Maintenance of Underground Stormwater Management **Systems:** Who is responsible?



Maintenance is a fact of life. Cars require maintenance, houses require maintenance, people require maintenance, and so do stormwater management systems. Without maintenance, the performance of any stormwater treatment Best Management Practice (BMP) will decline over time until the system ceases to be effective altogether. The costs of repairing or replacing a damaged stormwater BMP can be expensive but, with a little bit of routine maintenance, that BMP can operate at peak performance for many years for a very low cost.

Regardless of the size of a stormwater management project, the structures in the system aim to retain stormwater for later reuse or to or detain stormwater for slower discharge back into the groundwater table or watershed. Stormwater enters retention or detention systems carrying sediment that accumulates within structures and reduces the volume available for actual stormwater. Systems must be regularly inspected and this sediment must be removed on a recurring basis to optimize the efficiency of the entire stormwater management system.

IMPORTANCE OF REGULAR CLEANING SCHEDULES

The actual removal of sediments and associated pollutants and trash occurs only when inlets or sumps are cleaned out; therefore, regular maintenance is required. Most studies have linked the failure of stormwater management systems to the lack of regular maintenance. The more frequent the cleaning, the less likely sediments will build up, clog inlets and outlets, or become resuspended and subsequently discharged. In addition, frequent cleaning also results in more volume available for future storms and enhances the overall performance. A small investment in routine maintenance ensures a longer service life for the stormwater management system.

Different areas will have different maintenance frequencies based on the size of the system, anticipated storm activity, quantity and type of expected sediment and other factors.[¥] For proper operation and maintenance



An unmaintained stormwater system will eventually clog.



Precast concrete systems are typically much larger than plastic and corrugated metal pipe systems, and offer much easier access for inspections and maintenance.



A lack of regular maintenance can prevent stormwater from entering the system (COURTESY OF Hydro International).



Pumping stormwater inlets removes sediment carried there by stormwater (COURTESY OF Hydro International).

of stormwater management systems, the Department of Public Utilities of the City of Columbus, Ohio suggests the following for owners of systems in their jurisdiction: 1) Visually inspect all of the system components twice per year; 2) Vacuum stormwater management systems once every six months; 3) Reverse flushing and vacuuming if system inspection indicates significant accumulation of sediment and pollutants in pipes; 4) Periodically remove and dispose of other material and debris. These are their minimum guidelines.

In areas of high sediment loading, stormwater management systems should be inspected and cleaned after every major storm event. One study referenced in the Massachusetts Stormwater Handbook found maximum benefits from consistent monthly cleaning. A variety of techniques can be used to remove pollutants^{**}, but settling vessels will fill, filters and screens will clog, and chemicals will become exhausted. There simply is no magic bullet that will eliminate the need for a regular

cleaning schedule. At a minimum, NPCA recommends water quality inlets and deep sumps should be cleaned four times per year and inspected monthly. Yet, many systems are still lacking for maintenance and the problem may very well be one of communication.

COMMUNICATION PROBLEMS

The onus falls on *owners* of stormwater systems to conduct maintenance. However, a lack of clear communication and expectations to owners of these systems is a main cause of lack of maintenance. Is the specifier, design engineer, contractor, precaster or provider of a proprietary system communicating the maintenance expectation to the owner?

An uninformed owner may incorrectly believe that the maintenance-related BMPs are executed into the design of the system and there is nothing for them to do after the project is completed. It is recommended that owners should be educated on the specific maintenance plan for their system during the construction closing meeting. After all, Stormwater Management Standards^{*} specifically require that stormwater management facilities create and maintain an operation and maintenance plan.

OPERATION AND MAINTENANCE PLANS

Operation and maintenance plans should answer specific questions that can become part of the post-construction closeout meeting with the owner:

- 1. Who is responsible for the stormwater system, post-construction?
- 2. Will the system receive operational maintenance?
- 3. Is there an inspection and service schedule in place?
- 4. Who will actually be conducting post-construction inspections and maintenance?

When BMPs include proprietary devices within the system, the supplier should be consulted about the proper inspection, maintenance and servicing requirements of those devices/areas, and costs for maintenance and replacement parts. Their feedback should be incorporated into the post-construction closeout meeting with the owner.

START AT THE BEGINNING

Although maintenance of stormwater systems should be included as part of the construction closeout meeting, it should not be the first time owners learn of their maintenance responsibilities. The answers to the questions above should be developed during the selection process; maintenance of any BMPs selected should be addressed when choosing a particular stormwater solution. The closeout meeting should be relaying maintenance information that was generated much earlier in the project.

The most difficult part of developing a maintenance plan during the selection process may be identifying a responsible party to perform and pay for the long-term maintenance of the system and the BMPs employed therein. But it is best for the environment, and the efficacy of the constructed system, to ensure all expectations, including bearing cost of maintenance, are addressed prior to the start of construction. It will contribute to a smoother post-construction closeout meeting and will ensure a transfer of ownership with a maintenance plan in place.



Sediment-free dischrage of stormwater is the result of proper stormwater system maintenance (Photo Courtesy of Contech Engineered Solutions LLC).

RESPONSIBILITIES

Proper maintenance of a stormwater system is responsibility of the owner. However, everyone involved in the process from design to operation has a responsibility to create and convey maintenance expectations.

- Specifier require development of a maintenance plan in the specification
- Design Engineer obtain appropriate maintenance requirements specified and design accordingly
- General Contractors ensure that bids to subcontractors require appropriate maintenance plan information
- **Manufacturers of the precast unit or proprietary devices** provide appropriate maintenance documents as required by contractor or owner for any proprietary system
- Owners agree to maintain stormwater system per the specification

If the long-term operation of a stormwater BMP is part of the design requirement and the expectation for a maintenance plan is carried throughout the process, then the owner can leave the closeout meeting system knowing their ongoing responsibility to maintain a stormwater BMP that will continue to perform well into the future.

RELATED ARTICLES

*Check out https://precast.org/2016/02/top-10-reasons-to-specify-precast-concrete-stormwater-products/ for a list of TEN reasons why precast concrete is the ideal choice for stormwater management systems.

Read (https://precast.org/2015/04/underground-stormwater-management/), for reasons why precast concrete is the most preferred stormwater storage material.

*https://www3.epa.gov/npdes/pubs/sw_state_summary_standards.pdf

^{**}Keep in mind that disposal of the accumulated sediment and hydrocarbons must be in accordance with applicable local, state, and federal guidelines and regulations.

