# NPDES Phase II Stormwater Annual Report City of Roxboro

**Fiscal Year** 

2019-2020

Prepared by: Josh Johnson, P.E.

And

Phil Ross Stormwater Program Coordinator



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

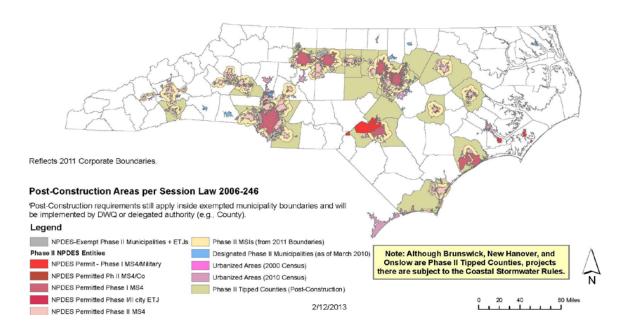
# **Report Outline**

- 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.
- Falls Lake Rules and Report.
- Stormwater Funding.
- Future Issues.
- Program Contacts.

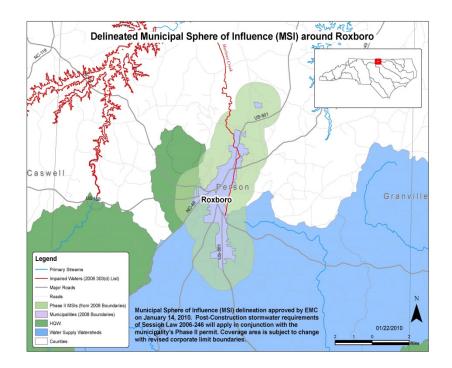
# Introduction

On July 1, 2005, The North Carolina Division of Water Quality (DWQ) in the Department of Environmental Quality (DEQ formerly 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 DEQ 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.

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



Since 2006, Additional Communities have been designated as Phase II Communities due to size, population density, and potential water quality impacts. The City of Roxboro was designated in 2010 because of a combination of population density and the Falls Lake Nutrient Strategy.



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 require 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 Roxboro 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.

The City's permit was officially issued in late 2011 and 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 and provide reporting information for the implementation of the Falls Lake Rules.

# 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 has stormwater handouts on display at the Roxboro City Hall. The City's website also maintains a Stormwater Link: <a href="http://www.cityofroxboro.com/government/public-services/engineering-services/stormwater-administration">http://www.cityofroxboro.com/government/public-services/engineering-services/stormwater-administration</a> which has information on the stormwater ordinance.

Roxboro also partners with the *Clean Water Education Partnership* (CWEP), an education and outreach organization hosted by the Triangle J Council of Governments (TJCOG). CWEP is a cooperative group that is funded by 39 communities in North Carolina. It was created in 2001 to provide education and outreach for MS4 systems. CWEP has a large Mass Media Campaign that includes an educational website, TV, Radio and Social Media campaigns. Through this resource CWEP is able to bring stormwater education to a large population in the City of Roxboro and surrounding areas. In 2018 CWEP hired its first AmeriCorps service member to conduct direct environmental education and outreach with children and adults in CWEP communities. This program was very successful and continued in 2019.

### The CWEP staff include:

Maya Cough-Schulze – Water Resources Planner – <a href="mcough-schulze@tjcog.org">mcough-schulze@tjcog.org</a> – ph. 919-558-9389 Hannah Barg - CWEP Education & Outreach Coordinator – <a href="mailto:hbarg@tcog.org">hbarg@tcog.org</a> – ph. 919-558-9341

For additional information about stormwater education the CWEP website has the most up to date information available at <a href="http://www.nccleanwater.org/">http://www.nccleanwater.org/</a>.

In 2020, due to the unprecedented COVID-19 pandemic, statewide shutdowns of public events and programs that were being planned and typically held in the spring were cancelled.

