CITY OF WILMINGTON
STORMWATER SERVICES

City of Wilmington, North Carolina

STORMWATER MANAGEMENT PLAN & ANNUAL NPDES PERMIT REPORT

Prepared by:
City of Wilmington, NC
Stormwater Services
PO Box 1810
209 Coleman Drive
Wilmington, NC 28412

NPDES Permit No.: NCS000406

Reporting Year: July 1, 2015 – June 30, 2016

REPORTING CERTIFICATION

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

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Derek R. Pielech, P.E. Date

Manager, Stormwater Services

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INTRODUCTION

Stormwater Management Plan Overview

The North Carolina Division of Water Quality issued NPDES Phase II Permit NCS000406 to the City of Wilmington effective November 12, 2012. The Stormwater Management Plan is the City of Wilmington's program to comply with NPDES Phase II permit NCS000406 for stormwater discharges from Small Municipal Separate Storm Sewer Systems (MS4s). The plan defines strategies and guidelines necessary for protecting water quality and reducing pollutant discharges to the maximum extent practicable. The plan also includes reporting results for the current yearly reporting period from July 1, 2015 to June 30, 2016.

The plan is a guidance document to be used by the City staff and the general public. The plan is evolving and will address needs and priorities that will be reflected in compliance programs over the 5 year implementation schedule.

As required by EPA regulations for the NPDES Phase II stormwater programs, the following six minimum measures are addressed in the plan:

1. Public Education and Outreach
2. Public Participation and Involvement
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Control
5. Post-Construction Runoff Control
6. Pollution Prevention and Good Housekeeping for Municipal Operations

Program Implementation Status

The City of Wilmington is pleased to report excellent progress for year 3 compliance with requirements of NPDES Phase II permit NCS000406. Primary areas of work include:

- Continued implementation of amended ordinances related to Post Construction and Illicit Discharge BMPs.
- Continued mapping of stormwater infrastructure within areas where data is absent.
- Continuation of Public Outreach and Public Participation efforts.
- Improved procedures for certain maintenance activities in order to improve water quality in surrounding water bodies.
- Implementation of several key actions of the Bradley and Hewletts Creek Watershed Restoration Plan, including the installation of a large bioretention area through the collaborative efforts of plan partners and stakeholders.

Wilmington continues to move forward with implementing the necessary goals and objectives as outlined in their permit. Considerable progress related to Illicit Discharge Detection and Elimination has been made during the past year with respect to dry weather flow monitoring and planning. We continue to have success with our public outreach and participation program and education to the public. The City remains focused on improving the water quality for the areas surrounding water bodies as indicated by UNCW's Center for Marine Science ambient monitoring of water quality on creeks within the City.

CITY OF WILMINGTON STORMWATER SERVICES OVERVIEW

Comprehensive Stormwater Management

Comprehensive stormwater management takes into account both the quantity and quality of stormwater runoff and is reflected in five core components of Wilmington's Stormwater Services program:

Management & Planning

Master planning utilizes the existing stormwater system inventory to develop a long range plan to improve drainage and water quality within an entire watershed. When planning on such a large scale, Stormwater Services seeks involvement and input from citizens and stakeholders. Management activities also include customer service – responding to customer concerns or inquiries and administrative services required for operation of the City stormwater utility.

Regulatory and Enforcement

Regulatory and enforcement activities are outlined in the City's existing stormwater ordinance requiring comprehensive stormwater management and creating technical standards for design and maintenance of private stormwater facilities. Stormwater Services also provides semi-annual inspections for privately permitted stormwater retention facilities. These inspections are performed in order to ensure compliance with city maintenance standards. Compliance with NPDES Phase II stormwater regulations also fall into this category.

Capital Improvements

The stormwater utility provides dedicated funding and staff resources for planning, designing, and constructing capital projects. These projects are necessary when the existing storm drainage system is inadequate and can result in flooded streets, houses, and businesses. Capital improvement projects require collaboration among City departments, outside agencies, and citizens in affected areas. Whenever possible, capital projects incorporate innovative design or best management practices (BMPs) to improve water quality and reduce the quantity of stormwater runoff.

Operations and Maintenance

The City of Wilmington's Maintenance Division is responsible for maintaining the public drainage system. Maintenance activities consist of open drainage, closed drainage, street sweeping, and best management practices (BMPs). The open drainage system consists of roadside swales, ditches, channels, creeks, and ponds. The closed drainage system consists of pipes, culverts, catch basins, and manholes. Both of these systems are maintained using manual and mechanical techniques to insure that they remain open for proper drainage. Street sweeping provides preventative maintenance to minimize the amount of trash, debris,

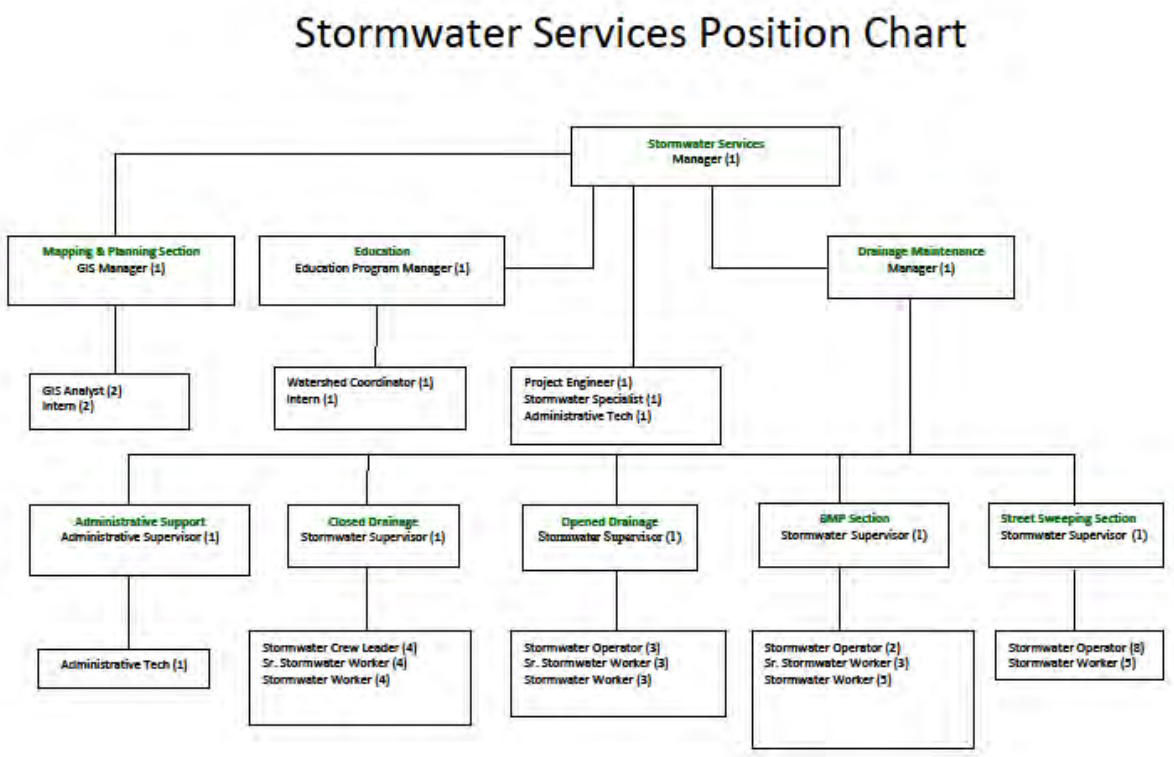
sediment, and other pollutants entering open or closed drainage routes. BMP maintenance consists of activities necessary to keep over 62 BMP sites including ponds, wetlands, and bio-retention areas in fully-functioning condition.

Water Quality

Water quality monitoring is executed by the University of North Carolina at Wilmington under annual contract with the City. Monitoring is performed on specific creeks and waterways within the City limits. Monitoring tests for specific pollutants and resulting data is used to plan capital improvement projects, guide outreach and education efforts, assess water quality at the sites monitored, identify persistent pollutant discharge areas or points, help to build a framework for future detection and tracing of pollutant sources and obtain grant funding. In addition, Stormwater Services implements an extensive outreach, education, and public involvement program that serves the citizens of Wilmington and includes a wide array of water quality education programming and materials. These programs include school presentations, homeowner association outreach, stormwater publications and giveaways, mass media advertising, special event exhibits, workshops, volunteer cleanups and storm drain marking, and collaborative efforts such as grant projects. These efforts strive to educate and engage citizens in protecting and improving local water quality through awareness, education, behavior modification and action.

Management and Planning

Organization Chart of the Stormwater Services Division



Estimated FY 16-17 Stormwater Management Fund Budget for NPDES

	FY 15-16 Adopted	FY 16-17 Adopted	
REVENUES			
Storm Water Utility Fees	7,291,414	7,730,986	
City Streets Storm Water Fees	2,249,917	2,441,004	
Storm Water Discharge permits	20,000	47,000	
NCDOT Drainage Maintenance	37,000	37,000	
Interest Earnings	44,231	44,231	
Miscellaneous	-	-	
Appropriated Fund Balance	-	-	
TOTAL REVENUES	9,642,562	10,300,221	
EXPENDITURES			
Public Services	5,143,894	5,202,047	
Non-Departmental	977,066	1,160,853	
Debt Service	2,421,602	1,837,321	
Contingency	100,000	100,000	
Transfer to Capital Project Fund	1,000,000	2,000,000	
TOTAL EXPENDITURES	9,642,562	10,300,221	[1]

[1] The FY 2017 budget was adopted by the Wilmington City Council on June 21, 2016

Regulatory and Enforcement

Public Services Code Enforcement

The City's stormwater ordinance required by this permit has been effective since November 1, 2009. Citizens can report suspected pollution through the Stormwater Hotline and the webpage reporting form. All complaints received by the Stormwater Division either from the public or from City staff is investigated; corrective action is prescribed; documented and followed until the violation is resolved. A Enforcement/Civil Penalty Guidance tool has been developed and is now being used to ensure consistency and help to guide the decision making process for NOVs and Civil Penalty issuance. Any complaints received that have environmental impacts other than stormwater or fall outside the City's regulatory authority are referred to DENR DWQ Wilmington Regional Office.

In an effort to maximize voluntary compliance, the City has, and will continue to develop and distribute educational materials to targeted populations in an aggressive manner. Consequently, all complaints provide the opportunity to educate the public on the issues that threaten stormwater, the best management practices for prevention, the awareness of our city's stormwater program, and the new ordinance.

Compliance through Public Education

The stormwater code enforcement program strives to maximize voluntary compliance through public education and use enforcement through penalties as a last resort. Staff has found that most stormwater ordinance violations can be resolved through public education. Most of the people encountered violating the ordinances are not even aware of their wrongdoings. Teaching them why they are in violation and why it matters works because most people want to do the right thing. There are very few repeat offenders. In Fiscal Year 2015, a total of 2 repeat offender were identified. Our enforcement and civil penalties are reserved for 1) serious discharges and spills with the potential of harming human health and the environment, 2) repeat offenders, and 3) as a last resort to achieve compliance.

The program developed an assortment of educational material for targeted audiences, as well as targeted pollutants that teach the public about our stormwater ordinance and pollution prevention. For other circumstance specific letters are written with instructions to guide violators to a solution and compliance expectations. This clear outline of the City's expectations is a powerful tool for preventing future pollution problems.

Yard Waste

Yard waste violations receive a face to face meeting and a standardized letter explaining the ordinance and the reasons why it is necessary. Also highlighted are the expectations for compliance and civil penalties for any future violations. This letter is accompanied by a poster in English or Spanish and in various sizes. The poster's objective is to help educate landscape companies and their employees on the ordinance requirements that keep yard waste out of the drainage system and surface waters and the city's expectations.

Pet Waste

Reports of pet waste violations receive a face to face meeting if possible. A brochure and flyer has been developed explaining the dangers of pet waste bacteria in surface waters and the city's expectations as well as the ordinance and penalty amounts for any violations. Pet waste message flags are used and distributed with ordinance information in parks and public places, and in specific neighborhoods in response to complaints. The pet waste flyer is also available in poster size for display when needed in parks and common areas.

Illicit Discharges

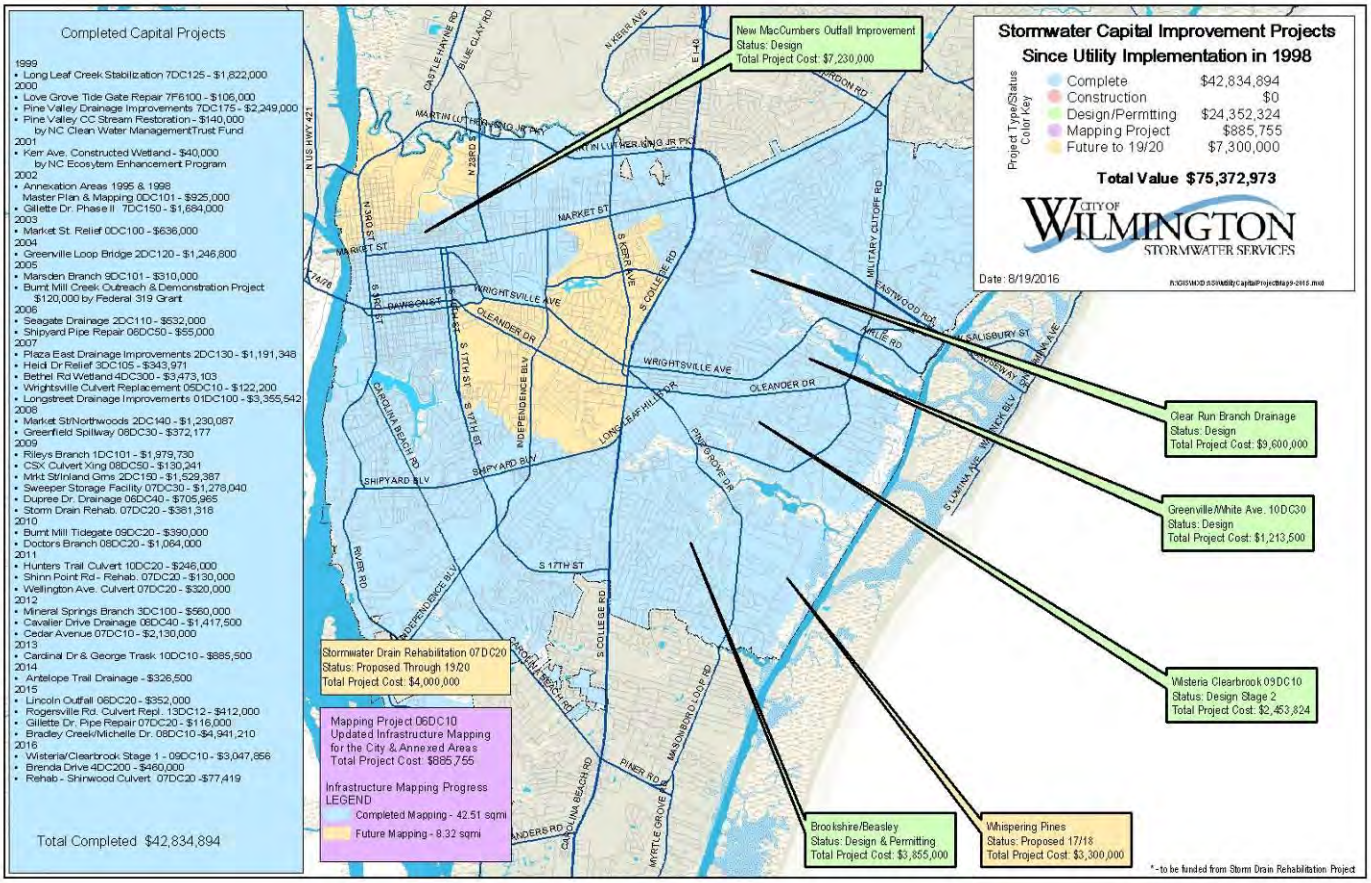
Reports of illicit discharges are addressed on a case by case basis. Informational posters and brochures for general use have been developed for distribution targeting the general public as well as specific source types that are typical in any urban area. These posters are kept on hand and distributed to businesses on an as needed basis to inform and educate them and their employees in restaurants, vehicle maintenance facilities, construction sites, on industry specific issues and best management practices specific to their businesses on how to avoid and prevent stormwater pollution. For issues that require investigation, assessment, and enforcement the process detailed in the Illicit Discharge Detection and Elimination Manual is followed.

Cape Fear Public Utility Authority

The Cape Fear Public Utility Authority (CFPUA) currently employs three Environmental Compliance Officers, one Environmental Compliance Supervisor, and one Environmental Compliance Manager that implement and enforce elements of the City's NPDES Wastewater Discharge Permit to include the City's Collection System Permit. As part of those requirements the group regulates sanitary sewer overflows (SSOs) and eliminates any wastewater or other polluted waters from leaving their system. They respond to reports and investigate leads generated by the public or monitoring results as part of their permit requirement and respond using public education, enforcement, and maintenance. The CFPUA copies the City on all SSOs and follows up with monitoring results and clean up measures. The CFPUA has maintained right of entry on the properties that it services. The city and CFPUA are working together to keep open lines of communication, continue to build relationships, and combine resources in a continued effort to locate chronic leaks and minimize release to MS4.

The CFPUA and the City continue to utilize the joint policy established in 2011 for the reporting and documentation of SSOs and leaks. This policy provides procedures for CFPUA to follow regarding reporting and documentation of SSOs that impact the City's MS4. These guidelines will enable the City to comply with Phase II reporting requirements as well as provide assistance to CFPUA in mitigating any potential threat to public health and environment. This policy is attached in Appendix D.

Capital Improvements



In-House Projects

Location	Pipe				Structures			BMP			Total Cost
	Amt.	Size	Type	Cost	Amt.	Type	Cost	Amt.	Type	Cost	
Raintree Wetland *								0		$ 3,201.32	$ 3,201.32
901 Fanning St. (Dreams Grant)								0	Biorention Cell	$ 17,999.83	$ 17,999.83
4604 Bentley Dr	48'	24"	RCP	$ 13,879.21	2	Casting, frame & grate, 24 x 36	$ 5,385.38				$ 19,264.59
					2	Casting, frame & grate, 24 x 36					
					2	Headwall					
	80'	42"	RCP		1	Specialty bottom, 2 x 3					
405 Brookshire lane	8'	15"	RCP	$ 7,884.55	1	Specialty bottom, 5 x 5	$ 24,039.10				$ 31,923.65
105 Chelsea Lane	134'	15"	RCP	$ 10,039.83	1	Casting, manhole complete, 24"	$ 3,241.25				$ 13,281.08
213 Derby Down Way *				$ 8,178.82							$ 8,178.82
5413 Forest Ave	24'	18"	RCP	$ 2,638.38							$ 2,638.38
	248'	24"	RCP								
128 Grainger Point Rd	42'	6"	Subdrain	$ 27,386.43							$ 27,386.43
			Perforated								
451 Hollis Rd	88'	6"	PVC Sewer	$ 8,392.66							$ 8,392.66
			Corrugated								
Nottingham Ln & Greenwich Ln	60'	12"	Galavanized	$ 2,377.31	1	Specialty bottom, 2 x 3	$ 1,783.71				$ 4,161.02
Orange & Jasmine St *				$ 44.70							$ 44.70
107 Oxmoor Place	8'	18"	RCP	$ 13,678.72	1	Specialty bottom, 2 x 3	$ 1,368.08				$ 15,046.80
4106 Park Ave	35'	12"	RCP	$ 1,815.21							$ 1,815.21
Pine Grove & Ivocet Dr	153'	30"	RCP	$ 17,664.21	2	Specialty bottom, 2 x 5	$ 1,904.28				$ 19,568.49
378 R L Honeycutt Dr	6'	15"	RCP	$ 1,069.36							$ 1,069.36
	168'	24"	RCP								
6208 Turtle Hall Dr *	24'	18"	RCP	$ 26,540.44	1	Special made bottom, 4 x 4	$ 2,881.90				$ 29,422.34
646 Windemere Rd	80'	15"	RCP	$ 4,480.84	1	Speciality slab, 5 x 5	$ 2,123.87				$ 6,604.71
3412 Amber Dr					1	Headwall	$ 5,166.17				$ 5,166.17
5753 Oak Bluff Ln					1	headwall	$ 1,296.21				$ 1,296.21
Total				**$ 146,070.67**			**$ 49,189.95**			**$ 21,201.15**	**$ 216,461.77**

***carry over from FY14/15 report**

Operations and Maintenance

Yearly Maintenance Activities Chart

SECTION 1: CONSTRUCTION					
C-1 Construction - Structure	18.00	each	1,026.00	$	48,054.18
C-1 Construction - Pipe	1,206.00	ft.	2,453.50	$	134,568.23
C-2 Construction - Flume					
C-3 Construction - Ditch		each			
C-3 Construction - BMP	1.00	each	327.00	$	21,201.15
C-0 Construction - Stock pile material	101.00	load	160.25	$	8,298.45
C-0 Construction - Plan work			769.25	$	30,234.06
			4,736.00	**$**	**242,356.07**
SECTION 2: INSPECTION					
I-1 Inspection - Closed			4,331.00	$	123,701.70
I-1 Inpection - Video	27,327.00	ft.	808.50	$	19,325.43
I-1 Inspection-Video data management			4.00	$	90.40
I-1 Inspection-new system					
I-1 Inspection-Survey			24.00	$	796.88
I-2 Inspection-Open			941.75	$	23,648.17
I-3 Inspection-BMP	530.00	each	461.00	$	9,830.92
I-3 Inspection-Lake					
I-4 Inspection-Tide gate					
I-0 Inspection-Miscellaneous					
I-0 Inspection-Plan work			7.00	$	203.96
			6,577.25	**$**	**177,597.46**
SECTION 3: MAINTENANCE					
M-1 Maintenance-BMP	574.00	each	4,880.23	$	138,816.22
M-1 Maintenance-Right of Way			2,805.00	$	90,114.73
M-2 Maintenance-Ditching manual	209,673.00	ft.	3,767.50	$	98,155.36
M-3 Maintenance-Ditching mechanical	20,506.90	ft.	1,727.50	$	76,414.09
M-4 Maintenance-Culvert	760.00	each	254.00	$	7,469.97
M-5 Maintenance-Pipe	105,257.00	ft.	3,050.00	$	149,204.37
M-5 Maintenance-Structure	16,222.00	each	3,997.75	$	157,173.08
M-5 Maintenance-Reset cover	284.00	each	353.50	$	9,259.84
M-6 Maintenance-Lake	53.00	each	610.00	$	19,822.05
M-7 Maintenance-Mowing	613,218.30	ft.	2,433.50	$	96,903.90
M-7 Maintenance-Mowing right of way	90.83	acre	535.25	$	25,972.45
M-8 Maintenance-Tide gate	9.00	each	73.00	$	1,793.71
M-9 Maintenance-Sweep streets	10,045.27	mile	5,508.50	$	353,377.43
M-9 Maintenance-Sweep support			2,327.25	$	77,994.26
M-10 Maintenance-Haul waste	259.00	load	296.75	$	14,276.05
M-10 Maintenance-Screen material			1,371.75	$	50,767.85
M-11 Maintenance-Vehicle			1,464.00	$	62,491.53
M-0 Maintenance-Yard			7.00	$	273.35
M-0 Maintenance-Plan work					
			35,462.48	**$**	**1,430,280.24**
SECTION 4: REPAIR					
R-1 Repair-Pipe failure	219.00	each	4,086.00	$	156,213.50
R-2 Repair Pipe work	332.00	ft.	929.50	$	44,011.42
R-2 Repair-Convert structure	1.00	each	91.00	$	4,075.46
R-3 Repair Structure	74.00	each	1,350.50	$	54,300.21
R-4 Repair Erosion	3,865.90	ft.	456.00	$	22,957.39
R-5 Repair Replace cover	132.00	each	154.00	$	18,727.96
R-5 Repair Tidegate	-	each			
R-0 Repair- Plan work			115.00	$	3,256.80
			7,182.00	**$**	**303,542.74**

Water Quality

Monitoring Program Overview

In October 1997, the City of Wilmington contracted with the UNCW Center for Marine Science for a project with the goal of assessing water quality in Wilmington City watersheds under base flow conditions. Also, certain sites were analyzed for sediment heavy metals concentrations (EPA Priority Pollutants). New Hanover County also participated in this effort for tidal creeks outside of City jurisdiction. UNCW produced a combined report of results entitled Environmental Quality of Wilmington and New Hanover County Watersheds. Immediately below is an overview of their work methods. Following this overview is the executive summary of their most recent report.

The water quality data in these reports are presented from a watershed perspective. Some of the watersheds cross political boundaries (i.e. parts of the same watershed may lie in the County but not the City). Howe and Whiskey Creeks are examples. Water quality parameters analyzed in the tidal creeks include water temperature, pH, dissolved oxygen, salinity/conductivity, turbidity, nitrate, ammonium, orthophosphate, chlorophyll *a*, and in selected creeks fecal coliform bacteria. Similar analyses were carried out in the City watersheds with the addition of total nitrogen (TKN), total nitrogen (TN), total phosphorus (TP), total suspended solids (TSS) and biochemical oxygen demand (BOD) at selected sites.

Water Quality Methods

Field parameters were measured at each site using a YSI 6920 Multiparameter Water Quality Probe (sonde) linked to a YSI 650 MDS display unit. Individual probes within the instruments measured water temperature, pH, dissolved oxygen, turbidity, salinity, and conductivity. YSI Model 85 and 55 dissolved oxygen meters were also used on occasion. The instruments were calibrated prior to each sampling trip to ensure accurate measurements. The UNCW Aquatic Ecology laboratory is State-Certified for field measurements (temperature, conductivity, dissolved oxygen and pH) and for laboratory chlorophyll *a* measurements.

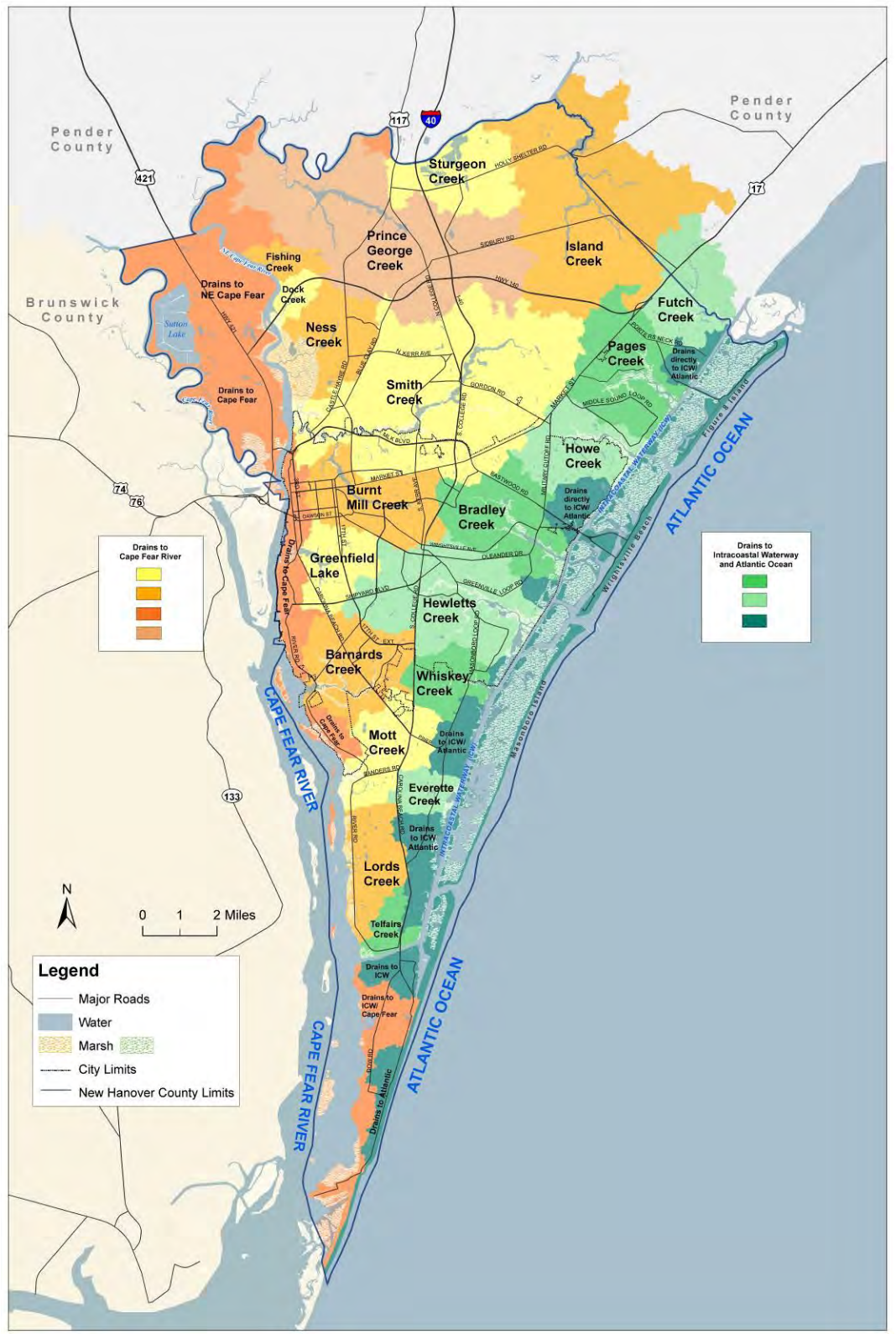
The analytical method used to measure chlorophyll *a* is described in Welschmeyer (1994) and US EPA (1997). Chlorophyll *a* concentrations were determined from the 1.0 micrometer glass fiber filters used for filtering samples for nitrate+nitrite and orthophosphate analyses. All filters were wrapped individually in aluminum foil, placed in an airtight container and stored in a freezer. During the analytical process, the glass filters were separately immersed in 10 ml of a 90% acetone solution. The acetone was allowed to extract the chlorophyll from the material for 18-24 hours. The solution containing the extracted chlorophyll was then analyzed for chlorophyll *a* concentration using a Turner AU-10 fluorometer. This method uses an optimal combination of excitation and emission bandwidths that reduces errors in the acidification technique.

Nutrients (nitrate, ammonium, total Kjeldahl nitrogen, total nitrogen, orthophosphate, and total phosphorus) and total suspended solids (TSS) were analyzed by a state-certified contract laboratory using EPA and APHA techniques. We also computed inorganic nitrogen to phosphorus

molar ratios for relevant sites (N/P). Fecal coliform concentrations were determined using a membrane filtration (mFC) method (APHA 1995).

For a large wet detention pond (Ann McCrary Pond on Burnt Mill Creek) and for a constructed wetland on Kerr Avenue (at the headwaters area of Burnt Mill Creek) UNCW collected data from input (control) and outfall stations. This data was used to test for statistically significant differences in pollutant concentrations between pond input and output stations. The data were first tested for normality using the Shapiro-Wilk test. Normally distributed data parameters were tested using the paired-difference t-test, and non-normally distributed data parameters were tested using the Wilcoxon Signed Rank test. Statistical analyses were conducted using SAS (Schlotzhauer and Littell 1987).

Wilmington (New Hanover County)Watersheds Map



Wilmington Watersheds Yearly Monitoring Report (UNCW)

ENVIRONMENTAL QUALITY OF WILMINGTON AND NEW HANOVER COUNTY WATERSHEDS, 2015

by

Michael A. Mallin, and Matthew R. McIver

CMS Report 16-01
Center for Marine Science
University of North Carolina Wilmington
Wilmington, N.C. 28409
May 2016

http://www.uncw.edu/cms/aelab/

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Executive Summary

This report represents combined results of Year 18 of the Wilmington Watersheds Project. Water quality data are presented from a watershed perspective, regardless of political boundaries. The 2015 program involved 7 watersheds and 22 sampling stations. In this summary we first present brief water quality overviews for each watershed from data collected between January and December 2015.

Barnards Creek – Barnards Creek drains into the Cape Fear River Estuary. It drains a 4,173 acre watershed that consists of 22.3% impervious surface coverage, and a population of approximately 12,200. Water column sampling was not funded during 2015.

Bradley Creek – Bradley Creek drains a watershed of 4,583 acres, including much of the UNCW campus, into the Atlantic Intracoastal Waterway (AICW). The watershed contains about 27.8% impervious surface coverage, with a population of about 16,470. Three sites were sampled, all from shore. In 2015 there were no significant algal blooms recorded, but average dissolved oxygen was fair to poor at the three sites. All three sites sampled were rated poor due to high fecal coliform bacteria, with the south branch site BC-SB and the College Acres station BC-CA both having especially high counts.

Burnt Mill Creek – Burnt Mill Creek drains a 4,207 acre watershed with a population of about 23,700. Its watershed is extensively urbanized (39.8% impervious surface coverage) and drains into Smith Creek. Three locations were sampled during 2015. This creek had very poor water quality, with high fecal coliform counts occurring at two of the three sites exceeding the human contact standard > 80% of occasions sampled. One major and several minor algal blooms occurred in 2015. Dissolved oxygen concentrations were good in the upper creek and poor in the lower creek in 2015.

The effectiveness of Ann McCrary wet detention pond on Randall Parkway as a pollution control device for upper Burnt Mill Creek was mixed for 2015. Comparing inflows to outflows, there were significant increases in dissolved oxygen and pH, but also significant increases in total phosphorus and chlorophyll *a*. However, there were significant decreases in fecal coliform counts and nitrate. Several water quality parameters showed an increase in pollutant levels along the creek from the exit from the detention pond to the downstream Princess Place sampling station, including fecal coliform bacteria and nitrate.

Greenfield Lake – This lake drains a watershed of 2,465 acres, covered by about 37% impervious surface area with a population of about 10,630. This urban lake has suffered from low dissolved oxygen, algal blooms, periodic fish kills and high fecal bacteria counts over the years. The lake was sampled at four tributary sites and three in-lake sites. The four tributaries of Greenfield Lake (near Lake Branch Drive, 17th Street, Jumping Run Branch, and Lakeshore Commons Apartments) all suffered from low dissolved oxygen problems, as did one of the three in-lake stations. Algal blooms are periodically problematic in Greenfield Lake, and have occurred during all seasons, but

are primarily a problem in spring and summer. In 2015 algal blooms continued to occur in the lake. The continuing presence of the blooms led NCDENR to add (February 2014) this lake to the NC 303(d) list for excessive chlorophyll *a*. In the period 2007-2013 there was a statistically significant relationship within the lake between chlorophyll *a* and BOD5, meaning that the algal blooms are an important cause of low dissolved oxygen in this lake. Stormwater runoff into the streams also contributes BOD materials into the lake. In 2015 all tributary stations and one of the in-lake stations exceeded the fecal coliform State standard on 50% or more of occasions sampled.

Beginning in 2005 several steps were taken by the City of Wilmington to restore viability to the lake. Sterile grass carp were introduced to the lake to control (by grazing) the overabundant aquatic macrophytes, and four SolarBee water circulation systems were installed in the lake to improve circulation and force dissolved oxygen from the surface downward toward the bottom. Also, on several occasions a contract firm and City staff applied herbicides to further reduce the amount of aquatic macrophytes. These actions led to a major reduction in aquatic macrophytes lake-wide, and improved in-lake dissolved oxygen content. However, the times that chlorophyll *a* concentrations exceeded the state standard have tripled since the installation of the mixers, addition of herbicides, and grass carp introductions. Again, this led to the lake being included on the 2014 NC 303(d) list for impaired waters.

Hewletts Creek – Hewletts Creek drains a large (7,478 acre) watershed into the Atlantic Intracoastal Waterway. This watershed has about 25.1% impervious surface coverage with a population of about 20,210. In 2015 the creek was sampled at four tidal sites and one non-tidal freshwater site.

Incidents of low dissolved oxygen occurred on 33% of samples collected at Stations SB-PGR and NB-GLR in 2015. Turbidity was low, and only one large algal bloom was documented in 2015. Fecal coliform bacteria counts exceeded State standards 100% of the time at MB-PGR and NB-GLR, 67% of the time at PVGC-9, and 50% of the time at SB-PGR. The geometric means at PVGC-9, MB-PGR, SB-PGR and NB-GLR all well exceeded 200 CFU/100 mL for a poor rating for this pollutant parameter, but the geometric mean of fecal bacteria counts at HC-3 was well under the standard at 50 CFU/100 mL.

During 2007 the 7.6 acre JEL Wade wetland (located at the end of Bethel Road) was constructed to treat stormwater runoff from a 589 acre watershed within the Hewletts Creek drainage. Drainage for this wetland enters the south branch of the creek, upstream of the SB-PGR sampling site. This constructed wetland has continued to function well in reduction of nutrients and fecal bacteria from stormwater inputs. Additionally, sampling data collected downstream of the wetland at Station SB-PGR showed a statistically significant decline in ammonium and nitrate and near-significant decrease in fecal coliform bacteria after completion of the wetland, demonstrating the wetland's benefits to the creek system as a whole.

Howe Creek – Howe Creek drains a 3,516 acre watershed into the AICW. This watershed hosts a population of approximately 6,460 with about 21.4% impervious surface coverage. Two stations

were sampled in Howe Creek in 2015. Both stations sampled had one major algal bloom exceeding the NC standard. The uppermost station HW-DT was rated poor for high fecal coliform bacteria counts, exceeding the state standard on 100% of the times sampled, while HW-GP was also rated poor, exceeding the standard on 33% of occasions sampled. Dissolved oxygen concentrations were rated good at both sample sites in 2015.

Motts Creek – Motts Creek drains a watershed of 3,342 acres into the Cape Fear River Estuary with a population of about 9,530; impervious surface coverage 23.4%. This creek was not sampled for water quality by UNCW in 2015.

Smith Creek – Smith Creek drains into the lower Northeast Cape Fear River just upstream of where it merges with the Cape Fear River. It has a watershed of 16,650 acres that has about 21.3% impervious surface coverage, with a population of about 31,780. One estuarine site on Smith Creek, SC-CH, was sampled by UNCW under the auspices of the Lower Cape Fear River Program (LCFRP).

The dissolved oxygen standard for Smith Creek, which is rated as C Sw waters is 4.0 mg/L, which was not violated in our 2015 samples. The North Carolina turbidity standard for estuarine waters (25 NTU) was not exceeded. There were no algal blooms present upon any of our 2015 sampling occasions. Fecal coliform bacterial concentrations exceeded 200 CFU/100 mL on 33% of samples in 2015, for a Poor rating.

Whiskey Creek – Whiskey Creek is the southernmost large tidal creek in New Hanover County that drains into the AICW. It has a watershed of 2,078 acres, a population of about 8,000, and is covered by approximately 25.1% impervious surface area. One station, on Masonboro Loop Road, was sampled from shore along this creek in 2015. This site had low to moderate nutrient concentrations and no algal bloom problems. Dissolved oxygen was substandard (below 5.0 mg/L) on one of six occasions sampled, whereas fecal coliform bacteria counts were above standard on 50% of occasions sampled.

Water Quality Station Ratings – The UNC Wilmington Aquatic Ecology Laboratory utilizes a quantitative system with four parameters (dissolved oxygen, chlorophyll *a*, turbidity, and fecal coliform bacteria) to rate water quality at our sampling sites. If a site exceeds the North Carolina water quality standard (see Appendix A) for a parameter less than 10% of the time sampled, it is rated Good; if it exceeds the standard 10-25% of the time it is rated Fair, and if it exceeds the standard > 25% of the time it is rated Poor for that parameter. We applied these numerical standards to the water bodies described in this report, based on 2015 data, and have designated each station as good, fair, and poor accordingly (Appendix B).

