

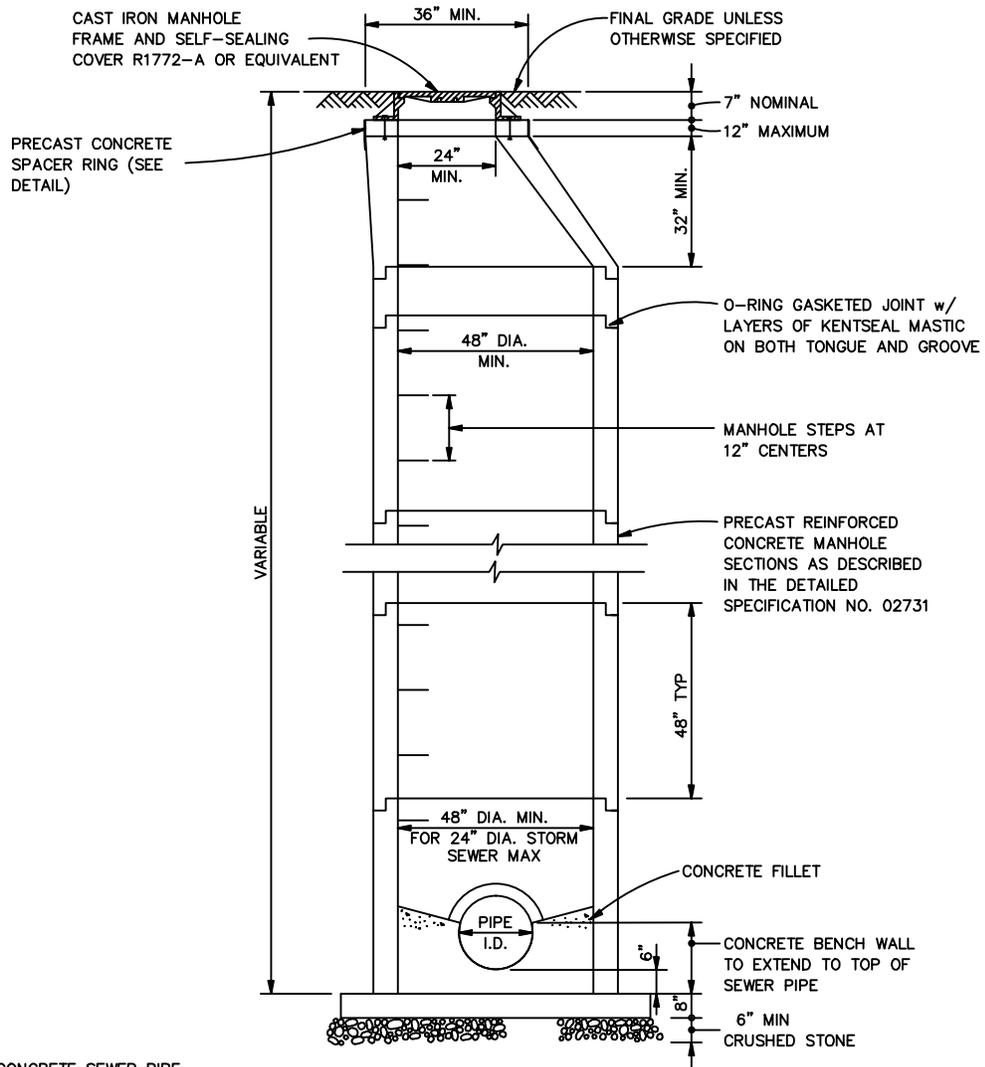
**CITY OF WESTFIELD**  
**Stormwater Management Technical**  
**Standards Manual**

---

**APPENDIX 1**

---

**CITY OF WESTFIELD**  
**STORMWATER MANAGEMENT TECHNICAL STANDARD**  
**DETAILS**



**\*NOTE:**

1. GROUT CONCRETE SEWER PIPE WATERTIGHT TO MANHOLE WALL
2. INSTALL BUTYL RUBBER WATERSTOP FOR PIPE OTHER THAN CONCRETE SEWER PIPE
3. SEE TYPE 1 STORM SEWER MANHOLE DETAIL FOR SEWERS LARGER THAN 24"

## STANDARD STORM MANHOLE DETAIL

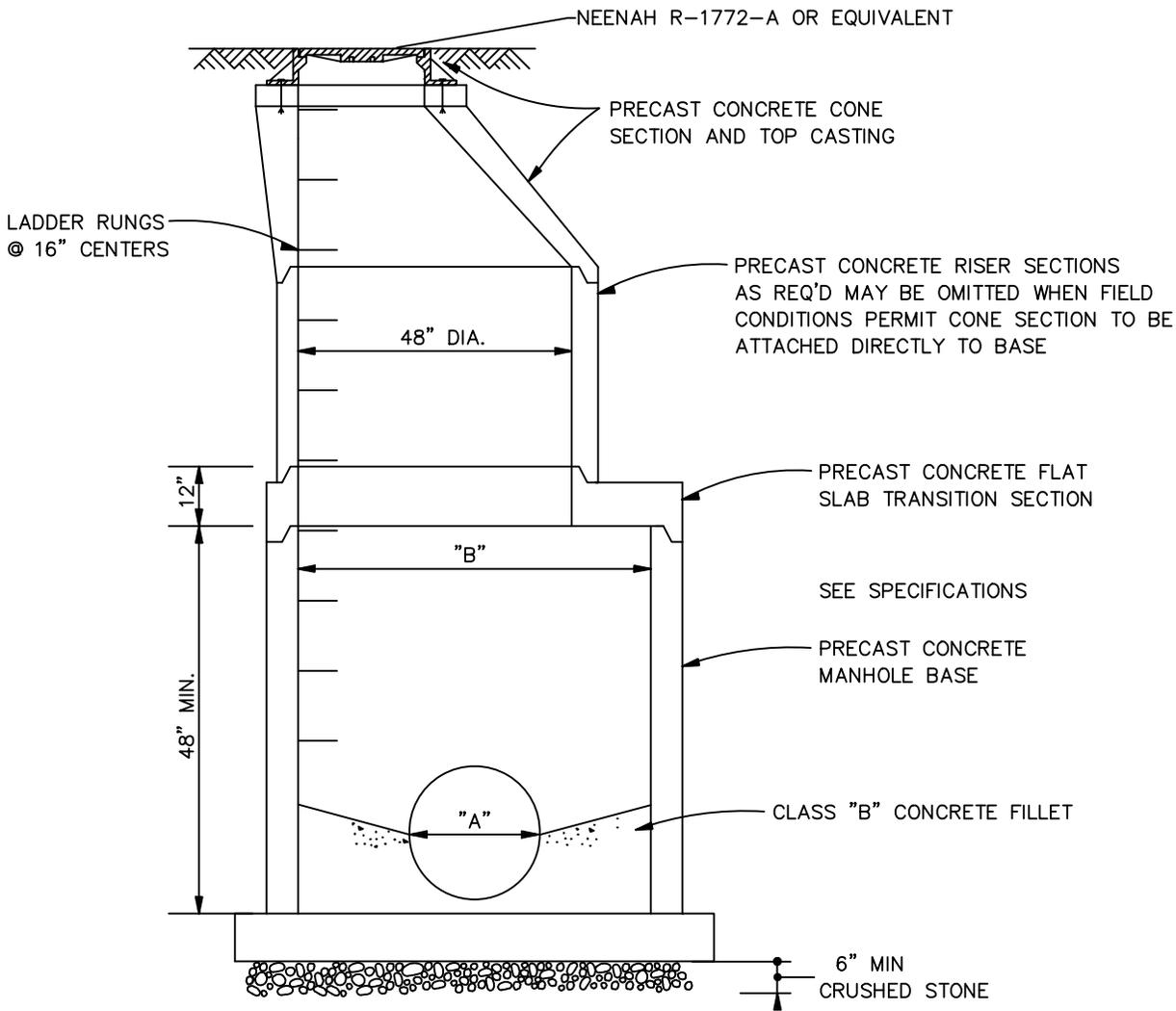


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FIGURE ST-1



TYPE I MANHOLE STRUCTURE DATA		
PIPE DIA. "A"	INTERSECTING ANGLE	PIPE DIA. "B"
30"	0° TO 44°	30"
30"	44° TO 90°	30"
36"	0° TO 44°	36"
36"	44° TO 90°	36"

- NOTES:**
1. SEE STANDARD STORM SEWER MANHOLE DETAIL FOR OTHER DETAIL & DIMENSIONS
  2. RISER & CONE SECTIONS SHALL BE AS SHOWN ON STANDARD STORM SEWER MANHOLE DETAIL

## TYPE 1 STORM SEWER MANHOLE DETAIL

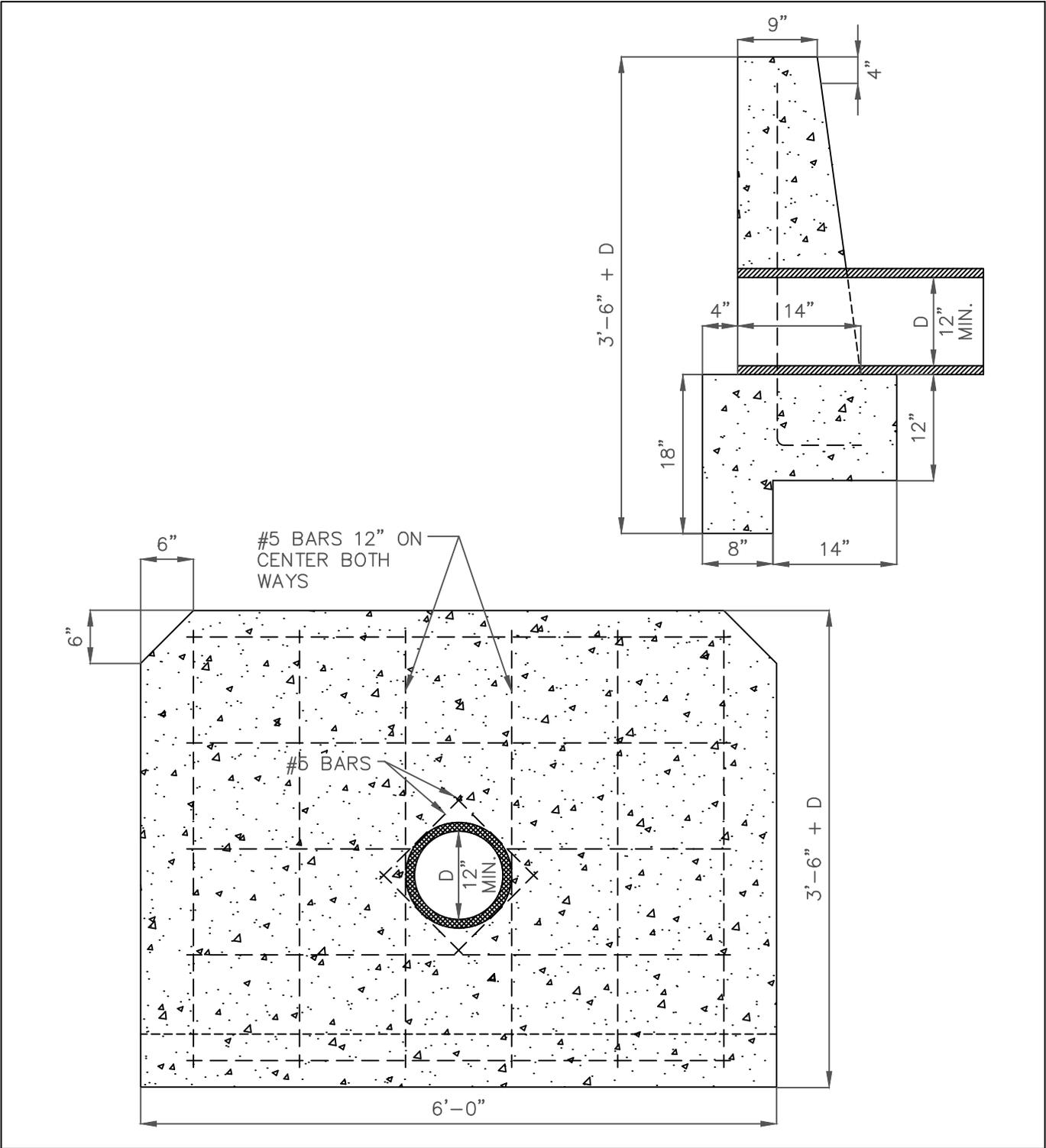


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FIGURE ST-2



STRAIGHT HEADWALL

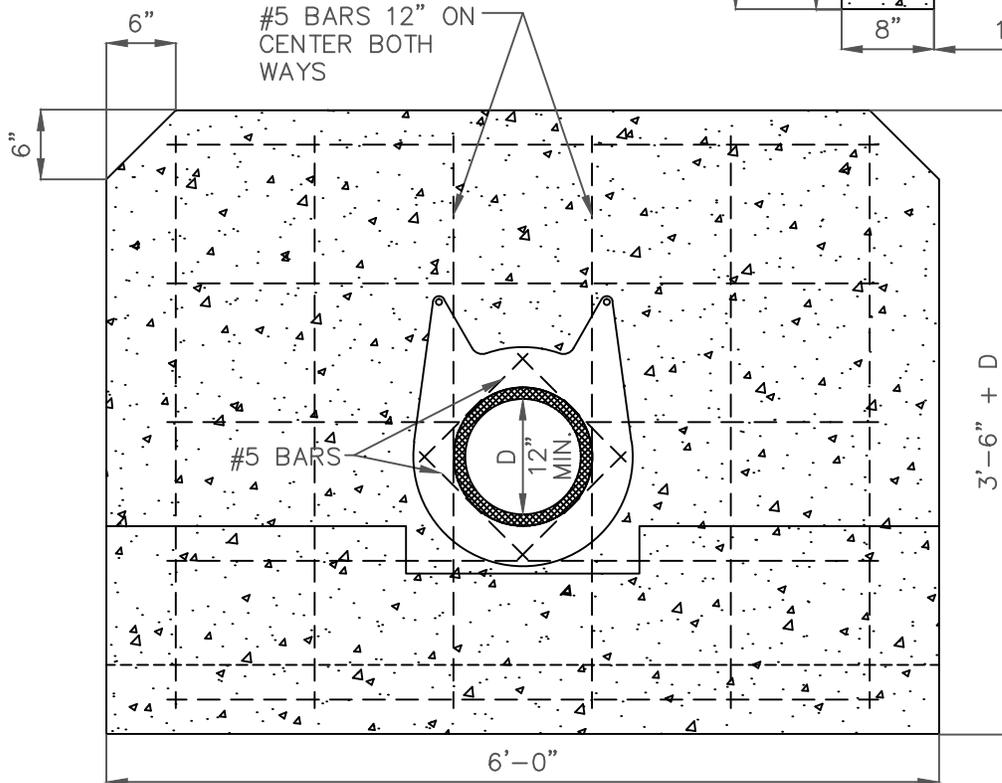
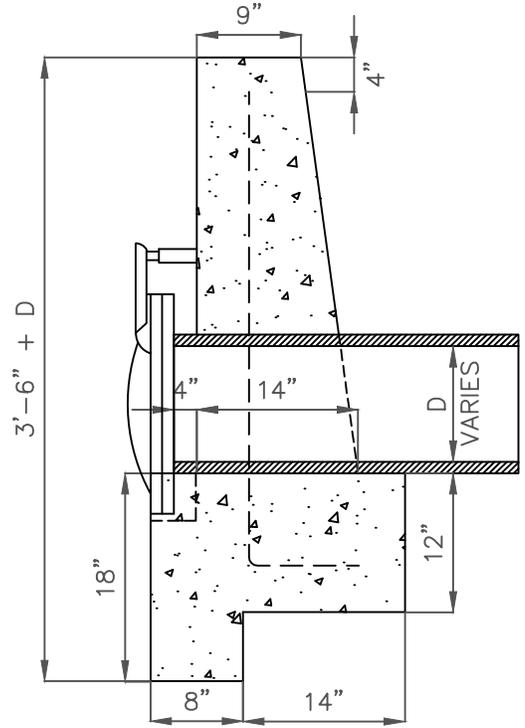


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FIGURE ST-3

RODNEY HUNT SERIES FV-AC FLAP  
GATE REQUIRED, OR APPROVED  
EQUAL.



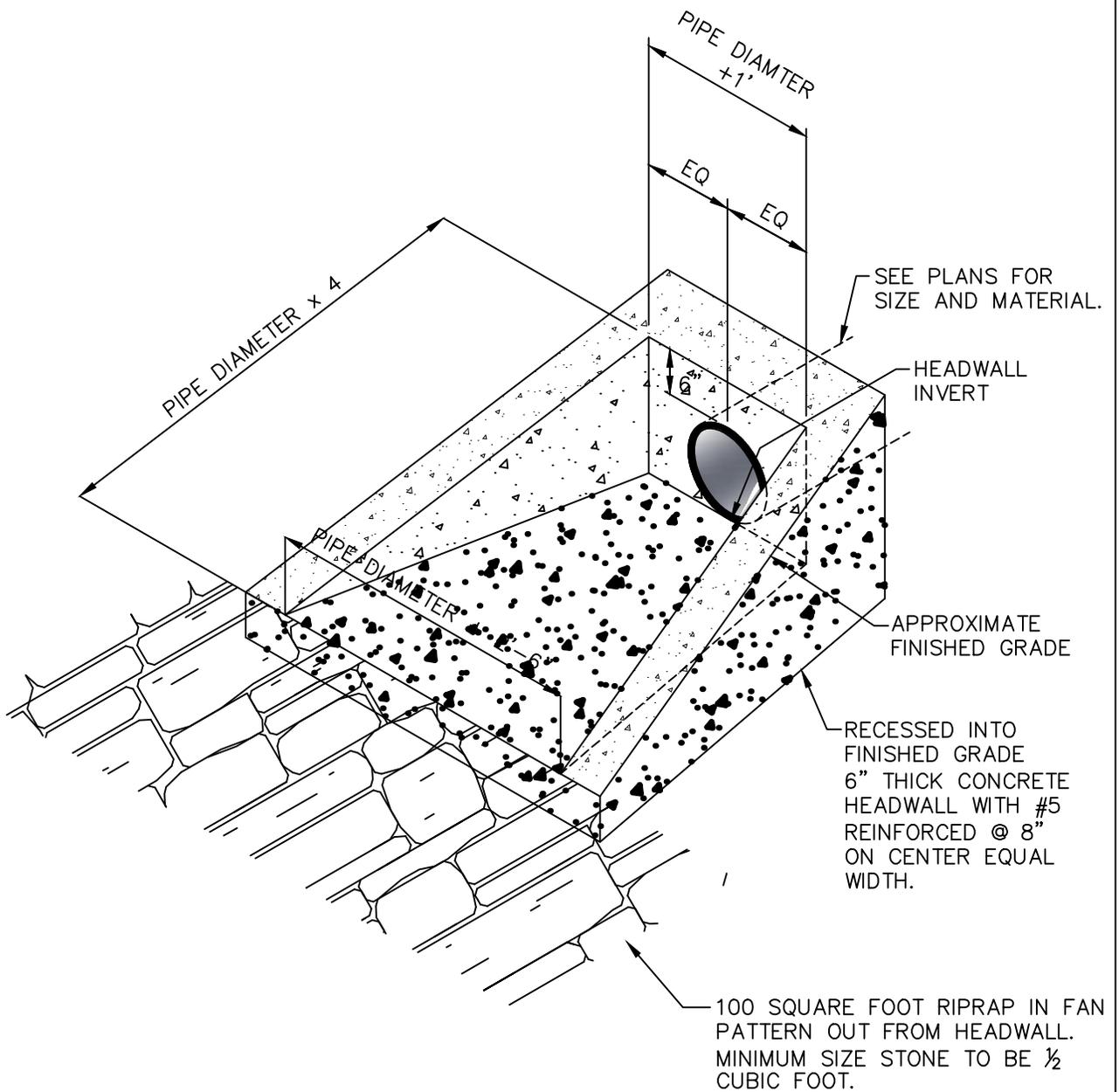
STRAIGHT HEADWALL WITH FLAP GATE



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ISOMETRIC @ HEADWALL TYPE "1"

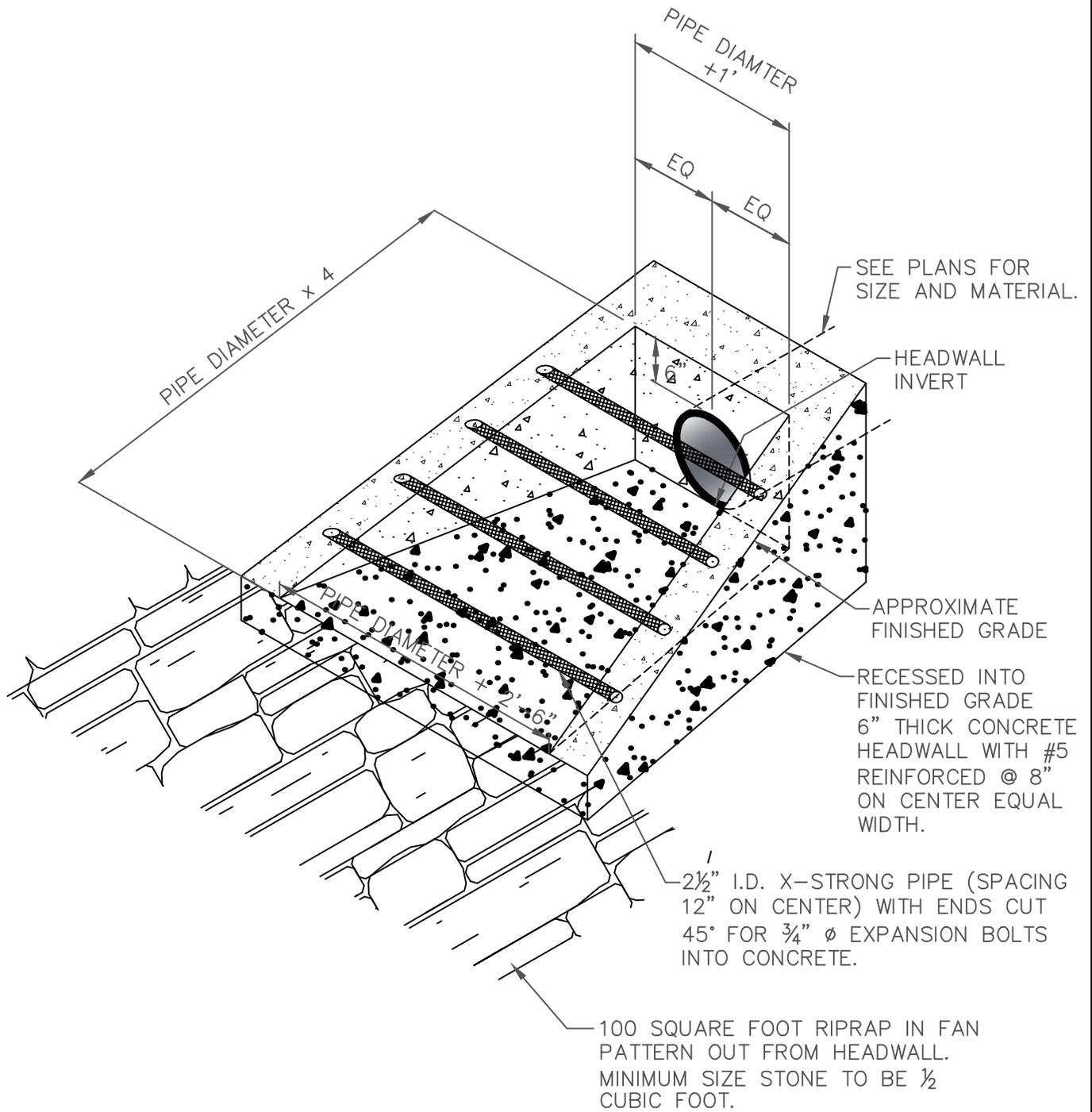


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FIGURE ST-5



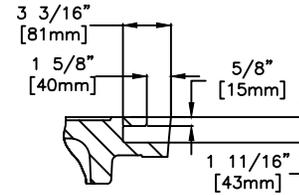
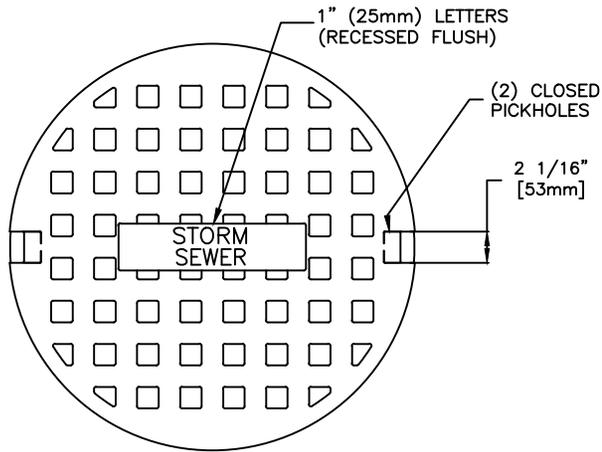
NOTE: HEADWALL SIMILAR TO TYPE "I" EXCEPT FOR PIPE GUARDS

ISOMETRIC @ HEADWALL TYPE "II"

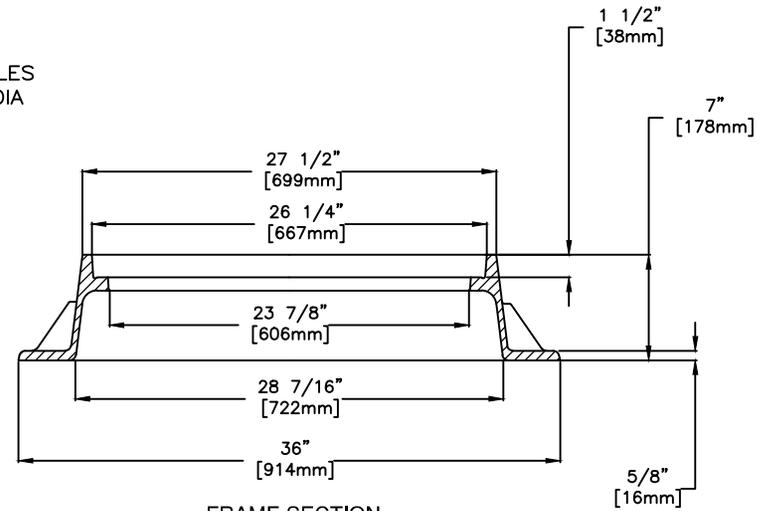
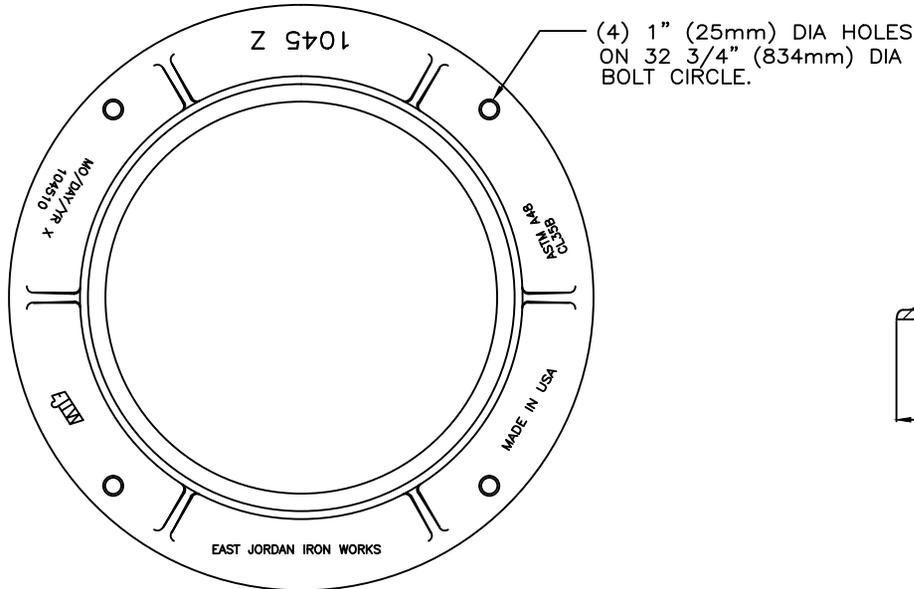


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PICKHOLE DETAIL



FRAME SECTION

NEENAH	R-1642
EAST JORDAN	1045Z

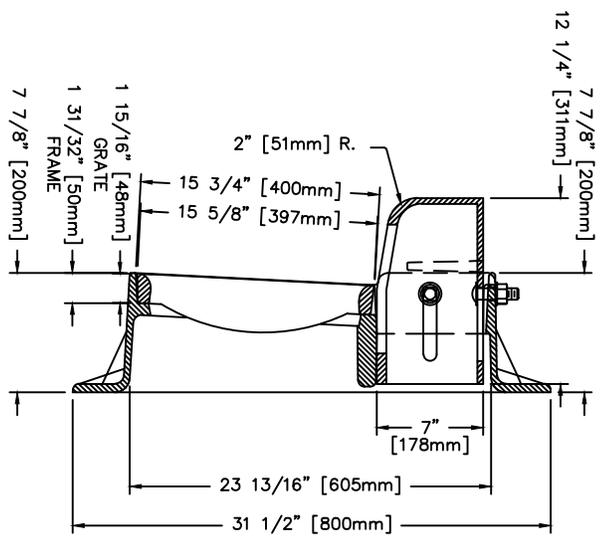
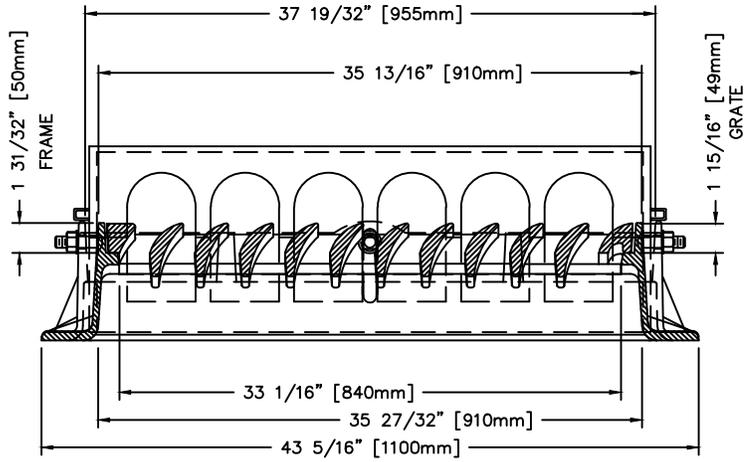
MANHOLE SOLID LID CASTING



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NEENAH	R-3287-10V
EAST JORDAN	7505 M1 & T2

- \* OR APPROVED BY WESTFIELD PUBLIC WORKS DEPARTMENT
- \*\* STORM SEWER CASTINGS MANHOLE COVERS, BEEHIVE INLETS, CURB INLETS OR OTHER APPROVED CASTING SHALL HAVE THE FOLLOWING PHRASES CAST IN RECESSED LETTERS TWO (2) INCHES IN HEIGHT:
  - A. "STORM SEWER"
  - B. "DRAINS TO RIVER" OR "DRAINS TO WATERWAY"
  - C. "DUMP NO WASTE"
  - D. OTHER PHRASES SHALL REQUIRE APPROVAL OF THE WESTFIELD PUBLIC WORKS DEPARTMENT.

