

# **NPDES Phase II Stormwater Annual Report City of Graham**

**Calendar Year 2014**

Prepared by:

Josh Johnson, P.E.

And Troy King, P.E.



alley, williams, carmen & king, inc.  
engineers and architects  
740 chapel hill road - post office box 1179  
burlington, north carolina 27216-1179  
Phone: (336) 226-5534  
Fax: (336) 226-3034

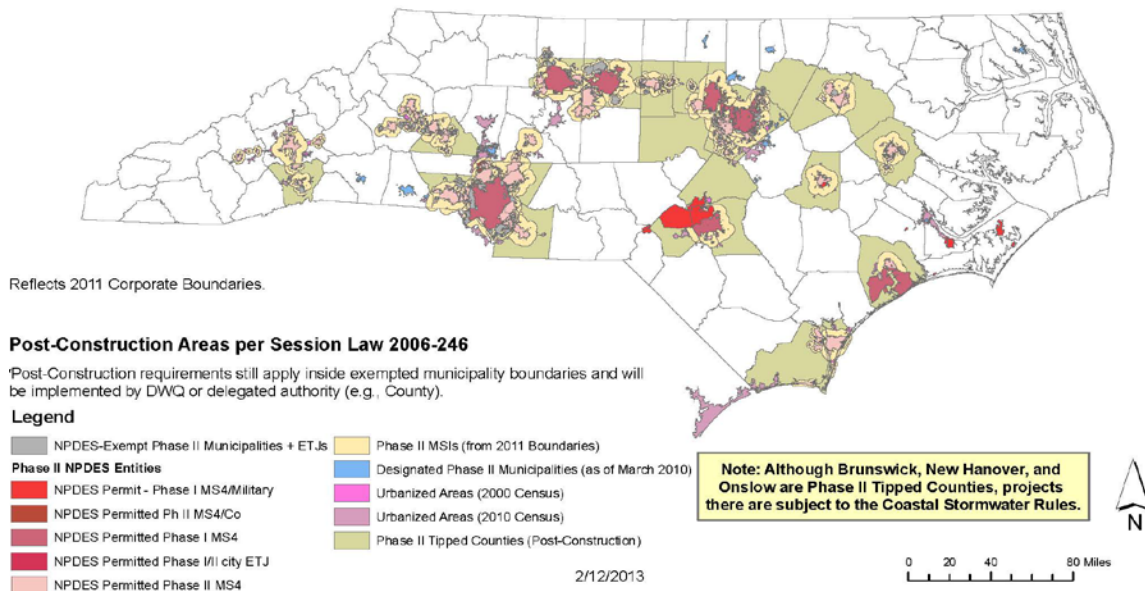
## Report Outline

- Introduction
- NPDES Phase II.
  - Minimum Control Measures.
    - Public Education and Outreach.
    - Public Involvement and Participation.
    - Illicit Discharge Detection and Elimination.
    - Construction Site Runoff Controls.
    - Post Construction Stormwater Management.
    - Pollution Prevention and Good Housekeeping.
- Impaired Waters and TMDL Waters.
  - Listing of Impaired Waters
    - Impairment Type.
    - Timeline for Improvements.
    - Current Status.
- Jordan Lake Rules Compliance.
  - Overview, Background, and Implementation Schedule.
  - Riparian Buffer Protection Program.
  - New Development Program.
  - Existing Development Stage 1 Programs.
  - Future Existing Development Stage 2 Programs.
- Stormwater Funding.
- Future Issues.
- Program Contacts.

## Introduction

On July 1, 2005, The North Carolina Division of Water Quality (DWQ) in the Department of Environment and Natural Resources (DENR) began issuing Phase II stormwater permits to municipalities in North Carolina under the National Pollutant Discharge Elimination System Program (NPDES). At the time, the NPDES Phase II Program was the latest stormwater program stemming from the Federal Clean Water Act of 1972. Prior to the Phase II program, EPA and NC DENR had issued NPDES Phase I Stormwater Permits to Cities larger than 100,000 persons. In North Carolina these cities were Raleigh, Charlotte, Fayetteville, Durham, Greensboro, and Winston Salem. The Phase II Program included distribution of Phase II permits to municipalities less than 100,000 residents and began with municipalities within Municipal Spheres of Influence (MSI) that were greater than 50,000 citizens. The Burlington Corridor represented a MSI of greater than 50,000 residents and each municipal separate storm sewer system (MS4) was given a Phase II permit.

### NPDES Phase I/II Communities, Exempted Municipalities\*, & Tipped Counties with County-wide Post-Construction



The Phase II stormwater program was created with the intention of improving the quality of the nation’s waterways by reducing the quantity of pollutants that stormwater transports into stormwater systems and discharges to surface water bodies. The permit requires permittees at a minimum to develop, implement, and enforce a stormwater program designed to reduce the discharge of pollutants from the municipal separate storm sewer system (MS4) to the maximum extent practicable. The stormwater program is composed of the following six management measures:

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

Each of these measures consists of required Best Management Practices (BMPs), measurable goals for each BMP and an implementation schedule for the 5 year permit cycle. Additionally, the City of Graham has a Comprehensive Stormwater Management Program and completes annual reporting about the NPDES Phase II Program. Because the NPDES Program concentrates on water quality it has limited provisions concerning water quantity and flooding controls.

In November 2011, after several months of discussion, NC DWQ issued a renewal of the City's NPDES Phase II Permit. This renewed permit is similar to the original permit with a few additional requirements included. A copy of the permit is available either through Josh Johnson, P.E. or through NC Division of Energy, Mineral and Land Resources (NC DEMLR – which as of fall of 2013 now houses Stormwater Permitting).

This Report is intended to complete the Annual Report specifying the City's progression in implementing the NPDES Permit and Comprehensive Stormwater Management Plan. It is also intended to give readers a comprehensive idea of the City's full Stormwater Program including the City's Jordan Lake, Little Alamance Creek, and Water Quantity Programs as well as the City's current funding structure.

## **NPDES Phase II Minimum Control Measures**

Each of the 6 Minimum Control Measures (MCM's) has a set of best management practices (BMP's) that are intended to foster compliance with both the City's Permit and CSWMP. These specific BMP's can be found in both the Permit and the CSWMP but highlights and specific actions will be noted in the report.

