# CITY OF OWOSSO, MICHIGAN OWOSSO WATER TREATMENT PLANT, AND REMOTE SITES SCADA SYSTEM UPGRADES

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PROJECT LOCATION:

**CLIENT INFORMATION:** CITY OF OWOSSO, MICHIGAN

OWOSSO, MICHIGAN

3497 COOLIDGE RD.

EAST LANSING, MI. 48823

Tt PROJECT No.: CLIENT PROJECT No.

200-280565-21002

PROJECT DESCRIPTION / NOTES:

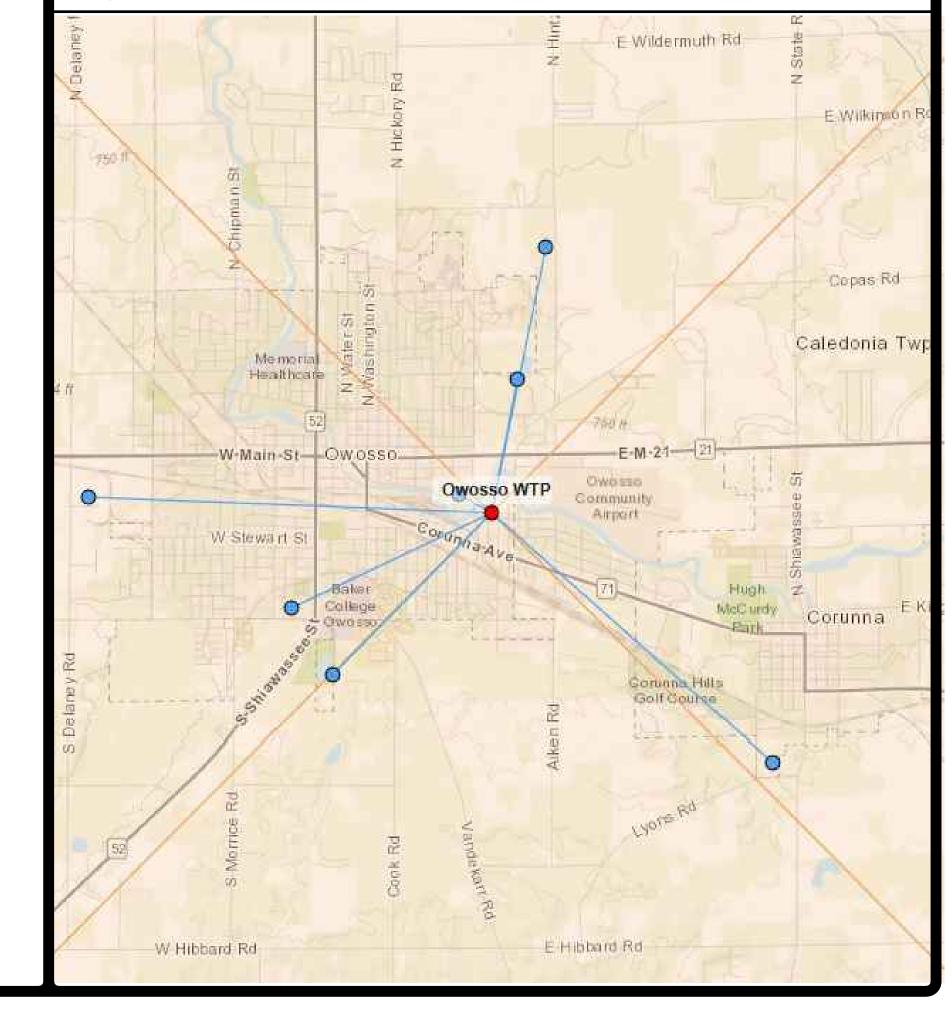
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## **ISSUED:**

CONCEPTUAL DRAWINGS - OWNER REVIEW MAY 28, 2021 OWNER REVIEW, PRELIMINARY DRAWINGS - OCTOBER 21, 2021 OWNER REVIEW - FINAL REVIEW NOVEMBER 9, 2021 FINAL REVIEW JANUARY 12, 2022 UPDATES JANUARY 14, 2022 UPDATES MARCH 30, 2022 FINAL OWNER REVIEW APRIL 1, 2022 UPDATES NOVEMBER 10, 2022 UPDATES NOVEMBER 22, 2022 UPDATES NOVEMBER 30, 2022

## **VICINITY MAP:**

**ISSUED FOR BIDS DECMEBER 2022** 



SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	CONTROL SWITCH (SEL. OR P.B.) SEE CIRCUITS FOR SPECIFIC TYPE	☐—(FT 10)	TAG NO. (BALLOON) FOR DEVICE INDICATED
F FL	SEE CIRCUITS FOR SPECIFIC TYPE FLOAT SWITCH - FLOW SWITCH		
T M	TEMPERATURE - HUMIDISTAT SWITCH (SUBSCRIPT=NO. OF STAGES)	FT 10	FOR POWER (SEE NOTE 2 ON STANDARD NOTE SHEET) 3/4"C(2/C#18SH)
L P V	LIMIT (PROXIMITY TYPE) PRESSURE - VACUUM SWITCH	A-3 MCP OR	CONDUIT AND WIRE RUN FROM DEVICE INDICATED TO LOCATION
ALT	ELECTRICAL OR MECHANICAL ALTERNATOR (SEE WIRING)	CP-1	INDICATED
os	OVERLOAD SWITCH OR DEVICE		CAPACITOR, 3 PHASE, SIZE AS INDICATED  DISCONNECT SWITCH (F) = FUSED,
ТВ	TERMINAL BOX		(C) = CIRCUIT BREAKER  MAGNETIC STARTER
$\otimes$	SOLENOID VALVE		(BACKGROUND DRAWINGS ONLY) COMBINATION MAGNETIC
PC	PHOTOCELL LINE VOLTAGE	SIZE 2	STARTER FUSED UNLESS NOTED (CIRCUIT BREAKER)
	AS NOTED (LIGHTING PANEL, CONTROL PANEL, DISTRIBUTION PANEL, ETC.) WALL MOUNTED	SIZE Z	COMBINATION LIGHTING CONTACTOR WITH HAND-OFF-AUTO SWITCH
JB	JUNCTION BOX		MANUAL STARTER (R) = REVERSING
38	TRANSFORMER		CONTROL PANEL
	CONDUIT WITH CONDUIT SEAL FITTING		CONTROL PANEL
	CONDUIT EXPOSED	1/8 UH-19	UNIT HEATER, 1/8 HORSEPOWER
	CONDUIT CONCEALED		
——E———————————————————————————————————	DIRECT BURIED CONDUIT DIRECT BURIED CABLE		LIGHTING ARRESTOR
—-ОН	OVERHEAD LINE	A-3	LOW VOLTAGE HOME RUNS 120/208V, 120/240V (SEE NOTE 2
—— DB ——	UNDERGROUND DUCT BANK		ON STANDARD NOTE SHEET)
—— EDB ——	EXISTING UNDERGROUND DUCT	NEMA 4	WATERTIGHT WATERTIGHT AND CORROSION
123	BANK CONCRETE ENCASED DUCT BANK	NEMA 4X	PROOF
456	WITH CABLE LOCATIONS, AND SPARE DUCTS AS INDICATED ON DRAWINGS	NEMA 7	EXPLOSION PROOF - CLASS I, DIVISION 1, GROUP D
	CABLE REEL	NEMA 9	EXPLOSION PROOF - CLASS II, DIVISION 1
	MULTI-STACK ALARM LIGHTS	K	KEYLOCK
	SELECTOR SWITCH /	SD	SMOKE DETECTOR
r@nO1	PUSHBUTTON. FUNCTIONS AS SHOWN IN WIRING DIAGRAMS	Ê	EXIT LIGHT
0 0	LOW VOLTAGE DISCONNECT SWITCH		FLUORESCENT LUMINAIRE
	LOW VOLTAGE FUSE (BELOW 600V)	X	INCANDESCENT LUMINAIRE
	HIGH VOLTAGE FUSE (ABOVE 600V) ALL STARTERS SHALL BE FULL		HIGH INTENSITY DISCHARGE LIGHT
1 RV 2 FVR	VOLTAGE, NON-REVERSING UNLESS OTHERWISE INDICATED. (FVR) FULL VOLTAGE REVERSING	EM	EMERGENCY BATTERY PACK
3-2S,2W	(RV) REDUCED VOLTAGE (2S, 2W) TWO SPEED, TWO WINDING	DS	DESK INTERCOM SET
0 0	600V, 3 POLE MOLDED CASE CIRCUIT BREAKER, FRAME &		CAMERA
	RATING AS SHOWN SINGLE PHASE, FRACTIONAL HP	PTZ	DOME CAMERA (PAN, TILT, ZOOM)
A-3	MOTOR TO LOCATION INDICATED (SEE NOTE 2 ON STANDARD NOTE SHEET)	< 52 →>	DRAW OUT CIRCUIT BREAKER (ABOVE 600 VOLT)
86	DEVICE SYMBOL WITH TYPE DEVICE	< <oo> <oo> <oo> <ol> <li>✓</li> <li>✓</li></ol></oo></oo></oo>	CIRCUIT BREAKER WITH STAB CONNECTION
A 1	THREE PHASE LOAD WITH IDENTIFICATION	(3) ( 50/5	CURRENT TRANSFORMER, AND RATIO (WITH NUMBER REQUIRED SHOWN)

BACKGROUND PLAN AND ONE LINE SYMBOLS

WIRING DEVICE SCHEDULE		
SYMBOL	DESCRIPTION	NEMA TYPE
$\bigoplus$	125V, 2P, DUPLEX, 3W	5-20 R
Ф	SIMPLEX RECEPTACLE	
-	QUAD RECEPTACLE	
Š	20A, 120/277V SWITCH	SPST

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
To	PRESSURE ACTUATED SWITCH	0 0	SELECTOR SWITCH - NORMALLY OPEN
	FLOW ACTUATED SWITCH		FLOAT ACTUATED SWITCH
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	LIMIT SWITCH - NORMALLY OPEN		TEMP. ACTUATED SWITCH
· · · · · · · · · · · · · · · · · · ·	LIMIT SWITCH - NORMALLY CLOSED - HELD OPEN	070	LIMIT SWITCH - NORMALLY CLOSED
0-0	LATCHING CABLE SWITCH	070	LIMIT SWITCH - NORMALLY OPEN HELD CLOSED
<u> </u>	MOMENTARY PUSHBUTTON		TIME DELAY FUSE
	MOMENTARY PUSHBUTTON	оТо	PUSHBUTTON OPERATOR WITH MUSHROOM HEAD
0 0	OPERATOR-NORMALLY OPEN  CONTROL RELAY CONTACT -	<u>O L O</u> (F)	FIELD LOCATED STOP BUTTON
——————————————————————————————————————	NORMALLY OPEN  TIMING RELAY INSTANTANEOUS	N	CONTROL RELAY CONTACT - NORMALLY CLOSED
CR CR	CONTACT  CONTROL RELAY COIL	INST.	TIMING RELAY INSTANTANEOUS CONTACT
CR L	TWO COIL LATCHING RELAY	* O O O X	SELECTOR SWITCH OPERATOR WITH FUNCTION SHOWN
0	TIMED CLOSED CONTACT ON ENERGIZATION	oto	TIMED OPEN CONTACT ON ENERGIZATION
0	TIMED OPEN CONTACT ON DE-ENERGIZATION	0 7 0	TIMED CLOSED CONTACT ON DE-ENERGIZATION
0	ZERO SPEED OR ANTI-PLUGGING SWITCH	0 R 1-0	PUSH-TO-TEST INDICATING LIGHT
	MAINTAINED STOP-START PUSHBUTTON OPERATOR	0 0	MAINTAINED STOP - MOMENTAR START PUSHBUTTON (JOG)
-0 0			SOLENOID OR CLUTCH
    -0   0-	MAINTAINED PUSH - PULL OPERATOR	ETI	ELAPSED TIME INDICATOR
	LOCAL TERMINALS WITH EXTERNAL WIRING	X1 O	120VAC TRANSFORMER
-(T)-	TIMING RELAY COIL	010	PUSHBUTTON OPERATOR WITH MUSHROOM HEAD
T	1 TIMING RELAY COIL (OFF DELAY)	(F)	THERMAL OVERLOAD FIELD LOCATED
G	INDICATING LIGHT	0—0	TERMINAL POINT
	PUSH-TO-TEST INDICATING LIGHT	Ø	TERMINAL
	1 OOT TO TEST INDICATING LIGHT		LOW VOLTAGE FUSE
X1 O	X2 SECONDARY TRANSFORMER		FUSIBLE TERMINAL BLOCK
0 0	MOLDED CASE CIRCUIT BREAKER		CONTROL POWER TRANSFORM
	GENERAL DISCONNECT SWITCH		RECEPTACLE

NOTE: THE PLC I/O ADDRESS SHALL BE USED AS THE	

CONTROL WIRING. COORDINATE WITH ELECTRICAL CONTRACTOR.

SYMBOL	FIRST LETTER	SUCCEEDING LETTERS
A	ANALYSIS, ANALOG	ALARM
В	BURNER, FLAME	BATCH
С	CONDUCTIVITY, COMMAND	CONTROL (FEEDBACK TYPE)
D	DENSITY, SPECIFIC GRAVITY	
E	VOLTAGE	PRIMARY ELEMENT
F	FLOW RATE	RATIO
G	GAGING	GLASS
Н	HAND, MANUAL	HIGH
I	CURRENT	INDICATE
J	POWER	SCAN
K	TIME, TIME SCHEDULE	CONTROL (NO FEEDBACK)
L	LEVEL, LIGHT	LOW
М	MOISTURE, HUMIDITY	MIDDLE, MODULATE
N		
0	OVERLOAD	ORIFICE
Р	PRESSURE, VACUUM	POINT
Q	QUANTITY	TOTALIZE, INTEGRATE
R	RADIOACTIVITY	RECORD, PRINT, RECEIVE
S	SPEED, FREQUENCY, SOLENOID	SWITCH
T	TEMPERATURE, TURBIDITY	TRANSMIT, TRANSFORM
U	MULTIVARIABLE	MULTIFUNCTION
V	VIBRATION, VISCOSITY	VALVE, DAMPER, LOUVER
W	WEIGHT, FORCE	
X		
Υ		RELAY, COMPUTE
Z	POSITION	DRIVE, ACTUATE

F	PROTECTIVE RELAY LEGEND	
EVICE NO.	DESCRIPTION	
2	SYNC. TIMER 0-5 MIN.	
25	SYNCHRONIZING	
27	SHORT TIME UNDERVOLTAGE	
32	REVERSE POWER RELAY	
38	TEMPERATURE	
40	LOSS OF EXCITATION	
43	SELECTOR SWITCH	
47	PHASE SEQUENCE & UNDERVOLTAGE	
49	THERMAL	
50/51	INSTANTANEOUS AND VERY INVERSE	
51	VERY INVERSE	
51G	INVERSE GROUND FAULT	
51N	NEUTRAL OVERCURRENT	
51V	OVERCURRENT RELAY WITH VOLTAGE RESTRAINT	
52/CS	CONTROL SWITCH	
59	INSTANTANEOUS OVERVOLTAGE	
60	VOLTAGE BALANCE	
62	TIME DELAY	
64	SHORT TIME LOW PICK UP OVERVOLTAGE	
67	DIRECTIONAL OVERCURRENT	
69	LOCKOUT CONTROL SWITCH	
78	OUT OF STEP	
81	OVER/UNDER FREQUENCY RELAY	
83	MULTI-CONTACT AUXILIARY	
86/HR	MULTI-CONTACT AUX. HAND RESET	

	SYMBOL	LEGEND	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
PT	POTENTIAL TRANSFORMER	W	WATTMETER
СТ	CURRENT TRANSFORMER	AP	ALARM POINT
А	AMMETER	CPT	CONTROL POWER TRANSFORMER
V	VOLTMETER	(2) (3)	NUMBER OF DEVICES REQUIRED
PF	POWER FACTOR METER	ETI	ELAPSED TIME METER

## EXAMPLE OF P&ID I/O SYMBOL

NOTE: THE PLC I/O ADDRESS SHALL BE USED AS THE WIRING TAG SCHEME FOR ALL PANEL AND FIELD CONTROL WIRING. COORDINATE WITH ELECTRICAL CONTRACTOR.

I/O TAGS FOR WIRES FOR CONTROL WIRING INSIDE ALL CONTROL PANELS, AND IN FIELD TO BE POLYPROPYLENE.

Project No.: 200-280565-21002 Drawn By: Checked By:

- 2. TURN OVER TO OWNER AT PROJECT COMPLETION OPERATION AND MAINTENANCE MANUALS (QUANTITY AS SPECIFIED) TO OWNER.
- 3. IN ADDITION TO PATCH CABLES SUPPLIED FOR THE PROJECT, FURNISH 30-10FT LONG SINGLEMODE DUPLEX FIBER OPTIC PATCH CABLES (ST-ST) CONNECTORS, AND 30-10FT CAT-5E PATCH CABLES FOR OWNERS USE. TURN OVER CABLES TO OWNER.
- 4. MULTIMODE FIBER OPTIC PATCH CABLES, AND ETHERNET PATCH CABLES SUPPLIED IN THE PROJECT SHALL BE COLORED PURPLE.
- 5. FIBER OPTIC PATCH PANELS SHALL BE THE PRODUCT OF CORNING CABLE SYSTEMS. (RACK OR SURFACE MOUNTED AS SHOWN", ST AND/OR LC STYLE CONNECTORS AS SHOWN, WITH QUANTITY OF BULKHEADS AS 4.

### GENERAL CONSTRUCTION NOTES:

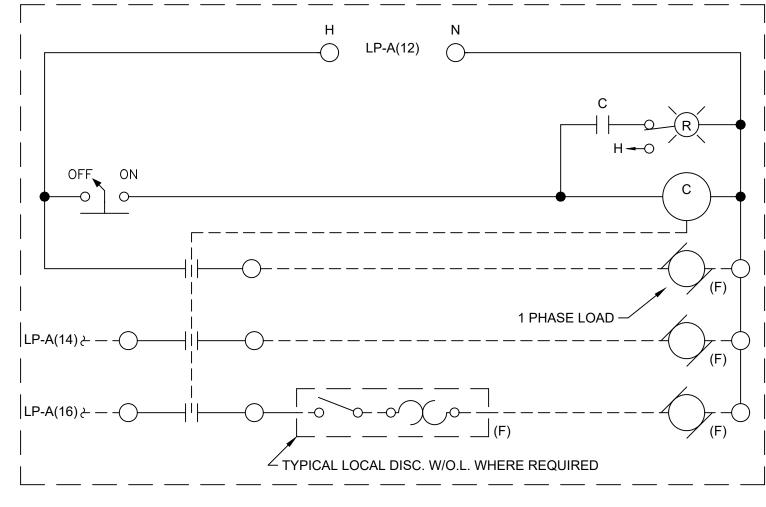
- 1. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN LIGHT LINE WEIGHTS ON THE DRAWINGS ARE EXISTING ITEMS TO REMAIN. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN HEAVY LINE WEIGHTS ARE NEW THIS CONTRACT.
- 2. ITEMS SHOWN OR NOTED TO BE DEMOLISHED ON THE DRAWINGS ARE EXISTING ITEMS TO BE REMOVED FROM SITE BY CONTRACTOR UNLESS NOTED TO BE TURNED OVER TO OWNER.
- 3. FOR ITEMS INDICATED AS "FIELD LOCATE". THE CONTRACTOR SHALL FIELD VERIFY FOR INTERFERENCE AND FOR LOCATIONS OF MOUNTING FLANGES, CONNECTION POINTS, ETC.
- 4. CONDUIT ROUTINGS SHOWN ON BACKGROUND PLANS ARE INTENDED ROUTINGS ONLY. EXACT CONDUIT ROUTINGS FOR CONDUITS, AND LENGTH SHALL BE FIELD LOCATED AND VERIFIED BY THE CONTRACTOR. COORDINATE CONDUIT ROUTING IN FINISHED AREAS WITH OWNER. CONDUIT TO BE CONCEALED IN THESE
- 5. REFER TO THE CABLE MANUFACTURER'S RECOMMENDATIONS FOR MINIMUM BEND RADIUS FOR FIBER OPTIC CABLES. INSTALL NEW PULL BOXES (PB) AS REQUIRED FOR CONDUITS. SIZE PULL BOXES AS REQUIRED PER FIBER OPTIC CABLE MANUFACTURERS RECOMMENDATIONS.
- 6. CONDUITS/RACEWAYS, PULL BOXES AND JUNCTION BOXES TO BE INSTALLED WITH 316 STAINLESS STEE CHANNEL STRUT. MINIMUM STRUT LENGTH TO BE 12 INCHES, WHERE POSSIBLE.
- 7. PANELS SHALL BE MOUNTED OFF WALLS WITH STRUT, CONDUITS SHALL BE MOUNTED ON STRUT INCLUDING SINGLE RUNS.

DUCT SEAL, INCLUDING OPENINGS IN BOTTOM OF PANELS, AND EQUIPMENT.

- CONDUIT ENTERING CONTROL PANELS AND ELECTRICAL EQUIPMENT ENCLOSURES SHALL BE FILLED WITH (TCP) AT TEMPERATURE CONTROL PANEL
- REPAIR SIDEWALKS AND ROADWAYS DUE TO SITE WORK ADDITIONS, THE EXTENT OF THE REPAIR REQUIRED SHALL BE FIELD VERIFIED PRIOR TO BIDS IN CONJUNCTION WITH THE WORK SHOWN IN THE CONTRACT DOCUMENTS. PRIOR TO TRENCHING, FIELD LOCATE EXISTING GAS LINES, TELEPHONE LINES, SPRINKLER LINES, ETC. COORDINATE WITH OWNER
- 10. PULL CORDS SHALL BE INSTALLED IN CONDUITS CONTAINING NETWORK CABLES, AND FIBER OPTIC CABLES.
- 11. CORE HOLES AS REQUIRED TO SUIT INSTALLATION OF CONDUIT AND WIRING/CABLING AS SHOWN. FIELD VERIFY EXACT EXTENT OF WORK REQUIRED.
- 12. FURNISH PULL BOXES FOR FIBER OPTIC CABLE. COORDINATE EXACT BENDING RADIUS WITH MANUFACTURER.
- 13. NEW CONDUITS INSTALLED THIS CONTRACT WITH FIBER OPTIC CABLES ARE TO BE LABELED WITH PHENOLIC TAGS (AT BEGINNING TO END) TO INDICATE THE NUMBER OF STRANDS, ORIGINATION AND DESTINATION. TAGS TO BE COLOR CODED ORANGE FOR MULTIMODE.
- 14. WHERE NEW CONDUITS SHOWN TO BE INSTALLED PASS UNDER ROADWAYS, CONDUITS SHALL BE CONCRETE ENCASED.
- 15. PRIOR TO EXCAVATION, FIELD LOCATE EXISTING UTILITIES. COORDINATE WITH OWNER.
- 16. AREAS WHERE CAMERAS ARE SHOWN TO BE INSTALLED SHALL BE CLASSIFIED AS NEMA 4, UNLESS CALLED OUT OTHERWISE.
- 17. THE ASSOCIATED INSTRUMENTATION DRAWINGS SHOW EXISTING WIRES AND TERMINAL NUMBERS REQUIRED TO PROPERLY INTERFACE WITH NEW EQUIPMENT. THIS INFORMATION WAS COLLECTED FROM AS-BUILT DRAWINGS AND EXTENSIVE FIELD VERIFICATION. THE INFORMATION SHALL BE USED AS A GUIDE IN RE-TERMINATION. IT SHALL REMAIN THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE THE WIRING AND TO REVISE TO SUIT AS REQUIRED. CHANGES IN THE CONTRACT OR COST WILL NOT BE GRANTED FOR THIS COORDINATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE PROPOSED WORK SHOWN.
- 18. CONDUIT ROUTINGS SHOWN ON BACKGROUND PLANS ARE PROPOSED ROUTINGS ONLY. EXACT CONDUIT ROUTINGS AND LENGTH SHALL BE FIELD LOCATED AND VERIFIED BY THE CONTRACTOR. COORDINATE CONDUIT ROUTING IN FINISHED AREAS WITH OWNER. CONDUIT TO BE CONCEALED IN THESE AREAS.
- 19. RACEWAYS, PULL BOXES AND JUNCTION BOXES TO BE INSTALLED WITH 316 STAINLESS STEEL FASTENERS SUPPORTS, AND THREADED ROD, ETC. (CHANNEL STRUT TO ALSO BE STAINLESS STEEL). MINIMUM STRUT LENGTH TO BE 12 INCHES, WHERE POSSIBLE. TYPICAL FOR NEMA 12, 4, AND 7 AREAS.
- 20. WIRING FOR STARTERS SHALL BE IN ACCORDANCE WITH NEMA CLASS II B STANDARDS. SUBMIT ENGINEERED SHOP DRAWINGS FOR ALL STARTERS SHOWN TO BE WIRED.
- 21. WIRE NUMBERS (1, 3, 5, ETC.) SHALL BE PREFIXED WITH STARTER TAG NUMBERS. THE WIRE NUMBER AFTER THE PREFIX SHALL BE THE MANUFACTURER'S WIRE NUMBERING SYSTEM. WIRE MARKERS SHALL BE USED AT EACH WIRE TERMINATION POINT.
- 22. IN AREAS WHERE EQUIPMENT AND CONDUIT IS REMOVED, REPAIR WALL AND FLOOR SURFACES AS REQUIRED TO MATCH SURROUNDING AREA. WHERE DEVICES ARE REMOVED FROM CONCEALED BOXES, FURNISH AND INSTALL A BLANK COVER ON THE BOX.
- 23. FIBER OPTIC CABLE SHALL BE AS CALLED OUT ON SYSTEM CONFIGURATION DRAWINGS, MULTIMODE, ALL DIELECTRIC, SUITABLE FOR INSTALLATION UNDERGROUND IN WET CONDUIT.

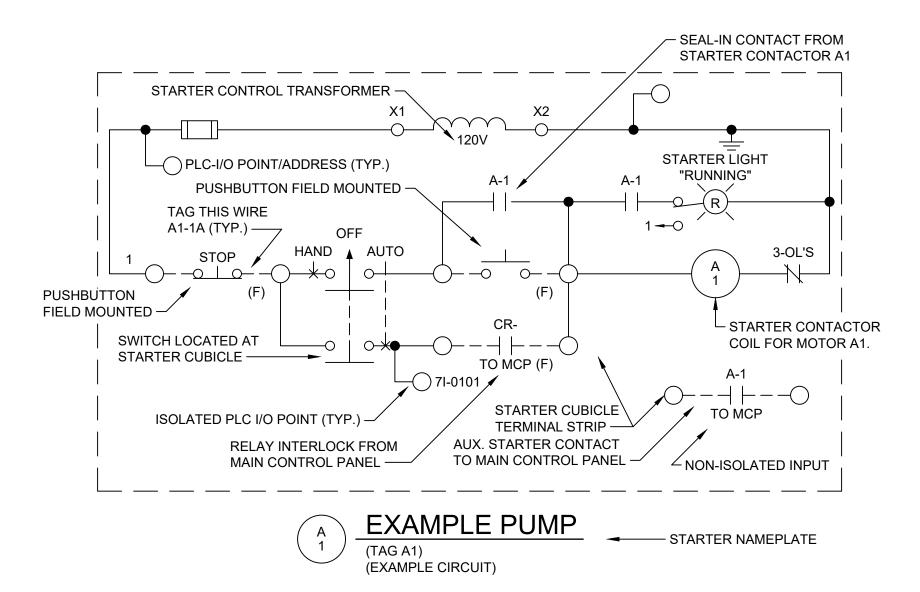
#### **GENERAL NOTES:**

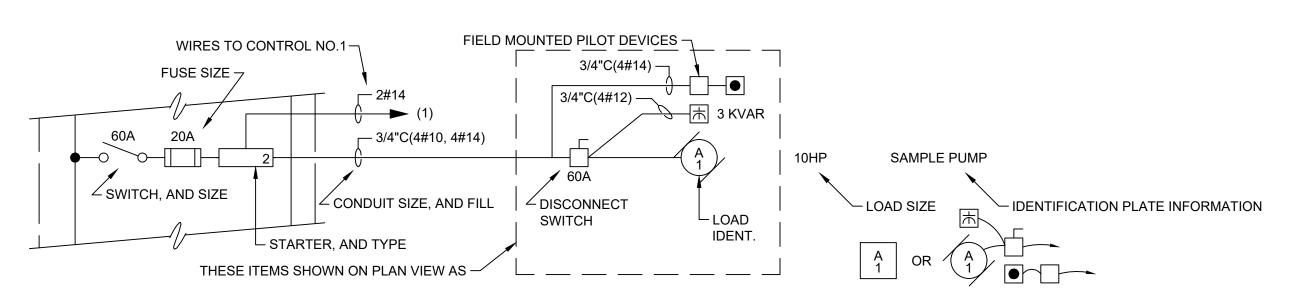
- PRIOR TO SUBMITTING A BID FOR THE WORK DETAILED UNDER THIS CONTRACT, BIDDER SHALL VISIT THE WATER TREATMENT PLANT, AND REMOTE WATER SITES. THE BIDDER SHALL FULLY ACQUAINT ONESELF WITH EXISTING FIELD CONDITIONS AT EACH SITE. NO BULLETINS WILL BE WRITTEN FOR WORK DUE TO LACK OF VERIFICATION OF EXISTING SITE CONDITIONS AND WIRING.
- NO WIRES SHALL BE TERMINATED TO TERMINAL STRIPS, OR OTHER EQUIPMENT WITHOUT FIRST VERIFYING SIGNAL TYPE. DAMAGES RESULTING FROM LACK OF VERIFICATION SHALL BE BORNE BY THE CONTRACTOR. CONTRACTOR SHALL COORDINATE SIGNAL TYPE AND VOLTAGE WITH I/O CARDS SHOWN.
- WITHIN CONTROL PANELS, NAMEPLATES SHALL BE PROVIDED TO INDICATE DIFFERENT VOLTAGE LEVELS WITHIN PANELS. ALSO, A NAME TAG (YELLOW BACKGROUND, RED LETTERING) SHALL BE LOCATED ON THE FRONT OF EVERY PANEL INDICATING THAT WHEN MAIN PANEL IS DISCONNECTED 120V IS STILL PRESENT FROM FIELD DEVICES (YELLOW WIRING/ISOLATED INPUT CARDS.)
- PHENOLIC TAGS ON FACE OF CONTROL PANELS TO HAVE WHITE BACKGROUND AND BLACK LETTERING (EXCEPT WARNING TAGS; YELLOW BACKGROUND RED LETTERING).
- PROVIDE SAFETY COVERS ON ALL 480V MOLDED CASE MAIN CIRCUIT BREAKERS TO INSULATE THE INCOMING CABLES AND SIDE CONDUCTORS FROM CONTACT. (TYP. FOR CONTROL PANELS.) PROVIDE BREAKER LOCKS FOR PUMP CIRCUIT BREAKERS (MCP)AND MAIN PANEL BREAKERS.
- REFER TO WIRING DIAGRAMS FOR ADDITIONAL INFORMATION ON ISOLATED I/O. A COMMON NEUTRAL MAY BE USED FOR SEVERAL ISOLATED INPUTS FROM THE SAME STARTER. PROVIDE NEUTRAL JUMPERS WIRES WITHIN THE PANEL AS REQUIRED.
- ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN LIGHT LINE WEIGHTS ON THE DRAWINGS ARE EXISTING ITEMS TO REMAIN. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN HEAVY LINE WEIGHTS ARE NEW THIS CONTRACT.
- ITEMS SHOWN CROSSHATCHED (OR NOTED TO BE DEMOLISHED) ON THE DRAWINGS ARE EXISTING ITEMS TO BE REMOVED, FROM SITE BY CONTRACTOR.
- INSTALL A SINGLE CONDUCTOR INSULATED (RHW, THWN, OR XHHW) COPPER GROUND WIRE IN EACH CONDUIT, SIZE AS SHOWN ON DRAWINGS, OR AS A MINIMUM PER THE NATIONAL ELECTRICAL CODE. THIS GROUND WIRE SHALL BE CONNECTED AT EACH END TO THE EQUIPMENT GROUND. THIS ALSO INCLUDES INSTRUMENTATION DEVICES SUCH AS LEVEL, PRESSURE, FLOW TRANSMITTERS, LIMIT SWITCHES CONDUITS, NETWORK AND I/O CABLES.
- 10. THE FOLLOWING EXAMPLE COMPONENT IDENTIFICATION SHALL BE USED AS APPROPRIATE
- (F) FIELD MOUNTED, NOT AT STARTER OR OTHER CONTROL PANELS
- (S) STARTER PANEL MOUNTED (MCP)AT MAIN CONTROL PANEL
- (1) AT CONTROL PANEL NO.1
- (2) AT CONTROL PANEL NO.2
- 11. REFER TO DETAIL SHEETS. CONTRACTOR SHALL FURNISH AND INSTALL HARDWARE AND APPURTENANCES (I.E. PIPE TAPS, WETWELL BUBBLER TUBES, VALVES, COPPER TUBING, BALL VALVES, PNEUMATIC PIPING, SPOOL PIECES, ETC.) FOR FIELD DEVICES SHOWN (FLOWMETERS, PRESSURE TRANSMITTERS, LEVEL TRANSMITTERS, ETC.). WORK SHALL BE COORDINATED WITH OTHER TRADES (MECHANICAL INSTRUMENTATION, ETC.) CONTRACTOR SHALL BE RESPONSIBLE FOR SYSTEM COORDINATION AND INSTALLATION.
- 12. ETHERNET AND FIBER OPTIC TERMINATIONS SHALL BE PERFORMED BY A QUALIFIED REPRESENTATIVE OF CABLE MANUFACTURER, THE CABLES SHALL BE TESTED. NO SPLICING SHALL BE PERMITTED OF FIBER OPTIC CABLES, BETWEEN PANELS. FIBERS SHALL BE TERMINATED AT PATCH PANELS, INCLUDING SPARES.
- 13. REFER TO THE CABLE MANUFACTURER'S RECOMMENDATIONS FOR MINIMUM BEND RADIUS FOR FIBER OPTIC CABLES. INSTALL NEW PULL BOXES (PB) AS REQUIRED FOR CONDUITS. SIZE PULLBOXES AS REQUIRED PER FIBER OPTIC CABLE MANUFACTURERS RECOMMENDATIONS.
- 14. CONDUIT ENTERING CONTROL PANELS AND ELECTRICAL EQUIPMENT ENCLOSURES SHALL BE FILLED WITH DUCT SEAL, INCLUDING OPENINGS IN BOTTOM OF PANEL.
- 15. CABLES (INCLUDING FIBER, ETHERNET, CONTROL WIRE, ETC.) WHERE PASSING THROUGH A PULLBOX SHALL BE LABELED AND COMPLETELY IDENTIFIED WITH IDENTIFICATION NUMBERS AND ORIGINATION/DESTINATION. THIS ALSO INCLUDES ALL CABLE BUNDLES ENTERING CONTROL PANELS,
- 16. CONTROL WIRES SHALL BE TAGGED WITH THE PLC I/O ADDRESS IN THE FIELD AND AT THE PANEL.
- 17. THE FIELD DEVICES SHOWN ON THE P&ID'S, ELECTRICAL BACKGROUNDS, AND DETAILS SHEETS MAKEUP THE FIELD DEVICE EQUIPMENT REQUIREMENTS. NOT ALL FIELD DEVICES REQUIRED ARE SHOWN ON THE
- 18. UPS SELECTED SHALL BE COMPATIBLE WITH ISOLATION TRANSFORMERS. (TYP.)
- 19. REFER TO I/O DRAWING LAYOUT FOR ADDITIONAL SIGNALS NOT SHOWN ON P&ID FLOW DIAGRAMS.