Fecal coliform bacterial conditions for the entire Wilmington City and New Hanover County Watersheds system (22 sites sampled for fecal coliforms) showed 5% (i.e. one) to be in good condition, 9% in fair condition, but **86%** in poor condition, higher than in 2014. Dissolved oxygen conditions system-wide (22 sites) showed 36% of the sites were in good condition, 23

were in fair condition, and 41% were in poor condition, a deterioration from 2014. For algal bloom presence, measured as chlorophyll *a*, 68% of the 22 stations sampled were rated as good, 18% as fair and 14% as poor. For turbidity, all 22 of the 22 sites sampled were rated as good. It is important to note that the water bodies with the worst water quality in the system also have the most developed watersheds with the highest impervious surface coverage; Burnt Mill Creek – 39% impervious coverage; Greenfield Lake – 37% impervious coverage; Bradley Creek – 28% impervious coverage.

2015-2016 NPDES PROGRAM HIGHLIGHTS & ANNUAL REPORTING

Public Education & Outreach

- Stormwater Watch annual newsletter mailed to 40,000+ city residents highlighting UNCW water quality testing and State 303(d) list status of local creek and litter-focused articles.
- A collaboration with the UNCW Film Studies class resulted in a high-definition, media quality public service announcement that will be aired in paid campaigns next year.
- 68 Enviroscape watershed education presentations delivered to 8th grade science classes in New Hanover County Schools serving over 2,100 students.

Public Involvement & Participation

- Public meetings were held for Clear Run Branch drainage improvement project, and targeted mail/door hangers were sent to residents impacted by the following projects: Oxmoor Place,
- South Branch of Bradley Creek, Wisteria/Clearbrook, Brookshire/Derby, Clearbrook,
- 55 storm drain markers were placed by volunteers in the Holly Glen, Brookwood, and Colonial Drive areas this year.
- 10 watershed cleanups were held involving 311 volunteers contributing 822 volunteer hours and collecting over 225 thirty gallon bags of trash, two 92-gallon bins of garbage, and two 92-gallon bins of recyclables.

Illicit Discharge Detection and Elimination (IDDE)

- Stormwater infrastructure mapping has continued with the goal of mapping the public drainage system throughout the City. Currently, approximately 83% of the City has been mapped.
- The City has a full year of data collection with its established procedures for collecting data (introduced during the previous reporting year) for dry weather flow monitoring.
- The City conducted 5 dry weather flow investigation segments in the Burnt Mill Creek, Greenfield Lake and Upper Cape Fear River watersheds.

Post-Construction Site Runoff Controls

- Continued implementing the City's Land Development Code to provide post construction controls to meet the requirements of the City's Phase II permit and to bring the ordinance into compliance with the recent Coastal Stormwater Legislation.
- Continued site plan reviews of all new development and redeveloped sites.
- Conducted inspections on privately owned BMPs located within the City limits in order to ensure that maintenance requirements were being met by property owners.

Pollution Prevention and Good Housekeeping for Municipal Operations

- Continued implementation of BMPs in SPPP for Fleet Maintenance Facility.
- Improved decanting procedures from the City's vacuum trucks in order to help improve water quality to surrounding water bodies.
- Continued to implement BMPs per the recommendation plans for several City facilities with the potential to pollute.
- Continued planning for water quality improvements to existing City maintenance activities for Stormwater, Streets, and Parks and Recreation departments.

Voluntary Watershed Restoration Plan

- Secured a 319 grant in partnership with the NC Coastal Federation to install 12 BMPs in the Bradley and Hewletts Creek Watersheds in 2017.
- Coordinated a training, in partnership with NC Cooperative Extension that certified 17 local professionals in residential rain garden installation.
- Developed and mailed educational literature to roughly 17,500 target watershed residents and businesses, concentrating on sediment and litter as sources of pollution in local tidal creeks.

PUBLIC EDUCATION AND OUTREACH

1. Objectives for Public Education and Outreach

a. Implement a public outreach and education program, locally or through cooperative or contractual agreement, which includes a combination of approaches designed to reach the public and target audiences with stormwater pollution prevention messages.

b. Distribute educational materials and information and conduct outreach/education activities for the community, which address the impacts of stormwater discharges on water bodies and the steps the public can take to reduce stormwater pollution.

2. BMPs for Public Education and Outreach

The permittee shall implement the following BMPs to meet the objectives of the Public Education and Outreach Program.

BMP	Measurable Goals
a. Define outreach/education program goals including a description of the target pollutants, sources, and target audiences	Define goals and objectives of the outreach/education program to include a description of target pollutants or stressors, likely residential and/or industrial and commercial sources of these pollutants, target audiences for each pollutant and why they were selected, and key outreach messages. Update this section as necessary to reflect changes in the target audience, public awareness, etc.

Accomplishments:

A comprehensive plan including our outreach/education program goals and objectives and target pollutants, sources and audiences is included in the Public Education and Outreach Appendix. The plan defines the origin and sources of each pollutant, target audience(s), and includes suggested outreach strategies and key outreach messages. Staff regularly uses this information as a guide for planning, implementing, and evaluating outreach and education efforts throughout the city. The plan is updated and modified as pollutant sources, target audience demographics, public awareness, water quality, funding, and other program variables change over time.

b. Distribute public education materials and information to identified target audiences and user groups. For example, schools, homeowners, and/or businesses.	The permittee shall distribute stormwater educational materials and information to appropriate target groups. Instead of developing its own materials, the permittee may rely on Public Education and Outreach materials supplied by the state, and/or other entities through a cooperative or contractual agreement, as available, when implementing its own program.

Accomplishments:

The Enviroscape Watershed Education Program has been integrated into the 8th grade curriculum for over 10 years. As a result, the program reaches all 8th grade science classes in New Hanover County Schools, serving approximately 74 classes and 2,200 students each year. Over the course of 10 years, the program has reached over 740 classes and 22,000 students with information about watersheds, water quality, non point source pollution and solutions, and how to be a good steward of our waterways. Cape Fear River Watch, New Hanover Soil & Water Conservation District and the City of Wilmington Stormwater Services have trained and certified instructors that deliver the presentations each year. Anonymous teacher feedback surveys have been very positive for the life of the program and end of grade test scores rate high in the county for this content area.

Stormwater education staff made several presentations to UNCW classes including an Environmental Policy class and Film Studies class. The collaboration with the Film Studies class resulted in a digital and television quality public service announcement (PSA) focused on stormwater. Education staff will air the PSA in a paid campaign next year. An overview of the history and function of Wade Wetland and invasive plant species was presented to a Cape Fear Community College Biology class in the spring.

This year's annual Stormwater Watch newsletter was mailed to 40,000+ city residents. The topic focus centered on the problematic issue of litter, which is impacting crew maintenance activities, as well as wildlife, habitat, and aesthetics in the city. The UNCW water quality report and State 303(d) list information were also included for creeks and lakes that lie within the city limits.

In conjunction with Halyburton Park staff, new Wildlife Feeding signage was developed for installation at Anne McCrary Park, Greenfield Lake, Halyburton Park and Wade Park. This signage addresses the impacts of feeding wildlife on water quality, wildlife health and welfare, and overpopulation.

c. Informational Web Site	The permittee shall promote and maintain an internet web site designed to convey the program's message(s).

Stormwater education staff continued to update our website for most of the year. However, we were informed in the spring that the city website was going to be redeveloped, as well as all of our webpages. As part of this process, the IT Department asked that we only update critical information, since the current website content was migrating to a new website platform.

As part of the website migration to the new platform, Stormwater Services and IT staff met to discuss the content of the new stormwater website and to lay out the architecture for the new site. From this collaboration, the education staff developed the architecture, verbiage and representative photos that will be used on the new site. In addition, the Heal Our Waterways stand-alone website will be absorbed and become a sub-site of the main Stormwater Services website. It is anticipated

that work on the new website will be completed in the fall of 2016. This upgraded website will allow for a better end-user experience, as well as a better content management experience.

Maintain Hotline/Help line	The permittee shall promote and maintain a hotline for citizens and businesses to report suspected stormwater pollution and illicit discharges occurring within the City.

Accomplishments:
The Stormwater Pollution Prevention hotline was established in January 2010 to field calls from citizens, businesses and employees to report illicit discharges and instances of potential or definitive stormwater pollution. The hotline phone # is 910-341-1020 and the web address is www.wilmingtonnc.gov/reportstormwaterpollution.

Hotline/web reports are routed to the Stormwater Code Compliance Officer who tracks, investigates, and responds to each hotline report. The hotline and online reporting webform are advertised on the City's cable TV channel and via the stormwater website, citywide newsletters, public presentations and displays, large educational magnets on stormwater fleet vehicles, and promotional outreach items including cups, pens, refrigerator magnets, and post-it note giveaways to the public.

To summarize hotline activity this past year: 8 calls were placed to the City's Stormwater hotline, 10 online webform reports were submitted, and 76 emails and 20 calls were received by the Compliance Officer related to stormwater violations. The nature of the hotline reports are found in the Enforcement section of the Appendix.

d. Extent of Exposure/Reporting Requirements	For each event, activity, or media, including those elements implemented locally or through a cooperative or contractual agreement, the permittee shall estimate and record the extent of exposure.

Accomplishments:
The extent of exposure requirement is extensively documented in tables in the Public Education Appendix, as well as the Public Involvement Appendix. Documentation includes the date of event or activity, the type of event/activity, audience reached, who delivered the content, the method of delivery and/or message, and the resulting attendance or participation.

Assessment of Program Implementation
The outreach and education program continues to implement a variety of novel activities and programs that meet or exceed the minimum requirements of our NPDES permit, educate the community about stormwater runoff pollution/solutions, and inspire action and behavior change.

Objectives for Next Year

- Develop new, robust, user-friendly website for Stormwater Services.
- Fabricate and install new signage to replace vandalized and degrading interpretive signs at Wade Wetland.
- Education Manager will complete renewal of North Carolina Environmental Education Certification.
- Develop content for the citywide Annual Spring Stormwater Watch public newsletter, to include UNCW's annual water quality data and the State's 303(d) list data.
- Coordinate the Enviroscape Watershed Program to serve all 8th grade science classes in NHC Public Schools.
- Develop pet waste database to implement survey of pet owners regarding pet waste (bacterial) pollution and solutions.

PUBLIC INVOLVEMENT AND PARTICIPATION

1. Objectives for Public Involvement and Participation

Involve the community in the development and implementation of the stormwater program by implementing a public involvement and participation program locally or through cooperative or contractual agreement.

2. BMPs for Public Involvement and Participation

The permittee shall implement the following BMPs to meet the objectives of the Public Involvement and Participation Program.

BMP	Measurable Goals
a. Volunteer community involvement program	The permittee shall include and promote volunteer opportunities designed to promote ongoing citizen participation, implemented locally or through cooperative or contractual agreement.

Accomplishments:

The City of Wilmington Stormwater Services contracts annually with Cape Fear River Watch (CFRW) and New Hanover Soil & Water Conservation District (NHSWCD) to implement public involvement and participation activities, as well as public education and outreach services. Both agencies sign an annual contract with the City which specifies services and deliverables that enable Stormwater Services to meet many of its NPDES public education and public participation requirements. In addition to full time staff, each agency taps into a volunteer base and encourages citizens to become involved in stormwater outreach, education and volunteer efforts.

Services performed by CFRW & NHSWCD include activities such as volunteer watershed clean-ups, volunteer creek monitoring, wetland monitoring including cleanups and plantings, educational workshops for the schools and the community at large, participation in the Lower Cape Fear Stewardship Awards program, a monthly rain barrel sale, LID consultation, volunteer storm drain marking, public eco-tours, high school Envirothons and elementary school field days, website updates, community stormwater best management practice (BMP) installations, and more.

Each agency provides the City with four quarterly progress reports and invoices during the annual contract period for services performed. The cumulative Year End progress report for each agency is included in the Public Involvement and Participation Appendix of this annual report.

The City of Wilmington Stormwater Services was a major sponsor of the area's annual Earth Day Festival. With record attendance of 6000+ attendees this year, we had several event booths and provided direct stormwater education in the form of challenges/games, one-on-one interaction, promotional giveaways and literature distribution.

CFRW and NHSWCD continued their efforts to engage volunteers through the Storm Drain Marking Program. These efforts include adhering metal markers with pollution messages near storm drains and distributing educational doorhangers to nearby residents and businesses. In addition, the city created a GIS webmap that allows education staff to track and record the number and locations of marked drains in the city, as well as volunteer and outreach data.

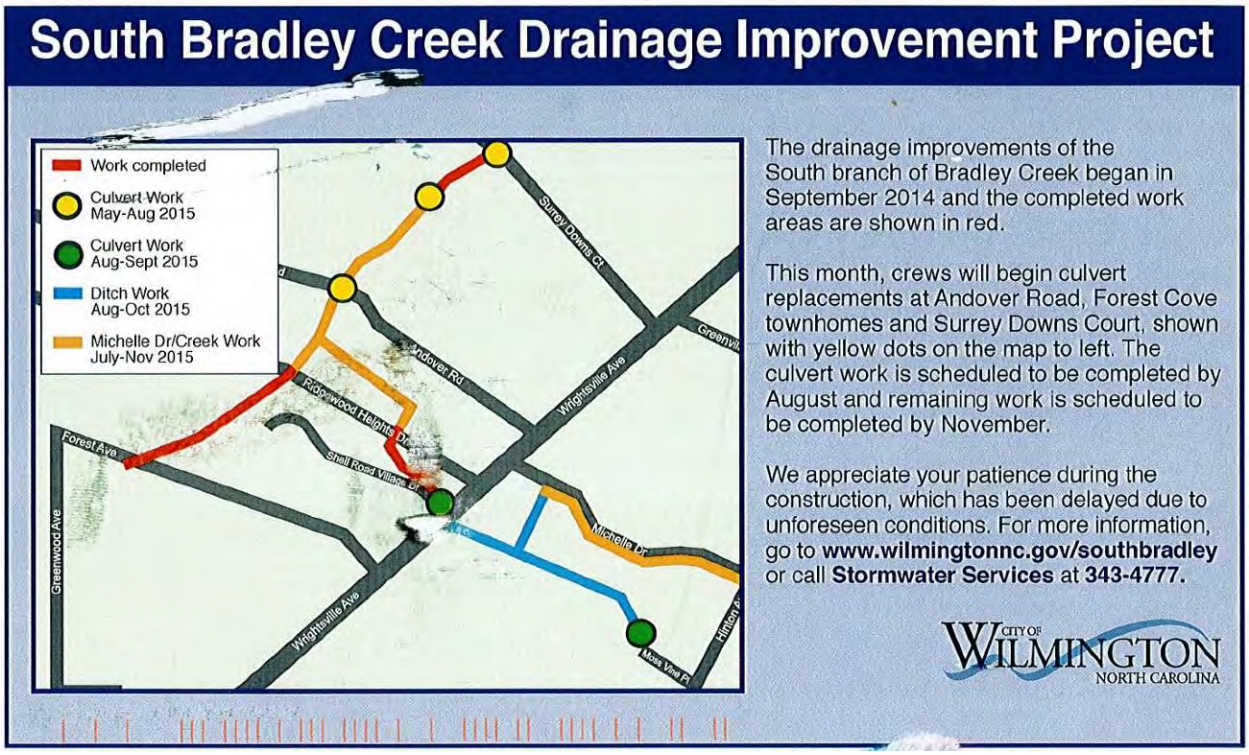
Stormwater education staff presented to the DREAMS after-school arts program in conjunction with the installation of Best Management Practices (BMPs) at the site through a 319 Grant. The students will be involved with planting vegetation in the bioretention area and performing light maintenance of the site.

Stormwater Services jointly participates in a monthly rain barrel sale which is organized by the New Hanover Soil & Water Conservation District. Rain Barrel USA, a North Carolina company, is the current vendor, enabling us to offer 60 and 80 gallon rain barrels at a discounted price to the public. The sale is publicized through a variety of media outlets including city and county public TV and websites, press releases, garden shows, and special events. This year, 53 rain barrels were sold to the public.

b. Mechanism for Public involvement	The permittee shall provide and promote a mechanism for public involvement that provides for input on stormwater issues and the stormwater program, implemented locally or through cooperative or contractual agreement. These mechanisms could include public meetings, citizen/business surveys, citizen portal website feedback, public event participation, one-on-one citizen contact, etc.

Accomplishments:

Stormwater Services conducted a public meeting and one-on-one meetings with residents in the fall of 2015 for the ongoing Clear Run Branch project. Throughout the year, doorhangers and/or project notices were also distributed to residents affected by drainage projects for Oxmoor Place, Brittain & Shuney Drive, Brookshire/Derby Down, and Clearbrook Drive.



Hotline/Help line	The permittee shall promote and maintain a hotline for citizens and businesses to report suspected stormwater pollution and illicit discharges occurring within the City.

Accomplishments:

The Stormwater Pollution Prevention hotline was established in January 2010 to field calls from citizens, businesses and employees to report illicit discharges and instances of potential or definitive stormwater pollution. The hotline phone # is 910-341-1020 and the web address is www.wilmingtonnc.gov/reportstormwaterpollution.

Hotline/web reports are routed to the Stormwater Code Compliance Officer who tracks, investigates, and responds to each hotline report. The hotline and online reporting webform are advertised on the City's cable TV channel and via the stormwater website, citywide newsletters, public presentations, large educational magnets on stormwater fleet vehicles, and promotional outreach items including cups, pens, refrigerator magnets, and post-it note giveaways to the public.

To summarize hotline activity this past year: 8 calls were placed to the City's Stormwater hotline, 10 online webform reports were submitted, and 76 emails and 20 calls were received by the Compliance Officer related to stormwater violations. The nature of the hotline reports are found in the Enforcement section of the Appendix.

Assessment of Program Implementation
The City has continued to partner with contract agencies to implement public education, involvement and participation activities. These annual, contractual agreements have resulted in numerous public and action-oriented activities including watershed cleanups, storm drain marking, community workshops, grant partnerships, monthly rain barrel sale, eco-tours, and more.

This past year, the city also conducted efforts to reach out to the public regarding the implementation of drainage projects including the Clear Run Branch drainage project and other capital and in-house projects.

Objectives for Next Year

- Promote Stormwater Pollution Prevention Hotline.
- Utilize partner agency contracts to implement volunteer and community-focused activities.
- Conduct public outreach and meetings for upcoming stormwater drainage projects.

ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)

1. Objectives for Illicit Discharge Detection and Elimination

a. Implement and enforce a program to address the detection and elimination of illicit discharges into the MS4.

b. Maintain a storm sewer system map, showing the location of all major outfalls and the names and location of all waters of the United States that receive discharges from those outfalls;

c. Prohibit, through ordinance, or other regulatory mechanism, non-storm water discharges except as allowed in this permit and implement appropriate enforcement procedures and **actions;**

d. Implement a plan to detect and address non-storm water discharges, including illegal dumping, to the MS4;

e. Inform public, employees, businesses, and the general public of hazards associated with illegal discharges, how to recognize illicit discharges and improper disposal of waste; and

f. Address non-storm water discharges or flows as identified in Part I, Paragraph (8).

2. BMPs for Illicit Discharge Detection and Elimination

The permittee shall implement the following BMPs to meet the objectives of the Illicit Discharge Detection and Elimination Program and shall notify the Division prior to modification of any goals.

BMP	Measurable Goals
a. Maintain adequate legal authorities	The permittee shall annually review the permittee's IDDE ordinances or other regulatory mechanisms, or adopt any new ordinances or other regulatory mechanisms that provide the permittee with adequate legal authority to prohibit illicit connections and discharges and enforce the approved IDDE Program.

Accomplishments:

The City continues to utilize the existing ordinances in place to address illicit discharges to its system. The City passed the Ordinance to amend Chapter 12 of the City Code on 9/15/2009 to address illicit discharges to the stormwater system and to protect public water and sewer systems. This Ordinance change went into effect on November 1, 2009.

The current Cape Fear Public Utility Authority (CFPUA) ordinance defines wastewaters that are required to be discharged into the sanitary sewer system. The City utilizes CFPUA's ordinance to address discharges of regulated wastewaters to the City's MS4 and other natural outlets.

The City will continue to review its ordinance annually to make sure we are providing adequate legal authority.

b. Maintain a Storm Sewer System Base Map of Major Outfalls.	The permittee shall maintain a current map showing major outfalls and receiving streams

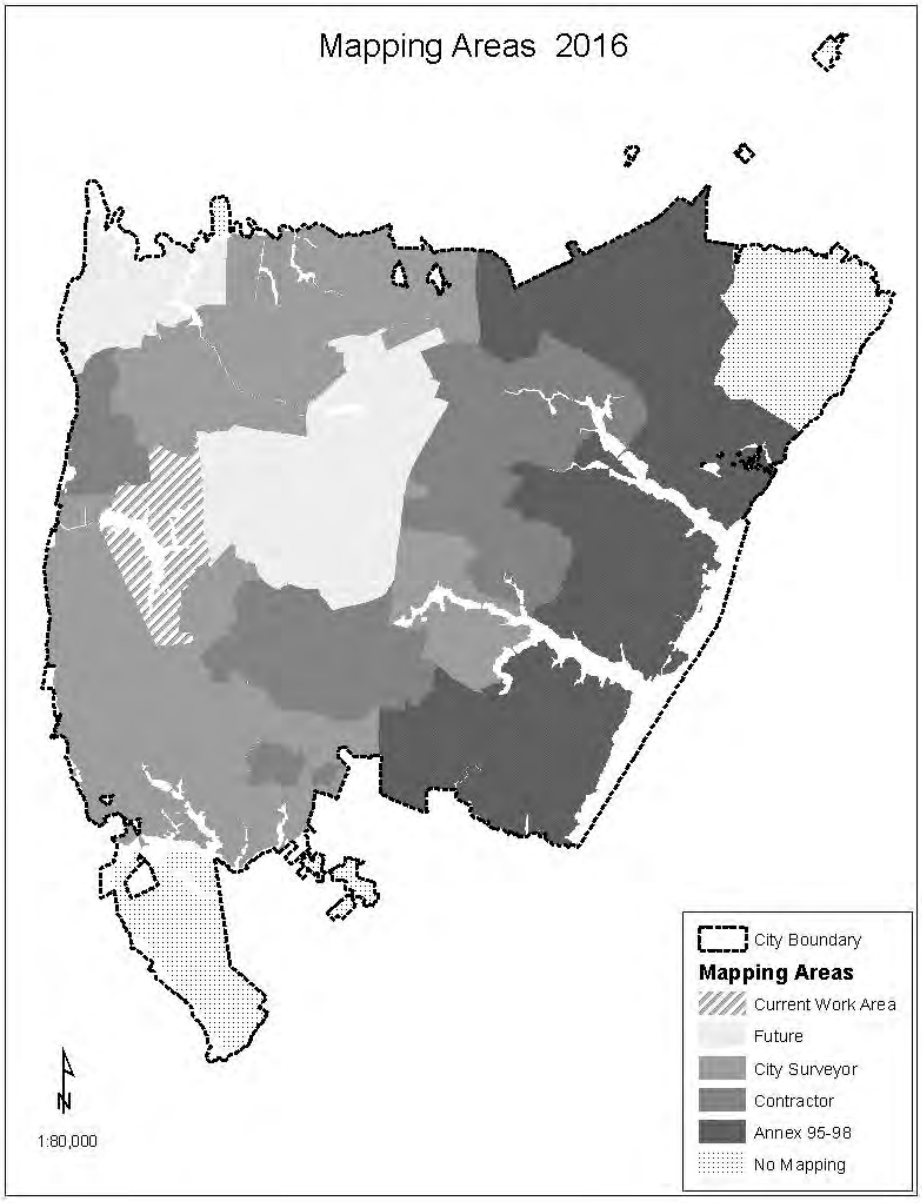
Major Outfall Map

Accomplishments:

The City continues to maintain and update a base map of major outfalls and receiving water bodies. Outfalls are classified and added to the GIS dataset as mapping of the City MS4 proceeds. Additionally, the City has made significant improvements to the GIS mapping of

watershed boundaries using the best available data. At this time, approximately 83% of the City has been mapped as part of its stormwater inventory.

Stormwater Inventory Mapping needs were identified during the last reporting year in the Greenfield Lake Watershed, an impaired water body as noted on the 303d list. The City has begun inventory mapping in this area to collect data where gaps in our mapping exists. The figure below details the current mapping area within the City (Greenfield Lake). Approximately 10-15% of the watershed had already been mapped during previous data collection projects. This reporting year with the City's data collection efforts, inventory mapping in the Greenfield Lake watershed is estimated to be 75% complete.



Major outfalls have been already identified within the Greenfield Lake watershed so this will

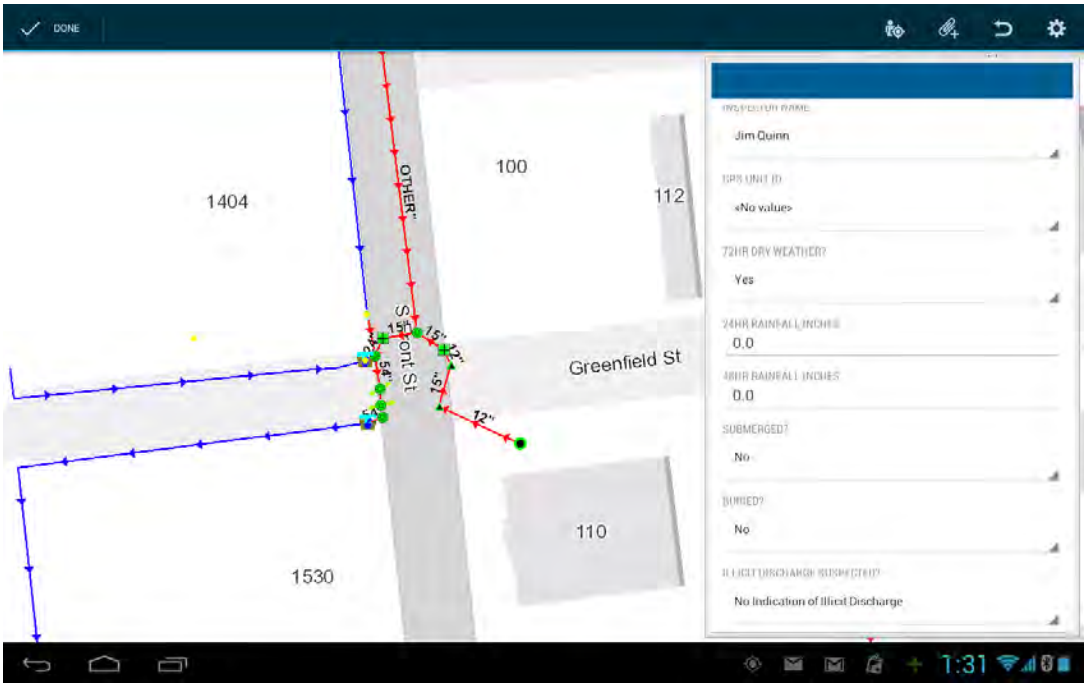
help with the dry weather flow monitoring program and identifying potential pollution sources leading into the lake.

c. Detect dry weather flows	The permittee shall develop and implement a program for conducting dry weather flow field observations in accordance with a written procedure for detecting and removing the sources of illicit discharges.

Accomplishments:

The City has had a full year of data collection utilizing its procedures established during the previous reporting year with good results. The process has streamlined time spent at each structure while providing copious information that can be exported into a spreadsheet for reviews.

The dry weather flow web map, when accessed through the Collector app (as shown below), allows staff to collect relevant data while in the field, including photographs, using only a tablet or smart phone. The inspector is able to enter the data, including date and time, color, odor, turbidity and other relevant characteristics of the location into the preformatted database. The data are then uploaded to the City servers in real time, allowing office staff to see the data and develop reports without the need for cumbersome data transfer routines or post processing.



The City managed to investigate 5 separate, major outfall locations and trunk lines across its jurisdictional area, which is a slight increase from last year. These locations were found within the Burnt Mill Creek, Upper Cape Fear River and Greenfield Lake watersheds. However, due to a very wet fall and winter season, there was a delay in the collection of data. As the data collection process becomes more familiar with the relevant staff involved, there should be an increase in the number locations investigated during the next reporting years. Maps of the 5 locations and associated table are found in Appendix D.

d. Investigations into the source of all identified illicit discharges.	The permittee shall maintain, and evaluate annually written procedures for conducting investigations of identified illicit discharges.

Accomplishments:
The City has continued to utilize its Illicit Discharge Detection Elimination (IDDE) Policy and Procedures Manual document. The purpose of this document is to provide a standard for guidance and information for the effective and efficient implementation of the Illicit Discharge Detection and Elimination Program within the City of Wilmington. The document outlines the investigation, testing, coordination with other authorities, GIS inventory, follow up, and documentation procedures to be taken to resolve a questionable dry weather flow.

The City had its third full year of data input and documentation through *Intelligov*, our data management system. All details of incidences are reported are entered from the start of an incidence until the investigation until is closed. This documentation into *Intelligov* has allowed for the extraction of data for evaluation of our program, and assessment to identify repeat offenders and chronic violators as well as serve as help us identify areas of the City with higher violation reports. See Appendix I.

The City also reevaluated the *Intelligov* system during this reporting year to determine if any improvements could be made to the process. This involved the City's IT Staff and Stormwater Staff to go through the program and make any changes to help streamline and make the system better for utilization.

e. Track investigations and document illicit discharges	The permittee shall track all investigations and document the date(s) the illicit discharge was observed; the results of the investigation; any follow-up of the investigation; and the date the investigation was closed.

Accomplishments:
The City continues to address illicit discharges in the stormwater system and to protect public water under its Ordinance. This Ordinance change went into effect on November 1, 2009. The City continues to update the Illicit Discharge Detection Elimination (IDDE) Policy and Procedures manual as the program evolves. The purpose of this document is to provide standards for protocol, field guidance and information for the effective and efficient implementation of the Illicit Discharge Detection and Elimination (IDDE) Program. We continue to update as procedures change and become more efficient for data collection and reporting into the City's tracking database *Intelligov*.

The City has continued to utilize its improved process for collecting data for dry weather flow monitoring during this reporting period. The continued and familiarized use of the data collection process will allow for more efficient field procedures, better documentation, and increased number of site investigations per year going forward.

f. Employee Training	The permittee shall implement and document a training program for appropriate municipal staff who as part of their normal job responsibilities, may come into contact with or otherwise observe an illicit discharge or illicit connection to the storm sewer system.

Accomplishments:
The City conducted training for the all Stormwater Services Field Maintenance Staff during this reporting year (See Appendix D). Training sessions for new employees is planned for implementation during the upcoming reporting period. Refresher training and education for existing staff will be updated as necessary and implemented every 2 years.

g. Provide Public Education	The permittee shall inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.

Accomplishments:
The Education Program Manager and staff do an outstanding job of providing the public information through education regarding illegal discharges. One of these ways is through The Enviroscape Watershed Education Program. This program has been integrated into the 8th grade curriculum for over 10 years. As a result, the program reaches all 8th grade science classes in New Hanover County Schools, serving approximately 74 classes and 2,200 students each year.

In addition, The City's annual Stormwater Watch newsletter was mailed to 40,000+ city residents. The topic focus centered on the problematic issue of litter, which is impacting crew maintenance activities, as well as wildlife, habitat, and aesthetics in the city.

The City's Public Services Code Enforcement Officer also works hard to educate the public on Illicit Discharges through educational material and flyers when making site visits and meeting with the public during investigations.

h. Public reporting mechanism	The permittee shall promote, publicize, and facilitate a reporting mechanism for the public and staff to report illicit discharges and establish and implement citizen request response procedures.

Accomplishments:
The Stormwater Pollution Prevention hotline was established in January 2010 to field calls from citizens, businesses and employees to report illicit discharges and instances of potential or definitive stormwater pollution. The hotline phone # is 910-341-1020 and the web address is www.wilmingtonnc.gov/reportstormwaterpollution.

Hotline/web reports are routed to the Stormwater Code Compliance Officer who tracks, investigates, and responds to each hotline report. The hotline and online reporting webform are advertised on the City's cable TV channel and via the stormwater website, citywide newsletters, public presentations, large educational magnets on stormwater fleet vehicles, and promotional

outreach items including pens, refrigerator magnets, and post-it notes giveaways to the public. To summarize hotline activity this past year: 8 calls were placed to the City's Stormwater hotline, 10 online webform reports were submitted, and 76 emails and 20 calls were received by the Compliance Officer related to stormwater violations. The nature of the hotline reports are found in Appendix I.

i. Enforcement	The permittee shall implement a system to track the issuance of notices of violation and enforcement actions as administered by the permittee. The data maintained in this system shall enable permittee to identify chronic violators for initiation of actions to reduce noncompliance.

Accomplishments:

The City of Wilmington uses *Intelligov* data management system to track all requests for service. This includes illicit discharge reports from the public and from City staff. This system allows us to enter all relevant data from an investigation and then analyze, map, and track various aspects of the incident including enforcement actions and repeat offenders in order to identify chronic violators. For year 2015-2016 there were no repeat offenders for Illicit Discharges. See Appendix I for enforcement actions summary for this reporting year.

Assessment of Program Implementation

The City continues to implement and enforce its IDDE program to address the detection and elimination of illicit discharges. The City has completed its second year fully implementing its dry weather flow monitoring program and has improved its procedures for collecting data for dry weather flow monitoring during this reporting period. Dry weather flow locations will continually be updated and added through outfall investigations that are schedule throughout the year and also through investigations initiated by its field crews as they are encountered.

The City has documented its third year of *Intelligov data*, our data management system. The City reevaluated the data management system this year for efficiency and to determine if all documentation efforts from the program are meeting our needs for NPDES Phase II requirements.

The City continues to utilize the existing ordinances in place to address illicit discharges to its system. To date, no changes to the ordinance have been necessary as it provides the adequate legal authority to prohibit illicit connections and discharges and enforce the approved IDDE Program at this time.

Public education regarding illicit discharges continues to be one of the major goals for the City. Staff worked in cooperation with Stormwater Code Enforcement to develop targeted educational and enforcement materials.

Continued improved use of dry weather flow methods through investigations and data collection.

Objectives for Next Year

- Update and add dry weather flow monitoring schedule as new locations are identified.
- Continue with the goal of completing one drainage segment per month as identified on the dry weather flow schedule (as weather permits). Efforts will be concentrated in the impaired

watersheds of Bradley Creek, Burnt Mill Creek and Greenfield Lake.

- Continue to evaluate the effectiveness of the *Intelligov* reporting practices. Assess locations of offenders to determine repeat violations and make recommendations to address those sites.
- Continue with public education efforts to help reduce illicit discharges and illicit connections to the City's MS4.
- Implement training sessions for new employees regarding IDDE.
- Continue Inventory Mapping of areas identified around Greenfield Lake.

CONSTRUCTION SITE RUNOFF CONTROLS

The permittee relies on New Hanover County to comply with this minimum measure. The New Hanover County Sediment and Erosion Control Program effectively meets the requirements of the Construction Site Runoff Controls by permitting and controlling development activities disturbing one or more acres of land surface and those activities less than one acre that are part of a larger common plan of development. This program includes procedures for public input, sanctions to ensure compliance, requirements for construction site operators to implement appropriate erosion and sediment control practices, review of site plans which incorporates consideration of potential water quality impacts, and procedures for site inspection and enforcement of control measures.

New Hanover County Erosion Control Program information supplied in Appendix E.

POST CONSTRUCTION SITE RUNOFF CONTROLS

1. Objectives for Post-Construction Site Runoff Controls

a. Implement and enforce a program to address storm water runoff from new development and redevelopment projects that require a CAMA major development permit or a Sedimentation and Erosion Control Plan. The program shall ensure that controls are in place that would prevent or minimize water quality impacts.

b. Implement strategies which include a combination of structural and/or non-structural best management practices (BMPs) appropriate for the community;

c. Use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects; and

d. Adequate long-term operation and maintenance of BMPs.

2. BMPs for Post-Construction Site Runoff Controls

The permittee shall implement the following BMPs to meet the objectives of the Post-Construction Stormwater Management Program. To the extent there is any conflict between this permit and the post-construction ordinances adopted by the permittee as approved by the N.C. Division of Water Quality, the post-construction ordinances shall apply with regard to permit compliance.

BMP	Measurable Goals
a. Adequate legal authorities	Maintain through an ordinance, or other regulatory mechanism, adequate legal authorities to meet the objectives of the Post-Construction Site Runoff Controls program. The permittee shall have the authority to review designs and proposals for new development and redevelopment to determine whether adequate stormwater control measures will be installed, implemented, and maintained. The permittee shall have the authority to request information such as stormwater plans, inspection reports, monitoring results, and other information deemed necessary to evaluate compliance with the Post-Construction Stormwater Management Program. The permittee shall have the authority to enter private property for the purpose of inspecting at reasonable times any facilities, equipment, practices, or operations related to stormwater discharges to determine whether there is compliance the Post-Construction Stormwater Management Program.

Accomplishments:
The City continues to utilize the Land Development Code that was amended and adopted on September 15, 2009 to provide post construction controls in order to meet the requirements of the City's Phase II permit and to bring the ordinance into compliance with the new Coastal Stormwater Legislation.

b. Strategies which include BMPs appropriate for the MS4	The permittee shall adopt the DWQ BMP Design Manual or certify that the local BMP Design Manual meets or exceeds the requirements in the DWQ BMP Design Manual.

Accomplishments:
The DWQ BMP manual was adopted when the stormwater ordinance was amended in 2009. This ordinance contains provisions addressing the use of combinations of structural and non-structural BMPs to manage stormwater runoff. Some examples of these include providing peak attenuation flow for the 2, 10 and 25 year storm event, requiring (new development) a 50 foot set back from surface waters, and stricter built-upon requirements for projects near SA waters.

c. Plan reviews	The permittee shall conduct site plan reviews of all new development and redeveloped sites that disturb greater than or equal to one acre (including sites that disturb less than one acre that are part of a larger common plan of development or sale). The site plan review shall address how the project applicant meets the performance standards and how the project will ensure long-term maintenance.

Accomplishments:
The City continues to conduct site plan reviews utilizing the City's Land Development Code in order to provide post construction controls to meet the requirements of the City's Phase II permit. A summary of the plan review activities for this reporting year is available in Appendix F.

d. Inventory of projects with post-construction structural stormwater control measures	The permittee shall maintain an inventory of projects with post-construction structural stormwater control measures installed and implemented at new development and redeveloped sites, including both public and private sector sites located within the permittee's corporate limits that are covered by its post-construction ordinance requirements.

Accomplishments:
The City's Plan Review Engineers continue to update a spreadsheet of projects with stormwater control measures installed during the reporting year. This spreadsheet includes the dates permits

were issued, review times for projects, types of projects (new development, redevelopment), and the types and numbers of BMPs per project location. This spreadsheet will continue to be used for future permits issued and evaluated or modified if data extraction is warranted.

e. City Code, Permitting Regulations, Easement, and/or Deed Restrictions and Protective Covenants	Ensure development activities will maintain the project consistent with approved plans.

Accomplishments:
Current City of Wilmington stormwater management ordinance stipulates among other requirements for stormwater management after construction that:

Record (as-built) drawings (reproducible mylar) for all stormwater management facilities certified by an authorized registered professional must be provided to the City for permanent record.

