सिलबन्दी दरभाउपत्र आह्वानको सूचना

मिति: २०८२।०३।०५

महाबु गाउँपालिका जलवायु परिवर्तन स्थानीय अनुकूलन परियोजना दैलेख अन्तरगत महाबु गाउँपालिकामा सञ्चालित तपसीलका सोलार लिफ्ट खानेपानी तथा सरसफाइ योजनाहरुको लागि परियोजनाको खरिद निर्देशिका बमोजिम सोलार लिफ्ट खानेपानी योजना निर्माणमा प्रयोग हुने निर्माण सामग्रीहरु, सोलार प्यानल, पम्प,र फिटिङ्गस् लगायतका सामग्रीहरु खरिद गर्नुपर्ने भएकोले दरभाउपत्र साथ संलग्न परिमाण, दरभाउपत्र साथ उपलब्ध गराइएको स्पेशीफिकेशन वमोजिमको तौल र गुणस्तरका सामानहरु निम्न शर्तहरुको अधिनमा रही सप्लाई गर्न इच्छुक मूल्य अभिवृद्धि करमा दर्ता भएका फर्म वा सप्लायरबाट सिलबन्दी दरभाउपत्र आव्हान गरिएको छ ।

शर्तहरु:

१. सोलार लिफ्ट खानेपानी योजनाको लागी विभिन्न आवश्यक निर्माण सामग्री, सोलार प्यानल, पम्प र फिटीङ्गस् लगातका सामग्रीहरु सप्लाई सम्बन्धी दरभाउपत्र प्रति फाराम रु. ३०००।०० अक्षरेपी रु. तिन हजार मात्र (पछि फिर्ता नहुने गरी) महाबु महाबु गाउँपालिकाको नाममा कुमारी बैंक लिमिटेड शाखा गैडाबाँज दैलेखमा रहेको कार्यालयको आन्तरीक राजस्व खाता ग.१.१ २७४०२४७८१८६०००० सुत्र अनलाईन भौचरको (राजस्व शीर्षक १४२२९ मा) मा सक्कल प्रतिको साथमा मूल्य अभिवृद्धि कर दर्ताको प्रमाणपत्र, अद्यावधिक कर चुक्ताको प्रमाणपत्र निवेदन साथ संलग्न राखी यो सूचना प्रकाशित भएको मितिले ७ (सातौ) दिनको कार्यालय समय भित्र महाबु गाउँपालिकाको कार्यालय गैडाबाँज दैलेख र जलवायु परिवर्तन स्थानिय अनुकूलन परियोजना, परियोजना सहयोग इकाई , बिरेन्द्रनगर सुर्खेतवाट खरिद गर्न सकिने छ । साथै सप्लाई सम्बन्धी दरभाउपत्र फार महाबु गाउँपालिका कार्यालयको वेभसाइट www.mahabumun.gov.np. र जलवायु परिवर्तन स्थानिय अनूकुलन परियोजनाको वेभसाइट www.laccp.org.np बाट पनि डाउनलोड गरी प्राप्त गर्न सकिनेछ । तर सप्लायरले डाउनलोड गरी प्राप्त गरेको कोटेशन दर्ता गर्दा महाबु गाउँपालिकाको नाममा कुमारी बैंक लिमिटेड शाखा गैडाबाँज दैलेखमा रहेको कार्यालयको आन्तरीक राजस्व खाता ग.१.१ आन्तरीक राजस्व खाता (२७४०२४७८१८६०००० सुत्र अनलाईन भौचरको (राजस्व शीर्षक १४२२९) मा राजश्व जम्मा गरेको सक्कल प्रति सिलबन्दी दरभाउ पत्रमा अनिवार्य संलग्न गरी पेश गर्नुपर्नेछ ।

२. खरिद गरिएको दरभाउपत्र फारामहरु ७ औ (बाइसौ) दिनको दिउसो १२:०० बजे भित्र महाबु गाउँपालिकाको कार्यालय, जलवायु परिवर्तन स्थानिय अनुकूलन परियोजना सहयोग इकाइ बिरेन्द्रनगर, सुर्खेत, जलवायु परिवर्तन स्थानिय अनुकूलन परियोजना काठमाण्डौ स्थित सम्पर्क कार्यालय (**विकास व्यवस्थापन संस्था**) काठमाण्डौ महानगरपालिका वडा नं. ३१ सानोखरीबोट शान्तीनगर मा पनी दर्ता गराउन सकिनेछ । साथै दरभाउ पत्र खरिद गरेको बैंक भौचरको सक्कल प्रति सहित दरभाउपत्र फाराम सिलबन्दी गरी सम्बन्धित उपभोक्ता समितिको नाम, ठेगाना र सोलार प्यानल, पम्प र फिटिङ्गस् लगायतका सामग्रीहरु सप्लाई सम्बन्धी दरभाउपत्र भन्ने व्यहोरा लेख्नुपर्नेछ ।

३. सिलवन्दी दरभाउ पत्र पेश गर्दा सप्लायरको आधिकारिक प्रतिनिधि आफै उपस्थित भई, हुलाक वा कुरियर मार्फत समेत पेश गर्न सक्नेछ । हुलाक वा कुरियर मार्फत पठाएको सिलवन्दी दरभाउपत्र सूचना प्रकाशित भएको मितिले ८ औ (आठौ) दिनको दिउसो १२.०० वजे भित्र प्राप्त भईसक्नु पर्नेछ ।

४. सप्लाई हुने सामग्रीहरुको भुक्तानी उपभोक्ता समितिहरुको तपशिलमा उल्लेखित रोडहेडमा मा रहेको उपभोक्ता समितिहरुको गोदाममा ढुवानी भै चेकजाँच भएपछि मात्र गर्नेछन । तसर्थ दरभाउपत्र पेश गर्दा जमानत आवश्यक पर्ने छैन ।

५. उपरोक्त अनुसार प्राप्त भएका दरभाउपत्रहरु संकलन गरि २०८२ साल असार १५ गते दिउंसो २: ०० वजे महाबु गाउँपालिकाको कार्यालय, गैडावाँजमा, उपभोक्ता समितिका खरिद समितिका प्रतिनिधिहरु, गाउँपालीका कार्यालयका प्रतिनिधिहरु र जलवायु परिवर्तन स्थानीय अनुकूलन परियोजना, दरभाउपत्रदाताहरु वा निजहरुको प्रतिनिधिको रोहवरमा खोलिनेछ । दरभाउपत्रदाताको प्रतिनिधि उपस्थित नभएमा दरभाउपत्र खोल्न बाधा पुग्ने छैन ।

