

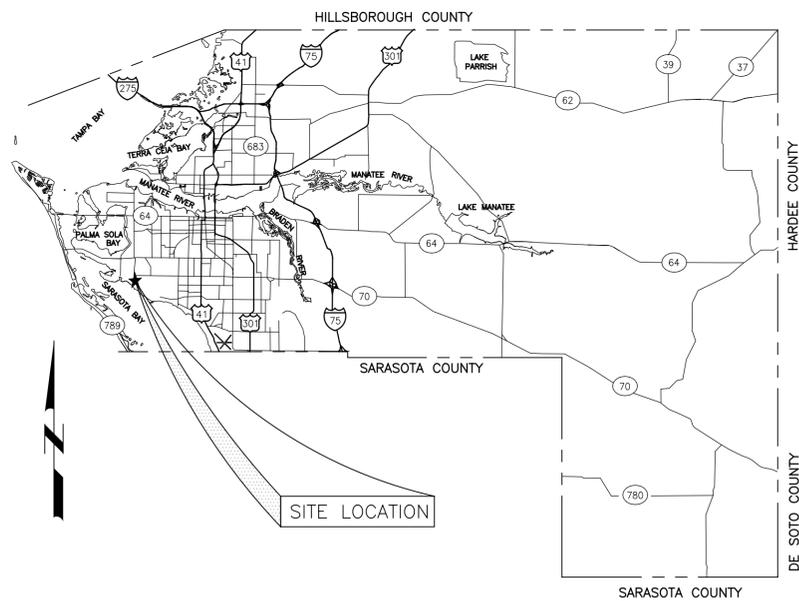
MANATEE COUNTY GOVERNMENT PUBLIC WORKS DEPARTMENT (MANATEE COUNTY, FLORIDA)

SOUTHWEST WATER RECLAMATION FACILITY UPGRADES TO CHLORINE RESIDUAL FEED LINES

MANATEE COUNTY PROJECT NO. 5130480
SUBMITTAL DATE

APRIL 2015
BID SUBMITTAL

DWG	DISCIPLINE / TITLE
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G-02	GENERAL NOTES
	<u>CIVIL</u>
C-01	YARD PIPING PLAN
	<u>MECHANICAL</u>
M-01	FILTRATION AND DISINFECTION SAMPLING / MONITORING SYSTEM
M-02	CHLORINE BUILDING
M-03	CHLORINE FEED PUMP DISCHARGE STATION
M-04	FILTRATION AND DISINFECTION SAMPLING LOCATION PLAN
	<u>ELECTRICAL</u>
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T-02	ELECTRICAL TYPICAL DETAILS



VINCINITY MAP

..
ORIGINAL
SEALED BY
DEAN MILTON P.E.
APRIL 2015
FL 52719
..



401 NORTH CATTLEMEN ROAD, SUITE 306
SARASOTA, FL 34232
PHONE: (941) 371-9832 FAX: (941) 371-9873
CA 00008571

JOB NO. 9520F00
DRAWING NO. G01
SHEET NO. X OF XX

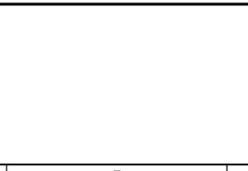
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GENERAL NOTES:

- | | | |
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| <p>1. THE LOCATIONS, ELEVATIONS AND DIMENSIONS OF EXISTING STRUCTURES AND UTILITIES HAVE BEEN DERIVED FROM INFORMATION PROVIDED BY THE OWNER AND SURVEYS. THIS INFORMATION IS NOT GUARANTEED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION, DEPTH, AND CHARACTER OF ALL UTILITIES PRIOR TO CONSTRUCTION.</p> <p>2. LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES EXPOSED DURING CONSTRUCTION SHALL BE ACCURATELY RECORDED ON THE CONSTRUCTION DRAWINGS. THE OWNER AND ENGINEER SHALL BE IMMEDIATELY NOTIFIED OF ANY CONFLICTS WITH PROPOSED CONSTRUCTION.</p> <p>3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE HIS WORK WITH THE SCHEDULE OF ADJACENT CONTRACTORS.</p> <p>4. RECORD DRAWINGS ARE AVAILABLE, UPON REQUEST FOR THIS PROJECT. CONTRACTOR'S USE OF THE ORIGINAL CONSTRUCTION DRAWINGS ARE FOR REFERENCE ONLY. CONTRACTOR SHALL FIELD VERIFY TIE-INS PRIOR TO CONSTRUCTION.</p> <p>5. ANY NECESSARY SYSTEM SHUTDOWNS SHALL BE STRICTLY COORDINATED WITH THE OWNER. IT IS POSSIBLE THAT THE TIE-IN WORK MAY HAVE TO OCCUR DURING OFF-HOURS. PROVIDE 2 WEEKS NOTICE TO OWNER.</p> <p>6. CONTRACTOR SHALL BE AWARE OF OF SMALL CHEMICAL AND WATER PIPING THROUGHOUT THE FACILITY SITE WHICH MAY NOT BE DEPICTED IN THE CONSTRUCTION PLANS. CONTRACTOR SHALL REFER TO EXISTING RECORD DRAWINGS AND PERFORM FIELD VERIFICATION FOR LOCATION OF EXISTING PIPING. ANY PIPE TO BE REUSED SHALL BE RECONNECTED WITH NEW PIPE AND SHALL BE FIELD ROUTED IN SUCH A MANNER AS TO AVOID ANY CONFLICT WITH EXISTING OR PROPOSED YARD PIPING. ANY DAMAGES CAUSED BY THE CONTRACTOR TO EXISTING PIPE SHALL BE REPAIRED IN KIND BY CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.</p> <p>7. ALL ANCHOR BOLTS SHALL BE EMBEDDED IN CONCRETE. UNLESS OTHERWISE STATED, ALL ANCHORS, BOLTS, NUTS, WASHERS, EXPANSION SLEEVES AND ALL OTHER FASTENERS WITHIN THE AREA OF THE TREATMENT PLANT SHALL BE 316 STAINLESS STEEL.</p> <p>8. HANDRAILS, GUARDRAILS, POSTS, BRACKETS, MOUNTINGS, AND LADDERS SHALL COMPLY WITH THE FLORIDA STANDARD BUILDING CODE, AND THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) LOADING REQUIREMENTS.</p> <p>9. STAINLESS STEEL BOLTS 1/2-INCH AND LARGER SHALL BE THREAD PROTECTED DURING SHIPMENT.</p> <p>10. CONTRACTOR TO UTILIZE EARLY SET NON-SHRINK EPOXY GROUT FOR ALL WALL/ROOF PENETRATIONS.</p> <p>11. CONTRACTOR TO COORDINATE THE LOCATION OF SLEEVES AND WALL PIPE THROUGH WALLS, SLABS AND CEILINGS. REFER TO MECHANICAL, ELECTRICAL, STRUCTURAL, AND PROCESS DRAWINGS FOR SPECIFIED REQUIREMENTS.</p> <p>12. ALL DUCTILE IRON PIPING LOCATED BENEATH STRUCTURES SHALL BE CONCRETE ENCASED WITH A MINIMUM OF SIX (6) INCHES OF COVER.</p> <p>13. A VERTICAL CLEARANCE OF AT LEAST 18 INCHES AND A HORIZONTAL SEPARATION OF TEN (10) FEET SHALL BE MAINTAINED BETWEEN CROSSINGS OF POTABLE WATER AND SEWER LINES OR OTHER NON-POTABLE WATER.</p> <p>14. ALL BELOW GROUND DUCTILE IRON PIPE FOR THE CARRIER PIPING AND VALVES TO BE PUSH-ON JOINT. ALL ABOVE GROUND VALVES TO BE FLANGED.</p> <p>15. PROVIDE MINIMUM OF 36-INCH COVER FROM GRADE FOR UNDERGROUND PIPING TO TOP OF PIPE, UNLESS OTHERWISE NOTED.</p> <p>16. ALL PIPING AND/OR APPURTENANCES CONNECTING TO ADJACENT CONSTRUCTION SHALL BE PLUGGED IF ADJACENT WORK HAS BEEN COMPLETED.</p> | <p>17. DIMENSIONS FOR ALL EQUIPMENT SHALL BE VERIFIED BY CONTRACTOR PER MANUFACTURER'S SHOP DRAWINGS, AND REVISED AS NECESSARY PRIOR TO CONSTRUCTION. INFORM ENGINEER OF ANY DISCREPANCY.</p> <p>18. SIZE AND FINAL LOCATION OF ALL OPENINGS AND CONNECTIONS SHALL BE COORDINATED WITH EQUIPMENT MANUFACTURER/SUPPLIER. ALL EQUIPMENT PAD DIMENSIONS INDICATED ON THE DRAWINGS SHALL BE VERIFIED WITH MANUFACTURER FOR ACTUAL SIZE OF EQUIPMENT SELECTED. REFER TO STRUCTURAL DRAWING DETAILS FOR EQUIPMENT PAD DESIGN DETAILS.</p> <p>19. ALUMINUM EMBEDDED IN CONCRETE MUST BE PAINTED WITH ONE SHOP COAT OF ZINC CHROMATE FOLLOWED BY ONE HEAVY COAT OF ALUMINUM PIGMENTED ASPHALT PAINT. ALUMINUM SHAPES IN CONTACT WITH CONCRETE MUST BE ISOLATED FROM THE CONCRETE BY A 1/32 INCH NEOPRENE GASKET. ALSO ANY CASE WHERE TWO DIFFERENT METALS ARE IN CONTACT, A NEOPRENE GASKET MUST BE PROVIDED ALONG WITH BOLT ISOLATION KITS FOR FLANGES.</p> <p>20. CONTRACTOR SHALL SUPPLY AND INSTALL ALL NECESSARY TAPS AND BLIND FLANGES AS NECESSARY FOR ALL PRESSURE, VACUUM AND LEAK TESTS AND CLEANING. ALL TAPS SHALL BE BALL VALVES AND MATCH PIPING MATERIAL. VALVES SHALL BE PER THE PROJECTS TECHNICAL SPECIFICATIONS.</p> <p>21. CONTRACTOR TO PROVIDE TEMPORARY PIPING, BLIND FLANGES, PUMPS FOR BYPASSING EQUIPMENT FOR CLEANING, TESTING AND START UP ACTIVITIES.</p> <p>22. CONTRACTOR SHALL OBTAIN SWFWMD PERMIT AND PROVIDE ALL DEWATERING NECESSARY TO KEEP EXCAVATIONS DRY AND SHALL PROVIDE ALL SHEETING, SHORING, AND BRACING NECESSARY TO PROTECT ADJACENT STRUCTURES, UTILITIES, EXISTING PAVEMENT, OR TO MINIMIZE TRENCH WIDTH, ALL IN ACCORDANCE WITH THE SPECIFICATIONS. THE DEWATERING PERMIT SHALL BE OBTAINED FROM SARASOTA COUNTY.</p> <p>23. THE CONTRACTOR SHALL ADHERE TO ALL CONDITIONS AND REQUIREMENTS OF ALL PERMITS WHICH HAVE BEEN OBTAINED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED FOR CONSTRUCTION, EXCEPT FOR THE FDEP WASTEWATER TREATMENT PLANT CONSTRUCTION, WHICH IS PROVIDED BY THE OWNER.</p> <p>24. CONTRACTOR SHALL TAKE CARE TO PROVIDE PROPER GRADE, ELEVATIONS, AND ALIGNMENT FOR PROPOSED AND FUTURE CONNECTIONS AS SHOWN ON THE DRAWINGS.</p> <p>25. ALL DISTURBED GRASS AREAS SHALL BE RESTORED WITH SOLID SOD IN LIKE KIND AT THE END OF CONSTRUCTION, UNLESS OTHERWISE DIRECTED BY OWNER.</p> <p>26. UNLESS OTHERWISE NOTED, ALL GRATING SECTIONS SHALL BE REMOVABLE.</p> <p>27. CONTRACTOR TO PROVIDE SIDEWALK AT LOCATIONS SHOWN ON THE CONSTRUCTION DRAWINGS.</p> <p>28. CONCRETE FOR ROADWAY AND DRAINAGE STRUCTURES SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000-PSI, UNLESS NOTED FOR A HIGHER STRENGTH CONCRETE.</p> <p>29. IT IS REQUIRED THAT TEMPORARY PLUMBING FIXTURE CONNECTIONS BE MADE FOR FIRST FILLING AND A MINIMUM PERIOD OF THREE WEEKS BE PROVIDED BETWEEN INITIAL FILLING AND PERMANENT CONNECTION FOR ALL WATER BEARING STRUCTURES.</p> <p>30. ALL DRAINAGE CULVERT JOINTS SHALL BE WRAPPED PER FDOT INDEX 280.</p> | <p>31. EROSION AND SEDIMENT CONTROL BMPs IN ADDITION TO THOSE PRESENTED ON THE PLANS AND OUTLINED IN THE EROSION AND SEDIMENT CONTROL PLAN (ECP) AND STORMWATER POLLUTION PREVENTION PLAN (SWPPP) SHALL BE IMPLEMENTED AS NECESSARY TO PREVENT TURBID DISCHARGES FROM FLOWING ONTO ADJACENT PROPERTIES OR ROADWAYS, OFFSITE STORMWATER CONVEYANCES, OR RECEIVING WATERS OR ONSITE WETLANDS AND SURFACE WATERS. BMPs SHALL BE DESIGNED, INSTALLED, AND MAINTAINED BY THE SITE OPERATOR TO ENSURE THAT OFFSITE SURFACE WATER QUALITY REMAINS CONSISTENT WITH STATE AND LOCAL REGULATIONS. (THE OPERATOR IS THE ENTITY THAT OWNS OR OPERATES THE CONSTRUCTION ACTIVITY AND HAS AUTHORITY TO CONTROL THOSE ACTIVITIES AT THE PROJECT NECESSARY TO ENSURE COMPLIANCE.)</p> <p>32. OFFSITE SURFACE WATER DISCHARGES, OR DISCHARGES TO ONSITE WETLANDS OR SURFACE WATERS WITH TURBIDITY IN EXCESS OF 29 NEPHELOMETRIC TURBIDITY UNITS (NTUs) ABOVE BACKGROUND LEVEL SHALL BE IMMEDIATELY CORRECTED. SUCH INCIDENTS SHALL BE REPORTED TO THE OWNER AND ENGINEER WITHIN 24 HOURS OF THE OCCURRENCE. THE REPORT SHALL INCLUDE CAUSE OF THE DISCHARGE AND CORRECTIVE ACTIONS TAKEN.</p> <p>33. THE CONTRACTOR SHALL ENSURE THAT ADJACENT PROPERTIES ARE NOT IMPACTED BY WIND EROSION OR EMISSIONS OF UNCONFINED PARTICULATE MATTER IN ACCORDANCE WITH RULE 62-296.32(4) (C) 1, F.A.C. BY TAKING ADEQUATE MEASURES TO STABILIZE AFFECTED AREAS.</p> <p>34. FUEL AND OTHER PETROLEUM PRODUCT SPILLS THAT ENTER STORMWATER DRAINS OR WATERBODIES, OR FUEL AND OTHER PETROLEUM PRODUCT SPILLS THAT ARE IN EXCESS OF 25 GALLONS SHALL BE CONTAINED, CLEANED UP AND IMMEDIATELY REPORTED TO THE COUNTY, OWNER AND PROPER AUTHORITIES. SMALLER GROUND SURFACE SPILLS SHALL BE CLEANED UP AS SOON AS PRACTICAL. COST INCURRED FOR CLEAN UP ACTIVITIES DUE TO FUEL SPILLS CAUSED BY THE CONTRACTOR SHALL BE HIS RESPONSIBILITY.</p> <p>35. CONTRACTOR SHALL DISPOSE ALL EXCESS FILL FROM EXCAVATION LOCATIONS AND VEGETATION FROM CLEARING/GRUBBING OFF-SITE.</p> <p>36. MANATEE COUNTY OWNS THE SOUTHWESTWATER RECLAMATION FACILITY AND EXERCISES UNIFIED CONTROL OVER THIS FACILITY.</p> <p>37. CLOSURE PLAN: IN THE EVENT THIS PROJECT IS ABANDONED PRIOR TO COMPLETION, THE SITE SHALL BE RESTORED TO A CLEAN AND DEBRIS FREE CONDITION. ALL CONSTRUCTION MATERIALS SHALL BE REMOVED FROM THE SITE AND STORED IN AN APPROPRIATE MANNER. ALL STOCKPILED VEGETATIVE DEBRIS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF ACCORDINGLY.</p> <p>38. CONTRACTOR SHALL PROVIDE SILT FENCES PER DETAILS ON THE DRAWINGS AROUND ANY VEGETATION OR SOIL STOCKPILE AREAS.</p> <p>39. NOT ALL THE ITEMS ARE SHOWN IN PLANS, SECTIONS, DETAILS, SCHEMATICS, ISOMETRICS AND P&ID DRAWINGS. THE CONTRACTOR SHALL PROVIDE ALL THE ITEMS EVEN IF THEY ARE SHOWN AT ANY ONE LOCATION ON THE DRAWINGS OR SPECIFIED IN THE SPECIFICATIONS ONLY.</p> <p>40. THE CONTRACTOR SHALL PROVIDE ALL THE ITEMS REQUIRED PER SPECIFICATIONS WHETHER OR NOT THEY ARE SHOWN ON THE DRAWINGS.</p> <p>41. IF CONTAMINATED SOIL AND / OR GROUNDWATER IS DISCOVERED DURING DEVELOPMENT OF THE SITE, ALL ACTIVITY IN THE VICINITY OF THE CONTAMINATION SHALL IMMEDIATELY CEASE, AND THE OWNER AND ENGINEER SHALL BE CONTACTED.</p> <p>42. SOD SHALL BE PLACED AT THE BACK OF ALL CURBS, PAVEMENT EDGES, SWALES AND DETENTION AREAS.</p> <p>43. THESE DOCUMENTS WERE PRODUCED IN ACCORDANCE WITH THE FLORIDA BUILDING CODE, IN EFFECT AT TIME OF DESIGN (DECEMBER 2014). IF PROJECT IS BID AT LATER DATE, NECESSARY UPDATES TO THE DOCUMENTS WILL BE REQUIRED TO COMPLY WITH APPLICABLE CODES IN EFFECT AT BID TIME.</p> <p>44. THESE DOCUMENTS REFLECT RECORD INFORMATION AVAILABLE AT TIME OF DESIGN(DECEMBER 2014). IF PROJECT IS BID AT A LATER DATE, CONTRACTOR SHOULD NOT ASSUME THAT ALL RECORD INFORMATION IS PRESENTED AND REQUEST LATEST INFORMATION FROM THE OWNER.</p> |
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REV	DATE	BY	DESCRIPTION

DESIGNED GDM DRAWN DVP CHECKED EP DATE APRIL 2015	** ORIGINAL SEALED BY DEAN MILTON P.E. APRIL 2015 FL 52719 **
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carollo
 401 NORTH CATTLEMEN RD, SUITE 306
 SARASOTA, FL 34232
 PHONE: (941) 371-9832 FAX: (941) 371-9873
 CA 00008571



MANATEE COUNTY
SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
 GENERAL
GENERAL NOTES

VERIFY SCALES
 BAR IS ONE INCH ON ORIGINAL DRAWING
 0 1"

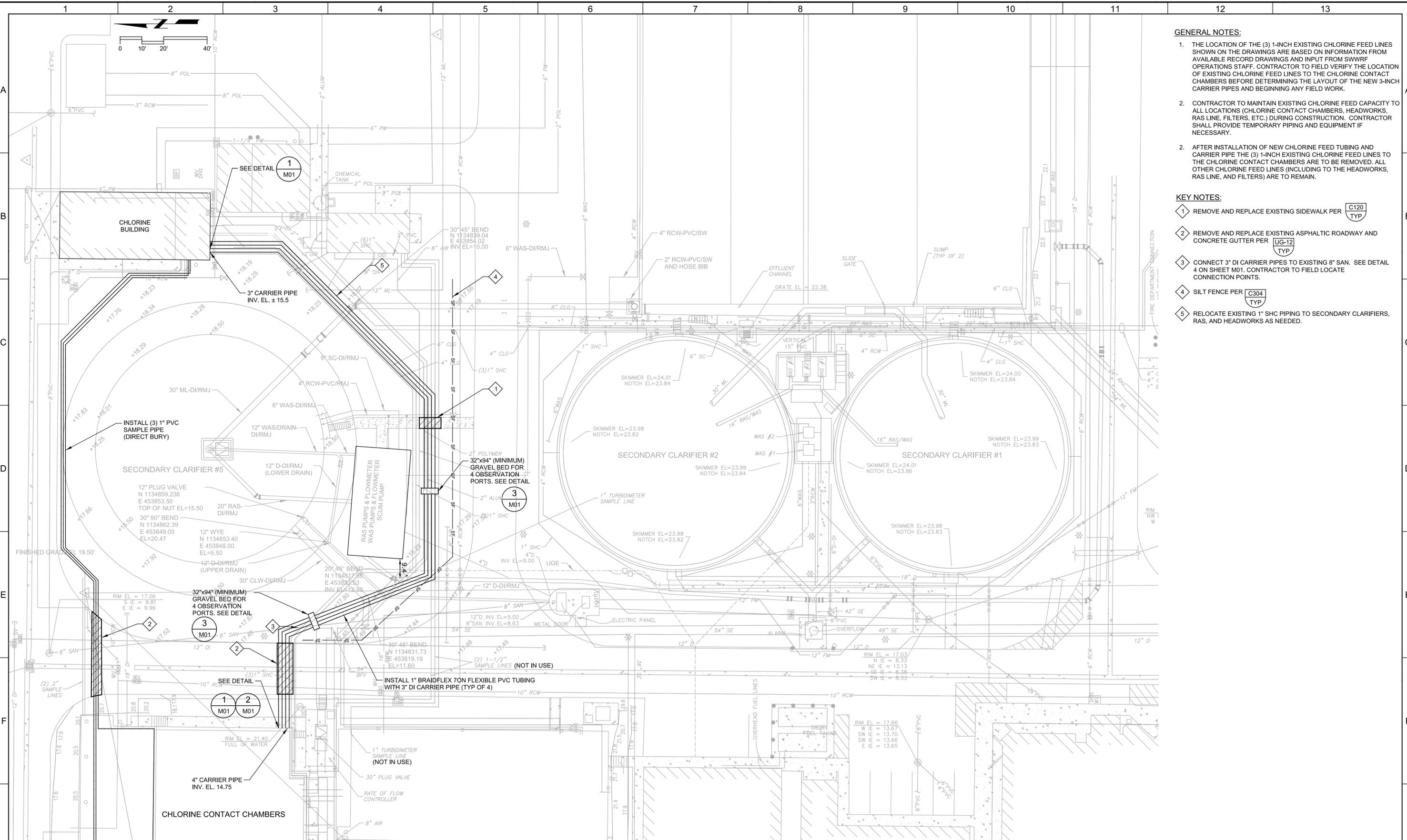
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- GENERAL NOTES:**
1. THE LOCATION OF THE (3) 1-INCH EXISTING CHLORINE FEED LINES SHOWN ON THE DRAWINGS ARE BASED ON INFORMATION FROM AVAILABLE RECORD DRAWINGS AND INPUT FROM SSWRF OPERATIONS STAFF. CONTRACTOR TO FIELD VERIFY THE LOCATION OF EXISTING CHLORINE FEED LINES TO THE CHLORINE CONTACT CHAMBERS BEFORE DETERMINING THE LAYOUT OF THE NEW 3-INCH CARRIER PIPES AND BEGINNING ANY FIELD WORK.
 2. CONTRACTOR TO MAINTAIN EXISTING CHLORINE FEED CAPACITY TO ALL LOCATIONS (CHLORINE CONTACT CHAMBERS, HEADWORKS, RAS LINE, FILTERS, ETC.) DURING CONSTRUCTION. CONTRACTOR SHALL PROVIDE TEMPORARY PIPING AND EQUIPMENT IF NECESSARY.
 2. AFTER INSTALLATION OF NEW CHLORINE FEED TUBING AND CARRIER PIPE THE (3) 1-INCH EXISTING CHLORINE FEED LINES TO THE CHLORINE CONTACT CHAMBERS ARE TO BE REMOVED. ALL OTHER CHLORINE FEED LINES (INCLUDING TO THE HEADWORKS, RAS LINE, AND FILTERS) ARE TO REMAIN.

