Index 430-022
Side Drain Mitered End Section

ORIGINATION

Date: May 7, 2018
Name: Rick Jenkins
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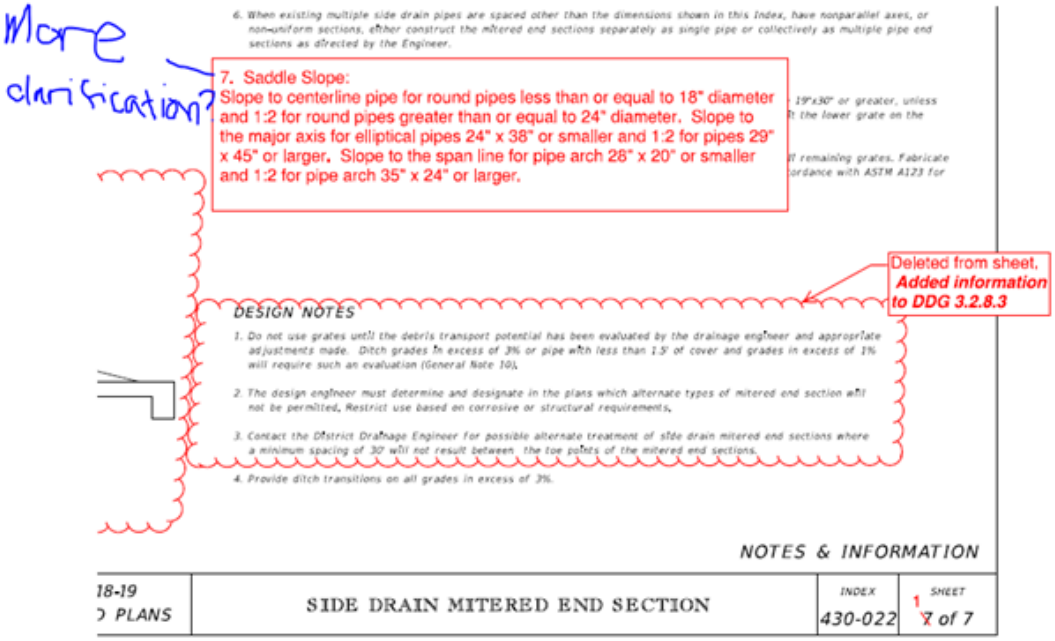
COMMENTARY

Reorganized Index. Moved General Notes and overview to Sheet 1.
Added Pipe/Slab Fillet Detail, and General Note on Saddle Slope. Deleted references to payment and design criteria, information moved to Specifications or Drainage Design Guide. Combined Details for Round and Elliptical Concrete Pipe, and Round and Arched Corrugated Metal Pipe. Sod requirements and information moved to Specifications.

COMMENTS AND RESPONSES

BLACK = Industry Review Comments **RED** = Standard Plans Response

Name: Erin Yao
Date: August 8, 2019
COMMENT:



NOTES:

1. ⅝" x 3" bolts are standard for all grate fasteners, except when the contractor elects to use the for the intermediate fasteners on multiple drain pipes, which will require bolt lengths in the Sp
2. ⅝" galvanized bolt hex head bolt shown; either hex head or square head bolt may be used. Use
3. Make the specified weld when the fabricated unit is subject to hazardous hauls and repeated ha permitted for local or job site fabrication. Galvanizing over welded surface not required.
4. Omit on trailing downstream ends on divided roadways. ← design note? omit what?
5. Use grates only when called for in the plans on round pipes 24" or less in diameter, arch pipes and elliptical pipes 14" x 23" or smaller.

RESPONSE:
Date: August 8, 2019

These notes were developed based on the notes from multiple sheets in the original indexes. We combined the notes and made it a general note since it applied throughout the index. The General Note is still referenced in each detail where the saddle slope is actually depicted. See sheet 2 and sheet 4.

Design note 4 on sheet 7 is in reference to the detail in the middle right of the sheet layout. This was formally an asterisk callout and was changed to a note.

Name: FHWA
Date: September 24, 2019

COMMENT:
Sheet 2 and 4: - To avoid interpretations be more clear: "Details to be used in elliptical pipes also". Include a note in the sheet for the Contractor to know that he may need to make minor modifications in the field for elliptical pipes.

