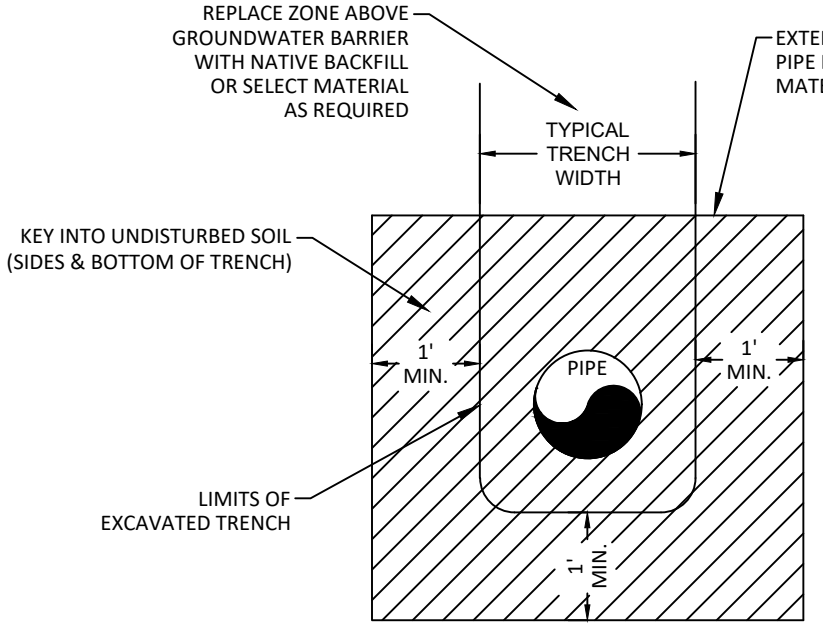
CONSTRUCTION STANDARD DRAWINGS
TABLE OF CONTENTS

WATER AND NON-POTABLE

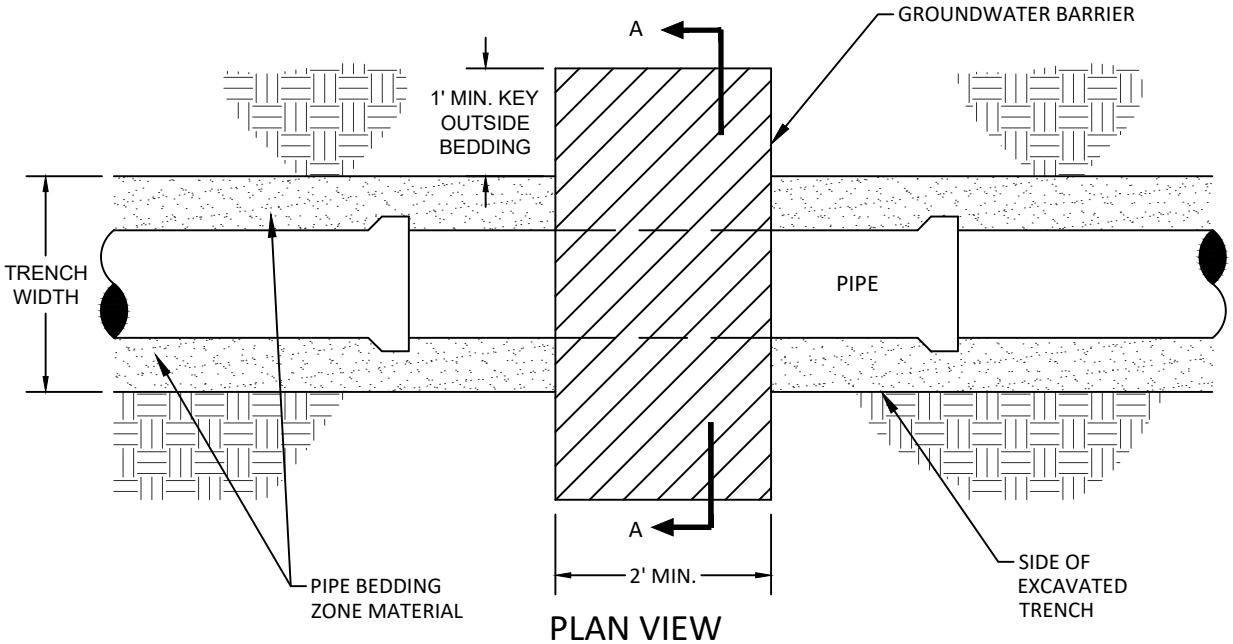
UTILITY LOCATES



NOTES:

1. REFER TO WATER & SEWER (W&S) DEPARTMENT CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS) FOR GROUNDWATER BARRIER MATERIAL AND COMPACTION REQUIREMENTS
2. LOCATE GROUNDWATER BARRIERS PER ACCEPTED CONSTRUCTION DRAWINGS AND SPECIFICATIONS.
3. GROUNDWATER BARRIER TO BE CONCRETE, BENTONITE, CLSM CONCRETE, OR OTHER CITY APPROVED MATERIAL. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

SECTION A-A



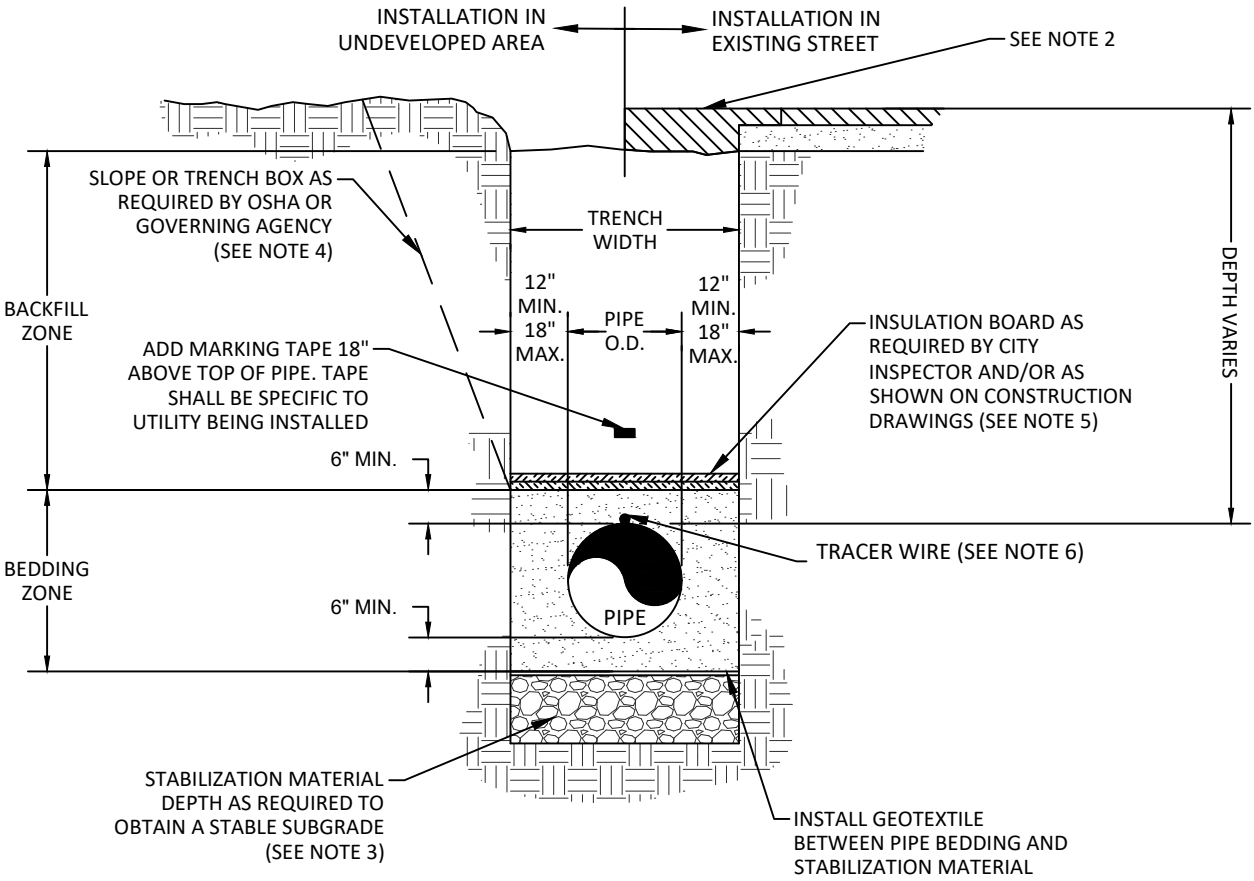
PLAN VIEW

City of Greeley Colorado

GROUNDWATER BARRIER

DETAIL WS-1

DATE: JANUARY 2023 SCALE: N.T.S.



NOTES:

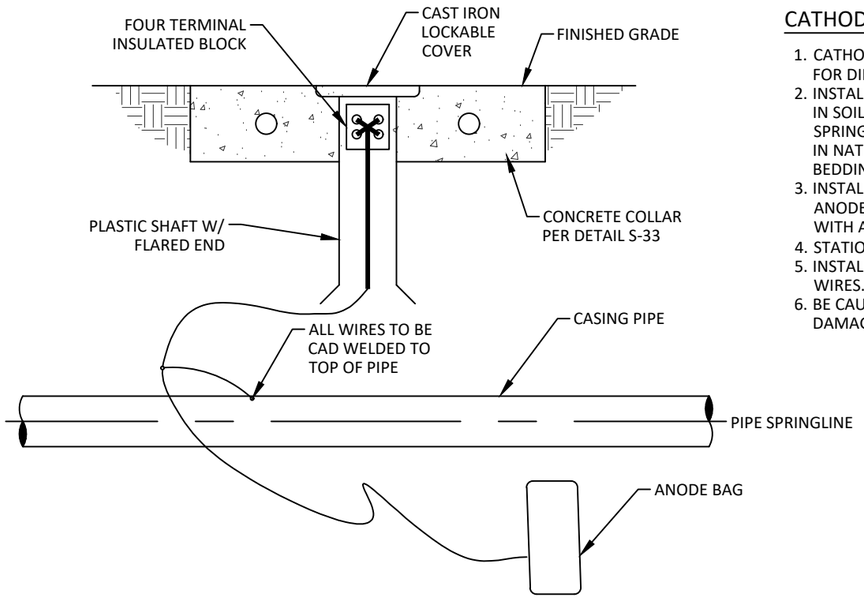
1. REFER TO WATER & SEWER (W&S) DEPARTMENT CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS) FOR STABILIZATION, GEOTEXTILE, BEDDING, BACKFILL MATERIAL, COMPACTION, AND MARKING TAPE REQUIREMENTS. FOR ANY CONFLICT BETWEEN WATER AND SEWER AND PUBLIC WORKS BACKFILL MATERIAL SPECIFICATIONS AND COMPACTION REQUIREMENTS, THE MORE STRINGENT SPECIFICATION SHALL APPLY.
2. REFER TO STREETS DETAIL S-31 "EXISTING STREET PAVEMENT PATCH DETAIL FOR ASPHALT & CONCRETE", CURRENT VERSION, FOR STREET CUT REQUIREMENTS.
3. AN OVER EXCAVATED TRENCH SHALL BE BACKFILLED AND COMPACTED WITH STABILIZATION OR BEDDING MATERIALS (AS PER SPECIFICATIONS) UNDER THE DIRECTION OF THE CITY.
4. TRENCHES SHALL BE SHORED, BRACED, OR SHEETED PER OSHA REQUIREMENT AND AS NECESSARY FOR THE SAFETY AND PROTECTION OF PERSONNEL AND OTHER UTILITIES.
5. INSULATION BOARD SHALL BE 2" THICK MINIMUM, CONSISTING OF TWO BOARDS (1" MINIMUM PER BOARD) WITH OFFSET JOINTS PLACED ACROSS FULL TRENCH WIDTH. REFER TO SPECIFICATIONS.
6. INSTALL TRACER WIRE ACCORDING TO SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") DETAILS, LATEST REVISION OF EACH.

City of Greeley Colorado

TRENCH CROSS SECTION

DETAIL WS-2

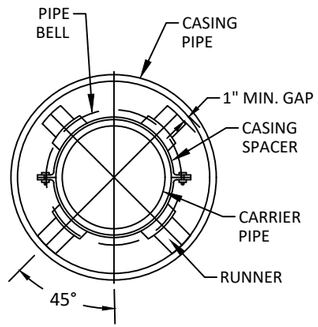
DATE: JANUARY 2023 SCALE: N.T.S.



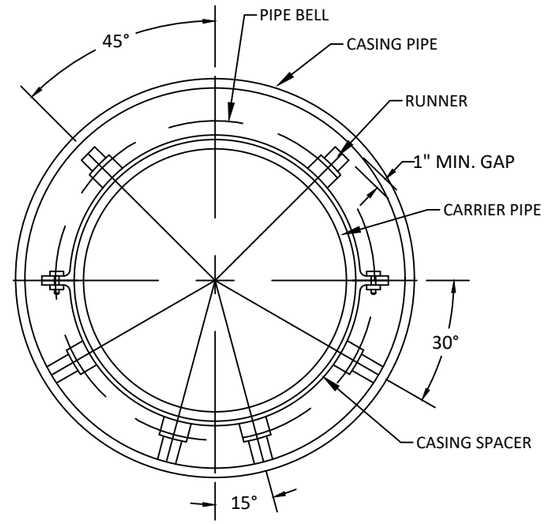
CATHODIC TEST STATION DETAIL

CATHODIC PROTECTION NOTES:

1. CATHODIC PROTECTION SHALL ONLY BE REQUIRED FOR DIP AND STEEL PIPES.
2. INSTALL THE ANODES VERTICALLY OR HORIZONTALLY IN SOIL WITH TOP OF ANODES BELOW THE SPRINGLINE OF THE PIPE. ANODES MUST BE PLACED IN NATIVE SOIL, NOT SELECT BACKFILL SUCH AS SAND, BEDDING, OR CRUSHED ROCK.
3. INSTALL A 17 LB HIGH POTENTIAL MAGNESIUM ANODE BAG ON EACH END OF STEEL CASING PIPES WITH A CATHODIC TEST STATION.
4. STATION TEST WIRES TO BE THHN/THWH.
5. INSTALL A MINIMUM OF 2 FT SLACK AT EACH END OF WIRES.
6. BE CAUTIOUS DURING BACKFILLING. TO NOT DAMAGE OR STRESS WIRES OR CONNECTIONS.



FOR CARRIER PIPES 4"-12"

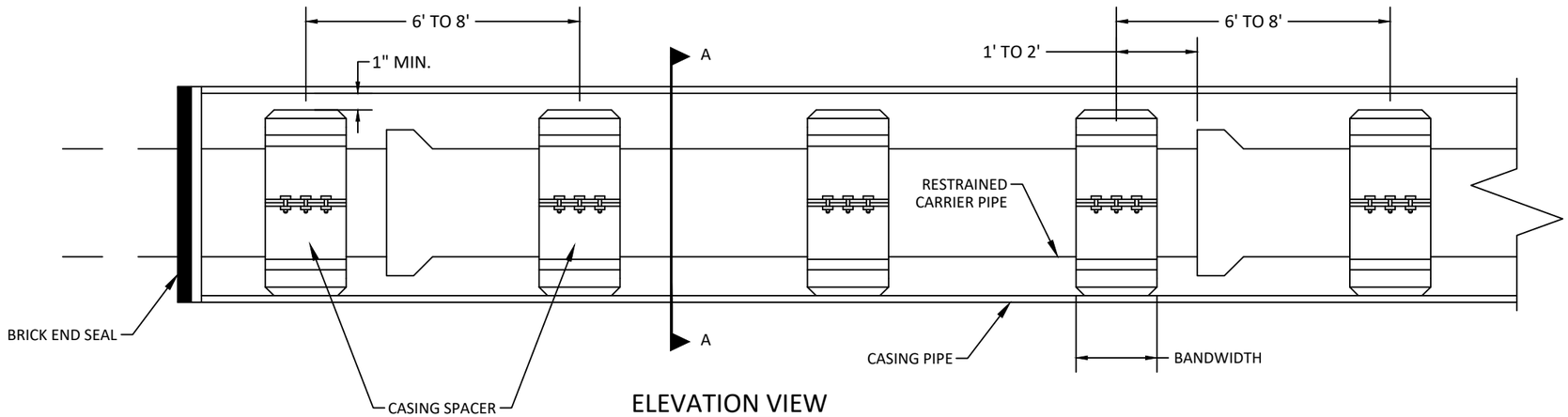


FOR CARRIER PIPES 15" & 16"

SECTION A-A

NOTES:

1. CASING PIPE, CASING SPACERS, AND END SEALS TO BE INSTALLED PER WATER & SEWER (W&S) DEPARTMENT CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS).
2. RECOMMENDED CASING SPACER POSITIONING - PLACE ONE CASING SPACER 1-2 FT ON EITHER SIDE OF THE BELL JOINT AND ONE EVERY 6-8 FT APART THERE AFTER FOR A TOTAL OF 3 CASING SPACERS PER PIPE LENGTH UNLESS OTHERWISE SPECIFIED BY THE MANUFACTURER OR CITY.
3. FOR 12" DIAMETER AND SMALLER CARRIER PIPES, USE 8" CASING SPACER BANDWIDTH.
4. FOR CARRIER PIPES LARGER THAN 12" DIAMETER, USE 12" CASING SPACER BANDWIDTH.
5. CASING SPACERS TO BE IN THE "CENTER RESTRAINED" POSITION.
6. REFER TO SPECIFICATIONS, LATEST REVISION, FOR PIPE CASING SIZES AND MATERIALS.
7. ALL BORINGS & ENCASEMENTS WILL REQUIRE WATERTIGHT END SEALS AS SHOWN AND GROUT FILLED ANNULAR SPACE.
8. RESTRAINTS ARE REQUIRED TO NOT OVER INSERT PIPE AND ALLOWS FOR INSTALLATION OR REMOVAL OF PIPING.



ELEVATION VIEW

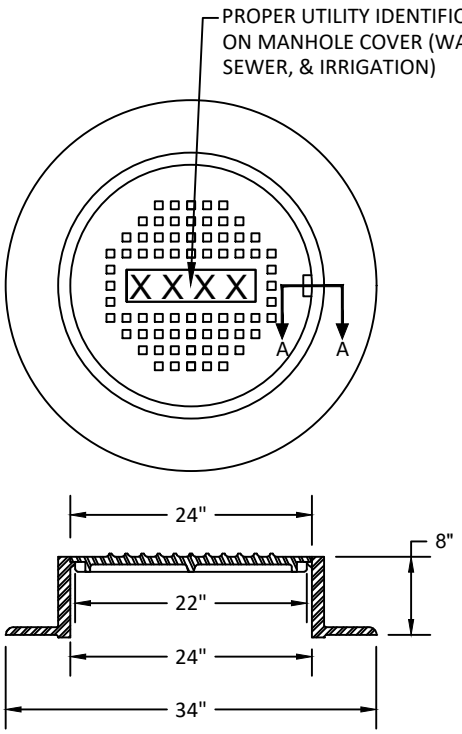
City of Greeley Colorado

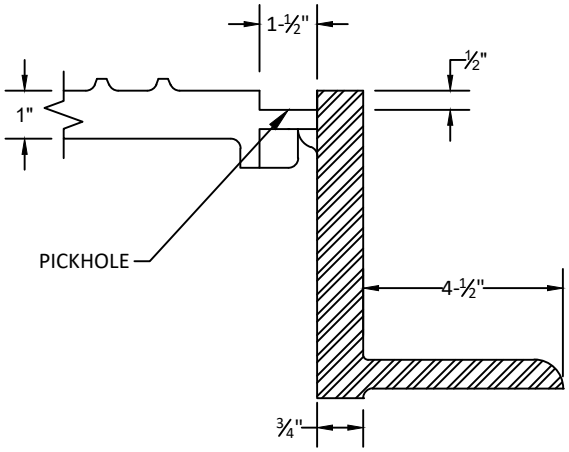
BORING AND ENCASEMENTS

DETAIL WS-3

DATE: JANUARY 2023

SCALE: N.T.S.





SECTION A-A PICK OPENING

NOTES:

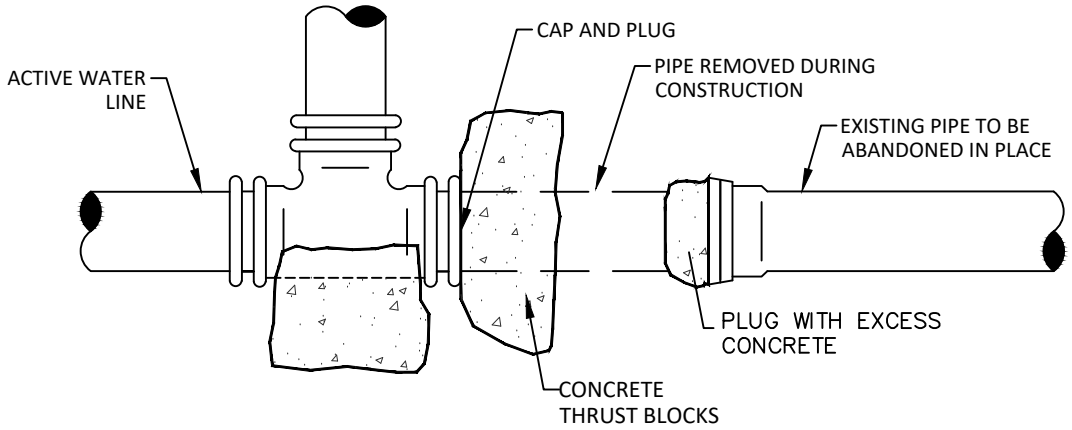
1. THE "PROPER UTILITY" DESIGNATION SHALL BE CAST IN THE COVER (WATER, SEWER, IRRIGATION).
2. ALL RINGS SHALL BE A MAXIMUM EIGHT-INCH (8") IN HEIGHT
3. STANDARD IRON RING AND COVERS SHALL BE HS-20 LOADING, CAPABLE CAST IRON CONFORMING TO ASTM A48 CLASS 305B, WITH A BLACK BITUMINOUS FINISH.
   - 3.1. HORIZONTAL BEARING SURFACES OF ALL RINGS AND COVERS SHALL BE MACHINED TO ELIMINATE ANY ROCKING ACTION OR NON-UNIFORM BEARING.
   - 3.2. PICK-HOLE SHALL BE ONE AND ONE-HALF INCH (1-½") WIDE BY ONE-HALF INCH (½") DEEP.
4. COVERS SHALL BE NON-PERFORATED CHECKER PATTERN WITH MAXIMUM 3/16" "RAISED PATTERN IN NON-PEDESTRIAN TRAFFIC AREAS AND NON-PERFORATED, NON-SKID PATTERN COMPLYING WITH AMERICAN WITH DISABLITIES ACT (ADA) REQUIREMENTS IN PEDESTRIAN TRAFFIC AREAS.
5. MANHOLE COVERS LOCATED WITHIN DESIGNATED 100-YEAR FLOODPLAINS AND AREAS SUBJECT TO WATER INUNDATION SHALL BE THE NON-PERFORATED, WATER TIGHT, SOLID BOLT DOWN, & GASKETED COVER.
6. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION FOR ALL ACCEPTABLE RING AND COVER MANUFACTURERS & MODELS.

City of Greeley Colorado

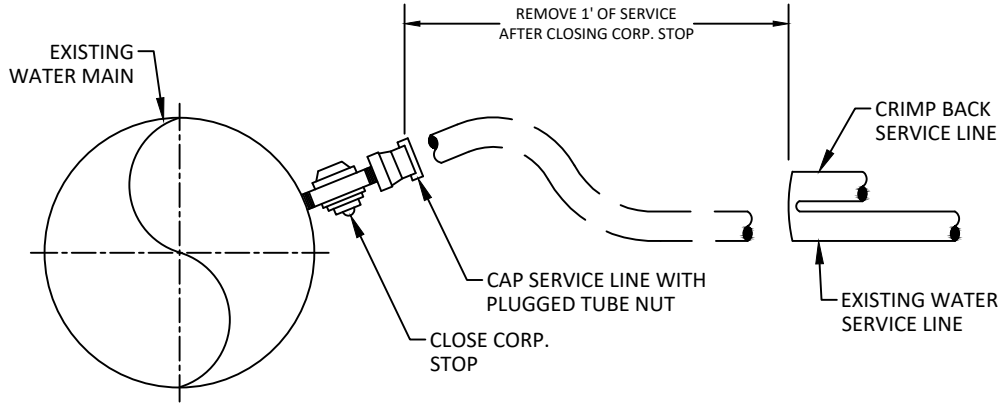
(TYP) MANHOLE COVER

DETAIL WS-4

DATE: JANUARY 2023 SCALE: N.T.S.



EXISTING WATER MAIN ABANDONMENT DETAIL



EXISTING WATER SERVICE ABANDONMENT DETAIL

NOTES:

WATER MAIN ABANDONMENT

1. EXISTING WATER MAINS ABANDONED SHALL BE PLUGGED AND CAPPED AT NEAREST VALVE OR TEE OF ACTIVE WATER LINE AND SHALL HAVE CONCRETE THRUST BLOCK SIZED FOR DEAD ENDS REFERENCED IN DETAILS W-2A AND W-2B.
2. WATER MAIN ABANDONMENT MUST BE SCHEDULED WITH THE CITY 72 HOURS IN ADVANCE AT 970-350-9320.

WATER SERVICE ABANDONMENT

1. EXISTING WATER SERVICES THAT ARE TO BE ABANDONED SHALL BE ABANDONED AT THE MAIN.
2. SERVICE SHALL HAVE THE CORPORATION STOP CLOSED.
3. PLUGGED TUBE NUT SHALL BE INSTALLED NEAREST TO THE CORPORATION STOP.
4. THE END FURTHEST FROM THE CORPORATION STOP SHALL BE CRIMPED BACK.
5. REMOVE CURB STOP AT PROPERTY LINE.
6. IF THE SERVICE TO BE ABANDONED WAS DIRECTLY TAPPED ONTO THE MAIN, THE SERVICE MUST BE ABANDONED AT THE MAIN WITH THE SERVICE PIPE REMOVED AND A STAINLESS STEEL ROMAC REPAIR BAND PLACED OVER THE TAP.
7. WATER SERVICE ABANDONMENT MUST BE SCHEDULED WITH THE CITY 72 HOURS IN ADVANCE AT 970-350-9320.

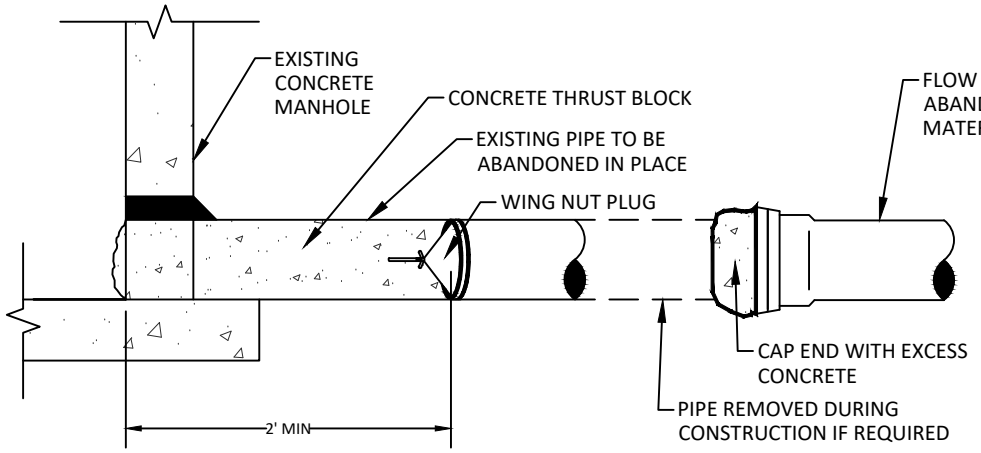
City of Greeley Colorado

EXISTING WATER SERVICE & MAIN ABANDONMENT

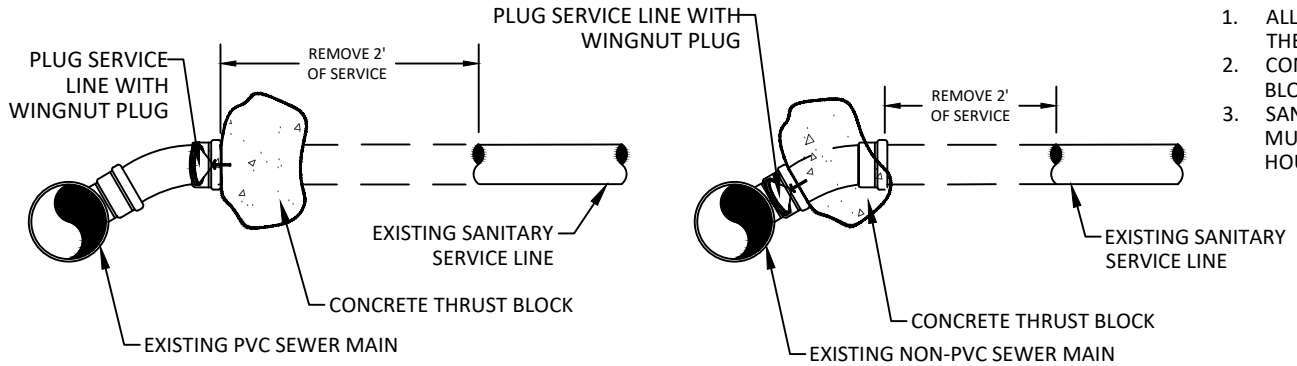
DETAIL WS-5

DATE: JANUARY 2023

SCALE: N.T.S.



EXISTING SANITARY SEWER MAIN ABANDONMENT DETAIL



EXISTING SANITARY SEWER SERVICE ABANDONMENT DETAIL

NOTES:

SANITARY SEWER MAIN ABANDONMENT

1. EXISTING SANITARY SEWER MAINS AND SERVICES ABANDONED IN MANHOLES SHALL HAVE A WING NUT PLUG PLACED 2' OUTSIDE OF MANHOLE & HAVE A CONCRETE THRUST BLOCK PLACED FROM INSIDE THE MANHOLE TO THE WING NUT PLUG.
2. ALL ABANDONED MAINS SHALL HAVE BOTH ENDS CAPPED AND ABANDON.
3. ANY EXISTING VITRIFIED CLAY PIPE (VCP) SHALL BE FLOW FILLED COMPLETELY. ALL OTHER PIPE MATERIALS SHALL BE CAPPED ON BOTH ENDS WITH CONCRETE.
4. SANITARY SEWER MAIN ABANDONMENT MUST BE SCHEDULED WITH THE CITY 72 HOURS IN ADVANCE AT 970-350-9322.

SANITARY SEWER SERVICE ABANDONMENT

1. ALL SEWER SERVICES SHALL BE PLUGGED AT THE SEWER MAIN.
2. CONTRACTOR TO INSTALL CONCRETE THRUST BLOCK BEHIND THE WING NUT PLUG.
3. SANITARY SEWER SERVICE ABANDONMENT MUST BE SCHEDULED WITH THE CITY 72 HOURS IN ADVANCE AT 970-350-9322.

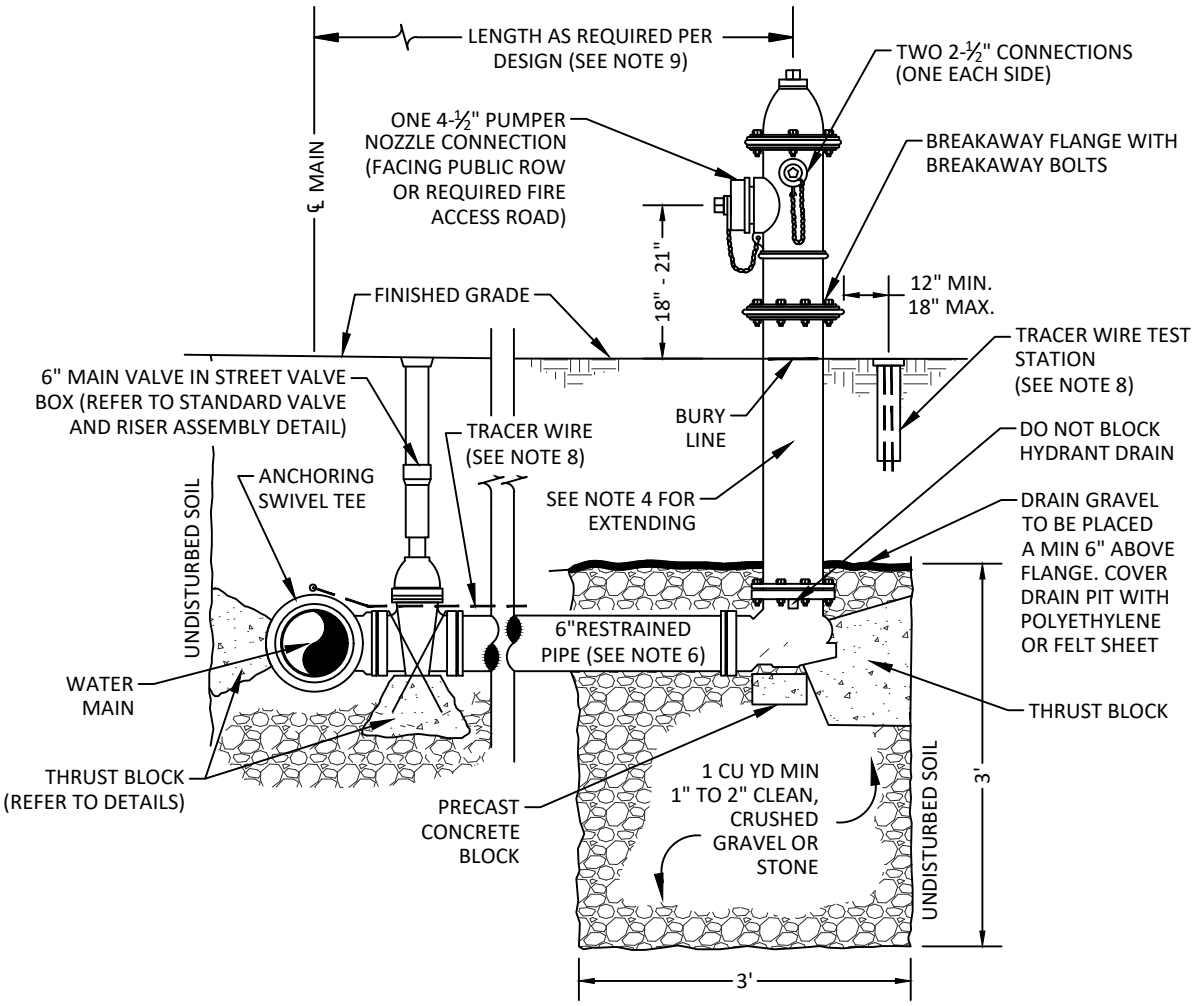
City of Greeley Colorado

EXISTING SANITARY SEWER SERVICE & MAIN ABANDONMENT

DETAIL WS-6

DATE: JANUARY 2023

SCALE: N.T.S.



ELEVATION VIEW

NOTES:

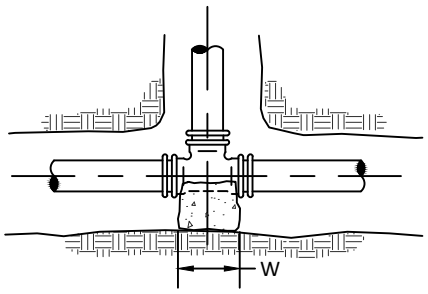
1. MINIMUM DEPTH OF BURY 5'-6' FROM FINISHED GRADE TO TOP OF PIPE.
2. PROVIDE POLYETHYLENE BOND BREAKER BETWEEN ALL PIPE/FITTINGS AND POURED CONCRETE.
3. FIRE HYDRANTS MUST BE PURCHASED FROM W&S OPERATIONS WITH A MINIMUM 48 HOUR NOTICE. CALL TO ORDER 970-350-9320.
4. ONLY A SINGLE FIRE HYDRANT EXTENSION IS PERMITTED. FIRE HYDRANT EXTENSION MAY BE UP TO 36" (MAX) PER WATER & SEWER SPECIFICATIONS (W&S).
5. GRADELOK EXTENSIONS WILL BE ALLOWED FOR UP TO 2' MAXIMUM ELEVATION ADJUSTMENTS. ANY OTHER EXTENSIONS MUST BE APPROVED BY W&S DEPARTMENT.
6. ALL BURIED VALVES, FITTINGS, AND APPURTENANCES SHALL BE RESTRAINED AND INSTALLED PER W&S SPECIFICATIONS, LATEST REVISION.
7. EITHER D.I.P. OR PVC IS ACCEPTABLE FOR HYDRANT LATERAL PIPE MATERIAL.
8. BEDDING AND BACKFILL SHALL BE PLACED PER W&S SPECIFICATIONS
9. INSTALL TEST STATION AND TRACER WIRE ACCORDING TO W&S SPECIFICATIONS AND UTILITY LOCATING ("UL") STANDARD DETAILS, LATEST REVISION OF EACH.
10. HYDRANT DISTANCE FROM MAIN SHALL BE SUCH THAT THE MINIMUM FIRE FLOW AND PRESSURE MEETS WATER & SEWER DESIGN CRITERIA, LATEST REVISION. THE MAXIMUM DISTANCE A HYDRANT MAY BE FROM THE MAIN SHALL NOT EXCEED 150 FT UNLESS FURTHER HYDRAULIC ANALYSIS IS PERFORMED AND APPROVED BY THE CITY OF GREELEY WATER & SEWER DEPARTMENT.

City of Greeley Colorado

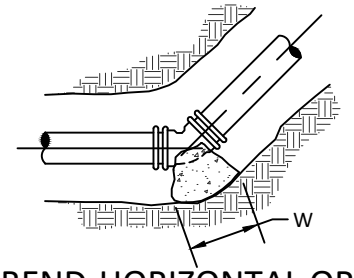
FIRE HYDRANT ASSEMBLY

DETAIL W-1

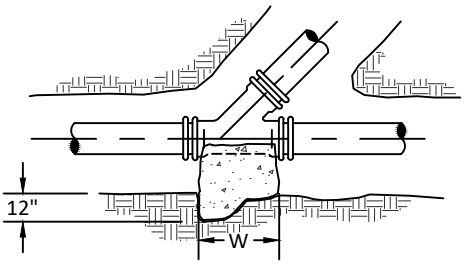
DATE: JANUARY 2023 SCALE: N.T.S.



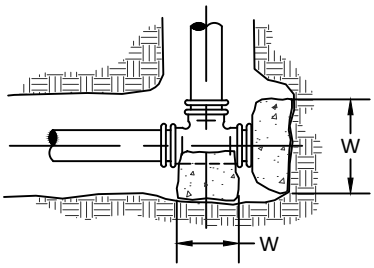
TEE



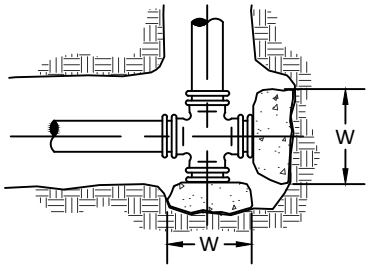
BEND-HORIZONTAL OR BOTTOM OF VERTICAL



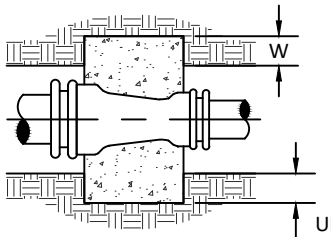
WYE



TEE W/DEAD END ON RUN

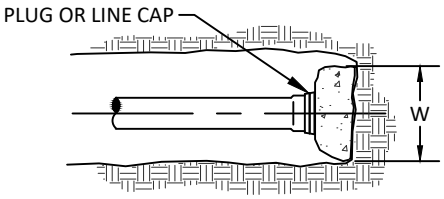


CROSS WITH DEAD END BRANCHES

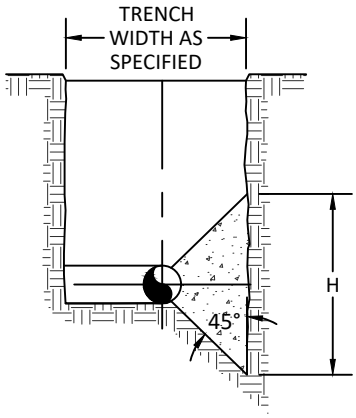


REDUCER

UNDISTURBED EARTH VARIES REFER TO EQUATION ON DETAIL W-4



DEAD END



SECTION (TYPICAL)

NOTES:

1. SEE TABLE ON W-2B OF THRUST BLOCK DETAILS FOR MINIMUM AREA OF CONCRETE TO BEAR ON UNDISTURBED EARTH.
2. POLYETHYLENE BOND BREAKER SHALL BE INSTALLED BETWEEN ALL FITTINGS AND CONCRETE.