### **Public Education and Outreach**

The City operates a Public Education and Outreach program that is designed to educate the general public about the need to improve water quality in stormwater. The general objectives are to distribute education materials to the community and/or to conduct equivalent outreach activities about the impacts of storm water discharges on surface waters and the steps the public can take to reduce pollutants in stormwater runoff. These objectives have been further refined to target residents, school children, local businesses (specifically gas station owners and landscaping companies) and industry because these groups have the most impact on stormwater pollution prevention.

The education program targets total suspended solids (TSS and Sediment) and nutrient loading because turbidity, sedimentation, and nutrients are the pollutants of concern in downstream waters.

The City partners with Stormwater Smart, an education and outreach organization hosted by the Piedmont Triad Regional Council (PTRC). Stormwater Smart is a cooperative group that is funded by several Piedmont municipalities. It was created in 2005 to provide education and outreach for the new MS4 Permittees (like Graham) and concentrates on direct education of school children and residents. The Stormwater Smart Outreach and Education Coordinator is Elizabeth Jernigan and a copy of the Stormwater Smart’s Annual Report is enclosed with this report or available at [http://www.stormwatersmart.org/pdf/Annual%20Reports/2013-2014\\_SS\\_Annual\\_Report\\_Final\\_web.pdf](http://www.stormwatersmart.org/pdf/Annual%20Reports/2013-2014_SS_Annual_Report_Final_web.pdf) and provides a comprehensive outlook for the Fiscal Year 2013-2014 period. Appendix A of the annual report provides specific details of outreach efforts within the City of Graham. Elizabeth can be contacted at [ejernigan@ptrc.org](mailto:ejernigan@ptrc.org) or at (336)904-0300.

GRAHAM			
Southern High School	April 8, 2014	NC Watershed Game	40
Alexander Wilson Elementary	April 9, 2014	Incredible Journey	47
Auto Mechanic Outreach	June, 2014	Mailing	34
<b>Total</b>			<b>121</b>

**Stormwater Smart Outreach Efforts in Graham**

NC DOT Division 7 Health Fair	September 17, 2013	Outreach	12
Project WET Teacher Training *Alamance County Teachers	February 7, 2014	Project WET	12
Nature Center at Glencoe Mill *Mebane, Graham, Burlington, Haw River, Green Level, Elon	Ongoing	Board Member	
<b>Total</b>			<b>24</b>

**Stormwater Smart Outreach Efforts in Alamance County**

During the last few years the City of Graham partnered with the City of Burlington do several stream cleanups on Bowden Branch (known locally as Boyd Creek). These events drew a significant amount of coverage and a good response from citizens and included participation from both City Staff and City Elected Officials. In addition, the appearance commission sponsored a Spring Cleanup day and property maintenance planted approximately 150 trees in various parts of the City.



Volunteers at the Boyd Creek Stream Cleanup

The City also has handouts on display at the Graham Library and Town Hall as well as maintaining an education website located at <http://www.cityofgraham.com/services/stormwater/>.

### Public Participation and Involvement

The City has a responsibility to solicit and consider public opinion on all matters, including stormwater management. Many times this involvement is lacking but the City is often times required to continue to solicit public involvement. The City of Graham is currently in this situation. The City originally involved the public with a public hearing in 2005 and tried to create a citizen's committee during the first permit cycle but little interest was shown from the public. The City has been receptive to any questions from citizens, maintains a helpline (City Hall at (336) 570-6700) and has worked with Stormwater Smart and the City of Burlington to educate the public but continues to struggle to establish effective Public Participation and Involvement. The City did not hold a Stormwater Public Meeting in calendar year of 2014 but will hold one in 2015. This public meeting will seek input on the stormwater program and will provide both input to the City as well as education to the citizens.

### Illicit Discharge Detection and Elimination

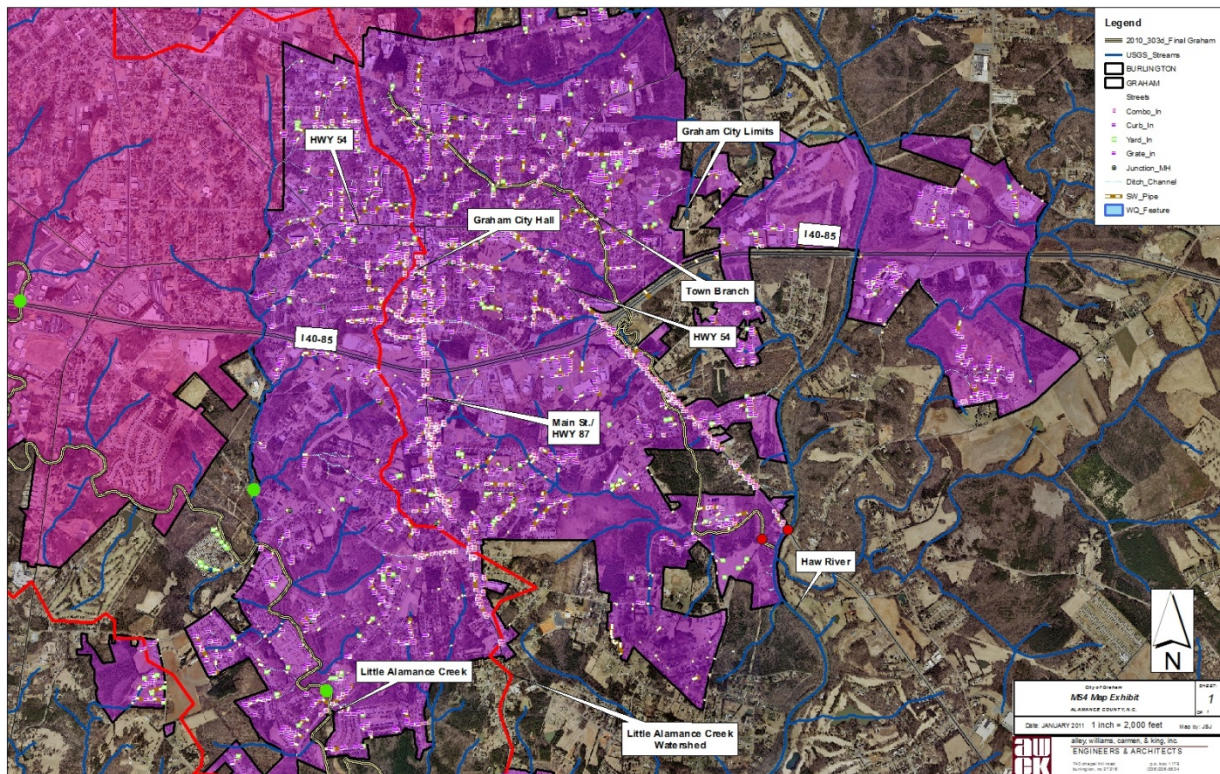
The City of Graham has a full Illicit Discharge Detection and Elimination (IDDE) Program. The IDDE Program is intended to reduce discharges to the stormwater system that are not entirely composed of stormwater. There are a few permitted discharges and firefighting related discharges that are allowed.

