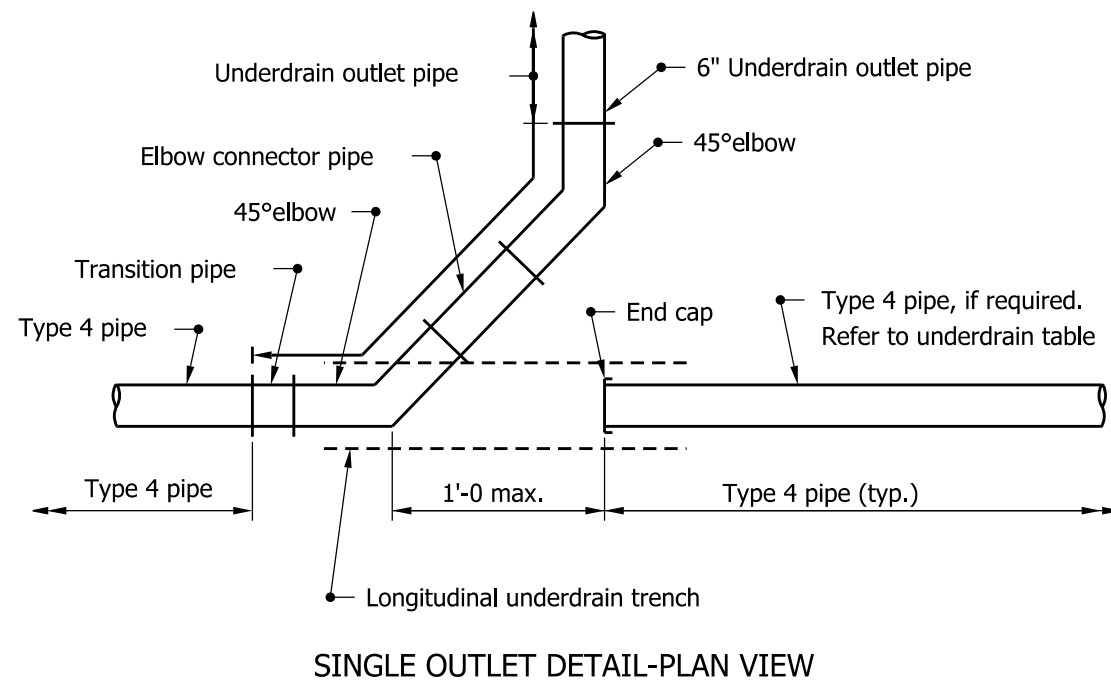
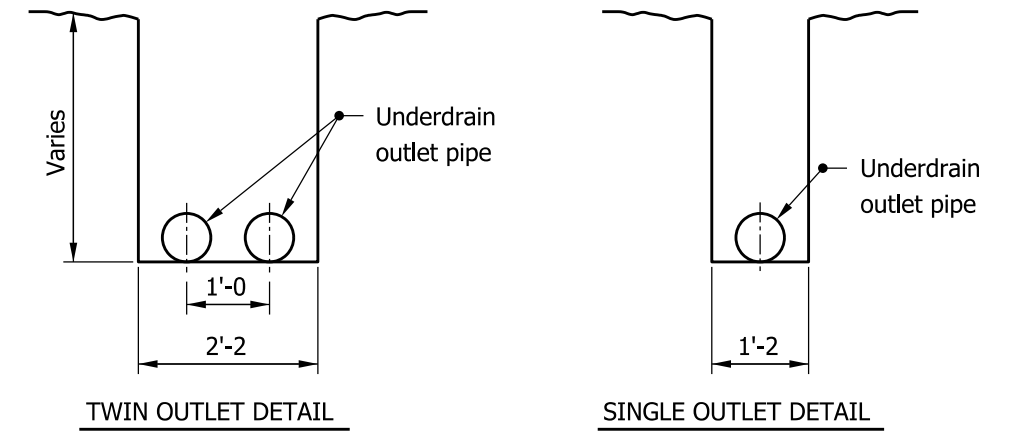
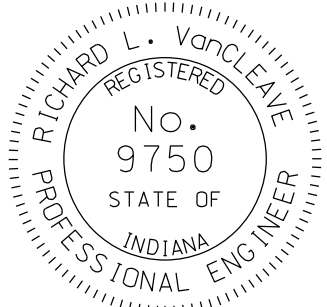
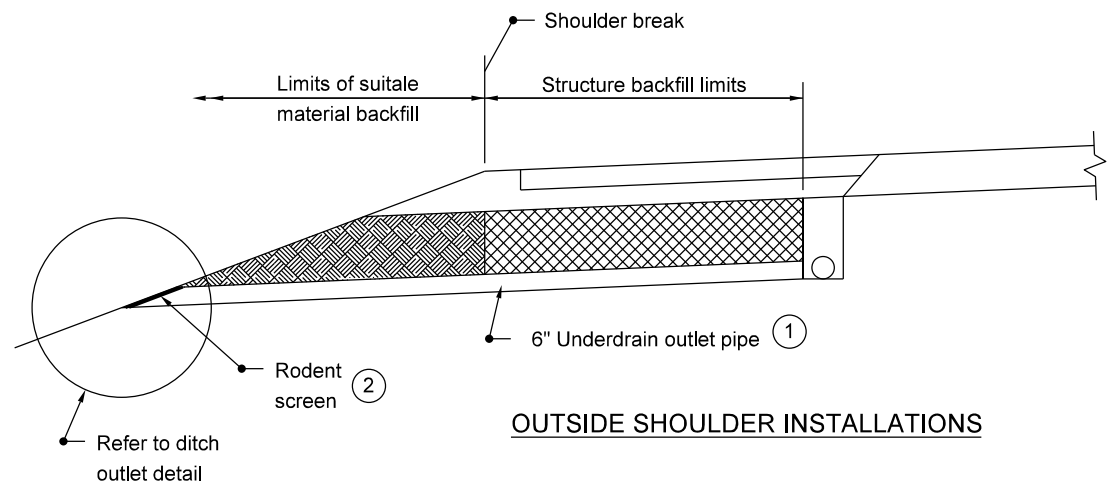


