STORMWATERCONSULTINGINC.
STORMWATER | STREAMS | WETLANDS

STORMWATERMAINTENANCE
INSPECTION | MAINTENANCE | REPAIR

128 Cockeysville Road, Suite 200, Hunt Valley, Maryland 21030 | phone 410.785.0875 | fax 443.269.0216 | tes@MdSWM.com
www.MdSWM.com | www.SWMaintenance.com

United States Senate
Committee on Environment and Public Works
Subcommittee on Water and Wildlife
Testimony of Theodore E. Scott, PE, CPESC, LEED AP, MSP
December 13, 2011

Good Morning Mr. Chairman and Members of the Committee. My name is Theodore Scott. I am a professional engineer and co-owner of two small businesses: a civil engineering and landscape architecture firm and a niche construction and maintenance company. Both companies specialize in stormwater related infrastructure from Richmond, Virginia to Connecticut. Our professions design, construct, and maintain spaces that communities use to live, work, shop, and play. A critical part of our work is designing to minimize the impacts on the environment. Being involved in this field for 25 years, I have been a part of the paradigm shift in the way development protects and restores the environment. I have also been involved in work that begins to address our aging stormwater infrastructure.

After a brief introduction of the issue of stormwater runoff, I'd like to discuss three topics:

- Green Infrastructure
- The condition of our existing stormwater infrastructure,
- The economic impact of green infrastructure and maintaining existing stormwater infrastructure.

Stormwater Runoff

Urbanization creates a wide variety of pollution. Every time it rains, stormwater runoff flushes pollutants from rooftops, sidewalks, and streets. Flooding and pollutants such as trash, debris, and sediment are the visible impacts of urban stormwater runoff. But stormwater also carries

unseen pollutants such as oil and grease from vehicles, and chemicals from a wide variety of sources.


Traditional Approach:
Efficient Engineering
Out of Sight, Out of Mind

Ever since people began converting land for their use, the changes to the physical characteristics of land and resulting stormwater runoff have impacted the environment. Traditionally, engineers have designed storm drain systems that are efficient and quickly put runoff out of sight into pipe systems. These methods reduce water filtering into the ground, increase flows and downstream flooding, and efficiently send the problem downstream. This results in physical impacts to streams, bays, estuaries and ultimately the oceans, causing unbalanced marine environments. With these natural filters impacted, many pollutants now end up in our oceans.


First Attempts at Treating Stormwater
Easy Designs, Traditional Construction

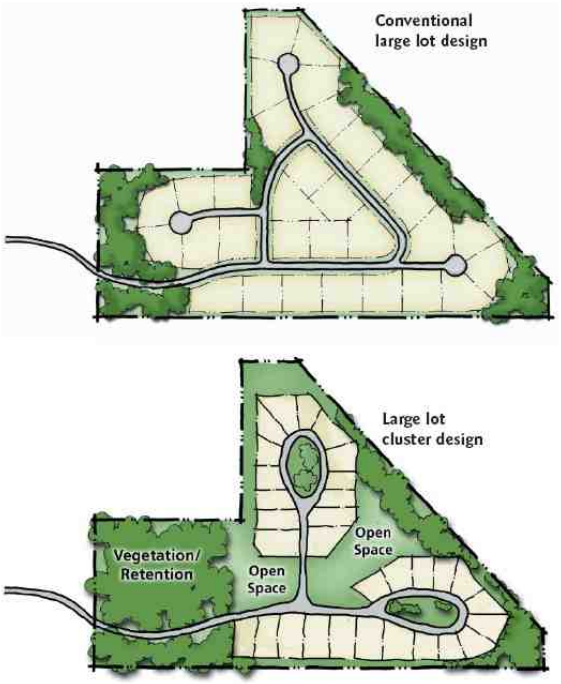
By now, many have heard of the emerging ocean garbage patches. The styrofoam coffee cup or plastic water bottle dropped outside on the street will quite possibly end up in the Atlantic Garbage Patch. Miniscule pieces of plastic, once thought to be too small to matter, are becoming great floating masses in our oceans. We are realizing that society's lack of action regarding stormwater runoff is becoming an international public health issue that affects everyone. It all begins with how we treat our stormwater runoff.

Green Infrastructure

Mitigation of stormwater pollution has been occurring for some time. About 30 years ago, some areas of the country, including my home state of Maryland, began efforts to regulate the treatment of stormwater.

