

SECTION S605 - UNDERDRAIN

S605-1 DESCRIPTION

Work consists of installing underdrain pipe and filter material as required in Contract Documents and as directed by Project Manager.

References to NYSDOT specifications are to be in accordance with latest edition of *NYSDOT Standard Specifications (US Customary Units)*.

S605-2 MATERIALS

S605-2.01 Filter Material

Material and gradation tests and quality control methods pertaining to requirements and work of this section will be performed as ordered by Project Manager. Underdrain filter material is to be stockpiled and approved by Project Manager prior to installation.

Underdrain filter material is to consist of crushed stone, sand, gravel or screened gravel, in accordance with following gradation requirements:

Screen Size	Percent Passing by Weight
1 inch	100%
1/2 inch	30 to 100%
1/4 inch	0 to 30%
#10	0 to 10%
#20	0 to 5%

Soundness of materials meeting requirements of NYSDOT Sections 703-02 Coarse Aggregate or 703-10 Lightweight Aggregates, is acceptable for use as underdrain filter material. When electing to use material from sources not approved under NYSDOT Sections 703-02 Coarse Aggregate or 703-10 Lightweight Aggregates, soundness of material is to be tested and is not to have loss exceeding 20 percent by weight after four cycles of Magnesium Sulphate Soundness Test.

Recycled materials, pulverized or recycled portland cement concrete aggregate (RCA) and brick, reclaimed asphalt pavement (RAP), and Corian® are unacceptable for use as filter material, unless specifically authorized in writing by City Engineer.

S605-2.02 Perforated Corrugated Polyethylene Underdrain Tubing

Perforated corrugated polyethylene underdrain tubing and fittings are to be black in accordance with AASHTO M252 Corrugated Polyethylene Drainage Tubing.

Perforated corrugated polyethylene underdrain tubing is to be furnished in straight lengths with minimum nominal length of 20 feet. Coiled pipe may be substituted for straight tubing only in those areas where it would be more appropriate and as approved by Project Manager.

S605-2.03 Perforated Corrugated Steel Underdrain Pipe

Perforated corrugated steel underdrain pipe and fittings are to be 16 gauge Type III in accordance with AASHTO M 36 Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains.

Where bituminous coating is required, pipe and fittings are to be coated in accordance with AASHTO M 190 Bituminous-Coated Corrugated Metal Culvert Pipe and Pipe Arches - Type A Fully Bituminous Coated.

S605-2.04 High-Density Perforated Corrugated Polyethylene Pipe

High-density perforated corrugated polyethylene pipe and fittings is have smooth interior, and is to be in accordance with AASHTO M 252 Corrugated Polyethylene Drainage Pipe Type SP for 4 through 10 inch diameter pipe, and AASHTO M 294 Corrugated Polyethylene Pipe Type SP for 12 inch diameter and larger pipe.

S605-3 CONSTRUCTION DETAILS

S605-3.01 Underdrain Filter Material - General

Where required, underdrain trench is to be encased with geotextile material in accordance with Section S207 Geotextiles.

Underdrain filter material is to be loosely placed around and over underdrain pipe to such depth that, after compaction, underdrain filter material will extend to level 4 inches above underdrain pipe.

For perforated corrugated polyethylene underdrain tubing and high-density perforated corrugated polyethylene pipe, underdrain filter material is to be compacted by three passes of vibrating pad or drum type compactor. For perforated corrugated steel underdrain pipe, underdrain filter material is to be compacted by two passes of vibrating pad or drum type compactor.

In event underdrain pipe is not to be installed, underdrain filter material is to be placed in lifts not exceeding 6 inches in thickness prior to compaction. Each lift is to be compacted by two passes of vibrating pad or drum type compactor.

Placement and compaction operations are to be conducted in manner so as to insure that top surface of each lift does not become contaminated by adjacent backfill materials. Contaminated underdrain filter material is to be replaced.

S605-3.02 Underdrain Filter Material at Structures

Underdrain filter material is to be placed in lifts not exceeding 6 inches in thickness, and is to precede placement of any adjacent backfill material. Temporary barrier may be used between underdrain filter material and adjacent backfill material. Temporary barrier is to be removed prior to compaction.

Each lift of underdrain filter material and adjacent backfill material located within minimum distance of 3 feet from backwall plus footing heel projection of any structure, is to be compacted simultaneously. Each lift is to be compacted by two passes of vibratory compactor.

