



# BAIF INSTITUTE FOR SUSTAINABLE LIVELIHOODS AND DEVELOPMENT

State Office: Odisha  
Plot No. 1565/2682, At Bhatra, PO. Dhanupali, Sambalpur  
Odisha 768005  
Telephone: +91 7894418530

## INVITATION FOR QUOTATION

To

Date: 15.08.24

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Dear Sir / Madam,

Sub.: **INVITATION FOR QUOTATION FOR** "Solar powered Lift Irrigation System 05 hp".

You are invited to submit your most competitive quotation for the following product:

Brief description of the product/work/service	Specifications	Quantity	Delivery period	Location For Installation
Solar powered Lift Irrigation System 05 hp	As per the attached tender details	03 sites	45 days from date of issue of P.O/W.O	Jujomura, Rairakhol & Naktideul block of Sambalpur, Odisha

### **Detailed Description of the Product: As Above**

#### **1. Quoted Price:**

- The offer shall be for full quantity as described above. Corrections, if any, shall be made by crossing out, initialing, dating and re-writing.
- The party shall quote for goods / services in the attached format of quotation.
- All duties, taxes and other levies payable on the raw materials and components shall be included in the total price.
- The rates quoted by the party shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
- Delivery and transportation at the cost of the party.
- The prices shall be quoted in Indian Rupees only.

2. Each party must submit only one **SEALED** quotation. Party shall not contact other parties in matters related to this quotation.

#### **3. Validity of Quotation**

The quotation shall remain valid for a period not less than 30 days after the deadline fixed for submission of quotations.



#### 4. Evaluation of Quotations

- a. BAIF will evaluate and compare the quotations determined to be substantially responsive i.e., which are properly signed, and conform to the terms & conditions and specifications.
- b. The evaluation would be done for all the goods / services put together or separately as feasible. The items for which no rates have been quoted would be treated as zero and the total amount would be computed accordingly.
- c. List of similar works undertaken with details of clients etc. if any should be provided.
- d. Contract will be awarded to the responsive party/parties based on technical-cum-commercial grounds.

#### 5. Award of contract

- a. The contract will be awarded to the party/parties whose quotation has been determined to be substantially responsive and technical specifications and commercial terms suit best to requirement. BAIF, prior to the expiration of the quotation validity period, will notify the party/parties whose quotation has been accepted for the award of contract. The terms of the accepted offer shall be incorporated in the Purchase Order or Work Order. Quotations shall include GST & PAN Numbers.
- b. Notwithstanding the above, BAIF reserves the right to accept or reject any quotation and to cancel the procurement process and reject all quotations at any time prior to the award of the contract.
- c. Rate contract can be entered into for subsequent procurement. Order may be given partially & in multiple slabs.
- d. The party/parties are bound to abide by the Organization's Internal Committee guidelines.

6. Normal commercial guarantee / warranty shall be applicable to the supplied goods.

7. Payment terms: 10% advance after receiving SD amount including initial site visit & technical document delivery, 50% payment against supply of mounting structure, water pumps, electrical control panel, pump controller, PV module and erecting of structure at site with civil foundation, Balance 40% payment after installation, testing, and commissioning of the Solar Lift Irrigation System.

8. Queries pertaining to specifications and scope, if any, may be clarified by contacting the undersigned during office hours.

9. 10 % Security shall deposit in favour of '**BAIF Institute for Sustainable Livelihoods and Development**' and payable at Sambalpur, Odisha within 5 days from the Work order issued and it will be refund after one year from date of work completion.

10. You are requested to provide your offer **on or before 25<sup>th</sup> August 2024** in the name of **BAIF, Odisha** only at the above address. Please superscribe the subject on the envelope.

11. We look forward to receiving your quotations and thank you for your interest in this project.

**BAIF Institute for Sustainable Livelihoods and Development**

Solar powered Lift Irrigation System 05 hp

Authorized signatory



To be printed on letterhead / entered in printed quotation / proforma invoice / entered in this format with detailed stamp / seal)

Quotation no.:

Date:

To  
The Chief Programme Executive  
BAIF  
Odisha

Quotation for \_\_\_\_\_

Sr. No.	Description of goods	Specifications, scope, make etc.	Unit	Qty.	Quoted unit price (Rs.)	Total Amount (Rs.) (A)	GST (___%) (Rs.) (B)	Other taxes/packing /installation charges / Discount (Rs.) (C)	Transportation (Rs.) (D)	Gross Amount (Rs.) (A+B+C+D)
1										
2										
3										
4										
5										
	<b>Total</b>									

**Terms and Conditions:**

1. Warranty / Expiry :
2. Terms of payment :
3. Delivery of material within :
4. Delivery at :
5. Validity of quotation :
6. License (if applicable) (Enclose copy):
7. GST registration no. (Enclose copy) : \_\_\_\_\_
8. Permanent Account Number (Enclose copy): \_\_\_\_\_

Signature & stamp of firm

Signature with Stamp of Firm  
Name of Authorized signatory

## Tender Details

**BAIF Institute for  
Sustainable Livelihoods &  
Development-Odisha**



**Solar powered  
lift irrigation system at  
Sambalpur locations in  
Odisha**

Solar powered lift irrigation system

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## 1 Disclaimer

Though adequate care has been taken while preparing the Invitation to tender (ITT) document, the Bidders shall satisfy them that the document is complete in all respects. Intimation of any discrepancy shall be given to this Company Representative immediately. Suppose no intimation is received from any Bidder within Three (03) days from the date of notification of these ITT documents. In that case, it shall be considered that the document is complete in all respects and has been received by the Bidder.

BAIF Institute for Sustainable Livelihoods & Development reserves the right to modify, amend or supplement this ITT document including any format and Appendix.

While this ITT has been prepared in good faith, neither BAIF Institute for Sustainable Livelihoods & Development (BISLD) nor their employees or advisors make any representation or warranty, express or implied, or accept any responsibility or liability, whatsoever, in respect of any statements or omissions herein, or the accuracy, completeness or reliability of information, and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability or completeness of this ITT, even if any loss or damage is caused by any act or omission on their part.





## 2 Definitions & Abbreviations

<b>BISLD</b>	BAIF Institute of Sustainable Livelihoods & Development
<b>BIS</b>	Bureau of India Standards (BIS)
<b>IEC</b>	International Electro-Technical Commission
<b>IEEE</b>	Institute of Electrical and Electronics Engineers
<b>IS</b>	India Standards
<b>CEA</b>	Central Electrical Authority
<b>Bid/Tender</b>	Techno commercial and price bid submitted by the bidder along with all documents/ credentials/ attachments/ annexure etc., in response to this tender, in accordance with the terms and conditions here forth.
<b>Bidder/Contractor</b>	Bidding company the bid. Any reference to the bidder includes bidding company representative / including its successors, executors and permitted assigns as the context may require
<b>Bid / Tender Deadline</b>	The last date and time for submission of bid in response to this tender as specified in bid information sheet
<b>Commissioning</b>	Successful operation of the project / works by the contractor, for the purpose of carrying out performance test(s) as defined.
<b>Company Representative</b>	A body incorporated in India under the companies act, 1956 or companies act, 2013 including any amendment thereto.
<b>Qualification Criteria</b>	The set under name of different chapter to qualification for the opening of price bid
<b>kWp – DC</b>	Kilo-watt peak – DC
<b>kW – AC</b>	Kilo-watt – AC
<b>HP</b>	Horsepower
<b>Project capacity</b>	Total Capacity in kWp allocated to the Bidder for different states of India consisting of single or multiple Area. The project capacity specified is on “DC” module capacity side only.
<b>Performance Ratio” (PR):</b>	Performance ratio” (PR) means the ratio of plant output versus installed plant capacity at any instance with respect to the radiation measured.
<b>Solar Based Pumping System</b>	Pumping system which electricity source of supply is taken from photovoltaic system installed on the flat land /inclined roof of the building / elevated platform on metallic or concrete
<b>Statutory Auditor</b>	The auditor of a company representative appointed under the provisions of the companies act, 1956 / 2013 or under the provisions of any other applicable governing law.
<b>SNA</b>	State Nodal Agency
<b>Wp</b>	Watt Peak
<b>TPI</b>	Third Party Inspection Agency
<b>In Charge Engineer</b>	Reprehensive / authorised person to monitor overall project from planning to final site acceptance testing from owner / developer representative.





### 3 Contractor Information and Agreement

Sr No	Description	Data
1	Name of Contractor / Vendor	
2	Mailing detail	
	Address line 1	
	Address line 2	
	Landmark	
	City – postal code	
	State - country	
3	Contact details	
	Web site	
	Telephone no (sales)	
	Telephone no (service)	
	Email address (sales)	
	Email address (service)	
4	Statutory details	
	GST number	
	MSME category / number	
	Electrical contractor number	
	Electrical supervisor number	
5	Company representative detail	
	Name / designation	
	Email address	
	Telephone no	
	Cell no	
<b>General Scope of Work</b>	To carry out the initial visit of all sites for detail study of site condition, study of tender documents to understand details requirement of scope of work for engineering design, supply, installation, testing & commissioning of base water pumping system with insurance to cover external risk of damage.	
<b>Agreement</b>	I / we, aware about mention site condition and read total tender along with scope of work, technical specifications and terms & conditions. also, agree to provide the same as per requirement.	

<b>Sign</b>	<b>Stamp</b>
<b>Name of the Authorized Person</b>	BAIF Institute of Sustainable Livelihoods & Development



## 4 Bid Information Sheet

<b>Tender Reference No</b>	
<b>Document Description</b>	The bidding process is for a solar power lift irrigation system at 03 sites.
<b>Broad Scope of Work</b>	Initial site visit and identification & study of existing site condition. Detailed engineering, supply, installation, testing & commissioning of solar based water pumping system as per technical regulations along with insurance to cover external risk of damages.
<b>Start Date of Bid Request Acceptance</b>	15/08/2024
<b>Last Date of Bid Request Acceptance</b>	25/08/2024
<b>Closing Date for Bidding</b>	25/08/2024
<b>Technical Bid Opening Date</b>	Internal process
<b>Price Bid Opening Date</b>	Internal process
<b>Final Date of Execution:</b>	<b>Within 45 days from date of issuing work order</b>
<b>Bid Technical &amp; Legal Documents</b>	Bidders must submit all essential documents mentioned in the tender. Bid received without documents as indicated in tender will be rejected.
<b>Bid Process</b>	Single Stage Two Part Bid Process (Part 1 Technical bid & Part 2 Price bid)
<b>Zero Deviation</b>	This is a ZERO deviation bidding process. Bidder is to ensure compliance of all provisions of the bid document and submit their bid accordingly. Tenders with any deviation to the bid conditions shall be liable for rejection.
<b>Tender Process Authority</b>	BAIF Institute for Sustainable Livelihoods & Development
<b>Contact Person (Technical)</b>	Mr. Pawan Deo Kumar
<b>Email Address:</b>	bisld.odisha@baif.org.in
<b>Contact No</b>	+91 8210505696
<b>Contact Person (General)</b>	Mr. Chandrakanta Barada Prasan
<b>Email Address:</b>	bisld.odisha@baif.org.in
<b>Contact No</b>	+91 8328860930



## 5 Tender Submission Procedure

### Hard copy submission

Bidders are required to submit the bid in single sealed cover which must contain two separate sealed covers with part 1 & part 2.