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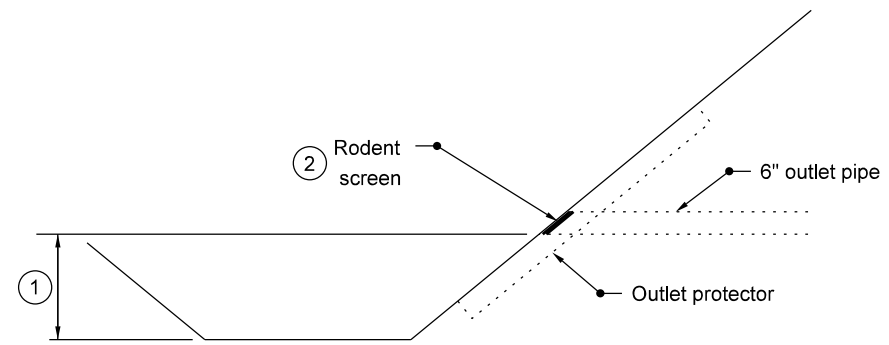
1. See Standard Drawing E 718-UNDR-07 for General Notes.



INDIANA DEPARTMENT OF TRANSPORTATION									
UNDERDRAIN DETAILS									
SEPTEMBER 2009									
STANDARD DRAWING NO. E 718-UNDR-01									
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-bottom: 1px solid black; padding: 2px;"><i>/s/ Richard L. VanCleave</i></td> <td style="border-bottom: 1px solid black; padding: 2px;">09/01/09</td> </tr> <tr> <td style="padding: 2px;">DESIGN STANDARDS ENGINEER</td> <td style="padding: 2px;">DATE</td> </tr> <tr> <td style="border-bottom: 1px solid black; padding: 2px;"><i>/s/ Mark A. Miller</i></td> <td style="border-bottom: 1px solid black; padding: 2px;">09/01/09</td> </tr> <tr> <td style="padding: 2px;">CHIEF HIGHWAY ENGINEER</td> <td style="padding: 2px;">DATE</td> </tr> </table>	<i>/s/ Richard L. VanCleave</i>	09/01/09	DESIGN STANDARDS ENGINEER	DATE	<i>/s/ Mark A. Miller</i>	09/01/09	CHIEF HIGHWAY ENGINEER	DATE
<i>/s/ Richard L. VanCleave</i>	09/01/09								
DESIGN STANDARDS ENGINEER	DATE								
<i>/s/ Mark A. Miller</i>	09/01/09								
CHIEF HIGHWAY ENGINEER	DATE								
DESIGN STANDARDS ENGINEER									

