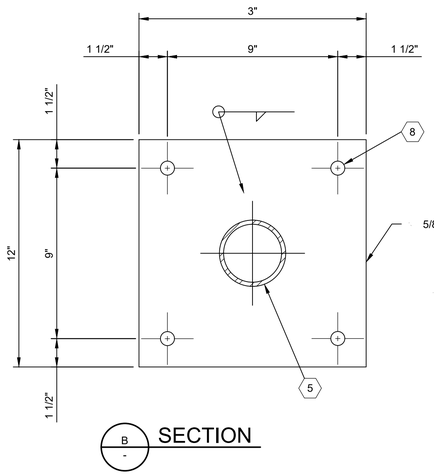
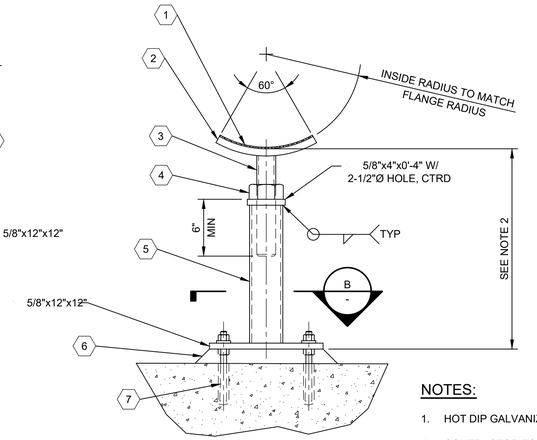


B - SECTION



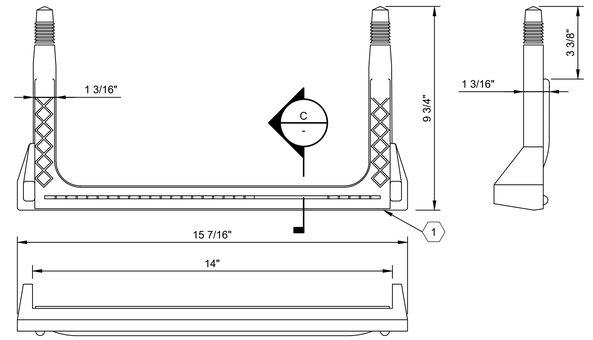
KEY NOTES: (X)

1. 1/2" NEOPRENE DIELECTRIC PAD
2. 1/2"x3" HOT ROLLED BAR STOCK BENT TO RADIUS, SEE NOTE 3
3. 2" UNC ALL-TREAD, LENGTH AS REQUIRED
4. 2" HEAVY HEX NUT FOR ADJUSTMENT
5. 3"Ø SCH 40 STL PIPE
6. 1 1/2" GROUT FILL, PLACE AFTER BASE PLATE IS LEVEL
7. GALVANIZED 5/8"Ø ADHESIVE SET ANCH BOLT W/ 4" MIN EMBED. 11/16"Ø ADHESIVE CAPSULE
8. 3/4"Ø DRILLED HOLE (TYP)

NOTES:

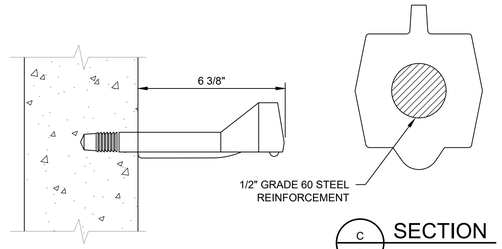
1. HOT DIP GALVANIZE SUPPORT AFTER FABRICATION AND COAT PER SPECIFICATIONS.
2. CONTRACTOR TO FIELD VERIFY DIMENSION FOR EACH VAULT AND COORDINATE WITH SUPPORT MANUFACTURER.
3. SADDLE LENGTH SHALL BE 10" UNLESS SPECIFIED OTHERWISE ON DRAWINGS.

1 - ADJUSTABLE PIPE SUPPORT
NOT TO SCALE



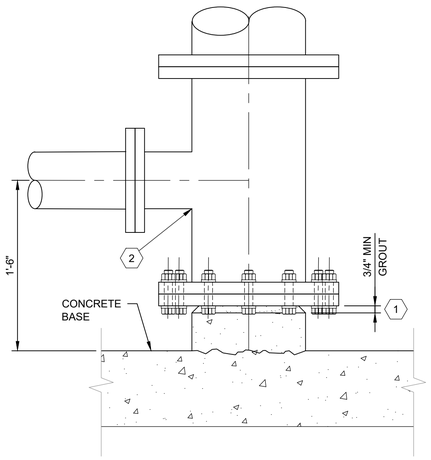
KEY NOTES: (X)

1. RETRACTABLE SAFETY POST (BILCO LADDERUP SAFETY POST) TO BE INSTALLED ON TOP TWO RUNGS OF MANHOLES STEPS.

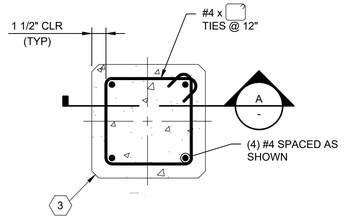


C - SECTION

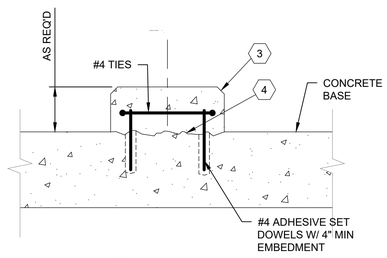
2 - MANHOLE STEP
NOT TO SCALE



ELEVATION VIEW



SECTIONAL PLAN



A - SECTION

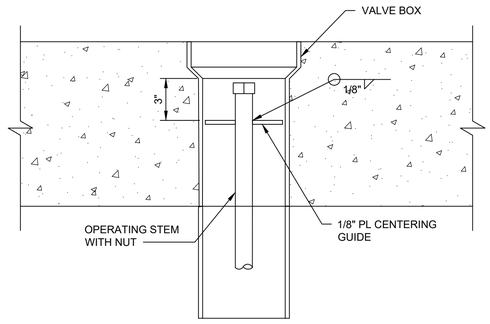
KEY NOTES: (X)

1. 3/4" GROUT BELOW FLANGE.
2. 12"x6" STEEL TEE W. BLIND FLANGE.
3. 3/4" CHAMFER ON ALL EXPOSED CONCRETE CORNERS.
4. ROUGHEN AND CLEAN SURFACE PRIOR TO CONCRETE PLACEMENT.

NOTES:

1. FABRICATED FITTING FINISH SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 09 90 04.

3 - CAST-IN-PLACE CONCRETE PEDESTAL FOR FLANGED TEE
NOT TO SCALE



NOTE:

1. CONTRACTOR TO COORDINATE CENTERING RING DIAMETER W/ SUBMITTED VALVE BOX.

4 - FLUSH MOUNT VALVE BOX FOR CAST-IN-PLACET VAULT
NO TO SCALE

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	R. NALLEY
PROJECT NUMBER	10442825

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

CIVIL
MISC DETAILS

0 1" 2"

FILENAME 01C508.DWG
SCALE NO SCALE

SHEET 01C508

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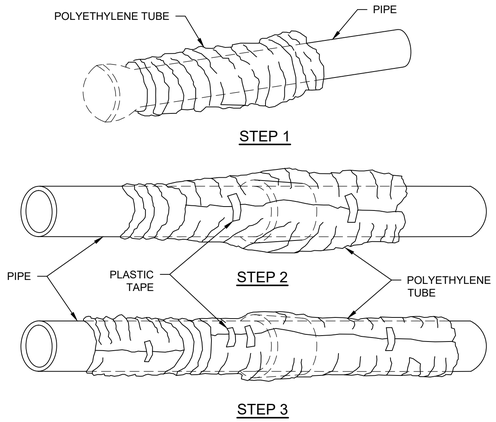


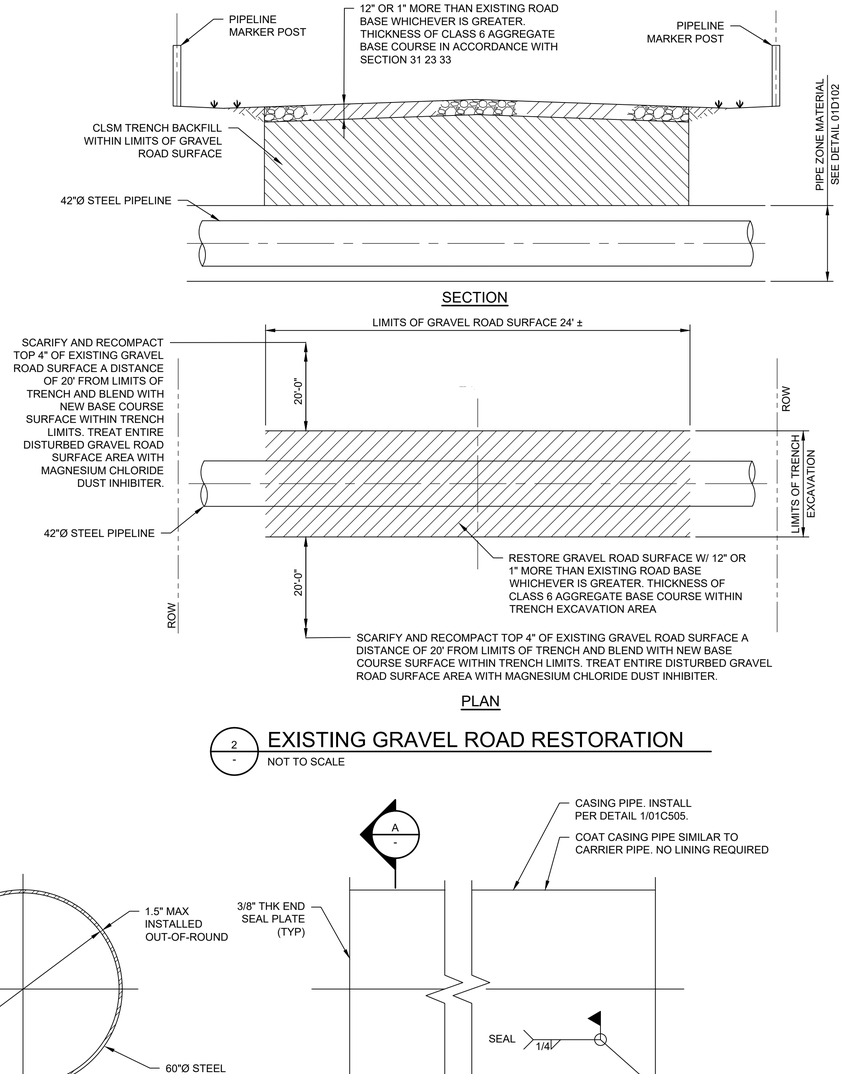
FIELD INSTALLATION - POLYETHYLENE WRAP

STEP 1 - PLACE TUBE OF POLYETHYLENE MATERIAL ON PIPE PRIOR TO LOWERING IT INTO TRENCH.

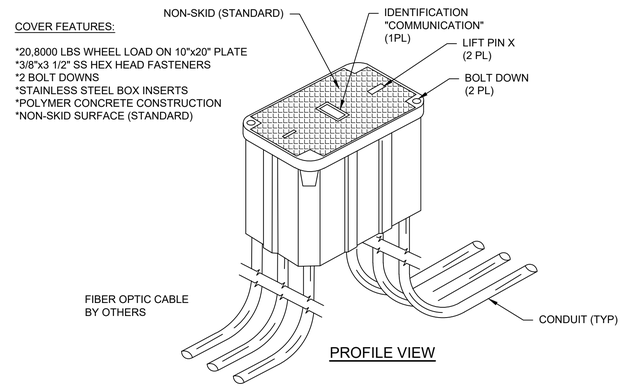
STEP 2 - PULL THE TUBE OVER THE LENGTH OF THE PIPE. TAPE TUBE TO PIPE AT JOINT. FOLD MATERIAL AROUND THE ADJACENT SPIGOT END AND WRAP WITH TAPE TO HOLD PLASTIC TUBE IN PLACE.

STEP 3 - OVERLAP FIRST TUBE WITH ADJACENT TUBE AND SECURE WITH PLASTIC ADHESIVE TAPE. THE POLYETHYLENE TUBE MATERIAL COVERING THE PIPE SHALL BE LOOSE. EXCESS MATERIAL SHALL BE NEATLY DRAWN UP AROUND THE PIPE BARREL, FOLDED ON TOP OF PIPE AND TAPED IN PLACE.

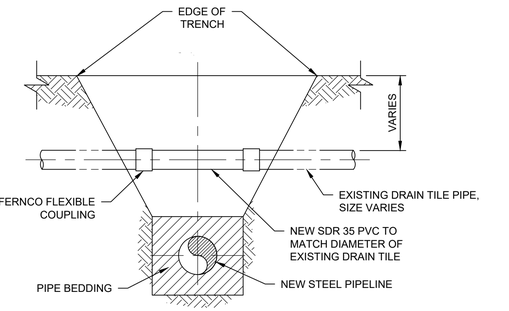
1 - NOT TO SCALE
POLYETHYLENE WRAP



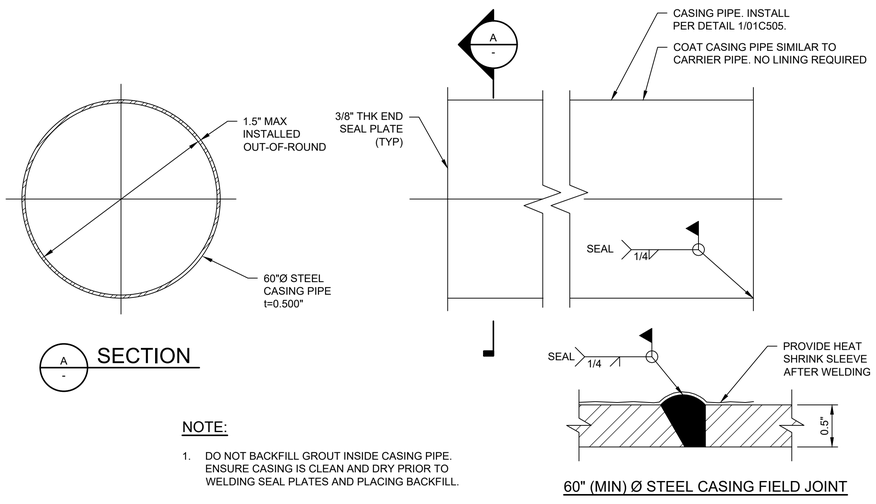
2 - NOT TO SCALE
EXISTING GRAVEL ROAD RESTORATION



3 - NOT TO SCALE
TYPE 1 AT GRADE FIBER OPTIC HANDHOLE



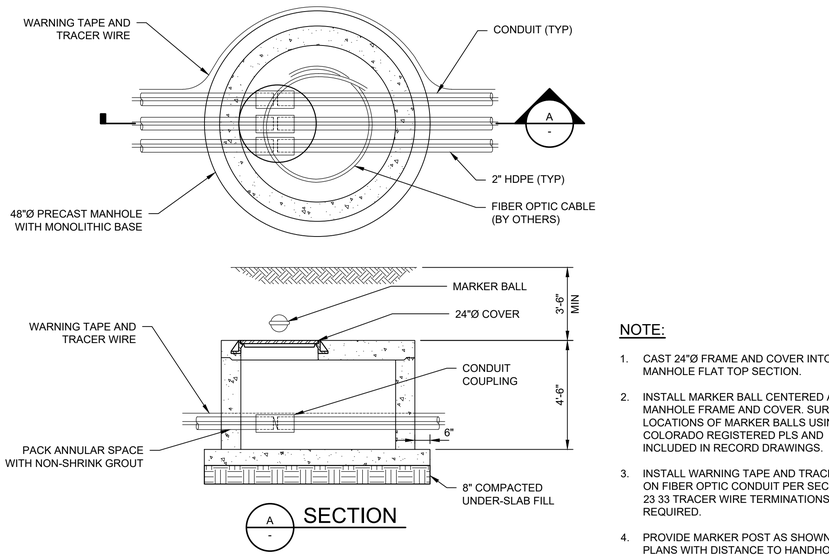
4 - NOT TO SCALE
EXISTING FIELD DRAIN CROSSING



NOTE:

1. DO NOT BACKFILL GROUT INSIDE CASING PIPE. ENSURE CASING IS CLEAN AND DRY PRIOR TO WELDING SEAL PLATES AND PLACING BACKFILL.

5 - NOT TO SCALE
OPEN CUT CASING PIPE FOR FUTURE PIPELINE



NOTE:

1. CAST 24"Ø FRAME AND COVER INTO MANHOLE FLAT TOP SECTION.
2. INSTALL MARKER BALL CENTERED ABOVE MANHOLE FRAME AND COVER. SURVEY LOCATIONS OF MARKER BALLS USING A COLORADO REGISTERED PLS AND INCLUDED IN RECORD DRAWINGS.
3. INSTALL WARNING TAPE AND TRACER WIRE ON FIBER OPTIC CONDUIT PER SECTION 31 23 33 TRACER WIRE TERMINATIONS NOT REQUIRED.
4. PROVIDE MARKER POST AS SHOWN ON PLANS WITH DISTANCE TO HANDHOLE.

6 - NOT TO SCALE
TYPE 2 BURIED PRECAST FIBER OPTIC HANDHOLE

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	R. NALLEY
PROJECT NUMBER	10442825

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

CIVIL
MISC DETAILS

0 1" 2"

FILENAME 01C509.DWG
SCALE NO SCALE

SHEET 01C509

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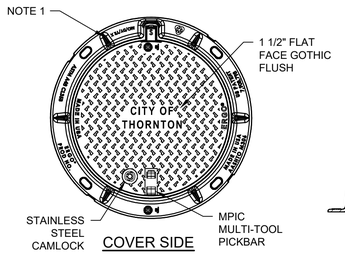
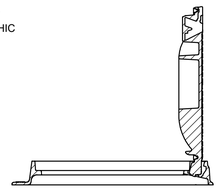
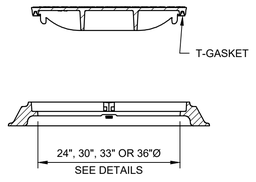


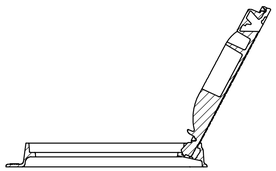
COVER SIDE



SAFETY LOCK@90



COVER SIDE

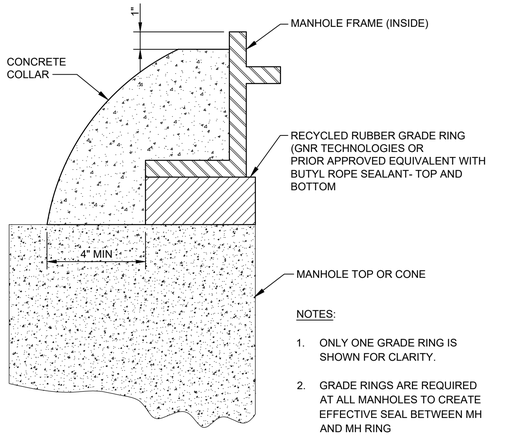


FULLY OPENED@120

NOTES:

1. INSTALL IN ACCORDANCE WITH MANUFACTURE'S WRITTEN INSTRUCTIONS. PROVIDE BUTYL ROPE SEALANT BETWEEN MH RING AND GRADE RING.
2. LIDS AND FRAMES SHALL BE TAPPED AND DRILLED TO FIT McGARD BOLTS PER COT STANDARDS. 2 BOLTS PER LID. SEE SPE SECTION 33 05 81.

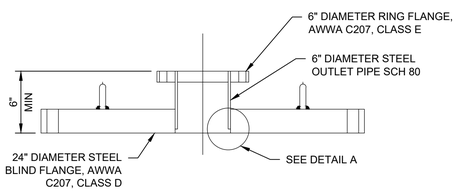
1 - HINGED & GASKET MANHOLE RING AND COVER
NOT TO SCALE



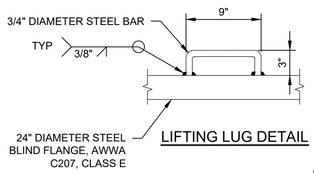
NOTES:

1. ONLY ONE GRADE RING IS SHOWN FOR CLARITY.
2. GRADE RINGS ARE REQUIRED AT ALL MANHOLES TO CREATE EFFECTIVE SEAL BETWEEN MH AND MH RING

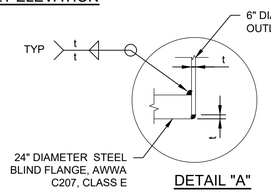
2 - MANHOLE CONCRETE COLLAR
NOT TO SCALE



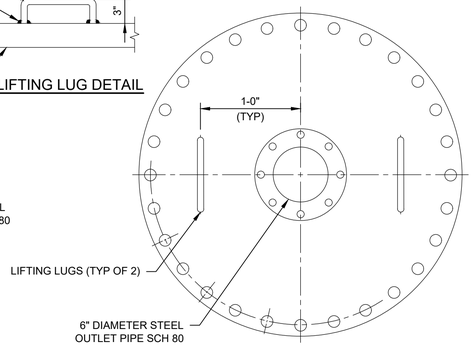
24" ACCESS RISER BLIND FLANGE W/ 6" OUTLET ELEVATION



LIFTING LUG DETAIL



DETAIL "A"

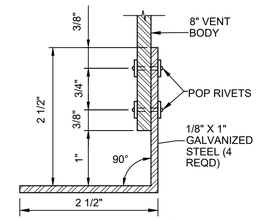


24" ACCESS RISER MANWAY W/ 6" OUTLET PLAN

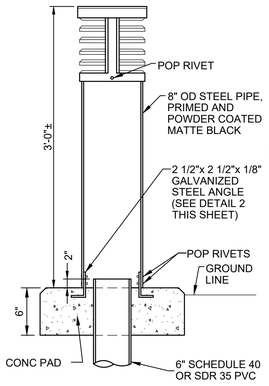
NOTES:

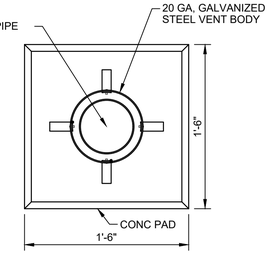
1. FLANGES SHALL BE AWWA CLASS E, ASME B16.1 CL 125, OR ASME B16.5 CL 150.
2. SEE AWWA C207 FOR METHOD OF RING FLANGE ATTACHMENT.
3. FIELD COAT ALL BOLTS IN ACCESS MANWAY WITH WAX TAPE AS SPECIFIED.
4. EXPOSED PIPE AND FITTINGS IN ACCESS MANWAY SHALL BE COATED IN ACCORDANCE WITH SECTION 09 90 04.

3 - BLIND FLANGE DETAILS FOR VAULTED ACCESS MANWAYS
NOT TO SCALE



GALVANIZED STEEL ANGLE DETAIL
NOT TO SCALE





NOTES:

1. LOCATE VENT OUT OF TRAFFIC AREAS AND AS APPROVED BY THE CITY REPRESENTATIVE.
2. VENTS SHALL HAVE FINE MESH SCREEN INSTALLED IN INTERIOR TO PREVENT INSECTS ENTERING THE VENT PIPE.

4 - VAULT VENT DETAIL
NOT TO SCALE

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	R. NALLEY
PROJECT NUMBER	10442825

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

CIVIL MISC DETAILS

0 1" 2"

FILENAME 01C510.DWG
SCALE NO SCALE

SHEET 01C510

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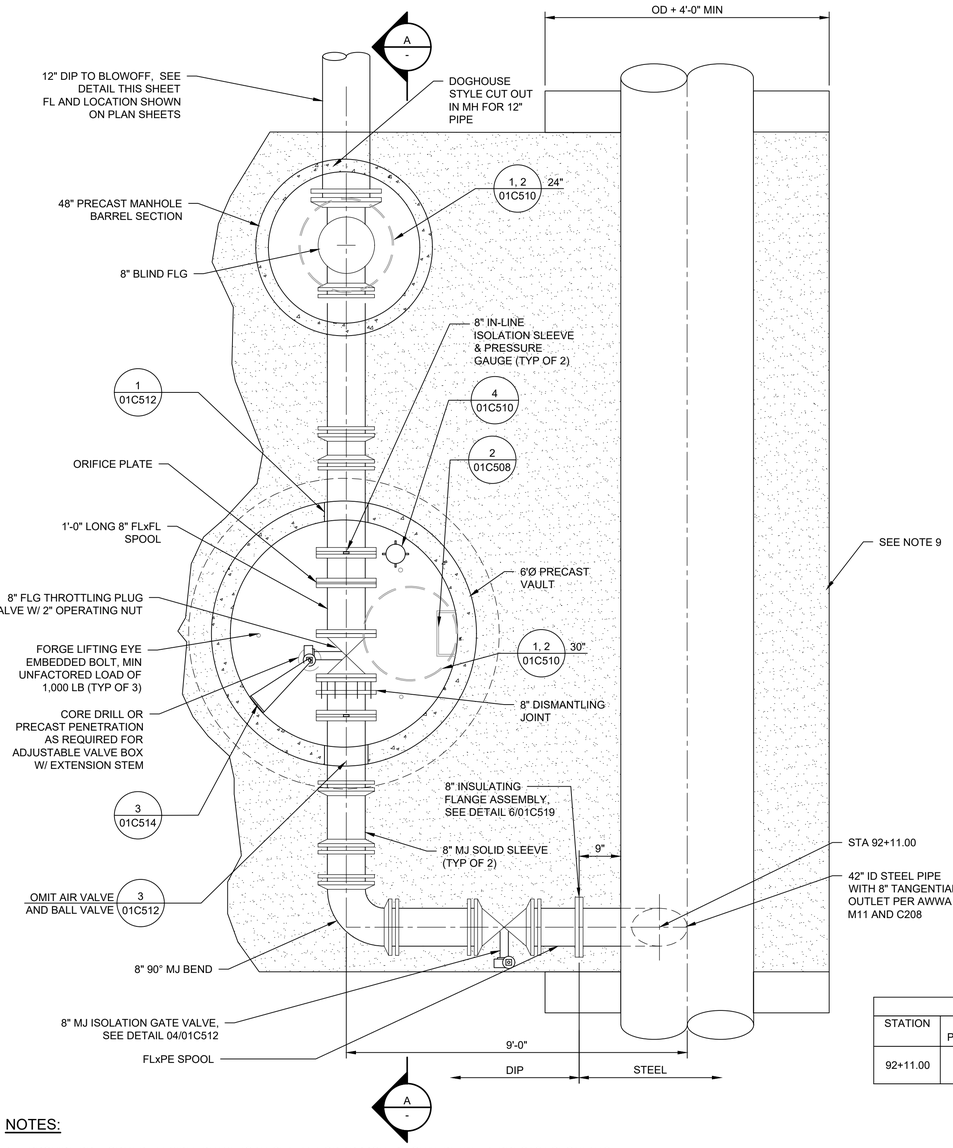
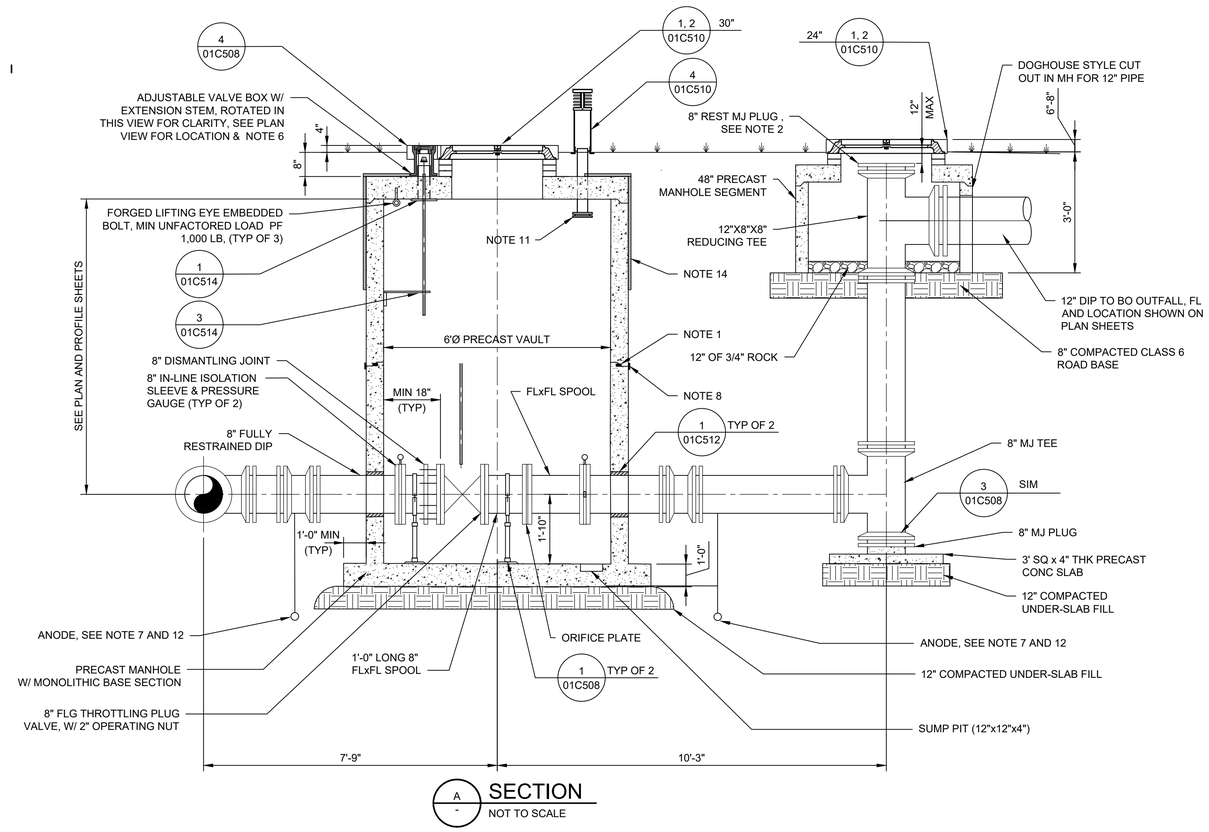
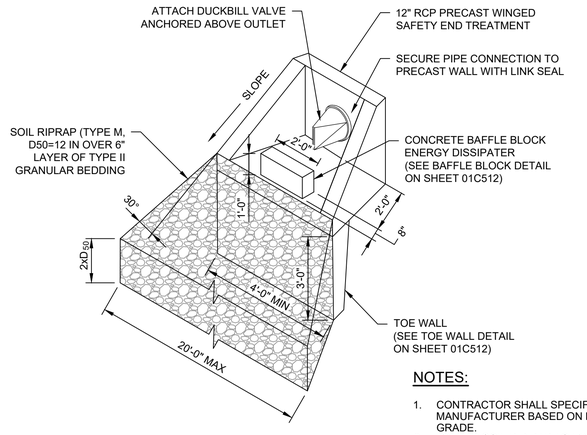




A - SECTION
NOT TO SCALE

8" BLOWOFF					
STATION	WORKING PRESSURE (PSI)	FLANGE CLASS (AWWA C207)	ISOLATION GATE VALVE	THROTTLING PLUG VALVE	ORIFICE PLATE OPENING (IN)
92+11.00	232	CLASS E	MJ 8" RATED TO 350 PSI	FL 8" RATED TO 285 PSI	6"



NOTES:

1. CONTRACTOR SHALL SPECIFY WINGWALL SLOPE TO MANUFACTURER BASED ON EXISTING NATURAL GRADE.
2. EXTEND SOIL RIP RAP TO EXTENTS SHOWN ON PLAN AND PROFILE SHEETS.
3. SEE SOIL RIPRAP DETAIL.

