

**NATURAL RESOURCE CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

SUBSURFACE DRAINAGE SYSTEMS

1. SCOPE

The work shall consist of furnishing and installing drain tile or tubing and necessary fittings and appurtenances.

2. MATERIALS

Subsurface drain tile shall meet the requirements of ASTM Specification C-4 (Clay) or C-412 (Concrete). Subsurface polyethylene drain tubing shall meet the requirements of ASTM Specification F-405 (3 to 6 inch) or F-667 (8 to 24 inch).

3. EXCAVATION

Unless otherwise specified, excavation for and subsequent installation of each drain line shall begin at the outlet end and progress upstream.

The trench or excavation for the drain shall be constructed to the depths and cross-sections shown on the drawings. The trench width may be increased above the top of the tile, at the option of the Contractor.

Trench shields, shoring and bracing, or other methods, necessary to safeguard the workers and work, and to prevent damage to the existing improvements shall be furnished, placed and subsequently removed by the Contractor.

4. PREPARING THE TILE BED

In stable soils, the tile or tubing shall be firmly and uniformly bedded throughout its entire length to the specified depth and in the specified manner.

If the bottom of the trench does not provide a sufficiently stable or firm foundation for the drain tile, cradles for the tile (constructed of timber or fabricated lumber of a cleat-and-rail type construction), a sand-gravel mix or other approved materials shall be used to stabilize the bottom of the trench.

Drain tile or tubing shall not be laid on rock foundation. In the event that boulders, rocks or ledge rock or cemented materials that prevent satisfactory bedding are encountered at the required grade, the trench shall be excavated to a depth of at least 6 inches below grade and backfilled to grade with a sand-gravel mixture or other approved material. The bedding material shall be compacted and shaped to grade.

5. PLACEMENT AND JOINT COVERING

All drains shall be laid to grade. Outlet pipe, animal guards and other appurtenances shall be as shown in the drawings.

When using clay or concrete tiles the gap between the tiles shall be maintained at $\frac{1}{8}$ to $\frac{1}{4}$ inches.

The ends and inside surfaces of all tile shall be kept clean during laying. All earth or other extraneous material in the tile shall be removed. At the end of each day's work and when laying has been temporarily suspended, the inlet end shall be blocked so that earth or other extraneous materials will not enter the tile. The upper end of each tile line shall be blocked with permanent type materials on completion of the line.

All water loving trees such willow, elm, soft maple, and cottonwood should be removed for a distance of 100 feet on each side of the drain. A distance of 50 feet should be maintained from other species of trees, shrubs or vines. If the trees can not be removed or the line rerouted, a closed line with sealed joints shall be installed. This type of construction shall extend through out the tree root zone.

After placement of tubing in the trench and after blinding but prior to backfilling, sufficient time shall elapse to allow the tubing to conform to the temperature of the trench. All split fittings shall be securely tied before any backfill is placed.

6. CONNECTIONS

Lateral connections will be made with manufactured junctions comparable in strength with the specified tile or tubing unless otherwise specified.

Where existing drain lines not shown on the drawings are crossed, they shall be bridged across the new trench or they shall be connected into the new drain lines, as directed by the NRCS Engineer or designated representative.

Surface water inlets shall not be connected to the subsurface drain unless shown in the drawings.

7. FILTER OR ENVELOPE MATERIAL

When a filter or envelope is specified, it shall be installed as shown on the drawings. Fabric socks or filters if specified, shall be installed according to the manufacturer's recommendations.

8. BLINDING MATERIAL

As soon as the tile or tubing is placed, it shall be blinded by covering with friable topsoil to a depth of at least 6 inches. Material used for blinding shall not be frozen and shall contain no stones large enough to damage the tile or a specific size if specified. Sandy and other non-cohesive soils shall not be used for blinding unless the joints are covered. All tile or tubing placed during any day shall be blinded by the end of that day's work.

9. BACKFILLING

The backfilling of the trench shall be completed as rapidly as consistent with the soil conditions.

Automatic backfilling machines may be used only when approved by the NRCS Engineer or designated representative. Backfill shall extend above the ground surface and be well rounded over the trench.

Unless otherwise specified, where drain tile or tubing is laid under roads and at other designated locations shown on the drawings, the backfill shall be placed in successive layers of not more than 6 inches and each layer shall be tamped before the next layer is placed.

10. ADDITIONAL ITEMS WHICH APPLY TO THIS JOB