The first methods utilized were larger basins and ponds that collected drainage and treated it in centralized areas. Several decades of research indicated these practices do not allow enough water to filter into the ground, radically change drainage patterns, and convey a significant amount of pollutants downstream. The results were continued impacts to streams, estuaries, and our oceans. Since the 1990s, alternative ways to treat stormwater have been researched and implemented to resolve these continuing issues.

Referred to as green infrastructure, these practices are a different way of planning communities and urban areas. Alternative materials such as green roofs and permeable pavement are used for surfaces that absorb pollutants and allow stormwater to filter directly into the ground. Landscaped practices use natural processes to slow flows, absorb water, and remove pollutants. These practices are very small and are distributed throughout site areas. Instead of one or two very large ponds, we may have 20 or 30 small practices throughout the site. In lieu of mounded landscaping, we design strategically located stormwater treatment areas.



Land planning is also different. Instead of using all available land area for communities, as we have done for decades to create tract housing, land use is

intensified in smaller areas leaving natural or restored areas interspersed throughout. This planning preserves sensitive forest and wetland resources while facilitating restoration of features degraded by past development.

By converting parking lot islands into small stormwater practices, natural runoff processes are preserved, allowing water to seep into the ground throughout the site. With careful planning, engineering, and landscape design, stormwater practices become an integral part of the community and are considered amenities instead of being hidden out of site. Invisible pollutants are treated by the vegetation or absorbed into the ground. Trash, debris, and sediments are easily removed by homeowners or landscape maintenance crews. Micro-habitats emerge within the spaces created for people, establishing flora and fauna in between rows of parking.

As these practices represent a change in the way land is developed, adoption has taken some time. In Maryland, new regulations suggested the use of these practices starting in year 2000. Even though there are numerous advantages, sometimes including cost savings, many developers and engineers resisted the change. In 2009, the Maryland legislature revised our regulations regarding stormwater, which mandated these practices on every project. While some developers and engineers resistant to change feel challenged, they are clearly working through it and these practices are becoming the status quo for stormwater in Maryland.

These practices differ in many ways from the traditional large engineered ponds. One important way is in how they are constructed and maintained. Because they are smaller and

integrated throughout sites, they require more hand labor and less heavy equipment. With many more of them on a given site, maintenance changes dramatically, requiring teams of laborers instead of large equipment with a few operators. This generates jobs. As they are also amenities, there is more motivation for re-occurring maintenance. Therefore, many of the jobs created are permanent – not one-time construction employment assignments.

Because the skill set and equipment requirements are less with green infrastructure, a wide range of alternatives to traditional construction are available. We have been engaged in numerous projects at school sites. These projects introduce green infrastructure hands-on and involve a wide range of students. The design, construction, and monitoring of these practices involves practically every subject – from art and math to geography and biology. Known as retrofits, these projects right previous wrongs with green infrastructure treating areas that never before had treatment. In many cases, existing infrastructure is upgraded at that same time. Learning outdoors, the kids love it. The driver for these projects is usually grant funding with volunteer participation.

These programs are also being extrapolated into larger community events. Grass roots NGOs such as Blue Water Baltimore have initiated numerous community projects involving green infrastructure. Through efforts like these, clean water is becoming a meaningful vehicle to bring urban communities together. An example is a Blue Water Baltimore school greening project at the Academy for College & Career Exploration in Baltimore last summer that involved several hundred volunteers.

We understand what the problems are and the solutions that Green Infrastructure offers. The challenge is implementing the solutions with the least impact on economics. As mentioned, in Maryland we have had several iterations of regulations moving toward green infrastructure. In the end, we found that the most effective way to make it happen is with a regulatory mandate. All along the way, there have been naysayers that simply did not want to deal with change. True, these practices present new challenges to design and construct. It takes creativity. The most creative designers consistently realize cost savings with these practices. Those who prefer to do cookie cutter work are the ones who have struggled the most. In the end, we have found that creative developers and designers can incorporate green stormwater practices into new projects with minimal economic impact.