2 - BLOWOFF OUTLET
NOT TO SCALE

NOTES:

1. PROVIDE PREFORMED FLEXIBLE BUTYL JOINT SEALANT OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE VAULT AND MANHOLE SEGMENTS.
2. FIELD COAT ALL HARDWARE, BURIED AND IN VAULT, WITH WAX TAPE AS SPECIFIED.
3. EXPOSED PIPE AND FITTINGS IN VAULT SHALL BE COATED IN ACCORDANCE WITH SECTION 09 90 04.
4. ALL PIPE SHALL BE FULLY RESTRAINED.
5. FOR MANHOLES DEEPER THAN 20 FEET, A SAFETY CLIMBING RAIL MUST BE PROVIDED.
6. VALVE OPERATOR NUT EXTENSION SHALL BE TERMINATED NO DEEPER THAN 8" FROM THE FINISHED GRADE.
7. SEE CP SCHEDULE
8. IN ADDITION TO BUTYL JOINT SEALANT, PROVIDE ALL MANHOLE BARREL SECTION JOINTS WITH PERIMETER JOINT SEALS.
9. DISTURBED EARTH UNDER PIPE ZONE SHALL BE BACKFILLED WITH CLSM TO SPRING LINE OF BLOW OFF PIPING.
10. CONTRACTOR SHALL VERIFY DIMENSIONS WITH MANUFACTURERS AND PROVIDE VAULT WITH PROPERLY ALIGNED PENETRATIONS.
11. FLANGED STYLE FROST-SAFE 2-WAY AIR DAMPER (VALMATIC 1508 OR ENGINEER APPROVED EQUAL).
12. BOND ALL BURIED DUCTILE PIPE AND FITTINGS PRIOR TO BACKFILL.
13. PROVIDE ALL BURIED DIP WITH POLYETHYLENE WRAP PER DETAIL 01/01C511.
14. INSTALL 2" THICK INSULATION TO THE TOP 4 FEET AND TOP SURFACE OF VAULT STRUCTURE EXTERIOR. SEE SPECIFICATION SECTION 33 05 16.
15. PROVIDE MH STEPS W/ RETRACTIBLE SAFETY POST PER 2/01C508

1 - 8" BLOWOFF ASSEMBLY
NOT TO SCALE

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	R. NALLEY
PROJECT NUMBER	10442825

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

CIVIL
8-INCH BLOWOFF DETAILS

0 1" 2"

FILENAME 01C511.DWG
SCALE NO SCALE

SHEET 01C511

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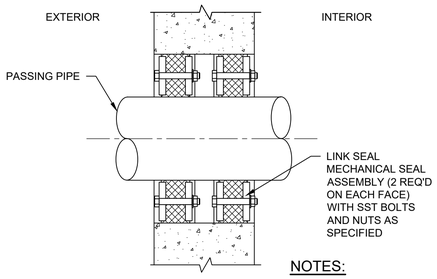
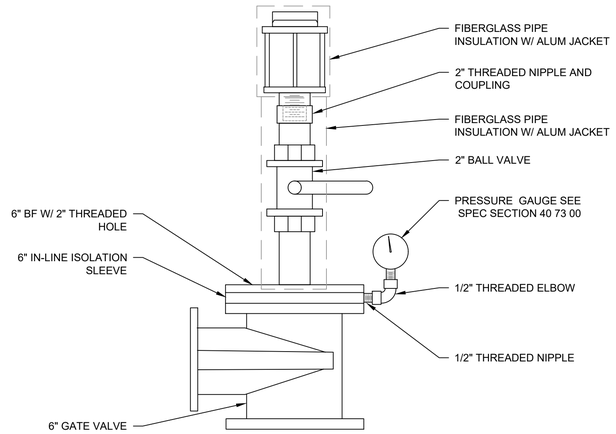


NOTES:

1. BLOCK OUT SMOOTH OPENING IN PRECAST CONCRETE FOR LINK SEAL TO BEAR AGAINST.
2. ORIENT BOLTS TO FACE THE INTERIOR OF THE STRUCTURE FOR EASE OF ACCESS.

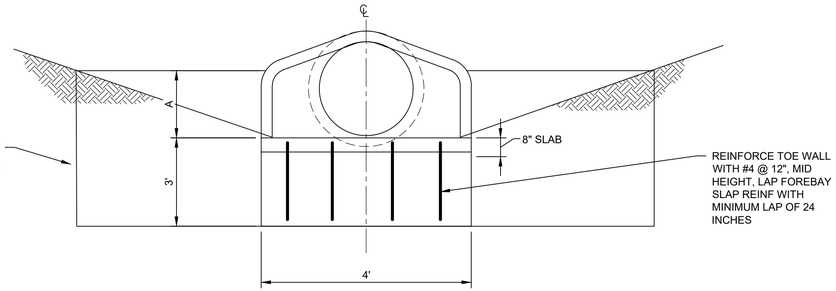
1 - DOUBLE LINK SEAL PIPE PENETRATION

NOT TO SCALE

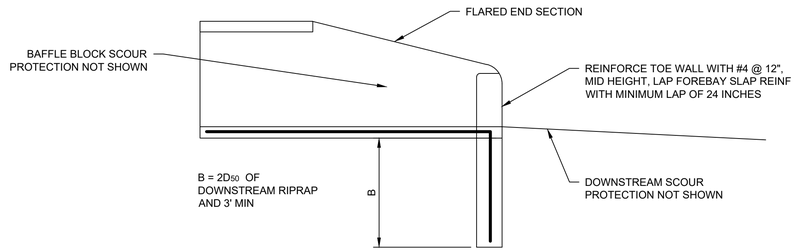


3 - 2-INCH AIR VALVE ASSEMBLY

NOT TO SCALE



ELEVATION VIEW



PROFILE

TOE WALL STRUCTURAL DETAIL

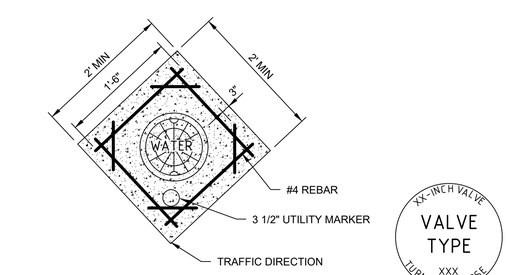
NOT TO SCALE

NOTES:

1. CARE SHALL BE TAKEN WHEN INSTALLING VALVES TO ASSURE PROPER SUPPORT OF THE VALVE.
2. OPERATING NUTS SHALL BE SET CLOSER THAN THREE (3) FEET TO FINAL GRADE OR DEEPER THAN FIVE (5) FEET FROM FINAL GRADE. OPERATOR EXTENSIONS SHALL BE CONNECTED TO VALVE OPERATOR USING SET SCREW.
3. (NOT USED).
4. CATHODIC PROTECTION PER SPECIFICATIONS SECTION 26 42 17.
5. PLACE TUBE ON POLYETHYLENE MATERIAL ON VALVE BOX PRIOR TO LOWERING IN THE TRENCH.
6. PULL THE TUBE OVER THE LENGTH OF THE VALVE BOX. TAPE TO PIPE AT JOINT AND WRAP COMPLETELY AROUND VALVE BOX.
7. OVERLAP FIRST TUBE WITH ADJACENT TUBE AND SECURE WITH THE PLASTIC ADHESIVE TAPE. COMPLETELY SURROUNDING THE TUBE, THE POLYETHYLENE TUBE MATERIAL COVERING THE VALVE BOX SHALL BE LOOSE. EXCESS MATERIAL SHALL BE NEATLY DRAWN UP AROUND THE VALVE BOX STEM, FOLDED ON TOP OF THE VALVE BOX AND STEM AND TAPED IN PLACE.

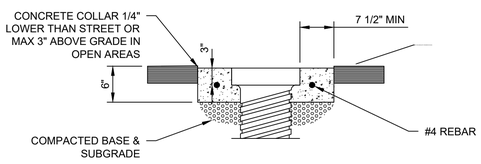
4 - DIRECT BURY VALVE

NOT TO SCALE



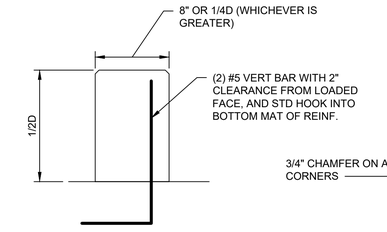
CONCRETE VALVE BOX COLLAR

PROVIDE CONCRETE UTILITY MARKER IN ACCORDANCE WITH USACE TYPE C MONUMENT DISC SPECIFICATION AND WITH A 3-INCH LONG SPLIT TAPERED STEM. THE MARKER SHALL BE ORBITAL-FORMED FROM SOLID, UNLEADED SILICON-BRONZE BAR WITH INFORMATION SHOWN, OR APPROVED EQUAL



5 - BURIED WATER VALVE BOX COLLAR AND ADJUSTMENT

NOT TO SCALE



ELEVATION

PLAN VIEW

NOTES:

1. REBAR TO BE PLACED ON THE LOADED SIDE OF THE BAFFLE BLOCK (CLOSEST TO FLAP GATE)

BAFFLE BLOCK STRUCTURAL DETAIL

NOT TO SCALE

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	R. NALLEY
PROJECT NUMBER	10442825

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

CIVIL MISC DETAILS

0 1" 2"

FILENAME	01C512.DWG
SCALE	NO SCALE

SHEET 01C512

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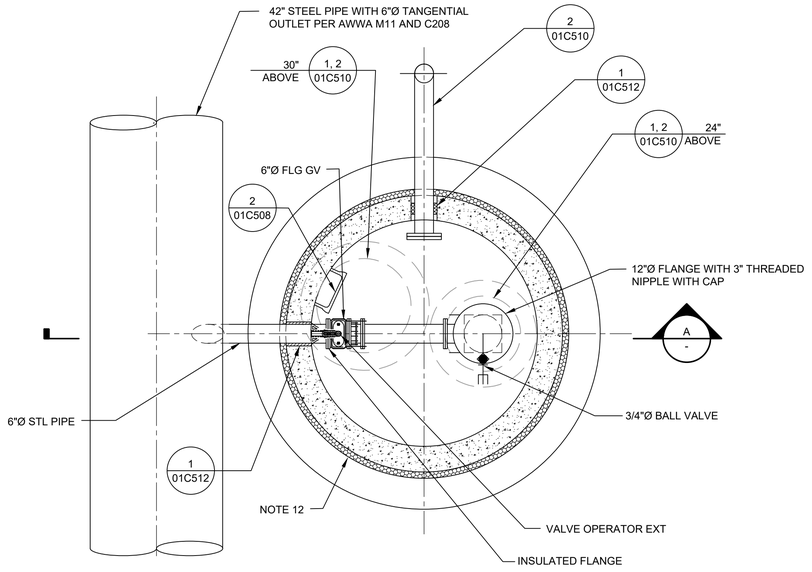
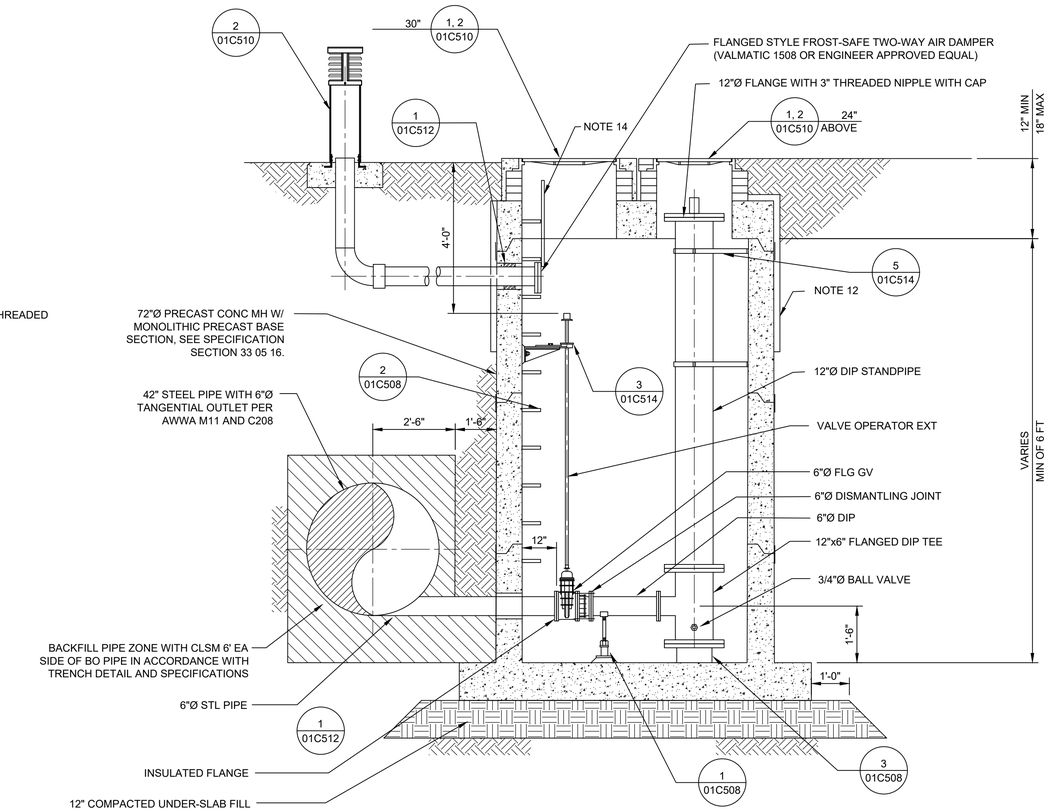


6" BLOWOFF ASSEMBLY PLAN

1/2"=1'-0"



A - 6"Ø BLOWOFF ASSEMBLY - SECTION

1/2"=1'-0"

GENERAL NOTES:

1. PROVIDE PREFORMED FLEXIBLE BUTYL JOINT SEALANT OR APPROVED EQUAL BETWEEN PRECAST SECTIONS.
2. FIELD COAT ALL BOLTS IN VAULT WITH WAX TAPE AS SPECIFIED.
3. EXPOSED STEEL PIPE AND FITTINGS IN VAULT SHALL BE COATED IN ACCORDANCE WITH SECTION 09 90 04.
4. FLANGE FOR TANGENTIAL OUTLET SHALL BE SHIPPED LOOSE.
5. FOR MANHOLES DEEPER THAN 20 FEET, A SAFETY CLIMBING RAIL MUST BE PROVIDED.
6. IF VALVE IS GRATER THAN 8 FEET DEEP PROVIDE VALVE OPERATOR NUT EXTENSION. TERMINATE EXTENSION 4 FEET BELOW FINISHED GRADE.
7. FOR CLSM BACKFILL, ENSURE PROPER CONSOLIDATION AND FILLING OF CLSM IN PIPE HAUNCHES. PLACE IN LIFTS AND ENSURE ADEQUATE BUOYANCY CONTROL MEASURES ARE IN PLACE.
8. DISTURBED EARTH UNDER PIPE ZONE SHALL BE STRUCTURALLY BACKFILLED WITH BEDDING MATERIAL OR CLSM.
9. CONTRACTOR SHALL VERIFY DIMENSIONS WITH MANUFACTURERS AND PROVIDE VAULTT WITH PROPERLY ALIGNED PENETRATIONS.
10. PROVIDE ALTERNATIVE VENT PIPE LOCATION AS NECESSARY FOR VAULTS LOCATED WITHIN ROADWAY.
11. COORDINATE VENT LOCATION IN FIELD W/ INSPECTOR.
12. INSTALL 2" THICK INSULATION TO THE TOP 4 FEET AND TOP SURFACE OF VAULT STRUCTURE EXTERIOR, SEE SPECIFICATION SECTION 33 05 16.
13. IN ADDITION TO BUTYL JOINT, PROVIDE ALL MANHOLE BARREL SECTION JOINTS WITH PERIMETER JOINT SEALS.
14. PROVIDE MH STEPS W/ RETRACTABLE SAFETY POST PER 2/01C508

6" BLOWOFF			
STATION	WORKING PRESSURE (PSI)	FLANGE CLASS (AWWA C207)	ISOLATION GATE VALVE
61+45.00	232	CLASS E	FL 6" RATED TO 300 PSI
141+41.00	200	CLASS E	FL 6" RATED TO 300 PSI
177+15.00	175	CLASS E	FL 6" RATED TO 300 PSI
206+89.00	160	CLASS D	FL 6" RATED TO 300 PSI
219+50.00	162	CLASS D	FL 6" RATED TO 300 PSI

1 - 6"Ø BLOWOFF ASSEMBLY - DETAIL

1/2"=1'-0"

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	R. NALLEY
PROJECT NUMBER	10442825

PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING

THORNTON
COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

CIVIL
6-INCH BLOWOFF DETAILS

0 1" 2"

FILENAME 01C513.DWG
SCALE NO SCALE

SHEET
01C513

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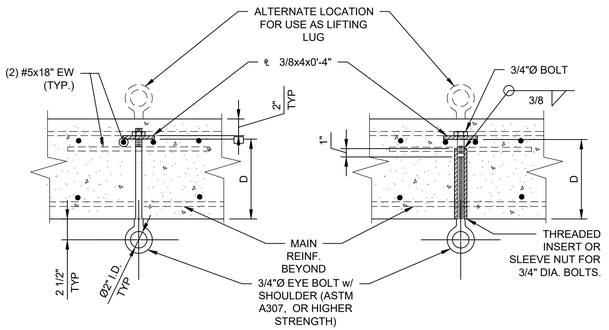


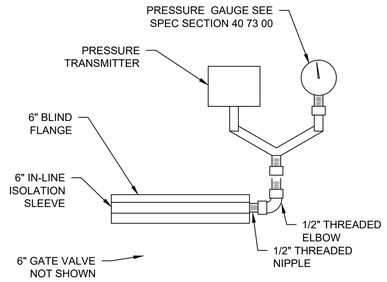
TYPE "A" SECTION TYPE "B" SECTION

LOAD TABLE	
D (INCHES)	ALLOWABLE LOAD (POUNDS)
2	1000
3	2000
4	3300
≥6	6600

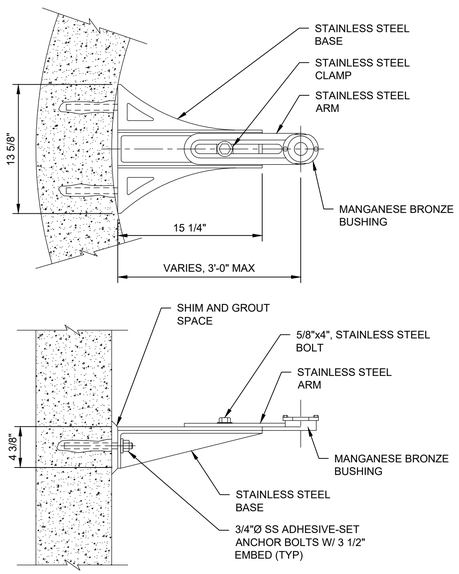
NOTES:

1. LIFTING DEVICES SHALL BE GALVANIZED AFTER FABRICATION.
2. LOAD TABLE BASED ON MINIMUM 28 DAY COMPRESSIVE STRENGTH = 4 KSI.
3. CONTRACTOR SHALL PROVIDE OWNER WITH SCHEDULE INDICATING ALLOWABLE LOAD AND LOCATION OF EACH LIFTING DEVICE USED.

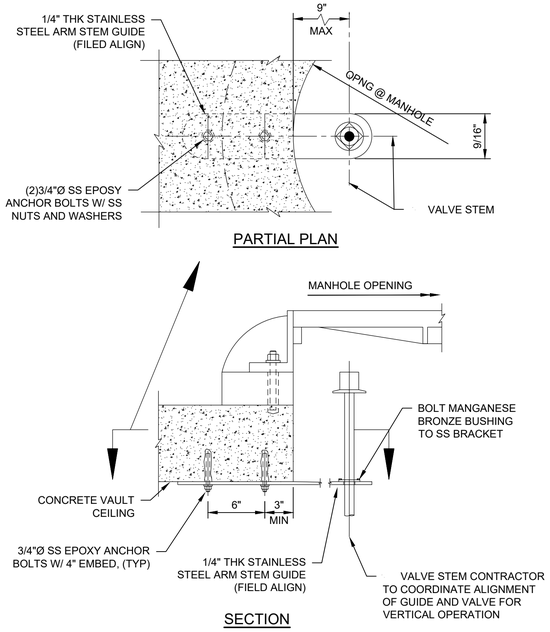
1 - LIFTING EYE
NOT TO SCALE



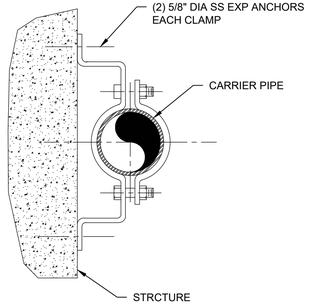
2 - PRESSURE SENSOR MOUNTING
NOT TO SCALE



3 - VALVE STEM GUIDE
NOT TO SCALE



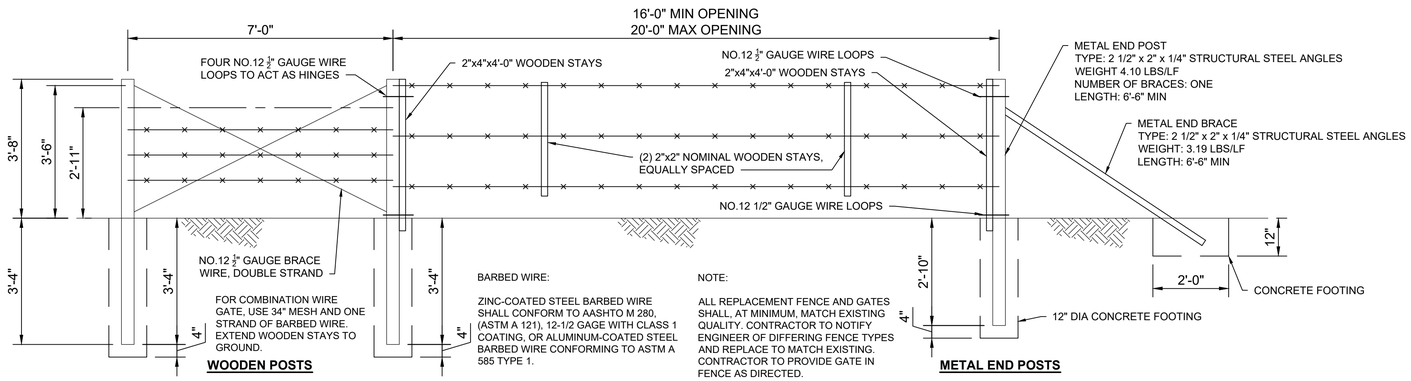
4 - VALVE STEM GUIDE - CEILING MOUNT
NOT TO SCALE



NOTES:

1. OFFSET PIPE CLAMP MAY BE USED FOR PIPE SIZES 3/4"Ø TO 12"
2. MATERIAL SHALL BE STAINLESS STEEL.
3. WHERE DIMENSION FROM FACE OF WALL TO CENTER OF PIPE DOES NOT MATCH OFFSET PIPE CLAMP DIMENSION, MARINE HANGER MAY BE SUBSTITUTED AND FIELD MODIFIES FOR CONDITIONS COORDINATE WITH ENGINEER,

5 - OFFSET PIPE CLAMP
NOT TO SCALE



6 - BARBED WIRE FENCE AND GATE
NOT TO SCALE

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	R. NALLEY
PROJECT NUMBER	10442825

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

CIVIL MISC DETAILS

0 1" 2"

FILENAME 01C514.DWG
SCALE NO SCALE

SHEET 01C514

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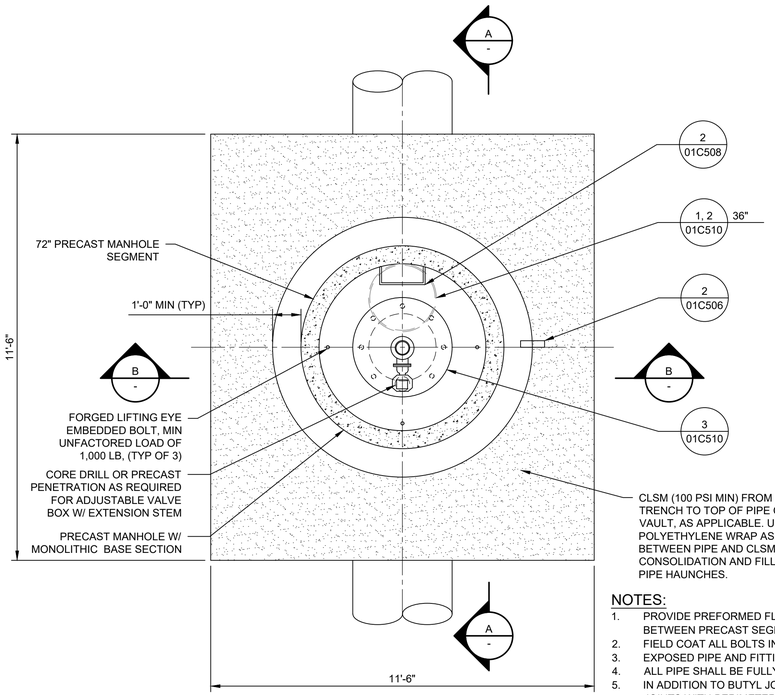
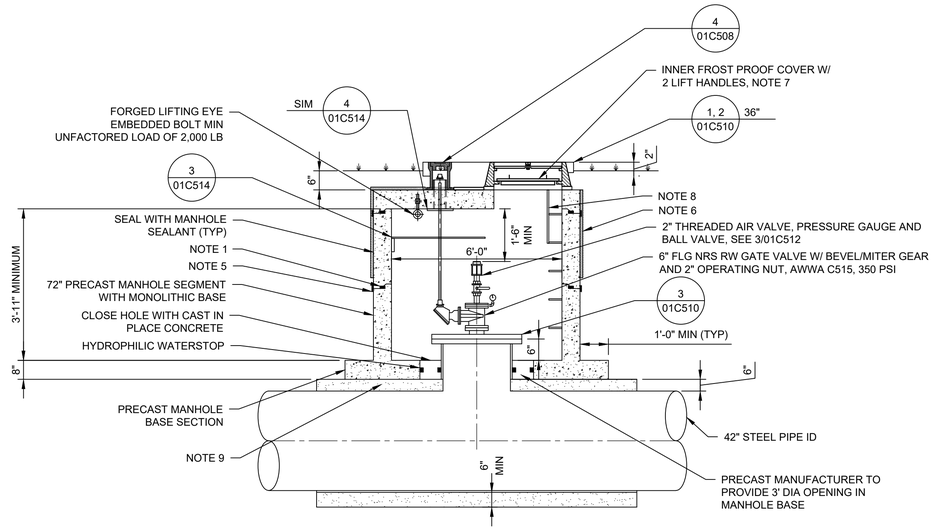


1 - 24" ACCESS MANWAY PLAN

NOT TO SCALE



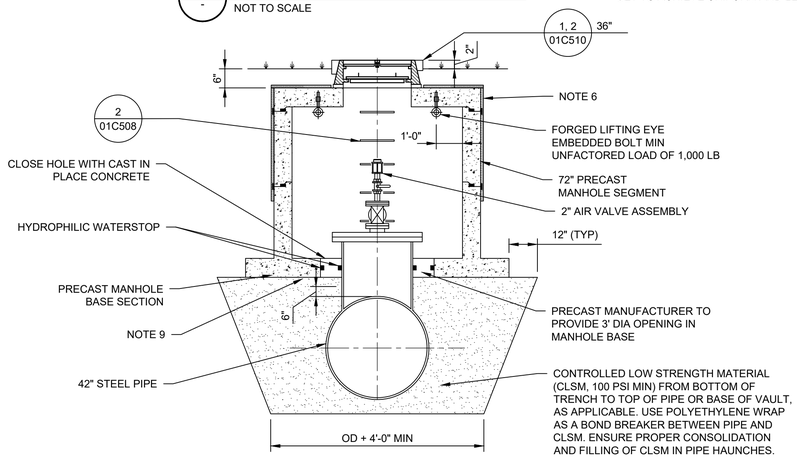
A - 24" ACCESS MANWAY - SECTION

NOT TO SCALE

NOTES:

1. PROVIDE PREFORMED FLEXIBLE BUTYL JOINT SEALANT OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE MANHOLE.
2. FIELD COAT ALL BOLTS IN ACCESS MANWAY WAX TAPE AS SPECIFIED.
3. EXPOSED PIPE AND FITTINGS IN VAULT SHALL BE COATED SEE SECTION 09 90 04.
4. ALL PIPE SHALL BE FULLY RESTRAINED.
5. IN ADDITION TO BUTYL JOINT SEALANT, PROVIDE ALL MANHOLE BARREL SECTION JOINTS WITH PERIMETER JOINT SEALS.
6. INSTALL 2" THICK INSULATION TO THE TOP 4 FEET OF VAULT EXTERIOR AND TO CEILING OF VAULT STRUCTURE EXTERIOR. SEE SPECIFICATION SECTION 33 05 16.
7. ATTACHED 2" THICK INSULATION TO UNDERSIDE OF INNER MANHOLE COVER.
8. PROVIDE MH STEPS W/ RETRACTABLE SAFETY POST PER 2/01C508
9. PLACE PRECAST MH BASE DIRECTLY ON CLSM AFTER IT HAS ONLY PARTIALLY SET TO ACHIEVE UNIFORM AND LEVEL FOUNDATION.

