STORMWATER

What are Stormwater Control Measures (SCMs)?

SCM stands for Stormwater Control Measure. Stormwater SCMs are designed to remove pollutants from urban runoff, improve water quality, and control quantity before the water reaches our streams and drinking water supply reservoirs. Stormwater SCMs offer both "non-structural" and "structural" approaches to water quality protection. Non-structural SCMs may include such practices as minimizing impervious area for site development, providing vegetative buffers along all streams and waterways, promoting natural infiltration of runoff before it enters a receiving stream, pollution prevention practices such as regular sweeping of parking lots, and public environmental outreach programs.

Structural SCMs are permanent devices, which are designed, constructed, and maintained to remove pollutants from runoff. While it is important to note that structural SCMs are only one part of a comprehensive watershed management plan, they play a critical role in protecting water quality in our receiving streams and lakes by removing or filtering out pollutants in runoff. Without these constructed devices, pollutants in urban runoff would directly enter the closest stream or lake, possibly impair downstream water quality or aquatic life, and also degrade the quality of our drinking water reservoirs.

Many different kinds of SCMs can be installed, such as stormwater wetlands, bioretention cells, infiltration basins, dry detention areas or wet retention ponds to name a few.

What types of SCMs are there out there?

Stormwater Wet Retention Pond

In Garner, the wet retention pond is the most commonly used structural SCM for stormwater quality enhancement. This stormwater SCM improves stormwater quality by retaining stormwater runoff for an extended period of time to allow pollutants that are suspended in the runoff to settle out. As runoff enters the pond, its velocity is dramatically reduced, allowing suspended pollutants to begin settling. Many pollutant particles found in stormwater runoff are very small and, because smaller particles settle slower than larger particles, the pond is designed to provide adequate detention time so smaller particles have a chance to settle out.

Stormwater Wetlands
By building wetlands to treat stormwater, we can try to reproduce the superior pollutant removal capability of natural wetlands. Wetlands remove pollutants primarily through physical filtration and settling and by biological processes of wetland plants. This SCM is somewhat similar to wet retention ponds in that they both have a permanent pool and a temporary pool. Generally, stormwater wetlands have a shallower permanent pool than wet detention ponds so that wetland plant species can thrive in the basin. Runoff that is captured by the wetland area first enters a micropool or forebay, which is a relatively deep pool that promotes initial settling of larger pollutant particles. The stormwater slowly flows through the shallow areas of the wetland where the wetland plants filter suspended pollutants and reduce nutrient pollution through uptake.

Bioretention Systems (Rain Gardens)
The bioretention systems mimic forest ecosystems to enhance stormwater quality. A bioretention system consists of a depression in the ground filled with soil media mixture, mulch and plantings and is designed to appear as a landscaped area, giving this SCM a very natural and appealing image. The manner in which runoff flows through the bioretention system is very similar, on a smaller scale, to watering potted plants. These bioretention areas can also be sodded and mowed for easy maintenance.

Stormwater runoff enters the bioretention area and is temporarily stored in a shallow pond on top of the mulch layer. The ponded water then slowly filters downward through the soil media mixture and is absorbed through the plantings. As the excess water filters through the system, it is collected by an under drain pipe and discharged to a storm conveyance system.

Dry Extended Detention Basin
Underground detention facilities are structural SCMs designed to provide temporary storage of stormwater runoff for quantity control purposes. The systems are typically installed beneath parking lots, streets, and parks to maximize property usage and lower development costs. Underground detention system design measures must be taken to trap and store sediments in locations where clean-out and maintenance can be easily performed. Dry extended detention ponds are designed for the water to exit the pond through the principal and emergency spillway.

Why should you care about SCMs?

Stormwater Devices Help Preserve our Water Quality and Stream Structure
Local, State and Federal regulations help ensure that all stormwater is not detrimental to the watershed. All stormwater within the Town of Garner flows to the Neuse River Basin. A large majority in town flows to Lake Benson, a drinking water source for Garner citizens. In order to protect our drinking water, these stormwater control measures are required on residential and commercial development sites to reduce pollutants such as nitrogen and total suspended solids, as well as reduce the runoff rate from a site with increased impervious surface and prevent future erosion of our creeks and waterways. This will also help reduce the nutrient load within the Neuse River. Reducing the runoff rate will also slow erosion and degradation within our creeks and waterway systems.

Stormwater Devices as Part of Development Plan Approval
These stormwater control measures were required to be installed and functioning correctly as part of your development site plan and/or construction drawing approval. Any failure of these systems would mean that the property owner is out of compliance of the original approved development permit.

How can you ensure the longevity and success of the SCMs on your development site?

Develop a Funding Source for Ongoing and Future Maintenance
Preparing financially for routine maintenance will help prevent a large sum cost to your systems down the line if your systems remain unmaintained. A dedicated funded account for SCM maintenance through either a homeowner's association or if a commercial business can help you manage routine maintenance as well as help you save for end of life SCM replacement. These end of life SCM replacements or major

maintenance events are determined by the type of system and lifespan of your system. They can vary from 15 years to 50 years. Routine maintenance assures a longer lifespan for your SCM system. There are several companies within the triangle area that provide routine preventative maintenance for these SCM systems.

Routine Maintenance of structures within the SCMs

Dam and Emergency Spillway
The dam and emergency spillway are very important in protecting lives and property downstream in the event of a catastrophic failure. Too much woody vegetation or too many mature shrubs and trees can degrade the integrity of a dam if their root structure gets into the dam foundation. Burrowing animals, such as muskrats and mice, can cause even more degradation. Dams must be inspected for any cracks, seepage, or excessive erosion that may cause a failure of the pond. The emergency spillway should be maintained from any excessive woody vegetation or significant erosion as well.

Inlets and Outlets
The inlets and outlets to and from the pond may become clogged with sediment, trash or debris. Structural failure of the inlet or outlet may occur as a result of blockages or improper installation. Blockages should be removed and pipes should be repaired or replaced as needed. The riser pipe and orifice holes should be visually inspected from shore to ensure they are not blocked and that the pond appears to be draining properly.

Erosion
Erosion can be of minimal importance or it can be the most significant problem associated with the SCM. Minor erosion should be noted and can be corrected by revegetating. Major erosion on the dam or spillway, or where it impairs the sediment storage capacity of the pond, should be corrected by regrading and vegetating or dredging. Erosion of side slopes may occur if the slopes are too steep and/or if there is limited vegetation to stabilize the slopes. On slopes with less than a 3:1 ratio, revegetation of the side slopes is recommended to prevent erosion. On steep slopes, regrading the slope to less than a 3:1 ratio and then revegetating that slope should prevent erosion.

Sediment Storage Capacity
One of the major functions of the wet retention pond is to trap pollutants, including sediment. Periodic sediment removal is required to ensure that stormwater runoff is treated. A visual inspection of the pond forebay should reveal any excessive sedimentation problem. If a pond requires sediment removal, sediment capacity calculations should be used to determine the extent of removal necessary to restore the pond to designed conditions.

Water Quality
Water quality problems in ponds may result from needed maintenance, upstream influences, or urban runoff. Algae or sedimentation is the most likely problem, but on occasion, stagnation or fish kills may result for no apparent reason. Other problems, such as oil, trash, and bacterial growth, will occur as well. Commonly, algae will grow when sedimentation has begun to fill in the pond and the nutrients do not have enough room to settle out and be treated. Dredging to remove the sediment usually resolves this issue. General appearance and overall function should be visually inspected to ensure proper function.

Have more questions? Please contact Jaclyn Stannard, Stormwater Program Administrator for the Town of Garner at jstannard@garnernc.gov or 919-773-4421.