An illicit discharge is typically dirt, soap, pet waste, litter, oil, fertilizer, pesticides, or raw sewage and often times comes from "generating sites." Generating sites are points of pollution that continue over a period and are recurring at regular or irregular intervals.

The backbone of the IDDE program is the IDDE Ordinance that the City passed in May 2008. The IDDE ordinance provides permits specific discharges into the MS4 as legal, provides legal authority to restrict illegal discharges, prohibits illicit connections, provides conditions for cleaning up and preventing

polluted spills, provides for right of entry into property to investigate prohibited activities, and provides the City with options for enforcing the Ordinance. The IDDE Ordinance is based on the NC DWQ's Model Ordinance.

The second basis for the IDDE program is the City's MS4 Map. The mapping program was completed in the first permit cycle by GPS mapping and is now usable in a GIS format. The map includes the entire MS4 system and provides for easy access to aid in the investigation of illicit discharges. An investigator with the map could find an illicit discharge and then easily follow the flow of the discharge upstream until finding a source of the discharge.



The map was originally published as a map book but generally is used on a watershed basis or through ArcGIS software. If a specific area is needed it can be printed by either Stormwater or City Staff. The map is intended to be updated on a regular basis as new development happens but updates since the completion of the map have been sporadic.

The IDDE program also includes dry weather testing of outfalls into the stream system. In the first permit cycle this was conducted in coordination with the mapping. Outfalls that had dry weather flows were reported and investigated. Since the first permit cycle, most dry weather flow testing has been done in conjunction with complaints or City staff investigations.

The City has significantly reduced sanitary sewer overflows within the collection system in the last ten year but had one sanitary sewer overflows in 2014. The spill occurred on March 7, 2014 of an estimated 188,650 gallons. The untreated wastewater spilled into "Boyd Creek" in the Cape Fear River Basin. The

spill was a result of damage from a fallen tree to the Emergency Generator at the Boyd Creek Lift Station during a power outage from a freezing rain/ice storm event. Corrective actions were taken and service was restored. The damaged generator was removed and a new Emergency Generator has been installed.

The City of Graham hydraulically cleans 10% of the collection system annually and chemically treats approximately 35,000' of the system to prevent root intrusion. These maintenance issues are intended to reduce Sanitary Sewer Overflows and therefore prevent illicit discharges to the MS4.

City Staff are trained on an annual basis to identify illicit discharges and the reporting process for these discharges. This training is combined with the Pollution Prevention and Good Housekeeping training of public works, utilities, recreation, planning, and administrative staff as well as some fire and police personnel. A possible future improvement would be multiple trainings annually and/or including more fire and police personnel. Past presenters include Mitch Woodward of NC State, Connor Boyle of AWCK, and Michael Layne of the City of Burlington. The trainings vary from 90 minutes to 2.5 hours and are well attended.



## Construction Site Runoff Controls

The City of Graham delegates the Construction Site Runoff Controls to the NC DENR Division of Land Quality. The City of Graham does not have a delegated erosion control program but does make sure that plans it approves that will disturb greater than 1.0 acres of land apply for, and receive, and erosion control plan. The City of Graham also has the ability to call NC DENR to report known sedimentation issues. A possible improvement could be NC DENR's responsiveness to City generated complaints, which has been less than effective in the past.

## Post Construction Site Runoff Controls


The City of Graham has a typical NPDES Phase II Post Construction Program. This includes a Post Construction Ordinance, administrative forms that support it, and a review process. The Post Construction Program applies to projects that exceed 1 acre of disturbance or have a common plan of development that will cumulatively exceed 1.0 acres of disturbance. Projects that exceed 24% built-upon area are considered high density projects, projects that are less than 24% BUA are low density projects. High Density Projects are then required to meet the following requirements:

- Treat runoff from the first 1" of rain (the first flush).
- Treated Runoff is to be for 85% TSS removal.
- Discharge treated water at a rate less than or equal to the Predevelopment rate for the 1 year 24 hour storm.




- Discharge treated water between 48-120 hours.
- Stormwater Control Measures must be in easements and must have a recorded operation and maintenance agreement.
- Compliance with the Jordan Lake Riparian Buffer Protection Ordinance.


Stormwater Control Measures, as well as runoff calculations, are prepared based upon the NC DWQ BMP Manual and then reviewed by Josh Johnson, P.E.



**City of Graham**  
STORMWATER WETLAND  
Engineer's Statement of Certification



FOR OFFICIAL USE ONLY  
Form No. \_\_\_\_\_  
Date Rec'd: \_\_\_\_\_  
Rec'd By: \_\_\_\_\_



**Stormwater PERMIT**

F.O. Drawer: 357  
203 South Main Street  
Graham, NC 27233  
(336) 570-6705  
Fax (336) 570-6703  
www.cityofgraham.com/planning

---

City of Graham Planning Department  
Telephone: (336) 570-6705  
Fax: (336) 570-6703

203 South Main St  
Graham, NC 27233

City web site:  
www.cityofgraham.com

On \_\_\_\_\_, the City's Stormwater Administrator received a request to consider the following application:

Project Name: \_\_\_\_\_

Property Owner(s): \_\_\_\_\_

Property Location: \_\_\_\_\_

Tax#: \_\_\_\_\_ GRN: \_\_\_\_\_

Total Site Acres:  High Density  
Impervious Acres:  Low Density

Type and number of BMPs proposed:  
\_\_\_\_\_

---

**Bio-Retention Cell Identification:**

Description	Required/Designed	As-built
<b>Slope of embankments (3:1)</b>		
Elevations on the following:		
Deep Pool		
Shallow Water		
Shallow Land		
Water quality hole - size		
Bypass Structure		
Emergency Spillway - Elevation		
Top of dam: Elevation and width		
Anti-seep collars/Filter Drainage Diaphragm		
Size and material of riser barrel		
Volume (CF)		
<b>Surface Area (SF) on following:</b>		
Deep Pool		
Shallow Water		
Shallow Land		

I state to the best of my knowledge and belief that the permanent structural stormwater Best Management Practice(s) for \_\_\_\_\_ will control and treat the runoff from the first one \_\_\_\_\_ inch of rain over the total drainage area, is duly recorded in the Office of the Alamance County Register of Deeds, and has been completed in conformance with the approved plans and specifications dated \_\_\_\_\_.