ACCESS MANWAY TABLE					
STATION	WORKING PRESSURE (PSI)	FLANGE CLASS (AWWA C207)	PRESSURE GAUGE	GATE VALVE	AV/AR
61+45.00	232	CLASS E	PG-001, 4 1/2"	FL 6" RATED TO 350 PSI	2"



B - 24" ACCESS MANWAY - SECTION

NOT TO SCALE

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	R. NALLEY
PROJECT NUMBER	10442825

PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING

THORNTON
COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

CIVIL
ACCESS MANWAY DETAILS

0 1" 2"

FILENAME 01C515.DWG

SCALE NO SCALE

SHEET 01C515

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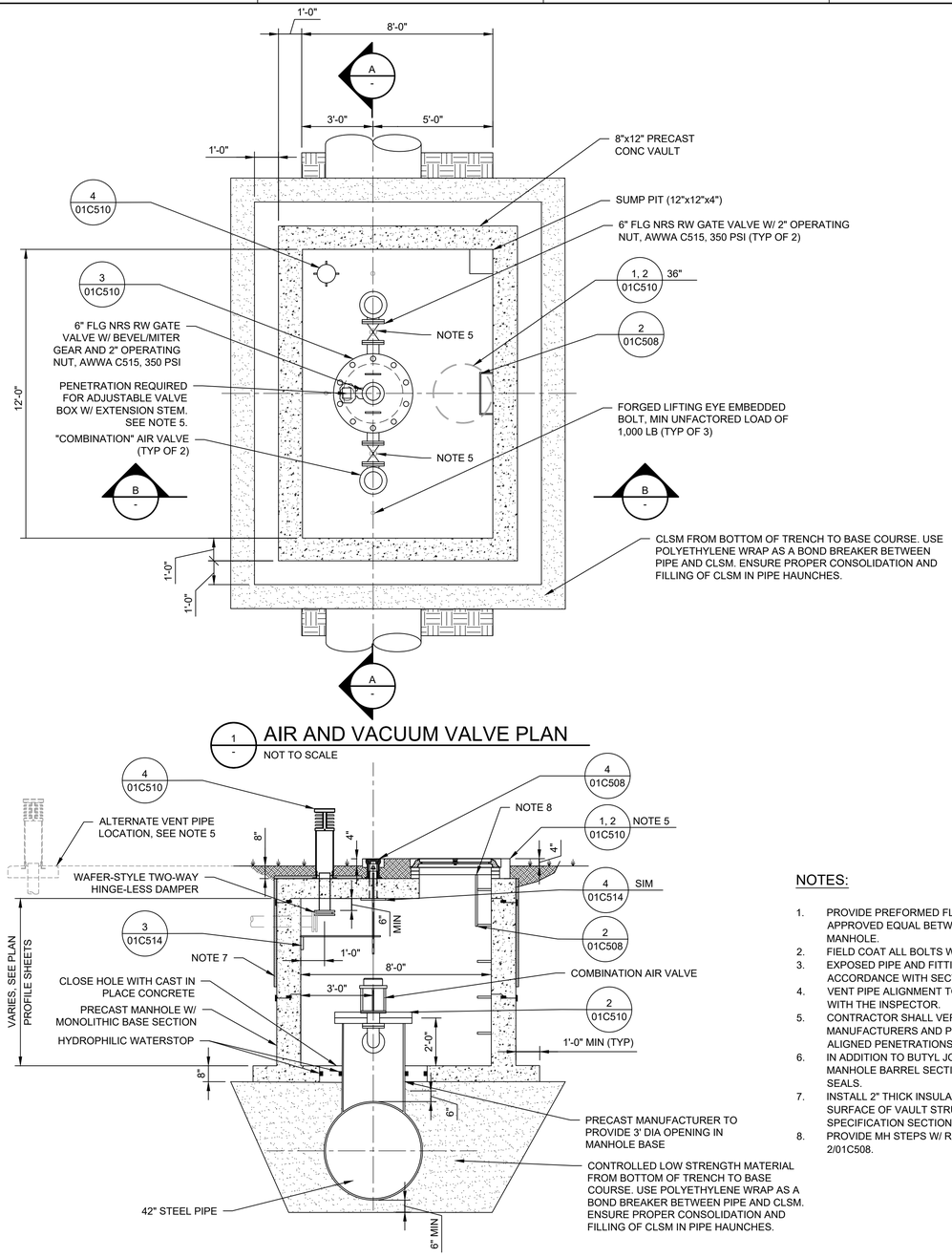
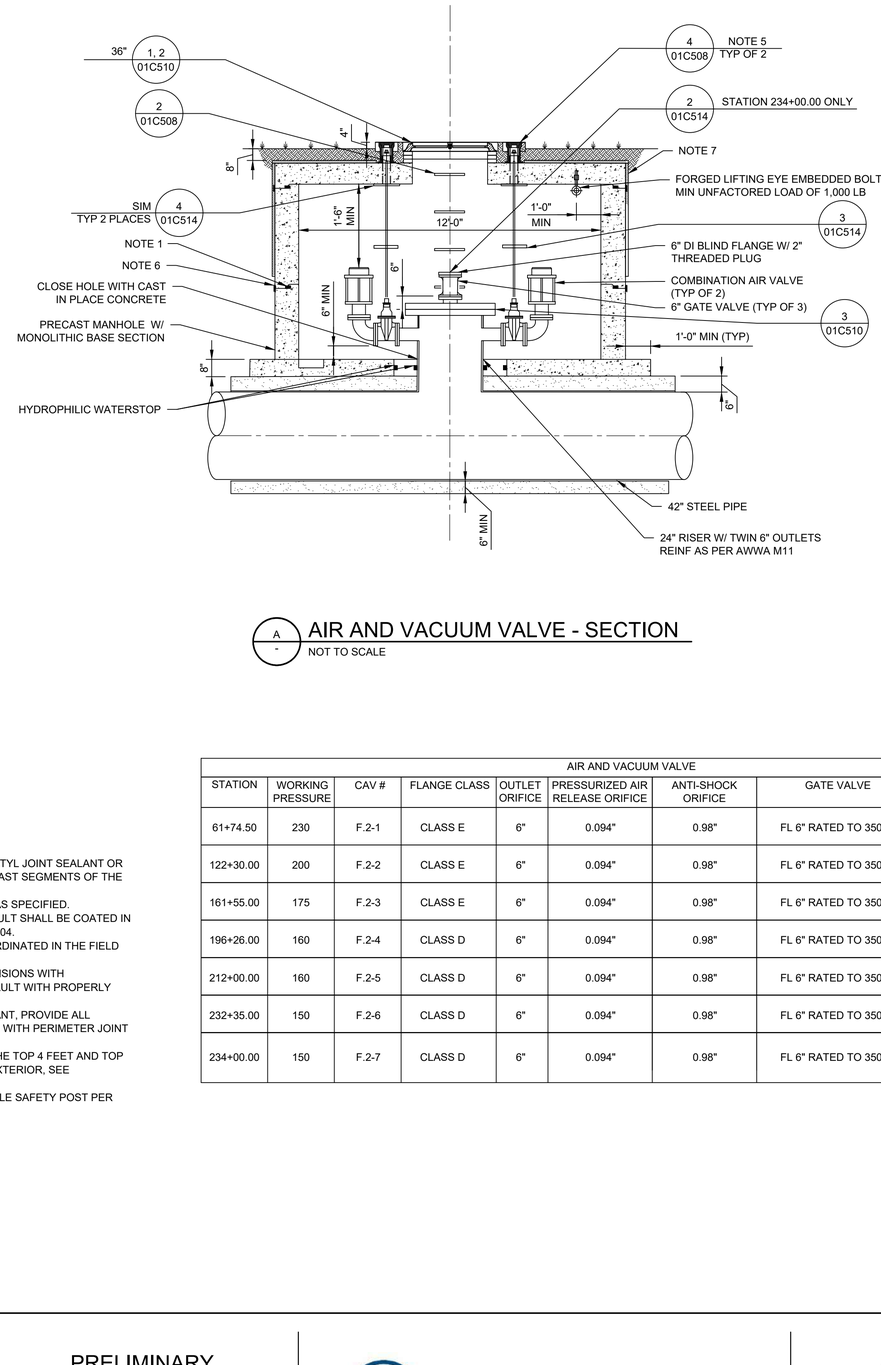


1 - AIR AND VACUUM VALVE PLAN

NOT TO SCALE



A - AIR AND VACUUM VALVE - SECTION

NOT TO SCALE

B - AIR AND VACUUM VALVE WITH FLAT TOP - SECTION

NOT TO SCALE

NOTES:

1. PROVIDE PREFORMED FLEXIBLE BUTYL JOINT SEALANT OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE MANHOLE.
2. FIELD COAT ALL BOLTS WAX TAPE AS SPECIFIED.
3. EXPOSED PIPE AND FITTINGS IN VAULT SHALL BE COATED IN ACCORDANCE WITH SECTION 09 90 04.
4. VENT PIPE ALIGNMENT TO BE COORDINATED IN THE FIELD WITH THE INSPECTOR.
5. CONTRACTOR SHALL VERIFY DIMENSIONS WITH MANUFACTURERS AND PROVIDE VAULT WITH PROPERLY ALIGNED PENETRATIONS.
6. IN ADDITION TO BUTYL JOINT SEALANT, PROVIDE ALL MANHOLE BARREL SECTION JOINTS WITH PERIMETER JOINT SEALS.
7. INSTALL 2" THICK INSULATION TO THE TOP 4 FEET AND TOP SURFACE OF VAULT STRUCTURE EXTERIOR, SEE SPECIFICATION SECTION 33 05 16.
8. PROVIDE MH STEPS W/ RETRACTABLE SAFETY POST PER 2/01C508.

AIR AND VACUUM VALVE								
STATION	WORKING PRESSURE	CAV #	FLANGE CLASS	OUTLET ORIFICE	PRESSURIZED AIR RELEASE ORIFICE	ANTI-SHOCK ORIFICE	GATE VALVE	LOCATION SPECIFIC REQUIREMENTS
61+74.50	230	F.2-1	CLASS E	6"	0.094"	0.98"	FL 6" RATED TO 350 PSI	
122+30.00	200	F.2-2	CLASS E	6"	0.094"	0.98"	FL 6" RATED TO 350 PSI	
161+55.00	175	F.2-3	CLASS E	6"	0.094"	0.98"	FL 6" RATED TO 350 PSI	
196+26.00	160	F.2-4	CLASS D	6"	0.094"	0.98"	FL 6" RATED TO 350 PSI	
212+00.00	160	F.2-5	CLASS D	6"	0.094"	0.98"	FL 6" RATED TO 350 PSI	
232+35.00	150	F.2-6	CLASS D	6"	0.094"	0.98"	FL 6" RATED TO 350 PSI	
234+00.00	150	F.2-7	CLASS D	6"	0.094"	0.98"	FL 6" RATED TO 350 PSI	PROVIDE IN-LINE ISOLATION SLEEVE, PRESSURE SENSOR AND GAUGE. MOUNT ON BETWEEN VERTICAL GV AND BF. SEE 02/01C514

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	R. NALLEY
PROJECT NUMBER	10442825

PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING

THORNTON
COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

CIVIL
AIR AND VACUUM VALVE DETAILS

0 1" 2"

FILENAME 01C516.DWG
SCALE NO SCALE

SHEET
01C516

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GENERAL NOTES

1. ALL MATERIALS AND INSTALLATION METHODS SHALL BE IN ACCORDANCE WITH THESE DRAWINGS AND TECHNICAL SPECIFICATION SECTION 26 42 17.

2. UNLESS OTHERWISE NOTED, DRAWINGS ARE NOT SHOWN TO SCALE.

3. CORROSION TEST STATIONS:
   A. PROVIDE 24" SLACK WIRE AT WELD TO PIPE AND COILED AT BASE OF TEST STATION.
   B. INSTALL REINFORCED CONCRETE PAD (24" SQ. x 4" THICK) PER DETAIL 4/01C519 AROUND POST IN UNPAVED AREAS. USE No. 4 REBAR.
   C. IDENTIFY STRUCTURE LEADS WITH THE USE OF HEAT SHRINK SLEEVE MADE FROM DURABLE, FLAME RETARDANT, RADIATION-CROSSLINKED HEAT-SHRINKABLE POLYOLEFIN IN ACCORDANCE WITH MIL-M-81531 AND DETAIL 1/01C519.
   D. WIRE SIZE, INSULATION, AND COLORS SCHEDULE
      PROJECT PIPE LEADS - NO 10 AWG STRANDED XLPE BLACK
      BOND WIRE - NO 8 AWG XLPE - BLACK
      CASING CTS - NO 10 AWG XLPE - BLACK (ON PIPELINE)
      NO 10 AWG XLPE - ORANGE (ON CASING)
      NO 8 AWG XLPE - RED (ZHANG WIRE - THROUGH CASING LENGTH) SEE DETAIL 01C518
      **PHASE TAPING OF WIRES FOR COLOR CODING IS NOT ALLOWED.

4. BURIED MECHANICAL JOINTS, I.E., VALVES, FLANGES OR COUPLINGS, EXCEPT INSULATING FLANGES, MUST BE BONDED AND WAX TAPED, PER AWWA C217 AND SPECIFICATION.

5. NO WIRE OR CABLE SPLICES ARE PERMITTED.

6. WIRE CONNECTIONS TO PIPE SHALL BE MADE BY THE EXOTHERMIC WELD OR PIN BRAZING PROCESS SHOWN ON DETAIL 1/01C519. ATTACH 1 WIRE PER EXOTHERMIC WELD. ALL WELDS MUST BE SEPARATED BY 6" MINIMUM.

7. CONTRACTOR SHALL DOCUMENT ALL CHANGES FROM THESE DRAWINGS AND SUBMIT "AS-BUILT" DRAWINGS TO THE ENGINEER WITHIN 10 BUSINESS DAYS OF COMPLETION OF CP SYSTEM INSTALL.

8. REINFORCING STEEL SHALL NOT MAKE ELECTRICAL CONTACT WITH WELDED STEEL PIPE.
   A. TESTING BETWEEN PIPE AND REINFORCING STEEL SHALL BE CONDUCTED PRIOR TO POURING CONCRETE.
   B. TESTING SHALL BE CONDUCTED BY A CERTIFIED "CATHODIC PROTECTION" SPECIALIST AND WITNESSED BY THE ENGINEER.
   C. ELECTRICAL CONTACTS OR SHORTS BETWEEN PIPE AND FOREIGN STRUCTURE SHALL BE REMEDIED BY THE CONTRACTOR.

ABBREVIATIONS

#	NUMBER
ø	DIAMETER
"	INCH
'	FOOT
Al	ALUMINUM
AWG	AMERICAN WIRE GAGE
AWWA	AMERICAN WATER WORKS ASSOCIATION
ATS	ANODE TEST STATION
BFV	BUTTERFLY VALVE
BLK	BLACK
BOP	BOTTOM OF PIPE
CCP	CONCRETE CYLINDER PIPE
Cd	CADMIUM
CML+PC	CEMENT-MORTAR LINE AND POLYURETHANE COATED
CP	CATHODIC PROTECTION
CSE	COPPER SULFATE ELECTRODE
CSTS	CASING TEST STATION
Cu	COPPER
CTS	CORROSION TEST STATION
DIA	DIAMETER
E.G.	EXAMPLE
ELEC	ELECTRICAL
EXIST	EXISTING
Fe	IRON
F.G.	FINISHED GRADE
FPTS	FOREIGN PIPELINE TEST STATION
FPTS/A	FOREIGN PIPELINE TEST STATION WITH ANODES
FT	FEET
INSUL	INSULATING
IJTS	INSULATING JOINT TEST STATION
IR	VOLTAGE DROP
LBS	POUNDS
LCSTS	LINE CURRENT SPAN TEST STATION
LP	LIGHT POLE
MIN.	MINIMUM
Mg	MAGNESIUM
MOV	MOTOR OPERATED VALVE
No	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
PLCS	PLACES
PB	PULLBOX
PTS	POTENTIAL TEST STATION
PVC	POLYVINYL CHLORIDE
PW	POTABLE WATER
RECT	RECTANGULAR
REF	REFERENCE
REQ	REQUIRED
RW	RAW WATER
SCH	SCHEDULE
SPECS	SPECIFICATIONS
SQ.	SQUARE
STA	STATION
STRD	STRANDED
T.O.P	TOP OF PIPE
TYP	TYPICAL
VAR	VARIOUS
VV	VALVE VAULT
W/	WITH
W	WATER
WSP	WELDED STEEL PIPE
XLPE	CROSS LINKED POLYETHYLENE /USE-2
Zn	ZINC

INSTALLATION SUMMARY SCHEDULE

TEST STATION TYPE	QUANTITY	DETAIL
2-WIRE POTENTIAL TS	14	1/01C518
4-WIRE CASING TEST STATION	4	2/01C518
FOREIGN PIPELINE TEST STATION	1	3/01C518
INSULATING JOINT TEST STATION		
MONOLITHIC INSULATOR JOINT		
INSULATOR JOINT		
TOTAL NUMBER OF ANODES, 48LB STD POT MG	9	2/01C520
GALVANIC ANODE CASING TEST STATION (ICCP SYSTEM BY OTHERS)	2	1/01C520

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	R. NALLEY
PROJECT NUMBER	10442825

PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING

THORNTON
COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

CIVL
CATHODIC PROTECTION NOTES

0 1" 2"

FILENAME 01C517.DWG
SCALE NO SCALE

SHEET
01C517

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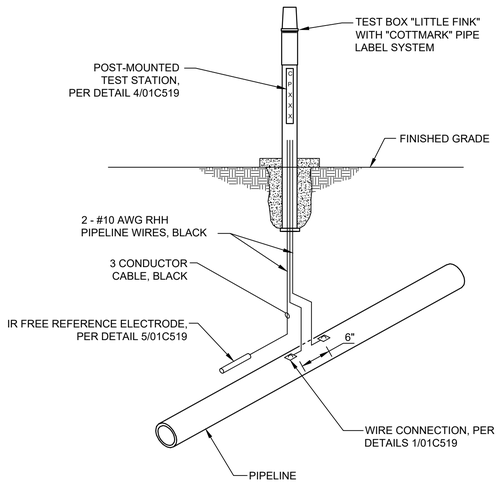
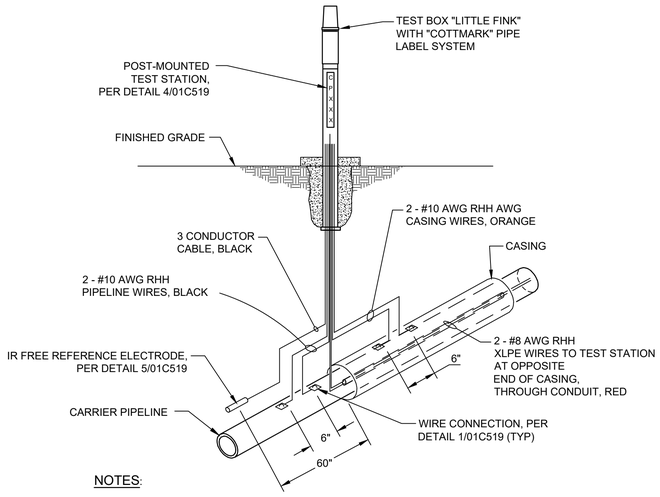


NOTES:

1. PLACE PLASTIC WARNING TAPE 12" ABOVE WIRE RUNS.
2. HORIZONTAL RUNS TO BE 36" BELOW GRADE.

1 - POTENTIAL TEST STATION

NOT TO SCALE

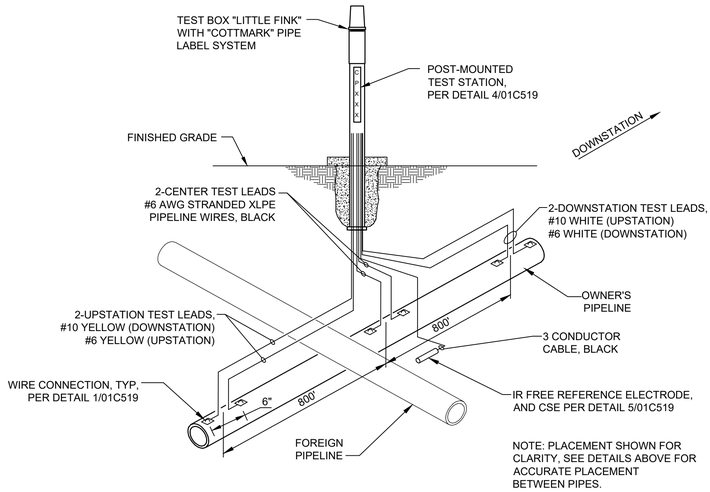


NOTES:

1. PLACE PLASTIC WARNING TAPE 12" ABOVE WIRE RUNS.
2. HORIZONTAL RUNS TO BE 36" BELOW GRADE.
3. PROVIDE 4-INCH DIA. CONDUIT FOR CP WIRES ALONG ENTIRE LENGTH OF TUNNEL/REINFORCED CONCRETE TRENCH/ FLOWABLE FILL ENCASEMENT TRENCH AND SET TEST STATION AT TOP OF RAMP.

2 - CASING TEST STATION

NOT TO SCALE

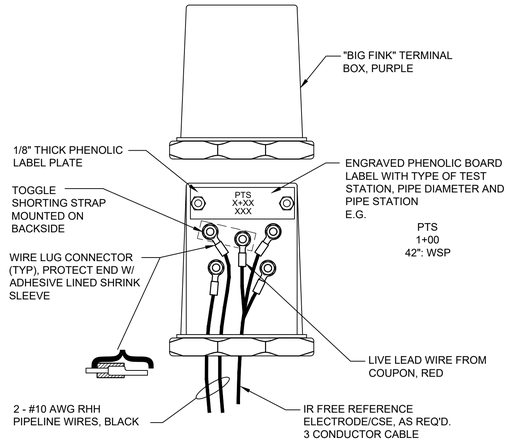


NOTES:

1. PLACE PLASTIC WARNING TAPE 12" ABOVE WIRE RUNS.
2. HORIZONTAL RUNS TO BE 36" BELOW GRADE.

3 - FOREIGN PIPELINE TEST STATION

NOT TO SCALE

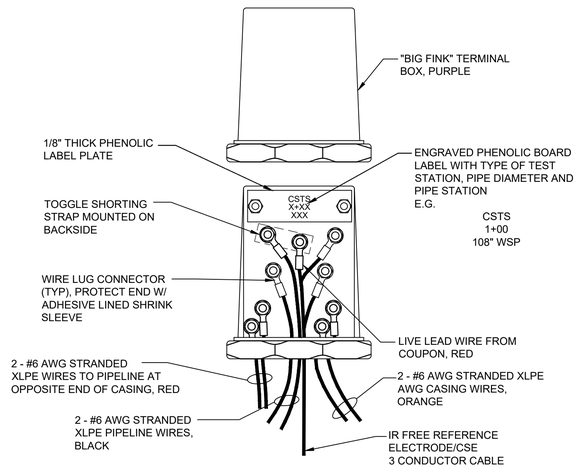


NOTES:

1. TERMINALS SHALL BE 1/4" NICKEL PLATED BRASS LOCKING WASHER, TWO FLAT WASHERS, AND DOUBLE NUTS.
2. SOLDER ALL LUGS TO WIRES.

4 - POTENTIAL TEST STATION TERMINAL BOARD

NOT TO SCALE

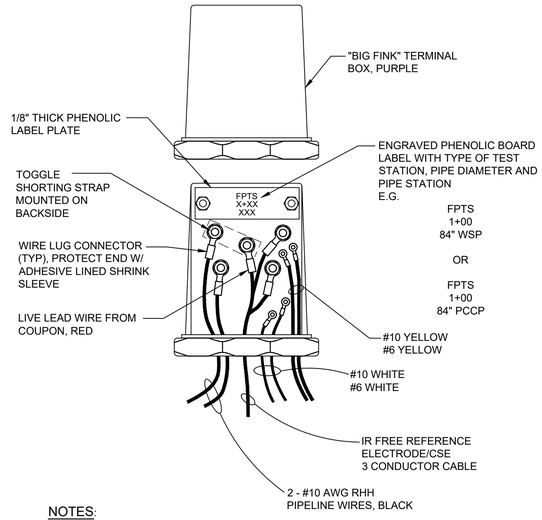


NOTES:

1. TERMINALS SHALL BE 1/4" NICKEL PLATED BRASS WITH LOCKING WASHER, TWO FLAT WASHERS, AND DOUBLE NUTS.
2. SOLDER ALL LUGS TO WIRES.

5 - CASING TEST STATION TEST TERMINAL BOARD

NOT TO SCALE



NOTES:

1. TERMINALS SHALL BE 1/4" NICKEL PLATED BRASS WITH LOCKING WASHER, TWO FLAT WASHERS, AND DOUBLE NUTS.
2. SOLDER ALL LUGS TO WIRES.

6 - FOREIGN PIPELINE TEST STATION TERMINAL BOARD

NOT TO SCALE

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	R. NALLEY
PROJECT NUMBER	10442825

PRELIMINARY
NOT FOR CONSTRUCTION
OR
RECORDING

THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

CIVIL
CATHODIC PROTECTION TEST STATIONS

0 1" 2"

FILENAME 01C518.DWG
SCALE NO SCALE

SHEET 01C518

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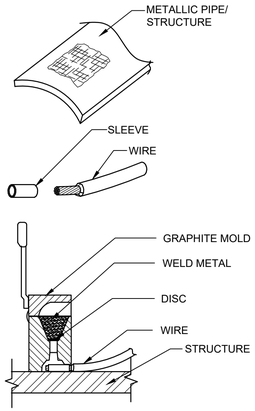
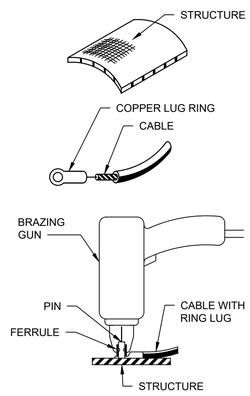
COD WELD

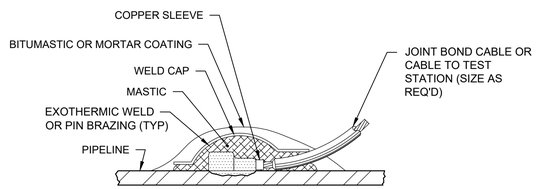


NOTES:
1. GRIND PIPE/STRUCTURE TO BARE METAL AND CLEAN SURFACE.
2. STRIP INSULATION FROM WIRE AND ATTACH SLEEVE.
3. HOLD MOLD FIRMLY WITH OPENING AWAY FROM OPERATOR. IGNITE WITH FLINT GUN, REMOVE SLAG FROM CONNECTION WITH CHIPPING HAMMER. TEST WELD WITH 22 OZ HAMMER W/ GLANCING BLOW. IF WELD FAILS, POSITION WIRE ATTACHMENT A MINIMUM 3" AWAY REPEATING THE ABOVE STEPS. ATTACH LEAD WIRES A MINIMUM 6" APART.
4. COVER CONNECTION WITH BITUMASTIC COATING OVER ALL EXPOSED METAL, PLACE WELD CAP OVER CONNECTION. REPAIR ALL DAMAGE TO COATING AND LINING IN ACCORDANCE WITH MFG RECOMMENDATIONS.
5. ALLOW COATING TO CURE BEFORE BURIAL.
6. ILLUSTRATION DEPICTS HORIZONTAL WELDER. FOR OTHER ORIENTATION USE MOLD RECOMMENDED BY MANUFACTURER.

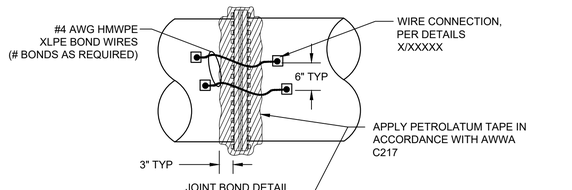
PIN BRAZING



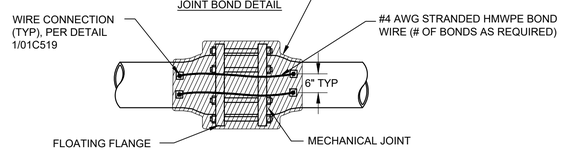
NOTES:
1. DEGREASE AND CLEAN STRUCTURE TO BARE, BRIGHT METAL WITH MECHANICAL DEVICES.
2. STRIP WIRE INSULATION AND ATTACH FROM WIRE AND ATTACH A BAC M1 COMPRESSION TERMINAL OR APPROVED EQUAL.
3. LOAD THE BRAZING GUN WITH A DIRECT BRAZING PIN AND FERRULE. USE A THREADED TYPE CONNECTION FOR ABOVE-GROUND USE ONLY.
4. BRAZE THE CABLE TO THE PIPE. EXTRA MATERIAL REQUIRED FOR DI OR CI PIPE.
5. TEST BRAZE BY BREAKING OFF THE SHANK OF THE PLAIN PIN WITH A HAMMER.
6. COVER CONNECTION WITH MASTIC FILLED WELD CAP AND BITUMASTIC COATING 80% SOLIDS BY VOLUME OVER WELD CAP AND ALL EXPOSED METAL.
7. ALL WELDS SHALL BE A MINIMUM OF 6" APART.
8. ALLOW WELD COATING TO CURE PER MANUFACTURER'S RECOMMENDATIONS BEFORE BURIAL.



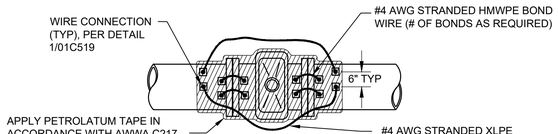
1 - WIRE-TO-STRUCTURE CONNECTION
NOT TO SCALE



JOINT BOND DETAIL



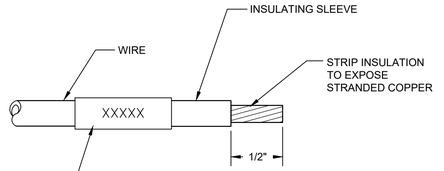
TYPICAL MECHANICAL COUPLING BOND



TYPICAL BONDING OF VALVE

NOTES:
1. BOND ALL NON-WELDED PIPE JOINTS, INCLUDING THOSE ON PIPE, FITTINGS, VALVES, ETC., EXCEPT THOSE SPECIFIED TO BE INSULATED.
2. APPLY WAX TAPE PER AWWA C217.

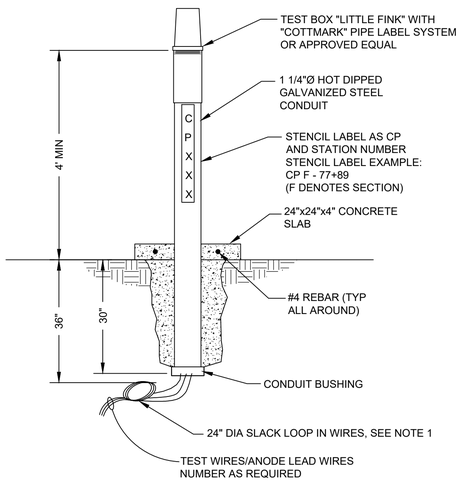
2 - FLANGED JOINT BOND CABLES
NOT TO SCALE



LEGEND:

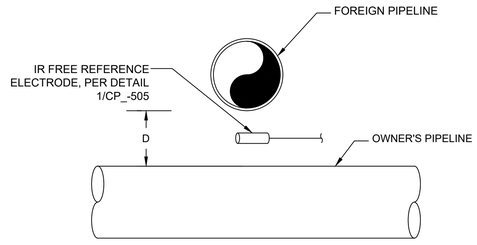
PCCP - PRE-STRESSED PIPE
WSP - WELDED STEEL PIPE
IR-CSE - IR-FREE COPPER-COPPER SULFATE ELECTRODE
ANODE - GALVANIC ANODE
CASING - CASING

3 - WIRE IDENTIFIER
NOT TO SCALE

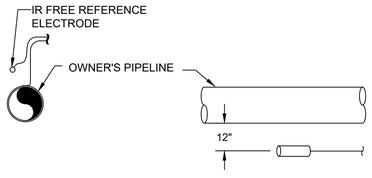


NOTES:
1. LOOP WIRE AT BASE OF POST TO MINIMIZE WIRE STRESS.
2. COAT THREADS WITH INORGANIC ZINC PRIMER OR COLD GALVANIZING REPAIR COATING.

4 - POST MOUNTED TEST STATION
NOT TO SCALE

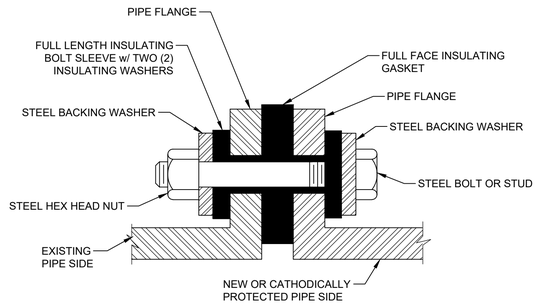


IR FREE REFERENCE ELECTRODE
PLACEMENT AT FOREIGN TEST STATION



IR FREE REFERENCE ELECTRODE
PLACEMENT AT OTHER TEST STATIONS

5 - IR FREE REFERENCE ELECTRODE PLACEMENT
NOT TO SCALE



NOTES:
1. INSULATING GASKET SHALL BE A FULL FACED PHENOLIC RING GASKET WITH BUNA-N SEALING ELEMENT, NSF 61 APPROVED.
2. INSULATING BOLT SLEEVES SHALL BE G10 MATERIAL THE TWO-PIECE WASHER AND SLEEVE COMBINATIONS ONLY.
3. INSTALL PER MANUFACTURERS DIRECTIONS.
4. ALL EXPOSED STEEL PORTIONS OF THE FLANGE, BOLTS, AND PIPE SHALL BE PRIMED AND WRAPPED AFTER FLANGE KIT INSTALLATION AND TESTING WITH WAX TAPE 2 PIPE DIAMETERS PAST THE INSULATOR.

