



MIDLAND COUNTY FAIRVIEW CEMETERY

REQUEST FOR PROPOSAL 22MCO600 IRRIGATION AT THE CEMETERY

MIDLAND COUNTY
500 N. LORAIN ST.
MIDLAND, TEXAS 79701



LOCATION MAP

NTS



PROJECT LOCATION:
1620 N. A St.
MIDLAND, TEXAS
79701

MIDLAND COUNTY STAFF - POINT OF CONTACT

Eddie Melendez
Director of Facilities/Operations
(432) 688-4151

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Fairview Cemetery
Landscape Irrigation Renovations



CLIENT

MIDLAND COUNTY
500 N Loraine Street
Midland, TX 79701
Phone: 432-742-7777

PROJECT NO.

40044.22

KEY PLAN

#	DATE	DESCRIPTION
1	11/30/2022	Addendum 001
-	11/07/2022	Issued for Bid

Cover Sheet

G001

Parkhill
BID DOCUMENTS

NOVEMBER 2022

Parkhill No. 40044.22



GENERAL NOTES

- A. COORDINATE ALL STORAGE AREAS WITH OWNER PRIOR TO CONSTRUCTION OPERATIONS
- B. LOCATE PROJECT SIGNAGE AS DIRECTED BY OWNER
- C. IRRIGATION SYSTEM SHALL BE INSTALLED IN PHASES ACCEPTABLE TO AND COORDINATED WITH OWNER'S BURIAL SCHEDULES AND MODIFIED AS REQUIRED
- D. THE PROJECT SITE IS OPEN TO THE PUBLIC 24 HOURS PER DAY, 7 DAYS PER WEEK, 365 DAYS PER YEAR. ALL AREAS NOT CURRENTLY UNDER CONSTRUCTION SHALL BE OPEN AND ACCESSIBLE TO THE PUBLIC
- E. ALL AREAS OF ACTIVE EXCAVATION SHALL BE MONITORED BY THE CONTRACTOR TO ENSURE PUBLIC SAFETY
- F. OPEN EXCAVATIONS TO REMAIN UN-MONITORED SHALL BE SECURED BY INSTALLATION OF TEMPORARY FENCING TO ENSURE PUBLIC SAFETY
- G. VEHICULAR PAVING DEMOLITION AND REPAIR SHALL BE COORDINATED WITH OWNER. INSTALL TEMPORARY PAVING AS REQUIRED TO PROVIDE VEHICULAR USE WITHIN 24 HOURS OF REMOVAL
- H. PIPE INSTALLED BELOW PAVING SHALL BE INSTALLED AS PER DETAIL B31502 OR BORED AT THE CONTRACTOR'S OPTION
- I. PIPE SLEEVE INSTALLED ACROSS A STREET SHALL BE BORED AS PER LOCAL CODE

IRRIGATION SLEEVE LEGEND

- PIPE SLEEVE: EXISTING IRRIGATION SLEEVE FIELD VERIFY SIZE, LOCATION, AND PASSABILITY
- PIPE SLEEVE: PIPE BENEATH PAVING
- PIPE SLEEVE: SDR 26 - CLASS 160 IPS - ASTM D2241



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Demolition Plan

L004



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Irrigation Plan

L101

IRRIGATION GENERAL NOTES

A. SEE SHEET L001 FOR IRRIGATION GENERAL NOTES

IRRIGATION SCHEDULE

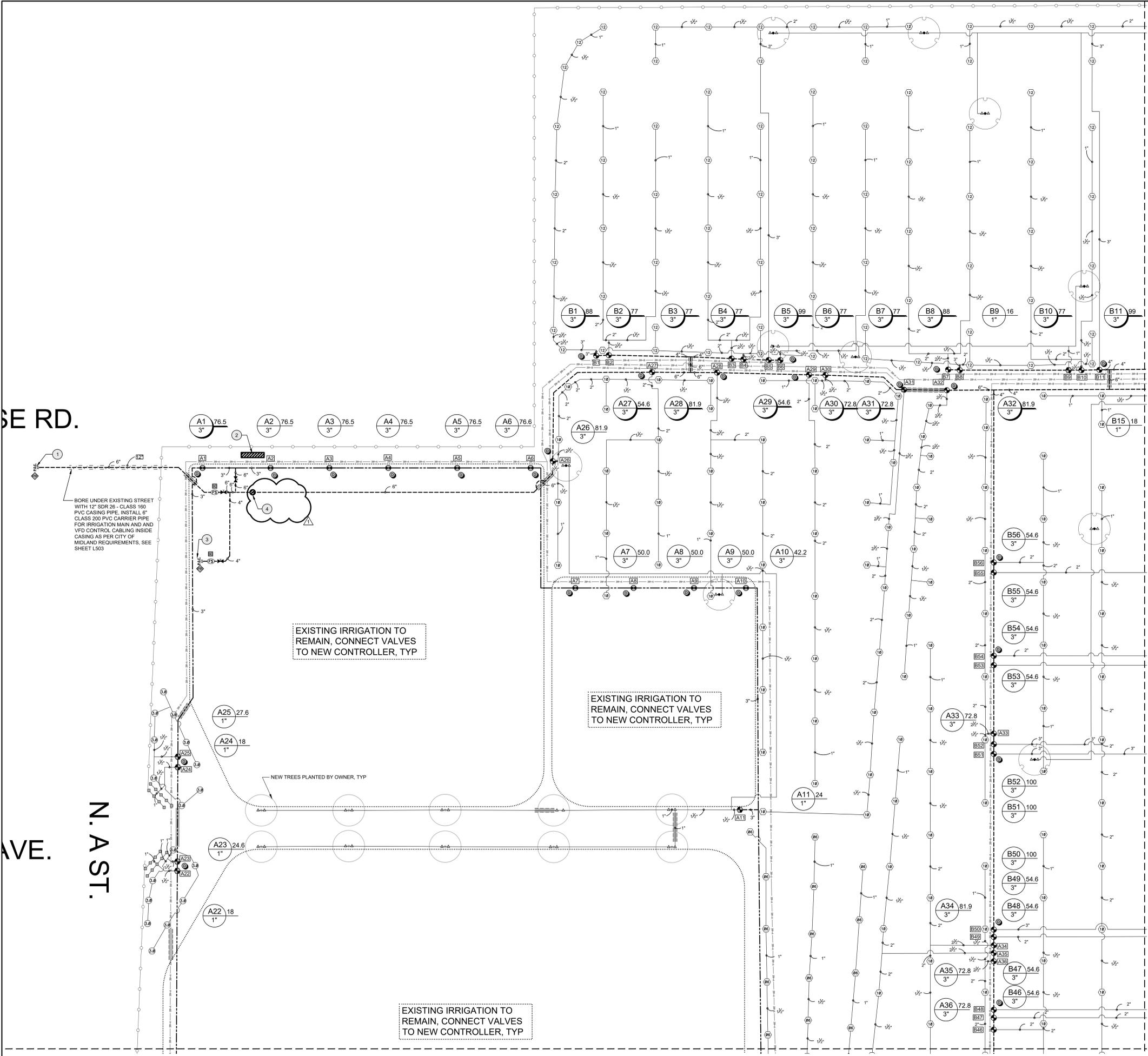
A. SEE SHEET L001 FOR IRRIGATION SCHEDULES

