USDA
NATURAL RESOURCES
CONSERVATION SERVICE
DELAWARE
CONSERVATION PRACTICE
STANDARD

GRASSED WATERWAY

CODE 412
(Reported by Acre)

DEFINITION

A natural or constructed channel that is shaped or graded to required dimensions and established with suitable vegetation.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following purposes:

- To convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding
- To reduce gully erosion
- To protect/improve water quality

CONDITIONS WHERE PRACTICE APPLIES

In areas where added water conveyance capacity and vegetative protection are needed to control erosion resulting from concentrated runoff and where such control can be achieved by using this practice alone or combined with other conservation practices.

CONSIDERATIONS

Consider the time of year for installation of this practice. Avoid periods of high runoff volumes, or temporarily divert runoff from the planted area. This will allow the vegetation to become well established before it is subjected to storm flows. Use irrigation, if available, to promote germination and vegetative establishment.

If wildlife is a concern, select plant species that provide wildlife benefits, provided that they do not distract from the grassed waterway's other functions. Do not mow or graze the waterway during peak nesting season. Consider leaving the waterway unmowed through the winter to provide good winter cover.

Consider establishing filter strips on each side of the waterway to improve water quality and wildlife habitat.

Provide livestock and vehicular crossings as necessary to prevent damage to the waterway and its vegetation.

Consider the potential to affect National Register listed or eligible cultural resources.

CRITERIA

Grassed waterways shall be planned, designed, and constructed to comply with all federal, state, and local laws and regulations.

Capacity. The minimum capacity shall be that required to convey the peak runoff expected from a storm of 10-year frequency, 24-hour duration. When the waterway slope is less than 1 percent, out-of-bank flow may be permitted if such flow will not cause excessive erosion. The minimum in such cases shall be the capacity required to remove the water before crops are damaged.

Velocity. Design velocities shall not exceed those obtained by using the procedures, "n" values, and recommendations in the NRCS Engineering Field Handbook (EFH) Part 650, Chapter 7, or Agricultural Research Service (ARS) Agricultural Handbook 667, Stability Design of Grass-lined Open Channels.

Width. The bottom width of trapezoidal waterways shall not exceed 100 feet unless multiple or divided waterways or other means are provided to control meandering of low flows.

Side Slopes. Side slopes shall not be steeper than a ratio of two horizontal to one vertical. They shall be designed to accommodate the equipment anticipated to be used for maintenance and tillage/harvesting equipment that will cross the waterway.

Depth. The minimum depth of a waterway that receives water from terraces, diversions, or other tributary channels shall be that required to keep the design water surface elevation at, or below the design water surface elevation in the tributary channel, at their junction when both are flowing at design depth.

Freeboard above the designed depth shall be provided when flow must be contained to prevent damage. Freeboard shall be provided above the designed depth when the vegetation has the maximum expected retardance.

Drainage. Designs for sites having prolonged flows, a high water table, or seepage problems shall include Subsurface Drains (NRCS Practice Code 606); Underground Outlets (NRCS Practice Code 620), Stone Center Waterways, or other suitable measures to avoid saturated conditions.

Outlets. All grassed waterways shall have a stable outlet with adequate capacity to prevent ponding or flooding damages. The outlet can be another vegetated channel, an earthen ditch, a grade-stabilization structure, filter strip, or other suitable outlet.

Vegetative Establishment. Grassed waterways shall be vegetated according to NRCS Conservation Practice Standard Critical Area Planting, Code 342.

Seedbed preparation, time of seeding, mixture rate, stabilizing crop, mulching, or mechanical means of stabilizing, fertilizer, and lime requirements shall be specified for each applicable area.

Establish vegetation as soon as conditions permit. Use mulch anchoring, nurse crop, rock, straw or hay bale dikes, filter fences, or runoff diversion to protect the vegetation until it is established.

PLANS AND SPECIFICATIONS

Plans and specifications for grassed waterways shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose(s).

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be provided to and reviewed with the landowner. The plan shall include the following items and others as appropriate.

A maintenance program shall be established to maintain waterway capacity, vegetative cover, and outlet stability. Vegetation damaged by machinery, herbicides, or erosion must be repaired promptly.

Seeding shall be protected from concentrated flow and grazing until vegetation is established.

Minimize damage to vegetation by excluding livestock whenever possible, especially during wet periods.

Inspect grassed waterways regularly, especially following heavy rains. Damaged areas will be filled, compacted, and seeded immediately. Remove sediment deposits to maintain capacity of grassed waterway.

Avoid using waterways as turn-rows during tillage and cultivation operations.

Mow or periodically graze vegetation to maintain capacity and reduce sediment deposition.

Control noxious weeds.

Do not use as a field road. Avoid crossing with heavy equipment when wet.

SUPPORTING DATA FOR DOCUMENTATION

Field Data and Survey Notes.

The following is a list of the minimum data needed:

a. Plan view sketch.

b. Slope of each design reach (hand level survey permitted when slope is steeper than 2 percent)

c. Cross-section (minimum of one per reach not to exceed 300 feet.)

d. Lengths of each reach and total length.

e. Profile and cross-section of outlet and, special precautions if needed.

Design Data

Record on appropriate engineering paper. For guidance on the preparation of engineering plans see Chapter 5 of the EFH, Part 650. The following is a list of the minimum required design data

a. Locate the practice on the farm plan map in the case file.

b. Determine soil type and any special restrictions.

c. Determine peak runoff from the contributing drainage area for the required design storm in accordance with Chapter 2, EFH Part 650 or by other approved method.

d. Design each reach in accordance with Chapter 7, EFH, Part 650, or other source.

e. Show job class on the plan.

f. Plan view sketch, profile of waterway when required and cross-sections of each design reach to be shown on plans.

g. Quantities estimate.

h. Details of outlet protection or other structural components needed.

i. Planting plan. This must meet the criteria, specifications and documentation requirements of the conservation standard for Critical Area Planting (Code 342). Show on the plans.

j. Written Operation and Maintenance plan.

Construction Check Data/As-Built Plans

Record on survey notepaper, SCS-ENG-28, or other appropriate engineering paper. Survey data will be plotted in red. The following is a list of minimum data needed for As-built documentation:

a. Documentation of site visits on CPA-6. The documentation shall include the date, who performed the inspection, specifics as to what was inspected, all alternatives discussed and decisions made and by whom.

b. Check notes recorded during or after completion of construction showing grade and cross section of constructed reaches and outlets including length, width, and depth.

c. Calculate acreage.

d. Statement on seeding and fencing.

e. Final quantities and documentation for quantity changes. Materials certifications as appropriate.

f. Sign and date check-notes and plans by someone with appropriate approval authority. Include statement that practice meets or exceeds plans and NRSC practice standards.