City of Greeley Colorado

HORIZONTAL THRUST BLOCKS

DETAIL W-2A

DATE: JANUARY 2023

SCALE: N.T.S.

THRUST BLOCK BEARING AREAS (SQ-FT) FOR INTERNAL STATIC PRESSURE OF 150 PSI, DIP I.D., SOIL BEARING CAPACITY OF 1000 PSF AND 1.5 SAFETY FACTOR (S.F.)

PIPE SIZE	90° BEND	45° BEND	22½° BEND	11¼° BEND	DEAD ENDS, VALVES & TEES, PLUGGED CROSS BRANCHES
4"	3.3	2.5	1.3	0.6	3.3
6"	10.2	5.5	2.8	1.4	7.2
8"	18.3	9.9	5.0	2.5	12.9
12"	39.9	21.6	11.0	5.5	28.2
16"	70.5	38.2	19.5	9.8	49.9
20"	SPECIAL DESIGN REQUIRED				
24"					

UNDISTURBED EARTH [FT^2] = W [FT] X H [FT]

THRUST FORCE FOR REDUCERS [LB] =TEST PRESSURE [PSI] X (A_{LARGE} [IN^2] - A_{SMALL} [IN^2])

$\therefore$ GRAVITY BLOCK SIZE FOR REDUCERS [FT^2] =0.225 X (A_{LARGE} [IN^2] - A_{SMALL} [IN^2])

NOTES:

1. POLYETHYLENE BOND BREAKER SHALL BE INSTALLED BETWEEN ALL FITTINGS AND CONCRETE.
2. ALL THRUST BLOCKING SHALL BE CAST-IN-PLACE CONCRETE WITH A MINIMUM YIELD 28 DAY STRENGTH OF 2500 P.S.I.
3. THRUST BLOCKING SHALL BE CAST AGAINST UNDISTURBED SOIL. FORMS SHALL BE USED AS REQUIRED TO OBTAIN ADEQUATE BEARING AREA AND TO CONFINE THE CONCRETE. THRUST BLOCKING SHALL BEAR ON THE FITTING OR END CAP ONLY AND WILL NOT BE ALLOWED TO SPILL OVER THE JOINT OR AGAINST THE PIPE.
4. THE CITY MAY REQUIRE LARGER THRUST BLOCKS THAN SPECIFIED IF SOILS ARE DETERMINED TO PROVIDE LESS THAN 1000 PSF BEARING CAPACITY.
5. IN THE ABSENCE OF SOIL BEARING CAPACITY INFORMATION USE 1000 PSF.
6. NO LESS THAN 150 PSI TEST PRESSURE SHALL BE USED FOR THRUST BLOCK CALCULATIONS.
7. BEARING AREAS FOR ANY PRESSURE AND SOIL BEARING CAPACITY MAY BE OBTAINED BY MULTIPLYING THE TABULATED BEARING AREAS BY A CORRECTION FACTOR "F":

$$F = \frac{(\text{ACTUAL SPECIFIED TEST PRESSURE IN PSI})/(150\ \text{PSI})}{(\text{ACTUAL SOIL BEARING CAPACITY IN PSF})/(1000\ \text{PSF})}$$

8. EXAMPLE: CALCULATE THE BEARING AREA FOR 8"-90° BEND WITH A TEST PRESSURE OF 200 PSI AND SOIL BEARING CAPACITY OF 3000 PSF.

FROM TABLE BEARING AREA = 18.3 SF

$$F = \frac{(200\ \text{PSI})/(150\ \text{PSI})}{(3000\ \text{PSF})/(1000\ \text{PSF})} = 0.44$$

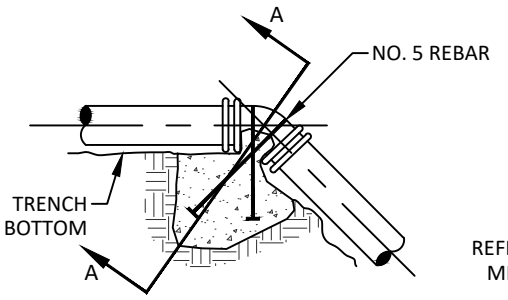
REQUIRED BEARING AREA ON UNDISTURBED SOIL = (0.44)(18.3 SF) = 8.1 SF

City of Greeley Colorado

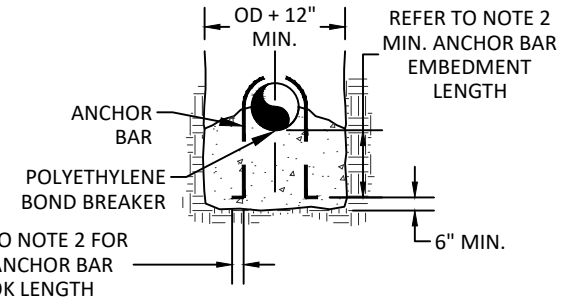
HORIZONTAL THRUST BLOCKS

DETAIL W-2B

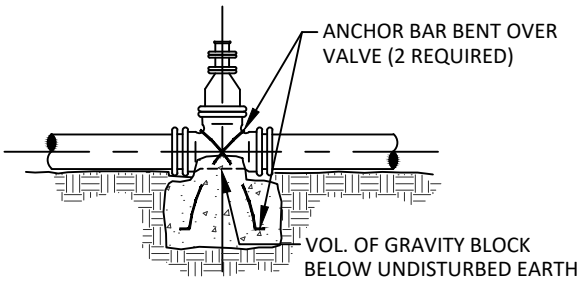
DATE: JANUARY 2023 SCALE: N.T.S.



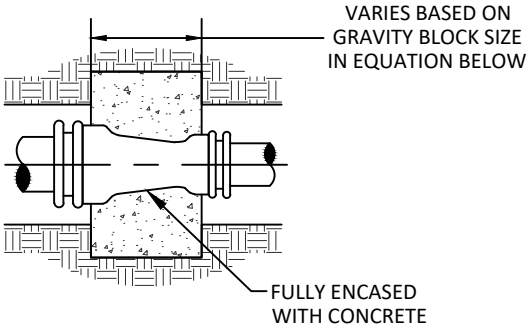
TOP OF VERTICAL BEND



SECTION A-A



VALVE
(GATE OR BUTTERFLY)



REDUCER

VOL. OF GRAVITY CONCRETE BLOCK (CU FT)

PIPE SIZE	BENDS		
	45°	22 ½°	11 ¼°
4"	16.7	8.5	4.3
6"	36.9	18.8	9.5
8"	65.9	33.6	16.9
12"	144.1	73.4	36.9
16"	254.5	129.7	65.2
20"	SPECIAL DESIGN REQUIRED		
24"			

NOTES:

1. POLYETHYLENE BOND BREAKER SHALL BE INSTALLED BETWEEN ALL FITTINGS AND CONCRETE.
2. ALL ANCHOR BARS SHALL BE EPOXY COATED NO. 5 REBAR AND SHALL BE EMBEDDED IN CONCRETE TO WITHIN 6" OF END OF CONCRETE BLOCK AND SHALL HAVE MINIMUM 6" HOOK LENGTH.

GRAVITY CONCRETE BLOCK SIZES SHOWN IN TABLE ARE BASED ON 150 LB/FT^3 DENSITY FOR CONCRETE, 150 PSI TEST PRESSURE, AND A SAFETY FACTOR OF 1.5.

$$\text{GRAVITY BLOCK SIZE } [FT^3] = \frac{\text{SAFETY FACTOR X THRUST FORCE [LB]}}{\text{DENSITY OF BLOCK MATERIAL } [LB/FT^3]}$$

$$\text{THRUST FORCE FOR REDUCERS [LB]} = \text{TEST PRESSURE [PSI]} \times (A_{LARGE}\ [IN^2] - A_{SMALL}\ [IN^2])$$

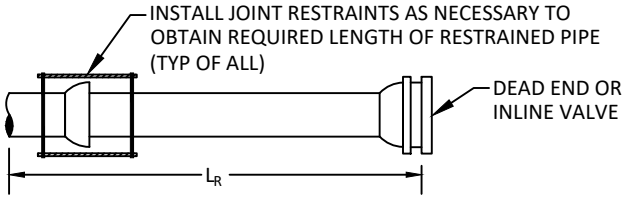
$$\therefore \text{ GRAVITY BLOCK SIZE FOR REDUCERS } [FT^3] = 1.5 \times (A_{LARGE}\ [IN^2] - A_{SMALL}\ [IN^2])$$

City of Greeley Colorado

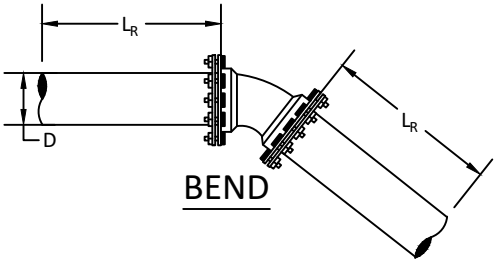
GRAVITY THRUST BLOCKS

DETAIL W-3

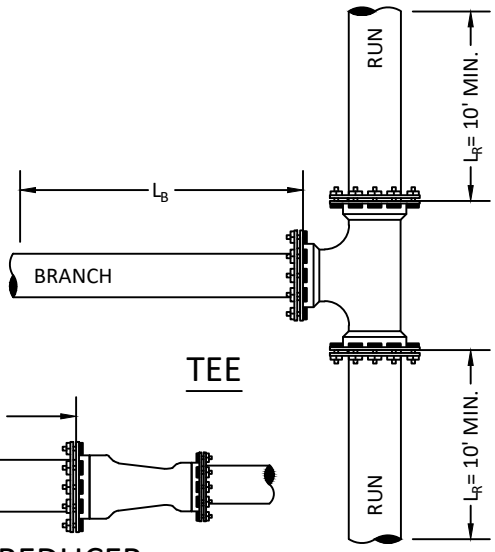
DATE: JANUARY 2023 SCALE: N.T.S.



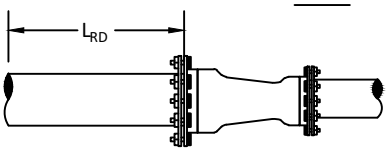
DEAD ENDS OR INLINE VALVES



BEND



TEE



REDUCER

DI PIPE (POLYETHYLENE-ENCASED): MINIMUM LENGTHS OF RESTRAINED PIPE - IN FEET

PIPE SIZES (D")		BENDS (L_R)				TEE (L_B)	DEAD ENDS/ INLINE VALVES (L_R)	REDUCERS (L_{RD})
RUN	BRANCH	11¼° BEND	22½° BEND	45° BEND	90° BEND			
4"	4"	5	5	10	15	5	50	-
6"	4"	-	-	-	-	5	-	40
	6"	5	5	10	20	5	70	-
8"	4"	-	-	-	-	5	-	65
	6"	-	-	-	-	5	-	40
	8"	5	10	15	30	15	90	-
12"	4"	-	-	-	-	5	-	115
	6"	-	-	-	-	5	-	95
	8"	-	-	-	-	5	-	70
	12"	5	10	20	40	55	130	-
16"	4"	-	-	-	-	5	-	155
	6"	-	-	-	-	5	-	140
	8"	-	-	-	-	5	-	120
	12"	-	-	-	-	24	-	70
	16"	5	10	20	50	90	165	-

NOTES:

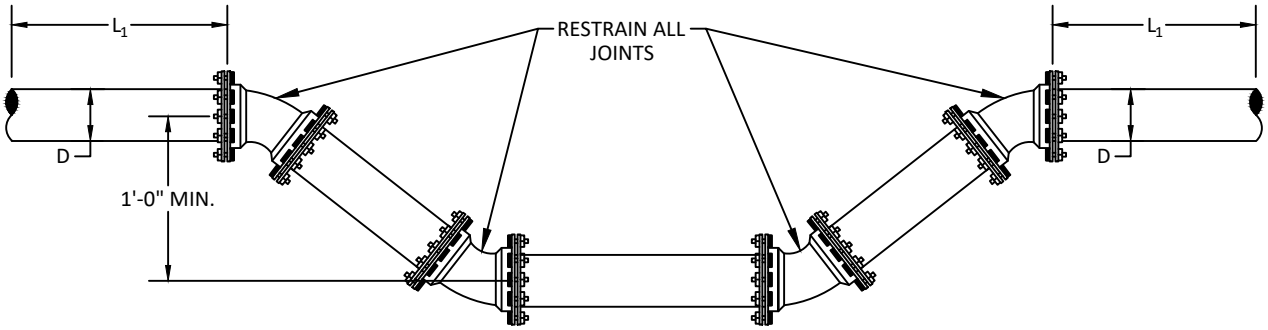
1. RESTRAINED LENGTHS SHOWN IN CHARTS ARE MINIMUM LENGTHS.
2. RESTRAINT SYSTEMS ON PIPE LARGER THAN 16-INCH DIAMETER SHALL BE DESIGNED FOR CONDITIONS EXISTING AT INSTALLATION SITE.
3. THE CHARTS ARE BASED ON THE FOLLOWING ASSUMPTIONS:
   A. 150 PSI TEST PRESSURE
   B. 1.5 SAFETY FACTOR
   C. 4-FT BURY DEPTH
   D. SOIL TYPE: ML, AS DEFINED BY AWWA M23 AND M41
   E. TRENCH TYPE: #4, AS DEFINED BY AWWA M23 AND M41.
4. THE DESIGN ENGINEER IS RESPONSIBLE FOR VERIFYING THE ACTUAL SITE CONDITIONS WITH RESPECT TO THE ASSUMPTIONS LISTED ABOVE.
5. IF LENGTHS CANNOT BE MET FOR DEAD ENDS AND/OR TEES, DESIGN ENGINEER SHALL SPECIFY RESTRAINED LENGTHS OR A COMBINATION OF THRUST BLOCKS AND RESTRAINTS.
6. BOTH ENDS OF INLINE VALVES SHALL BE RESTRAINED AT THE SPECIFIED RESTRAINT LENGTH (L_R) SHOWN IN TABLE.

City of Greeley Colorado

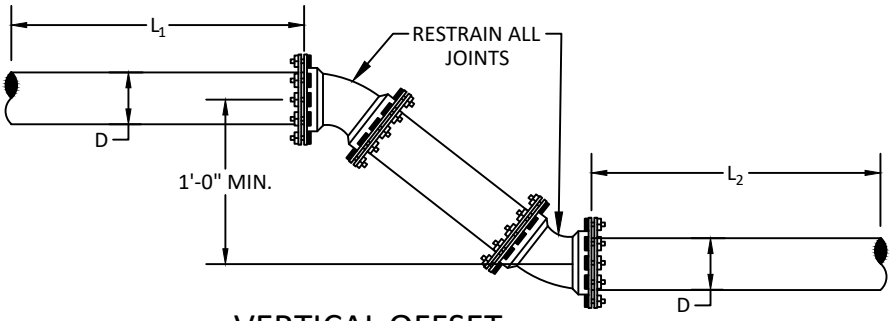
HORIZONTAL PIPE RESTRAINT

DETAIL W-4A

DATE: JANUARY 2023 SCALE: N.T.S.



VERTICAL LOWERING



VERTICAL OFFSET

DI PIPE (POLYETHYLENE-ENCASED): MINIMUM LENGTHS OF RESTRAINED PIPE - IN FEET

PIPE SIZES (D")	VERTICAL BENDS					
	11¼° BEND		22½° BEND		45° BEND	
	L_1	L_2	L_1	L_2	L_1	L_2
4"	5	5	10	5	25	5
6"	10	5	15	5	30	10
8"	10	5	20	5	40	10
12"	15	5	30	10	55	15
16"	20	5	35	10	70	20

NOTES:

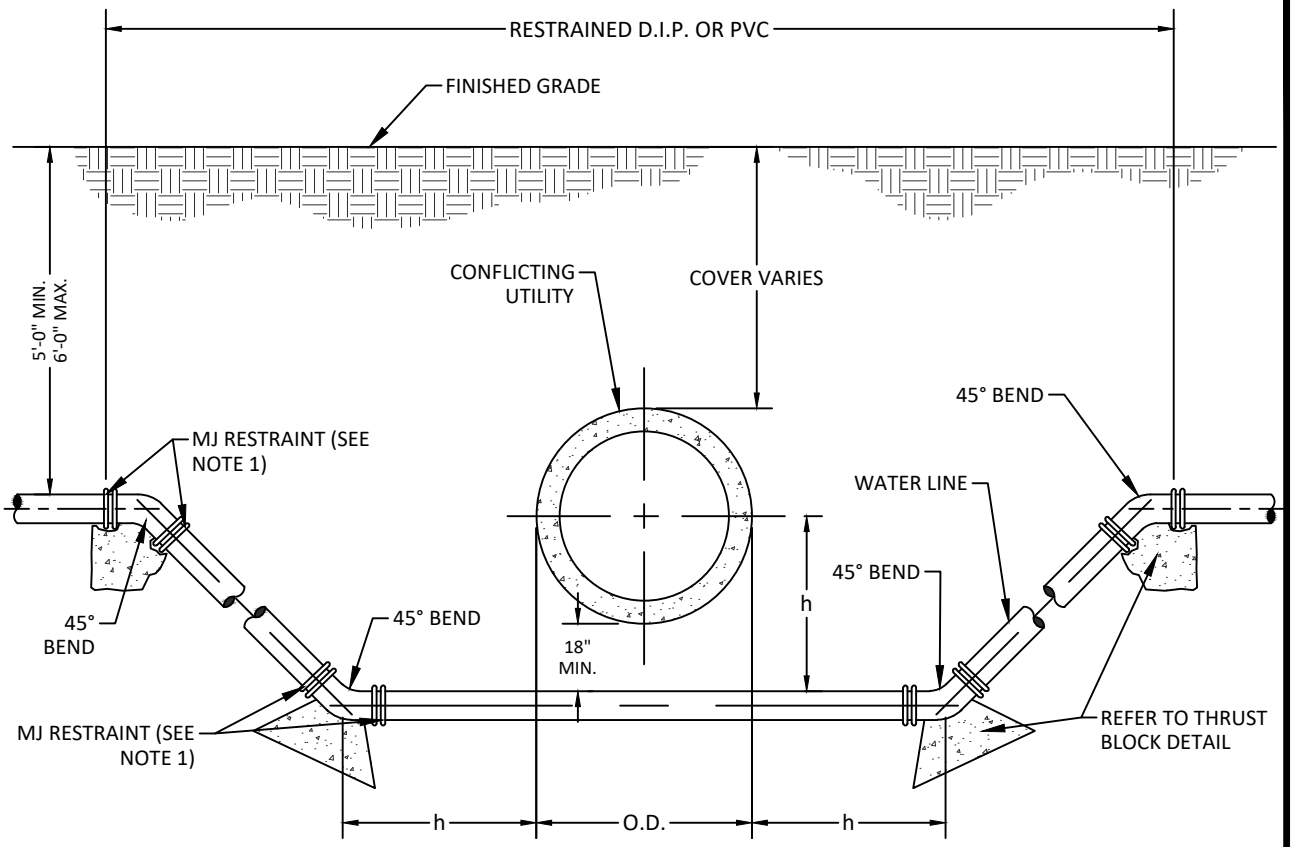
1. RESTRAINED LENGTHS SHOWN IN CHARTS ARE MINIMUM LENGTHS.
2. RESTRAINT SYSTEMS ON PIPE LARGER THAN 16-INCH DIAMETER SHALL BE DESIGNED FOR CONDITIONS EXISTING AT INSTALLATION SITE.
3. THE CHARTS ARE BASED ON THE FOLLOWING ASSUMPTIONS:
   A. 150 PSI TEST PRESSURE
   B. 1.5 SAFETY FACTOR
   C. 4-FT BURY DEPTH
   D. SOIL TYPE: ML, AS DEFINED BY AWWA M23 AND M41
   E. TRENCH TYPE: #4, AS DEFINED BY AWWA M23 AND M41
4. THE DESIGN ENGINEER IS RESPONSIBLE FOR VERIFYING THE ACTUAL SITE CONDITIONS WITH RESPECT TO THE ASSUMPTIONS LISTED ABOVE.
5. IF LENGTHS CANNOT BE MET FOR DEAD ENDS AND/OR TEES, DESIGN ENGINEER SHALL SPECIFY RESTRAINED LENGTHS OR A COMBINATION OF THRUST BLOCKS AND RESTRAINTS.

City of Greeley Colorado

VERTICAL PIPE RESTRAINT

DETAIL W-4B

DATE: JANUARY 2023 SCALE: N.T.S.



ELEVATION VIEW

NOTES:

1. ALL FOUR VERTICAL 45-DEGREE BENDS SHALL BE RESTRAINED BY MECHANICAL JOINT RESTRAINTS AND THRUST BLOCKS PER THE LATEST REVISION OF W&S THRUST BLOCK DETAILS. ALL BURIED PIPE, FITTINGS, AND APPURTENANCES SHALL BE RESTRAINED AND INSTALLED PER WATER & SEWER (W&S) SPECIFICATIONS, LATEST REVISION.
2. INSTALL TRACER WIRE ACCORDING TO WATER & SEWER SPECIFICATIONS AND STANDARD UTILITY LOCATING ("UL") DETAILS, LATEST REVISION OF EACH.
3. MINIMUM CLEARANCE FROM CONFLICTING UTILITY SHALL BE NO LESS THAN 18 INCHES AT THE NEAREST DIMENSION OR ENCASED PER DETAIL WS-3.
4. INSULATION BOARD ABOVE THE WATERLINE IS REQUIRED IF THE WATER LINE CROSSES WITHIN 4 FEET OF STORMWATER CROSSINGS OR OTHER OPEN-AIR CONDUITS. IN SUCH CASES, INSULATION BOARD SHALL EXTEND 5 FT HORIZONTALLY ON EITHER SIDE OF THE CROSSING CONDUIT. PLACEMENT SHALL BE IN ACCORDANCE WITH THE SEPARATE TRENCH CROSS SECTION DETAIL AND W&S SPECIFICATIONS, LATEST REVISION OF EACH.

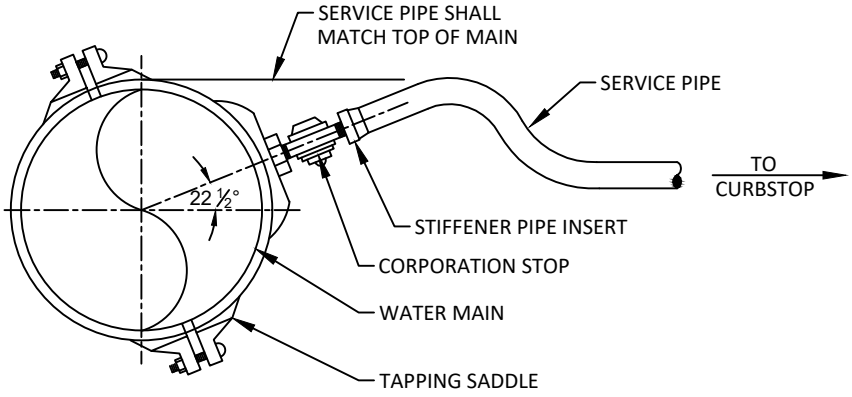
City of Greeley Colorado

VERTICAL PIPE LOWERING

DETAIL W-5

DATE: JANUARY 2023 SCALE: N.T.S.

TAPPING SADDLE:



ELEVATION VIEW

TYPE OF PIPE AND SIZE OF TAP												
PIPE SIZE	CAST IRON					DUCTILE IRON					PVC C-900	
	3/4"	1"	1 1/2"	2"	3"&4"	3/4"	1"	1 1/2"	2"	3"&4"	< 2"	> 2"
4"	S	S	NO	NO	TSV	S	S	NO	NO	TSV	S	TSV
6"	S	S	S	S	TSV	S	S	S	S	TSV	S	TSV
8"	S	S	S	S	TSV	S	S	S	S	TSV	S	TSV
12"	S	S	S	S	TSV	S	S	S	S	TSV	S	TSV
16"	S	S	S	S	TSV	S	S	S	S	TSV	N/A	N/A

"S" - TAPPING SADDLE REQUIRED, ALL SADDLES SHALL HAVE AWWA TAPER THREADS.
"NO" - NO TAP PERMITTED WITH OR WITHOUT A SADDLE, A TEE CONNECTION MAY BE PERMITTED IF SPECIFICALLY AUTHORIZED BY THE WATER DEPARTMENT.
"TSV" - TAPPING SLEEVE AND VALVE REQUIRED.
"N/A" - NOT APPLICABLE.

NOTES:

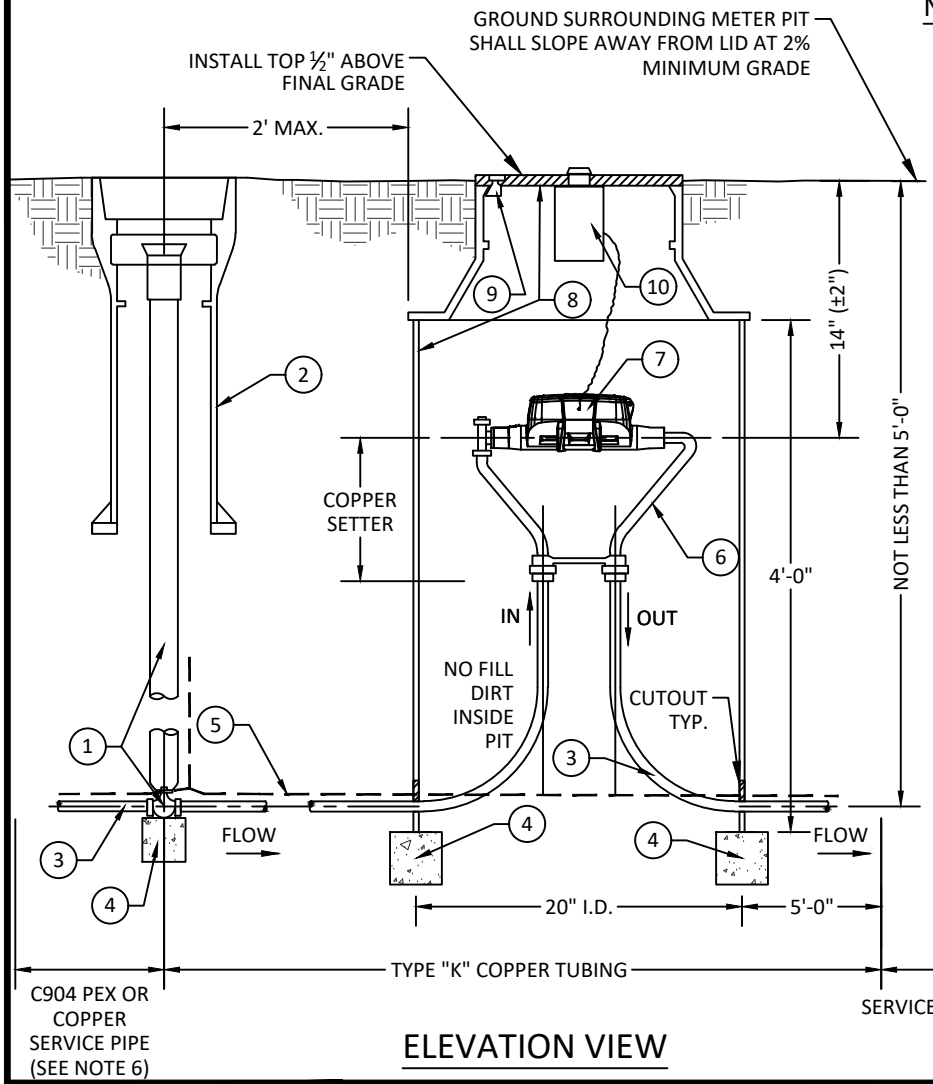
1. REFERENCE CITY OF GREELEY, WATER & SEWER CONSTRUCTION SPECIFICATIONS, LATEST REVISION, FOR TAPPING SADDLE SPECIFICATIONS.
2. EXISTING STEEL MAINS, TWELVE INCHES (12") IN DIAMETER OR LESS, SHALL BE TAPPED USING A CITY ACCEPTED TAPPING SADDLE.
3. ALL BURIED PIPE, FITTINGS, VALVES, AND APPURTENANCES SHALL BE RESTRAINED AND INSTALLED PER CITY OF GREELEY WATER & SEWER SPECIFICATIONS, LATEST REVISION.
4. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY WATER & SEWER SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") STANDARD DETAILS, LATEST REVISION OF EACH.
5. REFER TO CITY OF GREELEY WATER AND SEWER SPECIFICATIONS, LATEST REVISION, FOR PRODUCT AND MFR SPECIFICATIONS.
6. THIS DETAIL ALSO APPLIES TO NON-POTABLE IRRIGATION SERVICE CONNECTIONS TO NON-POTABLE IRRIGATION MAINS.
7. SERVICE TAPS ON WATER MAINS LARGER THAN 16" MAY BE CONSIDERED UNDER CERTAIN CIRCUMSTANCES WITH SPECIAL DESIGN ON A CASE-BY-CASE SCENARIO.
8. FOR ANY NEW WATER SERVICES TAPPING INTO EXISTING MAINS THE CONTRACTOR SHALL NOTIFY THE CITY 72 HOURS PRIOR AT 970-350-9320.

City of Greeley Colorado

WATER SERVICE CONNECTION

DETAIL W-6

DATE: JANUARY 2023 SCALE: N.T.S.



ELEVATION VIEW

NOTES:

1. METER MUST BE PURCHASED FROM THE WATER & SEWER (W&S) DEPARTMENT. NO EXCEPTIONS.
2. NOT FOR INSTALLATION IN ROADWAYS, DRIVEWAYS, OR PARKING AREAS.
3. IF SURFACE IS NOT TO FINAL GRADE AT TIME OF INSTALLATION OF METER, OR GRADE CHANGES AFTER INSTALLATION, PROPERTY OWNER MUST ADJUST PIT TO MEET DEPTH AND SPECIFICATIONS.
4. NO CONCRETE FLOOR SHALL BE POURED IN METER PIT.
5. IF PRESSURE REDUCING VALVE AND/OR BACKFLOW DEVICE IS REQUIRED BY PLUMBING CODE, IT SHALL BE INSTALLED DOWNSTREAM OF METER PER BUILDING AND PLUMBING CODE.
6. COPPER SHALL NOT SHOW ANY VISIBLE SIGNS OF CRIMPING AND SHALL BE INSTALLED FROM CURB STOP TO 5 FEET PAST METER PIT.
7. FOR ADDITIONAL METER INSTALLATION REQUIREMENTS, REFER TO METER INSTALLATION NOTES ON CITY OF GREELEY W&S DETAIL W-15, LATEST REVISION.
8. REFER TO CITY OF GREELEY W&S DETAIL W-9A/W-9B AND CONSTRUCTION SPECIFICATIONS, LATEST REVISION OF EACH, FOR CURB STOP, BOX, AND SERVICE PIPE REQUIREMENTS. IF CROSS-LINKED C904 PEX SERVICE LINE USED FROM CORP STOP TO CURB STOP THE PEX LINE MUST BE UPSIZED TO NEXT PIPE SIZE FROM METER SIZE TO REDUCE LOSS OF PRESSURE.
9. FOR PRODUCT AND MANUFACTURER SPECIFICATIONS, REFER TO CURRENT VERSION OF CITY OF GREELEY W&S CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS), LATEST REVISION.
10. ALL BURIED PIPE, FITTINGS, VALVES, AND APPURTENANCES SHALL BE INSTALLED AND RESTRAINED IN ACCORDANCE WITH WATER & SEWER DEPARTMENT SPECIFICATIONS, LATEST REVISION.
11. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.

LEGEND	
1	CURB STOP VALVE & SERVICE BOX (SEE NOTE 8)
2	UPPER HALF OF STANDARD VALVE BOX (INSTALLED PER SPECIFICATIONS)
3	¾" OR 1" SERVICE PIPE (MATCH SERVICE PIPE I.D.) (SEE NOTE 8)
4	BRICK SUPPORT (PLACE ON UNDISTURBED SOIL)
5	TRACER WIRE (SEE NOTE 11)
6	COPPER METER SETTER (MFR PER SPECIFICATIONS)
7	METER UNIT (ORDER FROM CITY OF GREELEY METER SHOP)
8	COMPOSITE DOUBLE LID CONE OR APPROVED EQUAL (MFR PER SPECIFICATIONS)
9	STANDARD FORGED BRASS WATERWORKS PENTAGON HEAD WITH LOCKING SCREW
10	METER ENDPOINT RADIO TRANSMITTER (RT UNIT)
11	TYPE K COPPER MATCHING METER SIZE

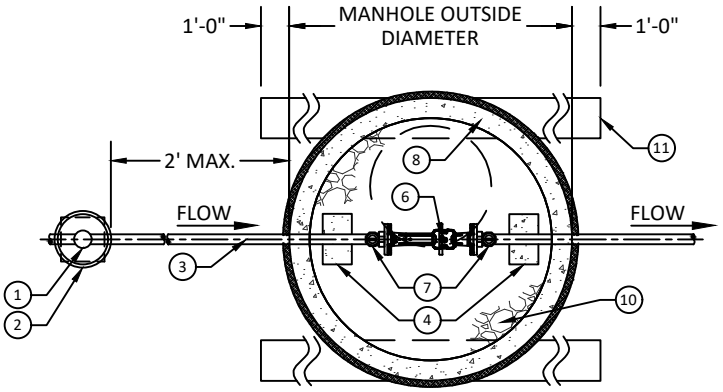
City of Greeley Colorado

OUTSIDE SETTING FOR ¾" & 1" POTABLE WATER METER

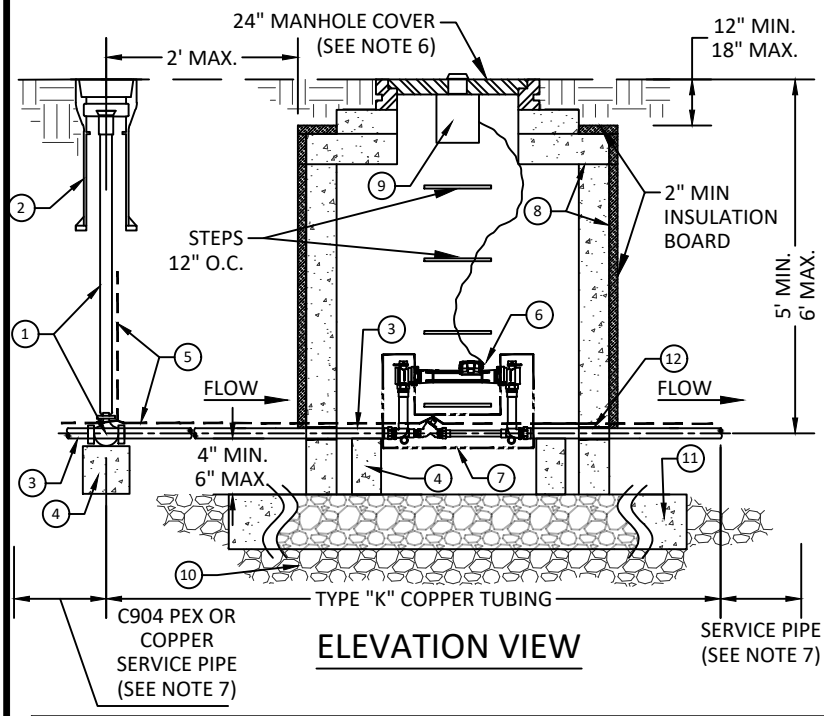
DETAIL W-7

DATE: JANUARY 2023

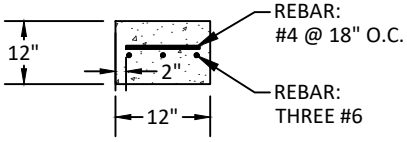
SCALE: N.T.S.



PLAN VIEW



ELEVATION VIEW



BASE BEAM DETAIL

NOTES:

1. METER MUST BE PURCHASED FROM THE WATER & SEWER (W&S) DEPARTMENT. NO EXCEPTIONS.
2. FOR PRODUCT AND MANUFACTURER SPECIFICATIONS, REFER TO CURRENT VERSION OF CITY OF GREELEY W&S CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS).
3. REFER TO W&S DETAIL W-16, LATEST REVISION, FOR ADDITIONAL METER INSTALLATION AND VAULT REQUIREMENTS.
4. ALL VAULTS, BURIED PIPE, FITTINGS, VALVES, AND APPURTENANCES SHALL MEET CITY OF GREELEY W&S SPECIFICATIONS, LATEST REVISION.
5. NO CONCRETE FLOOR SHALL BE POURED IN METER VAULT.
6. 24" MANHOLE COVER SHALL BE A WORM LOCK LID MARKED "WATER", REFER TO CITY OF GREELEY W&S SPECIFICATIONS, LATEST REVISION, FOR SPECIFIC MANHOLE COVER MFR AND PRODUCT INFORMATION.
7. REFER TO CITY OF GREELEY W&S DETAIL W-9A/W-9B AND CONSTRUCTION SPECIFICATIONS, LATEST REVISION OF EACH, FOR CURB STOP, BOX, AND SERVICE PIPE REQUIREMENTS. IF CROSS-LINKED C904 PEX SERVICE LINE USED FROM CORP STOP TO CURB STOP THE PEX LINE MUST BE UPSIZED TO NEXT PIPE SIZE FROM METER SIZE TO REDUCE LOSS OF PRESSURE.
8. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.

LEGEND	
1	CURB STOP VALVE AND SERVICE BOX
2	UPPER HALF OF STANDARD VALVE BOX (INSTALLED PER SPECIFICATIONS)
3	1-½" OR 2" SERVICE PIPE (MATCH SERVICE PIPE I.D.) (SEE NOTE 7)
4	BRICK SUPPORT (PLACED ON UNDISTURBED SOIL OR 1-½" STABILIZATION ROCK)
5	TRACER WIRE (SEE NOTE 8)
6	METER UNIT (ORDER FROM CITY OF GREELEY METER SHOP) (SEE NOTES 1 & 2)
7	COPPER METER SETTER (MFR PER SPECIFICATIONS)
8	48" DIAMETER OR SQUARE CONCRETE MANHOLE (SEE NOTE 4 FOR PRE-CAST)
9	METER ENDPOINT RADIO TRANSMITTER (RT UNIT)
10	6" MIN OF SUBGRADE MATERIAL UNDER GRADE BEAM AND INSIDE VAULT PER SPECIFICATION
11	CONCRETE MANHOLE BASE BEAM (SEE BASE BEAM DETAIL)
12	APPROVED RUBBER SEAL ON PIPE BARREL AT WALL PENETRATION PER SPECIFICATION

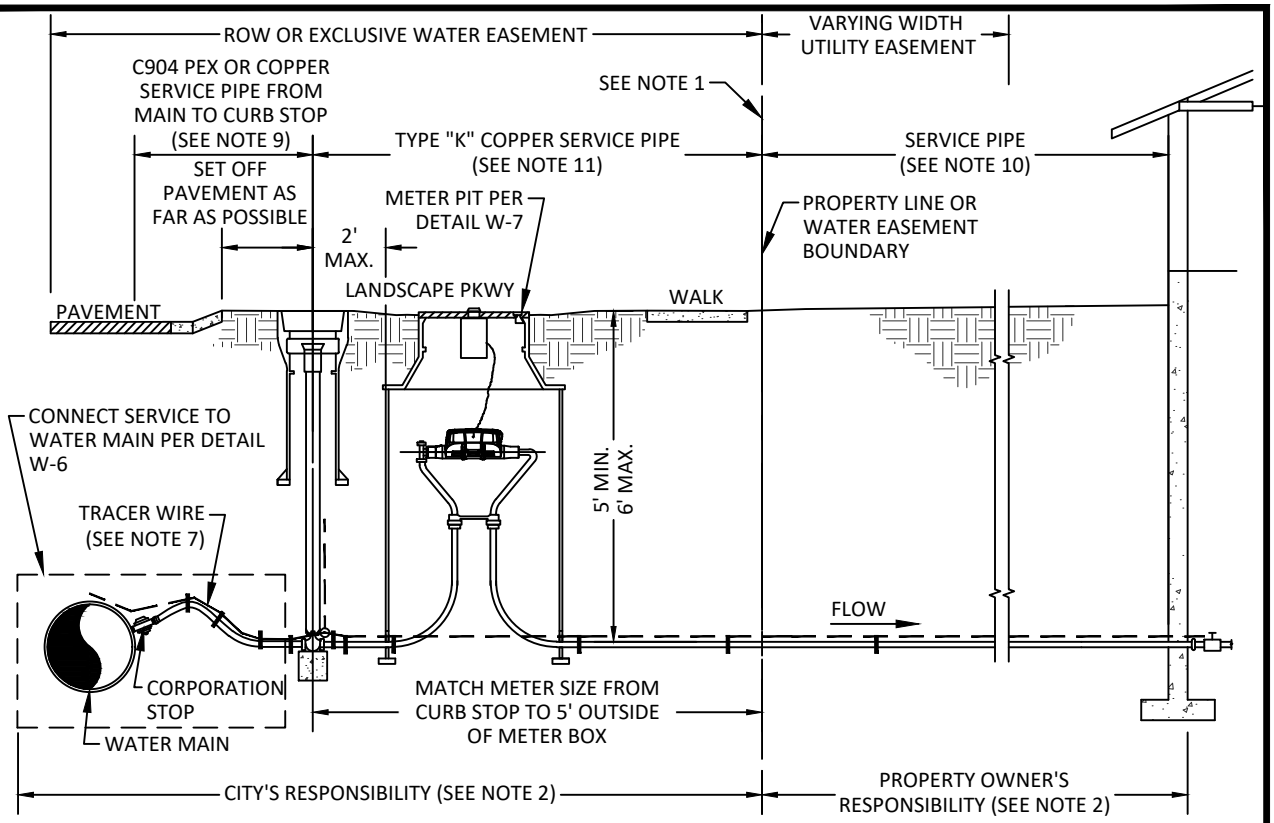
City of Greeley Colorado

OUTSIDE SETTING FOR 1-½" & 2" POTABLE WATER METER

DETAIL W-8

DATE: JANUARY 2023

SCALE: N.T.S.