६. दरभाउपत्र खरिद गर्ने, दर्ता गर्ने तथा खोल्ने अन्तिम दिनमा सार्वजनिक विदा पर्न गएमा सो को भोलिपल्ट कार्यालय खुलेको दिन तोकिएको समय भित्र बिक्रि गरिने, दर्ता गरिने वा खोलिनेछ ।

७. दरभाउपत्रमा उल्लेखित आइटमहरुको दररेट लेख्दा सबै आइटमहरुको दर अनिवार्यरुपमा अक र अक्षरमा स्पष्ट लेख्नुपर्नेछ । अंक र अक्षरमा फरक परेमा अक्षरमा लेखेकोलाई मान्यता दिइनेछ । अंक र अक्षरमा केरमेट भएकोमा दस्तखत र छाप लगाएको हुनु पर्नेछ । दरभाउपत्रमा उल्लेखित आइटमहरुको दररेटका आधारमा सप्लायर्स छनौट हुने भएकोले अन्य शर्त मान्य हुनछैन ।

८. म्याद नाघी वा रीत नपुगी आएको दरभाउपत्र उपर कुनै कारबाही हुने छैन ।

९. दरभाउपत्र स्वीकृत गर्ने वा नगर्ने वा आंशिक वा पुर्ण रुपमा स्वीकृत गर्ने सम्पूर्ण अधिकार उपभोक्ता समितिहरुमा सुरक्षित रहनेछ ।

१०. यस परियोजना अन्तर्गतका समान प्रकृतिका योजनाहरुमा कार्यसम्पादन स्तर कमजोर वा समयमै सेवा आपूर्ति गर्न असफल सप्लायर्सका दरभाउपत्र मुल्यांकनमा समावेश गरिने छैन ।

११. अन्य शर्तहरु परियोजनाको खरिद कार्यबिधि वमोजिम हुनेछ । थप शर्तहरु दरभाउपत्र साथै संलग्न गरिएको छ ।

१२. यो सूचनामा केहि संशोधन गर्नु परेमा सो को सूचना महाब'गाउँपालिका कार्यालय र सम्बन्धीत वडाको सूचना पाटीमा टाँस गरिनेछ ।

१३. कोटेशन फाराम पेश गर्ने सप्लायर्सहरूले पछिल्लो ३ (तीन) वर्षभित्र कम्तीमा २५० मिटर डबल लिफ्टसम्बन्धी कार्य सफलतापूर्वक सम्पन्न गरेको प्रमाणित अनुभवपत्र अनिवार्य रूपमा पेश गर्नुपर्नेछ ।

१४. अन्य सर्तहरु संलग्न BOQ अनुसार हुनेछ ।

१५. अन्य थप जानकारी चाहिएमा महाबु गाउँपालिका लक परियोजना कार्यन्वयन इकाइ (महाबु गा.पा. ९७४९२९४६८६/९८६६३६४६४६ सम्पर्क कार्यालय नम्बर ०१-४४३३९७९ मा सम्पर्क गर्न सकिनेछ ।

Chhamaghat Solar lift Irrigation Scheme
Mahabu Rural Municipality-3 Dailekh, District

REQUEST FOR QUOTATION (RFQ)
For
Design, Supply, Delivery, Installation, Testing and Commissioning of Solar PV Water Pumping System

Issued by:
User Committee of Chhamaghat Solar lift Irrigation Scheme
Mahabu Rural Municipality-3 Dailekh, District
Contract No.: 1/2082/083

June, 2026

Section I. Request for Quotation (RFQ)

User Committee of Chhamaghat Solar lift Irrigation Scheme

Mahabu Rural Municipality-3 Dailekh, District

Design, Supply, Delivery, Installation, Testing and Commissioning of Solar PV Water Pumping System

Date of Notice Publication: June 19, 2026 (2083/03/05 B.S.)

1. User Committee of User Committee of Chhamaghat Solar lift Irrigation Scheme invites sealed quotation from registered suppliers for Design, Supply, Delivery, Installation, Testing, Commissioning and After Sales Service of Solar PV Water Pumping System in at Chahmaghat Solar Lift Irrigation Scheme, Mahabu Rural Municipality-3, Dailekh, District.
2. The VAT registered suppliers can obtain the signed quotation form from Mahabu Rural Municipality (RM), Dailekh or Local Adaptation to Climate Change (LACC) Project, Project Support Unit (PSU), Birendranagar, Surkhet or can be downloaded from official sites of Mahabu RM (https://www.mahabumun.gov.np) and LACC Project (www.laccp.org.np) within 7 days from first publication date.
3. Sealed quotation must be submitted to Mahabu Rural Municipality Office or Local Adaption to Climate Change Project, Project Support Unit (PSU), Birendranagar, Surkhet or Liaison Office of LACC Project (DMI Nepal . Sanokharibot, Shantinagar, Kathmandu-31, Contact No.-01-4433979, DMI, Office location: https//mapps.app.goo.gl/gVFeDtLWhuXLF8 before 12:00 hours on 8th day of first publication date. Documents received after this deadline shall not be accepted.
4. Quotations must be valid for a period of 90 days from the day of deadline of submission.
5. If the last date of purchasing and opening falls on a government holiday, then the next working day shall be considered the last day.
6. The contractor must sign and stamp all the copies of submission including all the documents mentioned along with Technical Specification and any other document in the Quotation.
7. User committee reserves the right to accept or reject, wholly or partly any or all the quotations without assigning any reason whatsoever.

