1 Control Panel 24"x24"x12" NEMA 4X Hoffman A24H2412SSLP3PTW 304 SS panel painted white with 3-point latch or appr. equal see specification. and SS lockable handle MICROLOGIX 1400 Allen-Bradley 1766-L32BXB (24VDC) w/ memory module w/ memory module 3 Expansion Module Analog expansion module Allen-Bradley 1769–IF4 4 Radio SD4CES-NNSNN 5 Watt Ethernet/Serial Radio MDS 5 Antenna Cable Low loss coaxial cable Andrews Heliax LDF4-50A 6 RF Coaxial Connector L4TNM-PSA or L4TNF-PSA Antenna cable connector Andrews 7 RF Surge Suppressor RF Lighting Surge Arrester Polyphaser IS-50NX-C2 8 Yagi Antenna UHF 450MHz – 470MHz SY-307 Sinclair 9 120V Main Circuit Breaker Type QOU, 15A Thermal Magnetic Square D 10 120V TVSS Din—rail mount TVSS Atlantic Scientific MA15 11 240V TVSS Surge Current 80KA per phase HEPD Square D 12 Power Supply 120VAC to 12VDC power Allen-Bradley 1606-XLP50B supply unit 13 Power Converter 12VDC TO 24VDC Converter PSP24-DC12-1 Rhino VT25-182-10/XX 12-24VDC Converter Concepts majorVTC120i ´12-24VDC Majorpower.com Copper Tin Plated Double Deck 600V Box Lug 14 Terminal block Class 9080 UTTB4— 3044814 Square D Phoenix 15 Ground Terminal Copper Tin Plated, Ground Bar Square D End Clamp, 20 Pole Bridge Phoenix 2 Pole Bridge 16 Battery 12V, 18AH battery (for 120VAC) Power sonic P12180 12V, 55AH battery (for solar TOYO-USP 6GFM55 powered panel), sealed type 17 Level Transmitter Submersible Range: 0 — 5 feet Ametek Drexelbrook SDT-M-B-0006 Blue Ribbon Birdcage BC001-10-X w/ desiccant MEAS System Pressure (NEMA 4X) 0—150 psig 18 Pressure Transmitter Endress+Hauser Insertion Type, 4–20mA output X144-e 19 Flow Transmitter CLA-VAL Vary with pipe size DPDP, 3PDT 8 Pin Base 24 volt 20 Control Relay Potter Brumfield KRPA-11DG-24 Allen Bradley 21 Low voltage Surge Dual Signal Surge Arrester EDCO PC642C-036-X Ethernet Cable with connectors (8 Pin Mini Din to 9 Pin) 22 Cat. 5e Cable Allen-Bradley 23 120VAC Relay 3PDT 11 Pin, Round Base 120VAC Allen Bradley 24 Antenna Tower Tower Top Section w/ short base Rohn 25 Circuit Breaker Amp and number of poles vary Square D 26 Load Center 120/240V, 1—Phase, 125A rated, Square D Q0112L125GRB Service Entrance rated load center w/ QOM50VH w/ 50A Main Breaker, 12 spaces NÉMA 3R (min. 22 kAIC) 27 Solar Panel Solar Photovoltaic Module 110W SW-S110P-D4 Sunwize SPM110P-FSW Solartech

RECLAIMED WATER SYSTEM RTU CONTROL PANEL

A. The Remote Telemetry Units shall be microprocessor based, user programmable, Programmable Logic

Controllers (PLC's) which shall serve as an interface to accumulate, process, transmit and receive discrete and analog status and control messages between the RTU base stations and the remote RTU sites located within a ten mile radius of the base station.

B. Each RTU shall be PLC based, with sufficient battery backed RAM, or EEPROM non-volatile backup memories

C. The programmable controller shall be designed to operate in an industrial environment. The PLC shall be capable of operation in an ambient temperature range of 0°-60°C and a relative humidity of 5-95 percent,

D. All components of the PLC system shall be of the same manufacturer who is regularly engaged in the manufacture of programmable controllers. The manufacturer shall have fully tested units similar to that being furnished in an industrial environment with associated electrical noise. The processing unit shall perform the operations functionally described herein based on the program stored in memory and the status of the inputs

E. The processor and its associated memory shall be enclosed in a modular sheet metal enclosure. Memory shall consist of battery-backed RAM, which shall retain the control program in the event of AC power loss.

