

THE CITY OF NAPLES WRF AERATION MONITOR & CONTROL INSTRUMENTATION IMPROVEMENTS

10600 CHEVROLET WAY, SUITE 300
ESTERO, FLORIDA 33928
Ph: 239-390-1467 Fax: 239-390-1769



www.tetrattech.com

ATTACHMENT A - BID 14-016

PROJECT LOCATION:

380 RIVERSIDE CIRCLE
NAPLES, FLORIDA 34102

CLIENT INFORMATION:

CITY OF NAPLES
735 EIGHT ST. S
NAPLES, FLORIDA 34102

Tt PROJECT No.:

200-08516-12001

CLIENT PROJECT No.:

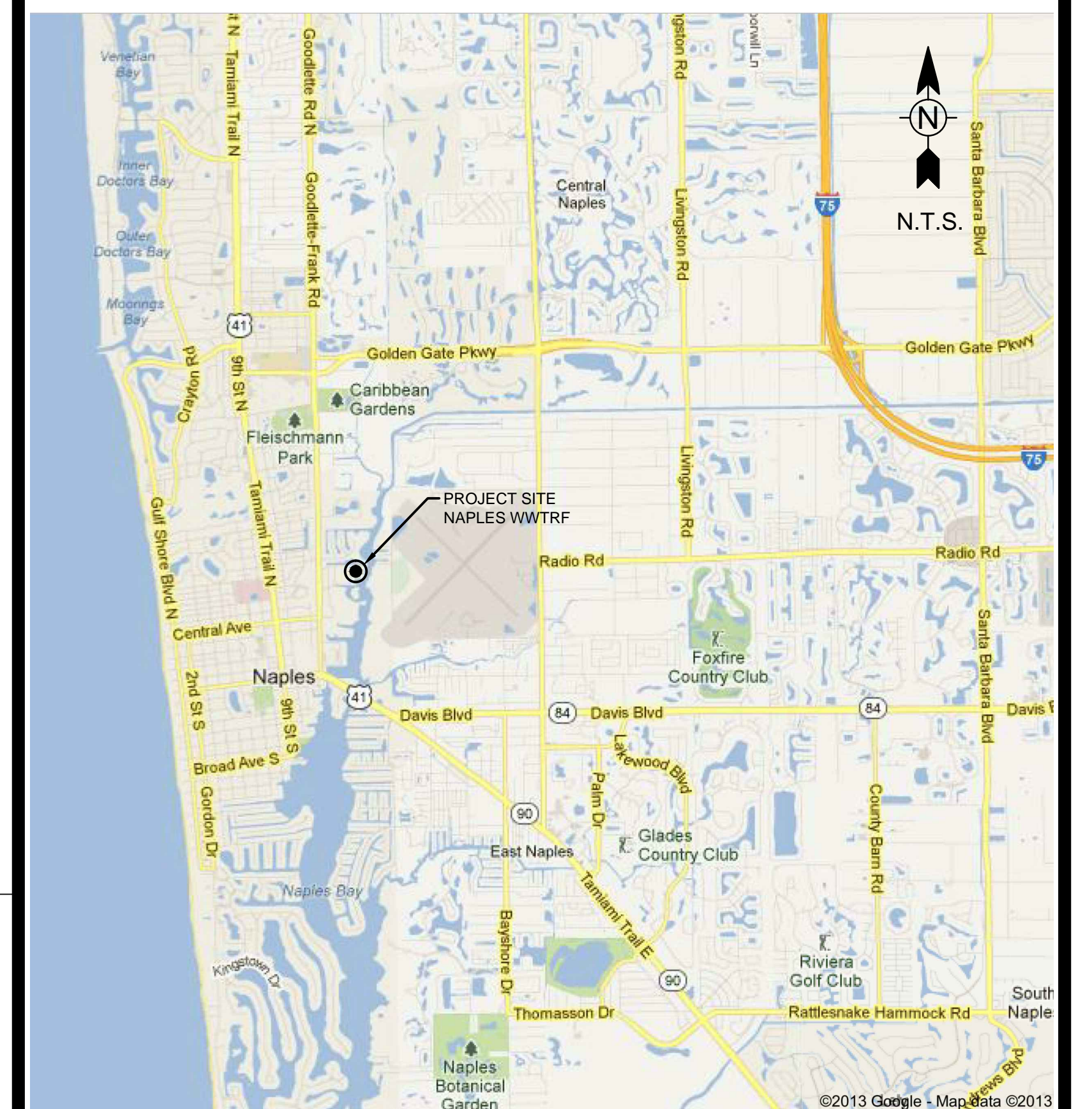
PROJECT DESCRIPTION / NOTES:

Installation of All Monitoring Devices (DO, SS, Sludge Level, & Thermal Mass Flow), PLC, power, communications, junctions, conduits, conductors, integration, and all related and required hardware, materials, and assemblies necessary for complete and operational systems that will allow real time monitoring, tracking, and control for the Blower systems of the aeration basins and improve treatment throughout various stages of the treatment plant.

ISSUED:

10/11/13 - 100% DESIGN REVISED

VICINITY MAP:



100% DESIGN
REVISED IN OCTOBER 2013

PREPARED FOR

THE CITY OF NAPLES

735 EIGHT ST. S
NAPLES, FLORIDA 34102

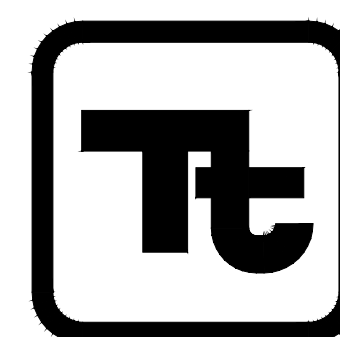
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|----------------|--------------------|
| JOHN SOREY III | MAYOR |
| GARY PRICE | VICE MAYOR |
| BILL MOSS | CITY MANAGER |
| BOB MIDDLETON | UTILITIES DIRECTOR |

CITY COUNCIL

TERESA HEITMANN
MARGARET "DEE" SULIK
BILL BARNETT
DOUG FINLAY
SAM SAAD III



11 October 2013



TETRA TECH, INC.

Infrastructure Offices Throughout Florida
Orlando * Fort Myers

10600 CHEVROLET WAY - SUITE 300 - ESTERO - FL 33928
TELEPHONE (239) 390-1467 - FAX (239) 390-1769 - WWW.TETRATECH.COM

Daniel M. Nelson, P.E.
Florida Registration 56152
Tetra Tech Inc.
10600 Chevrolet Way, Ste. 300
Estero, Florida 33928
Engineering Business No. 2429