Section II. RFQ Data

1	Name of the Purchaser**: User Committee of Chhamghat Solar Lift Irrigation Scheme, Mahabu Rural Municipality, Dailekh District**
2	Name of Contract: **Design, Supply, Delivery, Installation, Testing and Commissioning of Solar PV Water Pumping System**
3	**Contractor's Eligibility Requirements are:** **a) Cover Letter** for submission of quotation b) **Company Profile and experience** in design, supply, and installation of solar pumping schemes. c) **Tax Registration/Payment** Certificate issued by the **Internal Revenue Authority** evidencing that the contractor is updated with its tax payment obligations, or **Certificate of Tax exemption**, if any such privilege is enjoyed by the Bidder d) **Certificate of Registration of the business,** including Articles of Incorporation, or equivalent document if contractor is not a corporation e) **Quality Certificate** (e.g.,ISO, etc.) and/or other similar certificates, accreditations, awards and citations received by the contractor, if any f) **Valid ISO 9001 and ISO 14000 and IEC/IS/NEPQA** Quality Assurance Certification of the proposed product especially solar pump & panel.
4	Purchaser's Address **Chhamaghat Solar lift Irrigation User Committee.** Ward No: 3 Mahabu Rural Municipality, Dailekh District **Technical Contact Person** Mobile no: 9866364646 Bhim Prasad Dashaudi (Technical Person) Email: bhimdashaudi@gmail.com Sub-Engineer Contact Person: Punyparbha Dashaudi Position: Chairperson of above UC Contact no: 9861556270
5	Language of the Bid: **English**
6	Quote validity period : 90 days counted from the date of bid submission deadline.
7	Deadline for RFQ submission : Date : 8th day of notice publication 2082\03\12 Time : 12:00 hours Place : Mahabu Rural Municipality office, Gaidawaj Dailekh **or** Local Adaption to Climate Change Project, Project Support Unit (PSU), Simtalichowk, Birendranagar, Surkhet **or** Liason Office of LACC Project (DMI Nepal . Sanokharibot, Shantinagar, Kathmandu-31, Contact No.-01-4433979)DMI- Office Location: **https//mapps.app.goo.gl/gVFeDtLWhuXLF8**
8	Completion of Task as mentioned in the Scope of Work Within 4 Months from the date of Agreement.
9	Estimated Amount of the Schemes : **NRS 4,748,842.5** In Word Four Million Seven Hundred Forty-Eight Thousand Eight Hundred Forty-Two and Fifty Paisa only.
10	Documentary **evidence of technical and production capabilities**: (i) **Minimum Three (3) Years** experience in solar lifting water supply scheme

	(ii) **At least three solar water supply/irrigation lifting schemes** (lifting head more than 250 m) design, supply delivery, installation, testing commissioning projects within last five years. Experience letter should be submitted with the sealed quotation.
11	Performance Security Amount: Not needed as payment will be done after material received, verified and technical approval at Road Head.
12	Warranty: Minimum 5 years warranty against manufacturing defects of Solar PV Module. 3 Years Replacement Warranty of solar pump and standard applicable for other components.
13	Defect liability period : Repair or replace any defects found during the Defect Liability Period of One Year.
14	**Payment** i. Upon Signing of Agreement and submission of Field verification report: Twenty (20) percent of the Contract Price ii. Upon receiving the materials at road head: Fifty (50) percent of contract price iii. Upon Submission of Installation Completion, Testing & Comssioning report along with handover as per contract: Maximum thirty (30) percent of the Contract Price iv. After Sales Service: The company shall provide regular support and have a field visit atleast once (1) a year up to three years. Thereafter the company shall visit the site atleast once a year on paid basis.
15	Local representative of the company, if any: Name of the representative: Address: Contact no:

1. Design solar PV pumping system based on the minimum criteria as mentioned in Technical Specification: (I. Minimum Design Criteria- mentioned on the below page).
2. Field verification must be completed to assure the design & **submit the <u>detailed design report</u>** by the contractor after the award of the contract & **before first installments.**
3. After the verification of design, install solar PV pumping system based on the component recommended at Bills of Quantities (BoQ).
4. Works required for sequential installation of Solar PV Pumping System including necessary civil works (fixing casing pipe, solar frame) for mounting structures of solar module, shall be done by the contractor. All the work related to the proper installation and functioning of the system shall have to be carried out by the contractor with the prices offered in the quotation.
5. The contractor will make all necessary arrangements for satisfactory operation, maintenance and performance of the Pumping System for Warrantee/ Guarantee period as mentioned in **Section- II, 12 .**
6. Warrantee/Guarantee will include rectification/replacement of all the defective and consumable components/items. During Warrantee/Guarantee period, all the arrangements for keeping the Solar PV Pumping System functional shall be the sole responsibility of the contractor.
7. The contractor shall conduct on-site training of the user committee personnel regarding the assembly, start-up, operation, maintenance and repairs of the Solar PV Pumping System.
8. All necessary Spare parts/Tools should be provided by the contractor.
9. Transport the components to the site till the road head site as mentioned in the BOQ.
10. Provide Sales Service for an additional 3 years (after 2 years warrantee period) with a minimum of 1 site visit annually. This visit will be paid by UC.
11. Contractors should have made representative agents at a provincial level with availability of solar pumping components sales for the pumping system and must be made linked with the user committee.

Section IV. Technical Specification

4.1 Minimum Design Criteria

SN	Scheme's name and location	Design Data
1	Chhamghat Solar lift Irrigation, Mahabu-3, Basi, Dailekh	**Stage-1** System that must be able to lift a minimum of 70,000 liters of water per day at 256.96 m dynamic head, pipe length 850m and solar panel location distance- 25m **Stage-2** System that must be able to lift a minimum of 50,000 liters of water per day at 259.61 m dynamic head, pipe length 950m and solar panel location distance- 30m

Contractor/Firm also need to submit alternative design with more efficient & economic design in two stage lift in different head level than mentioned. The technical evaluation committee will consider if the proposed system justifies required design & installation as per field requirement.

4.2 Solar Submersible Pump Unit

The contractor must design the solar water pump unit and submit the detailed technical specification and the calculation showing the discharge of the pump to meet the **Minimum Design Criteria.** Contractor/Firm should submit the separate design with justification in change of pumping size meeting minimum require specification of technical part.

SN	Description	Specification	Contractor Proposal	Contractor's Remarks* (Fully Complaint/ Nor Complaint)
1	Name of the manufacturer	Grundfos or Pedrollo or Lorentz or equivalent		
2	Brand/Model	Grundfos or Pedrollo or Lorentz or equivalent		
3	Pump Type	Submersible borehole pump or equivalent Water filled (Oil must not be used for lubrication), Submersible centrifugal or positive displacement Solar Pump, fully stainless Steel, with necessary casing and protection. Pump Performance Curve i.e. Flow Vs Input Pump Power shall be provided at the Head of Project design. Warranty on the motor and pump: 2 years		
4	Minimum Efficiency	Pump motor efficiency must be at least 60 %		
5	Minimum Standard	Submersible borehole pump, suitable for pumping clean water. It can be installed vertically or horizontally. Pump carrying drinking water approval. **The pump and controller must be manufactured by the same company**. Pumps suitable for applications in groundwater lowering, pressure boosting, fountain applications. The suction interconnector is fitted with a strainer to prevent large particles from entering the pump. The suction interconnector is designed to comply with NEMA standards for motor mounting/dimensions.		