Bidders are required to mark each cover title as per following format for submission of hard copy.

### Main cover (1)

<b>Name of bidder with address</b>	
<b>Cover Title</b>	Part 1(technical bid) & part 2(price bid)

### Sub cover (1)

<b>Name of bidder with address</b>	
<b>Cover title</b>	Part 1(technical bid)
<b>Documents requirement</b>	All technical & essential documents (unpriced)

### Sub cover (2)

<b>Name of bidder with address</b>	
<b>Cover title</b>	Part 2(price bid)
<b>Document requirement</b>	Hard copy of total tender with filled price including all consideration with sign and stamp at each page of tender copy

### Part - 1: technical bid (cover 1)

Documents requirements

1. Annexure 1: format of financial report of bidders (list of completed work in last three financial year with contact reference as per attached).
2. Last three years audited financial statement and ITR.
3. Annexure 2: engineering design deliverables (following engineering design documents)
  - a. Overall equipment layout (plant layout)
  - b. Data sheets
4. Annexure 3: list of testing requirements (acceptance of available list of testing equipment's with data sheet to carry out pre-commissioning and performance testing)
5. Annexure 4: vendor documents requirement list (technical datasheets)
6. Annexure 5: engineering standards and compliance agreement
7. Annexure 6: list of safety equipment's & tools.
8. Work completion certificate / copy of purchase orders
9. Organization structure



**Part - 2: price bid (cover 2)**

Hard copy of total tender with filled price including all consideration with sign and stamp at each page of tender copy is required to be sent by speed post / courier at the below address below: -

**BAIF Institute for Sustainable Livelihoods & Development,**

**Plot no.: 1565/2682, At Bhatra, PO. Dhanupali, Sambalpur, Odisha- 768005**

## **6 Essential qualifying requirements**

The prospective bidder must fulfil the following qualification criteria:

1. The bidder should have minimum 03(three) years of experience in providing (similar)\* type of services.
2. Bidder should have executed at least 01(one) number of contracts of (similar)\* nature in the last 3 (three) years ending last day of month previous to the one in which applications are invited.
3. Bidders should have an average annual turnover of minimum 25 lacs Indian Rupees for preceding last three financial years.
4. Bidders should submit the electrical contractor licence & electrical supervisor licence.
5. In case the bidder is an India company / India joint venture company, either the India company / India joint venture company or its technical collaborator/ joint venture partner must meet the criteria.
  - a. Details of experience and past performance of the bidder and the collaborator (in case of collaboration) or of joint venture partner (in case of a joint venture), on works / jobs done of similar nature in the past and details of current work in hand and other contractual commitments, indicating areas and clients are to be submitted along with the techno-commercial bid, in support of the experience.
  - b. Bidders should submit a memorandum of understanding (MOU) / agreement with their technical collaborator/joint venture partner (in case of joint venture) clearly indicating their roles under the scope of work.
  - c. MOU/ Agreement concluded by the bidder with technical collaborator/ joint venture partner (in case of joint venture), should also be addressed to BISLD, clearly stating that the MOU /Agreement is applicable to this tender and shall be binding on them for the contract period.
6. Bidders need to submit all required data as per documents requirements mention in part 1 (technical bid) at the time of submission of the bid.

\* In this context "similar" works shall be as follows:

Engineering design, supply, erection, installation, testing and commissioning of solar based water pumping system documents.

To this effect, Bidder should submit copies of respective contracts, along with documentary evidence in respect of satisfactory execution of each of those contracts, in the form of copies of any of the documents (indicating respective contract number and type of services), such as



1. Satisfactory completion / performance report (or)
2. Proof of release of Performance Security after completion of the contract (or)
3. Proof of settlement / release of final payment against the contract (or)
4. Any other documentary evidence that can substantiate the satisfactory execution of each of the contracts cited above.

## 7 General instruction to bidders

The bidder should note & may visit the site conditions at own cost before quoting. Total site is two sites but during the entire one year, it might be some sites will be allocated to vendor as per requirement of BAIF. The site will be offered on as it is for the execution of this job and it will be sole responsibility of the contractor to ensure that they abide by the various rules, regulations, by-laws, and other statutory requirements, etc. Imposed by the government / semi-government and/or other local authorities governing execution of this job.

All entries and rates in the tender form must be written in permanent ink or typewritten. Erasures, overwriting or corrections, if any, should be attested under the full signatures of the tenderers. All rates should be both in figures and words. The total amount should be given both in figures and words in the tender form. In case of any difference, the rate expressed in words will be taken as authentic.

As far as possible, the bidders should endeavour not to stipulate any counter terms / conditions or modifications of tender clauses and should quote strictly as per tender conditions. This will assist in proper evaluation of each offer. However, should there be any specific comments in respect of any clauses; the same may be highlighted in a separate deviation schedule in the unpriced bid.

Material / equipment will be inspect & tested by third party at vendor's place / company before dispatch which appointed by in-charge engineer. Cost of travelling and stay (if required) beyond 50 km area of site location of third-party inspection has to be considering at the time of bidding.

Preliminary commissioning of system will be inspected & tested by third party at site before final testing.

Post commissioning testing of system will be inspected & tested by third party at site before final testing. Cost of travelling and stay (if required) beyond 50 km area of site location of third-party inspection has to be considering at the time of bidding.

Contractor requires to provide inspection call to in-charge engineer in advance by written email before 07 days of planned date.

In-charge engineer reserves the right to reject offers not meeting its technical specification requirements and commercial conditions.

In-charge engineer / (procurement committee) shall not be bound to accept the lowest tender and reserves right to accept any or more tenders in part. Decision of in-charge engineer in this connection shall be final.



In-charge engineer reserves the right to accept any tender in whole or in part or reject any or all tenders without assigning any reason

## 8 Period, guarantee & mode of payments

### 8.1 Contract period

The bidders should complete the engineering design, supply of material, erection, installation, testing and commissioning including third party inspection within 30 days from issuing of work order. BAIF will not be liable to accept any claim or invoice if work is not completed within timeline. The contractor should complete all the work on or before above-mentioned date.

### 8.2 Bank Guarantee

Successful bidder must submit an EMD amounting to 10% of total cost in the form of demand draft drawn in favour of 'BAIF Institute for Sustainable Livelihoods and Development' and payable at Sambalpur, Odisha within 05 days of the intimating the selection failing which the bidder's offer shall not be considered. The EMD amount shall not bear any interest. In case the awarded bidder denies accepting the work order their EMD shall be forfeited and work order will be cancelled.

EMD will be converted into security deposit to be retained without interest for a period of 12 (twelve) months after date of issue of completion certificate.

### 8.3 Payment Terms

Stage	Schedule of Work	% Of Contract Value	Reference Documents Requirements	Planned Timeline (Date)
1	advance after receiving SD amount including initial site visit & technical document delivery	10%	Proforma Invoice Data Sheets Bank Guaranty	
2	payment against supply of mounting structure, water pumps, electrical control panel, pump controller, PV module and erecting of structure at site with civil foundation	50%	Proforma Invoice Delivery Chalan FAT Report	
3	payment after installation, testing, and commissioning of the Solar Lift Irrigation System Including Test Report. (* After Completion of each site)	40%*	Original Tax Invoice Bunch of Master Documents as Per Annexure- 4	



**Carrying Out Part Work at The Risk and Cost of Bidders**

If Bidder:

At any time makes default during work or does not execute any part of the work with due diligence and continues to do so even after a notice in writing of 7 days in this respect from the Inspection Authority.

or

Commits default in complying with any of the terms and conditions of the contract and does not remedy it or takes effective steps to remedy it within 7 days even after a notice in writing is given by Inspection Authority.

or

Fails to complete the works or items of work with individual dates of completion, on or before the dates so determined, and does not complete them within the period specified in the notice given in writing By Inspection Authority.

The Inspection Authority / Owner without appealing action may, without bias to any other right or remedy against the Bidder which have either accrued or accrue thereafter to Government, by a notice in writing to take the part work / part incomplete work of any items out of his hands and shall have powers to:

- Take possession of the site and any materials, constructional plant, implements, stores, etc., there on and/or carry out the part work / part incomplete work of any items by any means at the risk and cost of the contractor.
- The Inspection Authority / Owner shall determine the amount, if any, is recoverable from the bidder for completion of the part work/ part incomplete work of any item(s) taken out of his hands and execute at the risk and cost of the bidder, the liability of Bidder on account of loss or damage suffered by the Inspection Authority because of action under this clause shall not exceed 10% of the contract value of the work.
- In determining the amount, credit shall be given to the Bidder with the value of work done in all respect in the same manner and at the same rate as if it had been carried out by the original bidder under the terms of his contract, the value of bidder's materials taken over and incorporated in the work and use of plant and machinery belonging to the bidder. The certificate of the Inspection Authority / Owner as to the value of work done shall be final and conclusive against the bidder provided always that action under this clause shall only be taken after giving notice in writing to the bidder. Provided also that if the expenses incurred by the department are less than the amount payable to the bidder at his agreement rates, the difference shall not be payable to the bidder.
- Any excess expenditure incurred or to be incurred by the Inspection Authority in completing the part work/ part incomplete work of any items or the excess loss of damages suffered or may be suffered by the Inspection Authority as aforesaid after allowing such credit shall without prejudice to any other right or remedy available to Government in law or per as agreement be recovered from any money due to the



### Solar powered lift irrigation system

Bidder on any account, and if such money is insufficient, the Bidder shall be called upon in writing and shall be liable to pay the same within 30 days.

