

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

IA-412 GRASSED WATERWAY

1. SCOPE

The work consists of all excavations, shaping, grading, and earthfill required to construct the waterways as shown on the drawings or as staked in the field. It is the land user's responsibility to locate any existing tile that may be under, along, or crossing the waterways prior to construction. The NRCS is not responsible for any tile damaged during construction.

2. MATERIALS

The earth materials used in constructing the earthfill portions of the waterways shall be suitable material obtained from the waterway channel or other approved sources. The fill material shall be free from brush, roots, frozen material, sod, stones over 6 inches in diameter, or other objectionable material.

3. FOUNDATION PREPARATION

All trees, stumps, brush and debris shall be removed from the site and disposed of so that they will not interfere with construction or proper functioning of the waterway. In fill sections, trees and stumps may be sawed off at a height not exceeding 6 inches above natural ground, provided that the final grade is four feet or more above the top of the stumps.

4. PLACEMENT

Fill will not be placed until the required foundation preparation is complete. Smooth surfaces where fill material is to be placed shall be scarified to insure bonding. Fill shall not be placed upon a frozen surface.

Fill will be placed in approximately uniform horizontal layers of not more than 9 inches in thickness. The moisture content of the material shall be sufficient to obtain firm and suitable compaction. Compaction shall be obtained by routing the hauling and spreading equipment over the fill in such a manner that the entire surface of each layer will be traversed by not less than one tread track of the loaded equipment, or equivalent methods approved by the inspector.

5. EXCAVATION

Excavation shall be to the lines and grades shown on the drawings or staked in the field. All surplus and unsuitable excavated materials will be disposed of at locations shown on the drawings or at locations approved by the inspector. Spoil shall not be placed where it will block the flow of water into the waterway, except as shown on the plan for the construction of temporary diversions.

Where infertile subsoil will be exposed by construction operations, topsoil shall be stripped, stockpiled, and spread on infertile areas after excavation is completed. Areas to be topsoiled shall be undercut so that the finished surface is a design grade after topsoiling is complete.

The area adjacent to the upper end of the waterway shall be graded to divert upper watershed flows into the newly constructed waterway. The outlet end of the waterway shall be left in a stable condition after construction is complete.

6. DIVERSIONS

Temporary or permanent diversions shall be constructed as shown on the plans or staked in the field.

Temporary diversions constructed around the top and sides of the waterway to divert runoff water from the new grass seeding shall be removed following seeding establishment. Spoil from this operation shall not permanently block runoff from adjacent land from entering the waterway and may be placed to help ensure runoff enters the waterway in the future.

7. TOLERANCES

The waterway shall be constructed to the specified width, depth, and grade. The constructed waterway shall present a workmanlike finish with uniform grades and cross sections.

The quarter points of a parabolic waterway shall be constructed to the required elevation plus or minus 10% of the depth. For example, if the waterway has a depth of 1.0 ft., the tolerance is plus or minus 0.1 ft.

The side slopes of a trapezoidal waterway shall be constructed to the required slope plus or minus 10% of the slope when expressed as a ration xH:1V. For example, if the required side slope is 8H:1V, the tolerance is plus or minus 0.8 and the constructed side slope shall be in the range of 7.2H:1V to 8.8H:1V.

Depth shall be measured at one-half the design width from the centerline at the lowest side of the waterway.

In addition to the tolerances stated above, Case 1 shall apply unless Case 2 is specified in Section 9, Additional Requirements. In all cases, no flat or reverse grades will be allowed.

Case 1: The center of parabolic waterways and the bottom of trapezoidal waterways shall be constructed to the required elevations with allowable tolerances as follows:

- For waterway slopes 1.5% or less: plus or minus 0.1 ft.
- For waterway slopes greater than 1.5%: plus or minus 0.2 ft.

Case 2 (Applies only to waterways with grades over 1.5%): Each reach of the grassed waterway shall be constructed to the specified depth and grade, with allowable tolerances as follows:

- The constructed depth plus or minus 0.2 ft.
- The constructed grade plus or minus 10% of the design grade. For example, if the waterway reach has a design grade of 3%, the tolerance is plus or minus 0.3% and the constructed grade shall be within the range of 2.7-3.3%.

8. SEEDING

A protective cover of vegetation shall be established on all surfaces of the areas disturbed by construction as shown on the plans or staked in the field. Seeding and mulching shall be performed in accordance with the IA-CPA-4, Seeding Plan, and Construction Specification IA-6, Seeding and Mulching for Protective Cover.

9. ADDITIONAL REQUIREMENTS