SN	Description	Specification	Contractor Proposal	Contractor's Remarks* (Fully Complaint/ Nor Complaint)
6	Material	All steel components made in stainless steel, EN 1.4301 (AISI 304), ensure high corrosive & wear resistance. Rotors and impellers must be made of stainless steel with a minimum grade of AISI 304 or higher.		
7	Control	The pump controller must have an MPPT control circuit. The pump or pump set must be capable of stopping operation in the event of dry running or insufficient energy supply. Must be equal to or greater than the capacity of the pump. Warranty on the pump controller: 2 years Must be of the same brand of the Pump. The Bidder must submit the technical datasheet. A Manufacturer's Authorization letter provided by principal manufacturer in their letter head.		
8	Warranty	As mentioned in Section- II, 12		
9	Protection Features	**Dry run protection,** **Over and under voltage protection,** **Overload protection,** Temperature Protection		

4.3 Solar PV Array

Note: The minimum estimated solar array is 590Watt (0.590 KWp). The contractor must calculate the solar array size based on the pump designed. In both cases, the capacity proposed by the contractor must not be below the minimum estimated capacity of Solar PV capacity. It is the responsibility of the contractor to guarantee the minimum water as mentioned in **Minimum Design Criteria**.

SN	Description	Specification	Contractor Proposal	Contractor's Remarks* (Fully Complaint/ Nor Complaint)
1	Name of the manufacturer			
2	Brand/Model	Seraphim, Jinko, Trina or Equivalent		
3	Minimum Capacity	Wp (can be redesigned based on the Note above.)		
4	PV Module Type	RETS Certified, Mono or Poly Crystalline, should be equal or more/less than 615Wp. The warranty period for the PV module must be at least first year- ≥ 97% of stc power, 10 years- ≥ 90% of STC power and 25 years- ≥ 80% of STC power. All PV modules offered for the scheme must be of the same type, same model, same power rating and same manufacturer. Minimum 5 years warranty against manufacturing defects. The test certificates must be provided. The PV Module should have the International Certification, IEC 61215:2005 2nd Edition or IEC 61215-1:2016 and IEC 61215-2:2016 for Terrestrial photovoltaic (PV) modules - Design qualification and type approval – Part 1: Test requirements and Part 2: Test Procedures. IEC 61730 for PV module safety qualification, IEC 62804 for detection of potential induced degradation (PID).		
5	Certifications	ISO 9001 / ISO 14000/NEPQA 2015 OHSAS 18001 certified production facilities.		

SN	Description	Specification	Contractor Proposal	Contractor's Remarks* (Fully Complaint/ Nor Complaint)
6	Power degradation	A letter provided by principal PV module manufacturer in their letter head stating the warranty period for their PV module. The warranty period for the PV Module must be at least 10 years against a maximum 10% reduction and 20 years against a maximum 20% reduction of output power at STC.		
7	Minimum Module efficiency	≥ 16%		
8	Peak Power Per Module	100 Watts Peak or greater		
9	Junction Box	IP 65		
10	Module Mounted Structure	non corrosive support structures to be fixed on the ground		
11	Tilt Angle and direction	As per field		
12	Support structure design, distribution poles and foundation mounting arrangements should withstand	Wind Speed up to 180 km/hr		
13	Support Structure	Shall be manufactured with Aluminum or stainless-steel angles and channels; deep galvanized. The support frame structure should be able to resist at least 20 years of outdoor exposure without suffering significant damage or corrosion. It shall support solar PV modules at a given orientation, absorb and transfer the mechanical loads to the ground properly.		
14	Structure Galvanization Requirement	The modules support structure shall be mild steel, hot dipped galvanized (120 micron) iron for holding the PV modules. The size of angle iron should not be less than 50x50x5 mm		

SN	Description	Specification	Contractor Proposal	Contractor's Remarks* (Fully Complaint/ Nor Complaint)
15	Clearance and fixing	Mounting structures shall have necessary clearance at least 60 cm or more between ground level and bottom edge of PV modules as per the requirements. PCC work of 0.3 cm above the ground level for each foundation		
16	HDPE Dugwell (Casing Pipe) with complete fittings with washout provision at bottom	3 mtr 200 mm dia or As per Attached drawings		
17	Grounding System of DC surge protector, AC surge protector, DC MCB, AC MCB, Set of Earthing Electrode 2" dia and 2m length installed in earthing pit with the set of Backfill chemical connected by 16sqmm copper cable all complete, wire 7/18, junction box etc.	SPD (for voltage limiting) shall have a discharge capacity total of 40 kA (8/20 µs). The earth-termination system with bare copper conductors (minimum cross section of 16 mm2) by connection to the earthing electrodes or to the buried bare copper conductor connecting the earthing electrodes. The length of each earthing electrode shall not be less than 1.5 meters and outer diameter less than 48 mm and an inner diameter less than 27mm.		

The following information should be provided by the contractor in regard to solar PV module.

- The bidder must be submitting the technical datasheet of PV Module.
- A manufacturer's Authorization letter should be provided by the principal manufacturer in their letter head.
- Catalogue and technical specification of solar PV module with I-V curve.
- Inedible labels must be firmly fixed on the solar PV module containing the following information:
  - Name and brand of the manufacturer.
  - Model and type.
  - Manufacturer serial number.
  - Maximum power in watt peak.
  - Open circuit voltage in volt.
  - Short circuit current in ampere.
  - Maximum rated voltage in volt.
  - Maximum rated current in ampere

4.4 Protection

4.4.0 Lightning Arrestor

The lightning protection system shall be of the enhanced type which is designed to attract lightning to a preferred point and safely convey the lightning energy to ground with minimal risk of side flashing via a pre-determined route.

The complete lightning protection system will comprise the following key components.

a) Lightning Air Terminal
b) Mounting support
c) Dedicated down conductor
d) Dedicated Earthing system

4.4.1 The Lightning Air Terminal

- The lightning air terminal shall be an Early Streamer Emission terminal which will respond dynamically upon leader activity in the near area.
- The lightning air terminal shall be configured as a spheroid which is comprised of separate electrically isolated panels surrounding an earthed central finial.
- The insulation material used to electrically isolate the panels shall be comprised of a base polymer which provides high ozone and UV resistance with a dielectric strength of 24 – 38 KV/mm.
- The external shape of the advanced lightning rod shall be such that it will limit the development of sharp point corona discharge under static thunderstorm conditions.
- The central finial shall be elevated above the spheroid to a length of 86mm.
- The upper section of the central finals shall be rated to withstand 200KA.
- An air gap shall be provided between the individual electrically isolated panels (4 panels) and the final tip of the central road.
- Arcing shall occur between the panel sections of the spheroid and the finial tip only upon the progression of a lightning leader.
- The lightning air terminal shall have no moving parts and will have no dependence on external power supply or batteries.
- Under a normal atmosphere all components of the advanced lightning terminal shall be non-corroding.