RESPONSE:
Date: September 26, 2019

The previous versions of the index provide details for both the round and the elliptical/arch. We felt that this was not necessary as the details were almost identical. The details shown in the index work for both the round and the elliptical/arch systems. The tables on sheets 3 of 7 and 5 of 7 provide the dimensions to accompany the details for round and elliptical/arch pipes. With the sheet title for the detail sheet, we simply added "Elliptical Pipe Similar" as the dimensions are included in the tables. The contractor will not have to make any special modifications in the field since the dimensions are all provided.

GENERAL NOTES:

1. Unless otherwise designated in the plans, concrete pipe mitered end sections may be used with any type of side drain pipe; corrugated steel pipe mitered end sections may be used with any type of side drain pipe except aluminum pipe; and, corrugated aluminum mitered end sections may be used with any type of side drain pipe except steel pipe. When bituminous coated metal pipe is specified for side drain pipe, construct the mitered end sections with like pipe or concrete pipe. When the mitered end section pipe is dissimilar to the side drain pipe, construct a concrete jacket in accordance with Index 430-001.

2. Use either corrugated metal or concrete mitered end sections for corrugated polyethylene pipe (HDPE), polyvinyl-chloride pipe (PVC), steel reinforced polyethylene pipe (SRPE), and polypropylene pipe (PP). When used in conjunction with corrugated mitered end sections, make connection using either a formed metal band specifically designated to join HDPE, PVC, SRPE, or PVC pipe. When used in conjunction with a concrete mitered end sections, construct concrete jacket in accordance with Index 430-001.

3. Use class NS concrete cast-in-place reinforced slabs for all cross drain pipes.

4. Select lengths of concrete pipe that avoid excessive connections in the assembly of the mitered end section.

5. Repair corrugated metal pipe galvanizing that is damaged during beveling and perforating.

6. When existing multiple side drain pipes are spaced other than the dimensions shown in this Index, have nonparallel axes, or non-uniform sections, either construct the mitered end sections separately as single pipe or collectively as multiple pipe end sections as directed by the Engineer.

7. Saddle Slope:
   - 1:4 Miter – Slope to ℄ of pipe for round pipes less than or equal to 18" diameter and 1:1 for round pipes greater than or equal to 24" diameter.
     Slope to the major axis for elliptical pipes 24"x38" or smaller and 1:2 for pipes 29"x45" or larger.
     Slope to the span line for pipe arch 28"x20" or smaller and 1:2 for pipe arch 35"x24" or larger.
   - 1:2 Miter – Slope to ℄ of pipe for round pipes less than or equal to 18"diameter and 1:2 for round pipes greater than or equal to 24" diameter.
     Slope to the major axis for elliptical pipes 29"x45" or smaller and 1:1 for pipes 34"x53" or larger.
     Slope 1:1 for all pipe arch sizes.

