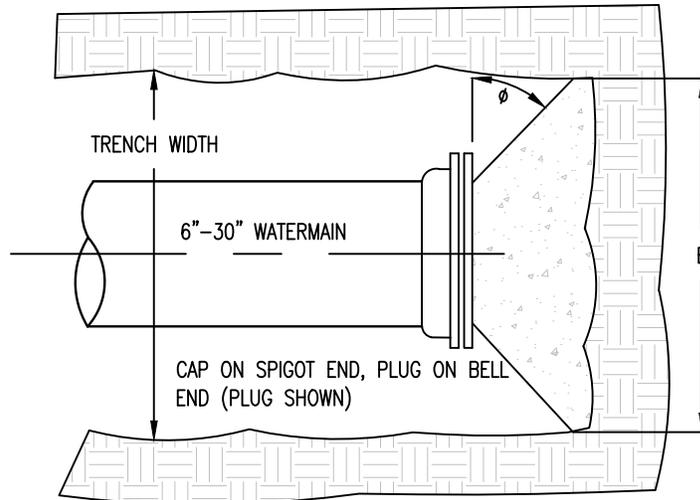
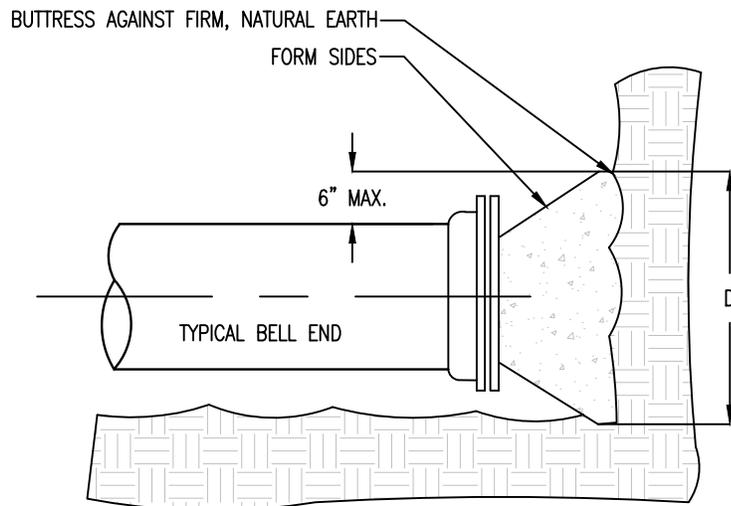


WATER SYSTEM DETAILS

- W-2 PLUG BLOCKING FOR WATERMAIN
- W-3 THRUST BLOCKING FOR WATERMAIN
- W-4 FIRE HYDRANT SETTING DETAIL- DUCTILE IRON
- W-4A FIRE HYDRANT SETTING DETAIL- HDPE
- W-5 TYPICAL COPPER WATER SERVICE - 3/4", 1", 1-1/4", AND 2"
- W-5A TYPICAL HDPE WATER SERVICE FOR
12" AND SMALLER HDPE MAINS - 1", 1-1/4", AND 2"
- W-5B 6" & LARGER WATER SERVICE FOR 12" AND SMALLER HDPE MAINS
- W-5C 4" & LARGER WATER SERVICE - DUCTILE IRON
- W-5D 1" THRU 2" HDPE WATER SERVICE FOR 14" AND LARGER HDPE MAINS
- W-6 STRAPPING WATERMAIN VERTICAL OFFSETS
- W-7 2" HDPE WATERMAIN CONNECTION TO DI OR CI
- W-8 1-1/4" BLOWOFF FOR 6" AND 8" IRON WATERMAINS
- W-8A 1-1/4" BLOWOFF (VALVE BOX TYPE) ON EXISTING WATERMAIN
- W-8B 1-1/4" BLOWOFF FOR HDPE WATERMAINS
- W-8C 1" BLOWOFF FOR 2" HDPE WATERMAINS
- W-9 MANUAL AIR RELEASE FOR C.I. AND D.I. MAINS (VALVE BOX TYPE)
- W-9A MANUAL AIR RELEASE FOR HDPE MAINS (VALVE BOX TYPE)
- W-10 AUTO AIR-RELEASE VALVE AND MANHOLE FOR NEW HDPE MAINS
- W-10A AUTO AIR-RELEASE VALVE AND MANHOLE FOR EXST'G C.I. OR D.I.P.
- W-11 EXCAVATION FOR TAPPING SLEEVE AND VALVE
- W-13 WATER MAIN INSULATION
- W-13A WATER SERVICE INSULATION
- W-15 CAST IRON WATER MANHOLE FRAME AND COVER
- W-16 DULUTH THREAD FOR HYDRANT PUMPER NOZZLE
- W-17 WATER VALVE BOX - DUCTILE IRON MAIN
- W-17A WATER VALVE BOX - HDPE MAIN
- W-18 ANODE CONNECTION
- W-19 CONCRETE ENCASED VALVE BOX COLLAR IN ROADWAY
- W-30 TYPICAL WATER METER INSTALLATION - SINGLE
- W-31 TYPICAL WATER METER INSTALLATION WITH BYPASS
- W-32 MULTIPLE WATER METER INSTALLATION
- W-34 TYPICAL 6" FIRE SERVICE WITH DOMESTIC WATER



PLAN



ELEVATION

BLOCKING DIMENSIONS		
PLUG SIZE	B	D
6"	12"	15"
8"	24"	15"
10"	24"	20"
12"	30"	22"
16"	40"	28"
20"	50"	34"
24"	62"	40"
30"	80"	48"

NOTES:

1. BLOCKING DIMENSIONS BASED ON EARTH RESISTANCE OF 2 TONS PER SQ. FT. WHERE, IN THE OPINION OF THE ENGINEER, EARTH IS POOR, BLOCKING SHALL BE INCREASED IN SIZE AS DIRECTED OR STRAPPING MAY BE NECESSARY.
2. ANGLE ϕ SHALL BE EQUAL TO OR LARGER THAN 45°.
3. BLOCKING SHALL BE CENTERED ON MAIN.
4. CONCRETE SHALL BE MIX 3G52 - MNDOT 2461.
5. POLYETHYLENE SHALL BE USED TO SEPARATE CONCRETE FROM FITTING.
6. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

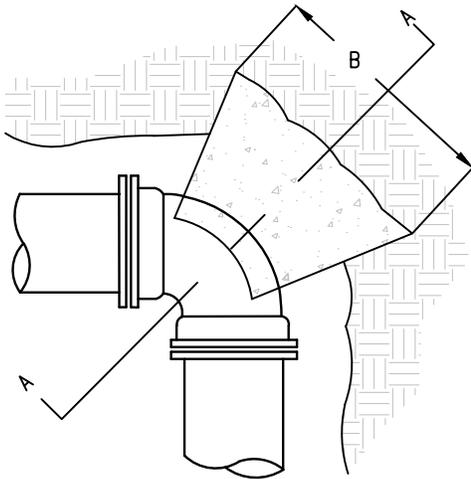
PLUG BLOCKING FOR WATERMAIN

W-2

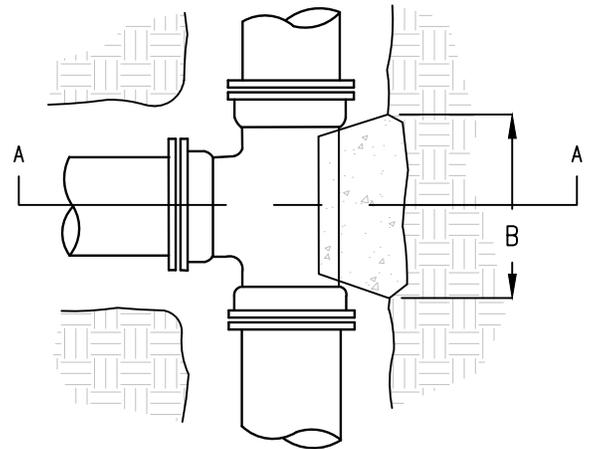
REVISED/APPROVED 01/20/2017

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

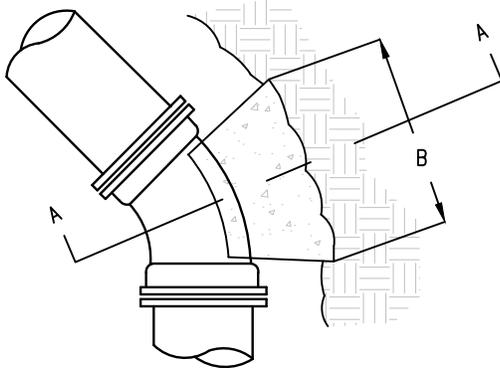
NO SCALE



PLAN - 90° BEND

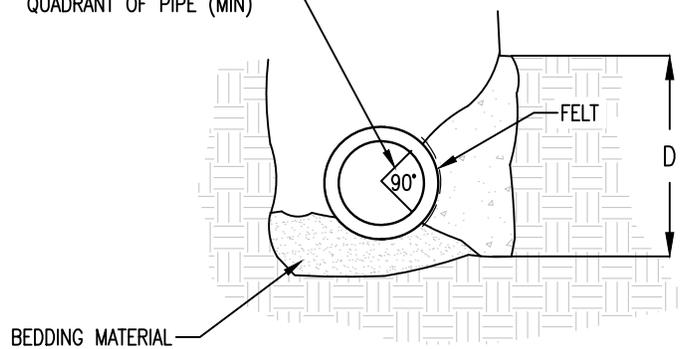


PLAN - TEE



PLAN - 45° BEND

CONCRETE SHALL BE IN CONTACT WITH THIS QUADRANT OF PIPE (MIN)



SECTION A-A

NOTES

1. DIMENSIONS IN TABLE ARE BASED ON A WATER PRESSURE OF 150 P.S.I. & AN EARTH RESISTANCE OF 2 TONS/S.F.
2. BLOCKING TO BE SET AGAINST UNDISTURBED SOIL.
3. CONCRETE SHALL BE MIX 3G52. (MNDOT SPEC. 2461) CONCRETE SHALL NOT INTERFERE WITH MECHANICAL JOINTS
4. POLYETHYLENE SHALL BE USED TO SEPARATE CONCRETE FROM FITTING.
5. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

BLOCKING DIMENSIONS								
BEND OR BRANCH SIZE	22-1/2° BENDS		45° BENDS		90° BENDS		TEES	
	B	D	B	D	B	D	B	D
0'-6"	1'-0"	1'-0"	1'-0"	1'-0"	1'-4"	1'-2"	1'-3"	1'-0"
0'-8"	1'-0"	1'-0"	1'-4"	1'-2"	1'-10"	1'-6"	1'-6"	1'-4"
1'-0"	1'-4"	1'-4"	1'-10"	1'-10"	2'-8"	2'-3"	2'-3"	2'-0"
1'-4"	1'-10"	1'-8"	2'-6"	2'-4"	3'-10"	2'-10"	3'-2"	2'-4"
1'-8"	2'-4"	2'-0"	3'-3"	2'-10"	5'-0"	3'-4"	4'-0"	3'-0"
2'-0"	2'-10"	2'-4"	4'-0"	3'-3"	6'-4"	3'-10"	5'-3"	3'-4"
2'-6"	3'-6"	3'-0"	5'-4"	3'-10"	8'-0"	4'-8"	6'-3"	4'-3"

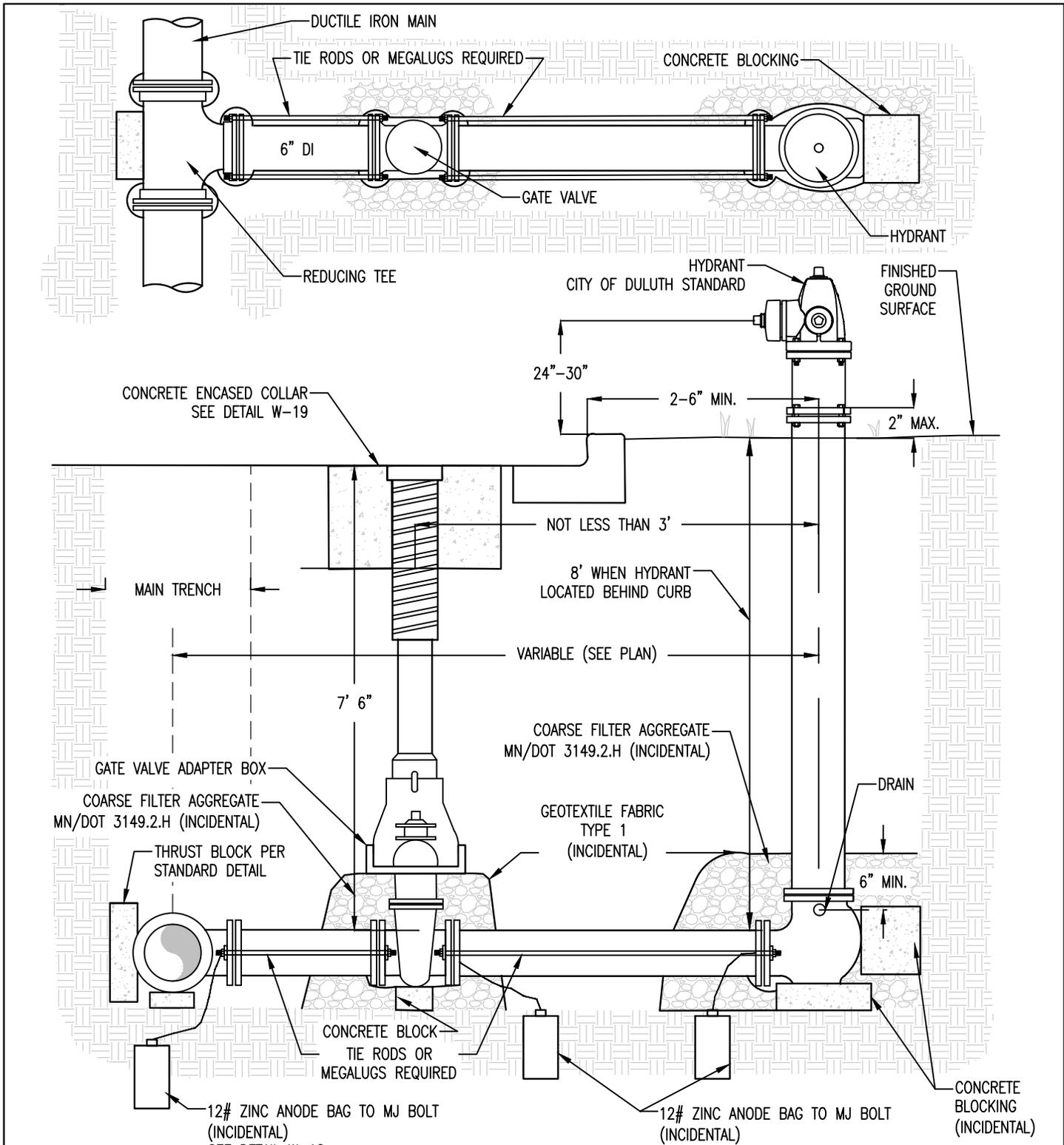
THRUST BLOCKING FOR WATERMAIN

W-3

REVISED/APPROVED 01/20/2017

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

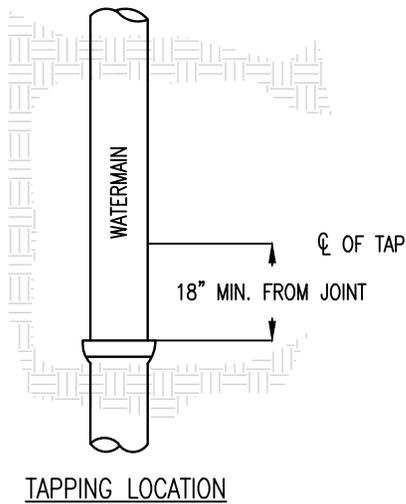
NO SCALE



GENERAL NOTES:

1. VALVES SHALL BE CONNECTED DIRECTLY TO AN ANCHORING TEE. WHENEVER DIRECT CONNECTION IS NOT POSSIBLE, TIE RODS OR MEGALUGS SHALL BE USED. TIE RODS SHALL BE GALVANIZED.
2. USE EPOXY COATING ON VALVE AND HYDRANT BASE.
3. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-418 FOR ALL MECHANICAL JOINT FITTINGS.
4. GATE VALVES AND HYDRANTS WITH ALPHA RESTRAINT COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS AND TIE RODS
5. VALVE BOXES SHALL NOT BE PLACED IN THE CURB AND GUTTER.

FIRE HYDRANT SETTING DETAIL – DUCTILE IRON		W-4
REVISED/APPROVED 02/25/2026	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



NOTE: EXCAVATE 6" UNDER IN-PLACE MAIN AND BACKFILL WITH COARSE FILTER AGGREGATE MNDOT SPEC. # 3149.2H. CONTRACTOR SHALL PROVIDE & PLACE A TRENCH BOX WHEN REQUIRED.

CURB BOX WILL BE SUPPLIED BY CITY AT GARFIELD SHOP AND INSTALLED BY CONTRACTOR. (INCIDENTAL)

2" I.D. BLK. IRON CAP ON 6" LONG PIECE OF 2" I.D. BLK IRON SLIPPED OVER 1 1/2" I.D. BLK IRON PIPE.