IRRIGATION WIRE SCHEDULE

- TWO-WIRE PATH 'A'
- TWO-WIRE PATH 'B'
- TWO-WIRE PATH 'C'

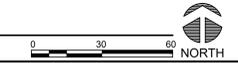
REFERENCE NOTES SCHEDULE

SYMBOL	DESCRIPTION
1	SUBMERSIBLE WELL #1
2	EXISTING ELECTRICAL RACK: CONTRACTOR TO INSTALL TWO NEW OUTDOOR RATED VFD DRIVES - ONE PER WELL. MCI CONTROLS SOLUTIONS VSDP SERIES SIZED PER WELL APPLICATION OR APPROVED EQUAL. EXISTING WELL 1 SUBMERSIBLE PUMP RATED AT 15HP, 250GPM, 480VAC, 3PHASE. EXISTING WELL 2 SUBMERSIBLE PUMP RATED AT 7.5HP, 75GPM, 480VAC, 3PHASE. CONTRACTOR TO INSTALL CONDUIT AND VFD CABLING SPECIFIC TO SIZE AND PUMP IN ACCORDANCE TO NFPA70E CODE AND PROJECT SPECIFICATIONS. CONTRACTOR TO MODIFY EXISTING ELECTRICAL RACK AND SERVICE IF NEEDED. VFD DRIVE UNITS TO OPERATE IN A CASCADE SEQUENCE WITH ONE DRIVE AS PRIMARY AND THE OTHER AS SECONDARY. VFDs TO OPERATE BASED ON SYSTEM PRESSURE AS PROVIDED BY NEW PRESSURE TRANSMITTER. VFDs TO MAINTAIN OPERATOR SETTABLE PRESSURE SETPOINT. VFDs TO AUTOMATICALLY START/STOP TO MAINTAIN SYSTEM PRESSURE WITHOUT EXCEEDING PIPE, FITTINGS, CONNECTIONS, SPRAY NOZZLES AND OTHER DEVICES AS INDICATED BY MANUFACTURER(S).
3	EXISTING SUBMERSIBLE WELL #2
4	NEW PRESSURE TRANSMITTER: CONTRACTOR TO INSTALL NEW 0-150PSIG PRESSURE TRANSMITTER. PRESSURE TRANSMITTER TO COMMUNICATE TO NEW VFD DRIVE UNITS. CONTRACTOR TO INSTALL PRESSURE TRANSMITTER WITH ISOLATION VALVES IN BETWEEN PRESSURE TRANSMITTER AND PIPE CONNECTION WITHIN AN IN GROUND JUNCTION BOX AT MINIMUM ACCESS OPENING OF 12"X18". CONTRACTOR TO INSTALL 3/4" CONDUIT UNDERGROUND FROM PRESSURE TRANSMITTER INSTALLED LOCATION TO EXISTING ELECTRICAL RACK. CONTRACTOR TO UTILIZE #16AWG TWISTED SHIELDED PAIR SIGNALING CABLING TERMINATED AT PRESSURE TRANSMITTER AND AT PRIMARY VFD.
5	EXISTING SUBMERSIBLE WELL #3: CONTRACTOR TO INSTALL ONE NEW OUTDOOR RATED VFD DRIVE. MCI CONTROLS SOLUTIONS VSDM4-SP SERIES SIZED PER WELL APPLICATION OR APPROVED EQUAL. EXISTING WELL 3 SUBMERSIBLE PUMP RATED AT 7.5HP, 75GPM, 230VAC, 1PHASE. CONTRACTOR TO INSTALL CONDUIT AND VFD CABLING SPECIFIC TO SIZE AND PUMP IN ACCORDANCE TO NFPA70E CODE AND PROJECT SPECIFICATIONS. CONTRACTOR TO ERCT NEW ELECTRICAL RACK AND SECURE TO INTERIOR OF EXISTING SHOP FACILITY. CONTRACTOR TO COORDINATE WITH OWNER AS TO LOCATION. CONTRACTOR TO MODIFY ELECTRICAL SERVICE IF NEEDED. CONTRACTOR TO INSTALL SIGNALING CABLE TO NEW DRIVE UNITS LOCATED ON WEST SIDE OF PROPERTY. VFD DRIVE UNITS TO OPERATE IN A CASCADE SEQUENCE WITH ONE DRIVE AS PRIMARY AND THE OTHERS AS SECONDARY. SEE NOTES ON DRAWING L101.



A1 IRRIGATION PLAN
1" = 30'

MATCH LINE (SEE SHEET L103)



A202240044.2203_DSGN01_DWG090_LANDU-01-1-04.DWG 11/28/2022 11:12:11 AM, TBSco

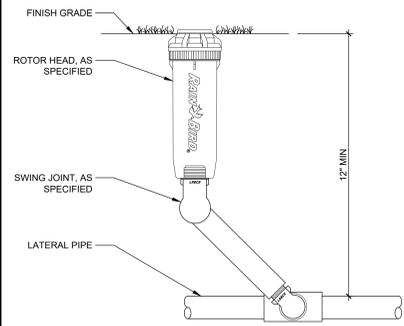


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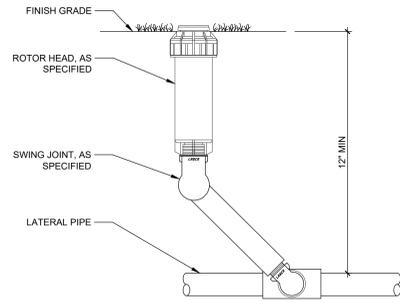
PROJECT NO.
40044.22
KEY PLAN

