required to enable the Procuring Entity to ascertain the final contract value.

Within sixty (60) days from the date of receipt of the verified final account from the Engineer, the Procuring Entity shall pay to the Contractor any amount due to the Contractor. While making such payment the Procuring Entity may, for reasons to be given to the Contractor in writing, withhold any part or parts of the verified amount.

11.6 Currency

Payment shall be in the currency stated in the Contract Data.

12 DEFAULT

12.1 Default by Contractor

If the Contractor abandons the Works, refuses or fails to comply with a valid instruction of the Engineer/Procuring Entity or fails to proceed expeditiously and without delay, or is, despite a written complaint, in breach of the Contract, the Procuring Entity may give notice referring to this Sub-Clause and stating the default.

If the Contractor has not taken all practicable steps to remedy the default within fourteen (14) days after receipt of the Procuring Entity's notice, the Procuring Entity may by a second notice given within a further twenty-one (21) days, terminate the Contract. The Contractor shall then demobilize from the Site leaving behind any Contractor's Equipment which the Procuring Entity instructs, in the second notice, to be used for the completion of the Works at the risk and cost of the Contractor.

12.2 Default by Procuring Entity

If the Procuring Entity fails to pay in accordance with the Contract, or is, despite a written complaint, in breach of the Contract, the Contractor may give notice referring to this Sub-Clause and stating the default. If the default is not remedied within fourteen (14) days after the Procuring Entity's receipt of this notice, the Contractor may suspend the execution of all or parts of the Works.

If the default is not remedied within twenty-eight (28) days after the Procuring Entity's receipt of the Contractor's notice, the Contractor may by a second notice given within a further twenty-one (21) days, terminate the Contract. The Contractor shall then demobilize from the Site.

12.3 Insolvency

If a Party is declared insolvent under any applicable law, the other Party may by notice terminate the Contract immediately. The Contractor shall then demobilize from the Site leaving behind, in the case of the Contractor's insolvency, any Contractor's Equipment which the Procuring Entity instructs in the notice is to be used for the completion of the Works.

12.4 Payment upon Termination

After termination, the Contractor shall be entitled to payment of the unpaid balance of the value of the Works executed and of the Materials and Plant reasonably delivered to the Site, adjusted by the following:

- a) any sums to which the Contractor is entitled under Sub-Clause 10.4,
- b) any sums to which the Procuring Entity is entitled,
- c) if the Procuring Entity has terminated under Sub-Clause 12.1 or 12.3, the Procuring Entity shall be entitled to a sum equivalent to twenty percent (20%) of the value of parts of the Works not executed at the date of the termination, and

- d) if the Contractor has terminated under Sub-Clause 12.2 or 12.3, the Contractor shall be entitled to the cost of his demobilization together with a sum equivalent to ten percent (10%) of the value of parts of the Works not executed at the date of termination.

The net balance due shall be paid or repaid within twenty-eight (28) days of the notice of termination.

13 RISKS AND RESPONSIBILITIES

13.1 Contractor's Care of the Works

Subject to Sub-Clause 9.1, the Contractor shall take full responsibility for the care of the Works from the Commencement Date until the date of the Procuring Entity's/Engineer's issuance of Certificate of Completion under Sub-Clause 8.2. Responsibility shall then pass to the Procuring Entity. If any loss or damage happens to the Works during the above period, the Contractor shall rectify such loss or damage so that the Works conform with the Contract.

Unless the loss or damage happens as a result of any of the Procuring Entity's Risks, the Contractor shall indemnify the Procuring Entity, or his agents against all claims loss, damage and expense arising out of the Works.

13.2 Force Majeure

If Force Majeure occurs, the Contractor shall notify the Engineer/Procuring Entity immediately. If necessary, the Contractor may suspend the execution of the Works and, to the extent agreed with the Procuring Entity demobilize the Contractor's Equipment.

If the event continues for a period of eighty-four (84) days, either Party may then give notice of termination which shall take effect twenty-eight (28) days after the giving of the notice.

After termination, the Contractor shall be entitled to payment of the unpaid balance of the value of the Works executed and of the Materials and Plant reasonably delivered to the Site, adjusted by the following:

- a) any sums to which the Contractor is entitled under Sub-Clause 10.4,
- b) the cost of his demobilization, and
- c) less any sums to which the Procuring Entity is entitled.

The net balance due shall be paid or repaid within thirty-five (35) days of the notice of termination.

14 INSURANCE

14.1 Arrangements

The Contractor shall, prior to commencing the Works, effect insurances of the types, in the amounts and naming as insured the persons stipulated in the Contract Data except for items (a) to (e) and (i) of the Procuring Entity's Risks under Sub-Clause

6.1. The policies shall be issued by insurers and in terms approved by the Procuring Entity. The Contractor shall provide the Engineer/Procuring Entity with evidence that any required policy is in force and that the premiums have been paid.

14.2 Default

If the Contractor fails to effect or keep in force any of the insurances referred to in the previous Sub-Clause, or fails to provide satisfactory evidence, policies or receipts, the Procuring Entity may, without prejudice to any other right or remedy, effect insurance for the cover relevant to such as a default and pay the premiums due and recover the same plus a sum in percentage given in Contractor Data from any other amounts due to the Contractor.

15 RESOLUTION OF DISPUTES

15.1 Engineer's Decision

If a dispute of any kind whatsoever arises between the Procuring Entity and the Contractor in connection with the Works, the matter in dispute shall, in the first place, be referred in writing to the Engineer, with a copy to the other party. Such reference shall state that it is made pursuant to this Clause. No later than the twenty-eight (28) days after the day on which he received such reference, the Engineer shall give notice of his decision to the Procuring Entity and the Contractor. Unless the Contract has already been repudiated or terminated, the Contractor shall, in every case, continue to proceed with the Work with all due diligence, and the Contractor and the Procuring Entity shall give effect forthwith to every such decision of the Engineer unless and until the same shall be revised, as hereinafter provided in an arbitral award.

15.2 Notice of Dissatisfaction

If a Party is dissatisfied with the decision of the Engineer or if no decision is given within the time set out in Sub-Clause 15.1 here above, the Party may give notice of dissatisfaction referring to this Sub-Clause within fourteen (14) days of receipt of the decision or the expiry of the time for the decision. If no notice of dissatisfaction is given within the specified time, the decision shall be final and binding on the Parties. If notice of dissatisfaction is given within the specified time, the decision shall be binding on the Parties who shall give effect to it without delay unless and until the decision of the Engineer is revised by an arbitrator.

15.3 Arbitration

A dispute which has been the subject of a notice of dissatisfaction shall be finally settled as per provisions of Arbitration Act 1940 (Act No. X of 1940) and Rules made thereunder and any statutory modifications thereto. Any hearing shall be held at the place specified in the Contract Data and in the language referred to in Sub-Clause 1.5.

15.4 Resolution of Dispute in Absence of the Engineer.

In case no Engineer has been appointed, the dispute, if any, between the Procuring Entity and the Contractor in connection with the Works, shall first be tried to be resolved amicably. In case the dispute could not be resolved amicably, it shall be settled as per provision of Arbitration Act-1940.

16 INTEGRITY PACT

161 If the Contractor, or any of his Sub-Contractors, agents or servants is found to have violated or involved in violation of the Integrity Pact signed by the Contractor as Schedule-F to his Bid, then the Procuring Entity 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 Sub-Contractors, agents or servants;
- (b) terminate the Contract; and
- (c) recover from the Contractor any loss or damage to the Procuring Entity as a result of such termination or of any other corrupt business practices of the Contractor or any of his Sub-Contractors, agents or servants.

On termination of the Contract under Sub-Para (b) of this Sub-Clause, the Contractor shall demobilize from the Site leaving behind Contractor's Equipment which the Procuring Entity instructs, in the termination notice, to be used for the completion of the Works at the risk and cost of the Contractor. Payment upon such termination shall be made under Sub-Clause 12.4, in accordance with Sub-Para (c) thereof, after having deducted the amounts due to the Procuring Entity under Sub-Para (a) and (c) of this Sub-Clause.

CONTRACT DATA

(Note: Except where otherwise indicated, all Contract Data should be filled in by the Procuring Entity prior to issuance of the Bid Solicitation Documents)

Sub-Clauses of Conditions of Contract

1.1.3 Procuring Entity's Drawings, if any
(To be listed by the Procuring Entity)

1.1.4 **The Procuring Entity** means

Executive Engineer

1.1.5 **The Contractor** means _____

The one who take participant in The Bidding Process

1.1.7 **Commencement Date** means the date of issue of Engineer's Notice to Commence which shall be issued within fourteen (14) days of the signing of the Contract Agreement.

1.1.9 **Time for Completion** _____ Months days

(The time for completion of the whole of the Works should be assessed by the Procuring Entity)

1.1.20 **Engineer (if appointed)**

1.3 **Documents forming the Contract listed in the order of priority:**

- (a) The Contract Agreement
- (b) Letter of Acceptance
- (c) The completed Form of Bid
- (d) Contract Data
- (e) Conditions of Contract
- (f) The completed Schedules to Bid including Schedule of Prices
- (g) The Drawings, if any
- (h) The Specifications
- (i) _____
- (j) _____

(The Procuring Entity may add, in order of priority, such other documents as form part of the Contract. Delete the document, if not applicable)

2.1 **Provision of Site:** On the Commencement Date*

31 **Authorized person:** _____

3.2 **Name and address of Engineer's/Procuring Entity's representative**

4.4 **Performance Security:**

Amount _____

Validity _____

(Form: As provided under Standard Forms* of these Documents)

5.1 **Requirements for Contractor's design (if any):**

Specification Clause No's _____

7.2 **Program:**

Time for submission: Within fourteen (14) days* of the Commencement Date.

Form of program: _____ (Bar Chart/CPM/PERT or other)

7.4 Amount payable due to failure to complete shall be % per day up to a maximum of (10%) * of sum stated in the Letter of Acceptance

(Usually the liquidated damages are set between 0.05 percent and 0.10 percent per day.)

9.1 **Period for remedying defects**

10.2 (e) **Variation procedure:**

Day work rates _____ (details)

11.1 ***(a) Terms of Payments**

Payment of Contract Price shall be made in the following manners:

Payment of Contract Price shall be made in the following manner:

10-15% of Contract Price shall be paid as interest free mobilization advance within days after the receipt of acceptable Bank Guarantee for such advance payment. The recovery / adjustment of mobilization advance or other advances, if any, is to be affected @ 10- 15% of each IPC, starting from the 1st IPC of the executed works. Full recovery of advances, if remains un-accounted for in the IPC's, is to be affected in the final payment certificate.

80-85% shall be paid in accordance with Clause 8.2, 11.2 & 11.3 of Conditions of Contract. And Five percent (5%) shall be paid in accordance with Clause 11.4 of Conditions of Contract. 11.1

*** (b) Valuation of the Works*:**

- i) Lump sum price _____ (details), or
- ii) Lump sum price with schedules of rates _____ (details), or
- iii) Lump sum price with bill of quantities _____ (details), or
- iv) Re-measurement with estimated/bid quantities in the Schedule of Prices _____ (details), or/and
- v) Cost reimbursable _____ (details)

11.2 (b) Percentage of value of Materials and Plant(for day work if applicable)

Materials	%)*
Plant	%)*

11.3 Percentage of retention: five (5%)

11.6 Currency of payment: Pak. Rupees

14.1 Insurances:

Type of cover

The Works

Amount of cover

The sum stated in the Letter of Acceptance plus fifteen percent (15%)

Type of cover

Contractor's Equipment:

Amount of cover

Full replacement cost

* (Procuring Entity to amend as appropriate)

Type of cover

Third Party-injury to persons and damage to property

(The minimum amount of third party insurance should be assessed by the
Procuring Entity and entered).

Workers:

Other cover*:

(In each case name of insured is Contractor and Procuring Entity)

14.2 Amount to be recovered

Premium plus _____percent (____%).

15.3 Arbitration

Place of Arbitration:_____

* (Procuring Entity to specify as appropriate)

STANDARD FORMS

(Note: Standard Forms provided in this document for securities are to be issued by a bank. In case the bidder chooses to issue a bond for accompanying his bid or performance of contract or receipt of advance, the relevant format shall be tailored accordingly without changing the spirit of the Forms of securities).

FORM OF BID SECURITY

(Bank Guarantee)

Guarantee No. _____

Executed on _____

(Letter by the Guarantor to the Procuring Entity)

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

Name of Principal (Bidder) with
address: _____

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

Bid Reference No. _____ Date of Bid _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bid and at the request of the said Principal, we the Guarantor above-named are held and firmly bound unto the _____, (hereinafter called The "Procuring Entity") 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 Principal has submitted the accompanying Bid numbered and dated as above for _____ (Particulars of Bid) to the said Procuring Entity; and

WHEREAS, the Procuring Entity has required as a condition for considering the said Bid that the Principal furnishes a Bid Security in the above said sum to the Procuring Entity, conditioned as under:

- (1) that the Bid Security shall remain valid for a period of twenty eight (28) days beyond the period of validity of the bid;
- (2) that in the event of;
 - (a) the Principal withdraws his Bid during the period of validity of Bid, or
 - (b) the Principal does not accept the correction of his Bid Price, pursuant to Sub-Clause 16.4 (b) of Instructions to Bidders, or
 - (c) failure of the successful bidder to
 - (i) furnish the required Performance Security, in accordance with Sub-Clause IB-21.1 of Instructions to Bidders, or
 - (ii) sign the proposed Contract Agreement, in accordance with Sub-Clauses IB-20.2 & 20.3 of Instructions to Bidders,

the entire sum be paid immediately to the said Procuring Entity for delayed completion and not as penalty for the successful bidder's failure to perform.

(53)

NOW THEREFORE, if the successful bidder shall, within the period specified therefore, on the prescribed form presented to him for signature enter into a formal Contract Agreement with the said Procuring Entity in accordance with his Bid as accepted and furnish within fourteen (14) days of receipt of Letter of Acceptance, a Performance Security with good and sufficient surety, as may be required, upon the form prescribed by the said Procuring Entity 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 then this obligation shall be void and of no effect, but otherwise to remain in full force and effect.

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

PROVIDED ALSO THAT the Procuring Entity shall be the sole and final judge for deciding whether the Principal 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 Guarantor shall pay without objection the sum stated above upon first written demand from the Procuring Entity forthwith and without any reference to the Principal or any other person.

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

	_____ Guarantor (Bank)
Witness:	1. Signature _____
1. _____	2. Name _____
_____	3. Title _____
Corporate Secretary (Seal)	
2. _____	
_____ (Name, Title & Address)	Corporate Guarantor (Seal)

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

Guarantee No. _____
Executed on _____

(Letter by the Guarantor to the Procuring Entity)

Name of Guarantor (Scheduled Bank in Pakistan) 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 Procuring Entity) in the penal sum of the amount stated above, for the payment of which sum well and truly to be made to the said Procuring Entity, 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 Procuring Entity'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 Procuring Entity, 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 the said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause 9, Remedying Defects, of Conditions of Contract are fulfilled.

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

We, _____ (the Guarantor), waiving all objections and defences under the Contract, do hereby irrevocably and independently guarantee to pay to the Procuring Entity without delay upon the Procuring Entity's first written demand without cavil or arguments and without requiring the Procuring Entity to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Procuring Entity's written declaration that the Principal has refused or failed to perform the obligations under the Contract, for which payment will be effected by the Guarantor to Procuring Entity's designated Bank & Account Number.

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

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

Witness:

1. _____

Corporate Secretary (Seal)

2. _____

(Name, Title & Address)

Guarantor (Bank)

1. Signature _____

2. Name _____

3. Title _____

Corporate Guarantor (Seal)

FORM OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT (hereinafter called the "Agreement") made on the _____ day of _____ 20__ between _____ (hereinafter called the "Procuring Entity") of the one part and _____ (hereinafter called the "Contractor") of the other part.