1 1/2" I.D. BLK. IRON PIPE TOP SECTION SLIPPED IN 2" I.D. BLK. IRON PIPE

2" I.D. BLK IRON PIPE BOTTOM SECTION SCREWED ONTO 2" X 1 1/2" I.D. REDUCING BUSHING

7' 6" MIN. COVER

MN/DOT 3149.2.H COARSE FILTER AGGREGATE REQUIRED AROUND CORPORATION STOP AND CURB STOP

VARIABLE PLY MEASURE - ONE PIECE

CORPORATION STOP DIRECT CONNECTION

TYPE "K" COPPER (FLARED FITTING)

BRASS CLAMP

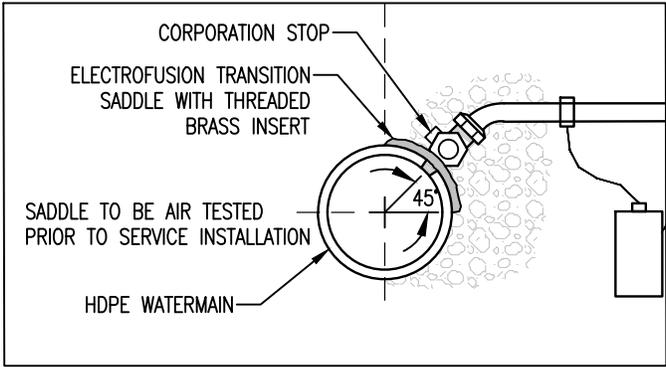
FLARE BY FLARE CURB STOP

CONCRETE SUPPORT

INSERT COPPER DISC & TIGHTEN FLARE NUT TO SEAL END

DI WATERMAIN

5# ZINC ANODE BAG TO BRASS CLAMP (INCIDENTAL)



TYPICAL COPPER WATER SERVICE - 3/4", 1", 1-1/4", AND 2"

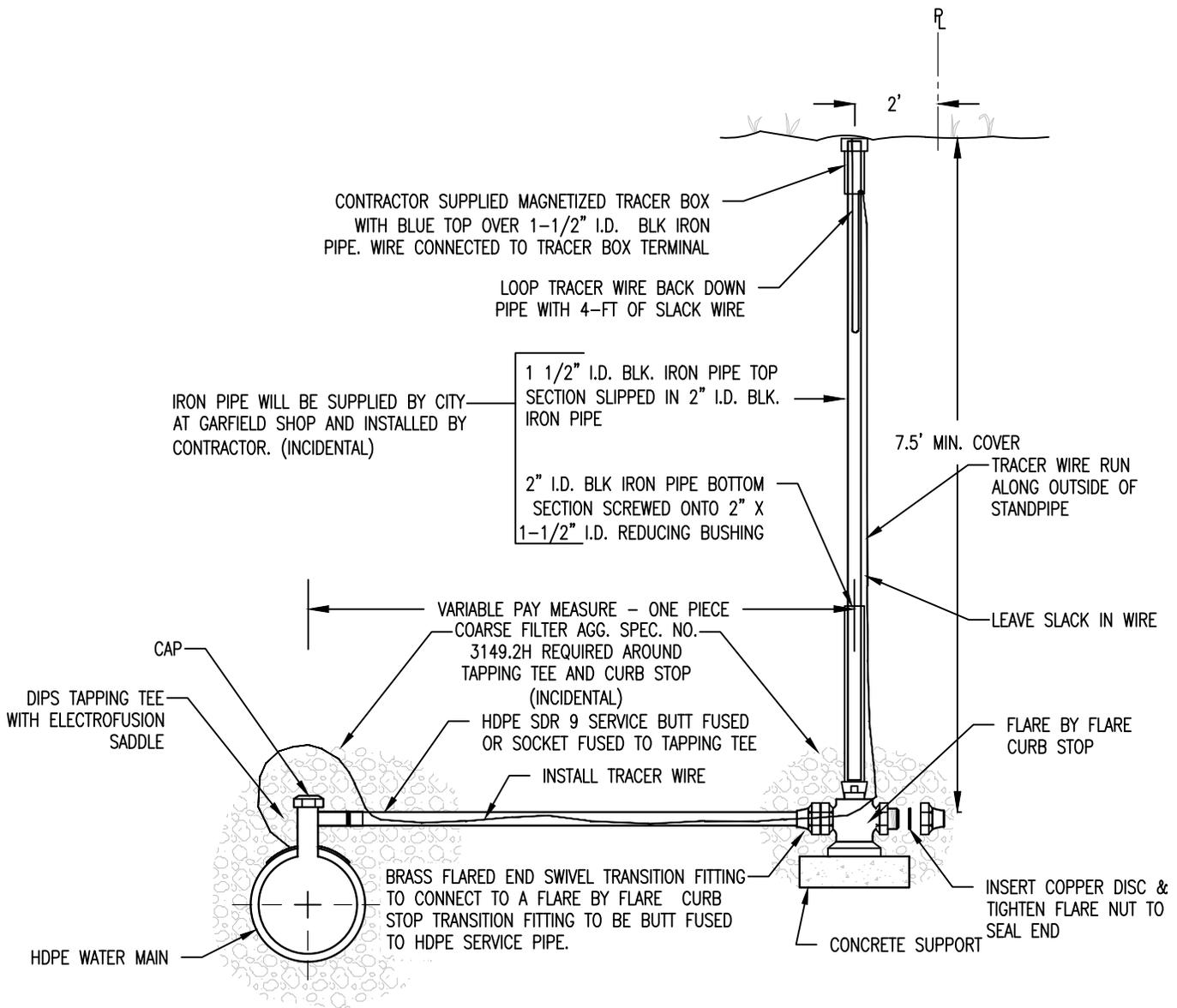
W-5

REVISED/APPROVED 02/25/2026

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

NOTE: EXCAVATE 6" UNDER IN-PLACE MAIN AND BACKFILL WITH COURSE FILTER AGGREGATE MNDOT SPEC. # 3149.2H. CONTRACTOR SHALL PROVIDE & PLACE A TRENCH BOX WHEN REQUIRED.

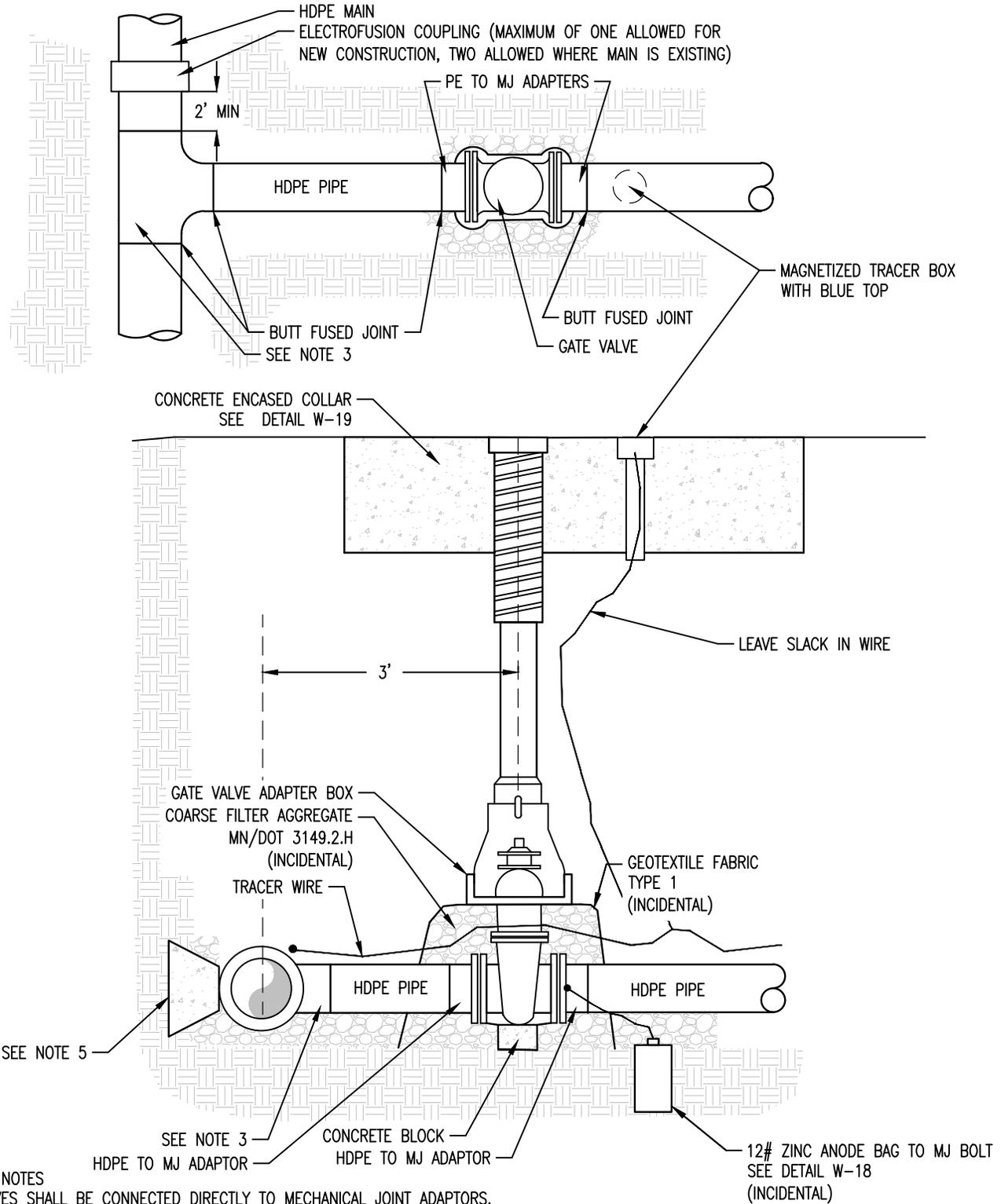


GENERAL NOTES

1. EXCAVATE 6" UNDER IN-PLACE MAIN AND BACKFILL WITH COURSE FILTER AGGREGATE MNDOT SPEC. #3149.2H. CONTRACTOR SHALL PROVIDE & PLACE A TRENCH BOX WHEN REQUIRED.
2. SERVICE IS TO BE AIR TESTED PRIOR TO TAPPING MAIN.
3. THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. THE NUMBER OF CONNECTIONS MUST BE KEPT TO A MINIMUM. ANY SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLIT BOLT CONNECTORS. WIRE NUTS OR CLIP TYPE CONNECTORS SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.

TYPICAL HDPE WATER SERVICE FOR ≤12" HDPE MAINS - 1", 1-1/4", AND 2" W-5A

REVISED/APPROVED 02/25/2026 CITY OF DULUTH STANDARD DETAIL NO SCALE
DEPT. OF PUBLIC WORKS AND UTILITIES

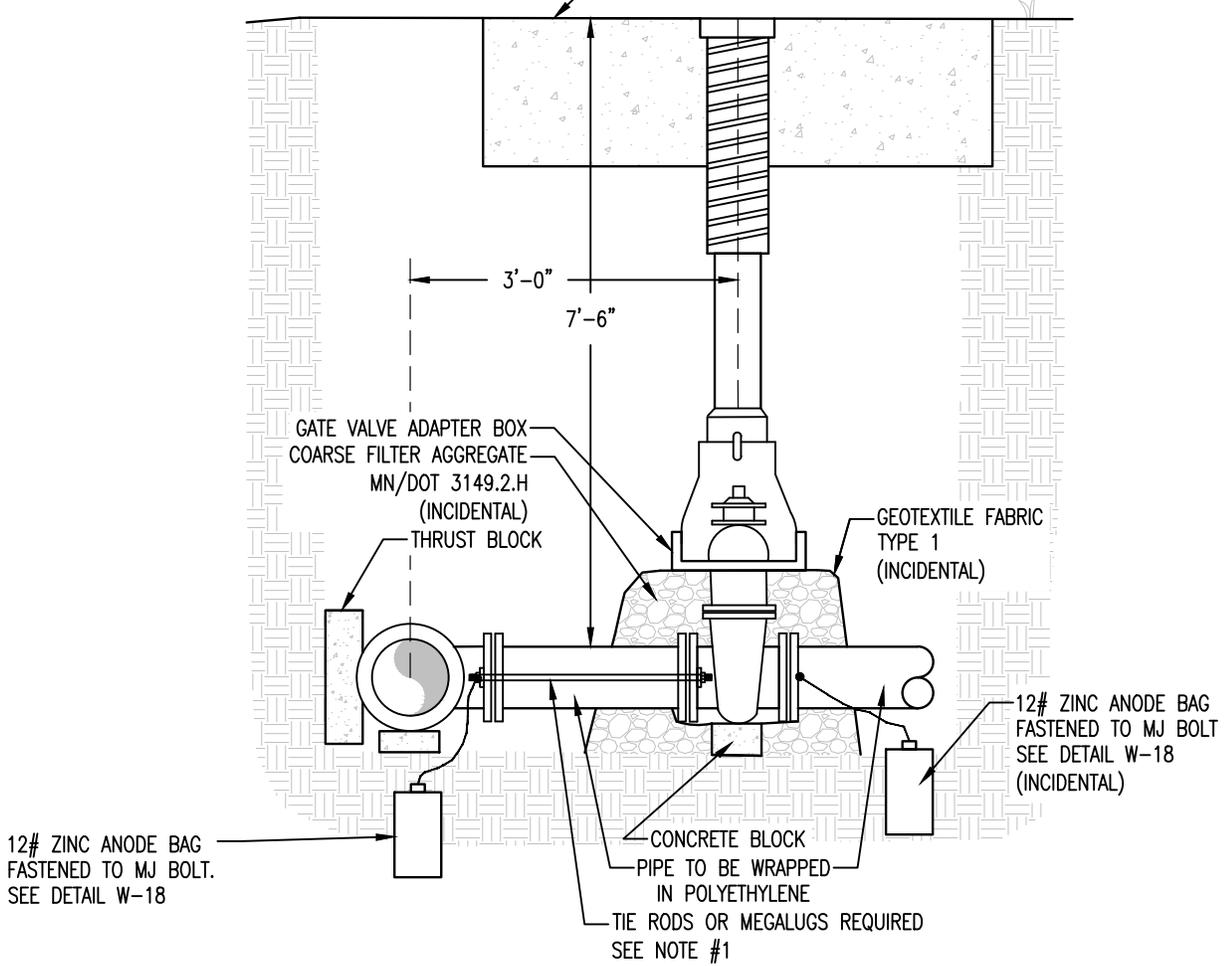
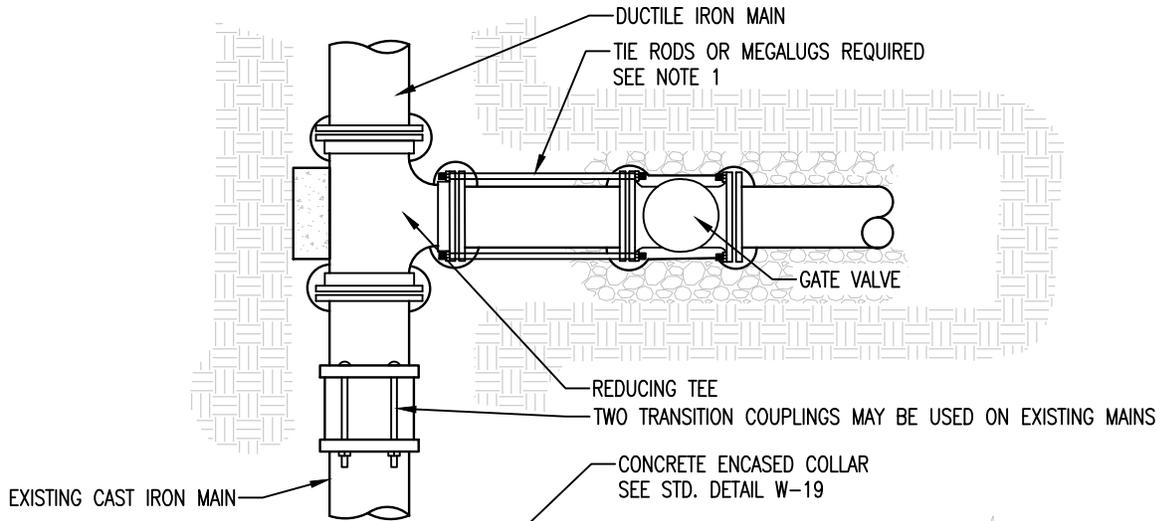


GENERAL NOTES

1. VALVES SHALL BE CONNECTED DIRECTLY TO MECHANICAL JOINT ADAPTORS.
2. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-418 FOR ALL MECHANICAL JOINT FITTINGS.
3. FOR 8" MAINS, CONTRACTOR SHALL USE AN 8 X 8 TEE WITH A MACHINED 8 X 6 REDUCER OR AN 8 X 6 ELECTROFUSION BRANCH SADDLE. FOR LARGER DIMENSION MAINS A FABRICATED TEE OR ELECTROFUSION BRANCH SADDLE WITH A 6" OUTLET MAY BE USED. FOR 8" AND LARGER SERVICES AN APPROVED FABRICATED TEE OF THE APPROPRIATE SIZE MUST BE USED.
4. GATE VALVES WITH ALPHA RESTRAINT COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS. ANODES SHALL BE CONNECTED DIRECTLY TO THE VALVE BONNET BOLTS.
5. WHEN RECONNECTING TO EXISTING SERVICE PIPING CONCRETE THRUST BLOCKING MAY BE REQUIRED

6" & LARGER WATER SERVICE FOR ≤12" HDPE MAINS	W-5B
REVISED/APPROVED 02/25/2026	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES
NO SCALE	

NOTE: ON EXISTING WATERMAINS, HOT TAPS SHALL BE PERFORMED FOR NEW SERVICES WHEN POSSIBLE.



GENERAL NOTES:

1. VALVES SHALL BE CONNECTED DIRECTLY TO AN ANCHORING TEE. WHENEVER DIRECT CONNECTION IS NOT POSSIBLE, TIE RODS OR MEGALUGS SHALL BE USED. TIE RODS SHALL BE GALVANIZED.
2. USE EPOXY COATING ON VALVE.
3. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-418 FOR ALL MECHANICAL JOINT FITTINGS.
4. GATE VALVES WITH ALPHA RESTRAINT COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS.

