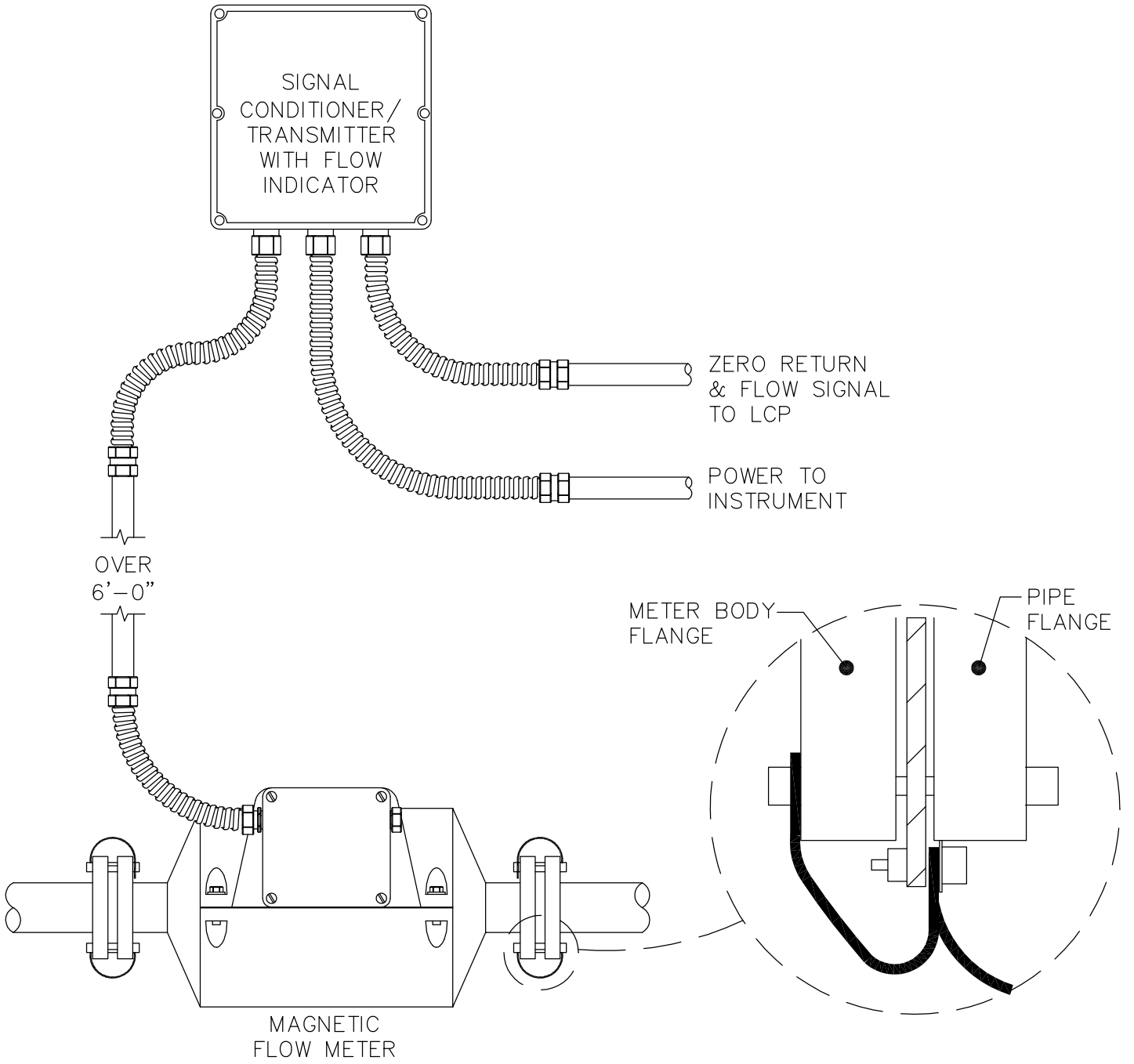

NOTES:

1. CONSULT MANUFACTURER'S RECOMMENDED INSTALLATION PRACTICES. REQUIREMENTS MAY VARY.
2. WALL MOUNT SIGNAL CONDITIONER.
3. PROVIDE GROUNDING GASKET & STRAPS FOR NONCONDUCTIVE OR LINED PIPE.
4. USE RIGID CONDUIT WHEN SIGNAL LINE IS LONGER THAN 6'-0".

DRAWING NAME: MAGNETIC FLOW METER REMOTE TRANSMITTER

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City of Seattle
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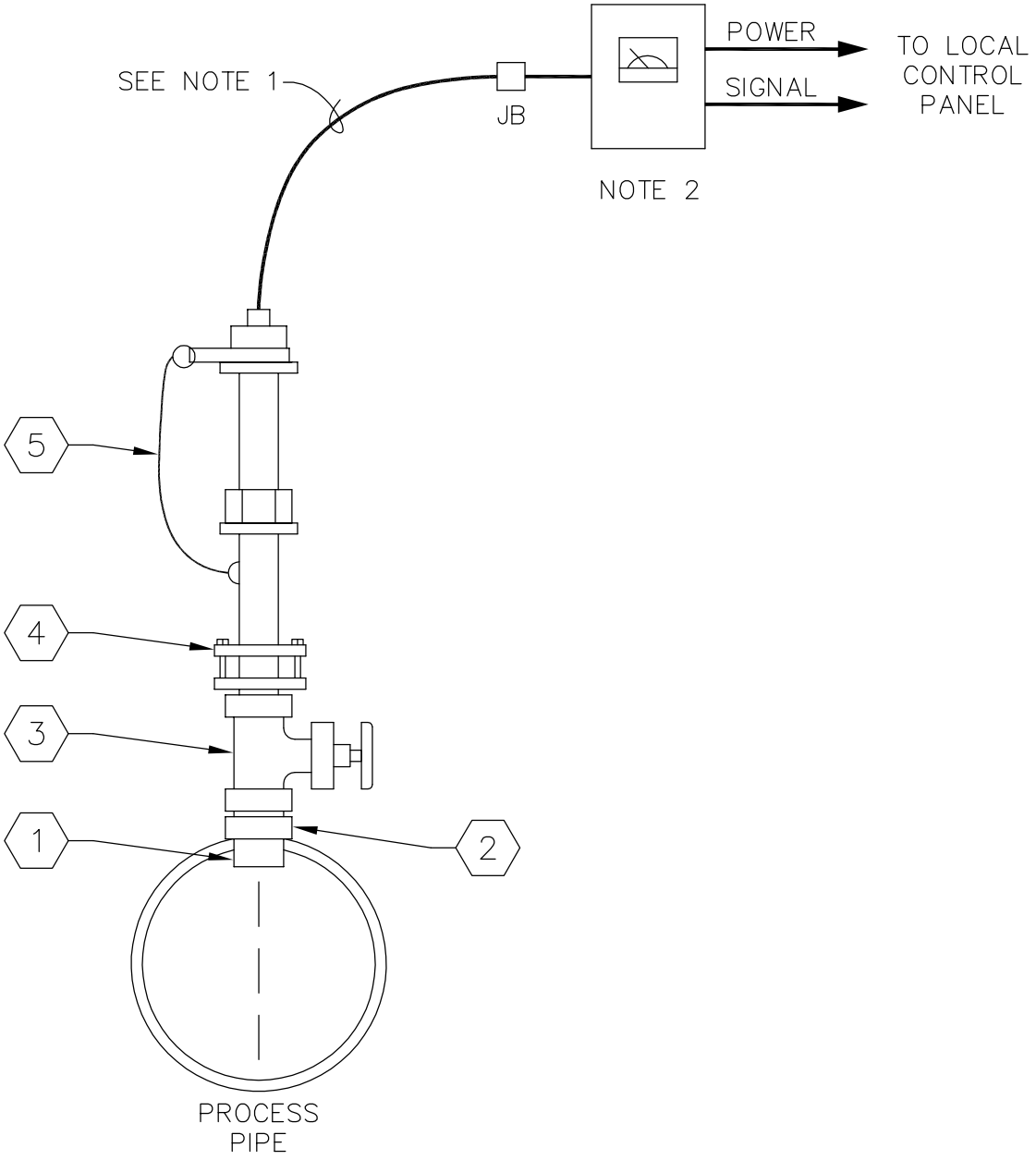
SEATTLE PUBLIC UTILITIES DESIGN STANDARDS AND GUIDELINES

REVISION DATE: 9/30/2010

DRAWING # DRG 10-1

SHEET OF



BILL OF MATERIALS:

1. PROBE WITH MAGNETIC ELECTRODES
2. WELDED THREADOLET
3. INSERTION VALVE
4. CONNECTING FLANGE
5. SENSOR RETENTION CHAIN OR CABLE

NOTES:

1. INSTALL LIQUID TIGHT FLEXIBLE CONNECTING CABLE BETWEEN SENSOR AND JUNCTION BOX.
2. LOCATE INDICATOR/TRANSMITTER APPROXIMATELY FOUR FEET ABOVE FLOOR AND WIRE BETWEEN SENSOR CABLE AND LOCAL CONTROL PANEL WITH RIGID CONDUIT.

DRAWING NAME: MAGNETIC FLOW METER INSERTION TYPE

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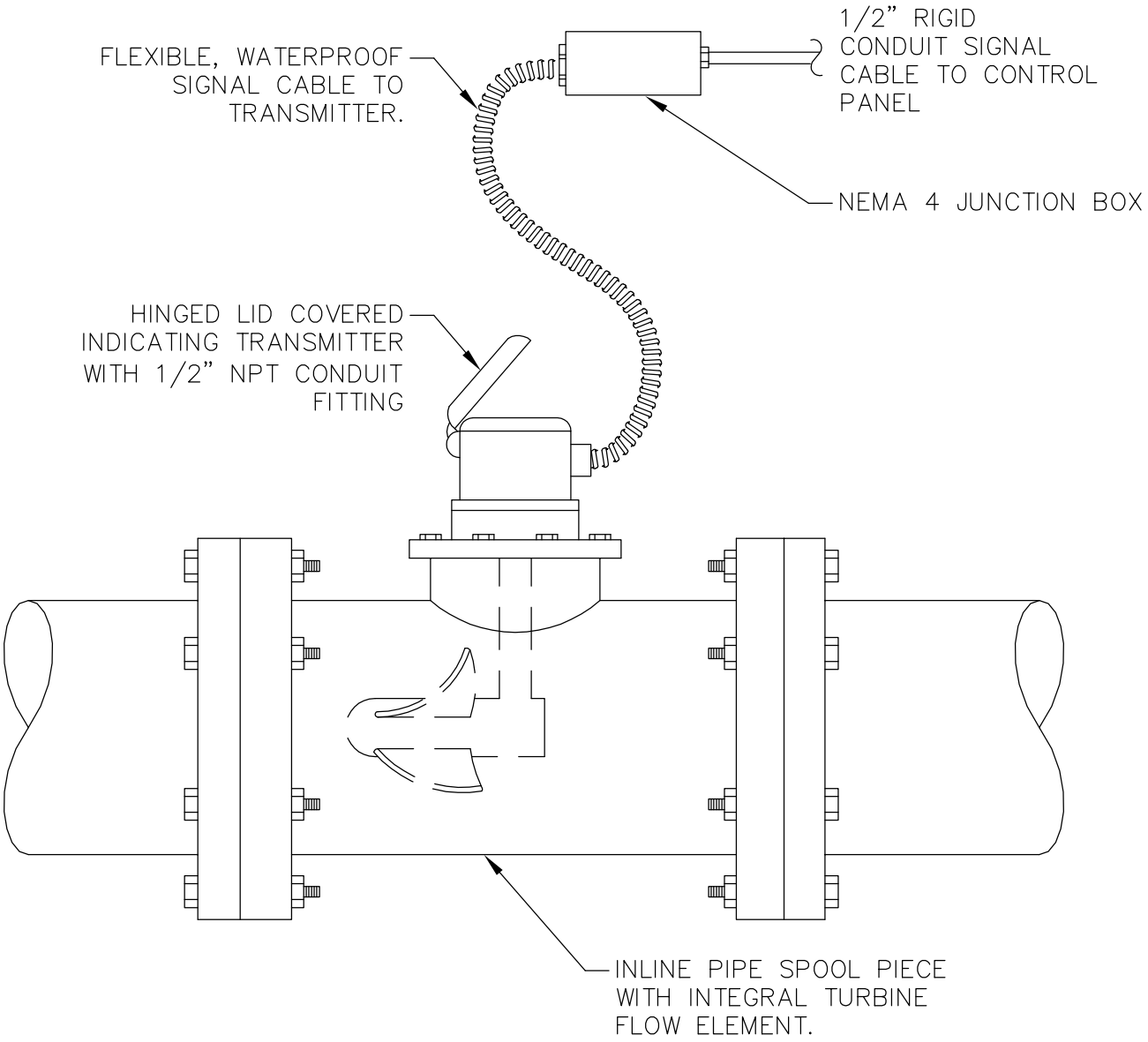
REVISION DATE: 9/30/2010

DRAWING # DRG 10-2

SHEET OF



DRAWING NAME: FLOW TURBINE INLINE

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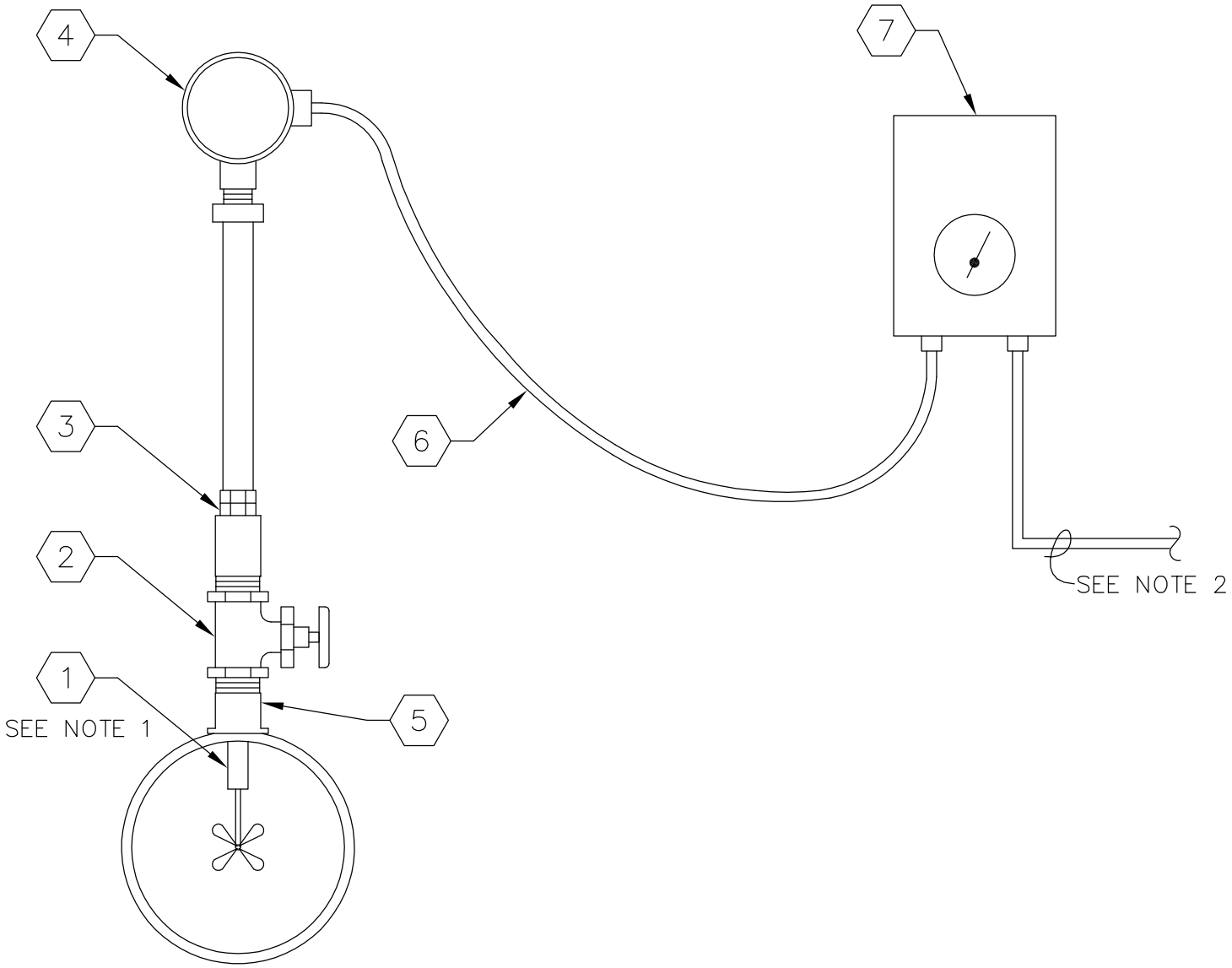
SEATTLE PUBLIC UTILITIES DESIGN STANDARDS AND GUIDELINES

REVISION DATE: 9/30/2010

DRAWING # DRG 10-3

SHEET OF



BILL OF MATERIALS:

1. TURBINE FLOW METER SENSING ELEMENT ASSEMBLY
2. ISOLATION VALVE
3. COMPRESSION COUPLING
4. CAST ALUMINUM ELECTRICAL CONNECTION JUNCTION BOX
5. THREADED RISER WELDED TO STEEL PIPE
6. FLEXIBLE, WATERPROOF SIGNAL CABLE TO TRANSMITTER
7. NEMA 4X TRANSMITTER WITH FLOW INDICATOR. LOCATE 4–5 FEET ABOVE FLOOR.

