



STORM WATER RETENTION PAVING SYSTEM - AQUAARCH®

PART 1: GENERAL

A. Scope of Work

The contractor shall furnish all labor, materials, equipment, and incidentals required and perform all operations in connection with the installation of the concrete paving units in accordance with the lines, grades, design and dimensions shown on the Contract Drawings and as specified herein.

B. Submittal

The Contractor shall submit to the Engineer all manufacturers' performance testing and calculations in support of the proposed concrete paving units.

The Contractor shall furnish the manufacturer's certificates of compliance for concrete paving units. The Contractor shall also furnish the manufacturer's specifications, literature, shop drawings for the layout of the blocks, and any recommendations, if applicable, that are specifically related to the project.

Alternative materials may be considered. Such materials must be pre-approved in writing by the Engineer prior to bid date. Alternative material packages must be submitted to the Engineer a minimum of fifteen (15) days prior to bid date. Submittal packages must include, as a minimum, the following:

1. Full-scale laboratory testing performed by the submitting manufacturer and associated engineered calculations quantifying the infiltration capacity and structural strength of the proposed concrete paving units in similar conditions to the specific project.
2. ASSHTO loading analysis for H-20, HS-20, HS-25 certification.

PART 2: PRODUCT

A. Concrete Paving Units

1. Scope

- 1.1 This specification covers AquaArch® concrete paving units used for storm water capture and retention.

Note 1 - Concrete units covered by this specification are made from lightweight or normal weight aggregates, or both.

Note 2 - The values stated in U.S. customary units are to be regarded as the standard.

2. Materials

2.1 Cementitious Materials - Materials shall conform to the following applicable ASTM specifications:

2.1.1 Portland Cements - Specification C 150, for Portland Cement.

2.1.2 Blended Cements - Specification C 595, for Blended Hydraulic Cements.

2.1.3 Hydrated Lime Types - Specification C 207, for Hydrated Lime Types.

2.1.4 Pozzolans - Specification C 618, for Fly Ash and Raw or Calcined Natural Pozzolans for use in Portland Cement Concrete.

2.2 Aggregates shall conform to the following ASTM specifications, except that grading requirements shall not necessarily apply:

2.2.1 Normal Weight - Specification C 33, for Concrete Aggregates.

3. Casting

3.1 The concrete units shall be produced by a dry cast method. The dry cast units obtain strength in a shorter duration as well as an increase in the durability and overall quality of product.

4. Physical Requirements

4.1 At the time of delivery to the work site, the units shall conform to the physical requirements prescribed in Table 2 listed below.

TABLE 2. PHYSICAL REQUIREMENTS

Compressive Strength Net Area Min. p.s.i (mPa)		Water Absorption Max. lb/ft³ (kg/m³)	
Avg. of 3 units	Individual Unit	Avg. of 3 units	Individual Unit
4,000 (27.6)	3,500 (24.1)	9.1 (160)	11.7 (192)

4.2 Units will be sampled and tested in accordance with *ASTM C140/C140M Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units*.

5. Visual Inspection

5.1 All units shall be sound and free of defects that would interfere with either the proper placement of the unit or impair the performance of the system. Surface cracks incidental to the usual methods of manufacture, or surface chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection.

5.2 Cracks exceeding 0.25 inches (.635 cm) in width and/or 1.0 inch (2.54 cm) in depth shall be deemed grounds for rejection.

5.3 Chipping resulting in a weight loss exceeding 10% of the average weight of a concrete unit shall be deemed grounds for rejection.

5.4 Blocks rejected prior to delivery from the point of manufacture shall be replaced at the manufacturer's expense. Blocks rejected at the job site shall be replaced at the expense of the contractor.

6. Sampling and Testing

6.1 The purchaser or their authorized representative shall be accorded proper access to facilities to inspect and sample the units at the place of manufacture from lots ready for delivery.

6.2 Infiltration performance shall be performed by third party laboratory tests in accordance with ASTM C1781.

6.3 Structural performance shall be calculated by a third party structural engineer to ensure that the concrete paving units are capable of supporting AASHTO H-20, HS-20, and HS-25 truck loading.

Manufacturer

Concrete paving units shall be AquArch[®] as manufactured and sold by:

Premier Concrete Products, Inc.

www.premier-concrete.com

38200 LA-16

Denham Springs, LA 70706

Phone: 225-667-4545

Fax: 225-661-7424

The AquaArch[®] concrete paving units shall have the following nominal characteristics:

TABLE 2. STANDARD SIZES OF AquaArch[®] CONCRET PAVING UNITS

Block Size	Dimensions	Unit Weight	Coverage Area	Arch Storage Capacity per Sqft.
Inches	Inches	Lbs.	Sqft./unit	Ft³/Ft²
8"	8"x8"x6"	23	.444	.0993
12"	8"x12"x6"	33	.667	.0951

*Block height may vary based on local manufacture's capabilities.