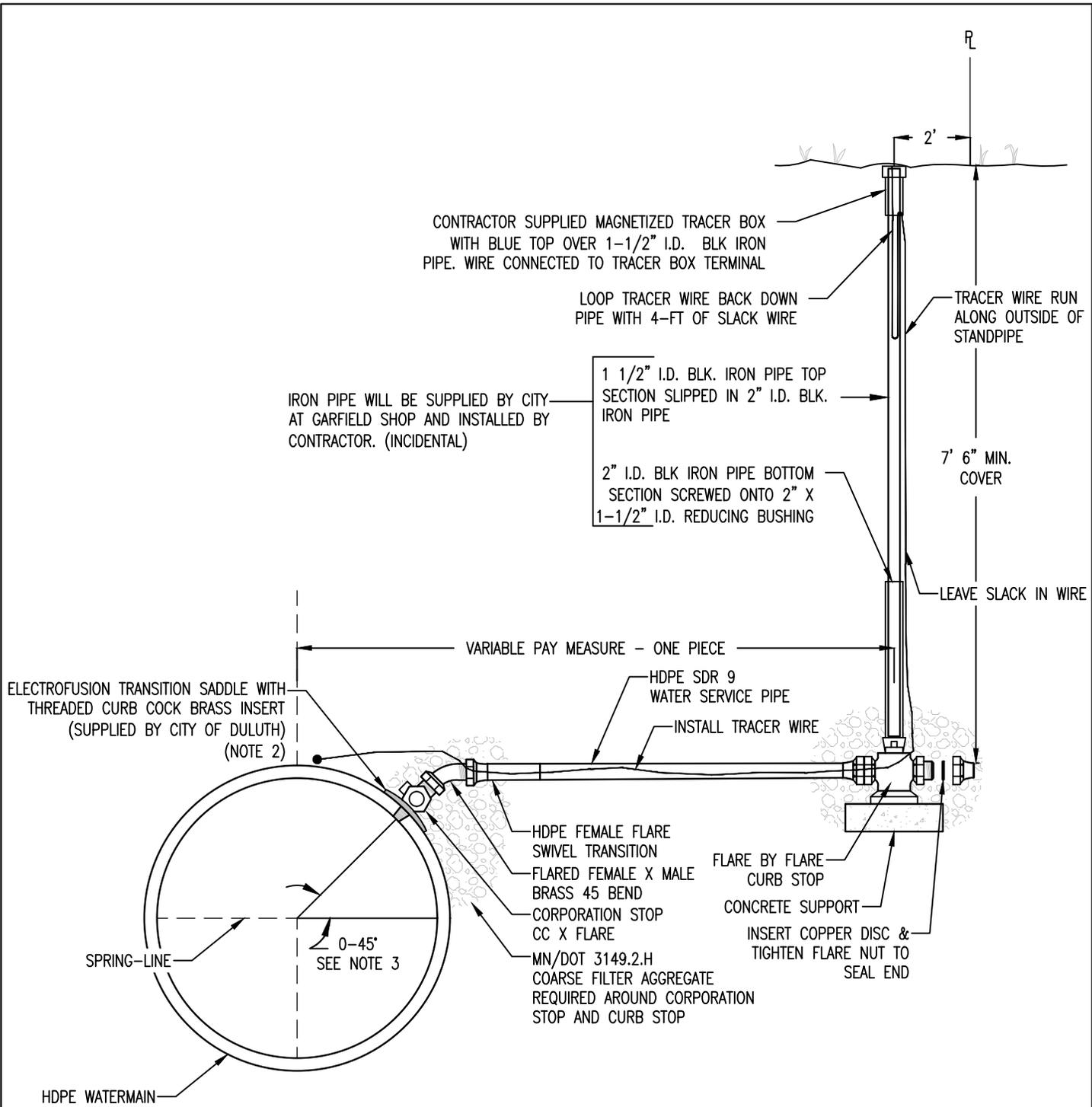
4" & LARGER WATER SERVICE - DUCTILE IRON

W-5C

REVISED/APPROVED 02/25/2026

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

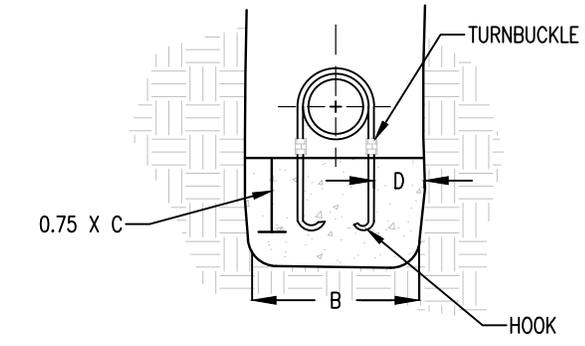
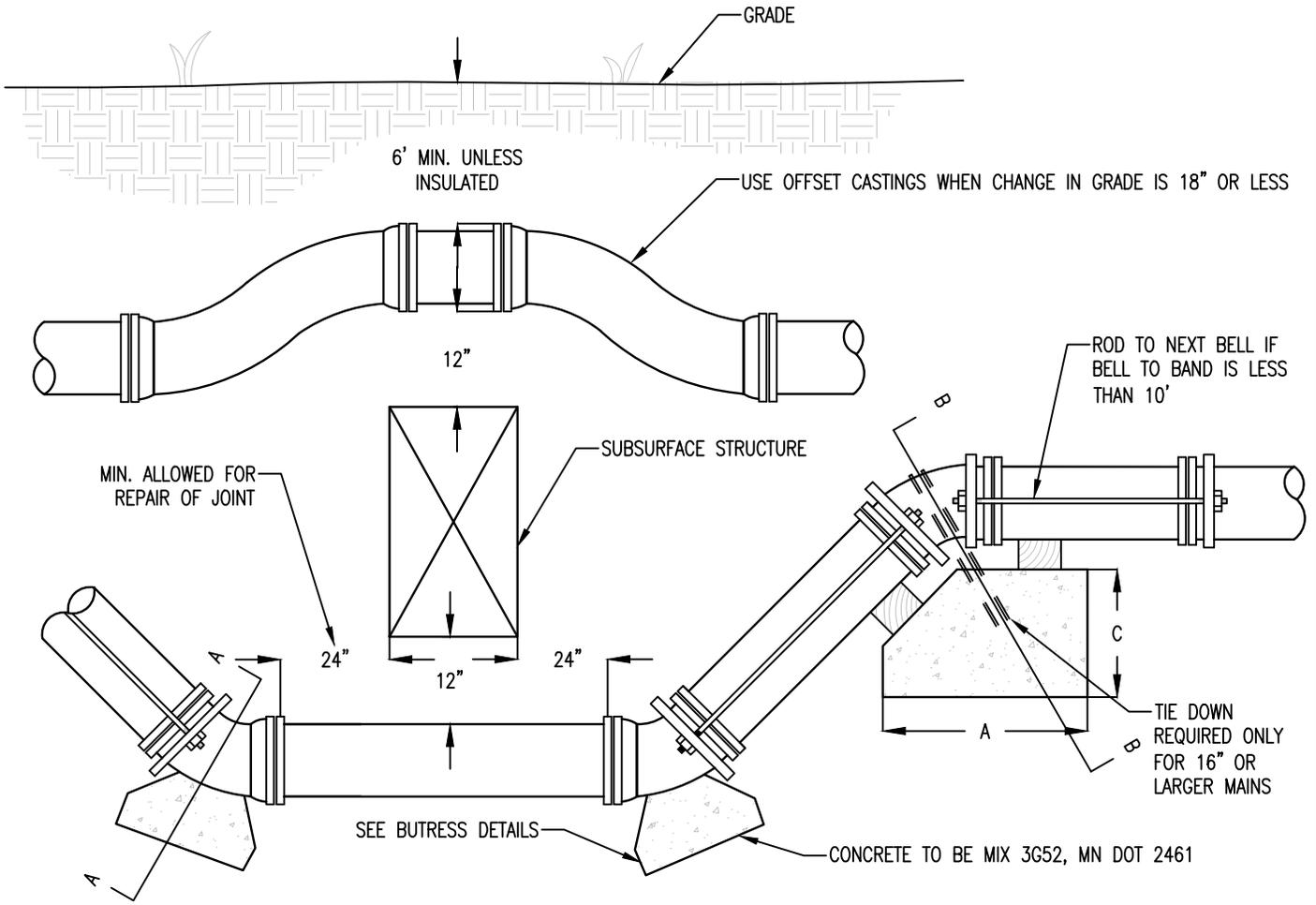
NO SCALE



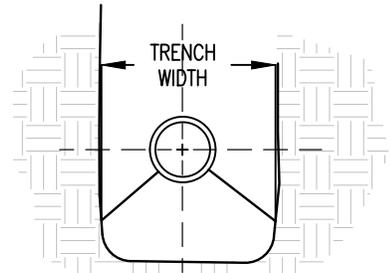
GENERAL NOTES

1. EXCAVATE 6" UNDER IN-PLACE MAIN AND BACKFILL WITH COURSE FILTER AGGREGATE MNDOT SPEC. #3149.2H. CONTRACTOR SHALL PROVIDE & PLACE A TRENCH BOX WHEN REQUIRED.
2. SADDLE TO BE AIR TESTED BEFORE TAPPING MAIN AND INSTALLING SERVICE PIPE.
3. IF MAIN HAS AN EXISTING BURY DEPTH LESS THAN 7' THE TAP LOCATION SHALL BE LOCATED AT THE SPRING-LINE OF THE MAIN.
4. THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. THE NUMBER OF CONNECTIONS MUST BE KEPT TO A MINIMUM. ANY SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLIT BOLT CONNECTORS. WIRE NUTS OR CLIP TYPE CONNECTORS SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.

1" THRU 2" HDPE WATER SERVICE FOR 14" ≤ HDPE MAINS	W-5D
REVISED/APPROVED 02/25/2026	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES
NO SCALE	



SECTION B-B



SECTION A-A

- NOTES:
1. TIE RODS, BOLTS, NUTS, BANDS, AND WASHERS TO BE FURNISHED BY THE CONTRACTOR AND INSTALLED BY CONTRACTOR. ALL RODS AND CONNECTING HARDWARE SHALL BE GALVANIZED. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH ZINC ANODE CAPS
 2. STRAPPING MATERIAL:
 - 2.1. NO. RODS 2 PER TIE
 - 2.2. DIA. RODS 1 INCH
 - 2.3. STRAP SIZE 1/2" X 2"
 - 2.4. BOLT DIA. 3/4"
 - 2.5. WASHER SIZE 1/2" X 3" X 5"
 3. OFFSETS FOR 16" WATER MAIN AND LARGER, TIE DOWNS SHALL BE INSTALLED AS SHOWN. TURNBUCKLE AND BLOCK SIZES:

PIPE SIZE	A	B	C	D
16"	6'-0"	2'-6"	3'-0"	0'-1"
20"	8'-0"	3'-0"	3'-0"	0'-1 1/4"
24"	8'-0"	3'-0"	5'-0"	0'-1 1/2"
30"	8'-0"	5'-0"	5'-0"	0'-2"

STRAPPING WATERMAIN VERTICAL OFFSETS

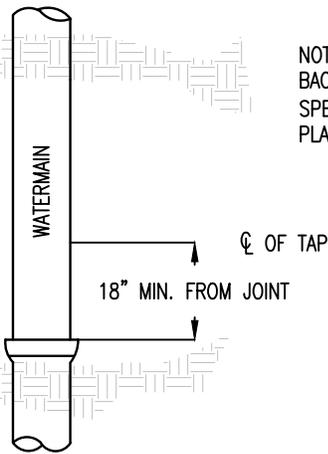
W-6

REVISED/APPROVED 04/05/2019

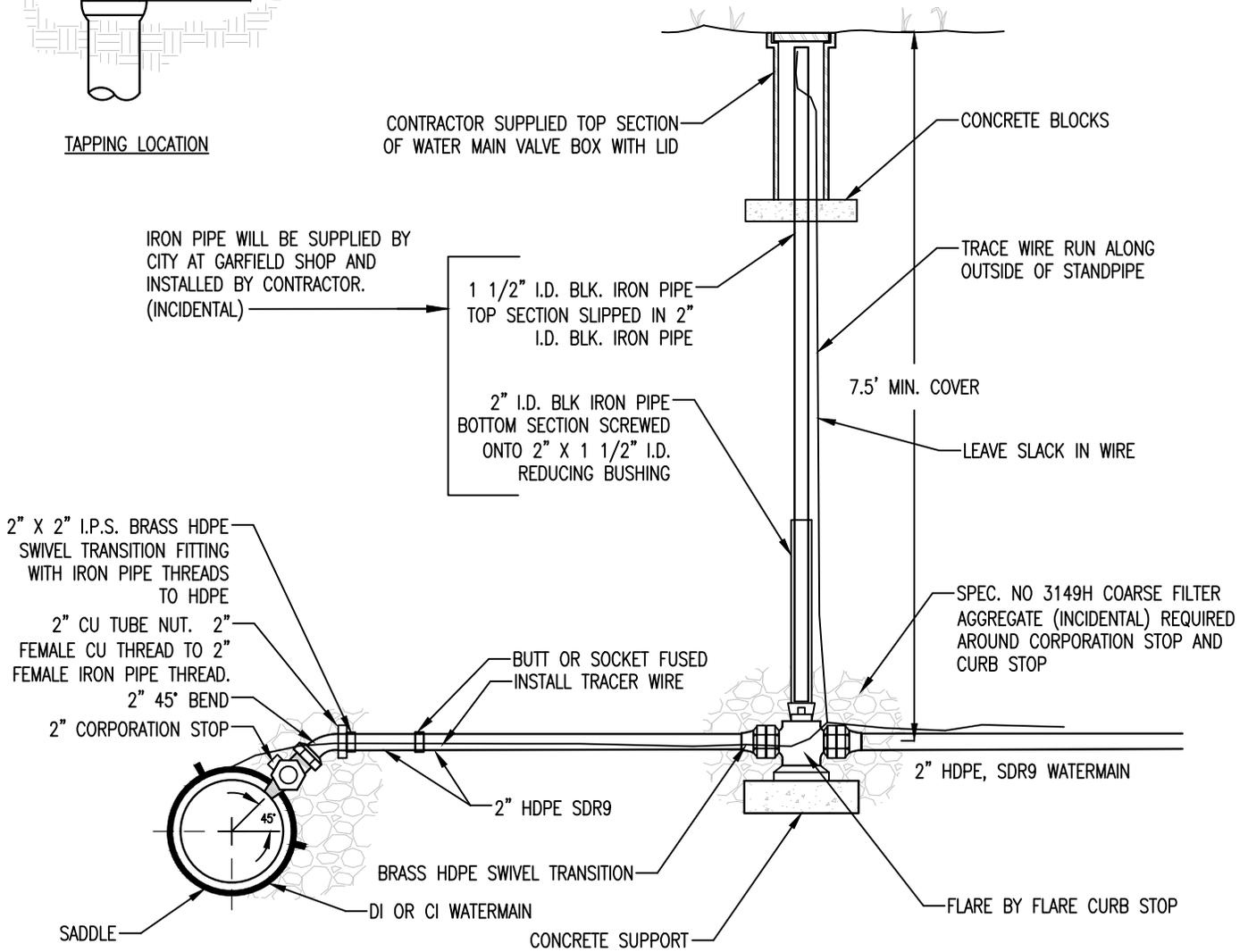
CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

NOTE: EXCAVATE 6" UNDER IN-PLACE MAIN AND BACKFILL WITH COARSE FILTER AGGREGATE MNDOT SPEC. # 3149.2H. CONTRACTOR SHALL PROVIDE & PLACE A TRENCH BOX WHEN REQUIRED.



TAPPING LOCATION



CONNECT TRACER WIRE TO WATERMAIN TO ENSURE ELECTRICAL CONDUCTIVITY OR PROVIDE 1 LB ANODE FOR TRACER WIRE.

THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. THE NUMBER OF CONNECTIONS MUST BE KEPT TO A MINIMUM. ANY SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLIT BOLT CONNECTORS. WIRE NUTS OR CLIP TYPE CONNECTORS SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.

2" HDPE WATERMAIN CONNECTION TO DI OR CI

W-7

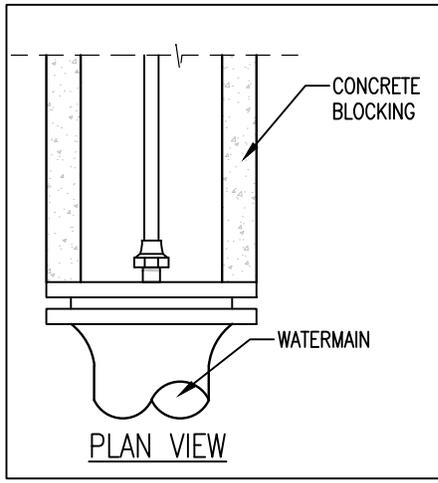
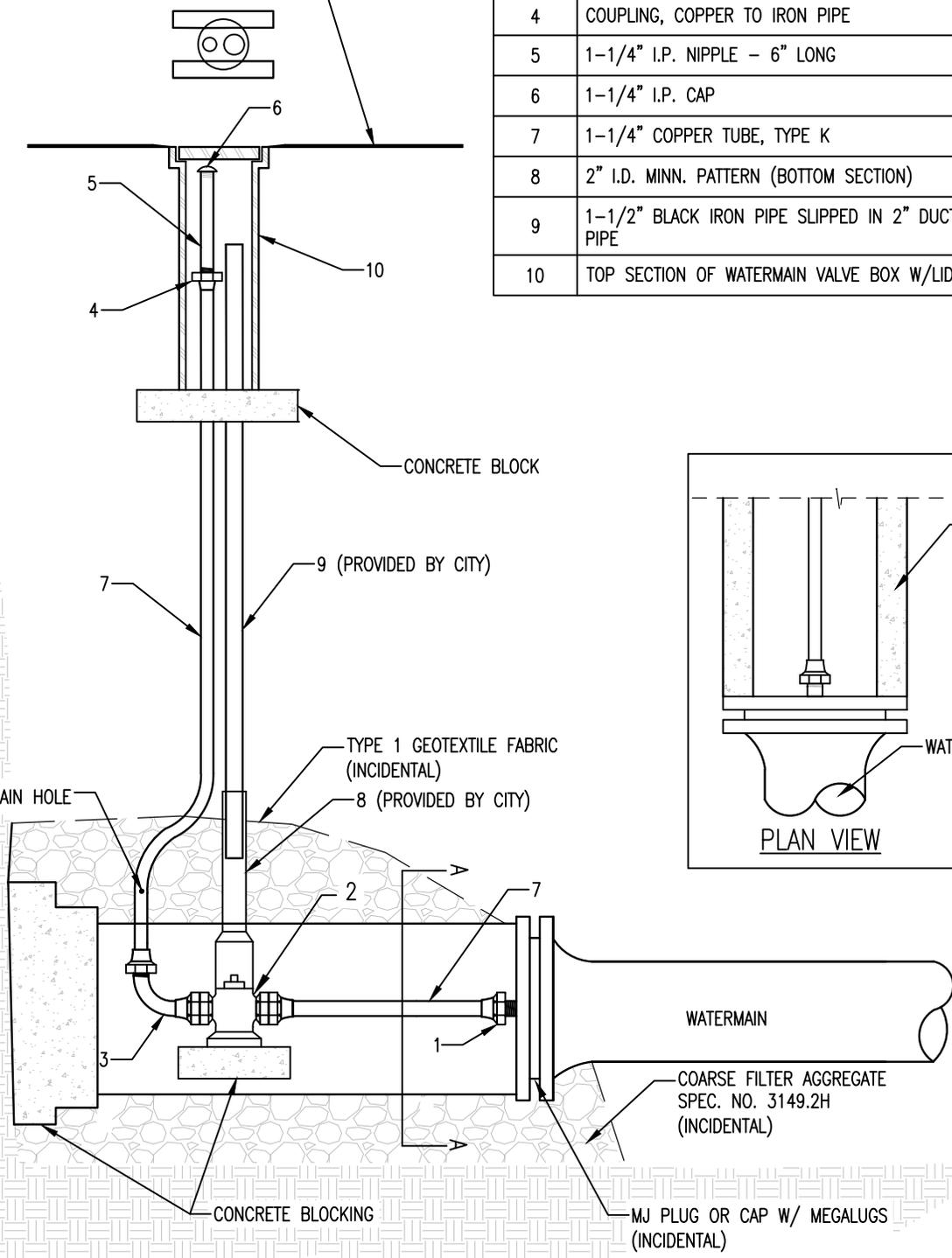
REVISED/APPROVED 11/19/2024