- If the Bidder fails to pay the required sum within the aforesaid period of 30 days, the Inspection Authority / Owner shall have the right to sell any or all of the Bidder unused materials, constructional plant, implements, temporary building at site etc. and adjust the proceeds of sale thereof towards the dues recoverable from the bidder under the contract and if thereafter there remains any balance outstanding, it shall be recovered in accordance with the provisions of the contract.

In the event of above course being adopted by Inspection Authority, the bidder shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered any engagements or made any advance on any account or with a view to the execution of the work or the performance of the contract.

## 9 Applicability of Labour Laws

The Bidder shall ensure payment of minimum wages as per labour laws and shall comply with all labour laws applicable to it under India law.

## 10 Applicability of health & safety laws

The bidder shall ensure to take care of safety of all working person at site by own cost. All bidders required to provide relevant safety personal protective equipment and safe working tools by own cost. Payment toward health and safety to all labour & engineers shall comply with all laws applicable to it under India law.

## 11 Delayed Execution Clause

In case the contractor failed to complete the contract work within prescribed time-period the contractor will be liable to pay penalty as per following rates:

Delay in Days	Penalty in % of Total Contract Amount (for unit)
8 - 10 days	15%
Above 10 days	20%



## 12 Scope of work

### 12.1 Executive summary

Scope of work for bidder is total project implementation including site survey, engineering design, supply of materials, erection, installation, arrangement of third-party inspection, pre & post commissioning testing and final site acceptance testing.

Scope specified is only indicative but not exhaustive and the vendor / bidder is required to carry out any other scope as per site requirement within the items available under the tender.

Levelling of improper land to proper level land without disturbing existing environment will be under bidder scope including arrangement of labour, various tools, material transport & waste management for that work.

Providing one year insurance policy of each system with minimum coverage of overall system cost against risk of burglary, housebreaking, machinery breakdown, standard fire, natural calamities and other external issues.

### 12.2 General scope of work

This scope of work is not limited as defined in bid documents but also applicable to comply all national technical standards, government regulations and local law. The various material/works cover under the scope of work is detailed below. However, the scope specified below is only indicative but not exhaustive and the vendor is required to carry out any other scope as per site requirement within the items available under the tender.

Carryout initial site survey, identifying existing ground water level, providing technical documents, arranging third party inspection, supply of material as per bill of material provided, pre & post commissioning testing of water pumps.

Supply of water pump, solar photovoltaic panels, controller for water pump, mounting structures for water pump, mounting structures for solar photovoltaic panels and other system, earthing system, lightning protection system & other balance of system as per specification.

Erection, installation, testing & commissioning of total solar photovoltaic system along with water pump with all other compliances.

Supply of materials for foundation, erection & testing of foundation with bolts along with arrangement of templates for foundation including all necessary work for painting.

Supply, erection. Commissioning & testing of cable, cable laying including all necessary work for cable trench making.

Supply & installation of identification mark, danger sign board & providing technical training for system operation and routine maintenance of all site person including all necessary training manual in local language.

Supply, erection, installation, testing & commissioning of intake well. Material of construction of intake well is M30. This will be considered as a separate item as per actual measurement.



### Solar powered lift irrigation system

Supply, erection, installation, testing & commissioning of piping system & piping accessories. This will be considered as a separate item as per actual measurement

Fencing for solar panels with G.I chain-link size (150 x 150 x 2.6mm) & MS angel (40X40X4), Height is 2.4 mtr including 0.3 m tilt on front side

## 12.3 Supply of materials, equipment's & consumable items

All equipment and consumable materials required for the job will have to be arranged by the contractor meeting the technical specification and relevant national engineering standards.

Supply of solar photovoltaic panels, electrical panel with pump controller, panel mounting structures, earthing electrode, earth bus, earthing strips, earthing cables, surge protection devices, fuses, lugs, nuts, bolts, and other accessories as per specification and as required for completeness of installation.

Any other item as may be required for completeness as per relevant applicable statutorily mandatory requirements and site inspection requirements by statutory officials. All materials required for the job will have to be arranged by the contractor meeting the relevant codes and as per item wise specifications of this document.

## 12.4 Erection, installation, commissioning, storage & transportation

The contractor will have to make his own arrangement to transport the required materials outside and inside the working place and leaving the premises in a neat and tidy condition after the completion of the job to the satisfaction of the in-charge engineer.

The contractor will have to arrange for safe keeping of his materials and should provide necessary security arrangements for safeguarding the materials. Contractor can provide location of storage material to in-charge engineer for record purpose only. In-charge engineer will not be responsible for any claims regarding this.

Contractor should arrange movable scaffolding, cherry picker, Crain, safety equipment wherever required.

The bidders are advised to visit the site and get acquainted with the site conditions. In-charge engineer will not provide any roads, infrastructure such as power, water, lighting etc. At site. Contractor must make their own arrangements for transportation of material, movement of heavy equipment at site.

The entire work of fabrication, assembly and installation shall conform to given specification & drawings and workmanship for sustainable long life. Mounting structure shall be as per specifications and drawings with pre-fabrication to be done before hot dip galvanizing. After fabrication & before galvanizing, inspection call to be given to client. Site execution shall preferably be without any hot work with bolting only in erection work of mounting structure (however, miscellaneous hot work in site work

Installation shall be strictly in accordance with the manufacturer's instruction manual and in-line with recognized standard **is 17018: part 1:2018 solar photovoltaic water pumping systems part 1 centrifugal pumps — specification quality work practices.**

## 12.5 Quality of materials

All parts of equipment shall be as per given specification, size, and material of contraction to function satisfactorily under all rated conditions of loading and operation. Materials / components



which are not conforming to standards laid down by bureau of India standards (bis) / IEC standards / IEEE shall not approved from BISLD. The entire work of fabrication, assembly and installation shall conform to standard engineering practice.

## 12.6 Special terms & conditions

### **Supply timeline:**

01 to 02 weeks from the date of work. Date of receipt of material at site shall be considered as date of supply. Contractor must require to schedule for third party inspection before dispatch of major equipment's at factory place.

### **Erection & commissioning timeline:**

03 to 06 weeks from the date clearance / advice from in-charge engineer to commence the erection, installation, inspection & testing.

### **Onsite service liability period:**

Contractor requires to arrange breakdown service for 01 year from the date of site acceptance report by third party inspection agency. No additional cost will be provided to contractor in case of any repair & maintenance against normal breakdown against manufacturing & installation related issue. Contactor is required to provide troubleshooting report to BISLD in case of any service call attempt during this period.

### **Onsite service response time:**

Contractor requires to attempt & resolve the non-operated / faulty system within 72 hours from the date of service call from BISLD / user side.

### **On site Routine Monitoring:**

Contractor requires to provide total 01 preventive maintenance service after every 03 month for each site along with general training to users. Contactor require to provide report to BISLD in for routine monitoring.

### **System Defects Liability Period:**

Twelve months (12) from the date of issue of completion certificate. Contractor also requires to provide technical and administrative support of to each user in case of any defect found in major equipment during warranty period & after defect liability period.

10% security deposit will be released on completion of defect liability period of 12 months after issue of completion certificate.

### **Risk coverage period:**

Contractor requires to arrange insurance for 01 year from the date of site acceptance report to cover risk of theft, damage etc.

### **Cost for service & routine monitoring:**

Contractor requires to provide prompt support to meet the requirement of users. In case, contractor not provide response withing specific time limit, BISLD will carry out the service support work and cost will be deduced from secure fund against submitted invoice. Total reserve payment will be release after 12 months in case of all above condition satisfy.



**Water & Power:**

Water & Power shall be arranged by contractor at his own cost. Water & Power will not be provided by In-charge Engineer.

## 12.7 Stagewise inspection requirements

Inspection by company representative or company authorized third party agency (TPA) shall be required mainly at following stages:

Fat pre-dispatch of PV module, electrical control panel, solar based water pump-motor sets & mounting structure.

**Fabricated structure members:**

1. Visual examination and quantity verification of offered lot.
2. Dimension, fabrication, and trueness verification of structure member from fabrication sketch.
3. Galvanizing test of each sample i.e. Dip test, hammer test and mass of zinc test.
4. Random verification zinc coating over galvanized surface by elcometer.

Bolts-nuts, washers, accessories, attachments etc.: (to be carried out at manufacture's works.)

1. Visual examination and quantity verification of offered lot.
2. Sample selection from the offered lot as per relevant is for each item.
3. Dimension, fabrication, and trueness verification from fabrication sketch.

Site inspection after completion of erection & before pre-commissioning of overall system.

Inspection call shall be made at least 07 days prior to readiness for demonstrating witness by company or TPA.

## 12.8 Warranty for supply & execution quality

**Supply:**

1. The manufacturer should warranty of the photovoltaic module(s) to be free from the defects and / or failures specified below for a period not less than five (05) years from the date of sale to the original customer.
  - a. Defects and / or failures due to manufacturing.
  - b. Defects and / or failures due to quality of materials
2. Nonconformity to specifications due to faulty manufacturing and/or inspection processes. If the solar module(s) fails to confirm to this warranty, the manufacturer will repair or replace the solar module(s), at the owner's sole option.
3. Follow the instruction guideline and instruction manual provided by the manufacture.

**Performance warranty:**

The contractor shall provide for the all-supplied photo-voltaic panels, a performance warrantee of 25 years with degradation of power generated not exceeding 10% over first (10) ten years and not exceeding 20% over rest of the (25) twenty-five-year period.

Contractor shall provide for the pump, controller manufacturing warrantee / guarantee for min. 05 years from the date of commissioning.



**Execution:**

Project site performance related issue, if any arises out of executions defects or workmanship quality within 01 year from the date final commissioning, contractor has to resolve, rectify and make required necessary correction at the site without any claim of extra charges at his cost till achievement of required performance outcome of installation as per mfg. Datasheet & applicable governing IEC/BIS standards based on site measure solar irradiance data.