4.4.2 Mounting Support

- The mounting pole used to support the lightning air terminal shall be a circular mast at a minimum height of 2 meters. The pole will have an outside diameter of 68mm.
- The mounting pole and supports shall be securely fixed with brackets and guy wires where required.
- Mounting structure shall be non-corrosive to be fixed on ground.
- PCC box of 0.3 cm above the ground level for the foundation or as per site.

4.4.3 Down Conductor

The down conductor shall pass through the center of the pole for the entire length of the pole.

- Each lightning air terminal should be fixed with one down conductor. The down conductor should have a minimum size of 50mm² and can be a bare or insulated round / flat copper conductor. The down conductor should be fixed securely every one meter.
- The main copper conductor shall allow for direct connection to the lightning rod through the use of a compression lug.

4.5 Surge Protector

- The DC surge protection (SPD for voltage limiting or class C) device shall be installed in TT configuration and in parallel mode compatible with Nepal's electricity supply.
- The Class C arrester used in and neutral side should be single pluggable MOV based and Spark Gap based plug.
- The class C arrester should have visual and remote indication both in phase to neutral and neutral to ground protection module.
- The neutral and phase plugs should have clear marking so that it fits to the respective bases only.
- The Class C arrester should not be less than 40 kA protection level at waveform of 8/20 µs.
- The unit shall be compatible in mounting on DIN Rail Channel.
- The degree of protection should be IP20 and inflammability class should be V0.

4.6 Earthing/Grounding for Lightning Arrestor/ For Electrical and Safety Earthing

- The Earthing electrode shall be constructed in Pipe-in-Pipe technology.
- Chemical shall be filled in between the electrodes.
- Earthing electrode shall not be less than 48 mm outer diameter and 27 mm inner diameter.
- The length of the Earthing electrode shall not be less than 1500 mm.
- The hot dipped galvanization or plating of earth electrode shall be of copper and shall be 70 microns to 100 microns.
- Backfill material shall be chemical bag having not less than 25 kg for each earthing electrode.
- The earthing shall be installed in delta type consists of 3 electrodes for one set.
- Earthing inspection pit shall be made of solid concrete with minimum dimension of 320 mm x 320 mm x 200 mm. Cover shall be marked with word EARTH" or acceptable earthing marking.
- The final impedance reading does not exceed 10 Ohms.
- The use of certified chemical ground resistance improvement material (other than salt and charcoal) shall be applied in order to reduce the resistivity levels of the earthing system.

4.7 Others

The components of the Solar PV Pumping systems must confirm to the latest edition of IEC/ equivalent BoS Standards as specified in table below:

BoS item/component	Applicable Standard	
	Standard Description	**Standard**
Transmission Cables	NS standard for PVC insulated cables and UV resistant for outdoor installation 3 core 16 sqm or as per design	NS Standard
Switches/Circuit Breakers / Connectors	General Requirements Connectors-safety	NS/ IS standard
Junction Boxes/ Enclosures	General Requirements	IP 65 (for outdoor)/ IP 21 (for indoor) or Equivalent
SPV System Design and Installation Practices	PV Stand-alone System design, verification and electrical installation of building requirements for SPV power supply systems	NS/ IS Standard

4.8 Civil Works

The civil works for the solar pumping system will be as under:

1. Solar PV array installation and fixing

Drawings: The details, drawings and calculations must be provided.

Section V. Bill of Quantity (BoQ)

S.N.	Description	Unit	Quantity			Rate without vat	Total Rs
			1st Stage	2nd Stage	Total Quantity		
A	**Vatable Materials**						
1	Mounting Frame Structure for 590 wp (32mm ND & 0.6 to 2.2 thickness Aluminium/GI pipe) complete set	No.	37	27	64		
2	Earthing Sets (for Pannel & Pump sets)						
a	8 SWG Earthing Wire	m	50	50	100		
b	Copper Coted Earthing rod/electrode (50mm dia.and 1m l0ng)	No.	1	1	2		
c	Earthing clamp	No.	1	1	2		
d	CU Earthing Plate (CU plate size 65x65x3.15mm)	No.	1	1	2		
e	DC Cable	m	20	20	40		
3	Lighting Arrester and Safety materials for solar pannel & pump sets.	No.	1	1	2		
4	M.C.B/Surge Protector (Minimum 40KA) for electrification if need with necessary electrical materials	No.	1	1	2		
5	Armoured Copper Cable 10 Sq.mm	m	25	30	55		
6	Supply of >23.85 HP (17.79 kW) Submersible water pump confirming to IS:8034 or GROUNDFOS or equivalent and suitable to install in a **150mm (6inch)** diameter well for a duty of **12.73 m³/hour** at 256.96 **m total dynamic head**.	No.	1	0	1		
7	Supply of > 17.21 HP (12.84 kW) Submersible water pump confirming to IS:8034 or GROUNDFOS or equivalent and suitable to install in a **150mm (6inch)** diameter well for a duty of **9.09 m³/hour** at 259.61 **m total dynamic head**.	No.	0	1	1		
8	Control panel for above pumps with suitable automatic starter including all a accessories fitting and all wiring from solar pannel	No.	1	1	2		

S.N.	Description	Unit	Quantity			Rate without vat	Total Rs
			1st Stage	2nd Stage	Total Quantity		
9	GI Casing Pipe / Pump Housing with necessary fittings and fitted with above pump (with the connection of Surface Plate, 65mm dia GI outlet, 63mm Inlet and 63mm dia washout pipe)	No.	0	1	1		
10	Supply of Pressure Gauge Standard bottom entry water pressure gauge, size 100 mm , pressure reading up to 50 kg/cm2 , Connection : M10 x 1 , Supplied with steel ball valve and adaptor for 15 mm (½") dia connection	No.	1	1	2		
11	Supply of steel Non Return / Check Valve ND-3"(80 mm)	No.	1	1	2		
12	Supply of steel Gate Valve for flow regulating and Washout, ND-3"(80 mm)	No.	1	0	1		
12	Supply of steel Gate Valve for flow regulating and Washout, ND-2.5"(75 mm)	No.	0	1	1		
13	ND-2.5"(63 mm) 20 mm thick MS flange confirming to IS:6392 for 2.5 N/mm2 having 4 nos 18 mm dia bolt holes for M16 bolts.	No.	4	4	8		
14	ND-1"(63mm) 90 Degree bend with connection of both side MS flane having 4 no 18mm dia bolt holes for MS16 bolts	No.	1	1	2		
15	Nipple ND-3" (80mm)	No.	4	4	8		
16	Unequal Tee (3") (80 mm))	No.	2	2	4		
17	High & Low water level Guard / Sensor / Level probes; prevent dry running	No.	1	1	2		
18	Additional Materials	LS	1	1	2		
	Sub Total						
	Vat 13 %						
	Total of A						
B	**Not Vatable Materials**						
1	Supply of Solar Panel 590wp, confirming requirement of AEPC Nepal	No.	37	27	64		