## CHAIR BACK CURB INLET CASTING

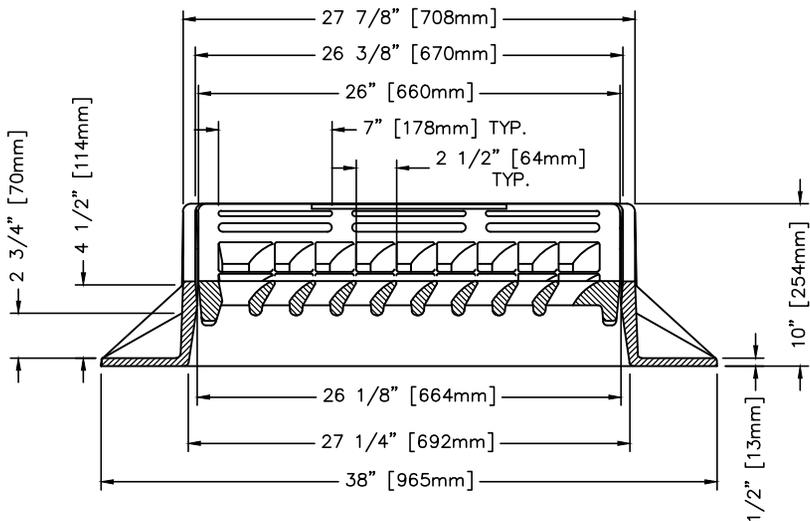
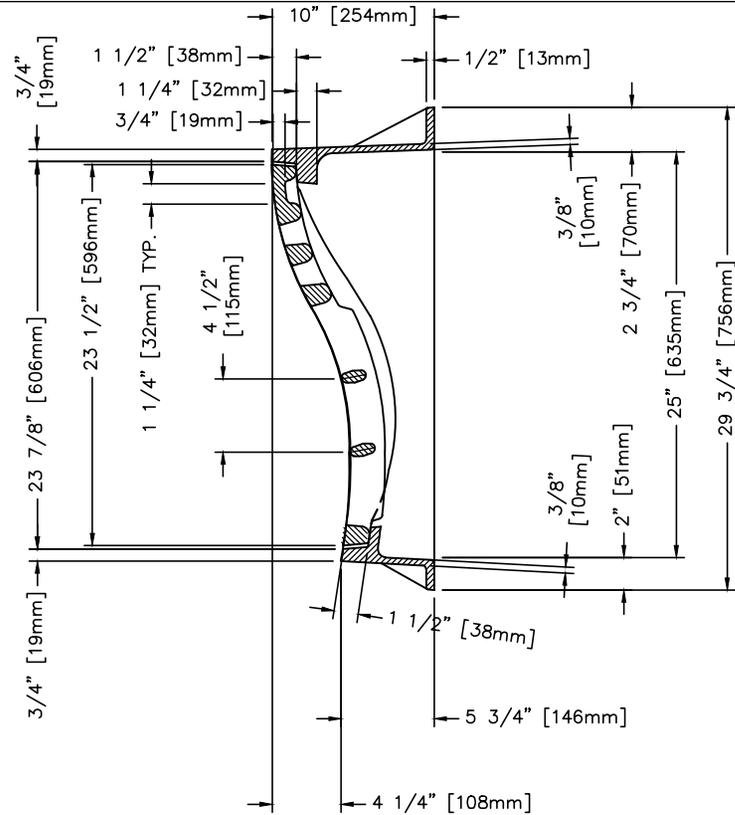
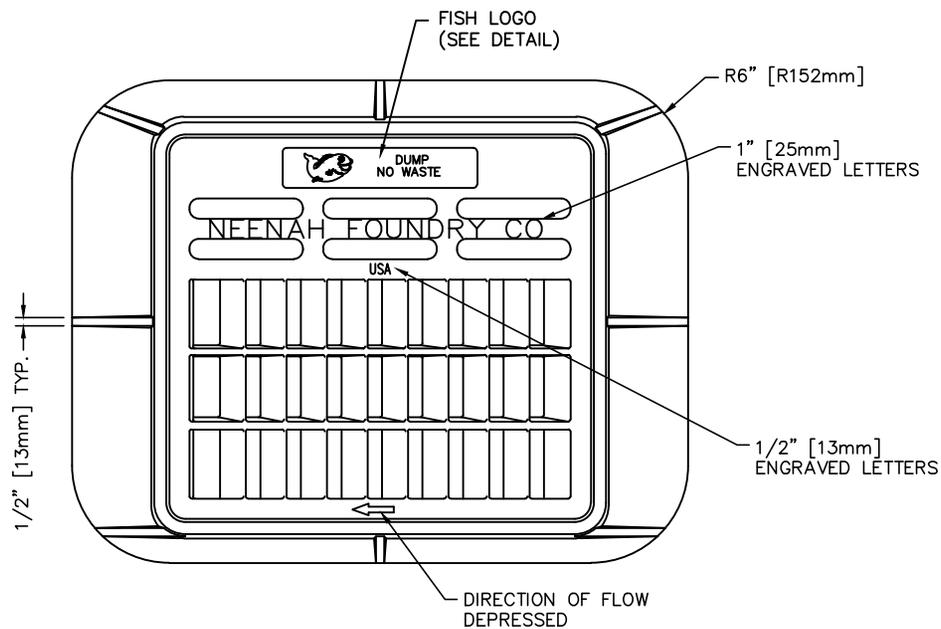


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FIGURE ST-8



NOTE: ALL DIMENSIONS SHOWN ARE IN ENGLISH AND [METRIC]  
 MEETS AASHTO M-306 PROOF LOAD REQUIREMENTS.  
 COMPONENT NOS: FRAME 3501-2176; GRATE 3501-3001  
 MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B  
 FINISH: NO PAINT  
 WEIGHT: FRAME 211#, GRATE 156#

NEENAH	3501-TL OR TR
EAST JORDAN	7495-M2 OR M1

\*\* STORM SEWER CASTINGS MANHOLE COVERS, BEEHIVE INLETS, CURB INLETS OR OTHER APPROVED CASTING SHALL HAVE THE FOLLOWING PHRASES CAST IN RECESSED LETTERS:  
 A. "STORM SEWER"  
 B. "DRAINS TO RIVER" OR "DRAINS TO WATERWAY"  
 C. "DUMP NO WASTE"  
 D. OTHER PHRASES SHALL REQUIRE APPROVAL OF THE WESTFIELD PUBLIC WORKS DEPARTMENT.

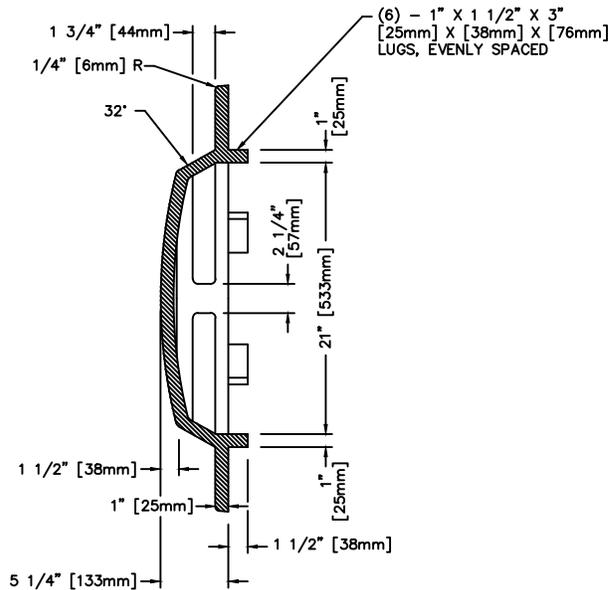
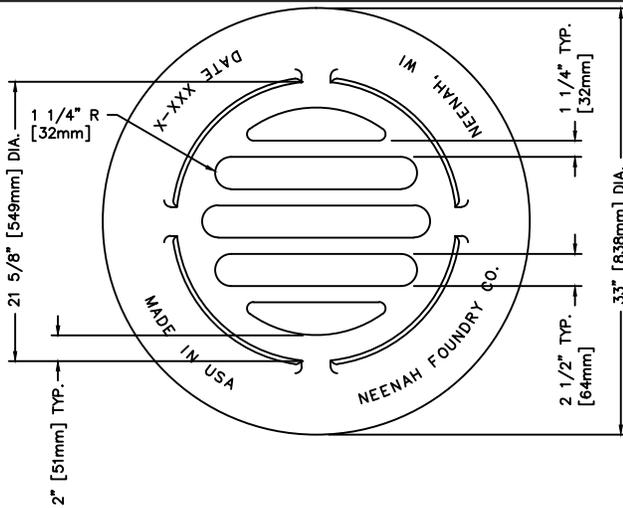
## ROLLED CURB INLET CASTING



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INDIANA



NEENAH	R-4342
EAST JORDAN	6489

- \* OR APPROVED BY WESTFIELD PUBLIC WORKS DEPARTMENT
- \*\* STORM SEWER CASTINGS MANHOLE COVERS, BEEHIVE INLETS, CURB INLETS OR OTHER APPROVED CASTING SHALL HAVE THE FOLLOWING PHRASES CAST IN RECESSED LETTERS TWO (2) INCHES IN HEIGHT:
  - A. "STORM SEWER"
  - B. "DRAINS TO RIVER" OR "DRAINS TO WATERWAY"
  - C. "DUMP NO WASTE"
  - D. OTHER PHRASES SHALL REQUIRE APPROVAL OF THE WESTFIELD PUBLIC WORKS DEPARTMENT.

## BEEHIVE CURB INLET CASTING

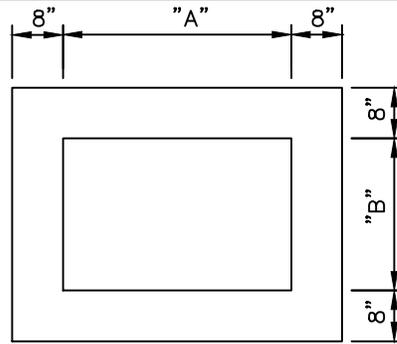


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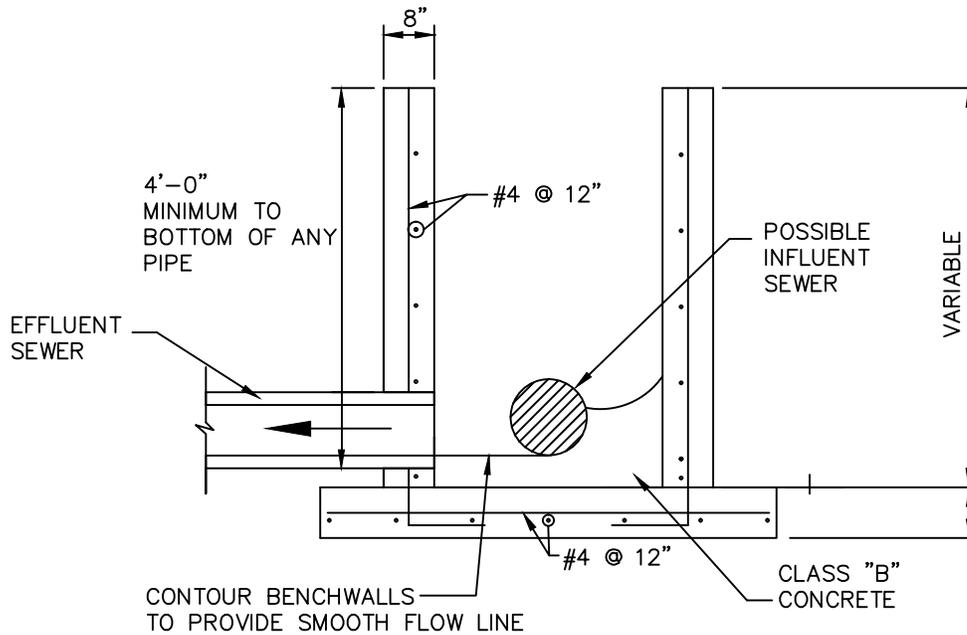
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DATE

FIGURE ST-10



PLAN



SECTION

CAST	"A"	"B"
TYPE 1	36"(0.91m)	24"(0.61m)
TYPE 2	24"(0.61m)	22"(0.56m)
TYPE 3	22"(0.56m)	20"(0.51m)

NOTE:

1. THESE DIMENSIONS ARE ALSO APPLICABLE TO TYPE "CA" CATCH BASINS. (See figure ST-13)
2. PRECAST INLETS AND CATCH BASINS SHALL BE CONSIDERED AN ACCEPTABLE ALTERNATE IF APPROVED BY THE WESTFIELD PUBLIC WORKS DEPARTMENT

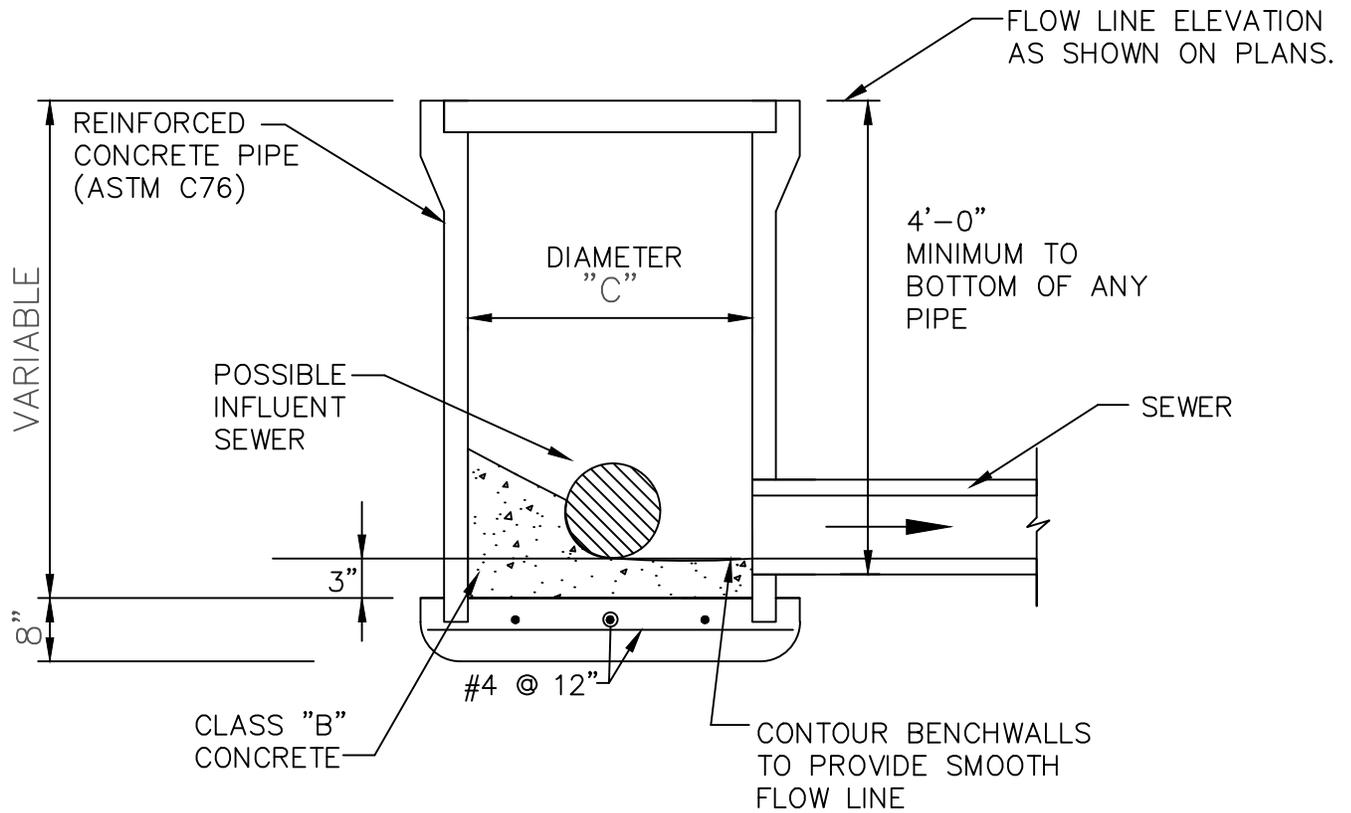
## INLET STRUCTURE TYPE 1A



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 DATE 4/1/14

FIGURE ST-11



**NOTE:**

DIMENSION "C" SHALL BE 24" (0.61m) UNLESS OTHERWISE NOTED ON THE DRAWINGS

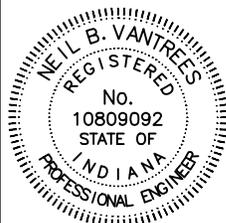
SECTION

CAST	"A"	"B"
TYPE 1	36" (0.91m)	24" (0.61m)
TYPE 2	24" (0.61m)	22" (0.56m)
TYPE 3	22" (0.56m)	20" (0.51m)

NOTES:

1. THESE DIMENSIONS ARE ALSO APPLICABLE TO TYPE CA CATCH BASINS.
2. PRECAST INLETS AND CATCH BASINS SHALL BE CONSIDERED AN ACCEPTABLE ALTERNATE IF APPROVED BY THE WESTFIELD PUBLIC WORKS DEPARTMENT.

INLET STRUCTURE TYPE 1

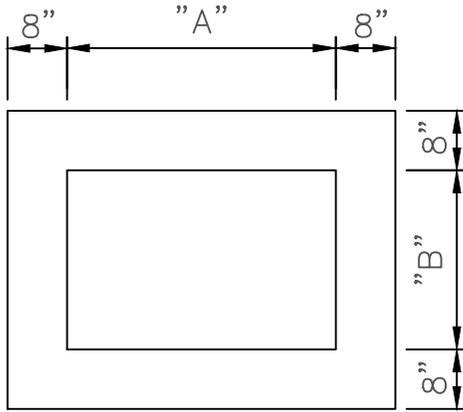


CITY OF WESTFIELD, INDIANA

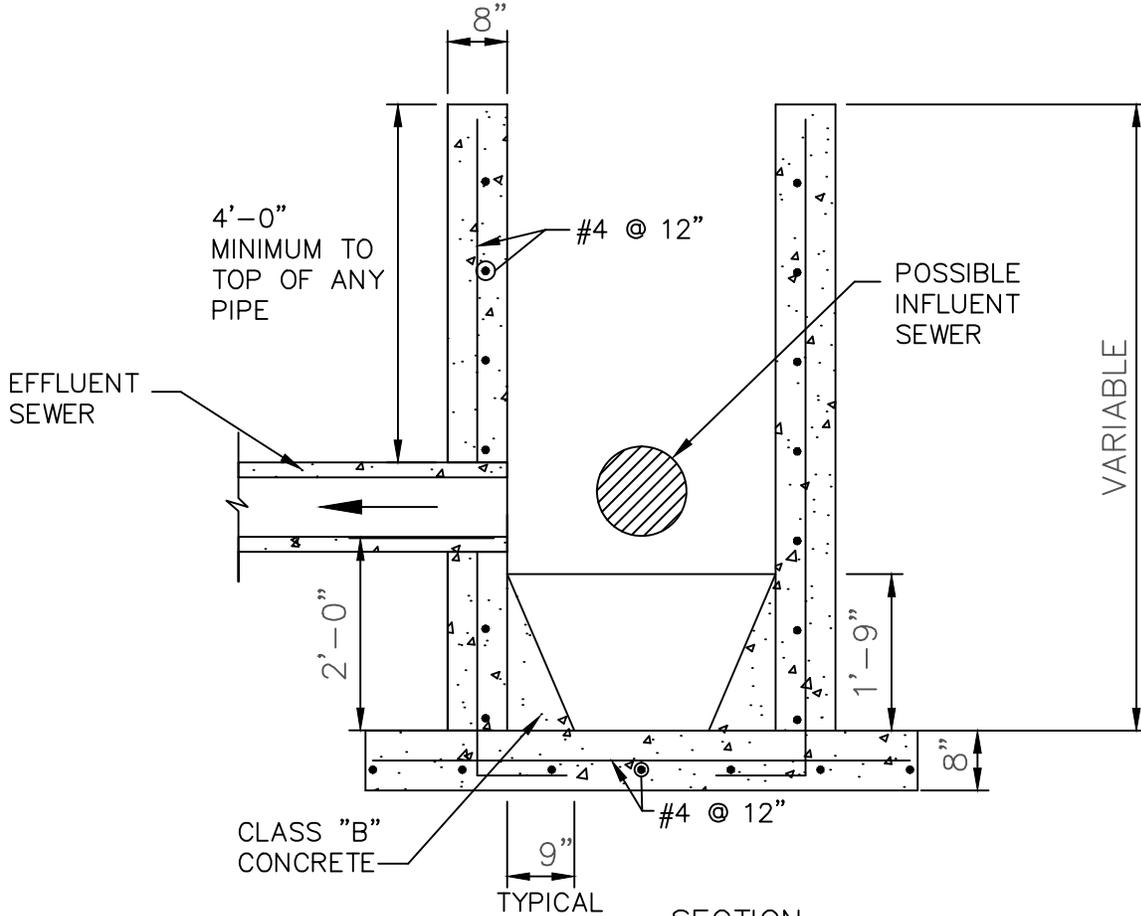
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DATE

FIGURE ST-12



PLAN



TYPICAL SECTION

NOTE:

1. DIMENSION "A" SHALL BE 36" (0.91m) AND DIMENSION "B" SHALL BE 24" (0.61m) UNLESS OTHERWISE NOTED ON THE DRAWINGS.
2. PRECAST CATCH BASINS SHALL BE CONSIDERED AN ACCEPTABLE ALTERNATE IF APPROVED BY THE WESTFIELD PUBLIC WORKS DEPARTMENT

TYPE "CA" CATCH BASIN DETAIL

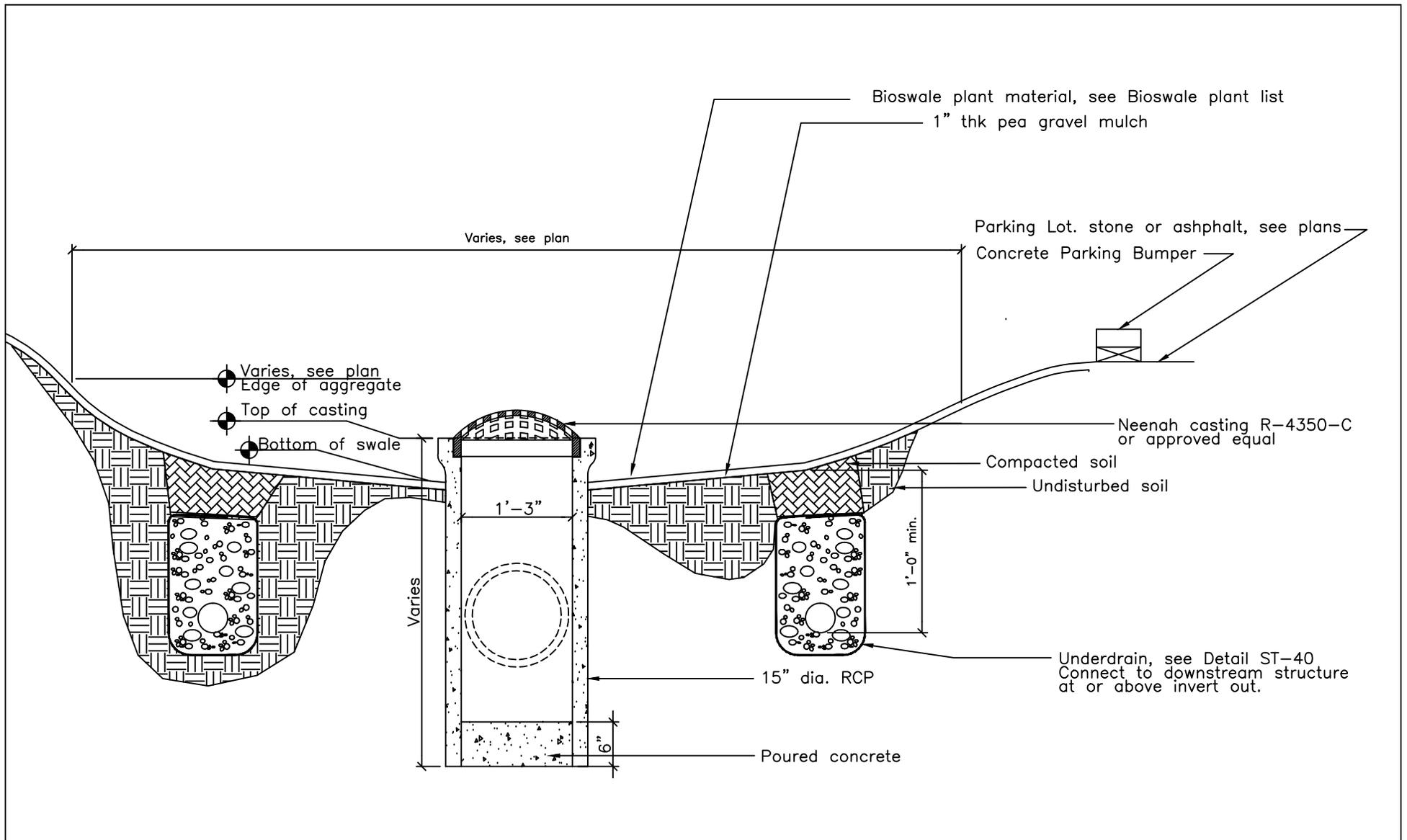


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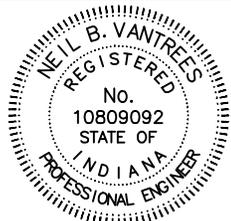
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FIGURE ST-13



## BIOSWALE DETAIL



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 INDIANA

FIGURE ST-14

PIPE SIZE (INCHES)	STRUCTURES LESS THAN 48" FROM T/C TO INVERT (INCHES)	STRUCTURES GREATER THAN 48" FROM T/C TO INVERT	ANGLE AND QUALITY OF PIPES WILL REQUIRE SPECIAL DESIGN	STEPS REQUIRED	CURB CASTING #R-3501N OR 7490	CASTING #3501 TL & TR OR 7495
12 TO 18	24 X 24	***	DESIGN APPROVAL	NO	YES	YES
12 TO 21	30 X 30	***	DESIGN APPROVAL	NO	YES	YES
18 TO 21		MH	DESIGN APPROVAL	YES	YES	YES
21 TO 27	24 X 36* OR 36 X 36	***	DESIGN APPROVAL	NO	NO	YES
12 TO 24	36 X 36	***	DESIGN APPROVAL	NO	YES	YES
24 OR LARGER	DESIGN APPROVAL	***	DESIGN APPROVAL	NO	NO	YES
24 OR LARGER		MH	DESIGN APPROVAL	YES**	YES	YES

\* PIPES NO LARGER THAN 18" CAN BE USED IN THE 2' SIDE OF THIS BOX.