SIGNATURE \_\_\_\_\_ (Seal)

DATE \_\_\_\_\_

**Permit Approval**

Stormwater Administrator: \_\_\_\_\_ Date: \_\_\_\_\_

**NORTH CAROLINA, ALAMANCE COUNTY**

I, \_\_\_\_\_, a Notary Public of the aforesaid County and State, certify that \_\_\_\_\_ personally appeared before me and acknowledged that s/he is Stormwater Administrator of the City of Graham, North Carolina and pursuant to authority duly given, and as an act of the City, s/he executed this Agreement for the purpose herein expressed.

WITNESS my hand and Official Seal this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

My Commission Expires \_\_\_\_\_ (Seal)

NOTARY PUBLIC

Permit # \_\_\_\_\_ DEVID# \_\_\_\_\_

continued on back of page...

**Permit Information**

**SECTION 1: APPROVAL.** Having reviewed the application and all supporting materials, the Stormwater Administrator has determined that the application is complete and subject to the conditions imposed below, and the proposed development meets the requirements of the City of Graham Phase II Stormwater Ordinance.

**SECTION 2: CONDITIONS.** Therefore, the subject site and land used is hereby approved and subject to all applicable provisions of the City of Graham Phase II Stormwater Ordinance, Sections 3 and 4 of this permit, and the following condition(s) which the Stormwater Administrator finds necessary for the proposed development to meet the intent of the ordinance:

1. This permit shall be valid for a period of two years from the date of issuance unless a valid building permit has been issued and maintained for the site or the permit has been revoked by the City of Graham. If, after two years the permitted activity has not begun nor a valid building permit secured, this permit shall expire.
2. All land purchases and transfers necessary to secure the property for development shall be completed prior to recordation of this permit.
3. The development of the tract shall proceed in conformity to all plans, design features, and restrictions submitted as part of the stormwater permit application and kept on file by the Graham Planning Department except that the Graham Stormwater Administrator may approve minor changes to such plans as required by field conditions.
4. The petitioner shall complete all required off-site stormwater improvements and receive approval from the City for such improvements prior to the release of any certificates of occupancy.
5. The petitioner shall submit a Floodplain Development Permit Application and receive approval from the Graham Planning Department prior to any land disturbance or filling of land located within Special Flood Hazard Areas.
6. The petitioner shall submit a Sedimentation and Erosion Control Plan Application and receive approval from the North Carolina Department of Environment and Natural Resources, Land Quality Section prior to any land disturbance or filling of land.

Low Density projects are required to comply with the Jordan Lake Buffer Protection Ordinance that went into effect in fall 2011. Both Low and High Density Projects are required to comply with the City's Storm Sewer Design Manual which governs storm drainage design as well as peak runoff rates and provides for evaluation of the 10 and 100 year design storms.

When a project is submitted to the City it goes through the City Planning Department. Then the plans are distributed to a Technical Review Committee (TRC). The TRC includes Engineering and Stormwater Reviewers as well as assorted City staff. At this point the project is determined to be subject to the Stormwater Ordinance and High Density or Low Density. At that point review comments are made about the project and addressed. After approval of the project, the owner is required to complete an Operation and Maintenance Agreement for the stormwater control measures. This O&M agreement is then recorded with the register of deeds so that it can reviewed at a later point in time.



**Stormwater Wetland @ Alamance Community College**

The City of Graham reviewed two projects that triggered the Stormwater Ordinance in 2014. Watercourse Apartments is currently under construction will have approximately 200 apartments. The project incorporates multiple stormwater BMPs to treat stormwater runoff. River Mill Academy was the second project that triggered the stormwater ordinance. River Mill Academy plans to construct a new gymnasium and cafeteria on the existing campus.

The City of Graham requires as-builts and annual inspection reports from new stormwater control measures (SCM) but has had trouble getting annual inspection reports submitted. In the coming year the City will inspect the existing stormwater control measures and then provide the property owners with the inspection report and the needed improvements. This letter will also contain information requiring SCM owners to provide future inspection reports to the City or face fines and/or assessments.

### **Pollution Prevention and Good Housekeeping**

Pollution Prevention is an overall goal of the City's stormwater management plan and Good Housekeeping is a key to that goal. Municipalities, in general, conduct many activities that can pose a threat to water quality. Municipal facilities are the primary potential source of contamination but with good housekeeping habits this potential can be reduced or eliminated. The City attempts to minimize stormwater pollution from municipal operations by complying with best management plans for each City facility. The BMP's are written into a City Facilities O&M Plan that is intended to reduce or eliminate stormwater exposure of oil, grease, pesticides, herbicides, fertilizers, sediment, and other materials used by the City. Each of the City facilities is inspected annually and any issues are noted, written into the Facility O&M Plan, and discussed with the facility supervisor.

The City operates a Fire Department, City Hall, Library, Police Department, Public Works Facility, Wastewater Plant, South Graham Park, Recreation Center, Maple Street Center for Performing Arts, Concession Stand for Apollo Field, Water Plant, Graham/Mebane Lake, Bill Cooke Park, and a Cemetery. Each of these facilities is inspected annually and any new facilities will be added to the inspection list.



Salt Storage at Public Works

City staff with the greatest exposure to stormwater are trained on PPGH once annually. The training is combined with illicit discharge detection and elimination training. The PPGH portion of the training concentrates on good housekeeping functions. This often includes identification of bad habits that can take place and how to fix the situation to reduce the risk of pollution to stormwater.



Recent PPGH Training

The City of Graham sweeps all of the town streets one per month, including the downtown area three days per week. On average a single 8 cubic yard hopper is filled each day.