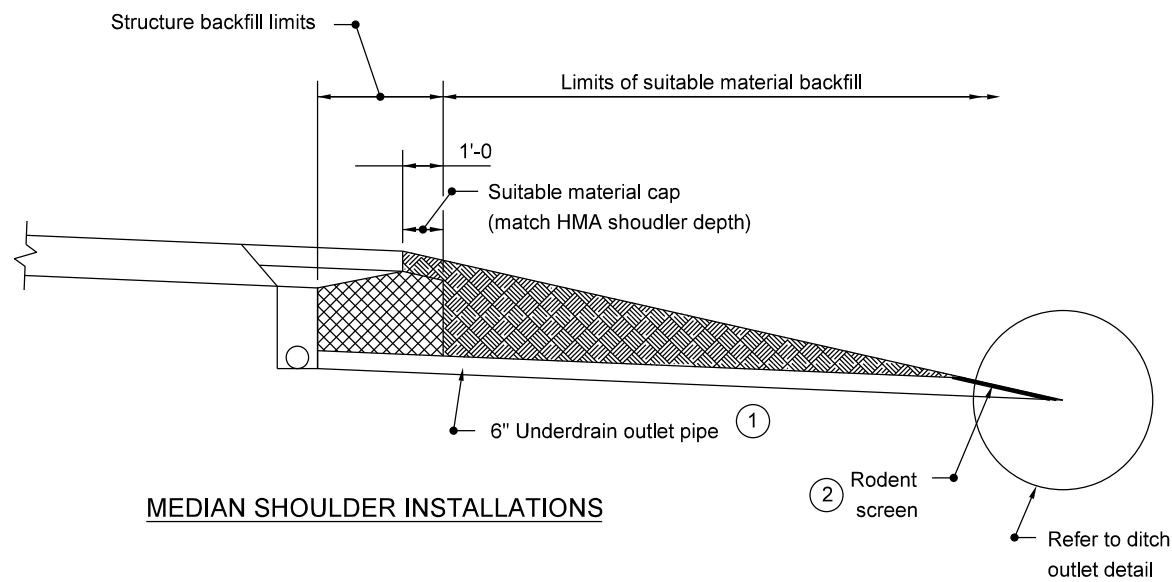


OUTSIDE SHOULDER INSTALLATIONS

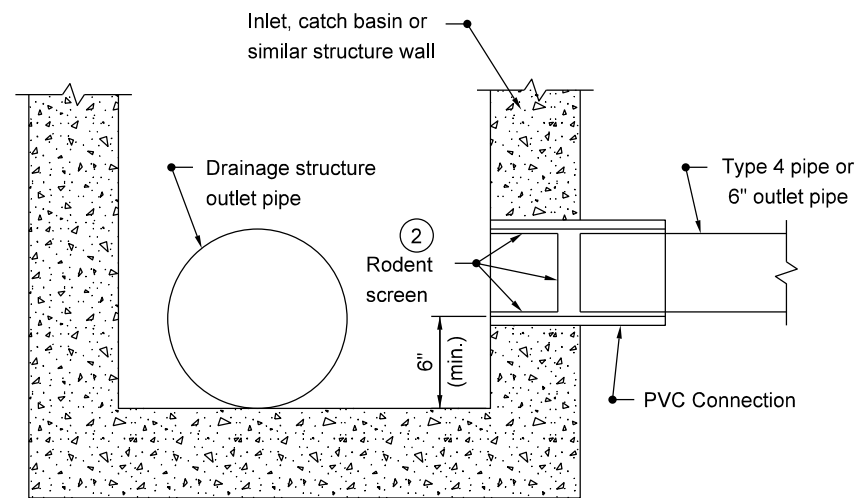


DITCH OUTLET DETAIL

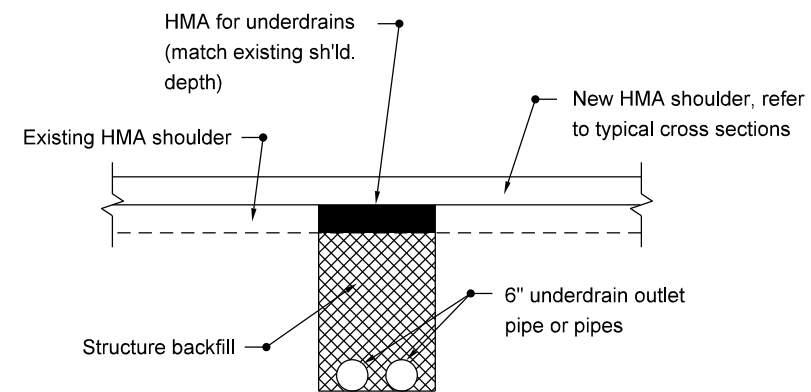
NOTE:
1. See Standard Drawing E 718-UNDR-07 for General Notes.



MEDIAN SHOULDER INSTALLATIONS



DRAINAGE STRUCTURE OUTLET DETAIL



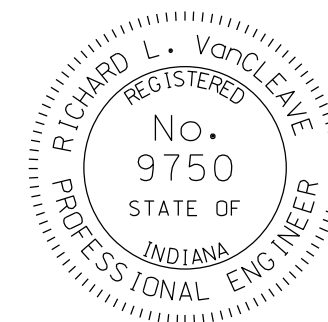
RETROFIT UNDERDRAIN OUTLET DETAIL (UNDER PAVED SHOULDER)

INDIANA DEPARTMENT OF TRANSPORTATION

UNDERDRAIN DETAILS

SEPTEMBER 2009

STANDARD DRAWING NO. E 718-UNDR-02



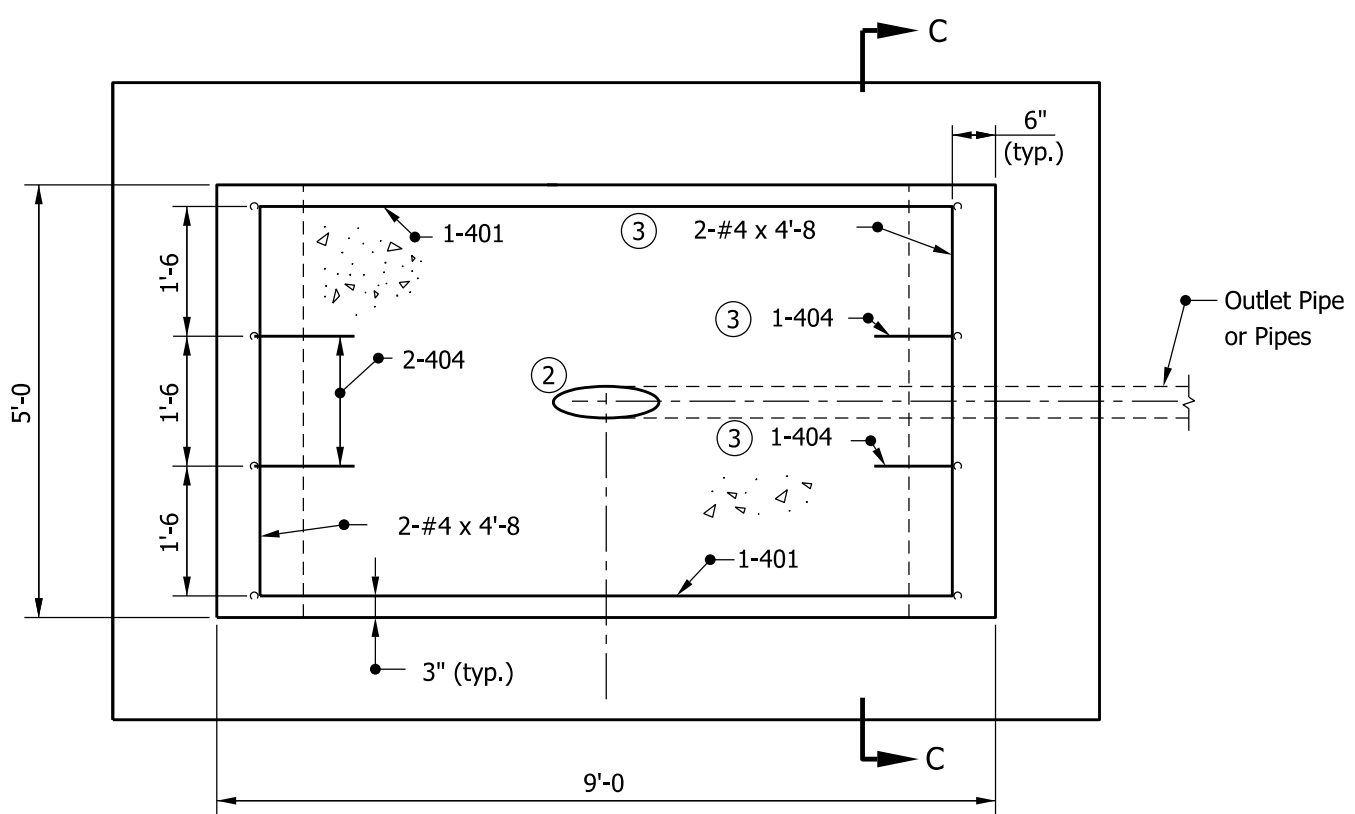
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/01/09
DESIGN STANDARDS ENGINEER DATE

