Stormcrete® Modular Precast Porous Concrete Stormwater System

Operation and Maintenance Manual

Introduction:

Stormcrete® is a modular precast porous concrete system which provides a reduced-risk alternative to poured in place porous pavements. Routine operation and maintenance (O&M) procedures are similar to that of conventional pervious pavements. However the use of Stormcrete® provides the security of knowing that the slabs may be easily lifted for maintenance and subsurface repairs. Individual or multiple Stormcrete® slabs may also be removed and replaced or reused.

Planning / Siting Criteria:

Proper planning and placement of porous surfaces is fundamental to their longevity and effectiveness. All projects are unique and careful attention should be given to each situation. Porous surfaces should be located where they will be most effective from a stormwater management perspective and least susceptible to heavy loading of sediment and debris. For example, potential issues can arise in the following locations; site entrances, heavy commercial traffic, and landscaped areas that may erode onto the porous surface.

Particular attention should be given to the amount of run-on flow from contributing impervious areas (Run-on Ratio). To avoid concentrating sediment in one location run-on flow should be consistently introduced across a row of Stormcrete® Slabs and not directed towards a limited number of slabs.

When choosing landscape plantings around a Stormcrete® System installations care should be taken to minimize the potential for heavy organic material loading from surrounding vegetation.

Regular Inspection

Regular inspection of the Stormcrete® System is critical to developing a site-specific maintenance program. Visual inspections should be performed several times in the first few months following installation to establish base line performance and identify potential sources of run-on sediment and debris. Wet weather inspection is generally the best way to establish base line performance and observe as-built flow conditions from surrounding surfaces.

Thereafter, inspections should be completed 2-4 times per year depending upon the intensity of use. For the best assessment of site conditions, inspections should be scheduled immediately before and immediately after maintenance procedures.

The following should be included in any ongoing inspection program and observations and recommendations should be carefully recorded:

- During inspection note the accumulation of sediment and debris. Voids should be checked for accumulation of fine material. This will aid in determining proper vacuum sweeping frequency and the ability to target areas with higher accumulation rates.
- Inspect for evidence of run-on from perimeter unpaved areas or nearby erosion.
- Inspect for evidence of ponding. (i.e. staining or unusual light sediment or debris)
- Confirm "good housekeeping" practices are in place. Do not store materials such as; mulch, soil, yard waste, and other stock piles on Stormcrete® slab surfaces or in such a way that the material can be washed or blown on to the Stormcrete® slab surface.
- Inspect for evidence of accidental or illicit spillage.
- Inspect for surface deficiencies. (i.e. raveling, spalling, cracking, etc.)
- Maintain a log detailing all inspection and maintenance activities to track the effectiveness of maintenance activities.

Routine Maintenance

Even considering the advantages of the Stormcrete® System, all porous surfaces require routine maintenance activities to preserve permeability and service life. Effective planning and regular maintenance is more cost effective than surface rehabilitation or replacement.

Minimum Recommended Maintenance: Vacuuming a minimum of 2 times per year is recommended for most installations. Site specific conditions (land use, climate, tree cover, slopes, construction activities, etc.) along with data from regular inspections will ultimately determine how frequently the surface should be vacuumed. At a minimum, vacuum cleaning should occur in spring and fall (after leaf drop). Additional cleaning should be scheduled any time accumulated sediment / debris is visible on surface.

Equipment & Procedures:

With the use of any equipment option operator experience and diligence is critical in achieving maximum cleaning results. Factors such as characteristics of material being removed, equipment speed, weather and appropriate timing for access for maintenance should all be considered. Proper equipment maintenance and adjustment is also required to gain maximum cleaning results.

Vacuum Truck: Regenerative air vacuum sweepers and high-efficiency vacuum-only sweepers are recommended. In general mechanical broom sweepers are not appropriate for pervious surfaces. Brooms associated with vacuum sweepers can be useful in mobilizing debris for capture.

- **Stormwater SUV ™:** Specialized small vacuum equipment such as the Stormwater SUV™ may be used for sidewalks, green alleys, pedestrian plazas, etc. for maximum porous surface cleaning effectiveness. Small vacuum equipment must be appropriately designed for the maintenance of porous surfaces.

- **Blower:** A high-powered backpack blower (similar to a Stihl BR700) can be used with a swirl pattern to loosen sediment and debris lodged into the Stormcrete® System. When possible a vacuum should be used to remove the material dislodged by the blower. Frequent use of a blower can be especially useful in removing organic debris before it is ground into pore spaces.

- **Maintenance Staff / Public awareness:** In all installations one of the best tools to ensure proper porous surface function is informing on-site maintenance personal and the surrounding public about the presence and function of the porous surface. On-site personnel and contractors should be made aware of proper O&M procedures. Signage should be provided to explain the value of pervious surfaces and to address the basics of maintenance to the general public.

Rehabilitation, Repairs, and Replacement:

Rehabilitation may be warranted when sediment and debris loading has diminished infiltration rates to unacceptable levels. Inspection and maintenance records outlined previously should be used in the evaluation of when rehabilitation methods may be required.

Recommended Rehabilitation Methods: Simultaneous power washing and vacuuming is recommended to remove embedded sediments. Care should be taken to ensure water pressure is sufficient to dislodge embedded/adhered particles but not damaging to the surface. Vacuum should be powerful enough to remove wash water and fine sediment.

- **Manufactured Porous Rehabilitation Device**: Equipment purpose-built for rehabilitation of porous surfaces is available in the marketplace. This equipment is designed to attach to a combination sewer cleaning truck (jet-vac) to combine power washing and vacuum extraction in a single unit for simultaneous sediment mobilization and removal. A recommended device is the B.I.R.D™ (Bunyan Infiltration Restoration Device).

- **Focused Power Washing**: Power-washing may be an effective tool for unclogging plugged areas. Power-washing should occur at moderate pressure and at low angle (<45 degrees) to drive materials off of porous surface or into a vacuum head. Care should be taken with water pressure until effect of water pressure on surface is realized. This technique may be effective at opening pore spaces, however caution should be exercised to ensure that sediment is not driven deeper into the porous surface.

- **Remove - Replace**: In the event that rehabilitative efforts have failed to restore adequate infiltration capacity, the slab(s) can be easily removed and replaced.

    - Please note: Removal and replacement should be completed using Stormcrete® lifting swivels. Refer to the Stormcrete® Handling & Installation Manual for additional information.

Winter Maintenance / Snow Removal:

- **De-icing & Chemicals:**
    - If possible avoid applying sand to Stormcrete® surfaces.
    - A minimum amount of deicing chemicals should be used due to the stormwater function of the Stormcrete® System. Due to the low water to cement ratio in porous concrete Stormcrete® slabs tend to be resistant to deicing chemicals.

- **Plowing & Snow Removal:**
    - Snow can be removed using conventional plow blades equipped with wearing shoes. Well maintained plow blades can prevent damage to porous surface. Back dragging is not recommended. Where possible, plow passes should be made at a 45-degree angle to the slab joints.
    - Operator training: Snow removal operators should be aware of the presence of the Stormcrete® System and its importance to the property and environment.
    - Snow within pores of porous pavement can make them appear more snow covered than standard impervious pavements. Porous surface should not be "over worked" or scraped.

Additional Help:

For guidance or a quote to maintain your porous surface please contact Stormwater Compliance, LLC at sweeping@stormwatercomp.com or 1-877-271-9055.