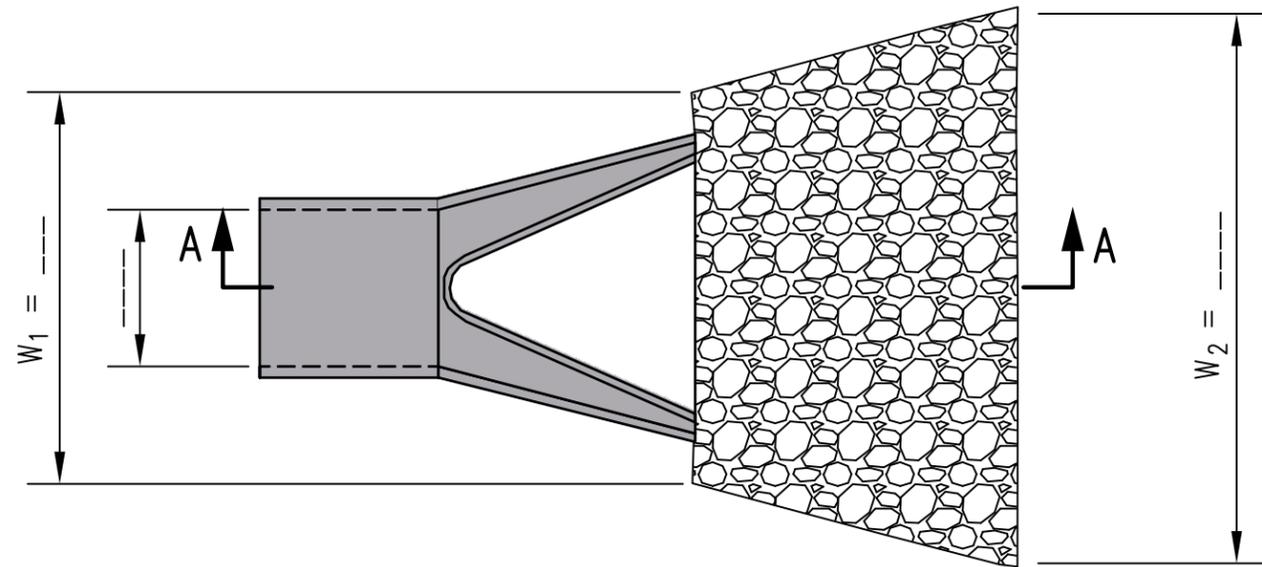
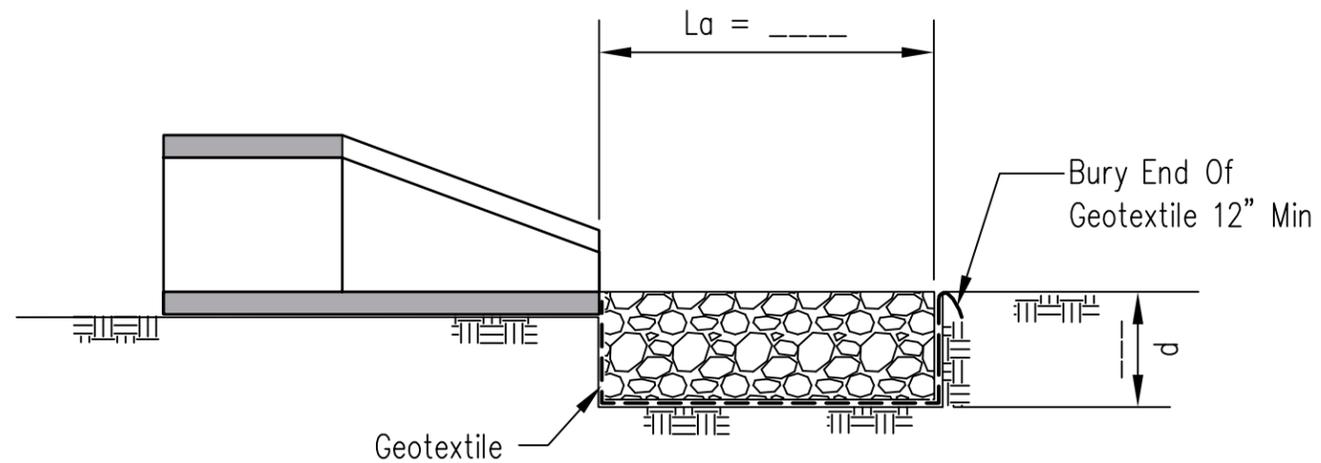


Pipe Outlet To Flat Area
No Well-Defined Channel



PLAN



SECTION A-A

NOTES:

1. The rock riprap shall meet IDOT requirements for Gradation No. _____, Quality Designation "A" or as designated by engineer.
2. Geotextile (non-woven, needle punched) Minimum criteria:
 Grab tensile strength (lb) ASTM D 4632 _____ 202
 Elongation at failure (%) ASTM D 4632 _____ ≥ 50
 Trapezoidal tear strength (lb) ASTM D 4533 _____ 79
 Puncture strength (lb) ASTM D 6241 _____ 433
 Ultraviolet light (% retained strength) ASTM D 4355 _____ min 50
 Apparent opening size (AOS) ASTM D 4751 _____
 _____ max 0.22 mm (US sieve size 70)
 Permittivity sec^{-1} / ASTM D 4491 _____ min 0.70
3. Any geotextile splices shall overlap a minimum of 18 inches, with upstream or upslope geotextile overlapping the abutting downslope geotextile.
4. Apron width W_1 shall be at least 3 times the culvert pipe diameter. Apron width W_2 shall be at least to L_a plus the pipe diameter.
5. Rock thickness d shall be at least 1.5 times the riprap D_{100} size.
6. Apron length L_a and rock riprap shall be sized according to Illinois Urban Manual Rock Outlet Protection standard 910 minimum $L_a = 10$ ft.

Designed	Date
Drawn	4/1/14
Checked	
Approved	

PIPE OUTLET TO FLAT AREA

United States
Department of
Agriculture
USDA
Natural Resources
Conservation Service

File No.
IL-ENG-44
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