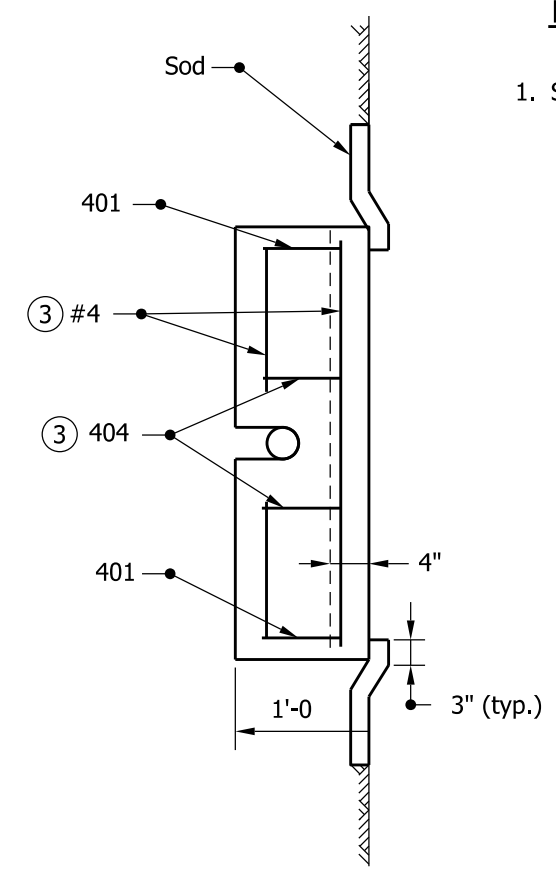
/s/ Mark A. Miller 09/01/09
CHIEF HIGHWAY ENGINEER DATE

NOTE:

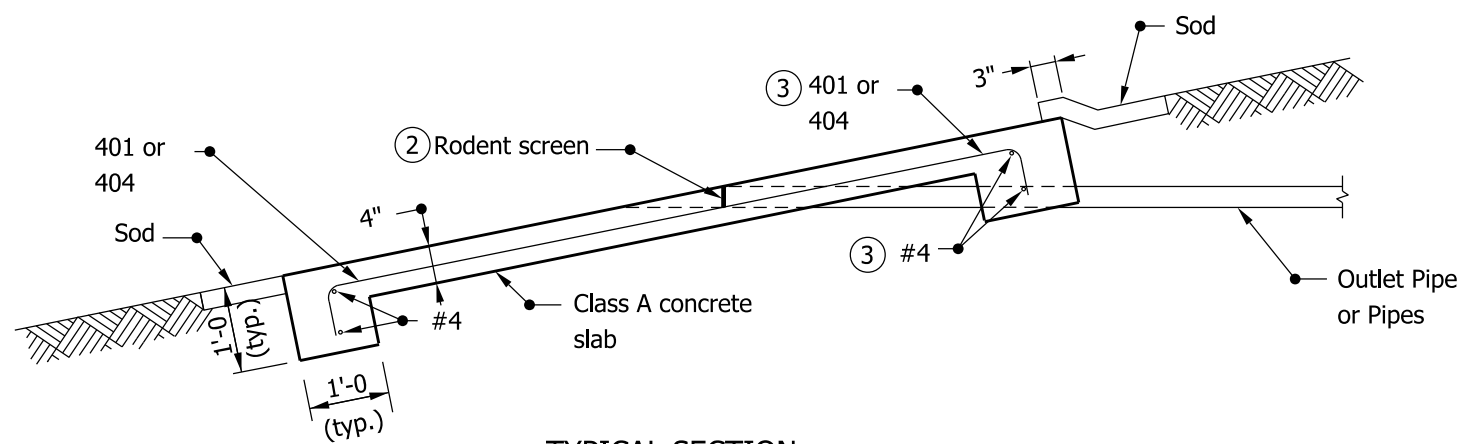
1. See Standard Drawing E 718-UNDR-07 for General Notes.



