ANNEX 2 TECHNICAL SPECIFICATION FOR LOT 1

ANNEX 1-LOT 1: ONE FULL SET SYSTEM (Supply, Delivery, Installation, Testing and Commisioning of Solar Pumping System)

	Pumping System)				
T4 a sea	BOQ		Unit of		
Item	Item Details	Quantity	Unit of		
No.	Salar DV/ Madula	`	Measurmen		
1.0	Solar PV Module Total Wattage Capacity: Should be at least 1.5 of submersible pump capacity. Mono or Poly Crystalline Silicon. Class A. Panel capacity should be ≥400Wp under STC. Positive power tolerance +3% or 0-5 Watt. More than 19 % conversion efficiency under STC. Data sheet of PV module that contains the P-V & I-V Curves, all electrical and mechanical Data, Dimensions, Module area must be provided by bidder. 40°C to 85°C operating temperature range. Temperature Characteristics: "Pmax: ≤-0.40% /C°, VOC: ≤-0.31% /C°" Nominal operating cell temperature (NOCT): 45 ±2°C. The operating voltage of proposed modules should not be less than 1000 VDC. Junction box of IP 67 and heat-resistance bypass diodes. High transparency and transmittance, tempered glass of 3 – 4 mm thickness. Must conform to CE, IEC 61215/ 61730/ 61701/62716, TUV, ISO, UL certificates or equivalent standards. Linear performance: Nominal power output not less than 0.9% after 10 years, 80% after 25 years and Product warranty for 10 years. Annual linear degradation rate should be less than 0.9%. The solar modules shall be provided with RF identification label. This should include following essential information: a. Name of the PV module manufacturer. b. Type or model number. Eatth/serial number. c. Bat	1	L.S		
2.0	Mounting Structure				
	The PV modules shall be mounted on fixed metallic structures having adequate strength and appropriate design, which can withstand the load of the modules and high wind velocities. The support structure shall be hot dip galvanized steel or corrosion resistant aluminum. The structure should be capable of withstanding a wind load of 120 km/hr. The module alignment and tilt angle shall be calculated to provide maximum annual energy output wherever possible. Hot dip galvanized Steel or corrosion resistant aluminum. Steel of util galvanized MS mounting structures should be used for mounting the modules / arrays. Minimum thickness of galvanization should be at least 80-120 microns as per ASTM A123 or ASTM A153 and ASTM A385. There should be adequate clearance between module and roofing material to prevent excessive heat being transferred to panels. The elevated structure must be Securely and directly anchored to the concrete rooflop using appropriate size nickel coated steel anchor bolts. Reinforced concrete of appropriate weight should be used for anchoring the structure shall be designed for simple mechanical on-site installation. Access for panel cleaning and maintenance All solar panels must be accessible from the top for cleaning and from the bottom for access to the module-junction box. The Installer shall specify installation details of the solar PV modules and the support structures with layout drawings and array connection diagrams. Such details shall include, but not limited to, the following: Array tilt angle to the horizontal, Details with drawings for fixing the modules, Structure installation details and drawings, electrical grounding (Earthing). The work shall be carried out as per the designs approved by the UNDP Project tencineer.	1	L.S		
3.0	Combiner Box				
4.0	The PV combiner box shall be used to combine the multiple DC input to one output, and it shall comply with the following specifications as minimum. Enclosure materials: Coated metal with lockable door. Enclosure protection: IP65. Number of input circuit: total number of strings + 2 strings spare ,inputs. at least 4 DC fuse rating for each string:1000V, 15 A. DC output circuit: not less than 40 A, 1000 VDC breaker; Built in surge protection device; Anti-backflow diodes. Solar Pumping inverter VFD	1	PCS		

	solar pumping drive with in-built MPPT, VFD (Variable Frequency drive). The drive rating should be 1.5 X AC pump capacity. Three phase output, voltage range 380-420 V; Efficiency: Not less than 95%; Output Frequency: 50H±3%; Enclosure class should be not less than IP55. Maximum input voltage Voc: not less than 800 VDC; Operating temperature: up to 50 °C; The device shall allow hybrid operation with external power source, where solar power should be configured as the primary power source; soft start, V/F stable speed control during solar radiation changes, adjustable auto/ manual start in early morning, auto wakeup after adjustable hibernation time in cloudy days, o inputs for pressure switch and water level sensor to protect the pump against dry running and tank full water or closed pipeline (high pressure) Display: LCD Screen display with Cover + LED status indicator; Protection: Over-Voltage, pump Over-Current, pump Over-Load, Over-Temperature, pump Phase Loss,	1	PCS
	pump Short-Circuit, ground fault, solar low power, DC Input Anti-reverse, AC output unbalance (3Phase);		
5.0	Submersible Pump and Motor		
60	Required Capacity: Q = 18 m ³ /hr , TDH: 85 m Pump Submersible pump Mixed flow multi -stage separate type, AC 3Ph motor type, the motor pump Sets should be used for the solar PV, Starting compatible with AC VFD operation, bidders shall indicate manufacture, country of origin and model. It shall follow below features as minimum: Cooling sleeve suitable for borehole well internal diameter Pump Efficiency at Duty Point: Not less than 70%; Casing (Pump Bowl), Impeller , Wear Rings, Pump delivery and Housing , Check valve (None Return Valve) , Inlet strainer should be comply with: (AISI 304 or equivalent) or higher specification materials. Shaft and coupling, Shaft sleeve, Bearing bush, Guide bearing, Screw, stud, nut, washer etc should be comply with: (AISI 304 or equivalent) or higher specification materials. Maximum allowable sand: 100gr/m3. Coupling: according to NEMA. Salt Water :TDDS 2700 mg/L. Motor The motors shall be Rewindable frame, insulation rating is compatible with AC VFD operation Rated Voltage:380/400VAC Insulation Material and Class, PE2+PA, F or H Ambient water temp:50 C° IP: not less than 68 Motor Efficiency: Not less than 80% Shaft, Motor Sleeve, Motor Housing, Diaphragm cover, bolts, Nuts, Studs, screws Washers etc. should be comply with: (AISI 304 or equivalent) or higher specification materials. Shaft Seal (Mechanical Seal) Tungsten carbide/ceramic- Diaphragm Nitrile Rubber Radial Bearing (Guide Bearing) Graphite or superior Axial Bearing (Thrust Bearing) Graphite/ S.S Pads superior, Rubber Parts NBR or equivalent	1	PCS
6.0	System Cables (including cable pipes) Cables should be sized in accordance to IEC 60364-5-52 standard, bidders should indicate cable sizing,		
	and voltage drop calculations considering the following: The total voltage drop on the cable segments from the solar PV modules to the system inverter shall not exceed 3.0%. The total voltage drop on the cable segments from the solar grid inverter to the pump shall not exceed 3.0%. Shall meet IEC 60227, EN 60228, IEC 60502 standards or equivalent. Terpo. Range: -10°C to +80°C. Voltage rating: up to 1000V. DC Cables: conductors shall flexible tinned copper, Multi-stranded,Insulated and Sheathed. Soft annealed tin-coated flexible stranded copper. Halogen-free, thermoset polyolefin specifically designed for maximum flexibility. Iow smoke non-halogenated, flame retardant, oil, abrasion, chemical and sunlight resistant cross-linked compound meeting UL 44 and TUV. Cable ends connections are to be made through suitable lugs or terminals, crimped properly & with use of cable glands. AC Cables: Type of Conductor: copper, flexible, finely multi stranded, Insulation: black poly chloroprene, HO7RN -F or equivalent material. All cable/wires are to be routed in PVC PIPE SCH 40 and high quality Trunky and suitably tagged and marked with proper manner so that the cable easily identified		
6.1	PV Array to Combiner Box: not less than 1*6 sqr.mm,1 KV (Red& Black)	120	М
6.1	Cable between combiner box and inverter: not less than1*35 sqr.mm, 1 KV (Red& Black)	100	М
6.3	AC Submersible Pump Cable: not less than 3*16 sqr.mm, 450/750 V	100	М
6.4	Level Sensor Cable with probe :not less than 1*1.5 sqr.mm	100	М
6.5	Excavation for PVC PIPE (in all types of soil) and backfill of cable trench and PVC PIPE trench with cross section size of 0.8 meter depth and 0.6 meter width including shoring and shuttering works (If Required).	30	М

7.0	Earthing System and Lightening Protection System		
	Earthing System and Lightening Protection System as per technical specifications and drawings including cabling, cable lugs, Earthing rods and all required accessories AC and DC Earthing Earthing System - All PV modules shall be grounded in accordance to the manufacturer instruction - Each array structure of the PV modules should be grounded properly All metal casing/shielding of the system and its components should be thoroughly grounded Earthing System clamps shall be used Earthing System equipment shall include SPD, Earth pits and Rods Earthing System resistance should be not more than 5 ohm. Lighting System - Lighting System shall be installed with height to protect all PV arrays Lightning System shall be comply with IEC/BS EN 62305-3 Earthing System shall be provided Earthing System shall be installed with height to protect all PV arrays Lightning System shall be installed with height to protect all PV arrays Lightning System shall be comply with IEC/BS EN 62305-3 Lightning System shall be installed with height to protect all PV arrays Lightning arrester shall be installed with leight to protect all PV arrays Lightning System shall be comply with IEC/BS EN 62305-3 Minimum height of lightning arrester is 3 m Number of lightning arrester as the system required Lightening protection equipment shall include lightening protection pits and rods System resistance should be not more than 5 ohm.	1	L.S
8.0	Raiser Pipes Materials: UPVC "high pressure pipes" Joint Type: Square Type Threaded Couplings. Pipes package shall include the following: Top and bottom Adaptors, SS AISI 304 or equivalent Pump guard set and all other accessories Diameter: 2.5 Inch, 3 m, 25 bar.	20	PCS
9.0	Stainless Steel Non-return Valves		
	Nominal Diameter (DN): 2.5 inch Nominal Pressure (PN): 25 bar. Connection Type: Flanged. BS Standard or Equivalent Material: Stainless steel Including all required accessories	1	PCS
10.0	Stainless Steel Gate Valves Nominal Diameter (DN): 2.5 inch. Nominal Pressure (PN): 25. Connection Type: Flanged. BS standard or Equivalent. Operator: Hand Wheel Resilient Seated. Material: Stainless Steel Including all required accessories	1	PCS

11.0	Mechanical Water Flow Meter		
	Inline, Flanged, Magnetic type, Dray dial, turbine flow meter with all needed accessories such as threaded flanges, gaskets and bolts. Nominal Pressure (PN): 25. Body: Cast Iron EN14154, ISO4064 or equivalent Transient Flow Qt : Shall be less than 50% of Pump flow rate. Accuracy: ±2% of Nominal flow Maximum dial indication: 999999 Measuring Units: cubic meter m3 Including all required accessories	1	PCS
12.0	Analog Pressure Gage		
	Reading range: Shall be specified according to the pressure on the installation point. Process connection: NPT connection 1/2" or 1/4". Pressure gauge should be equipped with isolation Stainless steel 1/2 inch Ball valve of the same pressure rating. Casing: Stainless steel	1	PCS
13.0	Valve Chamber		
	C.S cover, Min. plate thickness 3mm,angle of the frame 50x50x5mm,shall be painted with at least two layers, anti corrosion and enamel,cover shall be sloped to avoid water contain. 15cm solid concrete block Wall shall be plastered and painted from internal and external surfaces.	1	PCS
14.0	Well Cap / cover and carryng clamps (Support bracket):		
15.0	Material: made from A36 or equivalent CS plate Min. thickness: 18 mm for borehole wells caps Painted by Anti-corrosion Paint Diameter: as pe well diameter (12 inches) Fabricated with stiffeners and holes for pump and sensor cables Including all required accessories Security Fence (Chain Link Fabric)	1	PCS
13.0	Security Fence : Should be at least 120 Meter , fence mesh protection 50*50mm, 3.15mm thickness fence, excellent quality iron, height of 2 meters, thickness of not less than 3 mm, plus 0.5m of barbed wire (3 layers) protection around solar panels with everything necessary, and installing it in lists of galvanized pipes, diameter of 1.5 inches every 3 meters, with fixing of rolls in regular concrete 40 x 40 cm and depth not Less than 50 cm under the ground, fixing the bottom of the grille with a concrete block size 20 x 10 cm, and providing the fence with adoor of the grate with grates and all that is needed 1 x 2 meters, with the work of reinforcing the fence with galvanized iron pipes with a diameter of 1.5 inches between each	1	L.S
	two pipes at the top The grille to install it, weld a 40 x 60 cm plate with the UNDP logo on it and do whatever the work shall be carried out as per as per drawing and the designs approved by the UNDP Project engineer. Security Fence should be for all Solar Panels, Mounting Structures, Caravan Room and Tanks as		
16.0	whatever the work shall be carried out as per as per drawing and the designs approved by the UNDP		
16.0	whatever the work shall be carried out as per as per drawing and the designs approved by the UNDP Project engineer. Security Fence should be for all Solar Panels, Mounting Structures, Caravan Room and Tanks as	1	L.S
16.0 17.0	whatever the work shall be carried out as per as per drawing and the designs approved by the UNDP Project engineer. Security Fence should be for all Solar Panels, Mounting Structures, Caravan Room and Tanks as Warranty	1	L.S
	whatever the work shall be carried out as per as per drawing and the designs approved by the UNDP Project engineer. Security Fence should be for all Solar Panels, Mounting Structures, Caravan Room and Tanks as Warranty 2 years product and performance warranty	1	L.S PCS
17.0	whatever the work shall be carried out as per as per drawing and the designs approved by the UNDP Project engineer. Security Fence should be for all Solar Panels, Mounting Structures, Caravan Room and Tanks as Warranty 2 years product and performance warranty Others		