Irrigation Details

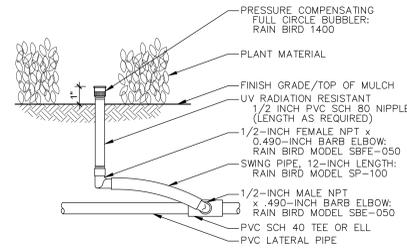
L501



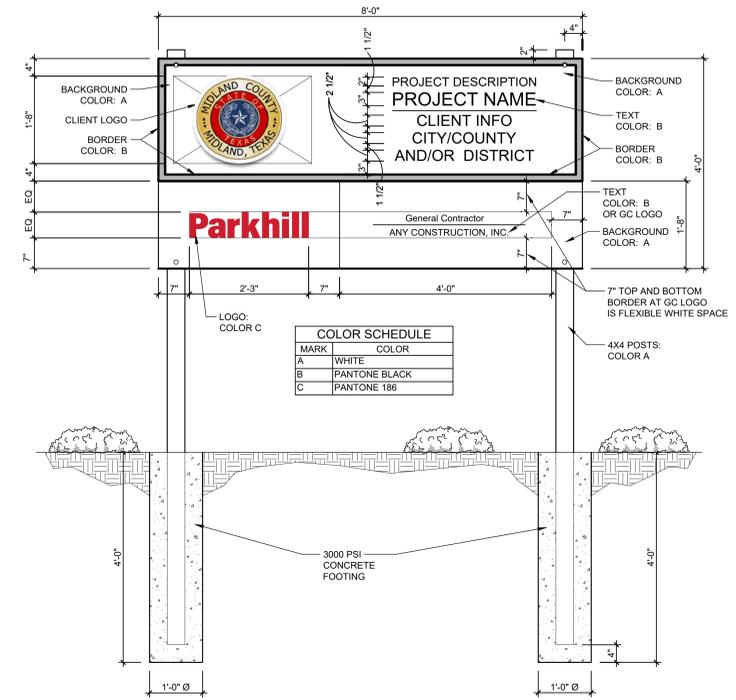
E1 RAINBIRD 6504 ROTOR
3" = 1'-0" PSC-MID-MCO-328403-04



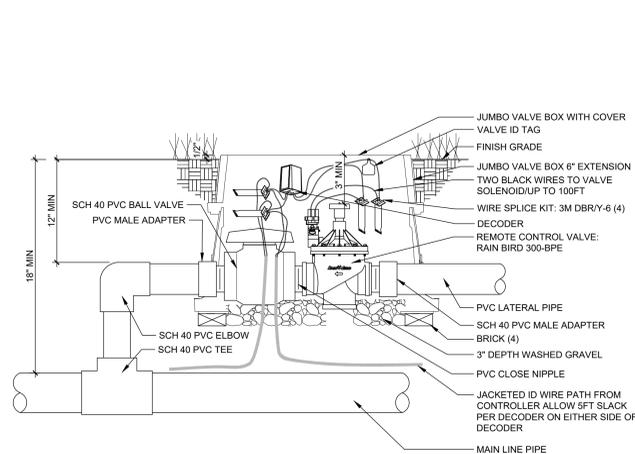
E2 RAINBIRD 5004 ROTOR
3" = 1'-0" PSC-MID-MCO-328403-05



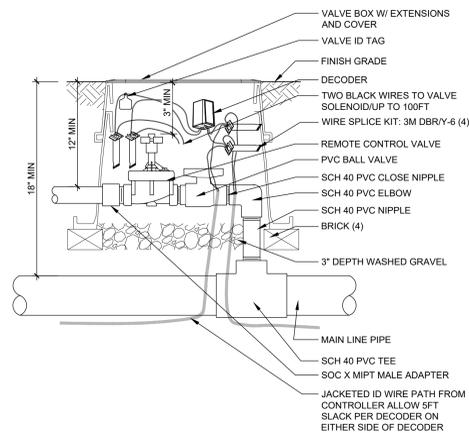
E3 BUBBLER ON RISER
3" = 1'-0" PSC-MID-MCO-328403-03



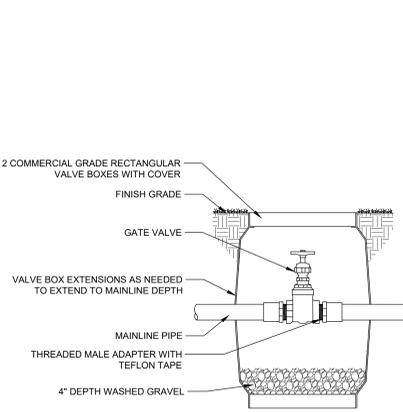
D5 PROJECT SIGN
3/4" = 1'-0" PSC-MID-MCO-0153-0-01



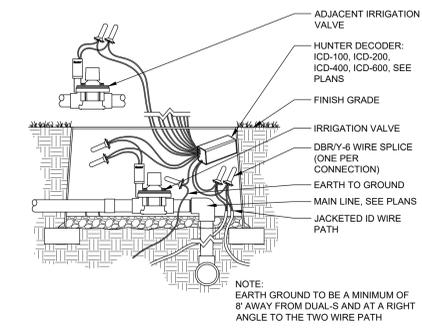
B1 3" ZONE VALVE
1 1/2" = 1'-0" PSC-MID-MCO-328406-09



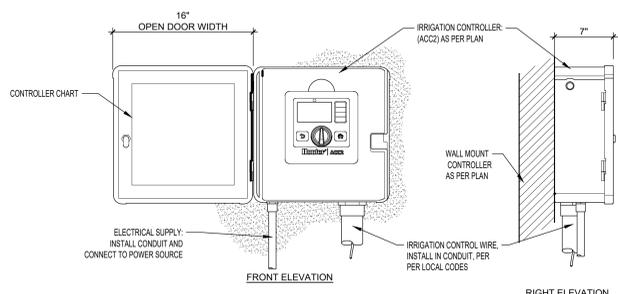
B2 RAINBIRD PESB VALVE
1 1/2" = 1'-0" PSC-MID-MCO-328406-10