When deemed necessary by the City, an easement in a form approved by the City attorney, granting the City and its agents and representatives adequate and perpetual access to the facility and sufficient area for inspection and maintenance, if necessary, by the City, its agents and representatives. Said easement shall be filed in the New Hanover County Registry, at the expense of the applicant, and shall bind all subsequent owners and assigns of the facility and of the property on which the facility is located.

The following excerpt from the new stormwater ordinance became operational upon adoption City Council:

The approval of the stormwater permit shall require an enforceable restriction on property usage that runs with the land, such as recorded deed restrictions or protective covenants, to ensure that future development and redevelopment maintains the site consistent with the approved project plans.

Additionally, the new ordinance has provisions to ensure that conveyance of the property does not terminate the original developer's obligations until a replacement permit has been issued. The original developer will be required to record in the deed conveying the property a notice of the existence of any stormwater devices and the purchaser's obligations to maintain and inspect them and to obtain a permit. There are also specific and detailed special requirements for property owner associations regarding operation and maintenance of stormwater devices, escrowing funds to ensure maintenance and remedies for the City in the event of failed compliance.

f. Provide a mechanism to require long-term operation and maintenance of structural BMPs.	The permittee shall implement or require an operation and maintenance plan for the long-term operation of the structural BMPs required by the program.

Accomplishments:
The DWQ BMP manual was adopted when the stormwater ordinance was amended in 2009. This ordinance contains provisions addressing the use of combinations of structural and non-

structural BMPs to manage stormwater runoff. With this adoption, the City also reviews and approves the O&M requirements and plans of the State through the review process.

g. Inspections of Structural Stormwater Control Measures	To ensure that all stormwater control measures meet the permittee's performance standards and are being maintained pursuant to the maintenance agreement, the permittee shall develop and implement a written inspection program for structural stormwater controls installed pursuant to the permittee's post-construction program. The permittee shall document and maintain records of inspections, findings and enforcement actions and make them available for review by the permitting authority.

Accomplishments:

Under the current stormwater management ordinance of the City, permitees of structural BMPs are required to properly maintain their stormwater management systems to ensure long term operation. The City conducted biannual compliance inspections for privately owned stormwater BMPs in order to ensure maintenance responsibilities are being undertaken by property owners. Inspections were conducted by a City staff member who has completed the Stormwater BMP Inspection and Maintenance Certificate offered through NC State's Biological and Agricultural Engineering Department (certification #182). Recertification occurred in March 2013. An inspection summary is included in Appendix F. In addition, sample inspection reports are provided.

The City continues to review and update its manual for all O&M plans for known City owned and/or maintained BMPs under their respective NCDWQ stormwater permits. This manual provides access to BMP schedules for O&M and permit renewal dates.

h. Educational materials and training for developers	The permittee shall make available through paper or electronic means, ordinances, post-construction requirements, design standards checklist, and other materials appropriate for developers. New materials may be developed by the permittee, or the permittee may use materials adopted from other programs and adapted to the permittee's new development and redevelopment program.

Accomplishments:

Currently all ordinances, design standards, application forms, BMP Manual and Technical Standards for developers are found online at the City's website. The city provides instruction online for the forms so that developers can provide the necessary documentation for the process review.

i. Enforcement	The permittee shall track the issuance of notices of violation and enforcement actions as administered by the permittee. This mechanism shall include the ability to identify chronic violators for initiation of actions to reduce noncompliance.

Accomplishments:
The City has tracked the issuance of violations through its current inspection process since the implementation of the stormwater ordinance. The City will continue to make improvements in the inspection process (as necessary) and its associated, updated database for private BMPs. The updated database will allow for improved documentation of City inspections.

Assessment of Program Implementation
The City has continued to maintain adequate legal authorities to meet the objectives of the Post-Construction Site Runoff Controls program through its Land Development Code. In addition, the City continues to conduct site plan reviews utilizing the City's Land Development Code in order to provide post construction controls to meet the requirements of the City's Phase II permit.

The City's Plan Review Engineers continue to their update their database in order to track projects with stormwater control measures installed. This spreadsheet provides relevant information regarding new development and redevelopment projects. This spreadsheet will continue to be used for future permits issued and evaluated or modified if data extraction is warranted.

Objectives for Next Year
- Review ordinances to determine if any changes are needed to improve the post-construction requirements.
- Continue to update and evaluate database of new or redeveloped projects to determine if information can be improved, if documentation is adequate, and if modification for data extraction is needed.
- Continue with improvements of BMP inspection database for 2015/16. With the discussed planned improvements, the City should be able to look for trends in repeat offenders and address them through education and outreach of property owners.
- Recertification for the Stormwater BMP Inspection and Maintenance Certificate offered through NC State's Biological and Agricultural Engineering Department

3. Post-construction Stormwater Runoff Controls for New Development

a. In order to fulfill the post-construction minimum measure program requirement the permittee may use the Department's model ordinance, design its own post-construction practices that meet or exceed the Department's Stormwater Best Management Practices Manual on scientific and engineering standards, or develop its own comprehensive watershed plan that is determined by the Department to meet the post-construction stormwater management measure required by 40 Code of Federal Regulations§ 122.34(b)(5)(1 July 2003 Edition).

b. The permittee shall meet the State's stormwater requirements for projects that are performed by, or under contract for, the permittee.

c. Adoption of the Universal Stormwater Management Program (USMP) meets the requirement to develop and implement a Post-Construction Program by the local government adopting an ordinance that complies with the requirements of l5A NCAC 02H .1020 and the requirements of 15A NCAC 02B .0104(f). Adoption of the USMP may not satisfy water quality requirements associated with the protection of threatened or endangered species or those requirements associated with a Total Maximum Daily Load (TMDL).

d. Compliance with the stormwater management and water quality protection promulgated in Rules 15A NCAC 2H .1000 and Session Law 2008-211 effectively meets the Post- construction Stormwater Runoff control requirements within the 20 coastal counties.

POLLUTION PREVENTION AND GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

1. Objective for Pollution Prevention and Good Housekeeping for Municipal Operations

a. Implement an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations.

b. Provide employee training to prevent and reduce storm water pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance.

2. BMPs for the Pollution Prevention and Good Housekeeping for Municipal Operations

The permittee shall implement the following BMPs to meet the objectives of the Pollution Prevention and Good Housekeeping Program.

BMP	Measurable Goals
a. Inventory of municipally owned or operated facilities	The permittee shall maintain a current inventory of facilities and operations owned and operated by the permittee with the potential for generating polluted stormwater runoff.

Accomplishments:

The City continues to keep an inventory of its known facilities with the potential for generating polluted runoff. Sites are identified by location, type of facility and potential pollution sources. These sites were evaluated to determine if further implementation of pollution prevention measures and BMPs could help to minimize current on-site procedures and equipment from potentially polluting the surrounding stormwater systems. Although no formal SPPP was required for each individual site, the City opted to be proactive in reducing the potential for contaminants and other pollutants that could leave the sites. Site BMP recommendations were implemented at some of the locations this reporting year such as the Coleman Sweeper Complex that houses some of the City's Stormwater Sweepers. Spill kits for the site were deployed and spill procedure training for relevant staff is currently proposed for the late summer of 2016. Additional structural and non-structural BMP implementation will continue at the other identified locations.

The City currently has a Spill Prevention Control and Countermeasure plan (SPCC) for the Operations Complex and a separate Stormwater Pollution Prevention Plan (SPPP) for the Fleet Maintenance building located within the complex. A SPCC is also in place for the Police Headquarters location.

b. Operation and Maintenance (O&M) for municipally owned or operated facilities	The permittee shall maintain and implement, evaluate annually and update as necessary an Operation and Maintenance (O&M) program for municipally owned and operated facilities with the potential for generating polluted stormwater runoff. The O&M program shall specify the frequency of inspections and routine maintenance requirements.

Accomplishments:
Currently, The City relies on a SPCC plan and a SPPP for the Operations Complex and Fleet Maintenance building. These plans focus on the activities at Fleet Maintenance and also preventive inspections at the City's fueling islands, (2) 10,000g fuel tanks and the 6 generators on site. An additional SPCC for the Police Headquarters addresses inspections for their fueling island and backup generator as well. Analytical and qualitative monitoring of the outfall per the requirements of the SPPP and General Permit (NCG08000) for Fleet Maintenance indicate parameter levels well below benchmark values.

Stormwater staff meets annually with appropriate site managers to ensure that proper documentation of the SPCC and SPPP is occurring. Stormwater staff evaluates any changes or modifications that may have occurred to the site within the year and works with the site managers to address any operation and maintenance practices that can be improved.

c. Spill Response Procedures	The permittee shall have written spill response procedures for municipally- owned or operated facilities.

Accomplishments:
Spill Response procedures are identified in the City's SPCC plans for the Operations Complex and Police Headquarters and also in the SPPP for Fleet Maintenance. The City will continue to follow these plans and make any changes if necessary and also ensure documentation is occurring within the plans.

Stormwater staff and the Public Services Safety Specialist have implemented the requirement for appropriate staff to complete training courses regarding spill prevention and small spill cleanup. This is required for the upcoming reporting year.

d. Streets, roads, and public parking lots maintenance	The permittee shall evaluate BMPs to reduce polluted stormwater runoff from municipally-owned streets, roads, and public parking lots within the corporate limits. Within 12 months, the permittee must update its Stormwater Plan to include the BMPs selected.

Accomplishments:
The City currently utilizes BMPs that help reduce polluted stormwater runoff from streets, roads, and public parking lots within its jurisdictional area. Stormwater crews sweep City streets with curbing (on average) twice/month, NCDOT owned roads once/month, and City owned parking lots from once/month to once/ quarter. City owned parking lots include City operations

facilities, City Hall, parks locations, and recreation facilities.

In reporting year 2015/16, street sweepers swept 10,045 curb miles thus reducing debris, sediment, vegetation and trash potentially diverted from the stormwater sewer system.

In fiscal year 2015/16, hand maintenance and vacuum trucks cleaned 105,257 linear feet of pipe and removed blockages and cleaned 16,222 drainage inlets and manholes thus reducing debris, sediment, vegetation and trash potentially diverted from being discharged into our receiving waters.

The tonnage of debris collected from street sweeping, hand maintenance and vacuum trucks could not be adequately calculated this year due to the City's scale house being inoperable from mechanical repair needs. The City hopes to get the scale house in working condition for the next reporting year.

The City is a member of the Urban Stormwater Consortium of the Water Resources Research Institute of the University of North Carolina. This group funded a research proposal to look at nutrient and carbon loading in gross solids in urban catch basins (including 4 locations in Wilmington). Data collected from this study which analyzed the mass, volume, bulk density, total nitrogen, total phosphorus, total carbon, and composition of material, was finalized recently. One of the conclusions from the study indicated that urbanized, downtown areas of cities were the highest contributors of gross solids in catch basins. The study recommended that street sweeping should be conducted more frequently in these areas to help minimize the solids from entering the catch basins. Currently, the City follows this practice by conducting routine street sweeping in the Central Business District, 7 days/week to help prevent and reduce the amount of gross solids from entering the downtown stormwater system.

The City, this year, has also finalized improved procedures for its decanting operations of vacuum trucks after pipe or structural maintenance/cleaning occurs. The City will be utilizing its own wet pond facilities located throughout the City as potential decanting sites for maintenance crews while conducting their jobs in these areas. The new procedures will help to improve water quality to the decanting methods that were previously being conducted in the field.

e. Streets, roads, and public parking lots maintenance	Within 24 months, the permitee must implement BMPs selected to reduce polluted stormwater runoff from municipally-owned streets, roads, and public parking lots.

Accomplishments:
See above 2.(d).

f. Operation and Maintenance (O&M) for municipally - owned or maintained catch basins and conveyance systems	Within 12 months, the permittee shall develop and implement an O&M program for the stormwater sewer system including catch basins and conveyance systems that it owns and maintains.

Accomplishments:
The City currently has a program for the operation and maintenance of all City owned structural BMPs, storm sewer system, and street sweeping. This program includes repair, inspection and maintenance of all City owned right of ways and officially accepted easements. This information was previously included in this report under *Operations/Maintenance – Yearly Maintenance Activities Table* on page 11.

g. Identify structural stormwater controls	The permittee shall maintain a current inventory of municipally-owned or operated structural stormwater controls installed for compliance with the permittee's post-construction ordinance.

Accomplishments:
The City keeps and updates a BMP Manual for all of its City owned BMPs. The manual includes all associated State DWQ stormwater permits, O&M plans, and site mapping in order to review maintenance requirements and permit renewal dates along with any additional documentation that might be needed. This manual provides information that can be readily reviewed by maintenance crews in order to keep the BMPs in compliance.

h. O&M for municipally-owned or maintained structural stormwater controls	The permittee shall maintain and implement an O&M program for municipally-owned or maintained structural stormwater controls installed for compliance with the permittee's post-construction ordinance. The O&M program shall specify the frequency of inspections and routine maintenance requirements. The permittee shall inspect and maintain municipally-owned or maintained structural stormwater controls in accordance with the schedule developed by permittee. The permittee shall document inspections and maintenance of all municipally-owned or maintained structural stormwater controls.

Accomplishments:
The City keeps and updates a BMP Manual for all its City owned BMPs. The manual includes all associated State DWQ stormwater permits, O&M plans, and site mapping in order to review maintenance requirements and permit renewal dates along with any additional documentation that might be needed. This manual provides information that can be readily reviewed by maintenance crews in order to keep the BMPs in compliance. Documentation occurs with every BMP site visit and maintenance activity.

i. Pesticide, Herbicide and Fertilizer Application Management.	The permittee shall ensure municipal employees and contractors are properly trained and all permits, certifications, and other measures for applicators are followed.

Accomplishments:
The City has compiled all pesticide, herbicide and fertilizer application certifications for its Parks and Recreation and Stormwater personnel to ensure that they are current. These certifications are updated and renewed annually. Currently, there are 20 certifications for Parks and Recreation staff and 2 certifications for Stormwater staff.

j. Staff training	The permittee shall implement an employee training program for employees involved in implementing pollution prevention and good housekeeping practices.

Accomplishments:
The City documents staff training for site supervisors involved with the SPCC and SPPP. Sites are reviewed at scheduled times during the reporting period to ensure that implemented BMPs are working and being utilized and that staff is documenting their respective plans as necessary. A supervisor training record for Fleet Maintenance is found in Appendix G.

Stormwater staff and the Public Services Safety Specialist are currently reviewing online employee training through *Otis Safety* regarding preventing spills and small spill cleanup for Fleet Maintenance staff and the Spill Response Team per the City's SPPP and SPCC plan. This training will be an annual requirement for City employees. In addition, on site hands-on training for employees is being discussed and planned by Stormwater staff and The PS Safety Specialist regarding spill control/cleanup at the Fleet Maintenance site.

The City is currently updating its Pollution Prevention/Good Housekeeping training for City staff. This should be completed by late summer 2016 and employee training at specific sites is planned for the fall/winter 2016.

The City has also begun evaluating where improvements can be made regarding water quality during other field maintenance activities. In addition to the improved decanting procedures the City has implemented, other field activities will be evaluated throughout the year in order to determine if changes can be made. If changes occur, the staff will be trained on how to conduct the new procedures. This will be occurring through the next year.

k. Prevent or Minimize Contamination of Stormwater Runoff from all areas used for Vehicle and Equipment Cleaning	The permittee shall describe and implement measures to prevent or minimize contamination of stormwater runoff from all areas used for vehicle and equipment cleaning.

Accomplishments:
Maintenance and cleaning conducted at the City's Operations Complex continues to occur at a wash down station, located at the Solid Waste facility, equipped with an oil/water separator that accepts wash water and directs it to the sanitary sewer.

During the previous reporting year, Stormwater staff along with the Fleet Maintenance Manager, began to evaluate the need for annual maintenance of the interior trench drains located along the

perimeter of the garage facility. Although no vehicle or equipment cleaning occurs at this location, sediment and grit accumulates in the trench drains from the everyday maintenance of vehicles pulled in and out of the building along with wind swept debris. Maintenance of the trench drains will be now be conducted annually at the site to help eliminate any gross solids from entering the surrounding stormwater system. This maintenance is scheduled to occur in late August 2016.

In addition, the Buildings Manager has scheduled maintenance and cleaning of the oil/water separator located at the Fleet Maintenance site at the same time the trench drains will be cleaned. This maintenance will be documented for future reporting.

Small engine repair (line trimmers, blowers, chain saws, compacters, etc.) and cleaning for various City activities occurs in individual departments maintenance garages. In the event of an accidental discharge, the garages have drains located within the floor that connect to an oil water separator located on each site within the Operations Complex.

Assessment of Program Implementation
The City was successful in implementing its SPCC and SPPP for designated City owned facilities with the potential to pollute receiving waters. Site BMPs continue to be implemented and documentation has been addressed with building supervisors.

The City continues to evaluate implementing BMPs at other City facilities identified with the potential to pollute based on the type of activities that occur there.

Procedures for improving water quality from the decanting of vacuum trucks has been finalized and is being implemented.

The City reviewed and compiled current herbicide, pesticide and fertilizer licenses to determine if personnel are current in their training.

Stormwater Staff and the Public Services Safety Specialist have designated appropriate city employees to complete required training for spill prevention and spill cleanup.

The City continues to conduct street sweeping efforts across the City with increased activity in its downtown area in order to help reduce the amount of gross solids from entering the stormwater drainage system.

Objectives for Next Year

- The City will continue to follow up on the recommendation plans for existing identified sites with the potential to pollute.
- The City will continue to evaluate and implement any necessary BMPs at its facilities.
- Require spill control training for appropriate employees per SPPP and SPCC plan.
- Staff training for Fleet Maintenance staff regarding Pollution Prevention/Good Housekeeping.
- Evaluate other maintenance activities in order to determine if water quality improvements can be implemented.
- Ensure documentation for SPCC and SPPP are being completed for various site locations.

TOTAL MAXIMUM DAILY LOADS (TMDLs)

1. Objective

a. Determine whether a TMDL has been developed and approved or established by EPA for the receiving water(s) of the MS4 stormwater discharge and/or downstream waters into which the receiving water directly flows.

b. Develop and implement BMPs to reduce non-point source pollutant loading to the maximum extent practicable (MEP) if the permittee is or becomes subject to an approved TMDL with an approved Waste Load Allocation (WLAs) assigned to stormwater.

c. If subject to an approved TMDL, the permittee is in compliance with the TMDL if the permittee complies with the conditions of this permit, including developing and implementing appropriate BMPs to reduce non-point source pollutant loading to the maximum extent practicable (MEP). While improved water quality is the expected outcome, the NPDES MS4 permit obligation is to reduce non-point source pollutant loading to the maximum extent practicable (MEP). The MS4 permittee is not responsible for attaining water quality standards (WQS) at the ambient monitoring stations. The Division expects attaining WQS will only be achieved through reduction from the MS4, along with reductions from other nonpoint source contributors.

2. Best Management Practices (BMPs)

At any time during the effective dates of this permit, if the permittee is or becomes subject to an approved TMDL with an approved Waste Load Allocation (WLAs) assigned to stormwater, the permittee shall implement the following BMPs to reduce non-point source pollutant loading to the maximum extent practicable (MEP):

BMP	Measurable Goals
a. Identify, describe and map watershed, outfalls, and streams	Within 12 months the permittee shall prepare a plan that: • Identifies the watershed(s) subject to an approved TMDL with an approved Waste Load Allocation (WLAs) assigned to stormwater, • Includes a description of the watershed(s), • Includes a map of watershed(s) showing streams & outfalls • Identifies the locations of currently known major outfalls within its corporate limits with the potential of contributing to the cause(s) of the impairment to the impaired segments, to their tributaries, and to segments and tributaries within the watershed contributing to the impaired segments and • Includes a schedule to discover and locate other major outfalls within its corporate limits that may be

BMP	Measurable Goals
	contributing to the cause of the impairment to the impaired stream segments, to their tributaries, and to segments and tributaries within the watershed contributing to the impaired segments.

b. Existing measures	Within 24 months the permittee's plan: • Shall describe existing measures being implemented by the permittee to enhance water quality in the watershed to which the TMDL applies; and • Provide an explanation as to how those measures are designed to enhance water quality.

c. Assessment of available monitoring data	Within 24 months the permittee's plan shall include an assessment of available monitoring data. Where long-term data is available, this assessment should include an analysis of the data to show trends.

d. Monitoring Plan	Within 36 months the permittee shall develop and submit to the Division a Monitoring Plan for each pollutant of concern or cause of impairment as specified in the TMDL. The permittee shall maintain and implement the Monitoring Plan as additional outfalls are identified and as accumulating data may suggest. Following any review and comment by the Division the permittee shall incorporate any necessary changes to monitoring plan and initiate the plan within 6 months. Modifications to the monitoring plan shall be approved by the Division. Upon request, the requirement to develop a Monitoring Plan may be waived by the Division if the existing and proposed measures are determined to be adequate to enhance water quality and reduce non-point source pollutant loading to the maximum extent practicable (MEP).

e. Additional Measures	Within 36 months the permittee's plan: • Shall describe additional measures to be implemented by the permittee to enhance water quality in the watershed to which the TMDL applies; and • Provide an explanation as to how those measures are designed to enhance water quality.

f. Implementation Plan	Within 48 months the permittee's plan shall: • Describe the measures to be implemented within the remainder of the permit term to enhance water quality in the watershed to which the TMDL applies and • Identify a schedule for completing the activities.

g. Incremental Success	The permittee's plan must outline ways to track and report successes designed to reduce non-point source pollutant loading to MEP. Successes could include increased inspections, expanded and/or tailored BMPs within the scope of the six minimum measures, structural and non-structural BMP installed and/or implemented, including retrofits, and strategies developed and implemented for development and redevelopment that include green infrastructure and LID practices.

h. Reporting	The permittee shall conduct an annual assessment of the program to enhance water quality in the watershed to which the TMDL applies and submit a report of the assessment to the Division. Any monitoring data and information generated from the previous year are to be submitted with each annual report.

3. If no stormwater waste load allocation is specified in the TMDL

If there was no stormwater waste load allocation in the TMDL, in lieu of developing a Water Quality Recovery Plan, the permittee shall evaluate strategies and tailor and/or expand BMPs within the scope of the six minimum measures to enhance water quality recovery strategies in the watershed(s) to which the TMDL applies. The permittee shall describe the strategies and tailored and/or expanded BMPs in their Stormwater Management Plan and annual reports.

4. Watershed Restoration Plan approved by the Division

Voluntary implementation of a Watershed Restoration Plan approved by the Division constitutes compliance with this requirement and will allow deferment of TMDL development if tracking and monitoring are provided that demonstrate progress in implementing stormwater BMPs and/or enhancing water quality.

Bradley & Hewletts Creeks Watershed Restoration Plan Accomplishments:

The Bradley and Hewletts Creeks Watershed Restoration Plan has made progress engaging the public through promotion of volume-reducing best management practices (BMPs) over the 2015-2016 year. Heal Our Waterways (HOW), as the restoration plan is known, has gained traction among its early-adopting target audience and the public-at-large within the watersheds. This was accomplished through the use of strategically implemented education and outreach efforts and successful networking and promotion among stakeholders, community groups, and partner organizations.

As with previous years, educational postcards were created and mailed in the fall and spring to 16,500+ residents and businesses within the Bradley and Hewletts Creek watersheds, as well as areas adjacent to the watersheds that drain directly into the Intracoastal Waterway. The fall 2015 postcard educated recipients about the environmental concerns related to sediment and erosion. The postcard addressed why sediment/turbidity is problematic for waterways and provided simple solutions and practical guidelines to empower citizens to prevent erosion. The spring 2016 postcard addressed the detrimental effects of litter on Wilmington's tidal creeks. The postcard equipped citizens with the necessary knowledge to combat the problem through personal and community-wide efforts.

Advertising efforts focused on digital and radio platforms. Local NBC affiliate WECT's nightly news anchor, Jon Evans, served as the local celebrity spokesperson for the HOW program by starring in a public service announcement (PSA) educating property owners about the benefits of rerouting downspouts. This PSA played whenever a HOW advertisement was clicked on the WECT.com website. The advertisement on WECT.com was viewed 423,713 times, with 1,169 clicks leading to the HOW Facebook page. The PSA was also uploaded to the City of Wilmington's YouTube channel, the city's GTV-8 government channel, and the HOW Facebook page which generated 655 views of the video.

HOW also became an underwriting partner with local National Public Radio affiliate, WHQR. A 15-second PSA aired 10 times per week for 13 weeks during commuter drive times (6a-9a & 4p-7p). Each week, WHQR reached about 40,000 listeners in the Wilmington Designated Market Area.

Educational presentations were given to community groups, professional classes, and middle school and university students. In addition, city staff and program partners presented to stormwater and engineering professionals about the Bradley and Hewletts Creeks Watershed Restoration Plan/HOW Program at a watershed plan creation workshop. Other presentations included a homeowners' association community meeting, a Surfrider Foundation Cape Fear Chapter meeting, and a grant interview.

HOW staff also maintained an interactive presence at community meetings and local events, such as UNCW's Our Green Future and Wilmington's Earth Day Festival. Promotional items and program materials were distributed at these events. Along with providing educational opportunities, these events also served to gauge outreach and advertising success. During the Earth Day Festival, 15 individuals stated that they had heard about the HOW program and wanted more information about getting involved.

Over the course of the year, the HOW website experienced some difficulties, including several successful malicious hacking attempts. These unforeseen attacks prompted the city to take action to prevent further problems and led to the website being transferred from external to internal hosting to help maintain site security and integrity. The website is still being redeveloped and is expected to be complete in fall of 2016. Fortunately, a strong social media presence for HOW was developed over the course of the year, with Facebook posts reaching 3,113 individuals and 187 Twitter followers. This serves to offset the potential lost audience from website outages and problems.

Since success of the HOW Program is reliant upon installation of volume-reduction BMPs, there was a need within the Wilmington-area for certified BMP installers. As a result, a Residential Rain Garden Certification workshop was held by NC Cooperative Extension. This workshop was specially tailored to the unique requirements of Rain Garden installation in the Southeast Coastal Plain, specifically the Wilmington area. Out of this training, 17 professionals were newly-qualified to install rain gardens.

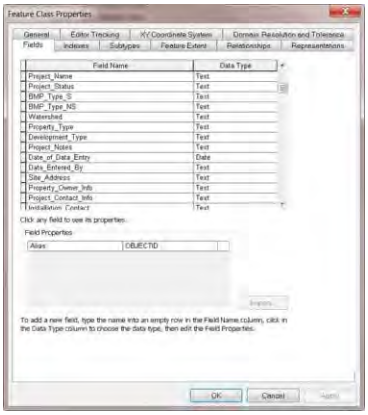
During the workshop, participants installed a rain garden in the Windward Oaks neighborhood within the Hewletts Creek Watershed. This was in conjunction with an EPA 319(h) Grant that NC Cooperative Extension and HOW have partnered to implement together. Other projects funded by this grant are still to be installed, including an installation at Longleaf Mall, an infiltration trench immediately adjacent to Hewletts Creek, and bioswales and infiltration basins at two other locations.

Another grant that will soon provide a volume-reducing BMP is an EEG grant in the Glen Meade neighborhood, also in the Hewletts Creek Watershed. Located off of Lynnwood Drive, this BMP installation is currently in the design process and should begin construction in late summer of 2016. Built on .28 acres, an infiltration basin will capture approximately 6,840 cubic feet of runoff from a drainage area 33.4 acres in the Glen Meade Neighborhood.

In April 2016, the NC Coastal Federation, in partnership with HOW, submitted an application for an EPA 319(h) Grant. This application was reviewed and selected for an interview. In May of the same year, NC Coastal Federation and City of Wilmington employees traveled to Raleigh to participate in the interview process. In June, the NC Coastal Federation was notified that they had been awarded the grant. It will fund 12 volume-reducing BMPs at various sites throughout the Bradley and Hewletts Creek Watersheds, to be completed over the next two years.

New Hanover Soil & Water Conservation District (NHSWCD) was once again granted a contract (HOWBMP) with the city to install BMPs on private properties in the watersheds. NHSWCD and HOW employees performed many visits to previously installed and potential future BMP sites this year. Sites of previous installations were properly maintained and in good working order, with a few rain gardens that needed maintenance. Those property owners were educated on necessary maintenance procedures. Awareness of the program was largely done through word of mouth this year. Despite greater public awareness than last year, there were no BMP installations through HOWBMP this year. While NHSWCD had several sites identified and were in the planning stages by the end of the year, they were unable to complete any installations before the fiscal year's end, due in part to staffing issues. This should not prove problematic next year, as NHSWCD can continue with the sites they have already identified.

All volume reduction projects that are in design or in the ground will be tracked using the GIS Atlas. This tracking tool is currently undergoing in-house redevelopment and is slated for release in the fall of 2016. This robust tool will not only allow project volume to be tracked, but it will also allow the user to monitor and input data at every step of the installation process. Functionality also includes fields for maintenance scheduling, photographs, and a hydrograph modeler that will calculate overall volume reduction within the watersheds.



Annual Assessment & Evaluation of Plan Implementation:

The HOW program made great strides in bringing awareness about stormwater pollution and volume-reducing BMPs to watershed residents' attention this year through outreach and advertising efforts. Fewer physical installations occurred this year as compared to years past due to unforeseen circumstances that pushed timelines back. The Hewletts Creek 319(h) grant with NCSU experienced challenges including a missed project opportunity with a local school, while staffing changes at NC Cooperative Extension also impacted the EEG Lynnwood grant and the Hewletts Creek 319(h) grant. This means that some of those projects that were slated for installation in FY15-16 will be completed in FY16-17, adding to the volume reduction benefit for that year.

The information below includes the progress towards the Plan's 6 Objectives and 35 Actions in FY15-16.

Objective 1: Continue existing programs that address water quality impairments in both watersheds:

The city has continued its environmental education and outreach efforts by sending out a fall and spring postcard mailing to watershed residents in FY15-16, focusing on sediment and erosion control issues and litter pollution, respectively. Public event participation is also a large component of the city's existing programs, including Earth Day, various UNCW events, and community meetings throughout the target watersheds. A very successful program was continued this fiscal year called the Enviroscape Watershed Education Program. This program educates every 8th grader in New Hanover County Schools about stormwater runoff, water quality impairment issues, and environmental stewardship.

A partnership with New Hanover Soil and Water Conservation District (NHSWCD), called the HOWBMP Program, installs BMPs throughout the target watersheds. While the BMPs installations have a measurable positive impact on water quality, news of the program is spreading by word of mouth within the community, helping to raise awareness of water quality issues.

Objective 2: Determine appropriate water quality classifications and designated uses where water quality impairment exists:

In accordance with Action 2-1, the University of North Carolina at Wilmington (UNCW) continues to conduct regular surface water sampling to determine what effects the program's volume reduction efforts are having on the health of the creeks. The most notable positive impact upon Hewletts Creek is JEL Wade Wetland, reducing overall geometric mean counts from 144 CFU/100mL to 99 CFU/100mL and improving the overall water quality in the south branch of Hewletts Creek.

This plan objective concentrates heavily on the classification of local waters and the appropriateness of current classifications considering today's conditions. Ongoing issues regarding the proper classification of some waters and the possibility of a reassessment and overhaul of the classification criteria by the State of North Carolina have delayed staff in addressing this objective for the last several years. As with years past, there has been no change in classification this year. The timeline for this objective is reliant upon the State's progress in this process. While not critical to the success of the plan at this stage, as the plan continues to gain traction and improve water quality, reclassification will become a more pressing concern.

Objective 3: Reduce the transport of bacteria from land to water by reducing and tracking volume reduction:

The HOW Program has secured 319 and EEG grant funding for BMP installations in the Hewletts Creek Watershed. While the Bradley Creek Watershed has been underrepresented by BMP

installations for the last few years, the recently secured 319 grant in partnership with the NC Coastal Federation will rectify this to some degree by installing BMPs in that watershed.

This imbalance of BMP installations between the two target watersheds is due to the discrepancy in water quality classifications. While Hewletts Creek is classified as an SA waterbody, which would allow for shellfish harvest, it is therefore officially impaired and listed on the State's 303(d) Impaired Waters List. Bradley Creek is classified as SC, which means it's suitable for secondary recreation, but not for shellfish harvest and is therefore not officially impaired according to the state. However, bacteria-laden runoff also affects Bradley Creek. These classifications afford more funding opportunities for BMP installations in the Hewletts Creek Watershed, than the Bradley Creek Watershed because grantees fund projects aimed at restoring impaired creeks. However, the NC Coastal Federation was wise in its application for 319 grant funds that will be used in *both* the Hewletts and Bradley Creek Watersheds. Consequently, more focus will be placed upon Bradley Creek in the coming years.

Objective 4: Promote stormwater reduction efforts:

Although many efforts to promote stormwater reduction are ongoing, several new opportunities have presented themselves in FY15-16. A robust social media presence has been adopted by HOW and is gaining in popularity throughout the community. HOW is also involved in more traditional stormwater reduction education campaigns within the target watersheds. A tree giveaway program is also currently in development and will begin implementation in the first quarter of FY16-17.

In support of Action 4-4, HOW has developed a tree giveaway program. A target neighborhood in the Hewletts Creek Watershed has been identified for tree installations. In the summer of 2016, door hangers and surveys will be distributed to homeowners. Participants will be chosen based on responses and trees will be planted with assistance from homeowners. This will create buy-in and understanding of the HOW Program and volume reduction efforts within this targeted neighborhood.

Both the 319 and EEG grants that HOW has partnered on this year contain outreach and education efforts. As a result, HOW has educated many homeowners in the Hewletts Creek Watershed, particularly regarding the 319 grant. Since installation of the EEG Grant BMP was delayed due to an unforeseen redesign of the BMP, education efforts in the associated neighborhood (Glen Meade) will begin in early FY16-17.

While many strides have been taken to promote stormwater reduction efforts throughout the target watersheds, some of the actions within this objective still need to be addressed. For example, Action 4-1 discusses the use of the GIS Atlas. This should be available for use at the end of summer and will be used extensively thereafter. Also, communication with the City Streets Department and NCDOT within the next year will facilitate Actions 4-5 and 4-6, respectively. In the future, there are several other additional actions that need to be addressed under this objective including working to promote LID within private development and the county schools, working

with UNCW to further develop and implement a stormwater master plan, and evaluating stormwater ponds for potential volume reduction enhancements.

Objective 5: Form and maintain partnerships:

The HOW program successfully maintained and forged new partnerships this past year, including UNCW, NC Coastal Federation, NC State Cooperative Extension, New Hanover County Soil and Water Conservation District, and Surfrider Foundation Cape Fear Chapter. New partnerships have been developed with WECT TV-6, WHQR Public Radio, and the Cape Fear Group of the Sierra Club.

In accordance with Action 5-1, HOW delivered an educational program to the Cape Fear Chapter of the Surfrider Foundation that was attended by 41 people. Furthering this action, a presentation has been scheduled for FY16-17 to members of the Sierra Club. HOW's ongoing partnership with the NC Coastal Federation resulted in successfully securing a 319 grant, which continues to fulfil Action 5-2.

HOW's social media presence has been enhanced through advertising efforts with the local National Public Radio and NBC affiliates (WHQR and WECT, respectively). WHQR listeners are provided with a 15-second message about the HOW Program and are then directed to the HOW Facebook page. WECT's web and mobile users view a clickable downspout reroute graphic which leads them to viewing a 30-second downspout disconnection PSA. From here, users are directed to the HOW Facebook page. HOW's partnership with WECT has resulted in a local celebrity spokesperson for the program, news anchor Jon Evans, who starred in the downspout disconnection PSA.

A technical training opportunity, in accordance with Action 5-5, was held for local landscape professionals this year. This two-day class was held in Wilmington by the NC Cooperative Extension and certified 17 professionals in the installation and maintenance of residential rain gardens.

The actions that have not been addressed in FY15-16 will be addressed in FY16-17. This includes the use of the GIS Atlas, which is currently in redevelopment and will be released in FY16-17. And although the City continues to partner with UNCW, more collaboration will be done to identify water quality trends and pursue retrofit projects that reduce stormwater volume, as outlined in Action 5-6.

Objective 6: Measure success and adapt plan based upon results:

Although there were some constraints and limitations this year, the HOW program has still had successes. The GIS Atlas is still in the in-house redevelopment process and has hampered progress of Action 6-1. Despite this, tracking of watershed volume reduction is taking place and will be transferred to the Atlas upon its completion.

Progress with the Hewletts Creek 319 grant has been slow, and measurable results are minimal at this point. However, this has been a valuable opportunity to focus on educational efforts related to grant projects. In the future, grant funding opportunities will focus on BMP installation *in tandem* with educational efforts, rather than education alone. This approach will be taken with the recently acquired NC Coastal Federation 319 grant and will likely deliver far greater results in the future.

HOW staff will also connect with UNCW water quality monitoring staff to evaluate water quality in Bradley & Hewletts Creeks and identify specific focus areas for BMP retrofits.

5. Information regarding North Carolina TMDLs

Information regarding North Carolina TMDLs is available at:
http://portal.ncdenr.org/web/wq/ps/mtu/trndlltmdls

APPENDICES

APPENDIX A: PROGRAM IMPLEMENTATION INCLUDING MODIFICATIONS AND JUSTIFICATION

None for this reporting period.