**TYPICAL 120V 3 POLE CONTACTOR** 

(EXAMPLE CIRCUIT)



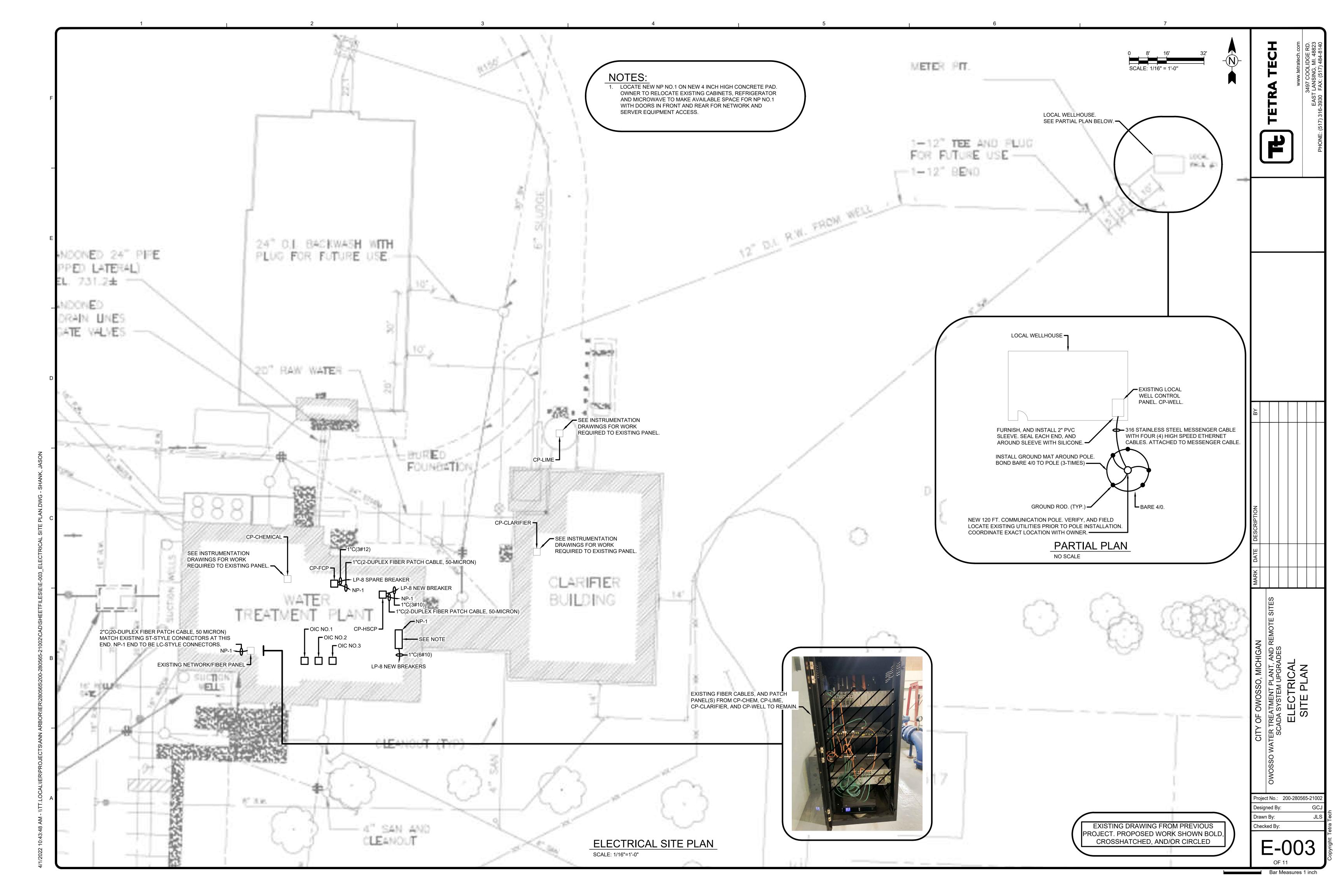


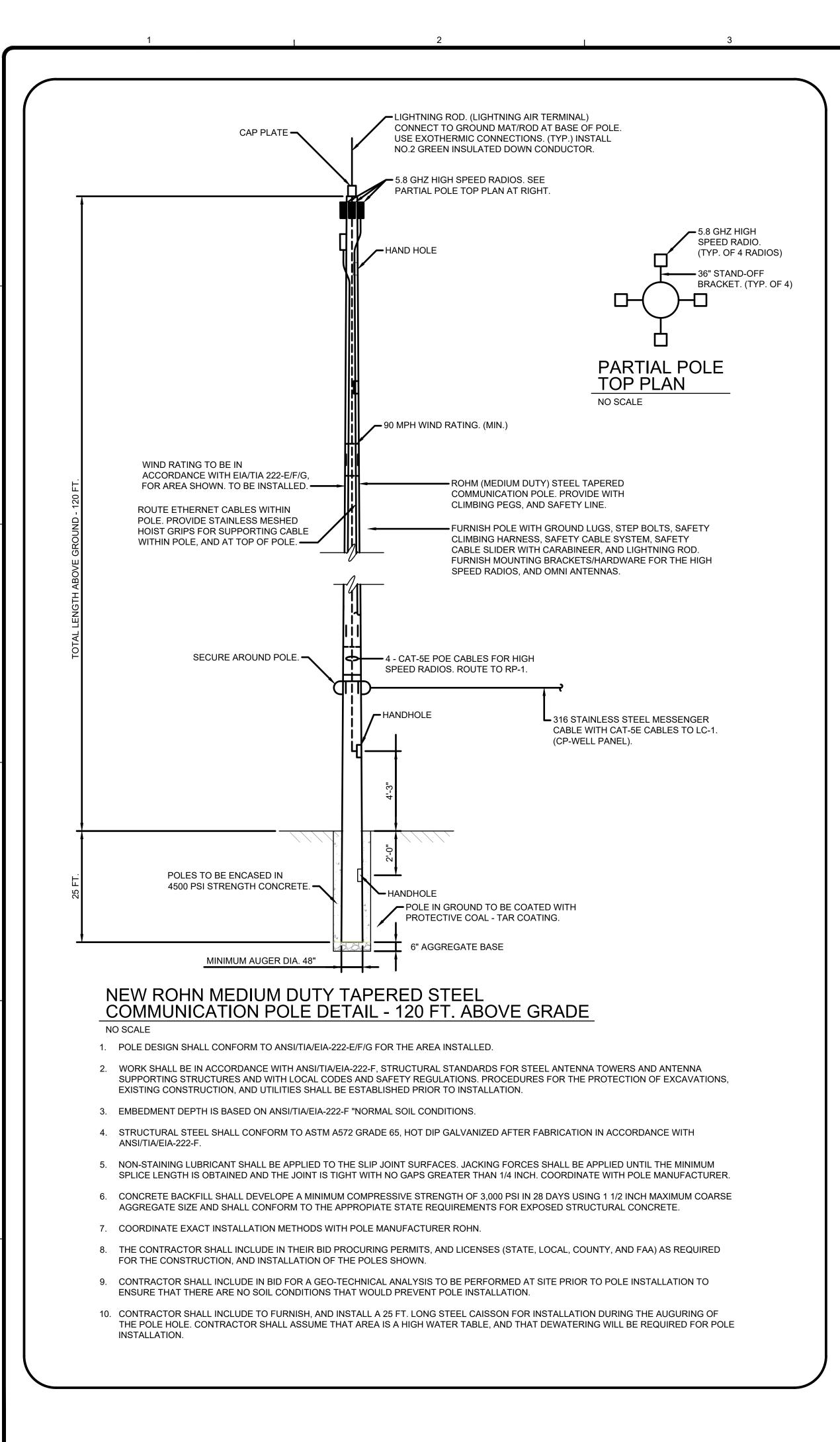
MCC LEGEND EXAMPLE

Project No.: 200-280565-210 Designed By:

Checked By:

Drawn By:





13 3 50 15 PUMP: 4 AIR COMP. 1 AND 3 WELDER VACUUM PUMP 23 PANEL 2 XFMR 27 NACTIVE 29 31 26 AIR COMP. 2 33 INACTIVE 35 32 SUMP PUMP INACTIVE 43 38 **PNACTIVE** 40 20 47 AUTO CLAVE 42 49 44 INACTIVE 46 53 48 SPACE 57 SPACE 59 36.96 36.96 SPACE WWP-2 3 100 63 36.96 CONNECTED LOAD CONNECTED LOAD 326 326 315 LP-8 DESCRIPTION: EXISTING PANEL SURFACE MOUNT, 120/240V, 1¢, 100A, MLO, 42 CIRCUIT KVA LOAD DENTIFICATION AMP POLE WIRE B A IDENTIFICATION BATH EXHAUST FAN 20 3 LIGHTS ROOM 107 & 108 LIGHTING CONTACTOR 1 20 5 6 20 1 EX. VACCUM PUMP EATHERNET 1 20 7 GFI MAU-1 CP-CHEM 1 20 9 10 20 1 EL -FLOW METER SENSOR 12 20 I EX. 1 20 11 CIRCULATING PUMP 14 20 1 EX. FLUORIDE PUMP 1 20 13 FUME HOOD POLYPHOSPHATE PUMP HYPOCHLORITE PUMP 18 20 1 EC -HYPOCHLORITE PUMP TRANSFER PUMP WATER SOFFEHER RECEPT EAST WALL SHOP 1 20 19 FLOW METER 20 21 22 20 1 Et. RECEPT SOUTH WALL SHOP WASH WATER CONTROL PANEL 20 23 24 20 1 EX. CP-HSCP SPARE

FURNISH, AND INSTALL 1 - 20A CIRCUIT BREAKERS, AND 2 - 30A CIRCUIT BREAKERS TO EXISTING PANELBOARD. (30A, 30A - NP-1) (20A - CP-HSCP) -

NP-1

CONNECTED LOAD

SPARE

SPARE

SPARE

SPARE

SPARE

SPARE SPARE

SPARE

CONNECTED LOAD

**EXISTING DRAWING FROM PREVIOUS** PROJECT. PROPOSED WORK SHOWN BOLD CROSSHATCHED, AND/OR CIRCLED

30 20 1 EX.

34 20 1 EX.

38 20 1 EU

42 20 1 EX. -

32 20

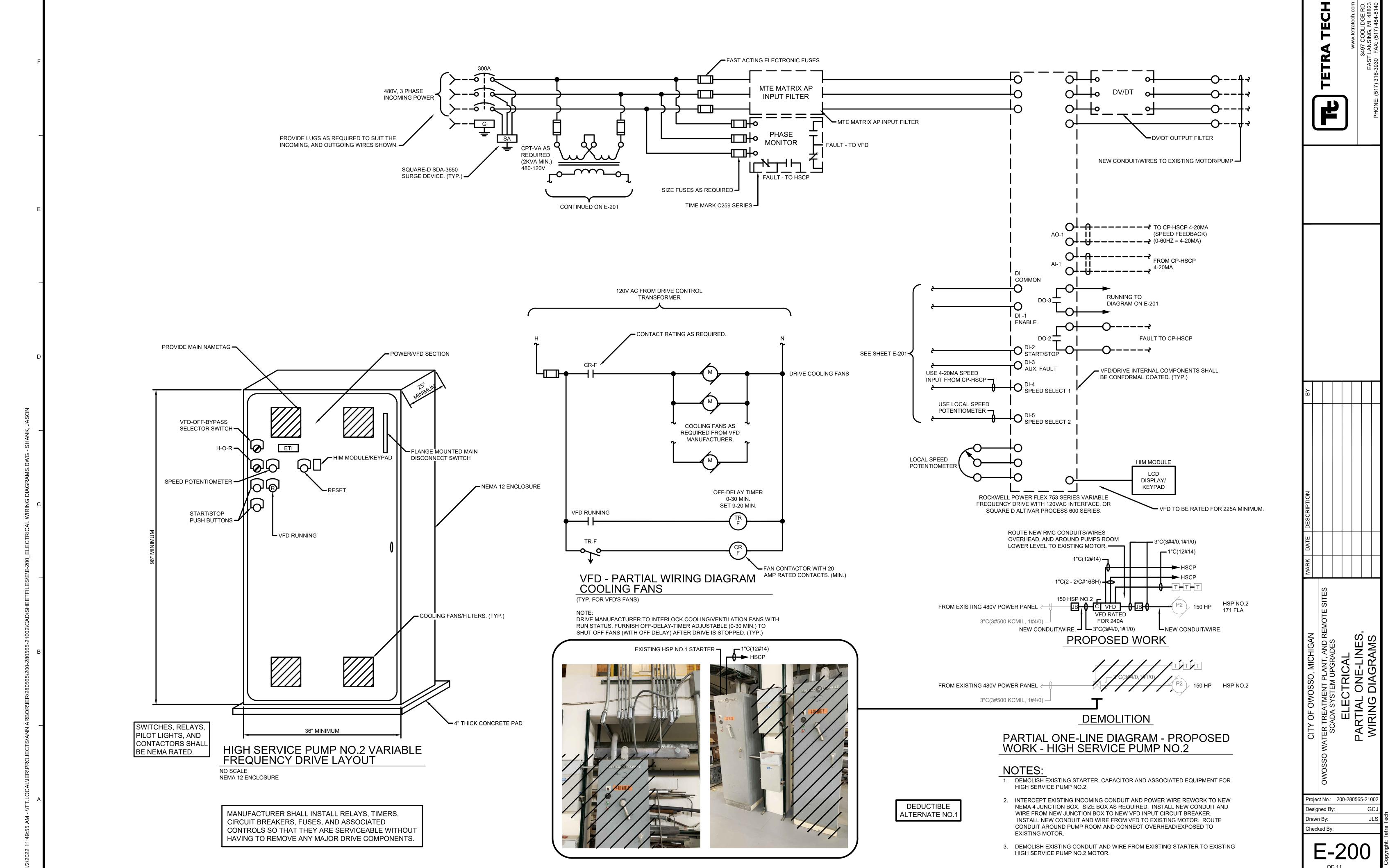
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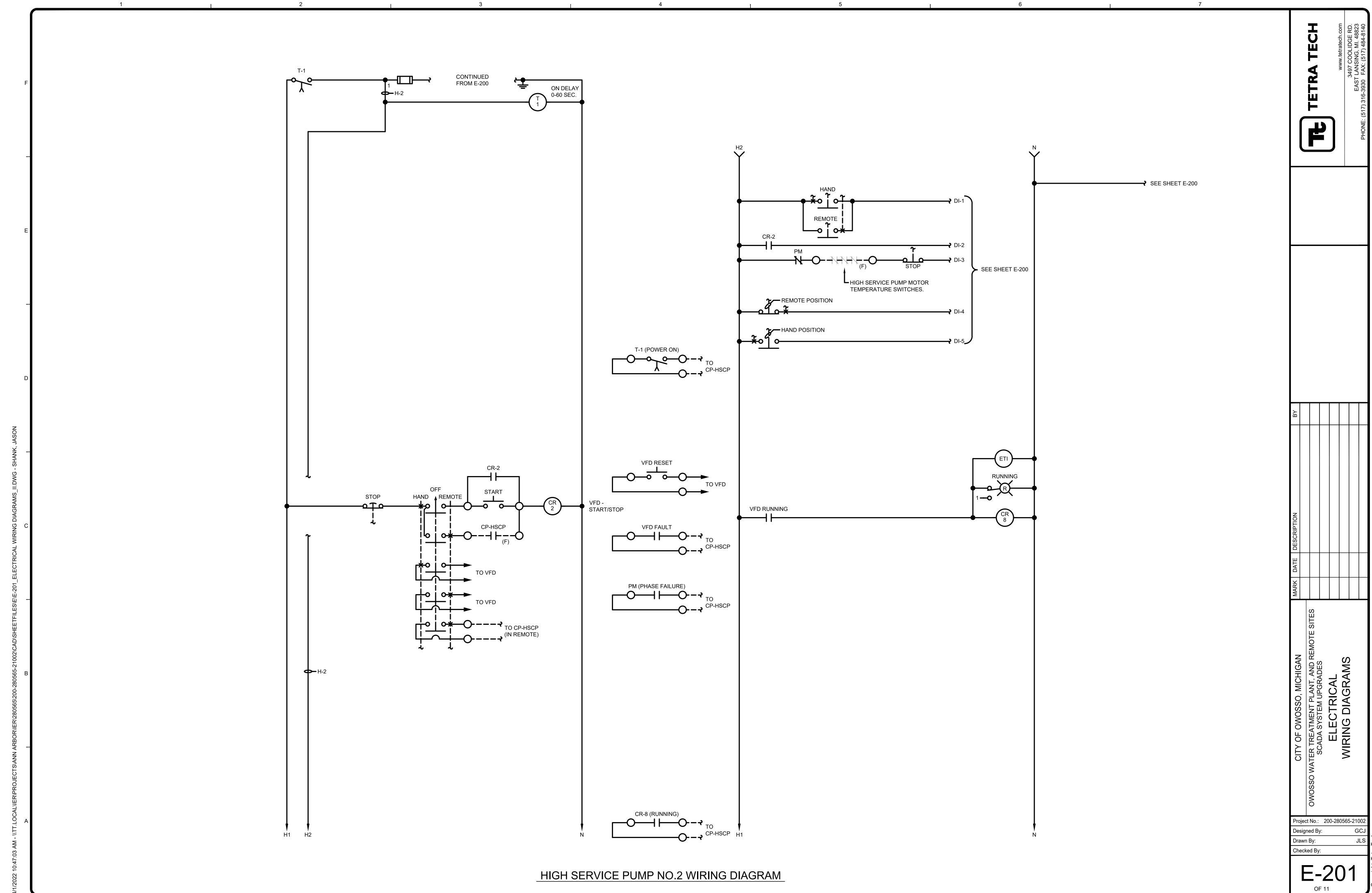
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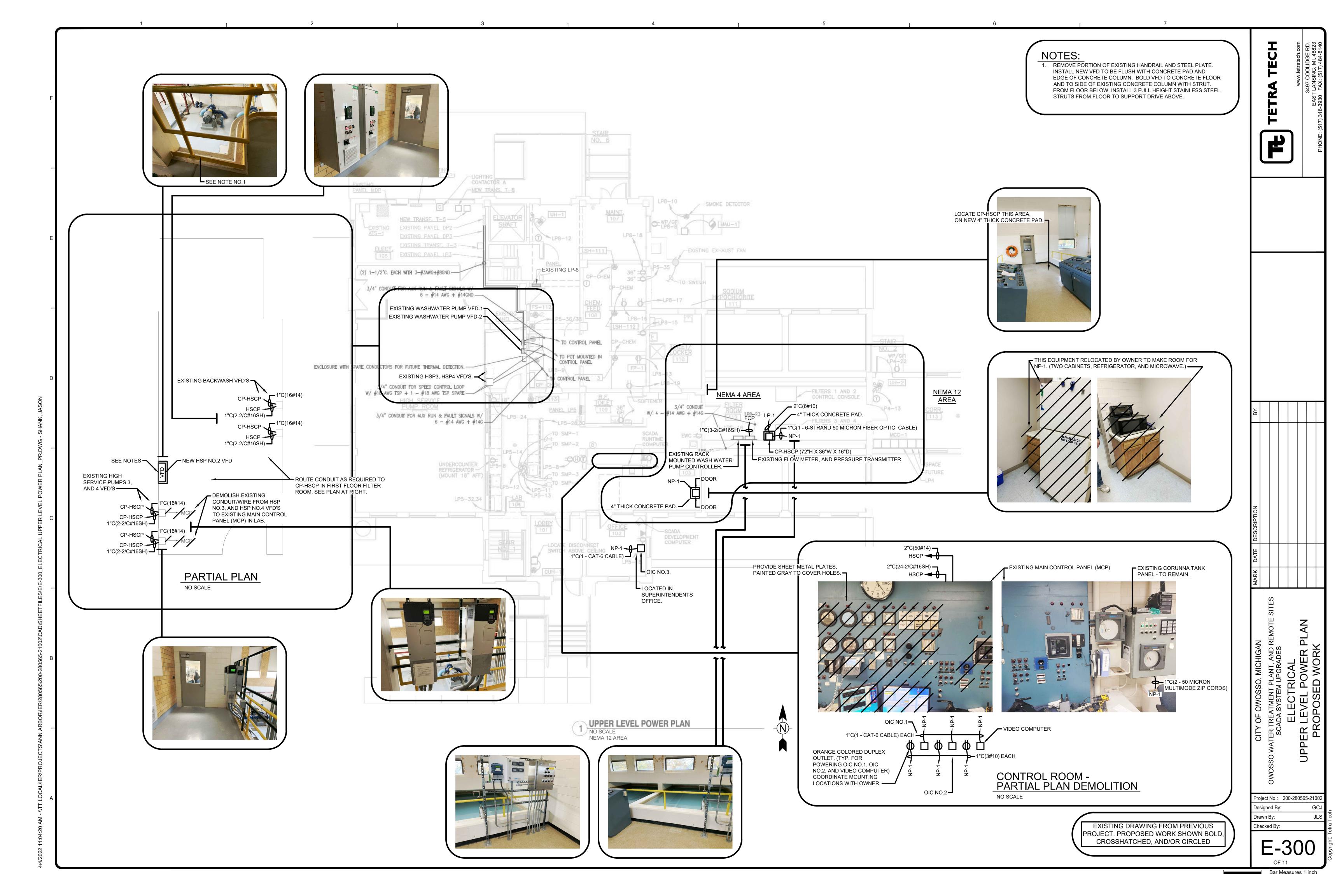
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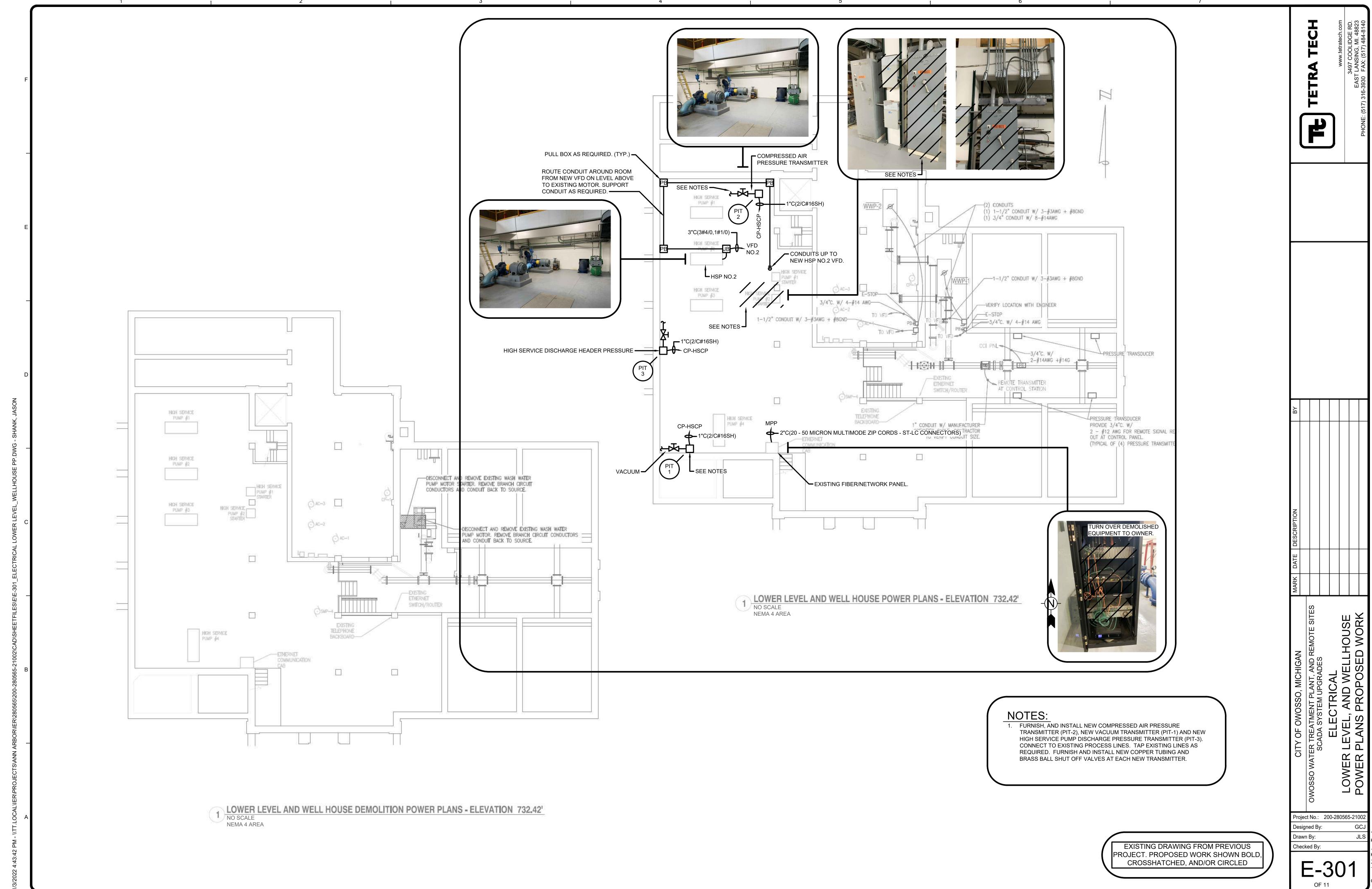
1 20 41

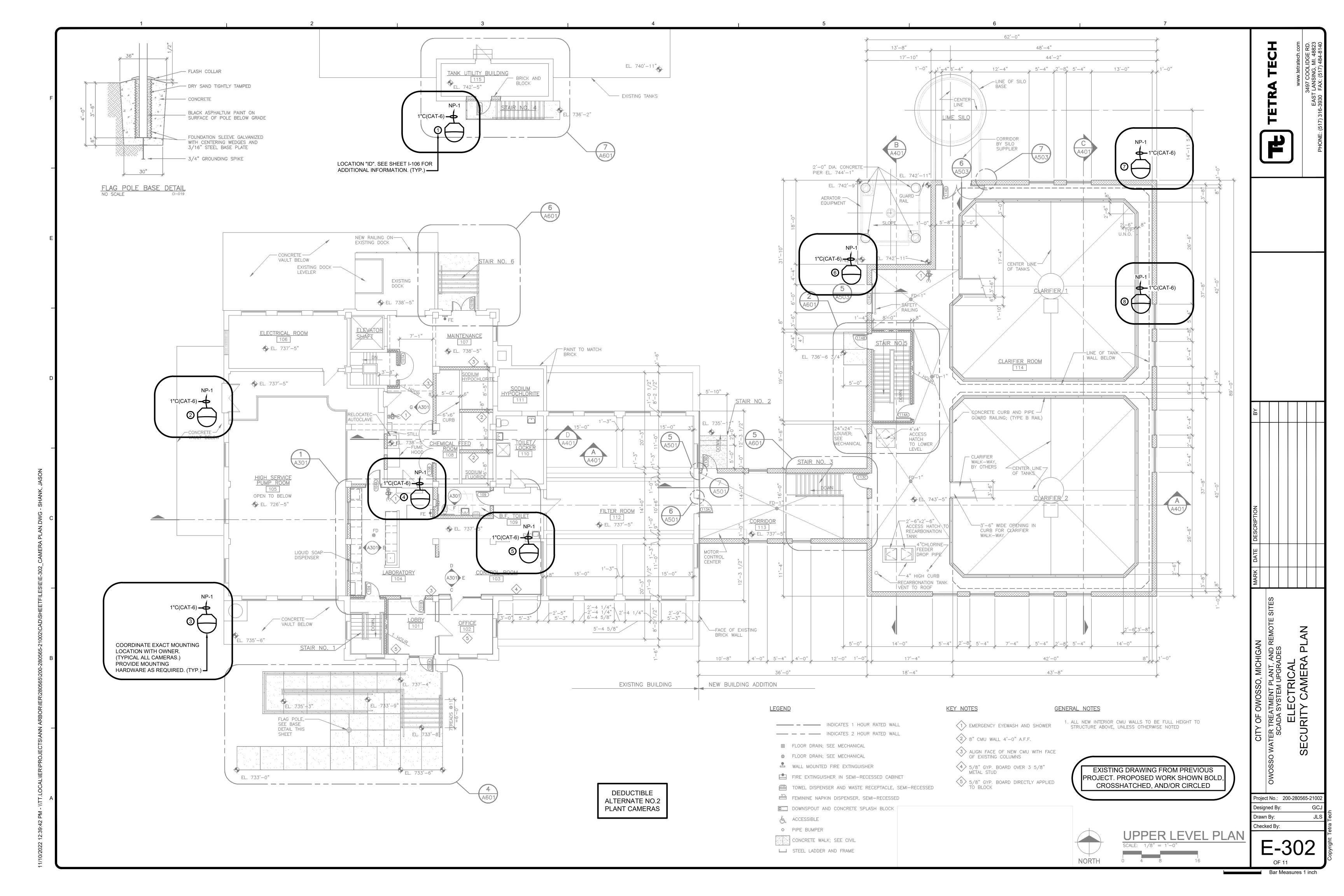
Project No.: 200-280565-2100 Designed By: Drawn By: Checked By:

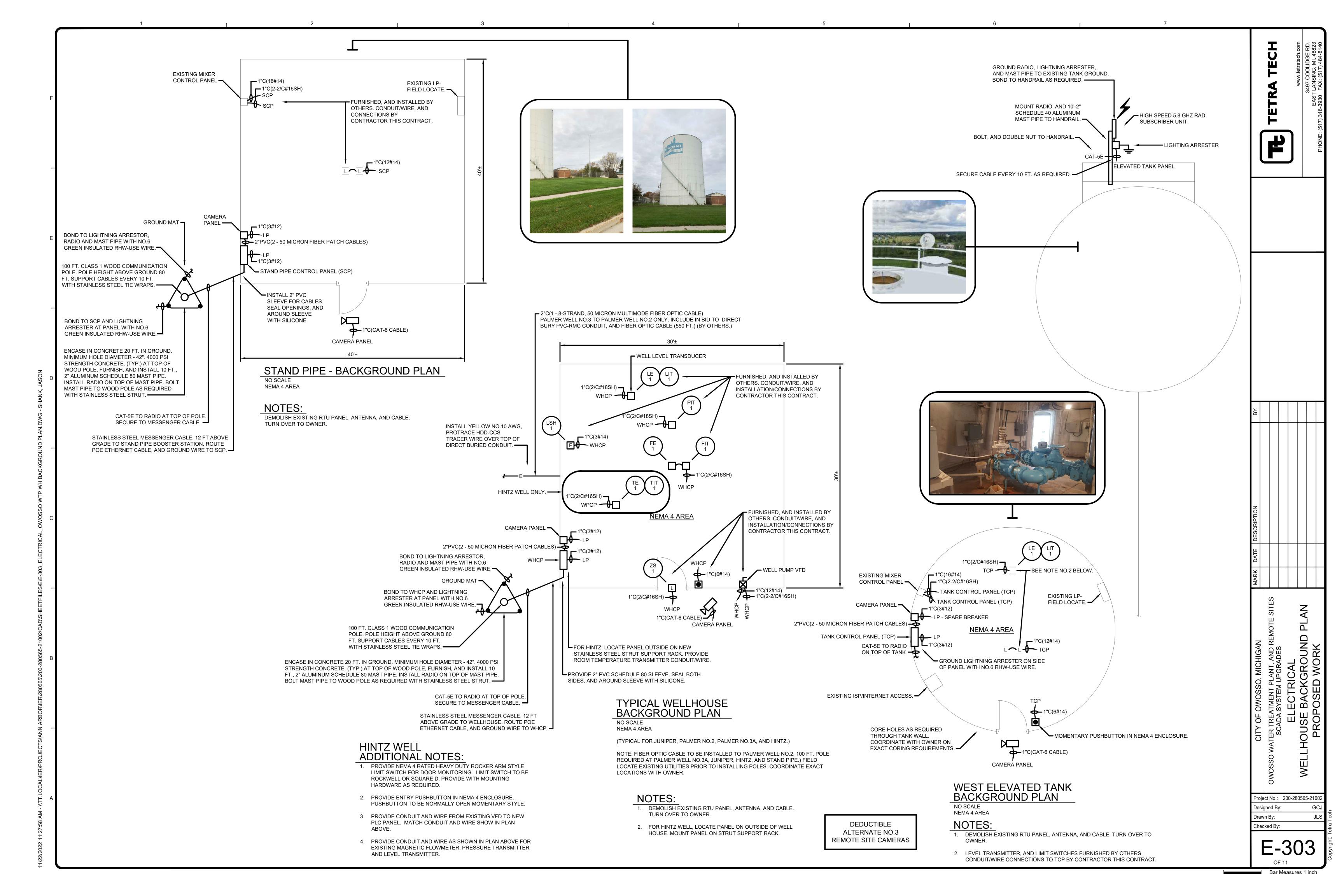


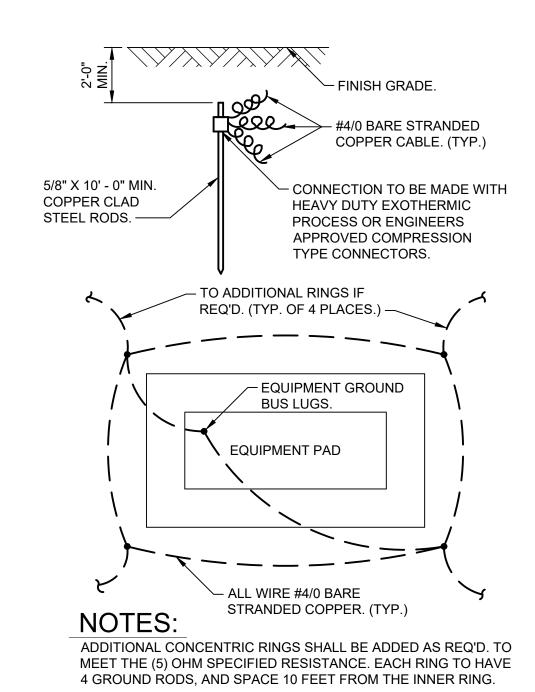






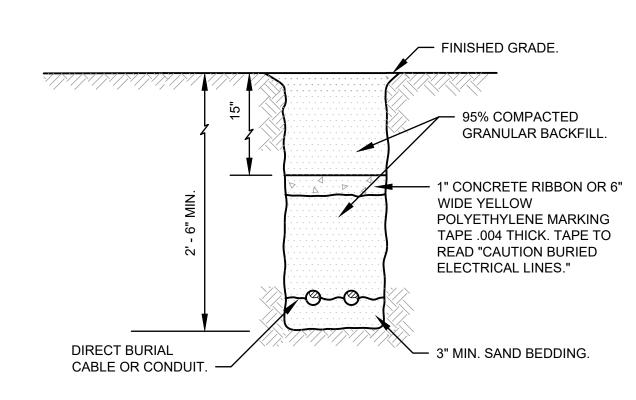




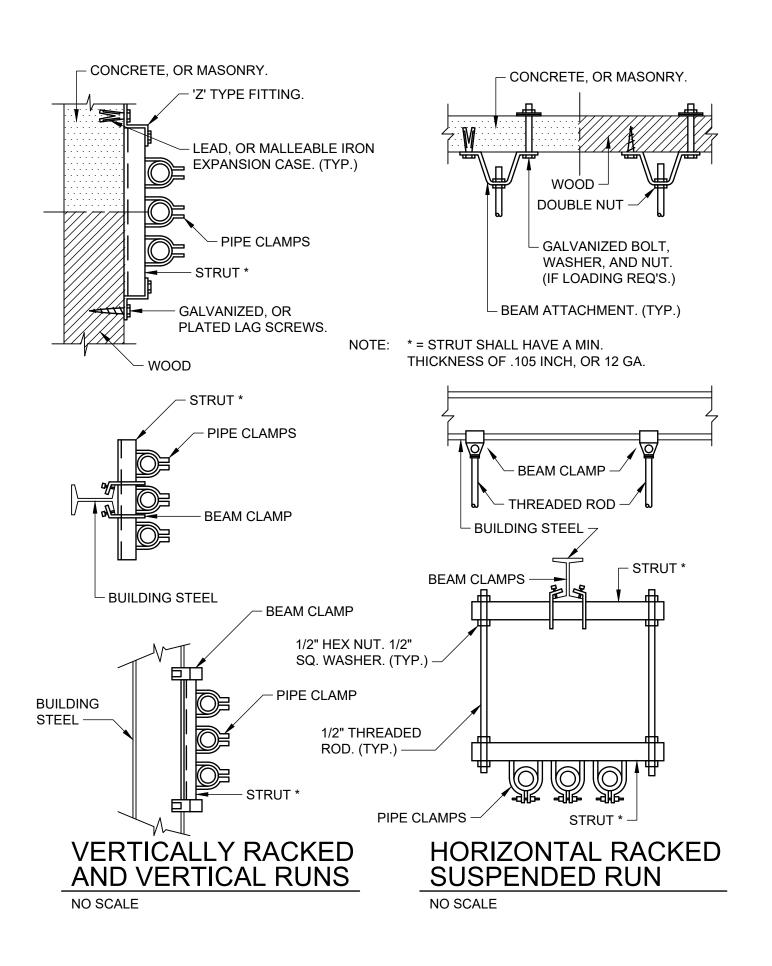


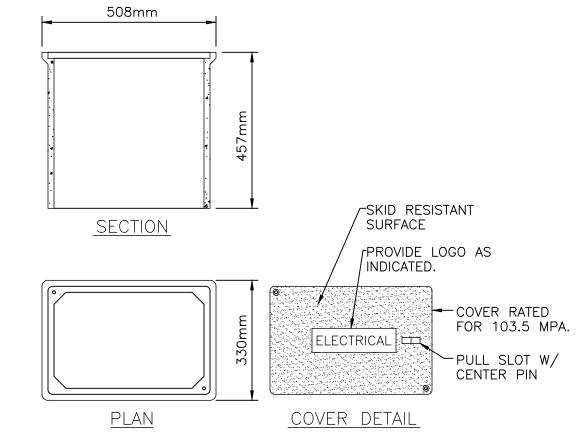
## **GROUND MAT**

NO SCALE



TRENCHING DETAIL NO SCALE



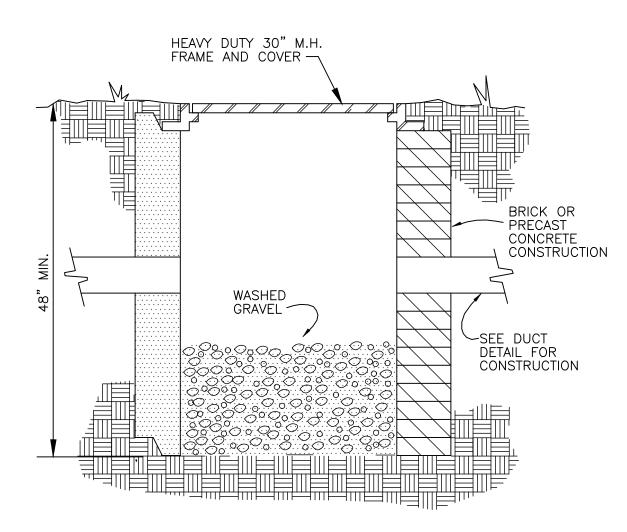


## HANDHOLE DETAIL

NO SCALE QUAZITE COMPOSOLITE OR EQUAL

HANDHOLES FOR LOW VOLTAGE CABLES INSTALLED IN PARKING LOTS, SIDEWALKS, AND TURFED AREAS SHALL BE FABRICATED FROM AN AGGREGATE CONSISTING OF SAND AND WITH CONTINUOUS WOVEN GLASS STRANDS HAVING AN OVERALL COMPRESSIVE STRENGTH OF AT LEAST 69 MPA AND A FLEXURAL STRENGTH OF AT LEAST 34.5 MPA. PULLBOX AND HANDHOLE COVERS IN SIDEWALKS, AND TURFED AREAS SHALL BE OF THE SAME MATERIAL AS THE BOX. CONCRETE PULLBOXES SHALL CONSIST OF PRECAST REINFORCED CONCRETE BOXES, EXTENSIONS, BASES, AND COVERS.

IN PAVED AREAS, FRAMES AND COVERS FOR HANDHOLE ENTRANCES IN VEHICULAR TRAFFIC AREAS SHALL BE FLUSH WITH THE FINISHED SURFACE OF THE PAVING. IN UNPAVED AREAS, THE TOP OF MANHOLE COVERS SHALL BE APPROXIMATELY 15 MM ABOVE THE FINISHED GRADE.



