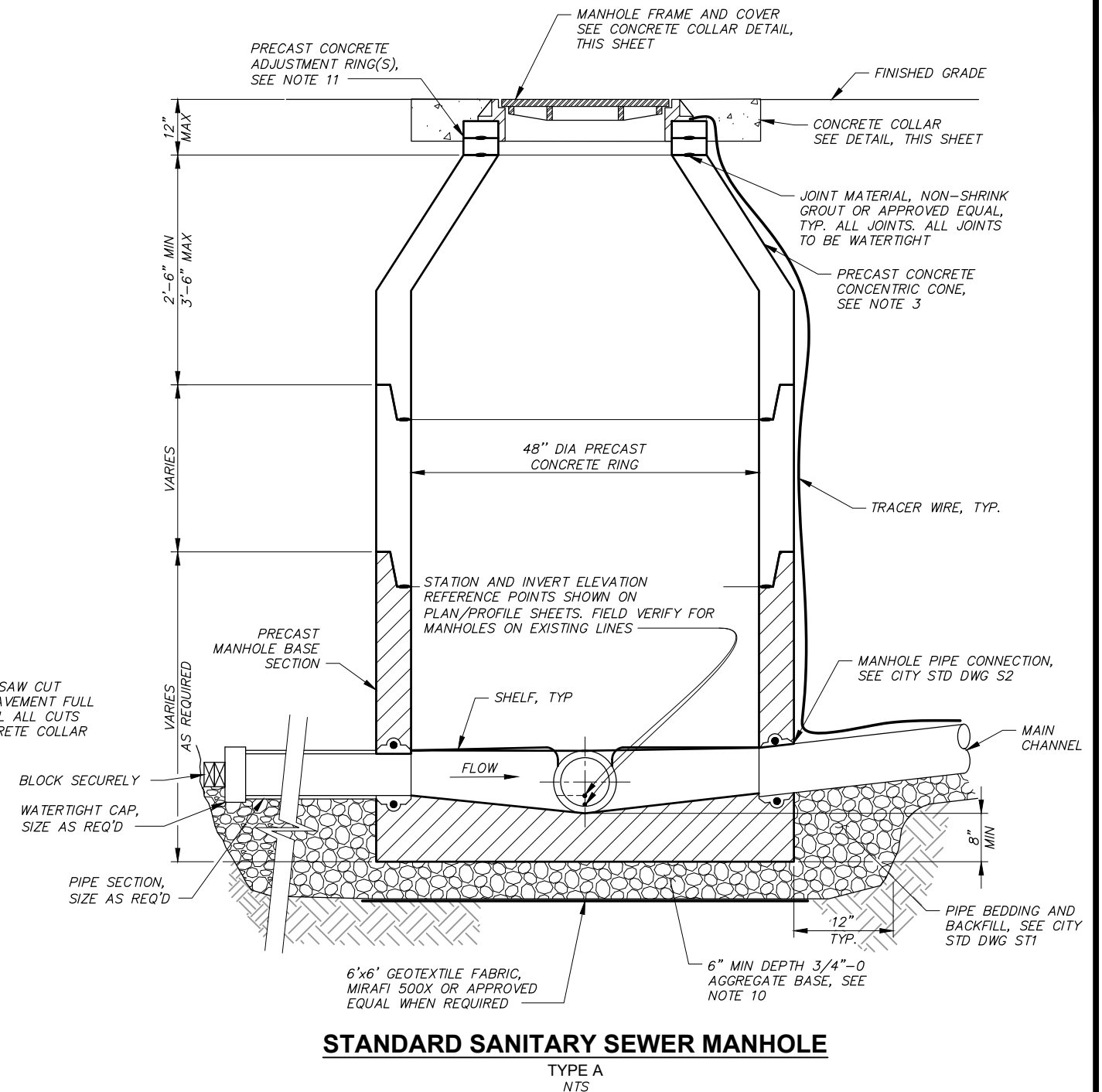
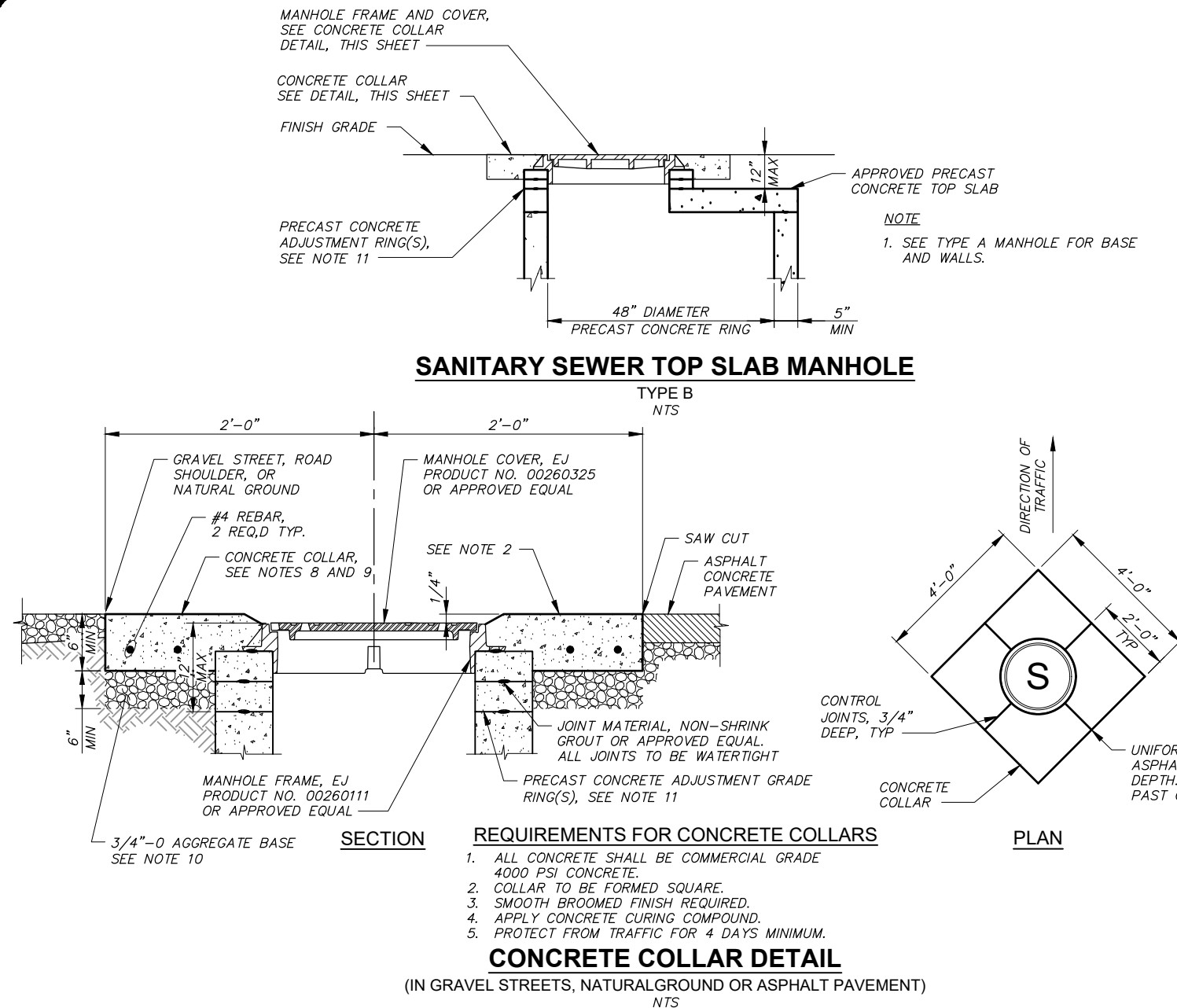


X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_S01.dwg, FIGURE, 8/21/2025 8:52 AM, agarcia



NOTES

1. ALL MANHOLES SHALL BE PRECAST MANHOLE UNITS CONFORMING TO ASTM C478.
2. ANY GAPS, HOLES, ROUGH SPOTS, ETC, IN THE CHANNELS SHALL BE FILLED OR REPAIRED IN THE FIELD.
3. MANHOLES SHALL BE TYPE A UNLESS MANHOLE DEPTH IS LESS THAN 5 FEET. MANHOLES LESS THAN 5 FEET IN DEPTH SHALL BE TYPE B UNLESS OTHERWISE CALLED FOR ON THE DESIGN DRAWINGS. MANHOLE DEPTH SHALL BE AS MEASURED FROM FINISHED GRADE TO INVERT OF PIPE.
4. PRIOR TO MANUFACTURING MANHOLES, THE CONTRACTOR SHALL VERIFY FIELD CONDITIONS, PIPE INVERT ELEVATIONS, PIPE ORIENTATION, AND MANHOLE DEPTH. CONTRACTOR SHOULD ALSO NOTE THAT PIPE SLOPES ARE CALCULATED TO CENTER OF THE MANHOLE.
5. WHERE THE DISTANCE BETWEEN INLET PIPE INVERT AND MANHOLE CHANNEL INVERT IS GREATER THAN 2 FEET A DROP MANHOLE SHALL BE USED.
6. ALL PRECAST MANHOLE BASE SECTIONS SHALL HAVE FACTORY CAST FLOW CHANNELS UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
7. MANHOLE STEPS NOT PERMITTED.
8. CONCRETE COLLAR REQUIRED AFTER PLACEMENT OF ACP.
9. ALL MANHOLES SHALL HAVE A CONCRETE COLLAR REGARDLESS OF BEING INSTALLED ON PAVED OR GRAVEL STREETS, ROAD SHOULDER, OR NATURAL GROUND.
10. COMPACT ALL AGGREGATE BASE TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
11. FOR ADJUSTMENTS LESS THAN 2" GROUT BETWEEN FRAME AND TOP OF CONCRETE OR ADJUSTMENT RINGS. ADJUSTMENTS 2" AND GREATER SHALL BE MADE WITH PRECAST CONCRETE RINGS.



CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

SANITARY SEWER MANHOLE

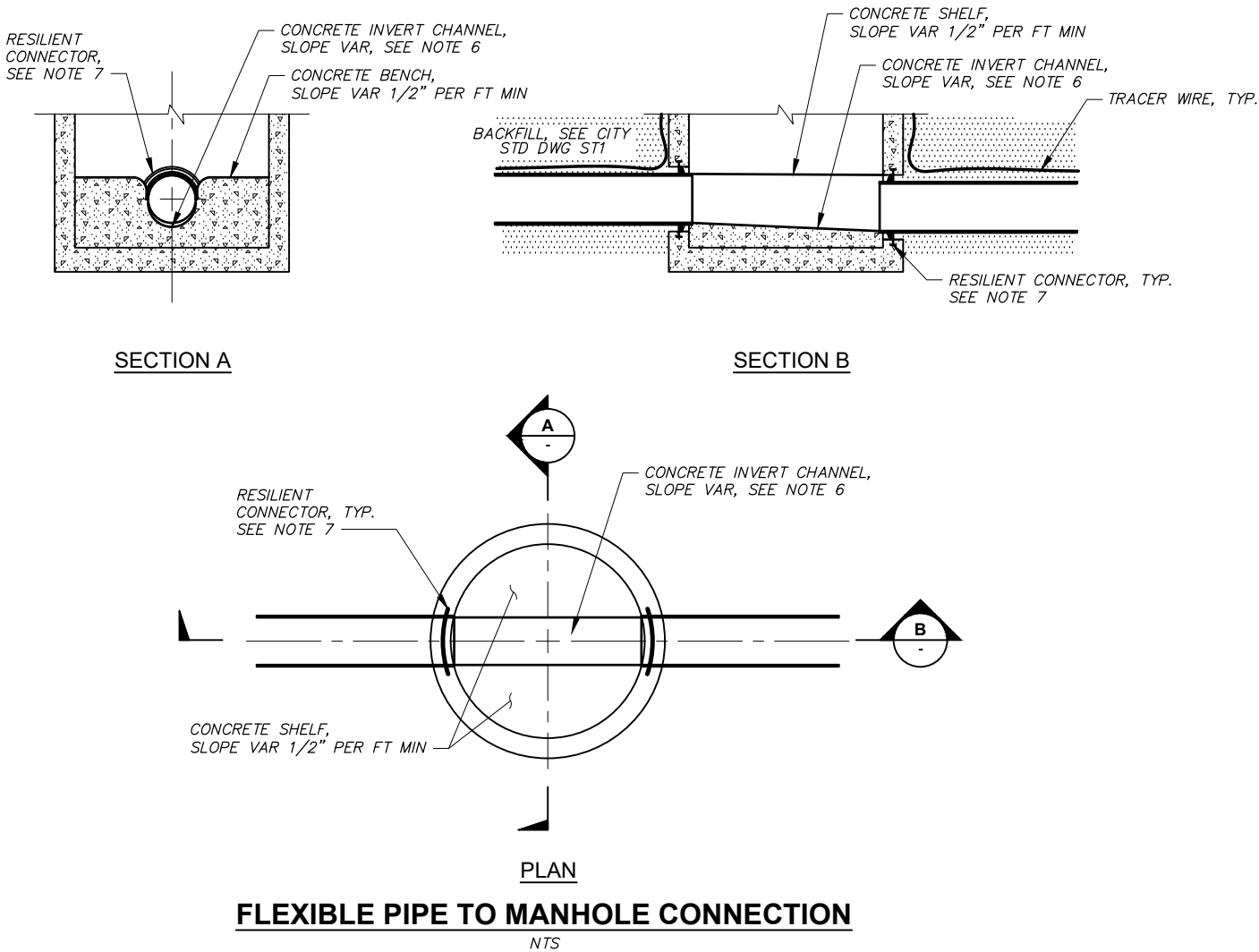
FIGURE

S1

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_S02.dwg, FIGURE, 8/22/2025 8:39 AM, agarcia

NOTES

1. ALL PRECAST SECTIONS SHALL CONFORM TO REQUIREMENTS OF ASTM C478.
2. MANHOLE BASE SECTIONS SHALL BE PRECAST UNLESS OTHERWISE APPROVED BY CITY.
3. ALL CONCRETE SHALL BE COMMERCIAL GRADE, 4000 PSI CONCRETE.
4. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE DESIGN DRAWINGS.
5. MAXIMUM PIPE DIAMETER VARIES WITH PIPE MATERIAL.
6. INVERT CHANNELS SHALL BE CONSTRUCTED TO PROVIDE SMOOTH SLOPES AND RADII TO OUTLET PIPE.
7. RESILIENT CONNECTOR SHALL BE THE X-CEL CONNECTOR AS MANUFACTURED BY A-LOK PRODUCTS, INC. OR APPROVED EQUAL. IN ADDITION, THE FIELD SLEEVE AS MANUFACTURED BY A-LOK PRODUCTS, INC. OR APPROVED EQUAL SHALL BE USED WHEN CONNECTING TO AN EXISTING MANHOLE. ALL CONNECTORS AND FIELD SLEEVES, INCLUDING GROUT IF ANY, SHALL BE INSTALLED PER THE CONNECTOR MANUFACTURERS RECOMMENDATIONS TO ENSURE A FLEXIBLE CONNECTION IS MAINTAINED.

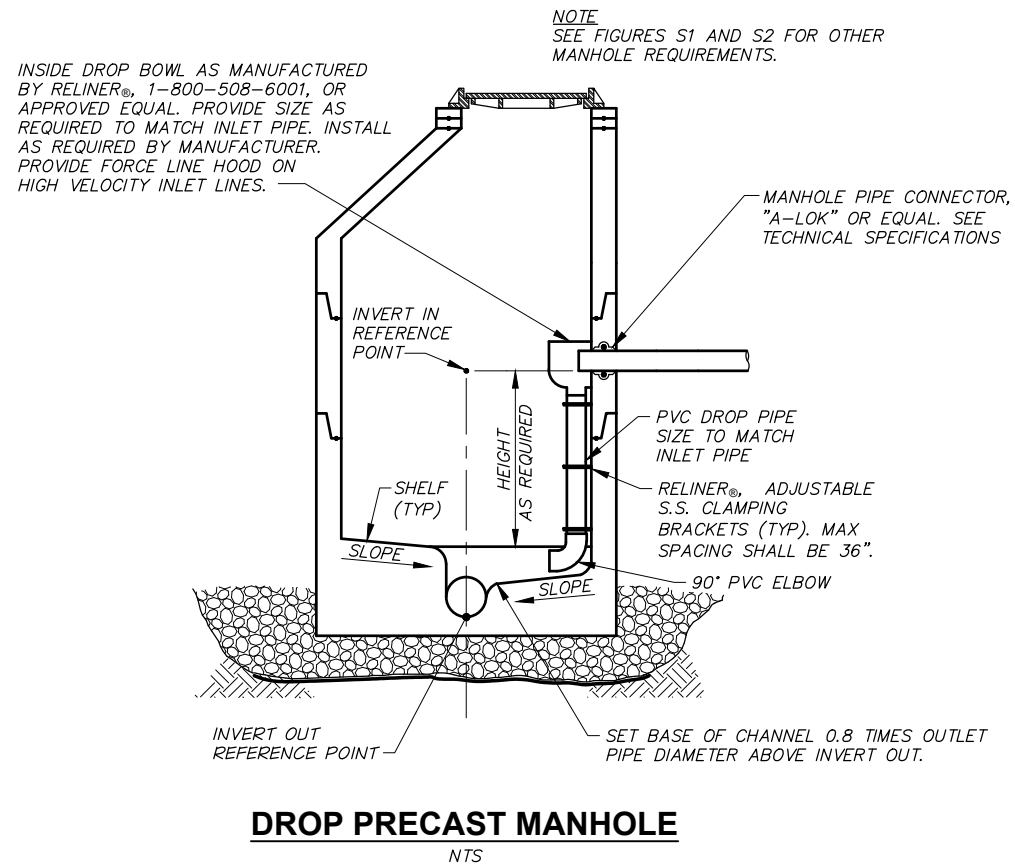


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

PIPE TO MANHOLE CONNECTIONS

FIGURE
S2

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_S03.dwg, FIGURE, 8/21/2025 9:10 AM, agarcia

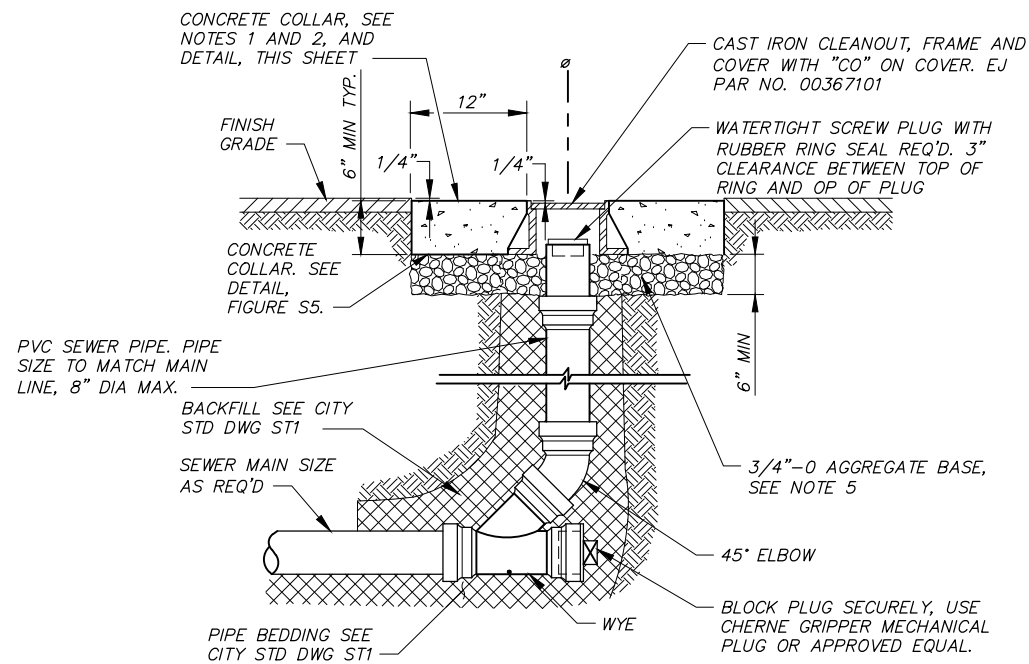


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

DROP PRECAST MANHOLE

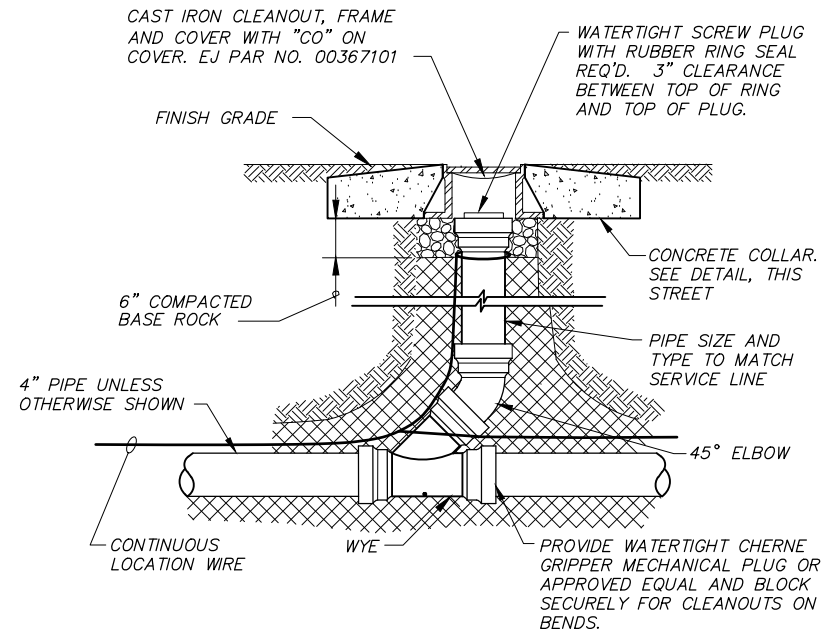
FIGURE
S3

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_S04.dwg, FIGURE, 8/21/2025 9:12 AM, agarcia



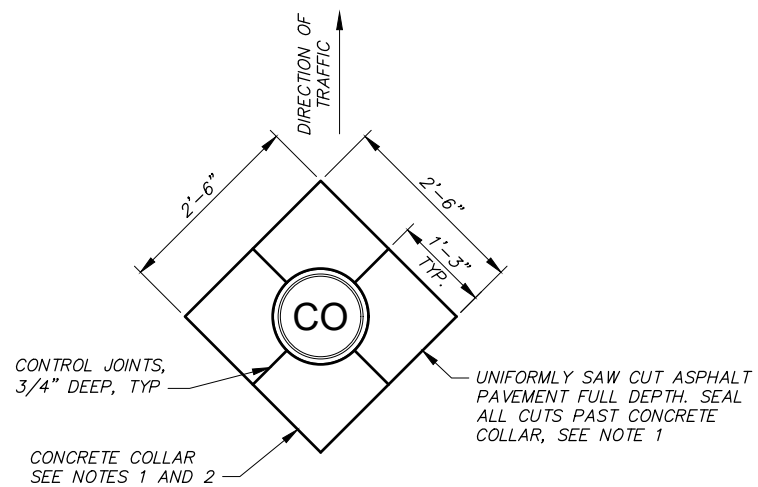
GRAVITY SEWER MAIN LINE CLEANOUT

NTS



SEWER SERVICE LINE CLEANOUT

NTS



PLAN

REQUIREMENTS FOR CONCRETE COLLARS

1. ALL CONCRETE SHALL BE COMMERCIAL GRADE 4000 PSI CONCRETE.
2. COLLAR TO BE FORMED SQUARE.
3. SMOOTH BROOMED FINISH REQUIRED.
4. APPLY CONCRETE CURING COMPOUND.
5. PROTECT FROM TRAFFIC FOR 4 DAYS MINIMUM.