## 12.9 Design base

Sr. No.	Description	Data
1	Sea level	Consider as per site Co-ordinates
2	Temperature range	2°C (Min.)-50°C (Max.)
3	Relative humidity	20% - 90%
4	Rain fall	Average
5	Seismic condition	Consider as per site Co-ordinates
6	Wind load	As per IS-875 Latest editions
7	Atmosphere	Polluted with dust
8	Photovoltaic technology	Polycrystalline /
9	Inverter technology	IGBT with MPPT algorithm
10	Pump type	Low Voltage AC
11	Tilt angle	Fixed Tilt
12	MOC of Mounting Structure	MS with hot dip galvanized
13	MOC of Fixing Accessories	Aluminium / SS 304
14	Ingress protection	IP 65
15	Photovoltaic system voltage	1000 -1500 Volts
16	Pump supply voltage (1 phase)	220-240 Volts AC
	Pump supply voltage (3 phase)	400-440 Volts AC
17	Operating frequency	As per Pump
18	Max. Fault level	10 kA for 1 Sec.
19	Earthing	As per IS 3043 & IEEE 80
20	Lightning protection	As Per IS/IEEE 62305
21	Protection	As per BIS
22	Operating staff	Non-skilled
23	Maintenance staff	Skilled
24	Cleaning cycle	Once a week
25	Predictive maintenance cycle	Once after every three months
26	System life	Minimum 15 years
27	Overall system standards	BIS

**General technical standards**

The supply of all materials, equipment's, other consumables, erection, installation, testing and commissioning shall conform to the codes of bureau of India standards and other applicable international standards. In case of any contradiction, the requirements of this



specification shall govern. In addition, the installation shall conform to the stipulations of the latest editions of the following.

1. India electricity rules & act
2. Regulations lay down by the chief electrical inspector of respective state govt.
3. Fire insurance regulations
4. Any other regulations lay down by central/state local authorities.

## 13 Standard bill of materials

Sr No.	Equipment name
<b>1</b>	<b>Photovoltaic module</b>
<b>2</b>	<b>Pump controller</b>
<b>3</b>	<b>Photovoltaic module mounting structure</b>
3.1	Structural material for base column
3.2	Structural material for rafter
3.3	Structural material for purlin
3.4	Structure fixing accessories (SS 304 nuts, bolt, washers, etc.)
3.5	Base plate
<b>4</b>	<b>Earthing system</b>
4.1	Earthing electrode with carbon back fill compound
4.2	Earth pit cover
4.3	Earthing strip
4.4	Earthing cable
4.5	Earthing bus
4.6	Fitting and accessories including nuts, bolt and lug
<b>5</b>	<b>Lighting protection system</b>
5.1	Air terminal
5.2	Down conductor
5.3	Insulator / separators
5.4	Fitting and accessories including nuts, bolt and lug
<b>6</b>	<b>Foundation for photovoltaic modules, earth pits, cable trench, etc</b>
6.1	Cement
6.2	Gravel
6.3	Sand
6.4	Foundation bolts
<b>7</b>	<b>Water pump</b>





Solar powered lift irrigation system

Sr No.	Equipment name
<b>8</b>	<b>Water pump output pipe with accessories</b>
<b>9</b>	<b>Cable trench</b>
9.1	Tile / brick
9.2	Sand
9.3	Identification tap
<b>10</b>	<b>Cables</b>
<b>Sr no.</b>	<b>Equipment name</b>
10.1	Photovoltaic copper cable
10.2	AC copper cable for pump
10.3	AC copper cable for earthing
10.4	AC cable for electrical panel control wiring
11	Accessories & other balance of system
11.1	Photovoltaic module fixing clamp / bolt
11.2	Cable gland
11.3	Lugs
12	Sign board and identification tag
12.1	System specification sign board
12.2	Sign board for safety indication
12.3	Cable identification tag
12.4	Cable route marker
12.5	Equipment tag
12.6	Training manual
13	Intake well
14	HDPE pipe rising main 125 mm, 4kg/cm <sup>2</sup> , PE-80
14.1	HDPE pipe outlet 110mm, 4kg/cm <sup>2</sup> , PE-63
14.2	HDPE pipe tapping 63, 4kg/cm <sup>2</sup> , PE-63
14.3	Unequal tee
14.4	Elbow- 45°
14.5	Elbow- 90°
14.6	None return valve
14.7	Air valve
14.8	2.5" ball valve



Solar powered lift irrigation system

Sr No.	Equipment name
14.9	4" ball valve
14.10	Cabel DC 6 SQ mm polycab
15	Fencing for solar panels with G.I chain-link size (150 x 150 x 2.6mm) & MS angel (40mmx40mmx4mm) height 2.4m including 0.3m tilt front side and Size : 12X10

## 14 Technical specifications

### 14.1 Technical specification – solar photovoltaic modules

Sr. No.	Particulars	Range	Units	Remarks
<b>Electrical Characteristics:</b>				
1	Max. power (P <sub>m</sub> )	300-340	Watt	
2	Power tolerance	±5	Watt	
3	Open circuit voltage (V <sub>oc</sub> )	45 - 50	Volts	
4	Short circuit current (I <sub>sc</sub> )	8.5-12	Ampere	
5	Voltage at Max. power (V <sub>mpp</sub> )	36-45	Volts	
6	Current at Max. power (I <sub>mpp</sub> )	7.9-11	Ampere	
7	Max. system voltage	1000-1500	Volts	
8	Module efficiency	17.00 – 22.00	%	
9	Max. series fuse rating	15-20	Ampere	
10	Limiting reverse current	15-20	Ampere	
<b>Mechanical characteristics:</b>				
11	Dimensions (L X W X T)	1950-2280	mm	
		950-1150	mm	
		35-45	mm	
12	Weight	30-35	kg	
13	Solar Cell per Module	72 / 144	Nos.	
14	Solar cell type	Polycrystalline / mono crystalline		



Solar powered lift irrigation system

Sr. No.	Particulars	Range	Units	Remarks
15	Front cover thickness	3-3.5	mm	
16	Front panel (front face glass material)	Tempered glass (Low Iron)		
17	Frame Material (AL / Cu / GI FB)	Anodized aluminium		
18	Junction box protection degree	IP65 to IP67		
19	Connector type	MC4 – IP67 rated		
20	Cable size	6	sqmm	
21	Cable length	1000-1200	mm	
22	Max. Surface load capacity	5400	Pa	
23	Product warranty	5-10	Years	
24	Output warranty	25-27	Years	
25	Certification	PID resistance, salt mist, ammonia and hail resistant		
26	Current Temperature Co-efficient	0.05-0.07	%/°C	
27	Voltage Temperature Co-efficient	-0.29 to -0.35	%/°C	
28	Power Temperature Co-efficient	-0.38 to -0.42	%/°C	
29	NOCT	(44° to 46°) ± 2	°C	
30	Operating temperature range	-40° to 85°	°C	

The total solar photovoltaics minimum array capacity should not be less than the 5000 Wp DC in case of 05 hp pump, (nameplate capacity of solar photovoltaic module) as specified and should comprise poly-crystalline modules of greater than or equal to 300 Wp & less than 340Wp.

The PV modules should be of indigenous make. The PV modules must confirm to the latest edition of the following / equivalent BIS standards:

1. IEC 61215 / IS 14286 for PV module design qualification and type approval.
2. IEC 61730 (1 & 2) for photovoltaic PV module safety qualification – requirements for construction and material.
3. IEC 60068-2-68 for environmental testing of photovoltaic modules.
4. IEC 61701 for salt mist corrosion testing of photovoltaic modules.
5. IEC 62716 for ammonia corrosion testing of photovoltaic modules.
6. IEC 62804 for test method for detection of potential induced degradation of photovoltaic modules.

### Solar powered lift irrigation system

Solar PV module conversion efficiency should be equal to or greater than 17.0% at STC of 1000 W / Sq. M. Irradiance, AM 1.5 spectrum and 25°C cell temperature.

The PV modules shall perform satisfactorily in humidity up to 100 % with temperature between - 40°C to +85°C.

Manufacturers / suppliers should supply PV modules using a radio frequency identification tag (RFID), which must contain the following information. The RFID can be placed inside or outside the module laminate, but must be able to withstand harsh environmental conditions:

1. Name & serial no. Of the manufacturer of PV module.
2. Name & serial no. Of the manufacturer of solar cells.
3. Month and year of the manufacture (separately for solar cells & module).
4. Country of origin (separately for solar cells & module).
5. I – V curve for the module.
6. Peak Wattage,  $I_{mp}$ ,  $V_{mp}$  and FF for the module.
7. Unique Serial No. and Model No. of the module.
8. Date and year of obtaining IEC PV module qualification certificate.
9. Name of the test lab issuing IEC certificate.

Other relevant information on traceability of solar cells and module as per ISO 9001 series. RFID shall be mandatorily placed inside the module laminate.

Other general requirement for the PV modules and subsystems shall be the following:

1. The rated output power of any supplied module shall not have negative tolerance.
2. The peak-power point voltage and the peak-power point current of any supplied module and / or any module string (series connected modules) shall not vary more than 3 (three) percent from the respective arithmetic means for all modules and/or for all module string, as the case may be
3. Except where specified, the front module surface shall consist of impact resistant, low-iron and high-transparent toughened glass.
4. The peak-power point voltage and the peak-power point current of any supplied module and/or any module string (series connected modules) shall not vary by more than 2 (two) per cent from the respective arithmetic means for all modules and/or for all module strings, as the case may be.
5. The module shall be provided with a junction box with either provision of external screw terminal connection or sealed type and with arrangement for the provision of by-pass diode. The Box should be Weatherproof PPO Enclosure with Bypass Diodes with IP 65 or IP 67 Rated.
6. I - V curves at STC should be provided by bidder.
7. Necessary I - V curves at 25° C, 45° C, and 60° C are required to be furnished.
8. Fill factor of module shall not be less than 0.70.