6 - INSULATING FLANGE KIT
NOT TO SCALE

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	R. NALLEY
PROJECT NUMBER	10442825

PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING

THORNTON
COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

CIVIL
CATHODIC PROTECTION DETAILS

0 1" 2"

FILENAME 01C519.DWG
SCALE NO SCALE

SHEET 01C519

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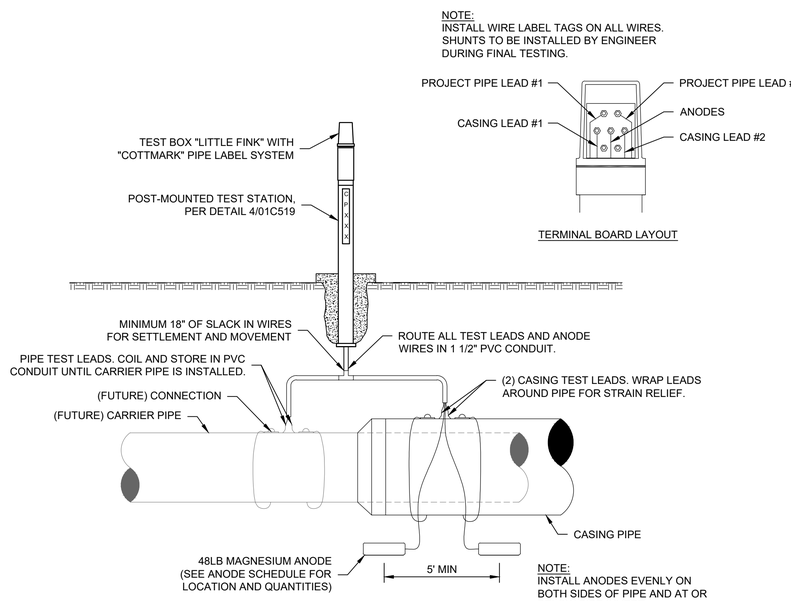
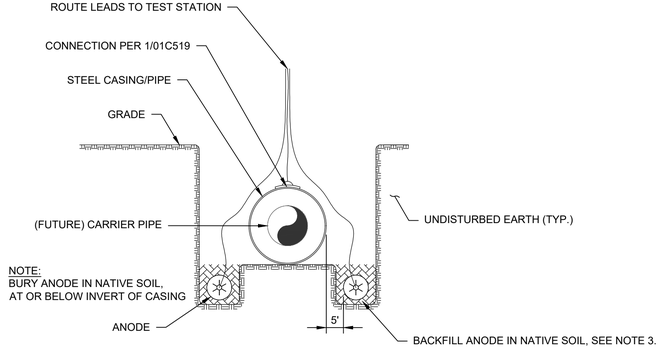


1 / - GALVANIC ANODE CASING TEST STATION

NOT TO SCALE



NOTES:

1. REMOVE ANODES FROM PLASTIC OR OTHER SHIPPING BAG AND POSITION ACCORDING TO DETAIL DRAWINGS. DO NOT REMOVE CLOTH SACK. DO NOT PLACE IN PIPE BEDDING.
2. INSTALL ANODES IN NATIVE SOILS A MINIMUM OF 5 FEET FROM EDGE OF PIPE OR ANY OTHER METALLIC OBJECT AND PLACE AT OR BELOW THE INVERT OF THE PIPE.
3. BACKFILL WITH NATIVE SOIL A MINIMUM OF 12 INCHES ALL AROUND ANY ANODES THEN FLOOD EACH WITH A MINIMUM OF 5 GALLONS OF FRESH WATER. AFTER WATER ABSORPTION, CONTINUE BACKFILLING PER SPECIFICATIONS.

2 / - GALVANIC ANODE PLACEMENT

NOT TO SCALE

TEST STATION SCHEDULE

CTS	PL STA	SHEET	PIPE	IR FREE REFERENCE ELECTRODE	DETAIL	REMARK
1	10+45	01C101	42IN WSP	1	1/01C518	AT CONNECTION TO SEGMENT F.1
2	35+07	01C103	42IN WSP		1/01C518	MANWAY
3	58+40	01C105	42IN WSP		2/01C518	I-25 WEST 295LF 54IN STEEL CASING
4	61+45	01C105	42IN WSP	1	2/01C518	I-25 EAST 295LF 54IN STEEL CASING
5	64+50	01C105	42IN WSP		1/01C518	ACCESS ROAD
6	92+18	01C108	42IN WSP		1/01C518	FENCE AT BOX ELDER CREEK
7	111+19	01C110	42IN WSP		1/01C518	FENCE
8	122+30	01C111	42IN WSP		1/01C518	AIR VALVE
9	140+00	01C113	42IN WSP	1	2/01C518	WEST SIDE/LARIMER COUNTY DITCH STEEL CASING
10	141+35	01C113	42IN WSP		2/01C518	EAST SIDE LARIMER COUNTY DITCH STEEL CASING
11	144+45	01C113	42IN WSP		2/01C518	NORTH CR-52 81LF STEEL CASING
12	145+50	01C113	42IN WSP	1	2/01C518	SOUTH CR-52 81LF STEEL CASING
13	161+55	01C115	42IN WSP		2/01C518	AIR VALVE
14	177+75	01C116	42IN WSP		1/01C518	EAST BARRY LANE
15	187+20	01C117	42IN WSP	1	3/01C518	ONEOK/MAGELLAN 8IN
16	188+15	01C117	42IN WSP		1/01C518	EAST CO CR 3
17	212+00	01C119	42IN WSP		1/01C518	AIR VALVE
18	234+00	01C121	42IN WSP		1/01C518	AIR VALVE
19	243+00	01C121	42IN WSP	1	1/01C518	AT CONNECTION TO NEXT PHASE
20	0+02	01C124	8IN DI, 01C511		1/01C518	AT INSULATING FLANGE
21	140+69, 20LT	01C125	STEEL CASING		1/01C520	BID ALT - LCC WEST STEEL CASING (NISP)
22	141+33, 20LT	01C125	STEEL CASING		1/01C520	BID ALT - LCC EAST STEEL CASING (NISP)

GALVANIC ANODE SCHEDULE

PL STA	SHEET	ANODE TYPE	ANODE QUANTITY	DETAIL	REMARK
0+02	01C124	48LB MAG	1	2/01C520	AT INSULATING FLANGE
140+69, 20LT	01C125	48LB MAG	4	2/01C520	BID ALT - LCC WEST STEEL CASING (NISP)
141+33, 20LT	01C125	48LB MAG	4	2/01C520	BID ALT - LCC EAST STEEL CASING (NISP)

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	R. NALLEY
PROJECT NUMBER	10442825

PRELIMINARY
NOT FOR CONSTRUCTION
OR
RECORDING

THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

CIVIL
CATHODIC PROTECTION SCHEDULE

0 1" 2"

FILENAME 01C520.DWG
SCALE NO SCALE

SHEET 01C520

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ONE LINE, POWER AND LIGHTING SYMBOLOGY

X 20A 3P OR X 100AF 80AT 3P LSIGA

LOW VOLTAGE CIRCUIT BREAKER (CB). RATING AND NO. OF POLES AS SHOWN. WHEN SPECIFIC TYPE, OTHER THAN MCCB, IS REQUIRED, X INDICATES TYPE.

TYPES:
- MCCB - MOLDED CASE
- ICCB - INSULATED CASE
- LVP - LOW VOLTAGE POWER
- MCP - MOTOR CIRCUIT PROTECTOR (RATING PER CONNECTED LOAD)

TRIP UNIT:
- L - LONG TIME PICKUP
- S - SHORT TIME PICKUP
- I - INSTANTANEOUS PICKUP
- G - GROUND FAULT PICKUP
- A - ARC FLASH MAINTENANCE

X — INTERLOCK; X INDICATES TYPE

TYPES:
- E - ELECTRICAL
- M - MECHANICAL
- K - KEY

GFP — GROUND FAULT PROTECTION

52 — MEDIUM VOLTAGE CIRCUIT BREAKER

FUSE, RATING, AND NUMBER OF FUSES AS NOTED

FUSED CUTOUT, CURRENT RATING, FUSE RATING, AND QUANTITY AS NOTED

FUSIBLE SWITCH, CURRENT RATING, FUSE RATING, AND QUANTITY AS NOTED (3 POLE UON)

NON-FUSED SWITCH, CURRENT RATING, AND NUMBER OF POLES AS NOTED (3 POLE UON)

DISCONNECT OR DRAWOUT CONNECTION

A & A B B — MAGNETIC MOTOR STARTER AND SEPARATELY MOUNTED COMBINATION MAGNETIC MOTOR STARTER

D & D — MOTOR/LOAD CONTROLLER AND SEPARATELY MOUNTED MOTOR/LOAD CONTROLLER WITH SHORT CIRCUIT PROTECTION AND DISCONNECT

MOTOR STARTER AND CONTROLLER SUBSCRIPTS:

A - MAGNETIC STARTER NEMA SIZE

B - STARTER TYPE
- NONE - FULL VOLTAGE NON-REVERSING (FVNR)
- FVR - FULL VOLTAGE REVERSING
- 2S - TWO SPEED
- RVAT - REDUCED VOLTAGE AUTO TRANSFORMER

C - CONTROL DIAGRAM OR CONTROLS SCHEDULE NUMBER (IF REQUIRED)

D - CONTROLLER TYPE
- VFD - VARIABLE FREQUENCY DRIVE
- SS - SOLID STATE
- CONT - CONTACTOR

SEPARATELY MOUNTED COMBINATION MOTOR STARTER OR CONTROLLER; SEE ELECTRICAL ONE - LINE DIAGRAM OR SCHEDULE FOR DESCRIPTION

SEPARATELY MOUNTED MOTOR STARTER OR CONTROLLER; SEE ELECTRICAL ONE-LINE DIAGRAM OR SCHEDULE FOR DESCRIPTION.

X — NON-FUSED SAFETY SWITCH, 30A, 3P, X INDICATES AMP RATING GREATER THAN 30A

X Y — SAFETY SWITCH, 3P, X INDICATES AMP RATING GREATER THAN 30A, Y INDICATES FUSE SIZE

CB — SEPARATELY MOUNTED CIRCUIT BREAKER; SEE ELECTRICAL ONE - LINE DIAGRAM OR SCHEDULE FOR DESCRIPTION

7 1/2 OR HP — MOTOR WITH DESIGN HORSEPOWER (WHEN INDICATED)

G — GENERATOR

ATS — TRANSFER SWITCH, CURRENT RATING, AND NUMBER OF POLES AS NOTED

ATS - AUTOMATIC
MTS - MANUAL

TRANSFORMER

- 3-PHASE, 3-WIRE DELTA CONNECTION
- 3-PHASE, 4-WIRE GROUNDED WYE CONNECTION

LP100 208/120V 3Ø, 4W — SWITCHBOARD OR PANELBOARD; NAME, VOLTAGE, PHASE, NUMBER OF WIRES WHEN INDICATED

100 KVA — NON-MOTOR LOAD WITH DESIGN KVA, KW, OR AMP

VOLTAGE TRANSFORMER (VT, PT, OR CPT)

CURRENT TRANSFORMER (CT)

WH — UTILITY WATT-HOUR METER PER UTILITY REQUIREMENTS

DMP — DIGITAL METERING PACKAGE

GROUND

LIGHTNING ARRESTER

SPD — LOW VOLTAGE SURGE PROTECTIVE DEVICE

SS — SELECTOR SWITCH

PB — PUSHBUTTON

IC — INSTRUMENTATION/CONTROL DEVICE

CONTROL PANEL INTEGRAL OR PROVIDED WITH ASSOCIATED EQUIPMENT

CONTROL PANEL WITH DISCONNECT SWITCH INTEGRAL OR PROVIDED WITH ASSOCIATED EQUIPMENT

J or J — JUNCTION OR PULL BOX

PANELBOARD (250V TO 600V)

PANELBOARD (LESS THAN 250V)

X — ELECTRICAL EQUIPMENT ENCLOSURE: SWITCHBOARD, MOTOR CONTROL CENTER, CONTROL PANEL, TRANSFORMER OR OTHER EQUIPMENT AS INDICATED. ESTIMATED SIZE AS INDICATED. WHEN USED X INDICATES EQUIPMENT TYPE.

EQUIPMENT TYPES:
- ATS - AUTOMATIC TRANSFER SWITCH
- CP - CONTROL PANEL
- MTS - MANUAL TRANSFER SWITCH
- MCC - MOTOR CONTROL CENTER
- UPS - UNINTERRUPTIBLE POWER SUPPLY
- VFD - VARIABLE FREQUENCY DRIVE
- SB - SWITCHBOARD
- SG - SWITCHGEAR
- T - TRANSFORMER

Z X Y — CEILING/PENDANT/BOLLARD MOUNTED LUMINAIRE, LAMP TYPE AS SPECIFIED

Z X Y — CEILING/PENDANT/BOLLARD MOUNTED LUMINAIRE, LAMP TYPE AS SPECIFIED, EMERGENCY (INTERNAL OR EXTERNAL POWER SOURCE AS INDICATED)

Z X Y — WALL MOUNTED LUMINAIRE, LAMP TYPE AS SPECIFIED

Z X Y — WALL MOUNTED LUMINAIRE, LAMP TYPE AS SPECIFIED, EMERGENCY (INTERNAL OR EXTERNAL POWER SOURCE AS INDICATED)

Z X Y — WALL MOUNTED FLOOD LUMINAIRE, LAMP TYPE AS SPECIFIED

Z X Y — POLE/STANCHION MOUNTED LUMINAIRE, LAMP TYPE AS SPECIFIED

Z X Y — POLE/STANCHION MOUNTED LUMINAIRE, LAMP TYPE AS SPECIFIED, EMERGENCY (INTERNAL OR EXTERNAL POWER SOURCE AS INDICATED)

Z X Y — POLE/STANCHION MOUNTED FLOOD LUMINAIRE, LAMP TYPE AS SPECIFIED

Z Z X Y — CEILING/PENDANT MOUNTED LUMINAIRE, LAMP TYPE AS SPECIFIED

Z X Y — WALL MOUNTED LUMINAIRE, LAMP TYPE AS SPECIFIED

Z X Y — CEILING/PENDANT MOUNTED LUMINAIRE, LAMP TYPE AS SPECIFIED, ALL OR PARTIAL EMERGENCY (INTERNAL OR EXTERNAL POWER SOURCE AS INDICATED)

Z X Y — WALL MOUNTED LUMINAIRE, LAMP TYPE AS SPECIFIED, ALL OR PARTIAL EMERGENCY (INTERNAL OR EXTERNAL POWER SOURCE AS INDICATED)

X Y — EMERGENCY LIGHT, NUMBER OF ATTACHED HEADS SHOWN

X Y — EMERGENCY LIGHT, REMOTE MOUNTED HEAD

X Y X Y — DOUBLE-FACED CEILING OR WALL-MOUNTED EXIT LIGHT; DIRECTIONAL ARROWS (IF REQUIRED) AS INDICATED ON PLANS

X Y X Y — SINGLE-FACED CEILING OR WALL-MOUNTED EXIT LIGHT; DIRECTIONAL ARROWS (IF REQUIRED) AS INDICATED ON PLANS

LIGHTING FIXTURE SUBSCRIPTS:
- X - INDICATES LUMINAIRE TYPE PER LUMINAIRE SCHEDULE
- Y - INDICATES CIRCUIT NUMBER FROM PANELBOARD
- Z - INDICATES CONTROLLING SWITCH (IF REQUIRED)
- NL - NIGHT LIGHT UNSWITCHED

$ Y X — WALL SWITCH

SUBSCRIPTS:

X - INDICATES TYPE
- NONE - SINGLE POLE
- 2 - DOUBLE POLE
- 3 - THREE-WAY
- 4 - FOUR-WAY
- K - KEY SWITCH
- P - PILOT LIGHT
- L - LIGHTED HANDLE
- DM - DIMMING
- MC - SPDT MOMENTARY CONTACT CENTER OFF
- T - TIMER

Y - INDICATES CONTROLLING SWITCH (IF REQUIRED)

$ Y X — MANUAL MOTOR STARTER

SUBSCRIPTS:

X - INDICATES TYPE
- HP - HORSEPOWER RATED
- TE - HORSEPOWER RATED WITH THERMAL ELEMENT
- FT - HORSEPOWER RATED WITH FUSETRON FUSE

Y - INDICATES SWITCH TYPE
- NONE - TOGGLE SWITCH TYPE
- R - ROTAR SWITCH TYPE

PC — PHOTOCELL

TC — TIME CLOCK

$ OSX or OSX — LIGHTING CONTROL OCCUPANCY SENSOR, WALL MOUNTED, X INDICATES SPECIFIC TYPE AS SPECIFIED

OSX — LIGHTING CONTROL OCCUPANCY SENSOR, CEILING MOUNTED, X INDICATES SPECIFIC TYPE AS SPECIFIED

X — ROOM/AREA LIGHTING CONTROL TYPE, SEE LIGHTING CONTROL SCHEDULE FOR REQUIREMENTS

X — LOW VOLTAGE DIGITAL WALL SWITCH, NUMBER INDICATES QUANTITY OF PUSH BUTTONS PER SINGLE GANG PLATE, LETTER INDICATES CONTROL ZONE WHEN SHOWN

PLUG-IN RECEPTACLE STRIP, QUANTITY AND SPACING OF RECEPTACLES AS NOTED OR SPECIFIED

X Y — SPECIAL-PURPOSE RECEPTACLE AS DEFINED ON PLANS

X X Y Y or X Y — TWO RECEPTACLES IN 2-GANG BOX UNDER COMMON COVER PLATE

X Y — DUPLEX RECEPTACLE

X Y — SIMPLEX RECEPTACLE

X Y — RECESSED FLOOR MOUNTED BOX, QUANTITY AND TYPE OF RECEPTACLES AS INDICATED

SUBSCRIPTS:

X - INDICATES TYPE
- GFCI - GROUND FAULT CIRCUIT INTERRUPTER
- IG - ISOLATED GROUND
- TR - TAMPER RESISTANT
- PLH - PLUG LOAD HALF CONTROLLED
- PLD - PLUG LOAD DUAL CONTROLLED
- USB - USB CHARGING STATION
- SPD - SURGE PROTECTIVE DEVICE
- AC - ABOVE COUNTER

Y - INDICATES CONTROLLING SWITCH (IF REQUIRED)

CONDUIT TURNING UP

CONDUIT TURNING DOWN

INDICATES THAT ALL OR PART OF THE CIRCUIT MAY BE ROUTED IN DUCT BANK OR UNDERGROUND

(#X) — HOMERUN TO PANEL
SINGLE PHASE: 2#12, 1#12G IN 3/4"C
THREE PHASE: 3#12, 1#12G IN 3/4"C
UNLESS OTHERWISE NOTED, CONDUCTOR SIZE IS FOR ENTIRE CIRCUIT

CONDUIT CONNECTION TO EQUIPMENT

CIRCUIT RUN BETWEEN DEVICES EXPOSED IN NON-ARCHITECTURALLY FINISHED AREAS; CONCEALED IN ARCHITECTURALLY FINISHED AREAS. CONDUIT AND CONDUCTOR SIZES SHALL BE THE SAME AS THE HOMERUN FOR THE CIRCUIT.

CONDUIT RUN BETWEEN DEVICES CONCEALED IN NON-ARCHITECTURALLY FINISHED AREAS OR UNDER FLOOR SLAB. CONDUIT AND CONDUCTOR SIZES SHALL BE THE SAME AS THE HOMERUN FOR THE CIRCUIT.

(#X) — CIRCUIT HASH MARKS (WHEN INDICATED); LONG, SHORT, SINGLE DOT, AND DOUBLE DOT REPRESENT PHASE, NEUTRAL, EQUIPMENT GROUND, AND ISOLATED EQUIPMENT GROUND, RESPECTIVELY. #12 IN 3/4" CONDUIT UNLESS OTHERWISE INDICATED.

CIRCUIT CONTINUATION

CONDUIT STUBBED OUT AND CAPPED

CORD AND PLUG CONNECTION

XXX OR XXX — CONDUIT TAG OR CIRCUIT NUMBER - WIRE AND CONDUIT SIZE AS SPECIFIED IN CIRCUIT SCHEDULE ON THE SHEETS

GROUND CABLE

GROUND ROD

GENERAL NOTES:

1. THIS IS A STANDARD ELECTRICAL SYMBOLOGY SHEET. NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT.
2. SCREENING OR SHADING OF WORK IS USED TO INDICATE EXISTING COMPONENTS OR TO DE-EMPHASIZE PROPOSED IMPROVEMENTS TO HIGHLIGHT SELECTED TRADE WORK. REFER TO CONTEXT OF EACH SHEET FOR USAGE.
3. SEE P&ID LEGEND SHEET FOR PROJECT-SPECIFIC EQUIPMENT SYMBOLS, EQUIPMENT ABBREVIATIONS, AND PIPING SYSTEM ABBREVIATIONS.

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER M. GOSSETT
ENGINEER P. BRASK
DRAWN BY M. GARRETT
PROJECT NUMBER 10442825

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

GENERAL ELECTRICAL LEGEND

0 1" 2"

FILENAME 01E001.dwg
SCALE

SHEET 01E001

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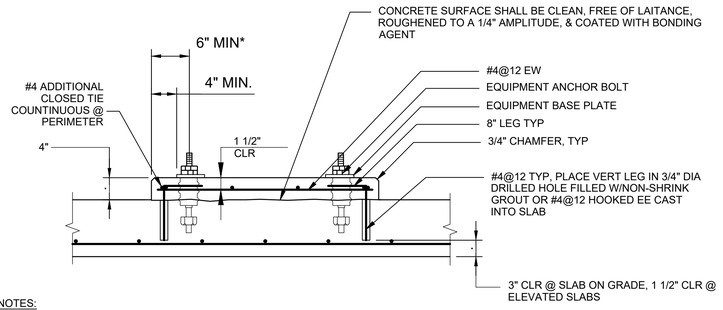


NOTES:

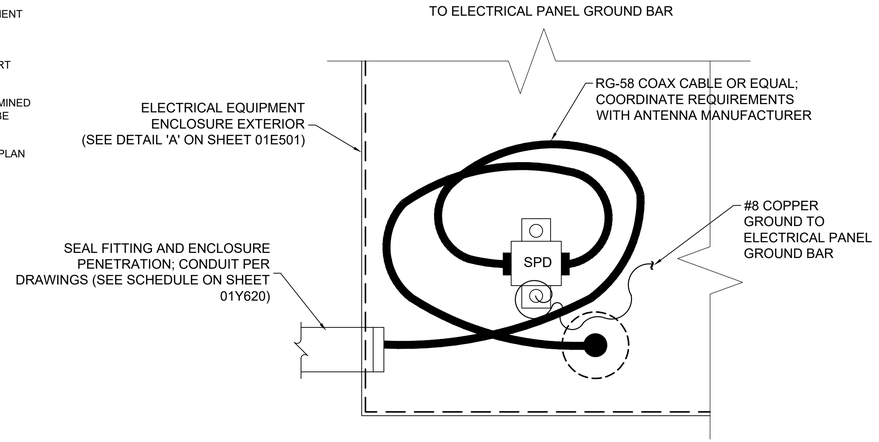
1. PROVIDE ABOVE PAD UNDER ALL ELECTRICAL AND MECHANICAL EQUIPMENT SUPPORTED ON STRUCTURAL SLABS. ALSO PROVIDE FOR EQUIPMENT WEIGHING LESS THAN 5000 POUNDS WHICH ARE SUPPORTED ON GRADE, OR WHERE SPECIFICALLY NOTED ON PLANS. FOR PAD HEIGHT GREATER THAN 8", SEE TALL EQUIPMENT SUPPORT PAD.
2. PAD THICKNESS SHALL BE A MINIMUM OF 4". CONTRACTOR SHALL VERIFY THE PAD THICKNESS WITH EQUIPMENT SUPPLIER. THICKEN SLAB ON GRADE BELOW EQUIPMENT PAD AS REQUIRED TO MAINTAIN MINIMUM 3" COVER ON EQUIPMENT ANCHOR BOLTS.
3. PROVIDE EMBEDDED CHANNELS FOR ANCHORING ELEC EQUIPMENT WHERE REQ'D.

PAD NOTES:

1. PAD DETAIL ON THIS SHEET APPLIES FOR SUPPORT OF ALL ELECTRICAL EQUIPMENT UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
2. BEFORE EQUIPMENT SUPPORT PADS ARE CAST, THE PAD SIZES AND REINFORCING SHALL BE APPROVED BY THE ENGINEER AS BEING CAPABLE OF SUPPORTING EQUIPMENT TO BE PLACED THEREON. EQUIPMENT BASE DIMENSIONS SHALL BE THE LARGER AS DETERMINED BY THE EQUIPMENT MANUFACTURER OR AS INDICATED ON THE DRAWINGS. SUBMIT ALL EQUIPMENT DIMENSIONS AND LOADS TO ENGINEER. THE SIZE, NUMBER, TYPE, LOCATION, AND THREAD PROJECTION OF THE ANCHOR BOLTS (AB) SHALL BE AS DETERMINED BY THE EQUIPMENT MANUFACTURER AND SHALL BE AS APPROVED BY THE ENGINEER. AB SHALL BE HELD IN POSITION WITH A TEMPLATE WHILE EQUIPMENT PAD IS CAST.
3. 6" MINIMUM PAD EDGE DIMENSION TO EQUIPMENT AB APPLIES FOR ALL NON-ELECTRICAL EQUIPMENT SUPPORT PADS. AT ELECTRICAL EQUIPMENT PROVIDE 1" FROM EDGE OF EQUIPMENT TO EDGE OF EQUIPMENT PAD.
4. THE SIZE, NUMBER, TYPE, LOCATION, AND THREAD PROJECTION OF THE ANCHOR BOLTS SHALL BE AS DETERMINED BY THE EQUIPMENT MANUFACURER AND SHALL BE AS APPROVED BY THE ENGINEER. ANCHOR BOLTS SHALL BE HELD IN POSITION WITH A TEMPLATE WHILE EQUIPMENT BASE IS BEING CAST.
5. EQUIPMENT BASES SHALL BE INSTALLED LEVEL UNLESS SPECIFIED OTHERWISE, TOLERANCE IS 1/8" ACROSS PLAN DIAGONALS.

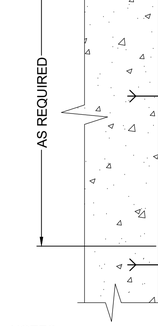
A - TYPICAL SHALLOW EQUIPMENT SUPPORT PAD

NOT TO SCALE



E - ANTENNA SPD

NOT TO SCALE

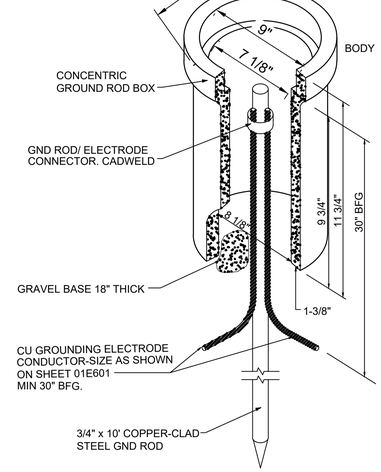


NOTES:

1. THIS DETAIL TYPICAL FOR BOTH VERTICAL AND HORIZONTAL MOUNTING.
2. MATERIAL FOR PREFORMED CHANNEL, FITTINGS, AND CLAMPS SHALL BE AS SPECIFIED IN SECTION 26 05 00.
3. SUPPORTS TO BE SPACED IN ACCORDANCE WITH NEC REQUIREMENTS FOR THE SMALLEST CONDUIT ATTACHED.

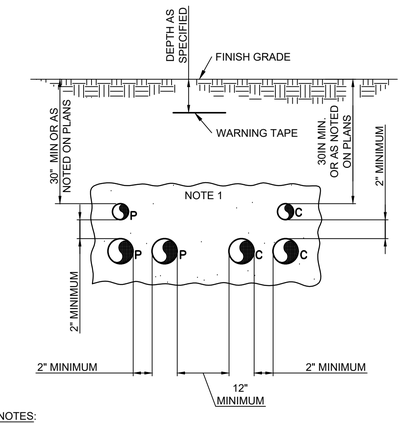
B - CONDUIT SUPPORT TO CONCRETE WALL

NOT TO SCALE



C - CONCRETE GROUND ROD HANDHOLE DETAIL

NOT TO SCALE



NOTES:

1. NUMBER OF CONDUITS AS REQUIRED FOR THE APPLICATION.
2. P SUBSCRIPT ELECTRICAL POWER OR CONTROL CONDUIT.
3. C SUBSCRIPT COMMUNICATION (TELEPHONE, DATA, INSTRUMENTATION) CONDUIT.

D - DIRECT BURIED CONDUITS

NOT TO SCALE

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	M. GARRETT
PROJECT NUMBER	10442825

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

GENERAL ELECTRICAL DETAILS I

0 1" 2"

FILENAME 01E501.dwg

SCALE

SHEET 01E501

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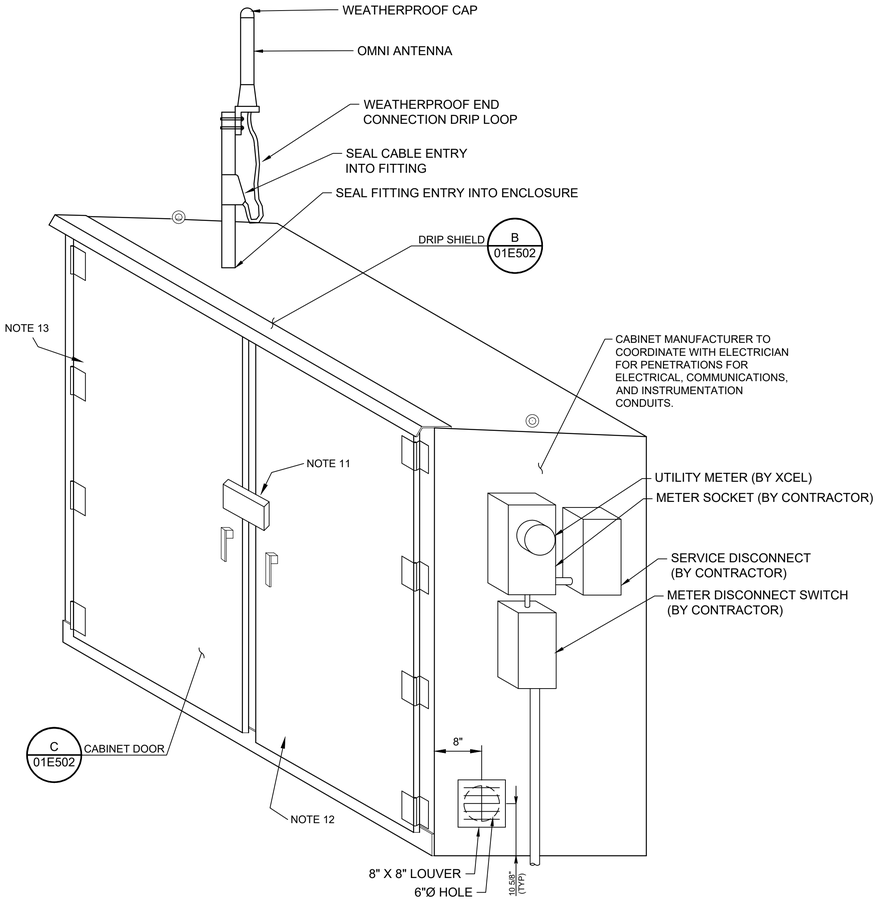


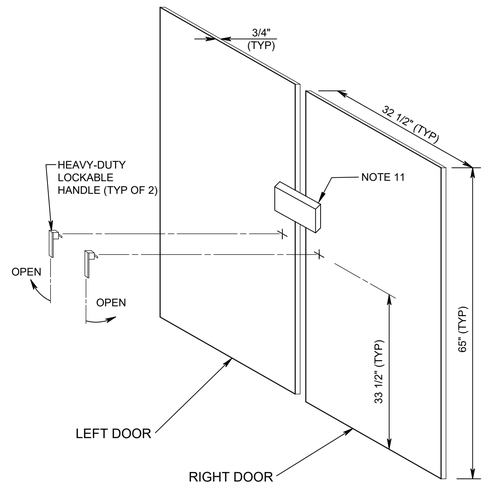
A OVERALL CABINET VIEW
NOT TO SCALE

NOTES:

1. CABINET MATERIAL SHALL BE TWELVE (12) GAUGE STEEL, MINIMUM (U.S. STANDARD) UNLESS OTHERWISE SPECIFIED. BACKBOARD SHALL BE ALUMINUM PLATE.
2. DOOR SEAL SHALL BE 1/4" X 3/4" NEOPRENE ATTACHED WITH SILICONE ADHESIVE.
3. FRAME STRUTS SHALL BE FRAME CHANNEL A-1200, 12 GAUGE, AS MANUFACTURED BY SUPER STRUT INC., OAKLAND, CALIFORNIA OR EQUAL.
4. DOOR HINGE SHALL BE 5" X 5", STAINLESS STEEL, FULL MORTISE, STANDARD WEIGHT, PLAIN BEARING HINGE, SERIES 1191 BY HAGER. PIN SHALL BE NON-REMOVABLE.
5. LIFTING EYE SHALL BE 5/8" TYPE 2 SHOULDER PATTERN EYEBOLT.
6. HOLD DOWN ANGLE SHALL BE 90° AB-201, 12 GAUGE, AS MANUFACTURED BY SUPER STRUT INC., OAKLAND, CALIFORNIA OR EQUAL.
7. DOOR HANDLE SHALL BE A-L1DR AS MANUFACTURED BY HOFFMAN ENGINEERING CO., ANOKA, MINNESOTA, OR EQUAL. HANDLE SHALL OPERATE A 3-POINT LATCHING SYSTEM AND ACCEPT A PADLOCK.
8. ALL STEEL SURFACES SHALL BE SHOP PRIMED FOLLOWED BY TWO COATS OF SEMI-GLOSS ENAMEL. COLOR SHALL BE GLIDDEN PAINT "FEDERAL GREEN" 14056.
9. MANUFACTURER TO DESIGN CABINET TO MEET THE FOLLOWING DESIGN CRITERIA:

   - WIND SPEED: 90 MPH, EXPOSURE C
   - GROUND SNOW LOAD: 30 PSF
   - SEISMIC DESIGN: CATEGORY B

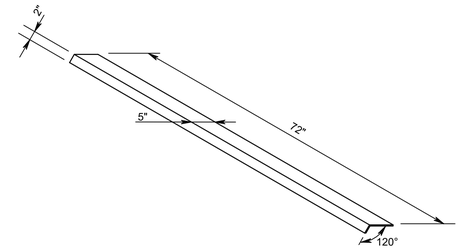
10. CONTRACTOR TO MOUNT METER DISCONNECT, METER SOCKET, AND PANEL DISCONNECT BREAKER ON OUTSIDE OF CABINET.
11. PADLOCK STAPLE WITH STEEL SHROUD TO FULLY-GUARD PADLOCK FROM TAMPERING.
12. ELECTRICAL EQUIPMENT TO BE INSTALLED ON RIGHT SIDE OF CABINET.
13. INSTRUMENTATION AND CONTROLS EQUIPMENT TO BE INSTALLED ON LEFT SIDE OF CABINET.
14. CONTRACTOR TO MOUNT CELLULAR BACKUP ANTENNA ON CABINET EXTERIOR. FIELD-CUT AND SEAL ENTRY.



