

FATA **UNIVERSITY**



BID SOLICITATION DOCUMENTS (SINGLE STAGE TWO ENVELOPE)

SELECTION OF CONTRACTOR

FOR

- 1. Solarization (On Grid System) of the Academic Science Block (Dr. A.Q Khan Block).**
- 2. Solarization (On- Grid System) Academic Arts Block (Hamza Baba Block).**
- 3. Solarization (On Grid System) Administration Block.**

(2023-24)

FATA UNIVERSITY
Darra Adam Khel Kohat
Ph: 091-5885510, Web site: www.fu.edu.pk

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I- INVITATION FOR BIDDERS



FATA UNIVERSITY

Darra Adam Khel, Kohat : Ph: 091-5885510, Web site: www.fu.edu.pk

RE TENDER NOTICE

FATA University TSD Darra, NMD Kohat, Invites Bids from eligible Firms/Bidders in accordance with KPPRA Procurement Rules 2014, amended up to date on Single Stage Two Envelope Procedure, having the following necessary particulars for the work mentioned below:

- Registered with Pakistan Engineering Council, having valid/updated PEC Registration Certificate along with the Relevant /Specialized Codes.
- Registered with the Khyber Pakhtunkhwa Revenue Authority, established under the Khyber Pakhtunkhwa Finance Act, 2013(Khyber Pakhtunkhwa Act No. XXI of 2013).
- Valid and updated Registration/ documents with KP Communication & Works Department.

S. NO	Name of Work	Estimated Cost	Bid Security	Last Date & Time of Bids Submission	Opening Date & Time	Time of Completion
1	Solarization (On Grid Solar System) of the Academic Science Block (Dr. A.Q Khan Block).	Rs. 26,175,065/-	2% of the Estimated Cost	23.08.2024 11:00 A.M	23.08.2024 11:30 A.M	As per Work Order
2	Solarization (On Grid Solar system) Academic Arts Block (Hamza Baba Block).	Rs. 20,940,052/-	do	do	do	do
3	Solarization (On Grid Solar System) Administration Block.	Rs. 17,450,043/-	do	do	do	do

- Bidding documents along with RFP can be obtained from the office of Directorate of Works FATA University on Payment of Rs.3000.00/- (Non Refundable) per scheme, as printing charges from the date of advertisement up to 22.08.2024 till 04:00 P.M. (Official Working Hours).
- Interested firms should have adequate financial soundness, similar work experience and personal capabilities.
- The proposals shall be in book binding form with properly page numbering and each page signed by the authorized person of the firm.
- Pre-Bid meeting will be held in the office of Director of Works FATA University dated. 15.08.2024 at 02:30 P.M.
- All Taxes Income Tax, Professional Tax, Sales Tax and Stamp Duty will be recoverable as per directives of the Government issued from time to time.
- In light of Govt. of Khyber Pakhtunkhwa Finance Department Notification KPRA Sales Tax (Service Charges) @ 2% added in all item codes of MRS so the same will be deducted at source from the gross amount of the project and the firm shall include the same in tax calculations.
- Additional Security is required to be deposited as per KPPRA Notification No. S.R.O (14)/ Vol: 1-24/2021-22 dated 10.05.2022.
- The sealed envelope containing technical and financial bids must be submitted to the office of the Director of Works up to 23.08.2024 till 11:00 A.M through registered courier services (No bid will be received by hand). Technical bids will be opened on the same day at 11:30 A.M in the presence of the bidders or their authorized representative in the committee Room of the FATA University.
- Original Bid Security @ 2% of the estimated cost of each scheme in the name of "Recurring Grant FATA University" shall be placed in financial bid; an affidavit shall be attached with technical bid (s) stating that the bid security is placed in financial bid.
- The Estimate is based on MRS-2022 (2nd Bi-Annual) along with NSI items.
- Incomplete / disfiguring / overwriting / conditional / late bids will be considered as non-responsive.
- In case of tie in all respects i.e. bid, taxes etc., toss shall be carried out in front of the bidders by the Works/Technical Committee.
- The Authority reserves the right to accept /reject all the applications / bids as per KPPRA rules.
- All the prevailing KPPRA rules/act and other Govt. Notifications issued from time to time shall be applicable.
- The scope of work may increase or decrease, subject to the availability of funds.
- The detailed terms and conditions are given in the RFP which can be obtained from the office of the Directorate of Works, FATA University on all working days, during office hours, till the closing deadline.

DIRECTOR OF WORKS : FATA UNIVERSITY Darra Adam Khel, Kohat



FATA UNIVERSITY

Darra Adam Khel, Kohat: Ph: 091-5885510 Website: www.fu.edu.pk

Corrigendum/Addendum

This is with reference to the Tender Notice published in The Daily Aaj, The Daily Pakistan and Daily The News, dated 08-08-2024 regarding the Solarization of the FATA University, the closing date of the tender is extended up to **02-09-2024 till 2:00 P.M.** Tender will be opened on the same day at **02:30 P.M.** Other terms & conditions of the NIT will remain unchanged.

DIRECTOR OF WORKS: FATA UNIVERSITY
Darra Adam Khel, Kohat



FATA UNIVERSITY

Darra Adam Khel, Kohat : Ph: 091-5885510, Web site: www.fu.edu.pk

Corrigendum/Addendum

This is with reference to the Tender Notice published in The Daily Aaj, The Daily Pakistan, Daily The News, dated 08-08-2024 and subsequent Addendum published in the Daily Aaj, Daily The News on 17-08-2024 and also appeared on the KPPRA website, regarding the Solarization of the FATA University, the following Addendum here by made:

- 1. The closing date of the tender is extended from 02-09-2024 to 16-09-2024 till 2:00 P.M. Tender will be opened on the same day at 02:30 P.M.**
- 2. Bidding documents along with RFP can be obtained from the office of Directorate of Works, FATA University on cash payment of Rs. 3000.00/- (Non Refundable) per scheme, as tender fee from the date of advertisement up to 13.09.2024 (Friday) till 04:00 P.M. (Official Working Hours).**
- 3. Bidding documents can also be downloaded from the university's official website, www.fu.edu.pk or from the KPPRA website. In case of bidding documents downloaded from the website (s), the tender fee of Rs.3000/- per scheme, in shape of CDR/Bank Draft, in the name of "Recurring Grant, FATA University", must be attached with the bids. Bid without tender fee will not be entertained.**
- 4. Other terms & conditions of the NIT will remain unchanged.**

DIRECTOR OF WORKS : FATA UNIVERSITY Darra Adam Khel, Kohat

II- INSTRUCTIONS TO BIDDERS

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INSTRUCTIONS TO BIDDERS

A. GENERAL

IB.1 Scope of Bid and Source of Funds

1.1 Scope of Bid

FATA UNIVERSITY

Wishes to receive bids for the following scope of work:

1. Solarization (On-grid system) of the Academic Science Block (Dr. A.Q Khan Block).
2. Solarization (On-grid system) Academic Arts Block (Hamza Baba Block).
3. Solarization (On- grid system) Administration Block.

IB.2 Eligible Bidders

2.1 Bidding is open to all participated firms and persons meeting the following requirements:

a) Mandatory Criteria:

S #	Description
1.	Covering Letter
2.	Form of Bid (Letter of Offer) Provided / accordingly to be filled and submitted in the technical proposal, in accordance with Clause IB.17.
3.	Power of Attorney in accordance with Clause IB 17.5. (The original and all copies of the bid shall be typed 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 signed and stamped by the person or persons signing the bid.)
4.	The firm must have ISO 9001-2015 certificate quality management system
5.	Valid Registration with Pakistan Engineering Council (PEC).
6.	Firm must have EE-04, EE-11 (Solar) Specialization & CE-10 Codes in their PEC Registration.
7.	Registration with Income Tax Department (Active).
8.	Registration of STRN.
9.	Firm must be registered with Securities & Exchange Commission of Pakistan (SECP).
10.	Registration with Khyber Pakhtunkhwa Revenue Authority (Active Tax Payer).
11.	Original Affidavit on Stamp Paper of at-least Rs. 100/-, duly attested by Notary Public that “the Firm is not Blacklisted from any Government/Semi Government Agency/NGO in accordance with KPPRA Rules”.
12.	Original Affidavit on Stamp Paper at-least Rs. 100/- duly attested by Notary Public “that the Firm DOESN’T have any Litigation History in which Decision has been given against the firm(s).”
13.	Technical compliance sheet of the quoted products as provided in the Bid Solicitation Document shall be filled and to be attached in the Technical Proposal as per the specifications (Standardization certification and codes provided.
14.	Bidders are required to submit the photocopy of the 2% (of the Estimated Cost) Bid Security in the shape of CDR on the name of “Recurring Grant FATA University” in the Technical Proposal. The Bidder shall in addition, place an affidavit in the technical proposal stating that “A Bid Security in original amounting to 2 percent has been placed in the financial proposal or bid”.
15.	Authorization Certificate of Quoted Brands and Models from the Manufacturers or Authorized Dealers of Inverters mentioning the quoted brand name and model.
16.	Valid Alternative Energy Development Board (AEDB-PPIB) Certification
17.	Firm must have 100 Million average annual turnover for last 3 years, Must attach Income Tax returns & Audited reports which should correspond reflect the annual turnover.

IB3. Evaluation Criteria.

Keeping in view the complexity of the project works, criteria for qualification has been evolved by Considering the prevailing market trends and mentioned below.

No	Category	Weightage/Marks
I	General Capabilities	10
II	Financial Capabilities	20
III	Experience Record	30
IV	Personal Capabilities	20
V	Equipment Capabilities	20
	Total	100

Note: Technical qualification status shall be decided on the basis of Pass/Fail basis. The applicant must secure at least 70 % score overall and 50% in each category. The further detailed criteria for each category may be developed as given under head as follows:

Qualification Evaluation Criteria.

I) General Capabilities

S.NO	Description	Marks assigned	Criteria for marks obtained
a)	Copy of valid dealership (Solar panels)	04	<ul style="list-style-type: none">No marks will be given if license is not attached and Four (04) points will be added in case of valid certificate.
b)	Copy of valid dealership (Inverter)	06	<ul style="list-style-type: none">No marks will be given if license is not attached and Six (06) points will be added in case of valid certificate.
Sub Total			10

a) **Experience:**

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

S. No	Description	Maximum Points	Remarks
1	<p>Projects of similar nature and complexity having Cost at least Rs.18.00 Million or above (Supply & Installation of Building Solarization Projects) completed in last five years in any Public Works Departments or Reputable Non-Profit Organizations</p> <p>Note: Must attach readable work orders & completion certificates of the projects.</p> <p>marks will will be given if work order & completion certificate both are attached</p>	20	<p>Five (05) Points will be given for each project falling under description given.</p> <p>Full Marks will be given for 4 (Four) or above.</p>
2	<p>Projects of similar nature and complexity having Cost at least Rs. 18.00 Million or above (Supply & Installation of Building Solarization Projects) on going in last five years in any Reputable Non-Profit Organizations or public Works Departments</p> <p>Note : Must Attach Readable Work Orders & Performance Certificates of the ongoing projects.</p> <p>Marks will be given if Work Orders & Performance Certificates both of the ongoing projects are attached.</p>	10	<p>Five (05) Marks will be given for each completed project.</p> <p>Full Marks will be given for Two (02) Projects or above.</p>
	Sub Total	30	

Personal Capabilities:

Credit Marks shall be awarded under this category using the following criteria

S. No	Description	Marks Assigned	Maximum points
i)	Engineering Strength (PEC Attached)	15	<u>Experience (06-Marks)</u> <ul style="list-style-type: none">• Five (05) Marks will be given for each B.Sc. Engineer Electrical/Electronic/Mechanical having experience of 5 years or above Maximum 3 required• (Must attach readable photocopy of the educational documents of each engineer along with appointment order issued by the firm) Engineer working /standing with the applied firm shall be verified from PEC online portal. No marks will be given if the engineer not working /not standing with the applied firm on PEC online portal.
ii)	Associate Engineers (DAE)	05	<ul style="list-style-type: none">• One (01) Marks will be given for Each Associate Engineers (DAE) having 3 Years' Experience up to Maximum of 5 Engineers.• (Must attach readable photocopy of the educational documents of each Associate Engineers along with appointment order issued by the firm) No marks will be given if the above mentioned documents are not attached
	Sub Total		20

Financial Position:

Credit Marks shall be awarded on the basis of the following criteria:

S.No	Description	Maximum marks	Remarks
1	Bank Certificate including Bank credit Line (Evidence in form of Agreement/Sanction from Guarantor Bank) (Valid Certificate)	10	<u>Bank Credit Line (03-Marks)</u> <ul style="list-style-type: none">• Full Marks (10) will be given in case of limit is 200 Million• Five (05) Marks are given if the available limit less than to 200 Million to 100 Million• Two (02) Marks For limit less than 100 Million to 50 Million• Zero Marks for Limit less than 50 Million
2	Audit Statements for Last 3 years (2020-21 ,2021-22,2022-23). No marks will be given if Audited Statements are not attached	03	<ul style="list-style-type: none">• One (01) point will be given for one-year audited Audit Statement.• Full Marks are given for three-year Audit Statement.
3	Annual Turnover Average Last 3 Years (Must be reflected in Income Tax Returns (2020-21,2021-22, 2022-23). No marks will be given if Income Tax Returns are not attached	7	<ul style="list-style-type: none">• Full Marks (7-Seven) will be given in case of Average Annual Turnover is 200 Million• Five (05) Marks are given if the Average Annual Turnover less than to 200 Million to 100 Million• Two (02) Marks for Average Annual Turnover less than 100 Million to 50 Million• Zero Marks for Average Annual Turnover less than 50 Million
Total Marks Allocated			20

Equipment Capabilities:

Credit marks shall be granted on the basis of the following criteria for various kinds of equipment & machinery relevant for the project:

S.No	Description	Marks assigned	Explanation for Marks obtained
1	PV Analyzer Set (1 Required)	06	Must be attached real picture and serial number. (pictures downloaded from internet are not acceptable) No marks will be given if the above mentioned documents are not attached
2	Clamp Meter (2 Required 2 marks for Each)	04	Must be attached real picture and serial number. (pictures downloaded from internet are not acceptable) No marks will be given if the above mentioned documents are not attached
3	Battery Tester (1 Required)	02	Must be attached real picture and serial number. (pictures downloaded from internet are not acceptable) No marks will be given if the above mentioned documents are not attached
4	Electrical Resistivity Meter (ERM)	02	Must be attached real picture and serial number. (pictures downloaded from internet are not acceptable) No marks will be given if the above mentioned documents are not attached
5	Workshop Facilities	02	Attach Layout and Address . No marks will be given if the above mentioned documents are not attached
6	Ultrasonic Micron Meter	02	Must be attached real picture and serial number. (pictures downloaded from internet are not acceptable) No marks will be given if the above mentioned documents are not attached
6	Ultrasonic Thickness Gauge	02	Must be attached real picture and serial number. (pictures downloaded from internet are not acceptable) No marks will be given if the above mentioned documents are not attached
Total Marks Allocated			20

IB.4 Cost of Bidding

- 4.1 The bidder shall bear all costs associated with the preparation and submission of its bid and the Employer will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

B. BIDDING DOCUMENTS/BSDs

IB.5 Contents of Bidding Documents

- 5.1 In addition to Invitations for Bids, the Bidding Documents are those described in this document, and should be read in conjunction with any Addendum issued in accordance with Clause IB.7.
- 5.2 The bidders are expected to examine carefully the contents of all the above documents. Failure to comply with the requirements of bid submission will be at the bidders' own risk. Pursuant to Clause IB.24, bids which are not substantially responsive to the requirements of the Bidding Documents will be rejected.

IB.6 Clarification of Bidding Documents

- 6.1 A prospective bidder requiring any clarification(s) in respect of the Bidding Documents may notify the Employer in writing or by telex or fax at the address:

Director Of Works, FATA University

Employer will examine the request for clarification of the Bidding Documents which it receives before one-week time prior to the deadline for the submission of bids. If needed will issue the clarification/amendment of the Bidding Documents at least 5 days before the date of submission of Bids (without identifying the source of enquiry) to all prospective bidders who have purchased the Bidding Documents.

IB.7 Amendment of Bidding Documents

- 7.1 At any time, prior (**at least 2 days**) to the deadline for submission of bids, the Employer may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective bidder, modify the Bidding Documents by issuing addendum.
- 7.2 Any addendum thus issued shall be part of the Bidding Documents pursuant to Sub clause 7.1 hereof, and shall be communicated in writing to all purchasers of the Bidding Documents. Prospective bidders shall acknowledge receipt of each addendum in writing to the Employer. The bidder shall also confirm in the Form of Bid that the information contained in such addenda have been considered in preparing his bid.
- 7.3 To afford prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may at its discretion extend the deadline for submission of bids in accordance with Clause IB.19.

C. PREPARATION OF BIDS

IB.8 Language of Bid

8.1 The Bid prepared by the Bidder and all correspondence and documents relating to the Bid, exchanged by the Bidder and the Engineer 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.9 Documents Comprising the Bid

9.1 The bid prepared by the bidder shall comprise the following components:

- (a) Covering Letter
- (b) Form of Bid duly filled, signed and sealed, in accordance with Clause IB.17.
- (c) Schedules (A to H those which are applicable) to Bid duly filled and signed, in accordance with the instructions contained therein.
- (d) Bid Security furnished in accordance with Clause IB.15. An affidavit is to be provided with Technical Bid stating that a bid security (Original) amounting to 2% (of the Estimated Cost), has been placed / enclosed in the financial proposal or bid. Also, Bidders are required to submit the photocopy of the 2% (of the Estimated Cost) Bid Security in the shape of CDR in the Technical Proposals otherwise, the technical proposal will be considered non-responsive and will be returned to the bidder after being examined by the procurement committee.
- (e) Documentary evidence established in accordance with Clause IB.13 that the bidder is eligible to bid and is qualified to perform the contract if its bid is accepted.
- (f) Documentary evidence established in accordance with Clause IB.14 that the Goods and ancillary Services to be supplied by the bidder are eligible Goods and Services and conform to the Bidding Documents.
- (g) Any other documents prescribed in Particular Conditions of Contract or Technical Provisions to be submitted with the bid.

IB.10 Form of Bid and Schedules

- 10.1 The bidder shall complete, sign and seal the Form of Bid, Schedules to Bid if any and Schedule of Prices furnished in the Bidding Documents and shall also enclose other information as detailed in Clause IB.9.
- 10.2 For the purpose of granting a margin of domestic preference pursuant to Clause IB.27, the Employer/Engineer will classify the bids. **NOT APPLICABLE**

IB.11 Bid Prices

- 11.1 The bidder shall fill up the Schedule of Prices attached to these documents indicating total prices of the Works to be performed under the Contract. Prices on the Schedule of Prices shall be entered keeping in view the instructions contained in the Preamble to the Schedule of Prices. The price shall be FOR destination inclusive of installation and three-year warranty.
- 11.2 The bidder shall fill in rates and prices for all items of the Works described in the Schedule of Prices. Items against which no rate or price is entered by a bidder will not be paid for by the Employer when executed and shall be deemed covered by rates and prices for other items in the Schedule of Prices. **NOT APPLICABLE**
- 11.3 The bidder's separation of price components in accordance with Sub-Clause 11.1 above, will be solely for the purpose of facilitating the comparison of bids by the Employer/Engineer and will not in any way limit its right to contract on any of the terms offered. **NOT APPLICABLE**
- 11.4 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. When the bidders are required to quote only fixed price(s) a bid submitted with an adjustable price quotation will be treated as non-responsive and rejected, pursuant to Clause IB.24.
- 11.5 Any discount offered shall be valid for at least the period of validity of the bid. A discount valid for lesser period shall be considered null and void.

IB.12 Currencies of Bid

- 12.1 Prices shall be quoted in the following currencies:

The prices shall be quoted in the **Pak. Rupees**. Bids in other currencies will not be acceptable and will be considered non-responsive.

- 12.2 Further, a bidder expecting to incur a portion of its expenditure in the performance of the Contract in more than one currency (but use no more than 3 foreign currencies), and wishing to be paid accordingly, shall so indicate in its bid. **NOT APPLICABLE**
- 12.3 The currencies of payment shall be as stated in Particular Conditions of Contract. However, provisions in Sub-Clauses 12.1 & 12.2 above, shall not in any way constitute

a contractual or legal binding on the Employer for the payment in the currencies required by the Contractor. **NOT APPLICABLE**

IB.13 Documents Establishing Bidder's Eligibility and Qualifications

- 13.1 Pursuant to Clause IB.9, 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.
- 13.2 The documentary evidence of the bidder's eligibility to bid shall establish to the Employer's satisfaction that the bidder, at the time of submission of its bid is from an eligible source country as defined under Clause IB.2.
- 13.3 The documentary evidence of the bidder's qualification to perform the Contract if its bid is accepted, shall establish to the Employer's/Engineer's satisfaction:
- (a) that, in the case of a bidder offering to supply Goods under the Contract which the bidder did not manufacture or otherwise produce, the bidder has been duly authorized by the Goods manufacturer or producer to supply the Goods to Pakistan;
 - (b) that the Bidder/Manufacturer has the financial, technical and production capability necessary to perform the Contract; and
 - (c) that, in the case of a bidder not doing business within Pakistan the bidder is or will be (if successful) represented by an agent in Pakistan equipped and able to carry out the Supplier's maintenance, repair and spare parts stocking obligations prescribed by the Conditions of Contract and/or Technical Provisions.
 - (d) (a) Bidder must possess and provide documentary evidence of the mandatory requirement, equipment and personnel capabilities as required for the technical evaluation of the firm.
- 13.4 Joint Venture

In order for a Joint Venture to qualify:

- (a) At least one of the partners of joint venture shall satisfy the relevant experience criteria specified in Sub-Clause IB .3 hereinabove.
- (b) All firms comprising the joint venture shall be legally constituted and considered as one firm and shall jointly meet eligibility requirement of Sub-Clause 2.1.
- (c) All partners of the joint venture shall at all times and under all circumstances be liable jointly and severally to Employer for the execution of the entire Contract in accordance with the Contract terms and conditions and a statement to this effect shall be included in the authorization mentioned under para (f) below as well as in the Form of Bid and Form of Contract Agreement (in case of a successful bidder).
- (d) The Form of Bid, and in the case of successful bidder, the Form of Contract Agreement, shall be signed so as to be legally binding on all partners.
- (e) 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.

- (f) The partner-in-charge shall be authorized to incur liabilities, receive payments and receive instructions for and on behalf of any or all partners of the joint venture.
- (g) 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 partners without prior written consent of the Employer.

13.5 The Bidder shall propose, in order of his priority; plant, equipment or goods of not more than three Manufacturers. Employer at his own jurisdiction will evaluate the plant, equipment or goods of only one of such Manufacturers.