HANDHOLE DETAIL NO SCALE

Project No.: 200-280565-2100 Designed By:

Drawn By: Checked By:

		DESCRIPTION	SYMBOL	DESCRIPTION
		DEVICE MOUNTED ON PANEL	0_0	FLOW ACTUATED SWITCH - NC
<u> </u>		BOARD OR PANEL MOUNTED DEVICE - DEVICE MOUNTED INSIDE		TEMPERATURE SWITCH - NO
		PANEL FIELD OR LOCALLY MOUNTED	0-70	
		DEVICE PROGRAMMED FUNCTION NOT		TEMPERATURE SWITCH - NC
		NORMALLY ACCESSIBLE TO OPERATOR	0000	LIMIT SWITCH (PROXIMITY TYPE) NORMALLY OPEN
		PROGRAMMED FUNCTION ACCESSIBLE THROUGH OPERATOR'S INTERFACE DEVICE	000	LIMIT SWITCH (PROXIMITY TYPE) NORMALLY CLOSED
<		PLC INPUT OR OUTPUT POINT	000	LIMIT SWITCH (PROXIMITY TYPE) NORMALLY CLOSED - HELD OPEN
	$\Diamond$	INTERLOCKING		LIMIT SWITCH (PROXIMITY TYPE) NORMALLY OPEN - HELD CLOSED
2	XÔR	EXCLUSIVE OR		CONTROL RELAY CONTACT -
	Â	ALTERNATOR		NORMALLY OPEN
	<u> </u>	OR	N	CONTROL RELAY CONTACT - NORMALLY CLOSED
	AND	AND		LIGHTING ARRESTOR
	<u>\$</u>	MOTOR STARTER	ETI	ELAPSED TIME INDICATOR
	<u>P</u>	PURGE		
	<u>\( \)</u>	COMPLEX LOGIC		TIMING RELAY COIL
		COMPUTER LOGIC SYSTEM  TERMINAL OR TRANSITION POINT	-(T)1	TIMING RELAY COIL (OFF DELAY)
		FLOAT SWITCH	G	INDICATING LIGHT
		PARTIAL FLUME		PUSH-TO-TEST INDICATING LIGHT
	8—	MIXER	1,1,1,	
	$\sim$	SEAL		X2 SECONDARY
>		OFF PAGE CONNECTOR	<u> </u>	TRANSFORMER
		PROCESS MACHINERY MOTOR	-\\\\\\\\\\	VARIABLE RESISTOR
		VENTURI OR INSERT FLOW TUBE		RESISTOR
	8	IN-FLOW ELEMENT (PROPELLER TYPE)	0 0	MOLDED CASE CIRCUIT BREAKER
		IN-LINE FLOW ELEMENT (MAGNETIC TYPE)		SPEED SWITCH
	<u>~</u>	IN-LINE FLOW ELEMENT	010	MOMENTARY PUSHBUTTON OPERATOR - NORMALLY CLOSED
		(ULTRASONIC)	0 0	MOMENTARY PUSHBUTTON OPERATOR - NORMALLY OPEN
		FLOW ORIFICE	0 0	SELECTOR SWITCH - NORMALLY OPEN
		TURBIDITY METER	<u> </u>	PUSHBUTTON OPERATOR WITH MUSHROOM HEAD
		ROTOMETER	0-/-0	SOLENOID OR CLUTCH
		PUMP	0)	THERMAL OVERLOAD
			(F)	FIELD LOCATED
		BLOWER	0—0	TERMINAL POINT
<u>\</u>		GENERAL USE DISCONNECTING		LOW VOLTAGE FUSE
0		SWITCH TIME CLOSED CONTACT ON		FUSIBLE TERMINAL BLOCK
0	<u> </u>	ENERGIZATION TIME OPENED CONTACT ON		CIRCUIT BREAKER WITH STAB
	<u> </u>	ENERGIZATION	<-ó	CONNECTION
0	$\sqrt{}$	TIME CLOSED CONTACT ON DE-ENERGIZATION		CONTROL POWER TRANSFORME
0		TIME OPENED CONTACT ON DE-ENERGIZATION	-(CR L)-	
0		FLOAT ACTUATED SWITCH - NO		TWO COIL LATCHING RELAY
0	To	FLOAT ACTUATED SWITCH - NC	-(CR)-	
0		PRESSURE ACTUATED SWITCH - NO	OFF	RECEPTACLE
0	<u></u>	PRESSURE ACTUATED SWITCH -	HAND AUTO	051 50705 2075
<u></u>	_ 0	NC		SELECTOR SWITCH OPERATOR WITH FUNCTION SHOWN
_		FLOW ACTUATED SWITCH - NO	$  \circ   \circ  $	

GRAPH	IIC SYMBOLS FOR I	NSTRUM	ENTATION ITEMS
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
FOC-DO(X)	DISCRETE INPUT TO FIBER CONVERTER (PROVIDE WITH 120V AC P/S FIBER CONVERTER TO DISCRETE OUTPUT) (PROVIDE WITH 120V AC P/S (WEED EOTEC - 2S07/2H07 WITH 120V AC P/S)) QUANTITY (X) AS NOTED ON DRAWINGS	FOC-AO(X)	ANALOG INPUT TO FIBER CONVERTER. FIBER CONVERTER TO ANALOG INPUT (WEED EOTEC 2T14/2R14 WITH P/S AS REQUIRED) QUANTITY (X) AS NOTED ON DRAWINGS
FOC	FIBER OPTIC CONVERTER - TYPE, AND STYLE AS NOTED		FLANGED DIAPHRAGM SEAL

FIBER OPTIC PATCH PANEL -CONNECTORS, AND QUANTITY

AS REQUIRED

	GRAPHIC SYMBO	OLS FOR	VALVES
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	STROKE OR POSITION ACTUATOR CYLINDER (OPEN-SHUT) STROKE OR POSITION ACTUATOR		CHECK VALVE
μX	STROKE OR POSITION ACTUATOR CYLINDER (THROTTLING) PNEUMATIC DIAPHRAGM OR	M	PLUG VALVE
Ŝ	PNEUMATIC DIAPHRAGM OR POSITIONER (OPEN-SHUT) PNEUMATIC DIAPHRAGM OR	1×1	BUTTERFLY VALVE, DAMPER OR LOUVER
	PNEUMATIC DIAPHRAGM OR POSITIONER (THROTTLING)	S	TWO - WAY SOLENOID VALVE OPERATOR
	MOTOR OPERATED (THROTTLING)	(M)	ELECTRONICALLY CONTROLLED CHECK VALVE
	MOTOR OPERATED (OPEN - SHUT)	S <sub>D</sub>	TWO - WAY SOLENOID VALVE OPERATOR - DETENTED
[—]	SLIDE - STOP GATE	<u> </u>	THREE - WAY SOLENOID VALVE
	SLUICE GATE		OPERATOR
$\overline{\forall}$	AIR SET ASSEMBLY	S	FOUR - WAY SOLENOID VALVE
<b>&gt;</b> ∞1	BALL VALVE		OPERATOR
	GLOBE VALVE	S-S-S	MANIFOLD STYLE BLOCK I/O SOLENOID VALVE - DUAL COILS
$\bowtie$	GATE VALVE OR KNIFE GATE		

NOTE: THE PLC I/O ADDRESS SHALL BE USED AS THE WIRING TAG SCHEME FOR ALL PANEL AND FIELD CONTROL WIRING. COORDINATE WITH ELECTRICAL CONTRACTOR.

	INSTRUMENTATIO	ON LINE S	SYMBOLS
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	ELECTRICAL SIGNAL	—— E-NET ——	ETHERNET COMMUNICATION SIGNAL-UNSHIELDED TWISTED
_////	AIR LINE/PNEUMATIC SIGNAL	L-INC I	PAIR (UTP)-SPEED AS INDICATED
——L——	HYDRAULIC SIGNAL	—— E-FO ——	ETHERNET FIBER OPTIC COMMUNICATIONS SIGNAL
	ELECTROMAGNETIC OR SONIC SIGNAL	——FО——	PLC REMOTE I/O FIBER OPTIC COMMUNICATION SIGNAL
—-о	SOFTWARE SIGNAL	V-FO	ETHERNET VIDEO FIBER OPTIC
	CONNECTION TO PROCESS, OR MECHANICAL LINK		

	I.S.A. STANDARD L	ETTER FUNCTIONS
SYMBOL	FIRST LETTER	SUCCEEDING LETTERS
A	ANALYSIS, ANALOG	ALARM
В	BURNER, FLAME	BATCH
С	CONDUCTIVITY, COMMAND	CONTROL (FEEDBACK TYPE)
D	DENSITY, SPECIFIC GRAVITY	
Е	VOLTAGE	PRIMARY ELEMENT
F	FLOW RATE	RATIO
G	GAGING	GLASS
Н	HAND, MANUAL	HIGH
I	CURRENT	INDICATE
J	POWER	SCAN
K	TIME, TIME SCHEDULE	CONTROL (NO FEEDBACK)
L	LEVEL, LIGHT	LOW
М	MOISTURE, HUMIDITY	MIDDLE, MODULATE
N		
0	OVERLOAD	ORIFICE
Р	PRESSURE, VACUUM	POINT
Q	QUANTITY	TOTALIZE, INTEGRATE
R	RADIOACTIVITY	RECORD, PRINT, RECEIVE
S	SPEED, FREQUENCY, SOLENOID	SWITCH
Т	TEMPERATURE, TURBIDITY	TRANSMIT, TRANSFORM
U	MULTIVARIABLE	MULTIFUNCTION
V	VIBRATION, VISCOSITY	VALVE, DAMPER, LOUVER
W	WEIGHT, FORCE	
Х		
Υ		RELAY, COMPUTE
Z	POSITION	DRIVE, ACTUATE

	ABBREVIATIONS				
SYMBOL	DESCRIPTION				
R	RESET				
Т	TRIP				
AS	AIR SUPPLY				
DO	DISSOLVED OXYGEN				
GS GAS SUPPLY					
HS	HS HYDRAULIC SUPPLY				
NS	NITROGEN SUPPLY				
ORP	OXYGEN REDUCTION POTENTIAL				
SS	STEAM SUPPLY				
SP	SET POINT				
WS	WATER SUPPLY				
PV	PROCESS VARIABLE				
F.O.	FAIL OPEN				
F.C.	FAIL CLOSE				
SBPP	SCREEN BUILDING PROCESSOR PANEL				
TFBMPP	TERTIARY FILTER BUILDING MAIN PROCESSOR PANEL				
HVACP HEATING VENTILATION AIR CONDITIONING CONTROL PANEL - I/O					
MD	MAIN DISCONNECT				
%	GAIN OR PROPORTIONAL CONTROL				
ſ	INTEGRAL OR RESET CONTROL				
D DERIVATIVE OR RATE CONTROL					
V	VELOCITY ALGORITHM				
1-0	ON - OFF CONTROL				
$\sqrt{}$	SQUARE ROOT EXTRACTOR				
Σ	ADD OR TOTALIZE				
Δ	SUBTRACT OR DIFFERENCE				
>	HIGHEST MEASURED VARIABLE				
<	LOWEST MEASURED VARIABLE				
E/I , I/P	CONVERT ONE TO ANOTHER				
* , /	MULTIPLY, DIVIDE				
±	BIAS OR REVERSING				
f(x)	CHARACTERIZE - (EQUATION / /D/%/ETC.)				

# NOTE: FIBER, AND ETHERNET PATCH CABLES SHALL BE THE FOLLOWING COLORS PINK - SCADA/LAN NETWORK

YELLOW - VIDEO NETWORK BLUE - BUSINESS NETWORK ORANGE - PLC-I/O NETWORK GREEN - AUDIO NETWORK (IP PHONES) (7 FT. IN LENGTH MINIMUM, EACH)

Project No.: 200-280565-21002

Checked By:

- 1. FIELD VERIFY CONDUIT ROUTING AT THE PLANT WITH OWNER. CORE HOLES AS REQUIRED TO SUIT INSTALLATION OF THE CONDUITS SHOWN. PATCH WITH NON-SHRINK GROUT.
- 2. TURN OVER TO OWNER AT PROJECT COMPLETION OPERATION AND MAINTENANCE MANUALS (QUANTITY AS SPECIFIED) TO OWNER.
- 3. IN ADDITION TO PATCH CABLES SUPPLIED FOR THE PROJECT, FURNISH 30-10FT LONG SINGLEMODE DUPLEX FIBER OPTIC PATCH CABLES (ST-ST) CONNECTORS, AND 30-10FT CAT-5E PATCH CABLES FOR OWNERS USE. 3. FOR ITEMS INDICATED AS "FIELD LOCATE", THE CONTRACTOR SHALL FIELD VERIFY FOR INTERFERENCE TURN OVER CABLES TO OWNER.
- 4. MULTIMODE FIBER OPTIC PATCH CABLES, AND ETHERNET PATCH CABLES SUPPLIED IN THE PROJECT SHALL 4. BE COLORED PURPLE.
- 5. FIBER OPTIC PATCH PANELS SHALL BE THE PRODUCT OF CORNING CABLE SYSTEMS. (RACK OR SURFACE MOUNTED AS SHOWN", ST STYLE CONNECTORS, WITH QUANTITY OF BULKHEADS AS SHOWN.
- 6. OBTAIN THE SERVICES OF GENETEC OMNICAST REPRESENTATIVE SYSTEM TECHNOLOGIES-715-539-2877 TO PROVIDE THE NEW VIDEO SERVER, SOFTWARE, CONFIGURATION, AXIS CAMERAS, POE'S, MOUNTING BRACKETS AND CONFIGURE THE CAMERA ADDRESSES. INCLUDE IN BID FOR 7 DAYS AT THE JOB SITE FOR SYSTEM TECHNOLOGIES FOR SERVER INSTALLATION, NEW CAMERA CONFIGURATION, SET UP AND VERIFICATION. SERVER TO INCLUDE 20 TOTAL LICENSES/CAMERA CONNECTIONS INCLUDING FUTURE CAMERAS.
- 7. TURN OVER TO OWNER AT PROJECT COMPLETION OPERATION AND MAINTENANCE MANUALS (QUANTITY AS SPECIFIED) TO OWNER.
- 8. IN ADDITION TO PATCH CABLES SUPPLIED FOR THE PROJECT, FURNISH EACH 10-10FT LONG MULTIMODE DUPLEX FIBER OPTIC PATCH CABLES (SC-SC, SC-ST, SC-LC, ST-LC, LC-LC) CONNECTORS, (TOTAL OF 50 FIBER PATCH CABLES) AND 30-10FT CAT-6 PATCH CABLES FOR OWNERS USE. TURN OVER CABLES TO OWNER.
- 9. MULTIMODE FIBER OPTIC PATCH CABLES, AND ETHERNET PATCH CABLES SUPPLIED IN THE PROJECT SHALL BE COLORED GREEN.
- 10. MEDIA CONVERTERS FOR CONVERTING ETHERNET TO FIBER SHALL BE THE PRODUCT OF TRANSITION AS SHOWN ON THE CONTRACT DRAWINGS.
- 11. FIBER OPTIC PATCH PANELS SHALL BE THE PRODUCT OF CORNING CABLE SYSTEMS. (RACK OR SURFACE 12. FURNISH PULL BOXES FOR FIBER OPTIC CABLE. COORDINATE EXACT BENDING RADIUS WITH MOUNTED AS SHOWN.) PROVIDE CONNECTOR TYPES AS SHOWN WITH QUANTITY OF BULKHEADS AS SHOWN.

### **GENERAL CONSTRUCTION NOTES:**

- ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN LIGHT LINE WEIGHTS ON THE DRAWINGS ARE EXISTING ITEMS TO REMAIN. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN HEAVY LINE WEIGHTS ARE NEW THIS CONTRACT.
- ITEMS SHOWN OR NOTED TO BE DEMOLISHED ON THE DRAWINGS ARE EXISTING ITEMS TO BE REMOVED FROM SITE BY CONTRACTOR UNLESS NOTED TO BE TURNED OVER TO OWNER.
- AND FOR LOCATIONS OF MOUNTING FLANGES, CONNECTION POINTS, ETC.
- CONDUIT ROUTINGS SHOWN ON BACKGROUND PLANS ARE INTENDED ROUTINGS ONLY. EXACT CONDUIT ROUTINGS FOR CONDUITS, AND LENGTH SHALL BE FIELD LOCATED AND VERIFIED BY THE CONTRACTOR. COORDINATE CONDUIT ROUTING IN FINISHED AREAS WITH OWNER. CONDUIT TO BE CONCEALED IN THESE
- REFER TO THE CABLE MANUFACTURER'S RECOMMENDATIONS FOR MINIMUM BEND RADIUS FOR FIBER OPTIC CABLES. INSTALL NEW PULL BOXES (PB) AS REQUIRED FOR CONDUITS. SIZE PULL BOXES AS REQUIRED PER FIBER OPTIC CABLE MANUFACTURERS RECOMMENDATIONS.
- CONDUITS/RACEWAYS, PULL BOXES AND JUNCTION BOXES TO BE INSTALLED WITH 316 STAINLESS STEEL CHANNEL STRUT. MINIMUM STRUT LENGTH TO BE 12 INCHES, WHERE POSSIBLE.
- PANELS SHALL BE MOUNTED OFF WALLS WITH STRUT, CONDUITS SHALL BE MOUNTED ON STRUT INCLUDING SINGLE RUNS.
- DUCT SEAL, INCLUDING OPENINGS IN BOTTOM OF PANELS, AND EQUIPMENT.
- REPAIR SIDEWALKS AND ROADWAYS DUE TO SITE WORK ADDITIONS, THE EXTENT OF THE REPAIR REQUIRED SHALL BE FIELD VERIFIED PRIOR TO BIDS IN CONJUNCTION WITH THE WORK SHOWN IN THE CONTRACT DOCUMENTS. PRIOR TO TRENCHING, FIELD LOCATE EXISTING GAS LINES, TELEPHONE LINES, SPRINKLER LINES, ETC. COORDINATE WITH OWNER
- 10. PULL CORDS SHALL BE INSTALLED IN CONDUITS CONTAINING NETWORK CABLES, AND FIBER OPTIC CABLES.
- NETWORKS. PROVIDE POWER SUPPLIES AS REQUIRED FOR THE CONVERTERS. SPEED, AND TYPE SHALL BE 11. CORE HOLES AS REQUIRED TO SUIT INSTALLATION OF CONDUIT AND WIRING/CABLING AS SHOWN. FIELD VERIFY EXACT EXTENT OF WORK REQUIRED.
  - MANUFACTURER.
  - 13. NEW CONDUITS INSTALLED THIS CONTRACT WITH FIBER OPTIC CABLES ARE TO BE LABELED WITH PHENOLIC TAGS (AT BEGINNING TO END) TO INDICATE THE NUMBER OF STRANDS, ORIGINATION AND DESTINATION. TAGS TO BE COLOR CODED ORANGE FOR MULTIMODE.
  - 14. WHERE NEW CONDUITS SHOWN TO BE INSTALLED PASS UNDER ROADWAYS, CONDUITS SHALL BE CONCRETE ENCASED.
  - 15. PRIOR TO EXCAVATION, FIELD LOCATE EXISTING UTILITIES. COORDINATE WITH OWNER.
  - 16. AREAS WHERE CAMERAS ARE SHOWN TO BE INSTALLED SHALL BE CLASSIFIED AS NEMA 4, UNLESS CALLED OUT OTHERWISE.
  - 17. THE ASSOCIATED INSTRUMENTATION DRAWINGS SHOW EXISTING WIRES AND TERMINAL NUMBERS REQUIRED TO PROPERLY INTERFACE WITH NEW EQUIPMENT. THIS INFORMATION WAS COLLECTED FROM AS-BUILT DRAWINGS AND EXTENSIVE FIELD VERIFICATION. THE INFORMATION SHALL BE USED AS A GUIDE IN RE-TERMINATION. IT SHALL REMAIN THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE THE WIRING AND TO REVISE TO SUIT AS REQUIRED. CHANGES IN THE CONTRACT OR COST WILL NOT BE GRANTED FOR THIS COORDINATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE PROPOSED WORK SHOWN.
  - 18. CONDUIT ROUTINGS SHOWN ON BACKGROUND PLANS ARE PROPOSED ROUTINGS ONLY. EXACT CONDUIT ROUTINGS AND LENGTH SHALL BE FIELD LOCATED AND VERIFIED BY THE CONTRACTOR. COORDINATE CONDUIT ROUTING IN FINISHED AREAS WITH OWNER, CONDUIT TO BE CONCEALED IN THESE AREAS.
  - 19. RACEWAYS, PULL BOXES AND JUNCTION BOXES TO BE INSTALLED WITH 316 STAINLESS STEEL FASTENERS 15. CABLES (INCLUDING FIBER, ETHERNET, CONTROL WIRE, ETC.) WHERE PASSING THROUGH A PULLBOX SUPPORTS, AND THREADED ROD, ETC. (CHANNEL STRUT TO ALSO BE STAINLESS STEEL). MINIMUM STRUT LENGTH TO BE 12 INCHES, WHERE POSSIBLE, TYPICAL FOR NEMA 12, 4, AND 7 AREAS.
  - 20. WIRING FOR STARTERS SHALL BE IN ACCORDANCE WITH NEMA CLASS II B STANDARDS. SUBMIT ENGINEERED SHOP DRAWINGS FOR ALL STARTERS SHOWN TO BE WIRED.
  - 21. WIRE NUMBERS (1, 3, 5, ETC.) SHALL BE PREFIXED WITH STARTER TAG NUMBERS. THE WIRE NUMBER AFTER 17. THE FIELD DEVICES SHOWN ON THE P&ID'S, ELECTRICAL BACKGROUNDS, AND DETAILS SHEETS MAKEUP THE PREFIX SHALL BE THE MANUFACTURER'S WIRE NUMBERING SYSTEM. WIRE MARKERS SHALL BE USED AT EACH WIRE TERMINATION POINT.
  - 22. IN AREAS WHERE EQUIPMENT AND CONDUIT IS REMOVED. REPAIR WALL AND FLOOR SURFACES AS REQUIRED TO MATCH SURROUNDING AREA. WHERE DEVICES ARE REMOVED FROM CONCEALED BOXES, FURNISH AND INSTALL A BLANK COVER ON THE BOX.
  - 23. FIBER OPTIC CABLE SHALL BE AS CALLED OUT ON SYSTEM CONFIGURATION DRAWINGS, MULTIMODE, ALL DIELECTRIC, SUITABLE FOR INSTALLATION UNDERGROUND IN WET CONDUIT.

## GENERAL NOTES:

- 1. PRIOR TO SUBMITTING A BID FOR THE WORK DETAILED UNDER THIS CONTRACT, BIDDER SHALL VISIT THE WATER TREATMENT PLANT, AND REMOTE SITES. THE BIDDER SHALL FULLY ACQUAINT ONESELF WITH EXISTING FIELD CONDITIONS AT EACH SITE. NO BULLETINS WILL BE WRITTEN FOR WORK DUE TO LACK OF VERIFICATION OF EXISTING SITE CONDITIONS AND WIRING.
- 2. NO WIRES SHALL BE TERMINATED TO TERMINAL STRIPS, OR OTHER EQUIPMENT WITHOUT FIRST VERIFYING SIGNAL TYPE. DAMAGES RESULTING IN LACK OF VERIFICATION SHALL BE BORNE BY THE CONTRACTOR. CONTRACTOR SHALL COORDINATE SIGNAL TYPE AND VOLTAGE WITH I/O CARDS SHOWN.
- 3. WITHIN CONTROL PANELS, NAMEPLATES SHALL BE PROVIDED TO INDICATE DIFFERENT VOLTAGE LEVELS WITHIN PANELS. ALSO, A NAME TAG (YELLOW BACKGROUND, RED LETTERING) SHALL BE LOCATED ON THE FRONT OF EVERY PANEL INDICATING THAT WHEN MAIN PANEL DISCONNECTED 120V IS STILL PRESENT FROM FIELD DEVICES (YELLOW WIRING/ISOLATED INPUT CARDS.)
- 4. PHENOLIC TAGS ON FACE OF CONTROL PANELS TO HAVE WHITE BACKGROUND AND BLACK LETTERING (EXCEPT WARNING TAGS; YELLOW BACKGROUND RED LETTERING).
- 5. PROVIDE SAFETY COVERS ON ALL 480V MOLDED CASE MAIN CIRCUIT BREAKERS TO INSULATE THE INCOMING CABLES AND SIDE CONDUCTORS FROM CONTACT. (TYP. FOR CONTROL PANELS.) PROVIDE BREAKER LOCKS FOR PUMP CIRCUIT BREAKERS (MCP)AND MAIN PANEL BREAKERS.
- 6. REFER TO WIRING DIAGRAMS FOR ADDITIONAL INFORMATION ON ISOLATED I/O. A COMMON NEUTRAL MAY BE USED FOR SEVERAL ISOLATED INPUTS FROM THE SAME STARTER. PROVIDE NEUTRAL JUMPERS WIRES WITHIN THE PANEL AS REQUIRED.
- CONDUIT ENTERING CONTROL PANELS AND ELECTRICAL EQUIPMENT ENCLOSURES SHALL BE FILLED WITH 7. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN LIGHT LINE WEIGHTS ON THE DRAWINGS ARE EXISTING ITEMS TO REMAIN. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN HEAVY LINE
  - WEIGHTS ARE NEW THIS CONTRACT. 8. ITEMS SHOWN CROSSHATCHED (OR NOTED TO BE DEMOLISHED) ON THE DRAWINGS ARE EXISTING ITEMS TO BE REMOVED, FROM SITE BY CONTRACTOR.
  - INSTALL A SINGLE CONDUCTOR INSULATED (RHW, THHN, OR XHHW) COPPER GROUND WIRE IN EACH CONDUIT, SIZE AS SHOWN ON DRAWINGS, OR AS A MINIMUM PER THE NATIONAL ELECTRICAL CODE. THIS GROUND WIRE SHALL BE CONNECTED AT EACH END TO THE EQUIPMENT GROUND. THIS ALSO INCLUDES INSTRUMENTATION DEVICES SUCH AS LEVEL, PRESSURE, FLOW TRANSMITTERS, LIMIT SWITCHES, CONDUITS, NETWORK AND I/O CABLES.
  - 10. THE FOLLOWING EXAMPLE COMPONENT IDENTIFICATION SHALL BE USED AS APPROPRIATE:
  - (F) FIELD MOUNTED, NOT AT STARTER OR OTHER CONTROL PANELS
  - (S) STARTER PANEL MOUNTED (MCP)AT MAIN CONTROL PANEL
  - (1) AT CONTROL PANEL NO.1
  - (2) AT CONTROL PANEL NO.2
  - (TCP) AT TEMPERATURE CONTROL PANEL
  - 11. REFER TO DETAIL SHEETS. CONTRACTOR SHALL FURNISH AND INSTALL HARDWARE AND APPURTENANCES (I.E. PIPE TAPS, WETWELL BUBBLER TUBES, VALVES, COPPER TUBING, BALL VALVES, PNEUMATIC PIPING, SPOOL PIECES, ETC.) FOR FIELD DEVICES SHOWN (FLOWMETERS, PRESSURE TRANSMITTERS, LEVEL TRANSMITTERS, ETC.). WORK SHALL BE COORDINATED WITH OTHER TRADES (MECHANICAL INSTRUMENTATION, ETC.) CONTRACTOR SHALL BE RESPONSIBLE FOR SYSTEM COORDINATION AND INSTALLATION.
  - 12. ETHERNET AND FIBER OPTIC TERMINATIONS SHALL BE PERFORMED BY A QUALIFIED REPRESENTATIVE OF CABLE MANUFACTURER, THE CABLES SHALL BE TESTED. NO SPLICING SHALL BE PERMITTED OF FIBER OPTIC CABLES, BETWEEN PANELS. FIBERS SHALL BE TERMINATED AT PATCH PANELS, INCLUDING SPARES.
  - 13. REFER TO THE CABLE MANUFACTURER'S RECOMMENDATIONS FOR MINIMUM BEND RADIUS FOR FIBER OPTIC CABLES. INSTALL NEW PULL BOXES (PB) AS REQUIRED FOR CONDUITS. SIZE PULLBOXES AS REQUIRED PER FIBER OPTIC CABLE MANUFACTURERS RECOMMENDATIONS.
  - 14. CONDUIT ENTERING CONTROL PANELS AND ELECTRICAL EQUIPMENT ENCLOSURES SHALL BE FILLED WITH DUCT SEAL, INCLUDING OPENINGS IN BOTTOM OF PANEL.
  - SHALL BE LABELED AND COMPLETELY IDENTIFIED WITH IDENTIFICATION NUMBERS AND ORIGINATION/DESTINATION. THIS ALSO INCLUDES ALL CABLE BUNDLES ENTERING CONTROL PANELS,
  - 16. CONTROL WIRES SHALL BE TAGGED WITH THE PLC I/O ADDRESS IN THE FIELD AND AT THE PANEL.
  - THE FIELD DEVICE EQUIPMENT REQUIREMENTS. NOT ALL FIELD DEVICES REQUIRED ARE SHOWN ON THE
  - 18. UPS SELECTED SHALL BE COMPATIBLE WITH ISOLATION TRANSFORMERS. (TYP.)
  - 19. REFER TO I/O DRAWING LAYOUT FOR ADDITIONAL SIGNALS NOT SHOWN ON P&ID FLOW DIAGRAMS.

#### NOTE: FIBER, AND ETHERNET PATCH CABLES SHALL BE THE FOLLOWING COLORS PINK - SCADA/LAN NETWORK

YELLOW - VIDEO NETWORK

**BLUE - BUSINESS NETWORK** 

ORANGE - PLC-I/O NETWORK

GREEN - AUDIO NETWORK (IP PHONES)

(7 FT. IN LENGTH MINIMUM, EACH)



**EXAMPLE OF P&ID I/O SYMBOL** 

## NOTE: THE PLC I/O ADDRESS SHALL BE USED AS THE WIRING

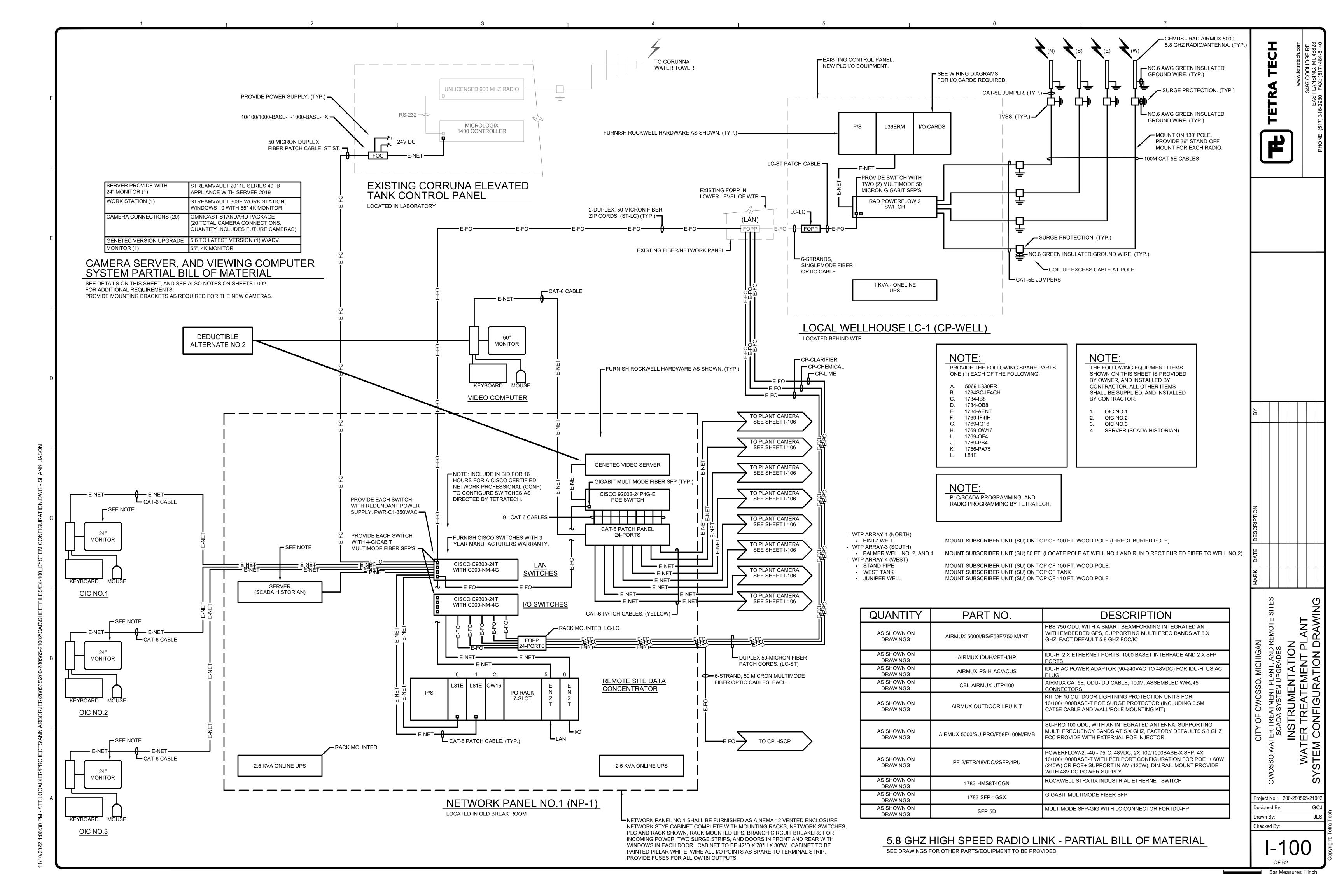
TAG SCHEME FOR ALL PANEL AND FIELD CONTROL WIRING. COORDINATE WITH ELECTRICAL CONTRACTOR.

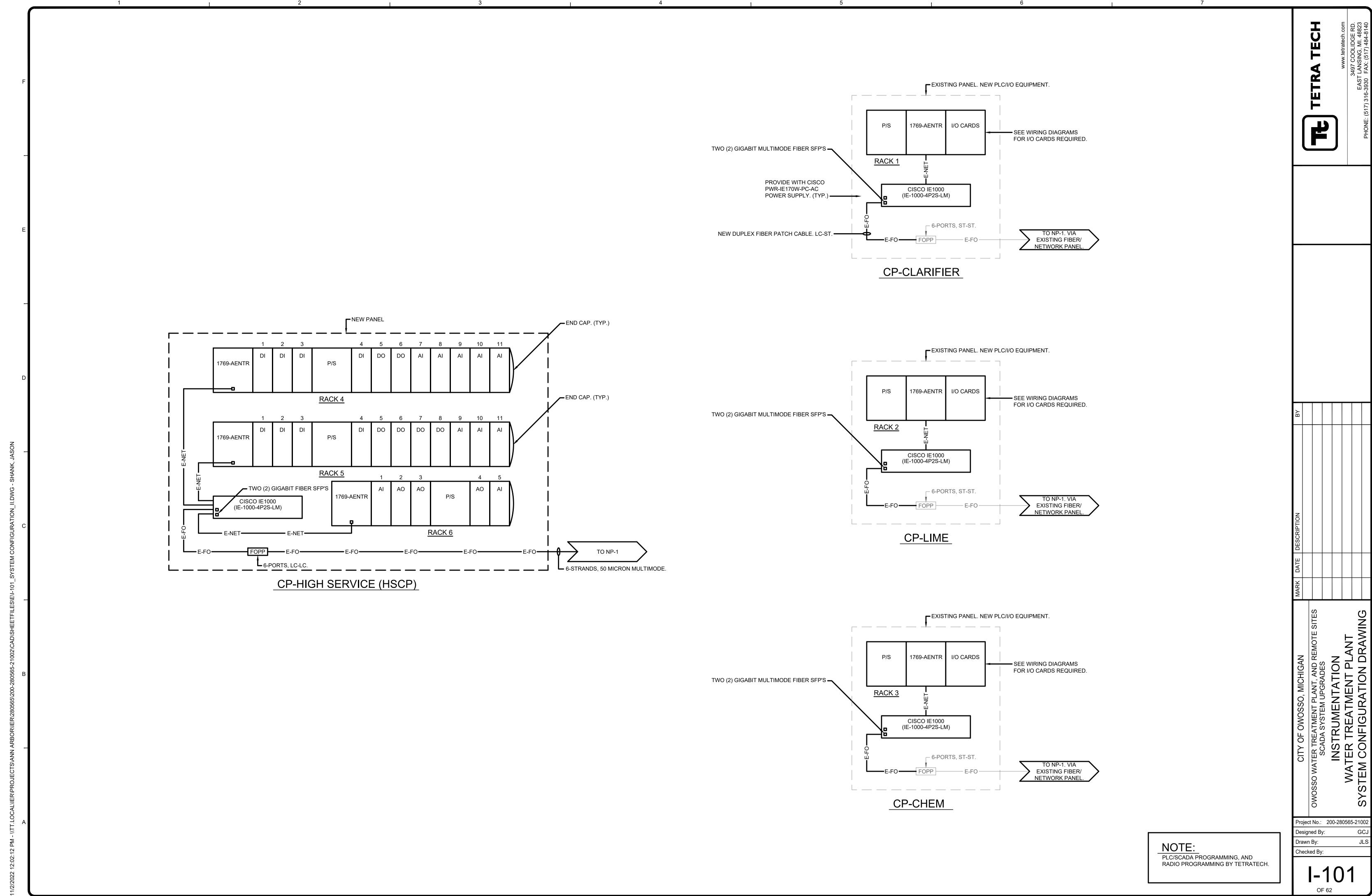
I/O TAGS FOR WIRES FOR CONTROL WIRING INSIDE ALL CONTROL PANELS, AND IN FIELD TO BE POLYPROPYLENE.