ELEVATION VIEW

NOTES:

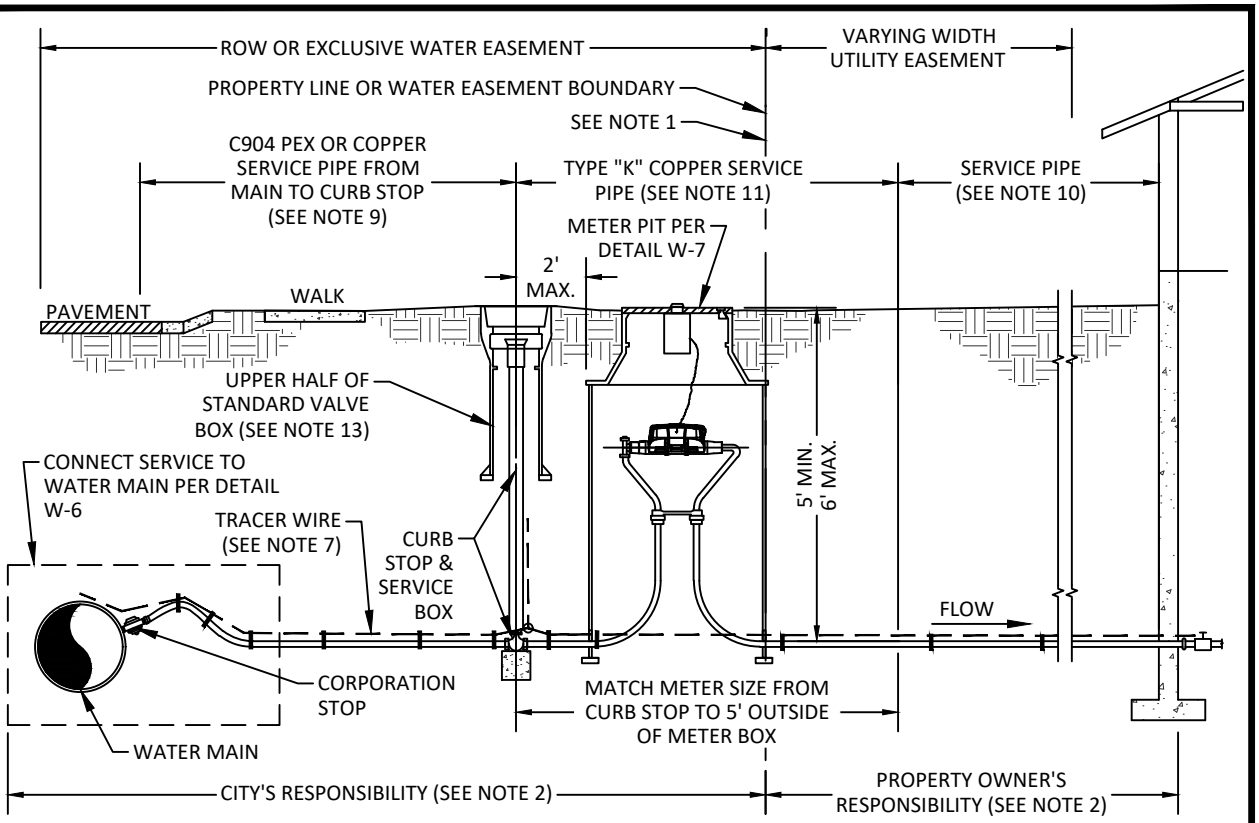
1. PLACEMENT OF CURB STOP SERVICE BOX MAY VARY FROM LANDSCAPE PARKWAY OR A MAXIMUM OF ±1 FOOT OF THE PROPERTY LINE. ANY VARIANCE OF LOCATION OF CURB STOP MUST BE APPROVED PRIOR TO CONSTRUCTION.SEE DESIGN CRITERIA, LATEST REVISION, FOR METER PIT LOCATION.
2. WATER DEPARTMENT'S RESPONSIBILITY SHALL BE THE WATER MAIN, THE METER INSIDE THE METER PIT, THE CORPORATION STOP, AND SERVICE PIPING FROM THE WATER MAIN UP TO DOWNSTREAM OF METER. PROPERTY OWNER'S RESPONSIBILITY SHALL INCLUDE EVERYTHING DOWNSTREAM OF METER STRUCTURE.
3. SHOULD ANY SITUATION ARISE OTHER THAN SHOWN CONCERNING THE DEPTH OR OBSTRUCTION OF SERVICE LINE OR THE PLACEMENT OF THE METER PIT OR STOP BOX, CALL (970) 350-9317 AND ASK FOR METER SERVICES DIVISION.
4. REFER TO WATER & SEWER (W&S) STANDARD DRAWINGS AND CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS) FOR METER INSTALLATION REQUIREMENTS.
5. CURB STOP IS TO BE MINNEAPOLIS PATTERN OR APPROVED EQUAL.
6. CURB STOP MUST BE INSTALLED WITH EITHER PLASTIC OR STAINLESS STEEL PIPE INSERTS TO ENSURE PROPER COMPRESSION FITTING ON C904 CROSS-LINKED PEX PIPE.
7. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
8. ALL BURIED PIPE, FITTINGS, VALVES, AND APPURTENANCES SHALL BE INSTALLED AND RESTRAINED IN ACCORDANCE WITH W&S SPECIFICATIONS, LATEST REVISION.
9. COPPER OR C904 CROSS-LINKED PEX SERVICE LINE SHALL BE INSTALLED FROM THE CORPORATION STOP TO CURB STOP. REFER TO W&S CONSTRUCTION SPECIFICATIONS FOR APPROVED SERVICE PIPE PRODUCT AND MFR REQUIREMENTS.
10. FROM 5 FT PAST THE METER PIT ON THE OWNER SIDE UP TO BUILDING STRUCTURE SHALL BE IN ACCORDANCE WITH BUILDING CODE AND DRINKING WATER REQUIREMENTS.
13. TYPE "K" COPPER SHALL BE PLACED FROM THE CURB STOP, THROUGH THE METER PIT, AND UP TO 5 FEET PAST THE METER PIT ON CUSTOMER SIDE.
14. ALL SERVICE PIPE SHALL BE SIZED ACCORDING TO SERVICE TAP INSIDE DIAMETER AND MUST COMPLY WITH AWWA C904. SEE W&S DESIGN CRITERIA, LATEST REVISION.
15. UPPER HALF OF STANDARD VALVE BOX SHALL BE PLACED OVER CURB STOP AND TRACER WIRE TEST STATION LOOP ACCORDING TO W&S SPECIFICATIONS, LATEST REVISION.

City of Greeley Colorado

POTABLE WATER SERVICE LINE, STOP BOX & METER INSTALLATION (INSIDE LANDSCAPE PARKWAY)

DETAIL W-9A

DATE: JANUARY 2023 SCALE: N.T.S.



ELEVATION VIEW

NOTES:

1. PLACEMENT OF CURB STOP SERVICE BOX MAY VARY FROM LANDSCAPE PARKWAY OR A MAXIMUM OF ±1 FOOT OF THE PROPERTY LINE. ANY VARIANCE OF LOCATION OF CURB STOP MUST BE APPROVED PRIOR TO CONSTRUCTION.SEE DESIGN CRITERIA, LATEST REVISION, FOR METER PIT LOCATION.
2. WATER DEPARTMENT'S RESPONSIBILITY SHALL BE THE WATER MAIN, THE METER INSIDE THE METER PIT, THE CORPORATION STOP, AND SERVICE PIPING FROM THE WATER MAIN UP TO DOWNSTREAM OF METER. PROPERTY OWNER'S RESPONSIBILITY SHALL INCLUDE EVERYTHING DOWNSTREAM OF METER STRUCTURE.
3. SHOULD ANY SITUATION ARISE OTHER THAN SHOWN CONCERNING THE DEPTH OR OBSTRUCTION OF SERVICE LINE OR THE PLACEMENT OF THE METER PIT OR STOP BOX, CALL (970) 350-9317 AND ASK FOR METER SERVICES DIVISION.
4. REFER TO WATER & SEWER (W&S) STANDARD DRAWINGS AND CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS) FOR METER INSTALLATION REQUIREMENTS.
5. CURB STOP IS TO BE MINNEAPOLIS PATTERN OR APPROVED EQUAL.
6. CURB STOP MUST BE INSTALLED WITH EITHER PLASTIC OR STAINLESS STEEL PIPE INSERTS TO ENSURE PROPER COMPRESSION FITTING ON C904 CROSS-LINKED PEX PIPE.
7. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
8. ALL BURIED PIPE, FITTINGS, VALVES, AND APPURTENANCES SHALL BE INSTALLED AND RESTRAINED IN ACCORDANCE WITH W&S SPECIFICATIONS, LATEST REVISION.
9. COPPER OR C904 CROSS-LINKED PEX SERVICE LINE SHALL BE INSTALLED FROM THE CORPORATION STOP TO CURB STOP. REFER TO W&S CONSTRUCTION SPECIFICATIONS FOR APPROVED SERVICE PIPE PRODUCT AND MFR REQUIREMENTS.
10. FROM 5 FT PAST THE METER PIT ON THE OWNER SIDE UP TO BUILDING STRUCTURE SHALL BE IN ACCORDANCE WITH BUILDING CODE AND DRINKING WATER REQUIREMENTS.
13. TYPE "K" COPPER SHALL BE PLACED FROM THE CURB STOP, THROUGH THE METER PIT, AND UP TO 5 FEET PAST THE METER PIT ON CUSTOMER SIDE.
14. ALL SERVICE PIPE SHALL BE SIZED ACCORDING TO SERVICE TAP INSIDE DIAMETER AND MUST COMPLY WITH AWWA C904. SEE W&S DESIGN CRITERIA, LATEST REVISION.
15. UPPER HALF OF STANDARD VALVE BOX SHALL BE PLACED OVER CURB STOP AND TRACER WIRE TEST STATION LOOP ACCORDING TO W&S SPECIFICATIONS, LATEST REVISION.

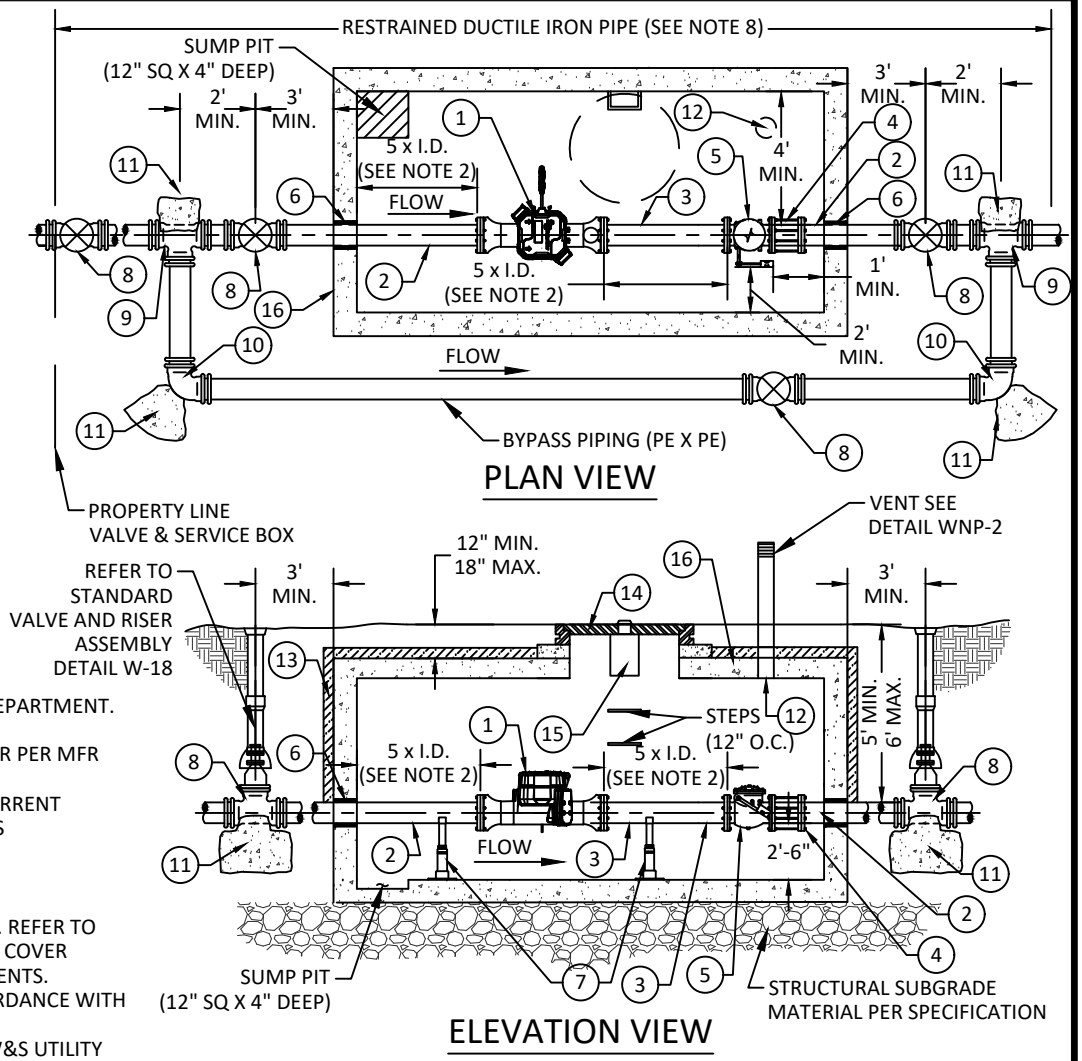
City of Greeley Colorado

POTABLE WATER SERVICE LINE, STOP BOX & METER INSTALLATION (OUTSIDE LANDSCAPE PARKWAY)

DETAIL W-9B

DATE: JANUARY 2023 SCALE: N.T.S.

LEGEND	
1	METER (SEE NOTE 1)
2	FLG X PE SPOOL PIECE WITH WALL RING IN CENTER OF VAULT WALL (SEE NOTE 2)
3	FLG X FLG SPOOL PIECE (SEE NOTE 2)
4	RESTRAINED FLANGED COUPLING ADAPTER
5	SWING CHECK VALVE
6	APPROVED RUBBER SEAL ON PIPE BARREL AT WALL PENETRATION PER SPECIFICATION
7	ADJUSTABLE S.S. PIPE SUPPORT
8	GATE VALVE (MJ X MJ)
9	TEE (MJ X MJ)
10	ELBOW (MJ X MJ)
11	THRUST BLOCK
12	6" HOLE FOR VENT
13	2" MIN INSULATION BOARD
14	24" MANHOLE COVER (SEE NOTE 5)
15	RT UNIT
16	PRE-CAST CONCRETE VAULT, SIZE AS REQUIRED FOR COMPONENTS SHOWN



NOTES:

1. METER MUST BE PURCHASED FROM THE WATER & SEWER (W&S) DEPARTMENT. NO EXCEPTIONS.
2. UPSTREAM AND DOWNSTREAM PIPE SPOOL LENGTHS 5X PIPE I.D. OR PER MFR REQUIREMENTS (WHICHEVER YIELDS THE LONGER PIPE LENGTH).
3. FOR PRODUCT AND MANUFACTURER SPECIFICATIONS, REFER TO CURRENT VERSION OF CITY OF GREELEY W&S CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS).
4. SEE DETAIL W-16 FOR ADDITIONAL METER & VAULT INSTALLATION REQUIREMENTS.
5. 24" VAULT COVER SHALL BE A COMPOSITE LID WITH A WORM LOCK. REFER TO W&S SPECIFICATIONS, LATEST REVISION, FOR APPROVED MANHOLE COVER MATERIALS, MANUFACTURERS, MARKINGS, AND OTHER REQUIREMENTS.
6. ALL BURIED PIPING SHALL BE INSTALLED AND RESTRAINED IN ACCORDANCE WITH W&S SPECIFICATIONS.
7. INSTALL TRACER WIRE ACCORDING TO W&S SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") STANDARD DETAILS, LATEST REVISION OF EACH.

City of Greeley Colorado

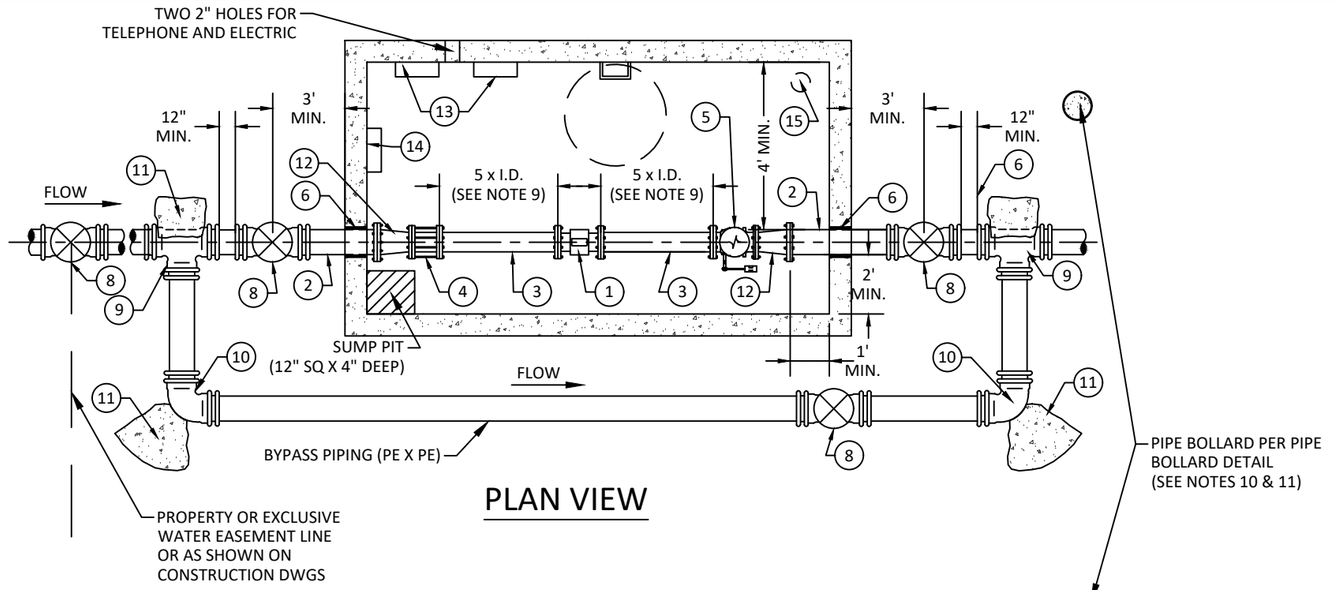
(TYP) SETTING FOR 3", 4", 6" & 8" POTABLE WATER METER & VAULT

DETAIL W-10

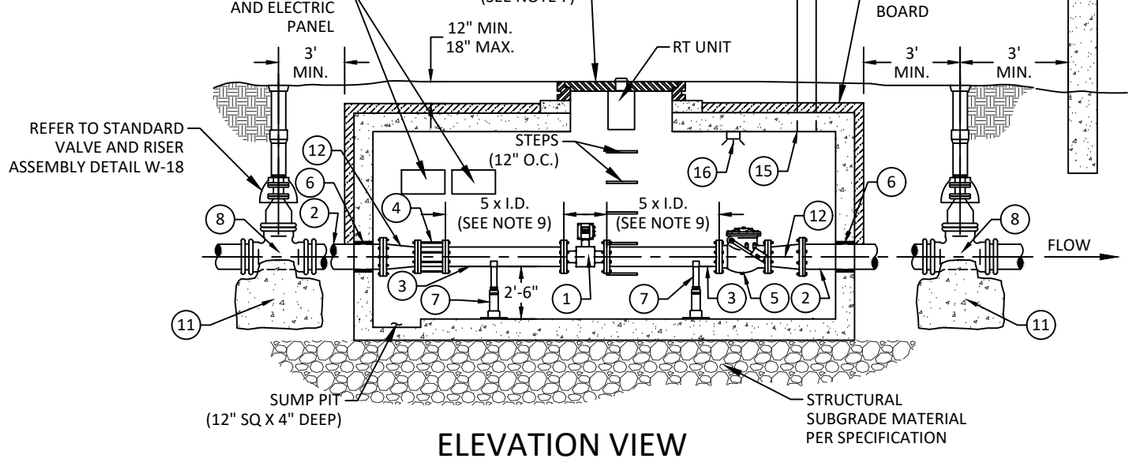
DATE: JANUARY 2023

SCALE: N.T.S.

LEGEND	
1	MAG METER (SEE NOTE 1)
2	FLG X PE SPOOL PIECE WITH WALL RING IN CENTER OF VAULT WALL
3	FLG X FLG SPOOL PIECE (SEE NOTE 9)
4	RESTRAINED MECHANICAL COUPLER OR FLANGED COUPLING ADAPTER
5	SWING CHECK VALVE
6	APPROVED RUBBER SEAL ON PIPE BARREL AT WALL PENETRATION PER SPECIFICATION
7	ADJUSTABLE S.S. PIPE SUPPORT
8	GATE VALVE (MJ x MJ)
9	TEE (MJ X MJ)
10	ELBOW (MJ X MJ)
11	THRUST BLOCK
12	CONCENTRIC REDUCER (AS REQUIRED)
13	ELECTRICAL PANEL
14	DEHUMIDIFIER
15	6" HOLE FOR VENT
16	LED LIGHT



PLAN VIEW



ELEVATION VIEW

NOTES:

1. PURCHASED METER MUST BE BADGER M2000 MAG METER AND/OR COORDINATED THROUGH THE CITY OF GREELEY METER SHOP. NO EXCEPTIONS. CONTRACTOR TO PROVIDE PIPING, COUPLINGS, AND ACCESSORIES AS NECESSARY FOR A COMPLETE SYSTEM.
2. ALL NOTES ON RELATED CITY OF GREELEY WATER & SEWER (W&S) DETAIL NP-3 APPLY TO THIS DETAIL.
3. CONTRACTOR IS RESPONSIBLE FOR PROVIDING POWER AND TELEMETRY TO THE METER AND VAULT.
4. ELECTRICAL/CONTROL PANEL SHALL BE MOUNTED ABOVE GRADE INSIDE A NEMA 4 ENCLOSURE PER W&S SPECIFICATIONS (SPECIFICATIONS), LATEST REVISION.
5. ALL ELECTRICAL WIRE SHALL BE EQUIPPED WITH WATERTIGHT CONNECTIONS ABOVE AND BELOW GRADE.
6. VAULT & MANHOLE COVER SHALL BE RATED FOR HS-20 TRAFFIC LOADINGS.
7. 36" VAULT COVER SHALL BE A WORM LOCK LID WITH A RECESSED TWO-INCH DIAMETER HOLE FOR RT UNIT. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR APPROVED MANHOLE COVER MATERIALS, MANUFACTURERS, MARKINGS, AND OTHER REQUIREMENTS.
8. SEE W&S DETAIL W-16, LATEST REVISION, FOR ADDITIONAL METER AND VAULT INSTALLATION REQUIREMENTS.
9. UPSTREAM AND DOWNSTREAM PIPE SPOOL LENGTH 5X PIPE I.D. OR PER MFR REQUIREMENTS (WHICHEVER YIELDS THE LONGER PIPE LENGTH).
10. REFER TO CITY OF GREELEY W&S SPECIFICATIONS, LATEST REVISION, FOR PRODUCT AND MANUFACTURER SPECIFICATIONS.
11. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
12. PIPE BOLLARD MAY BE OMITTED AT THE CITY OF GREELEY W&S DEPARTMENT'S DISCRETION.

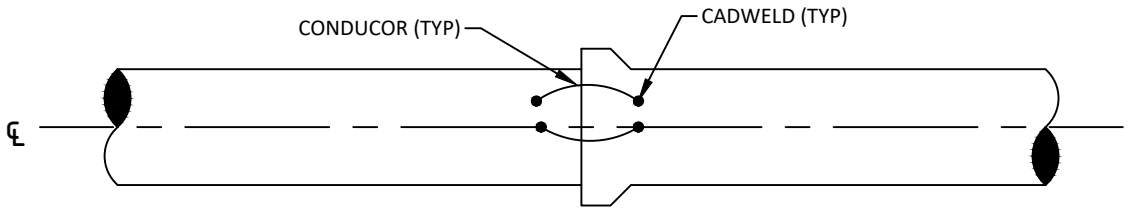
City of Greeley Colorado

(TYP) SETTING FOR 10" & LARGER ELECTROMAGNETIC (MAG) METER & VAULT

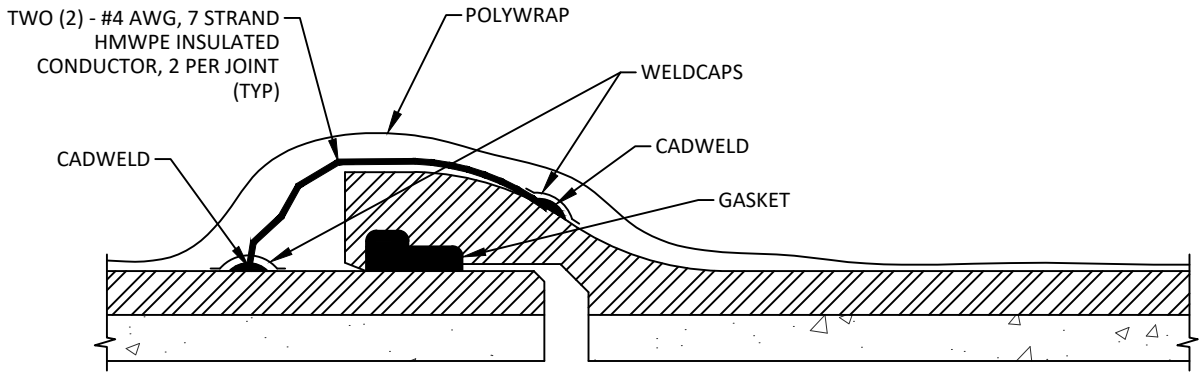
DETAIL W-11

DATE: JANUARY 2023

SCALE: N.T.S.



ELEVATION VIEW



CUTAWAY ELEVATION VIEW

NOTES:

1. CONDUCTOR WIRE SHALL BE RATED FOR DIRECT BURIAL, AND HAVE BOTH ENDS CAD WELDED TO THE PIPE OR BONDING STRAP BOLTED TO PIPE. WIRE SHALL HAVE A MINIMUM OF 2" SLACK.
2. JOINT BONDING SHALL ALSO APPLY TO RESTRAINED AND MECHANICAL JOINT PIPE AND FITTINGS.
3. CONSTRUCT CADWELD CONNECTIONS PER WATER & SEWER CONSTRUCTION SPECIFICATIONS AND DETAILS, LATEST REVISION.
4. ACCEPTABLE ALTERNATIVE TO ANODE CATHODIC PROTECTION IS ZINC COATED D.I.P.

City of Greeley Colorado

DUCTILE IRON PIPE JOINT BONDING

DETAIL W-12

DATE: JANUARY 2023 SCALE: N.T.S.

GENERAL NOTES:

1. POLYETHYLENE (PE) WRAP MAY BE OMITTED WHEN ZINC COATED D.I.P. IS USED.
2. PE WRAP IS REQUIRED FOR ALL STANDARD (NON-ZINC) DUCTILE IRON PIPE, FITTINGS, AND APPURTENANCES.
3. PE WRAP SHALL BE INSTALLED IN ACCORDANCE WITH THE WATER & SEWER SPECIFICATIONS AND STANDARD DETAILS BELOW, LATEST REVISION OF EACH.
4. REPAIR ANY CUTS, TEARS, PUNCTURES, OR DAMAGE WITH ADHESIVE TAPE. TO PREVENT DAMAGE TO THE PE WRAP DURING BACKFILL, ALLOW ADEQUATE SLACK IN THE TUBE AT THE JOINT. AVOID DAMAGING THE TUBE WHEN USING TAMPING DEVICES.

PIPE-SHAPED APPURTENANCES:

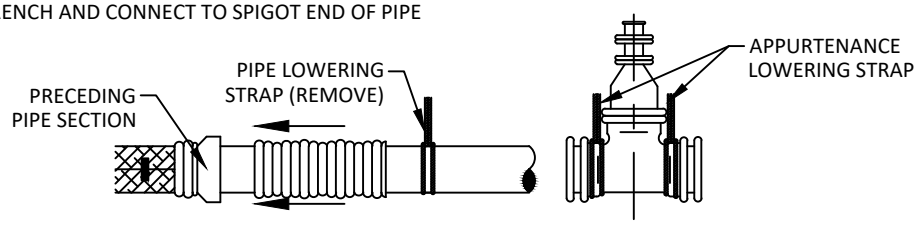
1. COVER BENDS, REDUCERS, OFFSETS, AND OTHER PIPE-SHAPED APPURTENANCES WITH PE IN SAME MANNER AS PIPE ON W&S DETAIL W-13B, LATEST REVISION.

ODD-SHAPED APPURTENANCES:

1. WHEN IT IS NOT PRACTICAL TO WRAP VALVES, FITTINGS, AND OTHER ODD-SHAPED PIECES IN TUBE, WRAP WITH FLAT SHEET OR SPLIT LENGTH OF PE TUBE IN THE FOLLOWING STEPS:

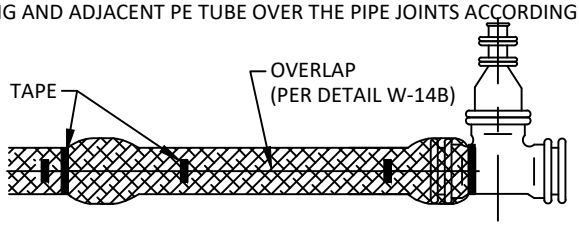
STEP 1

BEFORE CONNECTING THE APPURTENANCE TO THE SPIGOT END OF PIPE, INSTALL THE ADJACENT PIPE AND PE TUBE ACCORDING TO WATER & SEWER DETAIL W-13B, LATEST REVISION. BUNCH THE TUBE IN AN ACCORDIAN- FASHION TO EXPOSE THE SPIGOT END OF THE PIPE. THEN LOWER THE APPURTENANCE INTO THE TRENCH AND CONNECT TO SPIGOT END OF PIPE



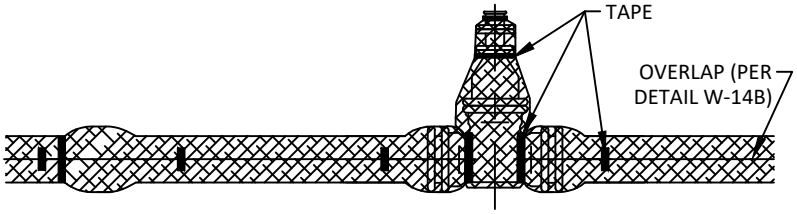
STEP 2

PULL THE PRECEDING AND ADJACENT PE TUBE OVER THE PIPE JOINTS ACCORDING TO STEPS 2 THROUGH 4 IN W-14B.



STEP 3

REPEAT STEP 2 WITH A NEW PIPE ON THE OTHER SIDE OF THE APPURTENANCE. THEN WRAP FLAT PE SHEET OR SPLIT LENGTH OF PE TUBE AROUND APPURTENANCE BY PASSING THE SHEET UNDER THE APPURTENANCE AND BRINGING IT UP AROUND BODY. MAKE SEAMS BY BRINGING EDGES TOGETHER, FOLDING OVER TWICE, AND TAPING DOWN. TAPE PE SECURELY IN PLACE AT VALVE STEM AND OTHER PENETRATIONS.



STEP 4

REPAIR ANY CUTS, TEARS, PUNCTURES, OR DAMAGE WITH ADHESIVE TAPE. TO PREVENT DAMAGE TO THE POLYETHYLENE WRAP DURING BACKFILL, ALLOW ADEQUATE SLACE IN THE TUBE AT THE JOINT. AVOID DAMAGING THE TUBE WHEN USING TAMPING DEVICES.

City of Greeley Colorado

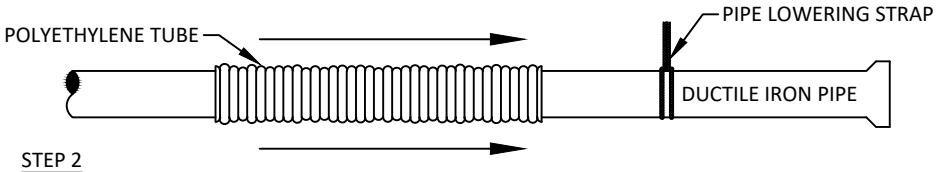
POLYETHYLENE WRAP INSTALLATION ON STANDARD DUCTILE IRON FITTINGS & GENERAL NOTES

DETAIL W-13A

DATE: JANUARY 2023 SCALE: N.T.S.

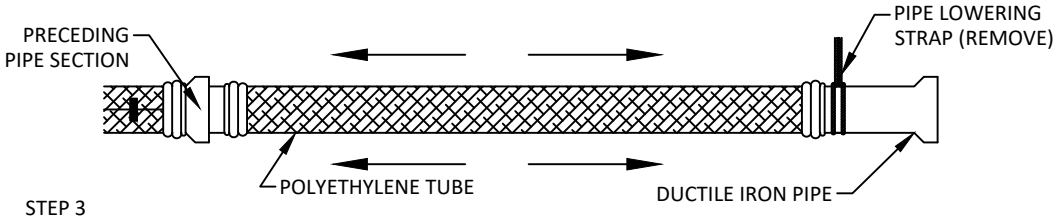
STEP 1

CUT A SECTION OF POLYETHYLENE (PE) TUBE APPROXIMATELY 2' LONGER THAN THE PIPE SECTION. REMOVE ALL DEBRIS FROM THE PIPE SURFACE. SLIP THE TUBE AROUND THE END OF THE PIPE, STARTING AT THE SPIGOT END. BUNCH THE TUBE ACCORDION-FASHION ON THE END OF THE PIPE. PULL BACK THE OVERHANGING END OF THE TUBE UNTIL IT CLEARS THE PIPE SPIGOT END.



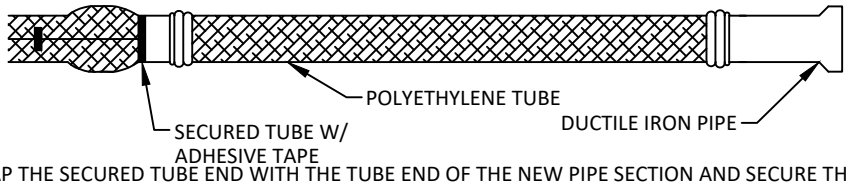
STEP 2

LOWER THE PIPE INTO THE TRENCH AND MAKE UP THE PIPE JOINT WITH THE PRECEDING SECTION OF PIPE. SPREAD THE TUBE OVER THE ENTIRE PIPE BARREL AND REMOVE THE PIPE LOWERING STRAP. MAKE SURE NO DIRT OR BEDDING MATERIAL BECOMES TRAPPED BETWEEN TUBE AND PIPE.



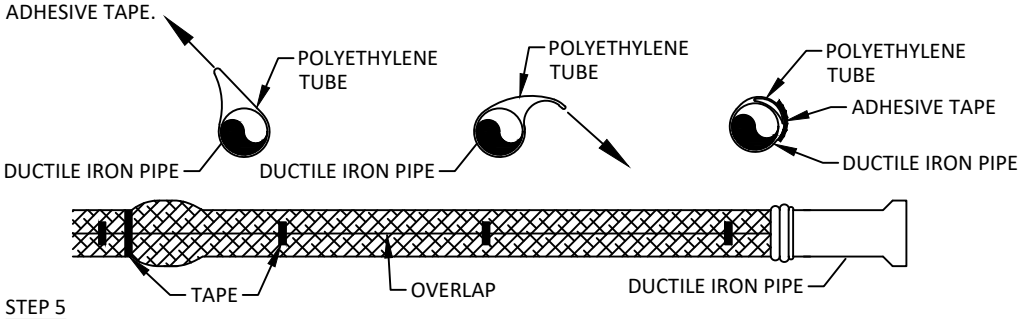
STEP 3

OVERLAP THE JOINT WITH THE TUBE FROM THE PRECEDING LENGTH OF PIPE AND SECURE IT INTO PLACE WITH THREE CIRCUMFERENTIAL TURNS OF 2" ADHESIVE TAPE.



STEP 4

OVERLAP THE SECURED TUBE END WITH THE TUBE END OF THE NEW PIPE SECTION AND SECURE THE NEW TUBE END IN PLACE WITH THE TAPING PROCEDURE IN STEP 3. TAKE UP THE SLACK IN THE TUBE ALONG THE BARREL OF THE PIPE TO MAKE A SNUG, BUT NOT TIGHT, FIT BY FOLDING THE EXCESS TUBE BACK OVER THE TOP OF THE PIPE. SECURE THE TUBE AT 3' TO 5' INTERVALS ALONG THE PIPE BARREL WITH ADHESIVE TAPE.



STEP 5

REPAIR ANY RIPS, TEARS, OR OTHER DAMAGE WITH ADHESIVE TAPE. CAREFULLY BACKFILL PIPE. TO PREVENT DAMAGE TO THE TUBE DURING BACKFILL, ALLOW ADEQUATE SLACK IN THE TUBE AT THE JOINT. AVOID DAMAGING THE TUBE WHEN USING TAMPING DEVICES.

