

# CITY OF BUFFALO, MINNESOTA STANDARD DETAILS

## TYPICAL SECTIONS

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CITY OF BUFFALO, MINNESOTA

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STD. DETAIL

0001

## CITY OF BUFFALO, MINNESOTA STANDARD DETAILS

### SANITARY SEWER

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### MISCELLANEOUS

PLATE #	DETAIL TITLE
9001	CONSTRUCTION LIMITS CONTROL
9002	BOLLARD GUARD POST



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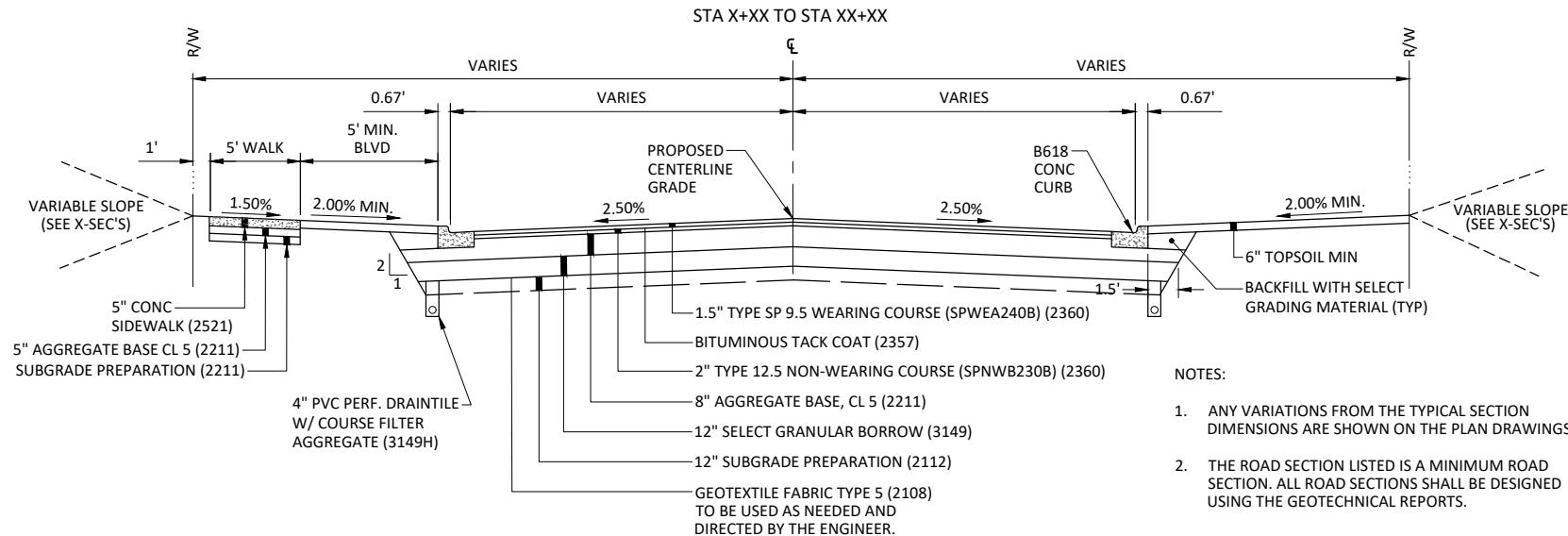
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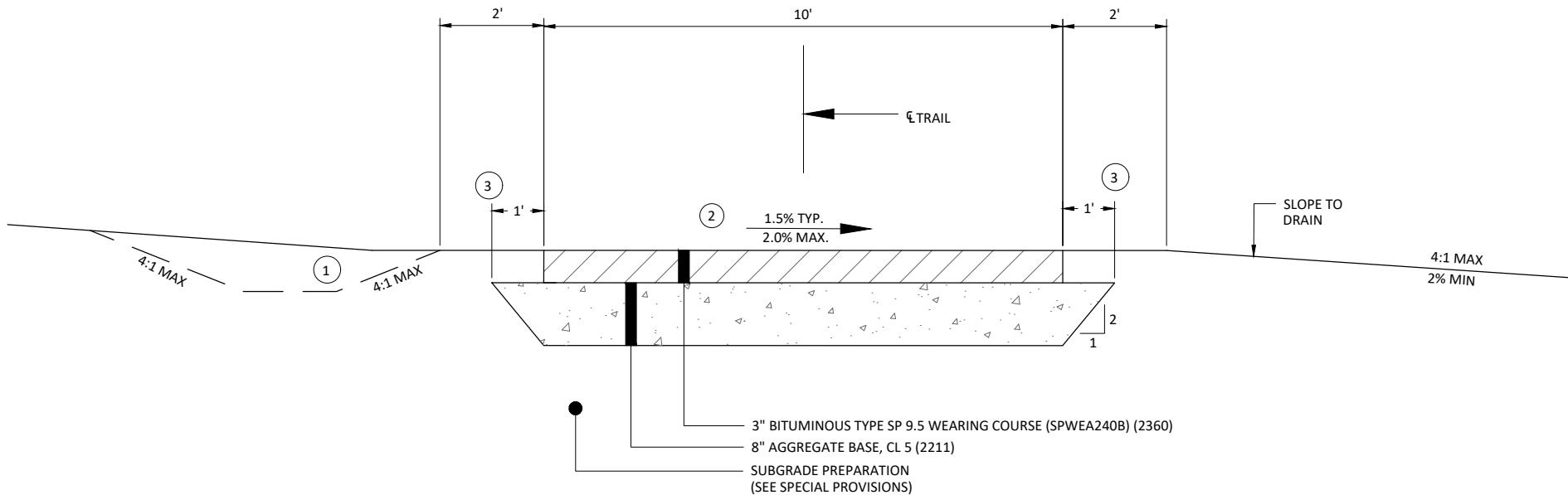
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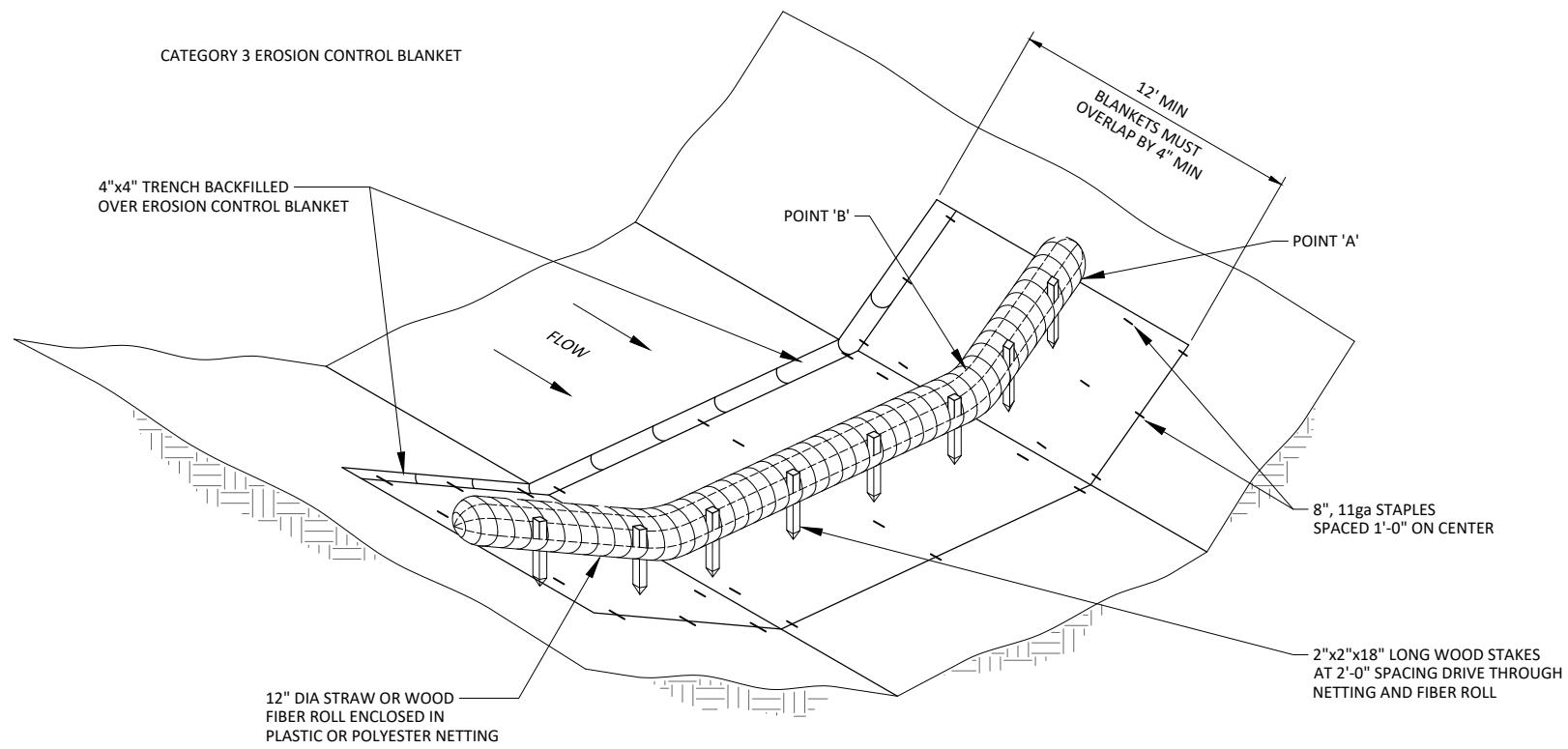
### TYPICAL SECTION



 TYPICAL SECTION  
NEIGHBORHOOD RESIDENTIAL  
NOT TO SCALE



 BITUMINOUS TRAIL  
NOT TO SCALE



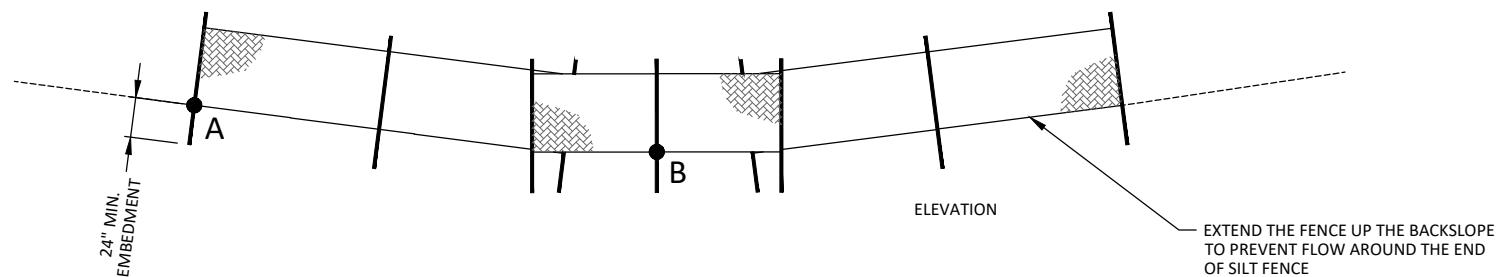
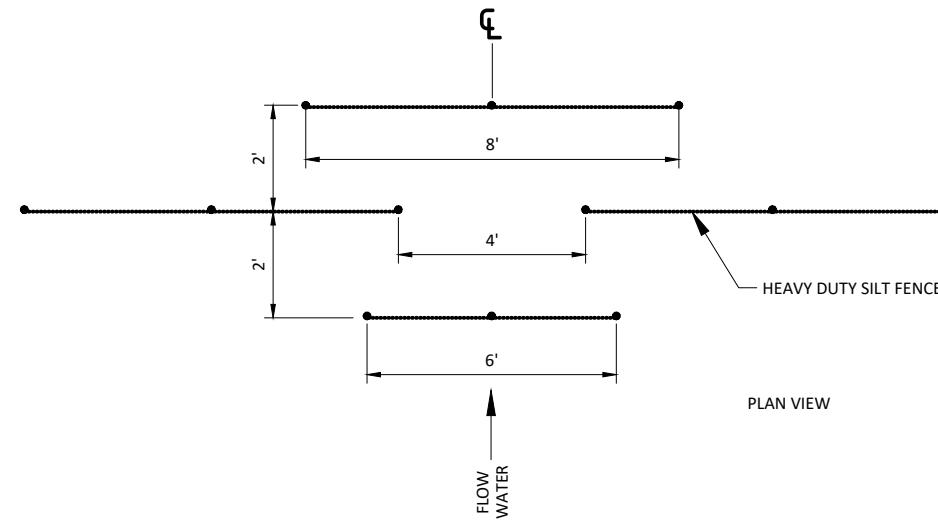
NOTE:  
 POINT 'A' MUST BE 1'-0" MIN HIGHER THAN POINT 'B' TO ENSURE THAT WATER FLOWS OVER THE DITCH CHECK AND NOT AROUND THE ENDS.  
 SHALL BE USED WHEN DITCH GRADIENT IS LESS THAN 3%.

### DITCH CHECK - BIOROLL

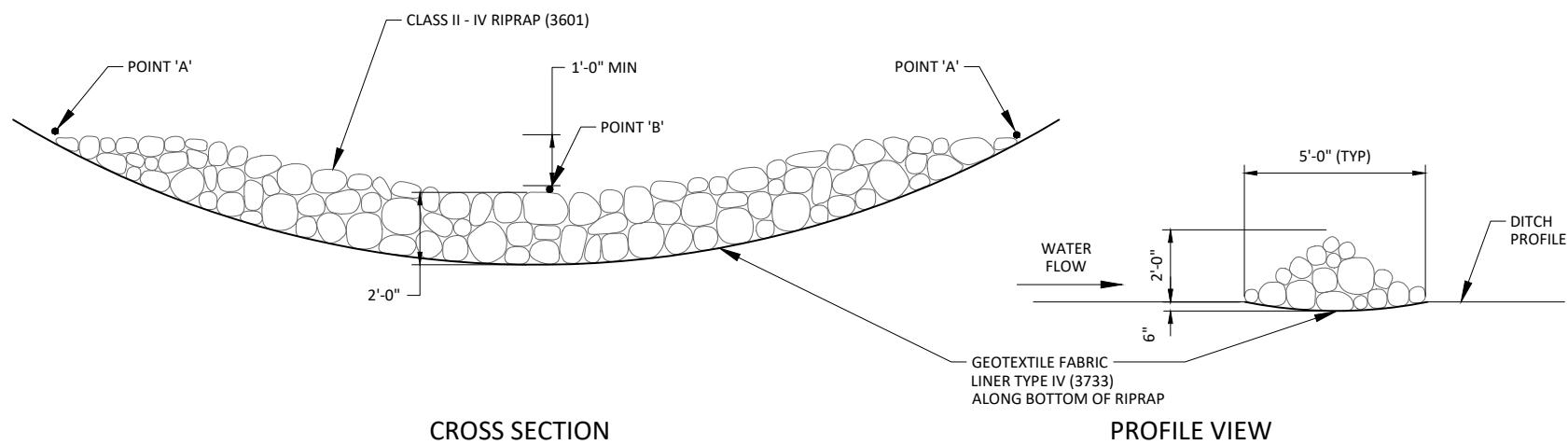
NOT TO SCALE

NOTES:

1. SEE SPECS 2571, 3882, 3885, 3886 & 3889
2. SPACING OF DITCH CHECKS (FT)  
= (HEIGHT OF DITCH CHECK (FT) X 100 / DITCH GRADE IN PERCENT)
3. POINT A MUST BE A MIN OF 12 INCHES HIGHER THAN POINT B TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS
4. HEAVY DUTY SILT FENCE SHALL CONFORM TO THE REQUIREMENTS OF MRDOT SPECIFICATION 3886.
5. WHEN SEDIMENT BUILD UP REACHES 8 INCHES OR  $\frac{1}{3}$  OF SILT FENCE HEIGHT, THE SILT FENCE MUST BE CLEANED OUT OR REPLACED.
6. DIMENSIONS SHOWN ARE FOR TYPICAL 8' DITCH BOTTOM, MODIFICATIONS MAY BE NECESSARY FOR VARYING SLOPES AND DITCH WIDTHS



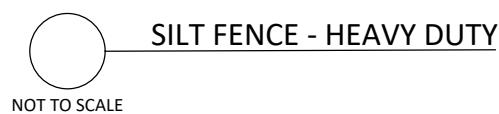
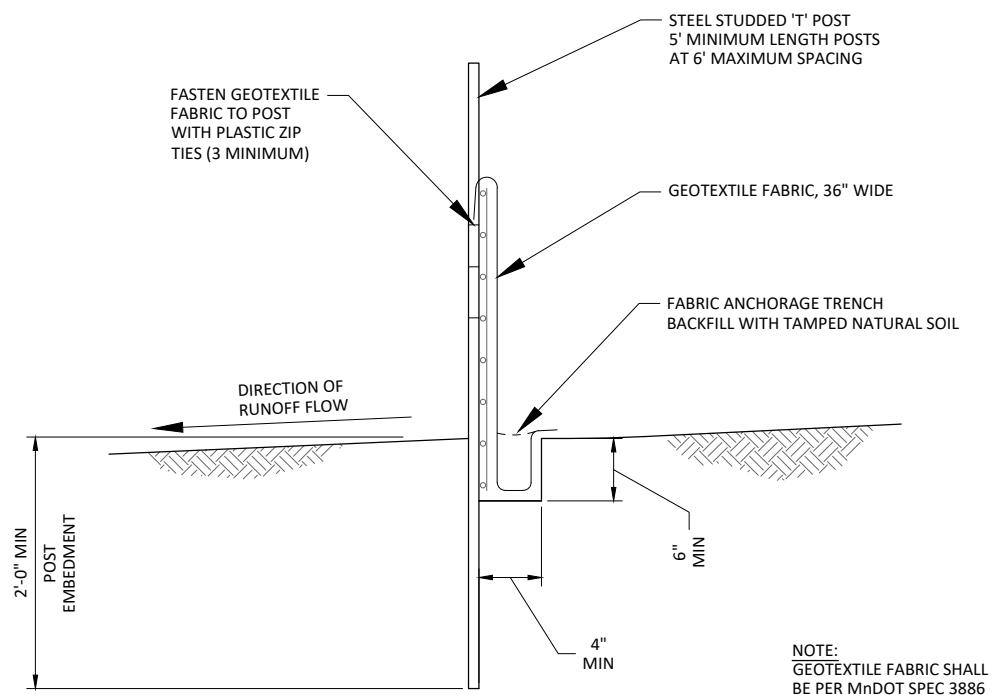
VELOCITY CHECK  
HEAVY DUTY SILT FENCE  
NOT TO SCALE



NOTE:

1. ROCK DITCH CHECK SHALL BE REMOVED FROM THE CLEAR ZONE AFTER SEEDING OR TURF IS ESTABLISHED AND PRIOR TO FINAL ACCEPTANCE
2. POINT 'A' MUST BE 1'-0" MINIMUM HIGHER THAN POINT 'B' TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
3. SEE SPECS. 2573, 3882, 3885, 3886 & 3889.
4. SPACING BETWEEN EACH DITCH CHECK SHALL BE DETERMINED FROM THE SPACING FORMULA:  
4.1. SPACING OF DITCH CHECKS (FT) =  
(HEIGHT OF DITCH CHECK (FT)X100/DITCH CHECK GRADE IN PERCENT).

DITCH CHECK - RIPRAP  
(TYPE 7 SPEC. 3889)  
NOT TO SCALE



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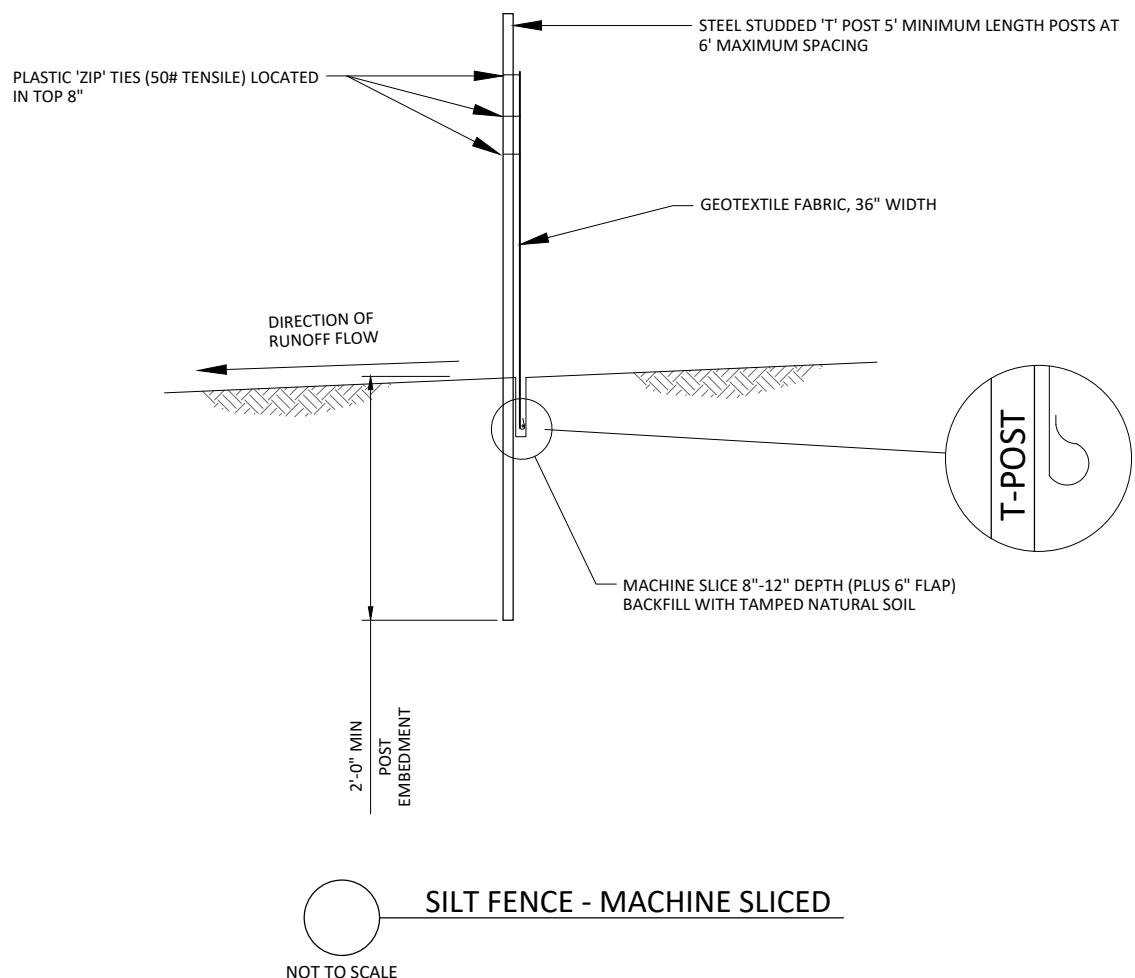
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SILT FENCE HEAVY DUTY

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STD. DETAIL  
3003



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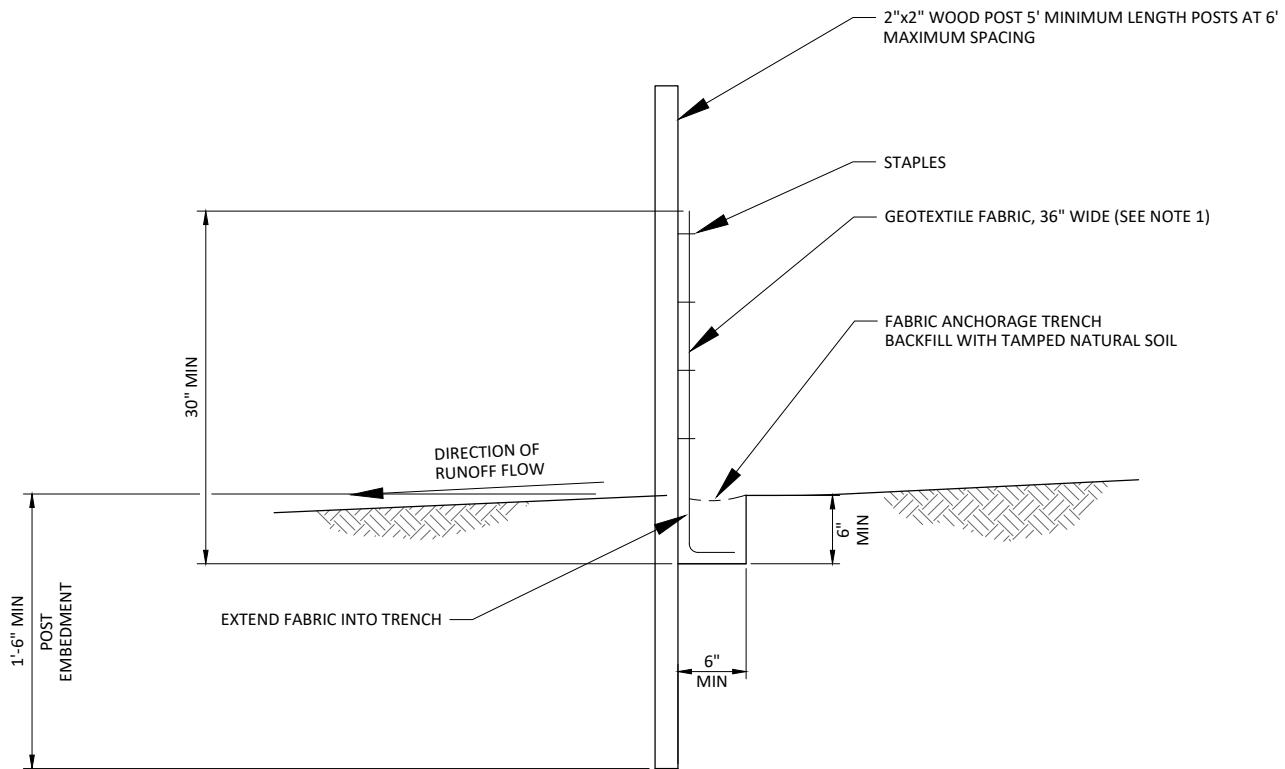
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SILT FENCE - MACHINE SLICED

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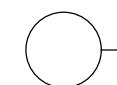
STD. DETAIL

3004



NOTE:

1. GEOTEXTILE FABRIC SHALL BE PER MnDOT SPEC 3886
2. ONLY TO BE USED WHEN MACHINE SLICED CANNOT BE INSTALLED.



SILT FENCE - PREASSEMBLED

NOT TO SCALE



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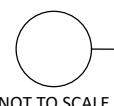
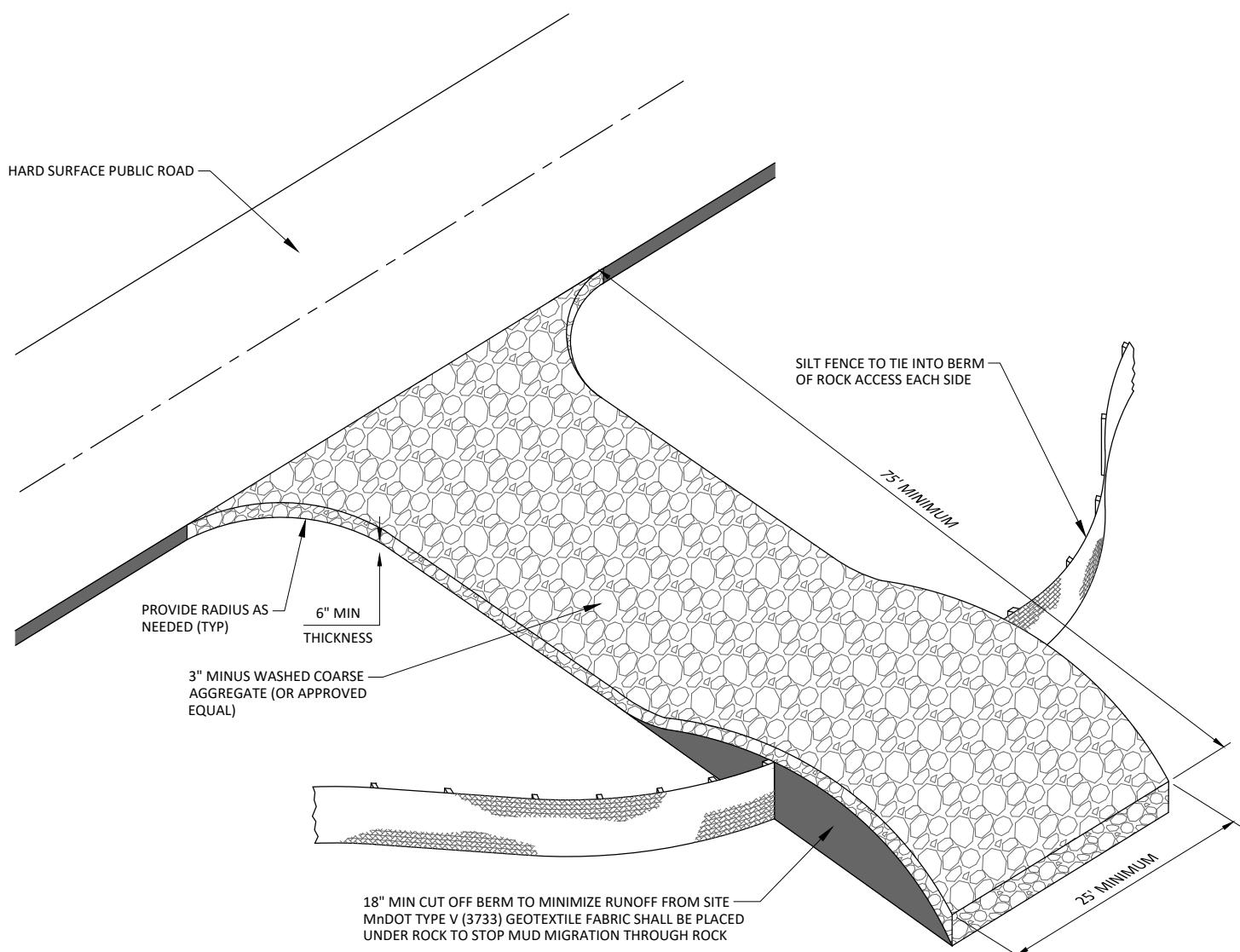
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SILT FENCE - PREASSEMBLED

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3005



### ROCK CONSTRUCTION ENTRANCE

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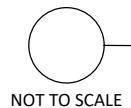
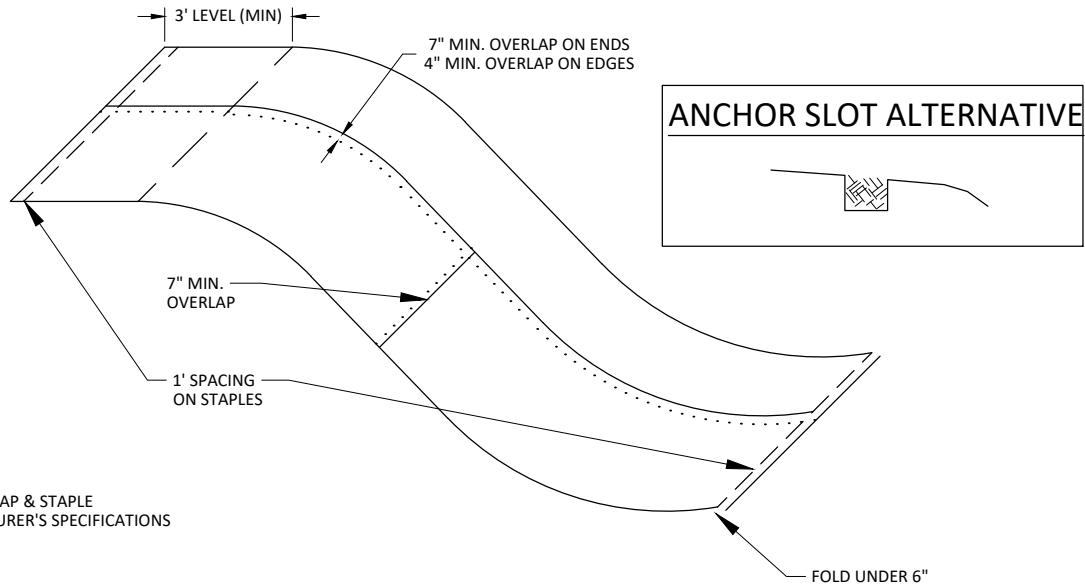
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ROCK CONSTRUCTION ENTRANCE