NOTES:

1. INSERT TURBINE SENSOR TO APPROXIMATE CENTER OF PIPE
2. CONNECT SIGNAL WIRES FROM TRANSMITTER TO LOCAL CONTROL PANEL VIA RIGID CONDUIT

DRAWING NAME: FLOW METER TURBINE INSERTION TYPE

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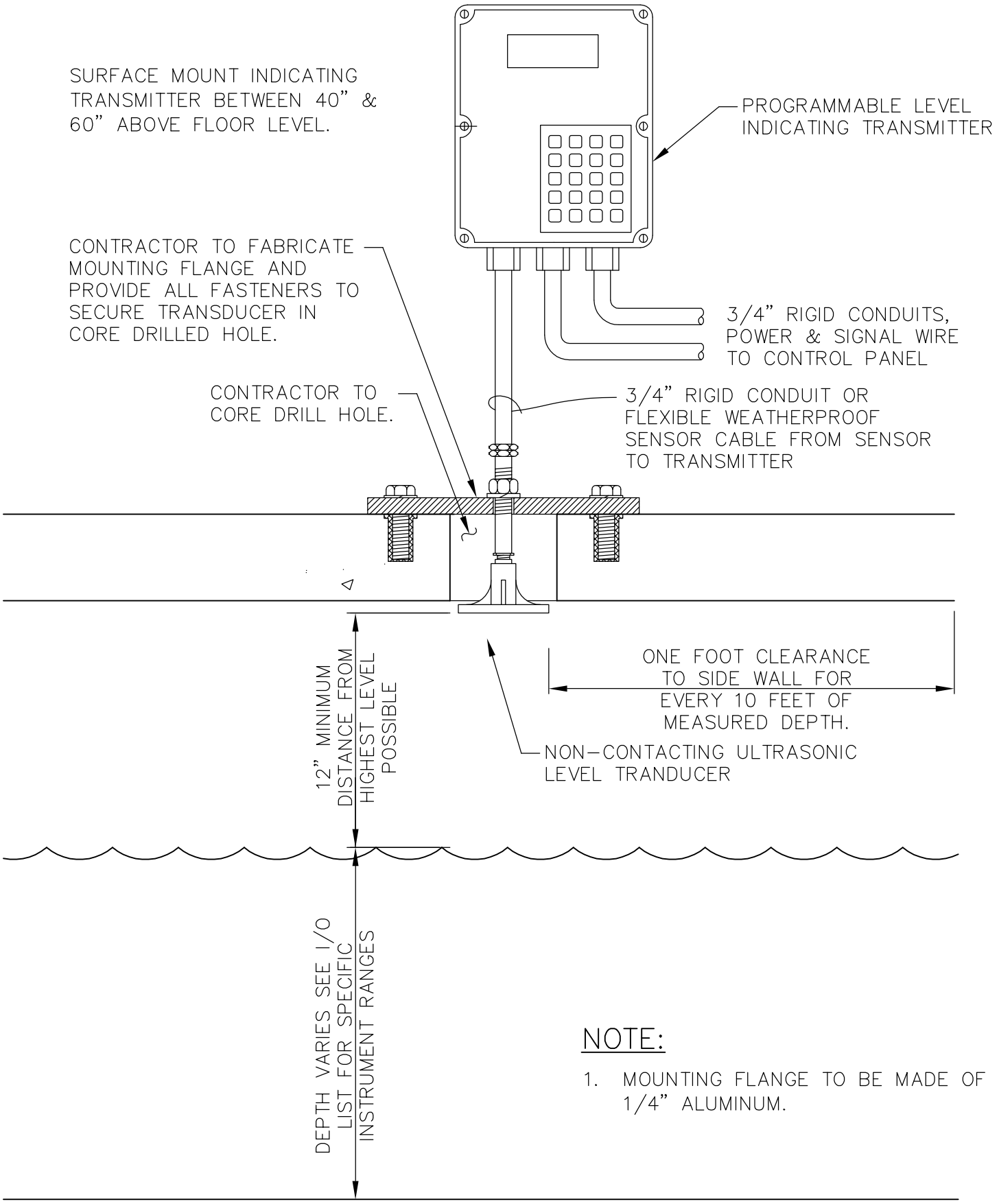
SEATTLE PUBLIC UTILITIES DESIGN STANDARDS AND GUIDELINES

REVISION DATE: 9/30/2010

DRAWING # DRG 10–4

SHEET OF



NOTE:

1. MOUNTING FLANGE TO BE MADE OF 1/4" ALUMINUM.

DRAWING NAME: LEVEL TRANSMITTER NON-CONTACTING ULTRASONIC

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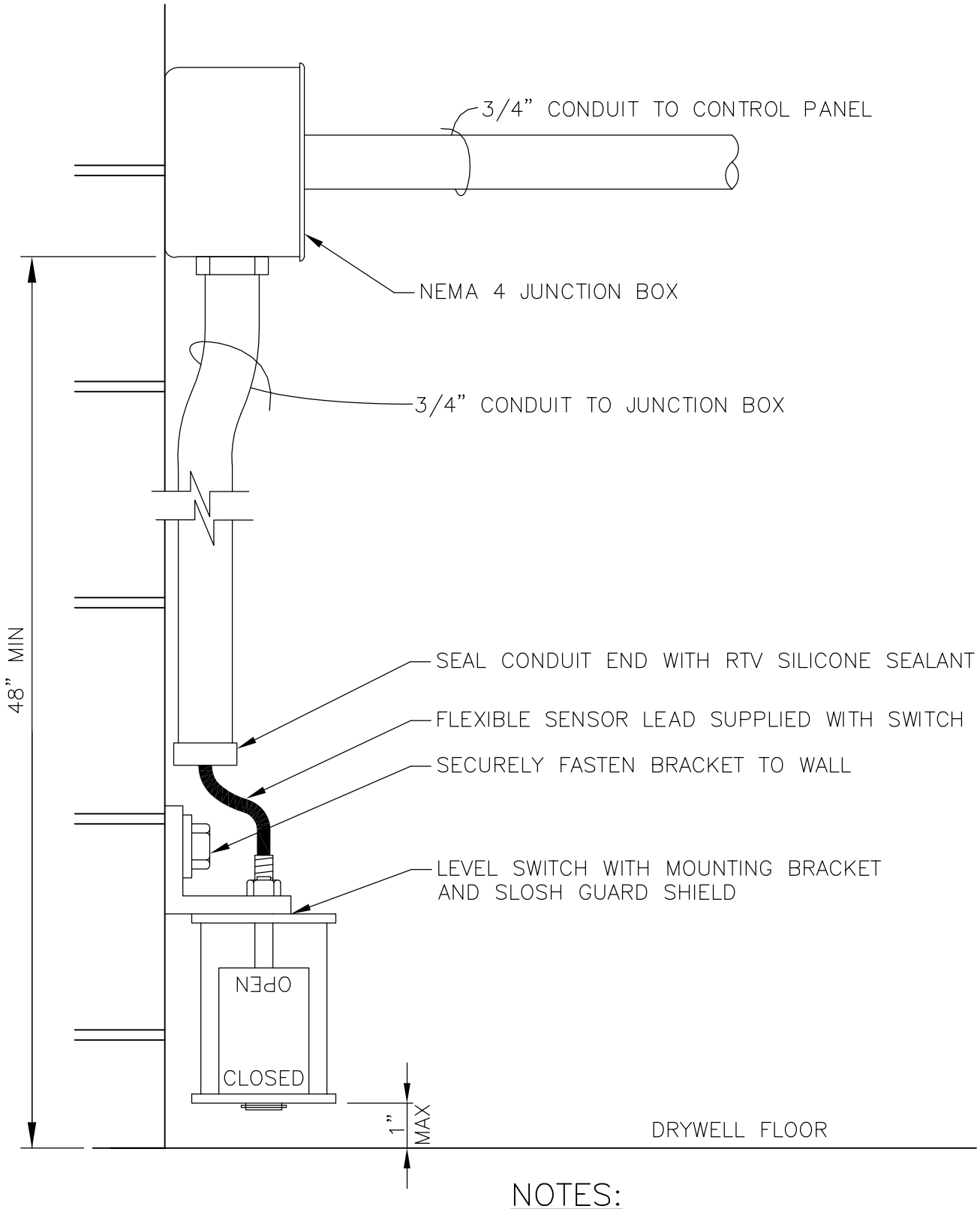
SEATTLE PUBLIC UTILITIES DESIGN STANDARDS AND GUIDELINES

REVISION DATE: 9/30/2010

DRAWING # DRG 10-5

SHEET OF



NOTES:

1. THE SWITCH WILL BE WIRED NORMALLY CLOSED (N.C.) OPEN ON RISE.
2. SWITCH MUST BE MOUNTED VERTICALLY TO PROVIDE SMOOTH FLOAT OPERATION.

DRAWING NAME: DRYWELL FLOOD LIQUID LEVEL SWITCH FLOAT TYPE

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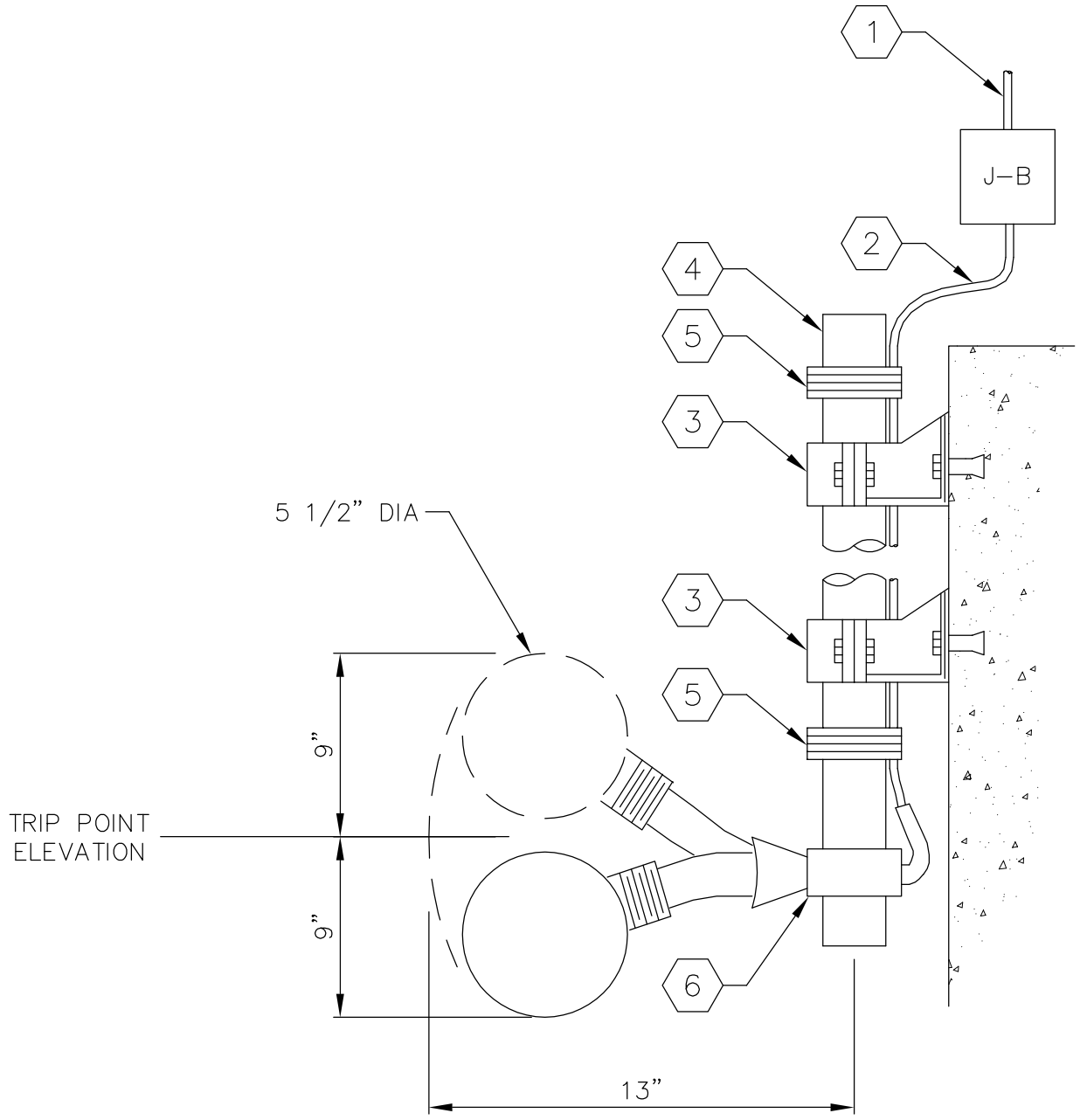
SEATTLE PUBLIC UTILITIES DESIGN STANDARDS AND GUIDELINES

REVISION DATE: 9/30/2010

DRAWING # DRG 10-6

SHEET OF



BILL OF MATERIALS:

1. RIGID CONDUIT TO CONTROL PANEL
2. FLEXIBLE WEATHERPROOF CABLE
3. SURFACE MOUNTING BRACKET AS REQ'D (MINIMUM TWO.)
4. 1"–2" PIPE SUPPORT. LENGTH AS REQ'D
5. TIE WIRE TO POLE EVERY THREE FEET
6. POLE CLAMP FOR FLOAT
7. FLOAT BULB WITH INTEGRAL HEAVY DUTY MERCURY SWITCH

DRAWING NAME: LEVEL SWITCH FLOAT TYPE

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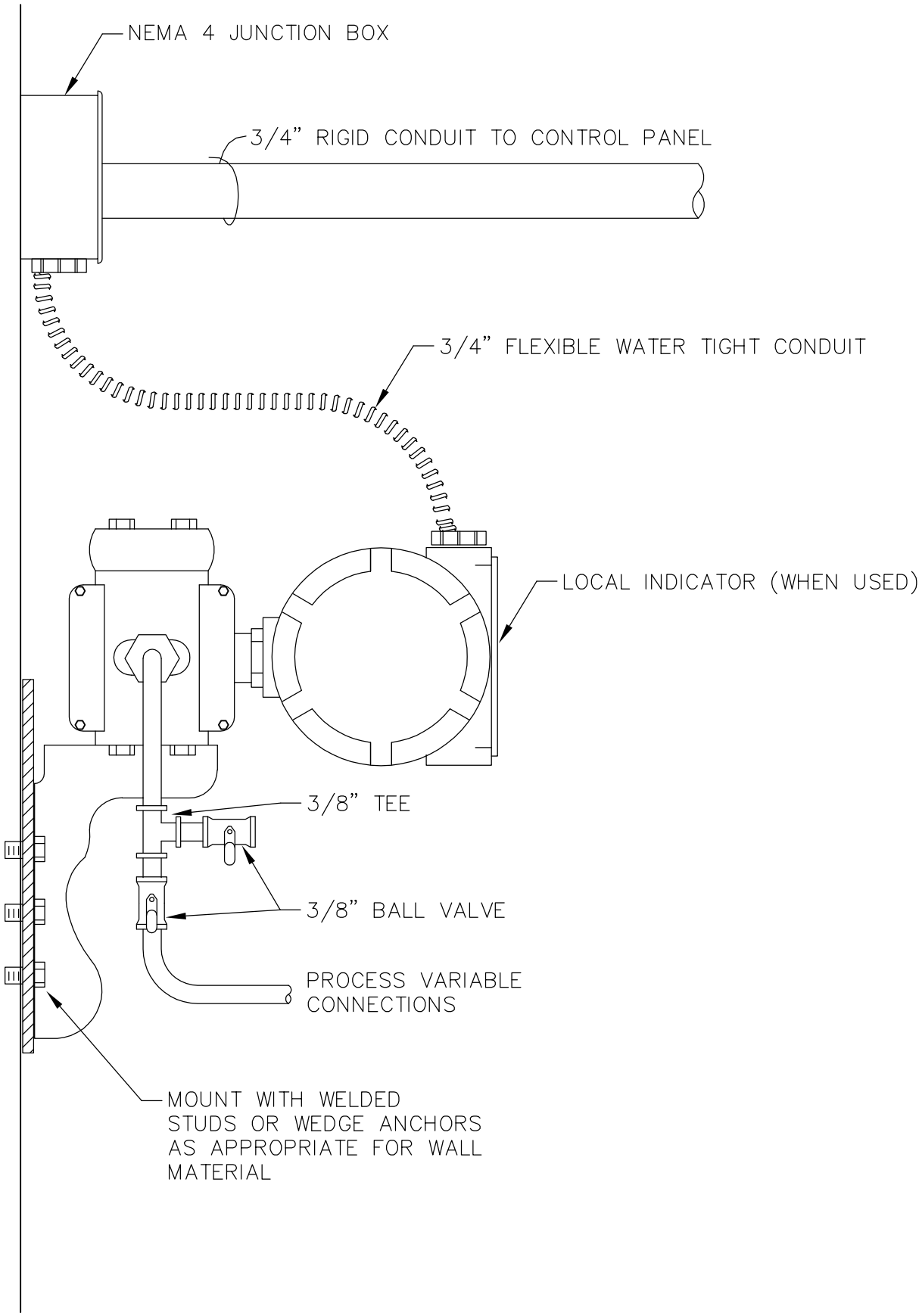
SEATTLE PUBLIC UTILITIES DESIGN STANDARDS AND GUIDELINES

