

DESIGN PROCEDURE AND CRITERIA FOR GEOTEXTILE REINFORCED VEGETATED OUTLET (GVO)

The purpose of the GVO is to provide an economical outlet for small watersheds (up to 100 cfs). In general the Iowa Standard and Specification for Grassed Waterway (412) shall be used to plan design and install GVO. The following design procedures and criteria will supplement Standard 412 and be applicable to GVO shown on Iowa Standard Drawing 806. This material is adapted from material developed by the Natural Resources Conservation Service in Michigan.

Use is restricted to soils with 30% or more material by weight passing the # 200 sieve. This includes clay, clay loam, loam, silty clay, silty clay loam, silt loam, sandy clay, and most sandy clay loam soils.

The cross section of the complete outlet shall be trapezoidal. Side slopes shall not be steeper than 2 horizontal to 1 vertical (2:1). Bottom widths shall be no more than 30 feet except for outlets steeper than 3:1 which are limited to 20 feet bottom widths. Maximum drop through the GVO is limited to 10 feet. Maximum allowable design velocity is 7 feet per second. Retardance values will be "D" for velocity and "B" for capacity. Ohio Engineering computer program for grassed waterways can be used to determine outlet dimensions or the following table be used.

<u>Outlet Slope, %</u>	<u>Flow, cfs/ft.</u>	<u>Outlet Depth, ft.</u>	<u>Inlet Depth, ft.</u>
8 (12.5:1)	4.0	0.8	1.4
10 (10:1)	3.5	0.7	1.3
12.5 (8:1)	3.0	0.6	1.1
16.7 (6:1)	2.5	0.6	1.0
20 (5:1)	2.25	0.5	1.0
25 (4:1)	2.0	0.5	1.0
33 (3:1)	1.75	0.4	1.0
50 (2:1)	1.5	0.3	1.0

Determine the minimum outlet bottom width by dividing the peak flow determined for the 10 year frequency, 24 hour duration storm by the flow from the table for the desired outlet slope.

The inlet depth shall be at least as deep as the upstream waterway. The upstream waterway shall be designed with a slope of 4% or less for at least 100 feet. The waterway may be used for a transition section to change the bottom width and/or side slopes to those that match the outlet inlet dimensions. The inlet shall be 10 feet long and shall be of the same width as the rest of the outlet.