



Florence Fountain

NEWS & HAPPENINGS FROM THE CITY OF FLORENCE & ITS UTILITY SYSTEMS • SUMMER 2011

ENHANCED STORMWATER REGULATIONS



City employee, Donnie McBride, takes a storm water sample from an area drain

The Florence community will see significant new stormwater regulations when the second NPDES permit cycle comes into effect.

Landowners will see it in the way landscape service companies maintain their clients' yards and other properties. Developers and contractors will be

affected in the manner and method of how development plans are reviewed, approved and inspected in the field. Even the City's day-to-day work operations and activities will have to be modified to comply with the new rules.

Unfortunately, a number of the new regulatory requirements will result in an increase in costs. While the City will meet the initial impact with existing funding and staff, increased emphasis on construction review and inspection, monitoring of our area waterways and drainage systems, and maintenance of post construction BMPs may impact the City and its residents. Each of the six minimum control measures (MCM) has significant new performance requirements. Some of the changes in MCM requirements are noted below:

Public Education and Outreach / Public Involvement and Participation

As required in the initial NPDES permit the City is required to educate and involve the public in stormwater pollution abatement. However, the City must also document, in quantifiable

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Florence City Council

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Member-At-Large

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Member-At-Large

The Mayor and City Council serve four-year terms. City Council meets the second Monday of every month in Room 604 at the City-County Complex, 180 North Irby Street, Florence, SC.

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WHAT HAPPENS TO THE RAIN IN OUR AREA?

On average, more than 44 inches of rain fall on the Florence area every year. Considering that there are about 21 square miles inside the Florence city limits, over 16 billion gallons of water fall on the City each year in the form of rain. This is a staggering volume of water to be handled by the natural features and manmade systems serving our City. Let's look at the life and times of the raindrops that fall on Florence.

What is the source of our water? The two



Identifiers such as these are on storm drains City-wide

great reservoirs of water that supply our area are the Gulf of Mexico and the Atlantic Ocean. The energy in weather systems that move across the Pee Dee delivers water that has been evaporated from these bodies. Because this water has been evaporated, leaving behind salts and other impurities, the rain that falls on us is fresh, clean and unpolluted. The raindrops that hit our streets, woods, rooftops, lawns and parking lots are high in quality as they begin their journey through Florence.

Once the raindrops are on the ground, what happens to this great quantity of fresh water? In

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City-supplied pet-waste station

terms, the results of this education / involvement effort. Advertising and education alone will not be sufficient to achieve compliance in the new permit cycle. The City must be able to demonstrate that it has substantively modified the conduct and views of its citizens, businesses and industries as it pertains to stormwater pollution issues.

Illicit Discharge Detection and Elimination (IDDE)

The City has established a wet and dry weather screening methodology and timetable for all municipal stormwater outfalls. The screening procedure involves in-field sampling and laboratory

analysis of stormwater samples for evidence of pollution.

It is required that actions to investigate illicit (illegal) discharges discovered during outfall screening must be undertaken within two business days after the discovery. Once the pollution source has been pinpointed, the City must take immediate action to eliminate the discharge.

Construction Site Stormwater Runoff Control

In general, developers will see higher design requirements for construction activities. The principal new requirement will be to manage the first inch of rain within the disturbed area of the construction site. Deficiencies in sediment control BMPs must be immediately corrected. Inspections and BMP maintenance must be continued

until the project is completed and all disturbed areas are permanently stabilized. All personnel involved in the design, inspection and administration of erosion and sediment control projects must be appropriately trained and licensed through the State.

Post-Construction Stormwater Management

Legally binding maintenance agreements must be submitted prior to approval of each development to ensure proper maintenance and operation of the stormwater management system.

Pollution Prevention / Good Housekeeping

All municipal facilities must be inspected at least once during the permit term for stormwater related pollutant impact.

All catch basins within the City's stormwater drainage system must be mapped, cataloged and ranked in regards to inspection and cleaning frequency. Comprehensive annual inspections are required on all catch basins.