8. Quantities shown are for estimating purposes only.

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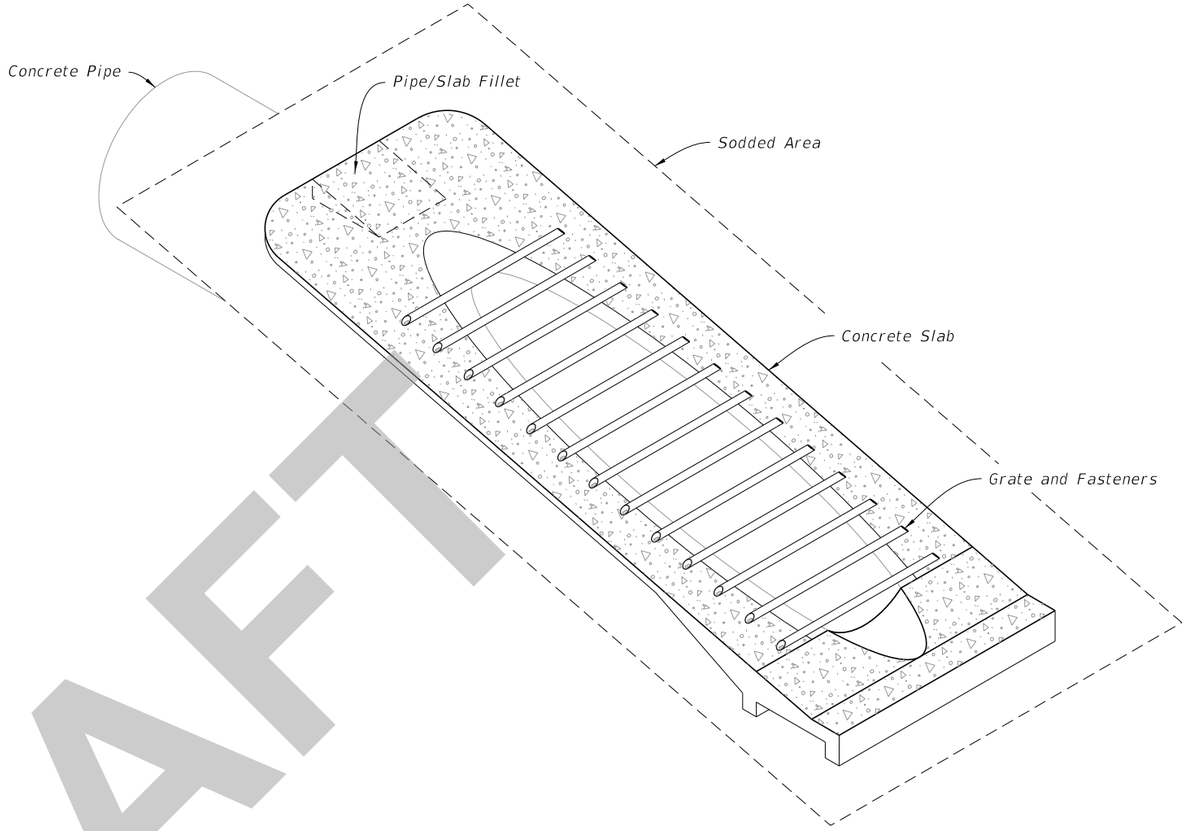
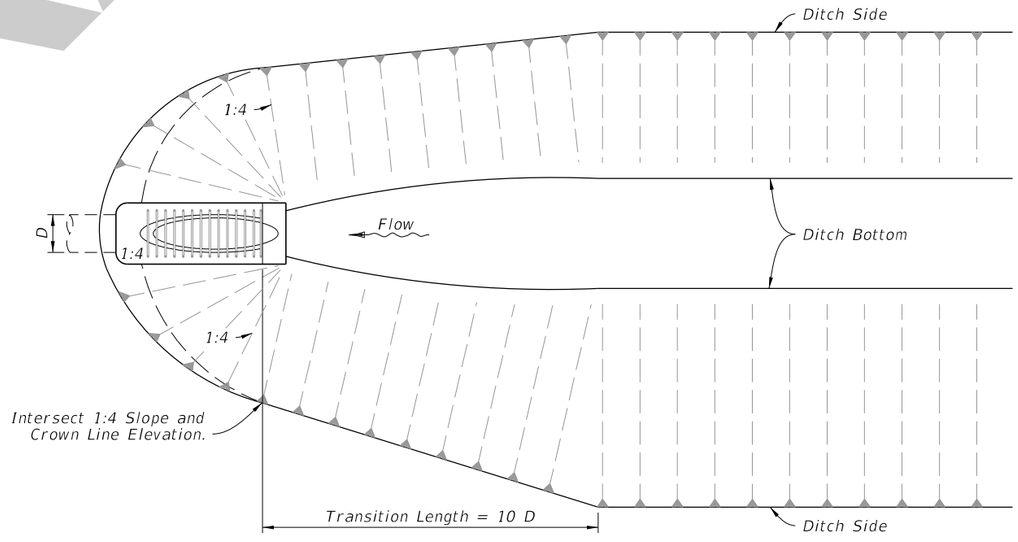


SIDEDRAIN MITERED END SECTION
(Concrete Pipe Shown, Corrugated Metal Pipe Similar)



DITCH TRANSITION

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NOTES:

1. 5/8" x 3" bolts are standard for all grate fasteners, except when the contractor elects to use the slotted upper holes for the intermediate fasteners on multiple drain pipes, which will require bolt lengths in the Special Bolt Length Table.
2. 5/8" galvanized bolt hex head bolt shown; either hex head or square head bolt may be used. Use only hex nuts.
3. Make the specified weld when the fabricated unit is subject to hazardous hauls and repeated handling. Tack welds are permitted for local or job site fabrication. Galvanizing over welded surface not required.
4. Omit on trailing downstream ends on divided roadways.
5. Use grates only when called for in the plans on round pipes 24" or less in diameter, arch pipes 28" x 20" or smaller, and elliptical pipes 14" x 23" or smaller.