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STD. DETAIL

3006



### EROSION CONTROL BLANKET INSTALLATION

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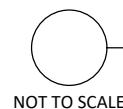
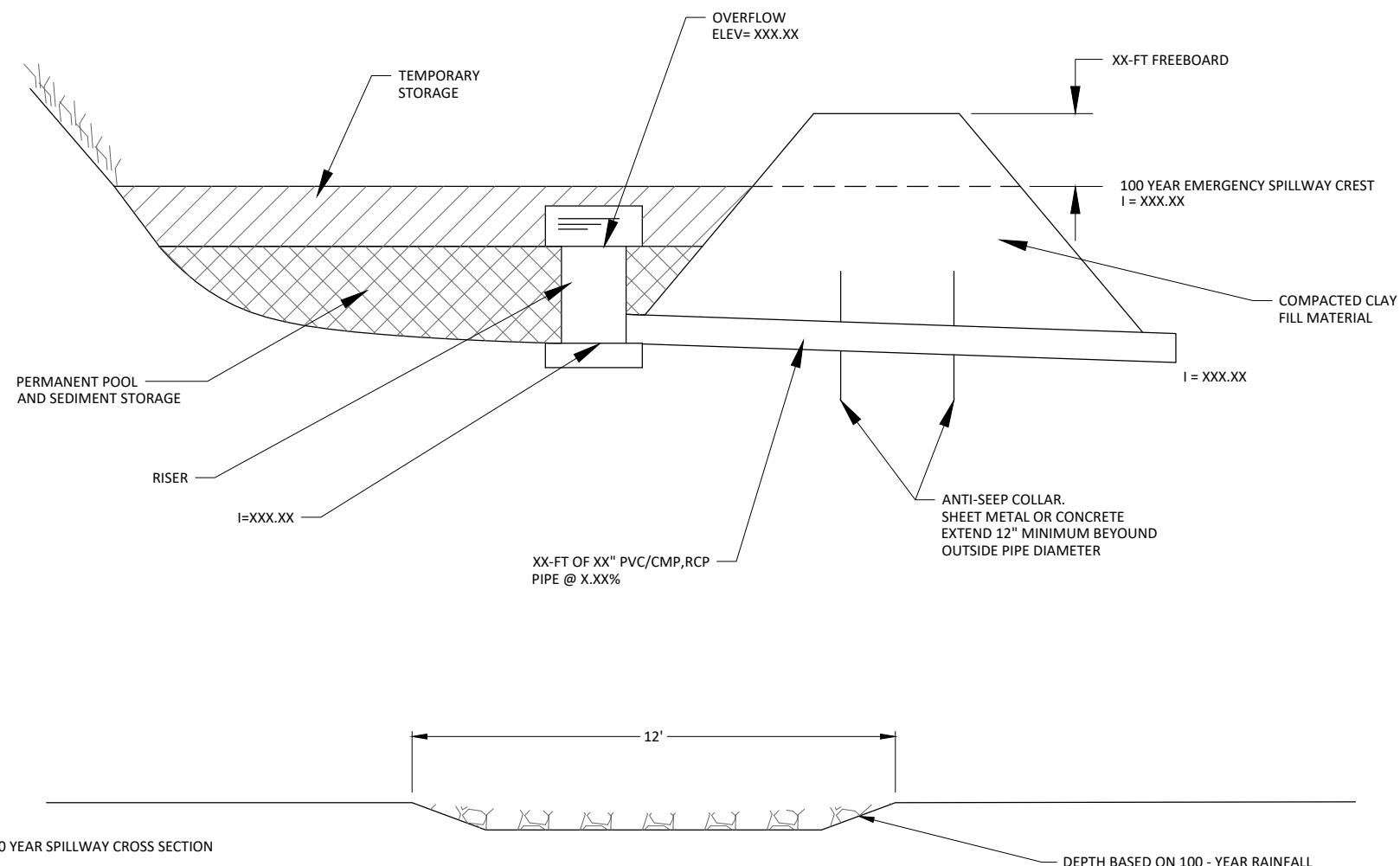
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EROSION CONTROL BLANKET INSTALLATION

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STD. DETAIL  
3007



### TYPICAL SEDIMENT BASIN CROSS SECTION

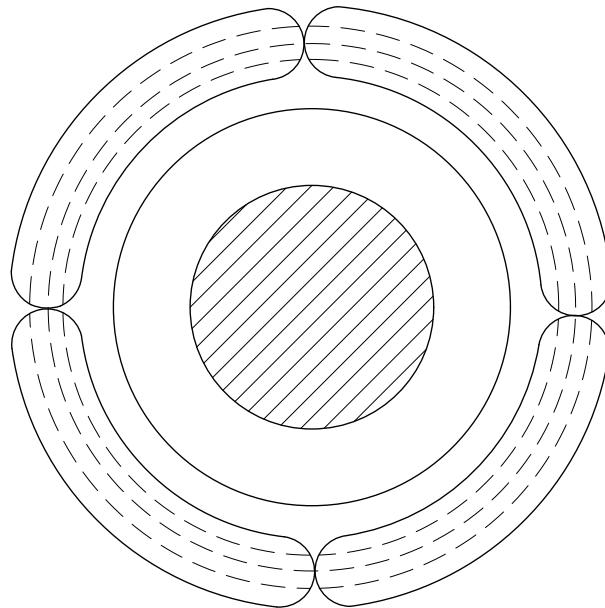
NOT TO SCALE

NOTE: SEE PLANS FOR SEDIMENT BASIN GRADING

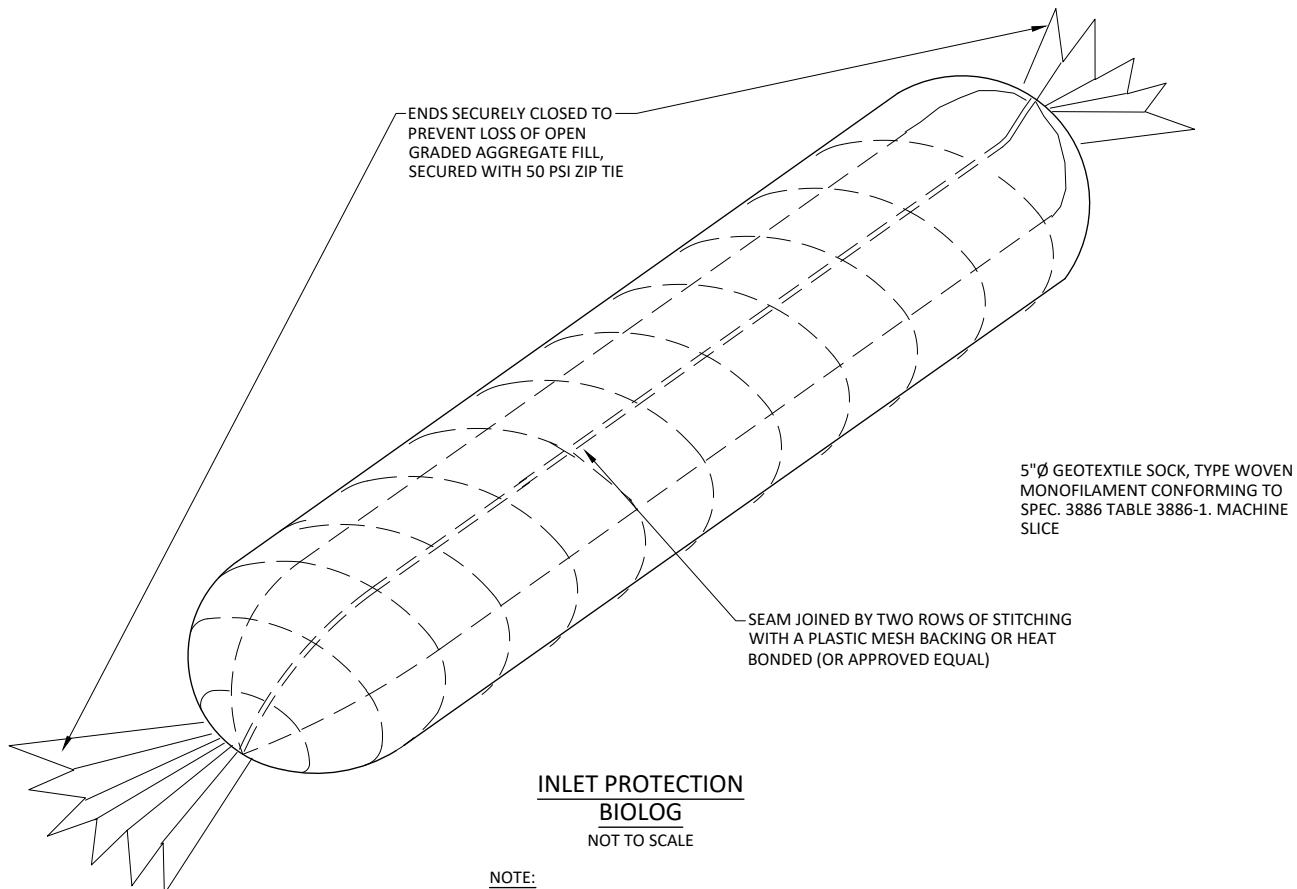
FILL ROCK LOG WITH 45 LBS. OF OPEN GRADED AGGREGATE CONSISTING OF SOUND, DURABLE PARTICLES OF CRUSHED QUARRY ROCK OR GRAVEL CONFORMING TO THE FOLLOWING GRADATION.

GRADATION	
SIEVE SIZE	PERCENT PASSING
1 1/2"	100
1"	95-100
3/4"	65-95
3/8"	30-65
NO 4	10-35
NO 10	3-20
NO 40	0-8
NO 200	0-3

NOTE:  
CRUSHED CONCRETE OR BITUMINOUS  
SHALL NOT BE USED FOR OPEN  
GRADED AGGREGATE.



INLET PROTECTION  
WITH BIOLOG



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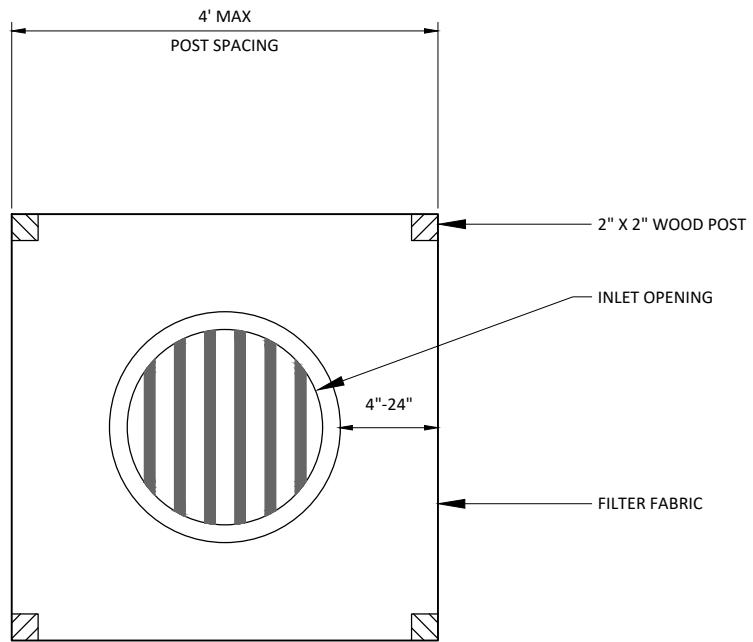
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INLET PROTECTION - BIOLOG

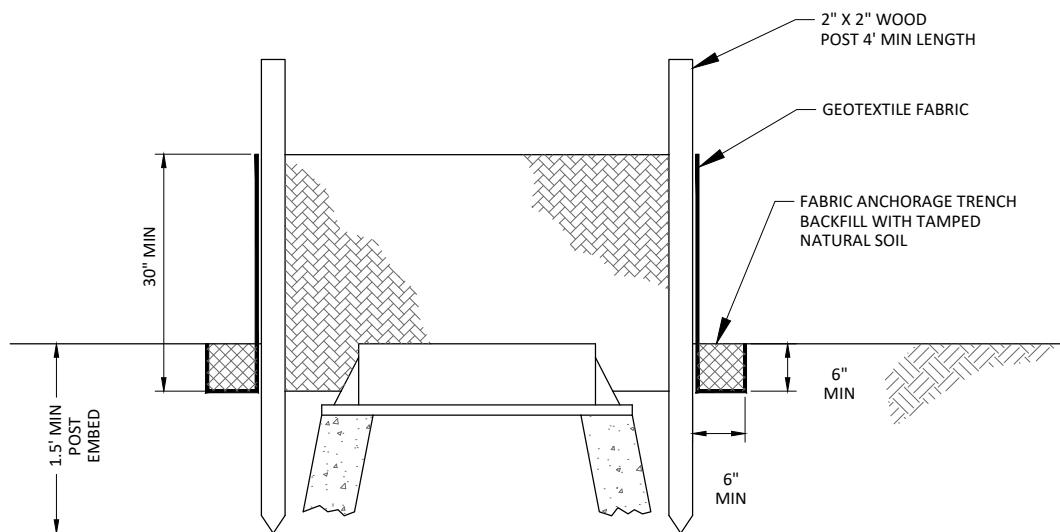
May 1st, 2025

STD. DETAIL

3009



PLAN VIEW



SECTION

NOTE:  
SILT FENCE SHALL CONFORM TO  
THE REQUIREMENTS OF MnDOT  
SPECIFICATION 3886

INLET PROTECTION  
PRESASSEMBLED SILT FENCE

NOT TO SCALE



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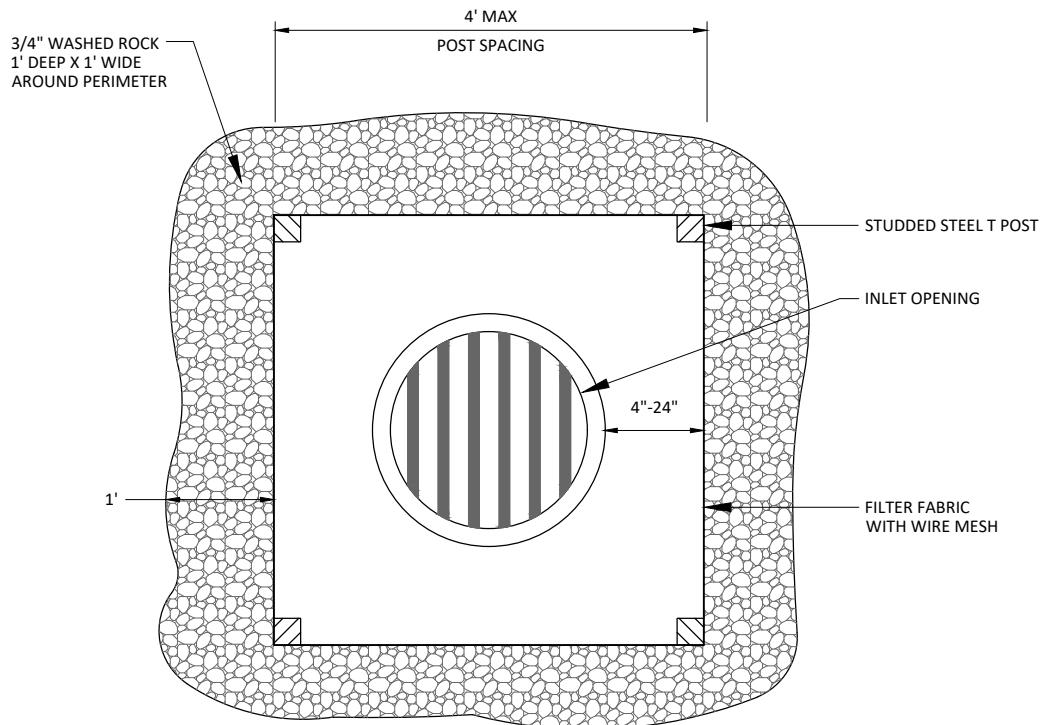
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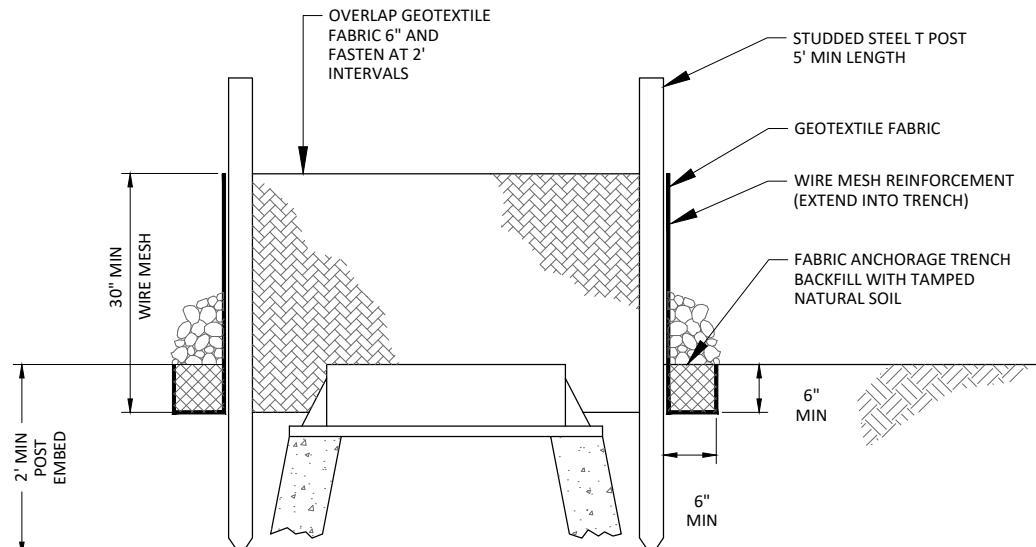
INLET PROTECTION  
PRESASSEMBLED SILT FENCE

May 1st, 2025

STD. DETAIL  
3010



PLAN VIEW



SECTION

NOTE:  
SILT FENCE SHALL CONFORM TO  
THE REQUIREMENTS OF MnDOT  
SPECIFICATION 3886

**INLET PROTECTION**  
**HEAVY DUTY SILT FENCE**

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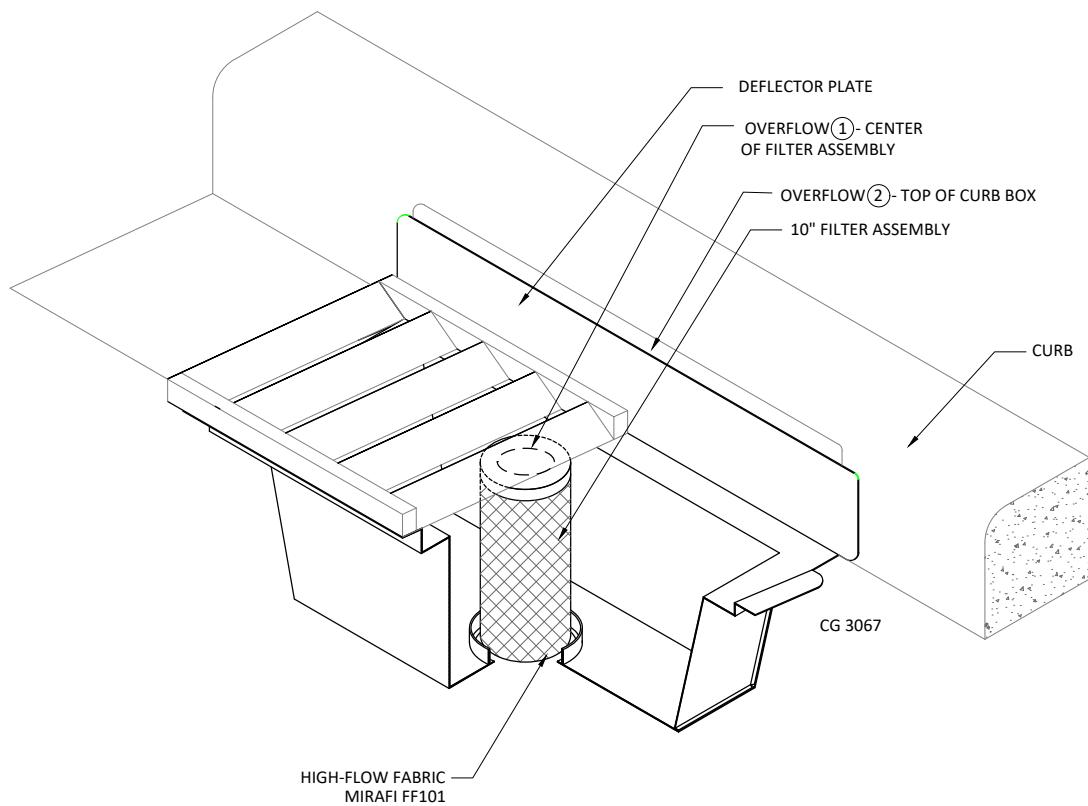
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CITY OF BUFFALO, MINNESOTA

**INLET PROTECTION**  
**HEAVY DUTY SILT FENCE**

May 1st, 2025

STD. DETAIL

3011



### INLET PROTECTION - WIMCO OR EQUAL

NOT TO SCALE

NOTE:

THIS INLET PROTECTION SHALL BE USED IMMEDIATELY FOLLOWING CURB & GUTTER CONSTRUCTION. INLET PROTECTION SHALL REMAIN INSTALLED AND MAINTAINED UNTIL ALL HOME CONSTRUCTION IS COMPLETE.



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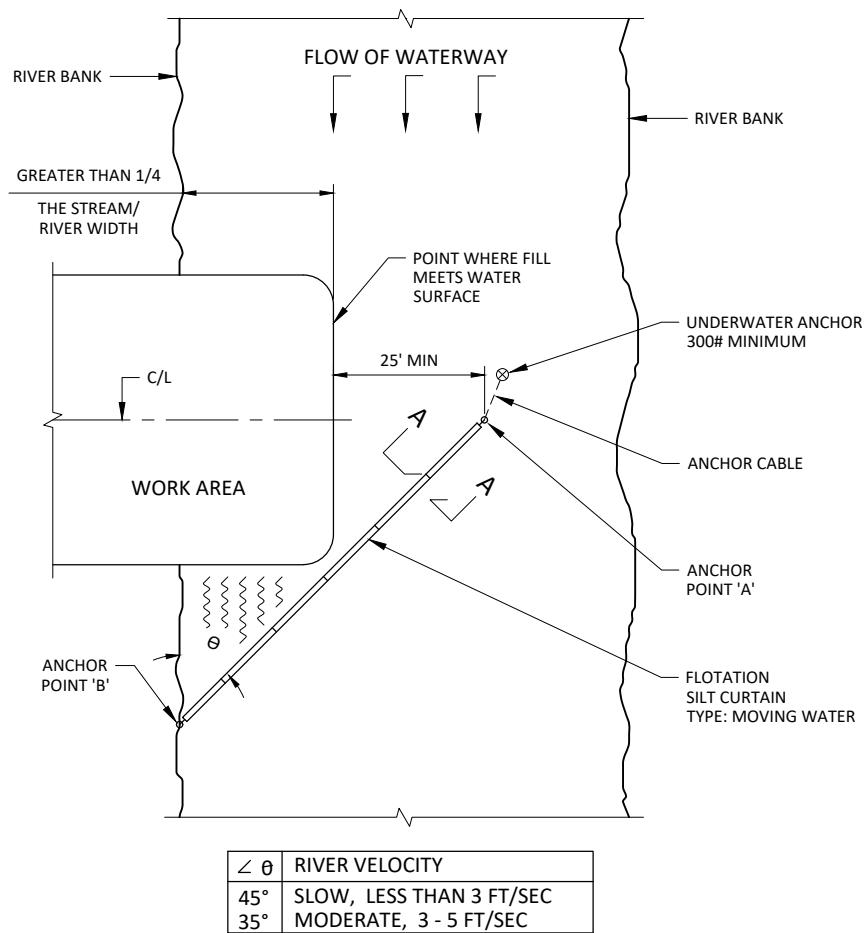
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INLET PROTECTION  
WIMCO OR EQUAL

May 1st, 2025

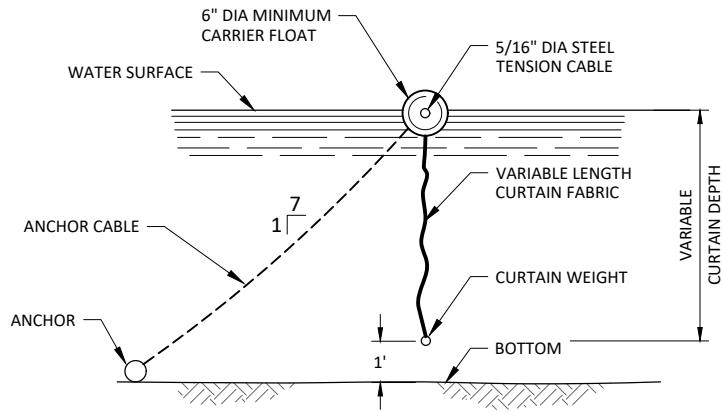
STD. DETAIL  
3012



PLAN VIEW

**DESIGN GUIDELINES:**  
WHEN TEMPORARY FILL ENCROACHES MORE THAN  
1/4 BUT LESS THAN 1/3 THE WIDTH OF THE STREAM

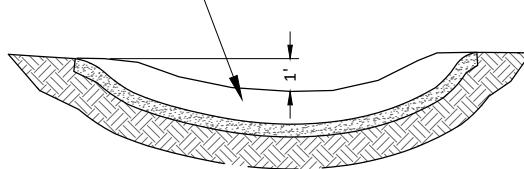
MAXIMUM WATER DEPTH: 11 FT  
MINIMUM WATER DEPTH: 3 FT  
MAXIMUM WATER VELOCITY: 5 FT/SEC



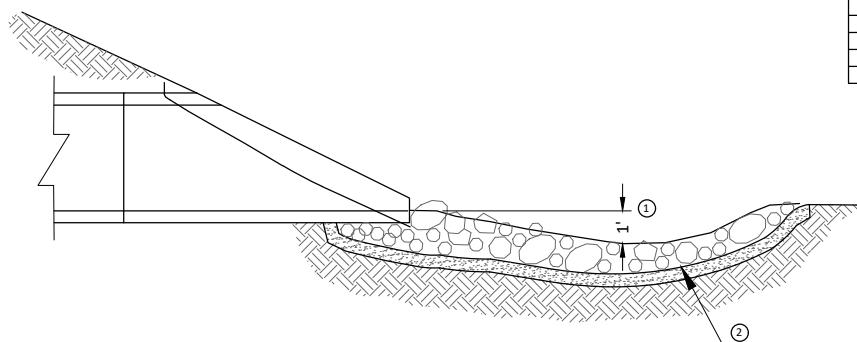
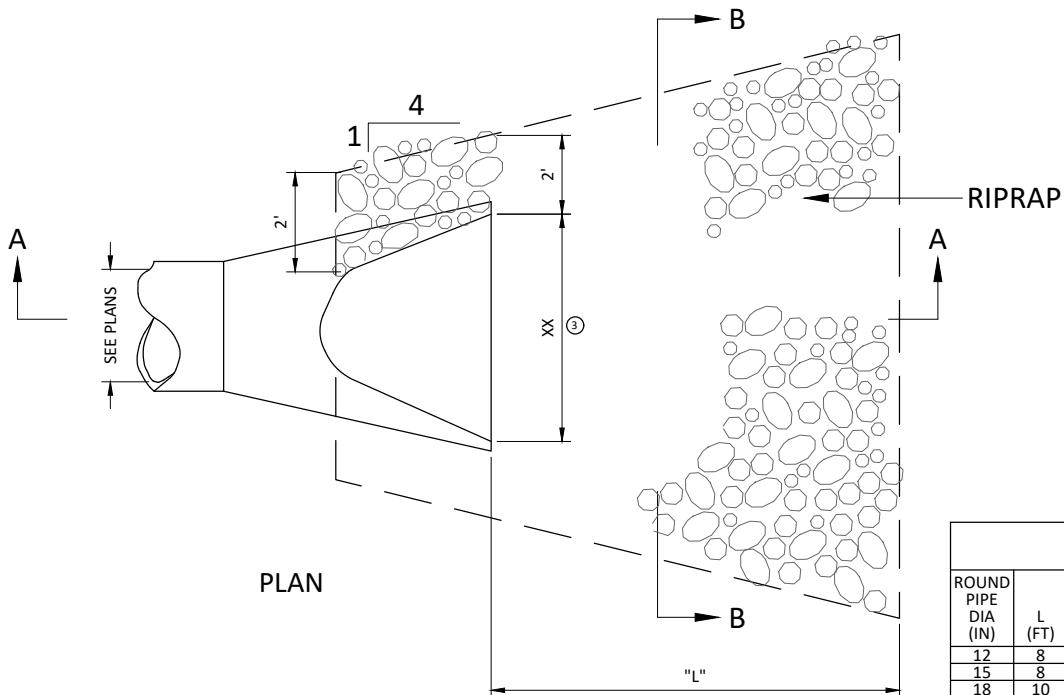
SECTION A-A



SEE TABLE FOR  
MINIMUM DEPTH



SECTION B-B



SECTION A-A

NOTES:  
PIPE SIZES LARGER THAN THOSE SHOWN REQUIRE A  
SPECIAL DESIGN.

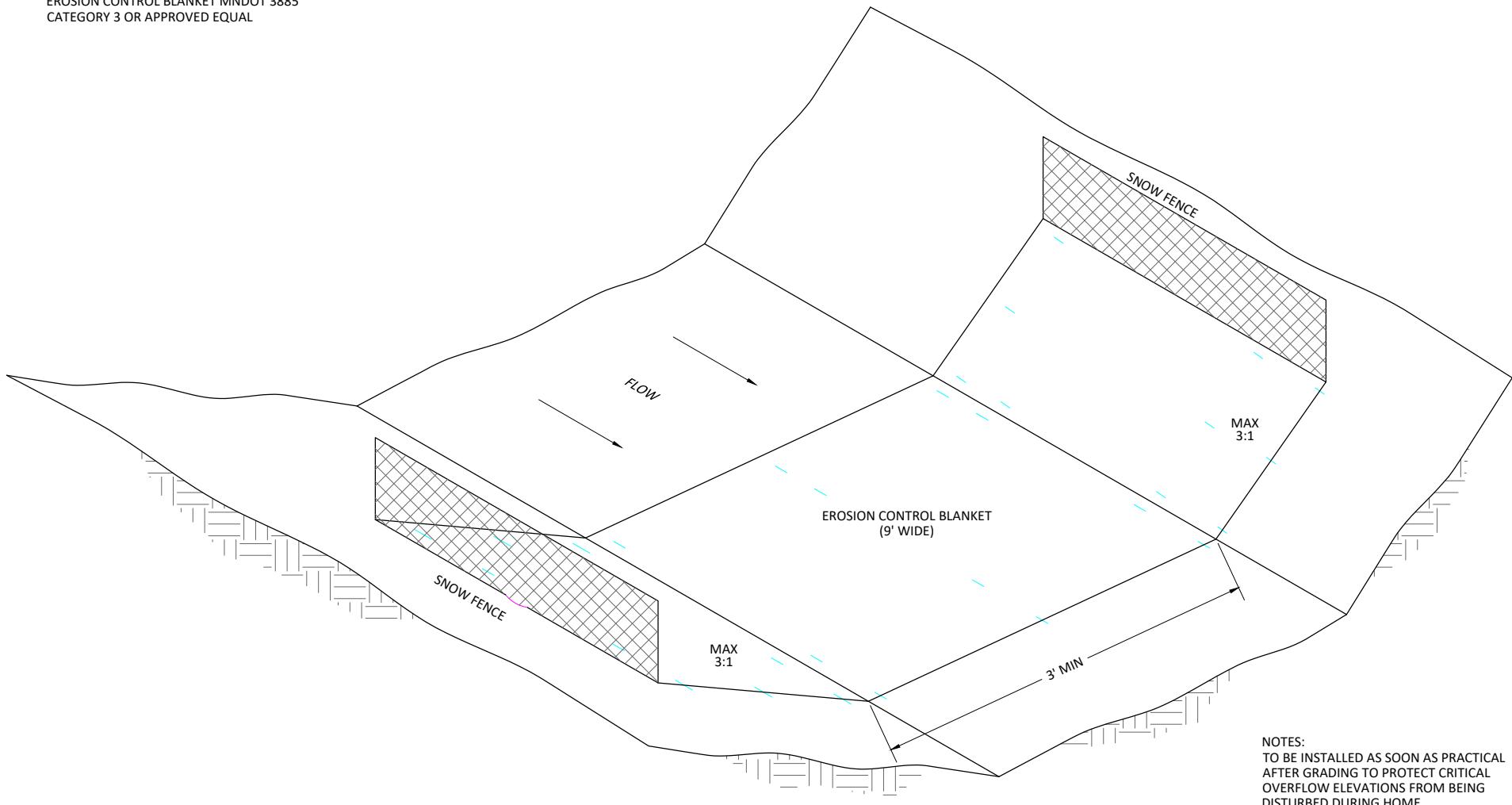
REQUIREMENTS FOR RIPRAP SIZE, THICKNESS AND FILTER  
BLANKET WILL BE DESIGNATED IN THE PLANS.