Partner Town of Apex	lia Impressions by CWEP	Jurisdiction	
Town of Anex	Population* for FY20	Impression	
TOWN OF THOOK	48,435	351,107	
Town of Benson	3,472	25,169	
Town of Butner	7,957	57,681	
Town of Carrboro	20,928	151,708	
Town of Cary	159,006	1,152,640	
Town of Chapel Hill	51,161	370,868	
Chatham County	56,986	413,094	
Town of Clayton	20,112	145,793	
City of Creedmoor	4,600	33,346	
City of Durham	260,251	1,886,569	
Durham County	42,507	308,135	
City of Fayetteville	185,988	1,348,234	
Town of Fuquay-Varina	25,548	185,198	
Town of Garner	30,008	217,529	
City of Goldsboro	33,685	244,184	
City of Havelock	20,089	145,626	
Town of Hillsborough	7,364	53,382	
Town of Holly Springs	32,472	235,391	
Town of Hope Mills	16,660	120,769	
Johnston County	138,403	1,003,288	
City of Kinston	20,393	147,830	
Town of Knightdale	14,417	104,509	
Town of Morrisville	25,242	182,980	
Nash County	41,787	302,915	
Town of Nashville	5,222	37,854	
City of New Bern	29,942	217,051	
Orange County	55,693	403,721	
City of Oxford	8,503	61,639	
Town of Pittsboro	4,602	33,360	
City of Raleigh	439,269	3,184,277	
City of Rocky Mount	54,686	396,421	
City of Roxboro	8,204	59,471	
Town of Smithfield	11,342	82,219	
Town of Spring Lake	6,342	45,973	
Town of Tarboro	10,735	77,818	
Town of Wake Forest	36,398	263,850	
Wayne County	83,005	601,706	
Town of Wendell	6,843	49,605	
Town of Zebulon	4,901	35,528	

# **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 Roxboro is currently in this situation. The City originally involved the public with a public hearing in 2010 and has attempted to create a stormwater committee but has not found a receptive audience. The City has been receptive questions from citizens, maintains a Helpline - City Hall at (336) 599-3116 and has worked with CWEP but continues to struggle to establish effective Public Participation and Involvement. The City did not hold a Stormwater Public Meeting in calendar year of 2019 but will hold one in the future as needed. 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.

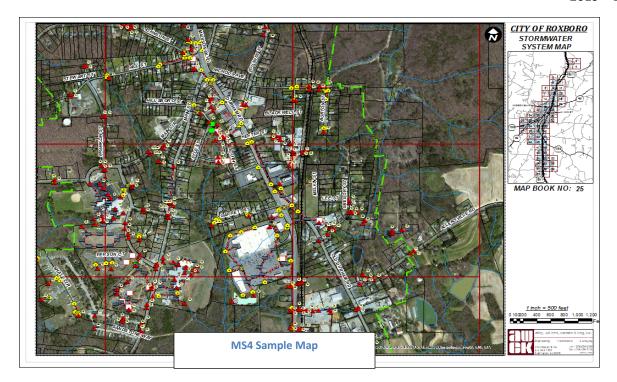
# **Illicit Discharge Detection and Elimination**

The City of Roxboro 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 June 2012 (at the same time as its Phase II and Falls Lake New Development Ordinances). This ordinance was revised on **February 12, 2019**. 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 City's mapping effort is completed. 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 is available for use through GIS and is printable for non-GIS users.



The IDDE program also includes dry weather testing of outfalls into the stream system. In the first permit cycle this is conducted in coordination with the mapping. Outfalls that have dry weather flows are reported and investigated.

In 2019 the City of Roxboro's had no private storm drain failure overflows. no illicit connections, and no rerouted wastewater to stormwater connections were found. Only one case of illegal dumping was found, and it was reported by staff and corrected. The City did smoke testing and video inspections in the sewer and stormwater systems in 2019.

The City's Capital Improvement Budget for 2019 -2020 included funding for culvert repairs at approx. \$140,000. Three Capital Improvement Projects are ongoing.

City Staff are trained on an annual basis as needed 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, and some administrative staff. A possible future improvement would be multiple trainings annually and/or including personnel from other departments including fire and police personnel. Training of new hires might also be a good addition.