All open channels and ditches within the City's stormwater drainage system must be mapped and cataloged. They must be cleaned at least once per permit term.

Florence's Citywide Stormwater Pollution Prevention Plan Standard Operating Procedures must be followed for all activities that have the potential for stormwater pollution impact. Where practical, the City has targeted areas in an effort to reduce discharge of vegetative litter when performing right-of-way maintenance.

Florence must also develop and maintain a database of all industrial sites currently permitted by South Carolina Department of Health and Environmental Control (SCDHEC) through its industrial permitting program.

Special Conditions

In addition to the six MCMs, the new permit will include a new section. These "special conditions" require that Phase II Stormwater Programs identify all impaired streams within their jurisdictions and make efforts to improve the water quality. For the City of Florence, Jeffries Creek, Middle Swamp and Gully Branch have been identified as streams which are impaired. For these streams the City will have to prepare monitoring and assessment plans for review and approval by SCDHEC and/or the EPA. The assessment plan must address the following requirements:

- Wet-weather monitoring must be done quarterly during a rainfall event at each station as defined in the plan.
- The monitoring and sampling plan must be representative of the designated drainage system.
- The plan must be updated with each annual report.

In addition to the above, all future annual reports must now include the following elements: a fiscal analysis which includes a cost accounting of activities associated with each MCM; reporting of all results of the monitoring plan; number and frequency of enforcement actions; and identification of water quality improvement or degradation.

"It is evident from a review of the new permit that the City and our community face a significant challenge," said Florence City Manager David Williams. "Increasingly, our citizens are coming to realize that healthy streams and wetland ecosystems provide significant benefits to the community. We encourage the citizens of Florence to work with us in our effort to develop workable policies to protect the area's waterways."

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rural, relatively undeveloped sections of the Pee Dee area, approximately 65 percent of the total rainfall is used by plants in their life processes or evaporates directly back into the atmosphere. Around 5 percent of our rainfall soaks, or infiltrates, into the ground and reaches the shallow aquifer systems. The remaining 30 percent becomes runoff and feeds into our streams, creeks and rivers.

However, in urban areas like Florence, hard (impervious) surfaces such as asphalt, concrete and rooftops limit the amount of water that can soak into the ground. As higher percentages of land surfaces are paved or occupied by buildings, there are fewer areas with trees and plants to utilize a portion of the rainfall. These factors combine to cause a significant increase in the volume of rainfall that runs off into ditches and streams. For highly developed watersheds in Florence, as much as 90 percent of the rain received during intense storm events can run off into the drainage system.

What are some consequences of the traditional development practice of building on, and hard surfacing, large portions of urban areas like Florence? First, there are the increased public and private costs of installing much larger drainage pipes to handle the higher



Rainwater runs off in creeks like the one above

flows that result from heavy runoff. Another aspect of urban runoff that sometimes goes unnoticed, however, is that our clean, refreshing raindrops can pick up and carry all sorts of pollutants from the land surfaces where they fall to the streams where they end up. The list of potential pollutants is long, but some examples include pesticides, oils and greases, chemicals from improperly stored materials, soil eroded from construction sites, trash and litter, pet wastes and sewage overflows from malfunctioning septic tanks.

In order to meet the challenge of maintaining good water quality, as required by SCDHEC and EPA, in Florence's creeks and streams, the City will be considering new code requirements and citizen initiatives in the near future. Because trees, lawns and other "green" areas are so useful in managing the quantity and quality of stormwater runoff, developers will be encouraged to use less hard-surfaced area and to incorporate more natural or landscaped areas in their projects.

Construction sites where earth is disturbed will have to be stabilized, resodded and restored within a short period of time to minimize the chances of soil erosion. Pet owners will be required to clean up and properly dispose of pet waste. Efforts will be made to change public attitudes toward littering and illegal dumping.