- ① FOR PIPES GREATER THAN OR EQUAL TO 30", USE 1.5".
- ② THE CONTRACTOR, AT HIS OPTION, MAY SUBSTITUTE A  
GEOTEXTILE FABRIC, SPEC. 3733, FOR THE GRANULAR  
FILTER BLANKET UNLESS OTHERWISE SPECIFIED IN THE  
PLANS. THE FABRIC SHOULD COVER THE AREA OF THE  
RIPRAP AND EXTEND UNDER THE CULVERT APRON 3 FT.
- ③ DIMENSION E IS GIVEN ON MnDOT STANDARD PLATES  
3100 AND 3110.
- ④ RIPRAP MATERIAL SHALL BE GRANITE OR FIELD STONE.

#### RIPRAP AT RCP CULVERT END

NOT TO SCALE

EMERGENCY OVERFLOW-RESTRICTED AREA  
EROSION CONTROL BLANKET MNDOT 3885  
CATEGORY 3 OR APPROVED EQUAL



### EMERGENCY OVERFLOW SWALE

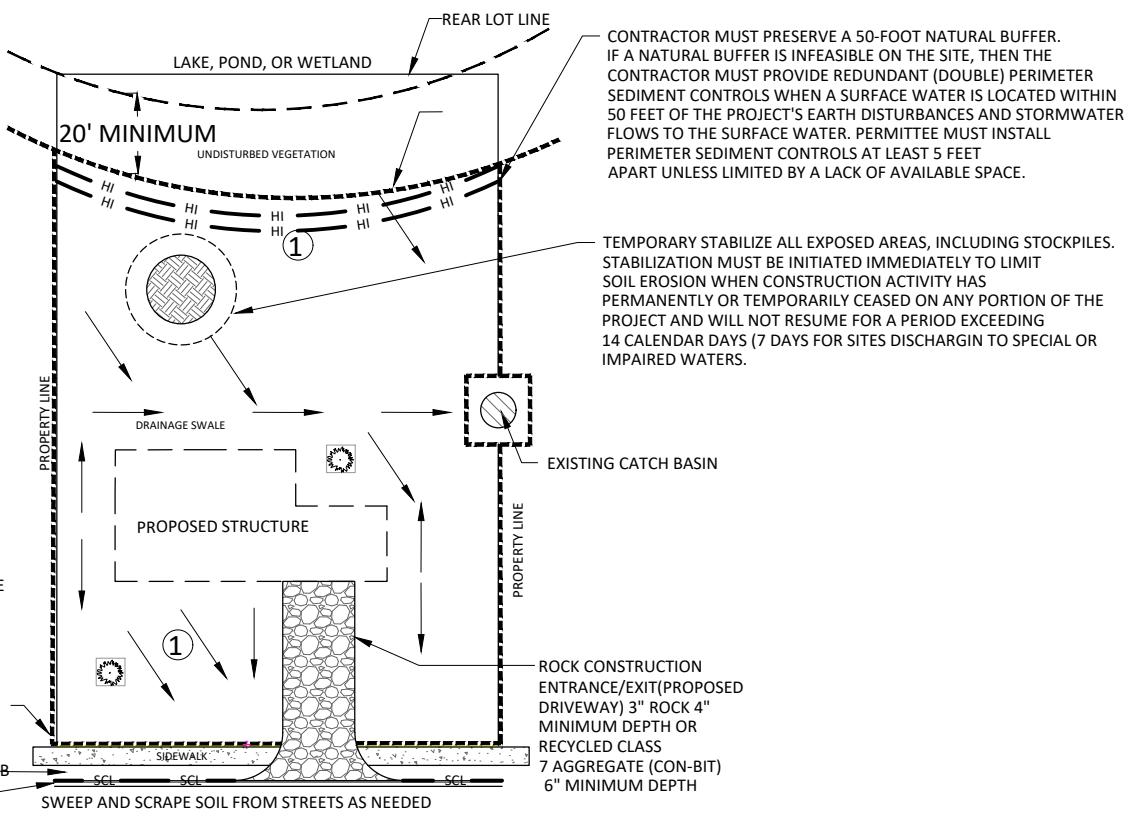
NOT TO SCALE

NOTES:  
TO BE INSTALLED AS SOON AS PRACTICAL  
AFTER GRADING TO PROTECT CRITICAL  
OVERFLOW ELEVATIONS FROM BEING  
DISTURBED DURING HOME  
CONSTRUCTION. SNOW FENCE SHALL BE  
MAINTAINED AND KEPT INPLACE  
THROUGHOUT DURATION OF HOME  
CONSTRUCTION UNTIL ADJACENT LOTS  
ARE ESTABLISHED. SNOW FENCE PROTECTS  
CRITICAL GRADING ELEVATIONS FROM  
BEING DISTURBED TO PROTECT ADJACENT  
HOMES FROM FLOODING.

## LEGEND

- STOCKPILED TOPSOIL (AVOID PLACEMENT IN DRAINAGEWAYS)
- \*SILT FENCE OR OTHER APPROVED BARRIER\* (WINTER INCLUDED)
- ① FINAL LAWN BY BUILDER OR OWNER ACCORDING TO CONTRACT
- TREE PRESERVATION WITH SNOW FENCE
- ROCK CONSTRUCTION ENTRANCE (PER PLANS) INSTALL AT TIME OF FOUNDATION EXCAVATION
- EXISTING DRAINAGE
- FINISHED GRADING (PER DEVELOPMENT GRADING PLAN)
- HI — HAND INSTALLED SILT FENCE
- SCL — SEDIMENT CONTROL LOG

RIGHT OF WAY LINE  
PROTECT EXISTING SOD BEHIND CURB  
EXISTING CURB & GUTTER  
SWEEP AND SCRAPE SOIL FROM STREETS AS NEEDED

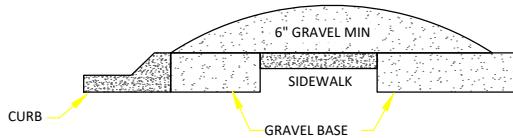


\* APPROVED ALTERNATIVES INCLUDE: BIOROLLS, COMPOST LOGS, ROCK LOG, OR WOODCHIP WINDROW AGAINST SNOW FENCE.

WARNING! EXTRA MEASURES MAY BE NEEDED IF YOUR SITE:  
1. IS WITHIN 200 FEET OF A WATER OF THE STATE.  
2. IS STEEP (SLOPES OF 18% OR MORE).  
3. RECEIVES RUNOFF FROM ADJACENT LAND.

NOTE: ALL EROSION CONTROL MEASURES SHOWN REQUIRE REGULAR MONITORING AND MAINTENANCE

BUILDER RESPONSIBLE FOR ANY DAMAGED SIDEWALK IN FRONT OF BUILDING SITE. ALL DAMAGED SIDEWALK MUST BE REPLACED BEFORE CERTIFICATE OF OCCUPANCY IS ISSUED.



SIDEWALK PROTECTION DETAIL

\*BUILDER MAY PLACE \$1,500 ESCROW WITH CITY OF BUFFALO IN LIEU OF SIDEWALK BLISTER.

NOT TO SCALE



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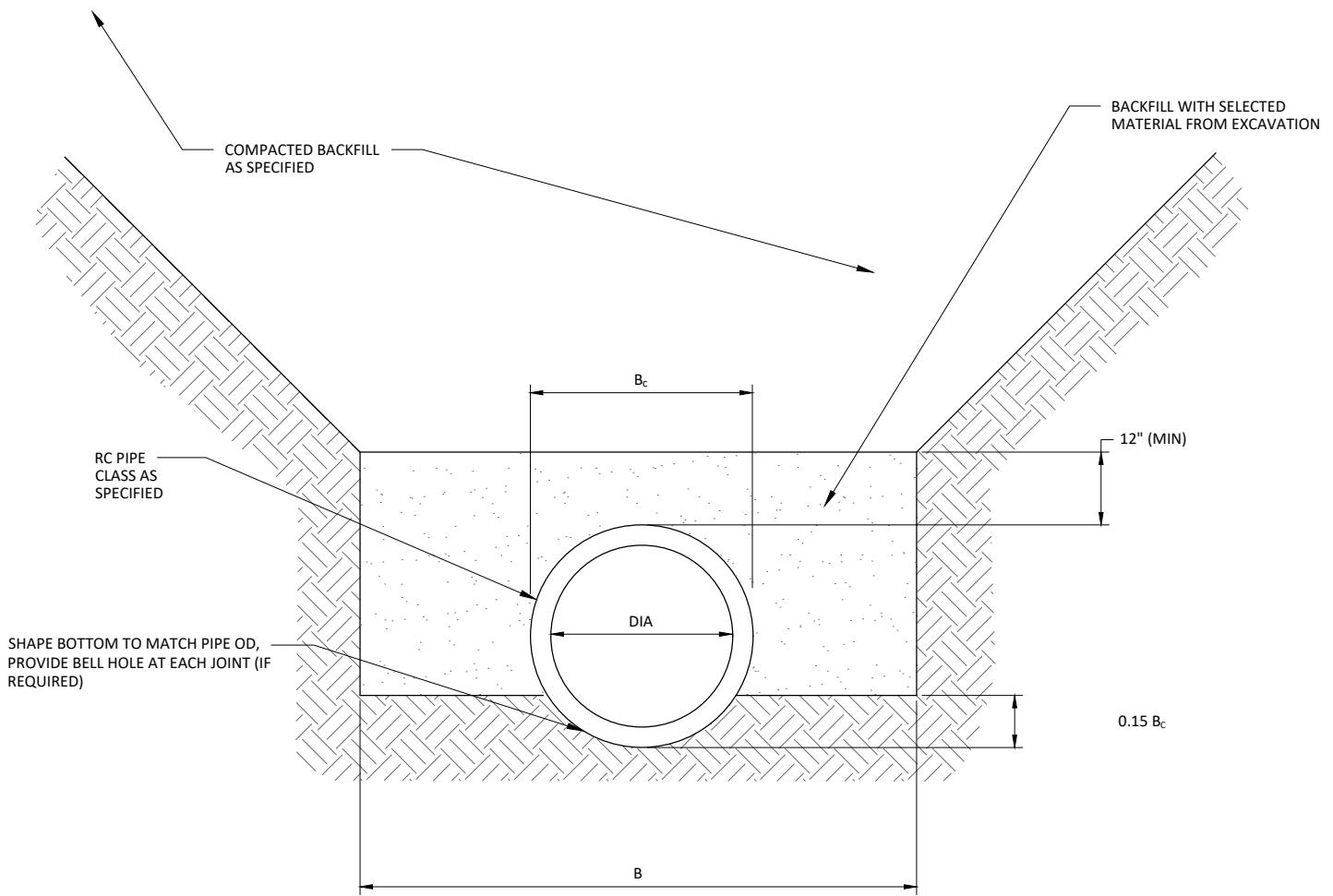
CITY OF BUFFALO, MINNESOTA

EROSION CONTROL FOR HOME BUILDERS & OTHER CONSTRUCTION SITES

May 1st, 2025

STD. DETAIL

3016



PIPE DIA	B
36" OR LESS	$B_c + 24"$
42" TO 54"	$1.5 \times B_c$
60" OR OVER	$B_c + 36"$

RC PIPE  
CLASS "C" BEDDING  
NOT TO SCALE



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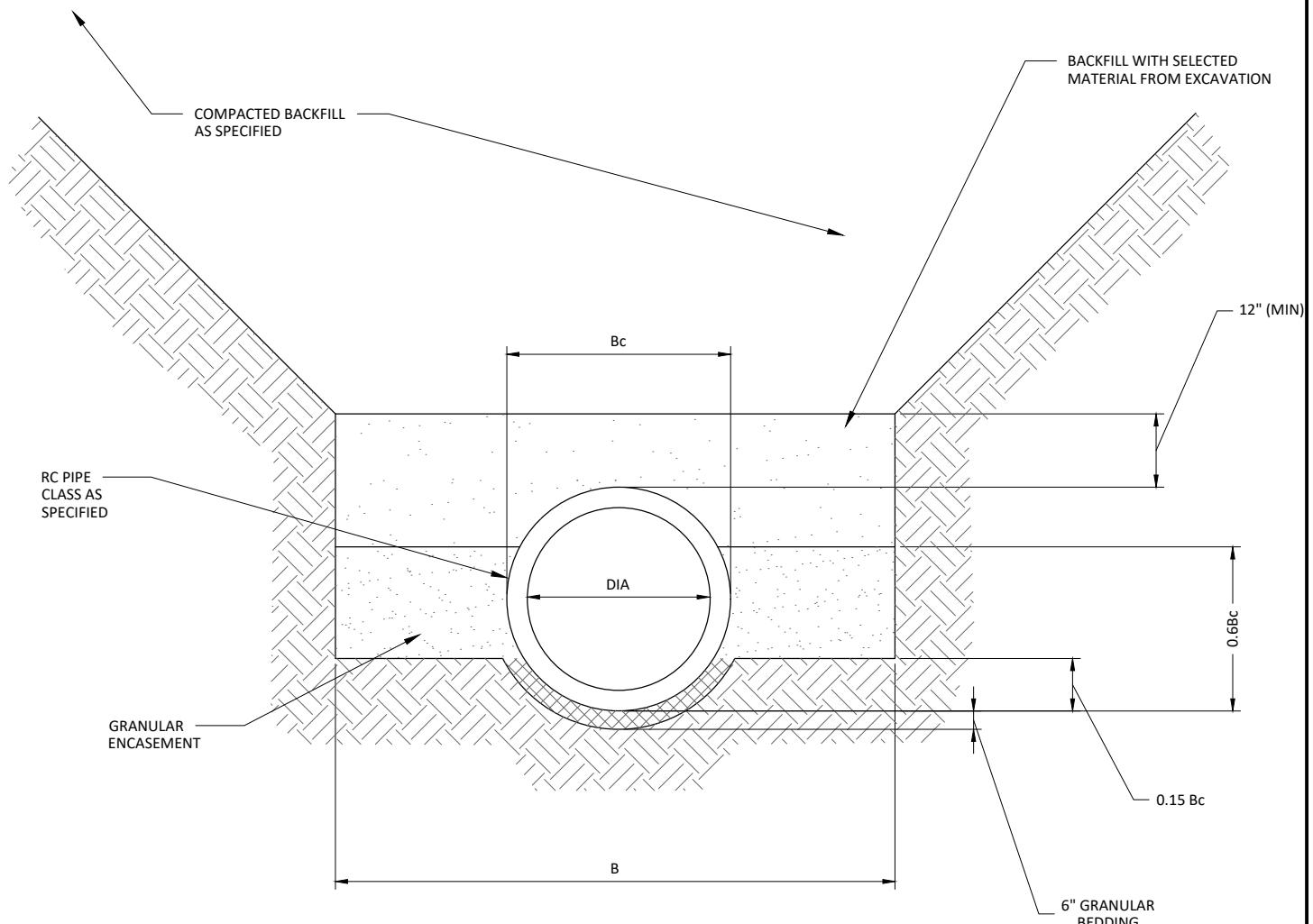
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RC PIPE CLASS C BEDDING

May 1st, 2025

STD. DETAIL

4001



PIPE DIA	B
36" OR LESS	Bc + 24"
42" TO 54"	1.5 x Bc
60" OR OVER	Bc + 36"

RC PIPE  
MODIFIED CLASS "B" BEDDING  
NOT TO SCALE



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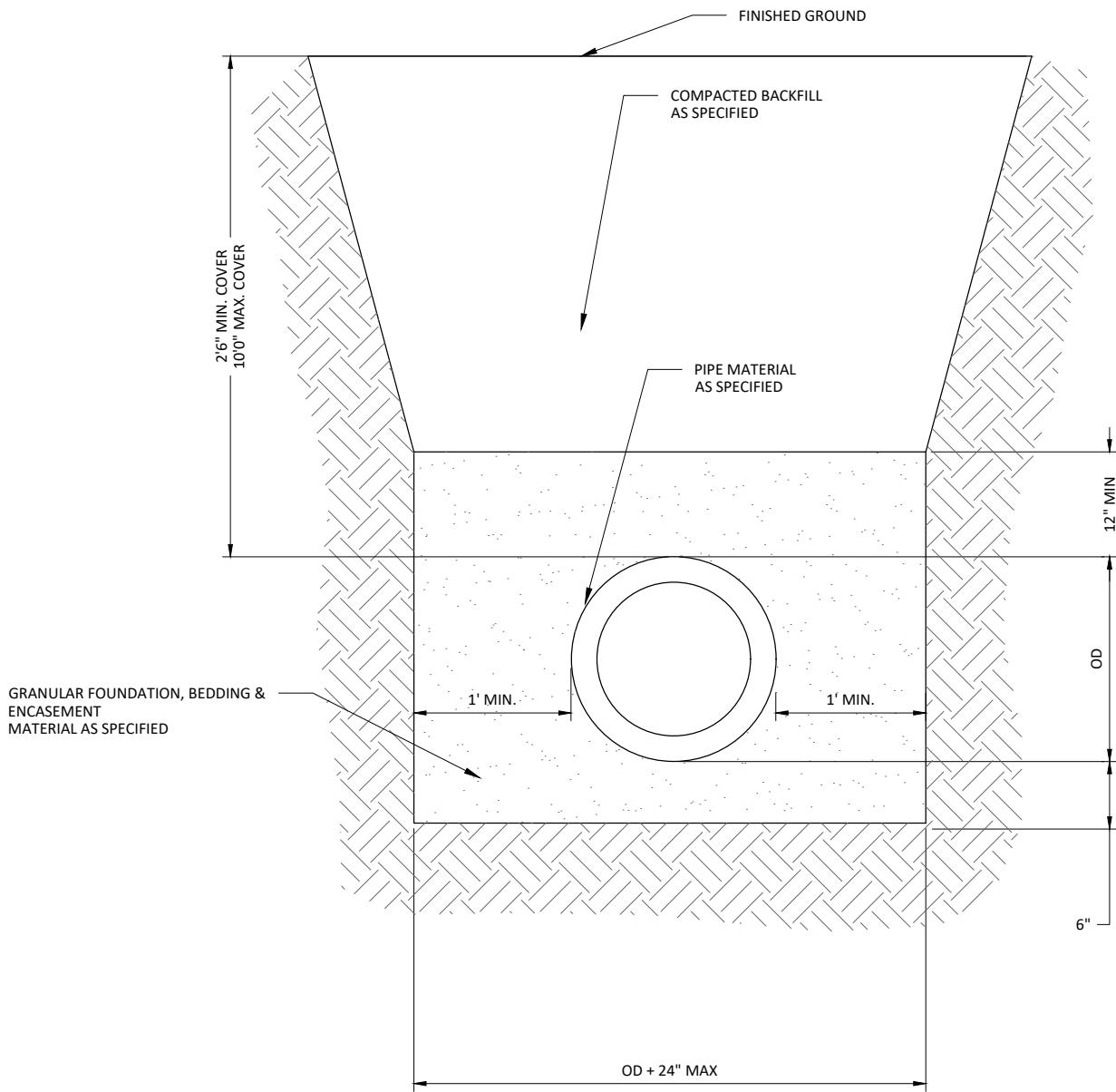
*Buffalo*  
CITY OF BUFFALO, MINNESOTA

RC PIPE CLASS B BEDDING

May 1st, 2025

STD. DETAIL

4002



NOTES:

1. THIS NON-RIGID INSTALLATION DETAIL APPLIES ONLY TO STORM SEWER.
2. MAXIMUM PIPE DIAMETER IS 24".
3. PIPE MATERIAL REQUIREMENTS PER CURRENT AASHTO REQUIREMENTS.
4. EMBEDMENT MATERIAL PER SPEC. 3149.2D MODIFIED TO 100% PASSING THE 1" SIEVE.
5. CONSTRUCTION REQUIREMENTS PER SPEC. 2451 MODIFIED SO THAT EMBEDMENT MATERIAL IS COMPACTION IN UNIFORM LIFTS, 8" OR LESS IN DEPTH, LOOSE MEASURE, TO 95% STANDARD PROCTOR DENSITY FROM THE BEDDING TO A MIN. DEPTH OF AT LEAST 12" ABOVE THE CROWN OF THE PIPE.
6. BEDDING TO BE CLASS C PER SPEC. 2451.3.
7. TRENCH WIDTH PER ASTM D2321 EXCEPT AS MODIFIED TO PROVIDE A MINIMUM OF 1-FOOT ON EACH SIDE OF THE PIPE TO ALLOW FOR COMPACTION.
8. PLASTIC STORM SEWER ALLOWED IN GREEN AREAS ONLY.

NON-RIGID STORM  
SEWER TRENCH

NOT TO SCALE

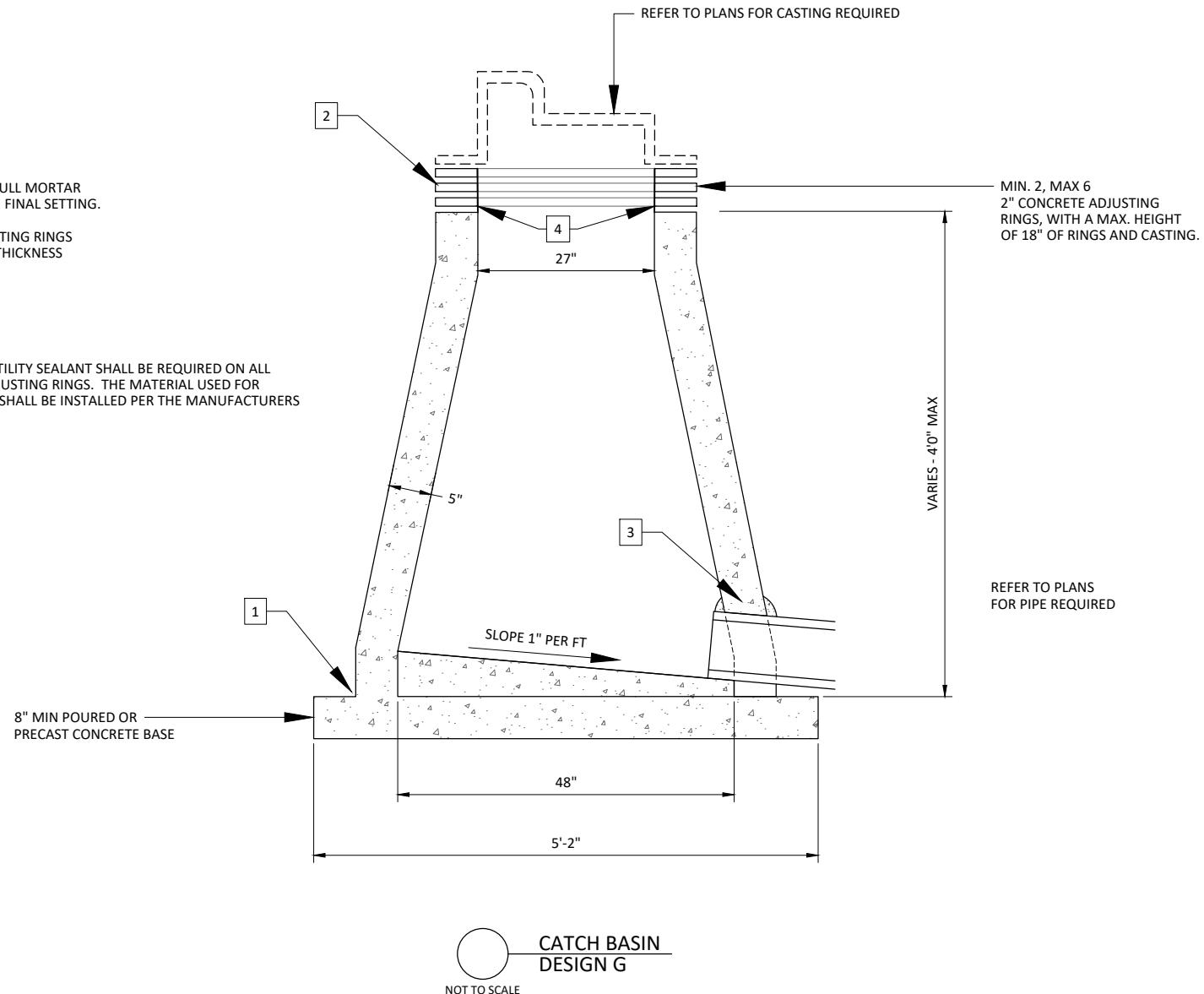
1 MANHOLE SHALL BE PLACED ON A FULL MORTAR BED OR BITUMINOUS MASTIC UPON FINAL SETTING.

2 THE INSIDE AND OUTSIDE OF ADJUSTING RINGS SHALL BE PLASTERED WITH A MIN. THICKNESS OF 1/2" OF CEMENT.

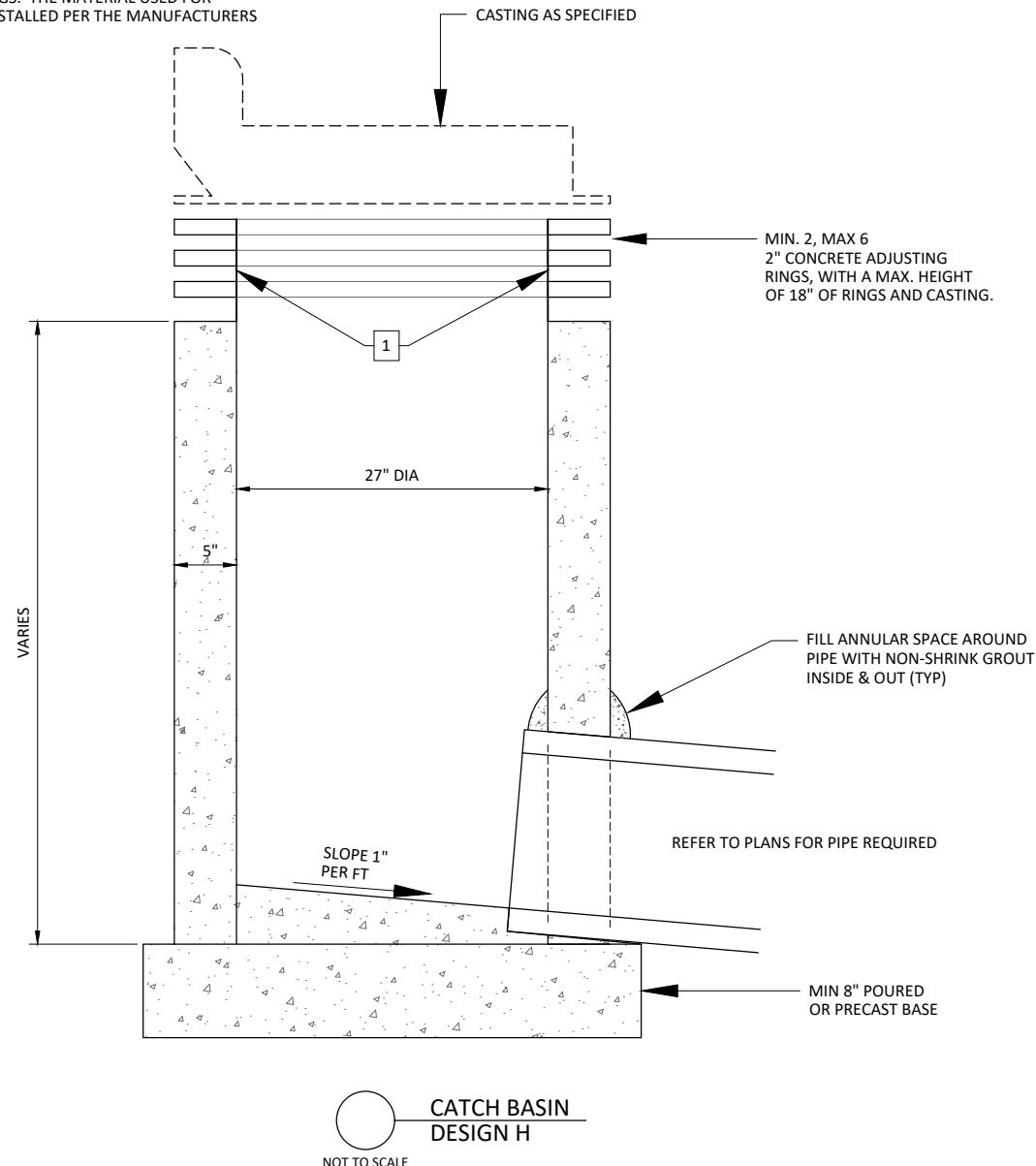
3 FILL ANNULAR SPACE AROUND PIPE WITH NON-SHRINK GROUT INSIDE & OUT

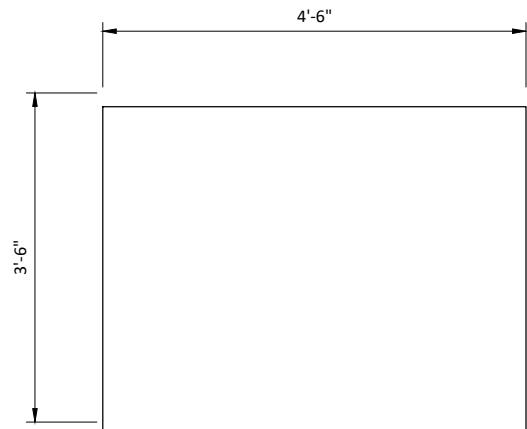
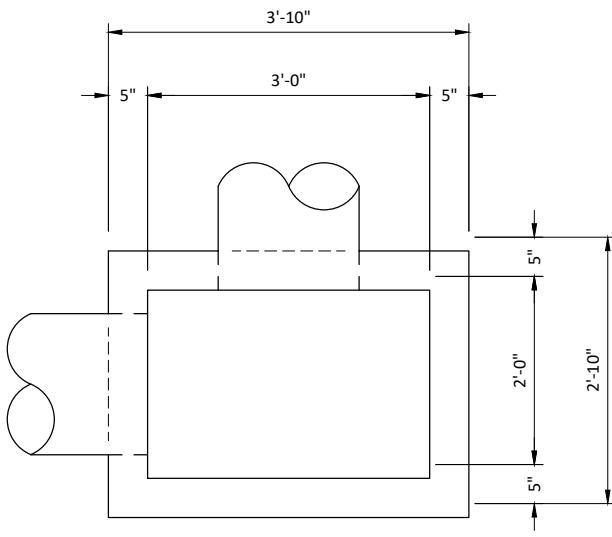
4 SEALING SYSTEMS INC. FLEX SEAL UTILITY SEALANT SHALL BE REQUIRED ON ALL CATCH BASINS WITH CONCRETE ADJUSTING RINGS. THE MATERIAL USED FOR LINING OF THE CATCH BASIN RINGS SHALL BE INSTALLED PER THE MANUFACTURERS RECOMMENDATIONS.

REFER TO PLANS FOR CASTING REQUIRED



1 SEALING SYSTEMS INC. FLEX SEAL UTILITY SEALANT SHALL BE REQUIRED ON ALL CATCH BASINS WITH CONCRETE ADJUSTING RINGS. THE MATERIAL USED FOR LINING OF THE CATCH BASIN RINGS SHALL BE INSTALLED PER THE MANUFACTURERS RECOMMENDATIONS.