DATE _____

BACKGROUND PLAN AND ONE LINE SYMBOLS

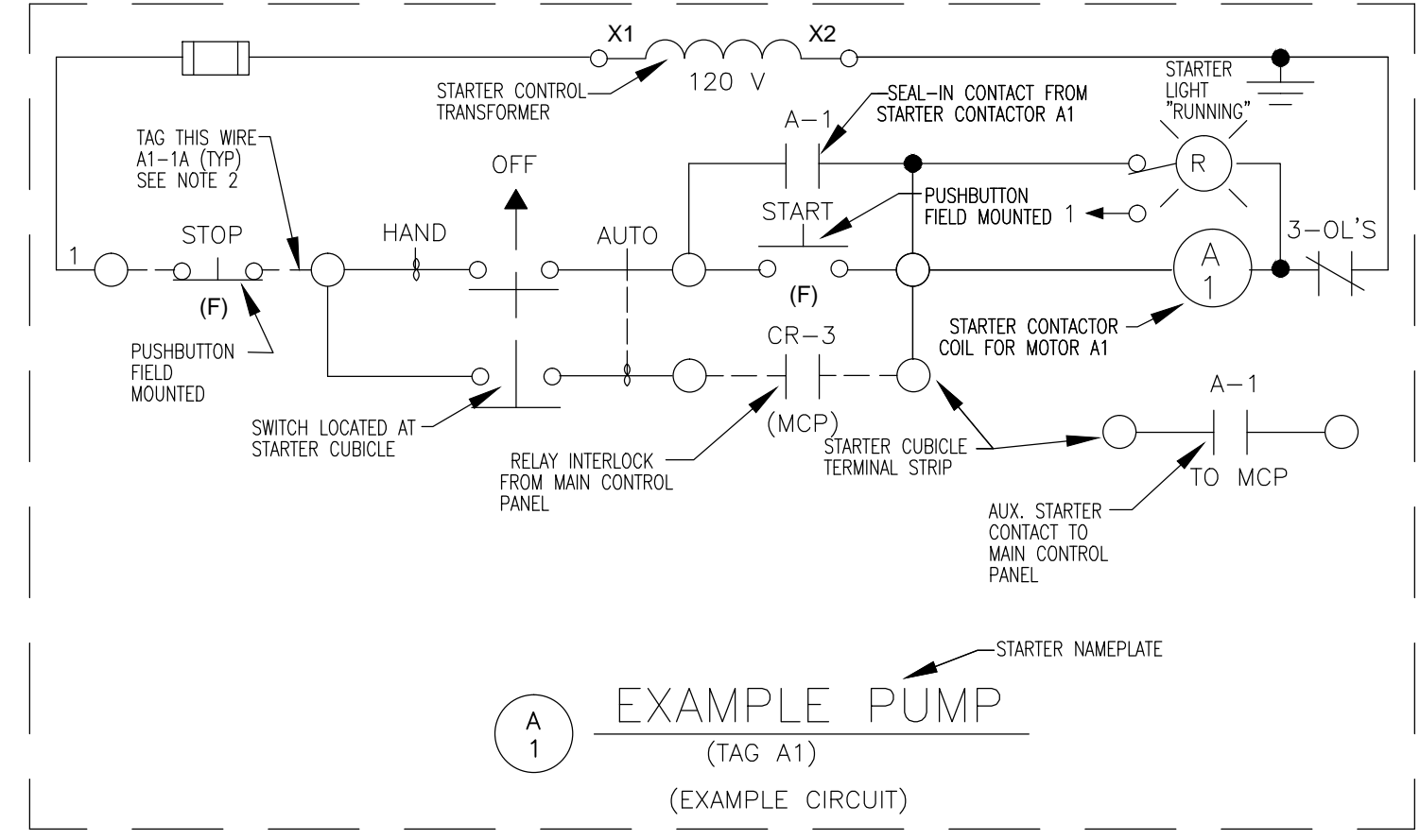
CONTROL CIRCUIT & PILOT DEVICE LEGEND

| SYMBOL | DESCRIPTION |
|--------|---|
| | CONTROL SWITCH (SEL. OR P.B.) SEE CIRCUITS FOR SPECIFIC TYPE |
| | FLOAT SWITCH - FLOW SWITCH |
| | TEMPERATURE - HUMIDISTAT SWITCH (SUBSCRIPT = NO. OF STAGES) |
| | LIMIT - PRESSURE - VACUUM SWITCH |
| | ELECTRICAL OR MECHANICAL ALTERNATOR (SEE WIRING) |
| | OVERLOAD SWITCH OR DEVICE |
| | TERMINAL BOX |
| | SOLENOID VALVE |
| | PHOTOCELL LINE VOLTAGE |
| | ITEM NO. INTERCOM EQUIPMENT |
| | INTERCOMMUNICATION SYSTEM AMPLIFIER - WALL STATION - LINE BALANCE |
| | INTERCOMMUNICATION DESK SET |
| | FLOAT SWITCH |
| | INTERCOM. SPEAKER (CEILING LAY-IN) |
| | TELEPHONE OUTLET OR JUNCTION BOX |
| | WELDING RECEPTACLE - NEMA L9-50R 600V, 2P, 3W, SIMPLEX |
| | INTERCOM HANDSET - SURFACE MOUNTED WITH REMOTE SPEAKER AMPLIFIER |
| | INTERCOM VOLUME CONTROL |
| | INTERCOM SPEAKER - SURFACE MOUNTED |
| | INTERCOM HANDSET - FLUSH MOUNTED WITH REMOTE SPEAKER AMPLIFIER |
| | AS NOTED (LIGHTING PANEL, CONTROL PANEL, DISTRIBUTION PANEL ETC.) WALL MOUNTED |
| | JUNCTION BOX |
| | HEATER |
| | TRANSFORMER |
| | CONDUIT WITH CONDUIT SEAL FITTING |
| | CONDUIT EXPOSED |
| | CONDUIT CONCEALED |
| | DIRECT BURIED CONDUIT |
| | DIRECT BURIED CABLE |
| | OVERHEAD LINE |
| | UNDERGROUND DUCT BANK |
| | CONCRETE ENCASED DUCT BANK, WITH CABLE LOCATIONS AND SPARE DUCTS AS INDICATED ON DRAWINGS |
| | CABLE REEL |
| | 16-PORT FIBER OPTIC PATCH PANEL (ST CONNECTORS) |

| SYMBOL | DESCRIPTION |
|--------|---|
| | LOW VOLTAGE DISCONNECT SWITCH |
| | LOW VOLTAGE FUSE (BELOW 600V) |
| | ALL STARTERS SHALL BE FULL VOLTAGE NON-REVERSING UNLESS OTHERWISE INDICATED (FVR) FULL VOLTAGE REVERSING (RV) REDUCED VOLTAGE (2S,2W) TWO SPEED, TWO WINDING |
| | 600V, 3 POLE MOLDED CASE CIRCUIT BREAKER, FRAME & RATING AS SHOWN |
| | SINGLE PHASE, FRACTIONAL HP MOTOR TO LOCATION INDICATED (SEE GEN. NOTE 4) |
| | THREE PHASE LOAD WITH IDENTIFICATION |
| | HIGH VOLTAGE FUSE (ABOVE 600 V) |
| | TAG NO. (BALLOON) FOR DEVICE INDICATED |
| | FOR POWER (SEE GEN. NOTE 4) 3/4" (2) (#18 SHLD.) CONDUIT AND WIRE RUN FROM DEVICE INDICATED TO LOCATION INDICATED |
| | CAPACITOR, 3 PHASE, SIZE AS INDICATED |
| | DISCONNECT SWITCH (F) = FUSED (C) = CIRCUIT BREAKER |
| | MAGNETIC STARTER (BACKGROUND DRAWINGS ONLY) |
| | COMBINATION MAGNETIC STARTER FUSED UNLESS NOTED (CIRCUIT BREAKER) |
| | COMBINATION LIGHTING CONTACTOR WITH HAND-OFF-AUTO SWITCH |
| | MANUAL STARTER (R) = REVERSING |
| | CONTROL PANEL |
| | TEMPERATURE CONTROL PANEL |
| | UNIT HEATER, 1/8 HORSEPOWER |
| | 600 VOLT FEEDER BUS DUCT (AMPERAGE AS INDICATED) |
| | LIGHTNING ARRESTER |
| | LOW VOLTAGE HOME RUNS 120/208 V 120/240 V (SEE GEN. NOTE 4) |
| | NEMA 4 WATER TIGHT |
| | NEMA 4X WATER TIGHT AND CORROSION PROOF |
| | NEMA 7 EXPLOSION PROOF - CLASS I, DIVISION I, GROUP D |
| | NEMA 9 EXPLOSION PROOF - CLASS II, DIVISION 1 |
| | KEYLOCK |
| | SMOKE DETECTOR |
| | EXIT LIGHT |
| | FLUORESCENT LUMINAIRE |
| | INCANDESCENT LUMINAIRE |
| | HIGH INTENSITY DISCHARGE LIGHT |
| | EMERGENCY BATTERY PACK |

| SYMBOL | DESCRIPTION |
|--------|---|
| | PRESS. ACTUATED SWITCH |
| | FLOAT ACTUATED SWITCH |
| | FLOW ACTUATED SWITCH |
| | TEMP. ACTUATED SWITCH |
| | LIMIT SWITCH-NORMALLY OPEN |
| | LIMIT SWITCH-NORMALLY CLOSED |
| | LIMIT SWITCH-NORMALLY CLOSED-HELD OPEN |
| | LIMIT SWITCH-NORMALLY OPEN-HELD CLOSED |
| | LATCHING CABLE SWITCH |
| | TIME-DELAY FUSE |
| | CONTROL RELAY COIL |
| | CONTROL RELAY CONTACT-NORMALLY OPEN |
| | CONTROL RELAY CONTACT-NORMALLY CLOSED |
| | TWO COIL LATCHING RELAY |
| | TIMING RELAY COIL |
| | TIMED CLOSED CONTACT ON ENERGIZATION |
| | TIMED OPEN CONTACT ON ENERGIZATION |
| | TIMED OPEN CONTACT ON DE-ENERGIZATION |
| | TIMED CLOSED CONTACT ON DE-ENERGIZATION |
| | 120 VAC TRANSFORMER |

