CONSTRUCTION SPECIFICATION

MI-114. 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 or tubing 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 (80 to 150 mm)) or F667 (8 to 24 inch (200 to 610 mm)).

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 workmen 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 (150 mm) 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.

Gaps between tile ordinarily shall be from 1/8 inch (3 mm) to 1/4 inch (6 mm) in clay, clay loam and cohesive soils; and with tight fit in sandy soils and on lines to conduct water but not intended to provide underdrainage.

Where tile is laid with the gaps between tile exceeding the limits stated above in non-cohesive silts, and in fine and medium sands, the joint shall be covered with a permanent type material such as coal tar pitch treated roofing paper, fiber glass sheet or mat, or plastic sheet.

Where the gap between tile on the outer edge of a curved tile line exceeds the recommended gap for the type of soil encountered, it shall be covered with tile bats (broken tile) or covering material as described above. The tile may be chipped and fitted to secure the required joint opening.

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 before laying the next tile. 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.

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 inspector.

7. FILTER OR ENVELOPE MATERIAL
When a filter or envelope is specified, it shall be installed as shown on the drawings.

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 (15 cm). 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 inspector. 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 (150 mm) and each layer shall be tamped before the next layer is placed.