

CONSTRUCTION SPECIFICATION EMBANKMENT POND CODE 378

SCOPE

This item shall consist of clearing, excavation, backfill, concrete, and other appurtenances required for the construction of the embankment and the disposal of all cleared and excavated materials for the water impoundment.

Construction operations shall be carried out in such a manner that erosion, air, water, and noise pollution will be minimized and held within legal limits as established by state regulations.

CLEARING AND GRUBBING

Pond Area. All trees and brush shall be cut as flush with the ground as practicable, and all such trees, brush, logs, and other debris shall be removed from the pond site. Clearing shall be performed around the shoreline as specified.

Spillway and Borrow Areas. On areas from which fill materials are to be obtained, all trees, brush, logs, and other debris larger than 1 inch in diameter shall be removed.

The Embankment Site. All trees, brush, and other debris shall be removed from the area on which fill is to be placed. All stumps and roots one inch in diameter and larger should be removed from the fill site to a depth of 12 inches.

Disposal of Cleared and Grubbed Material. All combustible material cleared and grubbed from the site shall be disposed of by burning / burying at approved locations or by removing from the site. All burning shall conform to state and local laws and regulations. All noncombustible materials cleared and grubbed from these areas shall be removed from the site or buried with a minimum cover of 2 feet. Topsoil, when available, should be stockpiled at a convenient location for use on the embankment, emergency spillway, and other disturbed areas to facilitate establishment of vegetative cover.

FOUNDATION PREPARATION

Surface Treatment. The foundation area shall be cleared of all trees, stumps, roots, brush, boulders, sod, and debris. All channel banks and sharp breaks shall be sloped to no steeper than one horizontal to one vertical (1:1). All material

containing excessive amounts of organic matter shall be removed. The surface of the foundation area will be thoroughly scarified before placement of the embankment material.

Topsoil. Topsoil excavated from the foundation area and from the emergency spillway and borrow areas shall be stockpiled and spread on the dam, auxiliary spillway, and borrow areas to facilitate establishment of vegetation.

EXCAVATION

Excavation and Backfill of Cutoff Trench. The cutoff trench shall be excavated to the depths, bottom width and side slopes (minimum one horizontal to one vertical) shown on the plans. All standing water shall be removed from the trench and it shall be backfilled using thin layers (maximum 8 inches) to the ground surface with suitable material by the same methods herein prescribed for "embankment construction".

Excavation and Backfill of Stream Channels. Existing stream channels crossing the foundation area shall be deepened and widened as necessary to remove all stones, gravel, sand, sediment, stumps, roots, organic matter, and other objectionable material and to accommodate compaction equipment. Side slopes shall be constructed to no steeper than one horizontal to one vertical (1:1). All water shall be removed from the channels and they shall be backfilled in the same manner as prescribed for the cutoff trench.

Spillway and Borrow Excavation. The completed spillway excavation shall conform as nearly to the lines, grades, bottom width, and side slopes shown on the plans as skillful operation of the excavating equipment will permit. The channel bottom shall be constructed transversely level and the side slopes uniform. All borrow areas outside the pool area shall be graded and constructed in such a manner that they are well drained and protected from erosion by the use of diversions or other conservation measures. Side slopes of borrow areas shall be constructed in such condition that establishment of vegetation, mowing, and maintenance operations will be facilitated.

Excavation in borrow areas within the permanent pool area shall be graded in such a manner that they are well drained and will provide the minimum

specified depth of water at the normal water level. When specified, shoreline treatment shall be performed by cut or fill to develop the desired depth of flooded area around the normal pool.

EMBANKMENT CONSTRUCTION

Selecting, Placing, and Spreading of Material. The fill material shall be free of all sod, roots, frozen soil, stones over 6 inches in diameter, and other objectionable material. The placing and spreading of the fill material shall be started at the lowest point of the foundation (cut off trench) and the fill shall be brought up in approximately horizontal layers not exceeding 8 inches in uncompacted thickness. Special attention will be given to compaction in the cutoff trench where it joins the abutment slopes.

These layers shall be of approximately uniform elevation and shall extend over the entire area of the fill placement surface. Each layer shall be thoroughly compacted by at least two complete passes of the construction equipment over the entire surface area of each layer after the layer has been spread to the specified lift thickness. Special compaction equipment shall be used when the required compaction cannot be obtained by routing of the construction equipment.