The City of Graham also placed approximately 125 tons of road salt and 7,000 gallons of alternatives to road salt (brine) prior to and during inclement weather in 2014.

The City also maintains several culverts and the storm drains that are either in storm drainage easements or within City right of ways. The City has 6 major culverts that they check on a regular basis and has recently replaced 3 additional culverts. One new culvert at Walker Avenue has been designed, while another near the intersection of Marshall Street and Travora Street is under design at this time. The City also checks all storm drains quarterly and after major rainfall events and cleans them as needed. Jet trucks are used to clean storm drain pipes and vacuum trucks are used to clean inlets when they are found to need maintenance during inspections.

## Impaired Waters and Total Maximum Daily Loads (TMDL)

The City of Graham discharges to three impaired waters. The impaired streams are the Haw River, Town Branch, and Little Alamance Creek. More details about the impaired streams are included below:

- Haw River (16-(1)d3) - A portion of the City discharges to the Haw River where it is impaired for fecal coliform. The Haw River has been impaired since 1998 for Fecal Coliform but only a small portion of Graham drains directly to the Haw in this impaired area.
- Town Branch (16-17) – Town Branch is impaired for Fecal Coliform and was originally listed on the 1998 NC DWQ 303d list and has had a TMDL for Fecal Coliform since August 2002. The TMDL specifically lists sanitary sewer overflows, failing septic systems, and other primarily point source pollutant loads. The City of Graham has spent a substantial amount of time, energy, and funding to reduce sanitary sewer overflows in the last 10 years including over \$800,000 on a 2009 project that rehabilitated over 17,000 lineal feet of sanitary sewer line in Town Branch and Little Alamance Creek. A potential future project would be to apply for grant funding to fund rehabilitation of the manholes in the same outfall areas.
- Little Alamance Creek (16-19-11) – Little Alamance Creek is impaired for benthic macro-invertebrates and has been since 1998. Little Alamance Creek was the subject of a draft TMDL for Impervious Cover in 2010 that was not adopted and currently the City of Graham is working with its partners in the watershed, the City of Burlington and NCDOT, to create a Category 4b exclusion plan. The Category 4b Plan will be written with the goal of achieving water quality standards but the timeframe for doing so is several NPDES permit cycles long. The final plan will be submitted to NC DENR in late summer 2014.

## Jordan Lake Rules

The City of Graham is within the Jordan Lake Watershed and is subject to the Jordan Lake Nutrient Strategy. The Jordan Lake Nutrient Strategy is composed of a set of regulatory rules enacted in 2009 that have since been augmented or replaced by a series of NC General Assembly Session Laws. The following rules are often referred to as the Jordan Lake Rules.:

[15A NCAC 02B .0262 - Purpose and Scope](#) (See #4 below.)

[15A NCAC 02B .0263 - Definitions](#)

[15A NCAC 02B .0264 - Agriculture](#)

[15A NCAC 02B .0265 - Stormwater Management for New Development](#) (See #2, #5 and #6 below.)

[15A NCAC 02B .0266 – Stormwater Management for Existing Development](#) (Replaced by #1 below.)

[15A NCAC 02B .0267 – Protection of Existing Riparian Buffers](#) (See #2 below.)

[15A NCAC 02B .0268 – Mitigation for Riparian Buffers](#)

[15A NCAC 02B .0269 – Riparian Buffer Mitigation Fees to NC EEP](#)

[15A NCAC 02B .0270 – Wastewater Discharge Requirements](#) (See #1 and #3 below.)

[15A NCAC 02B .0271 – Stormwater Requirements for State and Federal Entities](#) (See #2 below.)

[15A NCAC 02B .0272 - Fertilizer Management](#)

[15A NCAC 02B .0273 - Options for Offsetting Nutrient Loads](#)

15A NCAC 02B .0311 - Cape Fear River Basin

1. Session Law 2009-216 signed into law June 30, 2009. (Disapproves the Jordan Stormwater Management for Existing Development Rule and establishes substitute requirements. Also delays the nitrogen compliance date by two years for existing dischargers under the Wastewater Discharge Requirements Rule.)
2. Session Law 2009-484 was signed into law Aug. 26, 2009. (Part II revises three Jordan rules, including Stormwater Management for New Development, Stormwater Requirements for State and Federal Entities and Protection of Existing Riparian Buffers.)
3. Session Law 2011-394 signed into law July 1, 2011. (Section 14 provides a further, conditional two-year delay of the nitrogen wastewater compliance date for existing dischargers under the Wastewater Discharge Requirements Rule.)
4. Session Law 2012-187 signed into law July 16, 2012. (Section 12.1 creates a limitation affecting the Purpose and Scope Rule to narrow the applicability of certain surface water standards in WS-V waters.)
5. Session Law 2012-200 signed into law Aug. 1, 2012. (Section 11.(c) extends the allowable local program implementation date of the New Development Stormwater Rule.)
6. Session Law 2012-201 signed into law Aug. 1, 2012. (Section 9.(e) of this law revised the local program implementation date of the New Development Stormwater Rule by two years. Separate SL 2012-201 contains the same provision).
7. Session Law 2013-395 signed into law Aug. 23, 2013 (SB 515 continues the current Jordan Lake water quality measures, including 15A NCAC 02B .0267 Protection of Existing Riparian Buffers Rule, but delays additional measures that were to be implemented July 1, 2013 or later, for three years. The law also modifies existing Protection of Existing Riparian Buffers Rule to allow some exempt uses, including the permitted piping of streams by the U.S. Army Corps of Engineers and an expanded definition of "airport facilities." These changes are required to be adopted by the Environmental Management Commission in an amended rule. The delayed measures include the Jordan Lake Rules, 15A NCAC 02B .0262 - .0267, .0270 - .0272, .0311, as well as the Jordan Lake Session Laws.)

### **Jordan Lake Background, Rules, and Implementation Schedules**

Jordan Lake was impounded in 1983 by damming the Haw River near its confluence with the Deep River. It was created to provide flood control, water supply, protection of water quality downstream, fish and wildlife conservation, and recreation.

