

SECTION 32 14 43  
POROUS UNIT PAVING

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## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Permeable Articulating Concrete Block (P-ACB)
  - 2. Open-graded Aggregate Sub Base
  - 3. Rubber End Cap
  - 4. Geotextiles
- B. Related Sections:
  - 1. Section 31 22 00 – Grading
  - 2. Section 31 23 00 – Excavation and Fill
  - 3. Section 31 32 00 – Soil Stabilization
  - 4. Section 31 34 00 – Soil Reinforcement

## 1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM C 33 – Standard Specification for Concrete Aggregates
  - 2. ASTM D 75 – Standard Practice for Sampling Aggregates
  - 3. ASTM C 136 – Standard Test Method for Sieve Analysis for Fine and Coarse Aggregate
  - 4. ASTM C 140 – Methods of Sampling and Testing Concrete Masonry and Related Units
  - 5. ASTM C 150 – Standard Specification for Portland Cement
  - 6. ASTM D 448 – Standard Classification for Sizes of Aggregate for Road and Bridge Construction
  - 7. ASTM C 618 – Standard Specification for Coal Fly Ash for Use in Concrete
  - 8. ASTM D 1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
  - 9. ASTM C 1701 – Standard Test Method for Infiltration Rate of In Place Pervious Concrete
  - 10. ASTM D 6684 – Standard Specification for Materials and Manufacture of Articulating Concrete Block (ACB)
- B. American Association of State Highway and Transportation Office (AASHTO)
  - 1. HS20/H20 – Highway Truck Load Rating

## 1.3 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment, and incidentals required per Manufacturer's Installation Instructions.
- B. The Contractor shall perform all operations in connection with the installation of

the P-ACB's in accordance with the aggregates, grades, design and dimensions shown on the Contract Documents and Manufacturer's Installation Instructions.

#### 1.4 SUBMITTALS

- A. Refer to Section 01 33 00 – Submittal Procedures
- B. Shop Drawings: Submit design details and cross-sections as per Contract Documents.
- C. Samples: Submit one (1) full-sized P-ACB sample representative of color(s) selected on within this specification or noted on Construction Documents
- D. Geotextile: Submit product data sheet(s) for geotextile(s) proposed for use by engineer of record.
- E. Installation Instructions: Manufacturer's printed installation instructions
- F. Certification of Compliance
  - 1. Test Reports – Indicate compliance with requirements of Contract Documents including:
    - a. P-ACB unit compressive strength, moisture content and density on like units, tested in accordance to ASTM C 140 by independent laboratory.
    - b. Sieve analysis of all aggregate grades indicated in Contract Documents, sampled according to ASTM D 75 and tested in accordance to ASTM C 136.
    - c. Specified standard sizes of coarse aggregates shall comply with sizes given in accordance to ASTM D 448, Table 1.
  - 2. Performance Compliance – Indicate compliance with requirements of Contract Documents including:
    - a. **Infiltration Performance** – Submit independent laboratory test report indicating in-place infiltration performance of at least two thousand (2,000) inches per hour (in/hr). Test shall be performed in accordance to ASTC C 1701 and based on an outdoor working surface with typical base material and installation.
    - b. **Structural Performance** - Design of the P-ACB shall be capable of supporting AASHTO HS-20 and H-20 truck loading with proper subgrade and base installation. The P-ACB's shall be analyzed as unreinforced concrete arches supporting a uniform truck tire load with impact per AASHTO standards as tested by an independent laboratory.
- F. Substitutions
  - 1. No material shall be considered as an equivalent to the P-ACB unit specified herein unless it meets all areas of this specification without exception.
  - 2. Manufacturers requesting to submit materials as equivalent must provide records, data, independent laboratory test results, samples, certifications, and documentation meeting all areas of this specification without exception. Any requests must be submitted 15 days prior to bid date.

## 1.5 SCHEDULING

- A. Contractor shall contact P-ACB manufacturer to determine necessary lead time to produce unit material order.
- B. Schedule manufacture and delivery of P-ACB units to coincide with construction schedule to prevent storage for extended periods.

## 1.6 DELIVER, STORAGE AND HANDLING

- A. P-ACB units must be delivered on wooden pallets.
- B. Evaluate P-ACB units for acceptance based on the requirements in accordance to ASTM D 6684.
- C. All P-ACB units shall be sound and free of defects that would interfere with proper placement or that would impair the strength or longevity of the installation.
- D. Minor cracks incidental to the usual method of manufacture; or chipping that results from customary methods of handling in shipping, delivery and placement shall not be deemed grounds for rejection.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURED PERMEABLE ARTICULATING CONCRETE BLOCKS (P-ACB)