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

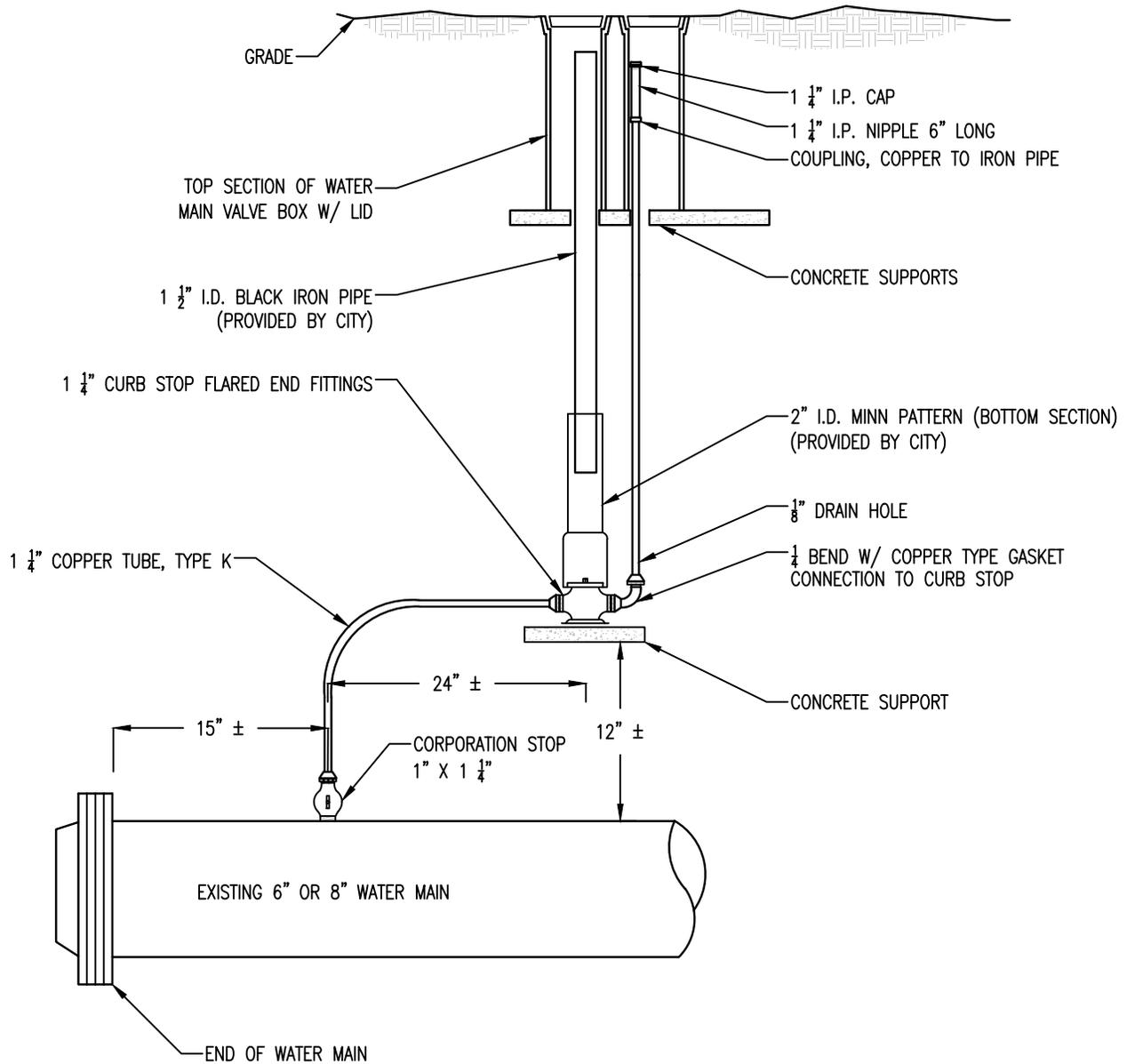
NO SCALE

NOTE: TOP OF CASTING SHALL BE $\frac{3}{8}$ " BELOW FINISHED SURFACE

ITEM	DESCRIPTION
1	1-1/4" I.P. THREAD TO FLARE COPPER COUPLING
2	1-1/4" CURB STOP, FLARED END FITTINGS
3	1-1/4" 90° BEND W/ COPPER TYPE GASKET CONNECTION TO CURB STOP
4	COUPLING, COPPER TO IRON PIPE
5	1-1/4" I.P. NIPPLE - 6" LONG
6	1-1/4" I.P. CAP
7	1-1/4" COPPER TUBE, TYPE K
8	2" I.D. MINN. PATTERN (BOTTOM SECTION)
9	1-1/2" BLACK IRON PIPE SLIPPED IN 2" DUCTILE IRON BLACK PIPE
10	TOP SECTION OF WATERMAIN VALVE BOX W/LID



1-1/4" BLOWOFF FOR 6" & 8" IRON WATERMAINS		W-8
REVISED/APPROVED 04/05/2019	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



1-1/4" BLOW OFF (VALVE BOX TYPE) ON EXISTING WATERMAIN

W-8A

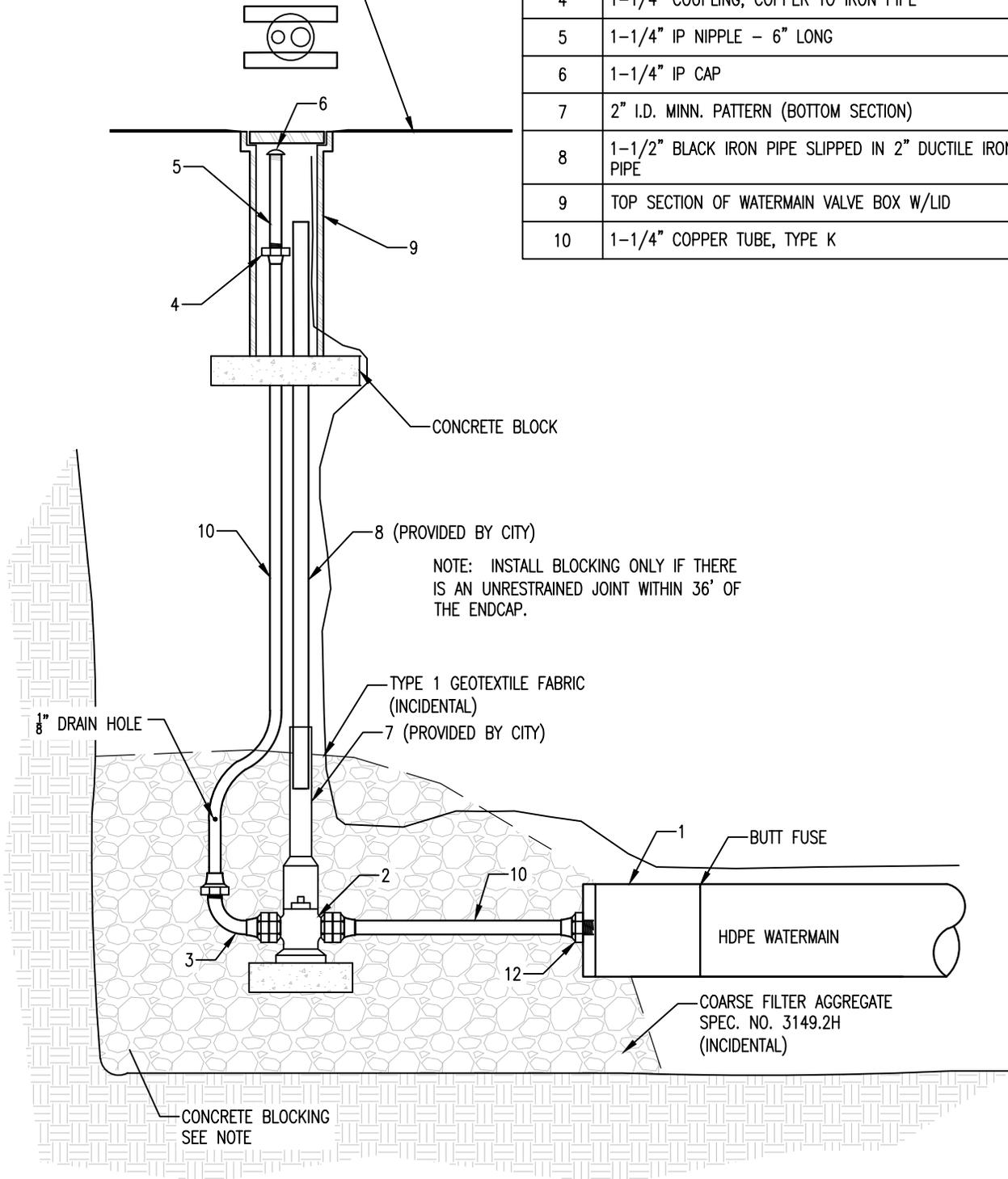
REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

ITEM	DESCRIPTION
1	BUTT FUSION CAP WITH AWWA (CC) THREAD INSERT
2	1-1/4" CURB STOP, CST X FLARE
3	1-1/4" 90° BEND W/COPPER TYPE GASKET CONNECTION TO CURB STOP
4	1-1/4" COUPLING, COPPER TO IRON PIPE
5	1-1/4" IP NIPPLE - 6" LONG
6	1-1/4" IP CAP
7	2" I.D. MINN. PATTERN (BOTTOM SECTION)
8	1-1/2" BLACK IRON PIPE SLIPPED IN 2" DUCTILE IRON BLACK PIPE
9	TOP SECTION OF WATERMAIN VALVE BOX W/LID
10	1-1/4" COPPER TUBE, TYPE K

NOTE: TOP OF CASTING SHALL BE 3/8" BELOW FINISHED SURFACE



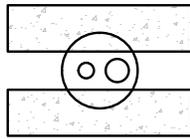
1-1/4" BLOWOFF FOR HDPE WATERMAINS

W-8B

REVISED/APPROVED 02/25/2026

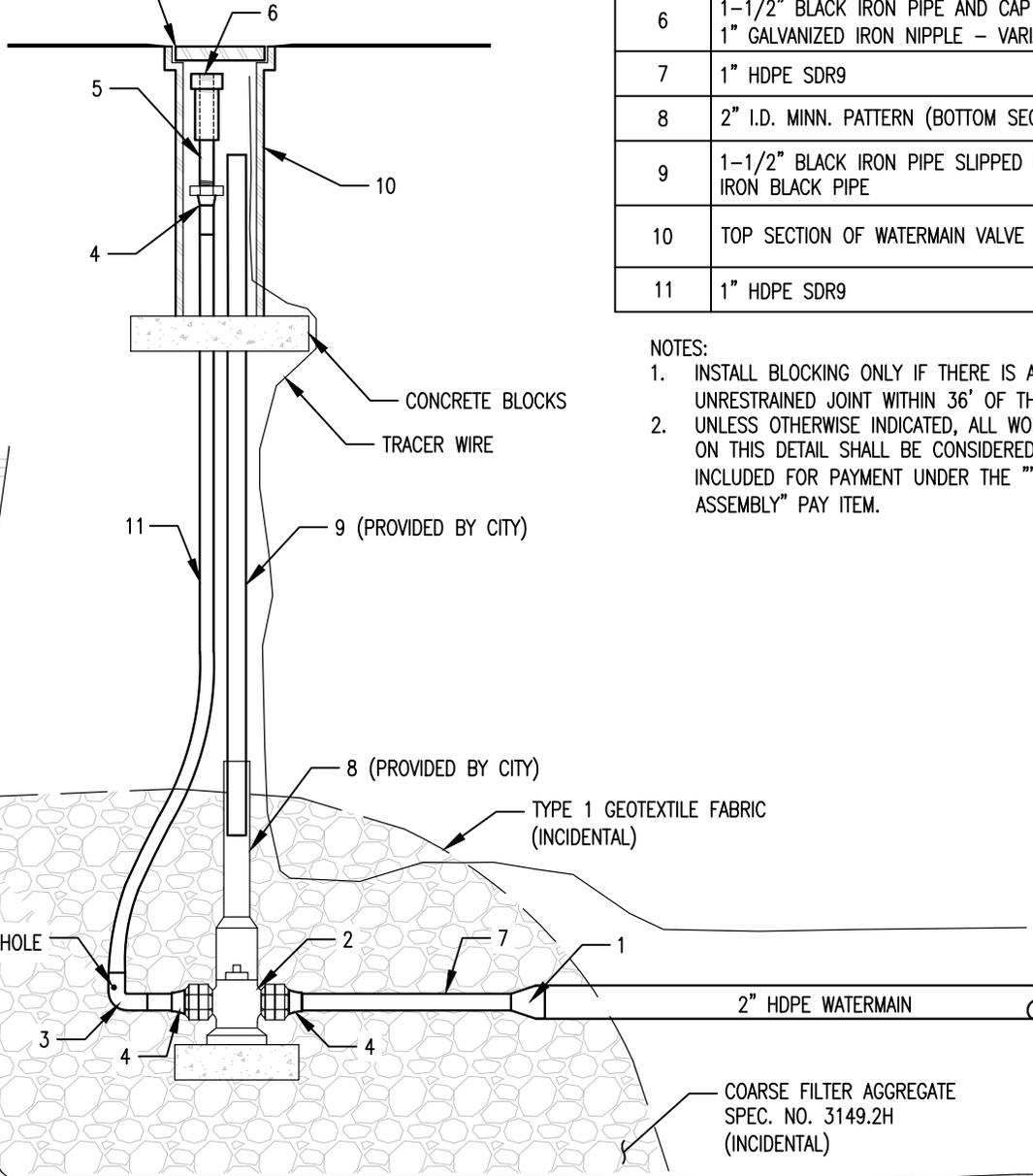
CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



PLAN VIEW

NOTE: TOP OF CASTING SHALL BE $\frac{3}{8}$ " BELOW FINISHED SURFACE



ITEM	DESCRIPTION
1	2" X 1" HDPE REDUCER
2	1" CURB STOP, FLARED END FITTINGS
3	1" HDPE 90° ELBOW
4	1" HDPE X 1" FEMALE THREAD TRANSITION
5	1" GALVANIZED IRON NIPPLE – VARIABLE LENGTH
6	1-1/2" BLACK IRON PIPE AND CAP SLIPPED OVER 1" GALVANIZED IRON NIPPLE – VARIABLE LENGTH
7	1" HDPE SDR9
8	2" I.D. MINN. PATTERN (BOTTOM SECTION)
9	1-1/2" BLACK IRON PIPE SLIPPED IN 2" DUCTILE IRON BLACK PIPE
10	TOP SECTION OF WATERMAIN VALVE BOX W/LID
11	1" HDPE SDR9

NOTES:

1. INSTALL BLOCKING ONLY IF THERE IS AN UNRESTRAINED JOINT WITHIN 36' OF THE ENDCAP. UNLESS OTHERWISE INDICATED, ALL WORK SHOWN ON THIS DETAIL SHALL BE CONSIDERED AS INCLUDED FOR PAYMENT UNDER THE "'X' BLOWOFF ASSEMBLY" PAY ITEM.

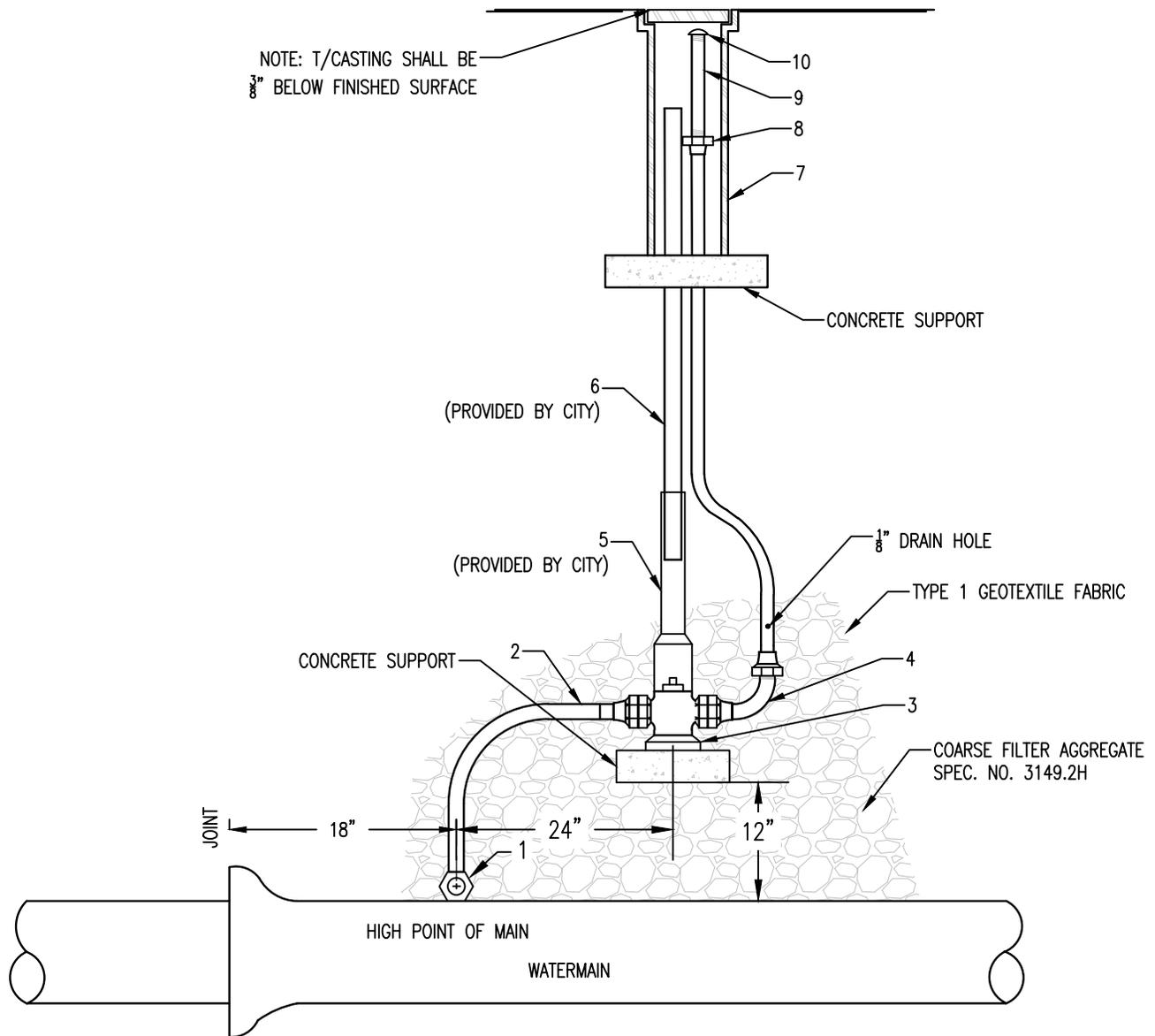
1" BLOWOFF FOR 2" HDPE WATERMAINS

W-8C

REVISED/APPROVED 02/25/2026

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



ITEM	DESCRIPTION
1	1" CORPORATION STOP
2	1" COPPER TUBE, TYPE K
3	1" CURB STOP, FLARED END FITTINGS
4	1 90° BEND W/ COPPER TYPE GASKET CONNECTION TO CURB STOP
5	2" I.D. MINN. PATTERN (BOTTOM SECTION)
6	1-1/2" I.D. BLACK IRON PIPE
7	TOP SECTION OF WATERMAIN VALVE BOX W/ LID
8	COUPLING, COPPER TO IRON PIPE
9	1" I.P. NIPPLE - 6" LONG
10	1" I.P. CAP