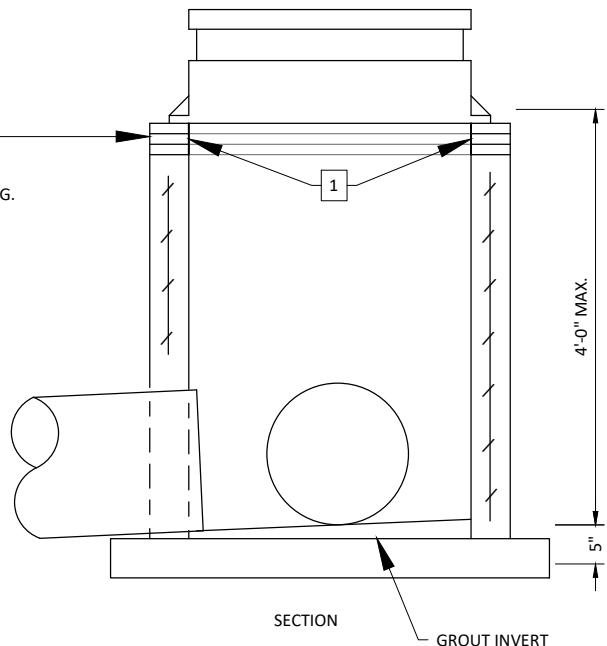




MIN. 2, MAX 6  
2" CONCRETE ADJUSTING  
RINGS, WITH A MAX. HEIGHT  
OF 18" OF RINGS AND CASTING.

NOTES:

1. CASTING AS SPECIFIED
2. PIPE CUT-OUTS PER CONSTRUCTION DOCUMENTS
3. ALTERNATE CAST-IN-PLACE BASE CAN BE USED
4. MIN REINFORCING SHALL BE WIRE FABRIC HAVING AN AREA OF NOT LESS THAN 0.12 SQ IN PER FOOT IN BOTH DIRECTIONS



 CATCH BASIN STRUCTURE  
DESIGN R-1 (2'x3')  
NOT TO SCALE

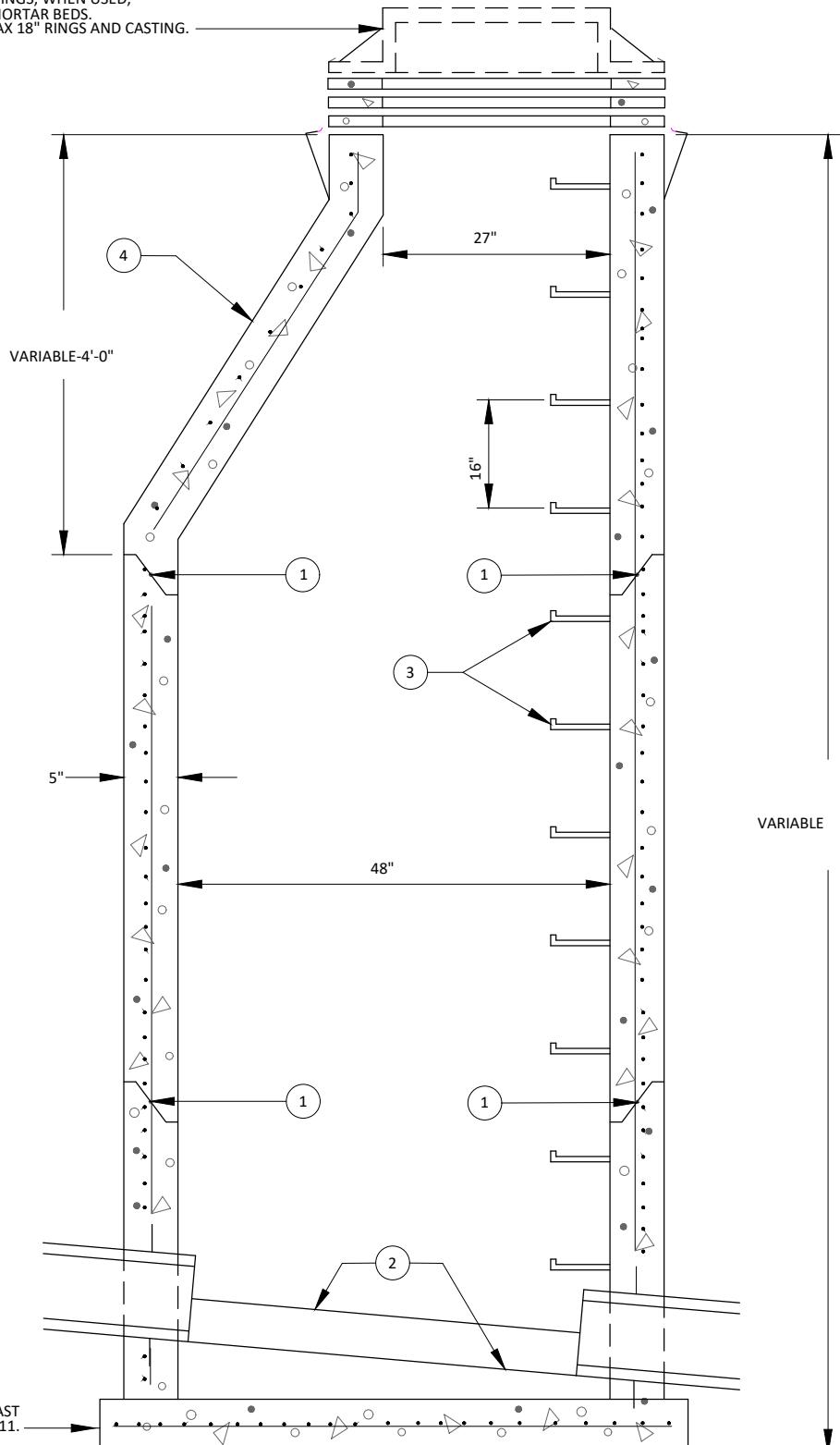
1 SEALING SYSTEMS INC. FLEX SEAL UTILITY SEALANT SHALL BE REQUIRED ON ALL CATCH BASINS WITH CONCRETE ADJUSTING RINGS. THE MATERIAL USED FOR LINING OF THE CATCH BASIN RINGS SHALL BE INSTALLED PER THE MANUFACTURERS RECOMMENDATIONS.

NEENAH R-1733B WITH WORDS "STORM SEWER"  
CASTING & ADJUSTING RINGS, WHEN USED,  
SHALL BE SET ON FULL MORTAR BEDS.  
MIN 2, MAX 6 RINGS: MAX 18" RINGS AND CASTING.

- ① ALL JOINTS SHALL BE "O" RING RUBBER GASKETS.
- ② PROVIDE MORTAR FILLETS TO FIT THE BOTTOM PORTION OF PIPE TO DIRECT FLOW TO OUTLET.
- ③ POLYPROPYLENE PLASTIC REINFORCED STEPS WITH A NO. 2 DETERRED STEEL ROD GRADE 60.
- ④ MN/DOT TYPE "B" ECCENTRIC PRECAST CONCRETE CONE SECTION TYPICAL FOR ALL MANHOLES.

REFER TO PLANS  
FOR PIPE REQUIRED

8" POURED CONCRETE BASE. BASE REINF. IS 0.12 SQ. IN. PER FT. IN EACH DIRECTION. FOR ALTERNATE PRECAST CONC. BASE, SEE Mn/DOT STD. PLATE 4011.



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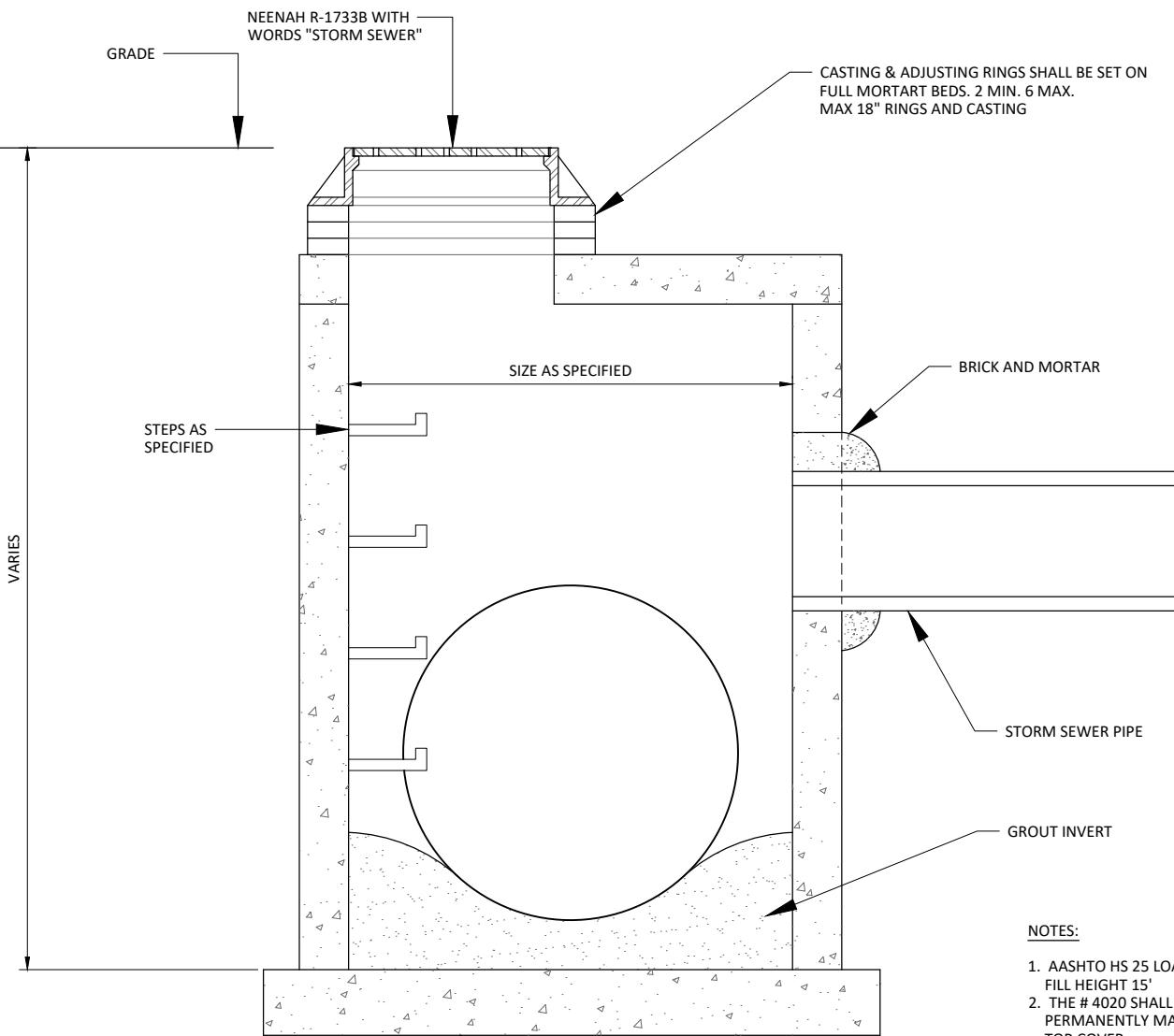
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CITY OF BUFFALO, MINNESOTA

STORM SEWER STRUCTURE  
DESIGN F, TYPE "B" CONE

May 1st, 2025

STD. DETAIL

4007



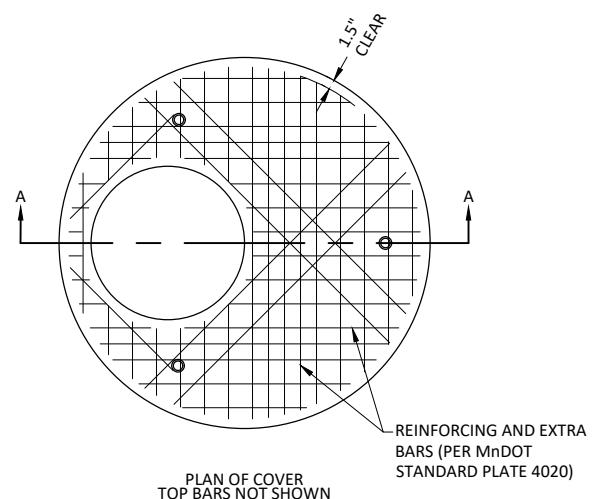
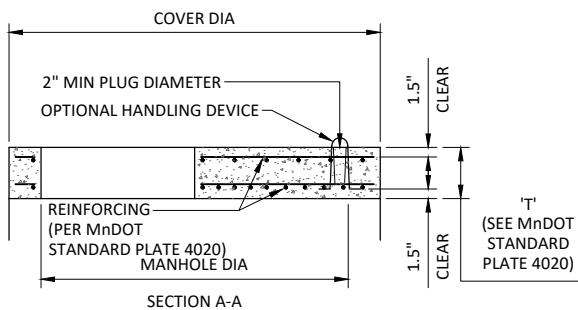
TYPICAL DESIGN 4020 MANHOLE/CATCH BASIN

DESIGNATION:  
DESIGN DIAMETER - STANDARD PLATE #  
DESIGN 48-4020

PRECAST CONCRETE BASE  
(PER MnDOT STANDARD PLATE 4011)

NOTES:

1. AASHTO HS 25 LOADING MAX FILL HEIGHT 15'
2. THE # 4020 SHALL BE PERMANENTLY MARKED ON THE TOP COVER
3. EQUIVALENT STEEL AREAS IN WIRE MESH MAY BE USED
4. REINFORCEMENT PER SPEC 3301, GRADE 60 A SINGLE HOOP OF 8ga STEEL WIRE



STORM SEWER STRUCTURE  
DESIGN 4020  
NOT TO SCALE



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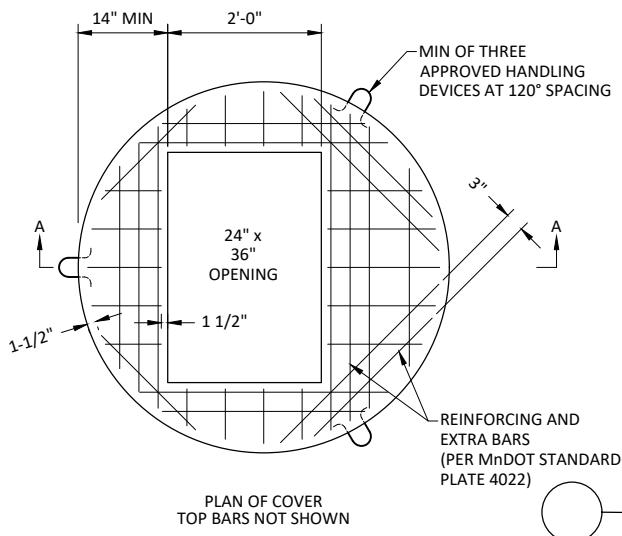
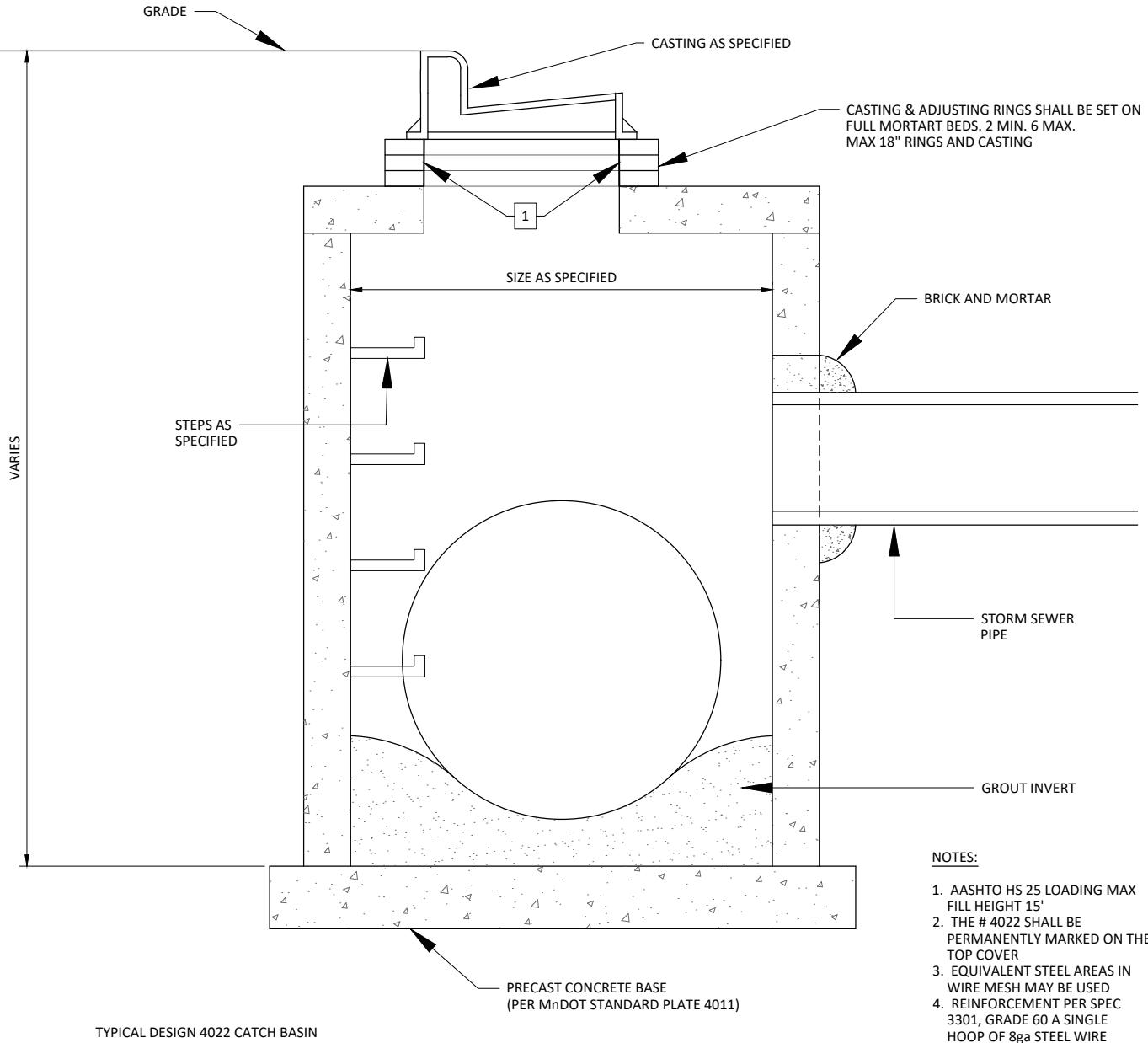
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CITY OF BUFFALO, MINNESOTA

STORM SEWER MANHOLE  
DESIGN 4020

May 1st, 2025

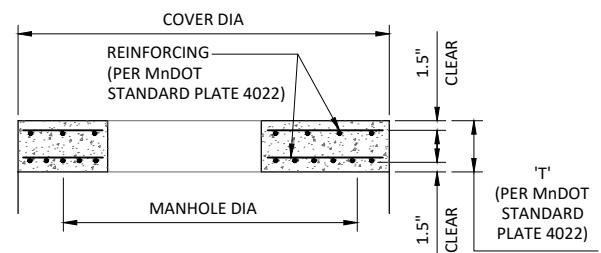
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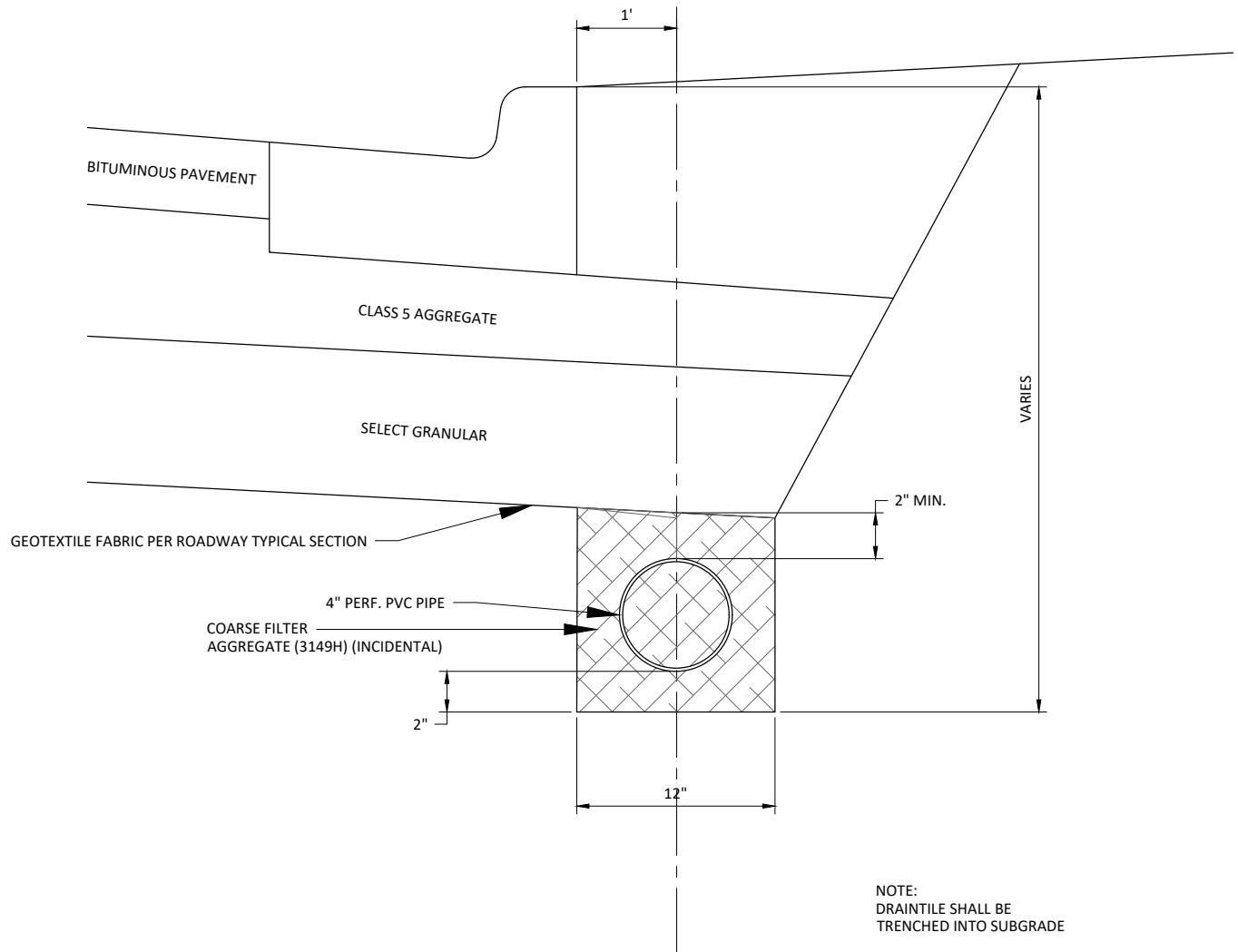
4008



NOT TO SCALE  
STORM SEWER STRUCTURE  
DESIGN 4022

**1** SEALING SYSTEMS INC. FLEX SEAL UTILITY SEALANT SHALL BE REQUIRED ON ALL CATCH BASINS WITH CONCRETE ADJUSTING RINGS. THE MATERIAL USED FOR LINING OF THE CATCH BASIN RINGS SHALL BE INSTALLED PER THE MANUFACTURERS RECOMMENDATIONS.





SUBSURFACE ROADWAY EDGE DRAIN

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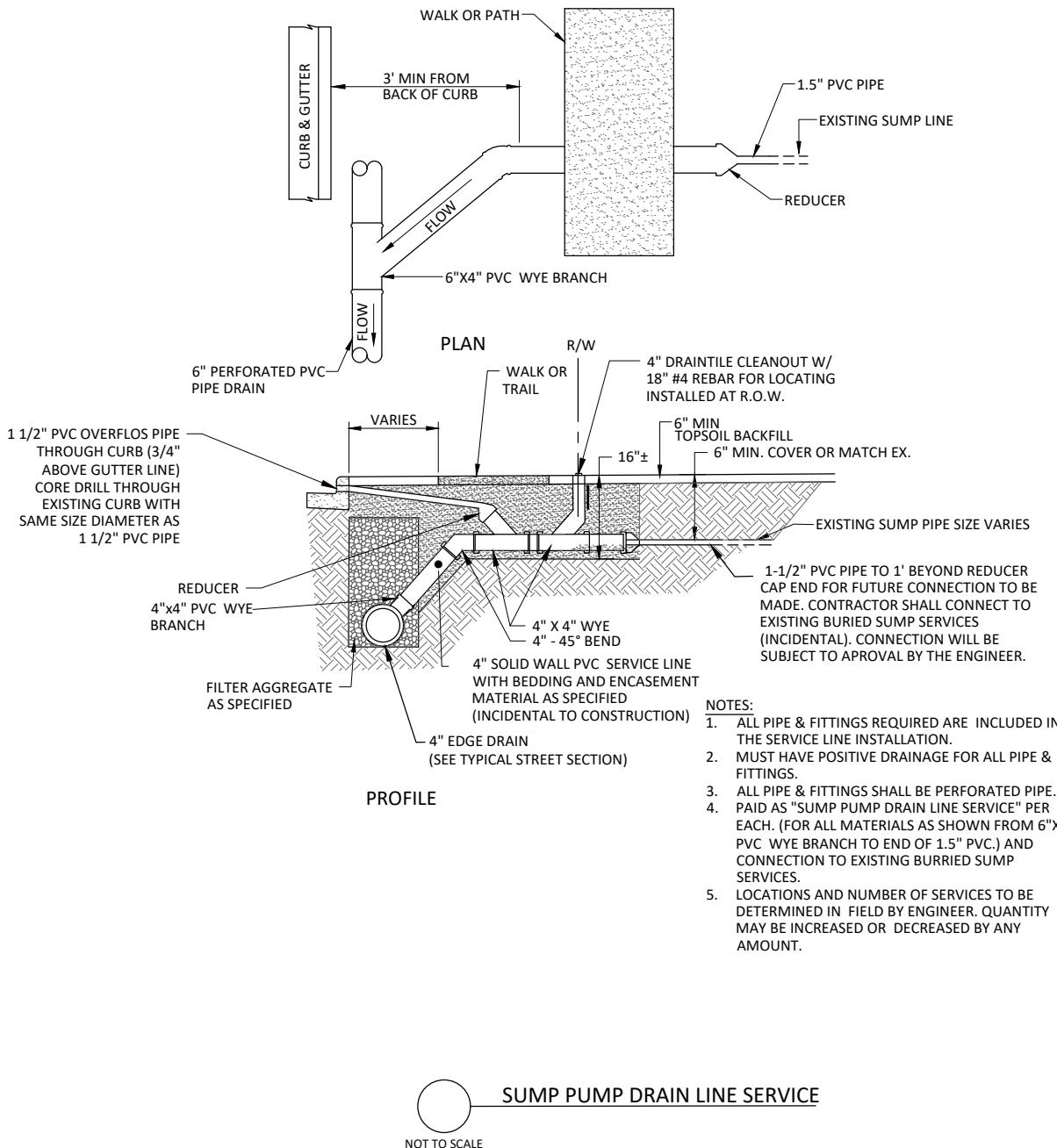
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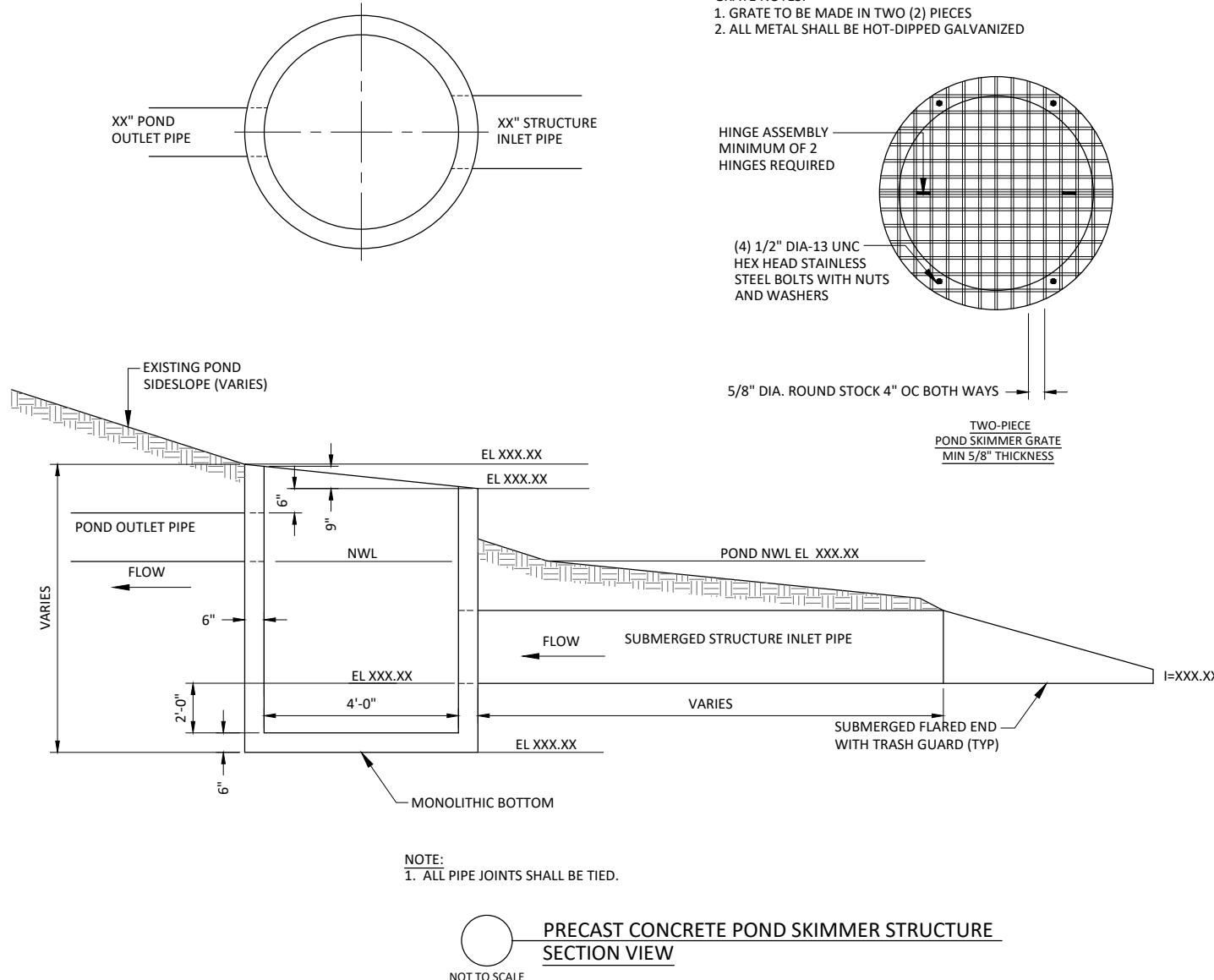
SUBSURFACE ROADWAY  
EDGE DRAIN