B3 GATE VALVE
1 1/2" = 1'-0" PSC-MID-MCO-328406-01

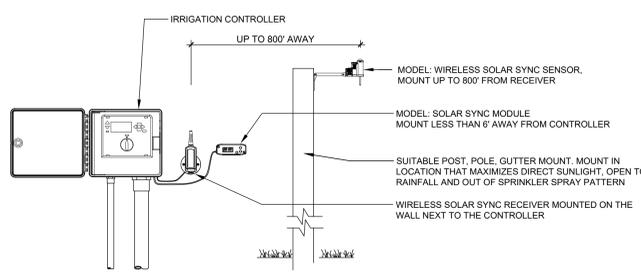


B4 HUNTER DECODER
1 1/2" = 1'-0" PSC-MID-MCO-328409-01

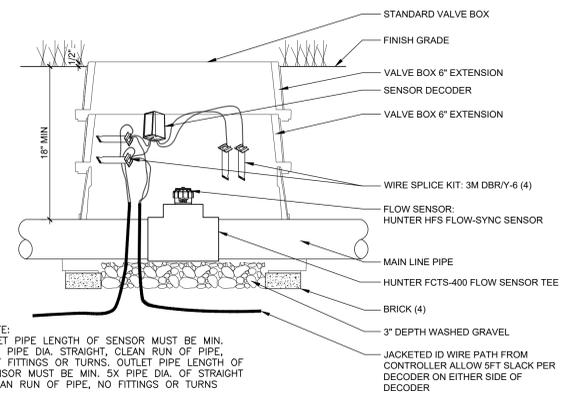


A1 IRRIGATION CONTROLLER - ACC2 WALL MOUNT
1 1/2" = 1'-0" PSC-MID-MCO-328409-07

NOTE: MOUNT CONTROLLER LCD SCREEN AT EYE LEVEL. CONTROLLER SHALL BE HARD-WIRED TO GROUND/ED 110 VAC POWER SOURCE



A3 WIRELESS SOLAR SYNC
1" = 1'-0" PSC-MID-MCO-27



A5 FLOW SENSOR
1 1/2" = 1'-0" PSC-MID-MCO-02

NOTE: INLET PIPE LENGTH OF SENSOR MUST BE MIN. 18X PIPE DIA. STRAIGHT, CLEAN RUN OF PIPE, NOT FITTINGS OR TURNS. OUTLET PIPE LENGTH OF SENSOR MUST BE MIN. 5X PIPE DIA. OF STRAIGHT CLEAN RUN OF PIPE, NO FITTINGS OR TURNS



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1	11/30/2022	Addendum 001
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Electrical Site Plan

ELECTRICAL SYMBOLS LEGEND	
SYMBOL	DESCRIPTION
	4" X 4" JUNCTION BOX, NEMA 3R IF INSTALLED OUTDOORS.
	WEATHERPROOF DUPLEX WITH GFI OUTLET. MOUNT 18" AFF OR AS INDICATED.
	PANELBOARD. SEE PANEL SCHEDULE FOR CHARACTERISTICS.
	MOTOR CONNECTION WITH HP INDICATED.
	11" X 17" INGROUND PULLBOX.
	OVERHEAD ELECTRICAL CIRCUIT
	ELECTRICAL UNDERGROUND CIRCUIT, 24" MINIMUM BELOW GRADE.
	UNDERGROUND CONTROLS CONDUIT
	#10 BARE CU WIRE GROUND RING
	BREAKER MOLDED CASE CIRCUIT BREAKER WITH AMP FRAME OVER AMP TRIP.
	GROUND ROD
	EQUIPMENT GROUND
	HOME RUN. 3/4" RMC CONDUIT, IN WALLS AND/OR CEILING, 2 #10, AND 1 #10 GROUND UNLESS OTHERWISE NOTED.
	GROUNDING CONDUCTOR (NEUTRAL)
	GROUND
	CURRENT CARRYING CONDUCTORS

GENERAL NOTES

- PRIOR TO BEGINNING CONSTRUCTION, ALL UNDERGROUND UTILITIES AND STRUCTURES SHALL BE LOCATED. ANY ITEMS OR AREAS THAT WILL CONFLICT WITH THE INSTALLATION OF CONDUIT OR EQUIPMENT SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.
- ANY DEVIATION OR SUBSTITUTIONS IN EQUIPMENT, MATERIALS OR ENGINEERING PRACTICES MUST HAVE THE CLIENT REPRESENTATIVE'S APPROVAL. FABRICATION AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS AND ALL APPLICABLE CODES.
- ALL LIGHTING, POWER, COMMUNICATION, INSTRUMENTATION, GROUNDING AND DETAIL DRAWINGS SHALL BE COORDINATED PRIOR TO AND DURING CONSTRUCTION. ALL INSTALLATION SHALL BE DONE IN A SAFE AND WORKMAN LIKE MANNER. WHERE MANUFACTURERS INSTRUCTIONS ARE FURNISHED WITH EQUIPMENT, INSTALLATION SHALL CONFORM TO THEIR REQUIREMENTS.
- CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH OTHER TRADES TO AVOID INTERFERENCE AND CONFLICTS DURING CONSTRUCTION.
- ALL CONDUIT AND CABLE ROUTING IS SHOWN DIAGRAMMATIC. FINAL ROUTING SHALL BE DETERMINED IN THE FIELD TO AVOID ANY DAMAGE OR INTERFERENCE WITH OTHER SYSTEMS.
- TYPICAL RECOMMENDED METHODS AND INSTALLATION PRACTICES ARE COVERED IN THE NOTES AND DETAILS. THE DETAILS REPRESENT GENERAL CONSTRUCTION METHODS ONLY AND DO NOT NECESSARILY IMPLY EXACT INSTALLATION PROCEDURES. THE DETAILS MAY BE MODIFIED TO MEET ACTUAL FIELD CONDITIONS PER CLIENT REPRESENTATIVE'S APPROVAL.
- TRENCHES IN WHICH MULTIPLE CONDUITS ARE INSTALLED, 2" SPACING IS REQUIRED BETWEEN CONDUITS, CONDUIT SPACERS SHALL BE INSTALLED EVERY 10 FT.
- A MINIMUM OF 12" CLEARANCE SHALL BE MAINTAINED WHEN CROSSING OTHER UNDERGROUND UTILITIES OR STRUCTURES.
- ALL ELECTRICAL WORK SHALL BE IN COMPLIANCE WITH NEC-2017 AND ALL APPLICABLE STATE AND LOCAL CODES.
- CONTRACTOR WILL BE RESPONSIBLE FOR SET UP AND CONFIGURATION OF VFDS IN A CASCADE TYPE SYSTEM. REFER TO CONTROL STRATEGY LOCATED ON SHEET E-101 FOR ADDITIONAL INFORMATION ON THE OPERATION OF IRRIGATION WELLS. CONTRACTOR TO PROVIDE ALL REQUIRED TERMINATIONS AND CABLING REQUIRED FOR COMMUNICATION/CONTROLS INSTALLATION.

