United States Department of Agriculture

Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

ROCK WALL TERRACE

CODE 555

(ft)

DEFINITION

A fitted rock wall constructed across the slope to create a farmable area.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Reduce sheet and rill erosion
- Reduce and control runoff

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where soil erosion and excessive slope length is a problem on agricultural land that is steeply sloping, where an earth embankment is not practical. This practice applies to sites with a soil depth adequate for cultivation and with land slopes up to 70 percent. A suitable, stable natural outlet or a satisfactory site for a constructed outlet must be available.

This practice does not apply where vehicular traffic is expected on the terrace.

CRITERIA

General Criteria Applicable to All Purposes

Plan, design, and construct the terrace to comply with all Federal, State, and local laws and regulations. Notify landowner and/or contractor of their responsibility to locate all buried utilities in the project area. The landowner is also required to obtain all necessary permits for project installation prior to construction.

The top of the rock wall may be level or have a grade toward the outlet.

The cultivated area between the walls can have a reverse slope into the hillside or can have a positive grade toward the wall. If the cultivated area has a positive grade, construct the top of the wall a minimum of 6 inches higher than the ground elevation. See figures 1 and 2.

Provide an adequate outlet for the runoff water, such as a graded channel to a stable outlet or an infiltration area. For a site with a constructed outlet, provide surface drainage along the terrace with a longitudinal ditch having a cross-sectional area not less than 0.5 square feet and a grade of 0.5 percent or flatter towards the outlet.

The maximum allowable height of the rock wall is 6 feet. Include a structural stability analysis in the design of a rock wall with a height greater than 3 feet.

The minimum base width is 18 inches plus 1.5 inches for each 0.5 feet of height in excess of 2.5 feet. Slope the exposed face (batter) of the wall into the hillside at least 2 inches for each foot of height. See figure 3.