Placement and compaction operations are to be conducted in manner so as to insure that top surface of each lift does not become contaminated by adjacent backfill materials. Contaminated underdrain filter material is to be replaced.

S605-3.03 Underdrain Tubing/Pipe

Storage and handling of underdrain tubing/pipe is to be in accordance with AASHTO M252 Corrugated Polyethylene Drainage Tubing, and AASHTO M 36 Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains, as appropriate.

Underdrain tubing/pipe is to be installed in accordance with Section R601-3 Construction Details.

Perforated underdrain tubing/pipe is to be placed on level and compacted bed of underdrain filter material. Where proper vertical alignment cannot be maintained, lengths of underdrain tubing/pipe are to be cut and secured with approved couplings. Sections of underdrain tubing/pipe are to be joined only with approved fittings, and are not to be split to make connection. Upgrade end of underdrain tubing/pipe is to be closed with appropriate plug or cap.

Where existing underdrain pipe is being replaced with new underdrain tubing/pipe, remove sufficient length of existing underdrain pipe to accommodate proper installation of new underdrain tubing/pipe. Remaining portion of existing underdrain pipe is to be abandoned by plugging open ends with concrete to minimum depth of 12 inches.

S605-3.04 High-Density Perforated Corrugated Polyethylene Pipe

High-density perforated corrugated polyethylene pipe is to be used in applications where combination underdrain and lateral pipe is required.

Storage and handling of pipe is to be in accordance with AASHTO M 252 Corrugated Polyethylene Drainage Pipe Type SP for 4 through 10 inch diameter pipe, and AASHTO M 294 Corrugated Polyethylene Pipe Type SP for 12 inch diameter and larger pipe.

S605-3.05 Underdrain Tubing/Pipe Connection

Underdrain tubing/pipe connections at catch basin or manhole structures are to be thoroughly sealed with concrete and 100 per cent epoxy grout material.

Openings in concrete structures are to be made by coring.

Openings in brick structures are to be made either by removing existing brick, or by coring.

S605-4 METHOD OF MEASUREMENT

S605-4.01 Underdrain Filter Material

Quantity to be measured for payment will be number of cubic yards of filter material installed.

Measurement for this item will be made only in those areas where filter material is installed without underdrain tubing/pipe.

S605-4.02 Underdrain Tubing/Pipe

Quantity to be measured for payment will be number of linear feet of underdrain tubing/pipe installed.

S605-5 BASIS OF PAYMENT

S605-5.01 General all Items

Unit price bid for all items includes cost of: excavation; pavement saw cutting; and furnishing all labor, material and equipment necessary to complete work.

No payment will be made for any losses of material which may result from compaction, foundation settlement, erosion, or any other causes. Cost of such losses is to be included in unit price bid for these items.

Furnishing and installing geotextile material will be paid for under Section S207 Geotextiles.

Excavation that is included in pay item does not include rock excavation. Rock excavation will be paid for under separate bid item.

S605-5.02 Underdrain Filter Material

Unit price bid also includes cost of: furnishing and placing underdrain filter material, without underdrain pipe.

S605-5.03 Underdrain Tubing/Pipe

Unit price bid also includes cost of: cutting, abandoning, plugging, removing existing underdrain pipe; furnishing and installing underdrain tubing/pipe; furnishing, placing and compacting underdrain filter material; making connection to catch basins, manholes and existing underdrain pipe; enlarging existing openings or making new openings in catch basin or manhole structures for connection of underdrain pipe; sealing connection with concrete and epoxy grout; plugging, capping unconnected ends of underdrain tubing/pipe.

Payment will be made under:

Note: XX in bid item number and X" in item description represent size of underdrain tubing/pipe. i.e.: 6 inch underdrain tubing would be bid as S605.140106 X" Perforated Corrugated Polyethylene Underdrain Tubing.

ITEM NO.	ITEM	PAY UNIT
S605.13	Underdrain Filter Material	Cubic Yard
S605.1401XX	X" Perforated Corrugated Polyethylene Underdrain Tubing	Linear Foot
S605.15XX	X" Perforated Corrugated Steel Underdrain Pipe - Uncoated	Linear Foot
S605.16XX	X" Perforated Corrugated Steel Underdrain Pipe - Coated	Linear Foot
S605.1701XX	X" High Density Perforated Corrugated Polyethylene Pipe	Linear Foot