

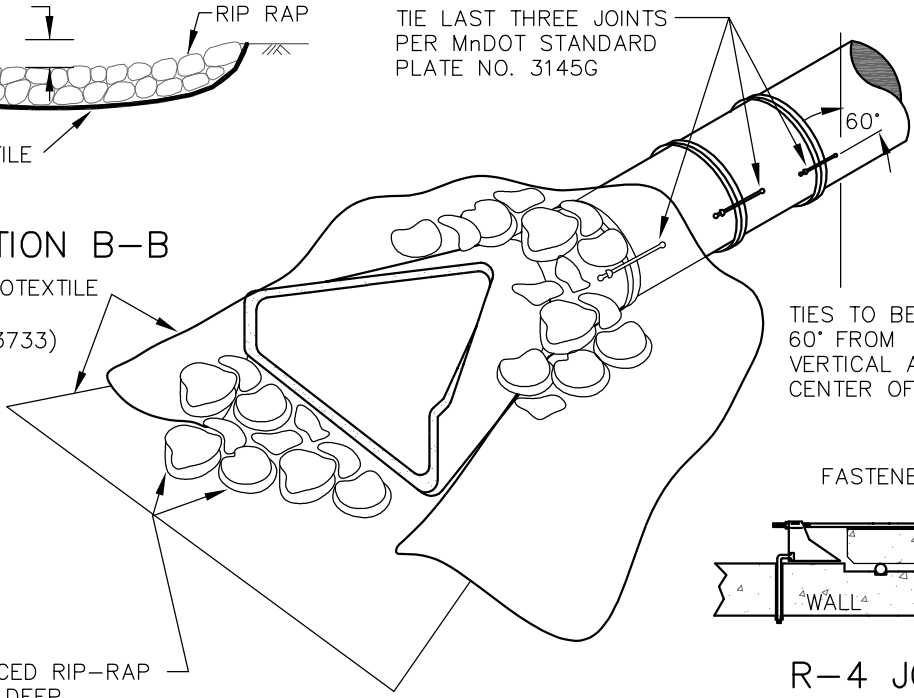
NON-WOVEN GEOTEXTILE  
FILTER FABRIC  
(MnDOT SPEC. 3733)

**SECTION B-B**

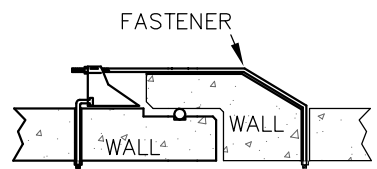
NON-WOVEN GEOTEXTILE  
FILTER FABRIC  
(MnDOT SPEC. 3733)

HAND PLACED RIP-RAP  
ONE FOOT DEEP

TIE LAST THREE JOINTS  
PER MnDOT STANDARD  
PLATE NO. 3145G

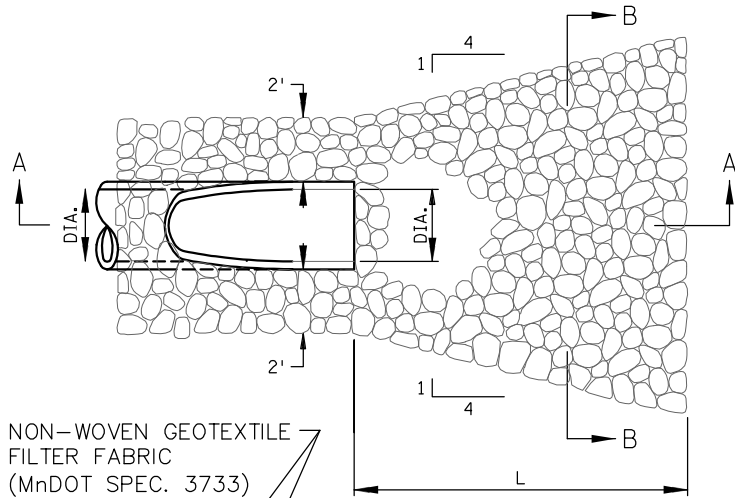


TIES TO BE LOCATED  
60° FROM  
VERTICAL AXIS  
CENTER OF PIPE



**R-4 JOINT**

**TIE BOLT & FASTENER ASSEMBLY**



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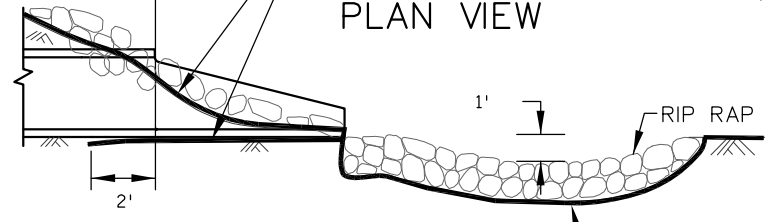
**PLAN VIEW**

**MINIMUM RIPRAP REQUIRED**

PIPE DIA. (IN.)	LENGTH (FT.)	QUANTITY (CY.)	CLASS	TIE BOLT DIA. (MIN)
12	8	5	3	3/4"
15	8	5	3	3/4"
18	10	6	3	3/4"
24	12	8	3	3/4"
30	14	12	3	1"
36	16	14	3	1"
42	18	22	4	1"
48	20	26	4	1"
60	22-28	30-40	4	1"
72 >	22-28	40-50	4	1-1/4"

**NOTES:**

1. INSTALLATION OF TIE BOLTS SHALL BE INCIDENTAL TO THE INSTALLATION OF FLARED END SECTIONS. INSTALLATION PER MnDOT STANDARD PLATE NO. 3145G.
2. NON-WOVEN GEOTEXTILE FABRIC BELOW F.E.S. AND ABOVE F.E.S. SHALL EACH BE OF A SINGLE CONTINUOUS PIECE WITHOUT SEAMS HOLES OR OTHER DAMAGE AND SHALL BE INCIDENTAL TO THE INSTALLATION OF F.E.S.
3. ALL GRANULAR BEDDING MATERIAL NECESSARY FOR THE INSTALLATION OF THE F.E.S. SHALL BE INCIDENTAL TO THE INSTALLATION OF THE F.E.S.



NON-WOVEN GEOTEXTILE  
FILTER FABRIC (MnDOT SPEC. 3733)

**SECTION A-A**

4. RIP RAP SHALL BE HAND PLACED TO PREVENT DAMAGE TO NON-WOVEN FILTER FABRIC. DAMAGED FILTER FABRIC SHALL BE REMOVED AND REPLACED
5. EXCESS NON-WOVEN GEOTEXTILE FABRIC SHALL BE TRIMED TO MATCH PERIMETER OF PLACED RIP RAP.

	<p><b>FLARED END</b></p>	<p>PUBLISH DATE 11/15/18</p>	<p>PLATE NO. SS-4</p>
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