CONCRETE COLLAR DETAIL

NTS

NOTES

1. CONCRETE COLLAR REQUIRED AFTER PLACEMENT OF ACP. WHERE A SERVICE LINE CLEANOUT IS INSTALLED OUTSIDE OF ASPHALT CONCRETE PAVING AT THE EDGE OF THE RIGHT-OF-WAY AS REQUIRED BY CITY STD DWG S5, A CONCRETE COLLAR IS NOT REQUIRED.
2. ALL CLEANOUTS SHALL HAVE A CONCRETE COLLAR IF INSTALLED ON GRAVEL STREET, ROAD, ON SHOULDER, OR NATURAL GROUND. EXCEPTION FOR RESIDENTIAL CONSTRUCTION: IF CLEANOUT IS INSTALLED ON PRIVATE PROPERTY, CONCRETE COLLAR REQUIREMENTS MAY BE WAIVED BY OWNER.
3. SEWER CLEANOUT RISER SIZE AND MATERIAL TO MATCH CARRIER PIPE.
4. CASTING SHALL MEET AASHTO H20 REQUIREMENT.
5. COMPACT ALL AGGREGATE BASE TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
6. MANHOLES SHALL BE INSTALLED WHEREVER POSSIBLE. CLEANOUTS SHALL ONLY BE INSTALLED WHEN APPROVED BY THE CITY.



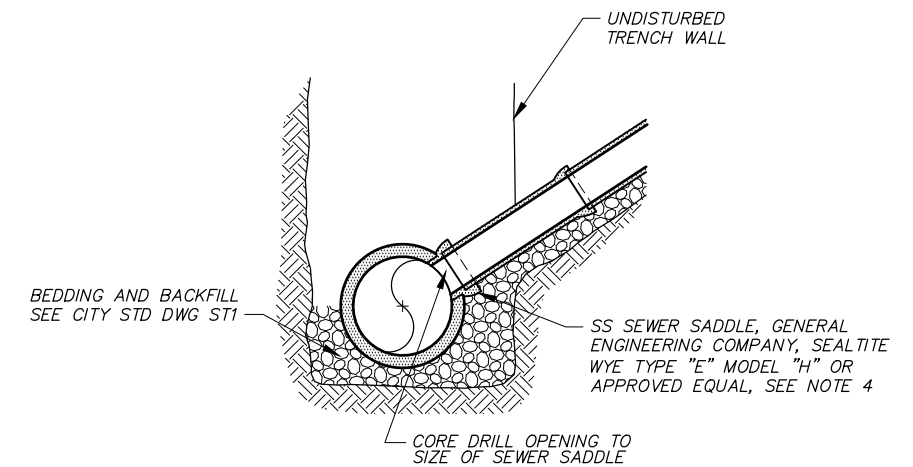
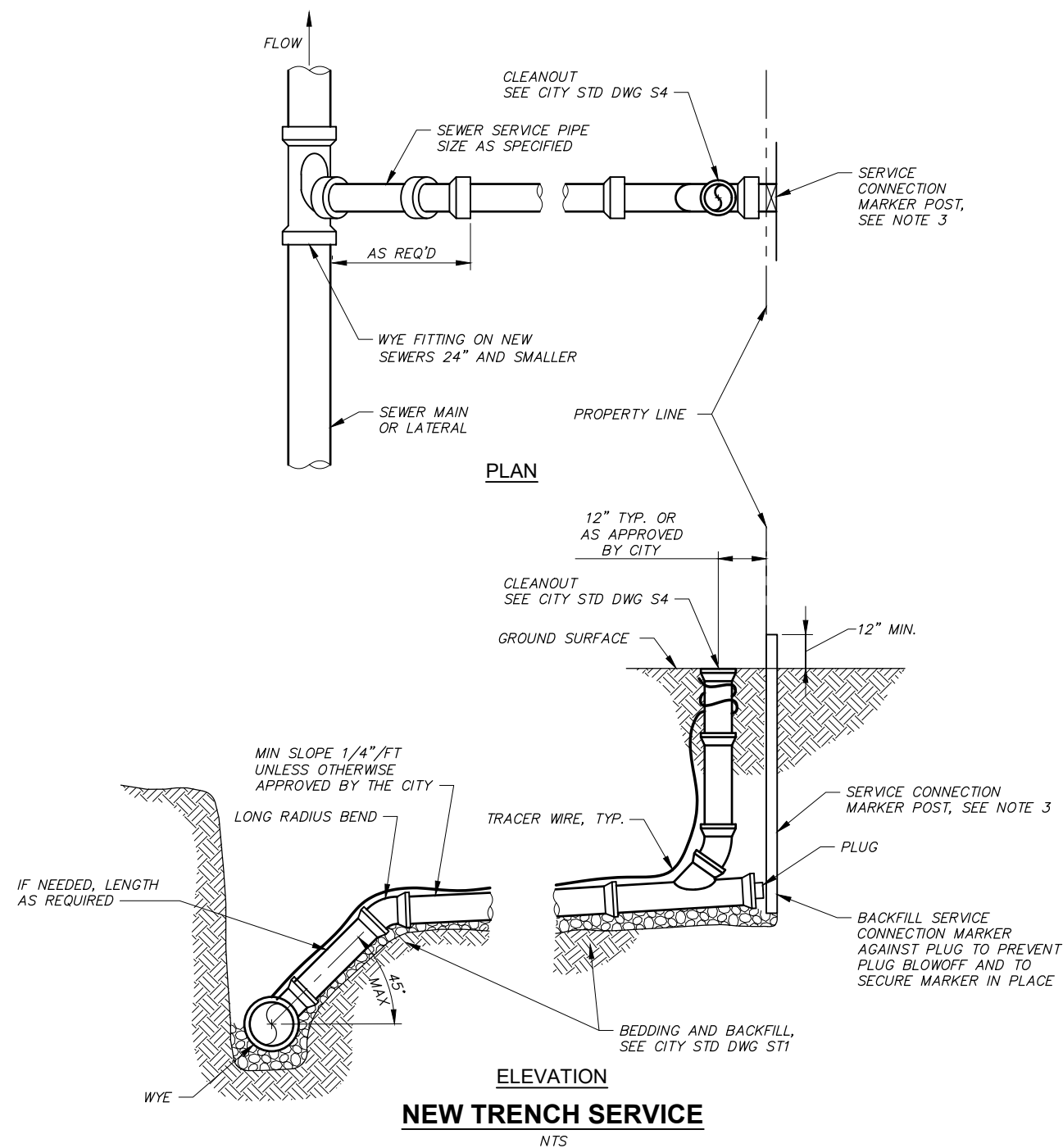
CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

SEWER CLEANOUTS

FIGURE

S4

X:\Clients\Boardman\CRM\09-101\Public Works\Design Standards\Update\GD469-101.s05.dwg, FIGURE, 8/21/2025 9:13 AM, agarcia



EXISTING SEWER SERVICE TAP

NTS

NOTES

1. PIPE AND FITTINGS SHALL BE COMPATIBLE. ONLY MANUFACTURED FITTINGS SHALL BE USED.
2. CONTRACTOR SHALL MAXIMIZE DEPTH OF THE SEWER SERVICE LATERAL AT THE PROPERTY LINE. SEWER SERVICE INVERT DEPTHS AT THE RIGHT-OF-WAY OR EASEMENT LINE SHALL BE SUFFICIENTLY DEEP SUCH THAT ALL POINTS ON THE PROPERTY CAN BE SERVICED BY SEWER PIPE HAVING A MINIMUM SLOPE OF 1/4" PER FOOT AND MEETING ALL REQUIREMENTS OF THE OREGON PLUMBING SPECIALTY CODE CURRENT EDITION INCLUDING MINIMUM COVER REQUIREMENTS. IN NO CASE SHALL THE SEWER SERVICE LATERAL HAVE LESS THAN 4 FEET OF COVER AT RIGHT OF WAY OR EASEMENT LINE, UNLESS OTHERWISE APPROVED BY THE CITY.
3. SERVICE CONNECTION MARKER POST SHALL BE 2"x4" (10' LONG) PRESSURE TREATED FIR. EXPOSED AREA SHALL BE PAINTED GREEN. THE DEPTH FROM THE FINISHED GRADE TO THE INVERT OF THE LATERAL SHALL BE CLEARLY MARKED IN WEATHER RESISTANT, FADE RESISTANT INK. BURIED END SHALL BE SET AT INVERT OF THE SERVICE LATERAL.
4. SEWER SADDLE:
 - 4.1. SEAT SADDLE IN PLACE TO FIT OUTSIDE SURFACE OF CARRIER PIPE AND TO FORM WATERTIGHT SEAL.
 - 4.2. SEWER SADDLE AND SERVICE LATERAL TEE SHALL NOT PROTRUDE INTO PIPE.
5. SERVICE LATERALS 8" AND LARGER SHALL BE CONNECTED TO THE SEWER MAIN LINE AT A MANHOLE UNLESS OTHERWISE APPROVED BY THE CITY.



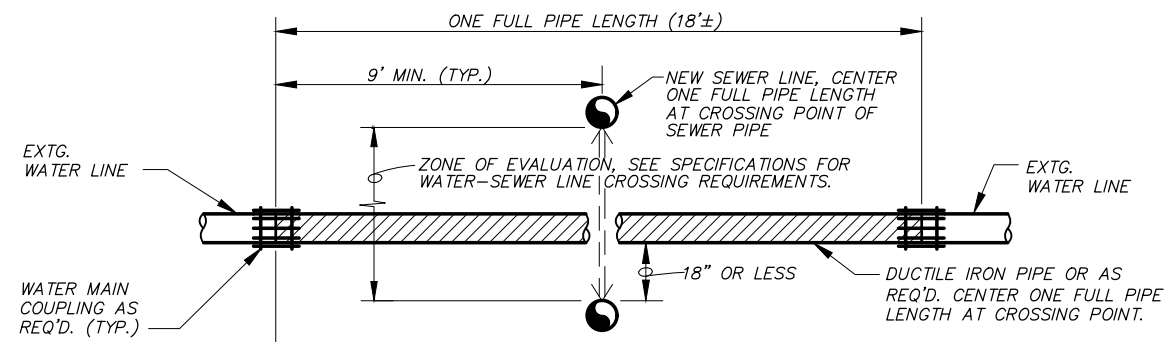
CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

SEWER SERVICE CONNECTION

FIGURE

S5

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_S06.dwg, FIGURE, 8/21/2025 9:15 AM, agarcia



NOTE
ALL BACK FILL IN AREA OF WATER-SEWER CROSSING TO A DEPTH 12" ABOVE THE TOP OF THE HIGHEST PIPE SHALL BE 3/4"-Ø BASE ROCK COMPACTED TO 95% OF ASTM D-698 LABORATORY DENSITY

WATER-SEWER CROSSING
(NEW SEWER LINE CONSTRUCTION)
NTS



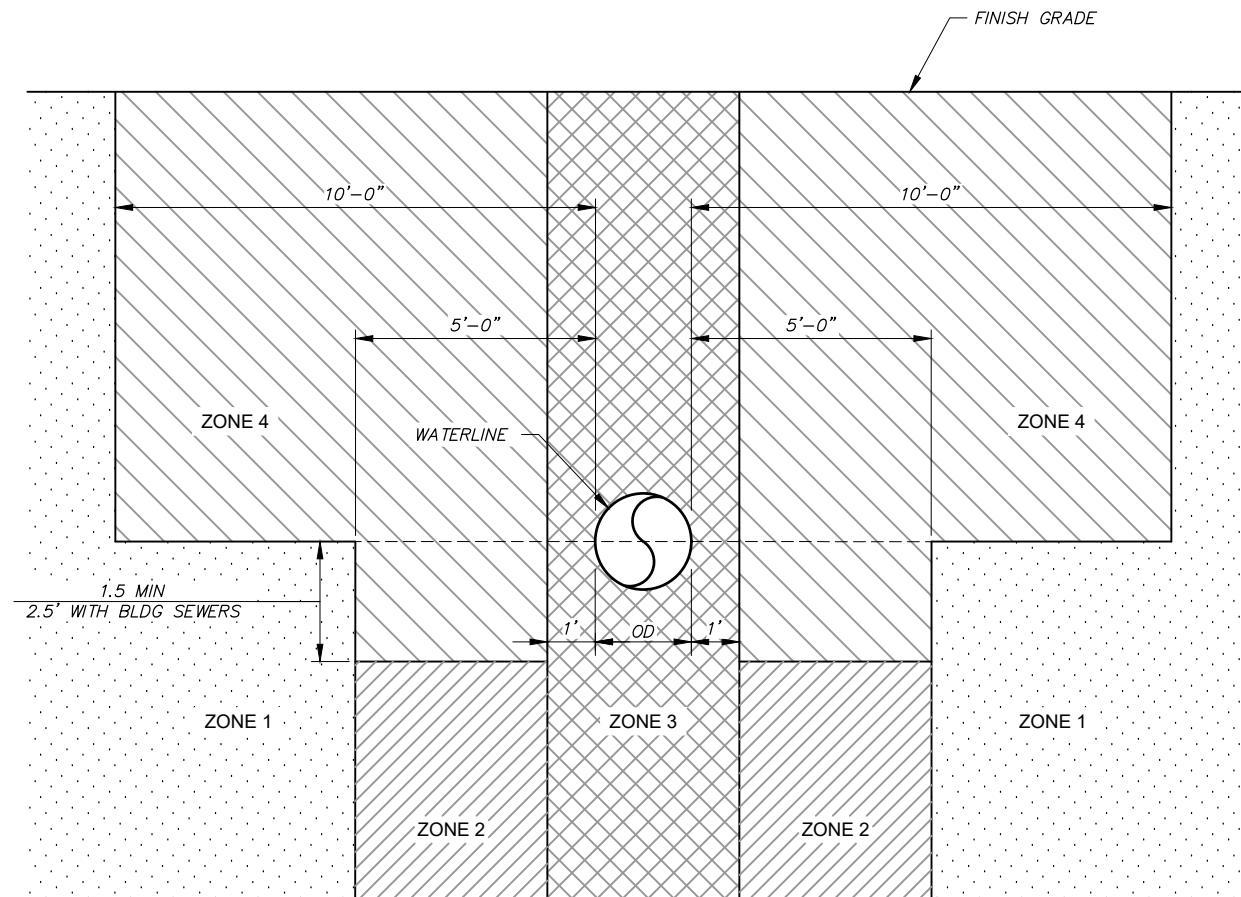
CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER - SEWER CROSSING

FIGURE

S6

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_S07.dwg, Layout 1, 8/21/2025 11:35 AM, agarcia



SEWER LINE ZONES

- | | | |
|--|---------------|--|
| | ZONE 1 | SEWER LINE CAN BE LAID IN THIS AREA WITH NO SPECIAL REQUIREMENTS OF EITHER CONSTRUCTION OR MATERIALS. |
| | ZONE 2 | INSTALLING A SEWER LINE IN THIS ZONE IS NOT ADVISABLE AND MUST BE JUSTIFIED IN EACH CASE. WATER LINE SHOULD BE LOCATED ON A BENCH OF UNDISTURBED EARTH WHEN CONSTRUCTED CONCURRENTLY IN A COMMON TRENCH WITH SEWER LINE. |
| | ZONE 3 | INSTALLING A SEWER MAIN DIRECTLY OVER A WATER MAIN OR DIRECTLY UNDER A WATER MAIN IN THIS ZONE IS PROHIBITED SINCE TAPPING, OPERATION, AND MAINTENANCE OF EACH LINE WOULD BE IMPAIRED. |
| | ZONE 4 | SEWER LINE CONSTRUCTION IN THIS ZONE WOULD GENERALLY NOT BE PERMITTED. EACH INSTALLATION MUST BE JUSTIFIED. IF CONSTRUCTION WAS PERMITTED, PRESSURE PIPE MATERIALS FOR THIS SEWER LINE WOULD BE REQUIRED. |

NOTE
THE CONTRACTOR SHALL MEET ALL THE REQUIREMENTS OF THE DEQ, INCLUDING OAR 340 DIVISION 52.

WATER - SEWER LINE SEPARATION

NTS



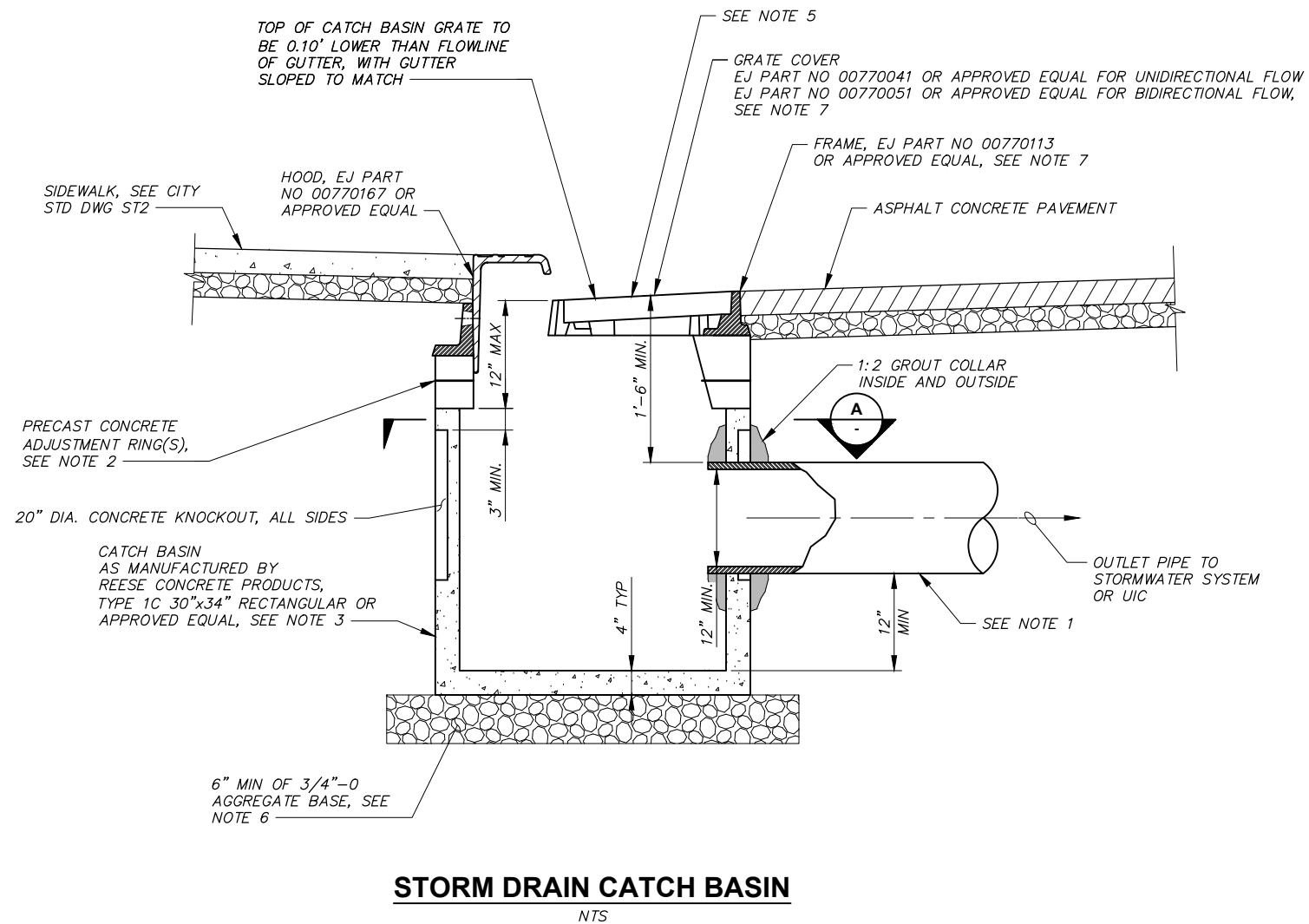
CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER - SEWER LINE SEPARATION

FIGURE

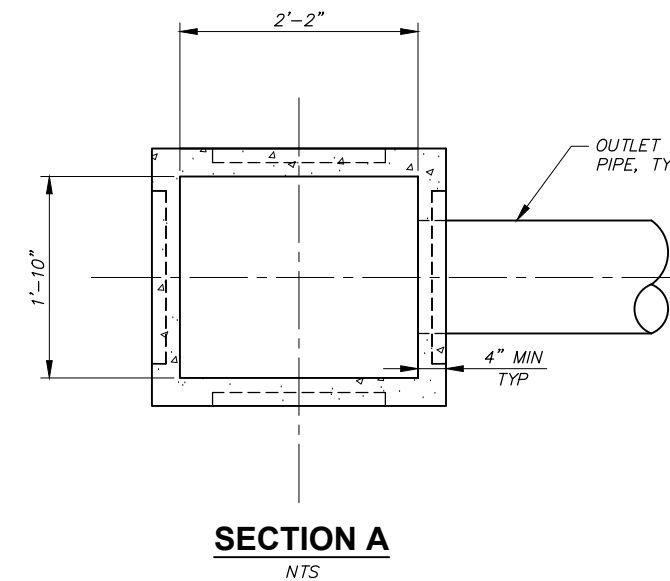
S7

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_SD01.dwg, FIGURE, 8/22/2025 8:40 AM, agarcia



NOTES

1. MINIMUM PIPE BURY TO BE 30" UNLESS OTHERWISE APPROVED BY CITY. NUMBER OF PIPES CONNECTING TO CATCH BASIN SHALL NOT EXCEED 3. MINIMUM PIPE SIZE SHALL BE 12".
2. FOR ADJUSTMENTS LESS THAN 2" GROUT BETWEEN FRAME AND TOP OF CONCRETE OR ADJUSTMENT RINGS. ADJUSTMENTS 2" AND GREATER SHALL BE MADE WITH PRECAST CONCRETE RINGS.
3. WIRE REINFORCED PRECAST CATCH BASIN SHALL BE REQUIRED WHEN 3-12" PIPES ARE TO BE CONNECTED AND SHALL CONFORM TO ASTM C913.
4. CONTRACTOR TO INSTALL EROSION AND SEDIMENT CONTROL PROTECTION DURING CONSTRUCTION PER CURRENT DEQ STANDARDS.
5. CATCH BASIN GRATES AND FRAMES NOT LOCATED IN CURB AND GUTTER REQUIRE CITY APPROVAL.
6. COMPACT ALL AGGREGATE BASE TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
7. AREA DRAIN CATCH BASINS LOCATED IN PAVED AREAS SHALL BE INSTALLED WITH A RECTANGULAR ADA GRATE (EJ PART NO 00775036) AND A NON SLOPING FRAME (EJ PART NO 00777011).
8. INSPECTION REQUIREMENTS: CONTRACTOR SHALL SET A STRING LINE FOR THE TOP BACK OF CURB. CITY REPRESENTATIVE SHALL WITNESS THAT THE STRING LINE IS DIRECTLY ABOVE INSIDE FACE OF THE CONCRETE RISER RING.