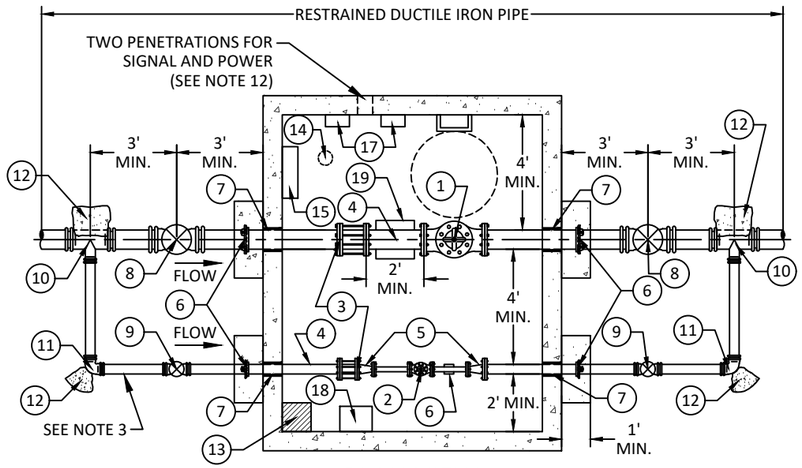
City of Greeley Colorado

POLYETHYLENE WRAP INSTALLATION ON STANDARD DUCTILE IRON PIPE

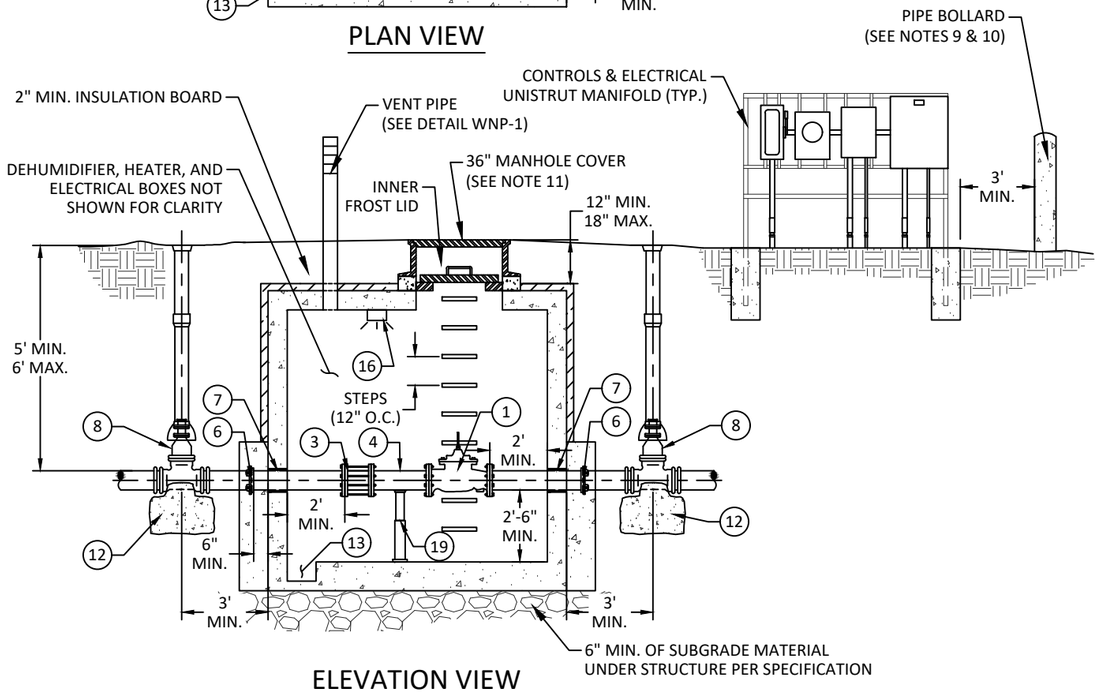
DETAIL W-13B

DATE: JANUARY 2023

SCALE: N.T.S.



PLAN VIEW

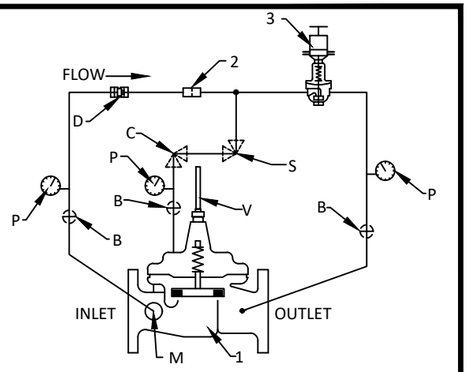


ELEVATION VIEW

EQUIPMENT LEGEND	
1	8" CLA-VAL 90-01 PRV (HIGH FLOW)
2	2" CLA-VAL 90-01 PRV (LOW FLOW)
3	RESTRAINED MECHANICAL COUPLER (MATCH PIPE SIZE)
4	SPOOL PIPE (MATCH PIPE SIZE)
5	4" X 2" REDUCER (FLG X FLG)
6	1100 MEGALUG® PIPE RESTRAINT (SEE NOTE 14)
7	LINK-SEAL® MODULAR SEALING UNIT
8	8" GATE VALVE (MJ X MJ) AND RISER PER DETAIL W-19
9	4" GATE VALVE (MJ X MJ) AND RISER PER DETAIL W-19
10	8" X 4" REDUCING TEE (MJ X MJ)
11	4" ELBOW (MJ X MJ)
12	THRUST BLOCK
13	SUMP PIT (12" SQ X 8" DEEP) & PUMP
14	6" HOLE FOR VENT (SEE VENT PIPE DETAIL WNP-2)
15	UNIT HEATER
16	LED LIGHT FOR WET CONDITIONS
17	ELECTRICAL JUNCTION BOXES (SEE CONTROLS DETAILS)
18	DEHUMIDIFIER
19	ADJUSTABLE STAINLESS STEEL PIPE STAND

NOTES:

1. SEE DETAILS W-15A & W-15B FOR ADDITIONAL VAULT INSTALLATION REQUIREMENTS.
2. ALUMINUM RING AND COVER TO BE RATED FOR HS-20 TRAFFIC LOADINGS.
3. LOW FLOW PRV AND LINE SIZING SHALL BE COORDINATED WITH THE CITY OF GREELEY WATER & SEWER (W&S) DEPARTMENT AND WILL BE EVALUATED BASED ON FLOW AND SITE CONDITIONS.
4. CLA-VAL X144 E-FLOW METER OR APPROVED EQUAL.
5. CLA-VAL 100-01 HYTROL MAIN VALVE SHALL BE CONTROLLED BY ELECTRIC ACTUATOR WITH 4-20 MA CONTROL AND FEEDBACK.
6. ALL BURIED PIPE, VALVES, FITTINGS, AND APPURTENANCES SHALL BE INSTALLED IN ACCORDANCE WITH W&S SPECIFICATIONS, LATEST REVISION.
7. ALL VAULT PIPE, VALVES, FITTINGS, AND APPURTENANCES 2" AND LARGER SHALL BE FLANGED.
8. INSTALL TRACER WIRE ACCORDING TO W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
9. PIPE BOLLARD MAY BE OMITTED AT THE W&S DEPARTMENT'S DISCRETION.
10. IF PIPE BOLLARD IS REQUIRED, BOLLARD SHALL BE INSTALLED IN ACCORDANCE WITH THE W&S STANDARD DETAILS AND CONSTRUCTION SPECIFICATIONS, LATEST REVISION OF EACH.
11. 36" MANHOLE COVER SHALL BE A BOLT DOWN LID MARKED "WATER" WITH INNER FROST LID. REFER TO W&S SPECIFICATIONS, LATEST REVISION, FOR SPECIFIC MANHOLE COVER MFR AND PRODUCT INFORMATION.
12. ALL CONDUIT PENETRATIONS SHALL USE LINKSEAL® AND LB FITTING INTO SIDE OF JUNCTION BOX.
13. UNIT HEATER SHALL BE MOUNTED TO VAULT PER MANUFACTURER SPECIFICATIONS.
14. ALL MEGALUG® PIPE RESTRAINTS SHALL BE ENCASED IN CONCRETE A MINIMUM OF 12" ON ALL SIDES OF PIPE AND CONCRETE SHALL BE FORMED FROM BOTTOM OF VAULT. AN APPROVED EQUAL RESTRAINT METHOD MAY BE ACCEPTED AT THE DISCRETION OF W&S DEPARTMENT.



PRV COMPONENTS SCHEMATIC

PRESSURE REDUCING VALVE COMPONENTS	
ITEM	DESCRIPTION
1	CLA-VAL MODEL 90-01 PRV (100-01 HYTROL MAIN VALVE, SEE NOTE 5)
2	X58C RESTRICTION FITTING
3	CRL-34 ELECTRONIC ACTUATED PRESSURE SUSTAINING PILOT CONTROL (4-20 mA COMMAND SIGNAL)
B	CK2 ISOLATION VALVE
C	CV FLOW CONTROL (CLOSING)
D	CHECK VALVES ISOLATION VALVE
M	X144 E-FLOWMETER (SEE NOTE 4)
P	X141 PRESSURE GAUGE
S	CV FLOW CONTROL (OPENING)
V	X101 VALVE POSITION INDICATOR

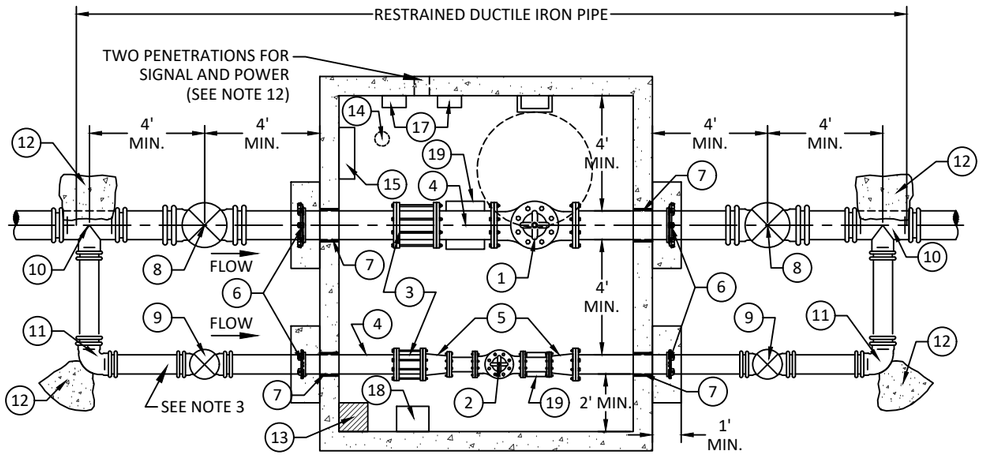
City of Greeley Colorado

(TYP) 8" PRESSURE REDUCING VALVE & VAULT

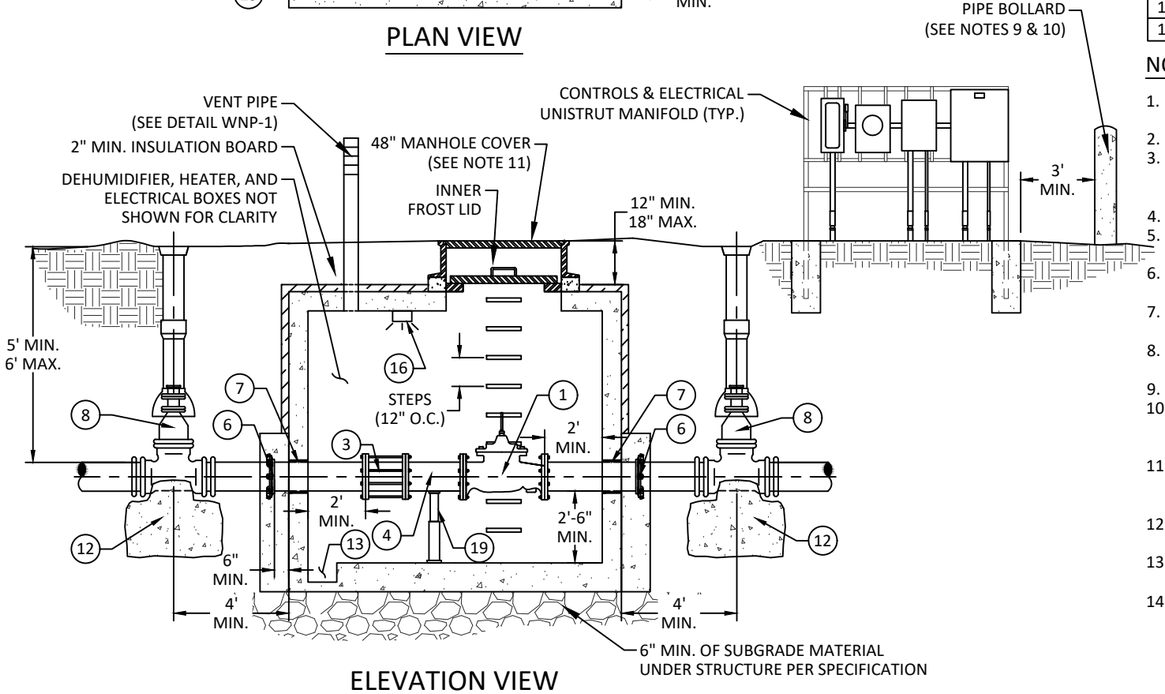
DETAIL W-14A

DATE: JANUARY 2023

SCALE: N.T.S.



PLAN VIEW

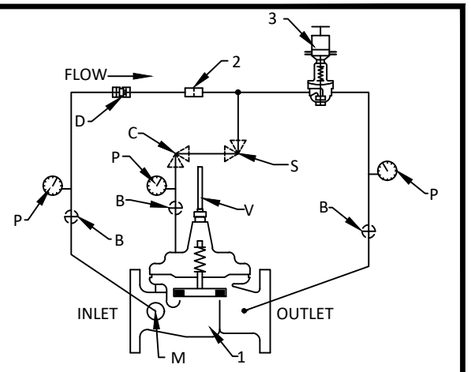


ELEVATION VIEW

EQUIPMENT LEGEND	
1	12" CLA-VAL 90-01 PRV (HIGH FLOW)
2	6" CLA-VAL 90-01 PRV (LOW FLOW)
3	RESTRAINED MECHANICAL COUPLER (MATCH PIPE SIZE)
4	SPOOL PIPE (MATCH PIPE SIZE)
5	8" X 6" REDUCER (FLG X FLG)
6	1100 MEGALUG® PIPE RESTRAINT (SEE NOTE 14)
7	LINK-SEAL® MODULAR SEALING UNIT
8	12" GATE VALVE (MJ X MJ) AND RISER PER DETAIL W-19
9	8" GATE VALVE (MJ X MJ) AND RISER PER DETAIL W-19
10	12" X 8" REDUCING TEE (MJ X MJ)
11	8" ELBOW (MJ X MJ)
12	THRUST BLOCK
13	SUMP PIT (12" SQ X 8" DEEP) & PUMP
14	6" HOLE FOR VENT (SEE VENT PIPE DETAIL WNP-2)
15	DEHUMIDIFIER
16	LED LIGHT FOR WET CONDITIONS
17	ELECTRICAL JUNCTION BOXES (SEE CONTROLS DETAILS)
18	DEHUMIDIFIER
19	ADJUSTABLE STAINLESS STEEL PIPE STAND

NOTES:

1. SEE DETAILS W-15A & W-15B FOR ADDITIONAL VAULT INSTALLATION REQUIREMENTS.
2. ALUMINUM RING AND COVER TO BE RATED FOR HS-20 TRAFFIC LOADINGS.
3. LOW FLOW PRV AND LINE SIZING SHALL BE COORDINATED WITH THE CITY OF GREELEY WATER & SEWER (W&S) DEPARTMENT AND WILL BE EVALUATED BASED ON FLOW AND SITE CONDITIONS.
4. CLA-VAL X144 E-FLOW METER OR APPROVED EQUAL.
5. CLA-VAL 100-01 HYTROL MAIN VALVE SHALL BE CONTROLLED BY ELECTRIC ACTUATOR WITH 4-20 MA CONTROL AND FEEDBACK.
6. ALL BURIED PIPE, VALVES, FITTINGS, AND APPURTENANCES SHALL BE INSTALLED IN ACCORDANCE WITH W&S SPECIFICATIONS, LATEST REVISION.
7. ALL VAULT PIPE, VALVES, FITTINGS, AND APPURTENANCES 2" AND LARGER SHALL BE FLANGED.
8. INSTALL TRACER WIRE ACCORDING TO W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
9. PIPE BOLLARD MAY BE OMITTED AT THE W&S DEPARTMENT'S DISCRETION.
10. IF PIPE BOLLARD IS REQUIRED, BOLLARD SHALL BE INSTALLED IN ACCORDANCE WITH THE W&S STANDARD DETAILS AND CONSTRUCTION SPECIFICATIONS, LATEST REVISION OF EACH.
11. 48" MANHOLE COVER SHALL BE A BOLT DOWN LID MARKED "WATER" WITH INNER FROST LID. REFER TO W&S SPECIFICATIONS, LATEST REVISION, FOR SPECIFIC MANHOLE COVER MFR AND PRODUCT INFORMATION.
12. ALL CONDUIT PENETRATIONS SHALL USE LINKSEAL® AND LB FITTING INTO SIDE OF JUNCTION BOX.
13. UNIT HEATER SHALL BE MOUNTED TO VAULT PER MANUFACTURER SPECIFICATIONS.
14. ALL MEGALUG® PIPE RESTRAINTS SHALL BE ENCASED IN CONCRETE A MINIMUM OF 12" ON ALL SIDES OF PIPE AND CONCRETE SHALL BE FORMED FROM BOTTOM OF VAULT. AN APPROVED EQUAL RESTRAINT METHOD MAY BE ACCEPTED AT THE DISCRETION OF W&S DEPARTMENT.



PRV COMPONENTS SCHEMATIC

PRESSURE REDUCING VALVE COMPONENTS	
ITEM	DESCRIPTION
1	CLA-VAL MODEL 90-01 PRV (100-01 HYTROL MAIN VALVE, SEE NOTE 5)
2	X58C RESTRICTION FITTING
3	CRL-34 ELECTRONIC ACTUATED PRESSURE SUSTAINING PILOT CONTROL (4-20 mA COMMAND SIGNAL)
B	CK2 ISOLATION VALVE
C	CV FLOW CONTROL (CLOSING)
D	CHECK VALVES ISOLATION VALVE
M	X144 E-FLOWMETER (SEE NOTE 4)
P	X141 PRESSURE GAUGE
S	CV FLOW CONTROL (OPENING)
V	X101 VALVE POSITION INDICATOR

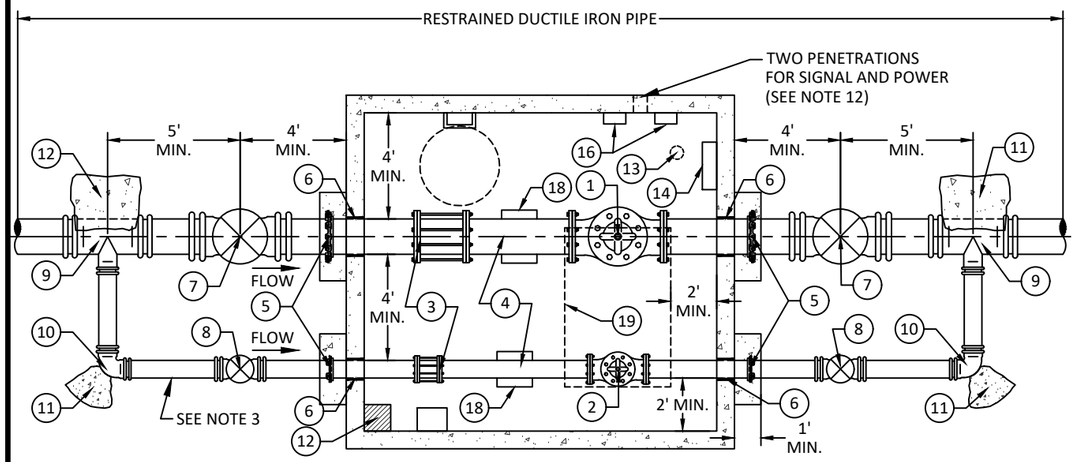
City of Greeley Colorado

(TYP) 12" PRESSURE REDUCING VALVE & VAULT

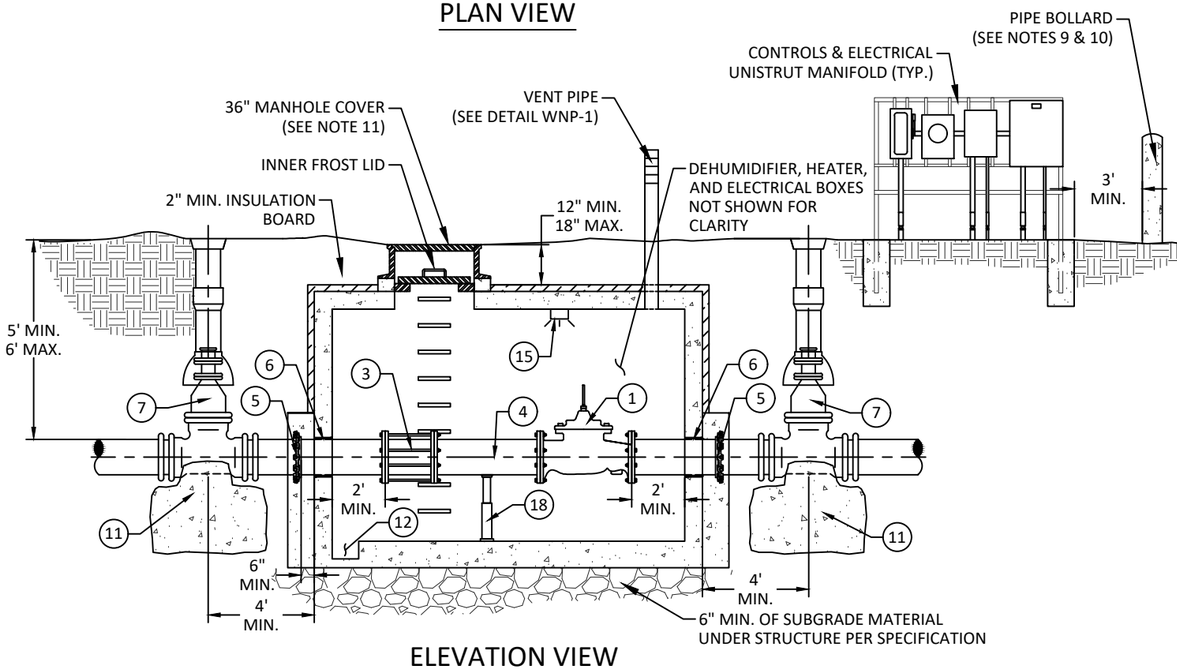
DETAIL W-14B

DATE: JANUARY 2023

SCALE: N.T.S.



PLAN VIEW

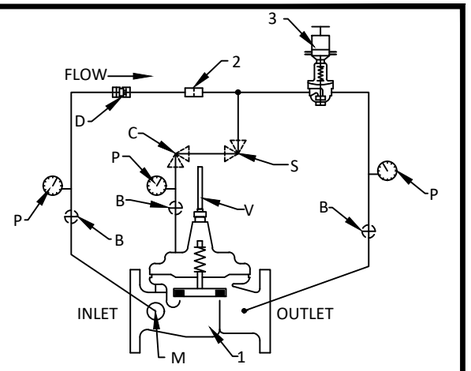


ELEVATION VIEW

EQUIPMENT LEGEND	
1	16" CLA-VAL 90-01 PRV (HIGH FLOW)
2	8" CLA-VAL 90-01 PRV (LOW FLOW)
3	RESTRAINED MECHANICAL COUPLER (MATCH PIPE SIZE)
4	SPOOL PIPE (MATCH PIPE SIZE)
5	1100 MEGALUG® PIPE RESTRAINT (SEE NOTE 14)
6	LINK-SEAL® MODULAR SEALING UNIT
7	16" GATE VALVE (MJ X MJ) AND RISER PER DETAIL W-19
8	8" GATE VALVE (MJ X MJ) AND RISER PER DETAIL W-19
9	16" X 8" REDUCING TEE (MJ X MJ)
10	8" ELBOW (MJ X MJ)
11	THRUST BLOCK
12	SUMP PIT (12" SQ X 8" DEEP) & PUMP
13	6" HOLE FOR VENT (SEE VENT PIPE DETAIL WNP-2)
14	UNIT HEATER
15	LED LIGHT FOR WET CONDITIONS
16	ELECTRICAL JUNCTION BOXES (SEE CONTROLS DETAILS)
17	DEHUMIDIFIER
18	ADJUSTABLE STAINLESS STEEL PIPE STAND
19	6' X 4' DOUBLE LEAF ACCESS HATCH (HS-20 RATED)

NOTES:

1. SEE DETAILS W-15A & W-15B FOR ADDITIONAL VAULT INSTALLATION REQUIREMENTS.
2. ALUMINUM RING AND COVER TO BE RATED FOR HS-20 TRAFFIC LOADINGS.
3. LOW FLOW PRV AND LINE SIZING SHALL BE COORDINATED WITH THE CITY OF GREELEY WATER & SEWER (W&S) DEPARTMENT AND WILL BE EVALUATED BASED ON FLOW AND SITE CONDITIONS.
4. CLA-VAL X144 E-FLOW METER OR APPROVED EQUAL.
5. CLA-VAL 100-01 HYTROL MAIN VALVE SHALL BE CONTROLLED BY ELECTRIC ACTUATOR WITH 4-20 MA CONTROL AND FEEDBACK.
6. ALL BURIED PIPE, VALVES, FITTINGS, AND APPURTENANCES SHALL BE INSTALLED IN ACCORDANCE WITH W&S SPECIFICATIONS, LATEST REVISION.
7. ALL VAULT PIPE, VALVES, FITTINGS, AND APPURTENANCES 2" AND LARGER SHALL BE FLANGED.
8. INSTALL TRACER WIRE ACCORDING TO W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
9. PIPE BOLLARD MAY BE OMITTED AT THE W&S DEPARTMENT'S DISCRETION.
10. IF PIPE BOLLARD IS REQUIRED, BOLLARD SHALL BE INSTALLED IN ACCORDANCE WITH THE W&S STANDARD DETAILS AND CONSTRUCTION SPECIFICATIONS, LATEST REVISION OF EACH.
11. 36" MANHOLE COVER SHALL BE A BOLT DOWN LID MARKED "WATER" WITH INNER FROST LID. REFER TO W&S SPECIFICATIONS, LATEST REVISION, FOR SPECIFIC MANHOLE COVER MFR AND PRODUCT INFORMATION.
12. ALL CONDUIT PENETRATIONS SHALL USE LINKSEAL® AND LB FITTING INTO SIDE OF JUNCTION BOX.
13. UNIT HEATER SHALL BE MOUNTED TO VAULT PER MANUFACTURER SPECIFICATIONS.
14. ALL MEGALUG® PIPE RESTRAINTS SHALL BE ENCASED IN CONCRETE A MINIMUM OF 12" ON ALL SIDES OF PIPE AND CONCRETE SHALL BE FORMED FROM BOTTOM OF VAULT. AN APPROVED EQUAL RESTRAINT METHOD MAY BE ACCEPTED AT THE DISCRETION OF W&S DEPARTMENT.



PRV COMPONENTS SCHEMATIC

PRESSURE REDUCING VALVE COMPONENTS	
ITEM	DESCRIPTION
1	CLA-VAL MODEL 90-01 PRV (100-01 HYTROL MAIN VALVE, SEE NOTE 5)
2	X58C RESTRICTION FITTING
3	CRL-34 ELECTRONIC ACTUATED PRESSURE SUSTAINING PILOT CONTROL (4-20 mA COMMAND SIGNAL)
B	CK2 ISOLATION VALVE
C	CV FLOW CONTROL (CLOSING)
D	CHECK VALVES ISOLATION VALVE
M	X144 E-FLOWMETER (SEE NOTE 4)
P	X141 PRESSURE GAUGE
S	CV FLOW CONTROL (OPENING)
V	X101 VALVE POSITION INDICATOR

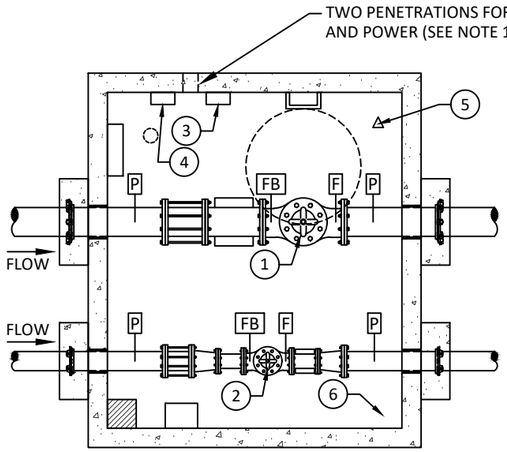
City of Greeley Colorado

(TYP) 16" PRESSURE REDUCING VALVE & VAULT

DETAIL W-14C

DATE: JANUARY 2023

SCALE: N.T.S.



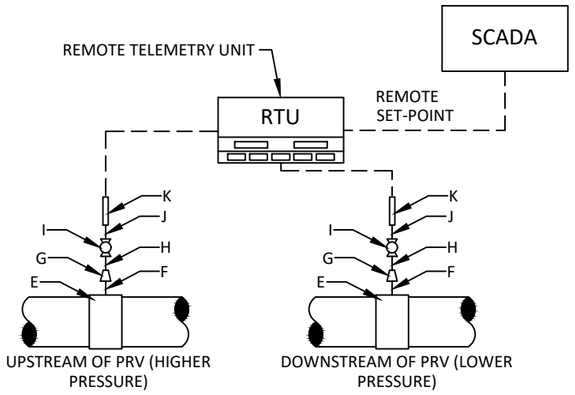
PLAN VIEW (TYP.)

LEGEND	
1	HIGH FLOW VALVE (SEE PRV VALVE & VAULT DETAILS)
2	LOW FLOW VALVE (SEE PRV VALVE & VAULT DETAILS)
3	SIGNAL WIRING JUNCTION BOX (SEE NOTE 1)
4	120V JUNCTION BOX (SEE NOTE 2)
5	INTRUSION ALARM (SEE NOTE 11)
6	FLOOD ALARM (SEE NOTE 10)
F	X144 E-FLOWMETER (SEE PRV & VAULT DETAIL)
FB	FEEDBACK & SIGNAL
P	PRESSURE TRANSDUCER

ELECTRICAL EQUIPMENT LIST	
ITEM	DESCRIPTION
SERVICE DISCONNECT	DH223NRK OR APPROVED EQUIVALENT
METER HOUSING	LEVER BYPASS (APPROVED BY POWER PROVIDER)
PANELBOARD	100AMP, 3R, BOLT-ON BREAKER
SPD	100KA MINIMUM, NEMA 4X RATED
LIGHT	LITHONIA VW150I M12 OR APPROVED EQUIVALENT
RECEPTACLES	WEATHER PROOF GFCI WITH IN USE COVER
OCC SENSOR	LEVITON OSW12-M0W W/ LED LIGHT BULB

NOTES:

1. INSTALL 12x12x6 JUNCTION BOX FOR SIGNAL WIRING. INSTALL TERMINAL BLOCKS FOR SPLICING.
2. INSTALL 12x12x6 JUNCTION BOX FOR POWER.INSTALL TERMINAL BLOCKS FOR SPLICING.
3. PROVIDE LABELING FOR ALL TERMINAL BLOCKS.
4. INSTALL WIRING FOR FOUR (4) PRESSURE SENSORS. REFER TO PRESSURE TRANSDUCER INSTALLATION DETAIL FOR MORE INFORMATION.
5. UNIK 5000F GE PRESSURE TRANSDUCER (MODEL#: PTX5032-TA-A2-CA-H0-PF) OR APPROVED EQUAL.
6. INSTALL WIRING FOR HIGH FLOW PRV AND FLOW METER.
7. INSTALL WIRING FOR LOW FLOW PRV AND FLOW METER.
6. PROVIDE AND INSTALL WIRING FOR 4-20MA FOR CONTROL.
7. INSTALL WIRING FOR 4-20MA FEEDBACK (FB) ON BOTH HIGH FLOW AND LOW FLOW VALVES.
8. REFER TO WATER & SEWER SPECIFICATIONS, LATEST VERSION FOR DESIGN PROGRAMING STANDARDS.
9. INSTALL FLOOD ALARM AND WIRE BACK TO CONTROL PANEL.
10. INSTALL LEVITON OSW12-M0W OCCUPANCY SENSOR 60" ABOVE FINISHED FLOOR.
11. PROVIDE AND INSTALL ALLEN BRADLEY MICRO 850 PLC FOR CONTROLS.
12. USE FIBER OR CONTACT CITY FOR RADIO SPECIFICATION TO COMMUNICATE BACK TO SCADA.
13. SUMP PUMP SHALL BE ROUTED TO STORM INFRASTRUCTURE OR PAN.
14. ALL CONDUIT PENETRATIONS SHALL USE LINKSEAL® AND LB FITTING INTO SIDE OF JUNCTION BOX.



PRESSURE TRANSDUCER INSTALLATION

PRESSURE TRANSDUCER COMPONENTS	
ITEM	DESCRIPTION
E	¾" BRONZE SADDLE
F	¾" X 2" NIPPLE
G	¾" X ¼" BRASS REDUCER
H	¼" X 2" NIPPLE
I	¼" BALL VALVE
J	¼" X 2" NIPPLE
K	UNIK 5000 PRESSURE TRANSDUCER (SEE NOTE 13)

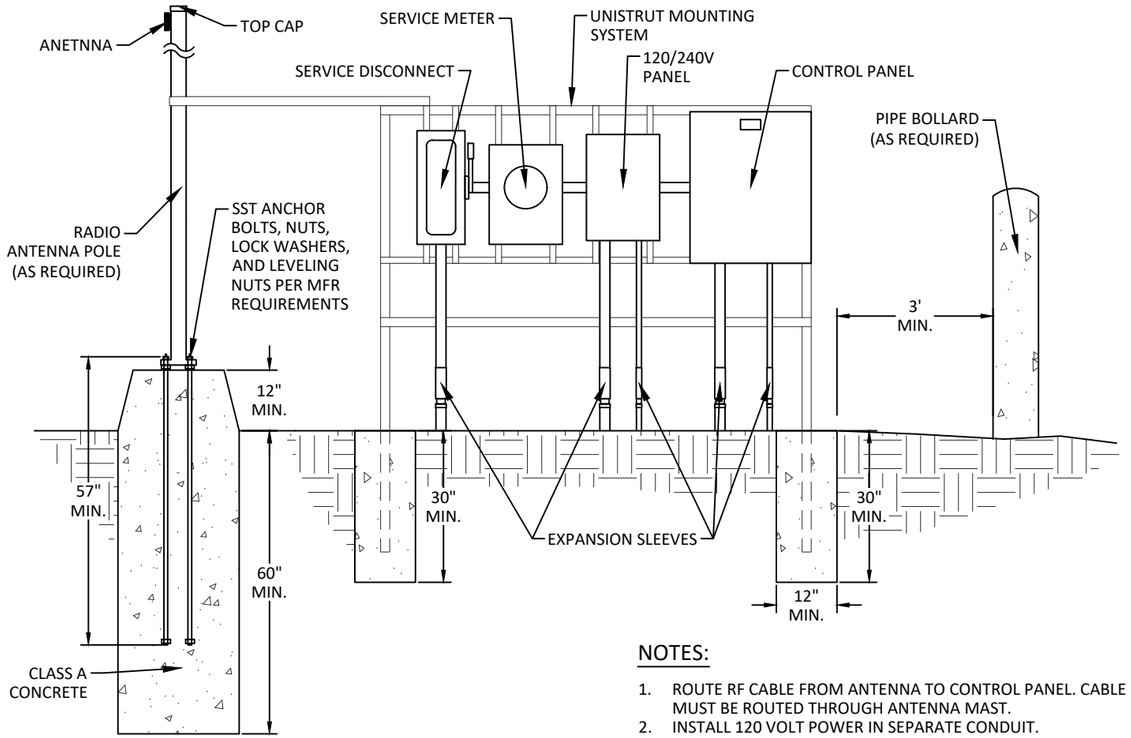
City of Greeley Colorado

(TYP) PRESSURE REDUCING VALVE ELECTRICAL, CONTROLS & TELEMETRY (1 OF 2)

DETAIL W-15A

DATE: JANUARY 2023

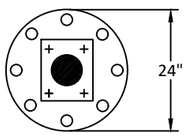
SCALE: N.T.S.



ANTENNA MAST NOTES:

1. INSTALL 30 FOOT TALL MAST FROM THE GRADE.
2. ANTENNA TO BE MOUNTED AT TOP OF POLE. CONTRACTOR TO PROVIDE BUCKET TRUCK FOR MOUNTING AND ADJUSTING ANTENNA.
3. CONCRETE BASED SHALL HAVE A 8-#6 REBAR CAGE FOR SUPPORT.
4. ANCHOR BOLTS BY LIGHT MFR SHALL BE A MIN. OF 4'9" LONG AND HAVE SST NUTS.
5. GROUNDING PER NEC REQUIREMENTS.

MAST TOP VIEW



NOTES:

1. ROUTE RF CABLE FROM ANTENNA TO CONTROL PANEL. CABLE MUST BE ROUTED THROUGH ANTENNA MAST.
2. INSTALL 120 VOLT POWER IN SEPARATE CONDUIT.
3. PROVIDE 120 VOLT CIRCUIT TO CONTROL PANEL.
4. FOR 120/240 VOLT (20 AMP) CIRCUITS:
   - 4.1. GENERAL OUTLETS
   - 4.2. DEHUMIDIFIER
   - 4.3. SUMP PUMP
   - 4.4. VAULT LIGHTING
   - 4.5. CONTROL PANEL
   - 4.6. 240V ELECTRIC HEATER
5. PROVIDE WIRING FROM CONTROL PANEL TO VAULT REFER TO CONDUIT/WIRE SCHEDULE.
6. PROVIDE AND INSTALL TWO (2) GROUND RODS AT THE CONTROL PANEL CABINET.
7. ALL CONDUIT RISERS AND 90° BENDS TO BE PVC COATED GRC OR GRC WRAPPED IN CORROSION TAPE.
8. CONTACT CITY FOR RADIO AND ANTENNA SPECIFICATIONS.
9. REFER TO PRV CONTROLS AND TELEMETRY DETAIL FOR ADDITIONAL REQUIREMENTS.
10. LOCATION OF CONTROL PANELS AND ANTENNA SHALL BE COORDINATED WITH GREELEY WATER & SEWER DEPARTMENT.
11. INSTALL EXPANSION SLEEVE FOR ALL CONDUITS THAT GO INTO GROUND.

IO LIST

DISCRETE INPUT		ANALOG INPUT		ANALOG OUTPUT	
DI-0	INT. ALARM	AI-0	FLOW METER (HIGH FLOW PRV)	AO-0	CRD POS. COMMAND (HIGH FLOW PRV)
DI-1	FLOOD ALARM	AI-1	FLOW METER (LOW FLOW PRV)	AO-1	CRD POS. COMMAND (LOW FLOW PRV)
DI-2		AI-2	INLET PRESSURE (HIGH FLOW PRV)	AO-2	
DI-3		AI-3	INLET PRESSURE (LOW FLOW PRV)	AO-3	
DI-4		AI-4	OUTLET PRESSURE (HIGH FLOW PRV)	AO-4	
DI-5		AI-5	OUTLET PRESSURE (LOW FLOW PRV)	AO-5	
DI-6		AI-6	CRD POS. FEEDBACK (HIGH FLOW PRV)	AO-6	
DI-7		AI-7	CRD POS. FEEDBACK (LOW FLOW PRV)	AO-7	

PANEL SCHEDULE

100 AMP MAIN

SPD	2P-30	1	2	1P-20	LIGHTS
SPD	2P-30	3	4	1P-20	GENERAL OUTLETS
HEATER	2P-20	5	6	1P-20	SUMP PUMP
HEATER	2P-20	7	8	1P-20	DEHUMIDIFIER
		9	10	1P-20	CONTROL PANEL
		11	12		

CONDUIT & WIRE LIST

CONDUIT TAG	CONDUIT LOCATION	CONDUIT SIZE	WIRE SIZE/TYPE
P-1	120/240V PANEL TO VAULT POWER J-BOX	2"	12) #12 XHHW + 1) #12 GROUND
C-1	CONTROL PANEL TO VAULT CONTROL J-BOX	2"	10) BELDEN 8760, 4) #14 XHHW + 1) #14 GROUND
C-2	CONTROL PANEL TO ANTENNA MAST	1"	1 OUTDOOR RATED, SHIELDED, GEL OR GEL TAPE CAT6e
N/A	***RED TRACER WIRE TO CHASE ALL CONDUITS		RED #10 SOLID DIRECT BURIAL

City of Greeley Colorado

(TYP) PRESSURE REDUCING VALVE ELECTRICAL, CONTROLS & TELEMETRY (2 OF 2)

DETAIL W-15B

DATE: JANUARY 2023

SCALE: N.T.S.