Memory shall be not less than 8K user logic for any PLC and shall be adequate for all control functions

F. The relay logic instructions of the programmable controller shall include normally open; normally closed;

transitional positive and negative contacts; timers in .01, .1, and 1.0- second resolution; and up/down counters. Register and table instructions shall include block moves, table to register, register to table, FIFO, table search,

and table to table. Register matrix operations shall include bit sense, bit set/clear, and, or, exclusive or, bit

H. Programmable controllers and accessory equipment shall be Allen Bradley MicroLogix 1400/1766—L32BXB, with memory module and analog extension module.

I. All RTUs shall be powered with either 120VAC through a power supply or 12VDC from solar controller capable of float charging sealed Gel-cell batteries. In a 120VAC powered panel, solar panel and solar controller are not required. For 120V, it shall include an AC power loss alarm output to the RTU on loss of AC power. Power supply shall be of sufficient capacity to provide all required DC power to all RTU equipment, discrete and analog

input/output circuitry, under full load, communications interface equipment, PC modems, radios and other radio interface/conditioning equipment and appurtenances as required. The primary power supply for radio and battery

backup shall be 12VDC. A 12V to 24V Converter is required for the PLC and I/O use. The batteries shall not be older than (3) months at the time of RTU acceptance and shall be lead acid sealed, 12 volt, 18 ampere-hour,

model Power Sonic PS-12180. The battery charger/power supply shall be compatible with the battery, type 1606-XLP50B by Allen Bradley and set the output voltage at 13.6V. The 12V to 24V converter shall be model: PSP24-DC12-1 by Automation Direct or approved equal. In a Solar powered panel, provide a Solar Panel with all

stainless steel U-bolts. The solar panel installation shall meet 150MPH wind loading requirements. Solar panel shall be 110 watts, 12V Sunwize SW-S110P-D4 or Solartech SPM110P-FSW with pole mount kit Sunwize 007954

necessary components including a solar controller. Solar panel shall be mounted on the antenna pole with

or by DPW Solar. The solar controller shall be Morningstar Sunsaver SS-20L-12V. See wiring schematics.

3. Analog input circuits shall be isolated, 15—bit resolution type. Analog inputs shall be coordinated with the receivers but shall generally be isolated 24V 4—20 mA inputs powered from the PLC. Analog input hardware

M. The summary of approved remote telemetry equipment/materials and manufacturers are listed in the Bill

digital input I/0 (only for 120VAC panel)

analog Input IV1 (extension module)

analog Input IV2 (extension module)

analog input IV3 (extension module)

K. All analog inputs shall be furnished with lightning surge protection devices. Sufficient I/O shall be

shall be provided as required for all types of analog inputs being transmitted to the PLC.

L. The RTU hardware shall be assembled to a back plate mounted inside the RTU control panel. All

digital output 0/0

digital output 0/1

components shall be mechanically secured and fully wired. A bonding wire #12 AWG with crimped end

non-condensing. The PLC shall be capable of operation on supply voltages of 24VDC.

specified. A minimum of 1920 on-board registers shall be addressable

G. LED-type indicating lights shall be provided as follows: READY, RUN.

to provide all discrete and analog status, monitoring and control functions and shall be designed to operate in

BILL OF MATERIALS (RECLAIMED CONTROL PANEL) (ALL ELECTRICAL COMPONENTS AND ASSEMBLIES MUST BE UL LISTED/APPROVED)

MANUFACTURER

<u>TYPE</u>

2. RTU COMMUNICATIONS INTERFACE

Baud (synchronous) in ASCII mode.

3. RTU RADIO SECTION AND APPURTENANCES

Neill-Concelman) and N. Male RF connectors.

stations. Frequencies are as follows:

of Roebuck Rd.

Drawing: W:\WUD 2019 STD DTL REVS\WUD STD DTL SHEETS\WUD 2019 STD DTLS - RECLAIMED WATER (5 SHTS).dwg\WUD RW-4 - Last Modified: Tue, Jul 30, 2019 - 11:31am

For stations located south of Clint Moore Rd.