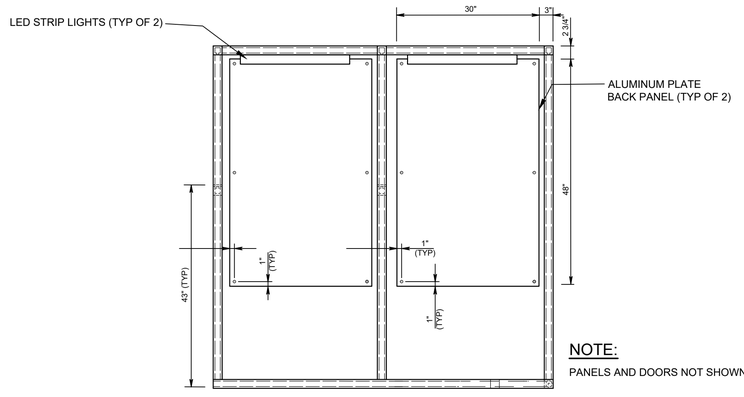
DOOR NOTES:

1. DOOR SEALS TO BE MOUNTED ON EACH DOOR CENTERED OVER 3/4" BENDS OF ADJOINING CABINET PIECES.
2. A DOOR STOP IS TO BE MOUNTED ON EACH DOOR.

C CABINET DOOR
NOT TO SCALE



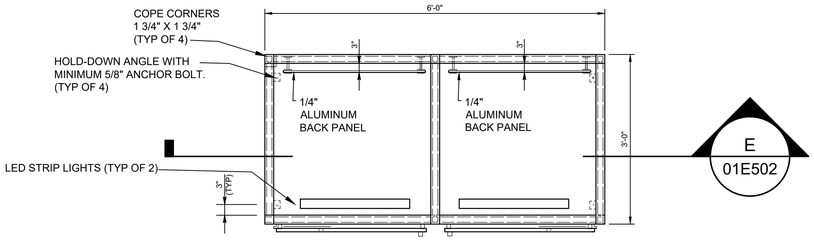
B DRIP SHIELD
NOT TO SCALE



NOTE:

PANELS AND DOORS NOT SHOWN FOR CLARITY.

E CABINET SECTION VIEW
NOT TO SCALE



NOTE:

TOP PANEL NOT SHOWN FOR CLARITY.

D CABINET PLAN VIEW
NOT TO SCALE

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	M. GARRETT
PROJECT NUMBER	10442825

PRELIMINARY
NOT FOR CONSTRUCTION
OR
RECORDING

THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

GENERAL ELECTRICAL DETAILS II

0 1" 2"

FILENAME 01E502.dwg

SCALE

SHEET 01E502

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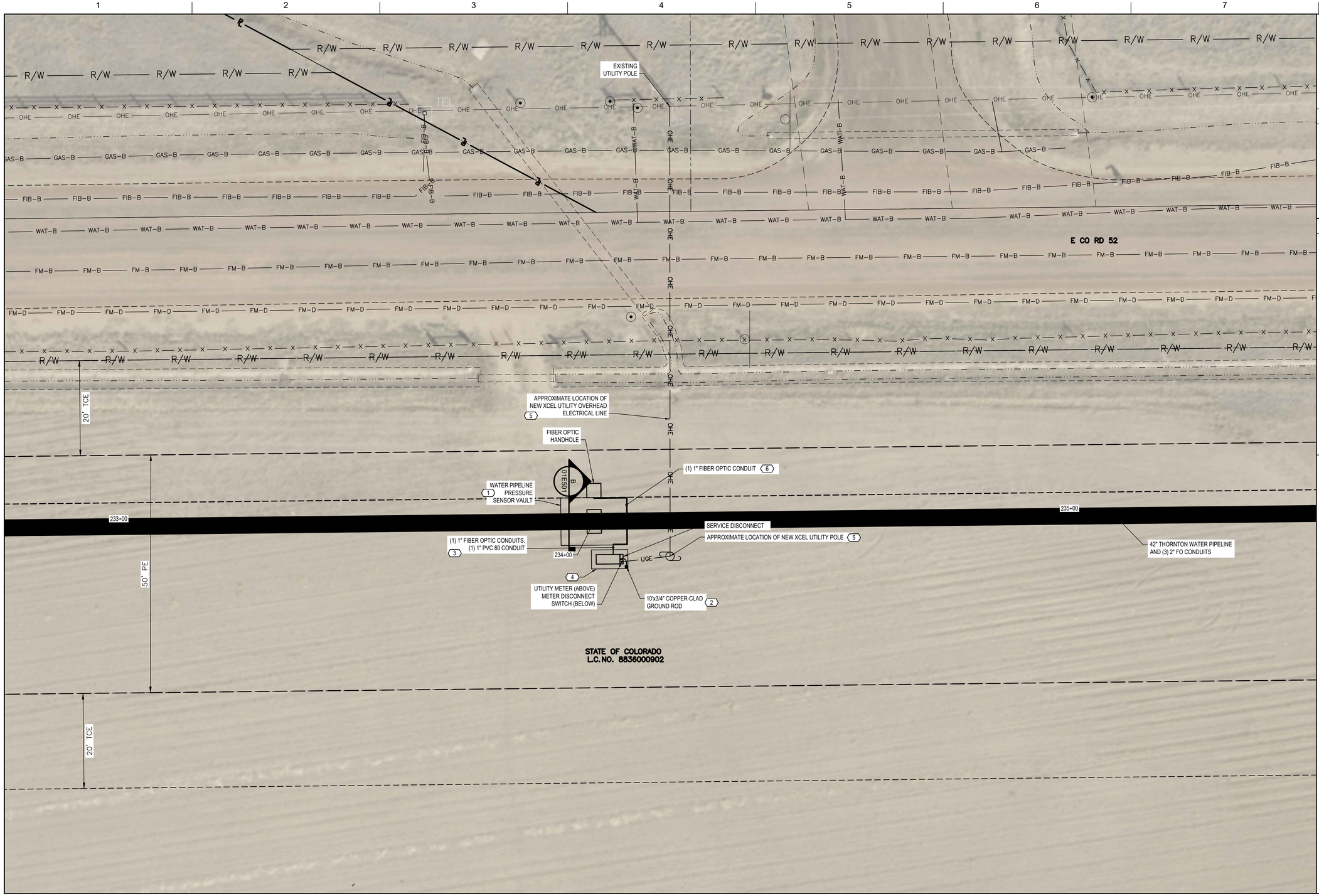

GENERAL NOTES

1. COORDINATE ALL UNDERGROUND INSTALLATIONS WITH CIVIL.
2. COORDINATE ALL ELECTRICAL SERVICE CONNECTIONS WITH XCEL ENERGY.
3. SEE SHEET 01E501 FOR DETAILS ON ROUTING CONDUIT INSIDE PRESSURE SENSOR VAULT.

KEYNOTES (##)

1. FIBER OPTIC CABLE TO TERMINATE AT THE FIBER OPTIC PATCH PANEL IN ELECTRICAL EQUIPMENT CABINET. SEE SHEET 01E601 FOR DETAILS. SEE CIVIL PLAN AND PROFILE SHEETS FOR HANDHOLE LOCATIONS.
2. CONTRACTOR SHALL DRIVE 10'x3/4" COPPER-CLAD GROUND ROD WITHIN 4" OF ELECTRICAL CABINET AND EXOTHERMIC WELD TO THE SERVICE ENTRANCE DISCONNECT GROUNDING CONDUCTOR. SEE SHEET 01E501 FOR DETAILS.
3. CONTRACTOR SHALL ROUTE (1) 1" FIBER OPTIC CONDUIT AND (1) 1" CONTROL CONDUIT, DIRECT BURIED, UNDERGROUND FROM THE PIPELINE PRESSURE SENSOR VAULT TO THE ELECTRICAL EQUIPMENT ENCLOSURE. SEE SHEET 01E601 FOR DETAILS.
4. ELECTRICAL EQUIPMENT PAD SHALL EXTEND MINIMUM OF 1' AROUND ELECTRICAL EQUIPMENT.
5. LOCATIONS OF UTILITY EQUIPMENT SHOWN ARE APPROXIMATE. CONTRACTOR SHALL COORDINATE WITH XCEL PRIOR TO BEGINNING UNDERGROUND ELECTRICAL WORK AND/OR CONSTRUCTION RELATED TO THE ELECTRICAL EQUIPMENT FOUNDATION AND UTILITY TIE-IN.
6. (1) 1" FIBER OPTIC CONDUIT FROM FIBER OPTIC HANDHOLE TO PIPELINE PRESSURE SENSOR VAULT.

10 0 10 20
SCALE IN FEET
HORIZONTAL SCALE: 1" = 20' (22"x34")
1" = 40' (11"x17")

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	R. NALLEY
PROJECT NUMBER	10442825

PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING

THORNTON
COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

ELECTRICAL
ELECTRICAL SITE PLAN

0 1" 2"

FILENAME 01E101.dwg
SCALE

SHEET 01E101

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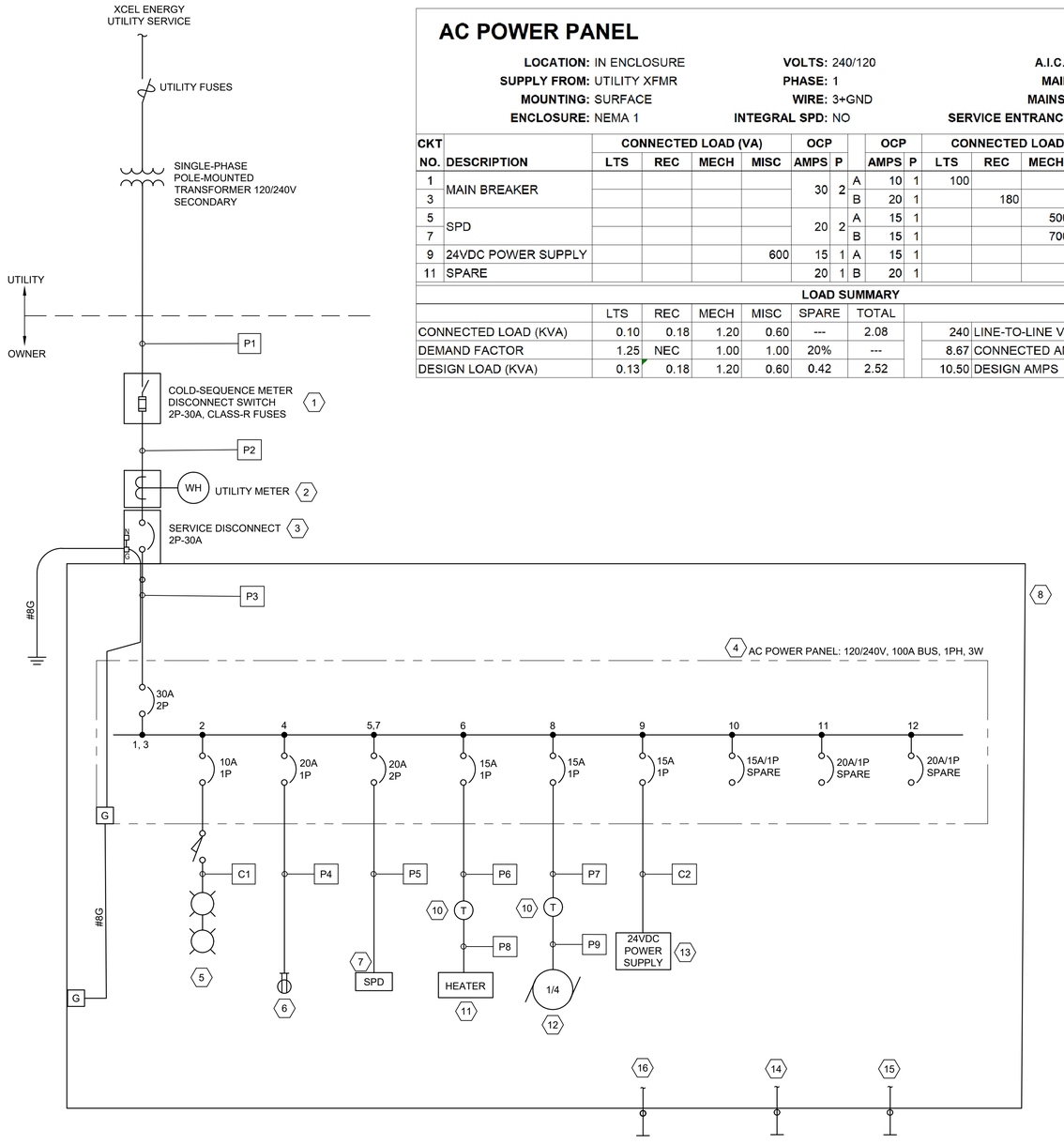

AC POWER PANEL

LOCATION: IN ENCLOSURE
SUPPLY FROM: UTILITY XFMR
MOUNTING: SURFACE
ENCLOSURE: NEMA 1

VOLTS: 240/120
PHASE: 1
WIRE: 3+GND
INTEGRAL SPD: NO

A.I.C. RATING: 10KA
MAINS TYPE: MCB
MAINS RATING: 30A
SERVICE ENTRANCE LABEL: NO

CKT NO.	DESCRIPTION	CONNECTED LOAD (VA) LTS	REC	MECH	MISC	OCP AMPS	P		OCP AMPS	P	CONNECTED LOAD (VA) LTS	REC	MECH	MISC	DESCRIPTION	CKT NO.
1	MAIN BREAKER					30	2	A	10	1	100				ENCLOSURE LIGHTS	2
3								B	20	1		180			CONVENIENCE RECP.	4
5	SPD					20	2	A	15	1			500		ENCLOSURE HEATER	6
7								B	15	1			700		ENCLOSURE FAN	8
9	24VDC POWER SUPPLY				600	15	1	A	15	1					SPARE	10
11	SPARE					20	1	B	20	1					SPARE	12

LOAD SUMMARY

	LTS	REC	MECH	MISC	SPARE	TOTAL			PHASE BALANCE	
CONNECTED LOAD (KVA)	0.10	0.18	1.20	0.60	---	2.08	240	LINE-TO-LINE VOLTS	PHASE A (KVA)	1.20
DEMAND FACTOR	1.25	NEC	1.00	1.00	20%	---	8.67	CONNECTED AMPS	PHASE B (KVA)	0.88
DESIGN LOAD (KVA)	0.13	0.18	1.20	0.60	0.42	2.52	10.50	DESIGN AMPS		

CABLE/CONDUIT KEY:

P2	P1	2#6, #6N, 1"C
	P3	2#6, #6N, #10G, 1"C
P7	P6	P4 2#12, #12G, 3/4"C
	P5	2#12, #12N, #12G, 3/4"C
C2	C1	2#14, #14G, 3/4"C

GENERAL NOTES:

A. ELECTRIC UTILITY IS XCEL ENERGY.
REPRESENTATIVE CONTACT:
BREANNA KREAGER
970-225-7819
BREANNA.N.KREAGER@XCELENERGY.COM

KEY NOTES:

1. COLD-SEQUENCE METER DISCONNECT SWITCH. HEAVY-DUTY NEMA 3R SAFETY SWITCH, 250V, 2P-30A, FUSIBLE WITH CLASS-R CURRENT-LIMITING FUSES AND FUSE REJECTION KIT. CONTRACTOR SHALL MOUNT TO EXTERIOR WALL OF ELECTRICAL ENCLOSURE. INCLUDE PROVISIONS FOR WIRE SEAL ON THE DOOR AND PADLOCKING IN THE 'ON' AND 'OFF' POSITIONS.
2. METER SOCKET BY CONTRACTOR PER XCEL ENERGY REQUIREMENTS. METER PROVIDED AND INSTALLED BY XCEL ENERGY.
3. SERVICE ENTRANCE-RATED SERVICE DISCONNECT CIRCUIT BREAKER. HEAVY-DUTY NEMA 3R, 250V, 2P-30A, 10000AIC, WITH PROVISIONS TO PADLOCK IN THE 'ON' AND 'OFF' POSITIONS. CONTRACTOR SHALL MOUNT TO EXTERIOR WALL OF ENCLOSURE.
4. AC PANELBOARD. SINGLE-PHASE, 3-WIRE, 120/240V, 10KAIC, 12-POLE, 2P-30A MAIN BREAKER, NEMA 1 ENCLOSURE, MOUNTED TO BACKPANEL OF ELECTRICAL ENCLOSURE.
5. LED STRIP LIGHTS IN ELECTRICAL ENCLOSURE, CONTROLLED BY DOOR SWITCH(ES). ONE STRIP BEHIND EACH ENCLOSURE DOOR.
6. HEAVY-DUTY 20A GFCI RECEPTACLE.
7. SURGE PROTECTIVE DEVICE. COORDINATE REQUIREMENTS WITH MANUFACTURER.
8. ELECTRICAL ENCLOSURE, FLOOR-MOUNTED NEMA 3R, PAINTED "FEDERAL GREEN". MINIMUM DIMENSIONS 60"H x 60"W x 24"D.
9. 120V-24VDC POWER SUPPLY.
10. THERMOSTAT CONTROL FOR ENCLOSURE HEATER. 120VAC, APPROXIMATELY 90W. LINE-VOLTAGE THERMOSTAT, DAYTON "4LZ94" (OR EQUAL), 120-240VAC, SPDT, 22A RESISTIVE CONTACT RATING, NEMA 4X ENCLOSURE. BREAKER AND RECEPTACLE SHALL BE GFI TYPE.
11. ENCLOSURE HEATER.
12. ENCLOSURE FAN.
13. SEE SHEET 01Y620 FOR INSTRUMENTATION WIRING DIAGRAM.
14. 1" FIBER OPTIC CONDUIT. SEE SHEET 01Y620 FOR WIRING DIAGRAM AND INSTRUMENTATION WIRING SCHEDULE.
15. 3/4" CONDUIT FOR COAX CABLE FROM CELLULAR BACKUP/SPD TO ANTENNA. MOUNT ANTENNA TO EXTERIOR OF ENCLOSURE. SEE ELECTRICAL DETAILS FOR SPD AND ANTENNA MOUNTING. SEE SHEET 01Y620 FOR INSTRUMENTATION AND CONTROLS WIRING DIAGRAM.
16. 1" CONDUIT FOR INSTRUMENT CONTROL CABLE. SEE SHEET 01Y620 FOR WIRING DIAGRAM AND INSTRUMENTATION WIRING SCHEDULE.

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	M. GARRETT
PROJECT NUMBER	10442825

PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING

THORNTON
COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

SITEWORK
ELECTRICAL ONE LINE

0 1" 2"

FILENAME 01E601.dwg
SCALE

SHEET
01E601

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LINE TYPES

- MAIN PROCESS LINE
- SECONDARY PROCESS LINE
- PROCESS AIR
- AUXILIARY PROCESS LINE
- CH — CHANNEL
- DIRECTION OF FLOW
- A — A — ANALOG SIGNAL
- H — H — ANALOG AND HARD SIGNAL
- P — P — FIELDBUS SIGNAL
- PNEUMATIC SIGNAL
- ELECTRICAL SIGNAL
- HYDRAULIC SIGNAL
- O — O — SOFTWARE OR ETHERNET
- SIGNAL CONNECTION
- CROSSOVER - NO CONNECTION
- X — X — CAPILLARY
- DOUBLE CONTAINMENT PIPING
- INTERIM PROCESS LINES

VALVE SYMBOLOGY

- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- CONE VALVE
- DOUBLE CHECK VALVE
- DOUBLE-DISK CHECK VALVE
- BALL CHECK VALVE
- DIAPHRAGM VALVE
- GATE VALVE
- GLOBE VALVE
- KNIFE GATE VALVE
- MUD VALVE
- NEEDLE VALVE
- PINCH VALVE
- PLUG VALVE
- FOOT VALVE
- EMERGENCY STATION EYE WASH
- COMBINED BACK-PRESSURE WITH ANTI SIPHON
- PRESSURE-REDUCING VALVE
- PRESSURE-REGULATING VALVE
- THREE-WAY CONTROL VALVE
- OR — PRESSURE-RELIEF (PRESSURE-SAFETY) VALVE (PSV)
- X — AIR-RELEASE VACUUM VALVE
  A = AIR RELEASE
  VAC = VACUUM RELEASE
  CAV = COMBINED AIR AND VACUUM RELEASE
- S — SOLENOID VALVE

CROSS REFERENCE SYMBOLOGY

B	01Y102	CONTINUATION ON SHEET 01Y102
01Y101	B	CONTINUATION ON SHEET 01Y101

INSTRUMENT SYMBOLOGY

- XXX — LOCALLY MOUNTED FIELD INSTRUMENTATION (SUBSCRIPT INDICATES INSTRUMENTATION ABBREVIATION)
- MOUNTED ON PANEL FRONT
- MOUNTED INSIDE PANEL
- XXX — FRONT PANEL MOUNTED ON AUXILIARY PANEL (SUBSCRIPT INDICATES PANEL)
- MOUNTED INSIDE AUXILIARY PANEL
- PILOT LIGHT
- INSTRUMENT FUNCTIONS SHARING COMMON HOUSING
- I — COMPLEX INTERLOCK AS DEFINED IN CONTROL DIAGRAM OR IN SPECIFICATIONS
- SHARED DISPLAY, SHARED CONTROL, FIELD MOUNTED
- SHARED DISPLAY, SHARED CONTROL, PRIMARY LOCATION - NORMALLY ACCESSIBLE TO OPERATOR
- PROGRAMMABLE LOGIC CONTROL, PRIMARY LOCATION - NORMALLY ACCESSIBLE TO OPERATOR
- PROGRAMMABLE LOGIC CONTROL, FIELD MOUNTED
- DISCRETE INPUT
- DISCRETE OUTPUT
- ANALOG INPUT
- ANALOG OUTPUT
- I/I — SIGNAL ISOLATOR
- ISR — INTRINSICALLY SAFE RELAY
- ISB — INTRINSICALLY SAFE BARRIER

ACTUATOR SYMBOLOGY

- X — OPERATOR ABBREVIATIONS:
  M = MOTOR
  P = PNEUMATIC
  S = SOLENOID
- FLOAT OPERATOR
- SPRING-OPPOSED SINGLE-ACTING PNEUMATIC CYLINDER
- DOUBLE-ACTING PNEUMATIC CYLINDER
- PNEUMATIC DIAPHRAGM
- PNEUMATIC DIAPHRAGM WITH POSITIONER

TYPES OF POWER SUPPLY

A	PLANT COMPRESSED AIR
IA	INSTRUMENTATION AIR
ES	ELECTRIC SUPPLY
NG	NATURAL GAS
HYD	HYDRAULIC

INSTRUMENT IDENTIFICATION LETTERS

	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		AUTO
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USERS CHOICE			CONTROL	CLOSED
D	USERS CHOICE	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			FORWARD
G	USER'S CHOICE		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	MOISTURE	MOMENTARY			MIDDLE, INTERMEDIATE
N	STATUS		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE, RESTRICTION		OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD	RESET	REMOTE, REVERSE
S	SPEED, FREQUENCY	SAFETY		SWITCH	STOP
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECH. ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	COMMAND	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

MISCELLANEOUS INSTRUMENTATION ABBREVIATIONS

AI	ANALOG INPUT
AO	ANALOG OUTPUT
CL2	CHLORINE (ANALYZER MODIFIER)
CO	CARBON MONOXIDE (ANALYZER MODIFIER)
CO2	CARBON DIOXIDE (ANALYZER MODIFIER)
COMB	COMBUSTIBLES (ANALYZER MODIFIER)
COND	CONDUCTIVITY (ANALYZER MODIFIER)
DEN	DENSITY (ANALYZER MODIFIER)
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
DO	DISSOLVED OXYGEN (ANALYZER MODIFIER)
E/P	VOLTAGE TO PNEUMATIC
FO	FIBER OPTIC
H2S	HYDROGEN SULFIDE (ANALYZER MODIFIER)
HCL	HYDROGEN CHLORIDE (ANALYZER MODIFIER)
I/O	INPUT/OUTPUT
I/P	CURRENT TO PNEUMATIC
I/P	CURRENT TO PNEUMATIC
LEL	LOWER EXPLOSIVE LIMIT
OI	OPERATOR INTERFACE
O2	OXYGEN (ANALYZER MODIFIER)
P&ID	PROCESS AND INSTRUMENTATION DIAGRAM
SC	STREAMING CURRENT (ANALYZER MODIFIER)
SO2	SULFER DIOXIDE
SS	SUSPENDED SOLIDS (ANALYZER MODIFIER)
TURB	TURBIDITY (ANALYZER MODIFIER)
WAN	WIDE AREA NETWORK

CONTROL SWITCH NOTATION ABBREVIATIONS

XXX / XXXX

ACK	ACKNOWLEDGE
ESTOP	EMERGENCY STOP
FAIL	FAILURE
FOR	FORWARD-OFF-REVERSE
FR	FORWARD-REVERSE
FS	FAST-SLOW
HA	HAND-AUTO
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
LL	LEAD-LAG
LLS	LEAD-LAG-STANDBY
LOR	LOCAL-OFF-REMOTE
LR	LOCAL-REMOTE
LS	LEAD-STANDBY
MA	MANUAL-AUTO
OAC	OPEN-AUTO-CLOSE
OC	OPEN-CLOSE
OO	ON-OFF
OSC	OPEN-STOP-CLOSE
PB	PUSH-BUTTON
RJ	RUN-JOG
RJR	RUN-JOG-REVERSE
SIL	SILENCE
SS	START-STOP

PRIMARY ELEMENT SYMBOLOGY

- ULTRASONIC ELEMENT
- ORIFICE PLATE
- SONIC OR ULTRASONIC ELEMENT
- M — MAGNETIC FLOW ELEMENT
- V — VELOCITY FLOW ELEMENT
- PROPELLER OR TURBINE ELEMENT
- TD — MASS DISPERSION FLOW ELEMENT
- THERMAL MASS FLOW ELEMENT
- FLUME
- WEIR
- VENTURI TUBE
- FLOAT SWITCH
- M — MOTOR
- THERMOWELL
- DIAPHRAGM SEAL
- ANNULAR SEAL
- BUBBLER LEVEL TUBE
- ULTRASONIC LEVEL SENSOR
- RADAR LEVEL SENSOR
- CABLE SUSPENDED PRESSURE TRANSMITTER
- IN-LINE FLANGED DIAPHRAGM SEAL
- PITOT TUBE OR ANNUBAR
- FG — SIGHT FLOW GLASS
- MASS DISPERSION FLOWMETER
- FT
- TE — TEMPERATURE ELEMENT WITH THERMOWELL
- FIC — ROTOMETER
- SIGNAL ISOLATOR
- STOP PLATE
- REDUCER

DUPLICATE INPUTS/OUTPUTS NOTATION

XXX / XXXX

- INPUTS AND OUTPUTS (I/O) THAT APPLY TO EACH DEVICE LISTED BELOW
- QUANTITY OF DEVICES THE I/O APPLIES TO
- LIST OF DEVICES THE I/O APPLIES TO; #### PPLIES TO EACH DEVICE'S TAGS

X#
DEV-####
DEV-####
DEV-####

ISA PREDEFINED ABBREVIATIONS

ISA PREFIX	FIRST LETTER	SECOND LETTER	THIRD LETTER
AE	ANALYTICAL	ELEMENT	
AIT	ANALYTICAL	INDICATING	TRANSMITTER
ES	EMERGENCY	STOP	
ETM	ELAPSED	TIME	METER
FE	FLOW	ELEMENT	
FIT	FLOW	INDICATING	TRANSMITTER
FT	FLOW		TRANSMITTER
HSR	HAND	SWITCH	REMOTE
LI	LEVEL	INDICATION	
LIT	LEVEL	INDICATING	TRANSMITTER
LSH	LEVEL	SWITCH	HIGH
LSHH	LEVEL	SWITCH	HIGH-HIGH
LSL	LEVEL	SWITCH	LOW
LSLL	LEVEL	SWITCH	LOW-LOW
LT	LEVEL		TRANSMITTER
MSH	MOISTURE	INDICATION	HIGH
NI	STATUS	SWITCH	
PI	PRESSURE	INDICATION	
PIT	PRESSURE	INDICATING	TRANSMITTER
PSH	PRESSURE	SWITCH	HIGH
PSHH	PRESSURE	SWITCH	HIGH-HIGH
PSL	PRESSURE	SWITCH	LOW
SC	SPEED	COMMAND	
SI	SPEED	INDICATION	
TI	TEMPERATURE	INDICATION	
TIT	TEMPERATURE	INDICATING	TRANSMITTER
TE	TEMPERATURE	ELEMENT	
UA	MULTIVARIABLE	ALARM	
UU	MULTIVARIABLE	INFORMATION	
VE	VIBRATION	ELEMENT	
XC	START/STOP	COMMAND	
XCF	START/STOP	COMMAND	FORWARD
XCR	START STOP	COMMAND	REVERSE
XO	COMMAND	OPEN	
XR	COMMAND	RESET	
XS	COMMAND	SWITCH	
XSM	COMMAND	SWITCH	MASTER
XSS	COMMAND	SWITCH	STANDBY
XVC	COMMAND	VALVE	CLOSE
XVO	COMMAND	VALVE	OPEN
XVS	COMMAND	VALVE	STOP
ZF	POSITION	FORWARD	
ZR	POSITION	REVERSE	
ZS	POSITION	SWITCH	
ZSC	POSITION	SWITCH	CLOSE
ZSO	POSTION	SWITCH	OPEN

GENERAL NOTES:

A. THIS IS A STANDARD INSTRUMENTATION SYMBOLOGY AND ABBREVIATIONS SHEET. LISTING OF SYMBOLS AND ABBREVIATIONS DOES NOT IMPLY ALL SYMBOLS AND ABBREVIATIONS HAVE BEEN USED ON THIS PROJECT.

B. SCREENING OR SHADING OF WORK IS USED TO INDICATE EXISTING COMPONENTS OR TO DE-EMPHASIZE PROPOSED IMPROVEMENTS TO HIGHLIGHT SELECTED TRADE WORK. REFER TO CONTEXT OF EACH SHEET FOR USAGE.