| SYMBOL | DESCRIPTION |
|--------|--|
| | SELECTOR SWITCH OPERATOR WITH FUNCTION SHOWN |
| | MOMENTARY PUSHBUTTON OPERATOR-NORMALLY OPEN |
| | MOMENTARY PUSHBUTTON OPERATOR-NORMALLY CLOSED |
| | PUSHBUTTON OPERATOR WITH MUSHROOM HEAD |
| | FIELD LOCATED STOP BUTTON |
| | MAINTAINED PUSH-PULL OPERATOR |
| | MAINTAINED STOP-START PUSHBUTTON OPERATOR |
| | SOLENOID OR CLUTCH |
| | PUSH-TO-TEST INDICATING LIGHT |
| | MAINTAINED STOP-MOMENTARY START PUSHBUTTON (JOG) |
| | ZERO SPEED OR ANTI-PLUGGING SWITCH |
| | LOCAL TERMINALS WITH EXTERNAL WIRING |
| | ELAPSED TIME INDICATOR |
| | TIMING RELAY INSTANTANEOUS CONTACTS |



- GENERAL 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 CROSSHATCHED ON THE DRAWINGS ARE EXISTING ITEMS TO BE REMOVED.
 - FOR ITEMS INDICATED AS "FIELD LOCATE" CHECK DRAWINGS OF OTHER TRADES (IN PARTICULAR PIPING AND STRUCTURAL) FOR INTERFERENCE AND FOR LOCATIONS OF MOUNTING FLANGES, CONNECTION POINTS, ETC.
 - 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. CONDUIT SHALL BE 3/4" MIN.
 - ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. INSTALLATION SHALL BE PLUMB AND LEVEL.
 - ELECTRICAL EQUIPMENT REMOVED FROM SITE SHALL BE RETURNED TO OWNER INCLUDING, BUT NOT LIMITED TO, MCC, MCC BUCKETS AND COMPONENTS, AND WIRING.
 - ELECTRICAL WIRES SHOWN SHALL BE RATED FOR 90-DEGREES CELSIUS, MINIMUM.

- NOTES:**
- THE FOLLOWING COMPONENT IDENTIFICATION SHALL BE USED AS APPROPRIATE:
(F) FIELD MOUNTED NOT AT STARTER OR OTHER CONTROL PANELS.
(S) STARTER PANEL MOUNTED.
(TCP) AT TEMPERATURE CONTROL PANEL.
(MCP) AT MAIN CONTROL PANEL.
(1) AT CONTROL PANEL NO. 1.
(2) AT CONTROL PANEL NO. 2.
 - WIRE NUMBERS (1, 3 & 5) ETC. SHALL BE PREFIXED WITH STARTER TAG NUMBERS. THE WIRE NUMBER AFTER THE PREFIX, MAY BE THE MANUFACTURERS WIRE NUMBERING SYSTEM. WIRE MARKERS MAY BE USED AT EACH WIRE TERMINATION POINT.
 - CONTRACTOR SHALL PROVIDE A LIST OF EQUIPMENT AND MATERIALS NECESSARY FOR CONSTRUCTION, PER COUNTY STANDARDS, TO COUNTY PRIOR TO BID. CONTRACTOR'S LIST SHALL BE APPROVED BY COUNTY PRIOR TO SUBMITTING BID. ANY ADDITIONAL COST ASSOCIATED WITH ADHERING TO COUNTY STANDARDS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

FLOW DIAGRAM SYMBOL LEGEND

| SYMBOL | DESCRIPTION |
|--------|--|
| | FIELD OR LOCALLY MOUNTED DEVICE |
| | BOARD OR PANEL MOUNTED DEVICE - (DASHED LINR THRU CIRCLE INDICATES DEVICE MOUNTED INSIDE OF PANEL) |
| | ELECTRICAL SIGNAL |
| | AIR LINE |
| | HYDRAULIC SIGNAL |
| | ELECTROMAGNETIC OR SONIC SIGNAL |
| | CONNECTION TO PROCESS, OR MECHANICAL LINK |
| | PROGRAMMED FUNCTION NOT NORMALLY ACCESSIBLE TO OPERATOR |
| | PROGRAMMED FUNCTION ACCESSIBLE THROUGH OPERATOR'S INTERFACE DEVICE |
| | PROGRAMMABLE CONTROLLER INPUT/OUTPUT POINT |
| R | RESET |
| T | TRIP |
| AS | AIR SUPPLY |
| DO | DISSOLVED OXYGEN |
| GS | GAS SUPPLY |
| HS | HYDRAULIC SUPPLY |
| NS | NITROGEN SUPPLY |
| ORP | OXYGEN REDUCTION POTENTIAL |
| SS | STEAM SUPPLY |
| SP | SET POINT |
| WS | WATER SUPPLY |
| PV | PROCESS VARIABLE |

| SYMBOL | DESCRIPTION |
|--------|---|
| | CHECK VALVE |
| | SOLENOID VALVE OPERATOR, SOLENOID VALVE OPERATOR-DETENTED |
| | BUTTERFLY VALVE, DAMPER OR LOUVER |
| | GATE VALVE OR KNIFE GATE |
| | PLUG VALVE |
| | GLOBE VALVE |
| | FLOW ORIFICE |
| | VENTURI OR INSERT FLOW TUBE |
| | IN-LINE FLOW ELEMENT (MAGNETIC TYPE) |
| | IN-LINE FLOW ELEMENT (PROPELLER TYPE) |
| | IN-LINE FLOW ELEMENT (ULTRA SONIC) |
| | PNEUMATIC DIAPHRAGM OR POSITIONER (OPEN-SHUT & THROTTLING) |
| | STROKE OR POSITION ACTUATOR CYLINDER (OPEN-SHUT & THROTTLING) |
| | MOTOR OPERATED (OPEN-SHUT & THROTTLING) |
| | ROTAMETER |
| | TURBIDIMETER |
| | BALL VALVE |
| | SLUICE GATE |
| | SLIDE-STOP GATE |
| | INTERLOCKING |
| | AND |
| | OR |
| | MOTOR STARTER |
| | EXCLUSIVE OR |
| | PURGE |
| | PARSHALL FLUME |
| | COMPUTOR LOGIC SYSTEM, INPUT OR OUTPUT |
| | AIR SET ASSEMBLY |
| | TERMINAL OR TRANSITION POINT |
| | MOTOR |

| SYMBOL | DESCRIPTION |
|--------|-------------------------------------|
| | GAIN OR PROPORTIONAL CONTROL |
| | INTEGRAL OR RESET CONTROL |
| | DERIVATIVE OR RATE CONTROL |
| | VELOCITY ALGORITHM |
| | ON-OFF CONTROL |
| | SQUARE ROOT EXTRACTOR |
| | ADD OR TOTALIZE |
| | SUBTRACT OR DIFFERENCE |
| | HIGHEST MEASURED VARIABLE |
| | LOWEST MEASURED VARIABLE |
| | CONVERT ONE TO ANOTHER |
| | MULTIPLY, DIVIDE |
| | BIAS OR REVERSING |
| | CHARACTERIZE - (EQUATION / D%/ETC.) |

I.S.A. STANDARD LETTER FUNCTIONS

| SYMBOL | FIRST LETTER | SUCCEEDING LETTERS |
|--------|----------------------------|-------------------------|
| A | ANALYSIS, ANALOG | ALARM |
| B | BURNER, FLAME | BATCH |
| C | CONDUCTIVITY, COMMAND | CONTROL (FEEDBACK TYPE) |
| D | DENSITY, SPECIFIC GRAVITY | |
| E | VOLTAGE | PRIMARY ELEMENT |
| F | FLOW RATE | RATIO |
| G | GAGING | GLASS |
| H | HAND, MANUAL | HIGH |
| I | CURRENT | INDICATE |
| J | POWER | SCAN |
| K | TIME, TIME SCHEDULE | CONTROL (NO FEEDBACK) |
| L | LEVEL, LIGHT | LOW |
| M | MOISTURE, HUMIDITY | MIDDLE, MODULATE |
| N | | |
| O | OVERLOAD | ORIFICE |
| P | 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 | | |
| Y | | RELAY, COMPUTE |
| Z | POSITION | DRIVE, ACTUATE |

