July 13, 2011
Revised Dec. 6, 2011

Mr. John Huisman
NC DWQ
Nonpoint Source Planning Unit
1617 Mail Service Center
Raleigh, NC 27699-1617

RE: Falls Lake Nutrient Management Strategy
Stormwater Ordinance Revisions
Franklin County

Dear John:

In compliance with the new Falls Lake Nutrient requirements, Franklin County has revised their Stormwater Ordinance in accordance with the model local stormwater program. Attached are two (2) copies of the revised ordinance for your review.

In accordance with the Guidance Document for Local Governments (3.10.11), we also note the following:

1. **PROPOSED ADOPTION TIMELINE AND EFFECTIVE DATE**

   In accordance with the Model Program schedule, Franklin County will implement the new regulations as outlined below:

<table>
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<td>July 13, 2011</td>
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<td>August 1, 2011</td>
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<td>July 2012</td>
<td>County enacts new regulations</td>
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<td>August 2013, and annually</td>
<td>County submits annual progress reports to the Commission</td>
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2. **OTHER STORMWATER PROGRAMS**

   Franklin County has the following stormwater programs in place:
   a. Franklin County Tar-Pamlico River Basin Stormwater Program for Nutrient Control (adopted 9.20.04)
   b. Flood Damage Prevention Ordinance (adopted 12.15.03)
3. **STATEMENT OF RIPARIAN BUFFER ORDINANCE COMPLIANCE**

Protection of riparian buffers is ensured in Section 7, “Riparian Buffer Requirements.”

In addition, NCDWQ reviewed and approval the updated Franklin County Stormwater text addressing the requirements of the Tar-Pamlico stormwater rule (see enclosed DWQ letter dated 7.19.07).

4. **STATE AND FEDERAL ENTITIES IMPLEMENTATION**

As stated in Section 4.4.C,

“Franklin County interprets the Falls State and Federal Rule [Rule 15A NCAC 02B .0281] (Session Law 2006-246) as requiring the County to apply the requirements of this rule to state and federal projects that do not have an NPDES stormwater permit. In regards to stormwater regulations, Franklin County intends to permit state and federal projects relative to the requirements of this rule.”

5. **AREA OF APPLICABILITY**

As stated in chapter 2 of the Franklin County Unified Development Ordinance (UDO),

“The locations and boundaries of each of the zoning districts shall be shown on the map accompanying this Ordinance and made a part hereof entitled “Official Zoning Map, Franklin County” dated October 8, 2001, and adopted by the County Board of Commissioners.

Section 2, “Purpose and Intent,” of the Stormwater Ordinance, describes that the stormwater management area has been established for both the Tar-Pamlico River Basin and Falls Lake Watershed areas in Franklin County.

6. **MINIMUM QUALIFICATIONS OF STORMWATER ADMINISTRATOR**

Stormwater review is under the authority of the Franklin County Planning Director. As stated in Section 5.12, the County intends to retain expert assistance for the implementation of the stormwater program, including stormwater plan review and BMP inspection. “Minimum qualifications are persons performing services only in their area of competence, including professional engineer, registered North Carolina professional surveyor, landscape architect, soil scientist, aquatic biologist, or a person certified by the North Carolina Cooperative Extension Service to approve stormwater management plans or to inspect BMPs.”

7. **MAINTENANCE/ INSPECTION PROGRAM**

As outlined in detail in Section 6, the maintenance/ inspection program includes:

a. Annual inspection and reporting requirements by properly qualified BMP inspectors,
b. Legally recorded maintenance agreements

c. Performance security

d. As-built drawing including location tied into the NC Grid so that each BMP can be located on the County GIS, and a BMP database can be maintained.
8. **FORMS IN ADMINISTRATIVE MANUAL**

Included in the Appendix of the Stormwater Ordinance is a copy of the following forms to be used in the permitting and compliance process.

- a. Franklin County Stormwater Jurisdiction Map: Falls Lake Watershed, etc.
- b. Stormwater Management Review Application
- c. Stormwater Management Checklist
- d. Export Calculation Worksheets and Supporting Information
- e. Nutrient Offset Mitigation (NCEEP) Payment Summary
- f. Example Stormwater Operation and Maintenance Legal Agreement
- g. Example BMP Operation and Maintenance Plan
- h. Example BMP Supplement Forms
- i. Stormwater BMP Annual Certification Form
- j. Stormwater BMP Annual Inspection Report Form
- k. Example Conservation Easement
- l. 15A NCAC 2B .0258 Tar-Pamlico River Basin - Nutrient Sensitive Waters Management Strategy: Basinwide Stormwater Requirements
- m. The Nitrogen Cycle
- n. 15A NCAC 2B 0.0277 Falls Water Supply Nutrient Strategy: Stormwater Management for New Development
- o. Jordan/Falls Stormwater Load Accounting Tool
- p. Example Illicit Discharge Screening Report Form
- q. Example Letter to Prevent Illegal Discharges
- r. Sample Public Education Action Plan and Report

9. **ORDINANCE**

A copy of the revised Franklin County Stormwater Ordinance is included in this package for your review.

10. **NUTRIENT LOADING TOOL**

As shown in the Franklin County Stormwater Ordinance Section 8.4, applicants are to use the Jordan/Falls Lake Stormwater Load Accounting Tool provided by NCDENR.

11. **APPENDIX OF SUPPORTING INFORMATION**

a. **Program Contacts:**

1) Scott Hammerbacher  
Franklin County Planning Director  
Franklin County Planning & Inspections  
215 E. Nash Street  
Louisburg, NC 27549  
919.496.2909  
shammerbacher@franklincountync.us

2) Donna Wood  
Franklin County Senior Planner  
Franklin County Planning & Inspections  
215 E. Nash Street  
Louisburg, NC 27549  
919.496.2909  
dwood@franklincountync.us
3) David C. Revoir, PE  
Stormwater Consultant  
Appian Consulting Engineers, PA  
PO Box 7966  
Rocky Mount, NC 27804  
252.972.7703, voice  
252.972.7638, fax  
drevoir@appianengineers.com

b. **Stormwater Map:** included in Appendix A of the Stormwater Ordinance

c. **Forms:** included in Appendix of Stormwater Ordinance

12. **SUPPLEMENTAL INFORMATION**

a. **Program Approval**

Revisions to the Franklin County Stormwater Ordinance are viewed as an amendment to the Unified Development Ordinance (UDO) and will be reviewed as follows:

- **County Staff Review**
- **Letter to Local Home Builders Association**
- **County Attorney Review & Cursory Approval**
- **DWQ Approval**
- **Planning Board Meeting & Approval**
- **Public Comment** (minimum advertisement of 10 business days)
- **County Commissioners Meeting & Approval**

b. ** Ordinance Changes** are shown in **purple** on the enclosed ordinance. Upon approval of the ordinance from DWQ, we will revise the text to be black.

c. **Appeals Process:** As noted in Section 5.13, “Any aggrieved person may file an appeal to the Board of Adjustment as outlined in the Franklin County UDO.”
Thank you for your review of the enclosed materials. Please let me know if you have any additional comments or concerns.

Respectfully,

_Appian Consulting Engineers, P.A._

David C. Revoir, PE
drevoir@appianengineers.com

cc: Scott Hammerbacher, Franklin County
    Donna Wood, Franklin County
**REVISIONS TO FRANKLIN COUNTY STORMWATER ORDINANCE**

To incorporate Falls Lake Nutrient Management Strategy Requirements

Dec. 6, 2011

The content and structure of the Franklin County Stormwater Ordinance has significantly changed since the 2004 adopted ordinance. The proposed structure resembles the ordinance revised in 2007 and more closely follows the NCDENR Model Ordinances. Revisions from the 2007 NCDENR approved (though not County adopted) ordinance are shown in purple in the proposed ordinance prepared for NCDENR DWQ approval in July 2011 and Dec. 2011.

Below is a brief summary of additional revisions to the ordinance:

1. Additional definitions
2. References to the County’s Watershed Ordinance
3. Clarification of Tar Pam, Neuse and Falls Lake watershed requirements
4. Description of nutrient offset buy-down procedure with NCEEP
5. Reference to NCDENR Erosion Control requirements
6. Addition of application form and clarification of stormwater management plan requirements
7. Clarification of roles of the Stormwater Administrator (County Planning Director)
8. Clarification of Operation and Maintenance requirements
9. Addition of Falls Lake Watershed Stormwater Ordinance
10. Additions to Appendix, including:
    - Stormwater Jurisdiction Map
    - Stormwater Management Review Application
    - Stormwater management Checklist
    - NCEEP Payment Summary
    - Example Operation and Maintenance Legal Agreement
    - Stormwater BMP Annual Certification Form
    - Stormwater BMP Annual Inspection Report Form
    - Jordan/Falls Stormwater Load Accounting Tool
## FALLS MODEL ORDINANCE PROVISIONS CROSS-REFERENCE

**With the Franklin County Stormwater Ordinance**

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***SEE CROSS REFERENCE NOTES NEXT PAGE***
CROSS-REFERENCE NOTES:

1. Interpretation: Section 5.11.B states that the Stormwater Administrator has the authority to make determinations and render interpretations of this ordinance. Section 5.13 provides a venue for any aggrieved person affected by the interpretation of the ordinance.

2. Applications for Approval – Concept Plan & Consultation Meeting: Pre-application and concept plan requirement Not included due to limited staff resources

3. Dedication of BMPS; Facilities & Improvements: Omitted; County does not publicly maintain any BMPS; no method in County resources available for BMP maintenance

4. Variances: Section 5.6 states that:
   
   Any applicant claiming a variance to one or more requirements of this ordinance shall submit evidence of valid approval of such variance at the time of permit application per Article 24 of the Franklin County UDO.

   Section 7.8 states that:
   
   No variance may fail to meet the min. req’ts of DWQ rules without prior approval from NCDENR DWQ.

5. Dedication of BMPS; Facilities & Improvements: Omitted; County does not publicly maintain any BMPS; no method in County resources available


   According to the Model Ordinance Commentary this is an optional provision for a maintenance easement. Franklin County will not maintain BMPs that serve private property, in order to minimize governmental liability for problems caused by flooding or other drainage issues, under North Carolina case law.

7. Enforcement & Violations- Authority: Section 5.11 describes the authority of Stormwater Administrator to enforce the ordinance. Section 6.5 describes that:

   Any violation of the Maintenance agreement shall be considered a violation of the Unified Development Ordinance and shall be enforced in accordance with Article 25 of the Franklin County UDO. In addition, if the situation meets the definition of a nuisance as defined in NCGS 153A-140 other corrective actions may be taken.

8. Remedies & Penalties: Section 5.13 states that:

   The provisions of this ordinance may be enforced by one, all, or a combination of the remedies authorized by Article 25 of Franklin County UDO.
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The structure of this document has significantly changed since the 2004 adopted ordinance. This proposed structure resembles the ordinance revised in 2007 and more closely follows the NCDENR Model Ordinances.

Revisions from the 2007 NCDENR approved (though not adopted) ordinance are shown in this document in purple text.
SECTION 8 — FALLS LAKE WATERSHED STORMWATER ORDINANCE
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</table>
Section 1 — AUTHORITY

These regulations, officially known as the “Franklin County Stormwater Ordinance,” are adopted pursuant to the authority vested in Franklin County by the Session Laws and the General Statutes of North Carolina, particularly Article 18, Parts 1, 2, 3, and 4, Chapter 153A-140, Chapter 153A-121; North Carolina General Statutes Chapter 143-214.7 and rules promulgated by the Environmental Management Commission thereunder; Chapter 143-215.6A; Chapter 153A-454; Chapter 160A, §§ 174, 185, 459; and any special local legislation enacted by the General Assembly for Franklin County.
Section 2 — PURPOSE AND INTENT

Pursuant to requirements of the North Carolina Administrative Code Section 15A NCAC 2B .0200 Classifications and Water Quality Standards Applicable to Surface Waters and Wetlands of North Carolina, and Section 15A NCAC 2B .0258 Tar-Pamlico River Basin Nutrient Sensitive Waters Management Strategy: Basinwide Stormwater Requirements, the Tar-Pamlico River Basin Stormwater Management Area has been established. This area is for lands within the Tar-Pamlico River Basin in Franklin County. Wherever other County ordinances and regulations differ from the Tar-Pamlico River Basin standards, the more restrictive provisions shall apply. Additional information may obtained at: http://portal.ncdenr.org/web/wq/ps/nps/tarpamlico

A small portion of southern Franklin County is located within the Falls Lake Watershed. New development within the Falls Lake Watershed must comply with the “Falls Lake Watershed Stormwater Ordinance,” Section 8. Additional information may be obtained at: http://portal.ncdenr.org/web/wq/ps/nps/fallslake

Internet hyperlinks are included in this ordinance for the benefit of the user and are subject to change.

FRANKLIN COUNTY STORMWATER MAP

[Map showing Tar-Pamlico River Basin, Neuse River Basin, Falls Lake Watershed, and Municipality]
The purpose of the County Commissioners in adopting these regulations is to protect the water quality of the Tar-Pamlico River Basin by addressing nitrogen loading reduction by 30% from 1991 levels and hold phosphorus loading to 1991 levels. The Tar-Pamlico River Basin Stormwater Management Ordinance for Franklin County shall achieve this by utilizing the following approach:

A. Review of stormwater management plans for new developments to ensure that:

1. The nitrogen load contributed by the proposed new development activity shall not exceed 70 percent of the average nitrogen load contributed by the non-urban areas in the Tar-Pamlico River basin based on land use data and nitrogen export research data. Based on 1995 land use data and available research, the nitrogen load value shall be 4.0 pounds per acre per year;

2. The phosphorus load contributed by the proposed new development activity shall not exceed the average phosphorus load contributed by the non-urban areas in the Tar-Pamlico River basin based on land use data and phosphorus export research data. Based on 1995 land use data and available research, the phosphorus load value shall be 0.4 pounds per acre per year;

B. Review of new development plans for compliance with requirements for protecting and maintaining existing riparian areas.

C. Identification and removal of illegal discharges.
Section 3 —DEFINITIONS AND CONSTRUCTION

For the purpose of this Ordinance, these terms shall be defined as follows:

Applicator. Any person, firm, corporation, wholesaler, retailer, distributor, any local, state or federal governmental agency, or any other person who applies fertilizer to the land of a consumer, or client, or to land they own, or to land they lease or otherwise hold rights.

Approved Accounting Tool: The accounting tool for nutrient loading approved by the EMC for the relevant geography and development type under review.

The Falls Lake Stormwater Load Accounting Tool worksheet is available online at: http://www.co.franklin.nc.us/Planning/LongRange/stormwater.htm

Best Management Practice (BMP). Means a structural or non-structural management-based practice used singularly or in combination to reduce nonpoint source inputs to receiving waters in order to achieve water quality protection goals.

Buffer. A natural or vegetated area through which stormwater runoff flows in a diffuse manner so that the runoff does not become channelized and which provides for infiltration of the runoff and filtering of pollutants.

Built-upon area (BUA). That portion of a development project that is covered by impervious or partially impervious cover including buildings, pavement, gravel areas (e.g. roads, parking lots, paths), recreation facilities (e.g. tennis courts) etc. (Note: Wooden slatted decks and the water area of a swimming pool are considered pervious). "Built-upon area" does not include pervious or partially pervious paving material to the extent that the paving material absorbs water or allows water to infiltrate through the paving material.

Channel. A natural water-carrying trough eroded vertically into low areas of the land surface by erosive action of concentrated flowing water or a ditch or canal excavated for the flow of water.


Development. Any land-disturbing activity which adds to or changes the amount of impervious or partially impervious cover (built-upon area) on a land area or which otherwise decreases the infiltration of precipitation into the soil. [15A NCAC 2B.202 (23)].

Discharge. The addition of any human-induced effluent either directly or indirectly to surface waters.

Ditch or canal. A constructed channel, other than a modified natural stream constructed for drainage purposes, that is typically dug through inter-stream divided areas. A ditch or canal may
have flows that are perennial, intermittent, or ephemeral and may exhibit hydrological and biological characteristics similar to perennial or intermittent streams.

**Disturbed Area.** Any use of the land that results in a change in the natural cover or topography that may cause or contribute to sedimentation including, but not limited to: grubbing, stump removal, grading or removal of structures.

**Domestic wastewater discharge.** The discharge of sewage, non-process industrial wastewater, other domestic wastewater, or any combination of these items. Domestic wastewater includes, but is not limited to, liquid waste generated by domestic water using fixtures and appliances, from any residence, place of business, or place of public assembly, even if it contains no sewage. Examples of domestic wastewater include once-through non-contact cooling water, seafood packing facility discharges, and wastewater from restaurants.

**DWQ.** Division of Water Quality, NC Department of Environment and Natural Resources.

**Effluent channel.** A discernable, confined, and discrete conveyance that is used for transporting treated wastewater to a receiving stream or other body of water.

**Ephemeral (stormwater) stream.** A feature that carries only stormwater in direct response to precipitation with water flowing only during and shortly after large precipitation events. An ephemeral stream may or may not have a well-defined channel; the aquatic bed is always above the water table, and stormwater runoff is the primary source of water. An ephemeral stream typically lacks the biological, hydrological, and physical characteristics commonly associated with continuous or intermittent conveyance of water.

**Existing Development:** Development not otherwise exempted by this ordinance that meets one of the following criteria:

a. It either is built or has established a statutory or common-law vested right as of the effective date of this ordinance; or

b. It occurs after the effective date of this ordinance, but does not result in a net increase in built-upon area and does not decrease the infiltration of precipitation into the soil

**Engineered stormwater control:** A physical device designed to trap, settle out, or filter pollutants from stormwater runoff; to alter or reduce stormwater runoff velocity, amount, timing, or other characteristics; to approximate the pre-development hydrology on a developed site; or to achieve any combination of these goals. Engineered stormwater control includes physical practices such as constructed wetlands, vegetative practices, filter strips, grassed swales, and other methods installed or created on real property. “Engineered stormwater control” is synonymous with “structural practice,” “stormwater control facility,” “stormwater control practice,” “stormwater treatment practice,” “stormwater management practice,” “stormwater control measures,” “structural stormwater treatment systems,” and similar terms used in this ordinance. It is a broad term that may include practices that do not require design by a professionally licensed engineer.

**Fertilizer.** Any substance containing nitrogen or phosphorous which is used primarily for its plant food content.

**Forest plantation.** An area of planted trees that may be conifers (pines) or hardwoods. On a plantation, the intended crop trees are planted rather than naturally regenerated from seed on the site, coppice (sprouting), or seed that is blown or carried into the site.
**Forest vegetation.** The plants of an area which grow together in disturbed or undisturbed conditions in various wooded plant communities in any combination or trees, saplings, shrubs, vines, and herbaceous plants. This includes mature and successional forests as well as cutover stands.

**Industrial discharge.** The discharge of industrial process treated wastewater or wastewater other than sewage. Stormwater shall not be considered to be an industrial wastewater unless it is contaminated with industrial wastewater. Industrial discharge includes:
- Wastewater resulting from any process of industry or manufacture, or from the development of any natural resource;
- Wastewater resulting from processes of trade or business, including wastewater from Laundromats and car washes, but not wastewater from restaurants; or
- Wastewater discharged from a municipal wastewater treatment plant requiring a pretreatment program.

**Intermittent stream.** A natural drainage way, which appears as a blue line on the USGS 7.5 minute quadrangle maps and has a contributing drainage area of 300 acres or more shall be considered an intermittent stream for the purposes of this ordinance.

NCDENR defines an intermittent stream as a “well-defined channel that contains water for only part of the year, typically during winter and spring when the aquatic bed is below the water table. The flow may be heavily supplemented by stormwater runoff. An intermittent stream often lacks the biological and hydrological characteristics commonly associated with the conveyance of water.” [15A NCAC 02B.0233(2)(g)].

**Land-disturbing activity.** Any use of the land that results in a change in the natural cover or topography that may cause or contribute to sedimentation [15A NCAC 2B.20 .(37)]. Any activity which changes the volume or peak flow discharge rate of rainfall runoff from the land surface. This may include the grading, digging, cutting, scraping, or excavating of soil, placement of fill materials, paving, construction, substantial removal of vegetation, or any activity which bares soil or rock, involves the diversion or piping of any natural or man-made watercourse, or the establishment of new impervious surface. The term “land disturbing” shall also include the term “land disturbance.”

**Larger common plan of development or sale.** Any area where multiple separate and distinct construction or land-disturbing activities will occur under one plan. A plan is any announcement or piece of documentation (including but not limited to a sign, public notice or hearing, sales pitch, advertisement, loan application, drawing, 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.

**Major variance.** A variance from the minimum statewide watershed protection or Falls rules that results in the relaxation, by a factor greater than five percent (5%) of any buffer, density or built-upon area requirement under the high density option; any variation in the design, maintenance or operation requirements of a wet detention pond or other approved stormwater management system; or relaxation by a factor greater than 10 percent (10%), of any management requirement under the low density option. For provisions in this ordinance that are more stringent than the state's minimum water supply protection rules and Falls rules, a variance to this ordinance is not considered a major variance as long as the result of the variance is not less stringent than the state's minimum requirements. [15A NCAC 2B.202, plus 15A NCAC 2B.104].
**Minor variance.** A variance from the minimum statewide watershed protection or Falls rules that results in a relaxation, by a factor of up to five percent (5%) of any buffer, density or built-upon area requirement under the high density option; or that results in a relaxation by a factor up to 10 percent (10%), of any management requirement under the low density option.

**Modified natural stream.** An on-site channelization or relocation of a stream channel and subsequent relocation of the intermittent or perennial flow as evidenced by topographic alterations in the immediate watershed. A modified natural stream must have the typical biological, hydrological and physical characteristics commonly associated with continuous conveyance of water.

**Nonpoint source pollution.** Pollution which enters waters mainly as a result of precipitation, and subsequent runoff from lands, which have been disturbed by human activity, and includes all sources of water pollution which are not required to have a permit in accordance with G.S. 143-215.1(c).

**Nutrients.** Nitrogen and phosphorus, which if present in excessive amounts within a water body, can lead to large growths of algae, low dissolved oxygen concentrations, and other water quality problems.

**Nutrient sensitive waters.** Those waters which are so designated in the classification schedule in order to limit the discharge of nutrients (usually nitrogen and phosphorous). They are designated by “NSW” following the water classification.

**1-year, 24-hour storm.** The surface runoff resulting from a 24-hour rainfall of an intensity expected to be equaled or exceeded, on average, once in 12 months and with a duration of 24 hours [SL 2004-163].

**Operation and Maintenance Agreement (O&M).** A legally recorded document that acts as a property deed restriction, and which provides for long-term maintenance or stormwater management practices.

**Outfall.** A point at which stormwater (1) enters surface water or (2) exits the property of a particular owner.

**Owner.** The legal or beneficial owner of land, including but not limited to a mortgagee or vendee in possession, receiver, executor, trustee, or long-term or commercial lessee, or any other person or entity holding proprietary rights in the property or having legal power of management and control of the property. “Owner” shall include long-term commercial tenants; management entities, such as those charged with or engaged in the management of properties for profit; and every person or entity having joint ownership of the property. A secured lender not in possession of the property does not constitute an owner, unless the secured lender is included within the meaning of “owner” under another description in this definition, such as a management entity.

**Perennial stream.** Perennial streams are streams that have essentially continuous flows. NCDENR defines a perennial stream as “a well-defined channel that contains water year round during a year of normal rainfall with the aquatic bed located below the water table for most of the year. Groundwater is the primary source of water for a perennial stream, but it also carries stormwater runoff. A perennial stream exhibits the typical biological, hydrological and physical..."
characteristics commonly associated with continuous conveyance of water.” 15A NCAC 02B .0233(2)(i)

**Perennial water body.** A natural or constructed basin that stores surface water permanently at depths sufficient to preclude growth of rooted plants, including lakes, ponds, sounds, non-stream estuaries, and oceans.

**Person.** Includes, without limitation, individuals, firms, partnerships, associations, institutions, corporations, municipalities and other political subdivisions, and governmental agencies [G.S. 143-212(4)].

**Pollutant.** Means anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordinances, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

**Redevelopment.** Any development on previously-developed land. Redevelopment of structures or improvements that (i) existed prior to December 2006 and (ii) would not result in an increase in built-upon area and (iii) provides stormwater control at least equal to the previous development is not required to meet the nutrient loading targets of this ordinance. [15A NCAC 2B.0277 (3)(a)].

**Redevelopment Area.** Any area, such as a historic crossroads community or other existing developed area, for which the Board of County Commissioners establishes a redevelopment strategy that is conducive to the goals of the Tar-Pamlico nutrient strategy, addressing the following criteria:

1. A “fix it first” policy that reserves public funds for repair of existing infrastructure in these areas before investing in new infrastructure of the same type in new growth areas.
3. Retrofits are consistent with NCDOT definitions for pedestrian scale in traditional neighborhood developments (e.g., 80% of users are within a ¼ mile walk from schools, libraries, and recreational/athletic facilities, 60% of students and 50% of teachers are within ½ mile walk from schools, and 40% of congregants are within ¼ mile from churches).
4. Parking maximums or shared parking rations.
5. Residential density bonuses where parking maximums, pedestrian scale, or “fix it first” are proposed.

**Residential Development.** Buildings for residence such as attached and detached single family dwellings, apartment complexes, condominiums, townhouses, cottages, and their associated outbuildings such as garages, storage buildings, and gazebos.

**Stormwater Administrator:** For the purposes of this ordinance the Stormwater Administrator shall be the Franklin County Planning Director or Designee.
**Stormwater collection system.** Any conduit, pipe, channel, curb, or gutter for the primary purpose of transporting (not treating) run-off. A stormwater collection system does include vegetated swales, swales stabilized with armoring or alternative methods where natural topography prevents the use of vegetated swales (subject to case-by-case review), curb outlet systems or pipes used to carry drainage underneath built-upon surfaces that are associated with development controlled by the provisions of 15A NCAC 2H 1003(c)(1).

**Stormwater Treatment Practices (STP’s).** Measures, either structural or nonstructural, that are determined to be the most effective, practical means or preventing or reducing point source or non-point source pollution inputs to stormwater runoff and water bodies.

**Stormwater System.** All engineered stormwater controls owned or controlled by a person that drain to the same outfall, along with the conveyances between those controls. A system may be made up of one or more stormwater controls.

**Stream.** A body of concentrated flowing water in a natural low area or natural channel on the land surface

**Substantial Progress.** For the purposes of determining whether sufficient progress has been made on an approved plan, one or more of the following construction activities toward the completion of a site or subdivision plan shall occur: obtaining a grading permit and conducting grading activity on a continuous basis and not discontinued for more than thirty (30) days; or installation and approval of on-site infrastructure; or obtaining a building permit for the construction and approval of a building foundation. “Substantial progress” for purposes of determining whether an approved plan is null and void is not necessarily the same as “substantial expenditures” used for determining vested rights pursuant to applicable law.

**Tree.** A woody plant with a DBH equal to or exceeding five inches.

**Waste disposal.** The use of waters for disposal of sewage, industrial waste or other waste after approved treatment.

**Wetlands.** “Waters” as defined by G.S. 143-212(6) and are areas that inundated or saturated by an accumulation of surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands do generally include swamps, marshes, bogs and similar areas. Wetlands classified as waters of the State are restricted to waters of the United States as defined by 33 CFR 328.3 and 40 CFR 230.3.
Section 4 — NEW DEVELOPMENT REVIEW

Development and redevelopment must comply with all other applicable sections of the Franklin County Unified Development Ordinance. Wherever other County or State ordinances and regulations differ from the Stormwater Ordinance, the more restrictive provisions shall apply.

The Franklin County UDO is available at the Franklin County website:
http://www.franklincountync.us/services/planning-and-inspections

4.1 WATERSHED ORDINANCE

A. Watershed Areas

As shown in the Watershed Protection Overlay District portion of the UDO, (Article 20), the County is hereby divided into the following areas as appropriate:

- WS-I: No areas currently exist in Franklin County
- WS-II-CA: (Critical Area)
- WS-II-BW: (Balance of Watershed)
- WS-IV-CA: (Critical Area)
- WS-IV-PA: (Protected Area)
- WS-V-RS: (River Segment)

B. Watershed Areas Described

Descriptions of the above watersheds are provided below, as excerpted from the County Watershed Ordinance.

1. WS-I Watershed Areas
   The intent is to provide maximum protection for water supplies within essentially natural and undeveloped watersheds by allowing only low intensity uses. No residential or nonresidential uses are allowed except those listed below. Impacts from non-point source pollution shall be minimized.

2. WS-II Watershed Areas - Critical Area (WS-II-CA)
   In order to maintain a predominately undeveloped land use intensity pattern, single-family residential uses shall be allowed at a maximum density of one (1) dwelling unit per eighty thousand (80,000) square feet. The built-upon area of all residential and nonresidential development shall be allowed at a maximum Impervious Surface Ratio of six percent (6%). Projects must be constructed according to detailed development drawings which minimize built-upon surface area, protect naturally vegetated areas, direct stormwater away from surface waters, and incorporate Best Management Practices to minimize water quality impacts. Landfills and sludge application sites are specifically prohibited.

In order to maintain a predominately undeveloped land use intensity pattern, single-family residential uses shall be allowed at a maximum density of one (1) dwelling unit per forty thousand (40,000) square feet. The built-up area of all residential and nonresidential development shall be allowed at a maximum Impervious Surface Ratio of twelve percent (12%). Projects must be constructed according to detailed development drawings which minimize built-upon surface area, protect naturally vegetated areas, direct stormwater away from surface waters, and incorporate Best Management Practices to minimize water quality impacts. Landfills and sludge application sites are specifically prohibited.

4. **WS-IV Watershed Areas - Critical Area (WS-IV-CA).**

Only new development activities that require an erosion/sedimentation control plan under the State law or approved local program are required to meet the provisions of this Ordinance when located in the WS-IV watershed. In order to address a moderate to high land use intensity pattern, single-family residential uses are allowed at a maximum density of one (1) dwelling unit per twenty thousand (20,000) square feet. The built-up area of all residential and nonresidential development shall be allowed at a maximum Impervious Surface Ratio of twenty-four percent (24%). Projects must be constructed according to detailed development drawings which minimize built-upon surface area, protect naturally vegetated areas, direct stormwater away from surface waters, and incorporate Best Management Practices to minimize water quality impacts. Landfills and sludge application sites are specifically prohibited.

5. **WS-IV Watershed Areas - Protected Area (WS-IV-PA).**

Only new development activities that require an erosion/sedimentation control plan under the State law or approved local program are required to meet the provisions of this Ordinance when located in the WS-IV watershed. In order to address a moderate to high land use intensity pattern, single-family residential uses shall develop at a maximum density of one (1) dwelling unit per twenty thousand (20,000) square feet. The built-up area of all residential and nonresidential development shall be allowed at a maximum Impervious Surface Ratio of twenty-four percent (24%). Projects must be constructed according to detailed development drawings which minimize built-upon surface area, protect naturally vegetated areas, direct stormwater away from surface waters, and incorporate Best Management Practices to minimize water quality impacts. Landfills and sludge application sites are allowed. A maximum density of one (1) dwelling unit per fifteen thousand (15,000) square feet or a built-up area of thirty-six percent (36%) Impervious Surface Ratio is allowed for projects without a curb and gutter street system.

Developers should contact the County Watershed Administrator for the administration of required activities within the regulated Surface Water Public Water Supply Watersheds.

4.2 **TAR-PAM VS FALLS LAKE WATERSHED REQUIREMENTS**

Developers may refer to the Stormwater Jurisdiction Map or the NCDENR Interactive Stormwater Map (http://149.168.87.13/stormwater/) to help identify their location within the following watersheds in Franklin County:
A. Neuse River Basin

Development and redevelopment within the Neuse River Basin is exempt from Stormwater Review [15A NCAC 2B .0235]. However, any encroachment within a Neuse River Basin riparian buffer, wetland or stream is subject to NCDENR DWQ approval. Developments within the Neuse River Basin are required to submit a Stormwater Management Review Application in Appendix A.

Additional information about Neuse Nutrient Strategy may be obtained at: http://portal.ncdenr.org/web/wq/ps/nps/neuse

B. Tar-Pamlico River Basin

New development or redevelopment within the Tar/Pamlico Basin must comply with the following:

6. Riparian areas must be protected and maintained in compliance with the Division of Water Quality rules and regulations 15A NCAC 2B .0259.

7. Nitrogen load contribution must not exceed 4.0 lbs per acre per year and Phosphorus must not exceed 0.4 lbs per acre per year, and

8. No net increase in peak flow leaving the site from the predevelopment conditions for the 1-year, 24-hour storm.

9. Additional information about Tar-Pamlico Nutrient Strategy may be obtained at: http://portal.ncdenr.org/web/wq/ps/nps/tarpamlico

C. Falls Lake Watershed

New development or redevelopment within the Falls Lake Watershed portion of southern Franklin County must comply with the Falls Lake New Development Stormwater requirements outlined in Section 8.

Additional information about Falls Lake Nutrient Strategy may be obtained at: http://portal.ncdenr.org/web/wq/ps/nps/fallslake

D. Nutrient Loading Limits:

<table>
<thead>
<tr>
<th></th>
<th>Tar-Pamlico River Basin (lbs/ac/year)</th>
<th>Falls Lake Watershed (lbs/ac/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>4.0</td>
<td>2.2</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>0.40</td>
<td>0.33</td>
</tr>
</tbody>
</table>

Refer to Ordinance: Section 4 Section 8

E. Land Disturbance required for Stormwater Permit

A stormwater management plan and permit is required for land disturbance as follows:
4.3 INCORPORATION OF THE STORMWATER BEST MANAGEMENT PRACTICES DESIGN MANUAL


The Stormwater Administrator shall use the policy, criteria, and information, including technical specifications and standards, in the DWQ Design Manual as the basis for decisions about stormwater permits and about the design, implementation and performance of engineered stormwater controls and other practices for compliance with this ordinance.

The NCDENR Design Manual includes a list of acceptable stormwater treatment practices, including specific design criteria for each stormwater practice. Stormwater treatment practices that are designed, constructed, and maintained in accordance with these design and sizing criteria will be presumed to meet the minimum water quality performance standards of the Tar-Pamlico and Falls Lake Rules.

If the standards, specifications, guidelines, policies, criteria, or other information in the NCDENR Design Manual are amended subsequent to the submittal of an application for approval pursuant to this ordinance but prior to approval, the new information shall control and shall be utilized in reviewing the application and in implementing this ordinance with regard to the application.

If any standard, requirement, or procedure as set forth in the NCDENR Design Manual is in conflict with any standard, requirement, or procedure as set forth in this ordinance then the most stringent shall prevail. A copy of the NCDENR Manual shall be available for public review in the Planning and Inspections office and online at: http://portal.ncdenr.org/web/wq/ws/su/bmp-manual

4.4 APPLICABILITY

A. New Development:

For the purposes of the Tar-Pamlico Stormwater Program, new development shall include the following:

<table>
<thead>
<tr>
<th>Type of Development</th>
<th>Tar-Pamlico River Basin</th>
<th>Falls Lake Watershed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-family, detached and duplex residential</td>
<td>1.0 ac or greater</td>
<td>0.50 ac or greater</td>
</tr>
<tr>
<td>Multi-family residential, commercial and industrial</td>
<td>0.50 ac or greater</td>
<td>12,000 sf or greater</td>
</tr>
</tbody>
</table>

Refer to Ordinance: Section 4, Section 8
1. Any activity that disturbs greater than **one (1.0) acre** of land to establish, expand, or replace a single family or duplex residential development or recreational facility. **New development also includes** individual single family residential lots of record that are not part of a larger common plan of development or sale that result in **greater** than ten percent built-upon area (10% BUA);

2. Any activity that disturbs greater than **one-half (0.5) acre** of land to establish, expand, or replace a multifamily residential development or a commercial, industrial or institutional facility.

**B. Exemptions to Applicability**

1. Projects meeting the criteria in item 1 above that replace or expand existing structures or improvements and that do **not** result in a net increase in built-upon area shall not be required to meet the basinwide average non-urban loading levels.

2. **Redevelopment:** The following projects are exempt from the nutrient loading requirements:
   a. Any project replacing or expanding existing structures or improvements that does not result in a net increase in built-upon area.
   b. Any project located in a "redevelopment area" as defined in Section 3.

3. **Agricultural Activity:** Agricultural activities (including intensive livestock operations), mining or forestry activities are exempt from nutrient and peak flow attenuation rules.

4. **Peak Flow Attenuation Exemption** - A new development project may be exempt from the above peak flow attenuation requirements if:
   a. The **increase** in peak flow between pre-and post-development conditions **does not exceed 10%**; OR
   b. The **overall impervious surface** (total site BUA) is **less than 15%** of the total site area, and the remaining pervious portions of the site are utilized to the maximum extent practicable to convey and control the stormwater runoff; OR
   c. The County and/or its representative makes a determination that **peak stormwater control** at this particular location will increase flooding, accelerate erosion or negatively impact existing storm drainage problems in the area. In such cases, an alternate method of stormwater quantity control may be required.
   d. Even if a project meets the above requirements a completed application and sealed supporting calculations are required.

5. **Vested Projects**
i) All new development projects that have received approval from Franklin County for a site-specific or phased development plan by September 21, 2004, and that have implemented that development in accordance with Article 21 shall be exempt from the requirements of the Tar-Pamlico stormwater rule. Any plats associated with such development must be recorded within a maximum of two (2) years from the date of development approval. All new development projects that have not received such approval by September 21, 2004 or recorded any plats associated with such development within two (2) years of the development’s approval shall be subject to the requirements of the rule.

ii) Projects that require a state permit, such as landfills, NPDES wastewater discharges, land application of residuals and road construction activities shall be considered exempt if a state permit was issued prior to the effective date of September 1, 2004.

iii) The projects shall meet NCGS §153A-344.1 Vesting rights.

C. State and Federal Entities

Franklin County interprets the Falls State and Federal Rule [Rule 15A NCAC 02B .0281] (Session Law 2006-246) as requiring the County to apply the requirements of this rule to state and federal projects that do not have an NPDES stormwater permit. In regards to stormwater regulations, Franklin County intends to permit state and federal projects relative to the requirements of this rule.

4.5 CALCULATING N AND P EXPORT LOADING:

The nitrogen and phosphorus export from each new development must be calculated by the applicant in accordance with the latest NCDENR requirements. This export will be calculated in pounds per acre per year (lbs/ac/yr). Worksheets to carry out this method are provided in the appendix and online at: http://portal.ncdenr.org/web/wq/ps/nps/tarpamstorm

of the Franklin County Tar-Pamlico Stormwater Program, along with a description of their development.

Nutrient limits shown below are in reference to Tar-Pam River Basin requirements. Those projects located within the Falls Lake Watershed should refer to the limits and requirements in Section 8.

A. Single and Two-Family Residential New Development

1. The nitrogen load contributed by new development activities shall not exceed 4.0 pounds per acre per year (lbs/ac/yr). Projects may achieve this load through onsite or offsite measures or some combination thereof as described in Section 4.6. In no case shall onsite loading exceed 6 lbs/ac/yr.

2. The phosphorus load contributed by new development activities shall not exceed 0.4 pounds per acre per year (lbs/ac/yr).
3. The nitrogen (N) and phosphorus (P) exports must be calculated from each new development in pounds per acre per year (lbs/ac/yr) on the following automated worksheets provided both manually and electronically by the Franklin County Planning and Inspections Department and as updated by NCDENR DWQ:

a. Export Calculation Worksheet for Piedmont Communities.

b. BMP Removal Calculation Worksheet for Piedmont

c. The Residential Worksheet provided in the calculation worksheets must be used to estimate land coverage’s (pervious and impervious), and apply the results to the nutrient export worksheets.

d. Worksheets are available online at: http://portal.ncdenr.org/web/wq/ps/nps/tarpamstorm

B. Multi-family and Non-Residential New Development

1. The nitrogen load contributed by new development activities shall not exceed 4.0 pounds per acre per year (lbs/ac/yr). Projects may achieve this load through onsite or offsite measures or some combination thereof as described in Section 4.6. In no case shall onsite loading exceed 10 pounds per acre per year (lbs/ac/yr).

2. The phosphorus load contributed by new development activities shall not exceed 0.4 pounds per acre per year (lbs/ac/yr).