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	M. GARRETT
PROJECT NUMBER	10442825

PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING

THORNTON
COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

GENERAL INSTRUMENTATION AND CONTROLS LEGEND

0 1" 2"

FILENAME 01Y001.dwg
SCALE

SHEET 01Y001

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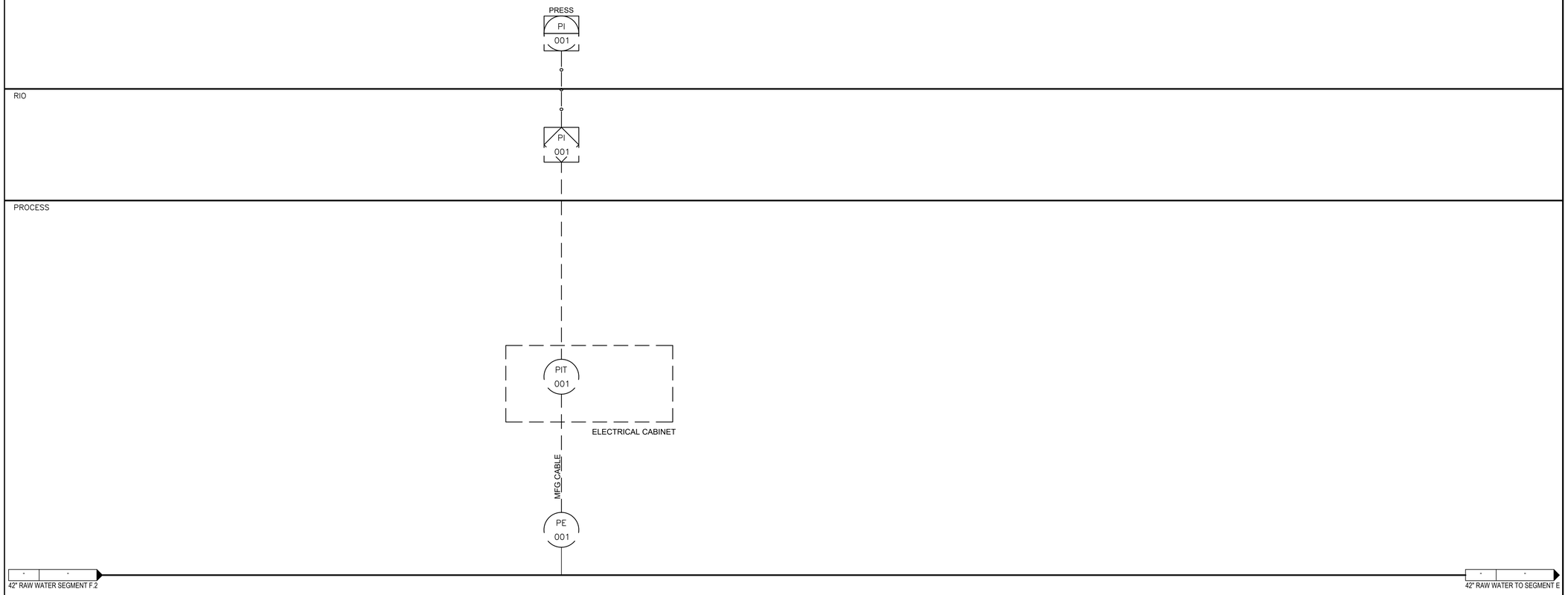
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

CELLULAR BACKUP

RIO

PROCESS



GENERAL NOTES:

A. REFER TO CIVIL AND ELECTRICAL PLANS FOR LOCATION OF INSTRUMENTATION.

B. SEE CIVIL DRAWINGS FOR PIPE ROUTING AND SIZING DETAILS.

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	M. GARRETT
PROJECT NUMBER	10442825

PRELIMINARY
NOT FOR
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OR
RECORDING

THORNTON
COLORADO

THORNTON WATER
PIPELINE

SEGMENT F.2

PIPING AND INSTRUMENTATION DIAGRAM

0 1" 2"

FILENAME 01Y601.dwg

SCALE

SHEET
01Y601

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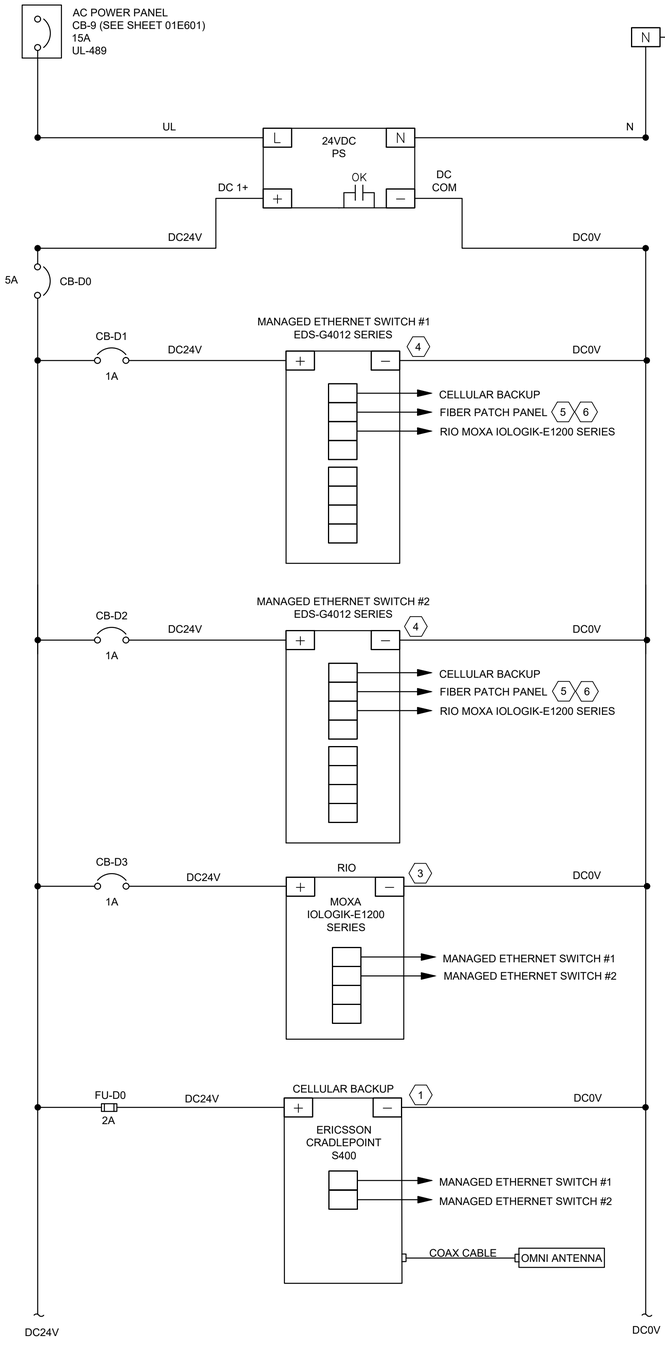

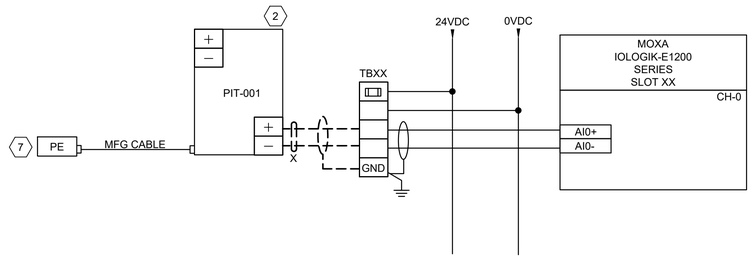

INSTRUMENTATION & CONTROLS WIRING AND CONDUIT SCHEDULE					
FUNCTION	FROM	TO	WIRE COUNT & SIZE	CONDUIT SIZE	NOTES
POWER	AC POWER PANEL, CB-9	24VDC POWER SUPPLY	2/C#14, #14G	3/4"	24VDC
POWER	24VDC POWER SUPPLY	MANAGED ETHERNET SWITCH #1	2/C#14, #14G	N/A	24VDC
NETWORK	MANAGED ETHERNET SWITCH #1	CELLULAR BACKUP	CAT6	N/A	
NETWORK	MANAGED ETHERNET SWITCH #1	FIBER PATCH PANEL	FO PATCH CABLES	N/A	
NETWORK	MANAGED ETHERNET SWITCH #1	RIO	CAT6	N/A	
POWER	24VDC POWER SUPPLY	MANAGED ETHERNET SWITCH #2	2/C#14, #14G	N/A	24VDC
NETWORK	MANAGED ETHERNET SWITCH #2	CELLULAR BACKUP	CAT6	N/A	
NETWORK	MANAGED ETHERNET SWITCH #2	FIBER PATCH PANEL	FO PATCH CABLES	N/A	
NETWORK	MANAGED ETHERNET SWITCH #2	RIO	CAT6	N/A	
POWER	24VDC POWER SUPPLY	RIO	2/C#14, #14G	N/A	24VDC
POWER	24VDC POWER SUPPLY	CELLULAR BACKUP	2/C#14, #14G	N/A	24VDC
POWER	24VDC POWER SUPPLY	PIT-001	2/C#14, #14G	3/4"	24VDC
INSTRUMENTATION	RIO	PIT-001	1#16TSP	N/A	
INSTRUMENTATION	PIT-001	PE-001	MANUFACTURER CABLE	1"	
NETWORK	FIBER PATCH PANEL	FIBER OPTIC NETWORK	(1) 24-STRAND SM FO CABLE	1"	SEE DRAWING 01E101 FOR ROUTING

GENERAL NOTES:

A. FOR CLARITY, SOME DEVICE PORTS MAY NOT BE SHOWN.

KEY NOTES:

1. CELLULAR BACKUP SHALL BE ERICSSON CRADLEPOINT S400 WITH RJ45 EXPANSION MODULE, NO OR EQUAL. CELLULAR BACKUP TO HAVE 600 MHz - 6 GHz, SMA, BLACK MINI OMNI ANTENNA, PART #: 170704-002.
2. PRESSURE ELEMENT AND PRESSURE INSTRUMENT TRANSMITTER (SEE SPECIFICATION 40 73 00 FOR REQUIREMENTS).
3. REMOTE I/O SHALL BE MOXA IOLOGIK-E1200 SERIES, NO OR EQUAL.
4. NETWORK SWITCHES SHALL BE MOXA EDS-G4012 SERIES, NO OR EQUAL. TWO PROVIDED FOR REDUNDANCY. CONTRACTOR TO PROVIDE 1000BASE-ZX10 SFP MODULES.
5. FIBER PATCH PANEL SPECIFIED BY OTHERS. FIBER OPTIC CABLE DESIGN BY OTHERS.
6. CONTRACTOR SHALL INSTALL A TOTAL OF (1) 1" FIBER OPTIC CONDUIT FROM THE PRESSURE SENSOR VAULT TO THE ELECTRICAL EQUIPMENT ENCLOSURE. SEE SHEET 01C120 FOR ROUTING.
7. THE PE IS A FIELD-MOUNTED DEVICE. ALL OTHER DEVICES SHOWN ON WIRING DIAGRAM ARE INTERNAL TO ELECTRICAL EQUIPMENT ENCLOSURE.

ISSUE	DATE	DESCRIPTION
0	08/2026	ISSUED FOR BID

PROJECT MANAGER	M. GOSSETT
ENGINEER	P. BRASK
DRAWN BY	M. GARRETT
PROJECT NUMBER	10442825

PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING

THORNTON
COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

INSTRUMENTATION & CONTROLS WIRING DIAGRAM

0 1" 2"

FILENAME 01Y620.dwg

SCALE

SHEET 01Y620

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SEG F-1
(BY OTHERS)
01ESCP101
BNSF RR
01ESCP101
01ESCP102
01ESCP102
01ESCP103
01ESCP103
01ESCP104
01ESCP104
01ESCP105
01ESCP105
01ESCP106
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01ESCP107
01ESCP108
01ESCP108
01ESCP109
01ESCP109
01ESCP110
01ESCP110
01ESCP111
SEG E
(BY OTHERS)
E COUNTY ROAD 54
E County Road 54
COBB LAKE
HINKLEY LAKE
Summerlin Way
Hinkley Ln
Gambel Way
N County Road 3
N COUNTY ROAD 1
E COUNTY ROAD 52
E County Road 52
E County Road 50
GIDDINGS
LARIMER COUNTY CANAL
Larimer County Canal
SOUTH GRAY RESERVOIR
LARIMER COUNTY
WELD COUNTY
Mountain Vista Greens
Church Dr
Beech Dr
Rainbow Ln
Continental Ln
Fairfield Dr
Fairfield Pl
Fairfield Way
Rolling Dr
Rainbow Dr
Rainbow Pl
Rainbow Way
Rainbow Trail
Rainbow Cir
Rainbow Ct
Rainbow Ln
Rainbow Rd

STORMWATER MANAGEMENT PLAN (SWMP)- THORNTON WATER PIPELINE SEGMENT F2

1. Site Description

The Contractor shall comply with all Local and State requirements associated with the CDPS-SCP on this project. The Contractor's Qualified Stormwater Manager for Construction shall update the SWMP to reflect current project site conditions.

[**Note:** This SWMP is provided for the Contractor's convenience. The Contractor is responsible for developing a SWMP as part of the DCP/CDPHE stormwater permit process; it is not required for Design Technical Review.]

A. Project Site Location:
Location or address of construction office: **TBD**
The project runs parallel to and alongside East County Road 52 between North County Road 1 and Broadacre Lane, along Broadacre Lane to Builtmoore Court, along Builtmoore Court across Interstate-25 to the Burlington Northern Santa Fe Railroad and north to East Douglas Road in Fort Collins, Colorado.

B. Project Site Description:
The City of Thornton (Thornton) is proposing to construct Segment F.2 of the water pipeline for the Thornton Water Project (TWP or project) in Larimer and Weld Counties, Colorado. The TWP is a domestic water transmission project in Larimer, and Weld Counties, Colorado that includes approximately 4.3 miles of buried 42-inch diameter pipeline and associated appurtenances in Segment F.2. The appurtenances include buried fiber optic cable, various buried water pipeline structures and valves including access manways, blow-off assemblies, air release vaults, and isolation valve vaults. This project includes clearing and grubbing, stripping the topsoil layer from subsoil and segregating for use in final restoration, grading, trench excavation or directional drilling pits, construction of new water pipeline and appurtenances, installation and removal of stormwater BMPs, and final stabilization.

C. Proposed Schedule for Sequence for Major Construction Activities:
Install stormwater erosion and sediment control measures. Clear and grub the right of way. Install pipeline and appurtenances using trenching or directional drilling methodologies. Backfill all trenches and excavated areas. Stabilize all areas that are not paved or landscaped through establishment of vegetation cover and remove construction control measures. For structural and non-structural control measure installation and maintenance instructions, refer to the MHFD detail sheets included as part of this SWMP.

- Stormwater BMP installation
- Clearing and grubbing
- Trenching, directional drilling, and pipeline installation
- Backfill trenches and bore pits
- Removal of stormwater BMPs and stabilize all areas that are not paved or landscaped through establishment of vegetation cover or agricultural soil needs.

D. Acres of Disturbance:
1. Total area of construction site (LOC (PERMITTED AREA)): 55.20 acres
2. Total area of proposed disturbance (LDA): 55.20 acres
3. Total area of seeding: TBD
4. Total area of pre-project impervious surface: 0 SQ. FT.*

* No impervious surface will be added during this project. Existing concrete/asphalt ground cover will be replaced with same or similar material.

E. Existing Soil Data:
Surficial Site soil consists primarily of sandy loams underlain by clay or clayey loams.
Data Source(s): Soil data was provided by Natural Resources Conservation Services Soil Maps for the Site locations. https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Detailed, location-specific, soil information is provided in the project Soil Management Plan.

F. Existing Vegetation, Including Percent of Vegetative Cover:
Refer to the project Landscape Plans starting on 01LAND101 for detailed information regarding existing vegetation within the project limits.

Pre-Construction Date of survey: _____ Percent Existing Vegetative Cover: _____
Description of existing vegetation:
Method for determining percent vegetative cover:
Include a map or table showing transect locations, photos documenting pre-Construction vegetative cover, and methodology used to determine existing vegetative cover to SWMP Tab 17:

Post-Construction Date of survey:
Pre-Construction Percent Vegetative Cover:
Description of vegetation:
The method used to determine pre-construction percent cover shall be used to determine post construction percent cover.

G. Potential Pollutants Sources:
The Contractor's Qualified Stormwater Manager for Construction shall prepare a list of all potential pollutants and their locations.

H. Drainage Patterns and Receiving Water(s):
1. Description of drainage patterns from the Site:
   Stormwater from within the project area generally drains to the Box Elder Creek and the ditches along East County Road 52. The drainage ditch flows generally to the southern end of the project area.
2. Names of immediate and ultimate receiving water(s) on site:
   The immediate receiving water is the drainage ditches and infrastructure along East County Road 52, which ultimately drains to North Gray Reservoir and Box Elder Creek.
3. Description of all stream crossings located within the Limits of Construction:
   Box Elder Creek, Larimer County Canal, and a wetland are planned to be crossed during construction. Construction is anticipated to occur during dry/winter months if schedule allows. The Contractor will plan the crossings as they deem appropriate. Wetlands mats or stream crossings will be used in all wetland/stream areas to minimize disturbance, if needed.

I. Allowable Non-Stormwater Discharges:

Discharge Description	Site Map #	Method Statement (Location)
Uncontaminated Springs	Not anticipated	
Concrete and Masonry Washout Water (in-ground washout structure)#	TBD	Due to underground utilities and narrow limits of construction, recommend using mobile CWAs
Landscape Irrigation Return Flows	Not anticipated	
Discharges from Diversions of State Waters ##	19	Trenching through the Larimer County Canal and Box Elder Creek is anticipated.
Emergency Fire Fighting	Not anticipated	
Discharges to the ground of water used to wash vehicles, equipment, and external buildings	Not anticipated	

#Concrete and masonry washout water associated with the washing of concrete and masonry tools and concrete mixer chutes can be discharged to the ground if site is managed accordingly to prevent the water from leaving the site as surface runoff or reaching receiving waters. Soaps and solvents shall not be added to concrete and masonry washout water.
##Trenching within the Larimer County Canal and Box Elder Creek is anticipated to occur during winter months or during dry periods, if schedule allows, when no water is present within the waterway. The Contractor will plan the crossings as they deem appropriate.

J. Diversion Criteria:
1. Is a diversion planned for the Site? Yes _____ No _____.
2. If yes, complete information below:
   a. What is the 2-year peak flow for the waterway being diverted (cubic feet per second)?
   b. What are the monthly averages if available? (provide averages for Jan-Dec if available)
   c. What is the upstream contributing drainage area and imperviousness?
   d. A method statement must be prepared by the Contractor and approved by City of Thornton for each diversion. Diversion structures must minimize soil transport and erosion within the entire diversion, minimize erosion during discharge, and minimize run-on into the diversion and meet the conditions in the SCP.

ISSUE	DATE	DESCRIPTION
D	08/2026	ISSUE FOR BID
C	05/2026	95% DESIGN
B	01/2026	60% DESIGN
A	09/2025	30% DESIGN

PROJECT MANAGER	M. GOSSETT
ENGINEER	T. HABBERFIELD
DRAWN BY	S. ADAMITIS
PROJECT NUMBER	10442825

Pinyon Environmental, Inc. HDR

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

EROSION AND SEDIMENT CONTROL PLAN NARRATIVE

FILENAME 00NAR01.dwg
SCALE NO SCALE
SHEET 00NAR01

2. Site Map Components:

Pre-construction

A. Project Construction Potential Site Boundaries:
See SWMP Site Maps

B. Flow Arrows that Depict Stormwater Flow Directions On-Site, Run-On and Runoff Direction:
See SWMP Site Maps

C. All Areas of Ground Surface Disturbance:
See SWMP Site Maps

D. Areas of Cut and Fill:
See SWMP Site Maps

E. Areas Used for Storing and Stockpiling of Materials, Staging Areas (field trailer, fueling, etc.) and Locations of All Waste Storage and Batch Plants Including Masonry Mixing Stations:
TBD - See SWMP Site Maps

F. Location of All Structural Control Measures Identified in the SWMP:
See SWMP Site Maps

G. Location of Non-Structural Control Measures as Applicable in the SWMP:
See SWMP Site Maps

H. Springs, Streams, Wetlands, Diversions, And Other State Waters Within or Bordering The Site, Including Areas That Require Pre-Existing Vegetation Be Maintained Within 50 Feet Of A Receiving Water:
See SWMP Site Maps - **None anticipated**

I. Locations of All Stream Crossing Located Within the Limits of Construction:
See SWMP Site Maps

J. Protection of Trees, Shrubs, Sensitive Habitat, and Cultural Resources:
See SWMP Site Maps

K. Locations of Pumped Stormwater Including Intake and Discharge Points and Locations of Dewatering Activities
None anticipated - See SWMP Site Maps

3. Qualified Stormwater Managers:

A. Qualified Stormwater Manger for Design:
Individual responsible for developing SWMP Plan Sheets and SWMP Site Maps during the design phase.

Name/Title	Contact Information [phone & email]
Thomas R. Habberfield, P.E.	habberfield@pinyon-env.com, (315)-243-4593

B. Qualified Stormwater Manger for Construction:
The Contractor shall designate a Qualified Stormwater Manager upon accepting co-permittee of the permit. The Contractor's Qualified Stormwater Manager shall become the operator for the SWMP and assume responsibility for all design changes to the SWMP implementation and maintenance, the SWMP shall remain the property of City of Thornton. The Contractor's Qualified Stormwater Manager shall be responsible for implementing, maintaining, and revising SWMP, including the title and contact information. The activities and responsibilities of the Contractor's Qualified Stormwater Manager shall address all aspects of the project's SWMP. (Update the information below for each new Qualified Stormwater Manager).

C. Erosion Control Inspector: The Contractor shall designate an Erosion Control Inspector. The Erosion Control Inspector shall complete duties in accordance with state and local erosion control inspection requirements.

4. Stormwater Management Controls for Initial Construction Activities Associated with Water Quality

The Contractor Shall Perform the Following:

A. Potential Pollutant Sources:
Evaluate, identify, locate, and describe all potential sources of pollutants at the site in accordance with the CDPS-SCP, and place in the SWMP. All control measures related to potential pollutants shall be shown on the SWMP Site Map by the Contractor's Qualified Stormwater Manager for Construction.

B. Offsite Drainage (Run on Water):
See SWMP Site maps.

C. Vehicle Tracking Control:
See SWMP Site maps.

D. Perimeter Control:
1. Temporary control measures shall be installed prior to commencing construction activities associated with water quality.
2. Perimeter control may consist of berms, silt fence, erosion logs (sediment control logs), existing landforms, or other control measures as approved.

5. During Construction

Responsibilities of the Contractor's Qualified Stormwater Manager: Considered a "living document", the SWMP is continuously reviewed and modified throughout the construction phases. During construction, the Qualified Stormwater Manager for Construction shall have full responsibility to maintain and update the SWMP.

During construction, indicate how items that were not addressed during design are being handled in construction. If items are covered in other sections of the SWMP, indicate below what section the discussion takes place.

A. Materials Handling and Spill Prevention and Response Plan: Prior to commencing Construction Activities Associated with Water Quality, the Contractor shall submit a Spill Response Plan.

B. Other CDPS Permits or Guidance Documents: List applicable CDPS permits or guidance documents associated with the permitted site and activities (i.e. dewatering permit, if needed).
- Soil Management Plan

C. Stockpile Management: Aggregate bags, erosion control logs or similar, shall be placed around stockpiles to prevent sediment from mobilizing outside of the stockpile footprint.

D. Concrete Washout: Concrete and masonry washout water or waste from field laboratories and paving equipment shall be contained.

E. Saw Cutting: Water shall be used to suppress dust when conducting pavement saw cutting operations.

F. Street Sweeping: Shall be done whenever sediment is tracked from the project area onto paved roadways.

6. Inspections

A. Water Quality inspections should be in accordance with the CDPS - SCP requirements.
B. Permanent stabilization inspections shall be in accordance with the CDPS - SCP requirements.
C. The contractor must conduct site inspections in accordance with one of the following minimum frequencies, unless the site meets the requirements of Part I.D.3 of the CDPS-SCP Permit requirements. All inspections must be recorded per Part I.D.5.C of the CDPS-SCP Permit.
1. At least one inspection every 7 calendar days; or
2. At least one inspection every 14 calendar days, if post-storm event inspections are conducted within 24 hours after the end of any precipitation or snowmelt event that causes surface erosion. Post-storm inspections may be used to fulfill the 14-day routine inspection requirement. **Larimer County requires post-storm inspections regardless of whether the inspection schedules in on 7- or 14-day frequency.**
3. When site conditions make the schedule required above impractical, the contractor may petition the division to grant an alternate inspection schedule. The alternative inspection schedule must not be implemented prior to written approval by the division and incorporation into the SWMP.

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PROJECT MANAGER	M. GOSSETT
ENGINEER	T. HABBERFIELD
DRAWN BY	S. ADAMITIS
PROJECT NUMBER	10442825

PRELIMINARY
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OR
RECORDING

THORNTON WATER PIPELINE

SEGMENT F.2

EROSION AND SEDIMENT CONTROL PLAN NARRATIVE

FILENAME	00NAR01.dwg
SCALE	NO SCALE
SHEET	00NAR02

7. Control Measure Maintenance

At any time, regardless of the inspection schedule, City of Thornton or the Contractor shall identify control measures requiring corrective action. Identified noncompliance shall be corrected immediately, but no later than 2 calendar days from the time of observation.

8. Record Keeping

Records shall be kept by the contractor in accordance with the CDPS - SCP requirements. Documentation required to be retained by this permit for a minimum of three years following the date that permit coverage expires or is terminated include:

- Records of all data used to complete the application for coverage under the COR400000 Permit
- The on-site stormwater management plans used to track implementation of the plans during construction (dates of control measure installation/removal, seeding operations, deviations from original plans, etc).
- Stormwater Management Plan Inspection Reports
- Any other document/records pertaining to the implementation of the stormwater management plans during construction

9. Temporary, Permanent Stabilization and Long-Term Stormwater Management

The Contractor shall comply with all temporary stabilization and permanent stabilization requirements in accordance with the CDPS - SCP.

A. Seeding Plan:
The following seed mix(es) and rates are for drill seeding method as shown on the Permanent Stabilization Site Maps shall be used:

- See Landscape Plan Phase 3 for Seed Mix(es).

B. Seeding Application Method:
The following seeding methods shall be used for all areas shown on the Permanent Stabilization Site Maps. Soil compaction shall be minimized for areas where permanent stabilization will be achieved through vegetative cover.

Seeding Method (subsection 212.05)	Acre
Seeding (Native) Drill	See Landscape Plans starting on 01LAND101
Seeding (Native) Hydraulic	See Landscape Plans starting on 01LAND101
Seeding (Native) Broadcast	See Landscape Plans starting on 01LAND101
Seeding (Wetland) Drill	See Landscape Plans starting on 01LAND101
Seeding (Wetland) Hydraulic	See Landscape Plans starting on 01LAND101
Seeding (Wetland) Broadcast	See Landscape Plans starting on 01LAND101
Total	

C. Soil Stabilization Methods:
See See Landscape Plans starting on 01LAND101 for seeding and soil stabilization methods used on this project.

D. Special Requirements:
1. Soil amendments, seedbed preparation, and permanent stabilization mulching shall be accomplished within four working days of placing the topsoil on the de-compacted civil subgrades. If placed topsoil is not mulched with permanent stabilization mulch within four working days, the Contractor shall complete temporary stabilization methods at no additional cost to the City of Thornton.
2. Complete permanent stabilization mulching within 24 hours of hydraulic application of native seed.

E. Reseeding Operations/Corrective Stabilization:
Prior to stormwater construction work partial acceptance.
1. All seeded areas shall be reviewed by the Qualified Stormwater Manger for Construction and or Erosion Control Inspector for bare soils caused by surface or wind erosion. Bare areas caused by surface or gully erosion, blown away mulch, etc. shall be re-graded, seeded, and have the designated mulching applied as necessary.
2. The Contractor shall maintain seeding/mulch/tackifier/blanket/TRM, mow to control weeds or apply herbicide to control weeds in the seeded areas.

F. Location and Description of Planned Permanent Control Measures:
Is Permanent Water Quality Required. Yes_____No__X____.
None anticipated for this project.

10. Prior to Project Final Acceptance

A. When directed by the Construction Manager, removal and disposal of temporary control measures shall be included in the cost of work.

B. At the end of the project, all ditch checks shall consist of either temporary erosion logs (sediment control logs) (or equivalent) or permanent riprap.

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COLORADO

THORNTON WATER
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SEGMENT F.2

EROSION AND SEDIMENT CONTROL PLAN
NARRATIVE

FILENAME 00NAR01.dwg
SCALE NO SCALE

SHEET
00NAR03

11. Narratives

Control Measure Matrixes During Construction:

1. Control measure details have been included with the SWMP. If a Non-Standard Control Measure not included in the SWMP is proposed and approved by the City of Thornton, the Qualified Stormwater Manager for Construction shall Place an "appropriate" column and provide the following information: drawings, dimensions, installation information, materials, implementation processes, control measure-specific inspection expectations, and maintenance requirements of the control measure.
2. The Qualified Stormwater Manager for Construction shall place an "X" in the column "In Use On Site" when the control measure has been installed.
3. A "B" in the "Initial Activities" column indicates that the control measure shall be installed **before** construction activities associated with water quality commence.

Structural Control Measures that may be potentially used on the project for erosion and sediment control; practices may include, but are not limited to the following:

Application, Control measure	Narrative	In Use on Site	Initial Activities	Interim Activities	Permanent Stabilization
Protection of Existing Wetlands (SM-02, SC-09) *Fence (SM-03) and sediment control logs (SC-02)*	Fence (plastic) shall be placed in combination with sediment control logs to prevent encroachment of construction traffic and sediment into state waters prior to start of construction activities associated with water quality. Fence (plastic) shall be placed adjacent to the wetlands; erosion logs (sediment control logs) shall be placed between the plastic fence and disturbance area. Logs shall be placed to direct flows away from or filter water running into wetlands from disturbance areas.		**B**	**X**	
Protection of Existing Trees/Landscaping (SM-02)	Fence (plastic) shall be used in areas indicated in the plans to prevent encroachment of construction traffic and sediment for the protection of sensitive habitat, mature trees and/or existing landscaping prior to start of construction activities associated with water quality.		**B**	**X**	
Check Dam (EC-12) *sediment control log (SC-02), silt berm, silt dike, rock check dam*	Placed in ditches immediately upon completion of ditch grading to reduce velocity of runoff in ditch. For existing ditches, place prior to start of construction activities associated with water quality.		**X**	**X**	
Inlet Protection (SC-06) *Outlet Protection (EC-06)*	Manufactured storm drain inlet protection placed prior to construction activities associated with water quality as detailed in (SC-06), to protect existing inlets or immediately upon completion of new inlets to prevent sediment from entering the inlet throughout construction. Placed at mouth of culvert inlets and over top of culvert at inlet and outlet where disturbance may be occurring adjacent to pipe to prevent sediment laden water from entering pipe or drainage. Place prior to the start of construction activities associated with water quality.		**B**	**X**	**X**
Stockpile Protection (MM-2)	Placed within specified distance, from toe to contain sediment around stockpile. Aggregate bags/rock socks are easily moved and replaced for access during the workday. Place prior to start of stockpiling, increase control as the stockpile increases size.			**X**	
Perimeter Control *S(sediment control logs (SC-02), silt fence (SC-01), dikes/swales (EC-10)*	Placed prior to construction activities associated with water quality commencing to address potential run-on water from off site, and to divert around disturbed area.		**B**	**X**	
Outlet Protection (EC-08)	Material placed as an energy dissipater to prevent erosion at outlet structure.		**B**	**X**	**X**
Concrete Washout (MM-1) *In-ground or fabricated*	Construction control, used for waste management of concrete/masonry and concrete/masonry equipment cleaning. Place prior to the start of concrete and masonry activities.				
Vehicle Tracking Control (SM-04)	Vehicle tracking controls shall be used at all vehicle and equipment exit points from the site to prevent sediment exiting the LOC. Place prior to the start of construction activities associated with water quality.		**B**	**X**	
Temporary Stream Crossing (SM-10)	Constructed over stream or drainage to prevent discharge of pollutants from construction equipment into water.			**X**	
Other					

Non-Structural Control Measures that may be potentially used on the project for erosion and sediment control; practices may include, but are not limited to:

Erosion control devices are used to limit the amount of soil loss on site. Sediment control devices are designed to capture sediment on the project site. Construction controls are control measures related to construction access and staging. Control Measure locations are indicated on the SWMP Site Map.