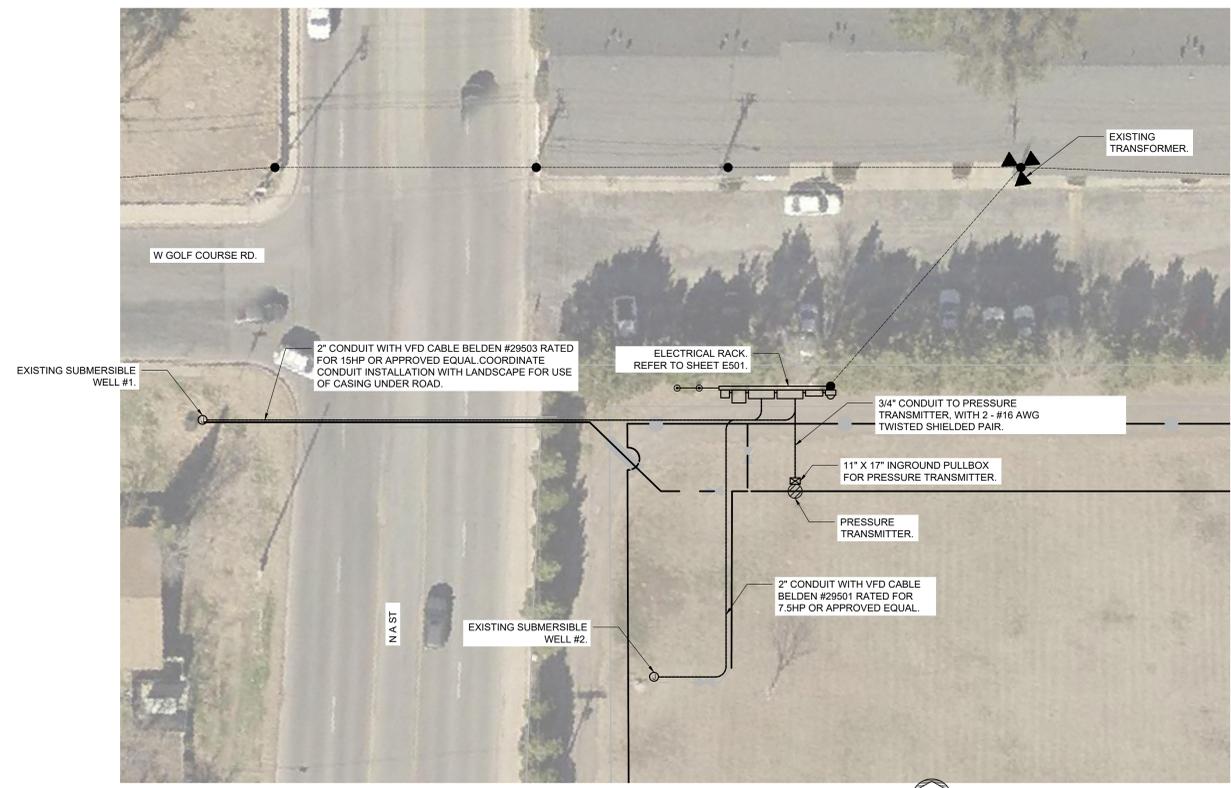
CONTROL STRATEGY

THE IRRIGATION SYSTEM WILL UTILIZE THREE (3) IRRIGATION WELLS, EACH EQUIPPED WITH VARIABLE FREQUENCY DRIVES (VFD). EACH VFD WILL COMMUNICATE WITH THE OTHER VIA ETHERNET TO PROVIDE CASCADE CONTROL VIA PRIMARY A WELL/VFD. EITHER OF THE THREE (3) WELL VFDS CAN BE MADE PRIMARY BY SELECTION ON THE SUBSEQUENT VFD KEYPAD BY THE SYSTEM OPERATOR. THE REMAINING TWO (2) WELL VFDS WILL BECOME SECONDARY AND TERTIARY TO FOLLOW THE PRIMARY'S REQUIRED IRRIGATION SYSTEM SUPPLY PARAMETERS.

THE PRIMARY VFD WILL UTILIZE A PRESSURE TRANSMITTER TO CONTROL THE IRRIGATION SUPPLY HEADER, TO AN OPERATOR SETTABLE PRESSURE SETPOINT. THE NEW IRRIGATION CONTROLLER IS TO AUTOMATICALLY INITIATE A PERMISSIVE RUN TO THE PRIMARY VFD. ONCE THE PERMISSIVE IS RECEIVED, THE PRIMARY VFD WILL AUTOMATICALLY START/STOP AND MODULATE SPEED/HZ, VIA VFD INTERNAL PID CONTROL, TO MAINTAIN THE IRRIGATION SYSTEM'S MAIN HEADER PRESSURE. THE PRIMARY VFD WILL UTILIZE A START PRESSURE, STOP PRESSURE, AND TARGET PRESSURE SETPOINT. THE PRIMARY VFD WILL AUTOMATICALLY INITIATE START/STOP COMMANDS TO THE SECONDARY AND TERTIARY VFDS AS NEEDED TO MAINTAIN HEADER PRESSURE SETPOINT.

THE SECONDARY AND TERTIARY VFDS WILL MODULATE SPEED ACCORDING TO THE PRIMARY VFDS PID CONTROLLER. IF THE IRRIGATION CONTROLLER REMOVES THE INITIATED PERMISSIVE RUN AND/OR THE SYSTEM HEADER PRESSURE EXCEEDS THE OPERATOR STOP SETPOINT, THE VFDS WILL AUTOMATICALLY DISCONTINUE OPERATION IN ORDER OF INITIATED START IF MULTIPLE VFDS ARE IN OPERATION.

IF ANY VFD EXPERIENCES A FAULT ACCORDING TO THE SETTINGS WITHIN THE AFFECTED VFD, IT WILL DISCONTINUE OPERATION AND BE NOT ALLOWED TO PROVIDE OPERATION UNTIL THE FAULT OCCURRENCE IS RECTIFIED. THE VFDS WILL HAVE THE ABILITY TO BE RUN IN 'HAND' AND OPERATE PER THE ASSOCIATED KEYPAD BY SYSTEM OPERATOR REGARDLESS OF PRESSURE SETPOINT IN THE AUTOMATIC MODE.