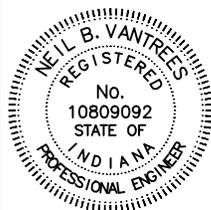
\*\*INCOMING AND OUT GOING PIPES EFFECT STEPS IN THIS STRUCTURE.

\*\*\*SPECIAL NOTE: STRUCTURES DEEPER THAN 48" FROM T/C TO INVERT WILL BE A M.H. WITH STEPS UNLESS SPECIAL DESIGN IS APPROVED

SPECIAL NOTE: STRUCTURES WILL BE DESIGNED FOR MAXIMUM FLOW IN PIPES.

SPECIAL NOTE: THE CITY MAY REQUIRE STEPS TO BE INSTALLED AFTER STRUCTURE IS SET, TO IMPROVE ACCESS.

## STORM STRUCTURE SIZING TABLE



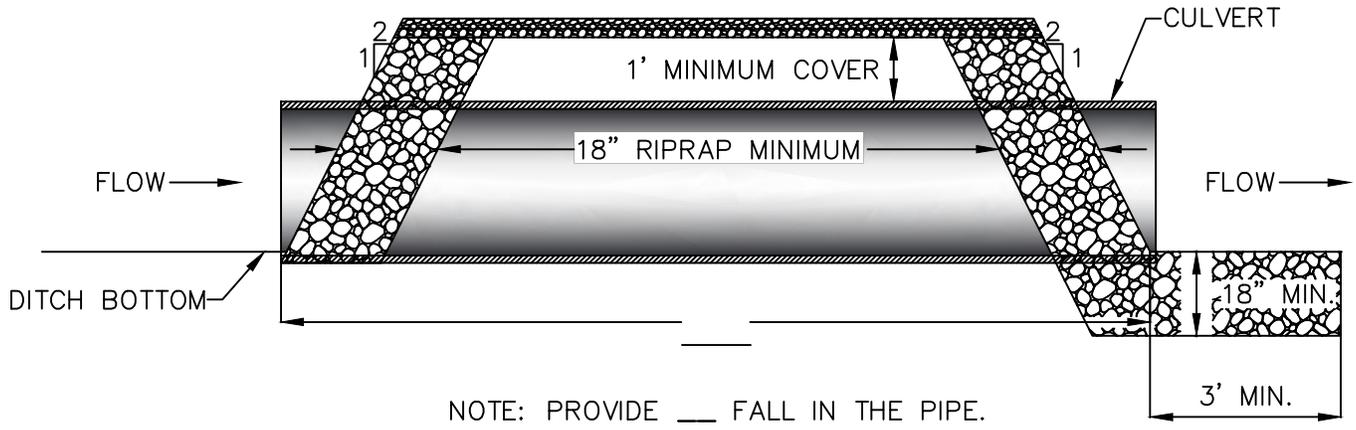
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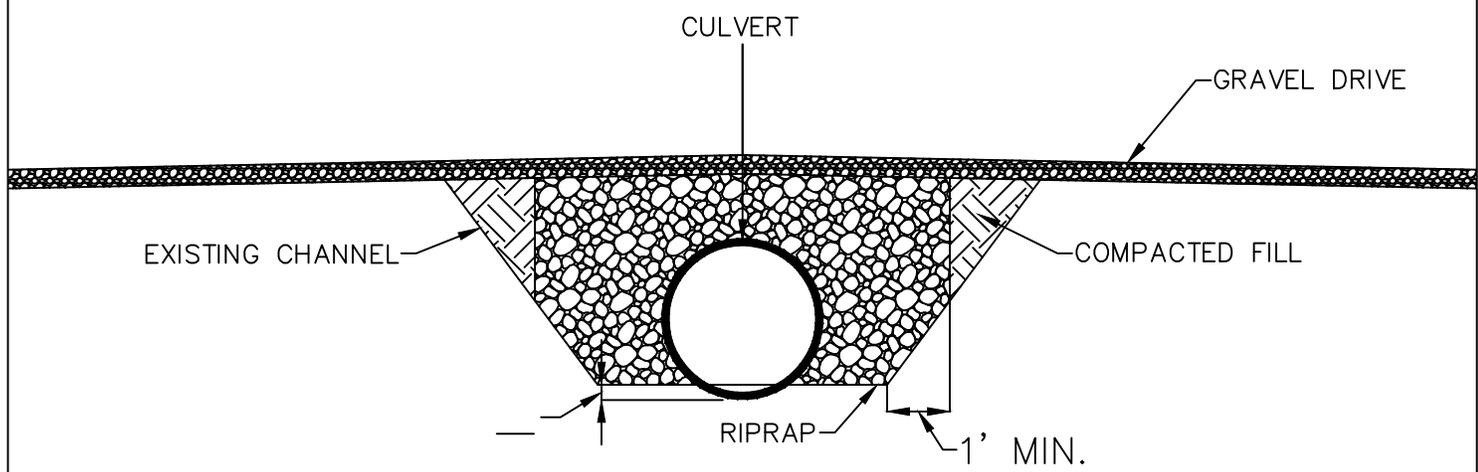
FIGURE ST-15





NOTE: PROVIDE \_\_\_ FALL IN THE PIPE.  
 TOE OF SLOPE TO COINCIDE WITH END OF PIPE  
 ON BOTH DOWNSTREAM AND UPSTREAM ENDS.

LONGITUDINAL SECTION



NOTE: GOOD COMPACTION OF THE FILL IS CRITICAL. THE CULVERT SHOULD BE  
 DEPRESSED BELOW THE CHANNEL BOTTOM THE AMOUNT SHOWN ON THE PLAN.

ELEVATION

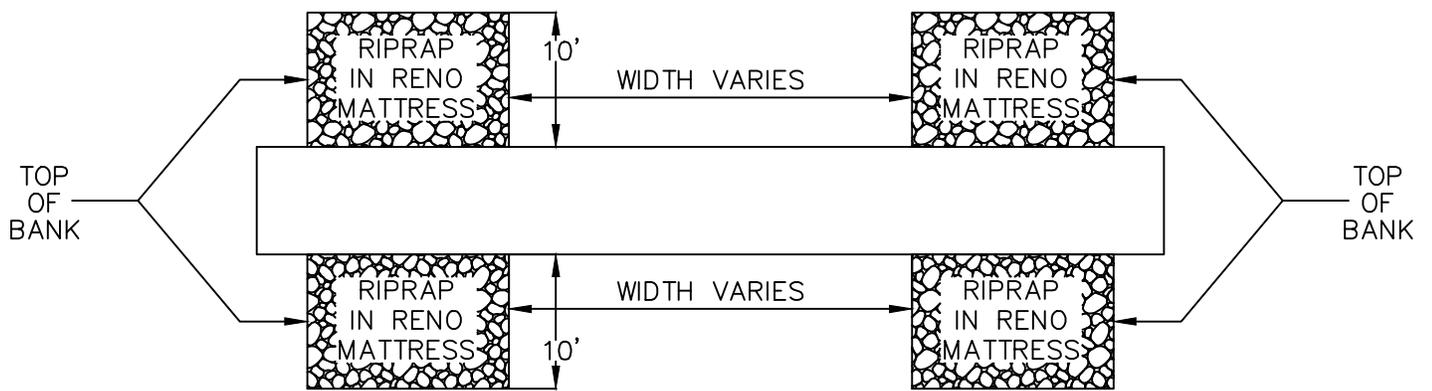
LENGTH OF PIPE: \_\_\_\_\_ DIAMETER AND PIPE MATERIAL: 1. \_\_\_\_\_ OR  
 WIDTH OF ROADWAY: \_\_\_\_\_ 2. \_\_\_\_\_  
 DEPRESSION BELOW FLOWLINE: \_\_\_\_\_ GRADIENT OF PIPE: \_\_\_\_\_

CULVERT BRIDGE INSTALLATION

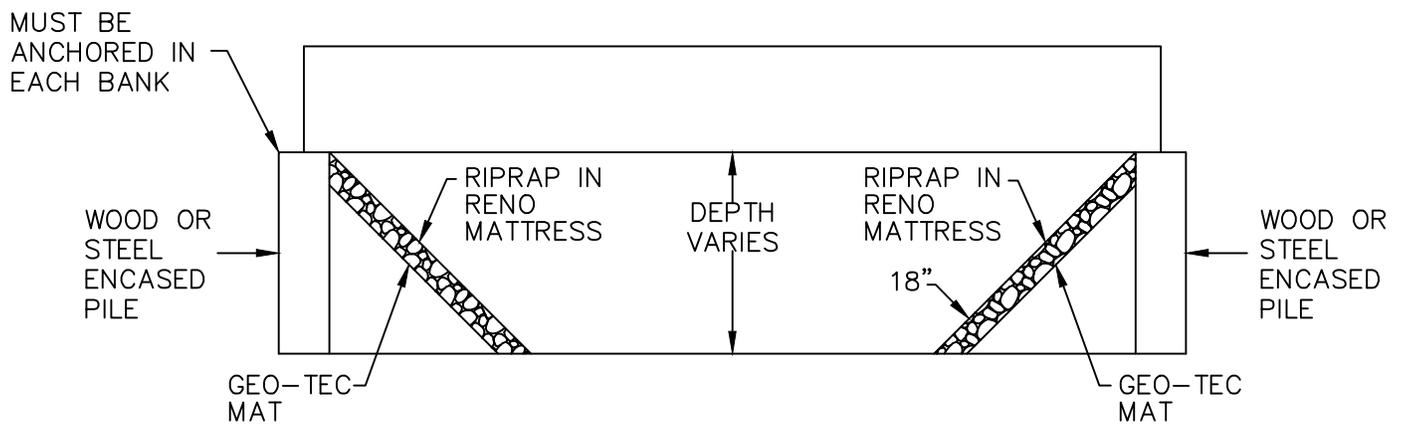


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PLAN VIEW



CROSS SECTION

Bridge must be clear span. No supports allowed from the top of the bank to the top of bank of ditch. No part of the structure may be lower than top of bank. all structures, whether permanent or temporary, must be approved by the City Engineer prior to construction. Crossing may require Local, County, State and Federal approval based on location.

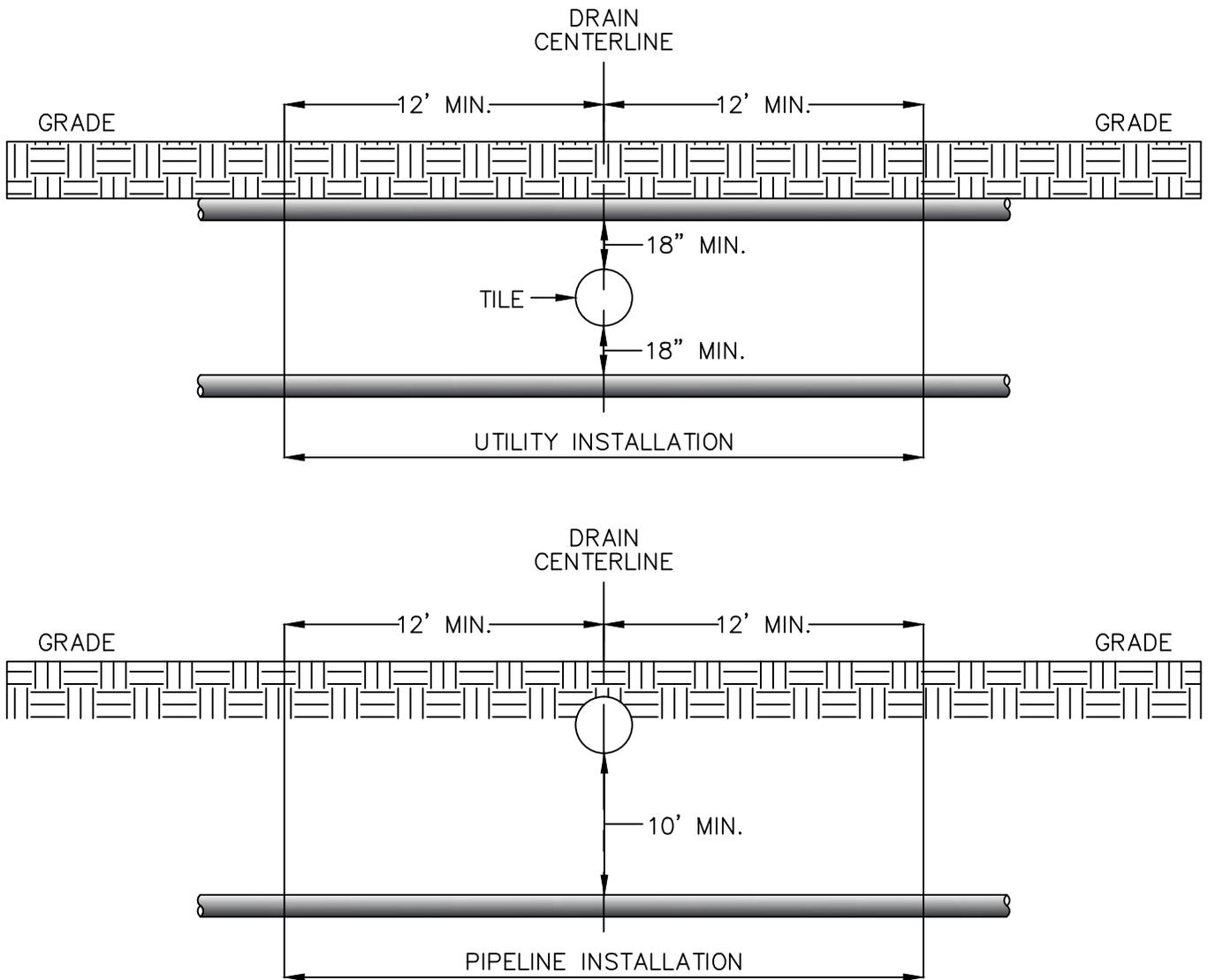
PEDESTRIAN BRIDGE CROSSINGS



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FIGURE ST-18



When installing a utility across a storm drain, the utility contractor will adhere to the following procedure.

1. Utility to be installed a minimum of eighteen (18") inches below or above existing tile.
2. If utility is to be installed using directional boring methods, the utility shall be a minimum of five (5') feet below the storm drain.
3. All petroleum pipelines and/or high pressure transmission lines are to be installed a minimum of ten (10') feet below existing invert of storm drains.
4. If sanitary sewer is installed under drain, sewer shall be encased with concrete. Minimal distance shall be measured from top of concrete encasement.
5. Utility contractor shall adhere to open drain crossing standard during construction process.
6. Notify Westfield Public Works at (317) 804-3150, two working days prior to installation and backfilling.

## PIPELINE & UTILITY INSTALLATION: TILE DRAIN

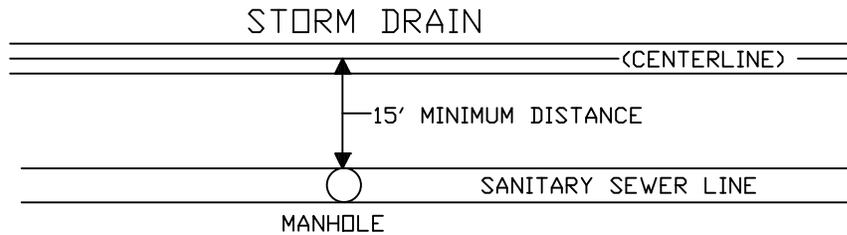
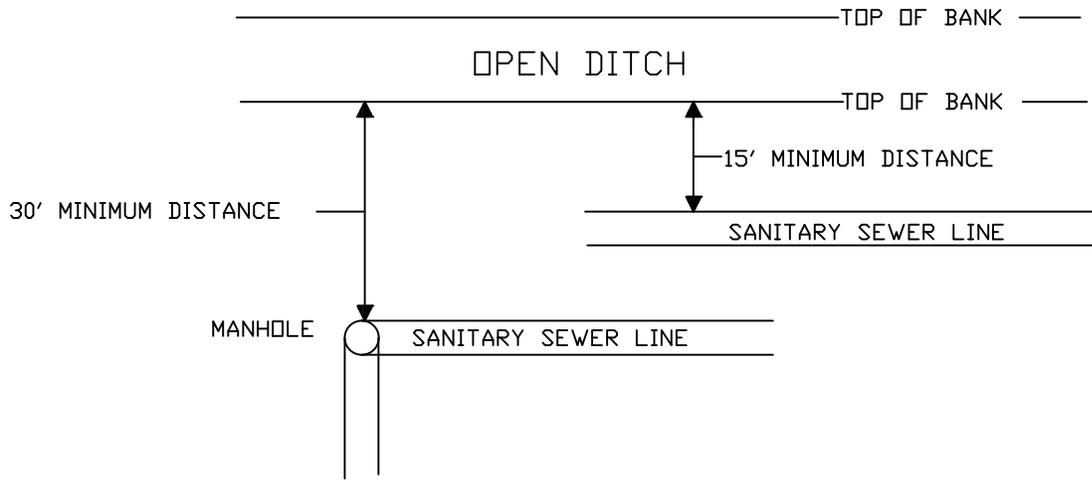
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DATE

FIGURE ST-19

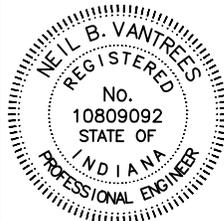


A SANITARY SEWER MANHOLE CANNOT BE LOCATED ANY CLOSER THAN 30 FEET FROM THE TOP OF BANK OF AN OPEN DITCH, OR 15 FEET FROM THE CENTERLINE OF A REGULATED DRAIN TILE.

THE ACTUAL SANITARY SEWER PIPE CANNOT BE LOCATED ANY CLOSER THAN 15 FEET FROM THE THE TOP OF BANK OF AN OPEN DITCH, OR FROM THE CENTERLINE OF A REGULATED DRAIN TILE.

DEEPER INSTALLATIONS OF SANITARY SEWERS MAY REQUIRE GREATER DISTANCE BETWEEN DRAIN AND SANITARY SEWER MANHOLE OR PIPE.

## STANDARD FOR SANITARY SEWERS BEING CONSTRUCTED ADJACENT TO AN OPEN DRAIN & PARALLEL TO STORM DRAINS



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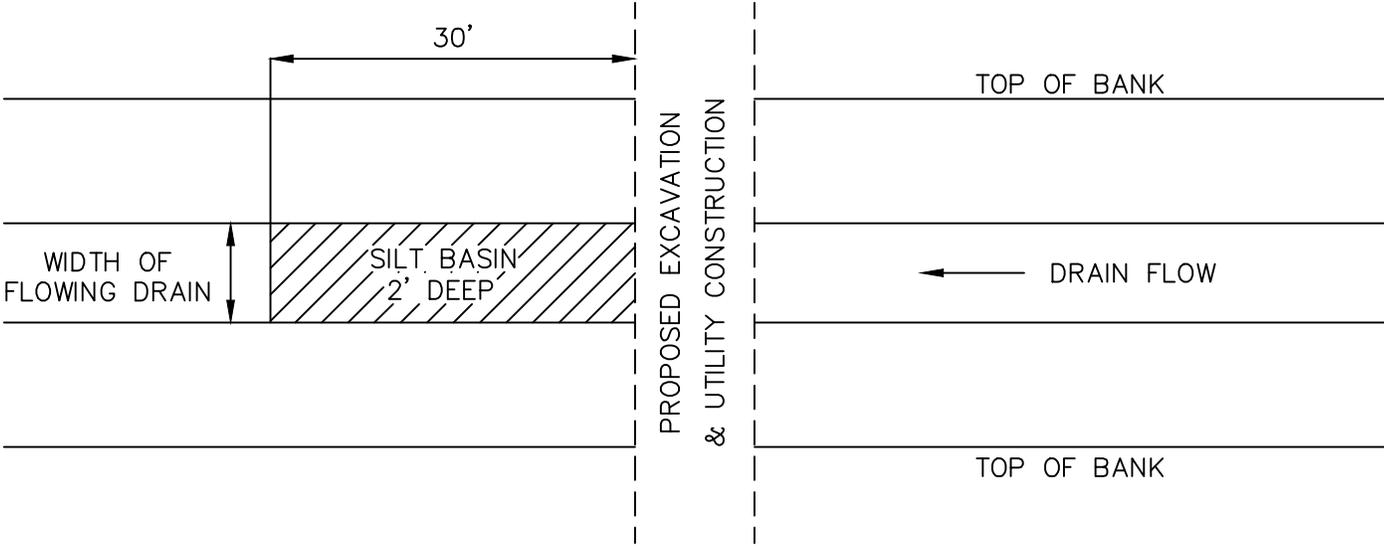
FIGURE ST-20

When Excavating in, across, or through an open drain, the utility contractor will adhere to the following procedure:

1. Excavate silt basin:

Silt basin location & length to be determined in field by City Engineer or designated representative. Contractor shall maintain silt basin throughout work duration.

- 2. Riprap shall be keyed or pressed into ditch bank at location of excavation on bank and slope. Riprap stone shall be 9 inches graded. Riprap area will be one foot in depth, 4 feet minimum in height from flow line, 4 feet minimum in width. No riprap will be placed in flow line of drain.
- 3. All Disturbed areas, other than bank slope are to be seeded and mulched. The contractor has the option of using an erosion fabric if desired.
- 4. Notify the City Engineer at (317) 804-3150, two working days prior to back-filling.
- 5. Must meet all other Federal, State, and Local Regulations.



OPEN DRAIN CROSSING

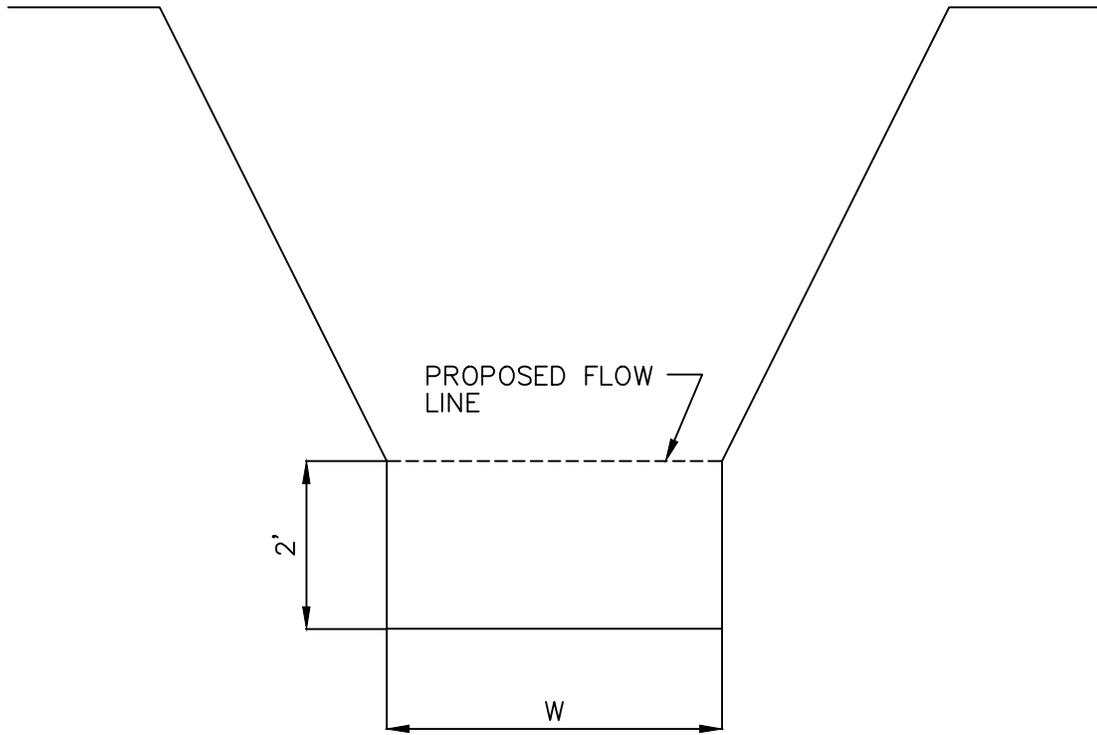


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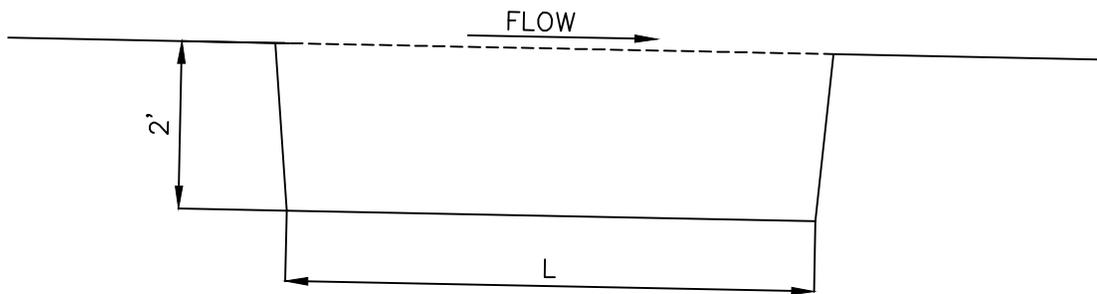
4/1/13  
DATE

FIGURE ST-21



CROSS SECTION

W: VARIES - SEE PLAN
L: VARIES - SEE PLAN



PROFILE

SILT BASIN

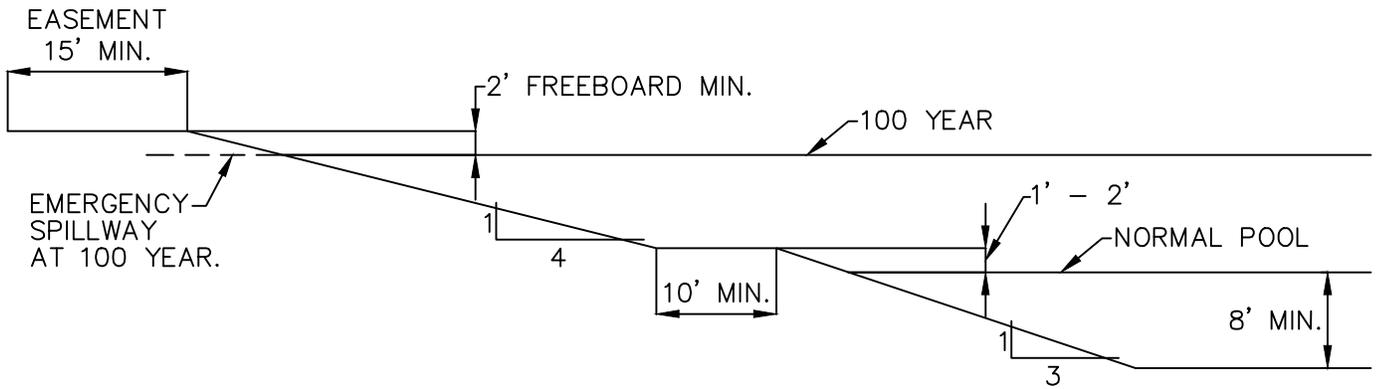


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FIGURE ST-22



USE OUTLET OPTION 1 (SEE FIGURE ST-26)

