## SECTION 288
## CEMENT TREATED PERMEABLE BASE

**288-1 Description.**

**288-1.1 General:** Construct Cement Treated Permeable Base and Outlet Pipe as shown in the Plans and Design Standards, Index No. 287. Use any one of the types of pipe listed in 288-2, unless a particular type is specifically required by the Contract Documents. Use only perforated pipe, and do not use open joints.

**288-1.2 Concrete Plant and Cement Concrete pavement:** Meet the requirements of Section 346 for plant and equipment, and Section 350 for general construction requirements.

Work will be accepted in accordance with the applicable provisions in Section 350.

**288-2 Materials.**

Meet the following requirements:

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| Coarse Aggregate | Section 901 |
| Portland Cement | Section 921 |
| Water | Section 923 |
| Polyvinyl-Chloride Pipe | Section 948 |
| Polyethylene Pipe | Section 948 |
| Geotextile Fabric | Section 985 |

For Cement Treated Permeable Base, the concrete requirements of Section 346 are modified as follows:

Use Type I or II portland cement (no fly ash or other pozzolans permitted).

Composition:

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| Grade of coarse aggregate (stone) | # 57 or # 67 |
| Maximum Water/Cement ratio* | 0.40 |
| Minimum cement factor** | 9 lb/ft$^3$ |
| Maximum Slump Range | Not Applicable |
| Fine Aggregate | None |
| Admixtures | None |

*The Engineer will approve the Water/Cement ratio.

**±2 lbs/ft$^3$

Do not use materials which contain hardened lumps, crusts, or frozen matter, or are contaminated with dissimilar material.

**288-3 Control of Quality.**

**288-3.1 General:** Meet the provisions of this Section and Chapter 9.2 of the Materials Manual - Concrete Production Facilities Guidelines, which may be view at the following URL: http://www.dot.state.fl.us/programmanagement/Implemented/URLinSpecs/files/section92.pdf .

**288-3.2 Concrete Design Mix:** Submit the proposed design mix prior to production, on the "Concrete Mix Design" form, for the Engineer's approval. Use only Cement Treated Permeable Base design mixes having prior approval of the Engineer.

Furnish sufficient material of each component when requested by the Engineer, for verification of the proposed mix design by the State Materials Office. Verify the unit weight

requirements as determined in accordance with FM 5-530. Also, provide one of the following with the design mix submittal:

1. Evidence from three sets of production data, either from Department acceptance tests or independently verifiable commercial mixes, that Cement Treated Permeable Base produced in accordance with the proposed design mix meets the requirements of this Section.

2. Test data from a single trial batch of a 1 $yd^3$ minimum is required, which demonstrates that the Cement Treated Permeable Base produced using the proposed mix, designated ingredients, and designated water-cement ratio meets the requirements of this Section.

**288-3.3 Batch Adjustment - Materials:** Meet the theoretical yield requirements of the approved mix design. Inform the Engineer of any adjustments to the approved mix design. Note any batch adjustments and record the actual quantities incorporated into the mix, on the concrete "Delivery Ticket/Certification" form.

**288-3.4 Delivery Certification:** Furnish to the Engineer a complete "Delivery Ticket/Certification" form with each batch of Cement Treated Permeable Base prior to unloading at the site.

**288-4 Acceptance of Placement.**

Acceptance of the Contractor's method of placement and compaction will be based upon the completion of a 500 foot test section, acceptable to the Engineer, prior to further placement.

For the purpose of acceptance and partial payment, each days production will be divided into LOTs as specified in Section 346 and in accordance with the applicable requirements of Sections 5, 6, and 9.

**288-5 Temperature Requirements.**

Place Cement Treated Permeable Base only when the atmospheric temperature is above 40°F and rising.

**288-6 Construction Requirements.**

**288-6.1 Placement:** Ensure that the structural course on which Cement Treated Permeable Base is to be placed conforms to the compaction and elevation tolerances specified in the Plans and is free of loose or extraneous material. Fill any area of the structural course which is lower than the grade established by the Plans with structural course material, at no additional cost to the Department.