ANNEX 2 TECHNICAL SPECIFICATION FOR LOT 2

ANNEX 2 - LOT 2: ONE FULL SET SYSTEM (Supply, Delivery, Installation, Testing and Commissioning of RO Unit with Solar System)

	BOQ	1	
Item No.	Item Details	Quantity	Unit of Measurment
1.0	Solar PV Module: Wattage Capacity of solar panels for each pump in the system should be at least 1.5 of pump capacity. Total Wattage Capacity: Should be at least 52KWp. Mono or Poly Crystalline Silicon. Class A. Panel capacity: should be ≥400Wp under STC. Positive power tolerance +3% or 0-5 Watt. More than 19 % conversion efficiency under STC. Data sheet of PV module that contains the P-V & I-V Curves, all electrical and mechanical Data, Dimensions, Module area must be provided by bidder. 40°C to 85°C operating temperature range. Temperature Characteristics: "Pmax: ≤-0.40% /C°, VOC: ≤-0.31% /C°" Normial operating cell temperature (NOCT): 45 ±2°C. The operating voltage of proposed modules should not be less than 1000 VDC. Junction box of IP 67 and heat-resistance bypass diodes. High transparency and transmittance, tempered glass of 3 – 4 mm thickness. Must conform to CE, IEC 61215/ 61730/ 61701/62716, TUV, ISO, UL certificates or equivalent standards. Linear performance: Nominal power output not less than 90% after 10 years, 80% after 25 years and Product warranty for 10 years. Annual linear degradation rate should be less than 0.9%. The solar modules shall be provided with RF identification label. This should include following essential information: a. Name of the PV module manufacturer. b. Type or model number.	1	L.S
2.0	 d. Country of solar cells/module origin. e. Year of solar module manufacture. Mounting Structure: The PV modules shall be mounted on fixed metallic structures having adequate strength and appropriate design, which can withstand the load of the modules and high wind velocities. The support structure shall be hot dip galvanized steel or corrosion resistant aluminum. The structure should be capable of withstanding a wind load of 120 km/hr. The module alignment and tilt angle shall be calculated to provide maximum annual energy output wherever possible. Hot dip galvanized MS mounting structures should be used for mounting the modules / arrays. Minimum thickness of galvanization should be at least 80-120 microns as per ASTM A123 or ASTM A153 and ASTM A385. There should be adequate clearance between module and roofing material to prevent excessive heat being transferred to panels. The elevated structure feet's to keep their resistance for wind load. anti-theft bolts, nuts, fasteners, panel mounting clamps should be Stainless steel. Installation: The structures shall be designed for simple mechanical on-site installation. Access for panel cleaning and maintenance All solar panels must be accessible from the top for cleaning and from the bottom for access to the module-junction box. The Installer shall specify installation details of the solar PV modules and the support structures with lay-out drawings and array connection diagrams. Such details shall include, but not limited to, the following: Array tilt angle to the horizontal, Details with drawings for fixing the modules, but not limited to, the following: Array tilt angle to the horizontal, Details with drawings for fixing the modules, but not limited to in tealis and drawings, electrical grounding (Earthing). The work shall be carried out as per the designs approved by the 	1	L.S
3.0	UNDP Project engineer. Combiner Box The PV combiner box shall be used to combine the multiple DC input to one output, and it shall comply with the following specifications as minimum. Enclosure materials: Coated metal with lockable door. Enclosure protection: IP65. Number of input circuit: total number of strings of the system + 2 spare strings ,inputs. at least 5 DC fuse rating for each string:1000V, 15 A. DC output circuit: not less than 63 A, 1000 VDC breaker; Built in surge protection device; Anti-backflow diodes. Operational Environment Temperature: -30 °C ~+70 °C.	2	PCS

	Cables should be sized in accordance to IEC 60364-5-52 standard, bidders should indicate cable sizing,		
	and voltage drop calculations considering the following:		
	The total voltage drop on the cable segments from the solar PV modules to the system inverter shall not		
	exceed 3.0%.		
	The total voltage drop on the cable segments from the solar grid inverter to the pump shall not exceed 3.0%.		
	Shall meet IEC 60227, EN 60228, IEC 60502 standards or equivalent.		
•	Temp. Range: -10°C to +80°C.		
	Voltage rating: up to 1000V. DC Cables:		
	Conductors shall flexible tinned copper, Multi-stranded, Insulated and Sheathed.		
	Soft annealed tin-coated flexible stranded copper. Halogen-free, thermoset polyolefin specifically designed for maximum flexibility.		
	Low smoke non-halogenated, flame retardant, oil, abrasion, chemical and sunlight resistant cross-linked compound meeting UL 44 and TUV.		
	Cable ends connections are to be made through suitable lugs or terminals, crimped properly & with use of		
	cable glands. AC Cables:		
	Type of Conductor: copper, flexible, finely multi stranded, Insulation: black poly chloroprene.		
	All cable/wires are to be routed in PVC PIPE SCH 40 and high quality Trunky and suitably tagged and		
	PV Array to Combiner Box: not less than 1*6 sqr.mm,1 KV (Red& Black)	750	Μ
4.2	Cable between combiner box and inverter: not less than1*35 sqr.mm, 1 KV (Red& Black)	150	Μ
4.3	Cable between combiner box and inverter VFD: not less than1*50 sqr.mm, 1 KV (Red& Black)	120	М
4.5	Sensor Cable with probe :not less than 2*2.5 sqr.mm	100	Μ
4.5	AC Cable: not less than 4*16 sqr.mm, 450/750 V	60	Μ
	Excavation for PVC PIPE (in all types of soil) and backfill of cable trench and PVC PIPE trench with cross section size of 0.8 meter depth and 0.6 meter width including shoring and shuttering works (If Required).	80	Μ
	Earthing System and Lightening Protection System		
	Earthing System and Lightening Protection System as per technical specifications and drawings including		
	cabling, cable lugs, Earthing rods and all required accessories AC and DC Earthing		
	Earthing System		
	- All PV modules shall be grounded in accordance to the manufacturer instruction		
	- Each array structure of the PV modules should be grounded properly.		
	- All metal casing/shielding of the system and its components should be thoroughly grounded.		
	- Earthing System shall be comply with IEC/BS EN 62305-3.		
	- Earthing System clamps shall be used.		
	- Earthing System clamps shall be used. - Earthing System equipment shall include SPD, Earth pits and Rods.	4	1.6
		1	L.S
	Earthing System equipment shall include SPD, Earth pits and Rods.	1	L.S
	Earthing System equipment shall include SPD, Earth pits and Rods. Earthing System resistance should be not more than 5 ohm.	1	L.S
	- Earthing System equipment shall include SPD, Earth pits and Rods. - Earthing System resistance should be not more than 5 ohm. Lightning System	1	L.S
	- Earthing System equipment shall include SPD, Earth pits and Rods. - Earthing System resistance should be not more than 5 ohm. Lightning System - Lighting arrester should be provided.	1	L.S
	- Earthing System equipment shall include SPD, Earth pits and Rods. - Earthing System resistance should be not more than 5 ohm. Lightning System - Lightning arrester should be provided. - Lightning arrester shall be installed with height to protect all PV arrays.	1	L.S
	Earthing System equipment shall include SPD, Earth pits and Rods. Earthing System resistance should be not more than 5 ohm. Lightnig System - Lightnig arrester should be provided. - Lightnig arrester shall be installed with height to protect all PV arrays. - Lightning System shall be comply with IEC/BS EN 62305-3.	1	L.S
	Earthing System equipment shall include SPD, Earth pits and Rods. Earthing System resistance should be not more than 5 ohm. Lightning System - Lightning arrester should be provided. - Lightning arrester shall be installed with height to protect all PV arrays. - Lightning System shall be comply with IEC/BS EN 62305-3. - Minimum height of lightning arrester is 3 m.	1	L.S