WHEREAS the Procuring Entity 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 after incorporating addenda, if any except those parts relating to Instructions to Bidders, shall be deemed to form and be read and construed as part of this Agreement, viz:
 - (a) The Letter of Acceptance;
 - (b) The completed Form of Bid along with Schedules to Bid;
 - (c) Conditions of Contract & Contract Data;
 - (d) The priced Schedule of Prices;
 - (e) The Specifications; and
 - (f) The Drawings
3. In consideration of the payments to be made by the Procuring Entity to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Procuring Entity to execute and complete the Works and remedy defects therein in conformity and in all respects within the provisions of the Contract.
4. The Procuring Entity hereby covenants to pay the Contractor, in consideration of the execution and completion of the Works as per provisions of the Contract, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

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

Signature of the Contactor _____ Signature of the Procuring Entity _____ (Seal) (Seal)

Signed, Sealed and Delivered in the presence of:

Witness:

(Name, Title and Address)

Witness:

(Name, Title and Address)

FORM OF BANK GUARANTEE FOR ADVANCE PAYMENT

Guarantee No. _____

Executed on _____

(Letter by the Guarantor to the Procuring Entity)

WHEREAS the _____ (hereinafter called the Procuring Entity) has entered into a Contract for _____

_____ (Particulars of Contract), with _____
_____ (hereinafter called the Contractor).

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

AND WHEREAS the Procuring Entity has asked the Contractor to furnish Guarantee to secure the advance payment for the performance of his obligations under the said Contract.

AND WHEREAS _____ (Scheduled Bank) (hereinafter called the Guarantor) at the request of the Contractor and in consideration of the Procuring Entity 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 fulfillment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Procuring Entity for payment not exceeding the aforementioned amount.

Notice in writing of any default, of which the Procuring Entity shall be the sole and final judge, as aforesaid, on the part of the Contractor, shall be given by the Procuring Entity 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 come into force as soon as the advance payment has been credited to the account of the Contractor.

This Guarantee shall expire not later than _____

by which date we must have received any claims by registered letter, telegram, telex or E-mail.

It is understood that you will return this Guarantee to us on expiry or after settlement of the total amount to be claimed hereunder.

Guarantor (Scheduled Bank)

Witness:

1. _____

1. Signature _____

Corporate Secretary (Seal)

2. Name _____

3. Title _____

2. _____

(Name, Title & Address)

Corporate Guarantor (Seal)

SPECIFICATIONS

[Note for Preparing the Specifications]

A set of precise and clear specifications is a prerequisite for bidders to respond realistically and competitively to the requirements of the user without qualifying their Bids. The specifications must be drafted to permit the widest possible competition and, at the same time, present a clear statement of the required standards of workmanship, materials, performance of the works. Only if this is done objectives of economy, efficiency, and fairness in procurement will be realized and responsiveness of Bids can be ensured, and the subsequent task of bid evaluation can be facilitated. The specifications should require that materials to be incorporated in the works be new, unused, and of the most recent or current models, and incorporated all recent improvements in design and materials unless provided for otherwise in the contract.

Samples of specifications from similar to previous procurements are useful in this respect. The use of metric units is encouraged. Depending on the complexity of the works and the repetitiveness of the type of procurement, it may be advantageous to standardize the Technical Specifications that should cover all classes of workmanship, materials and equipment although not necessarily to be used in a particular procurement.

Care must be taken in drafting specifications to ensure that they are not restrictive. In the specification of standards for equipment, materials, and workmanship, recognized international standards should be used as much as possible. The specifications shall consider all conditions but not limited to seismic conditions, weather conditions and environmental impact. The specifications should state that equipment, materials, and workmanship that meet other authoritative standards, and which ensure at least a substantially equal quality than the standards mentioned, will also be acceptable. The following clause may be inserted in the Specifications.

Sample Clause: Equivalency of Standards and Codes

Wherever reference is made in the Specifications to specific standards and codes to be met by Works to be furnished and tested, the provisions of the latest current edition or revision of the relevant shall apply, unless otherwise expressly stated in the Contract. Other authoritative standards that ensure equivalence to the standards and codes specified will be acceptable.]

***DRAWINGS**

* (Note: The Engineer/Procuring Entity may incorporate specific Drawings for Bidding purposes only or may include the detailed drawings in a separate volume, if necessary).

**SYSTEM DESIGN FOR MANUAL BASED SOLAR POWER
PUMPING SETS**

S N o.	Name of Work	Discharge (l- GPH)	Head (Feet)	Setting (feet)	Water Horse Power (KW)	Pump efficiency	Motor Efficiency	Motor Input Power (watt)	Shaft Power (Watt)	Total PV Power (Watt)	PV Generator Peak Power (watts)				PV De- Rating Factor for Solar Panels as per Specifi cation attache d
											No of Strings in Parallel	No of Modul e/Strin g in Series	Module Size	Total PV Generati on	
1.	Construction of New Solar Irrigation Tube well at Bosti Khel TSD Darra.	390	320	4400											
2.	Existing Solar Irrigation Tube Well at Akhorwal TSD Darra.	390	325	4000											
3.	Existing Solar Irrigation Tube Well at Jawaki TSD Darra.	380	320	4000											

BOQ

BILL OF QUANTITY Civil Works Package-2

S.#	MRS 2025 1st bi (Annau)	Description.	Unit	Qty:	Rate.	Amount
Total Amount In Rs.						
Total Amount In Million.						

Note:- Any other item of work crop out during execution will be paid on MRS-2025 1st bi
The Quantities are liable to be increased or decreased during execution.

Contractor Premium _____ % Above / Below.

Signature of Contractor _____

BILL OF QUANTITIES Civil Work

(1. Construction of New Solar Irrigation Tube well at Bosti Khel TSD Darra)

B.O.Q.

Name of work ADP NO.2153/250066 Construction of 30 Nos Solar Based Irrigation Tube Wells In Merged Districts

Sub Work:- Construction of New Solar Irrigation Tube well at Bosti Khel TSD Darra.

Estimated Cost:-

8165690 /-

Estimated Money:-

163314 /-

Time Limit:-

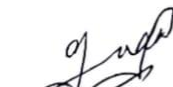
As per work order

S#	MRS. 2025 1st Bi Annual	Discription	Unit	Qty	Rate	Amount
1	03-11-a	Excavation in shingle or gravel formation & rock not requiring blast, undressed, 50m lead : Dry	M ³	46.127	311.22	14356
2	03-25-c	Excavation in foundation of building, bridges etc complete in hard soil or soft murum	M ³	19.694	442.42	8713
3	03-12-d	Earth excavation in irrigation channels/drain & disposal upto 25m. & dressing : in Shingle/Gravel	M ³	26.620	938.14	24973
4	24-41	Conducting Elec: Resistivity survey of the area and furnishing its reports.	Job	1.00	37258.38	37258
5	24-01-a	Mobilization of plant, equipment and camping arrangements etc & demobilization after completion.	Job	1.00	76186.66	76187
6	24-02-a-09	Drilling of Bore holes for tube well in all types of soil and soft rock except hard rock from ground level upto 328 ft depth (0m to 100m), including sinking, collection of 100 % corings and withdrawing of pipe, complete as per specifications.: Dia of Bore 18" (450 mm) i/d	M	100.00	17564.64	1756464
7	24-02-b-07	Drilling of Bore holes for tube well in all types of soil and soft rock except hard rock from a depth of 328.1 ft to 656 ft (100.1m to 200 m) depth, including sinking, collection of 100 % corings and withdrawing of pipe, complete as per specifications.: 18" (450 mm) i/d	M	25.00	20178.64	504466
8	24-12-c-03	Providing and installing PVC blind pipe BSS Class "D" in Tube Well Bore Hole including Sockets and Solvents and jointing with strainer etc. complete : 10" Nominal Pipe Size (NPS) (250 mm)	M	100.00	14296.03	1429603
9	24-09-c-03	Providing and installing PVC Strainer BSS Class "D" of approved make \ quality in tubewell bore hole, including socket, special sockets, studs etc. complete as per specification: 10" Nominal Pipe Size (NPS) (250 mm)	M	25.000	7163.73	179093
10	24-10-c-03	Providing and installing wooden bail plug intubewell BSS Class 'D' working pressure : 10" (250 mm) i/d	No	1.000	7168.46	7168
11	24-14	Shrouding with graded pack gravel 3/8" (10 mm) to 1/8" (3 mm) around tubewell in bore hole complete as per specification:-	M	125.000	347.67	43459
12	24-13-b	Testing and developing of tubewell with DNT unit 8" i/d and above complete as per specifications	P.H	72.000	3369.41	242598
13	24-13-a	Cleaning and washing of tubewell with air compressor in all sizes and depth, 8" i/d and above	P.H	72.000	3364.86	242270
14	06-05-f	Plain Cement Concrete including placing, compacting, finishing & curing (Ratio 1:2:4)	M3	10.012	17035.28	170556
15	06-03-b	Cement Concrete (brick/stone ballast, 1.5" to 2"/nullah shingle well graded and cleaned) in foundation & plinth (Ratio 1:4:8)	M3	14.361	10776.73	154765
16	07-04-a-03	1st class brick work in foundation and plinth in Cement, sand mortar 1:4	M3	41.736	17062.81	712133
17	06-26-a-02	Damp proof course of cem. conc. 1:2:4 including bitumen coat, 1 layer polythene & 1 coat bitumen (2" thick)	M2	32.052	1510.02	48399
18	07-05-a-03	1st class brick work in ground floor Cement, sand mortar 1:4	M3	44.762	18128.70	811477
19	03-18-d	Filling, watering and ramming earth under floor with earth excavated from outside lead upto 30m	M3	126.570	527.17	66724
20	25-45-a	Supplying and Fixing 18 SWG MS Sheet Door with angle iron frame 1 5"x1 5"x1/8", bolt, hinges, paint etc complete	M2	7.525	11557.74	86973
21	11-09-b	Cement plaster 1:4, upto 20' height 1/2" thick	M2	180.428	519.49	93731
22	11-18-b	Cement pointing struck joints, on walls, upto 20' height :Ratio 1:3	M2	213.635	530.25	113280
23	11-23-a-03	White washing New surface : Three coats	M2	370.486	77.14	28579
24	25-42	Providing and fixing barbed wire (12 Gauge) fencing consisting of 1 5"x1 5"x3/16" angle iron post 3 25 ft long, 5 to 6 ft centre to centre embedded in cement concrete 1:2:4 base of size 9"x9"x12", and 3 rows of barbed wire, painting posts, etc complete in all respects	M	84.430	1317.89	111269
25	06-07-a-03	RCC in roof slab, beam, column & other structural members, insitu or precast Type C (1:2:4)	M3	2.402	19446.34	46710

26	06-08-c	Supply & fabricate M.S. reinforcement for cement concrete (Hot rolled deformed bars Grade 40)	P.Ton	0.1781	303008.50	53966
27	10-15-d	Provide & lay topping of concrete 1:2:4, including surface finishing & dividing in panels : 2" thick	M3	17.837	1431.12	25527
28	25-44	Supplying and Fixing 18SWG Steel Almirah, 12" max depth including box shelves, back, shelves, lock, spray paint complete	M2	1.394	17163.74	23926
29	(09-36)	Providing and fixing AC rain water down pipe 4" dia, with shoe, tee, bend & clamp etc	M	0.320	1133.44	363
30	11-18-a	Cement Pointing struck joints, on walls, upto 20' high (Ratio 1:2)	M2	23.410	561.34	13141
31	11-08-a	Cement plaster 1:3 upto 20' height 3/8" thick	M2	44.590	499.95	22293
32	24-16-c-08	Providing, Laying, cutting, jointing, testing and disinfecting GI Pipe line in trenches, with socket joint using GI Pipes of EN10255-2004 (approved light quality) i/c specials etc: complete as per specification 3" NPS	M	1.000	3950.44	3950
33	24-16-c-06	Providing, laying, cutting, jointing, testing and disinfecting GI pipeline in trenches, with socket joint, using GI pipes of EN 10255 - 2004 (Approved Light quality) including specials etc. Complete as per specifications except excavation. '2" Nominal Pipe Size (NPS)	M	4.000	2431.83	9727
34	24-22-a-01	Providing and Fixing of Sluice valve of BSS quality (BS 5163) for GI, PVC, MS, HDPE and also for all type of pipes i/c rubber sheet, jointing material complete in all respect PN-16, 3" (75 mm) dia of Valve	M	3.047	39874.52	121498
35	03-67-c	Structure back fill using common material available at site.	M3	60.317	544.30	32831
36	25-43	Providing & Fixing barbed (22SWG) wire fencing on compound wall of 1.5"x1.5"x3/16" angle iron post 3' long, 4' apart in bedded in CC 1:2:4 base of size 6"x6"x9" and 4 rows of barbed wire i/c binding wire, painting post, etc: complete in all respect.	M	19.202	1462.27	28079
37	25-30-a	Providing and fixing steel grated doors, complete with locking arrangement, angle iron frame 2"x2"x3/8" and 3/4" round bars 4" center to center.	M2	1.765	28006.49	49431
38	06-05-h	Plain cement concrete i/c Placing, Compacting, Finishing and Curing (Ratio 1:3:6)	M3	26.618	13983.72	372219
39	06-46-b	Erection and removal of Form work with Wood Surface Finishing for RCC or Plain cement Concrete in any shape - Position / Vertical	M2	174.660	762.91	133250
40	MR	Supply and Fixing of Panel Naccas 12"-18" Complete in all respect.	No	5.000	2500.00	12500
41	MR	Supply & Fixing of Steel Girder size 7"x4"	Rft	15.500	900.00	13950
					Total:-	7927854
					Multiplied by area factor @ 3%	237836
					Total:-	8165690
					Rs In Million:-	8.166

Note:-

- 1 If any other item (s) crop up during execution of the work, the same shall be executed by the Contractor as per direction of Engineer Incharge
- 2 Quantities mention in the B.O.Q are tentative basis, which may vary during execution of the work.


Sub Engineer


Assistant Engineer
Irrigation Division
District Orakzai

_____ % AT PAR/ Above / Below

Signature of Contractor _____

BILL OF QUANTITIES CIVIL WORK

(2. Existing Solar Irrigation Tube Well at Akhorwall TSD Darra Kohat)

IRRIGATION DIVISION District Orakzai

B.O.Q.

Name of work ADP NO.2153/250066 Construction of 30 Nos Solar Based Irrigation Tube Wells In Merged Districts

Sub Work:- Existing Solar Irrigation Tube Well at Akhorwall TSD Darra Kohat.