- KEY NOTES:**
- 1 REMOVE AND REPLACE EXISTING SIDEWALK PER **C120 TYP**
 - 2 REMOVE AND REPLACE EXISTING ASPHALTIC ROADWAY AND CONCRETE GUTTER PER **UG-12 TYP**
 - 3 CONNECT 3\"/>

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DATE APRIL 2015	

carollo

401 NORTH CATTLEMEN RD, SUITE 306
SARASOTA, FL 34232
PHONE: (941) 371-9832 FAX: (941) 371-9873
CA 00008571

Manatee County
FLORIDA

MANATEE COUNTY
SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
CIVIL
YARD PIPING PLAN

VERIFY SCALES
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IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

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9520F.10
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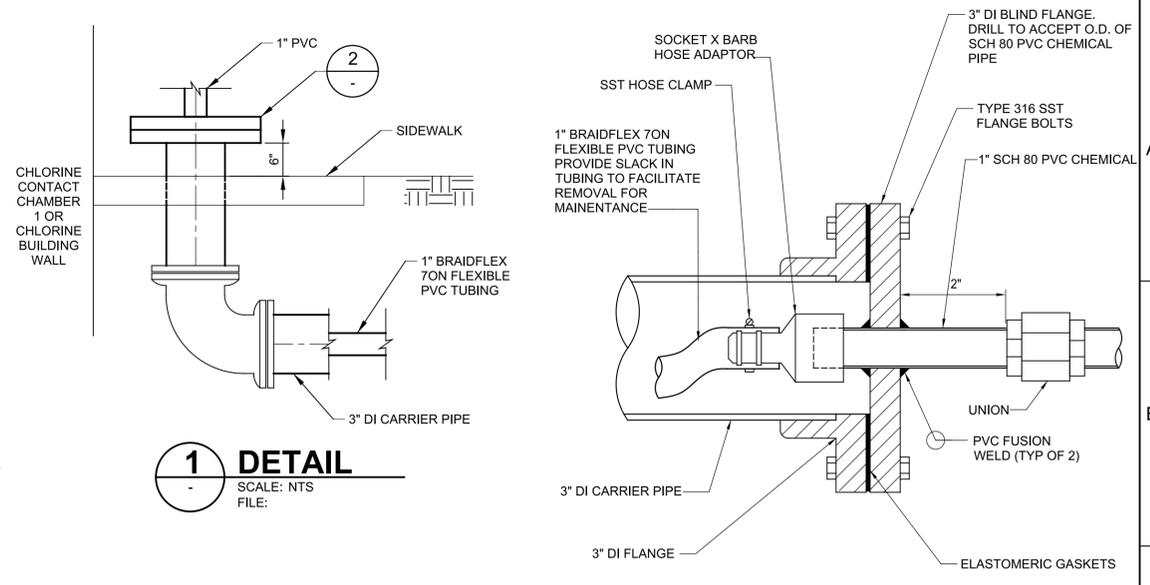
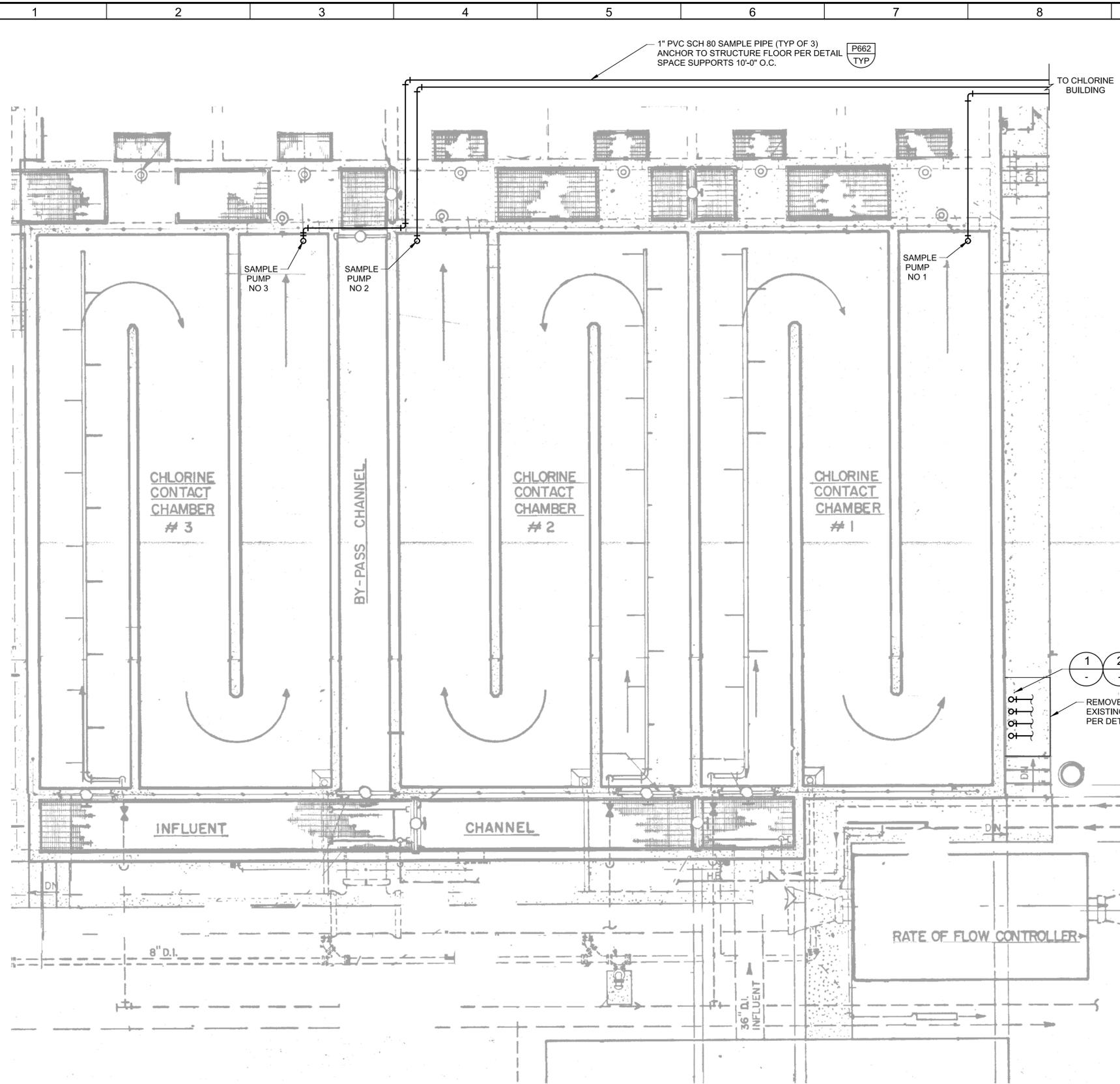
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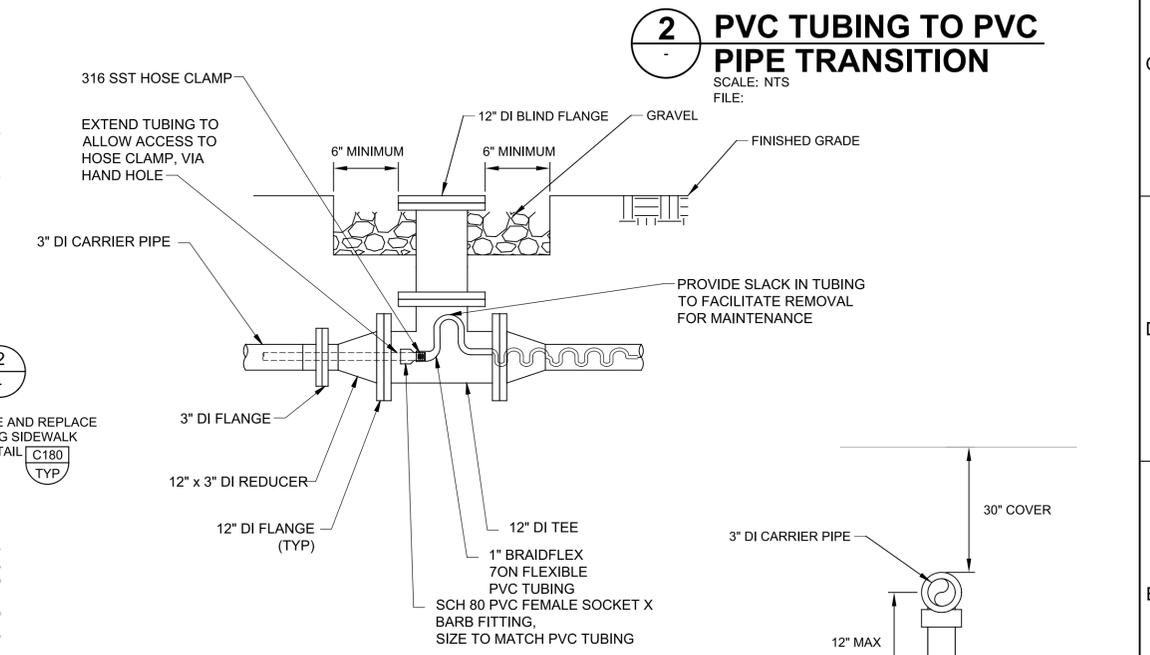
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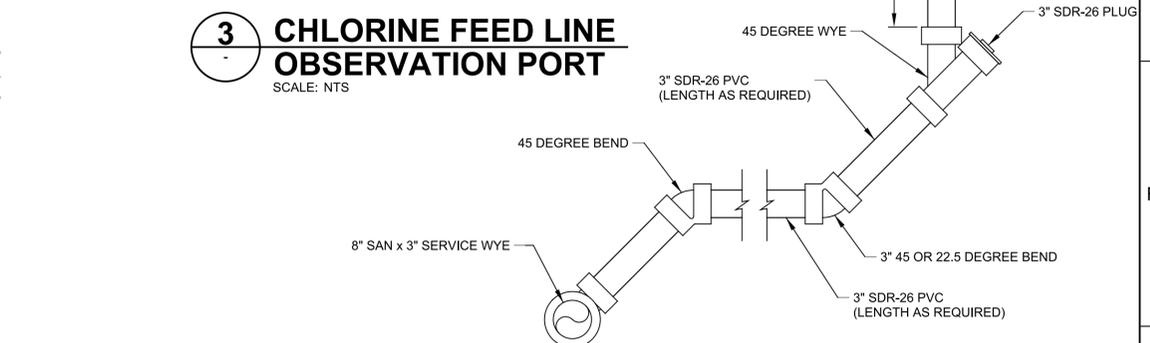
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1 DETAIL
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FILE:



2 PVC TUBING TO PVC PIPE TRANSITION
SCALE: NTS
FILE:



3 CHLORINE FEED LINE OBSERVATION PORT
SCALE: NTS
FILE:



4 DETAIL
SCALE: NTS
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A CHLORINE RESIDUAL ANALYZER LOCATION PLAN
SCALE: NTS
FILE: CCC PLAN VIEW.JPG

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DATE APRIL 2015	

PROJECT NO. 9520F.10
FILE NAME: 9520F10-M01.dgn

401 NORTH CATTLEMEN RD, SUITE 306
SARASOTA, FL 34232
PHONE: (941) 371-9832 FAX: (941) 371-9873
CA 00008571

MANATEE COUNTY
FLORIDA

MANATEE COUNTY
SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
MECHANICAL
DISINFECTION SAMPLING
LOCATION PLAN

VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	JOB NO. 9520F.10 DRAWING NO. M01
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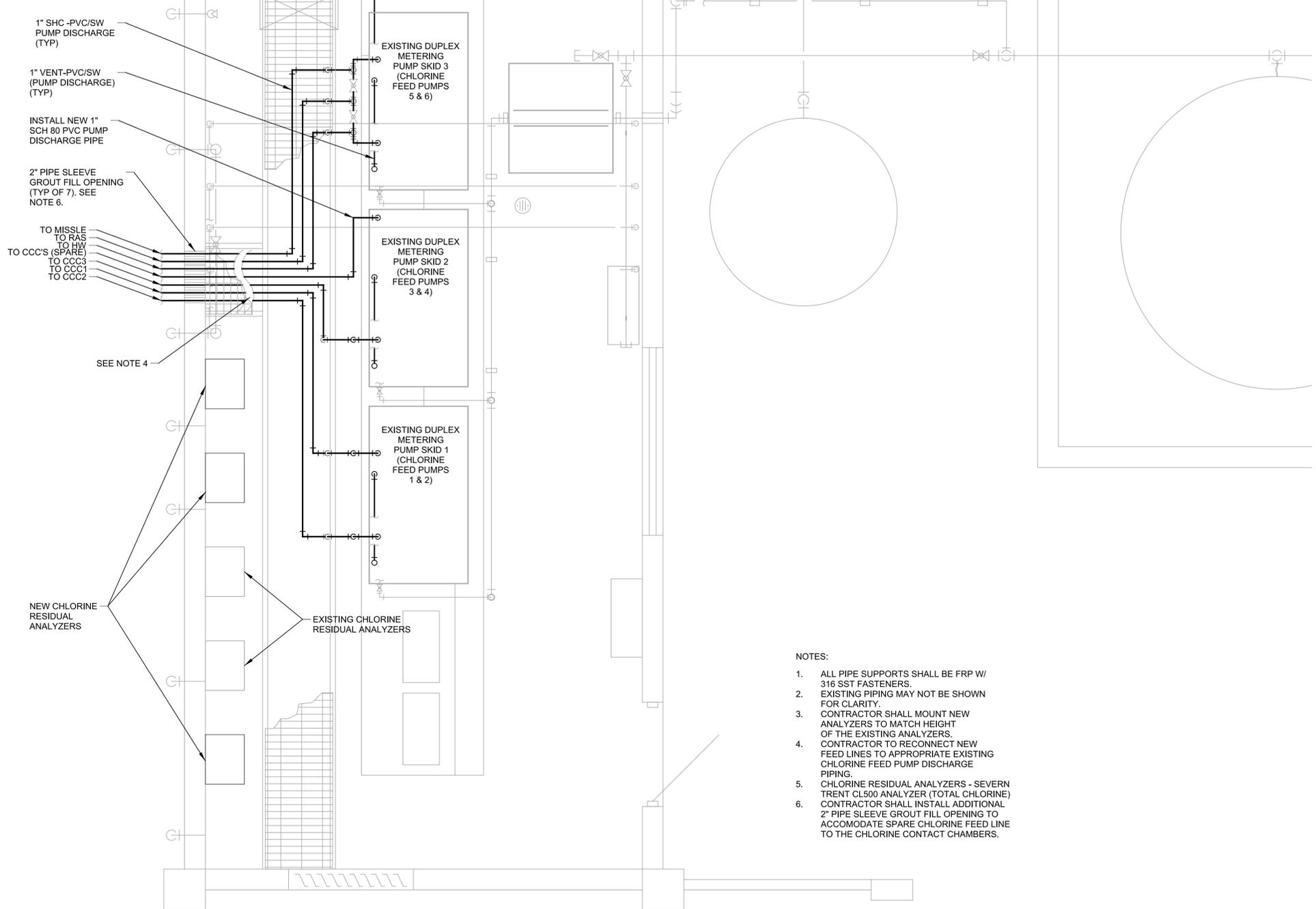
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- NOTES:
1. ALL PIPE SUPPORTS SHALL BE FRP W/ 316 SST FASTENERS.
 2. EXISTING PIPING MAY NOT BE SHOWN FOR CLARITY.
 3. CONTRACTOR SHALL MOUNT NEW ANALYZERS TO MATCH HEIGHT OF THE EXISTING ANALYZERS.
 4. CONTRACTOR TO RECONNECT NEW FEED LINES TO APPROPRIATE EXISTING CHLORINE FEED PUMP DISCHARGE PIPING.
 5. CHLORINE RESIDUAL ANALYZERS - SEVERN TRENT CL500 ANALYZER (TOTAL CHLORINE)
 6. CONTRACTOR SHALL INSTALL ADDITIONAL 2" PIPE SLEEVE GROUT FILL OPENING TO ACCOMMODATE SPARE CHLORINE FEED LINE TO THE CHLORINE CONTACT CHAMBERS.

A CHLORINE BUILDING PLAN
 SCALE: 3/8"=1'
 FILE: SW-METERING PUMPS.DWG

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DRAWN DLW	
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401 NORTH CATTLEMEN RD, SUITE 306
 SARASOTA, FL 34232
 PHONE: (941) 371-9832 FAX: (941) 371-9873
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MANATEE COUNTY
 SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
 MECHANICAL
 CHLORINE BUILDING

VERIFY SCALES
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 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

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M02

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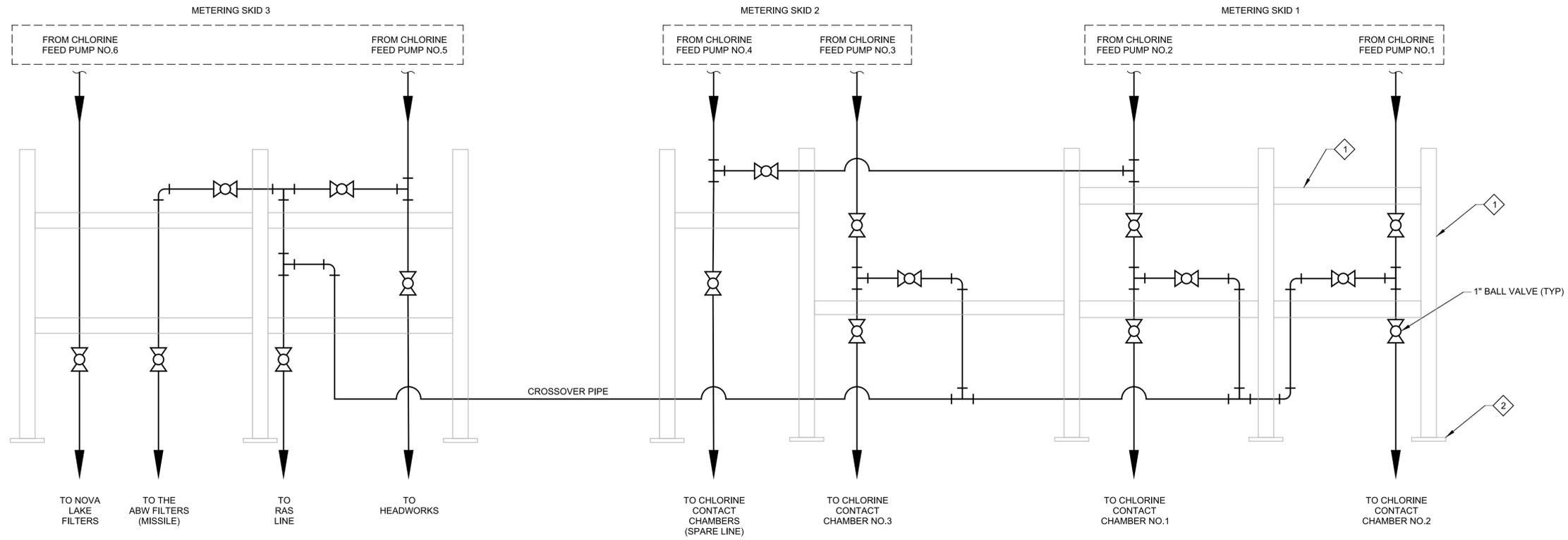
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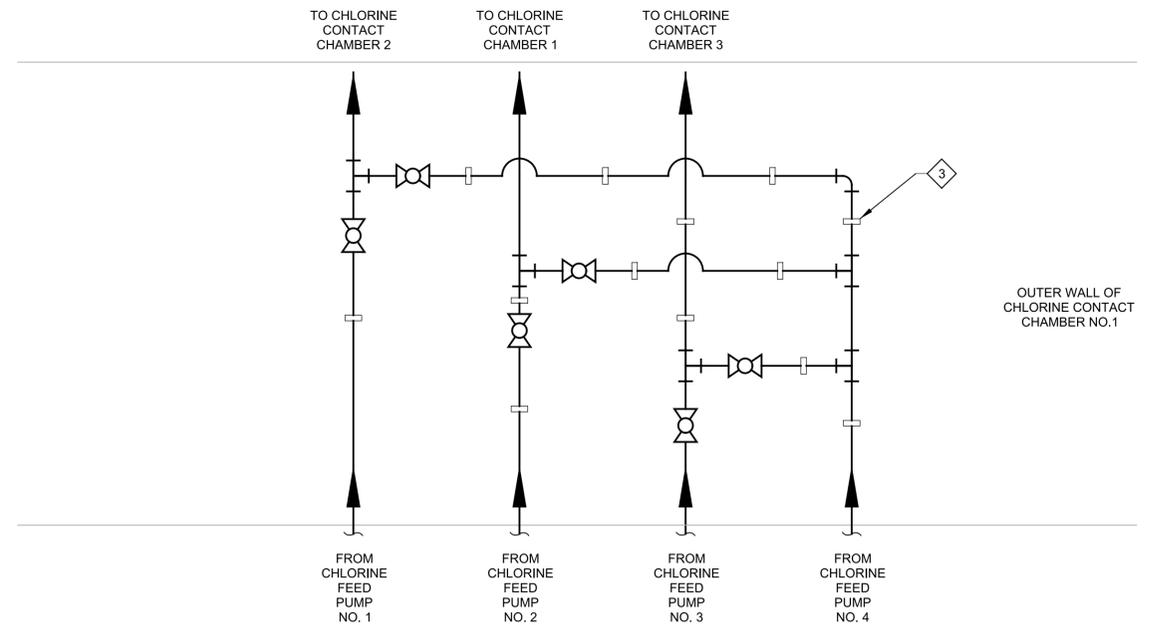
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- GENERAL NOTES:**
1. CONTRACTOR TO PROVIDE ALL NECESSARY FITTINGS AND VALVES.
 2. ALL BALL VALVES SHALL HAVE TRUE UNION ENDS.
 3. CONTRACTOR TO SUPPORT ALL CHLORINE FEED PIPING WITH NON-METALLIC PIPE SUPPORT SYSTEMS. DESIGN AND LAYOUT OF SYSTEM SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND MANUFACTURER.