## 14.2 Technical Specification – Pump Controller

### 14.2.1 Technical Specification of 05 HP Pump Controller

Sr. No.	Particular	Details	Unit	Remarks
1	Power	05.00	hp	
2	Min. DC voltage	300	Volt	
3	Max. DC voltage	800	Volt	
4	Start voltage	300	Volt	
5	MPPT voltage range	500-680	Volt	
6	Max. DC input current	10	Ampere	
7	Max. input DC power	5000-6800	Watt	
8	AC voltage range	300-460	Volts	
9	Max. output current	10	Ampere	
10	Rated AC power	4800-5000	Watt	
11	Max. efficiency	>96	%	
12	Ambient humidity	0-90%	%	
13	Altitude	< 1000	m	
14	Operating temperature range	-20 to 70	°C	
15	Weight	6.5-8	kg	
16	Warranty	1	Year	
17	Certificates	IEC 61683, IEC 60068-2, IS 16221, IEC 60529	-	



### 14.2.2 Technical specifications – Mounting structure

Sr. No.	Description	Data / Details	Units	Remarks
1	<b>Material of Construction</b>	Hot dip galvanizing (80 micron)	-	-
2	<b>Structure type</b>	Fixed	-	-
3	<b>Structure dimension</b>	As per drawing	-	-
4	<b>Type of welding</b>	Electrical arc welding	-	-
5	<b>Details of nut bolt</b>			
(i)	Material of construction	SS 304	-	-
(ii)	Size			
a.	Length	Bidder scope	mm	-
b.	Diameter	Bidder scope	mm	-
6	<b>Details of J bolt</b>			
(i)	Material of construction	SS 304	-	-
(ii)	Size			
a.	Length	Bidder scope	mm	-
b.	Internal dimension	Bidder scope	mm	-
7	<b>MS square pipe</b>			
(i)	Length x width x thickness	1. Hight 915 MM 2. Height- 1666MM 3. Size-72*72*3 mm	mm	As per drawing
(ii)	Thickness	3 & 2	mm	As per drawing
(iii)	Sectional area	12.13 7.01 4.76	Sq. cm.	As per IS 4923
(iv)	Unit weight	9.52 5.50 3.74	Kg / mtr.	As per IS 4923
(v)	Moment of inertia	187.28 54.94 17.47	cm4	As per IS 4923
(vi)	Radius of gyration	3.93 2.80 1.92	cm	As per IS 4923
(vii)	Elastic modulus	37.46 13.74 6.99	Cubic. Cm	As per IS 4923



Sr. No.	Description	Data / Details	Units	Remarks
(viii)	Outer surface	0.384 0.224 0.187	Sq. mtr.	As per IS 4923
<b>8</b>	<b>Standards followed</b>			
(i)	Hot dip galvanizing	IS 2629	-	-
(ii)	MS Pipes and Purlins	IS 4923	-	-
(iii)	Welding	IS 816	-	-
(iv)	Bolts	IS 1363 & 1364	-	-

**Bidder require to provide STAAD Pro engineering design simulation report in case of any modification in above specification.**

### 14.2.3 Fabrication workmanship

The details of fabrication shall conform to IS: 802 (Part-II) - 1978. All the structure members shall be accurately fabricated to bolt together easily at site without any undue strain on the bolts. All similar parts of structure shall be made strictly inter-changeable. All steel sections before any work is done on them, shall be carefully, levelled, straightened and made true to detailed drawings by methods which will not injure the materials so that when assembled the adjacent matching surfaces are in close contact throughout. No rough edges shall be permitted in the entire structure.

### 14.2.4 Drilling and punching

Before any cutting work is started, all steel sections shall be carefully straightened and trued by pressure and not by hammering. They shall again be trued after being punched and drilled. Holes for bolts shall be drilled or punched with a jig but drilled holes shall be preferred. The following maximum tolerance of accuracy of punched holes is permissible. Holes must be perfectly no tolerance in this respect is permissible. The maximum allowable difference in diameter of the holes on the two sides of plates or angle is 1 mm i.e. the allowable taper in a punched hole should not exceed 1 mm of diameter. Drilling or ramming to enlarge defective holes shall not be permitted.

### 14.2.5 Galvanising

The galvanizing shall be done to all the structure members after the fabrication work is completed. The zinc deposition should not be less than specified, per galvanized surface area of the fabricated structure member. The galvanizing of the structure members shall conform to IS: 2629-1985 & IS: 4759-1984. All galvanized members shall withstand tests as per IS: 2633-1986.

The weight of zinc coating shall be determined as per the method stipulated in IS:2633-1986. Spring washers shall be electro galvanized as per IS:1573-1970. The average zinc coating for section 5 mm & above shall be maintained as 80 Micron.





Hot dip galvanized MS mounting structures may be used for mounting the modules / panels /arrays. Each structure should have angle of inclination as per Requirement.

Suitable fastening arrangement such as grouting, and calming should be provided to secure the installation against the specific wind speed. The mounting structure steel shall be as per latest IS 2062: 1992 and galvanization of the mounting structure shall be complying of latest IS 4759.

Structural material shall be corrosion resistant and electrolytic ally compatible with the materials used in the module frame, its fasteners, nuts, and bolts.

#### 14.2.6 Technical specification – earthing

Sr No.	Particulars	Range	Units	Remarks
1	Type of electrode	Solid rod		-
2	Material of Construction	MS with copper coating		-
3	Length of electrode	2000	mm	-
4	Diameter of electrode	Bidder scope	-	-
5	Type of earth encasement	Bidder scope	-	-
6	Faults withstand capacity	Bidder scope	-	-
7	Standards	IS 3043, IEEE 80		-

- Each array structure of the Photovoltaic System should be grounded / earthed properly as per IS:3043-1987.
- Overall earth resistance test requires to comply as per IS 3043, IEEE 81 and IEC 142. It shall be ensured that all the earthing points are bonded together to make them at the same potential.
- 25 mm x 3 mm GI Strip / 16 Sq.mm. Copper Cable as Per Standard shall be used for Interconnection and Preparation of Grid.
- The main earth pit outside the building shall be connected to the earth boss on terrace using 25 mm x 3 mm GI Strip.
- The mounting structure earthing / solar panel earthing shall be connected to earth boss on terrace using 1C X 6 Sq.mm. Cu cable.

#### 14.2.7 Technical specification – lightning arrestor

- The Solar Photovoltaic power plants shall be provided with lightning & overvoltage protection.
- The main aim in this protection shall be to reduce the over voltage to a tolerable value before it reaches the PV or other sub system components.
- The source of over voltage can be lightning, atmosphere disturbances etc the entire space occupying the SPV array shall be suitably protected against Lightning by deploying required number of Lightning Arrestors.
- Lightning protection should be provided as per IEC 62305 standard.



### 14.2.8 Technical specification of cables

Technical specification – 4 Sq. mm. DC cable

Sr. No.	Particulars	Range	Units	Remarks
1	PV cable size	4	Sq. mm.	-
2	Current rating	Above 40	Amp	
3	Conductor	Electrolytic Tinned fine copper	-	-
4	Insulation	Crosslinked Halogen Free & Flame-Retardant Insulation	-	-
5	Sheath	Crosslinked halogen free & flame-retardant UV and ozone resistant sheath	-	-
6	Thickness of insulation	Bidder Scope	mm	-
7	Thickness of sheath	Bidder Scope	mm	-
8	Approx. overall diameter	Bidder scope	mm	-
9	Approx. weight of cable	Bidder Scope	kg / km	-
10	Max. DC resistance at 20 °C	Bidder Scope	Ω / km	-
11	Continuous current rating	Bidder scope	Amps.	-
12	Ambient temperature	- 40° to +90°	°C	-
<b>Chemical Features</b>				
13	Weather and UV resistant	Yes	-	-
14	Resistant to mineral oils	Yes	-	-
15	Resistant to acids and alkaline	Yes	-	-
<b>Thermal Features</b>				
16	Maximum temp at conductor	120°	°C	-
17	Short circuit temperature	200°	°C	5 Sec
18	Thermal endurance test	According EN 60216-2	-	-
19	High temp pressure test	According EN 60811-3-1	-	-
20	Damp heat test	According EN 60068-2-78	-	
<b>Electrical Features</b>				
21	Rated DC voltage	1500	Volts	-



Solar powered lift irrigation system

Sr. No.	Particulars	Range	Units	Remarks
22	Working voltage (DC)	1000	Volts	-
23	Insulation resistance	1000	MΩ/ KM	-
24	Spark test	6000 / 8400	Vac / Vdc	-
25	Voltage withstands	6500	Volts.	
<b>Mechanical features</b>				
26	Minimum bending radius	4 times the diameter	-	-
27	Safe pulling force	50	N/Sq mm	-
28	Standards followed	EN 50618:2012 Pfg 1169/08.2007		

Flexible sizes of cables between array interconnections, solar string to electrical panel incoming terminal shall be so selected to keep the voltage drop (power loss) of the entire solar system to the minimum (2%).

#### 14.2.9 Technical specification – Flat AC cables for pump motors

Sr No.	Particulars	Range	Units	Remarks
1	AC cable size	6 / 10	Sq. mm.	-
2	Operating voltage	1100	Volts	-
4	Thickness of insulation	0.8-1.0	mm	-
5	Min. Thickness of inner sheath	0.3-0.5	mm	-
6	Max. DC resistance at 20°C	3.5-4.0	Ω / Km	-
8	Current rating	25 - 25	Amp	-
9	Temperature range	- 40° to +90°	°C	-
10	Insulation material	PVC	-	-
11	Jacket material	Abrasion resistant	-	-
12	Flame resistance	Yes	-	-
13	Standards	IS 8783 (Part4 / section1).		

The total voltage drop on the cable segments from the electrical control panel output to the pump motor terminal board shall not exceed 3.0%.



## 15.3 Technical specification of piping & pumps

### 15.3.1 Technical specification for piping.

Sr No.	Particular	Details / Range	Unit	Remarks
1	Type of application	Water lifting Irrigation	-	
2	Type of material	HDPE	-	
3	Pipe size	125 / 110/ 63	mm	
4	Pipe quality	PE 80 & PE 63		
5	Pipe thickness	4 - 6	mm	
6	Pipe outer diameter	5.38/ 4.5/ 2.38	Inch	
7	Pipe inner diameter	4.34/ 3.63/ 1.92	Inch	
8	System rated pressure	4	kg	
9	System max. Pressure	6	kg	
10	Connection type		-	
a.	Unequal tee 6" to 4"	As per requirement	Nos.	
b.	Unequal tee 4" to 2"	As per requirement	Nos.	
c.	Elbow-90°	As per requirement		
d.	Elbow-45°	As per requirement		
11	2" ball valve	As per requirement	Nos.	
12	4" ball valve	As per requirement	Nos.	
13	Foot valve	2.00	Nos.	
14	Pipe laying depth	1000.00	mm	
15	Standards	IS 3589:2011, ISO 14001	-	
16	Fusion wedding	As per requirement		



### 15.3.2 Technical specification for 05 HP pump

Sr No.	Particular	Details / Range	Unit	Remarks
1	Type of application	Water lifting Irrigation		
2	Capacity & Model	5.00 & JVSA0502-KIROLSKAR/SHAKTI/LUBI/CRI	HP	
3	Discharge range	10-14	lps	
4	Total Head range	15-20	m	
5	System pressure (Max.)	6.00	kg	
6	Main power supply	300 - 400	V	
7	Power frequency	50.00	Hz	
8	Overall pump efficiency	More than 63%		
9	Pump design head	Vendor needs to specify		
10	Type of Pump	Open Well Submersible, Horizontal		
11	Motor efficiency	Higher than 90%		
12	Insulation class	F		
13	Enclosure	IP 66		
14	Vibration level	Accordance with ISO 10816		
15	Cooling standard	Accordance with IEC 6034-6		
16	Maximum noise level	< 75 dB @ 1 m		
17	Standards	ISO 9001, ISO 14001, EMC		
18	Model of Pump	JVSA0502-KIROLSKAR/SHAKTI/LUBI/CRI		

For pumping & piping protection vendor should use proper foot valve with proper strainer arrangement.