Estimated Cost:-

1792626 /-

Estimated Money:-

35853 /-

Time Limit:-

As per work order

S#	MRS. 2025 1st Bi Annual	Description	Unit	Qty	Rate	Amount
1	03-11-a	Excavation in shingle or gravel formation & rock not requiring blast, undressed, 50m lead : Dry	M ³	10.773	311.22	3353
2	03-25-c	Excavation in foundation of building, bridges etc complete in hard soil or soft murum.	M ³	19.694	442.42	8713
3	03-12-d	Earth excavation in irrigation channels/drain & disposal upto 25m. & dressing : in Shingle/Gravel	M ³	18.123	938.14	17002
4	06-03-b	Cement Concrete (brick/stone ballast, 1.5" to 2"/nullah shingle well graded and cleaned) in foundation & plinth (Ratio 1:4:8)	M3	7.933	10776.73	85492
5	07-04-a-03	1st class brick work in foundation and plinth in Cement, sand mortar 1:4	M3	20.010	17062.81	341427
6	06-05-f	Plain Cement Concrete (PCC) including placing, compacting, finishing and curing (Ratio 1:2:4).	M3	5.228	17035.28	89060
7	11-18-a	Cement Pointing struck joints, on walls, upto 20' height (Ratio 1:2)	M2	23.410	561.34	13141
8	11-08-a	Cement plaster 1:3 upto 20' height 3/8" thick	M2	44.590	499.95	22293
9	24-16-c-08	Providing, Laying, cutting, jointing, testing and disinfecting GI Pipe line in trenches, with socket joint using GI Pipes of EN 10255-2004 (approved light quality) i/c specials etc: complete as per specification 3" NPS	M	1.000	3950.44	3950
10	24-16-c-06	Providing, laying, cutting, jointing, testing and disinfecting GI pipeline in trenches, with socket joint, using GI pipes of EN 10255 - 2004 (Approved Light quality) including specials etc. Complete as per specifications except excavation. "2" Nominal Pipe Size (NPS)	M	4.000	2431.83	9727
11	24-22-a-01	Providing and Fixing of Sluice valve of BSS quality (BS 5163) for GI, PVC, MS, HDPE and also for all type of pipes i/c rubber sheet, jointing material complete in all respect PN-16, 3" (75 mm) dia of Valve	M	3.047	39874.52	121498
12	03-67-c	Structure back fill using common material available at site.	M3	47.574	544.30	25895
13	25-43	Providing & Fixing barbed (22SWG) wire fencing on compound wall of 1.5"x1.5"x3/16" angle iron post 3' long, 4' apart in bedded in CC 1:2:4 base of size 6"x6"x9" and 4 rows of barbed wire i/c binding wire, painting post, etc: complete in all respect.	M	19.202	1462.27	28079
14	25-30-a	Providing and fixing steel grated doors, complete with locking arrangement, angle iron frame 2"x2"x3/8" and 3/4" round bars 4" center to center.	M2	1.765	28006.49	49431
15	06-26-a-02	Damp proof course of cem. conc. 1:2:4 including bitumen coat, 1 layer polythene & 1 coat bitumen (2" thick)	M2	8.222	1510.02	12415
16	07-05-a-03	1st class brick work in ground floor Cement, sand mortar 1:4	M3	16.218	18128.70	294011
17	25-45-a	Supplying and Fixing 18 SWG MS Sheet Door with angle iron frame 1.5"x1.5"x1/8", bolt, hinges, paint etc complete	M2	3.902	11557.74	45098
18	11-09-b	Cement plaster 1:4, upto 20' height 1/2" thick	M2	55.568	519.49	28867
19	11-18-b	Cement pointing struck joints, on walls, upto 20' height :Ratio 1:3	M2	85.435	530.25	45302
0	11-23-a-03	White washing New surface : Three coats	M2	117.426	77.14	9058

21	06-07-a-03	RCC in roof slab, beam, column & other structural members, insitu or precast. Type C (1:2:4)	M3	2.402	19446.34	46710
22	06-08-c	Supply & fabricate M.S. reinforcement for cement concrete (Hot rolled deformed bars Grade 40)	P.Ton	0.1780	303008.50	53936
23	10-15-d	Provide & lay topping of concrete 1:2:4, including surface finishing & dividing in panels : 2" thick	M3	17.837	1431.12	25527
24	25-44	Supplying and Fixing 18SWG Steel Almirah, 12" max depth including box shelves, back, shelves, lock, spray paint complete	M2	1.394	17163.74	23926
25	(09-36)	Providing and fixing AC rain water down pipe 4" dia, with shoe, tee, bend & clamp etc	M	0.320	1133.44	363
26	06-05-h	Plain cement concrete i/c Placing, Compacting, Finishing and Curing (Ratio 1:3:6)	M3	18.123	13983.72	253427
27	06-46-b	Erection and removal of Form work with Wood Surface Finishing for RCC or Plain cement Concrete in any shape - Position / Vertical	M2	118.920	762.91	90725
28	MR	Supply and Fixing of Pannel Naccas 12"-18" Complete in all respect.	No	5.000	2500.00	12500
29	MR	Supply & Fixing of Steel Girder size 7"x4"	Rft	15.500	900.00	13950
Total:-						1774877
Multiplied by area factor @ 1%						17749
Total:-						1792626
Rs In Million:-						1.793

Note:-

- 1 If any other item (s) crop up during execution of the work, the same shall be executed by the Contractor as per direction of Engineer Incharge
- 2 Quantities mention in the B.O.Q are tentative basis, which may vary during execution of the work.


Sub Engineer


Assistant Engineer
Irrigation Division
District Orakzai

_____ % AT PAR/ Above / Below

Signature of Contractor _____

BILL OF QUANTITIES CIVIL WORK

(3. Existing Solar Irrigation Tube Well at Jawaki area TSD Darra Kohat)

IRRIGATION DIVISION District Orakzai

B.O.Q.

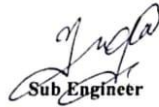
Name of work ADP NO.2153/250066 Construction of 30 Nos Solar Based Irrigation Tube Wells In Merged Districts
 Sub Work:- Existing Solar Irrigation Tube Well at Jawaki area TSD Darra Kohat.
 Estimated Cost:- 1828220 /-
 Estimated Money:- 36564 /-
 Time Limit:- As per work order

S#	MRS. 2025 1st Bi Annual	Description	Unit	Qty	Rate	Amount
1	03-11-a	Excavation in shingle or gravel formation & rock not requiring blast, undressed, 50m lead : Dry	M ³	10.773	311.22	3353
2	03-25-c	Excavation in foundation of building, bridges etc complete in hard soil or soft murum.	M ³	19.694	442.42	8713
3	03-12-d	Earth excavation in irrigation channels/drain & disposal upto 25m. & dressing : in Shingle/Gravel	M ⁴	19.822	938.14	18596
4	06-03-b	Cement Concrete (brick/stone ballast, 1.5" to 2" nullah shingle well graded and cleaned) in foundation & plinth (Ratio 1:4:8)	M3	7.933	10776.73	85492
5	07-04-a-03	1st class brick work in foundation and plinth in Cement, sand mortar 1:4	M3	20.010	17062.81	341427
6	06-05-f	Plain Cement Concrete (PCC) including placing, compacting, finishing and curing (Ratio 1:2:4).	M3	5.228	17035.28	89060
7	11-18-a	Cement Pointing struck joints, on walls, upto 20' hight (Ratio 1:2)	M2	23.410	561.34	13141
8	11-08-a	Cement plaster 1:3 upto 20' height 3/8" thick	M2	44.590	499.95	22293
9	24-16-c-08	Providing, Laying, cutting, jointing, testing and disinfecting GI Pipe line in trenches, with socket joint using GI Pipes of EN 10255-2004 (approved light quality) i/c specials etc: complete as per specification 3" NPS	M	1.000	3950.44	3950
10	24-16-c-06	Providing, laying, cutting, jointing, testing and disinfecting GI pipeline in trenches, with socket joint, using GI pipes of EN 10255 - 2004 (Approved Light quality) including specials etc. Complete as per specifications except excavation. '2" Nominal Pipe Size (NPS)	M	4.000	2431.83	9727
11	24-22-a-01	Providing and Fixing of Sluice valve of BSS quality (BS 5163) for GI, PVC, MS, HDPE and also for all type of pipes i/c rubber sheet, jointing material complete in all respect PN-16, 3" (75 mm) dia of Valve	M	3.047	39874.52	121498
12	03-67-c	Structure back fill using common material available at site.	M3	50.123	544.30	27282
13	25-43	Providing & Fixing barbed (22SWG) wire fencing on compound wall of 1.5"x1.5"x3/16" angle iron post 3' long, 4' apart in bedded in CC 1:2:4 base of size 6"x6"x9" and 4 rows of barbed wire i/c binding wire, painting post, etc: complete in all respect.	M	19.202	1462.27	28079
14	25-30-a	Providing and fixing steel grated doors, complete with locking arrangement, angle iron frame 2"x2"x3/8" and 3/4" round bars 4" center to center.	M2	1.765	28006.49	49431
15	06-26-a-02	Damp proof course of cem. conc. 1:2:4 including bitumen coat, 1 layer polythene & 1 coat bitumen (2" thick)	M2	8.222	1510.02	12415
16	07-05-a-03	1st class brick work in ground floor Cement, sand mortar 1:4	M3	16.218	18128.70	294011
17	25-45-a	Supplying and Fixing 18 SWG MS Sheet Door with angle iron frame 1.5"x1.5"x1/8", bolt, hinges, paint etc complete	M2	3.902	11557.74	45098
18	11-09-b	Cement plaster 1:4, upto 20' height 1/2" thick	M2	55.568	519.49	28867
19	11-18-b	Cement pointing struck joints, on walls, upto 20' height :Ratio 1:3	M2	85.435	530.25	45302

20	11-23-a-03	White washing: New surface : Three coats	M2	117.426	77.14	9058
21	06-07-a-03	RCC in roof slab, beam, column & other structural members, insitu or precast. Type C (1:2:4)	M3	2.402	19446.34	46710
22	06-08-c	Supply & fabricate M.S. reinforcement for cement concrete (Hot rolled deformed bars Grade 40)	P.Ton	0.1780	303008.50	53936
23	10-15-d	Provide & lay topping of concrete 1:2:4, including surface finishing & dividing in panels : 2" thick	M3	17.837	1431.12	25527
24	25-44	Supplying and Fixing 18SWG Steel Almirah, 12" max depth including box shelves, back, shelves, lock, spray paint complete	M2	1.394	17163.74	23926
25	(09-36)	Providing and fixing AC rain water down pipe 4" dia, with shoe, tee, bend & clamp etc	M	0.320	1133.44	363
26	06-05-h	Plain cement concrete i/c Placing, Compacting, Finishing and Curing (Ratio 1:3:6)	M3	19.822	13983.72	277185
27	06-46-b	Erection and removal of Form work with Wood Surface Finishing for RCC or Plain cement Concrete in any shape - Position / Vertical	M2	130.064	762.91	99227
28	MR	Supply and Fixing of Pannel Naccas 12"-18" Complete in all respect.	No	5.000	2500.00	12500
29	MR	Supply & Fixing of Steel Girder size 7"x4"	Rft	15.500	900.00	13950
Total:-						1810118
Multiplied by area factor @ 1%						18101
Total:-						1828220
Rs In Million:-						1.828

Note:-

- 1 If any other item (s) crop up during execution of the work, the same shall be executed by the Contractor as per direction of Engineer
- 2 Quantities mention in the B.O.Q are tentative basis, which may vary during execution of the work.


Sub Engineer


Assistant Engineer
Irrigation Division
District Orakzai

_____ % AT PAR/ Above / Below

Signature of Contractor _____

BILL OF QUANTITY SOLARIZATION PACKAGE-2

S.#	MRS 2025 1st bi (Annuall)	Description.	Unit	Qty:	Rate.	Amount
Total Amount In Rs.						
Total Amount In Million.						
Total Bid Price						
Note: Following Information to be provided by the bidder otherwise bid shall be declared as Non-responsive (must be duly supported by evidence of exemption)						
Amount Chargeable_____ % Federal (FBR) Sale Tax on goods (PKR)						
Federal (FBR) Sale Tax on goods @ % (PKR)						
Amount Chargeable_____ % Provisional (KPPRA) Sales Tax on Services (PKR)						
Provisional (KPPRA) Sales Tax on Services @ % (PKR)						
Total amount						

Note:- Any other item of work crop out during execution will be paid on MRS-2025 1st bi
The Quantities are liable to be increased or decreased during execution.

Contractor Premium _____ % Above / Below.

Signature of Contractor _____

IRRIGATION DIVISION District Orakzai

B.O.Q.

Name of work ADP NO.2153/250066 Construction of 30 Nos Solar Based Irrigation Tube Wells In Merged Districts
Sub Work:- Construction of New Solar Irrigation Tube well at Bostl Khel TSD Darra.

Estimated Cost:- 2173036 /-
Estimated Money:- 43461 /-
Time Limit:- As per work order

S#	MRS. 2025 1st Bi Annual	Description	Unit	Qty	Rate	Amount
1	26-01-d-01	Supply and Erection of A-Grade Solar PV Modules containing N-Type Mono-crystalline silicon A-Grade solar cells, As per approved specifications	Watt	13000	44.34	576420
2	26-01-i-03-e	Supply and Erection of 3 phase 380V Solar Pump inverter (MPPT) 18.5 KW	No	1.00	582062.88	582063
3	26-01-m-01	Frame constructed of Hot dipped galvanized (80 Microns)	KG	325.00	411.26	133660
4	14-79-d	Supply & Installation, testing and commissioning of Submersible Pump (ISO - 9906 Certified) coupled with Submersible rewind-able Electric Motor with AC winding for discharge less than or equal to 3000 iGPII and output capacity greater than 10 WHIP and upto 15 WHIP (As per Approved Technical Specifications)	HP	10.00	44388.57	443886
5	24-50-c-01	Supply and installation of Submersible Flat Cable made of 99.9% copper, coated with double PVC as per BSS Standards, 3x10 mm2	M	79.00	1,447.02	114315
6	24-30-a-04	Providing, laying, cutting, jointing, testing and disinfecting High Density Polyethylene Pipe (HDPE) Din 8074/Din-8075/ISO-4427 in trenches, complete in all respects except excavation (75 mm dia) PN-8	M	79.00	717.28	56665
7	NSI	Hoare cover plate	Each	1.00	3,000.00	3000
8	NSI	Suspension Installation Clamps	Each	1.00	3,000.00	3000
9	26-01-n-02	Supply and Erection of Copper Earthing Plate 12"x12"x4mm	No	1.00	15,604.63	15605
10	15-71-b	Suitable Capacity Breakers for each string,	Each	2.00	717.04	1434
11	15-70-b	Supply and Erection transpower auto circuit breaker 3-phase, 400V fungus moisture proofing : 63 Amp	Each	1.00	2,342.20	2342
12	26-01-o	Supply and Erection of BOX / STAND for Batteries SHS Inverter & Charge Controller	Watt	13,000	8.08	105040
13	06-05-f	Plain Cement Concrete including placing, compacting, finishing & curing (Ratio 1:2:4)	M3	4.25	17035.28	72315
Total:-						2109743
Multiplied by area factor @ 3%						63292
Total:-						2173036
Rs In Million:-						2.173
Total Bid Price						
Note: Following Information to be provided by the bidder otherwise bid shall be declared as Non-responsive (must be duly)						
Amount Chargeable			% Federal (FBR) Sale Tax on goods (PKR)			
			Federal (FBR) Sale Tax on goods @ % (PKR)			
Amount Chargeable			% Provisional (KPPRA) Sales Tax on Services (PKR)			
			Provisional (KPPRA) Sales Tax on Services @ % (PKR)			
Total amount						

Note:-

- 1 If any other item (s) crop up during execution of the work, the same shall be executed by the Contractor as per direction of Engineer Incharge and
- 2 Quantities mention in the B O Q are tentative basis, which may vary during execution of the work.


Sub Engineer


Assistant Engineer
Irrigation Division
District Orakzai

_____% AT PAR/ Above / Below

Signature of Contractor _____

IRRIGATION DIVISION District Orakzai

B.O.Q.

Name of work ADP NO.2153/250066 Construction of 30 Nos Solar Based Irrigation Tube Wells In Merged Districts
Sub Work:- Existing Solar Irrigation Tube Well at Akhorwall TSD Darra Kohat.