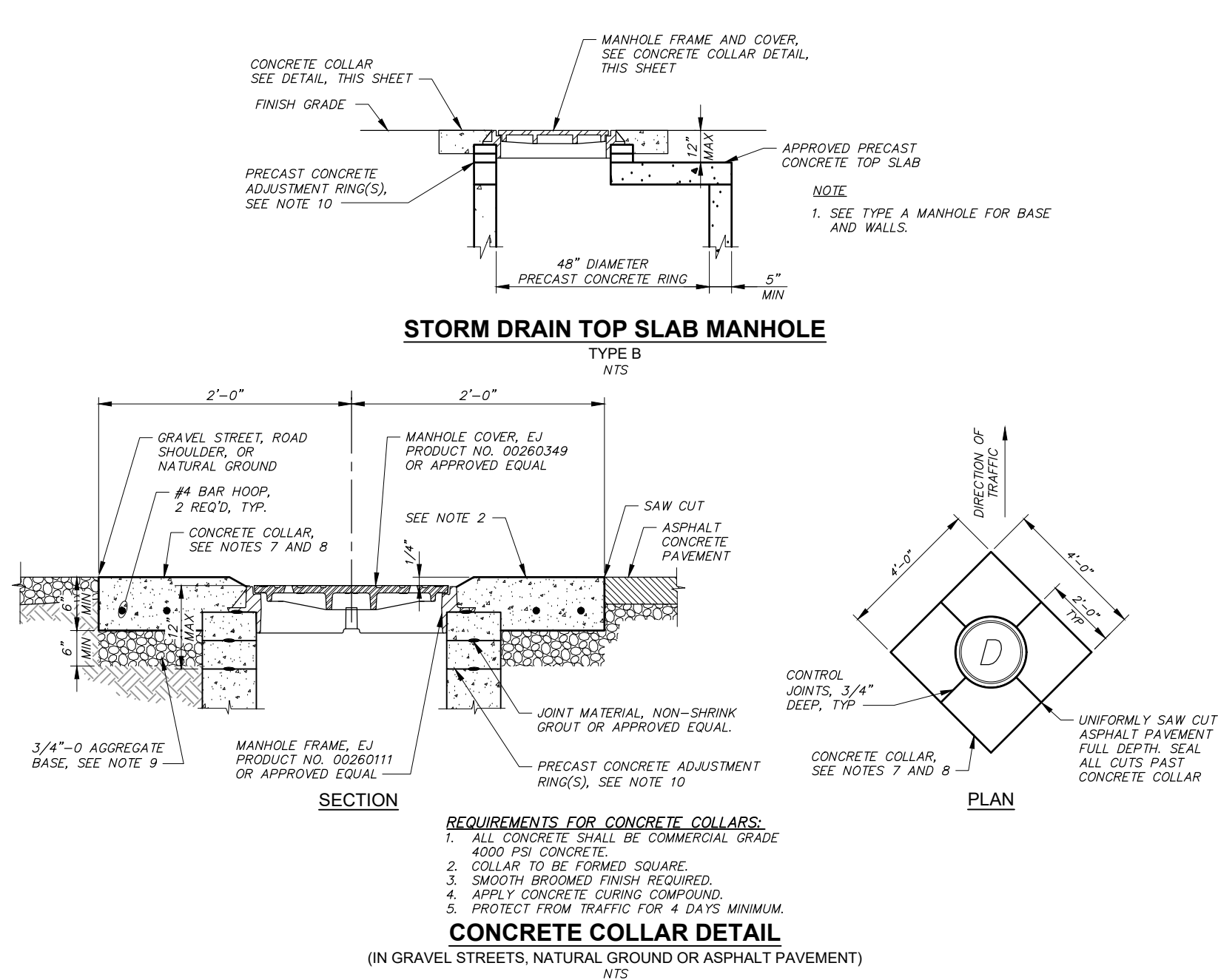


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

STORM DRAIN CACH BASIN

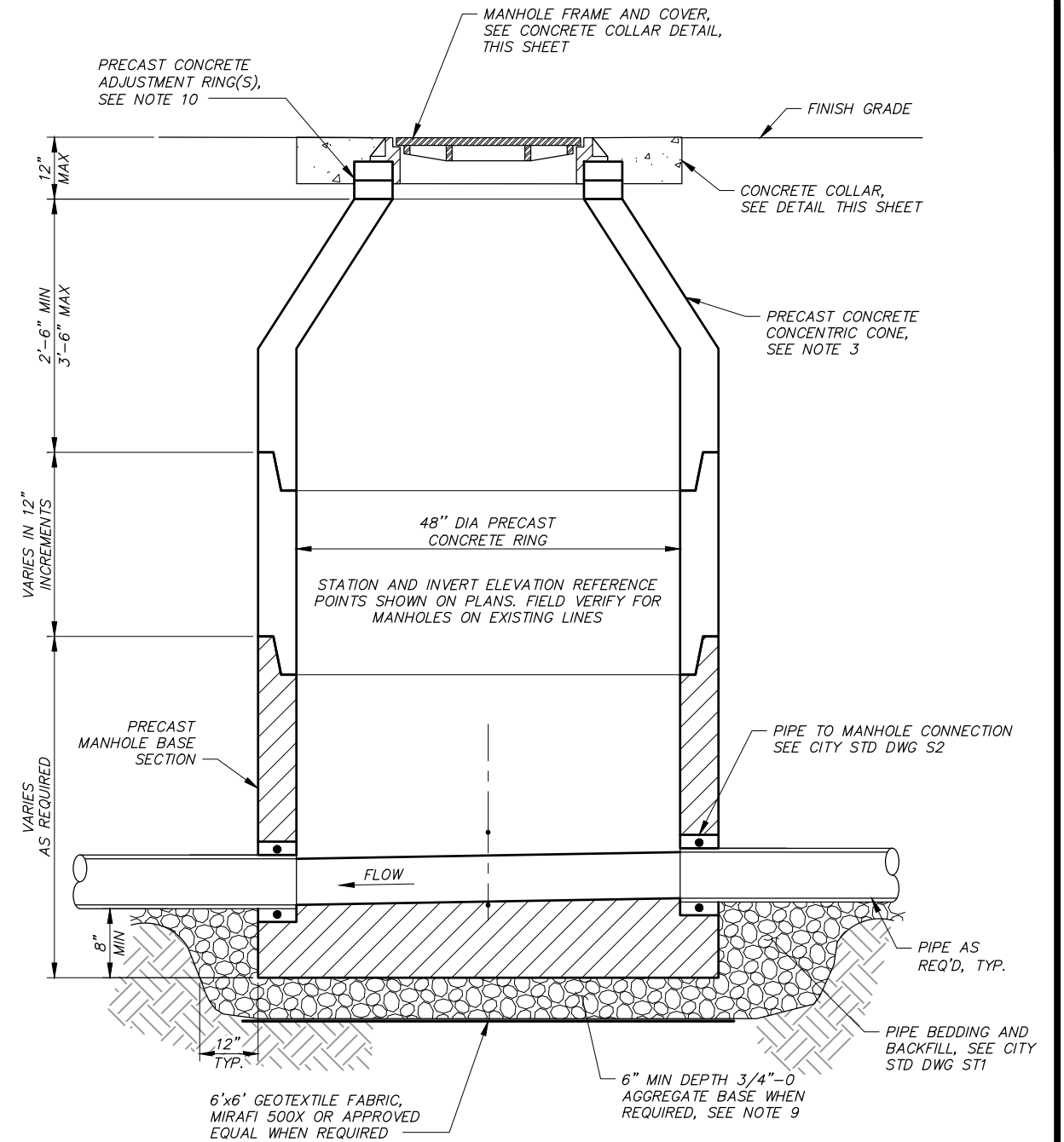
FIGURE
SD1

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_SD02.dwg, FIGURE, 8/21/2025 11:40 AM, agarcia



NOTES

1. ALL MANHOLES SHALL BE PRECAST MANHOLE UNITS CONFORMING TO ASTM C478.
2. ANY GAPS, HOLES, ROUGH SPOTS, ETC, IN THE INVERT CHANNELS SHALL BE FILLED OR REPAIRED IN THE FIELD.
3. CONE SECTION SHALL BE TYPE A UNLESS MANHOLE DEPTH IS 5.5 FEET OR LESS. MANHOLES 5.5 FEET OR LESS IN DEPTH SHALL BE TYPE B UNLESS OTHERWISE CALLED FOR ON THE DESIGN DRAWINGS.
4. PRIOR TO MANUFACTURING MANHOLES THE CONTRACTOR SHALL VERIFY FIELD CONDITIONS, PIPE INVERT ELEVATIONS, PIPE ORIENTATION, AND MANHOLE DEPTH. CONTRACTOR SHOULD ALSO NOTE THAT PIPE SLOPES ARE CALCULATED TO CENTER OF THE MANHOLE.
5. ALL PRECAST MANHOLE BASE SECTIONS SHALL HAVE FACTORY CAST FLOW CHANNELS UNLESS OTHERWISE APPROVED BY THE CITY.
6. MANHOLE STEPS NOT PERMITTED.
7. CONCRETE COLLAR REQUIRED AFTER PLACEMENT OF ACP.
8. ALL MANHOLES SHALL HAVE A CONCRETE COLLAR REGARDLESS OF BEING INSTALLED ON PAVED OR GRAVEL STREET, ROAD SHOULDER, OR NATURAL GROUND.
9. COMPACT ALL AGGREGATE BASE TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
10. FOR ADJUSTMENTS LESS THAN 2" GROUT BETWEEN FRAME AND TOP OF CONCRETE OR ADJUSTMENT RINGS. ADJUSTMENTS 2" AND GREATER SHALL BE MADE WITH PRECAST CONCRETE RINGS.

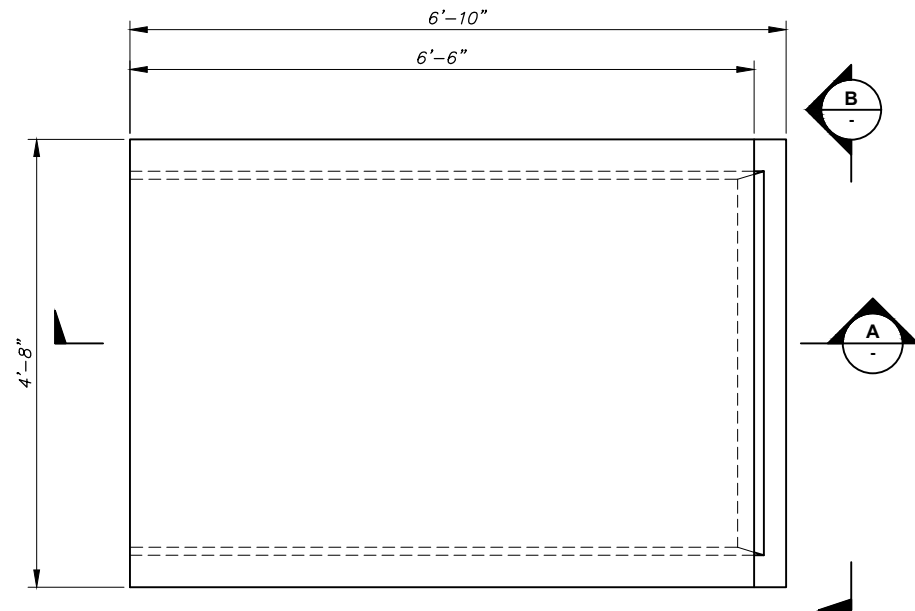


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

STORM DRAIN MANHOLE

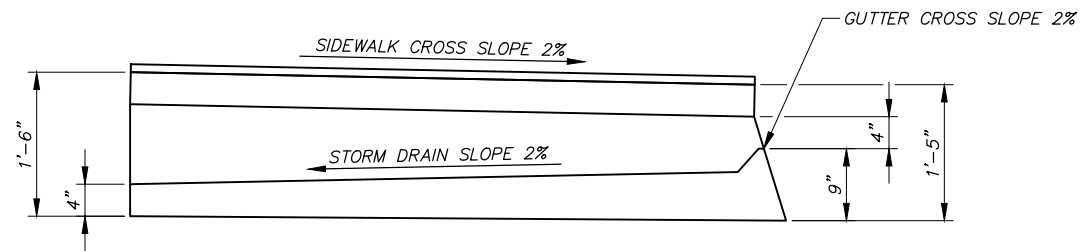
FIGURE
SD2

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_SD04.dwg, FIGURE, 8/21/2025 9:40 AM, agarcia

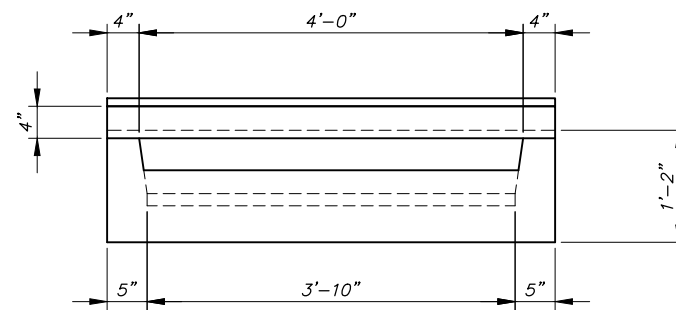


NOTE
1. SPECIAL CURB INLET TYPE 2 SHALL BE AS MANUFACTURED BY WILBERT PRECAST, SPECIAL CURB INLET TYPE 2, MODEL NO. 1840 OR APPROVED EQUAL.

PLAN



SECTION A



SECTION B

REBAR
#4 BAR AT 10" OC, EW, IN LID
#4 U-BAR AND #4 BAR STRAIGHTS IN BASE AT 10" OC

SPECIAL CURB INLET TYPE 2

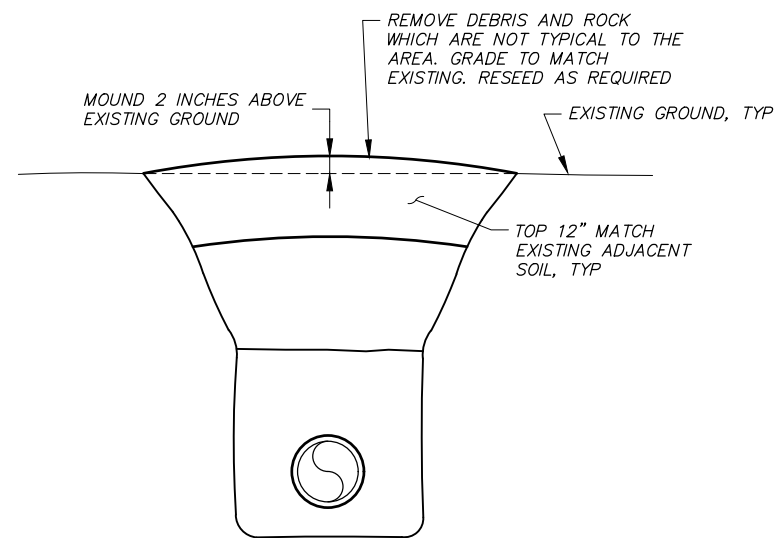
NTS



CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

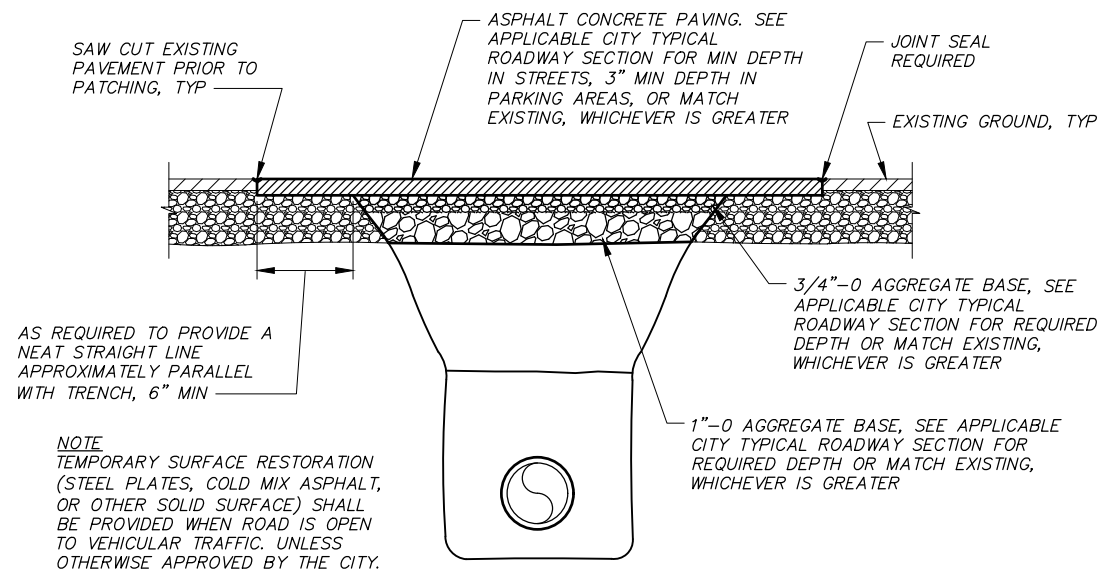
CURB INLET

FIGURE
SD4



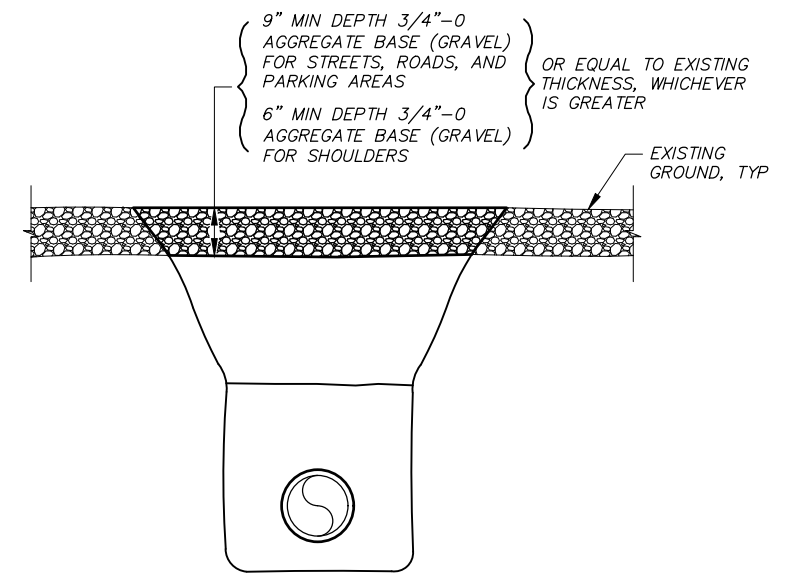
SURFACE RESTORATION

NATURAL SURFACES
NTS



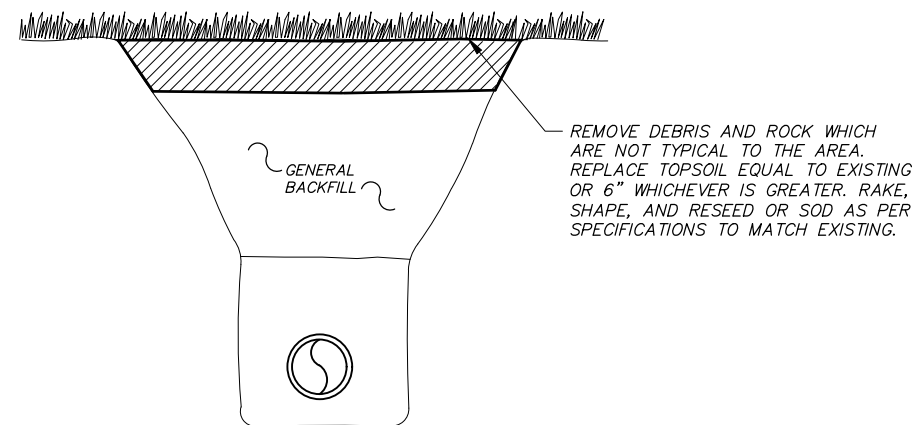
SURFACE RESTORATION

PAVED SURFACES
NTS

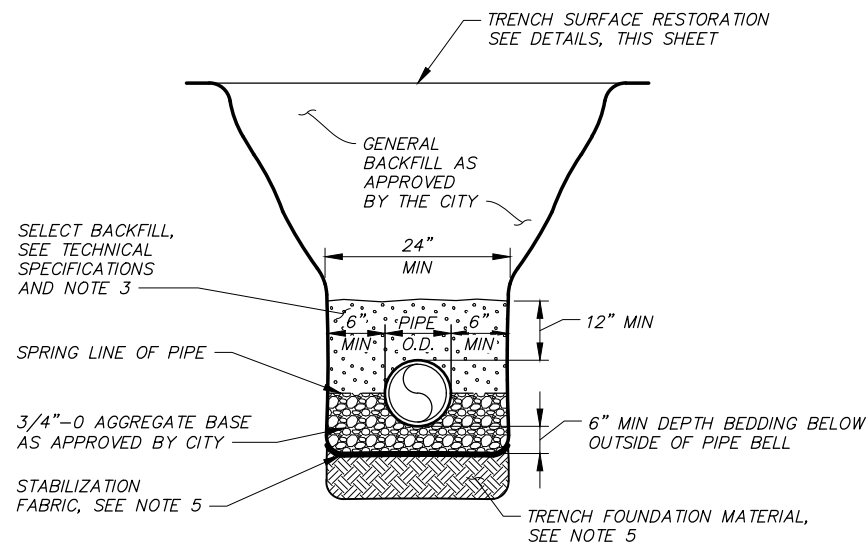


SURFACE RESTORATION

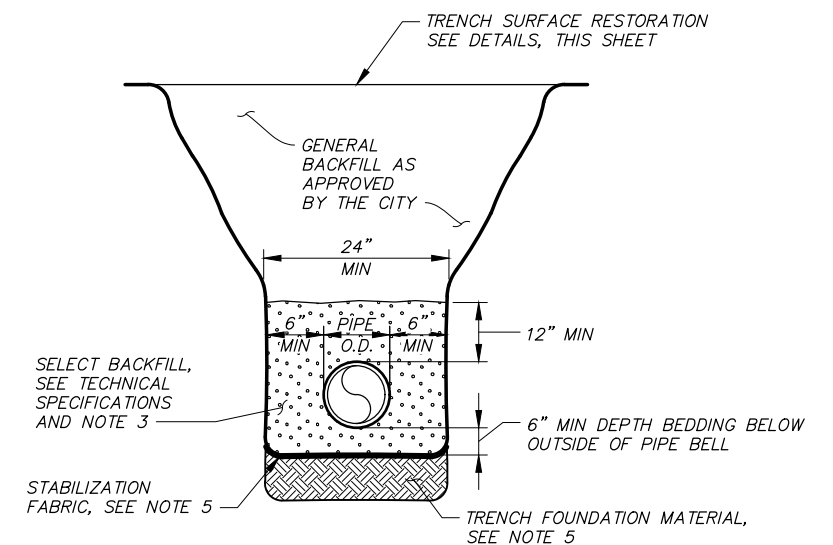
GRAVEL SURFACES
NTS



TRENCH RESTORATION
LAWNS & LANDSCAPED AREAS
NTS



SEWER AND STORM DRAIN LINE TRENCH BEDDING AND BACKFILL
NTS



WATER LINE TRENCH BEDDING AND BACKFILL

- ## TRENCH BEDDING AND BACKFILL NOTES

1. SURFACING OF PAVED AREAS SHALL COMPLY WITH CITY STANDARD STREET DRAWINGS.
2. ALL BACKFILL MATERIAL SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY PER ASTM D1557 AND SHALL BE PLACED AND COMPACTED IN 6" LIFTS, UNLESS NOTED OTHERWISE.
3. BACKFILL FROM PIPE BOTTOM TO 12-INCHES ABOVE PIPE SHALL BE COMPACTED TO 85% MAXIMUM DRY DENSITY PER ASTM D1557. COMPACTION BY HAND TAMPING WILL BE ALLOWED IF 85% DENSITY IS ACHIEVED. OTHERWISE MECHANICAL TAMPING WILL BE REQUIRED.
4. BACKFILL INSPECTION/TESTING
 - TRENCH DEPTH OF LESS THAN 1 FT VISUAL INSPECTION BY CITY.
 - TRENCH DEPTH GREATER THAN 1 FT:
 - BELOW FINISH AGGREGATE BASE GRADE: 1 TEST PER 300 FT OF TRENCH AND EVERY 1.5 FT OF FILL.
 - AT FINISH AGGREGATE BASE GRADE: 1 TEST PER 300 FT OF TRENCH OR 2 TESTS PER STREET CROSSING.
 - IF BACKFILL MATERIAL OR COMPACTION EQUIPMENT CHANGES, COMPACTION TESTING SHALL IMMEDIATELY BE PERFORMED TO VERIFY THAT DENSITY IS BEING ACHIEVED.
5. STABILIZATION FABRIC AND IMPORTED FOUNDATION MATERIAL SHALL BE REQUIRED WHERE NATURAL SOIL CONDITIONS IN THE BOTTOM OF THE TRENCH ARE UNSUITABLE FOR PROPER PIPE INSTALLATION.