Performance Data: Design Permeter Row 20 m/Wr Design Permeter Row 20 m/Wr Red Flow 20 m/Wr Red Flow X = 2.100 m/Wr Recover; 2.75 % Design Permeter Result 2.300 °C Design Permeter Result 2.300 °C Design Permeter Persone; 2.3 % Design Persone; 2.3 % System Inder Persone; 2.3 A bar System Inder Persone; 2.3 A bar System Inder Persone; 2.3 A bar System Inder Persone; 2.3 A bar System Toperating: Support Persone; 3.4 bar System Toperating: Support Persone; 3.4 bar System Topulating: Cantrologing Persone; 3.4 bar System Topulating: Support Persone; 3.4 bar Number of Duranging; 2.6 Ausing Inding; 2.4 Housing Dameter; 2.8 Banking Arrangements; 2.5 3 High-Pressure Pump Moth Type; TEPC, Motor Stater and inverter VFD: VFD Skid Mounted, Dantos or equal Membrane Elementh Quartity: 2.3, Mentione Type; TEPC Wator Stater and inverter VFD: VFD Skid Mounted, Dantos or equal Membrane Elementh Mump Power: 2: 10 HP, Motor Type TEPC, IPT Tax: Volume: 500 gal, Included Motor Stater Material of Constructions: Filter Housing: RFP, While Teps: Tep: Mink Requirements; Fanges, Control Circuit, and Skidetc. Torons: Nome: Net A W additional 8 analog inputs Processor: Home: X 44 "Color toucharbore Dispit Torons: Tele Persone Topic: Tele Persone Dispits Torons: Telement Housing: RFP
Design Permease Flow 280 m/hr Feed Flow: 24.00 m/hr Concentrate Flow Rate: 21.00 m/hr Recovery: 275 % Design Persture: 23.00 m/hr Besign Persture: 23.00 m/hr Design Persture: 23.00 m/hr System InderPerssure: 23.00 m/hr Design Persture: 23.00 m/hr System InderPerssure: 23.00 m/hr Design Persture: 20.00 m/hr Design Perst: 20.00 m/hr Design Persture:
Concentrale Flow Rate: ≥ 10.00 m/hr Internal Recovery: 27.5% Design pitt: 55 - 6.5 System InderPressure: 2.3.0 b or C Design pitt: 55 - 6.5 System InderPressure: 2.3.0 b or C Design pitt: 55 - 6.5 System InderPressure: 2.3.0 b or C Design pitt: 55 - 6.5 System InderPressure: 2.3.0 b or C Design pitt: 55 - 6.5 System InderPressure: 2.3.0 b or C Design pitt: 55 - 6.5 Winh Components: Cartidge Filtration Housing Countly: 2.2, Reling: 2.1-Indicon nominal, Length: 2.40-Inches, Filter Quantity: 2.2, TIES of Filter: 2.53 High-Pressure Pump Motor HP ≥ 30 HP, Type: TEFC, Motor Starter and inverter VFD: VFD Skid Mounted, Danioss or equal Membrane Element Membrane Element Quantity: 2.2, Mantrane Type: FRP Wrapped, PA CIP System Our HP: 20 HP, Motor Type TEFC, CIP Tank Volume: 500 gal, Included Motor Starter Material of Constructions: Filter Housing FRP With B FaceAvaler Pump; Schedule 80, PVC High-Pressure Pump 315 Schedule 80, PVC High-Pressure Pump 315 Schedule 80, PVC High-Pressure Pump 316 Schedule 80, PVC Filter Housing: FRP With all Installations and Ulling Requirements: Filter Schedule 80, PVC High-Pressure Pump 316 Schedule 80, PVC High-Pressure
Internal Recycle Flow Rate: ≥ 7.04 m/hr Racovery: 77.5% Design Temperature: ≥ 3.00 °C Design Temperature: ≥ 3.00 °C System Intel Pressure: ≥ 3.4 bar System Intel Pressure: ≥ 3.4 bar System Operating Pressure: ≥ 3.4 bar System Intel Pressure: ≥ 3.4 bar System Operating Pressure: ≥ 3.4 bar Carridge Filtation Houing Quantity: ≥ 2, Rating: ≥ 1-micron nominal, Length: ≥ 40-inches, Filter Quantity: ≥ 2, TIES of Filter: > 6 4 Membrane Element Housings Number of Housing: ≥ 10, HD, Type: TEFC, Motor Stater and inverter VFD: VFD Skid Mounted, Danfoss or equal Membrane Element: Quantity: ≥ 3, Membrane Type: FRP Wrapped, PA Cli P System Pump Power: 20 HP, Type: TEFC, GIP Tank Volume: 500 gal, Included Motor Stater Material of Constructions: Filter Housing: FRP, White Permeate Piping: Schedule 80, PVC High-Pressure Piping: Statiales Statel. Sch. 10 Permeate Candon stal Membrane System Alarms: Processor: Houre: K with Additional B analog inputs Enclose: None: X With additional B analog inputs <t< td=""></t<>
Recovery: 27.5 % Design pH: 55. 6.5 System InderPressure: 3.4 bor System Operating Pressure 8 bar Power Frequency: 50.12 Main Components: Carridge Filtration Housing Quantity: 2.2, Reling: 2 I-Inicon nominal, Length: 240-inches, Filter Quantity: 2.2, TIES of Filter: 2.64 Membrane Element Housings Number of Housings: 2.8, Housing length: 2.4, Housing Diameter: 2.8, Banking Arrangements: 2.5.3 High-Pressure Pump Motor HP 2:30 IP, Type: TEFC, Motor Stater and inverter VFD: VFD Skid Mounted, Dantoss or equal Membrane Element Quantity: 2.2, Rendmane Type: FRP Wrapped, PA QIP System Pum Power: 2:10 HP, Motor Type TEFC, CIP Tank Volume: 500 gal, Included Motor Stater Material of Constructions: Filter Housing: FRP, With a Feedwater Piping: Schedule 80, PVC Horizon Element Hernbrane Element Housing: FRP With all Instations and Utility Requirements: Processor: Honer X4 with additional & aniog inputs Filter Housing: FRP, With a Remotorial: Element Housing: FRP Processor: Honer X4 with additional & aniog inputs Endoscie: Herner X4. Colo Low Concentrate Flow; Suff, more) + CAN-RTU/Serial Moduus Metarial from Stetement Housinge
Design pt+1 55 - 8.5 System Operating Pressure 8 bar Power Frequency: 50hz Main Components: Cartidge Filtration Housing Quantity: ≥ 2, Rating: 2 I-micron nominal, Length: ≥ 40-inches, Filler Quantity: ≥ 2, TIES of Filter: 2 K4 Membrane Element Housings Number of Housings: ≥ 8, Housing length: ≥ 4, Housing Diameter: ≥ 8, Banking Arrangements: ≥ 53 High-Pressure Pump Motor HP ≥ 30 HP, Type: TEFC, Motor Starter and inverter VFD: VFD Skid Mounted, Danfoss or equal Membrane Element Quantity: ≥ 2, Manticane Type: FRP Wrapped, PA Cartify: ≥ 2, Manticane Type: FRP Wrapped, PA Cartify: ≥ 2, Manticane Type: TRP Visione Starter and inverter VFD: VFD Skid Mounted, Danfoss or equal Membrane Element Partice Frequence: Carbon steel Material of Constructions: Filter Housing: FRP, While Pressure Piping: Schedule 80, PVC High-Pressure Piping: Stockale 80, PVC High-Pressure Piping: Stockale 80, PVC Filter Housing: FRP With all Installation and UNBIP Requirements: Flanges, Control Circuit, and Skidetc. Controls: Electrical Dystems: Processor: Horner X4 with additional B anlog inputs Endosure: NEMA 4, Ro Skid Mounted Operation Infranze Herman:
System inter Pressure: 2 3 4 bar System inter Pressure: 2 3 4 bar Dower Frequency: SDtz Main Components: Carridge Filtration Housing Quantity: 2 2, Rating: 2 1-micron nominal, Length: 2 40-inches, Filter Quantity: 2 2, TIES of Filter: 2 5 Hombrane Element Housings Number of Housings: 2 8, Housing longit: 2 4, Housing Diameter: 2 8, Banking Arrangements: 2 5 3 High-Pressure Pump Wort P 30 HP, Type: TEFC, CMot Starter and Inverter VFD: VFD Skid Mounted, Dantoss or equal Membrane Elements Quantity: 32, Membrane Type: FFP Wrapped, PA CIP System Pump Power: 2 10 HP, Motor Type TEFC, CIP Tank Volume: 500 gal, Included Motor Starter Material of Constructions: Filter Housing: FRP, White Pressure Physics 15 Stantias Startel, Sch. 10 Permeate Piping: Schedule 80, PVC Frame 2 Control Keil Systems: Process: Honer X 4 with Vind Requirements: Flanges, Control Circuit, and Skdetc. Controls / Electrical Systems: Process: Honer X with additional 8 analog inputs Endosure: NEMA 4, RO Skid Mounted Operation Interface: Honer X 4* Color touchscreen Display Communications: Ethernet (Modbus TCPI/P, Ethernet/P, SMTP, more) + CAN-RTU/Serial Modbus Materi Starte
Power Frequency. S0hz Main Components: Carridge Filtration Housing Quantity: ≥ 2, Rating: ≥ 1-micron nominal, Length: ≥ 40-inches, Filter Quantity: ≥ 2, TIES of Filter: ≥ 64 Membrane Element Housings Number of Housing: ≈ 28, Housing Ingeth: ≥ 4, Housing Diameter: ≥ 8, Banking Arrangements: ≥ 53 High-Pressure Pump Notor HP ≥ 30 HP, Type: TEFC, Motor Starter and inverter VFD: VFD Skid Mounted, Danfoss or equal Membrane Element Quantity: ≥ 2, Membrane Type: FRP Wapped, PA CIP System Pump Power: ≥ 10 HP, Motor Type TEFC, CIP Tank Volume: 500 gal, Included Motor Starter Material of Constructions: Filter Housing: FRP, White Feedwater Plong: Schedule 80, PVC High-Pressure Phing: 315 Stanliess Stale, Sch. 10 Permeate Ping: Schedule 80, PVC High-Pressure Phing: 316 Stanliess Stale, Sch. 10 Permeate Ping: Schedule 80, PVC High-Pressure Phing: 316 Mounted Operator Interface: Home: X4 4* Color touchscreen Displot Commonizations: Element (Modus TCPIP)P. Elthernel/P, SMTP, more) + CAN+RTU/Serial Modus Material Starte Membrane Element Alemants Manter Rest (Modus TCPIP)P. Elthernel/P, SMTP, more) + CAN+RTU/Serial Modus Material
Main Components: Carridge Filtration Housing Quanity: ≥ 2, Reing: ≥ 1-micron nominal, Length: ≥ 40-inches, Filter Quanity: ≥ 2, TIES of Filter: ≥ 64 Membrane Element Housing Work P ≥ 30 HP, Type: TEFC, Motor Starter and inverter VFD: VFD Skid Mounted, Danfoss or equal Membrane Element Housing Quantity: ≥ 30, MenThrea Type: TEFC, CIP Tank Volume: 500 gal, Included Motor Starter Membrane Element Housing Quantity: ≥ 30, MenThrea Type: TEFC, CIP Tank Volume: 500 gal, Included Motor Starter Material of Constructions: Filter Housing: FRP. White Feedwater Piping: Schedule 80, PVC Trame: Carlon stell Permeate Piping: Schedule 80, PVC Trame: Carlon stell Membrane Element Housing: FRP Wite all Installation and Utily Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: HomeTA viti Wite Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: HomeTA viti Wite Requirements: Flanges, Control Circuit, and Skidetc. Processor: HomeTA viti Wite Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: HomeTA viti Wite Requirements: Flanges, Control Circuit, and Skidetc. Processor: HomeTA viti Wite Requirements: NameTA viti Colar Constructions: Processor: HomeTA viti Wite Requirements: Flanges, Control Circuit, and Skidetc. Processor: HomeTA viti Wite Requirements: Ranges, Control Circuit, and Skidetc. Processor: HomeTA viti Wite Requirements: Ranges, Control Circuit, and Skidetc. Processor: HomeTA viti Requirements: Ranges, Control Cir
Cartridge Finitation Housing Quantity: ≥ 2, Rating: ≥ 1-micron nominal, Length: ≥ 40-inches, Filter Quantity: ≥ 2, TIES of Filter: ≥ 54 Membrane Element Housings Number of Housings: ≥ 8, Housing length: ≥ 4, Housing Diameter: ≥ 8, Banking Arrangements: ≥ 5.3 High-Pressure Pump Moor Type: TEPC, Motor Statter and inverter VFD: VFD Skid Mounted, Dantoss or equal Membrane Elements Quantity: ≥ 32, Membrane Type: FRP Wrapped, PA CIP System Quantity: ≥ 32, Membrane Type: FRP Wrapped, PA CIP System Pump Power: 2: 01 HP, Motor Type TEFC, CIP Tank Volume: 500 gal, Included Motor Starter Haterial of Constructions: Filter Housing: FRP, White Feedwater Ping: Schedule 80, PVC Frame: Carbon stell Membrane Element Housings: FRP With Installation and Utility Requirements: Franges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: Homer X 4th installation and Utility Requirements: Pinges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: Homer X 4th installation and Utility Requirements: Pinge, SMTP, more) + CAN-RTU/Serial Moduus Master/Save Master/Save Instrumentation: Housing: REP Permeate Conductivity, How Meters, Intel Pressure Switch, Pressure Gauge, Intel Conductivity, Intel Temperature, high Permeate Conductivity, Net Reprocessor: Hower X 4th indel COP Transmither, eds. Housinde CoP Transmither, eds.
Housing Quantity: ≥ 2, Rating: ≥ 1-micron nominal, Length: ≥ 40-inches, Filter Quantity: ≥ 2, TIES of Filter: ≥ 4 Membrane Element Housings Number of Housings: > 2, Housing Jength: ≥ 4, Housing Diameter: ≥ 8, Banking Arrangements: ≥ 5.3 High-Pressure Pump Motor IP ≥ 30 HP, Type: TEFC, Motor Starter and inverter VFD: VFD Skid Mounted, Danfoss or equal Membrane Element Ournify: ≥ 32, Membrane Type: FRP Wrapped, PA CIP System Ournify: ≥ 32, Membrane Type: FRP Wrapped, PA CIP System Pump Power: ≥ 10 HP, Motor Type TEFC, CIP Tank Volume: 500 gal, Included Motor Starter Material of Constructions: Filter Housing: FRP, White Permeate Pripring: Started 80, PVC Frame: Carbon steel Membrane Element Housings: FRP With all Installation and Ultility Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical System: Processor: Homer X 4 with additional 8 analog inputs Endosure: NEMA 4, RO Skid Mounted Operation Interface: Homer X4 4 * Color tourboxreen Display Communications: Permeate Conductivity, Fow Meters, Intel Pressure Switch, Pressure Gauge, Intel Conductivity, Intel Temperature R10, and Intel DRP Transmitteretc. Membrane Element Housings: Canuber Siten Maters Ne