REVISION DATE: 9/30/2010

DRAWING # DRG 10–7

SHEET OF



DRAWING NAME: PRESSURE TRANSMITTER, ELECTRO–MECHANICAL FLANGE MOUNT

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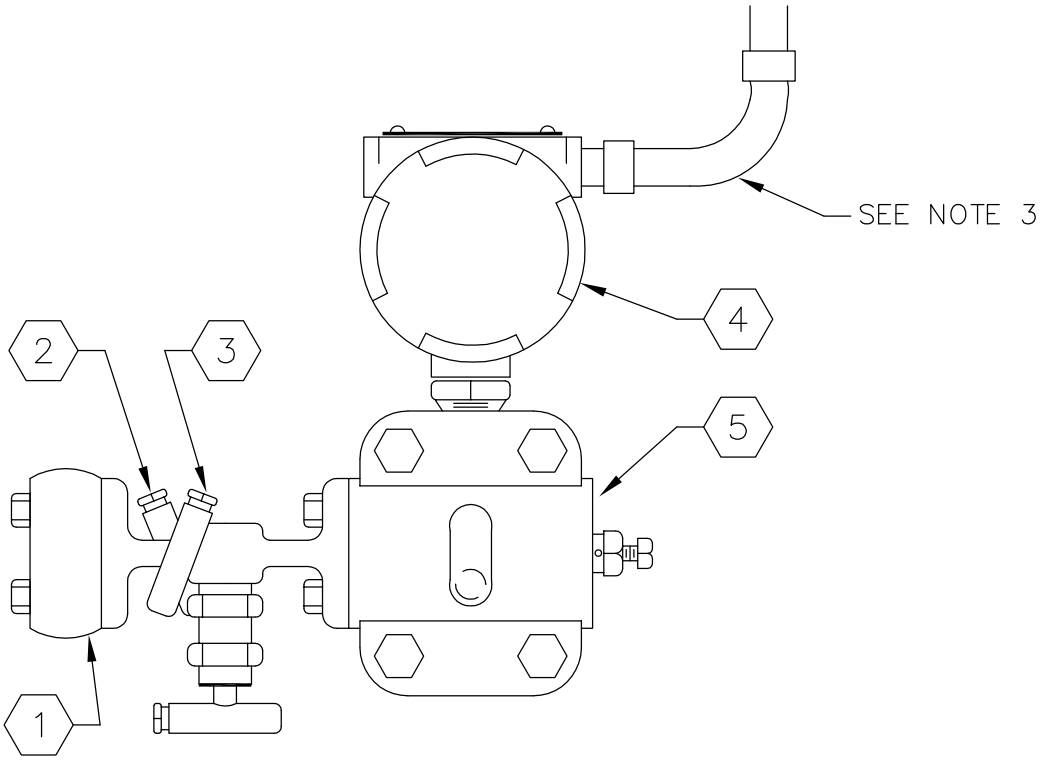
REVISION DATE: 9/30/2010

DRAWING # DRG 10–8

SHEET OF



BILL OF MATERIALS:

1. 3–VALVE MANIFOLD
2. HIGH TAP SHUTOFF VALVE
3. LOW TAP SHUTOFF VALVE
4. DIFFERENTIAL PRESSURE TRANSMITTER
5. BLEEDER VALVE

NOTES:

1. MOUNT WITH MANUFACTURERS SUPPLIED BRACKET ON 2" PIPE STAND.
2. PROVIDE NEMA 4 WALL MOUNTED JUNCTION BOX AND RIGID CONDUIT TO INTERFACE CABINET
3. PROVIDE FLEX CONDUIT TO MENA 4 JUNCTION BOX

DRAWING NAME: FLOW METER TURBINE INSERTION TYPE

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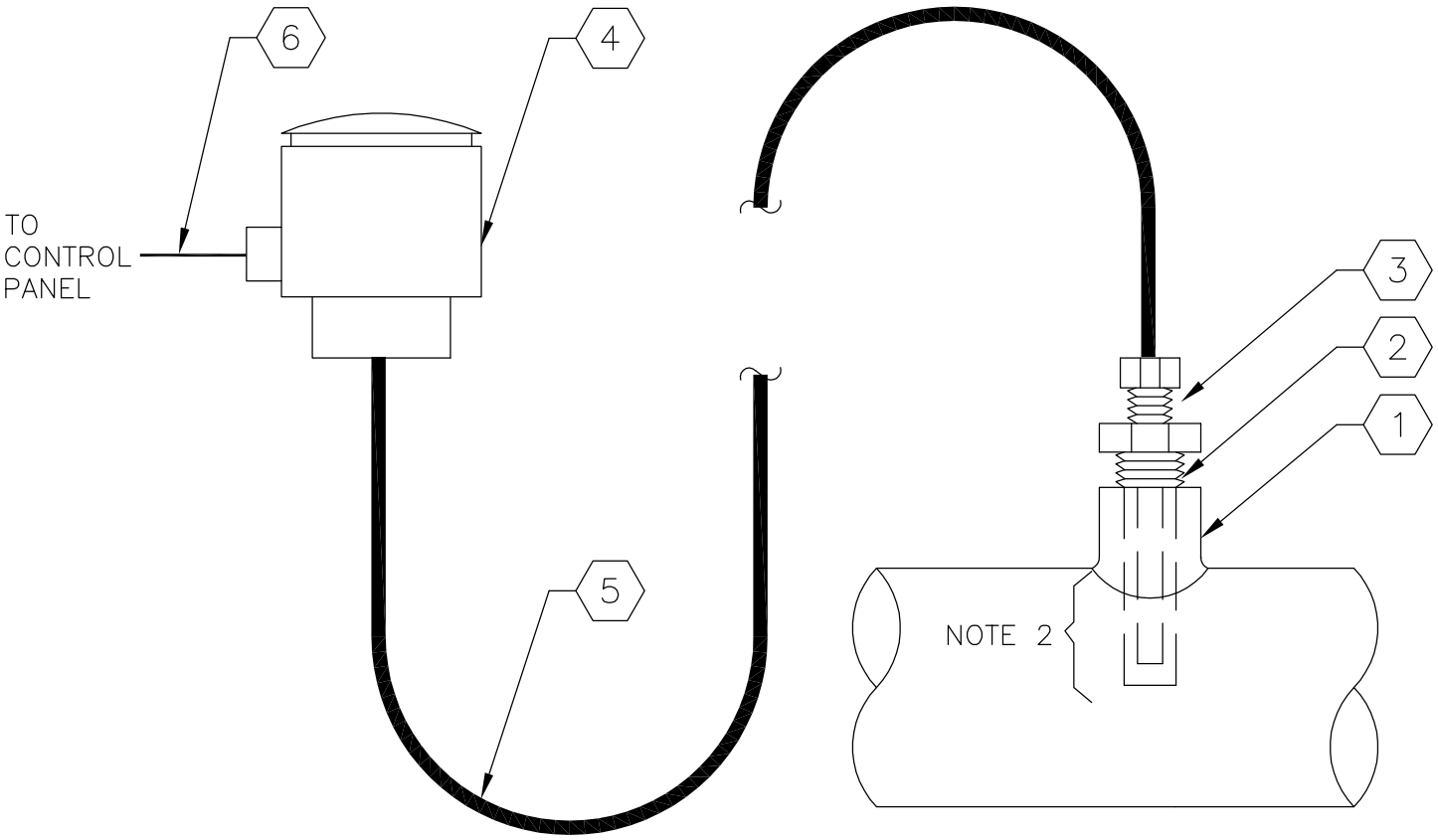
SEATTLE PUBLIC UTILITIES DESIGN STANDARDS AND GUIDELINES

REVISION DATE: 9/30/2010

DRAWING # DRG 10–9

SHEET OF



BILL OF MATERIALS:

1. 3/4" THREADOLET
2. THERMOWELL
3. RTD MUST BE EASILY REMOVABLE
4. TWO WIRE TEMPERATURE TRANSMITTER (WALL MOUNTED)
5. WATERTIGHT FLEX CONDUIT
6. RIGID CONDUIT CONTAINING SIGNAL CABLE

NOTES:

1. THERMOWELL AND RTD ASSEMBLY TO BE MOUNTED VERTICALLY.
2. THERMOWELL DIMENSION SHOULD MEET MANUFACTURES, RECOMMENDATION. USE STAINLESS STEEL THERMOWELLS.

DRAWING NAME: TEMPERATURE TRANSMITTER

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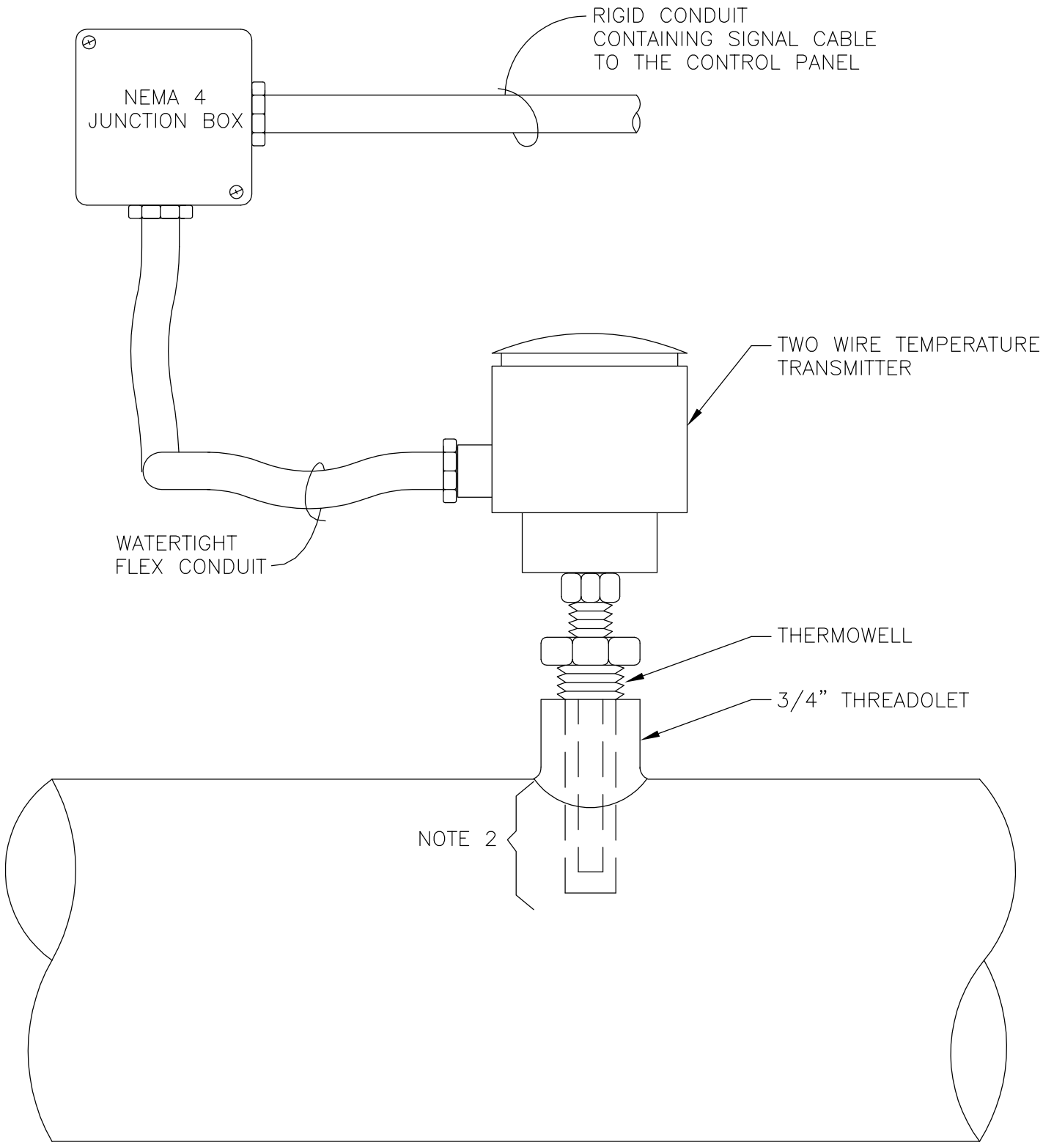
SEATTLE PUBLIC UTILITIES DESIGN STANDARDS AND GUIDELINES

REVISION DATE: 9/30/2010

DRAWING # DRG 10-9

SHEET OF



NOTES:

1. THERMOWELL AND RTD ASSEMBLY TO BE MOUNTED VERTICALLY.
2. THERMOWELL DIMENSION SHOULD MEET MANUFACTURES RECOMMENDATION. USE STAINLESS STEEL THERMOWELLS.
3. RTD MUST BE EASILY REMOVABLE

DRAWING NAME: TEMPERATURE TRANSMITTER RTD TYPE PROCESS PIPE MOUNTED

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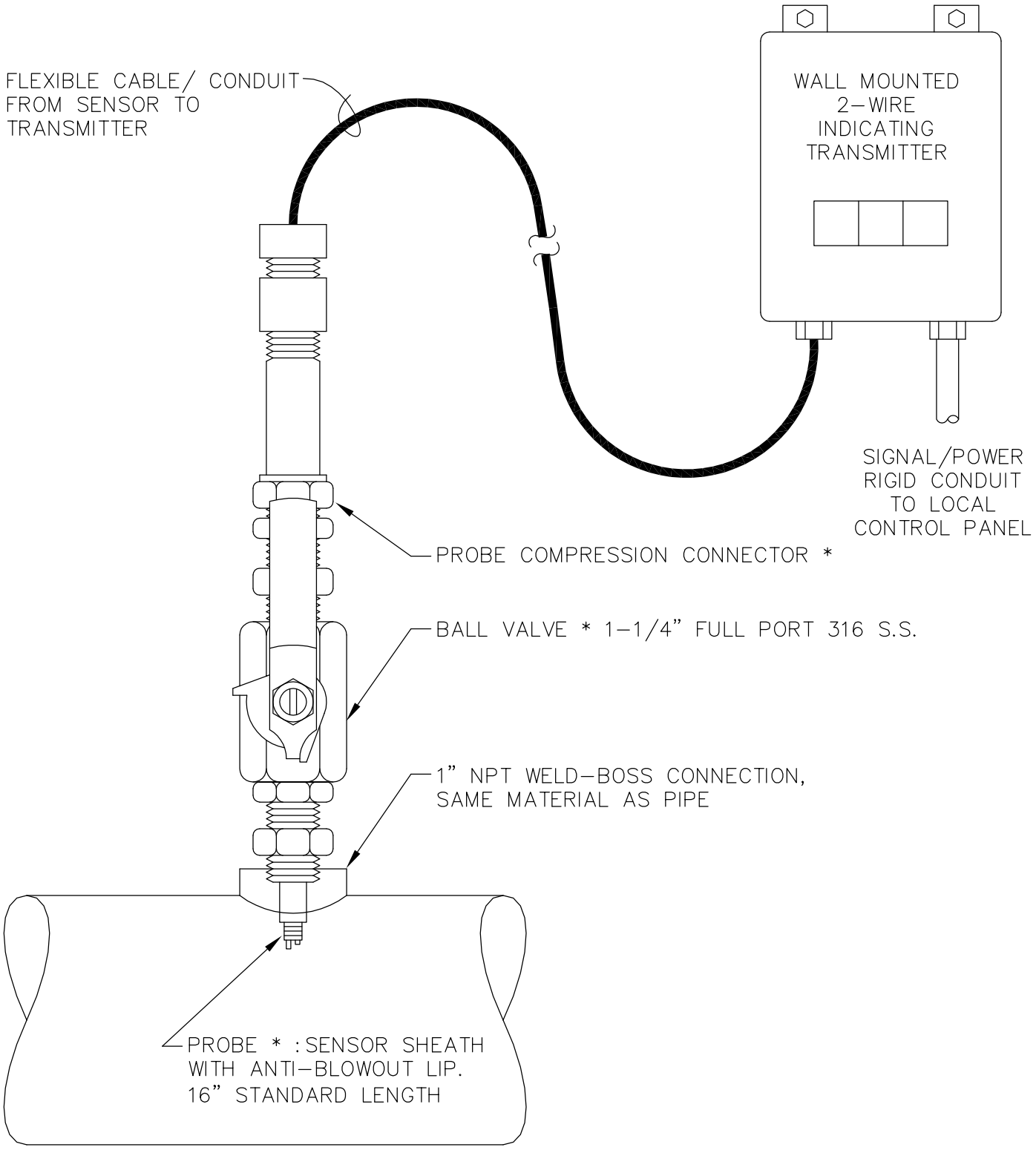

NOTES:

1. COMPONENTS DESIGNATED BY * ARE SUPPLIED BY INSTRUMENT MANUFACTURER.
2. PROVIDE A MINIMUM OF 14" CLEARANCE ABOVE PROBE FOR REMOVAL.