LAKE CROSS SECTIONS: OPTION 1

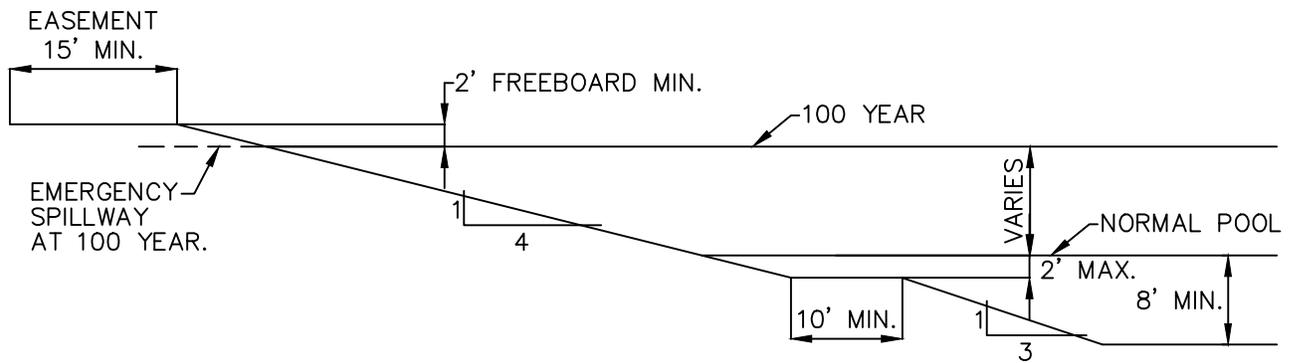


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FIGURE ST-23



USE OUTLET OPTION 2 (SEE FIGURE ST-27)

LAKE CROSS SECTIONS: OPTION 2

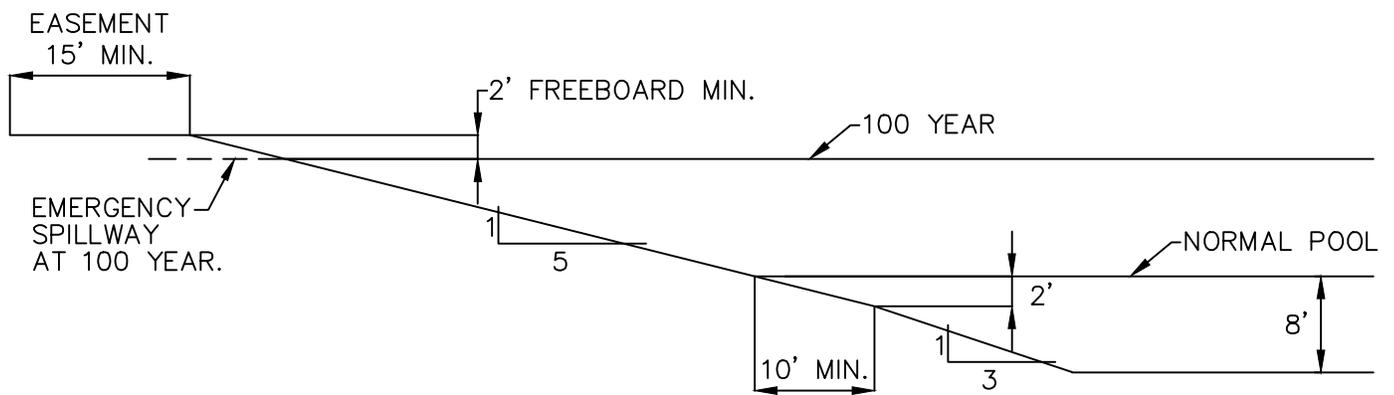


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FIGURE ST-24



USE OUTLET OPTION 3 (SEE FIGURE ST-28)

LAKE CROSS SECTIONS: OPTION 3



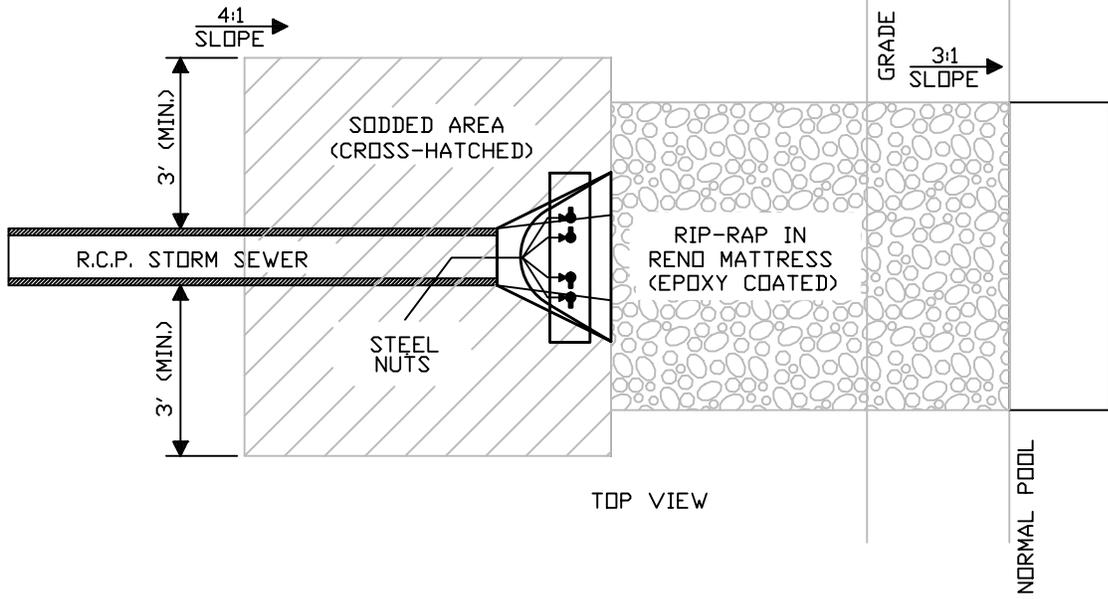
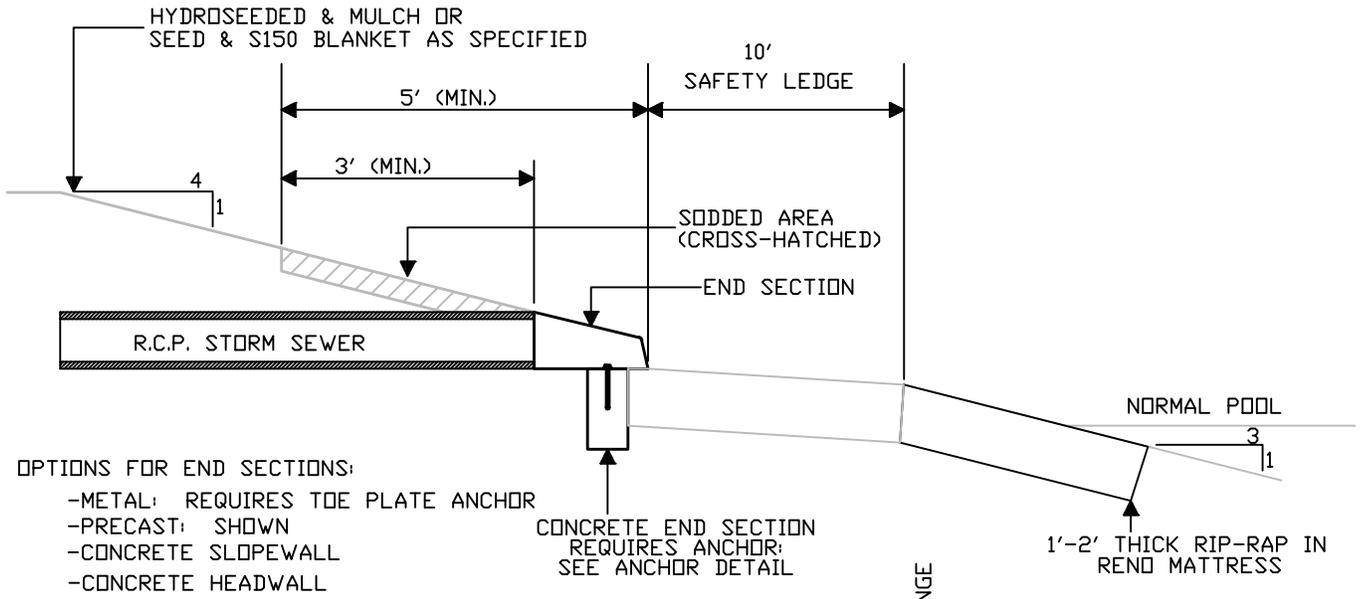
CITY OF WESTFIELD, INDIANA

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FIGURE ST-25

# UNDERWATER DISCHARGE NOT ALLOWED



## LAKE OUTLET DETAIL FOR LAKE CROSS-SECTION OPTION 1

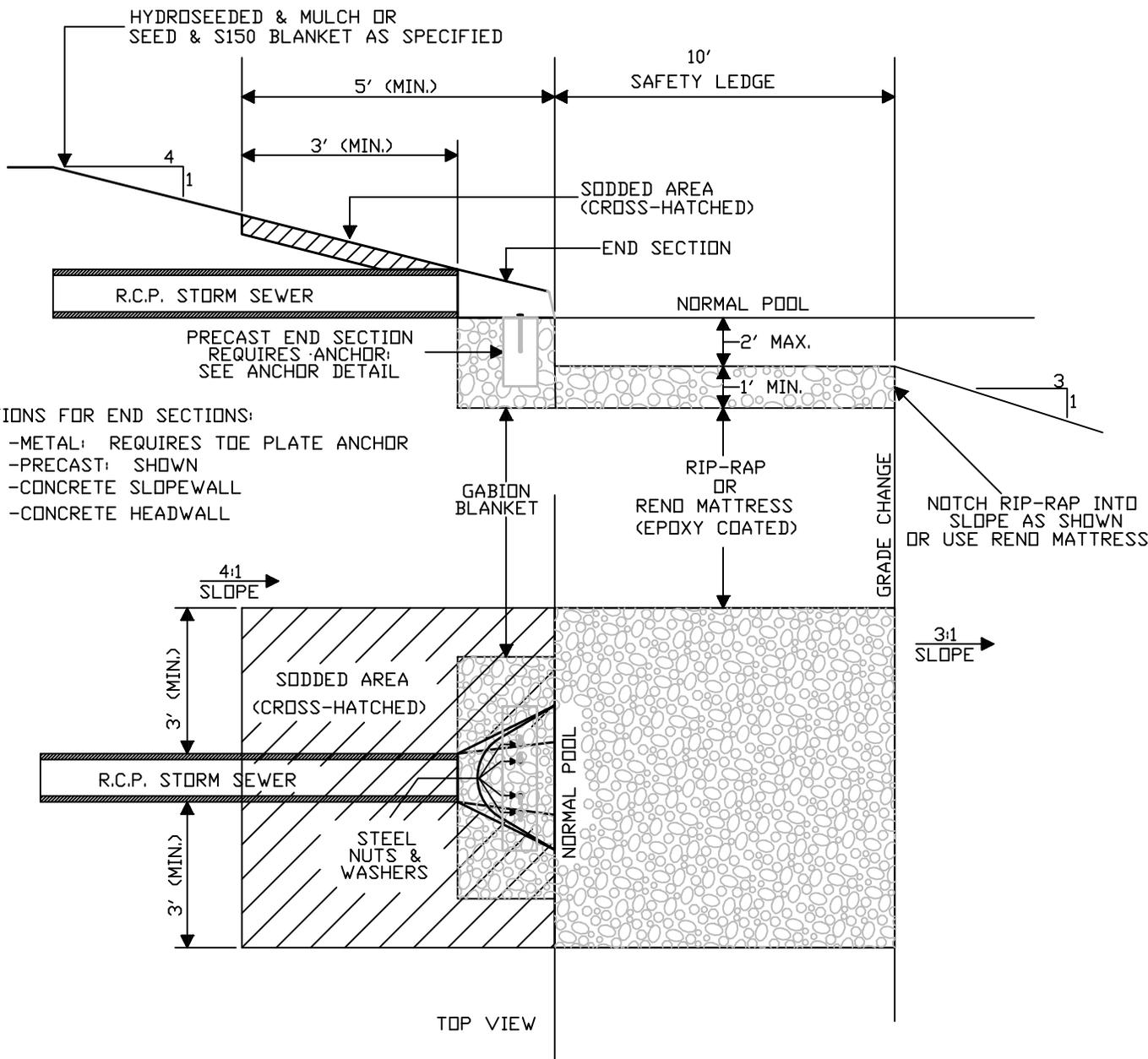


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FIGURE ST-26



- OPTIONS FOR END SECTIONS:
- METAL: REQUIRES TOE PLATE ANCHOR
  - PRECAST: SHOWN
  - CONCRETE SLOPEWALL
  - CONCRETE HEADWALL

## LAKE OUTLET DETAIL FOR LAKE CROSS-SECTION OPTION 2

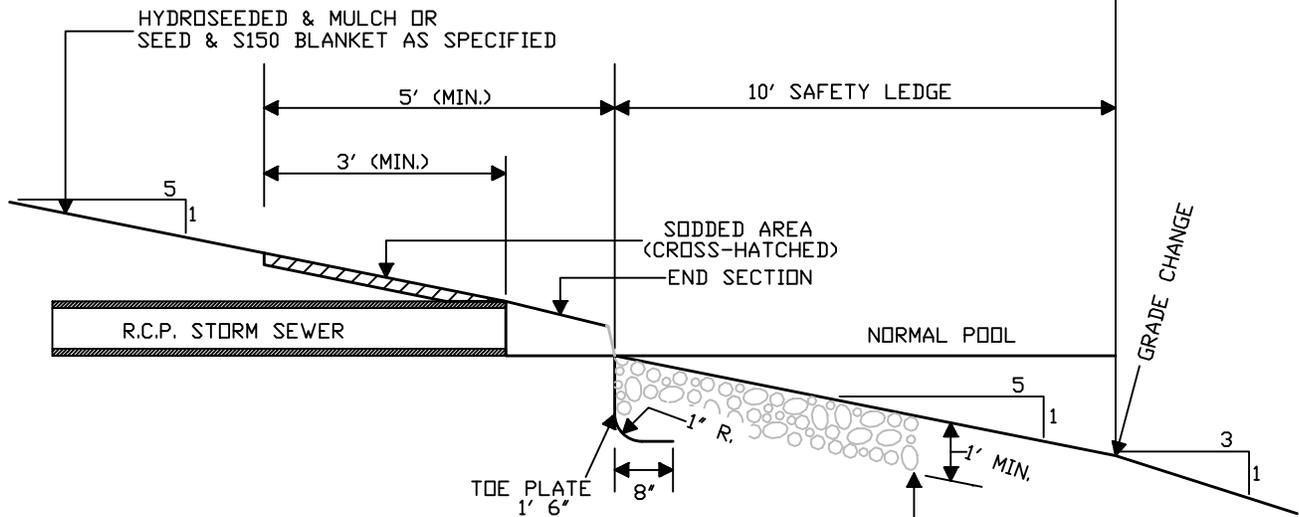


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FIGURE ST-27

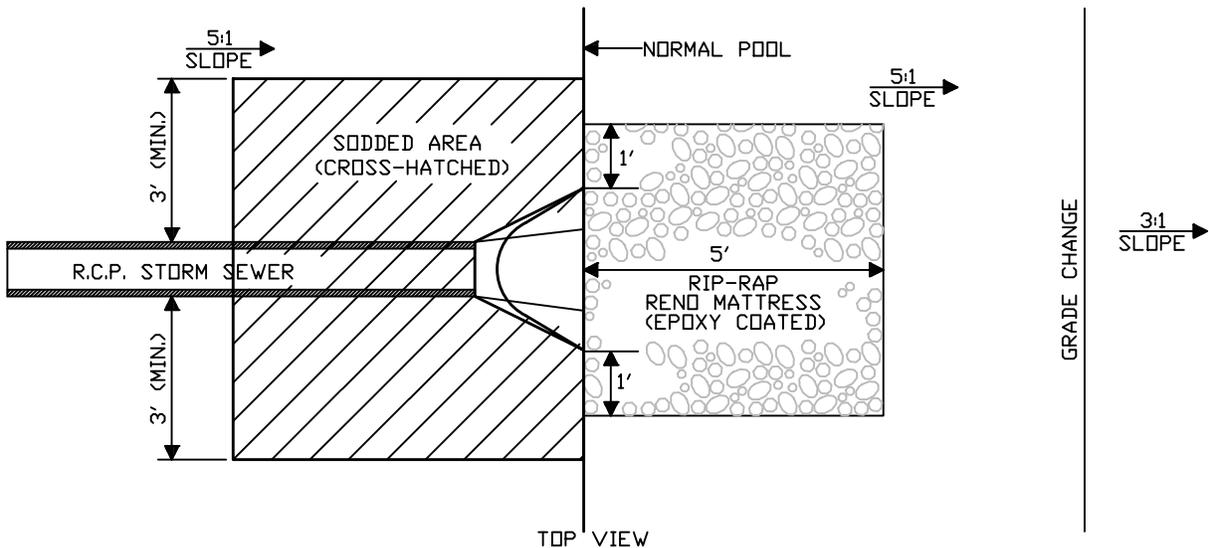
# UNDERWATER DISCHARGE NOT ALLOWED



**OPTIONS FOR END SECTIONS:**

- METAL: SHOWN/REQUIRES TOE PLATE ANCHOR
- PRECAST: REQUIRES ANCHOR W/ TOE WALL
- CONCRETE SLOPEWALL
- CONCRETE HEADWALL

NOTCH RIP-RAP INTO SLOPE AS SHOWN  
USE REND MATTRESS



## LAKE OUTLET DETAIL FOR LAKE CROSS-SECTION OPTION 3

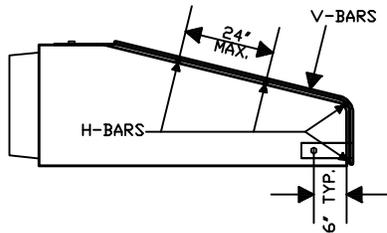


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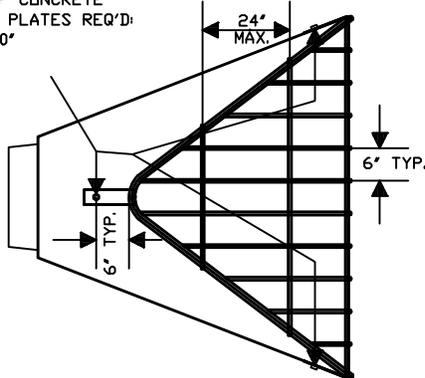
FIGURE ST-28

## SIDE PROFILE



## TOP VIEW

BOLT TO APRON 6" FROM  
EDGE OF CONCRETE  
3 BOLT PLATES REQ'D:  
1/4"X4"X10"



Apron Size Inches	V-bar Size Inches	No. of H-bars Req'd	H-bar Size Inches	Bolt Dia. Inches	"A" Dim. Inches
18	1/2	3	5/8	1/2	5
24	5/8	4	3/4	1/2	7
30	5/8	4	3/4	1/2	7 1/2
36	3/4	4	1	1/2	10 1/2
42	3/4	4	1	3/4	11
48	3/4	4	1 1/2 pipe	3/4	12
54	3/4	4	1 1/2 pipe	3/4	12
60	3/4	5	1 1/2 pipe	3/4	14
72	3/4	5	1 1/2 pipe	3/4	14
84	3/4	6	1 1/2 pipe	3/4	15

Apron Size Inches	V-bar Size Inches	No. of H-bars Req'd	H-bar Size Inches	Bolt Dia. Inches	"A" Dim. Inches
12	1/2	3	5/8	1/2	4
15	1/2	3	5/8	1/2	4 1/2
18	1/2	4	5/8	1/2	4 1/2
21	1/2	4	5/8	1/2	5
24	5/8	4	3/4	1/2	5
27	5/8	4	3/4	1/2	5 1/2
30	5/8	4	3/4	1/2	5 1/2
36	3/4	4	1	3/4	8
42	3/4	4	1	3/4	8
48	3/4	5	1	3/4	8
54	3/4	5	1 1/2 pipe	3/4	8
60	3/4	5	1 1/2 pipe	3/4	8
66	3/4	6	1 1/2 pipe	3/4	8
72	3/4	6	1 1/2 pipe	3/4	9
84	3/4	7	1 1/2 pipe	3/4	10
90	3/4	7	1 1/2 pipe	3/4	14

### NOTES:

1. BARS & PLATES ARE HOT-ROLLED STEEL.
2. BARS, PLATES, & PIPE ARE FINISHED WITH 2 COATS OF ALUMINUM PAINT.
3. BOLTS ARE GALVANIZED
4. NO REBAR THROUGH PIPES WILL BE ALLOWED
5. DEBRIS GUARD SHALL BE REMOVABLE

## DEBRIS GUARD

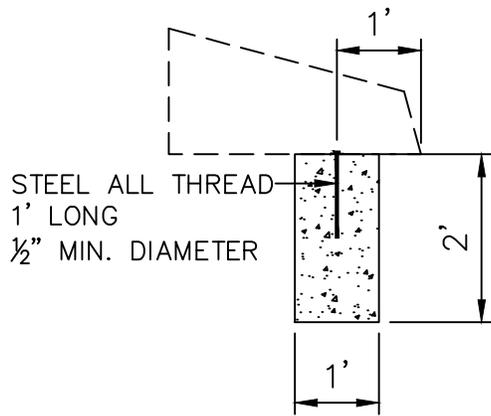


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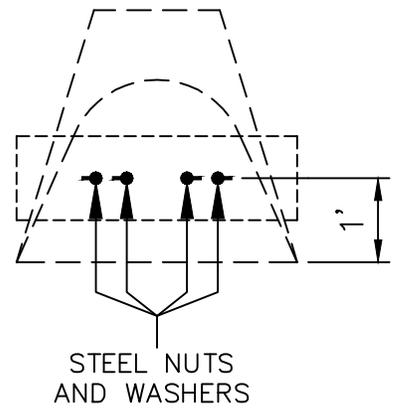
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FIGURE ST-29

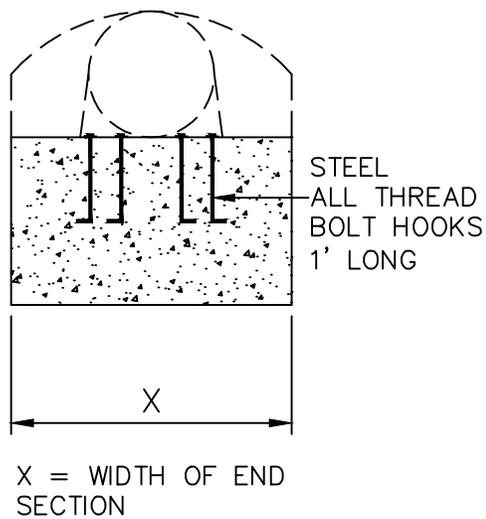
SIDE PROFILE



TOP VIEW

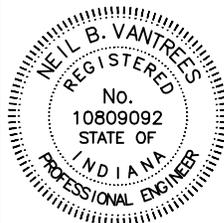


END PROFILE



ALLTHREAD SPACING TO BE TWO PER FOOT  
 EX: 12" END SECTION = 2 ALLTHREAD  
 24" END SECTION = 4 ALLTHREAD

# ANCHOR FOR CONCRETE END SECTIONS

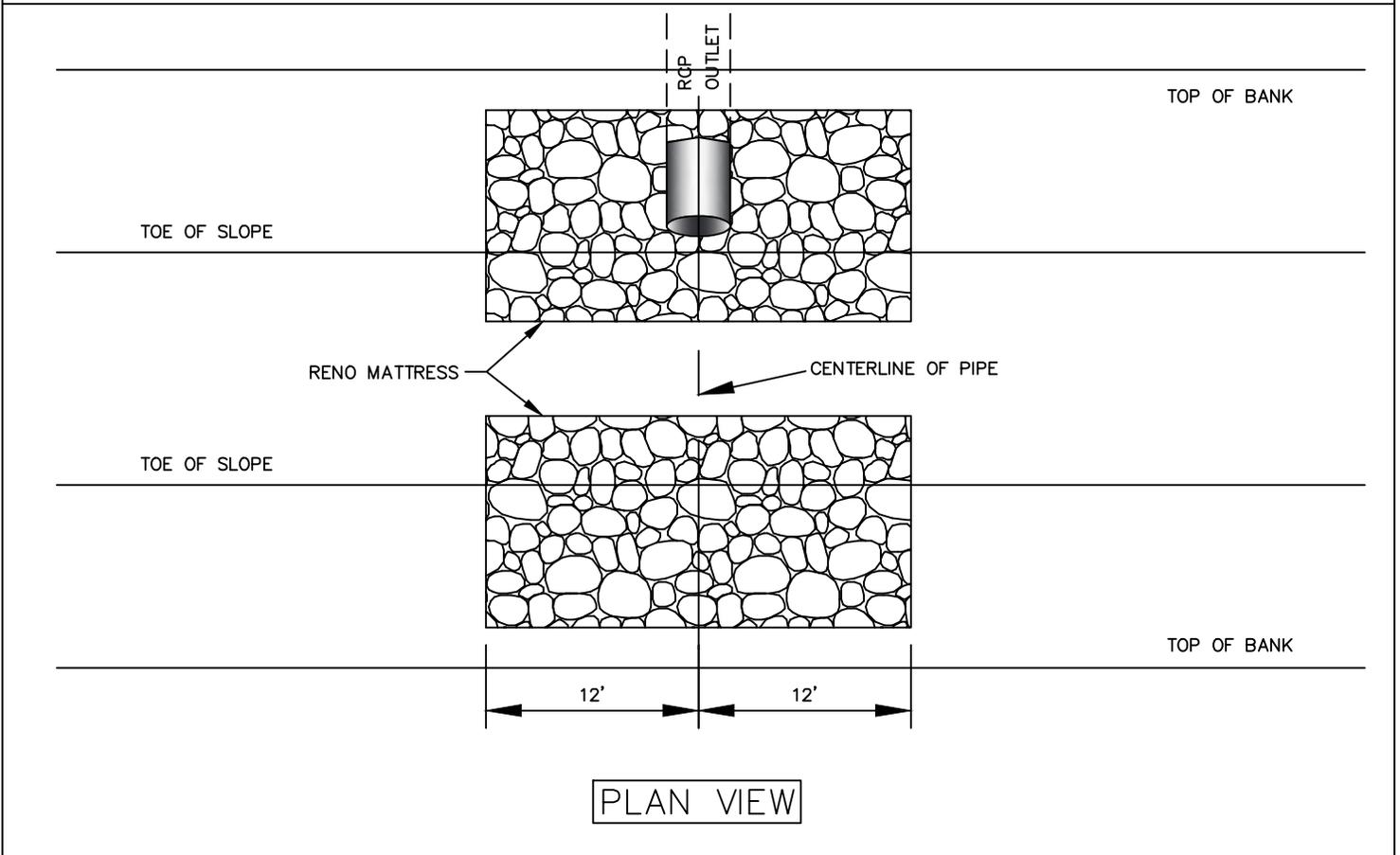
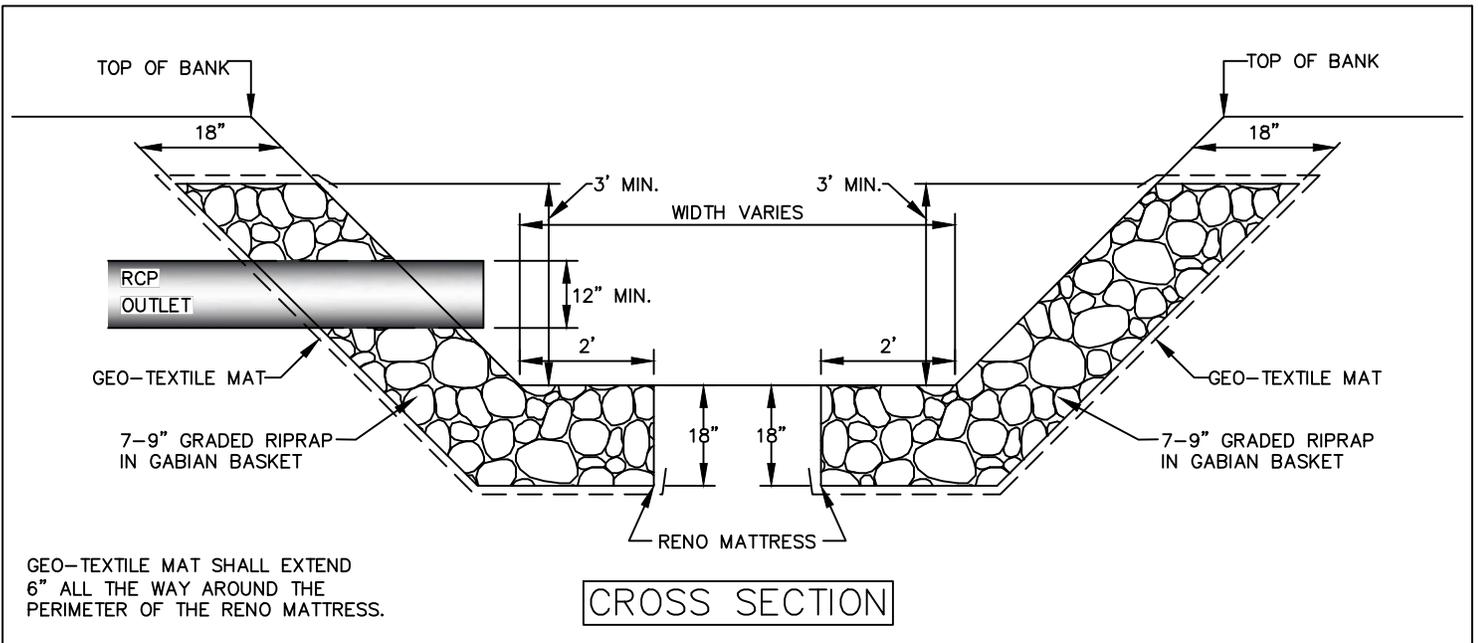