2 54 Membrane Element Housings Number of Housings: ≥ 8, Housing length: ≥ 4, Housing Diameter: ≥ 8, Banking Arrangements: ≥ 5.3 High-Pressure Pump Motor HP ≥ 30 HP, Type: TEPC, Motor Starter and inverter VFD: VFD Skid Mounted, Danloss or equal Membrane Elements Quantity: ≥ 32, Membrane Type: FRP Wrapped, PA CIP System Pump Power: 21 0HP, Motor Type TEPC, CIP Tank Volume: 500 gal, Included Motor Starter Material of Constructions: Filter Housing: FRP, While Feedwater Ping: Schedule 80, PVC Frames Poing: Schedule 80, PVC Frames Poing: Schedule 80, PVC Frames: Filter Stalling Schedule 80, PVC Frames: Cathon stall Membrane Element Housings: FRP With all Installation and Utility Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: Horner X4 with additional 8 analog inputs Enclosure: FLMA 4, RO Skid Mounted Operator Interface: Horner X4 with additional 8 analog inputs Enclosure: FLMA 4, RO Skid Mounted Operator Interface: Horner X4 th additional Respector, High CPP Parmeate Conductivity, How Meters, Intel Pressure Switch, Pressure Gauge, Intel Conductivity, Intel Temperature RTD, and Intel CPP Transmitteretc.
Number of Housings: 28, Housing length: 24, Housing Diameter: 28, Banking Arrangements: 25.3 High-Pressure Pump Motor HP 2: 30 HP, Type: TEFC, Motor Starter and inverter VFD: VFD Skid Mounted, Danfoss or equal Membrane Elements Curstity: 32, Membrane Type: FRP Wrapped, PA Quantity: 3: 20, Membrane Type: TEFC, CIP Tank Volume: 500 gal, Included Motor Starter Material of Constructions: Pump Power: 21 to HP, Motor Type TEFC, CIP Tank Volume: 500 gal, Included Motor Starter Material of Constructions: Filter Housing: FRP, White Feedwater Piping: Schedule 80, PVC Frame: Carbon steel Membrane Element Housings: FRP With all installation and Utility Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: Home: X4 with additional 8 analog inputs Endosum: Element (Modbus TCP/IP, Element/IP, SMTP, more) + CAN-RTU/Serial Modbus Master/Siave Instrumentation: Permeate Conductivity, How Meters, Intel Pressure Switch, Pressure Gauge, Intel Conductivity, Intel Temperature RTD, and Intel CRP Transmitteretc. Membrane System Alarms: Motor Overload, Low Permeate Flow, Low Concentrate Flow, Low Intel Pressure, High Intel Temperature, High Permeate and concentrate flow meters • Automatic intel studif value • Automatic intel studif value • Permeate and concentrate flow Res • Remote machine on/off capability • Termane Indorp rotecion <td< td=""></td<>
High-Pressure Pump Motor HP 230 HP, Type: TEFC, Motor Starter and inverter VFD: VFD Skid Mounted, Danloss or equal Membrane Elements Quantity: 23, Membrane Type: FRP Wrapped, PA CP System Pump Power: ≥ 10 HP, Motor Type TEFC, CIP Tank Volume: 500 gal, Included Motor Starter Material of Constructions: Filter Housing: FRP, White Feedwater Piping: Stafe Maines Steel, Sch. 10 Permeate Diping: Schedule 80, PVC Frame: Carbon steel Membrane Element Housings: FRP With all Installation and Utility Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: Homer X4 with additional B analog inputs Endosure: NEMA 4, RO Skid Mounted Operator Interface: Horner X4 4* Color touchscreen Display Communications: Element (Modus TCP/P, Element/P, SMTP, more) + CAN-RTU/Serial Modbus Master/Slave Instrumentation: Membrane System Alarms: Motor Overload, Low Permeate Flow, Low Concentrate Flow, Low Intel Pressure, High Intel Temperature, High Permeate Conductivity, Low Membrane Rejection, High ORP Features Included: • Automatic intel shudfi valve • Permeate and concentrate flow, Low Concentrate Flow, Low Intel Pressure, High Intel Temperature, High Permeate Conductivity, Low Membrane Rejection, High ORP Features Included: • Penditic indet shudfi valve • Permeate and concentrate flow meters • Remote machine onlift capability • Thermal motor protection • Pre-fifter, poet-fifter, primary, and final pressure gauges • Low voltage ontrol panel mounted on RO skid • Includes external run command; pretreatment lockout; and onlift control of feed pump. • O&M Manual, Electrical, General Dimensional, and Process and Instrumentation Drawings included. • Mill Finik • Electric actuated inter valve • Includes CIP pump mounted to RO skid. Adds separate CIP cone botom tank shipped separately from RO skid. The system
Moine HP = 20 HP. Type: TEFC, Motor Starter and inverter VFD: VFD Skid Mounted, Danfoss or equal Membrane Elements Mainthy = 23, Membrane Type: FRP Wrapped, PA CIP System Pump Powers: 21 0H P. Motor Type TEFC, CIP Tank Volume: 500 gal, Included Motor Starter Material of Constructions: Filer Housing: FRP, While Feedwater Priprig: Schedule 80, PVC High-Pressure Priprig: 316 Stainless Steel, Sch. 10 Permeate Priprig: Schedule 80, PVC High-Pressure Priprig: 316 Stainless Steel, Sch. 10 Permeate Priprig: Schedule 80, PVC High-Pressure Priprig: 316 Stainless Steel, Sch. 10 Permeate Priprig: Schedule 80, PVC High-Pressure Priprig: 316 Stainless Steel, Sch. 10 Permeate Carbon steel Membrane Element Housings: FRP 1 LLS With all Installation and Ultilly Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processo: Homer X4 4* Color touchscreen Display Communications: Element (Modbus TCP/IP, Element/IP, SMTP, more) + CAN-RTU/Serial Modbus Master/Slave Instrumentation: Permeeta Conductivity, Flow Membrane Rejection, High ORP Heatures Included 1
Quantity: 2: 32, Membrane Type: FRP Wrapped, PA CP System Pump Power: 2 10 HP, Motor Type TEFC, CIP Tank Volume: 500 gal, Included Motor Starter Material of Constructions: Filter Housing: FRP, White Feedwater Piping: Schedule 80, PVC High-Pressure Piping: 316 Stainless Steel, Sch. 10 Permeate Piping: Schedule 80, PVC Frame: Carbon stel Membrane Element Housing: FRP 1 L.S With all installation and Utility Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: Homer X4 with additional 8 analog inputs Endosure: IKEMA 4, NO Skid Mounted Operator Interface: Homer X4 4* Color Isuchscreen Display Communications: Ethernet (Modusus TCP/IP, Ethernet/IP, SMTP, more) + CAN-RTU/Serial Modbus Master/Slave Instrumentation: Processor: Homer X4 4* Color Isuchscreen Display Communications: Ethernet (Modusus TCP/IP, Ethernet/IP, SMTP, more) + CAN-RTU/Serial Modbus Master/Slave Motor Overload, Low Permeate Flow, Low Concentrate Flow, Low Unitel Pressure, High Inlet Temperature, High Permeate Conductivity, Low Membrane Rejection, High ORP Features Include? Permeate and concentrate flow meters Permeate and concentrate flow meters Permeate and concentrate flow meters • Parmeate and concentrate flow meters Permeate and concentrate flow meters Permeater and concentrate flow meters • Perefilter, post-filter, point
CIP System Pump Power: ≥ 10 HP, Motor Type TEFC, CIP Tank Volume: 500 gal, Included Motor Starter Material of Constructions: Filter Housing: FRP, White Facewater Piping: Schedule 80, PVC High-Pressure Piping: 316 Stainless Steel, Sch. 10 Permeate Piping: Schedule 80, PVC Fram: Carbon steel Membrane Element Housings: FRP 1 With all Installation and Utility Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: Homer X4 with Additional 8 analog inputs Enclosure: NEMA 4, RO Skid Mounted Operator Interface: Homer X4 4' Color touchscreen Display Communications: Ethernet (Madbus TCP/IP, Ethernet/IP, SMTP, more) + CAN-RTU/Serial Modbus Master/Slave Instrumentation: Permeate Conductivity, Flow Meters, Inlet Pressure Switch, Pressure Gauge, Inlet Conductivity, Inlet Temperature RTD, and Inlet ORP Transmitteretc. Membrane System Alarms: Motor Overload, Low Permeate Flow, Low Concentrate Flow, Low Inlet Pressure, High Inlet Temperature, High Permeate Conductivity, Low Membrane Rejection, High ORP Features Included : • Automatic inlet shutoff valve • Permeate and concentrate flow meters • Automatic inlet shutoff valve • Premeate and concentrate Row Low Concentrate Flow, Low Control of feed pump. • Odd Manual, Electrical, General Dimensional, and Process and Instrumentation Drawings included. • Mill Finisi
Pump ² Power: ≥ 10 HP, Motor Type TEFC, CIP Tank Volume: 500 gal, Included Motor Starter Material of Constructions: Filter Housing: FRP, While Feedwater Piping: Schedule 80, PVC High-Pressure Piping: 316 Stainless Steel, Sch. 10 Permeate Piping: Schedule 80, PVC High-Pressure Piping: Schedule 80, PVC Fame: Carbon steel Membrane Element Housings: FRP With all Installation and Utility Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: Homer X4 with additional 8 analog inputs Enclosure: NEMA 4, RO Skid Mound Operator Interface: Homer X4 4* Color touchscreen Display Communications: Ethernet (Modus TCP/IP, Ethernet/IP, SMTP, more) + CAN-RTU/Serial Modbus Master/Slave Instrumentation: Permeate Conductivity, Flow Meters, Iniet Pressure Switch, Pressure Gauge, Iniet Conductivity, Iniet Temperature RTD, and Iniet ORP Transmitteretc. Membrane System Alarms: Motor Vorlend, Luce Mermate Flow, Low Concentrate Flow, Low Iniet Pressure, High Iniet Temperature, High Permeate Conductivity, Low Membrane Rejection, High ORP Features Included : • Automatic inite shutoff valve • Permeate and concentrate flow meters • Remote achonicontic apabili
Filter Housing: FRP, White I LS Feedwater Piping: Schedule 80, PVC High-Pressure Piping: 316 Stainless Steel, Sch. 10 Permeate Piping: Schedule 80, PVC Frame: Carbon steel Membrane Element Housings: FRP I LS With all Installation and Utilty Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: Homer X4 with additional 8 analog inputs Enclosure: NEMA 4, RO Skid Mounted Operator Interface: Homer X4 with additional 8 analog inputs Enclosure: NEMA 4, RO Skid Mounted Operator Interface: Nomer X4 with additional 8 analog inputs Enclosure: NEMA 4, RO Skid Mounted Deparator Interface: Nomer X4 with additional 8 analog inputs Montorent Net 70 Corb touchscreen Display Communications: Ethemet (Modbus TCP/IP, Ethemet/IP, SMTP, more) + CAN-RTU/Serial Modbus Master/Slave Instrumentation: Permeate Conductivity, How Meters, Intel Pressure Switch, Pressure Gauge, Intel Conductivity, Intel Temperature, High Permeate and concentrate flow, Low Concentrate Flow, Low Unitel Pressure, High Intel Temperature, High Permeate and concentrate flow weters Permeate and concentrate flow meters • Remote machine on/off capability • Nutomatic flore primary, and final pressure gauges • Low voltage control panel mounted on RO skid • Includes contrate flow meters • Remote machine on/off capability • Nutomatis presental concounting, perferatment lockout; and onfo
Filter Housing: FRP, White I LS Feedwater Piping: Schedule 80, PVC High-Pressure Piping: 316 Stainless Steel, Sch. 10 Permeate Piping: Schedule 80, PVC Frame: Carbon steel Membrane Element Housings: FRP I LS With all Installation and Utilty Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: Homer X4 with additional 8 analog inputs Enclosure: NEMA 4, RO Skid Mounted Operator Interface: Homer X4 with additional 8 analog inputs Enclosure: NEMA 4, RO Skid Mounted Operator Interface: Nomer X4 with additional 8 analog inputs Enclosure: NEMA 4, RO Skid Mounted Deparator Interface: Nomer X4 with additional 8 analog inputs Montorent Net 70 Corb touchscreen Display Communications: Ethemet (Modbus TCP/IP, Ethemet/IP, SMTP, more) + CAN-RTU/Serial Modbus Master/Slave Instrumentation: Permeate Conductivity, How Meters, Intel Pressure Switch, Pressure Gauge, Intel Conductivity, Intel Temperature, High Permeate and concentrate flow, Low Concentrate Flow, Low Unitel Pressure, High Intel Temperature, High Permeate and concentrate flow weters Permeate and concentrate flow meters • Remote machine on/off capability • Nutomatic flore primary, and final pressure gauges • Low voltage control panel mounted on RO skid • Includes contrate flow meters • Remote machine on/off capability • Nutomatis presental concounting, perferatment lockout; and onfo
Feedwater Piping: Schedule 80, PVC High-Pressure Piping: 316 Stainless Steel, Sch. 10 Permeate Piping: Schedule 80, PVC Frame: Carbon steel Membrane Element Housings: FRP With all Installation and Utility Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: Homer X4 with additional 8 analog inputs Enclosure: INEMA K, RO Skid Mounted Operator Interface: Homer VA 41° Color touchscreen Display Communications: Ethernet (Modous TCP/IP, Ethernet/IP, SMTP, more) + CAN-RTU/Serial Modbus Master/Slave Instrumentation: Permeate Conductivity, Flow Meetrs, Intel Pressure Switch, Pressure Gauge, Inlet Conductivity, Inlet Temperature RTD, and Inlet ORP Transmitteretc. Membrane System Alarms: Motor Overload, Low Permeate Flow, Low Concentrate Flow, Low Inlet Pressure, High Inlet Temperature, High Permeate conductivity, Low Membrane Rejection, High ORP Features Included : • Automatic inlet shutoff valve • Permeate and concentrate flow meters • Remote machine en/off capability • Thermal motor protection • Pre-filter, post-filter, primary, and final pressure gauges • Low voltage control panel mounted on RO skid • Includes external run command; pretr