DRAWING NAME: RETRACTABLE PH SENSOR

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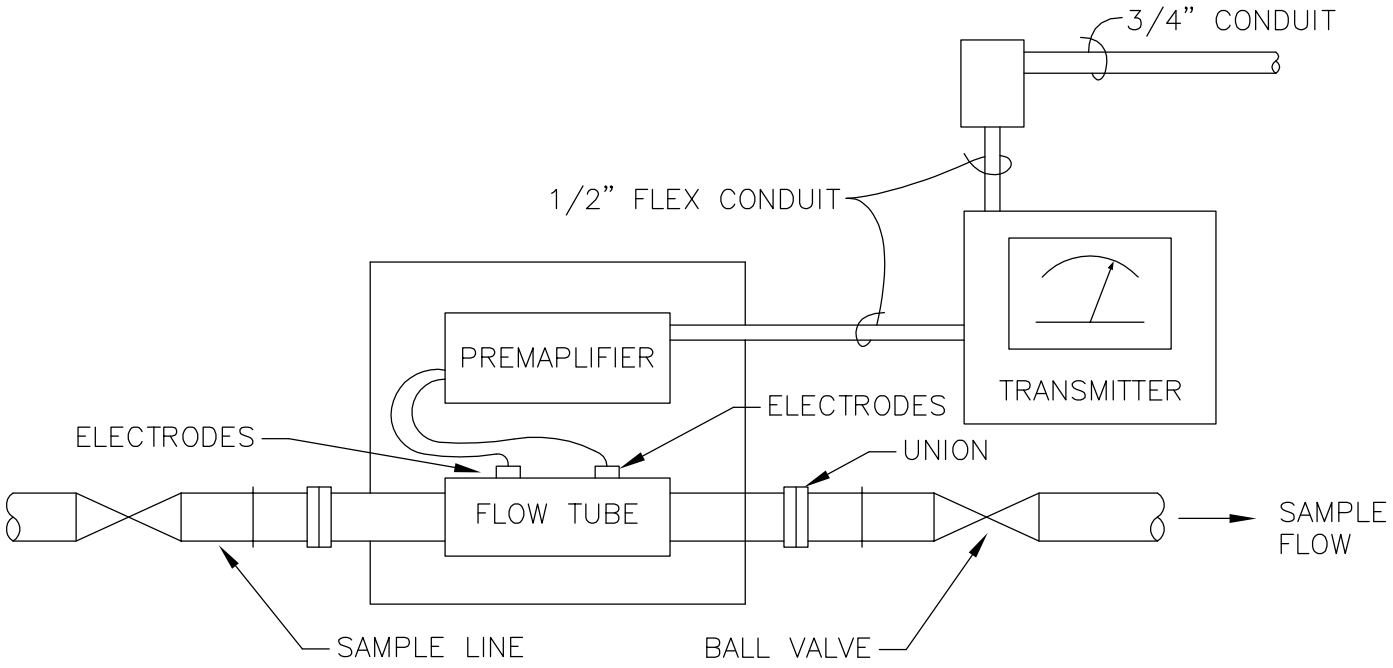

NOTES:

1. MOUNT PREAMPLIFIER AND TRANSMITTER ON WALL OR IN SAMPLE PANEL NEXT TO PROBE.
2. PROVIDE SAMPLE VALVE NEAR SAMPLER FOR CONFORMANCE CHECK.
3. INSTALL IN AREA WHERE EQUIPMENT CAN BE EASILY ACCESSED.
4. INSTALL PROBE IN HORIZONTAL SECTION OF SAMPLE LINE.

DRAWING NAME: PH METER MOUNTING DIAGRAM

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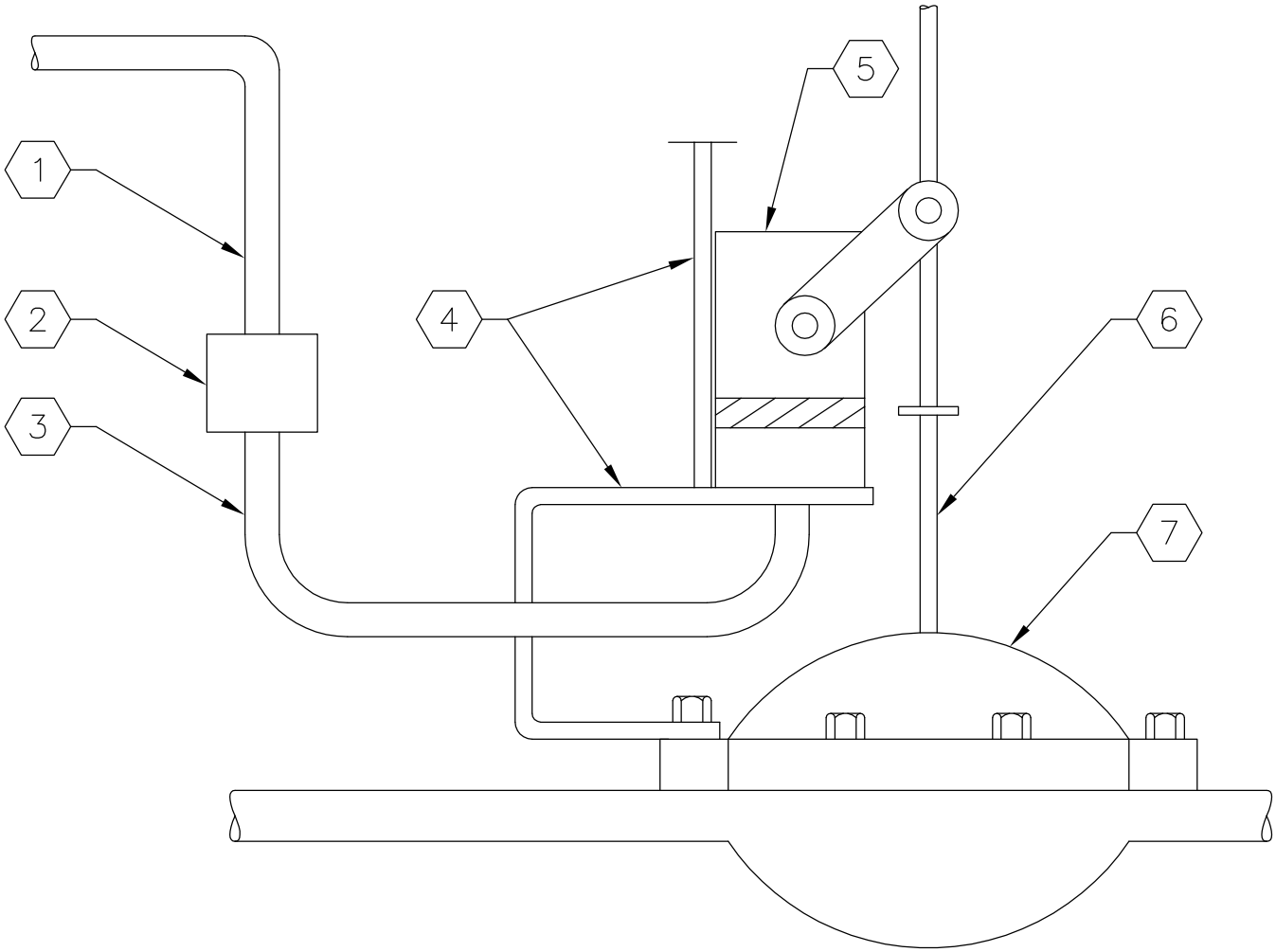

BILL OF MATERIALS:

1. 1/2" RIGID CONDUIT FOR 120 VAC CONDUCTORS.
2. JUNCTION BOX.
3. 1/2" FLEXIBLE CONDUIT.
4. MOUNTING BRACKET.
5. LIMIT SWITCH.
6. VALVE POSITION SPINDLE.
7. CONTROL VALVE.

DRAWING NAME: POSITION LIMIT SWITCH

Seattle Public Utilities

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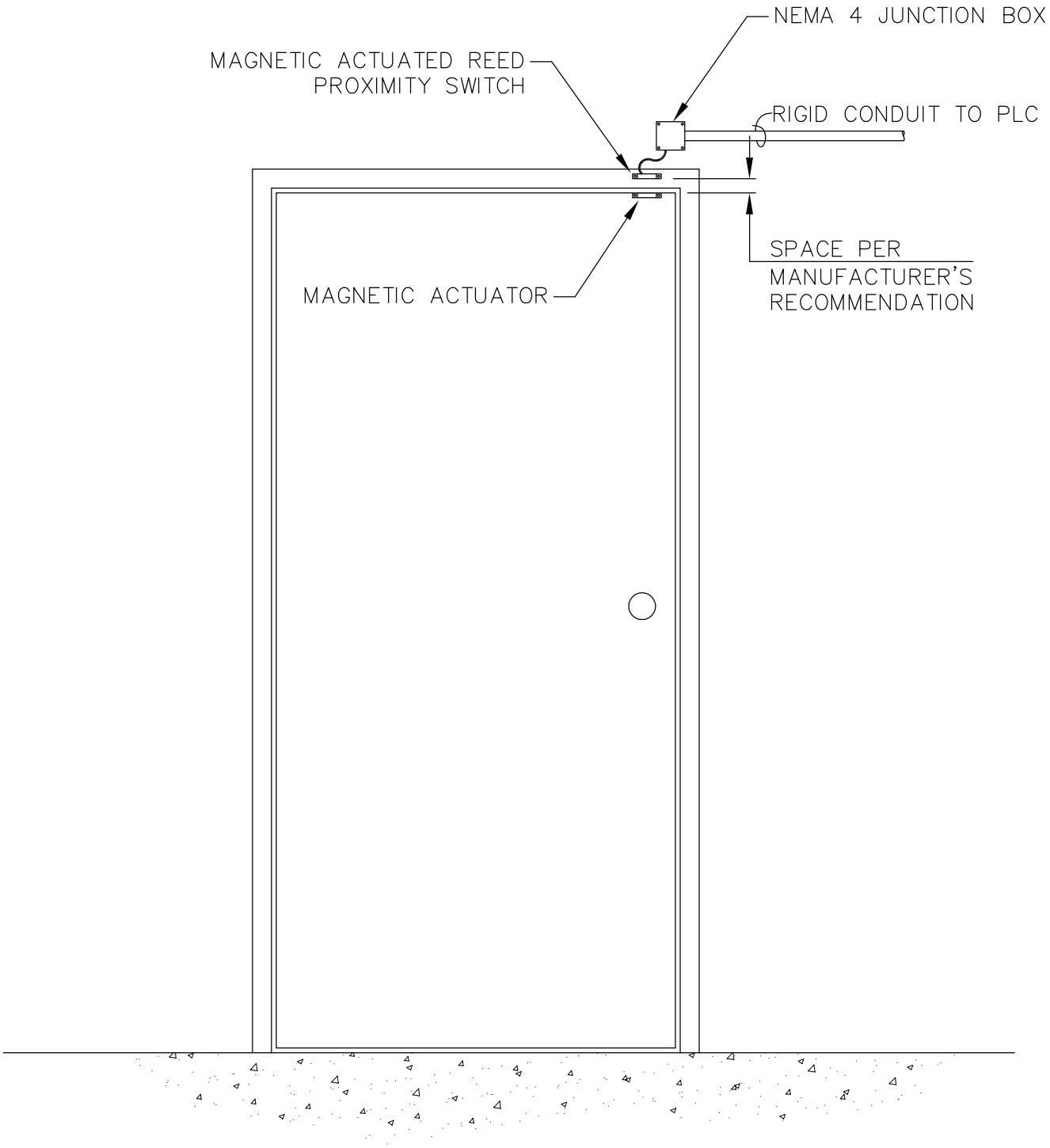
SEATTLE PUBLIC UTILITIES DESIGN STANDARDS AND GUIDELINES

REVISION DATE: 9/30/2010

DRAWING # DRG 10-14

SHEET OF



NOTE:

1. MOUNT SWITCH AND ACTUATOR ON INNER MOST DOOR.

DRAWING NAME: INTRUSION DETECTION SWITCH MAGNETIC REED PROXIMITY SINGLE DOOR

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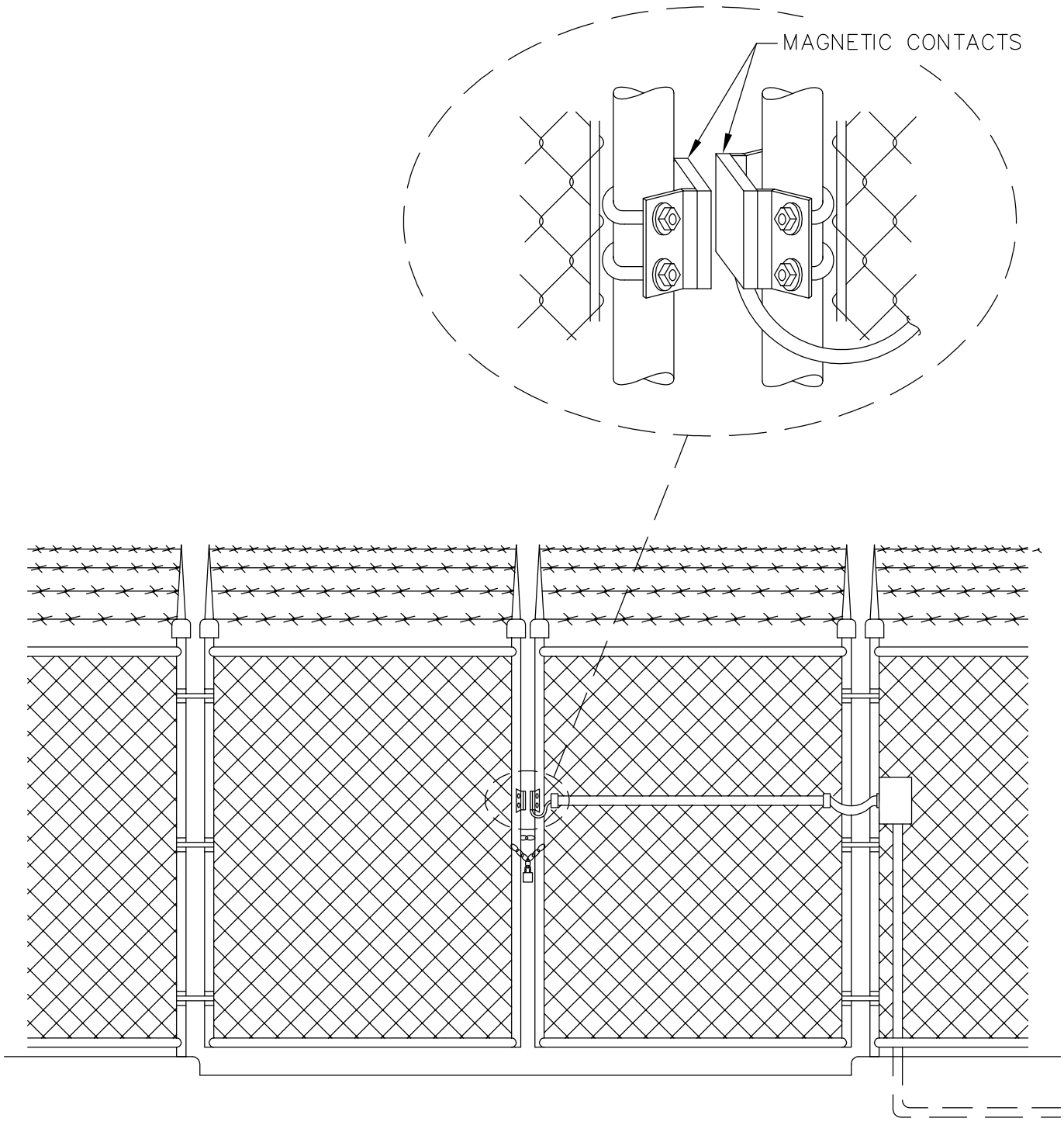
REVISION DATE: 9/30/2010