TYPICAL VAULT NOTES:

1. ALL METER, VALVE, AND VAULT COMPONENTS AND PRODUCT SPECIFICATIONS SHALL BE IN ACCORDANCE WITH APPROVED CONSTRUCTION DRAWINGS ALONG WITH WATER & SEWER (W&S) DEPARTMENT SPECIFICATIONS, LATEST REVISION.
2. PIPING CONFIGURATION IS GENERAL AND INDICATES MINIMUM REQUIREMENTS. CONTRACTOR TO PROVIDE ADDITIONAL PIPING, COUPLINGS, REDUCERS, AND ACCESSORIES AS NECESSARY FOR A COMPLETE SYSTEM. VAULT MODIFICATIONS MAY BE REQUIRED FOR A COMPLETE SYSTEM.
3. METER OR PRV COMPONENTS, INSTRUMENTATION, AND ELECTRICAL SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
4. CONTRACTOR TO SUBMIT VAULT MANUFACTURER'S SHOP DRAWINGS TO ENGINEERING DEVELOPMENT REVIEW FOR ACCEPTANCE A MINIMUM OF 2 WEEKS PRIOR TO ORDERING AND INSTALLATION.
5. APPROPRIATE LENGTH OF STRAIGHT PIPE SEGMENTS UPSTREAM AND DOWNSTREAM OF METER OR VALVE SHALL BE PROVIDED PER THE METER/VALVE MANUFACTURER'S RECOMMENDATION.
6. FOR INSTALLATIONS LARGER THAN 2", ALL PIPING AND APPURTENANCES WITHIN THE VAULT SHALL BE FLANGED DIP. ALL OTHER EXTERIOR PIPING AND APPURTENANCES, BETWEEN AND INCLUDING THE EXTERIOR TEES AND VALVES, SHALL BE MECHANICAL RESTRAINED JOINT DIP.
7. ALL VAULT JOINTS SHALL BE WATER TIGHT.
8. ALL EQUIPMENT AND PIPING SHALL BE ADEQUATELY SUPPORTED AND ATTACHED TO THE VAULT WALL OR FLOOR USING STAINLESS STEEL FASTENERS AND BOLTS OR APPROVED EQUIVALENT.
9. VAULT COVERS SHALL BE APPROVED MANHOLE COVERS, MARKED “WATER” OR “IRRIGATION” AS REQUIRED, AND INCLUDE AN INNER FROST PROOF LID. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR APPROVED VAULT COVER MATERIALS AND MANUFACTURERS.
10. FOR VAULTS PERMITTED IN ROAD RIGHT-OF-WAY, VAULT AND RING/COVER SHALL BE RATED FOR HS-20 TRAFFIC LOADING.
11. VAULT LADDER SHALL HAVE OSHA-APPROVED EXTENSION POST INSTALLED.
12. VAULT EXTERIOR SHALL BE COVERED WITH 2” THICK INSULATION BOARD.
13. IF SURFACE IS NOT TO FINAL GRADE AT TIME OF METER VALVE INSTALLATION OR GRADE CHANGES AFTER INSTALLATION, PROPERTY OWNER MUST ADJUST PIT OF VAULT MANHOLE COVER TO MEET SPECIFICATIONS.
14. SLOPE FINAL GROUND SURFACE AWAY FROM PIT VAULT COVER AT A 2% MINIMUM GRADE. MANHOLE LIDS SHALL NOT BE LOCATED IN DRAINAGE AREA OR PAN.
15. SUBGRADE AND SOIL SURROUNDING VAULT SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE WITH WATER & SEWER SPECIFICATIONS, LATEST REVISION.
16. MANHOLE BASEBEAMS ARE REQUIRED FOR ALL MANHOLE VAULT INSTALLATIONS.
17. ALL PIPING TO BE PRESSURE TESTED PER W & S SPECIFICATIONS, LATEST REVISION.
18. ALL THREADED CONNECTIONS SHALL HAVE TEFLON TAPE OR APPROVED EQUIVALENT TO ENSURE NO LEAKING OCCURS.
19. COPPER SHALL NOT SHOW ANY VISIBLE SIGNS OF CRIMPING.

VAULT ELECTRICAL SPECIFICATIONS:

1. PROVIDE 100 AMP 240/120 VOLT METER LOAD CENTER COMBINATION WITH A MINIMUM 12 SPACES, LOCATED WITHIN 25' OF VAULT.
2. PROVIDE 1-¼" CONDUIT, SCHEDULE 80, FROM LOAD CENTER TO JUNCTION OR PULL BOX IN VAULT WITH ONE SPARE.
3. JUNCTION OR PULL BOX SHALL HAVE 12”X12X8” MINIMUM PANEL LOCATED INSIDE VAULT FOR EXTRA CIRCUIT CONDUIT CONNECTIONS.
4. PROVIDE FIVE 20-AMP BREAKERS FOR LOAD CENTER.
5. PROVIDE OUTLET FOR SUMP PUMP AND DEHUMIDIFIER, 20-AMP 120 VOLT CIRCUIT.
6. PROVIDE LED LIGHTING CIRCUIT: TWO 10-WATT LED LIGHTS WITH OUTDOOR SWITCH LOCATED IN VAULT ON 20-AMP 120 VOLT CIRCUIT.
7. PROVIDE ONE 20-AMP GFI OUTLET FOR SERVICE WORK LOCATED INSIDE VAULT.
8. ALL CONDUIT BOXES, FITTINGS, AND HANGERS SHALL BE PVC, FIBERGLASS, OR STAINLESS STEEL AND SUITABLE FOR OUTDOOR USE.
9. PROVIDE DISCONNECT LOCATED BEFORE METER OR VALVE COMBINATION AS REQUIRED PER ELECTRIC UTILITY IF APPLICABLE.
10. PROVIDE 2” SCHEDULE 80 PVC CONDUITS FROM POLE TO TRANSFORMER TO LOAD CENTER.
11. PROVIDE 240 VOLT SURGE PROTECTION FOR LOAD CENTER.
12. MUST MEET ALL CITY OF GREELEY AND STATE ELECTRICAL CODE REQUIREMENTS.

DEHUMIDIFIER SPECIFICATIONS:

1. DEHUMIDIFIER SHALL BE A LOW TEMP 38 DEGREES OR LOWER AND BE INSTALLED TO MANUFACTURER SPECIFICATIONS.
2. DEHUMIDIFIER SHALL BE INSTALLED A MINIMUM 2' FROM THE VAULT FLOOR.
3. A MINIMUM ½” HOSE SHALL BE INSTALLED FROM DEHUMIDIFIER TO THE SUMP PIT.

METER INSTALLATION NOTES:

1. METER SETTING MUST BE INSPECTED BEFORE BACKFILLING. FOR INSPECTION CALL (970) 350-9317.
2. NO SPRINKLER SYSTEM CONNECTION SHALL BE MADE IN THE VAULT. SPRINKLER PIT SHALL BE MINIMUM 5' DOWNSTREAM FROM THE FINAL VAULT APPURTENANCE (BYPASS TEE).
3. NO MAJOR LANDSCAPING OR STRUCTURES SHALL BE LOCATED WITHIN 10' OF METER VAULT.
4. PRESSURE REDUCING AND BACKFLOW DEVICES SHALL BE INSTALLED INSIDE THE BUILDING SERVED. INSTALL PER CITY OF GREELEY ADOPTED BUILDING CODE.
5. REFER TO W&S SPECIFICATIONS, LATEST REVISION, FOR PRODUCT SPECIFICATIONS.
6. LOCATION OF METER VAULT SHALL NOT BE MORE THAN 2 FEET DOWNSTREAM OF CURBSTOP UNLESS OTHERWISE APPROVED BY W&S.

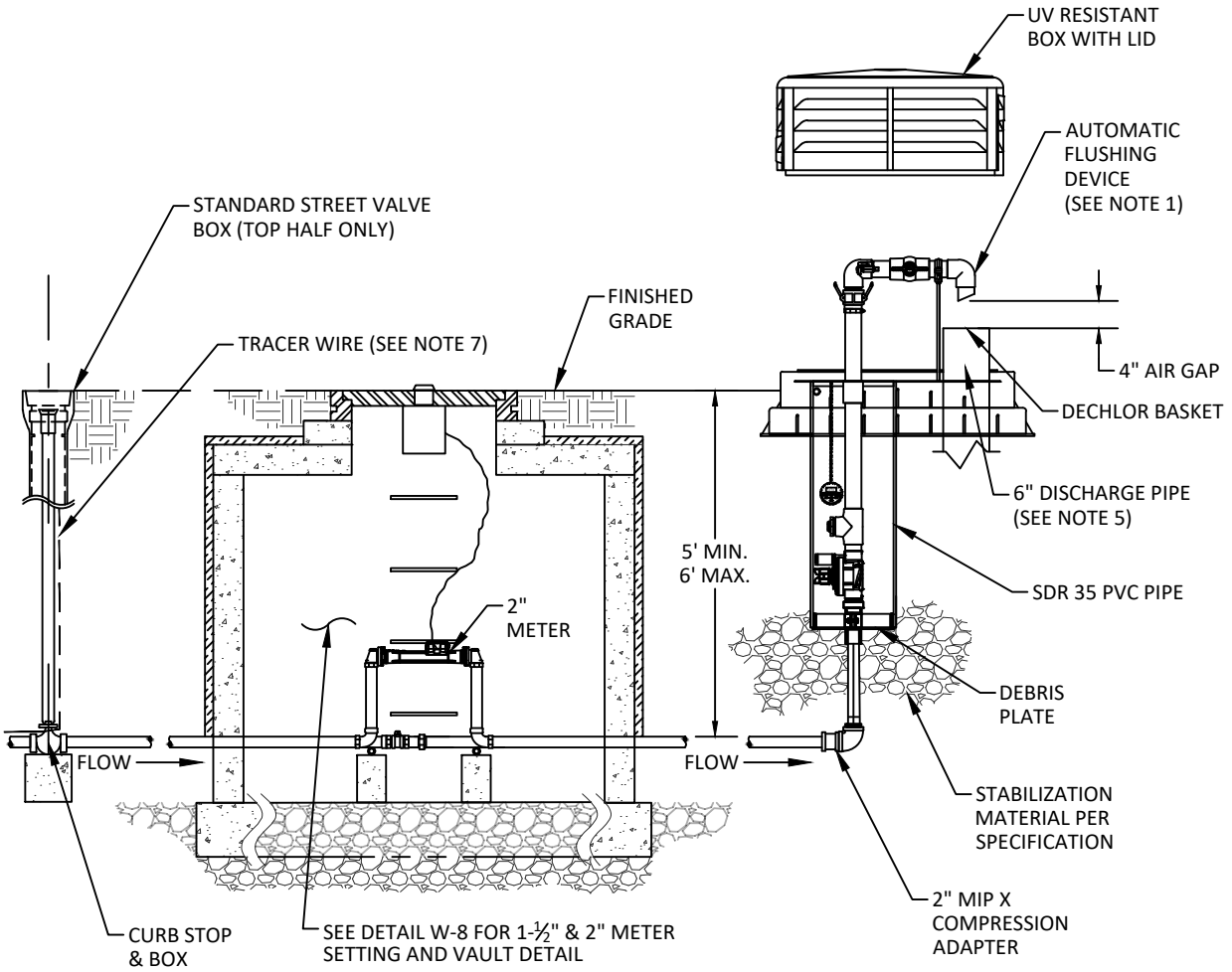
City of Greeley Colorado

(TYP) VAULT NOTES

DETAIL W-16

DATE: JANUARY 2023

SCALE: N.T.S.



NOTES:

1. FLUSHING DEVICE SHALL BE KUPFERLE #9800 FLUSHING STATION OR APPROVED EQUAL.
2. FLUSHING DEVICE SHALL BE INSTALLED PER MFR REQUIREMENTS.
3. REFER TO WATER & SEWER (W&S) DETAIL W-8, LATEST REVISION, FOR METER INSTALLATION AND LOCATION REQUIREMENTS.
4. FLUSH LINES FREE OF DEBRIS BEFORE INSTALLATION
5. CITY MAY REQUIRE INSTALLATION OF STORMWATER LINE UP TO DISCHARGE POINT TO MANAGE FLUSH WATER.
6. ALL BURIED PIPING SHALL BE INSTALLED AND RESTRAINED IN ACCORDANCE WITH W&S SPECIFICATIONS, LATEST REVISION.
7. INSTALL TRACER WIRE ACCORDING TO W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
8. ALL PIPING SHALL BE 2 INCHES.

City of Greeley Colorado

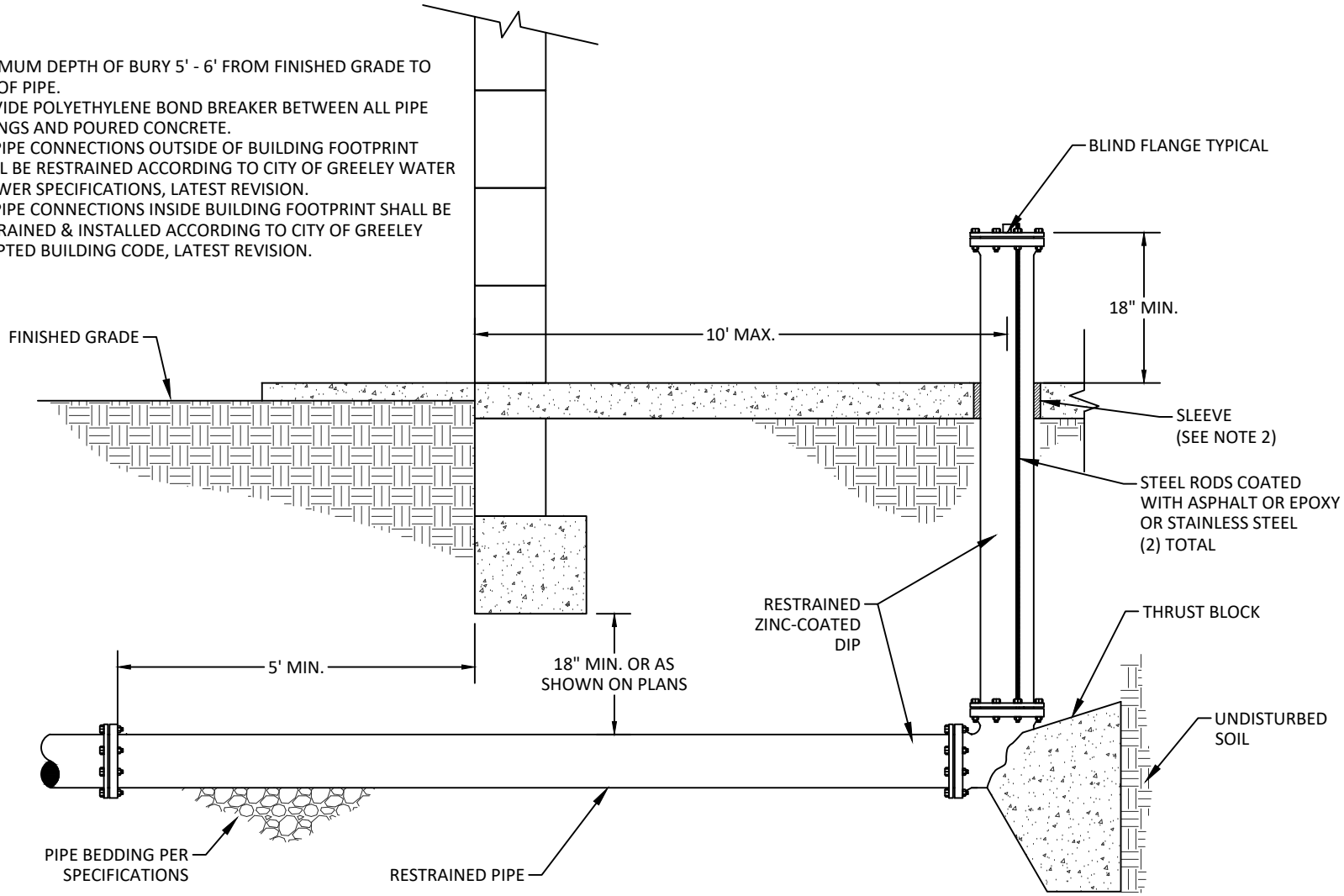
AUTOMATIC FLUSHING STATION WITH METER

DETAIL W-17

DATE: JANUARY 2023 SCALE: N.T.S.

NOTES:

1. MINIMUM DEPTH OF BURY 5' - 6' FROM FINISHED GRADE TO TOP OF PIPE.
2. PROVIDE POLYETHYLENE BOND BREAKER BETWEEN ALL PIPE FITTINGS AND POURED CONCRETE.
3. ALL PIPE CONNECTIONS OUTSIDE OF BUILDING FOOTPRINT SHALL BE RESTRAINED ACCORDING TO CITY OF GREELEY WATER & SEWER SPECIFICATIONS, LATEST REVISION.
4. ALL PIPE CONNECTIONS INSIDE BUILDING FOOTPRINT SHALL BE RESTRAINED & INSTALLED ACCORDING TO CITY OF GREELEY ADOPTED BUILDING CODE, LATEST REVISION.



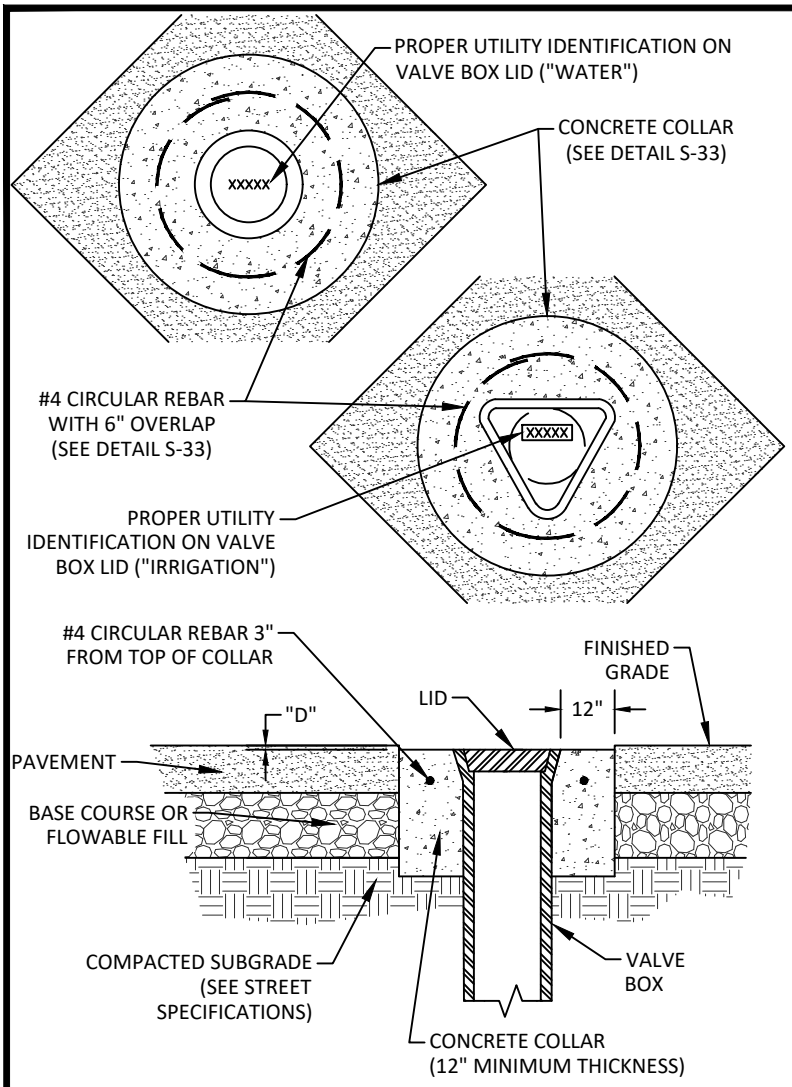
City of Greeley Colorado

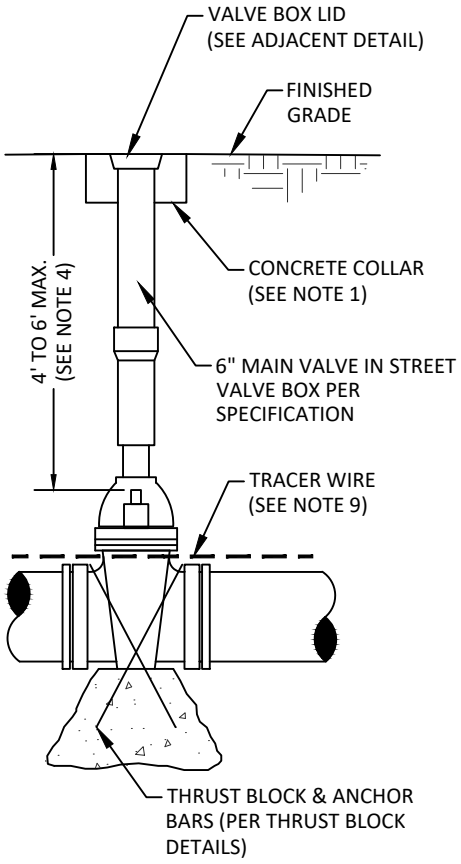
FIRE RISER INSTALLATION

DETAIL W-18

DATE: JANUARY 2023

SCALE: N.T.S.





NOTES:

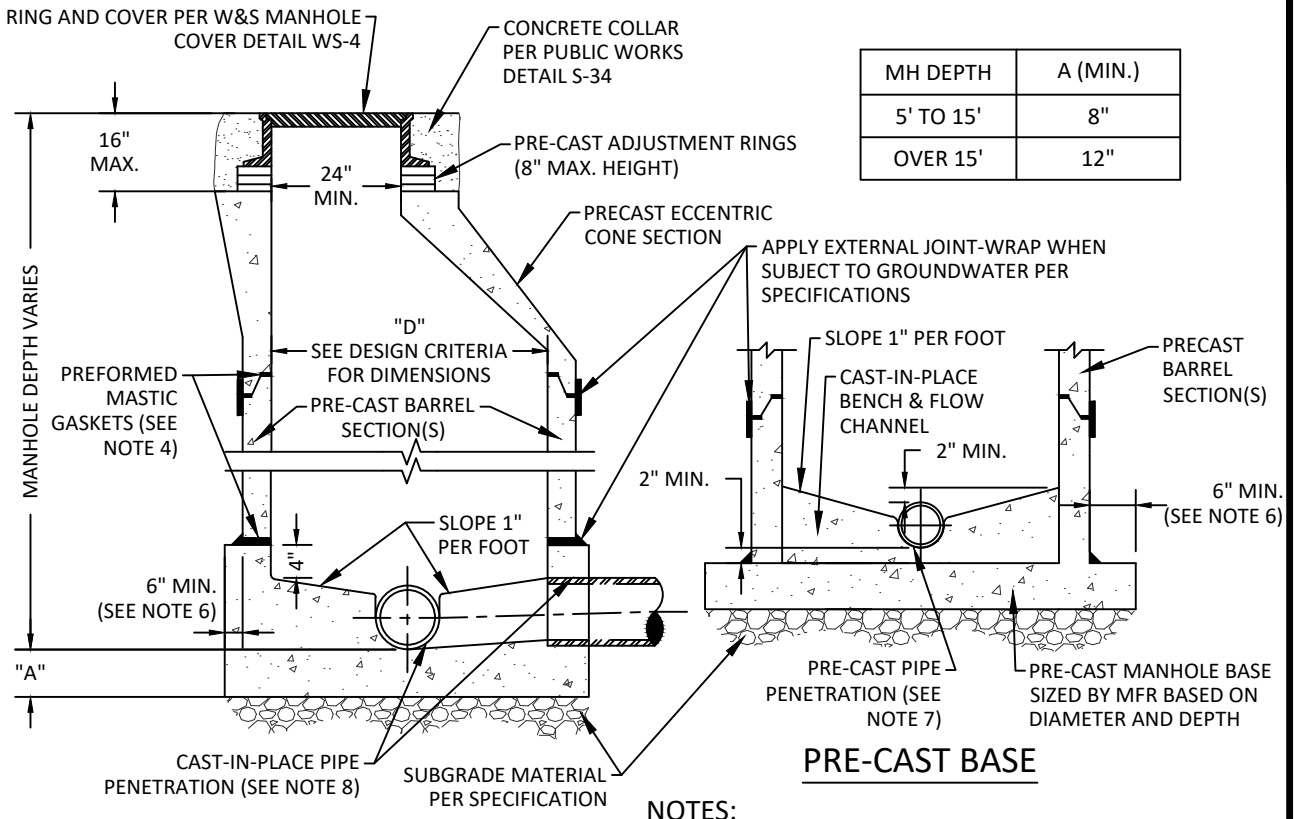
1. VALVE BOX SHALL BE PLACED IN A CONCRETE COLLAR AT THE SURFACE FOR STABILIZATION. REFER TO STREETS STANDARD DETAILS, LATEST REVISION, FOR VALVE BOXES LOCATED IN PUBLIC STREETS AND ROADWAYS (S-33).
2. VALVE BOX SHALL BE CENTERED & PLUMB OVER THE OPERATING NUT.
3. OPERATING NUT ON BURIED VALVES SHALL BE BETWEEN 4' & 6' BELOW FINISHED GRADE. EXTENSION REQUIRED IF DEEPER THAN 6' TO BRING THE OPERATING NUT TO THE SPECIFIED RANGE.
4. PROVIDE POLYETHYLENE BOND BREAKER BETWEEN ALL PIPE/FITTINGS AND POURED CONCRETE.
5. ALL BURIED VALVES, FITTINGS, AND APPURTENANCES SHALL BE RESTRAINED AND INSTALLED PER WATER & SEWER (W&S) SPECIFICATIONS (SPECIFICATIONS), LATEST REVISION.
6. ALL BURIED VALVES TO BE INSTALLED ACCORDING TO W&S THRUST BLOCK DETAILS AND SPECIFICATIONS, LATEST REVISION OF EACH.
7. BEDDING AND BACKFILL AROUND VALVE SHALL BE PLACED PER W&S SPECIFICATIONS, LATEST REVISION.
8. INSTALL TEST STATION AND TRACER WIRE ACCORDING TO W&S SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") STANDARD DETAILS, LATEST REVISION OF EACH.
9. UNLESS OTHERWISE SPECIFIED, THIS DETAIL ALSO APPLIES TO BOTH POTABLE WATER AND NON-POTABLE IRRIGATION STANDARD VALVES.

City of Greeley Colorado

STANDARD VALVE & RISER ASSEMBLY

DETAIL W-19

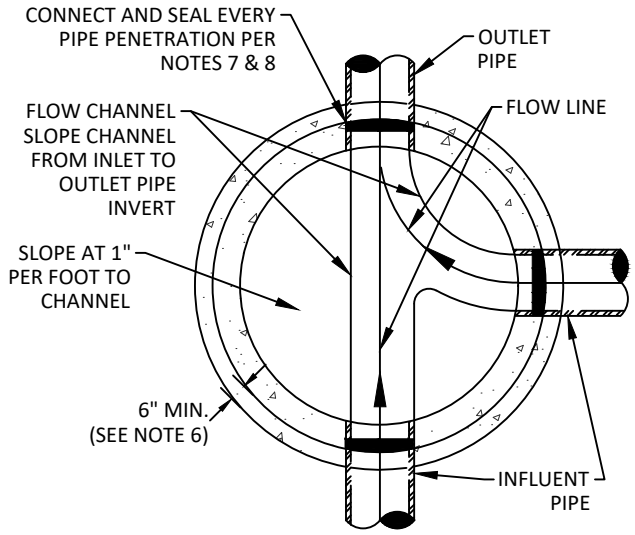
DATE: JANUARY 2023 SCALE: N.T.S.



MH DEPTH	A (MIN.)
5' TO 15'	8"
OVER 15'	12"

CAST-IN-PLACE BASE

PRE-CAST BASE



PLAN VIEW

NOTES:

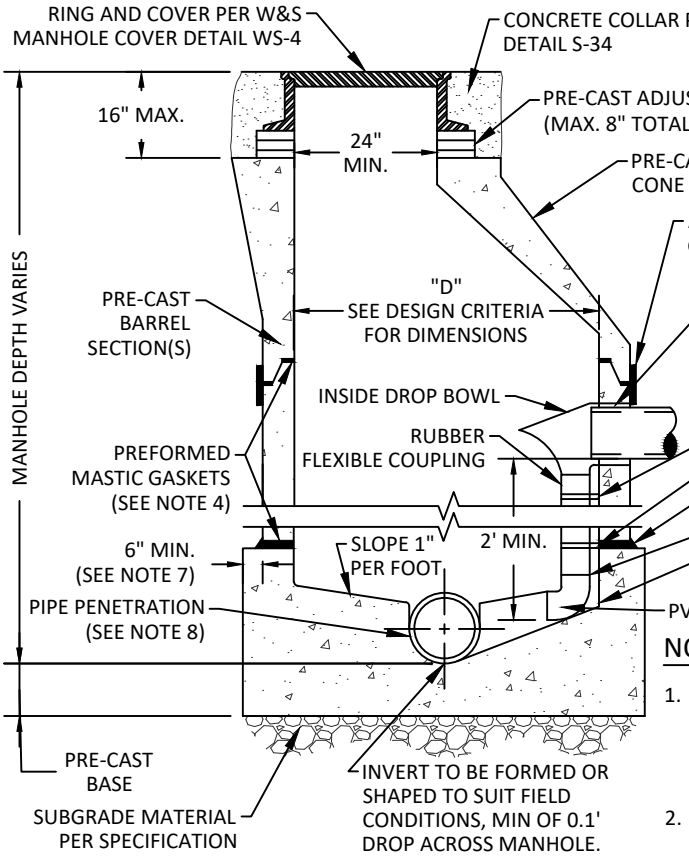
1. REFERENCE CITY OF GREELEY WATER & SEWER (W&S) DESIGN CRITERIA FOR MINIMUM MANHOLE DIAMETER (D), AND WATER & SEWER CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS) AND MATERIAL/INSTALLATION REQUIREMENTS, LATEST REVISION.
2. MANHOLES INSTALLED IN GROUNDWATER ABOVE THE BASE SHALL HAVE ALL MANHOLE SECTION JOINTS SEALED PER W&S SPECIFICATIONS.
3. ALL SEWER MANHOLES SHALL BE VACUUM TESTED PER SPECIFICATIONS.
4. SEE W&S SPECIFICATIONS, LATEST REVISION, FOR ACCEPTABLE MFR FOR PREFORMED MASTIC GASKETS.
5. ALL BURIED PIPING SHALL BE INSTALLED IN ACCORDANCE WITH W&S SPECIFICATIONS.
6. BASE SHALL BE AT LEAST 6" WIDER THAN THE BOTTOM PRE-CAST BARREL SECTION AND WIDE ENOUGH TO PREVENT FLOTATION AS DESIGNED BY THE ENGINEER.
7. FOR PIPE PENETRATIONS IN CAST-IN-PLACE BASE, AN APPROVED SWELLSTOP SEAL ON PIPE BARREL SHALL BE USED. SEE SPECIFICATIONS FOR APPROVED MFR AND INSTALLATION REQUIREMENTS.
8. FOR PRE-CAST BASE, PIPE PENETRATIONS SHALL BE INSTALLED WITH A-LOK RUBBER BOOT CONNECTORS OR APPROVED EQUAL.
9. CHANNEL INVERT TO BE FORMED OR SHAPED TO SUIT FIELD CONDITIONS AND MATCH PIPE SIZE, MIN. OF 0.1' DROP ACROSS MANHOLE.
10. ALL PIPES WITH MULTIPLE SIZES MUST HAVE MATCHING CROWNS TO ELIMINATE POSSIBLE SEWER BACKUPS.

City of Greeley Colorado

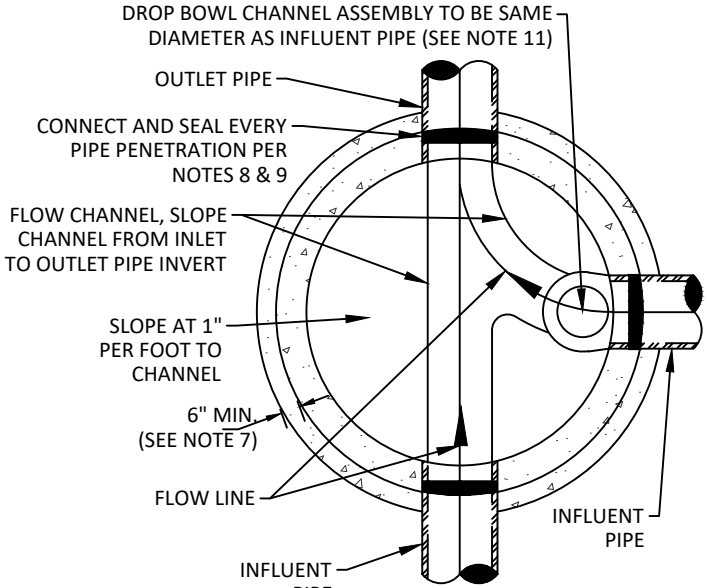
STANDARD SANITARY SEWER MANHOLE

DETAIL SS-1

DATE: JANUARY 2023 SCALE: N.T.S.



PRE-CAST BASE



PLAN VIEW

NOTES:

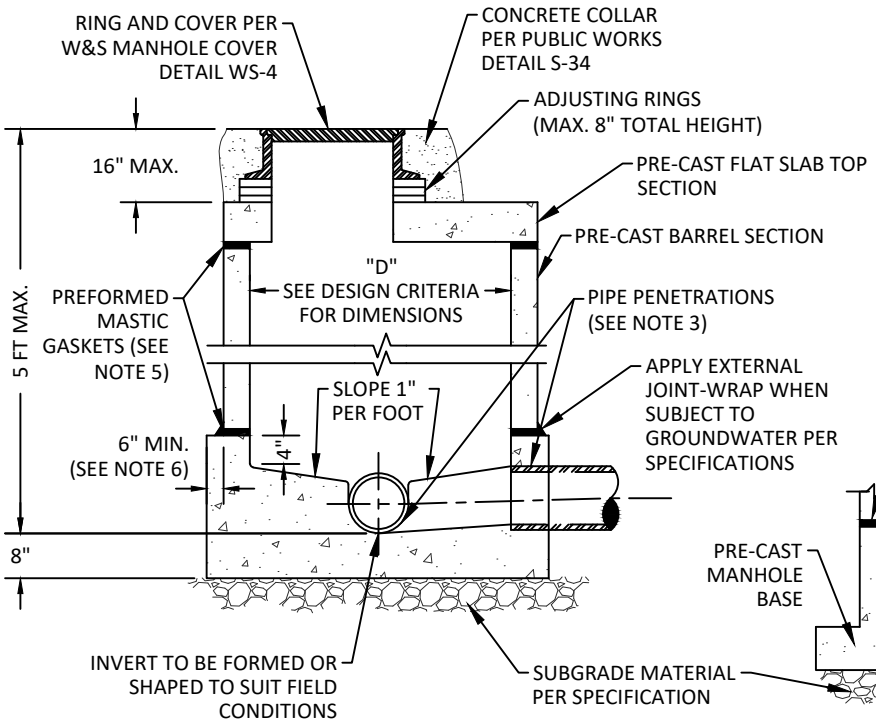
1. REFERENCE CITY OF GREELEY WATER & SEWER (W&S) DESIGN CRITERIA FOR MINIMUM MANHOLE DIAMETER (D), AND CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS) FOR MATERIAL/INSTALLATION REQUIREMENTS.
2. MANHOLES INSTALLED IN GROUNDWATER ABOVE THE BASE SHALL HAVE ALL MANHOLE SECTION JOINTS SEALED PER W&S SPECIFICATIONS.
3. ALL WASTEWATER MANHOLES SHALL BE VACUUM TESTED PER SPECIFICATIONS
4. MANHOLE RETROFITS CAN ROUTE DROP EQUIPMENT PIPING INTO INSIDE FLOW LINE CHANNEL.
5. SEE W&S SPECIFICATIONS, LATEST REVISION, FOR ACCEPTABLE MFR FOR PREFORMED MASTIC GASKETS
6. ALL BURIED PIPING SHALL BE INSTALLED IN ACCORDANCE WITH W&S SPECIFICATIONS.
7. BASE SHALL BE AT LEAST 6" WIDER THAN THE BOTTOM PRE-CAST BARREL SECTION AND WIDE ENOUGH TO PREVENT FLOTATION AS DESIGNED BY THE ENGINEER.
8. FOR PIPE PENETRATIONS IN CAST-IN-PLACE BASE, AN APPROVED SWELLSTOP SEAL ON PIPE BARREL SHALL BE USED. SEE SPECIFICATIONS FOR APPROVED MFR AND INSTALLATION REQUIREMENTS.
9. FOR PRE-CAST BASE, PIPE PENETRATIONS SHALL BE INSTALLED WITH A-LOK RUBBER BOOT CONNECTORS OR APPROVED EQUAL.
10. ALL PIPES WITH MULTIPLE SIZES MUST HAVE MATCHING CROWNS TO ELIMINATE POSSIBLE SEWER BACKUPS.
11. DROP BOWL CHANNEL ASSEMBLY TO BE SAME DIAMETER AS INFLUENT PIPE, OR SIZED TO MEET FULL PIPE CAPACITY OR SPECIFICALLY APPROVED BY W&S DEPARTMENT.
12. ALL SECTIONS OF DROP MANHOLES MUST BE PROTECTED AGAINST MICROBIAL INDUCED CORROSION PER W&S DESIGN CRITERIA AND SPECIFICATIONS.

City of Greeley Colorado

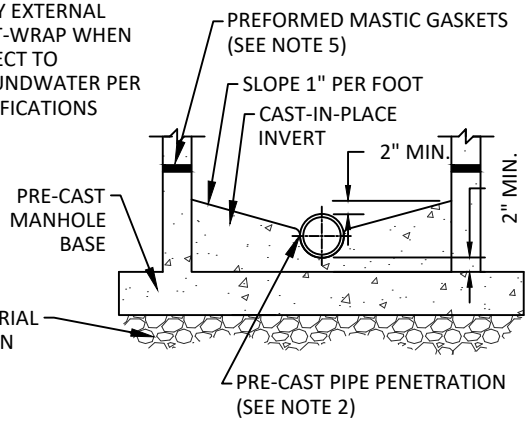
INSIDE DROP SANITARY SEWER MANHOLE

DETAIL SS-2

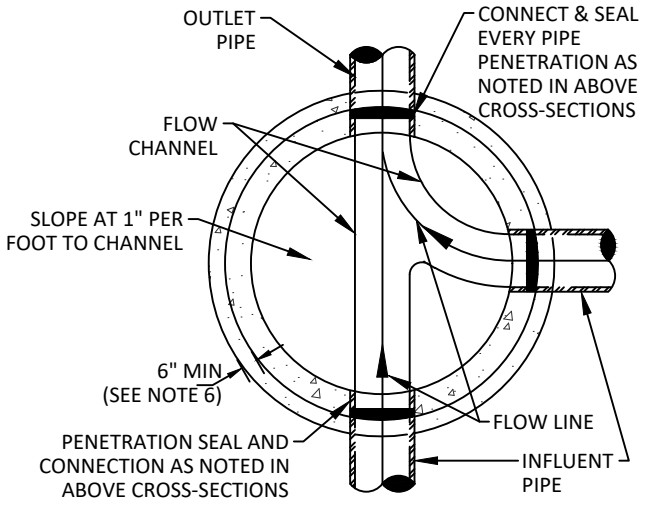
DATE: JANUARY 2023 SCALE: N.T.S.