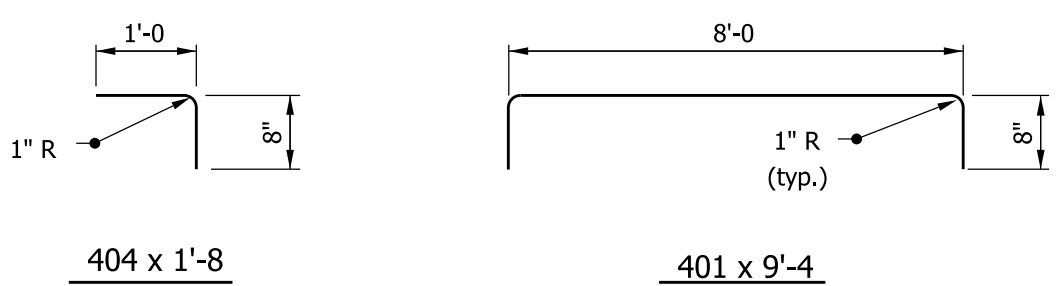
PLAN VIEW



SECTION C-C




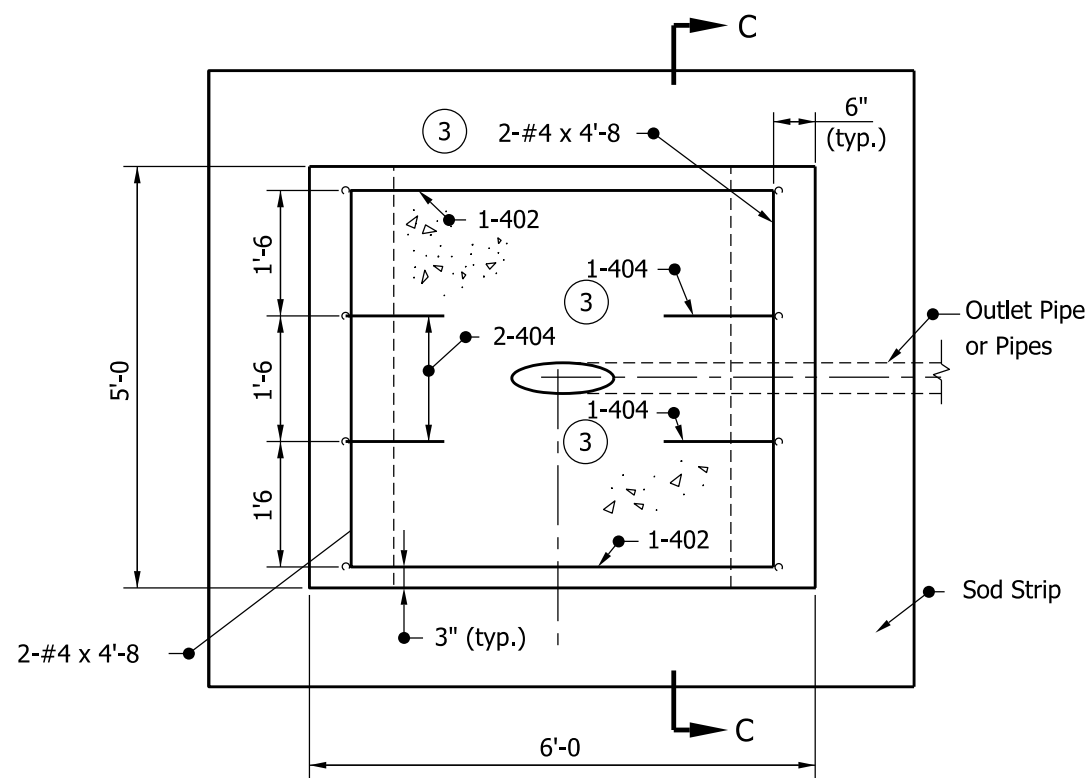
TYPICAL SECTION



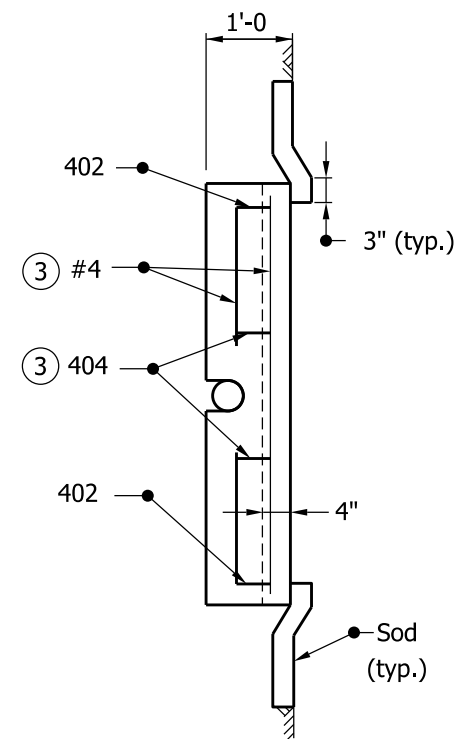
404 x 1'-8

401 x 9'-4

INDIANA DEPARTMENT OF TRANSPORTATION	
OUTLET PROTECTOR, TYPE 1	
SEPTEMBER 2009	
STANDARD DRAWING NO. E 718-UNDR-03	
	<p><i>/s/ Richard L. VanCleave</i> 09/01/09 <small>DESIGN STANDARDS ENGINEER DATE</small></p> <p><i>/s/ Mark A. Miller</i> 09/01/09 <small>CHIEF HIGHWAY ENGINEER DATE</small></p>
<small>DESIGN STANDARDS ENGINEER</small>	



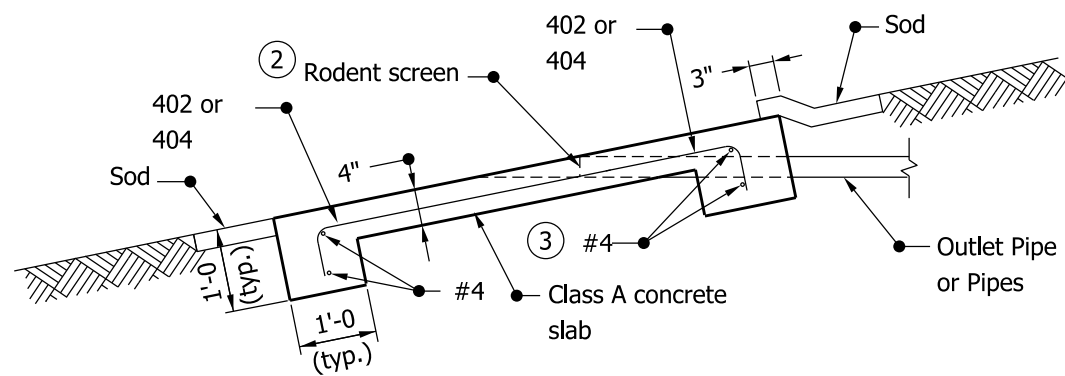
PLAN VIEW



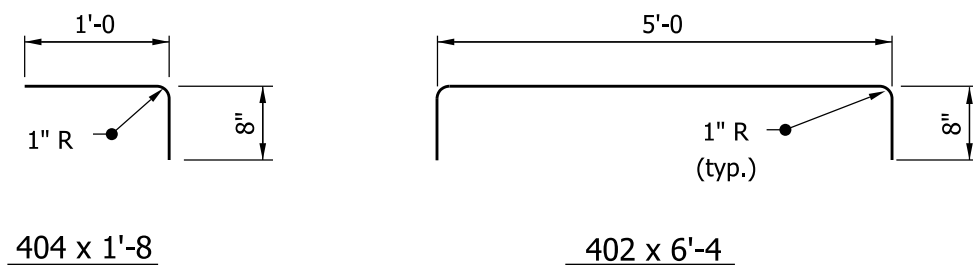
SECTION C-C

NOTE:

1. See Standard Drawing E 718-UNDR-07 for General Notes.



TYPICAL SECTION

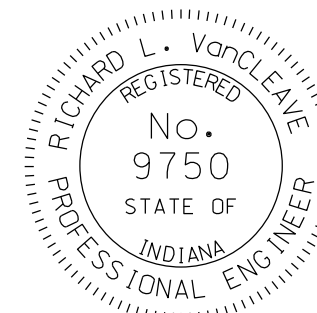


INDIANA DEPARTMENT OF TRANSPORTATION

OUTLET PROTECTOR, TYPE 2

SEPTEMBER 2009

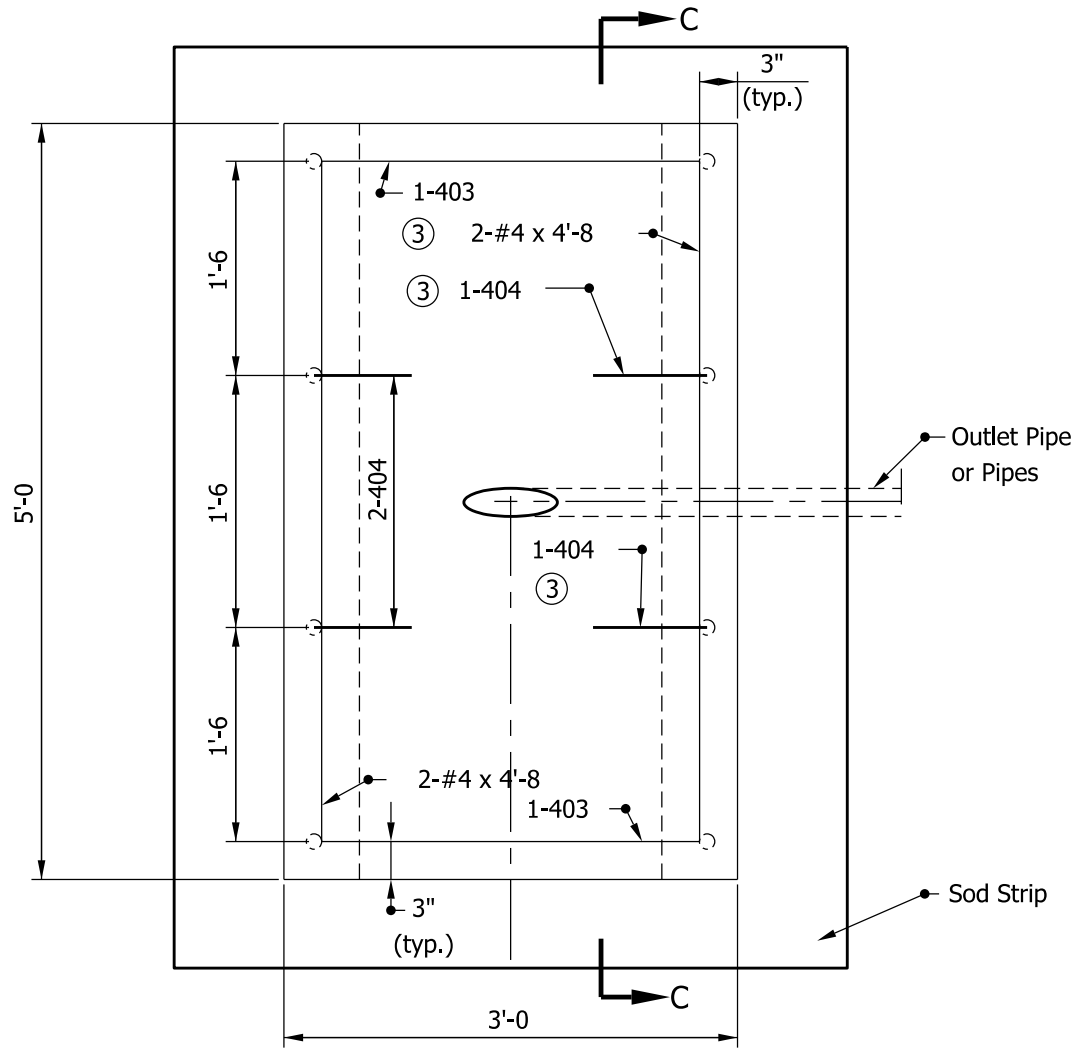
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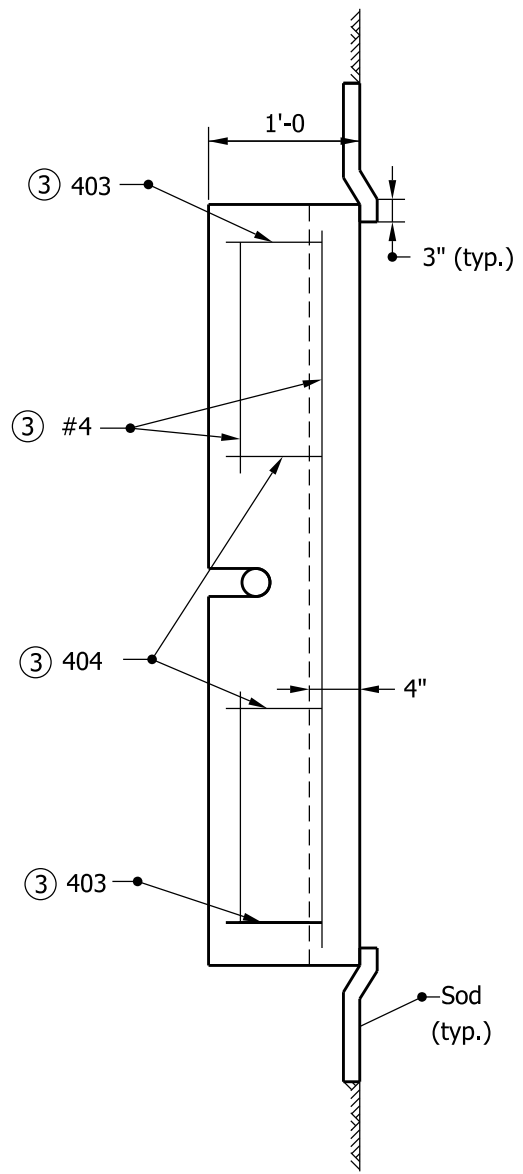
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/01/09
DESIGN STANDARDS ENGINEER DATE