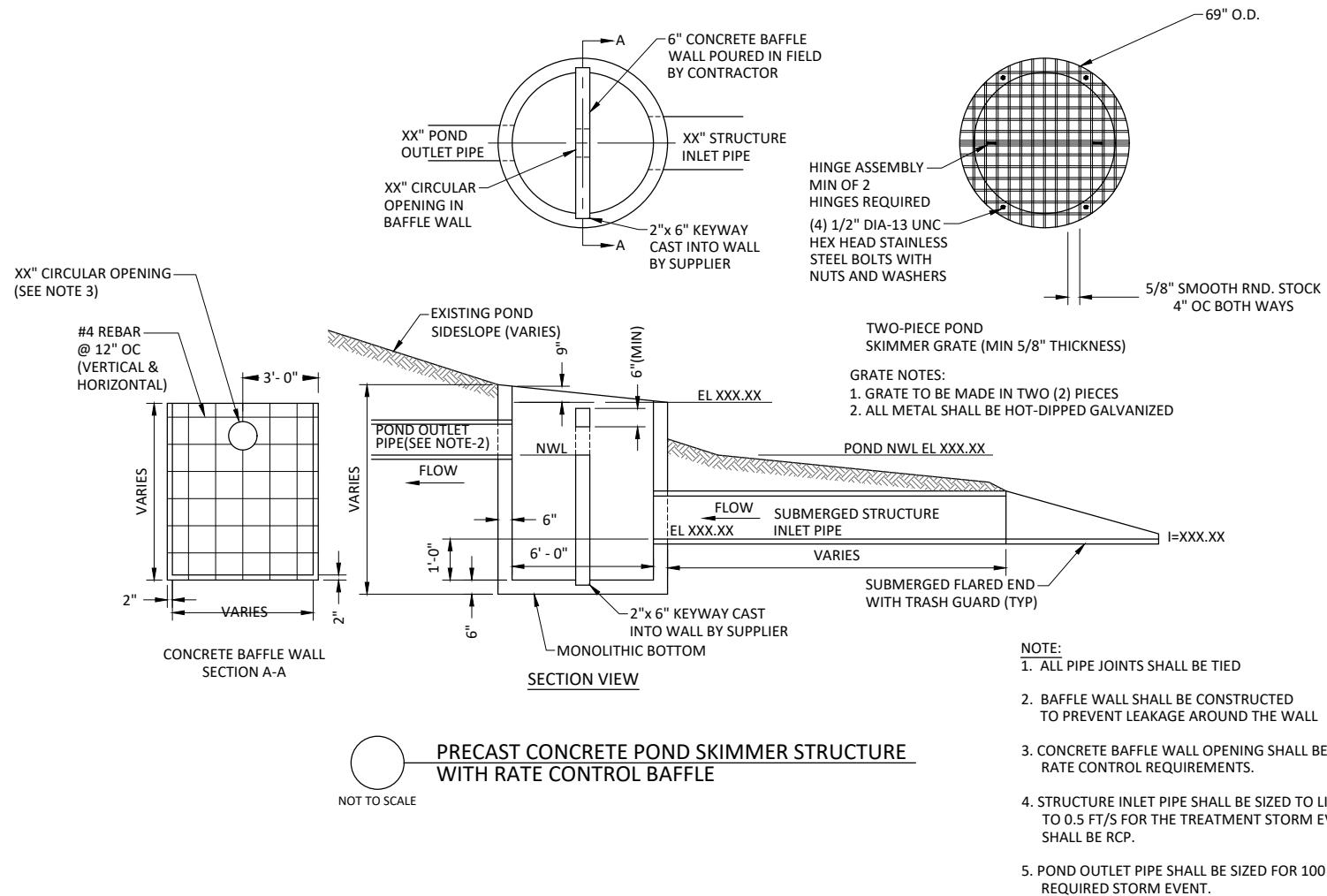
May 1st, 2025

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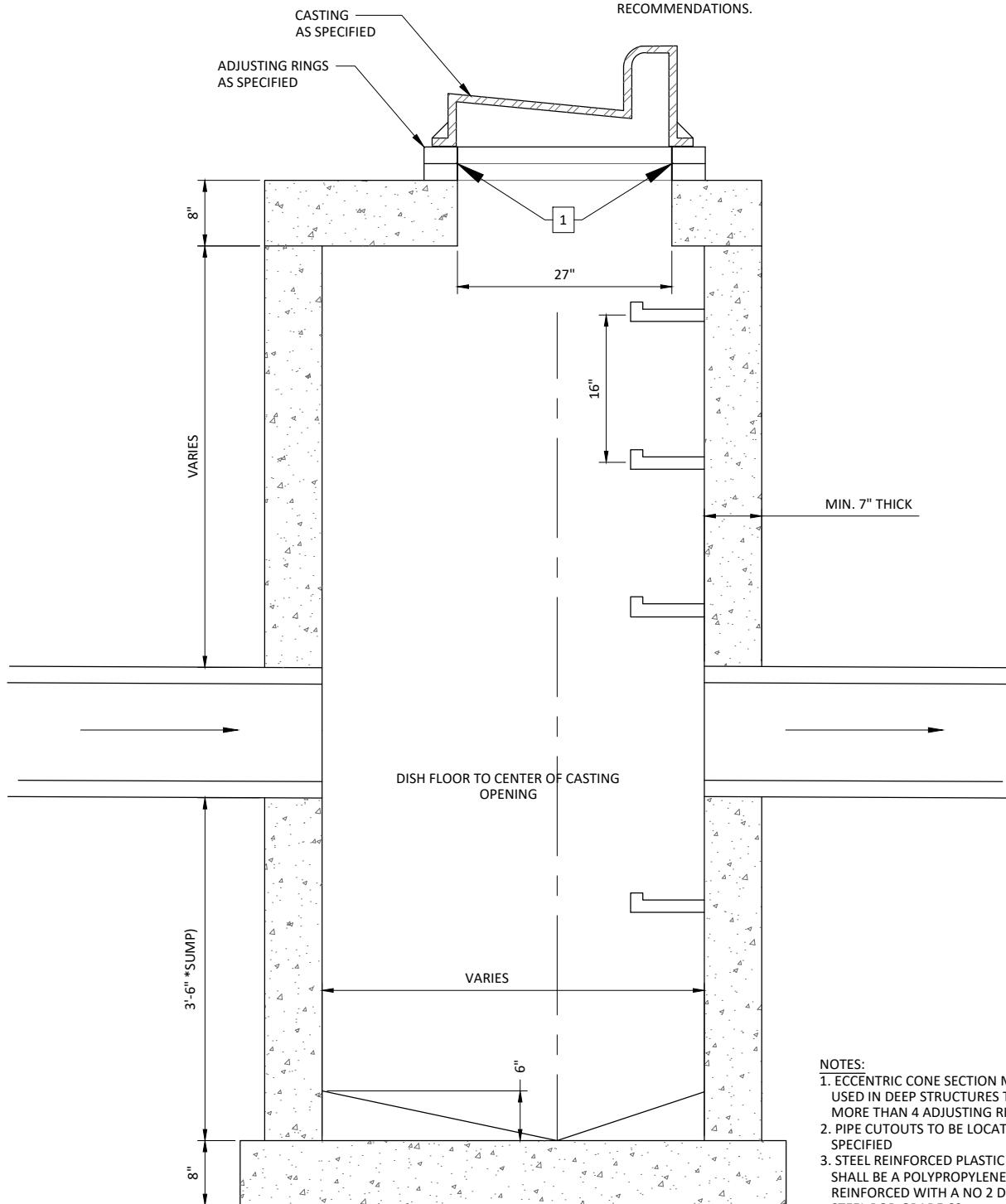
4010







1 SEALING SYSTEMS INC. FLEX SEAL UTILITY SEALANT SHALL BE REQUIRED ON ALL CATCH BASINS WITH CONCRETE ADJUSTING RINGS. THE MATERIAL USED FOR LINING OF THE CATCH BASIN RINGS SHALL BE INSTALLED PER THE MANUFACTURERS RECOMMENDATIONS.



## SECTIONAL VIEW



DRAINAGE STRUCTURE WITH SUMP

NOT TO SCALE

### NOTES:

1. ECCENTRIC CONE SECTION MAY BE USED IN DEEP STRUCTURES TO AVOID MORE THAN 4 ADJUSTING RINGS
2. PIPE CUTOUTS TO BE LOCATED AS SPECIFIED
3. STEEL REINFORCED PLASTIC STEPS SHALL BE A POLYPROPYLENE PLASTIC REINFORCED WITH A NO 2 DEFORMED STEEL ROD GRADE 60



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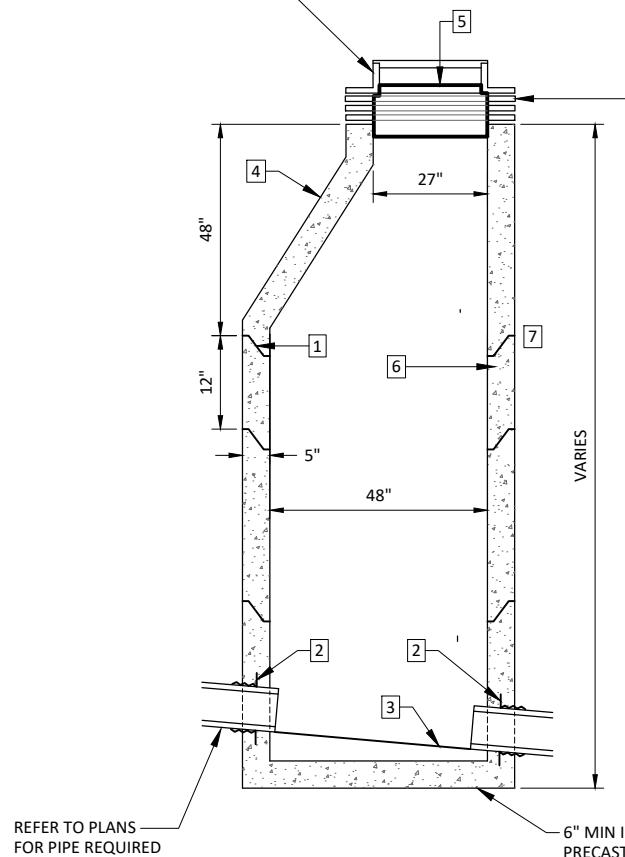
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DRAINAGE  
STRUCTURE WITH  
SUMP

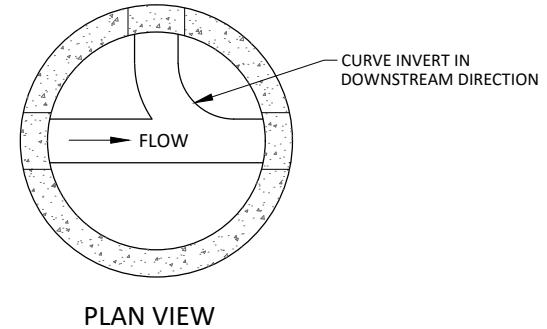
May 1st, 2025

STD. DETAIL  
4014

NEENAH R1733 FRAME & CASTING WITH TWO CONCEALED PICKHOLES "SANITARY SEWER" IMPRINTED ON THE COVER



MIN. 2, MAX 5 CONCRETE ADJUSTING RINGS WITH FULL MORTAR BED. MAXIMUM 18" OF CASTING AND RINGS ALLOWED WITHOUT CHANGING BARREL SECTIONS.

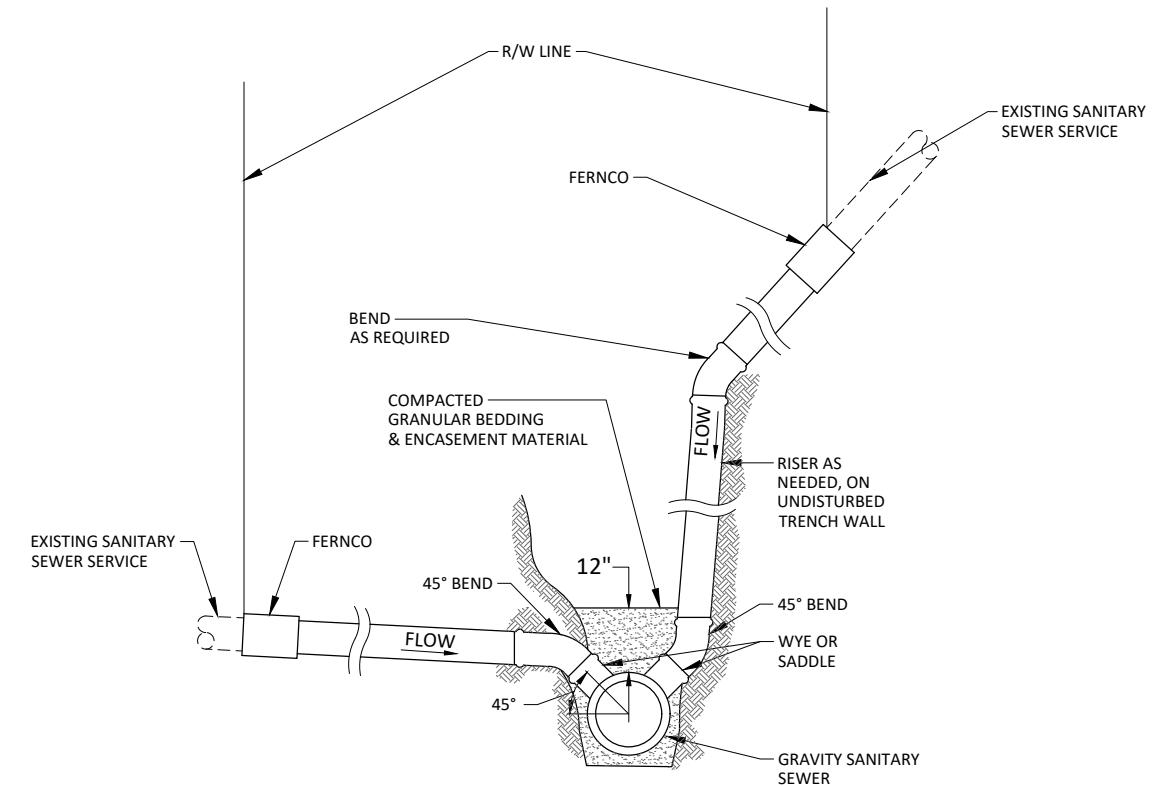
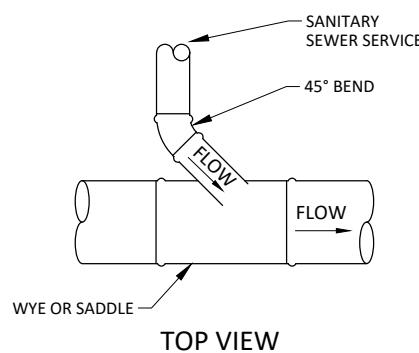


PLAN VIEW

1. RUBBER GASKET (TYPICAL)
2. FLEXIBLE WATERTIGHT SEAL TO BE APPROVED BY ENGINEER
3. SHAPE, DEPTH AND SLOPE OF INVERT TO BE APPROVED BY ENGINEER
4. MnDOT TYPE "B" ECCENTRIC PRECAST CONCRETE CONE SECTION TYPICAL FOR ALL MANHOLES
5. PLACE INTERIOR MEDIUM DENSITY POLYETHYLENE I & I BARRIER
6. PLACE 1' TALL BARREL SECTION IMMEDIATELY BELOW CONE SECTION ON ALL MANHOLES

NOTES:  
NO STEPS IN MANHOLES

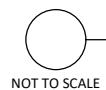




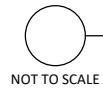
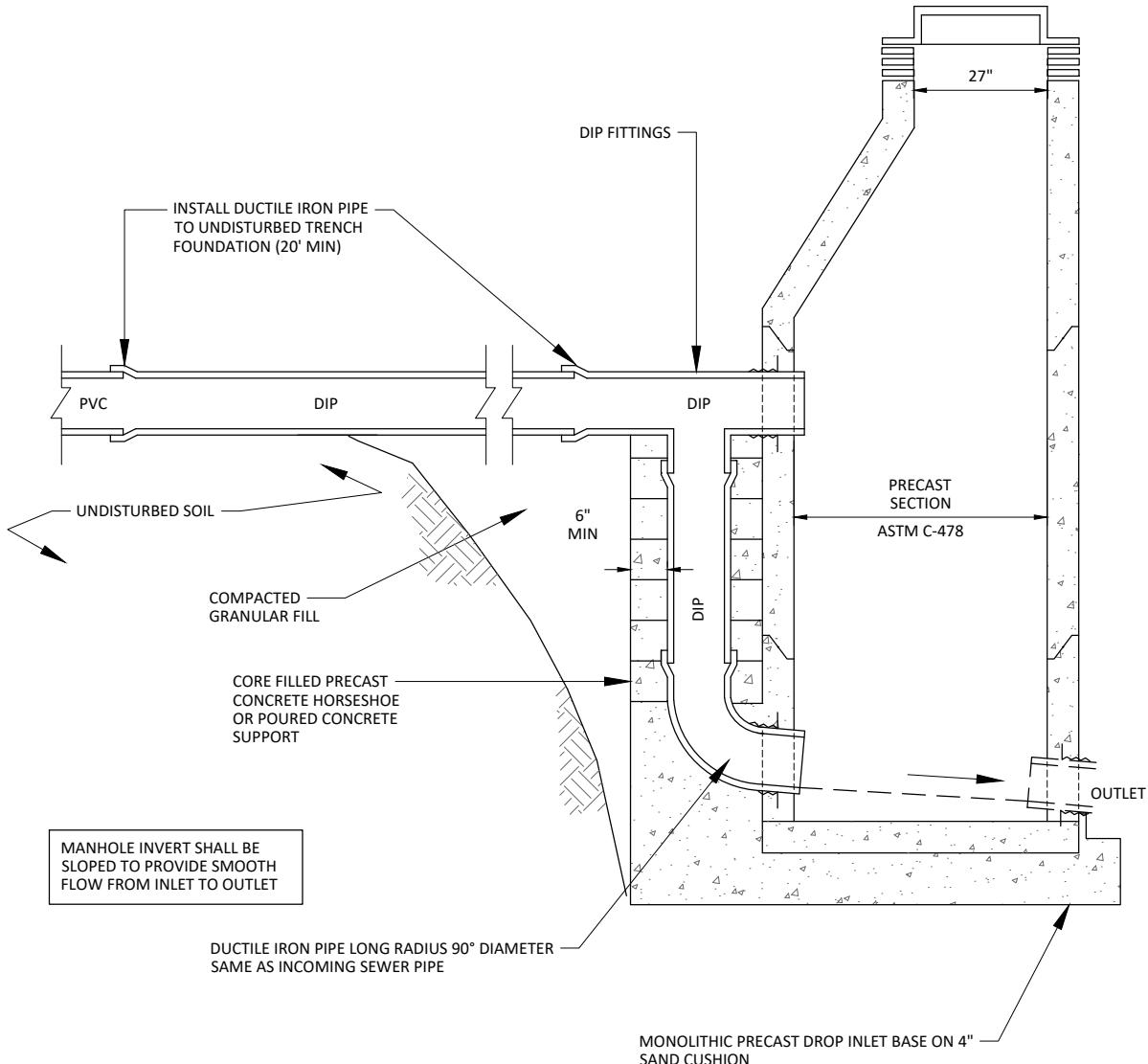
NOTE:

1. SEWER PIPE AND MATERIAL SHALL BE SDR 26 PVC.
2. SERVICES NOT ALLOWED UNDER DRIVEWAYS.
3. CLEANOUTS REQUIRED EVERY 100 LF MIN.
4. WYES, BENDS AND PIPE SIZES AS REQUIRED BY PLANS AND SPECS
5. WHERE NO EXISTING SEWER IS INPLACE, INSTALL PVC CAP AND MARK LOCATION WITH 4"X4"X6' TIMBER & 3/8" X 4' STEEL ROD BURY 6" BELOW FINISHED GRADE
6. SEE MINNESOTA RURAL WATER ASSOCIATION STANDARD DETAILS FOR TRACER WIRE REQUIREMENTS.

SEWER SERVICE REQUIREMENTS  
-GRADES-  
MINIMUM - 1.0% (1/8" PER FT)  
OPTIMUM - 2.0% (1/4" PER FT)  
MAXIMUM - 12.5%



SANITARY SEWER SERVICE & SERVICE RISER, RECONSTRUCTION



SANITARY MANHOLE WITH OUTSIDE DROP

NOT TO SCALE



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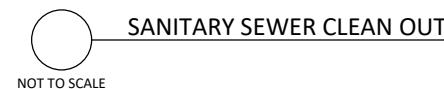
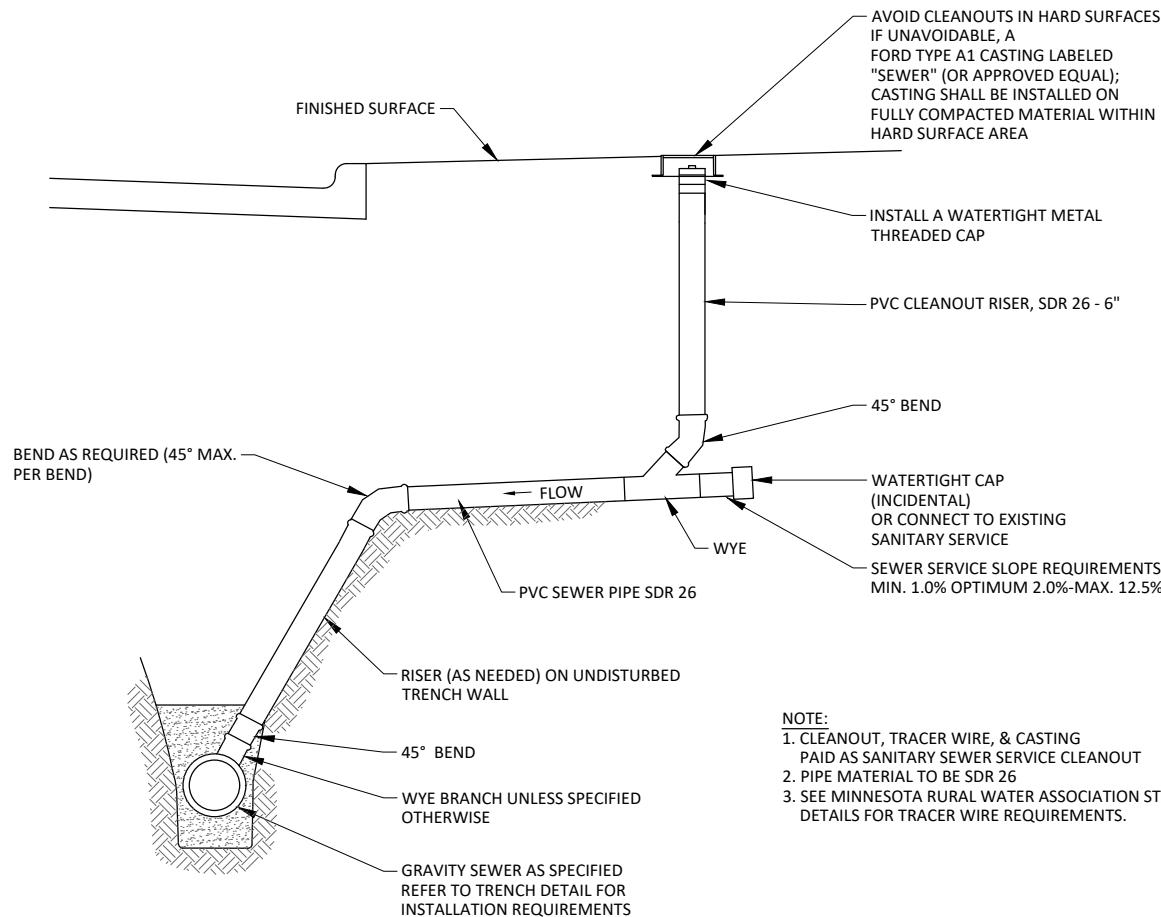
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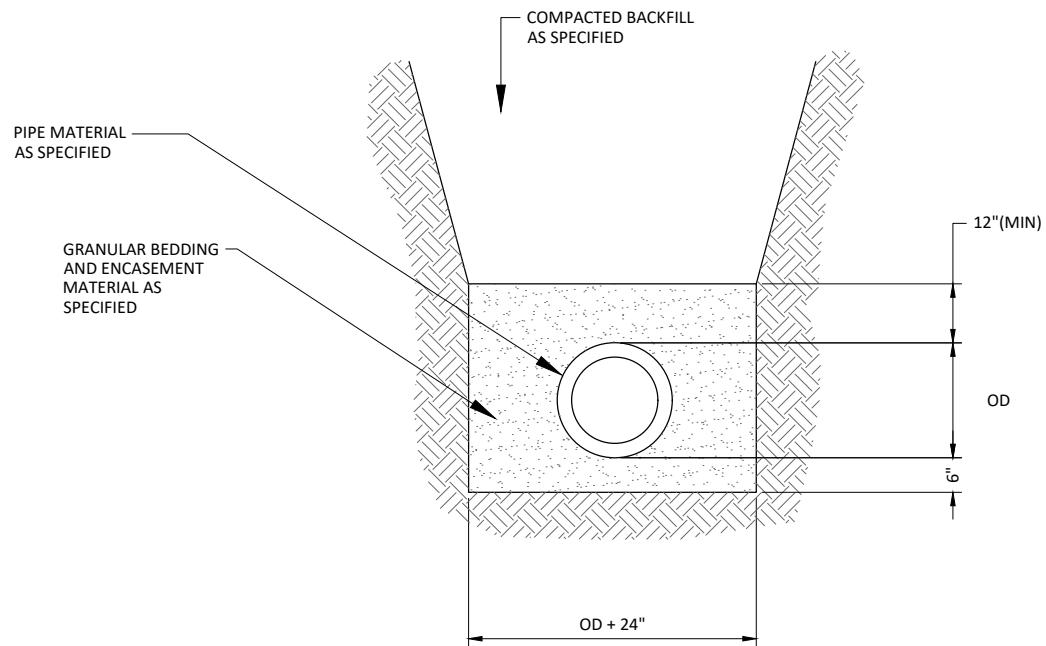
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CITY OF BUFFALO, MINNESOTA

SANITARY MANHOLE WITH OUTSIDE DROP

May 1st, 2025

STD. DETAIL  
5003





 NON-RIGID SANITARY SEWER TRENCH  
NOT TO SCALE



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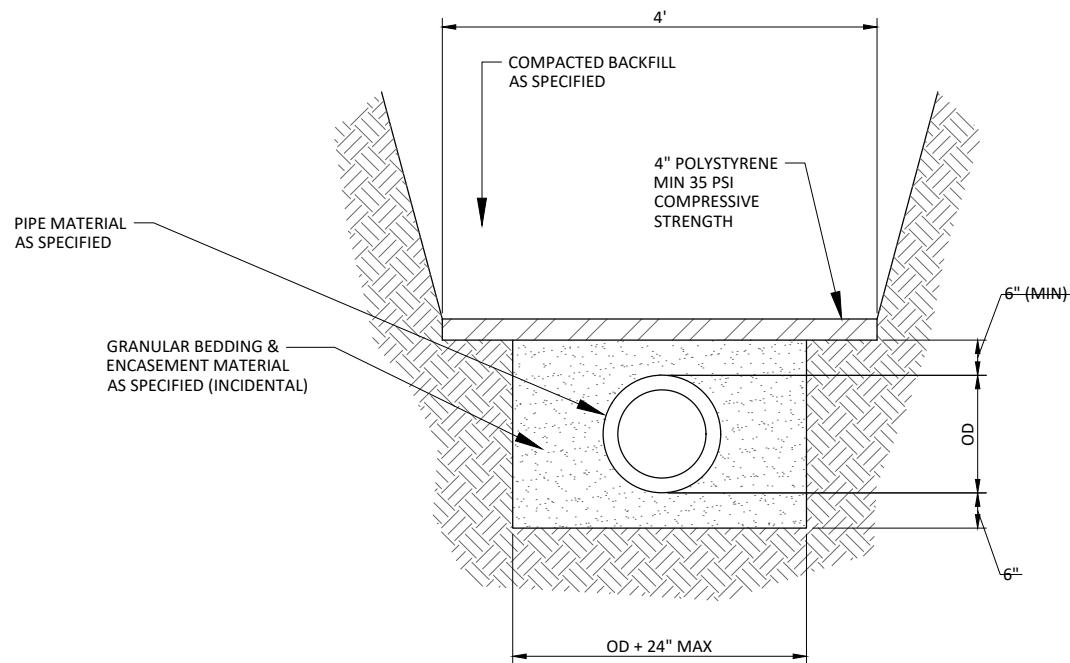
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NON-RIGID SANITARY SEWER TRENCH

May 1st, 2025

STD. DETAIL

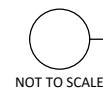
5005



NOTE:  
SEE MINNESOTA RURAL WATER ASSOCIATION STANDARD  
DETAILS FOR TRACER WIRE REQUIREMENTS

IF SERVICE LINE HAS LESS THAN 5' OF COVER  
INSULATION WIDTH SHALL INCREASE AS FOLLOWS:

DEPTH OF COVER	WIDTH OF INSULATION
4 FT	6 FT
3 FT	8 FT
2 FT	10 FT



SANITARY SEWER SERVICE INSULATION

NOT TO SCALE



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SANITARY SEWER SERVICE INSULATION

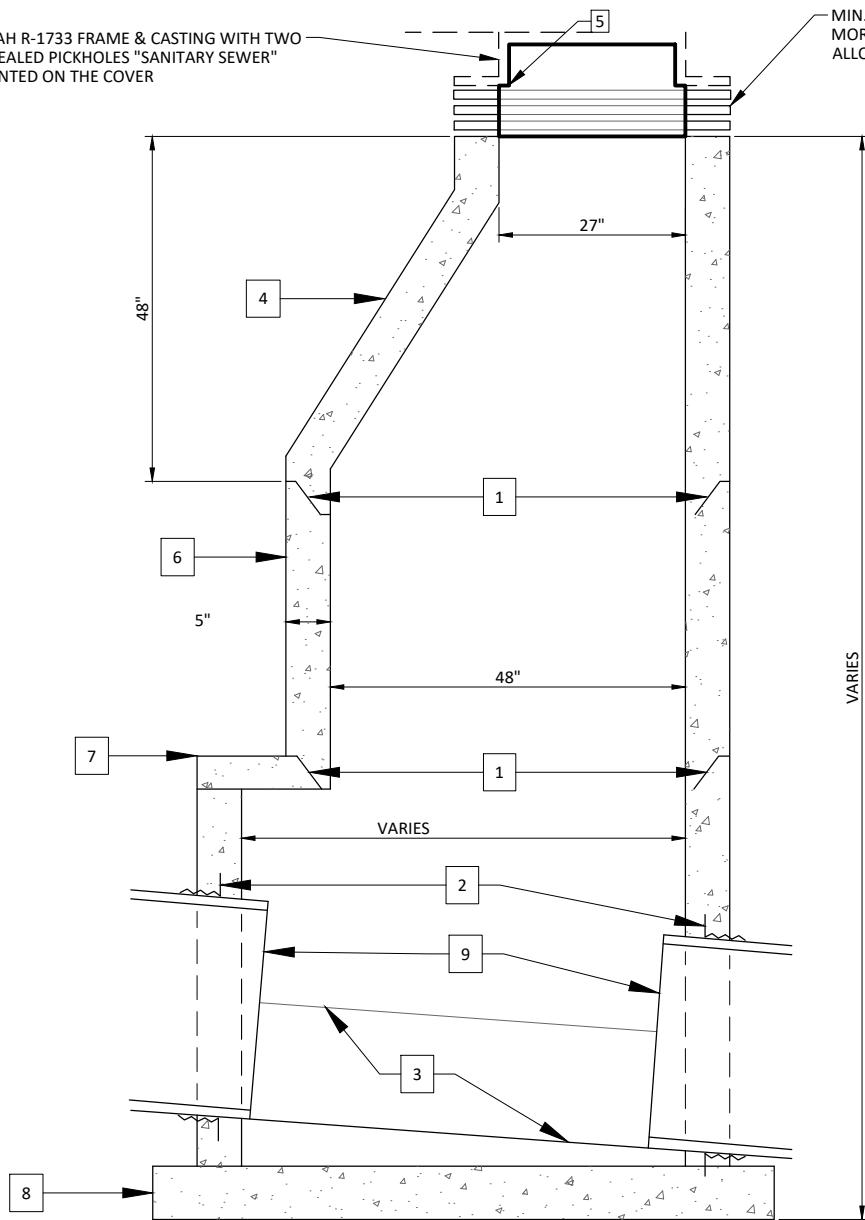
May 1st, 2025

STD. DETAIL

5006

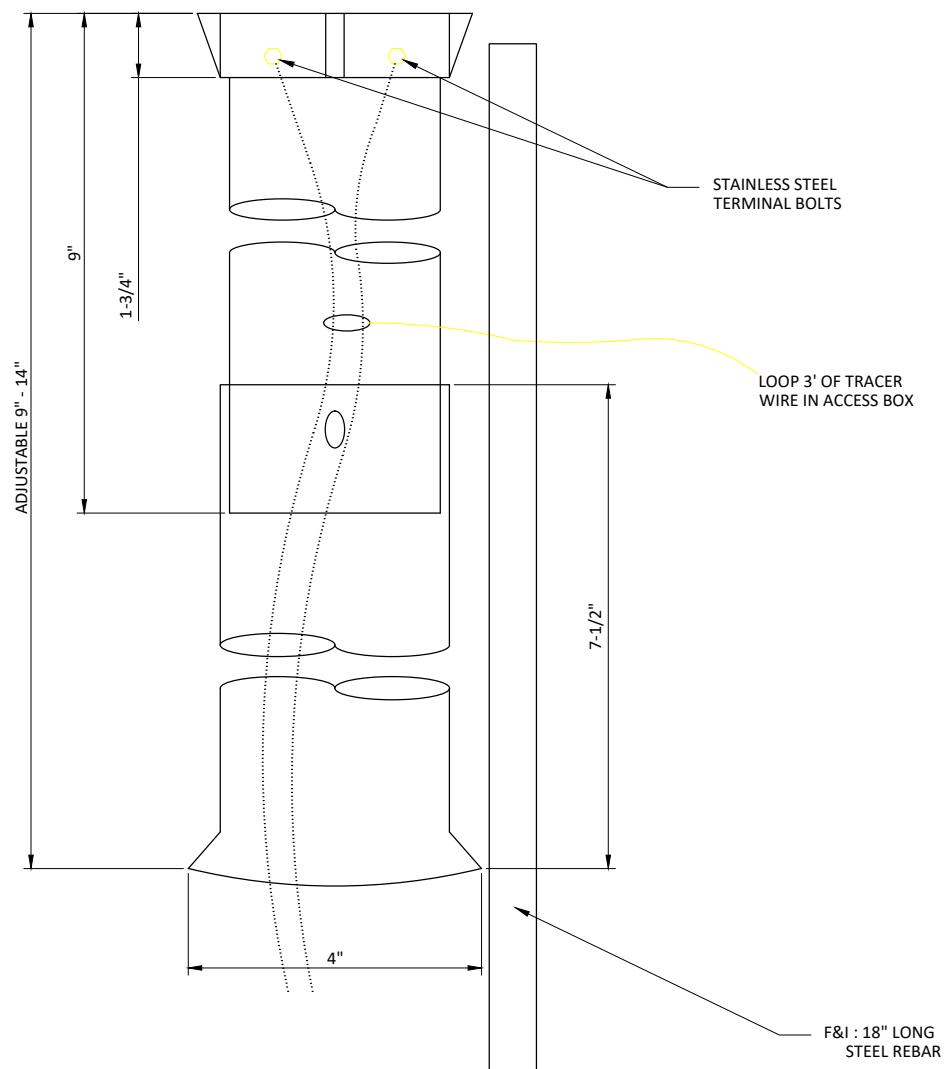
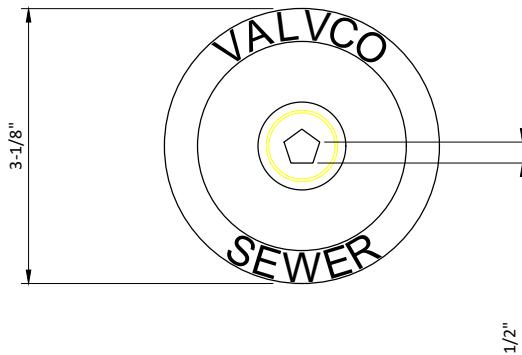
NEENAH R-1733 FRAME & CASTING WITH TWO CONCEALED PITCHES "SANITARY SEWER" IMPRINTED ON THE COVER

MIN. 2, MAX 5 CONCRETE ADJUSTING RINGS WITH FULL MORTAR BED. MAXIMUM 18" OF CASTING AND RINGS ALLOWED WITHOUT CHANGING BARREL SECTIONS.