CAST-IN-PLACE BASE



PRE-CAST BASE



PLAN VIEW

NOTES:

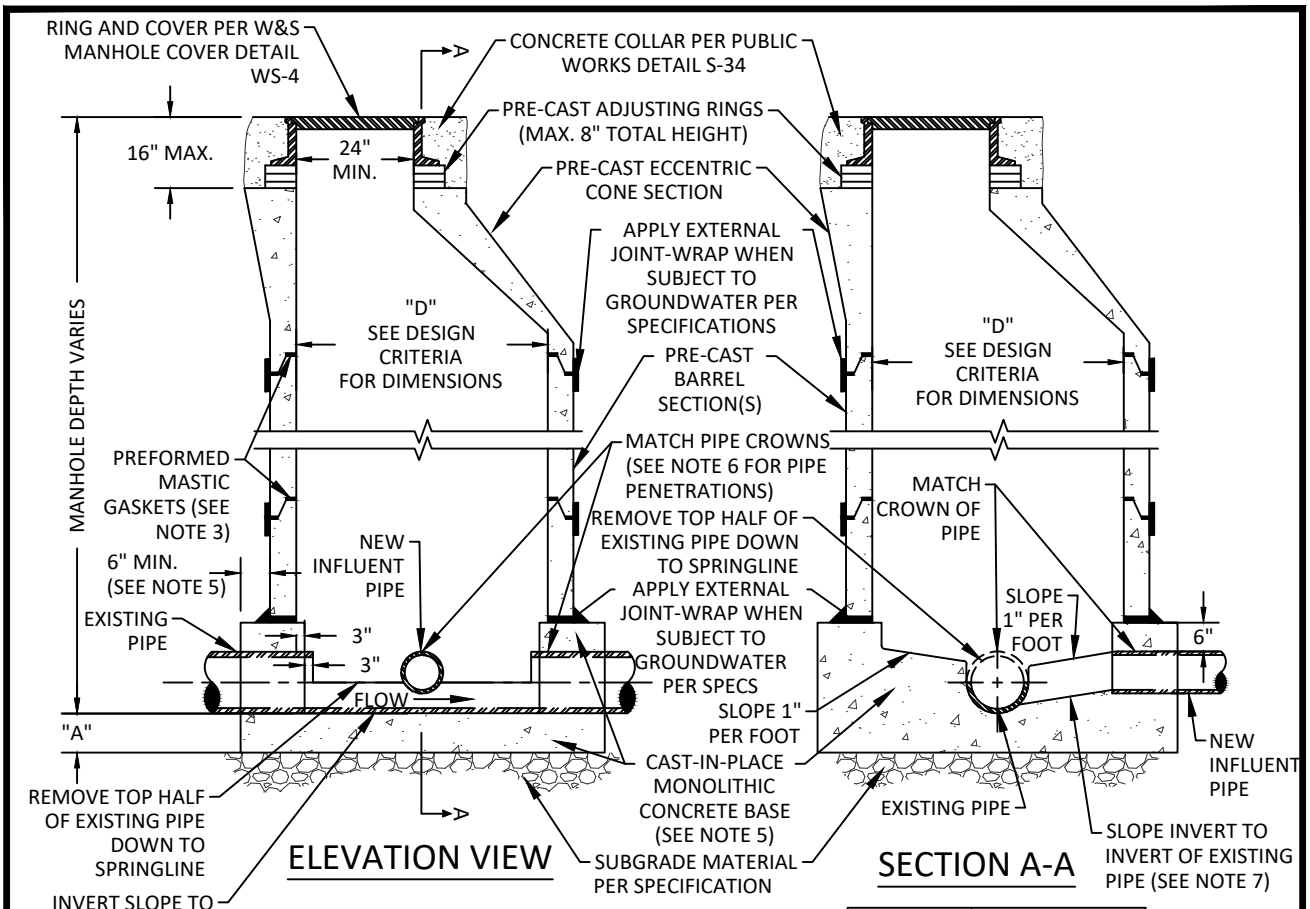
1. REFERENCE CITY OF GREELEY WATER & SEWER (W&S) DESIGN CRITERIA FOR MINIMUM MANHOLE DIAMETER (D), AND CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS) FOR MATERIAL/INSTALLATION REQUIREMENTS.
2. FOR PIPE PENETRATIONS IN CAST-IN-PLACE BASE, AN APPROVED SWELLSTOP SEAL ON PIPE BARREL SHALL BE USED. SEE SPECIFICATIONS FOR APPROVED MFR AND INSTALLATION REQUIREMENTS.
3. FOR PRE-CAST BASE, PIPE PENETRATIONS SHALL BE INSTALLED WITH A-LOK RUBBER BOOT CONNECTORS OR APPROVED EQUAL.CONNECTORS OR APPROVED EQUAL.
4. ALL SEWER MANHOLES SHALL BE VACUUM TESTED PER SPECIFICATIONS
5. SEE SPECIFICATIONS FOR ACCEPTABLE MFR FOR PREFORMED MASTIC GASKETS
6. ALL BURIED PIPING SHALL BE INSTALLED IN ACCORDANCE WITH W&S SPECIFICATIONS.
7. BASE SHALL BE AT LEAST 6" WIDER THAN THE BOTTOM PRE-CAST BARREL SECTION AND WIDE ENOUGH TO PREVENT FLOTATION AS DESIGNED BY THE ENGINEER.

City of Greeley Colorado

SHALLOW SANITARY SEWER MANHOLE

DETAIL SS-3

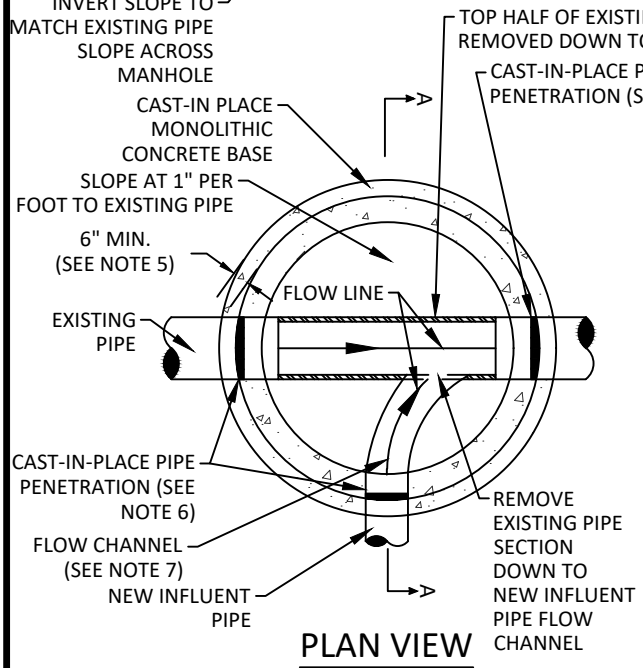
DATE: JANUARY 2023 SCALE: N.T.S.



ELEVATION VIEW

SECTION A-A

MH DEPTH	A (MIN.)
5' TO 15'	8"
15' TO 25'	10"



PLAN VIEW

NOTES:

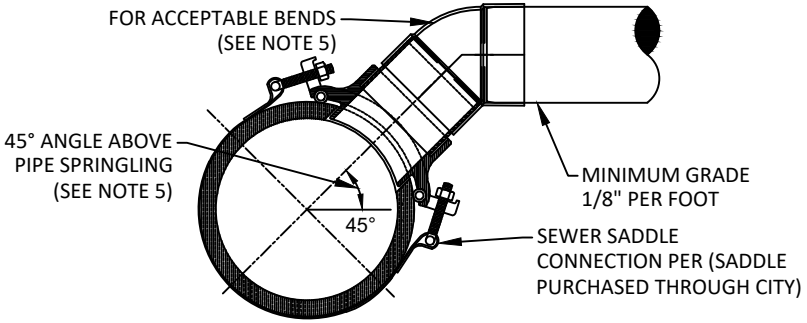
1. REFERENCE CITY OF GREELEY WATER & SEWER (W&S) DESIGN CRITERIA FOR MINIMUM MANHOLE DIAMETER (D), AND CONSTRUCTION SPECIFICATIONS FOR MATERIAL/INSTALLATION REQUIREMENTS.
2. ALL WASTEWATER MANHOLES SHALL BE VACUUM TESTED PER SPECIFICATIONS
3. SEE WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR ACCEPTABLE MFR FOR PREFORMED MASTIC GASKETS
4. ALL BURIED PIPING SHALL BE INSTALLED IN ACCORDANCE WITH WATER & SEWER SPECIFICATIONS, LATEST REVISION.
5. CAST-IN-PLACE BASE SHALL BE AT LEAST 6" WIDER THAN THE BOTTOM PRE-CAST BARREL SECTION AND WIDE ENOUGH TO PREVENT FLOTATION AS DESIGNED BY THE ENGINEER.
7. FOR PIPE PENETRATIONS IN CAST-IN-PLACE BASE, AN APPROVED SWELLSTOP SEAL ON PIPE BARREL SHALL BE USED. SEE SPECIFICATIONS FOR APPROVED MFR AND INSTALLATION REQUIREMENTS.
8. MANHOLE BASE THICKNESS ARE MINIMUMS OR AS DESIGNED BY PRECAST MANUFACTURER AND TO PREVENT FLOATATION.

City of Greeley Colorado

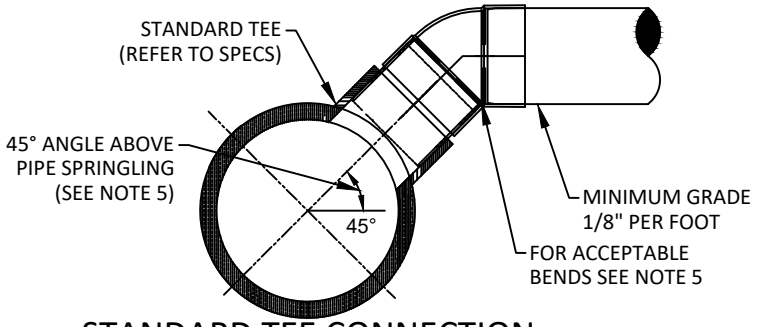
MANHOLE OVER EXISTING SANITARY SEWER LINE

DETAIL SS-4

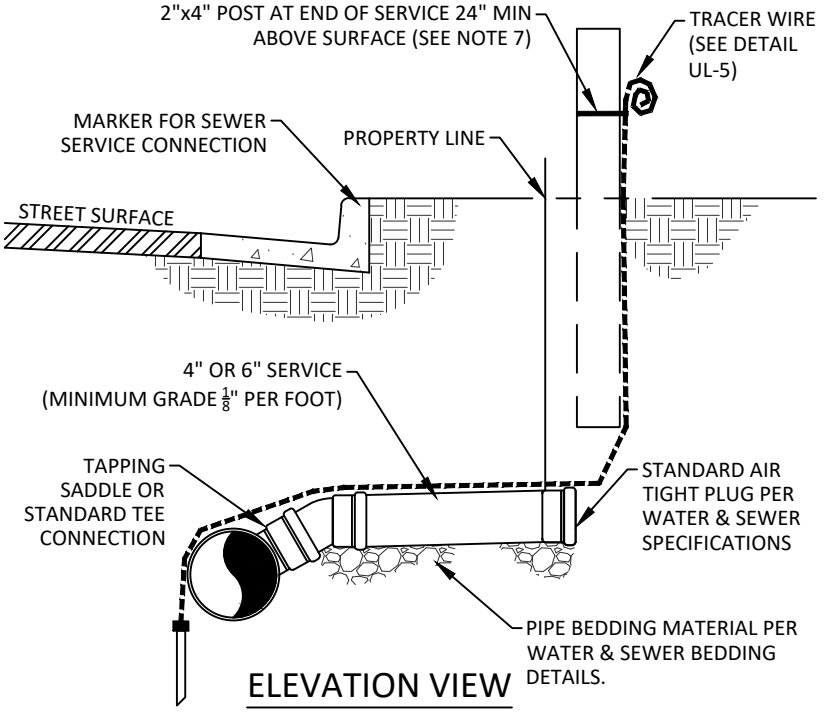
DATE: JANUARY 2023 SCALE: N.T.S.



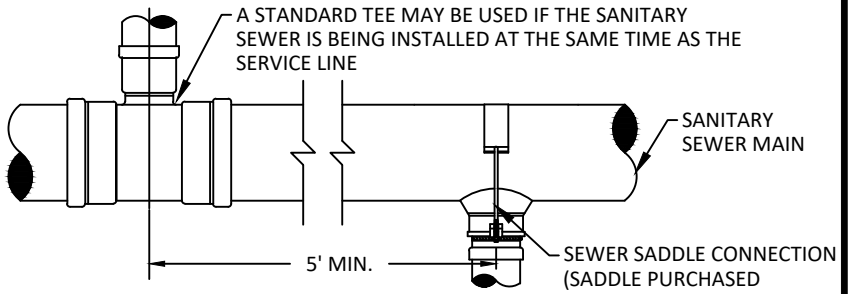
STANDARD SADDLE CONNECTION



STANDARD TEE CONNECTION



ELEVATION VIEW



PLAN VIEW

NOTES:

1. IN NO CASE SHALL THE SERVICE LINE PROTRUDE INTO THE MAIN.
2. SERVICES ARE 4" OR 6" IN DIAMETER AND SHALL HAVE A MINIMUM SLOPE OF 1.0% (1/8" PER FOOT) AND A MAXIMUM SLOPE OF 8.0%.
3. SERVICES 8" DIAMETER AND LARGER SHALL BE CONNECTED TO A MANHOLE.
4. SERVICES SHALL EXTEND TO THE PROPERTY LINE UNLESS OTHERWISE SHOWN ON CITY ACCEPTED CONSTRUCTION DRAWINGS.
5. SERVICE CONNECTIONS SHALL BE INSTALLED AT A POSITION 45° ABOVE PIPE SPRINGLINE. ACCEPTABLE BENDS FOR SERVICE CONNECT ARE 45°, 22.5° & 11.25°.
6. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY WATER & SEWER SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") DETAILS, LATEST REVISION OF EACH.
7. 2 X 4 POST SHALL BE EXTERIOR GRADE, PRESSURE TREATED, LUMBER.
8. TAPPING OF EXISTING SEWER LINE TO BE SCHEDULED WITH CITY AT LEAST 72 HOURS PRIOR TO CONSTRUCTION (970) 350 - 9322.

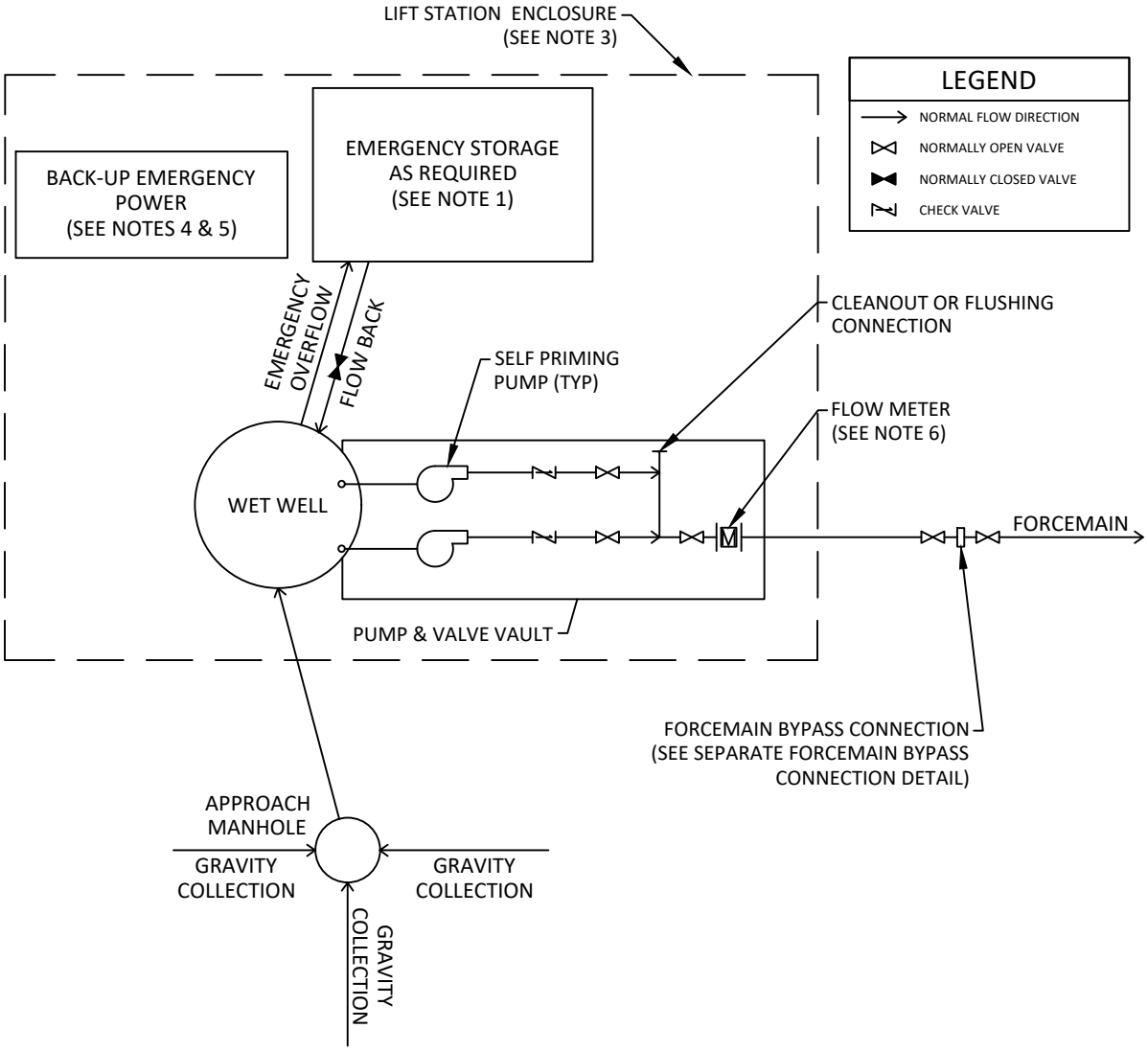
City of Greeley Colorado

SANITARY SEWER SERVICE CONNECTION

DETAIL SS-5

DATE: JANUARY 2023

SCALE: N.T.S.



NOTES:

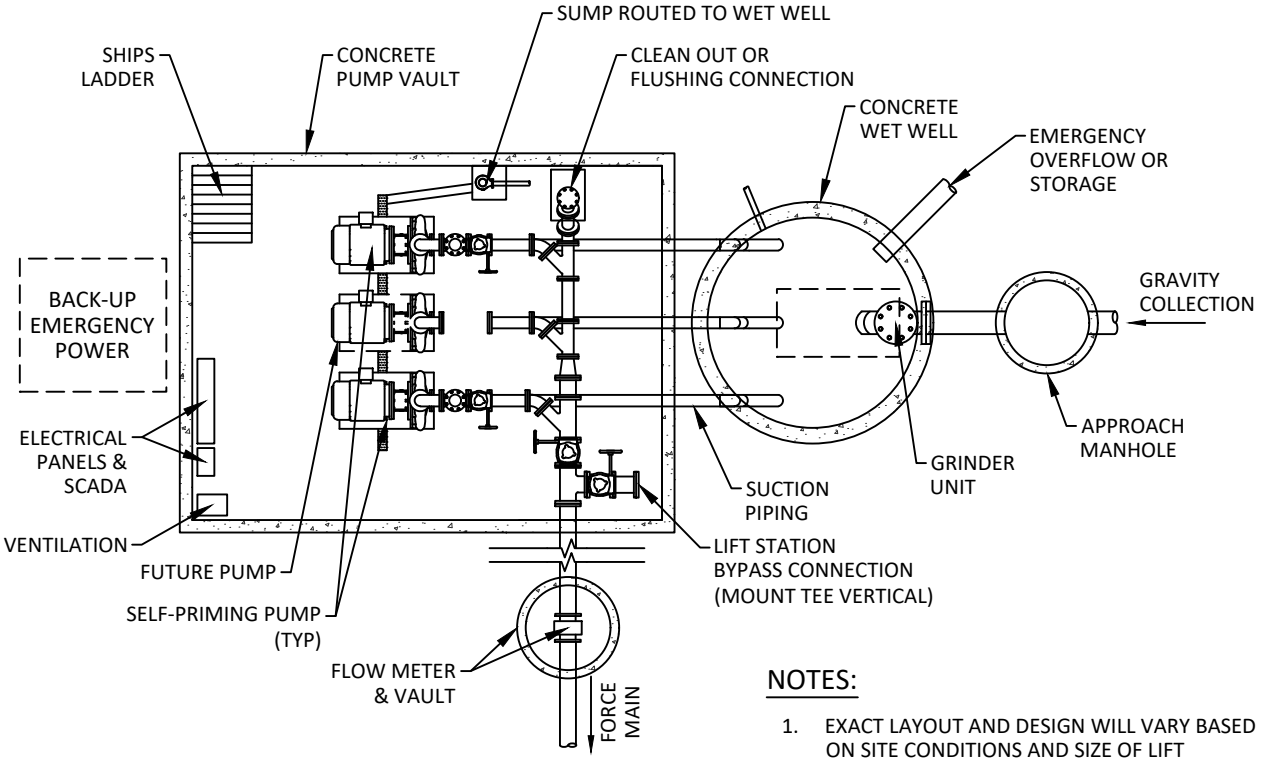
1. EMERGENCY STORAGE VOLUME WILL BE BASED ON PEAK HOURLY FLOW AND RESPONSE TIME. STORAGE VOLUME IS SUBJECT TO REVIEW & ACCEPTANCE BY THE CITY AND COLORADO DEPARTMENT OF PUBLIC HEALTH & ENVIRONMENT (CDPHE).
2. LIFT STATION BYPASS CONNECTION IS REQUIRED FOR ALL LIFT STATIONS.
3. FINAL ORIENTATION AND ARRANGEMENT OF LIFT STATION AND FORCE MAIN SUBJECT TO REVIEW & ACCEPTANCE BY CITY.
4. BACK-UP EMERGENCY POWER SYSTEM SHALL BE INCLUDED IN THE STATION BY PUMP MANUFACTURER OR INDEPENDENT GAS GENERATOR.
5. SKID-MOUNTED NATURAL GAS DRIVEN ENGINES INTEGRAL WITH SKID-MOUNTED LIFT STATION PUMP SYSTEM PREFERRED FOR BACK-UP EMERGENCY POWER SYSTEMS.
6. FLOW METER SHALL BE INSIDE DEDICATED METER VAULT PER WATER METER VAULT DETAILS, LATEST REVISION, OR LIFT STATION ENCLOSURE (PREFERRED).
7. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR ACCEPTABLE PRODUCT AND EQUIPMENT MODELS AND MANUFACTURERS.

City of Greeley Colorado

(TYP) LIFT STATION FLOW SCHEMATIC

DETAIL SS-6

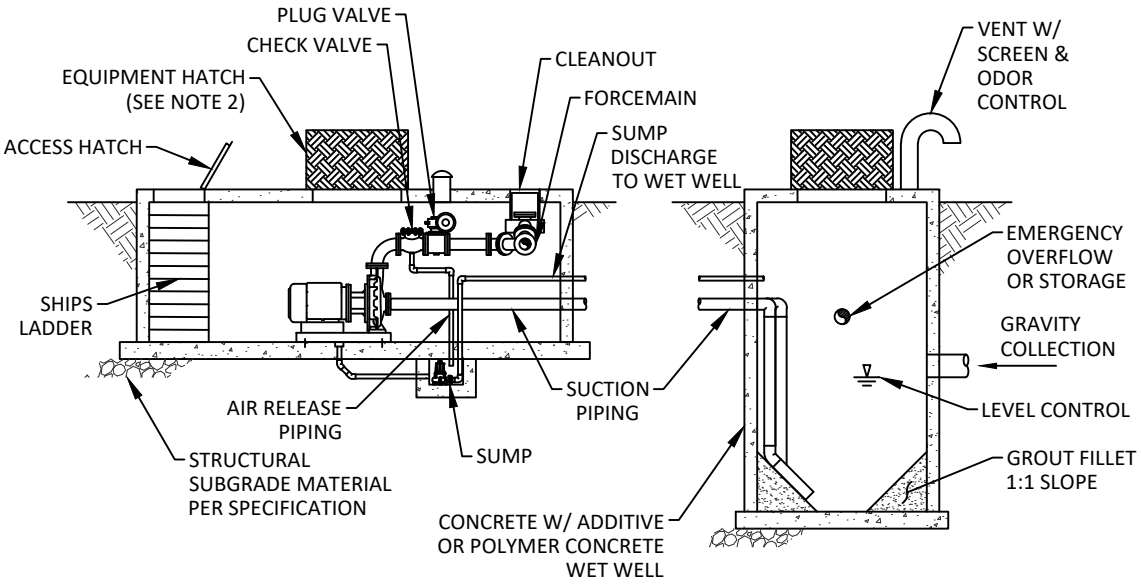
DATE: JANUARY 2023 SCALE: N.T.S.



PLAN VIEW

NOTES:

1. EXACT LAYOUT AND DESIGN WILL VARY BASED ON SITE CONDITIONS AND SIZE OF LIFT STATION.
2. EQUIPMENT HATCH SHALL BE OVER ALL EQUIPMENT THAT WILL REQUIRE REPLACEMENT OR MAINTENANCE.



SECTION VIEW

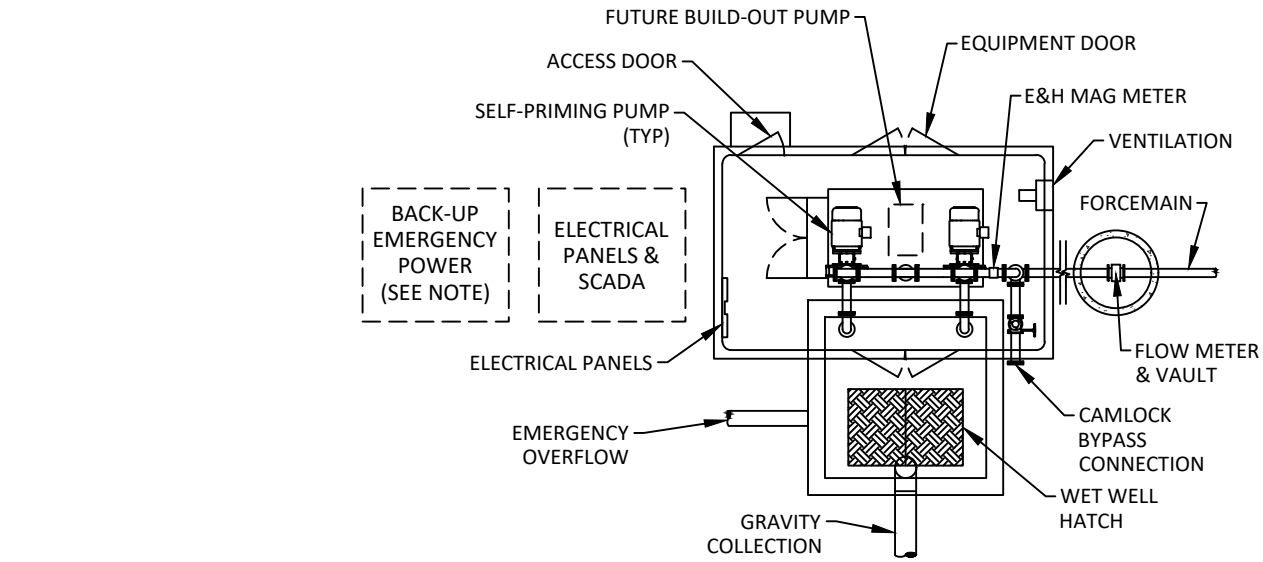
City of Greeley Colorado

(TYP) BELOW GRADE LIFT STATION

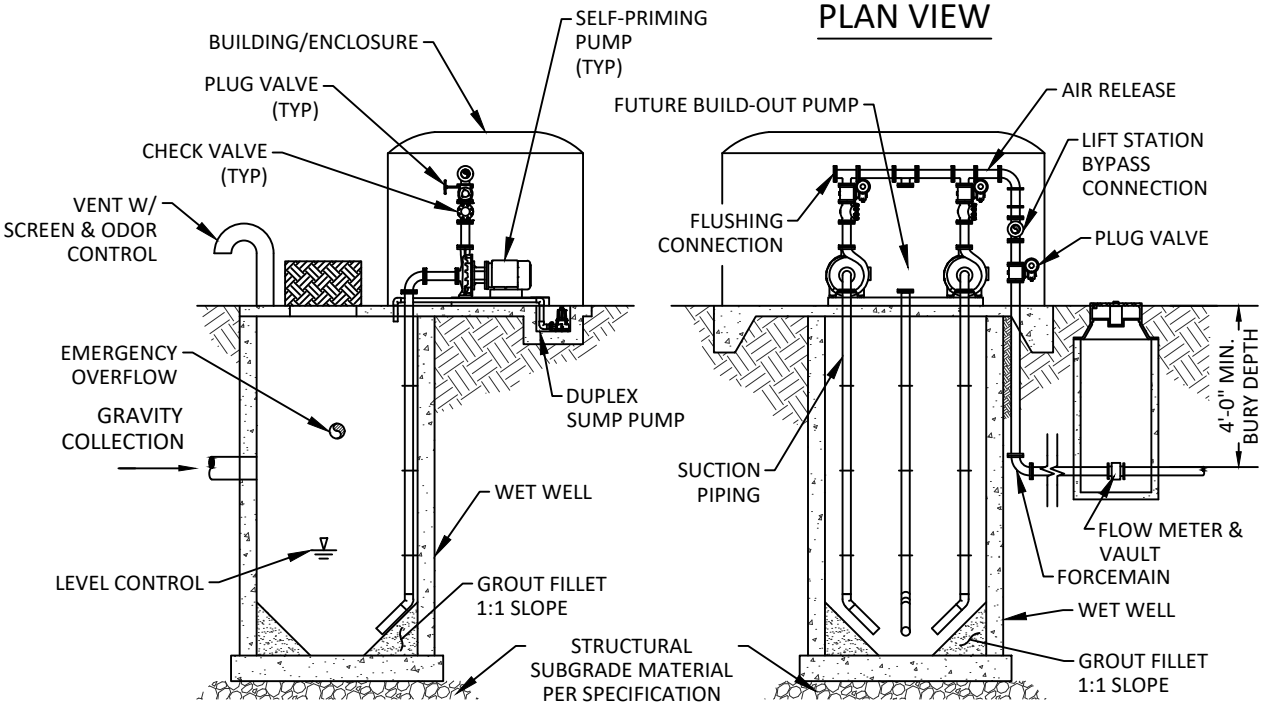
DETAIL SS-7

DATE: JANUARY 2023

SCALE: N.T.S.



PLAN VIEW



ELEVATION VIEW

SECTION VIEW

NOTES:

1. BACK-UP POWER SYSTEMS SHALL BE PROVIDED BY PUMP MANUFACTURER.
2. EXACT LAYOUT AND DESIGN WILL VARY BASED ON SITE CONDITIONS AND SIZE OF LIFT STATION.

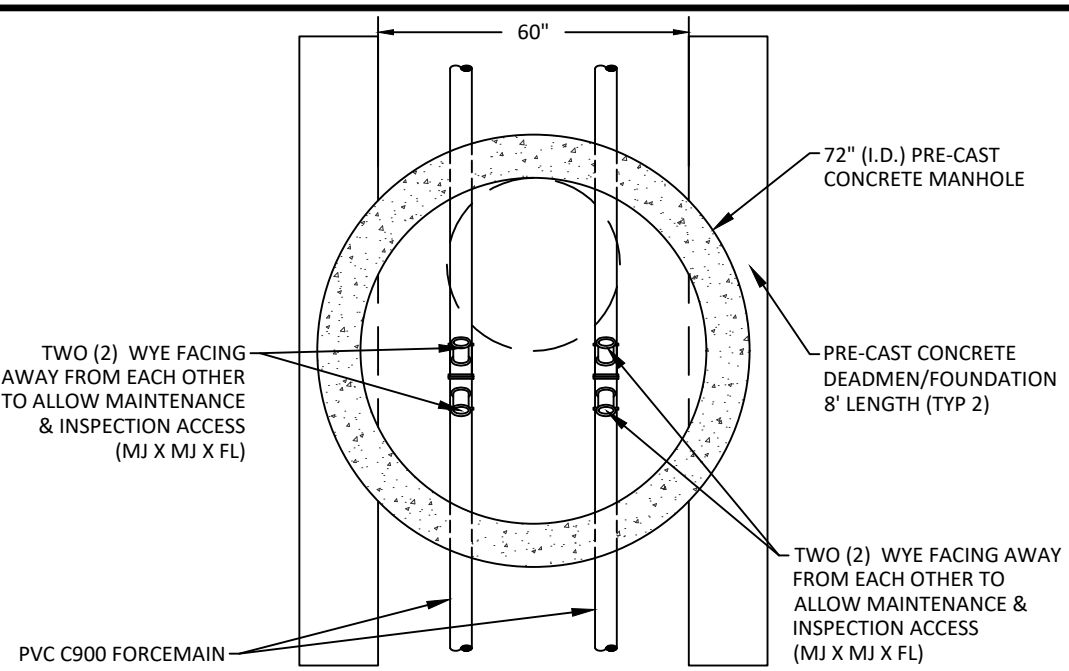
City of Greeley Colorado

(TYP) ABOVE GRADE LIFT STATION

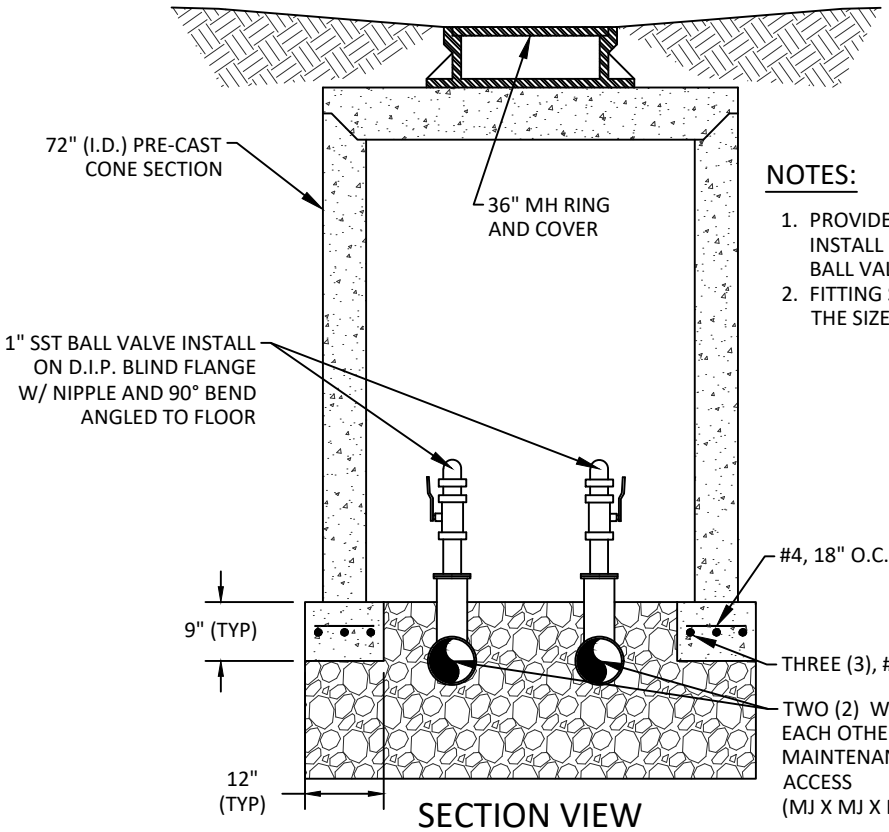
DETAIL SS-8

DATE: JANUARY 2023

SCALE: N.T.S.



PLAN VIEW



NOTES:

1. PROVIDE 1" BLIND FLANGE, INSTALL 1" STAINLESS STEEL (SST) BALL VALVE.
2. FITTING SIZES WILL DEPEND ON THE SIZE OF THE FORCE MAIN.

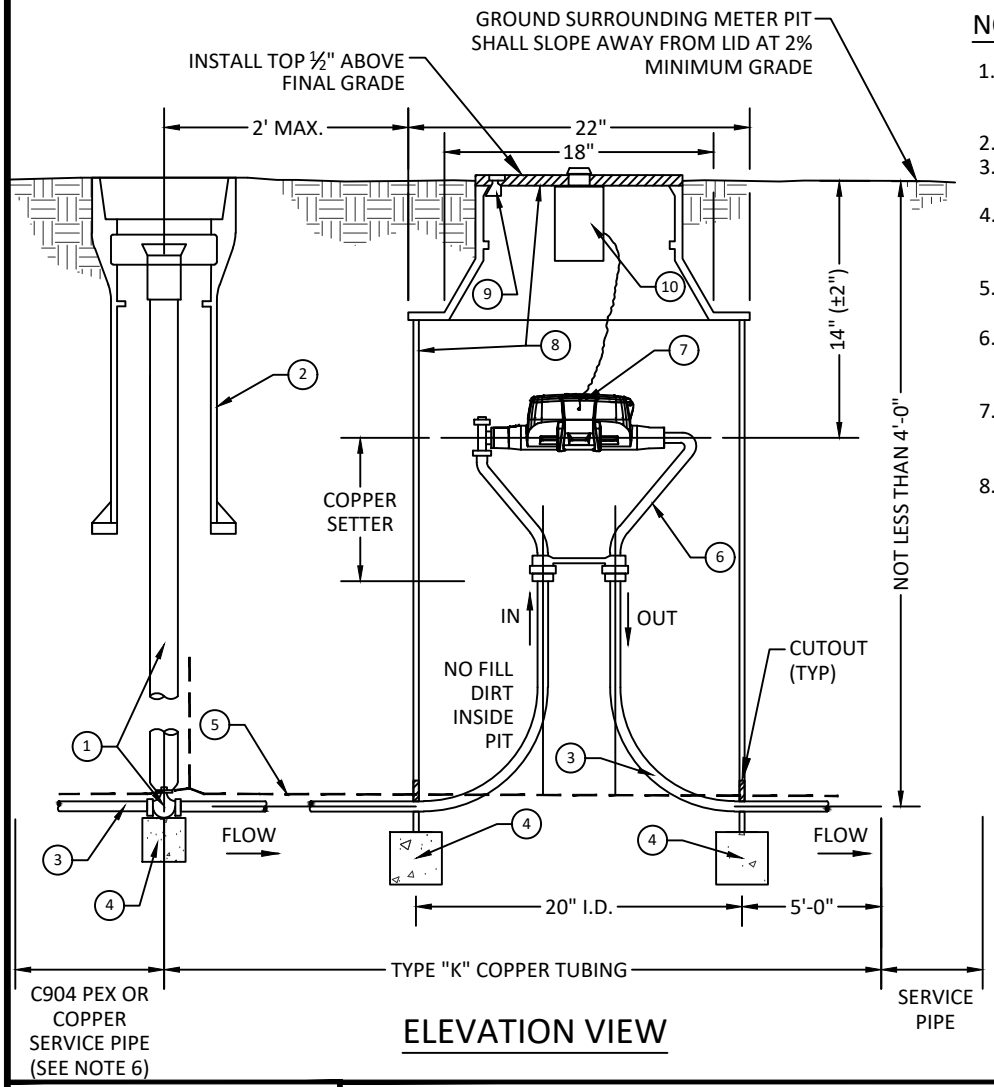
SECTION VIEW

City of Greeley Colorado

(TYP) FORCEMAIN BYPASS & CLEANOUT CONNECTION

DETAIL SS-9

DATE: JANUARY 2023 SCALE: N.T.S.



ELEVATION VIEW

NOTES:

1. METER MUST BE PURCHASED THROUGH THE CITY OF GREELEY METER SHOP. NO EXCEPTIONS. CONTRACTOR TO PROVIDE ADDITIONAL PIPING, COUPLINGS, AND ACCESSORIES AS NECESSARY FOR A COMPLETE SYSTEM.
2. COPPER SHALL NOT SHOW ANY VISIBLE SIGNS OF CRIMPING.
3. METER PIT SHALL NOT BE PLACED IN ROADWAYS, DRIVEWAYS, OR PARKING AREAS.
4. PLACEMENT OF CURB STOP BOX MAY VARY FROM A MAXIMUM OF 1 FT OUTSIDE THE PROPERTY LINE TO A MAXIMUM OF 1 FT INSIDE THE PROPERTY LINE. PLACEMENT OF CURB STOP BOX OUTSIDE THE PROPERTY LINE IS PREFERRED.
5. METER PIT AND PIPING MUST BE INSPECTED BEFORE BACKFILLING. FOR INSPECTION CALL (970)-350-9264.
6. REFER TO CITY OF GREELEY WATER & SEWER (W&S) CONSTRUCTION SPECIFICATIONS, LATEST REVISION, FOR PRODUCT AND MANUFACTURER SPECIFICATIONS, REQUIRED MARKINGS, AND COATINGS.
7. FOR ADDITIONAL APPLICABLE METER AND METER PIT INSTALLATION NOTES AND REQUIREMENTS, REFER TO CITY OF GREELEY W&S DETAIL W-16, CONSTRUCTION SPECIFICATIONS, AND DESIGN CRITERIA, LATEST REVISION OF EACH.
8. FOR CURB STOP DETAILS, REFER TO CITY OF GREELEY W&S DETAIL W-9A/W-9B, LATEST REVISION.