APPENDIX B: PUBLIC EDUCATION AND OUTREACH

Included in this section:

- BMP Reporting Table
- Public Outreach, Education and Involvement Plan including program goals, description of target pollutants, sources, and target audiences

DATE OF EVENT/ ACTIVITY	EVENT/ACTIVITY	AUDIENCE	DELIVERED BY (AGENCY)	METHOD OF DELIVERY / MESSAGE	ATTENDANCE/ PARTICIPATION
BMP a. Define outreach/education program goals including a description of the target pollutants, sources, and target audiences					
Outreach and education program goals, as well as a description of the target pollutants, sources, and target audiences, why they were selected and key outreach messages are thoroughly identified in the Appendix. This section is updated as necessary to reflect changes in target audience characteristics, awareness, etc.					
BMP b. Distribute public education materials and information to identified target audiences and user groups. For example, schools, homeowners, and/or businesses.					
In addition to public outreach efforts in this category, the Stormwater Compliance Officer also distributes education materials to the public and targeted user groups (i.e. pet owners, auto shops, restaurants, residents, etc) and issues NOVs and fines to citizens and businesses that have been identified as non-compliant with the City's stormwater ordinances. Information about code enforcement actions are included in the Appendix.					
Annually	8th Grade Enviroscape Watershed Presentations	All 8th Grade NHC Schools Science Classes	Stormwater Services CFRW NHSWCD	Classroom presentation about watersheds, water quality, nonpoint source pollution, BMPs and stewardship	74 classes 2200 students
9/30/2015	Presentation: UNCW Environmental Policy class	Undergraduate students	Stormwater Services	Enviroscape demonstration, policy constraints discussion, PSA videos shown, educational giveaways - newsletters, zip wallets, water bottles	30 students
11/1/2015	Pet Waste Signage Pilot Program	Pet owners	Stormwater Services	Continued program to deploy educational pet waste signage in city easements where pet owners walk their dogs	40 additional signs printed
2/19/2016	Pet Waste Signage & Mailing - response to complaint	Pet owners	Stormwater Services	Deployed pet waste ordinance signage on Winston Blvd. and conducted neighborhood mailing	Temporarily installed Pet Waste ordinance signage and gave PW flags to homeowner
2/19/2016	Pet Waste Signage & mailing - response to complaint	Pet owners	Stormwater Services	Deployed pet waste ordinance signage in S. Churchill Drive neighborhood and conducted neighborhood mailing	Temporarily installed Pet Waste ordinance signage and gave PW flags to homeowner
2/25/2016	Lower Cape Fear Stewardship Awards Program	Realtors, Developers, Environmental Agencies, Politicians	Stormwater Services	Staffed display booth and educated participants about stormwater pollution, BMPs, pet waste, etc.	150 in attendance

3/19/2016	Canines for Clean Water booth at New Hanover County Rabies Clinic	Pet owners	Stormwater Services	Canines for Clean Water booth - interactive event where pet owners sign a pledge to clean up after their pet and submit a photo of their pet to be featured on our website wilmingtonnc.gov/canines	80 pet owners signed the pledge
4/7/2016	DREAMS Presentations	Students	Stormwater Services	Garden class students that are involved with the rain garden being installed at DREAMS location	5 students, 2 adults
4/23/16	Lower Cape Fear Earth Day Celebration at Hugh MacRae Park	Festival attendees, general public	Stormwater Services (SWS is an annual sponsor of Lower Cape Fear Earth Day Festival)	Display booth to promote stormwater pollution education with an interactive game/quiz and stormwater prizes	6-7000 attendees
4/27/2016	Presentation: Cape Fear Community College Biology Class	Community college students	Stormwater Services	Wade Wetland history, water quality, invasives in cooperation with Melanie Doyle	8 students 2 faculty
4/30/2016	Pawz in the Park at Battleship Park	Pet owners	NHSWCD	Canines for Clean Water booth - interactive event where pet owners sign a pledge to clean up after their pet and submit a photo of their pet to be featured on our website wilmingtonnc.gov/canines	50 pet owners signed the pledge
6/11/2016	Canines for Clean Water booth at New Hanover County Rabies Clinic	Pet owners	Stormwater Services	Canines for Clean Water booth - interactive event where pet owners sign a pledge to clean up after their pet and submit a photo of their pet to be featured on our website wilmingtonnc.gov/canines	27 pet owners signed the pledge

BMP c. Informational Web Site (www.wilmingtonnc.gov/stormwater)					
Ongoing/Regular Updates	Stormwater Services website	General public, website viewers	Stormwater Services	Dedicated stormwater website	Updates to the Stormwater website are ongoing.Will have brand new stormwater website in Fall 2016.
Ongoing	Stormwater Hotline info advertised on City website homepage and Facebook page	General public	Stormwater Services Communications Div.	Stormwater hotline and web reporting form for public; posted on website under What's New section and on City's Facebook page	Stormwater website, city website, Facebook fans, general public
7/9/2015	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Lincoln Forest Drainage complete	City of Wilmington Website viewers and Facebook fans
8/4/2015	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - City installs wetland in Raintree subdivision	City of Wilmington Website viewers and Facebook fans

8/24/2015	City of Wilmington website homepage and Facebook news	General public Web Viewers	Stormwater Services	News article - Portion of Patricia Drive closed	City of Wilmington Website viewers and Facebook fans
8/24/2015	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Inland Greens drainage improvements complete	City of Wilmington Website viewers and Facebook fans
9/30/2015	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - City prepares for Hurricane Joaquin	City of Wilmington Website viewers and Facebook fans
10/15/2015	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - WPD closes portion of Ringo Drive	City of Wilmington Website viewers and Facebook fans
10/19/2015	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Stormwater Solutions	City of Wilmington Website viewers and Facebook fans
12/1/2015	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Portion of Brittan Dr. closed	City of Wilmington Website viewers and Facebook fans
12/4/2015	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Patricia Drive to reopen	City of Wilmington Website viewers and Facebook fans
12/17/2015	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - City's first green building still saves (Streetsweeper Bldg)	City of Wilmington Website viewers and Facebook fans
1/14/2016	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Brenda Dr. drainage project begins	City of Wilmington Website viewers and Facebook fans
12/17/2015	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - City's first green building still saves (Streetsweeper Bldg)	City of Wilmington Website viewers and Facebook fans
1/22/2016	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Wisteria Clearbrook drainage improvements continue	City of Wilmington Website viewers and Facebook fans
2/10/2016	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - City completes major stormwater project (S. Branch of Bradley Creek)	City of Wilmington Website viewers and Facebook fans
2/25/2016	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Portion of Brenda Dr. to close temporarily	City of Wilmington Website viewers and Facebook fans
4/1/2016	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Carolyn Drive closure	City of Wilmington Website viewers and Facebook

					fans
4/12/2016	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Spring stormwater newsletter insert is out.	City of Wilmington Website viewers and Facebook fans
4/21/2016	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Stormwater sponsors Earth Day Fest	City of Wilmington Website viewers and Facebook fans
5/20/2016	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Brenda Dr drainage project	City of Wilmington Website viewers and Facebook fans
6//7/2016	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Shinnwood Rd drainage improvements	City of Wilmington Website viewers and Facebook fans

BMP d. Maintain Hotline/Help line

The Stormwater Pollution Prevention Hotline was established in January 2010 to field calls from the citizens, businesses, and city employees regarding illicit discharges and other reports of stormwater pollution. The hotline phone # is **910-341-1020** and the web address is **www.wilmingtonnc.gov/reportstormwaterpollution.** Hotline/web reports are routed to the Stormwater Code Compliance Officer who tracks, investigates, and responds to all hotline reports. Information regarding hotline reports is included in the Enforcement Appendix section including the number and nature of hotline phone/web reports.

Ongoing	Stormwater Hotline advertised using various outreach methods: truck magnets, signs, billboards, presentations, etc.	General public	Stormwater Services	Hotline poster, website, GTV-8 and promo items (pens, magnets, sticky notes) are used to raise awareness of the Stormwater Hotline	Hotline calls and webform reports vary each year. More info can be found in the "Enforcement" section of the report.

BMP e. Extent of Exposure/Reporting Requirements

Media Advertising Campaigns

September - November 2015	Mass Media - Cumulus Radio Broadcasting - 102.7 WGNI and 101.3 WWQQ	General public	Stormwater Services	:30 second Pet Waste PSAs on broadcast radio stations and 2 dedicated days of "blink" ads (24/per day) -Pet Waste PSA 384 ads total with PSAs and blinks combined	Target Audience: Pet owners, General public Reach: 67,507 adults Frequency: 5.0 times Total cost: $2000
September - December 2015	Mass Media - WECT-6 TV and website campaign (including Top Story wrap on website)	General public TV and web viewers	Stormwater Services	30 second Pet Waste PSA on TV (72 spots total) -WECT.com online digital campaign for 3 months running concurrent with TV ad campaign	Target Audience: General public, males TV Reach: 76.7% for viewers age 35-64 TV Frequency: 3.4 WECT.com Web Reach: 250,000 unique visitors per month 1.9 million average page views per month Total cost: $4500

February - May 2016	Mass Media - WECT-6 TV and website campaign (including Top Story wrap on website)	General public TV and web viewers	Stormwater Services	30 second Stormwater Basics PSA on TV (72 spots total) -WECT.com online digital campaign for 3 months running concurrent with TV ad campaign (20,000 mobile ads per month, 2000 video pre-roll ads per month, Top Story Wraps	Target Audience: General public, males TV Reach: 76.7% for viewers age 35-64 TV Frequency: 3.4 WECT.com Web Reach: 250,000 unique visitors per month 1.9 million average page views per month Total cost: $4500
January - March 2016	Mass Media - Cumulus Radio Broadcasting - 102.7 WGNI	General public	Stormwater Services	:30 second Pet Waste PSAs on broadcast radio stations and 2 dedicated days of "blink" :05 ads (24 / day) -Pet Waste PSA 384 ads total with PSAs and blinks combined	Target Audience: Pet owners, General public Reach: 67,507 adults Frequency: 5.0 times Total cost: $1680
April - May 2016	Fairway Outdoor Billboard Advertising	Motorists Pedestrians	Stormwater Services	Pet Waste billboard	Target Audience: General public Reach: Motorists Frequency: Rotating - shown for 8 seconds every minute 24/7 Total cost: $2500
Spring 2016	Going Green Magazine- Stormwater Ad	General public Adults	Stormwater Services	Print and digital online magazine article - Cigarette butt prevention ad	Target Audience: Adults/general public, Environmental groups Reach & Frequency: 8000 printed, also available online Total cost: Free
Cumulus Media is no longer purchasing Arbitron or Nielson ratings systems. This is a cost-cutting measure on their part, but it means they no longer have the ability to provide us with reach and frequency data for the campaigns that run on their stations. The data provided references prior years available reach and frequency data for these stormwater outreach campaigns. Approved per M. Randall, NCDEQ.					

News Coverage

8/12/2015	Star News Article	Newspaper and online readers	Star News reporter	Print and online newspaper article - City turns ditch into wetland	Stats: -Daily print newspaper and online website -94,492 print readers -628,086 monthly unique visitors to online website

8/12/2015	Star News Article	Newspaper and online readers	Star News reporter	Print and online newspaper article - Native plants part of park revitalization	Stats: -Daily print newspaper and online website -94,492 print readers -628,086 monthly unique visitors to online website
9/4/2015	WECT-TV6 news story	Station viewers	WECT reporter	TV news coverage - New Hanover County builds its first live roof	Stats: -WECT-TV6 reaches 176,000 homes/per wk -WECT.com has 250,000 average unique visitors per month and 1,200,000 average page views per month
10/7/2015	WECT-TV6 news story	Station viewers	WECT reporter	TV news coverage - Wetland doing its job after heavy rainfall	Stats: -WECT-TV6 reaches 176,000 homes/per wk -WECT.com has 250,000 average unique visitors per month and 1,200,000 average page views per month
10/21/2015	Star News Article	Newspaper and online readers	Star News reporter	Print and online newspaper article - New rules set for oyster shell use	Stats: -Daily print newspaper and online website -94,492 print readers -628,086 monthly unique visitors to online website
10/21/2015	Star News Article	Newspaper and online readers	Star News reporter	Print and online newspaper article - Farmers hope new oyster bed leases generate revenue	Stats: -Daily print newspaper and online website -94,492 print readers -628,086 monthly unique visitors to online website
10/21/2015	Star News Article	Newspaper and online readers	Star News reporter	Print and online newspaper article - Recent rains still affecting water quality	Stats: -Daily print newspaper and online website -94,492 print readers -628,086 monthly unique visitors to online website

11/10/2015	Star News Article	Newspaper and online readers	Star News reporter	Print and online newspaper article - Rains keeping shellfishing waters closed	Stats: -Daily print newspaper and online website -94,492 print readers -628,086 monthly unique visitors to online website
1/5/2016	Star News Article	Newspaper and online readers	Star News reporter	Print and online newspaper article - Greener than grass: Beautiful yards don't need lawns	Stats: -Daily print newspaper and online website -94,492 print readers -628,086 monthly unique visitors to online website
1/21/2016	Star News Article	Newspaper and online readers	Star News reporter	Print and online newspaper article - Coastal fed works with Blockade Runner to reduce stormwater runoff	Stats: -Daily print newspaper and online website -94,492 print readers -628,086 monthly unique visitors to online website
4/8/2016	Star News Article	Newspaper and online readers	Star News reporter	Print and online newspaper article - Homeowners can add flood fixes to yards and gardens	Stats: -Daily print newspaper and online website -94,492 print readers -628,086 monthly unique visitors to online website
6/3/2016	Star News Article	Newspaper and online readers	Star News reporter	Print and online newspaper article - Potentially harmful algae found in Greenfield Lake	Stats: -Daily print newspaper and online website -94,492 print readers -628,086 monthly unique visitors to online website

Social Media

9/6/2015	Post on City of Wilmington, NC Facebook page	Facebook viewers	City Communications staff	Facebook post about rain and stormwater management video	14,100 page likes 2.6k post views 67 post likes 42 shares
10/2/2015	Post on City of Wilmington, NC Facebook page	Facebook viewers	City Communications staff	Facebook post about crews cleaning a storm drain with video	14,100 page likes 1.1k post views 19 post likes 3 shares
1/3/2016	Post on City of Wilmington, NC Facebook page	Facebook viewers	City Communications staff	Facebook post about rain and stormwater management video	14,100 page likes 759 post views 33 post likes 1 share

5/25/2016	Post on City of Wilmington, NC Facebook page	Facebook viewers	City Communications staff	Facebook post about stormwater runoff and Pet Waste pollution video	14,100 page likes 802 post views 17 post likes 1 share
5/26/2016	Post on City of Wilmington, NC Twitter page	Twitter followers	City Communications staff	Twitter post about stormwater runoff and Pet Waste pollution video	2 post likes 4 post retweets

Distributing promos/giveaways

Ongoing	Public Meetings, events, displays, city buildings	General public	Stormwater Services	Distribute items or leave in strategic locations where citizens will pick them up	Spread stormwater messages via freebies/promos at events such as Earth Day, Canines for Clean Water, etc.
Ongoing	Canines for Clean Water program at community pet events (ie Rabies Clinics, Pawz in the Park, etc)	Pet owners	Stormwater Services NHSWCD	Pet owners sign a pledge to clean up after their pet and submit a photo of their pet to be featured on our website wilmingtonnc.gov/canines	Goodie bag includes Canines for Clean Water pet bandana, pet waste pick up bags, pet waste brochure, pens, notepads
9/30/2015	Promos distributed at presentation to UNCW Environmental Policy class	Undergraduate students	Stormwater Services	Stormwater educational giveaways - brochures, zip wallets, tote bags, watershed posters	30 students
2/25/2016	Lower Cape Fear Stewardship Awards Program	Realtors, Developers, Environmental Agencies, Politicians	Stormwater Services	Stormwater educational giveaways - brochures, zip wallets, tote bags, watershed posters	150 in attendance
4/7/2016	DREAMS Presentations	Students	Stormwater Services	Garden class students that are involved with the rain garden being installed at DREAMS location	Distributed educational items including pamphlets, bags, pens, literature
4/23/16	Lower Cape Fear Earth Day Celebration at Hugh MacRae Park	Festival attendees, general public	Stormwater Services (SWS is an annual sponsor of Earth Day)	Display booth, interactive Stormwater Sleuth poster game and educational giveaways	Approx. 6-7,000 attendees
4/27/2016	Presentation: CFCC Biology Class	Community college students	Stormwater Services	Watershed maps Reusable bags Educational brochures HOW bumper stickers	8 students 2 faculty

Local Cable Access (GTV-8)

Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (slides)	Cable access TV viewers	Stormwater staff GTV-8 Staff	Monthly rain barrel sale to the public	Inform public about opportunity to purchase reduced cost rain barrels every month
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (slides)	Cable access TV viewers	Stormwater staff GTV-8 Staff	Re-route your downspout slideshow	Inform public about re-routing downspouts to let water soak in, instead of runoff

Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (video slideshow)	Cable access TV viewers	Stormwater staff GTV-8 Staff	Shortnose Sturgeon narrated slideshow	Inform public about the Shortnose Sturgeon, an endangered species in the Cape Fear River
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (slides)	Cable access TV viewers	Stormwater staff GTV-8 Staff	Pet waste ordinance slideshow, detailing ordinance rules and fines	Inform public of pet waste ordinance
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (slides)	Cable access TV viewers	Stormwater staff GTV-8 Staff	Yard waste ordinance slideshow, detailing ordinance rules and fines	Inform public of yard waste ordinance
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (slides)	Cable access TV viewers	Stormwater staff GTV-8 Staff	Stormwater hotline info slideshow	Inform public of water pollution/illicit discharge and hotline to report pollution
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (slides)	Cable access TV viewers	Stormwater staff GTV-8 Staff	Stormwater Poster slideshow	Inform public about hotline, pet waste, yard waste, and where runoff drains
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater staff GTV-8 Staff	:30 second PSA	UNCW Buffers PSA
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater staff GTV-8 Staff	:30 second PSA	Grasshopper Litter PSA
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater staff GTV-8 Staff	:30 second PSA	Hard to Train a Human Pet Waste PSA 2014 (refilmed in Hi-Def)
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater staff GTV-8 Staff	:30 second PSA	Yard Waste PSA 2010
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater staff GTV-8 Staff	:30 second PSA	Johnny Fishpatrick PSA - NC DENR
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater staff GTV-8 Staff	:30 second PSA	Keep America Beautiful Grasshopper PSA
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater staff GTV-8 Staff	:30 second PSA	Not your Ashtray PSA
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (documentary)	Cable access TV viewers	Stormwater staff GTV-8 Staff	Documentary	Puget Sound Scuba Urban Pollution documentary

Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater staff GTV-8 Staff	:30 second PSA	Shortnose Sturgeon Documentary

Brochures, Displays, Signs, Welcome Packets, Pamphlets

11/1/2015	Pet Waste Signage Pilot Program	Pet owners	Stormwater Services	Continued program to deploy educational pet waste signage in city easements where pet owners walk their dogs	40 additional signs printed
3/1/2016	Wildlife Feeding signs	City Park patrons	Stormwater Services	Wildlife feeding signage redesigned to deploy to Wade Wetland, Greenfield Lake, Halyburton Park and Anne McCrary Park	20 signs fabricated; signage kiosks being built and installed by the Parks Div.

Newsletters

Summer 2015	Citywide Public Information Report Newsletter	City residents Public library Special events	Stormwater Services Communications Div.	Stormwater projects article	40,000+ newsletters mailed to city residents
Fall 2015	Citywide Public Information Report Newsletter	City residents Public library Special events	Stormwater Services Communications Div.	Brief highlights about Stormwater Drainage Projects - S. Bradley Creek, Clearbrook Wisteria, Brenda Drive projects	40,000+ newsletters mailed to city residents
Winter 2016	Citywide Public Information Report Newsletter	City residents Public library Special events	Stormwater Services Communications Div.	Stormwater Projects article - Raintree Wetland, stormwater improvement projects summary	40,000+ newsletters mailed to city residents
Spring 2016	Stormwater Watch Newsletter Insert included in Citywide Public Information Report Newsletter	City residents Public library Special events	Stormwater Services Communications Div.	UNCW Annual Water Quality Report including articles about litter and cigarette butt pollution	40,000+ newsletters mailed to city residents

Grant Projects

Began Jan 2015 (1st year of 2.5 year grant)	319 Hewletts Creek Watershed BMP Installations Grant (A collaborative approach to voluntary watershed restoration)	Hewletts Creek	NCSU Stormwater Services	Stormwater improvement projects on private and city property	Collaboration with NCSU to implement projects that align with the Bradley & Hewletts Creek Watershed Restoration plan
Began Jan 2014 (2.5 year grant with extension)	319 DREAMS Grant with NCSU	Burnt Mill Creek	NCSU Stormwater Services	Stormwater improvement project on city property housing DREAMS in downtown area of BMC Watershed	Collaboration with DREAMS students and faculty to design and install BMPs which include rain gardens, permeable pavement and cisterns

Began August 2015	Lynnwood EEG Grant	Hewletts Creek	NCCF NCSU Stormwater Services	Bioinfiltration Area designed and constructed summer/fall 2016. Will reduce runoff volume for Heal Our Waterways program	Collaboration with NC Coastal Federation, NC State, and City of Wilmington Stormwater Services to design and construct project
Ongoing	Developed watershed restoration plan for Hewletts and Bradley Creeks, now being implemented by Watershed Coordinator	Hewletts & Bradley Creek watershed residents and businesses	Partners: Stormwater Services NC Coastal Federation Town of Wrightsville Beach Withers and Ravenal UNCW	Heal Our Waterways program implementation. See TMDL section of report for status of restoration plan implementation	Watershed restoration plan implementation began in 2013

Employee Trainings

12/7/2015	Stormwater Presentation for Maintenance Field Crew	Stormwater Services-Closed Drainage Crew	Stormwater Services Education Staff Heal Our Waterways staff	Stormwater and Illicit Discharge Enviroscape presentation	13 attendees
12/7/2015	Stormwater Presentation for Maintenance Field Crew	Stormwater Services Street-Sweeping Crew	Stormwater Services Education Staff Heal Our Waterways staff	Stormwater and Illicit Discharge Enviroscape presentation	14 attendees
12/9/2015	Stormwater Presentation for Maintenance Field Crew	Stormwater Services-Open Drainage Crew	Stormwater Services Education Staff Heal Our Waterways staff	Stormwater and Illicit Discharge Enviroscape presentation	12 attendees
12/9/2015	Stormwater Presentation for Maintenance Field Crew	Stormwater Services- BMP Crew	Stormwater Services Education Staff Heal Our Waterways staff	Stormwater and Illicit Discharge Enviroscape presentation	6 attendees
5/25/2016	CFPUA Tour	Stormwater Services Other CFPUA employees	CFPUA Plant Managers and Operators	Tour of Northside & Southside Wastewater Treatment Plant and Tour of Sweeney & Nano Filtration Drinking Water Plants	8 attendees

Weekly Update Articles for City Council / City Staff / Media

Weekly	Weekly Email Update	City Council Employees Media	Various city staff	Weekly update of city news, events, projects, etc.	Stormwater information was included in 13 Weekly Updates

Citizen Contacts

Ongoing/ regularly	Stormwater office via phone, email or walk-in	Citizens/ Businesses	Stormwater staff	Responses to requests for information, literature, etc.	Information provided regarding specific nature of contact

LEGEND:

COW = City of Wilmington

NHSWCD = New Hanover Soil & Water Conservation District

CFRW = =Cape Fear River Watch

WECT-TV6 = NBC station

CUMULUS = radio stations

NCSU = NC State University

FB = Facebook

HOW = Heal Our Waterways program

CITY OF WILMINGTON
STORMWATER SERVICES

Public Outreach & Education, Public Involvement & Participation Plan

Compiled
August 2012
Updated as Needed

Table of Contents

Introduction

Stormwater runoff is water from rain or irrigation that flows over land and into local creeks, streams and waterways. According to the US Environmental Protection Agency (EPA), stormwater runoff is the #1 source of surface water pollution.

Impervious surfaces are hard surfaces that water cannot penetrate, such as driveways, streets, parking lots and rooftops, which prevent stormwater runoff from naturally soaking into the ground. Instead, runoff flows over these surfaces picking up pollutants such as pet waste, auto fluids, fertilizers, pesticides, litter, and yard waste and carries them through the stormwater drainage system, directly into our waterways.

In Wilmington, runoff travels through a complex, interconnected system of storm drains, pipes, ditches, creeks and other natural and man-made features. In Wilmington, the storm drainage system consists of approximately:

- 9,000 catch basins and manholes
- 220 miles of pipe
- 200 miles of open drainage (ditches, creeks, and channels)
- 145 acres of retention ponds including Randall Pond and Silver Stream Pond
- 12 miles of culverts under roads
- Greenfield Lake, Love Grove Tidegates
- Stormwater BMPs such as Kerr Avenue Wetland, Park Avenue Bioretention Area, Wade Wetland, etc.

This plan for Public Education and Outreach and Public Participation and Involvement is a segment of the City of Wilmington's Comprehensive Stormwater Management Plan (hereinafter referred to as Stormwater Plan), as required by the State of North Carolina Department of Environment and Natural Resources Division of Water Quality Permit No. NCS000406. The permit authorizes the City of Wilmington to discharge stormwater from their municipal separate storm sewer system (MS4) to the receiving waters of the State within the Cape Fear and White Oak River Basins, under Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES) Program.

As required by the NPDES Permit, the City of Wilmington's Stormwater Plan must detail the City's outreach program for the five-year term of the stormwater permit. This document serves as the Outreach and Education Plan.

Since 1993, scientists at the UNC Wilmington Center for Marine Science Research have been assessing the water quality of Wilmington's major waterways. Approximately 70 sampling sites assess the water quality of 10 of Wilmington's tidal creeks, as well as Greenfield Lake, and the Cape Fear River. The findings are reported annually and serve as a valuable tool to gauge changes in water quality in the area.

Public education, outreach, and participation are essential tools to develop stewardship and awareness of stormwater pollution issues in Wilmington. By successfully reaching out to citizens

and businesses, we can reduce the pollution in our local surface waters preserving them as a healthy, beautiful resource for our area.

Mission of Stormwater Services

The City of Wilmington Stormwater Services provides comprehensive management of the stormwater drainage system in order to protect our community and environment.

Goals & Objectives ~ Outreach, Education, Involvement Program

The City of Wilmington Stormwater Services strives to improve local water quality by creating awareness of stormwater runoff issues through public education and outreach and public participation and involvement.

Through education, outreach, and involvement we educate citizens, businesses and employees about the stormwater drainage system, sources of stormwater pollution, the direct impacts of stormwater pollution on local waterways, and what we can do as a community to prevent and reduce stormwater pollution. The program complies with the City's NPDES stormwater permit.

The education program addresses the following facts as a basis for education efforts:

- Storm drains and drainage conveyances (i.e. ditches) carry water directly to local waterways without any treatment. Only rain should go down the storm drain!

- Impervious surfaces increase the speed and volume of polluted stormwater runoff entering the stormwater drainage system.

- Polluted stormwater runoff flows directly into local waterways where it impacts water quality, aquatic habitat, shellfish harvest areas, and drinking water supplies.

- Plants, shrubs, trees, and other vegetation greatly reduce stormwater pollution by absorbing and filtering stormwater runoff and preventing soil from washing away.

- Reduce the amount of polluted stormwater runoff entering local waterways by utilizing BMPs (Best Management Practices). BMPs are any action or on-the-ground practice that reduces the amount of stormwater and pollution flowing into waterways. BMPs such as rain gardens, rain barrels, and re-routing downspouts to grassy areas allow stormwater runoff to soak into the ground and be cleaned and filtered naturally.

The program also addresses the six major pollutants that impact Wilmington's waterways:

1) Fecal coliform bacteria
2) Nutrients
3) Sediment
4) Chemicals
5) Litter
6) Vehicle Pollution

Target Pollutants, Sources, and Audiences

The following pollutants have been identified as significant sources of pollution in Wilmington's waterways. Many of these pollutants also negatively impact the proper functioning of the stormwater drainage system. These particular pollutants were chosen based on several sources including UNCW's water quality monitoring data, New Hanover Animal Control statistics, and the 2006 NC Statewide Stormwater Survey of North Carolina residents.

This is a working document; therefore the goals and target pollutants will change over time based on the target audiences' knowledge and implementation of stormwater-friendly practices, as well as water quality data and trends.

Target Pollutant	**Pollutant Origin**	**Likely Pollutant Sources / Target Audience** (Residential & Commercial/Industrial)
Fecal Coliform Bacteria	⌖ Domestic & wild animal waste	- Pet owners and their pets - Stray dogs, feral cats - Boarding kennels - Veterinarian facilities - Pet-related businesses
Nutrients (nitrogen and phosphorous)	⌖ Fertilizers ⌖ Yard waste	- Homeowners - Gardeners - Landscapers/Landscaping Companies - Turf maintenance professionals - Golf courses
Sediment (sand, soil, etc)	⌖ Eroding stream banks ⌖ Exposed soil ⌖ Construction	- Construction sites/land-disturbing activities - Landscapers/landscaping companies - Homeowners
Chemicals	⌖ Pesticides ⌖ Pressure washing chemicals ⌖ Vehicle and boat washing soaps	- Homeowners - Pressure washing businesses - Mobile detailers - Pressure washers - Turf/landscape professionals - Restaurants
Litter	⌖ Plastics ⌖ Paper ⌖ Cigarette butts	- Motorists - Smokers - Restaurants - Retail centers - Construction sites
Vehicle Pollution	⌖ Vehicle fluids (motor oil, antifreeze, etc) ⌖ Vehicle washing soaps/detergents	- Motorists' vehicles - Backyard mechanics - Vehicle maintenance repair shops - Mobile detailers - Dealership lots

Target Pollutant: FECAL COLIFORM BACTERIA (domestic and wild animal waste)

Nutrients, such as nitrogen and phosphorus, enter our waterways in excessive amounts via stormwater runoff that carries fertilizers and yard waste into the storm drainage system. High nutrient loads causes algal blooms, low dissolved oxygen levels, fish kills, and impaired aquatic habitats.

Pollutant Source:

Likely Residential Sources: Domesticated Animals, Stray and Feral Animals
Likely Commercial/Industrial Sources: Boarding Kennels, Veterinarian Facilities, Pet-Related Businesses

Background/Environmental Impacts:

- Storm drains and drainage conveyances (i.e. ditches) carry polluted runoff directly to local waterways without any treatment. Only rain should go down the storm drain!
- Fecal coliform bacteria is the #1 pollution problem impacting Wilmington's creeks and waterways, as identified through water quality monitoring. The primary source of this bacterial pollution is canine and outdoor cat waste.
- Stormwater runoff washes bacteria, parasites, viruses, and nutrients from animal waste directly into our waterways.
- There is a direct correlation between the amount of impervious surface coverage and fecal coliform bacteria counts in Wilmington's waterways.
- Once in our waterways, these pathogens can cause shellfish bed closures, swimming advisories, algal blooms, low dissolved oxygen levels, fish kills, and impaired aquatic habitat.
- High levels of fecal coliform bacteria can cause diseases and infections in humans upon contact such as roundworm, salmonellosis, toxoplasmosis, E. coli, and gastroenteritis.

Target Pollutant: FECAL COLIFORM BACTERIA (domestic and wild animal waste)

Key Outreach Messages:

- Messages should connect uncollected pet waste to water quality problems and human health impacts.
- Dogs waste is a major source of bacterial pollution considering their population, daily defecation rate, and bacterial production. Outdoor cats are also a major problem for these same reasons; steps should be taken to control their waste as well.
- Bacteria can cause diseases in humans and other animals.
- Pet owners have a responsibility to clean up after pets and dispose of the waste properly.
- Debunk barriers to cleaning up after pets (i.e. it's not fertilizer, it's okay to use a bag to pick it up with your hand, pet waste is still a problem even if it's in your own backyard, etc).
- Pet owners should be aware of and abide by the City's Pet Waste Ordinance:
  - Fully and immediately clean up after pets on any public property. *(Public property consists of streets, sidewalks, right of ways, parks, plazas, stream banks, public accesses, pathways, drainageways, storm drains, creeks, officially accepted easements, etc.)*
  - Carry a clean-up device (i.e. bag, scooper) at all times.
  - Show the clean-up device to a Code Enforcement Official, if requested.
  - Bag and dispose of pet waste in a closed trash receptacle or refuse container.
  - Do not flush pet waste down the toilet (Cape Fear Public Utility Authority ordinance).
  - Fines for non-compliance with the City's pet waste ordinance are $250 per occurrence.
- Utilizing BMPs, such as rain gardens, rain barrels, and re-routing downspouts to grassy areas allows polluted runoff to soak into the ground and be cleaned and filtered naturally.

Target Audience	Audience Description (Why Selected?)	Suggested Outreach Strategies
Pet Owners	By right of ownership, a pet owner has the power to reduce pet waste-contaminated runoff by cleaning up after their pet. Survey data reports both females and males should be targeted, with a slightly higher % of males not picking up.	• Educate citizens about the City's pet waste ordinance via the stormwater website and GTV • Participate in local pet-related events (i.e. Paw Jam) • Continue Canines for Clean Water program (C4CW) • Post educational signs at pet waste stations • Distribute pet waste education brochures and flyers during special events • Air public service announcements in paid spots • Direct mail enforcement letter to neighborhoods with complaints • Include blurbs in the citywide newsletter • Utilize enforcement actions when necessary for violators of the pet waste ordinance
Pet-Related Businesses	Targeting pet-related businesses will educate those in the profession about best practices for pet waste management and also serve as a conduit to deliver outreach messages to the public. Businesses include: - Veterinarians - Animal hospitals - Kennels - Pet stores - Groomers - Trainers - Petsitters	• Encourage businesses to be models for environmental stewardship at their place of business (i.e. install pet waste receptacles in parking lot islands or properly design kennel runs for waste removal) • Encourage businesses to post the pet waste education poster and/or brochures for customers to view

	- Doggie day care - Local pet magazines - Local adoption agencies - NHC Animal Control - NH Humane Society	
Management/ Residents of Apartment Complexes	Apartment complexes often experience problems with uncollected pet waste on their property. In Wilmington, a large number of college students with pets reside in these complexes. Management can play a key role in educating their residents about pet waste and implementing and enforcing a pet waste management policy on their property.	• Provide materials to educate the management of apartment complexes on how to institute a pet waste policy, as well as provide a consistent policy for enforcement • Encourage apartment complex management to educate their residents by distributing the City's pet waste education materials to each apartment • Encourage management to post the pet waste education poster and/or brochure in common areas for their residents to view • Encourage management to be make it easy for their residents to manage pet waste by installing pet waste receptacles around the property
Assessment & Evaluation		
• Assess and evaluate local water quality utilizing UNCW Center for Marine Science annual water quality monitoring, specifically Fecal Coliform counts in local waters • Periodically assess the habits of pet owners and pet industry professionals by: - Direct observation of habits *(collects vs. doesn't collect, where dispose, etc.)* - Count of citations issued for pet waste violations - Count of reported complaints to Stormwater Hotline regarding pet waste violations		

Target Pollutant: NUTRIENTS (fertilizers, yard waste)

Nutrients, such as nitrogen and phosphorus, enter our waterways in excessive amounts via stormwater runoff that carries fertilizers and yard waste into the storm drainage system. High nutrient loads causes algal blooms, low dissolved oxygen levels, fish kills, and impaired aquatic habitats.

Pollutant Source:
Likely Residential Sources: Homeowners, Gardeners, etc.
Likely Commercial/Industrial Sources: Landscapers, Turf Maintenance, Golf Courses, etc.

Background/Environmental Impacts:

- Storm drains and drainage conveyances (i.e. ditches) carry polluted runoff directly to local waterways without any treatment. Only rain should go down the storm drain!
- Lawn fertilization is one of the most widespread watershed behaviors by homeowners and landscaping companies.
- Improper application of fertilizer results in the introduction of nutrients into our waterways via stormwater runoff.
- Yard waste (i.e. grass clippings, leaves, pinestraw) are often improperly blown or directed into streets, storm drains, and ditches leading to clogged stormwater conveyances resulting in flooding of streets and property. This organic matter can also flow through the drainage system introducing nutrients and pesticides into waterways.
- Fertilizers and yard waste that end up in local surface waters impact aquatic life by introducing an overabundance of nutrients, a process known as eutrophication.
- Eutrophic water conditions cause algal blooms. Once the excess nutrients are used up in a water body, the algae will decompose using up the dissolved oxygen in the water, which aquatic organisms (i.e. fish) need to survive. This can lead to fish kills.
- Algal blooms produced from eutrophic conditions also prevent sunlight from reaching benthic (bottom-dwelling) aquatic plants and organisms.
- Some types of algal blooms are toxic to plants and animals, including humans.

Target Pollutant: NUTRIENTS (fertilizers, yard waste)

Key Outreach Messages:

- A direct link exists between improper fertilizer application and yard waste disposal and poor water quality resulting in algal blooms, fish kills, and habitat degradation.
- Grass cycle! Leave grass clippings on the lawn to reduce or eliminate the need for fertilizer. Clippings conserve soil moisture and are a natural fertilizer.
- Compost yard waste and use the resulting material in your landscape or garden
- Contain yard waste for City pickup.
- Before fertilizing, get a free soil test from NHC Cooperative Extension. It will tell you the exact nutrients your lawn needs and could save you money spent on fertilizer.
- Design and maintain lawns with the goal of absorbing runoff. For instance, minimize the use of lawn area and fertilizer by replacing with native trees, shrubs, plants and groundcover.
- Use alternatives to fertilizer such as organic fertilizer, compost, grass cycling, worm poop, etc.
- If fertilizer must be used, read the label and apply correctly. Improper application includes over-applying by frequency or volume, applying the wrong type, applying before rain, and failure to clean excess fertilizer from driveways and streets after application.
- Utilizing BMPs, such as rain gardens, rain barrels, and re-routing downspouts to grassy areas allows polluted runoff to soak into the ground and be cleaned and filtered naturally.
- Improper disposal of yard waste (leaves, grass clippings, pine straw) can clog the storm drainage system causing flooding of streets and property.
- Landscapers/Property owners should be aware of and abide by the City's Yard Waste Ordinance:
  - It is unlawful to rake, sweep, blow, wash, direct or place any debris into the storm drainage system. (*The storm drainage system consists of streets, storm drains, ditches, swales, creeks, lakes, rights-of-way, dedicated easements, etc).*
  - Property owners shall keep all ditches, drains, swales, and other drainageways on their property free from obstructions which would impede the flow of water.
  - Fines for non-compliance with the City's yard waste ordinance are $250 per occurrence.
- Landscaping company employees should be trained on proper fertilization and yard waste disposal practices.

Target Audience	Audience Description (Why Selected?)	Suggested Outreach Strategies
Homeowners/ Residents	Many citizens improperly apply fertilizer and/or blow yard waste into the street or storm drain. Target audience is majority male homeowners for self-application of fertilizer and yard waste disposal. Also target households that hire landscaping companies.	• Distribute fertilizer and yard waste education brochures and soil test kits to Wilmington residents during HOA presentations and special events like Earth Day • Inform residents about proper disposal methods for yard waste including grass cycling, composting, and collecting yard waste for pick-up by posting info on GTV • Post educational lawn care poster on stormwater website • Air public service announcements on mass media outlets • Include blurbs in citywide newsletter • Submit periodic press releases to the media

Landscapers and Turf Maintenance Professionals	Landscaping and turf maintenance companies frequently use fertilizers and produce a large amount of yard waste on a regular basis. Employees are often male and of Hispanic background.	• Distribute large format education poster about yard waste disposal to landscapers and lawn maintenance companies, available in both English and Spanish • Emphasize proper staff training on practices like fertilization application and yard waste disposal • Distribute fertilizer education info to golf course management • Post outreach materials in English and Spanish on stormwater website and GTV • Utilize enforcement actions when necessary for violators of yard waste ordinance
Assessment & Evaluation		
• Periodically assess the habits of homeowners and landscape industry professionals by: - Direct observation of the fertilizer application habits of homeowners and landscape industry - Surveys of the fertilizer application habits of homeowners and landscape industry professionals • Assess and evaluate local water quality utilizing UNCW Center for Marine Science annual water quality reporting, specifically nitrogen, phosphorus, BOD, and algal bloom frequencies and locations		

Target Pollutant: SEDIMENT (sand, dirt, gravel, clay, soil particles)

Sediment is generated by the process of natural or accelerated erosion and consists of sand, dirt, clay, or soil particles. Sedimentation occurs when stormwater runoff carries soil particles from a disturbed land area or eroding stream bank to surface waters. Sediment can quickly fill in a waterbody, clog the storm drainage system, and cause turbidity and problems for aquatic life.

Pollutant Source:
Likely Residential Sources: Yards, Driveways, etc.
Likely Commercial/Industrial Sources: Construction Sites, Landscapers, Clear-cut Land, etc.

Background/Environmental Impacts:

- Storm drains and drainage conveyances (i.e. ditches) carry polluted runoff directly to local waterways without any treatment. Only rain should go down the storm drain!
- Both natural and accelerated erosion produce sediment. Natural erosion is the process of weathering that forms soil. Accelerated erosion is a result of land-disturbing activities by humans that loosen topsoil, making the land more prone to erode quickly (i.e. construction-related activities).
- While natural erosion contributes sediment to waterways, the majority of sediment comes from areas where accelerated erosion has occurred. Stormwater runoff carries soil particles from a disturbed area of land to local creeks and streams. The waves created by boaters can also cause accelerated erosion near the banks.
- Excessive sedimentation can fill in a water body or clog the storm drainage system, leading to flooding. Sedimentation also impacts bottom-dwelling organism by smothering fish eggs, shellfish, coral and benthic (bottom-dwelling) plants.
- Sediment can also cause water to become cloudy, also known as turbidity. Turbidity impairs the photosynthesis of aquatic plants, as well as the ability of aquatic animals to breathe and see prey/predators.
- Sediment serves as a “transport vehicle” for other pollutants such as nutrients, metals, and bacteria. These pollutants attach to sediment particles and cause additional water quality issues when the sediment gets stirred up (i.e. boating, hurricanes, etc) and re-pollutes the water.
- Other sources of sediment include poorly vegetated areas in a yard or landscape.