Vendor should use adequate size of gate valve and the ball valve for the piping distribution system.

### 15.3.3 Technical specifications – Intake well

Water intake well depth should be greater than 3 meters, and the water level of the intake well should always greater than the min. water level of the river/canal over the year, M30 concrete should be use for the erection of the intake well.



Solar powered lift irrigation system

Sr. No.	Description	Qty.
1	Excavation for foundation in all type of soft soil strata in wet or dry condition up to 1.5 mt. incl. compacting watering dressing of the excavated stuff, back filling after foundation.	
	For Intake well -2.0m Dia (3.14x1.10x1.10x3.0)	11.40
2	PCC Work (1:4:8)	
	For Intake well bottom -2.0m Dia (3.14x1.0x1.0x0.100)	0.31
3	RCC Work (M20) (1:1.5:3)	
	Pre casting RCC ring wall (Complete work - RCC work, Steel work, shuttering work)	10.00
	thickness of RCC wall -50mm	
	RCC Cover of Intake well (Thickness -75mm)	0.25
4	Misc. Expenses (Back filling and Misc. work)	

We need to hang pump on the top of the well with chain pulley arrangement to change the height of pump respect to the water level and cover the intake well with G.I covering.

#### 15.3.4 Technical Specifications – Fencing for solar panels

Fencing for solar panels with G.I chain-link size (150 x 150 x 2.6mm) & MS angel (40X40X4), Height is 2.4 mtr including 0.3 m tilt on front side , Size is 10X12. We need fencing work as per design & diagram.

Sr. No.	Description	Unit	Total Quantity	Rate	Amount
1	Excavation for MS angle	Cum	2.33		
2	Providing and erection of MS angel including cc 1:3:6 strips complete.	Cum	3.65		
3	Providing and erection of MS angel (40mmx40mmx4mm) height 2.4m including 0.3m tilt front side.	No.	25		
4	Providing and erection of Doors of size 0.90X1.5 M with door frame etc. complete.	sqm	1.35		
5	Providing & fitting of chain link of size 150X150X2.6 mm thick Gi chain-link fencing wire etc complete.	sqm	66		
6	Barbed wire 12 gauge	Rmt.	88		



### **15.3.5 Technical Specifications – Civil foundation**

The civil foundation shall have to be designed based on the weight of the structure with module and maximum wind speed of the site as per is 875. Separate design calculation and drawings require to submit along with bidding documents in equipment layout. Bidder may carryout soil analysis to design module mounting structure.

### **15.3.6 Technical specification – installation, commissioning, testing of system**

#### **General**

Entire system installation shall be strictly in accordance with manufacturer's instruction manual, respective applicable and statutory regulations, and in-line with standard industry recognized practices including each electrical, mechanical equipment's, cables, termination and civil work must are carry out as per applicable local / installation standards and not limited up to mention scope. Contractor is responsible to complete overall installation, commissioning & testing work.

#### **Testing requirements**

Bidders / contractors require to provide detail pre-commissioning and post commissioning report after completion of testing as per national / international standards requirement. Some important and mandatory testing listed below. Provided list of testing is not limited. Contractors require to carry out all testing as per standards.

1. Inspection of all materials at one location before dispatch.
2. Inspection of entire system after commissioning onsite.

Pre-commissioning test to be performed:

1. IV curve test
2. Thermography test
3. Earth pit resistance test
4. Insulation resistance test
5. Pump controller & motor function test

## **6. Overall system performance**

### **Commissioning**

Overall system commissioning requires to complete as per national & international technical standards. Relevant document along with different test report (fat, pre commissioning, post commissioning, performance test, equipment data sheets, manuals, warranty & guarantee card, training manual) require submitting for site acceptance test certificate.

### 15.3.7 Labelling and identification

All equipment's, structures, electrical circuits, cables, protective devices, switches and terminals suitably labelled.

- All warning label indicating that active parts inside the boxes are fed from a PV array and may still be alive after isolation from the PV inverter and public supply.
- Main AC & DC isolator clearly labelled.
- Dual supply warning labels fitted at point of interconnection.
- Single line wiring diagram displayed on site.
- Inverter protection setting and installer details displayed on site.
- Emergency shutdown procedures displayed on site.
- All signs and labels suitably affixed and durable.





## 16 Bill of Quantity

Sr. No	Equipment name	Unit	05 hp System Dhandumunda, Jujumura	05 hp System Baniabandh,Rairak hol	05 hp system Padamal,Naktideul
			Qty	Qty	Qty
1	Photovoltaic module	No	16	16	16
2	Pump controller	No	1	1	1
3	Photovoltaic module mounting structure	Lot	1	1	1
3.1	Structural material for base column	Lot	2	2	2
3.2	Structural material for rafter	Lot	1	1	1
3.3	Structural material for purlin ()	Lot	1	1	1
3.4	Structure fixing accessories (SS 304 nuts, bolt, washers, etc.)	Lot	1	1	1
3.5	Base plate	Lot	1	1	1
4	Earthing system	No	1	1	1
4.1	Earthing electrode with carbon back fill compound	No	3	3	3
4.2	Earth pit cover	No	3	3	3
4.3	Earthing strip	Lot	1	1	1
4.4	Earthing cable	Lot	1	1	1
4.5	Earthing bus	No	3	3	3
4.6	Fitting and accessories including nuts, bolt and lug	Lot	1	1	1
5	Lighting protection system	No	1	1	1
5.1	Air terminal	No	1	1	1
5.2	Down conductor	Lot	1		1

Sr. No	Equipment name	Unit	05 hp System Dhandumunda, Jujumura	05 hp System Baniabandh,Rairak hol	05 hp system Padamal,Naktideul
			Qty	Qty	Qty
5.3	Insulator / separators	Lot	1	1	1
5.4	Fitting and accessories including nuts, bolt and lug	Lot	1	1	1
6	Foundation for photovoltaic modules, earth pits, cable trench	Lot	1	1	1
6.1	Cement	Lot	1	1	1
6.2	Gravel	Lot	1	1	1
6.3	Send	Lot	1	1	1
6.4	Foundation bolt	Lot	1	1	1
7	Submersible open well pump	No	1	1	1
8	Water pump output pipe with accessories	Lot	1	1	1
9	Cable trench	Lot	1	1	1
9.1	Tile / brick	Lot	1	1	1
9.2	Sand	Lot	1	1	1
9.3	Identification tap	Lot	1	1	1
10	Cables	Lot	1	1	1
10.1	Photovoltaic copper cable (4 mm <sup>2</sup> )	Lot	1	1	1
10.2	AC copper cable for pump (4 mm <sup>2</sup> )	Lot	1	1	1
10.3	AC copper cable for earthing	Lot	1	1	1
10.4	AC cable for electrical panel control wiring	Lot	1	1	1
11	Accessories & other balance of system	Lot	1	1	1
11.1	Photovoltaic module fixing clamp / bolt	Lot	1	1	1



Sr. No	Equipment name	Unit	05 hp System Dhandumunda, Jujumura	05 hp System Baniabandh,Rair akhol	05 hp system Padamal,Naktideul
			Qty	Qty	Qty
11.2	Cable gland	Lot	1	1	1
11.3	Lugs	Lot	1	1	1
12	Sign board and identification tag	Lot	1	1	1
12.1	System specification sign board	Lot	1	1	1
12.2	Sign board for safety indication	Lot	1	1	1
12.3	Cable identification tag	Lot	1	1	1
12.4	Cable route marker	Lot	1	1	1
12.5	Equipment tag	Lot	1	1	1
12.6	Training manual per system	No	2	2	2
13	Intake well	No	1	1	1
	HDPE pipe rising main 125 mm, 4kg/cm <sup>2</sup> , pe-80	M	550	450	330
	HDPE pipe for outlet 110mm, 4kg/cm <sup>2</sup> , pe-63	M	6	6	6
	HDPE pipe for tapping 63mm, 4kg/cm <sup>2</sup> , pe-63		5	5	5
	Unequal tee	No		As per requirement	
	Elbow- 45°	No		As per requirement	
	Elbow- 90°	No		As per requirement	
	Non return valve	No	1		1
	Air valve	No		As per requirement	
	2.5" ball valve	No		As per requirement	
	4" ball valve	No		As per requirement	
	Fencing for solar panels with G.I chain-link size (150 x 150 x 2.6mm) & MS angel (40X40X4) with fencing area size 10m x 12m	No	1	1	1

## 17 Price bid – Schedule of rates

Sr no	Description	Unit price	Qty	Unit price in India rupees
1	Supply, installation, commissioning & testing of submersible open well pump Supply of 3 phase, 05 hp submersible open well pump. Including mounting structures for water pump, earthing system, lightning protection system, protection system, earthing cable etc. Complete in all respect and as per site condition & specification provided	Each	1	
2	Supply, installation, commissioning & testing of 05 kWp solar photovoltaic plant supply of PV panel including mounting structure, water pump controller, earthing system, lightning protection system, system, PV cable, connectors, accessories, labelling, 2 no of training manual per site, etc.	Each	1	
3	Supply, erection, installation, testing & commissioning of cable trench material and cable supply of material for cable trench preparation with erection & commissioning as per specification including (1.1 kV, 3 core, 4/6/10 mm <sup>2</sup> flat cable) cable laying from electrical control panel output to water pump input terminal, termination and commissioning. This will be considered as a separate item as per actual measurement.	Running meter	1	
4	Supply, erection, installation, testing & commissioning of piping system & piping accessories. This will be considered as a separate item as per actual measurement.	Running meter	1	
5	Supply, erection, installation, testing & commissioning of piping system of 125 mm pipe	Running meter	1	
6	Supply, erection, installation, testing & commissioning of piping system of 110 mm pipe	Running meter	1	
7	Supply, erection, installation, testing & commissioning of piping system of 63 mm pipe	Running meter	1	
9	Supply, erection, installation, testing & commissioning of intake well. Material of construction of intake well is M30. This will be considered as a separate item as per actual measurement.	Each	1	
10	Fencing for solar panels with G.I chain-link size (150 x 150 x 2.6mm) & MS angel (40X40X4) with fencing area size 10m x 12m	Each	1	