Place and compact Cement Treated Permeable Base in one course (except the trench which includes the subdrainage pipe), in accordance with these Specifications, lines, grades, dimensions and notes as shown in the Plans. Placement may be accomplished by either the fixed-form or the slip-form method.

Place and compact Cement Treated Permeable Base material around the subdrainage pipe for the full width of the trench, in layers not exceeding 8 inches (loose measure). Do not displace or damage the subdrainage pipe or filter fabric.

Remove and replace all Cement Treated Permeable Base material which is greater than 1/2 inch below the grade shown in the Plans or is not covered with the next layer of material

within five calendar days after initial placement or in the opinion of the Engineer is damaged or contaminated, at no additional cost to the Department.

**288-6.2 Compaction:** Compact the Cement Treated Permeable Base by one of the following methods.

1. One complete coverages with a steel-wheeled, two-axle tandem roller weighing between 4 and 10 tons in static mode.
2. By vibratory plates or screeds.

There will be no density requirements for Cement Treated Permeable Base.

**288-6.3 Curing:** Sprinkle the Cement Treated Permeable Base surface with a fine spray of water every two hours for a period of eight hours or cover with polyethylene sheets for three or four calendar days.

Begin the curing process the morning after placement of the base.

**288-6.4 Surface Requirements:** Ensure that the finished surface of the Cement Treated Permeable Base does not vary more than ±1/2 inch from the grade shown in the Plans.

The Engineer may approve removal of high spots to within the specified tolerance by a method which does not produce contaminating fines. Remove and replace Cement Treated Permeable Base material that is above tolerance, at no additional cost to the Department. Neither grinding nor milling will be permitted.

**288-7 Sampling and Testing.**

The Engineer will take random samples of the Cement Treated Permeable Base at the point of placement in accordance with FM 5-530 to determine the unit weight. Cement Treated Permeable Base not within ± 3 lbs/ft$^3$of the unit weight of the approved mix design will be rejected.

Remove and replace all rejected Cement Treated Permeable Base at no cost to the Department.

**288-8 Subdrainage Pipe and Geotextile Material.**

Place the subdrainage pipe and geotextile material (filter fabric) in accordance with the Plans and Design Standards, Index No 287.

**288-9 Outlet Pipe.**

Install outlet fittings and pipes concurrent with subdrainage pipe to provide positive gravity drainage and eliminate soil intrusion. The Engineer will restrict installation of additional sections of Cement Treated Permeable Base, until appropriate outlets are installed.

Ensure that all fittings and materials are designed and installed to eliminate soil intrusion into the system.

Connect the open end of the outlet pipe into either an existing drainage structure, existing ditch pavement or terminate with a concrete apron.

Do not block the drainage system at any time. Ensure that at the time of inspection and project acceptance, all outlet pipes and concrete aprons are clear of earth material, vegetation, and other debris.

**288-10 Method of Measurement.**

**288-10.1 Cement Treated Permeable Base:** The quantity of cement treated permeable base to be paid for will be the plan quantity, in cubic yards, completed and accepted, subject to 9-3.2.

**288-10.2 Outlet Pipe:** The quantity of outlet pipe to be paid for will be the length, in feet, completed and accepted, measured in place along the centerline and gradient of the outlet pipe.

**288-11 Basis of Payment.**

**288-11.1 Cement Treated Permeable Base:** Price and payment will be full compensation for work specified in this Section, including furnishing all labor, materials (including the cement treated permeable base material, geotextile, and subdrainage pipe), tools, equipment, and incidentals, necessary to complete the work.

**288-11.2 Outlet Pipe:** Price and payment will be full compensation for work specified in this Section, including removal of existing shoulder pavement, trench excavation, pipe and fittings, standard aprons, galvanized hardware cloth (rodent screens), grouting around and stubbing into existing or proposed inlets and drainage structures or paved ditches; restoration of ditch pavement and other areas disturbed by the Contractor, backfill in place, and disposal of excess materials and incidentals, necessary to complete the work.

Payment will be made under:

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| Item No. 288- 1- | Cement Treated Permeable Base - per cubic yard. |
| Item No. 446- 71-1- | Edgedrain Outlet Pipe - per foot. |