IB.14 Documents Establishing Goods' Eligibility and Conformity to Bidding Documents

- 14.1 Pursuant to Clause IB.9, the bidder shall furnish, as part of its bid, documents establishing the eligibility and conformity to the Bidding Documents of all Goods and Services which the bidder proposes to perform under the Contract.
- 14.2 The documentary evidence of the Goods and Services eligibility shall establish to the Employer's satisfaction that they will have their origin in an eligible source country as defined.
- 14.3 The documentary evidence of the Goods and Services' conformity to the Bidding Documents may be in the form of literature, drawings and data and shall furnish:
 - (a) A detailed description of the Goods, essential technical and performance characteristics.
 - (b) Complete set of technical information, description data, literature and drawings as required. This will include but not be limited to the following:
 - (i)
 - (ii) A sufficient number of drawings, photographs, catalogues, illustrations and such other information as are necessary to illustrate clearly the significant characteristics such as general construction dimensions and other relevant information about the Goods to be furnished.
 - (iii) Details of equipment and machinery with capacity.
 - (iv) Any other information which is required for evaluation purposes.
 - (c) A clause-by-clause commentary on Technical Provisions, provided with the Bidding Documents, demonstrating the Goods' and Services' substantial responsiveness to those Specifications or a statement of deviations and exceptions to the provisions of the Technical Provisions as required in Schedule D to Bid.

14.4 For purpose of the commentary to be furnished pursuant to Sub-Clause 14.3(c) above, the Bidder shall note that standards for workmanship, material and equipment, and references to brand names or catalogue numbers, designated by the Engineer in the Technical Provisions are intended to be descriptive only and not restrictive. The bidder may substitute alternative standards, brand names and/or catalogue numbers in its bid, provided that it demonstrates to the Engineer's satisfaction that the substitutions are substantially equivalent or superior to those designated in the Technical Provisions. Copies of the standards proposed by the bidder other than those specified in the Bidding Documents shall be furnished.

IB.15 Bid Security

- 15.1** Bid shall be accompanied by Bid Security @ 2% of the Estimated Cost of each scheme applied In shape of CDR in the name, "Recurring Grant, FATA University" Original CDR shall be placed with Financial Bid and a photocopy of the CDR is to be provided in the Technical Bid. Affidavit is to be provided with Technical Bid that CDR @ 2% (of the estimated cost) is enclosed with Financial Bid. Bids without 2% (of the estimated cost) Bid Security will be straightaway considered as non-responsive. The bidders should ensure that the offered price is not reflected in the Technical Bid (s).
- 15.2 The Bid Security shall be, in the form of CDR issued by a Scheduled Bank in Pakistan.

IB.16 Validity of Bids

- 16.1 Bids shall remain valid for **90 days** after the date of bid opening as prescribed in Clause IB.19.
- 16.2 In exceptional circumstances prior to expiry of original bid validity period, the Employer may request the bidders to extend the period of validity for a specified additional period which shall in no case be more than the original bid validity period. The request and the responses thereto shall be made in writing. A bidder may refuse the request without forfeiture of his Bid Security. A bidder agreeing to the request will be required to extend the validity of his Bid Security for the period of the extension., and in compliance with Clause IB.15 in all respects in which case, the Employer will be obligated to compensate the bidders, upon substantiation for their increase in costs (if it is a fixed price bid).

IB.17 Format and Signing of Bid

- 17.1 Bidders are particularly directed that the amount entered on the Form of Bid shall be for performing the Contract strictly in accordance with the Bidding Documents.
- 17.2 All Schedules to Bid are to be properly completed and signed.
- 17.3 No alteration is to be not made in the Form of Bid nor in the Schedules thereto 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.
- 17.4 Each bidder shall prepare and submit separate Technical Bid and Financial Bid for each scheme.**
- 17.5 The original and all copies of the bid shall be typed 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 stamped by the person or persons signing the bid.
- 17.6 The bid shall contain no alterations, omissions or additions, except to comply with instructions issued by the Employer, or as are necessary to correct errors made by the bidder, in which case such corrections shall be initialed by the person or persons signing the bid.
- 17.7 Bidders shall indicate in the space provided in the Form of Bid their full and proper addresses at which notices may be legally served on them and to which all correspondence in connection with their bids and the Contract is to be sent.
- 17.8 Bidders should retain a copy of the Bidding Documents as their file copy.

D. SUBMISSION OF BIDS

IB.18 Sealing and Marking of Bids

- 18.1 Each bidder shall submit his bid as under:
- (a) Bidders have to submit technical and financial proposals for each scheme in accordance to the financial limit of the Firm Pakistan Engineering Council category. Technical proposal (ORIGINAL) and Financial Bid (ORIGINAL) should be clearly marked and sealed in separately envelopes for each scheme. .
 - (b) The envelopes containing the ORIGINAL will be put in one sealed envelope and addressed / identified as given in Sub Clause 18.2 hereof.
- 18.2 The inner and outer envelopes shall;

- (a) Be addressed to the Employer at the address given in Sub-Clause 6.1 heretofore.
- (b) Bear the Project name, Bid No. and Date of opening of Bid.
- (c) Provide a warning not to open before the time and date for bid opening.

18.3 The Bid shall be delivered by registered couriers at the address to Employer as given in Sub-Clause 6.1 heretofore. Bids delivered by hand/in person will not be acceptable.

18.4 In addition to the identification required in Sub-Clause 18.2 hereof, the inner envelope shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared “late” pursuant to Clause IB.20.

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

IB.19 Deadline for Submission of Bids

- 19.1 (a) Bids must be received by the Employer at the address specified.
- (c) Bids with charges payable will not be accepted, nor will arrangements be undertaken to collect the bids from any delivery point other than that specified above. Bidders shall bear all expenses incurred in the preparation and delivery of bids.
- (d) Where delivery of a bid is by mail and the bidder wishes to receive an acknowledgment of receipt of such bid, he shall make a request for such acknowledgment in a separate letter attached to but not included in the sealed bid package.

19.2 Bids submitted through telegraph, telex, fax or e-mail shall not be considered.

19.3 The Employer may, at his discretion, extend the deadline for submission of bids by issuing an addendum in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will thereafter be subject to the deadline as extended.

IB.20 Late Bids

- 20.1 (a) Any bid received by the Employer after the deadline for submission of bids prescribed in Clause IB.19 will be returned unopened to such bidder.
- (b) Delays in the mail, delays of person in transit, or delivery of a bid to the wrong office shall not be accepted as an excuse for failure to deliver a bid at the proper place and time. It shall be the bidder’s responsibility to determine the manner in which timely delivery of his bid.

IB.21 Modification, Substitution and Withdrawal of Bids

- 21.1 Any bidder may modify, substitute or withdraw his bid after bid submission provided that modification, substitution or written notice of the withdrawal is received by the Employer prior to the deadline for submission of bids.
- 21.2 The modification, substitution or notice for withdrawal of any bid shall be prepared, sealed, marked and delivered in accordance with the provisions of Clause IB.18 with the outer and inner envelopes additionally marked “MODIFICATION”, “SUBSTITUTION” or “WITHDRAWAL”, as appropriate.
- 21.3 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 Clause IB.15.

E. BID OPENING AND EVALUATION

IB.22 Bid Opening

- 22.1 A committee consisting of nominated members by the Employer will open the bids, including withdrawals, substitution and modifications made, in the presence of bidders’ representatives who choose to attend, at the time, date and location stipulated in the Invitation for Bids/Corrigendum.

The bidders’ representatives who are present shall sign in a register evidencing their attendance.

- 22.2 Envelopes marked “MODIFICATION”, “SUBSTITUTION” or “WITHDRAWAL” shall be opened and read out first and the name of the Bidder shall be read out. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Clause IB.21 shall not be opened.
- 22.3 The bidder’s name, Bid Prices, unit rates, any discount and price of any Alternate Proposal(s), bid modifications, substitutions and withdrawals, the presence or absence of Bid Security, and such other details as the Employer at its discretion may consider appropriate, will be announced by the Employer at the bid opening. The Employer will record minutes of bid opening.
- 22.4 Discounts offered for lesser period than the bid validity shall not be considered in evaluation.

IB.23 Clarification of Bids

- 23.1 To assist in the examination, evaluation and comparison of Bids the Engineer 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.

IB.24 Preliminary Examination & Determination of Responsiveness of Bids

24.1 Prior to the detailed evaluation of bids, pursuant to Clause IB.26,

(a) the Employer will examine the Bids to determine whether;

- (i) The Bid is complete and does not deviate from the scope,
- (ii) Any computational errors have been made,
- (iii) Required sureties have been furnished,
- (iv) The documents have been properly signed,
- (v) The Bid is valid till required period,
- (vi) The Bid prices are firm during currency of contract if it is a fixed price bid,
- (vii) Completion period offered is within specified limits,
- (viii) The Bidder/Manufacturer is eligible to Bid and possesses the requisite experience,
- (ix) The Bid does not deviate from basic technical requirements and the Bids are generally in order.

(b) A bid is likely not to be considered, if;

- (i) it is unsigned,
- (ii) its validity is less than specified,
- (iii) it is submitted for incomplete scope of work,
- (iv) it indicates completion period later than specified,
- (v) it indicates that Works and materials to be supplied do not meet eligibility requirements,
- (vi) it indicates that Bid prices do not include the amount of income tax,

(c) A bid will not be considered, if;

- (i) It is not accompanied with bid security,
- (ii) it is received after the deadline for submission of bids,
- (iii) it is submitted through fax, telex, telegram or email,
- (iv) it indicates that prices quoted are not firm during currency of the contract whereas the bidders are required to quote fixed price(s),
- (v) the bidder refuses to accept arithmetic correction,
- (vi) it is materially and substantially different from the Conditions/Specifications of the Bidding Documents.
- (vii) An affidavit is not provided with Technical Bid stating that a bid security amounting to 2% (of the estimated cost), has been placed / enclosed in the financial proposal or bid.

24.2 Arithmetical errors will be rectified on the following basis:

If there is a discrepancy between the unit price and total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If unit price and reevaluated total price is correct and there is a discrepancy between the words and figures the amount in words shall prevail. If there is a discrepancy between the total Bid price entered in Form of Bid and the total shown in Schedule of Prices Summary, the amount stated in the Form of Bid will be corrected by the Employer/Engineer in accordance with the Corrected Schedule of Prices.

If the Bidder does not accept the corrected amount of Bid, his Bid shall be rejected and his Bid Security forfeited.

- 24.3 Prior to the detailed evaluation, the Employer will determine the substantial responsiveness of each Bid to the Bidding Documents. For purpose of these Clauses, a substantially responsive Bid is one which conforms to all the terms and conditions of the Bidding Documents without material deviations.

A material deviation or reservation is one

- (i) Which affects in any substantial way the scope, quality or performance of the Works.
- (ii) which limits in any substantial way, inconsistent with the Bidding Documents, the Employer's rights or the bidder's obligations under the Contract; or
- (iii) Whose rectification/adoption would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

The Employer's/Engineer's determination of a Bid's responsiveness will be based on the contents of the Bid itself without recourse to extrinsic evidence.

- 24.4 A Bid determined as substantially non-responsive will be rejected and will not subsequently be made responsive by the Bidder by correction of the non-conformity.
- 24.5 Any minor informality or non-conformity or irregularity in a Bid which does not constitute a material deviation may be waived by Employer/Engineer, provided such waiver does not prejudice or affect the relative ranking of any Bidder.

IB.25 Conversion to Single Currency

- 25.1 The Bid Price is to be in Pak. Rupees. **Bids in other currency will be rejected.**

IB.26 Detailed Evaluation of Bids

- 26.1 The Employer will evaluate and compare only the bids previously determined to be substantially responsive as per requirements given hereunder.
- 26.2 Evaluation and Comparison of Bids:
Please refer to the Mandatory Criteria
- (a) Bids will be evaluated for each item and/or complete scope of work.
 - (b) Basis of Price Comparison

The prices will be compared on the basis of the Evaluated Bid Price pursuant to Para (e) hereinbelow.

(c) Technical Evaluation

It will be examined in detail whether the Goods offered by the bidder comply with the Technical Provisions of the Bidding Documents. For this purpose, the bidder's data submitted with the bid will be compared with the specific work data prescribed by the Employer and technical features/criteria of the Goods detailed in the Technical Provisions. Other technical information submitted with the bid regarding the Scope of Work will also be reviewed.

b) Commercial Evaluation

It will be examined in detail whether the bids comply with the commercial/contractual conditions of the Bidding Documents. It is expected that no major deviation/stipulation shall be taken by the bidders.