1. RUBBER GASKET
2. FLEXIBLE WATERTIGHT SEAL TO BE APPROVED BY ENGINEER
3. SHAPE, DEPTH & SLOPE OF INVERT TO BE APPROVED BY ENGINEER, GROUT TO BE MIX 3A34
4. MNDOT TYPE "B" ECCENTRIC PRECAST CONCRETE CONE SECTION TYPICAL FOR ALL MANHOLES
5. PLACE INTERIOR MEDIUM DENSITY POLYETHYLENE I & I BARRIER
6. 48" DIAMETER PRECAST RISER SECTIONS AS REQUIRED
7. PRECAST SLAB WITH ECCENTRIC 48" OPENING DESIGN -HS20 PLUS EARTH LOAD
8. 80" PRECAST BASE SLAB, DIAMETER DEPENDENT ON DIAMETER OF LOWER MANHOLE SECTION
9. REFER TO PLANS FOR PIPE REQUIRED

 SANITARY SEWER MANHOLE  
DES. SPECIAL  
NOT TO SCALE



ADJUSTABLE TRACER WIRE ACCESS BOX

NOT TO SCALE



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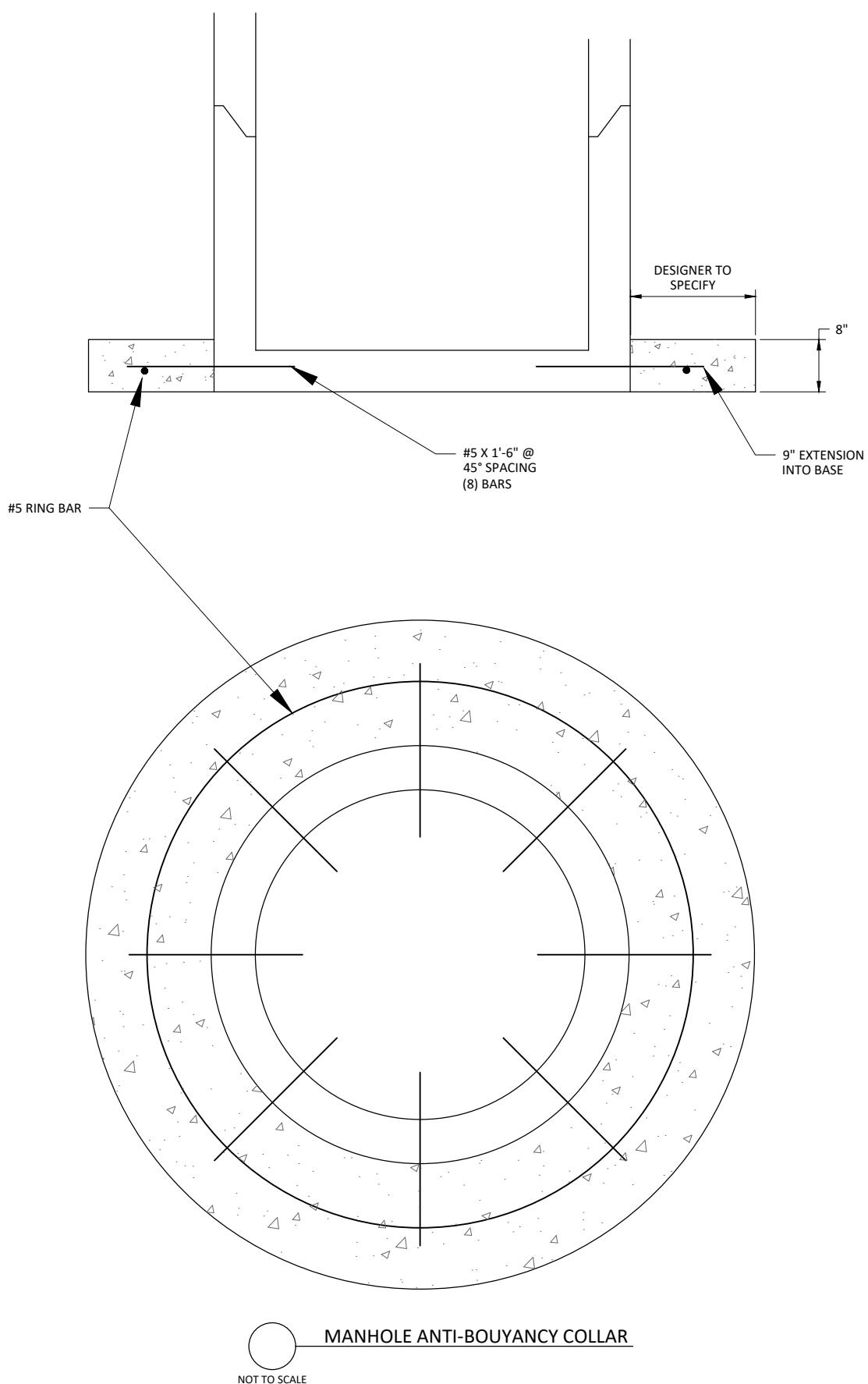
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ADJUSTABLE TRACER WIRE  
ACCESS BOX

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5008



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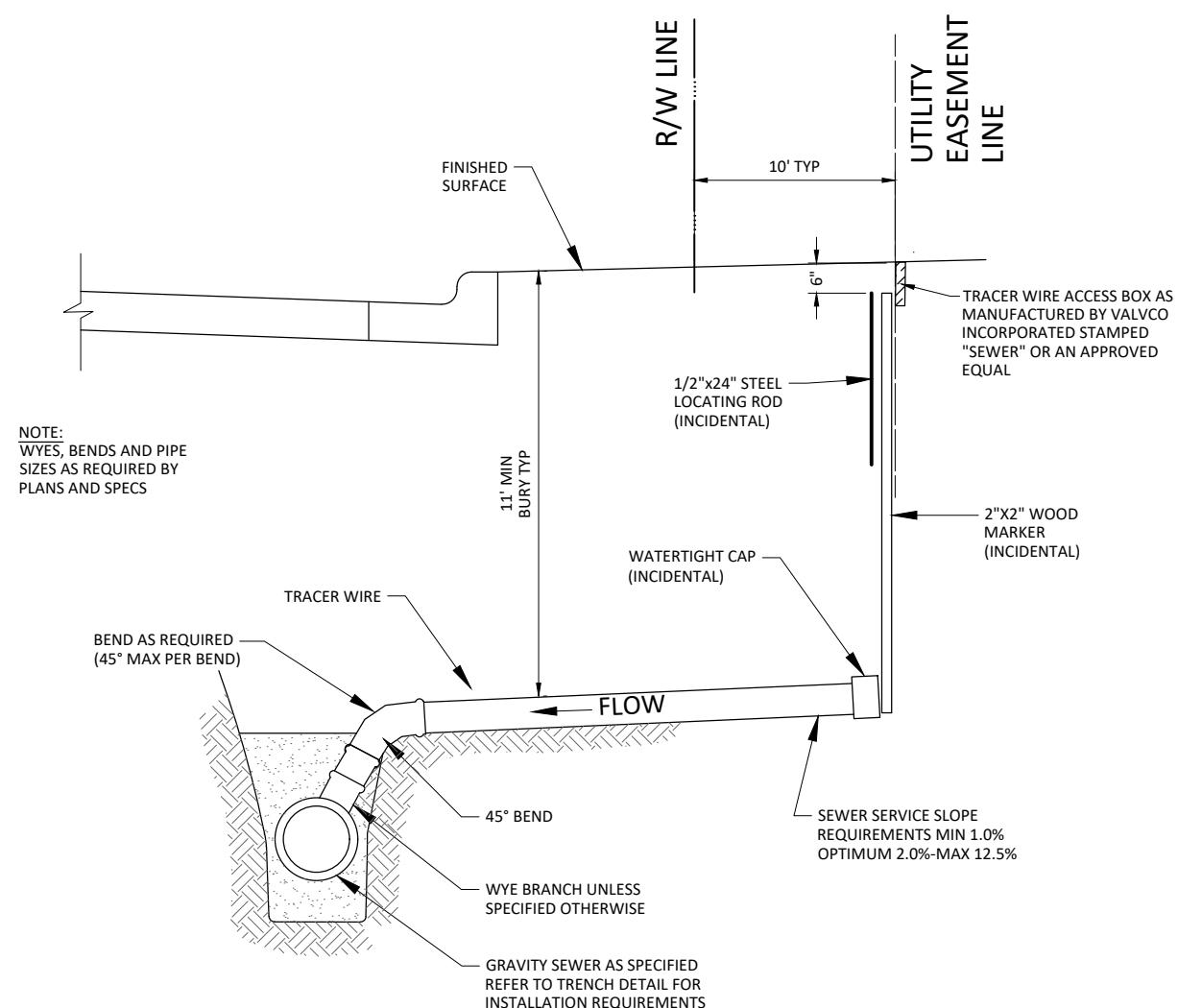
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MANHOLE ANTI-BUOYANCY  
COLLAR

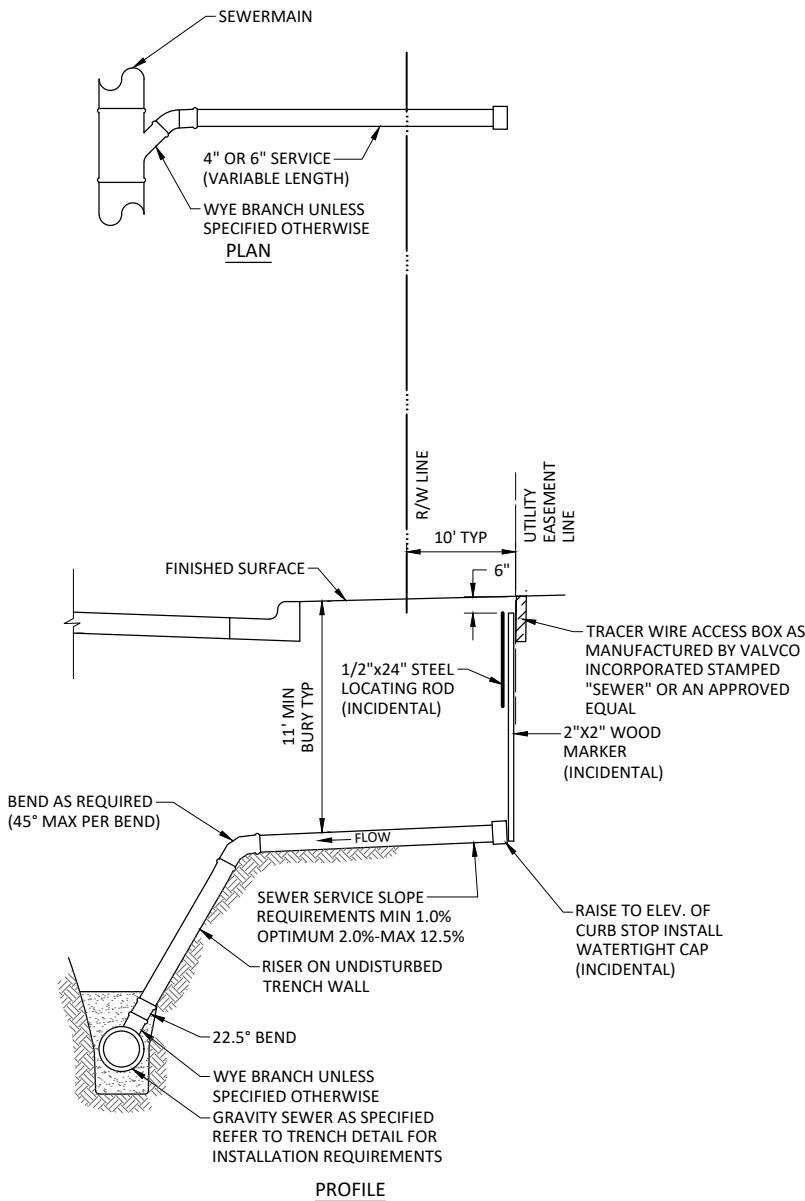
May 1st, 2025

STD. DETAIL  
5009



NOTE:  
 1. WYES, BENDS AND PIPE SIZES AS REQUIRED BY PLANS AND SPECS  
 2. SEWER PIPE MATERIAL SHALL BE SDR 26 PVC  
 3. SERVICES NOT ALLOWED IN OR UNDER DRIVEWAYS.  
 4. CLEANOUTS REQUIRED EVERY 100 LF MIN.  
 5. SEE MINNESOTA RURAL WATER ASSOCIATION STANDARD DETAILS FOR TRACER WIRE REQUIREMENTS.

 SANITARY SEWER SERVICE  
NEW CONSTRUCTION  
NOT TO SCALE



NOTE:

1. WYES, BENDS AND PIPESIZES AS REQUIRED BY PLANS AND SPECS
2. SEWER PIPE MATERIAL SHALL BE SDR 26 PVC
3. SERVICES NOT ALLOWED IN OR UNDER DRIVEWAYS.
4. CLEANOUTS REQUIRED EVERY 100 LF MIN.
5. SEE MINNESOTA RURAL WATER ASSOCIATION STANDARD DETAILS FOR TRACER WIRE REQUIREMENTS.



SANITARY SEWER SERVICE - RISER  
NEW CONSTRUCTION

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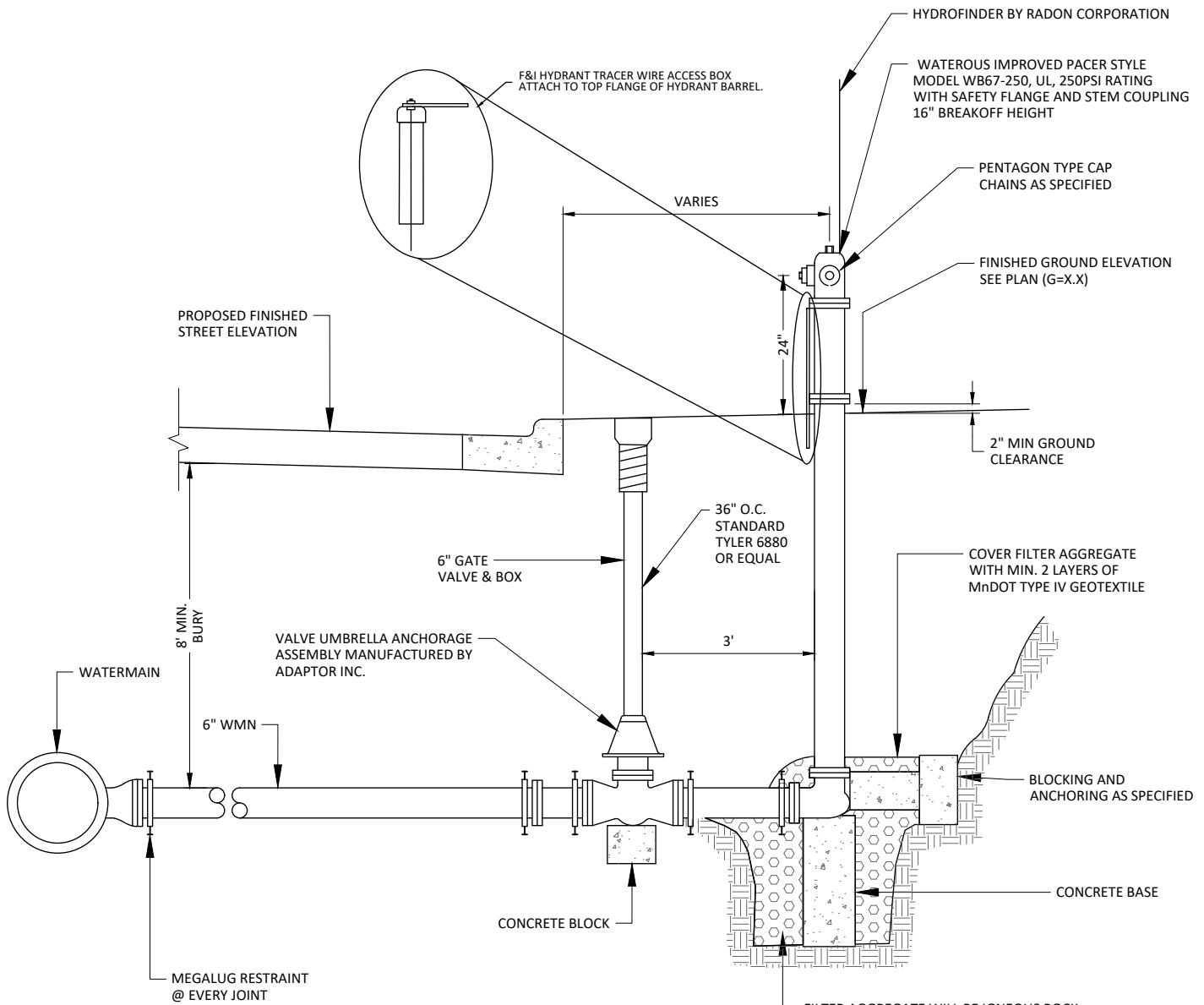
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**SANITARY SEWER SERVICE - RISER**  
NEW CONSTRUCTION

May 1st, 2025

STD. DETAIL

5011



NOTE:

1. HYDRANT & GATE VALVE TO BE TIED TO WATERMAIN WITH METAL RESTRAINING TIE RODS AND/OR MEGA LUG RESTRAINING GLANDS.
2. ALL NUTS & BOLTS SHALL BE 316 STAINLESS STEEL.
3. TIP TEE UP AND INSTALL 45° BEND TO OBTAIN 8.5' BURY FROM HYDRANTS AT LOCATIONS WHERE MAIN IS DEEPER THAN 8'.
4. MATCH CITY OF BUFFALO COLOR AND THREAD TYPES.
5. SEE MINNESOTA RURAL WATER ASSOCIATION STANDARD DETAILS FOR TRACER WIRE REQUIREMENTS.

FILTER AGGREGATE WILL BE IGNEOUS ROCK NO LIMESTONE, MIN. HEIGHT OF 6" ABOVE WEEP HOLES. (MNDOT 3149H). IN AREAS OF HIGH GROUND WATER, PLUG WEEP HOLES AND PAINT STEAMER CAP BLUE.



HYDRANT INSTALLATION, MEGALUGS



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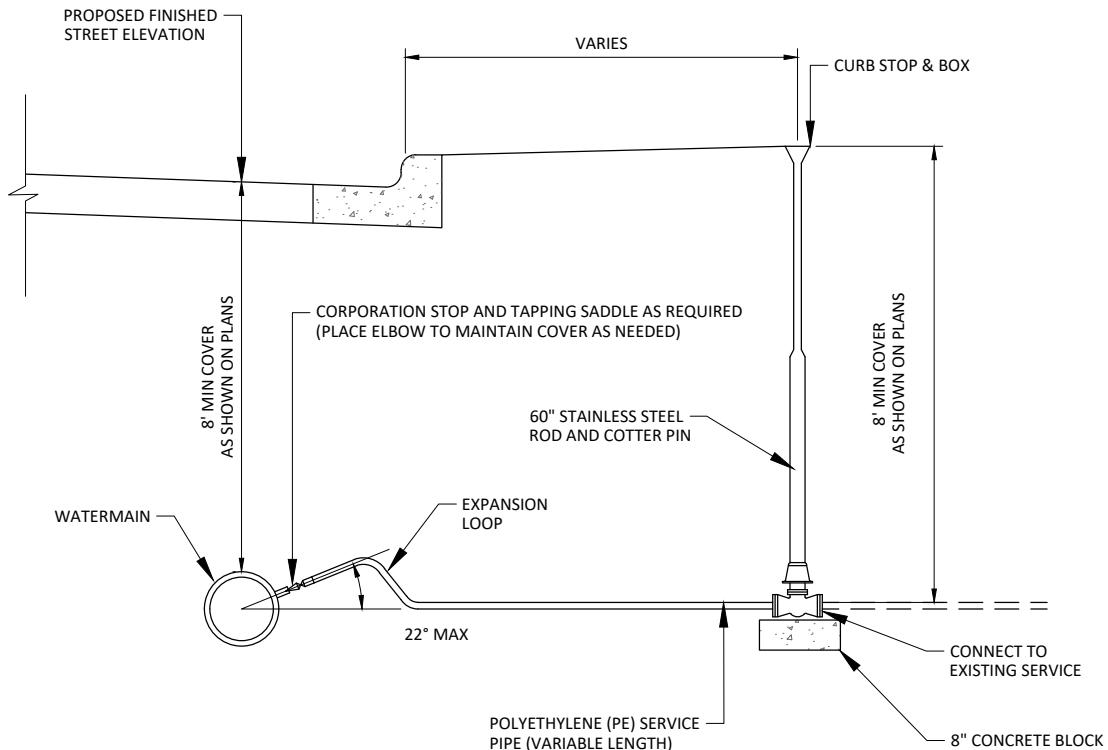


CITY OF BUFFALO, MINNESOTA

HYDRANT INSTALLATION, MEGALUG

May 1st, 2025

STD. DETAIL  
6001



NOTE:

1. WHERE NO EXISTING WATER SERVICE IS INPLACE, PLACE CAP AND STEEL "T" FENCE POST AT CURB STOP
2. SEE MINNESOTA RURAL WATER ASSOCIATION STANDARD DETAILS FOR TRACER WIRE REQUIREMENTS.

 **WATER SERVICE INSTALLATION  
RECONSTRUCTION**  
 NOT TO SCALE



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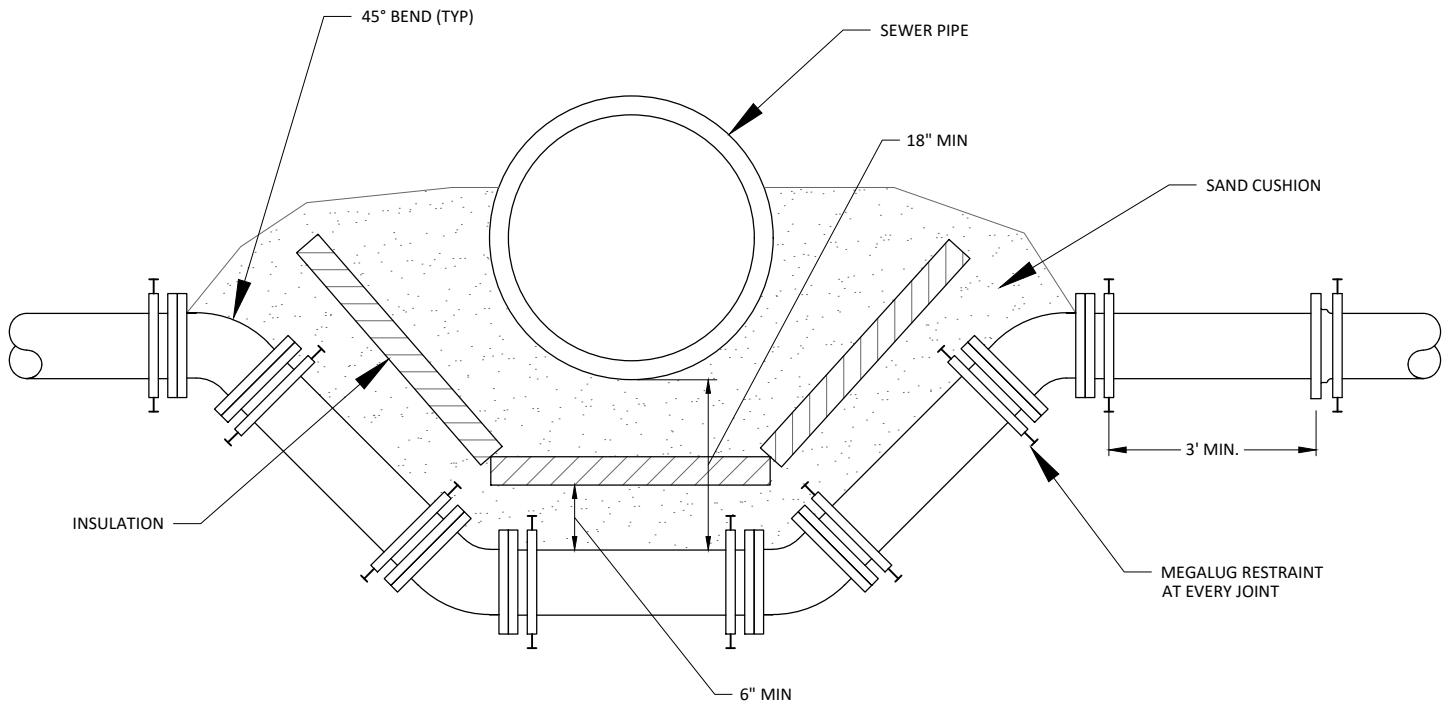
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**WATER SERVICE INSTALLATION  
RECONSTRUCTION**

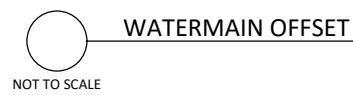
May 1st, 2025

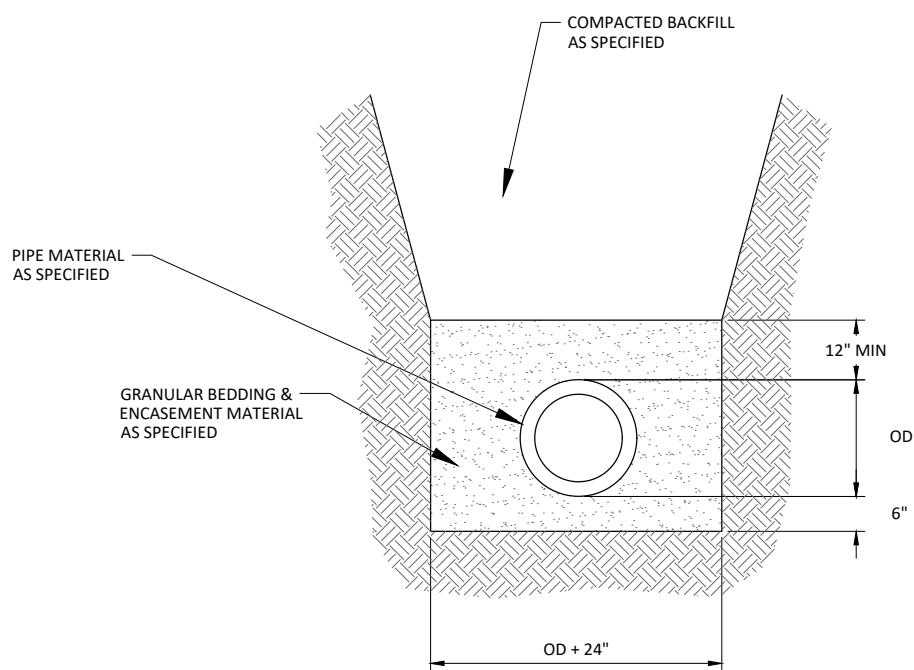
STD. DETAIL  
6002



NOTES:

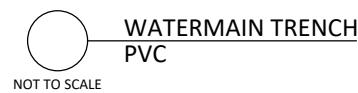
1. PROVIDE MEGALUG RESTRAINT AT JOINT ON BENDS AND AS SHOWN THIS DETAIL
2. COAT ALL ANCHORAGE AS PER SPECS
3. PROVIDE SAND CUSHION BETWEEN TOP OF WATERMAIN AND BOTTOM OF SEWER PIPE, MIN DIMENSIONS AS SHOWN THIS DETAIL (INCIDENTAL)
4. INSULATION TO BE 4" THICK DENSE FOAM IN AREAS OF LIMITED LONGITUDINAL SPACE.
5. IN AREAS OF GREATER LONGITUDINAL SPACE THE WATERMAIN SHALL BE GRADUALLY LOWERED AND RAISED, USING NO BENDS, OVER A DISTANCE OF 200'.





