NATURAL RESOURCES CONSERVATION SERVICE

CONSTRUCTION SPECIFICATIONS

GRADE STABILIZATION STRUCTURE

(TERRACE OUTLET STRUCTURE)

1. Scope

The work shall consist of all construction operations and furnishing all materials as required by the drawings and specifications for the complete installation of the works.

2. Location

The location of the structures and channel excavation shall be as specified on the drawings or as staked in the field.

3. Site Preparation

The area shall be cleared of all trees, logs, stumps, roots, boulders, sod, rubbish, and other objectionable materials not suitable as determined by the inspector. Topsoil containing substantial amounts of organic matter shall be stockpiled for later placement on the embankment.

Waste material such as rocks, frozen soil, mud, stumps, trees, logs, roots, rubbish, or other objectionable materials shall be disposed of by piling, burying, or burning at locations outside the embankment area or as directed by the inspector. Burning shall comply with all state and local policies pertaining to open burning.

4. Excavation

To the extent they are suitable and approved by the inspector, excavated materials are to be used as fill materials. Excess materials shall be placed at waste locations shown on the drawings or as directed by the inspector.

Excavated surfaces against which earthfill or concrete is to be placed shall be preserved in the soundest possible condition and protected from drying that may cause the formation of shrinkage cracks. Such protection may include but not be limited to (1) leaving a temporary cover of unexcavated material, (2) covering with mulch, (3) placing a protective coating of impervious sprayed material, (4) keeping moist by sprinkling with water, or (5) covering with sheets of plastic. The method of protection shall be approved by the inspector.

5. Concrete

Concrete shall have a design mix that will provide a minimum compressive strength of 3500 pounds per square inch (psi) at 28 days. The maximum net water content shall be 6.0 gallons/bag. Portland cement shall be Type I or II. Air entraining admixture shall be used to provide air content of 5 to 8 percent of the volume of concrete. Coarse aggregate shall be hard and free from dirt and organic materials and shall consist of well-graded gravel, crushed stone, or other suitable materials larger than #8 sieve. Maximum size shall be 1 inch. Fine aggregate shall consist of well-graded natural or manufactured sand particle gradation ranging from coarse (1/4 inch) to fine (#200 sieve). Mixing water shall be clean and free from oil, alkali, or acid.

The proportions of the aggregates shall be such to produce a concrete mixture that will work readily into the corners and angles of the forms and around steel reinforcement when consolidated. The slump at the time of placing shall be 3 to 5 inches.

Forms shall be wood, plywood, steel, or other approved materials and shall be mortar-tight. The forms shall be unyielding and shall be constructed so the finished concrete conforms to the specified dimensions and contours.

Prior to placement of concrete, the forms and subgrade shall be free of chips, sawdust, debris, water, ice, snow, extraneous oil, mortar, or other harmful substances or coatings.

Concrete shall be conveyed from the mixer to the forms as rapidly as practical by methods that will prevent segregation of the aggregates and loss of mortar. Concrete shall not be dropped more that 5 feet vertically except where suitable equipment is used to prevent segregation.

Immediately after the concrete is placed in the forms, it shall be consolidated by spading, hand tamping, or vibration as necessary to ensure smooth surfaces and dense concrete.

Forms shall be removed in such a way to prevent damage to the concrete.

The minimum period from completion of the concrete placement to the removal of the forms shall be 12 hours.

All exposed surfaces of the concrete shall be accurately screeded to grade and then wood floated.

Concrete shall be prevented from drying for a curing period of at least 7 days after it is placed. Exposed surfaces shall be kept continuously moist for the entire period or until compound is applied.

Concrete shall not be mixed nor placed when the atmospheric temperature is less than 40° F or more than 90° F unless facilities are provided to prevent freezing or for cooling as required. If concrete is placed when temperatures may fall below 40° F during the curing period, it will be insulated or heated to maintain a temperature of 50° F for the first 3 days of the curing period. The Natural Resources Conservation Service (NRCS) will be notified a minimum of 2 days before placing concrete in cold weather to allow for inspection.

6. Reinforcing Steel

Welded wire fabric 6 x 6 - W2.9 x W2.9 (6 x 6 - 6 x 6) is to be used in the structure. Welded wire fabric shall conform to the requirements of ASTM A 185. All joints are to be double-reinforced by laps of 15 inches or more.

All steel shall be accurately placed and adequately supported before concrete is placed. Steel shall have a minimum of 2 inches of cover (3 inches when against the earth). Steel in slope and apron shall be bent into the toewalls. Steel in the sidewalls shall be bent into the slope and apron.

No. 3 reinforcing steel bars are to be placed in both side walls 2 inches from the top and bent 15 inches into the headwall and toewall of the structure. The reinforcing steel shall be Grade 40 or Grade 60 standard deformed reinforcing bars.

Before reinforcement is placed, the surface of the reinforcement and any supports shall be cleaned to remove any rust, mill scale, oil, grease, or other coatings and shall be maintained in such condition until it is completely embedded in concrete.

7. Placement of Earthfill

The foundation area shall be scarified to a minimum depth of 4 inches before the fill material is placed and moisture is added (if necessary) so that the first layer of fill material can be bonded to the foundation. The material placed in the fill shall be free of sod, roots, frozen soil, stones over 6 inches diameter, and other objectionable material.

The distribution and gradation of materials shall be such that there will be no lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material.

The completed work shall conform to the lines, grades, and elevations shown on the drawings or as staked in the field.

Hand compacted backfill. Selected impervious backfill material shall be placed against structure surfaces in layers not more than 4 inches thick before compaction; and each layer shall be thoroughly compacted to the density of the surrounding material by hand tamping, manually directed power tampers, or plate vibrators. The height of fill shall be increased at approximately the same rate on all sides of the structure. Heavy equipment shall not be operated within 2 feet of the structure.

8. Moisture Control

The moisture content of the fill material shall be such that the required compaction can be obtained. Material that is too wet shall be dried to meet this requirement, and material that is too dry shall have water mixed until the requirement is met.

The minimum moisture content of the earthfill material shall be such that, when kneaded in the hand, the fill material will form a ball which does not readily separate. Earthfill shall not be placed when the moisture content is such that adequate compaction by hauling and compacting equipment cannot be obtained.

9. Construction Details

Inspection. Inspection and approval of the forms and steel placement by NRCS personnel shall be made prior to the placement of concrete. Copies of the concrete delivery tickets shall be furnished to NRCS.

Channel excavation. The channel below each structure shall be shaped with 6:1 or flatter side slopes and a bottom width that is equal to or greater than the upstream structure width. The grade shall be as shown on the drawings.