S.N.	Description	Unit	Quantity			Rate without vat	Total Rs
			1st Stage	2nd Stage	Total Quantity		
2	Installation of Earthing set, Pumps and Solar Panels with all hardware component as per necessary and Testing & Commissioning and Field verification	LS	1	1	2		
3	Pipe Welding Cost	Joint	45	45	90		
4	Transportation up to site	LS	1	1	2		
	Total of B						
C	**Transmission Cable**						
1	Stay Set	nos	1	1	2		
2	Labour Work site	LS	1	1	2		

Section V. Bill of Quantity (BoQ)

Important Note: Contractor/Firm can propose separate economical, efficient design & estimated BoQ by authorized Engineering designer with one of the pumping systems of **Grundfos or Pedrollo or Lorentz** or equivalent. Technical evaluation can consider the new design and proposed costing maintaining the minimum standards of technical specifications.
Transportation (Road Head locations): Basi, Mahabu-3 GPS Location: 28.913286994,81.665771820
Please trick the following information option as per your capacity:

Availability Pump & Panel in the stock	☐ Yes ☐ No
Time of materials delivery to the sites after agreement with UC:	☐ Within One month ☐ 1-2 month ☐ More than 2 months
Availability of spare parts of solar pump, Panel & other accessories in local Market:	☐ Available in Patan/Dailekh ☐ Dadeldhura ☐ Dhangadhi ☐ Kathmandu
Availability of Local Technical Agent for repair & maintenance of solar pump, Panel & other accessories in region:	Available in ☐ Dailekh ☐ Dadeldhura ☐ Dhangadhi

Annex: 1 Cover Letter format

[On Firm's Letterhead]

Date:

To: Chhamghat Solar lift Irrigation

User Committee

Mahabu, 3, Dailekh

We, the undersigned, provide the attached proposal in accordance with **RFQ** Design, Supply, Delivery, Installation, Testing and Commissioning of Solar PV Water Pumping System **dated** ……. Our attached proposal is for the total price of <Sum in Words Rs ……... Sum in Figures……. for the two systems) >. We honestly understood & accepted the technical specification and requirement of the WSUC for the given task.

I certify a validity period of …….. days for the prices provided in the attached Bill of Quantities. Our proposal shall be binding upon us subject to the modifications resulting from any discussions.

Offeror shall verify here the items specified in this RFQ document.
We understand that the User Committee is not bound to accept any proposal it receives.

Yours sincerely,

Authorized Signature:

Name and Title of Signatory: …….