3. The nitrogen (N) and phosphorus (P) exports must be calculated from each new development in pounds/acre/year on the following automated worksheets provided both manually and electronically by the Franklin County Planning and Inspections Department and as updated by DWQ:

a. Export Calculation Worksheet for Piedmont Communities.

b. BMP Removal Calculation Worksheet for Piedmont

c. Worksheets are available online at: http://portal.ncdenr.org/web/wq/ps/nps/tarpamstorm

C. BMPs for Reducing Nitrogen and Phosphorus

1. Single and Two-family Residential Development

a. When Nitrogen export is greater than 6 pounds per acre per year (lbs/ac/yr), the owner must either use on-site BMPs or take part in an approved regional or jurisdiction-wide stormwater strategy to lower nitrogen to at least 6 pounds per acre per year (lbs/ac/yr).

b. When Nitrogen export is greater than 4 but less than 6 pounds per acre per year (lbs/ac/yr), the owner may install onsite BMPs or take part in an approved regional or jurisdiction-wide stormwater strategy or provide
treatment of an offsite-developed area that drains into the same stream to achieve the same nitrogen mass loading reduction that would have occurred on the new development site, or some combination thereof.

c. When Phosphorus export is greater than 0.4 pounds per acre per year (lbs/ac/yr), the owner must install onsite BMPs or take part in an approved regional or jurisdiction-wide stormwater strategy or provide treatment of an offsite-developed area that drains into the same stream to achieve the same phosphorus mass loading reduction that have occurred on the new development site, or some combination thereof as long as the Nitrogen export is less than 6 pounds per acre per year (lbs/ac/yr).

2. Multifamily and Nonresidential Development
   a. When Nitrogen export is greater than 10 pounds per acre per year (lbs/ac/yr), the owner must either use on-site BMPs or take part in an approved regional or jurisdiction-wide stormwater strategy to lower nitrogen to at least 10 pounds per acre per year (lbs/ac/yr).
   b. When Nitrogen export is greater than 4 but less than 10 pounds per acre per year (lbs/ac/yr), the owner may install onsite BMPs or take part in an approved regional or jurisdiction-wide stormwater strategy or provide treatment of an offsite-developed area that drains into the same stream to achieve the same nitrogen mass loading reduction that would have occurred on the new development site, or some combination thereof.
   c. When Phosphorus export is greater than 0.4 pounds per acre per year (lbs/ac/yr), the owner must install onsite BMPs or take part in an approved regional or jurisdiction-wide stormwater strategy or provide treatment of an offsite-developed area that drains into the same stream to achieve the same phosphorus mass loading reduction that have occurred on the new development site, or some combination thereof as long as the Nitrogen export is less than 10 pounds per acre per year (lbs/ac/yr).

3. Multiple BMPs

Multiple BMPs may be installed in series on a development; however the removal rate is calculated through serial rather than additive calculations. (i.e., The total nitrogen rate of removal for a wet pond (25) and grass swale (20) in series is 40 in lieu of 45. See the latest Tar-Pamlico Nutrient Management Spreadsheet for the formula to calculate the BMPs in series.)

http://portal.ncdenr.org/web/wq/ps/nps/tarpamstorm

4. Assigning Values to Pervious Cover
   a. Wooded or Forested Areas - Undisturbed wooded or forested areas are calculated at the lawn/landscape managed pervious export rate unless a County-approved permanent conservation easement for ensuring protection is executed and recorded.
   b. Riparian Buffer Areas described in Article IV Section 12-3.4.5 “Delineation of Buffer Zones” are calculated as follows:
      Zone 1 is calculated as “wooded pervious”
Zone 2 is calculated as “managed pervious” (lawn/landscape)

### 4.6 OFFSITE PARTIAL OFFSET OPTION FOR NUTRIENT REDUCTION

The Tar-Pamlico stormwater rule provides two options for partially offsetting nitrogen and phosphorus load increases from new development by making a one-time payment to the North Carolina Ecosystem Enhancement Program’s (NCEEP) Riparian Buffer Restoration Fund, OR by providing treatment of offsite-developed areas. There is no option for making a payment to address peak flow attenuation. To participate in either option, the development plan must demonstrate the following:

1. The new development first reduces nitrogen export from the site to at least 6.0 lbs/ac/yr for residential and 10.0 lbs/ac/yr for other types of development. The balance of the nitrogen removal must be made by the offsite options.

2. The net phosphorus loading for the project must be reduced to at least 0.4 lb/ac/yr. Some or all of the reduction may be obtained through the offsite options.

#### A. **Option 1: NC EEP Payment Option** - Pay a one-time offset payment to the North Carolina Ecosystem Enhancement Program’s Riparian Buffer Restoration Fund using the applicable nitrogen and phosphorous offset payment calculations specified in the Nutrient Offset Payments Rule (15A NCAC 02B.0240). See Section 4.7 below.

   a) The formula to calculate nutrient offset payments will be adjusted by NC EEP on an annual basis (January of each year) based upon the construction cost index factor published every December in the Engineering News Record.

   b) In cases where reductions are needed for both nitrogen and phosphorous and the offset option is sought, only the greater value of the two offset payments calculated is required to satisfy the offset reductions for both limits.

   c) Franklin County shall determine the approximate offset payment amount required and shall issue an approval letter to NC EEP and the developer. The approval letter shall include the project name and location including river basin, the offset payment calculations, and the amount of the offset payment. The NC EEP will verify the correct offset payment amount, which will be forwarded to both Franklin County and the developer.

   d) Prior to Franklin County issuing a permit, the developer shall provide receipt from NC EEP acknowledging payment of the correct offset amount.

#### B. **Option 2: Offsite Construction Measures**

The offsite area must drain to the same classified surface water as the new development, as defined in the schedule of classifications, 15A NCAC 2B .0316. The developer must also provide appropriate legal measures to ensure that the offsite area achieves and maintains the credited nutrient reduction for as long as the development exists, including through changes of ownership on either property. In order to take advantage of the partial offset option, the development plan must demonstrate the following criteria:
1. That the offsite facility drains into the same classified surface water as the new
development.

2. The offsite facility may be used to address only the nutrient requirements, unless
the development proposal demonstrates that meeting some or all attenuation
requirements offsite will not result in degradation of surface waters to which the
new development site discharges.

3. The offsite BMP may serve multiple projects provided the facility is appropriately
sized and a tracking system to allocate nutrient removal is in place and the off-
site facility has been approved as a regional BMP.

4. Both the development owner and the owner of the offsite facility must agree in a
documented, enforceable manner that offsite facilities are dedicated to achieving
the specified nutrient and flow reductions for the life of the new development.
The responsibility for maintaining these reductions as well as the provisions of
any required conservation easements and operation and maintenance
agreements shall run with the land and be binding upon subsequent owners of
both the development project and the offsite BMP.

5. The operation and maintenance agreement shall require an annual inspection by
a licensed professional and shall ensure that Franklin County has the authority to
inspect the stormwater facilities and make any necessary corrections if the owner
fails to complete the required inspection or complete any required improvements.
Any costs associated with this work, including administrative costs and fines, will
be charge to the owner or party legally responsible for maintenance of the facility.

6. A complete list of all owners of the existing development site along with their
addresses and contact information—the offsite facility may be public or private.

7. A yearly maintenance plan for the offsite facility that meets all of the
requirements of this ordinance.

8. Prior to approval of any subsequent change of use or land development activity
on either site, the applicant shall demonstrate that offsite property nutrient
loading reductions and, if applicable, attenuation as required by this ordinance
shall be maintained.

Many individual developments include stormwater designs that could be interpreted
as “off-site” or “regional” under the broadest of definitions, but which are not intended
for the type of review and approval process described here. Projects such as
phased developments or commercial projects without parcels may propose using
shared stormwater facilities that receive runoff from more than one lot and that would
be accessed by lots under different ownership at different points in time. These
shared facilities are not considered “off-site” or “regional” and may be permitted as
“on-site” facilities not subject to the pre-treatment limitations defined above.
4.7 NCEEP

The NC General Assembly has set goals for nutrient reduction in particular river basins and watersheds in the state. These nutrient reduction goals must be met through a combination of management strategies, including requirements for stormwater controls for development activities. Rules adopted by the NC Environmental Management Commission provide options for how developers meet these nutrient control standards.

The *NC Ecosystem Enhancement Program’s Nutrient Offset Program (NCEEP)* was developed to provide a mechanism to assist developers in meeting their nutrient loading requirements. More information on nutrient management strategies in the state can be found at the N.C. Division of Water Quality’s web site: [http://portal.ncdenr.org/web/EEP/home](http://portal.ncdenr.org/web/EEP/home)

Before a developer can receive final site-plan approval from a local government, the anticipated nutrient loading for nitrogen and/or phosphorus where applicable in pounds over a 30-year period is calculated by the developer and verified by the local government. If the loading exceeds the allowable threshold established by rule or law, then the excess loading must be offset by the developer. Developers can offset nutrient loading on site or choose a third-party mitigation provider such as the NCEEP or a compensatory mitigation bank to “buy down” their loading requirements to meet the thresholds established for nutrient loading.

The Ecosystem Enhancement Program partners with private biological-engineering and mitigation contractors on wetlands restoration and enhancement programs across the state. NCEEP accepts “buy down” payments from permit holders in lieu of actual undertaking of a mitigation project. NCEEP then uses the money to create, restore or enhance wetlands, streams and riparian areas.

A. THE NUTRIENT BUY-DOWN PROCESS

Developers choosing to “buy down” their loading requirements to meet the nutrient loading requirements must coordinate with both the County and NCEEP. With the developer as “applicant,” the process is as follows:

1. Applicant submits the Nitrogen and Phosphorus Loading Calculation Worksheet, BMP Removal Calculation Worksheet, and the Nutrient Offset Mitigation Payment Summary Worksheet to the County for review.

2. County reviews and approves nutrient calculations.

3. County writes a verification letter to the NCEEP In-Lie Fee Coordinator regarding the project, and copies the applicant. The verification letter specifies the amount of nutrient buy-down to be made by the developer.
4. Applicant submits the signed NCEEP Nutrient Offset Payment Request Form and a copy of the County verification letter directly to the NCEEP In-Lieu Fee Coordinator and copies the County.

5. NCEEP reviews the Request Form and County verification letter, and considers the financial, temporal and technical ability of the EEP Program to satisfy the mitigation request.

6. Once EEP has agreed to accept payment, NCEEP provides an invoice letter to the Applicant for the Nutrient Offset Mitigation Payment amount due.

   Fees may be obtained from:  http://portal.ncdenr.org/web/eep/fee-schedules

7. Applicant pays NCEEP. The Applicant has 30 days from the date of the invoice to submit payment to EEP.

8. NCEEP provides a receipt to the Applicant upon receipt of payment.

9. Applicant submits receipt to County, at which time Contractor may begin work if all other County and other regulatory requirements have been met.

B. Questions regarding this process may be addressed to:
Kelly Williams
NCEEP In-Lieu Fee Program Coordinator
1652 Mail Service Center         Raleigh, NC  27699-1652
919.716.1921,v              919.715.2219, f
kelly.williams@ncdenr.gov              Hours:  M-Th 8-4:30
THE NCEEP NUTRIENT BUY-DOWN PROCESS

4.8 CONSERVATION EASEMENTS

The Following information was obtained from the NCEEP and Conservation Easements: An Introduction for North Carolina Landowners. Conservation Trust for North Carolina, P.O. Box 33333, Raleigh, NC, 27636. An example conservation easement is included in the appendix.

A. A conservation easement is a written agreement between a landowner and Franklin County or the State of North Carolina that protects water quality by maintaining or establishing natural vegetation. The property under conservation easement cannot be used for commercial, residential or industrial development or cultivation.

B. The State is required by N.C. General Statutes to acquire a conservation easement on all sites qualifying for an NCEEP project to permanently protect the site. The landowner should know that condemnation authority is not applicable and is prohibited by statute for EEP projects. Negotiations must be amicable and, in the event that negotiations fail, the State will not be able to acquire the property, and EEP will not be able to implement the project.

C. Donating a conservation easement does not mean giving up title to the property. The fee-simple title to the land still resides with the landowner. The landowner has the use of the property consistent with the rights specifically reserved in the easement. For
example, this might include hunting, hiking and fishing, control of access, and the passive enjoyment of the property under the easement. In general, the landowner may continue to use the land consistent with the conditions agreed upon in the easement. A permanent conservation easement applies in perpetuity and follows the land from owner to owner via the deed. The conservation easement does not restrict the owner from selling or willing their property.

D. The conservation easement provides for permanent access to the easement area so that the County or State can ensure its success and protection. The easement does not require or imply any public access to your land.

E. Conveying a conservation easement on wetlands or stream buffers may increase the value of the remainder of your land. Buyers will often pay more for homes near permanently protected open space. A landowner may also realize many tax benefits from dedicating a permanent conservation easement. Conservation easements are also important for protecting environmental and historical values.

F. Easements only apply to the portion of land specifically identified and agreed upon in the easement. The easement area acquired is surveyed by a licensed N.C. land surveyor, and a plat is prepared of the total land area.

G. There are several economic benefits of placing a conservation easement on your property, including possible NC income tax credits, federal income tax credits, and federal estate tax deductions. Interested individuals advised to consult an attorney and a financial advisory/estate planner concerning these programs.

4.9 REGIONAL OR JURISDICTION WIDE OPTIONS FOR NUTRIENT REDUCTION OR FLOW CONTROL REQUIREMENTS

Regional and jurisdiction-wide options and requirements are described in the Franklin County Stormwater Program plan. Franklin County shall propose any such strategy to and gain approval from the NC Division of Water Quality prior to permitting its use by any proposed development project.

A. Calculating Peak Runoff Volume

1. Developments shall not result in a net increase in peak flow leaving the site from pre-development conditions for the 1-year, 24-hour storm event. The storm peak flow from each new development must be calculated by the applicant.

2. Using the 2-year Design Storm, but Controlling it to 1-year Predevelopment Levels:

   a. Compute the peak flows (both pre- and post-development) from the drainage area based on the 2-year design storm using one of the methodologies in the NC BMP Design Manual.

   b. Estimate the 1-year predevelopment peak flow by multiplying the 2-year predevelopment peak flow by 80%.
c. Design a BMP that will control the 2-year post-development peak flow to 1-year pre-development peak flow levels (estimated by the second step).

3. The same method must be used for both the pre- and post-development conditions.

4. Acceptable methodologies for computing the pre- and post-development conditions for the design storm include:
   a. The Rational Method.
   b. Dr. Rooney Malcom, P.E., Small Watershed Method
   c. NRCS Methodologies applied through the Corps of Engineers HEC-1 Program

4.10 EROSION CONTROL

A. All erosion and sediment control measures shall be designed in accordance with the North Carolina Erosion and Sediment Control Planning and Design Manual, latest revision (http://www.dlr.enr.state.nc.us/pages/publications.html), and the NCDENR DWQ Stormwater Best Management Practices Manual (http://h2o.enr.state.nc.us/su/bmp_forms.htm). These manuals contain valuable information and tools for developing plans to minimize soil erosion and prevent sedimentation pollution associated with land-disturbing activities.

B. NCDENR Land Quality Section must issue a Letter of Approval for Erosion and Sedimentation Control Plans prior to final plan approval. Applicant to submit a copy of the Letter of Approval to the County.

C. No person may initiate any land-disturbing activity that will disturb one acre (43,560 sf) or greater without having an erosion and sedimentation control plan approved by NCDENR Land Quality Section.

D. Limits of disturbance must be clearly identified on the plan and are to include any use of the land that results in a change in the natural cover or topography that may cause or contribute to sedimentation [15A NCAC 2B.20 .(37)].

This may include grading, digging, cutting, scraping, or excavating of soil, placement of fill materials, paving, construction, substantial removal of vegetation, or any activity which bares soil or rock, involves the diversion or piping of any natural or man-made watercourse, or the establishment of new impervious surface. Plans must also indicate stockpile locations, access to construction activities and adequate space for installation of erosion control measures.

E. All land-disturbance less than one acre not requiring a NCDENR permit are required to install silt fence on the low side of the lot, erosion and sediment control measures as needed to prevent sediment from leaving the site, and, at the discretion of the County, tree protection fence around the remaining perimeter. For those projects
whose apparent disturbance exceeds one-half acre, the County also reserves the right to require an as-built survey of the disturbed area prepared by a professional land surveyor. If site disturbance is determined to exceed one-half acre “after-the-fact,” then the property must comply with applicable sections of this ordinance.

4.10 RETENTION OF EXPERT ASSISTANCE

The County may hire any consultant and/or expert necessary to assist the County in reviewing and evaluating the application, including the construction and modification of the site, once permitted, and any requests for re-certification.
Section 5 — STORMWATER MANAGEMENT PLAN AND PERMIT

5.1 PERMIT REQUIRED

No person shall receive any permit for land development, land disturbing activity or building permit without first meeting the requirements of this part and receiving a stormwater permit prior to commencing the proposed activity unless specifically excluded from the requirements of this ordinance.

5.2 EFFECT OF PERMIT

A stormwater permit shall govern the design, installation, and construction of stormwater management and control practices on the site, including engineered stormwater controls and elements of site design for stormwater management other than engineered stormwater controls.

The permit is intended to provide a mechanism for the review, approval, and inspection of the approach to be used for the management and control of stormwater for the development or redevelopment site consistent with the requirements of this ordinance, whether the approach consists of engineered stormwater controls or other techniques such as low-impact or low-density design. The permit does not continue in existence indefinitely after the completion of the project; rather, compliance after project construction is assured by the maintenance provisions of this ordinance.

5.3 AUTHORITY TO FILE APPLICATIONS

All applications required pursuant to this Code shall be submitted to the Stormwater Administrator by the land owner or the land owner’s duly authorized agent.

5.4 ESTABLISHMENT OF APPLICATION REQUIREMENTS, SCHEDULE AND FEES

A. Application Contents and Form

The Stormwater Administrator shall establish requirements for the content and form of all applications and shall amend and update those requirements from time to time. At a minimum, the stormwater permit application shall describe in detail how post-development stormwater runoff will be controlled and managed, the design of all stormwater facilities and practices, and how the proposed project will meet the requirements of this ordinance.

B. Submission Schedule

The Stormwater Administrator shall be able to establish a submission schedule for applications. The schedule shall be able to establish deadlines by which complete applications must be submitted for the purpose of ensuring that there is adequate time to review applications, and that the various stages in the review process are accommodated.
C. **Permit Review Fees**

The Franklin County Planning Director shall establish permit review fees as well as policies regarding refund of any fees upon withdrawal of an application, and may amend and update the fees and policies from time to time. [G.S. §153A].

5.5 **APPLICATION REQUIREMENTS**

A. **Exemption Review:**

Any project seeking an exemption according to **Section 4.4** shall submit in writing the reason for the exemption with sealed supporting calculations. The Planning Director or Designee shall issue an exemption confirmation including any conditions or limitations on exemption (e.g. the date a vesting exemption expires).

B. **Preliminary Plat Review:**

Nutrient calculation worksheets must be submitted with preliminary plats or preliminary site plans and must show that the design will obtain the required nutrient reduction.

C. **Permit Review:**

Any person desiring a stormwater permit shall submit a permit application to the Planning Director or Designee on a form provided by Franklin County for that purpose. Unless otherwise excepted by this ordinance, a permit application must be accompanied by the following in order for the permit application to be considered complete:

A. **If No BMPs or Peak Flow measures are Proposed:**

   a. Two copies of professionally sealed calculation worksheets demonstrating that the proposed development complies with Tar-Pam Nutrient Reduction Requirements as designed (include an electronic copy);

   b. Site plan or preliminary plat showing land coverage (transportation and roof impervious, managed and wooded pervious areas;

   c. Conservation easement with map and description, if applicable, and;

   d. A non-refundable permit review fee.

B. **If BMPs or peak flow attenuation measures are indicated or required, the application must also include:**

   a. Approved BMP and/or Peak flow facility design specifications and calculation (both hard copy and electronic copy), including narrative;

   b. Map showing drainage area into treatment BMP or peak flow facility (may include offsite areas)
c. Two copies of stormwater management plan;

d. Two copies of an operation and maintenance agreement;

e. A non-refundable permit review fee.

5.6 APPLICATION PROCEDURE

Applications for a stormwater permit may be filed with the Planning and Inspections Department during regular business hours.

A. Applications shall be submitted to the Stormwater Administrator pursuant to the application submittal schedule in the form established by the Stormwater Administrator, along with the appropriate fee established pursuant to this section.

B. An application shall be considered as timely submitted only when it contains all elements of a complete application pursuant to this ordinance (refer to Stormwater Management Application and Checklist in Appendix), along with the appropriate fee. If the Stormwater Administrator finds that an application is incomplete, the applicant shall be notified of the deficient elements and shall be provided with an opportunity to submit a complete application. However, the submittal of an incomplete application shall not suffice to meet a deadline contained in the submission schedule established above.

C. An application for a stormwater permit may be filed simultaneously with an application for a building permit, grading permit or other land development permit issued by Franklin County.

D. Any applicant claiming a variance to one or more requirements of this ordinance shall submit evidence of valid approval of such variance at the time of permit application per Article 24 of the Franklin County UDO.

5.7 STORMWATER MANAGEMENT PLAN REQUIREMENTS

A. All plans shall be prepared and sealed by a qualified professional who also certifies under seal that the plan, including engineering detail, conforms to the minimum requirements established by this ordinance.

The stormwater management permit application shall detail how post-development stormwater runoff will be controlled and managed and how the proposed project will meet the requirements of this ordinance. All such sealed plans shall be prepared by a qualified registered North Carolina professional engineer, surveyor, soil scientist or landscape architect, and the engineer, surveyor, soil scientist or landscape architect shall perform services only in their area of competence, and shall verify under seal that the design of all stormwater management facilities and practices meets the submittal requirements for complete applications, that the designs and plans are sufficient to comply with applicable standards and policies found in the Design Manual, and that the designs and plans ensure compliance with this ordinance.

A. All stormwater management plan submittals shall include:
1. Stormwater management plan, as described in 5.7.B.
2. **Stormwater Management Review Application** (found in appendix)
3. **Stormwater Management Checklist** (found in appendix)
4. Items identified on checklist and outlined below.

**B.** All plans shall include a site plan, which at a minimum, clearly indicates the following features unless the Planning Director or Designee determines that certain elements are not appropriate or are unnecessary for a particular application:

1. Ownership and use of the proposed site and all surrounding properties;
2. The entire area of development and existing built-upon area on the site;
3. Existing and proposed structures and impervious surfaces;
4. The location of any watercourses or surface water bodies;
5. The location, extent and dimensions of all existing and proposed stormwater conveyances on and immediately adjacent to the development site;
6. Existing and proposed buffer areas;
7. Existing and proposed open space;
8. Existing and proposed conservation easements;
9. Existing and proposed topography using two foot contours;
10. Existing and proposed structural BMPs;
11. Existing and proposed structures related to peak flow attenuation;
12. The extent of existing vegetation;
13. Acreages of the various proposed land covers (e.g. pervious, impervious, managed open space, etc.);
14. Drainage areas flowing into BMPs and/or Peak Flow attenuation facilities (may include offsite areas); **Runoff Map**
15. Diversion methods or structures if offsite drainage is diverted around site and excluded from calculations; and
16. Any other information that the Planning Director or Designee needs in order to determine compliance with these regulations.

**C.** All plans shall clearly demonstrate protection of and diffuse flow through buffer areas.

**D.** All plans shall include **nutrient calculation worksheets** and **peak flow calculations**, as established in section 4.(G). Applicants shall submit NCDENR Nutrient Calculation Worksheets, BMP Supplement Forms and Operation and Maintenance Forms found online at:

http://portal.ncdenr.org/web/wq/ws/su/bmp-manual

**E.** All plans shall include data, site plans, and information necessary to support a proposed offsite approach, if applicable, as established in **Section 4.6.B.**
F. All plans shall include a landscaping plan, which clearly shows the extent of undisturbed vegetation and the location, species, number, and planting characteristics (including height at time of planting, spacing, etc.) of proposed vegetation. The plan must also describe the vegetative stabilization and management techniques to be used at the site after construction is completed, who will be responsible for the maintenance of vegetation, and what practices will be employed to ensure that adequate vegetative cover is preserved.

G. All plans shall include engineering detail for each structural BMP, including calculations and narrative, sufficient to determine compliance with this ordinance.

H. Stormwater Management Summary Statement

A Stormwater Management Summary Statement is required with all plans submissions that implement structured engineering controls to help the Stormwater Administrator determine how the stormwater management facility was designed.

At a minimum, the Stormwater Management Summary Statement must include:

1. Development name and address.
2. Developer/Owner and Consultant contact information.
3. A description of the existing site.
4. A description of the proposed development or construction activity.
5. An impervious area calculation for both existing site and proposed site conditions.
6. A description of the stormwater impacts the proposed development or construction activity may have on the surrounding properties. This includes identifying upstream and downstream drainage facilities potentially affected by the new development and the ability of the existing drainage ways to handle the additional runoff.
7. A description of the proposed stormwater management facility and how they will be designed, constructed, maintained and operated to:
   a. Minimize the adverse affects on the quality of stormwater runoff from the development,
   b. Provide BMP’s to maximize infiltration, minimize connected impervious surfaces and minimize concentrated flows,
   c. Provide distributed stormwater runoff to minimize offsite impacts and provide sheet flow into existing vegetated buffers,
   d. Extend the time of concentration to the maximum practical level.
   e. Preserve and protect the natural drainage ways,
   f. Respect the practical limits of public and private drainage facilities,
   g. Protect neighboring properties from unreasonable adverse effects resulting from the development,
   h. Prevent flooding within the development and on surrounding properties, and
   i. Limit the impacts of stormwater runoff discharging into or from the site, or obtain approvals and easements from the affected property owners.
8. A **vicinity map** showing the location of the site. The scale of the map shall be adequate to show the area in question with reasonable depiction of streets to determine the exact location of the site. The scale shall be no less than 1"=400'.

9. A **USGS Quadrangle map** with the site location depicted on the map.

10. A copy of the **NRCS Franklin County Soil Survey** with the site location clearly depicted on the map.
   a. Per NCDENR Letter of Memorandum dated May 21, 2007, the *hard copy paper bound version of the soil surveys* are the only soil survey maps that will be accepted by NCDENR DWQ for applicability of the Tar-Pamlico Buffer and Neuse River Basin Rules. Therefore, applicants must submit a copy of the official “hard-copy” publication with the site location clearly depicted.
   c. The NRCS online version of the soils maps may be used for soil breakouts and design, but cannot be used for stream determination.

### 5.8 PLAN/ PERMIT REVIEW AND APPROVAL PROCEDURE

A. The Planning Director or Designee shall approve, approve with conditions, or deny the permit application within the specified time frame per Franklin County UDO requirements for submission.

B. If the permit application is **denied**, the Planning Director or Designee shall provide written comments to the applicant explaining the reason(s) for denial. The applicant shall have an opportunity to submit a revised application.

   A complete revised application shall be reviewed by the Stormwater Administrator after its re-submittal and shall be approved, approved with conditions or disapproved. If a revised application is not re-submitted within thirty (30) calendar days from the date the applicant was notified, the application shall be considered withdrawn, and a new submittal for the same or substantially the same project shall be required along with the appropriate fee for a new submittal.

C. If the permit application is **approved** by the Planning Director or Designee, a stormwater permit shall be issued. The Stormwater Administrator may impose *conditions of approval* as needed to ensure compliance with this ordinance. The conditions shall be included as part of the approval. Approval authorizes the applicant to go forward with only the specific plans and activities authorized in the permit. The approval shall not be construed to exempt the applicant from obtaining other applicable approvals from local, state, and federal authorities.

D. A previously denied permit application may not be resubmitted for consideration unless the Planning Director or Designee determines that material facts, either in the ordinance or the application, have changed significantly enough to warrant reconsideration.
5.9 PERMIT DURATION

Permits issued under this section shall be as specified by Franklin County UDO requirements. An approved plan shall become null and void if the applicant fails to make substantial progress on the site within one (1) year after the date of approval. The Stormwater Administrator may grant a single, one-year extension of this time limit, for good cause shown, upon receiving a written request from the applicant before the expiration of the approved plan.

In granting an extension, the Stormwater Administrator may require compliance with standards adopted since the original application was submitted unless there has been substantial reliance on the original permit and the change in standards would infringe the applicant’s vested rights.

5.10 PERMIT AMENDMENTS

Once an applicant has received a stormwater permit, any minor change or alteration to the site, as determined by the Planning Director or Designee, that is inconsistent with the approved permit shall require an amendment to the approved permit. Any major change or alteration to the site, as determined by the Planning Director or Designee, shall require the owner to submit a new stormwater permit application to the Planning Director or Designee for review and approval. Until such amendment or new permit have been approved, no work inconsistent with the original permit shall be commenced.

5.11 STORMWATER ADMINISTRATOR

For the purposes of this ordinance the Stormwater Administrator shall be the Franklin County Planning Director or Designee. The Stormwater Administrator shall have the following powers and duties under this ordinance:

A. To review and approve, approve with conditions, or disapprove applications for approval of plans pursuant to this ordinance.

B. To make determinations and render interpretations of this ordinance.

C. To establish application requirements and schedules for submittal and review of applications and appeals, to review and make recommendations to Franklin County on applications for development or redevelopment approvals.

D. To enforce the provisions of this ordinance in accordance with its enforcement provisions.

E. To maintain records, maps, forms and other official materials as relate to the adoption, amendment, enforcement, and administration of this ordinance.

F. To provide expertise and technical assistance to Franklin County upon request.

G. To designate appropriate other person(s) who shall carry out the powers and duties of the Stormwater Administrator.

H. To take any other action necessary to administer the provisions of this ordinance.
5.12 RETENTION OF EXPERT ASSISTANCE

The County may hire any consultant and/or expert necessary to assist the County in reviewing and evaluating the application, including the construction and modification of the site, once permitted, and any requests for re-certification.

Minimum qualifications are persons performing services only in their area of competence, including North Carolina registered professional engineer, professional surveyor, landscape architect, soil scientist, aquatic biologist, or a person certified by the North Carolina Cooperative Extension Service to approve stormwater management plans or to inspect BMPs.

5.13 APPEALS

Any aggrieved person affected by any decision, order, requirement, or determination relating to the interpretation or application of this ordinance made by the Planning Director, Stormwater Administrator or Designee, may file an appeal to the Board of Adjustment as outlined within the Franklin County UDO.
Section 6 — ANNUAL MAINTENANCE

The long-term effectiveness of any engineered stormwater control relies, above all, on appropriate maintenance. This section provides provisions to ensure that such maintenance occurs, including identifying who will be responsible for maintenance over the long term as well as during development, and ensuring that funds for maintenance and repair are available when appropriate.

The County is required to ensure that BMPs implemented to achieve the nitrogen and phosphorus reduction and flow attenuation requirements for development are maintained and inspected on a yearly basis.

6.1 FUNCTION OF BMP AS INTENDED

The owner of each engineered stormwater control installed pursuant to this ordinance shall maintain and operate it so as to preserve and continue its function in controlling stormwater quality and quantity at the degree or amount of function for which the engineered stormwater control was designed.

6.2 OWNERS’ ASSOCIATIONS

An owners association shall be established in accordance with Article 28-4 for the purpose of owning all BMPs shown on the development plan and for ensuring that maintenance is performed to keep BMPs functioning properly. The articles of incorporation must be submitted to the County for review and approval and must contain clear language and a means for collecting dues for the cost of BMP maintenance and yearly certification.

6.3 ESTABLISHMENT AND ELEMENTS OF THE MAINTENANCE AGREEMENT

A. Prior to the conveyance or transfer of any lot or building site to be served by a engineered stormwater control pursuant to this ordinance, and prior to issuance of any permit for development requiring a engineered stormwater control pursuant to this ordinance, the applicant or owner of the site must execute a legal Operation and Maintenance agreement that shall be binding on all subsequent owners of the site, portions of the site, and lots or parcels served by the engineered stormwater control. Until the transference of all property, sites, or lots served by the engineered stormwater control, the original owner or applicant shall have primary responsibility for carrying out the provisions of the maintenance agreement.

B. The legal Operation and Maintenance agreement shall require the owner or owners to maintain, repair and, if necessary, reconstruct the engineered stormwater control, and shall state the terms, conditions, and schedule of maintenance for the engineered stormwater control.

C. The legal Operation and Maintenance agreement and/or conservation easement must be approved by the Stormwater Administrator prior to plan approval, and it shall
be referenced on the final plat and shall be recorded with the county Register of Deeds upon final plat approval. If no subdivision plat is recorded for the site, then the Operations and Maintenance agreement and/or conservation easement shall be recorded with the county Register of Deeds so as to appear in the chain of title of all subsequent purchasers under generally accepted searching principles. A copy of the recorded maintenance agreement shall be given to the Stormwater Administrator within fourteen (14) days following its recordation.

D. The Operation and Maintenance Agreement shall be submitted at the time of final plat or site plan and executed by the Owner or Owners Association and the County prior to recordation of the final plat or issuance of a Certificate of Occupancy, and shall contain the following elements:

1. Yearly Annual Maintenance Plan
   a. Name, address and contact telephone numbers of all current officers of the Owners Association. Any changes in this information during the year shall be provided to the Planning and Inspections Department within 30 days of the change.
   b. Description of method used to collect dues or other payments necessary for maintenance of BMPs.
   c. For each BMP type, description of BMP features requiring inspection, inspection frequency, types and frequencies of or basis for routine and periodic maintenance activities, actions in the event that repair is needed. Maintenance actions and frequencies shall at minimum include those identified by practice in the NC BMP Manual. Franklin County utilizes the BMP Operation and Maintenance Agreement Forms provided by NCDENR DWQ in the Design Manual and online at: http://portal.ncdenr.org/web/wq/ws/su/bmp-manual
   d. Depending on the BMPs constructed the plan might include schedules or other provisions for:
      i) Any mowing of permanent vegetation.
      ii) Any removal of bushes and trees from the dam of a wet detention pond.
      iii) Reseeding of any eroding areas of the wet detention ponds, open channel practices, riparian buffers and vegetated filter strips.
      iv) Replacing of impaired vegetation in a constructed wetlands or riparian buffer.
      v) Removal of debris from the “trash rack” on any wet detention pond or sand filter.
      vi) Repair of any damage to structural aspects of wet detention ponds, constructed wetlands, level spreaders, and sand filters.

2. Yearly-Annual Inspection and Certification of BMPs

Submission to the County of a yearly certification from a licensed engineer, certifying that the BMPs originally approved are in existence, functioning properly and compliant with the yearly maintenance plan.
The person responsible for maintenance of any **engineered stormwater control** installed pursuant to this ordinance shall submit to the Stormwater Administrator an annual inspection report from one of the following **persons** performing services only in their area of competence: a qualified registered North Carolina professional engineer, surveyor, landscape architect, soil scientist, aquatic biologist, or person certified by the North Carolina Cooperative Extension Service for stormwater treatment practice inspection and maintenance.

The inspection report shall contain all of the following:

1. The name and address of the land **owner**;
2. The recorded book and page number of the lot of each **engineered stormwater control**;
3. A statement that an inspection was made of all **engineered stormwater controls**;
4. The date the inspection was made;
5. A statement that all inspected **engineered stormwater controls** are performing properly and are in compliance with the terms and conditions of the approved maintenance agreement required by this ordinance; and
6. The original signature and seal of the engineer, surveyor, or landscape architect, if applicable.

All inspection reports shall be on forms supplied by the Stormwater Administrator. An original inspection report shall be provided to the Stormwater Administrator beginning one year from the date of **as-built certification** and each year thereafter on or before the date of the as-built certification. **Annual inspection report form** and **annual certification forms** are found in the appendix and online at:

http://www.co.franklin.nc.us/Planning/LongRange/stormwater.htm

Records of maintenance and/or repair activities shall be maintained by the owner for at least 5 years and shall be provided to the County upon request.

3. **Contact Information**

   a. Name and address of the person or organization financially responsible for maintenance specified in the annual inspection report.
   b. Emergency contact information.

4. **Authority for the County to Inspect and Maintain Stormwater Facilities**

   a. Legal authority for the County to routinely inspect stormwater facilities.
   b. Legal authority for the County to require performance of maintenance activities to ensure continued operational performance of BMPs.
   c. Legal authority for the County to place liens on common properties in the subdivision/development and maintenance if the BMPs are not properly maintained and certified.
   d. Legal Authority for right of entry in the event that the Stormwater Administrator has reason to believe it has become necessary to inspect, monitor, maintain, repair, or reconstruct the engineered stormwater control;
however, in no case shall the right of entry, of itself, confer an obligation on Franklin County to assume responsibility for the engineered stormwater control.

6.4 PERFORMANCE SECURITY FOR INSTALLATION AND MAINTENANCE

A. The County may, at its discretion, require the submittal of a performance security or bond with surety, cash escrow, letter of credit or other acceptable legal arrangement prior to issuance of a permit in order to ensure that the engineered stormwater controls are:

1. Installed by the permit holder as required by the approved stormwater management plan; and/or
2. Maintained by the owner as required by the operation and maintenance agreement.

B. The amount of an installation performance security shall be in the amount of 110% of the cost estimate for the BMP. The performance bond may be reduced to 25% at the time the Certificate of Occupancy is issued to satisfy the requirement for the one year warranty period.

C. Within sixty days of the final approval, the installation performance security shall be refunded to the applicant or terminated, except any amount attributable to the cost (plus 25%) of landscaping installation and ongoing maintenance associated with the BMPs covered by the security. Any such landscaping shall be inspected one (1) year after installation with replacement for compliance with the approved plans and specifications and, if in compliance, the portion of the financial security attributable to landscaping shall be released.

D. The performance security shall contain forfeiture provisions for failure, after proper notice, to complete work within the time specified, or to initiate or maintain any actions which may be required of the applicant or owner in accordance with this ordinance, approvals issued pursuant to this ordinance, or an operation and maintenance agreement established pursuant to this ordinance.

E. Upon default of the owner to construct, maintain, repair and, if necessary, reconstruct any engineered stormwater control in accordance with the applicable permit or operation and maintenance agreement, the Stormwater Administrator shall obtain and use all or any portion of the security to make necessary improvements based on an engineering estimate. Such expenditure of funds shall only be made after requesting the owner to comply with the permit or maintenance agreement. In the event of a default triggering the use of installation performance security, the County may not return any of the unused deposited cash funds or other security.

F. If County takes action upon such failure by the applicant or owner, the County may collect from the applicant or owner the difference between the amount of the reasonable cost of such action and the amount of the security held, in addition to any other penalties or damages due.
6.5 FAILURE TO COMPLY WITH THE PROVISIONS OF THE MAINTENANCE AGREEMENT

Any violation of the Maintenance agreement shall be considered a violation of the Unified Development Ordinance and shall be enforced in accordance with Article 25 of the Franklin County UDO. In addition, if the situation meets the definition of a nuisance as defined in NCGS 153A-140 other corrective actions may be taken.

6.6 REQUIREMENT OF SEALED AS-BUILT DRAWINGS FOR STORMWATER FACILITIES

A. Developers shall be required to submit the following sealed as-built drawings:

1. Drawings of any new or addition to a stormwater conveyance by a private developer;

2. Drawings of all development sites to determine compliance with the “approved plan” and the requirements of the Tar-Pamlico Overlay District.

3. As-built plans of each BMP along with a statement under seal that the BMP as constructed complies with the approved plans and the UDO.

B. Upon completion of a project, and before a Certificate of Occupancy shall be granted, the applicant shall certify that the completed project is in accordance with the approved stormwater management plans and designs, and shall submit actual field surveyed “as built” plans for all stormwater management facilities or practices after final construction is completed.

C. The as-built plan shall be prepared by a land surveyor or professional engineer registered to practice in North Carolina. Applicant to provide (2) sealed paper copies and (1) digital copy on CD (compact disk), consistent with the programs used by the Franklin County GIS Department. Field survey/ as-built to be tied to NC grid system.