- KEY NOTES:**
- 1 VERTICAL/HORIZONTAL FRAMING FOR NON-METALLIC PIPE SUPPORT SYSTEM.
 - 2 ANCHOR FRAMING TO EXISTING CONCRETE FLOOR WITH 316SS FASTENERS.
 - 3 NON-METALLIC PIPE SUPPORT AND STRAP (TYP)

1 CHLORINE FEED PUMP DISCHARGE PIPING
SCALE: NTS
FILE:



2 CHLORINE FEED PIPING (AT THE CONTACT CHAMBERS)
SCALE: NTS
FILE:

REV	DATE	BY	DESCRIPTION

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CHECKED EP	
DATE APRIL 2015	



MANATEE COUNTY
SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
MECHANICAL
CHLORINE FEED LINES - PIPING AND VALVES SCHEMATIC

VERIFY SCALES
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M03

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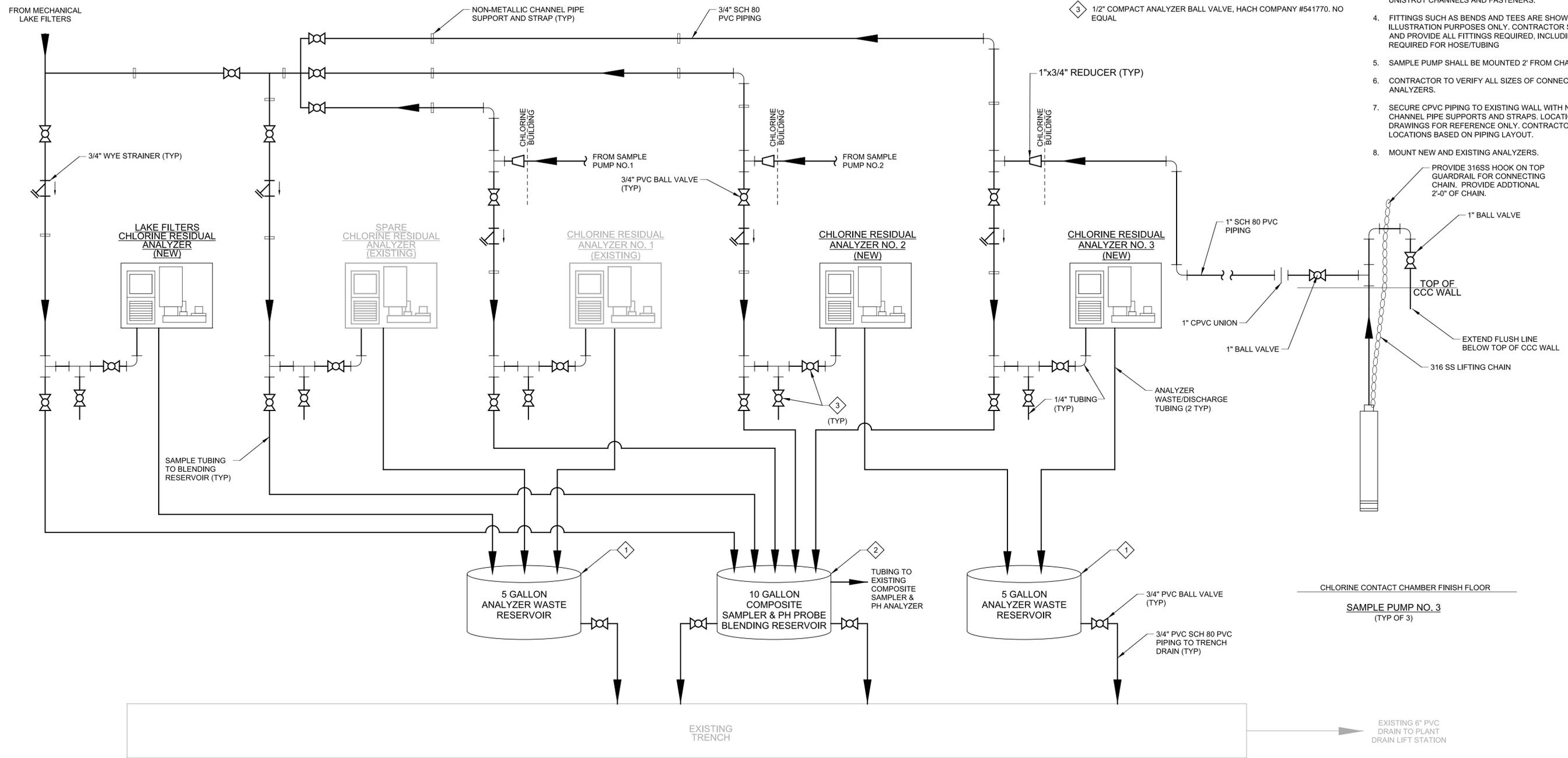
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KEY NOTES

- 1 5 GALLON POLYETHYLENE, SELF-SUPPORTING TANK W/ OPEN TOP OR REMOVABLE LID, MINIMUM 10" DIAMETER AND SUITABLE FOR HEAVY DUTY SERVICE. PROVIDE W/ A 3/4" THREADED OUTLET FOR DRAINAGE VALVE AND PIPING.
- 2 10 GALLON POLYETHYLENE SELF-SUPPORTING TANK W/ OPEN TOP OR REMOVABLE LID, MINIMUM 12" DIAMETER AND SUITABLE FOR HEAVY DUTY SERVICE. PROVIDE W/ TWO 3/4" THREADED OUTLETS FOR DRAINAGE VALVES AND PIPING.
- 3 1/2" COMPACT ANALYZER BALL VALVE, HACH COMPANY #541770. NO EQUAL

GENERAL NOTES:

- 1. SAMPLE PUMPS - HIGH HEAD FILTERED SUBMERSIBLE EFFLUENT PUMP. 1/2 HP, 11 AMP, DAYTON MODEL 4NY25, GPM., NO EQUAL
- 2. SAMPLE PIPE - 1" CPVC SCH. 80 PIPE (FROM SAMPLE PUMP TO CHLORINE BUILDING), 3/4" CPVC SCH 80 PIPE (IN CHLORINE BUILDING).
- 3. CONTRACTOR SHALL MOUNT NEW ANALYZERS TO MATCH THE HEIGHT OF THE EXISTING ANALYZERS. USE STAINLESS STEEL UNISTRUT CHANNELS AND FASTENERS.
- 4. FITTINGS SUCH AS BENDS AND TEES ARE SHOWN FOR ILLUSTRATION PURPOSES ONLY. CONTRACTOR SHOULD VERIFY AND PROVIDE ALL FITTINGS REQUIRED, INCLUDING ADAPTERS REQUIRED FOR HOSE/TUBING
- 5. SAMPLE PUMP SHALL BE MOUNTED 2' FROM CHAMBER FLOOR.
- 6. CONTRACTOR TO VERIFY ALL SIZES OF CONNECTIONS TO ANALYZERS.
- 7. SECURE CPVC PIPING TO EXISTING WALL WITH NON-METALLIC CHANNEL PIPE SUPPORTS AND STRAPS. LOCATIONS SHOWN ON DRAWINGS FOR REFERENCE ONLY. CONTRACTOR TO DETERMINE LOCATIONS BASED ON PIPING LAYOUT.
- 8. MOUNT NEW AND EXISTING ANALYZERS.



A CHLORINE RESIDUAL ANALYZER DIAGRAM
 SCALE: NTS
 FILE: 9520F10-050-601.DGN

REV	DATE	BY	DESCRIPTION
1			
2			
3			

DESIGNED GDM	** ORIGINAL SEALED BY DEAN MILTON P.E. APRIL 2015 FL 52719 **
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MANATEE COUNTY
 SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
 MECHANICAL
 DISINFECTION
 SAMPLING / MONITORING SYSTEM

VERIFY SCALES
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 0 1"
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JOB NO.
9520F.10
DRAWING NO.
M04

Plot Date: 29-APR-2015 9:39:43 AM

User: svcPW

PlotScale: 1:1

Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo.plt PenTable: pen

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IDENTIFICATION SYMBOLS

- EQUIPMENT IDENTIFICATION
- CONDUIT IDENTIFICATION
- EQUIPMENT/INSTRUMENT LOCATOR
- LUMINAIRE IDENTIFICATION
a = DEVICE SWITCHED FROM
b = CIRCUIT DESIGNATION
c = MOUNTING HEIGHT IN FEET TO BOTTOM OF FIXTURE

INDICATES KEYNOTE 1 (PERTAINS ONLY TO SHEET WHERE NOTE IS FOUND)

EQUIPMENT ENCLOSURE

GROUNDING

- LIGHTNING PROTECTION AIR TERMINAL; STREAMER RETARDING TYPE.
- GROUND CONDUCTOR
- UNDERGROUND GROUND GRID UNLESS OTHERWISE NOTED #4/0 SDBC
- GROUND ROD
- GROUND ROD AND GROUND WELL
- COMPRESSION OR EXOTHERMIC GROUNDING CONNECTION

LUMINAIRES

- FLUORESCENT FIXTURE
- HID FIXTURE POLE MOUNTED

CONTROL - ELEMENTARY SYMBOLS

- FUSE
- CONTROL POWER TRANSFORMER
- REMOTE TERMINAL BLOCK POINT
- COPPERWELD GRD. ROD
- HAND OFF REMOTE CONTROL STATION
- HAND OFF AUTO CONTROL STATION
- TWISTED SHIELDED PAIRS
- OFF REMOTE SWITCH

CONTROL - ELEMENTARY SYMBOLS

- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- LIMIT SWITCH, NORMALLY OPEN
- LIMIT SWITCH, NORMALLY CLOSED
- PRESSURE SWITCH, NORMALLY OPEN
- PRESSURE SWITCH, NORMALLY CLOSED
- FLOAT SWITCH, NORMALLY OPEN
- FLOAT SWITCH, NORMALLY CLOSED
- FLOW SWITCH, NORMALLY OPEN
- FLOW SWITCH, NORMALLY CLOSED
- TEMPERATURE SWITCH, NORMALLY OPEN
- TEMPERATURE SWITCH, NORMALLY CLOSED
- NORMALLY OPEN, TIMED TO CLOSE CONTACT
- NORMALLY CLOSED, TIMED TO CLOSE CONTACT
- NORMALLY CLOSED, TIMED TO OPEN CONTACT
- NORMALLY OPEN, TIMED TO OPEN CONTACT
- ANALYZER INDICATOR TRANSMITTER
- ALARM RELAY
- CONTROL RELAY
- FLOW INDICATOR TRANSMITTER (TOTALIZER)
- FLOW SWITCH HIGH/LOW
- LIQUID LEVEL SWITCH
- LEVEL INDICATOR TRANSMITTER
- LIMIT SWITCH OR LEVEL SWITCH
- MOTOR STARTER
- MOTOR SWITCH MANUAL
- PRESSURE GAUGE
- PRESSURE SWITCH
- TIMING RELAY
- SURGE SUPPRESSION DEVICE
- SOLENOID VALVE
- VIBRATION SWITCH
- TORQUE SWITCH
- DIFFERENTIAL PRESSURE SWITCH HIGH
- ALARM INDICATING LIGHT
- RUN INDICATING LIGHT
- MOMENTARY CONTACT PUSHBUTTON
- MOMENTARY BREAK PUSHBUTTON OR RESET
- KEYED SWITCH
- MAINTAINED CONTACT ON-OFF SWITCH
- START/STOP (S/S) CONTROL SWITCH
- MAINTAINED CONTACT

ELECTRICAL PLAN SYMBOLS

- WALL OUTLET BOX AND 20 AMP SINGLE POLE SWITCH ('a' INDICATES SWITCHES) 48" TO CENTERLINE.
- WALL OUTLET BOX AND 20 AMP 3-WAY SWITCH ('a' INDICATES SWITCHES) 48" TO CTR LINE.
- WALL OUTLET BOX AND EXHAUST FAN SPEED CONTROLLER/SWITCH CONNECTIONS.
- MANUAL MOTOR STARTING SWITCH WITH OVERLOADS AND PILOT LIGHT. NEMA 4X TYPICAL
- WALL OUTLET BOX AND 20 AMP SWITCH WITH PILOT LIGHT.
- WALL OUTLET BOX AND 20 AMP SWITCH WITH WEATHERPROOF COVER OR ENCLOSURE.
- WALL OUTLET BOX AND 20 AMP DUPLEX RECEPTACLE 18" TO CENTERLINE
- WALL OUTLET BOX AND 20 AMP DUPLEX RECEPT MOUNTED 48" AFF OR ABOVE COUNTER OR AS NOTED.
- WALL OUTLET BOX AND 20 AMP GFCI DUPLEX RECEPTACLE AT 18" TO CENTERLINE. WP INDICATES WEATHERPROOF COVER PLATE.
- WALL OUTLET BOX AND 20 AMP GFCI RECEPTACLE MOUNTED 48" AFF OR ABOVE COUNTER, OR AS NOTED.
- WALL OUTLET BOX AND SPECIAL PURPOSE RECEPTACLE AS NOTED OR COORDINATE.
- FLUSH MOUNTED JUNCTION BOX (SURFACE IN MECH/ELEC SPACES OR ABOVE CEILINGS).
- BRANCH CIRCUIT PANELBOARD AS NOTED; SEE PANEL SCHEDULES
- TRANSFORMER (# = KVA RATING)
- DISCONNECT SWITCH SIZE PER EQUIPMENT NAME PLATE OR AS NOTED; FOR DISCONNECTS SERVING MOTOR LOADS OF 10HP OR GREATER AND FOR ALL MOTOR LOADS SERVED THROUGH VARIABLE FREQUENCY DRIVES; PROVIDE SURGE SUPPRESSION DEVICE EQUAL TO SQ.-D. SP3650 OR EQUAL AT DISCONNECT.
- COMBINATION MAGNETIC MOTOR STARTER AND SWITCH
- MOTOR CONNECTION (HP OR # = HORSE POWER)
- MOTOR OPERATED VALVE CONNECTION
- EXPOSED CONDUIT
- UNDERGROUND/EMBEDDED CONDUIT
- EXISTING CONDUIT OR ITEM (SCREENED LINE TYPE)

SYSTEM SYMBOL LEGEND

- SYSTEMS BACKBOARD AS NOTED
- SYSTEMS CABINET AS NOTED OR MARKED.

ELECTRICAL ONE LINE SYMBOLS

- VOLTMETER
- POWER FACTOR METER
- KILOWATT METER
- AMMETER
- THREE PHASE VOLT SWITCH
- THREE PHASE AMP SWITCH
- CURRENT TRANSMITTER
- KILOWATT TRANSMITTER
- POWER FACTOR TRANSMITTER
- LOCAL CONTROL PANEL
- GROUND FAULT INTERRUPTER
- WATT HOUR METER
- CAPACITOR
- DRAW-OUT CIRCUIT BREAKER
- MOLDED CASE CIRCUIT BREAKER
- TYPICAL STARTER CONTROL. SEE SWITCHGEAR CONTROL DIAGRAMS FOR EXACT TYPE.
- SERVICE OR EQUIPMENT GROUND.
- NON-FUSIBLE DISCONNECT SWITCH, 30A,3P UNLESS OTHERWISE INDICATED.
- NON-FUSIBLE DISCONNECT SWITCH, 30A,3P UNLESS OTHERWISE INDICATED, WITH REMOTE CONTROL STATION AS REQUIRED BY ELEMENTARY DIAGRAMS OR SPECS.
- LIGHTING PANELBOARD
- POWER PANELBOARD
- KIRK KEY INTERLOCK
- CURRENT TRANSFORMERS
- POTENTIAL TRANSFORMERS

REV	DATE	BY	DESCRIPTION

DESIGNED MAG
DRAWN JB
CHECKED MAG
DATE APRIL 2015

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401 NORTH CATTLEMEN RD, SUITE 306
SARASOTA, FL 34232
PHONE: (941) 371-9832 FAX: (941) 371-9873
CA 00008571

MANATEE COUNTY
SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
ELECTRICAL
LEGEND AND GENERAL NOTES

VERIFY SCALES
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0 1"
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JOB NO. 9520F.10
DRAWING NO. E01

Plot Date: 29-APR-2015 9:39:43 AM
 User: svcPW
 PlotScale: 1:1
 Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo.plt PenTable.pen FileScale: 1:1
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ABBREVIATIONS

A	AMP	P	POLE
AC	ALTERNATING CURRENT	PE	PHOTOCELL
AF	AMP FRAME	PS	PRESSURE SWITCH
AIC	AMP INTERRUPTING CAPACITY	PVC	POLYVINYL CHLORIDE RIGID PLASTIC
AT	AMP TRIP	CONDUIT	CONDUIT
AWG	AMERICAN WIRE GAGE	PWR	POWER
BKR	BREAKER	RAC	RIGID ALUMINUM CONDUIT
C	CONDUIT / CONTINUOUS LOAD	RECPT	RECEPTACLE
CB	CIRCUIT BREAKER	S	SHIELD / SHORT-TIME
CKT	CIRCUIT	SIG	SIGNAL
CT	CURRENT TRANSFORMER	SLT	SEALTIGHT LIQUIDTIGHT FLEXIBLE CONDUIT
CTRL	CONTROL	SP	SINGLE POLE
DISC	DISCONNECT SWITCH	SPD	SURGE PROTECTIVE DEVICE
DPDT	DOUBLE POLE DOUBLE THROW	SPDT	SINGLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW	SPST	SINGLE POLE SINGLE THROW
EM	EMERGENCY	S-S	START-STOP
ETM	ELAPSED TIME METER	SV	SOLENOID VALVE
FDR	FEEDER	SW	SWITCH
FLA	FULL LOAD AMPS	SYS	SYSTEM
FLUOR	FLUORESCENT	UNG	UNGROUND
FLX	FLEXIBLE CONDUIT	V	VOLT
FUT	FUTURE	VA	VOLT AMPERE
FVNR	FULL VOLTAGE NON-REVERSING	VCP	VENDOR CONTROL PANEL
FVR	FULL VOLTAGE REVERSING	VFD	VARIABLE FREQUENCY DRIVE
G	GROUND / EQUIPMENT GROUND / GROUND	W	WATT / WEST
FAULT	FAULT	WP	WEATHER PROOF
GFCI	GROUND FAULT CIRCUIT INTERRUPTER (RECEPTACLE)	XFMR	TRANSFORMER
H-O-A	HAND-OFF-AUTO	ZS	POSITION SWITCH
H-O-R	HAND-OFF-REMOTE		
HZ	HERTZ		
IC	INTERRUPTING CAPACITY		
J	JUNCTION BOX		
KV	KILOVOLT		
KVA	KILOVOLT AMPERE		
KW	KILOWATT		
L1, L2, L3	LIGHTING PANEL BRANCH CIRCUIT		
LP - X	LIGHTING PANEL NO. X		
LTG	LIGHTING		
LV	LOW VOLTAGE		
LVL	LEVEL		
MAN	MANUAL		
MCB	MAIN CIRCUIT BREAKER		
MCC - X	MOTOR CONTROL CENTER NO. X		
MCP	MOTOR CIRCUIT PROTECTOR		
MH	MANHOLE / MOUNTING HEIGHT		
MOT	MOTOR		
NC	NORMALLY CLOSED		
NCTO	NORMALLY CLOSED TIMED OPEN		
NEC	NATIONAL ELECTRICAL CODE		
NP	NAMEPLATE		
O	OPEN OR OPENED		
O-C	OPEN-CLOSE		

ANSI STANDARD POWER DEVICE FUNCTION NUMBERS

15	SPEED OR FREQUENCY MATCHING DEVICE
25	SYNCHRONIZING OR SYNCHRONISM-CHECK DEVICE
27	UNDERVOLTAGE RELAY
32	DIRECTIONAL POWER RELAY
47N	NEGATIVE SEQUENCE VOLTAGE RELAY
50	INSTANTANEOUS OVERCURRENT OR RATE-OF-RISE RELAY
51	AC TIME OVERCURRENT RELAY
51G	GROUND TIME OVERCURRENT RELAY
59	OVERVOLTAGE RELAY
65	GOVERNOR
81	FREQUENCY RELAY
86	LOCKOUT RELAY

NOTES: 1. REFER TO OTHER DRAWINGS FOR ADDITIONAL ABBREVIATIONS.