Target Pollutant: SEDIMENT (eroding streambanks, construction, exposed soil)

Key Outreach Messages:

- Any land-disturbing activity including gardening, planting, construction, etc. can produce sediment which can lead to flooding of streets and property when the sediment is carried into the storm drainage system via stormwater runoff.
- There is a direct link between sediment and poor water quality, in addition to impacts on aquatic life and habitat.
- Residents can plant groundcover, shrubs, and trees to hold soil in place and prevent erosion. Use native plants whenever possible – they don't need fertilizers and pesticides. For properties with sandy soil, mix organic matter (i.e. compost) in with the sand to allow plants to grow better.
- Mulch should be used to cover exposed soil and prevent it from washing away.
- Sediment should be collected off paved surfaces and not rinsed or blown into the drainage system.
- Lack of vegetation along waterfront property and streambanks can produce significant erosion. These types of property owners should be encouraged to plant vegetative buffers.
- Developers should follow all sedimentation and construction site laws and practices. Construction site violations can be reported to the State Hotline: 1-800-STOP-MUD
- Utilizing BMPs, such as rain gardens, rain barrels, and re-routing downspouts to grassy areas, allows polluted runoff to soak into the ground and be cleaned and filtered naturally.

Target Audience	Audience Description (Why Selected?)	Suggested Outreach Strategies
General Public/ Homeowners	The environmental consequences of sedimentation are not widely understood by citizens. Sources of sediment in our surface waters are primarily the result of human-related activities. Homeowners may have exposed soil in lawns or landscape beds or poorly vegetated areas on their property. Target both males and females.	• Encourage homeowners to plant vegetation or apply mulch to anchor soil in place and prevent erosion during HOA or community presentations • Post outreach materials on stormwater website and GTV • Lack of vegetation along waterfront property and streambanks can produce significant erosion. These types of property owners should be encouraged to plant vegetative buffers. • The public should be made aware of the City's yard waste ordinance via GTV and paid spots on mass media
Construction/ Landscape Professionals	Construction, landscape, and related industries significantly contribute to sediment loading in waterways. Employees in this field are often male.	• Promote compliance with the land development code and sedimentation and erosion control laws • Encourage proper staff training with construction, landscaping, and related businesses • Post outreach materials on stormwater website and GTV • Construction workers and landscapers should be aware of the City's yard waste ordinance which prohibits sediment from being blown into streets and storm drains. Provide landscaping companies with the yard waste poster that addresses sediment

Assessment & Evaluation

- Assess and evaluate local water quality utilizing UNCW Center for Marine Science annual water quality reporting, specifically Total Suspended Solids (TSS)
- Gather information from NHC Sedimentation and Erosion program about violations within the city

Target Pollutant: CHEMICALS (pesticides, pressure washing and cleaning soaps)

Stormwater runoff washes harmful chemicals found in pesticides, pressure washing cleaners, vehicle washing soaps and other illicit discharges directly into our waterways. All of these pollutant sources contain toxic chemicals that can persist in the environment, causing toxicity in humans and aquatic organisms, in addition to contaminating drinking water resources.

Pollutant Source:
Likely Residential Sources: Homeowners, Gardeners, Car/Boat Owners, etc.
Likely Commercial/Industrial Sources: Pressure Washers, Vehicle Washing Businesses, Turf/Landscape Professionals, Restaurants, etc.

Background/Environmental Impacts:

- Storm drains and drainage conveyances (i.e. ditches) carry polluted runoff directly to local waterways without any treatment. Only rain should go down the storm drain!
- An illicit discharge is any unlawful disposal, placement, emptying, dumping, spillage, leakage, pumping, pouring, emission, or other discharge of any substance other than stormwater into the storm drainage system.
- Chemicals and cleaning agents used to wash cars, boats, driveways and other surfaces are carried into storm drains and eventually into our waterways. These chemicals can destroy the external mucus layer on fish that protects them from bacteria and parasitic infections.
- Commonly used organophosphate pesticides are present in stormwater runoff and are toxic to aquatic life in receiving water bodies. Pesticides bio-accumulate up the food chain and are harmful to beneficial insects, humans and other wildlife, as well as entire aquatic ecosystems.

Target Pollutant: CHEMICALS (pesticides, pressure washing/vehicle washing soaps and cleaners, etc.)

Key Outreach Messages:

- There is a direct link between the use of chemicals on land (i.e. pesticides, pressure washing cleaners) and water quality and habitat impacts (i.e. frogs with six legs).
- Install native plants which do not require pesticides or fertilizers.
- Use alternatives to pesticides such as ladybugs, weeding by hand, and organic pesticides.
- If you must apply pesticides, read the labels and apply the correct amounts. Do not apply before rain.
- Suggest less toxic, environmentally-friendly alternatives to chemicals.
- Promote info on how to properly dispose of chemicals and other household chemicals, including promotion of Household Hazardous Waste Collection Days.
- Pressure washing surfaces and washing cars/boats using soaps or cleaning agents of any toxicity level can negatively affect water quality. These surfaces can only be washed legally with plain, clear water.
- Wash on grassy areas that can absorb and filter the chemicals and wastewater naturally.
- Businesses are required to capture and discharge the wastewater legally in a treatment system.
- The City's Illicit Discharge ordinance specifies that it is unlawful to dispose of or discharge any substance other than stormwater into the storm drainage system. Fines are up to $10,000 per offense.
- Utilizing BMPs, such as rain gardens, rain barrels, and re-routing downspouts to grassy areas allows polluted runoff to soak into the ground and be cleaned and filtered naturally.

Target Audience	Audience Description (Why Selected?)	Suggested Outreach Strategies
Homeowners / Residents	All citizens have the potential to contribute chemical pollution by washing outdoors (i.e. driveways, homes, lawn furniture) or by using pesticides around their property. Target a higher % of males.	• Distribute educational materials to residents about practicing environmentally safe gardening/lawn maintenance and washing of materials outdoors • Emphasize compliance with the City's Illicit Discharge ordinance • Promote the stormwater hotline to report illicit discharges • Post outreach materials on stormwater website and GTV • Promote Household Hazardous Waste Collection Days
Mobile Detailers, Pressure Washers	Businesses that wash surfaces often use cleaning agents containing chemicals that are harmful to our waterways. These chemicals can be easily washed into the storm drainage system. Target males.	• Mail educational info to pressure washing businesses and mobile detailers • Post outreach materials on stormwater website and GTV
Landscape/Turf Maintenance Professionals	Landscape/turf maintenance professionals frequently use pesticides. Employees in this field are often male.	• Promote training of workers for proper application of pesticides • Emphasize use of pesticides as a last resort; promote alternatives • Post outreach materials on stormwater website and GTV
Restaurants	Restaurants often clean equipment or dump mop wash water outdoors. The discharge of any type of wastewater into the storm drainage system is unlawful.	• Distribute educational poster to local restaurants • Disseminate business checklist to ensure stormwater-friendly practices • Encourage employee training on wastewater practices, proper chemical use and disposal, etc. • Promote compliance with the illicit discharge ordinance via GTV and website

Assessment & Evaluation

- Conduct a survey of restaurants to gauge compliance with local stormwater ordinances and stormwater-friendly

practices

- Periodically assess the pesticide application habits of homeowners and landscape professionals by:
    - Direct observation of pesticide application habits of homeowners and landscape professionals
    - Surveys of pesticide application habits of homeowners and landscape professionals
- Assess and evaluate local water quality utilizing UNCW Center for Marine Science annual water quality reporting, specifically focusing on illicit discharge tested locations

Target Pollutant: LITTER (plastic, paper, cigarette butts, etc.)

Litter is generated as a result of improperly discarded plastics, food wrappers, cigarette butts, etc. that can wash into waterways via the storm drainage system and impact habitat, wildlife, and water quality.

Pollutant Source:
Likely Residential Sources: Motorists, Smokers, General public, Trash pickup incidental litter, etc.
Likely Commercial/Industrial Sources: Restaurants, Retail Centers, Construction Sites, etc.

Background/Environmental Impacts:

- Storm drains and drainage conveyances (i.e. ditches) carry polluted runoff directly to local waterways without any treatment. Only rain should go down the storm drain!
- Litter is carried by stormwater runoff into the drainage system where it can clog storm drains and drainage routes and cause flooding on streets and property.
- Litter that washes into local surface waters can be mistaken by fish, birds and other wildlife for food that become sick or die from ingesting it. Wildlife also can become entangled in litter and die as a result.
- Litter is often produced as a result of being dropped during trash pickup.
- Litter introduces chemical pollutants into waterways, such as plastics and cigarette butts.
- Cigarette butts are a major source of litter and contain many dangerous toxins that can leach into waterways.
- Littered areas beget litter; areas that are clean tend to repel litter.

Target Pollutant: LITTER (plastic, paper, cigarette butts, etc.)

Key Outreach Messages:

- Flooding of streets/property is sometimes attributed to the accumulation of litter in the drainage system.
- A direct link exists between animal impacts, habitat destruction, and water quality as a result of littering.
- Cigarette butts leach chemicals such as cadmium, lead, and arsenic into the aquatic environment within one hour of contact with water.
- The 2011 Ocean Conservancy International Coastal Cleanup identified cigarette butts as the #1 most littered item.
- Litter attracts wildlife to the side of the road where they are likely to get hit by oncoming vehicles.
- Utilizing BMPs, such as rain gardens, rain barrels, and re-routing downspouts to grassy areas allows polluted runoff to soak into the ground and be cleaned and filtered naturally. BMPs can also trap litter so it doesn't wash away.

Target Audience	Audience Description (Why Selected?)	Suggested Outreach Strategies
Youth (8th grade presentations)	Litter habits cannot be confined to a particular demographic in most cases. However, targeting 8th graders during yearly presentations should be a priority since they are in the developmental stage of thinking and forming opinions.	• Make students aware of the impact of littering and the toxicity of many littered items • Emphasize easy solutions to littering - using trash or recycling receptacles • Promote the 5 R's: Reduce, Reuse, Recycle, Refuse, Repurpose • Explain the negative impacts on wildlife species (i.e. plastic bags look like jellyfish to sea turtles)
Smokers	Cigarette butts are the largest environmental litter problem both locally and worldwide. Target both male and female smokers.	• Display signs encouraging proper disposal of cigarette butts in public areas (i.e. Wave Transit buses) • Post outreach materials on stormwater website and GTV • Encourage use of ashtrays for smokers • Distribute pocket ashtrays at public events
Motorists and Pedestrians	Along roadways, motorists (52%) and pedestrians (23%) are the largest contributors of litter. Target males and females.	• Educate citizens about North Carolina's Swat-A-Litterbug program via website and GTV • Remind motorists about the proper disposal of trash by displaying educational signs on public transportation vehicles (i.e. Wave Transit buses) • Encourage use of car litterbags for proper trash disposal

Assessment & Evaluation

- Conduct an informal poll before 8th grade presentations to gauge how many students litter and then pledge not to litter after the presentation.
- Elicit count of Stormwater Maintenance Department responses to clogged stormwater drainage system components as a result of litter.
- Have Stormwater Maintenance crews continually provide field observations of problem litter areas for clean-up by community service workers or Cape Fear River Watch.
- Periodically assess the litter disposal habits of Wilmington residents by:
  - Direct observation of habits
  - Surveys of habits
  - Count of citations issued pertaining to improper litter disposal habits
  - Count of reported violations to Stormwater Hotline, Keep America Beautiful of NHC, or Swat-a-Litterbug from New Hanover county

Target Pollutant: VEHICLE POLLUTION (vehicle fluids, washing soaps/detergents, etc.)

Vehicle pollution comes from the intentional or unintentional disposal of vehicle fluids into our waterways, some of which washes off impervious surfaces into the drainage system or is disposed of improperly. These fluids are insoluble and can easily contaminate water resources, as well as poison fish and other aquatic organisms.

Pollutant Source:
Likely Residential Sources: Motorists, Backyard Mechanics
Likely Commercial/Industrial Sources: Vehicle Maintenance Repair Shops, Mobile Detailers, Dealership Lots

Background/Environmental Impacts:

- Storm drains and drainage conveyances (i.e. ditches) carry polluted runoff directly to local waterways without any treatment. Only rain should go down the storm drain!
- Vehicles have seals and gaskets that have the potential to leak a variety of fluids, such as oil and grease. An accumulation of these fluids on roadways and parking lots gets carried away by stormwater runoff emptying into our waterways.
- Commonly, it is the backyard mechanic that is illegally dumping or draining vehicle fluids.
- 1 quart of motor oil can contaminate 250,000 gallons of water.
- Once vehicle pollution enters a body of water, it disperses quickly and forms a film on the water's surface, making oxygen transfer from the surface to the bottom difficult, as well as toxic for aquatic organisms.
- It is a common watershed behavior to wash vehicles on impervious (hard) surfaces
- Washing vehicles or boats can cause nutrients, heavy metals, hydrocarbons and grime to wash down the street and into waterways.
- Soaps and detergents used to wash vehicles or boats are carried into storm drains and eventually into our waterways. These chemicals can destroy the external mucus layer on fish that protects them from bacteria and parasitic infections.
- Vehicle washers are typically unaware of the content of washing soaps and detergents and their impact on water quality.

Target Pollutant: VEHICLE POLLUTION (vehicle fluids, washing soaps/detergents)

Key Outreach Messages:

- There is a direct link between the introduction of vehicle fluids and water quality degradation, habitat destruction and plant/animal death.
- All vehicles, machinery, and equipment that utilize vehicle fluids (i.e. oil, grease) for operation have the potential to leak and contribute to water pollution.
- Keep vehicles tuned up, check and repair leaks, check tire pressure, and recycle or properly dispose of vehicle fluids and batteries.
- Properly clean up vehicle leaks and fluid spills using an absorbent material (i.e. kitty litter) to soak up the spill. Sweep up contaminated absorbent, put in a sealed bag and place in the trash.
- Driving less, carpooling or using alternative transportation are some of the best ways to prevent vehicle pollution.
- Washing vehicles or boats using soaps/detergents can negatively affect water quality by contaminating them with chemicals, debris, or sediment that is washed off of vehicles, driveways, parking lots, etc.
- Wash vehicles on the grass using a phosphate-free detergent, and/or use a commercial car wash which recycles and treats wash water. If you must wash on pavement, use plain, clear water and no chemicals.
- On-site storage (i.e. fluids, batteries) has the potential to leak during filling, emptying, storage unit failure, or vandalism.
- Business owners should be aware of and abide by the City's Illicit Discharge Ordinance which states that
    - Anyone found responsible for causing a polluting substance to enter the storm drainage system will be subject to a fine up to $10,000 per violation.
    - The city will have the authority to enter property to inspect for illicit discharges, and if found, to require that they be disconnected and permanently closed.
    - Commercial businesses will not be permitted to wash vehicles, equipment, or any other surfaces with any soaps or solvents or dislodge any other substance that may be harmful to surface waters, unless the resulting wastewater is diverted to the sanitary sewer system.
    - Restaurants will not be permitted to discharge any wastewater outside.
    - Dumpster lids must be kept closed and dumpster plugs in place.
    - Swimming pool water must be de-chlorinated before discharging.
    - Floor drains in old buildings, connected to the storm drainage system, will be required to be disconnected and permanently closed.
    - Residents and businesses will be expected to prevent harmful substances from running off into the storm drainage system.
    - Fines for non-compliance with the City's illicit discharge ordinance are up to $10,000 per offense.
- Utilizing BMPs, such as rain gardens, rain barrels, and re-routing downspouts to grassy areas allows polluted runoff to soak into the ground and be cleaned and filtered naturally.

Target Audience	Audience Description (Why Selected?)	Suggested Outreach Strategies
General Public/ Backyard Mechanics	All citizens of driving age have the potential to contribute to vehicle pollution by nature of driving the vehicle or washing it. For backyard dumping of auto fluids, target males.	• Emphasize vehicle maintenance is the #1 priority (i.e. tune ups) • Post outreach materials on stormwater website and GTV • Promote alternative methods of transportation (i.e. public transportation, carpooling, bikes, walking, bio-fuels) • Encourage the utilization of the stormwater hotline to report illegal fluid dumping • Encourage environmental stewardship to practice eco-friendly vehicle washing using commercial car wash businesses or washing vehicles in a grassy area to absorb polluted runoff • Mark storm drains in visible areas to prevent illegal dumping
Vehicle Maintenance	Businesses in auto parts or maintenance/repair-related	• Distribute Auto Care educational poster to businesses for employees to learn about proper vehicle maintenance, fluid

Repair, and Auto Parts Businesses	fields deal with vehicle fluids on a regular basis. Most employees are male.	storage and disposal methods, and the City's Illicit Discharge ordinance • Post outreach materials on stormwater website and GTV
Pressure Washers, Vehicle Washing Businesses, Dealership Lots	Vehicle washing businesses often use cleaning agents containing chemicals that are harmful to our waterways. These chemicals, along with other vehicle fluids, can be easily washed into the storm drainage system. Employees are typically male.	• Distribute educational flyer to businesses • Encourage environmental stewardship to practice eco-friendly vehicle washing using commercial car wash businesses or washing vehicles in a grassy area, or washing using plain water and no chemicals over pavement • Post outreach materials on stormwater website and GTV

Assessment & Evaluation

- Periodically assess vehicle fluid disposal habits of Wilmington residents and businesses
  - Direct observation of habits
  - Surveys of habits
  - Count of reported violations pertaining to chemical leaks or disposal habits to Stormwater Hotline
- Periodically assess vehicle washing and exterior home washing habits of Wilmington residents by:
  - Direct observation of habits
  - Surveys of habits
- Assess and evaluate local water quality utilizing UNCW Center for Marine Science annual water quality monitoring

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APPENDIX C: PUBLIC INVOLVEMENT AND PARTICIPATION

Included in this section:

- BMP Reporting Table
- Cumulative Year End Reports for Contractual/Cooperative Agreements with:
  - Cape Fear River Watch
  - New Hanover Soil & Water Conservation District

DATE OF EVENT/ ACTIVITY	EVENT/ACTIVITY	AUDIENCE	DELIVERED BY (AGENCY)	METHOD OF DELIVERY / MESSAGE	ATTENDANCE/ PARTICIPATION
BMP a. Volunteer community involvement program					
Community Events / Participation					
1/16/2016	Striperfest	CFRW members Public Youth	Stormwater Services staff	Stormwater educational booth with "Too See or Turbidity" pollution game	350 attendees
2/25/2016	Lower Cape Fear Stewardship Awards Program	Realtors, Developers, Environmental Agencies, Politicians	Stormwater Services	Staffed display booth and educated participants about stormwater pollution, BMPs, pet waste, etc.	150 in attendance
3/19/2016	Canines for Clean Water booth at New Hanover County Rabies Clinic	Pet owners	NHSWCD	Canines for Clean Water booth - interactive event where pet owners sign a pledge to clean up after their pet. They can then submit a photo of their pet to be featured on our Canine's website and receive a dog bandana, treats, related literature.	80 pet owners signed the pledge
4/7/2016	Enviroscape Presentation and Campus Field Trip	DREAMS Students	Stormwater Services	Presentation and field trip with students at DREAMS arts education after school center. Students will be involved in BMP installation process on campus.	7 students
4/30/2016	Pawz in the Park at Battleship Park	Pet owners	NHSWCD	Canines for Clean Water booth - interactive event where pet owners sign a pledge to clean up after their pet. They can then submit a photo of their pet to be featured on our Canine's website and receive a dog bandana, treats, related literature.	50 pet owners signed the pledge
4/23/2016	Lower Cape Fear Earth Day Celebration at Hugh MacRae Park	Festival attendees General public	Stormwater Services (SWS is an annual sponsor of Lower Cape Fear Earth Day Festival)	Display booth to promote stormwater pollution education with an interactive game/quiz and stormwater prizes, literature and educational giveaways.	6,000+ attendees

6/11/2016	Canines for Clean Water booth at New Hanover County Rabies Clinic	Pet owners	NHSWCD	Canines for Clean Water booth - interactive event where pet owners sign a pledge to clean up after their pet. They can then submit a photo of their pet to be featured on our Canine's website and receive a dog bandana, treats, related literature.	6,000+ attendees

Monthly Public Rain Barrel Sale

Monthly	Monthly rain barrel sale to the general public. Held the 2nd Thursday of each month at NHC Government Center with partner agency, NHSWCD	General public	Stormwater Services NHSWCD RainBarrelUSA	Stormwater runoff reduction, watershed and water conservation education with rain barrel sale attendees	53 total sales this year

Storm Drain Marking

Ongoing campaign	Campaign to place storm drain awareness markers and educational doorhangers throughout the City	City residents, businesses, landscapers	Contract agencies: CFRW NHSWCD and their volunteers	Stormwater awareness activity. Place educational markers on storm drains and distribute educational doorhangers to residents in neighborhoods where markers are installed	55 markers were placed in the Independence South, Holly Glen, Brookwood, and Colonial Drive areas this year

Stream & Litter Clean-ups

Ongoing	Watershed cleanups including the Annual Big Sweep event	Volunteers	CFRW volunteers	Watershed cleanup and/or invasive species vegetation removal Areas cleaned include Greenfield Lake, Smith Creek, Cape Fear River, Burnt Mill Creek, Randall Pond, Kerr Avenue Wetland	10 cleanup events including annual Big Sweep event 311 volunteers contributed a total of 822 hours Collected 225 (30 gallon) bags of trash and/or invasive species vegetation; two 92 gallon trash bins of garbage and two 92 gallon bins of recyclables.

Watershed Watch Creek Observation Monitoring

Every other month	Volunteer monitoring of creek segments that drain to Cape Fear River	CFRW volunteers are trained to do observations. City staff receive these reports	CFRW and volunteers	Volunteers conduct bi-monthly observations of area creeks and provide a monitoring report and photos to Stormwater Services	Observations include creek and corridor conditions, vegetation and wildlife present, litter quantity, and suggestions for remediation

Contracts / Cooperative Agreements

The City of Wilmington contracts annually with Cape Fear River Watch (CFRW) and New Hanover Soil & Water Conservation District (NHSWCD) to implement additional public involvement and participation activities, as well as education and outreach activities. Both organizations sign a yearly contract with the City of Wilmington that includes specific deliverables that enable the City to meet many of its federal NPDES permit requirements. A year end summary report for each agency's contract is included in the Appendix. Below is a summary of each agency's annual service deliverables.
CFRW - Supports NPDES permit activities including: 8th grade classroom presentations, educational programs for Wilmington residents, volunteer storm drain marking, volunteer watershed cleanups and coordination, volunteer creek monitoring program, local water quality initiatives, Greenfield Lake & Kerr Ave. education/monitoring, support for NPDES public meetings and education efforts, quarterly reporting/invoicing.

NHSWCD - Supports NPDES permit activities such as: 8th grade classroom presentations, fecal coliform/pet waste education, community presentations, local outreach events, LID education, environmental field days, educational website, volunteer storm drain marking, monthly rain barrel sale, Stewardship Development Awards Program coalition and planning member, Hewletts Creek education, support for NPDES public meetings and education efforts, quarterly reporting/invoicing.

BMP b. Mechanism for Public involvement

Public Notices, Public Meetings & Community Input

8/24/2015	Targeted mail	Residents and businesses affected by Patricia Drive project	Stormwater Services	Project info notice distributed to local residents in advance of project work	100 notices mailed to residents
8/26/2015	Public Meeting	Residents and businesses affected by Clear Run Branch project	Stormwater Services	Clear Run Branch meeting with residents to discuss upcoming drainage improvement project	45 residents in attendance
9/1/2015	Targeted direct contact	Residents and businesses affected by Clear Run Branch project	Stormwater Services	Project info notice distributed to local residents in advance of project work	6 direct email contacts with residents
10/1/2015	Meetings with individual homeowners about Clear Run Branch project	Residents and businesses affected by Clear Run Branch project	Stormwater Services	One-on-one meetings with homeowners impacted by project	Individual meetings requested by homeowners
10/1/2015	Targeted doorhangers	Residents and businesses affected by Oxmoor Place Drainage Improvements	Stormwater Services	Project info notice distributed to local residents in advance of project work	10 doorhangers distributed to residents
11/1/2015	Targeted mail	Residents and businesses affected by South Branch of Bradley Creek project	Stormwater Services	Project info notice distributed to local residents in advance of project work	125 notices mailed to residents
11/30/2015	Targeted doorhangers	Residents and businesses affected by Brittain & Shuney Drive project, part of Wisteria/ Clearbrook project	Stormwater Services	Project info notice distributed to local residents in advance of project work	50 doorhangers distributed to residents
12/1/2015	Targeted doorhangers	Residents and businesses affected by Brookshire/Derby Down project	Stormwater Services	Project info notice distributed to local residents in advance of project work	100 doorhangers distributed to residents
1/7/2016	Targeted doorhangers	Residents and businesses affected by Clearbrook Drive project	Stormwater Services	Project info notice distributed to local residents in advance of project work	140 doorhangers distributed to residents
6/8/2016	Targeted doorhangers	Residents and businesses affected by Shinnwood Drive project	Stormwater Services	Project info notice distributed to local residents in advance of project work	150 doorhangers distributed to residents

BMP c. Maintain Hotline/Help line					
The Stormwater Pollution Prevention Hotline was established in January 2010 to field calls from the citizens, businesses, and city employees regarding illicit discharges and other reports of stormwater pollution. The hotline phone # is **910-341-1020** and the web address is **www.wilmingtonnc.gov/reportstormwaterpollution.** Hotline/web reports are routed to the Stormwater Code Compliance Officer who tracks, investigates, and responds to all hotline reports. Information regarding hotline reports is included in the Enforcement Appendix section including the number and nature of hotline phone/web reports.					
Ongoing	Stormwater Hotline advertised using various outreach methods: truck magnets, signs, billboards, presentations, etc.	General public	Stormwater Services	Hotline poster, website, GTV-8 and promo items (pens, magnets, sticky notes) are used to raise awareness of the Stormwater Hotline	Hotline calls and webform reports vary each year. More info can be found in the "Enforcement" section of the report.

Cumulative Year End Contract Agency Reports

NEW HANOVER SOIL & WATER CONSERVATION DISTRICT
230 Market Place Drive, Suite 100
Wilmington, NC 28403

Quarterly Progress Report #4: April 1-June 30, 2016

New Hanover Soil & Water Conservation District (NHSWCD), under contract with the City of Wilmington Stormwater Services, will provide the following services for the time period consistent with the City's fiscal year from **July 1, 2015** through **June 30, 2016** for the agreed amount of **$24,182.** These contracted services, implemented as equitably as possible throughout the fiscal year, assist the City in meeting requirements of the federal NPDES Stormwater Permit.

Public Education/Outreach

Total Allocated Cost: $16,607

Conduct Enviroscape Presentations for at least 1/3 of 8th grade science classes in New Hanover County Schools each semester for the entire school year. The Enviroscape watershed education presentation is an integral component of the 8th grade science curriculum in New Hanover County Schools. Presentations will be done in coordination with other environmental agencies and will focus on the specific NC Essential Standard and Objectives for the Hydrosphere unit. Enviroscape instructors will be trained, certified, and follow all applicable Enviroscape policies and procedures as set forth by the City of Wilmington Stormwater Services. A maximum of 3 trained Enviroscape instructors from each agency (which includes the Enviroscape supervisor) are permitted to deliver presentations in 8th grade. Enviroscape supervisors are responsible for ensuring that their instructors are trained and certified accordingly and kept up to date on the script, props and other pertinent presentation information. Additional presentations should not conflict or duplicate the 8th grade presentations in any fashion. A summary will be provided in each quarterly report for any additional presentations given. Other efforts may include assisting with curriculum development, scheduling presentations, teacher relations, and training instructors. **($2200)**

July 1 - September 30, 2015

Staff attended Enviroscape helped update script and attended the scheduling meeting to set-up this semester's presentations.

October 1 - December 31, 2015

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
10/7/2015	Virgo Middle School	8th	2	32
10/26/2015	Roland Grise MS	8th	2	60
11/19/2015	Holly Shelter MS	8th	2	53

11/20/2015	Holly Shelter MS	8th	2	50
12/15/2015	Trask MS	8th	2	60

January 1 – March 31, 2016

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
2/22/2016	Noble MS	8th	2	64
3/1/2016	Williston MS	8th	2	60
3/2/2016	Williston MS	8th	2	60
3/3/2016	Williston MS	8th	2	48

April 1 – June 30, 2016

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
4/18/2016	Myrtle Grove MS	8th	2	55
4/25/2016	Murray MS	8th	2	58
4/26/2016	Murray MS	8th	2	55

Increase awareness and education in the city about pet waste/fecal coliform bacterial pollution and the City's pet waste ordinance. Implement education with city residents about pet waste, fecal bacteria, the city's pet waste ordinance, and solutions. Provide outreach and education materials via K-12 education programs, public meetings, agency website, and by participating/staffing the Canines for Clean Water (C4CW) Program booth at a minimum of 3 pet-related events (with pets present at a minimum of 2 events). The expectation is to target well-attended events. **($1550)**

January 1 – March 31, 2016

Pet Events				
Date	**Event**	**Location**	**Method of Delivery / Materials Distributed / Etc.**	**# of signed Pet Waste pledges**
3/19/2016	NHC Animal Services-Free Rabies Shot clinic	Animal Control, Division Drive	C4CW display table and pledge signatures acquired. Materials about pet waste ordinance distributed.	80

Staff inventoried and assessed materials used to promote program in order to insure enough materials were available for event. Also promoted canines for clean water during Stormwater 101 presentations listed later in contract.

April 1 – June 30, 2016

Pet Events				
Date	**Event**	**Location**	**Method of Delivery / Materials Distributed / Etc.**	**# of signed Pet Waste pledges**
4/30/2016	Pawz in Park	Battleship Park	C4CW display table and pledge signatures acquired. Materials about pet waste ordinance distributed	80
6/11/2016	NHC Animal Services-Free Rabies Shot clinic	Animal Control, Division Drive	C4CW display table and pledge signatures acquired. Materials about pet waste ordinance distributed.	27

Staff inventoried and assessed materials used to promote program in order to insure enough materials were available for event. Also promoted canines for clean water during Stormwater 101

presentations listed later in contract. It was also promoted at summer camps, Earth Day, and other public events where the District displayed organizational information.

Conduct at least 2 "Stormwater 101" education presentations to HOAs, garden clubs, community/civic groups, developers, or during watershed-wide meetings. A maximum of 1 presentation may target university or college classes/students. Initiate direct contact with potential audiences, promote program, and schedule presentations. **($1000)**

July 1 - September 30, 2015

Stormwater 101 Presentations			
Date	**Organization / Audience**	**Method of Delivery / Materials Distributed / Etc.**	**Attendance**
9/15/15	UNCW Graduate Students	SW 101 Power Point Presentation	11
9/24/15	NHC Employees and Citizens	SW 101 Power Point Presentation/Stormwater brochures	3

October 1 - December 31, 2015

Stormwater 101 Presentations			
Date	**Organization / Audience**	**Method of Delivery / Materials Distributed / Etc.**	**Attendance**
12/3/15	NHC Employees and Citizens	SW 101 Power Point Presentation/Stormwater brochures	12

January 1 – March 31, 2016

Stormwater 101 Presentations			
Date	**Organization / Audience**	**Method of Delivery / Materials Distributed / Etc.**	**Attendance**
2/25/16	NHC Employees and Citizens	SW 101 Power Point Presentation/Stormwater brochures	4

April 1 – June 30, 2016

Stormwater 101 Presentations			
Date	**Organization / Audience**	**Method of Delivery / Materials Distributed / Etc.**	**Attendance**
6/16/16	NHC Employees and Citizens	SW 101 Power Point Presentation/Stormwater brochures	9

Had presentation scheduled with Backyard Naturalist program through Cooperative Extension, but the program was cancelled due to low participation.

Provide educational contact with residents in the Hewletts Creek Watershed conservation easement areas and pursue opportunities as they arise to secure additional conservation easements within the City. Contact with residents may include an annual newsletter, educational camp presentations, easement education, etc. In addition, NHSWCD will provide stormwater education programs at the J.E.L. Wade Stormwater Wetland, as the need arises. **($1350)**

October 1 - December 31, 2015

Hewletts Creek Educational Contact				
Date	**Audience Name OR School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
10/12/15	Made contact with potential landowner for donation of new property in Hewlett's Creek to add to current greenway area.	Land Conservation	n/a	1

April 1 – June 30, 2016

Hewletts Creek Educational Contact				
Date	**Audience Name OR School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
6/16/16	Hewletts Creek Residents	Annual NHSWCD newsletter to residents along Tumors Creek Branch located near easement area along Warlick Estates and Holly Glen subdivision.	n/a	237
6/28/16	Easement Check	Checked easement area in Hewletts Creek near Warlick Estates. Easement was being maintained.	n/a	n/a

Facilitate additional environmental education presentations in the city that highlight stormwater issues for local residents, students, teachers, camps, business owners, etc. Presentation topics will tie into water quality, BMPs, and water conservation issues. **($2650)**

July 1 - September 30, 2015

Environmental Education Presentations				
Date	**Audience Name OR School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
8/4/2015	Childcare Network: 41st location	Water conservation	2	35

October 1 - December 31, 2015

Environmental Education Presentations				
Date	**Audience Name OR School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
11/2/2015	Virgo MS- 6th	Watershed poster contest	1	8
11/17/2015	Pine Valley ES- 3-5th	Watershed poster contest	1	350
12/1/2015	Gregory ES- 3rd	Watershed poster contest	1	72
12/17/2015	Noble MS- 8th	Watershed poster contest	4	125

January 1 – March 31, 2016

Environmental Education Presentations				
Date	**Audience Name OR School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
1/12/2016	Williston MS- 6th	Watershed poster contest	2	60
1/15/2016	CFCI- 8th	Watershed poster contest	2	44
1/27/2016	Hoggard HS- 9th	Watershed poster contest	2	58
3/9/2016	Howe Pre-K	PLT Early Childhood Education Workshop (to instruct teachers on how to use rain gardens as teaching labs)	1	25
3/10/2016	CREC Pre-K	PLT Early Childhood Education Workshop (to instruct teachers on how to use rain gardens as teaching labs)	1	20
3/23/2016	UNCW Grad Students	PLT Education Workshop	1	18

April 1 – June 30, 2016

Environmental Education Presentations				
Date	**Audience Name OR School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
4/5/2016	Rachel Freeman ES- 4th grade	Weathering and Erosion	2	60
4/9/2016	UNCW Grad Students & other educators	Food, Land, and People Workshop	1	20
4/12/2016	Rachel Freeman ES- 5th grade	Ecosystems	1	36
4/21/2016	Howe Pre-K	Worms/Earth Day	4	120

Organize/facilitate at least 2 Environmental Field Days a year serving an entire grade at a New Hanover County School within the City limits. ($2400)

January 1 – March 31, 2016

Environmental Education Presentations				
Date	**School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
3/28/2016	Pine Valley ES, 4th grade	Soils/Water Cycle/Wildlife/Forestry	4 of each station	100

April 1 – June 30, 2016

Environmental Education Presentations				
Date	**School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
4/27/2016-4/28/2016	Trask MS, 6th grade	Soils/Water Quality/Wildlife/Eco-Tour/Stewardship	5 of each station	210

Organize/participate in community outreach events to engage citizens and provide stormwater education. NHSWCD will attend and provide stormwater, BMP, and rain barrel sale education at two community outreach events (such as the Bellamy Going Green, LakeFest, StriperFest, Girl Scouts World Water Day). **($3000)**

July 1 - September 30, 2015

Community Outreach Events				
Date	**Event**	**Location**	**Method of Delivery / Materials Distributed / Etc.**	**Attendance**
8/29/2015	Riverfront Farmers Market	Water & Princess St.	Displayed and sold rain barrels. Distributed rain barrel info and educated citizens on BMPs/water conservation	50
9/19/2015	Riverfront Farmers Market	Water & Princess St.	Displayed and sold rain barrels. Distributed rain barrel info and educated citizens on BMPs/water conservation	40

October 1 - December 31, 2015

Community Outreach Events				
Date	**Event**	**Location**	**Method of Delivery / Materials Distributed / Etc.**	**Attendance**
10/17/15	Fire in the Pines	Halyburton Park	Displayed District information about organization and programs. Distributed stormwater info, education program info, and rain barrel info.	1,500
10/17/15	Operation Medicine Drop	New Hanover Medical Mall	Coordinated recycling of all plastics (bottles and lids) and all paper products (boxes and	761; 950 lbs

			inserts).	medicine collected, 100 lbs recycling
10/31/2015	Cape Fear Fair and Expo	Fairgrounds at ILM airport	Display/Booth regarding District programs as it relates to Agriculture. Reducing non-point source water pollution as it relates to all programs was also displayed. Display won 3rd place	10,000+

January 1-March 31, 2016

Community Outreach Events				
Date	**Event**	**Location**	**Method of Delivery / Materials Distributed / Etc.**	**Attendance**
1/14/2016	Meet with Eagle Scout	Government Center	Served as a Merit Badge Counselor for Scout working on his Sustainability badge	1
1/16/2016	CFRW StriperFest	Coastline Convention Center	Assisted in activities geared toward children to help learn about water quality and local water issues.	750
1/22/2016	TreeFest	Independence Mall	Worked the two day event, which provides free seedlings to county residence to help control soil erosion and improve water quality as a result.	678
2/25/2016	LCFSDC Awards Luncheon	Terraces at Sir Tyler	Staff set up a display table to inform attendees of District roles/programs.	130
3/16/2016	Coastal Envirothon	Cool Springs Education Center	Staff provided support for participating teams. Four local teams from Hoggard High School attended, participated and 2 advanced to the state level.	350

April 1-June 30, 2016

Community Outreach Events				
Date	**Event**	**Location**	**Method of Delivery / Materials Distributed / Etc.**	**Attendance**
4/23/2016	Wilmington Earth Day Festival	Hugh MacRae Park	Staff set up a display table to inform attendees of District roles/programs	~6500
5/14/2016	BMP Tour	Airlie Gardens	Gave a public presentation on stormwater BMPs to elected officials and citizens and took a tour of the gardens to view site BMPs	15

Promote/consult on Low Impact Development (LID) including stormwater Best Management Practices (BMPs) to developers, engineers, architects, private property owners, HOAs, etc, in the city. Promote BMPs, LID, and the local LID manual, provide input to City Technical Review Committee, as well as provide education and technical assistance as the need arises for property owners. **($1057)**

July 1 - September 30, 2015

Provided comments for City and County Technical Review Committees (TRC). Soils reports were given for three city projects and 4 county projects. Each soils report includes and encourages the developer to refer to the LID manual designed and created for the region. Example practices such as constructed wetlands and bioretention were suggested for implementation.

October 1 - December 31, 2015

Provided comments for City and County TRC. Soils reports were given for 4 city projects and 2 county projects. Each soils report includes and encourages the developer to refer to the LID

manual designed and created for the region. Example practices such as constructed wetlands and bioretention were suggested for implementation.