C1 ELECTRICAL SITE PLAN - WELL #1 AND WELL #2
SCALE 1" = 20'



A1 ELECTRICAL SITE PLAN - WELL #3
SCALE 1" = 10'

A:2022/04/04.2203_DS62N01_DWG150_ELEDE-101-40044.DWG, 11/30/2022 1:57:24 PM, AWBson



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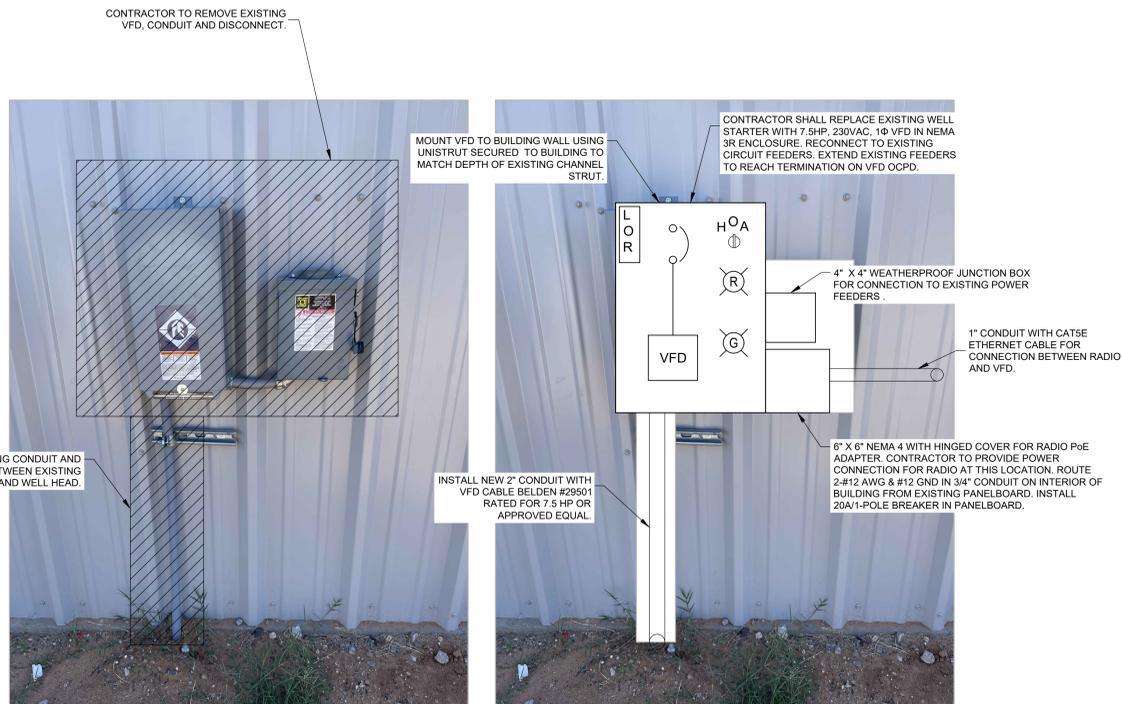
PROJECT NO.
40044.22

KEY PLAN

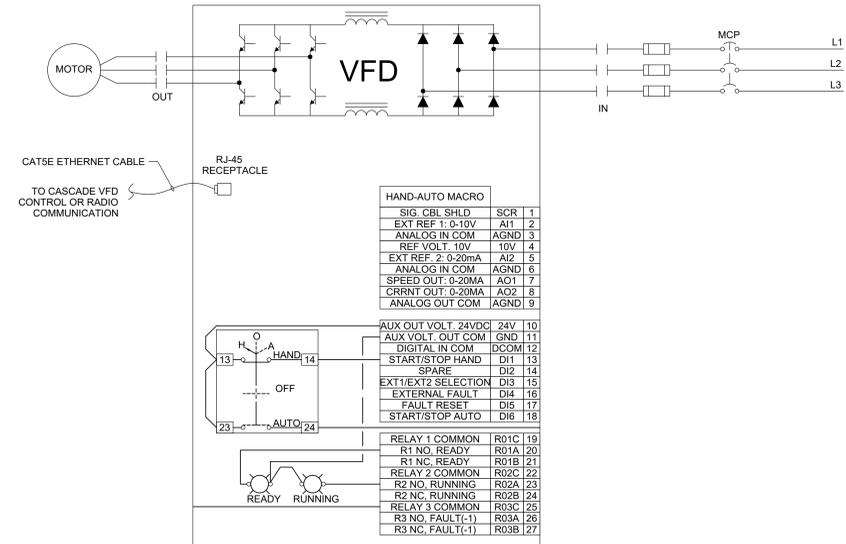
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Electrical Details