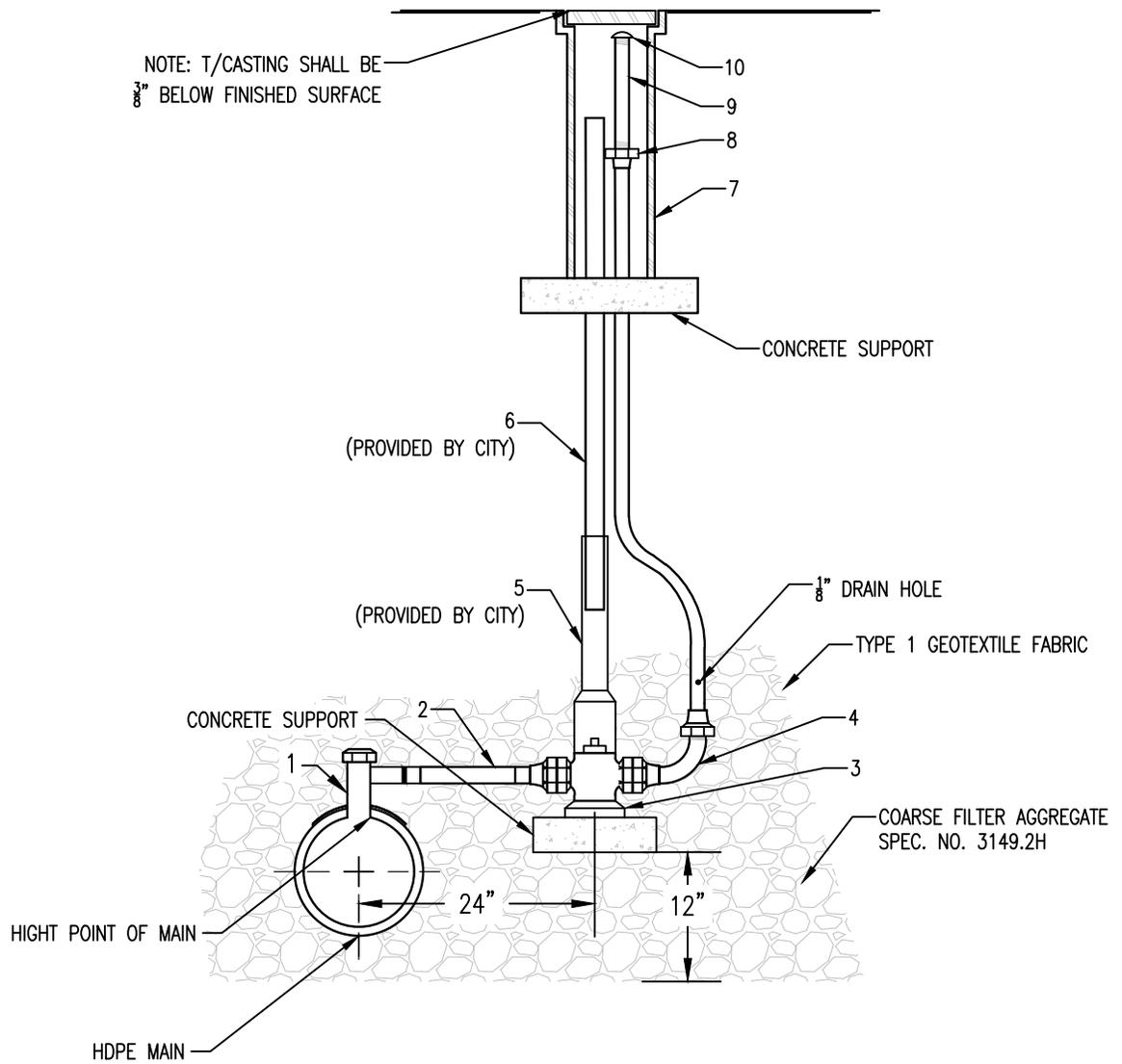
MANUAL AIR RELEASE FOR C.I. AND D.I. MAINS (VALVE BOX TYPE)

W-9

REVISED/APPROVED 02/25/2026

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



ITEM	DESCRIPTION
1	1" ELECTROFUSE TAPPING TEE
2	1" HDPE DR11 IPS FEMALE FLAIR SWIVEL TRANSITION W/ 304SS INSERT & COPPER GASKET
3	1" CURB STOP, FLARED END FITTINGS
4	1 90° BEND W/ COPPER TYPE GASKET CONNECTION TO CURB STOP
5	2" I.D. MINN. PATTERN (BOTTOM SECTION)
6	1-1/2" I.D. BLACK IRON PIPE
7	TOP SECTION OF WATERMAIN VALVE BOX W/ LID
8	COUPLING, COPPER TO IRON PIPE
9	1" I.P. NIPPLE - 6" LONG
10	1" I.P. CAP

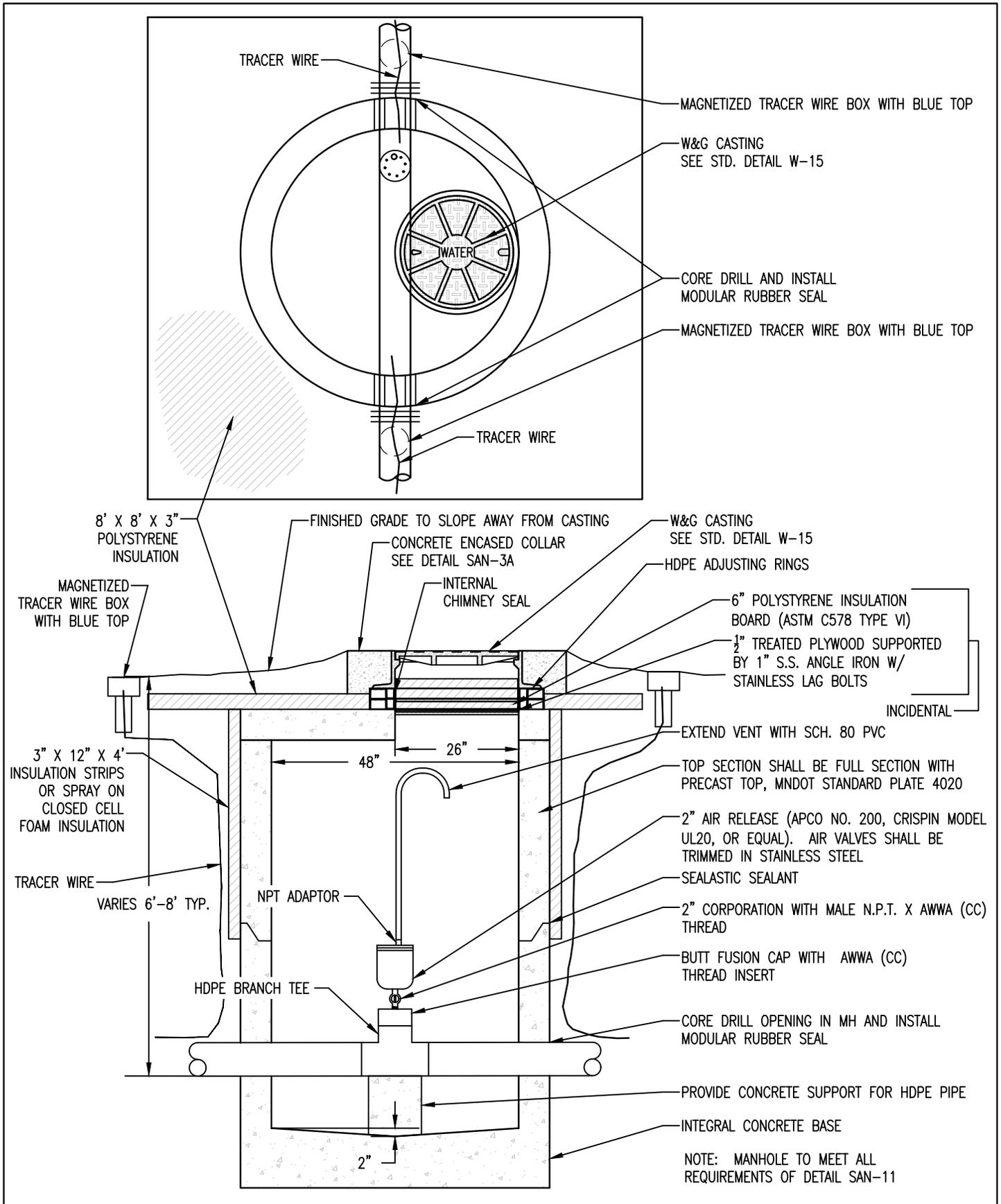
MANUAL AIR RELEASE FOR HDPE MAINS (VALVE BOX TYPE)

W-9A

REVISED/APPROVED 02/25/2026

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



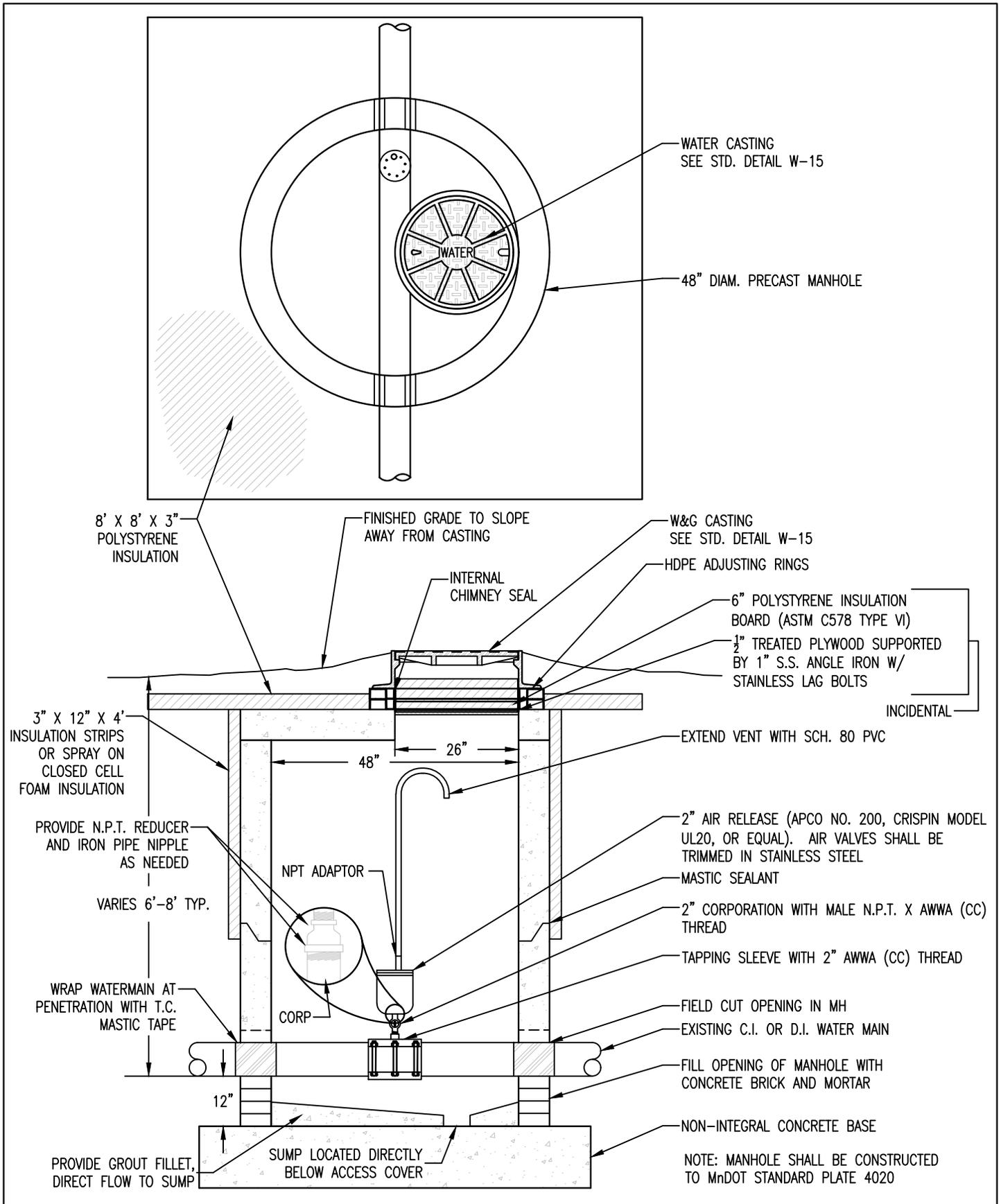
AUTO AIR-RELEASE VALVE AND MANHOLE FOR NEW HDPE MAINS

W-10

REVISED/APPROVED 02/25/2026

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



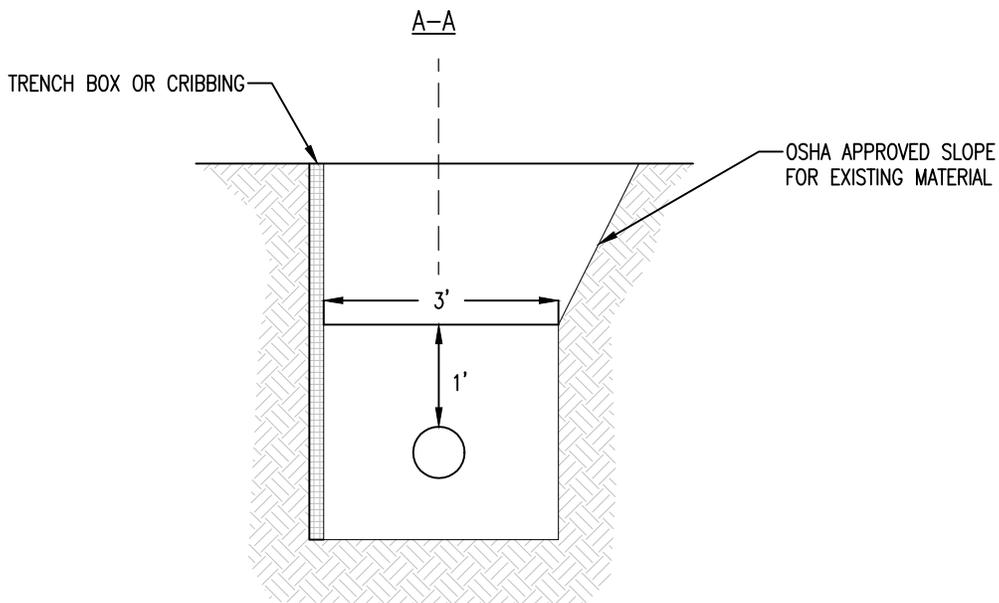
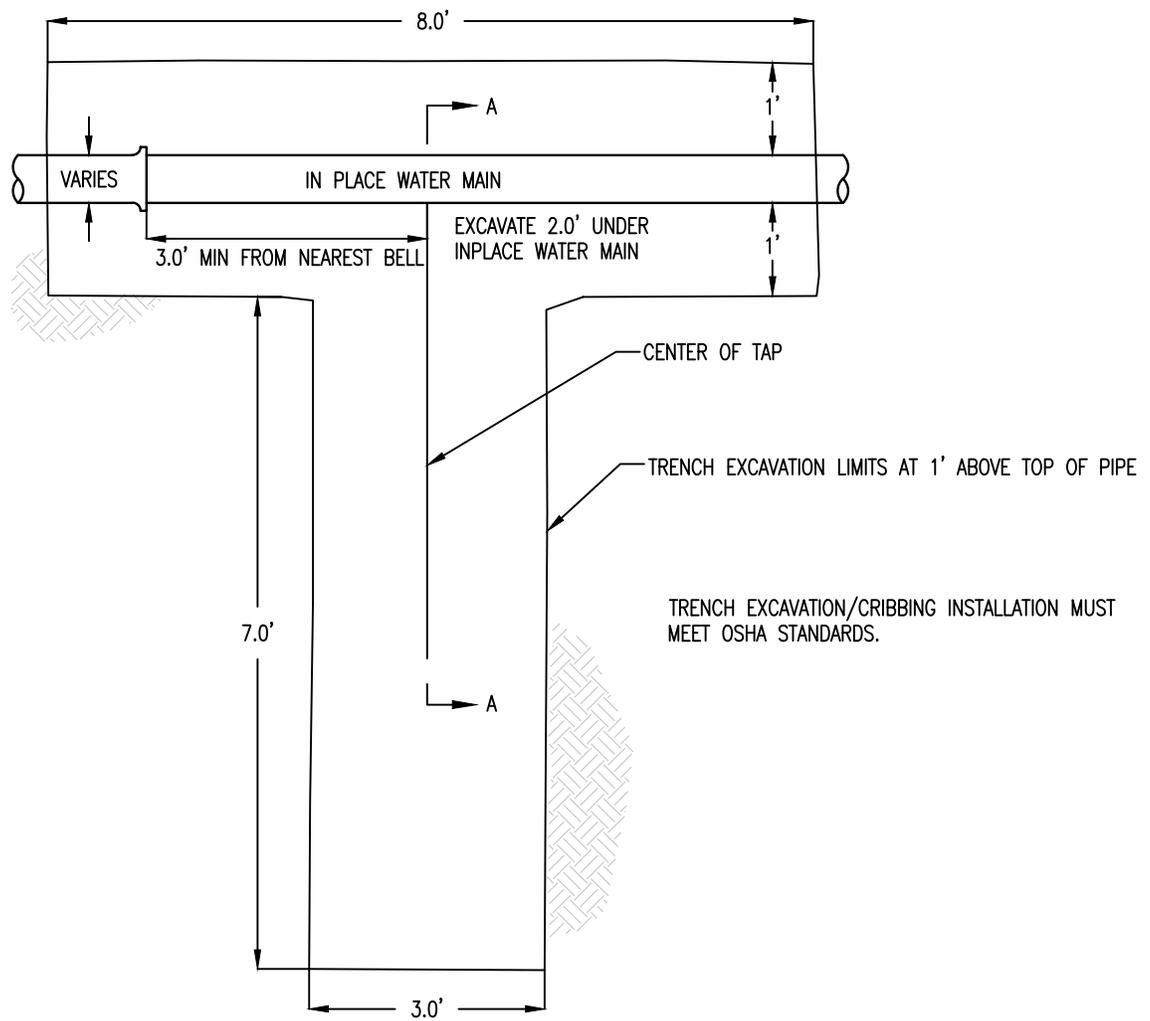
AUTO AIR-RELEASE VALVE AND MANHOLE FOR EXST'G C.I. OR D.I.P.