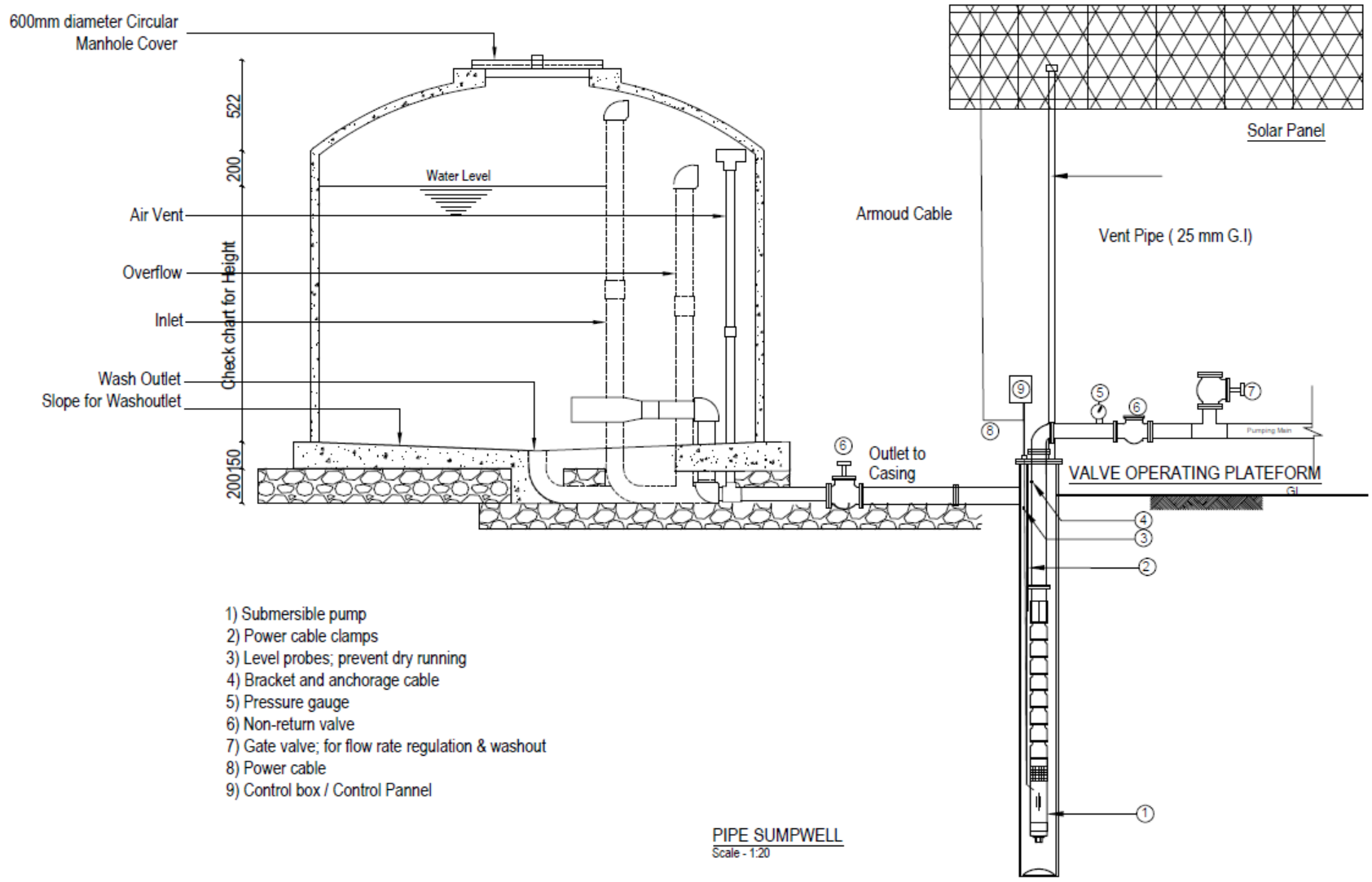
Name of Firm: ……

Address: ……

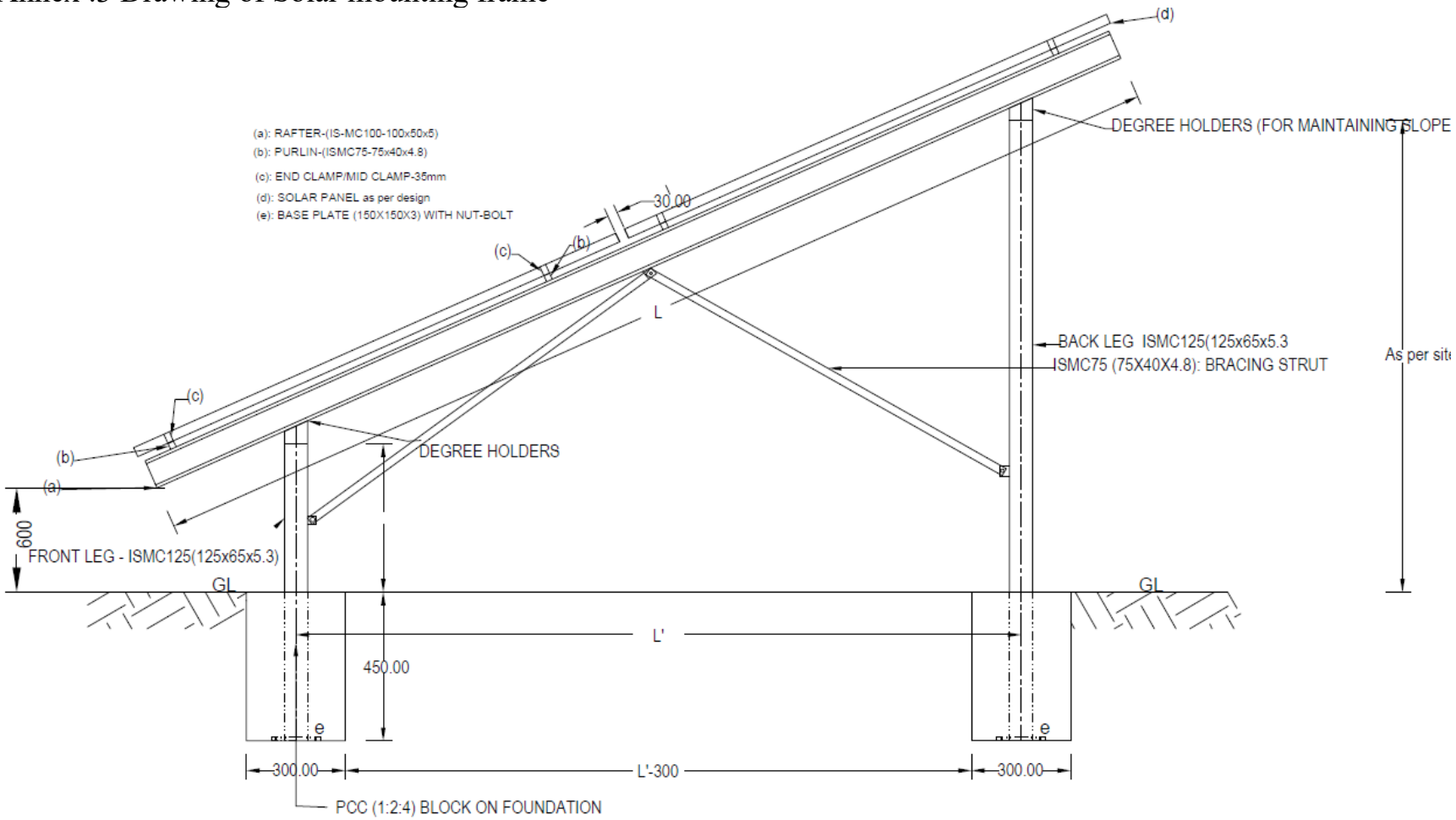
Telephone & contact Mobile no: ……

Email: ……..
Company Seal/Stamp:

Annex :2 Drawing of Casing Pipe



Annex :3 Drawing of Solar mounting frame



ELEVATION OF SOLAR MOUNTING STRUCTURE : POTRAIT MODE OF SOLAR PANEL INSTALLATION

Annex 4: Initial Design
Stage 1:

Design of Pump

Name of Scheme	LG	Ward	District
Chhamaghata Solar Lift DWS	mahabu	3	Dailekha

Distance of pumping main, L		**850.00**	m
Total level difference between Source and proposed reservoir		**240.00**	m
Total Demand (Excluding School tap)		**70000.00**	L
Sunshine hrs		**5.50**	Hr
The discharge to be pumped, Q		**= 12727.27**	L/h
		= 3.535	lps
		= 12.727	m3/hr
By Lea's formula, economic size of pumping main, D is given then:			
$D = 1.22\sqrt{Q}$			
Hence, D	**= 72.54 mm**		
However available size of GI pipe nearest to this size is:		**= 80.00 mm**	
Hence, use 80 mmØ GI pipe having bore		**= 80.00 mm**	3 Inch
Calculation of head loss :			
Here, discharge, Q		**= 3.535**	Lps
For 80 mmØ GI pipe			
Pipe bore, D		**= 80.00**	mm
For length, L		**= 850.00**	m
Pipe material being		GI	
Velocity of flow, $V = Q/A = 4Q/\pi D^2$		**= 0.70**	m/s
Absolute roughness		**= 1.00**	mm
Coefficient of friction, f		**= 0.0423**	
Using Darcy-Weisbach equation			
Headloss, $H_l = f.L/D.v^2/2g$		**= 12.46**	m
Total headloss		**= 12.46**	
Total head for pumping = Level difference + headloss + Suction head			m
Depth of sump-well		**= 2.50**	m
However take the dyanimic level of water for submersible pump as 1.2 m below the sumpwell			
However take the dynamic level of water below the sumpwell for submersible pump as		**= 2.00**	m
∴ Total dynamic head, H		**= 256.96**	m

Horse Power of Pump

$$HP = \frac{Q \rho g H}{746\,\eta}$$

Where,

- Q = discharge, m³/s
- ρ = density of water, kg/m³
- g = acceleration due to gravity, m/s²
- H = total dynamic head, m
- η = efficiency of pump

Assuming efficiency of pump as **= 50.00 %**

The HP of pump required	**= 23.85**	**= 17.79**	KW

OR

From pump manufacturer's characteristic performance curve, following pump matches

Name of pump :	**PEDROLLO, Groundfos or equivelent**
Pump model :	
Phase of power supply :	**Three**
Power of pump :	**17.79 kW**
Total Dyanamic Head (m)	**257**
Discharge (m3/hr) :	**= 12.727**

Which almost matches the required condition.