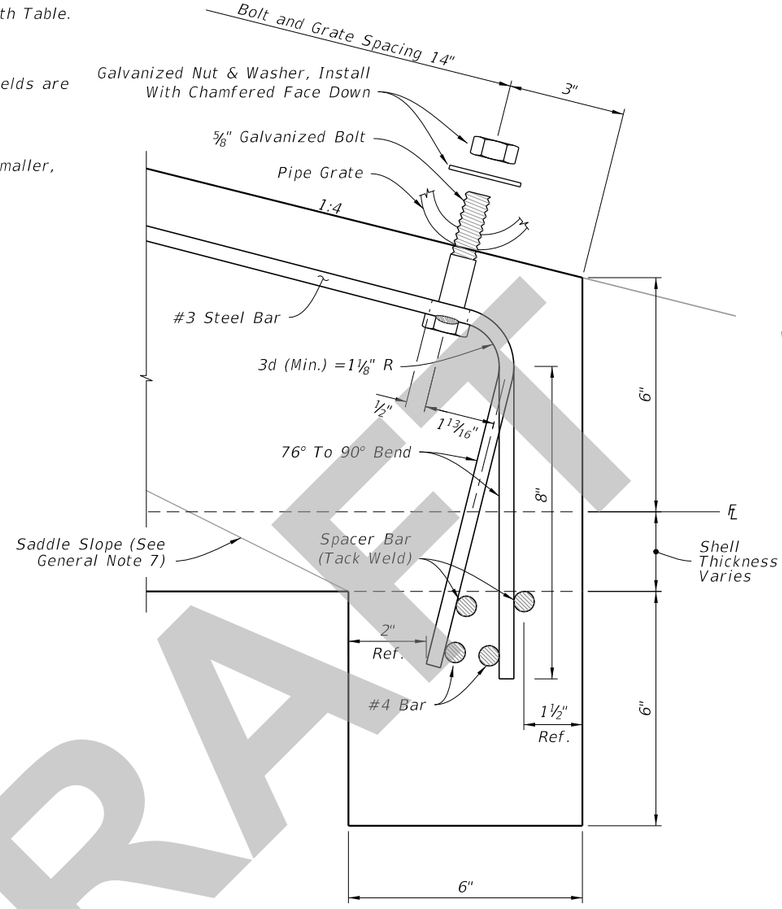
CONCRETE PIPE

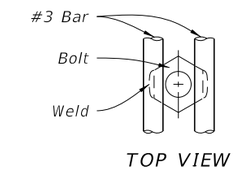
ROUND PIPE					ELLIPTICAL PIPE				
Pipe Dia.	s	n	L	La	Drain Size	s	n	L	La
*15"	3	4	4'-0"	4'-11"	*12"x18"	2	3	2'-10"	3'-9"
*18"	4	5	5'-2"	6'-1"	*14"x23"	3	4	4'-0'	4'-11"
*24"	6	7	7'-6"	8'-5"	19"x30"	4	5	5'-2"	6'-1"
30"	7	8	8'-8"	9'-7"	24"x38"	5	6	6'-4"	7'-3"
36"	9	10	11'-0"	11'-11"	29"x45"	7	8	8'-8"	9'-7"
42"	11	12	13'-4"	14'-3"	34"x53"	8	9	9'-10"	0'-9"
48"	13	14	15'-8"	16'-7"	38"x60"	10	11	12'-2"	13'-1"
54"	14	15	16'-10"	17'-9"	43"x68"	11	12	13'-4"	14'-3"
60"	16	17	19'-2"	20'-1"	48"x76"	13	14	15'-8"	16'-7"
					53"x83"	14	15	16'-10"	17'-9"
					58"x91"	15	16	18'-0"	18'-11"