## Annexure – 1

### Format of financial report of bidders

Sr no.	Description	Annual turnover in lac (Indian Rupees)
1	Financial year 21-22	
2	Financial year 22-23	
3	Financial year 23-24	

**Note:** Should submit the audited balance sheet, audited profit and loss statements.



## Annexure – 2

### Engineering Design Deliverables

Sr. No	Description	Type	Submission stage		
			A	B	C
<b>Package - 1 - data sheets</b>					
1	Photovoltaic module	Datasheet	Yes		
2	Solar based water pump controller	Datasheet	Yes		
3	Water pump	Datasheet	Yes		
4	PV module mounting structure members	Datasheet	Yes		
5	DC cables (photovoltaic cable)	Datasheet	Yes		
6	AC cable	Datasheet	Yes		
7	Earthing electrode	Datasheet	Yes		
8	Air terminal - lightning protection system	Datasheet	Yes		
<b>Package - 2 - detailed engineering</b>					
1	Overall equipment layout	Drawing		Yes	
2	Detailed single line diagram (DC & AC)	Drawing		Yes	
3	Lightning protection layout	Drawing		Yes	
4	Earthing system & earthing location layout	Drawing		Yes	
5	Mounting structure fabrication drawing	Drawing		Yes	
<b>Package - 3 - detailed bill of qty.</b>					
1	Detailed bill of qty. For overall system	Document		Yes	
<b>Package - 5 - test reports</b>					
1	TPI witness of PV module	Document			Yes
2	TPI witness of solar based water pumps	Document			Yes
3	TPI witness report water pump controller	Document			Yes
4	Performance - water pump flow test	Document			Yes
5	Training module for operation & maintenance	Document			Yes
6	Solar module warranty / guarantee document	Document			Yes
7	Pump controller warranty / guarantee document	Document			Yes
8	Pump warranty / guarantee document	Document			Yes



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Stage of submission

A – at the time of bidding (along with technical bid)

B – before place the order & before mobilization of material

C – during final approval (before site acceptance)

D – following documents require at the time of releasing of bank guarantee and reserve fund

1. Breakdown repair and maintenance report
2. Routine repair & maintenance report
3. Acceptance of system operation & general maintenance by users.



## Annexure - 3

### List of testing requirements & equipment's

#### List of required test

- Visual inspection of materials before dispatch
- Final inspection – after commissioning of entire system

#### List of equipment's

- Insulation resistance
- Earth analyser
- DC Power clamp meter
- AC Power clamp meter





## Annexure - 4

### Approved List of Makes / Brands

Sr. No.	Description	Approved makes			
		Make 1	Make 2	Make 3	Make 4
1	Pump controller	Kirloskar	Shakti	Lubi	ABB
2	Solar PV panel	Panasonic	Luminous	vikaram	Renewsys
3	Surge protecting device	ABB	Citel	Phoenix	Obo
4	Switchgear	Abb	Schneider	Siemens	L&T
5	Cables	RR	Polycab	Havells	Finolex
6	PV connectors & fuses	Ab ABB	Phoenix	Elmex	Nordic
7	Structure members	Tata	Asian	Jindal	Hutch
8	Lugs & accessories	Hex	Elmex	Phoenix	
9	Earthing system	Doksun power	Jmv	Jef	Ashlok
10	Lightning protection system	Doksun power	Jmv	Jef	Aslok
11	Submersible pump	Kirloskar	Shakti	Lubi	Ksb
12	Dc combiner / enclosure	Hencell	Stahel	Reputed	Reputed
9	Earthing system	Doksun power	Jmv	Jef	Aslok
10	Lightning protection system	Doksun power	Jmv	Jef	Aslok



## Annexure – 5

### Site location details

Sr. No.	District	Site details	Water pump details (hp)& Modul No.	Head (m)	Discharge (lps)	Area ha.
1	Sambalpur-1	Dhandumunda, Jujumura	05 & JVSA0502-KIROLSKAR/SHAK TI/LUBI/CRI	16	11-12	3.93
2	Sambalpur-2	Baniabandh, Rairakhol	05 & JVSA0502-KIROLSKAR/SHAK TI/LUBI/CRI	17	10-12	3.24
3	Sambalpur- 3	Podamal, Naktideul	05 & JVSA0502-KIROLSKAR/SHAK TI/LUBI/CRI	16	12-14	3.97



## Annexure - 6: Engineering standards

Sr no.	Standards	Description
1	IS 17018: part 1: 2018	Solar photovoltaic water pumping systems: part 1 centrifugal pumps - specification
2	IS 5120	Technical requirements for rotodynamic Special purpose pumps
3	IEC 62253	Photovoltaic pumping systems – design qualification and performance measurements
4	IEC 61215 / IS 14286	Design qualification and type approval for crystalline silicon - photovoltaic (PV) modules
5	IEC 61730 - 1 & 2	Photovoltaic (PV) module safety qualification – part - 1: requirements for construction, part - 2: requirements for testing
6	IEC 61853	Photovoltaic (PV) module performance testing and energy rating
7	IEC 62716	Photovoltaic (PV) modules - ammonia (NH <sub>3</sub> ) corrosion testing
8	IEC 62804	Photovoltaic (PV) modules - test methods for the detection of potential induced degradation.
9	IEC 61701	Salt mist corrosion testing of photovoltaic (PV) modules
10	IEC 60364	Protection against electric shock
11	BS EN 50530 / IEC 62891	Overall efficiency of grid connected photovoltaic inverters
12	IEC 62109 - 1 & 2 / EN50178	Safety of power converters for use in photovoltaic power systems safety compliance.
13	IEC 61000	Electromagnetic interference (EMI) and electromagnetic compatibility (EMC) testing of PV inverters



Solar powered lift irrigation system

Sr no.	Standards	Description
14	IEC / IS 61683	Photovoltaic systems - power conditioners: procedure for measuring efficiency.
15	IS / IEC 60947, EN 50521	General safety requirements for connectors, switches, Circuit breakers (AC / DC)
16	IEC 60269 - 6	Low voltage fuses - part 6: supplementary requirements for fuse links for the protection of solar PV energy systems.
17	IEC 61643 - 11 / IS 15086 - 5	Low voltage surge protective devices (SPD) - part 11: Surge protective devices connected to low voltage power systems - requirements and test methods
18	IEC 60227 / IS 694, IEC 60502 / IS 1554 -1 & 2	General test and measuring method for PVC (polyvinyl chloride) insulated cables (for working voltages up to and including 1100 v, and UV resistant for outdoor Installation)
19	BS EN 50618	Electric cables for photovoltaics systems, mainly dc cables
20	IS 2062 / IS 4759	Material for the mounting structure
21	IEC 60529 / IS 2147	Junction boxes and solar panel terminal boxes shall be of the thermo-plastic type with IP 65 for outdoor use and IP 54 for indoor use.
22	IEC 60904-1 / IS 12762 - 1	Photovoltaic devices: part 1 measurement of photovoltaic current - voltage characteristics
23	IEC 287	Electrical cables calculation of current rating
24	IEC 364.4.41 / IEC 364.4.471	Protection against electric shock
25	IEC 364.5.54	Earthing arrangements and protective conductors
26	IEC 1024.1	Protection of structures against lightning
27	IS 3043:1987	Code of practice for earthing
28	IS 2309	Protection of buildings and allied structures against lightning
29	IS 732:1989	Code of practice for electrical wiring installation practice
30	IS 1255:1983	Code of practice for installation and maintenance of power cable
31	IS 2309:1989	Code of practice for protection of building and allied Structures against lightning
32	IS 14153:1994	Guide for general description of photovoltaic (PV) power generating system
33	IEC 62116	Utility interconnected photovoltaic inverter - test procedure for islanding prevention measures
34	IEC 62093 / IEC 60067-2	PV inverter reliability test standard
35	IS 875: PART 3	Code of practice for the design loads for the building and structures - wind load
36	IS 800: 2007	Code of practice for use of structural steel in general Building construction



**Solar powered lift irrigation system**

Sr no.	Standards	Description
37	IS 4759	Hot dip zinc coating on structural steel and other allied products
38	IS 513	Cold rod low carbon steel sheets
36	IS 814	Covered electrode for manual metal arc welding
37	UL 94 V	Fire resistant / flammability
38	UL 746 C	UV resistant
39	IEC 62262	Mechanical impact resistance
40	IEC 62208	Enclosure for low voltage switchgear and control gear assemblies
41	IEEE 929 - 2000	Utility interconnection
42	IEC 62116 / IEEE 1547	Islanding of grid
43	BDEW 2008	Technical guidelines for generating plant connected to medium voltage network
44	IEC 298	A.C. Metal - enclosed and control gear for rated voltages above 1 KV and including 72.5 KV
45	IS 3427	A.C. Metal - enclosed and control gear for rated voltages Above 1 KV and including 52 KV
46	IS 8623	Specification for low voltage switch gear and control gear assemblies
47	IEC 529	Degree of protection
48	IS 5578 & 11353	Making and arrangement of switch gear bus bar main connection and auxiliary wiring
49	IEC 137	Bushing for ac voltages
50	IS 5561	Terminal connectors
51	IS 3156	Voltage transformer
52	IS 2705	Current transformer
53	IS 13010	Watt hour meter
54	IS 13779	Static energy meter
55	IS 8686	Static protection relay
<b>Government regulations</b>		
56	CEA - central electricity authority (measures related to safety and electric supply), 2010 and all subsequent amendments on same from CEA.	
57	CEA- central electricity authority (grid standards) regulations, 2010 and all subsequent amendments.	
58	CEA technical standards for connectivity of distributed generation sources to grid regulation 2013	
59	CEA installation and operation of energy meters, regulations 2006 and all subsequent amendments.	