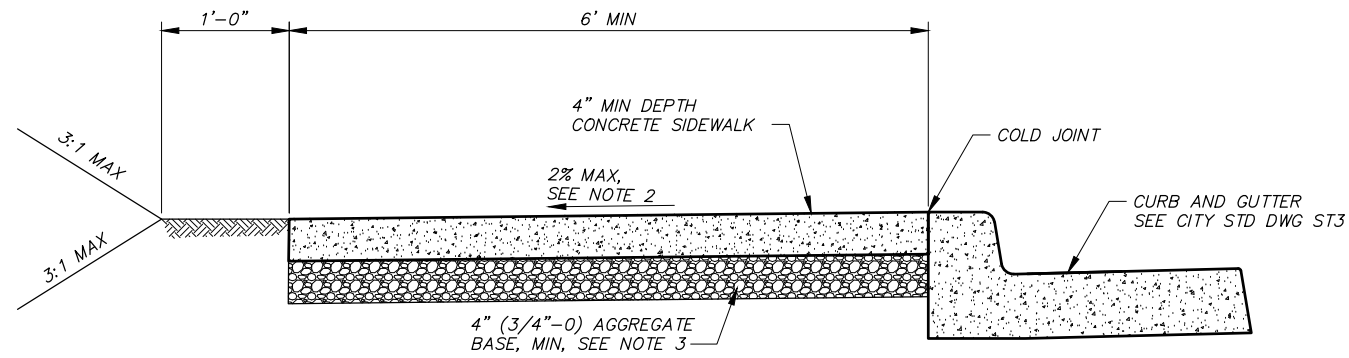
**CITY OF
BOARDMAN, OREGON
STANDARD DRAWING**

TRENCH BEDDING, BACKFILL, AND SURFACE RESTORATION

FIGURE

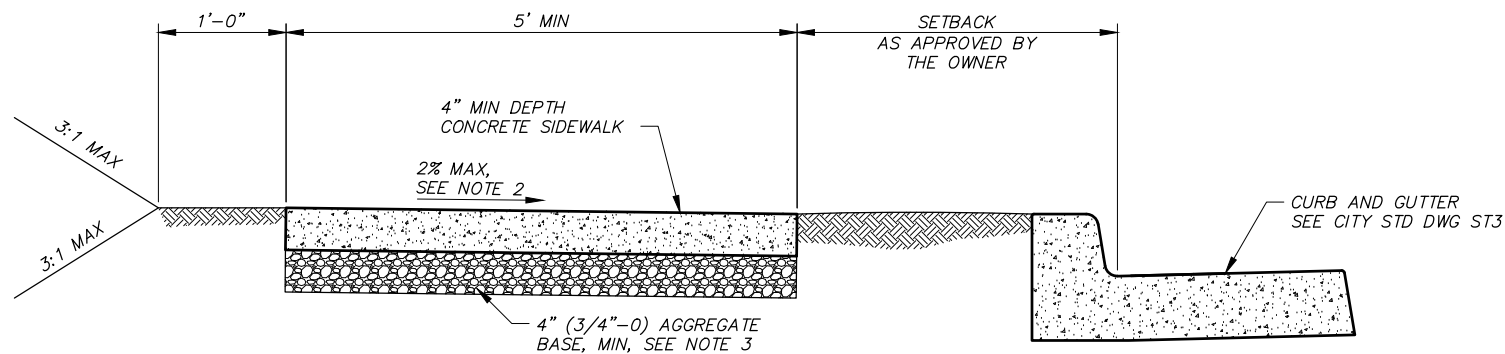
ST1

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_ST02.dwg, FIGURE, 8/22/2025 8:42 AM, agarcia



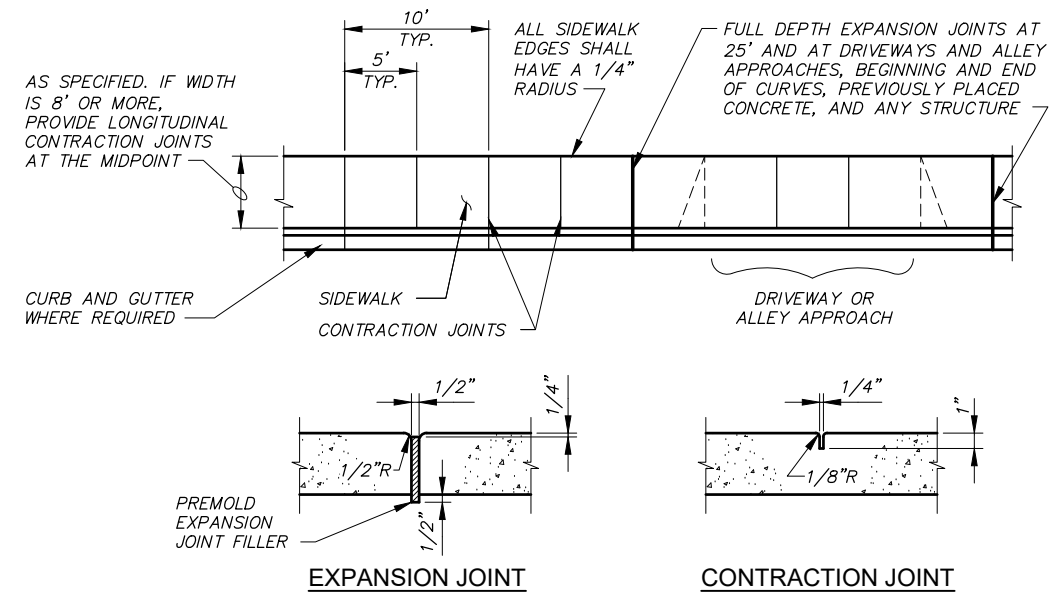
SIDEWALK SECTION

NTS



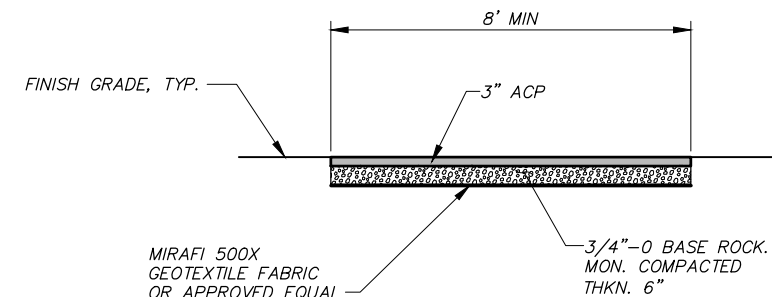
SIDEWALK SECTION WITH SETBACK

NTS



SIDEWALK JOINTING DETAILS

NTS



MULTI-USE PATH

NTS

NOTES

1. PROVIDE EXPANSION JOINTS AROUND POLES, BOXES, AT THE ENDS OF EACH DRIVEWAY, AROUND ANY FIXTURES WHICH PROTRUDE THROUGH THE SIDEWALK, AND BETWEEN ANY STRUCTURE IMMEDIATELY ADJACENT TO THE SIDEWALK.
2. TO INSURE SLOPES DO NOT EXCEED MAXIMUM ALLOWABLE SLOPES, IT IS RECOMMENDED TO SET SLOPES LOWER THAN MAXIMUM ALLOWABLE SLOPES AS FOLLOWS:
-FOR 2% MAX, SET SLOPE AT 1.5%
-FOR 8.33% MAX, SET SLOPE AT 7.5%
SIDEWALK WITH SLOPES EXCEEDING MAXIMUM ALLOWABLE VALUES SHALL BE REMOVED AND REPLACED AT THE CONTRACTORS EXPENSE.
3. COMPACT AGGREGATE BASE TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
4. ALL CONCRETE SHALL BE COMMERCIAL GRADE 4,000 PSI CONCRETE.



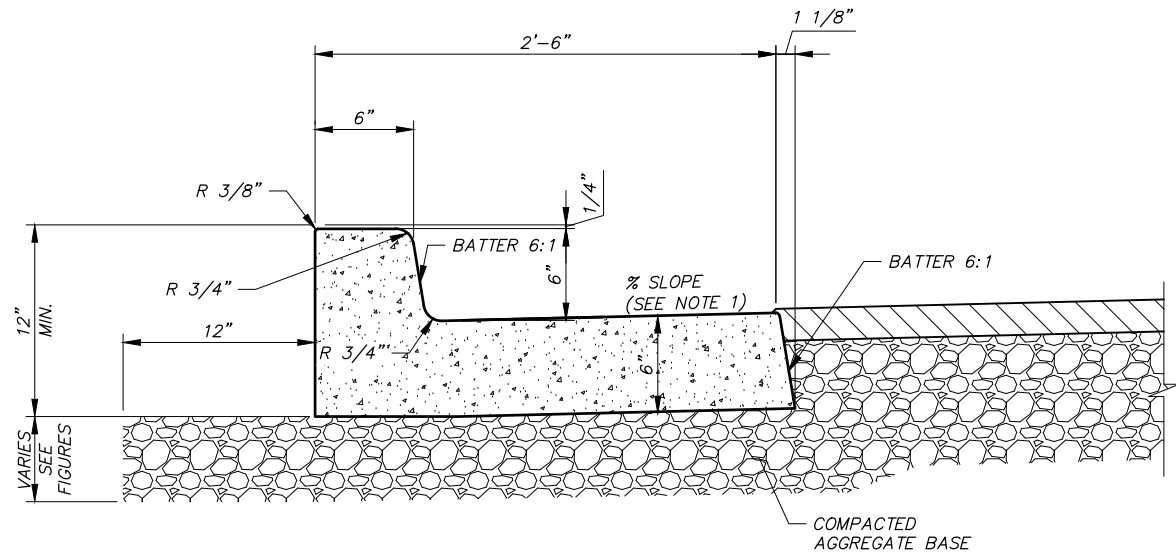
CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

SIDEWALK DETAILS

FIGURE
ST2

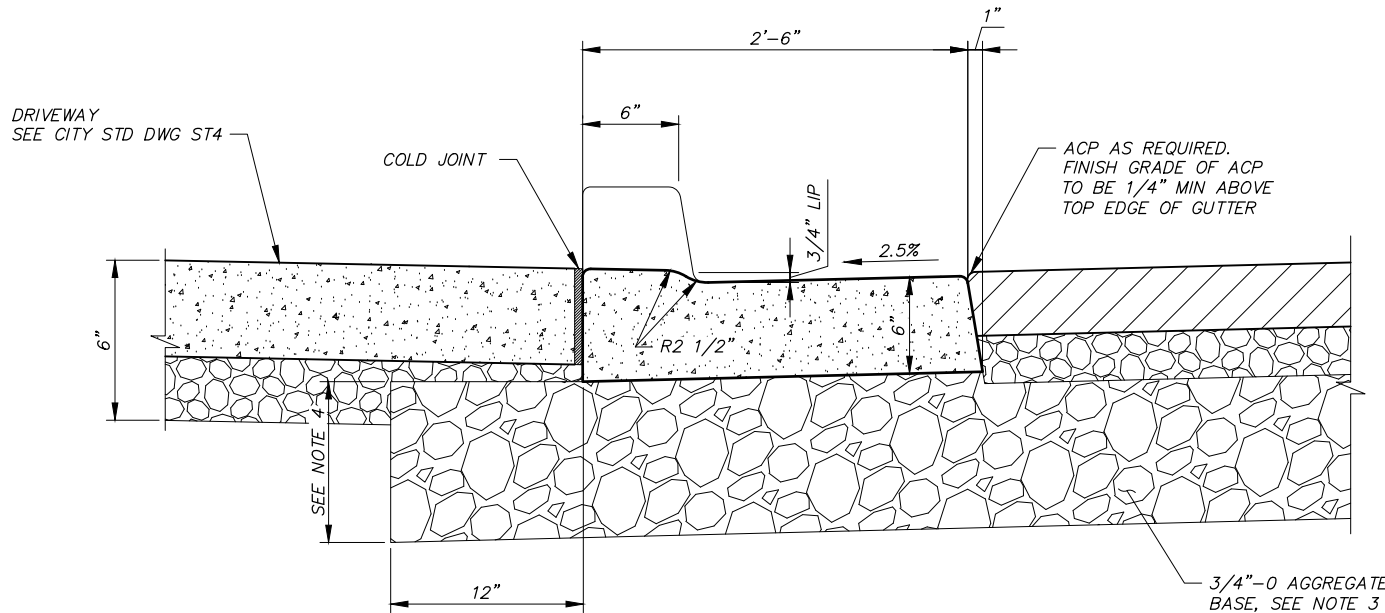
NOTES

- 1. GUTTER CROSS SLOPE SHALL BE MINIMUM 2% AND MAXIMUM 3% UNLESS OTHERWISE APPROVED BY THE CITY.
- 2. ALL CONCRETE SHALL BE COMMERCIAL GRADE 4,000 PSI CONCRETE.
- 3. COMPACT AGGREGATE BASE TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
- 4. AGGREGATE BASE THICKNESS BELOW CURB AND GUTTER SHALL BE 6" THICK.
- 5. SEE CITY STD DWG XXX FOR CURB AND GUTTER JOINT REQUIREMENTS.
- 6. CONCRETE SHALL BE TROWELED SMOOTH PRIOR TO APPLYING BROOM FINISH.
- 7. INSPECTION CRITERIA:
 - 7.1. COMPLETED CURB AND GUTTER SHALL NOT CAUSE PUDDING ISSUES. PUDDLE WIDTH SHALL NOT EXCEED 75% OF THE GUTTER WIDTH AND PUDDLE LENGTH SHALL NOT EXCEED 2'.
 - 7.2. CROSS SLOPE OF THE GUTTER SHALL BE A MINIMUM OF 1.5% AND A MAXIMUM OF 3.5% AS MEASURED BY A 2' ELECTRONIC LEVEL.
 - 7.3. THERE SHALL BE NO BREAK POINTS OR REVERSE SLOPE IN THE GUTTER CROSS SLOPE AS MEASURED BY A 2' ELECTRONIC LEVEL. THE MAXIMUM ALLOWABLE GAP BETWEEN THE LEVEL AND THE GUTTER SURFACE SHALL BE 1/8".
 - 7.4. WHEN A 6 FOOT LONG STRAIGHTEDGE IS LAID ON THE TOP FACE OF THE CURB OR ON THE SURFACE OF THE GUTTER, THE SURFACE SHALL NOT VARY MORE THAN 0.02 FEET FROM THE EDGE OF THE STRAIGHTEDGE EXCEPT AT GRADE CHANGES OR VERTICAL CURVES.
 - 7.5. THE CONTRACTOR SHALL CONSTRUCT ALL CURB AND GUTTER WITHIN 0.02 FEET OF TRUE LINE, WITHIN 0.02 FEET OF ESTABLISHED SURFACE GRADE, CROSS SECTION, SLOPE, AND WITHIN 0.02 FEET OF SPECIFIED THICKNESS.
- 8. WHEN INSTALLING NEW CURB AND GUTTER ON AN EXISTING PAVED STREET, THE ASPHALT SHALL BE CUT A MINIMUM OF 2 FEET FROM THE EDGE OF THE GUTTER OR AS NEEDED TO ACHIEVE COMPACTION OF THE AGGREGATE BASE BY MECHANICAL MEANS.



STANDARD CURB AND GUTTER

NTS



CURB AND GUTTER AT DRIVEWAY

NTS



CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

CURB AND GUTTER

FIGURE
ST3

NOTES

1. RESIDENTIAL DRIVEWAYS AND SIDEWALKS SECTIONS THROUGH DRIVEWAYS SHALL HAVE A MINIMUM NOMINAL THICKNESS OF 6".

2. CONCRETE FOR COMMERCIAL USE AND ALLEY APPROACHES SHALL HAVE A MINIMUM NOMINAL THICKNESS OF 8". ALL CONCRETE SHALL BE COMMERCIAL GRADE 4,000 PSI CONCRETE.

3. THE 2% CROSS-SLOPE OF SIDEWALK IS MEASURED FROM HORIZONTAL. THE 12:1 SLOPE OF SIDEWALK TRANSITION TO DRIVEWAY/ALLEY IS RELATIVE TO THE RUNNING SLOPE OF THE SIDEWALK. THE SLOPE OF THE APRON IS MEASURED RELATIVE TO HORIZONTAL, SEE NOTE 7.

4. THE DRIVEWAY SHALL NOT BE PLACED INTEGRAL WITH THE SIDEWALK, CURB, OR ANY DRIVEWAY TRANSITION SLAB AND SHALL BE ISOLATED WITH FULL DEPTH EXPANSION JOINTS.

5. DRIVEWAY CONTROL JOINS (NOT SHOWN) SHALL BE SPACED AT A MAXIMUM ON CENTER SPACING EQUAL TO THE SIDEWALK WIDTH OR TO MATCH EXISTING SIDEWALK CONTROL JOINT SPACING, WHICHEVER IS LESS.

6. DRIVEWAY WIDTH SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

6.1. DRIVEWAYS SHALL NOT BE LOCATED CLOSER THAN 5 FEET TO SIDE PROPERTY LINES.

6.2. DRIVEWAYS SHALL BE LOCATED A MINIMUM DISTANCE FROM CURB RETURNS AS REQUIRED BY TECHNICAL SPECIFICATIONS SECTION 5 STREETS SECTION 1.1.Q.5.

6.3. MAXIMUM DRIVEWAY WIDTH SHALL BE 50% OF THE PROPERTY FRONTAGE OR 50 FEET WHICHEVER IS LESS. ADDITIONALLY, WHERE ROADSIDE SWALES ARE PRESENT, THE DRIVEWAY WIDTH SHALL IN NO CASE LIMIT THE SWALE CUMULATIVE LENGTH TO LESS THAN 50% OF THE PROPERTY FRONTAGE.

7. TO ENSURE SLOPES DO NOT EXCEED ALLOWABLE SLOPES. IT IS RECOMMENDED TO SET SLOPES LOWER THAN MAXIMUM ALLOWABLE SLOPES AS FOLLOWS:

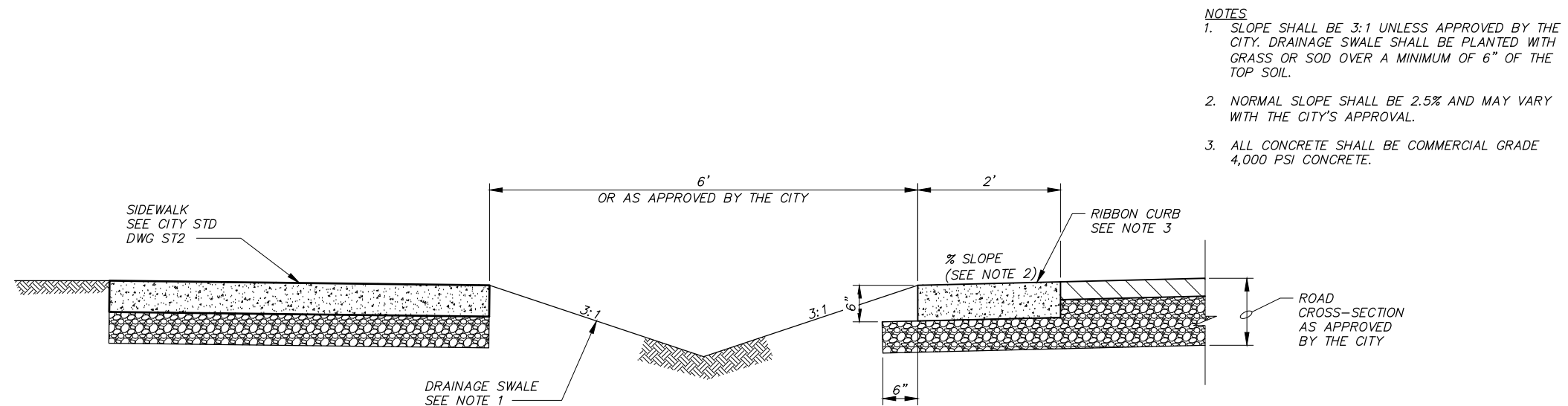
- FOR 2% MAX, SET SLOPE AT 1.5%

- FOR 8.33% MAX, SET SLOPE AT 7.5%

DRIVEWAYS WITH SLOPES EXCEEDING MAXIMUM ALLOWABLE VALUES SHALL BE REMOVED AND REPLACED AT THE CONTRACTORS EXPENSE.

8. COMPACT AGGREGATE BASE TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
- SECTION VIEW
- DRIVEWAY RAMP
ISOMETRIC VIEW
NTS
-
- CITY OF
BOARDMAN, OREGON
STANDARD DRAWING
- DRIVEWAY AND ALLEY RAMPS
- FIGURE
ST4

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_ST05.dwg, FIGURE, 8/21/2025 9:23 AM, agarcia



RIBBON CURB AND DRAINAGE SWALE

NTS

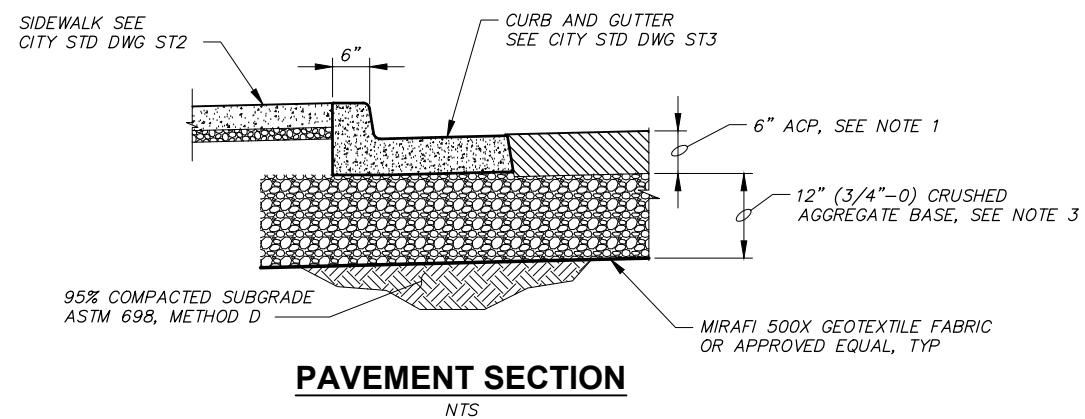
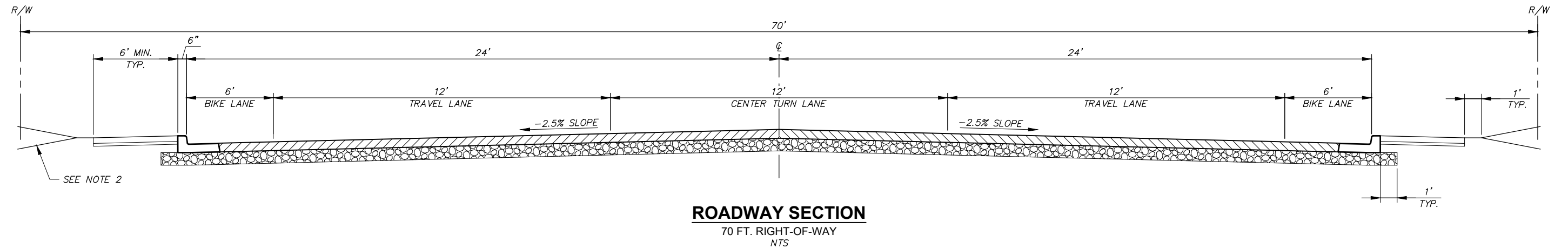
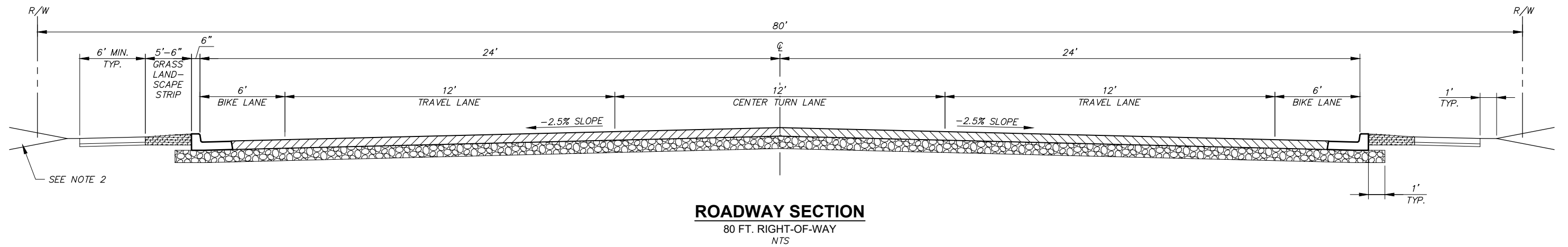


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

RIBBON CURB DRAINAGE SWALE

FIGURE
ST5

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_ST06.dwg, FIGURE, 8/21/2025 2:24 PM, agarcia



NOTES

1. ASPHALT CONCRETE PAVEMENT SHALL BE CONSTRUCTED IN 2, 3" LIFTS.
2. SLOPES SHALL NOT EXCEED 3:1 UNLESS APPROVED BY THE CITY.
3. DEPTH'S OF CRUSHED AGGREGATE BASE SHALL BE CONFIRMED BY A SITE SOILS INVESTIGATION AND APPROVED BY THE CITY.