Existing Stormwater Infrastructure

As mentioned, stormwater related infrastructure has been in place for some time. Conveyance systems, such as catch basins and underground pipe systems have been installed in urban areas for many years. Since the 2nd World War, most suburban areas have been developed with these systems. Large stormwater treatment facilities, such as ponds and basins, began to be installed in many parts of the country thirty years ago. As with the case of any infrastructure, the materials in these systems have finite life cycles. Constant exposure to water accelerates corrosion and degradation. Failure of pipe systems leads to pollution from sediments entering the pipes and being conveyed downstream. When part of a stormwater pond or basin, the failure of these pipes can result in

embankment failure which results in sudden and uncontrollable floods. Floods from dam failures can be catastrophic and can damage the environment, other infrastructure such as homes and roads, and result in deaths to people who may be caught in the path of the floodwaters.

These situations can be easily avoided by instituting reliable Operations and Maintenance (O&M) programs. These programs establish standards for the inspection, maintenance, and repair of aging infrastructure. Although some of the infrastructure is publically owned, the majority of stormwater facilities that we see are privately owned. Therefore costs of instituting and maintaining O&M plans for stormwater facilities are distributed to many parties. For the typical property owner, this is an expense of maintaining property, such as repairs to plumbing or heating systems.

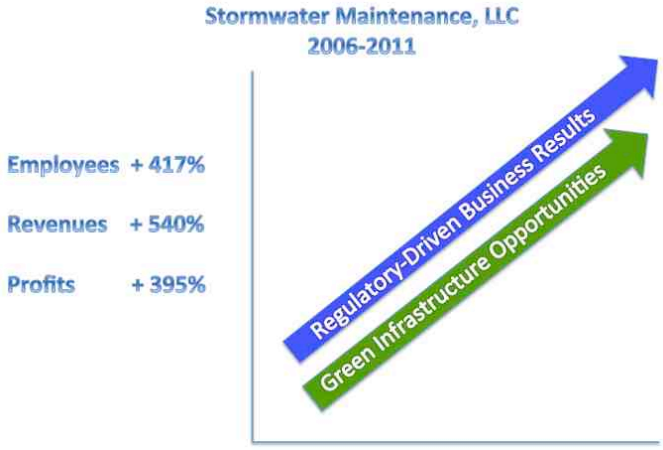
Many municipalities have these programs in place. Numerous large corporations understand the value of maintaining their infrastructure and have programs in place. These municipalities and landowners have found that once the initial repairs are performed, ongoing inspection and maintenance involve costs that are incidental to doing business.

Others, including many federal facilities, await specific mandates to begin to maintain their infrastructure. Without such a mandate, those responsible for the maintenance of stormwater infrastructure can take little action. Meanwhile, many stormwater facilities have become point-sources of pollution with some on the verge of catastrophic failure.

With the appropriate regulatory directives, the resources and jobs that were dedicated to constructing this infrastructure can be converted to maintaining and repairing it.

Impact on Business

Some may suggest that environmental regulations and infrastructure maintenance mandates are bad for business. My experience is the opposite. As demonstrated from the success of the Leadership in Energy and Environment Design (LEED) driven green building industry over the past five years, businesses that rely on regulatory insight and market savvy capitalize on environmental initiatives. Many business owners have identified how regulations change the business environment, and met the changing market needs, resulting in success. Over the course of the worst economic environment since World War II for design and construction firms, we have quadrupled the size of our firm. Regulations and green infrastructure are the primary drivers for this growth.



In the midst of these difficult economic times, our company's greatest challenge is determining the best way to maximize benefits from the opportunities ahead. Along the way, we look forward to continuing to do our part to improve and restore the impacts of urbanization, one stormwater facility at a time.

Thank you, Mr. Chairman, and committee members for the opportunity to appear before you today. I stand ready to answer any questions you might have.

STORMWATERCONSULTINGINC.
STORMWATER | STREAMS | WETLANDS

STORMWATERMAINTENANCE
INSPECTION | MAINTENANCE | REPAIR

128 Cockeysville Road, Suite 200, Hunt Valley, Maryland 21030 | phone 410.785.0875 | fax 443.269.0216 | tes@MdSWM.com
www.MdSWM.com | www.SWMaintenance.com

THEODORE E. SCOTT, PE, CPESC, LEED AP, MSP

A practicing Professional Civil Engineer, Certified Professional in Erosion and Sediment Control, LEED Accredited Professional, and Master Stormwater Practitioner, Mr. Scott has over 25 years of experience in site and stormwater management design, maintenance, construction, and repair.