January 1-March 31, 2016
Provided comments for City and County TRC. Soils reports were given for 2 city projects and 3 county projects. Each soils report includes and encourages the developer to refer to the LID manual designed and created for the region. Example practices such as constructed wetlands and bioretention were suggested for implementation.

April 1-June 30, 2016
Provided comments for City and County TRC. Soils reports were given for 2 city projects and 4 county projects. Each soils report includes and encourages the developer to refer to the LID manual designed and created for the region. Example practices such as constructed wetlands and bioretention were suggested for implementation. Also promoted LID practices during teacher education workshops and presentation to Cape Fear Community College students.

Update and maintain agency website and social media outlets to include stormwater education materials, events, and the city's Report Stormwater Pollution hotline. The website will also provide links to stormwater educational materials in Spanish in an effort to reach more minorities in our region. The city's Report Stormwater Pollution hotline and online reporting form will be promoted and linked from the NHSWCD website. NC Community Conservation Assistance Program (CCAP) and Heal Our Waterways BMP project pictures will continue to be labeled and updated and a local map showing CCAP and other BMP projects will be updated and available on the website. The website will be promoted on local government TV and social media outlets. **($1400)**

July 1 - September 30, 2015
Completed review/audit of website to assess what needed to be updated and changed. Will be working on updates next quarter.

October 1 - December 31, 2015
Promote rain barrel sales on New Hanover County and NHSWCD social media pages. Updated information on where to find soils maps and aerial photos.

January 1 – March 31, 2016
Promote rain barrel sales on New Hanover County and NHSWCD social media pages; added Canines for Clean Water events to the District website.

April 1 – June 30, 2016
Promote rain barrel sales on New Hanover County and NHSWCD social media pages; added Canines for Clean Water events to the District website. Also added annual newsletter Changing Tides to education page.

Public Involvement/Volunteer Efforts

Total Allocated Cost: $1,100

Encourage public involvement by engaging city residents/businesses/civic groups in a volunteer Storm Drain Marking program in the city to educate the community about stormwater pollution. A minimum of 2 separate volunteer days is required.

For each outing day, a minimum of 7 markers will be applied per volunteer group and educational doorhangers will be distributed to surrounding residences/businesses. Staff will assist in identifying areas to mark drains, educate volunteers about stormwater and the purpose of the program, train volunteers in marking and safety, use supplied markers, and help provide oversight of the program. A trained NHSWCD staff member is required to be present during all storm drain marking activities and with each volunteer group. **($1100)**

October 1-December 31, 2015

Storm Drain Marking			
Date	**Name of Volunteer Organization, Business, etc.**	**# of Volunteers**	**Specific Area Marked / # of Storm Drains Marked**
11/21/2015	Cub Scout troop	12	Warlick and Whitner Drive/ 7 drains

April 1 – June 30, 2016

Storm Drain Marking			
Date	**Name of Volunteer Organization, Business, etc.**	**# of Volunteers**	**Specific Area Marked / # of Storm Drains Marked**
6/16/2016	Cape Fear Surfrider Foundation	9	Brookwood, Borden, and Grady Ave/16 drains

Programs/Partnerships

Total Allocated Cost: $3,775

Administer and partner with the City of Wilmington Stormwater Services to hold a public rain barrel sale. NHSWCD will utilize local government television, local events including Earth Day, agency website, outdoor signage (day of), and periodic press releases to the media to promote the sale. Rain barrel buyers will be asked to give their watershed location in order to educate them about watersheds and record volume reduction for the Heal Our Waterways Bradley/Hewletts Creek watershed restoration effort. **($1325)**

July 1 - September 30, 2015
July: 1-60 gallon; 4-80 gallon sold
August: 2-60 gallon; 1-80 gallon sold
September: 2-60 gallon sold

October 1-December 31, 2015
October: 1-60 gallon; 1-80 gallon sold
November: 1-60 gallon; 2-80 gallon sold
December: 1-80 gallon sold

January 1-March 31, 2016
January: 1-80 gallon sold
February: 6-80 gallon sold
March: 7-60 gallon sold; 5- 80 gallon sold

April 1-June 30, 2016
April: 4-60 gallon sold; 3-80 gallon sold
May: 2-60 gallon sold; 4-80 gallon sold
June: 5-60 gallon sold

Serve as an integral partner to facilitate the Lower Cape Fear Stewardship Development Awards Program. Also serve as an active partner organization on grant projects or initiatives that benefit local surface water quality and water resources within the city. The Stewardship Development program recognizes developers for demonstrating outstanding environmental stewardship such as stormwater reduction and LID practices through the protection and awareness of our natural resources. **($2450)**

July 1 - September 30, 2015
Attended three monthly board meetings for Lower Cape Fear Stewardship Development (LCFSDC). Collected applications and fees of current year applicants. Staff still serves as Treasurer for the committee.

October 1-December 31, 2015
Participated in 3 LCFSDC meetings as Treasurer and also assisted with project judging on November 13, 2015. NHSWCD intern is also organizing event registration.

January 1-March 31, 2016
Participated in 3 LCFSDC meetings as Treasurer. Coordinated registration for the annual awards luncheon before and during the event. Served as event photographer during the luncheon. Lead annual audit report for the organization.

April 1-June 30, 2016
Participated in 3 LCFSDC meetings as Treasurer. Attended the Board retreat in May. Completed IRS tax filing for organization. Completed FY 2016-2017 draft budget.

Contract Administration

Total Allocated Cost: $2,700

Quarterly progress reports and invoices will be submitted in accordance with the following provisions:

Quarterly reports and invoices are due within 10 days of the quarter end date and will follow templates and instructions set forth by Stormwater Services. Reports and invoices that do not follow templates/instructions will be returned for correction; payment will be processed once updated reports and invoices are received, reviewed, and approved.

Submit cumulative quarterly progress reports and invoices according to the following quarters: July 1 - Sept 30; October 1 - Dec. 31; January 1 -March 31; April 1 - June 30. The 4th quarter progress report will serve as a compiled year-end summary report and will be included in the City's NPDES annual report.

The quarterly invoice should use the supplied template which shows the % of each service completed each quarter, invoice amount, and amount remaining to be paid. Invoices will be paid once quarterly progress report and invoice are received and reviewed by the City for adequate progress. Non-performance or inadequate progress may result in non-payment or reduction of payment. No pre-payment of services will occur.

NHSWCD will maintain all records and reports related to this contract on a fiscal year (FY) basis (July 1-June 30). These records should be retained for a period of at least 5 years. In addition, an annual compilation CD or DVD copy of all contract documents, records, reports, invoices, and pertinent educational materials will be provided to the City of Wilmington Stormwater Services by July 10th for the prior FY. These files are public record and should be accessible.

Contact person: Stormwater Services requires one main point of contact for the implementation, management, communication and reporting of this annual contract. This staff person will be the individual that implements the majority of contract services, and therefore will be the most familiar with the contract. The designated contact person is: **Dru Harrison. ($2700)**

Other:

Do not assign a cost.

Assist Stormwater Services in implementing additional public outreach, education, involvement, and participation activities required by federal NPDES stormwater permit. Summary reports and information may be included in the City's NPDES yearly report to the State.

Report compiled by: Dru Harrison **Date:** 6/30/16

CAPE FEAR RIVER WATCH
617 Surry Street
Wilmington, NC 28401
(910) 762-5606
www.capefearriverwatch.org

Quarterly Progress Report #4: April 1 – June 30, 2016

Cape Fear River Watch, Inc. (CFRW), under contract with the City of Wilmington Stormwater Services, will provide the following services for the time period consistent with the City's fiscal year from **July 1, 2015** through **June 30, 2016** for the agreed amount of $**15,500**. These contracted services, implemented as equitably as possible throughout the fiscal year, assist the City in meeting requirements of the federal NPDES Stormwater Permit.

Public Education/Outreach

Total Allocated Cost: $5400 **Conduct Enviroscape Presentations for at least 1/3 of 8th grade science classes in New Hanover County Schools each semester for the entire school year.** The Enviroscape presentation is an integral component of the 8th grade science curriculum in New Hanover County Schools. Presentations will be done in coordination with other environmental agencies and will focus on the specific NC Essential Standard and Objectives for the Hydrosphere unit. Enviroscape instructors will be trained, certified, and follow all applicable Enviroscape policies and procedures as set forth by the City of Wilmington Stormwater Services. A maximum of 3 trained Enviroscape instructors from each agency (which includes the Enviroscape supervisor) are permitted to deliver presentations in 8th grade. Enviroscape supervisors are responsible for ensuring that their instructors are trained and certified accordingly and kept up to date on the script, props and other pertinent presentation information. CFRW will also work cooperatively with Stormwater Services to provide other presentations in addition to the 8th grade program, as needed. Additional presentations should not conflict or duplicate the 8th grade presentations in any fashion. A summary will be provided in each quarterly report for any additional Enviroscape presentations given. CFRW was provided with city funds to purchase an Enviroscape for the express purpose of being available to conduct 8th grade presentations. **($2200)**

July 1 - September 30, 2015

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
Other Enviroscape Presentations				
Date	**School/Group/Event**	**Grade**	**# of presentations**	**# of attendees**
9/12/2015	Leadership Academy for Young Women	5 - 7	2	30

October 1 - December 31, 2015

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
10/7/2015	Virgo	8	2	60
10/27/2015	Roland Grise	8	2	58
11/19/2015	Holly Shelter	8	1	28
11/20/2015	Holly Shelter	8	2	61
12/14/2015	Trask	8	3	72
Other Enviroscape Presentations				
Date	**School/Group/Event**	**Grade**	**# of presentations**	**# of attendees**
10/29/2015	Calvary Christian School/GFL program	7	3	95

January 1 - March 31, 2016

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
2/22/2016	Noble	8	2	58
2/23/2016	Noble	8	2	61
3/3/2016	Williston Middle School	8	1	30
Other Enviroscape Presentations				
Date	**School/Group/Event**	**Grade**	**# of presentations**	**# of attendees**

April 1 - June 3, 2016

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
4/19/2016	Myrtle Grove	8	4	102
4/25/2016	Murray	8	2	56
Other Enviroscape Presentations				
Date	**School/Group/Event**	**Grade**	**# of presentations**	**# of attendees**
6/13/2016	CFRW Eco Camp	4th- 7th	1	16
6/27/2016	CFRW Eco Camp	4th - 7th	1	19

Provide educational programs for Wilmington residents. Educational programs include First Saturday Seminars, presentations to community and civic organizations, and other scheduled talks in the community. Educational programs for homeowners associations should be planned and coordinated with Stormwater Services. Educational programs will also include eco-tours and birding tours at Greenfield Lake and Smith Creek paddling tours. Wildlife feeding education can be incorporated into these established educational activities, as well as provided by the boathouse staff for lake patrons. Efforts will be made to inform the local media about educational programs. **($3200)**

July 1 - September 30, 2015

First Saturday Seminars			
Date	**Topic**	**Speaker**	**Attendance**
7/4/15	Microcystis in the Cape Fear River:	Madi Polera	35
8/1/15	Fire Ecology	Angie Carl	45
9/5/15	CAFOs	Kemp Burdette	50

Other Presentations by CFRW Staff			
Date	**Organization/Audience**	**Topic/Speaker**	**Attendance**
9/26/15	UNCW/Sociology and EVS	Fisheries and Communities of the Cape Fear River	20
Greenfield Lake Tours & Smith Creek Paddle Tours			
Date	**Group Served/Audience**	**Type of Tour/Topic/Location**	**Attendance**
7/8/2015	PCG Campers	Eco tour/flora,wildlife,history/GFL	40
7/11/2015	Wilmington family	Paddling Eco Tour/flora,wildlife & issues,history/GFL	5
7/14/2015	CFRW Eco Campers	Eco tour/flora,wildlife & issues, history/GFL	15
7/28/2015	CFRW Eco Campers	Eco tour/flora,wildlife & issues,history/GFL	22
9/12/2015	Leadership Academy for Young Women	Eco tour/flora,wildlife & issues, history/GFL	30
9/15/2015	Encore Magazine	Paddling Eco Tour/flora,wildlife & issues, stormwater, history/GFL	1

October 1 - December 31, 2015

First Saturday Seminars			
Date	**Topic**	**Speaker**	**Attendance**
11/7/2015	Proposed cofferdam around the Battleship and educational walkway through the wetlands	Terry Bragg	50
12/5/2015	History of Historic Preservation in Wilmington	Beverly Tetterton	40
Other Presentations by CFRW Staff			
Date	**Organization/Audience**	**Topic/Speaker**	**Attendance**
10/18/2015	Castle Hayne Community Event	Water Quality/Kemp Burdette	50
10/22/2015	Osher Life-long Learning Institute	Fish passage/Frank Yelverton	110
11/8/2015	CFRW Annual Membership Meeting	CFRW Advocacy/Kemp Burdette	103
11/8/2015	CFRW Annual Membership Meeting	CFRW Fishery Restoration/Frank Yeltervon	103
11/8/2015	CFRW Annual Membership Meeting	CFRW Education/Kay Lynn Hernandez	103
Greenfield Lake Tours & Smith Creek Paddle Tours			
Date	**Group Served/Audience**	**Type of Tour/Topic/Location**	**Attendance**
10/29/2015	Calgary Christian School 7th Graders	Walking eco tour/GFL flora and fauna, GFL history, stormwater issues/Greenfield Lake	95
11/10/2015	Murrayville Elementary/4th Graders	Raindrop Journey/Stormwater/Greenfield Lake	65
11/13/2015	Murrayville Elementary/4th Graders	Raindrop Journey/Stormwater/Greenfield Lake	65
11/27/2015	Wilmington community members	Paddling eco tour/GFL flora and fauna, GFL history, stormwater issues/Greenfield Lake	7
11/17/2015	Castle Hayne Elementary/4th Graders	Raindrop Journey/Stormwater/Greenfield Lake	60
11/18/2015	Castle Hayne Elementary/4th Graders	Raindrop Journey/Stormwater/Greenfield Lake	50
12/15/2015	Crestdale Middle School/7th Graders	Walking Eco Tour/GFL flora and fauna, GFL history, stormwater issues/Greenfield Lake	80

January 1 - March 31, 2016

First Saturday Seminars

Date	Topic	Speaker	Attendance
1/2/2016	Canceled due to holidays		
2/6/2016	Fort Anderson	Chris Fonvielle	68
3/5/2016	Frog Watch	Andy Gould	45
Other Presentations by CFRW Staff			
Date	**Organization/Audience**	**Topic/Speaker**	**Attendance**
1/16/2016	StriperFest Banquet	Fish Restoration in the Cape Fear River/Kemp Burdette	350
1/16/2016	StriperFest Banquet	Cape Fear River Fish Passage/Frank Yelverton	350
1/16/2016	StriperFest Banquet	Importance of Environmental Education/Kay Lynn Hernandez	350
2/3/2016	Cape Fear Country Club	Fish Passage, Cape Fear River Locks and Dams/Frank Yelverton	12
2/3/2016	Great Outdoor Provision Co.	Fish Passage, Cape Fear River Locks and Dams/Frank Yelverton	35
3/15/2016	New Hanover County 3rd-5th Graders	Stormwater Pollution: What Is It and How You and Your Family Can Help/Kay Lynn Hernandez	17
Greenfield Lake Tours & Smith Creek Paddle Tours			
Date	**Group Served/Audience**	**Type of Tour/Topic/Location**	**Attendance**
3/15/2016	New Hanover County 3rd-5th Graders	Walking Eco Tour/History, flora, fauna, wildlife feeding, stormwater runoff of GFL/Greenfield Lake	17
3/15/2016	New Hanover County 3rd-5th Graders	Paddle boat Eco Tour/BMPs, flora, fauna, wildlife feeding, stormwater runoff of GFL/Greenfield Lake	17

April 1 - June 30, 2016

First Saturday Seminars			
Date	**Topic**	**Speaker**	**Attendance**
4/1/2016	Plastic Ocean Project – Gut Plastic	Bonnie Monteleone	48
5/7/2016	Invasive Species	Melanie Doyle	35
6/4/2016	Colonial Nesting Waterbirds	Walker Golder	62
Other Presentations by CFRW Staff			
Date	**Organization/Audience**	**Topic/Speaker**	**Attendance**
4/5/2016	NHCS TV, The Forum/Television	LakeFest/Kay Lynn Hernandez	300+ viewers
4/16/2016	Annual Cape Fear AEYC Conference/School Teachers	Key Note: Integrating Environmental Education Into Traditional School Programs/Kay Lynn Hernandez	250
4/20/2016	Myrtle Grove Middle School/Rising 6th Graders and families	Key Note: Importance of Environmental Education/Kay Lynn Hernandez	25
4/29/2016	Cambridge Village/Residents	Cambridge Village Anadromous Fish Restoration, Cape Fear River/Frank Yelverton	12
6/8/2016	UNCW Island Ecology/Graduate Students	CFRW/Kay Lynn Hernandez	15
6/23/2016	Cambridge Village/Residents	Stormwater Pollution Prevention/Kay Lynn Hernandez	18
Greenfield Lake Tours & Smith Creek Paddle Tours			
Date	**Group Served/Audience**	**Type of Tour/Topic/Location**	**Attendance**
4/6/2016	Joshua Academy/Primary Students	Eco Tour/Stormwater, Flora and Fauna/GFL	20
4/8/2016	Beaufort Middle School/Students	Eco Tour/Stormwater, Flora and Fauna/GFL	65
4/16/2016	Wilmington Residents/Adults	Smith Creek Paddle Tour/Smith Creek	Canceled due to rain
4/19/2016	Wrightsboro Elementary	Raindrop Journey/GFL	90

	School/4th Grade Students		
4/27/2016	Trask Middle School/6th Graders	Lakeside Learning Pilot	105
4/28/2016	Trask Middle School/6th Graders	Lakeside Learning Pilot	105
5/7/2016	Wilmington residents	LakeFest/Stormwater, Flora & Fauna/GFL	300
6/12/2016	Brunswick HS/ students	Eco Tour/Stormwater, Flora and Fauna/GFL	95
6/14/2016	Kanapolis Tours/13 - 15yr. olds	Eco Tour/Stormwater, Flora and Fauna/GFL	35
6/16/2016	Daisy Troop	Eco Tour/Stormwater, Flora and Fauna/GFL	6
6/20/2016	Forest Hills Elementary/4th Graders	Raindrop Journey/GFL	31
6/23/2016	Wilmington Singles Group/members	Paddling Eco Tour/GFL	12
6/31/2016	Wilmington Homeschool Group/5th & 6th Grade	Eco Tour/Stormwater, Flora and Fauna/GFL	25
6/14/2016	CFRW Eco Camp/Campers age 9 - 13	Raindrop Journey/GFL	17
6/23/2016	Migrant Workers/children levels K-5	Eco Tour/Stormwater, Flora and Fauna/GFL	45
6/28/2016	CFRW Eco Camp/Campers age 9 - 13	Raindrop Journey/GFL	19

Public Involvement/Volunteer Efforts *Total Allocated Cost: $7230*

Encourage public involvement by engaging city residents/businesses/civic groups in a volunteer Storm Drain Marking program in the city to educate the community about stormwater pollution. A minimum of 2 separate volunteer days is required.
For each outing day, a minimum of 7 markers will be applied per volunteer group and educational doorhangers will be distributed to surrounding residences/businesses. Staff will assist in identifying areas to mark drains, educate volunteers about the purpose of the program, train volunteers in marking and safety, use supplied markers, and help provide oversight of the program. A trained CFRW staff member is required to be present during all storm drain marking activities and with each volunteer group. **($700)**

Storm Drain Marking			
Date	**Name of Volunteer Organization, Business, etc.**	**# of Volunteers**	**Specific Area Marked / # of Storm Drains Marked**
4/19/2016	Girl Scouts	4	Whitner Dr. near Holly Tree/7
6/10/2016	UNCW Human Resource	10	Colonial Dr, Wayne Dr./16
6/24/2016	UNCW Human Resource	10	Creecy, Woolcott, Metts, 221st & 22nd Sts./9

Coordinate volunteer clean-ups of city watersheds/tributaries 10x per year, once per month (with the exception of July and December). These cleanups will focus on tributaries that flow into Greenfield Lake, Smith Creek, Burnt Mill Creek, Barnards Creek, and the Cape Fear River. 10 monthly clean-ups will be completed including at least one site for Big Sweep, an annual international clean-up. A field trip will be conducted by the city with CFRW, as necessary, to point out the specific tributaries/areas to focus cleanups.

In order to avoid duplication of cleanup activities, CFRW will provide a schedule to City Stormwater Services at least 2 months in advance of proposed cleanup event locations. CFRW will inspect these sites in advance to make sure the area is actually in need of a cleanup.

Local watershed clean-ups may also include volunteer efforts to remove wetland and aquatic invasive plants with a focus on Greenfield Lake, Kerr Ave, and the Mary Bridger Wetland, but

should not be conducted in place of cleanups. Any cleanups conducted on private property should include written permission obtained in advance of cleanups by CFRW from the property owner. These "written permissions" should be included on the end of the year compilation CD.

Efforts should be made to inform the local media about upcoming cleanup events. In addition, significant water quality problems identified during cleanups will be reported *immediately* to the appropriate officials, including the city's Stormwater Compliance Officer.

A summary of each clean-up will be completed and submitted to Stormwater Services. *Reports will be submitted using the supplied template and within 10 days of the cleanup event.* Reports will include: the specific watershed, the location within the watershed that was cleaned, number of participants, hours worked, estimate of the quantity of waste materials removed, photographs to document work completed including before and after of site, volunteer photos, and documentation of efforts to secure volunteers and contact the media. **($5430)**

July 1 - September 30, 2015

Watershed Clean-ups				
Date	**Watershed**	**Specific Area Cleaned (List map # and specific location cleaned)**	**Trash Collected (ie. # of 30 gallon bags, and type of trash collected)**	**# of Volunteers/ Total Volunteer Hours Contributed**
8/25/15	Burnt Mill Creek	#9 end of Shirley Rd	14 thirty-gallon bags filled with plastic bottles, plastic wrappers, cans and various other plastics	10 Volunteers/20 volunteer hours
9/22/15	Burnt Mill Creek	#1 Randall Pond	4 thirty-gallon bags and 3 sixteen gallon bags filled with assorted plastics, aluminum cans and other	5 Volunteers/10 volunteer hours

October 1 - December 31, 2015

Watershed Clean-ups				
Date	**Watershed**	**Specific Area Cleaned (List map # and specific location cleaned)**	**Trash Collected (ie. # of 30 gallon bags, and type of trash collected)**	**# of Volunteers/ Total Volunteer Hours Contributed**
10/10/2015	Greenfield Lake, Bradley Creek, Burnt Mill Creek, Smith Creek	#s 2, 4 and 5 Greenfield Lake	97 thirty-gallon bags filled with plastic, cigarette butts, aluminum, styrofoam, needles, condoms, fishing line, rope, food wrappers, bottles, cans, grocery bags, cigarette lighters	200 Volunteers/ 600 Volunteer Hours. CFRW coordinated the cleanup for the NHC Keep America Beautiful Cleanup
11/14/2015	Burnt Mill Creek	#6 dry ditch along McMillan & Hamilton	13 thirty-gallon bags filled with hundreds of plastic bottles/cups, fast food bags, tin cans, cigarettes and plastic pieces. 2 Yard signs	11 Volunteers/22 volunteer hours

January 1 - March 31, 2016

Watershed Clean-ups				
Date	**Watershed**	**Specific Area Cleaned (List map # and specific location cleaned)**	**Trash Collected (ie. # of 30 gallon bags, and type of trash collected)**	**# of Volunteers/ Total Volunteer Hours Contributed**
1/30/2016	Burnt Mill Creek	#8, Market North, Intersection of Darlington Ave & Broad St.	6 thirty-gallon bags, 3 tires, metal rental sign, saturated mattress, construction material, bed frame, sound board	4 volunteers/8 volunteer hours

2/13/2016	Drains to Cape Fear River	#1 dirt road at the intersection of Greenfield St. and Front St.	21 thirty-gallon bags, aluminum cans, plastic bottles and styrofoam cups/trays	10 volunteers/20 volunteer hours
3/12/2016	Greenfield Lake	#4 along 13th St. to Lakeshore Dr., starting at Lee Dr.	30 thirty-gallon bags, cooler, buckets, aluminum cans, plastic bottles and Styrofoam	18 volunteers/36 volunteer hours

April 1 - June 30, 2016

Watershed Clean-ups				
Date	**Watershed**	**Specific Area Cleaned (List map # and specific location cleaned)**	**Trash Collected (ie. # of 30 gallon bags, and type of trash collected)**	**# of Volunteers/ Total Volunteer Hours Contributed**
4/9/2016	Burnt Mill Creek	Shirley/Kline (Location #9)	40 Thirty-Gallon trash bags were filled. -22 filled with recyclable materials -18 filled with trash A TV, and multiple buckets were also recovered.	36 Volunteers/72 volunteer hours
5/14/2016	Burnt Mill Creek	Randall Pond (Location #9)	Two 92 Gallon trash bins were filled with trash One 92 Gallon trash bin was filled with recyclables	7 Volunteers/14 volunteer hours
6/11/2016	Greenfield Lake	The intersection of Carolina Beach Rd and Medical Center Dr. Behind Carolina Pediatrics of Wilmington (Location #5)	Two 92-Gallon Trash bins were filled. One with trash and the other with recyclables. Two tires were also removed	10 Volunteers/20 volunteer hours

Conduct a volunteer watershed monitoring program and alert Stormwater Services when volunteers find problem areas. Every other month Watershed Watch volunteer monitoring activities will be conducted in at least 2 locations and will target high priority creeks or creek sections identified in cooperation with Stormwater Services. Observation months are August, October, December, February, April, and June. The Creek Observation Monitoring Form with basic field observations and photo documentation will be submitted for review to Stormwater Services *within 10 days of monitoring.* In addition, significant water quality problems identified during observation monitoring will be reported *immediately* to the appropriate officials, including the city's Stormwater Compliance Officer. In addition to CFRW staff and interns, Watershed Watch volunteers should include city residents to help satisfy public involvement objectives **($1100)**

July 1 - September 30, 2015

Watershed Watch Reports were submitted in August for Burnt Mill Creek/Downy Branch and also for Wrightsville/Dawson.

October 1 - December 31, 2015

Watershed Watch Reports were submitted in October and December for Burnt Mill Creek/Downy Branch and also for Wrightsville/Dawson.

January 1 - March 31, 2016

Watershed Watch Reports were submitted in February for Burnt Mill Creek/Downy Branch and also for Wrightsville/Dawson.

April 1 - June 30, 2016

Watershed Watch Reports were submitted in April and June for Burnt Mill Creek/Downy Branch and also for Wrightsville/Dawson.

Programs/Partnerships

Total Allocated Cost: $700

Serve as an active partner organization on local grant projects and initiatives that benefit local surface water quality and water resources. Examples include local grant projects in the Burnt Mill Creek Watershed, removing trash and performing light maintenance for existing BMPs, and the Smith Creek paddle trail creation. **($700)**

July 1 - September 30, 2015

Cape Fear River Watch partnered with DREAMS of Wilmington, YWCA, Friends School of Wilmington and Guilford College to conduct summer camp programs, which included clean-ups and stormwater education including BMPs.

Cape Fear River Watch met with NHC Soil and Water and NHC Cooperative Extension on grant funded, partnership program with 6th grade students.

October 1 - December 31, 2015

Cape Fear River Watch assumed the responsibility of coordinating the grant-funded New Hanover County Keep America Beautiful Program and is in the process of acquiring the project on a permanent basis. Partners on the October clean-up included Fort Fisher Aquarium, Town of Wrightsville Beach and Wilmington Chamber of Commerce.

January 1 - March 31, 2016

Cape Fear River Watch met with NHC Soil and Water and NHC Cooperative Extension on grant funded, partnership program with 6th grade students.

April 1 - June 30, 2016

Cape Fear River Watch partnered with DREAMS of Wilmington, YWCA, Friends School of Wilmington and Guilford College to conduct summer camp programs, which included clean-ups and stormwater education including BMPs.

Monitoring Activities

Total Allocated Cost: $950

Monitor and evaluate the condition of the Kerr Avenue Stormwater Wetland in August and January. Provide outreach/education for groups and/or surrounding businesses. A brief monitoring report will be sent via e-mail to Stormwater Services for the months of August and January. *Observations will be conducted between the 15th – 25th of these months and reports will be submitted using supplied templates within 10 days of observation*. The monitoring report will include observations such as water clarity, invasive species, algae, wildlife, maintenance and restoration opportunities, and photographs.

In addition, significant water quality problems identified during monitoring will be reported immediately to the appropriate officials including the city's Stormwater Compliance Officer.

Outreach and education activities for the Kerr Avenue Wetland may include presentations to groups, group cleanups (*independent of the 10 cleanups service*), and periodic outreach/education

for business owners/operators and property owners in close proximity to the KA Wetland. **($537.50 of which $250 is allocated for education)**

July 1 - September 30, 2015
A monitoring report for August was completed and submitted.

October 1 - December 31, 2015
No monitoring was conducted for this quarter.

January 1 - March 31, 2016
Outreach/education for business owners/operators and property owners in close proximity to the KA Wetland was conducted on March 31st. Brochures and other materials were distributed to Long Island Eatery, Apple Annies, Big Gal's Boutique, Patriot Dive Center, Tommy's Golf Shop, Sally's Beauty Supply, Repair/Cleaner Shop, Laundromat, Furniture and Mattress, Dick's, Trolley Stop, Tonia's Salon, Silver Shears, Low Tide, TJ Salon and PTs. The Cook Out office was closed. No monitoring was conducted for this quarter.

April 1 - June 30, 2016
Kerr Avenue Wetland - Resources Class Visit by UNCWilmington. Discussion of the wetland function, stormwater, water properties and plant types.

Monitor and evaluate the condition of Greenfield Lake in August and January.
A brief monitoring report will be sent via e-mail to Stormwater Services for the months of August and January. *Observations will be conducted between the 15th - 25th of each month and reports will be submitted using supplied templates within 10 days of observation.* The monitoring report will include observations from specified locations around the lake highlighting water clarity, invasive species, algae, wildlife, spillway depth, maintenance and restoration opportunities, and photographs. In addition, significant water quality problems identified during monitoring will be reported immediately to the appropriate officials including the city's Stormwater Compliance Officer. **($412.50)**

July 1 - September 30, 2015
A monitoring report for August was completed and submitted.

October 1 - December 31, 2015
No monitoring was conducted for this quarter.

January 1 - March 31, 2016
No monitoring was conducted for this quarter.

April 1 - June 30, 2016
No monitoring was conducted for this quarter.

Contract Administration

Total Allocated Cost: $1220

Quarterly progress reports and invoices will be submitted in accordance with the following provisions: *Quarterly reports and invoices are due within 10 days of the quarter end date and will follow templates and instructions set forth by Stormwater Services.* Reports and invoices that

do not follow templates/instructions will be returned for correction; payment will be processed once updated reports and invoices are received, reviewed, and approved.

Submit cumulative quarterly progress reports and invoices according to the following quarters: July 1 - Sept 30; October 1 - Dec. 31; January 1 -March 31; April 1 - June 30. The 4th quarter progress report will serve as a compiled year end summary report and will be included in the City's NPDES annual report.

The quarterly invoice should use the supplied template which shows the % of each service completed each quarter, invoice amount, and amount remaining to be paid. Invoices will be paid once the quarterly progress report and invoice are received and reviewed by the City for adequate progress. Non-performance or inadequate progress may result in non-payment or reduction in payment. No pre-payment of services will occur.

CFRW will maintain all records and reports *(ie. annual contract, quarterly reports, quarterly invoices, monitoring reports, cleanup reports, Watershed Watch reports, educational activities, educational print materials, permissions, media notices, etc)* related to this contract on a fiscal year basis (July 1-June 30). These records should be retained for a period of at least 5 years. In addition, an annual compilation CD or DVD copy will be provided to the City of Wilmington Stormwater Services by July 10th for the prior FY. These files are public record and should be made accessible.

Contact person: Stormwater Services requires one main point of contact for the implementation, management, communication and reporting of this annual contract. This staff person will be the individual that implements the majority of contract services, and therefore will be the most familiar with the contract. The designated contact person is: **Kay Lynn Hernandez ($1220)**

Other:

Do not assign a cost.

Assist Stormwater Services in implementing additional public outreach, education, involvement, and participation activities required by federal NPDES stormwater permit. Summary reports and information will be included in the City's NPDES yearly report to the State.

Report compiled by: Kay Lynn Hernandez **Date: 6/30/2016**

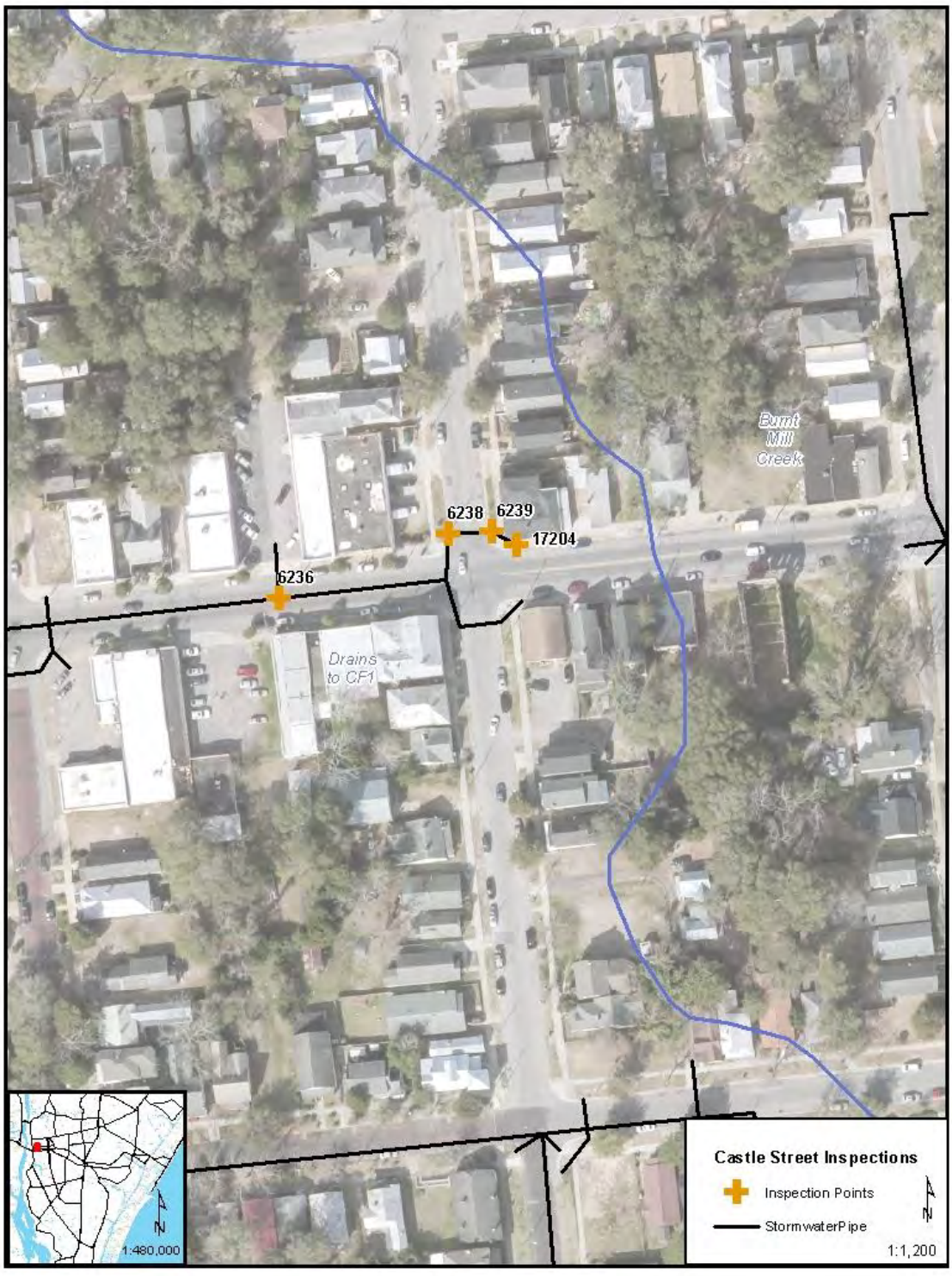
APPENDIX D: ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)

Dry Weather Flow Monitoring Location Maps

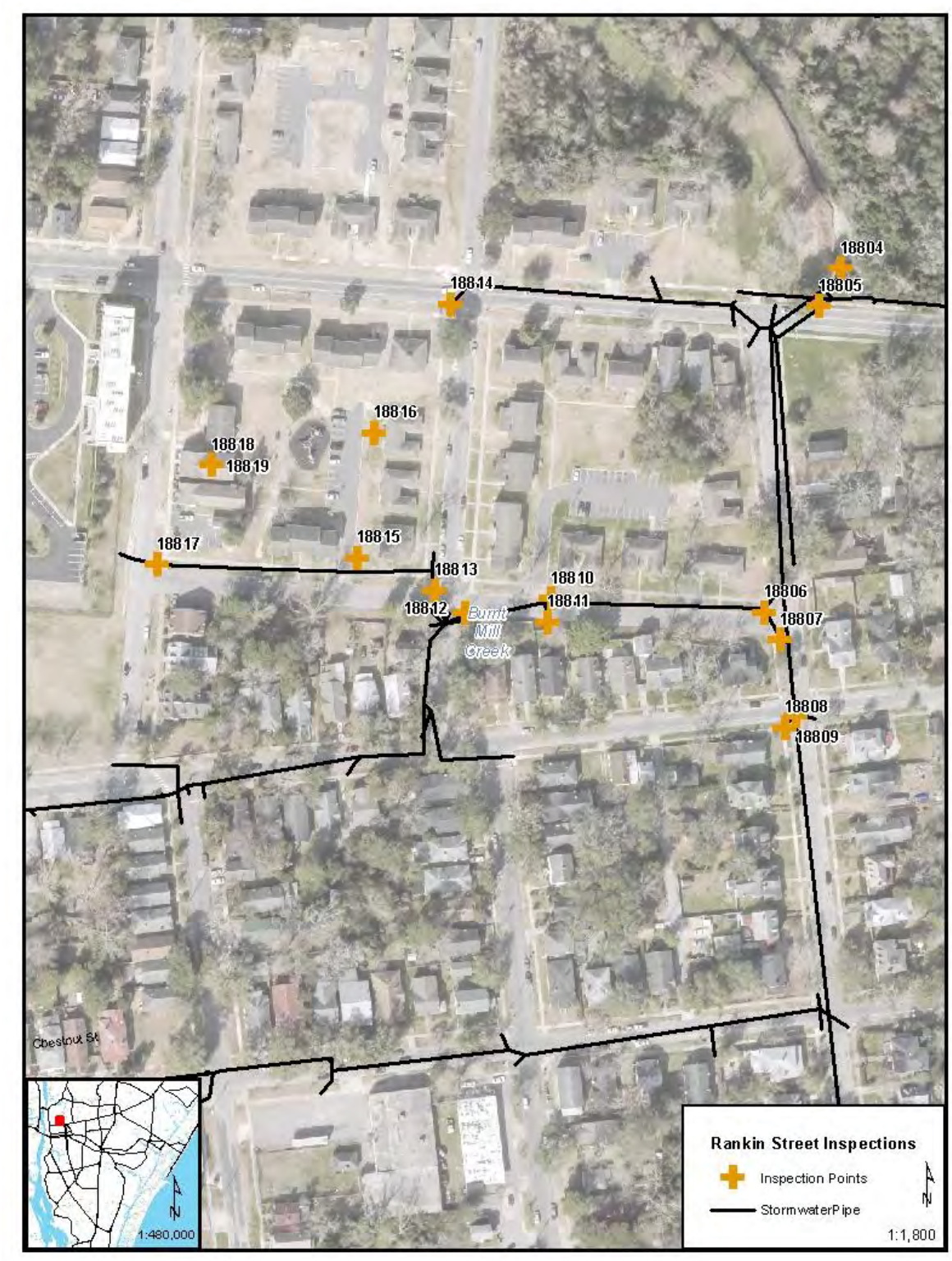
Drainage Segment Location *(description)*
Outfall (30") at Chestnut Street, southward along 20th Street, then westward along Princess Street

Drainage Segment Location *(description)*
15" vitrified clay pipe at intersection of Ann Street/3rd Street westward to intersection of Ann Street/2nd Street.