4. RTU ELECTRICAL TRANSIENT PROTECTION

A. Bi-directional communications of status, commands and radio diagnostics between

the RTUs and the RTU base station shall be provided by the RTU communications interface subsystem. The PLC MODBUS serial interface port shall serve as the RTU communications interface. The data transmission rate shall be set to operate at 9600

B. The RTU communications interface shall control the modem during the polling sequence. It shall be possible to assign a base address to each RTU through the data interface. The addressing scheme shall allow a minimum of 247 RTUs for each

SD4CES-NNSNN 5-watt (continuous) Ethernet/Serial radio transceiver with integral RF modem, RS-232 synchronous serial interface and cable, private line coded squelch and carrier defeat timer to inhibit communications lockup. Radio transceiver shall include automatic frequency, control, loop—back and SMART diagnostics remote maintenance

B. Remote terminal unit antenna shall be a heavy-duty, pole-mounted, grounded, 450

MHz - 470MHz Yagi, directional type furnished with a minimum of 20 feet of Andrews Heliax (LDF4-50A) low loss coaxial antenna cable or approved equal, line adapter,

lightning protector and appurtenances. Antenna and accessories shall be an SY-307 as manufactured by Sinclair or approved equal. Dual phase array Yagi antennae shall be

required if the Remote Receive Signal Strength (RSSI) is less than 95 dbm. Minimum antenna height shall be 12 feet above grade, unless otherwise instructed by the Utility Department. Antenna tower shall be made of galvanized steel. RF lightning surge suppressor shall be IS-50NX-C2 by Polyphaser Corporation or approved equal. RF

coaxial connectors shall be of the compression type and be a L4TNM-PSA or L4TNF-PSA by Andrews or approved equal. The antennae orientation toward the receiving

D. Radios shall be pre-programmed by the factory for the frequency of the tower that the radio_will be communicating with. See attached RTU Schedule for location of

1. North Tower — Remote transmit—465.1500 MHz — Receive—460.1500 MHz For stations located north of Lantana Rd., south of Roebuck Rd., and east of S.R. 7

2956 Pinehurst Dr., Greenacres, FL (Coordinates: 26°38.017'N, 80°09.352'W)

12751 Hagen Ranch Rd., Delray Beach, FL (Coordinates: 26°29.260'N, 80°10.018'W)

22438 S.W. 7th Street, Boca Raton, FL (Coordinates: 26°20.586'N, 80°11.840'W)

4. West Tower — Remote transmit—465.525 MHz — Receive—460.525 MHz For stations located north of S.R. 80 and west of S.R. 7; plus all stations located north

A. All electrical and electronic elements shall be protected against damage due to electrical

B. Manufacturer's Requirements: All surge suppressor devices shall be manufactured by a

company that has been engaged in the design, development, and manufacture of such devices for at least 5 years.

C. Suppressor Locations: As a minimum, provide surge suppressors at the following locations:

2. At the field, panel, or assembly connections of all analog signal circuits that have any

D. Surge Suppressor Assemblies for 120-Volt AC Power Supply Connectors: Surge suppressors

transient induced in interconnecting lines from lightning discharges and nearby electrical

2. Central Tower — Remote transmit—465.750 MHz — Receive—460.750 MHz For stations located south of Lantana Rd. and North of Clint Moore Rd.

3. South Tower - Remote transmit-465.025 MHz - Receive-460.025 MHz

20 S.R. 880, Loxahatchee, FL (Coordinates: 26°41.05'N, 80°23.37'W)

1. At main breaker of the RTU control panel for 120VAC power panel.

for connections to ac power supply circuits shall be assemblies that:

5. The suppressor shall be of the type MA15 by Atlantic Scientific.

portion of the circuit extending outside of a protecting building.

3. Between the radio and external mounted antenna.

1. Pluggable, Din-rail mounting AC power protection.

4. UL 1449, 3rd edition and 10 year product warranty.

2. Power on and protection status indicator. 3. Hybrid MOV and RFI filtering components.

C. The complete communications subsystem including all interconnecting cables shall contain lightning, surge and transient protection. All antennae masts shall be grounded.

communication tower shall be set using appropriate instruments.

data link. The communications protocol shall be master-slave MODBUS ASCII for Central and South Towers, and be master-slave MODBUS RTU for North Tower.

A. The radio section shall consist of a Microwave Data Systems model MDS

module to monitor; power out, RSSI, voltage level, internal temperature and forward/reflected power. Radio enclosure shall include RF shield. The interface cable from radio to RF surge suppressor shall be 24" long, RG142 cable with TNC (Threaded

DESCRIPTION

<u>ITEM NAME</u>

2 PLC

28 Solar Controller

30 Terminal J-Box

29 Power Supply for Solenoid

1. REMOTE TELEMETRY UNITS AND APPURTENANCES (R.T.U.)

an outdoor industrial environment

and outputs.

rotate, and complement.