## CITY OF WESTFIELD, INDIANA

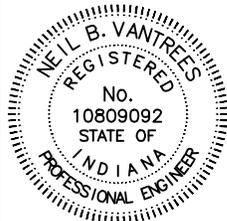
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FIGURE ST-30



## BANK ARMORMENT AT OUTLET PIPE IN OPEN CHANNELS

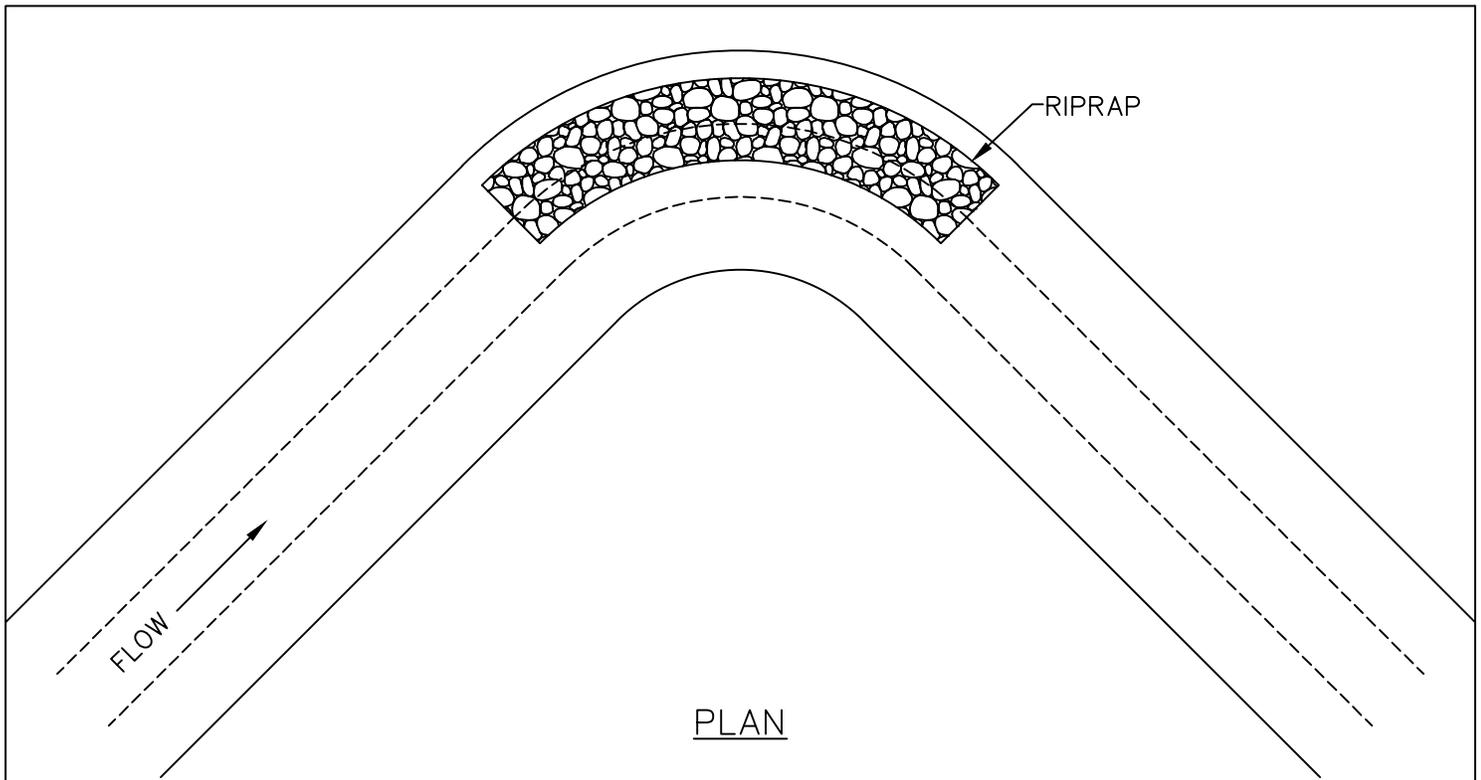


CITY OF WESTFIELD, INDIANA

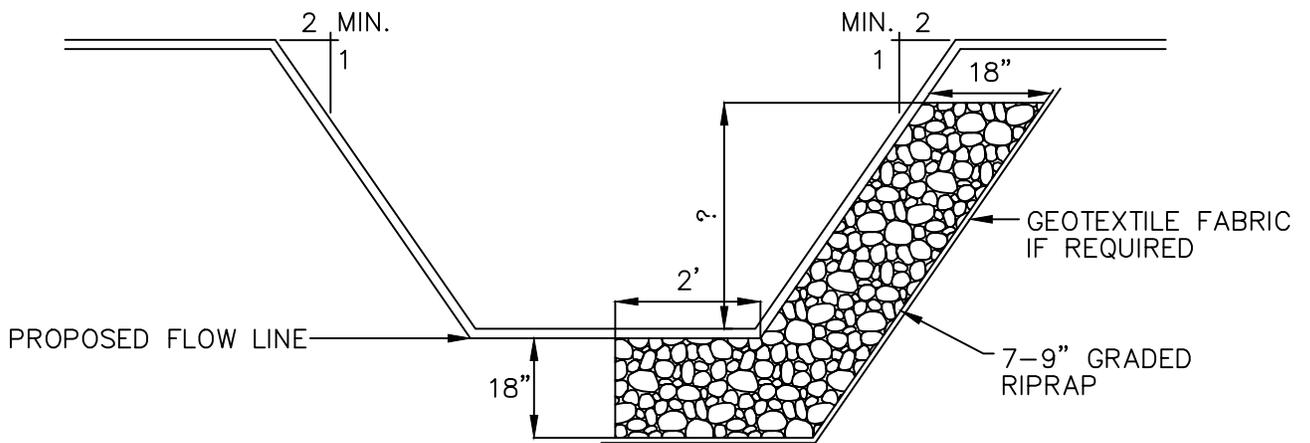
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FIGURE ST-31



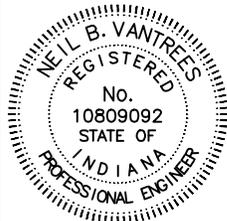
PLAN



GEOTEXTILE FABRIC MAY BE REQUIRED, DEPENDING ON SOIL CONDITIONS.

CROSS SECTION

CORNER PROTECTION

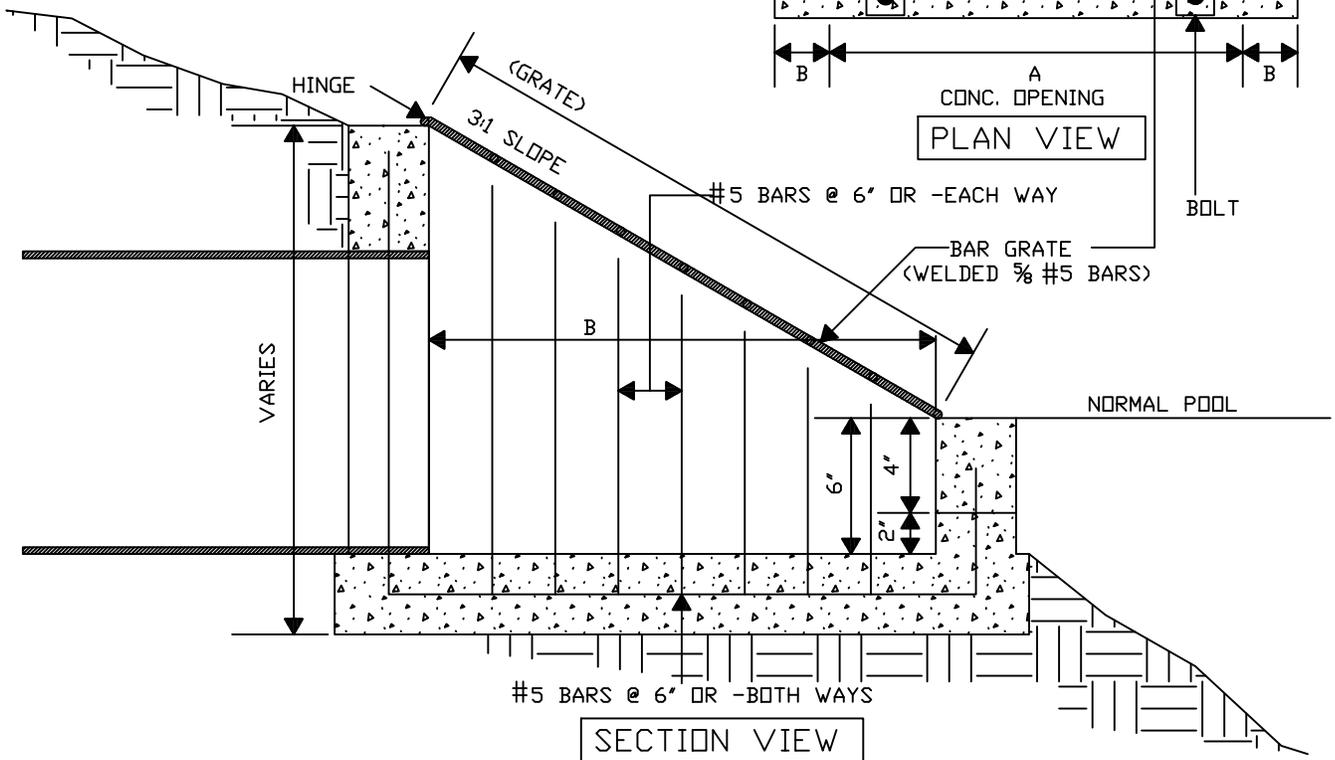
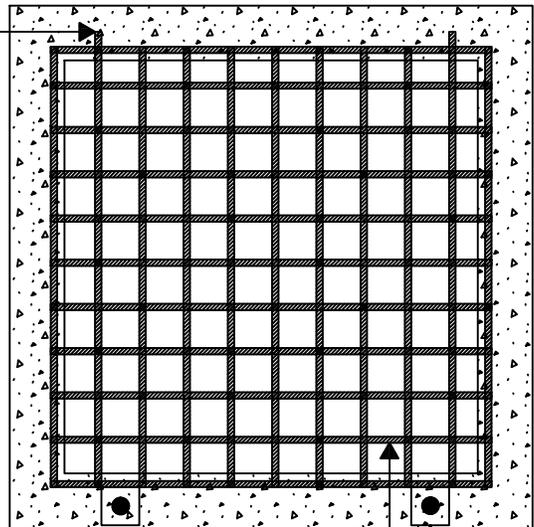
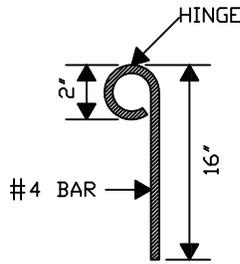


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FIGURE ST-32

PIPE SIZE	A	B
12"	3'	4'
15"	3'	4'
18"	3'	4'
36"	4'	6'



POND OUTFALL STRUCTURE

CITY OF WESTFIELD, INDIANA

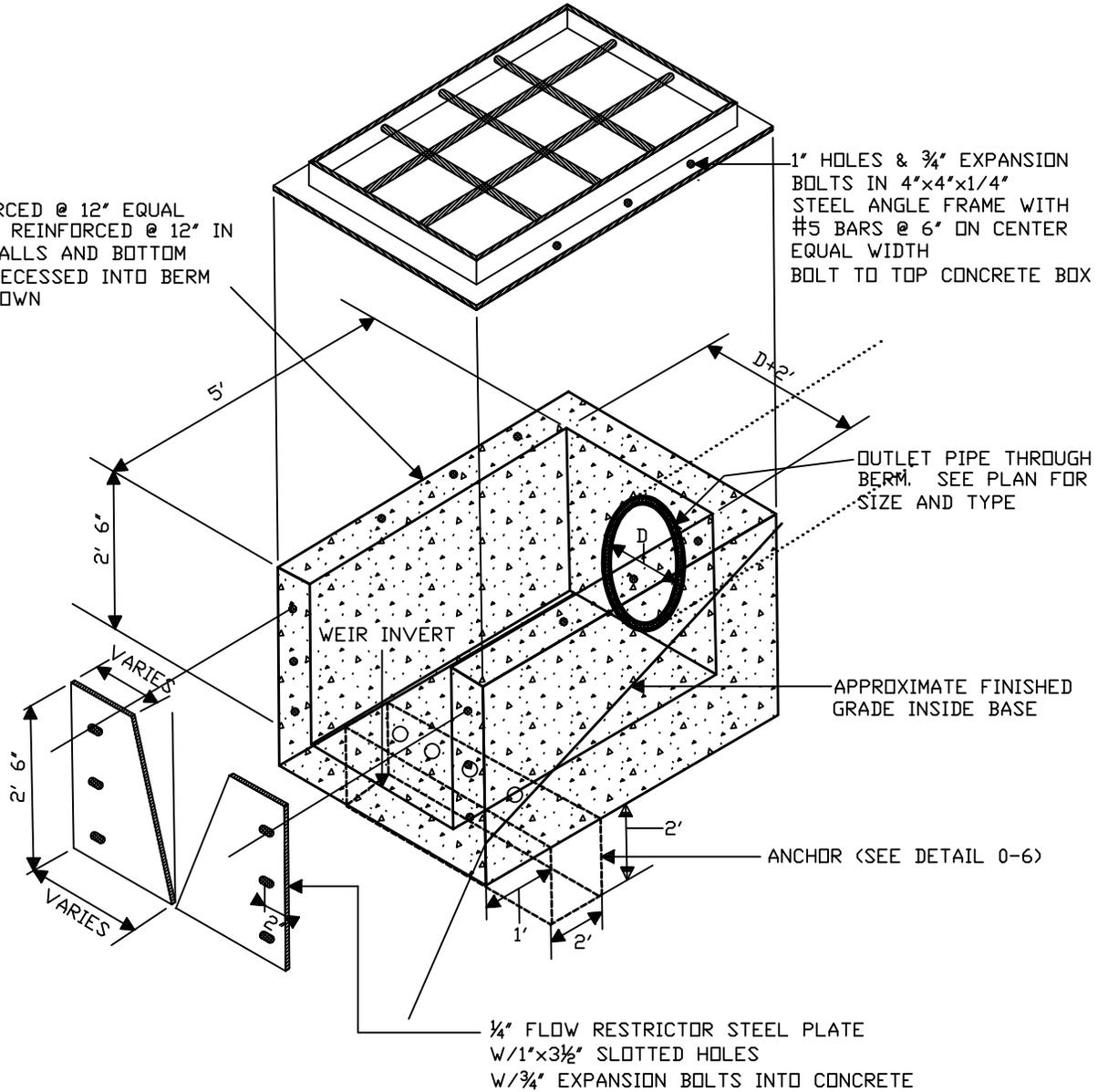


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FIGURE ST-33

#5 REINFORCED @ 12" EQUAL WIDTH IN 5 REINFORCED @ 12" IN 6" THICK WALLS AND BOTTOM WEIR BOX RECESSED INTO BERM SIDE AS SHOWN



1" HOLES & 3/4" EXPANSION BOLTS IN 4"x4"x1/4" STEEL ANGLE FRAME WITH #5 BARS @ 6" ON CENTER EQUAL WIDTH BOLT TO TOP CONCRETE BOX

OUTLET PIPE THROUGH BERM. SEE PLAN FOR SIZE AND TYPE

APPROXIMATE FINISHED GRADE INSIDE BASE

ANCHOR (SEE DETAIL 0-6)

1/4" FLOW RESTRICTOR STEEL PLATE W/1"x3 1/2" SLOTTED HOLES W/3/4" EXPANSION BOLTS INTO CONCRETE

ISOMETRIC @ WEIR OUTLET



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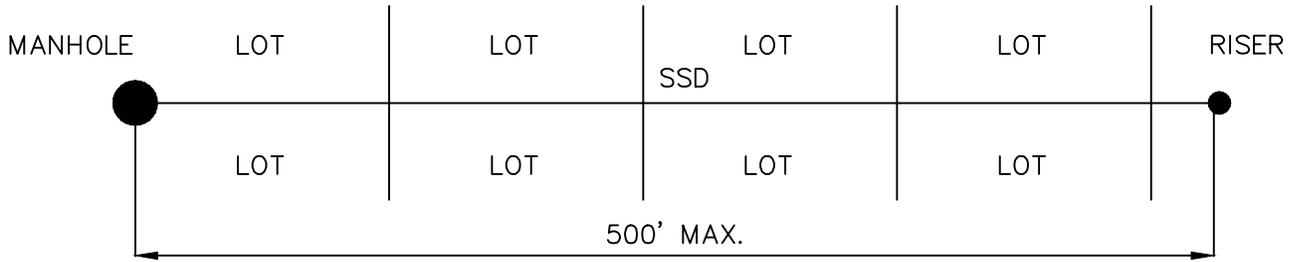
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FIGURE ST-34

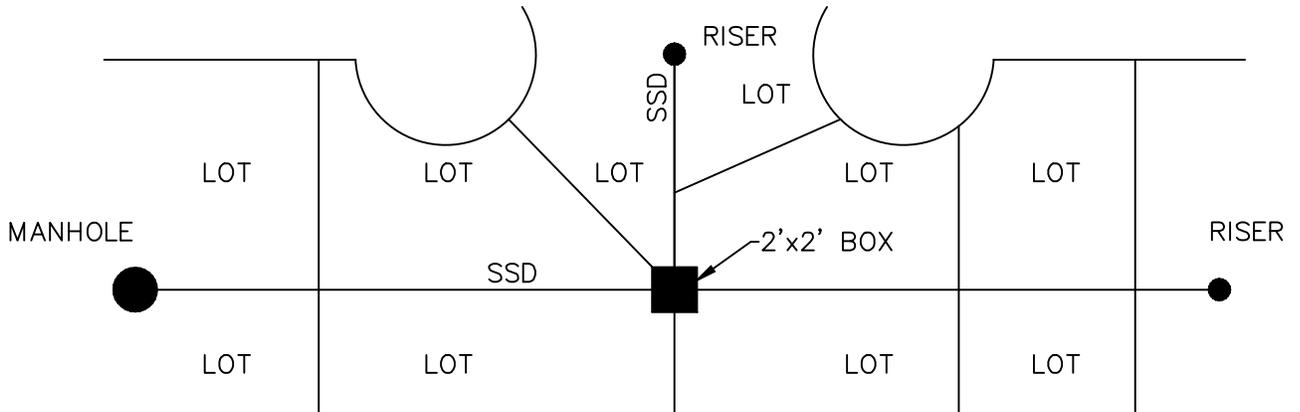




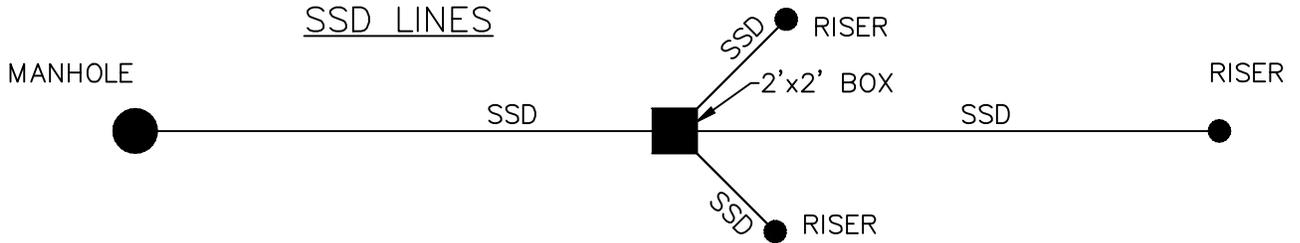
SINGLE LINE



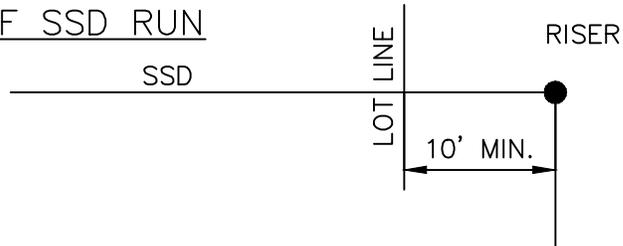
INTERSECTION OF TWO SSD LINES



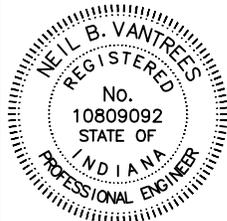
INTERSECTION OF THREE OR MORE SSD LINES



END OF SSD RUN



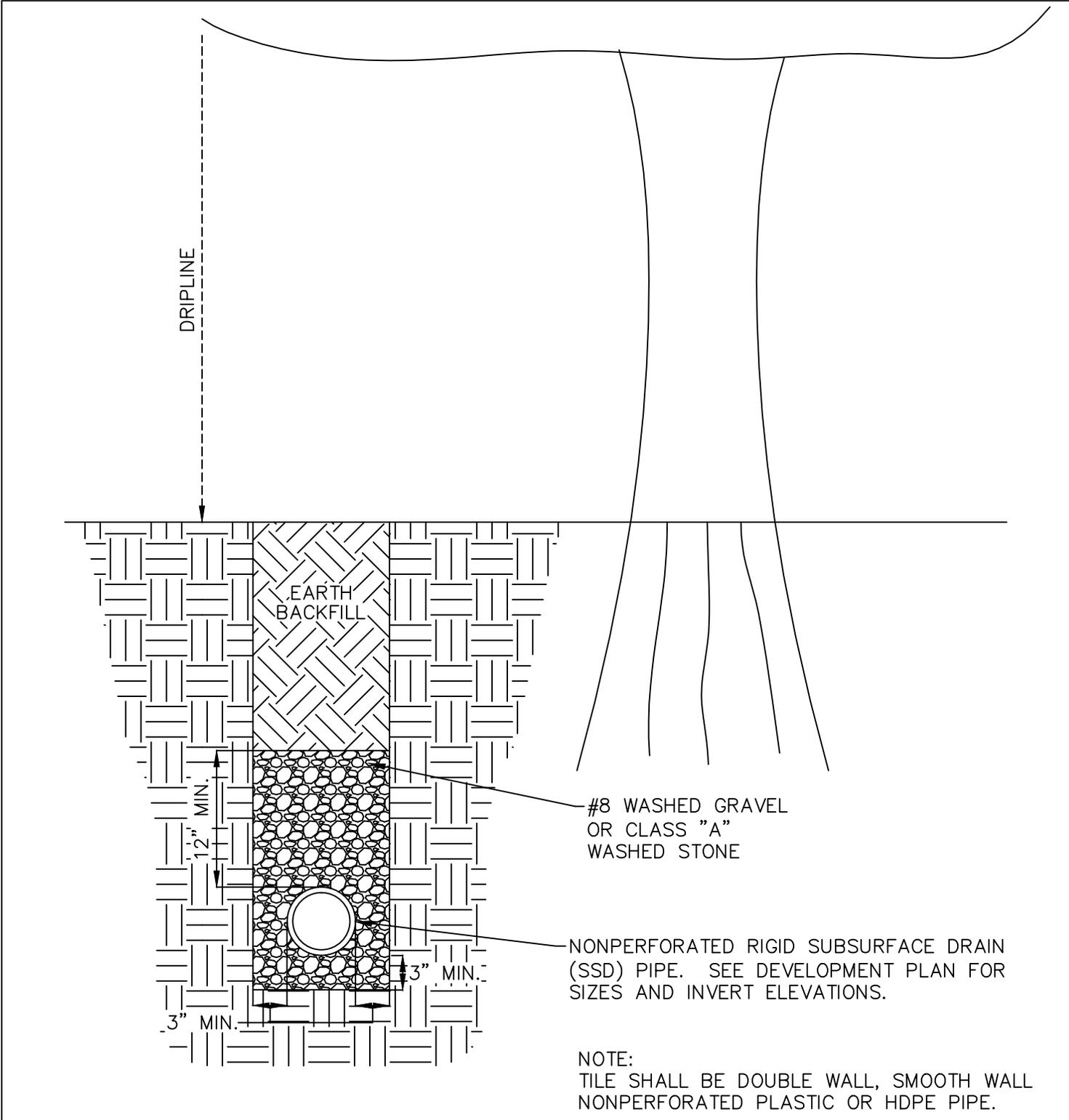
RISER LOCATIONS



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FIGURE ST-38



SUBSURFACE DRAIN (SSD) DETAIL  
WHEN WITHIN DRIPLINE OF EXISTING TREES

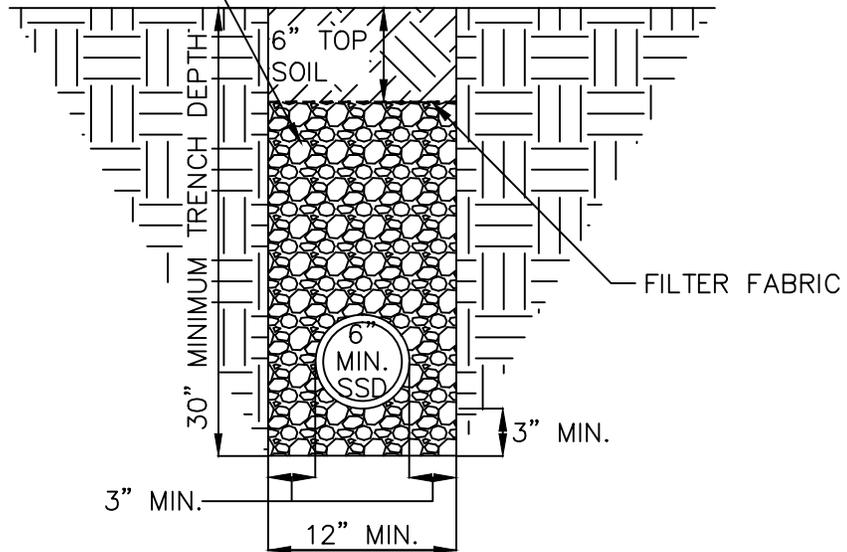


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FIGURE ST-39

#8 WASHED GRAVEL  
OR CLASS "A"  
WASHED STONE



NOTE:  
TILE SHALL BE DOUBLE WALL, SMOOTH  
WALL PERFORATED HDPE PIPE.