**Block weight may vary based upon the specific gravity of local available aggregate material

B. Filter Fabric

The geotextile filter shall meet the minimum physical requirements listed in Table No. 3 of these Specifications. Consultation with the manufacturer is recommended.

The geotextile must be permitted to function properly by allowing relief of hydrostatic pressure; therefore, fine soil particles shall not be allowed to clog the filter fabric.

The geotextile fiber shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of propylene, ethylene, ester, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic, if necessary, to make the filaments resistant to deterioration due to ultraviolet and heat exposure. The edges of the geotextile shall be finished to prevent the outer fiber from pulling away from the geotextile.

The Contractor shall furnish the Engineer, in duplicate, manufacturer's certified test results showing actual test values obtained when the physical properties are tested for compliance with the specifications.

During all periods of shipment and storage, the filter fabric shall be protected from direct sunlight, ultraviolet rays and temperatures greater than 140 degrees Fahrenheit. To the extent possible, the fabric shall be maintained wrapped in its protective covering. The geotextile shall not be exposed to sunlight, ultraviolet rays until the installation process begins.

TABLE 3. PHYSICAL REQUIREMENTS

Physical Property	Test Procedure	Minimum Value
Grab Tensile Strength (Unaged Geotextile)	ASTM D4632	200 Lbs. (in any principal direction)
Breaking Elongation (Unaged Geotextile)	ASTM D4632	50% max. (in any principal direction)
Burst Strength	ASTM D3786	400 p.s.i

Puncture Strength	ASTM D4833	115 lbs.
A.O.S., U.S. Std. Sieve	ASTM D4751	see Design Manual
% Open Area	CWO-22125-86	See Design Manual
Permittivity	ASTM D4491	See Design Manual

Final acceptance of the filtration geotextile by the Engineer based on project specific soil information.

At the time of installation, the filter fabric shall be rejected if it has been removed from its protective cover for over 72 hours or has defects, tears, punctures, flow deterioration, or damage incurred during manufacture, transportation or storage. With the acceptance of the Engineer, placing a filter fabric patch over the damaged area prior to placing the mats shall repair a torn or punctured section of fabric. The patch shall be large enough to overlap a minimum of three (3) feet in all directions.

C. Geogrid

The geogrid shall be installed in between the finished rock layer and the AquaArch[®] concrete paving units. Recommended geogrid is a Tensar triax or approved equal.

PART 3: FOUNDATION PREPARATION, GEOTEXTILE AND AQUAARCH PLACEMENT

- A. **General.** It is the contractor's duty to ensure that the subgrade has been excavated and shaped according to project drawings. All subgrade preparation including compaction and stabilization should be performed in accordance with *ASTM D1557*.
- B. **Geotextile Fabric.** The filtration geotextile will be placed directly on the prepared area, in intimate contact with the subgrade, and free of folds or wrinkles. The geotextile filter fabric will be placed so that the upstream strip of fabric overlaps the downstream strip. The longitudinal and transverse joints will be overlapped at least two (2) feet.
- C. **Aggregate subbase.** The thickness of the aggregate subbase shall be determined by the EOR and based on the required storm water runoff for each specific project. It is the manufacturers recommendation that a minimum thickness of six (6) inches of ASTM grade #57 aggregate be used.

All aggregate subbases shall be compacted prior to placement of the AquaArch[®] concrete paver units using a vibratory plate compactor. The finished grade shall be a smooth surface that follows the grades and cross-sections of the contract drawings.

- D. **Hand placing AquaArch[®].** It is the contractor's responsibility to determine the appropriate starting location for the placing the AquaArch[®] units. The AquaArch[®] units shall be placed in the manner shown in the contract drawings or AquaArch[®] layout sheet. All units should be place so that they are touching the blocks most adjacent and can be placed in a straight line or staggered configuration.

No backfilling of aggregate or soil between AquaArch[®] units shall occur as the pavers are designed with that open area to allow for water infiltration down into the aggregate subbase.

Blocks may be cut onsite to ensure a proper fit to curbs or other structures.

- E. Inspection.** Immediately prior to placing the AquaArch[®] units, the prepared subbase shall be inspected by the Engineer as well as the owner's representative. The surface should be smooth and conform the lines and grades shown on the contract drawings.
- F. Consultation.** The manufacturer of the AquaArch[®] will provide design and construction advice during the design and initial installation phases of the project as necessary, by the discretion of the Engineer.