D. The plans shall show the final design specifications for all stormwater management facilities and practices and the field surveyed location, size, depth, and planted vegetation (if applicable) of all measures, controls, and devices, as installed. The designer of the stormwater management measures and plans shall certify, under seal, that the as-built stormwater measures, controls, and devices are in compliance with the approved stormwater management plans and designs and with the requirements of this ordinance. A final inspection and approval by the Stormwater Administrator may be required before the release of any performance securities.
Section 7 — RIPARIAN BUFFER REQUIREMENTS

Riparian buffers shall be protected because in most cases they provide a measure of protection for surface waters by removal of nutrients from nonpoint sources. The riparian buffer regulations are intended to protect and preserve existing riparian buffers and maintain their nutrient removal functions within the county’s river basins.

7.1 GENERAL REQUIREMENTS

All of the regulations delineated in Section 12-3.4 are intended to comply with the requirements of 15A NCAC 2B .0259. All property located in Franklin County outside of any municipal boundary or extraterritorial jurisdiction shall comply with the riparian buffer regulations.

7.2 APPLICABILITY

A. The Riparian Buffer regulations shall apply to all areas of the county outside of any municipal boundary or its extraterritorial jurisdiction.

B. Riparian Buffer Exemption – Existing and ongoing uses within the riparian buffer, if present as of January 1, 2000, may be exempt from the riparian buffer protection requirements according to the provisions outlined in 15A NCAC 02B .0259. Proposed developments, which have County approval, but have not been constructed as of January 1, 2000, may not claim an exemption to the riparian buffer protection requirements.

7.3 RIPARIAN BUFFER PROTECTION

The purpose of this regulation is to protect and preserve existing riparian buffers to maintain their nutrient removal functions in the entire Tar-Pamlico River Basin. As required by 15A NCAC 02B .0259, a fifty-foot (50’) wide riparian buffer shall be maintained directly adjacent to all perennial and intermittent streams, including lakes, ponds and other bodies of water, excluding wetlands, as indicated on the most recent version of the 1:24,000 scale (7.5 minutes) quadrangle topographic maps prepared by the USGS and all other surface waters as indicated by the most recent version of the Soil Survey for Franklin County, North Carolina. Where obvious conflicts exist between actual field conditions and USGS and county soil survey maps, appeals may be made to the North Carolina Division of Water Quality.

7.4 DELINEATION OF BUFFER ZONES

The buffer is divided into two zones, moving landward from the surface water, that are afforded different levels of protection. Zone 1, the first 30 feet, is to remain essentially undisturbed, while Zone 2, the outer 20 feet, must be vegetated but may be managed in certain ways, such as grading and revegetating provided that the health of the vegetation in Zone 1 is not compromised. Zones are specifically described in 15 NCAC 02B .0259 (4)(a and b).
For intermittent and perennial streams, Zone 1 begins at the most landward limit of the top of the bank or the rooted herbaceous vegetation and extending landward a distance of 30 feet on all sides of the surface water, measured horizontally on a line perpendicular to the surface water.

For ponds, lakes, and reservoirs located within a natural drainage way, Zone 1 shall begin at the most landward limit of the normal water level or the rooted herbaceous vegetation and extend landward a distance of 30 feet, measured horizontally on a line perpendicular to the surface water.

Zone 2 shall begin at the outer edge of Zone 1 and extend landward 20 feet as measured horizontally on a line perpendicular to the surface water. The combined width of Zones 1 and 2 shall be 50 feet on all sides of the surface water.

### 7.5 ACTIVITY WITHIN THE BUFFER

A. Activity may take place within any riparian buffer zone as defined by 15A NCAC 02B.0259 subject to approval from DWQ. No development proposal that includes impact to the riparian buffer shall be approved by Franklin County unless it includes one of the following:

1. Certifications from DWQ that surface waters are not present as determined by an on-site inspection.
2. An Authorization Certificate from DWQ for an “allowable” use such as a road crossing or utility line, or for a use that is “allowable with mitigation” along with a Division-approved mitigation plan has been obtained.
3. A documented opinion from DWQ that a vested right has been established for the proposed development activity.
4. A letter from DWQ documenting that a variance has been approved for the proposed development activity.

B. For more information on allowable activities within a riparian buffer or along a stream or for detailed information for exemptions from the riparian buffer rule, contact the NCDENR DWQ Raleigh Regional Office at 919.791.4200, or at http://portal.ncdenr.org/web/wq/ps/nps/tarpamlico

C. A small portion of southern Franklin County is located within the Falls Lake Watershed. New development within the Falls Lake Watershed must comply with the “Falls Lake Watershed Stormwater Ordinance,” Section 8. Additional information may be obtained at: http://portal.ncdenr.org/web/wq/ps/nps/fallslake

7.6 BUFFERS DEPICTED ON DEVELOPMENT PLANS

A. Required riparian buffers shall be shown on all plats and/or site plans submitted with a note indicating the protected nature of the buffer and how diffuse flow is to be maintained. When required by the Planning Director, the placement of adequate signage shall be required to relay the buffer protection to the public.

B. In addition, the following items must be addressed, where applicable, on Stormwater Management Plans:

1. All surface waters, as shown on the USGS Quadrangles or Franklin County Soil Survey (published paper copy), must be shown on the proposed plan.

2. All riparian buffers must be appropriately labeled on the proposed plan and final plat. Riparian buffers must extend 50 feet from the top of bank for streams or the edge of normal water levels for ponds and other impoundments.

3. Where development requires the disturbance of a riparian buffer, documentation of approval from NCDENR DWQ is required. If the project is considered exempt, documentation or an explanation should be provided noting this, utilizing the conditions stated in NCDENR rules.

4. Diffuse flow must be provided for all stormwater runoff entering the riparian buffer. The following guidelines should be utilized:
   a. Development located near riparian buffers should minimize large concentrated discharge points. By providing multiple outlets for stormwater runoff and maintaining natural drainage patterns, the stormwater runoff impacts from new development can be minimized.
   b. Documentation must be provided, indicating that the proposed development has provided sheet flow at all discharge points where required. Appropriate calculations and details should be included.
   c. Additional methods to provide diffuse flow will be reviewed and approved on an individual basis. Developers and design professionals may request a pre-design conference to determine if a proposed facility will be accepted.
d. The NCDENR DWQ Level Spreader Design Guidelines, latest revision, shall be utilized as necessary. Refer to the NCDENR BMP Design Manual.

e. Discharge that will flow into an existing, non-buffered draw or stream, prior to entering the riparian buffer will be exempt from the diffuse flow requirement.

C. All stormwater facilities proposed to create sheet flow must be contained within permanent drainage easements and have Operation and Maintenance Agreement and/or guidelines provided in the restrictive covenants. The Operation and Maintenance Agreements and the restrictive covenants must be recorded.

7.7 VARIANCES TO THE RIPARIAN BUFFER RULE

Requests for variances to the Riparian Buffer Rule shall be directed to, and approval sought from, the Division of Water Quality, NCDENR.

7.8 AMENDMENTS AND VARIANCES TO THE TAR-PAM OVERLAY DISTRICT REGULATIONS

The County may not amend the program or grant a variance in a manner that fails to meet the minimum requirements of the rule without prior approval from NCDENR DWQ.
Section 8 — FALLS LAKE WATERSHED STORMWATER ORDINANCE

8.1 FINDINGS

It is hereby determined that:

A. Development and redevelopment alter the hydrologic response of local watersheds and increases stormwater runoff rates and volumes, flooding, soil erosion, stream channel erosion, nonpoint and point source pollution, and sediment transport and deposition, as well as reducing groundwater recharge;

B. These changes in stormwater runoff contribute to increased quantities of water-borne pollutants and alterations in hydrology that are harmful to public health and safety as well as to the natural environment; and
C. These effects can be managed and minimized by applying proper design and well-planned controls to manage stormwater runoff from development sites.

D. Further, the NC Environmental Management Commission has identified Falls of Neuse reservoir, a water supply reservoir, as nutrient sensitive waters; has identified all or a portion of the reservoir as impaired waters under the federal Clean Water Act due to exceedences of the chlorophyll a standard; and has promulgated rules (the “Falls Rules”) to reduce the average annual loads of nitrogen and phosphorus delivered to Falls Reservoir from all point and nonpoint sources of these nutrients located within its watershed, including stormwater from new development in this jurisdiction; [15 NCAC 02B .0275-.0282 and amended .0235 and .0315].

Therefore, Franklin County establishes this set of water quality and quantity regulations to meet the requirements of state and federal law regarding control of stormwater runoff and discharge for development.

Further information is available online at: http://portal.ncdenr.org/web/wq/ps/nps/fallslake

8.2 PURPOSE

The purpose of this ordinance is to protect, maintain and enhance the public health, safety, environment and general welfare by establishing minimum requirements and procedures to control the adverse effects of nitrogen and phosphorus in stormwater runoff and nonpoint and point source pollution associated with new development and redevelopment in the watershed of Falls of Neuse reservoir. It has been determined that proper management of construction-related and post-development stormwater runoff will minimize damage to public and private property and infrastructure; safeguard the public health, safety, and general welfare; and protect water and aquatic resources.

This ordinance seeks to meet its general purpose through the following specific objectives and means:

A. Establishing decision-making processes for development that protects the integrity of watersheds and preserve the health of water resources;

B. Requiring that new development and redevelopment maintain the pre-development hydrologic response in their post-development state for the applicable design storm to reduce flooding, stream bank erosion, nonpoint and point source pollution and increases in stream temperature, and to maintain the integrity of stream channels and aquatic habitats;

C. Establishing minimum post-development stormwater management standards and design criteria for the regulation and control of stormwater runoff quantity and quality;

D. Establishing design and review criteria for the construction, function, and use of structural stormwater BMPs that may be used to meet the minimum post-development stormwater management standards;

E. Encouraging the use of better management and site design practices, such as the use of vegetated conveyances for stormwater and the preservation of green space, riparian buffers and other conservation areas to the maximum extent practicable;
F. Establishing provisions for the long-term responsibility for and maintenance of structural and nonstructural stormwater BMPs to ensure that they continue to function as designed, are maintained appropriately, and pose no threat to public safety;

G. Establishing administrative procedures for the submission, review, approval and disapproval of stormwater management plans, for the inspection of approved projects, and to assure appropriate long-term maintenance.

8.3 APPLICABILITY AND JURISDICTION

A. General

Beginning with and subsequent to its effective date, this ordinance shall be applicable to all development and redevelopment, including, but not limited to, site plan applications, subdivision applications, and grading applications, unless exempt pursuant to this ordinance.

B. Exemptions

Single family and duplex residential and recreational development and redevelopment that cumulatively disturbs less than one half acre (<½ acre) and is not part of a larger common plan of development or sale is exempt from the provisions of this ordinance.

Commercial, industrial, institutional, multifamily residential or local government development and redevelopment that cumulatively disturbs less than 12,000 square feet and is not part of a larger common plan of development or sale is exempt from the provisions of this ordinance.

Development and redevelopment that disturbs less than the above thresholds are not exempt if such activities are part of a larger common plan of development or sale and the larger common plan exceeds the relevant threshold, even though multiple, separate or distinct activities take place at different times on different schedules.

Development that is exempt from permit requirements of Section 404 of the federal Clean Water Act as specified in 40 CFR 232 (primarily, ongoing farming and forestry activities) are exempt from the provisions of this ordinance.

<table>
<thead>
<tr>
<th>Type of Development</th>
<th>Falls Lake Watershed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-family, detached and duplex residential</td>
<td>0.50 ac or greater</td>
</tr>
<tr>
<td>Multi-family residential, commercial and industrial</td>
<td>12,000 sf or greater</td>
</tr>
</tbody>
</table>

C. No Development or Redevelopment Until Compliance and Permit

No development or redevelopment shall occur except in compliance with the provisions of this ordinance or unless exempted. No development or redevelopment
for which a permit is required pursuant to this ordinance shall occur except in compliance with the provisions, conditions, and limitations of the permit.

D. Map

The provisions of this ordinance shall apply within the areas designated on the map titled "Falls Watershed Stormwater Map of Franklin County, North Carolina" ("the Stormwater Map"), which is adopted simultaneously herewith. The Stormwater Map and all explanatory matter contained thereon accompanies and is hereby made a part of this ordinance (See Appendix A).

8.4 FALLS LAKE WATERSHED STANDARDS

A. General Standards

All development and redevelopment to which this ordinance applies shall comply with the standards of this section. The approval of the stormwater permit shall require an enforceable restriction on property usage that runs with the land, such as a recorded deed restriction or protective covenants, to ensure that future development and redevelopment maintains the site consistent with the approved project plans.
B. Nitrogen and Phosphorus Loading

a) Nitrogen and phosphorus loads contributed by the proposed new development shall not exceed the following unit-area mass loading rates: **2.2** and **0.33** pounds per acre per year for nitrogen and phosphorus, respectively.

<table>
<thead>
<tr>
<th>Falls Lake Watershed (lbs/ac/year)</th>
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</thead>
<tbody>
<tr>
<td>Nitrogen</td>
</tr>
<tr>
<td>2.2</td>
</tr>
<tr>
<td>Phosphorus</td>
</tr>
<tr>
<td>0.33</td>
</tr>
</tbody>
</table>

b) Calculations within the Falls Lake Watershed are to follow the model and worksheets described in Section 4, with the nutrient loading limits described above.

c) Notwithstanding 15A NCAC 2B.104(q), redevelopment subject to this ordinance that would replace or expand existing structures or improvements and would result in a net increase in built-upon area shall have the option of either meeting the nutrient loading standards identified above OR meeting a loading rate that achieves the following nutrient loads compared to the existing development: 40 percent and 77 percent reduction for nitrogen and phosphorus, respectively.

d) According to Neuse River Basin Strategy (15A NCAC 2B.0235), developers shall have the option of partially offsetting their nitrogen loads by funding wetland or riparian area restoration through the North Carolina Wetland Restoration Fund as described in below in Section 8.4.E and Section 4.7.

e) The developer shall determine the need for engineered stormwater controls to meet these loading rate targets by using the approved accounting tool. The Falls Lake Stormwater Load Accounting Tool worksheet is available online at:
   http://www.co.franklin.nc.us/Planning/LongRange/stormwater.htm
   http://portal.ncdenr.org/web/wq/ps/nps/fallslake

C. Nitrogen and Phosphorus Standard is Supplemental

The nitrogen and phosphorus loading standards in this ordinance are supplemental to, not replacements for, stormwater standards otherwise required by federal, state or local law, including without limitation any riparian buffer requirements applicable to the location of the development. This includes, without limitation, the riparian buffer protection requirements of 15A NCAC 2B.0233 and .0242.

D. Control and Treatment of Runoff Volume

Stormwater systems shall be designed to control and treat the runoff generated from all surfaces by **one inch** of rainfall. The treatment volume shall be drawn down pursuant to standards specific to each practice as provided in the NCDENR DWQ Design Manual. To ensure that the integrity and nutrient processing functions of receiving waters and associated riparian buffers are not compromised by erosive
flows, stormwater flows from the development shall not contribute to degradation of waters of the State.

At a minimum, the development shall not result in a net increase in peak flow leaving the site from pre-development conditions for the one-year, 24-hour storm event.

E. Partial Offset of Nutrient Control Requirements

Development subject to this ordinance shall attain nitrogen and phosphorus loading rate reductions on-site that meet the following criteria prior to using an offsite offset measure:

1. 30 percent or more reduction in both nitrogen and phosphorus loading from the untreated conditions for any single-family, detached and duplex residential development disturbing one half acre but less than one acre.

2. 50 percent or more reduction in both nitrogen and phosphorus loading from the untreated conditions for any single-family, detached and duplex residential development disturbing more than one acre.

3. 30 percent or more reduction in both nitrogen and phosphorus loading from the untreated condition for other development, including multi-family residential, commercial and industrial development disturbing 12,000 square feet but less than one acre.

4. 50 percent or more reduction in both nitrogen and phosphorus loading from the untreated condition for other development, including multi-family residential, commercial and industrial development disturbing more than one acre.

<table>
<thead>
<tr>
<th>Type of Development</th>
<th>Area Disturbed</th>
<th>Minimum Reduction in N&amp;P from Untreated Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-family, detached and duplex residential</td>
<td>0.50 ac to 0.99 ac</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>1.0 ac or more</td>
<td>50%</td>
</tr>
<tr>
<td>Other development, including multi-family residential,</td>
<td>12,000 sf to 0.99 ac</td>
<td>30%</td>
</tr>
<tr>
<td>commercial and industrial development</td>
<td>1.0 ac or more</td>
<td>50%</td>
</tr>
</tbody>
</table>

A developer subject to this ordinance may achieve the additional reductions in nitrogen and phosphorus loading required by this ordinance by making offset payments to the NC Ecosystem Enhancement Program (NCEEP) contingent upon acceptance of payments by that Program. A developer may use an offset option provided by Franklin County. A developer may propose other offset measures to Franklin County, including providing his or her own offsite offset or utilizing a private seller. All offset measures permitted by this ordinance shall meet the requirements of 15A NCAC 02B .0282 and 15A NCAC 02B .0240. Refer to Section 4.7 of this ordinance for guidance.

F. Evaluation of Standards for Stormwater Control Measures
1. Evaluation According to Contents of Design Manual

All stormwater control measures, stormwater systems and stormwater treatment practices (also referred to as Best Management Practices, or BMPs) required under this ordinance shall be evaluated by the Stormwater Administrator according to the policies, criteria, and information, including technical specifications and standards and the specific design criteria for each stormwater practice, in the NCDENR BMP Design Manual. The Stormwater Administrator shall determine whether proposed BMPs will be adequate to meet the requirements of this ordinance. The Design Manual is available online at: http://portal.ncdenr.org/web/wq/ws/su/bmp-manual

2. Determination of Adequacy; Presumptions and Alternatives

Stormwater treatment practices that are designed, constructed, and maintained in accordance with the criteria and specifications in the NCDENR Design Manual and the approved accounting tool will be presumed to meet the minimum water quality and quantity performance standards of this ordinance. Whenever an applicant proposes to utilize a practice or practices not designed and constructed in accordance with the criteria and specifications in the NCDENR Design Manual, the applicant shall have the burden of demonstrating that the practice(s) will satisfy the minimum water quality and quantity performance standards of this ordinance. The Stormwater Administrator may require the applicant to provide the documentation, calculations, and examples necessary for the Stormwater Administrator to determine whether such an affirmative showing is made.
Section 9 — ILLEGAL DISCHARGES

This section of the Ordinance establishes methods for controlling the introduction of pollutants into the stormwater collection system.

9.1 DISCHARGE PROHIBITIONS

No person shall discharge or cause to be discharged into the stormwater collection system any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than stormwater.

9.2 ALLOWABLE DISCHARGES

The commencement, conduct, or continuance of any illegal discharge to the stormwater collection system is prohibited except as described as follows:

The following discharges are exempt from discharge prohibitions established by this Ordinance provided that they do not significantly impact water quality:

a. Waterline flushing,
b. Landscape irrigation,
c. Diverted stream flows,
d. Uncontaminated rising groundwater,
e. Uncontaminated groundwater infiltration to the stormwater collection system,
f. Uncontaminated pumped groundwater,
g. Discharges from potable water sources,
h. Foundation drains,
i. Uncontaminated air-conditioning condensation,
j. Irrigation water,
k. Springs,
l. Water from crawl space pumps,
m. Footing drains,
n. Lawn watering,
o. Non-commercial car washing,
p. Flows from riparian habitats and wetlands,
q. NPDES permitted discharges,
r. Street wash water,
s. Fire fighting emergency activities,
t. Wash water from the cleaning of buildings,
u. Dechlorinated backwash and draining associated with swimming pools, and
v. Flows from firefighting.
w. Discharges specified in writing by the County as being necessary to public health and safety.
x. Dye testing is an allowable discharge, but requires verbal notification to the County prior to the time of the test. Any non-stormwater discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or waste discharge order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the stormwater collection system.

9.3 PROHIBITED DISCHARGES

A. It is a violation of this Ordinance for any person to discharge any substance into the stormwater collection system, which by its nature, may:
   1. Become a public health hazard endangering human or animal health.
   2. Interfere with the free and rapid flow of surface water.
   3. Be flammable or explosive.
   4. Be toxic to human, animal or plant life.
   5. Be corrosive or damaging to the stormwater collection system.
   6. Affect adversely the State of North Carolina classification of the stream into which the discharge flows.

B. Non-allowable discharges include, but are not limited to, the following:
   1. Dumping of oil, anti-freeze, chemicals, garbage, paint or cleaning fluids,
   2. Untreated animal waste,
   3. Commercial car washes,
   4. Industrial discharges,
   5. Contaminated foundation drains,
   6. Cooling water unless no chemicals are added, and a NPDES permit is in place,
   7. Washwaters from commercial and industrial activities,
   8. Sanitary sewer discharges,
   9. Septic tank discharges,
   10. Washing machine discharges, and
   11. Chlorinated backwash and draining associated with swimming pools.

C. Prohibition of Illegal Connections

   1. The construction, use, maintenance, or continued existence of illegal connections to the stormwater collection system are prohibited. Any connection to the stormwater collection system, which allows the discharge of non-stormwater, other than the exclusions listed in Section 7.B of this Ordinance, is prohibited.

   2. This prohibition expressly includes, without limitation, illegal connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of the connection.

   3. A person is considered to be in violation of this Ordinance if the person connects a line conveying sewage to the stormwater collection system, or allows such a collection to continue.
4. Where such connections exist in violation of this Ordinance, and said connections existed prior to the adoption of this Ordinance, the property owner, or person using said connection shall remove the connection within one (1) year following the adoption of this Ordinance. This grace period shall not apply to connections which may result in the discharge of hazardous materials or other discharges which pose an immediate threat to health and safety, or are likely to result in immediate injury and harm to human, animal or plant life, and natural resources.

5. Where it is determined that the one (1) year grace period shall not apply, the Planning Director or Designee shall determine the time within which the connection shall be removed. In setting the time limit for compliance, the County shall take into consideration:
   a. The quantity and complexity of the work.
   b. The consequences of delay.
   c. The potential harm to the environment, to the public health, to public and private property, to wildlife, and to natural resources.
   d. The cost of remedying the damage.

9.4 SPILLS

A. Spills or leaks of polluting substances discharged to, or having the potential to reach the stormwater collection system, shall be contained, controlled, collected, and removed promptly. All affected areas shall be restored to their preexisting condition.

B. Notification of Spills:

1. Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into or may reach the stormwater collection system or waters of the Tar-Pamlico River Basin in Franklin County, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such discharge. In the event of such a discharge of hazardous materials, said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services, and shall notify the County within twenty-four (24) hours. In the event of a discharge of non-hazardous materials, said person shall notify the County no later than the next business day. All notifications shall be confirmed by written notice addressed and mailed to the County within three (3) business days of the discharge.

2. Notification shall not relieve said person of:
   a. Any liability or expense related to the discharge.
   b. Restoration of any area affected by the discharge to preexisting conditions.
   c. Liability or violation of any regulatory body of the County, State or Federal government.
Section 10 — JURISDICTION-WIDE COLLECTION OF ILLEGAL DISCHARGE INFORMATION

Franklin County Planning and Inspections shall collect information related to Illegal Discharges from all applicable sources within its Jurisdiction within the Tar-Pamlico and Neuse River Basin.
Section 11 —INSPECTIONS AND INVESTIGATIONS

11.1 AUTHORITY TO ENTER

Agents and officials of Franklin County shall have the right to enter property at all reasonable times to inspect sites subject to the requirements of this ordinance to determine whether the development, BMPs, discharges and/or other activities on the property conform to the standards and requirements as set out herein. No person shall obstruct, delay, hamper, or in any way interfere with a county agent or official while in the process of carrying out their duties under this ordinance.

11.2 INSPECTION OF STORMWATER FACILITIES

Inspection programs may be established on any reasonable basis, including but not limited to: routine inspections; random inspections; inspections based upon complaints or other notice of possible violations; inspection of drainage basins or areas identified as higher than typical sources of sediment or other contaminants or pollutants; inspections of businesses or industries of a type associated with higher than usual discharges of contaminants or pollutants or with discharges of a type which are more likely than the typical discharge to cause violations of state or federal water or sediment quality standards or an NPDES stormwater permit; and joint inspections with other agencies inspecting under environmental or safety laws. Inspections may include, but are not limited to: reviewing maintenance and repair records; sampling discharges, surface water, groundwater, and material or water in drainage control facilities; and evaluating the condition of drainage control facilities and other stormwater treatment practices.

If the owner or occupant of any property refuses to permit such inspection, the Stormwater Administrator shall proceed to obtain an administrative search warrant pursuant to G.S. 15-27.2 or its successor. No person shall obstruct, hamper or interfere with the Stormwater Administrator while carrying out his or her official duties.

11.3 REMEDIES

The provisions of this ordinance may be enforced by one, all, or a combination of the remedies authorized by Article 25 of Franklin County UDO.
Section 12 — EFFECTIVE DATE AND AMENDMENTS

12.1 This Ordinance will become effective upon passage by the Franklin County Board of Commissioners and the approval of the Environmental Management Commission. Amendments to the Ordinance may not be made in a way that causes it to not meet the minimum requirements of the Tar-Pamlico Stormwater Rule or Falls Lake Watershed requirements. All amendments to the Stormwater Ordinance must be approved by the NCDENR Division of Water Quality.

12.2 Severability

If the provisions of any section, subsection, paragraph, subdivision or clause of this ordinance shall be adjudged invalid by a court of competent jurisdiction, such judgment shall not affect or invalidate the remainder of any section, subsection, paragraph, subdivision or clause of this ordinance.
APPENDIX A

STORMWATER MAP

Developers and designers should refer to the Stormwater Map provided on the Franklin County website:

http://www.franklincountync.us/services/planning-and-inspections/current-planning-2/informational-maps
APPENDIX B

STORMWATER MANAGEMENT REVIEW APPLICATION
This application accompanies the project plans identified below and is intended to provide the information for determining compliance with the Franklin County Stormwater Ordinance.

**Project Information:**

Project Name: ________________________________________________________________

Property Address: ____________________________________________________________

Owner/Developer: ____________________________________________________________

Tax Map Number: ___________________________        PIN #: __________________________

Project Location: [ ] Tar-Pamlico River Basin  [ ] Neuse River Basin  [ ] Falls Lake Watershed

*If the project is located in the Neuse River Basin, the project is exempt from this application process!*

Project Type: [ ] New Development  [ ] Redevelopment

Size of Tract: ___________________________        Total Disturbed Area: ___________________________

**Type of Development:**

[ ] Single Family Residential  [ ] Multifamily  [ ] Commercial

[ ] Redevelopment  [ ] Industrial  [ ] Other: _______________________________________

**Peak Flow:**

Pre-Development Runoff ___________________________ cfs (1 yr – 24 hour storm)

Post-Development Runoff ___________________________ cfs (1 yr – 24 hour storm)

% Difference ___________________________ Increase / Decrease

**Impervious:**

Existing Impervious ___________________________ Ac % Impervious

Post-Developed Impervious ___________________________ Ac % Impervious

**Documentation:**

[ ] Stormwater Management Checklist with all appropriate Submittal Documentation

**Signatures**

Owner Signature: ___________________________ Date: ___________________________

Property Owner: ___________________________ Telephone: ___________________________

Address: ___________________________ Fax: ___________________________

                             Email: ___________________________

Applicant

Signature: ___________________________ Date: ___________________________

Submitted by: ___________________________ Telephone: ___________________________

Address: ___________________________ Fax: ___________________________

                             Email: ___________________________
APPENDIX C

STORMWATER MANAGEMENT CHECKLIST
FRANKLIN COUNTY
STORMWATER MANAGEMENT CHECKLIST

This signed checklist should be submitted with the Stormwater Management Plan.

Project Name: ____________________________ PIN No: ____________________________
Site Address: ____________________________ Owner/Developer: ____________________________

Submitted By: ____________________________ Date: ____________________________
Signature: ____________________________

Plans Including:

☐ Vicinity map showing the location of the site. The scale of the map shall be adequate to show the area in question with reasonable depiction of streets to determine the exact location of the site.

☐ Overall map of the site showing the current zoning and land use of adjacent property, which could be affected by the proposed stormwater management system.

☐ Existing topographical information for site with a min. 2 ft contours

☐ 100-year Flood Plain boundaries from the latest FEMA FIRM map.

☐ Wetlands boundaries as verified with the US Corps of Engineers.

☐ USGS Quadrangle Map, properly labeled with project location

☐ NRCS Franklin County Soil Survey Map, properly labeled with project location. Please note that the soil survey map must be from the USDA NRCS paper-bound hard copy and not online sources.

☐ Stormwater management features, both existing and proposed.

☐ Details of all proposed stormwater management structures. The detail shall be sufficient to provide information to construct and review the structure for proper design.

☐ Easements for all stormwater management structures.

☐ Construction sequence for the construction of the stormwater management structures to specifically include the timing of when to install the system. This can be part of the erosion and sedimentation control construction sequence.

☐ Landscape plan, which clearly shows the extent of undisturbed vegetation and the location, species and number and planting characteristics (including height at time of planting, spacing, etc.) of proposed vegetation. The plan must also describe the vegetative stabilization and management techniques to be used at the site after construction is completed, who will be responsible for the maintenance of vegetation, and what practices will be employed to ensure that adequate vegetation cover is preserved.

Stormwater Calculations:

☐ Stormwater Management Summary Statement

☐ Drainage maps for the area of development. Both overall and site-specific drainage maps are required to give an accurate picture of flow of runoff.

☐ Calculations and analysis of stormwater drainage system.

☐ Calculations of Pre- vs. Post-development runoff

☐ Calculations for Nitrogen and Phosphorus loading, if necessary

☐ Calculations of Best Management Practices (BMPs) including hydrographs, storage calculations, buoyancy calculations, etc.

☐ Analysis of the stormwater runoff impacts that the proposed development or construction activity will have on the surrounding properties, both upstream and downstream.

Submittals:

☐ (1) Stormwater Management Checklist

☐ (1) Stormwater Management Review Application

☐ (1) Full set of plans for the entire development

☐ (2) Stormwater Management Plan and Details

☐ (2) Stormwater Calculations/ Maps

☐ (2) Stormwater Operations and Maintenance Agreement (draft).

☐ (2) Stormwater Operations and Maintenance Plan for each BMP (draft).

☐ Documentation of approval from NCDENR DWQ, if required.

☐ Documentation of Erosion and Sedimentation Control approval from NCDENR, if required.

☐ Check for Plan Review Fee
APPENDIX D

NUTRIENT EXPORT CALCULATION WORKSHEETS

Nutrient Export Calculation Worksheets are to be used as provided by NCDENR at:
http://portal.ncdenr.org/web/wq/ps/nps/tarpamstorm
APPENDIX E

NUTRIENT OFFSET MITIGATION PAYMENT SUMMARY

Refer to Franklin County’s Nutrient Offset Mitigation Payment Worksheet online at:
http://www.franklincountync.us/services/planning-and-inspections
### NUTRIENT OFFSET MITIGATION PAYMENT SUMMARY

<table>
<thead>
<tr>
<th>Jurisdiction:</th>
<th>Franklin County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basin:</td>
<td>Tar/Pamlico</td>
</tr>
<tr>
<td>Project Name:</td>
<td></td>
</tr>
<tr>
<td>Address:</td>
<td></td>
</tr>
<tr>
<td>Engineer of Record:</td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td></td>
</tr>
</tbody>
</table>

#### Site Characteristics
- **Acreage**: 1 acres
- **Redevelopment Site**: Yes
- **BMP(s) Utilized**: 

#### Pre-Development Nitrogen and Phosphorous Loading
- **Nitrogen**: 0.00 lb/year, 0.00 lb/acre/year
- **Phosphorous**: 0.00 lb/year, 0.00 lb/acre/year

#### Post-Development Nitrogen and Phosphorous Loading
- **Nitrogen**: 0 lb/year, 0.00 lb/acre/year
- **Phosphorous**: 0.00 lb/year, 0.00 lb/acre/year

#### Nitrogen and Phosphorous Loading Limits
- **Nitrogen**: 0 lb/year, 0.00 lb/acre/year
- **Phosphorous**: 0 lb/year, 0.00 lb/acre/year

*Note: If Redevelopment Site, limits are based on 30% reduction in Nitrogen and pre-development loading for Phosphorous*

#### Post-BMP Nitrogen and Phosphorous Loading
- **Nitrogen**: 0.00 lb/year, 0.00 lb/acre/year
- **Phosphorous**: 0.00 lb/year, 0.00 lb/acre/year

*Note: Unless project is a redevelopment site, post Nitrogen loading is subject to 6 (or 10) lbs/acre/year threshold*

#### Nutrient Buy-Down Summary
- **Nitrogen**: 0.00 lb/year, 0.00 lb/acre/year
- **Phosphorous**: 0.00 lb/year, 0.00 lb/acre/year

#### NCEEP Offset Payment Schedule
- **Nitrogen**: $11.79 per lb.
- **Phosphorous**: $142.02 per lb.

#### Buydown Calculations
- **Nitrogen**: (Mitigation Cost $ per lb.) x (# of N lb/yr) x 30 years
  - Nitrogen Buydown = $ -
- **Phosphorous**: (Mitigation Cost $ per lb.) x (# of P lb/yr) x 30 years
  - Phosphorous Buydown = $ -

#### Total Nutrient Offset Mitigation Payment
- **$0.00**

*(Note: Mitigation Payment is sum of the Nitrogen and Phosphorous fees)*

[http://www.nceep.net/services/stratplan/Nutrient_Offset_Program.htm](http://www.nceep.net/services/stratplan/Nutrient_Offset_Program.htm)
APPENDIX F

EXAMPLE STORMWATER OPERATION & MAINTENANCE LEGAL AGREEMENT
THIS AGREEMENT, made and entered into this _______ day of ____________, 20___, by and between _______________________________________________, herein “Permittee” and Franklin County, a political Municipality of North Carolina (the “County”); W I T N E S S E T H:

WHEREAS, the County has adopted through the County Zoning Ordinance certain stormwater management regulations applicable to the property of Permittee located in the Franklin County, North Carolina and known as _______________________________ (“the Property”), recorded in Plat Book ___________ Page __________, Franklin County Registry; and

WHEREAS, such regulations, including but not limited to the Franklin County Stormwater Ordinance require the Permittee to operate and maintain an engineered stormwater Best Management Practice (BMP) to provide storage and/or treatment of stormwater runoff as part of the development of the Property; and

WHEREAS, Permittee has constructed an on-site stormwater control structure or series of engineered stormwater controls (the “Facility”) to satisfy the requirements of such regulations, the boundaries and general description of such Facility being described in Exhibit A attached hereto and incorporated herein by reference; and

WHEREAS, Permittee is, or upon completion thereof shall become, the Owner of the Facility; and

WHEREAS, as a condition of the development of the Property, Permittee is required to operate and maintain the Facility in perpetuity in a manner that accomplishes the stormwater control and treatment intended, including but not limited to ongoing nutrient reduction and/or peak flow attenuation, and to enter into an agreement with the County securing that commitment;

NOW, THEREFORE, for and in consideration of the premises and the approval by the County of the development activities on the Property, the Permittee does hereby covenant and agree with the County that the Property and Facility shall be held, operated, maintained, and encumbered pursuant to the covenants and conditions hereinafter set forth;
1. **No conveyance of Facility without new Agreement.** Permittee covenants and agrees that it will not convey, transfer, assign, lease or otherwise release or relinquish ownership or control of the Facility, in whole or in part, unless and until the proposed new owner of the Facility, or any interest therein, has entered into a BMP Operation and Maintenance Agreement with the County containing substantially the same terms and conditions as this Agreement.

2. **Property Obligated.** A legal description of all the property which is obligated to maintain the Facility is attached hereto as Exhibit B. All owners of each lot or parcel therein (or the sole owner if there is but one parcel) at the time the obligation hereunder arises shall be ultimately responsible for compliance by the Permittee with the terms, conditions and obligations of the Agreement.

3. **Operation and Maintenance.** Permittee shall operate, maintain, repair, and, if necessary, reconstruct the Facility in accordance with the provisions below:

   a. Maintenance of the Facility shall be at least in accordance with instructions for the specific type of BMPs, as described in *Stormwater Best Management Practices ("Manual"),* NC Department of Environment and Natural Resources (NCDENR), Division of Water Quality, Water Quality Section, 1999, including any and all subsequent revisions. At minimum, maintenance activities shall conform to the guidelines contained therein, and shall maintain the Facility as designed for optimal functioning. For the project named herein, the specific BMP(s) is/are described in Exhibit A.

   b. An *Annual BMP Certification* shall be submitted by the Permittee and approved by the County, according to County regulations. Annually, on or before August 15, the Permittee shall submit to the County a certification, sealed by a registered Professional Engineer, that the Facility is functioning as intended, plus a certification by the person or entity responsible for maintenance that (1) the specific maintenance activities have occurred, (2) all nonroutine maintenance has been listed and (3) that the *Operation and Maintenance Plan* is adequate to ensure optimal functioning or that changes are recommended.

   c. A notarized *Operation and Maintenance Plan* shall be signed by the responsible party and submitted to the County prior to approval of this agreement. Changes to the *Operation and Maintenance Plan* shall be submitted with the *BMP Certification,* if required to maintain optimal functioning of the BMP or to remain in compliance with the maintenance recommendations of the Manual. Proposed changes to the *Operation and Maintenance Plan* are subject to approval by the County. Additional information may be required for reporting purposes, as directed by the County Planning Director or designee.

   d. Landscaping of the area around the Facility shall not reduce the County or hinder operation and maintenance of the Facility. Landscaping shall be maintained to ensure that landscape materials live and prosper. Re-vegetation and stabilization of areas may be required by the County Planning Director or designee.

   e. The Facility shall be maintained in a manner so as to control insects, odors and algae as determined necessary by the County Planning Director or designee.

   f. Any fencing or other security measures shall be maintained in good condition. If no fencing or security measures are included with the original construction, they shall be
added at the Permittee’s expense at such time as the County Planning Director or
designee determines that unauthorized persons are disturbing the Facility and that
security measures will help prevent such unauthorized activity.

g. Necessary non-routine maintenance actions shall be performed in a timely manner
so as to ensure continuous performance of the Facility. All non-routine maintenance
activities shall be noted in the next yearly report.

4. Right of Inspection by County. The Permittee hereby grants the County the right,
privilege and easement over, upon and across the Property lying between any public street or
right of way and the Facility for the purpose of inspecting, correcting, repairing, replacing or
maintaining the Facility as provided in this Agreement. This right, privilege and easement is
appurtenant to and shall run with the Property and Facility.

5. Remedies for Violations of this Agreement.
a. If the Permittee shall fail to satisfactorily maintain or repair the Facility as set forth herein, or
otherwise violates this Agreement, the County may order the Permittee to undertake
necessary actions to correct such violation. If the Permittee fails to comply with such order
within (30) days from the date thereof, the County, in its sole discretion may enter the
Property and perform all necessary work to place the Facility in proper working condition.
The full cost of performing the work shall be a lien on the property as provided in G.S. 160A-
193. In such event, the County shall assess against Permittee all of its related costs and
expenses (including but not limited to employee time, materials and supplies, vehicle and
equipment use, administrative expenses, plus all contract costs, if required for repairs,
design or inspection) and the Permittee hereby agrees to timely pay the same. Where the
Permittee is the sole owner of the development, if this total amount is not paid in full within
three (3) months of the assessment, then such amount shall be a continuing lien on the
Property. Where there is more than one owner of record of the Property, and if the total
amount is not paid in full to the County within three (3) months of the assessment, then each
owner of record shall become personally liable for such owner’s proportionate share of the
assessment. If the proportionate share of the assessment is not paid in full by each such
owner within thirty (30) days following receipt of notice thereof from the County, then such
amount shall be a continuing lien on the property owned by each owner, such owner’s heirs,
devises, personal representatives, successors and/or assigns.

b. The County shall have the right to bring an action against the Permittee and/or each
individual owner to recover all sums due, including its expenses, damages and its
reasonable attorney fees, seek injunctive and equitable relief, and/or such other and further
relief as may be just and appropriate.

c. The remedies provided by this paragraph are cumulative and are in addition to any other
remedies provided by law.

5. No Waiver of Breach. In the event of a breach of any term of this Agreement, any delay
or failure on the part of the County to exercise any rights, powers, or remedies herein provided
shall not be construed as a waiver thereof or acquiescence of such breach or any future breach.