REV	DATE	BY	DESCRIPTION

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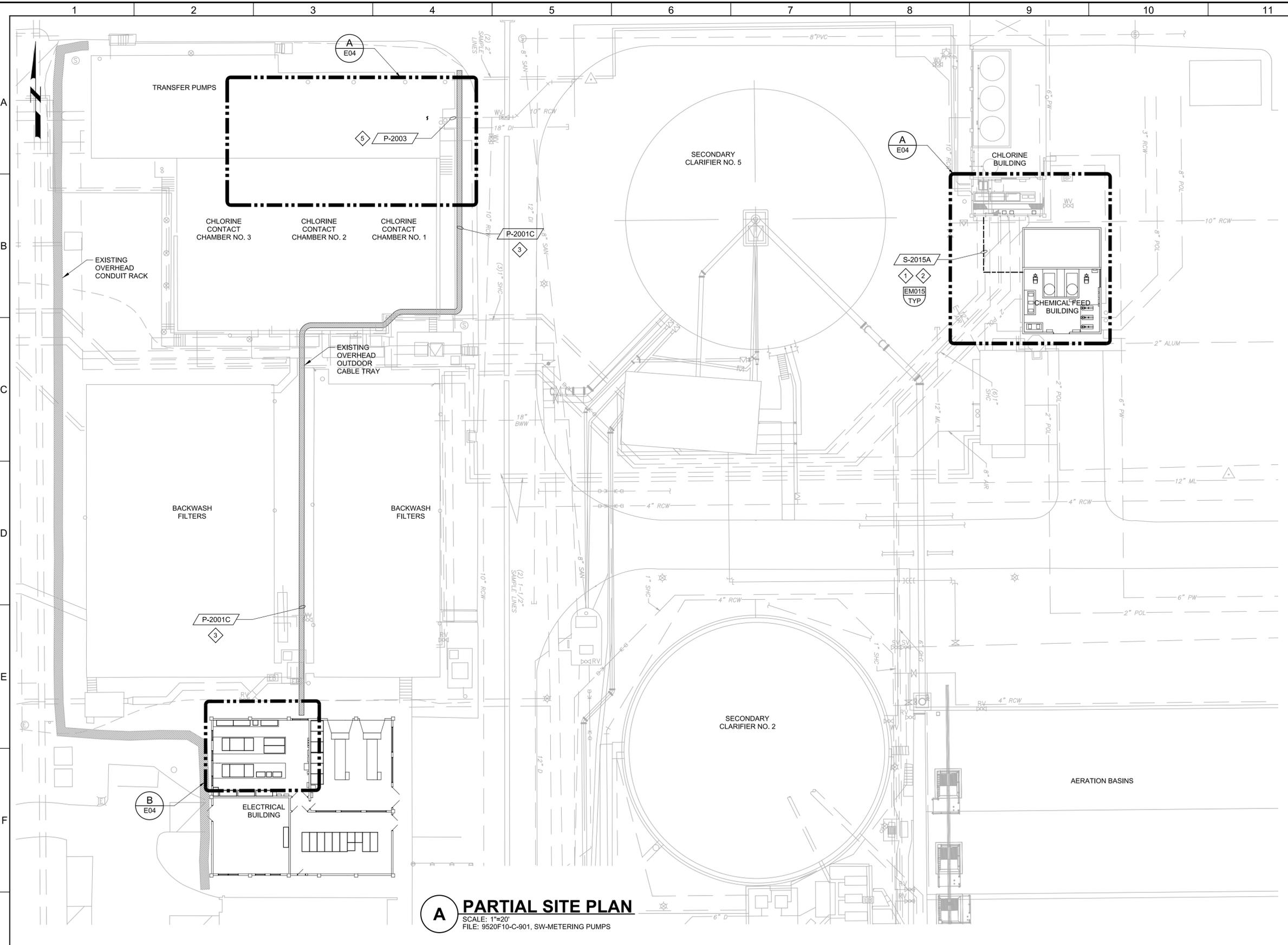


MANATEE COUNTY
 SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
 ELECTRICAL
 ABBREVIATIONS

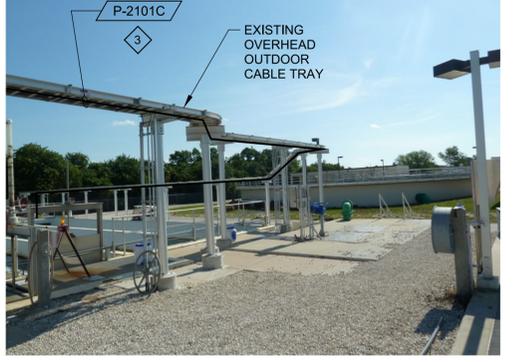
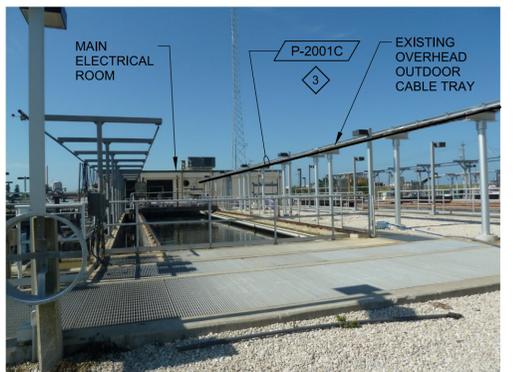
VERIFY SCALES
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JOB NO.
9520F.10
 DRAWING NO.
E02

Plot Date: 29-APR-2015 9:40:01 AM
 User: svcPW
 Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo.plt PenTable.pen PlotScale: 1:1
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- GENERAL NOTES:**
- XXXXXX
- KEY NOTES:**
- PUT HOLE AND VERIFY ALL EXISTING UNDERGROUND UTILITIES PRIOR TO EXCAVATING NEW TRENCH.
 - UPON COMPLETION OF TRENCHING PATCH GRASSED AREA TO MATCH EXISTING CONDITIONS.
 - ROUTE NEW CABLE ON EXISTING OVERHEAD CABLE TRAY. SEE DETAIL B.
 - ROUTE CONDUIT ON CONCRETE DECK ALONG SIDE OF EXISTING PIPE.
 - SEE DWG E-04.



A PARTIAL SITE PLAN
 SCALE: 1"=20'
 FILE: 9520F10-C-901, SW-METERING PUMPS

B DETAIL
 SCALE:
 FILE:

REV	DATE	BY	DESCRIPTION
1			
2			
3			

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PROJECT NO. 9520F.10
 FILE NAME: 9520F10-E03.dgn

carollo

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 PHONE: (941) 371-9832 FAX: (941) 371-9873
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Manatee County
 FLORIDA

MANATEE COUNTY
 SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
 ELECTRICAL
 PARTIAL SITE PLAN

VERIFY SCALES
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 0 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO.
9520F.10
 DRAWING NO.
E03

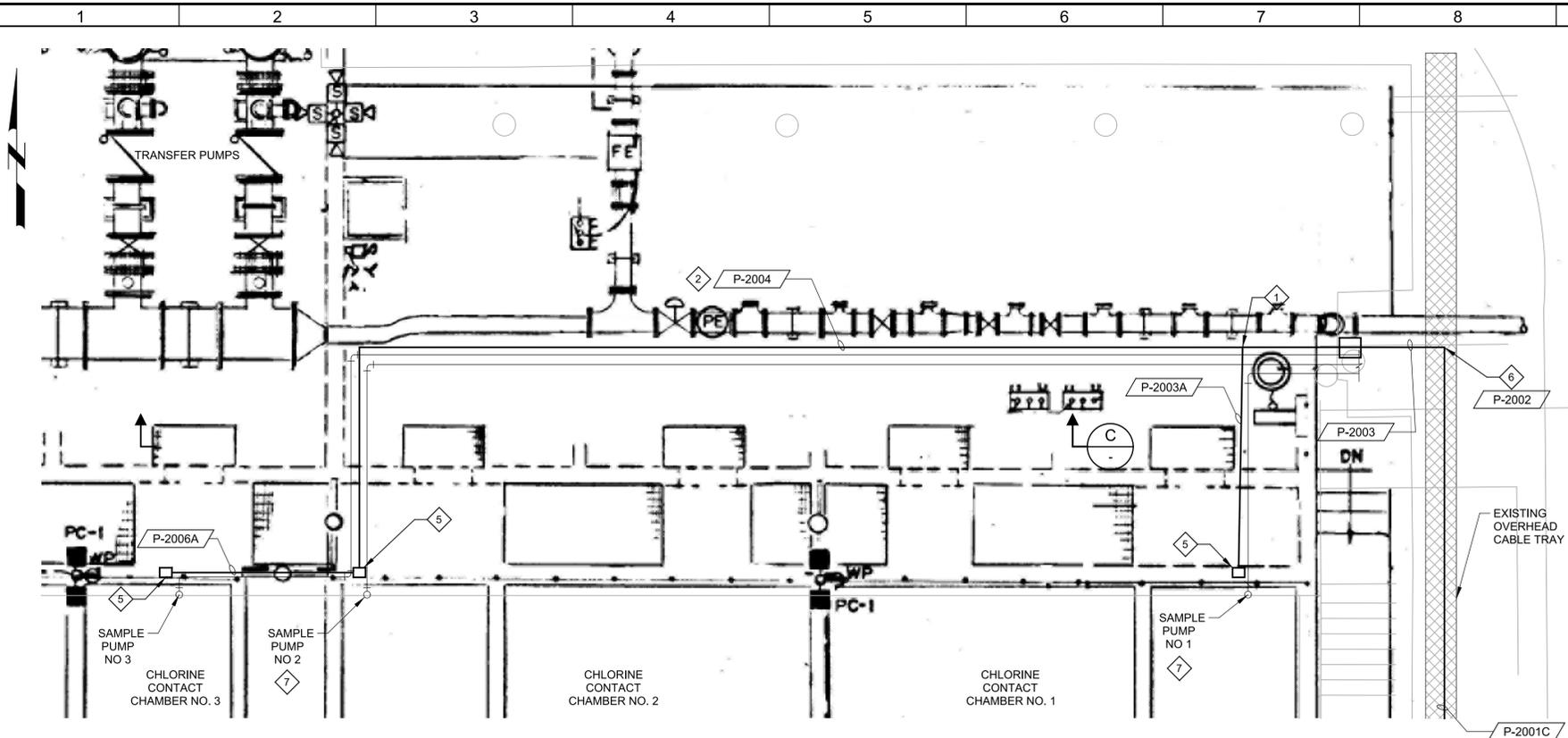
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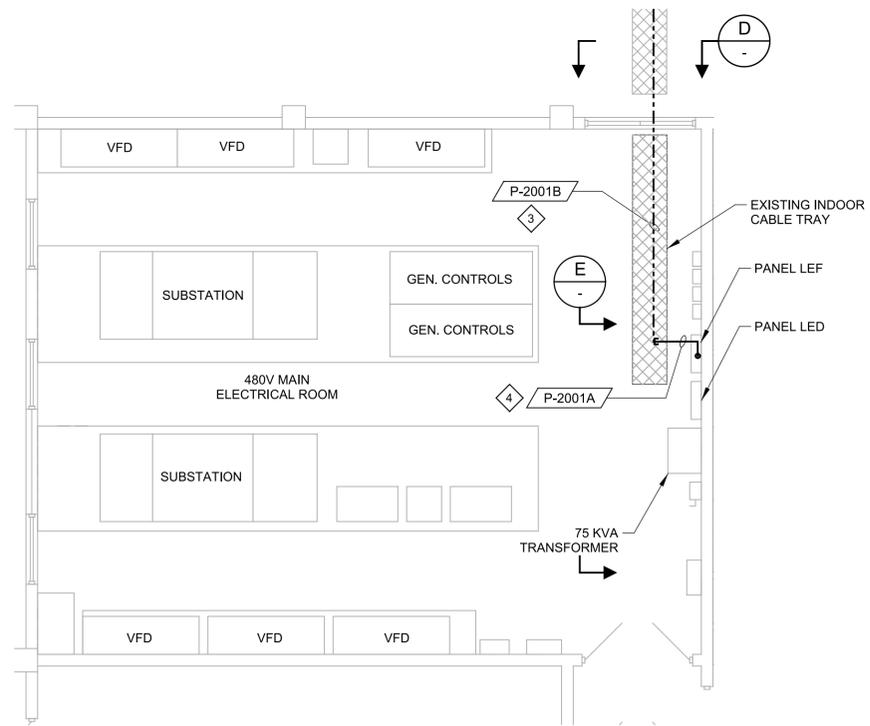
A PARTIAL SITE PLAN - CHLORINE CONTACT CHAMBERS
 E-03 SCALE: 3/16"=1'0"
 FILE: 9520F10-C-901, SW-METERING PUMPS



C DETAIL
 SCALE:
 FILE:



D DETAIL
 SCALE:
 FILE:



B PARTIAL SITE PLAN - MAIN ELECTRICAL BUILDING
 E-03 SCALE: 3/16"=1'0"
 FILE: 9520F10-C-901, SW-METERING PUMPS

GENERAL NOTES:
 1. THE CHLORINE CONTACT CHAMBERS OUTDOOR AREA IS A CORROSIVE LOCATION AND ALL MATERIALS AND PRODUCTS SHALL BE CORROSION RESISTANCE, NEMA 4X.

- KEY NOTES:**
- 1 NEW "T" CONDULET.
 - 2 ROUTE CONDUIT ON CONCRETE DECK ALONG SIDE OF EXISTING PIPE. SEE DETAIL C.
 - 3 ROUTE NEW CABLE ON EXISTING OVERHEAD CABLE TRAY. SEE DETAILS D & E.
 - 4 NEW CONDUIT STUB-UP FROM PANEL LEF TO EXISTING OVERHEAD CABLE TRAY.
 - 5 NEW GFI & WP RECEPTACLE. EM202 TYP EM315 TYP
 - 6 PROVIDE PULL BOX AT OVERHEAD CABLE TRAY SUPPORT COLUMN TO TRANSITION FROM OVERHEAD CABLE TRAY CABLE TO CONDUIT ENCLOSED WIRING.
 - 7 DISCONNECT AND REMOVE ALL EXISTING CONDUITS, ENCLOSURES AND WIRING ASSOCIATED WITH EXISTING SAMPLE PUMPS FROM THE PUMP(S) LOCATION TO THE ORIGIN OF POWER SOURCE.



E DETAIL
 SCALE:
 FILE:

REV	DATE	BY	DESCRIPTION

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MANATEE COUNTY
 SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
 ELECTRICAL
 PARTIAL SITE PLAN
 CHLORINE CONTACT BASINS

VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1"	JOB NO. 9520F.10 DRAWING NO. E04
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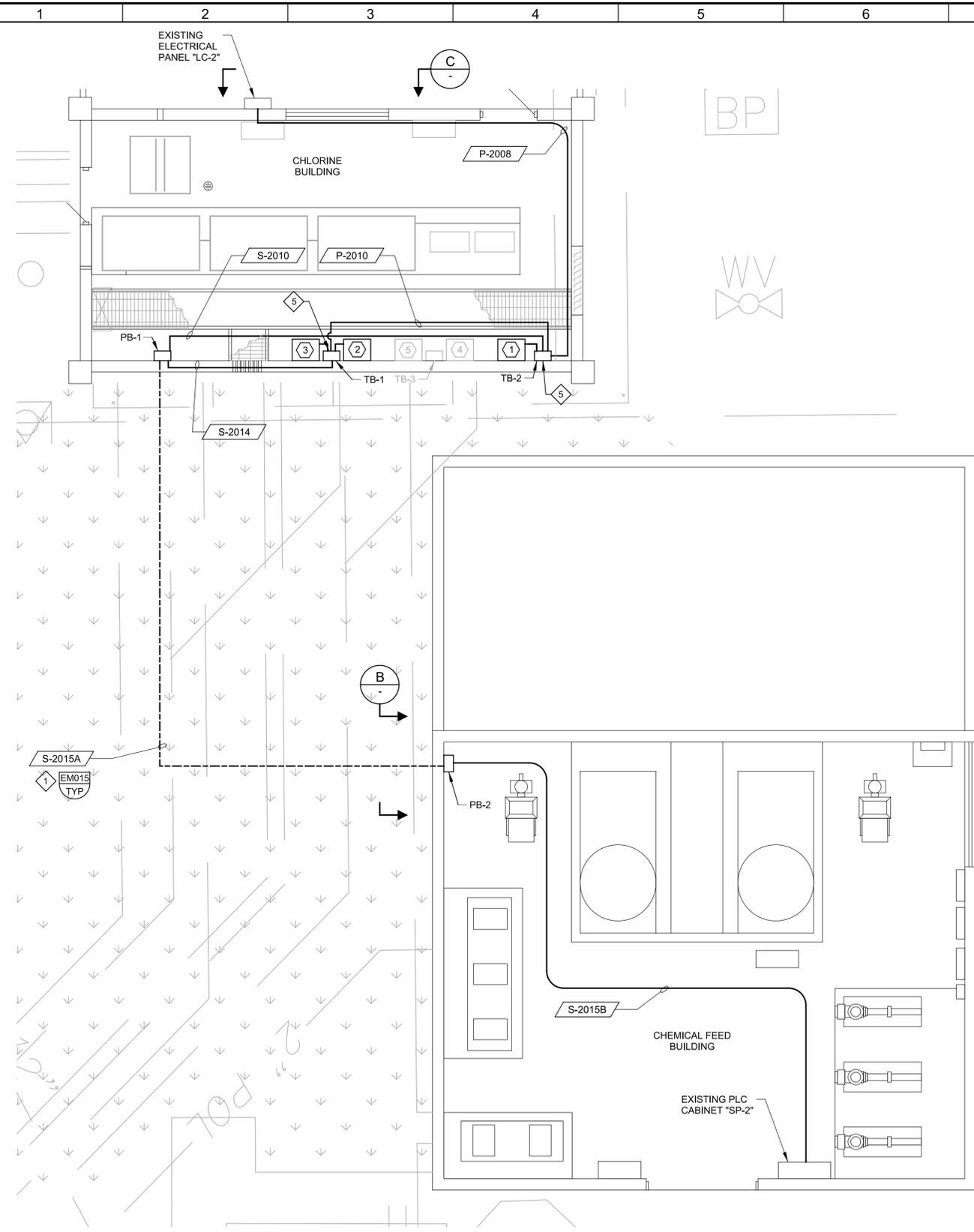
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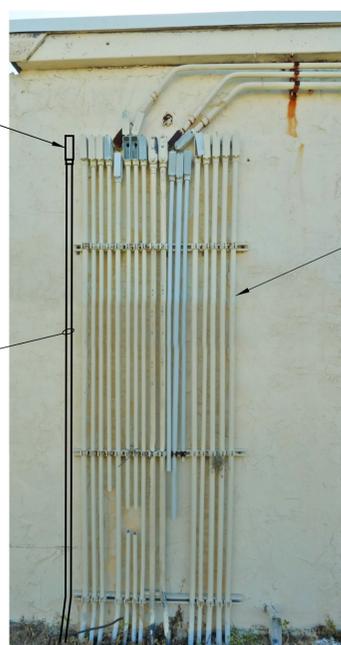
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A PARTIAL SITE PLAN
 E-03 SCALE: 1/4"=10"
 FILE: 9520F10-C-901, SW-METERING PUMPS



B DETAIL



C DETAIL

- GENERAL NOTES:**
- SEE MECHANICAL DRAWING M-04 FOR PIPING DIAGRAM OF CHLORINE RESIDUAL ANALYZERS.
 - PROVIDE EQUIPMENT LABELS ACCORDING TO LAYOUT OF MECHANICAL EQUIPEMNT.

- KEY NOTES:**
- PUT HOLE AND VERIFY ALL EXISTING UNDERGROUND UTILITIES PRIOR TO EXCAVATING NEW TRENCH.
 - UPON COMPLETION OF TRENCHING PATCH GRASSED AREA TO MATCH EXISTING CONDITIONS.
 - REMOVE AND REPLACE PANEL COVER WITH NEW.
 - LB CONDULET AND WALL PENETRATION.
 - PROVIDE POWER AND SIGNAL WIRING BETWEEN ANALYZER AND TERMINAL BOX. (NOT SHOWN FOR DWG CLARITY)

- EQUIPMENT TAGS:**
- NEW CL2 R-ANALYZER - LAKE FILTERS
 - NEW CL2 R-ANALYZER NO. 2
 - NEW CL2 R-ANALYZER NO. 3
 - EXISTING CL2 R-ANALYZER NO. 1
 - EXISTING CL2 ANALYZER (SPARE)

PULL BOX SCHEDULE	
PB-1	12" x 12" x 10"
PB-2	12" x 12" x 10"
TB-1	18" x 18" x 8"
TB-2	18" x 18" x 8"

REV	DATE	BY	DESCRIPTION

DESIGNED MAG
DRAWN JB
CHECKED MAG
DATE APRIL 2015

.. ORIGINAL SEALED BY MARIO A. GAMBOA P.E. APRIL 2015 FL 44675 ..



MANATEE COUNTY
 SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
 ELECTRICAL
PARTIAL PLANS
 CHLORINE AND CHEMICAL BUILDINGS

VERIFY SCALES
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 0 1"
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JOB NO. 9520F.10
 DRAWING NO. E05

Plot Date: 29-APR-2015 9:40:23 AM

User: svcPW

FileScale: 1:1

DesignScript: Carollo.iplot_PenTable.pen

ColorTable: gshade.ctb

Model: Layout1



A PANEL "LC-2" (CHEMICAL BUILDING) ◆

B PANEL "LC-2" BREAKERS ◆

C PANEL "LEF" BREAKERS (AT MAIN ELECTRICAL BUILDING) ◆

D PANEL "LEF" INDEX ◆

KEY NOTES:

- ◆ REPLACE ENTIRE COVER OF EXISTING PANEL WITH NEW. COVER FINISH SHALL BE POWDER COATED WITH ANSI GRAY COLOR TO MATCH EXISTING.
- ◆ ASSIGN THREE (3) EXISTING 120 VOLT - 20 AMP SPARE BREAKER(S) FOR POWER SUPPLY OF NEW CHLORINE ANALYZERS. REVISE CIRCUIT DIRECTORY WITH IDENTIFICATION OF NEW CIRCUITS SEE DWG E-05.
- ◆ ASSIGN THREE (3) EXISTING 120 VOLT - 20 AMP SPARE BREAKER(S) FOR POWER SUPPLY OF NEW SUBMERSIBLE SAMPLE PUMPS AT CHLORINE CONTACT CHAMBERS.
- ◆ REVISE CIRCUIT DIRECTORY WITH IDENTIFICATION OF NEW CIRCUITS.

REV	DATE	BY	DESCRIPTION
1			
2			
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DESIGNED MAG
DRAWN JB
CHECKED MAG
DATE APRIL 2015

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ORIGINAL
SEALED BY
MARIO A. GAMBOA P.E.
APRIL 2015
FL 44675
..