(e) Evaluated Bid Price

In evaluating the bids, the Employer 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 errors pursuant to Sub-Clause 24.2 hereof.
- (ii) Excluding Provisional Sums, if any, but including priced Day work.
- (iii) Making an appropriate adjustment for any other acceptable variation or deviation.

26.3 Evaluation Methods

Bids indicating completion beyond later than the dates set out shall not be considered and rejected as non-responsive.

26.4 If the bid of the successful bidder is seriously unbalanced in relation to the Employer's estimate of the cost of work to be performed under the Contract, the Employer may require the bidder to produce detailed price analyses for any or all items of the Schedule of Prices to demonstrate the internal consistency of those prices with the construction methods and schedule proposed..

IB.27 Domestic Preference NOT APPLICABLE

IB.28 Process to be Confidential

28. No Bidder shall contact Employer 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 Employer. 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.

- 28.2 Any effort by a Bidder to influence Employer and/or Engineer in the Bid evaluation, bid comparison or Contract Award decisions may result in the rejection of his Bid. Whereas any bidder feeling aggrieved may lodge a written complaint not later than fifteen (15) days after the announcement of the bid evaluation result; however, mere fact of lodging a complaint shall not warrant suspension of the procurement process.

F. AWARD OF CONTRACT

IB.29 Post-Qualification

- 29.1 The Employer, 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 being already mentioned in technical bid:

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.

- 29.2 The determination will take into account the bidder's financial and technical capabilities. It will be based upon an examination of the documentary evidence of the bidder's qualification submitted
- 29.3 An affirmative determination will be a pre-requisite for award of the Contract to the highest ranked bidder. A negative determination will result in rejection of that bidder's bid in which event, Employer will proceed to undertake a similar determination of the next highest evaluated bidder's capabilities to perform the Contract satisfactorily.

IB.30 Award Criteria

- 30.1 The Employer will award the Contract to the bidder whose bid has been determined to be substantially responsive to the Bidding Documents and who has offered the lowest evaluated Bid Price, provided such bidder has been determined to be qualified to satisfactorily perform the Contract in accordance with the provisions of Clause IB.29.

IB.31 Employer's Right to Vary Quantities

- 31.1 Employer reserves the right at the time of award of Contract to increase by up to 15% the quantity of goods and services specified in the Schedule of Prices without any change in the unit price or other terms and conditions.

IB.32 Employer's Right to accept any Bid and to reject any or all Bids

- 32.1 the Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to award of

Contract, without thereby incurring any liability to the affected bidders or any obligation to inform the affected bidders of the grounds for the Employer's action except that the grounds for its rejection shall upon request be communicated, to any bidder who submitted a bid, without justification of grounds. Rejection of all bids shall be notified to all bidders promptly.

- 32.2 No negotiations with the bidder having been evaluated as lowest responsive or any other bidder shall be permitted. However, the Employer may have clarification meeting(s) to get clarify any item(s) in the bid evaluation report.

IB.33 Notification of Award

- 33.1 Prior to expiration of the period of bid validity prescribed by the Employer, the Employer will notify the successful bidder in writing ("Letter of Acceptance") that his bid has been accepted. This letter shall name the sum which the Employer will pay the Contractor in consideration of the execution and completion of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called the "Contract Price").
- 33.2 The Letter of Acceptance and its acceptance by the bidder will constitute the formation of the Contract, binding the Employer and the Bidder till signing of the formal Contract Agreement.
- 33.3 Upon furnishing by the successful bidder of a Acceptable to Employer Performance Security, the Employer will promptly notify the other bidders that their bids have been unsuccessful and return their bid securities.

IB.34 Performance Security

(As per kppra notification No. S.R.O (15)/Vol: 1-25/2022-23 dated August 22, 2022)

Performance Guarantee:

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.

- (a) Bank guarantee from any Scheduled Bank in Pakistan or
- (b) Bank guarantee from a bank located outside Pakistan duly counter guaranteed by a Scheduled Bank in Pakistan or
- (c) **Deleted (as per kppra notification No. S.R.O (18)/Vol: 1-28/2023-24 dated April 8, 2024)**

IB.35 Signing of Contract Agreement

- 35.1 Within Fourteen (14) days from the date of issuance of LOA under the Conditions of Contract, the Employer will send to the successful bidder the Form of Contract Agreement provided in the Bidding Documents, duly filled in and incorporating all agreements between the parties for signing and return it to the Employer.
- 35.2 The formal Agreement between the Employer and the successful bidder shall be executed within fourteen (14) days of the receipt of such Form of Contract Agreement by the successful bidder from the Employer.

G. ADDITIONAL INSTRUCTIONS

IB.36 Instructions not Part of Contract

36.1 Bids shall be prepared and submitted in accordance with these Instructions which are provided to assist bidders in preparing their bids, and do not constitute part of the Bid or the Contract Documents.

IB.37 Contract Documents

37.1 The Documents which will be included in the Contract are listed in the Form of Contract Agreement set out in these Bidding Documents.

IB.38 Sufficiency of Bid

38.1 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. Except insofar as it is otherwise expressly provided in the Contract, the rates and prices entered in the Schedule of Prices shall cover all his obligations under the Contract and all matters and things necessary for the proper completion of the Works.

IB.39 One Bid per Bidder per work

39.1 Each bidder shall submit only one bid either by himself, or as a partner in a joint venture. A bidder who submits in more than one bid in same work will be disqualified and bids submitted by him shall not be considered for evaluation and award.

IB.40 Bidder to Inform Himself

40.1 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. This shall include but not be limited to the following:

- (a) inquiries on Pakistani Income Tax/Sales Tax/KPRA to the Commissioner of the Income Tax, Sales Tax and KPRA, Peshawar Pakistan.
- (b) Inquiries on customs duties and other import taxes, to the concerned authorities of Customs and Excise Department.
- (c) Information regarding port clearance facilities, loading and unloading facilities, storage facilities, transportation facilities and congestion at Pakistan seaports.
- (d) Investigations regarding transport conditions and the probable conditions which will exist at the time the Goods will be actually transported.

IB.41 Alternate Proposals by Bidder

- 41.1 Should any bidder consider that he can offer any advantage to the Employer by a modification to the designs, specifications or other conditions, he may, in addition to his bid to be submitted in strict compliance with the Bidding Documents, submit any Alternate Proposal(s) containing (a) relevant design calculations; (b) technical specifications; (c) proposed construction methodology; and (d) any other relevant details/conditions, provided always that the total sum entered on the Form of Bid shall be that which represents complete compliance with the Bidding Documents.
- 41.2 Alternate Proposal(s), if any, of the lowest evaluated responsive bidder only may be considered by the Employer as the basis for the award of Contract to such bidder.

IB.42 Local Conditions

- 42.1 Bidder must verify and supplement by his own investigations the information about site and local conditions. The bidders are advised to visit and examine the site of Works and its surroundings and obtain for themselves on their own responsibility all information that may be necessary for preparing the bid and entering into a contract for construction of the Works. All cost in this respect shall be at the bidder's own expense. However, Employer will assist the Bidder wherever practicable and possible.

IB.43 Integrity Pact

The Bidder shall sign and stamp the Integrity Pact provided at Schedule-H to Bid in the Bidding Document for Government procurement contracts exceeding Rupees ten million. Failure to provide such Integrity Pact shall make the bid non-responsive.

**Appendix A to
Instructions to Bidders**

NAME OF ELIGIBLE COUNTRIES

[As per list allowed by Government of Pakistan]

**Appendix B to
Instructions to Bidders**

EVIDENCE OF BIDDER'S CAPABILITY

[Note: Bidders to provide the following information with the bid separately and indicate herein its references where this information is available.]

S.No.	Information to be Supplied	Bid References
1.	Name of bidder, business address and country of incorporation.	
2.	Type of firm whether individually owned, partnership, corporation or joint venture and the names of its owners or partners.	
3.	The annual reports or Qualification statements giving general description of the firm, sort of business carried out, balance sheets, profit and loss statements, turn over and business done by the firm, duly authenticated, for the last three (3) years. Audited Balance Sheets for the preceding 3 years shall be provided.	

4. Location and address of manufacturing facilities.
5. Full description of factories owned and the annual manufacturing capacities of various items made therein.
6. Details of the factory or factories where the offered equipment is proposed to be manufactured. This description should include the facilities and capacities of the particular factories including testing facilities and the processes used in manufacturing and testing. Where parts or components are purchased from outside, the details of equipment purchased and the names and experience record of the suppliers.

S.No.	Information to be Supplied	Bid References
7.	Detailed description of the quality control testing and research facilities. If the equipment is manufactured under license, the name of the licensor and details of the licensing arrangements, such as the duration of the license, the facilities provided to the bidder by the licensor and whether future improvements are available or not etc. A copy of the license agreement may be attached.	
8.	Names, qualifications and experience of the key technical personnel.	
9.	The time since the manufacturer has been in this business and the time since he has been doing work of similar nature.	
10.	The time since the particular equipment offered has been manufactured and the time for which it has been in service. The manufacturer shall have the following experience.	

11. All the Goods in the Scope of Work Manufacturer should have produced same items for at least 05 years and such Goods shall have proven successful in the field for at least 05 years and the bidder shall submit with the bid all necessary documentation in this regard.
12. Reference lists of similar works done by the bidder/Manufacturer in its country and abroad indicating the name of customer, description and quantity of product, year of supply and the approximate value.
13. Details of projects under execution and future contractual commitments (for each partner, in case of a joint venture).
14. Banking reference, names of banks and addresses may be given to whom reference regarding financial capability of the bidder may be made, with authority to make inquiries from the bidder's bankers and clients regarding any financial and technical aspects (for each partner, in case of a joint venture).
15. Information on any litigation or arbitration resulting from contracts completed or under execution by the bidder over the last ten (10) years. The information shall indicate the parties concerned, the matter of dispute, the disputed amounts and the result thereof (for each partner, in case of a joint venture).

A. Total amount of Value Addition (from Col.7)	Rs

_____	B.Total
Ex-Factory Price of Indigenous Goods (from Col.5) Rs_	

C. Total DDP Price of imported supply items	Eqv.Rs_____D.
Total Price of supply items [B+C]	Eqv.Rs_____
E. % of value addition = [(A/D) x100]	_____ %
F. Domestic Preference = (15,20 or 25) % of B	Rs_____

III- FORM OF BID AND SCHEDULES TO BIDTECHNICAL PROPOSAL

FORM OF BID
(LETTER OF OFFER)

Bid Reference No. _____

(Name of Works)

To:

Gentlemen,

1. Having examined the Bidding Documents including Instructions to Bidders, Conditions of Contract, Specifications, Drawings, 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 _____
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 Prices as indicated in the Schedule of Prices placed in our Technical Bid envelop.
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 2% Bid Security (placed in our Financial Bid envelop) drawn in your favor or made payable to you and valid for a period 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 whole of the Works comprised in the Contract within the time(s) stated in Preamble to the Conditions of Contract.
5. We agree to abide by this Bid for the period of **90 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 Sub Clause 10.1 of Particular 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.
10. We confirm, if our Bid is accepted, that all partners of the joint venture shall be liable jointly and severally for the execution of the Contract and the composition or the constitution of the joint venture shall not be altered without the prior consent of the Employer. **(Please delete in case of Bid from a single firm).**

Dated this _____ day of _____ 20_____

Signature _____ in the capacity of _____ duly

authorized to sign bids for and on behalf of _____

(Name of Bidder in Block Capitals)

(Seal)

Address

Witness:

(Signature)_

(Name) _____

Address:

Occupation _____

SCHEDULE A SPECIFIC WORKS DATA

- Note:** All the Parameters quoted shall be verifiable from Data Sheet or User Manual or any other Document provided from the manufacturer else, Bid will be considered non-responsive.
- All other data required as per specification provided, shall be provided or reflected in the Data Sheets / Brouchers of each item else, Bid will be considered non-responsive.
 - Certificates required for the items, specified in the specification (Annex A) shall be provided along with the data sheets and Brouchers else, Bid will be considered non-responsive.
 - Brouchers / Data sheets / Certification of all products must be provided from original Manufacturer.
 - The bidder may be called for presentation along with sample demonstration of the products quoted in the technical bid/proposal for testing before opening of financial bids by the Client and Project Consultant. The contractor shall be liable to provide the specimens/sample and will presents the specimens/sample to the Client and Project Consultant, in case the contractor fails to provide the desired specimen/sample or fails to satisfy the Client and Project Consultant with the presentation regarding the technical parameters of the quoted products, then the technical bid of the vendor/contractor will be declared as non-responsive.
 - The Contractors must submit the filled technical compliance sheet along with the schedule of prices – summary of bid prices and schedule of prices (BOQ) in the Financial Proposal.