Estimated Cost:- 2130841 /-
Estimated Money:- 42617 /-
Time Limit:- As per work order

S#	MRS. 2025 1st Bi Annual	Discription	Unit	Qty	Rate	Amount
1	26-01-d-01	Supply and Erection of A-Grade Solar PV Modules containing N-Type Mono-crystalline silicon A-Grade solar cells, As per approved specifications.	Watt	13000	44.34	576420
2	26-01-i-03-e	Supply and Erection of 3 phase 380V Solar Pump inverter (MPPT) 18.5 KW	No	1.00	582062.88	582063
3	26-01-m-01	Frame constructed of Hot dipped galvanized) (80 Microns)	KG	325.00	411.26	133660
4	14-79-d	Supply & Installation, testing and commissioning of Submersible Pump (ISO - 9906 Certified) coupled with Submersible rewind-able Electric Motor with AC winding for discharge less than or equal to 3000 iGPH and output capacity greater than 10 WHP and upto 15 WHP (As per Approved Technical Specifications)	HP	10.00	44388.57	443886
5	24-50-c-01	Supply and installation of Submersible Flat Cable made of 99.9% copper, coated with double PVC as per BSS Standards, 3x10 mm ²	M	79.00	1,447.02	114315
6	24-30-a-04	Providing, laying, cutting, jointing, testing and disinfecting High Density Polyethylene Pipe HDPE) Din 8074/Din-8075/ISO-4427 in trenches, complete in all respects except excavation. (75 mm dia) PN-8	M	79.00	717.28	56665
7	NSI	Bore cover plate	Each	1.00	3,000.00	3000
8	NSI	Suspension Installation Clamps	Each	1.00	3,000.00	3000
9	26-01-n-02	Supply and Erection of Copper Earthing Plate 12"x12"x4mm	No	1.00	15,604.63	15605
10	15-71-b	Suitable Capacity Breakers for each string.	Each	2.00	717.04	1434
11	15-70-b	Supply and Erection transpower auto circuit breaker 3-phase, 400V fungus moisture proofing : 63 Amp.	Each	1.00	2,342.20	2342
12	26-01-o	Supply and Erection of BOX / STAND for Batteries SHS Inverter & Charge Controller	Watt	13,000	8.08	105040
13	06-05-f	Plain Cement Concrete including placing, compacting, finishing & curing (Ratio 1:2:4)	M3	4.25	17035.28	72315
Total:-						2109743
Multiplied by area factor @ 1%						21097
Total:-						2130841
Rs In Million:-						2.131
Total Bid Price						
Note: Following Information to be provided by the bidder otherwise bid shall be declared as Non-responsive (must be duly)						
Amount Chargeable						
% Federal (FBR) Sale Tax on goods (PKR)						
Federal (FBR) Sale Tax on goods @ % (PKR)						
Amount Chargeable						
% Provisional (KPPRA) Sales Tax on Services (PKR)						
Provisional (KPPRA) Sales Tax on Services @ % (PKR)						
Total amount						

Note:-

- 1 If any other item (s) crop up during execution of the work, the same shall be executed by the Contractor as per direction of Engineer Incharge and
- 2 Quantities mention in the B O Q are tentative basis, which may vary during execution of the work.


Sub Engineer


Assistant Engineer
 Irrigation Division
 District Orakzai

_____ **% AT PAR/ Above / Below**

Signature of Contractor _____

IRRIGATION DIVISION District Orakzai

B.O.Q.

Name of work ADP NO.2153/250066 Construction of 30 Nos Solar Based Irrigation Tube Wells In Merged Districts
Sub Work:- Existing Solar Irrigation Tube Well at Athhorah TSD Darra Kohat.

Jawak

Estimated Cost:- 2067512 /-
Estimated Money:- 41350 /-
Time Limit:- As per work order

Sr	MRS. 2025 1st Bi Annual	Description	Unit	Qty	Rate	Amount
1	26-01-d-01	Supply and Erection of A-Grade Solar PV Modules containing N-Type Mono-crystalline silicon A-Grade solar cells, As per approved specifications	Watt	12000	44.34	532080
2	26-01-i-03-e	Supply and Erection of 3 phase 380V Solar Pump inverter (MPPT) 18.5 KW	No	1.00	582062.88	582063
3	26-01-m-01	Frame constructed of Hot dipped galvanized) (80 Microns)	KG	300.00	411.26	123378
4	14-79-d	Supply & Installation, testing and commissioning of Submersible Pump (ISO - 9906 Certified) coupled with Submersible rewind-able Electric Motor with AC winding for discharge less than or equal to 3000 iGPH and output capacity greater than 10 WHIP and upto 15 WHIP (As per Approved Technical Specifications)	HP	10.00	44388.57	443886
5	24-50-c-01	Supply and installation of Submersible Flat Cable made of 99.9% copper, coated with double PVC as per BSS Standards, 3x10 mm2	M	79.00	1,447.02	114315
6	24-30-a-04	Providing, laying, cutting, jointing, testing and disinfecting High Density Polyethylene Pipe HDPE) Din 8074/Din-8075/ISO-4427 in trenches, complete in all respects except excavation. (75 mm dia) PN-8	M	79.00	717.28	56665
7	NSI	Bore cover plate	Each	1.00	3,000.00	3000
8	NSI	Suspension Installation Clamps	Each	1.00	3,000.00	3000
9	26-01-n-02	Supply and Erection of Copper Earthing Plate 12"x12"x4mm	No	1.00	15,604.63	15605
10	15-71-b	Suitable Capacity Breakers for each string	Each	2.00	717.04	1434
11	15-70-b	Supply and Erection transpower auto circuit breaker 3-phase, 400V fungus moisture proofing : 63 Amp.	Each	1.00	2,342.20	2342
12	26-01-o	Supply and Erection of BOX / STAND for Batteries SHS Inverter & Charge Controller	Watt	12,000	8.08	96960
13	06-05-f	Plain Cement Concrete including placing, compacting, finishing & curing (Ratio 1:2:4)	M3	4.25	17035.28	72315
Total:-						2047042
Multiplied by area factor @ 1%						20470
Total:-						2067512
Rs In Million:-						2.068
Total Bid Price						
Note: Following Information to be provided by the bidder otherwise bid shall be declared as Non-responsive (must be duly supported)						
Amount Chargeable			% Federal (FBR) Sale Tax on goods (PKR)			
			Federal (FBR) Sale Tax on goods @ % (PKR)			
Amount Chargeable			% Provisional (KPPRA) Sales Tax on Services (PKR)			
			Provisional (KPPRA) Sales Tax on Services @ % (PKR)			
Total amount						

Note:-

- If any other item (s) crop up during execution of the work, the same shall be executed by the Contractor as per direction of Engineer Incharge and
- Quantities mention in the B O Q are tentative basis, which may vary during execution of the work


Sub Engineer


Assistant Engineer
Irrigation Division
District Orakzai

% AT PAR/ Above / Below

Signature of Contractor _____



GOVERNMENT OF KHYBER PAKHTUNKHWA
COMMUNICATION & WORKS DEPARTMENT
NO.SO(B)/II-10/Standardization//Solar Panels/PBC/2018-19/C&WD
Dated Peshawar the: 29/01/2019

To

1. Additional Secretary (Admn / Coord), FATA Secretariat Warsak Road Peshawar.
2. Director General M&E P&D Department, Peshawar.
3. Director Agriculture Engineering Tarnab Farm Peshawar.
4. Superintending Engineer, PHE Division Mardan, PHE Department.
5. Superintending Engineer PBC, C&W Department, Peshawar.
6. Director General PDA.
7. Chairman Electrical Engineering Department, University of Engineering & Technology Peshawar.
8. Executive Engineer Warsak Canal Division Peshawar, Irrigation Department.
9. Executive Engineer, Peshawar Division, PHE Department.
10. Deputy Director (PHA), ATI Campus Jamrod road Peshawar.
11. Executive Engineer PBC-II C&W Department.
12. Planning Officer, LG&RD Department.
13. Assistant Engr. CSR / MRS (Cell) C&W Department.
14. Manager Energy & Power Department Peshawar.
15. Deputy Secretary (Technical), Public Health Engineering Department, Peshawar.

Subject: REVISED TECHNICAL SPECIFICATIONS FOR SOLAR PANELS AND ALLIED EQUIPMENT (REV 2018).

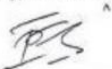
I am directed to refer to the subject noted above and to enclose herewith approved Minutes of the standardization of revised technical specification for solar panels and allied equipment's (Rev 2018) meeting held on 11/01/2019 at 10:30 AM under the Chairmanship of Secretary C&W Department along with approved "Revised specifications for supply and installations of 1).Solar Based Pumping System 2).Solar Buildings / Home Systems 3).Solar Street Lights", duly approved by Standardization Committee of Khyber Pakhtunkhwa and approved pre-qualification proforma of solar panels for information and necessary action at your end, please.


(Engr. Muhammad Imran)
Section Officer (Buildings)

Endst: No. & Date Even:

Copy is forwarded for information to the:-

1. Chairman Pakistan Engineering Council (PEC) Building, Attaturk Avenue (East) G-5/2 P.O Box 1296, Islamabad.
2. Director Solar, Alternative Energy Development Board, Ministry of Energy / Power Division, Government of Pakistan, 2nd Floor, OPF Building, Shahrah e Jamhuriat, G5/2, Islamabad.
3. Manager Technical, National Energy Efficiency & Conservation Authority (NEECA), Near State Bank of Pakistan, NEECA Building, Sector G5/2, Islamabad.
4. Director Standards, Pakistan Standards & quality Control Authority, PSQCA Complex, Plot No. ST-7/A, Block No. 3 Scheme No. 36, Near Kamran Chowrangi, Gulistan E Jauhar, Karachi.
5. Member Custom Policy, Federal Board of Revenue (FBR), FBR House / Building, Opposite Supreme Court of Pakistan, Islamabad.
6. PS to Secretary C&W Department Peshawar.


Section Officer (Buildings)

Note: "Revised specifications for supply and installations of 1).Solar Based Pumping System 2).Solar Buildings / Home Systems 3).Solar Street Lights" is uploaded on C&W Department official website i-e cwd.gov.pk for easy receipt of the same.

LIST OF PARTICIPANTS

UP GRADATION IN APPROVED SPECIFICATIONS OF SOLAR PANELS COMMITTEE
MEETING SCHEDULED TO BE HELD ON 11/12/2018 AT 10:30 AM.

SUB HEAD: REVISED TECHNICAL SPECIFICATION FOR SOLAR PANELS AND
ALLIED EQUIPMENT'S (REV 2018).

S.No.	Name of Officer/Official	Designation	Department	Signature
1.	Engr. Shahab Khattak	Secretary	C&W	
2.	Ishfaq Ahmad	Assistant Engineer C&W/Miscell	C&W	
3.	Amin Zeb	Director	Housing	
4.	Samiullah Kundi	Xen	Irrigation	
5.	Jehanzeb Khan	SDO	Irrigation	
6.	Engr. Nasir Zaman Khan	SO (C&W)	PH&D Dept	
7.	Engr. M. Anjad Khan	DST (C&W)	M&S	
8.	Mahmood Jaleel	Director	Agri Engg	
9.	Engr. Qaiser Aslam	Superintending Engineer	M&S	
10.	Engr. Bader Nazam	Assistant Director	M&S System, PED	
11.	Engr. Khuram Durrani	PO —	Energy & Power Dept	
12.	Engr. Salman	Dy. Director	PDACElect	
13.	SAUD KHAN	SDO PBC-II	C&W	
14.				
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**REVISED
SPECIFICATIONS
FOR
SUPPLY AND INSTALLATIONS OF**

- 1. SOLAR BASED PUMPING SYSTEMS,**
- 2. SOLAR BUILDINGS / HOME SYSTEMS.**
- 3. SOLAR STREET LIGHTS**



**2019
Version-01**

**APPROVED BY STANDARIZATION COMMITTEE OF
KHYBER PAKHTUNKHWA**

[Signatures and stamps of various officials]

Executive Engineer
Wazirak Cabana Division
Peshawar

DIRECTOR
Agril: Engineering
Tarnab, Peshawar

Deputy Secretary (Tech:)
Public Health Engg: Department
Khyber Pakhtunkhwa

Superintending Engineer
PHE Circle Tribal
Districts Peshawar.

Assistant Director (M&E)

PD Lt Depu

Chairman Electric. & UED

SECHEB
CE (M.A)

16/01/2019

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ASSISTANT ENGINEER
CSR/MRS Cell C&W
Department

KEN PBC-II

KEN (PHE)

KEN EEP

PDA

- q. The Inverter Junction Box should be properly earthed as well as per vetted design of the Engineer in charge.
- r. All wiring should be in proper conduit of capping casing. Wire should not be hanging loose.
- s. All wires should be terminated properly by using lugs / thimble connectors / sleeves.
- t. Distribution board must be installed with proper screws.
- u. Electrical Hazards Safety Labels should be pasted on DC Combiner /VFD Enclosure / Charge Controller /Battery Enclosures.
- v. Following lab tests are mandatory.

Conductor resistance test, Insulation resistance test, Pressure test, Spark test.

- w. DC Cable from PV Module to Junction Box / Inverter for each string should be minimum size 6 mm².
- x. DC Cable sizing (For Pumping Schemes) from Junction Box to Inverter as per details below;

S. No	Nos of Strings	Cable Size ((mm ²))	Remarks
1	1	6	If Cable length is >200 ft (One Sided) than cable size should also be increased accordingly.
2	2	10	
3	3	16	
4	4-5	25	
5	6-8	35	

3. PANEL MOUNTING & STRUCTURE:

- a. The panel mounting and structure should be made of hot dipped (80 microns Average) galvanized steel of minimum thickness of **12 SWG / 2.64 mm Channel / Pipe or 8 SWG / 4.06 mm Angle** (Profile of channel and Sketch Attached for Reference).
- b. A sketch of the mounting frame (As per Actual Site Requirements) showing dimensions of the frame parts should be provided at the time of supply.
- c. PV to ground clearance must not be less than 1.5 feet. The height of the upper edge of the structure should not exceed 10 feet above the ground and 6 Feet for Roof Top Installations.
- d. To avoid Shading, Distance between two rows of PV panels and from walls should be maintained at a minimum of 1.6 times the height of structure/walls.
The pit size for concrete works should be minimum 1.5x1.5x2 feet for each individual leg or 1.5x2.5x2 for double leg and the concrete should be extended at least 1 foot above the ground. The concrete ratio should be 1:2:4.
- f. The Surface azimuth angle of PV Module 180° and the Tilt angle (slope) of PV Module should be 33°.
- g. The PV modules will be mounted on metallic structures of adequate strength and appropriate design, which can withstand load of modules and high wind velocities up to 150 km per hour.
- h. Due to land Non-availability or any other problem, Structure design can be modified as per site requirement. Pole Mounted or manual Tracker Structure can be provided with the approval of Engineer In-charge.
- i. Array fasteners (nut/bolts/washers) between PV Module and Structure shall be stainless steel. Washers should be installed on both sides of Module frame.
- j. The minimum space between two PV Modules should be 2.54 cm (1 inch), to avoid air push over PV Modules.
- k. Mechanism / arrangement for cleaning of PV Panels should be provided, i.e: Space and ladder between panels or at the back side of structure, so that the operator can safely climb and clean the panels.
- l. All other array fasteners Structure shall be stainless steel or galvanized steel that provides the required mechanical strength.

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Deputy Secretary (Tech.)
Public Health Engg. Department
Khyber Pakhtunkhwa

A - SPECIFICATIONS FOR SOLAR SYSTEMS-COMMON PART

1. SOLAR PANELS:

- a. The PV module(s) shall contain mono crystalline silicon Grade-A Solar cells. (N-Type Mono PV Cell Modules and Bifacial Double Glass Modules due to its better performance will be given preference).
- b. The PV module should Work well with high-voltage input Inverters/ charge controllers (1000 Vdc).
- c. The PV Panel must have clear anodized aluminium frame with Anti-reflective, hydrophobic, low-iron Tempered cover glass.
- d. The Solar Modules shall meet the following valid IEC Standards or latest:
 - IEC 61215-1, IEC 61215-1-1, IEC 61215-2 :2016 (Design Qualification)
 - IEC61730-1:2016 (Safety - Requirements for construction)
 - IEC61730-2:2016 (Safety - Requirements for testing)
 - IEC TS-62804-1. (i.e: TUV PPP-58042 or Equivalent) Anti-PID Certification.
 - IEC 61701 Salt Mist Corrosion Resistance Test (Latest)
 - IEC 62716 Ammonia Corrosion Resistance Test (Latest)
 - IEC 60068-2-68 Sand and Dust Erosion Resistance Test.
- e. Unique Serial number, Name / Logo of manufacturer and separate date of manufacturing (DD/MM/YYYY) should be laminated inside the module so as to be clearly visible from the front side.
- f. A properly laminated sticker containing the following details should be available at the back side of the module.
 - Name of the manufacturer / distinctive logo.
 - Model Name and Type of Cell Technology.
 - Peak Watt Rating (Wp) and Power Tolerance Range
 - Voltage (V_{mp}) and Current (I_{mp}) at STC
 - Open Circuit Voltage (V_{oc}) and Short Circuit Current (I_{sc})
 - Maximum System Voltage (V_{dc}) (i.e: This should not be less than 1000 V_{dc})
 - Dimensions of PV Module
 - Test Standard(s) to which the module has been tested and certified.
- g. Following essential technical parameters of solar panel/modules should be provided with each panel supplied as well as in the technical proposal.
 - I-V curve for the solar photovoltaic module/panel.
 - Date and year of obtaining IEC PV module standardization qualification certificate.
 - Electrical Data (i.e: P_{max}, V_{oc}/V_{mp}, I_{sc}/I_{mp} at nominal Cell Operating Temperature (NOCT).
 - PV Module efficiency at STC.
 - Working temperature range of PV Module.