DRAWING # DRG 10–15

SHEET OF



DRAWING NAME: INTRUSION DETECTION SWITCH MAGNETIC REED PROXIMITY GATE

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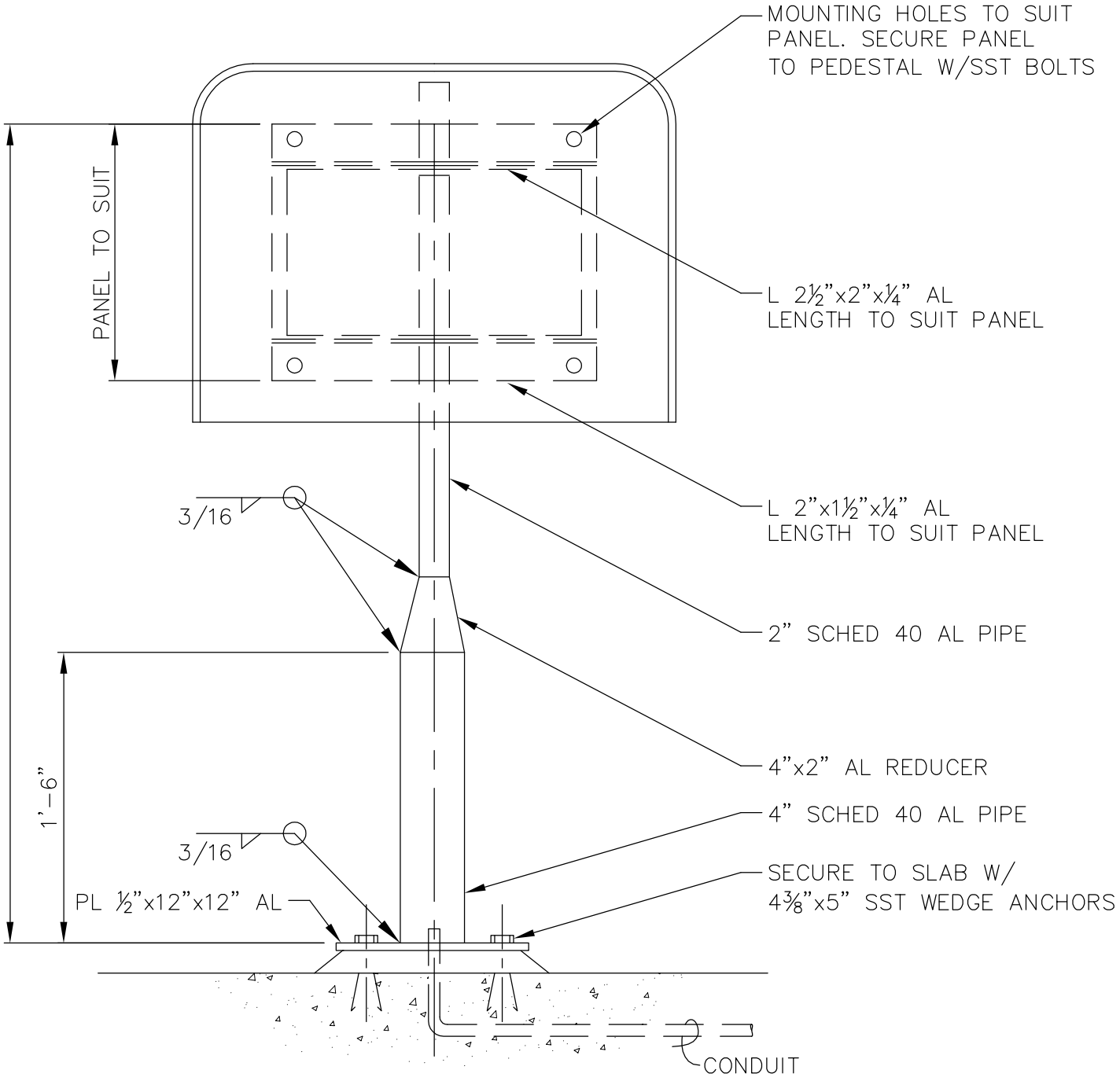
SEATTLE PUBLIC UTILITIES DESIGN STANDARDS AND GUIDELINES

REVISION DATE: 9/30/2010

DRAWING # DRG 10–16

SHEET OF



NOTES:

1. ROUND OFF ALL EXPOSED EDGES & CORNERS.
2. PAINT AL IN CONTACT WITH CONCRETE.
3. PROVIDE 6"x18"x18" CONCRETE BASE.

DRAWING NAME: PANEL MOUNTING PEDESTAL

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REVISION DATE: 9/30/2010

DRAWING # DRG 10-17

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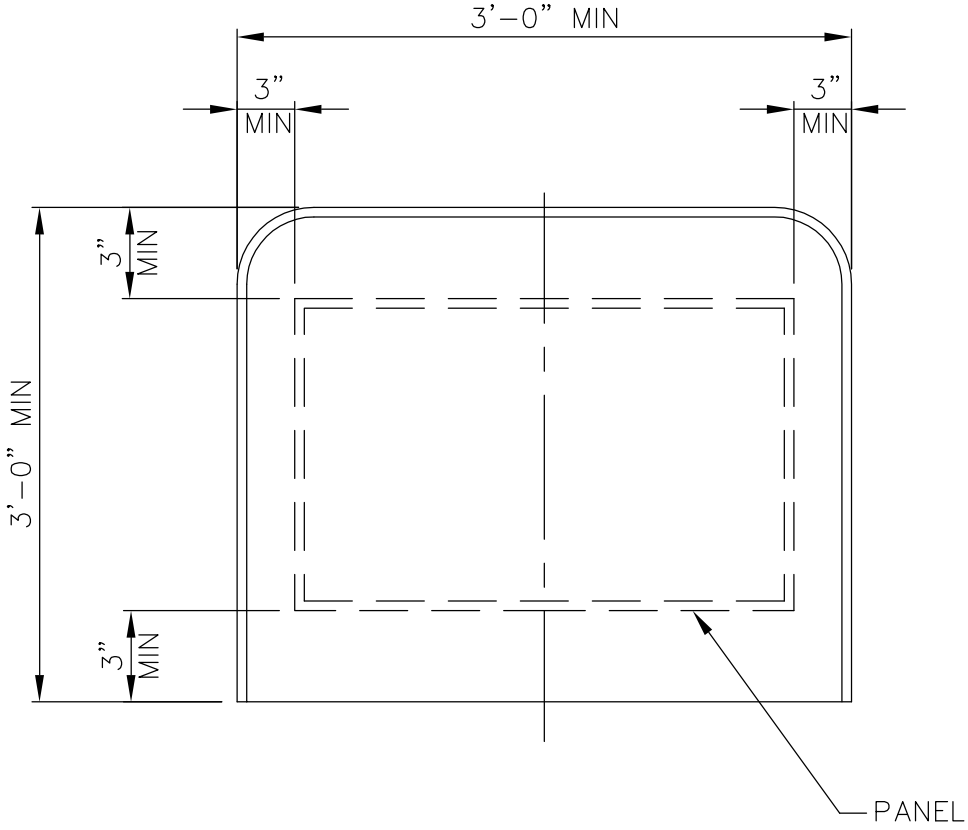

NOTES:

1. ROUND OFF ALL EXPOSED EDGES & CORNERS.
2. MOUNT RAINHOOD BETWEEN PANEL & SUPPORT. DRILL HOLES IN RAINHOOD AS PER MOUNTING HOLES FOR PANEL

DRAWING NAME: PANEL MOUNTING RIANHOOD INSTALLATION

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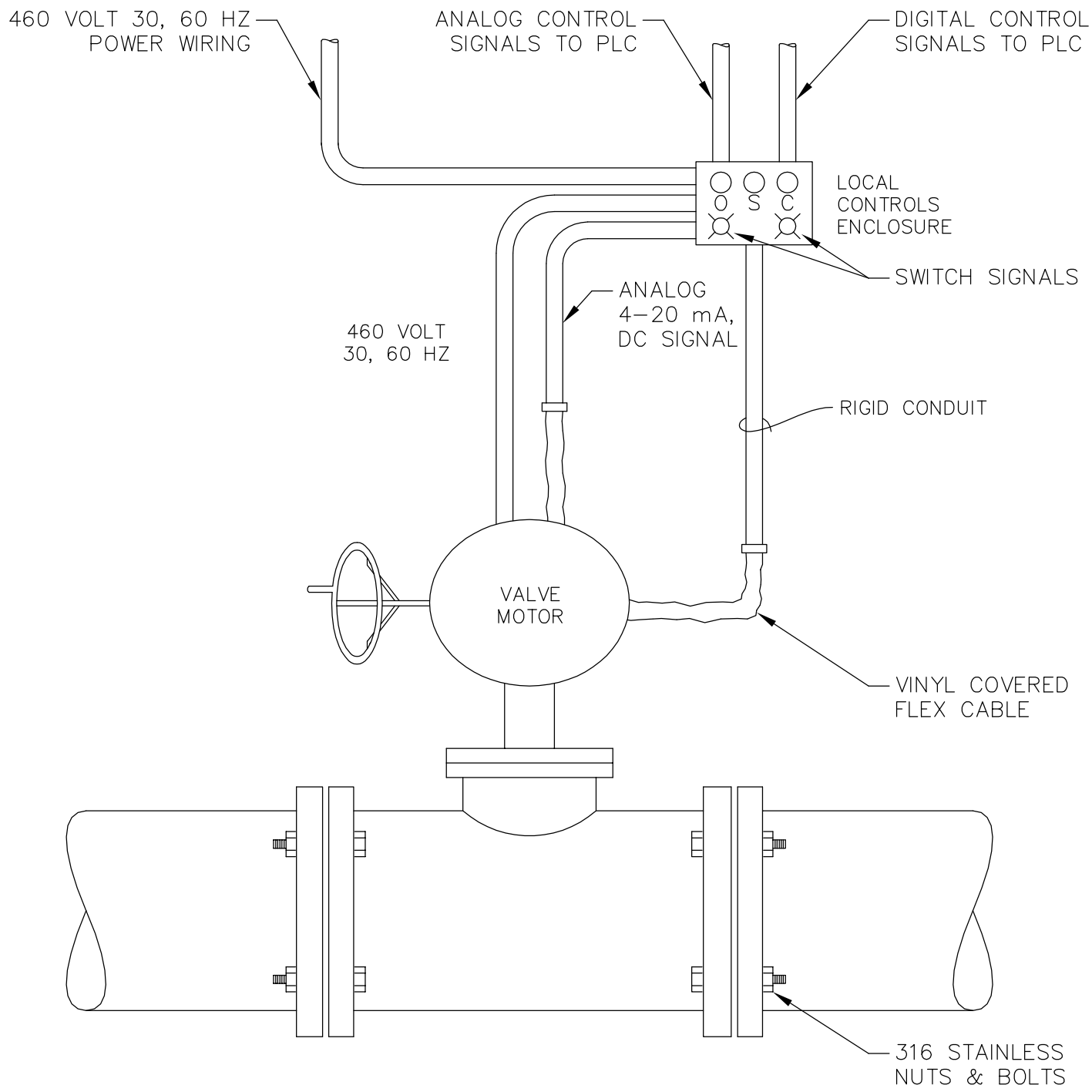
REVISION DATE: 9/30/2010

DRAWING # DRG 10-18

SHEET OF



DRAWING NAME: QUARTER–TURN FLOW CONTROL VALVE

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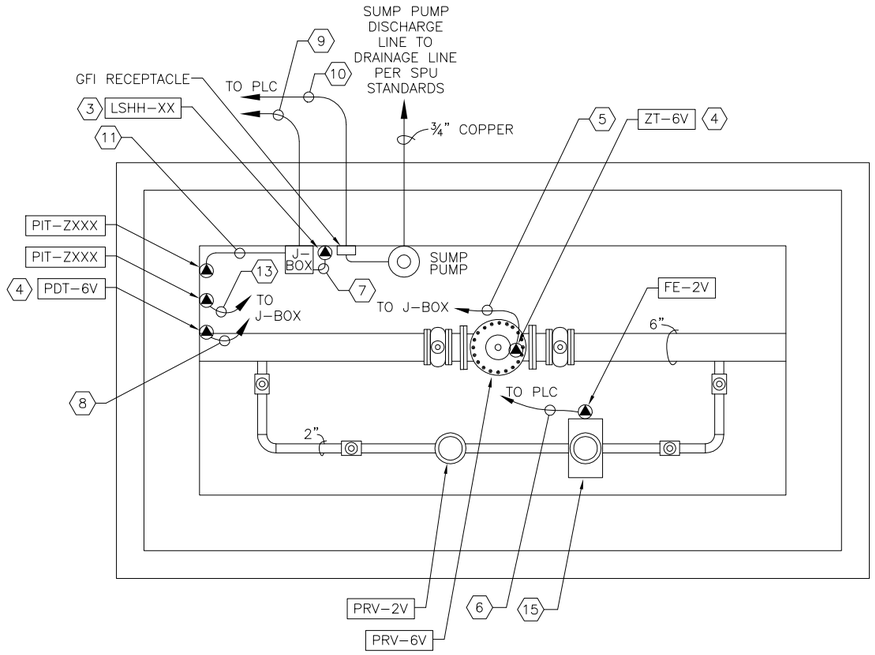
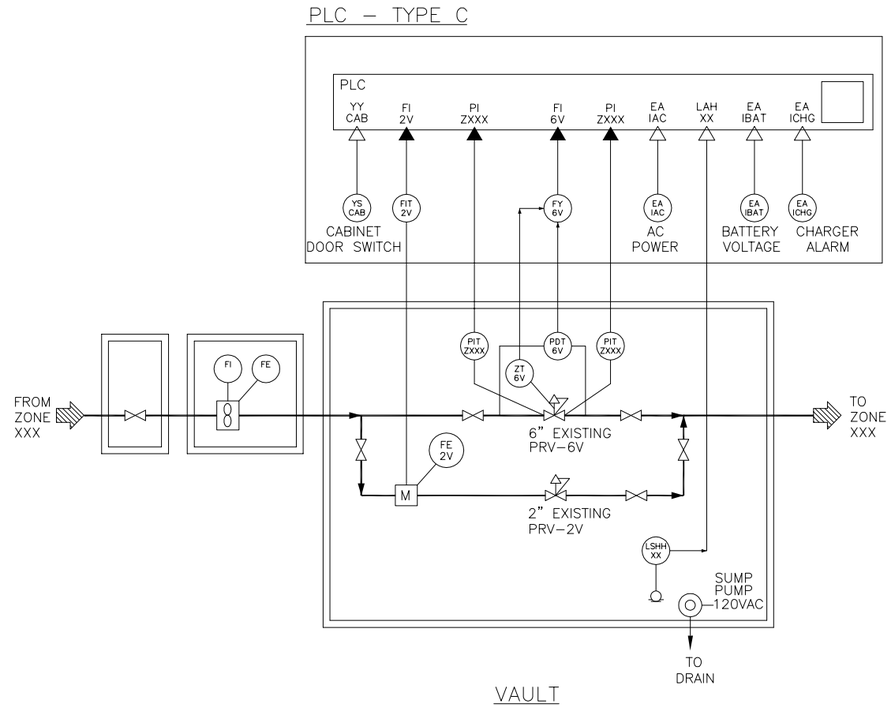
REVISION DATE: 9/30/2010