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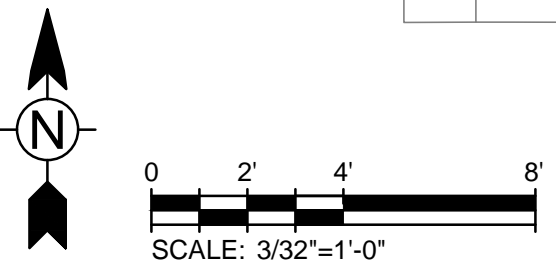
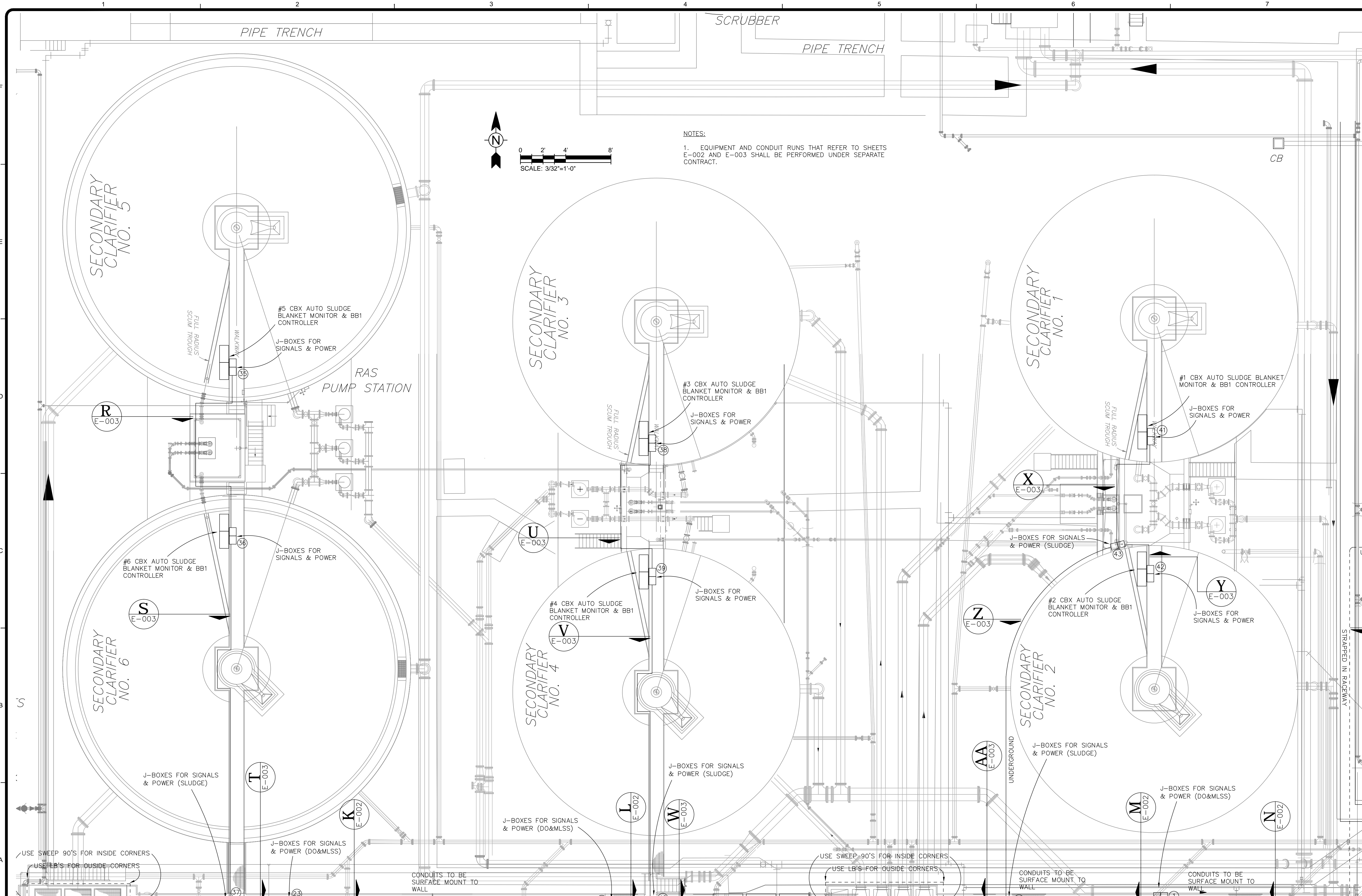
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CITY OF NAPLES WRF AERATION MONITOR & CONTROL INSTRUMENTATION IMPROVEMENTS

Project No.: 200-08516-12001
Designed By: JAS
Drawn By: JAS
Checked By: FWY

E-001

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NOTES:
 1. EQUIPMENT AND CONDUIT RUNS THAT REFER TO SHEETS E-002 AND E-003 SHALL BE PERFORMED UNDER SEPARATE CONTRACT.

CLARIFIER SLUDGE
 SCALE: 3/32" = 1'-0"



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CITY OF NAPLES, FL
 CITY OF NAPLES WRF AERATION MONITOR & CONTROL INSTRUMENTATION IMPROVEMENTS
 CLARIFIER SLUDGE

Project No.: 200-08516-12001
 Designed By: BCS
 Drawn By: BCS
 Checked By: WP

E-103

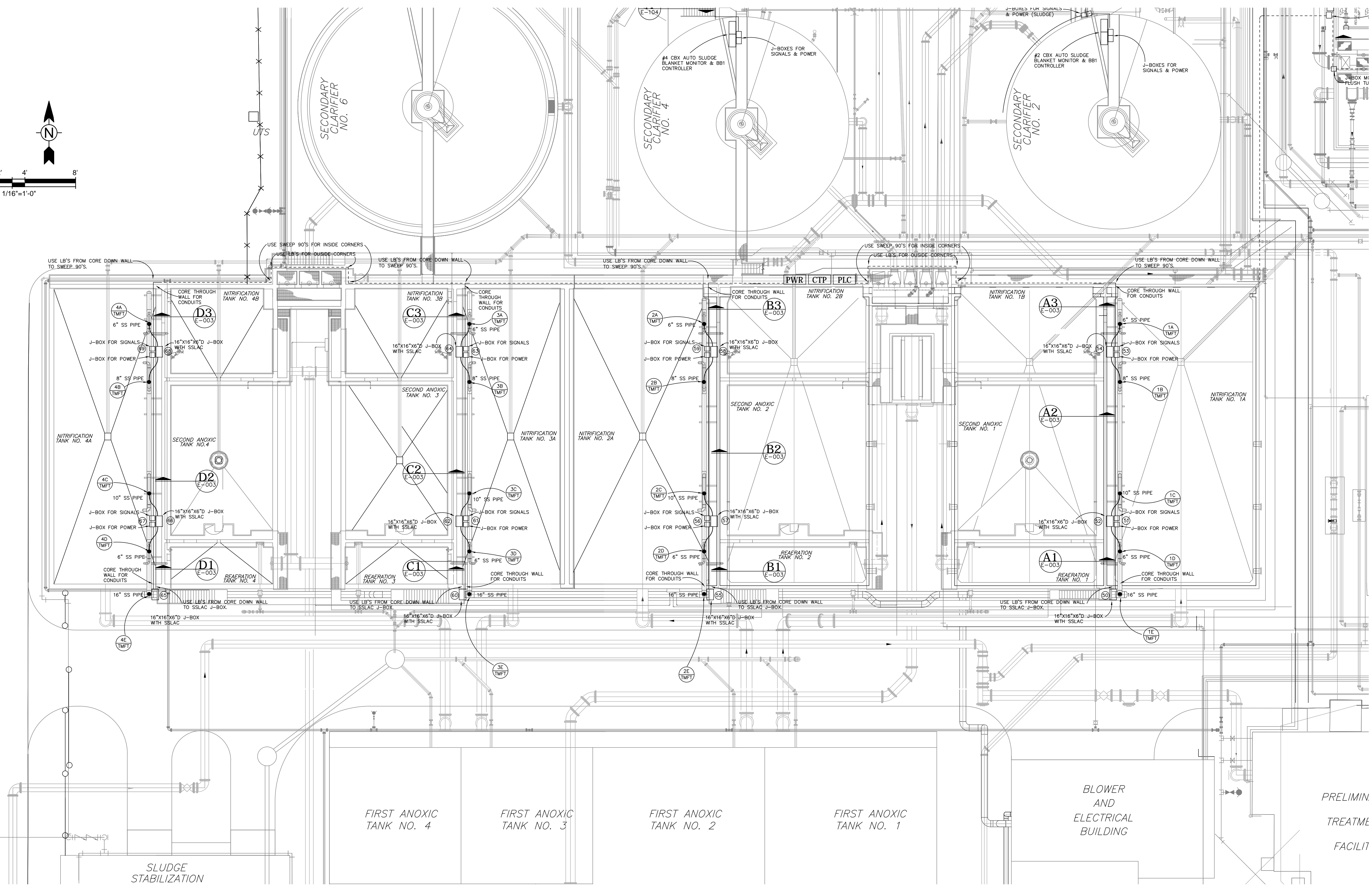
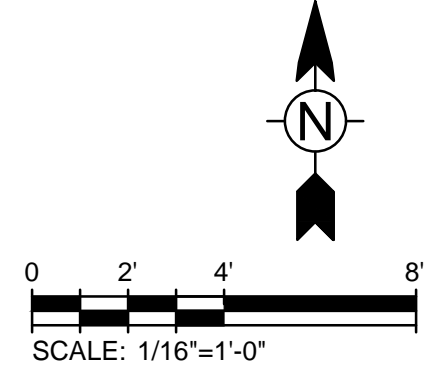
Bar Measures 1 inch