# **Construction Site Runoff Controls**

The City of Roxboro delegates the Construction Site Runoff Controls to the NC DEQ Division of Land Quality. The City of Roxboro 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 Roxboro also has the ability to call NC DEQ to report known sedimentation

issues. A possible improvement could be NC DEQ's responsiveness to City generated complaints, which has been less than effective in the past.

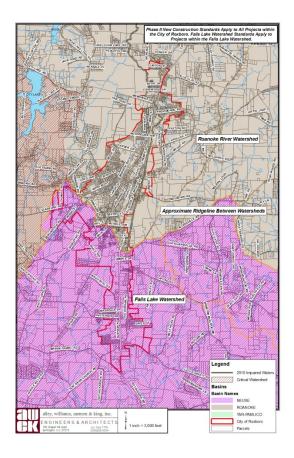
# **Post Construction Site Runoff Controls**

The City of Roxboro 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 is intended to treat two different watersheds. The northern portion of Roxboro is in the Roanoke River Watershed and has only typical NPDES Phase II Stormwater Controls. The southern portion of the City drains to the Neuse River and is within the Falls Lake Watershed. The Falls Lake Watershed is subject to both the Water Supply Watershed restrictions and the Falls Lake Rules restrictions. The below table further explains the differences in the two watersheds.

Stormwater Standards Summary Table				
	Falls Lake Watershed	Roanoke River Watershed		
Residential Exemption	< 1/2 ac	<1 ac		
Commercial Exemption	<12,000 sq ft	<1 ac		
Low Density Option	N/A	Yes (<24% impervious)		
Total Suspended Solids (TSS)	85% reduction	85% reduction		
Post Development Flow	10-yr 24 hr	10-yr 24 hr		
Treatment Volume	1"	1"		
Drawdown Time	48 hour minimum	48 hour minimum		
Stream Buffers	50' (30' undisturbed)*	30' pervious		
Nitrogen Loading	2.2 lb/ac/yr (40% reduction)	No		
Phosphorus Loading	0.33 lb/ac/yr (77% reduction)	No		
O&M	Bond Required	Bond Required		
Easements	Required	Required		

<sup>\*</sup> Projects that impact the 50' riparian buffers on USGS Streams within the Falls Lake Watershed will be required to obtain approval from NC DWQ unless a separate buffer program is adopted by the City of Roxboro.

The City passed its New Development Ordinance in June 2012 *(Revised Feb. 12, 2019)* and the ordinance contains language explaining the different watersheds and establishing the different standards. The City's ordinance also allows for the Stormwater Administrator to require peak flow matching for the 100 year – 24 hour storm.



When a project is submitted to the City it goes through the City Planning Department. During the review process, Public Services Director Andrew Oakley, P.E. reviews the project from both a stormwater and a utility perspective. 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.

In 2019 the City of Roxboro conducted five plan reviews, one of which triggered the Stormwater Ordinance, and no projects were completed.

The City of Roxboro requires as-builts and annual inspection reports from new stormwater control measures (SCM).

# **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 City Hall/Fire Department, Police Station, 2 Fire Substation, Public Services Facility, Water Treatment Plant, Wastewater Treatment Plant, and an Old Public Works Facility. 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.

Approximately 8 tons of salt and no salt brine were used during inclement weather in 2019. The City also recycled 436 gallons of used oil with Noble Oil Services in 2019.

The City of Roxboro sweeps the entire cities streets on a weekly basis, which they estimate to be 800 miles a month. The City's sweeping operation picked up 710 yds. in 2019. Culverts and storm drains are cleaned by jet truck and hand as needed. The City contracts out outfall cleaning.

The City maintains 5 pet waste signs or stations.

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

The City of Roxboro discharges to one impaired stream in the Roanoke River Basin and a different portion of the City is in the Falls Lake Watershed. The impaired stream is Marlow Creek. Marlowe Creek (22-58-12-6b) is impaired for aquatic life. The Falls Lake Watershed is covered later in this report.