The lake has had water quality issues from the beginning, with the North Carolina Environmental Management Commission declaring it as nutrient-sensitive waters (NSW) the same year it was impounded. Since that time, Jordan Lake has consistently rated as eutrophic or hyper-eutrophic, with excessive levels of nutrients present. "Eutrophic" is an over-abundance of nutrients in the lake, primarily nitrogen and phosphorus, which can result in algal blooms and poor water quality. Nutrients make their way to the lake from sources such as wastewater discharges, rainfall runoff from agriculture and stormwater runoff from new and existing developed lands throughout the watershed. Excessive nutrient inputs can drive excessive growth of microscopic algae, which imparts a greenish, murky appearance to

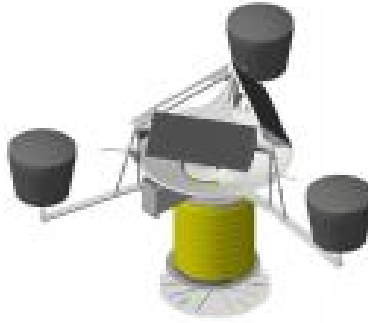
the water, causes taste and odor problems in potable water, and robs the water of oxygen. This can then stress or kill fish and other aquatic life. Excess nutrients also favor the growth of undesirable algae that does not support the food chain and can release toxins into the water. While not necessarily making the lake unfit for fishing, swimming or drinking uses, excessive nutrients can impact these uses and produce undesirable algae in the lake.

The Jordan Lake Rules are designed to protect and improve water quality in the lake. The rules were developed over several years through a process that involved extensive meetings, public hearings and negotiations between residents, environmental groups, local and state government agencies and other stakeholders in the watershed. Specific issues addressed by the rules include reducing pollution from wastewater discharges, stormwater runoff from new and existing development, agriculture and fertilizer application.

The primary rules that affect local governments (like the City of Graham) are the Stormwater Management for New Development, Stormwater Management for Existing Development, Protection of Existing Riparian Buffers, Wastewater Discharge Requirements, Options for Offsetting Nutrients Loads, Session Law 2009-216, Session Law 2009-484, Session Law 2011-394 and to a lesser extent the Fertilizer Management Rule. The Protection of Existing Riparian Buffer Rules was implemented in 2011 after the Stage 1 Existing Development Programs were adopted in 2009 and Waste Water Treatment Plant compliance with Total Phosphorous limitations by January 1, 2010. The New Development Programs, Stage 2 Existing Development Program, and Wastewater Treatment Plant Compliance with Total Nitrogen Limitations were all delayed for 3 years. This establishes the following compliance timeframes for these rules:

- New Development Programs – August 2017.
- Stage 2 Existing Development Programs – 2017 for the Upper New Hope Creek Watershed (Durham), 2020 for the Haw River Watershed.
- Wastewater Treatment Total Nitrogen Limits – 2019 (Unless enacted with 2016 Permit Renewals).

Additionally, Session Bill 2013-395 created a study to determine if “mechanical circulation” within Jordan Lake could reduce algal growth within the lake. This study will be completed by NDENR and Medora Corporation for \$1.44 million and will include the leasing of 36 Solar Bee Circulators. The Solar Bee’s, similar to the ones in the Graham-Mebane Lake, are a relatively new technology and the study is ongoing.



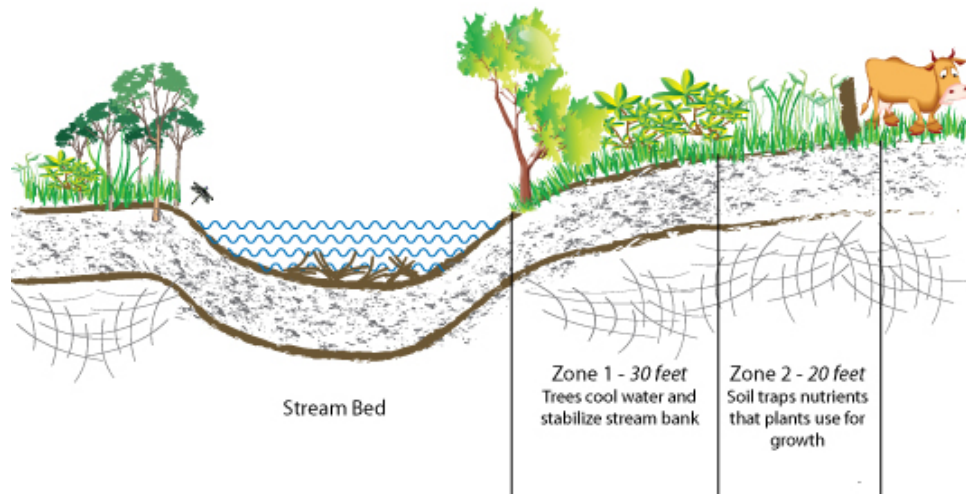
Solar Bee Rendering

During the calendar year of 2014, a Legislative Review Committee met and investigated options for rulemaking revisions to the Jordan Lake Nutrient Strategy. While the Legislative Review Committee meetings were generally productive, it does not appear that any near term legislation will come out of the meetings. However, in 2015 and 2016, NC DENR will be complying with the Rules Review and Readoption Process. This process is the result of Session Law 2014-413 that required review and possible readoption of all rules, beginning with environmental rules. The Rules Review process for Jordan Lake (and other nutrient sensitive waters) began in the spring of 2015 and will continue over the next 18 months. Additional information can be found at <http://portal.ncdenr.org/web/wq/ps/csu/rulesreadoption>.

### Riparian Buffer Protection Program

The City's Riparian Buffer Protection Program was implemented in December 2010. The enforcement mechanism for the Buffer Protection Program is the Jordan Riparian Buffer Protection Ordinance that was approved by the City of Graham in December 2010. The Buffer Program establishes a protected buffer along surface waters (primarily perennial and intermittent streams but also ponds and other surface waters) shown on the USGS Quadmaps or the NRCS Soil Survey Maps. The buffer has two different zones: Zone 1 is the closest 30' from the top of bank in all directions; Zone 2 is from 30' to 50' from the top of bank in all directions. Zone 1 is to remain undisturbed while Zone 2 is to remain vegetated.

The Buffer Ordinance is a change of use ordinance; therefore the regulations only apply if new development or a change in use takes place within the buffer. Changes in use can range from new development that goes through an approval process to clearing of the buffer for residential or commercial landscaping but any change of use within the buffer is subject to the buffer ordinance. The Buffer Ordinance also includes a Table of Uses that breaks down uses within the buffer to Exempt, Allowable, and Allowable with Mitigation. Any uses not in the Table of Uses are prohibited without a variance. Uses that fall in the Allowable or Allowable with Mitigation categories must submit a request to the City for written authorization prior to disturbing the buffer. These uses also must show that there are no practical alternatives to the requested use. In showing the no practical alternatives, users must show how they are minimizing the impacts if possible.