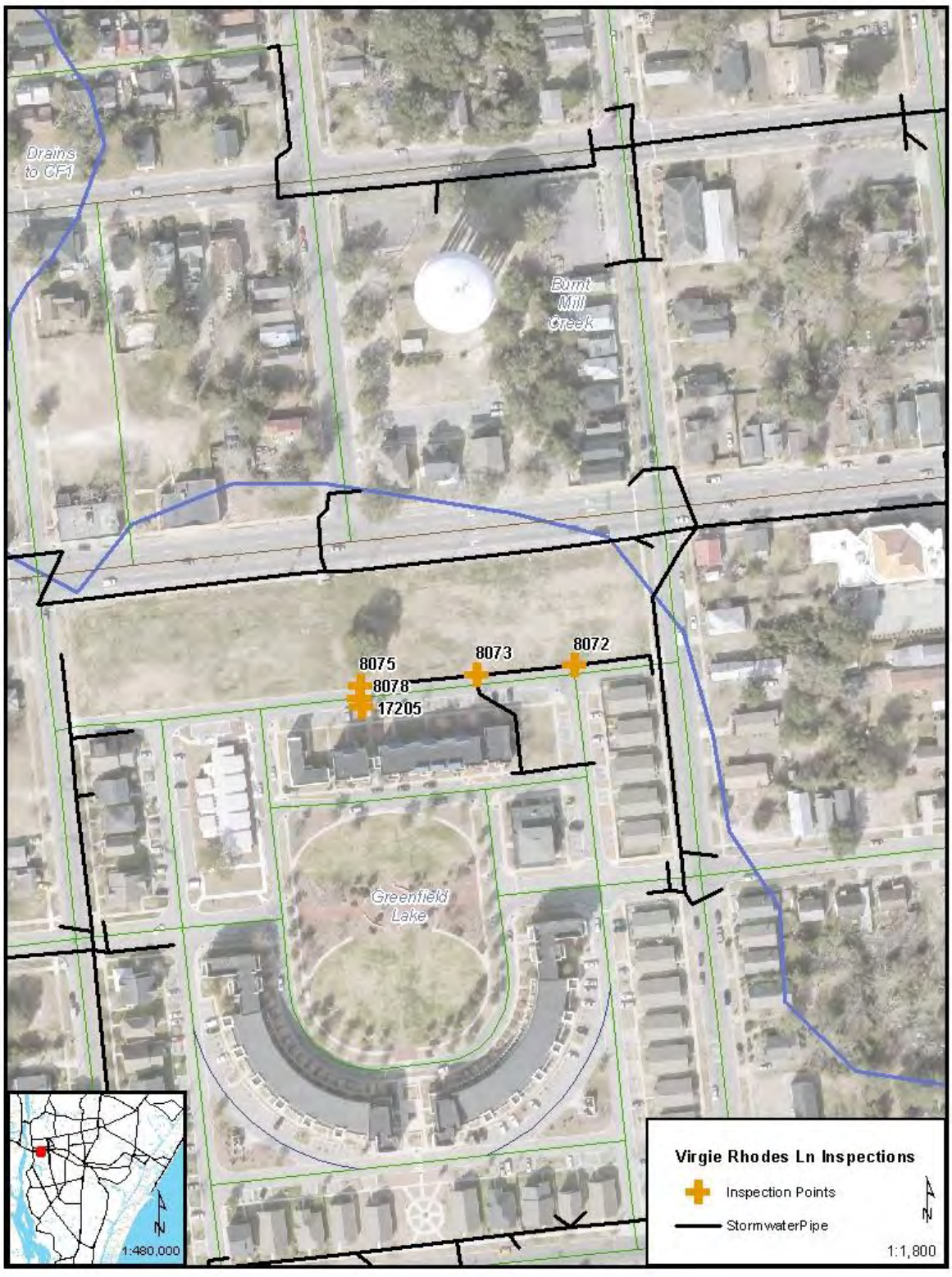
Drainage Segment Location *(description)*
18" RCP at intersection of Castle Street/7th Street westward to 6th Street.



Drainage Segment Location *(description)*
36" Outfall along Burnt Mill Creek at Rankin Street, southward along 13th Street, then westward along Walnut Street.



Drainage Segment Location *(description)*
24" RCP pipe along Virgie Rhodes Lane.



2016 Dry Weather Flow Inspections

ID	Inspection Date	Inspector	Illicit Discharge?	Description	Referred to Enforcement
6151	9/21/2015	SASKIA COHICK	NO INDICATION		NO
6154	9/21/2015	SASKIA COHICK	NO INDICATION		NO
6156	9/21/2015	SASKIA COHICK	NO INDICATION	Needs maintenance	NO
6164	9/21/2015	SASKIA COHICK	NO INDICATION		NO
6165	9/21/2015	SASKIA COHICK	NO INDICATION		NO
6236	9/16/2015	GRACE MORRISON	POSSIBLE DISCHARGE	appears to be cleaning products in flow	YES
6238	9/16/2015	GRACE MORRISON	NO INDICATION		NO
6239	9/16/2015	GRACE MORRISON	NO INDICATION		NO
8072	9/3/2015	JIM QUINN	NO INDICATION	Dry	NO
8073	9/3/2015	JIM QUINN	NO INDICATION	Dry	NO
8075	9/3/2015	JIM QUINN	NO INDICATION	Dry	NO
8078	9/3/2015	JIM QUINN	NO INDICATION	Dry	NO
11768	9/1/2015	BETH NUNNALLY	POSSIBLE DISCHARGE	sheen on flow, odor stronger	YES
16005	7/9/2015	JIM QUINN	NO INDICATION		NO
16006	7/9/2015	JIM QUINN	NO INDICATION		NO
16404	9/21/2015	SASKIA COHICK	NO INDICATION		NO
16804	9/21/2015	SASKIA COHICK	POSSIBLE DISCHARGE		YES
17204	9/16/2015	GRACE MORRISON	NO INDICATION		NO
17205	9/3/2015	JIM QUINN	NO INDICATION		NO
17604	9/22/2015	SASKIA COHICK	NO INDICATION		NO
18004	9/22/2015	GRACE MORRISON	NO INDICATION		NO
18404	1/6/2016	SASKIA COHICK	NO INDICATION	dry	NO
18405	1/6/2016	SASKIA COHICK	NO INDICATION	dry	NO
18804	3/11/2016	SASKIA COHICK	NO INDICATION		NO
18805	3/11/2016	SASKIA COHICK	NO INDICATION		NO
18806	3/11/2016	SASKIA COHICK	NO INDICATION	dry	NO
18807	3/11/2016	SASKIA COHICK	NO INDICATION	dry	NO
18808	3/11/2016	SASKIA COHICK	NO INDICATION		NO
18809	3/11/2016	SASKIA COHICK	POSSIBLE DISCHARGE	flowing water	NO
18810	3/11/2016	SASKIA COHICK	NO INDICATION	dry	NO
18811	3/11/2016	SASKIA COHICK	NO INDICATION	dry	NO
18812	3/11/2016	SASKIA COHICK	NO INDICATION	dry	NO
18813	3/11/2016	SASKIA COHICK	NO INDICATION	slow flow	NO
18814	3/11/2016	SASKIA COHICK	NO INDICATION	dry	NO
18815	3/11/2016	SASKIA COHICK	NO INDICATION	appears dry, metal grate over inlet	NO
18816	3/11/2016	SASKIA COHICK	NO INDICATION	metal grate, no apparent flow	NO
18817	3/11/2016	SASKIA COHICK	NO INDICATION	dry	NO
18818	3/11/2016	SASKIA COHICK	NO INDICATION	dry	NO
18819	3/11/2016	SASKIA COHICK	NO INDICATION	dry	NO

Employee Training

Employee training was conducted for Stormwater Services Field Staff. Forty Five (45) individuals went through the training conducted on 12/7/15. Four separate trainings were conducted that day which included 13 filed staff from the closed drainage crews, 14 field staff from the street sweeping crews, 12 field staff from the open drainage crews, and 6 field staff from the BMP crews. Refresher training and education for existing staff will be updated as necessary and implemented every 1-2 years.

Policy for Reporting and Documentation of Sanitary Sewer Overflows and System Leaks

Cape Fear Public Utility Authority and City of Wilmington

Purpose:

The purpose of this document is to establish agreed upon procedures for the Cape Fear Public Utility Authority (CFPUA) to follow regarding reporting and documentation of sanitary sewer overflows (SSO) that impact the City of Wilmington Municipal Separate Storm Sewer System (MS4). These guidelines will enable the City to comply with NPDES Phase II Stormwater permit reporting requirements as well as to provide assistance to CFPUA in mitigating any potential threat to public health or the environment.

Reporting Requirements:

All SSOs resulting in discharge to the City of Wilmington MS4, or causing possible contamination of stormwater discharging to the storm system, must be reported to the City within 48 hours of occurrence in accordance with City Code Chapter 12, section 12-24. Failure to comply may result in a notice of violation (NOV) for the CFPUA. Fines for non-compliance range up to $10,000 based on quantity, risk to the public, environment damage and degree of negligence as documented in the City Code. The following table documents the minimum information required for sanitary sewer overflows and sewage leaks that may impact the City's MS4.

	Date of Spill/Leak	Location	Volume	Corrective Action	NCDWQ Form	Analytical Data
SSO						
< 1000 gal	X	X	X	X		
> 1000 gal	X	X	X	X	X	X
System Leak	X	X	X	X	X	as needed

Spills greater than 1,000 gallons require an additional completed copy of the DWQ's Collection System Sanitary Sewer Overflow Reporting Form (CS-SSO) provided at the same time as when provided to the State. Failure to comply may result in an NOV for CFPUA. Clean up requirements are in accordance with the CFPUA's Clean up Procedure Policy. This information will also be used in documenting the compliance with the City of Wilmington's annual NPDES Phase II Stormwater report to NCDWQ.

City of Wilmington Contact Information:

Spills less than 1,000 gallons

Use the Pollution Prevention Hotline: 910-341-1020
Or go to: www.wilmingtonnc.gov/reportstormwaterpollution and fill out the on line form.

Spills greater than 1000 gallons or system leaks

1) Corey Boyett
Stormwater Compliance Officer
910-341-0092
Corey.Boyett@wilmingtonnc.gov

2) Jim Quinn
Stormwater Specialist
910-341-4694
Jim.Quinn@wilmingtonnc.gov

3) Derek Pielech
Stormwater Services Manager
910-341-5818
Derek.Pielech@wilmingtonnc.gov

(From Page 8 of City of Wilmington Illicit Detection and Elimination Program Manual)

Dry Weather Flow Inspection Program

In accordance with permit requirements for detecting dry weather flows, the City is developing and implementing a program for conducting inspections throughout the MS4 to detect dry weather flows. Dry weather flows are defined as any flow in the MS4 that occurs after a 72 hour period without rain. The objective is to identify and eliminate flows that contain pollutant or pathogen loads. Such flows vary in source, content, and frequency, thereby imparting variable impacts within the larger MS4 and the final receiving water bodies. Promptly identifying dry weather flows is instrumental in recognizing and addressing deleterious illicit discharges. As the program develops, procedures will be evaluated and modified with the aim of more effectively detecting and eliminating illicit discharges.

Employees of the City familiar with outfall inspection procedures will conduct the inspections. Inspections will be conducted only during dry periods to facilitate identification of only those flows unassociated with allowable stormwater flows. Furthermore, those outfalls located along tidally influenced reaches will be inspected at low tide; should the outfall still be submerged at low tide, the stormwater conduit will then be traced upgrade to the nearest manhole or observable location beyond tidal influence, where an inspection will be more likely to detect a dry weather flow. A similar modified observation procedure will be used for those points where direct inspection of the outfall point is not possible; observations will be made immediately upgrade in the system at an appropriate location for dry weather inspection.

The inspection itself will consist of an initial visual inspection of the outfall to determine the presence or absence of water or liquid flow. Photographs will be taken of the inspection location and saved along with the inspection record containing data describing the conditions observed at the outfall or observation point. . The detection of any suspicious dry weather flow will prompt a service request for a field screening as described in later sections of this manual outlined as Steps 1-4, in which physical, chemical, and biological parameters may be analyzed to determine the nature and source of any illicit discharge.

The inspection records will be stored in the GIS as tables. Screen shots of the actual ArcPad routine and a diagram showing the database designed for storing these records is shown in Appendix E: *Field Data Collection of Dry Weather Inspections using ArcPad.*

Given that the City is located in a coastal area with tidal influence in parts of the MS4 and numerous groundwater sources infiltrating or directly routed into the MS4, our strategy for performing the observations will be adjusted accordingly. The initial location of all major outfall points has provided the starting point for the Dry Weather Flow Inspection Program. Each of the major outfall points will be inspected, photographed and have an observation record saved to the GIS database as described above. Following completion of this effort, a similar systematic inspection of major trunk lines and areas of interest will begin.

The selection of major trunk lines for inspection will be a strategically targeted effort to isolate those portions of the drainage system that may be contributing to any dry weather flow. At this point, we envision inspections progressing up a selected trunk line from the outfall so that any contributing dry weather flow source areas can be identified and investigation into the source can begin. MS4 structures which have sewer cross pipes associated with them are at the greatest risk for sewage contamination; therefore along with the trunk line inspection effort, special attention will be given to inspecting any MS4 structures or junctions which have a sewer cross pipe passing through the structure. Any identified illicit discharge encountered during the both the trunk line and sewer cross pipe inspection process will result in a service request being generated.

The selection of major trunk lines and points along the trunk line for inspection will be scheduled with consideration given to several influencing factors including: weather conditions, the degree to which stormwater infrastructure mapping is reliable and complete within a given area, suspicion of negative inputs to the MS4 based upon annual water quality reports, 303d listings, and/or industrial land use designations. Also, indications of illicit discharge observations from the MS4 mapping crew will prompt inspections. Dry weather inspections will be performed at a minimum of four locations along one or more trunk lines during any given month depending on weather conditions.

APPENDIX E: CONSTRUCTION SITE RUNOFF CONTROLS

Included in this section:

New Hanover County Erosion & Sedimentation Control Ordinance

New Hanover County Ordinance:

The following are excerpts culled from the New Hanover County Erosion and Sedimentation Control Ordinance:

The New Hanover County erosion and sedimentation control ordinance is adopted for the purposes of:

(1) Regulating certain land disturbing activity to control accelerated erosion and sedimentation in order to prevent the pollution of water and other damage to lakes, watercourses, and other public and private property by sedimentation; and

(2) Establishing procedures through which these purposes can be fulfilled.

General requirements of the permit include among others:

(a) *Plan required.* No person shall initiate any land disturbing activity which uncovers more than one acre without having an erosion control plan approved by the county. No land disturbing activity may be initiated until the county is notified of the date that the land disturbing activity will begin.

(b) *Protection of property.* Persons conducting land disturbing activity shall take all reasonable measures to protect all public and private property from damage caused by such activity.

(c) *More restrictive rules shall apply.* Whenever conflicts exist between federal, state, or local laws, ordinances, or rules, the more restrictive provision shall apply.

(e) *Inspections.* Any and all applicable intermediate inspections may be held in any trade (building, mechanical, electric and/or plumbing) if any land disturbing activity, on a tract, including single-family residences, is found not to be in compliance with any part of this article.

(f) *Building finals.* Building finals and/or certificates of occupancy may not be issued if any land disturbing activity, including single-family residences, is found not to be in compliance with any part of this article.

Mandatory Standards For Land Disturbing Activity

No land disturbing activity subject to the control of this article shall be undertaken except in accordance with the following mandatory standards:

(1) *Buffer zone*.

a. No land disturbing activity during period of construction or improvement to land shall be permitted in proximity to a lake or natural watercourse unless a buffer zone is provided along the margin of the watercourse of sufficient width to confine visible siltation within the 25 percent of the buffer zone nearer the land disturbing activity. Waters that have been classified as trout waters

by the environmental management commission shall have an undisturbed buffer zone 25 feet wide or of sufficient width to confine visible siltation within the 25 percent of the buffer zone nearest the land disturbing activity, whichever is greater. Provided, however, that the county may approve plans which include land disturbing activity along trout waters when the duration of said disturbance would be temporary and the extent of said disturbance would be minimal. This subdivision shall not apply to a land disturbing activity in connection with the construction of facilities to be located on, over, or under a lake or natural watercourse.

b. Unless otherwise provided, the width of a buffer zone is measured from the edge of the water to the nearest edge of the disturbed area, with 25 percent of the strip nearer the land disturbing activity containing natural or artificial means of confining visible siltation.

c. The 25-foot minimum width for an undisturbed buffer zone adjacent to designated trout waters shall be measured horizontally from the top of the bank.

d. Where a temporary and minimal disturbance is permitted as an exception by subsection (1)a. of this section, land disturbing activities in the buffer zone adjacent to designated trout waters shall be limited to a maximum of ten percent of the total length of the buffer zone within the tract to be distributed such that there is not more than 100 linear feet of disturbance in each 1,000 linear feet of buffer zone. Larger areas may be disturbed with the written approval of the director.

e. No land disturbing activity shall be undertaken within a buffer zone adjacent to designated trout waters that will cause adverse temperature fluctuations, as set forth in 15 NCAC 2B.0211 "Fresh Surface Water Classification and Standards", in these waters.

(2) Graded slopes and fills. The angle for graded slopes and fills shall be no greater than the angle, from zero to nineteen degrees, which can be retained by vegetative cover or other adequate erosion control devices or structures. Only when approved by the county may slopes be steeper than two foot of run to one foot of rise. In any event, slopes left exposed will, within 15 working days or 30 calendar days, whichever is shorter, of completion of any phase of grading, be planted or otherwise provided with ground cover, devices, or structures sufficient to restrain erosion.

(3) Ground cover. Whenever land disturbing activity is undertaken on a tract comprising more than one acre, if more than one acre is uncovered, the person conducting the land disturbing activity shall install such sedimentation and erosion control devices and practices as are sufficient to retain the sediment generated by the land disturbing activity within the boundaries of the tract during construction upon and development of said tract, and shall plant or otherwise provide a permanent ground cover sufficient to restrain erosion after completion of construction or development. Except as provided in section 23-238(b)(5), provisions for a ground cover sufficient to restrain erosion must be accomplished within 30 working days or 120 calendar days following completion of construction or development whichever period is shorter.

(4) Prior plan approval. No person shall initiate any land disturbing activity on a tract if more than one acre is to be uncovered unless, 30 or more days prior to initiating the activity, an erosion and sedimentation control plan for such activity must be both filed with and approved by the county. The county shall forward to the director of the division of water quality a copy of each erosion and sedimentation control plan for a land disturbing activity that involves the utilization of ditches for the purpose of dewatering or lowering the water table of the tract.

Design and Performance Standards.

(a) Except as provided in subsection (b)(2) of this section, erosion and sedimentation control measures, structures and devices shall be so planned, designed and constructed as to provide protection from the calculated maximum peak of runoff from the ten-year storm. Runoff rates shall be calculated using the procedures in the USDA, Soil Conservation Service's "National Engineering Field Manual for Conservation Practices," or other acceptable calculation procedures.

(b) In high quality water (HQW) zones, the following design standards shall apply:

(1) Uncovered areas in HQW zones shall be limited at any time to a maximum total area within the boundaries of the tract of 20 acres. Only the portion of the land disturbing activity within an HQW zone shall be governed by this section. Larger areas may be uncovered within the boundaries of the tract with the written approval of the director.

(2) Erosion and sedimentation control measures, structures and devices within HQW zones shall be so planned, designed and constructed to provide protection from the runoff of the 25-year storm which produces the maximum peak rate of runoff as calculated according to procedures in the United States Department of Agriculture Soil Conservation Service's "National Engineering Field Manual for Conservation Practices" or according to procedures adopted by any other agency of this state or the United States or any generally recognized organization or association.

(3) Sediment basins within HQW zones shall be designed and constructed such that the basin will have a settling efficiency of at least 70 percent for the 40-micron (0.04 mm) size soil particle transported into the basin by the runoff of that two-year storm which produces the maximum peak rate of runoff as calculated according to procedures in the United States Department of Agriculture Soil Conservation Services "National Engineering Field Manual for Conservation Practices" or according to procedures adopted by any other agency of this state or the United States or any generally recognized organization or association.

(4) Newly constructed open channels in HQW zones shall be designed and constructed with side slopes no steeper than three horizontal to one vertical if a vegetative cover is used for stabilization unless soil conditions permit a steeper slope or where the slopes are stabilized by using mechanical devices, structural devices or other acceptable ditch liners. In any event, the angle for side slopes shall be sufficient to restrain accelerated erosion.

(5) Ground cover sufficient to restrain erosion must be provided for any portion of a land disturbing activity in a HQW zone within 15 working days or 60 calendar days following completion of construction or development, whichever period is shorter.

Responsibility For Maintenance.

During the development of a site, the person conducting the land disturbing activity shall install and/or maintain all temporary and permanent erosion and sedimentation control measures as required by the approved plan or any provision of this article, the act, or any order adopted pursuant to this article or the act. After site development, the land owner or person in possession or control of the land shall install and/or maintain all necessary permanent erosion and sediment control measures, except those measures installed within a road or street right-of-way or easement accepted for maintenance by a governmental agency.

The full text of this article can be found under Chapter 23, Article VI of the Code of Ordinances County of New Hanover, North Carolina.

APPENDIX F: POST-CONSTRUCTION SITE RUNOFF CONTROLS

Included in this section:

Inspection Reporting Summary
Inspection Letter
Stormwater Detention Facility Compliance Inspection Report

Dates of Inspections	**July/Aug. 2015**	**Feb./March 2016**
Total # Sites Inspected	343	349
Response Letter Severity		
Level 1 (first letter)	45	37
Level 2 (second letter)*	0	0
Level 3 (third letter)**	0	0
# of Sites Requiring Maintenance	45	37

*If no response from first letter after 60 days, second letter is sent

**If no response from second letter after 60 days, third letter is sent

SAMPLE LETTER

Date

«OWNER»
«CO_OWNER»
«OWN_ADDR»
«OWN_CITY», «OWN_STATE» «OWN_ZIP»

RE: Storm Water Maintenance Inspection - «SUBD_NAME»
(Parcel # «PIN»)

The City of Wilmington Storm Water Services Section has recently completed a routine inspection of the storm water management facilities at «SIT_ADDR» for the above referenced site. The facility was inspected for compliance with the operation and maintenance requirements as outlined in the City's Technical Standards Manual. The City will be conducting these inspections a minimum of twice a year. Our ---------- (date) inspection indicates that the storm water facilities at the above property does not comply with current maintenance standards as listed on the attached Compliance Inspection Report.

According to the storm water management specifications and standards and the inspection and maintenance agreement from the responsible entities, corrective action must be taken within a reasonable time period. The City will be reinspecting the above storm water facilities to track the progress of any corrective action. I will be happy to work with you toward a satisfactory resolution of this matter. If you have questions, please contact me at 341-4694. Your cooperation and assistance in the City's storm water management efforts is greatly appreciated.

Sincerely,

Jim Quinn
Stormwater Specialist
Stormwater Services

Stormwater Detention Facility

Compliance Inspection Report

SITE:

DATE:

LOCATION:

The Stormwater Management for Post-Construction Ordinance requires a bi-annual inspection of all structural water quality detention facilities to ensure that they are being properly maintained and are functioning as originally designed.

The results of this inspection are as follows:

☐ **Visual inspection found no apparent problems with the facility.**
☐ **Please complete the following repairs and/or maintenance items within 60 days of this report**

Slopes
☐ Repair eroded pond slopes
☐ Repair erosion at pond inlet
☐ Repair erosion at outlet structure
☐ Re-seed and/or repair bare areas
☐ Mow and regularly maintain vegetation
☐ Regrade slopes and/or aquatic shelf

Inlets
☐ Remove vegetative obstruction
☐ Remove sediment accumulation within pipes

Emergency Spillway
☐ Remove debris located in spillway
☐ Remove trees and woody vegetation
☐ Repair eroded areas and/or rip-rap

Outlet Structure
☐ Remove debris obstructing outlet structure
☐ Remove obstruction to orifice
☐ Repair and/or replace trash rack
☐ Repair trash screen for lower orifice
☐ Remove vegetation around outlet structure

Pond Main Body
☐ Repair vegetative shelf
☐ Remove sediment accumulation
☐ Remove floating debris and/or debris on slopes
☐ Remove vegetation in pond that has reduced surface area

Other
☐
☐

Additional comments and maintenance concerns:

_____
_____
_____
_____
_____
_____
_____

Proper operation and maintenance are the sole responsibility of the property owner, and a vital part of ensuring the effectiveness of your detention facility. If you fail to complete the above maintenance in a timely manner, please be advised that the City of Wilmington reserves the right to complete the maintenance, and assess the owner for any costs or damages incurred. You will be notified if the City chooses to pursue this action.

Please inform this office of the date when work is completed, and if you should have any questions or comments concerning these items or future maintenance issues, please feel free to contact me at (910) 341-4694.

Inspected by: Jim Quinn Title: Stormwater Specialist

Summary of Plan Review Activities

Project Name	Project Type	Permit #	Permit Issue Date	Type of BMP	Pervious (Y or N)	# of BMPs Onsite	Notes
Tiburon Parc Apts. Phase II	SWP offsite	2013020R2	7/13/2015	Offsite Pond	N	0	Tiburon Parc pond (City)
Carolian Marina Terminal Storage Domes	SWP HD	2005018R2	7/13/2015	Wet Pond	N	1	
Live Oak Bank Flytrap Parking	SWP offsite	2011034R2	7/13/2015	Offsite Pond	N	0	Tiburon Parc pond (City)
Enviva Wood Pellet Storage Facility	SWP HD	2014026R1	7/17/2015	infiltration	N	3	3 infiltration basins
NHC ABC Facility Expansion	Drain Plan	2015019	7/24/2015	None	N	0	
Bragg Rd Development (Publix)	SWP HD	2015020	8/7/2015	Wet Pond	N	1	
Riverlights Marina Village	SWP HD	2015021	9/3/2015	infiltration	Y	3	3 Infiltration Trenches & PC
Decks and Docks Expansion	Drain Plan	2015025	9/10/2015	None	N	0	
Airlie Offices	SWP HD	2015026	9/10/2015	infiltration	Y	1	Infiltration Basin & PC
Wrightsville Manor	Drain Plan	2015027	9/10/2015	None	N	0	
Port of Wilmington Cold Storage (PWCS)	Redevopment	2015023	9/10/2015	None	N	0	
Wilmington Tire & Auto	SWP HD	2015029	9/18/2015	Wet Pond	N	1	
Hoggard HS Recreation Building	Drain Plan	2015028	9/18/2015	None	N	0	
Mayfaire Flats I (aka Westfall Park Apartments)	SWP offsite	2015030	9/21/2015	Offsite Pond	Y	0	Westfall Pond 4 (State)
Seagate Landing	Drain Plan	2015032	9/23/2015	None	N	0	
Aspen Heights	SWP HD	2015033R1	9/30/2015	Wet Pond	N	1	
Vertex Railroad Phase I	SWP HD	2015036	10/12/2015	Wet Pond	N	1	
Stone Garden	Drain Plan	2015031R1	10/20/2015	None	N	0	
Phoenix MART	SWP offsite	2015038	10/20/2015	Offsite Pond	N	0	Silverstream Pond (State)
Echo West	SWP HD	2015037	10/20/2015	Wet Pond	N	3	
Annexe at the Reserve	SWP HD	2015035	10/20/2015	infiltration	Y	3	Infiltration via PC
Smithfield's BBQ S 17th	SWP offsite	2007007R1	10/23/2015	Offsite Pond	N	0	Fulton Station (State)
Tongue and Groove Office	Drain Plan	2015022	10/27/2015	None	N	0	
Barclay West (aka Gallery Park Blvd)	SWP HD	2014013R2	11/1/2015	Wet Pond	N	1	
Riverlights Age Qualified Ph1	SWP HD	2015034	11/1/2015	Wet Pond, Infiltration	N	5	2WP, 3 Infiltration
Bojangles- S. College Rd	SWP HD	2015039	11/1/2015	Wet Pond	N	1	
South Front II (aka Block Apartments)	Drain Plan	2015040	11/5/2015	None, except PC	Y	0	
Carolina Marine Terminal Storage Domes	SWP HD	2005018R3	11/30/2015	Wet Pond	N	1	
Cornerstone Industrial Park	Drain Plan	2016002	1/11/2016	None	N	0	
The Parker Building	Drain Plan	2015042	1/13/2016	None, except PC	Y	0	
Sea Pines Apartment	SWP HD	1997062R1	1/15/2016	Wet Pond, Infiltration	N	2	1 WP, 1 Infiltration Basin
Gallery Park Commercial (aka the Pointe at Barclay)	SWP offsite	2016004	1/15/2016	Offsite Pond	N	0	Barclay West Pond (City)
NHRMC Additional Parking (Glen Meade Lot)	SWP offsite	2016003	1/19/2016	Offsite Pond	N	0	Silverstream Pond (State)
Sweeney Water Plant Parking	SWP HD	2008035R1	2/1/2016	Dry Ponds	N	5	Ex State permit, transferred to City
Ocean Blue Pools & Spas	Drain Plan	2016005	2/2/2016	None	N	0	
Wrightsville Beach Brewery	SWP HD	2016008	2/4/2016	infiltration	Y	1	Infiltration trench & PC
AutoZone Oleander	SWP HD	2016007	2/5/2016	infiltration	Y	1	Infiltration Basin & PC
Reed's Jewelry Expansion	Drain Plan	2016009	2/11/2016	None	N	0	
Vision Dr Retail	Drain Plan	2016006	2/16/2016	None	N	0	
Audi Wilmington Drainage Improvement	No Permit Req'd	2012013R1	2/17/2016	None	N	0	exp of site w no new BMP's
Cambridge Village Ph II	SWP HD	2012004R2	2/19/2016	Wet Pond, SW Wetlands	Y	5	2 WP, 3 SW Wetlands & PC
Greenfield FDS	SWP HD	2016011	2/23/2016	infiltration	N	1	
Echo Farms Apartments	SWP HD	2016010	3/3/2016	Wet Pond, Infiltration	Y	2	1 WP, 1 Infiltration Basin & PC
Riverlights Conventional Ph1	SWP HD	2016012	3/7/2016	Wet Pond, Infiltration	N	5	1 WP, 4 infiltration basins
DREAMS Parking Lot Exp	Drain Plan	2016001	3/9/2016	None permitted	N	0	voluntary BMP's onsite, not req'd by permit
Public Library Story Park	Drain Plan	2016013	3/14/2016	None	N	0	
Kenan Chapel at Landfall	SWP LD	2000003R2	3/18/2016	Dry Pond	Y	1	Pond for detention only
South Front II (aka Block Apartments)	SWP HD	2015040R1	3/21/2016	None, except PC	Y	0	
Riverlights Marina Village Ph 1B	SWP HD	2015021R1	3/22/2016	infiltration	Y	5	2 new (5 total) infiltration trenches & PC
Lakeside Reserve (aka Good Shepherd)	SWP HD	2016014	3/30/2016	Wet Pond	N	1	
Dungannon Village-Autumn Hall	SWP HD	2016015	4/27/2016	Offsite Pond	N	0	Autumn Hall, Pond B (State)
Bayside Elec Exp	Drain Plan	1999028r1	4/29/2016	Ex wet Pond	N	1	Existing Wet Pond
Zimmer Cancer Renovation	SWP offsite	2016016	5/6/2016	Offsite Pond	N	0	Silverstream Pond (State)
Intracoastal Seafood	Drain Plan	2016017	5/25/2016	None	N	0	
Sea Sell Auto	SWP HD	2016018	5/25/2016	infiltration	N	1	Infiltration trench with storage basin
Seahawk Cove	SWP HD	2016019	5/26/2016	infiltration	N	4	3 Infiltration trenches, 1 Infiltration basin
Riverlights Conventional PhI, IA & II	SWP HD	2016012R1	5/27/2016	Wet Pond, Infiltration	N	8	2 WP, 6 Infiltration basins
Hoggard HS Exp	SWP HD	2015028R1	6/13/2016	infiltration	N	1	Infiltration trench
Circle K	SWP offsite	2016020	6/15/2016	Offsite Pond	N	0	Independence Ventures Pond (City)

APPENDIX G: POLLUTION PREVENTION & GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

Form G-7

Sheet 1 of 1

EMPLOYEE TRAINING CHECKLIST

TRAINING TOPIC	SCHEDULE	ATTENDEES
NPDES PERMIT REQUIREMENTS Purpose of NPDES Program Permit Conditions	Annually	Members of Pollution Prevention Team
STORMWATER POLLUTION PREVENTION PLAN Purpose of SPPP Identification of potential pollutant sources Methods to reduce pollutants in stormwater Best Management Practices	Annually	Members of Pollution Prevention Team
SPILL PREVENTION AND RESPONSE PLAN Identification of potential spill areas Location of potential pollutant sources Spill response team Spill response procedure Spill response equipment Spill reporting procedure	Annually	All employees (other than administrative)
PREVENTATIVE MAINTENANCE Identify equipment (if any) Facility inspection requirement and schedule Documentation	Annually	All employees (other than administrative)
GOOD HOUSEKEEPING PROGRAM Regular cleanup procedures Material storage practices Facility inspection requirement and schedule Documentation	Annually	All employees (other than administrative)

The employee signature below indicates completion of the Stormwater Pollution Prevention training program.

