



SPECIFICATIONS

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retain-it ®

Specifications

Storm Water Management Systems

Detention, Retention and Infiltration Systems

Structures

- All precast concrete structures and components shall be manufactured in accordance with the approved design shop drawings.
- Contractor shall supply shop drawings for review and approval prior to installation. Drawings shall include dimensions, elevations and configuration of the system, including any internal flow controls; attenuation channels, weirs, baffles, orifices and overflow devices. They shall also include inlet splash pads, sumps and outlet control structures. The drawings shall identify and detail all roof access openings and inlet/outlet pipe openings.

Precast Concrete

- Precast concrete shall be manufactured by a NPCA certified plant.
- Precast vendor shall submit structural calculations prepared by a licensed Professional Engineer licensed in the state of installation.
- Precast concrete shall be a minimum of 5000psi @ 28 days.
- Reinforcing shall conform to latest ASTM A615.
- Design shall conform to H-20 Loading conditions per AASHTO HS-20-44.
- Precast vendor shall supply sufficient lifting devices cast into the structures capable of supporting structure.

Structural Design

- Soil strength shall be verified to be a minimum of 3000 psf soil bearing capacity. Soil density is assumed to be 120 PCF.
- Subgrade soils shall be compacted to a 95% density.
- Water table level shall be verified to be below the system structural section for structural and buoyancy conditions. If ground water elevation is higher than the structure base, buoyancy calculations shall be submitted.

- Structural buoyancy calculations shall assume the concrete density to be 150 psi. Soils above units (structural column) can be considered in the calculations assuming soil density to 120 psi. The effects of sidewall friction shall not be used in calculation.

Installation

- retain-it[®] installation shall be in accordance with the approved engineering drawings, specifications and calculations. Location, dimensions, elevations, pipe sizes and access manholes shall be per plan.
- Contractor shall obtain and be familiar with product installation guide.
- Contractor shall excavate the installation area to the specified subgrade elevation. Subgrade soils shall be graded to a consistent level bed, free from deleterious materials such as organics, trash and debris. Subgrades shall be compacted to a 95% density.
- For detention/retention systems, contractor shall place a waterproof membrane (PPL-24, 24mil containment membrane supplied by Carthage Mills, or approved equal) sandwiched between fabric pads (803 PROPEX 801 non-woven geotextile by Carthage Mills or approved equal) over complete base and sides of the excavation walls. Membrane / fabric pads shall be wrapped so as to contain the required crushed stone base section specified and to isolate the exterior perimeter of the structures from the native material backfill. Fabric shall be wrapped over the top of the retain-it[®] structures a minimum of 4'. Fabric shall be installed in such fashion so as to create a waterproof wrap whereas the corner folds overlap and are folding into an upward position to prevent water from entering. ConSeal CS-212 "ribbon tape" may be used to adhere and keep membrane/fabric materials in place during excavation and backfill operations.
- A minimum of 6" of $\frac{3}{4}$ "+ crushed stone base placed in a 95% compacted level grade shall be installed on top of the filter fabric in the bottom of the excavation.
- Precast concrete (or cast in place) inlet splash pads shall be installed to the specified grade and locations per plan.
- retain-it[®] structures shall be installed in a level and plumb fashion so as to minimize the gap between structures to no more than an average of $\frac{1}{4}$ " and no greater than $\frac{1}{2}$ " gap. Unless noted, all structure bottom and top elevations shall be equal to within $\frac{1}{2}$ ".
- Exterior top joints shall be sealed with ConSeal CS-212 (.065 thick x 6" wide) "ribbon tape", or approved equal. "Ribbon tape" shall be applied to a clean dry surface that may require surface preparation to apply per the manufactures

recommendations. "Ribbon tape" shall be applied in a continuous length; although when required, a minimum of a 12" overlay can be utilized.

- All pipe inverts shall be installed per specified elevation. Installation of the inlet/outlet pipes with a membrane system shall incorporate a watertight rubber boot and flange gasket kit supplied by the vendor. The rubber boot shall be installed inside the pipe hole cut into the structure wall. Hole shall be clean and smooth and free of loose or foreign material. The rubber boot should fit tightly and snug against the receiving concrete wall section. The internal metal expansion ring should be tightened to the manufactures recommended torque. The pipe should be slipped into the rubber boot and the external metal pipe clamp should be tightened down to the manufactures recommended torque. When using corrugated pipe, a pipe adapter may be supplied by the pipe vendor to fill the cavity and produce a flat surface to connect the pipe boot to. Those materials may be a Conseal CS-102 "rope tar" or ConSeal CS- 212 "ribbon tape" material or a watertight caulking such as Sikaflex 1a construction sealant.
- Watertight detention systems will require the installation of a flanged gasket plate sealing the membrane against the wall of the concrete structure. The flange plate consists of a flange ring with an inside hole dimensioned larger than the pipe OD, and predrilled holes to insert the Power-Studs through.. Contractor shall place a minimum of one layer in a continuous band of ConSeal CS-212 "ribbon tape" applied against a clean smooth structure outside wall. The membrane shall have a hole cut large enough to fit the OD of the pipe thru at the location of the pipe protrusion. The membrane can then be pressed against the band of the CS-212, compressing and adhering to the band to the membrane. The flange ring can then be placed around the opening in the membrane, pressed into place and then fastened by Power-Stud threaded expanded fastener. Use minimum number #4 for smaller diameters and as many as required to ensure ring seats in a flat watertight fit. Torque down nuts to hold in place. Note that any wall perforation holes that are visible between the ID of the ring and the OD of the pipe shall be filled with a waterproof grout mix.
- For infiltration systems a masonry grout filled pipe hole is sufficient.
- For internal piping configurations, a rubber boot system or masonry grout filled pipe hole is sufficient.
- Internal flow control structure shall be installed per plan specifications.
- Contractor shall install manhole access structures per plan specifications.
- Backfill around and on top of structures shall consist of select native material, structural fill or structural stone per plan specifications. Fills shall be placed in 9" lifts at 95% compaction. All fill should not contain any deleterious materials or stones larger than 3" diameter within 6" of system top.