Each panel should have factory equipped weather proof terminal junction box having at least IP67 protection with provision of opening for replacement of DC cables, blocking diodes and easy debugging if necessary.

- i. Limited performance guarantee: panel power, in standard conditions, will not be less than 90% of nominal power by the end of 10 years of operation and at least 80% at the end of 25 years of operation with 25-year limited power warranty.
- j. The PV Module should have at least 10-years warranty for any defects and efficiency as mentioned above. It should be provided On Stamp Paper Signed and Sealed by Contractor at the time of Handing/Taking Over.
- k. The PV Module should have at-least 17.50 % Module efficiency with Positive Power Tolerance.

Deputy Secretary (Tech.)
Public Health Engg: Department
Khyber Pakhtunkhwa

AD (MCE)

PD 14

16/11/2019

PDA

Chairman
Elect. Eng Dept
16/01/2019

XEN

K. W. EEP

DIRECTOR
Agril. Engineering
KPK Tarnab, Peshawar

Executive Engineer
Wansak Canal Division
Peshawar

Page 2 of 24

- l. The PV modules offered should not be more than 12 months old from the date of issue of work order.
- m. PV Module should have a Snow Load bearing of 5400 Pa and Wind Load Bearing of at least 2400 pa however if department deem appropriate may go for 3800 pa wind load depending upon their requirement.
- n. The Solar Module should be free from visual and cosmetics defects.
- o. The department/consultant on the expense of contractor/supplier shall verify Flash test reports with serial numbers from manufacturer for each panel (at the time of supply).
- p. All information regarding solar panel with above mentioned featured data should be accessible and verifiable online on the manufacturer website.
- q. IEC accredited lab test for solar panels is mandatory.
- r. EL (Electro-luminous) test will be performed randomly for each individual project at the cost of contractor/supplier.

2. CABLE & WIRING:

- a. The AC / DC cables should be made of 99.9% copper strands and Flexible.
- b. From PV Panel to Junction Box, XLPE or XLPO insulated & XLPE/PVC Sheathed, UV stabilized single core, Double Insulated. Stranded /flexible cables (Conforming preferably to EN 50618 or IEC FDIS 62930) be used.
- c. From JB to Inverter, the DC cable must have Single Core, double insulated and suitable for minimum 1000 V_{DC} transmission.
- d. From Inverter to batteries, the DC cable can be single insulated, Single Core and suitable for minimum 300 V_{DC} transmission.
- e. DC circuit breakers (not fuse) of $\geq$ Voc of String Voltage and suitable ampere rating (1.25 to 1.50 Times of Rated Current of all strings connected) must be installed between PV modules and controller / inverter.
- f. AC Circuit Breaker (s) of suitable rating (1.25 to 1.50 Times of connected Load) must be installed between Controller / inverter to Load and Grid to Controller / Inverter.
- g. AC / DC breakers should be marked with the manufacturer model number, rated voltage, ampere rating and batch/serial number.
- h. DC / AC breakers rating should be approved from Engineer In-charge before installation at site.
- i. To prevent solar panels from damage an appropriate size of DC Breaker / Fuse should be installed for each PV string and Surge Protection should be installed for combined Array (before Main DC Breaker / Inverter).
- j. DC Breaker, AC Breaker & Change overs should be placed in an enclosure. All Enclosures / Junction boxes should be made from Hot Dipped Galvanized Sheets of minimum 16 SWG.
- k. Cables shall be clearly labelled with essential electrical parameters including manufacturer name, Voltage Range, standards etc.
- l. All DC Wiring shall be aesthetically neat and clean, over all wiring/connection losses shall not exceed 1% of the total rated output power.
- m. All connections/ socket outlet among array, controller, inverters, batteries, and pumping set etc must be made in junction boxes of adequate protection level.
- n. All wires/cables should be in standard flexible UV-Resistant conduits / HDPE of PN12, SDR 13.6, PE100 for outdoor installation & (2-3 feet deep) for underground wiring / Cabling and PVC ducts for indoor installation.
- o. The DC Combiner Junction Box should be properly earthed including earthing of door as well.
- p. The DC Combiner should contain proper bus bars of adequate size each for Positive, Negative and Earthing.

Deputy Secretary (Tech:)
Public Health Engg. Department
Peshawar

DIRECTOR
Agril: Engineering
PK Tarnab, Peshawar

ADCMGE

PO LG

16/01/2019

PDA

SEP 10

- m. The PV modules will be mounted on metallic structures at the inner holes for cantilevered installation, which will evenly distribute the load of the panel around the support structure on both sides and in the middle.

4. EARTHING/ GROUNDING:

- The PV Panel frame and structure should be connected by the shortest practical route to an adequate earth contact (of Less than 5 Ohms Resistance) as per requirement of equipment manufacturer and site earth conditions, using an uninterrupted conductor. Grounding can reduce the risks of damage from lightning-induced surges.
- The Sizing of Earthing conductor will be done as per NEC Table 250.122
- The grounding conductor should be 99% Copper and PVC insulated / Bare Copper if installed underground along a defined path where size & Design shall be approved from Engineer In-charge before installation at site.
- Motor, inverter, Battery / Battery Box (if required), Main Distribution Board should be connected to an adequate earth contact / Grounding.
- Ground enhancement material (GEM) shall be used below and above the Earthing plate for proper grounding. Gravel or coarse sand shall be pour along with soil in the pit.
- Grounding / Earthing plate should be made of Copper plate of 4mm thickness & Size minimum 1.0 x 1.0 Ft.
- Grounding / Earthing conductor should be connected to the plate / Rode / GI Pipe by proper connector of minimum depth of 6 feet.
- Alternatively Earthing Rod of suitable size and length can be installed. (Instead of Plate). If given / mentioned in the BOQ/Design and Engineer In-Charge Approval.
- All nut / bolt and Earthing clamp shall be stainless steel or galvanized steel.

5. BATTERIES:

- The battery should be Deep Cycle, GEL, OPzV/OPzS, Lithium LiFePO4, Lead Carbon Type or equivalent. (Note: Battery type shall be specified in the bidding documents.)
- The battery must ensure safe and reliable operation in the whole range of ambient temperatures from -5° C to + 50° C.
- The maximum permissible self-discharge rate should not be more than 5 percent of rated capacity per month at 25° C.
- The battery shall have a certificate of compliances, issued by a recognized laboratory.
- The Batteries should have three years Comprehensive replacement warranty.
- The battery must meet the requirements and recommendations given in IEC 61427, IEC 60896 21/22 (For VRLA) or equivalent. Lab Test Reports for battery cycle life should be provided.
- The Battery must support parallel connection to increase capacity in case of future expansion. Each Battery should have following minimum information printed on battery:
 - Model Number, Serial Number and Type of battery.
 - Rated Voltage and Capacity (AH) at discharge rate of 10 Hours.
 - Origin of made.
 - Manufacturer Name with distinct logo.
- The following information must be provided in the data sheet while submitting technical bid.
 - Certification/Test Standard(s) of the battery.
 - Information regarding cycles & self-discharge rate.
- In case of rechargeable battery bank (having more than one battery), the interconnection shall be made using lead plated copper bus bars or properly insulated flexible copper conductors.
- Battery disconnect switch / breaker of suitable size should be installed between batteries and inverter / charge controller.
- The Battery must have Low self-discharge rate, No memory effect and No gassing.

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Deputy Secretary (Tech:)
Public Health Engg. Department
Khyber Pakhtunkhwa

and neat appearance. Battery Box /stand should be installed at a place in accordance with user's preference

7. LED FLOOD LIGHTS:

- Solar Based LEDs/Light fixtures shall conform to the latest IEC/ISO internationally recognized standards.
- LEDs/Light fixtures should not be Chip-on-board (COB) single chip type due to their poor heat dissipation.
- LEDs/Light fixtures shall be modular type with proper heat sinks.
- Solar based lights (LED fixtures etc) should provide at least 100 Lumen/watt.
- The Color rendering Index (CRI) must be equal or greater than 70
- LEDs/Light fixtures should be designed to deliver at least 10 years of service.
- Complete lightening unit shall be weather proof (Protection Class IP65).
- The output from the LEDs/Light fixtures should be constant throughout the duty cycle.

8. AC ENERGY EFFICIENT LED LIGHT BULBS:

Shape	Cap/Fitting/Type	Colour	Lumen s Per Watt	Colour Temperature	Colour rendering index (CRI)	Life Time of Lamp (Hours)	Power Factor & Rated Voltage
Globe	E27	Cool or Warm White	Min 100W	2700K / 6500K	70	10,000	≥ 0.70 & 220 Vac

Note:

- LED Light Bulbs should be marked with the manufacturer model number, rated voltage, Wattage.

9. AC ENERGY EFFICIENT CEILING FANS:

Sweep		Rated Power	Speed			
Inches	MM	Watts	Rpm			
56	1400	50 Max	≥ 320			

- 10% + in Power Consumption is Allowed as per PSQCA Standard
- Rated Voltage: 230 V~ (±10V)
- Rated Frequency: 50 Hz
- Insulation Class: 155 (F) or better
- Motor Core: Electrical Steel Sheet
- Winding Wire: 99.99% Super Enamelled Copper CA Wire or 99.99% Pure Copper Wire.

Note:

- Energy efficient fan should be marked with the manufacturer model number, rated voltage, and wattage.

10. DC ENERGY EFFICIENT LED LIGHT BULBS:

- The LED lamps must have luminous efficacy of at least 80 lm/W (at 25 °C ambient temperature).
- The LED lamp must be protected against reversed polarity of the operation voltage.
- Base shall be an E-27 thread type.
- The emitted light shall be cool or warm white.

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Deputy Secretary (Tech.)
Public Health Engg. Department
Khyber Pakhtunkhwa

5.1 **GEL BATTERIES:**

- 5.1.1 Cycle life of the GEL battery (12V) before 80% capacity of Initial Capacity must be minimum **1000** cycles @ 50% depth of discharge (DOD) at discharge rate of 10 Hours
- 5.1.2 Cycle life of the GEL battery (2V Cell) before 80% capacity of Initial Capacity must be minimum **1300** cycles @ 50% depth of discharge (DOD) at discharge rate of 10 Hours

5.2 **LEAD CARBON:**

- 5.2.1 Cycle life of the Lead Carbon battery (12V) before 80% capacity of Initial Capacity must be minimum **2000** cycles @ 50% depth of discharge (DOD) at discharge rate of 10 Hours.
- 5.2.2 Cycle life of the Lead Carbon battery (2V) before 80% capacity of Initial Capacity must be minimum **2500** cycles @ 50% depth of discharge (DOD) at discharge rate of 10 Hours.

5.3 **OPzV / OPzS BATTERIES:**

- 5.3.1 Cycle life of the OPzV / OPzS battery (12V) before 80% capacity of Initial Capacity must be minimum **2000** cycles @ 50% depth of discharge (DOD) at discharge rate of 10 Hours
- 5.3.2 Cycle life of the OPzV / OPzS battery (2V Cell) before 80% capacity of Initial Capacity must be minimum **2500** cycles @ 50% depth of discharge (DOD) at discharge rate of 10 Hours

5.4 **LITHIUM BATTERIES (LiFePO4):**

- 5.4.1 Cycle life of the Lithium LiFePO4 battery before 80% capacity of Initial Capacity must be minimum **5750** cycles @ 50% depth of discharge (DOD) at discharge rate of 10 Hours.
- 5.4.2 The battery must have Integrated Battery Management System (BMS) to ensure battery safety and reliability.
- 5.4.3 The BMS of the battery must have the following specifications:
- Temperature protection
 - Over charge protection
 - Low voltage disconnect
 - High Voltage Disconnect
 - Short circuit alarm function
 - Self-balancing function
- 5.4.4 The LiFePO4 Battery must have LED status and alarm indication.
- 5.4.5 The charge and discharge rate of the battery must be designed at 0.2C minimum but capable of handling 0.5C charge and discharge currents.

Note:

- **Product brochure, catalogue and certificates must be attached with the Technical Bid.**

6. BOX / STAND FOR BATTERIES, SHS-INVERTER & CHARGE CONTROLLER:

- a. The batteries should be housed in a vented compartment/stand that prevents users from coming in contact with battery terminals. This compartment/stand should be strong enough to accommodate the weight of the battery.
- b. A mechanism to prevent opening and entry of the battery should be provided.
- c. This compartment should be manufactured of mild steel of at least **18 SWG**.
- d. The compartment should be powder coated paint.
- e. The entire enclosure/stand must be constructed to last at least twenty years without maintenance and should be protected against corrosion. The enclosure should have a clean

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- e. The wide angle shall be between 120° to 125°.
- f. Operating Voltage 12Vdc / 24Vdc
- g. Lamps should be marked with the manufacturer model number, rated voltage, wattage and date of manufacture or batch number.

11. DC CEILING FANS:

Sweep	Rated Power	Speed	Service Value	Operating Voltage
Inches	Watts	Rpm	Air Delivery/W	V
48 ((with Speed Control) Metal Blades	30-36	> =320 RPM	9.54	12 / 24

12. DC PEDISTAL FANS:

Sweep	Rated Power	Speed	Service Value	Operating Voltage
Inches	Watts	Rpm	Air Delivery/W	V
18 Inch (with Speed Control)	18-30 W	1250 RPM (Full Speed)	5.22	12 / 24

13. INVERTER BASED SPLIT AC

Inverter based AC with both heating and cooling option.

S.No	DESCRIPTION	UNIT	DETAILS
1	Compressor	Type	Multistage Rotary
2	Noise Level (Indoor)	Db (Max)	≤ 50
3	Voltage Range	Volts (Min & Max)	180 to 250 Vac

14. PVC CHANNEL DUCTS & PIPES

a. A product of good quality standard material standardized by the provincial standardization committee with suitable size to be provided / used, as per direction/approval of Engineer In-charge.

- b. Ducting must be done with proper steel nails and clips.
- c. All ducting (wiring) must be align.

15. FLEXIBLE PVC PIPE

- a. The flexible PVC pipe should be of good quality material standardized by the provincial standardization committee with suitable size to be provided / used, as per direction/approval of Engineer In-charge.

16. CIVIL WORK:

The following Civil Works should be carried out for ground installation of SPV Modules/mounting structures.

- a. Minor Cutting and clearing of trees/plantation to avoid shadows.
- b. Civil work for earthing system as per the statutory requirements.

17. REFLECTIVE / INSULATING PAINT

The Roof Paint should be ultra-white, high reflective, 100% acrylic elastomeric roof sealer designed for fixing leaks in roofs the paint should contain heat reflective pigments and additives that provide an excellent, highly protective barrier which reflects the sun's heat and destructive UV rays leaves a brilliant ultra-white finish, reducing surface heat absorption up 20°F.