J. Spare parts are not required

Power Loss Alarm (Spare in Solar)

Valve Open Command

Valve Close Command Reclaimed Water Pressure

Reclaimed Water Flow

of Materials. I/O List:

Lake Level

provided for each RTU to accommodate the scheduled I/O

terminals is required between the back plate and control panel.

1. Digital inputs shall be 24VDC from dry contacts. 2. All outputs shall be wired through interposing relays.

Solar Controller (12V) Morningstar 120VAC to 24VDC (only required at Allen-Bradley lift sta. & reclaim combined panel) NEMA 4X, 316 S.S. w/ Hoffman control terminals

Class 9080, 1130-PK9GTA CLIPFIX, FBS 20-6 30300365, FBS 2-6 30300365 KPSI 720-S14B0A (cable length as necessary) Cerabar T (PMC131—A22F1Q4R) (cable length as necessary) 700-HA33Z24-3-4 4PRS, STP 26AWG 700-HA33A1-3-4 45AG2 w/ SB45G Class 860 Multi 9 C60

Sunsaver SS-20L-12V

1606-XLP30E

A1212CHNFSS6

32R

								PROJECT NO.
								00-000
	CONTROL PANEL WITH DOOR OPENED	A. Panel 1. 2. 3. B. Panel 1. C. RTU E 1. 2. 2.	 Builder The panel builder shall be experienced in shall have a UL approved shop. Panel shall have a UL approved shop. Panel shall have a UL approved shop. Panel shall the date of final project certification. The panel builder or qualified technical rept the panel as part of the reclaimed RTU sy Components The panel components are specified on the described in these specifications. Items are other equal quality components may be su Utility Department, be UL listed, and be fur function, mounting dimensions, plug in conchanges must be approved in advance and components shall be new, with no signs of Enclosure The RTU panel itself shall be 24 inch wide (24"W x 24"H x 12"D). A shop drawing m preconstruction meeting. The panel shall h with the following features: a. Constructed of 304 stainless steel 1 All seams to be continuously welded, accepted. b. All external hardware shall be stainles 3-point latch with roller fitting top of padlock fitting and stainless steel extended closed cell neoprene gasket on the closed cell neoprene gasket on the steel or aluminum pocket for log bo f. No penetration through the panel will i.e. no screws through panel, frame, The enclosure shall be the product of a La NEMA-4X enclosure. Manufacturer shall 	the construction of control panels/RTU's, I be UL listed and UL labeled. for one (1) full year minimum from presentative shall check-out and test restern start-up. e drawings with the exception of items e listed by manufacturer and catalog number, bstituted but they must be preapproved by lly interchangeable with those specified in size, nections, and ampacity. Any substitutions or d in writing by the Utility Department. All r evidence of corrosion. e x 24 inch high x 12 inch deep ust be submitted prior to be of a NEMA 4X construction 4 gauge with white powder coated. spot welded panels will not be ess steel with piano hinge, and bottom and single handle with ternal parts. lect water from the door, a continuous door. heavy components (min090 thickness). by eleven inch (9" x 11") stainless ok, tack weld to door. I be allowed except for conduits. no top penetration. JL approved manufacturer and shall be be Hoffman or approved	 Wiring shall be enclosed in panduct or equivalent wireways and the doors and the panel shall be enclosed in a spiral wrap or with sufficient slack to allow full opening of the door. Wiring shall be secured with screw-on tabs, tabs with adhesive used. All electrical wiring must meet or exceed National Electric Code Standards. Any place that electrical wire passes through a metal cover or grommet is required to protect the wire. Component Mounting All relay bases shall be securely mounted with stainless steel I tapping screws are not acceptable. All relay bases shall be securely mounted with screw terminals, no connections shall be used. All base terminals shall be number to relay numbers. Where