DRAWING # DRG 10–19

SHEET OF



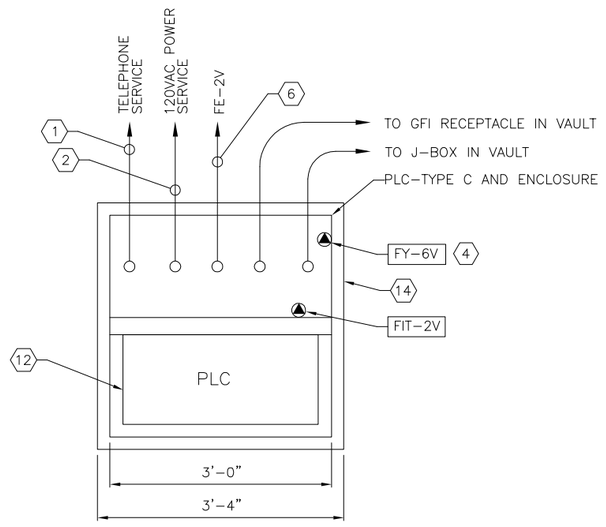
VAULT PLAN
NTS



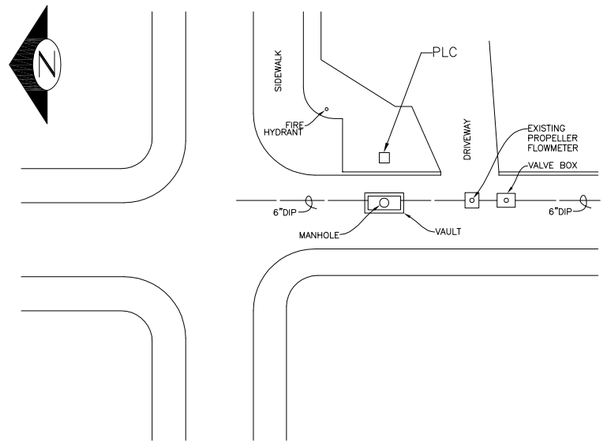
VAULT P&ID

KETNOTES:

1. INSTALL FRAME RELAY TELEPHONE SERVICE PER SPU STANDARDS.
2. INSTALL 120VAC POWER SERVICE AND CONDUIT PER SPU STANDARDS.
3. INSTALL FLOOD SWITCH LSHH–XX PER MANUFACTURER'S INSTRUCTIONS. INSTALL CLA–VAL FLOW METER SYSTEM AT REGULATOR,
4. INSTALL PER MANUFACTURER'S INSTRUCTIONS. LOCATE CLA–VAL FLOW COMPUTATION MODULE AT PLC, INSTALL PER MANUFACTURER'S INSTRUCTIONS.
5. (1) TSP, 3/4" CONDUIT TO J–BOX, (ZT–6V).
6. (1) MANUFACTURER SUPPLIED CABLE, 1" CONDUIT TO PLC, (FE–2V).
7. (2) #14, 3/4" CONDUIT TO J–BOX, (LSHH–XX).
8. (1) TSP, 1" CONDUIT TO J–BOX, (PDT–6V).
9. (5) TSP, (2) #14, 2" CONDUIT, (PDT–6V, ZT–6V, XS–602, PIT–ZXXX, PIT–ZXXX, FIT–2V). (2) #12, #12G, 2" CONDUIT, (POWER).
10. (1) TSP, 1" CONDUIT TO J–BOX, (PIT–ZXXX).
11. PLC AND COMPONENTS SHOWN WITHIN THE PLC ENCLOSURE PROVIDED BY OWNER.
12. (1) TSP, 1" CONDUIT TO J–BOX, (PIT–ZXXX).
13. CONCRETE PAD FOR PLC ENCLOSURE PER SPU STANDARDS.
14. INSTALL 2" MAGNETIC FLOW METER PER MANUFACTURER'S INSTRUCTIONS. PROVIDE A
15. MINIMUM OF 5 DIAMETERS UPSTREAM AND 5 DIAMETERS DOWNSTREAM OF THE METER FROM PIPE DISTURBANCES, SUCH AS ELBOW, GATE VALVE, OR PRV.



PLC PLAN
NTS



SITE PLAN
NTS

GENERAL NOTES:

1. EXISTING PIPING, EQUIPMENT & INSTRUMENTS ARE SHOWN LIGHT–LINED OR SCREENED.
2. CONDUIT RUNS ARE SHOWN DIAGRAMMATICALLY. DETERMINE ACTUAL CONDUIT RUNS IN THE FIELD.

DSG REFERENCE –

DATE	REVISION NAME	MADE	CHACKED	FINALIZED

NAME AND DATE DESIGNED:

APPROVED: DATUM:

DRAWING NAME: SCADA CONTROL SYSTEM

Seattle Public Utilities — **City of Seattle**
Ray Hoffman, Director

SEATTLE PUBLIC UTILITIES DESIGN STANDARDS AND GUIDELINES

REVISION DATE: 9/30/2010

DRAWING # DRG 10–20

SHEET OF

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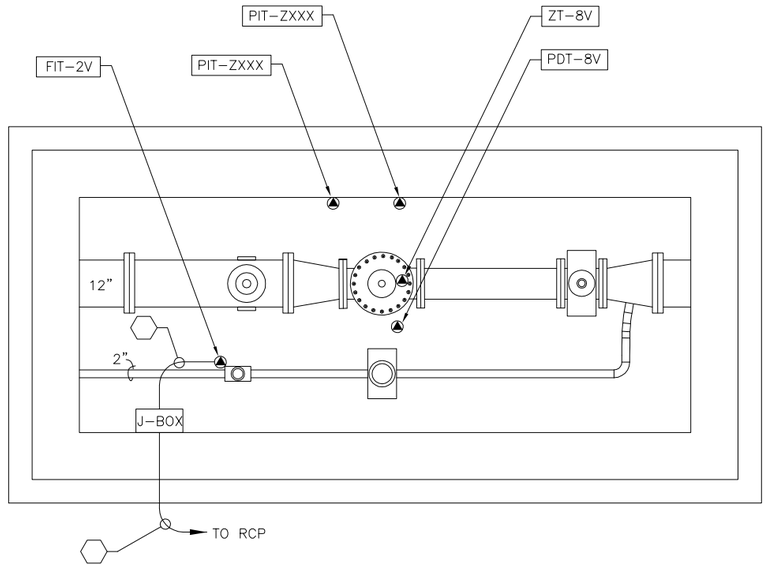


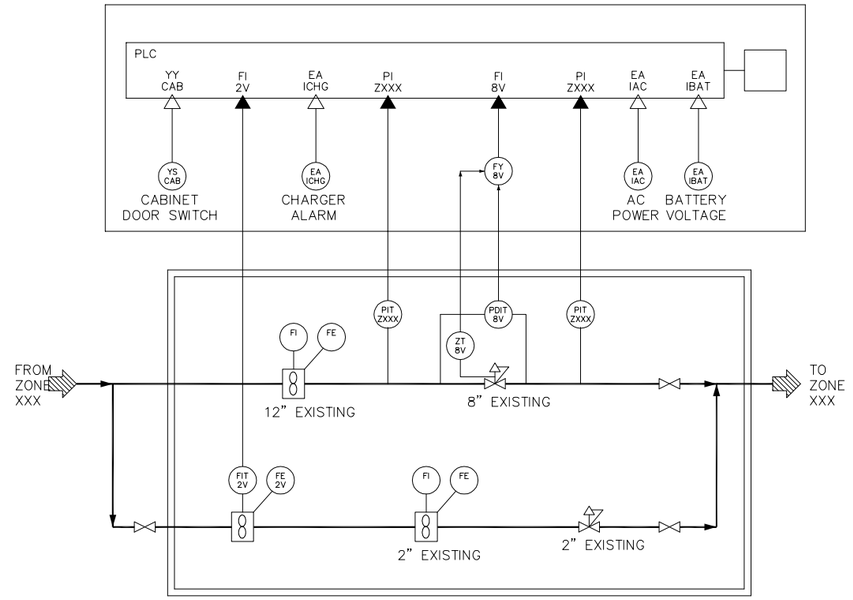
VAULT PLAN
NTS

1. INSTALL RCP-TSR, TRANSMITTER PANEL AND ANTENNA PER DETAIL SHEET #61.
2. REMOVE CHART RECORDER, TONE TELEMETRY, AND MOUNTING POLE, RETURN TO OWNER. SAVE PRESSURE SENSE LINES. PULL NEW 110VAC POWER WIRING BETWEEN RCP AND POWER PEDESTAL. EXTEND EXISTING SENSE LINE CONDUIT UNDERGROUND TO TRANSMITTER PANEL PER SECTION 16110. EXTEND EXISTING 110VAC POWER CONDUIT UNDERGROUND TO RCP PER SECTION 16110.
3. INSTALL FLOOD SWITCH XS-602 PER MANUFACTURE INSTRUCTIONS.
4. INSTALL CLA-VAL FLOW METER SYSTEM AT REGULATORS (2 PLACES), INSTALL PER MANUFACTURE INSTRUCTIONS. LOCATE CLA-VAL FLOW COMPUTATION MODULE(S) AT RCP, INSTALL PER MANUFACTURE INSTRUCTIONS .
5. (2) TSP, 3/4" CONDUIT TO J-BOX, (PDT-305, ZT-305)
6. (2) TSP, 1" CONDUIT TO J-BOX, (PDT-306, ZT-306)
7. (2) #14, 3/4" CONDUIT TO J-BOX, (XS-602)
8. (2) 3/8" COPPER TUBE, 2" CONDUIT, (UPSTREAM PRESSURE, DOWNSTREAM PRESSURE) CORE DRILL VAULT FOR 2" CONDUIT. INSTALL CONDUIT FROM CORE DRILL TO TRANSMITTER PANEL. INSTALL 3/8" COPPER FROM OWNER SUPPLIED ISOLATION VALVES ON PRV'S THROUGH NEW CONDUIT TO TRANSMITTER PANEL, CONNECT TO TRANSMITTER PER P&ID. USE METAL CLAMPS EVERY 36" ANCHORED TO VAULT WALL TO SECURE COPPER TUBING IN VAULT.
9. (4) TSP, (2) #14, 2" CONDUIT, (PDT-305, 306, ZT-305, 306, XS-602)
10. (2) #12, #12G, 2" CONDUIT, (POWER)
11. (2) TSP, (2) #14, 1" CONDUIT, (PIT-301, 302, XS-602).
12. RCP AND COMPONENTS SHOWN WITHIN THE RCP, PROVIDED BY OWNER.

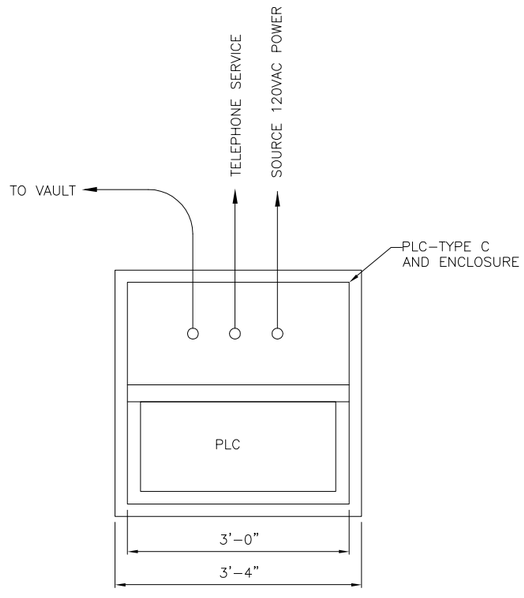
GENERAL NOTES:

1. EXISTING PIPING, EQUIPMENT & INSTRUMENTS ARE SHOWN LIGHT-LINED OR SCREENED.
2. CONDUIT RUNS ARE SHOWN DIAGRAMMATICALLY. DETERMINE ACTUAL CONDUIT RUNS IN THE FIELD.

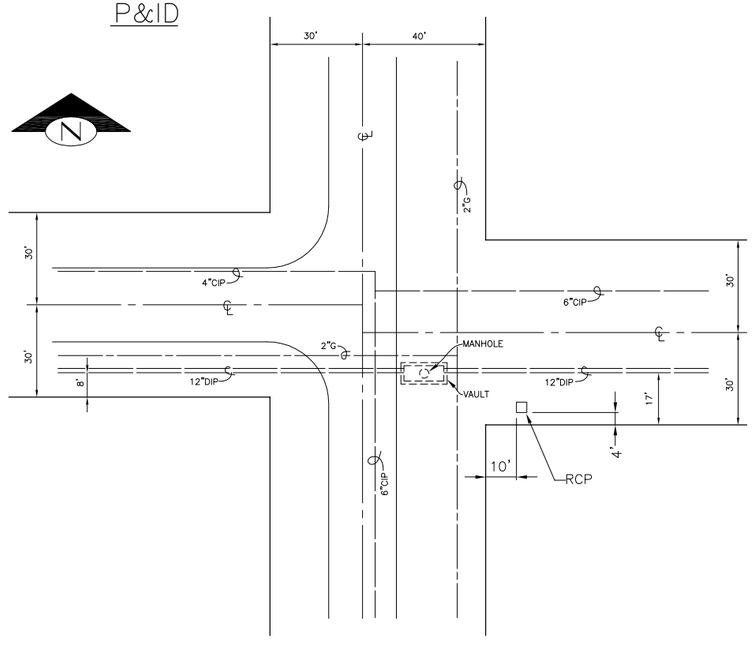
RCP - TYPE C



VAULT P&ID



RCP PLAN
NTS



SITE PLAN
NTS

DSG REFERENCE –				
DATE	REVISION NAME	MADE	CHACKED	FINALIZED

NAME AND DATE DESIGNED:

APPROVED: DATUM:

DRAWING NAME: SCADA CONTROL SYSTEM

Seattle Public Utilities

City of Seattle
Ray Hoffman, Director

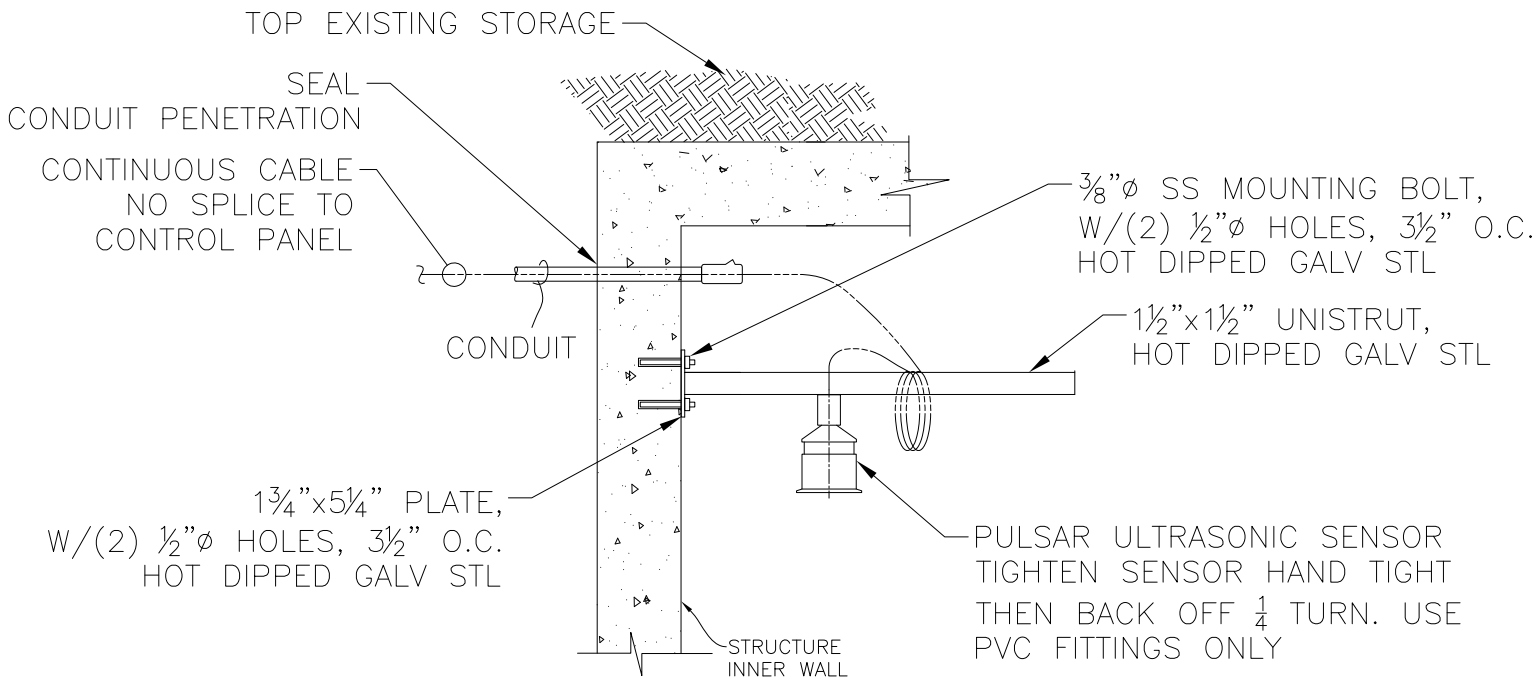
SEATTLE PUBLIC UTILITIES
DESIGN STANDARDS
AND GUIDELINES