## Annexure - 7

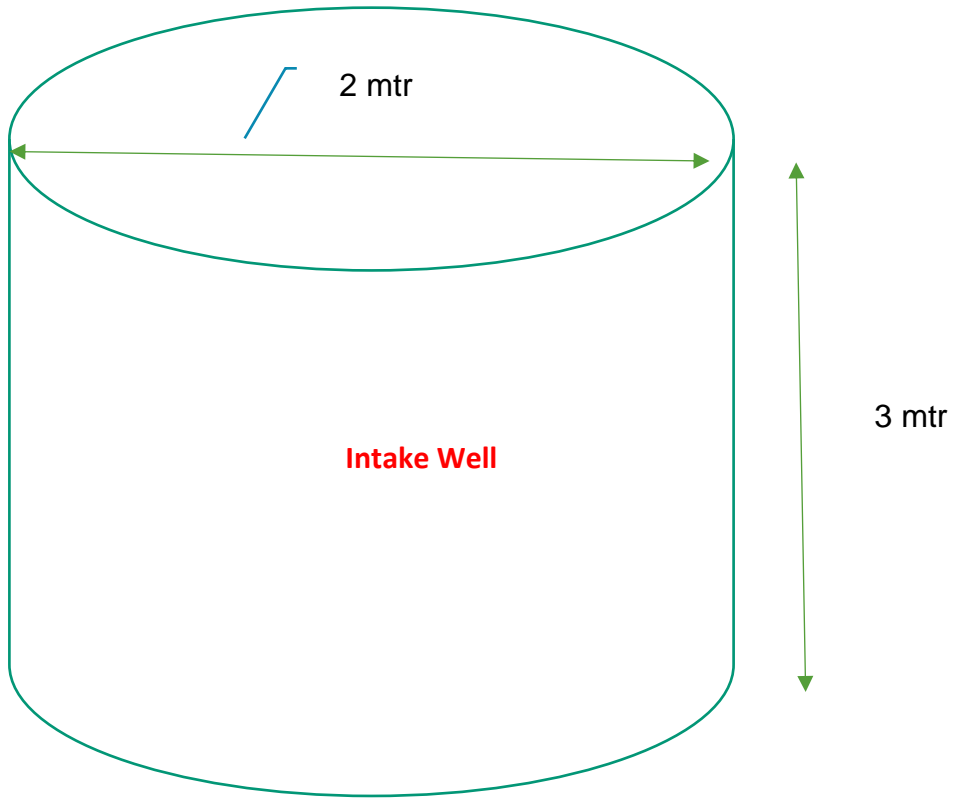
### List of safety equipment's & tools

No	Description	Standard comply
1	Safety shoes (Mechanical)	IS 15298
2	Safety shoes (Electrical)	IS 15298
3	Safety hamlet	IS 2925
4	Safety eye glass	IS 2521
5	Mc4 connector crimping tools	
6	Tools for cable crimping, termination and lugging	
7	Tools for excavation, structure fittings and other activity	
8	Hand gloves	IS 4770
9	Face mask (covid compliance)	
10	Hand sanitizer for each person (covid compliance)	
11	Medical fitness report of each person (covid compliance)	
12	Covid test report (covid compliance) (vaccination certificate)	



## Annexure – 8

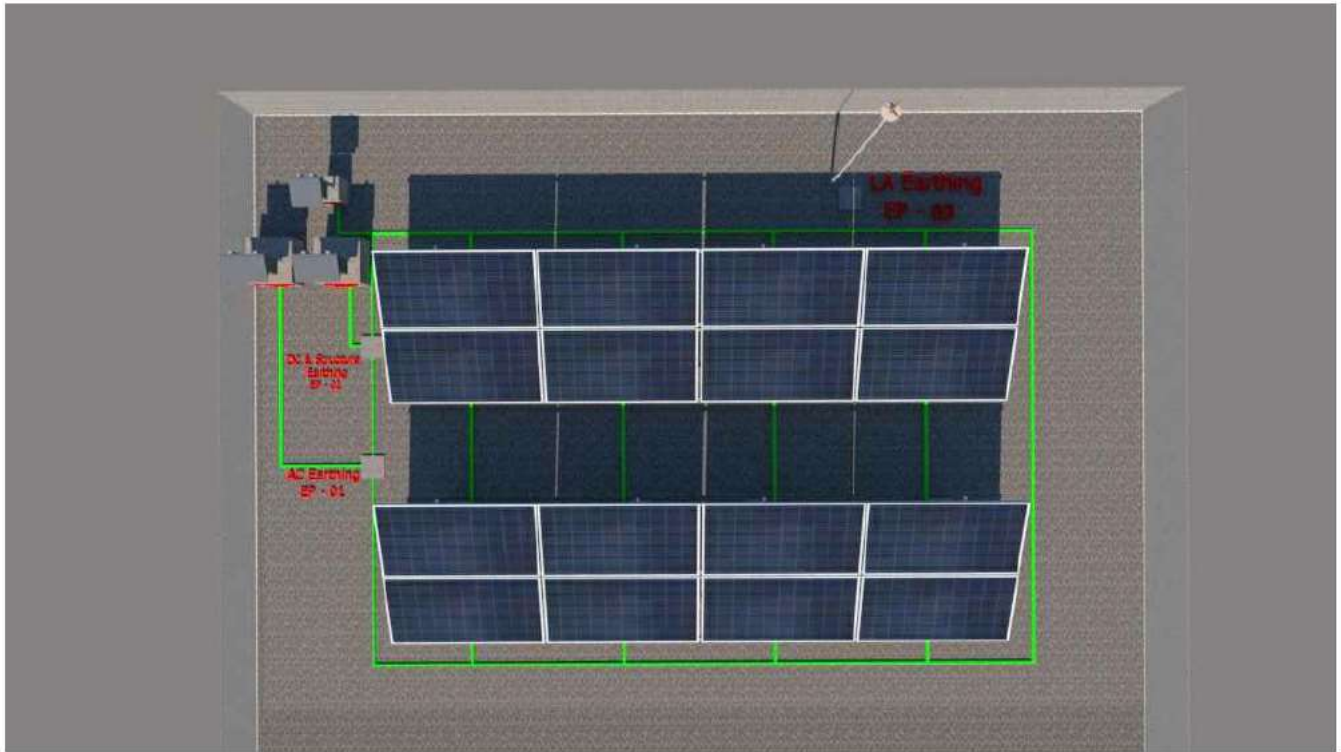
### Intake well design and datils



## Annexure - 9: Arrangement of Solar Modules

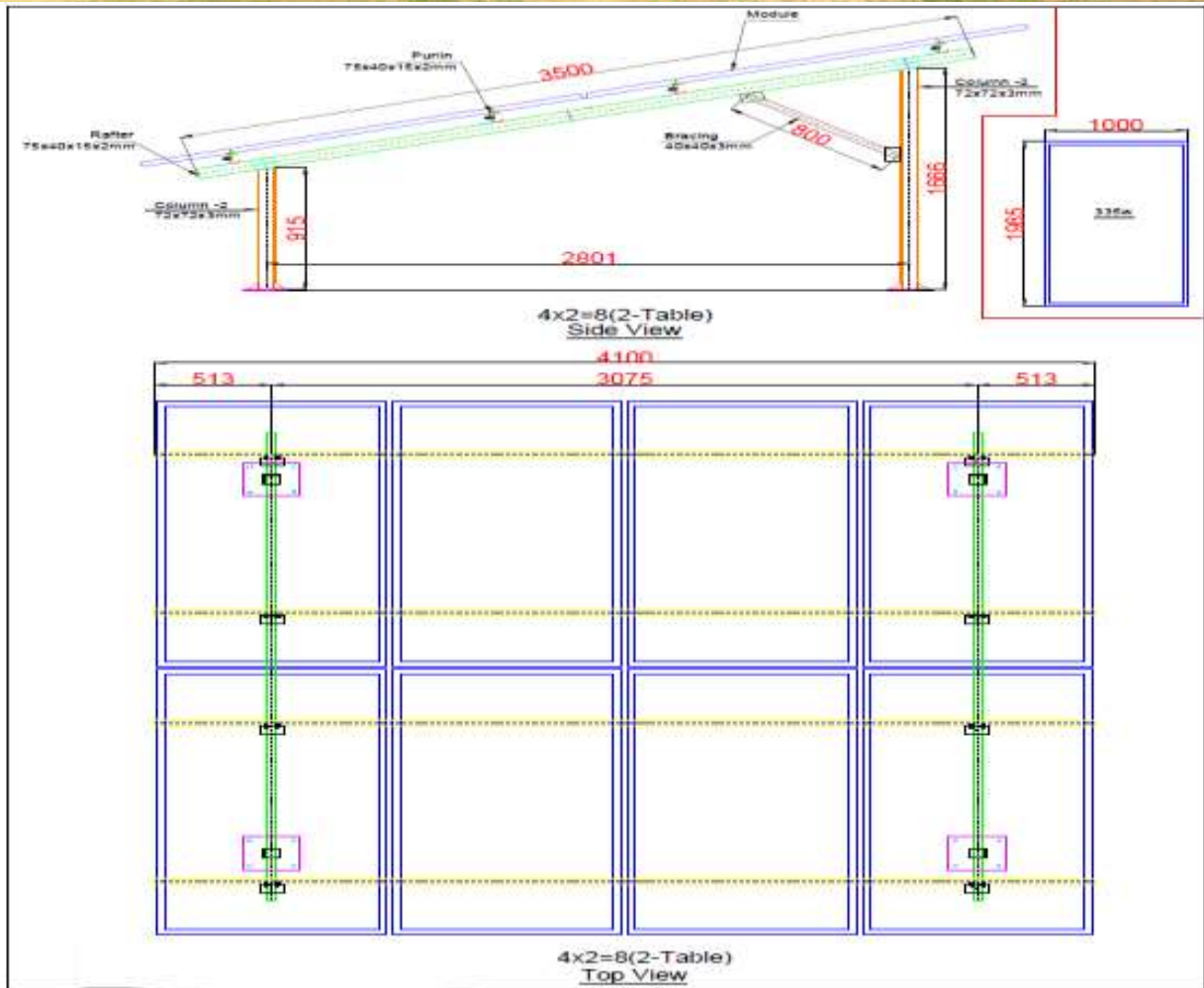


General Arrangement of Modules





Annexure - 10: solar panel fencing work



A handwritten signature or mark, possibly "S.M.", written in black ink on a white background.