Permeate Priping: Schedule 80, PVC Frame: Carbon steel 1 L.S Membrane Element Housings: FRP With all Installation and Ultilty Requirements: Flanges, Control Circuit, and Skidetc. 1 L.S Ortors JS Electrical Systems: Processor: Horner X4 with additional 8 analog inputs Enclosure: NEMA 4, RO Skid Mounted 0perator Interface: Horner X4 4° Color touchscreen Display Communications: Ethernet (Modbus TCP/IP, Ethernet/IP, SMTP, more) + CAN-RTU/Serial Modbus Master/Slave Instrumentation: Permeate Conductivity, Flow Meters, Inlet Pressure Switch, Pressure Gauge, Inlet Conductivity, Inlet Temperature RTD, and Inlet ORP Transmitteretc. Membrane Element (Modbus TCP/IP, Ethernet/IP, SMTP, more) + CAN-RTU/Serial Modbus Mostor Overload, Low Permeate Flow, Low Concentrate Flow, Low Inlet Pressure, High Inlet Temperature, High Permeate Conductivity, Icow Membrane Rejection, High ORP Fatures Included • • Automatic initel studioff valve • Permeate and concentrate flow, Low Concentrate Flow, Low Intel Pressure, High Inlet Temperature, High Permeate Conductivity, Low Membrane Rejection, High ORP Fatures Included 1 • • Automatic initel studioff valve • Permeate and concentrate flow meters • Remote machine on/off capability • Thermal motor protection • Divodies cottent and runcommand; perfertament lockout; and on/off control of feed pump. • OkM Manual, Electrical, General Dimensional, and Process and Instru
Frame: Carbon steel 1 L.S With all Installation and Utility Requirements: Flanges, Control Circuit, and Skidetc. 1 L.S With all Installation and Utility Requirements: Flanges, Control Circuit, and Skidetc. 1 L.S Processor: Horner X4 with additional 8 analog inputs Enclosure: NEMA 4. RO Skid Mounted 0 Operator Interface: Horner X4 4* Color touchscreen Display Communications: Ethemet (Modbus TCP/IP, Ethernet/IP, SMTP, more) + CAN-RTU/Serial Modbus Nature State Instrumentation: Permeate Conductivity, Flow Meters, Iniet Pressure Switch, Pressure Gauge, Iniet Conductivity, Iniet Temperature RTD, and Iniet ORP Transmitteretc. Membrane System Alarms: Notor Overload, Low Permeate Flow, Low Concentrate Flow, Low Iniet Pressure, High Inlet Temperature, High Permeate Conductivity, I. Low Membrane Rejection, High ORP Features Included : Nature State Nature Stat
Membrane Element Housings: FRP 1 L.S With all Installation and Utility Requirements: Flanges, Control Circuit, and Skidetc. 1 L.S With all Installation and Utility Requirements: Flanges, Control Circuit, and Skidetc. 1 L.S Processor: Horner X4 with additional 8 analog inputs Enclosure: NEMA 4, RO Skid Mounted 0 Operator Interface: Homer X4 4" Color touchscreen Display Communications: Ethemet (Modbus TCP/IP, Ethernet/IP, SMTP, more) + CAN-RTU/Serial Modbus Naster/Slave Instrumentation: Permeate Conductivity, Flow Meters, Inlet Pressure Switch, Pressure Gauge, Inlet Conductivity, Inlet Temperature RTD, and Inlet ORP Transmitteretc. Membrane System Alarms: Motor Overload, Low Permeate Flow, Low Concentrate Flow, Low Inlet Pressure, High Inlet Temperature, High Permeate Conductivity, Low Membrane Rejection, High ORP Features Included : • Automatic inlet shutoff valve • Permeate and concentrate flow meters • Remote machine on/off capability • Thermal motor protection • Pre-filter, post-filter, primary, and final pressure gauges • Low voltage control panel mounted on RO skid • Low voltage control panel mounted on RO skid • Includes setternal run command; pretreatment lockout; and on/off control of feed pump. • O&M Manual, Electrical, General Dimensional, and Process and Instrumentation Drawings included. • Mill Finish • Electric actuated inter valve • Includes clP pump mounted to RO skid. Adds separate ClP cone bottom tank shipped separately
With all Installation and Utility Requirements: Flanges, Control Circuit, and Skidetc. Controls / Electrical Systems: Processor: Home X 4 with additional 8 analog inputs Enclosure: NEMA 4, RO Skid Mounted Operator Interface: Homer X 4 * Color touchscreen Display Communications: Ethernet (Modbus TCP/IP, Ethernet/IP, SMTP, more) + CAN-RTU/Serial Modbus Master/Slave Instrumentation: Permeate Conductivity, Flow Meters, Inlet Pressure Switch, Pressure Gauge, Inlet Conductivity, Inlet Temperature RTD, and Inlet ORP Transmitteretc. Membrane System Alarms: Motor Overload, Low Permeate Flow, Low Concentrate Flow, Low Inlet Pressure, High Inlet Temperature, High Permeate Conductivity, Low Membrane Rejection, High ORP Features Included : • Automatic inlet shutoff valve • Permeate and concentrate flow meters • Remote machine on/off capability • Thermal motor protection • Pre-filter, post-filter, primary, and final pressure gauges • Low voltage control panel mounted on RO skid • Includes CIP purp mounted to RO skid. Adds separate CIP cone bottom tank shipped separately from RO skid. • Nill Finish • Electric actuated inlet valve • Includes CIP purp mounted to RO skid. Adds separate CIP cone bottom tank shipped separately from RO skid.
Processor: Homer X4 with additional 8 analog inputs Enclosure: NEMA 4, RO Skid Mounted Operator Interface: Homer X4 4" Color touchscreen Display Communications: Ethernet (Modbus TCP/IP, Ethernet/IP, SMTP, more) + CAN-RTU/Serial Modbus Master/Slave Instrumentation: Permeate Conductivity, Flow Meters, Inlet Pressure Switch, Pressure Gauge, Inlet Conductivity, Inlet Temperature RTD, and Inlet ORP Transmitteretc. Membrane System Alarms: Motor Overload, Low Permeate Flow, Low Concentrate Flow, Low Inlet Pressure, High Inlet Temperature, High Permeate Conductivity, Low Membrane Rejection, High ORP Features Included : • Automatic inlet shutoff valve • Permeate and concentrate flow meters • Remote machine on/off capability • Thermal motor protection • Pre-filter, post-filter, primary, and final pressure gauges • Low voltage control panel mounted on RO skid • Includes external run command; pretreatment lockout; and on/off control of feed pump. • O&M Manual, Electrical, General Dimensional, and Process and Instrumentation Drawings included. • Mill Finish • Electric actuated inlet valve • Includes citIP pump mounted to RO skid. Adds separate CIP cone bottom tank shipped separately from RO skid. The system shouid be have selar inverters to work (RO) Unit
Enclosure: NEMA 4, RO Skid Mounted Operator Interface: Horner X4 4" Color touchscreen Display Communications: Ethermet (Modbus TCP/IP, Ethermet/IP, SMTP, more) + CAN-RTU/Serial Modbus Master/Slave Instrumentation: Permeate Conductivity, Flow Meters, Inlet Pressure Switch, Pressure Gauge, Inlet Conductivity, Inlet Temperature RTD, and Inlet ORP Transmitteretc. Membrane System Alarms: Motor Overload, Low Permeate Flow, Low Concentrate Flow, Low Inlet Pressure, High Inlet Temperature, High Permeate Conductivity, Low Membrane Rejection, High ORP Features Included : • Automatic inlet shutoff valve • Permeate and concentrate flow meters • Remote machine on/off capability • Thermal motor protection • Pre-filter, post-filter, primary, and final pressure gauges • Low voltage control panel mounted on RO skid • Includes certeral run command; pretreatment lockout; and on/off control of feed pump. • O&M Manual, Electrical, General Dimensional, and Process and Instrumentation Drawings included. • Mill Finish • Electric actuated inlet valve • Includes CIP pump mounted to RO skid. Adds separate CIP cone bottom tank shipped separately from RO skid. The system should be have solar inverters to work (RO) Unit from the solar panels and all material and accessories (cables,lugs, glands,circuit breakers,control panels etc.) The system should be have all material and accessories to work from solar panels. The system should be have all material and accessories to work from solar panels. The system should be have all material and accessories to work (RO) Unit perfectly.
Operator Interface: Horner X4 4" Color touchscreen Display Communications: Ethernet (Modbus TCP/IP, Ethernet/IP, SMTP, more) + CAN-RTU/Serial Modbus Master/Slave Instrumentation: Permeate Conductivity, Flow Meters, Inlet Pressure Switch, Pressure Gauge, Inlet Conductivity, Inlet Temperature RTD, and Inlet ORP Transmitteretc. Membrane System Alarms: Motor Overload, Low Permeate Flow, Low Concentrate Flow, Low Inlet Pressure, High Inlet Temperature, High Permeate Conductivity, Low Membrane Rejection, High ORP Features Included : • Automatic inlet shutoff valve • Permeate and concentrate flow meters • Remote machine on/off capability • Thermal motor protection • Pre-filter, post-filter, primary, and final pressure gauges • Low voltage control panel mounted on RO skid • Includes external run command: pretreatment lockout; and on/off control of feed pump. • O&M Manual, Electrical, General Dimensional, and Process and Instrumentation Drawings included. • Mill Finish • Electric actuated inlet valve • Includes external run command: pretreatment lockout; and on/off control of feed pump. • O&M Manual, Electrical, General Dimensional, and Process and Instrumentation Drawings included. • Mill Finish • Electric actuated inlet valve
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Test Operative (20,000 bits and instants in here using 0 bits 0 and 10 bits 1 bits 1
7.1 Tank Capacity of 30,000 Liters and implementation base using Solid Cement Block for tank with all 4 PCS
accessories as required the system to work perfectly. Automatical accessories as a Multi-Media Filters, with distribution & collection systems and sand & carbon bags with all accessories as
7.2 required the system to work perfectly.
7.3 Dosing Pumps for Chlorine, Acid & Anit-Scalant with all accessories as required the system to work 3 PCS
Control panel to make the pumps operate in a coordinated way with system alarms.
The feeding pump works as long as there is water in the feeding tanks and stops when there is no water in
the feeding tanks or fresh water tanks be full. 7.4 Also, the up pump to the tower tank works as long as there is water in the fresh water tanks and stops 1 PCS
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The control panel must contain (four electrical floating switch, contactors, relays, timers, circuit breakers,
alarm bells, Metal boxetc.) as required the system to work perfectly.
Water Network PVC 3" Pipes, Schedule 80.
7.5 The network PVC connect plastic tanks and (RO) Unit with all accessories as (Valves, flangeetc.)as 1 L.S
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3.0	tower tank"		
8.1	Required Capacity: Q = 20 m ³ /hr , TDH: 70 m Pump will connect with pipes 4 inch Diameter. Pump: non-self-priming vertical multistage pump coupled to a standard motor. Short-circuit squirrel-cage motor, enclosed construction with external ventilation (TEFC) ,IP55 protection degree, Insulation class 155 (F),Electrical performances according to EN 60034-1. The motor pump Sets should be used for the solar PV, Starting compatible with AC VFD operation, bidders shall indicate manufacture, country of origin and model. Pump Efficiency at Duty Point: Not less than 70%; Impeller, Wear Rings, Pump delivery and Housing, Check valve (None Return Valve) , Inlet strainer should be comply with: (AISI 304 or equivalent) or higher specification materials. Shaft and coupling, Shaft sleeve, Bearing bush, Guide bearing, Screw, stud, nut, washer etc should be comply with: (AISI 304 or equivalent) or higher specification materials. Maximum allowable sand: 100gr/m3. Ambient water temp:50 C° Coupling: according to NEMA. The motors shall be Rewindable frame, insulation rating is compatible with AC VFD operation, with all accessories as required the system to work perfectiv.	1	PCS
8.2	Intervention of the with in-built MPPT, VFD (Variable Frequency drive). The drive rating should be 1.5 X AC pump capacity. Efficiency: Not less than 95%; Output Frequency: 50H±3%; Enclosure class should be not less than 1P55. Maximum input voltage Voc: not less than 800 VDC; Operating temperature: up to 50 °C; The device shall allow hybrid operation with external power source, where solar power should be configured as the primary power source; soft start, V/F stable speed control during solar radiation changes, adjustable auto/ manual start in early morning, auto wakeup after adjustable hibernation time in cloudy days, o inputs for pressure switch and water level sensor to protect the pump against dry running and tank full water or closed pipeline (high pressure) Display: LCD Screen display with Cover + LED status indicator; Protection: Over-Voltage, pump Over-Current, pump Over-Load, Over-Temperature, pump Phase Loss, pump Short-Circuit, ground fault, solar low power, DC Input Anti-reverse, Display content: PV status (Current, Voltage, Power, Energy), AC input voltage, AC output voltage, Load, Running Status, RPM, and	2	PCS
9.0	Warranty		
	2 years product and performance warranty	1	L.S
L O.O	Others		
10.1	Project board that contain the project information written in Arabic and English	1	PCS
10.2	End user training on operation and maintenance	1	L.S