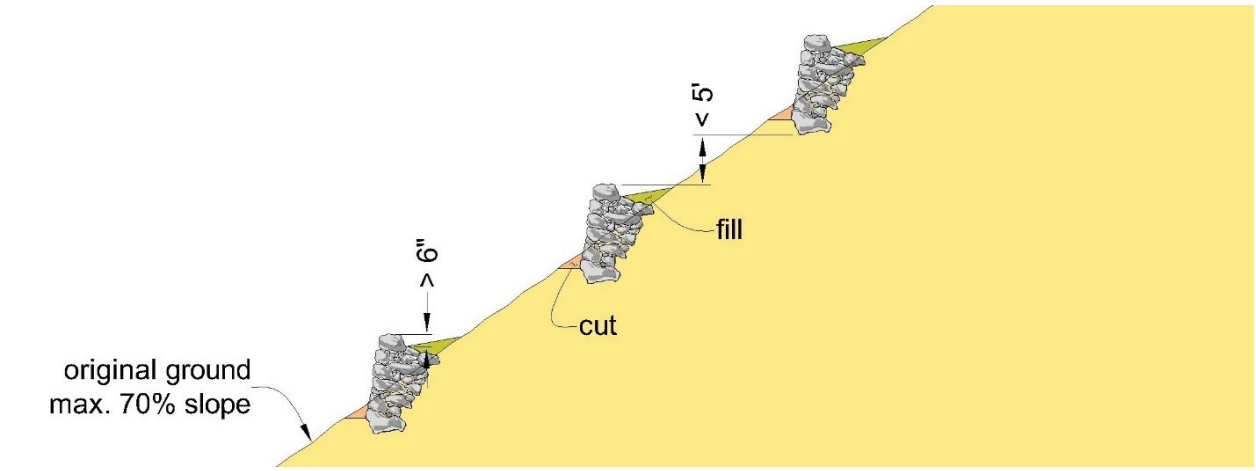

Figure 1. Vertical separation distance between adjacent rock wall terraces

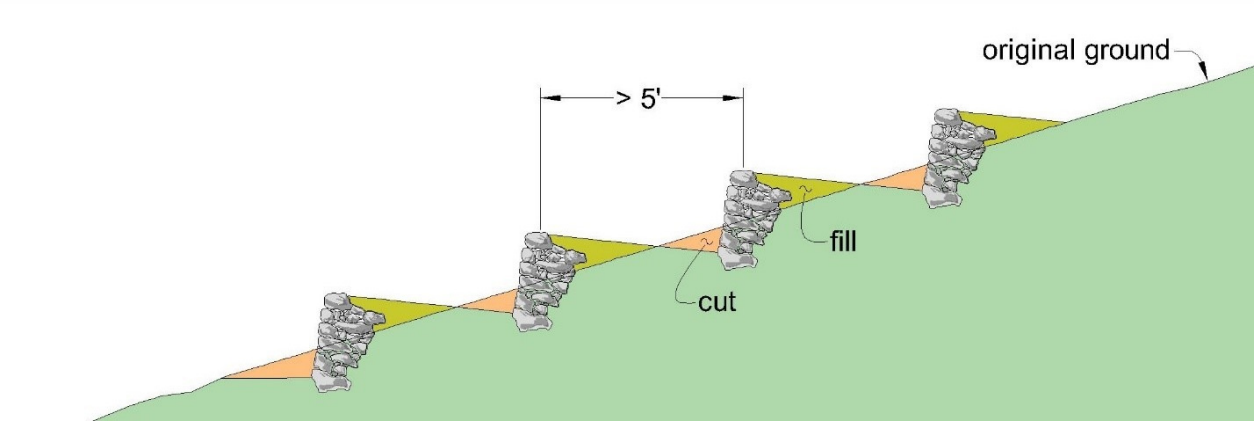

Figure 2. Horizontal separation between adjacent rock wall terraces

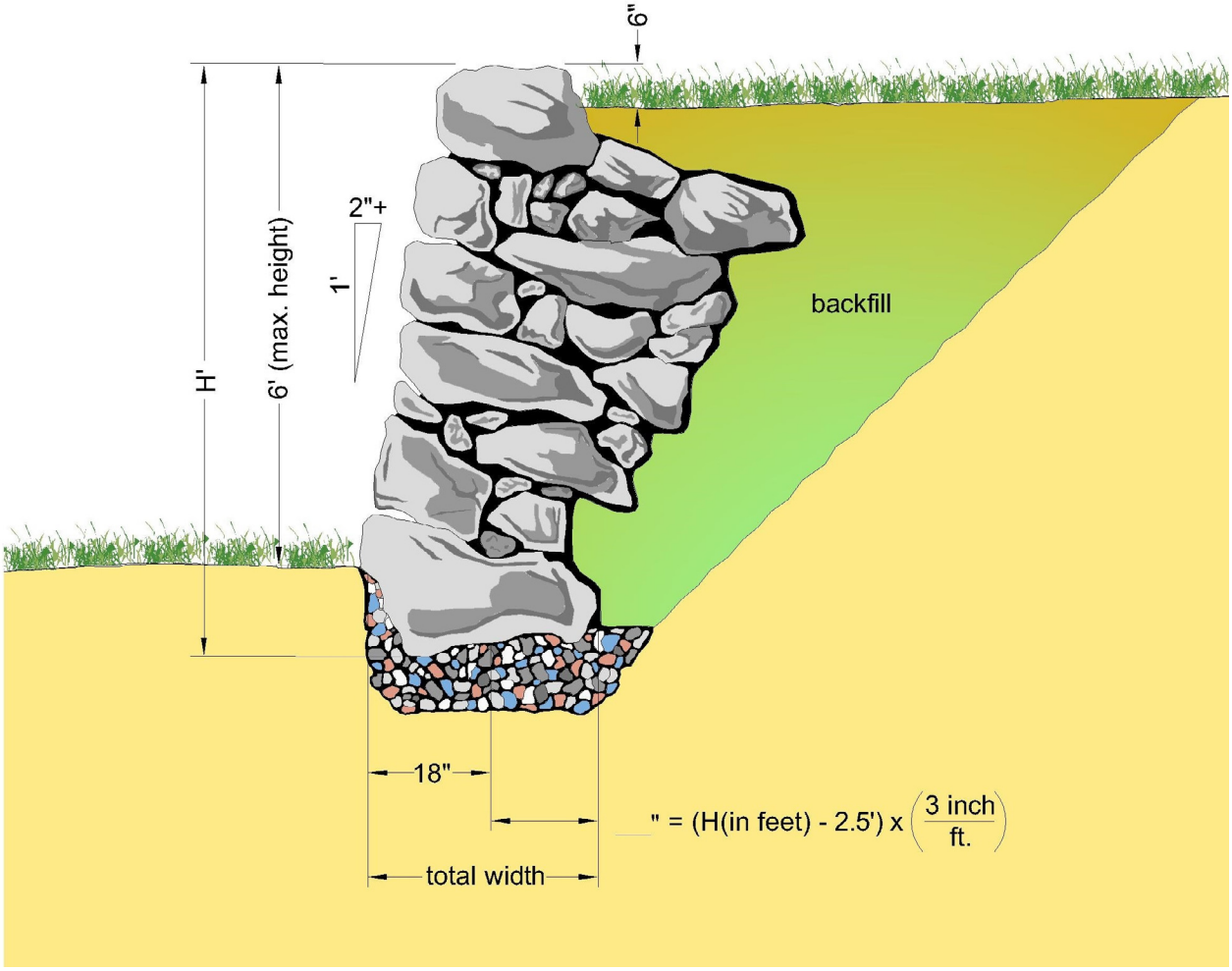

Figure 3. Dimensions of rock wall.

For sites with multiple walls, space the walls so that the vertical interval from the top of one wall to the toe of the adjacent upslope wall does not exceed 5 feet (fig. 1).

Space the walls and benches so that the horizontal interval between adjacent walls is not less than 5 feet (fig. 2).

Evaluate the piping potential and the need for use of a geotextile between the rock and soil materials. See NRCS Technical Note 24 (TN) (Title 210, Design Engineering), “Guide for the Use of Geotextiles,” for design considerations.

Each cultivated area must have a safe and stable outlet, either natural or constructed. The outlet must convey runoff to a point where outflow will not cause damage (i.e., at a nonerosive velocity for the design discharge). Soil infiltration may be used as the outlet where soil infiltration rates, under average rainfall conditions, permit infiltration within the inundation tolerance of the planned crops. Combinations of

different outlet types may be used to optimize water conservation, improve water quality, and to accommodate farming operations or to provide for economical installation.

CONSIDERATIONS

When choosing the location and spacing of rock wall terraces, first evaluate the amount of soil necessary to provide adequate plant growth. If needed, salvage and stockpile topsoil. To the extent possible, balance the cuts and fills to minimize the amount of earthmoving.

Consider the vegetation and effects on microhabitats for wildlife and pollinators.

Rock wall terraces alone may not be adequate to control storm runoff. Consider other conservation practices that may need to be installed to provide an adequate conservation system.