LEGEND	
1	CURB STOP VALVE & SERVICE BOX (SEE NOTE 8)
2	UPPER HALF OF STANDARD 6" VALVE BOX (INSTALLED PER SPECIFICATIONS)
3	¾" OR 1" SERVICE PIPE (MATCH SERVICE PIPE I.D.) (SEE NOTE 6)
4	BRICK SUPPORT (PLACE ON UNDISTURBED SOIL)
5	TRACER WIRE (SEE GENERAL NOTES ON RELATED DETAIL NP-2)
6	COPPER METER SETTER (SEE NOTE 1)
7	METER UNIT (SEE NOTE 1)
8	COMPOSITE DOUBLE LID CONE OR APPROVED EQUAL (SEE NOTE 6)
9	STANDARD FORGED BRASS WATERWORKS PENTAGON HEAD WITH LOCKING SCREW
10	METER ENDPOINT RADIO TRANSMITTER (RT UNIT)

City of Greeley Colorado

OUTSIDE SETTING FOR ¾" & 1" IRRIGATION METER

DETAIL NP-1

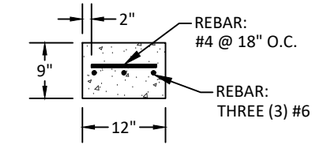
DATE: JANUARY 2023

SCALE: N.T.S.

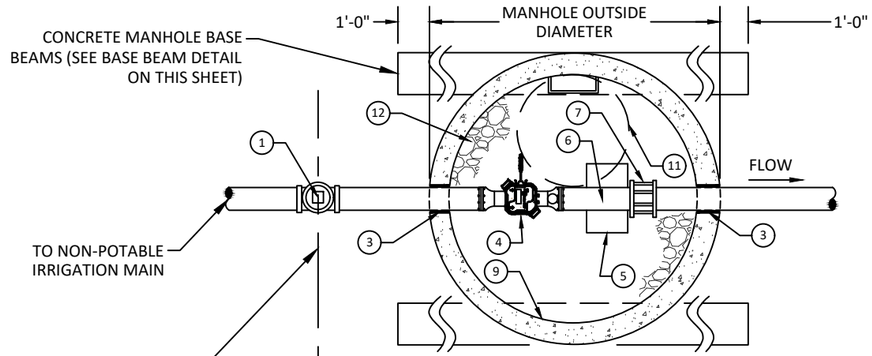
GENERAL NON-POTABLE NOTES:

1. METER MUST BE PURCHASED THROUGH THE CITY OF GREELEY METER SHOP. NO EXCEPTIONS. CONTRACTOR TO PROVIDE PIPING, COUPLINGS, AND ACCESSORIES AS NECESSARY FOR A COMPLETE SYSTEM.
2. LOCATION OF METER VAULT SHALL BE 2 FT DOWNSTREAM OF THE CURB STOP UNLESS OTHERWISE SPECIFIED BY THE WATER & SEWER DEPARTMENT.
3. NO CONCRETE SHALL BE POURED INTO VAULT, UNLESS IN SITUATIONS INVOLVING HIGH GROUND WATER OR OTHERWISE SPECIFIED BY THE CITY. THE WATER & SEWER DEPARTMENT RESERVES THE RIGHT TO REQUIRE A CONCRETE BOTTOM AND BE WATERTIGHT IN AREAS OF HIGH GROUND WATER.
4. ALL EQUIPMENT AND PIPING SHALL BE ADEQUATELY SUPPORTED AND ATTACHED TO VAULT WITH STAINLESS STEEL FASTENERS AND BOLTS.
5. IF SURFACE IS NOT TO FINAL GRADE AT TIME OF METER VAULT INSTALLATION OR GRADE CHANGES AFTER INSTALLATION, OWNER SHALL ADJUST VAULT TO MEET SPECIFICATIONS.
6. VAULT MANHOLE COVER SHALL BE A BOLT DOWN LID. REFER TO WATER & SEWER (W&S) CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS), LATEST REVISION, FOR APPROVED MANHOLE COVER MATERIALS, MANUFACTURERS, MARKINGS, AND OTHER REQUIREMENTS.
7. VAULT MANHOLE COVER SIZE DEPENDS ON METER SIZE:
   - 24" MIN. MANHOLE COVER FOR 1-½" AND 2" METERS
   - 30" MIN. MANHOLE COVER FOR 3" AND LARGER METERS
8. METER SETTING MUST BE INSPECTED BEFORE BACKFILLING. FOR INSPECTION CALL (970)-350-9264.
9. PLACEMENT OF CURB STOP BOX MAY VARY FROM A MAXIMUM OF 1' OUTSIDE THE PROPERTY LINE TO A MAXIMUM OF 1' INSIDE THE PROPERTY LINE. PLACEMENT OF CURB STOP BOX OUTSIDE THE PROPERTY LINE IS PREFERRED.
10. SHUTOFF VALVE SHALL MATCH THE SERVICE PIPE INSIDE DIAMETER. REFER TO W&S SPECIFICATIONS, LATEST REVISION, FOR ACCEPTABLE MFR AND MODELS.
    - FOR 2" AND SMALLER SERVICE LINES: SHUTOFF VALVE SHALL BE A STANDARD CURB STOP.
    - FOR 3" AND LARGER SERVICE LINES: SHUTOFF VALVE SHALL BE A STANDARD GATE VALVE (SEE DETAIL W-19).
11. INSTALL UPPER HALF OF STANDARD VALVE BOX AROUND CURB STOP BOXACCORDING TO THE W&S SPECIFICATIONS, LATEST REVISION.
12. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY W&S SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") DETAILS, LATEST REVISION OF EACH.
13. UPSTREAM AND DOWNSTREAM PIPE SPOOL LENGTH 5X PIPE I.D. OR PER MFR REQUIREMENTS (WHICHEVER YIELDS THE LONGER PIPE LENGTH).
14. NO SPRINKLER SYSTEM CONNECTIONS SHALL BE MADE IN THE METER VAULT.
15. NO MAJOR LANDSCAPING OR STRUCTURES SHALL BE LOCATED WITHIN 10 FT OF METER VAULT.
16. REFER TO W&S SPECIFICATIONS, LATEST REVISION, FOR PRODUCT AND MANUFACTURER SPECIFICATIONS.
17. ALL BURIED PIPING SHALL BE RESTRAINED AND INSTALLED IN ACCORDANCE WITH W&S SPECIFICATIONS, LATEST REVISION.
18. SEE WATER & SEWER DETAIL W-16, LATEST REVISION, FOR ADDITIONAL METER AND VAULT INSTALLATION REQUIREMENTS.

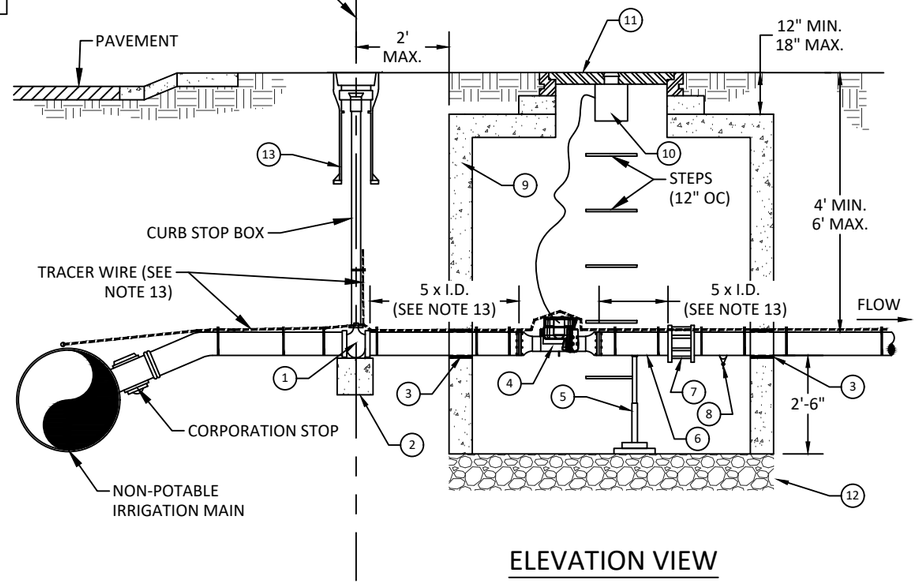
LEGEND	
1	SHUTOFF VALVE WITH 2" OPERATING NUT (SEE NOTE 10).
2	CONCRETE PAVER OR APPROVED EQUIVALENT
3	APPROVED RUBBER SEAL ON PIPE BARREL AT WALL PENETRATION PER SPECIFICATION
4	METER UNIT (SEE NOTE 1)
5	ADJUSTABLE STAINLESS STEEL PIPE SUPPORT AND BASE
6	FLG X PE SPOOL PIPE
7	RESTRAINED FLANGED COUPLING ADAPTER OR COUPLING
8	1" BALL VALVE DRAIN
9	CONCRETE MANHOLE (48" MIN. DIAMETER FOR 1-½" AND 2" METERS, 60" MIN. DIAMETER FOR 3" AND 4" METERS, 72" MIN. FOR 6" AND 8" METERS)
10	METER ENDPOINT RADIO TRANSMITTER (RT UNIT)
11	ACCESS FRAME AND APPROVED MANHOLE COVER WITH RECESSED 2" DIAMETER HOLE FOR RT UNIT (SEE NOTES 6 & 7)
12	6" MIN OF SUBGRADE MATERIAL UNDER GRADE BEAM AND INSIDE VAULT PER SPECIFICATIONS
13	UPPER HALF OF STANDARD 6" VALVE BOX (INSTALLED PER SPECIFICATIONS)



BASE BEAM DETAIL



PLAN VIEW



ELEVATION VIEW

City of Greeley Colorado

OUTSIDE SETTING FOR 1-½" TO 8" IRRIGATION METER & GENERAL NON-POTABLE NOTES

DETAIL NP-2

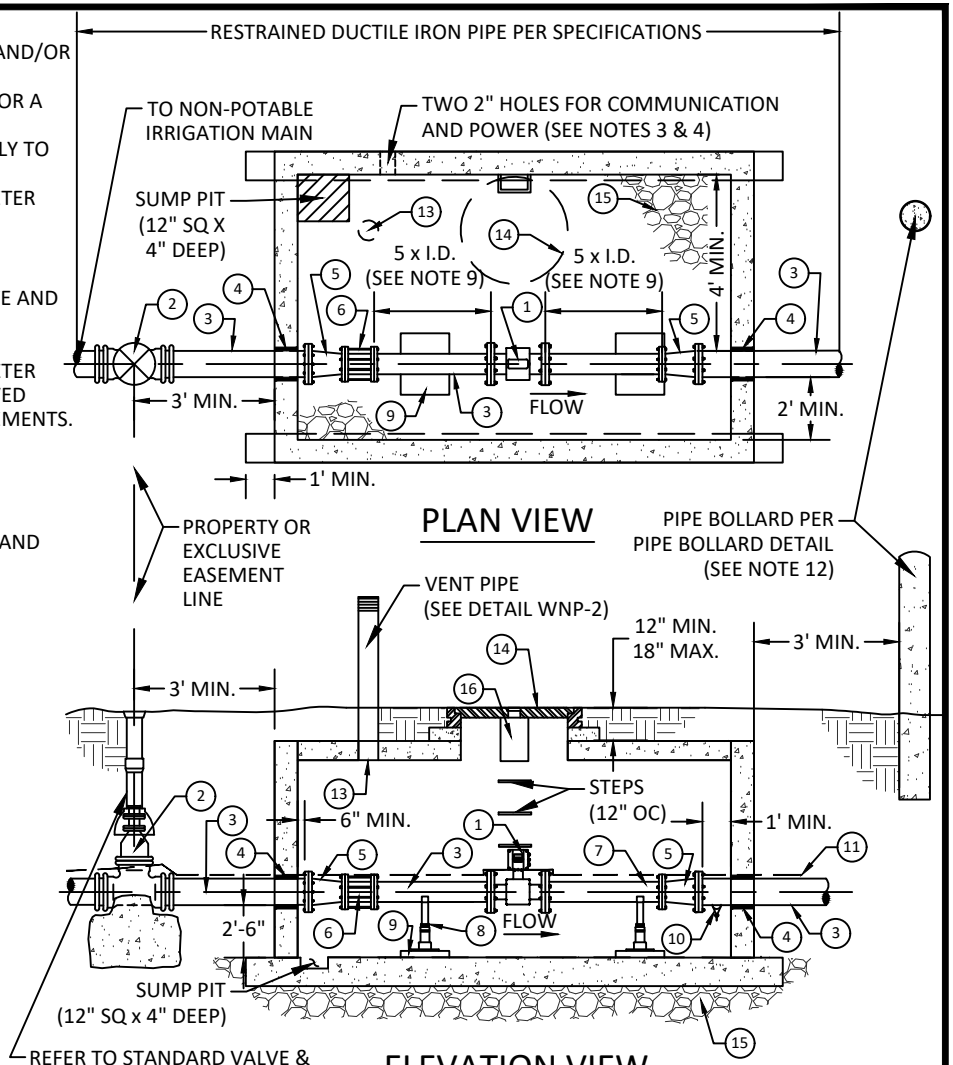
DATE: JANUARY 2023

SCALE: N.T.S.

NOTES:

1. PURCHASED FLOW METER SHALL BE BADGER M2000 MAG METER AND END POINT AND/OR COORDINATED THROUGH THE CITY OF GREELEY METER SHOP. NO EXCEPTIONS. CONTRACTOR TO PROVIDE PIPING, COUPLINGS, AND ACCESSORIES AS NECESSARY FOR A COMPLETE SYSTEM.
2. ALL NOTES ON RELATED CITY OF GREELEY WATER & SEWER (W&S) DETAIL NP-2 APPLY TO THIS DETAIL.
3. CONTRACTOR IS RESPONSIBLE FOR PROVIDING POWER AND TELEMETRY TO THE METER AND VAULT.
4. ELECTRICAL/CONTROL PANEL SHALL BE MOUNTED ABOVE GRADE INSIDE A NEMA 4 ENCLOSURE PER W&S SPECIFICATIONS (SPECIFICATIONS), LATEST REVISION.
5. ALL ELECTRICAL WIRE SHALL BE EQUIPPED WITH WATERTIGHT CONNECTIONS ABOVE AND BELOW GRADE.
6. VAULT & MANHOLE COVER SHALL BE RATED FOR HS-20 TRAFFIC LOADINGS.
7. 36" VAULT COVER SHALL BE A BOLT DOWN LID WITH A RECESSED TWO-INCH DIAMETER HOLE FOR RT UNIT. REFER TO W&S SPECIFICATIONS, LATEST REVISION, FOR APPROVED MANHOLE COVER MATERIALS, MANUFACTURERS, MARKINGS, AND OTHER REQUIREMENTS.
8. SEE W&S DETAIL W-16, LATEST REVISION, FOR ADDITIONAL METER AND VAULT INSTALLATION REQUIREMENTS.
9. UPSTREAM AND DOWNSTREAM PIPE SPOOL LENGTH 5X PIPE I.D. OR PER MFR REQUIREMENTS (WHICHEVER YIELDS THE LONGER PIPE LENGTH).
10. REFER TO CITY OF GREELEY W&S SPECIFICATIONS, LATEST REVISION, FOR PRODUCT AND MANUFACTURER SPECIFICATIONS.
11. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
12. PIPE BOLLARD MAY BE OMITTED AT THE CITY OF GREELEY W&S DEPARTMENT'S DISCRETION.

LEGEND	
1	METER (SEE NOTE 1)
2	MJ X MJ GATE VALVE
3	FLG X PE SPOOL PIECE
4	APPROVED RUBBER SEAL ON PIPE BARREL AT WALL PENETRATION PER SPECS
5	CONCENTRIC REDUCER (AS REQUIRED)
6	RESTRAINED FLANGED COUPLING ADAPTER
7	FLG x FLG SPOOL PIECE
8	ADJUSTABLE S.S. PIPE SUPPORT
9	CONCRETE PAVER OR APPROVED EQUAL
10	1" BALL VALVE DRAIN
11	TRACER WIRE (SEE NOTE 11)
12	THRUST BLOCK
13	6" HOLE FOR VENT PIPE
14	36" MANHOLE FRAME AND COVER (SEE NOTES 6 & 7)
15	6" MIN. OF SUBGRADE MATERIAL UNDER GRADE BEAM AND INSIDE VAULT PER SPECS
16	METER ENDPOINT RADIO TRANSMITTER (RT UNIT)

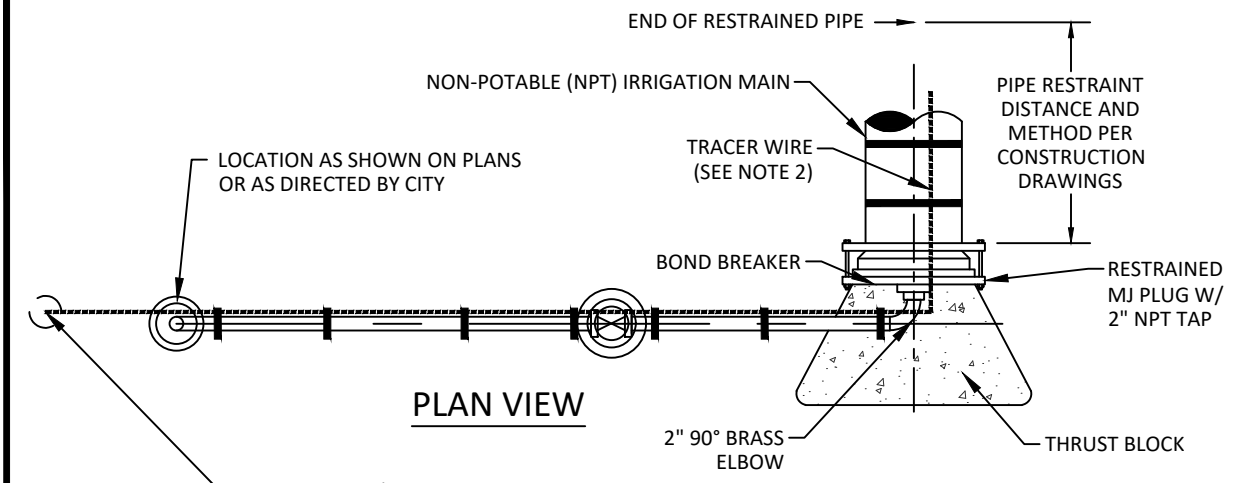


TYPICAL SETTING FOR 10" AND LARGER IRRIGATION METER & VAULT

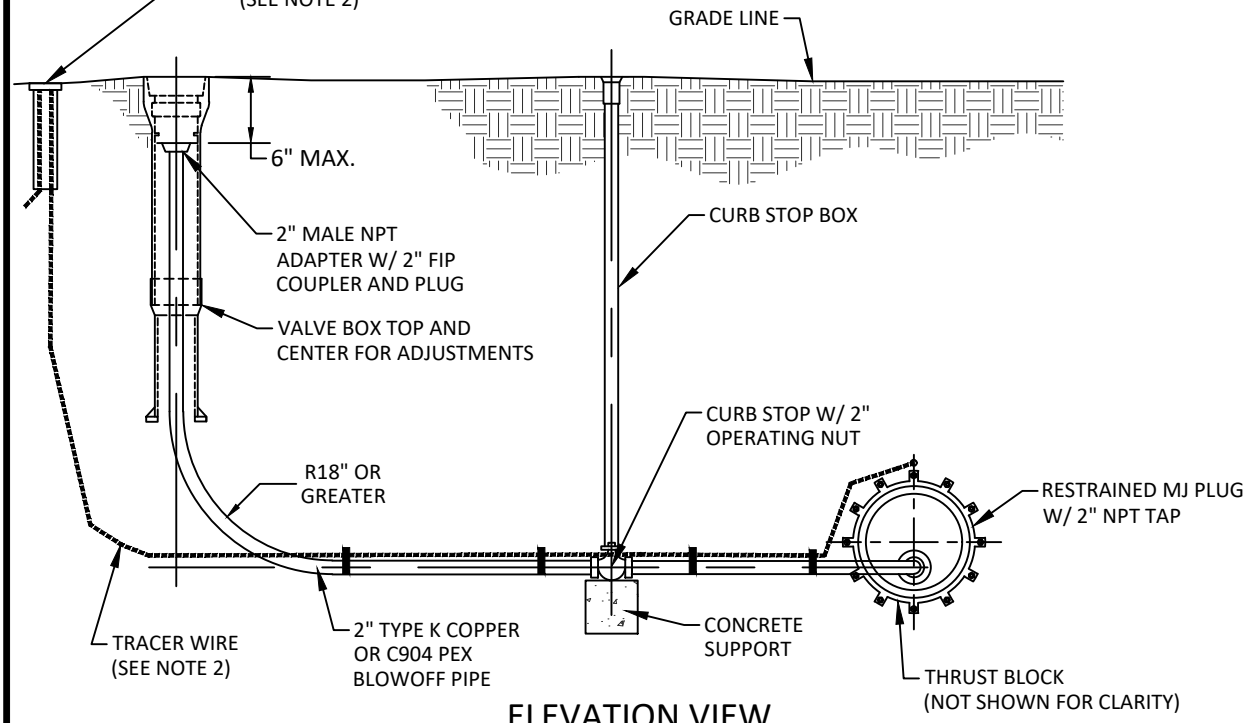
DETAIL NP-3

DATE: JANUARY 2023

SCALE: N.T.S.



PLAN VIEW



ELEVATION VIEW

NOTES:

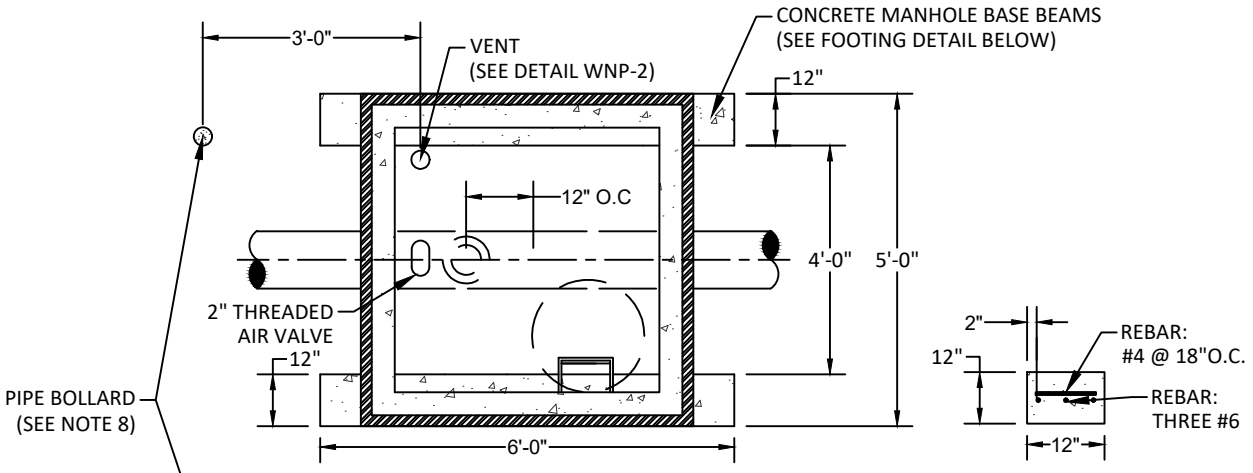
1. REFER TO RELATED NON-POTABLE IRRIGATION DETAIL NP-1 AND WATER & SEWER (W&S) DEPARTMENT CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS), LATEST REVISION OF EACH, FOR ADDITIONAL NON-POTABLE PIPE, CURB STOP, AND MISC. VALVE INSTALLATION REQUIREMENTS.
2. INSTALL TRACER WIRE ACCORDING SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") DETAILS, LATEST REVISION OF EACH.
3. ALL BURIED PIPING SHALL BE RESTRAINED AND INSTALLED ACCORDANCE WITH W&S SPECIFICATIONS, LATEST REVISION.

City of Greeley Colorado

NON-POTABLE BLOWOFF

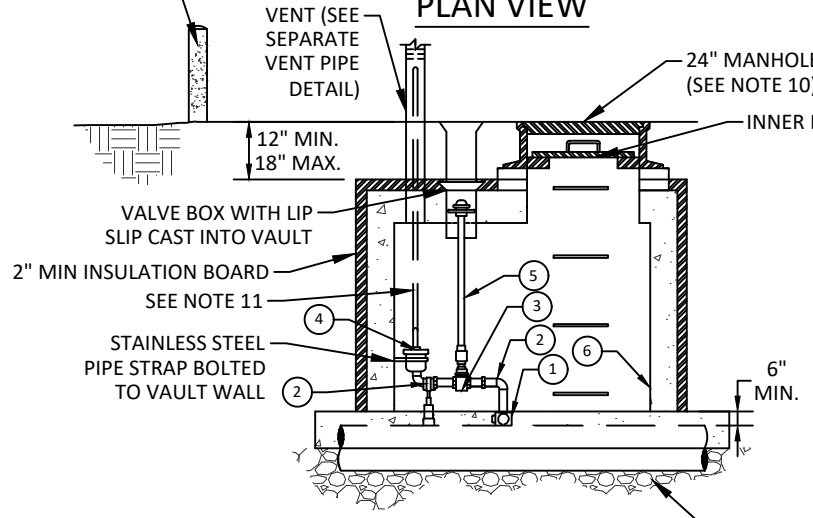
DETAIL NP-4

DATE: JANUARY 2023 SCALE: N.T.S.



PLAN VIEW

FOOTING DETAIL



ELEVATION VIEW

LEGEND	
1	PIPE SADDLE AND CORPORATION STOP OR TAPPING SLEEVE
2	ELBOW
3	THREADED GATE VALVE WITH STANDARD OPENING NUT
4	AIR RELEASE, AIR VACUUM, OR COMBINATION AIR VALVE (SEE NOTES 2 & 3)
5	VALVE STEM EXTENSION (AS REQUIRED BY THE CITY)
6	5' CONCRETE MANHOLE

NOTES:

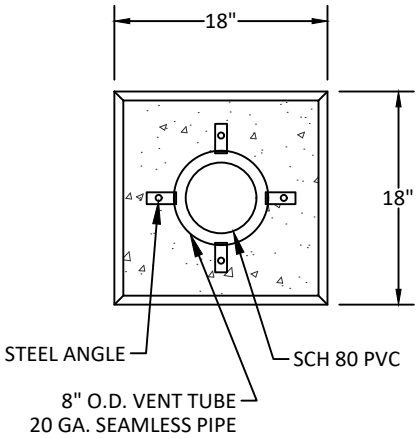
1. PLACE 6" OF SUBGRADE MATERIAL IN THE BOTTOM OF THE MANHOLE TO THE CROWN OF PIPE ONLY. REFER TO WATER & SEWER (W&S) DEPARTMENT CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS), LATEST REVISION, FOR MATERIAL GRADATION.
2. VALVE TYPE AND SIZE SHALL BE SPECIFIED BY THE DESIGN ENGINEER AND APPROVED BY THE CITY.
3. INSTALL AIR RELEASE, AIR/VACUUM, AND COMBINATION AIR VALVES IN ACCORDANCE WITH MFR SPECIFICATIONS.
4. ALL SUPPORT MATERIALS SHALL BE GIVEN TWO (2) COATS OF RUST INHIBITIVE PAINT.
5. VAULT BOTTOM SHALL SIT 6" HIGHER THAN TOP OF PIPE.
6. VAULT AND MANHOLE COVER TO BE RATED FOR HS-20 TRAFFIC LOADINGS.
7. SEE SPECIFICATIONS AND DETAIL W-16, LATEST REVISION, FOR ADDITIONAL RELEVANT TYPICAL VAULT NOTES.
8. PIPE BOLLARD MAY BE OMITTED AT THE CITY OF GREELEY W&S DEPARTMENT'S DISCRETION. BOLLARD SHALL BE INSTALLED IN ACCORDANCE WITH THE WATER & SEWER STANDARD DETAILS AND SPECIFICATIONS, LATEST REVISION OF EACH.
9. INSTALL TRACER WIRE ALONG MAIN ACCORDING TO SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") STANDARD DETAILS, LATEST REVISION OF EACH.
10. 24" MANHOLE COVER SHALL BE A BOLT DOWN LID MARKED WITH THE APPROPRIATE UTILITY. REFER TO CITY OF GREELEY SPECIFICATIONS, LATEST REVISION, FOR SPECIFIC MANHOLE COVER MFR AND PRODUCT INFORMATION.
11. FOR ALL AIR VACUUM VALVE VAULTS, AIR VALVE INTAKE SHALL BE WATER TIGHT AND PIPED TO THE SURFACE INSIDE THE VENT PIPE WITH SCHEDULE 80 PVC THAT MATCHES VALVE OUTLET SIZE.

City of Greeley Colorado

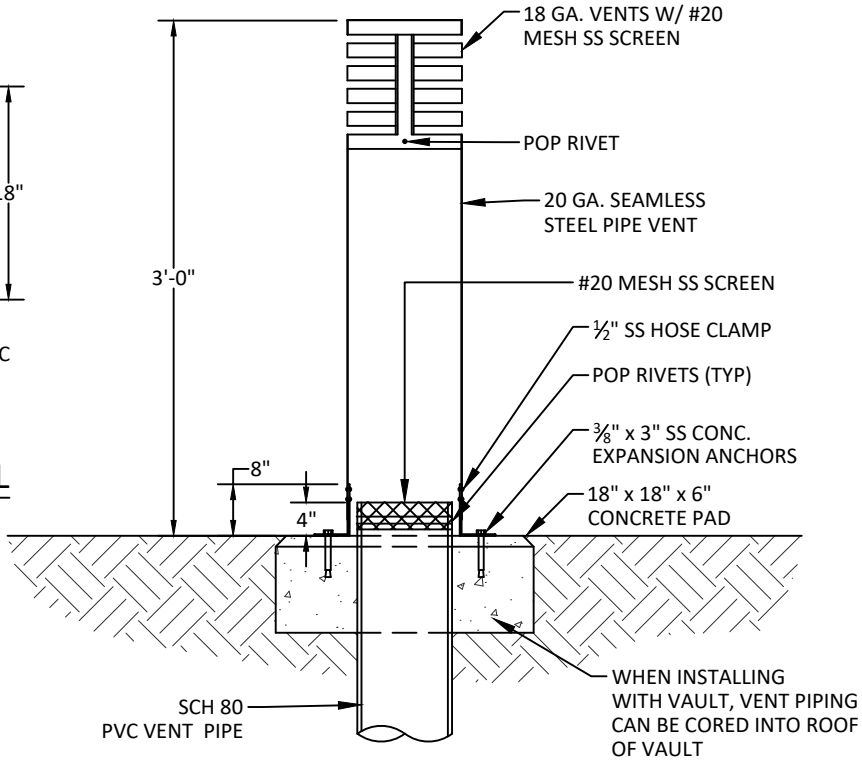
AIR RELEASE/VACUUM & COMBINATION AIR VALVE VAULT

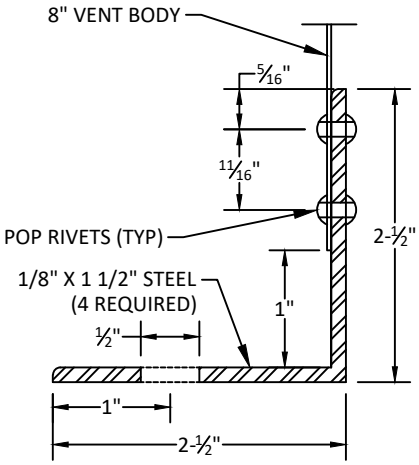
DETAIL WNP-1

DATE: JANUARY 2023 SCALE: N.T.S.



CONCRETE BASE DETAIL





STEEL ANGLE DETAIL

ROUND VENT SCREEN

NOTES:

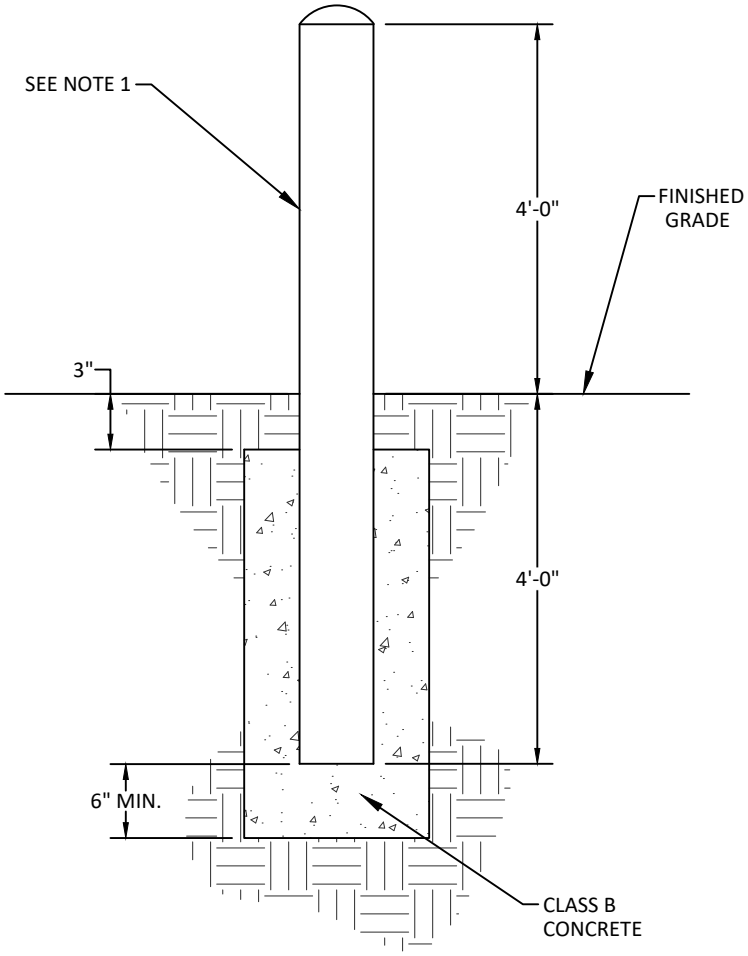
1. REFER TO CONCRETE STANDARD SPECIFICATIONS
2. VENT PIPE SHALL BE MANUFACTURED BY CUSTOM METAL MFG OR APPROVED EQUAL.
3. VENT PIPE SHALL BE PRIMED AND COATED ACCORDING TO THE APWA UNIFORM COLOR CODE FOR FOR THE CORRESPONDING UTILITY:
   - 3.A. POTABLE WATER: SHERWIN-WILLIAMS SAFETY BLUE NO. SW4086 OR APPROVED EQUAL
   - 3.B. NON-POTABLE IRRIGATION: SHERWIN-WILLIAMS SAFETY PURPLE NO. SW 4080 OR APPROVED EQUAL.
4. 3" AIR VENT TO BE PVC SCHEDULE 8O WITH GLUED JOINTS BELOW GRADE AND SIZED TO MATCH TO AIR VALVE OUTLET SIZE.
5. WHEN SITE CONDITIONS PREVENT INSTALLING VENT IN ROOF OF VAULT AND PER WATER & SEWER DEPARTMENT'S DIRECTION, SCH 80 PVC MAY PENETRATE VAULT WALL AND RUN HORIZONTAL BEFORE BENDING VERTICAL AT AN ACCEPTABLE LOCATION FOR THE ROUND VENT SCREEN.

City of Greeley Colorado

VAULT & AIR/VAC VENT PIPE

DETAIL WNP-2

DATE: JANUARY 2023 SCALE: N.T.S.



NOTES:

1. PROVIDE A 6" MIN SCHEDULE 40 STL. PIPE BOLLARD FILLED WITH CONCRETE WITH ROUNDED TOP, PAINT SAFETY YELLOW.
2. BOLLARD SHALL BE PLACED AT MINIMUM 3'-0" FROM VALVE BOXES, VAULTS, AND CONCRETE STRUCTURES.
3. THE CITY OF GREELEY RESERVES THE RIGHT TO DETERMINE WHERE AND WHEN A PIPE BOLLARD MAY BE REQUIRED OR OMITTED.

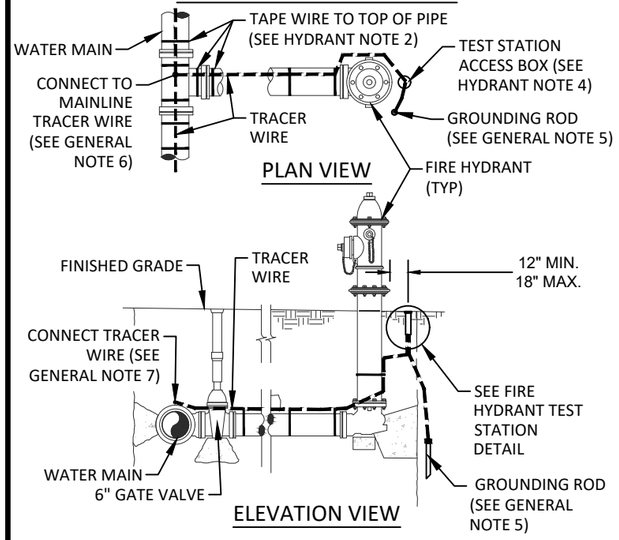
City of Greeley Colorado

(TYP) CONCRETE PIPE BOLLARD

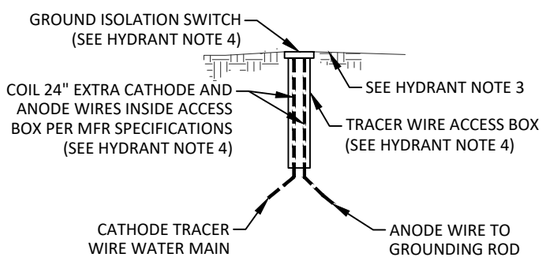
DETAIL WNP-3

DATE: JANUARY 2023 SCALE: N.T.S.

FIRE HYDRANT TRACER WIRE



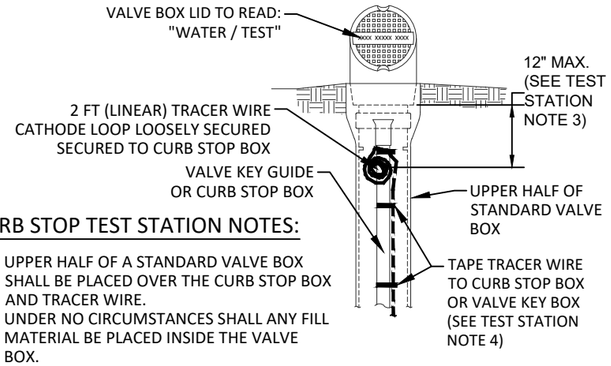
FIRE HYDRANT & STANDARD MFR TEST STATION DETAIL



HYDRANT & STANDARD MFR TEST STATION NOTES:

1. REFER TO RELATED DETAIL FIRE HYDRANT DETAIL, LATEST REVISION, FOR FIRE HYDRANT INSTALLATION STANDARD DRAWING.
2. REFER TO GENERAL NOTES FOR ADDITIONAL TRACER WIRE REQUIREMENTS.
3. GRADE SURROUNDING TRACER WIRE ACCESS BOX SHALL SLOPE AWAY FROM LID AT 2% MINIMUM GRADE.
4. FIRE HYDRANT TEST STATION ACCESS BOX SHALL BE COPPERHEAD SNAKEPIT ACCESS POINT WITH TWO-TERMINAL SWITCHABLE LID OR APPROVED EQUAL.

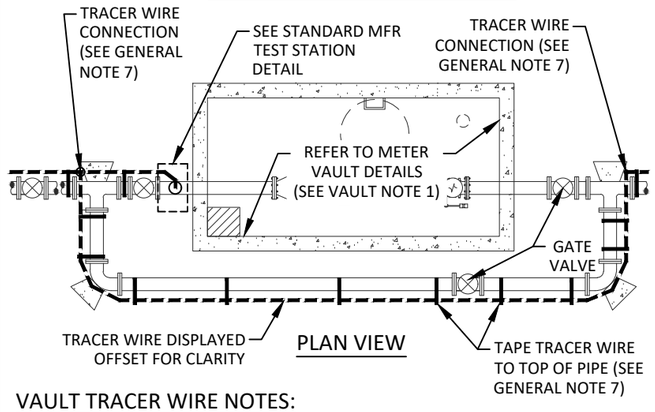
CURB STOP TEST STATION DETAIL



CURB STOP TEST STATION NOTES:

1. UPPER HALF OF A STANDARD VALVE BOX SHALL BE PLACED OVER THE CURB STOP BOX AND TRACER WIRE.
2. UNDER NO CIRCUMSTANCES SHALL ANY FILL MATERIAL BE PLACED INSIDE THE VALVE BOX.
3. SECURE CATHODE LOOP 12" MAX BELOW VALVE BOX COVER INSIDE THE VALVE BOX.
4. FOLLOW SAME TAPING INTERVAL FOR TRACER WIRE ALONG CURB STOP AS TRACER WIRE IS TAPED ALONG PIPE.