Residents are part of the solution, by becoming more aware of the sources of stormwater pollution and by taking personal actions that help to keep our raindrops clean, and our waterways unspoiled.



The new tennis activity center

Construction on the 25-acre Florence Tennis Complex and 5,000 square foot Tennis Activity Center is to be completed by the end of June 2011. Excitement is building as the tennis public looks forward to playing on new courts and being able to spend time before and after in the new Activity Center.

The Complex will feature 24 asphalt courts, six clay courts and the tennis activity center with outdoor decking. The activity center will also include a lounge area, student study area with computers, restrooms, locker rooms, meeting and office space and a pro shop. The Complex is located east of North Cashua Drive. The location of the facility is ideally situated for easy access and participation by all members of the Florence

TENNIS COMPLEX NEARS COMPLETION

community. This complex will host league play, open/free play, special instruction, and developmental tennis clinics. In partnership with the Florence Tennis Association, the City also plans to develop an after-school educational/tennis outreach program for city youth.

In recognition of the City's obligation under its Phase II Stormwater Permit, the City's design team for the Tennis Complex specified certain stormwater best management practices (BMPs) that emphasized protection of water quality. The primary purpose of these practices was to reduce pollutant loads and flow velocities. These BMPs and other low impact development (LID) strategies will become more common within the Florence community.

LID is a stormwater management strategy that emphasizes conservation and the use of existing natural site features integrated with stormwater controls that mimic natural hydrologic patterns. A key component of LID is the use of open space and the minimization of impervious surfaces to manage stormwater runoff.

Low Impact Development Principles

- Treat water as a resource
- Minimize impervious surfaces
- Use natural systems to promote infiltration / evapotranspiration of water

- Protect riparian buffers
- Minimize land disturbance during development

Low Impact Development Practices used at the Tennis Complex

- Vegetated filter strips at the edges of paved surfaces designed to capture and soak in stormwater
- Larger impervious parking areas and less asphalt parking
- Bioretention facilities
- Bioswales which are designed to remove silt and pollution from surface runoff water.
- Use of native species for landscaping



Some of the 24 recently completed courts

STORMWATER UTILITY ACCOMPLISHES PERMIT REQUIREMENTS

During December 1996, the City received more than 20 inches of rain within a 30 day period. The flooding issues and public outcry that resulted from these rain events led to a mandate from City Council for City staff to develop a process to deal with drainage issues. This mandate coincided with staff realizations that there were significant new EPA stormwater regulations on the horizon that would fundamentally change the way stormwater is handled by municipalities. It was obvious that a substantial funding source needed to be developed for stormwater issues.

After additional research, it was staff's recommendation that the best solution to funding a responsive program was the creation and adoption of a stormwater utility. In 1998, the City approved the creation of the utility and the first stormwater billing took place in October 2001. A capital drainage improvement program was developed and implemented, and in March 2006, the City began coverage under the first five year permit cycle of the National Pollution Discharge Elimination System (NPDES). This permit expired in February of 2011. The City is currently working with SCDHEC on a new permit which is scheduled to become effective January 2012.

During the life of this permit, the City was able to meet the six mandated NPDES requirements.

1. Public Education and Outreach
2. Public Involvement and Participation

3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Control
5. Post-Construction Runoff Control
6. Pollution Prevention / Good Housekeeping

These requirements were achieved with participation from the following parties, and through the following programs:

- Implementation of stormwater utility
- Development of a Stormwater Advisory Board (SWAB)
- Agreement with Carolina Clear
- Formation of the Florence-Darlington Stormwater Consortium with its community partners
- Development of a Stormwater Management Plan

The City of Florence stormwater utility has accomplished the required permit goals of the first phase of the Stormwater Phase II NPDES Program. A review of the accomplishments of the six Minimum Control Measures (MCMs) follows:

Minimum Control Measures #1 and #2 Public Education, Outreach and Participation

Public Education and Participation are the first two mandates of the NPDES Phase II permit program. In order to address these requirements in a cost-effective manner, the City partnered with Clemson Extension to form the Florence-Darlington Stormwater Consortium. The Consortium works to develop and implement

educational strategies and coordinate community activities. Its primary goal is to educate residents of the Pee Dee region about ways to protect and enhance healthy waterways. Accomplishments during the past two and a half years include the following:

- Developed a partnership with Carolina Clear (Clemson Extension) to assist the City in meeting the requirements of MCMs #1 and #2. Carolina Clear also provided a framework for establishing a working stormwater consortium involving the City of Florence, Florence County and Darlington County.
- Signed a joint resolution on November 18, 2009, forming the Florence-Darlington Stormwater Consortium.
- Developed, through the Consortium, educational events for the general public, city youth, pet owners, engineers, developers and contractors.
- Developed a website dedicated to the stormwater issues specific to Florence.
- Placed a billboard at Five Points in Florence, that stated "Nobody Wants Polluted Water" which produced an estimated impact of 30,400 views per day.
- Aired a stormwater-specific commercial on Time Warner Cable.
- Developed a bilingual educational flyer titled "Leaf It On The Lawn" to provide tips for proper disposal of yard debris.
- Provided educational tours of the Florence Stormwater Improvement and Mitigation (SWIM) Project, which included water quality testing and a look into the local

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- aquatic life within the project.
- Created a stormwater drainage model to educate K-12 students about stormwater runoff and the adverse effect it can have on our local ecosystem.
- Organized a special detail which collected 2.82 tons of debris and litter from Florence roadways.
- Participated in an annual program to clean litter and debris from several ponds located off David McLeod Blvd., resulting in the collection of 20 bags of improperly discarded litter.
- Reorganized the City's stormwater advisory board (SWAB) and conducted six meetings.
- Coordinated, as part of an Eagle Scout Project, the placement of 35 signs along area roadways and trail systems promoting watershed awareness.

Minimum Control Measure #3 Illicit Discharge Detection and Elimination

Illicit discharges are unauthorized stormwater discharges that contribute pollutants to streams and creeks. As part of its response to the NPDES permit requirements, the City must develop a program directed at eliminating illicit discharges to Florence's waterways. The following tasks were accomplished in this endeavor:

- Completed the investigation of 50 percent of the total outfalls within the City.
- Identified and inventoried food service establishments that discharged fats, cooking oils and grease into the sanitary sewer system.
- Increased the number of inspections of local restaurants and other like businesses.
- Enforced the necessary corrective action of four illicit discharges.

Minimum Control Measure #4 Construction Site Runoff

Minimum Control Measure #4 is directed at improving management of construction sites. Poor management of a construction site may lead to soil erosion. When eroded soil enters a water body, this sediment and silt can smother bottom dwelling aquatic life, reduce fish populations, block sunlight needed for plant life and alter the natural wetland ecosystem. With this in mind, the City implemented the following strategies:

- Accepted from SCDHEC primary review and permitting responsibilities for construction.
- Created an inspection process for individual construction sites consistent with SCDHEC and EPA requirements.
- Developed an Enforcement Response Guide (ERG).
- Amended and adopted improved sediment control standards for construction activities.



New construction faces stricter regulation

Minimum Control Measure #5 Post Construction Stormwater Management

Under this mandate the City developed a program to monitor construction best management practices (BMPs) to ensure that they are being properly operated and maintained.

- Adopted and encouraged the use of low impact development practices.
- Inventoried all known post-construction BMPs within the City.
- Issued Notices of Termination on all completed construction projects.

Minimum Control Measure #6 Municipal Pollution Prevention

Under this mandate, the City must, like private businesses, implement maintenance and construction-related programs to prevent or reduce pollutant runoff from municipal operations.

- Completed annual training for staff who are routinely involved with activities directly impacting stormwater runoff. This training included a review of BMPs that can be incorporated into municipal work activities to prevent pollution from impacting area streams and creeks.
- Adopted a site-specific municipal Storm Water Pollution Prevention Plan (SWPPP) which provides guidance for pollution prevention and good housekeeping controls for municipal operations at 22 city-owned facilities.