Project No.: 200-280565-210 esigned By:

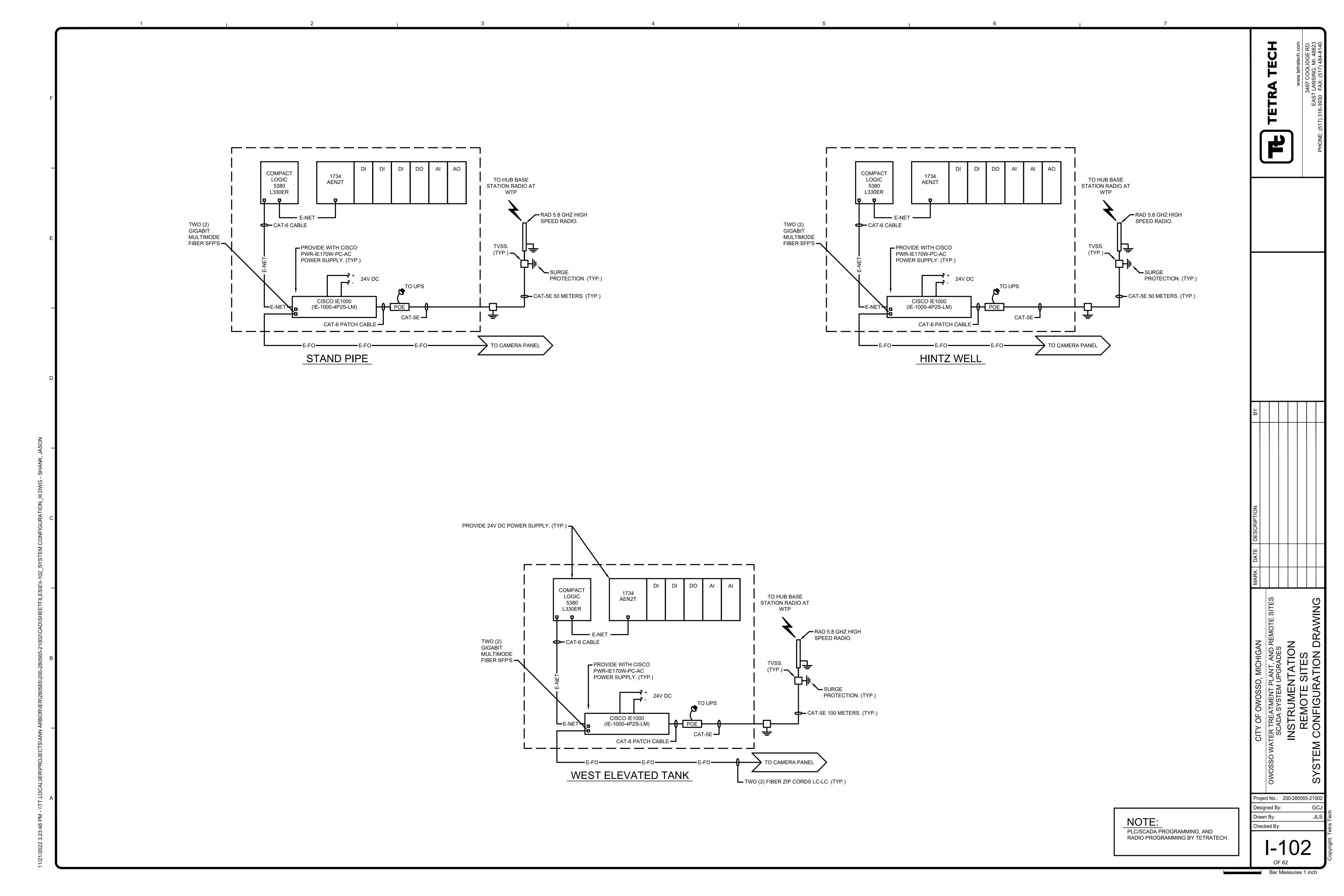
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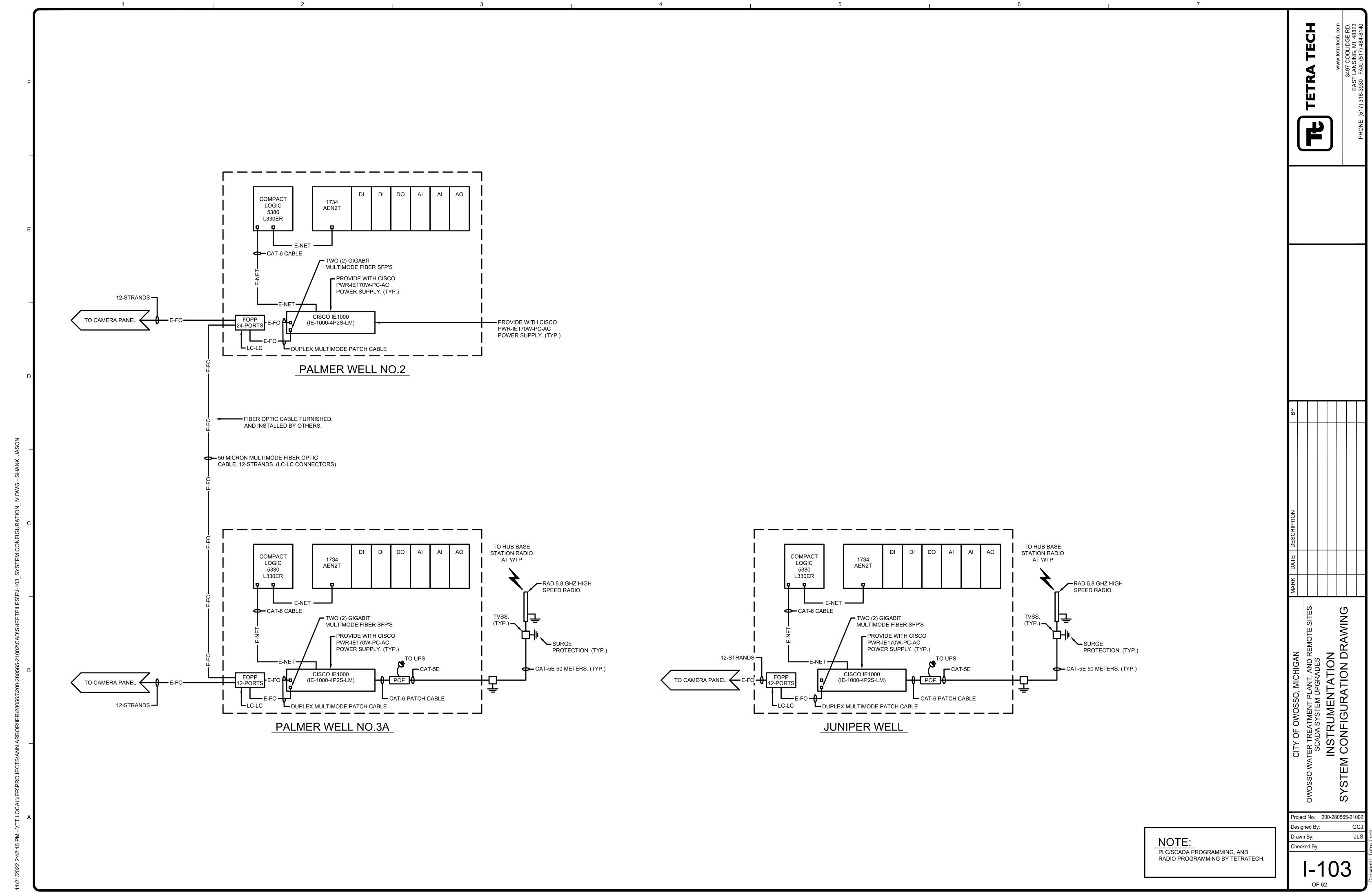
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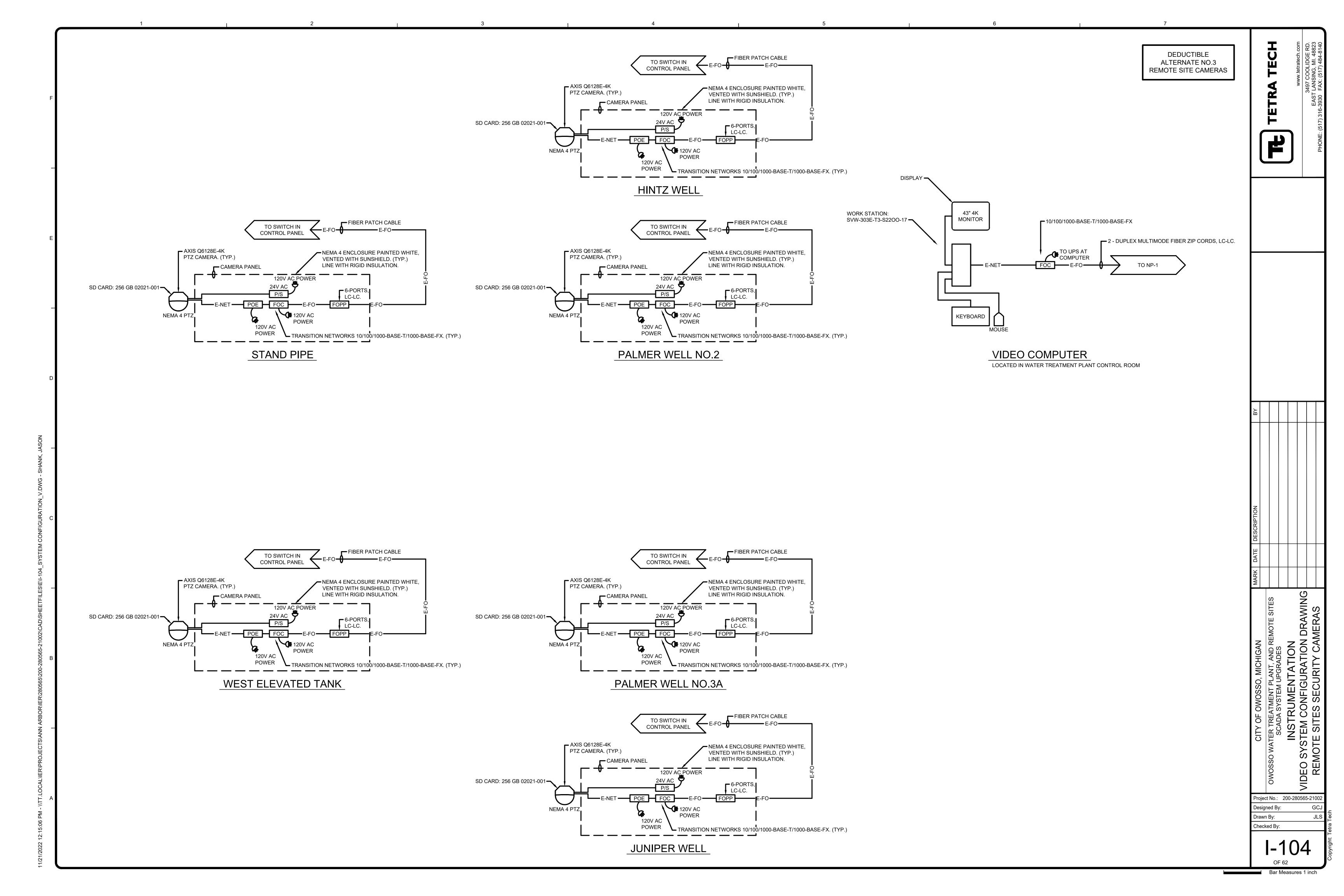


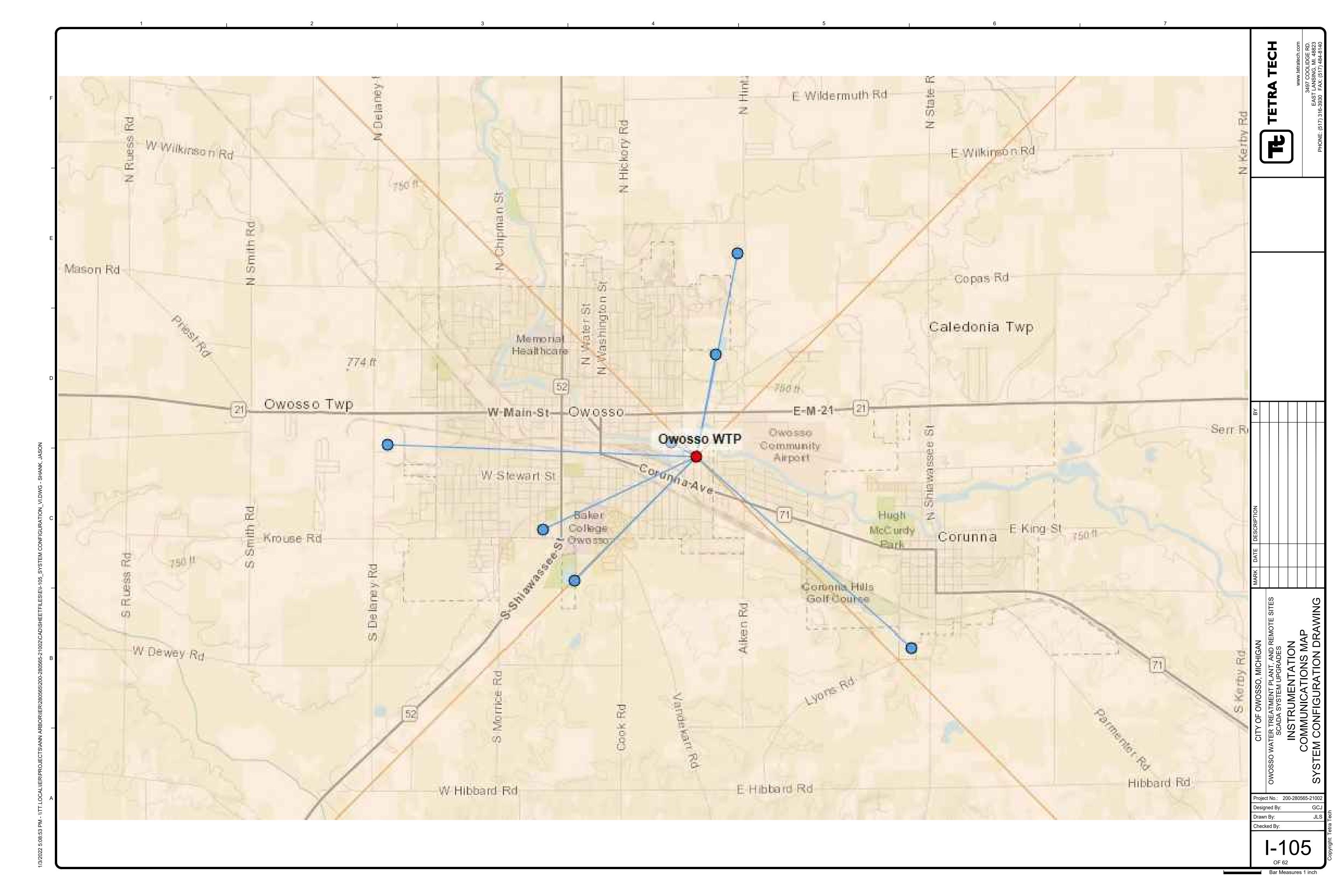


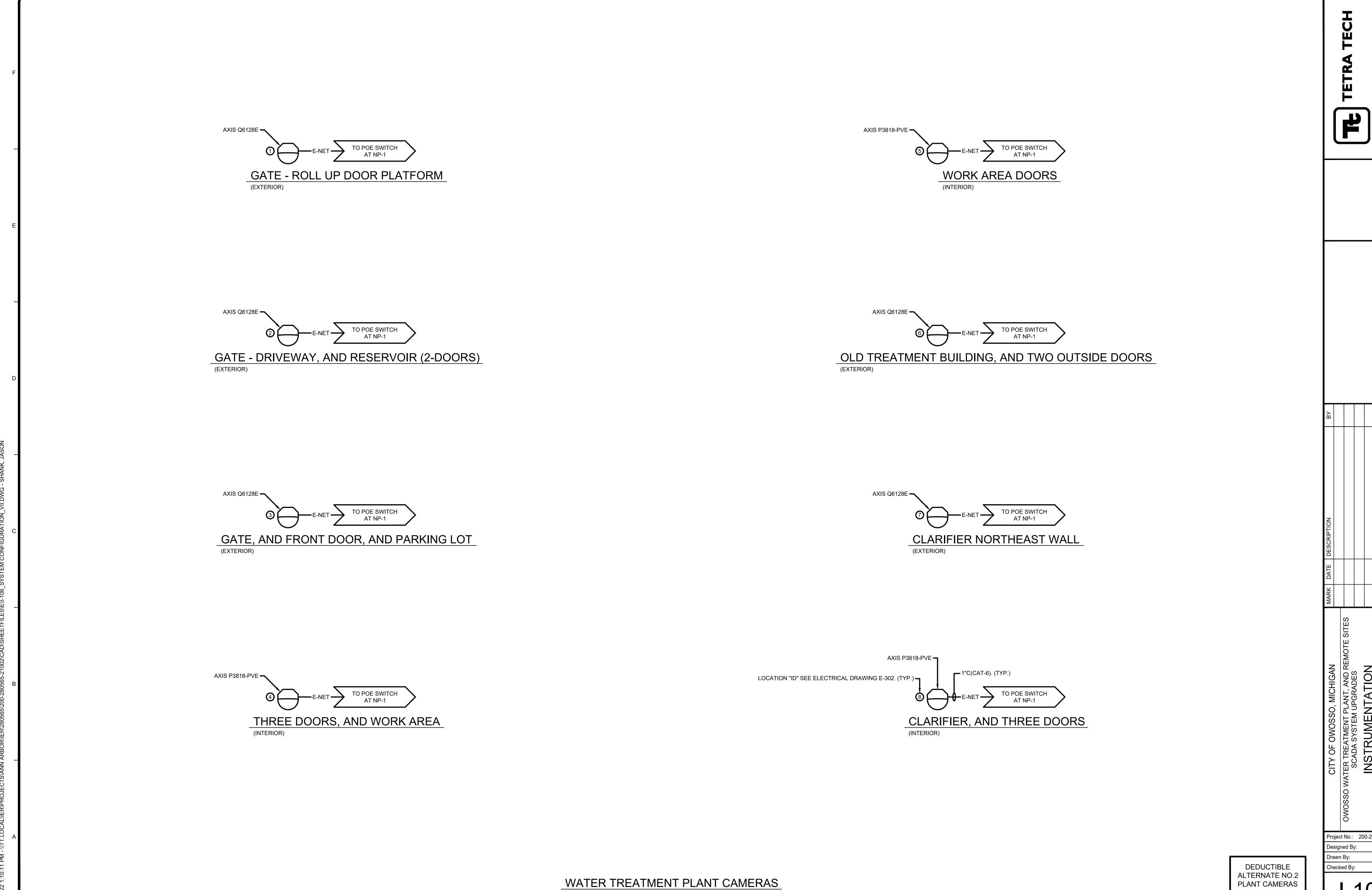
Par Massuras 1 inch







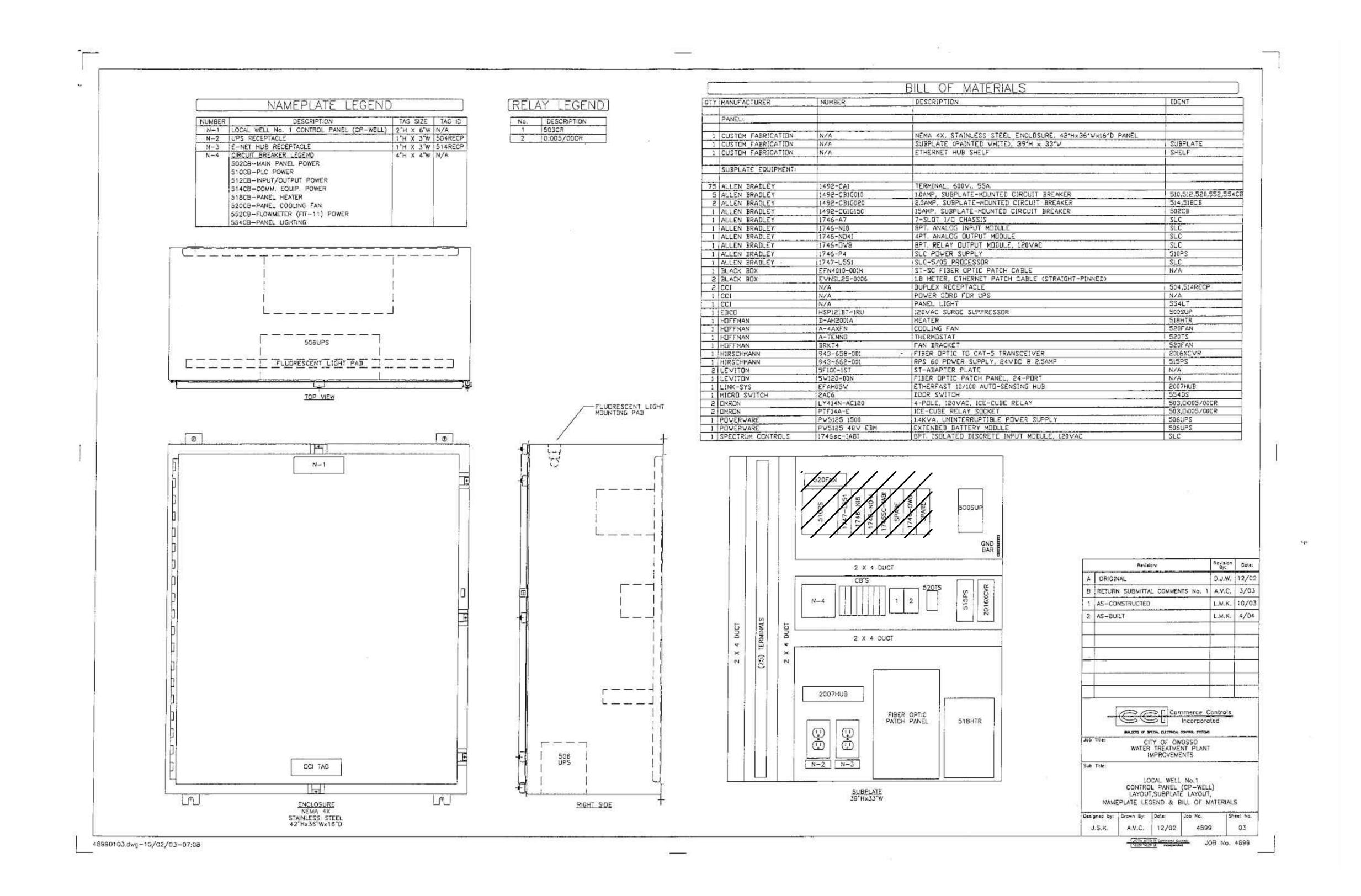




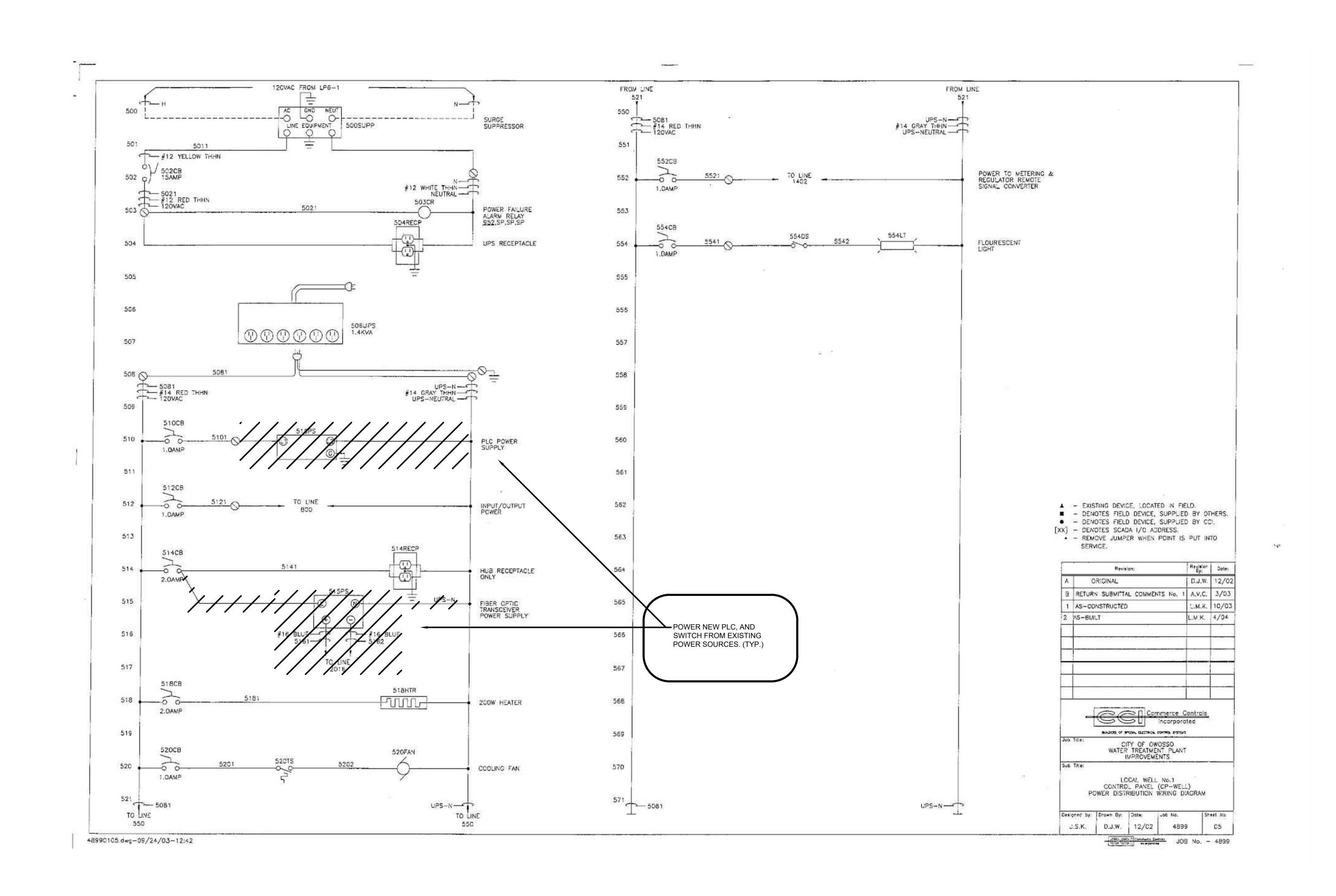
PLANT CAMERAS

I-106

OF 62



Project No.: 200-280565-21003 Designed By: Drawn By: EXISTING DRAWING FROM PREVIOUS Checked By: PROJECT. PROPOSED WORK SHOWN BOLD CROSSHATCHED, AND/OR CIRCLED



Project No.: 200-280565-21002 Designed By: Drawn By: Checked By:

EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD CROSSHATCHED, AND/OR CIRCLED

REPLACE CARD WITH 1769-IF8. RECONNECT EXISTING WIRES. (TYP.) FROM LINE 821 #14 GRAY THHN #14 GRAY THHN UPS-NEUTRAL 802 LOCAL WELL No.1 FLOW RANGE: 0-1500GPM (FE/FIT-11) 803 804 854 806 SPARE 812 EXISTING DEVICE, LOCATED IN FIELD. DENOTES FIELD DEVICE, SUPPLIED BY OTHERS. SPARE DENOTES FIELD DEVICE, SUPPLIED BY CCI.

[XX] - DENOTES SCADA I/O ADDRESS.

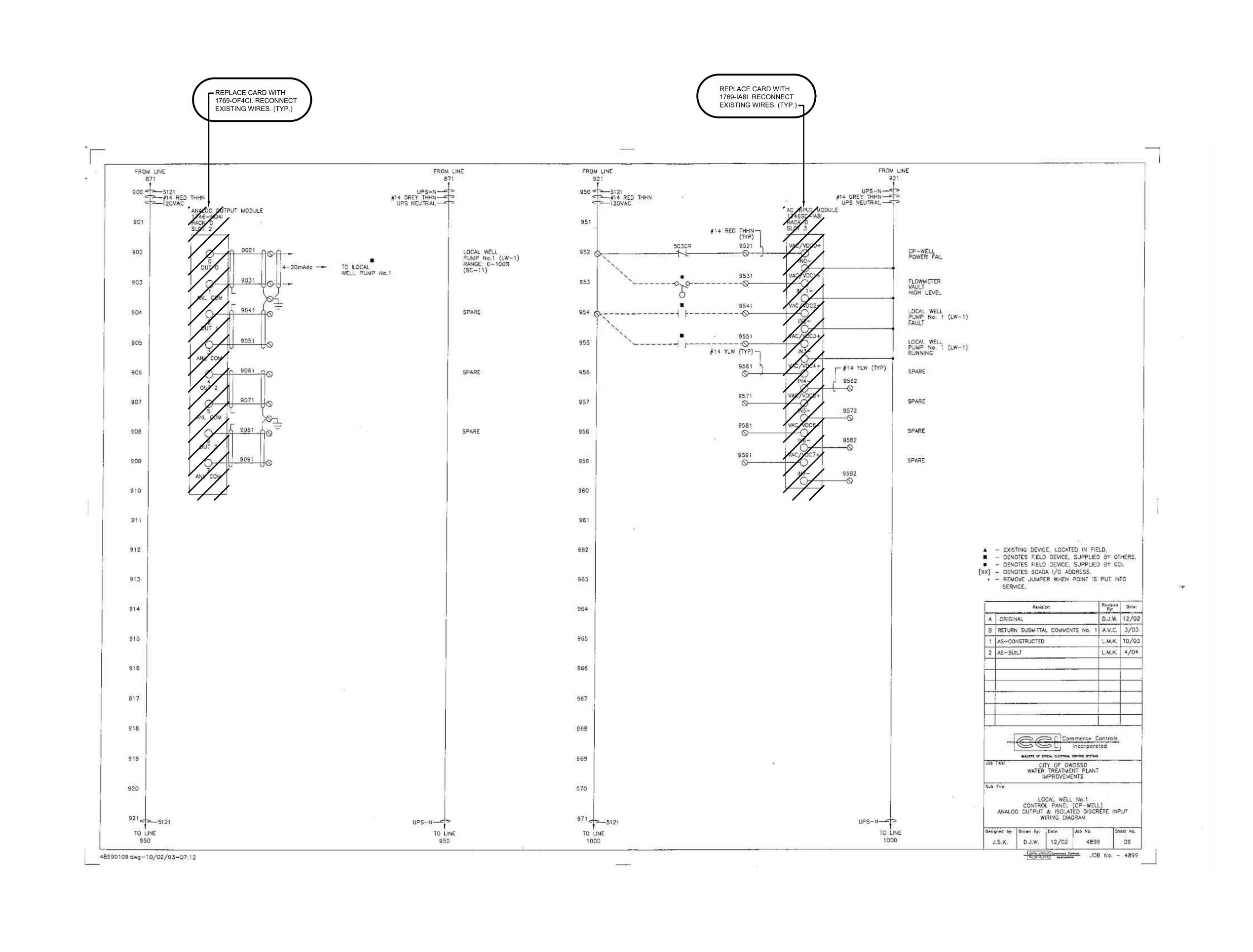
 REMOVE JUMPER WHEN POINT IS PUT INTO SERVICE. 813 863 Revision Dole: 814 SPARE D.J.W. 12/02 A ORIGINAL B RETURN SUBMITTAL COMMENTS No. 1 A.V.C. 3/03 815 865 L.M.K. 10/03 AS-CONSTRUCTED LM.K. 4/04 2 AS-BUILT 866 SPARE 817 818 Commerce Controls incorporated CURR ON OFF CURR ON OFF CURR ON OFF CURR ON OFF CURR OFF CONTRACT OFF CURR OFF CONTRACT OFF CURR OFF CONTRACT OFF CURR ON OFF CURR ON OFF CURR OFF 819 ENDOUS OF SPECIAL ELECTRICAL CONTROL SYSTEMS 869 CITY OF OWOSSO WATER TREATMENT PLANT IMPROVEMENTS 820 870 CURR ON OFF WE VOLTAGE OFF WE VOLTAG LOCAL WELL No.1 CONTROL PANEL (CP-WELL) PROCESSOR & ANALOG INPUT WIRING DIAGRAM CH 7 CH 4 821 - 5121 871 - 5121 UPS-N-UPS-N-TO LINE 850 TO LINE TO LINE Designed by: Drawn By: Date: Jab No. TO LINE 850 J.S.K. D.J.W. 12/02 GG Carrier Service JOB No. - 4899 48990105.dwg-10/02/03-07:10

EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD, CROSSHATCHED, AND/OR CIRCLED

Designed By:
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Project No.: 200-280565-21002



EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD, CROSSHATCHED, AND/OR CIRCLED

Project No.: 200-280565-21002 Designed By: Drawn By:

Checked By:

REPLACE CARD WITH 1769-OW8I. RECONNECT EXISTING WIRES. (TYP.) FROM LINE FROM LINE FROM LINE 1021 UPS-N 1000 -5121 - W14 RED THHN - 120VAC SPARE SLOT RACK O SLOT 4 0:005/00CR LOCAL WELL PUMP No.1 (LW-1) CALL (CS-11) 1062.SP,SP,SP 1002 1052 SPARE 1053 1003 SPARE 1004 1054 SPARE 1055 1005 SPARE 1006 1055 SPARE 1057 1007 SPARE 1008 1058 SPARE 1009 1059 1060 1010 F#14 YELLOW (TYP) WELL PUMP No. 1 ----- START/STOP CIRCUIT 10521 0:005/00CR 10522 TO LOCAL WELL PUMP No. 1 1012 1062 EXISTING DEVICE, LOCATED IN FIELD. DENOTES FIELD DEVICE, SUPPLIED BY OTHERS.
 DENOTES FIELD DEVICE, SUPPLIED BY CCI. (XX) - DENOTES SCADA I/O ADDRESS.
- REMOVE JUMPER WHEN POINT IS PUT INTO 1013 1063 Revision Date: Revision 1014 1064 A ORIGINAL D.J.W. 12/02 B RETURN SUBMITTAL COMMENTS No. 1 A.V.C. 3/03 1015 1065 1 AS-CONSTRUCTED L.M.K. 10/03 2 AS-BUILT L.M.K. 4/04 1016 1056 1017 1057 1018 1068 Commerce Controls
Incorporated 1019 1069 CITY OF OWOSSO WATER TREATMENT PLANT IMPROVEMENTS 1020 1070 LDCAL WELL No.1 CONTROL PANEL (CP-WELL) SPARE SLOT & RELAY OUTPUT WIRING DIAGRAM UPS-N--UPS-N----> Designed by: Drawn By: Date: Job No. TO LINE 1050 TO LINE TO LINE TO LINE 1050 1100 J.S.K. D.J.W. 12/02 4899 10 48990110.dwg-10/02/03-07:13

Project No.: 200-280565-21002 Designed By: Drawn By: Checked By:

EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD, CROSSHATCHED, AND/OR CIRCLED

NAMEPLATE LEGEND

DESCRIPTION TAG SI BILL OF MATERIALS RELAY LEGEND No. DESCRIPTION
1 2503CR
2 0:005/00CR TAG SIZE TAG ID GTY MANUFACTURER N-2 UPS RECEPTACLE
N-3 E-NET HUB RECEPTACLE
N-4 CIRCUIT BREAKER LEGEND 1"H X 3"W 2504RECP 1"H X 3"W 2514RECP NEMA 4X, STAINLESS STEEL ENCLOSURE, 48'Hx39'Vx)6'D PANEL SUBPLATE (PAINTED WHITE), 45'H x 36'W ETHERNET HUB SHELF 1 CUSTOM FABRICATION 1 CUSTOM FABRICATION N/A
1 CUSTOM FABRICATION N/A
| SUBPLATE EQUIPMENT: 4"H X 4"W N/A 2502CB-MAIN PANEL POWER 251008-PLC POWER 251208-INPUT/OUTPUT POWER TERMINAL, 500V., 55A.

1.0AMP, SUBPLATE-MOUNTED CIRCUIT BREAKER
2.0AMP, SUBPLATE-MOUNTED CIRCUIT BREAKER
15AMP, SUBPLATE-MOUNTED CIRCUIT BREAKER
17-SLOT I/D CHASSIS
4PT. ANALOG DUTPUT MODULE
8PT. RELAY DUTPUT MODULE, 120VAC
SLC POWER SUPPLY
SLC-5/05 PROCESSOR
27-SC FIBER OPTIC PATCH CABLE B ALLEN BRADLEY 1492-CA1 1492-CB1G010 2514CB-COMM, EQUIP, POWER 2510,2512,2520, 2518CB-PANEL HEATER 2 ALLEN BRADLEY
1 BLACK BOX 2520CB-PANEL COOLING FAN 1492-CBIGC20 1492-CGIG150 1746-A7 1746-ND41 2514,2518CB 2502CB 2552CB-LEVEL SWITCH (LAH-111) POWER 2554CB-LEVEL SWITCH (LAH-112) POWER 2556CB-LEVEL SWITCH (LAH-113) POWER 1746-0W8 1746-P4 2558CB-FLOW SWITCH (FS-81) POWER 255008-PANEL LIGHTING 1747-L551 EFN4010-001M S CCI S BLACK BGX EVNSL25-0006 N/A 18 METER, ETHERNET PATCH CABLE (STRAIGHT-PINNED) 2504,2514RECP DUPLEX RECEPTACLE I CCI
I CCI
I EDCD
I HOFFMAN
I HOFFMAN
I HOFFMAN
I HOFFMAN
I HOFFMAN \_\_\_\_\_\_\_\_\_ POWER CORD FOR UPS NZA: N/A PANEL LIGHT 120VAC SURGE SUPPRESSOR HEATER N/A HSP121ET-IRU D-AH2001A 2500SUP 2518HTR 2506UPS COCLING FAN
FAN BRACKET
THERMOSTAT 2520FAN 2520FAN 2520TS 3416XCVR A-4AXFN A-BRKT4 A-TEMNO 943-658-00 FLUDRESCENT LIGHT PAD FIBER OPTIC TO CAT-5 TRANSCEIVER 943-662-001 | SF100-1ST | SW120-00N | EFAH05W | ZAC6 1 HIRSCHMANN RPS 60 POWER SUPPLY, 24VDC & 25AMP 2515PS 1 HIRSCHMANN
2 LEVITON
1 LEVITON
1 LINK-SYS
1 MICRO SWITCH
2 OMRON
2 OMRON
1 POWERVARE
1 POWERWARE
1 SPECTRUM CONTROLS RPS 60 POWER SUPPLY, 24VDC & 25AMP
ST-ADAPTER PLATE
FIBER OPTIC PATCH PANEL, 24-PORT
ETHERFAST 10/100 AUTO-SENSING HUB
DOOR SWITCH
4-POLE, 120VAC, ICE-CUBE RELAY
ICE-CUBE RELAY SOCKET
1.4KVA, UNINTERRUPTIBLE POWER SUPPLY
EXTENDED BATTERY MODULE
RPT 150 ATER DISCRETE VARIET MODULE TOP VIEW 3407HUB 256003 - FLUORESCENT LIGHT MOUNTING PAD LY414N-AC120 PTF14A-E PW5125 1500 PW5125 4BV EBM 1746sc-IA8I 2506UPS BPT. ISOLATED DISCRETE INPUT MODULE, 120VAC N-12500 SUP 2 X 4 DUCT FUTURE 7 SLOT I/O CHASSIS GND BAR Revision Revision Date: A ORIGINAL D.J.W. 12/02 2 X 4 DUCT B RETURN SUBMITTAL COMMENTS No. 1 A.V.C. 3/03 1 AS-CONSTRUCTED L.M.K 10/03 2 A5-BUILT L.M.K. 4/04 2 X 4 DUCT 3407HUB ----Commerce Controls
Incorporated FIBER OPTIC PATCH PANEL 2518HTR N-2 N-3 MAJORS OF SPECIAL ELECTRICAL EDITION, SYSTEMS. CITY OF OWOSSO WATER TREATMENT PLANT IMPROVEMENTS 2506 UPS CCI TAG CHEMICAL FEED CONTROL
PANEL (CP-CHEM)
LAYOUT, SUBPLATE LAYOUT,
NAMEPLATE LEGEND & BILL OF MATERIALS LPL LfL RIGHT SIDE STAINLESS STEEL 48"Hx39"Wx16"D J.S.K. A.V.C. 12/02 4899 JOB No. 4899 4899C123.dwg-10/02/03-07:44

INSTRUMENTA CHEMICAL FEED CON (CP-CHEM) LAYOUT -Project No.: 200-280565-21002 Designed By: Drawn By: **EXISTING DRAWING FROM PREVIOUS** Checked By: PROJECT. PROPOSED WORK SHOWN BOLD CROSSHATCHED, AND/OR CIRCLED

I-305

2521 AC GND NEUT
OUNE EQUIPMENT
O O O 2500 SURGE SUPPRESSOR #14 GRAY THEN UPS-NEUTRAL #12 YELLOW THHN #12 WHITE THHN 1.0AMP POWER FAILURE ALARM RELAY 2952,SP,SP,SP 2553 POWER TO LEVEL SWITCH UPS RECEPTACLE 2505 2506 000000POWER TO LEVEL SWITCH UPS-N-T 1.0AMP 2559 FLOURESCENT LIGHT 2561 2552 EXISTING DEVICE, LOCATED IN FIELD. INPUT/OUTPUT POWER ■ - DENOTES FIELD DEVICE, SUPPLIED BY OTHERS. 1.CAMP DENOTES FIELD DEVICE, SUPPLIED BY CCI. [XX] - DENOTES SCADA I/O ADDRESS.
 REMOVE JUMPER WHEN POINT IS PUT INTO SERVICE. 2513 2563 Revision Date: 2514 HUB RECEPTACLE D.J.W. 12/02 2. CAMP A ORIGINAL B RETURN SUBMITTAL COMMENTS No. 1 A.V.C. 3/03 2515 2555 1 AS-CONSTRUCTED L.M.K. 10/03 2 AS-BUILT L.M.K. 4/04 | Φ Θ #16 BLUE #16 BLUE 25162 2566 1489-M SERIES. ■ INSTALL NEW BREAKER. POWER 2567 NEW SWITCH. POWER NEW PLC FROM EXISTING POWER SOURCE. 2518CB 2518HTR 2518 2568 - 200W HEATER Commerce Controls
Incorporated 2.CAMP MARKET OF SPECIAL RECEIVED, CONTROL SYSTEMS 2519 2569 CITY OF OWOSSO WATER TREATMENT PLANT IMPROVEMENTS 2520FAN 2570 COOLING FAN CHEMICAL FEED
CONTROL ANEL (CP-CHEM)
POWER DISTRIBUTION WIRING DIAGRAM SMAO, I 2521 2571 UPS-N-F7 UPS-N-T 25081 25081 TO LINE 2550 TO LINE 2550 J.S.K. D.J.W. 12/02 4899 JCB No. - 4899 48990125.dwg-10/02/03-07:16

CITY OF OWOSSO WOTER TREATMENS SCADA SYSTE SCADA SYSTE INSTRUME INSTRUME CHEMICAL FEED (CP-CHEM) WIRING DIVING DIV

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EXISTING DRAWING FROM PREVIOUS

PROJECT. PROPOSED WORK SHOWN BOLD CROSSHATCHED, AND/OR CIRCLED

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FROM LINE 2821 1747-L551 RACK 0 SLOT 0 SPARE SLOT RACK 0 SLOT 1 2802 2852 2803 2805 28:0 EXISTING DEVICE, LOCATED IN FIELD.
 DENOTES FIELD DEVICE, SUPPLIED BY OTHERS.
 CENOTES FIELD DEVICE, SUPPLIED BY CC. 2812 2862 [XX] - DENOTES SCADA I/O ADDRESS:
- REMOVE JUMPER WHEN POINT IS PUT INTO SERVICE. 2813 2853 Revision Date: 2814 2664 D.J.W. 12/02 A DRIGINAL B RETURN SUBMITTAL COMMENTS No. 1 A.V.C. 3/03 2815 2865 1 AS-CONSTRUCTED L.M.K. 10/03 2 AS-BUILT L.M.K. 4/04 2616 2866 2817 2857 2818 2868 2819 2869 2820 2870 CHEMICAL FEED

CONTROL PANEL (CP-CHEM)

PROCESSOR & ANALOG INPUT WIRING DIAGRAM 2821 - 25121 UPS-N-2871 - 25121 UPS-N-TO LINE TO LINE 2850 TO LINE TO LINE 2850 2900 2900 J.S.K. D.J.W. 12/02 4899 - CC | 108 No. - 4899 48990128.cwg-10/02/03-07:18

Project No.: 200-280565-21002 Designed By: Drawn By: Checked By:

EXISTING DRAWING FROM PREVIOUS

PROJECT. PROPOSED WORK SHOWN BOLD, CROSSHATCHED, AND/OR CIRCLED

REPLACE CARD WITH 1769-OF4CI. RECONNECT REPLACE CARD WITH 1769-IA8I. RECONNECT EXISTING WIRES. (TYP.) EXISTING WIRES. (TYP.) FROM LINE 2921 FROM LINE 2921 2871 2900 = 25121 = #14 RED THHN = 120VAC #14 GREY THHN UPS-N-S FLOURIDE METERING PUMP (FP-1) FLOW PACING RANGE:0-100% (SC-81) 2902 CP-CHEM POWER FAIL (JA-82) 2903 SODIUM HYPOCHLORITE STORAGE ROOM HIGH LEVEL 2953 2904 POLYPHOSPHATE STORAGE ROOM HIGH LEVEL SPARE 2905 SODIUM FLOURIDE STORAGE ROOM HIGH LEVEL 2906 SPARE CHEMICAL ROOM EYEWASH IN USE (FS-112) 2907 2957 2908 SPARE 2958 SPARE 2909 2959 SPARE 2912 2952 ▲ - EXISTING DEVICE, LOCATED IN FIELD. ■ - DENOTES FIELD DEVICE, SUPPLIED BY OTHERS. DENOTES FIELD DEVICE, SUPPLIED BY CCI. [XX] - DENOTES SCADA I/O ADDRESS.
 REMOVE JUMPER WHEN POINT IS PUT INTO SERVICE. 2913 2963 2914 Revision Cole: 2964 D.J.W. 12/02 A ORIGINAL B RETURN SUBMITTAL COMMENTS No. 1 A.V.C. 3/03 2915 2965 1 AS-CONSTRUCTED L.M.K. 10/03 2 AS-BUILT L.M.K. 4/04 2916 2966 2917 2967 2918 2968 Commerce Controls
Incorporated 2919 MADDIN OF SPECIAL DUTTINGAL CONTROL SYSTEM 2969 CITY OF OWOSSO WATER TREATMENT PLANT IMPROVEMENTS 2920 2970 CHEMICAL FEED

CONTROL PANEL (CP-CHEM)

ANALOG OUTPUT & ISOLATED DISCRETE INPUT

WIRING DIAGRAM UPS-N----UPS-N-T> TO LINE TO LINE 2950 TO LINE 3000 70 LINE 3000 2950 J.S.K. D,J.W. 12/02 4899 108 No. - 4899 48990129.dwg-10/02/03-07:15

> EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD, CROSSHATCHED, AND/OR CIRCLED

Project No.: 200-280565-21002 Designed By: Drawn By: Checked By:

REPLACE CARD WITH 1769-OW8I. RECONNECT EXISTING WIRES. (TYP.) FROM LINE 3021 3000 - 25121 2 714 RED THHN 20VAC UPS-N 3050 = -25121 3 #14 RED THHN -120VAC 3051 SPARE SLOT RACK 0 SLOT 4 0:005/00CR 3002 FLOURIDE METERING PUMP (FP-1) CALL (CS-81) 3062,SP,SP,SP 3052 3003 3053 SPARE 3004 3054 SPARE 3005 SPARE 3006 SPARE 3056 3007 3057 SPARE 3008 3058 SPARE 3009 3059 SPARE 3010 3060 3062 TO FLOURIDE 30621 0:005/00CR 30622 TO FLOURIDE METERING PUMP (FP-1) START/STOP CIRCUIT 3012 A - EXISTING DEVICE, LOCATED IN FIELD.
 ■ - DENGTES FIELD DEVICE, SUPPLIED BY OTHERS. DENOTES FIELD DEVICE, SUPPLIED BY CCI.