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401 NORTH CATTLEMEN RD, SUITE 306
SARASOTA, FL 34232
PHONE: (941) 371-9832 FAX: (941) 371-9873
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Manatee County
FLORIDA

MANATEE COUNTY
SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
ELECTRICAL
E06

VERIFY SCALES
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0 1"
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JOB NO. 9520F.10
DRAWING NO. E06

Plot Date: 29-APR-2015 9:41:53 AM

User: svcPW

PlotScale: 1:1

ColorTable: gshade.ctb

DesignScript: Carollo.plt

ColorTable: gshade.ctb

Model: Layout1

GENERAL ELECTRICAL AND CONTROLS REQUIREMENTS

1. PROVIDE ALL NECESSARY MATERIAL AND LABOR FOR THE COMPLETE CONNECTION FROM SOURCE OF POWER TO FINAL UTILIZATION EQUIPMENT, WHETHER OR NOT SPECIFICALLY MENTIONED BUT WHICH ARE NECESSARY FOR SUCCESSFUL OPERATION.
2. PERFORM ALL WORK TO MEET THE REQUIREMENTS OF FLORIDA BUILDING CODES, INCLUDING FIRE (NFPA-820), THE NATIONAL ELECTRICAL CODE (NFPA-70), THE UNIFORM BUILDING CODE, AND THE LIFE SAFETY CODE (NFPA-101).
3. THE DRAWINGS INDICATE, IN A DIAGRAMMATIC MANNER, THE DESIRED LOCATIONS AND ARRANGEMENTS OF THE COMPONENTS OF THE ELECTRICAL WORK. FOLLOW THE DRAWINGS AS CLOSELY AS POSSIBLE, BUT USE JUDGEMENT AND COORDINATE WITH THE OTHER TRADES TO SECURE THE BEST POSSIBLE INSTALLATION IN THE AVAILABLE SPACE AND UNDER THE DEVELOPED CONDITIONS.
4. BEFORE INSTALLING ANY CONDUIT OR LOCATING ANY ELECTRICAL EQUIPMENT, EXAMINE THE COMPLETE SET OF DRAWINGS AND SPECIFICATIONS AND VERIFY ALL DIMENSIONS AND SPACE REQUIREMENTS. MAKE SUCH MINOR ADJUSTMENTS THAT MAY BE NECESSARY TO AVOID CONFLICTS WITH THE BUILDING STRUCTURE OR THE WORK OF OTHER TRADES.
5. CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING AND EXAMINE THE PREMISES CAREFULLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BE FULLY FAMILIAR WITH THE EXISTING CONDITIONS AND LOCAL REQUIREMENTS AND REGULATIONS. DIFFICULTIES THAT ARISE AFTER THE CONTRACT HAS BEEN AWARDED WHICH COULD HAVE BEEN AVOIDED BY A MORE COMPLETE INITIAL SITE VISIT ARE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE CORRECTED BY THE CONTRACTOR WITHOUT ANY ADDITIONAL COSTS TO THE OWNER.
6. EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE, PROVIDE ONLY NEW MATERIALS HAVING ALL LEGALLY REQUIRED APPROVALS AND/OR LABELS. ITEMS OF SIMILAR NATURE MUST BE OF THE SAME TYPE AND MANUFACTURER.
7. EQUIPMENT OR MATERIAL DAMAGED PRIOR TO FINAL INSPECTION AND ACCEPTANCE BY THE ENGINEER SHALL BE REPLACED IN A MANNER APPROVED BY THE ENGINEER AT NO ADDITIONAL COST TO THE OWNER.
8. DO ALL CUTTING, PATCHING, CHANNELING, CORE DRILLING, AND FITTING REQUIRED OF THE ELECTRICAL WORK, EXCEPT AS OTHERWISE DIRECTED. SECURE THE PERMISSION OF THE ENGINEER BEFORE PERFORMING ANY OPERATION LIKELY TO AFFECT THE STRENGTH OF A STRUCTURAL MEMBER.
9. PROTECT ELECTRICAL WORK AT ALL TIMES FROM DAMAGE, DEFACEMENT OR DETERIORATION FROM ANY CAUSE WHATSOEVER. PROVIDE PROPER STORAGE FACILITIES AND CONDUCT OPERATIONS TO THIS EFFECT. PERFORM ELECTRICAL WORK IN SUCH A MANNER AS TO PROTECT THE WORK OF OTHER TRADES. REPAIR OR REPLACE DAMAGED ELECTRICAL WORK AND BE RESPONSIBLE FOR THE CORRECTION OF ANY DAMAGE DONE IN THE PERFORMANCE OF THE ELECTRICAL WORK TO THE WORK OF OTHER TRADES.
10. KEEP OUTAGES TO OCCUPIED AREAS TO A MINIMUM AND PREARRANGE ALL OUTAGES WITH THE OWNER'S REPRESENTATIVE. REQUESTS FOR OUTAGES SHALL STATE THE SPECIFIC DATES AND HOURS AND THE MAXIMUM DURATION, WITH THE OUTAGES KEPT TO THESE SPECIFIC TIMES. CONTRACTOR WILL BE LIABLE FOR ANY DAMAGES RESULTING FROM UNSCHEDULED OUTAGES OR FOR THOSE NOT CONFINED TO THE PRE-APPROVED TIMES. INCLUDE ALL COSTS FOR OVERTIME LABOR AS NECESSARY TO MAINTAIN ELECTRICAL SERVICES IN THE INITIAL BID PROPOSAL. TEMPORARY WIRING AND FACILITIES, IF USED, SHALL BE REMOVED AND THE SITE LEFT CLEAN BEFORE FINAL ACCEPTANCE.
11. WHEN THE WORK IS SUBSTANTIALLY COMPLETE, AND AT A TIME SELECTED BY THE OWNER'S REPRESENTATIVE, CONDUCT AN OPERATING TEST IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE, THAT DEMONSTRATES THAT ALL EQUIPMENT AND SYSTEMS OPERATE IN ACCORDANCE WITH REQUIREMENTS OF THE PLANS AND SPECIFICATIONS, AND ARE FREE OF ELECTRICAL AND MECHANICAL DEFECTS.
12. FURNISH TWO SETS OF OPERATING MANUALS WITH A NARRATIVE DESCRIPTION OF OPERATION, PROVIDE HARDCOPY AND MAGNETIC MEDIA COPIES OF ALL REVISED SOFTWARE FOR THE CONTROL AND SCADA SYSTEM. PROVIDE OPERATING MANUALS AND CATALOG SHEETS FOR ALL NEW INSTRUMENTS. AFTER THE OPERATIONAL TESTS, THE CONTRACTOR SHALL SUBMIT REVISED MATERIALS FOR THESE MANUALS TO ADDRESS ALL CHANGES REQUESTED BY THE ENGINEER AND ALL CHANGES MADE DURING TESTING AND START UP, PLUS TWO ADDITIONAL COMPLETE MANUALS.
13. FURNISH A WRITTEN GUARANTEE TO THE OWNER, EFFECTIVE FOR A PERIOD OF ONE YEAR AFTER DATE OF FINAL COMPLETION, COVERING ALL DEFECTS IN CONTRACTOR FURNISHED MATERIALS AND WORKMANSHIP. THE CONTRACTOR SHALL AGREE TO REMEDY ANY DEFECT BY REPLACEMENT OF DEFECTIVE PART WITHOUT ADDITIONAL COST TO OWNER DURING THE PERIOD OF GUARANTEE. INCANDESCENT LAMPS ARE EXEMPT FROM THE GUARANTEE.
14. THE DRAWINGS SHALL NOT BE USED FOR ROOM DIMENSIONS, OR EQUIPMENT PLACEMENT. DRAWINGS ARE SCHEMATIC VERIFY ALL LOCATIONS.
15. DETAILS ARE TYPICAL OF THE INSTALLATION, HOWEVER NOT EVERY SITUATION CAN BE DETAILED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ALL NECESSARY MATERIALS AND PROPER INSTALLATION FOR ANY GIVEN SITUATION, WHICH MAY VARY, FROM THE DETAILS OR THE DRAWINGS.
16. IN CASE OF INTERFERENCE BETWEEN ELECTRICAL EQUIPMENT SHOWN ON THE DRAWINGS AND THE OTHER EQUIPMENT. THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER IN WRITING AND THE ENGINEER SHALL REVIEW THE PROPOSED CHANGES BEFORE THEY ARE MADE.
17. PACKAGE EQUIPMENT. EQUIPMENT MANUFACTURERS MAY REQUIRE SOME ADDITIONAL CONDUITS AND WIRES. COORDINATE THIS REQUIREMENT WITH SUBCONTRACTORS TO MAKE SURE THAT THE EQUIPMENT SUPPLIER PROVIDES ALL NECESSARY ELECTRICAL INFORMATION TO ELECTRICAL SUBCONTRACTOR FOR INCLUSION OF COSTS IN BID PACKAGE. ALL NECESSARY MATERIALS AND LABOR TO COMPLETE ELECTRICAL INSTALLATION SHALL BE PROVIDED WHETHER SHOWN OR NOT SHOWN ON THE DRAWINGS.
18. EQUIPMENT DIMENSIONS SHOWN ON PLANS AND ELEVATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL USE THE SHOP DRAWINGS FOR PROPER LAYOUT AND FINAL INSTALLATION, FOUNDATION AND PAD, ETC. ANY SUCH MODIFICATIONS SHALL BE WITHOUT ANY ADDITIONAL COST TO THE OWNER.
19. ALL LOCAL CONTROL PANELS, INSTRUMENTS, DEVICES, ETC. SHALL BE MOUNTED ON CONTRACTOR FABRICATED RACKS UNLESS OTHERWISE SHOWN ON THE PLAN DRAWINGS.
20. PROVIDE POWER WIRING AND CONNECT TO EACH ITEM OF EQUIPMENT.
21. UPDATE THE TYPED CIRCUIT DIRECTORY IN THE POWER PANEL DOOR TO IDENTIFY ALL NEW CIRCUITS. CIRCUIT BREAKERS SHALL BE OF THE SAME MANUFACTURER AS THE PANEL.

RACEWAY AND ENCLOSURES

1. PROVIDE ONLY NEW CONDUIT WITH UL LISTING OR LABEL AND DELIVER TO THE SITE IN STANDARD LENGTHS. UNLESS OTHERWISE INDICATED, PROVIDE CONDUITS FOR ALL TYPES OF CONDUCTORS OR CABLES FOR ALL SYSTEMS AND VOLTAGE. ALL CONDUITS MUST BE REAMED CLEAR AND FREE OF ANY BURRS BEFORE INSTALLATION.
2. ALUMINUM CONDUIT AND SIMILAR CONDULETS SHALL BE USED FOR EXPOSED OUTDOOR AND INDOOR LOCATIONS. NOT ALLOWED UNDERGROUND OR EMBEDDED IN CONCRETE.
3. PVC SCHEDULE 40 SHALL BE USED ONLY IN UNDERGROUND LOCATIONS, ENCASED IN REINFORCED CONCRETE.
4. PCV SCHEDULE 80 MAY BE USED IN INDOOR LOCATIONS OF CHEMICAL STORAGE BUILDING, INSTALLED EXPOSED WHERE NOT SUBJECT TO DAMAGE DUE TO MECHANICAL EQUIPMENT TRAFFIC OF PERSONNEL TRAFFIC.
5. WIRING PULL BOXES AND ENCLOSURES SHALL BE 316 STAINLESS STEEL, PAINTED WHITE, NEMA 4X.
6. CONDUIT SIZES NOT INDICATED ON THE DRAWINGS SHALL BE IN ACCORDANCE WITH NEC REQUIREMENTS AND SHALL BE SIZED BASED ON QUANTITIES AND SIZES OF WIRE INSTALLED THEREIN. INCREASE CONDUIT SIZE AS REQUIRED TO ACCOMMODATE THE MANDATORY GROUNDING CONDUCTOR, INSTALLED THEREIN. A SEPARATE EQUIPMENT GROUNDING CONDUCTOR IS MANDATORY IN ALL RACEWAYS. THE CONDUIT SYSTEM IS NOT AN ALLOWABLE GROUND.
7. LIQUID TIGHT FLEXIBLE CONDUIT WITH OVERALL POLYVINYL CHLORIDE PLASTIC JACKET. PROVIDE INSULATING CONNECTORS, APPLETON STN SERIES OR EQUAL. USE LIQUID TIGHT FLEXIBLE CONDUIT: WHERE INDICATED; FOR FINAL CONNECTIONS TO MOTORS; VIBRATING EQUIPMENT; WHERE REQUIRED FOR EQUIPMENT SERVICING. IN DAMP LOCATIONS OR AREAS EXPOSED TO THE WEATHER, USE LIQUID TIGHT TYPE OF FLEXIBLE CONDUIT PROVIDED THE JACKET TEMPERATURE LIMITATIONS WILL NOT BE EXCEEDED. SIZE ALL CONDUITS AS LEGALLY REQUIRED OR LARGER WHERE INDICATED OR PREFERRED. WHERE PORTIONS OF A CONDUIT RUN ARE INCREASED IN SIZE, FOR WHATEVER REASON, MAKE ALL REMAINING PORTION IN THAT RUN THE SAME SIZE. THE MAXIMUM ALLOWABLE LENGTH OF FLEXIBLE METALLIC CONDUIT SHALL NOT EXCEED 24 INCHES.
8. SUPPORT CONDUIT AT LEGAL INTERVALS, AS SPECIFIED BY THE NATIONAL ELECTRICAL CODE. PROVIDE ADDITIONAL SUPPORTS WHERE OBVIOUSLY REQUIRED OR AS DIRECTED. PERFORATED STRAP OR PLUMBERS TAPE ARE NOT ACCEPTABLE FOR CONDUIT SUPPORTS. DO NOT INSTALL ONE INCH OR LARGER RACEWAYS IN OR THROUGH STRUCTURAL MEMBERS UNLESS APPROVED BY ENGINEER. REPLACE ANY DENTED OR DAMAGED CONDUIT. SUPPORTS AT STRUCTURAL STEEL MEMBERS USE BEAM CLAMPS, DRILLING OR WELDING MAY BE USED ONLY AS NECESSARY.
9. ROUTE CONDUIT TO AVOID DRAINS OR OTHER GRAVITY LINES. WHERE CONFLICTS OCCUR, RELOCATE CONDUIT AS REQUIRED. KEEP CONDUIT AT LEAST 6" FROM THE COVERINGS ON HOT WATER AND STEAM PIPES AND AT LEAST 18" FROM THE COVERINGS OF FLUES AND BREACHING, AND AT LEAST 12" FROM FUEL LINES AND GAS LINES. RUN CONDUIT EXPOSED TO VIEW PARALLEL WITH OR AT RIGHT ANGLES TO STRUCTURAL MEMBERS, WALLS OR LINES OF THE BUILDING. ROUTE ALL EXPOSED CONDUIT TO PRESERVE HEADROOM ACCESS SPACE AND WORK SPACE. TURN CONDUITS WITH NEAT SYMMETRICAL BENDS. WHEN INSTALLING CONDUIT THROUGH EXISTING SLABS OR WALLS MAKE PROVISIONS FOR LOCATING POSSIBLE CONFLICTING ITEMS WHERE CONDUIT IS TO PENETRATE. USE TONE SIGNAL OR X-RAY METHODS TO INSURE THAT NO PENETRATIONS WILL BE MADE INTO EXISTING CONDUIT, PIPING, CABLES, POST-TENSION CABLES, ETC.
10. THE CONTRACTOR SHALL VERIFY EXACT LOCATION OF TERMINAL BOXES AND CONDUIT ENTRANCES OF ALL EQUIPMENT AGAINST SHOP DRAWINGS BEFORE STUBBING UP CONDUITS.
11. CONDUIT FITTINGS AND SUPPORT ARE NOT SHOWN ON THE DRAWINGS. PROVIDE ALL 316 S.S. SUPPORT CHANNELS, CLAMPS, HARDWARE, ETC. MATERIAL TO BE SUITABLE FOR THE AREA WHERE THEY ARE TO BE INSTALLED.
12. PROVIDE ALL SLEEVES AND OPENINGS REQUIRED FOR THE PASSAGE OF ELECTRICAL RACEWAYS OR CABLES EVEN WHEN THESE OPENINGS OR SLEEVES ARE NOT SPECIFICALLY SHOWN ON THE DRAWINGS.
13. UNDERGROUND CONDUITS SHALL BE BURIED A MINIMUM OF 24" BELOW GRADE, UNLESS OTHERWISE NOTED. WARNING MARKER TAPE SHALL BE LAID IN TRENCHES AND GROUND SYSTEM TRENCHES A MINIMUM OF 12" ABOVE CONDUIT. ALL UNDERGROUND CONDUIT RUNS SHALL BE INSTALLED USING LONG RADIUS SWEEP BENDS. THE MINIMUM BENDING RADIUS SHALL BE 12 TIMES NOMINAL DIAMETER OF THE CONDUIT. ALL ELBOWS AND FITTINGS SHALL BE TYPE PCS.
14. CONDUITS INSTALLED BELOW GRADE SHALL NOT BE LESS THAN 1" UNLESS OTHERWISE STATED.
15. THE MINIMUM SIZE OF CONDUIT INSTALLED ABOVE GRADE SHALL NOT BE LESS THAN 3/4" UNLESS OTHERWISE NOTED.
16. LABEL EACH CONDUIT AT BOTH ENDS WITH CONDUIT NUMBERS AS PER SCHEDULE.
17. ALL CONDUIT PENETRATING EXTERIOR WALLS MUST HAVE A WATER TIGHT CONDUIT PENETRATION SEAL INSTALLED.

LAST SAVED BY: awalls

REV	DATE	BY	DESCRIPTION

DESIGNED MAG	** ORIGINAL SEALED BY MARIO A. GAMBOA P.E. APRIL 2015 FL 44675 **
DRAWN JB	
CHECKED MAG	
DATE APRIL 2015	



401 NORTH CATTLEMEN RD, SUITE 306
SARASOTA, FL 34232
PHONE: (941) 371-9832 FAX: (941) 371-9873
CA 00008571



MANATEE COUNTY	
SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES	
ELECTRICAL AND CONTROLS	
GENERAL SPECIFICATIONS I	

VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1"	JOB NO. 9520F.10
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	DRAWING NO. E07

Plot Date: 29-APR-2015 9:43:09 AM

User: svcPW

PlotScale: 1:1

Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo.plt PenTable.pen

LAST SAVED BY: awalls

WIRES, CABLES, CONNECTORS

1. PROVIDE NEW CONDUCTORS MANUFACTURED WITHIN 1 YEAR OF THE DATE OF DELIVERY TO THE SITE. STORE CONDUCTORS OUT OF THE WEATHER AND WHERE NOT SUBJECT TO DAMAGE OR OTHER DELETERIOUS CONDITIONS. UNLESS SPECIFICALLY INDICATED OTHERWISE, CONDUCTOR SIZES ARE FOR SOFT DRAWN COPPER, MINIMUM 98% CONDUCTIVITY.
2. PROVIDE MINIMUM SIZE NO. 12 AWG AND LARGER CONDUCTORS WITH INSULATION RATING OF 600 VOLTS. TYPE XHHW INSULATION, UNLESS OTHERWISE INDICATED. WIRE PRODUCTS AS MANUFACTURED BY OKONITE, GENERAL CABLE, SOUTHWIRE, BELDEN.
3. WIRING FOR ANALOG SIGNALS OF INSTRUMENTS SHALL BE #16 AWG - SHIELDED TWISTED PAIRS, CONDUCTOR INSULATION THWN, OVERALL 15 MILS PVC JACKET, WITH 4 MILS NYLON JACKET; MANUFACTURED BY OKONITE, GENERAL CABLE, SOUTHWIRE, BELDEN.
4. MULTIN-CONDUCTOR CABLE FOR INSTALLATION IN CABLE TRAY SHALL HAVE INDIVIDUAL CONDUCTORS WITH THWN INSULATION, COLOR CODED FOR EACH PHASE, WHITE NEUTRAL CONDUCTOR AND GREEN INSULATED GROUND. OVERALL JACKET SHALL BE CPE AND TYPE TC, RESISTANT TO U.V. SUNLIGHT.
5. WHERE A COMMON NEUTRAL IS RUN FOR TWO OR THREE HOME RUN CIRCUITS, PHASE CONDUCTORS SHALL BE CONNECTED TO BREAKERS IN THE PANEL WHICH ARE ATTACHED TO SEPARATE PHASE LEGS IN ORDER THAT THE NEUTRAL CONDUCTORS WILL CARRY ONLY THE UNBALANCED CURRENT. NEUTRAL CONDUCTORS SHALL BE OF THE SAME SIZE AS THE PHASE CONDUCTORS UNLESS SPECIFICALLY NOTED OTHERWISE.
6. INSTALL WIRES IN ONLY APPROVED RACEWAYS. PULL IN WIRE WITH AN APPROVED WIRE PULLING LUBRICANT, EQUAL TO IDEAL "YELLOW", EFCOR WGY, POLYWATER, OR EQUAL AS RECOMMENDED BY CABLE MANUFACTURER FOR ALL WIRE NO. 4 AND LARGER, OR WHERE NECESSARY. DO NOT USE OIL, GREASE OR SIMILAR SUBSTANCES. DO NOT INSTALL WIRE IN: INCOMPLETE CONDUIT RUNS; UNTIL AFTER THE CONCRETE WORK AND PLASTERING IS COMPLETED; UNTIL AFTER ALL MOISTURE IS SWABBED FROM CONDUITS. BEFORE INSTALLING CONDUCTOR, REMOVE DEBRIS AND MOISTURE FORM CONDUIT AND EQUIPMENT ENCLOSURES.
7. NEATLY ARRANGE AND LACE CONDUCTORS IN CONTROL PANELS, SWITCHBOARDS, PANELBOARDS, GUTTERS AND TERMINAL CABINETS USING WIRE TIES AS MANUFACTURED BY TY-RAP, PANDUIT, ETC.
8. ONLY COMPRESSION TYPE CONNECTORS ARE ALLOWED FOR WIRE SPLICES (NO TWIST ON CONNECTORS ARE ALLOWED I.E., WIRENUTS, SCOTCH- LOCKS, ETC.). USE BUCHANAN COMPRESSION SPLICE CAPS (TYPICALLY NUMBER 2006S, ETC.) FOR WIRE NO. 10 AWG AND SMALLER. USE BURNDY "VERSITAPS" AND HEAVY-DUTY CONNECTORS; O.Z. SOLDERLESS CONNECTORS; EQUIVALENT BY BUCHANAN, KEARNEY, OR PENN UNION, FOR WIRE NO. 8 AWG AND LARGER. MAKE ALL CONNECTIONS WITH THE PROPER TOOL AND DIE AS SPECIFIED BY THE DEVICE MANUFACTURER. USE ONLY TOOLING AND DIES MANUFACTURED BY THE DEVICE MANUFACTURER. INSULATE ALL CONNECTIONS AND SPLICES WITH PREMOLDED PLASTIC COVERS, OR HEAT SHRINK TUBING AND CAPS.
9. EVERY WIRE SHALL BE MARKED AT BOTH ENDS OF THE CONDUCTOR, AT ALL TERMINAL BLOCKS AND FINAL DESTINATION EQUIPMENT. USE MACHINE PRINTED HEAT SHRINK SLEEVE TYPE MARKERS. HAND MARKING IS NOT ACCEPTABLE. VERIFY WITH THE ENGINEER WHAT WIRE IDENTIFICATION SYSTEM SHALL BE USE IF NOT DESCRIBED WITHIN THESE DRAWINGS.
10. SUBMIT PRODUCT DATA OF WIRES, CABLES AND RELATED MATERIALS FOR ENGINEER'S REVIEW PRIOR TO PURCHASING.

EQUIPMENT - PRODUCTS

1. RECEPTACLES FOR POWER SUPPLY OF SMALL SUBMERSIBLE SAMPLE PUMPS SHALL BE RATED 120V, 20 AMP, GFI TYPE, HEAVY DUTY WITH NEMA 4X ENCLOSURE, IN SERIRES WITH WATER-TIGHT CONNECTOR FOR SEPARATE WATER-TIGHT PLUG. PRODUCT AS MANUFACTURED BY WOODHEAD, HUBBELL OR EQUAL.

GROUNDING

1. CONDUIT SYSTEM IS NOT ALLOWED FOR EQUIPMENT GROUNDING. INSTALL A SEPARATE GREEN EQUIPMENT GROUND WIRE IN EACH CONDUIT AND BOND TO EQUIPMENT AT BOTH ENDS. SIZE AS PER N.E.C., UNLESS OTHERWISE NOTED.
2. ALL METALLIC STRUCTURES, METALLIC ENCLOSURES, AND ELECTRICAL EQUIPMENT SHALL BE PERMANENTLY AND EFFECTIVELY GROUNDED AND GROUND CONNECTIONS SHALL BE MADE TO THE PLANT GROUND GRID. THE GROUND CONDUCTOR SHALL BE SIZED PER N.E.C. UNLESS OTHERWISE NOTED.
3. GROUNDING CONDUCTORS STUB UPS AND LOCATIONS ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY LOCATIONS IN FIELD, WITH ENGINEER. ALL GROUND GRID CONDUCTORS SHALL BE #4/0 SIZE UNLESS OTHERWISE NOTED.
4. ALL GROUNDING GRID CONDUCTORS SHALL BE MINIMUM OF 36" BELOW GRADE EXCEPT UNDER BUILDING SLAB WHEN THEY SHALL BE A MINIMUM OF 6" BELOW SLAB.