To learn more about stormwater pollution prevention, please contact Compliance Assistance at (843) 665-3236.

CITY COMPLETES STORMWATER CAPITAL PROJECTS

Since implementation of the stormwater utility, the City of Florence has completed an array of capital stormwater projects that have helped to alleviate drainage issues throughout the City. The list of completed projects follows:

- Ingram/Dunbar Outfall – Cleaned and cleared local ditches and re-graded some swales, thereby reducing ponded water.
- Friendship Park Area – Piped existing swales and ditches to relieve flooding on adjacent roadways, often impassable after summer thunderstorms.
- Woodmont Outfall – Re-established the drainage outfall that serves the Woodmont Subdivision.
- Malden Drive Outfall – Re-directed drainage on the southern end of Malden Drive and Sidney Avenue as part of the Middleton Point Subdivision development.
- Northwest Park – Piped an open ditch along the eastern edge of Northwest Park, relieving major maintenance and public nuisance concerns.
- Cumberland Avenue – Piped an open ditch and replaced an existing culvert to relieve moderate flooding of the area.
- Woods Drive Outfall – Designed and constructed a drainage outfall system that serves College Park Subdivision to relieve localized flooding.
- Meadors Farm Road Ditch – Extended ditch piping along edge of road to stabilize ditch bank and right-of-way.
- Jeffries Creek Restoration Project – Removed selected downed timber, management of localized beaver

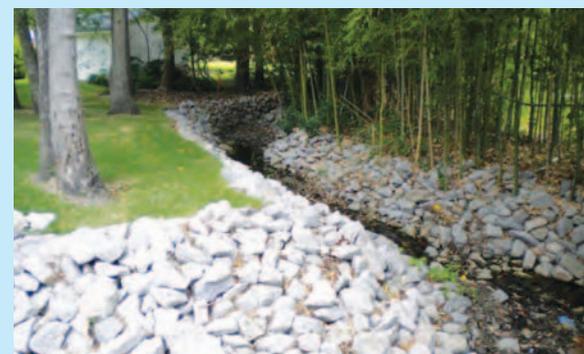
colonies and continual stormwater maintenance program for the area.

- Marion Street Outfall – Constructed new outfall to pond and storm drainage piping with catch basins in the area of Marion, Dixie and Cannon Streets to alleviate street flooding issues.
- Hamlin/Hamlet/Malloy – Constructed new outfall and storm drainage piping and catch basins in the area of Hamlin, Hamlet and Malloy Streets to alleviate street flooding issues.
- Huntington Plaza to Second Loop – Constructed new culvert under Second Loop Road to provide an improved, deeper outfall for the upstream area with new drainage in Huntington Plaza and the Heritage /Partridge Drive area. These improvements created additional runoff capacity for the watershed area, alleviating additional flooding in the Damon Drive area.
- Alton Circle and Beverly Drive – Piped portions of ditch that were erosion hazards, cleaned and re-graded the ditch, built a small berm to channelize flow and prevent stream flow from affecting yards and buildings.
- Cloisters/Wentworth Hall – Clean and re-grade/deepen ditch bottom to create more capacity. This will provide better drainage from the streets and neighborhoods at the upper end of the subdivision. This project is expected to be completed by August 2011.

Additionally, in order to meet water quality and educational requirements of our NPDES permit, the

City developed and implemented the East Florence Stormwater Improvement and Remediation Project. Through development of a constructed wetland in a former landfill, this project serves to improve the water quality of the Pye Branch watershed by filtering stormwater channeled from the surrounding neighborhood.

Utilizing an extensive trail and boardwalk system, including informative kiosks, this demonstration project is a unique education tool that is available as an outdoor laboratory for school field trips. Casual users of the facility will also develop an appreciation of the value derived from natural treatment processes.



Channelized streamflow and erosion stabilization in the Alton Circle area