Power of 3-phase pump/motor = $\sqrt{3}\times V.I\ Cos\varphi$

Where, V = (400-415) V

Therefore current I(in Ampere) :- 34.24

[Cosφ = 0.75 (for motors)]

Water Hammer Pressure

Since the pump is closed suddenly, which results the water hammer pressure at the delivery pipe. The water hammer pressure, Ph is given by:

$$P_h = \frac{V}{\sqrt{\frac{g}{w}\left[\frac{1}{K} + \frac{d}{t.E}\left(1 - \frac{1}{2m}\right)\right]}}$$

Where,

V = velocity of flow in pipe(m/s)
g = acceleration due to gravity(m/s²)
w = specific weight of water (N/m³)
K = Bulk modulus of water(N/m²)
d = bore of pipe(m)
t = thickness of pipe(m)
E = Youngs modulus of elasticity of pipe material(N/m²)
$1/m$ = Poisson ratio

For galvanised iron pipe and for above condition.

V	= 0.70 m/s
g	= 9.81 m/s²
w	= 9810.00 N/m³
K	= 2060.00 N/mm²
d	= 80.00 mm
t	= 5.40 mm
E	= 210.00 kN/mm²
1/m	= 0.270

Max. water hammer pressure, Ph = 0.951 N/mm²
= 9.33 kg/cm²

Max. pressure that should withstand by conduit material:

(static pressure+water hammer pressure = 34.26 kg/cm² **= 342.57 m of water**

This pressure may withstand by GI heavy pipe duty with welded joints.

Design of Solar Pannel According to Pedrollo or Equivalent Pump characteristic performance curve

The power required to Pump=	17.79 kW
Power In Watt=	17790.13678
factor of Safety=	20%
Power=	21348.16414

If use of 590 PV Model

Number of Pannel Required = 37

Stage 2: Design of Pump

Name of Scheme	RM	Ward	District
Chhamaghata Solar Lift DWS	mahabu	3	Dailekha

Distance of pumping main, L	**950.00**	m
Total level difference between Source and proposed reservoir	**245.00**	m
Total Demand (Excluding School tap)	**50000.00**	L
Sunshine hrs	**5.50**	Hr
The discharge to be pumped, Q	**= 9090.91**	L/h
	= 2.525	lps
	= 9.091	m3/hr

By Lea's formula, economic size of pumping main, D is given then:

$D = 1.22\sqrt{Q}$

Hence, D **= 61.31 mm**

However available size of GI pipe nearest to this size is: **= 75.00 mm**

Hence, use 75 mmØ GI pipe having bore **= 75.00 mm** 2.5 Inch

Calculation of head loss :

Here, discharge, Q	**= 2.525**	Lps
For 75 mmØ GI pipe		
Pipe bore, D	**= 75.00**	mm
For length, L	**= 950.00**	m
Pipe material being	GI	
Velocity of flow, $V = Q/A = 4Q/\pi D^2$	**= 0.57**	m/s
Absolute roughness	**= 1.00**	mm
Coefficient of friction, f	**= 0.0436**	

Using Darcy-Weisbach equation

Headloss, $H_l = f.L/D.v^2/2g$	**= 10.11**	m
Total headloss	**= 10.11**	

Total head for pumping = Level difference + headloss + Suction head m

Depth of sump-well **= 2.50** m

However take the dyanimic level of water for submersible pump as 1.2 m below the sumpwell

However take the dynamic level of water below the sumpwell for submersible pump as **= 2.00** m

∴ Total dynamic head, H **= 259.61** m

Horse Power of Pump

$$HP = \frac{Q \rho g H}{746\,\eta}$$

Where,

Q = discharge, m^3/s
ρ = density of water, kg/m^3
g = acceleration due to gravity, m/s^2
H = total dynamic head, m
η = efficiency of pump

Assuming efficiency of pump as **= 50.00 %**

The HP of pump required **= 17.21** **= 12.84** KW

OR

From pump manufacturer's characteristic performance curve, following pump matches

Name of pump :	**PEDROLLO, Groundfos or equivelent**
Pump model :	
Phase of power supply :	**Three**
Power of pump :	**12.84 kW**
Total Dyanamic Head (m)	**260**
Discharge (m3/hr) :	**= 9.091**

Which almost matches the required condition.

Power of 3-phase pump/motor = $\sqrt{3}\times V.I\ Cos\varphi$

Where, V = (400-415) V

Therefore current I(in Ampere) :- 24.71

[Cosφ = 0.75 (for motors)]

Water Hammer Pressure

Since the pump is closed suddenly, which results the water hammer pressure at the delivery pipe. The water hammer pressure, Ph is given by:

$$P_h = \frac{V}{\sqrt{\frac{g}{w}\left[\frac{1}{K} + \frac{d}{t.E}\left(1 - \frac{1}{2m}\right)\right]}}$$

Where,

V = velocity of flow in pipe(m/s)

g = acceleration due to gravity(m/s²)

w = specific weight of water (N/m³)

K = Bulk modulus of water(N/m²)

d = bore of pipe(m)

t = thickness of pipe(m)

E = Youngs modulus of elasticity of pipe material(N/m²)

$1/m$ = Poisson ratio

For galvanised iron pipe and for above condition.

V	= 0.57 m/s	
g	= 9.81 m/s²	
w	= 9810.00 N/m³	
K	= 2060.00 N/mm²	
d	= 75.00 mm	
t	= 5.40 mm	
E	= 210.00 kN/mm²	
1/m	= 0.270	
Max. water hammer pressure, Ph	= 0.776 N/mm²	
	= 7.61 kg/cm²	

Max. pressure that should withstand by conduit material:

(static pressure+water hammer pressure = 33.05 kg/cm² **= 330.45 m of water**

This pressure may withstand by GI heavy pipe duty with welded joints.

Design of Solar Pannel According to Pedrollo or Equivalent Pump characteristic performance curve

The power required to Pump=	12.84 kW
Power In Watt=	12838.08936
factor of Safety=	20%
Power=	15405.70723

If use of 590 PV Model

Number of Pannel Required = 27