CONSTRUCTION

1. REMOVE OR RELOCATE ALL ELECTRICAL WIRING, EQUIPMENT, FIXTURES, ETC., WHICH MAY BE ENCOUNTERED IN REMOVED OR REMODELED AREAS IN THE EXISTING AREAS EFFECTED BY THIS WORK. WIRING WHICH SERVES USABLE EXISTING OUTLETS SHALL BE RESTORED AND ROUTED CLEAR OF THE CONSTRUCTION OR DEMOLITION. REMOVE ALL UNUSED WIRE AND CONDUIT AND LEAVE SITE CLEAN. REMOVED MATERIALS NOT SCHEDULED FOR REUSE SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND REMOVED FROM THE SITE.
2. DO ALL PATCHING TO THE SAME QUALITY AND APPEARANCE AS THE ORIGINAL WORK AND WHERE REQUIRED OR DIRECTED, EMPLOY THE PROPER TRADESMEN TO SECURE THE DESIRED RESULTS. SEAL AROUND ALL CONDUITS, WIRES, AND CABLES PENETRATING WALLS, CEILINGS, AND FLOOR IN ALL LOCATIONS WITH A FIRE STOP MATERIAL.
3. MAINTAIN ALL SURFACES TO BE PAINTED IN A CLEAN AND SMOOTH CONDITION. WHERE ELECTRICAL WORK IS EXPOSED TO VIEW, REMOVE ALL FOREIGN MATERIAL AND RESTORE ALL DAMAGED FINISHES. AT THE COMPLETION OF THE WORK, LEAVE LIGHTING FIXTURES AND LAMPS CLEAN.
4. ALL DEBRIS, RUBBISH, AND SCRAPS, ETC., ASSOCIATED WITH THE ELECTRICAL WORK SHALL BE REMOVED EACH NIGHT AND ALL AREAS ARE TO BE LEFT SWEEPED CLEAN EACH NIGHT.

REV	DATE	BY	DESCRIPTION

DESIGNED MAG	** ORIGINAL SEALED BY MARIO A. GAMBOA P.E. APRIL 2015 FL 44675 **
DRAWN JB	
CHECKED MAG	
DATE APRIL 2015	



401 NORTH CATTLEMEN RD, SUITE 306
SARASOTA, FL 34232
PHONE: (941) 371-9832 FAX: (941) 371-9873
CA 00008571



MANATEE COUNTY
SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
ELECTRICAL AND CONTROLS
GENERAL SPECIFICATIONS II

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO.
9520F.10
DRAWING NO.
E08

Plot Date: 29-APR-2015 10:43:32 AM

User: svcPW

FileScale: 1:1

Model: Layout ColorTable: gshade.ctb DesignScript: Carollo.plt Plot: PenTable.pen

LAST SAVED BY: awells

CONDUIT SCHEDULE

2/3/15

SWWRF - UPGRADES TO CHLORINE RESIDUAL FEED LINES

MANATEE COUNTY

CONDUIT			CONDUCTORS			GROUND			DESCRIPTION	CONNECTING SEGMENTS
NUMBER	DWG	SIZE	#	SIZE	TYPE	#	SIZE	TYPE		
CONDUIT			CONDUCTORS			GROUND			DESCRIPTION	CONNECTING SEGMENTS
NUMBER	DWG	SIZE	#	SIZE	TYPE	#	SIZE	TYPE		
P-2001A	E-04	2"	3	3/C-#10	X-HW	1	#10	X-HW-2	FR: PANELBOARD "LEF" TO: OVERHEAD CABLE TRAY - INDOOR 3 3/C-#10 >>	
P-2001B	E-03 E-04		3	3/C-#10	X-HW	1	#10	X-HW-2	FR: OVERHEAD CABLE TRAY - INDOOR TO: OVERHEAD CABLE TRAY - OUTDOOR 3 3/C-#10 >> VIA CABLE TRAY	
P-2001C	E-03 E-04		3	3/C-#10	X-HW	1	#10	X-HW-2	FR: OVERHEAD CABLE TRAY - OUTDOOR TO: CABLE TRAY AT CHLOR. C. TANKS 3 3/C-#10 >> VIA CABLE TRAY	
P-2002	E-04	2"	3	3/C-#10	X-HW	1	#10	X-HW-2	FR: CABLE TRAY AT CHLOR. C. TANKS TO: PULL BOX BELOW CABLE TRAY 3 3/C-#10 >>	
P-2003	E-04	1"	3	#10	X-HW-2	1	#10	X-HW-2	FR: PB AT CHLOR. C. TANKS TO: "T" CONDULET FOR SAMPLE PUMPS 3 #10 >>	
P-2003A	E-04	0.75"	2	#10	X-HW-2	1	#12	X-HW-2	FR: "T" CONDULET FOR SAMPLE PUMPS TO: SAMPLE PMP # 1 RECEPTACLE 2 #10 >>	
P-2003B	E-04	1"	1	MFR	CABLE				FR: SAMPLE PUMP # 1 RECEPTACLE TO: SAMPLE PMP # 1 1 MFR >> SUBMERSIBLE CABLE	
P-2004	E-04	1"	3	#10	X-HW-2	1	#12	X-HW-2	FR: "T" CONDULET FOR SAMPLE PUMPS TO: "T" CONDULET FOR 2 SAMPLE PUMPS 3 #10 >>	
P-2005A	E-04	0.75"	2	#10	X-HW-2	1	#12	X-HW-2	FR: "T" CONDULET FOR 2 SAMPLE PUMPS TO: SAMPLE PMP # 2 RECEPTACLE 2 #10 >>	
P-2005B	E-04	1"	1	MFR	CABLE				FR: SAMPLE PUMP # 2 RECEPTACLE TO: SAMPLE PMP # 2 1 MFR >> SUBMERSIBLE CABLE	
P-2006A	E-04	0.75"	2	#10	X-HW-2	1	#12	X-HW-2	FR: "T" CONDULET FOR 2 SAMPLE PUMPS TO: SAMPLE PMP # 3 RECEPTACLE 2 #10 >>	
P-2006B	E-04	1"	1	MFR	CABLE				FR: SAMPLE PUMP # 2 RECEPTACLE TO: SAMPLE PMP # 2 1 MFR >> SUBMERSIBLE CABLE	
		0.75"							FR: TO:	
P-2008	E-05	0.75"	4	#12	X-HW-2	1	#12	X-HW-2	FR: PANELBOARD "LC-2" TO: TERMINAL BOX TB-2 4 #12 >>	
P-2009A	E-05	0.75"	2	#12	X-HW-2	1	#12	X-HW-2	FR: TERMINAL BOX TB-2 TO: CL2 ANALYZER- LAKE FILTERS 2 #12 >>	
S-2009B	E-05	0.75"	1	2/CS-#16		1	#12	X-HW-2	FR: TERMINAL BOX TB-2 TO: CL2 ANALYZER- LAKE FILTERS 1 2/CS-#16 >>	
P-2010	E-05	0.75"	3	#12	X-HW-2	1	#12	X-HW-2	FR: TERMINAL BOX TB-2 TO: TERMINAL BOX TB-3 3 #12 >>	
S-2010	E-05	0.75"	2	2/CS-#16					FR: TERMINAL BOX TB-2 TO: PULL BOX PB-1 2 2/CS-#16 >>	
P-2011A	E-05	0.75"	2	#12	X-HW-2	1	#12	X-HW-2	FR: TERMINAL BOX TB-3 TO: CL2 R. ANALYZER # 2 2 #12 >>	
S-2011B	E-05	0.75"	1	2/CS-#16					FR: TERMINAL BOX TB-3 TO: CL2 R. ANALYZER # 2 1 2/CS-#16 >>	

END OF CONDUIT SCHEDULE

CONDUIT SCHEDULE

2/3/15

SWWRF - UPGRADES TO CHLORINE RESIDUAL FEED LINES

MANATEE COUNTY

CONDUIT			CONDUCTORS			GROUND			DESCRIPTION	CONNECTING SEGMENTS
NUMBER	DWG	SIZE	#	SIZE	TYPE	#	SIZE	TYPE		
P-2012A	E-05	0.75"	2	#12	X-HW-2	1	#12	X-HW-2	FR: TERMINAL BOX TB-3 TO: CL2 R. ANALYZER # 3 2 #12 >>	
S-2012B	E-05	0.75"	1	2/CS-#16					FR: TERMINAL BOX TB-3 TO: CL2 R. ANALYZER # 3 1 2/CS-#16 >>	
S-2014	E-05	1.5"	4	2/CS-#16					FR: TERMINAL BOX TB-3 TO: PULL BOX PB-1 1 2/CS-#16 >> CL2 ANALYZER #2 1 2/CS-#16 >> CL2 ANALYZER #3 2 2/CS-#16 >> SPARES	
S-2015A	E-05	2"	5	2/CS-#16					FR: PULL BOX PB-1 TO: PULL BOX PB-2 1 2/CS-#16 >> CL2 ANALYZER #2 1 2/CS-#16 >> CL2 ANALYZER #3 1 2/CS-#16 >> CL2 ANALYZER LAKE FILTERS 2 2/CS-#16 >> SPARES VIA UNDERGROUND	
S-2015B	E-05	2"	5	2/CS-#16					FR: PULL BOX PB-2 TO: SCADA PANEL SP-2 1 2/CS-#16 >> CL2 ANALYZER #2 1 2/CS-#16 >> CL2 ANALYZER #3 1 2/CS-#16 >> CL2 ANALYZER LAKE FILTERS 2 2/CS-#16 >> SPARES	
		0.75"							FR: TO:	

DESIGNED
MAG
DRAWN
JB
CHECKED
MAG
DATE
APRIL 2015

**
ORIGINAL
SEALED BY
MARIO A. GAMBOA P.E.
APRIL 2015
FL 44675
**



MANATEE COUNTY
SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
ELECTRICAL AND CONTROLS
CONDUIT SCHEDULE

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO.
9520F.10
DRAWING NO.
E09

Plot Date: 29-APR-2015 10:27:24 AM

User: svcPW

Plot Scale: 1:1

Model: Layout ColorTable: gshade.ctb DesignScript: Carollo.plt PenTable.pen

LAST SAVED BY: awalls

GENERAL INSTRUMENT OR FUNCTION SYMBOLS

FROM DRAWING 04-N-02 TO CONNECTION POINT A OF 04-N-03

INTERFACE EXTERNAL TO P&ID'S

EQUIPMENT NO. XXXX

DESIGNATIONS OF CONTROL FUNCTIONS ASSOCIATED INSTRUMENT OR OTHER COMPONENTS.

AHC	AUTO/HOLD/CLOSE	OSC	OPEN/STOP/CLOSED
AM	AUTO/MANUAL	POT	POTENTIOMETER
DEV	DEVIATION	P/P	PUSH/PULL
HOA	HAND/OFF/AUTO	RL	RAISE/LOWER
HOR	HAND/OFF/REMOTE	RSL	RAISE/STOP/LOWER
LOS	LOCKOUT STOP	S/D	SHUTDOWN
L/R	LOCAL/REMOTE	SEL	SELECT
L/O/R	LOCAL/OFF/REMOTE	S/LOS	START/LOCKOUT STOP
MOA	MANUAL/OFF/AUTO	SP	SET POINT
O/O	ON/OFF	SR	START/RESET
OCA	OPEN/CLOSE/AUTO	S/S	STOP/START
OL	OVERLOAD		

INSTRUMENT PANEL MOUNTED WITH COMPUTING OR CONVERTING FUNCTION

CONVERT

E	VOLTAGE	H	HYDRAULIC
I	CURRENT	O	ELECTROMAGNETIC, SONIC
P	PNEUMATIC	R	RESISTANCE (ELECT.)
A	ANALOG	D	DIGITAL
B	BINARY		

COMPUTE

SUMMING	Σ	AVERAGING	Σ/n
SUBTRACTOR	−	RATIO	:
MULTIPLYING	X	DIFFERENCE	Δ
DIVIDING	÷	HIGH SELECTING	>
ROOT EXTRACTION	√	LOW SELECTING	<
PROPORTIONAL	P	HIGH LIMITER	▷
DERIVATIVE	R	LOW LIMITER	◁
INTEGRAL	I		

DISCRETE INPUT/OUTPUT. LIGHTNING SURGE ARRESTOR

ANALOG INPUT/OUTPUT. INTERPOSING RELAY

TAG NUMBERS

TYPICAL: TIC-1 - INSTRUMENT IDENTIFICATION OR TAG NUMBER

FORMAT TIC - FUNCTIONAL IDENTIFICATION

T - FIRST-LETTER

IC - SUCCEEDING-LETTER(S)

1 - LOOP NUMBER

FIRST LETTER - SUCCEEDING LETTER

INSTRUMENT LOOP NUMBER (INSTRUMENT SYMBOLS)

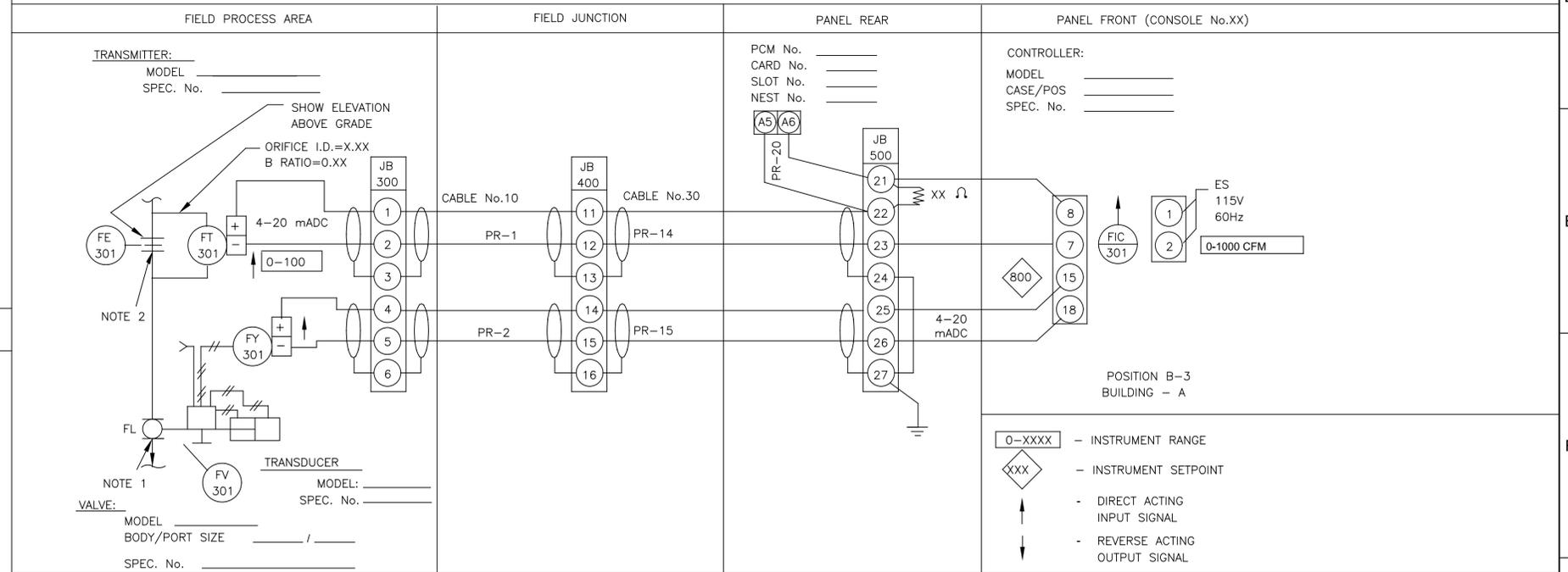
EXPANDED: 10-PAH-1A - TAG NUMBER

FORMAT A - OPTIONAL SUFFIX

IDENTIFICATION LETTERS

	FIRST-LETTER		SUCCEEDING-LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION				
C	CONDUCTIVITY			CONTROL	CLOSED
D	DENSITY	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	GAGE		GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	MOTOR	MOMENTARY			MIDDLE, INTERMEDIATE
N	TORQUE, RUN		ISOLATE	ISOLATOR	
O			ORIFICE, RESTRICTION		OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	INTRUSION, FAILURE	X AXIS			
Y	EVENT, STATE OR PRESENCE, REMOTE	Y AXIS			COMPUTE, CONVERT
Z	POSITION, DIMENSION	Z AXIS			DRIVER, ACTUATOR, FINAL CONTROL ELEMENT

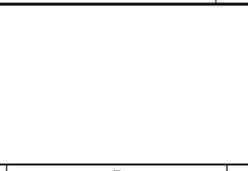
SAMPLE LOOP DIAGRAM ISA EXPANDED FORMAT



- NOTES:
- CONTROL LOOP SHOP DRAWINGS SHALL INCLUDE THE OPERATING SET POINTS OF THE DEVICE.
 - FE-301 REQUIRES 10 PIPE DIAMETERS UPSTREAM AND 5 PIPE DIAMETERS DOWNSTREAM OF STRAIGHT PIPE.

REV	DATE	BY	DESCRIPTION
1			

DESIGNED MAG	** ORIGINAL SEALED BY MARIO A. GAMBOA P.E. APRIL 2015 FL 44675 **
DRAWN JB	
CHECKED MAG	
DATE APRIL 2015	



carollo

401 NORTH CATTLEMEN RD, SUITE 306
SARASOTA, FL 34232
PHONE: (941) 371-9832 FAX: (941) 371-9873
CA 00008571



MANATEE COUNTY

SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES

PROCESS AND INSTRUMENTATION

PI&D LEGEND I

VERIFY SCALES	JOB NO. 9520F.10
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. N01
0 1" SCALE	
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	

VALVE AND PIPING SYMBOLS

Table of valve and piping symbols including GLOBE VALVE, GATE VALVE, BUTTERFLY VALVE, CHECK VALVE - SWING, CHECK VALVE - FLAPPER, PLUG VALVE, 3-WAY VALVE, ANGLE VALVE, RELIEF OR SAFETY VALVE, DIAPHRAGM VALVE, BALL VALVE, PRESSURE REGULATING VALVE, KNIFE GATE VALVE, BACKFLOW PREVENTER, FLEXIBLE HOSE, ROTAMETER, DRYER, HEAT EXCHANGE, LUBRICATOR, FILTER, FLUSHING PORT, POLYMER INJECTION PORT W/ REDUCERS, BASKET TYPE STRAINER, Y-TYPE STRAINER, DUPLEX STRAINER, SLEEVE COUPLING (SC), FLOOR DRAIN, EQUIPMENT DRAIN, CLEANOUT (CO), REMOVABLE PLUG, REMOVABLE CAP, BLIND FLANGE, EXHAUST TO ATMOSPHERE (INSIDE), EXHAUST TO ATMOSPHERE (OUTSIDE), REDUCER, UNION, QUICK DISCONNECT COUPLING, GAUGE SEAL, SILENCER, EXPANSION JOINT, AIR RELIEF VALVE, PULSATION DAMPENER.

VALVE OPERATOR SYMBOLS

Table of valve operator symbols including SOLENOID, MOTOR, ELECTRIC, DIAPHRAGM, DIAPHRAGM WITH POSITIONER, HANDWHEEL OR LEVER, CHAINWHEEL.

PRIMARY ELEMENT SYMBOLS - FLOW

Table of primary element symbols including ORIFICE PLATE, PILOT TUBE, VENTURI TUBE FLOW METER, TOTALIZING FLOWMETER, CALIBRATION TUBE, FLUME, WEIR, TURBINE OR PROPELLER TYPE METER, MAGNETIC FLOW METER, STATIC MIXER, SLIDE GATE, PROBE, FLOAT SWITCH, LEVEL RADAR.

EQUIPMENT SYMBOLS

Table of equipment symbols including CENTRIFUGAL PUMP, PNEUMATIC PUMP, SCREW CONVEYOR, METERING PUMP, PISTON PUMP, BLOWER, KNOCKOUT TANK, AIR COMPRESSOR (AC), MIXER, SUBMERSIBLE PUMP.

GENERAL INSTRUMENT SYMBOLS

Table of general instrument symbols including ONE VARIABLE, TWO VARIABLES, FIELD MOUNTED, PANEL MOUNTED, INTERLOCK, PROGRAMMABLE LOGIC CONTROLLER (PLC), HUMAN MACHINE INTERFACE (HMI), DIGITAL INPUT, DIGITAL OUTPUT, ANALOG INPUT, ANALOG OUTPUT.

LINE SYMBOLS

Table of line symbols including WATER STREAMS, SOLIDS STREAMS, SECONDARY WATER STREAMS, PNEUMATIC SIGNAL / COMPRESSED AIR LINE, CHEMICAL FEED LINE, ELECTRIC SIGNAL, CAPILLARY TUBING (FILLED SYSTEM), HYDRAULIC SIGNAL, ELECTROMAGNETIC OR SONIC SIGNAL NO WIRING OR TUBING.

PROCESS LINE ABBREVIATIONS

Table of process line abbreviations including AIR, BW, CA, CCA, CGW, D, EFF, EXH, FLT, FTW, NPW, OZE, P, PW, RW, S, SL, SN, SP, SS, TF, TW, V, VAP.

PIPING MATERIAL IDENTIFICATION

Table of piping material identification including CPVC, CSP, COP, CMP, CIP, DIP, FRP, GSP, HDPE, PE, PP, PVC, RCP, RUB, SS, VCP.

EQUIPMENT NOTATION ABBREVIATIONS

Table of equipment notation abbreviations including AC, AN, ARV, B, BFP, BP, BPD, C, CC, CH, CV, D, FC, FE, FM, FO, FV, GC, GT, H, HP, HV, IN, L, MX, P, PCV, PD, RM, S, SC, SIL, SM, SP, SV, SW, T, V, VR, WP, WW.

FUNCTION ABBREVIATIONS

Table of function abbreviations including <, >, A, ALT, BFC, BRG, CL, CS, D, DO, dP, f, FC, ES, FI, FL, FO, HMI, II, I/P, L, LCP, LEL, NC, NO, O, OAC, OC, ORP, TURB, UCP, VGAC, WDG.

Revision table with columns for REV, DATE, BY, DESCRIPTION.

Design and drawing information including DESIGNED MAG, DRAWN JB, CHECKED MAG, DATE APRIL 2015, and seal information for MARIO A. GAMBOA P.E.

Project identification table with columns for project name and drawing number.