plug-in components are not firmly s hold down clamps shall be provided. Identification All components shall be identified in accordance with the scher using permanent name tags on the panel of laminated micarta equal. The permanent name tags shall be securely attached a where they are clearly visible. All operator's controls shall be provided with laminated micarta attached with stainless steel screws, with minimum lettering hei Provide a laminated schematic drawing attached to the inside minimum size 11 inches by 17 inches (11" x 17"). Panel builder shall provide the following drawings: Schematic drawing showing all components. All connection anumbers of correspond to the component numbers. All terminals shall be clearly numbered and identified. Bill of material listing all parts as follows, in tabular form 	a wiring between approved equal es shall not be e and Local Code r shield, insulating hardware. Self o soldered red to correspond secured in bases, matic diagram, f or approved and in a position a name tags ight of 1/8 inch. of the outer door -	ANTENNA CABLE LOOP FOR ANTENNA CABLE NOTE 9 (AND TILT 45 DEGREE) 316 S.S. UNISTRUT AND HARDWARE 316 S.S. UNISTRUT AND HARDWARE 317 C ROS 2#12, 1#12G FROM SOLAR PANEL MEMA 4X S.S. 24"X24"X12" (MOUNT TO TOWER W/ S.S. UNISTRUT) USE MYERS HUBS ON ALL CONDUTS ANTENNA COAX CABLE (BOTTOM ENTRY TO RTU CONTROL PANEL) 316 S.S. UNISTRUT MIN. 24" FROM SPUT-BOLT RTU CONTROL PANEL) 317 C SCH 80 PVC, 1-TSP (TWISTED SHELDED PARE) TO PRESSURE TRANSMITTER AT FLOW METER AT CLA-VAL. 1"C SCH 80 PVC, 1-MSC (MAULT AT FLOW METER	PROJECT NAME
	FRONT VIEW NOT TO SCALE <u>NOTES:</u> 1. SEE BILL OF MATERIALS PAGE NO. 31R. 2. ALL FIELD WIRING SHALL BE CONNECTED TO THE TERMINALS. 3. BATTERY SHALL BE LOCATED ON THE BOTTOM OF THE CONTROL PANEL, AWAY FROM ANY	D. Wiring 1.	equal. Enclosure shall have lugs for mour All wiring shall be copper THWN or approv Color code wires as follows: Ground – Green Neutral – White 120 Volt Power – Black 24 Volt Control – Violet Analog Signal – Black and W Special – Blue	nting. ed equal, AWG 14 minimum. /hite	 Drawing Reference Description Manufacturer Catalog Number Type Notes c. Layout drawing showing the front with the operators panel open. Layout drawings shall also show the outside of the panels and dimensioned mounting supports.	el and with the e dimensions	 ANTENNA INSTALLATION SHALL MEET THE WIND LOADING REQUIREMENT PER FLORIDA BUILDING CODE. MINIMUM ANTENNA HEIGHT SHALL BE 12 FEET. IF ANY OBSTRUCTION IS LOCATED BETWEEN THE RADIO COMMUNICATION PATH, ANTENNA HEIGHT SHALL BE HIGHER THAN THOSE OBSTRUCTIONS. CONDUITS SHALL NOT ENTER THE TOP OF CONTROL PANEL. ALL ELECTRICAL PANELS SHALL BE GROUNDED. METER AND SERVICE ENTRANCE RATED LOAD CENTER ARE NOT REQUIRED IF THE RTU IS SUPPLIED BY SOLAR POWER OR NEARBY LIFT STATION POWER. ALL MOUNTING HARDWARE SHALL BE 316 STAINLESS STEEL. 	A BEACH COLLET
	4. PANEL BUILDER SHALL ADJUST THE PANEL LAYOUT AS NEEDED.	2. 3.	Different control wiring colors are acceptab wiring shall be kept separate from control phase. All wires shall be numbered with machine both ends. All external connection and internal connec shall be brought to the numbered terminal	ele if clearly identified. Power wiring, and shall be identified by made plastic wrap around labels at etions, where shown on the drawings, s. RECLAIMED WATER SYSTEM RTU	 Plastic enclosed drawing inside the puller as previously in 2. Drawings shall be clear and readable and a minimum of 11 in (11" x 17"). "Fuzzy" reductions will be rejected. H. See Remote Telemetry Units (RTU specifications) for programmable log I/O expansion module, Radio, solar power system, etc. requirements. PANEL SPECIFICATIONS 	nches by 17 inches gic controller (PLC),	 MAINTAIN 36" CLEARANCE IN FRONT OF ALL ELECTRICAL PANELS. SOLAR PANEL IS NOT REQUIRED IF 120 VAC POWER IS AVAILABLE. ELECTRICAL PANEL SUPPORT STRUCTURE / ANTENNA TOWER HAS BEEN DESIGNED IN ACCORDANCE WITH THE FLORIDA BUILDING CODE 2010 FOR THE FOLLOWING CRITERIA: INSK CATEGORY IV EXPOSURE CATEGORY "C" WIND VELOCITY, Vult = 181 MPH RECLAIMED WATER SYSTEM RTU ANTENNA AND PANEL MOUNTING DETAIL 41F 	BEACH COUNTY BEACH COUNTY LLITIES DEPARTMENT D. BOX 16097 LM BEACH, FL 33416 LM BEACH, FL 33416 561)493-6000