The City includes Riparian Buffer Protection Program training with its annual employee training but generally limits inspections of buffers to complaints about buffer clearing or City Staff reporting of impacts. The City tracks buffer impacts but tries to handle first time offenders by requiring replacement of the buffer and education of the offender, rather than fining first time offenders.

### New Development Programs

The Jordan Lake New Development Rule, 15A NCAC2B .0265, sets out standards that named communities are to incorporate into local stormwater programs, and requires the Division of Water Quality to develop a model local stormwater program for those communities to use to create a New Development Program that complies with the rule. The Jordan Lake New Development Ordinance is the legal mechanism that local governments will use to enforce these standards on new development projects greater than ½ acre in disturbed area (or 1 acre for single family residential).

Most communities within the Jordan Lake watershed are existing NPDES MS4 Phase II communities that have existing Phase II Stormwater Post-Construction Ordinances which are centered around 85% TSS treatment of the 1" storm for developments over 24% impervious and a 1 acre disturbance threshold. The Jordan Lake New Development Rule is centered on removal of Nitrogen and Phosphorous from stormwater and a ½ acre disturbance threshold. These two pollutants can be removed with many of the same processes as TSS but at differing removal rates and with a different calculation to determine the effectiveness of the treatment processes.

The City of Graham will combine its NPDES Phase II and Jordan Lake New Development Standards into one comprehensive stormwater ordinance. This will reduce confusion between the two ordinances on the part of developers, designers, reviewers, staff, and the public by creating one set of standards for review.

The City created, submitted, and had a full program approved in the summer of 2012. However, the City chose to delay implementation until a future date (in accordance with legislation from 2012 and 2013).



## Existing Development Stage 1 Programs

The City of Graham submitted a Stage 1 Adaptive Management Program to reduce existing nutrient loading to Jordan Lake in 2009. Often referred to as the Stage 1 Existing Development Program, the Program credits the NPDES Phase II Stormwater Program as the primary steps in the program along with requiring the City to create a Retrofit Identification Program. The Existing Development Program requires annual updates but full reporting is only required for the Retrofit Program because of this annual NPDES Phase II Report.

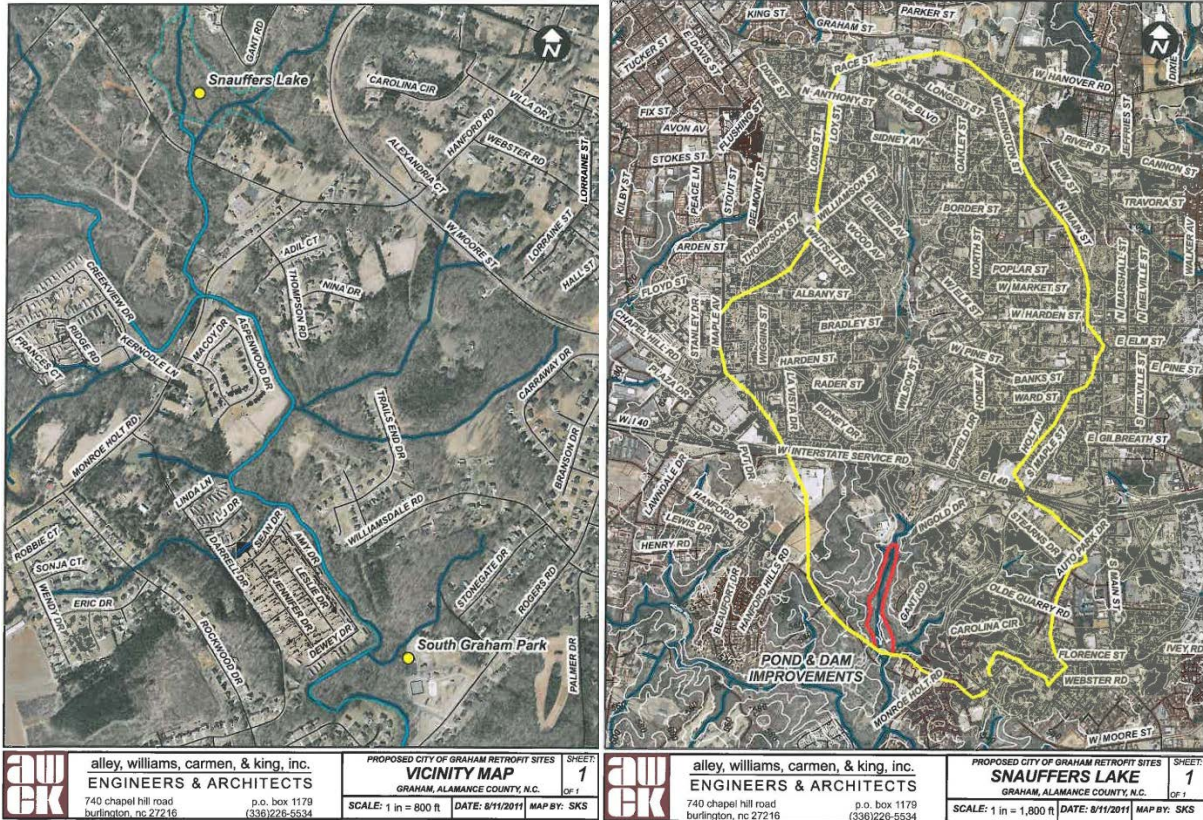
This retrofit program is intended to provide a framework for identifying retrofit opportunities to reduce nutrient loading in the Jordan Lake Watershed. The program is intended to identify both structural and non-structural retrofits that seek to reduce pollution, and nutrients, from being carried downstream by stormwater runoff. By either controlling stormwater runoff or reducing the pollution in the runoff, stormwater retrofits reduce downstream pollution in streams, rivers, and lakes. Typical structural stormwater retrofits are stormwater wetlands, bio-retention basins, water quality ponds, and other devices found in the NC Division of Water Quality Best Management Practices Manual (NC DWQ BMP Manual). Non-structural retrofits include but are not limited to fertilizer programs, reducing animal waste programs, urban forestry programs, and leaking septic tank replacement programs.