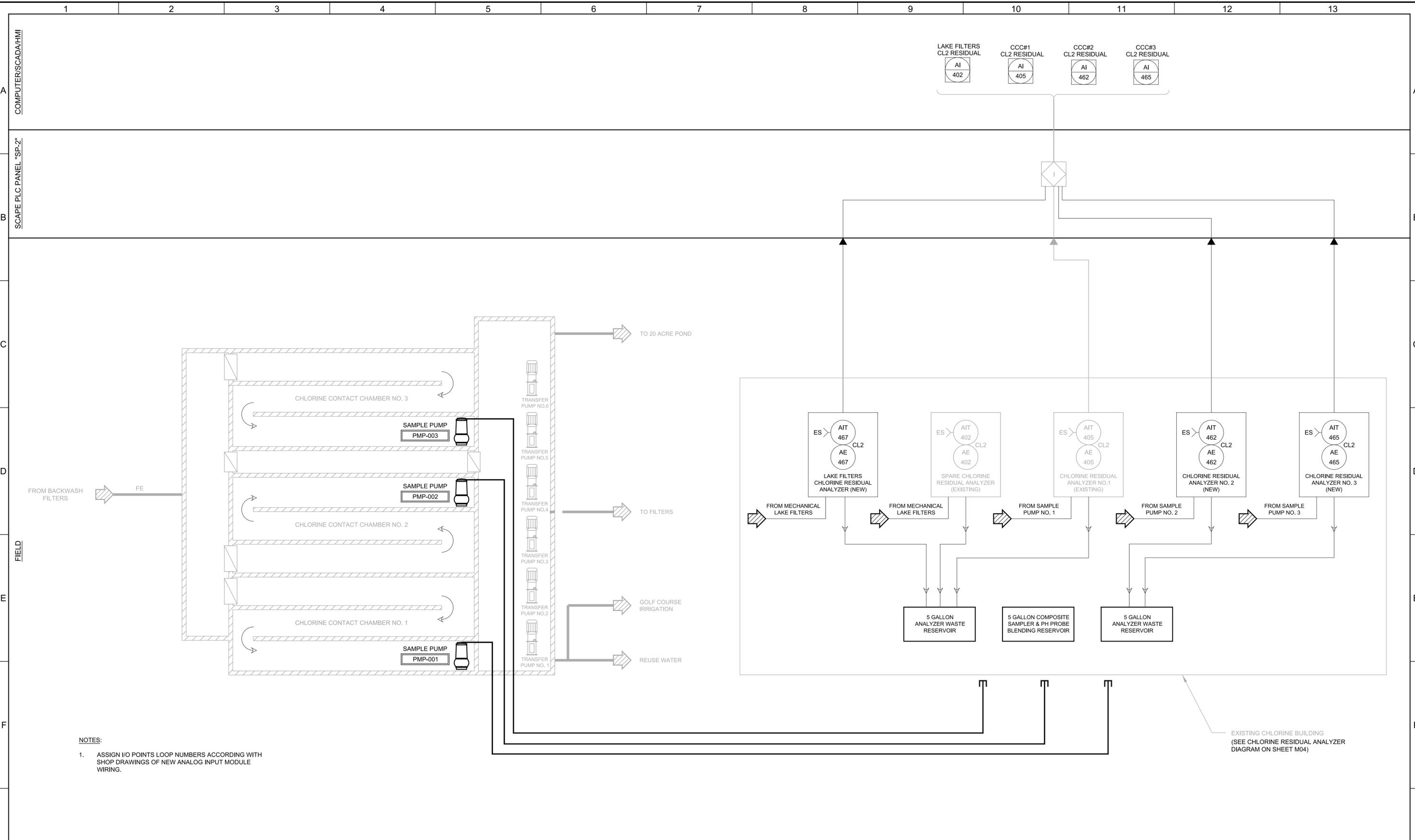
Carollo logo and contact information: 401 NORTH CATTLEMEN RD, SUITE 306 SARASOTA, FL 34232. PHONE: (941) 371-9832 FAX: (941) 371-9873 CA 00008571

Manatee County Florida logo with a sun icon.

MANATEE COUNTY SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES PROCESS AND INSTRUMENTATION PI&D LEGEND II

VERIFY SCALES: BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY. JOB NO. 9520F.10 DRAWING NO. N02

Plot Date: 29-APR-2015 10:33:55 AM
 User: svcPW
 Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo.plt PenTable.pen PlotScale: 1:1
 LAST SAVED BY: awalls



NOTES:
 1. ASSIGN I/O POINTS LOOP NUMBERS ACCORDING WITH SHOP DRAWINGS OF NEW ANALOG INPUT MODULE WIRING.

EXISTING CHLORINE BUILDING
 (SEE CHLORINE RESIDUAL ANALYZER DIAGRAM ON SHEET M04)

REV	DATE	BY	DESCRIPTION
1			
2			
3			

DESIGNED MAG	** ORIGINAL SEALED BY MARIO A. GAMBOA P.E. APRIL 2015 FL 44675 **
DRAWN JB	
CHECKED MAG	
DATE APRIL 2015	

401 NORTH CATTLEMEN RD, SUITE 306
 SARASOTA, FL 34232
 PHONE: (941) 371-9832 FAX: (941) 371-9873
 CA 00008571



MANATEE COUNTY
 SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
 PROCESS AND INSTRUMENTATION
**CHLORINE CONTACT CHAMBERS,
 SAMPLE PUMPS & CL2 ANALYZERS**

VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1"	JOB NO. 9520F.10
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	DRAWING NO. N03

Plot Date: 29-APR-2015 10:36:16 AM

User: svcPW

Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo.plot_PenTable.pen PlotScale: 1:1

LAST SAVED BY: awalls



A EXISTING PLC "SP-2" (FRONT VIEW) SCALE: - FILE: -



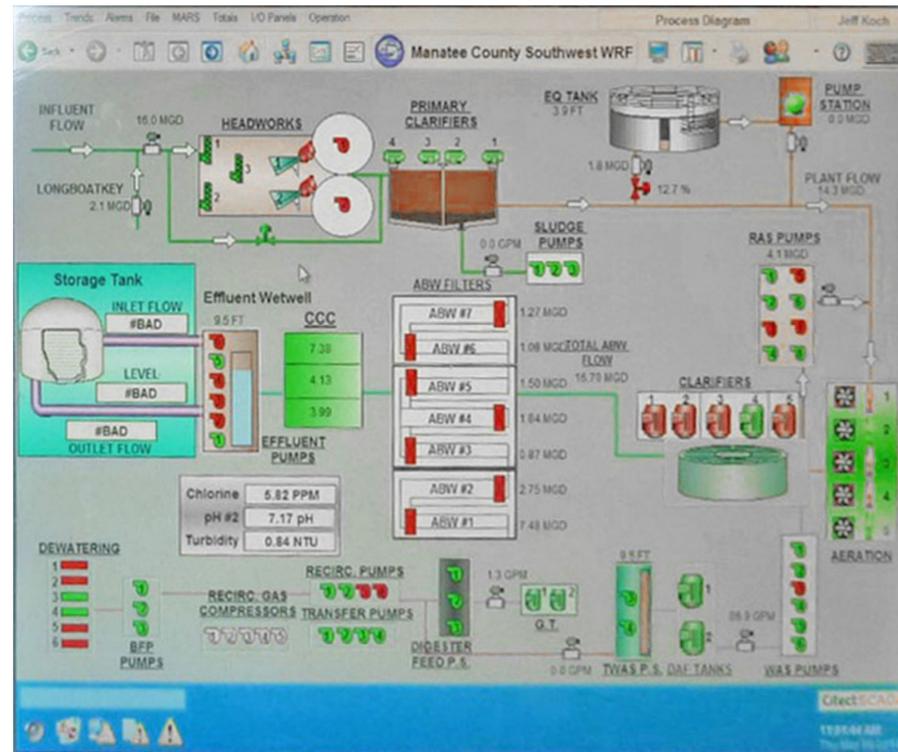
B EXISTING PLC "SP-2" (INTERIOR) SCALE: - FILE: -

KEY NOTES:

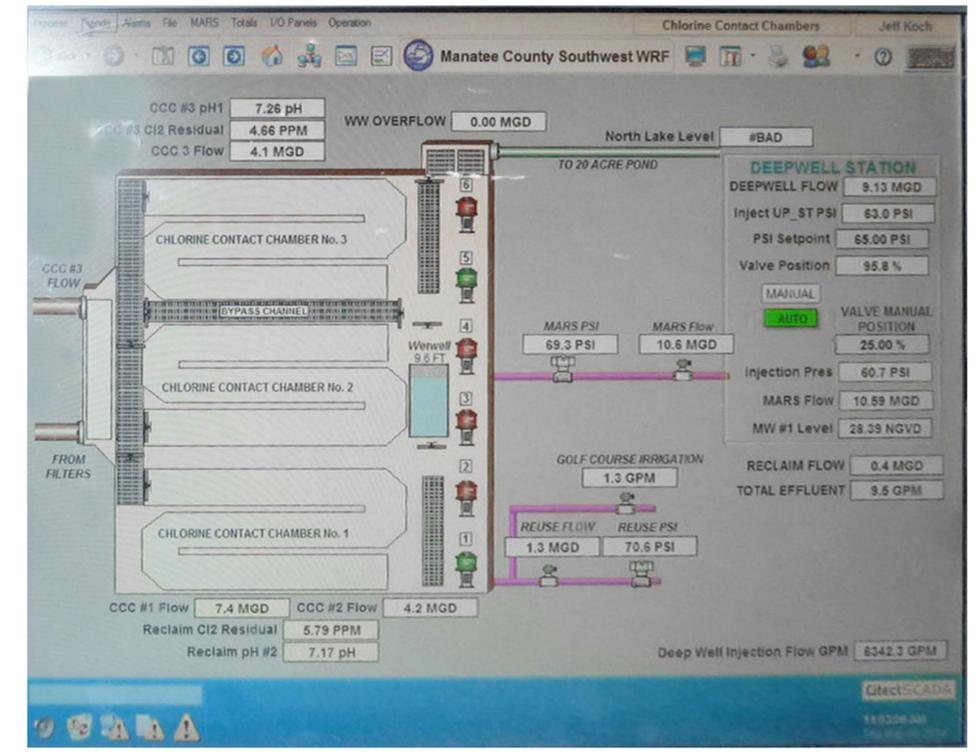
- 1 SEE SPECIFICATIONS SECTION 01XXXX FOR PRE-APPROVED SCADA SYSTEM INTEGRATOR.
- 2 EXISTING PANEL HAS (2) TWO PLC - ANALOG INPUT CARDS: ALLEN BRADLEY 1746-N18. PROVIDE A NEW ANALOG INPUT CARD TO MATCH EXISTING HARDWARE.
- 3 RE-LABEL WIRING OF TWO EXISTING CL2 ANALYZERS. TERMINATE NEW FIELD WIRING ASSOCIATED WITH (3) THREE NEW CHLORINE RESIDUAL ANALYZERS AND EXTEND FROM TERMINAL BLOCKS TO APPLICABLE PLC I/O MODULES ACCORDING TO LOOP DESCRIPTION ON DGW N-03.
- 4 MODIFY HMI SCREEN AT THE CONTROL CENTER TO DISPLAY CHLORINE RESIDUAL OF EACH CHLORINE CONTACT CHAMBER. SUBMIT NEW HMI SCREENS TO OWNER FOR REVIEW AND APPROVAL.
- 5 ADD SYMBOL OF CHLORINE RESIDUAL SAMPLE (SUBMERSIBLE) PUMP AT EACH C.C. CHAMBER.



C CONTROL CENTER - SCADA SCREEN SCALE: - FILE: -



D CONTROL CENTER - SCADA SCREEN SCALE: - FILE: -



E CONTROL CENTER - SCADA SCREEN SCALE: - FILE: -

DESIGNED MAG		DRAWN JB		CHECKED MAG		DATE APRIL 2015		** ORIGINAL SEALED BY MARIO A. GAMBOA P.E. APRIL 2015 FL 44675 **						MANATEE COUNTY SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES PROCESS AND INSTRUMENTATION EXISTING PLC CABINET AND SCADA ADDITIONS		VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1"		JOB NO. 9520F.10 DRAWING NO. N04	
REV	DATE	BY	DESCRIPTION																

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User: svcPW

PlotScale: 1:1

DesignScript: Carollo.plt; PenTable.pen

Model: Layout

ColorTable: gshade.ctb

LAST SAVED BY: dwalls

INSTRUMENTATION AND CONTROL SYSTEM DESCRIPTION

A. EXISTING SYSTEM:

1. THE EXISTING SCADA NETWORK CONSISTS OF SCADA PANELS LOCATED IN PROCESS AREAS THROUGHOUT THE PLANT, INTERCONNECTED WITH THE SCADA COMMAND CENTER VIA AN ETHERNET PROTOCOL.
2. THE SCADA PANEL , SP2, IS LOCATED IN THE POLYMER CHEMICAL BUILDING, AND INCLUDES THE PROGRAMMABLE LOGIC CONTROLLER (PLC) COMMUNICATION MODULES FOR INTERCONNECTION OF EXISTING SCADA COMMAND CENTER, AS WELL INCLUDES THE INPUT AND OUTPUT MODULES FOR THE CONNECTION WITH CHLORINE ANALYZERS IN THE CHEMICAL FEED BUILDING.
3. CONTRACTOR AND INSTRUMENTATION AND CONTROLS SUBCONTRACTOR ARE STRONGLY ENCOURAGED TO VISIT THE EXISTING SITE PRIOR TO BIDDING, TO HAVE MORE UNDERSTANDING OF THE EXISTING PLANT SCADA SYSTEM.
4. ALL THE DETAILED INTERFACE REQUIREMENTS MAY OR MAY NOT BE STATED ALL IN THIS SPECIFICATION. THE SITE VISIT SHALL BE CARRIED OUT TO OBTAIN SUPPLEMENTARY INFORMATION FOR THE PROJECT.
5. THE EXISTING SCADA AND PLC CABINETS AND RELATED HARDWARE WAS ORIGINALLY MANUFACTURED AND SUPPLIED BY REVERE CONTROLS, INC AND A COPY OF THE PERTINENT RECORD DRAWINGS WILL BE AVAILABLE TO THE CONTRACTOR.
6. THE OWNER HAS INSTALLED PLC HARDWARE/FIRMWARE UPGRADES TO THE PLC NETWORK, FOR CONSISTENCY WITH MANUFACTURER, S AVAILABLE UPGRADES FOR PLC PRODUCTS. DETAILS OF PREVIOUS UPGRADES WILL BE AVAILABLE TO THE CONTRACTOR.

B. REQUIRED SYSTEM ADDITIONS:

1. THE SWWRF CHLORINE FEED AND MONITORING SYSTEM SHALL HAVE INSTRUMENTATION IMPROVEMENTS AND MODIFICATIONS TO MEET THIS NEW PROJECT OBJECTIVE.
2. THE EXISTING PLC IN CABINET SP2 SHALL HAVE ADDITIONAL HARDWARE/FIRMWARE AND NEW ANALOG INPUT CARDS, AS NEEDED FOR MONITORING STATUS AND READINGS OF NEW CHLORINE RESIDUAL IN CHLORINE CONTACT CHAMBERS.
3. ALL FIELD MOUNTED INSTRUMENTS SHALL BE PROVIDED WITH STAINLESS STEEL TAGS STAMPED OR ENGRAVED WITH THE INSTRUMENT'S FULL TAG NUMBER. TAGS SHALL BE AFFIXED WITH STAINLESS STEEL WIRE FASTENERS.
4. SHIELDS AND MEASUREMENT LOOPS SHALL BE SINGLE POINT GROUNDED AT THE SOURCE PANEL EXTERNAL TERMINALS BY BONDING TO THE INSTRUMENT PANEL SIGNAL GROUND BUS.
5. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE TREATMENT PLANT AMBIENT AIR CONTAINS AIRBORNE CONTAMINANTS, INCLUDING BUT NOT LIMITED TO, THE CORROSIVE GASES: INCLUDING CHLORINE AND AMMONIA. THE CORROSION SEVERITY LEVEL WILL VARY ACCORDING TO SPECIFIC LOCATION, TEMPERATURE, RELATIVE HUMIDITY, RATE OF CHANGE OF RELATIVE HUMIDITY, WIND SPEED AND WIND DIRECTION, AND MAY, THEREFORE, ALSO BE SUBJECT TO SEASONAL VARIATION.
6. UNLESS OTHERWISE SPECIFIED, ELECTRONIC EQUIPMENT (EXCEPT FOR MODIFICATIONS TO EXISTING UNITS) SHALL BE INSTALLED SUCH THAT NO SIGNIFICANT OR DETRIMENTAL CORROSION SHALL OCCUR OVER A 20 YEAR PERIOD. INSTALLATION IN A NEMA 4X ENCLOSURE IS ACCEPTABLE.
7. IN EACH AND EVERY DRAWING SUBMITTED, PROVIDE PROJECT NUMBER, INSTRUMENT-AREA, AND DRAWING NUMBER.
8. PROVIDE AS-BUILT DRAWINGS TO SHOW INTERCONNECT WITH MANUFACTURER, S EQUIPMENT AND CONTRACTOR INSTALLED EQUIPMENT. INCLUDE MANUFACTURER, S TERMINAL NUMBERS, WIRE NUMBERS, AD PANEL TERMINAL NUMBERS SUPPLY MANUFACTURER, S DRAWINGS AS WELL AS PANEL DRAWINGS WITH AS-BUILT.
9. PROVIDE OUTDOOR FIELD INSTRUMENT LOOPS WITH VOLTAGE SURGE PROTECTION UNITS AT INSTRUMENTS, CAPABLE OF LIMITING VOLTAGE TO 30 VOLT DC PEAK WITH A RESPONSE TIME OF 5 NANO-SECONDS, AND DISSIPATING A 15,000 WATT, 1 MILLISECOND SURGE. PROVIDE 24 VDC LINE TO LINE, AND LINE TO GROUND PROTECTION.
10. INDIVIDUALLY FUSE EACH 4 TO 20 MA DC LOOP WITH A 1/16 AMPERE SLOW BLOW FUSE BETWEEN POWER SUPPLIES AND RECEIVER SURGE PROTECTORS.
11. PROVIDE VOLTAGE/SURGE PROTECTION FOR 4 WIRE TRANSMITTERS AND ANALYZERS WITH 120 VAC POWER SOURCES. PROTECT BOTH 120 VAC POWER SOURCE AND 24 VDC SIGNAL LOOP.
12. FIELD TEST AND CALIBRATE ALL CONTROL SYSTEMS AND INSTRUMENTATION IN ACCORDANCE WITH THE REVIEWED TESTING PROCEDURE SUBMITTAL AND THE MANUFACTURER'S INSTRUCTIONS.
13. PROVIDE ON-SITE TRAINING FOR ALL INSTRUMENTATION AND CONTROL SYSTEMS. ON-SITE TRAINING SHALL INCLUDE: TESTING AND MAINTENANCE TECHNIQUES, SET-UP, CALIBRATION, OPERATION, APPLICATION PROGRAMMING, SYSTEM RECONFIGURATION, A THOROUGH DESCRIPTION AND EXPLANATION OF THE ON-SITE CONTROL SYSTEM, FAILURE AND RECOVERY PROCEDURES (INDUCING FAILURES) , AND OPERATION DURING FAILURES. BOTH THEORY AND HANDS-ON EXPERIENCE SHALL BE PROVIDED.
14. PRODUCTS FOR CHLORINE RESIDUAL ANALYZERS ARE SPECIFIED IN MECHANICAL DRAWINGS.

C. SCADA COMMAND CENTER AND SOFTWARE SCREEN DISPLAY MODIFICATIONS:

1. PROVIDE MODIFICATIONS OF EXISTING SCADA SCREENS RELATED TO THE CHLORINE CONTACT CHAMBERS AND THE CHLORINE RESIDUAL ANALYZERS.
2. NEW SCREENS SHALL DISPLAY READINGS OF EXISTING CHLORINE RESIDUAL ANALYZERS AND NEW CHLORINE RESIDUAL ANALYZERS, ACCORDING TO THE DEVICES SHOWN ON THE DRAWINGS

D. SUPPLEMENTAL REQUIREMENTS:

1. INSTRUMENTATION AND CONTROL SYSTEMS FOR ADDITIONS AND/OR WIRING INTERCONNECTIONS TO EXISTING SCADA SYSTEM AND SCADA PANEL SP-2 SHALL BE PROVIDED UNDER THE SUPERVISION OF A LOCAL SINGLE CONTRACTOR OR SUBCONTRACTOR, WHICH HAS BEEN REGULARLY ENGAGED OVER THE PREVIOUS 5 YEARS IN SUPERVISION OF PROJECTS OF SIMILAR SCOPE AND COMPLEXITY IN WASTEWATER TREATMENT PLANTS.

E. SCADA SUBCONTRACTOR:

1. PROVIDE THE SERVICES OF THE SCADA SUBCONTRACTOR ACCORDING TO THE REQUIREMENTS SPECIFIED IN BIDDING DOCUMENTS, SECTIONS WITH INSTRUCTIONS TO THE BIDDERS AND THE GENERAL CONDITIONS.