Copyright: Tetra Tech

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1 2 3 4 5 6 7

F
E
D
C
B
A



**AERATION BASIN
THERMAL MASS FLOW**
SCALE: 1/16" = 1'-0"

TETRA TECH
www.tetra-tech.com
10600 CHEVROLET WAY, SUITE 300
ESTERO, FL 33928
PHONE: (239) 390-1467 FAX: (407) 839-3790

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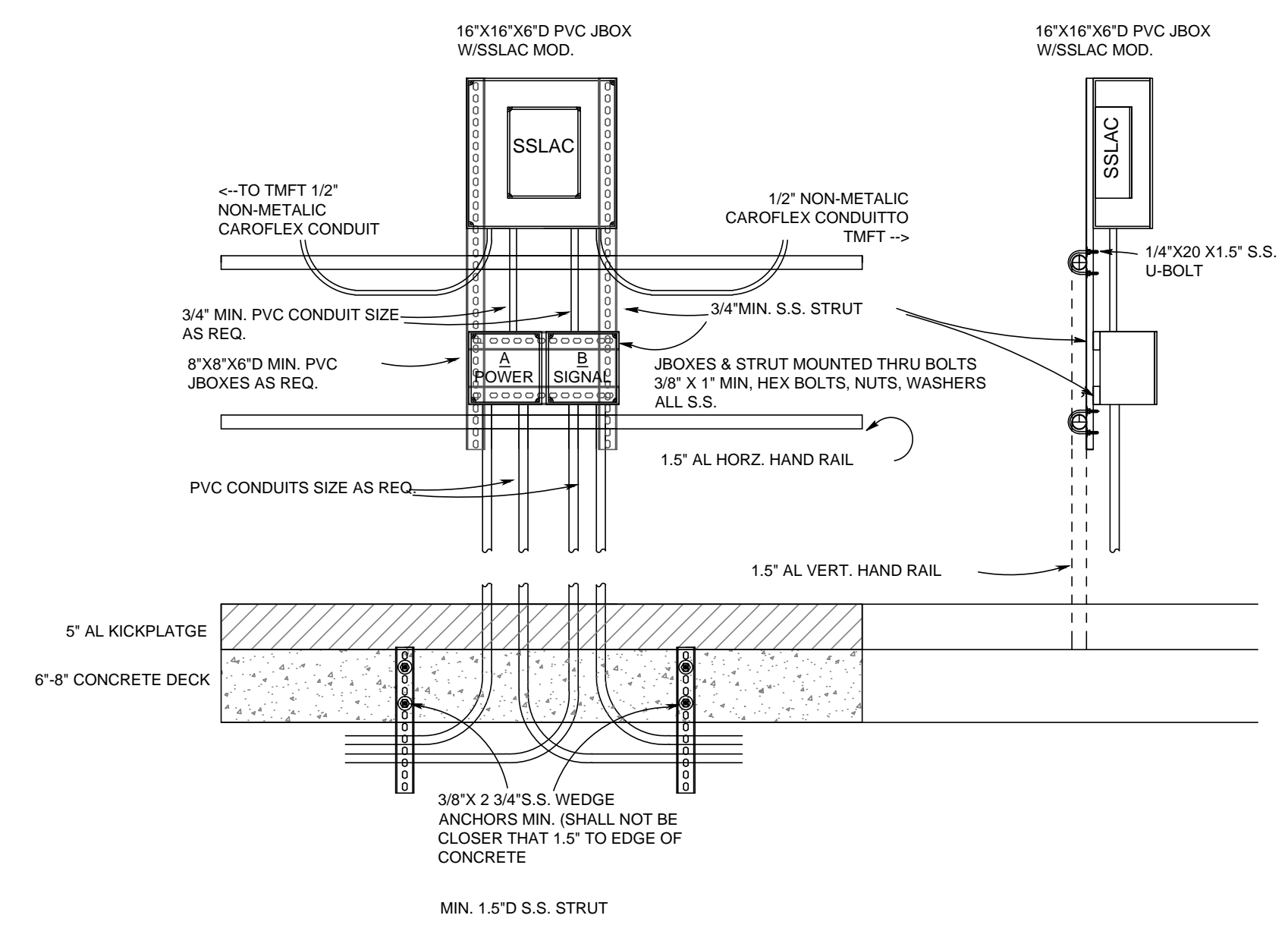
CITY OF NAPLES, FL
CITY OF NAPLES WRF AERATION MONITOR & CONTROL INSTRUMENTATION IMPROVEMENTS
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Project No.: 200-08516-12001
Designed By: BCS
Drawn By: BCS
Checked By: WP