REVISION DATE: 9/30/2010

DRAWING # DRG 10-21

SHEET OF

P:\Project\C407025_Flow_Monitoring_SCADA_FieldImprov\04-Design\A-Plot_Files\C407025_ 083-02.dwg
Xrefs: |

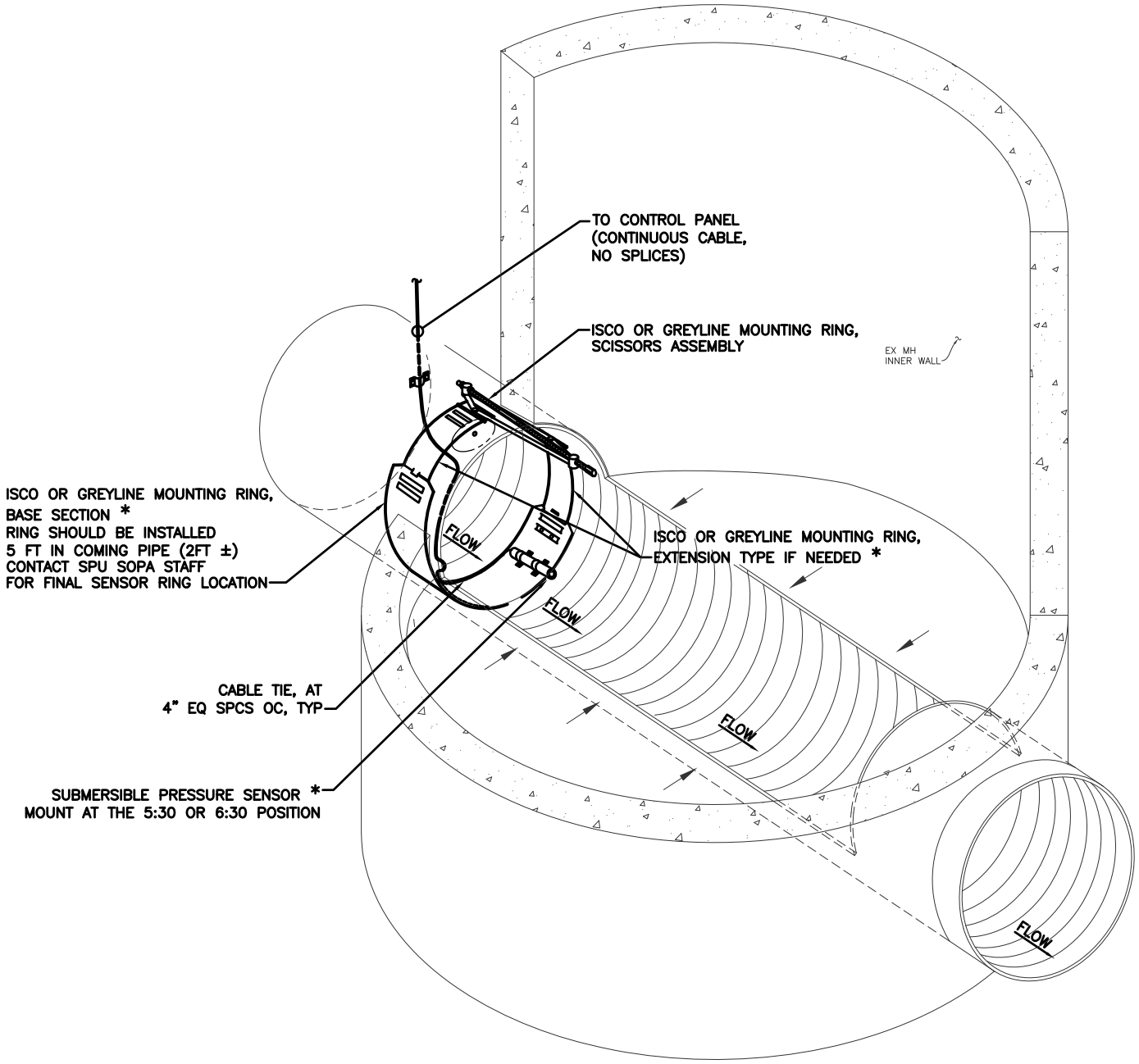


SECTION

TYPICAL ULTRASONIC LEVEL SENSOR W/ BRACKET

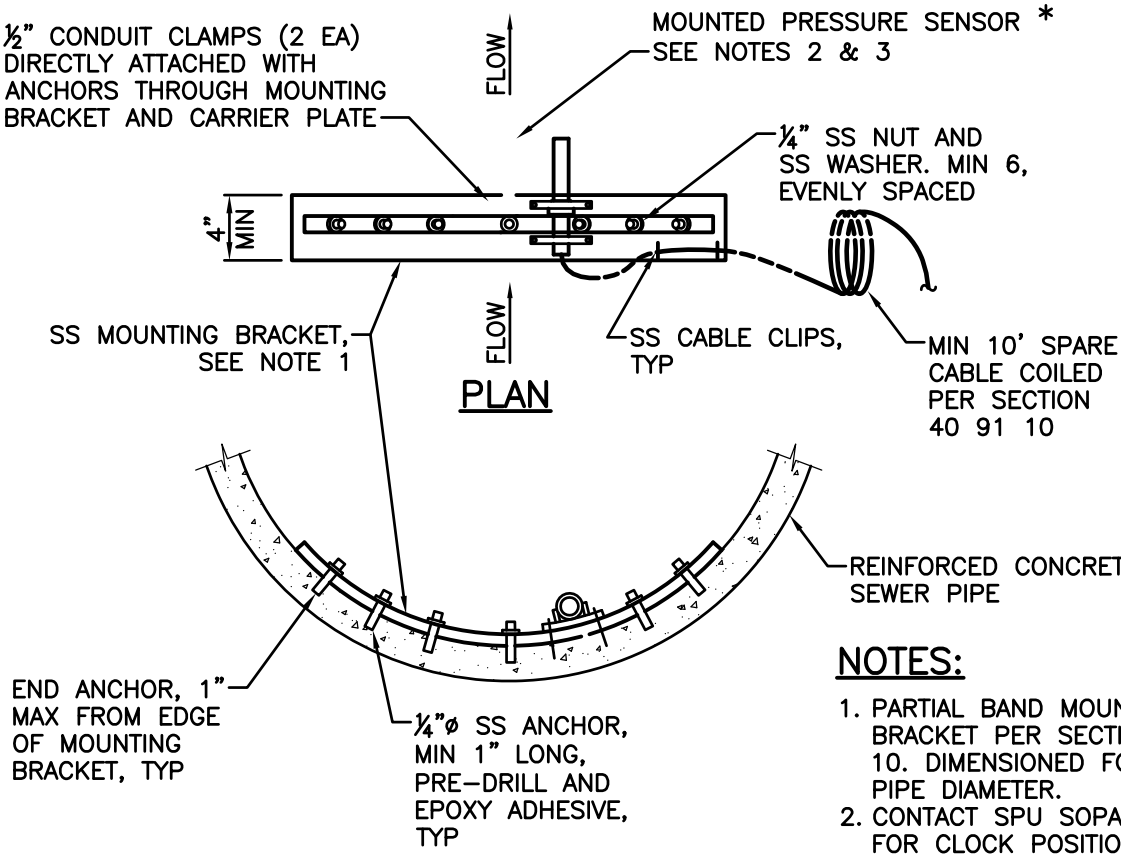
5
VAR

NTS



SUBMERSIBLE PRESSURE SENSOR
FULL RING
INSTALLATION DETAIL

NTS



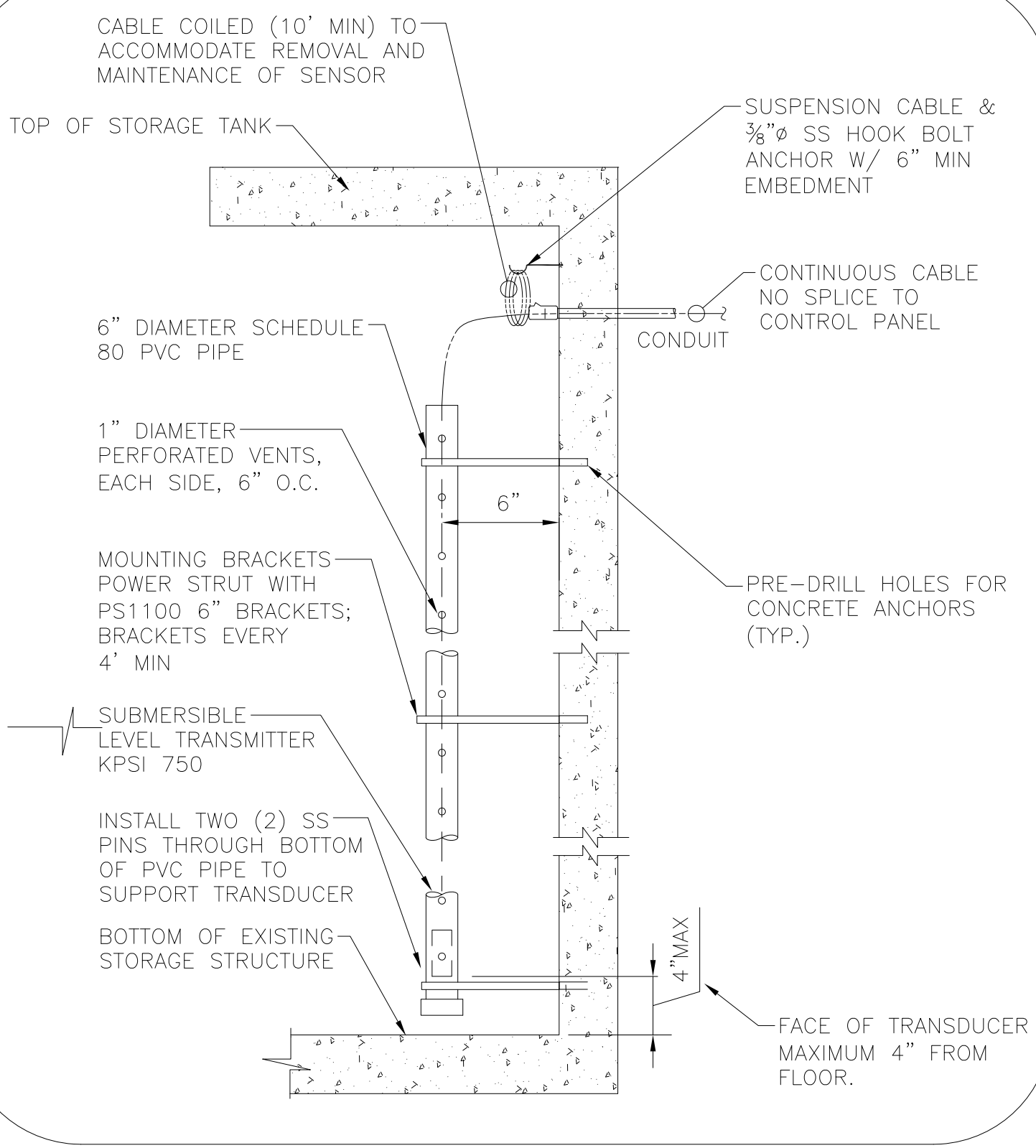
NOTES:

1. PARTIAL BAND MOUNTING BRACKET PER SECTION 40 91 10. DIMENSIONED FOR SEWER PIPE DIAMETER.
2. CONTACT SPU SOPA STAFF FOR CLOCK POSITION OF SENSOR IN PIPE.
3. SENSOR MOUNTED WITH CABLE END FACING UPSTREAM.

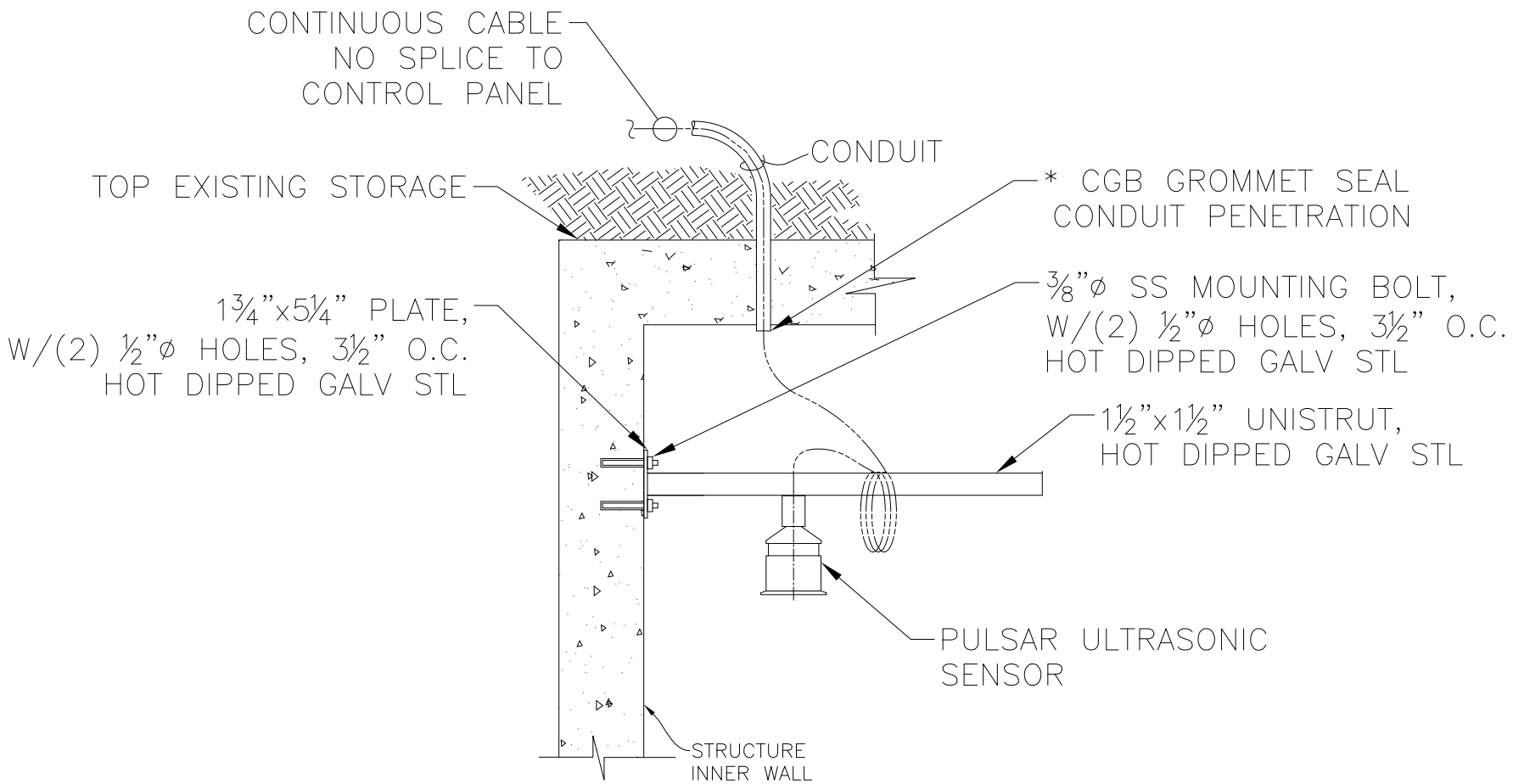
* SEE "MONITORING EQUIPMENT SPECIFICATIONS TABLE" FOR SPEC.