B - SPECIFICATIONS FOR SOLAR PUMPING SYSTEMS

19. PUMP (SUBERSIBLE):

Pump should be supplied having standard ISO-9906 specifications. The pump must be submersible, made of stainless steel. The characteristic curves (Original from Manufacturer) showing the efficiency at duty point and performance of the pump should be provided in the technical proposal and also at the time of pre-supply testing. The quoted pump should be tested for its performance and certified as per ISO-9906 standard. The pump should be suitable for installation and operation in tube wells/dug wells/open well with clear water discharge. Pump shall comprise of bowl assembly and non-return valve as integral part of pump's parts. Pump and motor shall rigidly couple through NEMA standard coupling. The stage casings of pumps should be connected as per NEMA/ANSI/AWWA /ASTM/BSS standard. Each stage casing must have replaceable wear ring. The impellers shall be secured to the pump shaft with tapered conical sleeves pressed into the taper bore of impeller or impeller secured through chrome plated stainless steel hexagonal sleeves. Suction casing must be between pump and motor with suction strainer as protection of pump against coarse impurities of the liquid handled.

Specification for main components of the Pumps:

S.NO	Components	Specifications
1	Casing/Diffuser	The Casing/Diffuser should be in fabricated stainless steel AISI 304 / 316.
2	Impellers	Stainless steel AISI 304 / 316.
3	Driving Shaft	Stainless steel 304/420 / 316
4	Sleeves	Stainless steel AISI 329/ 304 / 316
5	Gaskets	Rubber Gaskets
6	Bearings	AISI 329 stainless steel
7	Coupling & Screen + Cable Guard	Stainless steel AISI 316/319/304/420
8	Non-Return Valve / Sluice Valve	As per British standard specifications (BSS), Minimum PN16 (16 Bar) or Above (As Per Site Requirements) PN Value / Bar Capacity of Valves must be more than Installed Pump Max/Shut-off Head Minus Static Water Level of Bore. (Leakages in Valves are NOT Acceptable).
9	Pressure Gauge	As per British standard specifications (BSS), having PSI or Bar scale (4 Inch Size), Liquid Filled, minimum 350 PSI Range, Looped Siphon tube Pipe, Stainless Steel/polypropylene Casing.
10	Clamps	Steel - Pressed
11	Pump Efficiency	Minimum efficiency of the pump (For discharge of 3000 GPH and more) should be 70% ensured at duty point. (Duty Point of the Pump be preferably selected at the peak efficiency point or (Within $\pm 10\%$ of discharge) of Pump Peak efficiency Point)

20. MOTOR:

The winding material should be 99.99% copper. The motor should have wet type, water cool rewind-able/repairable stator. The motor should have non-disposable/non-hermetically sealed winding. The insulation class of the winding material should be mentioned. For each model quoted, all the technical parameters such as rated voltage, power factor, efficiency, full load ampere, speed

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and other similar parameters should be provided at the time of pre-supply testing. The testing report with all basic parameters should also be provided at the time of pre-supply testing.

The motor shall be manufactured in compliance with National Electrical Manufacturer Association (NEMA) standards. The motor shall be three-phase submersible and shall be capable of operating at rated voltage of 380 Volts at 50 Hz. The motor should be capable of operating with variable speed through V/F control. Winding of the motor shall of rewind able type with class – IC40 insulation and IP68 protection. The synchronous speed should be 2850-2950 RPM. Motor shall be capable of operating in well water with temperature normally start from 40°C. Motor should be designed for continuous operation. Motor must be filled with water without any chemical additives hazards to health for cooling. The motor must be properly protected against the entry of well water sand etc by double mechanical seal one is rotating and other stationary and must be made of Silicon carbide/ Tungsten carbide and must be protected with sand protection guards. All supports shall be high grade cast iron and stator outer side jacket body should be in stainless steel in AISI 304. The excessive pressure due to heating up of the filled water must be compensated by a pressure equalizing rubber diaphragm in the lower part of the motor. The axial thrust of the pump shall be countered by oscillating sliding block type thrust bearing. The thrust bearing of the motor should be able to bear a download thrust force from the water pump and the upward thrust force produced while starting the water pump. Motor in open well / water tank should be installed with cooling jacket / shroud / sleeve and when motor is installed in bore then installing of cooling jacket is also required. Motor shall be capable of maximum of 20 starts in an hour. Motor efficiency of motors 7.5 HP and above should not be less than 75% at Full Load and Motor Rated Voltage.

Technical specification of rewind-able wet stators, three phase squirrel cage water filled submersible motor.

S.No	Components	Specification
1.	Winding	Made of pure electrolyte copper and the winding insulation should be suitable for > 1000 Volts and must full fill resistant tests range.
2.	Stator	Energy efficient low-losses electrical magnetic sheet should be fixed in stainless steel casing. M800 or M600 magnetic sheet are preferable to use.
3.	Rotor	Energy efficient low-losses electrical magnetic sheet fixed with high grade copper bars. M800 or M600 magnetic sheets are preferable to use.
4.	Spline Shaft	AISI 420 stainless steel, flange dimension according to NEMA standard, over size design to ensure stiffness in severs condition.
5.	Shaft bearing	Water lubricated guide/general bearings fixed in upper and lower brackets should be made of metal impregnated carbon.
6.	Lower thrust bearing	Thrust sliding block bearings, self-aligning Mitchell type, should be able withstand 20000N axial load
7.	Mechanical Seal & Rotary	Silicon carbide or tungsten carbide mechanical seal.
8.	Cooling filling fluid	Water mixed with non-toxic anti-freeze provide cooling and lubrication also protect and prevent inside parts from corrosion
9.	Degree of protection	IP68
10.	Insulation Class	Insulation Class B (130°C) NEMA Insulation Class F (155°C) NEMA or above Will be given

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		Preference.
11.	Voltage Tolerance	+6% to -10%
12.	Mounting position	Capable of both Vertical or horizontal Installation
13.	Class	IC40
14.	Maximum Immersion	150 Meters
15.	Starting per hour	20

21. **SUBMERSIBLE FLATE ELECTRIC CABLE (4-Core):**

The Submersible cable (4-Core) should be made of 99.9% copper strands with double PVC insulation for **1000Vac**, should be adequately flexible and environment friendly. Stranded and flexible insulated copper wires and cables must be used for all outdoor and indoor installations. The wiring that leads into the building shall be protected in a conduit. The cable must have undergone quality tests as per BSS standards. Cable size should be selected so that the Voltage drop Losses in the drop cable should not be more than 2.5%.

Following lab tests are mandatory.

- Conductor resistance test.
- Insulation resistance test.
- Pressure test.
- Spark test.
- Note: The Supplier should provide the quality tests certificates at the time of pre-supply testing and inspection.

22. **COLUMN PIPE:**

The column pipe shall be flanged ERW steel pipes confirming to ASTM designation A-53 with a minimum thickness of **3.6 / 4.0 mm (3.6 mm for pipes upto 2.5" dia and 4 mm for pipes above 2.5" dia)** and shall be painted with corrosion resistance paint of suitable thickness. Flanges thickness of 19-20 mm shall have grooves for cable passage. Each column pipe shall be complete with gaskets, bolts/studs, washers and nuts. All nuts, bolts, and washers shall be made of minimum A2 grade stainless steel.

The column pipe shall be supplied in interchangeable section having an approximate length of 10 feet column pipe shall be flanged perpendicular to the axis of pipe.

Column pipe size should be selected so that the Head Losses in the column pipe should not be more than 5%.

For Reference a table-1 is given below.

HDPE Pipe of ≥ 0.75 Inch diameter, SDR 13.6, PE100, conforming to ASTM F-2160 Standard without Joints to be installed/included along with and equal to Column pipe for confirming Water Level testing purpose.

FEATURES:

- Manufacturer's pipes should meet international standards like BSEN 10255 & ASTM A 53.
- Dimensional accuracy circularity and plan end cut should be observed,
- Weld strength of pipe and mechanical properties or raw material should be tested as per manufacturing standards.
- Pipes should be NDT tested (Non-destructive – Eddy current)
- Pipes should be hydrostatically pressure as per manufacturing standard.
- Pipes should be gone through straightening process to remove bendiness.

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23. TOPSET:

Top set shall comprise of Bore covers plate, (covering bore hole completely and securely), installation/suspension clamps (2-Nos), sluice valve (BSS/ASTM), reflex valve (BSS/ASTM), Washout Valve approx. 3-4 feet above the ground (T-Connection For Testing Pump's discharge), connector and cable jointing material (Cable connection from motor to switching device shall be joint free), Liquid Filled Pressure gauge minimum 4 Inch diameter suitable / appropriate for the required head pressure and cable ties. Bore Cover Plate should have provision for water level testing facility (i.e: Hole for Sonic Water Level Meter / HDPE Pipe insertion)

For Cleaning of solar Panels, Plastic pressure pipe should be provided of suitable length to reach the furthest / last Solar Panel.

Every Water Supply Scheme should have a non-removable name plate fitted at suitable place / box having essential information and bearing the name of supplier, Consultant and client.

24. SOLAR PUMP INVERTER / CONTROLLER:

- a. The solar pump inverter/controller should have built-in advance version of Auto MPPT controller, over load protection, Soft start/Soft Stop Features and Variable Frequency Drive (VFD) with integrated Gate Bipolar Transistors (IGBTs) of European, USA or Japanese origin or atleast equivalent.
- b. The make and origin of the inverter/controller should be clearly mentioned in the catalog and submitted in the technical proposal.
- c. The inverter offered should comply to or Equivalent standards:
 - i. CE/RoHS
 - ii. Low Voltage Directive 2014/35/EU
 - iii. EMC Directive 2014/30/EU
 - iv. IEC 62109-1 (Safety of Power Converters for use in PV Systems)
- d. The complete datasheet showing all the electrical parameters like input & output voltage ranges should be provided in the technical bid.
- e. All the electrical parameters like input & output voltage ranges, and efficiency should be provided at the time of pre-supply testing and inspection.
- f. Efficiency of inverter should be 96% and above at Rated Capacity.
- g. Efficiency of MPPT should be 98% and above.
- h. The inverter < 25kW ingress protection of inverter must be minimum IP 65 Rating or above and for inverter ≥ 25kW ingress protection of inverter / enclosure will be minimum IP 54 Rating or above.
- i. Inverter / Controller having the capability to run both on AC and DC Power would be given preference.
- j. Inverter should have at least three (3) years product and performance warranty.
- k. The Pump Controller/Inverter should have an ON/OFF Switch/Button to Start and Stop the Pump.
- l. Inverter should have active RS232/485 etc communication port available, the Data available through this port can be used for Remote Monitoring.
- m. Inverter circuit must include protection against:
 - i. Over or Low voltages and currents beyond critical level of the inverters circuits.
 - ii. Protection against accidental short circuits & reverse polarity connections.
 - iii. Protection against lightning induced transients.
 - iv. Over load protection.
 - v. Low RPM Protection (i.e: Frequency < 30 Hz or as per pump characteristic curve) Motor Should Stop.
 - vi. Dry run protection. (PF / Current Based).

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25. dV/dT or Sine Filters With Inverter (VFD):

- a. The use of load reactors increases the reliability, performance, and efficiency of VFD systems, extends the life of both drives and motors, and reduces the amount of energy consumed by the motor/drive system.
- b. Output dV/dT or Sine Filters (between VFD and Motor) of appropriate size (for 3-phase ≥ 380 Vac Motor of Class B Insulation) should be used where the cable length between motor and inverter is more than Fifty (50) Feet or as advised / recommended by the inverter manufacturer in their Technical Documentation. For Cable lengths of more than 150 meters sine filters should be used.
- c. Filter should be enclosed in a vented box.
- d. Filter Efficiency should be minimum 97%.
- e. Filter should have a current rating of equal or greater than Motor FLA Rated Current.
- f. Distance between filter and pumping inverter should not be more than 2 meters.
- g. Motors with Insulation Class F, H or above are exempted from the requirement of dV/dT Filter.

26. SYSTEM DESIGN FOR PUMPING SYSTEM:

- a. Suitable factor of safety should be applied while designing the system in order to have compensations for variations in irradianations.
- b. For Fix Structure and Auto Tracker, the PV panel **peak power at STC (Wp) should be 75% more** than the Motor basic input power (**PV Loss Compensation Factor = 1.75**).
- c. For Auto /Manual Tracker, the PV panel **peak power at STC (Wp) should be 50% more** than the Motor basic input power (**PV Loss Compensation Factor = 1.5**) as per direction of Engineer Incharge
- d. If Single Axis Auto Tracker Structure is installed on the above factor, then daily operational timings of pumping can be increased by 10-20%, as compared to fixed structure installation.
- e. Total PV Power (Wp) (Imperial Gallons) =
$$\frac{Q \text{ (IGPH)} * TDH \text{ (ft)} * 746 * PV \text{ Loss Factor}}{60 * 3300 * \eta_{\text{pump}} * \eta_{\text{motor}}}$$
- f. Total PV Power (Wp) (US-Gallons) =
$$\frac{Q \text{ (US-GPH)} * TDH \text{ (ft)} * 746 * PV \text{ Loss Factor}}{60 * 3960 * \eta_{\text{pump}} * \eta_{\text{motor}}}$$
- g. Total PV Power (Wp) (Metric Units) =
$$\frac{Q \text{ (m}^3\text{/hr)} * TDH \text{ (m)} * 9.81 * 1000 * PV \text{ Loss Factor}}{3600 * \eta_{\text{pump}} * \eta_{\text{motor}}}$$
- h. Voltage (V_{mp}) of Each String of PV Panels should be as per details given below and String Voltage (V_{mp}) should be within the MPPT range of Inverter.
For 380 Vac 3-Phase Motor = $380 * 1.414 * 1.06 = 570$ Vdc String, minimum
For 220 Vac 3-Phase Motor = $220 * 1.414 = 310$ Vdc String.
Small Inverters (i.e: 3-Phase, 220 Vac) with voltage boost function are exempted from the above string voltage requirements. String can made as per boost Inverter Controller recommended String DC Voltage and should not be less than 230Vdc in any case.
- i. Details of each PV Panel string should be submitted in Technical proposal (i.e: Nos of total strings and Nos of PV panels in each string along with wattage and V_{mp} of each PV panel).
Unjustified Oversizing in PV Panels Wattage is not allowed.
To avoid any oversizing, all commercially available PV Panels should be considered.

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- l. Solar Pump Inverter should have a kW capacity equal or greater than the Motor Rated Input Power.
- m. Solar Pump Inverter / Controller Size (kW) $\geq$ (Motor Rated Power in kW / Motor Efficiency).
- n. Solar Pump Inverter / Controller should have a current rating of 1.15 Times (minimum) of Motor FLA Rated Current.
- o. Motor should not be loaded more than 90%. (i.e: Design / Calculated BHP should not be more than 90% of Motor Rated Horse Power)
- p. Along with this specification, contractors should also follow manufacturer's recommendations for all major components of Solar Pumping System.
- q. Requirement of Efficiency for Motor i.e. 75% will not apply on Motors smaller than or equal to 5.5HP and the requirement of efficiency for pump i.e. 70% will not apply on pumps having discharge equal to or lower than 3000 GPH.

27. PRESSURE PUMPS (UPTO 5.5 HP):

- a. Submersible pump confirming to ISO-9906 Standard.
- b. Pump + AC Motor (3-Phase-220V/380V) or DC Motor and Pump with Display Unit.
- c. Solar pump inverter/controller should be MPPT based and Minimum Ingress Protection of IP65.
- d. In case, where the column pipe diameter is less than or equal to 1.5-inch (For discharge equal or less than 6000 LPH and/or for Motor 4 HP and below), HDPE pipe of at least PN12 / SDR 13.6 / PE100 (For TDH of equal or less than 300 ft) without joint may be used instead of MS pipe for better economics and to avoid hydraulic losses. However stainless steel rope of minimum diameter of 6 mm (28 mm²) for suspension of pump-set must be supplied with HDPE pipe. (Note: For TDH of more than 300 ft, HDPE Pipe type / thickness may be increased/changed accordingly)
- e. Top set shall comprise of Suitable Galvanized stand (Design should be verified from Engineer In-Charge before start of work)
- f. For Pressure Pumps $\leq$ 5.5 HP schemes, Solar Module efficiency requirement is minimum 16%. (Only for Cut Cells PV Modules or Cell Size of 5 Inches PV Modules).
- g. Connection to overhead water storage tank. Top bend, S.S Fasteners & Erection clamps.
- h. Civil work to protect borehole i/e foundation.
- i. The pump should operate safely with Sand particles up to (50) gram/m³.