He is the founder of Stormwater Consulting, Inc., which is an engineering and landscape architecture firm specializing in stormwater, environmental, and infrastructure restoration design. He is also the founder of Stormwater Maintenance, LLC, a niche construction company devoted to the inspection, maintenance, repair, and construction of stormwater management, stream, and wetlands systems. The firms collectively trade as Applied Stormwater and perform work from Richmond, Virginia to Connecticut.

His on-the-ground experience and specialization provides unique insight into emerging trends in design, inspection, maintenance, and repair of stormwater BMPs. He applies this experience to help his clients minimize the cost of constructing, owning, and operating stormwater infrastructure.

Founded by an established industry leader, Mr. Scott's firms provide services throughout the Mid-Atlantic and Northeast with clients ranging from small "Mom & Pop" businesses to Fortune 50 Corporations. Together, his firms provide turn-key design/build services for stormwater and environmental restoration projects.

Mr. Scott is a sought after national speaker and trainer on subject matter related to the design, inspection, construction, maintenance, and repair of all types of stormwater management facilities and drainage infrastructure.

STORMWATER FACTS

WHAT IS STORMWATER?

Stormwater runoff occurs when rain and snowmelt flows over land or impervious surfaces (such as streets, parking lots, sidewalks, and rooftops) and does not percolate into the ground. Increases in impervious surface area cause higher flow rates as runoff collects debris, chemicals, oils, sediment and other pollutants that could adversely affect water quality if discharged to the environment without first being treated.

WHY TREAT STORMWATER?

Control and treatment of stormwater runoff in the United States was mandated by the Clean Water Act in 1972. The National Pollutant Discharge Elimination System (NPDES) program requires businesses, states, and municipalities to have programs, practices, and infrastructure in place to control the discharge of pollutants in stormwater. As a result, most sites constructed in the past 20 years include some form of stormwater treatment.

HOW IS STORMWATER MANAGED?

Controlling and treating runoff is known as stormwater management. While there are many different types of facilities used to control stormwater, two broad categories are Above Ground and Below Ground. Above Ground facilities include basins, dry ponds, wet ponds, sand filters, bioretention, swales, etc. Below Ground facilities are usually unseen and may be underground pipe storage systems, oil/water separators, sand filters, vaults, or they may be proprietary devices for separating, filtering, or storing stormwater.

See reverse side for more information...

STORMWATERMAINTENANCE
INSPECTION | MAINTENANCE | REPAIR

Serving the Mid-Atlantic region since 2004

MD: 410.785.0875
VA: 703.652.0488
DC: 202.787.1971
www.swmaintenance.com

INSPECTIONS

• Inspections help to identify issues that can be addressed with a customized maintenance program.

• Inspections catch small problems before they become larger (and more expensive) problems.

• Inspections include photo documentation and a consise, understandable report including recommendations.

MAINTENANCE

• Maintenance of above-ground facilities targets common problems such as erosion, burrowing rodents and vegetation managment.

• Sediment, litter, and debris should be regularly cleaned to avoid clogging of infrastructure.

• Routine maintenance reduces expensive repairs and helps meet regulatory obligations.

REPAIRS

• Repair work may be necessary if:
  -A facility has been neglected for too long
  -Damage occurs due to a large storm event
  -A facility was designed or constructed poorly
  -Materials have degraded over time

• Our in-house civil engineers design and prepare plans for major repairs.

UNDERGROUND STRUCTURES

• Underground structures designed to capture floatables and sediment. Structures should be cleaned when accumulated sediment has reached a certain volume, as determined by an inspection.

• Clogged pipes can cause flooding. Clogs are easily cleared by high pressure jetting with a vac truck.

COMMON PROBLEMS

• Standing water in metal pipes can accelerate corrosion.

• Damaged pipes can cause sinkholes in parking lots.

• Backed up systems can cause flooding.

• Rodent burrows and woody vegetation can weaken embankments and cause a failure.

• Sediment build-up in infiltration or bioretention facilities can cause a standing water nuisance

• Erosion causes sedimentation and increases frequency of dredging.

• A clogged pond out flow significantly increases costs by destroying vegetation and requiring dredging.

STORMWATERMAINTENANCE
INSPECTION | MAINTENANCE | REPAIR

MD: 410.785.0875
VA: 703.652.0488
DC: 202.787.1971
www.swmaintenance.com