

# **Porous Technologies, LLC**

## **URBAN RAINGARDEN** **Handling and Installation Instructions**



# Urban RainGarden Handling and Installation Instructions

## Required Tools and Equipment:

In addition to standard earthwork equipment (Backhoe or excavator, plate compactor and various hand tools) the following special equipment may be necessary:

1. Specialized precast concrete lifters and rigging – see plans and quote for details.
2. Levels for ensuring that precast components are plumb and level.
3. Wrenches for securing Urban RainGarden components to each other.
4. Recommended soil additives for planting (nursery recommended fertilizer).

## Acceptance of delivered Precast Urban RainGarden Components

Contractor shall thoroughly inspect all delivered components and shall act as follows:

- A. Any Component with chipped joints or top sections shall be rejected and replaced.
- B. Any component with a fracture or crack greater than 0.10 inches in length or 0.01 inches in width shall be rejected and replaced.
- C. Any component that has not had at least Seven (7) days curing time or is out of square shall be replaced at the Owner's discretion.
- D. Any section with indications of imperfections in mixing and/or molding, honeycombed, or open textured surfaces, shall be rejected and replaced.
- E. Any section with indications of patches or repairs shall be replaced at the Owner's discretion.
- F. Any section with exposed reinforcing steel shall be rejected and replaced.

## Site Preparation

The project site shall be properly prepared for installation of the Urban RainGarden components. Preparation should include, but may not be limited to, the following:

- A. Protect surrounding structures, sidewalks, utilities and pavements from damage caused by undermining or washout from adjacent excavation activities.
- B. Install and maintain erosion and sediment control measures until all surrounding disturbed areas are vegetated or stabilized.
- C. The subgrade areas between erected Precast Urban RainGarden components shall not be compacted or permanently covered with geotextile unless approved by the project design professional.
- D. Where erosion has caused accumulation of sediment or ponding on the subgrade, remove sediment with light equipment [and/or manually]. Scarify the underlying soils to a minimum depth of 6 inches with a York rake, or equivalent equipment, and a small/light tractor.



- E. Restore any subgrade areas damaged by erosion, ponding, or traffic compaction to design line and grades prior to installation of underdrain (if so required), filter fabric, filter sand layer or biofiltration media.

### **Trench Preparation and Excavation**

After Site Preparation has been completed trenches shall be prepared for acceptance of the precast Urban RainGarden Components in the following manner.

- A. Excavate trenches to ensure that sides will be stable under all working conditions. Slope trench walls or provide supports in conformance with all local and national standards for safety. Open only as much trench as can be safely maintained by available equipment. Backfill all trenches as soon as practicable, but not later than the end of each working day.
- B. Excavate to provide a width sufficient to ensure working room to properly and safely place and compact side wall backfill and other embedment materials. The space between the Precast Urban RainGarden System and the trench walls must be wider than the compaction equipment used.
- C. When supports such as trench sheeting, trench jacks, trench shields or boxes are used, ensure that support of the Precast Urban RainGarden system and its connections is provided throughout the installation process. Place sheeting together sufficiently tight enough to prevent debris from washing into the trench excavation from behind the sheeting. Provide tight support of trench walls below any obstructions to sheeting.
- D. Rock in either ledge or boulder form shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between exposed rock and the component section of at least 12 inches (0.3m).
- E. Excavate and remove wet, organic or otherwise unstable soil incapable of providing a proper foundation for the components to a depth of 24" below the bottom of the structure and replaced with granular material compacted as directed by the Engineer.

### **Dewatering**

Contractor shall ensure that excavated trenches are kept free from surface runoff and groundwater intrusion by:

- A. Prevent surface and ground water from entering excavations, from ponding on prepared subgrades and from flooding project site and surrounding areas.
- B. Protect Subgrades from softening, undermining, washout and damage by rain or water accumulation.
- C. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations.

## **Precast Urban RainGarden Component Installation Preparation/Examination**

Contractor must ensure that the prepared excavation is ready for acceptance of the precast components. A thorough examination of the project site shall include the following:

- A. Examine areas indicated to receive Precast Urban RainGarden System, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Verify that the granular levelling base is in suitable condition to begin installation according to manufacturer's written instructions.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

## **Precast Urban RainGarden Component Installation:**

Contractor shall install Precast Urban RainGarden System components to the line and grade specified on the project design plans.