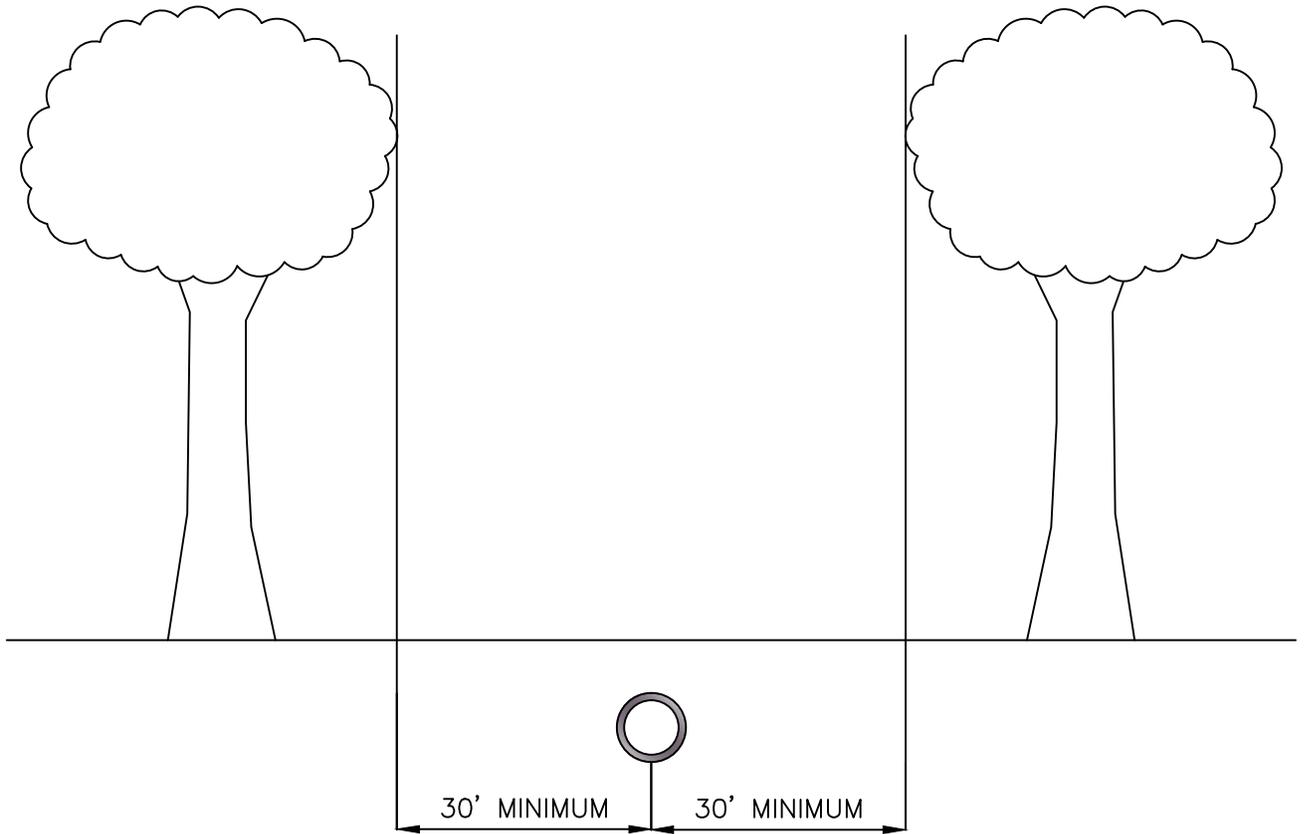
## SUBSURFACE DRAIN (SSD) DETAIL NO SWALE



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FIGURE ST-40



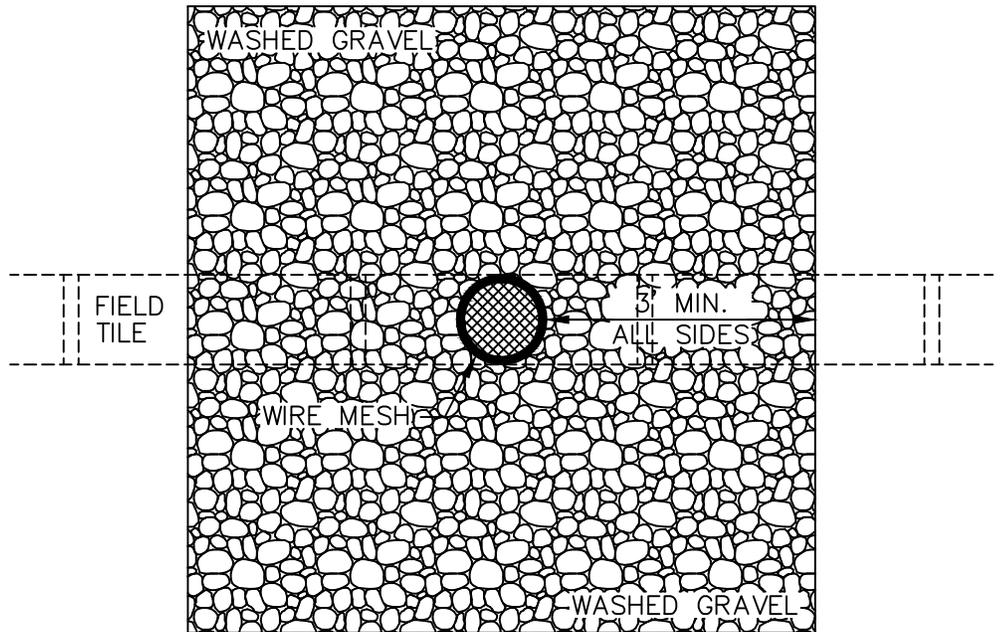
# TILE CLEARING THROUGH WOODS



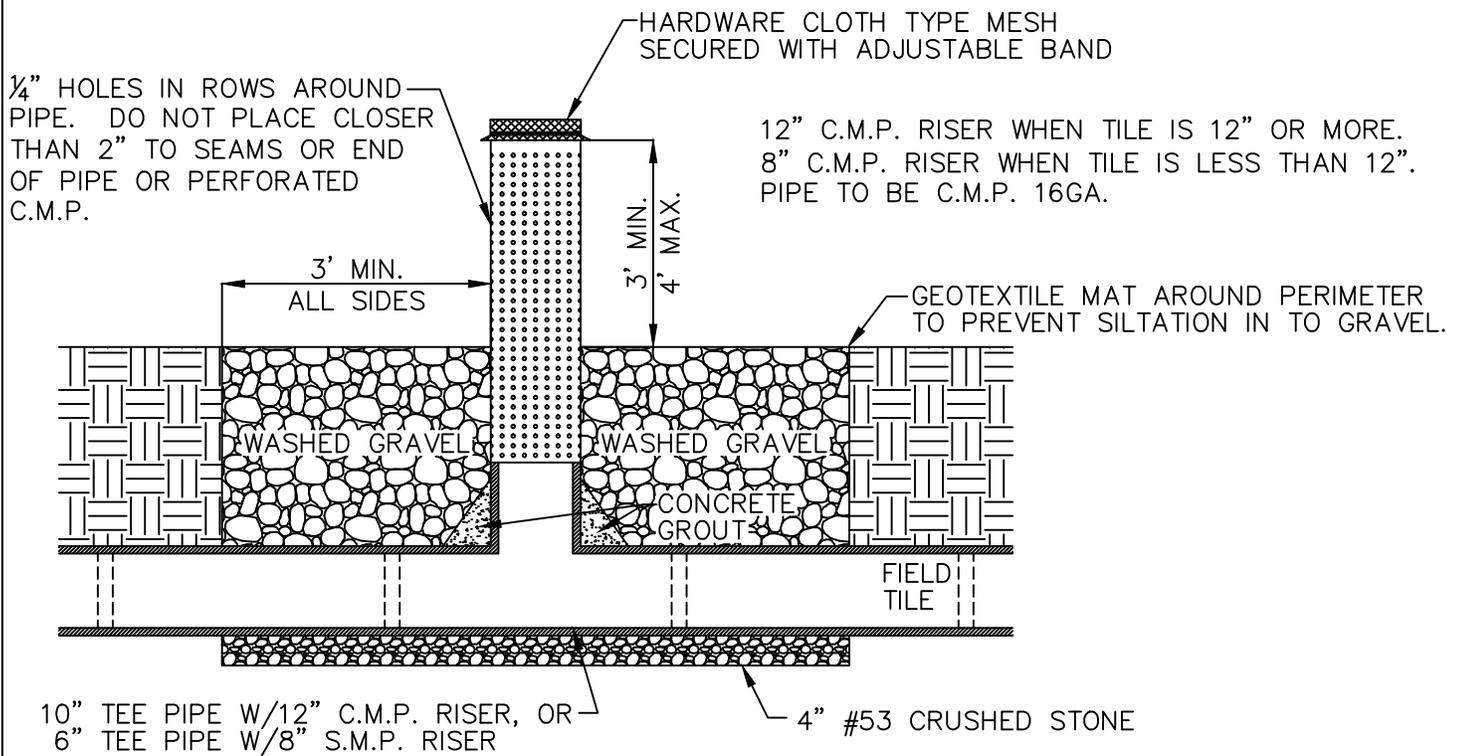
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FIGURE ST-41



TOP VIEW



CROSS SECTION

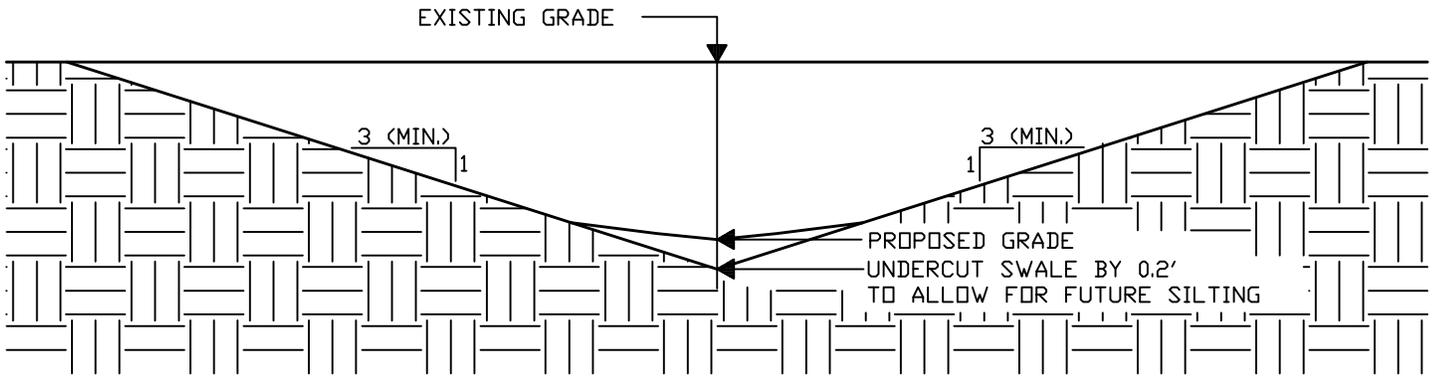
SLOTTED RISER INLET DETAILS



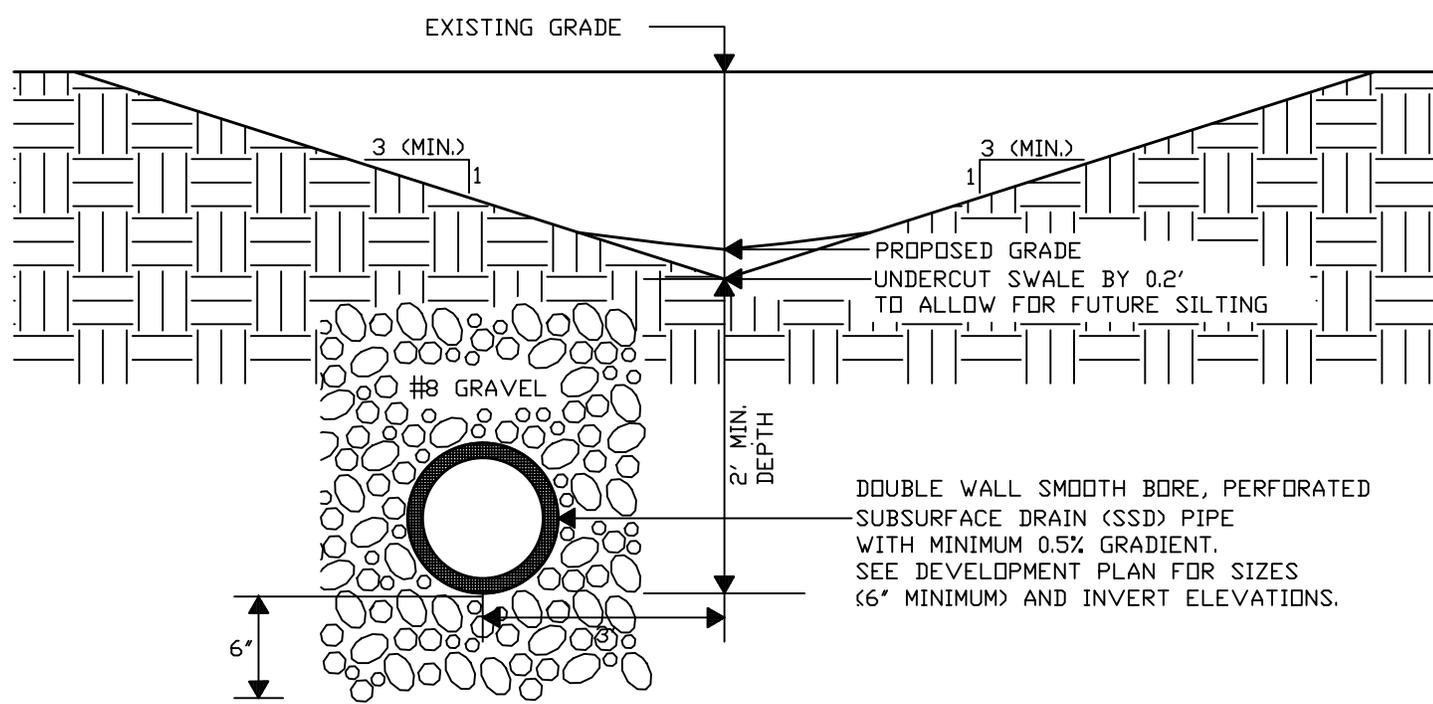
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FIGURE ST-42



UNDERDRAINS REQUIRED IN SWALES WITH SLOPE BETWEEN 1% & 2% GRADIENT



MINIMUM CHANNEL SLOPE 1% GRADIENT

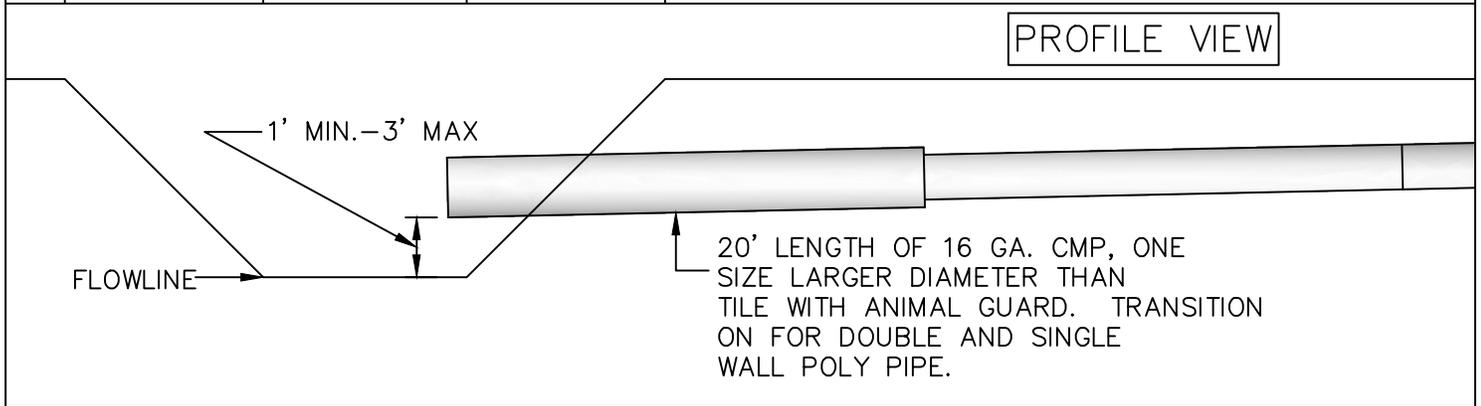
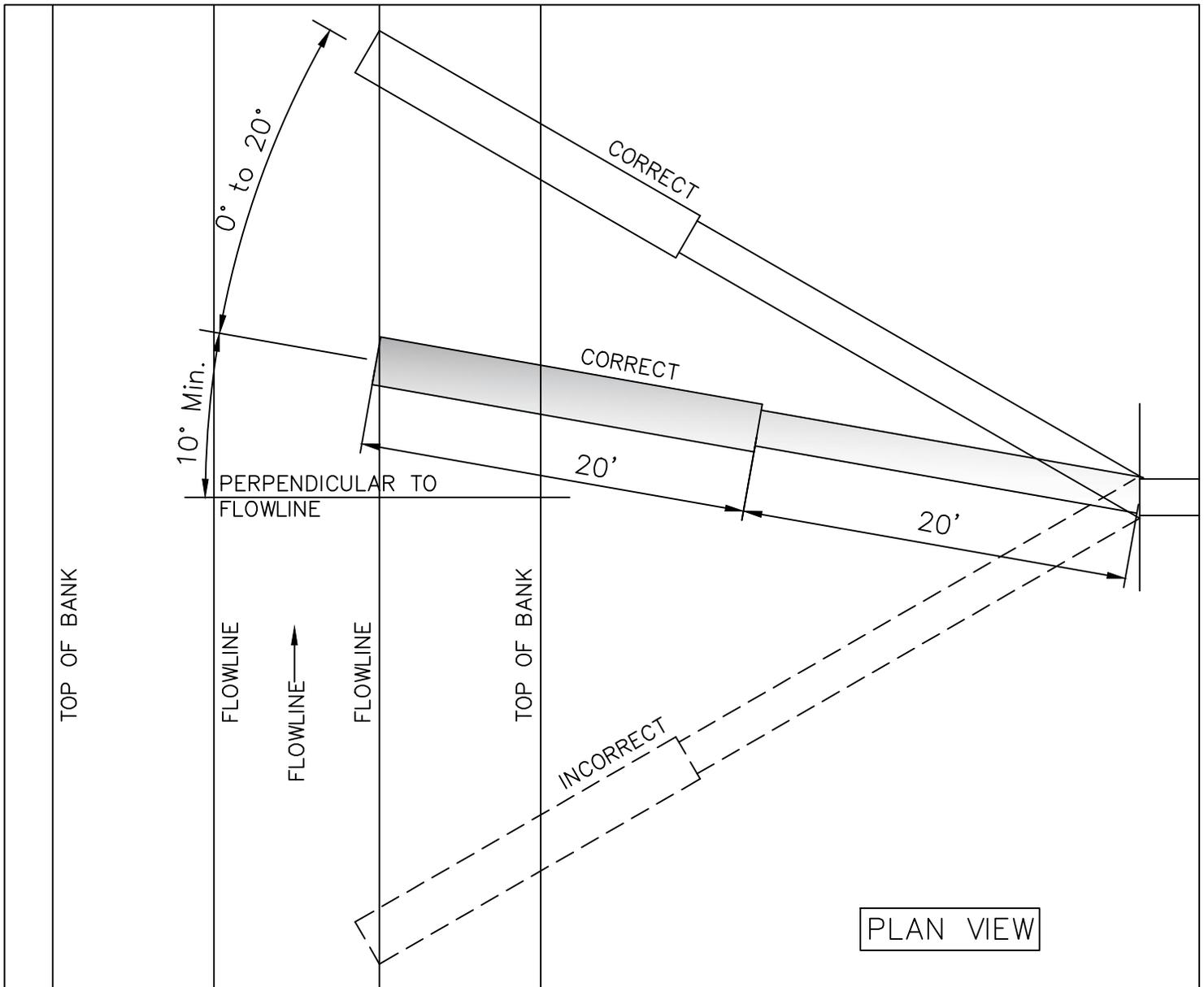
TYPICAL SWALE DETAIL



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FIGURE ST-43



## DRAIN OUTLET DETAIL #1

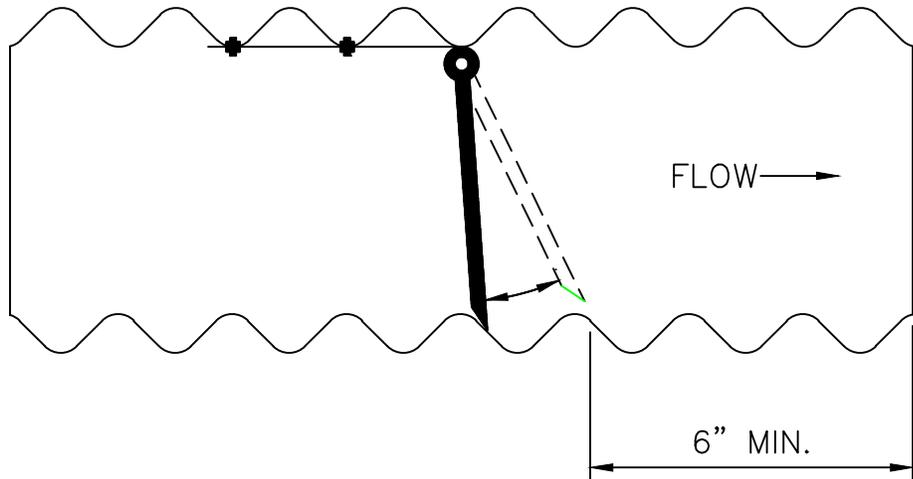


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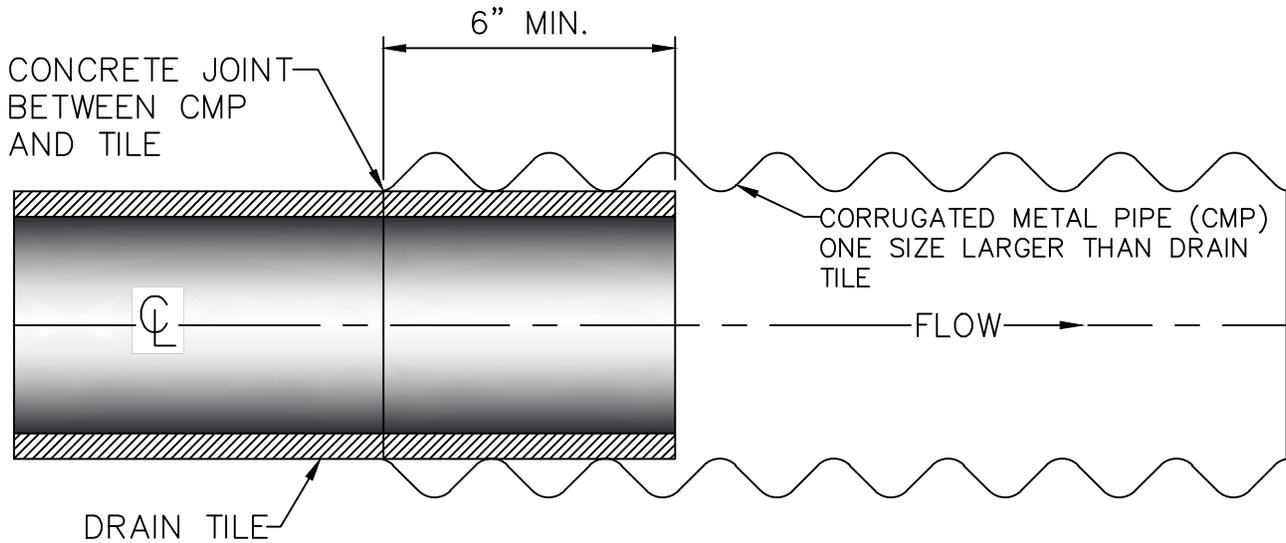
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FIGURE ST-44

FLAP TYPE ANIMAL GUARD DETAIL



SECTION ON  $\phi$  SHOWING DETAIL OF JOINT FOR DRAIN TILE AND CMP PIPE



DRAIN OUTLET DETAIL #2



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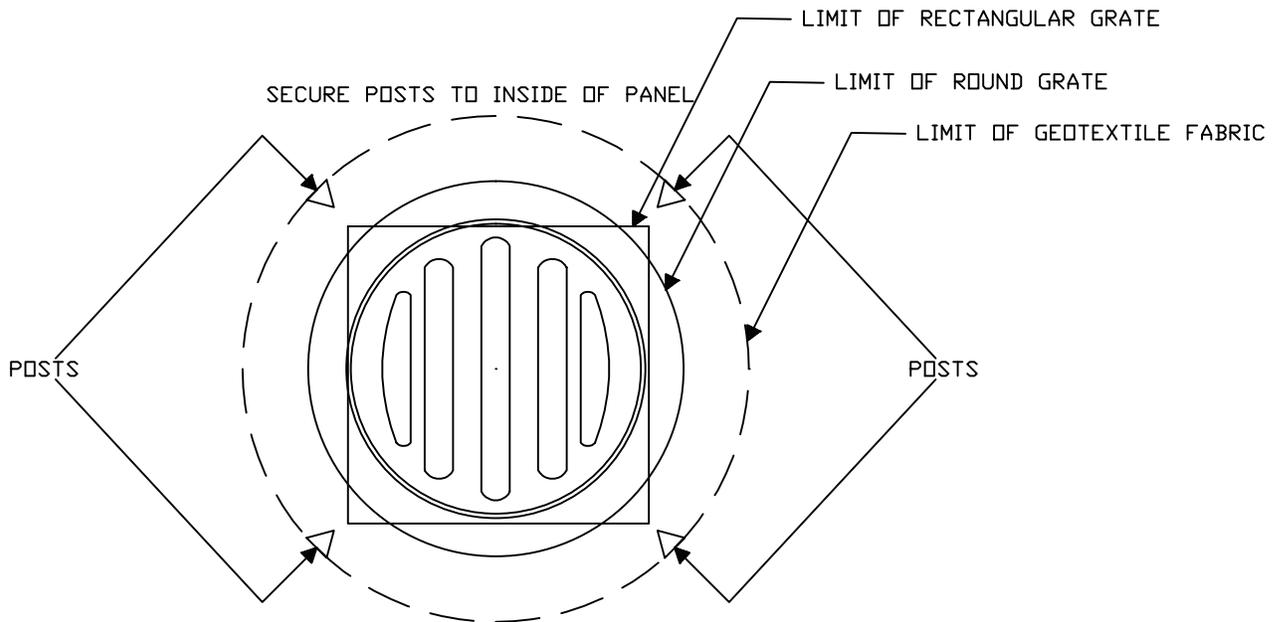
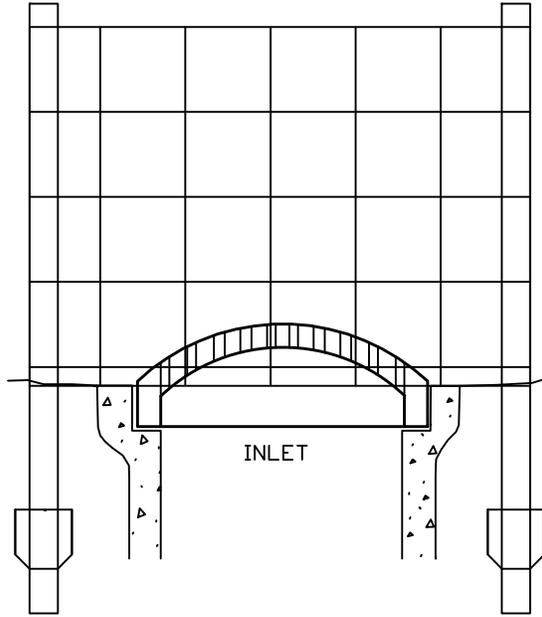
4/1/14  
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FIGURE ST-45