6. Amendments. This Agreement may be amended, revised or modified only by a written
document signed by the parties.

7. Binding Effect. The conditions and restrictions set forth herein with regard to the Facility
shall run with the land and shall bind the Permittee and its heirs, successors and assigns and all
parties claiming by, through, or under them shall be taken to hold, agree, and covenant with the County, its successors and assigns, and with each of them to conform to, comply with and observe said conditions and restrictions. The County shall be deemed a beneficiary of the conditions and restrictions set forth herein and such conditions and restrictions shall run with the land in favor of the County.

8. **Warranties of Title.** The Permittee covenants and warrants that it is lawfully seized and possessed of the Facility and real estate described in Exhibit A, that it has good right and lawful authority to enter into this Agreement for the purposes herein expressed, and that no consent or waiver by the holder of any mortgage, deed of trust, or other security instrument, or any other person, firm, or corporation is required prior to entering into this Agreement.

9. **Interpretation.** Use of the masculine gender herein includes the feminine and neuter, and the singular number used herein shall equally include the plural. The captions preceding the various provisions of this Agreement are for the convenience of reference only, and shall not be used as an aid in interpretation or construction of this Agreement. The laws of North Carolina shall govern this agreement.

10. **Severability.** Invalidation of any one of these covenants or conditions by judgment or order of any court shall in no way affect any of the other provisions, which shall remain in full force and effect.

IN WITNESS WHEREOF, the parties have hereunto set their hands and seals this the day and year first above written.

Property Owner: ________________

Franklin County

By: _________________________

By: _________________________

Title/Office ___________________

Title:_________________________

Address: _____________________

___________________________

215 East Nash Street

Louisburg, NC 27549
STATE OF __________________
COUNTY OF _________________

I, ________________________________, a notary public in and for said county and state, certify that _______________________________ personally appeared before me this date and acknowledged that he (or she) is ____________________ (title) of _______________________________ (corporation), a corporation, and that he (or she) as ____________________ (title), being authorized to do so, executed the foregoing on behalf of the corporation.

Witness my hand and official seal, this the __________ day of ____________, 20___.

__________________________________________
Notary Public

My Commission Expires: ________________________________

STATE OF NORTH CAROLINA
COUNTY OF FRANKLIN

I, ________________________________, a notary public in and for said county and state, certify that _______________________________ (Name) personally appeared before me this day, stated that he or she is the ____________________ (Title) of the County of Franklin a political Countyship in the State of North Carolina, and that by authority duly given may act on behalf of the County.

This the _____________ day of ____________________, 20___.

__________________________________________
Notary Public

My Commission Expires: ________________________________

(SEAL)
Exhibit A –
Description of Facility (BMPs) and Property Description

Best Management Practices providing stormwater nutrient removal for the subject Property identified as _______________________________, approved by the County on _____________ (date), are more particularly identified as:

BMP #1 – Dry Detention Pond #1; located on Lot # ___
or special Lot for stormwater conservation located adjacent to Lot # ?? ...

BMP #2 – Bioretention Area #1, located on Lot # …

OR:

The tract described below contains all approved BMP(s) and is a portion of the property identified above.

_______________________ Subdivision

Lot _____ – BMP Lot

Special Purpose Lot for Stormwater Purposes

Located and being in __________________ Countyship in Franklin County, said lot being identified as Lot ___ in the __________________ Subdivision and being more particularly described as follows:

Beginning at
Exhibit B –
Description of Property Obligated to Maintain Facility

Being all of the Property known as ________________________, recorded in Book ______ Page _____, Franklin County Registry.

From Recorded Deed/ Legal Description…

Or, if the whole subdivision is not being recorded at the same time, indicate the recorded sections and specify future sections developed as part of the preliminary plat approved by Franklin County on ___________ date.

Note: for phased final plats, all plats recorded after the O & M agreement, conservation easement or other document is recorded must include a note on the plat stating that the property on that plat is subject to the agreements recoded previously (with DB/Page records).
APPENDIX G

STORMWATER BMP OPERATION & MAINTENANCE FORMS

Refer to NCDENR BMP Operation & Maintenance Forms provided by NCDENR DWQ BMP Design Manual online at:
http://portal.ncdenr.org/web/wq/ws/su/bmp-manual
APPENDIX H

STORMWATER BMP SUPPLEMENT FORMS

Refer to NCDENR BMP Supplement Forms provided in NCDENR DWQ BMP Design Manual online at:
http://portal.ncdenr.org/web/wq/ws/su/bmp-manual
APPENDIX I

STORMWATER BMP
ANNUAL CERTIFICATION FORM
This form is to be completed and submitted annually by October 30 to the Franklin County Planning Director.

**Project Information:**

Project Name: ____________________________

Property Address: ____________________________

Owner/Developer: ____________________________

PIN #: ____________________________ Date of Inspection: ____________

Project Location:  
- [ ] Tar-Pamlico River Basin  
- [ ] Falls Lake Watershed

**BMP Certification Type:**

- [ ] **CONDITIONAL CERTIFICATION**
  Final Certification will be necessary after repair of system. Submit the following attachments:
  1. Stormwater BMP Annual Inspection Report, signed by Owner and Inspector
  2. Photographs
  3. Description of Problems
  4. Description of Corrective Measures

- [ ] **FINAL CERTIFICATION**
  If BMP passed inspection, submit the following:
  1. Stormwater BMP Annual Inspection Report, signed by Owner and Inspector
  2. Photographs

- [ ] **FINAL CERTIFICATION**
  If BMP was under Conditional Certification, submit the following with the Final Certification:
  1. Photographs, clearly showing BMP after repair

**Certification Statement**

As a duly registered Professional in the State of North Carolina, I hereby certify that the Stormwater BMP(s) were inspected under my responsible charge, and to the best of my knowledge, the safety and function are in compliance with the intent of the original design and the Franklin County/ NCDENR standards and regulations.

SEAL:

Signature: ____________________________ Date: ____________

Name (print): ____________________________ Telephone: ____________________________

Address: ____________________________ Fax: ____________________________

Email: ____________________________
APPENDIX J

STORMWATER BMP ANNUAL INSPECTION REPORT FORM
This form is to be completed and submitted annually by September 30 to the Franklin County Planning Director.

**Project Information:**

- Project Name: 
- Property Address: 
- Owner/Developer: 
- PIN #: 
- Date of Inspection: 

- Project Location: 
  - Tar-Pamlico River Basin
  - Falls Lake Watershed

**BMP Description and Number:**

- Bioretention Areas
- Level Spreader
- Permeable Pavement
- Sand Filter
- Underground Storage/ Detention
- Dry Detention Basins
- Infiltration Basin
- Proprietary Devices
- Stormwater Wetlands
- Grassed Swale
- Riparian Buffer
- Rooftop Runoff/ Harvesting
- Wet Detention Pond
- Other (describe): 

**General Information for all BMPs:**

- Yes
- No
- N/A

- Has sediment accumulated in the inlet, outlet or forebay?
- Are there signs of erosion or any denuded areas?
- Is there trash or debris that needs to be removed? (especially at outlet structures)
- Are algae, aquatic weeds or invasive plants (particularly cattails) present?
- Is there evidence of cracks, separation or alignment problems with pipes?
- Are rip-rap dissipator pads damaged, clogged with vegetation or insufficient?
- For dry detention ponds, is the basin holding water longer than 5 days after a storm event?
- Is there evidence of muskrat or beaver activity?
- Are vegetated slopes steeper than 3:1?
- Is there evidence of depressions in the soil surface over or around any pipes?
- Are records of operation and maintenance available for inspections performed quarterly and after every 1” storm event? (include copy)
- Other problems not listed above (describe below).
Describe all problems in detail (use additional sheets if necessary):

________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________

Describe corrective actions needed (use additional sheets if necessary):

________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________

**BMP Condition** (check one):

- **FAILED INSPECTION**
  Has MAJOR deficiencies and must be repaired in order to function properly and operate as designed. A final inspection and certification must be performed and submitted after repair.

- **CONDITIONAL APPROVAL**
  Has MINOR deficiencies but repair is needed in order to ensure system does not fail. Final Certification can be issued with contingent upon corrective measures being addressed.

- **FINAL CERTIFICATION**
  BMP has no deficiencies and a Final Certification will be issued.

**Owner/ Representative Certification:**
I have read and understand the findings of this inspection. I understand that I am responsible for correcting all deficiencies identified in this report by **October 30th** of this year.

Owner Signature: ___________________________ Date: ___________________________
Owner of Record: ___________________________ Telephone: _______________________
Address: __________________________________ Fax: _____________________________

**Inspector’s Certification**
As a duly registered Professional in the State of North Carolina, I hereby certify that the Stormwater BMP(s) described in this report were inspected under my responsible charge, and this report accurately identifies any deficiencies in the structure and function of the BMP(s).

Inspector Signature: ___________________________ Date: ___________________________
Inspector Name: ___________________________ Telephone: _______________________
Company: __________________________________ Fax: _____________________________
Address: __________________________________ Email: ___________________________

Credentials:

Completed NCSU BMP Maintenance & Inspection Certification?  ☐ Yes  ☐ No  Certification # ___________
APPENDIX K

EXAMPLE TAR-PAM CONVERSATION EASEMENT
CONSERVATION EASEMENT
Franklin County, North Carolina

THIS CONSERVATION EASEMENT (this "Conservation Easement") made and entered into this ________ day of __________, __________, by ____________________________ (whether one or more, "Grantor").

RECITALS AND CONSERVATION PURPOSES

A. Grantor is the sole owner in fee simple of certain real estate containing approximately ____ acres located in Franklin County, North Carolina, more particularly described in Exhibit A, attached hereto and by this reference incorporated herein (the “Property”); and

B. The Property is located in the [Tar/Pamlico] [Neuse] [Falls Lake Watershed] River Basin, which has been designated nutrient sensitive by the North Carolina Division of Water Quality and the North Carolina Environmental Management Commission; and

D. The Property possess natural and scenic values which Grantor intends to conserve and maintain by the continuation of land use patterns existing at the time of this grant; and

E. Grantor as owner of the Property intends to preserve and protect the conservation values of the Property in perpetuity; and

F. Grantor agrees by this easement to preserve and protect in perpetuity the conservation values of the Property for the benefit of the current generation and the generations to come;

NOW, THEREFORE Grantor has and by these presents, does hereby unconditionally and irrevocably grant a perpetual Conservation Easement of the nature, character, and extent hereinafter set forth in, over, under, through and across the Property, as described in Exhibit A attached hereto, together with the right of ingress to and egress from the Property over the adjoining property of Grantor, including the right with regard to said Conservation Easement to preserve and protect the conservation values thereof as described herein.
ARTICLE I - PURPOSE

It is the purpose of this Conservation Easement to assure that the Property will be retained forever in its natural state and to prevent any use of the Property which will impair or interfere with the conservation of the Property.

ARTICLE II - DURATION OF EASEMENT

This Conservation Easement shall be perpetual. It is an easement in gross, runs with the land, and is enforceable against Grantor, his, her, its, or their representatives, successors, assigns, lessees, agents, and licensees.

ARTICLE III - PROHIBITED AND RESTRICTED ACTIVITIES

Any activity on, or use of, the Property inconsistent with the purpose of this Conservation Easement is prohibited. The Property shall be maintained in its natural, scenic, wooded and open condition and restricted from any development or other use that would impair or interfere with the conservation purpose of this Conservation Easement set forth above.

All rights reserved by Grantor are reserved for Grantor, Grantor’s representatives, successors, and assigns and are considered to be consistent with the conservation purpose of this Conservation Easement.

Notwithstanding the foregoing, Grantor shall have no right to agree to any activity that would result in the termination of this Conservation Easement.

Without limiting the generality of the foregoing, the following activities and uses by Grantor or any other person are expressly prohibited or restricted:

A. Industrial and Commercial Use. Industrial and commercial activities of any type or kind and any right of access or passage for such purposes are prohibited.

B. Agricultural, Timber Harvesting, Grazing and Horticultural Use. Agricultural, farming, timber harvesting, grazing, horticultural and animal husbandry operations are prohibited; provided, however, those trees which are damaged or fallen as a result of disease, blight, or some weather related event such as a hurricane or other severe storm may be removed, including stumps.

C. Disturbance of Natural Features, Plants and Animals. There shall be no cutting or removal of trees, or the disturbance of other natural features.

D. Construction of Buildings and Use. There shall be no constructing or placing of any residence, building, mobile home, asphalt or concrete pavement, antenna or any other temporary or permanent structure or facility on, above, or under the Property.

E. Mineral Use, Excavation, Dredging. There shall be no filling, excavation, dredging, mining or drilling; no removal of topsoil, sand, gravel, rock, peat, minerals or other materials, and no change in the topography of the land in any manner except as necessary for the purpose of combating erosion or incidental to any conservation management activities otherwise permitted in this Conservation Easement.

F. Wetlands and Water Quality. There shall be no pollution or alteration of water bodies and no activities that would be detrimental to water purity or that would alter natural
water levels, drainage, sedimentation and/or flow in or over the Property or into any surface waters, or cause soil degradation or erosion; in addition, there shall be no diking, dredging, alteration, draining, filling or removal of wetlands, except for activities to restore natural hydrology or wetlands enhancement as permitted by state and any other appropriate authorities.

G. Dumping. Dumping of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances, or other materials on the property is prohibited.

H. Conveyance and Subdivision. The Property shall not be subdivided, partitioned, or conveyed except in its current configuration as an entity.

I. Other Activities or Use. Any use or activity not expressly permitted in ARTICLE IV – PERMITTED ACTIVITIES of this Conservation Easement is prohibited.

**ARTICLE IV – PERMITTED ACTIVITIES**

The following activities or uses on the Property are not inconsistent with the purpose of this Conservation Easement and are reserved to Grantor:

A. Fencing. The Property may be fenced, provided the same can be accomplished without cutting or removing trees, or disturbing the natural features of the land.

B. Hunting, Fishing, and Recreational Activities. Hunting, fishing, and recreational activities may be conducted on and from the Property provided the same are conducted in conformity with all applicable laws, rules, and regulations governing the same, and provided further, that there shall be no surface alteration or other development of the Property in connection therewith.

C. Existing Buildings and Structures. Existing buildings and structures, including billboards located on the Property as of the date hereof, may remain on the Property and be repaired and maintained, but may not be enlarged or expanded. In addition, “No Trespassing”, “For Sale”, “For Lease” signs, or similar informational signs no larger than eight (8) square feet may be placed on the Property.

D. Public Utilities. Public utility easements may be granted and facilities, including, without limitation, lines, wires, cables, pipes, meters, pumps, and lift stations may be placed on the Property, and, to the extent necessary, but only to the extent necessary, trees, undergrowth, and other natural and man made obstructions may be removed to install such public utility facilities.

**ARTICLE V - DOCUMENTATION AND TITLE**

A. Property Condition. The parties acknowledge that the Property is currently undeveloped land, with no improvements other than the following buildings and structures: ________________________________

__________________________________________

B. Easements and Rights of Way. The Property is subject to the following easements and rights of way: ________________________________
C. No. Forfeiture: Nothing contained herein will result in a forfeiture or reversion of Grantor’s title in any respect.

ARTICLE VI. MISCELLANEOUS

A. Conservation Purpose.

   (1) The Grantor, for itself, its successors and assigns, agrees that this Conservation Easement shall be held exclusively for conservation purposes.

   (2) The parties hereto recognize and agree that the benefits of this Conservation Easement are in gross and assignable, provided that in the event it transfers or assigns this Conservation Easement, the transferee or assignee receiving the interest will be a qualified organization as that term is defined in Section 170(h)(3) of the Internal Revenue Code of 1954, as amended (the “Internal Revenue Code”), or any successor section, and the regulations promulgated thereunder, which is organized or operated primarily for one of the conservation purposes specified in Section 170(h)(4)(A) of the Internal Revenue Code.

B. Access. No right of access to the general public to any portion of the Property is conveyed by this Conservation Easement.

C. Liberal Construction. Any general rule of construction to the contrary notwithstanding, this Conservation Easement shall be liberally construed in favor of the grant to effect the purpose of this Conservation Easement and the policy and purpose set forth in Section 170(h)(4)(A) of the Internal Revenue Code.

D. Severability. If any provision of this Conservation Easement, or the application thereof to any person or circumstance, is found to be invalid, the remainder of the provisions of this Conservation Easement, or the application of such provision to persons or circumstances other than those as to which it is found to be invalid, as the case may be, shall not be affected thereby.

E. Entire Agreement. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of this Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

F. Recording. Grantor shall record this instrument and any amendment hereto in a timely fashion in the official records of Franklin County, North Carolina, and may re-record it at any time as may be required to preserve its rights.

G. Joint Obligations. The obligations imposed by this Conservation Easement upon Grantor shall be joint and several.

H. Successors. The covenants, terms, conditions, and restrictions of this Conservation Easement shall be binding upon, and inure to the benefit of the parties hereto and
their respective personal representatives, heirs, successors, and assigns and shall continue as a servitude running in perpetuity with the Property.

I. Termination of Rights and Obligations. A party’s rights and obligations under this Conservation Easement terminate upon transfer of the party’s interest in the Conservation Easement or Property, except that liability for acts or omissions occurring prior to transfer shall survive transfer.

J. Captions. The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon construction or interpretation.

K. Counterparts. The parties may execute this instrument in two or more counterparts, which shall, in the aggregate, be signed by both parties; each counterpart shall be deemed an original instrument as against any party who has signed it. In the event of any disparity between the counterparts produced, the recorded counterpart shall be controlling.

L. Notices. Any notices shall be sent by registered or certified mail, return receipt requested, addressed to the parties as set forth above, or to such other addresses such party may establish in writing to the other. In any case where the terms of this Conservation Easement require the consent of any party, such consent shall be requested by written notice. Such consent shall be deemed denied unless, within thirty (30) days after receipt of notice, a written notice of approval and the reason therefore has been mailed to the party requesting consent.

M. Amendments. Grantor is free to jointly amend this Conservation Easement to meet changing conditions, provided that no amendment will be allowed that is inconsistent with the purpose of this Conservation Easement, affects the perpetual duration of this Conservation Easement, the status of Grantor under any applicable law, or that will affect the qualification of this Conservation Easement under Section 170(h) of the Internal Revenue Code. Such amendment(s) shall be effective upon recording in the public records of Franklin County, North Carolina.

N. Environmental Condition of Property. Grantor warrants and represents that to the best of Grantor’s knowledge after appropriate inquiry and investigation: (a) the Property described herein is and at all times hereafter will continue to be in full compliance with all federal, state, and local environmental laws and regulations, and (b) as of the date hereof there are no hazardous materials, substances, wastes, or environmentally regulated substances (including, without limitation, any materials containing asbestos) located on, in, or under the Property or used in connection therewith, and that there is no environmental condition existing on the Property that may prohibit or impede use of the Property for the purposes set forth herein.

O. Signs. Grantor shall have the right to post visible signs along the boundaries of the Property recognizing the participation of the Fund in the acquisition and protection of the Property and that the Property will remain in its protected state.

P. Costs and Liabilities. Grantor shall retain all responsibilities and shall bear all costs and liabilities of any kind related to the ownership, operation, upkeep, and maintenance of the Property, including, without limitation, the payment of all taxes and assessments levied on or assessed against the Property by any competent authority and the maintenance of adequate comprehensive general liability insurance coverage. Grantor shall keep the Property free of any
liens arising out of any work performed for, materials furnished to, or obligations incurred by, Grantor or anyone claiming under Grantor.

TO HAVE AND TO HOLD the Conservation Easement unto Grantor, its successors and assigns, forever.

IN WITNESS WHEREOF, Grantor has executed this Conservation Easement, each having adopted the type written word (“SEAL”) as their personal/corporate seal, as of the day and year first written above.

GRANTOR:

_________________________________ (SEAL)

NORTH CAROLINA

_________________________________ COUNTY

I, ________________, a Notary Public in and for said County and State so hereby certify that ________________ personally appeared before me this day and being duly sworn, acknowledged that he/she executed the foregoing instrument for the purposes contained within.

WITNESS my hand and official stamp or seal, this the _____ day of ________________, ____.

_______________________________
Notary Public

My Commission Expires: __________
EXHIBIT A

CONSERVATION EASEMENT

LEGAL DESCRIPTION
Developers and Designers should refer to the latest version of the NCDENR DWQ Tar-Pamlico Nutrient Strategy, which is included by reference in the County Stormwater Ordinance.

The Nonpoint Source Management Program: Tar-Pamlico Nutrient Strategy Rules and Maps are available online at: http://portal.ncdenr.org/web/wq/ps/nps/tarpamlico
15A NCAC 02B .0258
TAR-PAMLICO RIVER BASIN-NUTRIENT SENSITIVE WATERS
MANAGEMENT STRATEGY: BASINWIDE STORMWATER REQUIREMENTS

(a) PURPOSE. The purposes of this Rule are as follows.

(1) To achieve and maintain a reduction in nitrogen loading to the Pamlico estuary from lands in the Tar-Pamlico River Basin on which new development occurs. The goal of this Rule is to achieve a 30 percent reduction relative to pre-development levels;
(2) To limit phosphorus loading from these lands to the estuary. The goal of this Rule is to limit phosphorus loading to pre-development levels;
(3) To provide control for peak stormwater flows from new development lands to ensure that the nutrient processing functions of existing riparian buffers and streams are not compromised by channel erosion; and
(4) To minimize, to the greatest extent practicable, nitrogen and phosphorus loading to the estuary from existing developed areas in the basin.

(b) APPLICABILITY. This Rule shall apply to local governments in the Tar-Pamlico basin according to the following criteria.

(1) This Rule shall apply to the following municipal areas:
   (A) Greenville
   (B) Henderson
   (C) Oxford
   (D) Rocky Mount
   (E) Tarboro
   (F) Washington

(2) This Rule shall apply to the following counties:
   (A) Beaufort
   (B) Edgecombe
   (C) Franklin
   (D) Nash
   (E) Pitt

(3) The Environmental Management Commission may designate additional local governments as subject to this Rule by amending this Rule based on the potential of those jurisdictions to contribute significant nutrient loads to the Tar-Pamlico River. At a minimum, the Commission shall review the need for additional designations as part of the Basinwide process for the Tar-Pamlico River Basin. The Commission shall consider, at a minimum, the following criteria related to local governments: population within the basin, population density, past and projected growth rates, proximity to the estuary, and the designation status of municipalities within candidate counties.

(c) REQUIREMENTS. All local governments subject to this Rule shall develop stormwater management programs for submission to and approval by the Commission according to the following minimum standards:

(1) A requirement that developers submit a stormwater management plan for all new developments
proposed within their jurisdictions. These stormwater plans shall not be approved by the subject local governments unless the following criteria are met:

(A) The nitrogen load contributed by the proposed new development activity shall not exceed 70 percent of the average nitrogen load contributed by the non-urban areas in the Tar-Pamlico River basin based on land use data and nitrogen export research data. Based on 1995 land use data and available research, the nitrogen load value shall be 4.0 pounds per acre per year;

(B) The phosphorus load contributed by the proposed new development activity shall not exceed the average phosphorus load contributed by the non-urban areas in the Tar-Pamlico River basin based on land use data and phosphorus export research data. Based on 1995 land use data and available research, the phosphorus load value shall be 0.4 pounds per acre per year;

(C) The new development shall not cause erosion of surface water conveyances. At a minimum, the new development shall not result in a net increase in peak flow leaving the site from predevelopment conditions for the 1-year, 24-hour storm event; and

(D) Developers shall have the option of partially offsetting their nitrogen and phosphorus loads by providing treatment of off-site developed areas. The off-site area must drain to the same classified surface water, as defined in the Schedule of Classifications, 15A NCAC 2B .0316, that the development site drains to most directly. The developer must provide legal assurance of the dedicated use of the off-site area for the purposes described here, including achievement of specified nutrient load reductions and provision for regular operation and maintenance activities, in perpetuity. The legal assurance shall include an instrument, such as a conservation easement, that maintains this restriction upon change of ownership or modification of the off-site property. Before using off-site treatment, the new development must attain a maximum nitrogen export of six pounds/acre/year for residential development and 10 pounds/acre/year for commercial or industrial development.

(2) A public education program to inform citizens of how to reduce nutrient pollution and to inform developers about the nutrient and flow control requirements set forth in Part (c)(1).

(3) A mapping program that includes major components of the municipal separate storm sewer system, waters of the State, land use types, and location of sanitary sewers.

(4) A program to identify and remove illegal discharges.

(5) A program to identify and prioritize opportunities to achieve nutrient reductions from existing developed areas.

(6) A program to ensure maintenance of BMPs implemented as a result of the provisions in Subparagraphs (c)(1) and (c)(5).

(7) A program to ensure enforcement and compliance with the provisions in Subparagraph (c)(1).

(8) Local governments may include regional or jurisdiction-wide strategies within their stormwater programs as alternative means of achieving partial nutrient removal or flow control. At a minimum, such strategies shall include demonstration that any proposed measures will not contribute to degradation of surface water quality, degradation of aquatic or wetland habitat or biota, or destabilization of conveyance structure of involved surface waters. Such local governments shall also be responsible for including appropriate supporting information to quantify nutrient and flow reductions provided by these measures and describing the administrative process for implementing such strategies.

(d) TIMEFRAME FOR IMPLEMENTATION. The timeframe for implementing the stormwater management program shall be as follows:

(1) Within 12 months of the effective date of this Rule, the Division shall submit a model local stormwater program that embodies the minimum criteria described in Paragraph (c) of this Rule to the Commission for approval. The Division shall work in cooperation with subject local governments in developing this model program.

(2) Within 12 months of the Commission’s approval of the model local stormwater program or within 12 months of a local government’s later designation pursuant to Subparagraph (b)(3), subject
local governments shall submit their local stormwater management programs to the Commission for review and approval. These local programs shall meet or exceed the requirements in Paragraph (c) of this Rule.

(3) Within 18 months of the Commission’s approval of the model local stormwater program or within 18 months of a local government’s later designation pursuant to Subparagraph (b)(3), subject local governments shall adopt and implement their approved local stormwater management program.

(4) Local governments administering a stormwater management program shall submit annual reports to the Division documenting their progress and net changes to nitrogen load by October 30 of each year.

(e) COMPLIANCE. A local government that fails to submit an acceptable local stormwater management program within the timeframe established in this Rule or fails to implement an approved program shall be in violation of this Rule. In this case, the stormwater management requirements for its jurisdiction shall be administered through the NPDES municipal stormwater permitting program per 15A NCAC 2H .0126. Any local government that is subject to an NPDES municipal stormwater permit pursuant to this Rule shall:

(1) Develop and implement comprehensive stormwater management program to reduce nutrients from both existing and new development. This stormwater management program shall meet the requirements of Paragraph (c) of this Rule for new and existing development.

(2) Be subject to the NPDES permit for at least one permitting cycle (five years) before it is eligible to submit a local stormwater management program to the Commission for consideration and approval.

History Note: Authority G.S. 143-214.1; 143-214.7; 143-215.3(a)(1); 143-215.6A; 143-215.6B; 143-215.6C; 143-282(d); Eff. April 1, 2001.
APPENDIX M

THE NITROGEN CYCLE - SOURCES OF NITROGEN IN DEVELOPED AREAS
FORMS OF NITROGEN
Although nitrogen is the major pollutant of concern for the Tar-Pamlico River Estuary, it is also a nutrient that is essential for life. The majority of nitrogen on the planet exists as N\textsubscript{2} gas in the atmosphere. In fact, 78% of the volume of the air we breathe is nitrogen. Nitrogen is not a natural constituent of rocks or minerals.

The N\textsubscript{2} molecule has a triple bond, which is the most stable bond known to science. Plants obtain all of the oxygen and carbon they need from the air. However, it is very difficult for a plant to obtain nitrogen from the atmosphere because N\textsubscript{2} gas is so non-reactive.

Very special circumstances are required to break the triple bond in N\textsubscript{2} gas and to convert the nitrogen into forms that most plants can use, as described in the next section. The majority of plants obtain nitrogen from the soil as either nitrate (NO\textsubscript{3}) or ammonium (NH\textsubscript{4}).

Once in the plant, ammonium can be used directly but nitrate is transformed to the ammonium form using energy derived from photosynthesis. The plant uses nitrogen to form proteins that act primarily to control plant growth processes. A good supply of nitrogen is associated with vigorous growth and a deep green color. Plants deficient in nitrogen become stunted and yellow in appearance.

Nitrogen in plant-available forms is generally scarce under natural conditions. In other words, under natural conditions, nitrogen is a limiting growth factor. Only recently have humans upset the balance by the addition of nitrogen fertilizers and NO\textsubscript{x} emissions and by artificially concentrating nitrogen sources such as human and livestock wastes.

Nitrogen is classified as either inorganic or organic nitrogen. At any given time, most of the nitrogen in the soil is in the organic form. Inorganic nitrogen compounds are unstable and nitrogen is constantly returning to the atmosphere in gaseous forms.

INORGANIC FORMS OF NITROGEN
N\textsubscript{2}: Inert nitrogen gas found in the atmosphere
NO\textsubscript{2}: Nitrous oxides, is found in the atmosphere and is a component of automobile exhaust and industrial processes
NH\textsubscript{3}: Ammonia is a volatile gas and often is lost from soil applied ammonium fertilizer and animal manure into the atmosphere
NH\textsubscript{4}+: Ammonium, is a positively charge cation found in the soil
NO\textsubscript{2} -: Nitrite, is a negatively charge anion found in the soil
NO\textsubscript{3} -: Nitrate, is a negatively charge anion found in the soil and at times in the atmosphere

ORGANIC FORMS OF NITROGEN
Organic sources of nitrogen include proteins and other complex compounds found in living, dead, or decomposing plants and animals.

THE NITROGEN CYCLE
The conversion of N\textsubscript{2} to N compounds and from nitrogen compounds back to N\textsubscript{2} is the nitrogen cycle. It has been estimated that it takes from 44 to 220 million years for all nitrogen to pass through the cycle. In 1982, it was estimated that human activities have caused an imbalance in the nitrogen cycle that causes an accumulation of nine million metric tons per year. This accumulated nitrogen can cause pollution problems.

Figure C1 shows a simplified nitrogen cycle in an undisturbed, forested area. In an urban area, human activities add sources of nitrogen other than the ones shown here.
LOSSES OF NITROGEN
Nitrogen can be easily lost into the environment by various pathways. Those pathways include volatilization, leaching and runoff, and crop removal.

Volatilization, or the gaseous loss of ammonia, may occur under certain conditions with ammonia fertilizers. In situations where the soil is pH alkaline, or where limestone has recently been applied on acid soils, applications of ammonium fertilizer may result in the transformation of ammonium (NH₄) to ammonia (NH₃) which may be lost to the atmosphere. Urea fertilizers are particularly likely to volatilize. This situation can be avoided by incorporating these fertilizers into the soil in the case of soils with alkaline pH or waiting at least one month after limestone applications to surface apply ammonium fertilizers.

Leaching and Runoff are other important sources of nitrogen loss. Leaching occurs when inorganic forms of nitrogen, particularly nitrite (NO₂) and nitrate (NO₃) are solubilized and carried with water through the soil profile or with surface waters. Factors that contribute to nitrite and nitrate leaching or runoff include the following:

- Heavy, one-time applications of N fertilizers on sandy textured soils.
- Over applications of manure or sludge to land.
- Improperly timed applications of N fertilizer.
- Poorly designed or nonexistent soil conservation measures.
- Periods of exceptionally heavy rain.
Harvest and Mowing are very important ways that nitrogen is lost. If crops are harvested and removed, there is a net loss to the farm’s balance sheet for nitrogen. However, if crop residues or lawn clippings are saved and returned to the soil, some of the nitrogen will be recycled.

REFERENCES

SOURCES OF NITROGEN IN DEVELOPED AREAS
Water quality data from large municipalities in North Carolina clearly show that nitrogen loading is a problem in streams with entirely urban watersheds. Therefore, it is necessary and equitable for urban areas to address their nonpoint sources of nitrogen. An additional benefit of implementing practices to control nitrogen is that these practices are effective for a wide range of other pollutants, such as sediment, heavy metals, oil and grease, and bacteria.

Based on the present research, it appears that there are four major sources of nitrogen contributed by urban areas. These sources are:
- Atmospheric deposition
- Fertilizer
- Human waste
- Animal waste

ATMOSPHERIC DEPOSITION
Scientific evidence shows that atmospheric deposition is a significant source of nitrogen loading in urban areas. In fact, researchers in the Metropolitan Washington area believe that have shown that washoff of nitrate deposited on impervious surfaces from the atmosphere account for the majority of nitrogen in urban streams (MWCOG 1983).

Although atmospheric deposition occurs on all types of land areas, nitrogen deposited on urban areas is more likely to enter surface waters than nitrogen deposited on forests and farms. Urban areas contain impervious surfaces such as roofs, driveways and roads that quickly channel runoff and associated pollutants directly to surface waters with no opportunity for interception or uptake. Impervious surfaces that are drained by storm sewer systems generally have pollutants carried directly into surface waters. Urban roads also have a greater number of local emissions sources, resulting in greater deposition on them than on the landscape as a whole. Figure D1 illustrates nitrogen pathways for impervious areas drained by curb and gutter.

Another reason why atmospheric deposition is a more significant source of nitrogen in urban areas is that urban soils are often heavily compacted and thus can function almost as an impervious surface themselves. Information on how to maintain urban soils and lawns is offered in the next section.
Impervious areas associated with transportation, such as driveways, roads, and parking lots are usually greater sources of nitrogen than rooftops. Rooftop runoff, particularly in residential areas, is usually spread out over pervious yards that are not directly connected to the storm drain system. During smaller storms, rooftop runoff can infiltrate into the soil, and less runoff and pollutants are delivered to the stream.

Scientists from the Center for Watershed Protection estimate that the annual TN load from a parking lot is 15.4 lb/ac/yr (Schueler 1995). It is likely that roads with curb and gutter have similar export coefficients. According to recent DWQ estimates, the overall annual TN load from urban areas is 6.7 lb/ac/yr (1996). DWQ's estimated annual TN load includes not only contributions from parking lots and roads, but also nitrogen from construction areas, onsite wastewater treatment, and solid waste disposal (DWQ 1996). The large difference between the estimated loads suggests that transportation-related imperviousness is a significant source of nitrogen.

There is also evidence that nitrogen loads increase as average daily traffic volume increases. Runoff monitoring by the Federal Highway Administration (1990) indicates that highways with average daily traffic volume below 30,000 were found to have a 40% lower concentration of nitrate-N than highways with average daily traffic volume exceeding 30,000.

In summary, the available data indicate that:

- The transport of atmospheric nitrogen from land to surface waters is a major contributor of nitrogen to urban streams, and
- Reducing transport-related imperviousness in urban areas is likely to play a important role in reducing the deposited nitrogen that moves from urban land to surface waters.
- Minimizing the use of curb and gutter with storm sewer will also reduce the deposited nitrogen that moves from urban land to surface waters, and
- Reducing vehicle use in urban areas will reduce the amount of deposited nitrate nitrogen that could possibly be transported to surface waters.
In addition to reducing the amount of nitrogen moving into surface waters, reducing transportation-related imperviousness, minimizing curb and gutter, and reducing vehicle use all save money. For example, the cost of providing residential infrastructure such as roads, sidewalks, driveways, and parking spaces, generally constitutes about half of the cost of residential subdivision (Schueler 1995).

Reducing road widths, parking lot sizes, and the use of curb and gutter are important steps to reduce the contribution of nitrogen from atmospheric deposition. In addition, these measures will reduce loadings of many other pollutants, including phosphorous, bacteria, oxygen-demanding substances, and heavy metals. The next chapter on new approaches for planning development describes steps that can be taken on a larger scale to reduce overall impervious area.

**FERTILIZERS**

Well-managed lawns and landscaped areas help protect water quality in urban areas by reducing soil erosion, moderating air temperatures, and filtering pollutants. However, the fertilizers used to maintain these natural areas can pollute urban waters. An important component of improving fertilizer and pesticide use in urban areas is public awareness and education.

Studies suggest that a large number of lawn acres are regularly fertilized without determining the need for nutrient addition. A study found that 79% of Virginia homeowners use fertilizers, but less than 20% of them had their soil tested (Aveni 1994). This study found that product labels are the number one information source for homeowners, while the Cooperative Extension Service ranked last. While all labels indicate how many square feet the label should cover, each takes a different approach on how often the product should be applied. Most label instructions do not mention soil testing.

The nitrogen cycle of fertilizer used on urban lawns is diagrammed in Figure D2.

![Figure D2. N Cycle of Fertilizer Use on Urban Lawns](image)

Considering privately and publicly managed lawns, Schueler estimates that about a third of all vegetated areas in the urban landscape can be classified as “high input,” meaning that they receive high rates of irrigation and fertilizer application (1995).
Based on studies by the Center for Watershed Protection (Barth 1995):

- homeowners fertilizing their own lawns apply 44-261 pounds/acre/year of nitrogen
- home lawn companies apply 194-258 pounds/acre/year of nitrogen.

Although many homeowners are applying fertilizers with incomplete information, lawn care companies appear to be applying an equal or greater amount of fertilizer. Lawn care companies usually offer service plans that consist of five or more visits per year. Unless a customer specifically requests a soil test or a special application rate, most lawn companies give every lawn serviced the same rate of fertilization (Morton 1988).

The travel distance between lawns and impervious areas can be short. Lawns with compacted soil, bare spots, steep slopes, and channelized areas have increased flow of fertilizer off the lawn. Leaching can also be a significant source of nitrogen in areas with sandy soils where lawns are overwatered and overfertilized (Cohen et al. 1990). In areas where soils are highly compacted, fertilizer can run off lawns easily. Also, lawns in urban areas are frequently interlaced with driveways, roads, and parking lots, which increase the chance for fertilizer to enter into storm sewers.

A review of three nitrate-leaching studies by turfgrass researchers generally shows that grass, when managed properly, can retain nitrogen fertilizer at the soil surface or within the root zone and thus prevent soluble nitrates from percolating downward into the environment. All soils were sandy or silty loam. The results of the study are given in Table C1. This research strongly suggests that efforts to educate homeowners about lawn care should stress the critical connection between fertilization and overwatering. The concept that careless watering can flush nitrogen throughout the soil and away from the grass should be strongly emphasized on both economic and environmental grounds.

Another important factor that affects fertilizer use is soils. Development usually involves grading the entire site, removing topsoil, erosion during construction, compaction by heavy equipment, and filling of depressions. Thus, urban soils tend to be highly compacted, poor in structure, and low in permeability. As a result, urban areas often produce more runoff than before they were disturbed and thus have more potential to lose fertilizer. A good lawn care program should also address soil building.

Some management strategies that would contribute to a reduction in urban nitrogen from fertilizer use are:

- Use fertilizers that are composed of slow-release sources of nitrogen. Products containing slow-release sources of nitrogen are usually called one or more of the following terms: water-insoluble, slow-release, controlled-release, or slowly-available water soluble.
- Lightly water after fertilizer application to allow penetration and reduce the potential for runoff.
- Use drop (gravity) type spreaders rather than centrifugal (rotary) type spreaders so that fertilizer will not be deposited on impervious surfaces.
- Aerate lawns to reduce surface runoff. Also, aeration results in a healthier lawn that does not require as many nutrient inputs. Aerating the soil can reduce the potential for nitrogen export when the soil is compacted or the lawn is on a slope or in a natural drainage area.
- Select the appropriate grass species to reduce the need to add nitrogen to the lawn.
- Water lawns only when they need it. When lawns are very thirsty, grass will lie flat and leave footprints when walked on, shrubs will droop or drop leaves and look wilted. Watering less often actually promotes deeper, more tolerant root systems (Alliance for the Chesapeake Bay 1994).
• Do not fill fertilizer applicators over a hard surface. Make sure that the spreader is off when passing over driveway, sidewalk, patio, etc. Clean up any spills immediately.

• Expansive lawn areas can be replace with equally attractive, efficient landscape alternatives, such as appropriate shrubs or ground covers that require less maintenance (Alliance for the Chesapeake Bay 1994).

• Involve the public and golf community in decisions that affect water quality. Perhaps they would be willing to accept a few brown patches in exchange for knowing that the course is not harming water quality.