- A. Place and compact  $\frac{3}{4}$ " (No 57) stone in areas shown on approved plans. Place and compact stone in maximum 6" lifts. Compact with plate compactor in two directions a minimum of 2 times each direction or until there is no noticeable subsidence of stone. Where structural backfill is required install and compact a minimum structure bedding of 6" deep. The bedding surface must provide a firm and uniform density for all single and adjoining components for their entire length.
- B. After bedding has been prepared identify specific Precast Urban RainGarden components for installation and move them into position for installation. When lifting components use recommended hardware that is securely attached, but not overtightened.
- C. Ensure that final positioning of precast components provide width necessary for any required storage media.
- D. Tolerance: Install components with no greater than a  $\frac{1}{8}$ " offset from piece-to-piece and with no more than a  $\frac{1}{4}$ " in 10 ft. variance from level or from the slope indicated on the plans. Components shall be installed with a maximum out of plumb tolerance of  $\frac{1}{8}$ " in 4'

## **Joining Adjacent Urban RainGarden Components**

Connect each component installed to the previously installed component by the following methods:

- A. Position ½” x 6” preformed bituminous expansion joint material between adjacent components.
- B. Corners and Walls placed along a Curve: Place side and endwalls abutting each other as per the approved shop drawings. Position manufacturer supplied aluminum angle clip at locations shown on shop drawings and mark locations of required Simpson Strong-Bolt 2 Wedge Anchors. Drill and insert as per manufacturers recommendations and torque fasteners as per manufacturers recommendations to pull components together.
- C. Long Walls: Position ½” x 6” preformed bituminous expansion joint material between adjacent components. Insert Manufacturer provided 1” diameter x 24” long threaded rods with washers and nuts between adjoining component sections in both top and bottom precast pocket locations and tightened alternately to draw the two components together.
- D. Complete component installations with end section that is fastened to two side walls. On installations where there are more than one end walls required begin the installation by installing the required components for one end wall and then proceeding with the long walls.
- E. Prime walls at joint locations and install 6” butyl mastic joint wrap per manufacture’s directions across all accessible surface of component footing and up both inside and outside walls, stopping wrap 8” from top of components.

## **Drainage Inlet**

Drainage inlet must be installed in the location and elevation as shown on the designed plans.

- A. Place and compact bedding to 90% of maximum density per AASHTO T99 to a distance of 18” from the exterior of the drainage inlet.
- B. Install drainage inlet on compacted bedding.

## **Underdrain**

Underdrain (if specified) must be placed on a layer of drainage stone as indicated on plans.

- A. Drainage Aggregate: Place geotextile (if specified) at the bottom of the assembled Precast Urban RainGarden.
- B. Lay subsurface drainage pipe at grades and locations indicated on plans
- C. Cover underdrain with washed crushed stone to the depth indicated on plans.
- D. Place geotextile (if specified) over crushed stone drainage layer and protect from intrusion of fine sediment.

## **Plastic Storage Media**

If required plastic storage media shall be placed in the locations shown on the design plans, at the correct elevations.

- A. Storage media shall be placed in accordance with manufacture's instructions and with a minimum of 3" of No. 57 Stone bedding beneath it.
- B. After storage media is installed cover top and sides of media with Microgrid to provide separation between stone and storage media.
- C. Install any connections required between underdrain and storage media.

## **Backfilling**

Urban RainGarden System must be backfilled to the surrounding grade shown on the design plans.

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Backfill shall be brought up evenly on all sides of the System to required elevations.
- C. Backfill shall be placed alternately on the inside and outside of the System to avoid displacing Component walls.
- D. Remove temporary bracing only after backfilling is complete.
- E. Compact soils to not less than the following percentages of maximum dry unit weight according to the following:
  - 1. Under Components, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
  - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil to 90 percent.
  - 3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.

## **System Activation**

- A. Approved bioretention media shall be placed to the depth and grades indicated on plans.
- B. Install Inlet drainpipe at elevations specified in the design plans once the proper amount of bioretention media has been placed within the system.