USE ONE  
16' LIVESTOCK PANEL  
WRAPPED W/ GEOTEXTILE FABRIC

30" MINIMUM HEIGHT

INSTALL 3 TO 4  
6" T"  
STEEL FENCE POSTS



## TEMPORARY DITCH INLET PROTECTION



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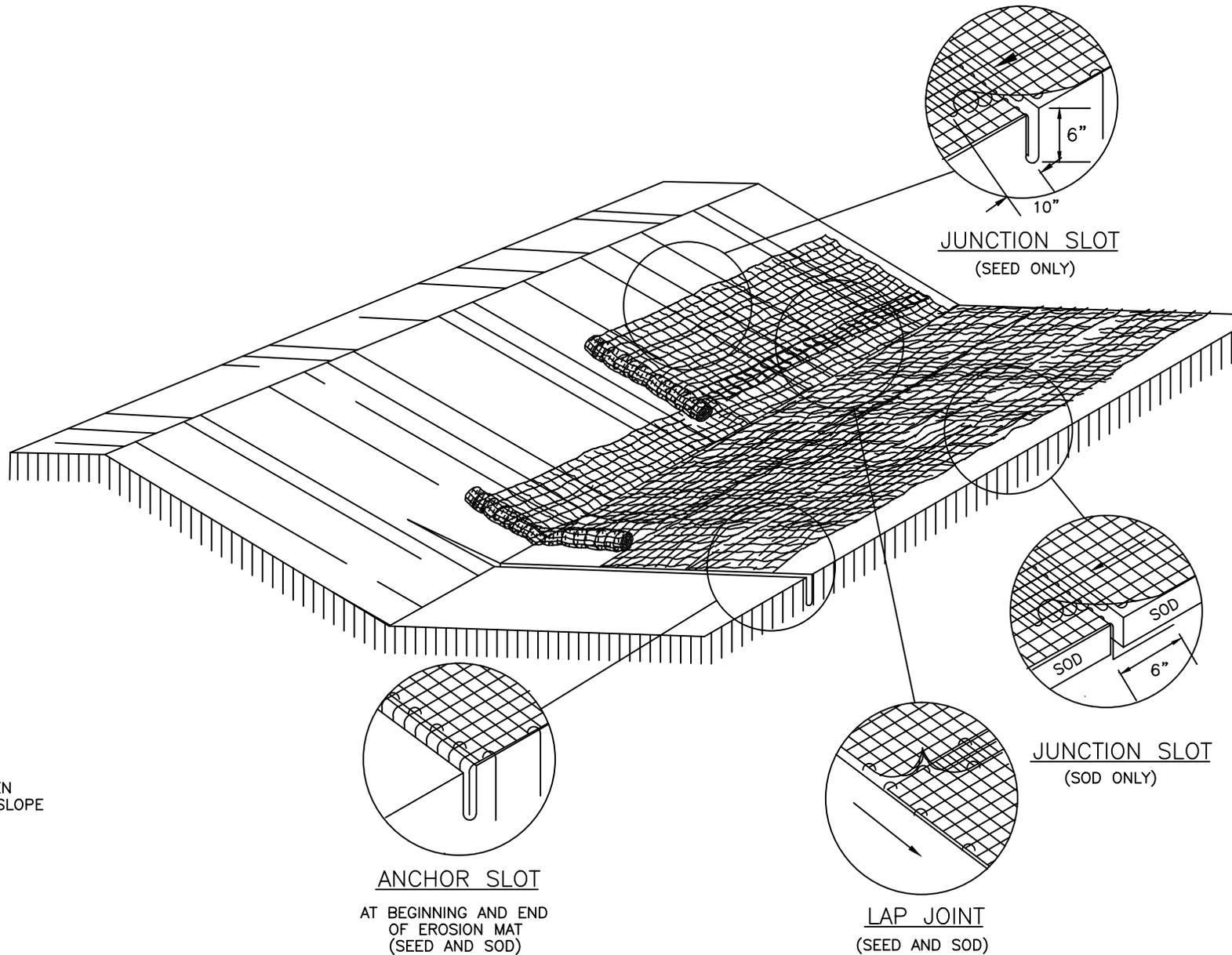
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FIGURE EC-1

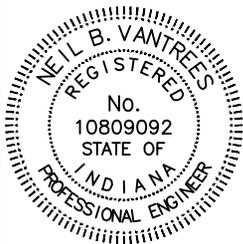
GENERAL NOTES

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING APPLICATION OF LIME, FERTILIZER AND SEED.
2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE BLANKET IN A 6" DEEP x 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
3. ROLL CENTER BLANKET IN DIRECTION OF WATER FLOW ON BOTTOM OF CHANNEL.
4. PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH A 6" OVERLAP. USE A DOUBLE ROW OF STAGGERED STAPLES 4" APART TO SECURE BLANKETS.
5. FULL LENGTH EDGE OF BLANKETS AT TOP OF SIDE SLOPES MUST BE ANCHORED IN 6" DEEP x 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
6. BLANKETS ON SIDE SLOPES MUST BE OVERLAPPED 4" OVER THE CENTER BLANKET AND STAPLED.
7. IN MEDIUM/HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FOOT INTERVALS. USE A ROW OF STAPLES 4" APART OVER ENTIRE WIDTH OF THE CHANNEL. PLACE A SECOND ROW 4" BELOW THE FIRST ROW IN A STAGGERED PATTERN.
8. THE TERMINAL END OF THE BLANKETS MUST BE ANCHORED IN A 6" DEEP x 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
8. BLANKET TYPE TO BE NORTH AMERICAN GREEN S75 OR S150 (OR SIMILAR) DEPENDING ON SLOPE



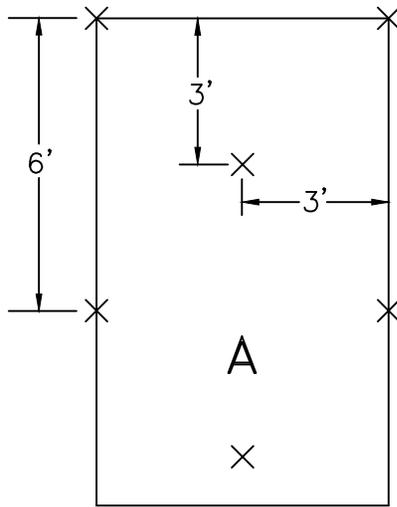
EROSION CONTROL MAT – SLOPE DETAIL

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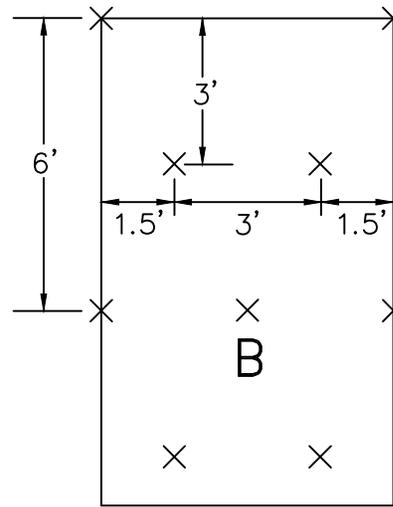


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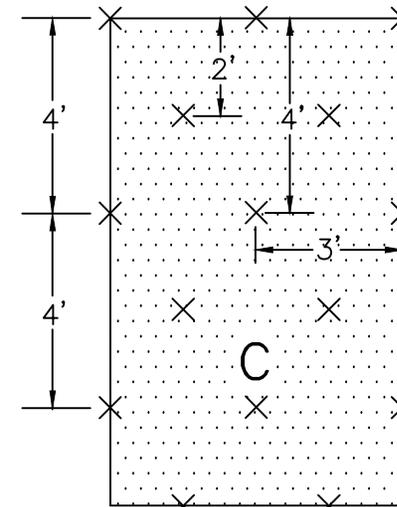
4/1/14  
DATE



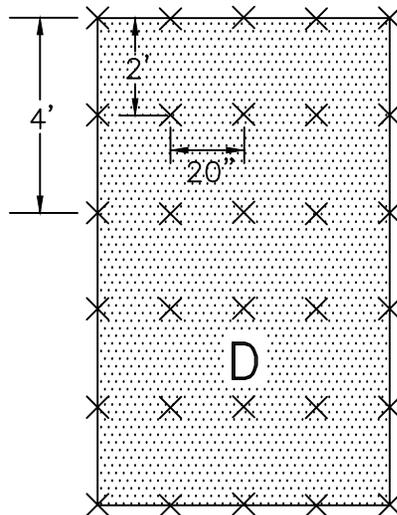
1 STAPLE PER SQ. YD.



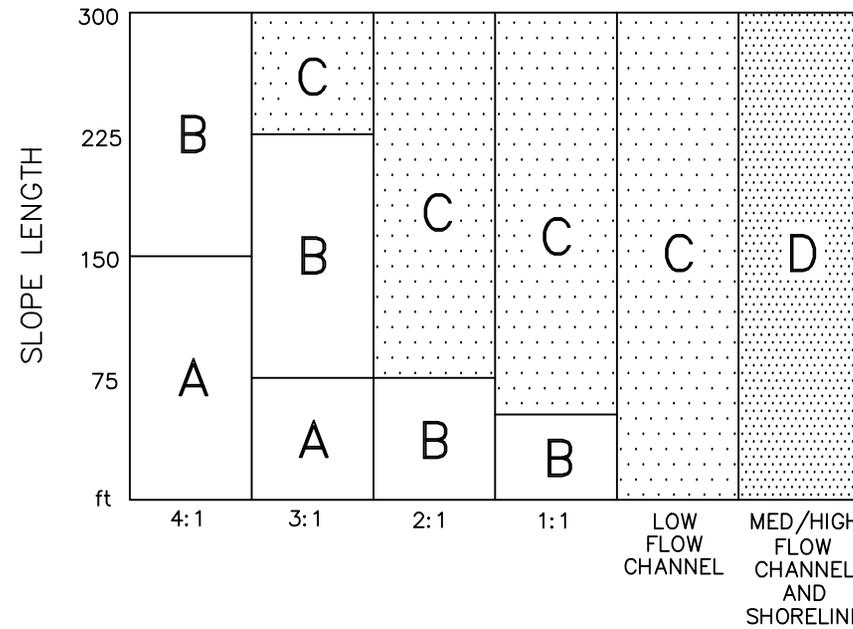
1.5 STAPLES PER SQ. YD.



2 STAPLES PER SQ. YD.



3.5 STAPLES PER SQ. YD.



SLOPE GRADIENT

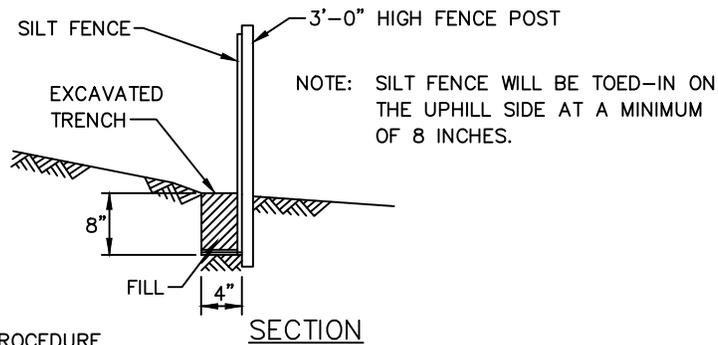
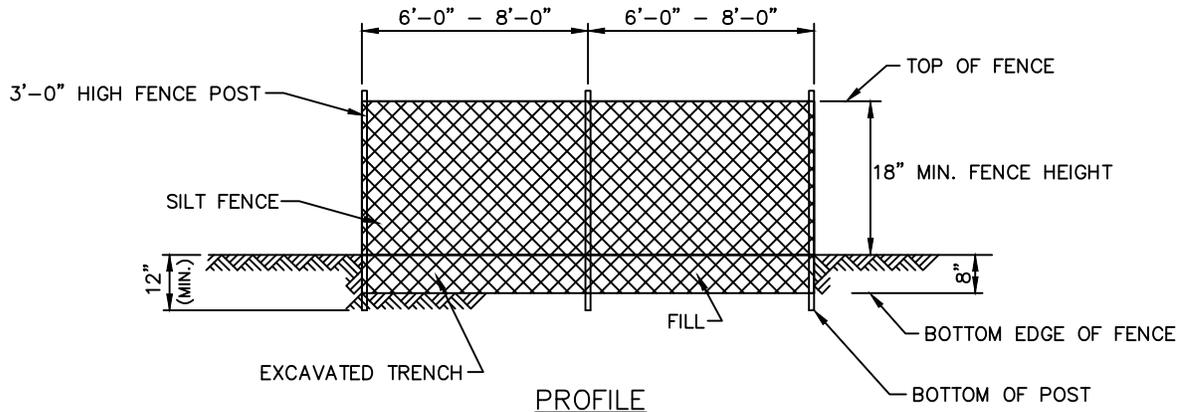
# EROSION CONTROL MAT – STAPLE GUIDE

CITY OF WESTFIELD, INDIANA



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4/1/14  
DATE



INSTALLATION PROCEDURE

1. 2" x 2" x 36" HARDWOOD OR STEEL FENCE POSTS ARE INSTALLED 6' APART (w/ EXTRA STRENGTH FABRIC WITHOUT WIRE BACKING) OR 8' APART (w/ WIRE BACKING), ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE.
2. A TRENCH 4" WIDE BY 8" DEEP IS DUG ALONG THE UPHILL SIDE OF THE FENCE LINE.
3. THE SILT FENCE IS UNROLLED AND LAID OUT ALONG THE FENCE LINE.
4. AT THIS TIME THE LOWER 8" OF THE FENCE IS LAID IN THE TRENCH AND CURLED TOWARD THE EROSION SOURCE. THE TRENCH IS THEN BACKFILLED WITH SOIL.

SILT FENCE DETAIL

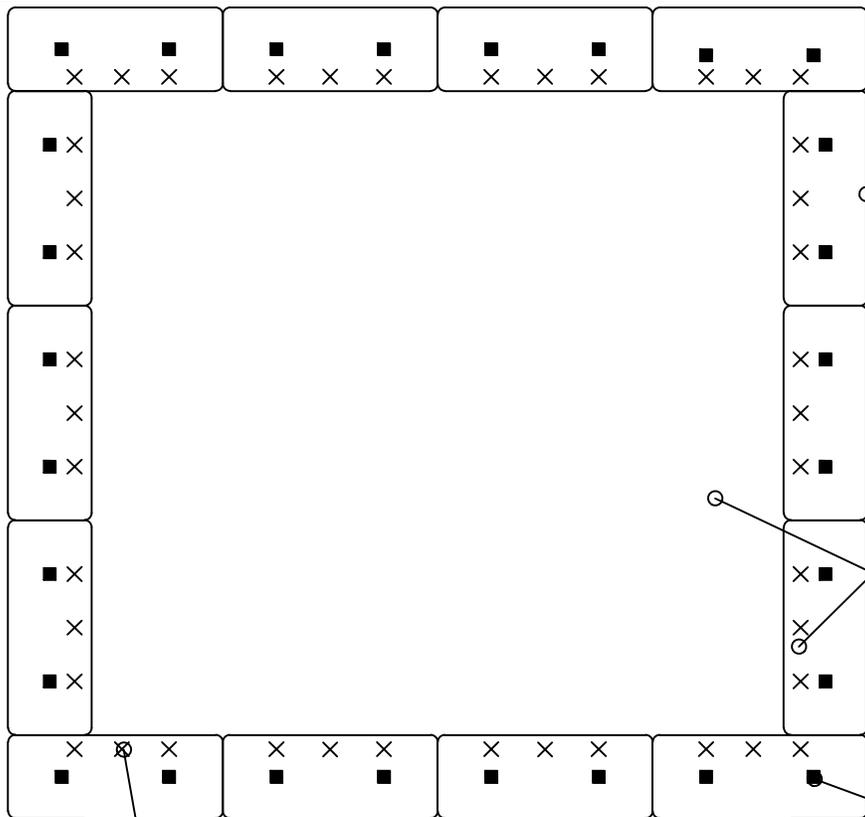


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DATE

FIGURE EC-4



STRAW BALE (IF APPROVED BY WPWD INSPECTORS ALTERNATIVE MATERIALS OR PRODUCTS MAY BE USED TO PROVIDE STRUCTURAL CONTAINMENT.) ALTERNATIVE MATERIALS OR PRODUCTS WILL REQUIRE DESIGN MODIFICATIONS.

POLYETHYLENE LINING (10 MILLIMETERS); THE LINING SHOULD EXTEND OVER THE STRAW BALES.

WOOD OR METAL STAKES TO SECURE THE STRAW BALES (2 PER STRAW BALE)

METAL PINS OR STAPLES TO SECURE THE POLYETHYLENE LINING TO THE STRAW BALES

POLYETHYLENE LINING (10 MILLIMETERS); THE LINING SHOULD EXTEND OVER THE STRAW BALES.

WOOD OR METAL STAKES TO SECURE THE STRAW BALES (2 PER STRAW BALE)

STRAW BALE (IF APPROVED BY WPWD INSPECTORS ALTERNATIVE MATERIALS OR PRODUCTS MAY BE USED TO PROVIDE STRUCTURAL CONTAINMENT.) ALTERNATIVE MATERIALS OR PRODUCTS WILL REQUIRE DESIGN MODIFICATIONS.

METAL PINS OR STAPLES TO SECURE THE POLYETHYLENE LINING TO THE STRAW BALES

COMPACTED SOIL MATERIAL

STRAW BALES ENTRENCHED 4" INTO THE SOIL

## CONCRETE WASHOUT DETAIL

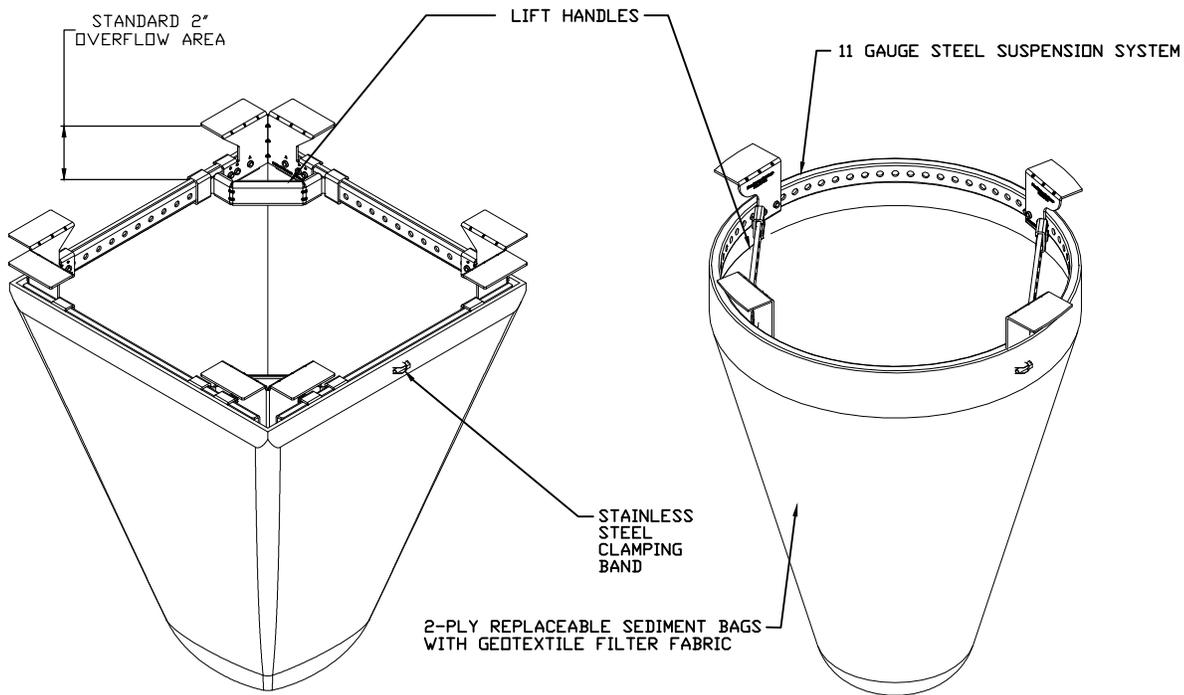


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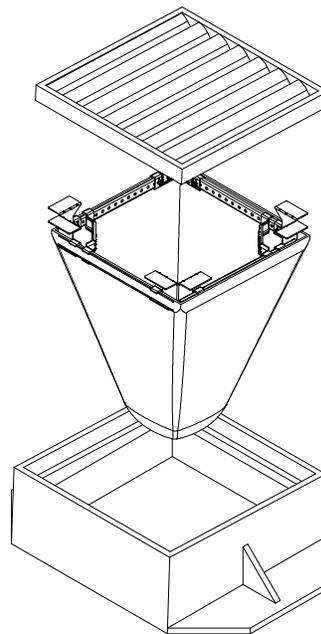
FIGURE EC-5



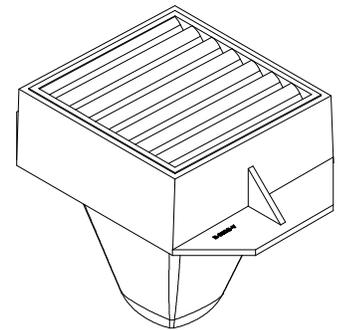
TYPICAL FLAT/RECTANGULAR/ROLLED CURB  
INLET FILTER

TYPICAL ROUND  
INLET FILTER

IPP FLeXstorm Inlet Filter Specifications			
Material Property	Test Method	Value (min ave)	
<b>&gt; Inner Filter Bag Specs (2 ft<sup>3</sup> min vol)</b>		<b>Non-Woven</b>	<b>Woven Mono</b>
Grab Tensile	ASTM D 4632	100 lbs	200 lbs
Puncture Strength	ASTM D 4833	65 lbs	90 lbs
Trapezoidal Tear	ASTM D 4533	45 lbs	75 lbs
UV Resistance	ASTM D 4355	70% at 500 hrs	90%
App Open Size (AOS)	ASTM D 4751	70 sieve (.212 mm)	40 sieve (.425 mm)
Permittivity	ASTM D 4491	2.0 /sec	2.1/sec
Water Flow Rate	ASTM D 4491	145 gpm/sqft	145 gpm/sqft
<b>&gt; Polyester Outer Reinforcement Bag Specifications</b>			
Weight	ASTM D 3776	4.55 oz/sqyd +/- 15%	
Thickness	ASTM D 1777	.040 +/- .005	
<b>&gt; Frame Construction</b>			
A36 Structural Steel; 11 Gauge; Zinc Plated	ASTM A 576	Tensile Strength > 58,000 psi; Yield Strength > 36,000 psi	



- INSTALLATION:**
1. REMOVE GRATE
  2. DROP INLET FILTER ONTO LOAD BEARING LIP OF CASTING OR CONCRETE STRUCTURE
  3. REPLACE GRATE



## INLET PROTECTION

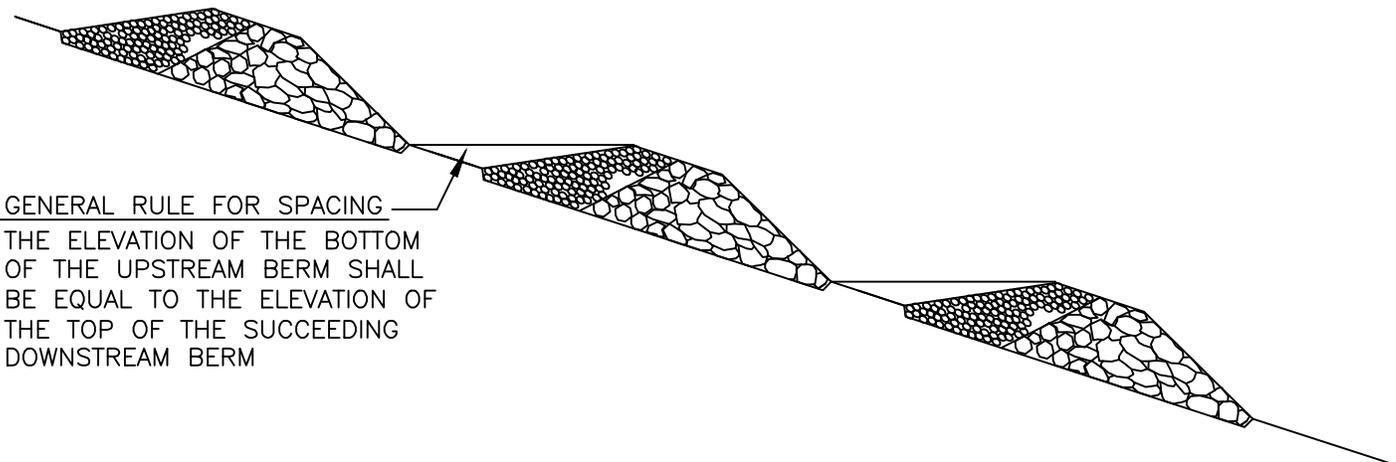
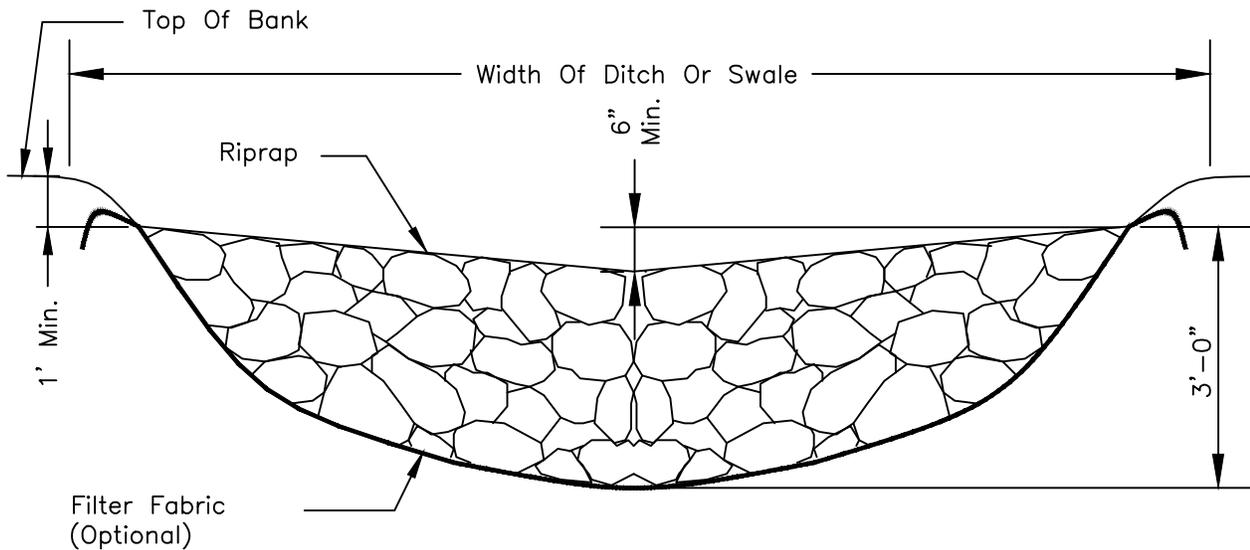
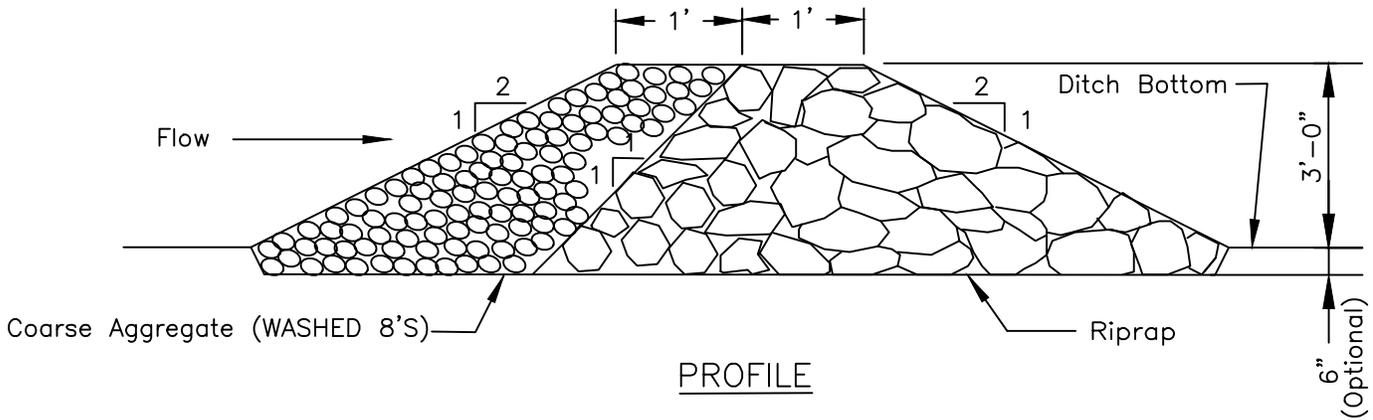
CITY OF WESTFIELD, INDIANA