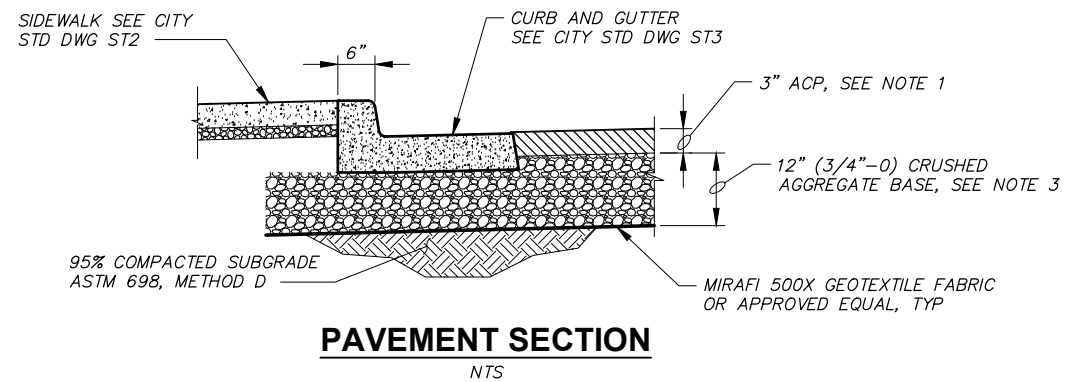
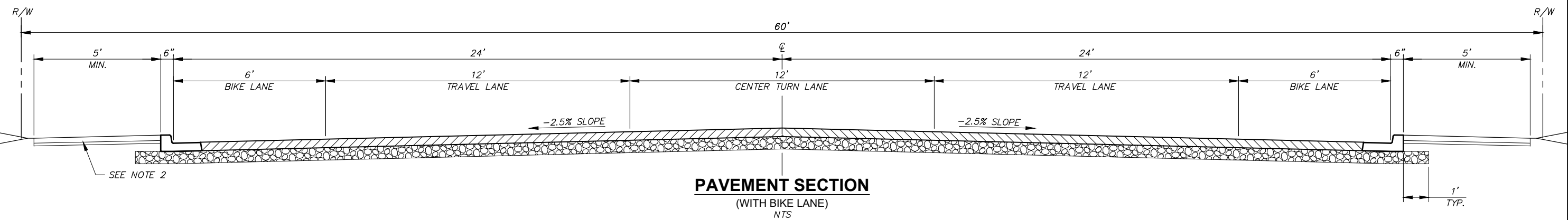


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

ARTERIAL CROSS SECTION

FIGURE
ST6

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_ST07.dwg, FIGURE, 8/21/2025 9:25 AM, agarcia



NOTES

1. ASPHALT CONCRETE PAVEMENT SHALL BE CONSTRUCTED IN 1 LIFT.
2. SLOPES SHALL NOT EXCEED 3:1 UNLESS APPROVED BY THE CITY.
3. DEPTH'S OF CRUSHED AGGREGATE BASE SHALL BE CONFIRMED BY A SITE SOILS INVESTIGATION AND APPROVED BY THE CITY.

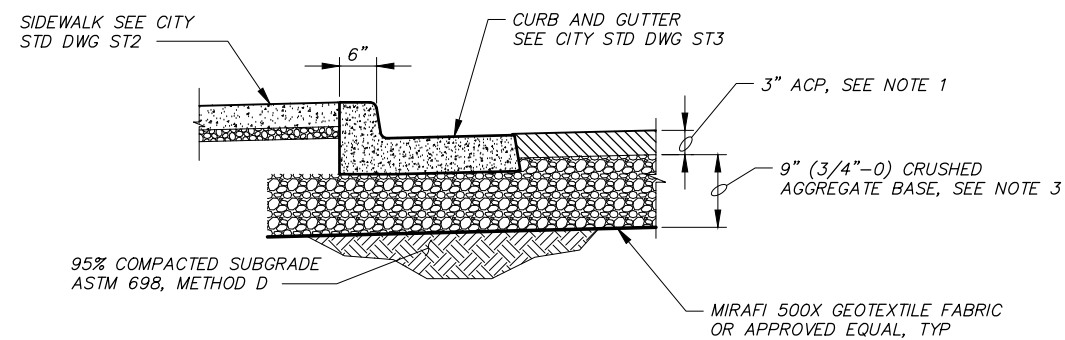
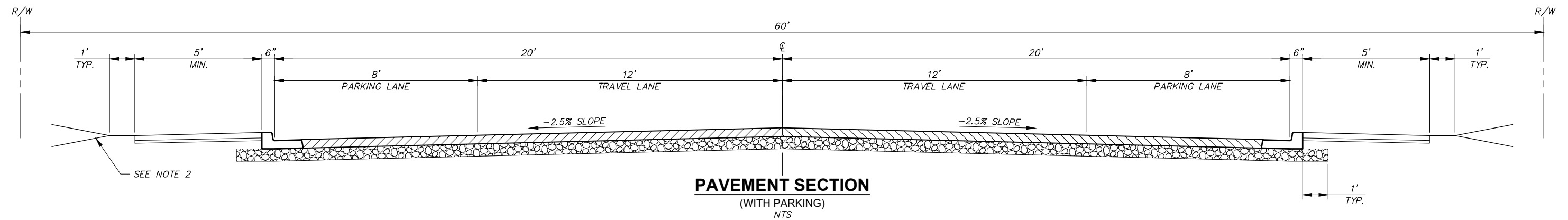


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

COLLECTOR CROSS SECTION

FIGURE
ST7

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_ST8.dwg, FIGURE, 8/21/2025 2:25 PM, agarcia



- NOTES
1. ASPHALT CONCRETE PAVEMENT SHALL BE CONSTRUCTED IN 1 LIFT.
 2. SLOPES SHALL NOT EXCEED 3:1 UNLESS APPROVED BY THE CITY.
 3. DEPTH'S OF CRUSHED AGGREGATE BASE SHALL BE CONFIRMED BY A SITE SOILS INVESTIGATION AND APPROVED BY THE CITY.



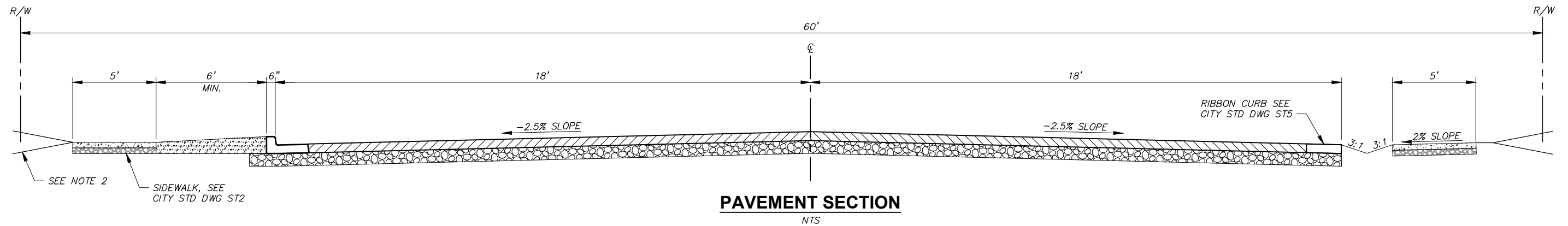
CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

NEIGHBORHOOD COLLECTOR

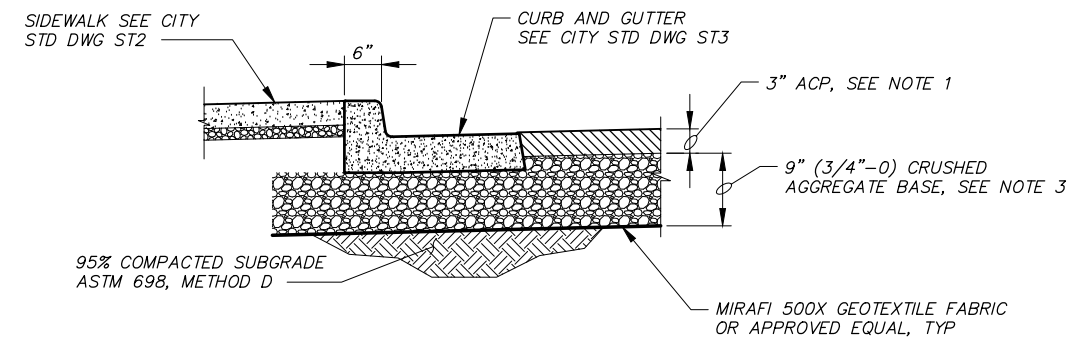
FIGURE

ST8

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_ST9.dwg, FIGURE, 8/25/2025 8:52 AM, agarcia



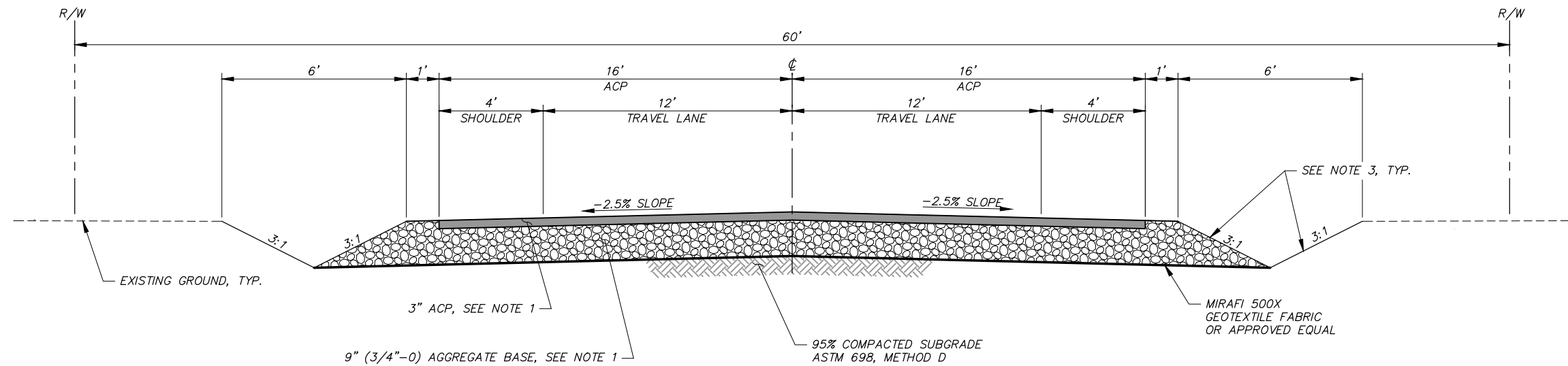
- NOTES**
1. ASPHALT CONCRETE PAVEMENT SHALL BE CONSTRUCTED IN 1 LIFT.
 2. SLOPES SHALL NOT EXCEED 3:1 UNLESS APPROVED BY THE CITY.
 3. SLOPES SHALL NOT EXCEED 3:1 UNLESS APPROVED BY THE CITY. DRAINAGE SWALE SHALL BE PLANTED WITH GRASS OR SOD OVER A MINIMUM OF 6" OF TOP SOIL.
 4. DEPTH'S OF CRUSHED AGGREGATE BASE SHALL BE CONFIRMED BY A SITE SOILS INVESTIGATION AND APPROVED BY THE CITY.
 5. ON STREET PARKING RESTRICTED TO ONE SIDE OF ROADWAY. PROVIDE NO PARKING SIGNS AS REQUIRED BY THE CITY ENGINEER.



CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

LOCAL CROSS SECTION

FIGURE
ST9



NOTES

1. ACP AND AGGREGATE BASE DEPTHS SHOWN ARE ACCEPTABLE FOR LOCAL STREETS ONLY. ACP AND AGGREGATE BASE DEPTHS SHALL CONFORM TO THE CITY STANDARD OF THE FUTURE ROADWAY CLASSIFICATION AS IDENTIFIED IN THE TRANSPORTATION SYSTEM PLAN.
2. MUNICIPAL CROSS SECTION STANDARD IS INTENDED ONLY FOR A PUBLIC IMPROVEMENT PROJECT CONSTRUCTED BY THE CITY OR OTHER PUBLIC AGENCY WHERE FURTHER IMPROVEMENTS REQUIRED BY THE STANDARD(S) ARE LIKELY TO BE PROVIDED BY DEVELOPMENT OF ADJACENT PROPERTY.
3. SLOPES SHALL BE 3:1 UNLESS APPROVED BY THE CITY ENGINEER.

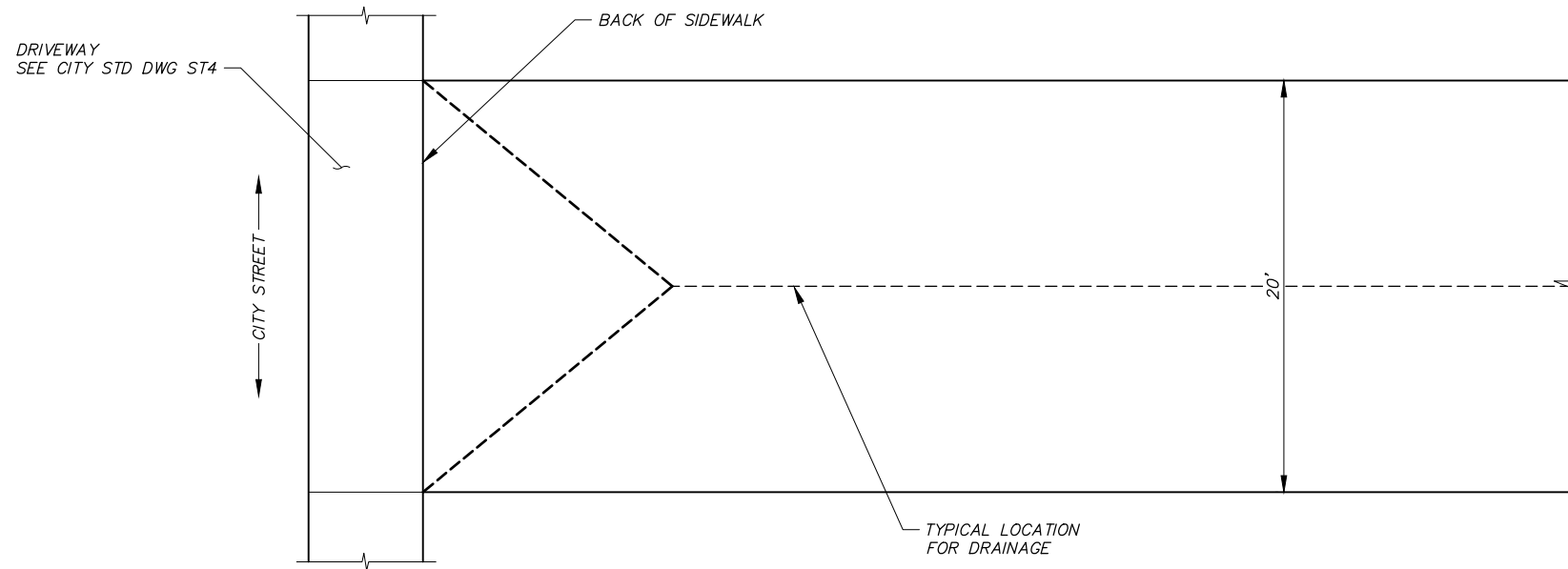


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

MUNICIPAL CROSS SECTION

FIGURE
ST10

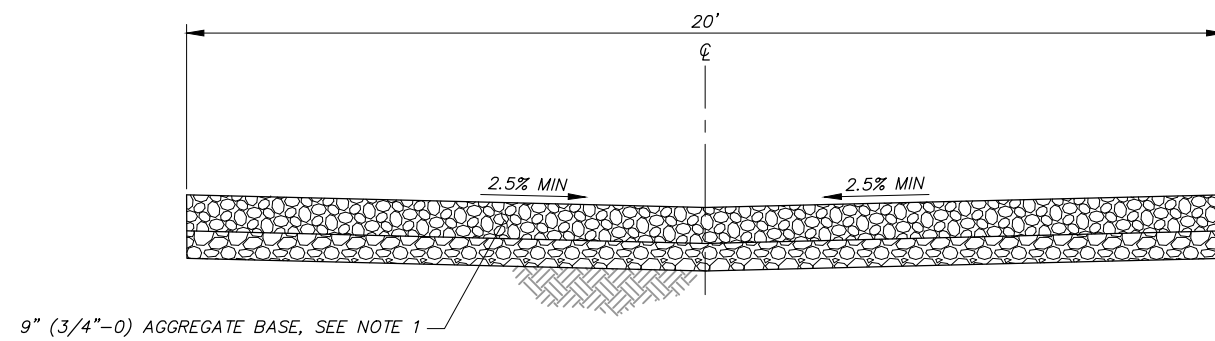
X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_ST11.dwg, Layout 1, 8/21/2025 2:53 PM, agarcia



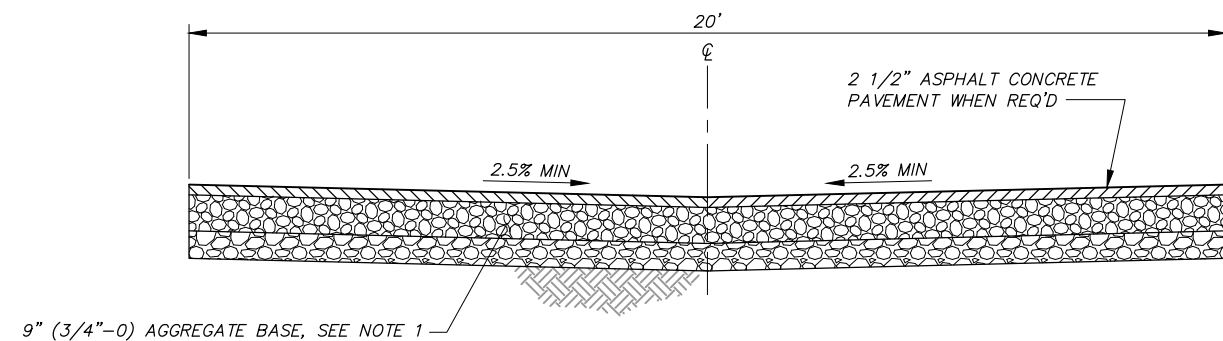
PLAN
NTS

NOTE

1. COMPACT AGGREGATE BASE AND SUBGRADE TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.



UNPAVED SECTION
NTS



PAVED SECTION
NTS

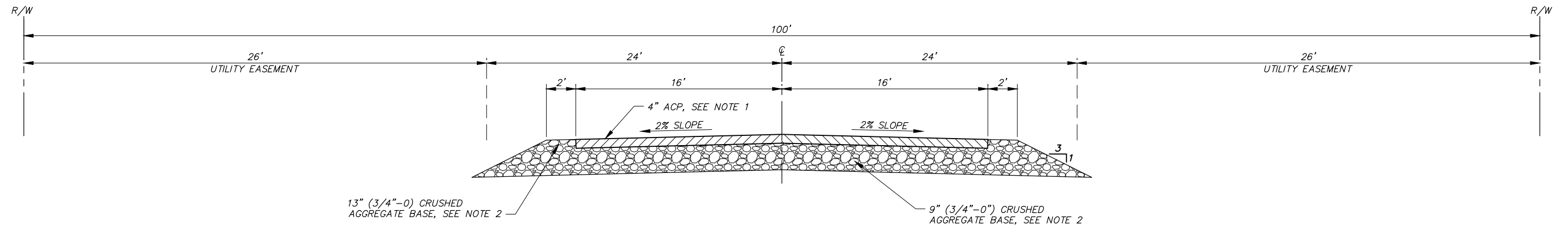


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

ALLEY

FIGURE
ST11

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_ST12.dwg, FIGURE, 8/21/2025 9:32 AM, agarcia



NOTES

1. ASPHALT CONCRETE PAVEMENT SHALL BE CONSTRUCTED IN 2, 2" LIFTS.
2. DEPTH'S OF CRUSHED AGGREGATE BASE SHALL BE CONFIRMED BY A SITE SOILS INVESTIGATION AND APPROVED BY THE CITY.

PAVEMENT SECTION

NTS

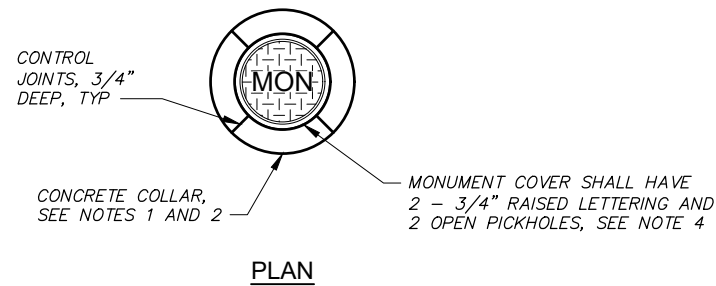


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

PORT OF MORROW ROAD SECTION

FIGURE
ST12

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_ST13.dwg, FIG ST17, 8/21/2025 9:33 AM, agarcia

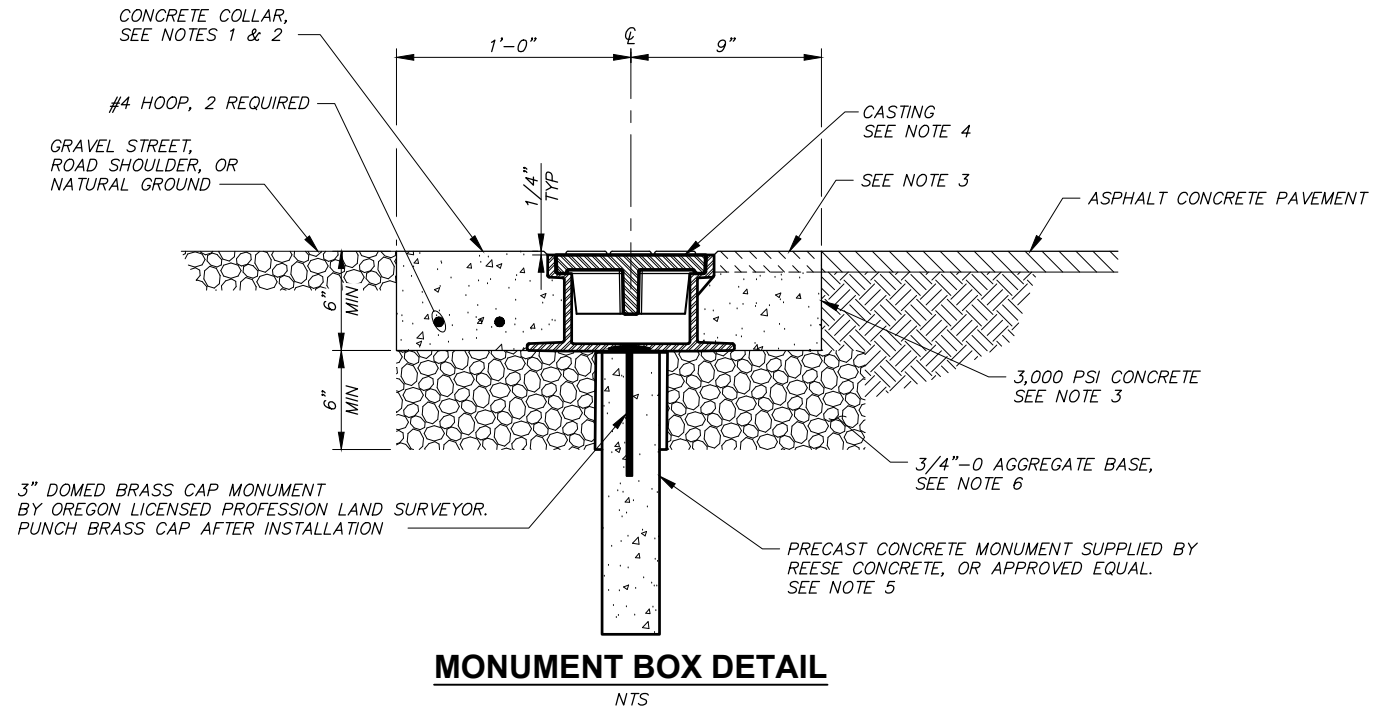


REQUIREMENTS FOR CONCRETE COLLARS

1. ALL CONCRETE SHALL BE COMMERCIAL GRADE 4000 PSI CONCRETE.
2. COLLAR TO BE FORMED CIRCULAR HAVING A DIAMETER OF 18" IN PAVED SURFACES AND 24" OTHERWISE.
3. SMOOTH BROOMED FINISH REQUIRED.
4. APPLY CONCRETE CURING COMPOUND.
5. PROTECT FROM TRAFFIC FOR 4 DAYS MINIMUM.