W-10A

REVISED/APPROVED 02/25/2026

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



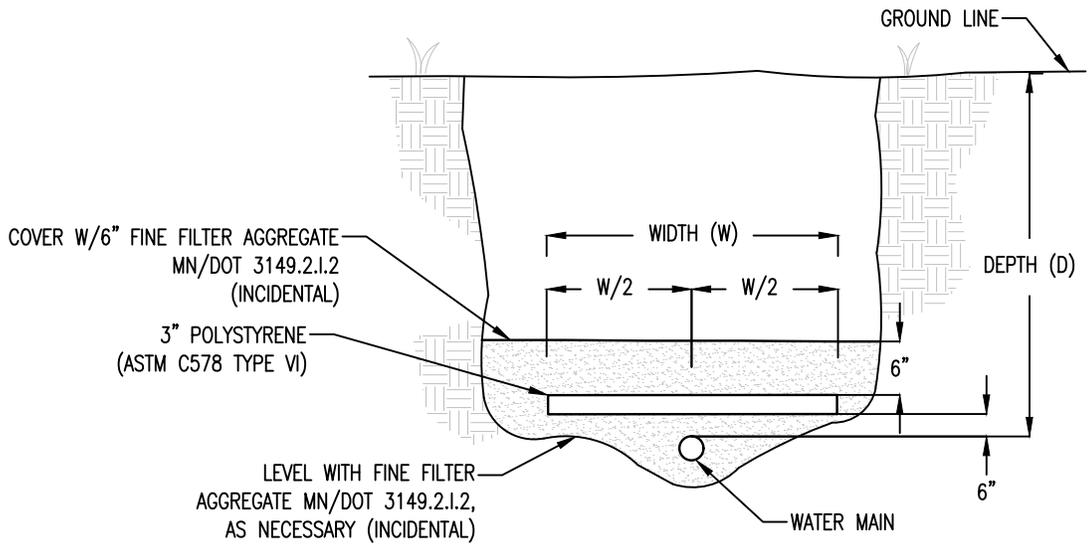
EXCAVATION FOR TAPPING SLEEVE AND VALVE

W-11

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

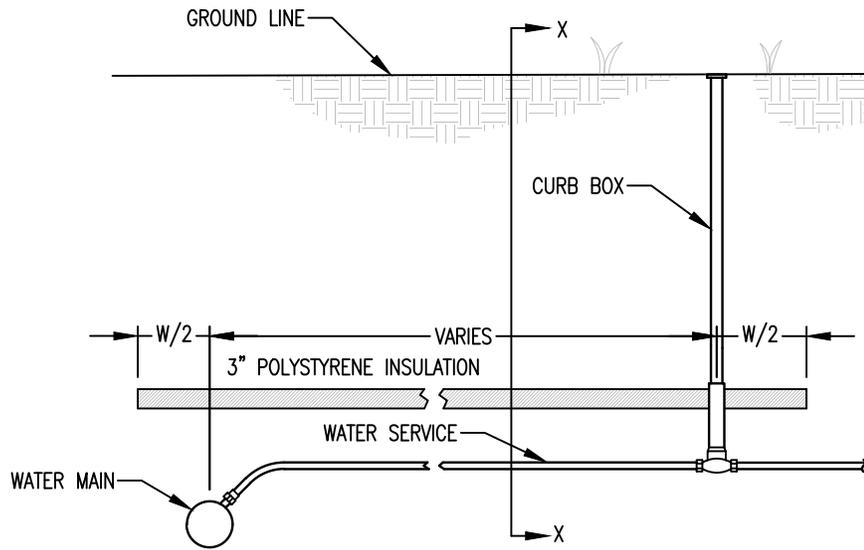
NO SCALE



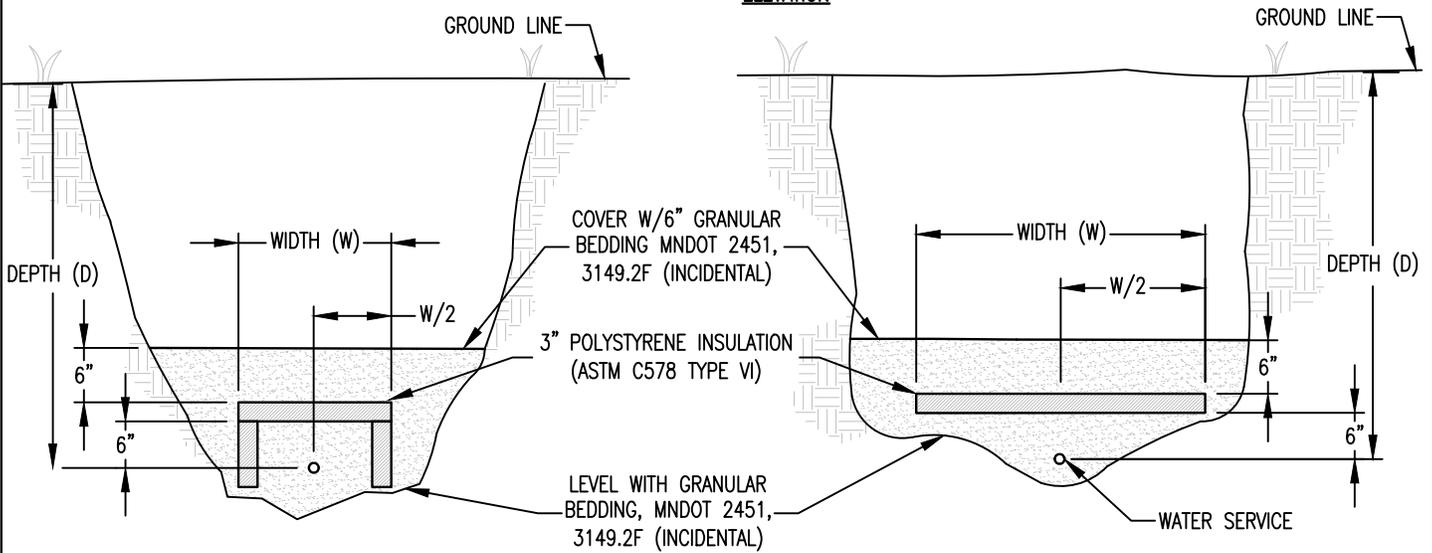
SECTION VIEW

- NOTES:
1. LAYERING OF 2 OR 3 SHEETS TO ARRIVE AT 3" IS REQUIRED WITH JOINTS OFFSET A MINIMUM OF 6".
 2. POLYSTYRENE SHALL BE AS SPECIFIED IN THE CITY OF DULUTH PUBLIC WORKS AND UTILITIES STANDARD CONSTRUCTION SPECIFICATIONS.
 3. INSULATION SHALL ONLY BE USED WHERE APPROVED BY THE ENGINEER.

DEPTH (D)	WIDTH (W)
7' OR MORE	NONE
5.2' TO 6.9'	4'-0"
4.3' TO 5.1'	6'-0"
3.0' TO 4.2'	8'-0"



ELEVATION



SECTION X-X BOX INSTALLATION

SECTION X-X FLAT INSTALLATION

NOTES:

1. AT THE DISCRETION OF THE ENGINEER, RIGID INSULATION MAY BE ADDED TO ANY TRENCH EXCAVATION FOR THE PURPOSE OF PROTECTING WATER MAINS AND SERVICES FROM FREEZING.
2. POLYSTYRENE SHALL BE AS SPECIFIED IN THE CITY OF DULUTH PUBLIC WORKS AND UTILITIES STANDARD CONSTRUCTION SPECIFICATIONS.
3. LAYERING OF 2 OR 3 SHEETS TO ARRIVE AT A MINIMUM OF 3" IS REQUIRED WITH JOINTS OFFSET A MINIMUM OF 6".
4. JOINTS BETWEEN INSULATION BOARDS SHALL BE TIGHT, UNIFORM, AND GAPLESS. INSULATION BOARDS SHALL BE HELD IN PLACE WITH WOOD SKEWERS OR METAL PINS.
5. WHERE SITE CONDITIONS AND/OR TRENCH WIDTH DO NOT ALLOW FLAT INSULATION AT THE SPECIFIED WIDTH, THE ENGINEERS MAY APPROVE THE USE OF BOX INSULATION.
6. BOX INSULATION JOINTS SHALL OVERLAP 6" AND BE TIGHT, UNIFORM, AND GAPLESS. BOX INSULATION SHALL BE FASTENED TOGETHER WITH METAL PINS OR AS APPROVED BY THE ENGINEER.
7. PRIOR TO PLACEMENT OF INSULATION, GRANULAR BEDDING SHALL BE UNIFORMLY GRADED AND COMPACTED TO PROVIDE CONSISTENT BEARING SURFACE FOR INSULATION.
8. INSULATION THAT IS BROKEN DURING INSTALLATION OR BACKFILLING OPERATIONS SHALL BE REMOVED AND REPLACED AT NO ADDITIONAL COST.

	FLAT INSTALLATION	BOX INSTALLATION
DEPTH (D)	WIDTH (W)	WIDTH (W)
7' OR MORE	NONE	NONE
5.2' TO 6.9'	4'-0"	12" MIN.
4.3' TO 5.1'	6'-0"	18" MIN.
3.0' TO 4.2'	8'-0"	ENGINEER TO DESIGN

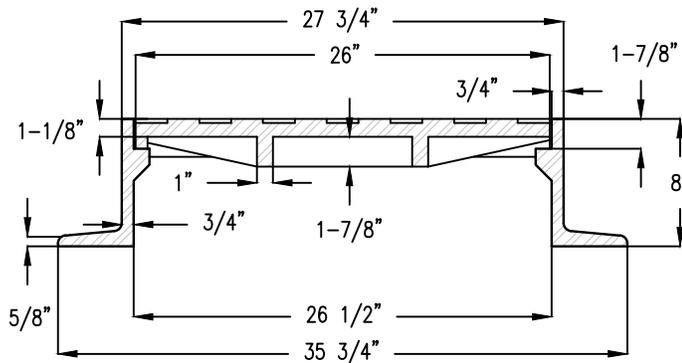
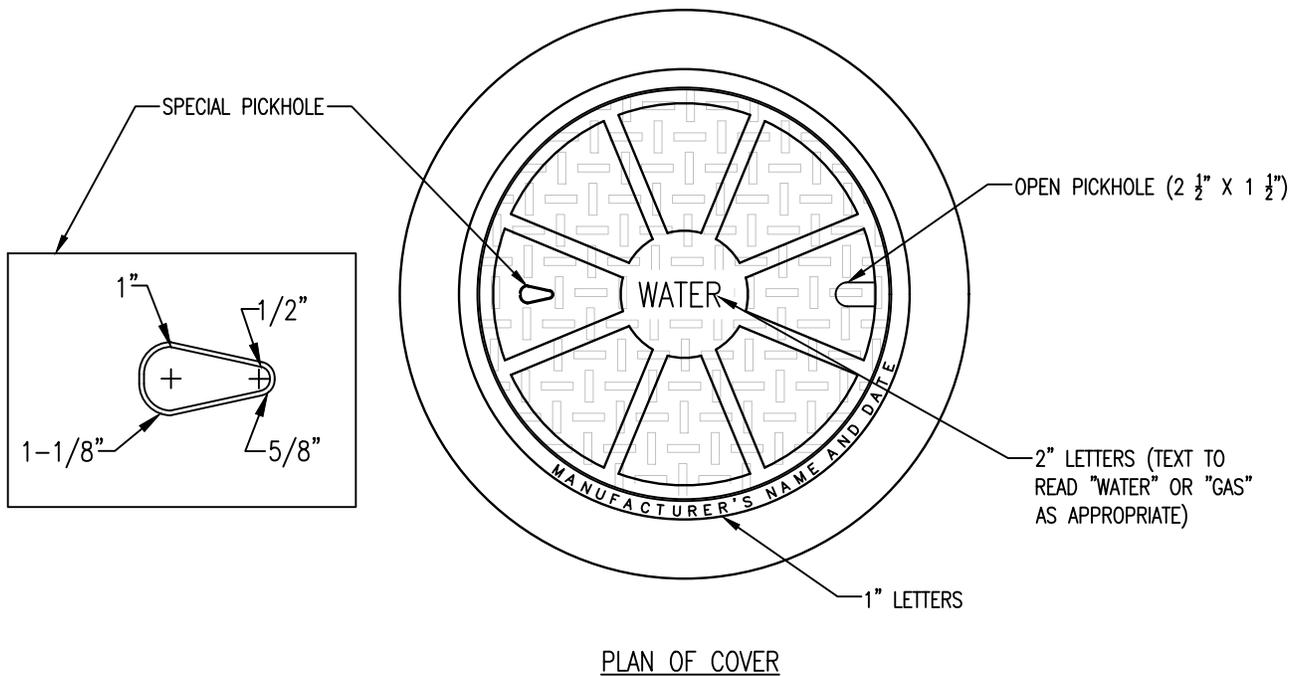
WATER SERVICE INSULATION

W-13A

REVISED/APPROVED 02/25/2026

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTE: ROUND OFF ALL EXPOSED EDGES FURNISHED WITH MACHINED HORIZONTAL BEARING SURFACES.
 WEIGHT: RING-295 LBS. COVER - 162 LBS. SIMILAR OR EQUAL TO NEENAH FOUNDRY NQR-1723 (EXCEPT WITH LETTERING AS NOTED)

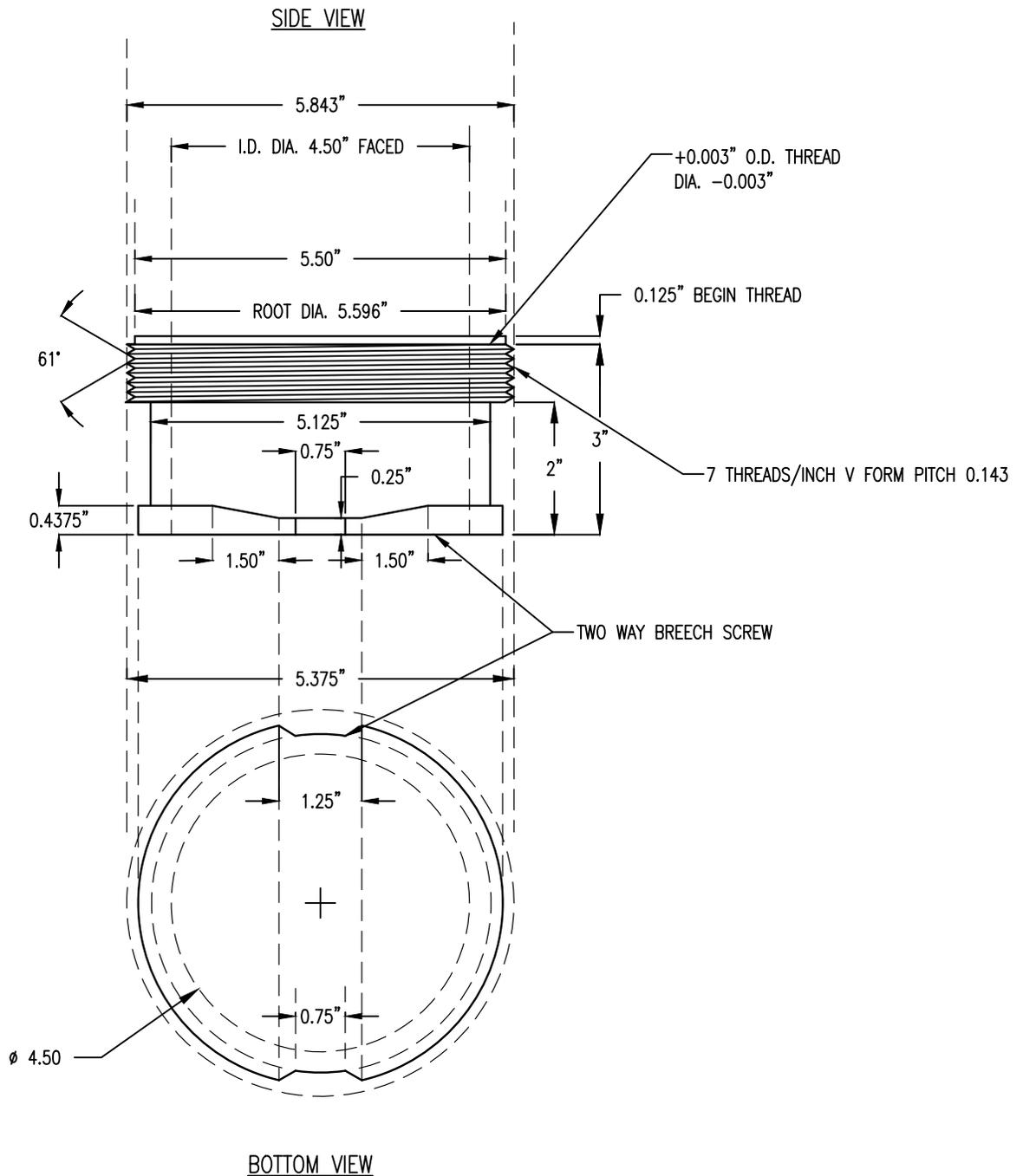
CAST IRON WATER MANHOLE FRAME AND COVER

W-15

REVISED/APPROVED 02/01/2013

CITY OF DULUTH STANDARD DETAIL
 DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



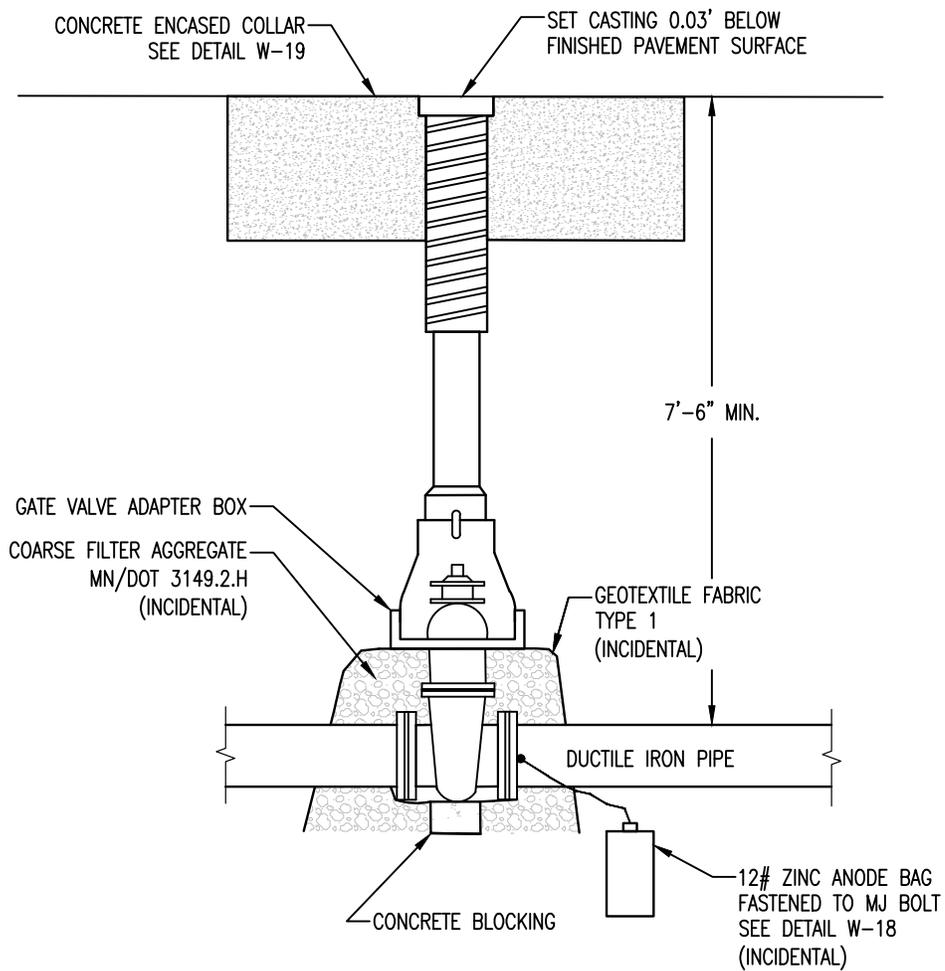
DULUTH THREAD FOR HYDRANT PUMPER NOZZLE

W-16

REVISED/APPROVED 01/30/2017

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES:

1. USE EPOXY COATING ON EXTERIOR OF VALVES
2. ALL BOLTS SHALL BE BLUE COATED COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-418 FOR ALL MECHANICAL JOINT FITTINGS.
3. GATE VALVES WITH ALPHA RESTRAINT COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS.