Employee Signature: _____

Type/Print Employee Name and Title: JOHN P. FORTUIN

Date Training Received: 8/12/16

Instructor: _____

APPENDIX H: TOTAL MAXIMUM DAILY LOADS (TMDL)

Bradley & Hewletts Creek Watershed Restoration Plan

- Heal Our Waterways Program
- Cumulative Year End Reports for Contractual/Cooperative Agreements with:
  - New Hanover Soil & Water Conservation District (HOWBMP)

DATE OF EVENT/ ACTIVITY	EVENT/ACTIVITY	AUDIENCE	DELIVERED BY (AGENCY)	METHOD OF DELIVERY / MESSAGE	ATTENDANCE/ PARTICIPATION
Presentations					
10/12/2015	Presentation: UNCW Environmental Policy Class	Undergraduate students	Heal Our Waterways	Enviroscape presentation	20 students
12/15/2015	Presentation: Trask Middle School	8th Graders	Heal Our Waterways	Enviroscape presentation	29 students
2/23/2016	Presentation: Noble Middle School	8th Graders	Heal Our Waterways	Enviroscape presentation	32 students
3/23/2016	Presentation: Surfrider Foundation	Surfrider Foundation Members and General Public	Heal Our Waterways	1 hr Powerpoint Presentation about HOW Program, BMPs, Stewardship	41 people
4/13/2016	Presentation: Myrtle Grove Middle School	8th Graders	Heal Our Waterways	Enviroscape presentation	24 students
4/28/2016	Watershed Plan Workshop hosted by NCCF/TOWB	Stormwater and Engineering Professionals from NC, SC, GA, and FL	Heal Our Waterways NCCF NC DEQ Withers and Ravenel Moffatt & Nichol	Full day of presentations about watershed management plan creation - Mostly centered around Bradley and Hewletts Creeks Watershed Management Plan	37 people
5/10/2016	Windward Oaks Community Homeowners Meeting	Windward Oaks Subdivision Homeowners	Heal Our Waterways	2.5 hr Community Forum with HOW Program and BMP Info presented	50 people
5/16/2016	Presentation: UNCW Film Studies Class	Undergraduate students	Heal Our Waterways Stormwater Services	HOW oral presentation	15 students
5/26/2016	Presentation: 319 Grant Interview - HOW Program Information	DEQ Employees EPA Employees Other relevant professionals	Heal Our Waterways NCCF	20 minute Powerpoint Presentation	18 people
Informational Website					
Ongoing	Heal Our Waterways Informational Website healourwaterways.org	Watershed residents Interested public	Heal Our Waterways	Dedicated Heal Our Waterways website	HOWBMP Project info Stormwater education BMPs Volume Reduction Participation links
It should be noted that the original Heal Our Waterways website was under constant attack by hackers this year, so it has been temporarily moved to the city of Wilmington's main website. Because of this temporary migration, it has not been regularly updated, nor promoted to the public for much of the year. The HOW website will be fully redesigned and functional in fall of 2016.					
Social Media Campaigns					
Ongoing	Twitter site campaign	Twitter followers Interested public	Heal Our Waterways	Dedicated Heal Our Waterways site	Currently have 193 "followers"
Ongoing	Facebook site campaign	Facebook followers Interested public	Heal Our Waterways	Dedicated Heal Our Waterways site	Currently have 79 "likes"

Media Campaigns

Ongoing	City of Wilmington YouTube.com Channel	YouTube.com viewers	WECT staff	Downspout disconnection public service announcement with local celebrity news anchor, Jon Evans	Inform public about re-routing downspouts to let water soak in, instead of run off
April - June 2016	WECT TV-6	Web and mobile viewers	WECT	Web and mobile platforms: Video Ads Skyscraper Ads Mobile Ads Video Pre-roll Ads	Target Audience: General public, homeowners TV Reach: 74% for viewers age 35-64 WECT.com Web & Mobile Reach: 250,000 unique visitors per month and 1.9 million average page views per month Total cost: $3900
March - June 2016	WHQR Radio 91.3 FM	Radio Listeners	WHQR	Local NPR affiliate underwriting message twice every weekday at peak drivetime hours	Target Audience: General public, homeowners Reach: 40,000 listeners per week Total cost: $3640

Local Cable Access (GTV-8)

Airs on rotating schedule	GTV-8 City's cable access channel	Cable access TV viewers	WECT staff GTV-8 staff	:30 second PSA with local celebrity news anchor from WECT, Jon Evans	Inform public about re-routing downspouts to let water soak in, instead of runoff

News Coverage

October 2015	Stormwater Magazine Article	Stormwater Professionals	Stormwater Magazine	Print and Digital - Informational Article on Wilmington area stormwater efforts - "Stormwater Management in Coastal North Carolina"	Approx.54,000 readers per issue
1/13/2016	Lumina News article	Print & online readers	Reporter Emmy Errante	Print and digital article - Coastal fed works with Blockade Runner to reduce stormwater runoff	Wilmington and Wrightsville Beach-area readership - 3,500 copies printed with 18 thousand readers per month and 20 thousand additional readers online
March 2016	WECT-TV6 news story	Station viewers	Reporter Stacey Pinno	TV and online news coverage - BMP and Heal Our Waterways Program presentation to Surfrider Foundation members and General Public	Stats: -WECT-TV6 reaches 176,000 homes/per wk -WECT.com has 250,000 average unique visitors per month and 1,200,000 average page views per month

Local Cable Access (GTV-8)

Airs on rotating schedule	GTV-8 City's cable access channel	Cable access TV viewers	WECT staff GTV-8 staff	Downspout disconnection public service announcement with local celebrity news anchor Jon Evans	Inform public about re-routing downspouts to let water soak in, instead of runoff

Distributing promos/giveaways

2/25/2016	Lower Cape Fear Stewardship Development Awards	Awards ceremony attendees	Heal Our Waterways	Display booth, educational giveaways distributed - pens, watershed maps, brochures, cups, bumper stickers	90 attendees
4/22/2016	UNCW "Our Green Future" Event	Event particpants Students	Heal Our Waterways	Display booth, educational giveaways distributed - pens, watershed maps, brochures, cups, bumper stickers	65 attendees
4/23/2016	Lower Cape Fear Earth Day Celebration at Hugh MacRae Park	Festival Attendees General public	Heal Our Waterways (annual sponsor)	Display booth, interactive game, and educational giveaways distributed. Focus: Pet Waste & Program exposure	Approx 6000
5/10/2016	Windward Oaks Homeowners Meeting	Windward Oaks Subdivision Homeowners	Heal Our Waterways	Pens, Watershed maps, brochures, cups, bumper stickers	50 attendees

Grant Projects

Awarded 8/2015	EEG grant	Hewletts Creek	Heal Our Waterways NCCF NCSU	Property acquisition, outreach, and design/ installation and volume reduction BMPs in the Hewletts Creek Watershed	BMP to be installed on City-owned property on Lynnwood Drive
Awarded 8/2014	EPA 319 grant	Hewletts Creek	Heal Our Waterways NCSU	Outreach and design/ installation of 6 volume reduction BMPs in the Hewletts Creek Watershed	BMPs to be installed in Hewletts Creek Watershed on public and private properties
Applied 4/2016	EPA 319 grant	Hewletts Creek Bradley Creek	Heal Our Waterways NCCF	Design, installation and outreach 12 BMP volume reduction practices in the Hewletts and Bradley Creek Watersheds	BMPs to be installed in Hewletts and Bradley Creek Watersheds on public and private properties

Employee Trainings Delivered

12/7/2015	Stormwater Presentation for Maintenance Field Crew	Stormwater Services- Closed Drainage Crew	Heal Our Waterways staff Stormwater Services Education staff	Stormwater and Illicit Discharge Enviroscape presentation	13 attendees
12/7/2015	Stormwater	Stormwater	Heal Our Waterways	Stormwater and	14 attendees

	Presentation for Maintenance Field Crew	Services Street-Sweeping Crew	staff Stormwater Services Education staff	Illicit Discharge Enviroscape presentation	
12/9/2015	Stormwater Presentation for Maintenance Field Crew	Stormwater Services- Open Drainage Crew	Heal Our Waterways staff Stormwater Services Education staff	Stormwater and Illicit Discharge Enviroscape presentation	12 attendees
12/9/2015	Stormwater Presentation for Maintenance Field Crew	Stormwater Services- BMP Crew	Heal Our Waterways staff Stormwater Services Education staff	Stormwater and Illicit Discharge Enviroscape presentation	6 attendees

Watershed Coordinator Training and Networking Events

2/2/2016	NCSU Rain Garden Training	Landscape Professionals	Heal Our Waterways	Program discussion	18 professionals
2/8/2016	North Carolina Water Resources Association Luncheon	Statewide Water Professionals	NC DEQ Employees	Powerpoint presentation	61 people
2/9/2016	EPA Webinar: Greening Vacant Lots	Low impact development professionals nationwide	EPA Employees	Webinar	124 people
2/18/2016	EPA Webinar: The Business of Sustainability	Sustainability/low impact development professionals nationwide	Michigan Department of Environmental Quality	Webinar	77 people
3/17/2016 & 3/18/2016	NC Water Resources Research Institute Annual Conference	Statewide Water Professionals	Various water-related professionals	Powerpoint presentations	Approx. 350 people
4/5/2016	EPA Webinar: Soak Up the Rain Webinar	Low impact development professionals nationwide	EPA Employees	Webinar	65 people
5/19/2016	Tree Planting Training	Watershed Coordinator	City of Wilmington Horticulturist	Hands-on interactive	65 people
5/25/2016	Cape Fear Public Utility Authority facilities tour	Watershed Coordinator, Education Program Manager, and CFPUA employees	CFPUA	Guided educational facilities tour	10 people

Citizen Contacts- Public Interaction

10/1/2015	Clear Run Branch Public Meeting Forum	Watershed residents	Heal Our Waterways	BMP and program discussion with homeowners	12 homeowners
1/11/2016	Private Citizen contact: Windward Oaks Neighborhood	Watershed resident	Heal Our Waterways/NC Cooperative Extension	Rain garden certification class site visit and homeowner consultation	1 homeowner
1/28/2016	Private Citizen contact: Windward Oaks Neighborhood	Watershed resident	Heal Our Waterways	Rain garden consultation	1 homeowner
2/16/2016	Private Citizen contact: Glenn Meade Neighborhood	Watershed resident	Heal Our Waterways	Discussed upcoming neighborhood BMP with adjacent homeowner	1 homeowner

2/26/2016	Private Citizen contact: Windward Oaks Neighborhood	Watershed resident	Heal Our Waterways	Discussion with rain garden class site homeowner about rain garden	1 homeowner
3/14/2016	Private Citizen contact: 42nd Street	Watershed resident	Heal Our Waterways/NHSWCD	Discussion with homeowners about potential backyard wetland	2 homeowners
3/22/2016	Private Citizen contact: Stormwater Services Office	Wilmington Resident	Heal Our Waterways	Concerned citizen visited office to inquire about program involvement	1 homeowner
4/8/2016	Private Citizen contact: Braxlo Lane	Wilmington Resident	Heal Our Waterways/NHSWCD	Homeowner consultation for potential rain garden installation	1 homeowner
5/5/2016	Private Citizen contact: Windward Oaks Neighborhood	Wilmington Resident	Heal Our Waterways	Met to discuss downspout disconnection opportunities	2 homeowners
6/24/2016	Site visits with NHSWCD (All raingardens installed last year with HOWBMP)	Hewletts Creek Residents	Heal Our Waterways/NHSWCD	Met with homeowners to assess and discuss maintenance of raingardens	4 homeowners

Watershed Resident Mailings

11/7/2015	Targeted direct mail	Residents in Bradley & Hewletts Creek Watersheds and ICW direct drainage areas	Heal Our Waterways	Sediment postcard	17,897 mailings to inform residents of proper sediment disposal, turbidity issues, and related fines
5/9/2016	Targeted direct mail	Residents in Bradley & Hewletts Creek Watersheds and ICW direct drainage areas	Heal Our Waterways	Litter postcard	16,397 mailings to inform residents of proper litter disposal, cleanup issues, and related fines

BMP Projects Installed

February 2016	Lindgren Raingarden - Windward Oaks Neighborhood	Hewletts Creek Watershed	NC Cooperative Extension Residential Raingarden Certification Class	Collect runoff from neighborhood sub-watershed and provide onsite infiltration and volume reduction	Total volume reduction: 121.2 cu ft.

NEW HANOVER SOIL & WATER CONSERVATION DISTRICT
230 Market Place Drive, Suite 100
Wilmington, NC 28403

HOWBMP Quarterly Progress Report #4: April 1 - June 30, 2016

NHSWCD mission is to protect and enhance water quality throughout New Hanover County through land conservation, stormwater management, technical support to citizens and organizations, and conservation education and outreach activities.

To achieve this mission, NHSWCD has contract relationships with city, county, and state organizations. These partnerships enable NHSWCD to deliver enhanced water quality projects and programs, as well as professional technical assistance to citizens and businesses.

Scope of Services

New Hanover Soil & Water Conservation District will serve as a project manager for the Heal Our Waterways Program- Best Management Practice (BMP) Installations (HOWBMP) Program. The HOWBMP Program supports the Bradley & Hewletts Creek Watershed Restoration Plan with the goal of reducing polluted stormwater runoff into the creeks in order to improve water quality.

NHSWCD will provide project management and oversight for the installation of BMPs in conjunction with the Heal Our Waterways program. 'Project management' includes the execution of a BMP project from start to finish including collaboration, current owner title search, obtaining HOA covenants/restrictions/permits, budgeting, technical assistance, design & engineering, permitting, contracting, construction, homeowner/business/media relations, selection and reimbursement of contractors and monitoring.

BMPs will be identified in collaboration with the City and the GIS Atlas for the purpose of reducing runoff volume into Hewletts Creek, Bradley Creek, and the designated project areas draining directly into the Intracoastal Waterway. A potential BMP project's location, type, and proposed budget will require authorization from City Stormwater Services prior to any design or contracted work.

A recommended minimum of 2 volume-reduction BMPs and 8 downspout reroutes on private property will be installed during the contract period. However, collaboration and approval from the city would allow flexibility for unexpected project opportunities to deviate from the recommend minimum.

For each BMP project, NHSWCD will provide the city with the necessary project information to enter into the GIS Atlas to track volume reduction of stormwater runoff entering Hewletts and Bradley Creeks.

Monitoring, or spot-checks, of completed BMP installations will be performed annually by NHSWCD for compliance. Monitoring will be required for five years for residential sites, and ten years for commercial or municipal BMP sites.

The BMP installations will be funded by the city with a lump-sum allocation of $20,000 to NHSWD at the beginning of the contract period. Any unused funds from this allocation will be reimbursed to the city at the end of contract period. NHSWCD will also reimburse the city for any returned funds from non-compliant property owners. NHSWCD will issue necessary 1099 tax forms to property owners that receive funded BMPs.

Reporting

Quarterly progress reports and invoices will be submitted in accordance with the following provisions:

Copies of invoices for BMP installations will be provided to the city with quarterly reports/invoices.

Quarterly reports and invoices for contract fees are due within 10 days of the quarter end date and will follow templates and instructions set forth by Stormwater Services. Reports and invoices that do not follow templates/instructions will be returned for correction; payment will be processed once updated reports and invoices are received, reviewed, and approved. Payment will be made within 30 days after receipt of an approved invoice.

Submit cumulative quarterly progress reports for work performed according to the following quarters: July 1 - Sept 30; October 1 - Dec. 31; January 1 -March 31; April 1 - June 30. The 4th quarter progress report will serve as a compiled year end summary report.

The quarterly invoice should use the supplied template which shows the % of each service completed each quarter, invoice amount, and amount remaining to be paid. Invoices will be paid once quarterly progress report and invoice are received and reviewed by the City for adequate progress. Non-performance or inadequate progress may result in non-payment. No pre-payment of services will occur.

NHSWCD will maintain all records, reports, and invoices related to this contract on a fiscal year (FY) basis (July 1-June 30). These records should be retained for a period of at least 5 years. In addition, an annual compilation CD or DVD copy will be provided to the City of Wilmington Stormwater Services by July 10th for the prior FY. These files are public record and should be accessible.

Fee Schedule

Lump Sum: NHSWCD shall receive a lump sum of **$20,000** upon execution and approval of this contract to specifically fund Best Management Practice (BMP) installations in the Hewletts and Bradley Creek Watersheds. Copies of invoices for these BMP installations will be provided to the City with quarterly reports/invoices.

Contract Fee: NHSWCD shall provide quarterly reports and invoices according to the schedule defined in Reporting for the total fee amount of **$7,318** to execute the HOWBMP program.

Total Cost: The total cost of the Project shall not exceed **$27,318** without written approval of the City. Such approval shall be in the form of a written amendment to this Agreement approved by the City Manager or City Council, if required, and signed by the parties.

July 1 - September 30, 2015
Scheduled collaborative meeting with City of Wilmington Stormwater staff to edit current HOW documents and summarize successes and changes for next year.

October 1 - December 31, 2015
Reviewed site visit check list as well as application form for future HOW applicants. Also attended Watershed planning workshop to gather idea on how to more effectively implement HOW program.

January 1 - March 31, 2016
Completed site visit to home in Hewletts Creek Watershed. Completed a draft of RFP for contractors to implement BMPs for home owners.

April 1 - June 30, 2016
Completed site visit to non-profit in Bradley Creek located at the corner of Racine Drive & Randall Parkway. Designed site for 2 rain gardens. Group wants to be involved with installation. Completed spot checks of 2015 BMPs installed 6/24/16. Spot checks were completed at all five installations from the previous year at the Blue, Biddle, Long, Knolls, and Gibson households. Pictures were taken to document the progress of the areas. Blue and Knolls rain gardens needed some maintenance, and homeowners were informed of such.

Report compiled by: Dru Harrison **Date:** 6/30/16

APPENDIX I: REGULATORY ENFORCEMENT ACTIONS

In 15-16 the Public Services Department Compliance Officer provided stormwater education and investigated approximately 54 requests. The majority were reports of illicit discharges to the storm drainage system followed by reports of violation of the Pet Waste section of the Stormwater Ordinance. The following table is a detail summary of the requests for compliance intervention for stormwater pollution issues.

ENFORCEMENT ACTIONS 2015-2016
Reporting period (FY16) July 1, 2015- June 30, 2016

Nature of Complaint	Number of Reports	Resolved thru Public Educ	NOVs Incidents	Referred to DWQ	# Civil Penalties
Pet Waste	10	100%	0	N/A	0
Outreach	5		0	N/A	N/A
Illicit Discharge/Sediment	39	92.3%	3	3	0
Illicit Connection	*1*	*100.0%*	*0*	*0*	*0*
Dry Weather Flow	*0*	*0.0%*	*0*	*0*	
SSO	*9*	*100.0%*	*0*	*0*	*0*
Totals for 1,2 and 3	54	94%	3	3	0

CIVIL PENALTIES 2015-2016

Nature of Compliant	Responsible Party	Address of violation	Date of Violation	Total Penalty
N/A	N/A	N/A	N/A	$0.00

DEFINITIONS: Nature of Complaint

Illicit Discharge/Sediment (Part 1, Sec. 12-22)

Complaints include reports of illicit discharges as defined by the ordinance. Reports include allowable as well as illegal discharges which is determined after the investigation is completed. Assessment when completed prescribes corrective action and can sometimes elevate to enforcement. All resolution of an incident typically includes education provided to the responsible party regarding stormwater pollution and awareness of the city ordinance as well as the potential fines for non-compliance and repeat offenders. Written NOVs are issued for serious offences.

Illicit Connection (Part 1, Sec. 12-23)

Reports are the result of an illicit connection that impacted the City's stormwater system with an illegal discharge. Assessment when completed prescribes corrective action and can sometimes elevate to enforcement. All resolution of an incident typically includes education provided to the responsible party regarding stormwater pollution and awareness of the city ordinance as well as

the potential fines for non-compliance and repeat offenders. Written NOVs are issued for serious offences.

SSO (Part 1, Sec.12-24)

Sewer overflows from the CFPUA system, both reportable and not reportable. Process is described in Illicit Discharge Section. Resolution of the incident also includes reviewing the DWQ SSO reporting form for cause and ensuring distribution of educational material pertaining to preventing grease related spills to residents near and contributing to the incident.

Pet Waste (Part 2, Sec. 12-28)

The pet waste complaint category included any report of violation of the City's Pet Waste Ordinance. These complaints which are reported by citizens or city employees, due to their nature, may not be substantiated after the investigation. Resolution of an incident includes distributing educational material to all parties involved on the adverse health effects of pet waste pollution, and prevention, as well as the City's ordinance requirements and the potential fines for violations.

Blockages (Part 2, Sec. 12-29)

Blockage reports include any complaint reported which were thought to have the potential to impede the flow of stormwater in the City's maintained drainage system. Resolution of the incident includes education to citizens involved directly or within the immediate area of the incident explaining how to prevent willful blockages of the stormwater system.

Yard Waste (Part 2, Sec. 12-29)

Yard waste complaints include calls the City received reporting violations of the City's stormwater ordinance which prohibits the intentional raking, sweeping, blowing, washing, directing or placing of yard waste into any part of the public drainage system which might impede the flow of water through the system or compromise water quality. Resolution of an incident includes removal of debris and distribution of educational material and/or explanation of the ordinance with the possible fines.

APPENDIX J: MAJOR OUTFALL LOCATIONS AND DESCRIPTION TABLE

Watershed	Latitude	Longitude	Size	Material	Number	Classification	Map Date	Condition
Barnards Creek	34.15865	-77.91188	6.0 X 8.0	RCP	Double	NPDES outfall found	2/20/2012	Good
Barnards Creek	34.16482	-77.92585	60	RCP	Double	NPDES outfall found	2/20/2012	Good
Barnards Creek	34.16657	-77.92957	60	RCP	Triple	NPDES Industrial outfall found	11/21/2011	Good
Barnards Creek	34.16113	-77.93105	42	RCP	Single	NPDES outfall found	11/2/2011	Good
Barnards Creek	34.16134	-77.93815	18	RCP	Quad	NPDES Industrial outfall found	11/14/2011	Good
Bradley Creek	34.20898	-77.83556	3.0 X 5.0	RCP	Single	NPDES outfall found	1/6/2012	Good
Bradley Creek	34.21320	-77.82715	2.0 X 4.0	RCP	Single	NPDES outfall found	8/29/2000	Good
Bradley Creek	34.21952	-77.84568	90	CAP	Double	NPDES outfall found	1/13/2012	Good
Bradley Creek	34.21911	-77.85177	72	CMP	Double	NPDES outfall found	1/13/2012	Good
Bradley Creek	34.20939	-77.83654	54	RCP	Single	NPDES outfall found	1/6/2012	Good
Bradley Creek	34.23066	-77.85234	54	CMP	Double	NPDES outfall found	1/13/2012	Good
Bradley Creek	34.23284	-77.84028	54	CMP	Double	NPDES outfall found	1/13/2012	Good
Bradley Creek	34.21585	-77.82498	48	CMP	Single	NPDES outfall found	1/31/2012	Good
Bradley Creek	34.21997	-77.86130	42	CMP	Single	NPDES outfall found	1/13/2012	Good
Bradley Creek	34.22630	-77.85231	42	CMP	Single	NPDES outfall found	1/13/2012	Good

Bradley Creek	34.20829	-77.83101	36	RCP	Single	NPDES outfall found	1/6/2012	Fair
Bradley Creek	34.20899	-77.83554	36	CMP	Single	NPDES outfall found	1/6/2012	Poor
Bradley Creek	34.20900	-77.83553	36	CMP	Single	NPDES outfall found	1/6/2012	Fair
Bradley Creek	34.21669	-77.83399	30	CMP	Single	NPDES outfall found	1/31/2012	Fair
Bradley Creek	34.21427	-77.83470	24	RCP	Single	NPDES outfall found	1/13/2012	Good
Bradley Creek	34.21440	-77.83926	24	RCP	Double	NPDES outfall found	1/13/2012	Good
Bradley Creek	34.22066	-77.83784	24	RCP	Single	NPDES outfall found	1/31/2012	Good
Burnt Mill Creek	34.22878	-77.90517	11.0 X 12.0	RCP	Double	NPDES outfall found	2/28/2012	Good
Burnt Mill Creek	34.22870	-77.88923	5.0 X 6.0	CMP	Double	NPDES outfall found	2/28/2012	Good
Burnt Mill Creek	34.24617	-77.93366	72	SMP	Single	NPDES outfall found	2/28/2012	Fair
Burnt Mill Creek	34.23148	-77.91302	66	RCP	Single	NPDES outfall found	11/24/2010	Good
Burnt Mill Creek	34.24430	-77.92571	60	RCP	Single	NPDES outfall found	9/29/2010	Good
Burnt Mill Creek	34.23402	-77.91972	54	RCP	Single	NPDES outfall found	10/26/2010	Good
Burnt Mill Creek	34.23232	-77.91568	42	RCP	Double	NPDES outfall found	11/9/2010	Good
Burnt Mill Creek	34.23397	-77.91877	42	RCP	Single	NPDES outfall found	11/24/2010	Good
Burnt Mill Creek	34.23989	-77.92258	36	RCP	Single	NPDES outfall found	10/5/2010	Good
Burnt Mill Creek	34.24025	-77.92318	36	RCP	Single	NPDES outfall found	10/5/2010	Good

Burnt Mill Creek	34.25344	-77.92354	30	RCP	Double	NPDES outfall found	3/2/2012	Good
Drains directly to ICW	34.19570	-77.83301	48	RCP	Single	NPDES outfall found	1/6/2012	Good
Drains directly to ICW	34.19629	-77.82915	48	RCP	Single	NPDES outfall found	1/6/2012	Good
Drains directly to ICW	34.22229	-77.81978	48	IRON	Single	NPDES outfall found	1/17/2012	Good
Drains directly to ICW	34.22234	-77.81985	48	IRON	Single	NPDES outfall found	1/17/2012	Good
Drains directly to ICW	34.19503	-77.83000	36	RCP	Single	NPDES outfall found	11/22/2011	Good
Drains directly to ICW	34.19904	-77.82758	36	RCP	Single	NPDES outfall found	1/6/2012	Good
Drains directly to ICW	34.22121	-77.81566	36	RCP	Single	NPDES outfall found	1/17/2012	Good
Drains directly to ICW	34.22432	-77.81658	30	CMP	Single	NPDES outfall found	1/17/2012	Good
Drains directly to ICW	34.22433	-77.81659	30	CMP	Single	NPDES outfall found	1/17/2012	Good
Drains directly to ICW	34.22432	-77.81658	24	CMP	Single	NPDES outfall found	1/17/2012	Good
Drains directly to ICW	34.16461	-77.85628	2.5 X 5.0	CMP	Single	NPDES outfall found	7/19/2011	Fair
Greenfield Lake	34.19852	-77.93558	4.0 X 6.0	CMP	Triple	NPDES outfall found	2/22/2012	Good

Greenfield Lake	34.20094	-77.93381	60	RCP	Double	NPDES outfall found	2/22/2012	Good
Greenfield Lake	34.21255	-77.93161	60	CMP	Quad		2/22/2012	Good
Greenfield Lake	34.21429	-77.93563	48	RCP	Single	NPDES outfall found	2/23/2012	Good
Greenfield Lake	34.20127	-77.93568	42	RCP	Double	NPDES outfall found	2/22/2012	Good
Greenfield Lake	34.19964	-77.93615	36	RCP	Single	NPDES outfall found	2/22/2012	Good
Greenfield Lake	34.20462	-77.93537	36	RCP	Single	NPDES outfall found	2/22/2012	Good
Greenfield Lake	34.20751	-77.92997	30	RCP	Triple	NPDES outfall found	2/22/2012	Good
Hewletts Creek	34.18153	-77.86851	5.0 X 16.0	OTHER	Other	NPDES outfall found	11/17/2011	Good
Hewletts Creek	34.18020	-77.87198	90	CMP	Single	NPDES outfall found	11/3/2011	Good
Hewletts Creek	34.19421	-77.85211	60	CMP	Single	NPDES outfall found	11/21/2011	Fair
Hewletts Creek	34.17296	-77.85090	48	RCP	Double	NPDES outfall found	7/28/2011	Good
Hewletts Creek	34.18735	-77.85761	48	RCP	Single	NPDES outfall found	11/3/2011	Good
Hewletts Creek	34.19359	-77.85549	48	RCP	Triple	NPDES outfall found	11/18/2011	Good
Hewletts Creek	34.17112	-77.85107	42	RCP	Single	NPDES outfall found	7/19/2011	Good
Hewletts Creek	34.17879	-77.86842	42	RCP	Single	NPDES outfall found	2/16/2001	Good
Hewletts Creek	34.19498	-77.85447	42	RCP	Double	NPDES outfall found	11/18/2011	Good
Hewletts Creek	34.19680	-77.84352	42	CMP	Single	NPDES outfall found	11/22/2011	Fair

Hewletts Creek	34.20042	-77.86258	42	CMP	Single	NPDES outfall found	11/8/2011	Fair
Hewletts Creek	34.18468	-77.85373	36	RCP	Single	NPDES outfall found	2/26/2001	Good
Hewletts Creek	34.17878	-77.86844	30	RCP	Single	NPDES outfall found	11/7/2011	Good
Hewletts Creek	34.19419	-77.85209	18	RCP	Single	NPDES outfall found	2/6/2001	Good
Hewletts Creek	34.19430	-77.88617	2.0 X 4.4	RCP	Single	NPDES outfall found	2/24/2011	Good
Hewletts Creek	34.19471	-77.88822	6.0 X 8.0	RCP	Triple	NPDES outfall found	2/2/2011	Good
Hewletts Creek	34.19793	-77.88484	7.7 X 15.0	CAP	Single	NPDES outfall found	2/24/2011	Good
Howe Creek	34.24536	-77.82717	7.0 X 9.0	RCP	Double	NPDES outfall found	5/16/2007	Good
Howe Creek	34.25450	-77.82624	72	RCP	Single	NPDES outfall found	2/1/2012	Good
Howe Creek	34.24701	-77.82334	66	CMP	Single	NPDES outfall found	2/1/2012	Good
Howe Creek	34.24211	-77.82454	60	RCP	Single	NPDES outfall found	1/31/2012	Good
Howe Creek	34.24226	-77.82714	48	RCP	Single	NPDES outfall found	1/31/2012	Good
Howe Creek	34.24700	-77.82333	48	CMP	Single	NPDES outfall found	2/1/2012	Good
Howe Creek	34.26158	-77.82611	48	RCP	Single	NPDES outfall found	2/1/2012	Good
Howe Creek	34.24225	-77.82718	42	RCP	Single	NPDES outfall found	1/31/2012	Good
Howe Creek	34.25029	-77.82655	42	RCP	Single	NPDES outfall found	2/1/2012	Good
Howe Creek	34.25030	-77.82655	42	RCP	Single	NPDES outfall found	2/1/2012	Good

Howe Creek	34.24083	-77.82759	36	RCP	Single	NPDES outfall found	5/16/2007	Good
Howe Creek	34.24304	-77.82263	36	RCP	Double	NPDES outfall found	2/1/2012	Good
Howe Creek	34.24519	-77.82714	36	RCP	Single	NPDES outfall found	2/1/2012	Good
Howe Creek	34.24551	-77.82710	36	RCP	Single	NPDES outfall found	2/1/2012	Good
Howe Creek	34.24749	-77.82369	36	CMP	Single	NPDES outfall found	2/1/2012	Good
Cape Fear River	34.20807	-77.95086	10.0 X 10.0	RCP	Single	NPDES outfall found	3/15/2011	Good
Cape Fear River	34.21225	-77.94608	5.8 X 8.4	RCP	Triple	NPDES outfall found	3/25/2011	Good
Cape Fear River	34.19774	-77.95482	66	RCP	Single	NPDES Industrial outfall found	11/14/2011	Good
Cape Fear River	34.20913	-77.94735	48	RCP	Double	NPDES outfall found	4/1/2011	Good
Cape Fear River	34.18028	-77.95095	36	RCP	Single	NPDES Industrial outfall found	11/14/2011	Good
Cape Fear River	34.16995	-77.94822	30	RCP	Single	NPDES Industrial outfall found	11/29/2011	Good
Cape Fear River	34.21504	-77.94755	24	RCP	Single	NPDES Industrial outfall found	3/21/2011	Good
Cape Fear River	34.17135	-77.94984	18	RCP	Single	NPDES Industrial outfall found	2/21/2012	Good
Cape Fear River	34.17294	-77.94902	18	RCP	Single	NPDES Industrial outfall found	11/29/2011	Good
Cape Fear River	34.18391	-77.95205	18	RCP	Single	NPDES Industrial outfall found		Good
Cape Fear River	34.24197	-77.95273	3.0 X 10.0	RCP	Single	NPDES outfall found	6/10/2011	Good
Cape Fear River	34.21631	-77.94661	54	RCP	Single	NPDES Industrial outfall found	3/15/2011	Good

Cape Fear River	34.21646	-77.94663	54	RCP	Single	NPDES Industrial outfall found	4/11/2011	Good
Cape Fear River	34.22374	-77.95034	54	RCP	Single	NPDES outfall found	9/28/2009	Good
Cape Fear River	34.23969	-77.95146	48	RCP	Single	NPDES outfall found	5/27/2011	Inaccessible
Cape Fear River	34.24087	-77.95156	42	RCP	Single	NPDES outfall found	6/8/2011	Good
Cape Fear River	34.24089	-77.95155	42	RCP	Single	NPDES outfall found	6/8/2011	Good
Cape Fear River	34.24333	-77.95131	36	RCP	Single	NPDES outfall found	6/10/2011	Good
Cape Fear River	34.24991	-77.95037	36	RCP	Single	NPDES outfall found	6/14/2011	Good
Cape Fear River	34.25033	-77.94992	36	RCP	Single	NPDES outfall found	6/14/2011	Good
Cape Fear River	34.25729	-77.94434	36	RCP	Single	NPDES Industrial outfall found	6/10/2011	Good
Cape Fear River	34.24314	-77.95131	30	CPP	Single	NPDES outfall found	6/10/2011	Good
Cape Fear River	34.24977	-77.95055	30	RCP	Single	NPDES outfall found	6/14/2011	Good
Cape Fear River	34.25050	-77.94980	30	RCP	Single	NPDES outfall found	6/14/2011	Good
Cape Fear River	34.22764	-77.95054	24	CMP	Single	NPDES outfall found	5/16/2011	Good
Cape Fear River	34.22889	-77.94994	24	CMP	Single	NPDES outfall found	9/28/2009	Fair
Cape Fear River	34.24200	-77.95272	24	RCP	Single	NPDES outfall found	6/10/2011	Good
Cape Fear River	34.24319	-77.95121	24	CMP	Single	NPDES outfall found	6/10/2011	Fair
Cape Fear River	34.24964	-77.95067	24	RCP	Single	NPDES outfall found	6/14/2011	Good
Cape Fear River	34.25245	-77.94726	24	RCP	Single	NPDES Industrial outfall found	6/14/2011	Good

Cape Fear River	34.25728	-77.94432	24	RCP	Single	NPDES Industrial outfall found	6/10/2011	Good
Cape Fear River	34.24335	-77.95138	12	RCP	Single	NPDES outfall found	6/10/2011	Poor
Cape Fear River	34.25565	-77.94679	12	VCP	Single	NPDES Industrial outfall found	6/14/2011	Poor
Cape Fear River	34.23014	-77.94946	Inaccessible - submerged	RCP	Single	NPDES outfall	5/25/2011	Inaccessible
Smith Creek	34.25505	-77.87846	6.8 X 8.0	RCP	Single	NPDES outfall found	2/21/2012	Good
Smith Creek	34.25536	-77.87357	9.0 X 11.0	RCP	Double	NPDES Industrial outfall found	2/21/2012	Good
Smith Creek	34.25739	-77.94108	Not Found	UNKNOWN	Single	NPDES outfall submerged	2/28/2012	Unknown
Smith Creek	34.25711	-77.90656	7.0 X 8.0	RCP	Single	NPDES outfall found	2/21/2012	Good
Smith Creek	34.25756	-77.91249	6.0 X 7.0	RCP	Single	NPDES Industrial outfall found	2/21/2012	Good
Smith Creek	34.25718	-77.90675	72	RCP	Triple	NPDES outfall found	2/21/2012	Good
Smith Creek	34.25403	-77.89263	66	RCP	Single	NPDES outfall found	2/21/2012	Good
Smith Creek	34.25297	-77.93964	48	RCP	Single	NPDES outfall found	2/28/2012	Good
Smith Creek	34.25437	-77.90027	48	RCP	Single	NPDES outfall found	2/21/2012	Good
Smith Creek	34.25718	-77.88761	42	RCP	Single	NPDES outfall found	2/21/2012	Fair
Smith Creek	34.25761	-77.91556	42	RCP	Single	NPDES Industrial outfall found	2/21/2012	Good
Whiskey Creek	34.16376	-77.86289	72	CMP	Single	NPDES outfall found	3/27/2001	Good

Whiskey Creek	34.16654	-77.86775	42	RCP	Single	NPDES outfall found	7/18/2011	Good
Whiskey Creek	34.16362	-77.86228	36	RCP	Single	NPDES outfall found	3/27/2001	Good
Whiskey Creek	34.16670	-77.86858	36	RCP	Single	NPDES outfall found	7/18/2011	Good
Whiskey Creek	34.16671	-77.86860	36	RCP	Single	NPDES outfall found	7/18/2011	Good
Whiskey Creek	34.16779	-77.87648	5.5 X 7.0	CMP	Single	NPDES outfall found	7/18/2011	Good

APPENDIX K: DEFINITIONS

Act
See Clean Water Act.

Best Management Practice (BMP)
Measures or practices used to reduce the amount of pollution entering surface waters. BMPs can be structural or non-structural and may take the form of a process, activity, physical structure or planning (see non-structural BMP).

Built-upon Area
That portion of a development project that is covered by impervious or partially impervious surface including, but not limited to, buildings; pavement and gravel areas such as roads, parking lots, and paths; and recreation facilities such as tennis courts. "Built-upon area" does not include a wooden slatted deck, the water area of a swimming pool, or pervious or partially pervious paving material to the extent that the paving material absorbs water or allows water to infiltrate through the paving material.

Clean Water Act
The Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), as amended, 33 USC 1251, et. seq.

Common Plan of Development
A construction or land disturbing activity is part of a larger common plan of development if it is completed in one or more of the following ways:

- In separate stages
- In separate phases
- In combination with other construction activities

It is identified by the documentation (including but not limited to a sign, public notice or hearing, sales pitch, advertisement, loan application, drawing, plats, blueprints, marketing plans, contracts, permit application, zoning request, or computer design) or physical demarcation (including but not limited to boundary signs, lot stakes, or surveyor markings) indicating that construction activities may occur on a specific plot. It can include one operator or many operators.

Department
Department means the North Carolina Department of Environment and Natural Resources

Division (DWQ)
The Division of Water Quality, Department of Environment and Natural Resources.

Director
The Director of the Division of Water Quality, the permit issuing authority.

Dry Weather Flow
Any flow in the MS4 that occurs after a 72 hour period without rain.

EMC
The North Carolina Environmental Management Commission.

Illicit Discharge
Any discharge to a MS4 that is not composed entirely of stormwater except .discharges pursuant to an NPDES permit (other than the NPDES MS4 permit), allowable non-stormwater discharges, and discharges resulting from fire-fighting activities.

Industrial Activity
For the purposes of this permit, industrial activities shall mean all industrial activities as defined in 40 CFR 122.26.

Large or Medium Municipal Separate Storm Sewer System
All municipal separate storm sewers that are either:

(a) Located in an incorporated place with a population of 100,000 or more as determined by the Decennial Census by the Bureau of Census; or
(b) Located in the counties with unincorporated urbanized populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships or towns within such counties; or
(c) Owned or operated by a municipality other than those described in paragraph (a) or (b) and that are designated by the Director as part of the large or medium separate storm sewer system.

Major municipal separate storm sewer outfall (or "major outfall")
Major municipal separate storm sewer outfall (or "major outfall") means a municipal separate storm sewer outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (discharge from a single conveyance other than circular pipe which is associated with a drainage area of more than 50 acres); or for municipal separate storm sewers that receive storm water from lands zoned for industrial activity (based on comprehensive zoning plans or the equivalent), an outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (discharge from other than a circular pipe associated with a drainage area of 2 acres or more).

Municipal Separate Storm Sewer System (MS4)
Pursuant to 40 CFR 122.26(b)(8) means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

(a) Owned or operated by the United States, a State, city, town, county, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under Section 208 of the Clean Water Act (CWA) that discharges to waters of the United States or waters of the State.

(b) Designed or used for collecting or conveying stormwater;
(c) Which is not a combined sewer; and
(d) Which is not part of a Publicly Owned Treatment Works (POTW) as defined in 40 CFR 122.2

Non-stormwater Discharge Categories
The following are categories of non-stormwater discharges that the permittee shall address if it identifies them as significant contributors of pollutants to the storm sewer system: water line flushing, landscape irrigation, diverted stream flows, rising groundwater, uncontaminated groundwater infiltration, [as defined in 40 CFR 35.2005(20)], uncontaminated pumped groundwater, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water (discharges or flows from fire fighting activities are excluded from the definition of illicit discharge and only need to be addressed where they are identified as significant sources of pollutants to waters of the United States).

Non-structural BMP
Non-structural BMPs are preventive actions that involve management and source controls such as: (I) Policies and ordinances that provide requirements and standards to direct growth to identified areas, protect sensitive areas such as wetlands and riparian areas, maintain and/or increase open space, provide buffers along sensitive water bodies, minimize impervious surfaces, and/or minimize disturbance of soils and vegetation; (2) policies or ordinances that encourage infill development in higher density urban areas, and areas with existing storm sewer infrastructure; (3) education programs for developers and the public about minimizing water quality impacts; (4) other measures such as minimizing the percentage of impervious area after development, use of measures to minimize directly connected impervious areas, and source control measures often thought of as good housekeeping, preventive maintenance and spill prevention.

Outfall
Outfall means a point source as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the United States and are used to convey waters of the United States.

Permittee
The owner or operator issued this permit.

Point Source Discharge of Stormwater
Any discernible, confined and discrete conveyance including, but not specifically limited to, any pipe, ditch, channel, tunnel, conduit, well, or discrete fissure from which stormwater is or may be discharged to waters of the state.

Redevelopment
Means any rebuilding activity unless that rebuilding activity;
(a) Results in no net increase in built-upon area, and
(b) Provides equal or greater stormwater control than the previous development.

Representative Storm Event
A storm event that measures greater than 0.1 inches of rainfall and that is preceded by at least 72 hours in which no storm event measuring greater than 0.1 inches has occurred. A single storm event may contain up to 10 consecutive hours of no precipitation. For example, if it rains for 2 hours without producing any collectable discharge, and then stops, a sample may be collected if a rain producing a discharge begins again within the next 10 hours.

Storm Sewer System
Is a conveyance or system of conveyances which are designed or used to collect or convey stormwater runoff that is not part of a combined sewer system or treatment works. This can include, but is not limited to, streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains that convey stormwater runoff.

Stormwater Associated with Industrial Activity
The discharge from any point source which is used for collecting and conveying stormwater and which is directly related to manufacturing, processing or raw material storage areas at an industrial site. Facilities considered to be engaged in "industrial activities" include those activities defined in 40 CFR 122.26(b)(l4). The term does not include discharges from facilities or activities excluded from the NPDES program

Stormwater Management Program (SWMP)
The term Stormwater Management Program (SWMP) refers to the stormwater management program that is required by the Phase I and Phase II regulations to be developed by MS4 permittees.

Stormwater Plan
The Stormwater Plan is the written plan that is used to describe the various control measures and activities the permittee will undertake to implement the stormwater management program. The Stormwater Plan is a consolidation of all of the permittee's relevant ordinances or other regulatory requirements, the description of all programs and procedures (including standard forms to be used for reports and inspections) that will be implemented and enforced to comply with the permit and to document the selection, design, and installation of all stormwater control measures.

Stormwater Runoff
The flow of water which results from precipitation and which occurs immediately following rainfall or as a result of snowmelt.

Total Maximum Daily Load (TMDL)
A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL is a detailed water quality assessment that provides the scientific foundation for an implementation plan. The implementation plan outlines the steps necessary to reduce pollutant loads in a certain body of water to restore and maintain water quality standards in all seasons. The Clean Water Act, Section 303, establishes the water quality standards and TMDL programs.

Watershed Restoration Plan
For purposes of this permit, a Watershed Restoration Plan is any plan developed in consultation with the Division for voluntary implementation with the intent of enhancing water quality and/or implementing stormwater BMPs within 303(d) listed waters.