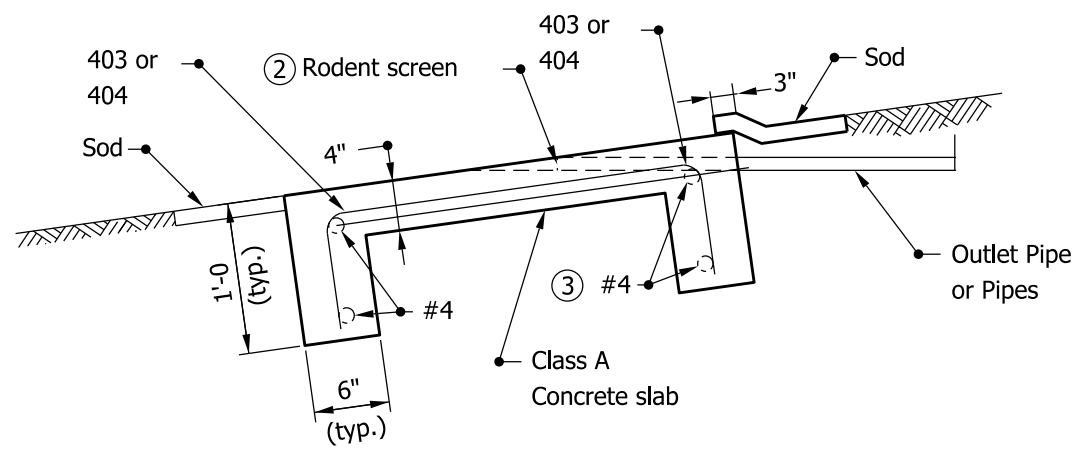
/s/ Mark A. Miller 09/01/09
CHIEF HIGHWAY ENGINEER DATE



PLAN VIEW



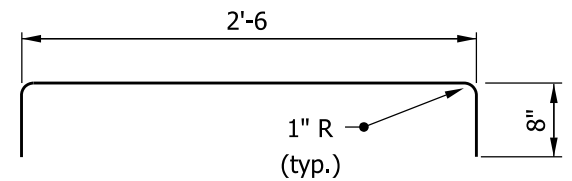
SECTION C-C



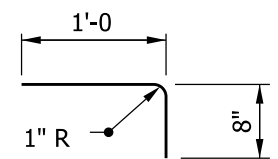
TYPICAL SECTION

NOTE:

1. See Standard Drawing E 718-UNDR-07 for General Notes.



403 x 3'-10



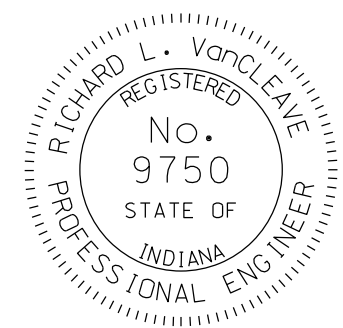
404 x 1'-8

INDIANA DEPARTMENT OF TRANSPORTATION

OUTLET PROTECTOR, TYPE 3

SEPTEMBER 2009

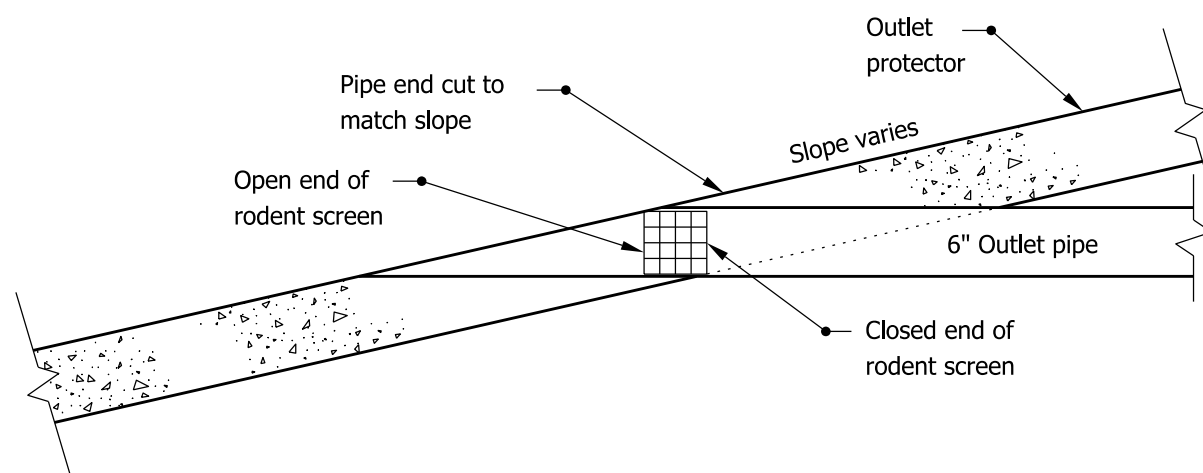
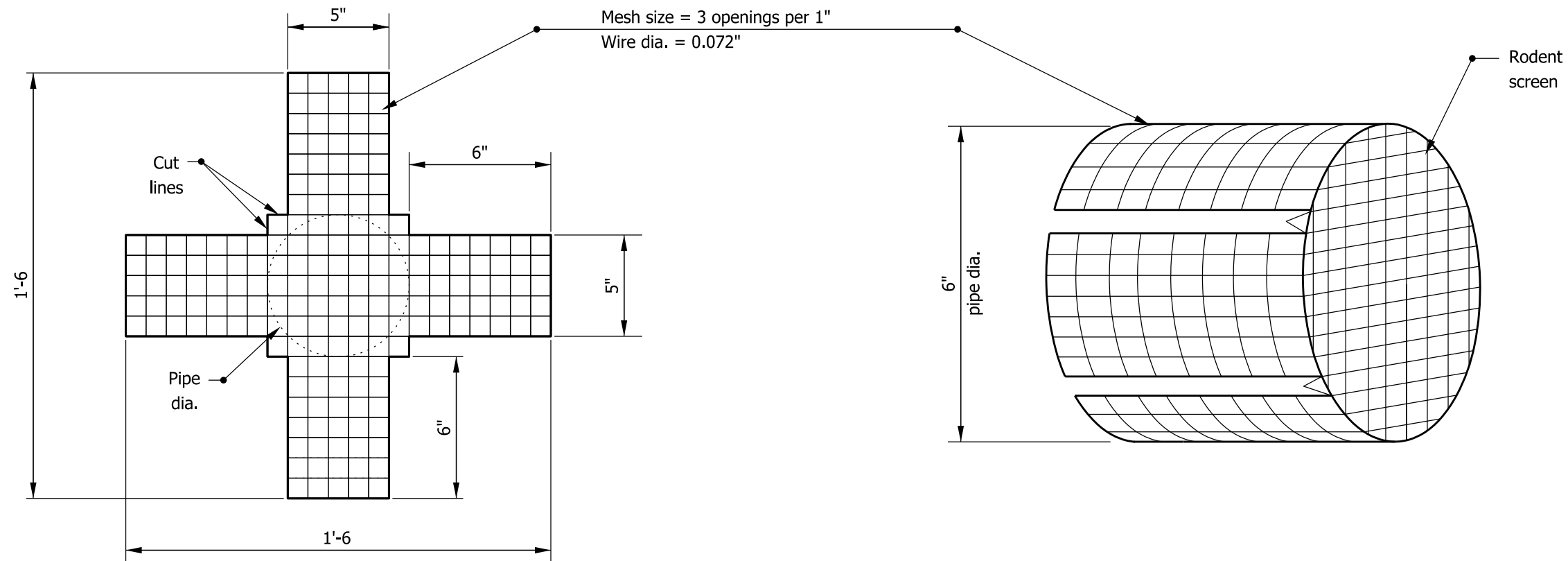
STANDARD DRAWING NO. E 718-UNDR-05



DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/01/09
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/01/09
CHIEF HIGHWAY ENGINEER DATE

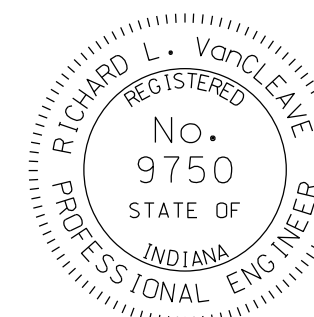


INDIANA DEPARTMENT OF TRANSPORTATION

OUTLET PROTECTOR
RODENT SCREEN

SEPTEMBER 2009

STANDARD DRAWING NO. E 718-UNDR-06



DESIGN STANDARDS ENGINEER


/s/ Richard L. VanCleave 09/01/09
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/01/09
CHIEF HIGHWAY ENGINEER DATE

GENERAL NOTES

- 1 If underdrain outlet-pipe elevations are not shown on Underdrain Table, the minimum outlet-pipe slope shall be 0.3%. The minimum freeboard between the outlet-pipe outfall and the ditch line shall be 1'-0 for median ditches and 2'-0 for side ditches.
- 2 See Standard Drawing E 718-UNDR-06 for rodent screen details.
- 3 The #4 transverse bars in the upslope lug may be field cut to accomodate the outlet pipe or pipes. The 404 bars in the upslope lug may be moved to accomodate the outlet pipe or pipes.

APPROXIMATE OUTLET PROTECTOR QUANTITIES			
TYPE	CONCRETE, CLASS A (cys)	REINFORCING BARS (lb)	SODDING (sys)
1	0.8	29	4.9
2	0.6	25	4.0
3	0.3	22	3.2

INDIANA DEPARTMENT OF TRANSPORTATION									
UNDERDRAIN NOTES									
SEPTEMBER 2009									
STANDARD DRAWING NO. E 718-UNDR-07									
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%; border-bottom: 1px solid black;"><i>/s/ Richard L. VanCleave</i></td> <td style="width: 20%; border-bottom: 1px solid black;">09/01/09</td> </tr> <tr> <td style="font-size: small;">DESIGN STANDARDS ENGINEER</td> <td style="font-size: small;">DATE</td> </tr> <tr> <td style="border-bottom: 1px solid black;"><i>/s/ Mark A. Miller</i></td> <td style="border-bottom: 1px solid black;">09/01/09</td> </tr> <tr> <td style="font-size: small;">CHIEF HIGHWAY ENGINEER</td> <td style="font-size: small;">DATE</td> </tr> </table>	<i>/s/ Richard L. VanCleave</i>	09/01/09	DESIGN STANDARDS ENGINEER	DATE	<i>/s/ Mark A. Miller</i>	09/01/09	CHIEF HIGHWAY ENGINEER	DATE
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