SCHEDULE – B TO BID

(INTEGRITY PACT)

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

Contract No. _____ Dated _____

Contract Value: _____

Contract Title: _____

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

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

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

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

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

Name of Buyer:

Name of Seller/Supplier:

Signature:

Signature:

[Seal]

[Seal]

IV- SCHEDULE OF PRICES
(FINANCIAL PROPOSAL)

1. PREAMBLE TO SCHEDULE OF PRICES

1. General

- 1.1 The Schedule of Prices shall be read in conjunction with the Conditions of Contract together with the Specifications and Drawings.
- 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 Work.

2. Description

- 2.1 The general directions and descriptions of work and materials are not necessarily repeated nor summarized in the Schedule of Prices. References to the relevant sections of the Bidding Documents shall be made before entering prices against each item in the Schedule of Prices. **NOT APPLICABLE**
- 2.2 The quantities shown in the Schedule of Prices are estimated quantities only as an indication of the Scope of Work to enable the bidder to bid for different items of the Works for his estimate of costs. The estimated quantities shall be used for comparing the bids. It is, however, to be noted that in the event of any increase or decrease in the quantity of any item of Works and subject to provisions of the Conditions of Contract herein, the actual quantities executed will be paid. **NOT APPLICABLE**

3. Units & Abbreviations

- 3.1 Units of measurement, symbols and abbreviations expressed in the Bidding Documents shall comply with the System International d' Unites (SI Units).

The following abbreviations shall be used in the Schedule of Prices:

	<u>Abbreviation</u>
Foreign Currency Component	FCC
Local Currency Component	LCC
United States Dollars	US\$
Pakistani Rupees	PKR/Rs
Number	No.
Kilometer	km
Kilogram	Kg
Cubic Meter	Cu.m
Provisional Sum	PS
Percent	%

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 work set forth or implied in the Contract; except for the amounts reimbursable to the Contractor under the Contract. **NOT APPLICABLE**
- 4.2** Unless otherwise stipulated in the Conditions of Contract, the rates and prices entered by the bidder shall not be subject to adjustment during the performance of the Contract.
- 4.3** Prices shall be inclusive of all the duties, taxes and other levies including Sales Tax payable by the contractor under the contract.
- 4.4** The whole cost of complying with the provisions of the Contract shall be included in the items provided in the priced Schedule of Prices, and where no items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related items of the Works 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 Employer when executed and shall be deemed covered by the rates and prices for other items in the Schedule of Prices. **NOT APPLICABLE**

- 4.5** The bidder shall be deemed to have obtained all information as to port clearance facilities and charges, loading and unloading facilities and charges, storage facilities and charges, transportation facilities and charges, congestion and/or other conditions to be expected at Karachi Port and or any other seaport of Pakistan and all requirements related thereto.

The Contractor shall be responsible to make complete arrangements for the transportation of the equipment to all selected houses.

The bidder shall be deemed to have included all clearing, forwarding and other incidental costs in this regard in his bid.

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

5. Bid Prices

The price offered by bidder shall be inclusive of all taxes, inland transportation to designated sites, installation and training to local.

5.1 Break-up of Bid Prices (Not Applicable)

The various elements of Bid Prices shall be quoted as detailed below:

a) FOB Port of Shipment

The bidder shall quote prices for FOB Port of Shipment for all individual items and for each sub-total of Plant, Erection Equipment and Spare Parts to be supplied from outside Pakistan on FOB (Port of Shipment) basis. The FOB Port of Shipment price shall include the cost of the following:

- i) Design, manufacture, finishing, factory testing, packing for transport and all transportation costs incurred in placing the Plant, Erection Equipment and Spare Parts and other materials on board the vessel.
- ii) Provision of clean on-board bills of lading.
- iii) Export taxes, fees or charges levied on exporting Plant, Erection Equipment and Spare Parts and other materials in the country of origin, in the case of Plant imported to Pakistan.
- iv) Provision of certificates of origin, consular invoices (if required) or any other documents issued in the country of origin.

b) Insurance & Shipping

i) Insurance

The bidder shall quote prices for insurance cover from ex-factory/ ex-works to the Site for the sub-totals of the Plant, Erection Equipment, Spare Parts and other materials to be imported for the Contract. Such prices shall include all insurance costs covering the responsibility for all loss or damages while loading, unloading, storing and trimming on board or on inland carrier and transportation to Site.

The prices for transportation/marine insurance cover shall be quoted on the basis of insurance through insurers from any country (is) of the world acceptable to the Employer.

ii) Shipping

The bidder shall quote prices for shipping from port of shipment to the port of entry in Pakistan for the sub-totals of the Plant, Erection Equipment, Spare Parts and other materials to be imported for the Contract in Pakistan. Such prices shall include all marine transportation costs including ocean freight and other charges, etc.

The prices for shipping/marine transportation shall be quoted for shipment through reputed shipping lines including Pakistan National Shipping Corporation (PNSC). Cost of shipment(s) effected by the Contractor at his option by aircraft shall be deemed to be included in the Total Bid Price.

c) CIF (Pakistan Seaport) Price

CIF (Pakistan Seaports) price will be the total of FOB price, insurance and shipping prices, described here above.

d) Customs Duties

Customs duty for Plant, Erection Equipment, Spare Parts and other materials, if any, offered from outside Pakistan shall also include sales tax, import duty and other import charges.

e) DDP (Pakistan Seaport) Price

DDP (Pakistan Seaport) price will be the total of CIF price and customs duties, described here above.

f) Ex-factory Price for Local Goods

The bidder shall quote prices for Local Goods, materials (other than materials required for civil works such as concrete and reinforcement etc. Cost of which will be included in the price of civil works) and equipment in the relevant column of Ex-Factory (Pakistan) of "Schedule of Prices". Such prices shall include:

- i) Design documentation, drawings, drafting, planning services, manufacturing, testing and packing of finished goods ready for delivery to Site.
- ii) All custom duties, sales tax and other taxes already paid or payable on the components and raw materials used in the manufacture or assembly of Local Goods, materials and equipment's.

g) Insurance of Local Goods

Insurance of Local Goods and other materials from factory to Site shall include all insurance costs covering the responsibility of all losses or damages, while loading, unloading, storing, trimming on the carrier and transporting to Site. Checking and verifying of consignments, issuance of receiving reports and damage reports (when applicable) shall be the Contractor's responsibility. The cost of insurance shall be quoted on the basis of insurance through National Insurance Company (NIC) of Pakistan or any other insurance company operating in Pakistan and acceptable to the Employer.

h) Local Transport

Inland transportation for the Plant, Erection Equipment and Spare Parts shall be the Contractor's responsibility in respect of:

- i) the Plant, Erection Equipment, Spare Parts and other materials offered from outside Pakistan; from the port of entry in Pakistan to the storage area at the Site, and
- ii) indigenous Plant, Erection Equipment, Spare Parts and other materials if any, offered from within Pakistan; from the factory in Pakistan to the storage area at the Site, and

all charges occurring therefrom including octroi, zila tax, fees etc. and charges for loading, forwarding and unloading expenses shall be borne by the Contractor. Unloading at the Site, handling of the Plant, Erection Equipment, Spare Parts and other materials to the designated point of Site storage, checking and verifying all shipments received against shipping documents, issue of all receiving reports and issues of damage reports (when applicable) shall be the Contractor's responsibility.

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

i) Erection & Other Work

The bidder shall quote prices for Erection & Other Work (foreign and local currency portion) for the sub-totals of the Plant at the Site. Such prices shall include the costs of handling of the Plant and other materials from Site storage to point of final installation, erection, installation, testing, commissioning including all inspection, reliability tests, the cost of foreign and local erection staff and labor, tools and equipment, etc. It shall also cover the services of qualified representative(s) of the supplier(s) of Plant or adviser(s) to assure proper erection and commissioning of the Plant. The price shall also include cost of arranging insurances in respect of Contractor's operations in Pakistan which insurances shall be effected by the Contractor with the National Insurance Company (NIC) of Pakistan or any other insurance company operating in Pakistan and acceptable to the Employer.

5.2 Total Bid Price

The total of bid prices under foreign currency and local currency columns in the Schedule of Prices shall be entered in the Summary of Bid Prices. The unit rates and prices and lump sum amount entered in the Schedule of Prices will be the rates at which the Contractor will be paid, and shall be deemed to be the full inclusive value of the work including all costs of performing the Works such as

Overheads, income tax, super tax, profits, costs of accepting the general risks, liabilities and obligations set forth or implied in the Contract except for the amounts reimbursable, if any, to the Contractor under the Contract. The rates shall also include Contractor's cost for providing Performance Security and other Bank Guarantees required for performance of the Contract.

6. Erection and Testing Equipment and Maintenance Tools (Not Applicable)

6.1 In the Schedule of Prices, under Erection and Testing Equipment & maintenance tools the Employer has drawn up a list of Erection and Testing Equipment and Maintenance Tools along with estimated quantities. The bidder shall enter the price only in FOB price column for all individual items and shall give the break-up of the prices into FOB Port of Shipment, Shipping to wharf at the port of entry in Pakistan, Insurance to Site and Local Transport in Pakistan against each sub-total. These Erection and Testing Equipment and Maintenance Tools shall be furnished and the cost included in the Bid Price.

The Employer shall have the option of ordering additional quantities of these essential Erection and Testing Equipment and Maintenance Tools, at the unit rates entered in the Schedule of Prices no later than one year after the Commencement Date.

The unit rate for any item shall be computed by dividing the total amount by the quantity of that item.

6.2 The bidder shall also list, in the space provided in the Schedule of Prices, Additional Recommended Erection and Testing Equipment and Maintenance Tools, any Erection and Testing Equipment and Maintenance Tools which he recommends be provided for the Works, in addition to those already specified by the Employer in the Schedule of Prices. The bidder shall enter against each such item, its recommended quantity, and price. The cost of such Additional Recommended Erection and Testing Equipment and Maintenance Tools will not be taken into account in the evaluation of bids.

The Additional Recommended Erection and Testing Equipment and Maintenance Tools may be selected by the Engineer/Employer and the Contract Price will be adjusted in accordance with the prices set against those items in the Schedule of Prices.

7. Spare Parts (Not Applicable)

7.1 In the Schedule of Prices, under Spare Parts, the Employer has drawn up a list of spare parts along with estimated quantities. The bidder shall enter the price only in FOB price column for all individual items and shall indicate the breakup of price into FOB Port of Shipment, Shipping to wharf at the port of entry in Pakistan, Insurance to Site and Local Transport in Pakistan against each sub-total. These spare parts shall be furnished and the cost included in the Bid Price.

The successful Bidder shall prepare and at the time of preparation of Letter of Acceptance submit to the Employer the unit rates of all individual items of the

Spare parts. The unit rates of the spare parts for the required quantities shall give a total cost equal to the amount entered in the Schedule of Price for spare parts.