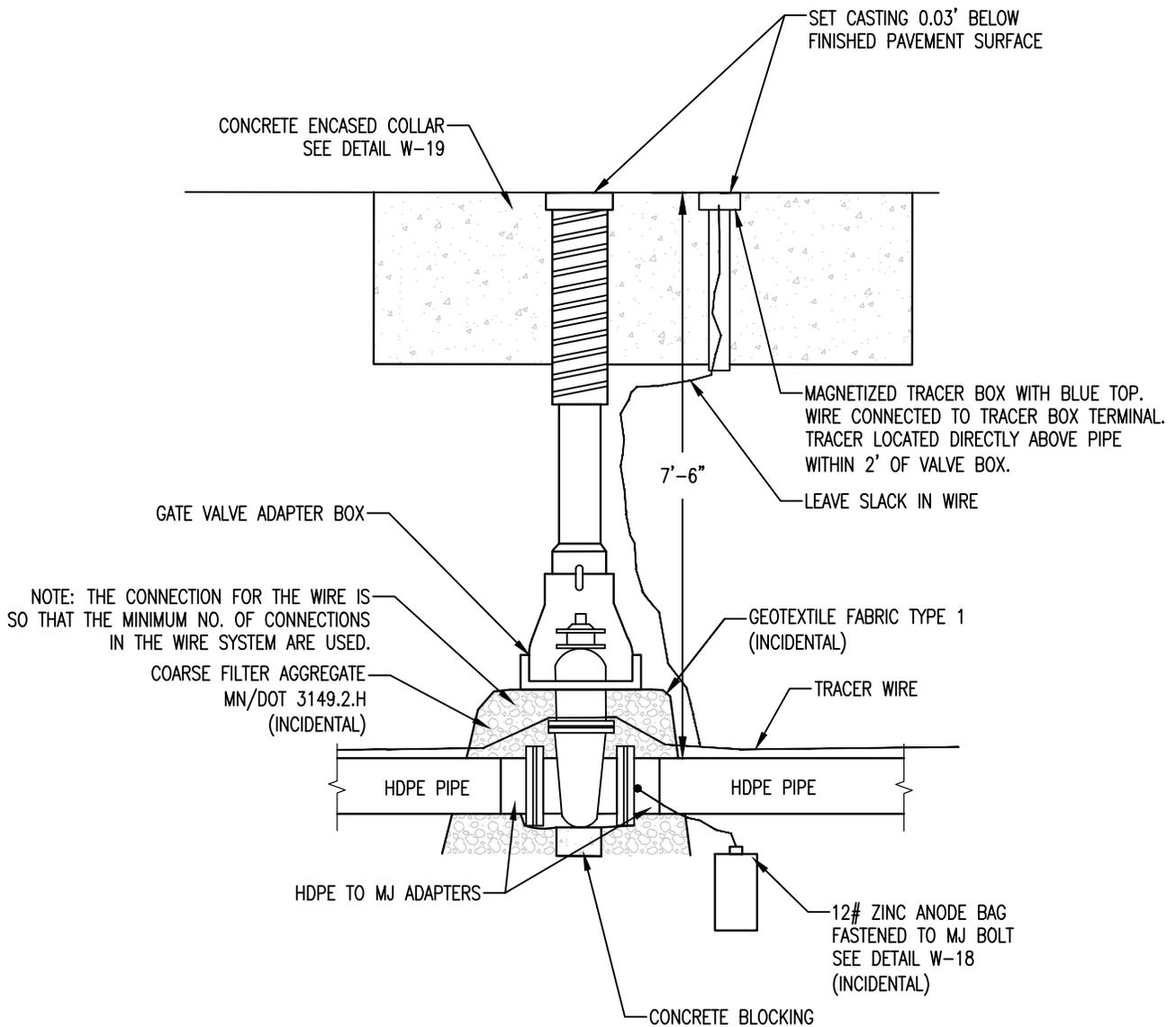
WATER VALVE BOX – DUCTILE IRON MAIN

W-17

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTE: THE CONNECTION FOR THE WIRE IS SO THAT THE MINIMUM NO. OF CONNECTIONS IN THE WIRE SYSTEM ARE USED.

COARSE FILTER AGGREGATE
MN/DOT 3149.2.H
(INCIDENTAL)

NOTES:

1. VALVES SHALL BE CONNECTED DIRECTLY TO HDPE WITH HDPE TO MECHANICAL JOINT ADAPTERS.
2. USE EPOXY COATING ON EXTERIOR OF VALVES.
3. ALL BOLTS SHALL BLUE COATED BE COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-418 FOR ALL MECHANICAL JOINT FITTINGS.
4. FOR OPEN CUT PIPE INSTALLATIONS, ELECTROFUSION COUPLINGS ARE NOT ALLOWED FOR CONNECTION OF HDPE TO MJ ADAPTERS. FOR DIRECTIONAL DRILLED INSTALLATIONS, ONE ELECTROFUSION COUPLING MAY BE USED PER VALVE.
5. GATE VALVES WITH ALPHA RESTRAINT COUPLERS MAY BE USED IN LIEU OF MJ FITTINGS. ANODE SHALL BE CONNECTED DIRECTLY TO THE VALVE BONNET BOLTS.

WATER VALVE BOX – HDPE MAIN

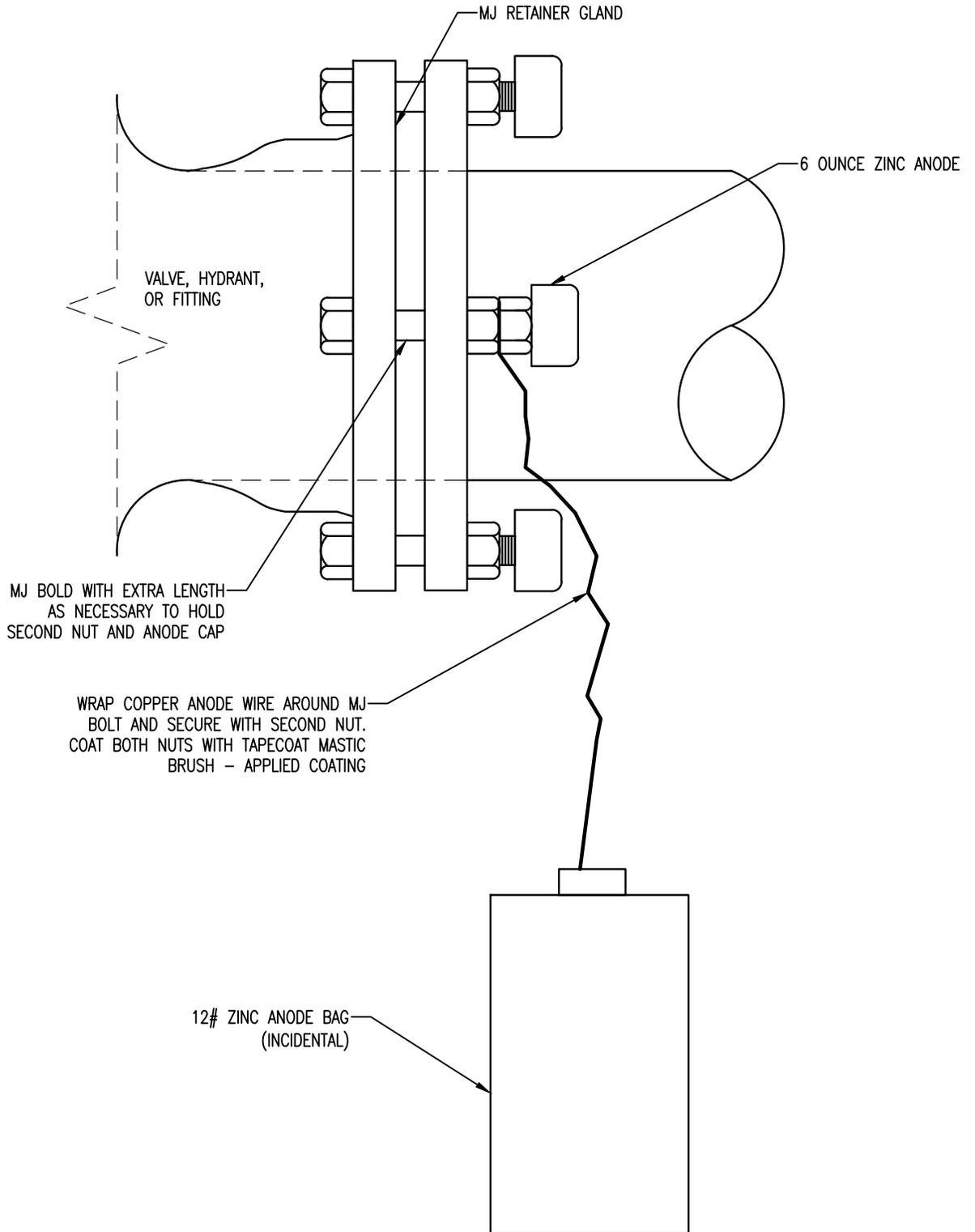
W-17A

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE

NOTE: ALL DUCTILE IRON VALVES, HYDRANTS, OR FITTINGS SHALL RECEIVE ANODES.



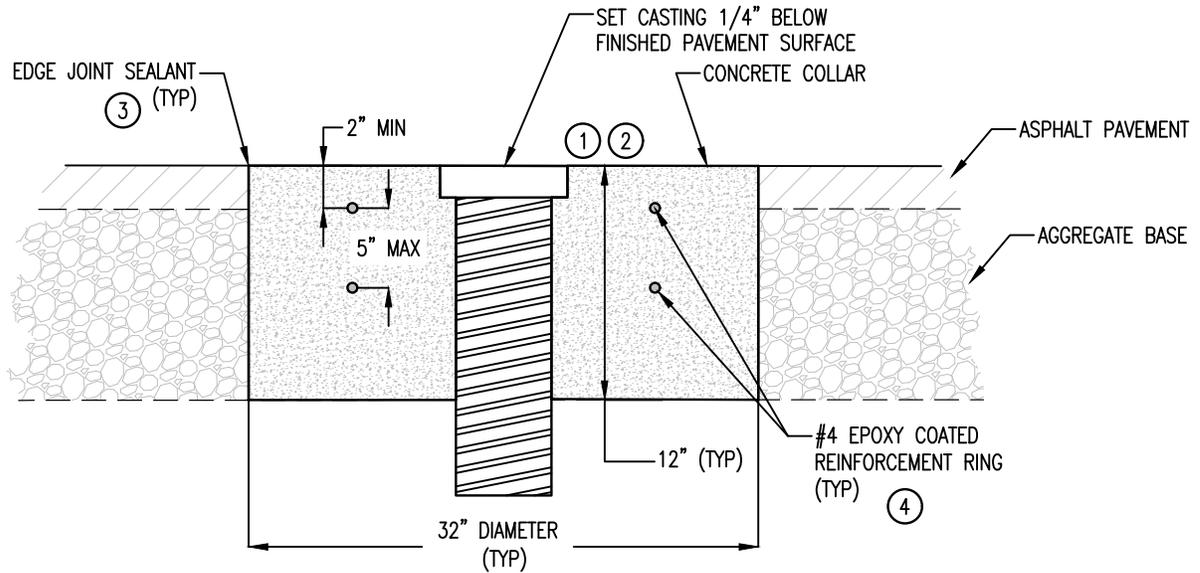
ANODE CONNECTION

W-18

REVISED/APPROVED 04/05/2019

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

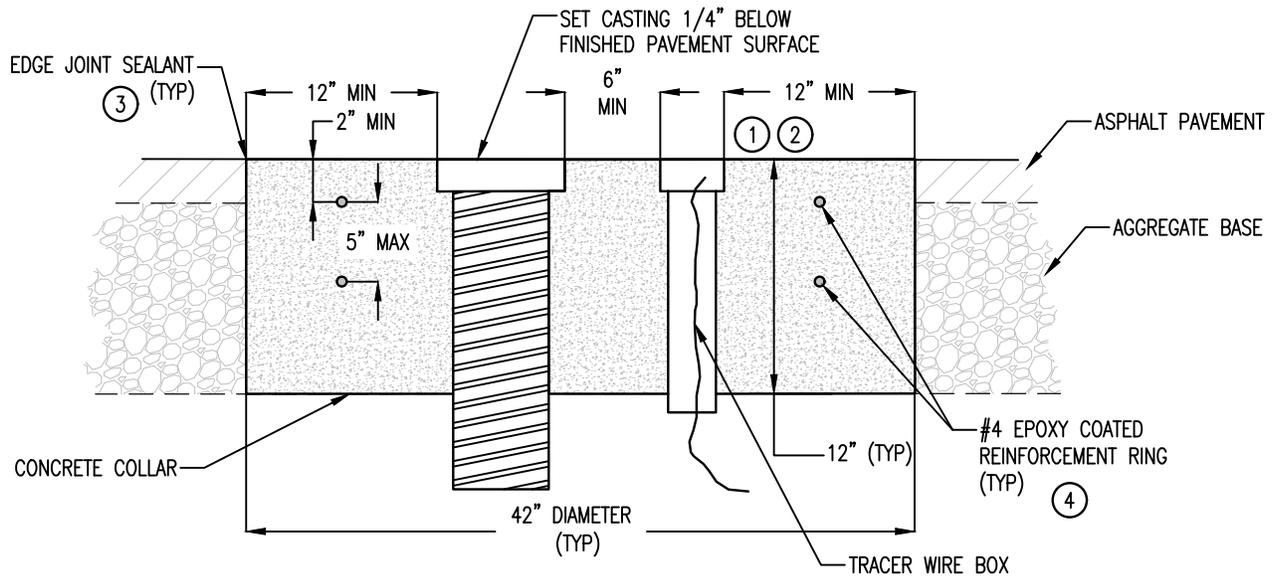
NO SCALE



NOTES:

- ① CONCRETE (MIX NO. 3G52) COLLAR TO ENCASE VALVE BOX CASTING.
- ② CONCRETE COLLAR SHALL BE CIRCULAR LAYOUT. PAVEMENT AND BASE SHALL BE CUT OUT WITH ROTATING CUTTING DEVICE
- ③ FINISH CONCRETE EDGE WITH 1/4" RADIUS. SEAL JOINT BETWEEN PAVEMENT AND COLLAR.
- ④ MAINTAIN 3.5" COVER ON REINFORCEMENT.