NOTE:

1. SEE MINNESOTA RURAL WATER ASSOCIATION STANDARD DETAILS FOR TRACER WIRE REQUIREMENTS.



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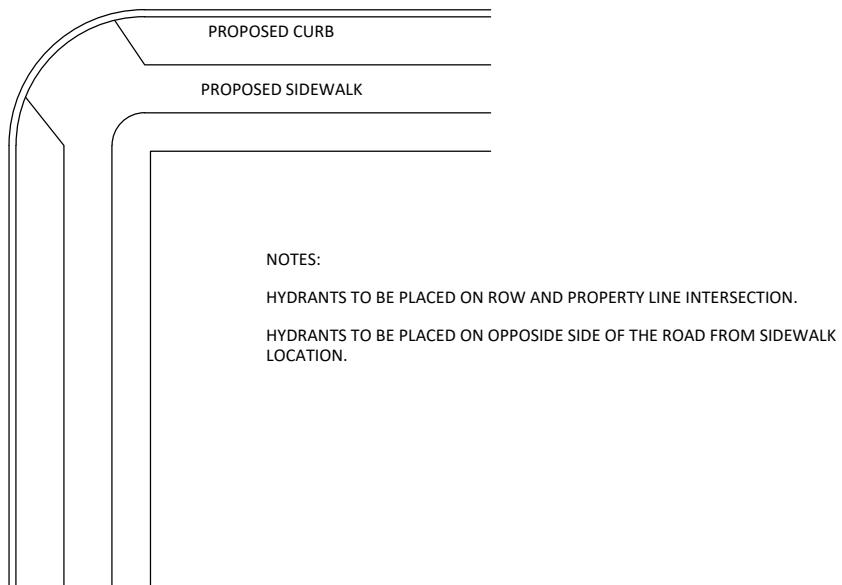
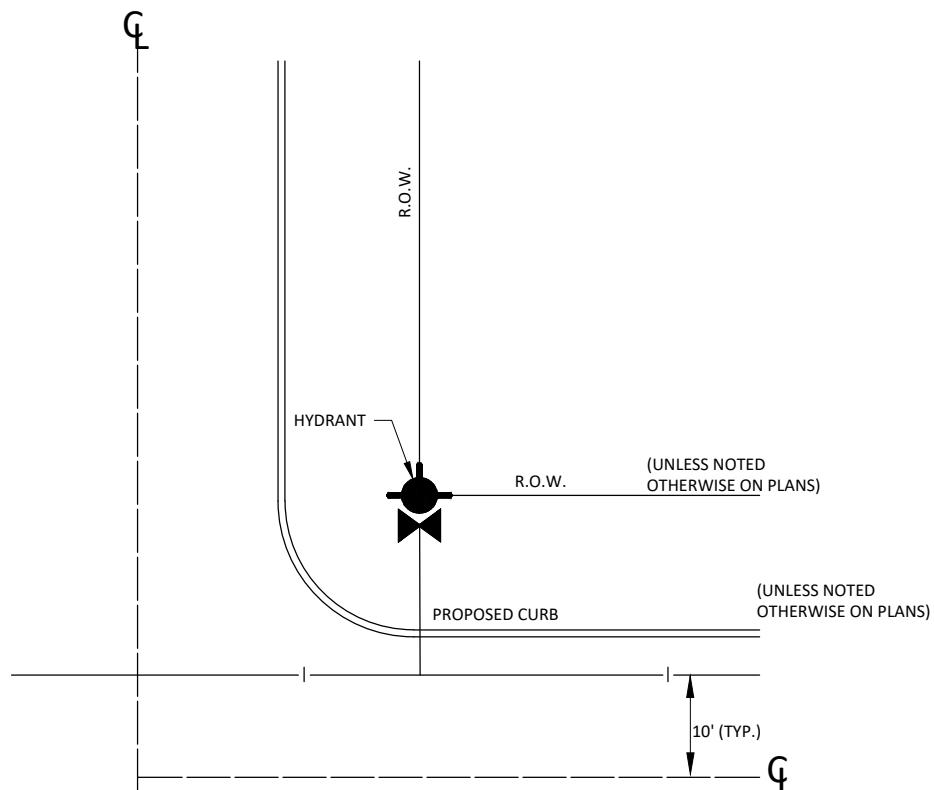
*Buffalo*  
CITY OF BUFFALO, MINNESOTA

WATERMAIN TRENCH - PVC

May 1st, 2025

STD. DETAIL

6004



PROPOSED HYDRANT LOCATION

NOT TO SCALE



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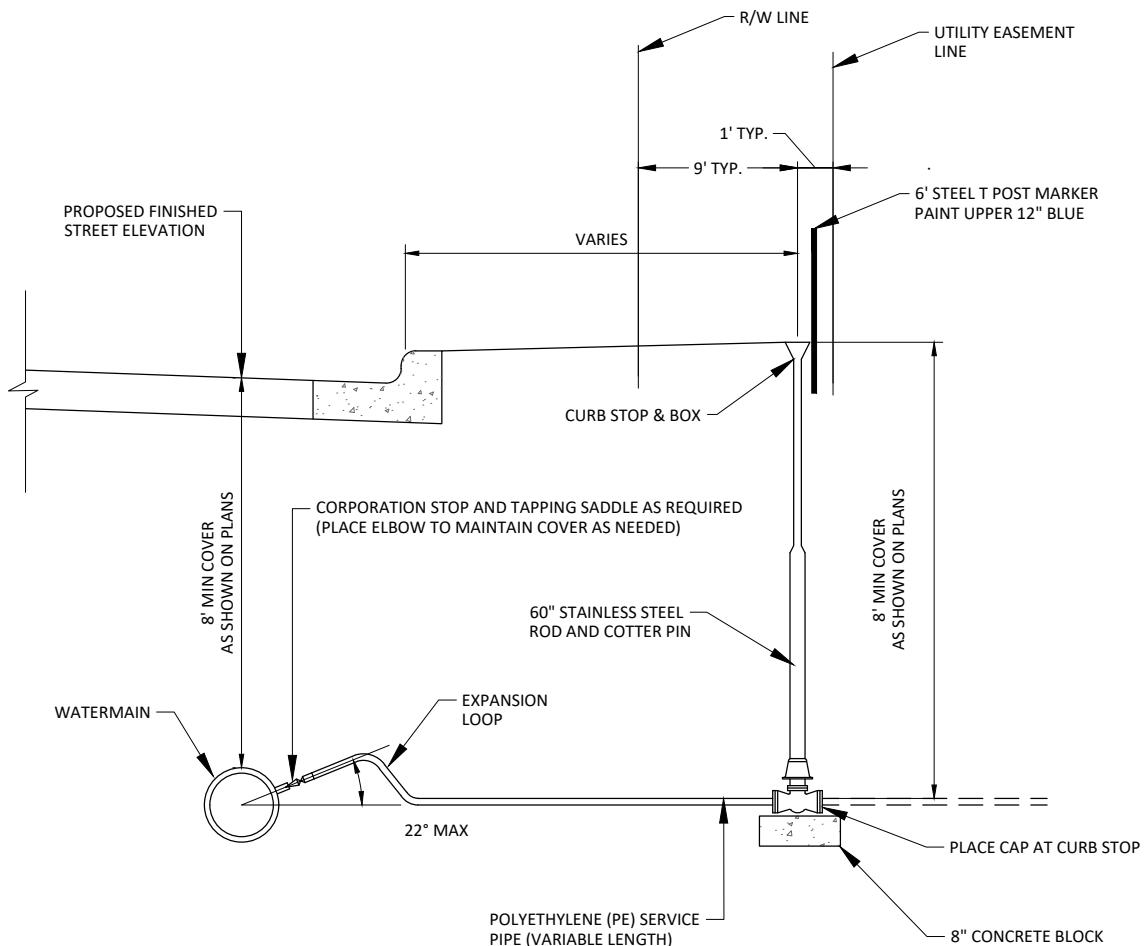
*Buffalo*  
CITY OF BUFFALO, MINNESOTA

PROPOSED HYDRANT LOCATION

May 1st, 2025

STD. DETAIL

6005



NOTE:

1. SERVICES SHALL NOT BE PLACED WITHIN ANY PAVED SURFACING INCLUDING DRIVEWAYS OR SIDEWALKS. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER OR HOMEOWNER TO RELOCATE ANY SERVICES WHICH ARE INSTALLED WITHIN A PAVED SURFACE.
2. SEE MINNESOTA RURAL WATER ASSOCIATION STANDARD DETAILS FOR TRACER WIRE REQUIREMENTS.

 **WATER SERVICE INSTALLATION**  
 NEW CONSTRUCTION  
 NOT TO SCALE



**BOLTON & MENK**

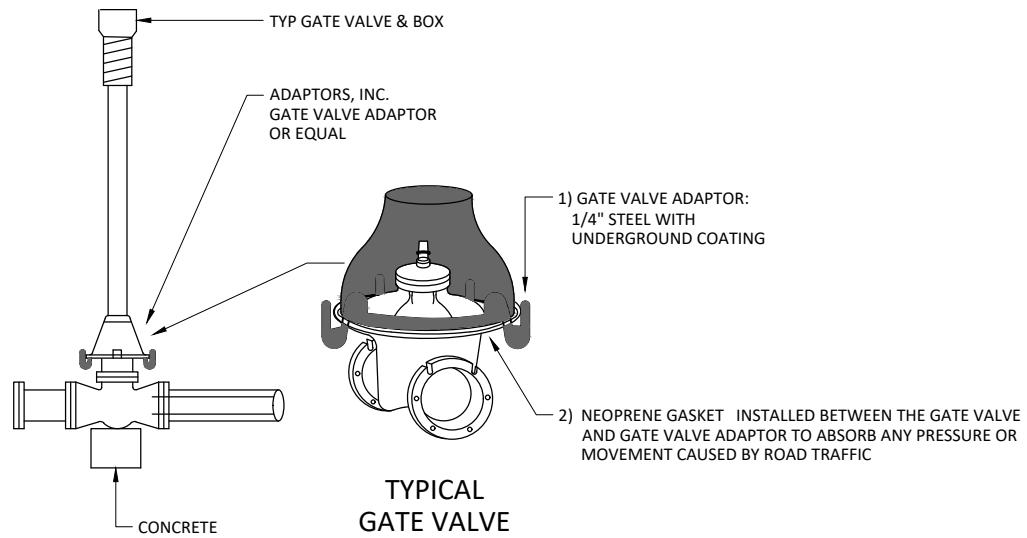
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*Buffalo*  
 CITY OF BUFFALO, MINNESOTA

**WATER SERVICE INSTALLATION**  
**NEW CONSTRUCTION**

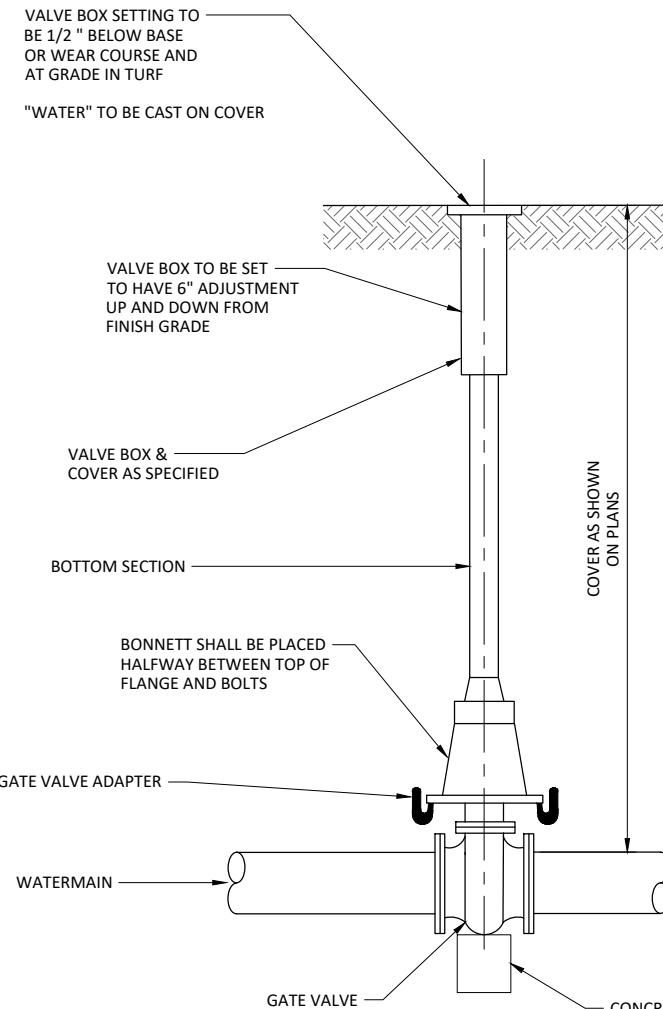
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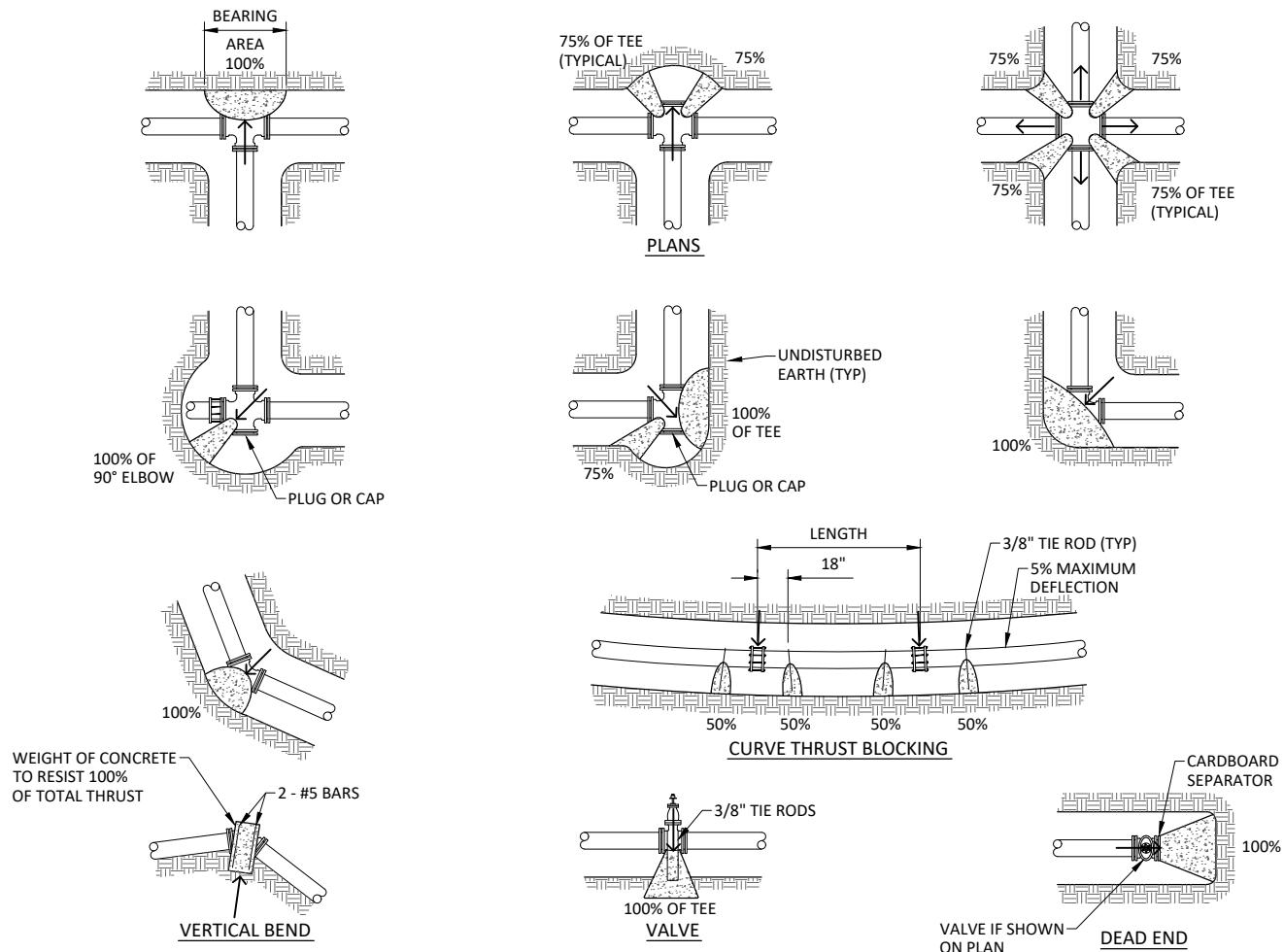
STD. DETAIL  
**6006**



**NOTES:**

1. VALVE BOX SHALL BE CENTERED ON OPERATING NUTS, STRAIGHT, FREE FROM DEBRIS, AND ALL SECTIONS UNBROKEN
2. VALVES IN EASEMENTS SHALL HAVE TRIVIEW MARKERS WITH THE APPROPRIATE REFLECTIVE STICKER.
3. DEEP VALVES SHALL HAVE NUT EXTENSIONS INSTALLED TO ELEVATION TO ACCOMMODATE STANDARD 10' KEY; BOTTOM NUT SHALL BE BOLTED TO VALVE NUT AND ONLY ONE SECTION
4. COMPACTION WITH MECHANICAL TAMPER AROUND VALVE BOX SHALL BE PLACED AND COMPACTED WITH 2' LIFTS TO ACHIEVE 95% COMPACTION
5. GATE VALVES IN CONCRETE SHALL BE AVOIDED. IF PLACEMENT IN CONCRETE IS SPECIFICALLY APPROVED BY THE CITY ENGINEER, GATE VALVES SHALL INCLUDE EXPANSION JOINT BETWEEN THE VALVE BOX AND THE CONCRETE.
6. ALL VALVE NUTS AND BOLTS SHALL BE 316 STAINLESS
7. GATE VALVES SHALL BE EPOXY COATED AND MANUFACTURED IN THE USA.
8. ALL VALVES AND RESTRAINING RODS SHALL BE PROTECTED USING 2 LARGE 6 OZ SACRIFICIAL ZINC ANODE CAPS FOR EVERY MECHANICAL JOINT GLAND INSTALLED.
9. ALL VALVES AND BOXES SHALL BE WRAPPED IN A POLYTHYLENE ENCASING MATERIAL AND SECURED WITH TAPE ON EACH END AND IN THE MIDDLE.





100% BEARING AREA (SQ FT)				
PIPE SIZE	DEAD END OR TEE	90° ELBOW	45° ELBOW	22 1/2° ELBOW
4	2.4	3.4	1.9	0.9
6	4.9	6.9	3.8	1.9
8	8.4	11.8	6.4	3.4
10	13.7	19.3	10.5	5.4
12	19.4	27.3	14.9	7.7
14	26.3	37.0	20.1	10.3
16	34.0	47.9	26.2	13.3
18	43.9	61.8	33.7	17.2
20	54.3	76.4	41.7	21.2
24	77.9	109.8	59.8	30.5

NOTE:  
BEARING AREAS ARE BASED ON 250 LB  
MAXIMUM PRESSURE AND SOIL BEARING  
STRENGTH OF 2000 LB/SQ FT.

ARROWS (→) INDICATE THRUST DIRECTION

NOTES:

1. FIGURE (100%) AT THRUST BLOCK INDICATES PER CENT OF TOTAL THRUST TO BE APPLIED FOR BEARING AREA.
2. CONCRETE FOR THRUST BLOCKS TO BE 2000 PSI.
3. RESTRAINING RODS ARE REQUIRED AT ALL TEES AND AT BENDS DEFLECTING 22 1/2° OR MORE.
4. WRAP THE PIPE WITH POLYETHYLENE WRAPPING PRIOR TO POURING THE THRUST BLOCK.
5. SEE SOILS REPORT FOR BEARING STRENGTH OF SOIL. IN ABSENCE OF A SOILS REPORT, AN AVERAGE SOIL (SPADABLE MEDIUM CLAY) CAN BE ASSUMED TO HAVE A BEARING STRENGTH OF 2000 PSI.
6. THRUST BLOCKS ARE NOT REQUIRED ON PVC WITH SOLVENT WELDED JOINTS.

SIDE THRUST PER 100 LB/SQ IN PRESSURE PER DEGREE OF DEFLECTION

PIPE SIZE	SIDE THRUST-LB	PIPE SIZE	SIDE THRUST-LB
4	35	14	377
6	72	16	486
8	122	18	665
10	197	20	790
12	278	24	1150

MULTIPLY THRUST BY DEGREE OF DEFLECTION TO OBTAIN TOTAL THRUST

CONCRETE THRUST BLOCKS

NOT TO SCALE



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**Buffalo**  
CITY OF BUFFALO, MINNESOTA

CONCRETE THRUST BLOCKS

May 1st, 2025

STD. DETAIL  
6008

## City of Buffalo - Coliform Bacteria Testing Procedures

Note: Inspector may be either a Bolton and Menk employee or City of Buffalo Water Department employee

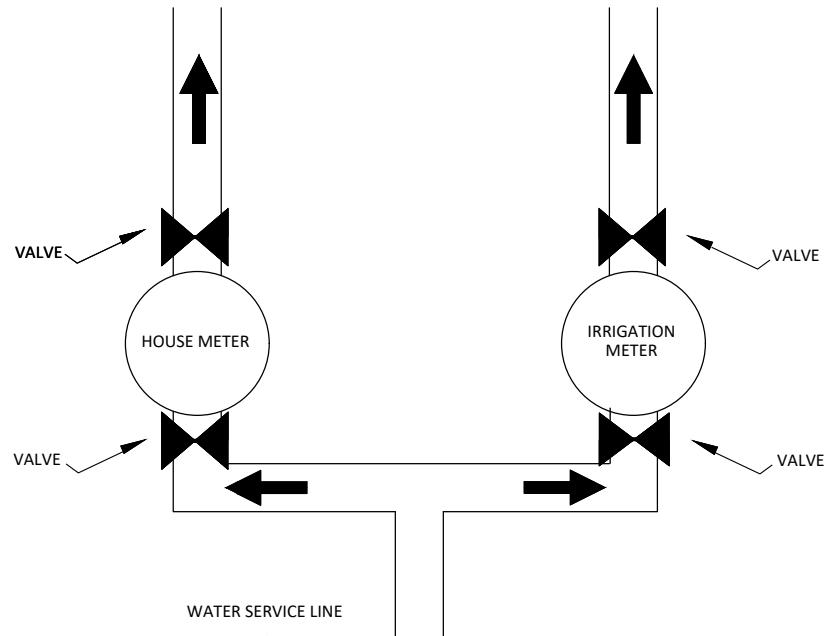
- 1) Contractor schedules sampling with inspector (24 hour notice required)
- 2) Inspector to be present to witness sample collection
- 3) Contractor takes sample per AWWA requirements. Sample bottle provided by contractor (Inspector may have bottles available but not guaranteed).
- 4) Water Laboratories, Inc. chain of custody form provided by inspector to contractor and filled out by contractor. Contractor provide an email address on the form if they want a copy of the results from the lab.
- 5) Contractor hands the collected sample and filled out chain of custody form to the inspector. Inspector places sample on ice.
- 6) Inspector takes sample and chain of custody form to Water Laboratories, Inc. lab within 24 hours of time of collection (Sample must be in lab incubator within 30 hours of collection time)
  - a. Lab Hours for Dropoff: 8am to 3:45 pm
  - b. Location: 333 Main St NW, Elk River, MN 55330
  - c. Phone: 763-441-7509
- 7) If asked by lab, test to be taken is "Colilert 18" (results are back within 18 hours) (This is the standard test used by most everyone)
- 8) Lab emails results and invoice to the following:
  - a. Nick Peterson - BMI - Nick.Peterson@bolton-menk.com
  - b. Justin Kannas - BMI - Justin.Kannas@bolton-menk.com
  - c. Cara Hesse - City of Buffalo Water Department - Cara.Hesse@ci.buffalo.mn.us
  - d. Contractor - If filled out on Chain of Custody Form
- 9) BMI reviews results and sends invoice to City Finance for payment with Project Name and Number



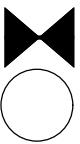
### COLIFORM BACTERIA TESTING PROCEDURES

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			STD. DETAIL 6009



LEGEND



VALVE



METER



DIRECTION OF WATER FLOW

IRRIGATION CONNECTION  
NOT TO SCALE



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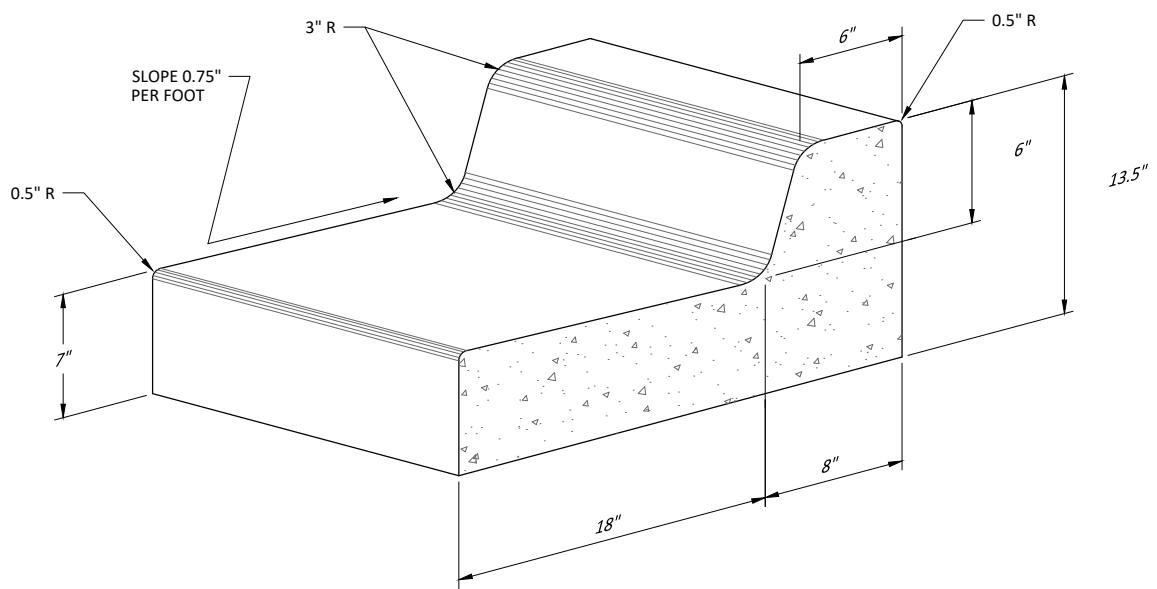
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*Buffalo*  
CITY OF BUFFALO, MINNESOTA

IRRIGATION CONNECTION

Jan 22, 2026

STD. DETAIL  
6010



CONCRETE CURB & GUTTER  
DESIGN B618

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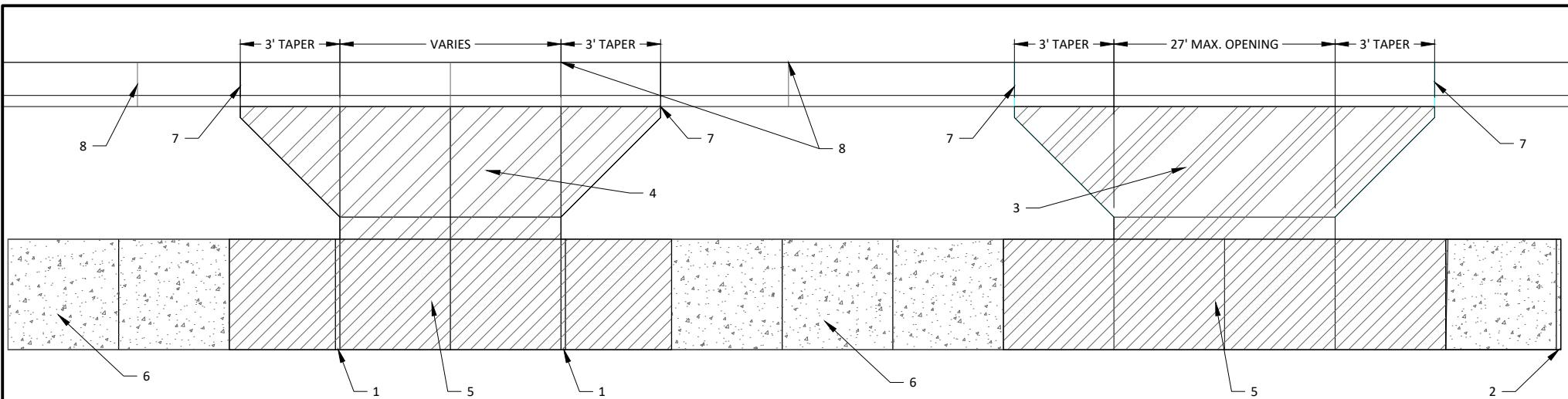
*Buffalo*  
CITY OF BUFFALO, MINNESOTA

CONCRETE CURB & GUTTER  
DESIGN B618

May 1st, 2025

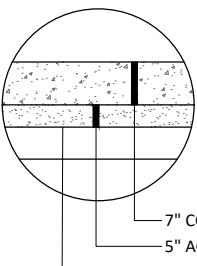
STD. DETAIL

7001



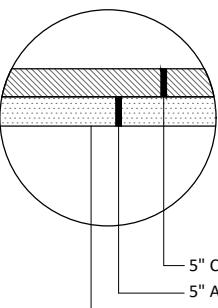
NOTES:

1. 1/2" PREFORMED JOINT FILLER MATERIAL - AASHTO M213 (NOT REQUIRED WHEN CURB AND GUTTER OR WALK ARE ADJACENT TO BITUMINOUS PAVING.)
2. 1/2" EXPANSION JOINTS AT 60' (APPROXIMATE) MAXIMUM INTERVALS. (INCIDENTAL)
3. RESIDENTIAL APRONS TO BE SUPPLIED BY THE DEVELOPER. MATERIAL TO BE CONCRETE OR BITUMINOUS PAVEMENT.
4. COMMERCIAL DRIVEWAY APRONS TO BE CONSTRUCTED OF 7" CONCRETE PAVEMENT AND CONSTRUCTED IN CORRELATION WITH THE SIDEWALK AND CURB & GUTTER.
5. 7" CONCRETE WALK SHALL BE CONSTRUCTED THROUGH DRIVEWAYS AND EXTEND 5' OUT FROM EACH SIDE OF DRIVEWAY.
6. 5' WIDE AND 5" THICK CONCRETE WALK SHALL BE CONSTRUCTED IN LOCATIONS NOT AFFECTED BY VEHICLE TRAFFIC.
7. 1/2" EXPANSION JOINT
8. CURB SHALL HAVE CONTRACTION JOINTS (FORMED OR SAWED) AT 8' (APPROXIMATE) MAXIMUM INTERVALS.



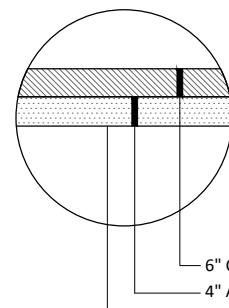
7" CONCRETE DRIVEWAY PAVEMENT

NOT TO SCALE



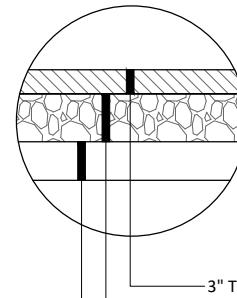
5" CONCRETE WALK  
TYPICAL

NOT TO SCALE



6" CONCRETE WALK  
PEDESTRIAN RAMP

NOT TO SCALE

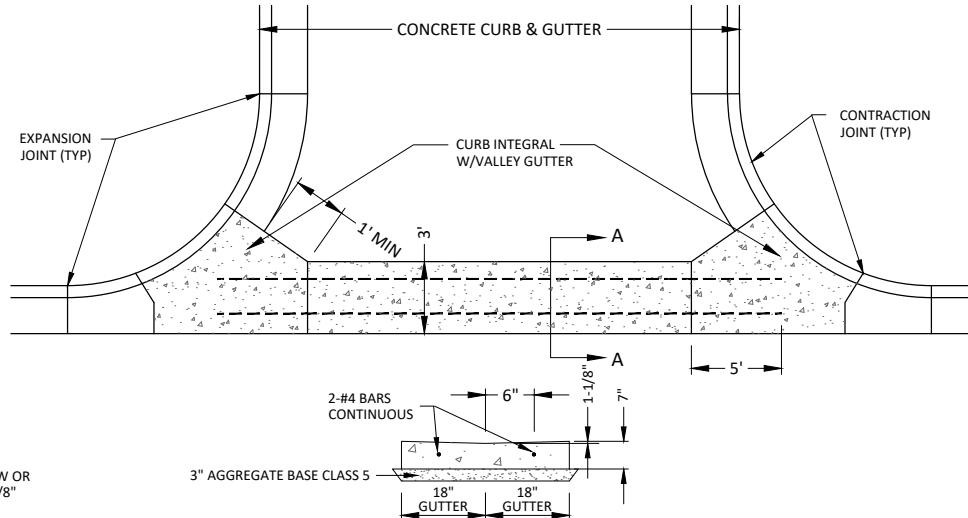


BITUMINOUS DRIVEWAY PAVEMENT

NOT TO SCALE

CONTRACTOR TO REFER TO MnDOT PEDESTRIAN RAMP CURB DETAILS - STANDARD PLAN 5-297.250 FOR PEDESTRIAN RAMP COMPLIANCE.

CONTRACTOR TO REFER TO MnDOT DRIVEWAY AND SIDEWALK DETAILS - STANDARD PLAN 5-297-254 FOR DRIVEWAY AND SIDEWALK COMPLIANCE.