Table C1. Nitrate Levels in Soil Water Depending on Turf Management Strategies (from Schueler 1994)

<table>
<thead>
<tr>
<th>Grass type</th>
<th>Irrigation</th>
<th>Management</th>
<th>N applied (lbs/ac/yr)</th>
<th>N conc. (mg/l)</th>
<th>Researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tall Fescue/Bluegrass</td>
<td>not watered</td>
<td>Clippings removed</td>
<td>none</td>
<td>0.33</td>
<td>Gross et al. 1990 Maryland</td>
</tr>
<tr>
<td>Bluegrass</td>
<td>overwatered</td>
<td>Clippings left</td>
<td>none</td>
<td>0.36</td>
<td>Morton et al. 1988 Rhode Island</td>
</tr>
<tr>
<td>Bluegrass</td>
<td>slightly watered</td>
<td>Clippings left</td>
<td>none</td>
<td>0.51</td>
<td>Morton et al. 1988 Rhode Island</td>
</tr>
<tr>
<td>Tall Fescue/Bluegrass</td>
<td>not watered</td>
<td>Granular fert. Clippings removed</td>
<td>196</td>
<td>0.85</td>
<td>Gross et al. 1990 Maryland</td>
</tr>
<tr>
<td>Bluegrass</td>
<td>slightly watered</td>
<td>Clippings left</td>
<td>86</td>
<td>0.87</td>
<td>Morton et al. 1988 Rhode Island</td>
</tr>
<tr>
<td>Tall Fescue/Bluegrass</td>
<td>not watered</td>
<td>Liquid fert. Clippings removed</td>
<td>196</td>
<td>1.02</td>
<td>Gross et al. 1990 Maryland</td>
</tr>
<tr>
<td>Kentucky bluegrass</td>
<td>watered</td>
<td>Seeded clippings left</td>
<td>194</td>
<td>1.09</td>
<td>Geron et al. 1993 Ohio</td>
</tr>
<tr>
<td>Bluegrass</td>
<td>slightly watered</td>
<td>Clippings left</td>
<td>217</td>
<td>1.24</td>
<td>Morton et al. 1988 Rhode Island</td>
</tr>
<tr>
<td>Bluegrass</td>
<td>overwatered</td>
<td>Clippings left</td>
<td>86</td>
<td>1.77</td>
<td>Morton et al. 1988 Rhode Island</td>
</tr>
<tr>
<td>Kentucky bluegrass</td>
<td>watered</td>
<td>slow release clippings left</td>
<td>194</td>
<td>1.84</td>
<td>Geron et al. 1993 Ohio</td>
</tr>
<tr>
<td>Kentucky bluegrass</td>
<td>watered</td>
<td>early season fert. Clippings left</td>
<td>194</td>
<td>2.27</td>
<td>Geron et al. 1993 Ohio</td>
</tr>
<tr>
<td>Kentucky bluegrass</td>
<td>watered</td>
<td>late season fert. Clippings left</td>
<td>194</td>
<td>2.30</td>
<td>Geron et al. 1993 Ohio</td>
</tr>
<tr>
<td>Kentucky bluegrass</td>
<td>watered</td>
<td>fast release clippings left</td>
<td>194</td>
<td>2.74</td>
<td>Geron et al. 1993 Ohio</td>
</tr>
<tr>
<td>Kentucky bluegrass</td>
<td>watered</td>
<td>Sodded clippings left</td>
<td>194</td>
<td>3.50</td>
<td>Geron et al. 1993 Ohio</td>
</tr>
<tr>
<td>Bluegrass</td>
<td>overwatered</td>
<td>Clippings left</td>
<td>217</td>
<td>4.02</td>
<td>Morton et al. 1988 Rhode Island</td>
</tr>
</tbody>
</table>

**HUMAN WASTE**

Conventional septic systems are comprised of a septic tank, a distribution system, and a soil absorption system. In the septic tank, anaerobic bacteria digest organic matter, solids settle to the bottom, and low-density compounds such as oil and grease float to the water surface. Partially-treated wastewater then leaves the septic tank and enters the distribution box, where it is discharged into the soil absorption systems, also know as the drainage field.

In the drainage field, effluent percolates through the soil and remaining pollutants -- nutrients, suspended solids, bacteria, viruses, and organic/inorganic compounds -- are removed by filtration, adsorption, and microbial degradation (AGWT 990). The absorption system consists of a network of perforated pipes.
located in shallow trenches covered with backfill. Gravel usually surrounds the piped to encourage even distribution of the effluent into soil.

Even properly functioning septic systems can deliver significant pollutant loads to groundwater. The most common shortcoming of conventional septic systems is their inability to remove much nitrogen. It is not uncommon for the effluent leaving a typical system to have a total nitrogen concentration of 40 to 60 mg/l, primarily in the form of ammonia and organic nitrogen (CBO 1992). Once in the drainage field, organic nitrogen forms are easily converted into nitrates, which are quite soluble and easily mobilized, thus increasing the potential for ground and surface water contamination.

Some problems with septic system performance are related to what goes into them. Household chemicals entering a septic tank can kill organic-consuming bacteria or cause sludge and scum to be flushed out into the drainfield. Such chemicals can include various readily available septic system additives, which ironically are advertised as having the ability to improve system performance. Not only are some household chemicals detrimental to the septic system itself, but they often reach ground or surface waters where they cause toxicity problems.

Normal amounts of detergents, bleaches, drain cleansers, and toilet bowl deodorizers, however, can be used without causing harm to bacterial action in the septic tank (AGWT 1990). Properly operating septic systems must be located in a way to ensure both lateral distance between surface waters and vertical separation to groundwater. Also, drainfield areas must become larger when soils are not permeable or slopes are steep. Larger volumes of wastewater require larger drainfields.

Unfortunately, many conventional septic systems have been constructed in areas poorly suited for their proper operation. Many were installed before the need for separation distance was understood or because no other wastewater treatment option was available. Septic systems are suspected of contributing nutrients through subsurface flow. Malfunctioning systems may increase the nutrient loading beyond the assimilative capacity of the site soils and vegetation. This may result in excess nutrients being conveyed to surface waters via groundwater and subsurface flow of infiltrated stormwater.

While alternative systems have some benefits over conventional septic systems, it is important to recognize that no system can simply be installed and forgotten. Regular inspection and maintenance is a necessity. For example, septic tanks should be periodically pumped out, since solids and sludge tend to accumulate over time. North Carolina does not require regular pumpouts of conventional septic systems.

Alternative on-site wastewater treatment designs are attractive because of their decreased reliance on site conditions and their ability to remove pollutants that cannot be removed by conventional systems. Two options that are particularly promising for nitrogen removal are recirculating sand filters and constructed wetlands.

### Table C2. Pollutant loadings from Septic Systems (Schueler, 1995)

<table>
<thead>
<tr>
<th>On-site wastewater treatment system</th>
<th>TN (%)</th>
<th>TSS (%)</th>
<th>BOD (%)</th>
<th>Pathogens (Logs)</th>
<th>Capital ($/house)</th>
<th>Maint. ($/house/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional septic system</td>
<td>28</td>
<td>72</td>
<td>45</td>
<td>3.5</td>
<td>$4,500</td>
<td>$70</td>
</tr>
<tr>
<td>Recirculating sand filter</td>
<td>64</td>
<td>90</td>
<td>92</td>
<td>2.9</td>
<td>$3,900</td>
<td>$145</td>
</tr>
<tr>
<td>Constructed wetlands</td>
<td>90</td>
<td>80</td>
<td>81</td>
<td>4.0</td>
<td>$710</td>
<td>$25</td>
</tr>
</tbody>
</table>
To reduce the contribution of nitrogen from septic systems, the following measures are recommended:

- Homeowners should not use garbage disposals or pour grease down the drain.

- Septic systems should be inspected at least once every two years and pumped as needed (time interval varies with size, use, and operation).

- DWQ, DEH, and local health departments should increase educational efforts for homeowners to properly operate and maintain septic systems and other on-site wastewater treatment systems.

- DWQ, DEH, and local health departments should encourage installation of innovative on-site wastewater treatment systems where they are appropriate and where there is a commitment to ongoing care and maintenance.

- DWQ, DEH, local health departments, and community groups should increase surveillance of their local streams to help to identify areas where on-site wastewater treatment systems are failing.

Another source of nitrogen from human waste is overflowing sanitary sewers. Often, maintaining infrastructure such as sanitary sewers does not receive a high priority for funding. Sometimes flow data at wastewater treatment plants indicates that there is a problem with leaking sewer lines, however it is extremely difficult to pinpoint the sources of the problem. It is recommended that this issue be addressed in this model program by educating citizens about how to detect and report an overflowing sanitary sewer line.

**ANIMAL WASTE**

Like human wastes, pet wastes also present a concentrated source of nutrients, bacteria, and oxygen-demanding substances. If these wastes are not disposed of properly, they often enter storm sewers without any treatment. In fact, some pet owners actually deposit their pet's waste into storm drains. Figure D3 shows the nitrogen cycle of pet wastes in urban areas.

*Figure D3. N Cycle of Pet Waste in Urban Areas*
To reduce the contribution of nitrogen from pet wastes, the following measures are recommended:

- Pet owners should use proper disposal methods such as putting waste in the trash (some landfills prohibit animal wastes) or burying waste in the yard or using a pre-fabricated pet waste disposal unit (this may relocate the contribution from surface to subsurface nutrient loading).

- The public should be educated about proper methods of disposing of pet wastes.

- Storm drain stenciling can remind citizens that storm drains go directly to streams.

- Local ordinances should require proper pet waste disposal.

**REFERENCES**

Alliance for the Chesapeake Bay. Environmentally-Sound Landscape Management. Richmond, VA.


Falls Nutrient Strategy

Rules Approved by the RRC on December 16, 2010
Effective Date - January 15, 2011

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**Amended Neuse Rules**

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<td>42-45</td>
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PURPOSE. The purpose of this Rule and Rules 15A NCAC 02B.0276 through .0282 and .0315(q) shall be to attain the classified uses of Falls of the Neuse Reservoir set out in 15A NCAC 02B.0211 from current impaired conditions related to excess nutrient inputs; protect its classified uses as set out in 15A NCAC 02B.0216, including use as a source of water supply for drinking water; and maintain and enhance protections currently implemented by local governments in existing water supply watersheds encompassed by the watershed of Falls of the Neuse Reservoir. The reservoir, and all waters draining to it, have been supplementally classified as Nutrient Sensitive waters (NSW) pursuant to 15A NCAC 02B.0101(e)(3) and 15A NCAC 02B.0223. These Rules, as enumerated in Item (6) of this Rule, together shall constitute the Falls water supply nutrient strategy, or Falls nutrient strategy, and shall be implemented in accordance with 15A NCAC 02B.0223. The following items establish the framework of the Falls nutrient strategy:

(1) SCOPE AND LIMITATION. Falls of the Neuse Reservoir is hereafter referred to as Falls Reservoir. All lands and waters draining to Falls Reservoir are hereafter referred to as the Falls watershed. The Falls nutrient strategy rules require controls that reduce nitrogen and phosphorus loads from significant sources of these nutrients throughout the Falls watershed. These Rules do not address atmospheric emission sources of nitrogen that is deposited into the watershed but do include provisions to account for reductions in such deposition as the water quality benefits of air quality regulations are quantified. Neither do these Rules address sources on which there is insufficient scientific knowledge to base regulation, other sources deemed adequately addressed by existing regulations, sources currently considered minor, or nutrient contributions from lake sediments, which are considered outside the scope of these Rules. The Commission may undertake additional rulemaking in the future or make recommendations to other rulemaking bodies as deemed appropriate to more fully address nutrient sources to Falls Reservoir. While the scope of these Rules is limited to the reduction of nutrient loads to surface waters, practitioners are encouraged to maximize opportunities for concurrently benefiting other ecosystem services where feasible in the course of achieving the nutrient objectives.

(2) CRITICAL WATER SUPPLY WATERSHED DESIGNATION. Water supply waters designated WS-II, WS-III, and WS-IV within the Falls watershed shall retain their classifications. The remaining waters in the Falls watershed shall be classified WS-V. The requirements of all of these water supply classifications shall be retained and applied except as specifically noted elsewhere within the Falls nutrient strategy. In addition, pursuant to G.S. 143-214.5(b), the entire Falls watershed shall be designated a critical water supply watershed and through the Falls nutrient strategy given additional, more stringent requirements than the state minimum water supply watershed management requirements. Water supply requirements of 15A NCAC 02B.0104 apply except to the extent that requirements of the Falls nutrient strategy are more stringent than provisions addressing agriculture, forestry, and existing development. These requirements supplement the water quality standards applicable to Class C waters, as described in Rule .0211 of this Section, which apply throughout the Falls watershed. Water supply watershed requirements shall be as follows:

(a) For WS-II, WS-III, and WS-IV waters, the retained requirements of Rules 15A NCAC 02B.0214 through .0216 are characterized as follows:

(i) Item (1) addressing best usages;

(ii) Item (2) addressing predominant watershed development conditions, discharges expressly allowed watershed-wide, general prohibitions on and allowances for domestic and industrial discharges, Maximum Contaminant Levels following treatment, and the local option to seek more protective classifications for portions of existing water supply watersheds;

(iii) Sub-Item (3)(a) addressing wastewater discharge limitations;

(iv) Sub-Item (3)(b) addressing nonpoint source and stormwater controls; and

(v) Sub-Items (3)(c) through (3)(h) addressing aesthetic and human health standards.

(b) For waters classified WS-V, the requirements of water supply Rule 15A NCAC 02B.0218 shall be applied.

(3) GOAL AND OBJECTIVES. To achieve the purpose of the Falls nutrient strategy, the Commission establishes the goal of attaining and maintaining nutrient-related water quality standards identified in 15A NCAC 02B.0211 throughout Falls Reservoir pursuant to G.S. 143-215.8B and 143B-282(c) and (d) of the Clean Water Responsibility Act of 1997. The Commission establishes a staged and adaptive implementation plan, outlined hereafter, to achieve the following objectives. The objective of Stage I
is to, at minimum, achieve and maintain nutrient-related water quality standards in the Lower Falls Reservoir as soon as possible but no later than January 15, 2021 and to improve water quality in the Upper Falls Reservoir.

The objective of Stage II is to achieve and maintain nutrient-related water quality standards throughout Falls Reservoir. This is estimated to require a reduction of 40 and 77 percent in average annual mass loads of nitrogen and phosphorus respectively, delivered from the sources named in Item (6) in the Upper Falls Watershed from a baseline of 2006. The resulting Stage II allowable loads to Falls Reservoir from the watersheds of Ellerbe Creek, Eno River, Little River, Flat River, and Knap of Reeds Creek shall be 658,000 pounds of nitrogen per year and 35,000 pounds of phosphorus per year.

(4) STAGED IMPLEMENTATION. The Commission shall employ the staged implementation plan set forth below to achieve the goal of the Falls nutrient strategy:

(a) STAGE I. Stage I requires intermediate or currently achievable controls throughout the Falls watershed with the objective of reducing nitrogen and phosphorus loading, and attaining nutrient-related water quality standards in the Lower Falls Reservoir as soon as possible but no later than January 15, 2021, while also improving water quality in the Upper Falls Reservoir as described in this Item. Implementation timeframes are described in individual rules, with full implementation occurring no later than January 15, 2021;

(b) STAGE II. Stage II requires implementation of additional controls in the Upper Falls Watershed beginning no later than January 15, 2021 to achieve nutrient-related water quality standards throughout Falls Reservoir by 2041 to the maximum extent technically and economically feasible, with progress toward this overall objective as described in Sub-Item (5)(a); and

(c) MAINTENANCE OF ALLOCATIONS. Sources shall maintain the load reductions required under these Rules beyond the implementation stages.

(5) ADAPTIVE IMPLEMENTATION. The Commission shall employ the following adaptive implementation plan in concert with the staged implementation approach described in this Rule:

(a) The Division shall perform water quality monitoring throughout Falls Reservoir and shall accept reservoir water quality monitoring data provided by other parties that meet Division standards and quality assurance protocols. The Division shall utilize this data to estimate load reduction achieved and to perform periodic use support assessments pursuant to 40 CFR 130.7(b). It shall evaluate use support determinations to judge progress on and compliance with the goal of the Falls nutrient strategy, including the following assessments:

(i) Attainment of nutrient-related water quality standards downstream of Highway NC-98 crossing of Falls Reservoir no later than January 15, 2016;

(ii) Attainment of nutrient-related water quality standards in the Lower Falls Reservoir no later than January 15, 2021;

(iii) Attainment of nutrient-related water quality standards in the Lick Creek arm of Falls Reservoir and points downstream no later than January 15, 2026;

(iv) Attainment of nutrient-related water quality standards in the Ledge and Little Lick Creek arms of Falls Reservoir and points downstream no later than January 15, 2031;

(v) Attainment of nutrient-related water quality standards at points downstream of the Interstate 85 crossing of Falls Reservoir no later than January 15, 2036;

(vi) Attainment of nutrient-related water quality standards throughout Falls Reservoir no later than 2041;

(vii) Where the Division finds that acceptable progress has not been made towards achieving nutrient-related water quality standards throughout Falls Reservoir defined in Sub-Items (i) through (vi) of this Item or that conditions have deteriorated in a segment of Falls Reservoir as described in this Item, at any time, it shall evaluate compliance with the Falls nutrient strategy rules, and may request Commission approval to initiate additional rulemaking;

(viii) Where the Division finds, based on reservoir monitoring, that nutrient-related water quality standards are attained in a previously impaired segment of Falls Reservoir, as described in this Item, and are met for sufficient time to demonstrate sustained maintenance of standards, as specified in individual rules of this strategy, it shall
(b) The Division, to address resulting uncertainties including those related to technological advancement, scientific understanding, actions chosen by affected parties, loading effects, and loading effects of other regulations, shall report to the Commission and provide information to the public in January 2016 and every five years thereafter as necessary. The reports shall address all of the following subjects:

(i) Changes in nutrient loading to Falls Reservoir and progress in attaining nutrient-related water quality standards as described in Sub-Items (5)(a)(i) through (vi) of this Rule;

(ii) The state of wastewater and stormwater nitrogen and phosphorus control technology, including technological and economic feasibility;

(iii) Use and projected use of wastewater reuse and land application opportunities;

(iv) The utilization and nature of nutrient offsets and projected changes. This shall include an assessment of any load reduction value derived from preservation of existing forested land cover;

(v) Results of any studies evaluating instream loading changes resulting from implementation of rules;

(vi) Results of any studies evaluating nutrient loading from conventional septic systems and discharging sand filter systems;

(vii) Assessment of the instream benefits of local programmatic management measures such as fertilizer or pet waste ordinances, improved street sweeping and the extent to which local governments have implemented these controls;

(viii) Results of applicable studies, monitoring, and modeling from which a baseline will be established to address changes in atmospheric deposition of nitrogen;

(ix) Recent or anticipated changes in regulations affecting atmospheric nitrogen emissions and their projected effect on nitrogen deposition;

(x) Results of any studies evaluating nutrient loading from groundwater;

(xi) Updates to nutrient loading accounting tools; and

(c) The Division shall submit a report to the Commission in July 2025 that shall address the following subjects in addition to the content required elsewhere under this Item:

(i) The physical, chemical, and biological conditions of the Upper Falls Reservoir including nutrient loading impacts;

(ii) Whether alternative regulatory action pursuant to Sub-Item (5)(g) would be sufficient to protect existing uses as required under the Clean Water Act;

(iii) The impact of management of the Falls Reservoir on water quality in the Upper Falls Reservoir;

(iv) The methodology used to establish compliance with nutrient-related water quality standards in Falls Reservoir and the potential for using alternative methods;

(v) The feasibility of achieving the Stage II objective; and

(vi) The estimated costs and benefits of achieving the Stage II objective;

(d) The Division shall make recommendations, if any, on rule revisions based on the information reported pursuant to Sub-Items (b) and (c) of this Rule;

(e) In developing the reports required under Sub-Items (b) and (c) of this Rule, the Division shall consult with and consider information submitted by local governments and other persons with an interest in Falls Reservoir. Following receipt of a report, the Commission shall consider whether revisions to the requirements of Stage II are needed and may initiate rulemaking or any other action allowed by law;

(f) Recognizing the uncertainty associated with model-based load reduction targets, to ensure that allowable loads to Falls Reservoir remain appropriate as implementation proceeds, a person may at any time during implementation of the Falls nutrient strategy develop and submit for Commission approval supplemental nutrient response modeling of Falls Reservoir.
based on additional data collected after a period of implementation. The Commission may consider revisions to the requirements of Stage II based on the results of such modeling as follows:

(i) A person shall obtain Division review and approval of any monitoring study plan and description of the modeling framework to be used prior to commencement of such a study. The study plan and modeling framework shall meet any Division requirements for data quality and model support or design in place at that time. Within 180 days of receipt, the division shall either approve the plan and modeling framework or notify the person seeking to perform the supplemental modeling of changes to the plan and modeling framework required by the Division;

(ii) Supplemental modeling shall include a minimum of three years of lake water quality data unless the person performing the modeling can provide information to the Division demonstrating that a shorter time span is sufficient;

(iii) The Commission may accept modeling products and results that estimate a range of combinations of nitrogen and phosphorus percentage load reductions needed to meet the goal of the Falls nutrient strategy, along with associated allowable loads to Falls Reservoir, from the watersheds of Ellerbe Creek, Eno River, Little River, Flat River, and Knap of Reeds Creek and that otherwise comply with the requirements of this Item. Such modeling may incorporate the results of studies that provide new data on various nutrient sources such as atmospheric deposition, internal loading, and loading from tributaries other than those identified in this Sub-item. The Division shall assure that the supplemental modeling is conducted in accordance with the quality assurance requirements of the Division;

(iv) The Commission shall review Stage II requirements if a party submits supplemental modeling data, products and results acceptable to the Commission for this purpose. Where supplemental modeling is accepted by the Commission, and results indicate allowable loads of nitrogen and phosphorus to Falls Reservoir from the watersheds of Ellerbe Creek, Eno River, Little River, Flat River, and Knap of Reeds Creek that are substantially different than those identified in Item (3), then the Commission may initiate rulemaking to establish those allowable loads as the revised objective of Stage II relative to their associated baseline values;

(g) Nothing in this strategy shall be construed to limit, expand, or modify the authority of the Commission to undertake alternative regulatory actions otherwise authorized by state or federal law, including the reclassification of waters of the State pursuant to G.S. 143-214.1, the revision of water quality standards pursuant to G.S. 143-214.3, and the granting of variances pursuant to G.S. 143-215.3.

(6) RULES ENUMERATED. The Falls nutrient strategy rules consists of the following rules titled as follows:

(a) Rule .0275 Purpose and Scope;
(b) Rule .0276 Definitions. An individual rule may contain additional definitions for terms that are used in that rule only;
(c) Rule .0277 Stormwater Management for New Development;
(d) Rule .0278 Stormwater Management for Existing Development;
(e) Rule .0279 Wastewater Discharge Requirements;
(f) Rule .0280 Agriculture;
(g) Rule .0281 Stormwater Requirements for State and Federal Entities;
(h) Rule .0282 Options for Offsetting Nutrient Loads; and
(i) Rule .0315 Neuse River Basin.

(7) APPLICABILITY. Categories of parties required to implement the Falls nutrient strategy rules and, as applicable, their geographic scope of responsibility, are identified in each rule. The specific local governments responsible for implementing Rules .0277, .0278, and .0282 shall be as follows:

(a) All incorporated municipalities, as identified by the Office of the Secretary of State, with planning jurisdiction within or partially within the Falls watershed. Those municipalities are currently:
(i) Butner;
(ii) Creedmoor;
(iii) Durham;
(iv) Hillsborough;
(v) Raleigh;
(vi) Roxboro;
(vii) Stem; and
(viii) Wake Forest;

(b) All counties with jurisdiction in Falls watershed and for land where municipalities listed in Sub-Item (7)(a) do not have an implementation requirement:
(i) Durham;
(ii) Franklin;
(iii) Granville;
(iv) Orange;
(v) Person; and
(vi) Wake;

(c) A unit of government may arrange through interlocal agreement or other instrument of mutual agreement for another unit of government to implement portions or the entirety of a program required or allowed under any rule of this strategy to the extent that such an arrangement is otherwise allowed by statute. The governments involved shall submit documentation of any such agreement to the Division. No such agreement shall relieve a unit of government from its responsibilities under these Rules.

(8) ENFORCEMENT. Failure to meet requirements of Rules .0275, .0277, .0278, .0279, .0280, .0281, or .0282 of this Section may result in imposition of enforcement measures as authorized by G.S. 143-215.6A (civil penalties), G.S. 143-215.6B (criminal penalties), and G.S. 143-215.6C (injunctive relief).

History Note: Authority G.S. 143-214.1; 143-214.3; 143-214.5; 143-214.7; 143-215.1; 143-215.3; 143-215.3(a)(1); 143-215.6A; 143-215.6B; 143-215.6C; 143-215.8B; 143B-282(c); 143B-282(d); S.L. 2005-190; S.L. 2006-259; S.L. 2009-337; S.L. 2009-486;
Eff. January 15, 2011 (this permanent rule replaces the temporary rule approved by the RRC on December 16, 2010).
15A NCAC 02B .0276  FALLS WATER SUPPLY NUTRIENT STRATEGY: DEFINITIONS

(a) Unless the context indicates otherwise, the following words and phrases, which are not defined in G.S. 143, Article 21, shall be interpreted as follows for the purposes of the Falls nutrient strategy:

(1) "Allocation" means the mass quantity of nitrogen or phosphorus that a discharger, group of dischargers, nonpoint source, or collection of nonpoint sources is assigned. For point sources, possession of allocation does not authorize the discharge of nutrients but is prerequisite to such authorization through a NPDES permit, and allocation may be further distinguished as follows:
   (A) "Active" allocation means that portion of an allocation that has been applied toward and is expressed as a nutrient limit in an individual NPDES permit;
   (B) "Reserve" allocation means allocation that is held by a permittee or other person but which has not been applied toward and is not expressed as a nutrient limit in an individual NPDES permit;

(2) "Applicator" means the same as defined in 15A NCAC 02B .0202(4);

(3) "Atmospheric nitrogen" means total oxidized nitrogen (NO_y) which includes all nitrogen oxides (including NO_2, NO, N_2, nitrogen trioxide [N_2O_3], nitrogen tetroxide [N_2O_4], dinitrogen pentoxide [N_2O_5], nitric acid (HNO_3) peroxyacil nitrates (PAN)), the sum of which is referred to as reduced nitrogen (NH_x);

(4) "Delivered," as in delivered allocation, load, or limit, means the allocation, load, or limit that is measured or predicted at Falls Reservoir;

(5) "Development" means the same as defined in 15A NCAC 02B .0202(23);

(6) "Discharge," as in discharge allocation, load, or limit means the allocation, load, or limit that is measured at the point of discharge into surface waters in the Falls watershed;

(7) "Existing development" means development, other than that associated with agricultural or forest management activities that meets one of the following criteria:
   (A) It either is built or has established a vested right based on statutory or common law as interpreted by the courts, as of the effective date of either local new development stormwater programs implemented under 15A NCAC 02B .0277 for projects that do not require a state permit or, as of the applicable compliance date established in 15A NCAC 02B .0281(5) and (6); or
   (B) It occurs after the compliance date set out in Sub-Item (5)(d) of Rule .0277 but does not result in a net increase in built-upon area;

(8) "Falls nutrient strategy," or "Falls water supply nutrient strategy" means the set of 15A NCAC 02B .0275 through .0282 and .0315(p);

(9) "Falls Reservoir" means the surface water impoundment operated by the US Army Corps of Engineers and named Falls of Neuse Reservoir;

(10) "Upper Falls Reservoir" means that portion of the reservoir upstream of State Route 50;

(11) "Upper Falls Watershed" means that area of Falls watershed draining to Upper Falls Reservoir;

(12) "Lower Falls Reservoir" means that portion of the reservoir downstream of State Route 50;

(13) "Lower Falls Watershed" means that area of Falls watershed draining to lower falls Reservoir without first passing through Upper Falls Reservoir;

(14) "Load" means the mass quantity of a nutrient or pollutant released into surface waters over a given time period. Loads may be expressed in terms of pounds per year and may be expressed as "delivered load" or an equivalent "discharge load;"

(15) "Load allocation" means the same as set forth in federal regulations 40 CFR 130.2(g), which is incorporated herein by reference, including subsequent amendments and editions. These regulations may be obtained at no cost from http://www.epa.gov/lawsregs/search/40cfri.html or from the U.S. Government Printing Office, 732 North Capitol St. NW, Washington D.C., 20401;

(16) "New development" means any development project that does not meet the definition of existing development set out in this Rule;

(17) "Nitrogen" means the sum of the organic, nitrate, nitrite, and ammonia forms of nitrogen in a water or wastewater;

(18) "NPDES" means National Pollutant Discharge Elimination System, and connotes the permitting process required for the operation of point source discharges in accordance with the requirements of Section 402 of the Federal Water Pollution Control Act, 33 U.S.C. Section 1251 et seq;

(19) "Nutrients" means total nitrogen and total phosphorus;
(20) "Phosphorus" or "total phosphorus" means the sum of the orthophosphate, polyphosphate, and organic forms of phosphorus in a water or wastewater;
(21) "Stream" means a body of concentrated flowing water in a natural low area or natural channel on the land surface;
(22) "Surface waters" means all waters of the state as defined in G.S. 143-212 except underground waters;
(23) "Technical specialist" means the same as defined in 15A NCAC 06H.0102(9);
(24) "Total nitrogen" means the same as 'nitrogen' defined in Item (17);
(25) "Total phosphorus" means the same as 'phosphorus' defined in Item (20);
(26) "Wasteload" means the mass quantity of a nutrient or pollutant released into surface waters by a wastewater discharge over a given time period. Wasteloads may be expressed in terms of pounds per year and may be expressed as "delivered wasteload" or an equivalent "discharge wasteload;" and
(27) "Wasteload allocation" means the same as set forth in federal regulations 40 CFR 130.2(h), which is incorporated herein by reference, including subsequent amendments and editions. These regulations may be obtained at no cost from http://www.epa.gov/lawsregs/search/40cfr.html or from the U.S. Government Printing Office, 732 North Capitol St. NW, Washington D.C., 20401.

(b) The definitions in Rule .0279 shall also apply throughout these Falls Water Supply Nutrient Strategy rules.

History Note: Authority G.S. 143-214.1; 1432-214.3; 143-214.5; 143-214.7; 143-215.1; 143215.3; 143-215.3(a)(1); 143-215.6A; 143-215.6B; 143-215.6C; 143-215.8B; 143B-282(c); 143B-282(d); S.L. 2005-190; S.L. 2006-259; S.L. 2009-337; S.L 2009-486; Eff. January 15, 2011 (this permanent rule replaces the temporary rule approved by the RRC on December 16, 2010).
15A NCAC 02B .0277 FALLS RESERVOIR WATER SUPPLY NUTRIENT STRATEGY: STORMWATER MANAGEMENT FOR NEW DEVELOPMENT

The following is the stormwater strategy, as prefaced in 15A NCAC 02B .0275, for new development activities within the Falls watershed:

(1) PURPOSE. The purposes of this Rule are as follows:
(a) To achieve and maintain the nitrogen and phosphorus loading objectives established for Falls Reservoir in 15A NCAC 02B .0275 from lands in the Falls watershed on which new development occurs;
(b) To provide control for stormwater runoff from new development in Falls watershed to ensure that the integrity and nutrient processing functions of receiving waters and associated riparian buffers are not compromised by erosive flows; and
(c) To protect the water supply, aquatic life and recreational uses of Falls Reservoir from the potential impacts of new development.

(2) APPLICABILITY. This Rule shall apply to those areas of new development that lie within the Falls watershed and the planning jurisdiction of a municipality or county that is identified in 15A NCAC 02B .0275. This Rule shall not apply to development activities on state and federal lands that are set out in Rule .0281 of this Section.

(3) REQUIREMENTS. All local governments subject to this Rule shall develop stormwater management programs for submission to and approval by the Commission, to be implemented in areas described in Item (2) of this Rule. Nothing in this Rule preempts local governments from establishing requirements that are more restrictive than those set forth in this Rule. Local government stormwater management programs shall include the following elements and the standards contained in Item (4):
(a) The requirement that a stormwater management plan shall be submitted for local government approval based on the standards in Item (4) for all proposed new development disturbing one-half acre or more for single family and duplex residential property and recreational facilities, and 12,000 square feet or more for commercial, industrial, institutional, multifamily residential, or local government property;
(b) A plan to ensure maintenance of best management practices (BMPs) implemented to comply with this rule for the life of the development; and
(c) A plan to ensure enforcement and compliance with the provisions in Item (4) of this Rule for the life of the new development.

(4) PLAN APPROVAL REQUIREMENTS. A developer's stormwater plan shall not be approved by a subject local government unless the following criteria are met:
(a) Nitrogen and phosphorus loads contributed by the proposed new development activity shall not exceed the following unit-area mass loading rates for nitrogen and phosphorus, respectively, expressed in units of pounds/acre/year: 2.2 and 0.33. Proposed development that would replace or expand structures or improvements that existed as of December 2006, the end of the baseline period, and that would not result in a net increase in built-upon area shall not be required to meet the nutrient loading targets or high-density requirements except to the extent that the developer shall provide stormwater control at least equal to the previous development. Proposed development that would replace or expand existing structures or improvements and would result in a net increase in built-upon area shall have the option to achieve at least the percentage loading reduction objectives stated in 15A NCAC 02B .0275 as applied to nitrogen and phosphorus loading from the previous development for the entire project site, or to meet the loading rate targets described in this Item. These requirements shall supersede those identified in 15A NCAC 02B .0104(q). The developer shall determine the load reductions needed to meet these loading rate targets by using the loading calculation method called for in Sub-Item (5)(a) or other equivalent method acceptable to the Division;
(b) The developer shall have the option of offsetting part of the nitrogen and phosphorus load by implementing or funding offsite offset measures. Before using an offsite offset option, a development shall implement onsite structural stormwater controls that achieve one of the following levels of reductions:
(i) Proposed new development activity disturbing at least one-half acre but less than one acre of land for single family and duplex residential property and recreational
facilities, except as stated in Sub-Item (4)(b)(iv), shall achieve 30 percent or more of the needed load reduction in both nitrogen and phosphorus loading onsite and shall meet any requirements for engineered stormwater controls described in Sub-Item (4)(e) of this Rule;

(ii) Proposed new development activity disturbing at least 12,000 but less than one acre of land for commercial, industrial, institutional, multifamily residential, or local government property, except as stated in Sub-Item (4)(b)(iv), shall achieve 30 percent or more of the needed load reduction in both nitrogen and phosphorus loading onsite and shall meet any requirements for engineered stormwater controls described in Sub-Item (4)(e) of this Rule;

(iii) Except as stated in Sub-Item (4)(b)(iv), proposed new development activity that disturbs one acre of land or more shall achieve 50 percent or more of the needed load reduction in both nitrogen and phosphorus loading onsite and shall meet any requirements for engineered stormwater controls described in Sub-Item (4)(e) of this Rule;

(iv) Proposed development that would replace or expand structures or improvements that existed as of December 2006 and that increases impervious surface within a local government's designated downtown area, regardless of area disturbed, shall achieve 30 percent of the needed load reduction in both nitrogen and phosphorus onsite, and shall meet any requirements for engineered stormwater controls described in Sub-Item (4)(e) of this Rule;

(c) Offsite offsetting measures shall achieve at least equivalent reductions in nitrogen and phosphorus loading to the remaining reduction needed onsite to comply with the loading rate targets set out in Sub-Item (4)(a) of this Item. A developer may use any measure that complies with the requirements of Rules .0240 and .0282. of this Section;

(d) Proposed new development subject to NPDES, water supply, and other state-mandated stormwater regulations shall comply with those regulations in addition to the other requirements of this Sub-item. Proposed new development in any water supply watershed in the Falls watershed designated WS-II, WS-III, or WS-IV shall comply with the density-based restrictions, obligations, and requirements for engineered stormwater controls, clustering options, operation and maintenance responsibilities, vegetated setbacks, land application, and landfill provisions described in Sub-Items (3)(b)(i) and (3)(b)(ii) of the applicable rule among 15A NCAC 02B .0214 through .0216. Provided, the allowance in water supply watershed rules for 10 percent of a jurisdiction to be developed at up to 70 percent built-upon area without stormwater treatment shall not be available in the Falls watershed;

(e) Stormwater systems shall be designed to control and treat at a minimum the runoff generated from all surfaces in the project area by one inch of rainfall. The treatment volume shall be drawn down pursuant to standards specific to each practice as provided in the July 2007 version of the Stormwater Best Management Practices Manual published by the Division, or other at least technically equivalent standards acceptable to the Division;

(f) To ensure that the integrity and nutrient processing functions of receiving waters and associated riparian buffers are not compromised by erosive flows, at a minimum, the new development shall not result in a net increase in peak flow leaving the site from pre-development conditions for the one-year, 24-hour storm event;

(g) New development may satisfy the requirements of this Rule by meeting the post-development hydrologic criteria set out in Chapter 2 of the North Carolina Low Impact Development Guidebook dated June 2009, or the hydrologic criteria in the most recent version of that guidebook;

(h) Proposed new development shall demonstrate compliance with the riparian buffer protection requirements of 15A NCAC 02B .0233 and .0242 or subsequent amendments or replacements to those requirements.

(5) RULE IMPLEMENTATION. This Rule shall be implemented as follows:

(a) No later than March 15, 2011, the Division shall submit a model local stormwater program, including a model local ordinance that embodies the criteria described in Items (3) and (4) of this Rule to the Commission for approval. The model program shall include a tool that will
allow developers to account for nutrient loading from development lands and loading changes due to BMP implementation to meet the requirements of Items (3) and (4) of this Rule. The accounting tool shall utilize nutrient efficiencies and associated design criteria established for individual BMPs in the July 2007 version of the Stormwater Best Management Practices Manual published by the Division, or other more precise standards acceptable to the Division. At such time as data quantifying nutrient loads from onsite wastewater systems is made available, the new development nutrient export accounting tool shall be revised to require accounting for nutrient loading from onsite wastewater from newly developed lands that use such systems. Should research quantify significant loading from onsite wastewater systems, the Division may also make recommendations to the Commission for Public Health to initiate rulemaking to reduce nutrient loading to surface waters from these systems. The Division shall work in cooperation with subject local governments and other watershed interests in developing this model program;

(b) Within five months after the Commission's approval of the model local stormwater program and model ordinance, subject local governments shall submit stormwater management programs, in conjunction with similar requirements in 15A NCAC 02B .0278, to the Division for preliminary approval. These local programs shall meet or exceed the requirements in Items (3) and (4) of this Rule;

(c) Within 10 months after the Commission's approval of the model local stormwater program, the Division shall provide recommendations to the Commission on local stormwater programs. The Commission shall either approve the programs or require changes based on the standards set out in Items (3) and (4) of this Rule. Should the Commission require changes, the applicable local government shall have two months to submit revisions, and the Division shall provide follow-up recommendations to the Commission within two months after receiving revisions;

(d) Within six months after the Commission's approval of a local program, or upon the Division's first renewal of a local government's NPDES stormwater permit, whichever occurs later, the affected local government shall complete adoption of and implement its local stormwater management program; and

(e) Upon implementation, subject local governments shall submit annual reports to the Division summarizing their activities in implementing each of the requirements in Items (3) and (4) of this Rule, including changes to nutrient loading.

(6) EQUIVALENT PROGRAM OPTION. A local government may in its program submittal under Sub-Item (5)(b) of this Rule request that the Division accept the local government's implementation of another stormwater program or programs as satisfying one or more of the requirements set forth in Items (3) and (4) of this Rule. The Division shall provide determination on the acceptability of any such alternative prior to requesting Commission approval of local programs as required in Sub-Item (5)(c) of this Rule. Should a local government propose alternative requirements to achieve and maintain the rate targets described in Sub-Item (4)(a) of this Rule, it shall include in its program submittal technical information demonstrating the adequacy of those requirements. Should an alternative program propose monitoring of watersheds to compare measured loading to expected loading, it shall at a minimum include the following:

(a) Engineering calculations that quantify expected loading from new development projects based on stormwater controls currently enforced;

(b) At least three years of continuous flow and nutrient monitoring data demonstrating that watershed loading rates are at or below rates that would result from meeting the requirements of this Rule and Rule .0278 of this Section based on the land cover composition of the watershed;

(c) An ongoing water quality monitoring program based on continuous flow and concentration sampling to be performed indefinitely into the future with results reported annually to the Division for review and approval;

(d) A corrective action plan to be implemented should data collected under the ongoing monitoring program demonstrate watershed loading is within 10 percent of the rate estimated in compliance with this Item; and
(e) Should a local government submit an alternate program for consideration that includes areas within its jurisdiction outside of the monitored watershed it shall submit technical information demonstrating the areas outside of the monitored watershed can reasonably be expected to load at equal or lesser rates than those estimated in compliance with this Item based on comparative analysis of land uses and other factors affecting nutrient loading.