CONCRETE COLLAR DETAIL

NTS



NOTES

1. CONCRETE COLLAR REQUIRED IF THE MONUMENT AND MONUMENT BOX IS SET AFTER PAVEMENT WORK IS PERFORMED. IF THE MONUMENT AND MONUMENT BOX IS SET PRIOR TO PAVEMENT WORK THEN CONCRETE COLLAR IS NOT REQUIRED. SEE NOTE 3
2. ALL MONUMENTS SHALL HAVE A CONCRETE COLLAR IF INSTALLED ON GRAVEL STREET, ROAD SHOULDER, OR NATURAL GROUND.
3. IF MONUMENTS ARE SET PRIOR TO PAVEMENT WORK, CONCRETE MAY BE LEFT 2" BELOW FINISH GRADE AND FINISHED WITH ACP.
4. CASTING FRAME AND COVER SHALL BE EAST JORDAN PRODUCT #00368004 OR APPROVED EQUAL MEETING AASHTO H20 REQUIREMENTS.
5. PRECAST CONCRETE MONUMENT SHALL BE 5" MINIMUM DIAMETER SCHEDULE 125 PVC PIPE, 18" IN LENGTH, WITH 6" OF #3 REBAR CENTERED BELOW THE BRASS CAP.
6. COMPACT ALL AGGREGATE BASE TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.

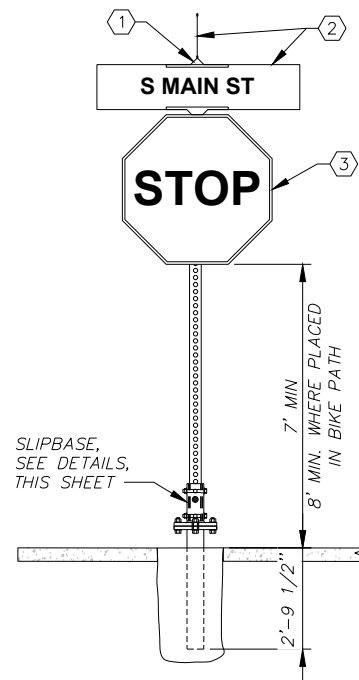


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

MONUMENT BOX

FIGURE
ST13

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_ST14.dwg, ST13, 8/21/2025 2:58 PM, agarcia



KEY NOTES

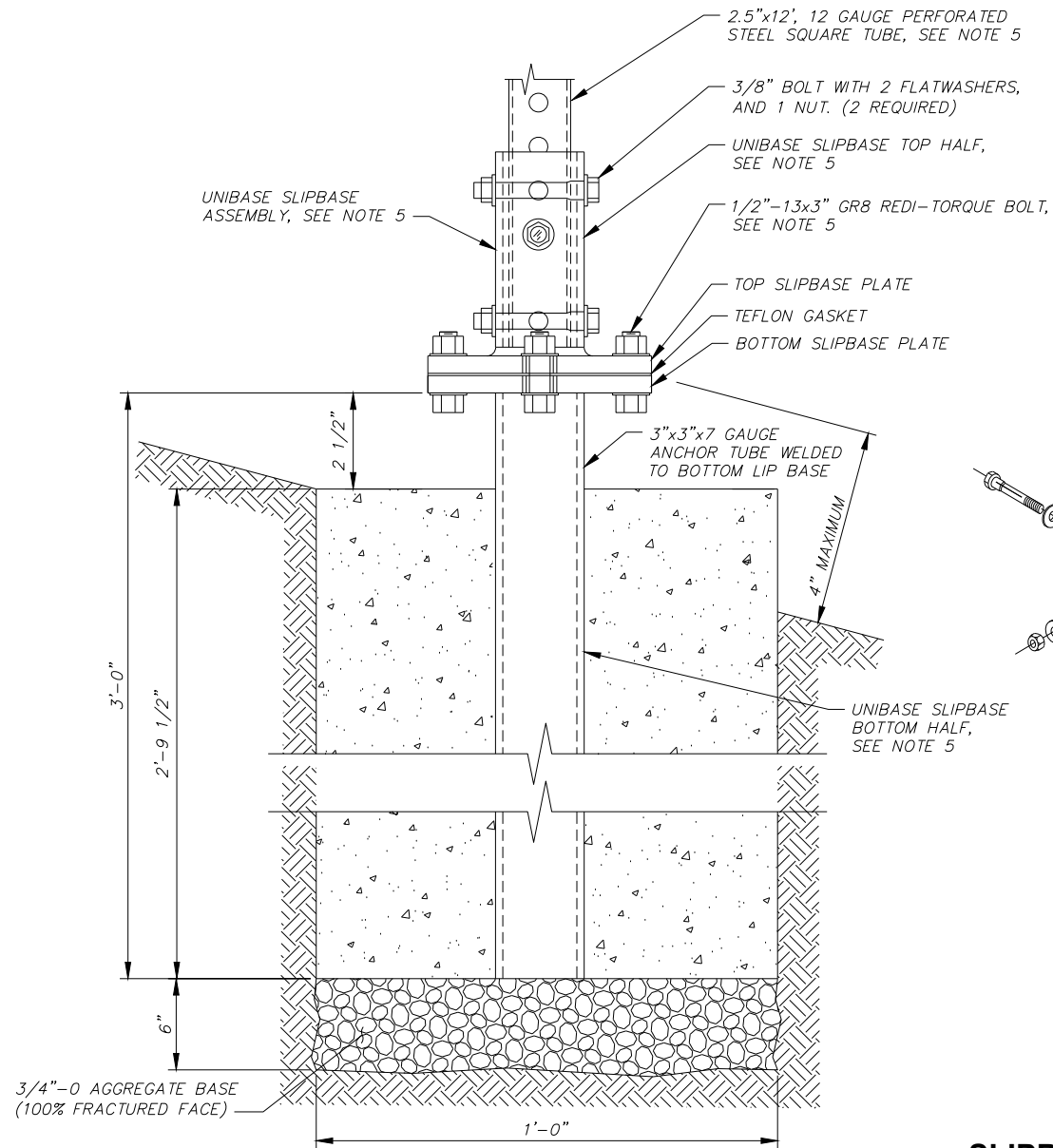
- 1 STREET NAME SIGN BRACKET SHALL BE ZUMAR 90° CROSS BRACKET FOR EXTRUDED BLADE, OR APPROVED EQUAL.
- 2 STREET NAME SIGNS SHALL BE MUTCD SIGN NO. D3-1, OR APPROVED EQUAL (VARIES X 6" MIN). CAPITAL LETTERS SHALL BE 4" IN HEIGHT AND LOWER CASE LETTERS SHALL BE 3" IN HEIGHT.
- 3 STOP SIGN SHALL BE MUTCD SIGN NO. R1-1 (30"X30"), OR APPROVED EQUAL

NOTES

1. STOP SIGN SHALL BE PLACED ON THE RIGHT SIDE OF THE ROADWAY, 4- FEET IN ADVANCE OF THE PROPOSED OR EXISTING CROSSWALK OR AS DIRECTED BY ENGINEER.
2. ORIENT SIGNS TO BEST FIT FIELD CONDITIONS.
3. SIGN SUPPORT SHALL BE PERFORATED STEEL SQUARE TUBE.
4. NO PERIODS SHALL FOLLOW ABBREVIATIONS ON STREET SIGNS.

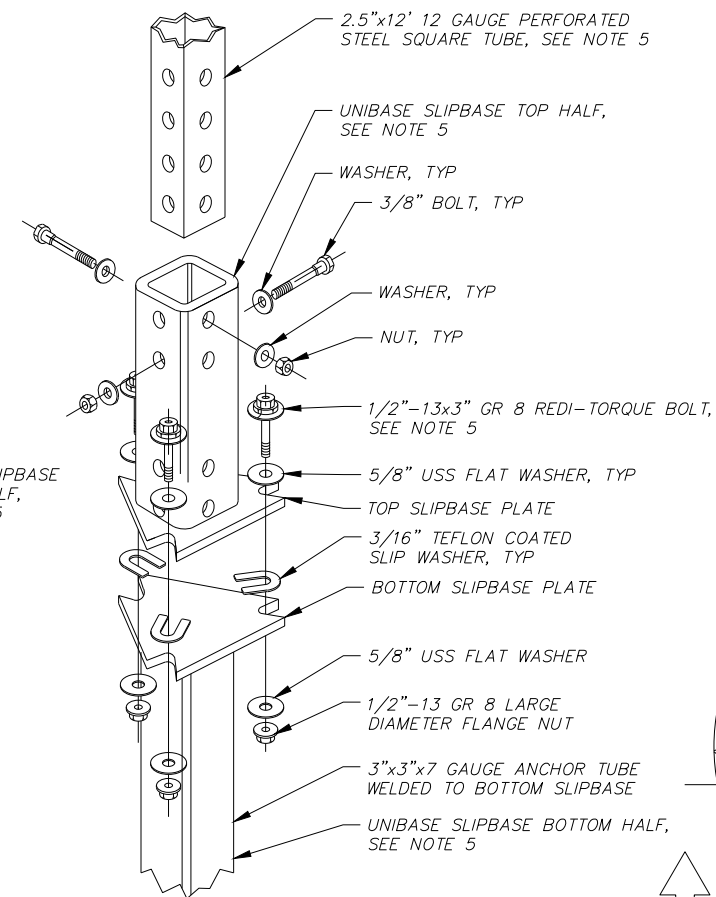
TYPICAL TRAFFIC SIGN

NTS



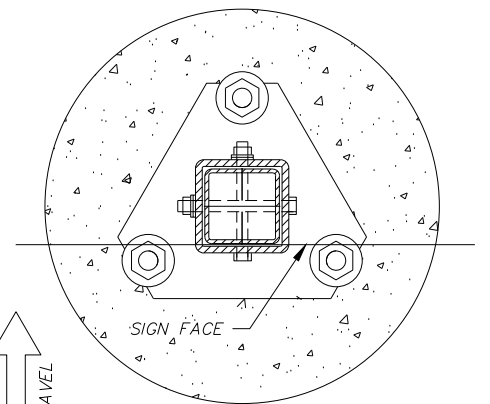
SLIPBASE ELEVATION

NTS



SLIPBASE EXPLODED VIEW

NTS



SLIPBASE PLAN

NTS



NOTES

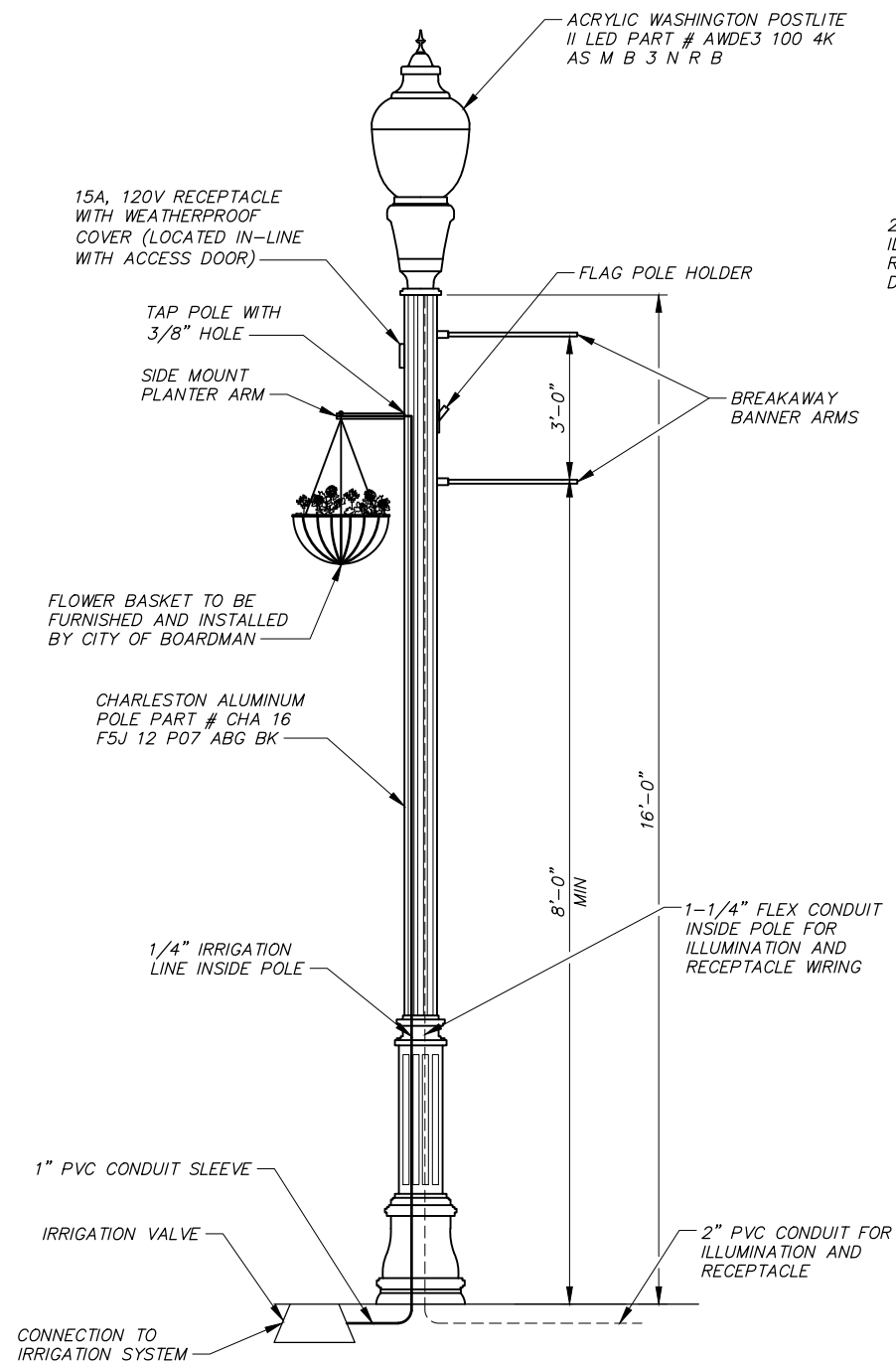
1. MATERIAL GRADE FOR BASE HARDWARE CONNECTION SHALL BE ACCORDING TO THE MANUFACTURER'S RECOMMENDATION AND BASED ON CRASH TESTING.
2. SLIPBASE STEEL SHALL BE HOT DIPPED GALVANIZED OR APPROVED EQUAL.
3. FOOTING CONCRETE SHALL BE COMMERCIAL GRADE 3,000 PSI CONCRETE.
4. ALL SLIPBASES SHALL BE PRE-ASSEMBLED BY THE MANUFACTURER AND SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
5. TRAFFIC SAFETY PART NUMBERS:
 - UNIBASE SLIPBASE ASSEMBLY - KIT-SLIPBASEODOT36
 - UNIBASE SLIPBASE TOP HALF - DP00384
 - UNIBASE SLIPBASE BOTTOM HALF - DP00385
 - 2.5"x12', 12 GAUGE POST - DP00313
 - UNIBASE SLIPBASE REDI-TORQUE MATCH PLATE HARDWARE KIT - DP00387



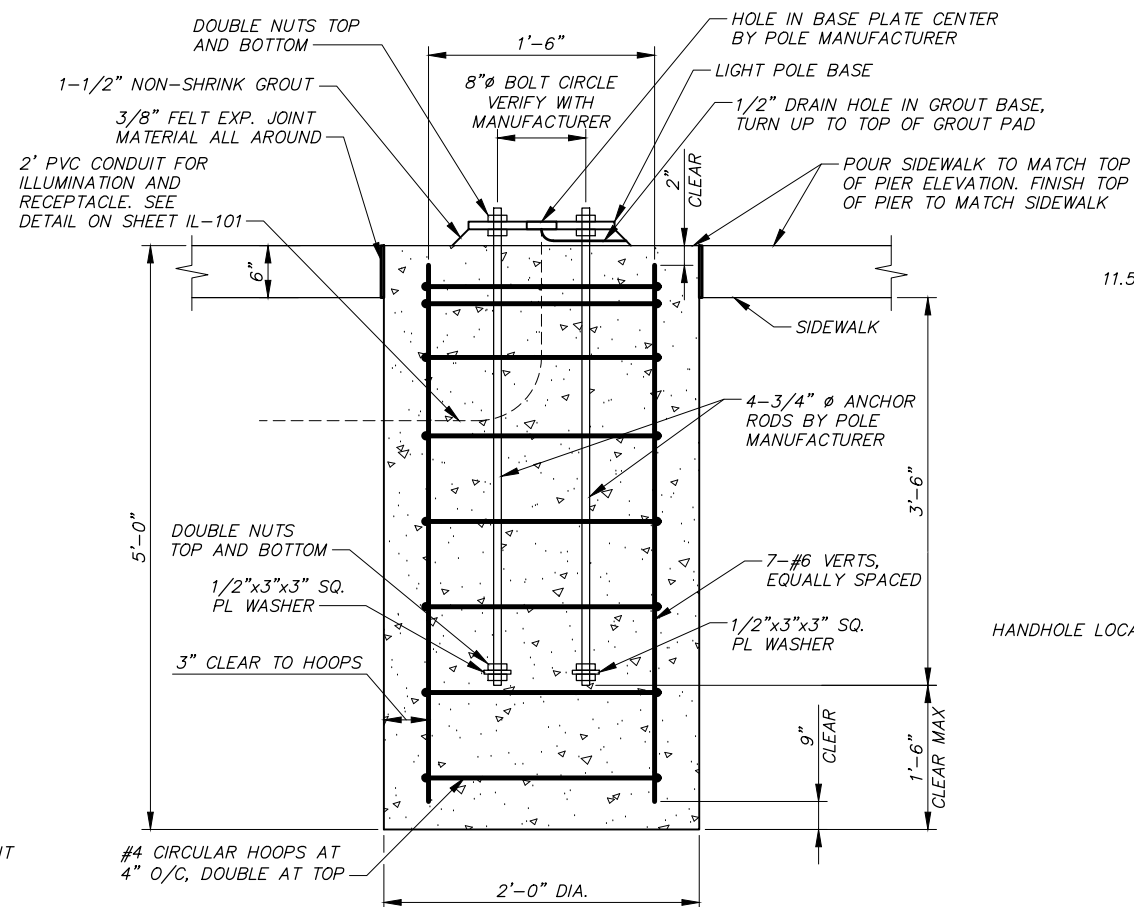
CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