Co-funded by the European Union



Az Zuhrah Solar Pump & RO Unit Drawing

DRAWING LIST :

L	1	
	D1	3D View For System Components
	D2	3D Overview Container for (RO) Unit
	D3	3D View Fence Details
	D4	WATER PUMP AND PIPING EQUIPMENT
	D5	EARTHING PIT, LIGHTING PROTECTION AND BUS BAR DET
	D6	EARTHING SYSTEM AND LIGHTNING PROTECTION SYSTEM
	D7	STRUCTURAL DESIGN
	D8	PROJECT SIGN BOARD

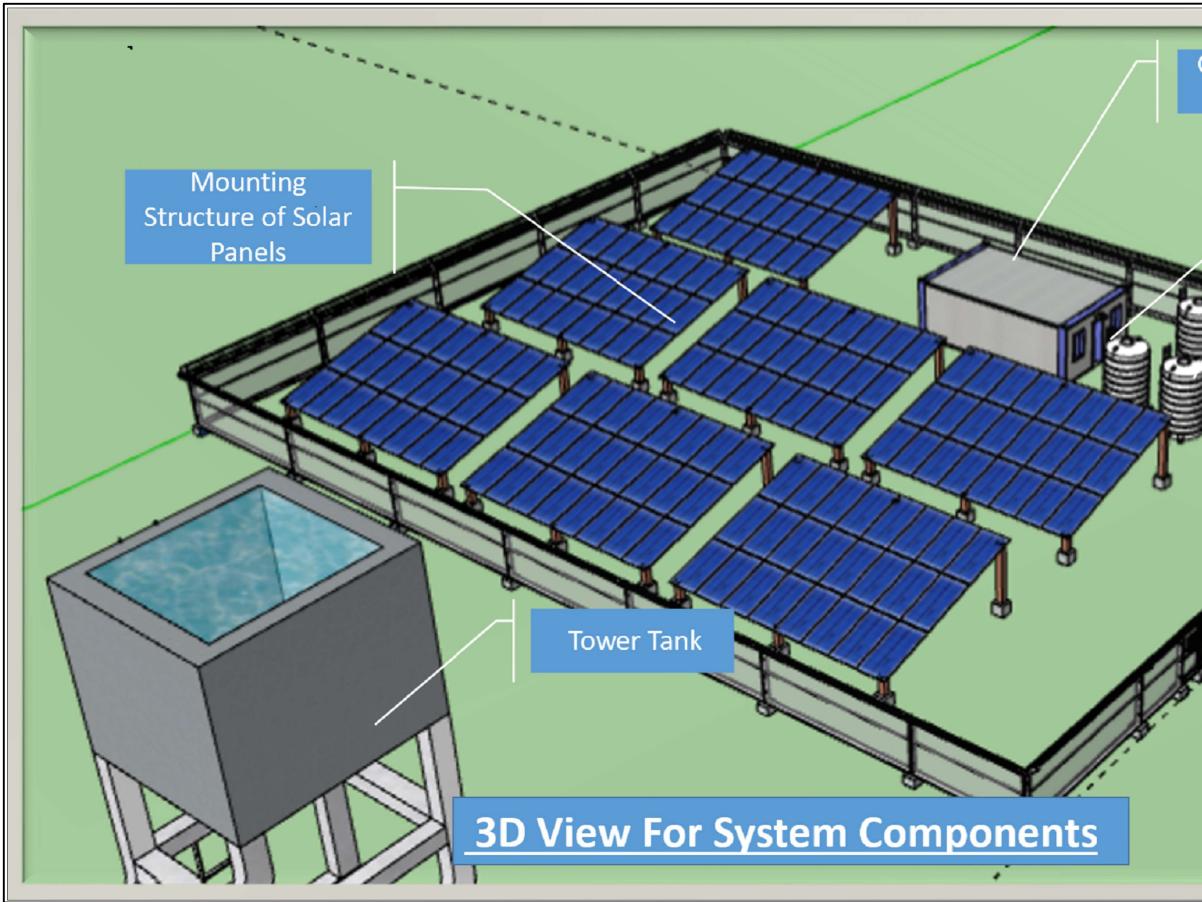


Empowered lives. Resilient nations.