		33R			٦	34-35R		LM UTII P.0 (5
	COMMUNICATIONS INTERFACE directional communications of status, commands and radio diagnostics between 'Us and the RTU base station shall be provided by the RTU communications ce subsystem. The PLC MODBUS serial interface port shall serve as the RTU unications interface. The data transmission rate shall be set to operate at 9600 (synchronous) in ASCII mode. RTU communications interface shall control the modem during the polling nce. It shall be possible to assign a base address to each RTU through the	 E. Surge Suppressors for Analog Signal Connections circuits shall: 1. Have four lead devices with a threaded mounting 2. Have a circuit consisting of a 3-electrode gas clamp each line to ground. High-energy gas tube separated by series impedance. 3. Be epoxy encapsulated with a nonflammable phenetering and the separatement of th	s: Surge suppressors for analog signal ng/grounding stud. tube and silicone avalanche devices to and silicone avalanche devices shall be enolic enclosure. Epoxy encapsulation shall	FROM FPL TRANSFORMER/ HANDHOLE 120/240V, 1PHASE 1 1/2"C SCH 80 PVC, 2#3, 1#3N/G	SERVICE CALCULATION 120/240V, 1-PHASE 50WATT POWER SUPPLY 1.0 A FUTURE LOAD 5.0 A TOTAL LOADS 6.0 A 25% OF CONTINUOUS LOAD 1.5 A TOTAL LOADS (AMP) 7.5 A			PAI TER
	nterface. The addressing scheme shall allow a minimum of 247 RIUs for each nk. The communications protocol shall be master—slave MODBUS ASCII for I and South Towers, and be master—slave MODBUS RTU for North Tower. I RADIO SECTION AND APPURTENANCES radio section shall consist of a Microwave Data Systems model MDS S—NNSNN 5—watt (continuous) Ethernet/Serial radio transceiver with integral RF n, RS—232 synchronous serial interface and cable, private line coded squelch and defeat timer to inhibit communications lockup. Radio transceiver shall include atic frequency, control, loop—back and SMART diagnostics remote maintenance a to monitor; power out, RSSI, voltage level, internal temperature and d/ceffered power. Radio enclosure shall include RF shield. The interface cable	 4. Limit line-to-ground and line-to-line voltage to 5. Meet or exceed the following performance criteri 8-microsecond rise time and 20-microsecond expo a. Recovery: Automatic b. Peak Source Current: 10,000 amps c. Pulse Lift Before Failure: 100 occurrences d. Minimum Voltage Clamp Rating: 36 volts e. Series Impedance: 24 ohms total f. Temperature Range: -20 degrees C to +85 degrees 	o 36 volts on 24V dc circuits. ia based on a test surge wave with onential decay time: egrees C	125A, 120/240V, 10 SERVICE ENTRANCE RATED LOAD CENTER W/ 50A MAIN BREAKER, NEMA 3R 20A 20A 20A	SERVICE LOADS (KVA) AT 240V, 1Ø = 1.8 KVA -3/4"C SCH 80 PVC, 1#12, 1#12N, 1#12G			
	adio to RF surge suppressor shall be 24" long, RG142 cable with TNC (Threaded concelman) and N. Male RF connectors. mote terminal unit antenna shall be a heavy-duty, pole-mounted, grounded, 450 470MHz Yagi, directional type furnished with a minimum of 20 feet of Andrews (LDF4-50A) low loss coaxial antenna cable or approved equal, line adapter, ig protector and appurtenances. Antenna and accessories shall be an SY-307 as actured by Sinclair or approved equal. Dual phase array Yagi antennae shall be d if the Remote Receive Signal Strength (RSSI) is less than 95 dbm. Minimum a height shall be 12 feet above grade, unless otherwise instructed by the Utility ment. Antenna tower shall be made of galvanized steel. RF lightning surge ssor shall be IS-50NX-C2 by Polyphaser Corporation or approved equal. RF connectors shall be of the compression type and be a L4TNM-PSA or -PSA by Andrews or approved equal. The antennae orientation toward the receiving unication tower shall be set using appropriate instruments.	 