Runoff from cultivated areas can carry sediment, nutrients, and pathogens. Consider where outlets will carry the runoff and make provisions for filter areas and buffers if necessary.

Consider scheduling vegetation maintenance and control outside of the primary nesting season for ground nesting birds.

Consider grouting to enhance wall stability. If grout is used, consider the potential hydrostatic pressure from water trapped behind the impervious face.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for the rock wall terrace that describe the requirements for applying the practice to meet the intended purpose. As a minimum, include—

- Plan view of the site showing the location of each rock wall terrace and the location of the outlet.
- Typical cross section of a rock wall terrace. A table may be used to describe the dimensions of each rock wall in a system.
- Profile or planned grade of each terrace.
- Details of the outlet system.
- Site-specific construction specifications that describe in writing the installation of the rock wall terrace(s).

OPERATION AND MAINTENANCE

Prepare an operation and maintenance plan for the operator. The minimum requirements to be addressed in a written operation and maintenance plan are:

- Provide periodic inspections, especially following large rainfall events.
- Promptly repair or replace damaged components as necessary.
- Remove sediment that has accumulated in the surface drain or outlet to maintain the designed capacity.
- Revegetate portions of the system damaged by livestock, machinery, or erosion.
- Control trees, brush, and undesirable vegetation.
- Keep vehicles and heavy equipment away from rock walls.

REFERENCES

USDA. NRCS. 1991. Design Note 24 (Title 210, Design Engineering), Guide for the Use of Geotextiles. Washington, D.C. https://directives.sc.egov.usda.gov