

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATIONS**

UNDERGROUND OUTLET

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 underground outlet works.

2. Location

The location of the underground outlet shall be as shown on the construction plans or as staked in the field.

3. Site Preparation

Vegetation from each side of the conduit line shall be scalped to sufficient depth to ensure the work area and excavated material are essentially free from vegetative matter and trash.

4. Trench Excavation

The trench shall be at least 8 inches wider than the outside diameter of the conduit. The trench shall closely follow the alignment and accurately be on the grade as shown on the drawings. Any part of the trench that is overexcavated below the grade line shall be partially filled with hand-compacted fill and excavated to grade.

The trench around the riser shall be overexcavated a minimum radius of 2 feet from the outside of the riser and around the entire riser. Backfill in the area shall be hand-compacted.

The trench bottom shall be smooth and free of exposed rock. A shaped, circular groove shall be cut in the trench bottom to support the bottom 120 degrees of the conduit. For bedding requirements, refer to Figure S-1, "Pipe installation under the terrace ridge," and Figure S-2, "Pipe installation outside the terrace ridge."

The contractor is responsible for being aware of and following all Occupational Safety and Health Administration (OSHA) rules and regulations concerning trench excavation.

5. Materials

Materials shown on the drawings or otherwise specified to be used in the installation of the inlet, main conduit, outlet, and appurtenant items shall meet the requirements stated herein.

- Smooth wall polyvinyl chloride (PVC) pipe shall be free from defects and be labeled to indicate the type and grade of pipe. The minimum ratio of the outside pipe diameter to the wall thickness--standard dimension ratio (SDR)--shall be that which is shown on the plans. The minimum cover over the top of the pipe shall be that which is shown on the plans.

Joints at fittings and pipe sections shall be gasketed and watertight.

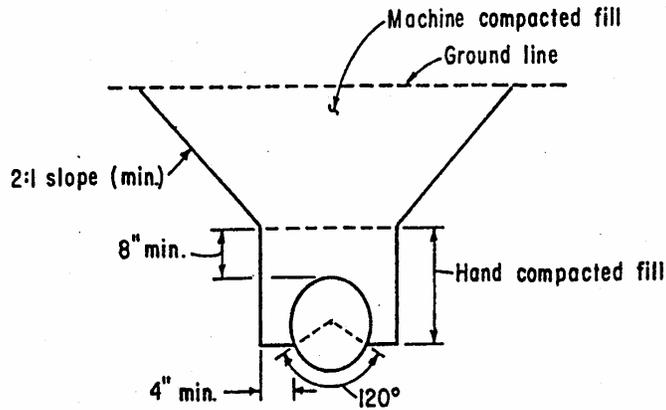


Figure S-1 - Pipe installation under the terrace ridge

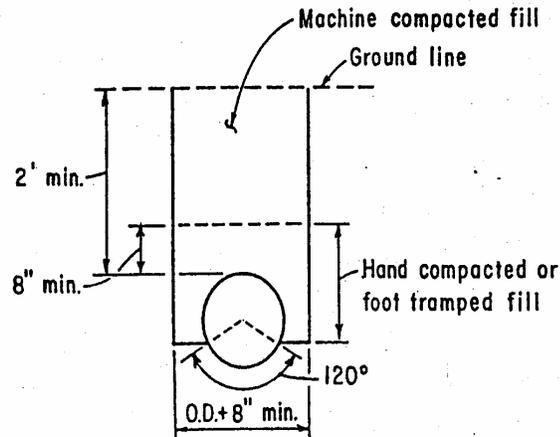


Figure S-2 - Pipe installation outside the terrace ridge

- Corrugated PVC pipe with smooth interior walls fused to the outer wall shall be free from defects and be labeled to indicate the type and grade of pipe. The PVC material shall be simultaneously extruded to form the 2 walls. The minimum cover over the top of the pipe shall be 2 feet.
Joints at fittings and pipe sections shall be gasketed and watertight.
- Smooth wall iron or steel pipe shall be free from pits and flaky rust and be at least 3/16 inch thick. Connections shall be gasketed "Dresser"-type couplings, gasketed flanges, or screw-type couplings. Minimum fill over the top of the pipe shall be 2 feet.

- Corrugated iron or steel pipe shall be galvanized or aluminized, be at least 16 gauge in thickness, and have helical or annular corrugations. Connections shall be gasketed flanges or gasketed connecting bands (either 1- or 2-piece) that are standard with the manufacturer. Minimum fill over the top of the pipe shall be 2 feet.
- Corrugated aluminum pipe shall be at least 16 gauge in thickness. Aluminum pipe shall not be used in soils having a pH greater than 9 or less than 4. Connections shall be gasketed flanges or gasketed connecting bands (either 1- or 2-piece) that are standard with the manufacturer. Minimum fill over the top of the pipe shall be 2 feet.
- Corrugated plastic tubing may be polyethylene (PE) or PVC. The joints at each fitting shall be double-wrapped with polyethylene tape at least 6 mils thick and 2 inches wide. Minimum fill over the top of the pipe shall be 2 feet.
- Orifices may be provided by cutting a smooth, circular hole of the specified diameter into a blind tee connecting the riser to the main conduit. Fabricated orifice plates (from metal or plastic with 1/8 inch minimum thickness) shall fit tightly against the seat to minimize leakage.
- End caps for the perforated plastic risers shall be the manufacturer's standard design and shall fit snugly when installed. End caps for metal risers shall be as shown on the drawings.
- Riser support posts may be wood, metal, or plastic of such proportions to provide a sturdy, rigid support to the riser against the effects of wind and trash accumulations. Posts shall be set in the ground at least 2 feet and be securely wired, strapped, taped, braced, or otherwise fastened to the riser. Posts shall be located at least 4 inches away from the riser pipe to provide for the movement of water into the perforations.

6. Laying Corrugated Plastic Tubing

Tubing with physical imperfections shall not be installed. Care shall be taken to prevent excessive impact or pull on the tubing during installation. The allowable stretch shall not exceed 5 percent of the normal length. When the temperature exceeds 90 degrees Fahrenheit, the tubing shall be allowed to cool in the trench to the soil temperature before backfilling.

7. Backfilling

The trench shall be backfilled as soon as possible after laying the tubing. Backfill material shall be a loose, friable cohesive soil that is free from clods, grass, weeds, straw, or other organic matter. The moisture content at the time of compaction shall be such that, when kneaded in the hand, a ball will form that does not separate readily.

The gradation and approximately the maximum-sized density requirements of the backfill shall be the same as the soil against which it is placed, except the maximum-sized rock shall be 2 inches.

Backfill material shall be worked along the sides of the pipe to provide solid support and watertightness. Under the terrace ridge, the backfill around the pipe shall be hand-compacted to a depth of at least 8 inches above the top of the pipe. Above this point, the walls of the trench shall be shaped to a minimum 2:1 slope, and machine-compacted fill shall be placed to the ground surface.

Outside the terrace ridge, the backfill around the pipe to a depth of at least 8 inches above the top of the pipe may be hand-compacted or firmly tramped by foot. Machine-placed backfill can be used above this point without sloping the trench walls.

Refer to Figures S-1 and S-2 for backfill requirements.

Heavy equipment must not track over the pipe until the specified minimum fill covers the pipe.

8. Site Cleanup

Any scraps or excess material brought to the work site shall be removed. Excess excavated soil and scalped material shall be spread over the work area to fill ruts from machine travel and to blend the surface with the surrounding field. The finished surface shall be smooth enough for travel by farm-type equipment.

9. Construction Details