

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATIONS**

POND (EMBANKMENT)

1. Scope

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

2. Location

The location of the embankment, borrow area, auxiliary spillway, and appurtenant structures shall be as specified on the construction plans or as staked in the field.

3. Site Preparation

Foundation area. The foundation area shall be cleared of all trees, logs, stumps, roots, brush, boulders, sod, and rubbish. Channel banks and breaks shall be sloped no steeper than 1.5 horizontal to 1 vertical (1.5:1) unless otherwise specified. Topsoil containing substantial amounts of organic matter shall be stockpiled for later placement on the dam, spillway, and borrow areas located outside the pool area.

Stream channels in the foundation area shall be deepened and widened as necessary to remove stones, gravel, sand, stumps, roots, mud, or other objectionable material and to accommodate compaction equipment.

The foundation area will be thoroughly scarified to a minimum depth of 4 inches before the fill material is placed and moisture is added, if necessary, so the first layer of fill material can be bonded to the foundation.

Waste material. Waste material from the construction operation such as rocks, frozen soil, mud, stumps, trees, logs, roots, or rubbish shall be disposed of by piling, burying, or burning at locations outside the dam 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.

Cutoff and principal spillway trenches. These trenches shall be excavated to the lines, grades, and widths shown on the construction plans or as staked in the field or as revised by the inspector for depth adjustment during excavation. The trenches shall be kept free of standing water during backfill operations.

Backfill shall be made with selected impervious material approved by the inspector and be placed in the same manner as specified for earthfill.

Auxiliary spillway, inlet channel, and outlet channel. These excavations shall conform to the lines, grades, bottom width, and side slopes shown on the construction plans or as staked in the field.

Borrow. The location, extent, and depth of the borrow area shall be as shown on the construction plans or as staked in the field. The borrow pits shall be stripped of all vegetation and topsoil containing substantial amounts of organic matter. This stripped material will be stockpiled for use to topsoil areas

disturbed by the construction, embankment slopes, auxiliary spillway, and other required topsoil areas (if the percentage of organic materials is not too great).

Borrow pits will be excavated and dressed in a manner to eliminate steep or unstable side slopes or other hazardous conditions. Side slopes shall be no steeper than 3:1. Surfaces of the borrow pits not covered by permanent water shall be graded and shaped to prevent the ponding of water.

5. Principal Spillway

The materials and manufacture of the pipe, anti-seep collars, coupling bands, coatings, and other appurtenances shall be as shown on the construction plans and shall conform to the appropriate material specifications suitable for the intended purpose.

The pipe shall be installed according to the manufacturer's instructions. The pipe shall be laid to the line and grades shown on the construction plans, be placed in original earth or properly compacted earthfill, and be uniformly bedded to the depth and in the manner specified.

OPTION A

Principal spillway (canopy inlet details). The canopy inlet and pipe details shall show the diameter, type, and material of the pipe. The details and the inlet and outlet elevations shall be as shown on the construction plans.

OPTION B

Principal spillway (drop inlet details). The riser and pipe shall be galvanized helical corrugated steel. The steel shall be a minimum of 16 gauge or as shown. The principal spillway riser details shall show the riser diameter and height, steel base size and thickness, and the angle and location of attachment of the 4-foot long barrel pipe and 2-foot long drawdown pipe (if needed). The spillway details and the elevations of the riser inlet, drawdown inlet, and spillway outlet shall be shown on the construction plans.

OPTION A

Drainage diaphragm. The drainage diaphragm shall consist of sand meeting the requirements of American Society for Testing and Materials (ASTM) C 33 for fine aggregate or a special design shown on the construction plans. The location and dimensions shall be as shown on the construction plans or as staked in the field. The drainfill outlet shall be protected from surface erosion.

OPTION B

Anti-seep collars. Anti-seep collars shall be of materials compatible with that of the pipe and shall be installed so that they are watertight. The location, size, and type shall be as shown on the construction plans.