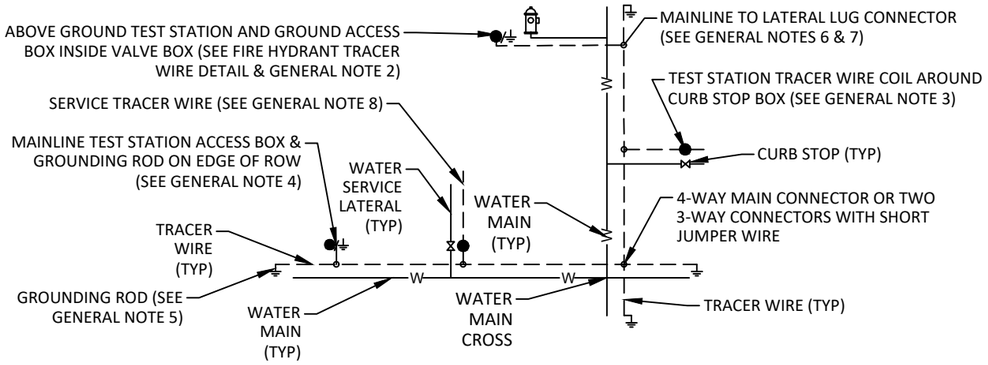
TRACER WIRE AROUND VAULTS



VAULT TRACER WIRE NOTES:

1. REFER TO RELATED DETAILS W-10, W-11, AND W-15 FOR METER VAULT DETAILS AND REQUIREMENTS.
2. REFER TO GENERAL NOTES FOR ADDITIONAL TRACER WIRE REQUIREMENTS.

SAMPLE PLAN OF WATER MAIN TRACER WIRE



GENERAL NOTES:

1. TRACER WIRE DEPICTED OFFSET FROM PIPE FOR CLARITY. TRACER WIRE SHALL BE INSTALLED ON TOP OF PIPE, IN ACCORDANCE WITH THE WATER & SEWER UTILITY LOCATING DETAIL UL-6, AND WATER & SEWER CONSTRUCTION SPECIFICATIONS, LATEST REVISION OF EACH.
2. TRACER WIRE ACCESS IN THE FORM OF A TEST STATION ACCESS BOX FROM A CITY APPROVED MFR MUST BE PROVIDED AND GROUNDED AT EVERY FIRE HYDRANT. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR PRODUCT AND MANUFACTURER RECOMMENDATIONS AND REQUIREMENTS.
3. TRACER WIRE ACCESS IN THE FORM OF A CATHODE WIRE LOOPED AROUND THE CURB STOP BOX SHALL BE PLACED INSIDE OF A STANDARD VALVE BOX AT EVERY SERVICE LATERAL. REFER TO W&S SERVICE LATERAL UTILITY LOCATING DETAILS UL-3 AND UL-4, LATEST REVISION OF EACH, FOR ADDITIONAL INSTALLATION REQUIREMENTS.
4. FOR LONG RUNS IN EXCESS OF 1,000 FEET WITHOUT SERVICE LATERALS OR HYDRANTS - TRACER WIRE ACCESS MUST BE PROVIDED IN THE FORM OF EITHER AN APPROVED MFR GRADE LEVEL WIRE ACCESS BOX OR A STANDARD VALVE BOX WITH CATHODE WIRE LOOP. EITHER FORM OF ACCESS SHALL BE LOCATED ABOVE THE PIPE OR AT THE EDGE OF RIGHT-OF-WAY AND OUT OF THE ROAD-WAY. TRACER WIRE ACCESS BOX SHALL ALSO BE DELINEATED USING A MINIMUM 48" POLYETHYLENE MARKER POST, COLOR CODED PER APWA STANDARD FOR THE SPECIFIC UTILITY BEING MARKED.
5. TRACER WIRE MUST BE GROUNDED AT EVERY MAINLINE DEAD END/STUB, AND ALONG CONTINUOUS RUNS AT A MAXIMUM OF 1,000 FT INTERVALS WITH A 1.5 LB DRIVE-IN MAGNESIUM GROUNDING ROD PER GROUNDING ROD MFR REQUIREMENTS. PLACEMENT OF GROUNDING ROD SHALL BE INSTALLED IN SUCH A WAY THAT ALLOWS FOR PROPER WIRE LOCATING WITHOUT A LOSS OR DETERIORATION OF LOW FREQUENCY SIGNAL (512 Hz) FOR DISTANCES IN EXCESS OF 1,000 FT. EVERY FIRE HYDRANT TEST STATION SHALL BE GROUNDED PER MFR RECOMMENDATIONS.
6. TRACER WIRE SYSTEMS MUST BE INSTALLED AS A SINGLE CONTINUOUS WIRE, EXCEPT WHERE USING APPROVED CONNECTORS. NO LOOPING OR COILING OF WIRE IS ALLOWED.
7. REFER TO WATER & SEWER SERVICE LATERAL TRACER WIRE DETAIL AND GENERAL TRACER WIRE NOTES ON DETAIL UL-6, LATEST REVISION OF EACH, FOR ADDITIONAL TRACER WIRE INSTALLATION, TAPING, CONNECTION, SPLICING, AND GROUNDING REQUIREMENTS.
8. SERVICE LATERAL TRACER WIRE SHALL EXTEND PAST CURB STOP TEST STATION AND TERMINATE AT STRUCTURE PER SERVICE LATERAL UTILITY LOCATING DETAIL.

City of Greeley Colorado

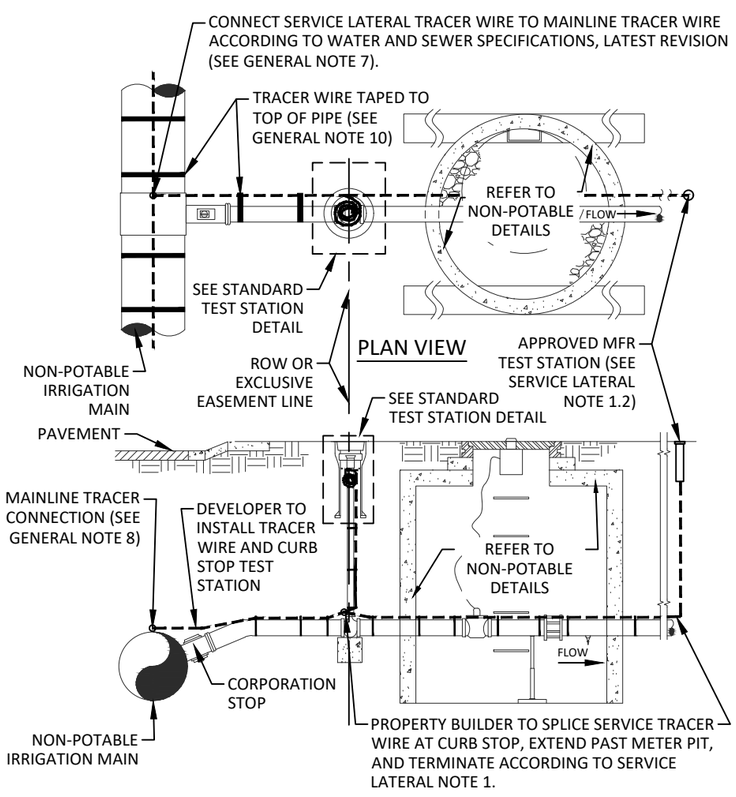
WATER MAIN TRACER WIRE AND UTILITY LOCATING

DETAIL UL-1

DATE: JANUARY 2023

SCALE: N.T.S.

NON-POTABLE IRRIGATION SERVICE LATERAL

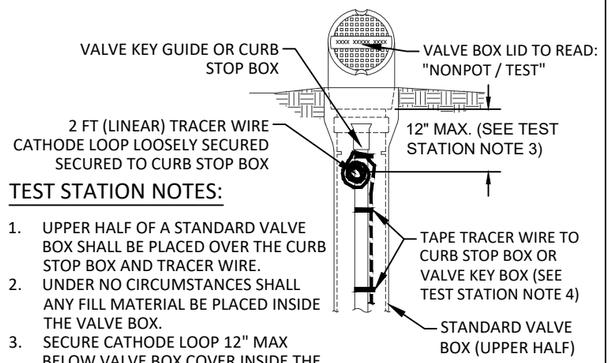


ELEVATION VIEW

NON-POTABLE IRRIGATION SERVICE LATERAL NOTES:

1. TEST STATION AT SERVICE LATERAL FAR END ON OWNER SIDE OF METER:
   - 1.1. SHALL BE A MOUNTABLE OR FLUSH-GRADE ACCESS POINT AND INSTALLED PER MFR SPECIFICATIONS. SEE WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR APPROVED MFR AND MODELS.
   - 1.2. TEST STATION ACCESS SHALL BE PROVIDED AT TRACER WIRE TERMINATION NEAR THE IRRIGATION CONTROL VALVE BOX OR AS NOTED ON THE DESIGN DRAWINGS.

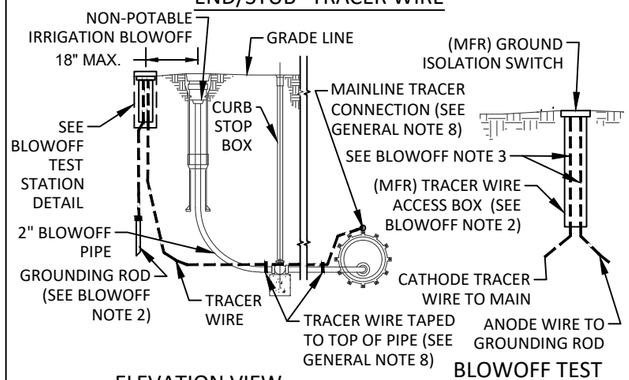
STANDARD TEST STATION DETAIL



TEST STATION NOTES:

1. UPPER HALF OF A STANDARD VALVE BOX SHALL BE PLACED OVER THE CURB STOP BOX AND TRACER WIRE.
2. UNDER NO CIRCUMSTANCES SHALL ANY FILL MATERIAL BE PLACED INSIDE THE VALVE BOX.
3. SECURE CATHODE LOOP 12" MAX BELOW VALVE BOX COVER INSIDE THE VALVE BOX.
4. FOLLOW SAME TAPING INTERVAL FOR TRACER WIRE ALONG CURB STOP BOX AS FOR TAPING TRACER ALONG PIPE.

NON-POTABLE IRRIGATION BLOWOFF AND "DEAD END/STUB" TRACER WIRE



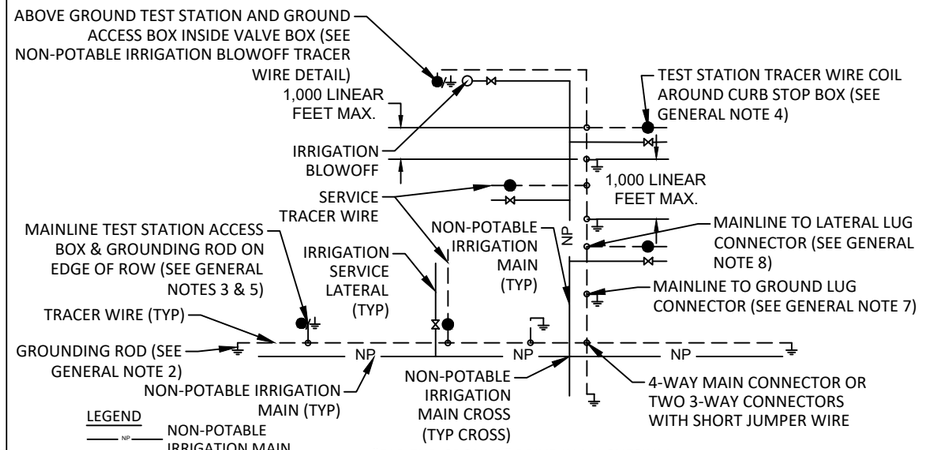
ELEVATION VIEW

BLOWOFF TEST STATION DETAIL

BLOW-OFF TRACER WIRE NOTES:

1. REFER TO RELATED NON-POTABLE BLOWOFF DETAIL, LATEST REVISION, FOR BLOWOFF INSTALLATION STANDARD DRAWING.
2. REFER TO GENERAL NOTES FOR ADDITIONAL TRACER WIRE REQUIREMENTS.
3. BLOWOFF TEST STATION ACCESS BOX SHALL BE COPPERHEAD SNAKEPIT ACCESS POINT WITH TWO-TERMINAL SWITCHABLE LID OR APPROVED EQUAL.
4. COIL 24" EXTRA CATHODE AND ANODE WIRES INSIDE ACCESS BOX PER MFR SPECIFICATIONS.

SAMPLE PLAN OF NON-POTABLE IRRIGATION MAIN TRACER WIRE



GENERAL NOTES:

1. TRACER WIRE DEPICTED OFFSET FROM PIPE FOR CLARITY. TRACER WIRE SHALL BE INSTALLED ON TOP OF PIPE, AND INSTALLED IN ACCORDANCE WITH THE WATER & SEWER UTILITY LOCATING DETAILS, AND WATER & SEWER SPECIFICATIONS, LATEST REVISION OF EACH.
2. TRACER WIRE MUST BE GROUNDED AT EVERY MAINLINE DEAD END/STUB, AND ALONG CONTINUOUS RUNS AT A MAXIMUM OF 1,000 FT INTERVALS WITH A 1.5 LB DRIVE-IN MAGNESIUM ANODE GROUNDING ROD PER GROUNDING ROD MFR REQUIREMENTS. PLACEMENT OF GROUNDING ROD SHALL BE INSTALLED IN SUCH A WAY THAT ALLOWS FOR PROPER WIRE LOCATING WITHOUT A LOSS OR DETERIORATION OF LOW FREQUENCY SIGNAL (512 Hz) FOR DISTANCES IN EXCESS OF 1,000 FT.
3. FOR LONG RUNS IN EXCESS OF 1,000 FEET WITHOUT SERVICE LATERALS - TRACER WIRE ACCESS MUST BE PROVIDED IN THE FORM OF EITHER AN APPROVED MFR GRADE LEVEL / IN-GROUND WIRE ACCESS BOX OR A STANDARD VALVE BOX WITH CATHODE LOOP. EITHER FORM OF ACCESS BOX SHALL BE LOCATED ABOVE THE PIPE OR AT THE EDGE OF RIGHT-OF-WAY AND OUT OF THE ROAD-WAY. TRACER WIRE ACCESS BOX SHALL ALSO BE DELINEATED USING A MINIMUM 48" POLYETHYLENE MARKER POST, COLOR CODED PER APWA STANDARD FOR THE SPECIFIC UTILITY BEING MARKED.
4. SERVICE LATERAL TEST STATIONS SHALL BE IN THE FORM OF A CATHODE WIRE LOOP AT THE CURB STOP AND PLACED INSIDE OF A STANDARD VALVE BOX AT EVERY SERVICE LATERAL. REFER TO W&S SPECIFICATIONS AND GENERAL NOTES ON DETAIL UL-6, LATEST REVISION OF EACH, FOR ADDITIONAL INSTALLATION REQUIREMENTS.
5. TEST STATIONS LOCATED AT THE MAXIMUM DISTANCE FROM THE NEAREST GROUND SHALL BE INSTALLED AS AN APPROVED MFR GRADE-LEVEL/ IN GROUND WIRE ACCESS BOX WITH A GROUNDING ROD.
6. GRADE SURROUNDING TEST STATION ACCESS BOX SHALL SLOPE AWAY FROM LID AT A 2% MINIMUM GRADE.
7. "FAR END" GROUNDING RODS WIRE SHALL BE CONNECTED TO MAINLINE TRACER WIRE USING APPROVED LOCKABLE CONNECTORS WITHOUT CUTTING OR SPLICING THE MAINLINE TRACER WIRE.
8. SERVICE LATERAL TRACER WIRE SHALL BE CONNECTED TO MAINLINE TRACER WIRE USING APPROVED LOCKABLE CONNECTORS WITHOUT CUTTING OR SPLICING THE MAINLINE TRACER WIRE.
9. TRACER WIRE SYSTEMS MUST BE INSTALLED AS A SINGLE CONTINUOUS WIRE, EXCEPT WHERE USING APPROVED CONNECTORS. NO LOOPING OR COILING OF WIRE IS ALLOWED.
10. REFER TO GENERAL TRACER WIRE NOTES ON WATER & SEWER DETAIL UL-6, LATEST REVISION, FOR ADDITIONAL TRACER WIRE INSTALLATION, TAPING, CONNECTION, SPLICING, AND GROUNDING REQUIREMENTS.

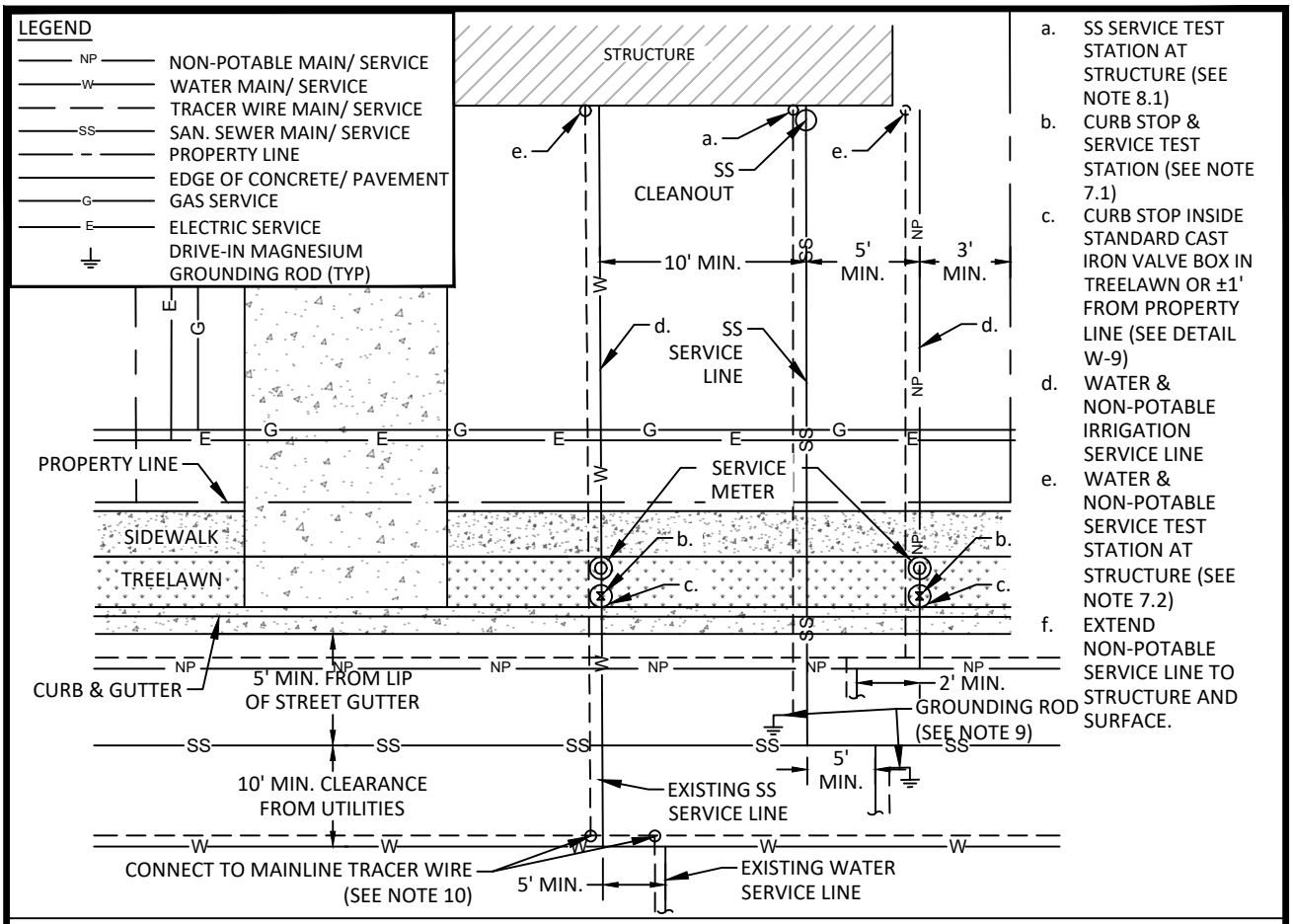
City of Greeley Colorado

NON-POTABLE IRRIGATION TRACER WIRE AND UTILITY LOCATING

DETAIL UL-2

DATE: JANUARY 2023

SCALE: N.T.S.



NOTES:

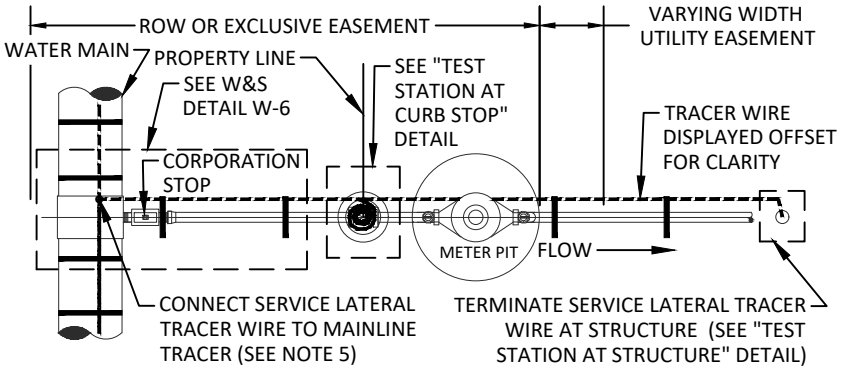
1. ALL BURIED PIPE, VALVES, AND APPURTENANCES SHALL BE INSTALLED ACCORDING TO THE CITY OF GREELEY WATER & SEWER DETAILS AND SPECIFICATIONS LATEST REVISION.
2. TRACER WIRE IS REQUIRED FOR ALL SERVICE PIPES (WATER, SEWER, NON-POTABLE).
3. TRACER WIRE IS ONLY DEPICTED AWAY FROM PIPE IN ABOVE DRAWING FOR CLARITY.
4. REFER TO GENERAL NOTES ON WATER & SEWER DETAIL UL-6, LATEST REVISION, FOR ADDITIONAL TRACER WIRE INSTALLATION, TAPING, CONNECTION, SPLICING, AND GROUNDING REQUIREMENTS.
5. FOR FUTURE CONNECTION SERVICE STUBS, DEVELOPER SHALL PROVIDE A MINIMUM OF 2 FEET OF WIRE WRAPPED AND TAPED TO MARKER POST AT PROPERTY LINE (PROPERTY BUILDER SHALL SPLICE TO THIS TRACER WIRE COIL AT LATER DATE).
6. REFER TO WATER & SEWER CONSTRUCTION SPECIFICATIONS, LATEST REVISION, FOR APPROVED TRACER WIRE, GROUNDING ROD, TEST STATION, AND MISC. PRODUCT MFR.
7. WATER & NON-POTABLE SERVICE TEST STATIONS/TRACER ACCESS:
   - 7.1. TEST STATION (AT CURB STOP): TAPE TRACER WIRE TO CURB STOP BOX AND RUN TO SURFACE. SECURE A TWO FOOT (LINEAR) COIL OF TRACER WIRE AT THE TOP OF THE CURB STOP BOX, AND PLACE THE UPPER HALF OF A STANDARD VALVE BOX AROUND THE CURB STOP AND TEST STATION.
   - 7.2. PROPERTY OWNER TEST STATION AT STRUCTURE: TERMINATE TRACER WIRE AT STRUCTURE WITH AN APPROVED TEST STATION ACCESS BOX FROM AN APPROVED MFR, MOUNTED TO STRUCTURE.
   - 7.3. SEE W&S DETAIL UL-4, LATEST REVISION, FOR ADDITIONAL DETAILS.
8. SANITARY SEWER SERVICE TEST STATIONS/TRACER ACCESS:
   - 8.1. PROPERTY OWNER TEST STATION AT STRUCTURE: TERMINATE TRACER WIRE AT STRUCTURE WITH AN APPROVED TEST STATION ACCESS BOX FROM AN APPROVED MFR, MOUNTED TO THE STRUCTURE.
   - 8.2. SEE W&S DETAIL UL-5, LATEST REVISION, FOR ADDITIONAL DETAILS.
9. ALL SANITARY SEWER SERVICE LATERAL TRACER WIRES SHALL TERMINATE WITHIN 2FT OF THE SS MAIN WITH AN APPROVED 1.5 LB DRIVE-IN MAGNESIUM GROUNDING ROD.
10. ALL WATER SERVICE LATERAL TRACER WIRES SHALL BE CONNECTED TO MAINLINE TRACER WITHOUT CUTTING / SPLICING THE MAINLINE TRACER WIRE, ACCORDING TO WATER & SEWER DETAIL UL-6, LATEST REVISION.

City of Greeley Colorado

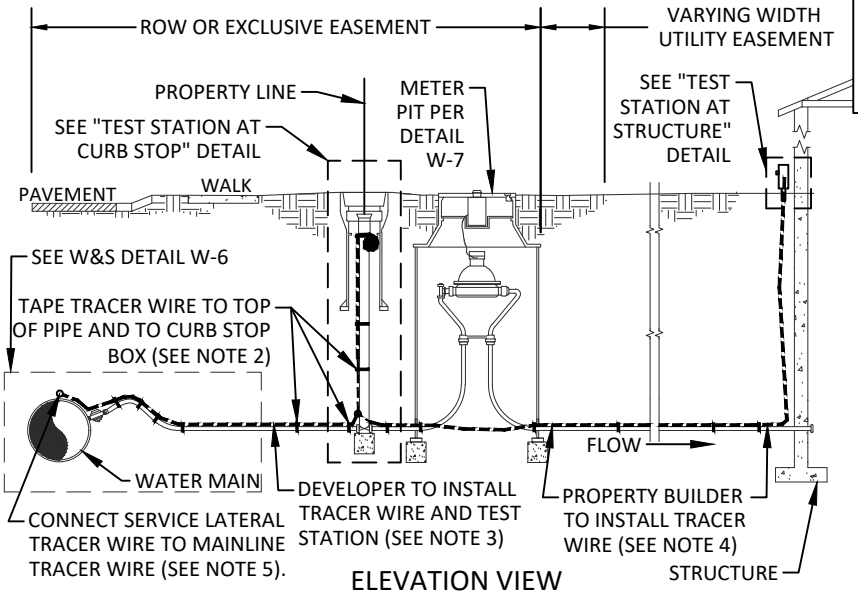
(TYP) SERVICE LATERAL UTILITY LOCATING PLAN

DETAIL UL-3

DATE: JANUARY 2023 SCALE: N.T.S.

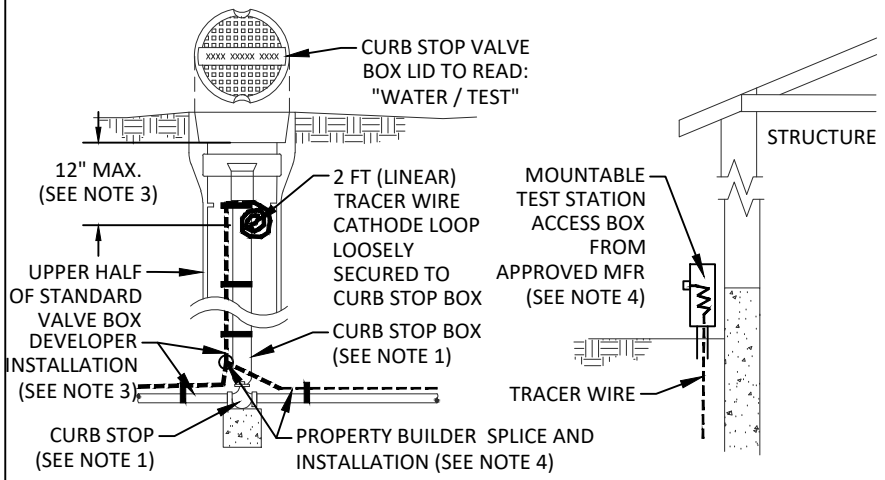


TRACER WIRE INSTALLATION PLAN VIEW



ELEVATION VIEW

WATER SERVICE TEST STATION DETAIL



TEST STATION AT CURB STOP

TEST STATION AT STRUCTURE

NOTES:

1. REFER TO RELATED WATER & SEWER DETAILS W-6 THROUGH W-11, LATEST REVISION OF EACH, FOR WATER SERVICE LATERAL AND METER INSTALLATION DETAILS.
2. REFER TO RELATED SERVICE LATERAL TRACER WIRE DETAIL UL-3, AND GENERAL TRACER WIRE NOTES ON UL-6, LATEST REVISION OF EACH, FOR ADDITIONAL TRACER WIRE TAPING, SPLICING, CONNECTING, AND GROUNDING DETAILS.
3. UTILITY DEVELOPER TO INSTALL TRACER WIRE ON MAIN AND UP TO TEST STATION AT CURB STOP ON THE EDGE OF ROW. PROVIDE 2 FT (LINEAR) OF EXCESS TRACER WIRE, SECURED AT THE TOP OF THE CURB STOP BOX, AND PLACE THE UPPER HALF OF A STANDARD VALVE BOX AROUND THE CURB STOP AND TEST STATION. FOR NEW DEVELOPMENT, UTILITY DEVELOPER SHALL PROVIDE A MINIMUM 2 FT COIL AT MARKER POST IF PRIOR TO CURB STOP INSTALLATION.
4. PROPERTY BUILDER TO SPLICE SERVICE TRACER WIRE TO TEST STATION TRACER WIRE AND INSTALL UP TO STRUCTURE, TERMINATING DIRECTLY ABOVE THE SERVICE LATERAL AT THE STRUCTURE WITH AN APPROVED ACCESS BOX FROM AN APPROVED MFR AND INSTALLED IN ACCORDANCE WITH MFR SPECIFICATIONS. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR APPROVED MFR.
5. ALL MAINLINE TRACER WIRE CONNECTIONS SHALL BE INSTALLED PER LATEST REVISION OF WATER & SEWER SPECIFICATIONS. MAINLINE TRACER SHALL NOT BE CUT OR SPLICED IN ANY WAY (SEE NOTE 3).

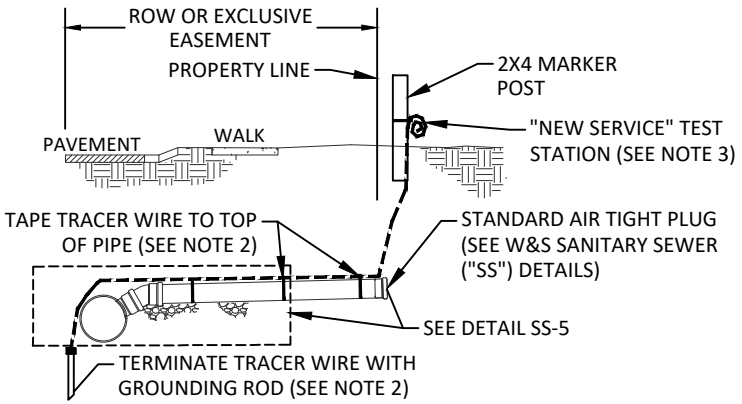
City of Greeley Colorado

(TYP) WATER SERVICE UTILITY LOCATING DETAIL SECTION & TEST STATION

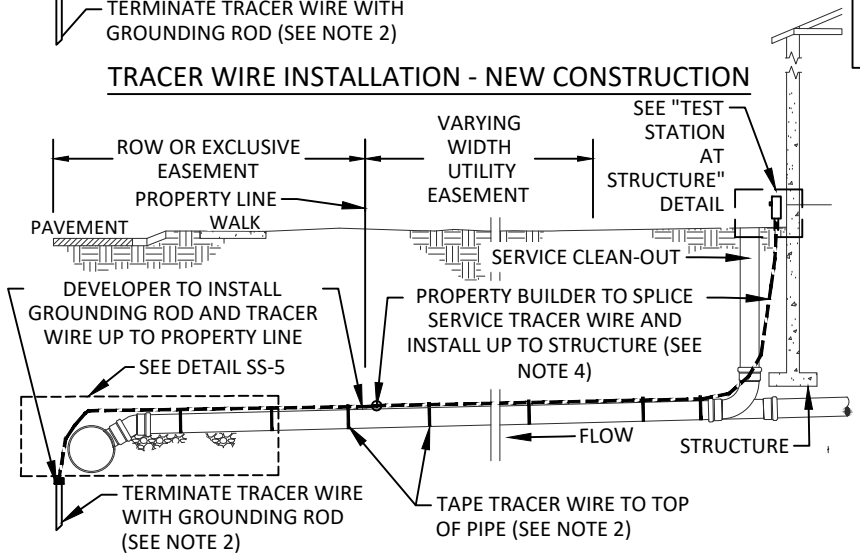
DETAIL UL-4

DATE: JANUARY 2023

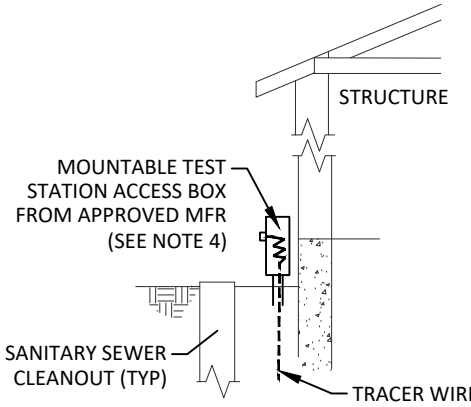
SCALE: N.T.S.



TRACER WIRE INSTALLATION - NEW CONSTRUCTION



TRACER WIRE INSTALLATION ELEVATION VIEW



TEST STATION AT STRUCTURE

NOTES:

1. REFER TO RELATED DETAIL SS-5, LATEST REVISION, FOR SANITARY SEWER SERVICE LATERAL STANDARD DRAWING.
2. REFER TO RELATED SERVICE LATERAL TRACER WIRE DETAIL UL-3, AND GENERAL TRACER WIRE NOTES ON UL-6, LATEST REVISION OF EACH, FOR ADDITIONAL TRACER WIRE TAPING, SPLICING, CONNECTING, GROUNDING, AND MISC. INSTALLATION DETAILS.
3. DEVELOPER TO INSTALL TRACER WIRE FROM SS MAIN TO THE TEST STATION BOX ON THE EDGE OF ROW. TEST STATION FOR NEW DEVELOPMENT SHALL BE A COIL OF 2 FT (LINEAR) TRACER WIRE, SECURED TO THE SERVICE STUB MARKER POST.
4. PROPERTY BUILDER TO SPLICE SANITARY SEWER SERVICE TRACER WIRE PROPERTY LINE AND INSTALL UP TO STRUCTURE, TERMINATING AT THE SS SERVICE CLEANOUT WITH AN APPROVED MFR TEST STATION ACCESS BOX FROM AN APPROVED MFR. TEST STATION ACCESS BOX SHALL BE MOUNTED TO THE STRUCTURE WITHIN 18" OF THE SS SERVICE CLEANOUT AND INSTALLED ACCORDING TO THE TEST STATION MFR SPECIFICATIONS. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR APPROVED MFR.

City of Greeley Colorado

(TYP) SANITARY SEWER SERVICE UTILITY LOCATING DETAIL SECTION & TEST STATION

DETAIL UL-5

DATE: JANUARY 2023

SCALE: N.T.S.

TRACER WIRE NOTES:

1. LOCATING MUST MEET REQUIREMENTS OF SENATE BILL 18-167 OR ANY UPDATE.
2. TRACER WIRE SHALL BE LOCATED ON TOP OF PIPE, TAPED EVERY 3 TO 4 FEET MAX AND EACH SIDE OF EVERY JOINT, FITTING, AND VALVE.
3. TRACER WIRE IS REQUIRED FOR ALL WATER SERVICE LATERALS, NON-POTABLE IRRIGATION SERVICE LATERALS, ALL SANITARY SEWER LATERALS, ALL WATER MAINS, AND ALL NON-POTABLE IRRIGATION MAINS.
4. TWO UNDERGROUND WIRE SPLICES ARE ALLOWED PER SERVICE, SHALL HAVE LOCKABLE CONNECTIONS SPECIFICALLY DESIGNED FOR DIRECT BURIAL, AND DIELECTRIC SILICONE GEL FILLED OR APPROVED EQUAL.
5. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR TRACER WIRE GAUGE, MATERIAL, AND COATING REQUIREMENTS.
6. TRACER WIRE SYSTEMS MUST BE INSTALLED AS A SINGLE CONTINUOUS WIRE, EXCEPT WHERE USING APPROVED CONNECTORS. NO LOOPING OR COILING OF WIRE AROUND THE PIPE IS ALLOWED.
7. ALL WATER SERVICE LATERAL TRACER WIRES SHALL BE CONNECTED TO MAINLINE TRACER USING AN APPROVED MAINLINE TO LATERAL LUG CONNECTOR WITHOUT CUTTING / SPLICING THE MAINLINE TRACER WIRE.
8. ALL MAINLINE TRACER WIRE BRANCHES SHALL BE MADE WITH AN APPROVED MAINLINE TO MAINLINE LUG CONNECTOR WITHOUT CUTTING / SPLICING EITHER MAINLINE TRACER WIRE.
9. REFER TO WATER & SEWER CONSTRUCTION SPECIFICATIONS, LATEST REVISION, FOR APPROVED TRACER WIRE MFR AND ADDITIONAL INSTALLATION REQUIREMENTS.

TEST STATIONS:

1. TRACER WIRE SHALL BE ACCESSIBLE AT LEAST ONCE EVERY 1,000 FT MAX.
2. TEST STATION SHALL NOT BE FURTHER THAN 1,000 FT FROM AN APPROVED "FAR-END" GROUNDING ROD. THIS GROUNDING ROD MUST MEET WATER & SEWER CONSTRUCTION SPECIFICATIONS AND DESIGN CRITERIA STATED IN THE GROUNDING NOTES.
3. TEST STATION MAY EITHER BE IN THE FORM OF A CATHODE WIRE LOOP ACCESSIBLE FROM FINAL GRADE SURFACE OR AN APPROVED TEST STATION ACCESS BOX FROM AN APPROVED MFR. EITHER TEST STATION FORM SHALL BE WITHIN THE FAR-END GROUNDING INTERVAL REQUIREMENT, AND MEET WATER & SEWER TRACER WIRE CONSTRUCTION SPECIFICATIONS AND DETAILS, LATEST REVISION OF EACH.
4. GROUND SURROUNDING TEST STATION ACCESS BOXES SHALL SLOPE AWAY FROM LID AT 2% MINIMUM GRADE.

GROUNDING NOTES:

1. ALL SANITARY SEWER SERVICE LATERAL TRACER WIRES SHALL TERMINATE WITHIN 2 FT OF THE SS MAIN WITH AN APPROVED DRIVE-IN MAGNESIUM GROUNDING ROD. SINGLE GROUNDING ROD MAY BE UTILIZED FOR UP TO 3 SEWER SERVICES MAX.
2. MAINLINE TRACER WIRE MUST BE GROUNDED AT EVERY DEAD END/STUB, AND ALONG CONTINUOUS RUNS AT A MAXIMUM OF 2,000 FT INTERVALS WITH A 1.5 LB DRIVE-IN MAGNESIUM GROUNDING ROD PER MFR REQUIREMENTS. PLACEMENT OF GROUNDING ROD SHALL BE INSTALLED IN SUCH A WAY THAT ALLOWS FOR PROPER WIRE LOCATING WITHOUT A LOSS OR DETERIORATION OF LOW FREQUENCY SIGNAL (512 HZ) FOR DISTANCES IN EXCESS OF 1,000 FT.
3. IF GROUNDING ROD IS TOO CLOSE TO A TEST STATION THAT IT INTERFERES WITH PROPER LOCATING, THE GROUNDING ROD MUST BE SWITCH-ABLE IN ORDER TO TEMPORARILY DEACTIVATE THE INTERFERING GROUND SIGNAL IN THE VICINITY. SUCH A TEST STATION SHALL BE IN THE FORM OF A TEST STATION ACCESS BOX FROM A CITY APPROVED MFR.
4. REFER TO WATER & SEWER CONSTRUCTION SPECIFICATIONS, LATEST REVISION, FOR APPROVED GROUNDING ROD MFR AND ADDITIONAL REQUIREMENTS.

City of Greeley Colorado

TRACER WIRE GENERAL NOTES

DETAIL UL-6

DATE: JANUARY 2023

SCALE: N.T.S.