The City of Graham will use this program annually in a review of the stormwater program that will include reviewing the public education program, reviewing the illicit discharge program, and using this program to have an accurate and up to date list of potential retrofit projects. The City is required to select a number of projects based on the following chart:

**Table 1: Minimum Number of Existing Development Nutrient Load-Reducing Projects**

Population in the Jordan Lake Watershed	Minimum Number of Existing Development Load Reducing Activities to be Identified Annually
Less than 15,000	1
15,000-30,000	2
30,000-60,000	3
60,000+	4

In 2013 the City of Graham identified two projects to pursue in the future. These two projects included the selected Snauffers Lake BMP and the backup BMP at South Graham Park. Snauffers Lake is a previously existing lake that had the dam breached several years ago but the potential exists to recreate a BMP that will treat a significant drainage area with a large amount of impervious area, has the space for a large structural stormwater control measure and is undevelopable land.



A future strategy for the City to consider would to fund a full study and construction of Snauffers Lake. Funding in the near future, before the 2020 requirement from the Jordan Lake Rules, could provide for additional grant funding and could make grant funding easier to obtain. Funding of any BMP's before legislative requirement represents some risk on the City's part but in this case would be within the Little Alamance Creek Watershed and credit would be applicable to both the Jordan Lake Watershed and the Little Alamance Creek Watershed.

### Future Existing Development Stage 2 Programs

The City of Graham will probably be required to establish a Stage 2 Adaptive Management Program in 2020. This requirement will be based upon the future testing of the water quality within Jordan Lake. At this point in time we view this requirement as likely. The Stage 2 Existing Development Programs will be intended to eventually reduce 8% of Total Nitrogen Loads and 5% Total Phosphorous Loads from the 2001 Baseline Period along with all TN and TP Loads from the Baseline Period until adoption of the New Development Program.

NC DWQ, through a contract process that involved the Nutrient Scientific Advisory Board (NSAB), remodeled the Jordan Lake Watershed and released preliminary reports in November. The remodeling study, completed by Tetra Tech, provided nutrient loadings for individual jurisdictions for the baseline period and for the post baseline period through 2010. These jurisdictional loadings are the first jurisdictional modeled loads that have been produced for Jordan Lake and will allow for the most

accurate estimate (to date) for the retrofits needed and the costs associated with reaching water quality standards within the lake.

The Stage 2 Programs will also have additional nutrient reduction measures that credit will be available for. These nutrient credits were established through another contract from NC DWQ and the NSAB that established accounting a new crediting program for the following items:

- Remedy Malfunctioning Septic System.
- Remedy Discharging Sand Filters.
- Volume Pond Retrofits.
- Improved Street Sweeping.
- Stream Restoration/Enhancements.
- Diverting Impervious Runoff to Pervious Areas/Impervious Disconnection.

Crediting of these measures will greatly improve the flexibility that affected parties (like Municipalities) have in achieving the required load reductions. The cost of these load reductions will be substantially reduced by including these strategies into the overall compliance strategy.

The release of these recent studies will be included in an overall Compliance Strategy Study for the City of Graham that will be completed in 2014. This study will evaluate the feasibility of all options for the City of Graham, will include trading options, and will include the most comprehensive and accurate financial assessment of compliance for the City to date.

## Stormwater Funding

The City of Graham funds its Stormwater Programs through a Stormwater Fee. The City collects a flat fee of \$1/month from utility users within the City Limits. The City uses this fee to pay for its Water Quality Programs including its NPDES Phase II, Jordan Lake, and Little Alamance Creek Programs.

In the future, the stormwater budget of \$140,000 will need to be increased in order to cover additional expenses for the Jordan Lake Rules and the Little Alamance Creek 4B Program. These increases may be offset by converting the current flat fee into an Existing Residential Unit (ERU) style fee. The ERU is based on an impervious area per property calculation and will be a more equitable distribution of stormwater costs than the flat fee is. However, the ERU will have a substantially higher startup and maintenance costs than the current fee has.

Historically, the City has also used general fund balance in order to fund capital storm drainage and stormwater needs. This includes \$85,000 for culvert replacements in 2014.

## The Future of Stormwater

Stormwater, and Water Quality in particular, is an evolving field of regulation. The City of Graham is already involved in NPDES Phase II, Biological Integrity within streams, and Nutrient Sensitive Waters. Within the next decade the City needs to plan for further regulation of these issues as well as several

other outstanding issues. EPA continues to work on two potentially large future items that include a Numerical Nutrient Criteria for all surface waters and a National Stormwater Rule. The Numerical Nutrient Criteria is an EPA supported push towards establishing nutrient limits for all surface waters. Currently in North Carolina, generally only reservoirs have nutrient limits and the limits are based upon response indicators. The National Stormwater Rule, underway since late 2009 and sometimes called NPDES Phase III, will likely address the following four water quality standards:

- Designated uses of a water body, such as recreation, water supply, aquatic life, or agriculture.
- Water quality criteria to protect designated uses, such as the metals criteria discussed above as part of North Carolina's ongoing triennial review.
- Antidegradation policies that maintain and protect existing uses and high quality waters from pollutant discharges that unnecessarily degrade those waters.
- General policies to address program implementation issues.

The proposed wording of the rule is available at this time, and can be found here

[http://water.epa.gov/lawsregs/lawguidance/wqs\\_index.cfm](http://water.epa.gov/lawsregs/lawguidance/wqs_index.cfm), although its implementation schedule is unclear but it is expected that it will include a step forward in the City's NPDES Stormwater Program.

## Stormwater Program Contacts

Name	Position	Phone #	Email
Melissa Guilbeau	Planner/SW Administrator	(336)570-6705	<a href="mailto:mguilbeau@cityofgraham.com">mguilbeau@cityofgraham.com</a>
Frankie Maness	City Manager	(336)570-6700	<a href="mailto:fmaness@cityofgraham.com">fmaness@cityofgraham.com</a>
Josh Johnson	Stormwater Engineer	(336)226-5534	<a href="mailto:josh@awck.com">josh@awck.com</a>
Terry Worth	Public Works Director	(336)570-6709	<a href="mailto:tworth@cityofgraham.com">tworth@cityofgraham.com</a>
Victor Quick	Utilities Director	(336)570-6721	<a href="mailto:vquick@cityofgraham.com">vquick@cityofgraham.com</a>