# **Falls Lake Rules**

A portion of the City of Roxboro is within the Falls Lake Watershed and is subject to the Falls Lake Nutrient Strategy. The Falls Lake Rules were adopted in January 2011 to restore water quality in the lake by reducing the amount of pollution entering upstream. The rules are a staged nutrient management strategy designed to reduce nutrient discharges to the lake from various sources, including stormwater runoff from new and existing development, wastewater treatment plants and agriculture. The following rules are often referred to as the Falls Lake Rules.:

15A NCAC 02B .0275 - Purpose and Scope

15A NCAC 02B .0276 - Definitions

15A NCAC 02B .0277 - Stormwater Management for New Development

15A NCAC 02B .0278 - Stormwater Management for Existing Development

<u>15A NCAC 02B .0279 – Wastewater Discharge Requirements</u>

15A NCAC 02B .0280 - Agriculture

15A NCAC 02B .0281 – Stormwater Requirements for State and Federal Entities

15A NCAC 02B .0282 - Options for Offsetting Nutrient Loads

15A NCAC 02B .0235 – Amended Neuse River Basin Stormwater Requirements

15A NCAC 02B .0315 – Amended Neuse River Basin

# Falls Lake Background, Rules, and Implementation Schedules

The Falls Lake Project was begun in 1978 by the U.S. Army Corps of Engineers. Construction was completed in 1981. The lake was created to provide flood control, drinking water supply, protection of downstream water quality, fish and wildlife conservation, and recreation.

Following questions in 2004 over the condition of Falls Lake, DWQ began more intensive sampling for use support assessment. A Falls Lake Technical Advisory Committee (TAC) was formed in July 2005 to assist DWQ with the review and modification of the monitoring strategy and developing levels of confidence for decision making associated with the monitoring and lake modeling activities. The field study was completed in fall 2007. Based on water quality data collected between 2002 and 2006, Falls Lake was listed as impaired for chlorophyll a on the draft NC 2008 303(d) list. The portion of the lake above I-85 was also listed as impaired for turbidity.

Following the impairment listing and completion of the study a watershed and lake model were completed by NC DWQ staff in later 2008 and early 2009 and presented to the TAC for their review. At the same time a stakeholder process was conducted to educated watershed stakeholders on lake issues, modeling basics and results, as well as strategy design issues and options. In 2009 and 2010 NC DWQ, with input from stakeholders, drafted the Falls Lake Rules that would be approved by the Environmental Management Commission in November 2010.

The Falls Lake Rules are designed to protect and improve water quality in the lake. Specific issues addressed by the rules include reducing pollution from wastewater discharges, stormwater runoff from new and existing development, agriculture and fertilizer application.

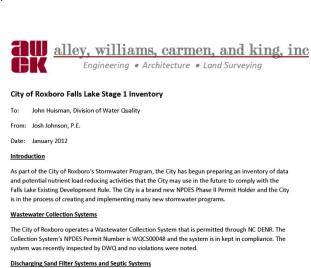
The primary rules that affect local governments (like the City of Roxboro) are the Stormwater Management for New Development, Stormwater Management for Existing Development, Protection of Existing Riparian Buffers, Wastewater Discharge Requirements, and Options for Offsetting Nutrients Loads. The Protection of Existing Riparian Buffer Rules impacts development within the watershed but is implemented by NC DENR while the Wastewater Discharge Requirements do not apply to Roxboro because Roxboro's water supply and wastewater discharge are both in the Roanoke River Watershed.

The New Development Program's went into effect in 2012 and are discussed in the above section of the report with the NPDES Phase II Post Construction Program. The City of Roxboro adopted the first stage of its Existing Development Program in January 2012. The first stage for Roxboro was to complete a "Stage 1 Inventory."

# **Existing Development Stage 1 Programs**

The City of Roxboro's Stage 1 Inventory included information about its Wastewater Collection System, Discharging Sand Filter Systems and Septic Systems within the City, Potential Restoration Opportunities in Utility Corridors, Fertilizer Management Plans, Structural Stormwater Practices, and Restoration Opportunities for Wetlands and Riparian Buffers.