**History Note:** Authority G.S. 143-214.1; 143-214.3; 143-214.5; 143-214.7; 143-215.1; 143-215.3; 143-215.3(a)(1); 143-215.6A; 143-215.6B; 143-215.6C; 143-215.8B; 143B-282(c); 143B-282(d); S.L. 2005-190; S.L. 2006-259; S.L. 2009-337; S.L. 2009-486; Eff. January 15, 2011 (this permanent rule replaces the temporary rule approved by the RRC on December 16, 2010).
This Rule establishes a staged, adaptive approach by which municipalities and counties shall contribute to achieving the nonpoint source loading objectives of the Falls Reservoir nutrient strategy by reducing or otherwise offsetting nutrient contributions from existing development. It provides local governments three years to develop programs that propose Stage I load reduction actions to the Division and requires local governments to begin and track measures to reduce nutrient loads from existing developed lands within their jurisdiction by January 15, 2014, as specified in Item (7). Local governments shall submit for approval and implement Stage II load reduction programs by January 15, 2021 and submit revised load reductions programs every five years thereafter. The following is the watershed stormwater strategy, as prefaced in Rule 15A NCAC 02B .0275, for existing development in the Falls watershed:

(1) PURPOSE. The purposes of this Rule are as follows:
(a) To achieve and maintain the nonpoint source nitrogen and phosphorus percentage reduction objectives established for Falls Reservoir in Rule 15A NCAC 02B .0275 on nutrient loading from existing development in the Falls watershed relative to the baseline period defined in that rule. Existing development is defined in Rule 15A NCAC 02B .0276; and
(b) To protect the water supply, aquatic life, and recreational uses of Falls Reservoir.

(2) APPLICABILITY. This Rule shall apply to municipalities and counties in the Falls watershed as identified in Rule 15A NCAC 02B .0275.

(3) STAGED AND ADAPTIVE IMPLEMENTATION REQUIREMENTS. Local governments shall employ the following staged and adaptive implementation program. All local governments subject to this Rule shall develop load-reducing programs for submission to and approval by the Commission that include the following staged elements and meet the associated minimum standards for each stage of implementation:
(a) In Stage I, a local government subject to this Rule shall implement a load reduction program that provides estimates of, and plans for offsetting by calendar year 2020, nutrient loading increases from lands developed subsequent to the baseline period and not subject to the requirements of the local government's Falls Lake new development stormwater program. For these post-baseline existing developed lands, the current loading rate shall be compared to the loading rate for these lands prior to development for the acres involved, and the difference shall constitute the load reduction need in annual mass load, in pounds per year. Alternatively, a local government may assume uniform pre-development loading rates of 2.89 pounds/acre/year N and 0.63 pounds/acre/year P for these lands. The local government shall achieve this Stage I load reduction by calendar year 2020. This Stage I program shall meet the criteria defined in Item (4) of this Rule;
(b) By January 15, 2021 and every five years thereafter, a local government located in the Upper Falls Watershed shall submit and begin implementing a Stage II load reduction program that meets the following requirements:
   (i) If a local government achieves the Stage I reduction objectives described in this Item, a local government's initial Stage II load reduction program shall, at the local government's election, either (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 or (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. A local government's expenditures shall include all local government funds, including any state and federal grant funds used to achieve nutrient reductions from existing developed lands. The cost of achieving reductions from municipal wastewater treatment plants shall not be included in calculating a local government's expenditures. Notwithstanding this requirement, the EMC may approve an initial Stage II load reduction program based on a lower annual level of reduction or a lower annual level of expenditure if the local government demonstrates that continuing the prior annual level of reduction or annual level of expenditure is not reasonable or cost-effective given the reductions that will be achieved, or the expenditure would cause serious financial hardship to the local government;
(ii) If Stage I reduction objectives are not achieved, a local government's initial Stage II load reduction program shall, at the local government's election, either (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 highest three years of implementation of Stage I or (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 highest three years of implementation of Stage I. Annual expenditures shall be calculated in accordance with Sub-Item (3)(b)(i) of this Item;

(iii) Subsequent five year programs shall be designed to achieve the Stage II percent load reduction goals from existing developed lands in a local government's jurisdiction, shall include timeframes for achieving these goals and shall meet the requirements of Item (4) of this Rule;

(4) ELEMENTS OF LOAD REDUCTION PROGRAMS. A local government's Stage I and Stage II load reduction program shall address the following elements:

(a) Jurisdictions in the Eno River and Little River subwatersheds shall, as a part of their Stage I load reduction programs, begin and continuously implement a program to reduce loading from discharging sand filters and malfunctioning septic systems discharging into waters of the State within those jurisdictions and subwatersheds;

(b) Jurisdictions within any Falls subwatershed in which chlorophyll a levels have exceeded 40 micrograms/liter in more than seventy-five percent of the monitoring events in any calendar year shall, as part of their Stage I load reduction programs, begin and continuously implement a program to reduce nutrient loading into the waters of the State within those jurisdictions and that subwatersheds;

(c) The total amount of nutrient loading reductions in Stage I is not increased for local jurisdictions by the requirements to add specific program components to address loading from malfunctioning septic systems and discharging sand filters or high nutrient loading levels pursuant to Sub-Items (4)(a) and (b) of this Item;

(d) In preparation for implementation of their Stage I and Stage II load reduction programs, local governments shall develop inventories and characterize load reduction potential to the extent that accounting methods allow of the following by January 2013:

(i) Wastewater collection systems;

(ii) Discharging sand filter systems, including availability of or potential for central sewer connection;

(iii) Properly functioning and malfunctioning septic systems;

(iv) Restoration opportunities in utility corridors;

(v) Fertilizer management plans for local government-owned lands;

(vi) Structural stormwater practices, including intended purpose, condition, potential for greater nutrient control; and

(vii) Wetlands and riparian buffers including potential for restoration opportunities;

(e) A local government's load reduction need shall be based on the developed lands that fall within its general police powers and within the Falls watershed;

(f) The load reduction need shall not include lands under state or federal control, and a county shall not include lands within its jurisdictional boundaries that are under municipal police powers;

(g) Nitrogen and phosphorus loading from existing development, including loading from onsite wastewater treatment systems to the extent that accounting methods allow, shall be calculated by applying the accounting tool described in Sub-Item (7)(a) and shall quantify baseline loads of nitrogen and phosphorus to surface waters in the local government's jurisdiction as well as loading changes post-baseline. It shall also calculate target nitrogen and phosphorus loads and corresponding load reduction needs;

(h) The Commission shall recognize reduction credit for early implementation of policies and practices implemented after January 1, 2007 and before timeframes required by this Rule, to reduce runoff and discharge of nitrogen and phosphorus per Session Law 2009-486. The load reduction program shall identify specific load-reducing practices implemented to date.
subsequent to the baseline period and for which the local government is seeking credit. It shall estimate load reductions for these practices and their anticipated duration using methods provided for in Sub-Item (5)(a);

(i) The program shall include a proposed implementation schedule that includes annual implementation expectations. The load reduction program shall identify the types of activities the local government intends to implement and types of existing development affected, a prioritization of practices, magnitude of reductions it expects to achieve from each, and the costs and efficiencies of each activity to the extent information is available. The program shall identify the duration of anticipated loading reductions, and may seek activities that provide long-term reductions;

(j) The load reduction program shall identify anticipated funding mechanisms or sources and discuss steps take or planned to secure such funding;

(k) The program shall address the extent of load reduction opportunities intended from the following types of lands:
   (i) Lands owned or otherwise controlled by the local government;
   (ii) Each land use type of privately owned existing development including projected redevelopment, on which the local government's load reduction need is based as described in this Item; and
   (iii) Lands other than those on which the local government's load reduction need is based as described in this Item, including lands both within and outside its jurisdiction and including the use of interlocal agreements and private third party sellers;

(l) The program shall address the extent of load reduction proposed from the following stormwater and ecosystem restoration activities:
   (i) Bioretention;
   (ii) Constructed wetland;
   (iii) Sand filter;
   (iv) Filter strip;
   (v) Grassed swale;
   (vi) Infiltration device;
   (vii) Extended dry detention;
   (viii) Rainwater harvesting system;
   (ix) Treatment of redevelopment;
   (x) Overtreatment of new development;
   (xi) Removal of impervious surface;
   (xii) Retrofitting treatment into existing stormwater ponds;
   (xiii) Off-line regional treatment systems;
   (xiv) Wetland or riparian buffer restoration; and
   (xv) Reforestation with conservation easement or other protective covenant;

(m) The program shall evaluate the load reduction potential from the following wastewater activities:
   (i) Creation of surplus relative to an allocation established in Rule 15A NCAC 02B .0279;
   (ii) Expansion of surplus allocation through regionalization;
   (iii) Connection of discharging sand filters and malfunctioning septic systems to central sewer or replacement with permitted non-discharge alternatives;
   (iv) Removal of illegal discharges; and
   (v) Improvement of wastewater collection systems;

(n) A local government may propose in its load reduction program the use of the following measures in addition to items listed in (l) and (m), or may propose other measures for which it can provide accounting methods acceptable to the Division:
   (i) Redirecting runoff away from impervious surfaces;
   (ii) Soil amendments;
   (iii) Stream restoration;
   (iv) Improved street sweeping; and
(v) Source control, such as pet waste and fertilizer ordinances;

(o) The program shall include evaluation of load reduction potential relative to the following factors:

(i) Extent of physical opportunities for installation;
(ii) Landowner acceptance;
(iii) Incentive and education options for improving landowner acceptance;
(iv) Existing and potential funding sources and magnitudes;
(v) Practice cost-effectiveness (e.g., cost per pound of nutrient removed);
(vi) Increase in per capita cost of a local government's stormwater management program to implement the program;
(vii) Implementation rate without the use of eminent domain; and
(viii) Need for and projected role of eminent domain;

(5) The Commission shall approve a Stage I load reduction program if it is consistent with Items (3) and (4) of this Rule. The Commission shall approve a Stage II load reduction program if it is consistent with Items (3) and (4) of this Rule unless the Commission finds that the local governments can, through the implementation of reasonable and cost-effective measures not included in the proposed program, meet the Stage II nutrient load reductions required by this Rule by a date earlier than that proposed by the local government. If the Commission finds that there are additional or alternative reasonable and cost-effective measures, the Commission may require the local government to modify its proposed program to include such measures to achieve the required reductions by the earlier date. If the Commission requires such modifications, the local government shall submit a modified program within two months. The Division shall recommend that the Commission approve or disapprove the modified program within three months after receiving the modified program. In determining whether additional or alternative load reduction measures are reasonable and cost effective, the Commission shall consider factors identified in Sub-Item (4)(o) of this Rule. The Commission shall not require additional or alternative measures that would require a local government to:

(a) Install or require installation of a new stormwater collection system in an area of existing development unless the area is being redeveloped;
(b) Acquire developed private property; or
(c) Reduce or require the reduction of impervious surfaces within an area of existing development unless the area is being redeveloped.

(6) A municipality shall have the option of working with the county or counties in which it falls, or with another municipality or municipalities within the same subwatershed, to jointly meet the loading targets from all lands within their combined jurisdictions within a subwatershed. A local government may utilize private or third party sellers. All reductions involving trading with other parties shall meet the requirements of Rule 15A NCAC 02B.0282.

(7) RULE IMPLEMENTATION. This Rule shall be implemented as follows:

(a) By July 2013, the Division shall submit a Stage I model local program to the Commission for approval that embodies the criteria described in Items (3)(a) and (4) of this Rule. The Division shall work in cooperation with subject local governments and other watershed interests in developing this model program, which shall include the following:

(i) Model local ordinances as applicable;
(ii) Methods to quantify load reduction requirements and resulting load reduction assignments for individual local governments;
(iii) Methods to account for discharging sand filters, malfunctioning septic systems, and leaking collection systems; and
(iv) Methods to account for load reduction credits from various activities;

(b) Within six months after the Commission's approval of the Stage I model local program, subject local governments shall submit load reduction programs that meet or exceed the requirements of Items (3) and (4) of this Rule to the Division for review and preliminary approval and shall begin implementation and tracking of measures to reduce nutrient loads from existing developed lands within their jurisdictions;

(c) Within 20 months of the Commission's approval of the Stage I model local program, the Division shall provide recommendations to the Commission on existing development load reduction programs. The Commission shall either approve the programs or require changes
based on the standards set out in Item (4) of this Rule. Should the Commission require changes, the applicable local government shall have two months to submit revisions, and the Division shall provide follow-up recommendations to the Commission within two months after receiving revisions;

(d) Within three months after the Commission's approval of a Stage I local existing development load reduction program, the local government shall complete adoption of and begin implementation of its existing development Stage I load reduction program;

(e) Upon implementation of the programs required under Item (4) of this Rule, local governments shall provide annual reports to the Division documenting their progress in implementing those requirements within three months following each anniversary of program implementation date until such time the Commission determines they are no longer needed to ensure maintenance of reductions or that standards are protected. Annual reports shall include accounting of total annual expenditures, including local government funds and any state and federal grants used toward load reductions achieved from existing developed lands. Local governments shall indefinitely maintain and ensure performance of implemented load-reducing measures;

(f) By January 15, 2021 and every five years thereafter until accounting determines that assigned load reductions have been achieved, standards are met in the lake, or the Commission takes other actions per Rule 15A NCAC 02B .0275, local governments located in the upper Falls watershed as defined in Item (3) of Rule 15A NCAC 02B .0275 shall submit and begin implementation of a Stage II load reduction program or program revision to the Division. Within nine months after submittal, the Division shall make recommendations to the Commission on approval of these programs. The Commission shall either approve the programs or require changes based on the standards set out in this Rule. If the Commission require changes, the applicable local governments shall submit revisions within two months, and the Division shall provide follow-up recommendations to the Commission within three months after receiving revisions. Upon program approval, local governments shall revise implementation as necessary based on the approved program;

(g) A local government may, at any time after commencing implementation of its load reduction program, submit program revisions to the Division for approval based on identification of more cost-effective strategies or other factors not originally recognized;

(h) Once either load reductions are achieved per annual reporting or water quality standards are met in the lake per Rule 15A NCAC 02B .0275, local governments shall submit programs to ensure no load increases and shall report annually per Sub-Item (e) on compliance with no increases and take additional actions as necessary;

(i) At least every five years after the effective date, the Division shall review the accounting methods stipulated under Sub-Item (7)(a) to determine the need for revisions to those methods and to loading reductions assigned using those methods. Its review shall include values subject to change over time independent of changes resulting from implementation of this Rule, such as untreated export rates that may change with changes in atmospheric deposition. It shall also review values subject to refinement, such as nutrient removal efficiencies.

History Note: Authority G.S. 143-214.1; 143-214.5; 143-214.7; 143-214.12; 143-214.21; 143-215.3(a)(1); 143-215.6A; 143-215.6B; 143-215.6C; 143-215.8B; 143B-282(c); 143B-282(d); S.L. 2005-190; S.L. 2006-259; S.L. 2009-337;
Eff. January 15, 2011 (this permanent rule replaces the temporary rule approved by the RRC on December 16, 2010).
The following is the NPDES wastewater discharge management strategy for the Falls of the Neuse Reservoir watershed (the Falls watershed):

1. **PURPOSE.** The purpose of this Rule is to establish minimum nutrient control requirements for point source wastewater discharges in the Falls watershed in order to restore and maintain water quality in the reservoir and protect its designated uses.

2. **APPLICABILITY.** This Rule applies to all wastewater treatment facilities discharging in the Falls watershed that receive nutrient-bearing wastewater and are subject to requirements for individual NPDES permits.

3. **DEFINITIONS.** For the purposes of this Rule, the definitions in 15A NCAC 02B .0276 and the following definitions apply:
   - In regard to point source dischargers, treatment facilities, and wastewater flows and discharges,
     - "Existing" means that which was subject to an NPDES permit as of December 31, 2006;
     - "Expanding" means that which has increased or will increase beyond its permitted flow as defined in this Rule; and
     - "New" means that which was not subject to an NPDES permit as of December 31, 2006.
   - "Limit" or "limitation," except when specified as a concentration limit, means the mass quantity of nitrogen or phosphorus that a discharger or group of dischargers is authorized through an NPDES permit to release into surface waters of the Falls watershed.
   - "MGD" means million gallons per day.
   - "Permitted flow" means the maximum monthly average flow authorized in a facility's NPDES permit as of December 31, 2006.

4. **INITIAL NUTRIENT ALLOCATIONS FOR EXISTING UPPER FALLS DISCHARGERS.** This Item establishes initial Stage I and Stage II nutrient allocations for existing dischargers in the Upper Falls watershed:
   - Stage I nitrogen and phosphorus allocations for dischargers with permitted flows of 0.1 MGD or greater are as follows:
     - Facility Name | NPDES No. | Total Nitrogen | Total Phosphorus |
     - North Durham   NC0023841 | 97,665       | 10,631        |
     - SGWASA        NC0026824 | 22,420       | 2,486         |
     - Hillsborough  NC0026433 | 10,422       | 1,352         |
   - Stage I allocations for dischargers with permitted flows less than 0.1 MGD are equal to the Stage II allocations specified in Sub-Items (c) and (d) of this Item.
   - Stage II nitrogen and phosphorus allocations are as follows:
     - Discharger Subcategories | Mass Allocations (pounds/year) |
     - Permitted flows ≥ 0.1 MGD | 97,617 | 5,438 |
     - Permitted flows < 0.1 MGD | 1,052 | 175 |
   - The Stage II allocations in Sub-Item (c) of this Item shall be divided among the existing dischargers in each subcategory in proportion to the dischargers' permitted flows as defined in this Rule, and the resulting nutrient allocations shall be assigned to each individual discharger.

5. **CHANGES IN NUTRIENT ALLOCATIONS.**
   - The aggregate and individual nutrient allocations available to point source dischargers in the Falls watershed are subject to change:
(i) Whenever the Commission, through rulemaking, revises the nutrient reduction targets in or pursuant to 15A NCAC 02B .0275 in order to ensure the protection of water quality in the reservoir and its tributaries or to conform with applicable state or federal requirements;

(ii) Whenever one or more point source dischargers acquires any portion of the nonpoint load allocations under the provisions in this Rule and 15A NCAC 02B .0282, Options for Offsetting Nutrient Loads; or

(iii) As the result of allocation transfers conducted between point sources or between point and nonpoint sources and in accordance with this Rule, provided that nutrient allocation can be transferred and applied only within the portion of the Falls watershed to which it was originally assigned (Upper or Lower).

(b) In the event that the Commission changes any nutrient reduction target specified in 15A NCAC 02B .0275 or in Item (4) of this Rule, the Commission shall also re-evaluate the apportionment among the dischargers and shall revise the individual allocations as necessary.

(6) NUTRIENT DISCHARGE LIMITATIONS FOR EXISTING UPPER FALLS DISCHARGERS.

(a) Beginning with calendar year 2016, any existing discharger with a permitted flow of 0.1 MGD or greater shall limit its total nitrogen and phosphorus discharges to its active, individual Stage I allocations as defined or modified pursuant to this Rule.

(b) Beginning with calendar year 2036, except as provided in Sub-item (d) of this Item, each existing discharger with a permitted flow greater than or equal to 0.1 MGD shall limit its total nitrogen and phosphorus discharges to its active, individual Stage II allocations as defined or modified pursuant to this Rule.

(c) Not later than March 15, 2011, the Director shall notify existing permittees of the individual Stage I and Stage II nutrient allocations initially assigned to them pursuant to this Rule.

(d) Not later than January 15, 2027, each existing discharger with a permitted flow greater than or equal to 0.1 MGD shall submit to the Division a plan for meeting its Stage II mass limitations. The plan shall describe the discharger's strategy for complying with the limitations and shall include a schedule for the design and construction of facility improvements and for the development and implementation of related programs necessary to the strategy. If a discharger determines that it cannot meet its limitations by calendar year 2036, the discharger may include its findings in the plan and request an extension of its compliance dates for the nitrogen and phosphorus limitations. This alternate plan shall document the compliance strategies considered and the reasons each was judged infeasible; identify the minimum loadings that are technically and economically feasible by 2036; and propose intermediate limits for the period beginning with 2036 and extending until the Stage II limitations can be met. Within 180 days of receipt, the Division shall approve the plan as submitted, which could include intermediate limits, or inform the discharger of any changes or additional information needed for approval. The Division shall incorporate the approved nitrogen and phosphorus mass limitations and compliance dates into the discharger's NPDES permit upon the next renewal or other major permit action following plan approval. If the Division extends the dates by which a discharger must meet Stage II limitations, the discharger shall update and submit its plan for Division approval every five years after the original submittal, and the Division shall take necessary and appropriate action as with the original plan, until the Stage II limitations are satisfied.

(e) It is the intent of this Item that all dischargers shall make continued progress toward complying with Stage II mass limitations. The Division shall not approve intermediate limitations that exceed either the applicable Stage I limitations or intermediate limitations previously approved pursuant to this Item.

(7) NUTRIENT DISCHARGE LIMITATIONS FOR EXISTING LOWER FALLS DISCHARGERS.

(a) Beginning with calendar year 2016, any existing discharger with a permitted flow of 0.1 MGD or greater shall limit its total nitrogen and phosphorus discharges as specified in this Item.

(b) CONCENTRATION LIMITS. The nitrogen and phosphorus discharge limits for existing dischargers shall be as follows:
### Discharge Limits (milligrams/liter)

<table>
<thead>
<tr>
<th>Limit Type</th>
<th>Total Nitrogen</th>
<th>Total Phosphorus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly Average</td>
<td>8.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Annual Average</td>
<td>5.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Existing facilities must meet both monthly average and annual average limits in any given calendar year.

(c) **MASS LIMITS.**

(i) In addition to the concentration limits specified in this Item, the collective annual mass discharge of total phosphorus shall not exceed 911 pounds in any calendar year.

(ii) Any discharger may request a mass discharge limit in lieu of the concentration limit for nitrogen or phosphorus or both, in which case the Director shall set a limit equivalent to the annual average concentration limit at the facility's permitted flow. The resulting mass limit shall become effective with the ensuing calendar year or with calendar year 2016, whichever is later.

(8) **NUTRIENT CONTROL REQUIREMENTS FOR NEW DISCHARGERS.**

(a) Any person proposing a new wastewater discharge in the Upper Falls watershed shall meet the following requirements prior to applying for an NPDES permit:

(i) Evaluate all practical alternatives to said discharge, pursuant to 15A NCAC 02H .0105(c)(2);

(ii) If the results of the evaluation support a new discharge, acquire sufficient nitrogen and phosphorus allocations for the discharge. The proponent may obtain allocation for the proposed discharge from existing dischargers pursuant to the applicable requirements of Item (10) of this Rule or obtain allocation from other sources to offset the increased nutrient loads resulting from the proposed discharge. The proponent may fund offset measures by making payment to the NC Ecosystem Enhancement Program contingent upon acceptance of payments by that program or to another seller of offset credits approved by the Division or may implement other offset measures contingent upon approval by the Division, either of which shall meet the requirements of Rule 15A NCAC 02B .0282. The amount of allocation or offsets obtained shall be sufficient for the duration of the discharge or for a period of 30 years, whichever is shorter. Payment for each allocation or offset shall be made prior to the ensuing permit issuance;

(iii) Determine whether the proposed discharge of nutrients will cause local water quality impacts; and

(iv) Provide documentation with its NPDES permit application demonstrating that the requirements of Sub-Items (a)(i) through (a)(iii) of this Item have been met.

(b) The nutrient discharge limits for a new facility in the Upper Falls watershed shall not exceed the mass loads equivalent to a concentration of 3.0 milligrams per liter nitrogen or 0.1 milligrams per liter phosphorus at the permitted flow in the discharger's NPDES permit.

(c) Upon the effective date of its NPDES permit, a new discharger in the Upper Falls watershed shall be subject to nitrogen and phosphorus limits not to exceed its active individual discharge allocations in any given calendar year.

(d) The Director shall not issue an NPDES permit for any new wastewater facility that would discharge in the Lower Falls watershed and to which this Rule would apply.

(9) **NUTRIENT CONTROL REQUIREMENTS FOR EXPANDING DISCHARGERS.**

(a) Any person proposing to expand an existing wastewater discharge in the Upper Falls watershed beyond its permitted flow shall meet the following requirements prior to applying for an NPDES permit:

(i) Evaluate all practical alternatives to said discharge, pursuant to 15A NCAC 02H .0105(c)(2);

(ii) If the results of the evaluation support an expanded discharge, acquire sufficient nitrogen and phosphorus allocations for the discharge. The proponent may obtain allocation for the proposed discharge from existing dischargers pursuant to the
applicable requirements of Item (10) of this Rule or obtain allocation from other sources to offset the increased nutrient loads resulting from the proposed discharge. The proponent may fund offset measures by making payment to the NC Ecosystem Enhancement Program contingent upon acceptance of payments by that program or to another seller of offset credits approved by the Division or may implement other offset measures contingent upon approval by the Division, either of which shall meet the requirements of Rule 15A NCAC 02B .0282. The amount of allocation or offsets obtained shall be sufficient for the duration of the discharge or for a period of 30 years, whichever is shorter. Payment for each allocation or offset shall be made prior to the ensuing permit issuance;

(iii) Determine whether the proposed discharge of nutrients will cause local water quality impact; and

(iv) Provide documentation with its NPDES permit application demonstrating that the requirements of Sub-Items (a)(i) through (a)(iii) of this Item have been met;

(b) The nutrient discharge limits for an expanding facility in the Upper Falls watershed shall not exceed the mass value equivalent to a concentration of 3.0 milligrams per liter nitrogen or 0.1 milligrams per liter phosphorus at the expanded flow limit in the discharger's NPDES permit; except that this provision shall not result in an active allocation or limit that is less than originally assigned to the discharger under this Rule.

(c) Upon expansion or upon notification by the Director that it is necessary to protect water quality, any discharger with a permitted flow of less than 0.1 MGD in the Upper Falls watershed, shall become subject to total nitrogen and total phosphorus permit limits not to exceed its active individual discharge allocations.

(d) The Director shall not issue an NPDES permit for the expansion of any wastewater discharge in the Lower Falls watershed to which this Rule applies.

(10) ADDITIONAL PROVISIONS REGARDING NUTRIENT ALLOCATIONS AND LIMITATIONS.

(a) Annual mass nutrient limits shall be established as calendar-year limits.

(b) Any discharger holding nutrient allocations pursuant to this Rule may by mutual agreement transfer all or part of its allocations to any new, existing, or expanding dischargers or to other person(s) in the Falls watershed, subject to the provisions of this Rule and the Falls nutrient strategy, except that allocation shall not be transferred between the Upper and Lower Falls watersheds.

(c) For NPDES compliance purposes, the enforceable nutrient limits for an individual facility or for a compliance association described in Item (11) of this Rule shall be the effective limits in the governing permit, regardless of the allocation held by the discharger or association.

(d) The Director may establish more stringent nitrogen or phosphorus discharge limits for any discharger upon finding that such limits are necessary to prevent the discharge from causing adverse water quality impacts on surface waters tributary to Falls Reservoir. The Director shall establish such limits through modification of the discharger's NPDES permit in accordance with applicable rules and regulations. When the Director does so, the discharger retains its nutrient allocations, and the non-active portion of the discharger's allocation becomes reserve allocation. The allocation remains in reserve until the Director determines that less stringent limits are allowable or until the allocation is applied to another discharge not subject to such water quality-based limits.

(e) In order for any transfer of allocation to become effective as a discharge limit in an individual NPDES permit, the discharger must request and obtain modification of the permit. Such request shall:

(i) Describe the purpose and nature of the modification;

(ii) Describe the nature of the transfer agreement, the amount of allocation transferred, and the dischargers or persons involved;

(iii) Provide copies of the transaction agreements with original signatures consistent with NPDES signatory requirements; and

(iv) Demonstrate to the Director's satisfaction that the increased nutrient discharge will not violate water quality standards in localized areas.
Changes in a discharger's nutrient limits shall become effective upon modification of its individual permit but no sooner than January 1 of the year following modification. If the modified permit is issued after January 1, the Director may make the limit effective on that January 1 provided that the discharger made acceptable application in a timely manner.

REGIONAL FACILITIES. In the event that an existing discharger or group of dischargers accepts wastewater from another NPDES-permitted treatment facility and that acceptance results in the elimination of the discharge from the other treatment facility, the eliminated facility's nutrient allocations shall be transferred and added to the accepting discharger's allocations, except that allocation shall not be transferred between the Upper and Lower Falls watersheds.

GROUP COMPLIANCE OPTION.

(a) Any facilities within the Upper or the Lower Falls watersheds may form a group compliance association to meet nutrient limits collectively within their respective portion of the Falls watershed. More than one group compliance association may be established in either portion of the watershed. No facility may be a co-permittee member of more than one association for any given calendar year.

(b) Any such association must apply for and shall be subject to an NPDES permit that establishes the effective nutrient limits for the association and for its members.

(c) No later than 180 days prior to the proposed date of a new association's operation or expiration of an existing association's NPDES permit, the association and its members shall submit an application for an NPDES permit for the discharge of nutrients to surface waters of the Falls watershed. The association's NPDES permit shall be issued to the association and its members. It shall specify the nutrient limits for the association and for each of its co-permittee members. Association members shall be deemed in compliance with the permit limits for nitrogen and phosphorus contained in their individually issued NPDES permits so long as they remain members in an association.

(d) An association's nitrogen and phosphorus limits shall be the sum of its members' individual active allocations for each nutrient plus any other active allocation obtained by the association or its members.

(e) The individual limits for each member in the association permit shall initially be equivalent to the discharge limits in effect in the member's NPDES permit. Thereafter, changes in individual allocations or limits shall be incorporated into the members' individual permits before they are included in the association permit.

(f) An association and its members may reapportion the individual allocations of its members on an annual basis. Changes in individual allocations or limits must be incorporated into the members' individual permits before they are included in the association permit.

(g) Changes in an association's nutrient limits shall become effective no sooner than January 1 of the year following permit modification. If the modified permit is issued after January 1, the Director may make the limit effective on that January 1 provided that the association made acceptable application in a timely manner.

(h) Beginning with the first full calendar year that the nitrogen or phosphorus limits are effective, an association that does not meet its permit limit for nitrogen or phosphorus for a calendar year shall, no later than May 1 of the year following the exceedance, make an offset payment to the NC Ecosystem Enhancement Program contingent upon acceptance of payments by that program or by implementing other load offsetting measures contingent upon approval by the Division, either of which shall meet the requirements of Rule 15A NCAC 02B .0282.

(i) Association members shall be deemed in compliance with their individual limits in the association NPDES permit for any calendar year in which the association is in compliance with its group limit for that nutrient. If the association fails to meet its limit, the association and the members that have failed to meet their individual nutrient limits in the association NPDES permit shall be deemed out of compliance with the association NPDES permit.

History Note: Authority G.S. 143-214.1; 143-214.5; 143-215; 143-215.1; 143-215.3(a)(1); 143-215B; 143B-282(c); 143B-282(d); S.L. 2005-190; S.L. 2006-259;
Eff. January 15, 2011 (this permanent rule replaces the temporary rule approved by the RRC on December 16, 2010).
This Rule sets forth a staged process, as prefaced in 15A NCAC 02B .0275, by which agricultural operations in the Falls watershed will collectively limit their nitrogen and phosphorus loading to the Falls Reservoir. This process is as follows:

(1) PURPOSE. The purposes of this Rule are to achieve and maintain the percentage reduction objectives defined in 15A NCAC 02B .0275 for the collective agricultural loading of nitrogen and phosphorus from their respective 2006 baseline levels, to the extent that best available accounting practices will allow, in two stages. Stage I shall be 10 years and Stage II shall be 15 years, as set out in Item (5) of this Rule. Additionally this Rule will protect the water supply uses of the Falls Reservoir.

(2) PROCESS. This Rule requires accounting for agricultural land management practices at the county level in the Falls watershed, and implementation of practices by farmers to collectively achieve the nutrient reduction objectives on a watershed basis. Producers may be eligible to obtain cost share and technical assistance from the NC Agriculture Cost Share Program and similar federal programs to contribute to their counties' nutrient reductions. A Watershed Oversight Committee and Local Advisory Committees will develop strategies, coordinate activities, and account for progress.

(3) LIMITATION. This Rule does not fully address significant agricultural nutrient sources in that it does not directly address atmospheric sources of nitrogen to the Falls watershed from agricultural operations located both within and outside of the Falls watershed. As better information becomes available from ongoing research on atmospheric nitrogen loading to the Falls watershed from these sources, and on measures to control this loading, the Commission may undertake separate rule-making to require such measures it deems necessary from these sources to support the objectives of the Falls Nutrient Strategy.

(4) APPLICABILITY. This Rule shall apply to all persons engaging in agricultural operations in the Falls watershed, including those related to crops, horticulture, livestock, and poultry. This Rule applies to livestock and poultry operations above the size thresholds in this Item in addition to requirements for animal operations set forth in general permits issued pursuant to G.S. 143-215.10C. Nothing in this Rule shall be deemed to allow the violation of any assigned surface water, groundwater, or air quality standard by any agricultural operation, including any livestock or poultry operation below the size thresholds in this Item. This Rule shall not apply to dedicated land application sites permitted under 15A NCAC 02T .1100. This Rule does not require specific actions by any individual person or operation if agriculture in the Falls watershed can collectively achieve its Stage I nutrient reduction objectives, in the manner described in Item (5) of this Rule, by calendar year 2020. If the Stage I nutrient reduction objectives are not met by calendar year 2020, Stage II of implementation shall require specific actions by individuals and operations. For the purposes of this Rule, agricultural operations are activities that relate to any of the following pursuities:

(a) The commercial production of crops or horticultural products other than trees. As used in this Rule, commercial shall mean activities conducted primarily for financial profit.

(b) Research activities in support of such commercial production.

(c) The production or management of any of the following number of livestock or poultry at any time, excluding nursing young:

(i) Five or more horses;
(ii) 20 or more cattle;
(iii) 20 or more swine not kept in a feedlot, or 150 or more swine kept in a feedlot;
(iv) 120 or more sheep;
(v) 130 or more goats;
(vi) 650 or more turkeys;
(vii) 3,500 or more chickens;
(viii) Any single species of any other livestock or poultry, or any combination of species of livestock or poultry that exceeds 20,000 pounds of live weight at any time.

(5) METHOD FOR RULE IMPLEMENTATION. This Rule shall be implemented in two stages and through a cooperative effort between the Watershed Oversight Committee and Local Advisory Committees in each county. The membership, roles and responsibilities of these committees are set forth in Items (7) and (8) of this Rule. Committee's activities shall be guided by the following:

(a) In Stage I, agriculture shall achieve a collective 20 percent reduction in nitrogen loading and a 40 percent reduction in phosphorus loading relative to the 2006 baseline by calendar year 2020.
(b) In Stage II, beginning in calendar year 2021 agriculture shall achieve a collective 40 percent reduction in nitrogen loading and a 77 percent reduction in phosphorus loading relative to the 2006 baseline by calendar year 2035.

(c) By January 15, 2013, the Watershed Oversight Committee shall provide the Commission with an initial assessment of the extent to which agricultural operations in the Falls watershed have achieved the Stage I nitrogen and phosphorus reduction objectives identified in Item (1) of this rule through activities conducted since the baseline period. The Watershed Oversight Committee shall use the accounting process described in Items (7) and (8) of this rule to make its assessment.

(d) If annual reporting following the 10th year of implementation indicates that agriculture has not collectively achieved its Stage I nitrogen and phosphorus reduction objectives identified in this Item, Stage II shall include specific implementation requirements for individual operators. Specifically, within five years of the start of Stage II, cropland operators shall establish vegetated riparian buffers adjacent to streams on all cropland where such buffers do not already exist. Additionally, pastured livestock operators shall establish excluded vegetated riparian buffers adjacent to streams where such excluded buffers do not already exist. Streams to which these requirements apply shall be those that meet the classification of intermittent or perennial streams using the September 2010 version of the Identification Methods for the Origins of Intermittent and Perennial Streams Manual published by the Division. Existing and newly established riparian buffers shall be a minimum of 20 feet in width with criteria further defined by the Watershed Oversight Committee.

The Commission may also consider alternative recommendations from the Watershed Oversight Committee based on the Committee's assessment of the practicability of agricultural operations meeting the Stage I objectives. Should the Commission accept some alternative form of individual compliance, then it shall also subsequently approve a framework proposed by the Watershed Oversight Committee for allowing producers to obtain credit through offsite measures. Such offsite measures shall meet the requirements of 15A NCAC 02B .0282.

(e) Should a committee called for under Item (5) of this Rule not form nor follow through on its responsibilities such that a local strategy is not implemented in keeping with Item (8) of this Rule, the Commission shall require all persons subject to this Rule in the affected area to implement BMPs as needed to meet the objectives of this Rule.

(6) RULE REQUIREMENTS FOR INDIVIDUAL OPERATIONS. Persons subject to this Rule shall adhere to the following requirements:

(a) Persons subject to this Rule shall register their operations with their Local Advisory Committee according to the requirements of Item (8) of this Rule;

(b) Persons are not required to implement any specific BMPs in Stage I, with the exception of Sub-Item (d) of this Item, but may elect to contribute to the collective local nutrient strategy by implementing any BMPs they choose that are recognized by the Watershed Oversight Committee as nitrogen-reducing or phosphorus-reducing BMPs;

(c) The Division shall require that residuals application, animal waste application, and surface irrigation pursuant to permits issued under 15A NCAC 02T .1100, 15A NCAC 02T .1300, and 15A NCAC 02T .0500 respectively, to lands within the Falls watershed be done in a manner that minimizes the potential for nitrogen and phosphorus loading to surface waters by implementing the following measures:

(i) Animal waste application operators subject to the permitting requirements in this Sub-item shall meet Realistic Yield Expectation based nitrogen application rates and shall apply phosphorus in compliance with guidance established in the most recent version of North Carolina Agricultural Research Service's Technical Bulletin 323, "North Carolina Phosphorus Loss Assessment: I Model Description and II. Scientific Basis and Supporting Literature" developed by the Department of Soil Science and Biological and Agricultural Engineering at North Carolina State University. The Division shall modify all existing permits for affected lands to include these requirements upon their next renewal after effective date, and shall include these requirements in all new permits issued after effective date. Permittees
shall be required to comply with this condition upon permit issuance or renewal as applicable; and

(ii) Residual application and surface irrigation operators subject to the permitting requirements in this Sub-item shall meet Realistic Yield Expectation based nitrogen application rates and shall conduct and provide to the Division annual assessments of their soil test phosphorus index results and phosphorus loading rates. At such time as data quantifying the fate and transport of chemically bound phosphorus are made available, the Division may make recommendations to the Commission to consider whether revisions to the requirements of this Rule are needed and may initiate rulemaking or any other action allowed by law.

(d) Should a local strategy not achieve its Stage I objectives by calendar year 2020; operations within that local area shall face specific implementation requirements, as described under Sub-Item (5)(d) of this Rule.

(7) WATERSHED OVERSIGHT COMMITTEE. The Watershed Oversight Committee shall have the following membership, role and responsibilities:

(a) MEMBERSHIP. The Director shall be responsible for forming a Watershed Oversight Committee by March 15, 2011. Until such time as the Commission determines that long-term maintenance of the nutrient loads is assured, the Director shall either reappoint members or replace members at least every six years. The Director shall solicit nominations for membership on this Committee to represent each of the following interests, and shall appoint one nominee to represent each interest except where a greater number is noted. The Director of the Division of Water Quality may appoint a replacement at any time for an interest in Sub-Items (7)(a)(vi) through (7)(a)(x) of this Rule upon request of representatives of that interest or by the request of the Commissioner of Agriculture:

(i) Division of Soil and Water Conservation;
(ii) United States Department of Agriculture-Natural Resources Conservation Service (shall serve in an "ex-officio" non-voting capacity and shall function as a technical program advisor to the Committee);
(iii) North Carolina Department of Agriculture and Consumer Services;
(iv) North Carolina Cooperative Extension Service;
(v) Division of Water Quality;
(vi) Three environmental interests, at least two of which are residents of the Falls watershed;
(vii) General farming interests;
(viii) Pasture-based livestock interests;
(ix) Equine livestock interests;
(x) Cropland farming interests; and
(xi) The scientific community with experience related to water quality problems in the Falls watershed.