*Neil B. Vantrees*

4/1/13  
DATE

FIGURE EC-6



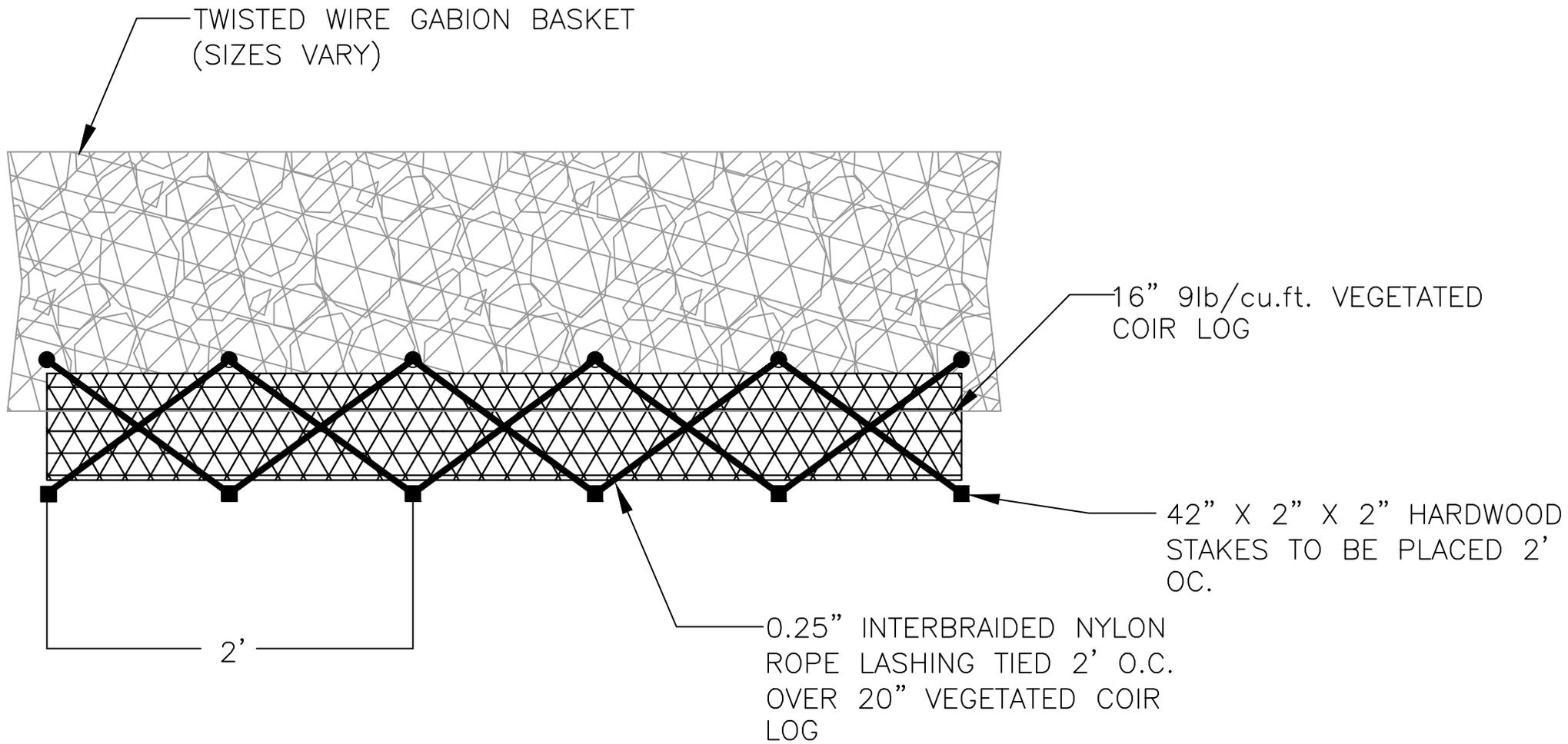
ROCK CHECK DAM – RIPRAP



CITY OF WESTFIELD, INDIANA

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4/1/13  
DATE



## GABION ANCHOR DETAIL

CITY OF WESTFIELD, INDIANA

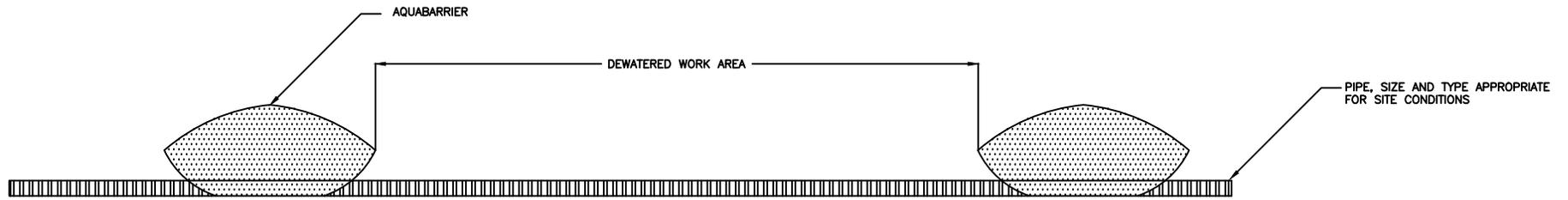


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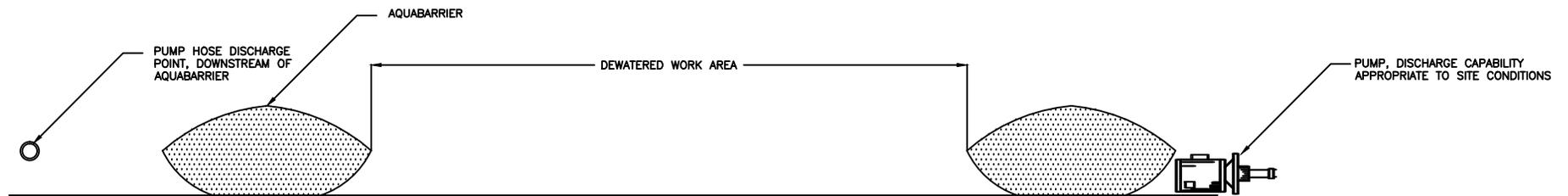
← STREAM FLOW DIRECTION

← STREAM FLOW DIRECTION



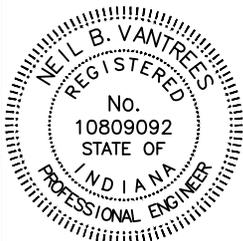
← STREAM FLOW DIRECTION

← STREAM FLOW DIRECTION



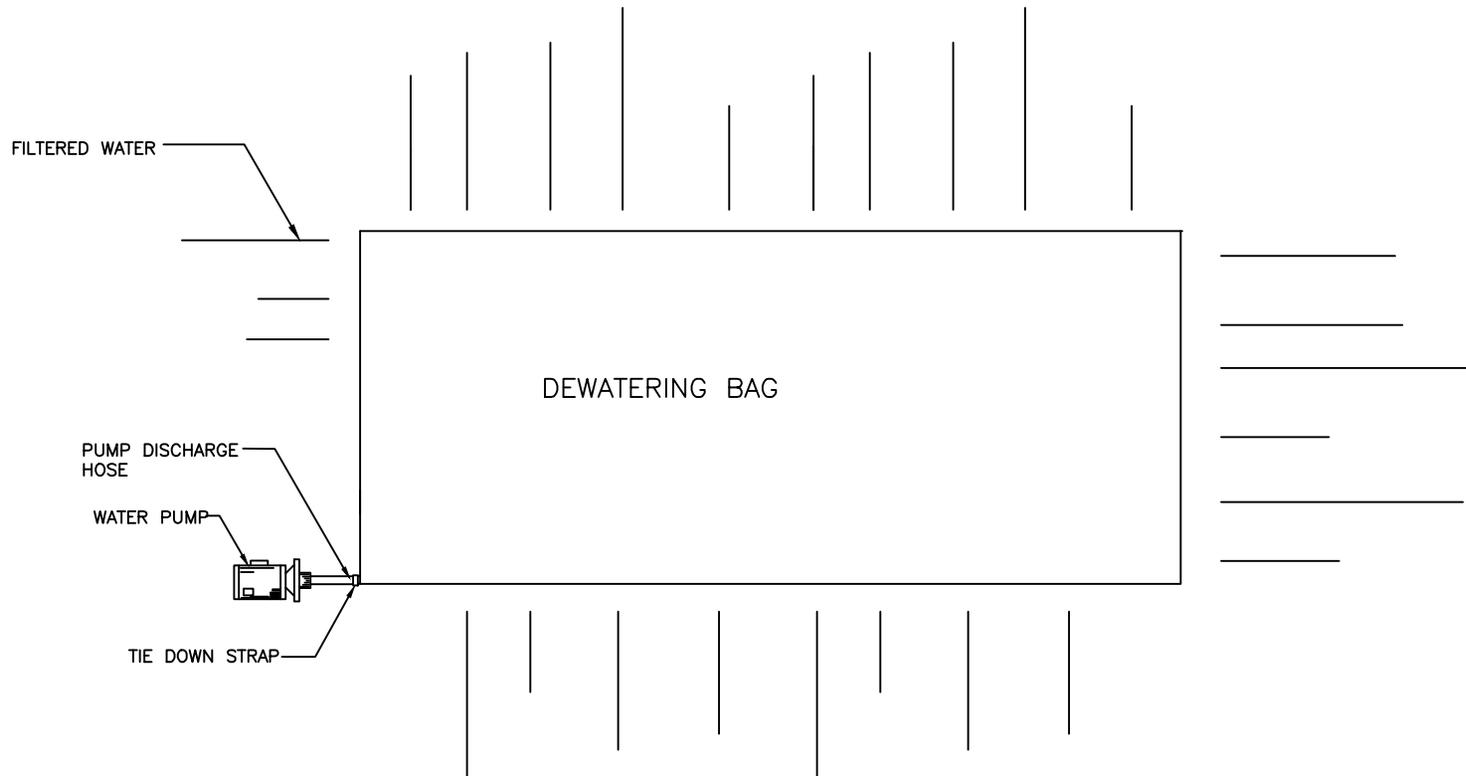
## TYPICAL AQUABARRIER DETAIL

CITY OF WESTFIELD, INDIANA



*Neil B. Vantrees*

4/1/14  
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Dewatering Filtration Bag Size	Maximum Gallon Per Minute Capacity
4' x 6'	228
7.5' x 7.5'	534
10' x 10'	950
10' x 15'	1,425
15' x 15'	2,137
15' x 30'	4,275
15' x 65'	9,262

INSTALLATION AND MAINTENANCE GUIDELINES

INSTALLATION: PLACE LIFTING STRAPS (NOT INCLUDED) UNDER THE UNIT TO FACILITATE REMOVAL AFTER USE. UNFOLD D2 DEWATERING BAG ON A STABILIZED AREA OVER DENSE VEGETATION, STRAW OR OTHER COVER. PLACE BAG OVER OPEN GRADED STONE TO ACHIEVE MAXIMUM FILTRATION AND DRAINAGE. INSERT DISCHARGE HOSE FROM PUMP INTO D2 DEWATERING BAG A MINIMUM OF SIX INCHES AND TIGHTLY SECURE WITH THE ATTACHED STRAP TO PREVENT WATER FROM FLOWING OUT OF THE UNIT WITHOUT BEING FILTERED. IF USING OPTIONAL ABSORBENTS, PLACE ABSORBENT BOOM INTO THE D2 DEWATERING BAG. CLIP ABSORBENT BOOM TO TETHER PROVIDED INSIDE THE UNIT.

MAINTENANCE: REPLACE THE UNIT WHEN 1/2 FULL OF SEDIMENT OR WHEN SEDIMENT HAS REDUCED THE FLOW RATE OF THE PUMP DISCHARGE TO AN IMPRACTICAL RATE. IF USING OPTIONAL OIL ABSORBENTS; REMOVE AND REPLACE ABSORBENT WHEN NEAR SATURATION.

## DEWATERING DETAIL AND SIZE CHART

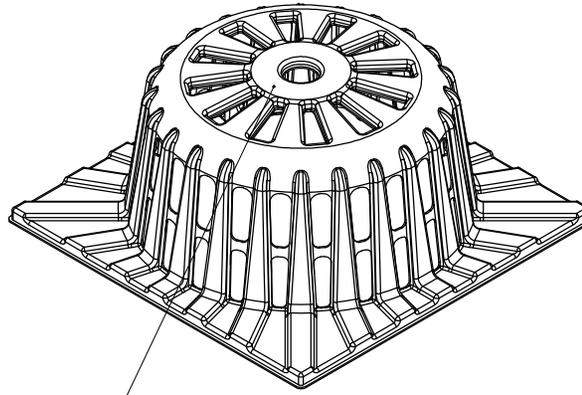
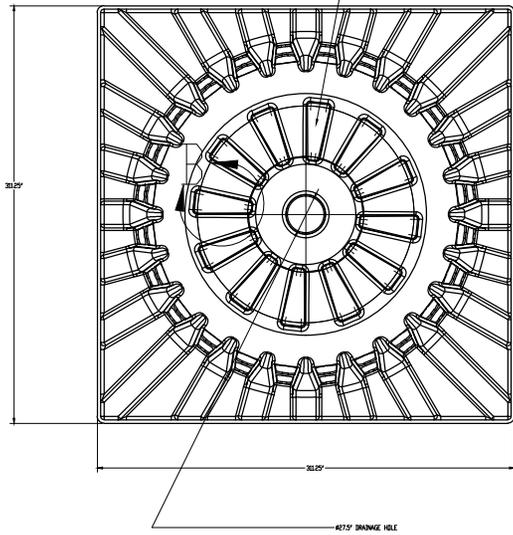
CITY OF WESTFIELD, INDIANA



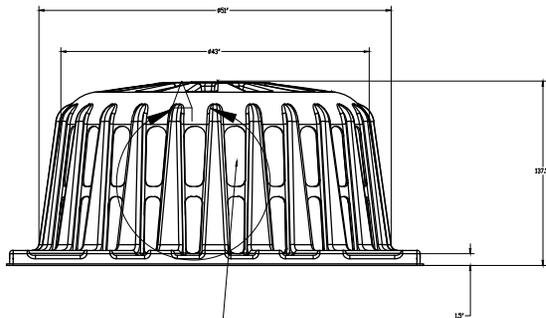
*Neil B. Vantrees*

4/1/14  
DATE

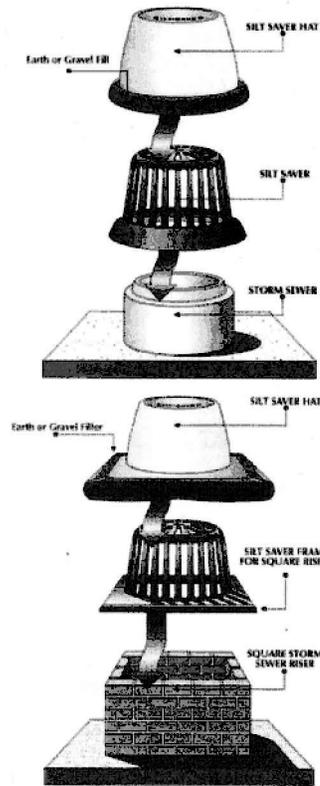
TWELVE DRAINAGE SLOTS IN TOP



SILT-SAVER LOGO AND PATENT NO. MOLDED INTO PART. SILT-SAVER LABEL IS PLACED OVER LOGO AREA ON OUTSIDE OF PART.



FORTY EIGHT DRAINAGE SLOTS AROUND PERIMETER

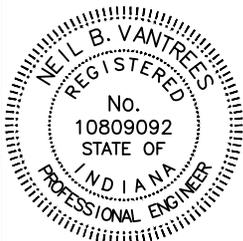


Weight	D-3776	3.0 oz y <sup>2</sup>
Tensile strength	D-4632	80lbs
Elongation	D-4632	50%
Mullen burst	D-3786	150
Puncture strength	D-4833	50
Trapezoid tear	D-4533	30
AOS-US std sieve	D-4751	70
Permittivity, -1 *	D-4491	2.0
Flow *	D-4491	102 gal/min/ft <sup>2</sup>
U.V. Resistance, %	D-4355 (500 hrs)	70

\* Due to the variations in soil conditions, (soil types, soil stability, etc.) Silt-Saver, Inc. does not specify long-term effectiveness, (resistance to clogging). If this is a concern, one may want to conduct a gradient ratio test that will compare a specific soils hydraulic gradient to the hydraulic through the filter.

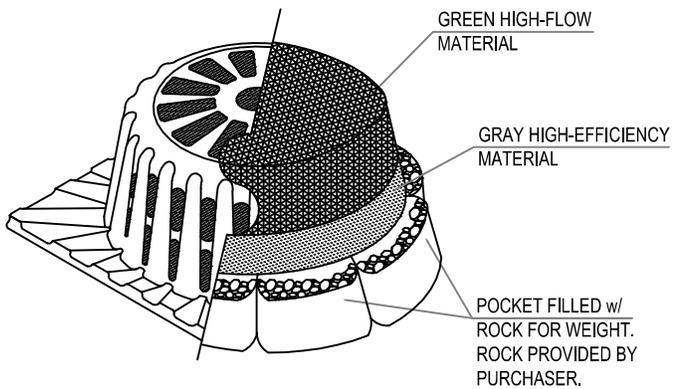
# SILT SAVER SQUARE INLET PROTECTION DETAIL

## CITY OF WESTFIELD, INDIANA



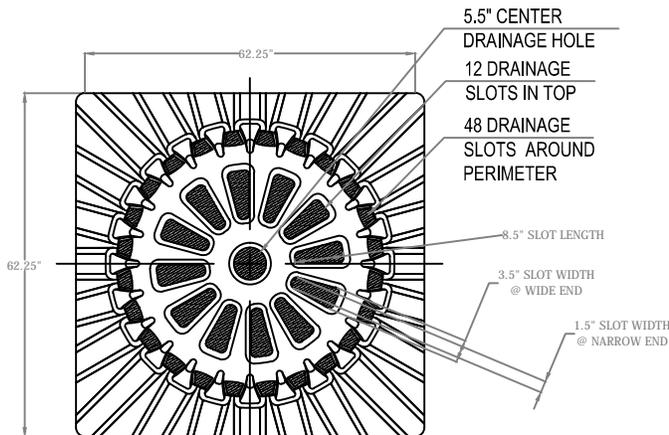
*Neil B. Vantrees*

4/1/14  
DATE

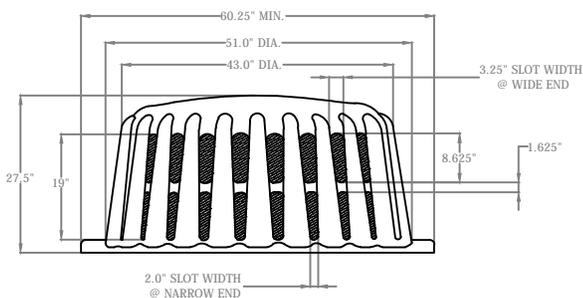


## ISOMETRIC VIEW

SHOWN WITH ROADWAY PROJECTS FILTER HAT



## PLAN VIEW



## ELEVATION VIEW

REPLACEMENT FILTERS: MODEL # S-240

### FILTER OPTIONS

FILTER HAT IS AVAILABLE IN THREE OPTIONS:

- 1) ALL HIGH-FLOW MATERIAL
- 2) ALL HIGH-EFFICIENCY MATERIAL
- 3) HIGH-FLOW MATERIAL ON TOP HALF OF HAT, HIGH-EFFICIENCY MATERIAL ON BOTTOM HALF (THIS FILTER COVER IS RECOMMENDED FOR ALL ROADWAY PROJECTS.)

IT IS THE PURCHASERS RESPONSIBILITY TO PURCHASE APPROPRIATE FILTER HAT. PURCHASER SHALL PROVIDE ROCK FOR FILTER POCKETS.

### FILTER HAT INSTALLATION

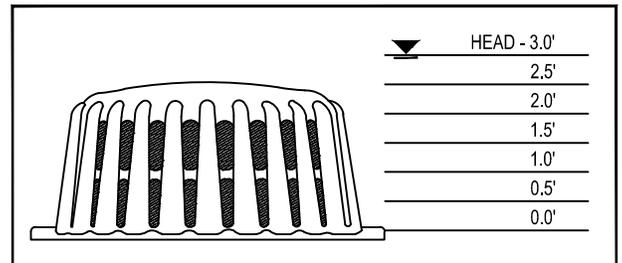
FILTER HAT SLIDES DIRECTLY OVER FILTER FRAME. TO KEEP FILTER FRAME IN PLACE OVER STORM STRUCTURE, ROCK POCKETS ARE SEWN DIRECTLY INTO FILTER HAT MATERIAL. EVERY FILTER HAT COMES IN ONE PIECE FOR EASY INSTALLATION.

### MAINTENANCE

ALL TEMPORARY EROSION, SEDIMENTATION, & POLLUTION CONTROL PRACTICES SHOULD BE INSPECTED DAILY. CONTRACTOR SHALL REMOVE SEDIMENT AND DISPOSE OF IN A PROPER MANNER. INSPECT S-200A DAILY FOR CUTS, ABRASIONS, AND PROPER INSTALLATION. REPLACE OR REPOSITION AS NECESSARY.

### SPECIFICATIONS

FILTER FABRIC SILT-SAVER HAT SHALL BE BASED ON DESIGN PROFESSIONAL'S SPECIFICATIONS.



### FRAME & FILTER DISCHARGE ANALYSIS

HEAD (FT)	EQUATION USED	OPENING AREA (SF)	FRAME FLOW (CFS)	FILTER AREA (SF)	FILTERED FLOW (CFS)
0.5	O	2.1	7	6	2
1.0	O	3.9	19	12	3
1.5	O	7.0	41	18	5
2.0	O	8.0	54	24	7
2.5	O	9.2	70	30	9
3.0	O	9.2	77	—	77

DUE TO NARROW SLOT, A TRANSITION WILL OCCUR BETWEEN WEIR AND ORIFICE CONDITIONS. ORIFICE FLOW WILL PROVIDE A MORE CONSERVATIVE ESTIMATE OF FLOW, THEREFORE THE LESSER OF THE ORIFICE AND WEIR FLOWS WILL BE USED FOR EACH STAGE CALCULATION.

FILTER MATERIAL ALLOWS 129 gpm/SF OR 0.29cfs/SF

ORIFICE EQUATION (O) =  $Q = 0.6A(2gh)^{0.5}$

P = FEET PERIMETER

h = HEAD IN FEET

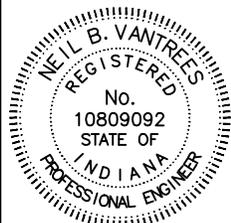
Q = CAPACITY IN cfs

A = FREE OPEN AREA OF FRAME

g = 32.2 FEET-PER-SECOND/SECOND

# SILT SAVER INLET PROTECTION MODEL #S-200

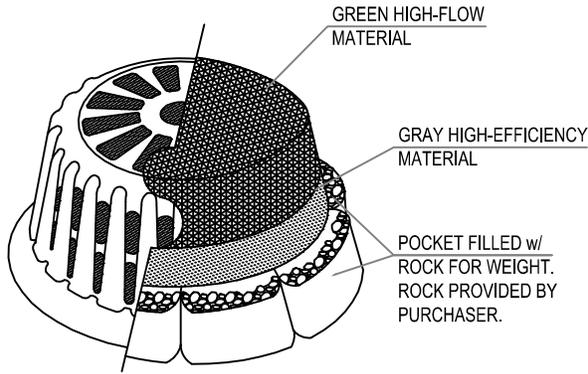
## CITY OF WESTFIELD, INDIANA



*Neil B. Vantrees*

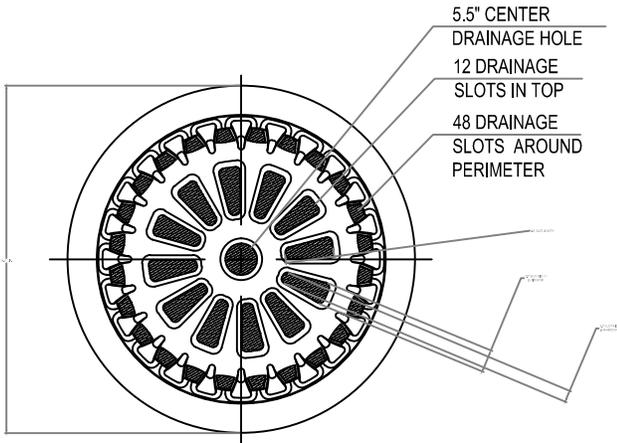
4/1/14  
DATE

FIGURE EC-14

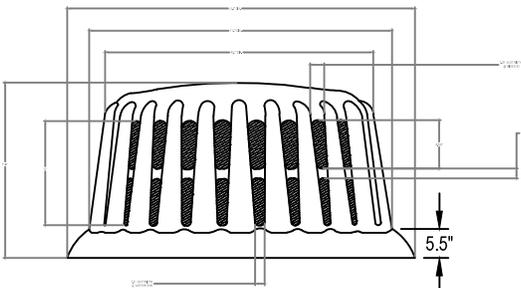


## ISOMETRIC VIEW

SHOWN WITH ROADWAY PROJECTS FILTER HAT



## PLAN VIEW



## ELEVATION VIEW

REPLACEMENT FILTERS: MODEL # R-140

### FILTER OPTIONS

FILTER HAT IS AVAILABLE IN THREE OPTIONS:

- 1) ALL HIGH-FLOW MATERIAL
- 2) ALL HIGH-EFFICIENCY MATERIAL
- 3) HIGH-FLOW MATERIAL ON TOP HALF OF HAT, HIGH-EFFICIENCY MATERIAL ON BOTTOM HALF (THIS FILTER COVER IS RECOMMENDED FOR ALL ROADWAY PROJECTS.)

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### FILTER HAT INSTALLATION

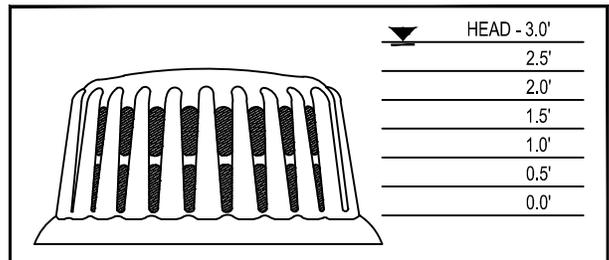
FILTER HAT SLIDES DIRECTLY OVER FILTER FRAME. TO KEEP FILTER FRAME IN PLACE OVER STORM STRUCTURE, ROCK POCKETS ARE SEWN DIRECTLY INTO FILTER HAT MATERIAL. EVERY FILTER HAT COMES IN ONE PIECE FOR EASY INSTALLATION.

### MAINTENANCE

ALL TEMPORARY EROSION, SEDIMENTATION, & POLLUTION CONTROL PRACTICES SHOULD BE INSPECTED DAILY. CONTRACTOR SHALL REMOVE SEDIMENT AND DISPOSE OF IN A PROPER MANNER. INSPECT R-100A DAILY FOR CUTS, ABRASIONS, AND PROPER INSTALLATION. REPLACE OR REPOSITION AS NECESSARY.

### SPECIFICATIONS

FILTER FABRIC SILT-SAVER HAT SHALL BE BASED ON DESIGN PROFESSIONAL'S SPECIFICATIONS.



### FRAME & FILTER DISCHARGE ANALYSIS

HEAD (FT)	EQUATION USED	OPENING AREA (SF)	FRAME FLOW (CFS)	FILTER AREA (SF)	FILTERED FLOW (CFS)
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2.0	O	8.0	54	24	7
2.5	O	9.2	70	30	9
3.0	O	9.2	77	—	77

DUE TO NARROW SLOT, A TRANSITION WILL OCCUR BETWEEN WEIR AND ORIFICE CONDITIONS. ORIFICE FLOW WILL PROVIDE A MORE CONSERVATIVE ESTIMATE OF FLOW, THEREFORE THE LESSER OF THE ORIFICE AND WEIR FLOWS WILL BE USED FOR EACH STAGE CALCULATION.

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h = HEAD IN FEET

Q = CAPACITY IN cfs

A = FREE OPEN AREA OF FRAME

g = 32.2 FEET-PER-SECOND/SECOND

# SILT SAVER INLET PROTECTION MODEL #R-100

## CITY OF WESTFIELD, INDIANA



*Neil B. Vantrees*

4/1/14  
DATE

FIGURE EC-15