SIGNS

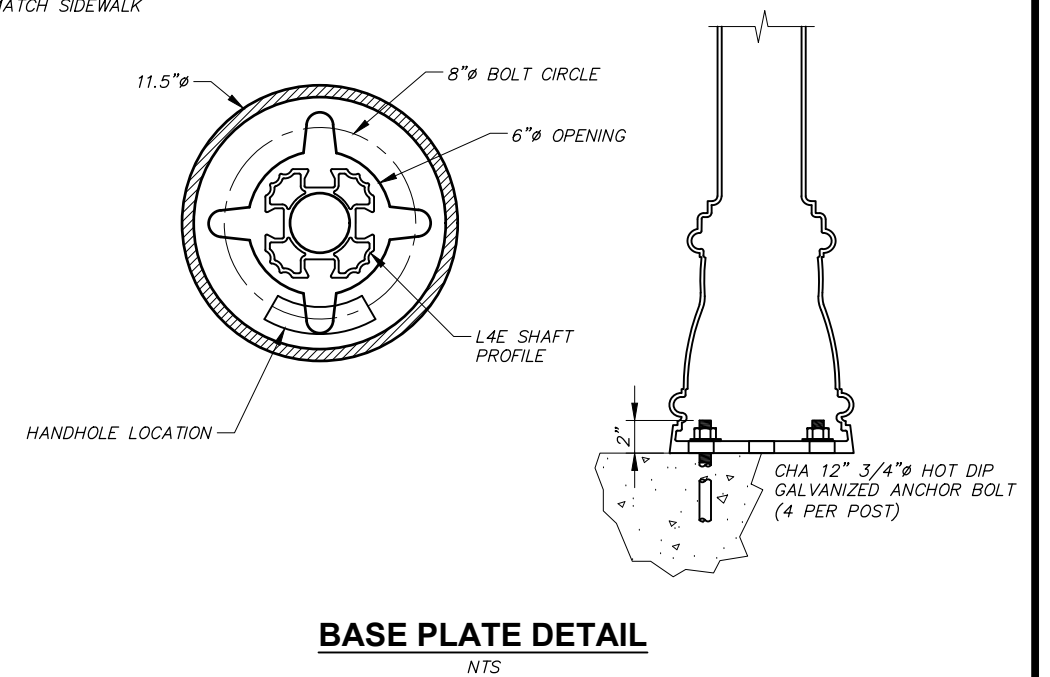
FIGURE
ST14



TYPICAL ORNAMENTAL POST-TOP LIGHT POLE INSTALLATION



ORNAMENTAL LIGHT POLE FOUNDATION DETAIL

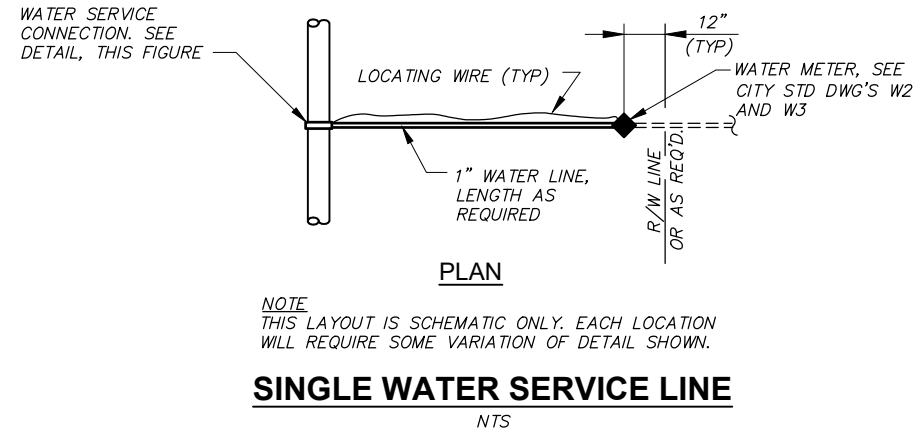
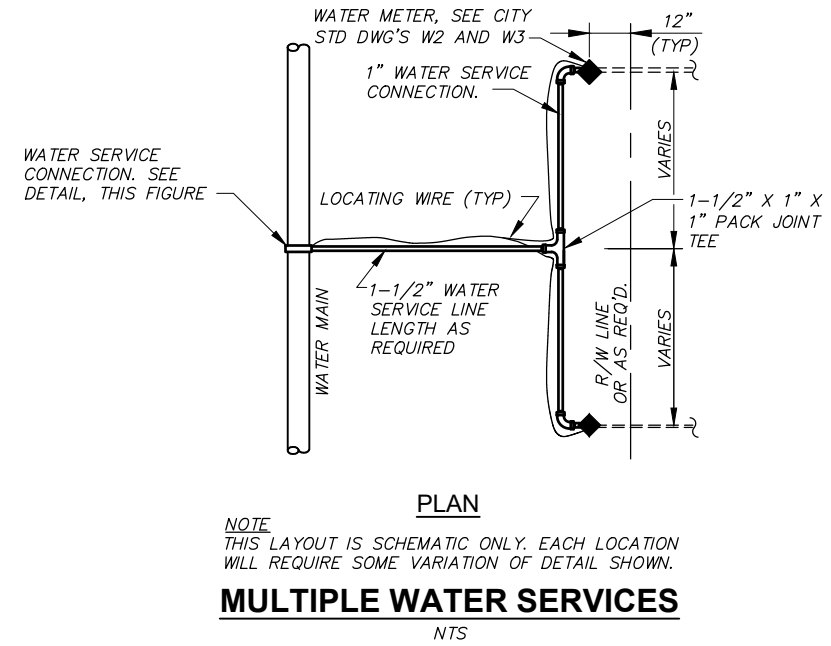
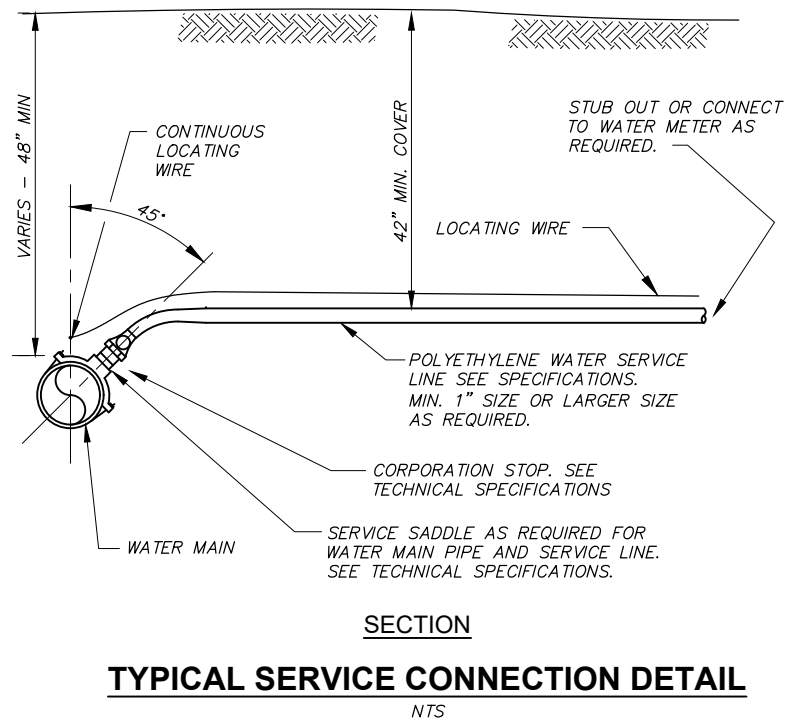


BASE PLATE DETAIL
NTS

NOTES

1. ORNAMENTAL LIGHT SPACING IS 150 FEET MINIMUM AND AT ALL INTERSECTION CORNERS.
2. INSTALLATION OF UMATILLA ELECTRIC COOP LIGHTING IS AN ACCEPTABLE ALTERNATIVE AT MINIMUM 300 FEET SPACING OR AS APPROVED BY THE CITY ENGINEER.

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_W01.dwg, FIGURE, 8/21/2025 9:41 AM, agarcia



CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

**WATER SERVICE LINE
SECTION AND PLAN DETAILS**

**FIGURE
W1**

WATER METER DETAILS 1" OR SMALLER

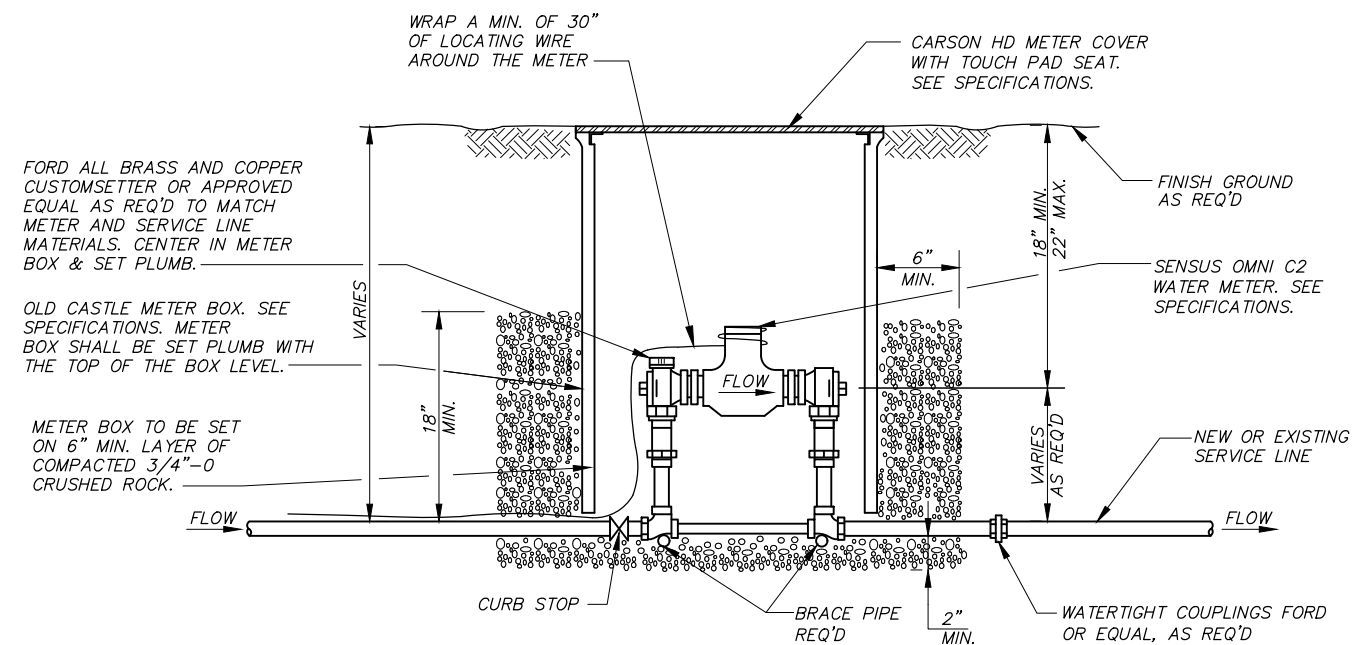
FIGURE
W2



TYPICAL 1" OR SMALLER WATER METER INSTALLATION

NTS

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_W03.dwg, FIGURE, 8/21/2025 9:42 AM, agarcia



NOTE
ALL INSULATION FOR WATER METERS WILL BE COMPLETED BY THE CITY.

TYPICAL 1 1/2" OR 2" WATER METER INSTALLATION
(USING COPPER CUSTOM SETTER)
NTS



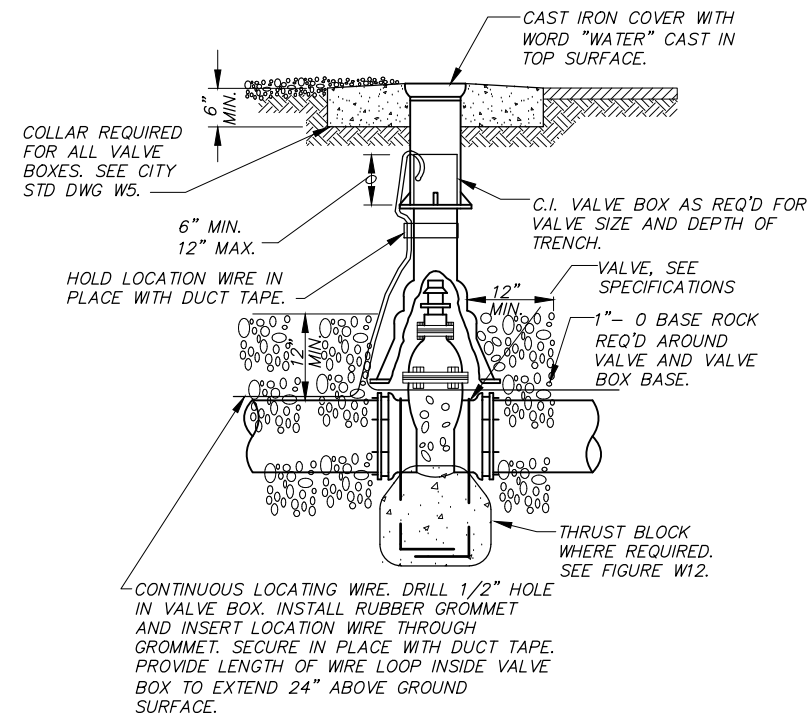
CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER METER DETAILS
1 1/2" OR 2"

FIGURE

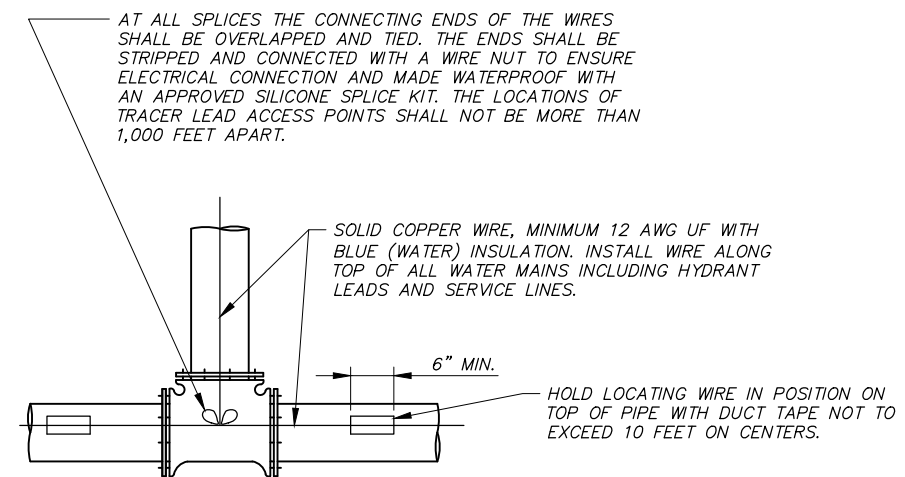
W3

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_W04.dwg, FIGURE, 8/21/2025 9:43 AM, agarcia



VALVE BOX DETAIL

NTS



CONTINUOUS LOCATING WIRE DETAIL

NTS

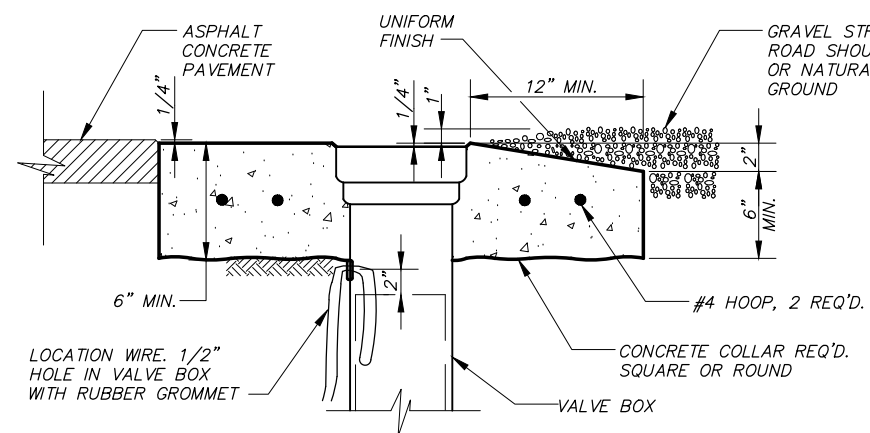


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

**VALVE BOX AND CONTINUOUS
LOCATING WIRE DETAIL**

FIGURE

W4



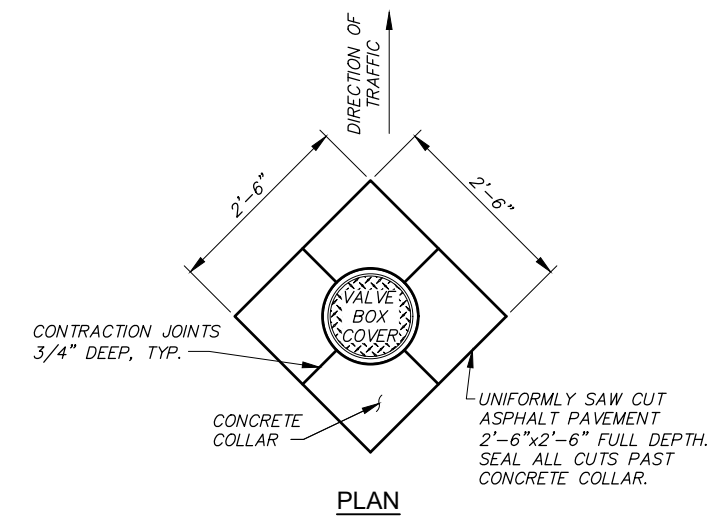
TYPICAL SECTION

REQUIREMENTS FOR CONCRETE COLLARS

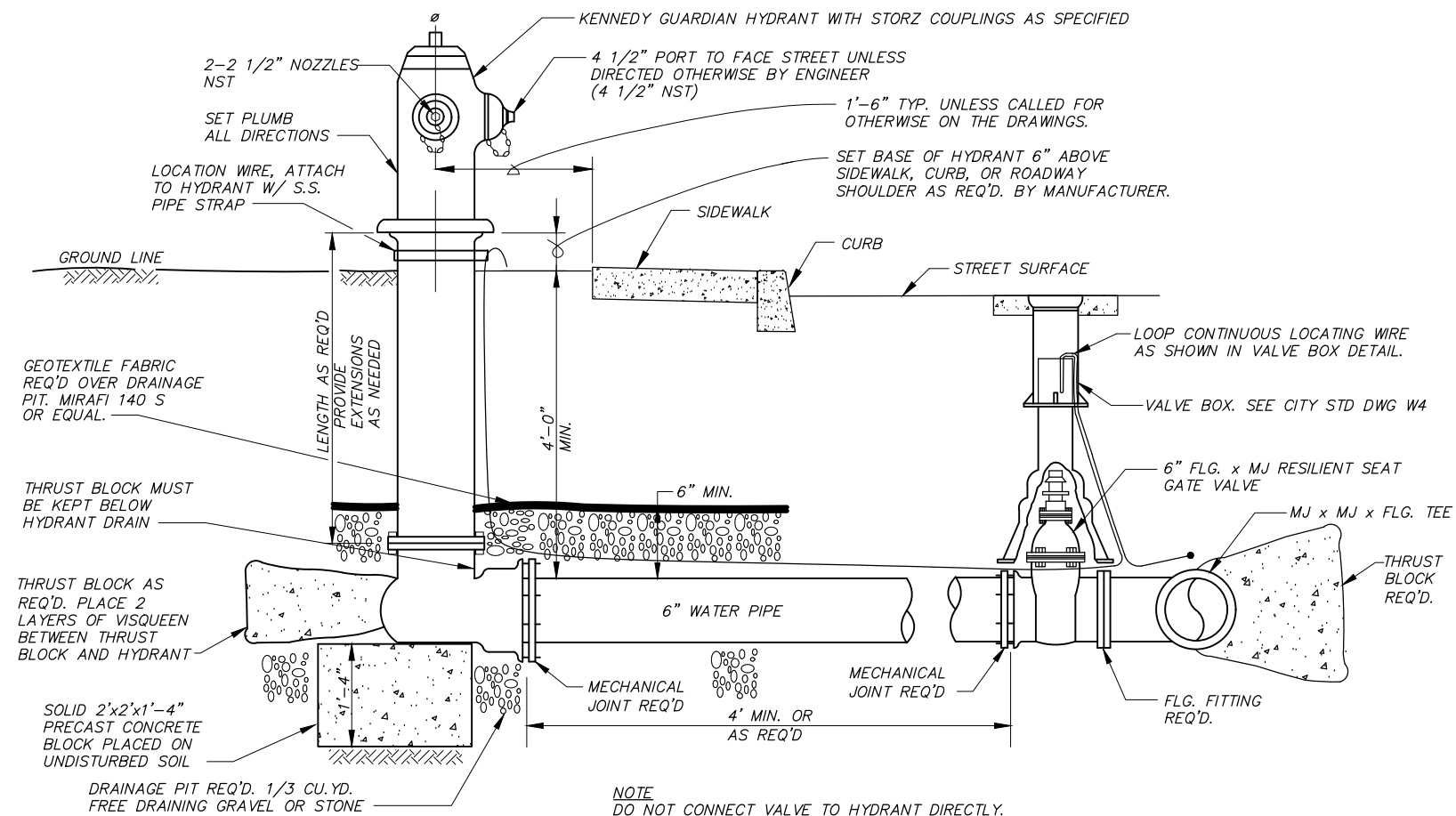
1. CONCRETE : 3/4", 7 SACK, 4000 PSI AT 28 DAYS, 2" TO 4" SLUMP, 4-7% AIR.
2. COLLAR TO BE FORMED AND UNIFORMLY SHAPED.
3. SMOOTH BROOMED FINISH REQUIRED.
4. CONTRACTOR TO STAMP OR TOOL AN ARROW, 6 INCHES IN LENGTH INTO THE CONCRETE COLLAR INDICATING FLOW DIRECTION.
5. APPLY CONCRETE CURING COMPOUND.
6. PROTECT FROM TRAFFIC FOR 4 DAYS MINIMUM.

VALVE CONCRETE COLLAR DETAIL

IN ASPHALT STREETS, GRAVEL STREETS, OR NATURAL GROUND
NTS



X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_W06.dwg, FIGURE, 8/21/2025 9:46 AM, agarcia



FIRE HYDRANT AND AUXILIARY VALVE DETAIL

NTS



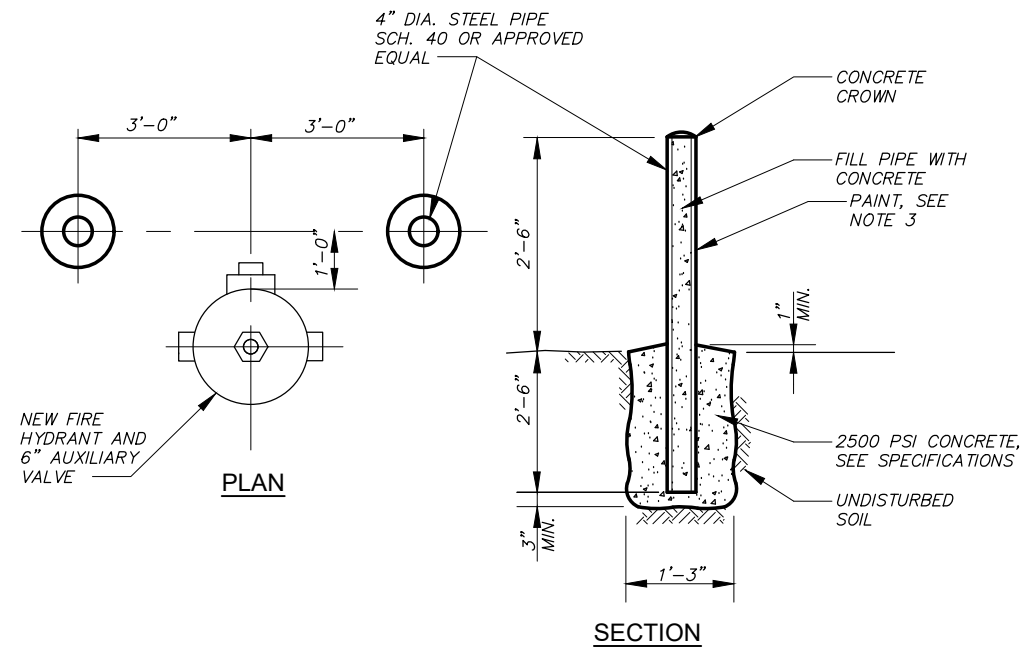
CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

**FIRE HYDRANT AND
AUXILIARY VALVE DETAIL**

FIGURE

W6

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_W07.dwg, FIGURE, 8/21/2025 9:47 AM, agarcia



NOTES

1. 4" DIAMETER STEEL PIPE SHALL BE PLUMB.
2. LOCATE PIPES EQUIDISTANT FROM FIRE HYDRANT.
3. PAINTING SHALL BE DONE ONLY AFTER SURFACE IS FREE OF RUST, OIL, AND GREASE. THE METAL SHALL BE PRIMED AND TWO FINISH COATS, YELLOW IN COLOR APPLIED.

FIRE HYDRANT BARRICADE

NTS



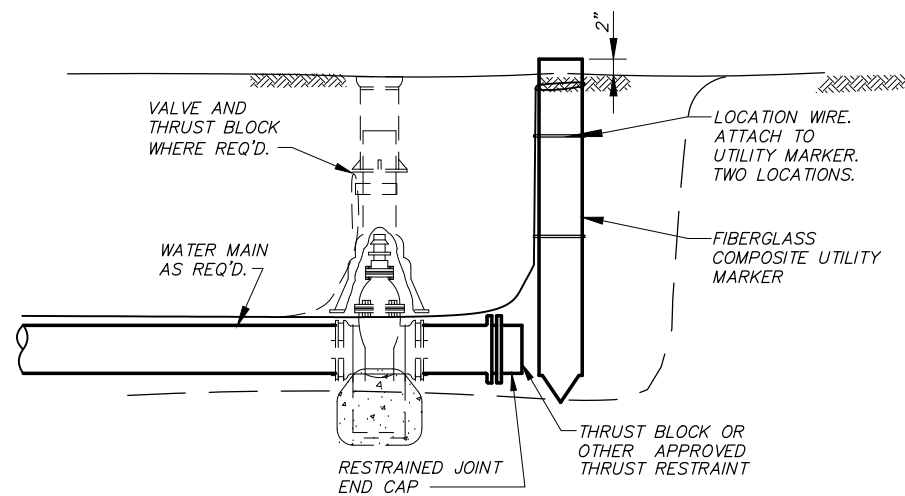
CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

FIRE HYDRANT BARRICADE

FIGURE

W7

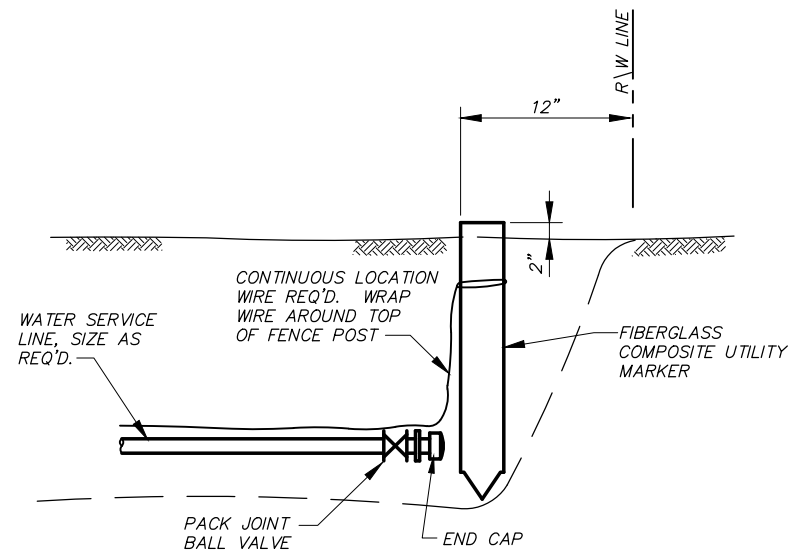
X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_W08.dwg, FIGURE, 8/21/2025 9:49 AM, agarcia



NOTE
THE CONTRACTOR SHALL PROVIDE TWO REFERENCES FROM PERMANENT OBJECTS TO THE END OF WATER SERVICE LINE. THESE TIES SHALL BE SHOWN AND DIMENSIONED ON THE "RECORD DRAWINGS" PREPARED BY THE CONTRACTOR.