g. Operating Voltage: Less than 36V dc h. Operating Current: 4 to 20 mA dc i. Resistance Line-to-Ground: Greater than 1 me 6. The suppressor shall be of the type PC 642C-0 F. RF Surge Suppressors: RF surge suppressors st 1. Meet or exceed the following technical specification a. Surge: 50kA IEC 1000-4-5 8/20ms Waveform b. Turn on: 600 VDC +/-20% c. Turn on time: 2.5ns for 2kV/ns d. Frequency Range: 125MHz to 16Hz e. VSWR: ≤1.1 to 1 over frequency range f. Insertion Loss: ≤0.1 dB over frequency range g. Temperature: -45°C to +85°C Storage/Operating 	ega-ohm D36 by EDCO Inc. or approved equal. shall: tions: 500 Joules +50°C	This portion is only required if new electrical service is required and solar power is not used.	#12 THHN RED			ISION / REMARKS
	 lightning, surge and transient protection. All antennae masts shall be grounded. ios shall be pre-programmed by the factory for the frequency of the tower that dio will be communicating with. See attached RTU Schedule for location of s. Frequencies are as follows: th Tower - Remote transmit-465.1500 MHz - Receive-460.1500 MHz otions located north of Lantana Rd., south of Roebuck Rd., and east of S.R. 7 Pinehurst Dr., Greenacres, FL (Coordinates: 26*38.017'N, 80*09.352'W) tral Tower - Remote transmit-465.750 MHz - Receive-460.750 MHz otions located south of Lantana Rd. and North of Clint Moore Rd. Hagen Ranch Rd., Delray Beach, FL (Coordinates: 26*29.260'N, 80*10.018'W) th Tower - Remote transmit-465.025 MHz - Receive-460.025 MHz otions located south of Clint Moore Rd. 	 n. Unit impedance: 50 Onm i. Mounting: Flange 2. The suppressor shall be of the type IS-50NX-4 equal. 5. RTU CORROSION PROTECTION A. All indoor and outdoor cabinets, panels and conscorrosion inhibitor capsules capable of protecting 5 Hoffman Model A-HC15E, ZERUST Model VC-6-2 of labeled with the date of activation. 6. RTU FABRICATION A. Cabinets and panels shall provide mounting for input/output subsystems, panel mounted equipment 	C2 by PolyPhaser Inc. or approved nsoles shall be fitted with vapor phase b-cubic feet of space for one year; or approved equal. Capsules shall be power supplies, control equipment, t and appurtenances. Ample space	#14 THHN RED	PFR CCB1 CONTENT (10) C #12 THEN BLACK PFR PFR C CONTROLLER C CONTROLLER C SOLAR C CONTROLLER C SOLAR			RE CENERAL REVISION
The set of and on operating by the set of a decide with the set	S.W. 7th Street, Boca Raton, FL (Coordinates: 26°20.586 N, 80°11.840 W) at Tower - Remote transmit-465.525 MHz - Receive-460.525 MHz ations located north of S.R. 80 and west of S.R. 7; plus all stations located north abuck Rd. 8. 880, Loxahatchee, FL (Coordinates: 26°41.05'N, 80°23.37'W) ELECTRICAL TRANSIENT PROTECTION electrical and electronic elements shall be protected against damage due to electrical	 shall be provided between equipment to facilitate servicing and cooling. B. Terminal blocks shall be factory assembled on a miniature mounting channel and the channel bolted to the steel strap. Terminals shall be miniature screw type with integral fuse holder unless otherwise required. Terminal blocks shall provide access to screw terminals without disabling the fuses. C. The terminals shall be marked vertically with a permanent, continuous marking strip from top to bottom. One side of each terminal strip shall be reserved exclusively for field incoming conductors. Common connections and jumpers required for internal wiring that the full strip shall be reserved exclusively for field incoming conductors. 		24VDC CONVERTER 13 #14 THHN	BLACK			NO. DATE JUN 2019