[XX] - DENOTES SCADA I/O ADDRESS.

 REMOVE JUMPER WHEN POINT IS PUT INTO SERVICE. 3013 3063 3014 Revision Dote: 3064 Revision. D.J.W. 12/02 A ORIGINAL B RETURN SUBMITTAL COMMENTS No. 1 A.V.C. 3/03 3015 3065 1 AS-CONSTRUCTED L.M.K. 10/03 L.M.K. 4/04 2 AS-BUILT 3016 3066 3017 3067 3018 3068 Commerce Controls
Incorporated 3019 3069 MAJORS OF SPECIAL ELECTRICAL CONTROL PRIVING CITY OF OWOSSO WATER TREATMENT PLANT IMPROVEMENTS 3020 3070 CHEMICAL FEED CONTROL PANEL (CP-CHEM) SPARE SLOT & RELAY OUTFUT WIRING DIAGRAM 3021 -25:21 UPS-N-UPS-N-TO LINE TO LINE 3050 TO LINE 3100 TO LINE 3100 3050 J.S.K. D.J.W. 12/02 4899 48990130.dwg-10/02/03-07:20 JOB No. - 4899

> EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD, CROSSHATCHED, AND/OR CIRCLED

Project No.: 200-280565-21002

Designed By: GCJ

Drawn By: JLS

Checked By:

■ Bar Measures 1 incl

NAMEPLATE LEGEND [RELAY LEGEND] No. CESCRIPTION
1 4003CR
2 0:014/01CR
3 0:014/02CR
4 0:015/00CR
5 0:015/01CR TAG SIZE TAG ID

2"H X 6"W N/A

1"H X 3"W 4004RECP

1"H X 3"W 4014RECP NUMBER DESCRIPTION

N-1 CLARIFIER CONTROL PANEL (CP-CLAR)

N-2 UPS RECEPTACLE

N-3 E-NET HUB RECEPTACLE N-4 CIRCUIT BREAKER LEGEND 4002CB-MAIN PANEL POWER 4"H X 4"W N/A 401008-PLC POWER 4012CB-INPUT/OUTPUT POWER 4014CB-COMM. EQUIP. POWER 4006UPS 4018CB-DIGITAL PANEL METERS POWER 4020CB-PANEL LIGHTING 4052CB-FLOWMETER (FIT-31) POWER 4054CB-FLOWMETER (FiT-32) POWER 4056CB-FLOWMETER (FIT-41) POWER 4058CB-PANEL HEATER TOP VIEW 4060CB-PANEL COOLING FAN FLUDRESCENT LIGHT MOUNTING PAD - RACK INTERCHANGEABLE CABLE N-1 N-5 N-9 3 X 4 DUCT N-10 N-11 N-13 N-7 N-8 T-5 (R) T-8 (P) T-15 2 X 4 DUCT T-31 (T-32) T-17 () T-20 (R) T-40 T-14 ® 4000 SUP Revision Date: By: D.J.W. 12/02 T-41 2 X 4 DUCT A ORIGINAL 
 B
 RETURN SUBMITTAL COMMENTS No. 1
 A.V.C.
 3/03

 1
 AS-CONSTRUCTED
 L.M.K.
 10/03

 2
 AS-BUILT
 L.M.K.
 4/04
 N-15 ----(D) (D) (D) (D) (N-2) (N-3) N-16 N-22 N-19
7 N-18 N-20 N-21
1-24 T-27 T-28
3 T-29 T-30
R T-35 T-36 FIBER OPTIC PATCH PANEL Commerce Controls
Incorporated 4058HTR BULLETS OF SPECIA ELECTRICA CONTROL PRIVILES CITY OF OWOSSO WATER TREATMENT PLANT IMPROVEMENTS 4006 UPS CCI TAG L.... CLARIFIER CONTROL
PANEL (CP-CLAR)
LAYOUT, SUBPLATE LAYOUT AND NAMEPLATE LEGEND IFT. Ĵ. SUBPLATE 57 Hk39 W ENCLOSURE NEMA 4X STAINLESS STEEL 60"Hx42"Wx16"D RIGHT SIDE J.S.K. A.V.C. 12/02 4899 JOB No. 4599 48990138.dwg-10/02/03-07:23

> Project No.: 200-280565-21002 Designed By: Drawn By: Checked By: I-310

EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD CROSSHATCHED, AND/OR CIRCLED

NAMEPLATE LEGEND TAG ID DESCRIPTION ID\_NUMBER N-5 HIGH LEVEL ALARMS N-6 AERATOR CONTROLS N-7 AERATOR SUPPLY BLOWER No.1 (SB-1) N-8 AERATOR SUPPLY BLOWER No.2 (S-8) N-9 CLARIFIER No.: CONTROLS N-10 CLARIFIER NO.L INFLUENT FLOW F1-31 N-11 CLARIFIER NO.1 VALVE POSITION N-12 CLARIFIER NO.2 CONTROLS N-13 CLARIFIER NO S NELUENT FLOW N-14 CLARIFIER No.2 VALVE POSITION Z1-32 N-15 SLUBGE CONTROLS N-16 SLUDGE BLOWDOWN VALVES CONTROL N-17 SLUDGE BLOVDOWN VALVE (V-23)
N-18 SLUDGE BLOVDOWN VALVE (V-25)
N-19 SLUDGE PUMPS CONTROL
N-20 SLUDGE PUMP No.I N-21 SLUDGE PUMP No.2 N-22 SLUDGE FLOW TO LAGOUNS
T-I TANK DRAIN SUMP HIGH LEVEL 4403PL T-2 SANITARY SUMP HIGH LEVEL 4404PL T-3 AERATOR SUPPLY BLOVER NO.1 (SB-1) FAULT 4452PL T-4 ASRATOR SUPPLY BLOWER No.2 (SB-2) FAULT
T-5 ASRATOR SUPPLY BLOWER No.1 (SB-1) RUNNING 4455PL 4453PL T-6 AERATOR SUPPLY BLOVER No.2 (S3-2) RUNNING 4456PL T-7 CLARIFIER NOT HIGH-HIGH LEVEL 4458PL T-8 CLARIFIER NO.1 INFLUENT VALVE (V-6) CLOSED 4508PL T-9 CLARIFIER No.1 HIGH LEVEL 4459PL T-10 N/A T-11 CLARIFIER No.1 SCRAPER DRIVE (CSD-1) FAULT
T-12 CLARIFIER No.1 SCRAPER DRIVE (CSD-1) RUNNING 4502PL T-13 CLARIFIER NO.1 MIXER DRIVE (CMD-1) FAULT 4506PL I-14 CLARIFIER No.1 MIXER DRIVE (CMD-1) RUNNING 4507PL T-15 CLARIFIER No.2 HIGH-HIGH LEVEL 4552PL T-16 CLARIFIER NO.2 INFLUENT VALVE (V-9) CLOSED 4602PL T-17 CLARIFIER No.P HIGH LEVEL \_\_4553PL T-19 CLARIFIER No.2 SCRAPER DRIVE (CSD-2) FAULT T-20 CLARIFIER No.2 SCRAPER DRIVE (CSD-2) RUNNING 4554PL 4557PL T-21 CLARIFJER NO 2 MIXER DRIVE (CMD-2) FAULT 4558PL 4559PL T-22 CLARIFIER No.2 MIXER DRIVE (CMD-2) RUNNING T-23 SLUDGE BLOWDOWN VALVE (V-23) OPENED 4603PL T-24 | SLUDGE BLOWDOWN VALVE (V-26) DRENED 4606PL T-25 SLUDGE BLOVDOWN VALVE (V-23) CLOSED 4604PL T-26 SLUDGE BLOWDOWN VALVE (V-26) CLOSED 4607PL T-27 SLUDGE PUMP NO.1 (SLP-1) FAULT
T-28 SLUDGE PUMP NO.2 (SLP-2) FAULT
T-29 SLUDGE PUMP NO.1 (SLP-1) 4652PL 4655PL 4653PL T-30 SLUDGE PUMP No.2 (SLP-2) RUNNING 4656PL T-31 AFRATOR SUPPLY BLOVER No.1 (SB-1) HAND-OFF-AUTO 445455 T-32 AERATOR SUPPLY BLOWER No.2 (SB-2) HAND-DFF-AUTO T-33 SLUDGE BLOWDOWN VALVE (V-23) OPEN-AUTO-CLOSE 4457\$\$ 460555 T-34 | SLUBGE BLOWNOWN VALVE (V-26) DPEN-AUTO-CLOSE 460855 T-35 St. UDGE PUMP No.1 (SLP-1) HAND-OFF-AUTO 465455 T-36 SLUDGE PUMP No.2 (SLP-2) HAND-DFF-AUTD 465755 T-37 ALARM HORN RESET 4408PE 1-38 CLARIFIER No.1 SCRAPER DRIVE (CSD-1) DFF-ON 496555 T-39 CLASIFIER No.1 MIXER DRIVE (CMD-1) DFF-DN 496655 T-40 CLARIFIER No.2 SCRAPER DRIVE (CSD-2) DFF-ON 496855 T-41 CLARIFIER No.2 MIXER DRIVE (CMB-2) DFF-ON T-42 CLARIFIER No.1 INFLUENT VALVE (V-6) CLOSE-STOP-OPEN 4911SS T-43 CLARIFIER NO.2 INFLUENT VALVE (V-9) CLOSE-STOP-OPEN 491855

ITY	MANUFACTURER	NUMBER	DESCRIPTION	IDENT
	<u> </u>			
			The same of the sa	
	PANELI			
1	CUSTOM FABRICATION	N/A	NEMA 4X, STAINLESS STEEL ENGLOSURE, 60 Hx42 Wx16'D PANEL	I a la l
1	CUSTOM FABRICATION	N/A	SUBPLATE (PAINTED WHITE), 57'H x 39'W	SUBPLATE
1	CUSTOM FABRICATION	N/A	ETHERNET HUB SHELF	SHELF
	SUBPLATE EQUIPMENT	E 10	30.340 11.000	
	ALLEN BRADLEY	1492-CA1	TERMINAL, 600V., 55A.	
	ALLEN BRADLEY	1492-CE6	FUSED TERMINAL	0:014/03,0:014/05FU
	ALLEN BRADLEY	1492-N12	FUSED PULLER .	D:014/03,D:014/05FU
-	ALLEN BRADLEY	1492-CB1G010	LOAMP, SUBPLATE-MOUNTED CIRCUIT BREAKER	4010,4012,4020.
_	ALLEN BRADLEY	11498-CB1G005	10.5AMP, SUBPLATE-MOUNTED CIRCUIT BREAKER	4018CB
	ALLEN BRADLEY	1492-CB1G020	2.0AMP, SUBPLATE-MOUNTED CIRCUIT BREAKER	4014,4058CB
	ALLEN BRADLEY	1492-CG1G150	15AMP, SUBPLATE-MOUNTED CIRCUIT BREAKER	4002CB
STATE OF THE PARTY.	ALLEN BRADLEY	1746-A13	13-SLDT I/D CHASSIS	SLC
_	ALLEN BRADLEY	1746-A4	4-SLOT I/O CHASSIS	SLC
-	ALLEN BRADLEY	1746-C7	CHASSIS INTERCONNECT CABLE	SLC
	ALLEN BRADLEY	1746-NI8	8PT, ANALOG INPUT MODULE	SrC
	ALLEN BRADLEY	1746-DW8	8PT. RELAY DUTPUT MODULE, 120VAC	SLC
	ALLEN BRADLEY	1746-P4	SLC POWER SUPPLY	4010,4011PS
_	ALLEN BRADLEY	1747-L551	SLC-5/05 PRDCESSCR	Src
_	ALLEN BRADLEY ALLEN BRADLEY	800H-QRTH16A	PUSH TO TEST PILOT LIGHT, AMBER	4403,4404,4452.
National Section 1995	ALLEN BRADLEY	800H-GRTH16R	PUSH TO TEST PILOT LIGHT, RED	4453,4456,4505,
_	ALLEN BRADLEY	80CH-DRTH16G	PUSH TO TEST PILOT LIGHT, GREEN	4603,4606PL
	ALLEN BRADLEY	800H-HR2DI 800H-JR2A	(2-POSITION SELECTOR SWITCH (MAINTAINED)	4965,4966.4968.49693
	ALLEN BRADLEY	The Control of the Co	3 POSITION SELECTOR SWITCH	4454,4457,4654,4657
	ALLEN BRADLEY	800H-JR2KC1B	3 POSITION SELECTOR SWITCH	4605,460855
_	ALLEN BRADLEY	800H-JR91A 800H-AR2A	3 POSITION SELECTOR SWITCH (SPRING RETURN TO CENTER)	228194,1194
	BLACK BOX	EFN4010-001M	BLACK, FLUSH, PUSHBUTTON ST-SC FIBER OPTIC PATCH CABLE	4408PB
	BLACK BOX	EVN2F52-0006	1.8 METER, ETHERNET PATCH CABLE (STRAIGHT-PINNED)	N/A N/A
-	CCI	IN/A	BUPLEX RECEPTACLE	THE PARTY OF THE P
_	122	N/A	POVER CORD FOR UPS	4004,4014RECP
_	cci	N/A	PANEL LIGHT	N/A
_	EDCD	HSP121BT-1RU	120VAC SURGE SUPPRESSOR	4020LT 4020004
	EDWARDS	870P-N5	AC VIBRATING HORN, NEMA 1X	D:014/00AH
Annual Property and	HIRSCHMANN	943-658-001	FIBER OFFIC TO CAT-5 TRANSCEIVER	6016XCVR
-	HIRSCHMANN	943-662-001	RPS 60 POWER SUPPLY, 24VDC & 2.5AMP	4015PS
1 !!	HDFFMAN	D-AH2001A	HEATER	4058HTR
	HDFFMAN	A-4AXEN	COOLING FAN	4060FAN
	HOFFMAN	A-BRKT4	FAN BRACKET	4060FAN
1	HOFFMAN	A-TEMNO	THERMOSTAT	406075
2 1	LEVITON	5F100-1ST	ST-ADAPTER PLATE	N/A
	LEVITON	5W120-00N	FIBER OPTIC PATCH PANEL, 24-PORT	N/A
	LINK-SYS	EF AH05V	[ETHERFAST 10/100 AUTO-SENSING HUB	6007HUB
	HICRO SWITCH	2AC6	DOOR SWITCH	4020DS
mangery.	OMRON	LY414N-AC120	4-POLE, 120VAC, ICE-CUBE RELAY	SEE RELAY LEGEND
_	DMRCN	PTF14A-E	ICE-CUBE RELAY SOCKET	SEE RELAY LEGEND
-	POVERVARE	PV5125 1500	1.4KVA, UNINTERRUPTIBLE POWER SUPPLY	14006UPS
	POVERWARE	PW5125 48V EBM	EXTENDED BATTERY MODULE	4006UPS
_	RED LION	DP5-D0000	DIGITAL PANEL METER	F1-31,F1-32,F1-
	SPECTRUM CONTROLS	1746sc-IABI	BPT. ISOLATED DISCRETE INPUT MODULE, 120VAC SLC	1 311 3511

	Revision:	Revision By:	Date:		
A	ORIGINAL	D.J.W.	12/02		
8	RETURN SUBMITTAL COMMENTS No.1	A.V.C.	3/03		
1	AS-CONSTRUCTED	L.M.K.	10/03		
2	AS-BUILT	L.M.K.	4/04		
	Commerce Controls Incorporated				

WATER TREATMENT PLANT CLARIFIER CONTROL
PANEL (CP-CLAR)
BILL OF MATERIALS & NAMEPLATE LEGEND

Casigned by: Orown By: Date: Job No. J.S.K. A.V.C. 12/02 4899 CC JCB No. 4899

46990139.dwg-10/02/03-07:23

EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD,

CROSSHATCHED, AND/OR CIRCLED

Bar Measures 1 inch

wosso water treatment plant, and remote sites scada system upgrades
INSTRUMENTATION
ARIFIER CONTROL PANEL (CP-CLARIFIER)
BOM/NAMEPLATE - DEMOLITION

Project No.: 200-280565-21003

Designed By: Drawn By:

Checked By:

FROM LINE 4021 FROM LINE 4021 AC GND NEUT SURGE SUPPRESSOR 4000 ! 4050 #14 GRAY THHN — UPS-NEUTRAL #12 YELLOW THHN POWER TO METERING & REGULATOR REMOTE SIGNAL CONVERTER #12 WHITE THEN POWER FAILURE ALARM RELAY 4402,SP,SP,SP 4053 POWER TO METERING & REGULATOR REMOTE SIGNAL CONVERTER UPS RECEPTACLE POWER TO METERING & REGULATOR REMOTE SIGNAL CONVERTER 000000 4058HTR 200W HEATER 2.0AMP COOLING FAN SUPPLY (PHYSICAL RACK 1) 4062 A - EXISTING DEVICE, LOCATED IN FIELD.
 ■ - DENOTES FIELD DEVICE, SUPPLIED BY OTHERS. DENOTES FIELD DEVICE, SUPPLIED BY CCI.

[XX] - DENOTES SCADA I/O ADDRESS.
 REMOVE JUMPER WHEN POINT IS PUT INTO SERVICE. 4013 4014 4054 Revision Date: HUB RECEPTACLE Revisions 2.DAMP D.J.W. 12/02 ORIGINAL B RETURN SUBMITTAL COMMENTS No. 1 A.V.C. 3/03 4015 4065 FIBER OPTIC TRANSCEIVER POWER SUPPLY L.M.K. 10/03 POWER NEW PLC, AND SWITCH FROM EXISTING POWER SOURCES. 1 AS-CONSTRUCTED 2 AS-BUILT L.M.K. 4/04 4016 4066 4017 4067 4068 POWER TO DIGITAL PANEL METERS 0.5AMP Commerce Controls
Incorporated 4019 BLADORS OF SPECIAL FLATBOAL CONTROL SYSTIMS 4069 CITY OF OWOSSO WATER TREATMENT PLANT IMPROVEMENTS 4020LT FLUORESCENT LIGHT FLOURESCENT LIGHT 4070 CLARIFIER CONTROL PANEL (CP-CLAR) POWER DISTRIBUTION WIRING DIAGRAM 4071 40081 UPS-N-TO LINE 5400 5400 J.S.K. D.J.W. 12/02 4699 48990140.dwg-10/02/03-07:24 JOB No. - 4899

LARIFIER) Project No.: 200-280565-21003 Designed By: Drawn By: Checked By: I-312

EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD CROSSHATCHED, AND/OR CIRCLED

REPLACE CARD WITH 1769-IF8. RECONNECT EXISTING WIRES. (TYP.) FROM LINE 4221 4200 40121 #14 RED THHN 120VAC 4250 40121 - #14 RED THEN 120VAC #14 GRAY THHN UPS-NEUTRAL #14 GRAY THHN UPS-NEUTRAL 4201 1747-L551 RACK 0 SLOT 0 4202 4252 CLARIFER No. 1 INFLUENT FLOW RANIGE:0-3000CPV (FE/FIT-31) 4203 4253 4204 4254 CLARIFIER No. 2 INFLUENT FLOW RANGE:0-3000GPM (FE/FIT-32) 4205 4255 4205 4256 CLARIFIER No. 1 INFLUENT VALVE (V-5) POSITION RANGE:0-100% (ZT-31) FROM LINE 5705 4207 4257 4208 4256 CLARIFIER No. 2 INFLUENT VALVE (V-9) POSITION RANGE:0-100% (ZT-32) FROM LINE 5805 4209 4259 4210 4260 SLUDGE FLOW TO LAGOONS RANGE:0-800GPM (FE/FIT-41) ▲ - EXISTING DEVICE, LOCATED IN FIELD.
 ■ - DENOTES FIELD DEVICE, SUPPLIED BY OTHERS.
 ● - DENOTES FIELD DEVICE, SUPPLIED BY CCI.
 [XX] - DENOTES SCADA I/O ADDRESS.
 ► REMOVE JUMPER WHEN POINT IS PUT INTO SERVICE. 4212 4262 SPARE 4213 4263 Revision Date: 4214 4264 SPARE D.J.W. 12/02 A ORIGINAL B RETURN SUBMITTAL COMMENTS No. 1 A.V.C. 3/03 4215 4265 1 AS-CONSTRUCTED L.M.K. 10/03 L.M.K. 4/04 2 AS-BUILT 4216 4256 SPARE 4217 4267 4218 4268 Commerce Controls Incorporated CURR ON OFF CURR O 4219 RADIOS OF PRICA CULTURA CONTRA STREET CITY OF DWOSSO WASTEWATER TREATMENT PLANT IMPROVEMENTS CURR ON CURR OF CURR OF CONTROL OF CURR OF CONTROL OF CURR OF 4220 CLARIFIER CONTROL PANEL (CP-CLAR) PROCESSOR & ANALOG INPUT WIRING DIAGRAM 4271 40121 UPS-N-Designed by: Order By: Date: Jab No. J.S.K. D.J.W. 12/02 4899 JOS No. - 4899 48990142.dwg-10/02/03-07:25

> EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD, CROSSHATCHED, AND/OR CIRCLED

I-313

Project No.: 200-280565-21002

Designed By:

Drawn By:

Checked By:

FROM LINE 4321 REPLACE CARD WITH 1769-IF8. RECONNECT 4300 40121 #14 RED THHN 120VAC #14 GRAY THHN 4350 40121 114 RED THHN 120VAC #14 GRAY THEN
UPS-NEUTRAL EXISTING WIRES. (TYP.) 4351 SPARE SLOT RACK 0 SLOT 3 4302 4352 LIME SILO LEVEL RANGE:0-100% (LE/LIT-71) 4-20mADC 💢 🕏 4303 4353 4304 4354 CARBON DIOXIDE STORAGE TANK LEVEL RANGE:0-60,000 POUNDS (LE/LIT-61) FROM STORAGE TANK CP 4-20mADC (€ \$ 1 15VDC ---4305 4355 4306 4356 CARBON DIOXIDE FEED No.1 PH 4-20mADC @ \$ 1-5VDC ----RANGE:0-14 PH (AE/AIT-61) 4307 4357 4308 4358 CARBON DIOXIDE FEED No.1 FLOW RANGE:0-0-50 FOUNDS/MR FROM CP-FSF1 4-20mADC (2) \$ 1 5VDC --(FE/FIT-61) 4309 4359 4310 4360 CARBON DIOXIDE FEED No.2 PH RANGE:0-14 PH (AE/AIT-63) 4361 4312 4352 EXISTING DEVICE, LOCATED IN FIELD. CARBON DIOXIDE FEED No.2 FLOW RANGE:0-50 POUNDS/MR (FE/FIT-53) - DENOTES FIELD DEVICE, SUPPLIED BY OTHERS. FROM CP-PSF2 4-20mADC (2) § 1 DENOTES FIELD DEVICE, SUPPLIED BY CCI. [XX] - DENOTES SCADA I/O ADDRESS.
- REMOVE JUMPER WHEN POINT IS PUT INTO 4313 4363 SERVICE. Revision Date: 4314 4364 SPARE D.J.W. 12/02 A ORIGINAL B RETURN SUBMITTAL COMMENTS No. 1 A.V.C. 3/03 4315 4365 1 AS-CONSTRUCTED L.M.K. 10/03 2 AS-BUILT L.M.K. 4/04 4366 SPARE 4317 4367 4318 4368 Commerce Controls incorporated CURR ON CURR OF CURR OF CURR OF CORRECT OF CORRECT OF CORRECT OF CURR ON CURR OF CURR MADD'S OF EPIDAL DISTINGA, GOVERN SYTTOMS 4359 CITY OF OWOSSO WASTEWATER TREATMENT PLANT IMPROVEMENTS CURR ON ON ON CURR ON ON CURR 4370 CLARIFIER CONTROL
PANEL (CP-CLAR)
PROCESSOR & ANALOG INPUT WIRING DIAGRAM 4371 --- 40121 4321 UPS-N-UPS-N--TO LINE 4350 J.S.K. D.J.W. 12/02 4899 DODGE DOOR NO. - 4899 46990143.dwg-04/29/04-08:37 <del>----</del>

Project No.: 200-280565-21002 Designed By: Drawn By: Checked By: I-314

EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD CROSSHATCHED, AND/OR CIRCLED

REPLACE CARD WITH REPLACE CARD WITH 1769-IA8. RECONNECT 1769-IA8. RECONNECT EXISTING WIRES. (TYP.) EXISTING WIRES. (TYP.) UPS-N-#14 GRAY THHN UPS-NEUTRAL #14 GRAY THHN UPS-NEUTRAL #14 RED (TYP.) -#14 RED (TYP.) 7 AERATOR SUPPLY SLOWER No. 1 (SB-1) FAULT CP-CLAR POWER FAIL (JA-100) AERATOR SUPPLY BLOWER No. 1 (SB-1) RUNNING TANK DRAIN RIGH LEVEL AERATOR SUPPLY BLOWER No. 1 (SB=1) IN AUTO SANITARY SUMP HIGH LEVEL RECARBONATION TANK HIGH-HIGH LEVEL AERATOR SUPPLY BLOWER No. 2 (SB-2) FAULT AERATOR SUPPLY BLOWER No. 2 (SB-2) RUNNING RECARBONATION TANK HIGH LEVEL AERATOR SUPPLY BLOWER No. 2 (SB-2) IN AUTO CLARIFIER BLDG. EYEWASH IN USE ALARM HORN RESET CLARIFIER No. 1 HIGH-HIGH LEVEL CLARIFIER No. 1 HIGH LEVEL 4409 4459 4412 4452 ▲ - EXISTING DEVICE, LOCATED IN FIELD. ■ - DENOTES FIELD DEVICE, SUPPLIED BY OTHERS DENOTES FIELD DEVICE, SUPPLIED BY CCI. [XX] - DENOTES SCADA I/O ADDRESS. 4413 4463 . - REMOVE JUMPER WHEN POINT IS PUT INTO SERVICE. Revision Date: 4464 D.J.W. 12/02 A ORIGINAL B RETURN SUBMITTAL COMMENTS No. 1 A.V.C. 3/03 4465 L.M.K. 10/03 1 AS-CONSTRUCTED L.M.K. 4/04 2 AS-BUILT 4466 4417 4467 4418 4468 Commerce Controls incorporated BIADDS OF BYCOL EXCENS CONFIDE PSTON 4419 4469 CITY OF OWOSSO WASTEWATER TREATMENT PLANT IMPROVEMENTS 4420 4470 CLARIFIER CONTROL
PANEL (CP-CLAR)
ISOLATED DISCRETE INPUT WIRING DIAGRAM 4471 --- 40121 UPS-N-UPS-N-| Designed by: | Drawn By: | Date: | Job No. | | J.S.K. | D.J.W. | 12/02 | 4899 TO LINE 4500 JOB No. - 4899 48990144.dwg-10/02/03-07:27

> EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD CROSSHATCHED, AND/OR CIRCLED

Project No.: 200-280565-21002

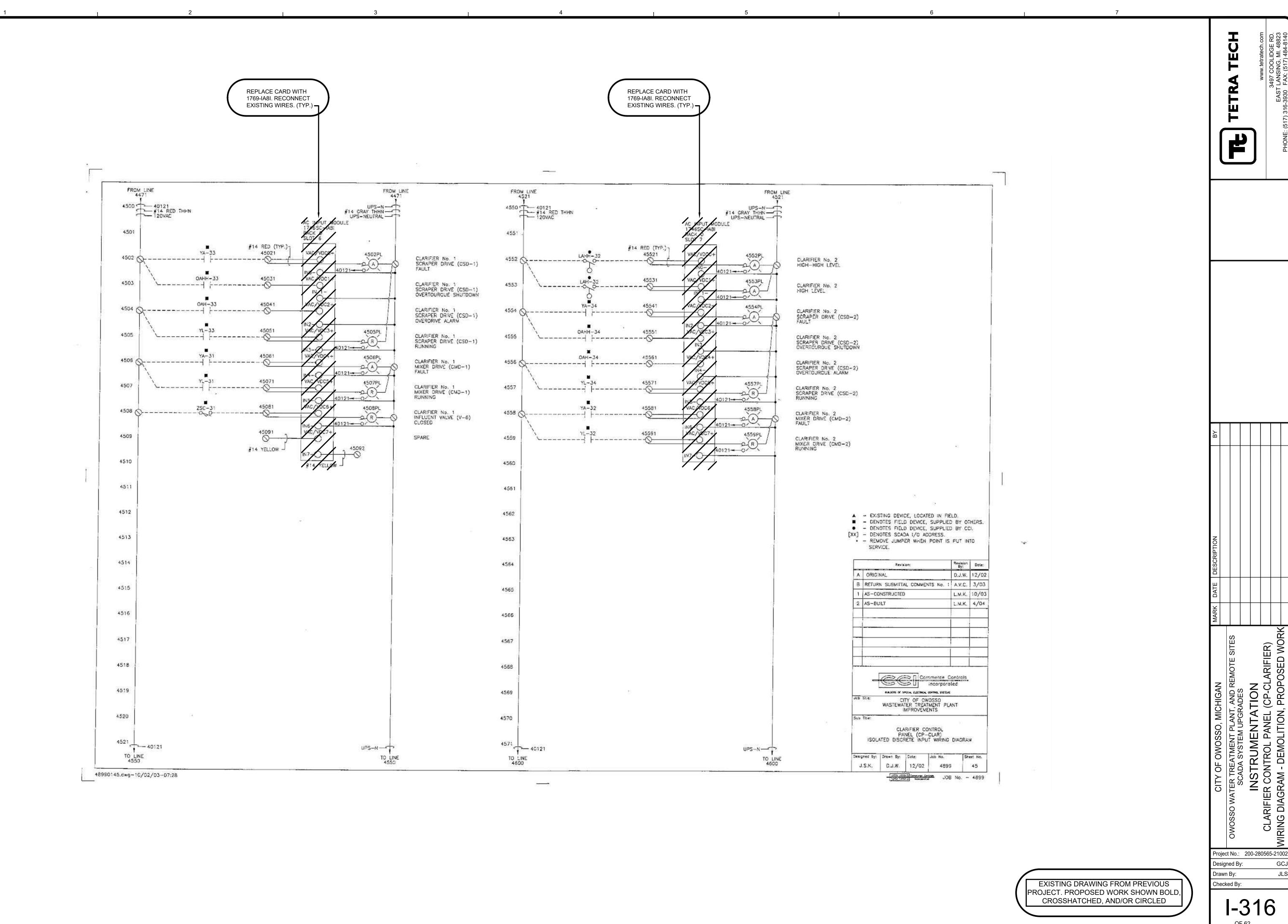
Designed By: GCJ

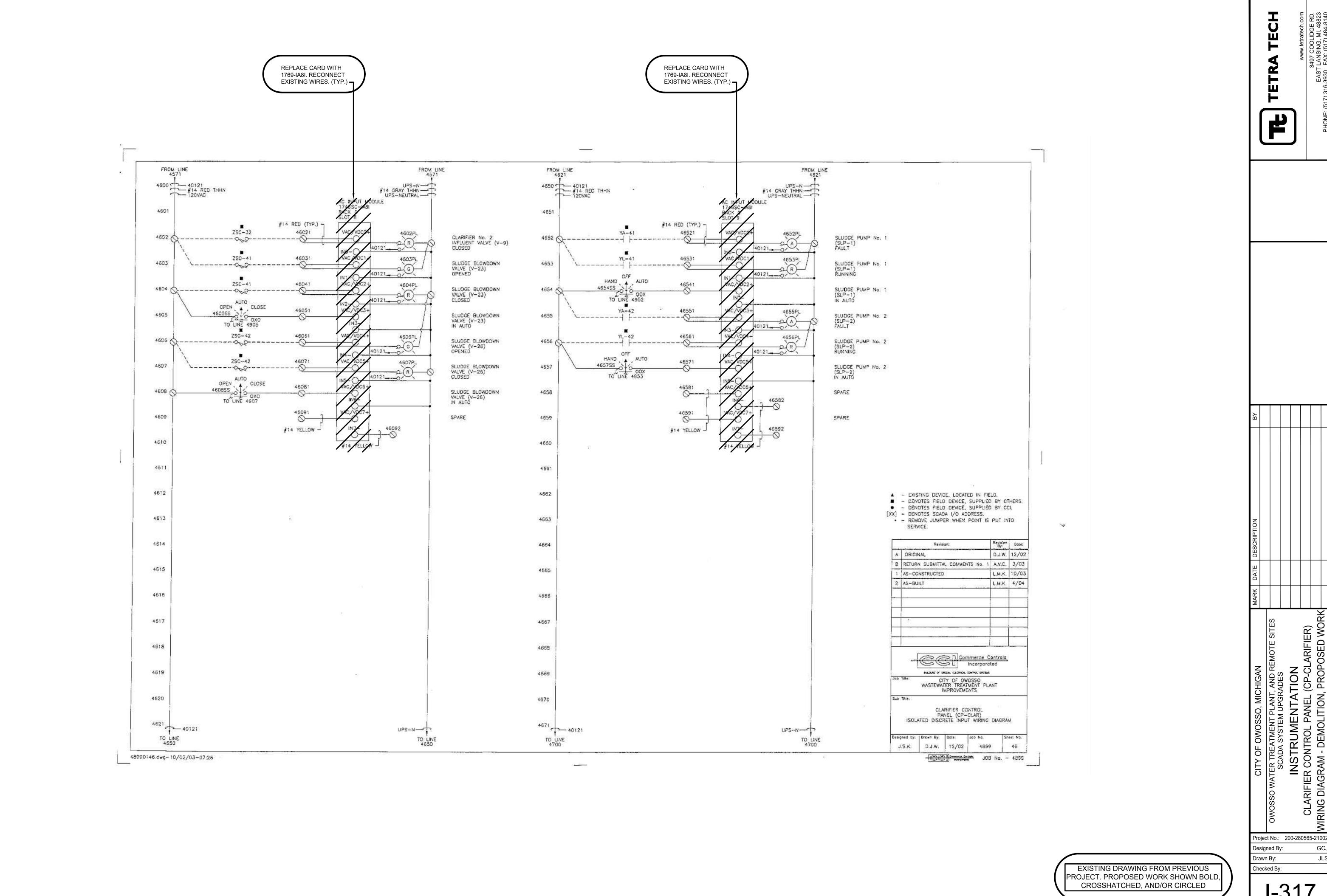
Drawn By: JLS

Checked By:

Checked By:

I-315



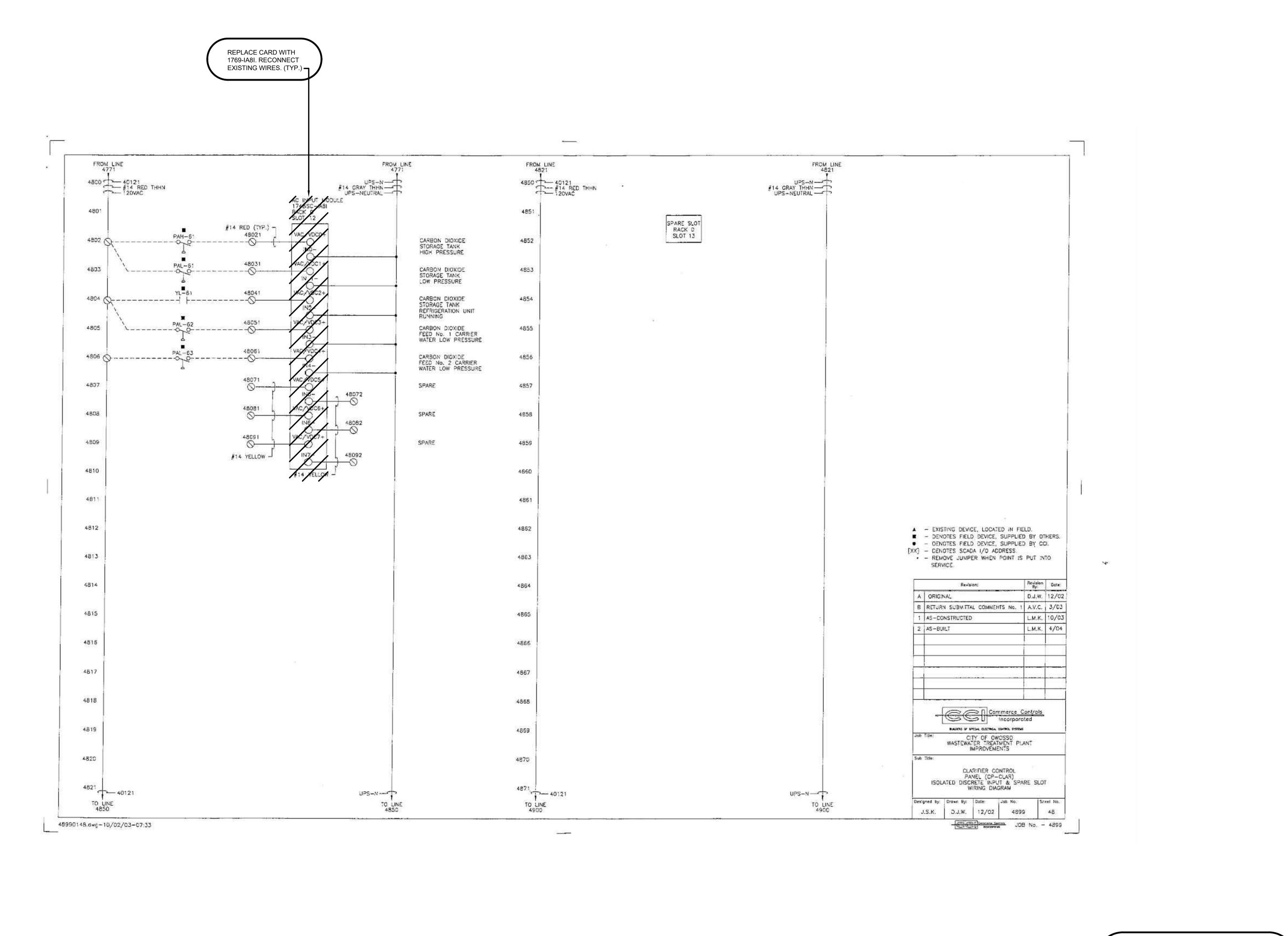


OF 62

REPLACE CARD WITH REPLACE CARD WITH 1769-IA8I. RECONNECT 1769-IA8I. RECONNECT EXISTING WIRES. (TYP.) EXISTING WIRES. (TYP.) #14 GRAY THEN #14 RED (TYP.)7 LIME SILO TRUCK UNLOADING 4752 LIME SILO ACTIVATOR No. 1 RUNNING LALL-71 LIME SILO LOW LEVEL LIME SILO FEEDER No. 2 RUNNING LIME SILO SLAKER No. 2 RUNNING LIME SILO RE-ORDER LEVEL YL-752 LIME SILO GRIT SCREW No. 2 RUNNING LIME SILO HIGH LEVEL L------YL-71 LIME SILO ACTIVATOR No. 2 RUNNING LIME SILO DUST COLLECTOR RUNNING 4756 \( \)-----\( \) LIME SILO FEEDER No. 1 RUNNING LIME SILO COMMON ALARM No. 1 LIME SILO SLAKER No. 1 RUNNING 4758 LIME SILO COMMON ALARM No. 2 YL~761 LIME SPLITTER BOX HIGH LEVEL LIME SILO GRIT SCREW No. 1 RUNNING /----0 4760 4712 4762 EXISTING DEVICE, LOCATED IN FIELD. ■ - DENOTES FIELD DEVICE, SUPPLIED BY OTHERS. DENOTES FIELD DEVICE, SUPPLIED BY CC. [XX] - DENOTES SCADA I/O ADDRESS.
- REMOVE JUMPER WHEN POINT IS PUT INTO 4713 4763 SERVICE. Revision Dote: 4714 4764 D.J.W. 12/02 A ORIGINAL B RETURN SUBMITTAL COMMENTS No. 1 A.V.C. 3/03 4715 4765 1 AS-CONSTRUCTED LM.K. 10/03 L.M.K. 4/04 4716 4766 4717 4767 4718 4758 Commerce Controls 4719 KILDON OF SPECIA ELECTRICA CONTROL PISTURE 4769 CITY OF DWOSSO WASTEWATER TREATMENT PLANT IMPROVEMENTS 4720 4770 CLARIFIER CONTROL
PANEL (CP-CLAR)
ISOLATED DISCRETE INPUT WIRING DIAGRAM 4721 40121 UPS-N-UPS-N-J.S.K. D.J.W. 12/02 4899 GO No. - 4899 48990147.dwg-10/02/03-07:32 Designed By: Drawn By: EXISTING DRAWING FROM PREVIOUS Checked By: PROJECT. PROPOSED WORK SHOWN BOLD CROSSHATCHED, AND/OR CIRCLED

Project No.: 200-280565-21002

I-318

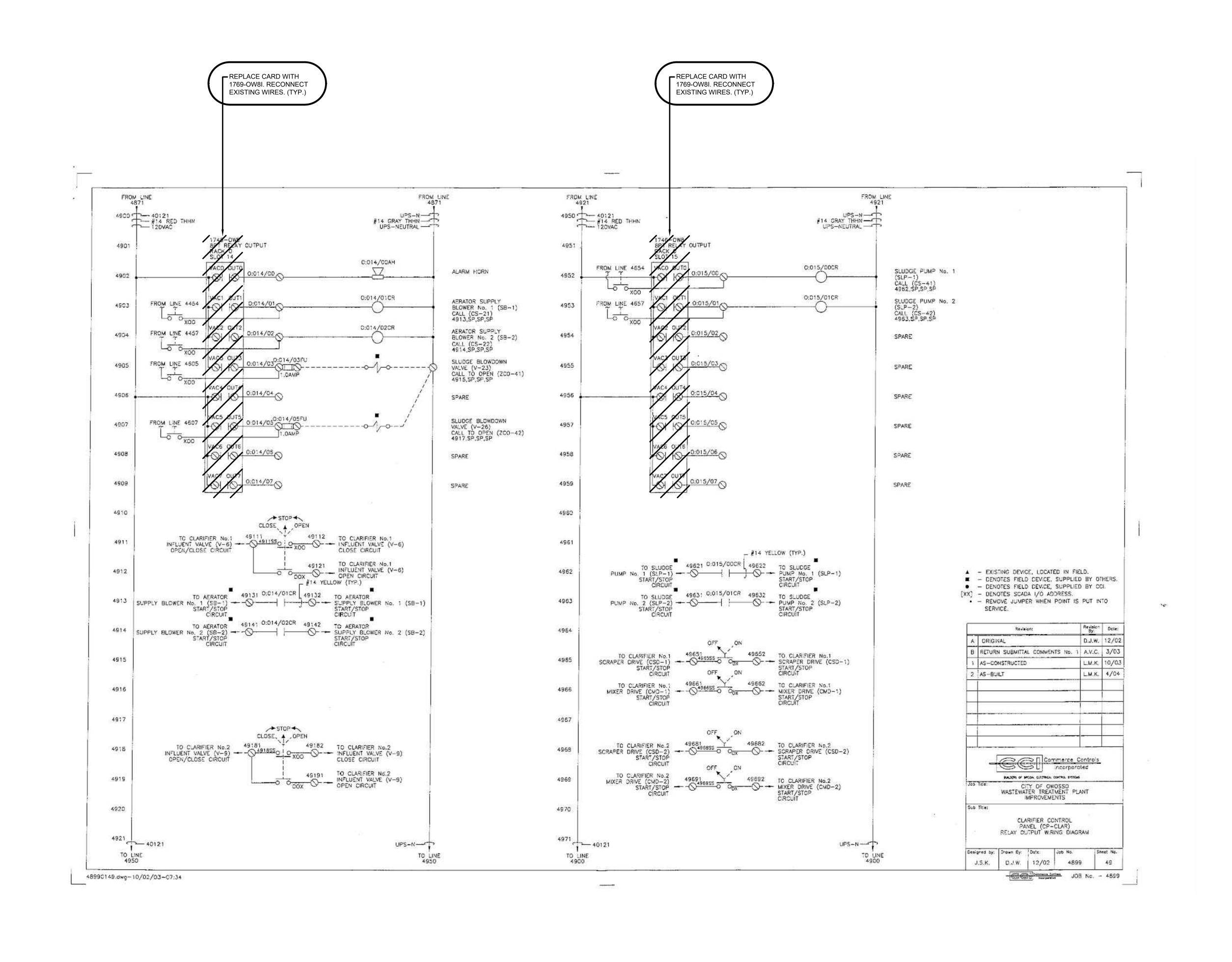


Checked By: 1-319

Designed By:

Drawn By:

Project No.: 200-280565-21002



Designed By:

Drawn By:

Checked By:

OF 62

■ Bar Measures 1 inc

Project No.: 200-280565-21002

SPARE SLOT RACK 0 SLOT 16 5002 5003 5004 5005 5006 ■ EXISTING DEVICE, LOCATED IN FIELD.
 ■ OENOTES FIELD DEVICE, SUPPLIED BY OTHERS.
 ■ DENOTES FIELD DEVICE, SUPPLIED BY CCI.
 [XX] - DENOTES SCADA I/O ADDRESS.
 ■ REMOVE JUMPER WHEN POINT IS PUT INTO SERVICE. 5012 5062 5013 5063 5014 Revision Date: 5064 D.J.W. 12/02 A ORIGINAL B RETURN SUBMITTAL COMMENTS No. 1 A.V.C. 3/03 5015 5065 L.M.K. 10/03 1 AS-CONSTRUCTED 2 AS-BUILT 5015 5066 5017 5067 5018 5019 BADDES OF SPECIAL ELECTRICAL CONTROL SYSTEMS CITY OF OWOSSO WASTEWATER TREATMENT PLANT IMPROVEMENTS 5070 CLARIFIER CONTROL PANEL (CP-CLAR) SPARE SLOT WIRING DIAGRAM 5021 \_\_\_\_\_ 40121 5071 UPS-N-| Designed by: | Drawn By: | Date: | Job No. | 5 | J.S.K. | D.J.W. | 12/02 | 4899 JOB No. - 4899 48990150.dwg-10/02/03-07:35 ---

OWOSSO WATER TREATMENT PLANT, AND REMOTE SITES

SCADA SYSTEM UPGRADES

INSTRUMENTATION

CLARIFIER CONTROL PANEL (CP-CLARIFIER)

WIRING DIAGRAM - DEMOLITION

EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD, CROSSHATCHED, AND/OR CIRCLED

I-32′

Designed By:

Drawn By:

Checked By:

REPLACE CARD WITH 1769-IF8. RECONNECT EXISTING WIRES. (TYP.) 600 UH145.83 UN1/5.83 EIGHT CHANNEL 24-46.29 ±20 mADC INPUT CARD 502 603 604 SLAKER 11 TEMPERATURE INPUT 4 TO 20 mADC 605 606 (4 AMP) 608 SLAKER #2 TEMPERATURE INPUT 4 TO 20 MADE 609 610 612 SILO LEVEL INPUT 4 TO 20 mADC 613 ROCKWELL 1489-M SERIES. 616 519 620 PANEL OPERATOR INTERFACE.
ALL CONTROL OPERATIONS
FOR THE LIME SYSTEM 667
ARE PERFORMED FROM
THIS 6 INCH COLOR LCD.
TOUCH SCREEN INTERFACE
LOCATED IN THE
OPERATOR INTERFACE PANEL 669 622 623 624 625 626 528 SPARE ANALOG INPUT 4 TO 20 mADC (4 WIRE) 629 24-/6.46 674 630 PWR631 631 532 24 VDC POWER SUPPLY POWER NEW PLC FROM EXISTING POWER SOURCES. INSTALL NEW CIRCUIT BREAKER FOR POWERING NEW SWITCH. 633 634 635 636 637 1. NINE-CONDUCTOR SHIELDED CABLES EXTEND THE PLC RS-232 PORT TO THE OPERATOR INTERFACE PANEL 638 FOR USE BY OIT OR PC. CONDUCTOR NUMBERS CORRESPOND WITH PIN AND TERMINAL NUMBERS.

2. WARK 13 ON SHEET 14 639 ± C478 C478 3. MARKS 14 & 15 ON SHEET 14; SEE SHEET 14 FOR WIRING DETAILS. HARPER INDUSTRIAL CONSTRUCTION, INC. PO No. 1405-CH-01 THIS DRAWING AND ALL INFORMATION THEREON CONTAIN CONFIDENTIAL AND PROPRETARY INFORMATION AND IS THE EXCLUSIVE PROPERTY OF CHEMICO SYSTEMS, L.P. IT MUST NOT BE MADE PUBLIC ON COMED WITHOUT THE AUTHORIZATION OF CHEMICO AND IS SUBJECT TO RETURN UPON DEMAND. 640 541 CHEMCO SYSTEMS, L.P. 1500 INDUSTRIAL DRIVE, MONONCAHELA, PA 642 SHE DESCRIPTIONE LIME SYSTEM - WIRING AS SHIPPED FOR CONSTRUCTION 643 OWG DESCRIPTION CITY OF OWOSSO WATER TREATMENT PLANT 644 UH1A/7.45 PER CUSTOWER COMMENTS OWOSSO, MICHIGAN LIME SLAKING SYSTEM | 11-22-07 0 ORIGI | DATE | REV | RE | DATE | 11-12-02 | DRWN ST: | MCK UH18/9.00 DRIGHAL ISSUE UN1/7.45 D | 0MS MO.: 102102 | SHEET NO. 6

> EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD CROSSHATCHED, AND/OR CIRCLED

Project No.: 200-280565-21002

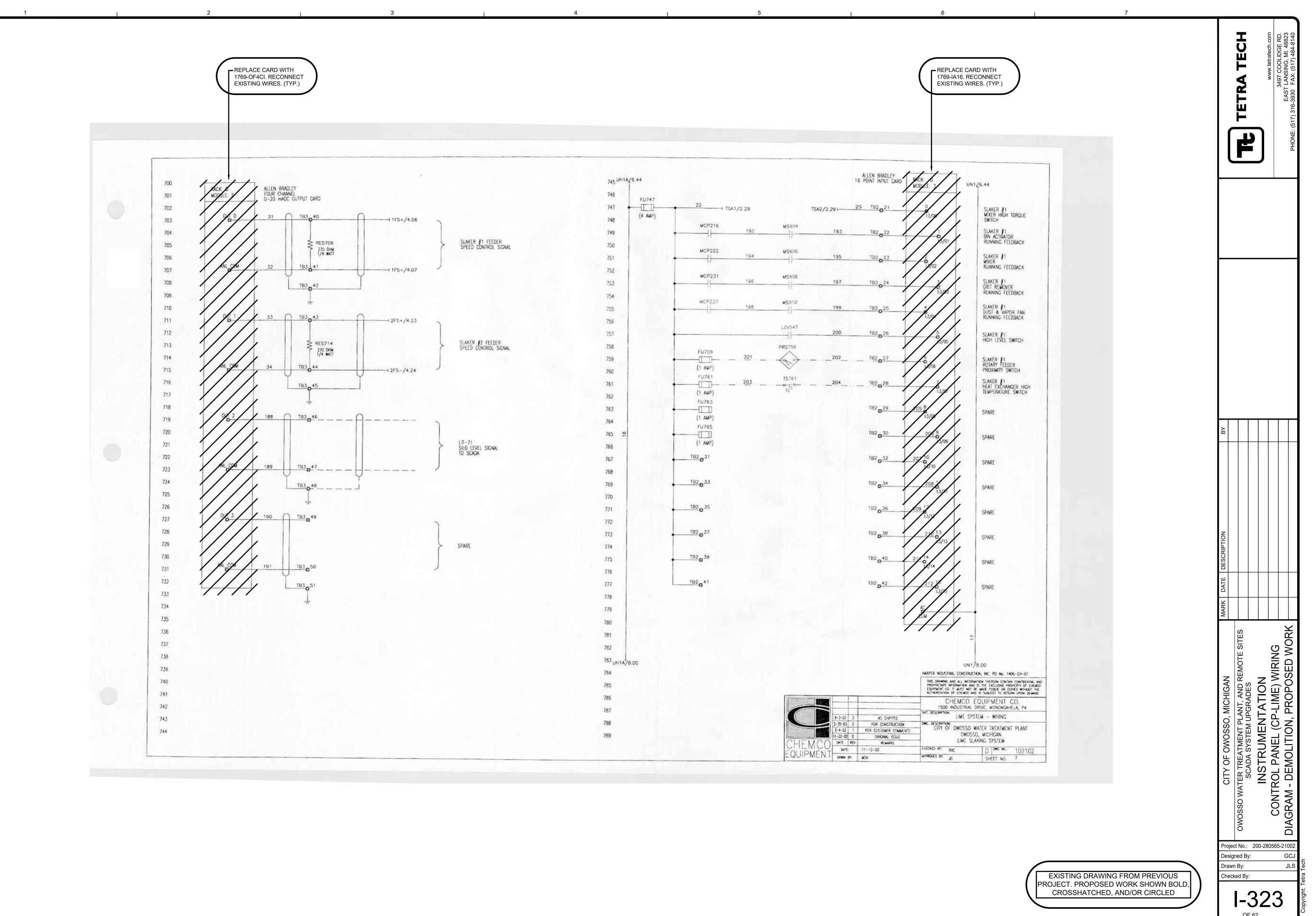
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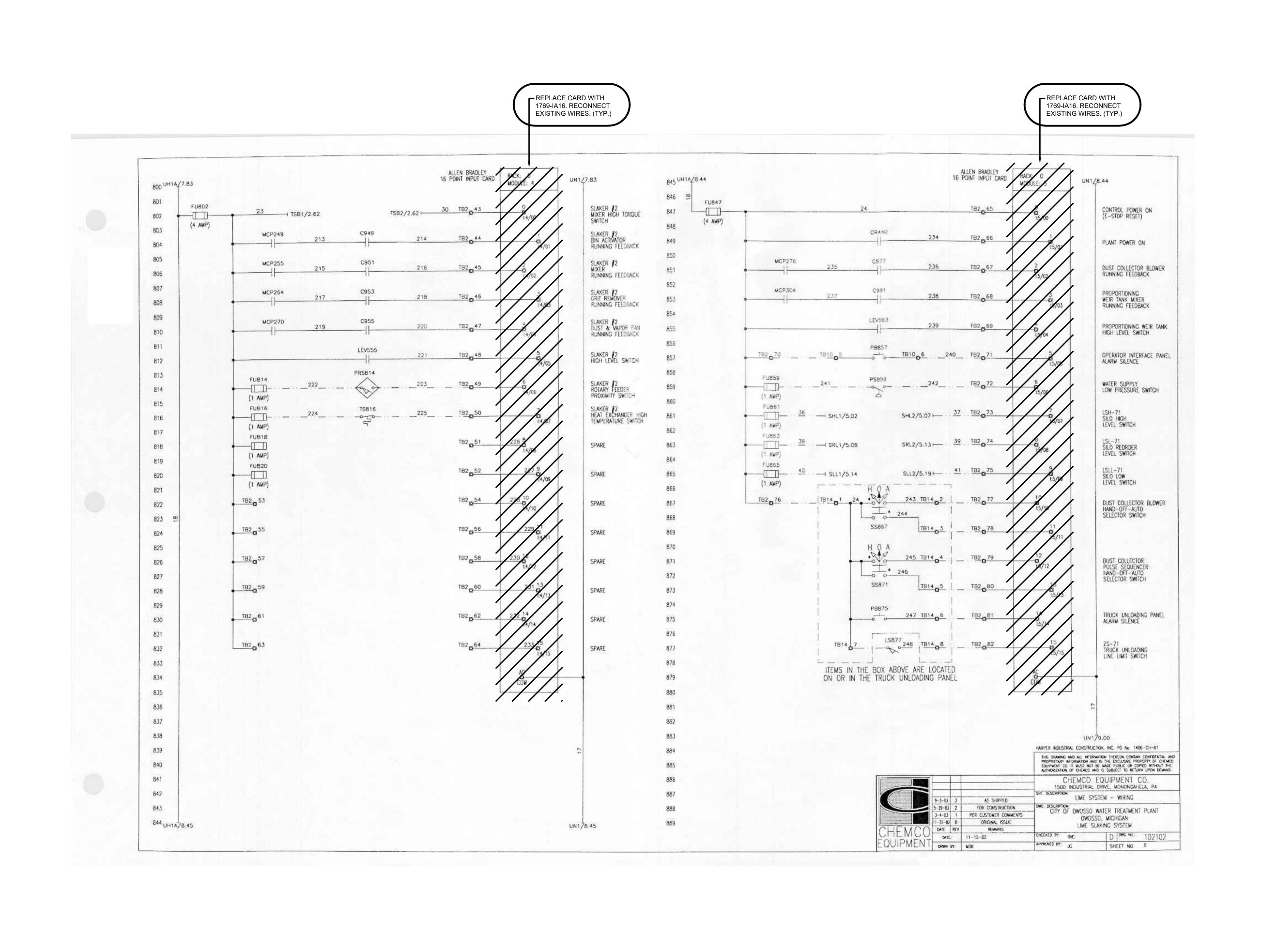
Drawn By: JLS

Checked By:

wosso water treatment Plant, and remote site scada system upgrades
INSTRUMENTATION
CONTROL PANEL (CP-LIME) WIRING
AGRAM - DEMOLITION, PROPOSED WOF

1-322





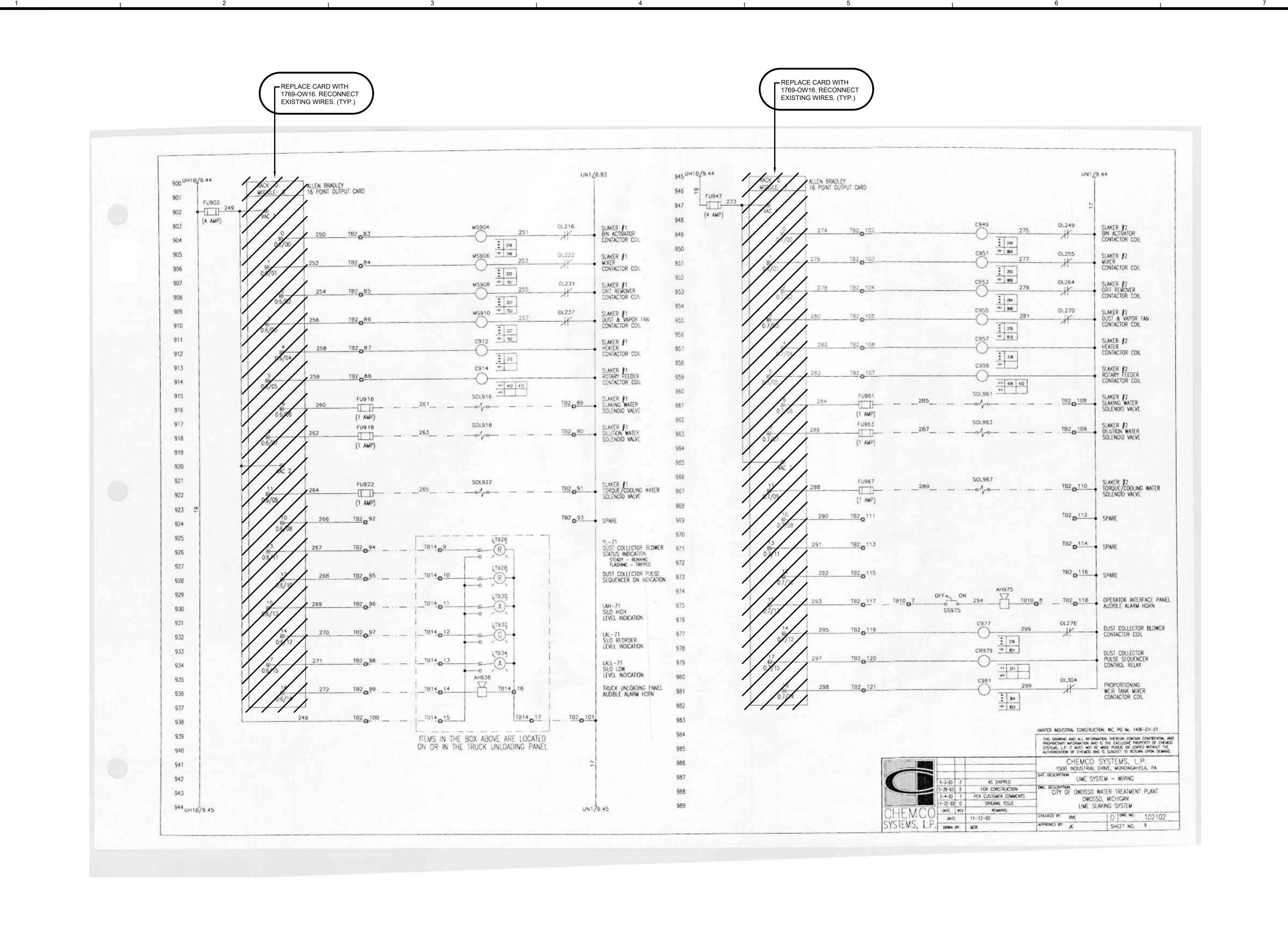
OSSO WATER TREATMENT PLANT, AND REMOTE SI SCADA SYSTEM UPGRADES INSTRUMENTATION CONTROL PANEL (CP-LIME) WIRING SRAM - DEMOLITION, PROPOSED WO

Project No.: 200-280565-21002
Designed By: GCJ
Drawn By: JLS

Checked By:

OF 62

Bar Measures 1 inc



Project No.: 200-280565-21002

Designed By: GCJ

Drawn By: JLS

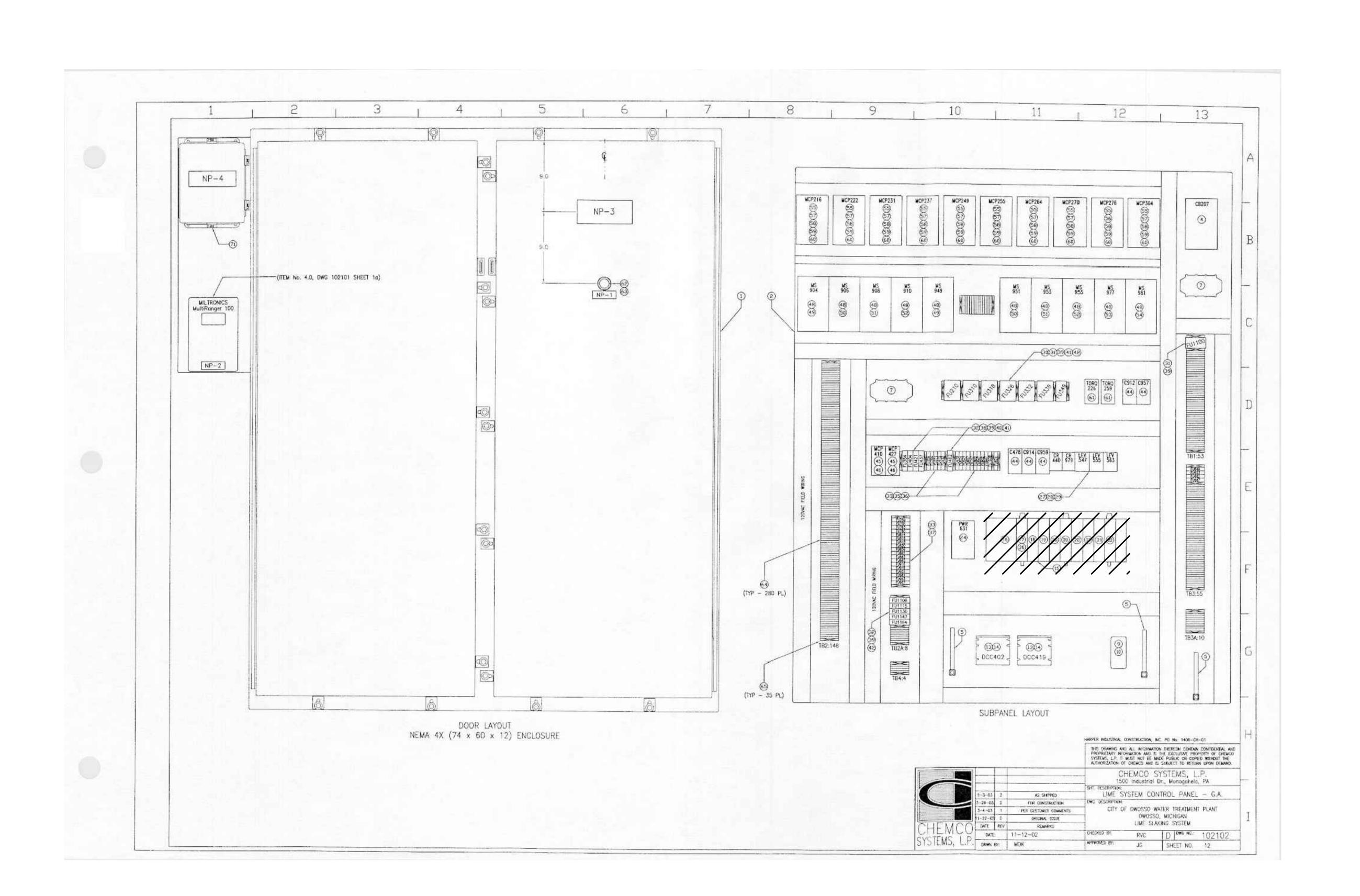
Checked By:

REPLACE CARD WITH 1769-OW16. RECONNECT EXISTING WIRES. (TYP.) 300 TB2 122 \_\_\_\_ \_ ZS-71 LIME SILD TRUCK UNLOADING 1004 1005 1005 1007 1008 1010 YL-761 LIME SILO GRIT REMOVER (1 RUNNING YL-731 LIME SILO BIN ACTIVATOR #1 RUNNING 1023 1025 1072 1027 YL-762 LIME SILO GRIT REMOVER ∮2 RUNNING 1028 1029 1074 YL-732 LIME SILO BIN ACTIVATOR #2 RUNNING 1075 1030 1076 1031 1032 1078 1033 THIS SIDE OF DRAWING INTENTIONALLY LEFT BLANK. 1079 1034 1080 1035 1036 1081 LIME SPLITTER BOX HIGH LEVEL 1037 1082 317 182 n 138 ------1038 1083 1039 1084 THIS DRAWING AND ALL INFORMATION THEREON CONTAIN CONFIDENTIAL AND PROPRIETARY INFORMATION AND IS, THE EXCLUSIVE PROPERTY OF CHEMICO SYSTEMS, L.P. IT MUST NOT BE WADE PLANCE OR COPIED WITHOUT THE AUTHORIZATION OF CHEMICO AND IS SUBJECT TO RETURN UPON DEMAND. 1040 CHEMCO SYSTEMS, L.P. 1500 INDUSTRIAL DRIVE, MONONGAHELA, PA SH. DESCRIPTION LIME SYSTEM - WIRING 1042 AS SHIPPED FOR CONSTRUCTION PER CUSTOMER COMMENTS DWG BOSCHPTON OWOSSO WATER TREATMENT PLANT OWOSSO, MICHIGAN LIME SLAKING SYSTEM 1043 11-22-02 0 ORIGIN
DATE REV RES
DATE 11-12-07
DRWN 8Y MOK ORIGINAL ISSUE 1044 REWARKS APPROXED IN: JC SHEET NO. 10

> EXISTING DRAWING FROM PREVIOUS PROJECT. PROPOSED WORK SHOWN BOLD, CROSSHATCHED, AND/OR CIRCLED

INSTRUMENTA OWOSSO WATER TREATMENT PL, WIRING DIAGRAM - DEMOLITION Project No.: 200-280565-21002 Designed By: Drawn By:

> Checked By: I-326

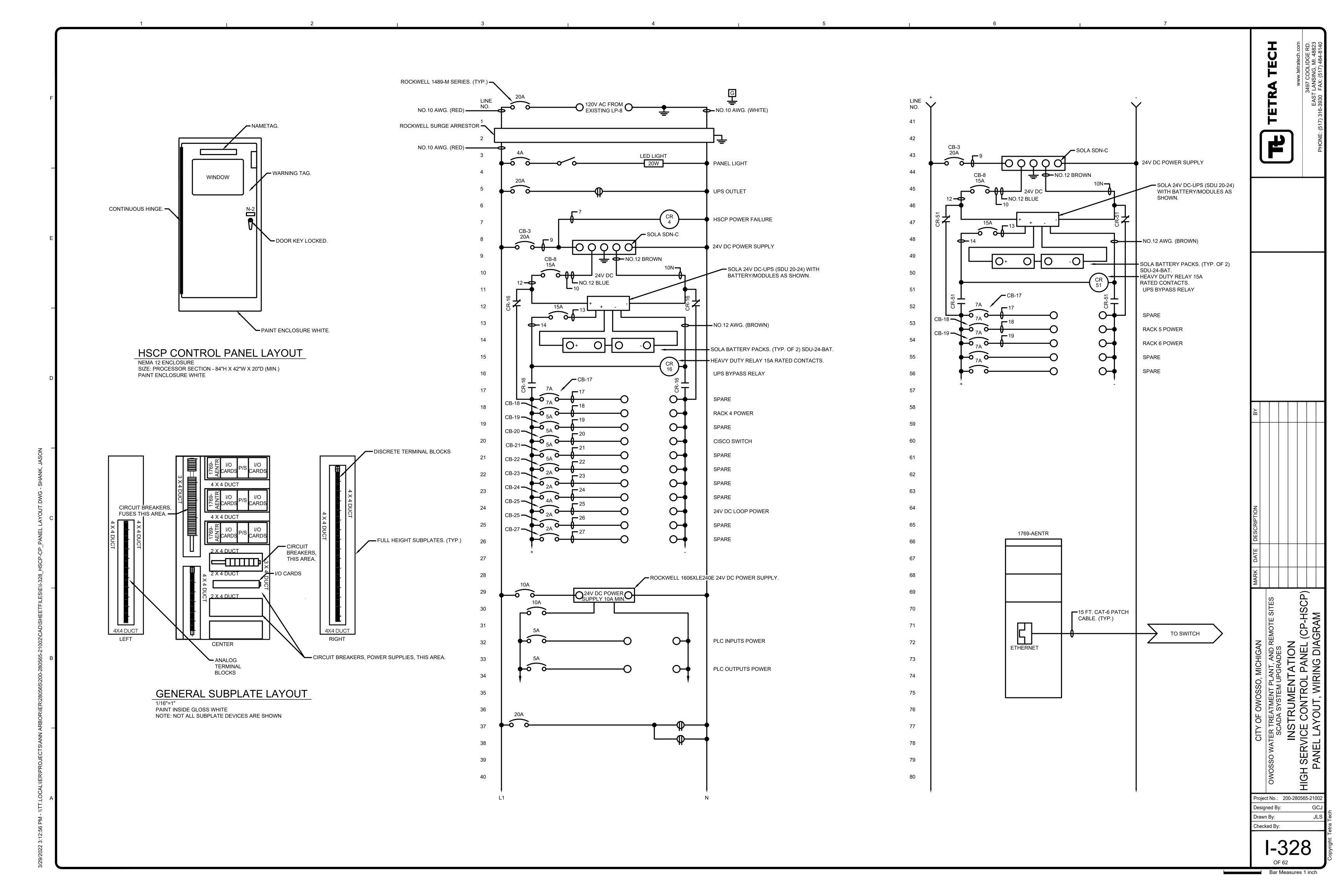


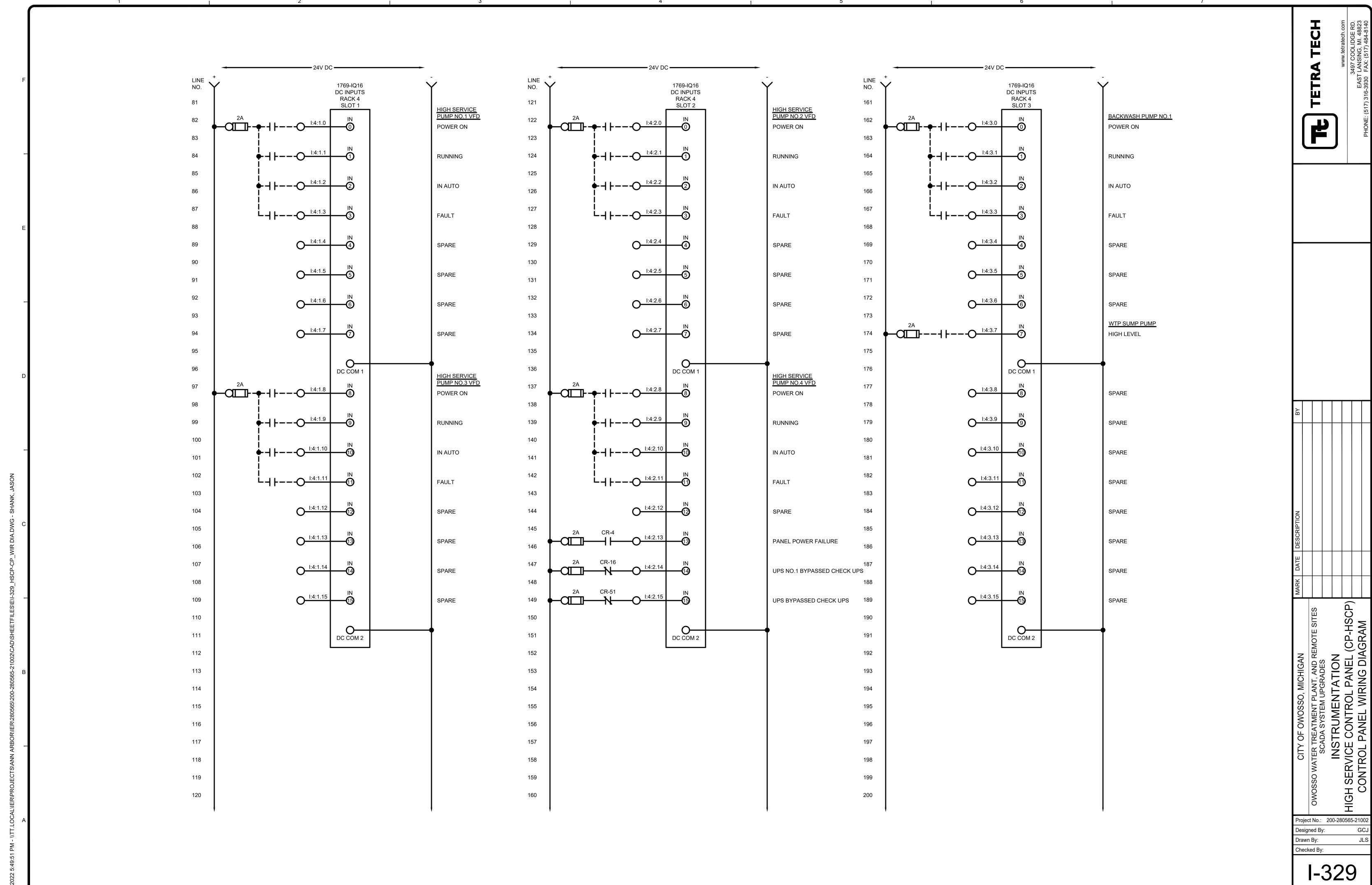
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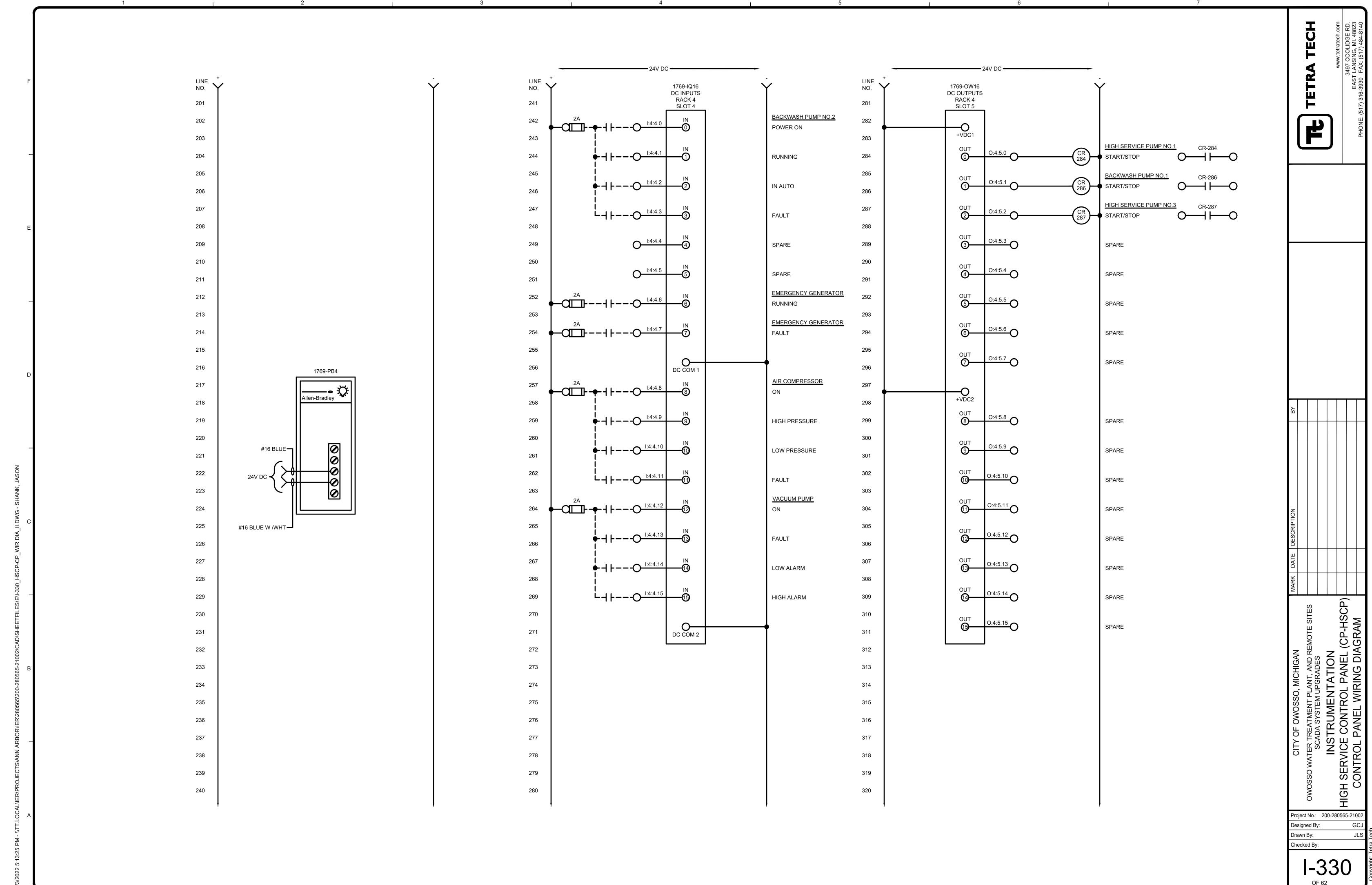
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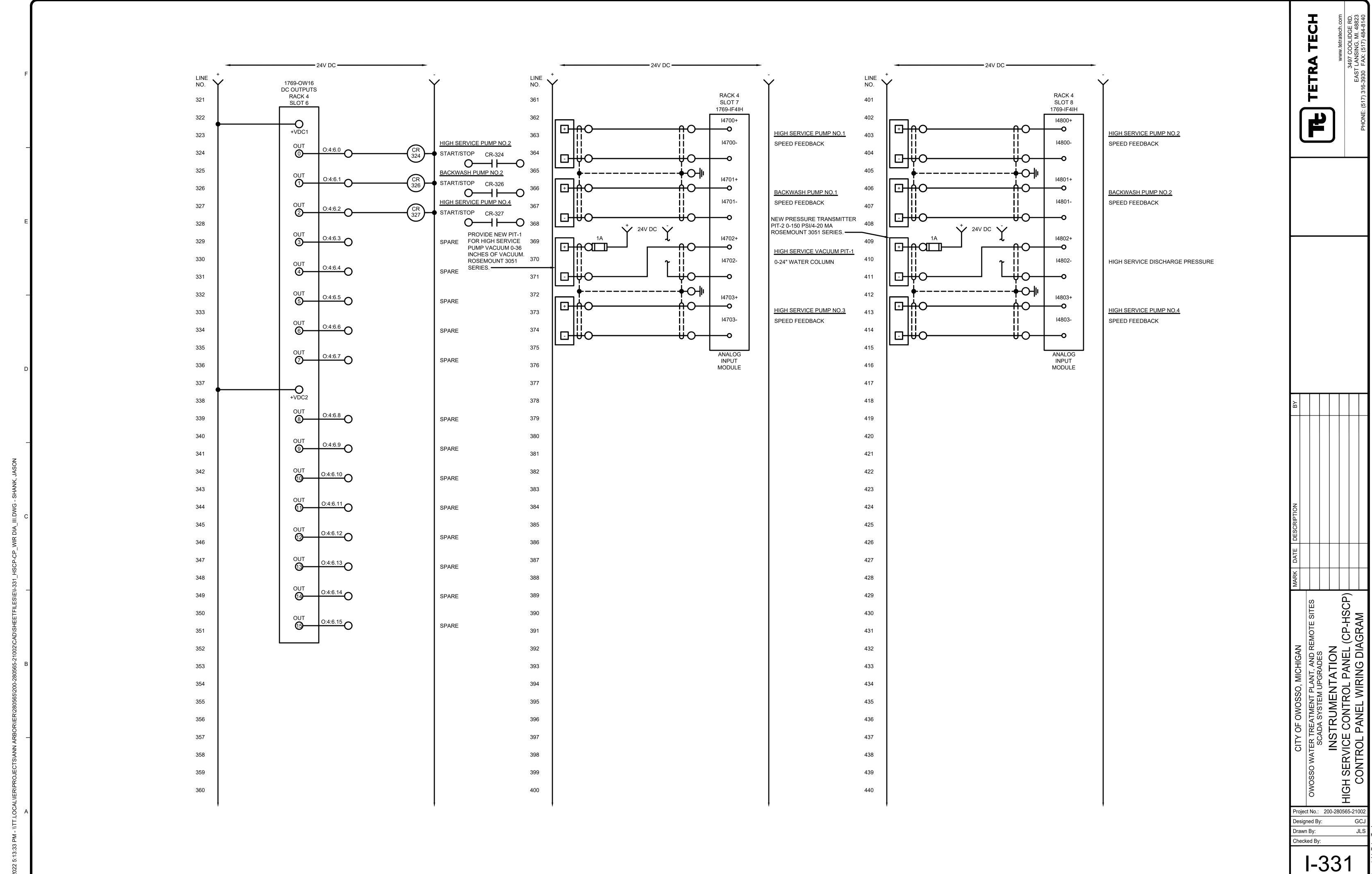
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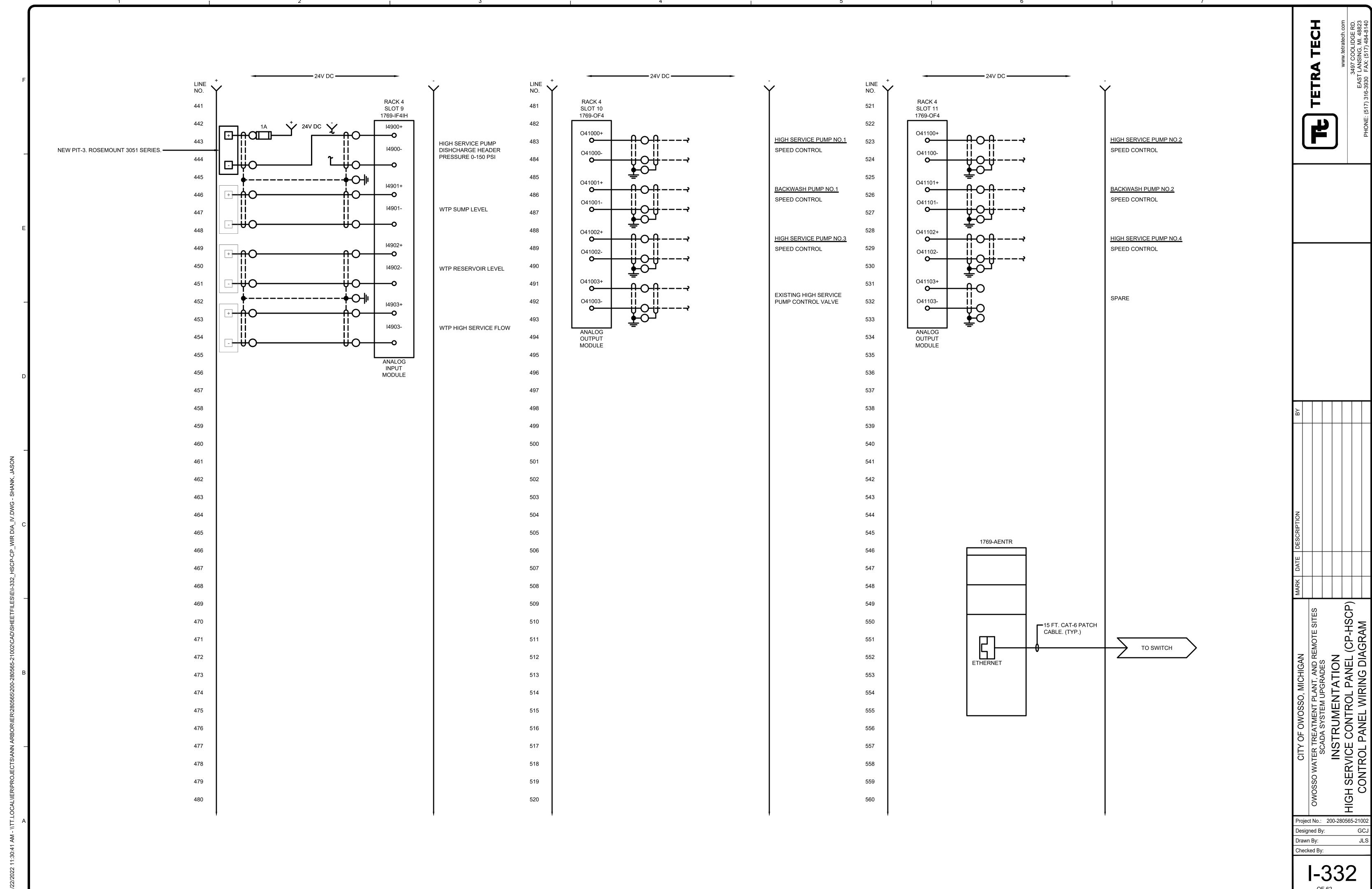
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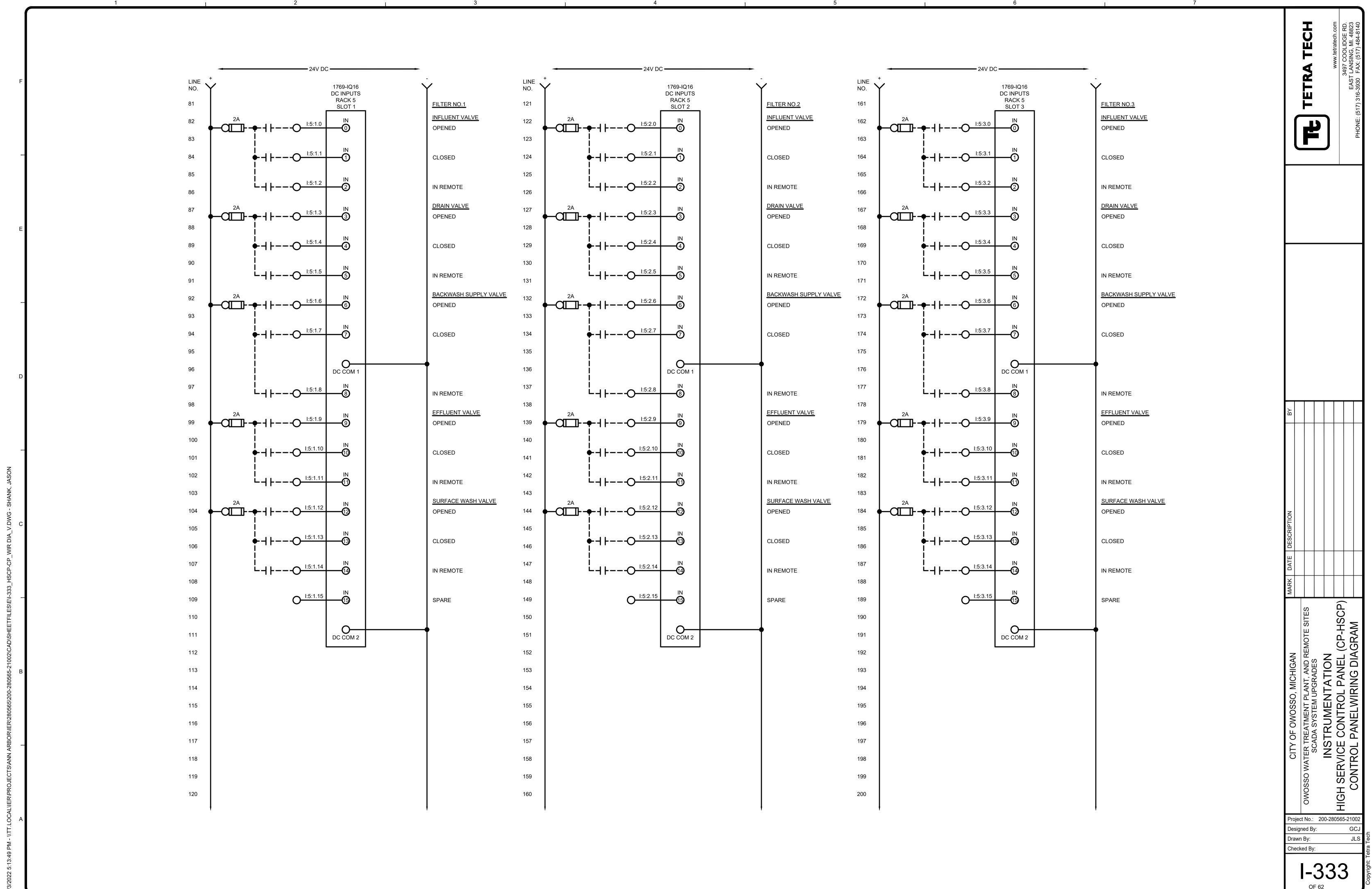




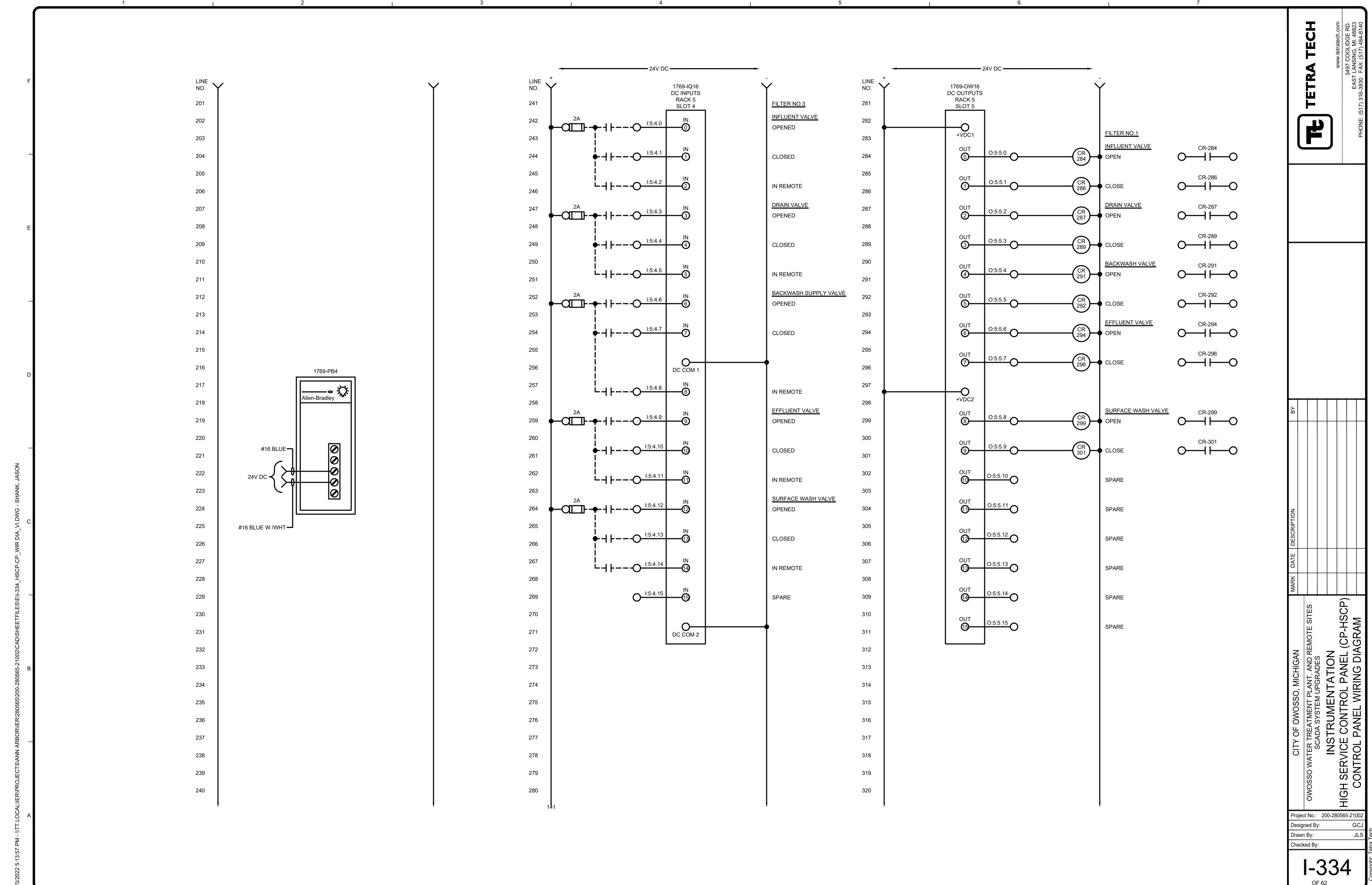


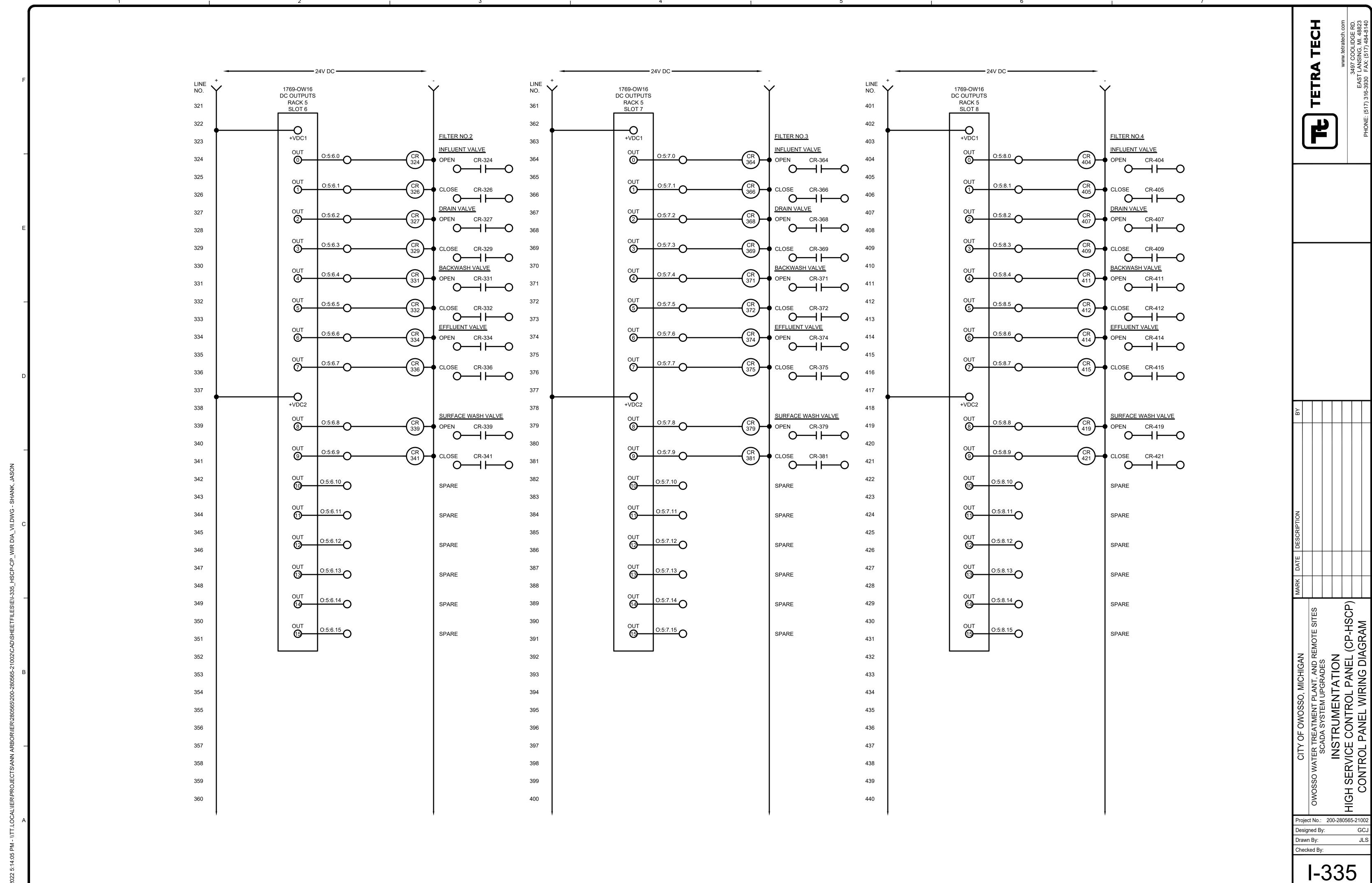




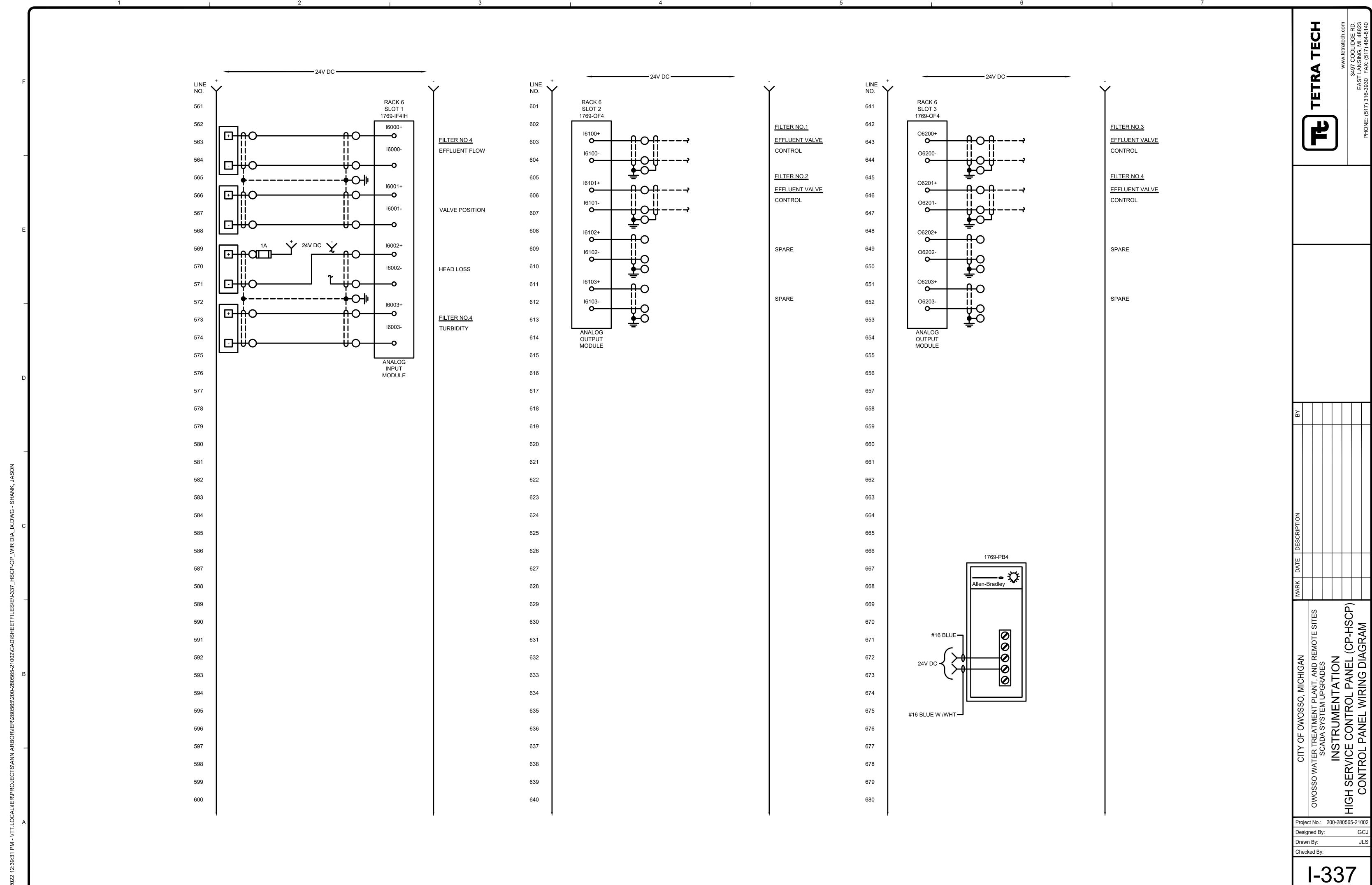


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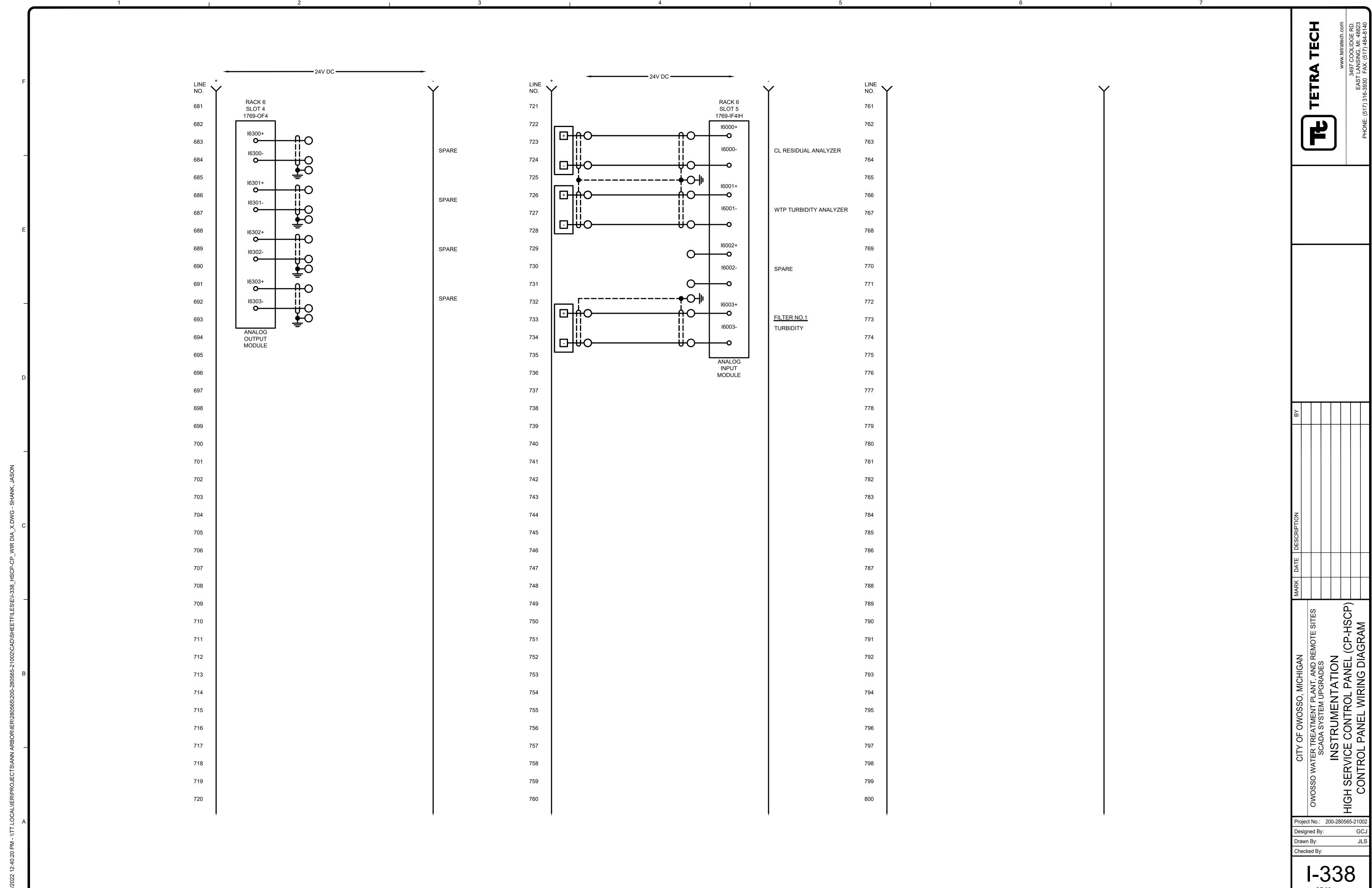


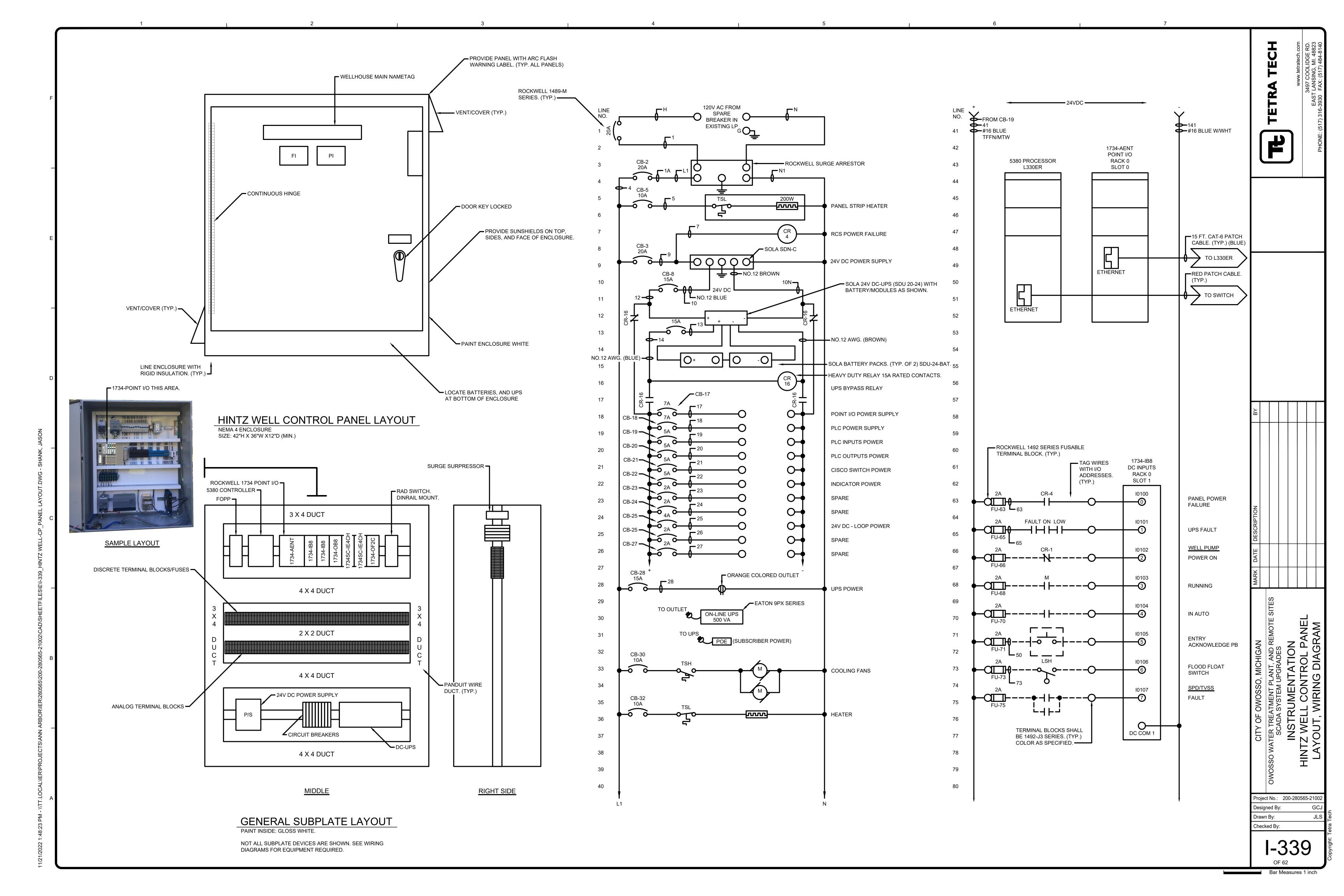


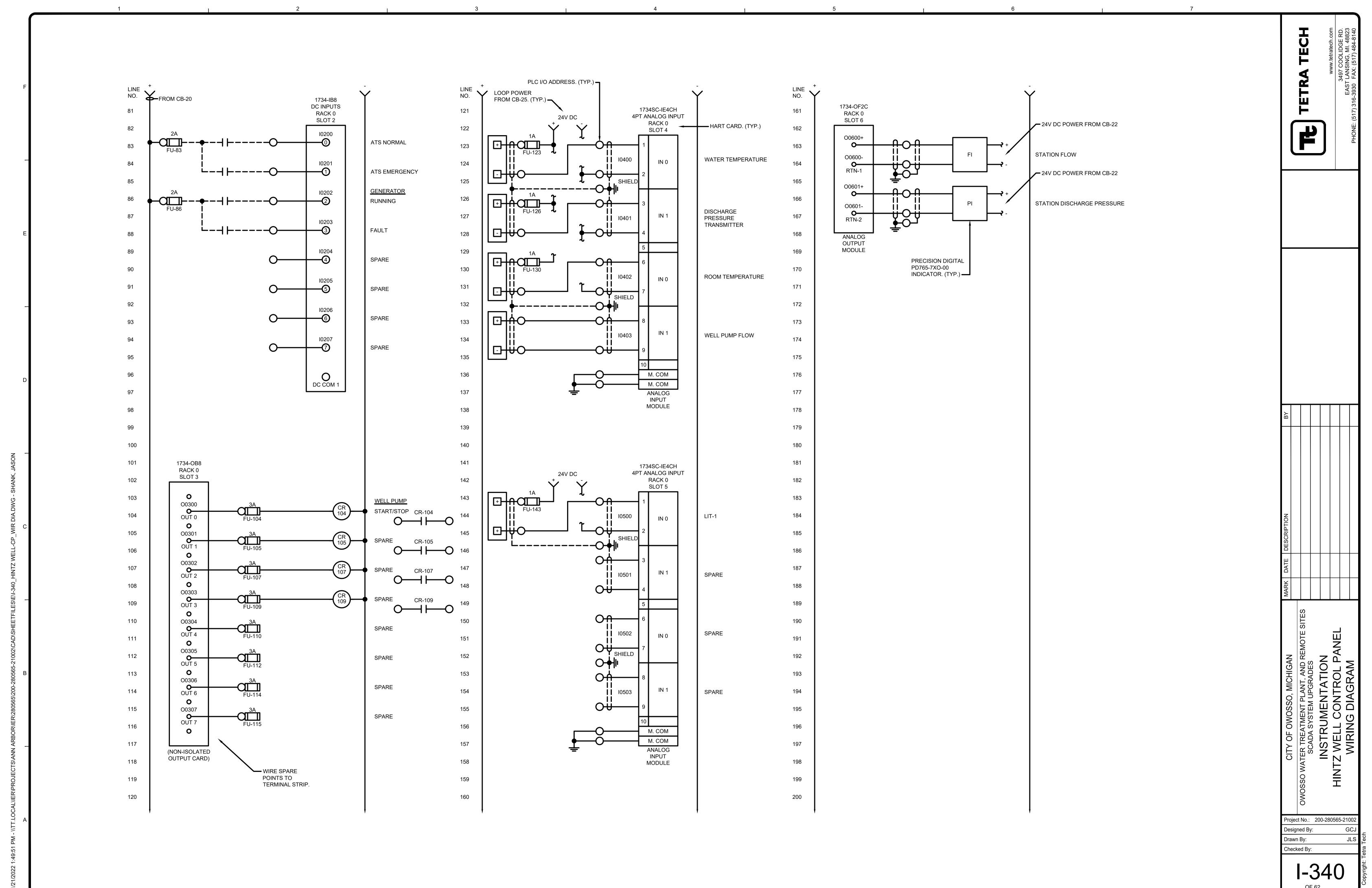
LINE NO. RACK 5 SLOT 10 1769-IF4IH RACK 5 SLOT 11 1769-IF4IH RACK 5 SLOT 9 1769-IF4IH 15900+ I51100+ I51000+ FILTER NO 3 FILTER NO 1 FILTER NO 2 I51000-**EFFLUENT FLOW** EFFLUENT FLOW EFFLUENT FLOW │<del>ॗऻ</del>ॗॳ VALVE POSITION VALVE POSITION VALVE POSITION I51102+ 15902+ I51002+ I51002-**HEAD LOSS HEAD LOSS HEAD LOSS** 15903+ BACKWASH VALVE FILTER NO.3 FILTER NO 2 TURBIDITY FLOW TURBIDITY ANALOG INPUT MODULE ANALOG INPUT MODULE ANALOG INPUT MODULE 1769-AENTR INSTRUMENTATION SERVICE CONTROL PANEL (CP-HSCP) CONTROL PANEL WIRING DIAGRAM 15 FT. CAT-6 PATCH CABLE. (TYP.) TO SWITCH ETHERNET Project No.: 200-280565-21002 Drawn By: Checked By:

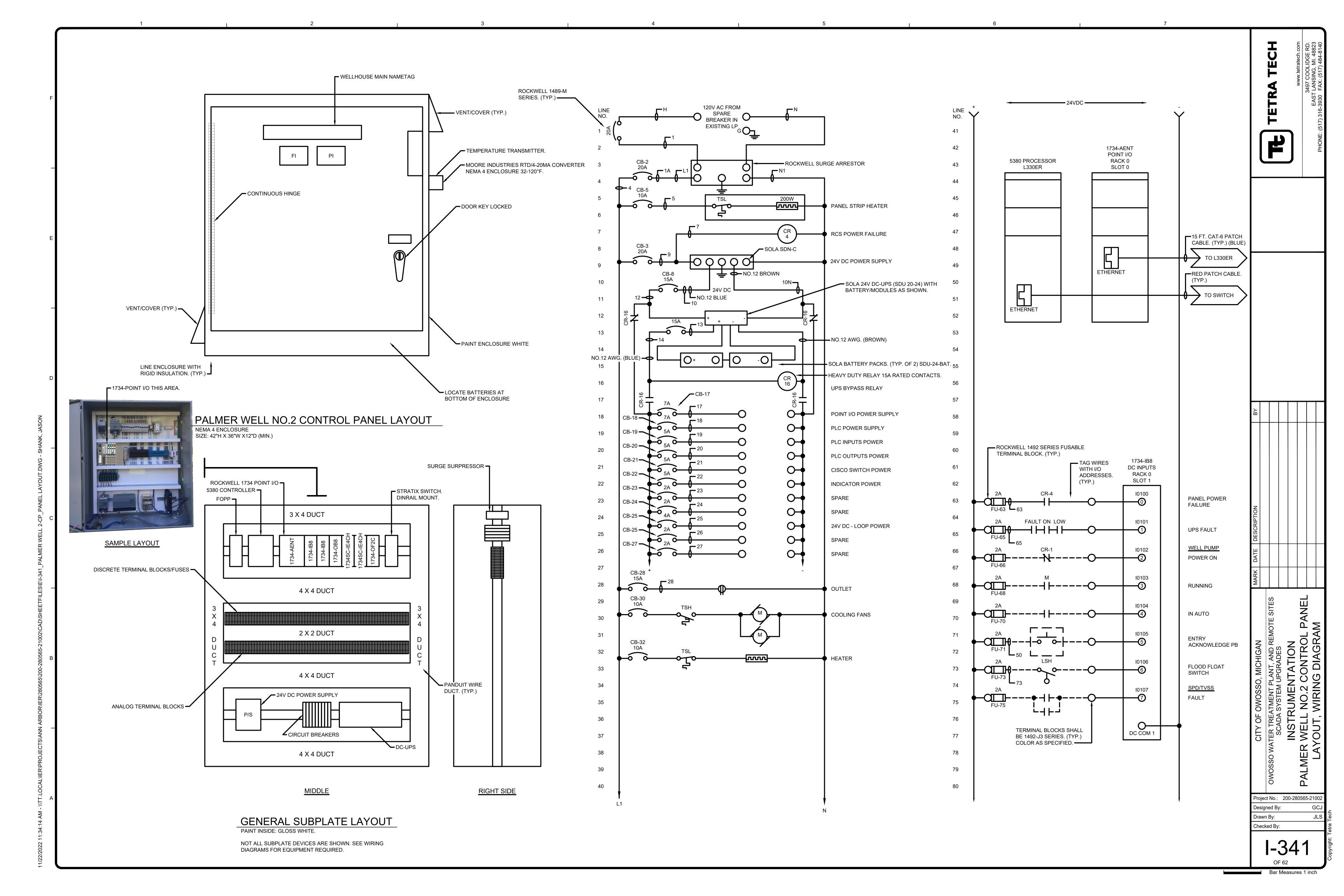


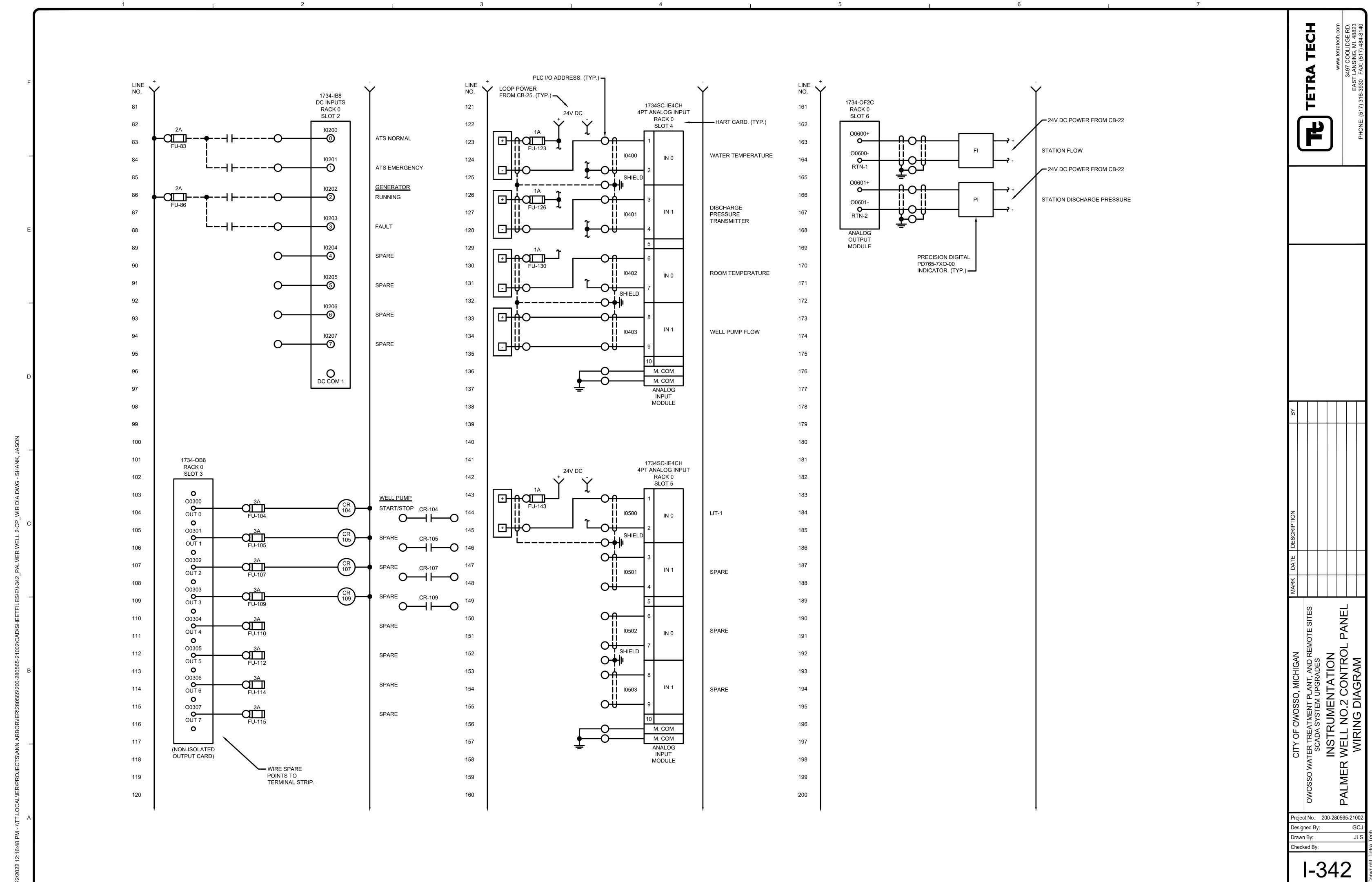
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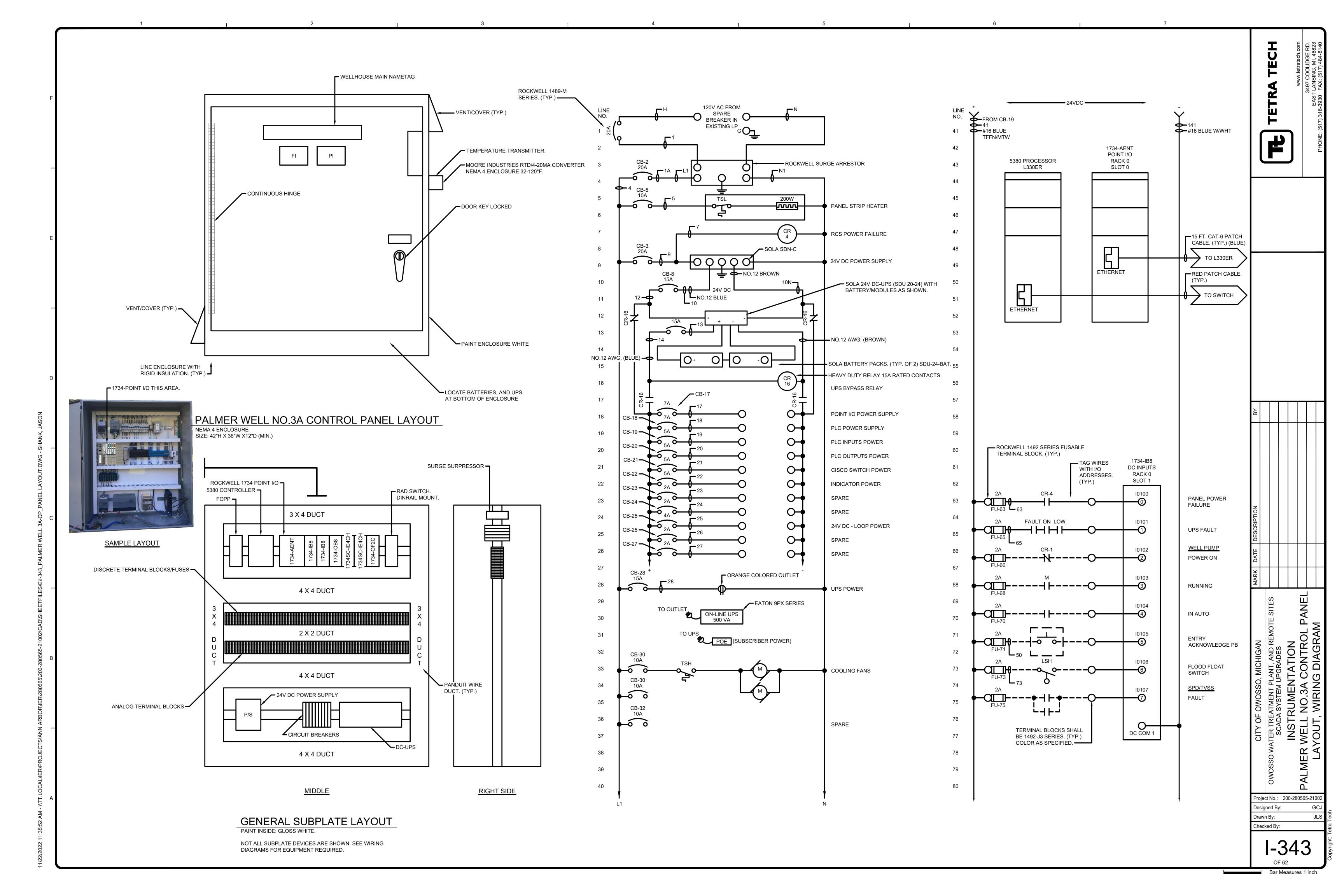


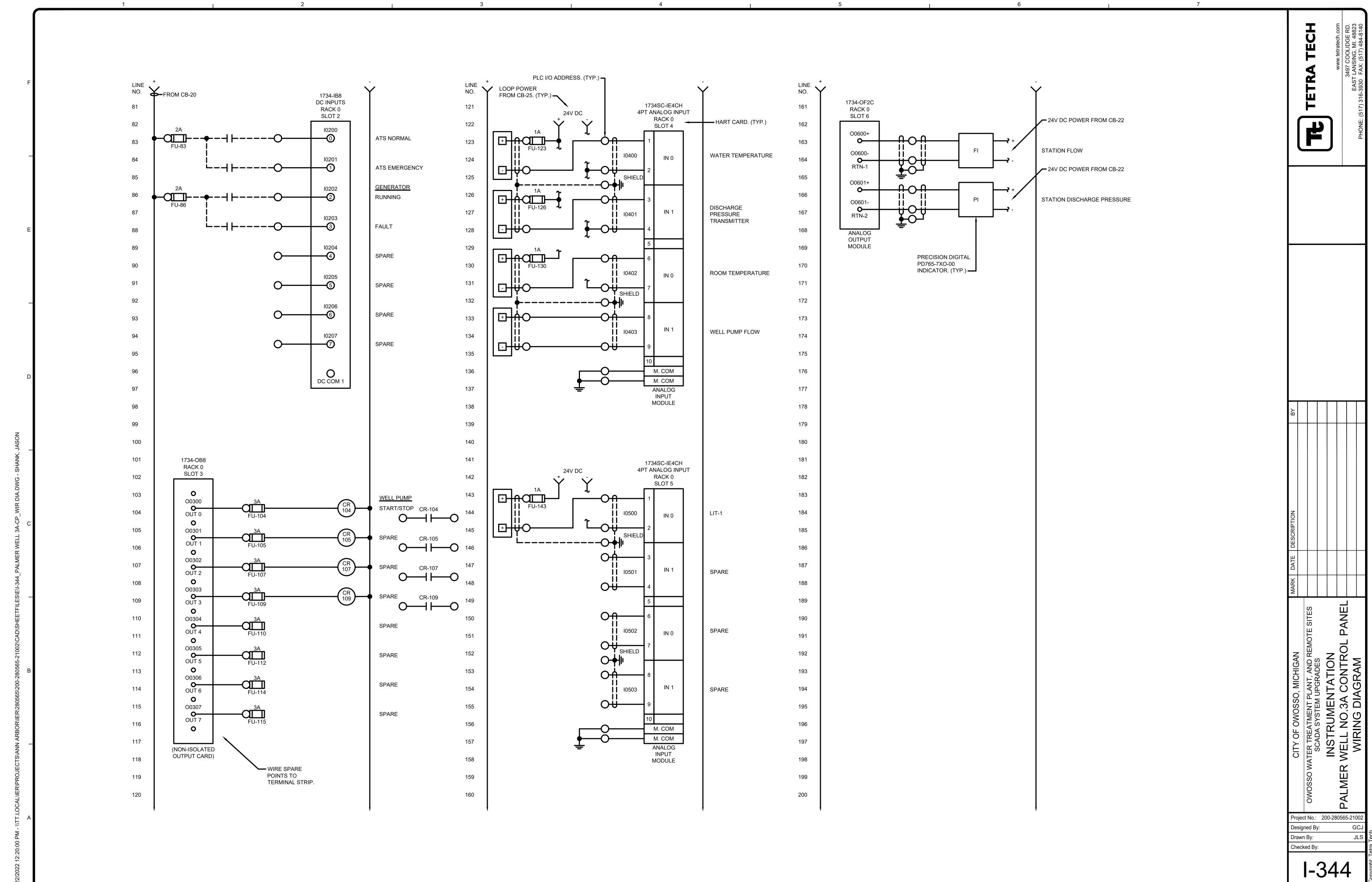


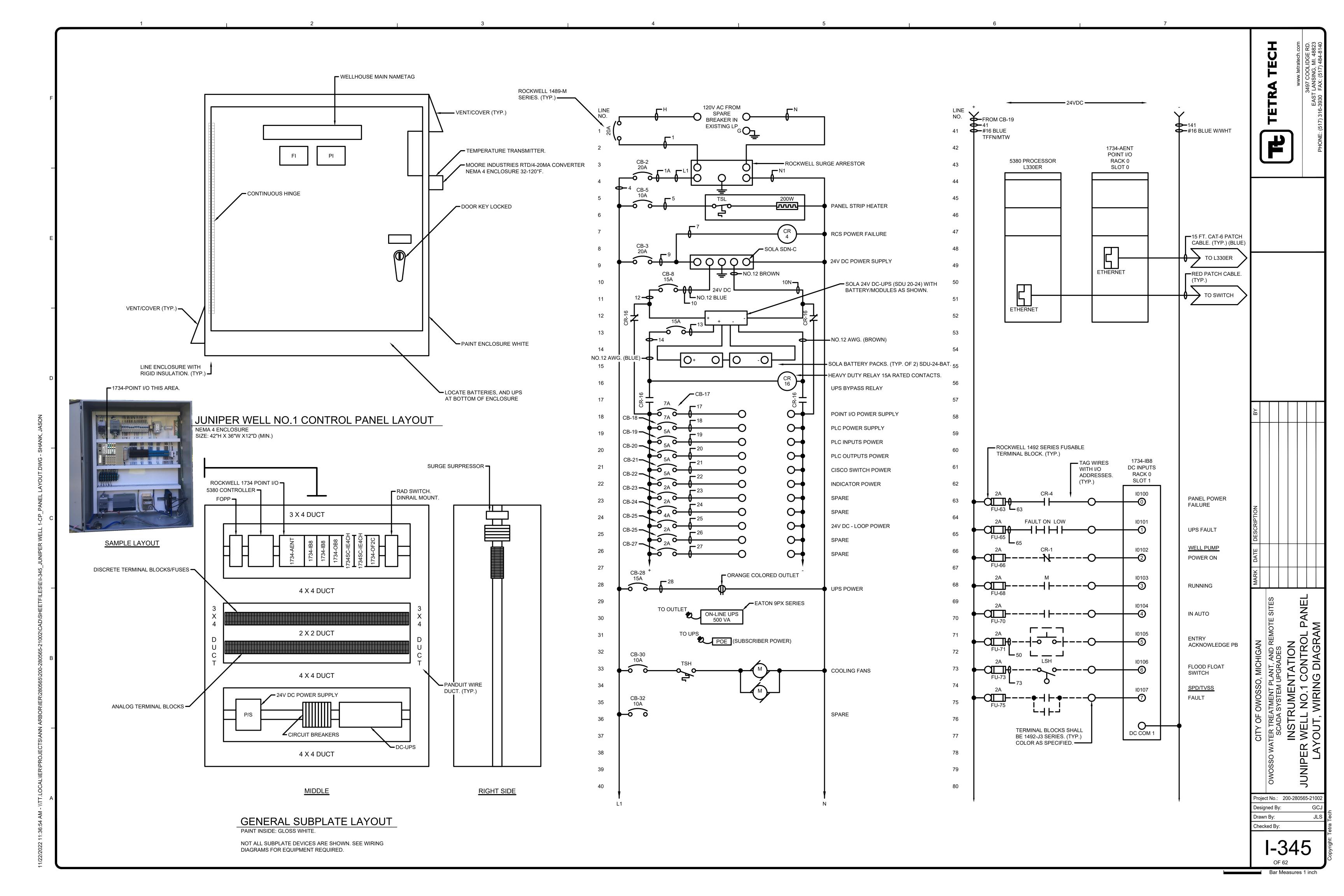


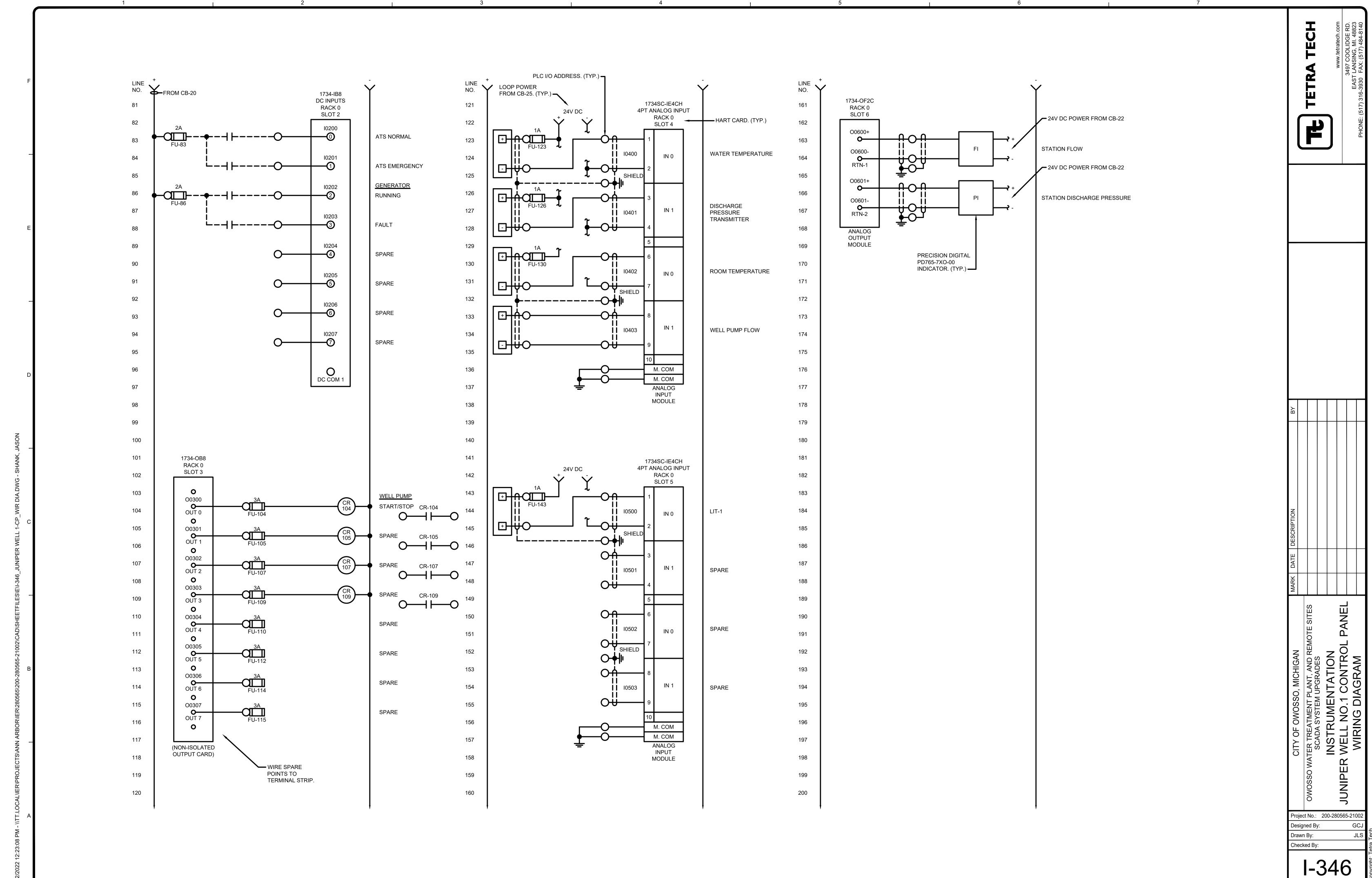


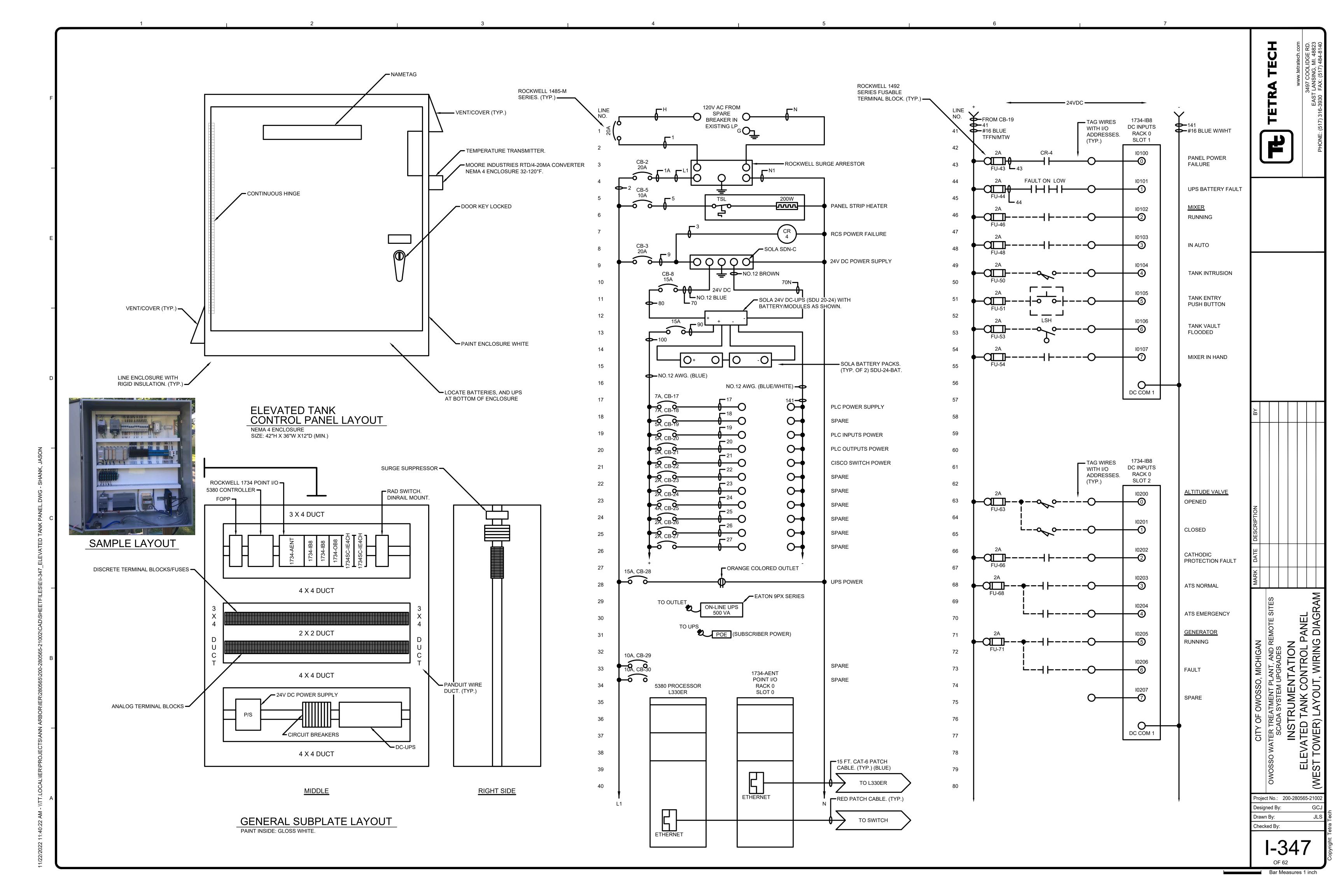


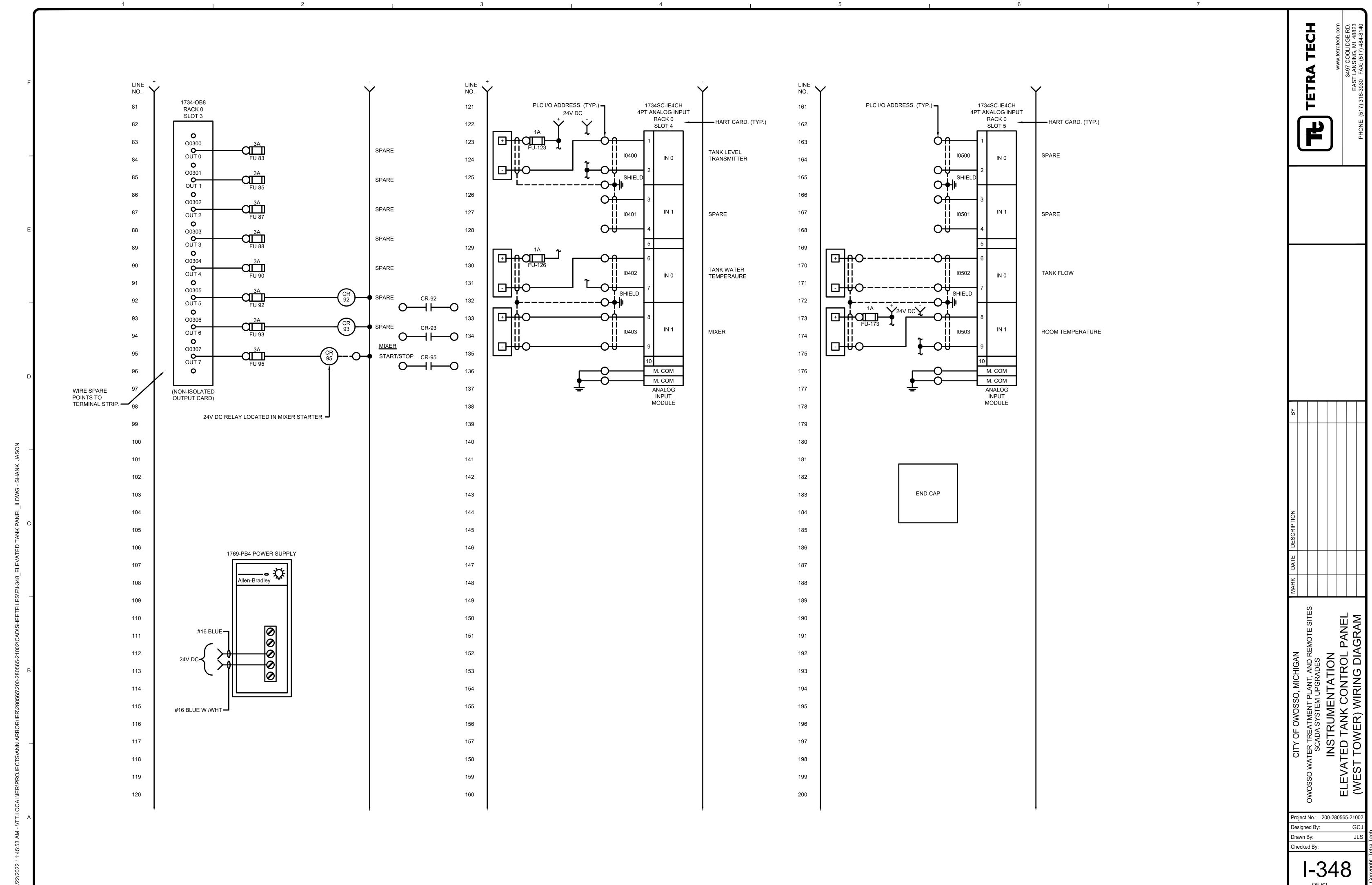


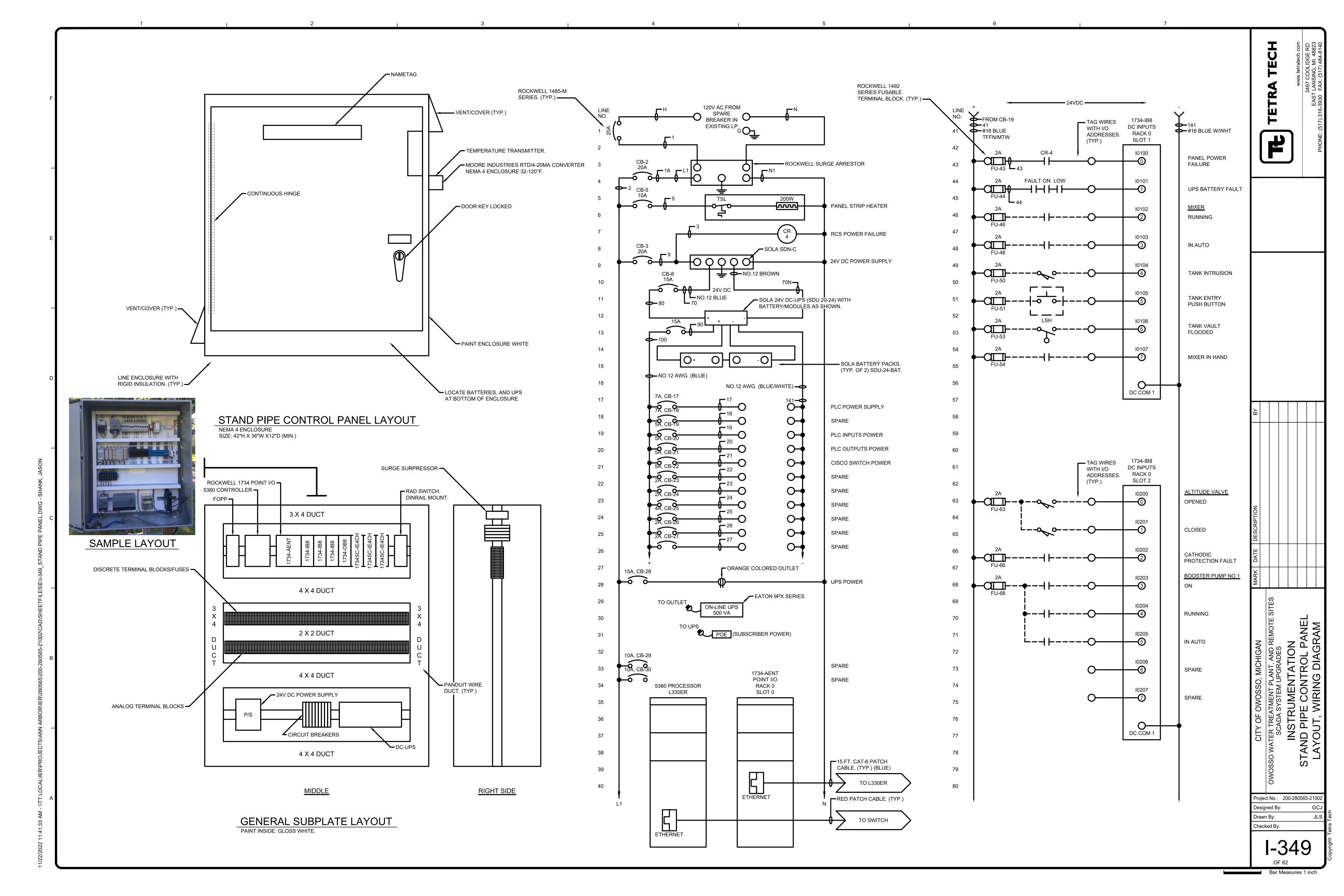


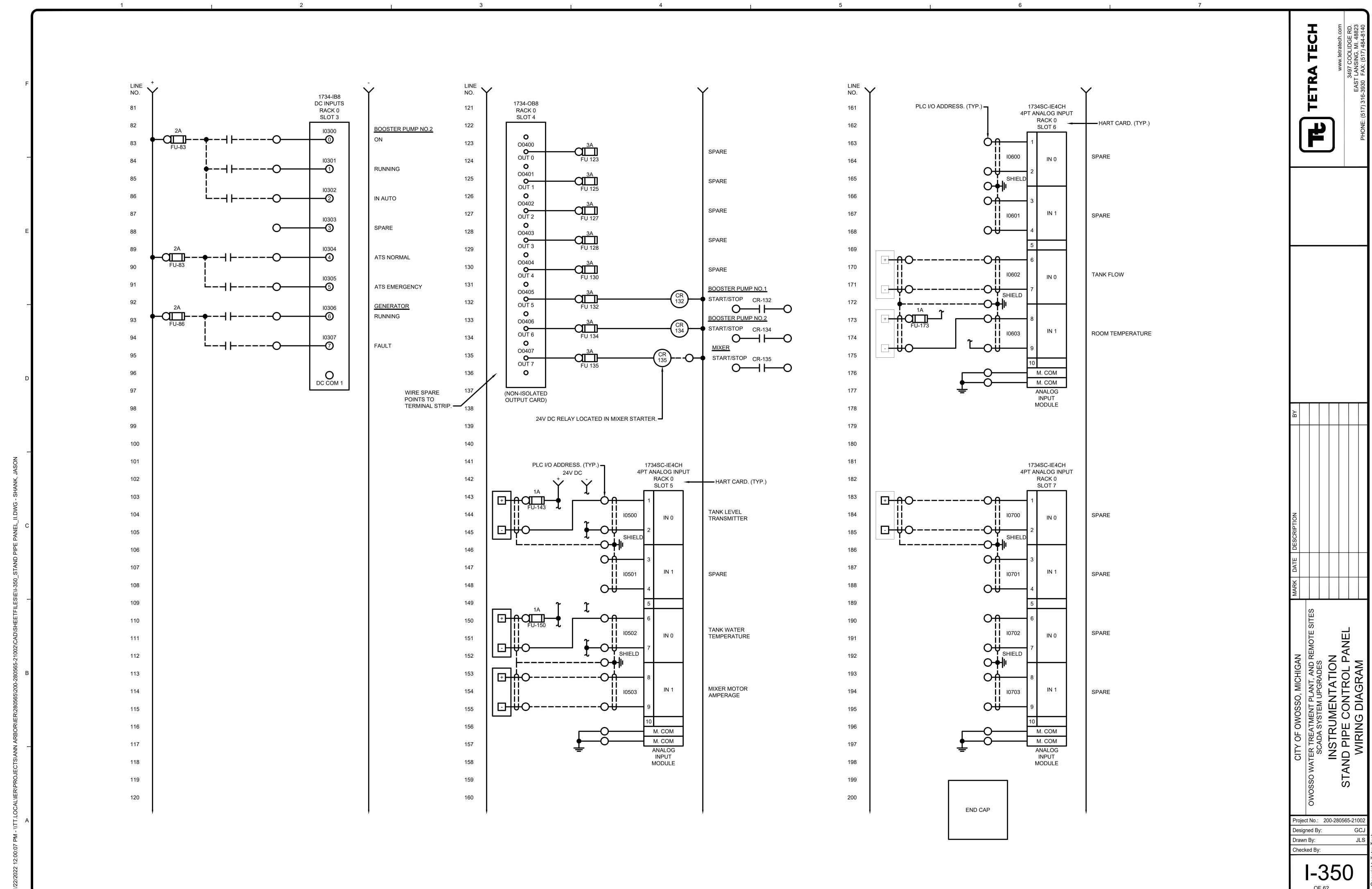












■ Rar Measures 1 inc