CORRUGATED METAL PIPE

ROUND PIPE					ARCHED PIPE				
Pipe Dia.	s	n	L	La	Drain Size	s	n	L	La
*15"	2	3	2'-10"	3'-9"	*17"x13"	1	2	1'-8"	2'-7"
*18"	3	4	4'-0"	4'-11"	*21"x15"	2	3	2'-10"	3'-9"
*24"	5	6	6'-4"	7'-3"	*28"x20"	4	5	5'-2"	6'-1"
30"	7	8	8'-8"	9'-7"	35"x24"	5	6	6'-4"	7'-3"
36"	8	9	9'-10"	10'-9"	42"x29"	6	7	7'-6"	8'-5"
42"	10	11	12'-2"	13'-1"	49"x33"	7	8	8'-8"	9'-7"
48"	12	13	14'-6"	15'-5"	57"x38"	9	10	11'-0"	11'-11"
54"	14	15	16'-10"	17'-9"	64"x43"	10	11	12'-2"	13'-1"
60"	15	16	18'-0"	18'-11"	71"x47"	12	13	14'-6"	15'-5"

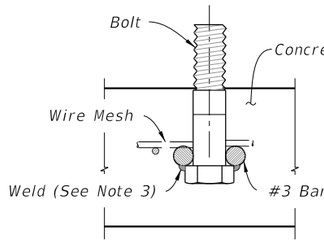
* See Note 5



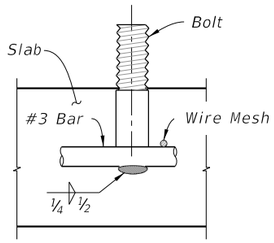


TOP VIEW

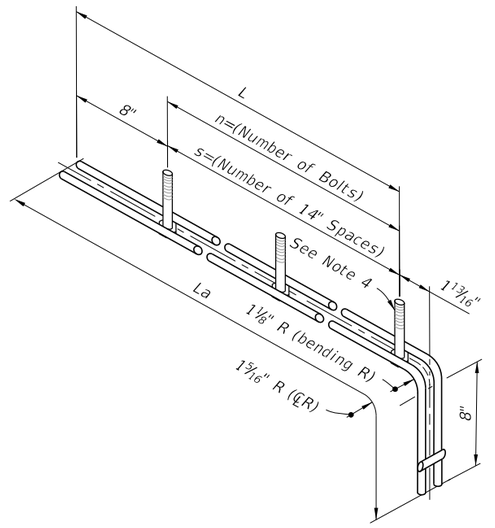
SPECIAL BOLT LENGTH	
Grade Size (Std. & X-Stg.)	Bolt Length
2 1/2"	5 1/2"
3"	6"
3 1/2"	6 1/2"
4"	7"



END VIEW



SIDE VIEW



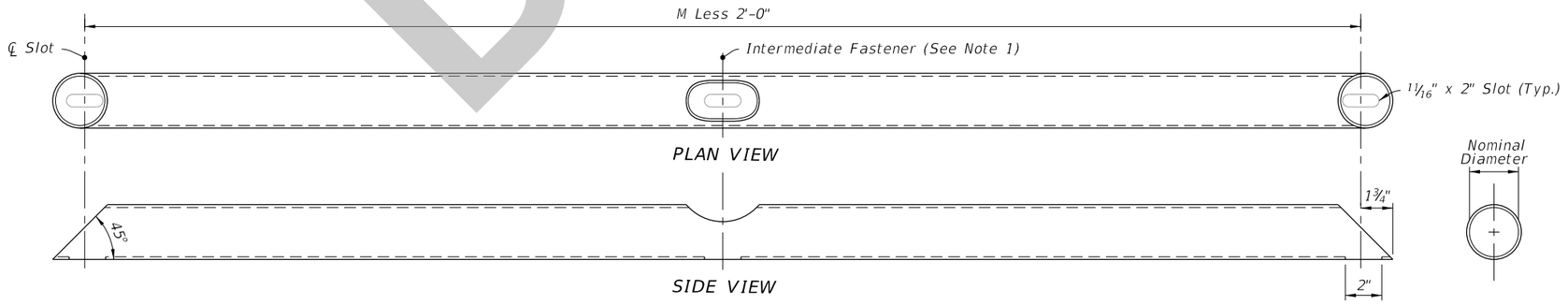
MULTIPLE FASTENER UNIT DETAIL
(For Single and Multiple Pipes)

NOTE:

1. Install intermediate slot and fastener for multiple drain pipes only.

Options for top opening:
a. 4" of 6" mill head cut, 1" deep
b. 2" diameter drilled hole
c. 1 1/16" x 2" slot

Bottom opening: 1 1/16" x 2" slot.



GRATE DETAIL
(For Single and Multiple Pipes)

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FASTENER UNIT AND GRATE DETAILS

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