TYPICAL WATER MAIN STUB

SECTION
NTS



NOTE
THE CONTRACTOR SHALL PROVIDE TWO REFERENCES FROM PERMANENT OBJECTS TO THE END OF WATER SERVICE LINE. THESE TIES SHALL BE SHOWN AND DIMENSIONED ON THE "RECORD DRAWINGS" PREPARED BY THE CONTRACTOR.

TYPICAL WATER SERVICE LINE STUB

SECTION
NTS

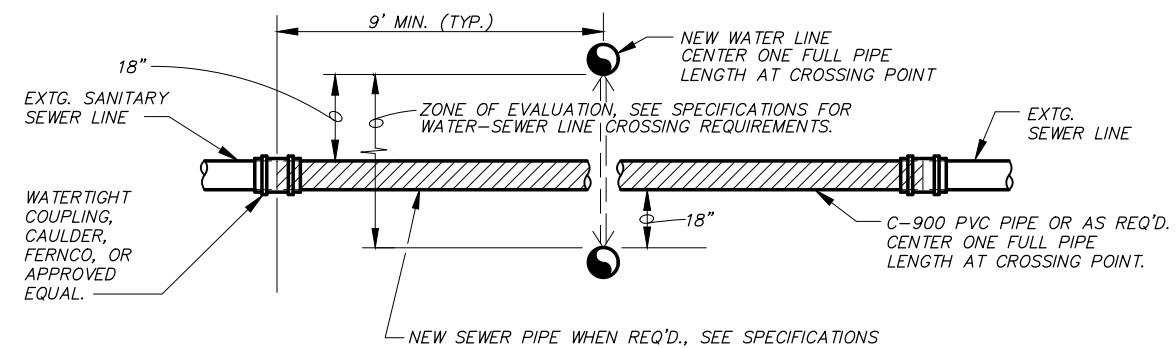


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER MAIN AND SERVICE LINE STUB

FIGURE
W8

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_W09.dwg, FIGURE, 8/21/2025 9:50 AM, agarcia



NOTES

1. PROVIDE SUPPORT BEAM WHEN REQUIRED. SEE SPECIFICATIONS.
2. ALL BACK FILL IN AREA OF WATER-SEWER CROSSING TO A DEPTH 12" ABOVE THE TOP OF THE HIGHEST PIPE SHALL BE 3/4"-0 BASE ROCK COMPACTED TO 95% OF ASTM D-698 LABORATORY DENSITY.

WATER-SEWER CROSSING

NEW WATER LINE CONSTRUCTION

NTS



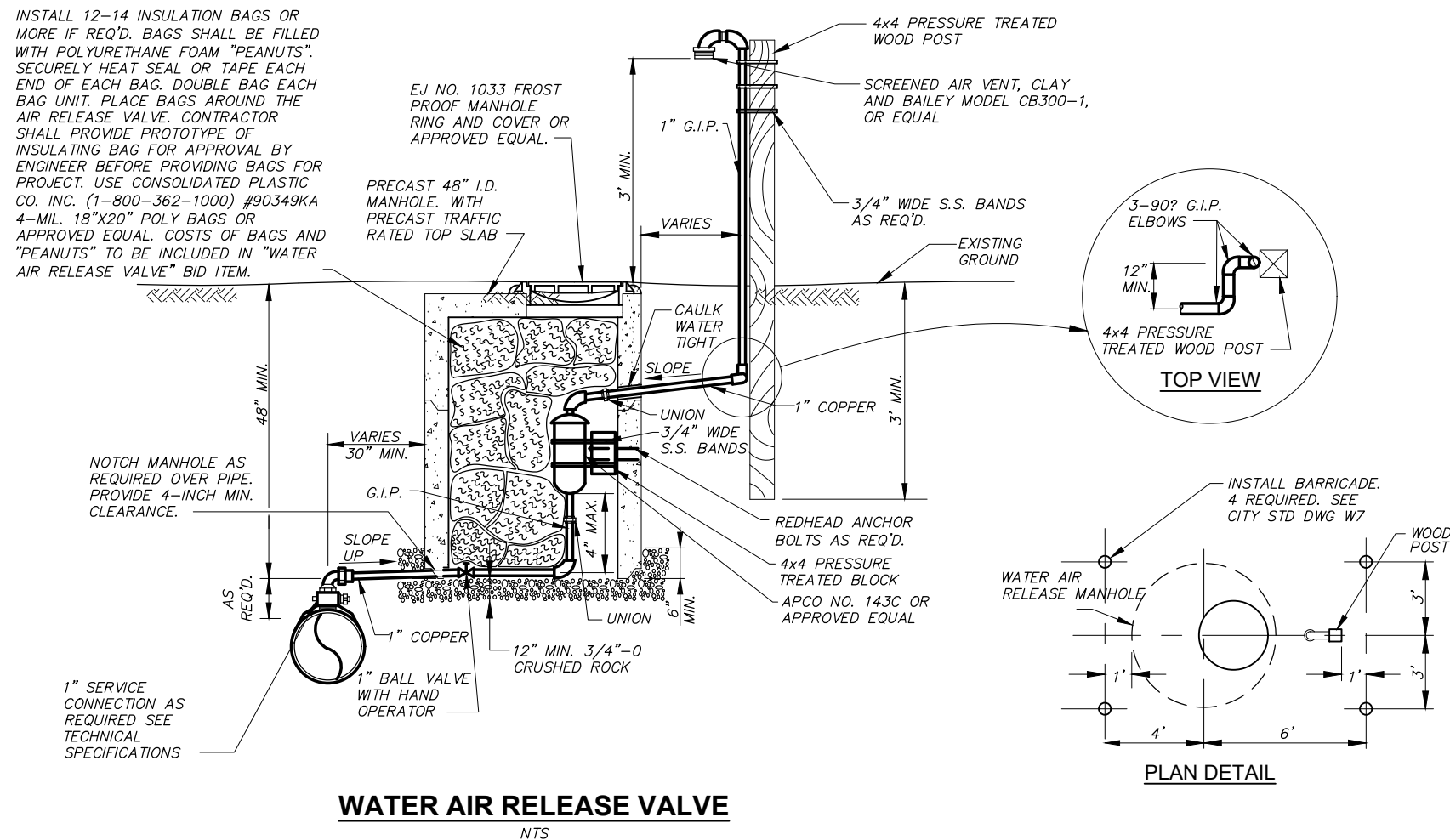
CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER-SEWER CROSSING

FIGURE

W9

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_W10.dwg, FIGURE, 8/21/2025 9:51 AM, agarcia



NOTES

1. ALL AGGREGATE BASE SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY PER ASTM D1557.
2. COMBINATION AIR VALVE ASSEMBLIES SHALL BE INSTALLED AT HIGH POINTS ON TRANSMISSION WATER MAINS. COMBINATION AIR RELEASE ASSEMBLIES NEED NOT BE INSTALLED ON DISTRIBUTION WATER MAINS WHEN A WATER SERVICE LINE IS LOCATED AT THE HIGH POINT ON A WATER MAIN.

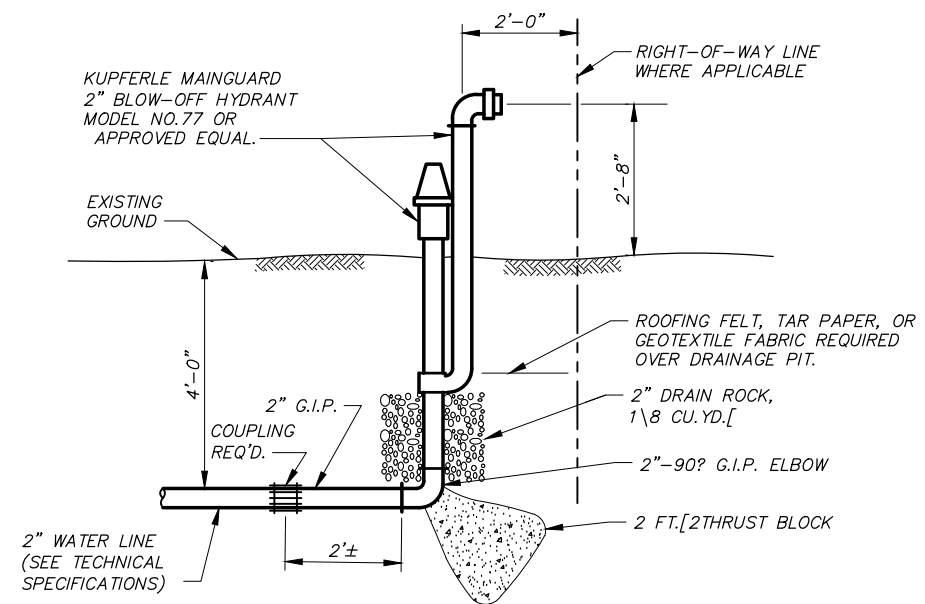


CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER AIR RELEASE VALVE

FIGURE
W10

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_W11.dwg, FIGURE, 8/21/2025 3:27 PM, agarcia



2" WATER LINE BLOW-OFF DETAIL

NTS



CITY OF
BOARDMAN, OREGON
STANDARD DRAWING

WATER LINE BLOW-OFF DETAIL

FIGURE
W11

THRUST BLOCK NOTES

- 1. THRUST BLOCKS SHALL BE REQUIRED AT THE FOLLOWING LOCATIONS:
 - A. ALL CHANGES IN DIRECTION.
 - B. ALL DEAD-ENDS.
 - C. ALL VALVE 10-INCH LARGER (SIZE FOR CLOSED CONDITION).
 - D. AT OTHER LOCATIONS REQUIRED BY THE ENGINEER.
 - E. AT TEMPORARY DEAD ENDS DURING PIPE INSTALLATION AS REQUIRED FOR TEMPORARY PRESSURE TESTING.
 - F. AT OTHER LOCATIONS REQUIRED BY THE CITY.
- 2. THRUST BLOCK SHALL BE SIZED AS REQUIRED BY SOIL CONDITIONS AND DESIGN PRESSURE.
- 3. PLACE CONCRETE AGAINST UNDISTURBED TRENCH WALL.
- 4. CONCRETE SHALL BE 2,500 PSI MINIMUM.
- 5. ALL CONCRETE SHALL BE PLACED SO THAT PIPE, FITTING JOINTS, BOLTS AND NUTS, ETC., WILL BE ACCESSIBLE FOR REPAIRS.
- 6. PLACE TWO LAYERS OF VISQUEEN BETWEEN FITTING AND CONCRETE TO FACILITATE FUTURE REMOVAL OF THRUST BLOCK IF REQUIRED.
- 7. ANCHOR RODS SHALL BE 3/4" DIAMETER GALVANIZED STEEL RODS OR #6 EPOXY COATED REINFORCEMENT BAR, AASHTO M284, HAVING AN 18" MINIMUM EMBEDMENT IN CONCRETE.
- 8. THRUST BLOCKING SHALL BE SIZED FOR 150 PSI WATER PRESSURE
- 9. IF THE REQUIRED BEARING ARE IS LESS THAN 1 SQUARE FOOT, A THRUST BLOCK SHALL NOT BE REQUIRED.

DETERMINATION OF THRUST BLOCK BEARING AREA

WHEN THRUST BLOCK BEARING AREA IS NOT SPECIFIED ON THE PLANS OR DETERMINED BY THE PROJECT ENGINEER, THE FOLLOWING PROCEDURE SHALL BE USED TO DETERMINE REQUIRED BEARING AREA.

- 1. DETERMINE THRUST (T) FOR TYPE OF FITTING OR JOINT AND SIZE OF PIPE, FROM TABLE NO. 1 OR TABLE NO. 3.
- 2. DETERMINE BEARING CAPACITY (B) OF SOIL FROM TABLE NO. 2.
- 3. $A = T - B$

EXAMPLE: DESIGN PRESSURE = 175 PSI
PIPE = 12"
FITTING = TEE
SOIL - SANDY GRAVEL
FROM TABLE NO. 1: T = 15,310 LB.
FROM TABLE NO. 2: B = 3000 LB/FT
 $A = \frac{15,310 \times 1.75}{3,000} = 8.9 \text{ FT}$

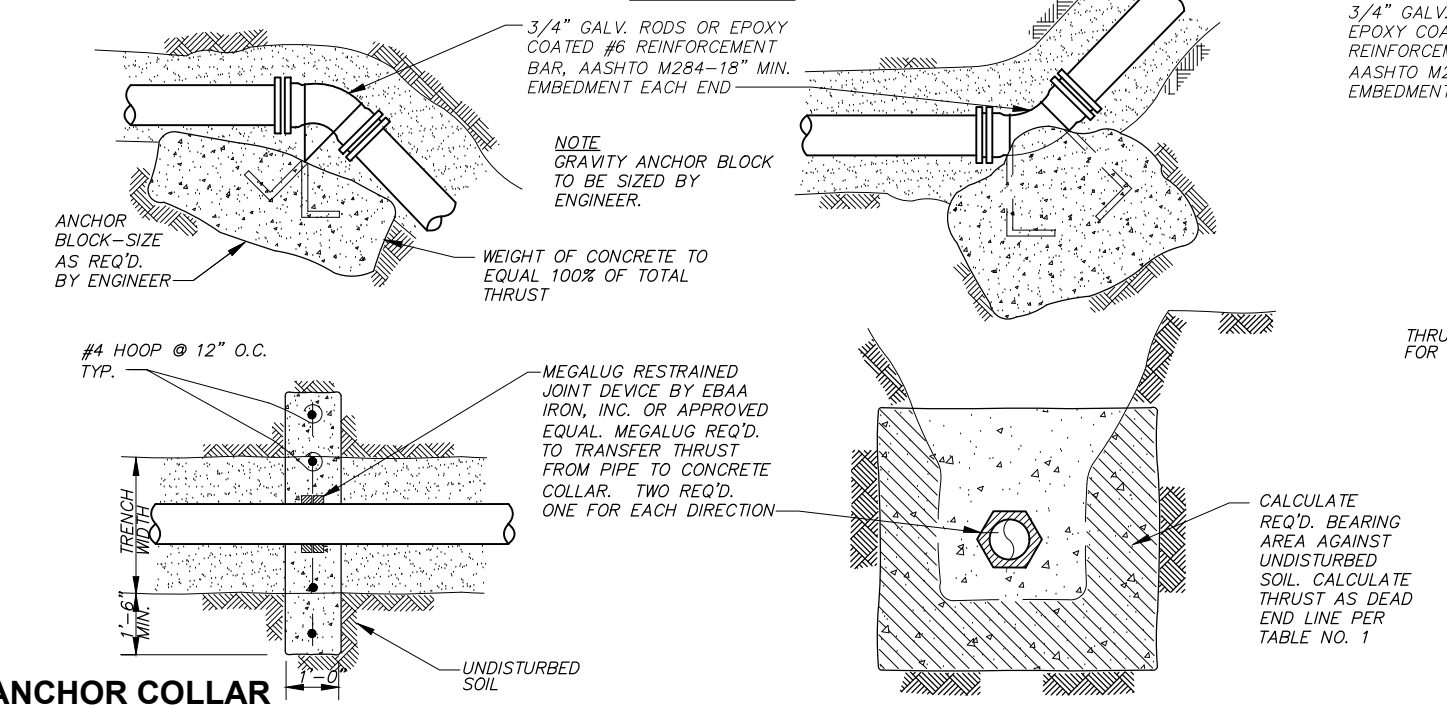
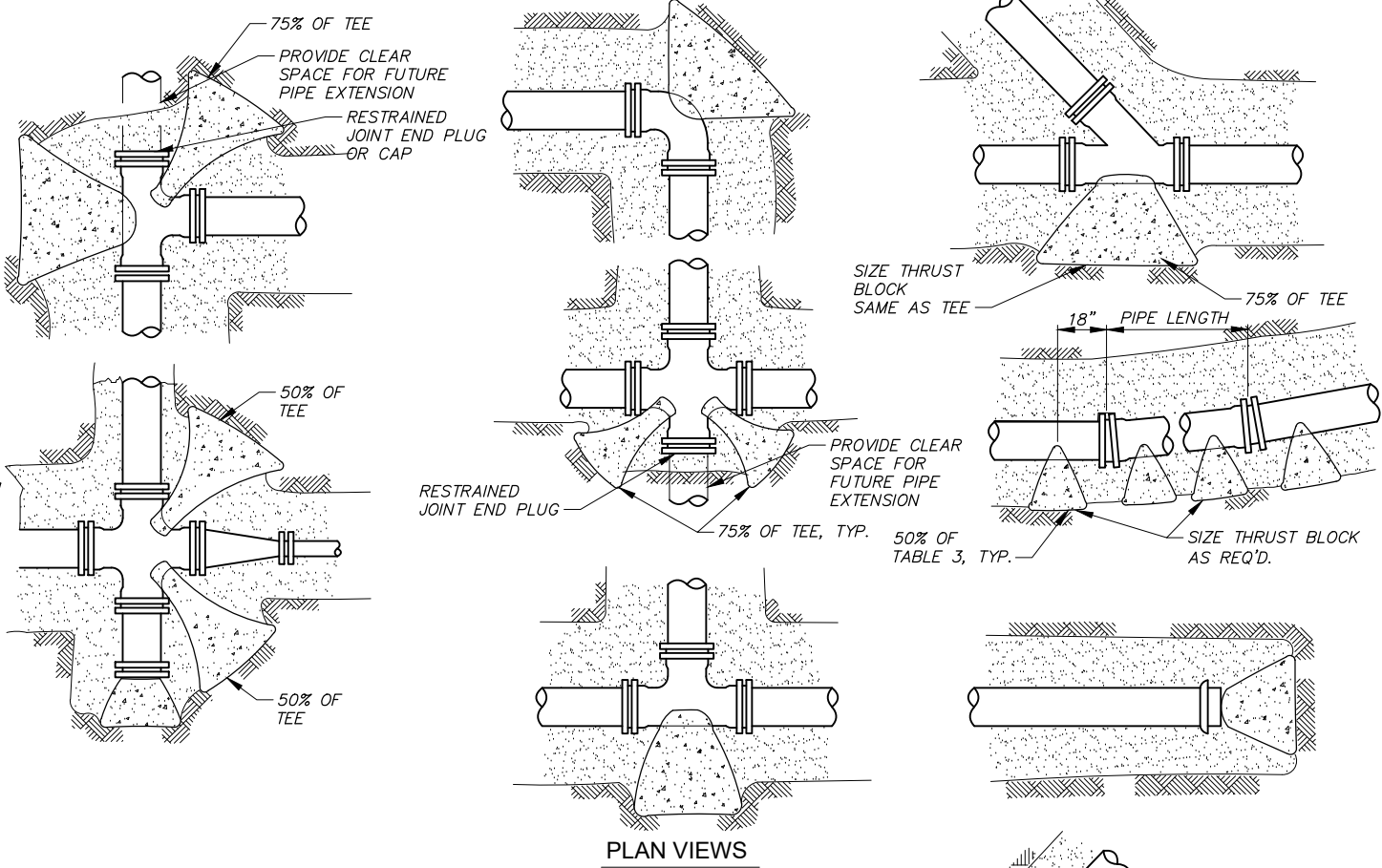
TABLE NO.1
THRUST AT FITTINGS IN POUNDS AT 100 PSI OF WATER PRESSURE

PIPE SIZE	TEES AND DEAD ENDS	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
4"	1,850	2,610	1,420	720	394
6"	3,800	5,370	2,910	1,470	810
8"	6,580	9,300	5,040	2,550	1,372
10"	10,750	15,200	8,240	4,170	2,216
12"	15,310	21,640	11,720	5,940	3,128
14"	20,770	29,360	15,910	8,060	4,241
16"	26,880	38,010	20,590	10,430	5,468
18"	29,865	42,235	22,858	11,653	5,855

NOTE
FOR WATER PRESSURES DIFFERENT THAN 100 PSI, MULTIPLY THRUST FOUND IN TABLE NO. 1 BY REQUIRED PROPORTION.
EXAMPLE: DESIGN PRESSURE = 175 PSI. MULTIPLY VALUE IN TABLE BY 1.75

TABLE NO.2

SOIL	SAFE BEARING LOAD LB/FT ²
SOFT CLAY	500
SILT	1,000
SAND	2,000
SAND AND GRAVEL	3,000
SAND AND GRAVEL CEMENTED WITH CLAY	4,000
HARD CLAY	4,000

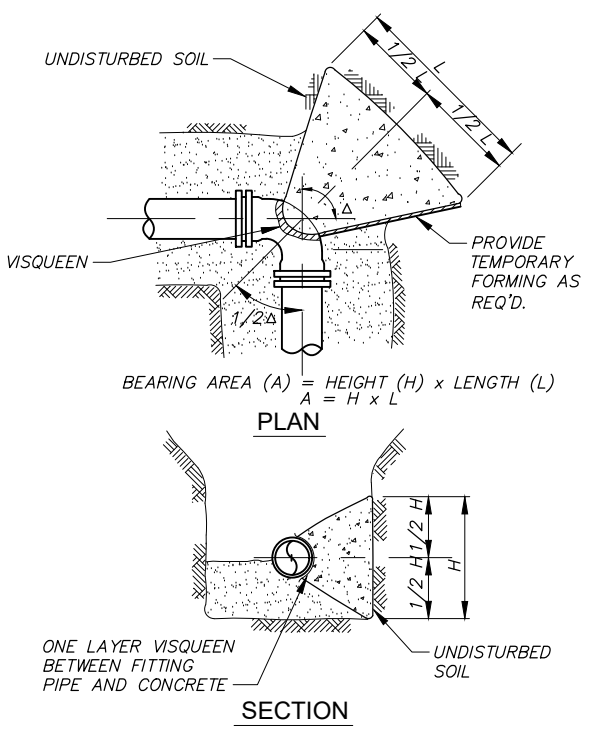


TYPICAL THRUST BLOCK LOCATIONS

TABLE NO.3
SIDE THRUST PER 100 LB./SQ.IN. PRESSURE PER DEGREE OF DEFLECTION

PIPE SIZE	SIDE THRUST-LB	PIPE SIZE	SIDE THRUST-LB
4"	N/A	14	377
6"	N/A	16	486
8"	N/A	18	665
10"	197	20	790
12"	278	24	1,150

MULTIPLY THRUST BY DEGREE OF DEFLECTION TO OBTAIN TOTAL THRUST



TYPICAL THRUST BLOCK DETAILS

- NOTES
- 1. THRUST BLOCK IS NOT REQUIRED WHEN VALVE IS CONNECTED BY A FLANGED OR RESTRAINED JOINT CONNECTION TO ADJACENT FITTING OR PIPE WHICH HAS THE REQUIRED THRUST RESTRAINT.
 - 2. THRUST BLOCK IS NOT REQUIRED ON 8" AND SMALLER VALVES UNLESS CALLED OUT OTHERWISE ON DRAWINGS.



CITY OF BOARDMAN, OREGON
STANDARD DRAWING

THRUST BLOCK DETAILS

FIGURE
W12

X:\Clients\Boardman OR\439-101 Public Works Design Standards Update\CAD\439-101_W12.dwg, FIGURE, 8/22/2025 9:06 AM, agarcia