

SECTION 64

UNDER-DRAINS

64.1 DESCRIPTION

A. General

This work consists of subgrade drainage installations or repair of porous backfill and under-drain pipe or edge drain.

B. Related Work

Section 56 Concrete for Incidental Construction, Class M
~~Section 105 Fine Aggregate for Use in Portland Cement Concrete~~
~~Section 110 Drainage Fabric~~
 Section 112 Select Granular Backfill
 Section 202 Engineering Fabric

64.2 MATERIALS

A. Under-drain ~~Pipe Trench~~ Backfill Material

~~Material placed with filtered or non-filtered corrugated polyethylene drainage tubing used as under drain shall conform to the requirements of Section 105.~~

~~Material placed with filtered or non-filtered prefabricated strip drain, or with filtered or non-filtered perforated or profiled PVC pipe, used as under drain, Under-drain Pipe Trench Backfill Material shall conform to the requirements of Section 112.~~

~~B.B. Under-drain Pipe or Tubing~~ ~~Corrugated Polyethylene Drainage Tubing~~

1. ~~Corrugated Polyethylene Drainage Tubing~~

Corrugated polyethylene drainage tubing, couplings, and fittings shall conform to the requirements of AASHTO M 252, except Section 6.4 is modified as follows:

The length of the individual slots on the four-inch to eight (4 – 8) inches diameter tubing shall not exceed 12 percent of the tubing inside nominal circumference.

Corrugated polyethylene drainage tubing for use as edge drain or subgrade drain shall be a prefabricated system utilizing polyethylene

drainage tubing ~~core wrapped on the outside with engineered drainage fabric~~. It shall be a flexible composite capable of following an ~~irregular trench~~ irregular trench wall.

Corrugated polyethylene pipe, couplings, and fittings shall conform to the requirements of AASHTO M 294.

Drainage tubing used as sub-drains or edge drains shall have cleanouts installed at the upper ends. In lieu of a cleanout, where directed or approved by the Engineer, a penetration into a storm sewer culvert, inlet or pipe will be acceptable. ~~The distance between cleanouts shall not exceed 500 feet.~~

2. Profiled Wall PVC Pipe

~~2.~~In lieu of corrugated polyethylene tubing, a profiled wall PVC pipe may be substituted. PVC and fittings shall meet the physical requirement specified for polyethylene pipe and shall meet the material requirements of ASTM D 3034, ~~except dimensions at time of manufacture.~~

Drainage ~~tubing~~ pipe used as sub-drains or edge drains shall have cleanouts installed at the upper ends. A penetration into a storm sewer culvert, inlet or pipe will be accepted in lieu of a cleanout, where direct by the Engineer. ~~The distance between cleanouts shall not exceed 500 feet.~~

- C. ~~Drainage Fabric Material Engineering Filter Fabric: Filter~~ Drainage fabric material used to prevent soil migration into the under drain, shall conform to Section ~~202440~~.
- D. Concrete, where required, shall conform to the requirements of Class M5, Section 56.
- E. Strip drain ~~can be used~~ used as edge drain or subgrade drain ~~with authorization of the Engineer~~. Strip drain used as edge drain or subgrade drain shall be a prefabricated system utilizing a ¾ in to 1 in thick by 12 in wide plastic double cusped core wrapped on both sides with drainage fabric and having channels capable of accepting drainage water from both sides. It shall be a flexible composite capable of following an irregular trench wall.

64.3 CONSTRUCTION REQUIREMENTS

The trench to receive the under-drain shall be excavated to the lines shown on the plans or as staked by the Engineer. The trench bottom shall be shaped and

tamped as required by the Engineer. Disposal of surplus excavation shall be made by the Contractor and shall be incidental to the under-drain construction.

Prior to placement of Under-drain Trench Backfill Material a layer of drainage fabric material shall be placed in the trench. The material shall be of sufficient width to totally wrap the bottom, sides and top of the Under-drain Pipe Trench Backfill Material and pipe or tubing. There shall be a minimum 12 inch overlap of drainage fabric material over the top of the Under-drain Pipe Trench Backfill Material. Longitudinal sections shall have a minimum 12 inch overlap end to end.

Prior to placement of perforated or corrugated under-drain pipe or tubing, a layer of Under-drain Pipe Trench Backfill Material ~~porous backfill~~ shall be placed to the depth shown on the plans and shaped to receive the pipe or tubing.

Perforated under-drain pipe or tubing shall be laid with the symmetrically placed holes on the lower side. In outlet sections, the pipe or tubing shall be either non-perforated or the symmetrically placed holes shall be on the upper side. The sections shall be well bedded at all points throughout their entire length and securely bolted or banded together.

Under-drain Pipe Trench Backfill Material ~~Under-drain backfill material~~ shall be placed without compaction, in one (1) foot layers. It shall be uniformly spread without segregation or contamination. Tarpaulins or other approved devices shall be used as guides to transport the backfill material from the hauling vehicle to the trench to prevent pulling dirt in with the backfill.

Satisfactory free and unobstructed outlets shall be provided for all drains. Where possible, all outlets shall have a twelve (12) inch free fall and shall be properly marked. ~~and a~~ All outlets to daylight shall be protected with a four-inch by four ~~(4 x 4)~~ inches, six-foot ~~(6-foot)~~ guide post painted with two (2) coats of white paint. Outlets to underground storm sewer shall be sealed to the storm sewer with a concrete grout collar.

Drain installations and waste disposal shall be furnished and left in a neat appearing condition satisfactory to the Engineer.

64.4 METHOD OF MEASUREMENT

A. Under-drain Pipe Trench Backfill Material ~~Under-drain Backfill Material~~

Where a separate bid item for Under-drain Pipe Trench Backfill Material ~~Under-drain backfill~~ is included in the bid proposal, Under-drain Pipe Trench Backfill Material ~~Under-drain backfill~~ will be measured to the nearest one-tenth (0.1) ton utilizing certified weight tickets delivered to the Engineer or his representative within 48 hours of material delivery and placement. Excess material used to fill unauthorized or oversized trench widths or other dimensions will not be measured for payment.

- B. Installed pipe quantities shall be determined by measuring from centerline to centerline of all pipe and fittings. Measurements shall be to the nearest whole foot.
~~B. Under-drain pipe will be measured parallel to the pipe to the nearest one linear foot.~~

64.5 BASIS OF PAYMENT

- A. ~~Under-drain Pipe Trench Backfill Material Under-drain Backfill Material~~

Where a separate bid item for ~~Under-drain Pipe Trench Backfill Material porous backfill~~ is included in the bid proposal, ~~Under-drain Pipe Trench Backfill Material under-drain backfill~~ will be paid for at the contract unit price per ton. Where no such item is included, payment shall be incidental to the under-drain installation.

Payment for this item will include full compensation for furnishing the material, labor, equipment, and incidentals necessary.

- B. Under-drain pipe ~~or tubing~~ will be paid for at the contract unit price per linear foot for the various types and classes of pipe ~~or tubing~~ and shall include pipe ~~or tubing~~, necessary fittings, bands, bolts, wyes, elbows, gratings, lids, covers, guide posts, screens, breathers, excavation, backfilling, ~~drainage fabric material~~, and handling waste disposal.

END OF SECTION