The Employer shall have the option of ordering additional quantities of these essential spare parts, at the unit rates entered in the Schedule of Prices, no later than one year after the Commencement Date.

The unit rate for any item shall be computed by dividing the total amount by the quantity of that item.

7.2 The Bidder shall also list in the space provided in the Schedule of Prices any Spare Parts which he recommends be provided for the Works, in addition to those specified by the Employer in the Schedule of Prices. The Bidder shall enter against each such item, its recommended quantity, rate and price. The cost of such Additional Recommended Spare Parts will not be considered in the evaluation of bids.

The Additional Recommended Spare Parts may be selected by the Engineer/ Employer and the Contract Price will be adjusted in accordance with the prices set against those items in the Schedule of Prices.

8. Reimbursable Costs (Not Applicable)

8.1 If provided in the Particular Conditions of Contract, the Contractor shall be reimbursed the actual amounts (without any overhead charges and profits) disbursed by him in respect of non-exempt Pakistani customs, import duties, and taxes, levied upon Plant, Erection Equipment and Spare Parts imported directly by him or his subcontractors into Pakistan for the purpose of this Contract for incorporation in the Works.

8.2 The bidder shall recognize such elements of the costs which he expects to incur in the performance of the Works and which are reimbursable, and he shall not include any such costs in the rates and amounts entered in the Schedule of Prices.

9. Provisional Sums (Not Applicable)

9.1 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 Employer/ Engineer. The Contractor will only receive payment in respect of Provisional Sums if he has been instructed by the Employer/Engineer to utilize such sums.

DAYWORK SCHEDULE (Not Applicable)

1. General

1.1 Work shall not be executed on a Day work basis except by written Order of the Engineer. The rates for Day work items entered in the Schedule of Prices shall apply to any quantity of Day work ordered by the Engineer. Nominal quantities have been indicated against each item of Day work, and the extended total for

Day work shall be carried forward as a provisional sum to the Summary of Bid Prices. (N/A)

2. Day work – Labor (Not Applicable)

2.1 In calculating payments due to the Contractor for the execution of Day work, the hours for labor shall be reckoned from the time of arrival of the labor at the job Site to execute the particular item of Day work to the time of departure, but excluding meal breaks and rest periods. Only the times of classes of labor directly doing work ordered by the Engineer and for which they are competent to perform shall be measured.

The time of Plant Erectors or other expatriate supervisory personnel shall not be measured unless their time on Site is extended by Variation Order. The rates entered by the Bidder for these categories shall be daily rates inclusive of all allowances and overheads.

2.2 For labor other than Plant Erectors or other expatriate supervisory personnel, the Contractor shall be entitled to payment in respect of the total time that labor is employed on Day work, calculated at the basic rates entered by him in the Schedule of “Day work Rates – Labor” together with an additional percentage payments on basic rates representing the Contractor's profit, overheads, etc., as described below:

- a) The basic rates for labor shall cover all direct costs to the Contractor, including (but not limited to) the amount of wages paid to such labor, transportation time, overtime, subsistence allowances and any sums paid to or on behalf of such labor for social benefits in accordance with Pakistan Labor laws. The basic rates will be payable in Pak. Rupees only, and
- b) The additional percentage payment to be quoted by the Bidder and applied to costs shall be deemed to cover the Contractor's overheads, profits, superintendence, liabilities and insurances and allowances to labor, timekeeping and clerical and office work, the use of consumable stores, water, lighting and power; the use and repair of staging, scaffolding, workshops and stores, portable power tools, manual plant and tools; supervision by the Contractor's staff, foremen and other supervisory personnel; and charges incidental to the foregoing. Payments under this item shall be made in foreign currency and local currency at the percentages entered in the Day work Schedule.

2.3 Rates entered in the Day work Schedule shall apply to labor of trade and qualification as described and to labor of other trades with similar skill and qualification.

3. Day work - Contractor's Equipment (Not Applicable)

3.1 The Contractor shall be entitled to payments in respect of Contractor's Equipment already on Site and employed on Day work at the basic rental rates entered by him in the "Schedule of Day work Rate - Contractor's Equipment".

The said rates shall be deemed to include complete allowance. for depreciation, interest, indemnity and insurance, repairs, maintenance, supplies, fuel, lubricants and other consumables and all overheads, profit and administrative costs related to the use of such equipment.

- 3.2 In calculating the payment due to the Contractor for Contractor's Equipment employed on Day work, only the actual number of working hours will be eligible for payment, except that, where applicable and agreed with the Engineer, the travelling time from the part of the Site where the Contractor's Equipment was located when ordered by the Engineer to be employed on Day work and the time for the return journey thereto shall be included for payment.
- 3.3 The rental rates for Contractor's Equipment employed on Day work shall be stated in Pakistani Rupees but payments to the Contractor will be made in local and foreign currencies according to the rates entered in the Schedule.

4. Day work-Materials (Not Applicable)

- 4.1 The Contractor shall be entitled to the following payments in respect of materials used for Day work (except for materials for which the cost is included in the percentage addition to labor costs) which are actually incorporated into the Works:
 - a) The net cost of such materials delivered to warehouse or work yard area or storage area at the Site. Such cost shall be calculated by the Contractor on the basis of the invoiced price and freight and insurance as certified by the Engineer on the basis of invoices produced.
 - b) Percentage addition, in local and/or foreign currency, of such net cost of materials to cover the Contractor's handling charges, overheads and profits.
- 4.2 Payment of the net cost to the Contractor of Day work materials shall be made in the same currency as the invoice. Payment of the addition for handling charges, overheads and profit shall be in local and/or foreign currency as entered in the Schedule of Day work - Materials.

2. (a) SCHEDULE OF PRICES – SUMMARY OF BID PRICES

2. (b) SCHEDULE OF PRICES – SUMMARY OF BID PRICES

Note:

- **Total Price in Pak Rupees, shall be provided on above / below / At par in figures as well as in words, Prices should be included with all Govt applicable taxes.**
- **The Percentage above or below quoted by the bidders shall be reflected automatically on the Schedule of Prices (BOQ) for each Design in this section “2. (b) Schedule of Prices (BOQ)”.**

V- STANDARD FORMS

STANDARD FORMS

Standard Forms include the following:

- Form of Contract Agreement

FORM OF CONTRACT AGREEMENT

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

WHEREAS the Employer is desirous that certain Works, via _____ 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, via:
 - (a) The Contract Agreement
 - (b) The Letter of Acceptance
 - (c) The completed Form of Bid
 - (d) The Preamble to Conditions of Contract
 - (e) The Particular Conditions of Contract
 - (f) The General Conditions of Contract
 - (g) The priced Schedule of Prices
 - (h) The completed Schedules to Bid
 - (i) The Specifications
 - (j) The Drawings
3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy defects therein-in conformity and in all respects with the provisions of the Contract.

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

IN WITNESS WHEREOF, the parties hereto have caused this 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 Employer

(Seal)

(Seal)

Signed, Sealed and Delivered in the presence of:

Witness:

Witness:

(Name, Title and Address)

(Name, Title and Address)

**VI ANNEX “A”
TECHNICAL
SPECIFICATION**

Note:

- The scope of services includes Operation and Maintenance (O&M) of the Solar Power Generation System for the period of one year (Free of Cost). (Guaranteed energy must equal or more than Committed, equaling deductions should be made in end of year if energy generation is low, on applicable grid rate.
- The cleaning and washing of solar panels (Free of Cost) is also the responsibility of Firm till the expiry of defect liability period on regular basis.
- The firm will conduct a test every month till the expiry of defect liability period and the average annual energy yield should not be less than 4 KWh for 1KW System Capacity Per Day

Minimum Technical Specifications

Note:

- The technical specifications of the solar panels and allied equipment must fulfill the standard requirements (PSS & IEC) as per the import policy S.R.O 604(I)/2019, Dated 28th May, 2019. Verifiable Test certifications for the required standards must be [provided with the technical proposals. In case of the discrepancy, the mentioned S. R. O shall prevail.
- The following are provided the minimum technical requirements for solar panels and allied equipment. “All products shall be compliant to relevant IEC standards/specifications; however, other equivalent international standards may be used where, IEC relevant standard is not available, as per the project requirement.

Solar PV Panels

Parameters	Min. Specifications required
Module Make	Brand should be verifiable for the procurement year
PV Module Capacity	585 Watts or above (as per design)
PV Module Type	N-Type Bifacial (Only)
Cell Quality	A Grade (verifiable)
Module Efficiency	22% or higher
Power Tolerance	Must be + 3% or more
Operating cell Temperature	minus 40C to positive 85C
Temperature coefficient	Minus 40 %/ C or less
bypass diode	AS per design
Certification	IEC 61215, IEC 61730, IEC 61439, IEC 60947-3 as amended to date, PID FREE
Frame	Must withstand 5400 PA impulse Load
Junction box	IP 67 or better
Cable	4mm ² (IEC),300mm or higher (As per design)
Connectors	MC4 or comparable weather proof
Cover Glass	Double Glass, Minimum 2 mm
Product Warranty and Guarantee	15 years product replacement warranty power output within 15 years shall not fall below 90% Power output within 25 years shall not fall below 85%
	12 years full replacement of module, if the major components malfunctioning PV module performance guarantee 25 years or more Type of performance guarantee shall be final after 1st year

On-Grid Solar Smart Inverter

Parameters	Min. Specifications required
Inverter Manufacturer	10 GW or above deployment in last two years. Renowned and verifiable brand having successful history in similar climatic conditions.
Inverter Type	String Inverter
Max. Efficiency /European Efficiency	> 98% or above
Max. Input Voltage	should be within the inverter's limit and must be less than the specified limit voltage
Max Current per MPPT	should be within the inverter's limit and must be less than the specified limit current
MPPT Operating Voltage Range	should be within the inverter's limit and must be less than the specified limit voltage
Output Voltage Range	400 Vac/ 480 Vac, 3W+(N) + PE
Max. Total Harmonic Distortion	<3%. As per relevant IEC clauses.
Power Factor Range	0.8 leading ~ 0.8 lagging
IP Protection	IP 66 or better
Protections	<ol style="list-style-type: none"> 1) Input-side Disconnection Device 2) Anti-islanding Protection 3) AC Over current Protection 4) DC Reverse-polarity Protection 5) PV-array String Fault Monitoring 6) DC Insulation Resistance Detection 7) Residual Current Monitoring Unit 8) DC Surge Arrester 9) AC Surge Arrester 10) Ripple Receiver Control
Operating Temperature Range	-25°C to 60oC
Communication	<ol style="list-style-type: none"> 1) With Remote Monitoring Feature, Mobile App, Web server user interface, Cloud Connected. 2) Real Time System Monitoring. Alerts, Faults and Warning data display. System Statistics – System Parameters, 3) Support WLAN/4G/RS485 Communication
Minimum Applicable Standards and Compliances	IEC62109-1/-2, IEC62116, IEC60068, IEC61683, IEC 61727, EN50530
Annual Failure rate	Less than 1%
Warranty	10 Years Standard replacement warranty; And support 20 Year extension warranty

PV MOUNTING Structure

S/N	Parameters	Min. Specifications required
Tentative outlines, the design will be site-dependent and may vary		
1	Structure material	Mild steel / Aluminum or material with more than 15 years of proven life
2	Wind loading	The mounting system should be able to allow air circulation for cooling in high temperatures and withstand wind speed of 150 Km/hour at 3-sec gust
3	Material surface protection	The mounting structure should be Galvanized, not less than 80 microns (in the case of Hot-dip ASTM Compliant). Ground Slope should be adequately maintained to allow access to water drainage
4	Civil work	Ground Slope should be adequately maintained to allow access to water drainage Civil design should comply with ACI code /IBC codes All civil work must be included SAP analysis report of civil work should be submitted In the case of Ground, the Slope should be adequately maintained to allow access to water drainage.