Application, Control measure	Narrative	In Use on Site	Initial Activities	Interim Activities	Permanent Stabilization
Vegetative Buffer (SC-09)	Finishing component for filtering sediment-laden runoff from disturbance area. Area within ROW, easement, or temporary easement, to be identified on SWMP prior to construction activities associated with water quality starting. Upgradient control measures must be installed immediately adjacent to vegetative buffers.		X	X	X
Topsoil Management Stockpile/Salvage Stockpile	Use MHFD detail MM-2.		X	X	
Surface Roughening (EC-01)	Daily stabilization of disturbance to minimize erosion.			X	
Straw/Hay/Hydraulic Mulch/Mulch Tackifier (EC-03, EC-04)	Temporary or Permanent Stabilization placed as a surface cover for erosion control and or seeding establishment. To be installed as Temporary Stabilization as a surface cover when work is temporarily halted			X	X
Seeding Permanent (EC-02)	Permanent Stabilization of disturbance and to reduce runoff and control erosion on disturbed areas.				X
Rolled Erosion Control Products (EC-06)	Temporary or Permanent Stabilization of disturbance and to reduce runoff and control erosion on disturbed areas.				X
Street Sweeping (SM-07)	Source control, used to remove sediment tracked onto paved surfaces and to prevent sediment from leaving the LOC. Sweep daily and at the end of the construction shift as needed. Kick brooms shall not be permitted.		X	X	X
Other					

Pinyon Environmental, Inc. HDR

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DRAWN BY	S. ADAMITIS
PROJECT NUMBER	10442825

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THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

EROSION AND SEDIMENT CONTROL PLAN NARRATIVE

FILENAME	00NAR01.dwg
SCALE	NO SCALE

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12. Biological Impacts and Dewatering

A. Environmental Impacts:

1. Wetland Impacts: Yes, but temporary.
2. Stream Impacts: Yes, but temporary. Work in waterways will be completed during dry/winter months if schedule allows. The Contractor will plan the crossings as they deem appropriate.
3. Threatened and Endangered Species: None

B. Dewatering:

(Not covered under the CDPHE guidance document Low Risk Discharge Guidance Discharges of Uncontaminated Groundwater to Land):
https://drive.google.com/open?id=17ck1ZJojHSacJ_wxp2FfUr4rAxNgVWZv

1. Dewatering: Refer to other environmental permits.
2. If groundwater is discharged from an excavation, a separate CDPS Dewatering Permit shall be obtained by the Contractor from CDPHE.

13. Notes

A. All sawcutting water shall be captured, collected, and disposed of off-site in accordance with all applicable regulations.
B. Contractor is responsible for determining the location and placement of all concrete washout structures and Vehicle Tracking Pads.
C. Refer to plan page 01 57 00 (Temporary Controls) and Specification 01 35 13 (Special Project Procedures) for property-specific requirements for topsoil and subsoil salvage and storage requirements.

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Construction Stormwater Control Standard Notes

The following standard notes for erosion control on construction sites must be included in each ESCP prepared for the County. The list is not exhaustive but represents the minimum requirements for addressing stormwater quality management on construction sites in the County. Additional notes addressing project specific conditions may be added.

General erosion control requirements

1. The property owner, owner's representative, developer, design engineer, general contractor, sub-contractors, or similar title for the developing entity (hereafter referred to as the Developer) has provided these erosion control materials in accordance with the erosion control criteria set forth in the Standards as an attempt to identify erosion, sediment, and other potential pollutant sources associated with these construction activities and to prevent those pollutants from leaving the project site as an illicit discharge.
2. The Developer shall make themselves thoroughly familiar with the provisions and the content of the specifications laid out in the Standards, the Development Agreement, the erosion control materials compiled for this project, and the following notes as all these materials are applicable to this project.
3. The Developer shall implement and maintain control measures for all potential pollutants from the start of land disturbing activities until final stabilization of the construction site.
4. The County Erosion Control Inspector shall be notified at least twenty-four (24) hours prior to the desired start of any construction activities on this site to allow adequate time for on-site confirmation (initial inspection which can take up to two business days after receiving the request) that the site is in fact protected from sediment and pollutants discharges off site. Please contact the County early to schedule those initial erosion control inspections well in advance so that demolition, clearing, grubbing, tree removal, and scraping may begin without delay. Failure to receive an on-site confirmation before construction activities commence is an automatic "Notice of Violation" and can result in further enforcement actions.
5. The Developer shall proactively provide all appropriate control measures to prevent damage to adjacent downstream and leeward properties. This includes but is not limited to trees, shrubs, lawns, walks, pavements, roadways, structures, creeks, wetlands, streams, rivers, and utilities that are not designed for removal, relocation, or replacement in the course of construction.
6. At all times the Developer shall be responsible to ensure adequate control measures are designed, selected, installed, maintained, repaired, replaced, and ultimately removed in order to prevent and control erosion suspension, sediment transportation, and pollutant discharge as a result of construction activities associated with this project.
7. All applicable control measures based upon the sequencing and/or phasing of the project shall be installed prior to those construction activities commencing.
8. As dynamic conditions (due to the nature, timing, sequence, and phasing of construction) in the field may warrant control measures in addition to, or different from, what is shown on these plans, the Developer shall at all times be responsible to implement the control measures that are most effective with the current state and progress of construction. The Developer shall implement whatever measures are determined necessary and/or as directed by the County Erosion Control Inspector. The Developer shall ensure that all Erosion and Sediment Control Plans (Maps) or SWMP documents are updated to reflect the current site conditions, with updates being initialed and dated. These site inspections and site condition updates shall be made available upon request by the County.
9. All listings, provisions, materials, procedures, activities, site work and the like articulated in this or other written site-specific documents (including but not limited to the erosion control reports, development agreements, landscape, and drainage materials) shall meet or exceed the most restrictive language for City, County, State, and Federal regulations with regards to erosion, sediment, pollutant, and other pollution source control measures. The Developer shall be responsible to comply with all of these aforementioned laws and regulations.
10. The Developer shall ensure that all appropriate permits (CDPS General Permit Stormwater Discharges Associated with Construction Activity, Dewatering, Clean Water Act, Army Corps of Engineers' 404 Wetlands Mitigation Permit, etc.) have been attained prior to commencement of the relevant activity. These permits or copies shall be made available upon request by the County.
11. The Developer shall furnish all conveniences and assistances to aid the Erosion Control Inspector's review of materials, workmanship, records, and self-inspections, etc., of the control measures in use at the construction site.
12. The Developer shall request clarification of all apparent site construction issues that may arise due to inconsistencies in construction plans for the site or site conditions around the selected control measures by contacting the Erosion Control Inspector. The Erosion Control Inspector will not be responsible for any explanations, interpretations, or supplementary data provided by others.
13. All control measures shall be installed in accordance with the Standards.
14. The County reserves the right to require additional control measures as site conditions warrant, to the extent authorized by relevant legal authority.
15. As with any construction standards, occasions may arise where the minimum erosion control standards are either inappropriate or cannot be justified. In these cases, a variance to these standards may be applied for pursuant to the terms, conditions, and procedures of the Standards.
16. Inspection: The Developer shall inspect site pollutant sources and implement control measures at a minimum of once every two weeks during construction and within 24 hours following a precipitation event. Documentation of each inspection shall be recorded and retained by the Developer.
17. All temporary control measures shall be cleaned, repaired, or reconstructed as necessary to assure continual performance of their intended function. All retained sediments, particularly those on paved roadway surfaces, shall be removed and disposed of in a manner and location so as not to cause their release into any drainageway.

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EROSION AND SEDIMENT CONTROL PLAN
LARIMER COUNTY STANDARD NOTES

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SCALE NO SCALE
SHEET 00NOT01

18. Any control measure may be substituted for another standard control measure so long as that control measure provides protection that is equal to or greater than the original control measure that was to be used in that location (e.g., silt fence for wattles or for compact berms). Wattles alone on commercial construction sites have shown to be an ineffective substitute for silt fence or compact berms unless accompanied by a construction fence to prevent vehicle traffic.
19. Any implementation or replacement of existing control measures with a non-standard control, or alternative control measure, shall require the review and acceptance of the County erosion control staff before the measure will be allowed to be used on this project. The control measure details shall be submitted, reviewed, and accepted as in conformance with the County's erosion control criteria based upon the functionality and effectiveness of the control measure in accordance with sound engineering and hydrological practices.

Land disturbance, stockpiles, and storage of soils

20. There shall be no earth-disturbing activity outside the limits designated on the accepted plans. Off-road staging areas or stockpiles must be preapproved by the County. Disturbances beyond these limits shall be restored to original condition.
21. Pre-disturbance vegetation shall be identified, protected, and retained wherever possible. Removal or disturbance of existing vegetation shall be limited to the area required for immediate construction operations, and for the shortest practical period of time. This should include sequencing and phasing construction activities in a way so that the soil is not exposed for long periods of time or by limiting grading to small areas. When practical, this should also include advancing the schedule on stabilization activities such that landscaping takes place shortly, if not immediately, after grading has occurred. Vegetation efforts shall start as soon as possible to return the site to a stabilized condition. Sensitive areas should avoid clearing and grading activities as much possible.
22. All exposed soils or disturbed areas are considered a potential pollutant and shall have control measures implemented on the site to prevent materials from leaving the site.
23. All soils exposed during land disturbing activity (stripping, grading, utility installations, stockpiling, filling, etc.) shall be kept in a roughened condition at all times by equipment tracking, scarifying or disking the surface on a contour with a 2-to-4-inch minimum variation in soil surface until mulch, vegetation, and/or other permanent erosion control is installed.
24. No soil stockpile shall exceed ten (10) feet in height. All soil stockpiles shall be protected from sediment transport through the use of surface roughening, watering, and down gradient perimeter controls. All soil stockpiles shall be protected from sediment transport by wind. All stockpiles shall be flattened to meet grade or removed from the site as soon as practical and no later than the completion of construction activities or abandonment of the project. If frequent access from hardscape to the stockpile is needed, a structural tracking control measure shall be implemented.
25. All required control measures shall be installed prior to any land disturbing activity (stockpiling, stripping, grading, etc.). All of the required erosion control measures must be installed at the appropriate time in the construction sequence as indicated in the approved project schedule, construction plans, and erosion and sediment control plan.
26. All inlets, curb-cuts, culverts, and other storm sewer infrastructure which could be potentially impacted by construction activities shall be protected with control measures. Material accumulated from this control measure shall be promptly removed and, in cases where the protection has failed, the pipes shall be thoroughly cleaned out.
27. All streams, stream corridors, buffers, woodlands, wetlands, or other sensitive areas shall be protected from impact by any construction activity through the use of control measures.
28. All exposed dirt shall have perimeter control. Any perimeter controls that drain off or have the ability to be tracked onto the nearby hardscape shall have some form of effective sediment control as, or as part of, the perimeter control.
29. All exposed slopes should be protected. All exposed steep slopes (steeper than 3H:1V) shall be protected from erosion and sediment transport through use of control measures.
30. No soils shall remain exposed by land disturbing activity for more than thirty (30) days after activity has ceased before required temporary seeding or permanent erosion control (e.g., seed/mulch, landscaping, etc.) is installed. This is not just limited to projects that are abandoned; this includes any project that is temporarily halted, and no immediate activity is to resume within the next thirty (30) days, unless otherwise approved by the County Erosion Control Inspector. During a season when seeding does not produce vegetative cover, another temporary erosion control shall be implemented with or until temporary seeding or permanent erosion control can be performed.
31. All individual lots shall have effective sediment controls located on the street side and any down gradient side. Typically, most lots drain to the front yet on those cases where houses are along a pond or drainage swale have the lot drain in a different direction than the street, those individual lots will need protection on that down gradient side to prevent sediment from leaving the lot.

Vehicle tracking

32. At all points where vehicles exit or leave the exposed dirt area on to a hardscape or semi hardscape (concrete, asphalt, road base, etc.), the Developer shall have installed at least one structural tracking control measure to prevent vehicle tracking. All areas not protected by adequate perimeter control shall be considered a point where vehicles exit the site. Access points should be limited to as few entrances as possible (all perimeter areas shall be protected from tracking activities).
33. In all areas where the structural tracking control measures fail to prevent vehicle tracking, collection and proper disposal of that material is required. All inlets located near access points and affected by tracking activities shall be protected from the introduction of sediment into the drainage system.
34. If repeated deposit of material occurs on a site, additional structural tracking controls may be required of the Developer by the County Erosion Control Inspector.

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LARIMER COUNTY STANDARD NOTES

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SCALE NO SCALE
SHEET 00NOT02

Loading and unloading operations

35. The Developer shall apply control measures to limit traffic impacts (site worker or public) and proactively locate material delivered to the site in close proximity to the work area or immediately incorporate materials into construction to limit operational impacts to disturbed areas, vehicle tracking, and sediment deposition that could impact water quality.
36. Any materials of a non-polluting nature (steel, rock, brick, lumber, etc.) shall be routinely inspected for any residue coming off the material and will generally be located at least fifty (50) feet from any permanent or interim drainageways, where practical.
37. Any pollutant with potential for significant environmental impact that is highly likely to result in discharge when in contact with stormwater (lubricants, fuels, paints, solvents, detergents, fertilizers, chemical sprays, bags of cement mix, etc.) should not be kept on site, where practical. When off-site storage is not practical, pollutants should be stored inside (vehicle, trailer, conex, building, etc.) and out of contact with stormwater or stormwater runoff. Where interior storage is not available, pollutants shall be stored outside in a raised (high spots or on pallets), covered (plastic or tarped), and sealed (leak proof) secondary containment location. The secondary containment or other control measure shall be adequately sized, located at least fifty (50) feet from any permanent or interim stormwater structures or drainageways (where practical), and monitored as part of the routine inspections.

Vehicle and equipment maintenance and fueling

38. Parking, refueling, and maintenance of vehicles and equipment should be limited to one area of the site to minimize possible spills and fuel storage areas. This area shall be located, where practical, at least fifty (50) feet from any permanent or interim stormwater structures or drainageways and shall be monitored as part of the routine inspections. All areas shall keep spill kits and supplies close.

Concrete truck/equipment washing, including the concrete truck chute and associated fixtures and equipment

39. All concrete and equipment washing shall use structural control measures appropriate to the volume of wash and frequency of use. These control measures shall be located, where practical, at least fifty (50) feet from any permanent or interim stormwater structures or drainageways and shall be monitored as part of the routine inspections. These areas shall be clearly identified, and any wash prevented from leaving the control measure. If frequent access from hardscape to the control measure is to occur, a structural tracking control measure shall be implemented. These control measures shall be frequently cleaned out.
40. The Developer is responsible for ensuring washing activity is taking place at the appropriate control measure and site workers are not washing or dumping wash water onto the dirt or in other uncontrolled locations.

Dedicated asphalt and concrete batch plants

41. Dedicated asphalt and concrete batch plants are not acceptable on construction sites within the County without an expressed written request, plan to reduce pollutants associated with that type of activity, and approval by the County's Erosion Control Inspector. The Developer shall inform the erosion control inspection staff of any dedicated asphalt or concrete batch plant that is to be used on site.

Waste materials storage and sanitary facilities

42. Trash, debris, material salvage, and/or recycling areas shall be, where practical, at least fifty (50) feet from any permanent or interim stormwater structures or drainageways and shall be monitored as part of the routine inspections. These facilities shall be located out of the wind and covered as able. Where not able to cover, locate said areas on the side of other structures to reduce exposure to winds, and follow maximum loading guidelines as marked on the container. The Developer is required to practice good housekeeping to keep the construction site free of litter, construction debris, and leaking containers.
43. Sanitary facilities shall be prevented from tipping through the use of anchoring to the ground or lashing to a stabilized structure. These facilities shall also be located as far as practical from an inlet, curb cut, drainage swale, or other drainage conveyance to prevent material transport from leaving the local area. This consists of the facility being located, where practical, at least fifty (50) feet from any permanent or interim drainageways.

Other site operations and potential spill areas

44. Spills: For those spills less than 5 gallons that have no potential to impact state waters, notify the County by email at eng-stormwater@larimer.org. For spills 5 gallons or greater or that have the potential to impact state waters or human health, contact the County Health Department (LCDHE) through Larimer County Sheriff Dispatch (970) 416-1985. All spills shall be cleaned up immediately.
45. Selection of "plastic welded" erosion control blankets shall not be used in areas where wildlife, such as snakes, are likely to be located as these have proven to cause entrapment issues.

Final stabilization and project completion

46. Any stormwater facilities used as temporary control measures shall be restored and storm sewer lines shall be cleaned upon completion of the project and before turning maintenance over to the owner, Homeowners Association (HOA), or other party responsible for long term maintenance of those facilities.
47. All disturbed areas designed to be vegetated shall be amended, seeded and mulched, or landscaped as specified in the landscape plans within 14 working days of final grading.
48. All seeding shall refer to landscaping plans for species mixture, application rates, and depth requirements.
49. All seed shall be drilled where practical to a depth based upon the seed type. Broadcast seeding shall be applied at double the rate as prescribed for drill seeding and shall be

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ENGINEER	T. HABBERFIELD
DRAWN BY	S. ADAMITIS
PROJECT NUMBER	10442825

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THORNTON WATER PIPELINE

SEGMENT F.2

EROSION AND SEDIMENT CONTROL PLAN
LARIMER COUNTY STANDARD NOTES

FILENAME	04NOTES101.dwg
SCALE	NO SCALE
SHEET	00NOT03

lightly hand raked after application. Hydroseeding may be substituted for drill seeding on slopes steeper than 3H:1V or on other areas not practical to drill seed and crimp and mulch. All hydroseeding must be conducted as two separate processes of seeding and tackification.

50. All seeded areas must be mulched within twenty-four (24) after planting. All mulch shall be mechanically crimped and/or have an adequately applied tackifier. The use of crimped mulch or tackifier may require multiple re-applications if not properly installed or if weathering or degradation occurs before vegetation has been established. Areas of embankments having slopes greater than or equal to 3H:1V shall be stabilized with an erosion mat or approved equal to ensure seed will be able to germinate on the steep slopes. During a season when seeding does not produce vegetative cover, another temporary erosion control shall be implemented along with, or until, temporary seeding or permanent erosion control can be performed.
51. The Developer shall warranty and maintain all vegetative measures for two growing seasons after installation or until seventy percent (70%) vegetative cover has been established, whichever is longer.
52. The Developer shall maintain, monitor, repair, and replace all applicable control measures until final stabilization has been obtained. All control measures must remain until such time as all upstream contributing pollutant sources have been vegetated or removed from the site. When the site has been deemed stabilized and verified by the County Erosion Control Inspector, all temporary control measures can be fully removed. When any control measure is removed, the Developer shall be responsible for the cleanup and removal of all sediment and debris from that control measure. All measures shall be removed within 30 days after final stabilization is achieved.
53. The responsible party shall maintain and keep current all payments or related forms of security for the Erosion Control Escrow until 1) stabilization has been reached and 2) all control measures and/or BMPs have sediment materials collected and the control measures have been removed from the site. At that time the site will be considered completed and any remaining Erosion Control Escrow shall be returned to the appropriate parties.

Other Standard Notes

The following notes are adapted from the LC Urban Area Street Standards and should also be included in the ESCP.

1. All references to any published Standards shall refer to the latest revision of said Standard, unless specifically stated otherwise.
2. The Developer shall comply with all terms and conditions of the Colorado Permit for Storm Water Discharge (Contact Colorado Department of Health, Water Quality Control Division, (303) 692-3517), the Storm Water Management Plan, and the Erosion and Sediment Control Plan.
3. The Local Entity shall not be responsible for the maintenance of storm drainage facilities located on private property. Maintenance of onsite drainage facilities shall be the responsibility of the property owner(s).
4. Prior to final inspection and acceptance by the Local Entity, certification of the drainage facilities, by a registered engineer, must be submitted to and approved by the Stormwater Utility Department. Certification shall be submitted to the Stormwater Utility Department at least two weeks prior to the release of a certificate of occupancy for single family units. For commercial properties, certification shall be submitted to the Stormwater Utility Department at least two weeks prior to the release of any building permits in excess of those allowed prior to certification per the Development Agreement.
5. All recommendations of the final drainage and erosion control study (name of the study and date) by (Engineering Firm) shall be followed and implemented.
6. Temporary erosion control during construction shall be provided as shown on the Erosion and Sediment Control Plan. All erosion control measures shall be maintained in good repair by the Developer, until such time as the entire disturbed area is stabilized with hard surface or landscaping.
7. The Developer shall be responsible for ensuring that no mud or debris shall be tracked onto the existing public street system. Mud and debris must be removed within 24 hours by an appropriate mechanical method (i.e., machine broom sweep, light duty front-end loader, etc.) or as approved by the Local Entity's street inspector.
8. At all times during construction, the Developer shall be responsible for preventing and controlling on-site erosion including keeping the property sufficiently watered so as to minimize wind-blown sediment. The Developer shall also be responsible for installing and maintaining all erosion control facilities shown herein.
9. The stormwater volume capacity of detention ponds will be restored, and storm sewer lines will be cleaned upon completion of the project and before turning the maintenance over to the Owner or Homeowners Association (HOA).

References

Larimer County, 2021. *Larimer County Urban Area Street Standards*.

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EROSION AND SEDIMENT CONTROL PLAN
LARIMER COUNTY STANDARD NOTES

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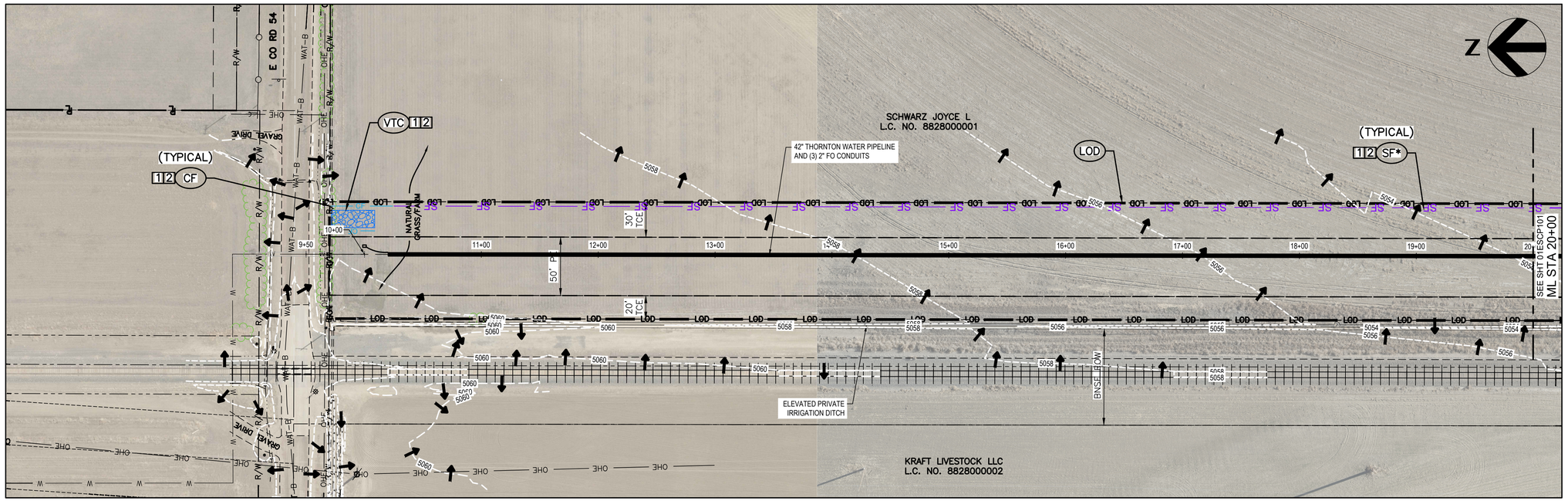

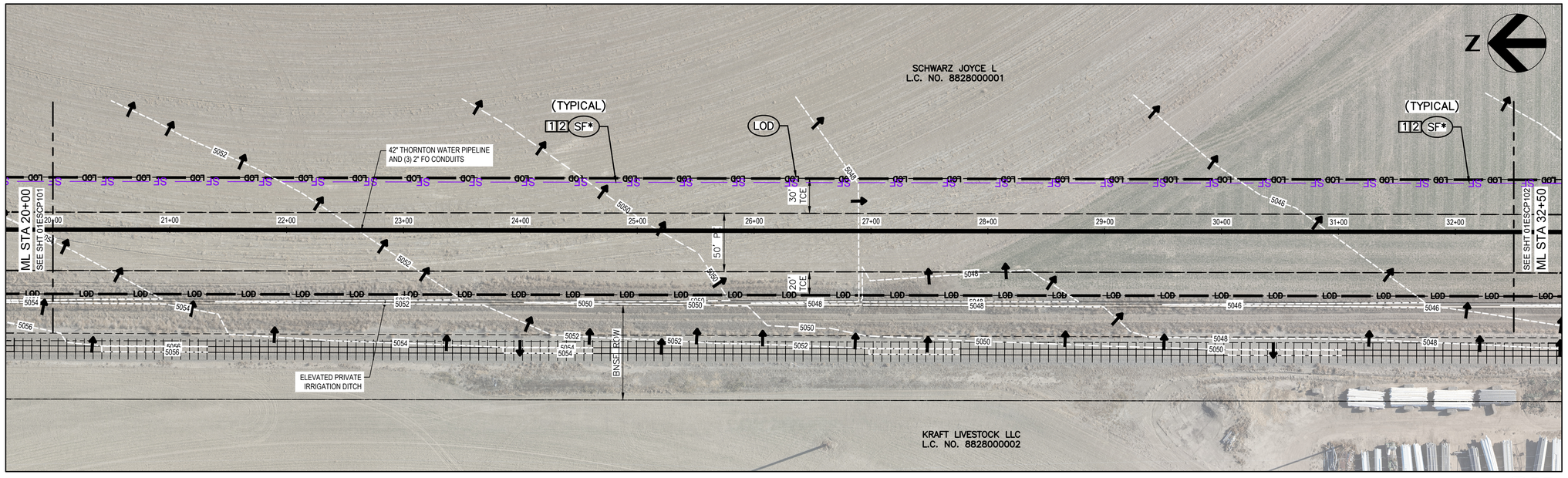

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DRAWN BY	S. ADAMITIS
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THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

EROSION AND SEDIMENT CONTROL PLAN PHASE 1 AND 2

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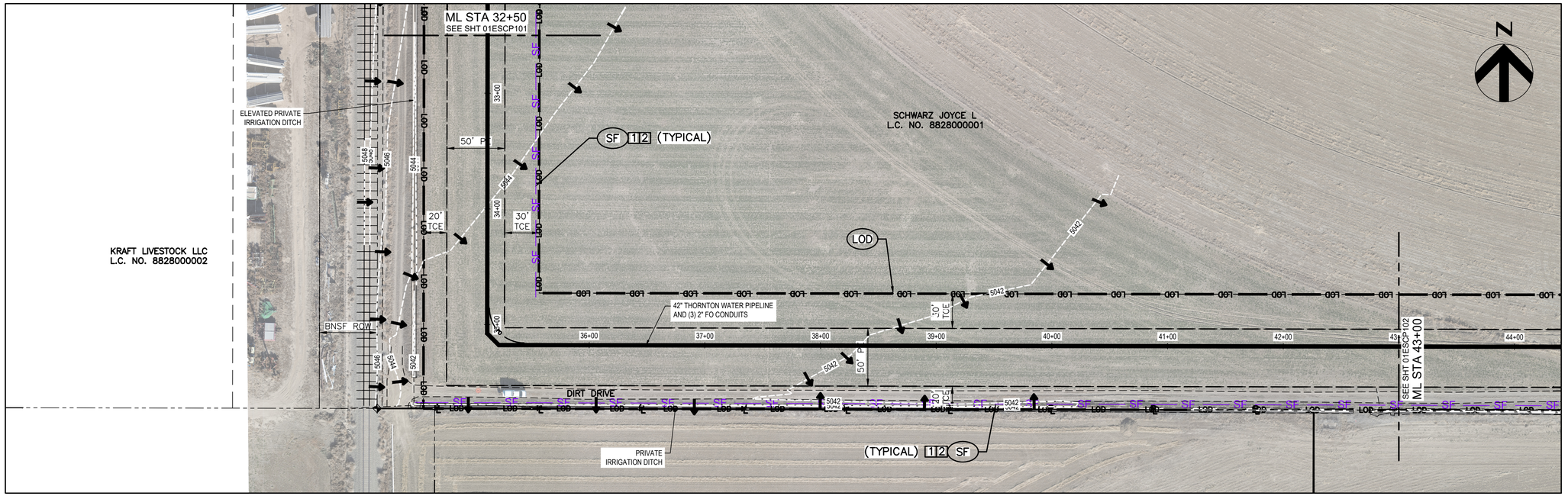

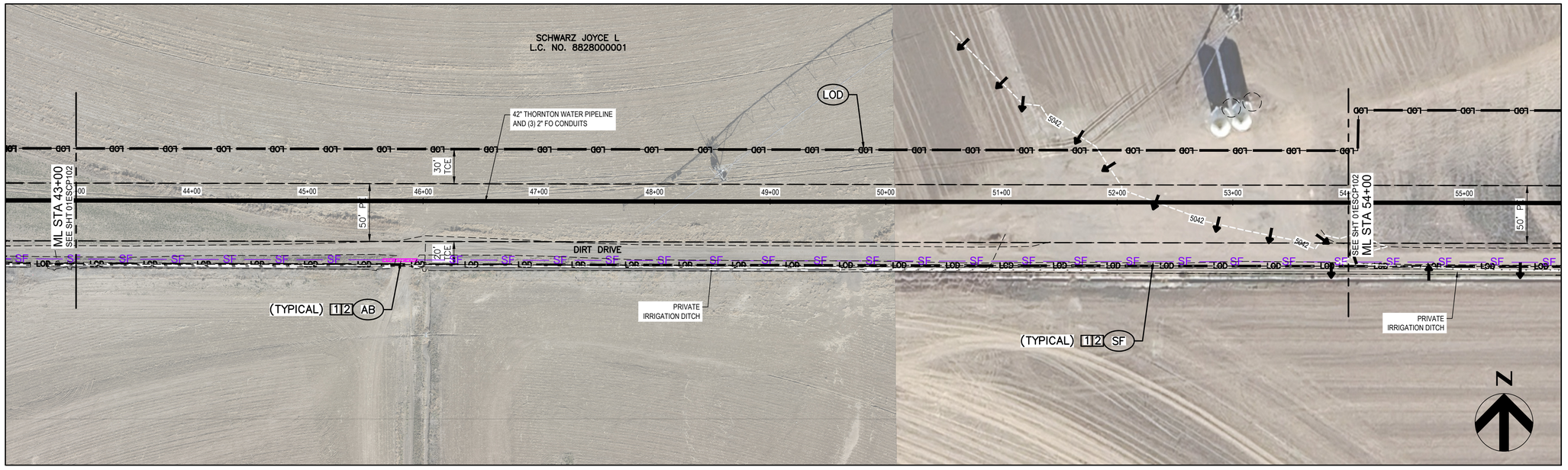

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DRAWN BY	S. ADAMITIS
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THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

EROSION AND SEDIMENT CONTROL PLAN PHASE 1 AND 2

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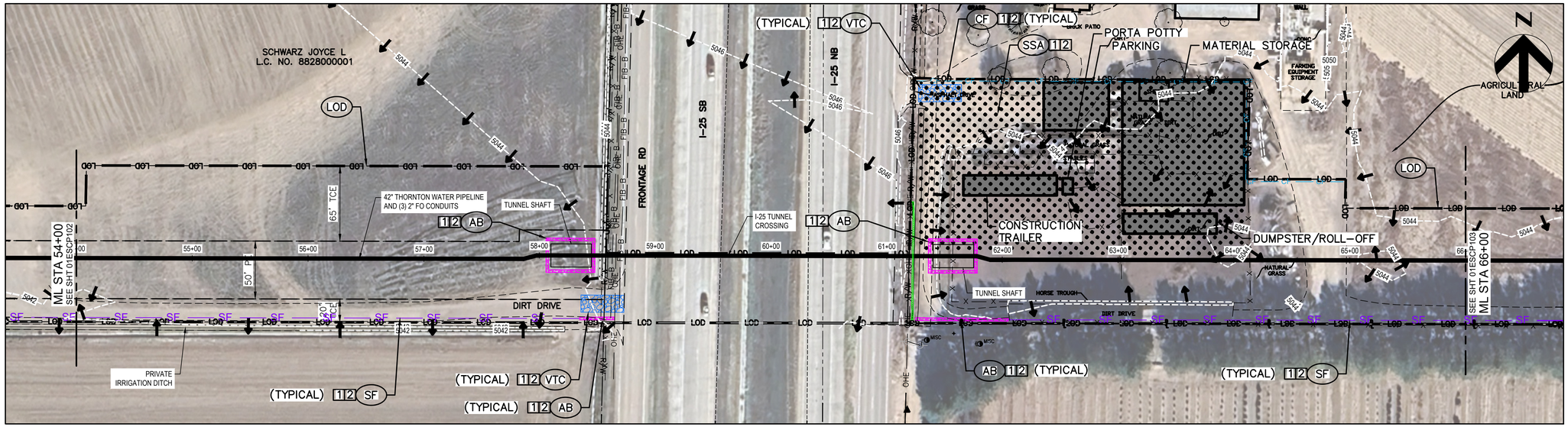
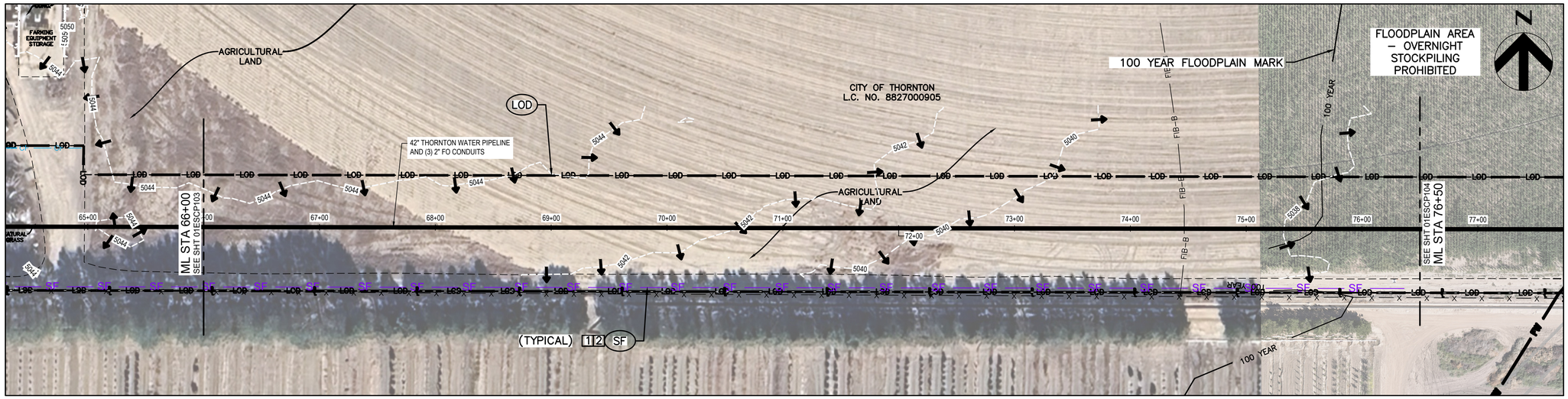
SHEET 01ESCP102



SPECIAL NOTE: CONTRACTOR TO DETERMINE FINAL PLACEMENT OF ALL STAGING AREA FEATURES.