6. Earthfill

Placement of earthfill. The material placed in the fill shall be free of sod, roots, frozen soil, stones over 6 inches in diameter, and other objectionable material. The placing and spreading of fill material shall be started at the lowest point of the foundation and the fill brought up in horizontal layers of such thickness that the required compaction can be obtained. The fill shall be constructed in continuous horizontal layers except where openings or sectionalized fills are called for. In those cases, the slope of the bonding surfaces between embankment in place and embankment to be placed will not be steeper than 3:1. The bonding surface is to be treated the same as that specified for the foundation so as to ensure a good bond with the new fill.

The distribution and gradation of materials shall be such that there are no lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material. Where it is necessary to use materials of varying texture and gradation, the more impervious material shall be placed in the center and upstream portions of the fill. Where zoned fills are specified of substantially differing materials, the zones shall be placed according to lines and grades shown on the construction plans.

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

Stockpiled topsoil strippings will be placed on the outer portion of the embankment as a part of each lift. Topsoil shall not be less than 6 inches or more than 2 feet thick measured vertically and shall be compacted concurrently with the earthfill.

Compaction 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 added and mixed until the requirement is met. Adequate moisture will be maintained in the fill material such that when a ball of material is formed by hand it will easily maintain its shape and act as a uniform pliable mass. Any additional moisture requirements will be as shown on the construction plans or in the Construction Details Section.

Compaction requirements. Compaction will be obtained by the controlled travel of the rubber-tired earthmoving equipment. Fill will be placed in a maximum of 9-inch lifts, and each lift will be completely traversed by the earthmoving equipment or additional compaction equipment. Special equipment will be used when the required compaction cannot be obtained without it.

Hand compaction. Selected impervious backfill material shall be placed around the conduit and appurtenances in layers not more than 4 inches thick before compaction; and each layer shall be thoroughly compacted by hand tamping, manually directed power tampers, or plate vibrators to the density of the surrounding material. 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 any structure.

7. Foundation and Embankment Drains

Foundation and embankment drains, when required, will be placed to the lines and grades as shown on the construction plans. Drainfill shall be kept from being contaminated by adjacent soil materials during placement by either placing it in a cleanly excavated trench or by keeping the drain at least 1 foot above the adjacent earthfill. Gradation requirements for drainfill and filter material and material requirements for pipe will be as shown on the construction plans or as specified in the Construction Details Section.

8. Vegetation

A protective cover of vegetation shall be established on all exposed surfaces of the embankment, spillway, outlet channel, and borrow areas exposed above the permanent waterline. Include details for seedbed preparation, seeding with a drill or broadcast, fertilizing, and a typical seed mix per acre on the construction plans or in the Construction Details Section.

9. Fencing

The embankment and spillway shall be fenced to protect the vegetation, when specified in the Construction Details Section. Fencing shall be as specified in the Construction Details Section.

10. Water Supply Line

A 1½-inch or 2-inch diameter water supply line shall be installed under the dam to provide water to a watering facility for livestock and/or wildlife when included in the design.

Details of the water supply line shall be as shown on the construction plans or as staked in the field.

11. Measurement

Earthfill in dam. The volume of earthfill completed as specified will be determined from the design dimensions as staked in the field.

The design dimensions shall be the measured surface of the foundation prior to stripping and the specified neat lines of the settled fill surface. Volume will be computed to the nearest cubic yard. No reduction in volume will be made for embedded conduits and appurtenances.

Earthfill in cutoff trench. The volume of earthfill will be computed from the measured surface of the foundation prior to stripping and the bottom of the excavated cutoff trench.

Auxiliary spillway, inlet channel, and outlet channel. No volume measurement will be made for these excavations.

Other component parts. Unless otherwise specified in the Construction Details Section, measurement shall be to the units shown in the bid schedule and/or the construction plans.

12. Construction Details