- A. PaveDrain® P-ACB
  1. Color(s): [            ] [            ] [            ]
  2. Class: S6-45
  3. Type: Closed cell manufactured with an arched storage chamber for additional stormwater storage as shown in Contract Documents.
  4. Compressive Strength: (Tested in accordance to ASTM C 140)
    - a. Average of three units: 4,000 lb/in<sup>2</sup> minimum
    - b. Individual units: 3,500 lb/in<sup>2</sup> minimum
  5. Water Absorption: (Tested in accordance to ASTM C 140)
    - a. Average of three units: Maximum 9.1 lb/ft<sup>3</sup>
    - b. Individual units: Maximum 11.7 lb/ft<sup>3</sup>
  6. Density (in air): (Tested in accordance to ASTM C 140)
    - a. Average of three units: 130 lb/ft<sup>3</sup> minimum
    - b. Individual unit: 125 lb/ft<sup>3</sup> minimum
  7. Dimensional Tolerances: Overall dimensions for width, height and length shall not differ by more than +/- 1/8 inch, in accordance to ASTM D 6684, Section 5.3.2.
- B. Acceptable manufacturers:
  1. PaveDrain, LLC  
Contact: 888-575-5339 or info@pavedrain.com

2. TITAN BLOCK (a Titan America Company)  
Contact: **Greg Strickland 561-291-3459**, GStrickland@titanamerica.com  
or www.titanamerica.com (866-421-7088)

## 2.2 AGGREGATE MATERIALS

- A. Open-Graded Coarse Aggregate: Select coarse aggregate shall be clean material free from organic materials. Select coarse aggregate shall meet the gradations that are listed in Table 1 of ASTM D 448 and based on sieve analysis in accordance to ASTM C 136. Recycled aggregate material is NOT allowed.
  1. Base Course Aggregate: ASTM Grade #57. #57 stone shall be used as the finish (top) layer of stone directly underneath the PaveDrain units.
  2. Secondary Sub-base Aggregate: ASTM Grade #2 or #4. If determined by engineer of record, thickness as indicated by cross-sections on the Contract Documents.

## 2.3 TRANSITION AND EDGE RETRAINTS

- A. Transition Rubber End Cap: PaveDrain® End Caps manufactured from 100% recycled rubber tires.
- B. Edge Restraint: Type and dimensions shall be indicated by engineer of record as per Contract Documents.

## 2.4 GEOTEXTILE MATERIALS

- A. Geotextile: High strength, high water flow, woven monofilament geosynthetic as specified by engineer of record based on native soil properties.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. The contractor shall verify that the subgrade has been excavated, shaped and compacted in accordance to Sections 31 23 00 & 31 22 00 and conforms to the lines, grades and cross-sections shown on Contract Documents.
- B. Verify that native subgrade has been compacted to a minimum of 92% Modified Proctor in accordance to ASTM D 1557. Do not over over-compact or rut native subgrade.
- C. Unsatisfactory conditions shall be corrected prior to installation of sub-base work.

### 3.2 GEOTEXTILE INSTALLATION

- A. The contractor shall place geotextile flat on subgrade and vertical sections of base aggregate free of wrinkles and overlapping a minimum of twelve (12) inches.

### 3.1 AGGREGATE SUB BASE INSTALLATION

- A. The thickness of the sub-base and requirement of multiple gradations of open-graded coarse aggregate, intermediate geosynthetic shall be indicated by the engineer of record and detailed on the Contract Documents. The minimum thickness of open-graded coarse aggregate is six (6) inches.

- B. The contractor shall install and compact, with a vibratory plate compactor, open-graded coarse aggregate over the geotextile in maximum lifts of six (6) inches. Open-graded coarse base aggregate installation shall not damage or dislodge the geotextile.
- C. Open-graded coarse aggregate sub-base shall be inspected by engineer of record or owners' representative prior to P-ACB placement. Finished grade shall conform to the lines, grades and cross-sections shown on Contract Documents.

### 3.2 PAVEDRAIN® PERMEABLE ARTICULATING CONCRETE BLOCK INSTALLATION

#### A. PLACING PAVEDRAIN® UNITS

- 1. The contractor shall determine the best starting point of the PaveDrain® unit installation to conform to the lines, grades and elevations shown on the Contract Documents.
- 2. Place PaveDrain® units in running bond pattern such that one unit is directly in contact with one half of the two adjacent units. Place units in such a manner as to ensure that the pattern remains square to curbs or adjacent pavements.
- 3. Verify that each PaveDrain® unit makes contact with the open-graded aggregate sub-base and is properly engaged with adjacent units.
- 4. When necessary, make partial units from saw cutting solid, arch-less PaveDrain® units. Transitions against curbs and other pavements should be made with maximum one-half (1/2) inch gaps.

#### B. ADJUSTMENTS

- 1. Minor adjustments to properly engage PaveDrain® units shall be made with a dead blow hammer or rubber mallet.
- 2. Once all PaveDrain® units have been installed, minor differential heights between units can be corrected with a vibratory plate compactor. Protect units with non-woven geotextile to eliminate scuffing.
- 3. Inspect completed installation and replace any cracked or damaged units.

### 3.3 TOLERANCES

- A. No individual PaveDrain unit shall protrude more than one-quarter (1/4) inch within the plane of placed units.
- B. No gap between the individual PaveDrain units shall exceed one-half (1/2) inch.

### 3.4 FINISHING

- A. The joints between the PaveDrain® units **DO NOT** require backfilling with smaller aggregate joint material or sand. **The joints are designed to be left open.**

END OF SECTION 04 22 23