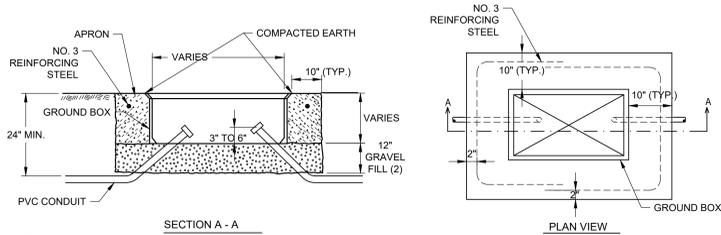
E501



A2 WELL #3 VFD DETAIL
NO SCALE

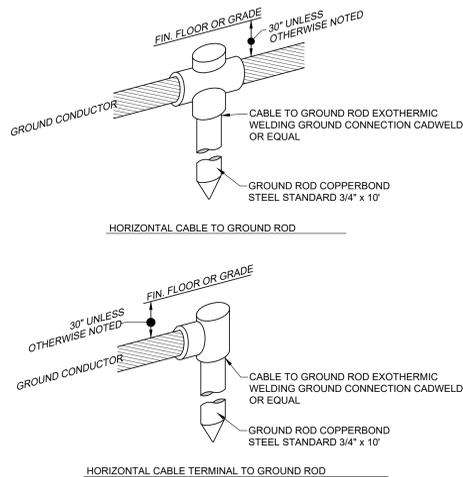


C4 VFD WIRING SCHEMATIC (TYP. OF 3)
SCALE: NONE

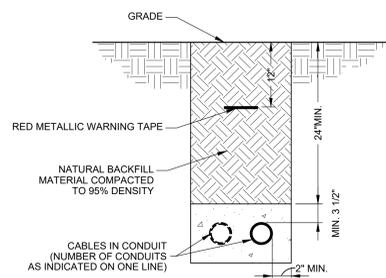


- NOTES:**
- FINAL POSITION OF END OF CONDUIT SHALL NOT EXCEED ONE-HALF THE DISTANCE TO THE SIDE OF BOX OPPOSITE THE CONDUIT ENTRY.
 - PLACE GRAVEL "UNDER" THE BOX, NOT "IN" THE BOX. GRAVEL SHOULD NOT ENCRoACH ON THE INTERIOR VOLUME OF THE BOX.
 - INSTALL BUSHING ON THE UPPER END OF ALL ELLS.
 - WHERE A GROUND ROD IS PRESENT IN THE GROUND BOX, CONNECT IT TO ANY AND ALL EQUIPMENT GROUNDING CONDUCTORS USING A LISTED CONNECTOR.
 - MAINTAIN SUFFICIENT SPACE BETWEEN ALL CONDUITS SO AS TO ALLOW FOR PROPER INSTALLATION OF BUSHINGS.
 - ALL CONDUITS SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER.
 - ALL CONDUITS INSTALLED IN THE GROUND BOX SHALL BE SEALED AFTER COMPLETION OF CONDUCTOR INSTALLATION AND ANY REQUIRED PULL TESTS. SILICONE SHALL NOT BE USED AS SEALANT.
 - PULL BOX SHALL BE A QUAZITE MODEL #PG1118BA12 WITH HEAVY DUTY BOLT DOWN LID OR APPROVED EQUAL.
 - PULL BOX LID SHALL BE ENGRAVED "ELECTRICAL" OR "CONTROLS", RESPECTIVELY.

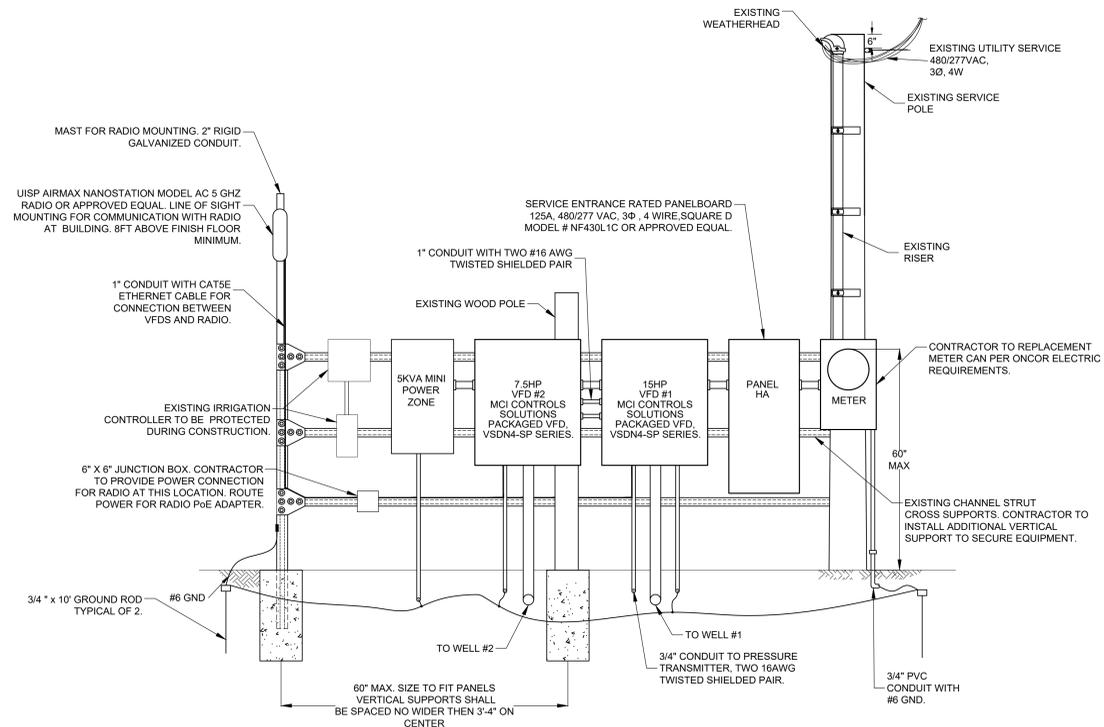
B2 INGROUND PULLBOX DETAIL
SCALE: NONE



A1 GROUNDING INSTALLATION DETAIL
NO SCALE



A2 CONDUIT TRENCH DETAIL
NO SCALE



A4 ELECTRICAL RACK DETAIL
SCALE: NONE



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Electrical Oneline And Tables