**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**

[Signature]
Executive Engineer
Warsak Canals Division
Peshawar

[Signature]
Superintending Engineer
PHE Circle Tribal
Districts Peshawar.

[Signature]
DIRECTOR
Agril: Engineering
Tarnab, Peshawar

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

[Signature]
ATI
PHD

[Signature]
SE (HE)
CE (M.A)

[Signature]
16/01/2019

Page 1 of 24

Chairman Electric & UED

[Signature]
Assistant Director (M&E)

[Signature]
16/01/2019
Assistant Engineer
CSR/MRS Cell C&W
Department

[Signature]
K&N PBC-II
[Signature]
K&N (PHE)
[Signature]
EEP

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.
- h. 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.

DIRECTOR
Agril. Engineering
KPK Tarnab Peshawar

Agree
Executive Engineer
Warsak Canals Division
Peshawar

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

ADLMEEJ
PO LG
16/11/2019

Jun-Jun
*Chairman
& Elects Eng Dept*
16/01/2019
PDA

SECHd
XEN
XEN
K. Com. E&P

- 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.

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

7. LED FLOOD LIGHTS:

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

8. AC ENERGY EFFICIENT LED LIGHT BULBS:

Shape	Cap/Fitting/ Base 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		

- a. 10% + in Power Consumption is Allowed as per PSQCA Standard
- b. Rated Voltage: 230 V~ (±10V)
- c. Rated Frequency: 50 Hz
- d. Insulation Class: 155 (F) or better
- e. Motor Core: Electrical Steel Sheet
- f. 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:

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

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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.

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The Reflective paint should comply with ASTM D6083, Fiber Reinforced for more protection, strength and durability which allows for contraction and expansion, Resists surface fungal growth.

18. WARRANTY/AFTER SALE SERVICE:

Three years Comprehensive Free Replacement, Repair and maintenance Warranty at site (Free of Cost) should be provided for all the components of Solar System. (if not mentioned separately otherwise)

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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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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 irradiations.
- 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) =
$$\frac{Q \text{ (iGPH)} * \text{TDH (ft)} * 746 * \text{PV Loss Factor}}{60 * 3300 * \eta_{\text{pump}} * \eta_{\text{motor}}}$$
- f. Total PV Power (Wp) (US-Gallons) =
$$\frac{Q \text{ (US-GPH)} * \text{TDH (ft)} * 746 * \text{PV Loss Factor}}{60 * 3960 * \eta_{\text{pump}} * \eta_{\text{motor}}}$$
- g. Total PV Power (Wp) (Metric Units) =
$$\frac{Q \text{ (m}^3\text{/hr)} * \text{TDH (m)} * 9.81 * 1000 * \text{PV Loss Factor}}{3600 * \eta_{\text{pump}} * \eta_{\text{motor}}}$$
- 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.
 - i. For 380 Vac 3-Phase Motor = $380 * 1.414 * 1.06 = 570$ Vdc String, minimum
 - ii. For 220 Vac 3-Phase Motor = $220 * 1.414 = 310$ Vdc String.
 - iii. 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).
- j. 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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7. The inverter must be user programmable for selecting PV, Grid and Battery Priority as well as Built-in programmed and user defined voltage and current settings of the charge controller for GEL, Lead Carbon, OPzV/OPzS batteries and Lithium Iron Phosphate batteries (LiFePO4).
8. The Inverter must have Protective function limits for:
 - a. AC under voltage protection
 - b. AC over voltage protection
 - c. Battery under voltage Alarm
 - d. Low Voltage Disconnect
 - e. High Voltage Disconnect
 - f. Overload and Short Circuit Protection
 - g. Over Temperature Protection
9. The inverter must be ISO 9001, ISO 14001 and CE Certified.
10. The inverter must have IEC 62109-1 and IEC 62109-2, or Equivalent Certificates.
11. The degree of protection of the outdoor inverter Installation should be IP-55 rated and for indoor Inverter installation, the IP rating should be IP-20 or above.
12. Wide input voltage range capability.
13. Inverter should have active RS232/485 etc communication port, the Data available through this port can be used for Remote Monitoring.
14. Inverter (If Quoted along with Lithium Batteries) must be capable of communication with the BMS of Lithium Batteries.

Note:

- Product Brochure, Catalog and certificates must be attached with the Technical Bid.

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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 than 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

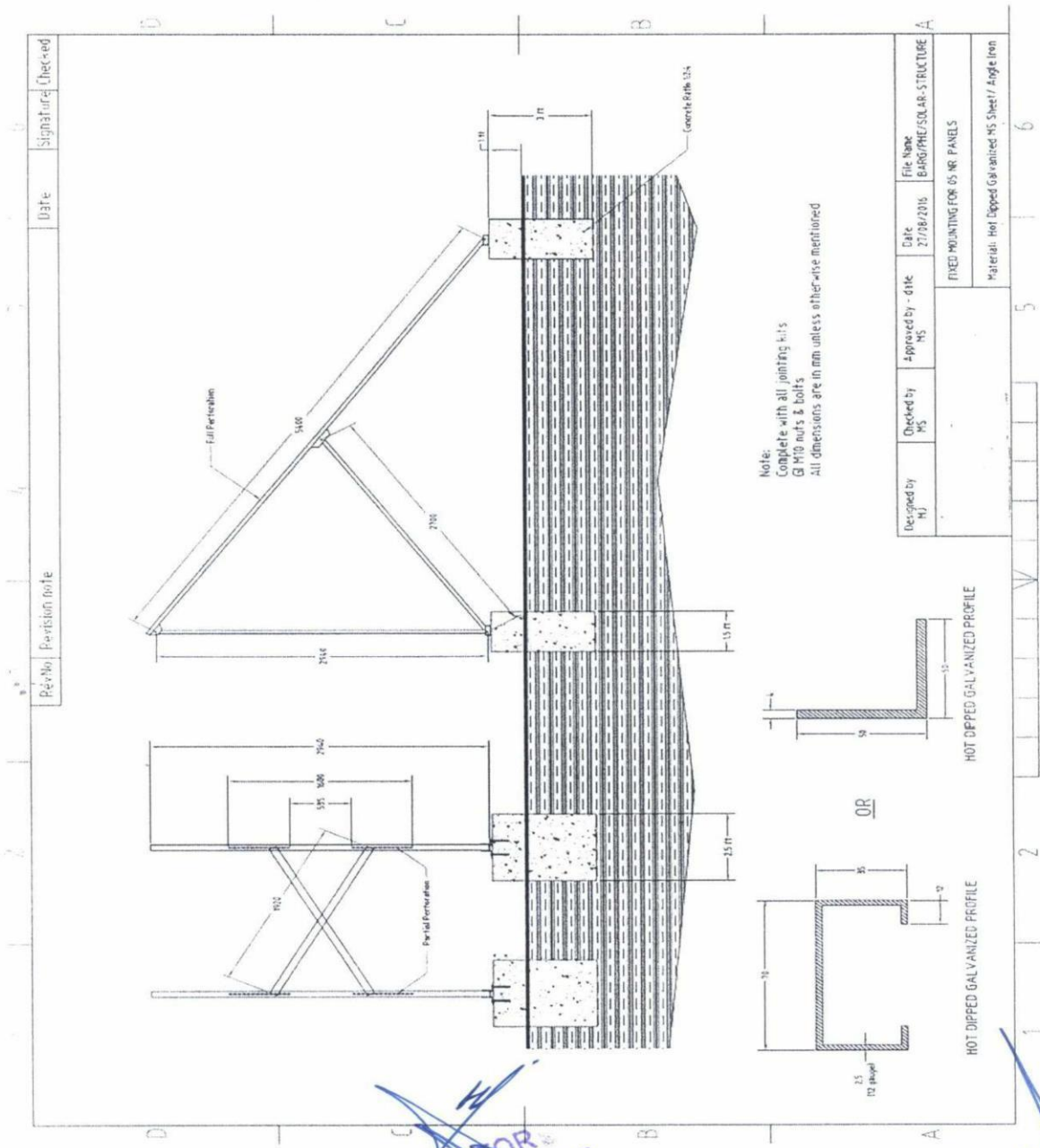
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ANNEXURE-1 (STRUCTURE DRAWING)