The function of the species last of the first point last of the species of the filst point last of the species last of the spe	nut inserved in intervention means from ingraning discharges and nearby electrical s. infacturer's Requirements: All surge suppressor devices shall be manufactured by a ny that has been engaged in the design, development, and manufacture of such devices least 5 years	Owner, a vendor's pre-engineered and prefabricated wiring termination system will be acceptable. D. Wiring shall comply with accepted standard instrumentation and electrical practices and codes. For each pair of parallel termination blacks the first standard instrumentation and electrical practices		+24 PLC (2) RADIO POWER CABLE			RECLAIMED WATER #4 STANDARD DETAILS	STD DETAILS
er on and protection status indicator. id MOV and RFI filtering components. id MOV and RFI filtering components. 1449, 3rd edition and 10 year product warranty. suppressor shall be of the type MA15 by Atlantic Scientific. RECLAIMED WATER SYSTEM RTU CONTROL PANEL POWER WIRING DIAGRAM APPROVED BY: WUD Water Astronoment Water Astronoment Notes: State Bill OF MATER SYSTEM RTU CONTROL PANEL Palm Beach County Water Utilities Department P.O.Box 16.097 Water Dividities of the type WATER SYSTEM RTU SPECIFICATIONS WUD	Teast 5 years. pressor Locations: As a minimum, provide surge suppressors at the following locations: main breaker of the RTU control panel for 120VAC power panel. the field, panel, or assembly connections of all analog signal circuits that have any of the circuit extending outside of a protecting building. ween the radio and external mounted antenna. ge Suppressor Assemblies for 120-Volt AC Power Supply Connectors: Surge suppressors nnections to ac power supply circuits shall be assemblies that: ggable, Din-rail mounting AC power protection.	 and codes. For each pair of parallel terminal blocks the blocks. Solder-less horseshoe (spade) connected used for connecting wires to terminal blocks. E. All wiring shall be bundled and run open or enc required. All conductors run open shall be bundled exceeding 12 inches, with nylon cable ties. Care s signal, discrete signal, and power wiring. A copper length of each panel. Interior panel wiring and fie terminations with machine-printed plastic sleeves. number listed in the input/output schedules. 	cks, the field wiring shall be between ors, with insulating sleeves, shall be closed in vented plastic wire way, as and bound at regular intervals, not shall be taken to separate electronic r ground bus shall be installed the full eld wiring shall be tagged at all The wire number shall be the ID	(3)× #16 TWISTED SHIELDED PAIR CABLE (3)× #16 TWISTED +14 THHN +24 -24 LOOP POWER TO FLOW, PRESSURE AND LEVEL INSTRUMENTS	BLUE ANTENNA CABLE CABLE ANTENNA CABLE CABLE CABLE CABLE TO ANTENNA CABLE TO ANTENNA CABLE TO ANTENNA CABLE TO ANTENNA CABLE CABLE TO ANTENNA CABLE CABLE TO ANTENNA CABLE COMMUNICATION CABLE COMMUNICATION CABLE		CONSULTANT: IT'S THE LAW ! CALL 48 HOURS BEFORE YOU DIG 1-800-432-4770 SUNSHINE STATE ONE CALL OF FLORIDA, INC. UTILITIES NOTIFICATION CENTER	SHEET NUMBER O DF O SEAL
suppressor shall be of the type MA15 by Atlantic Scientific. DRAWN BY: M. BUCKNER Suppressor shall be of the type MA15 by Atlantic Scientific. DRAWN BY: M. BUCKNER CHECKED BY: J. LAMMERT OPWER WIRING DIAGRAM APPROVED BY: J. LAMMERT Woter Viliations M. BUCKNER Power WIRING DIAGRAM M. BUCKNER Wuter Viliations Palm Beach County Water Viliations P.O.Box 16097 West Palm Beach. FL 33416-6097 Jul 30. 2019	rer on and protection status indicator. rid MOV and RFI filtering components. 1449, 3rd edition and 10 year product warranty.			<u>NOTES:</u> 1. SEE BILL OF MATERIALS ON PAGE NO	. 31R.	ſ	DESIGNED BY: WUD	
	suppressor shall be of the type MA15 by Atlantic Scientific.	IS	36-39R	2. ALL FIELD WIRING SHALL BE CONNECT RECLAIME	TED TO THE TERMINALS. D WATER SYSTEM RTU CONTROL PANEL POWER WIRING DIAGRAM	40R	DRAWN BY: <u>M. BUCKNER</u> CHECKED BY: <u>J. LAMMERT</u> APPROVED BY: <u>WUD</u> West Palm Beach EL 33416-6097	Jul 30. 2019