The distribution and gradation of materials throughout the fill shall be such that there will be no lenses, pockets, streaks, or layers of material differing substantially in texture and gradation from the surrounding material. Where it is necessary to use material of varying texture and gradation, the more impervious material shall be placed in the upstream and center portions of the fill.

Selected drain fill and backfill material shall be placed around structures, pipe conduits, and antiseep collars at about the same rate on all sides to prevent damage from unequal loading.

Moisture Control. The moisture content of the fill material shall be such that the specified compaction can be obtained with the equipment used. The moisture content of the fill shall be maintained within a range to:

1. Prevent the bulking or dilatence of the material under the action of the hauling or compaction equipment.
2. Prevent adherence of the fill material to the equipment.
3. Ensure the crushing and blending of the soil clods and aggregation into a homogeneous mass.

4. Contain adequate moisture so that a sample can be hand molded.

The completed fill shall conform as nearly to the lines and grades, top width and side slopes shown on the plans as skillful operation of the construction equipment will permit.

PIPE CONDUIT INSTALLATION

Pipe conduits must meet the requirements of Table 1 or Table 2 below.

The pipe conduit barrel shall be placed on a firm foundation to the lines and grades shown on the plans. Selected backfill material shall be placed around the barrel and its component parts in layers not exceeding 4 inches in thickness. Each successive layer shall be thoroughly compacted by hand or power tamper. Heavy equipment shall not cross over the pipe conduit until 2 feet of hand compacted material has been placed over the pipe.

Materials. All of the component parts of the principal spillway conduit including the barrel, riser, trash rack or deep water release, anti-seep collars, support posts, braces, and hardware for mounting shall be of the quality specified and constructed as shown on the plans.

Concrete. The work shall consist of furnishing, forming, placing, finishing, and curing Portland cement concrete.

When concrete is used for footings under risers, anti-seep collars, and bedding for reinforced concrete pipe barrels, the mixture shall be not less than five bags per cubic yard of concrete placed. The consistency of the concrete shall be such as to allow the concrete to be worked into place without segregation or excessive laitance.

Table 1.- Acceptable plastic pipe for use in earth dams¹

| Nominal pipe Size (in) | Schedule or standard dimension ratio (SDR) | Maximum depth of fill over pipe (ft) |
|------------------------|--|--------------------------------------|
| 4 or less | Schedule 40 | 15 |
| | Schedule 80 | 20 |
| | SDR 26 | 10 |
| 6.8.10.12 | Schedule 40 | 10 |
| | Schedule 80 | 15 |
| | SDR 26 | 10 |

¹Polyvinyl chloride pipe, PVC 1120 or PVC 1220, conforming to ATSM-D-1785 or ATSM-D-2241.

Table 2. - Minimum gage for corrugated metal pipe [2-2/3-in x 1/2-in corrugations]¹

| Fill Height (ft) | Minimum gauge of steel pipe with diameter (in) of — | | | | | |
|------------------|---|----|----|----|----|----|
| | 21 and less | 24 | 30 | 36 | 42 | 48 |
| 1-15 | 16 | 16 | 16 | 14 | 12 | 10 |
| 15-20 | 16 | 16 | 16 | 14 | 12 | 10 |
| 20-25 | 16 | 16 | 14 | 12 | 10 | 10 |

| Fill Height (ft) | Minimum thickness (in) of aluminum pipe ² with diameter (in) of — | | | |
|------------------|--|-------|-------|--------------------|
| | 21 and less | 24 | 30 | 36 |
| 1 - 15 | 0.06 | 0.06 | 0.075 | 0.075 |
| 15 - 20 | 0.06 | 0.075 | 0.105 | 0.075 |
| 20 – 25 | 0.06 | 0.105 | 0.105 | ----- ³ |

Minimum gauge for steel pipe with diameter (in) of ____

| Diameter (in) | 24 | 24 | 30 | 36 | 42 | 48 |
|------------------------------|----|----|----|----|----|----|
| Steel Pipe Gauge | 24 | 24 | 30 | 36 | 42 | 48 |
| Aluminum Pipe Thickness (in) | 16 | 16 | 16 | 14 | 12 | 10 |
| Aluminum Pipe Thickness (in) | 16 | 16 | 16 | 14 | 12 | 10 |

¹Pipe with 6-, 8-, and 10-in diameters has 1-1/2 in x 1/4-in Corrugations.
²Riveted or helical fabrication.
³Not permitted.