In the future, the City will need to establish a Stage 1 Nutrient Reduction Program that will contain plans to reduce any post-baseline loading within the City's jurisdictional area to the baseline loadings. This reduction and plan will be established at a later date but the reduction required within Roxboro will be limited because all development with the Falls Lake Watershed in Roxboro is also within the Water Supply Watershed and has had at least a partial offset of nutrient loading. Additionally, development within the last 5 years has been limited within the Falls Lake Watershed.



The City of Roxboro has no known discharging sand filters and very limited information about septic systems within the city limits. Septic Systems are regulated through the Person County Health Department. The City only knows of one area within the city limits that has septic and the City has plans to provide connections to these 5 homes in the near future. Any information concerning septic should be in an inventory prepared by Person County.

### Restoration Opportunities in Utility Corridors

The City of Roxboro is not aware of any restoration opportunities within existing utility corridors.

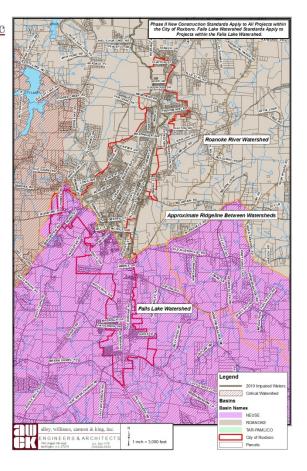
### Fertilizer Management Plans

All Fertilizer Applicators for the City of Roxboro are appropriately licensed by the North Carolina Cooperative Extension Service and all application rates would be in accordance with NCCES guidelines

### Structural Stormwater Practices

The City of Roxboro has begun mapping their MS4. The mapping of the MS4 will prioritize the Falls Lake watershed within the City and will identify structural stormwater practices which will then be inspected during the mapping process.

740 Chapel Hill Road (27215) - P.O. Box 1179 - Burlington, North Carolina 27216 *Tel.* - (336)226-5534 - *Fax* – (336)226-3034 - awck.com



# **Future Existing Development Stage 2 Programs**

The City of Roxboro will probably be required to establish a Stage 2 Existing Development Program in 2021. This program will be intended to continue the Stage 1 program and for the City of Roxboro to provide either of the following:

- A. Achieve additional annual reductions in nitrogen and phosphorus loads from existing development greater than or equal to the average annual additional reductions achieved in the last seven years of Stage I.
- B. Provide for an annual expenditure that equals or exceeds the average annual amount the local government has spent to achieve nutrient reductions from existing development during the last seven years of Stage I.

However, it is certainly possible, perhaps even probable that the regulations governing Stage 2 will change before 2021.

# **Falls Lake Annual Report**

The City of Roxboro has had no staffing changes within this past year, Andy Oakley is the Public Services Director.

In 2019 - 2020 there were no Roxboro annexation areas into the Falls Lake watershed.

There was also no projects and no BMP's installed. There were also no enforcement actions taken this year for violations of program requirements.

# **Stormwater Funding**

The City of Roxboro funds it's Stormwater Programs through a Stormwater Fee. The City collects a flat fee from utility users within the City Limits. The City uses this fee to pay for its Water Quality Programs including its NPDES Phase II, Falls Lake, and Street Sweeping Programs. The FY 19 -20 Adopted Stormwater Budget was \$250,000.00. There was no increase in Fees this year.

In the future, the stormwater budget will need to be increased in order to cover additional expenses for the Falls Lake Rules. 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. The future cost of Falls Lake may be offset by completion of the MS4 Mapping Program.

### The Future of Stormwater

Stormwater, and Water Quality in particular, is an evolving field of regulation. The City of Roxboro is already involved in NPDES Phase II 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 <a href="http://water.epa.gov/lawsregs/lawsguidance/wqs\_index.cfm">http://water.epa.gov/lawsregs/lawsguidance/wqs\_index.cfm</a>, 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
Andrew Oakley	Public Services Director	(336)599-5658	aoakley@cityofroxboro.com
Josh Johnson	Stormwater Engineer	(336)226-5534	josh@awck.com
Tommy Warren	Assistant City Manager	(336)599-5658	twarren@cityofroxboro.com