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THORNTON WATER PIPELINE

SEGMENT F.2

EROSION AND SEDIMENT CONTROL PLAN PHASE 1 AND 2

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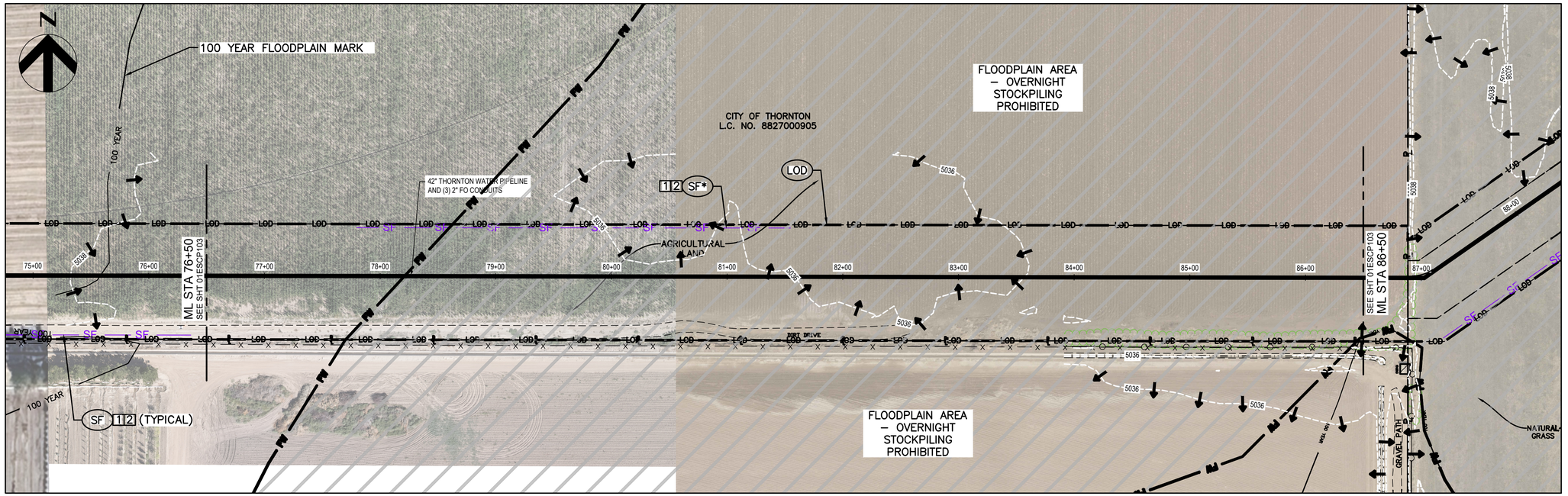

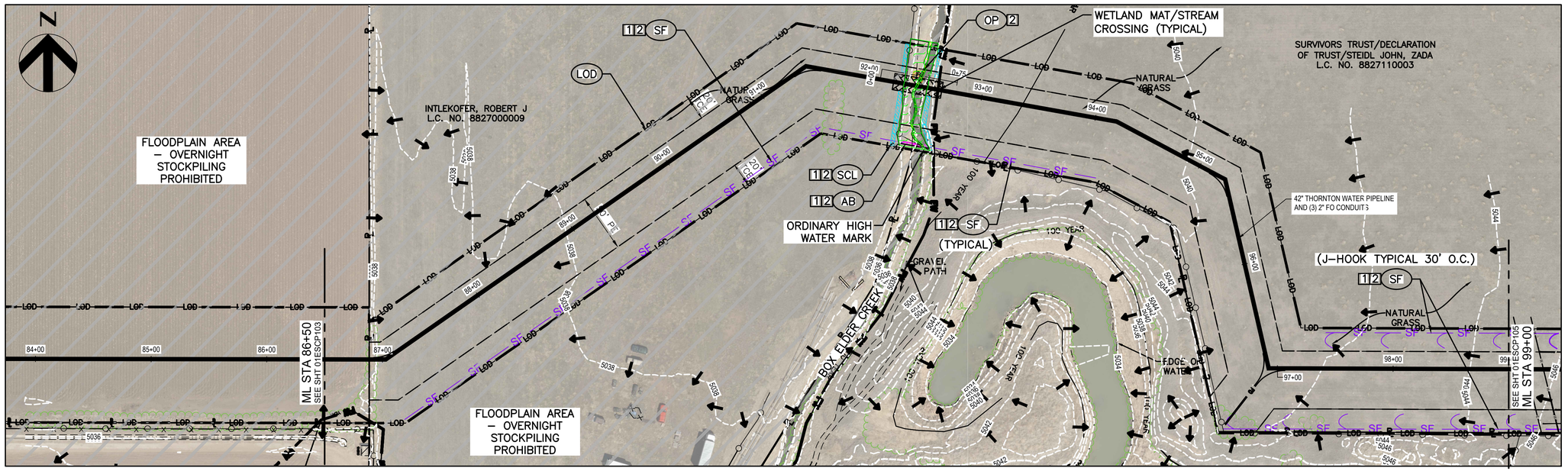

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THORNTON COLORADO

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SEGMENT F.2

EROSION AND SEDIMENT CONTROL PLAN PHASE 1 AND 2

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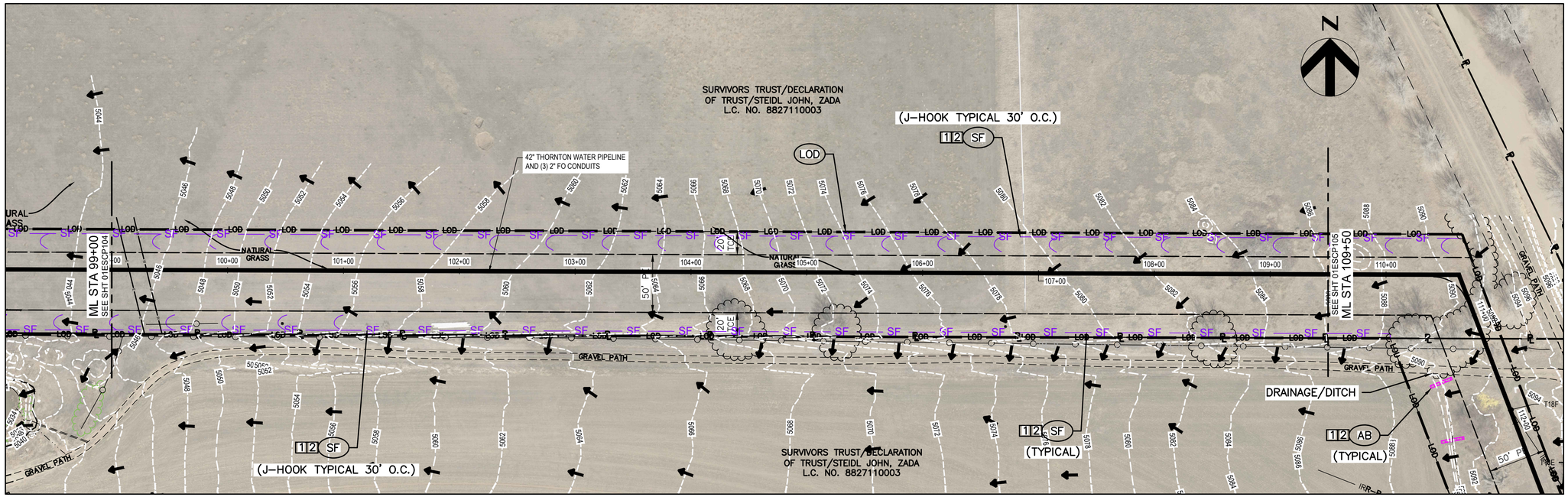

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- SF — SILT FENCE
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- VTC — VEHICLE TRACKING CONTROL
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- DC — WIND EROSION/ DUST CONTROL
- SS — STREET SWEEPING
- EXISTING BERM
- EXISTING BUSH LINE
- EXISTING TREE LINE
- EXISTING VEGETATION
- EXISTING CONTOUR
- EXISTING WETLAND AREA
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- WETLAND MATS/STREAM CROSSING
- FLOW ARROW – EXISTING
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SCALE IN FEET: 50 0 50 100

HORIZONTAL SCALE: 1" = 50' (22"x34") 1" = 100' (11"x17")

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D	08/2026	ISSUE FOR BID
C	05/2026	95% DESIGN
B	01/2026	60% DESIGN
A	09/2025	30% DESIGN

PROJECT MANAGER	M. GOSSETT
ENGINEER	T. HABBERFIELD
DRAWN BY	S. ADAMITIS
PROJECT NUMBER	10442825

Pinyon Environmental, Inc. HDR

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

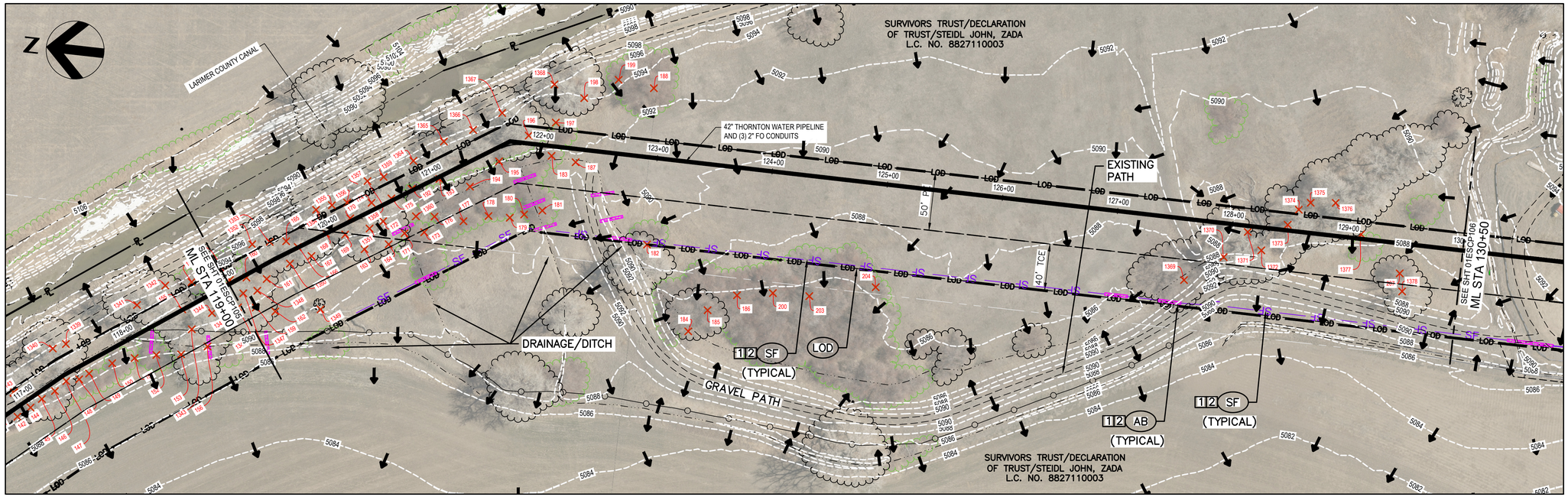
THORNTON COLORADO

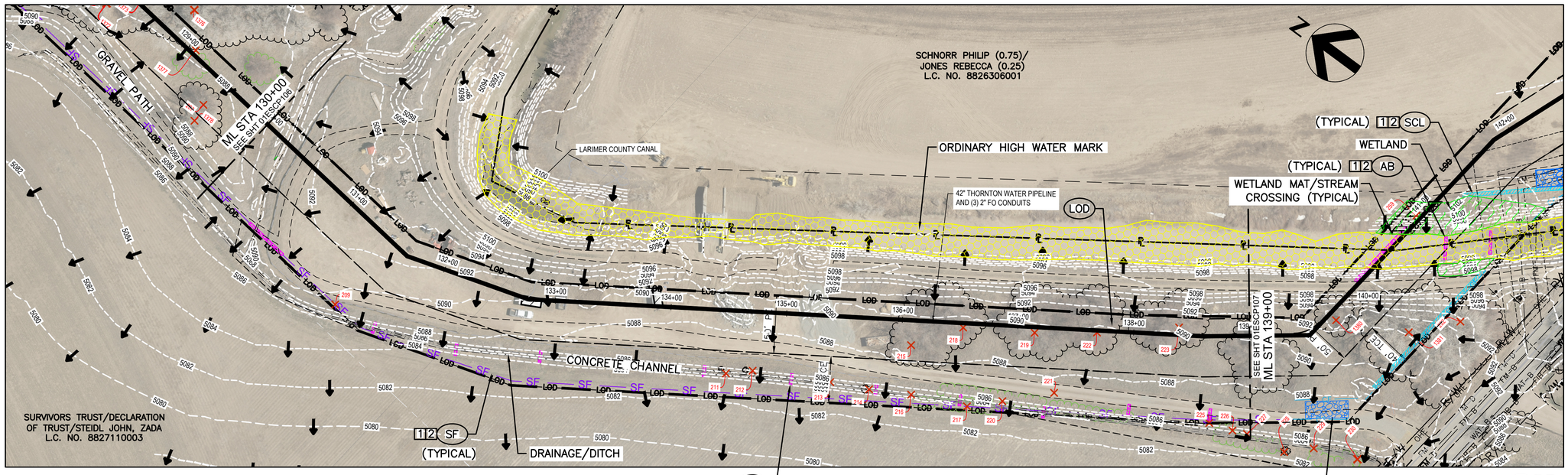
THORNTON WATER PIPELINE

SEGMENT F.2

EROSION AND SEDIMENT CONTROL PLAN PHASE 1 AND 2

FILENAME 01ESCP101.dwg | SCALE NO SCALE | SHEET 01ESCP105





PHASING LEGEND

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- [1] INITIAL BMP TO BE INSTALLED PRIOR TO CONSTRUCTION
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LEGEND

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- EXISTING TREE LINE
- EXISTING VEGETATION
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- WETLAND MATS/STREAM CROSSING
- FLOW ARROW – EXISTING
- TREE REMOVAL LOCATION

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B	01/2026	60% DESIGN
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PROJECT MANAGER	M. GOSSETT
ENGINEER	T. HABBERFIELD
DRAWN BY	S. ADAMITIS
PROJECT NUMBER	10442825

Pinyon Environmental, Inc. HDR

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

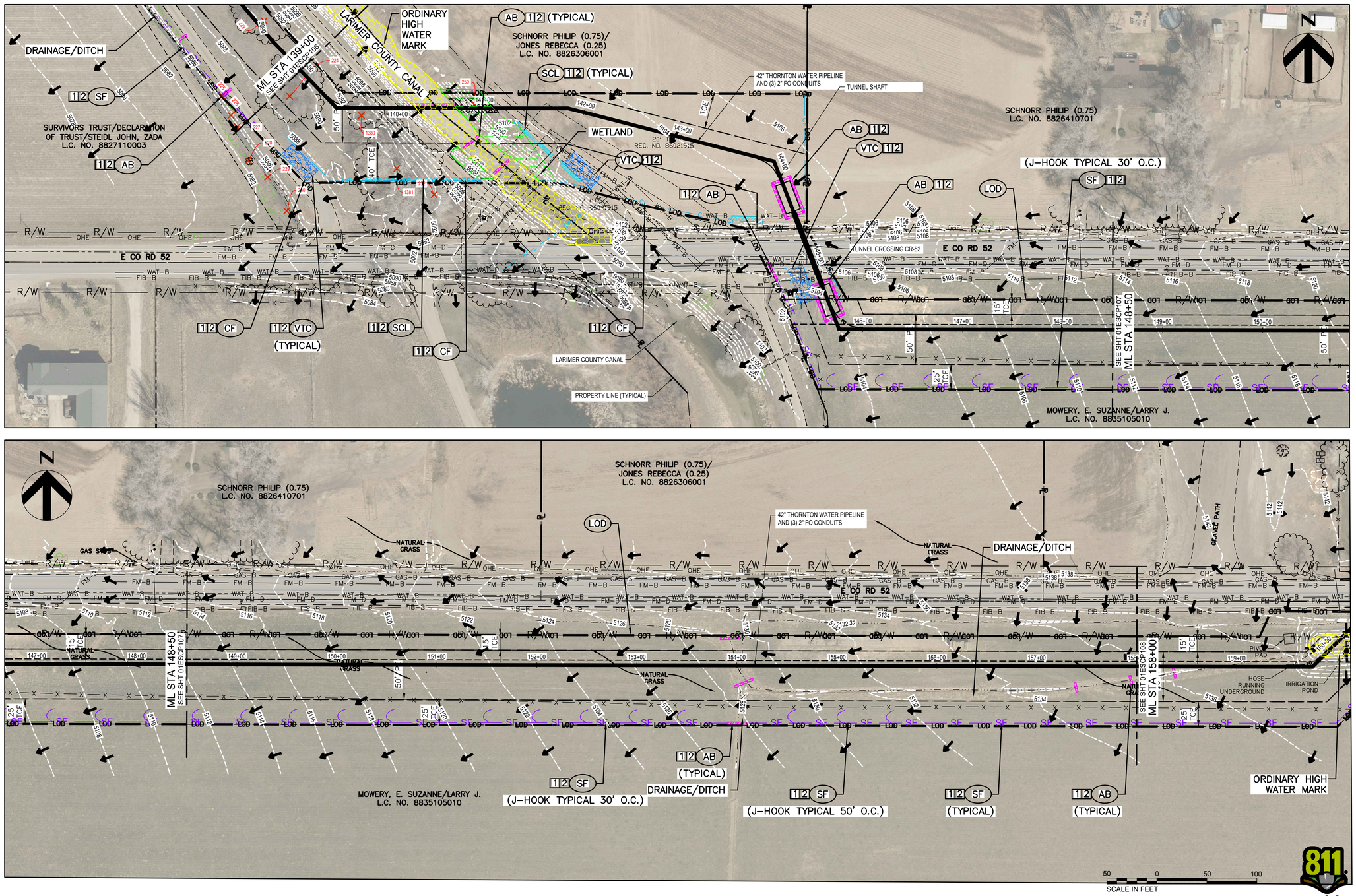
THORNTON COLORADO

THORNTON WATER PIPELINE

SEGMENT F.2

EROSION AND SEDIMENT CONTROL PLAN PHASE 1 AND 2

FILENAME	01ESCP101.dwg
SCALE	NO SCALE
SHEET	01ESCP106



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DRAWN BY	S. ADAMITIS
PROJECT NUMBER	10442825

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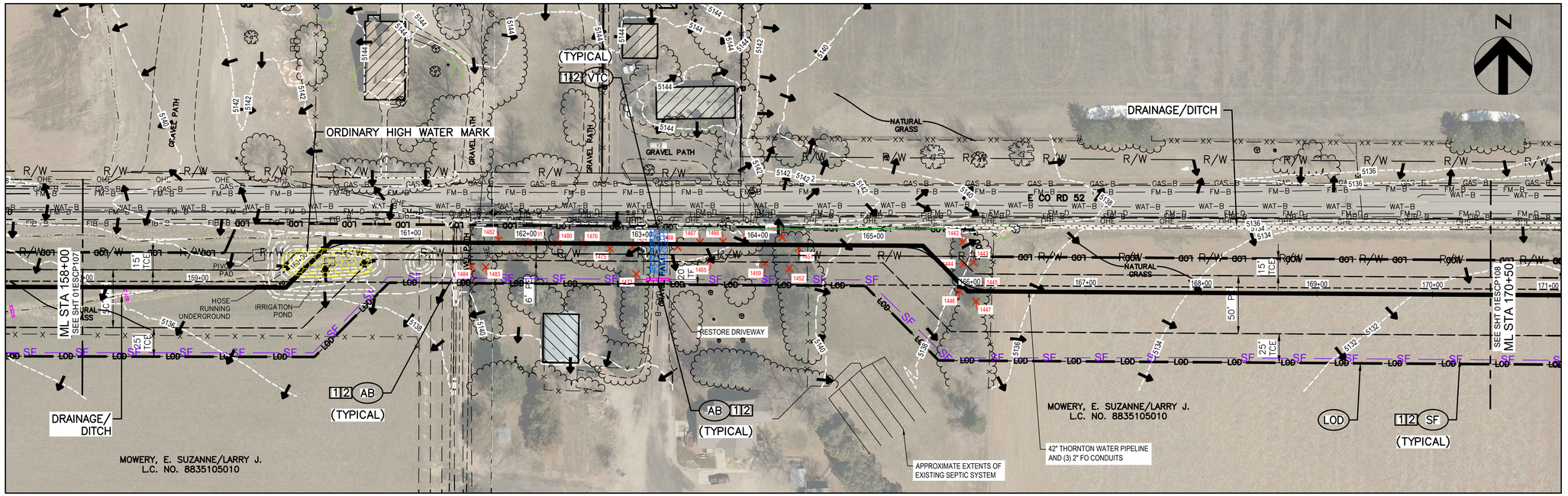
THORNTON COLORADO

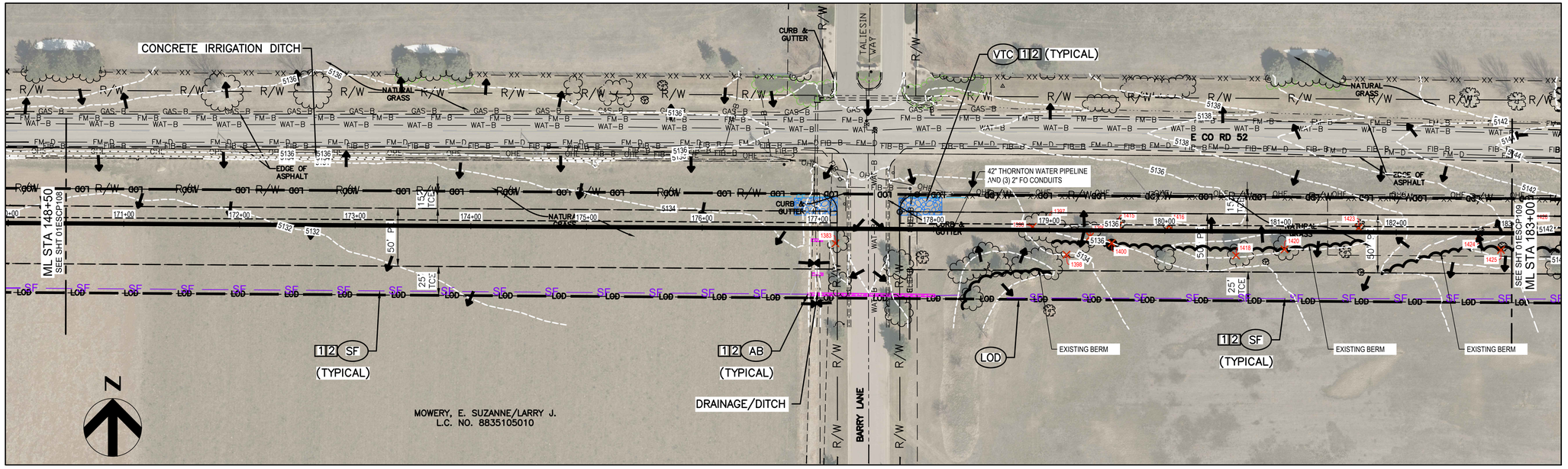
THORNTON WATER PIPELINE

SEGMENT F.2

EROSION AND SEDIMENT CONTROL PLAN PHASE 1 AND 2

FILENAME	01ESCP101.dwg
SCALE	NO SCALE
SHEET	01ESCP107





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PROJECT MANAGER	M. GOSSETT
ENGINEER	T. HABBERFIELD
DRAWN BY	S. ADAMITIS
PROJECT NUMBER	10442825

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

THORNTON COLORADO

THORNTON WATER PIPELINE

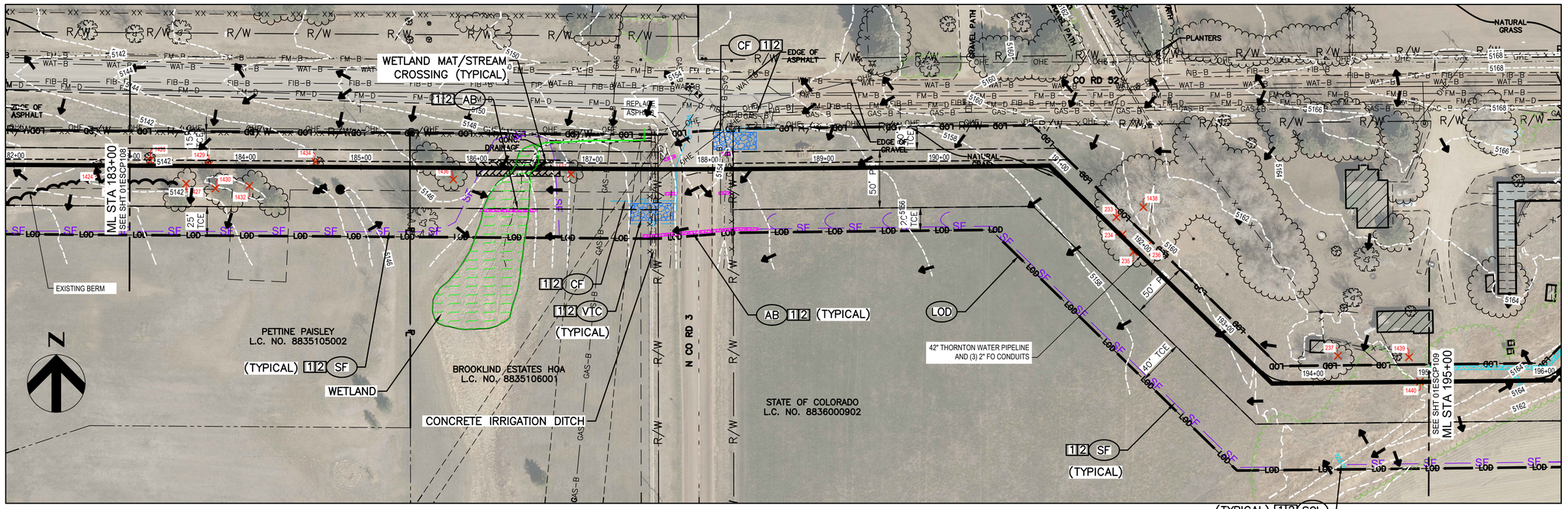
SEGMENT F.2

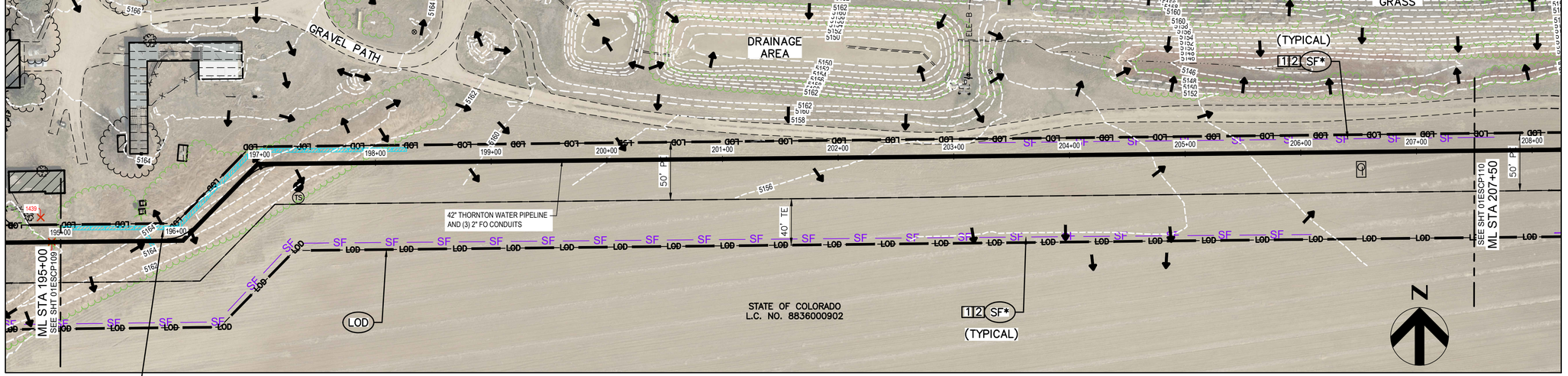
EROSION AND SEDIMENT CONTROL PLAN PHASE 1 AND 2

FILENAME 01ESCP101.dwg

SCALE NO SCALE

SHEET 01ESCP108





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THORNTON WATER PIPELINE

SEGMENT F.2

EROSION AND SEDIMENT CONTROL PLAN PHASE 1 AND 2

FILENAME	01ESCP101.dwg
SCALE	NO SCALE
SHEET	01ESCP109