M



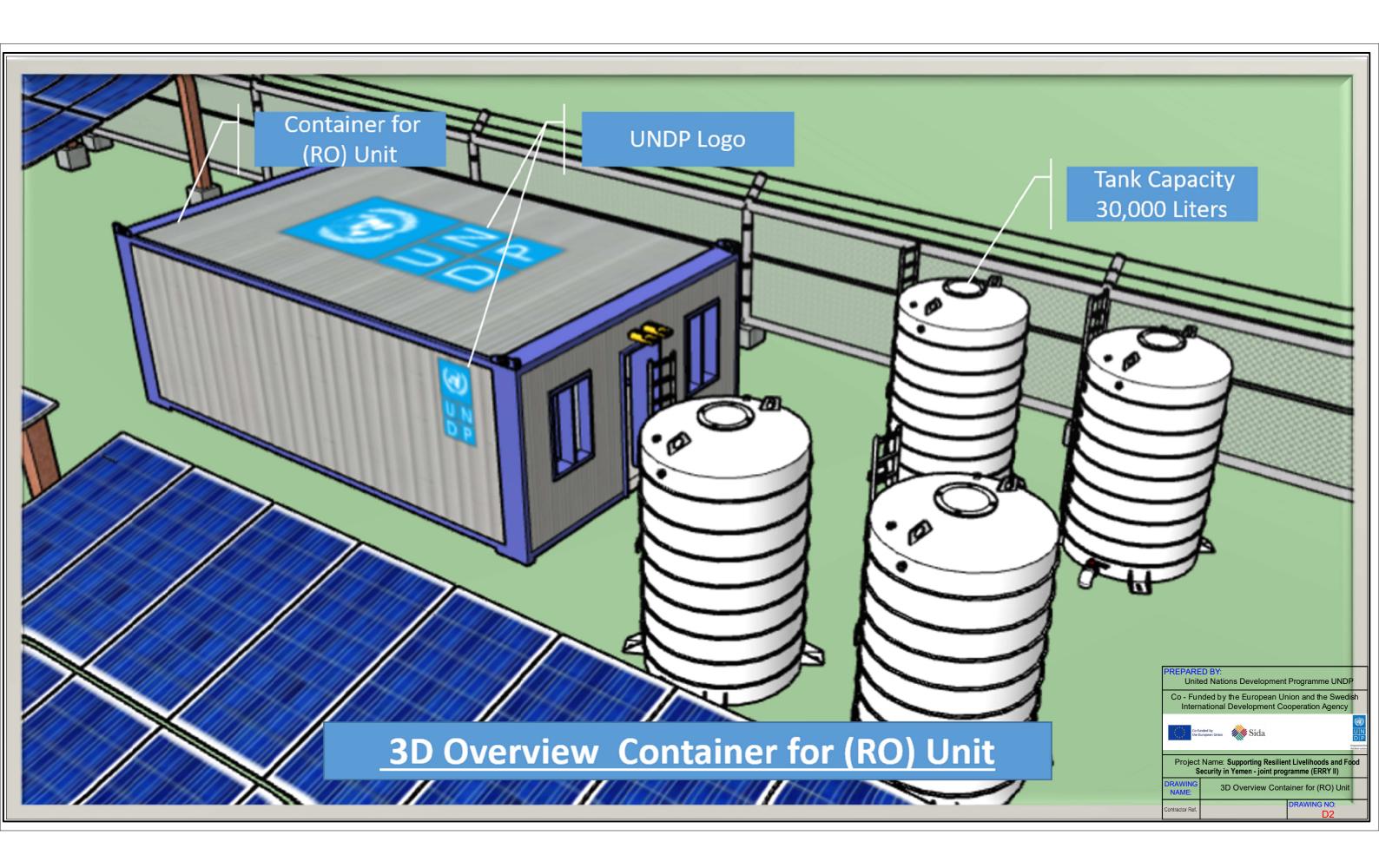
Caravan Room for (RO) Unit

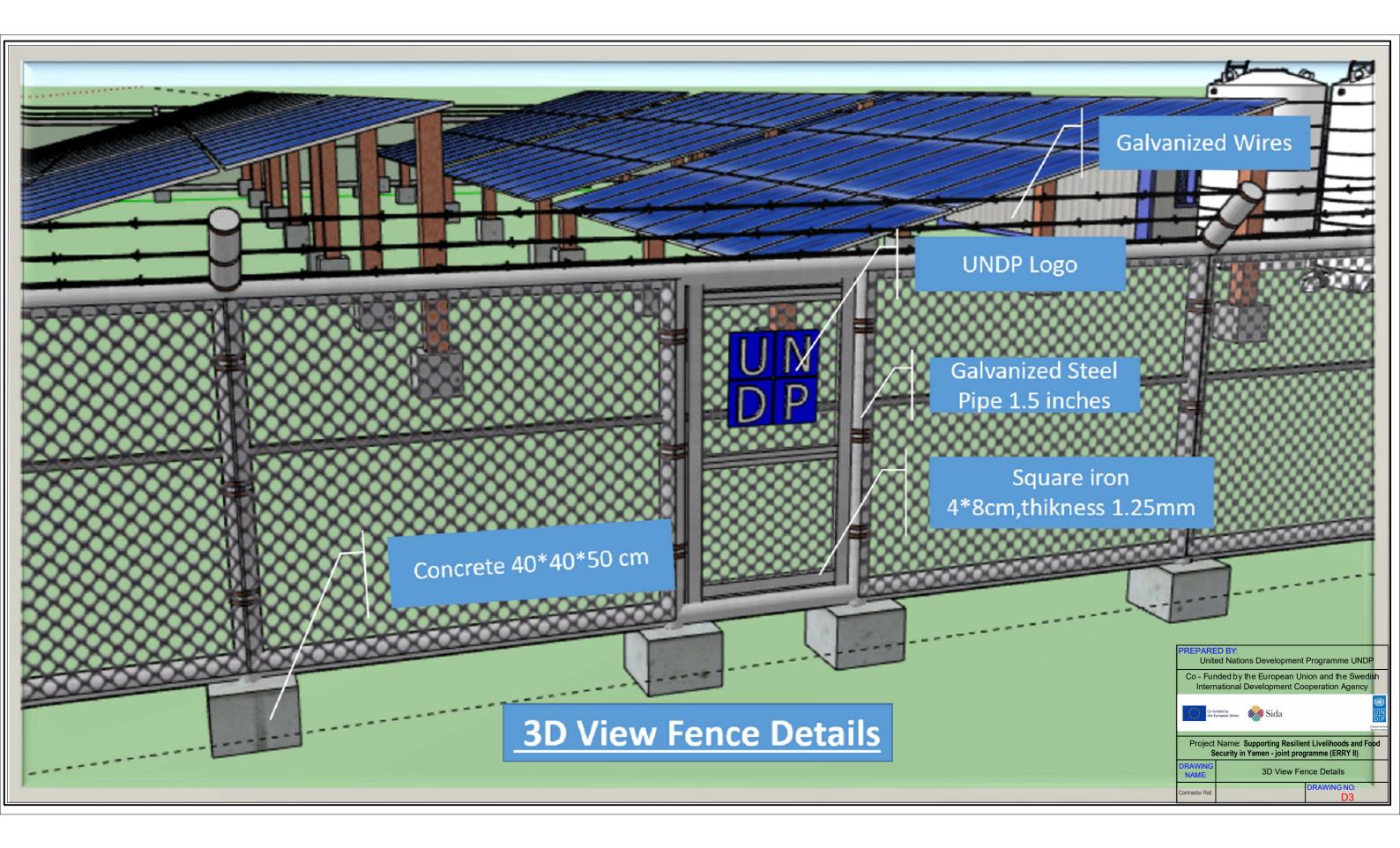
Tank Capacity 30,000 Liters

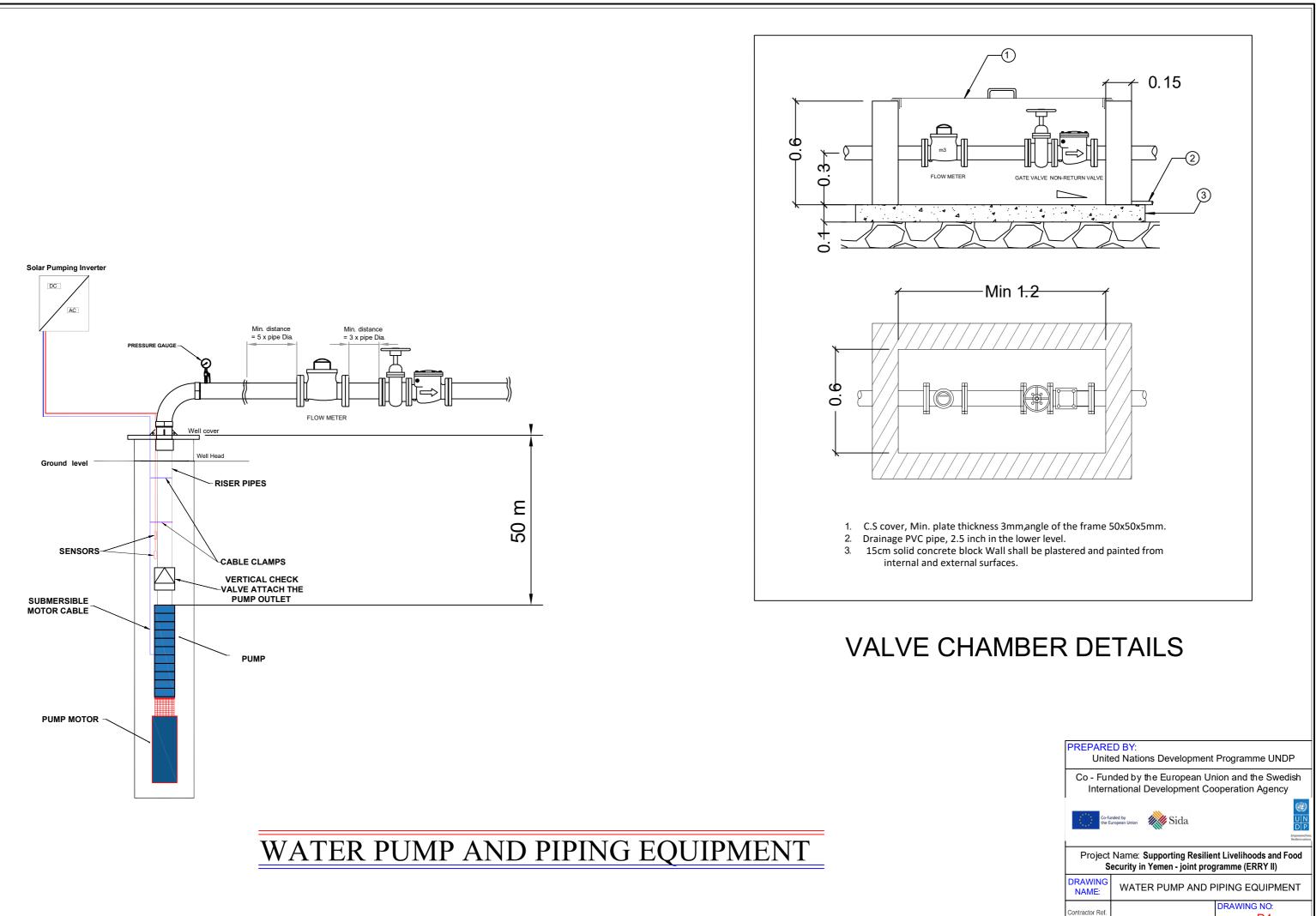
Well Room

Security Fence

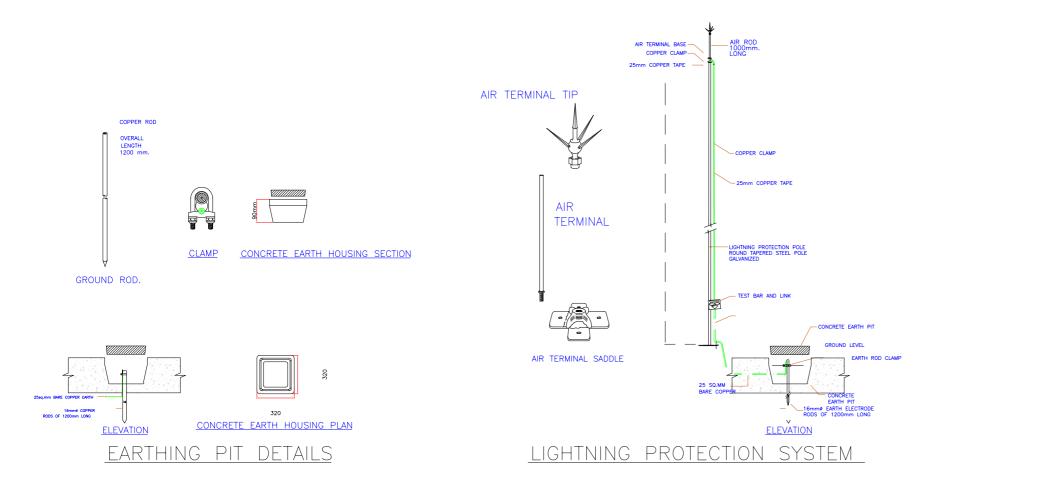




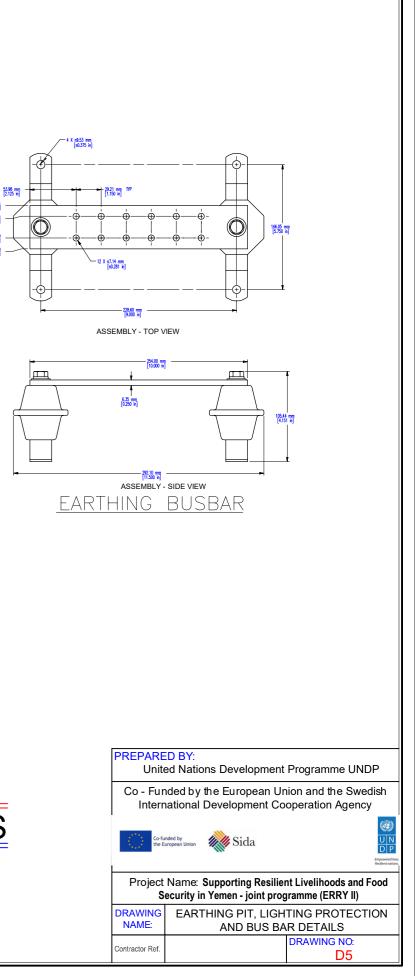




D4



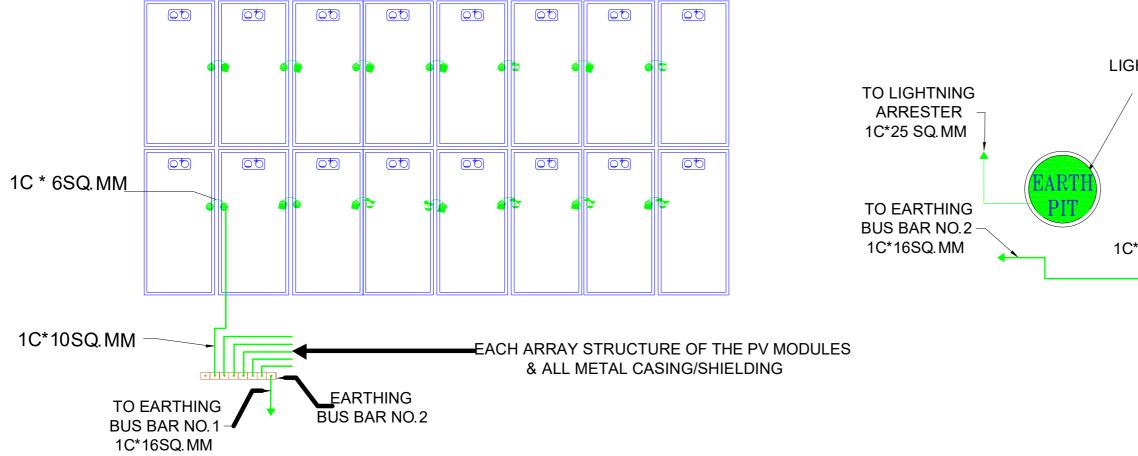
EARTHING PIT, LIGHTNING PROTECTION AND BUS BAR DETAILS