CONCRETE ENCASED WATER VALVE BOX COLLAR



CONCRETE ENCASED WATER VALVE BOX COLLAR W/
TRACER BOX ALTERNATIVE

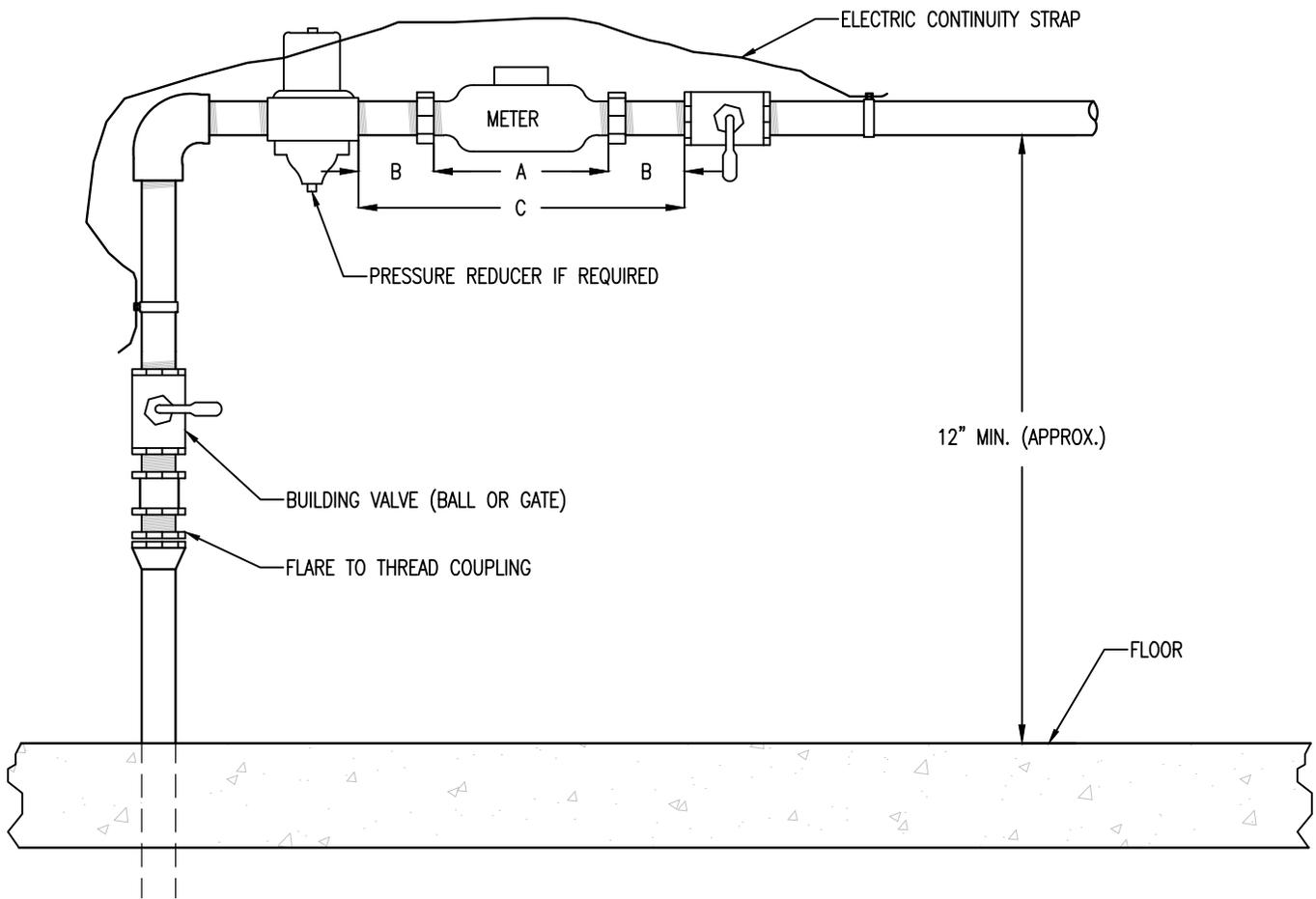
CONCRETE ENCASED VALVE BOX COLLAR IN ROADWAY

W-19

REVISED/APPROVED 02/25/2026

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



WATER METER SIZE					
	5/8"	3/4"	1"	1 1/2"	2"
A - METER LENGTH	7-1/2"	9"	10 3/4"	12-5/8"	15-1/4"
B - METER TAIL PIECE	2-3/8"	2-1/2"	2 5/8"	2-1/2"	2-5/8"
C - METER W/ TAIL PIECE	12-1/2"	14"	16"	17-5/8"	20-1/2"
TAIL PIECE THREAD SIZE	1/2"	3/4"	1"	2-1/4" X 1-3/4"	2-1/4" X 1-3/4"
MAX. METER OUTPUT (GPM)	25	35	70	120	170

NOTES:

- SUPPLY PIPE AND FITTINGS BETWEEN BUILDING VALVE AND METER SHALL BE THREADED BRASS AND/OR COPPER AND NOT BE LESS THAN 3/4" SIZE.
- METERS SHALL ALWAYS BE INSTALLED IN A HORIZONTAL POSITION.
- VALVES SHALL BE GATE OR FULL PORT BALL VALVES.
- PRESSURE REDUCING VALVE IS REQUIRED WHERE PRESSURE EXCEEDS 80 PSI.
- ELECTRICAL CONTINUITY STRAP IS REQUIRED EXCEPT WHERE BYPASS IS INSTALLED. SIZE OF STRAP BY ELECTRICAL CODE.

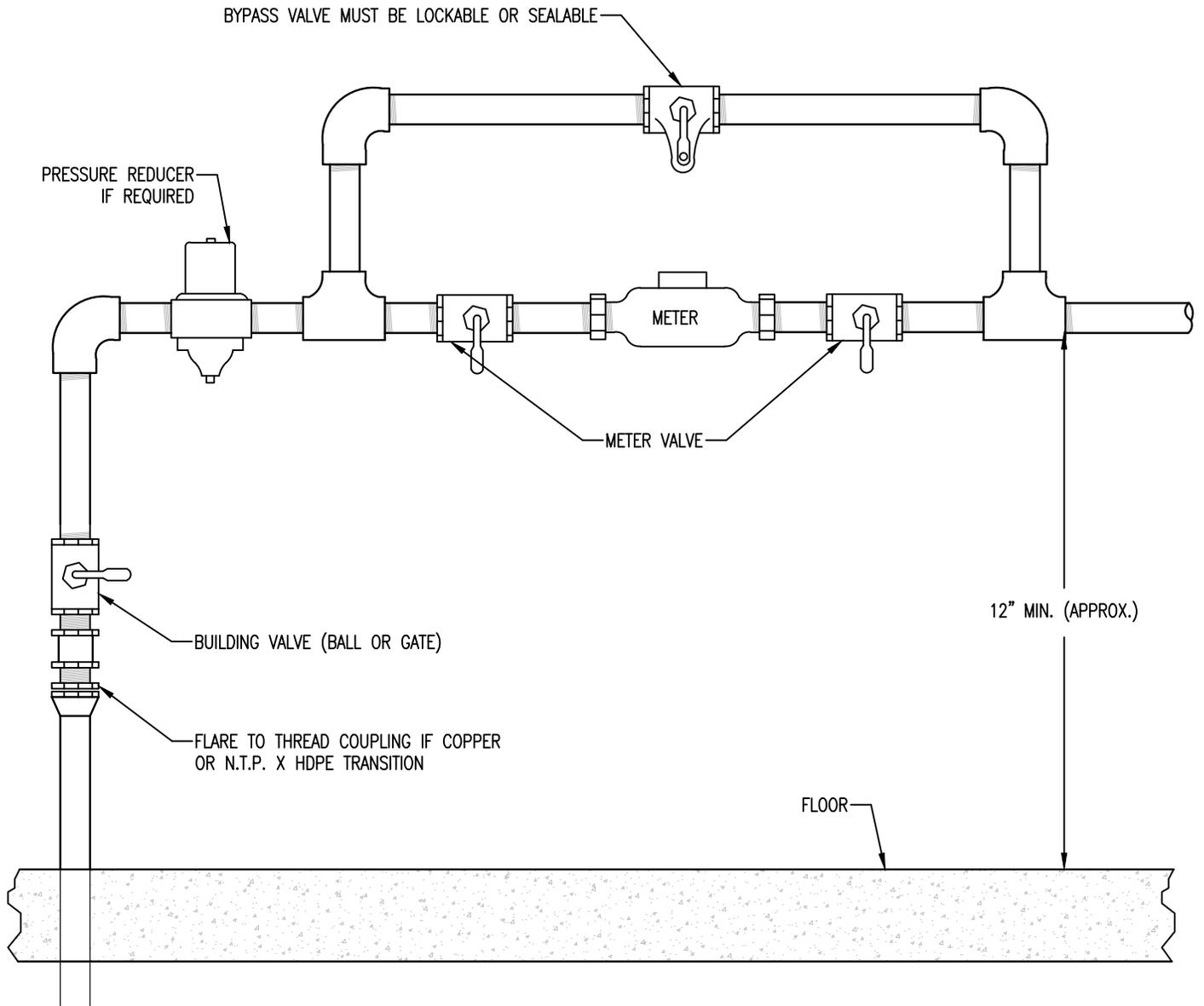
TYPICAL WATER METER INSTALLATION - SINGLE

W-30

REVISED/APPROVED 02/25/2026

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

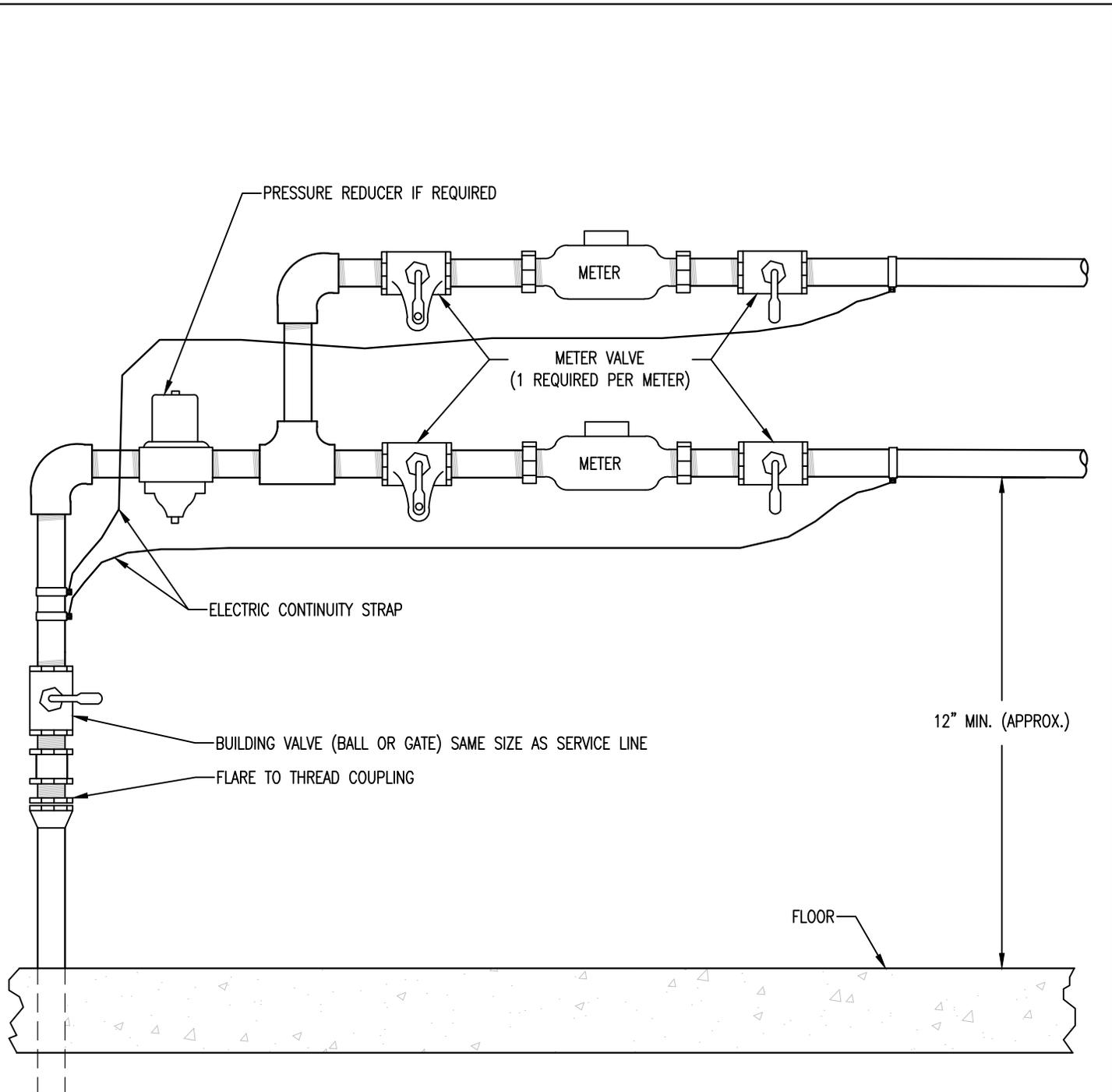
NO SCALE



NOTES:

1. SUPPLY PIPE AND FITTINGS BETWEEN BUILDING VALVE AND METER SHALL BE THREADED BRASS AND/OR COPPER AND NOT BE LESS THAN 3/4" SIZE
2. METERS SHALL ALWAYS BE INSTALLED IN A HORIZONTAL POSITION
3. VALVES SHALL BE GATE OR FULL PORT BALL VALVES
4. PRESSURE REDUCING VALVE IS REQUIRED WHERE PRESSURE EXCEEDS 80 PSI
5. BYPASS VALVE MUST BE LOCKABLE OR SEALABLE
6. METER INSTALLATIONS 2" OR LARGER MAY REQUIRE A BYPASS IF POTENTIAL HEALTH OR SAFETY RISKS INCREASE IF WATER SUPPLY IS INTERRUPTED

TYPICAL WATER METER INSTALLATION WITH BYPASS		W-31
REVISED/APPROVED 02/25/2026	CITY OF DULUTH STANDARD DETAIL DEPT. OF PUBLIC WORKS AND UTILITIES	NO SCALE



NOTES:

1. SUPPLY PIPE AND FITTINGS BETWEEN BUILDING VALVE AND METER SHALL BE THREADED BRASS AND/OR COPPER AND NOT BE LESS THAN 3/4" SIZE
2. METERS SHALL ALWAYS BE INSTALLED IN A HORIZONTAL POSITION
3. VALVES SHALL BE GATE OR FULL PORT BALL VALVES
4. PRESSURE REDUCING VALVE IS REQUIRED WHERE PRESSURE EXCEEDS 80 PSI
5. ELECTRICAL CONTINUITY STRAP IS REQUIRED EXCEPT WHERE BYPASS IS INSTALLED. SIZE OF STRAP BY ELECTRICAL CODE
6. FOR METERS 3" AND LARGER, A STRAINER IS REQUIRED AHEAD OF METER
7. UPSTREAM METER VALVE ON MULTIMETER INSTALLATIONS MUST BE LOCKABLE

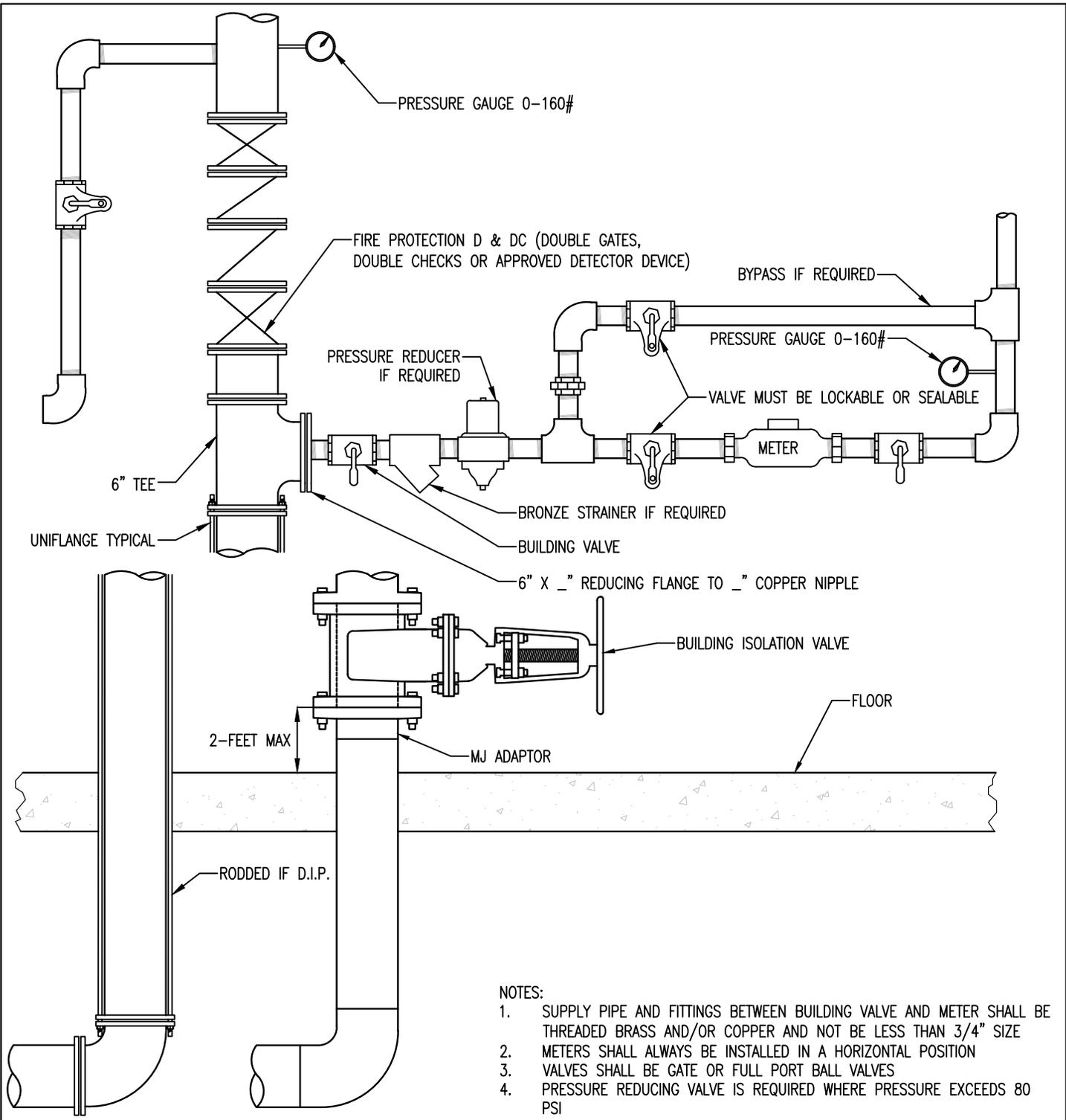
MULTIPLE WATER METER INSTALLATION

W-32

REVISED/APPROVED 02/25/2026

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE



NOTES:

1. SUPPLY PIPE AND FITTINGS BETWEEN BUILDING VALVE AND METER SHALL BE THREADED BRASS AND/OR COPPER AND NOT BE LESS THAN 3/4" SIZE
2. METERS SHALL ALWAYS BE INSTALLED IN A HORIZONTAL POSITION
3. VALVES SHALL BE GATE OR FULL PORT BALL VALVES
4. PRESSURE REDUCING VALVE IS REQUIRED WHERE PRESSURE EXCEEDS 80 PSI
5. ELECTRICAL CONTINUITY STRAP IS REQUIRED EXCEPT WHERE BYPASS IS INSTALLED. SIZE OF STRAP BY ELECTRICAL CODE
6. FOR METERS 3" AND LARGER, A STRAINER IS REQUIRED AHEAD OF METER
7. UPSTREAM METER VALVE ON MULTIMETER INSTALLATIONS MUST BE LOCKABLE
8. BYPASS VALVE MUST BE LOCKABLE OR SEALABLE
9. UPSTREAM METER VALVE ON DOMESTIC BRANCH OFF OF A FIRE SERVICE MUST BE LOCKABLE
10. HDPE SERVICES MUST BE EQUIPPED WITH A BUILDING ISOLATION VALVE WITHIN 2- FEET OF ENTERING THE BUILDING

TYPICAL 6" FIRE SERVICE WITH DOMESTIC WATER W-34

REVISED/APPROVED 02/25/2026

CITY OF DULUTH STANDARD DETAIL
DEPT. OF PUBLIC WORKS AND UTILITIES

NO SCALE