E601

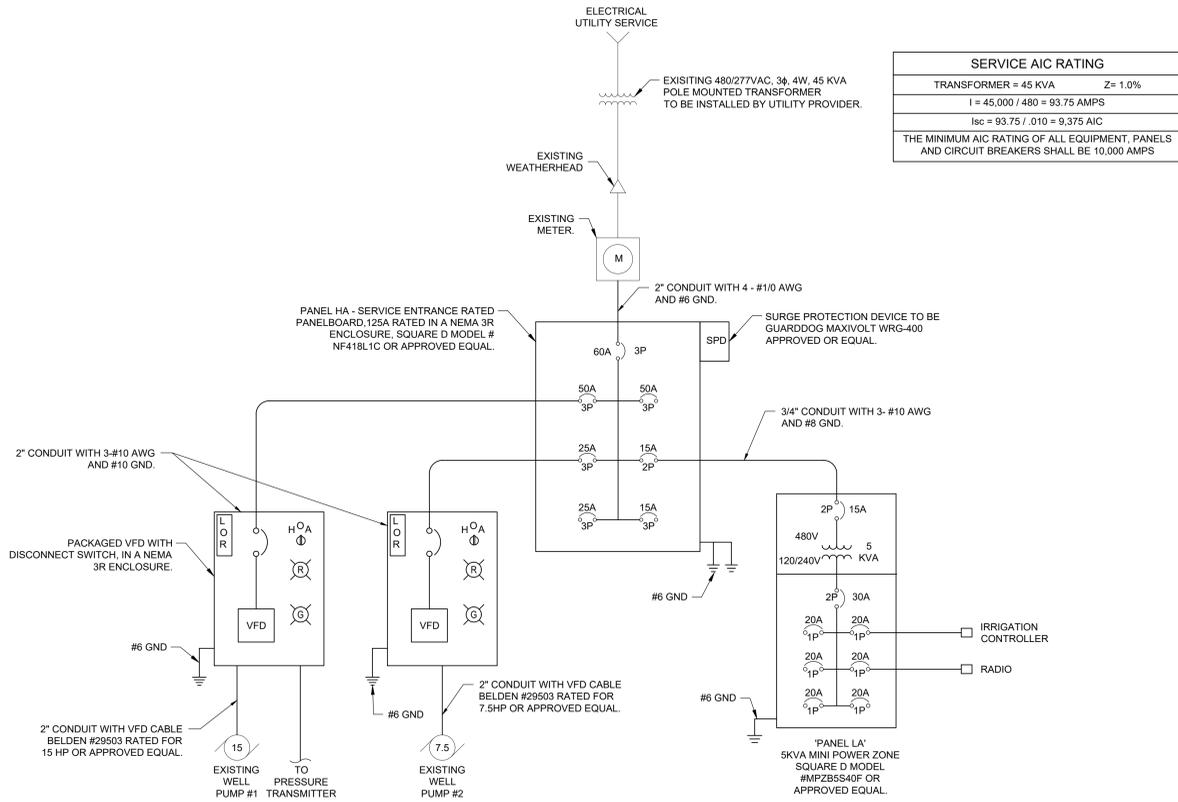


LOAD TABLE											
CUSTOMER: MIDLAND COUNTY						DATE: 11/7/2022					
PROJECT: FAIRVIEW CEMETERY LANDSCAPE IRRIGATION RENOVATIONS						REVISION NO.: A					
JOB NO: 03.40044.22											
EQUIP. TAG #	DESCRIPTION	LOAD RATING	MODIFIED FACILITY LOAD CALCULATIONS				AMPS (CONNECTED)				
			@ FULL LOAD		CONNECTED		ESTIMATED			TOTAL	
		HP, KW, KVA	EST. EFF	EST. PF	KVA	FLA	KW	KVA	AMPS	KW	AMPS
WELL #1 PUMP		15 HP	0.88	0.90	17.44	21.00	11.19	17.44	21.00	11.19	
WELL #2 PUMP		7.5 KVA	0.88	0.90	7.50	11.00	5.28	7.50	11.00	5.28	
5KVA MINI POWER CENTER		5 KVA			5.00	10.42	5.00	5.00	10.42	5.00	
25% OF LARGEST MOTOR		7.5 HP	0.88	0.90	9.13	11.00	5.60				
TOTALS					39.1	53.4	27.1	29.9	42.4	21.5	
					KVA	AMPS	KW	KVA	AMPS	KW	

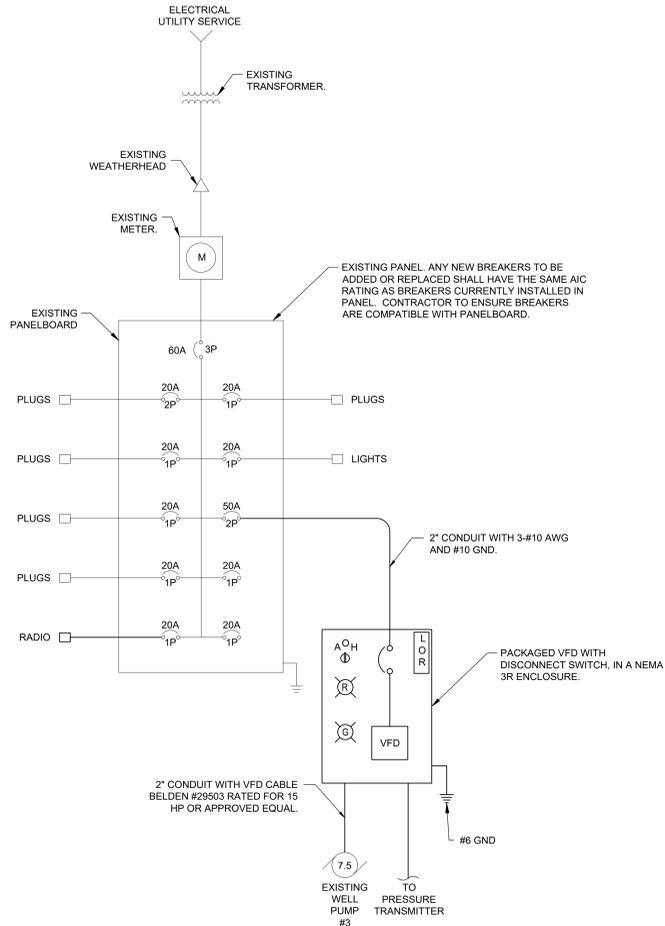
MIN. SHORT CIRCUIT CURRENT RATING (NEC 110.9)
CIRCUIT BREAKERS = 10 kA
PANELBOARD ISC = 10 kA
FUSES = 10 kA

FAULT CURRENT ANALYSIS
XFMR KVA = 45 KVA
%Z = 1.00%
100% MOTOR LOAD IN AMPS = 32.00
AVAILABLE UTILITY = INFINITE BUS
Isc = 5.5 KA

PANEL HA - WELL #1 & WELL#2													
PANEL COMPUTATION		VOLTAGE: 480 /277		3 PHASE, 4 WIRE				MIN CIRCUIT BREAKER INTERRUPTING RATING _10K_ AMPS					
PANEL HA				MCB: 70A									
CIRC. NO.	LOAD SERVED	TRIP AMPS	NO. POLES	WIRE SIZE	PHASE LOAD IN AMPS			WIRE SIZE	NO. POLES	TRIP AMPS	LOAD SERVED	CIRC. NO.	
					A	B	C						
1	VFD #1 - 15 HP	50	3	10	21.00				3	50	SPARE	2	
3						21.00						4	
5							21.00					6	
7	VFD #2 - 7.5 HP	25	3	10	11.00			4	2	15	5 KVA MINI POWER ZONE	8	
9						11.00						10	
11							11.00				SPACE	12	
13	SPARE	25	3						2	20	SPARE	14	
15												16	
17												18	
19	SPACE										SPACE	20	
21												22	
23												24	
25	SPACE										SPACE	26	
27												28	
29												30	
TOTAL CONNECTED LOAD		32.70	KVA	TOTAL				43.00	43.00	32.00	DEMAND LINE AMPS		43.0
ESTIMATED DEMAND LOAD		32.70	KVA										



A1 ELECTRICAL ONELINE - WELL #1 AND WELL #2
SCALE: NONE



A1 ELECTRICAL ONELINE - WELL #3
SCALE: NONE

SERVICE AIC RATING	
TRANSFORMER = 45 KVA	Z = 1.0%
I = 45,000 / 480 = 93.75 AMPS	
Isc = 93.75 / .010 = 9,375 AIC	
THE MINIMUM AIC RATING OF ALL EQUIPMENT, PANELS AND CIRCUIT BREAKERS SHALL BE 10,000 AMPS	