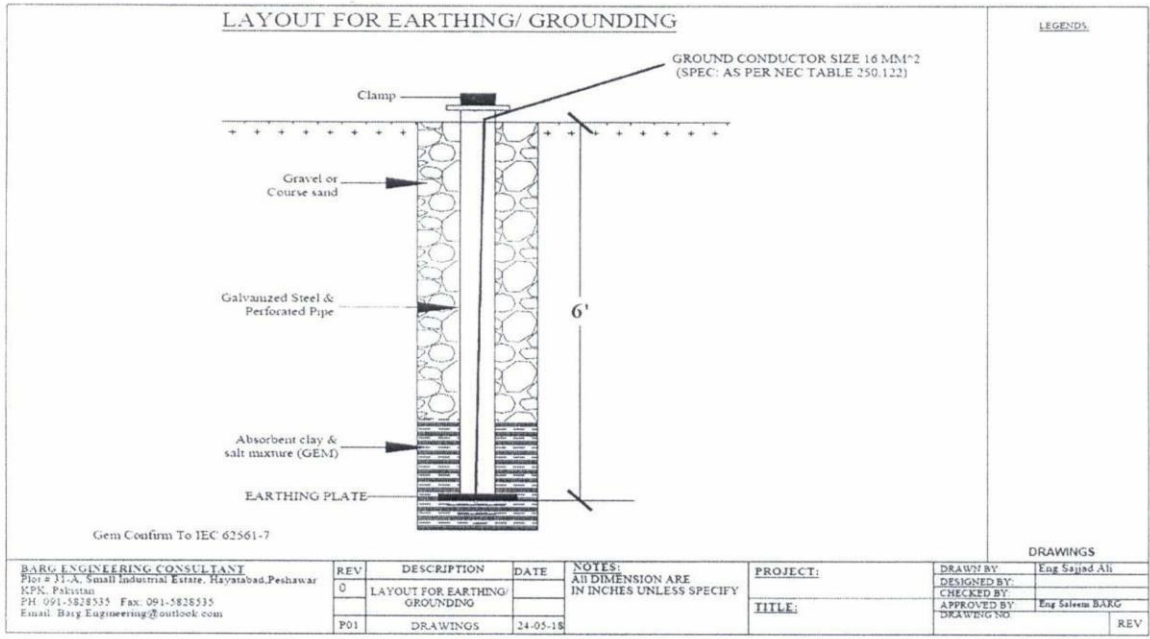
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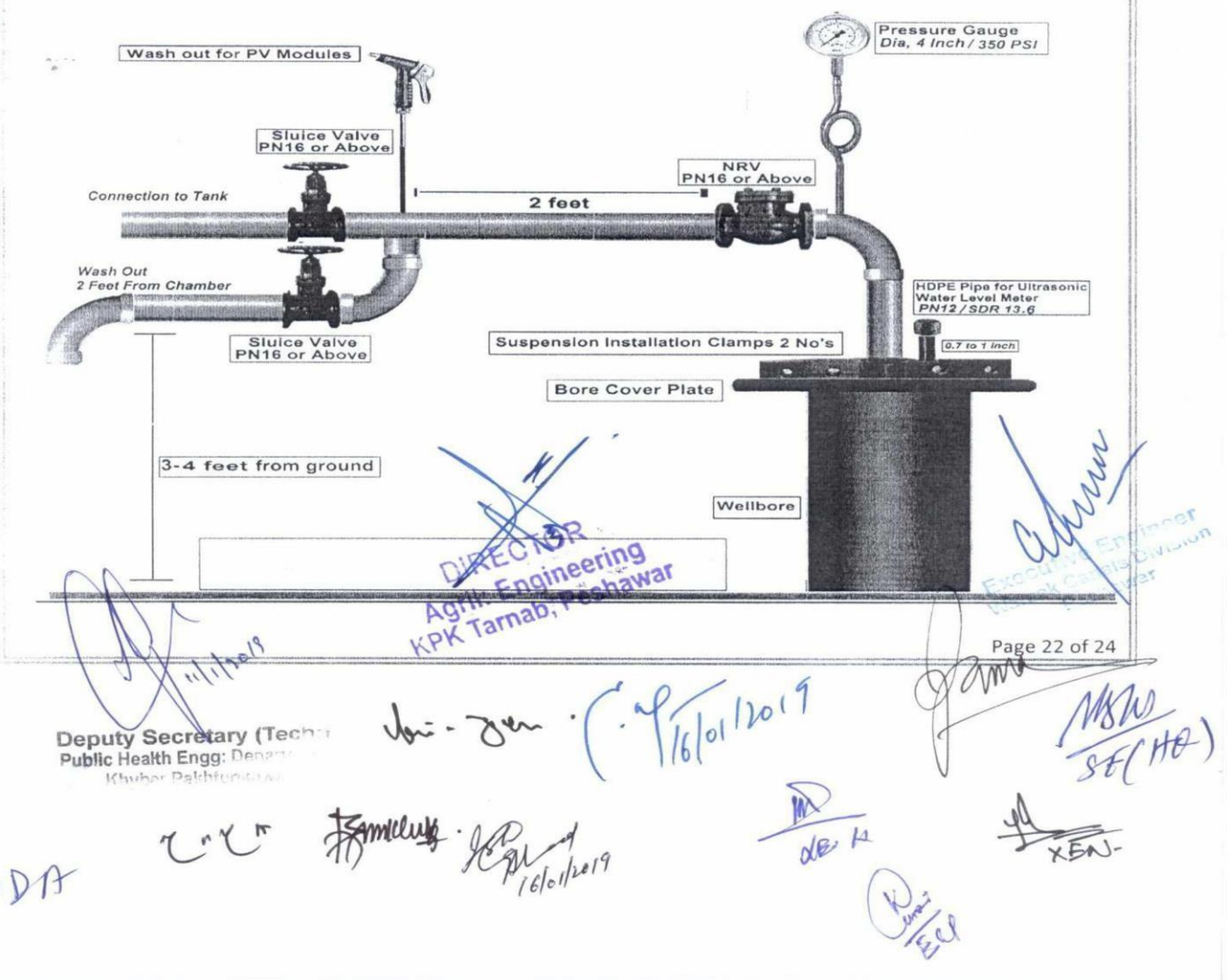
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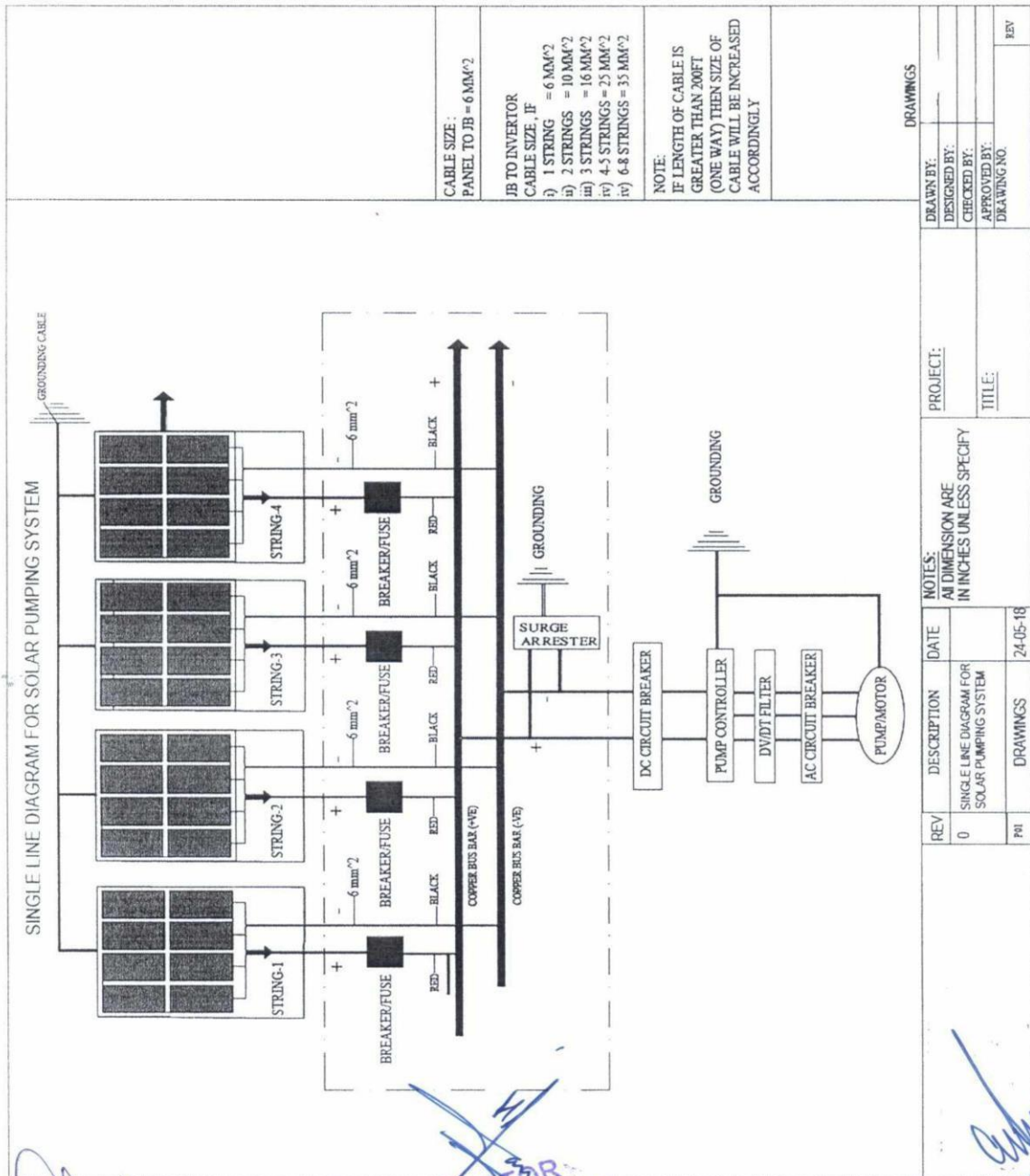
ANNEXURE-2 (EARTHING / GROUNDING DRAWING)



ANNEXURE-3 TOPSET LAYOUT:



ANNEXURE-4 (SYSTEM SINGLE LINE DIAGRAM-PUMPING)



CABLE SIZE :
PANEL TO JB = 6 MM²

JB TO INVERTOR
CABLE SIZE , IF
i) 1 STRING = 6 MM²
ii) 2 STRINGS = 10 MM²
iii) 3 STRINGS = 16 MM²
iv) 4-5 STRINGS = 25 MM²
v) 6-8 STRINGS = 35 MM²

NOTE:
IF LENGTH OF CABLE IS
GREATER THAN 200FT
(ONE WAY) THEN SIZE OF
CABLE WILL BE INCREASED
ACCORDINGLY

DRAWINGS		PROJECT:		NOTES:	
DRAWN BY:		PROJECT:		ALL DIMENSION ARE IN INCHES UNLESS SPECIFY	
DESIGNED BY:		TITLE:		REV	DATE
CHECKED BY:				0	16/01/2019
APPROVED BY:				DESCRIPTION	
DRAWING NO.				SINGLE LINE DIAGRAM FOR SOLAR PUMPING SYSTEM	
				PI	24-05-18
				DRAWINGS	

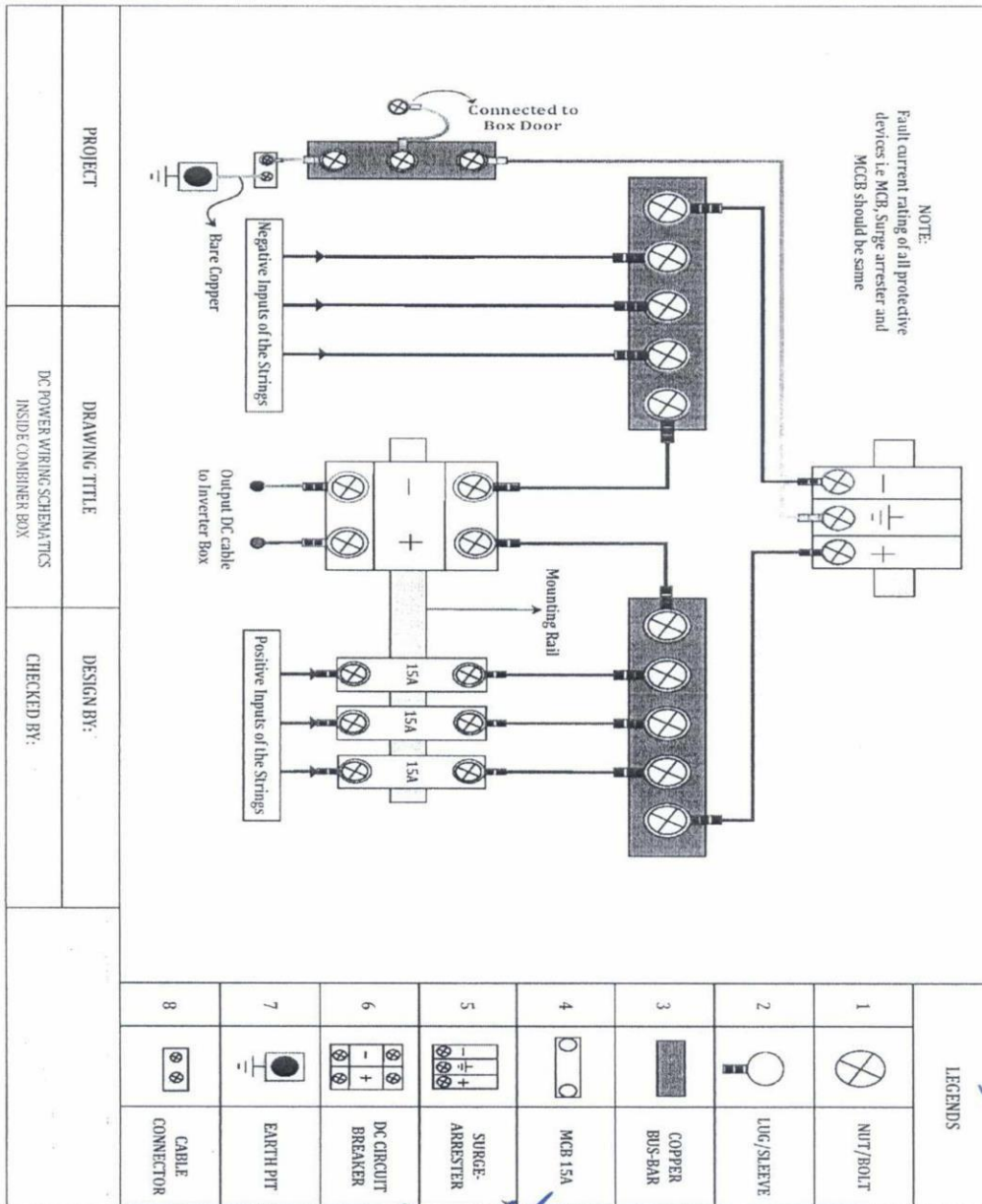
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Executive Engineer
Warsak, Peshawar

**ANNEXURE-5
(JUNCTION/COMBINER BOX SCHEMATICS DIAGRAM)**



PROJECT: _____
DRAWING TITLE: DC POWER WIRING SCHEMATICS INSIDE COMBINER BOX
DESIGN BY: _____
CHECKED BY: _____

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