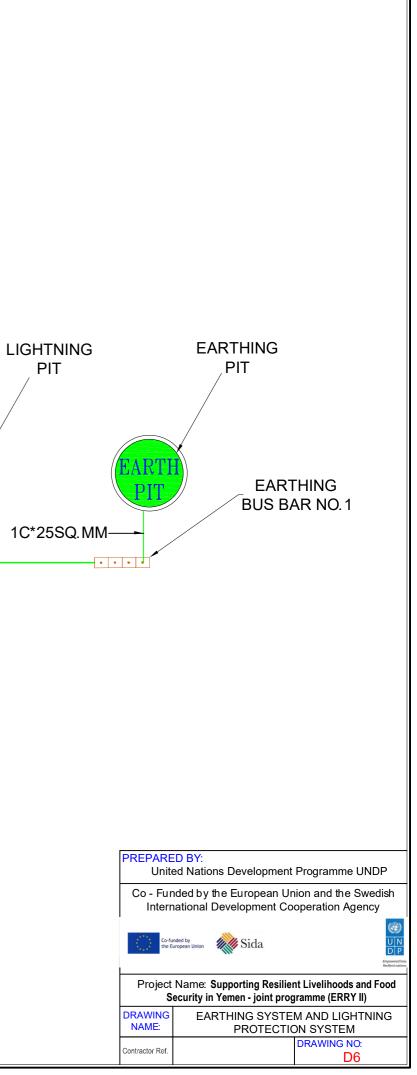
0.00 mm [0.000 in] 12.70 mm [0.500 in]

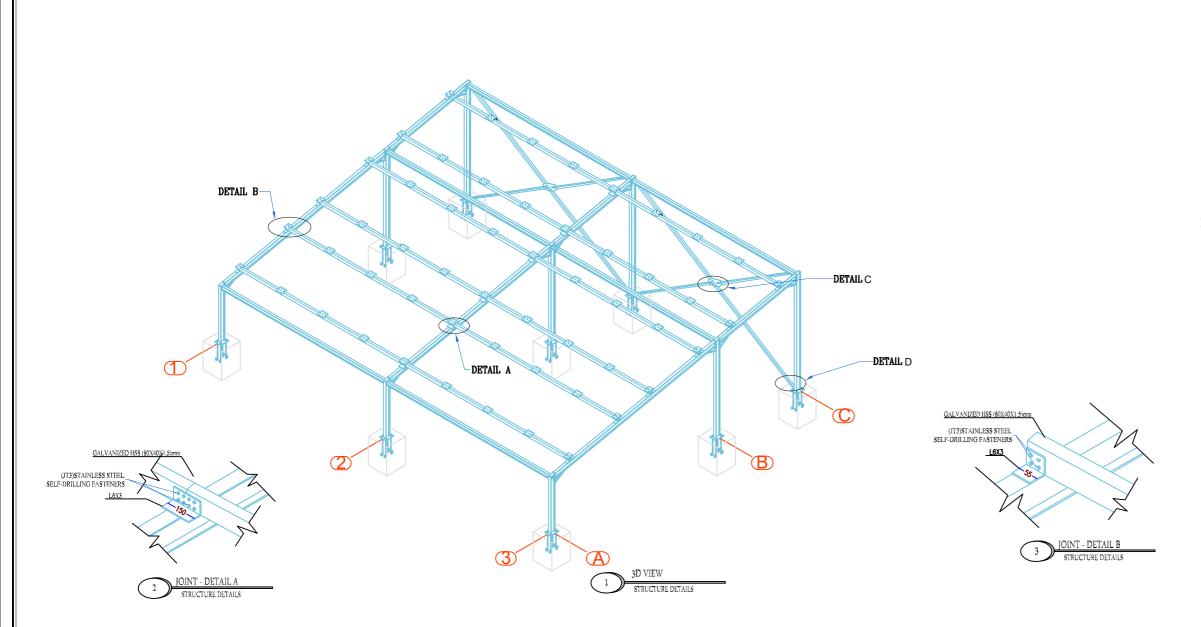
38.10 mm [1.500 in]

50.80 mm

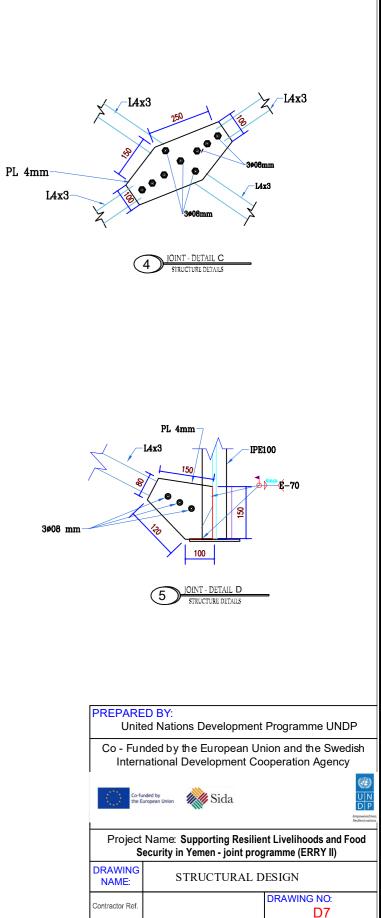


EARTHING SYSTEM AND LIGHTNING PROTECTION SYSTEM





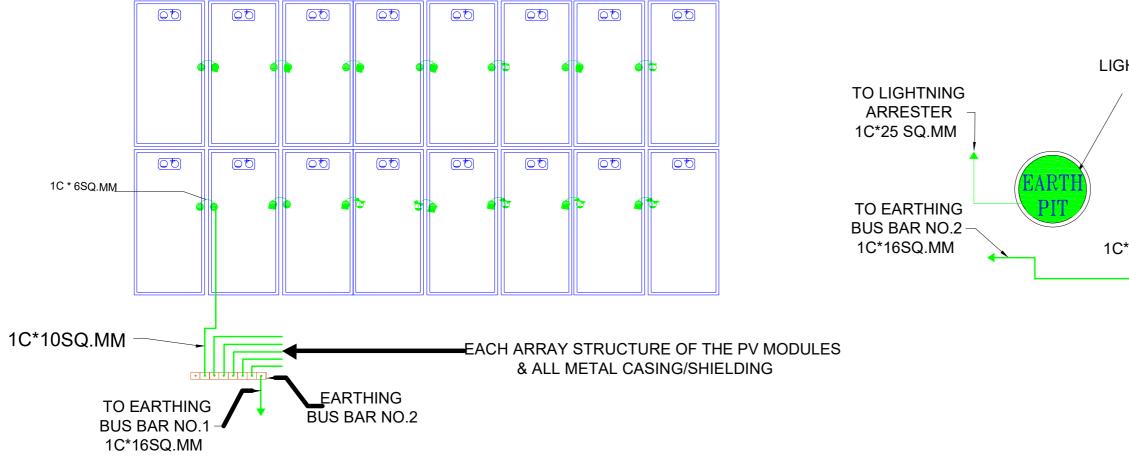
STRUCTURAL DESIGN



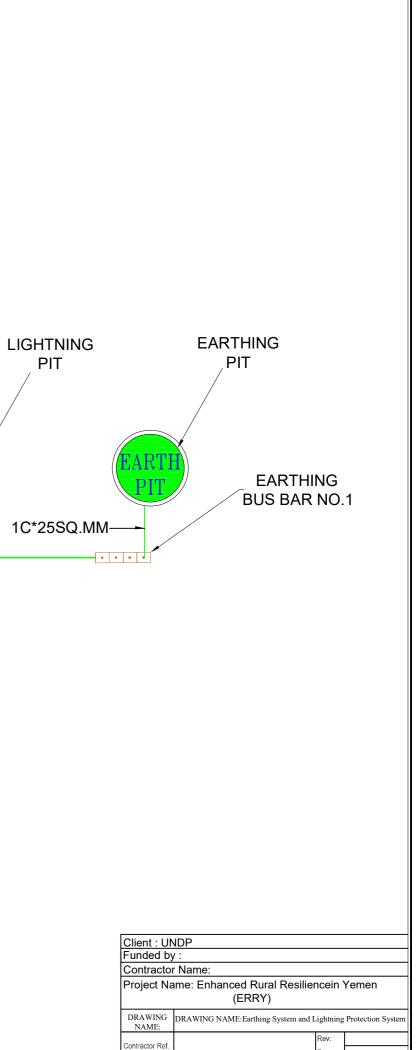


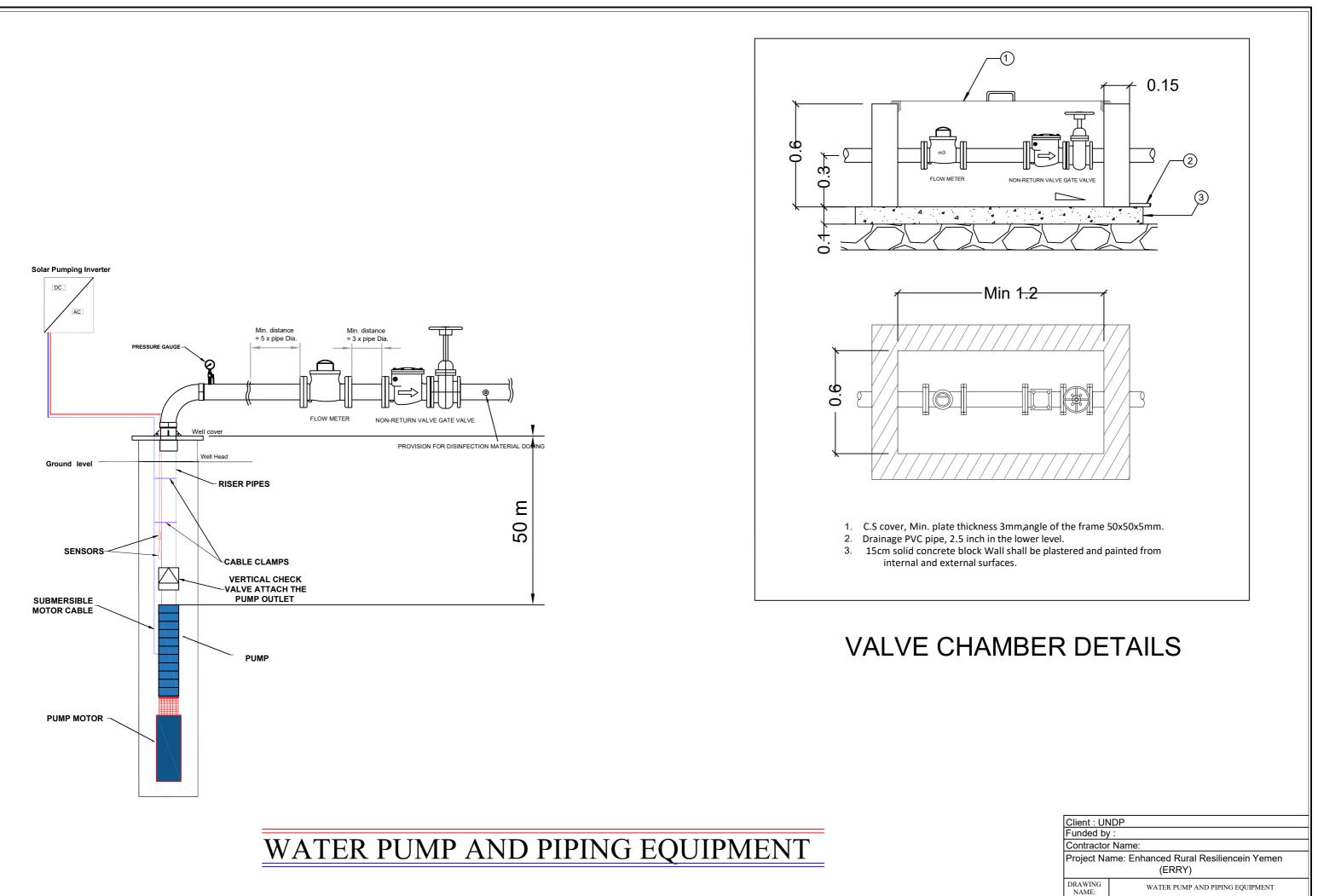
PROJECT SIGN BOARD





Earthing System and Lightning Protection System





Contractor Ref.