28. DC SOLAR WATER PUMP-SETS (UPTO 5.5 HP)

- a. DC Motor can also be provided for Equal or less than 5.5 HP.
- b. Motor should be capable of both AC and DC operation. There must be auto power source recognition feature.
- c. The motor should be brushless, permanent magnet type.
- d. The Controller must have a display Unit, showing all essential parameters (i.e: Current, Voltage etc).
- e. The Controller must be of MPPT type. MPPT efficiency should be equal or more than 98%
- f. Pump should have auto and soft start / stop feature.
- g. The pump-set should have following protections
 1. Dry Running Protection
 2. Reverse Polarity Protection
 3. Over phase protection
 4. Over Head Protection
 5. Lose Phase Protection
 6. Electronic Protection
 7. Over Current/ Overload Protection

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C- SPECIFICATIONS FOR SOLAR HOMES & BUILDING SYSTEMS.

33. GRID TIE INVERTER (ON-Grid without battery backup / Hybrid with battery backup)

1. UL-1741 Certified or IEC 62109-1 and IEC 62109-2 or Equivalent Certificates.
2. Minimum 95% Conversion Efficiency at Rated Capacity (High Frequency Inverters).
3. Minimum 87% Efficiency for Transformer based inverters (Low frequency Inverters).
4. The inverter should have built-in MPPT controller
5. The Priority of the inverter should be set that load will be running from the solar energy then Grid and in the end will be running from the Battery Backup.
6. Inverter (Hybrid Only) must be capable of configuring for Charging GEL, Lead Carbon, OPzV/OPzS Batteries and Lithium Iron Phosphate batteries (LiFePO4).
7. Hybrid Inverter (If Quoted along with Lithium Batteries) must be capable of communication with the BMS of Lithium Batteries.
8. Rated output voltage of inverter / Controller shall be pure sine wave AC.
9. Total harmonic distortion (THD) in AC output should not exceed 3% at rated capacity.
10. The degree of protection of the ON-Grid inverter Installation should be IP-65 rated and for indoor Hybrid Inverter installation, the IP rating should be IP-20 or above.
11. Wide input voltage range capability. (i.e: Voltage Range can be adjustable / selectable)
12. Natural convection cooling for maximum reliability
13. Outdoor enclosure for unrestricted use under any environmental conditions
14. Capability to connect external sensors for monitoring environmental conditions.
15. The output of the inverter must synchronize automatically its AC output to the exact AC voltage and frequency of the grid.
16. The Inverter should have the capability of Parallel operation upto three units. (Only For projects, where more than one inverter should be installed).
17. Inverter should have active RS232/485 etc. communication port, the Data available through this port can be used for Remote Monitoring.
18. Liquid crystal display should at least be provided on the inverters front panel or on separate data logging/display device to display following
 - a. DC Input Voltage
 - b. DC Input current
 - c. AC Power output (kW)
 - d. Current time and date
 - e. Temperatures (C)
 - f. Converter status
19. Inverter circuit must include protection against:
 - Over or Low voltages and currents beyond critical level of the inverters circuits.
 - Protection against accidental short circuits.
 - Protection against lightning induced transients.
 - Over load protection.

34. OFF-GRID / HYBRID INVERTER:

1. The Inverter must be pure sine wave output suitable for 220 Volt, 50 Hz.
2. Inverter must be capable of configuring for Charging GEL, Lead Carbon, OPzV/OPzS Batteries and Lithium Iron Phosphate batteries (LiFePO4).
3. The Inverter / system must have a MPPT Solar Charge Controller.
4. Minimum 92% Conversion Efficiency at Rated Capacity (High Frequency Inverters).
5. Minimum 87% Efficiency for Transformer based inverters (Low frequency Inverters).
6. Total harmonic distortion (THD) in AC output should not exceed 3% at rated capacity.

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D - SPECIFICATIONS FOR SOLAR STREET LIGHTS

35. SOLAR STREET / ROAD LIGHT SYSTEM DESIGN:

- a. Assessment of Wattage of the LED Luminaire, Pole Height, Pole thickness, Pole top diameter, Pole base diameter, Base plate size, Base Plate thickness, Stiffener size, Stiffener thickness, Pole arm design, Pole Arm Length, Pole arm thickness, Pole arm diameter, Pole arm Placement / Fixing position, RCC foundation size, Anchor / J-bolt size, Steel Rebars cage (Mesh) and Number of Poles (Pole to Pole distance) should be according to the design provided / approved by the Engineer In-charge.
- b. Round Conical or Octagonal Hot Dipped Galvanized Pole of average 80 Microns should be installed.
- c. All Nuts, Bolts and Washers should be stainless steel.
- d. Pole base plate should be tightened in between two stainless steel nuts and washers (one nut and washer at upper and one nut and washer at lower side of the base plate).
- e. All Anchor / J-bolt shall be in level and align to each other.
- f. All Anchor / J-bolt shall be galvanized.
- g. All Anchor / J-bolt shall have at least 150 mm minimum threads.
- h. All poles shall be installed on levelling nuts secured to the anchor bolts and with locking nuts on the top of the base flange.
- i. The concrete ratio should be 1:2:4 for RCC foundation.
- j. Proper sketches of Pole, base plate, RCC Foundation and Steel Rebars cage (Mesh) should be provided and approved from Engineer In-charge.
- k. In order to focus on winter sun availability and Easy cleaning of Solar panel from dust etc with Rain water, Solar Panels should be installed at 180° Azimuth Angle and the Tilt angle (slope) of PV Module should be between 45° ± 5° (Only for Solar Street Lights).

36. LED SOLAR ROAD/STREET LIGHT FIXTURE:

1. LED Efficacy must be greater than or equal to 130 Lumens/Watt.
2. The fixture must be IP-66 Rated or above.
3. The Color temperature of the LED should be Pure white in the range of 5000-6000 K.
4. The LED Light distribution must be IESNA Type-II
5. The LED must be suitable for working Temperature from -40 ~ + 60°C with relative humidity of 15% ~ 90%
6. The Color rendering Index (CRI) must be equal or greater than 70.
7. The LED Light Fixture must be LM79 and LM80 Tested.
8. LEDs/Light fixtures should not be Chip-on-board (COB) single chip type due to their poor heat dissipation.
9. LEDs/Light fixtures shall be modular type with proper heat sinks.
10. The output from the LEDs/Light fixtures should be constant throughout the duty cycle
11. LED Life should be greater or equal to 50,000 Hours.
12. The LED Light Fixture must have the following certification:
 - ISO 9001
 - ISO 14001
 - CE (EMC and LVD) Certified or equivalent.
 - International standard Certifications

Note: Product Brochure, Catalog and certificates must be attached with the Technical Bid

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- a. The charge controller must be suitable for the required battery voltage, auto voltage recognition feature and capable of charging OPzV & Lithium Ferrous Phosphate (LiFePO₄) Batteries
- b. The charge controller must be IP-67 rated or above for outdoor installation
- c. The charge controller must be Remote Controlled for parameter setting. The system must have the following feature:
 - Remote Parameter Setting and Monitoring
 - Remote control of the Lights (on/off, timer setting etc)
- d. The charge controller must have MPPT Technology
- e. The charge controller must have at-least three stage Flexible dimming function (0-100%).
- f. The Maximum power point tracking (MPPT) efficiency should be minimum 97%.
- g. It must have temperature compensation for charging batteries in higher temperatures.
- h. Charge controller must have the following protections:
 - PV Short circuit
 - PV reverse polarity
 - PV over voltage
 - PV over current
 - Battery over charging
 - Battery over discharging
 - Battery reverse polarity protection
 - Load short circuit
 - Load overload protections
- i. It must have proper heat sink to dissipate excessive heat
- j. The charge controller must have protection for reverse flow of current through the PV modules
- k. Controller should have active port for GSM based communication for Remote Monitoring.
- l. Mid Night based timing controller will be preferred.
- m. The Solar Charge controller must have the following certification:
 - ISO 9001
 - CE Certified

38. Battery and Controller Box:

- The battery box should be made of Hot Dipped Galvanized Sheet of average 80 Microns.
- The battery box must have vented compartment having inverted louvers.
- For Pole Mounted batteries Battery boxes must be made of minimum 16 SWG sheet and must have proper locking arrangement for protection against theft.
- For underground battery installation, the battery box should be made of minimum 16 SWG sheet and should be properly sealed to ensure protection against water. Proper cable glands and packing material should be used to ensure water proofing of the box.
- The battery and Controller Box should be at least IP65 ingress protection.

The specifications of Electric cables are as under:

- Flexible copper cable of proper size along with MC-4 connectors (TUV Approved) from solar panel to charge controller and charge controller to battery as well as to light fixtures.
- The cables should be made of minimum 99.9% Pure copper cable

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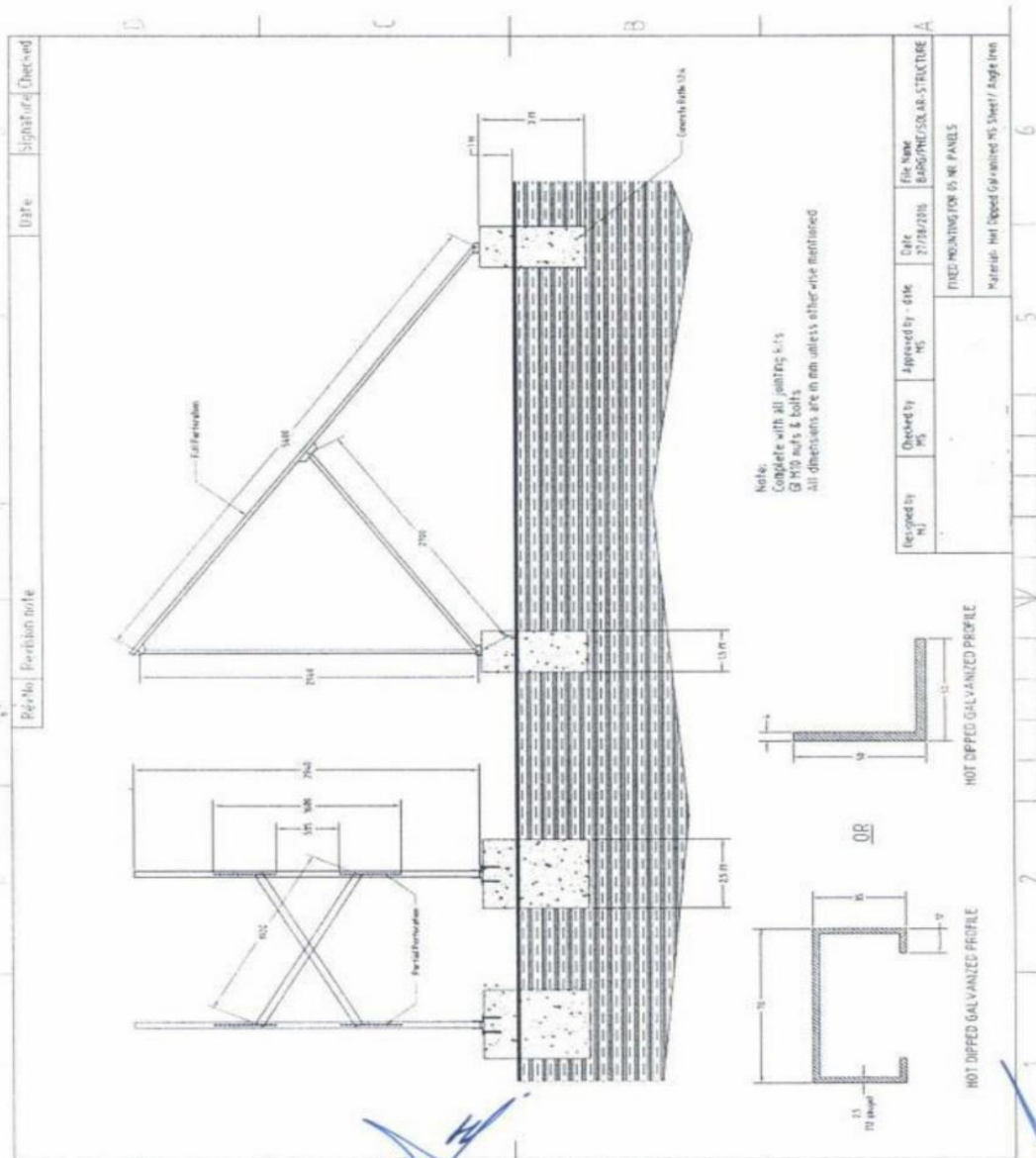
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ANNEXURE-1 (STRUCTURE DRAWING)



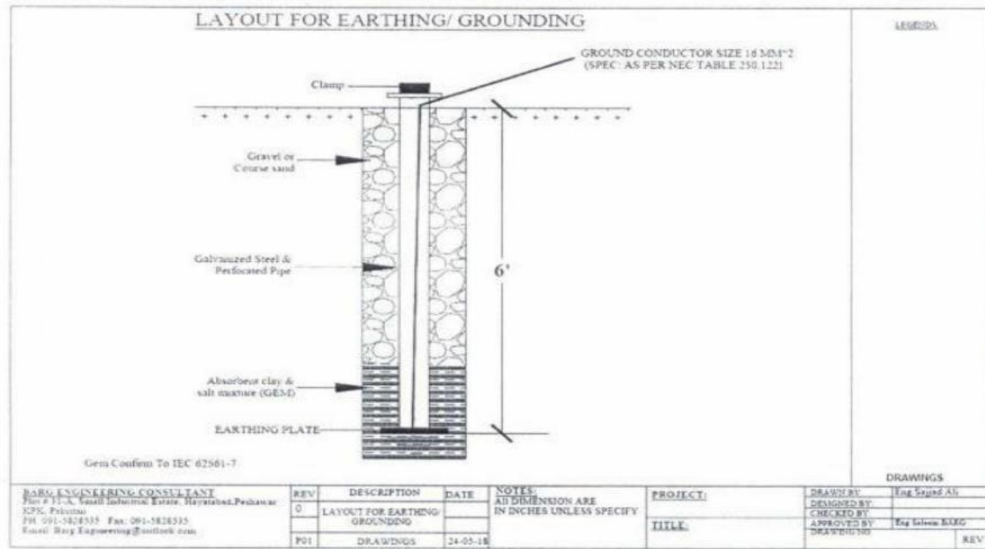
Prepared by	Checked by	Approved by	Date	File Name
MS	MS	MS	27/01/2017	BUDGET/SOLAR STRUCTURE
FIVE: MOUNTING ON 40 PANELS				
Material: Hot Dipped Galvanized MS Sheet / Angle Iron				