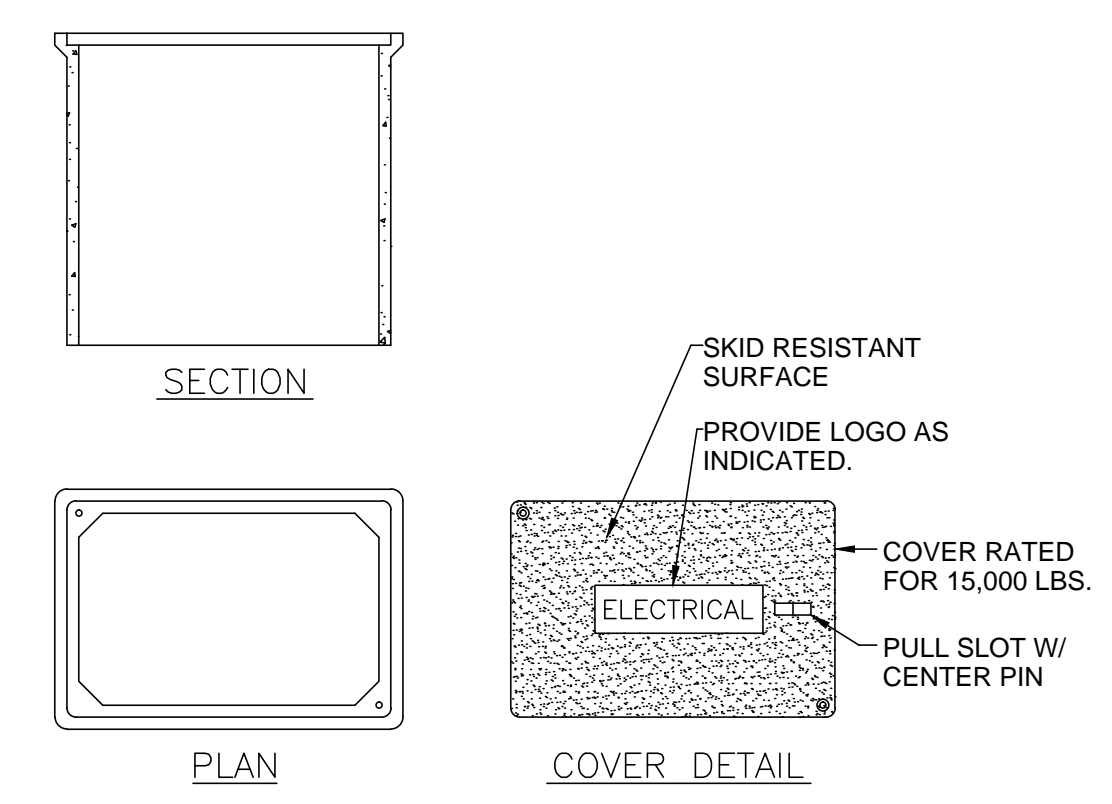
E-104

Bar Measures 1 inch

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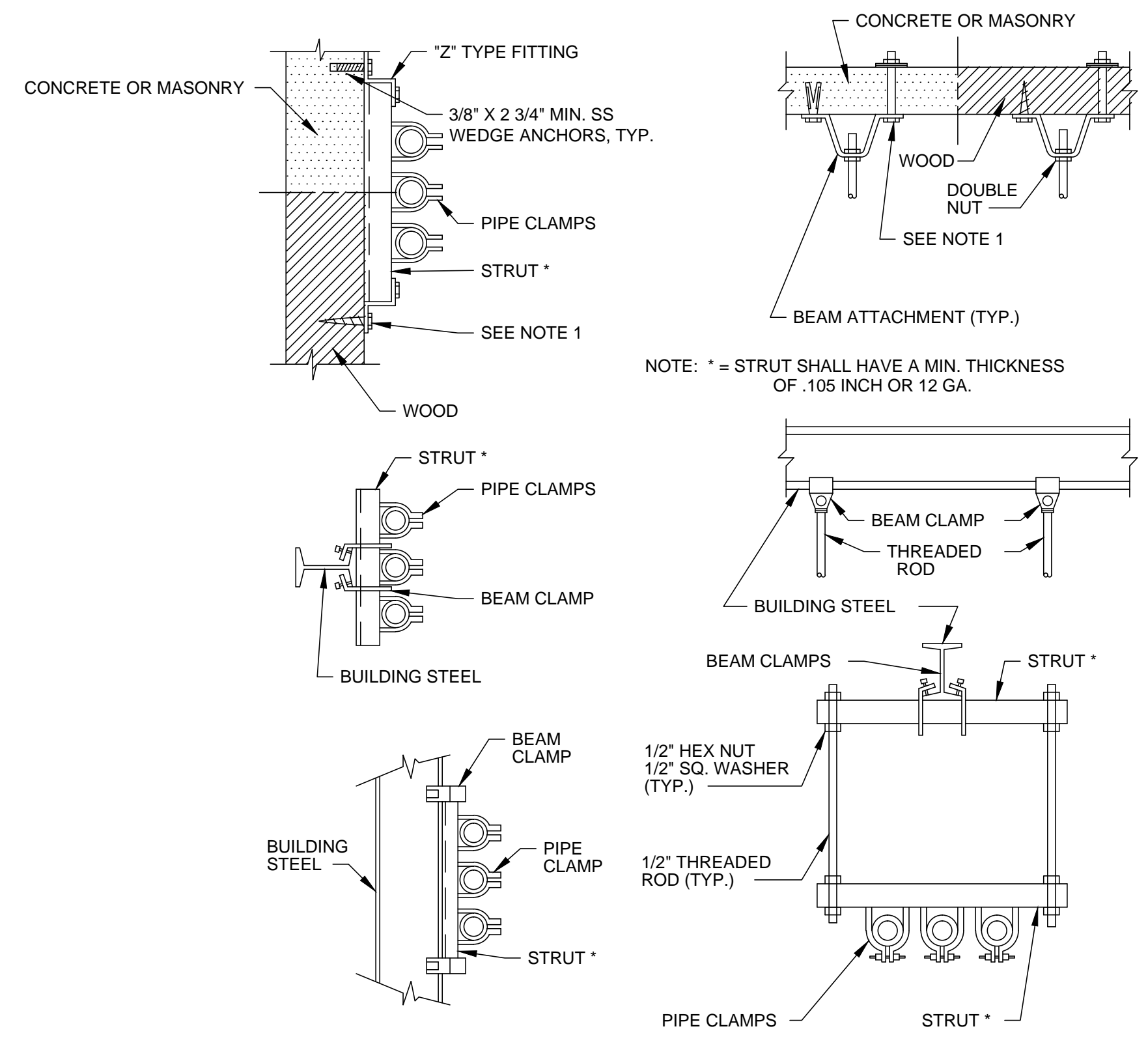


TYPICAL JBOX INSTALLATION ON HAND RAILS
(LAYOUTS MAY VARY) NO SCALE



- NOTES:**
- 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 10,000 PSI AND A FLEXURAL STRENGTH OF AT LEAST 5,000 PSI. 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 1/2" ABOVE THE FINISHED GRADE.

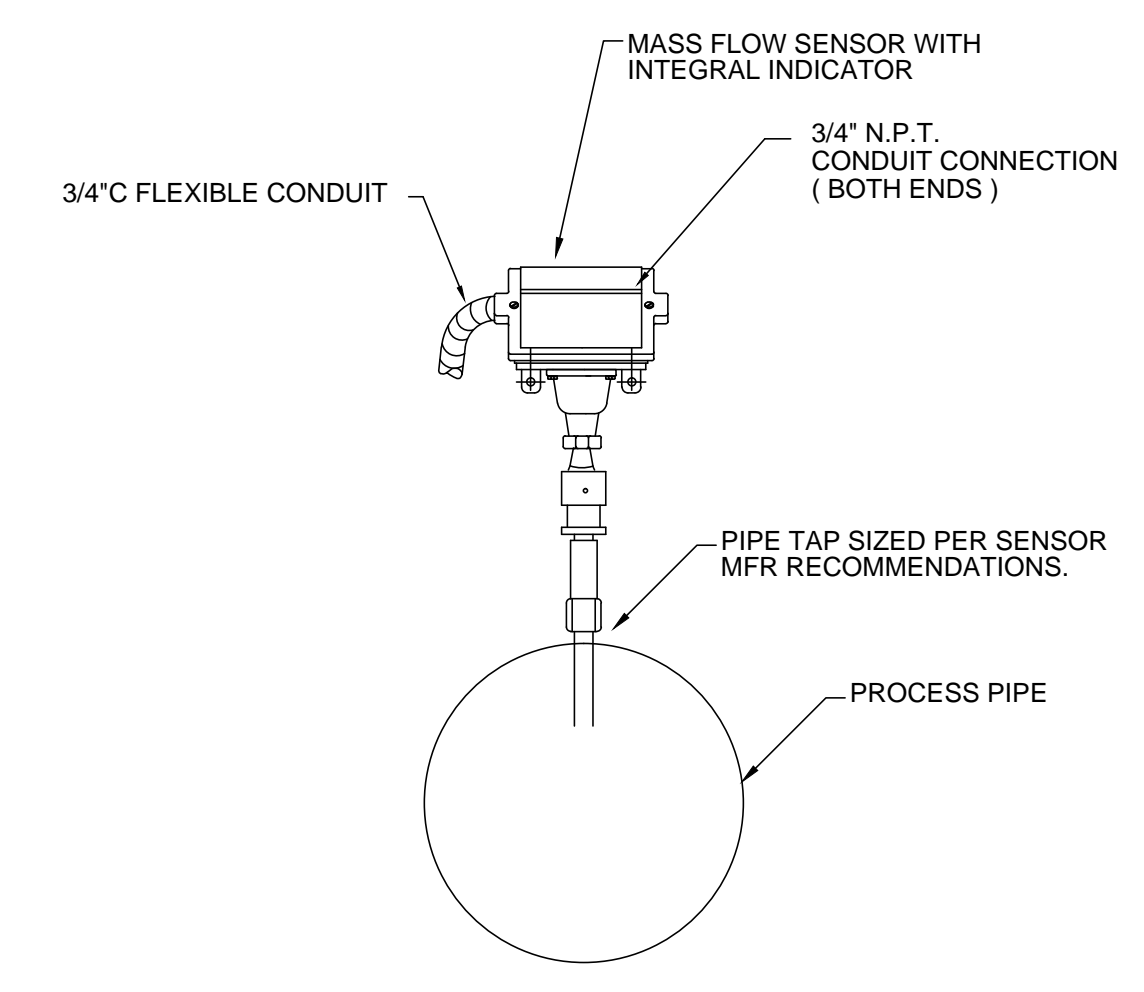
QUAZITE COMPOSOLITE OR EQUAL
HANDHOLE DETAIL
NO SCALE