REV	DATE	BY	DESCRIPTION

DESIGNED MAG	** ORIGINAL SEALED BY MARIO A. GAMBOA P.E. APRIL 2015 FL 44675 **
DRAWN JB	
CHECKED MAG	
DATE	
APRIL 2015	



401 NORTH CATTLEMEN RD, SUITE 306
SARASOTA, FL 34232
PHONE: (941) 371-9832 FAX: (941) 371-9873
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MANATEE COUNTY	
SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES	
PROCESS AND INSTRUMENTATION	
GENERAL SPECIFICATIONS	

VERIFY SCALES	JOB NO. 9520F.10
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. N05
0 1"	
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	

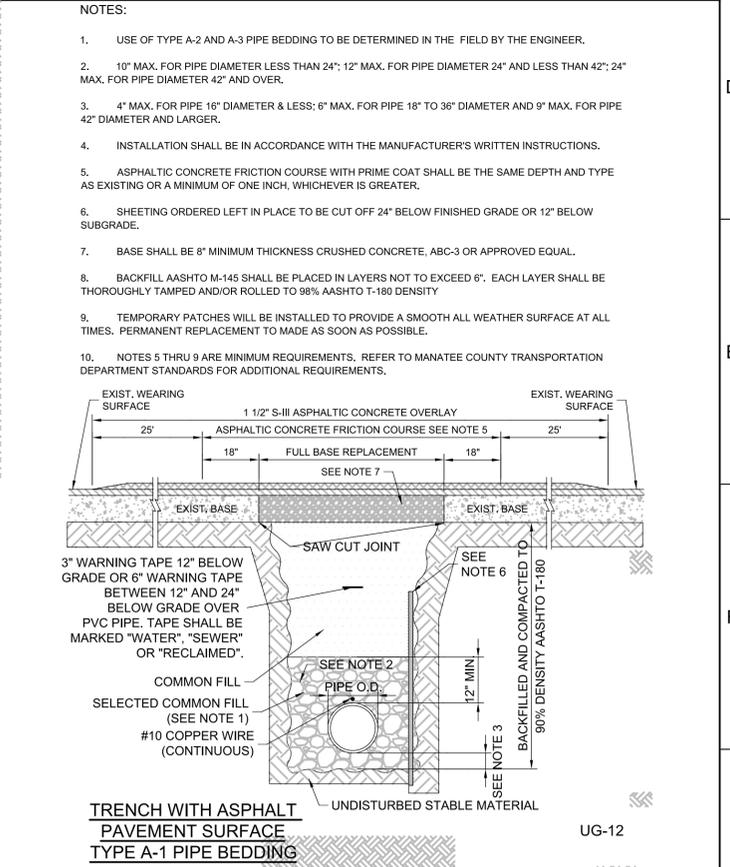
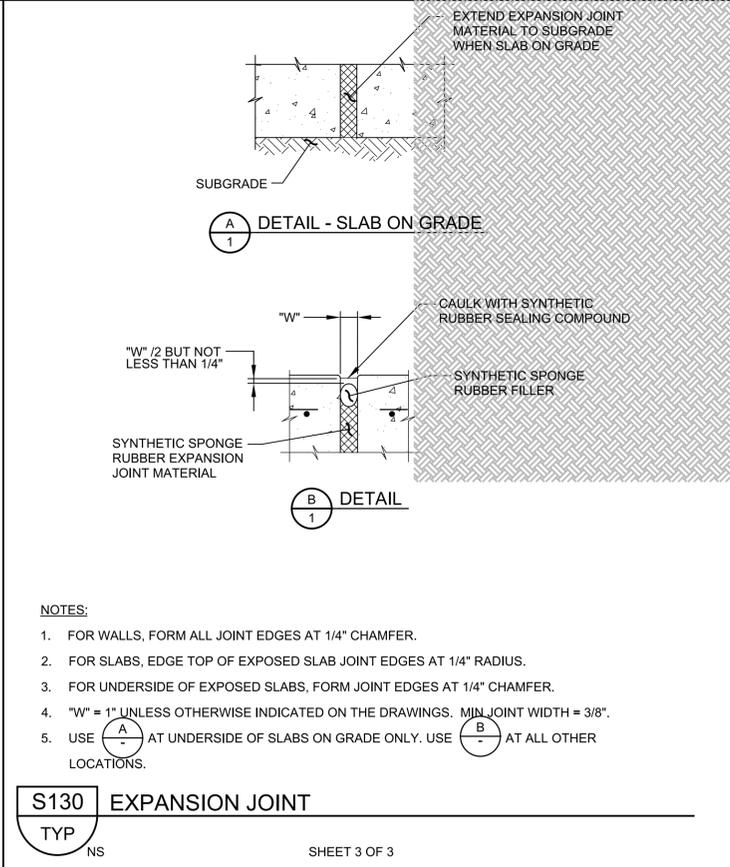
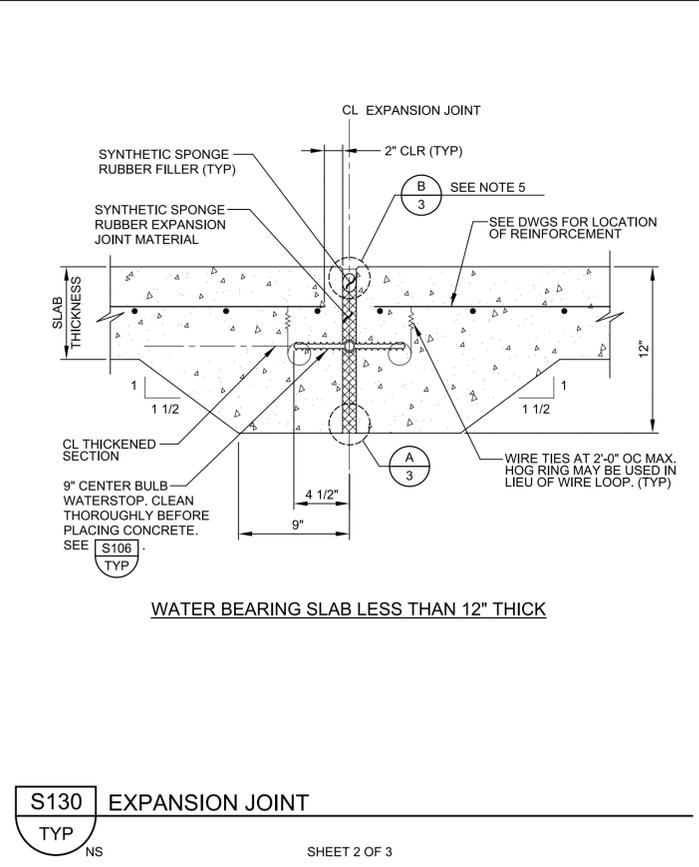
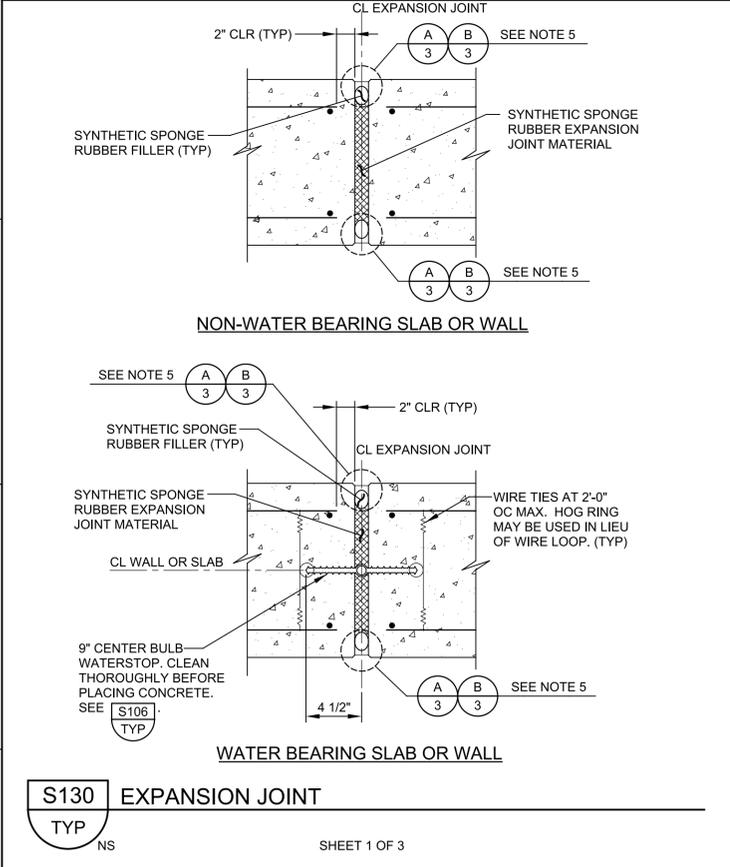
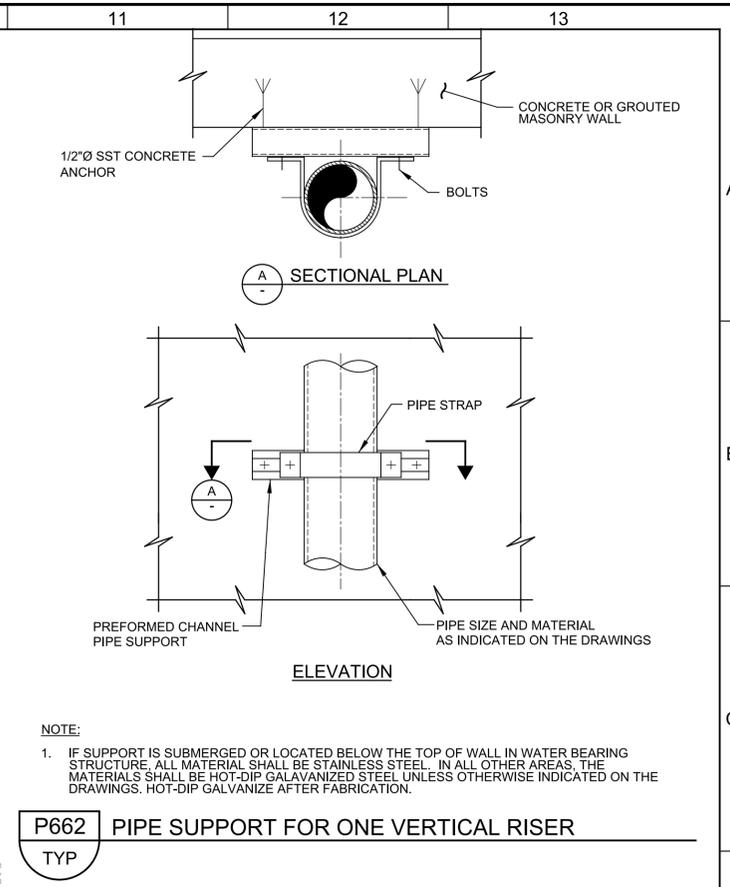
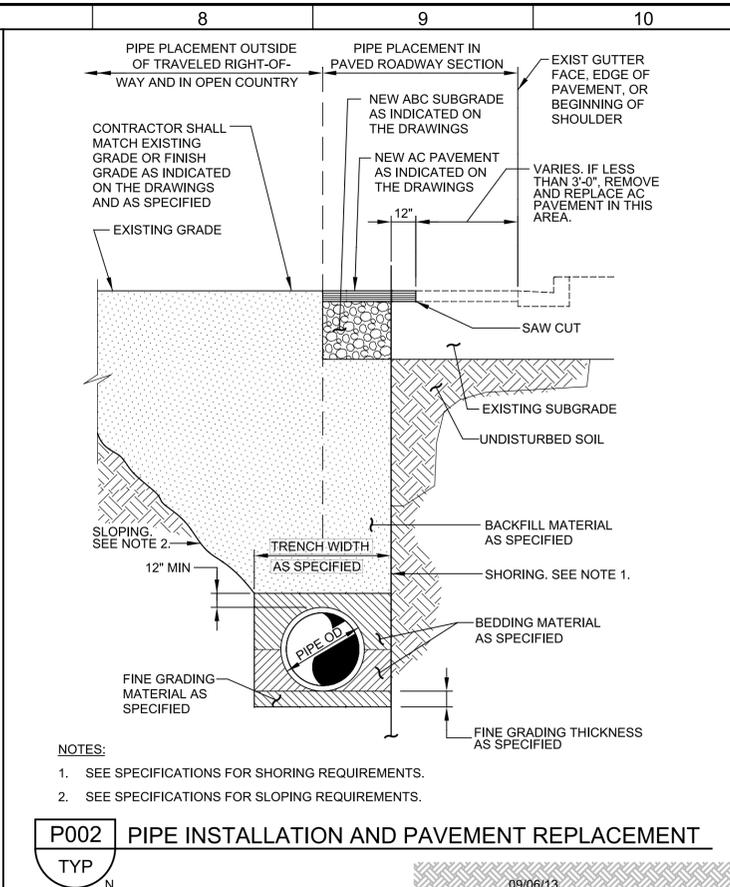
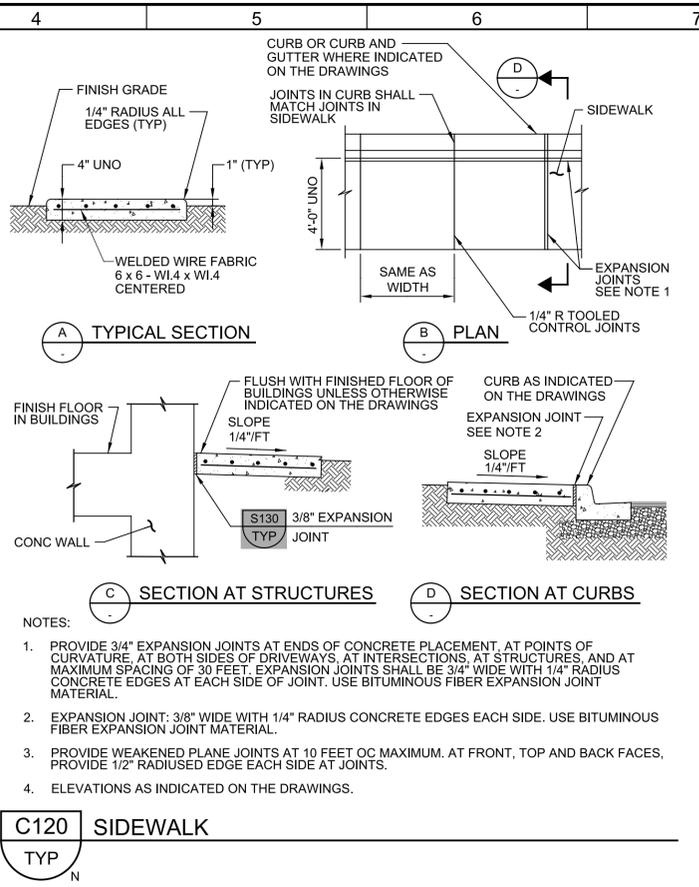
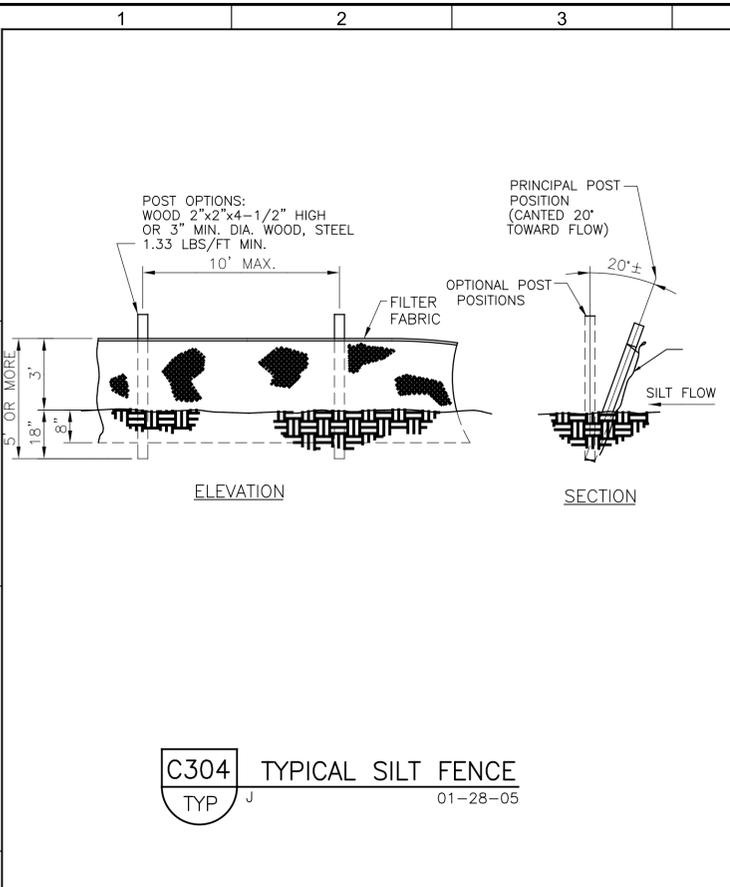
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User: svcpw

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LAST SAVED BY: awalls



REV	DATE	BY	DESCRIPTION
1			
2			
3			

DESIGNED GDM
DRAWN DVP
CHECKED EP
DATE APRIL 2015

** ORIGINAL SEALED BY DEAN MILTON P.E. APRIL 2015 FL 52719 **



MANATEE COUNTY
SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
TYPICAL DETAILS

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1" 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

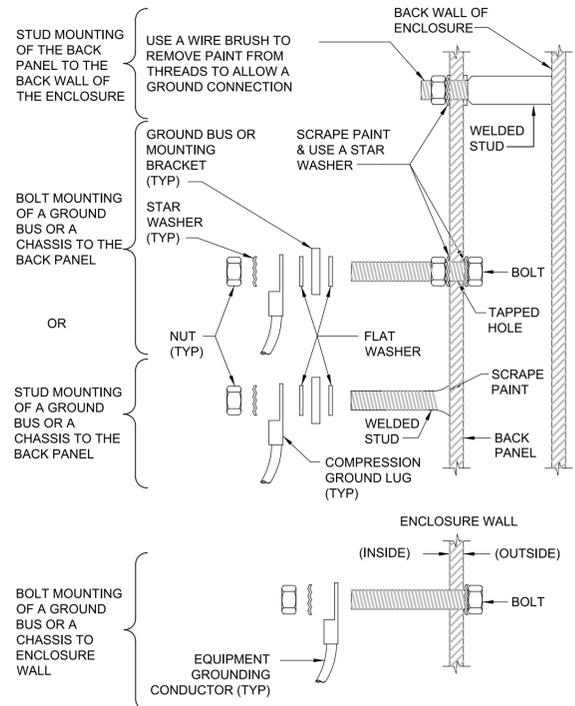
JOB NO. 9520F.10
DRAWING NO. T01

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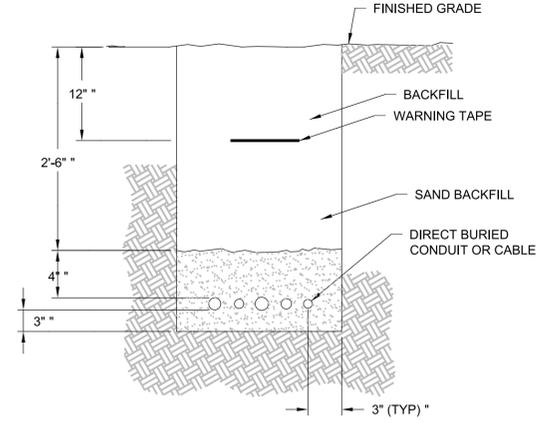
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LAST SAVED BY: awalls

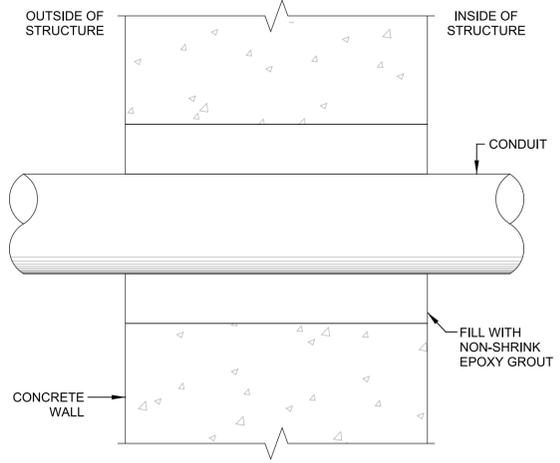


EG205 ENCLOSURE GROUNDING DETAILS
TYP S



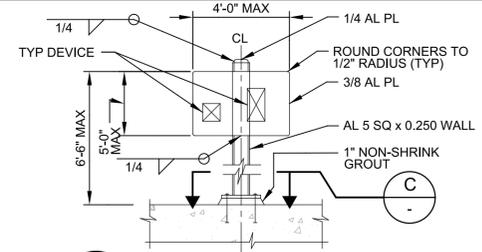
NOTES:
1. ALL DIMENSIONS ARE MINIMUM UNLESS OTHERWISE INDICATED ON THE DRAWINGS.

EM015 DIRECT BURIED CONDUIT OR CABLE
TYP

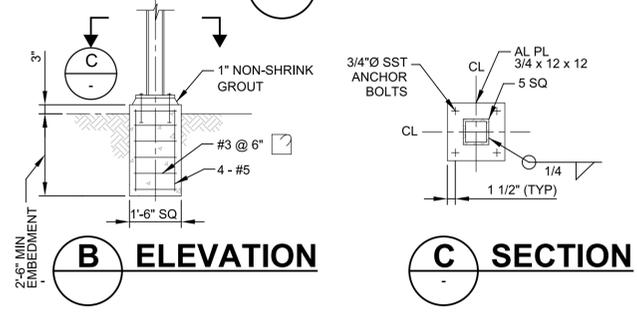


NOTES:
1. ROUGHEN SURFACE OF OPENING AND APPLY EPOXY CEMENT BONDING AGENT IMMEDIATELY PRIOR TO GROUTING.

EM138 CORE HOLE CONDUIT WALL PENETRATION
TYP S

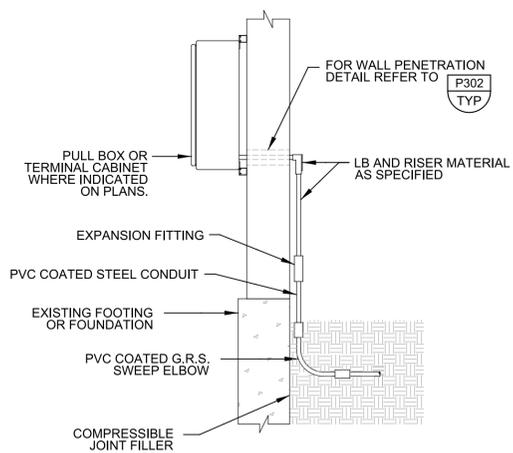


A ELEVATION

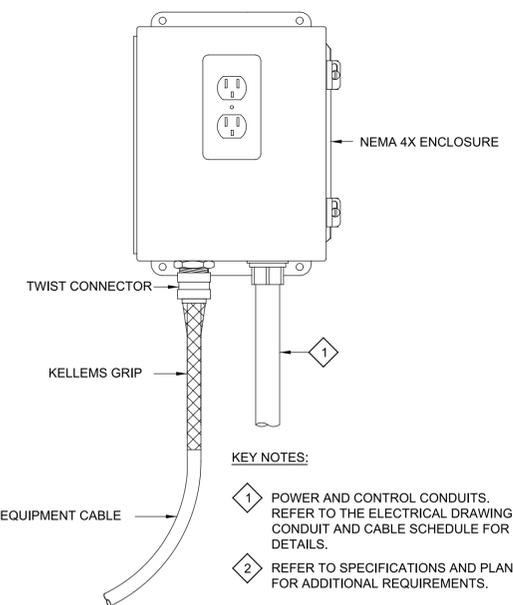


NOTES:
1. WHERE SEPARATE FOUNDATION IS REQD, SEE (C).
2. COAT ALUMINUM SURFACES IN CONTACT W/ CONCRETE PER SPECS.
3. USE SST FASTENERS FOR MOUNTING DEVICES.
4. WEIGHT OF DEVICE(S) SHALL NOT EXCEED 300 POUNDS.

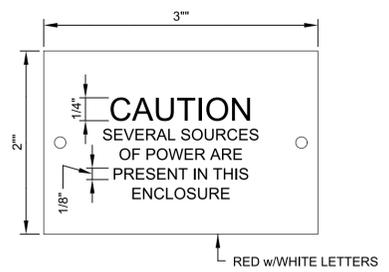
EM202 DEVICE SUPPORT AND MOUNTING
TYP S



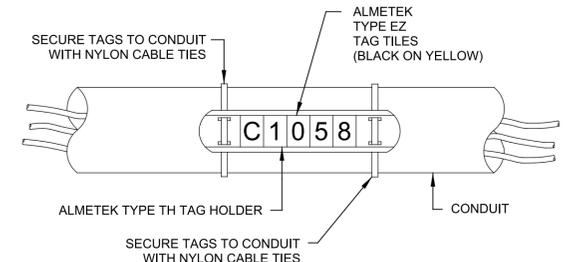
EM219 CONDUIT PENETRATION ABOVE GRADE
TYP R



EM315 SUBMERSIBLE EQUIPMENT CABLE CONNECTION DETAIL
TYP R



EN002 TYPICAL CAUTION NAMEPLATE
TYP S



EN006 TYPICAL CONDUIT MARKING SYSTEM
TYP S

REV	DATE	BY	DESCRIPTION
1			
2			
3			

DESIGNED MAG
DRAWN JB
CHECKED MAG
DATE APRIL 2015

** ORIGINAL SEALED BY MARIO A. GAMBOA P.E. APRIL 2015 FL 44675 **



MANATEE COUNTY
SWWRF UPGRADES TO CHLORINE RESIDUAL FEED LINES
ELECTRICAL
TYPICAL DETAILS

VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1"	JOB NO. 9520F.10 DRAWING NO. T02
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