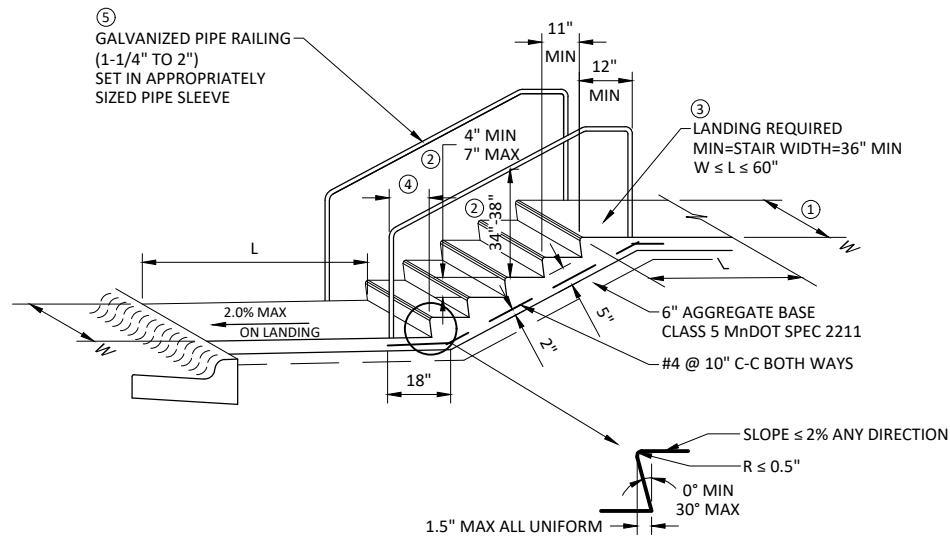


NOTE:

1. VALLEY GUTTER JOINTS: SAW OR SCORE 1/8" MINIMUM TO 3/8" MAXIMUM WIDTH JOINTS A MINIMUM OF 2" DEPTH AT APPROXIMATELY 10' INTERVALS. SEAL JOINTS IN ACCORDANCE TO MnDOT 2301.3.N.3
2. THE CONCRETE VALLEY GUTTER SHALL BE CONSTRUCTED ON 3" AGGREGATE BASE, CLASS 5

### CONCRETE VALLEY GUTTER

NOT TO SCALE

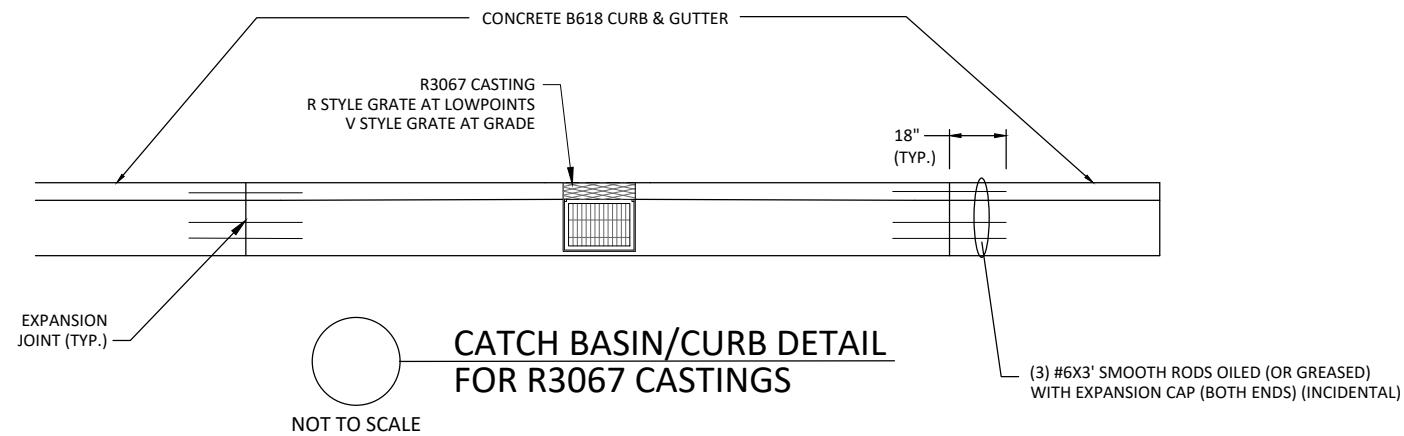
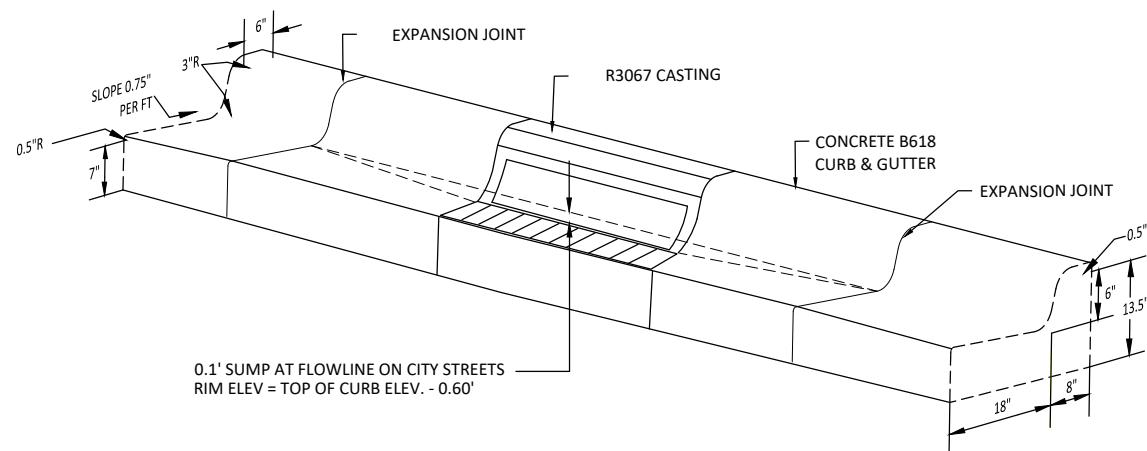


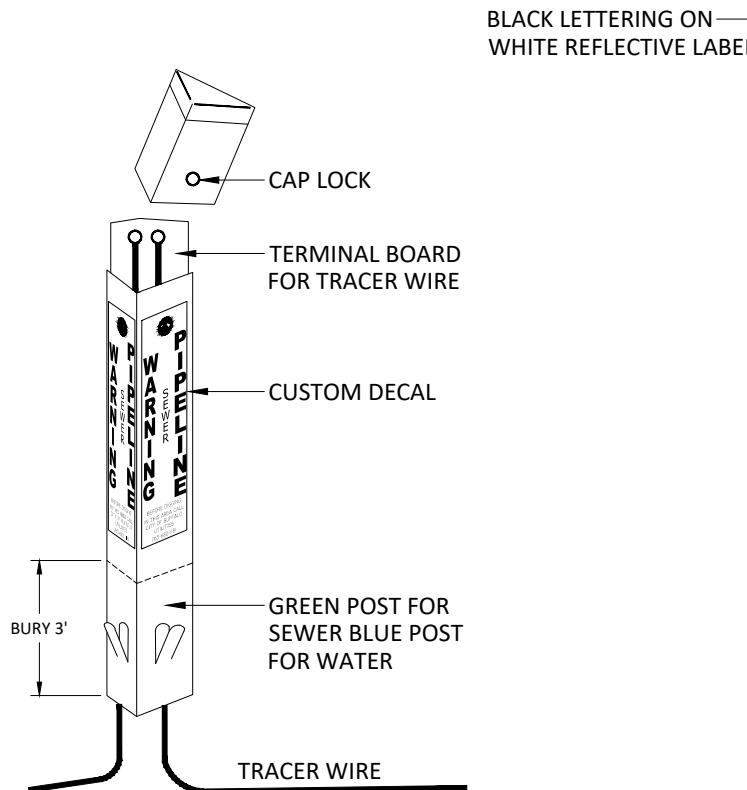
NOTES:

1. MIN WIDTH IS CLEAR BETWEEN HANDRAILS; CHECK WITH CITY BUILDING OFFICIAL FOR OCCUPANT LOADS  $\geq$  50 PERSONS
2. TREADS AND RISERS MUST BE UNIFORM WITH NO MORE THAN 3/8" DIFFERENCE FROM SMALLEST TO LARGEST TREAD OR RISER
3. SEE BUILDING CODE IF DOORS OPEN ON TO STAIR LANDING
4. MINIMUM ONE STAIR TREAD WIDTH
5. RAILINGS SHALL CONFORM TO AMERICANS WITH DISABILITIES ACT

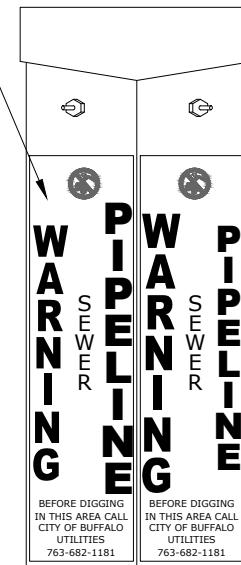
CONCRETE STAIRWAY

NOT TO SCALE

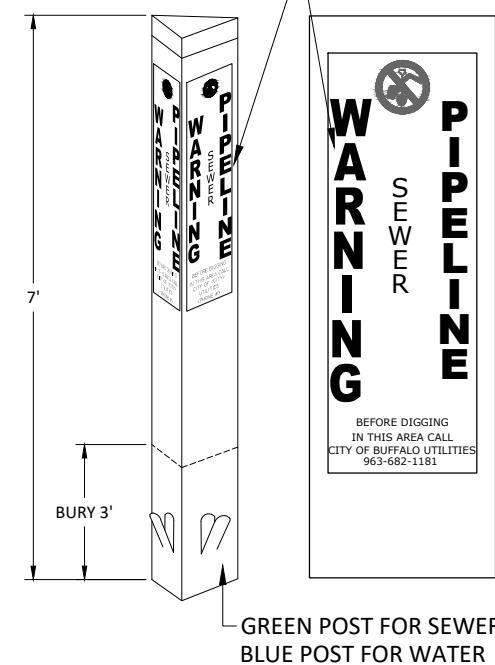




BLACK LETTERING ON  
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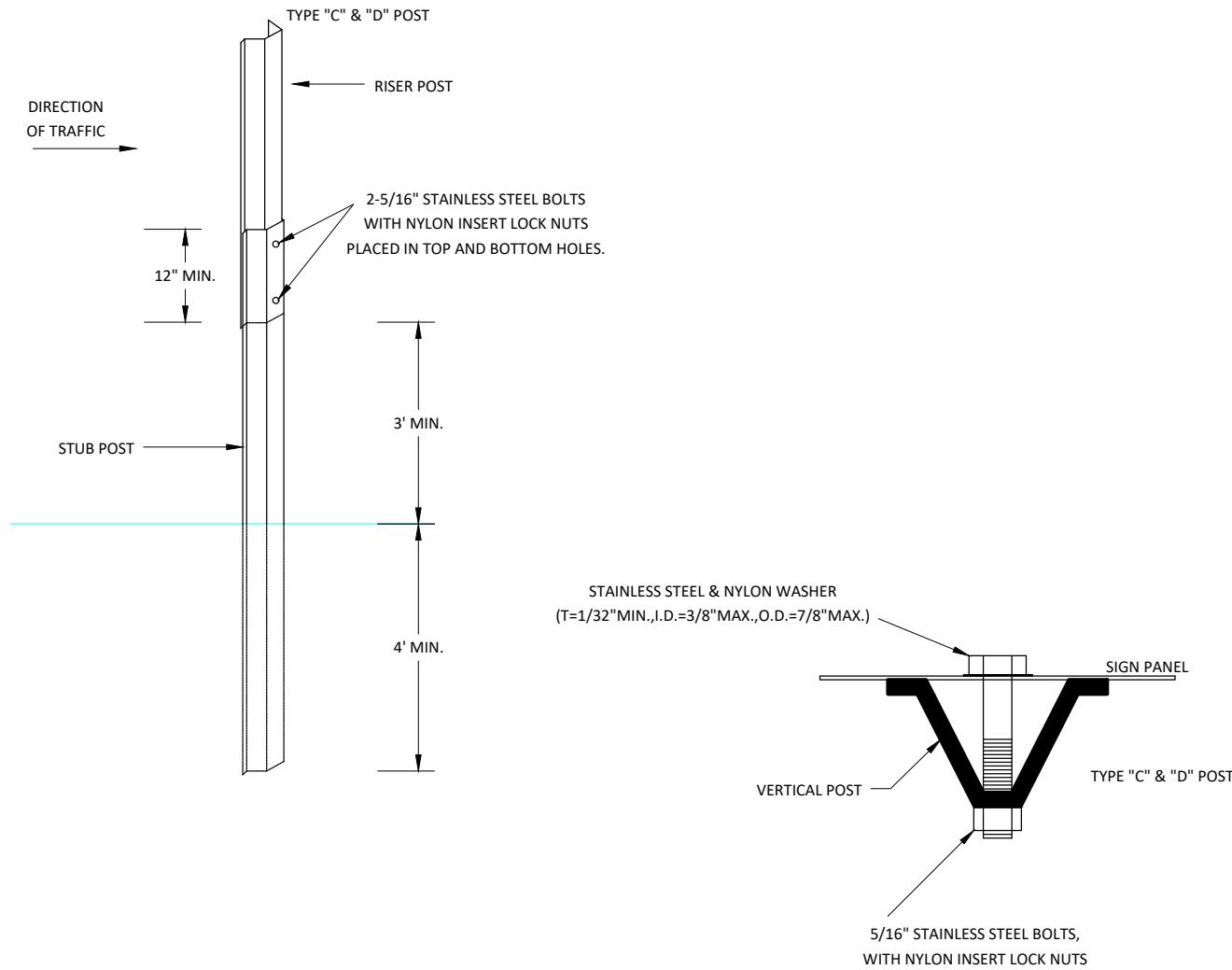


BLACK LETTERING ON  
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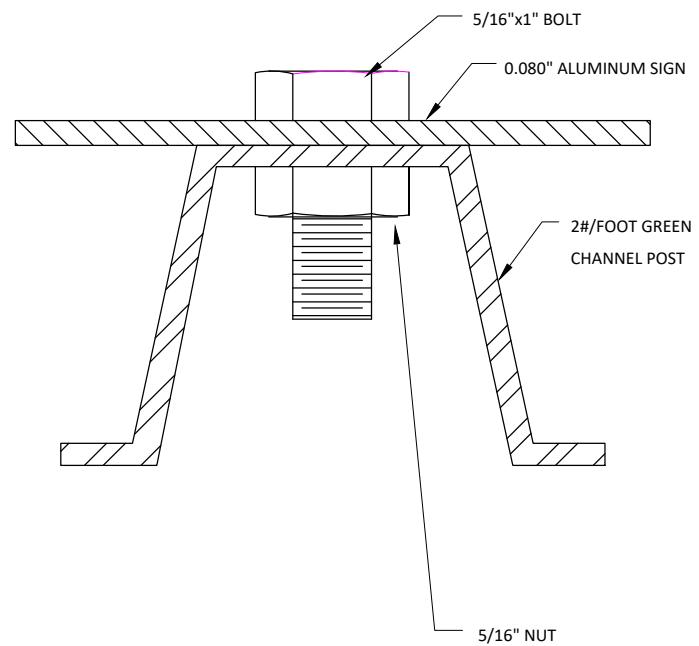
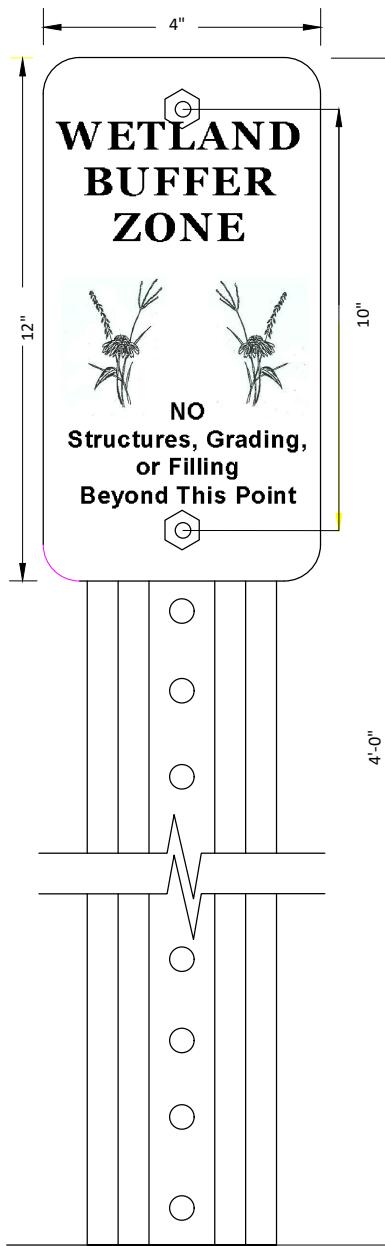
7'

**RHINO TRIVIEW TRACER PEDESTAL & UTILITY MARKER**  
NOT TO SCALE



1. USE 3# GALVANIZED STUB POSTS. DRIVEN STUB POSTS SHALL BE AT LEAST 8' LONG.
2. MOUNTING (PUNCHING CODE) FOR TYPE "C" SIGN PANELS SHALL BE INDICATED IN THE STANDARD SIGNS MANUAL UNLESS OTHERWISE SPECIFIED.
3. USE 2.0# GALVANIZED RISER POSTS AT LEAST 7' LONG.
4. USE STAINLESS STEEL BOLTS, WASHERS AND NYLON INSERT LOCK NUTS AS SHOWN FOR ALL GROUND MOUNTED SIGNS.
5. STAINLESS STEEL WASHER WITH SAME DIMENSIONS SHALL BE PROVIDED BETWEEN ALL NYLON WASHERS AND BOLT HEADS.
6. SIGNS AND INSTALLATION OF SIGNS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND MN/DOT SPEC 2564 AND 3352. 7. SIGN BASE MATERIAL SHALL BE ALUMINUM.

**STREET SIGN & POST INSTALLATION**  
NOT TO SCALE



#### TYPICAL SECTION

##### NOTES:

1. MATERIALS TO BE SUPPLIED BY THE DEVELOPER/CONTRACTOR INCLUDE THE FOLLOWING:
  - (2) 4"x12"x0.080" ALUMINUM WETLAND BUFFER SIGNS
  - (2) 5/16"x2" CAD PLATED BOLTS
  - (4) 5/16" CAD PLATED NUTS
  - (1) 7' (2#/FOOT) GREEN CHANNEL POST
2. SIGNS TO BE INSTALLED BY THE DEVELOPER PER THE DRAWING SHOWN AT THE LEFT.
3. AS A GENERAL RULE, WETLAND BUFFER SIGNS SHOULD BE PLACED AT EVERY OTHER LOT CORNER. HOWEVER, AT NO TIME SHOULD THERE BE MORE THAN 200' BETWEEN SIGNS IN UNFORESTED AREAS AND 150' IN FORESTED AREAS.
4. SIGN PANELS SHALL CONSIST OF GREEN BACKGROUND WITH WHITE LETTERING, VIP SHEETING

#### WETLAND BUFFER SIGN INSTALLATION N.T.S.



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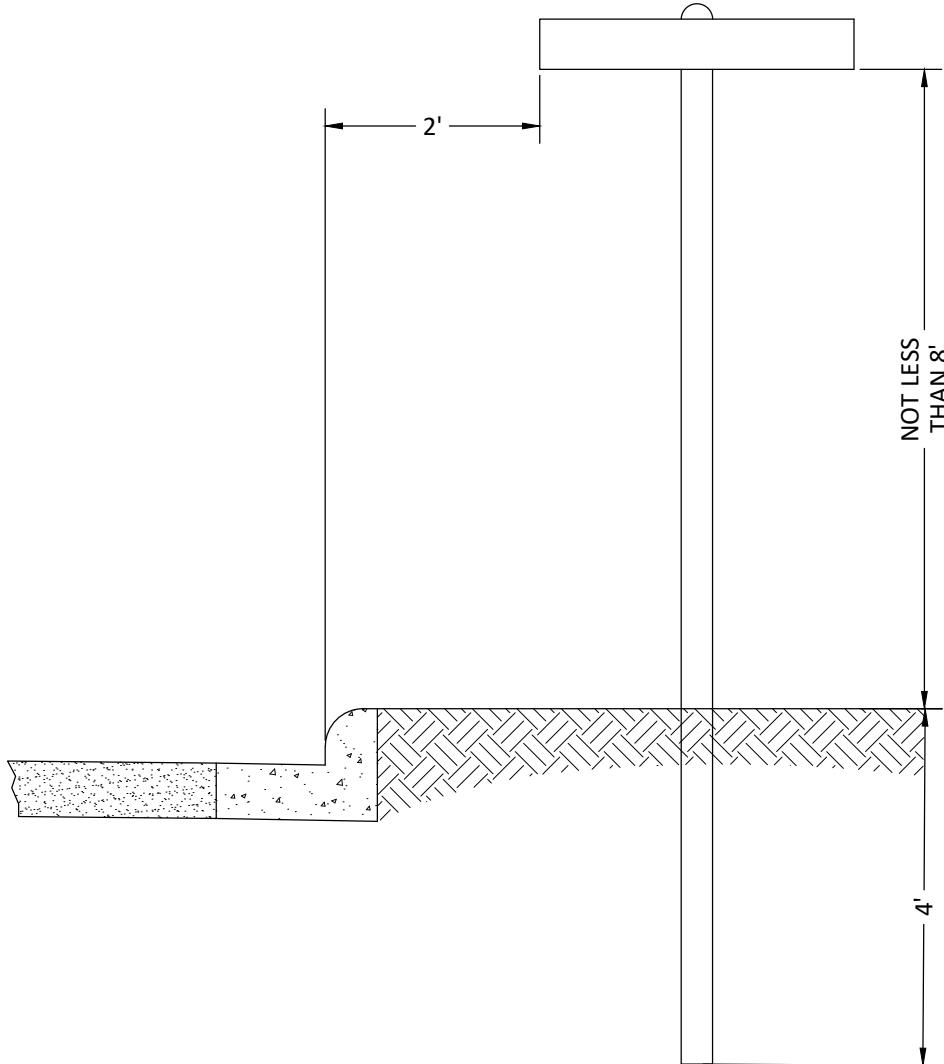
*Buffalo*  
CITY OF BUFFALO, MINNESOTA

WETLAND BUFER SIGN  
INSTALLATION

May 1st, 2025

STD. DETAIL

8003



SIGN POSTS SHALL BE CYLINDRICAL TUBE STEEL POSTS. THE POST SHALL BE 12' LONG, WITH 2-3/8" OD, AND SHALL MEET THE FOLLOWING:

MATERIAL: GALVANIZED FINISH, ROLL FORMED FROM 12 GAUGE (.080 U.S. GAUGE) COLD ROLLED STEEL, GALVANIZED MATERIAL ASTM DES. A-446 GRADE A.

THE POST AND SIGN HARDWARE SHALL INCLUDE 1 E250 SINGLE BRACKET OR 1 E450 4-WAY BRACKET. BRACKET AND HARDWARE SHALL BE BLACK.

STREET NAME SIGNS SHALL BE A 9" ALUMINUM .080 GAUGE PLATE WITH 6" UPPERCASE BLACK LETTERS, NUMBERS, E SERIES BORDER, AND MARKINGS, SERIES C LETTERS ON A WHITE BACKGROUND, AS SUPPLIED BY EARL F. ANDERSON.  
NO SUPERSCRIPT LETTERS SHALL BE USED.  
THE REFLECTIVITY OF THE SIGN SHALL BE HI-INTENSITY GRADE.

SIGNS AND INSTALLATION OF SIGNS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE "MINNESOTA MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES".

SIGN POST SHALL BE DRIVEN INTO THE GROUND A MINIMUM OF 4-FEET.

#### EXAMPLES

30x9

6TH ST S  
2ND ST S

36x9

1ST AVE S  
6TH AVE S

42x9

WINDRUSH RD  
SUNDANCE E  
INGALLS DR  
LAKEVIEW DR  
SERENITY CIR  
HARVEST TRL  
CHARLES CT  
WILDER WAY

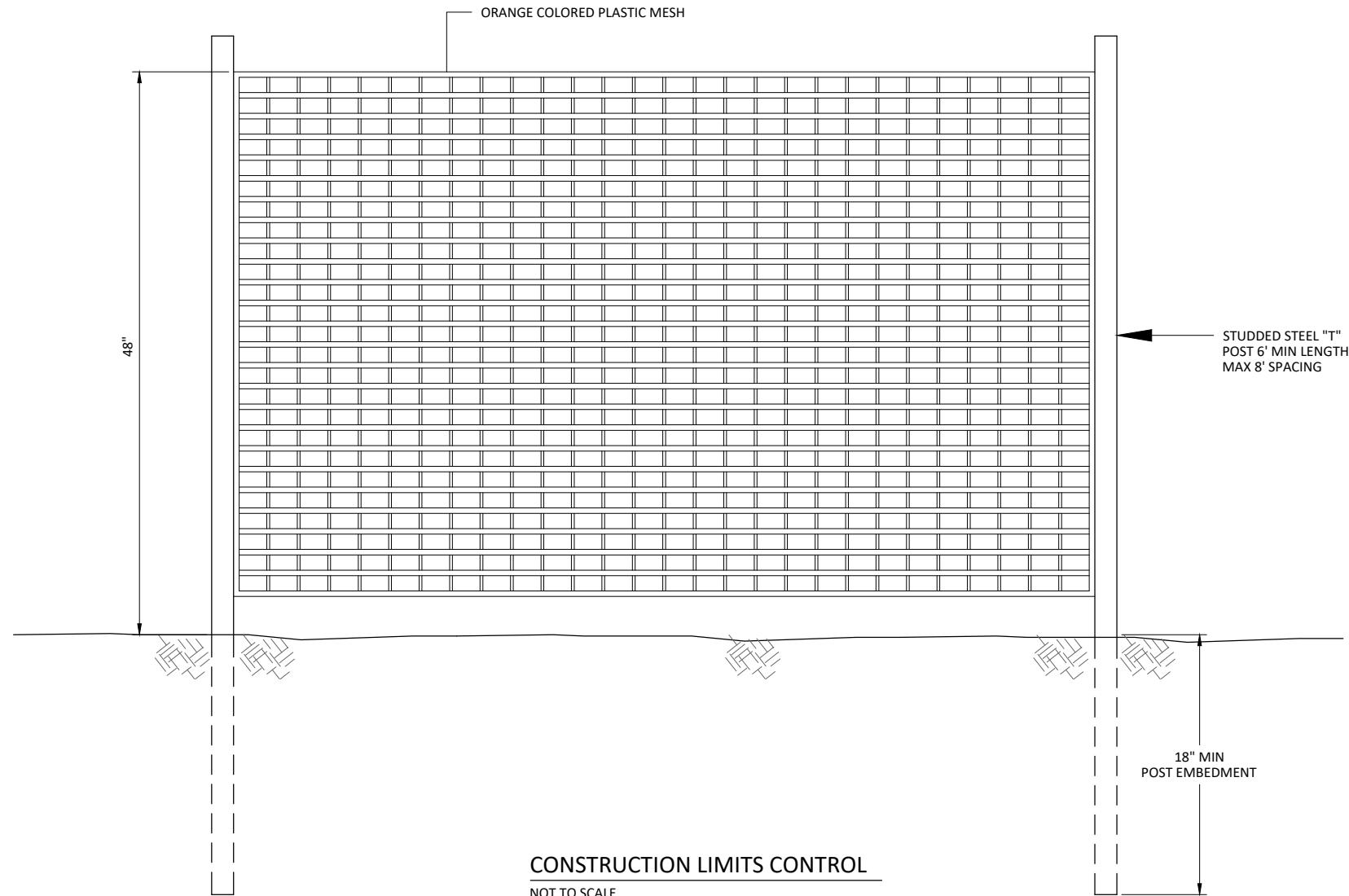
48x9

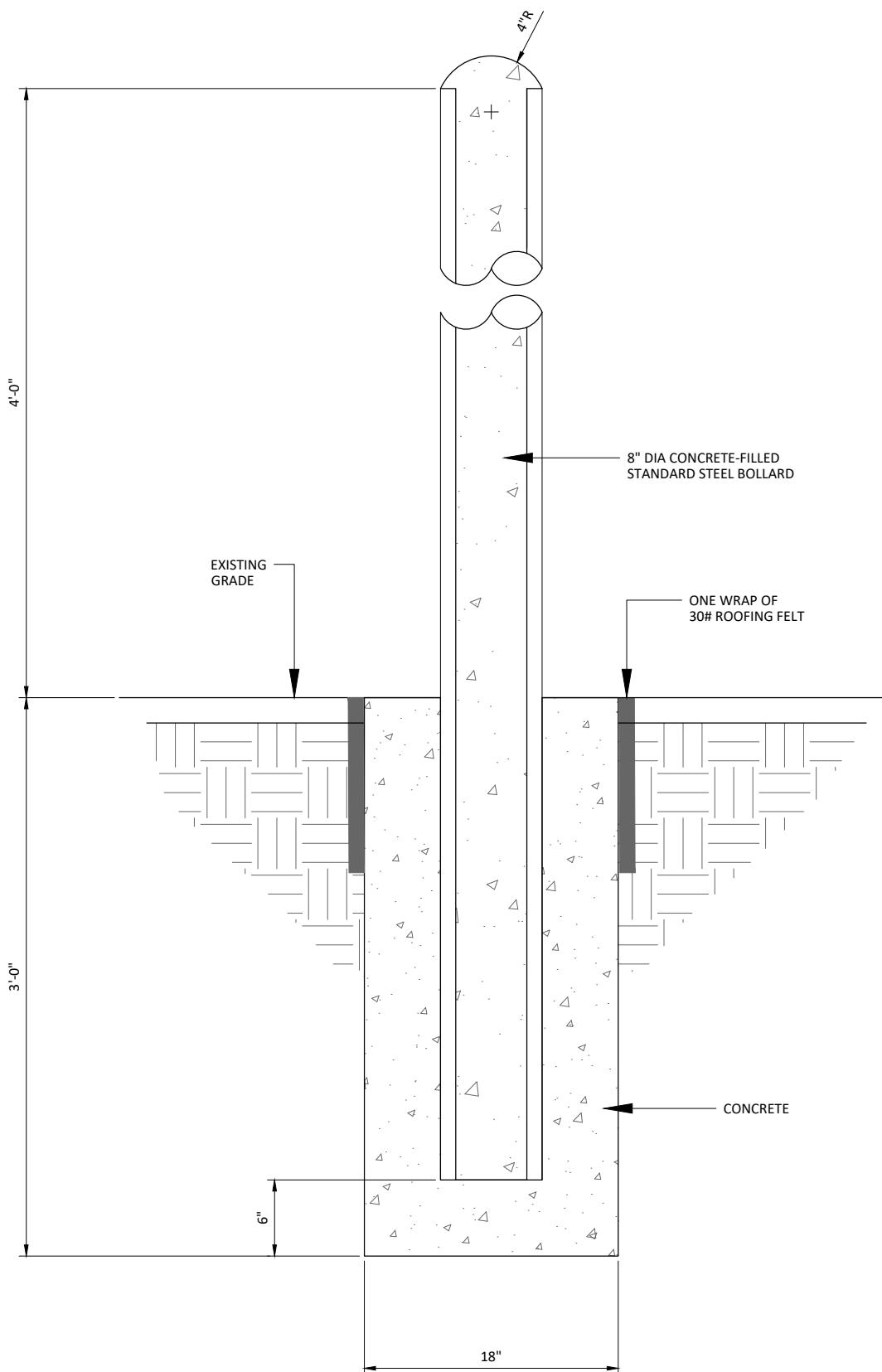
BAKER AVE NW  
SUNNY HILL RD  
LOOKOUT POINT  
OVERLOOK DR  
BLUFFS PKWY  
LANDSDOWN RD  
HEARTLAND RD

48x9

RIDGEHAVEN DR  
RIDGEHAVEN CIR  
LAWRENCE PKWY  
SUNRISE HEIGHTS CIR  
HONEY SUCKLE CT  
BRADSHAW AVE  
CAROLINE PATH  
SETTLERS PKWY

STREET NAME SIGN AND POST  
NOT TO SCALE





**BOLLARD GUARD POST**

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CITY OF BUFFALO, MINNESOTA

**BOLLARD GUARD POST**

May 1st, 2025

STD. DETAIL  
9002