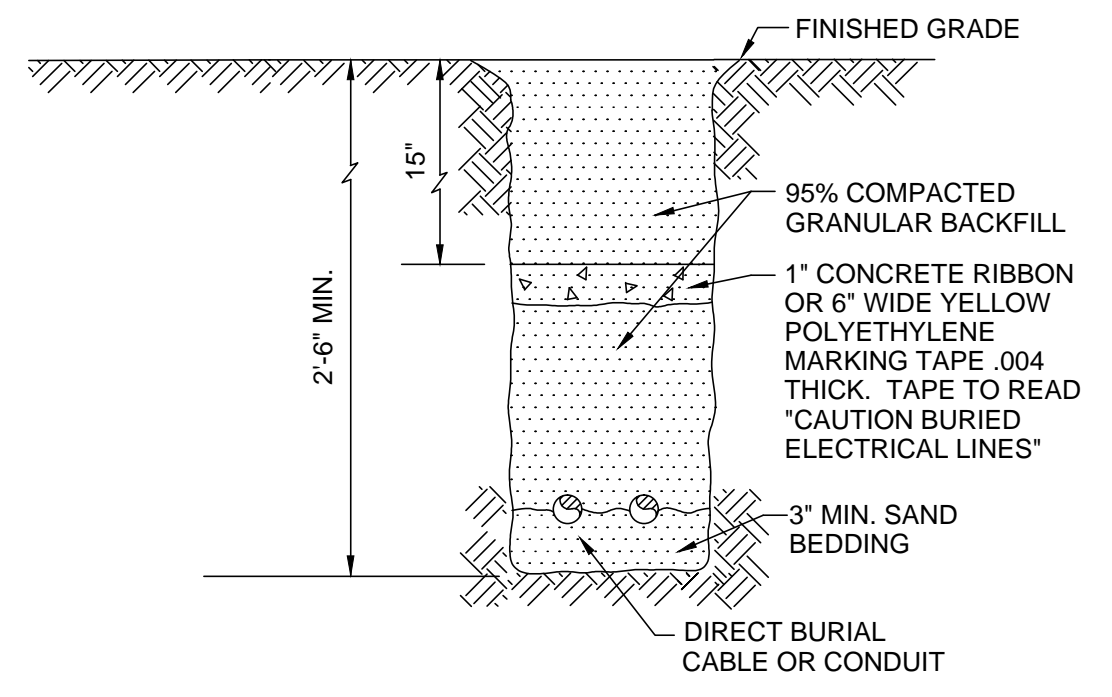
VERTICALLY RACKED AND VERTICAL RUNS
NO SCALE

HORIZ. RACKED SUSPENDED RUN
NO SCALE

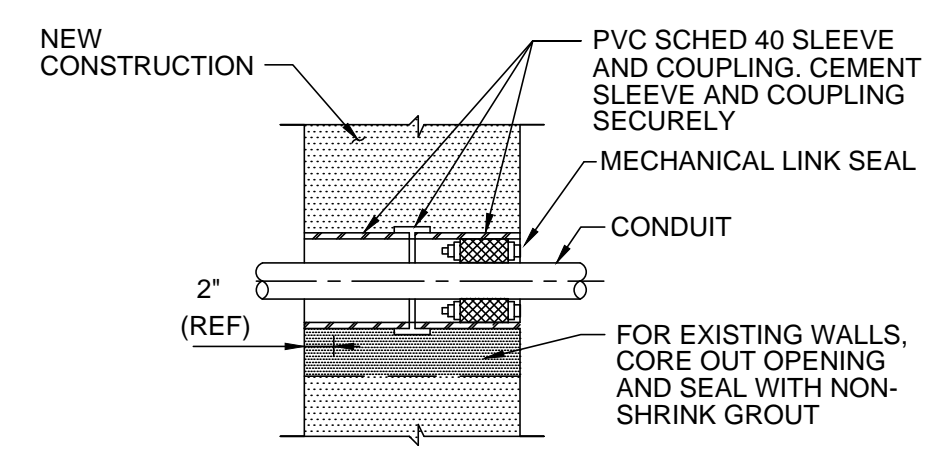
- NOTE:**
- ALL MOUNTING HARDWARE SHALL BE 304 STAINLESS STEEL (I.E.: ANCHORS, BOLTS, WASHERS, NUTS, THREADED ROD, CLAMPS, STRUTS, ETC.)



MASS FLOW SENSOR DETAIL
NO SCALE



TRENCHING DETAIL
NO SCALE



EXTERIOR WALL CONDUIT SLEEVE DETAIL
NO SCALE DO NOT USE BELOW GRADE

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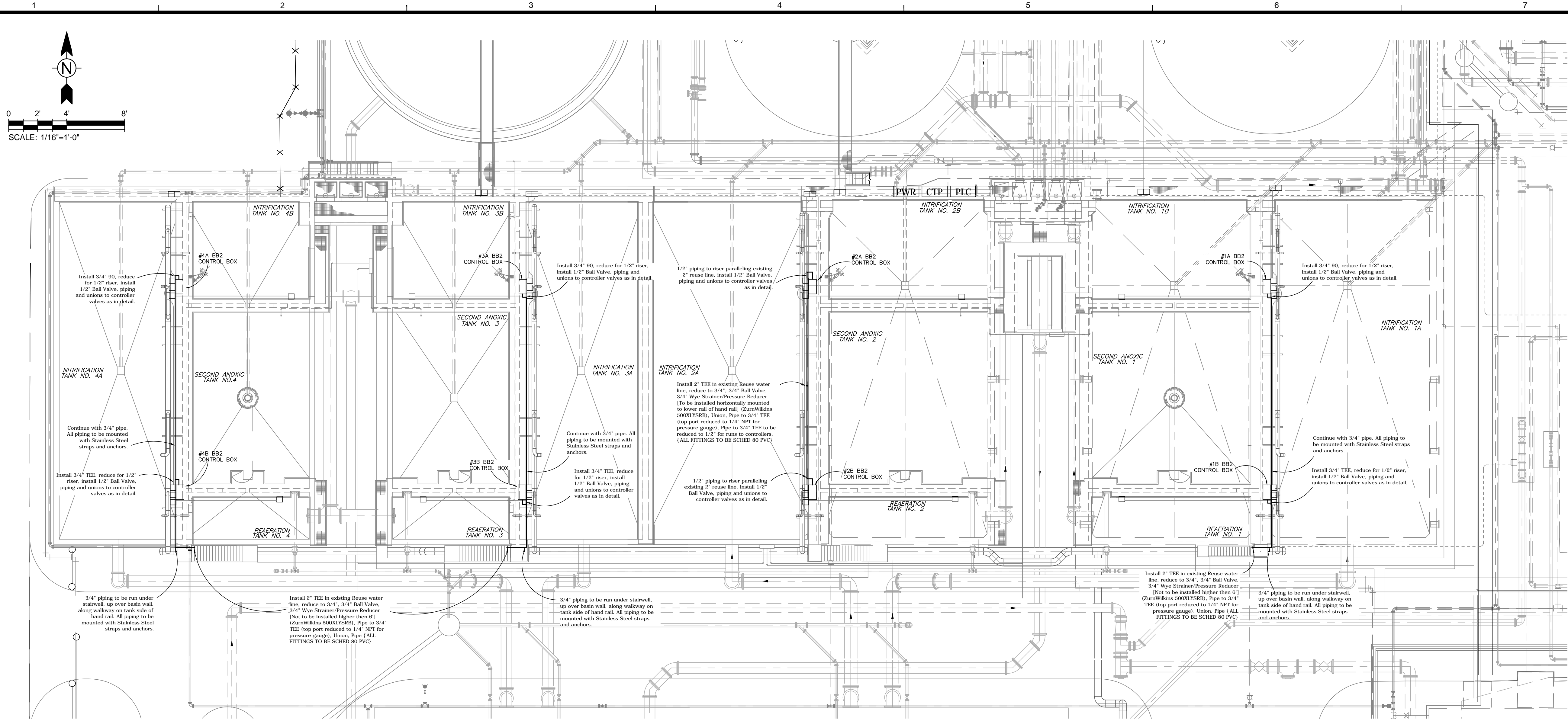
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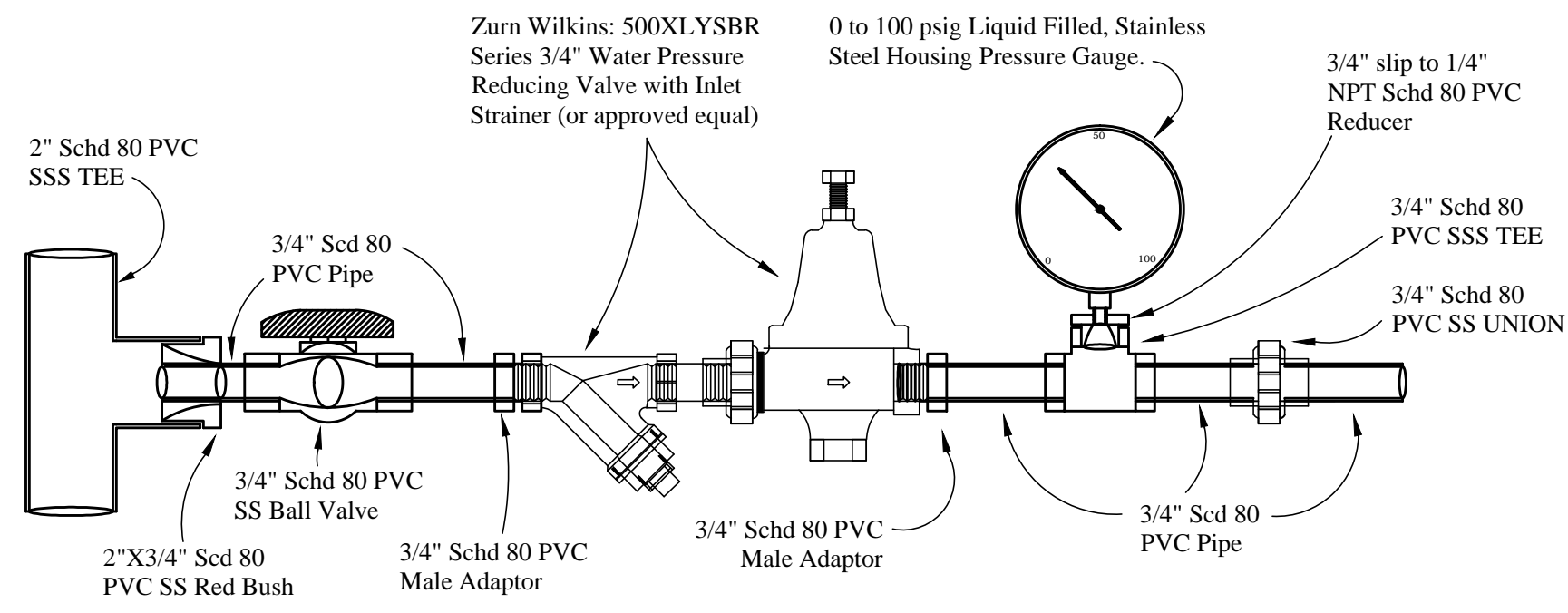
CITY OF MAPLES, FL
CITY OF NAPLES WRF AERATION MONITOR & CONTROL INSTRUMENTATION IMPROVEMENTS
DUCTBANK SECTIONS