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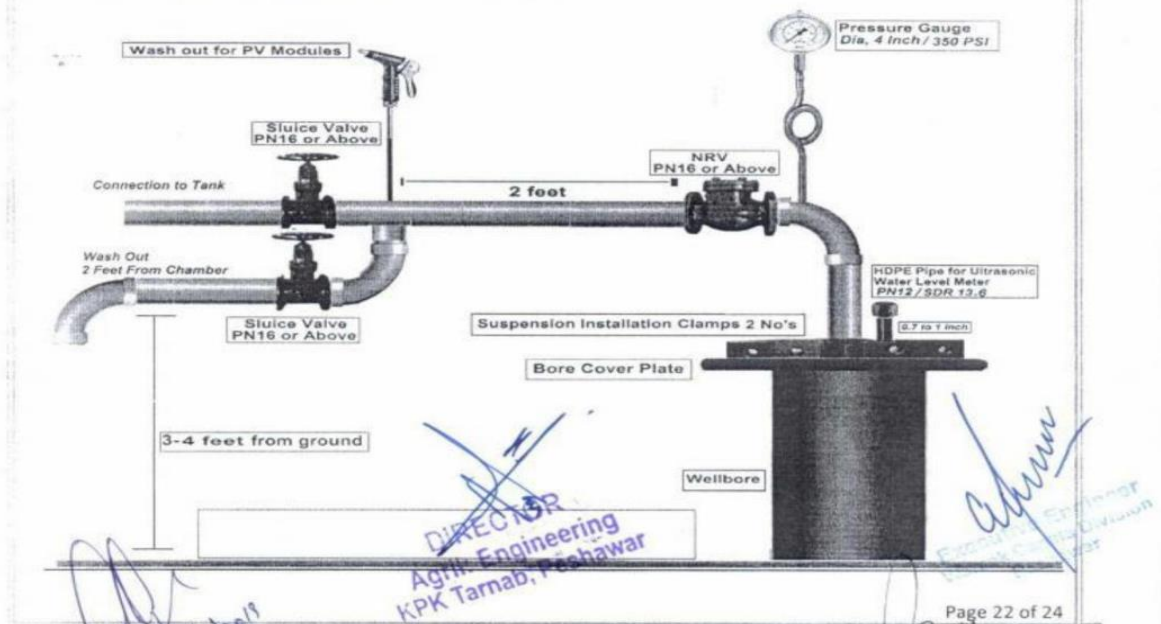
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ANNEXURE-2 (EARTHING / GROUNDING DRAWING)



ANNEXURE-3 TOPSET LAYOUT:



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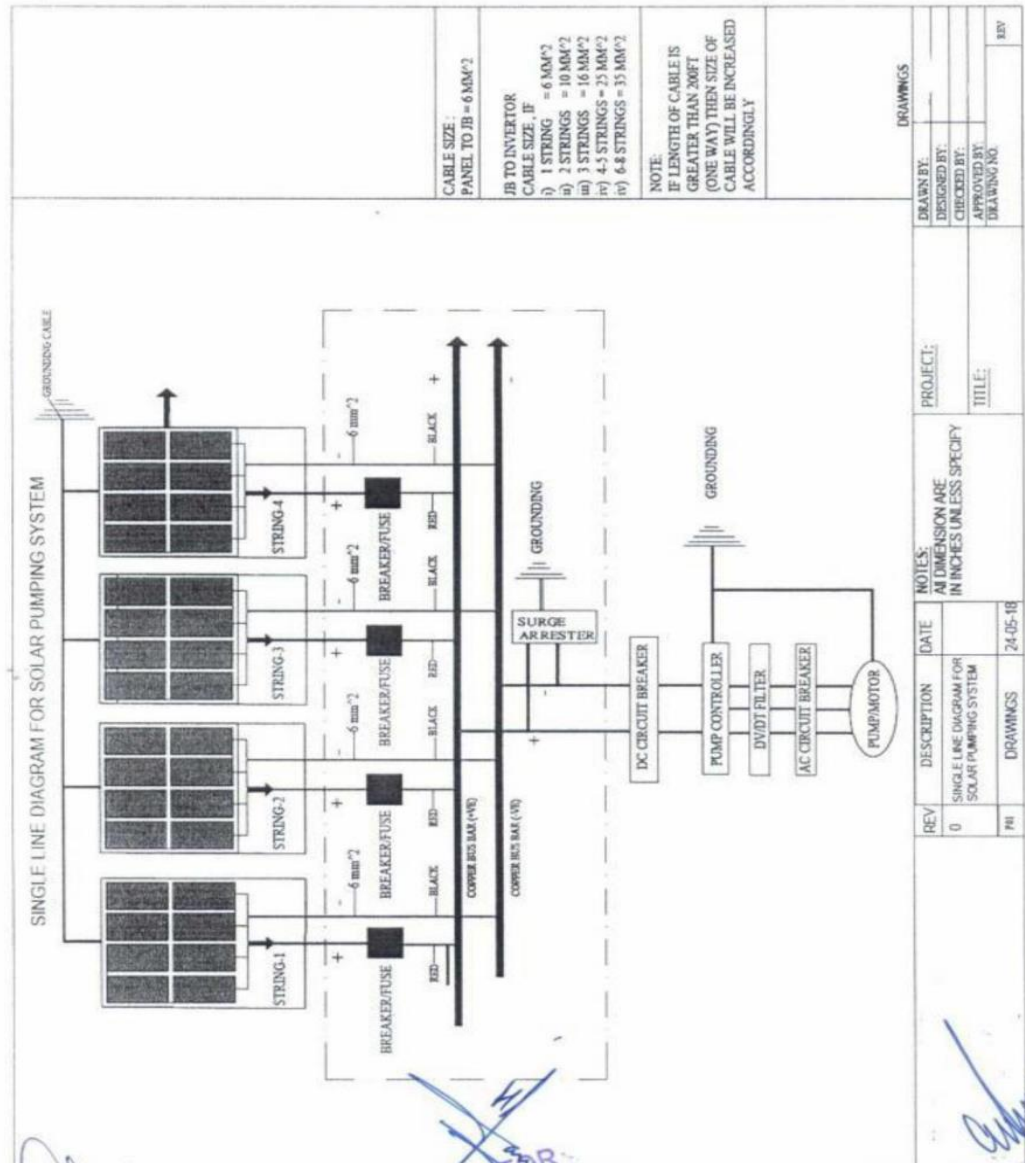
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ANNEXURE-4 (SYSTEM SINGLE LINE DIAGRAM-PUMPING)



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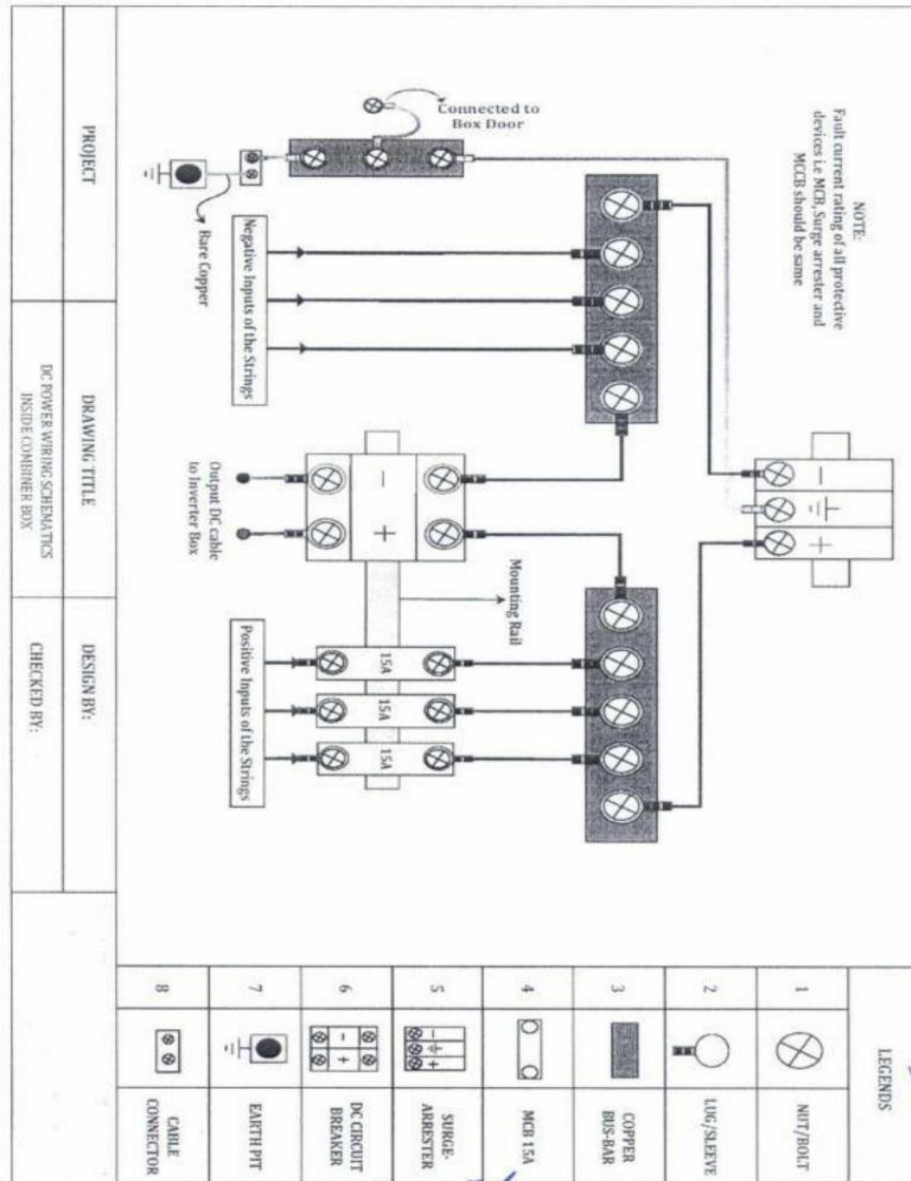
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ANNEXURE-5
(JUNCTION/COMBINER BOX SCHEMATICS DIAGRAM)

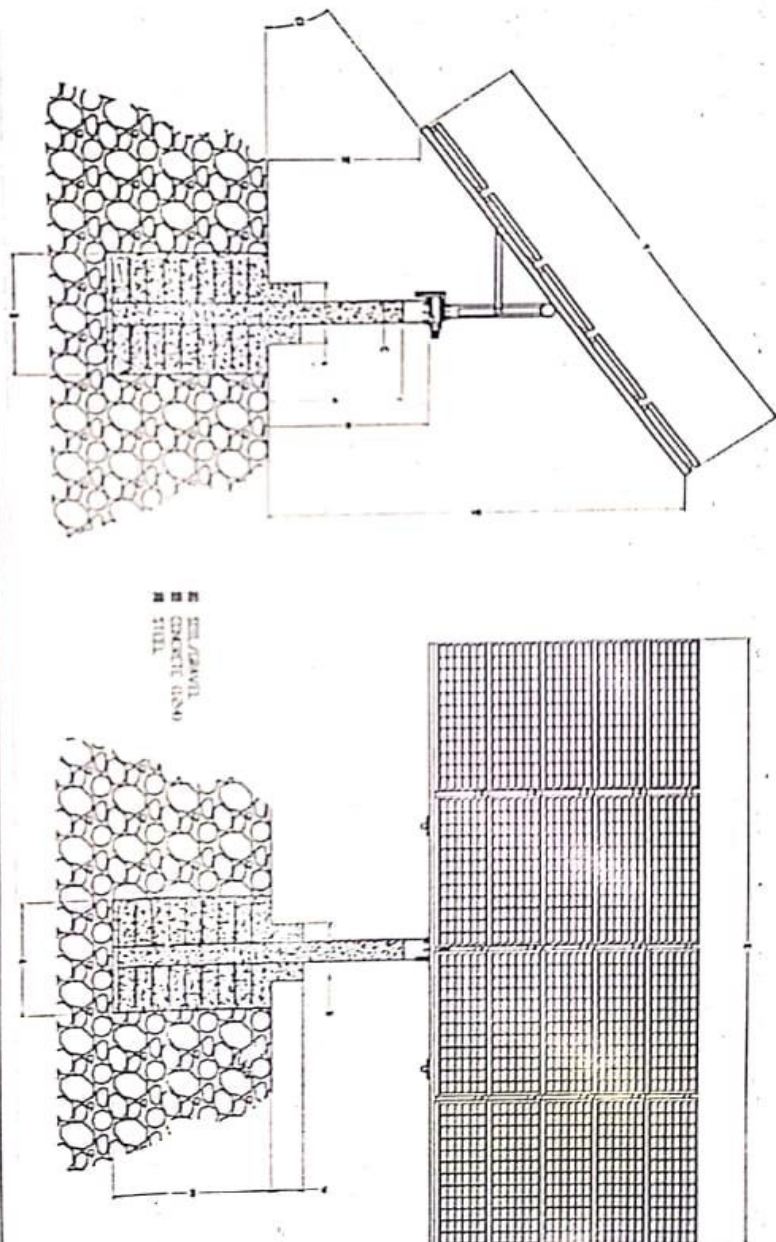


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General Dimensions and Concrete Plan of Single Pole PV Mounting Structure with Single Axis Tracking System

Sl. No.	Type/Size	X (ft)	Y (ft)	H (ft)	H ₁ (ft)	A	A ₁ (ft)	A ₂ (ft)	A ₃ (ft)	A ₄ (ft)	B (ft)	B ₁ (ft)	B ₂ (ft)	C (ft)	H (ft)	h (ft)
1	3/72x20	20.7	12.25	33	62	20-36	4	4	4	23	2	2	1	8	45	4
2	3/72x21	18.3	12.25	33	62	20-36	4	4	4	23	2	2	1	8	45	4
3	6/6x18	18.3	12.25	33	62	20-36	4	4	4	23	2	2	1	8	45	4
4	6/6x20	21.3	12.27	33	62	20-36	4	4	4	23	2	2	1	8	45	4

provision for vertical (east to west) automatic Sun-Tracking by slewing drive. A sketch of the mounting frame showing dimensions of the frame parts should be provided in the technical proposal.

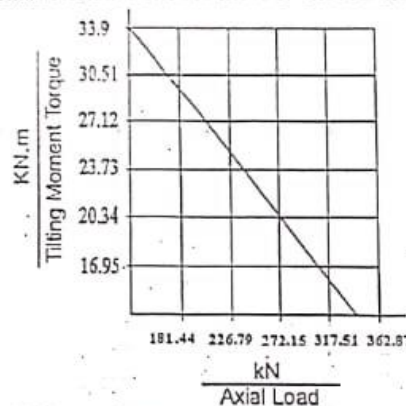
4. AUTO SUN TRACKING SYSTEM:

The tracker offered should be fabricated from GI pipes or channels having minimum wall thickness of 2.6 mm. It should have large mounting capacity 4000 Wp to 5500 Wp in order to achieve better land area utilization. The tracker offered should have robust structure capable of withstanding 150 km/hr wind speed. The tracker structure should rest on standard 9-inch gear drive/ slewing drive having following minimum specifications. Three years comprehensive free replacement, repair and maintenance warranty (Free of cost) should be provided for all components of auto tracker (including Batteries).

Detail catalog showing material specifications, load characteristics, make & origin of the slewing Drive and rated speed, voltage and power of the DC motor used must be provided in the Technical Proposal.

<i>Slewing Drive Performance Data</i>		
Rated Output Speed	0.049 rpm	
Rated Output Torque	805.2 kN.m	595.8 lbf.ft
Tilting Moment Torque (Max.)	33.9 kN.m	25×10 ³ lbf.ft
Holding Torque	38.7 kN.m	29×10 ³ lbf.ft
Axial Load (Max.)	338 kN	76×10 ³ lbf
Radial Load (Max.)	135 kN	30×10 ³ lbf
Ratio of Worm Gear	61:1	
Tracking Precision	≤ 0.17°	

The tilting moment/ axial load characteristics should meet or exceed the following



The slewing drive offered should be maintenance free. The drive control should be fully autonomous and based on real time sun sensing (not timer based control). There should be safety limit switches to restrict the movement of tracker. The control should have protection for tracker overloading due to jamming and or other reason. There

The slewing drive offered should be maintenance free. The drive control should be fully autonomous and based on real time sun sensing (not timer based control). There should be safety limit switches to restrict the movement of tracker. The control should have protection for tracker overloading due to jamming and or other reason. There should be provision for manual movement of tracker. Reference drawings showing concrete plan, general dimensions and slewing drive size are enclosed herewith.