(b) ROLE. The Watershed Oversight Committee shall:

(i) Develop tracking and accounting methods for nitrogen and phosphorus loading and submit methods to the Water Quality Committee of the Commission for approval based on the standards set out in Sub-Item (7)(c) of this Rule by March 15, 2012;
(ii) Identify and implement future refinements to the accounting methods as needed to reflect advances in scientific understanding, including establishment or refinement of nutrient reduction efficiencies for BMPs;
(iii) By January 15, 2013, collect data needed to conduct initial nutrient loading accounting for the baseline period and the most current year feasible, perform this accounting, and determine the extent to which agricultural operations have achieved the Stage I nitrogen loading objective and phosphorus loading trend indicators for the watershed and present findings to the Water Quality Committee of the Commission;
(iv) Review, approve, and summarize local nutrient strategies if required pursuant to Sub-Item (5)(d) of this Rule and according to the timeframe identified in Sub-Item (8)(c)(ii) of this Rule. Provide these strategies to the Division;
(v) Establish requirements for, review, approve and summarize local nitrogen and phosphorus loading annual reports as described under Sub-Item (8)(e) of this Rule, and present the report to the Division annually, until such time as the Commission determines that annual reports are no longer needed to fulfill the purposes of Rule. Present a report in January 2014 to the Commission. Should that report find that agriculture in the watershed has not met its collective nitrogen or phosphorus objective, include an assessment in that report of the practicability of producers achieving the Stage I objective by calendar year 2020, and recommendations to the Commission as deemed appropriate;

(vi) Obtain nutrient reduction efficiencies for BMPs from the scientific community associated with design criteria identified in rules adopted by the Soil and Water Conservation Commission, including 15A NCAC 06E .0104 and 15A NCAC 06F .0104; and

(vii) Investigate and, if feasible, develop an accounting method to equate implementation of specific nutrient-reducing practices on cropland or pastureland to reductions in nutrient loading delivered to streams;

(viii) Quantify the nitrogen and phosphorus credits generated by such practices for the purpose of selling or buying credits; establish criteria and a process as needed for the exchange of nutrient credits between parties subject to this rule with each other or with parties subject to other nutrient strategy rules in the Falls lake watershed pursuant to the requirements of 15A NCAC 02B .0282; obtain approval from the Division for this trading program pursuant to the requirements of Rule .0282; approve eligible trades; and ensure that such credits traded for purposes of meeting this Rule are accounted for and tracked separately from those contributing to the objectives of other rules of the Falls nutrient strategy.

(c) ACCOUNTING METHODS. Success in meeting this Rule's purpose will be gauged by estimating percentage changes in nitrogen loading from agricultural lands in the Falls watershed and by evaluating broader trends in indicators of phosphorus loading from agricultural lands in the Falls watershed. The Watershed Oversight Committee shall develop accounting methods that meet the following requirements:

(i) The nitrogen method shall estimate baseline and annual total nitrogen loading from agricultural operations in each county and for the entire Falls watershed;

(ii) The nitrogen and phosphorus methods shall include a means of tracking implementation of BMPs, including number, type, and area affected;

(iii) The nitrogen method shall include a means of estimating incremental nitrogen loading reductions from actual BMP implementation and of evaluating progress toward and maintenance of the nutrient objectives from changes in BMP implementation, fertilization, individual crop acres, and agricultural land use acres;

(iv) The nitrogen and phosphorus methods shall be refined as research and technical advances allow;

(v) The phosphorus method shall quantify baseline values for and annual changes in factors affecting agricultural phosphorus loading as identified by the phosphorus technical advisory committee established under 15A NCAC 02B .0256(f)(2)(C). The method shall provide for periodic qualitative assessment of likely trends in agricultural phosphorus loading from the Falls watershed relative to baseline conditions;

(vi) Phosphorus accounting may also include a scientifically valid, survey-based sampling of farms in the Falls watershed for the purpose of conducting field-scale phosphorus loading assessments and extrapolating phosphorus loading for the Falls watershed for the baseline period and at periodic intervals; and

(vii) Aspects of pasture-based livestock operations that potentially affect nutrient loading and are not captured by the accounting methods described above shall be accounted for in annual reporting to the extent that advances in scientific understanding reasonably allow. Such accounting shall, at a minimum, quantify changes in the extent of livestock-related nutrient controlling BMPs. Progress may be judged
based on percent change in the extent of implementation relative to percentage objectives identified in Item (5) of this Rule.

(8) LOCAL ADVISORY COMMITTEES. Local Advisory Committees shall be formed for each county within the watershed by January 15, 2012, and shall have the following membership, roles, and responsibilities:

(a) MEMBERSHIP. A Local Advisory Committee shall be appointed as provided for in this Item. It shall terminate upon a finding by the Commission that it is no longer needed to fulfill the purposes of this Rule. Each Local Advisory Committee shall consist of:

(i) One representative of the county Soil and Water Conservation District;
(ii) One representative of the county office of the United States Department of Agriculture Natural Resources Conservation Service;
(iii) One representative of the North Carolina Department of Agriculture and Consumer Services;
(iv) One representative of the county office of the North Carolina Cooperative Extension Service;
(v) One representative of the North Carolina Division of Soil and Water Conservation whose regional assignment includes the county;
(vi) At least two farmers who reside in the county; and
(vii) One representative of equine livestock interests.

(b) APPOINTMENT OF MEMBERS. The Director of the Division of Water Quality and the Director of the Division of Soil and Water Conservation of the Department of Environment and Natural Resources shall appoint members described in Sub-Items (8)(a)(i), (8)(a)(ii), (8)(a)(iv), and (8)(a)(v) of this Rule. The Director of the Division of Water Quality, with recommendations from the Director of the Division of Soil and Water Conservation and the Commissioner of Agriculture, shall appoint the members described in Sub-Items (8)(a)(iii) and (8)(a)(vi) of this Rule from persons nominated by nongovernmental organizations whose members produce or manage agricultural commodities in each county. Members of the Local Advisory Committees shall serve at the pleasure of their appointing authorities.

(c) ROLE. The Local Advisory Committees shall:

(i) Conduct a registration process for persons subject to this Rule. This registration process shall be completed by January 15, 2012. The registration process shall request at a minimum the type and acreage of agricultural operations. It shall provide persons with information on requirements and options under this Rule, and on available technical assistance and cost share options;

(ii) Develop local nutrient control strategies for agricultural operations, pursuant to Sub-Item (8)(d) of this Rule, to meet the nitrogen and phosphorus objectives of this Rule. Strategies shall be submitted to the Watershed Oversight Committee by July 2012;

(iii) Ensure that any changes to the design of the local strategy will continue to meet the nutrient objectives of this Rule; and

(iv) Submit reports to the Watershed Oversight Committee, pursuant to Sub-Item (8)(c) of this Rule, annually beginning in calendar year 2012 until such time as the Commission determines that annual reports are no longer needed to fulfill the purposes of this Rule.

(d) LOCAL NUTRIENT CONTROL STRATEGIES. Local Advisory Committees shall develop nutrient control strategies. If a Local Advisory Committee fails to submit a nutrient control strategy required in Sub-Item (8)(c)(ii) of this Rule, the Commission may develop one based on the accounting methods that it approves pursuant to Sub-Item (7)(b)(i) of this Rule. Local strategies shall meet the following requirements:

(i) Local nutrient control strategies shall be designed to achieve the required nitrogen loading reduction objectives and qualitative trends in indicators of agricultural phosphorus loading by calendar year 2020, and to maintain those reductions in perpetuity or until such time as this rule is revised to modify this requirement; and

(ii) Local nutrient control strategies shall specify the numbers, acres, and types of all agricultural operations within their areas, numbers of BMPs that will be
implemented by enrolled operations and acres to be affected by those BMPs, estimated nitrogen and phosphorus loading reductions, schedule for BMP implementation, and operation and maintenance requirements.

(e) ANNUAL REPORTS. The Local Advisory Committees shall be responsible for submitting annual reports for their counties to the Watershed Oversight Committee until such time as the Commission determines that annual reports are no longer needed to fulfill the purposes of this Rule. The Watershed Oversight Committee shall determine reporting requirements to meet these objectives. Those requirements may include information on BMPs implemented by individual farms, proper BMP operation and maintenance, BMPs discontinued, changes in agricultural land use or activity, and resultant net nitrogen loading and phosphorus trend indicator changes. The annual reports in 2016 and 2026 shall address agriculture's success in complying with the load reduction requirements described in Items (5)(a) and (5)(b) of this Rule and shall include adjustments to address deficiencies to achieve compliance.

(f) PROGRESS. In 2016 the Division of Water Quality, in consultation with the Watershed Oversight Committee, shall submit a report to the Commission gauging the extent to which reasonable progress has been achieved towards the Stage I objectives described in this Rule.

History Note: Authority G.S. 143-214.1; 143-214.3; 143-214.5; 143-214.7; 143-215.1; 143-215.3; 143-215.3(a)(1); 143-215.6A; 143-215.6B; 143-215.6C; 143-215.8B; 143B-282(c); 143B-282(d); S.L. 2005-190; S.L. 2006-259; S.L. 2009-337; S.L. 2009-486;
Eff. January 15, 2011 (this permanent rule replaces the temporary rule approved by the RRC on December 16, 2010).
The following is the stormwater strategy, as prefaced in Rule 02B .0275, for the activities of state and federal entities within the Falls watershed.

(1) PURPOSE. The purposes of this Rule are as follows.
   (a) To achieve and maintain, on new non-road development lands, the nonpoint source nitrogen and phosphorus percentage reduction objectives established for Falls Reservoir in 15A NCAC 02B .0275 relative to the baseline period defined in Rule, to provide the highest practicable level of treatment on new road development, and to achieve and maintain the percentage objectives on existing developed lands by reducing loading from state-maintained roadways and facilities, and from lands controlled by other state and federal entities in the Falls watershed;
   (b) To ensure that the integrity and nutrient processing functions of receiving waters and associated riparian buffers are not compromised by erosive flows from state-maintained roadways and facilities and from lands controlled by other state and federal entities in the Falls watershed; and
   (c) To protect the water supply, aquatic life, and recreational uses of Falls Reservoir.

(2) APPLICABILITY. This Rule shall apply to all existing and new development, both as defined in 15A NCAC 02B .0276, that lies within or partially within the Falls watershed under the control of the NC Department of Transportation (NCDOT), including roadways and facilities, and to all lands controlled by other state and federal entities in the Falls watershed.

(3) NON-NCDOT REQUIREMENTS. With the exception of the NCDOT, all state and federal entities that control lands within the Falls watershed shall meet the following requirements:
   (a) For any new development proposed within their jurisdictions that would disturb one quarter acre or more, non-NCDOT state and federal entities shall develop stormwater management plans for submission to and approval by the Division;
   (b) The non-NCDOT state or federal entity shall include measures to ensure maintenance of best management practices (BMPs) implemented as a result of the provisions in Sub-Item (a) of this Item for the life of the development; and
   (c) A plan to ensure enforcement and compliance with the provisions in Sub-Item (4) of this Rule for the life of the new development.

(4) PLAN APPROVAL REQUIREMENTS. A developer's stormwater plan shall not be approved unless the following criteria are met:
   (a) Nitrogen and phosphorus loads contributed by the proposed new development activity shall not exceed the following unit-area mass loading rates for nitrogen and phosphorus, respectively, expressed in units of pounds/acre/year: 2.2 and 0.33. Proposed development that would replace or expand structures or improvements that existed as of December 2006, the end of the baseline period, and that would not result in a net increase in built-upon area shall not be required to meet the nutrient loading targets or high-density requirements except to the extent that the developer shall provide stormwater control at least equal to the previous development. Proposed development that would replace or expand existing structures or improvements and would result in a net increase in built-upon area shall have the option either to achieve at least the percentage loading reduction objectives stated in 15A NCAC 02B .0275 as applied to nitrogen and phosphorus loading from the previous development for the entire project site, or to meet the loading rate targets described in this item. These requirements shall supersede those identified in 15A NCAC 02B .0104(q). The developer shall determine the need for engineered stormwater controls to meet these loading rate targets by using the loading calculation method called for in Sub-Item (4)(a) of 15A NCAC 02B .0277 or other equivalent method acceptable to the Division;
   (b) The developer shall have the option of offsetting part of their nitrogen and phosphorus loads by implementing or funding offsite offset measures. Before using an offsite offset option, a development shall implement onsite structural stormwater controls that achieve one of the following levels of reductions:
      (i) Proposed new development activity disturbing at least one quarter acre but less than one acre of land, except as stated in this Item, shall achieve 30 percent or more of
the needed load reduction in both nitrogen and phosphorus loading onsite and shall meet any requirements for engineered stormwater controls described in this item; (ii) Except as stated in this Item, proposed new development activity that disturbs one acre of land or more shall achieve 50 percent or more of the needed load reduction in both nitrogen and phosphorus loading onsite and shall meet any requirements for engineered stormwater controls described in this Item; or (iii) Proposed development that would replace or expand structures or improvements that existed as of December 2006, the end of the baseline period, and that increases impervious surface within a designated downtown area, regardless of area disturbed, shall achieve 30 percent of the needed load reduction in both nitrogen and phosphorus onsite, and shall meet any requirements for engineered stormwater controls described in this Item; (c) Offsite offsetting measures shall achieve at least equivalent reductions in nitrogen and phosphorus loading to the remaining reduction needed onsite to comply with the loading rate targets set out in this Item. A developer may use any measure that complies with the requirements of Rules .0240 and .0282 of this Section; (d) Proposed new development subject to NPDES, water supply, and other state-mandated stormwater regulations shall comply with those regulations and with applicable permit limits in addition to the other requirements of this sub-item. Proposed new development in any water supply watershed in the Falls watershed designated WS-II, WS-III, or WS-IV shall comply with the density-based restrictions, obligations, and requirements for engineered stormwater controls, clustering options, operation and maintenance responsibilities, vegetated setbacks, land application, and landfill provisions described in Sub-Items (3)(b)(i) and (3)(b)(ii) of the applicable rule among 15A NCAC 02B .0214 through .0216. Provided, the allowance in water supply watershed rules for 10 percent of a jurisdiction to be developed at up to 70 percent built-upon area without stormwater treatment shall not be available in the Falls watershed; (e) Stormwater systems shall be designed to control and treat at a minimum the runoff generated from all surfaces in the project area by one inch of rainfall. The treatment volume shall be drawn down pursuant to standards specific to each practice as provided in the July 2007 version of the Stormwater Best Management Practices Manual published by the Division, or other at least technically equivalent standards acceptable to the Division; (f) To ensure that the integrity and nutrient processing functions of receiving waters and associated riparian buffers are not compromised by erosive flows, at a minimum, the new development shall not result in a net increase in peak flow leaving the site from pre-development conditions for the one-year, 24-hour storm event; (g) New development may satisfy the requirements of this Rule by meeting the post-development hydrologic criteria set out in Chapter 2 of the North Carolina Low Impact Development Guidebook dated June 2009, or the hydrologic criteria in the most recent version of that guidebook; and (h) Proposed new development shall demonstrate compliance with the riparian buffer protection requirements of 15A NCAC 02B .0233 and .0242.

(5) NON-NCDOT STAGED AND ADAPTIVE IMPLEMENTATION REQUIREMENTS. For existing development, non-NCDOT state and federal entities shall develop and implement staged load reduction programs for achieving and maintaining nutrient load reductions from existing development based on the standards set out in this Item. Such entities shall submit these load-reducing programs for approval by the Commission that include the following staged elements and meet the minimum standards for each stage of implementation: (a) In Stage I, entities subject to this rule shall implement a load reduction program that provides estimates of, and plans for offsetting by calendar year 2020, nutrient loading increases from lands developed subsequent to the baseline (2006) and not subject to the requirements of the Falls Lake new development stormwater program. For these existing developed lands, the current loading rate shall be compared to the loading rate for these lands prior to development for the acres involved, and the difference shall constitute the load reduction need in annual mass load, in pounds per year. Alternatively, a state or federal entity may
assume uniform pre-development loading rates of 2.89 pounds per acre per year N and 0.63 pounds per acre per year P for these lands. The entity shall achieve this stage one load reduction by calendar year 2020. This Stage I program shall meet the criteria defined in Item (4) of 15A NCAC 02B.0278; and

(b) By January 15, 2021, and every five years thereafter, a state or federal entity located in the Upper Falls Watershed as defined in Item (11) of 15A NCAC 02B.0276 shall submit and begin implementing a Stage II load reduction program or revision designed to achieve the percent load reduction objectives from existing developed lands under its control, that includes timeframes for achieving these objectives and that meets the criteria defined in Items (5) and (6) of this Rule.

(6) ELEMENTS OF NON-NCDOT LOAD REDUCTION PROGRAMS. A non-NCDOT state or federal entity load reduction program shall address the following elements:

(a) State and federal entities in the Eno River and Little River subwatersheds shall, as part of their Stage I load reduction programs, begin and continuously implement a program to reduce loading from discharging sand filters and malfunctioning septic systems owned or used by state or federal agencies discharging into waters of the State within those subwatersheds;

(b) State and federal entities in any Falls subwatershed in which chlorophyll a levels have exceeded 40 ug/L in more than seventy-five percent of the monitoring events in any calendar year shall, as part of their Stage I load reduction programs, begin and continuously implement a program to reduce nutrient loading into the waters of the State within that subwatersheds;

(c) The total amount of nutrient loading reductions in Stage I is not increased for state and federal entities by the requirements to address loading from malfunctioning septic systems and discharging sand filters or high nutrient loading levels pursuant to Sub-Items (a) and (b) of this Item;

(d) In preparation for implementation of their Stage I and Stage II load reduction programs, state and federal entities shall develop inventories and characterize load reduction potential to the extent that accounting methods allow for the following:

(i) Wastewater collection systems;

(ii) Discharging sand filter systems, including availability of or potential for central sewer connection;

(iii) Properly functioning and malfunctioning septic systems;

(iv) Restoration opportunities in utility corridors;

(v) Fertilizer management plans for state and federally owned lands;

(vi) Structural stormwater practices, including intended purpose, condition, potential for greater nutrient control; and

(vii) Wetlands and riparian buffers including potential for restoration opportunities.

(e) A state or federal entities load reduction need shall be based on the developed lands owned or used by the state or federal entity within the Falls watershed;

(f) Nitrogen and phosphorous loading from existing developed lands, including loading from onsite wastewater treatment systems to the extent accounting methods allow, shall be calculated by applying the accounting tool described in Item (13) and shall quantify baseline loads of nitrogen and phosphorus to surface waters from the lands under the entity's control as well as loading changes post-baseline. It shall also calculate target nitrogen and phosphorus loads and corresponding reduction needs;

(g) Nitrogen and phosphorous loading from existing developed lands, including loading from onsite wastewater treatment systems to the extent accounting methods allow, shall be calculated by applying the accounting tool described in Item (13) of this Rule and shall quantify baseline loads of nitrogen and phosphorus to surface waters from state and federal entities as well as loading changes post-baseline. It shall calculate target nitrogen and phosphorous loads and corresponding load reduction needs;

(h) The Commission shall recognize reduction credit for implementation of policies and practices implemented after January 1, 2007 and before January 15, 2011, to reduce runoff and discharge of nitrogen and phosphorus per Session Law 2009-486. The load reduction program shall identify specific load-reducing practices implemented subsequent to the
baseline period and for which the entity is seeking credit. It shall estimate load reductions for these practices and their anticipated duration using methods provided for in Item (13);

(i) The program shall include a proposed implementation schedule that includes annual implementation expectations. The load reduction program shall identify the types of activities the state or federal entity intends to implement and types of existing development affected, relative proportions or prioritization of practices, relative magnitude of reductions it expects to achieve from each, and the relative costs and efficiencies of each activity to the extent information is available. The program shall identify the duration of anticipated loading reductions, and may seek activities that provide long-term reductions;

(j) The load reduction program shall identify anticipated funding mechanisms or sources and discuss steps taken or planned to secure such funding;

(k) The program shall address the extent of load reduction opportunities intended from the following types of lands:
   (i) Lands owned or otherwise controlled by the state or federal entity; and
   (ii) Lands other than those on which the entity's load reduction need is based as described in this Item, including lands both within and outside its jurisdiction and third party sellers.

(l) The program shall address the extent of load reduction proposed from, at a minimum, the following stormwater and ecosystem restoration activities:
   (i) Bioretention;
   (ii) Constructed wetland;
   (iii) Sand filter;
   (iv) Filter Strip;
   (v) Grassed swale;
   (vi) Infiltration device;
   (vii) Extended dry detention;
   (viii) Rainwater harvesting system;
   (ix) Treatment of Redevelopment;
   (x) Overtreatment of new development;
   (xi) Removal of impervious surface;
   (xii) Retrofitting treatment into existing stormwater ponds;
   (xiii) Off-line regional treatment systems;
   (xiv) Wetland or riparian buffer restoration; and
   (xv) Reforestation with conservation easement or other protective covenant.

(m) The program shall evaluate the load reduction potential from the following wastewater activities:
   (i) Creation of surplus relative to an allocation established in 15A NCAC 02B .0279;
   (ii) Expansion of surplus allocation through regionalization;
   (iii) Connection of discharging sand filters and malfunctioning septic systems to central sewer or replacement with permitted non-discharge alternatives;
   (iv) Removal of illegal discharges; and
   (v) Improvement of wastewater collection systems.

(n) A state or federal entity may propose in its load reduction program the use of the following measures in addition to items listed in (l) and (m), or may propose other measures for which it can provide equivalent accounting methods acceptable to the Division:
   (i) Redirecting runoff away from impervious surfaces;
   (ii) Soil amendments;
   (iii) Stream restoration;
   (iv) Improved street sweeping; and
   (v) Source control, such as waste and fertilizer controls.

(o) The program shall include evaluation of load reduction potential relative to the following factors:
   (i) Extent of physical opportunities for installation;
   (ii) Landowner acceptance;
   (iii) Incentive and education options for improving landowner acceptance;
(iv) Existing and potential funding sources and magnitudes;
(v) Practice cost-effectiveness (e.g., cost per pound of nutrient removed);
(vi) Increase in per capita cost of a non-NCDOT state or federal entity's stormwater management program to implement the program;
(vii) Implementation rate without the use of eminent domain; and
(viii) Need for and projected role of eminent domain.

(7) The Commission shall approve a non-NCDOT Stage I load reduction program if it meets the requirements of Items (5) and (6) of this Rule. The Commission shall approve a Stage II load reduction program if it meets the requirements of Items (5) and (6) of this Rule unless the Commission finds that the local non-NCDOT state or federal entity can, through the implementation of reasonable and cost-effective measures not included in the proposed program, meet the Stage II nutrient load reductions required by this Rule by a date earlier than that proposed by the non-NCDOT state or federal entity. If the Commission finds that there are additional or alternative reasonable and cost-effective measures, the Commission may require the non-NCDOT state or federal entity to modify its proposed program to include such measures to achieve the required reductions by the earlier date. If the Commission requires such modifications, the non-NCDOT state or federal entity shall submit a modified program within two months. The Division shall recommend that the Commission approve or disapprove the modified program within three months after receiving the modified program. In determining whether additional or alternative load reduction measures are reasonable and cost effective, the Commission shall consider factors including, but not limited to those identified in Sub-Item (6)(o) of this Rule. The Commission shall not require additional or alternative measures that would require a non-NCDOT state or federal entity to:
(a) Install a new stormwater collection system in an area of existing development unless the area is being redeveloped; or
(b) Reduce impervious surfaces within an area of existing development unless the area is being redeveloped.

(8) A non-NCDOT state or federal entity shall have the option of working with the county or counties in which it falls, or with a municipality or municipalities within the same subwatershed, to jointly meet the loading targets from all lands within their combined jurisdictions within a subwatershed. The entity may utilize private or third party sellers. All reductions involving trading with other parties shall meet the requirements of 15A NCAC 02B .0282.

(9) NCDOT REQUIREMENTS. The NCDOT shall develop a single Stormwater Management Program that will be applicable to the entire Falls watershed and submit this program for approval by the Division according to the standards set forth below. In addition, the program shall, at a minimum, comply with NCDOT's then-current stormwater permit. This program shall:
(a) Identify NCDOT stormwater outfalls from Interstate, US, and NC primary routes;
(b) Identify and eliminate illegal discharges into the NCDOT's stormwater conveyance system;
(c) Establish a program for post-construction stormwater runoff control for new development, including new and widening NCDOT roads and facilities. The program shall establish a process by which the Division shall review and approve stormwater designs for new NCDOT development projects. The program shall delineate the scope of vested projects that would be considered as existing development, and shall define lower thresholds of significance for activities considered new development. In addition, the following criteria shall apply:
(i) For new and widening roads, weigh stations, and replacement of existing bridges, compliance with the riparian buffer protection requirements of Rules 15A NCAC 02B .0233 and .0242 shall be deemed as compliance with the purposes of this Rule; and
(ii) New non-road development shall achieve and maintain the nitrogen and phosphorus percentage load reduction objectives established in 15A NCAC 02B .0275 relative to either area-weighted average loading rates of all developable lands as of the baseline period defined in 15A NCAC 02B .0275, or to project-specific pre-development loading rates. Values for area-weighted average loading rate targets for nitrogen and phosphorus, respectively, are expressed in units of pounds per acre per year: 2.2 and 0.33. The NCDOT shall determine the need for engineered stormwater controls to meet these loading rate targets by using the loading calculation method called for in Item (13) of this Rule or other equivalent method.
acceptable to the Division. Where stormwater treatment systems are needed to meet these targets, they shall be designed to control and treat the runoff generated from all surfaces by one inch of rainfall. Such systems shall be assumed to achieve the nutrient removal efficiencies identified in the July 2007 version of the Stormwater Best Management Practices Manual published by the Division provided that they meet associated drawdown and other design specifications included in the same document. The NCDOT may propose to the Division nutrient removal rates for practices currently included in the BMP Toolbox required under its NPDES stormwater permit, or may propose revisions to those practices or additional practices with associated nutrient removal rates. The NCDOT may use any such practices approved by the Division to meet loading rate targets identified in this Sub-item. New non-road development shall also control runoff flows to meet the purpose of this Rule regarding protection of the nutrient functions and integrity of receiving waters; and

(iii) For new non-road development, the NCDOT shall have the option of offsetting part of their nitrogen and phosphorus loads by implementing or funding offsite management measures. Before using an offsite offset option, a development shall implement structural stormwater controls that achieve 50 percent or more of the needed load reduction in both nitrogen and phosphorus loading onsite and shall meet any requirements for engineered stormwater controls described in this Item. Offsite offsetting measures shall achieve at least equivalent reductions in nitrogen and phosphorus loading to the remaining reduction needed onsite to comply with the loading rate targets set out in this Item. The NCDOT may use any measure that complies with the requirements of Rules .0240 and .0282 of this Section. 

(d) Establish a program to identify and implement load-reducing opportunities on existing development within the watershed. The long-term objective of this effort shall be for the NCDOT to achieve the nutrient load objectives in 15A NCAC 02B .0275 as applied to existing development under its control, including roads and facilities:

(i) The NCDOT may achieve the nutrient load reduction objective in 15A NCAC 02B .0275 for existing roadway and non-roadway development under its control by the development of a load reduction program that addresses both roadway and non-roadway development in the Falls watershed. As part of the accounting process described in Item (13) of this Rule, baseline nutrient loads shall be established for roadways and industrial facilities using stormwater runoff nutrient load characterization data collected through the National Pollutant Discharge Elimination System (NPDES) Research Program under NCS0000250 Permit Part II Section G;

(ii) The program shall include estimates of, and plans for offsetting, nutrient load increases from lands developed subsequent to the baseline period but prior to implementation of its new development program. It shall include a technical analysis that includes a proposed implementation rate and schedule. This schedule shall provide for proportionate annual progress toward reduction objectives as practicable throughout the proposed compliance period. The program shall identify the types of activities NCDOT intends to implement and types of existing roadway and non-roadway development affected, relative proportions or a prioritization of practices, and the relative magnitude of reductions it expects to achieve from each;

(iii) The program to address roadway and non-roadway development may include stormwater retrofits and other load reducing activities in the watershed including: illicit discharge removal; street sweeping; source control activities such as fertilizer management at NCDOT facilities; improvement of existing stormwater structures; use of rain barrels and cisterns; stormwater capture and reuse; and purchase of nutrient reduction credits;

(iv) NCDOT may meet minimum implementation rate and schedule requirements by implementing a combination of at least six stormwater retrofits per year for existing development in the Falls watershed or some other minimum amount based on more
accurate reduction estimates developed during the accounting tool development process;

(v) To the maximum extent practicable, retrofits shall be designed to treat the runoff generated from all surfaces by one inch of rainfall, and shall conform to the standards and criteria established in the most recent version of the Division-approved NCDOT BMP Toolbox required under NCDOT's NPDES stormwater permit. To establish removal rates for nutrients for individual practices described in the Toolbox, NCDOT shall submit technical documentation on the nutrient removal performance of BMPs in the Toolbox for Division approval. Upon approval, NCDOT shall incorporate nutrient removal performance data into the BMP Toolbox. If a retrofit is proposed that is not described in the NCDOT BMP Toolbox, then to the maximum extent practicable, such retrofit shall conform to the standards and criteria set forth in the July 2007 version of the Stormwater Best Management Practices Manual published by the Division, or other technically equivalent guidance acceptable to the Division;

(e) Initiate a "Nutrient Management Education Program" for NCDOT staff and contractors engaged in the application of fertilizers on highway rights of way. The purpose of this program shall be to contribute to the load reduction objectives established in 15A NCAC 02B .0275 through proper application of nutrients, both inorganic fertilizer and organic nutrients, to highway rights of way in the Falls watershed in keeping with the most current state-recognized technical guidance on proper nutrient management; and

(f) Address compliance with the riparian buffer protection requirements of 15A NCAC 02B .0233 and .0242 through a Division approval process.

(10) NON-NCDOT RULE IMPLEMENTATION. For all state and federal entities that control lands within the Falls watershed with the exception of the NCDOT, this Rule shall be implemented as follows:

(a) Upon Commission approval of the accounting methods required in Item (13) of this Rule, subject entities shall comply with the requirements of Items (3) and (4) of this Rule;

(b) By July 15, 2013, the Division shall submit a Stage I model local program to the Commission for approval that embodies the criteria described in Items (5) and (6) of this Rule. The Division shall work in cooperation with subject state and federal entities and other watershed interests in developing this model program, which shall include the following:

(i) Methods to quantify load reduction requirements and resulting load reduction assignments for individual entities;

(ii) Methods to account for discharging sand filters, malfunctioning septic systems, and leaking collection systems; and

(iii) Methods to account for load reduction credits from various activities;

(c) Within six months after the Commission's approval of the Stage I model local program, subject entities shall submit load reduction programs that meet or exceed the requirements of Items (5) and (6) of this Rule to the Division for review and preliminary approval and shall begin implementation and tracking of measures to reduce nutrient loads from existing developed lands owned or controlled by the responsible state or federal entity;

(d) Within 20 months of the Commission's approval of the Stage I model local program, the Division shall provide recommendations to the Commission on existing development load reduction programs. The Commission shall either approve the programs or require changes based on the standards set out in Item (4) of this Rule. Should the Commission require changes, the applicable state or federal entity shall have two months to submit revisions, and the Division shall provide follow-up recommendations to the Commission within two months after receiving revisions;

(e) Within three months after the Commission's approval of a Stage I existing development load reduction program, the affected entity shall complete adoption of and begin implementation of its existing development Stage I load reduction program;

(f) Upon implementation of the programs required under Item (4) of this Rule, state and federal entities subject to this Rule shall provide annual reports to the Division documenting their progress in implementing those requirements within three months following each anniversary
of program implementation date until such time the Commission determines they are no longer needed to ensure maintenance of reductions or that standards are protected. State and federal entities shall indefinitely maintain and ensure performance of implemented load-reducing measures;

(g) By January 15, 2021 and every five years thereafter until either accounting determines load reductions have been achieved, standards are met, or the Commission takes other actions per 15A NCAC 02B .0275, state and federal entities located in the upper Falls watershed as defined in Item (3) of 15A NCAC 02B .0275 shall submit and begin implementation of Stage II load reduction program or program revision to the Division. Within nine months after submittal, the division shall make recommendations to the Commission on approval of these programs. The Commission shall either approve the programs or require changes based on the standards set out in this Rule. Should the Commission require changes, the applicable state or federal entity shall submit revisions within two months, and the Division shall provide follow-up recommendations to the Commission within three months after receiving revisions. Upon approval, the state or federal entity shall adjust implementation based on its approved program;

(h) A state or federal entity may, at any time after commencing implementation of its load reduction program, submit program revisions to the Division for approval based on identification of more cost-effective strategies or other factors not originally recognized;

(i) Once either load reductions are achieved per annual reporting or water quality standards are met in the lake per 15A NCAC 02B .0275, state and federal entities shall submit programs to ensure no load increases and shall report annually per Sub-Item (10)(f) on compliance with no increases and take additional actions as necessary; and

(j) Beginning January 2016 and every five years thereafter, the Division shall review the accounting methods stipulated under Sub-Item (10)(a) to determine the need for revisions to those methods and to loading reductions assigned using those methods. Its review shall include values subject to change over time independent of changes resulting from implementation of this Rule, such as untreated export rates that may change with changes in atmospheric deposition. It shall also review values subject to refinement, such as nutrient removal efficiencies.

(11) NCDOT RULE IMPLEMENTATION. For the NCDOT, this Rule, shall be implemented as follows:

(a) By July 2013, the NCDOT shall submit the Stormwater Management Program for the Falls watershed to the Division for approval. This Program shall meet or exceed the requirements in Item (9) of this Rule;

(b) By January 15, 2014, the Division shall request the Commission's approval of the NCDOT Stormwater Management Program;

(c) By January 15, 2014, the NCDOT shall implement the Commission-approved Stormwater Management Program; and

(d) Upon implementation, the NCDOT shall submit annual reports to the Division summarizing its activities in implementing each of the requirements in Item (9) of this Rule. This annual reporting may be incorporated into annual reporting required under NCDOT's NPDES stormwater permit.

(12) RELATIONSHIP TO OTHER REQUIREMENTS. A party may in its program submittal request that the Division accept its implementation of another stormwater program or programs, such as NPDES stormwater requirements, as satisfying one or more of the requirements set forth in Items (4) or (5) of this Rule. The Division shall provide determination on acceptability of any such alternatives prior to requesting Commission approval of programs under this Rule. The party shall include in its program submittal technical information demonstrating the adequacy of the alternative requirements.

(13) ACCOUNTING METHODS. By July 15, 2012, the Division shall submit a nutrient accounting framework to the Commission for approval. This framework shall include tools for quantifying load reduction assignments on existing development for parties subject to this Rule, load reduction credits from various activities on existing developed lands, and a tool that will allow subject parties to account for loading from new and existing development and loading changes due to BMP implementation. The Division shall work in cooperation with subject parties and other watershed interests in developing this framework. The Division shall periodically revisit these accounting methods to
determine the need for revisions to both the methods and to existing development load reduction assignments made using the methods set out in this Rule. It shall do so no less frequently than every 10 years. Its review shall include values subject to change over time independent of changes resulting from implementation of this Rule, such as untreated export rates that may change with changes in atmospheric deposition. It shall also review values subject to refinement, such as BMP nutrient removal efficiencies.

History Note: Authority G.S. 143-214.1; 143-214.3; 143-214.5; 143-214.7; 143-215.1; 143-215.3; 143-215.3(a)(1); 143-215.6A; 143-215.6B; 143-215.6C; 143-215.8B; 143B-282(c); 143B-282(d); S.L. 2005-190; S.L. 2006-259; S.L. 2009-337; S.L. 2009-486;
Eff. January 15, 2011 (this permanent rule replaces the temporary rule approved by the RRC on December 16, 2010).
15A NCAC 02B .0282 FALLS WATER SUPPLY NUTRIENT STRATEGY: OPTIONS FOR OFFSETTING NUTRIENT LOADS

PURPOSE. This Rule provides parties subject to other rules within the Falls nutrient strategy with options for meeting rule requirements by obtaining or buying credit for nutrient load-reducing activities conducted by others (sellers). It provides the potential for parties who achieve excess load reductions under the Falls nutrient strategy to recover certain costs by selling such credits, and it provides opportunity for third parties to produce reductions and sell credits. Overall it provides the potential for more cost-effective achievement of strategy reduction objectives. Accounting is required to ensure and track the availability and use of trading credits. This accounting will be compared against compliance accounting required under other rules of the Falls nutrient strategy to ensure that crediting is properly accounted for. This Rule furthers the adaptive management intent of the strategy to protect the water supply, aquatic life, and recreational uses of Falls Reservoir. The minimum requirements for the exchange of load reduction credits are:

(1) PREREQUISITES. The following buyers shall meet applicable criteria identified here and in rules imposing reduction requirements on them before utilizing the option outlined in this Rule:
   (a) Agriculture Rule .0280: Owners of agricultural land shall receive approval from the Watershed Oversight Committee to obtain offsite credit pursuant to the conditions of Sub-Item (7)(b)(vii) of Rule .0280;
   (b) New Development Rule .0277: Developers shall meet onsite reduction requirements enumerated in Sub-Item (4)(b) of Rule .0277 before obtaining offsite credit;
   (c) Wastewater Rule .0279: New and expanding dischargers shall first make all reasonable efforts to obtain allocation from existing dischargers as stated in Sub-Items (7)(a)(ii) and (8)(a)(ii), respectively of Rule .0279; and
   (d) State and Federal Entities Stormwater Rule .0281:
      (i) Non-DOT entities shall meet onsite new development reduction requirements enumerated in Sub-Item (4)(b) of Rule .0281; and
      (ii) NC DOT shall meet onsite non-road new development reduction requirements enumerated in Sub-Item (9)(c) of Rule .0281 before obtaining offsite credit.

(2) The party seeking approval to sell load reduction credits pursuant to this Rule shall demonstrate to the Division that such reductions meet the following criteria:
   (a) Load reductions eligible for credit shall not include reductions that result from actions required to mitigate nutrient load-increasing actions under any regulation, except where a rule in this Section expressly allows such credit; and
   (b) The party seeking to sell credits shall define the nature of the activities that would produce reductions and define the magnitude and duration of those reductions to the Division, including addressing the following items:
      (i) Quantify and account for the relative uncertainties in reduction need estimates and load reduction estimates;
      (ii) Ensure that load reductions shall take place at the time and for the duration in which the reduction need occurs; and
      (iii) Demonstrate means adequate for assuring the achievement and claimed duration of load reduction, including the cooperative involvement of any other involved parties;
   (c) Geographic Restrictions. Eligibility to use load reductions as credit is based on the following geographic criteria:
      (i) Impacts in the upper Falls watershed as defined in Item (19) of 15A NCAC 02B .0276 may be offset only by load reductions achieved in the upper Falls watershed; and
      (ii) Impacts in the lower Falls watershed as defined in Item (20) of 15A NCAC 02B .0276 shall be offset by load reductions achieved anywhere within the Falls watershed.

(3) The party seeking approval to sell load reduction credits shall provide for accounting and tracking methods that ensure genuine, accurate, and verifiable achievement of the purposes of this Rule, and shall otherwise meet the requirements of Rule .0240 of this Section, which establishes procedural requirements for nutrient offset payments. The Division shallwork cooperatively with interested parties at their request to develop such accounting and tracking methods to support the requirements of Item (2) of this Rule.
Local governments have the option of combining their reduction needs from NPDES dischargers assigned allocations in 15A NCAC 02B .0279 and existing development as described in 15A NCAC 02B .0278, including loads from properly functioning and malfunctioning septic systems and discharging sand filters, into one reduction and allocation requirement and meet them jointly.