Project No.: 200-08516-12001
Designed By: JAS
Drawn By: JAS
Checked By: FWY

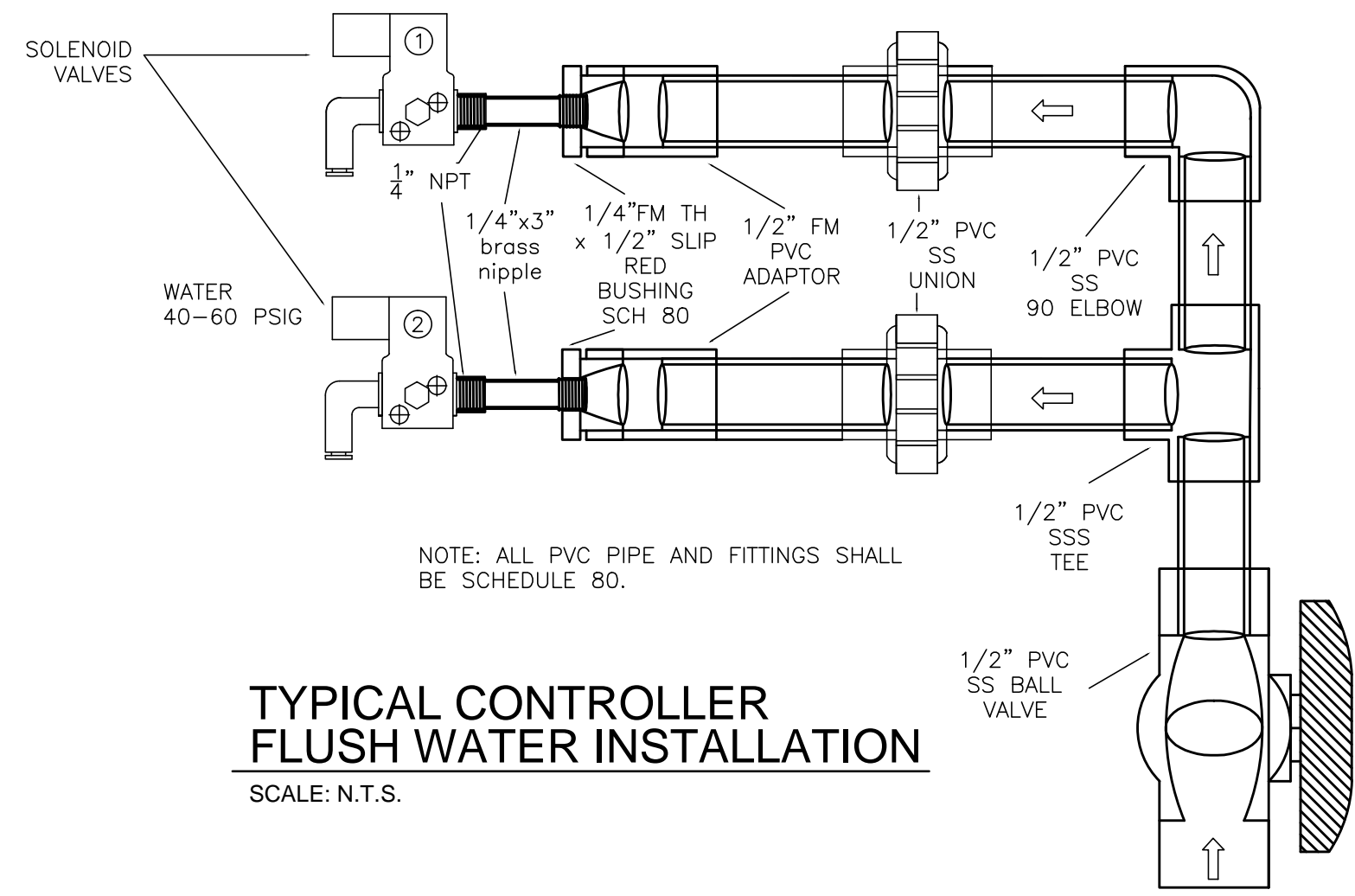
10/11/2013 4:42:17 PM - P:\NER\08516200-08516-12001\CAD\SHEETFILES\M-001 PHASE-1 FLUSH WATER PIPING REQUIREMENTS.DWG - MARQUEZ, GERMAIN



**AERATION BASINS
AND CLARIFIERS**
SCALE: 1/16" = 1'-0"



**TYPICAL PRESSURE
REDUCING ASSEMBLY INSTALLATION**
SCALE: N.T.S.



**TYPICAL CONTROLLER
FLUSH WATER INSTALLATION**
SCALE: N.T.S.

NOT FOR CONSTRUCTION

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CITY OF NAPLES, FL
CITY OF NAPLES WRF AERATION MONITOR
& CONTROL INSTRUMENTATION
IMPROVEMENTS
**PHASE 1 - FLUSH WATER
PIPING REQUIREMENTS**

Project No.: 200-08516-12001
Designed By:
Drawn By: GM
Checked By:

M-001