SUBMERSIBLE PRESSURE SENSOR PARTIAL RING INSTALLATION DETAIL

NTS

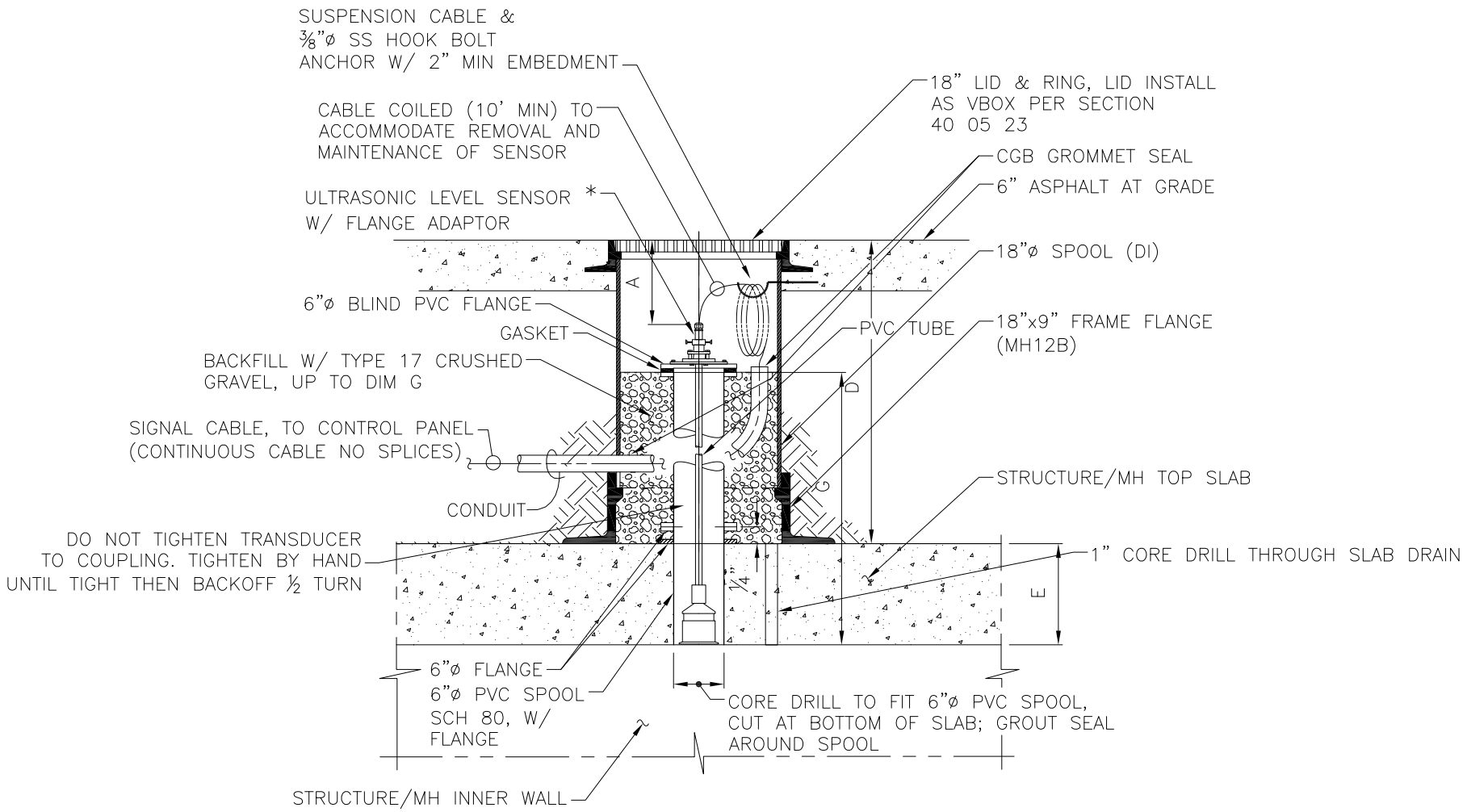


KPSI PRESSURE TRANSDUCER IN STILLING WELL



TYPICAL ULTRASONIC LEVEL SENSOR W/ BRACKET

NTS

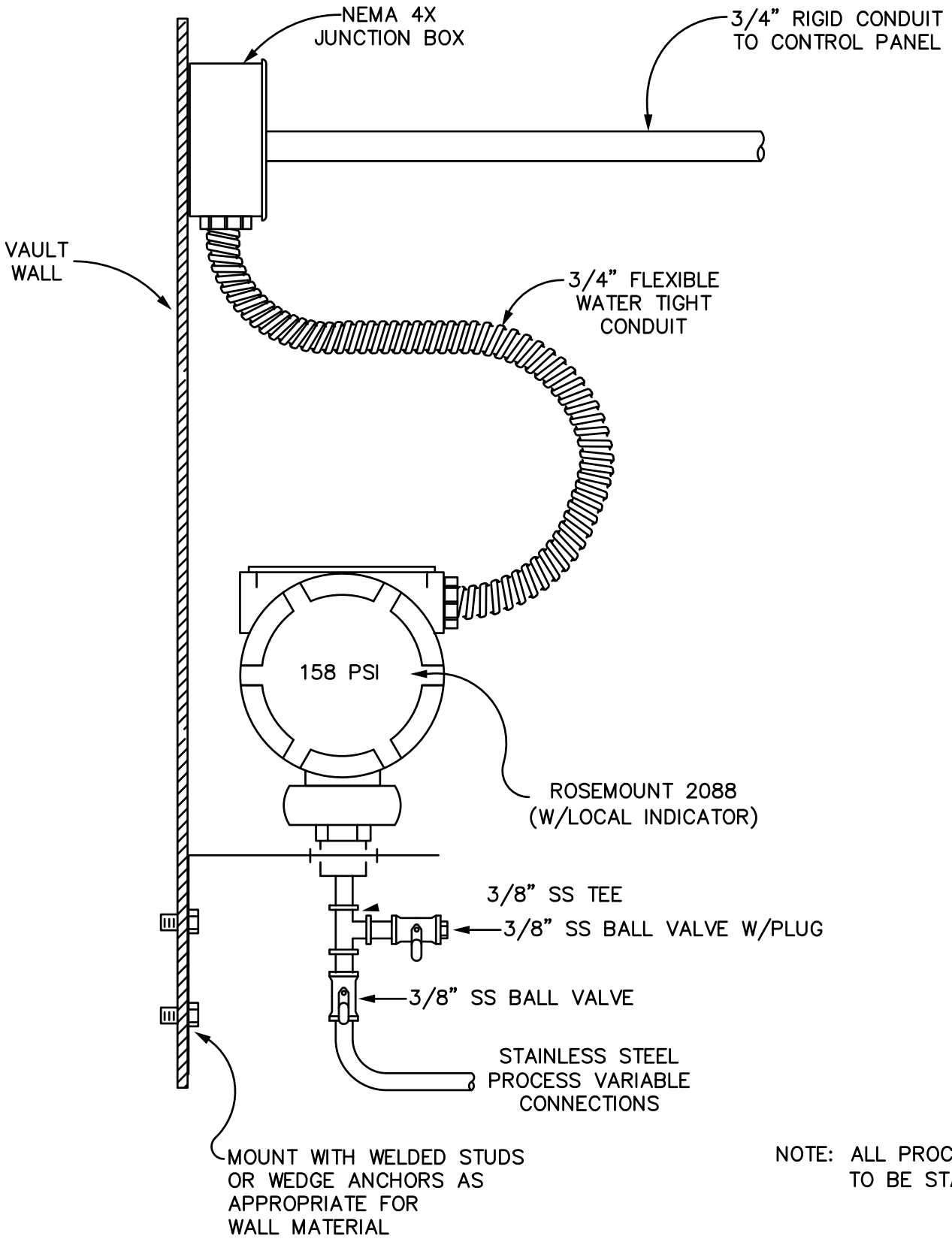


(PULSAR ULTRASONIC SENSOR)

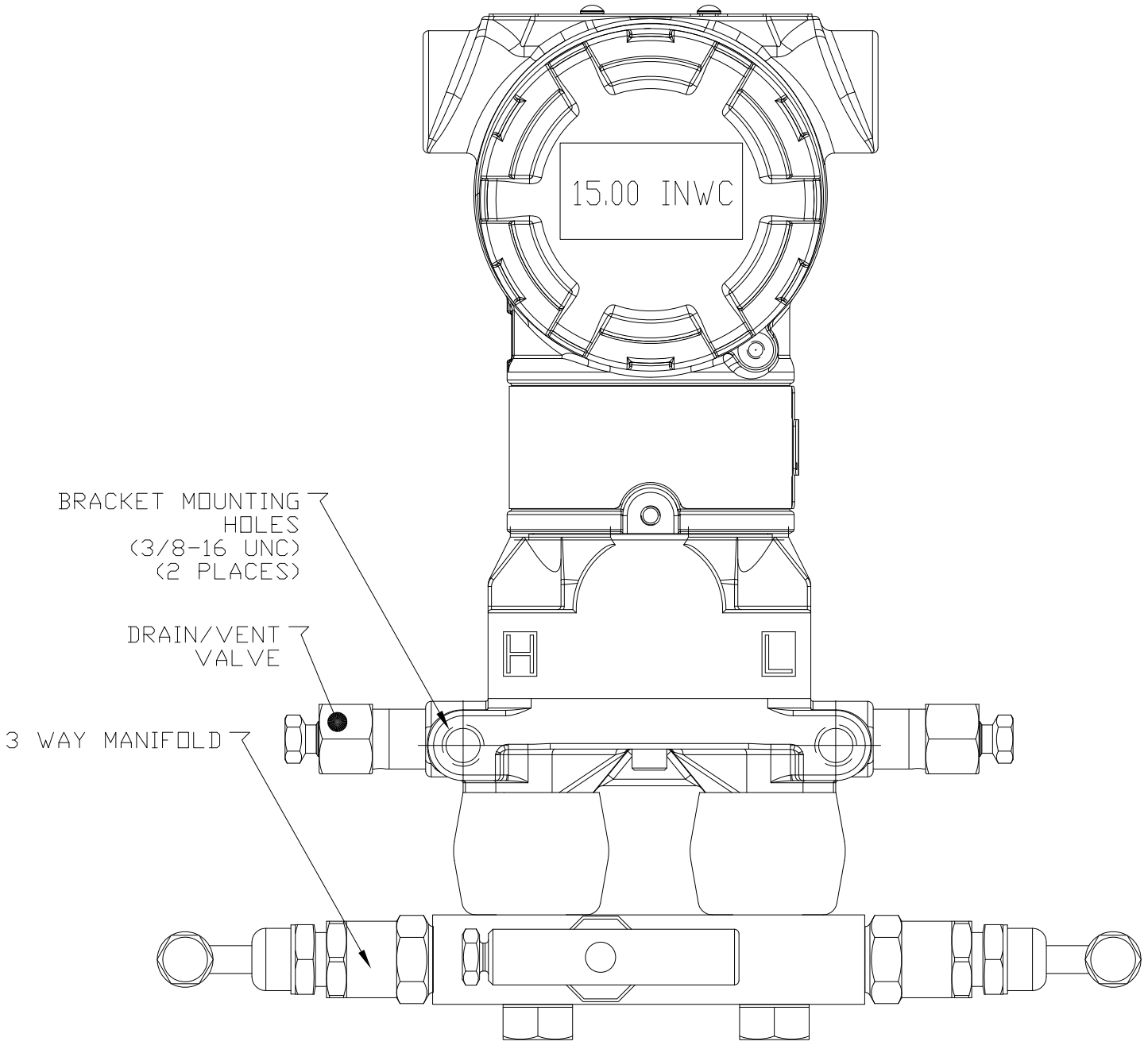
* SEE "MONITORING EQUIPMENT SPECIFICATIONS TABLE" FOR SPEC.

TYPICAL ULTRASONIC LEVEL SENSOR INSTALLATION THROUGH STRUCTURE SLAB DETAIL

SCALE: 1"=1'-0"

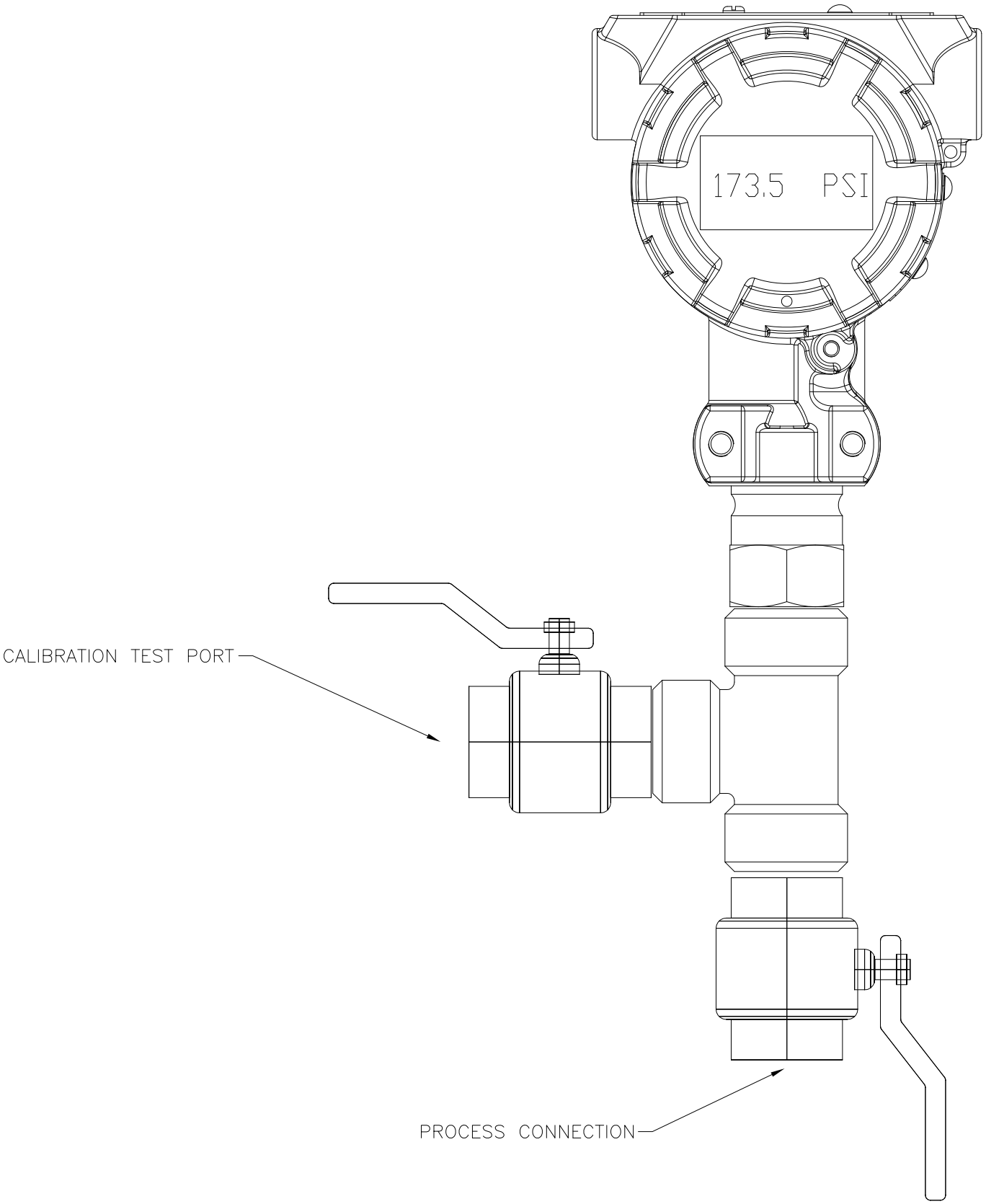

NEMA 4X
JUNCTION BOX
3/4" RIGID CONDUIT
TO CONTROL PANEL
VAULT
WALL
3/4" FLEXIBLE
WATER TIGHT
CONDUIT
158 PSI
ROSEMOUNT 2088
(W/LOCAL INDICATOR)
3/8" SS TEE
3/8" SS BALL VALVE W/PLUG
3/8" SS BALL VALVE
STAINLESS STEEL
PROCESS VARIABLE
CONNECTIONS
MOUNT WITH WELDED STUDS
OR WEDGE ANCHORS AS
APPROPRIATE FOR
WALL MATERIAL
NOTE: ALL PROCESS FITTINGS
TO BE STAINLESS STEEL

ROSEMOUNT 3051



DIFFERENTIAL PRESSURE

ROSEMOUNT 2088



GAUGE PRESSURE