Proposals for use of offsetting actions as described in this Rule shall become effective after determination by the Director that the proposal contains adequate scientific or engineering standards or procedures necessary to achieve and account for load reductions as required under Items (2) and (3) of this Rule, and that specific accounting tools required for these purposes in individual rules have been adequately established. In making this determination, the Director shall also evaluate the potential for load offset elsewhere that results in localized adverse water quality impacts that contribute to impairment of classified uses of the affected waters.

A party seeking to purchase nutrient offset credit from the NC Ecosystem Enhancement Program or from a public or private seller of reduction credit shall meet the applicable requirements of Rule .0240 of this Section, which establishes procedural requirements for nutrient offset payments, in addition to applicable requirements of this Rule. Requirements of Rule .0240 include, but are not limited to, the requirement for non-governmental entities to purchase credit from a provider other than the NC Ecosystem Enhancement Program if such credit is available.

The Watershed Oversight Committee under Rule 15A NCAC 02B .0280 may satisfy the seller requirements of Items (2) and (3) of this Rule and the trading provisions of Rule .0280 for individual agricultural land owners by submitting to the Division for approval a trading program, or revisions to such a program, that demonstrates how individual trades shall meet the requirements of this Rule and Rule .0280, and by subsequently including in annual reports required under Rule .0280 separate tracking and accounting for such trades.

**History Note:** Authority G S. 143-214.1; 1432-214.3;143-214.5; 143-214.7; 143-215.1; 1432-15.3; 143-215.3(a)(1); 143-215.6A; 143-215.6B; 143-215.6C; 143-215.8B; 143B-282(c); 143B-282(d); S.L. 2005-190; S.L. 2006-259; S.L. 2009-337; S.L. 2009-486; Eff. January 15, 2011 (this permanent rule replaces the temporary rule approved by the RRC on December 16, 2010).
The following is the urban stormwater management strategy for the Neuse River Basin:

(1) The following local governments are designated, based on population and other factors, as parties responsible for implementing stormwater management requirements as part of the Neuse River Nutrient Sensitive Waters stormwater management strategy:
   (a) Cary,
   (b) Durham,
   (c) Garner,
   (d) Goldsboro,
   (e) Havelock,
   (f) Kinston,
   (g) New Bern,
   (h) Raleigh,
   (i) Smithfield,
   (j) Wilson,
   (k) Durham County,
   (l) Johnston County,
   (m) Orange County,
   (n) Wake County, and
   (o) Wayne County.

(2) Other incorporated areas and other counties, not listed under Item (1) of this Rule, may seek to implement their own local stormwater management plan by complying with the requirements specified in Items (5) and (6) of this Rule.

(3) The Environmental Management Commission may designate additional local governments by amending this Rule based on their potential to contribute significant nutrient loads to the Neuse River. At a minimum, the Commission shall review the need for additional designations to the stormwater management program as part of the basinwide planning process for the Neuse River Basin. Any local governments that are designated at a later date under the Neuse Nutrient Sensitive Waters Stormwater Program shall meet the requirements under Items (5) and (6) of this Rule.

(4) Local stormwater programs shall address nitrogen reductions for both existing and new development and include the following elements:
   (a) Review and approval of stormwater management plans for new developments to ensure that:
      (i) the nitrogen load contributed by new development activities is held at 70 percent of the average nitrogen load contributed by the 1995 land uses of the non-urban areas of the Neuse River Basin. The local governments shall use a nitrogen export standard of 3.6 pounds/acre/year, determined by the Environmental Management Commission as 70 percent of the average collective nitrogen load for the 1995 non-urban land uses in the basin above New Bern. The EMC may periodically update the design standard based on the availability of new scientific information. Developers shall have the option of offsetting part of their nitrogen load by funding offsite management measures by making payment to the NC Ecosystem Enhancement Program or to another seller of offset credits approved by the Division or may implement other offset measures contingent upon approval by the Division. Offset payments shall meet the requirements of Rule .0240 of this Section, which establishes procedural requirements for nutrient offset payments. However, before using offset payments, the development must attain, at a minimum, a nitrogen export that does not exceed 6 pounds/acre/year for residential development and 10 pounds/acre/year for commercial or industrial development;
      (ii) For the following local governments and any additional local governments identified in rule by the Commission, the post-construction requirements of 15 NCAC 02B .0277 shall supersede the requirements in this Sub-item for areas within their jurisdiction within the watershed of the Falls of the Neuse Reservoir: Durham, Raleigh, Durham County, Orange County, and Wake County; and
(iii) there is no net increase in peak flow leaving the site from the predevelopment conditions for the 1-year, 24-hour storm.

(b) Review of new development plans for compliance with requirements for protecting and maintaining existing riparian areas as specified in 15A NCAC 02B .0233;

(c) Implementation of public education programs;

(d) Identification and removal of illegal discharges;

(e) Identification of suitable locations for potential stormwater retrofits (such as riparian areas) that could be funded by various sources; and

(f) Submittal of an annual report on October 30 to the Division documenting progress on and net changes to nitrogen load from the local government's planning jurisdiction.

(5) Local governments shall implement stormwater management programs according to their plans approved by the Commission as of March 2001. Local governments administering a stormwater management program shall submit annual reports to the Division documenting their progress and net changes to nitrogen load by October 30 of each year.

(6) If a local government fails to properly implement an approved plan, then stormwater management requirements for existing and new urban areas within its jurisdiction shall be administered through the NPDES municipal stormwater permitting program per 15A NCAC 02H .0126:

(a) Subject local governments shall develop and implement comprehensive stormwater management programs, tailored toward nitrogen reduction, for both existing and new development.

(b) These stormwater management programs shall provide all components that are required of local government stormwater programs in Sub-items (4)(a) through (f) of this Rule.

(c) Local governments that are subject to an NPDES permit shall be covered by the permit for at least one permitting cycle (five years) before they are eligible to submit a local stormwater management program for consideration and approval by the EMC.

History Note: Authority G.S. 143-214.1; 143-214.7; 143-215.1; 143-215.3(a)(1); S.L. 1995, c. 572; Eff. August 1, 1998; Amended Eff. January 15, 2011 (this permanent rule replaces the temporary rule approved by the RRC on December 16, 2010).
15A NCAC 02B .0315 NEUSE RIVER BASIN

(a) The Neuse River Basin Schedule of Classification and Water Quality Standards may be inspected at the following places:

(1) the Internet at http://h2o.enr.state.nc.us/csru/

(2) the North Carolina Department of Environment and Natural Resources:

(A) Raleigh Regional Office
    3800 Barrett Drive
    Raleigh, North Carolina;

(B) Washington Regional Office
    943 Washington Square Mall
    Washington, North Carolina;

(C) Wilmington Regional Office
    127 Cardinal Drive
    Wilmington, North Carolina;

(D) Division of Water Quality
    Central Office
    512 North Salisbury Street
    Raleigh, North Carolina.

(b) The Neuse River Basin Schedule of Classification and Water Quality Standards was amended effective:

(1) March 1, 1977 see Paragraph (c) of this Rule;

(2) December 13, 1979 see Paragraph (d) of this Rule;

(3) September 14, 1980 see Paragraph (e) of this Rule;

(4) August 9, 1981 see Paragraph (f) of this Rule;

(5) January 1, 1982 see Paragraph (g) of this Rule;

(6) April 1, 1982 see Paragraph (h) of this Rule;

(7) December 1, 1983 see Paragraph (i) of this Rule;

(8) January 1, 1985 see Paragraph (j) of this Rule;

(9) August 1, 1985 see Paragraph (k) of this Rule;

(10) February 1, 1986 see Paragraph (l) of this Rule;

(11) May 1, 1988 see Paragraph (m) of this Rule;

(12) July 1, 1988 see Paragraph (n) of this Rule;

(13) October 1, 1988 see Paragraph (o) of this Rule;

(14) January 1, 1990 see Paragraph (p) of this Rule;

(15) August 1, 1990;

(16) December 1, 1990 see Paragraph (q) of this Rule;

(17) July 1, 1991 see Paragraph (r) of this Rule;

(18) August 3, 1992;

(19) April 1, 1994 see Paragraph (t) of this Rule;

(20) July 1, 1996 see Paragraph (u) of this Rule;

(21) September 1, 1996 see Paragraph (v) of this Rule;

(22) April 1, 1997 see Paragraph (w) of this Rule;

(23) August 1, 1998 see Paragraph (x) of this Rule;

(24) August 1, 2002 see Paragraph (y) of this Rule;

(25) July 1, 2004 see Paragraph (z) of this Rule;

(26) November 1, 2007 see Paragraph (aa) of this Rule;

(27) January 15, 2011 see Paragraph (bb) of this Rule.

(c) The Schedule of Classifications and Water Quality Standards for the Neuse River Basin was amended effective March 1, 1977 with the a total of 179 streams in the Neuse River Basin reclassified from Class D to Class C.

(d) The Schedule of Classifications and Water Quality Standards for the Neuse River Basin has been amended effective December 13, 1979 as follows: Little River [Index No. 27-57-(21.5)] from source to the dam at Wake Forest Reservoir has been reclassified from Class A-II to Class A-II and B.

(e) The Schedule of Classifications and Water Quality Standards for the Neuse River Basin has been amended effective September 14, 1980 as follows: The Eno River from Durham County State Road 1003 to U.S Highway 501 [Index No. 27-2-(16)] was reclassified from Class C and B to Class A-II and B.
The Schedule of Classifications and Water Quality Standards for the Neuse River Basin was amended effective August 9, 1981 to remove the swamp water designation from all waters designated SA in the Neuse River Basin.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin has been amended effective January 1, 1982 as follows: The Trent River from the mouth of Brice Creek to the Neuse River [Index No. 27-101-(39)] was reclassified from Class SC Sw to Class SB Sw.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin has been amended effective April 1, 1982 as follows:

1. Longview Branch from source to Crabtree Creek [Index No. 27-33-(21)] was reclassified from Class C1 to Class C.

2. Watson Branch from source to Walnut Creek [Index No. 27-34-(8)] was reclassified from Class C1 to Class C.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin has been amended effective December 1, 1983 to add the Nutrient Sensitive Waters classification to the entire river basin above Falls dam.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin has been amended effective January 1, 1985 as follows: Nobel Canal from source to Swift Creek [Index No. 27-97-(2)] was reclassified from Class C1 to Class C.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin has been amended effective August 1, 1985 as follows:

1. Southeast Prong Beaverdam Creek from source to Beaverdam Creek [Index No. 27-33-15(2)] was reclassified from Class C1 to Class C.

2. Pigeon House branch from source to Crabtree Creek [Index No. 27-33-(18)] was reclassified from Class C1 to Class C.

3. Rocky Branch from source to Pullen Road [Index No. 27-34-6-(1)] was reclassified from Class C1 to Class C.

4. Chavis Branch from source to Watson Branch [Index No. 27-37-8-1] was reclassified from Class C1 to Class C.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin has been amended effective February 1, 1986 to reclassify all Class A-I and Class A-II streams in the Neuse River Basin to WS-I and WS-III.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin was amended effective May 1, 1988 to add the Nutrient Sensitive Waters classification to the waters of the Neuse River Basin below the Falls Lake dam.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin has been amended effective July 1, 1988 as follows:

1. Smith Creek [Index No. 27-23-(1)] from source to the dam at Wake Forest Reservoir has been reclassified from Class WS-III to WS-I.

2. Little River [Index No. 27-57-(1)] from source to the N.C. Hwy. 97 Bridge near Zebulon including all tributaries has been reclassified from Class WS-III to WS-I.

3. An unnamed tributary to Buffalo Creek just upstream of Robertson's Pond in Wake County from source to Buffalo Creek including Leo's Pond has been reclassified from Class C to B.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin has been amended effective October 1, 1988 as follows:

1. Walnut Creek (Lake Johnson, Lake Raleigh) [Index No. 27-34-(1)]. Lake Johnson and Lake Raleigh have been reclassified from Class WS-III to Class WS-III B.

2. Haw Creek (Camp Charles Lake) (Index No. 27-86-3-7) from the backwaters of Camp Charles Lake to dam at Camp Charles Lake has been reclassified from Class C to Class B.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin has been amended effective January 1, 1990 as follows:

1. Neuse-Southeast Pamlico Sound ORW Area which includes all waters within a line beginning at the southwest tip of Ocracoke Island, and extending north west along the Tar-Pamlico River Basin and Neuse River Basin boundary line to Lat. 35 degrees 06' 30", thence in a southwest direction to Ship Point and all tributaries, were reclassified from Class SA NSW to Class SA NSW ORW.

2. Core Sound (Index No. 27-149) from northeastern limit of White Oak River Basin (a line from Hall Point to Drum Inlet) to Pamlico Sound and all tributaries, except Thorofare, John Day Ditch were reclassified from Class SA NSW to Class SA NSW ORW.
The Schedule of Classifications and Water Quality Standards for the Neuse River Basin was amended effective December 1, 1990 with the reclassification of the following waters as described in (1) through (3) of this Paragraph.

1. Northwest Creek from its source to the Neuse River (Index No. 27-105) from Class SC Sw NSW to Class SB Sw NSW;

2. Upper Broad Creek [Index No. 27-106-(7)] from Pamlico County SR 1103 at Lees Landing to the Neuse River from Class SC Sw NSW to Class SB Sw NSW; and

3. Goose Creek [Index No. 27-107-(11)] from Wood Landing to the Neuse River from Class SC Sw NSW to Class SB Sw NSW.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin was amended effective July 1, 1991 with the reclassification of the Bay River [Index No. 27-150-(1)] within a line running from Flea Point to the Hammock, east to a line running from Bell Point to Darby Point, including Harper Creek, Tempe Gut, Moore Creek and Newton Creek, and excluding that portion of the Bay River landward of a line running from Poorhouse Point to Darby Point from Classes SC Sw NSW and SC Sw NSW HQW to Class SA NSW.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin was amended effective August 3, 1992 with the reclassification of all water supply waters (waters with a primary classification of WS-I, WS-II or WS-III). These waters were reclassified to WS-I, WS-II, WS-III, WS-IV or WS-V as defined in the revised water supply protection rules, (15A NCAC 02B .0100, .0200 and .0300) which became effective on August 3, 1992. In some cases, streams with primary classifications other than WS were reclassified to a WS classification due to their proximity and linkage to water supply waters. In other cases, waters were reclassified from a WS classification to an alternate appropriate primary classification after being identified as downstream of a water supply intake or identified as not being used for water supply purposes.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin was amended effective April 1, 1994 as follows:

1. Lake Crabtree [Index No. 27-33-(1)] was reclassified from Class C NSW to Class B NSW.

2. The Eno River from Orange County State Road 1561 to Durham County State Road 1003 [Index No. 27-10-(16)] was reclassified from Class WS-IV NSW to Class WS-IV B NSW.

3. Silver Lake (Index No. 27-43-5) was reclassified from Class WS-III NSW to Class WS-III B NSW.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin was amended effective July 1, 1996 with the reclassification of Austin Creek [Index Nos. 27-23-3-(1) and 27-23-3-(2)] from its source to Smith Creek from classes WS-III NSW and WS-III NSW CA to class C NSW.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin was amended effective September 1, 1996 with the reclassification of an unnamed tributary to Hannah Creek (Tuckers Lake) [Index No. 27-52-6-0.5] from Class C NSW to Class B NSW.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin was amended effective April 1, 1997 with the reclassification of the Neuse River (including tributaries) from mouth of Marks Creek to a point 1.3 miles downstream of Johnston County State Road 1908 to class WS-IV NSW and from a point 1.3 miles downstream of Johnston County State Road 1908 to the Johnston County Water Supply intake (located 1.8 miles downstream of Johnston County State Road 1908) to class WS-IV CA NSW [Index Nos. 27-(36) and 27-(38.5)].

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin was amended effective August 1, 1998 with the revision of the Critical Area and Protected Area boundaries surrounding the Falls Lake water supply reservoir. The revisions to these boundaries is the result of the Corps of Engineers raising the lake's normal pool elevation. The result of these revisions is the Critical and Protected Area boundaries (classifications) may extend further upstream than the current designations. The Critical Area for a WS-IV reservoir is defined as .5 miles and draining to the normal pool elevation. The Protected Area for a WS-IV reservoir is defined as 5 miles and draining to the normal pool elevation. The normal pool elevation of the Falls Lake reservoir has changed from 250.1 feet mean sea level (msl) to 251.5 feet msl.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin was amended effective August 1, 2002 with the reclassification of the Neuse River [portions of Index No. 27-(56)], including portions of its tributaries, from a point 0.7 mile downstream of the mouth of Coxe Creek to a point 0.6 mile upstream of Lenoir County proposed water supply intake from Class C NSW to Class WS-IV NSW and from a point 0.6 mile upstream of Lenoir County proposed water supply intake to Lenoir proposed water supply intake from Class C NSW to Class WS-IV CA NSW.

The Schedule of Classifications and Water Quality Standards for the Neuse River Basin was amended effective July 1, 2004 with the reclassification of the Neuse River (including tributaries in Wake County) [Index Nos. 27-(20.7), 27-21, 27-21-1] from the dam at Falls Lake to a point 0.5 mile upstream of the Town of Wake Forest Water Supply Intake...
(former water supply intake for Burlington Mills Wake Finishing Plant) from Class C NSW to Class WS-IV NSW and from a point 0.5 mile upstream of the Town of Wake Forest proposed water supply intake to Town of Wake Forest proposed water supply intake [Index No. 27-(20.1)] from Class C NSW to Class WS-IV NSW CA. Fantasy Lake [Index No. 27-57-3-1-1], a former rock quarry within a WS-II NSW water supply watershed, was reclassified from Class WS-II NSW to Class WS-II NSW CA.

(aa) The Schedule of Classifications and Water Quality Standards for the Neuse River Basin was amended effective November 1, 2007 with the reclassification of the entire watershed of Deep Creek (Index No. 27-3-4) from source to Flat River from Class WS-III NSW to Class WS-III ORW NSW.

(bb) The Schedule of Classifications and Water Quality Standards for the Neuse River Basin is amended effective January 15, 2011 with the reclassification of all Class C NSW waters and all Class B NSW waters upstream of the dam at Falls Reservoir from Class C NSW and Class B NSW to Class WS-V NSW and Class WS-V & B NSW, respectively. All waters within the Falls Watershed are within a designated Critical Water Supply Watershed and are subject to a special management strategy specified in Rules 15A NCAC 02B .0275 through .0283.

History Note: Authority G.S. 143-214.1; 143-215.1; 143-215.3(a)(1);
Eff. February 1, 1976;
Amended Eff. November 1, 2007; July 1, 2004 (see SL 2001-361); August 1, 2002; August 1, 1998;
April 1, 1997; September 1, 1996; July 1, 1996; April 1, 1994; August 3, 1992; July 1, 1991;
Amended Eff. January 15, 2011 (this permanent rule replaces the temporary rule approved by the RRC on December 16, 2010).
APPENDIX O

FALLS LAKE STORMWATER LOAD ACCOUNTING TOOL

Developers and designers should use the Falls/Jordan Stormwater Accounting Tool spreadsheets provided by NCDENR DWQ, available online at:
http://portal.ncdenr.org/web/wq/ps/nps/fallslake
Jordan/Falls Lake Stormwater Load Accounting Tool
(Version 1.0)

User’s Manual
(revised January 31, 2011)
Introduction
This accounting tool was developed by North Carolina State University in coordination with NCDENR to be used with the Jordan Lake Nutrient Strategy Rules. While the original application of this tool is the Jordan Lake Nutrient Strategy, it may also be applied to any location within the state of North Carolina. This tool is intended to be used for new developments (NCDENR is developing a separate tool for existing developments within the Jordan Lake watershed), but can be also be applied to existing developments that are incorporating retrofit best management practices (BMPs).

Important Notes:
Some BMPs included in the tool may not currently be used for meeting nutrient reduction requirements. Please check with the Division and the Division’s Stormwater BMP Manual for more details.

While the tool provides the option of undersizing BMPs, this option cannot currently be used to meet the Jordan New Development requirements. This option may potentially be used if the tool is used to calculate nutrient reductions for retrofits on existing development.

Using the Client/Master Files
To prevent manipulation of the Jordan/Falls Lake Stormwater Load Accounting Tool (JLSLAT) and its outputs, a system has been developed involving two Excel files: a Client file and a Master file. The Client file will be distributed to the general public and the Master file will be distributed to regulators by NCDENR. The Master file is NOT designed to run scenarios and analyze developments. Its only use is for regulators to extract input data from the Client file and view results. To ensure that both files function properly and produce accurate results, do NOT attempt to change any formatting, data or formulas within the files.

Client File
Developers (or anyone submitting the results from the JLSLAT for regulatory review) may use the Client file to run any and all scenarios for a given development. When they are ready to submit a given scenario/development for review, they will save the Client file and send it to the appropriate regulatory agency. The agency’s Master file will extract the input data from the Client file and produce its own results. Regulators will use these results to review the development.

Master File
The Master file extracts the input data from a specified Client sheet and produces its own set of results. Again, the Master file is NOT designed to run scenarios and analyze developments. It is strongly recommended that the regulatory agency use the “Save As” feature to have a separate Master file for each Client file. To establish the connection between the Master and Client files, go to the Instructions worksheet and click on Data → Connections → Edit Links. Browse files and select the client sheet you want to extract the data from. Click on the Update Values button. The files should update automatically and any time the Master Sheet is opened it will extract the data from the specified Client file. You may check the status of the connection by clicking Data → Connections → Edit Links → Check Status. If for some reason the link is broken, simply repeat the steps described above.
Glossary of Terms

**water quality depth** – The depth of rainfall that a BMP is designed to capture and treat (generally 1 inch for all regions except CAMA; for CAMA, it is generally 1.5 inches).

**physiographic region** – Broad-scale subdivision based on terrain texture, rock type and geologic structure and history. In North Carolina, there are five main physiographic regions: coastal plain, sandhills, piedmont, Triassic basin, and mountains. (In the JLSAT, the region “CAMA” refers to the region of the state where Coastal Area Management Act applies – see NCDENR’s website for more information about this region and the stormwater requirements)

**hydrologic soil group** – Soils are classified into hydrologic soil groups (HSGs) to indicate the minimum rate of infiltration obtained for bare soil after prolonged wetting.

**median effluent concentration** – The median concentration of a given constituent that is released from a best management practice. This value is independent of the inflow concentration.

**internal water storage zone** – Subsurface portion of a bioretention cell that provides water storage in the bottom of the cell. Water stored in this layer is principally released by exfiltration. The IWS zone is created by elevating the underdrain, usually with a 90-degree PVC elbow.
I. Using the Jordan/Falls Lake Stormwater Load Accounting Tool (JLSLAT)

This section covers the use and interpretation of the JLSLAT. There are four worksheet tabs within the Excel spreadsheet that users will need to access: Instructions, Watershed Characteristics, BMP Characteristics, and Development Summary. The Instructions tab provides background information and general instructions for using the JLSLAT. The Watershed Characteristics and BMP Characteristics tabs allow users to enter their development and BMP data. Finally, the Development Summary is where all outputs are displayed. Users may navigate between these four tabs by either clicking the buttons at the top of the worksheets (Figure 1A) or by clicking on the tab name at the bottom of the screen (Figure 1B). Each tab and its corresponding instructions, assumptions and uses are discussed in the next four sections.

![Figure 1. Methods of navigating between worksheet tabs.](image)

**Instructions**

The Instructions tab is the first worksheet one sees when opening the JLSLAT Excel file. This tab contains all instructions and assumptions regarding the JLSLAT and its use. Specific instructions are stated again in subsequent tabs so users can refer to them easily.

This worksheet contains two maps: a physiographic region map (Figure 2) and an annual precipitation map (Figure 3). These maps are provided for users to reference when choosing their physiographic region and precipitation location on the “Watershed Characteristics” tab. There is also a table (Table 1) of counties located within, or partially within, each physiographic region. Table 1 allows users to get a general idea of what region their site is located in. For users whose county is located within multiple regions, it is crucial that they determine which region the site of interest pertains to, as this affects calculations and outputs from the JLSLAT. This will be discussed in greater detail in the “Watershed Characteristics” section.

| Cells shaded grey are those designated for data input. |
Figure 2. Map of physiographic regions within the state of North Carolina (also located in the JLSLAT on the Instructions worksheet).

Figure 3. Average annual precipitation map for the state of North Carolina. Labeled towns/cities are available in the dropdown menu for ‘precipitation location’ (also located in the JLSLAT on the Instructions worksheet).
Table 1. List of counties located within, or partially within, each physiographic region.

<table>
<thead>
<tr>
<th>PIEDMONT &amp; MOUNTAIN</th>
<th>COASTAL PLAIN</th>
<th>CAMA COUNTIES</th>
<th>TRIASSIC BASIN</th>
<th>SANDHILLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rockingham</td>
<td>Lee</td>
<td>Bladen</td>
<td>Beaufort</td>
<td>Durham</td>
</tr>
<tr>
<td>Alamance</td>
<td>Lee</td>
<td>Bladen</td>
<td>Bertie</td>
<td>Granville</td>
</tr>
<tr>
<td>Alexander</td>
<td>Lincoln</td>
<td>Columbus</td>
<td>Brunswick</td>
<td>Wake</td>
</tr>
<tr>
<td>Alleghany</td>
<td>Madison</td>
<td>Cumberland</td>
<td>Camden</td>
<td>Chatham</td>
</tr>
<tr>
<td>Anson</td>
<td>McDowell</td>
<td>Duplin</td>
<td>Carteret</td>
<td>Lee</td>
</tr>
<tr>
<td>Ashe</td>
<td>Mecklenburg</td>
<td>Edgecombe</td>
<td>Chowan</td>
<td>Moore</td>
</tr>
<tr>
<td>Avery</td>
<td>Mitchell</td>
<td>Halifax</td>
<td>Craven</td>
<td>Montgomery</td>
</tr>
<tr>
<td>Buncombe</td>
<td>Montgomery</td>
<td>Harnett</td>
<td>Currituck</td>
<td>Richmond</td>
</tr>
<tr>
<td>Burke</td>
<td>Moore</td>
<td>Hoke</td>
<td>Dare</td>
<td>Anson</td>
</tr>
<tr>
<td>Cabarrus</td>
<td>Nash</td>
<td>Johnston</td>
<td>Gates</td>
<td>Union</td>
</tr>
<tr>
<td>Caldwell</td>
<td>Northampton</td>
<td>Jones</td>
<td>Hertford</td>
<td>Rockingham</td>
</tr>
<tr>
<td>Caswell</td>
<td>Orange</td>
<td>Martin</td>
<td>Hyde</td>
<td>Stokes</td>
</tr>
<tr>
<td>Catawba</td>
<td>Person</td>
<td>Moore</td>
<td>New Hanover</td>
<td>Davie</td>
</tr>
<tr>
<td>Chatham</td>
<td>Polk</td>
<td>Nash</td>
<td>Pitt</td>
<td></td>
</tr>
<tr>
<td>Cherokee</td>
<td>Randolph</td>
<td>Northampton</td>
<td>Richard</td>
<td></td>
</tr>
<tr>
<td>Clay</td>
<td>Richmond</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleveland</td>
<td>Rowan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Davidson</td>
<td>Rutherford</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Davie</td>
<td>Stanley</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Durham</td>
<td>Stokes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forsyth</td>
<td>Surry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Franklin</td>
<td>Swain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaston</td>
<td>Transylvania</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graham</td>
<td>Union</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Granville</td>
<td>Vance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guilford</td>
<td>Wake</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Halifax</td>
<td>Warren</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harnett</td>
<td>Watauga</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haywood</td>
<td>Wilkes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Henderson</td>
<td>Wilson</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iredell</td>
<td>Yadkin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jackson</td>
<td>Yancey</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johnston</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Watershed Characteristics

On the Watershed Characteristics worksheet users enter all information pertaining to the site of interest, including both pre- and post-developed conditions. General development information is entered in the upper section of the worksheet (shown in Figure 4).

**Figure 4. General development information section of Watershed Characteristics worksheet.**

- **Physiographic/Geologic Region (required):** This is the physiographic region in which the site is located. Select the appropriate region from the drop-down menu. Regions to select from include: CAMA (coastal area management act), Coastal, Sandhills, Piedmont, Triassic Basin, and Mountains. Users may reference Figure 2 or Table 1 (both located in the Instructions worksheet) to determine the appropriate physiographic region. The region of a site dictates the volume reduction capabilities of BMPs.

- **Hydrologic Soil Group (required):** The hydrologic soil group (HSG) is the predominant type of soil located on the site. Select the appropriate HSG (A, B, C or D) from the drop-down menu. Users may use on-site soil tests or soil maps to determine the appropriate HSG; however, one must be careful that the HSG does not vary throughout the site and truth-checking soil maps is highly encouraged (sometimes required). The HSG is a reference for regulators to make sure the selected BMPs are acceptable for the given HSG.

- **Precipitation Location (required):** Users should select a location from the drop-down menu that most closely represents the rainfall patterns of the site. Note that this may not necessarily be the closest location to the site. Figure 3 shows trends for North Carolina regarding average annual rainfall depths and can be used to choose the most appropriate precipitation location. The location selected is used to determine stormwater runoff volumes for the site.

- **Total Development Area (required):** Enter the total number of square feet comprising the site to be analyzed. It is important that this value equal the sum of all areas entered in the pre- and post-development land use columns. In the event that these values do not match, a warning will appear at the bottom of the worksheet alerting the user of this fact.

- **Development Name (optional):** The name assigned to the site/development to be analyzed. This name will appear on the summary sheet with the JLSLAT outputs.

- **Model Prepared By (optional):** The name of the person using the JLSLAT for a site/development. This name will appear on the summary sheet with the JLSLAT outputs.

The lower section of the Watershed Characteristics worksheet (Figure 5) is where users enter land use data for pre- and post-development conditions.
Figure 5. Section of Watershed Characteristics worksheet where pre- and post-development land use areas are entered.

Users may enter land use information in two sections: Non-residential land uses (Column 1) and residential land uses (Column 2). Land uses associated with commercial, industrial, or transportation categories are listed on the left of the screen, while land uses associated with the residential category are found on the right of the screen. Miscellaneous pervious land uses, as well as land that is taken up by BMPs, are also listed in the non-residential section of this worksheet. Land areas designated to BMPs, whether they exist in pre-development conditions, or whether they will be incorporated with the development, should be entered in the “Land Taken Up By BMPs” category. Natural wetlands, riparian buffers and open water (dubbed “Jurisdictional Land Uses”) are included in the model; however, these land uses are not considered in the runoff volume or concentration calculations, nor may they be treated by BMPs.

| Land area values do not have to be entered in only one of the columns – they may be mixed among the two columns if necessary. |

Users should enter the total area within the site/development for each type of land use. This should be done for both pre- and post-development conditions. If a particular land use is not present on the site, the cells may be left blank or a zero may be entered. The TN EMC and TP EMC values listed beside each land use are the representative concentrations of total nitrogen (TN) and total phosphorus (TP) found in stormwater runoff leaving that particular land use. The methods used to establish percent impervious assignments and representative pollutant concentrations for individual land uses are discussed in Part II of this document. The percent impervious value for the driveway land use is adjustable. This value defaults to 1 (100% impervious); however uses may adjust this in the gray-shaded cell in the “Age of Development” column. Note that the percent impervious value entered must be validated and may or may not be accepted by the reviewing agency.

It is important that the areas entered for both the pre- and post-development condition sum to equal the “Total Development Area” entered in the upper section of the Watershed Characteristics worksheet. A chart displaying the totals for each of these values is located below Column 1 (“Land Use Area Check”). If these values do not equal each other, a warning will be displayed below Column 2 to alert the user that there is a discrepancy.
Residential Land Uses. There are two options for entering land use information for residential sites. The first option is entering area values in Part A of Column 2. This section gives several lot size options, including ¼-, ⅛-, ½-, 1- and 2-acre lots, as well as multi-family and townhome lots. If the site conforms to one of these specific lot sizes, the appropriate area may be entered in the gray-shaded cells next to the appropriate land use. Average percent impervious values and representative TN and TP concentrations for these lot sizes are built in to the JLSLAT. The method by which these values were determined is discussed in Part II of this document.

If the site’s lot sizes fall between the given lot sizes, users may use the “Custom Lot Size” option. To do so, the user will enter the lot size for the development in the gray-shaded cell in the “Custom Lot Size” column. This value must fall between ¼ acre and 2 acres, as the JLSLAT linearly interpolates the percent imperviousness and representative pollutant concentrations from the given lot sizes. If the values fall outside this range, or the user prefers (or is required) to report individual residential land uses within a development, Part B of Column 2 should be used. Part B lists out all types of land uses that may be found within a residential area and allows the user to enter the total number of acres of each land use present for the site of interest.

To avoid inaccurate results, do NOT list out individual land uses in Part B within an area already described by lot size in Part A.

When using Part A of Column 2 to enter land use area information, users must specify the age of the development in the column labeled “Age of Development”. It is expected that the majority of developments analyzed with the JLSLAT will be new developments; however, should the JLSLAT be applied to existing developments, users have the option of choosing an age of “Before 1995” and “After 1995”. For new developments, users should select “New”. Results will not be displayed if a development age is not selected.

Users may clear all entries by clicking the “Clear All Values” button at the top of the worksheet. The other buttons – “Return to Instructions”, “Proceed to BMP Characteristics” and “Skip to Summary Page” – allow users to navigate among the different worksheets. In order for the “Clear All Values” button to work, macros MUST be enabled. An additional note regarding the “Clear All Values” button: When using the Client and Master files, clicking the “Clear All Values” button in the Master file will only clear values that were entered in the Master file in addition to those values carried over from the Client file. All values that were entered in the Client file (and thus carried over to the Master file) will remain. To clear these values, the user must click the “Clear All Values” button in the Client file. To avoid confusion, it is best to work entirely within the Client File. It is unnecessary to perform any actions within the Master file.

BMP Characteristics

All details pertaining to the BMPs that will be used to treat runoff from the development are entered in the BMP Characteristics worksheet. Users may divide the development into as many as 6 catchments, and each catchment may be treated with up to 3 BMPs.

BMPs are selected by clicking on the appropriate cell in the row of the worksheet labeled “BMP Type” (indicated by an arrow in Figure 6). After clicking on the cell, an arrow will appear on the right side of the cell. Click this arrow and a dropdown menu will appear with the available BMP choices: Bioretention
with IWS (Internal Water Storage Zone), Bioretention without IWS, Dry Detention Pond, Grassed Swale, Green Roof, Level Spreader/Filter Strip, Permeable Pavement, Sand Filter, Water Harvesting, Wet Detention Pond, and Wetland. Click on the appropriate BMP. To clear a BMP choice, either click on the cell and press the ‘delete’ key, or select the blank row in the dropdown menu.

**If more than 1 BMP is assigned to a single catchment, the BMPs are assumed to operate in series (i.e. the outflow from BMP 1 flows into BMP 2, etc.)**

The JLSLAT allows the user to designate additional drainage areas for the second and third BMP in the series. If additional drainage area was designated for BMP 2 of the series, BMP 2 would treat not only the outflow from BMP 1, but also the runoff from the designated drainage area. To designate this additional drainage area, simply enter the square footage for each type of land use within the area in the column for BMP 2 (more details on how to specify land uses within BMP drainage areas will be provided later in this section).

![Figure 6. Section of the BMP Characteristics worksheet where information regarding type of BMP, undersizing/oversizing and catchment routing is entered.](image)

**Undersized BMPs.** The JLSLAT allows for BMPs to be undersized to a minimum of 50% of the size required to treat the water quality event. When a BMP is undersized, the volume reduction provided by the BMP is reduced using a 1:1 ratio (i.e. if the BMP size required to treat the water quality event is reduced by 40%, the assigned volume reduction will be reduced by 40%). However, the median effluent concentrations assigned to the BMP remain the same. To specify that a BMP is undersized, the user should enter the BMP’s size relative to the design size required to capture the designated water quality depth in decimal form (i.e. 75% of required design size = 0.75) in the appropriate row of the worksheet (circled in Figure 6). **(While the tool provides the option of undersizing BMPs, this option cannot currently be used to meet the Jordan New Development requirements. This option may potentially be used if the tool is used to calculate nutrient reductions for retrofits on existing development – check with DWQ.)**
Oversized BMP. The JLSLAT does not include a direct method of oversizing BMPs; however, users can model oversized BMPs. To do so, users must enter two BMPs of the same type in series (the outflow from the first BMP flows into the second BMP). The BMP type should be that of the BMP the user wishes to oversize. The percent by which the user wishes to oversize the BMP should be added to 100%, then divided by 2. This value will be entered in the same row that undersized values are entered (circled in Figure 6) for both BMPs. For example, if a BMP was to be 50% greater than the size required to treat the water quality depth, it would be a total of 150% of the design size. Divide this value by 2, and the two BMPs in series would be assigned an ‘undersized’ value of 0.75 each.

Catchment Routing. Any catchment within the development may be routed to any other BMP or catchment. The section in which this information is entered is highlighted by a box in Figure 6. To indicate that a BMP is accepting the outflow from another catchment, select “yes” from the dropdown menu in the cell corresponding to the BMP that is accepting the outflow. For example, if BMP 2 of Catchment 1 is accepting the outflow from Catchment 3, the cell corresponding with the column for BMP 2 of Catchment 1 and the row for Catchment 3 should be changed to display “yes” instead of “no”. To route one catchment to another catchment, simply route the catchment outflow to the first BMP within the catchment accepting the outflow.

Water Harvesting BMP. Water harvesting is a BMP given as an option within the JLSLAT. Users must enter a volume reduction for the water harvesting BMP in the appropriate row within the BMP Characteristics worksheet. This is the volume reduction used to calculate volume and nutrient outputs from the system. It is important to note that the water harvesting BMP is NOT modeled as a catch-and-release system in the JLSLAT; it is assumed that volumes reduced by the system are NOT released to the stormwater network. It is up to the developer to prove that this is in fact the case and that the reported volume reduction is accurate.

To aid with the selection of BMPs, a table (“BMP Details”) is located at the top of the worksheet and displays the volume reduction and median effluent concentrations for each type of BMP for the physiographic region indicated in the Watershed Characteristics page. (Note the values will change if the region is changed.) Figure 7 shows this table with the Coastal physiographic region as the selected region. Users may use this table to determine which types of BMPs would provide the most treatment for their development. As permeable pavement, green roofs and water harvesting BMPs are not assigned a nutrient removal credit, their effluent concentrations default to the value of the land use they are replacing (parking lot, roof, etc.). (Water harvesting, permeable pavement and green roofs may not currently be used for meeting nutrient reduction requirements in the Jordan Lake watershed. Please check with the Division and the Division’s Stormwater BMP Manual for applicability details.)
Figure 7. “BMP Details” table displaying values for the Piedmont physiographic region (blank cells indicate 0% volume reduction).

The lower portion of the BMP Characteristics worksheet (Figure 8) allows the user to define the watershed draining to each BMP. The user should enter the total area of each land use type that drains to each BMP in the appropriate column. **Note that when entering residential land use information the user MUST be sure to enter the land area values in the appropriate row for the age of the development (New, Before 1995 and After 1995 ages are listed out separately, unlike the Watershed Characteristics worksheet).** The size of the BMP itself should be entered in the very last land use row – “Land taken up by BMP” – as all of the rainfall that falls on the BMP enters the BMP.

<table>
<thead>
<tr>
<th>BMP</th>
<th>Volume Reduction (%)</th>
<th>TN Effluent Conc. (mg/L)</th>
<th>TP Effluent Conc. (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioretention with IWS</td>
<td>50%</td>
<td>0.95</td>
<td>0.12</td>
</tr>
<tr>
<td>Bioretention without IWS</td>
<td>35%</td>
<td>1.00</td>
<td>0.12</td>
</tr>
<tr>
<td>Dry Detention Pond</td>
<td></td>
<td>1.20</td>
<td>0.20</td>
</tr>
<tr>
<td>Grassed Swale</td>
<td></td>
<td>1.21</td>
<td>0.26</td>
</tr>
<tr>
<td>Green Roof</td>
<td>50%</td>
<td>1.08</td>
<td>0.15</td>
</tr>
<tr>
<td>Level Spreader, Filter Strip</td>
<td>40%</td>
<td>1.20</td>
<td>0.15</td>
</tr>
<tr>
<td>Permeable Pavement*</td>
<td></td>
<td>1.44</td>
<td>0.39</td>
</tr>
<tr>
<td>Sand Filter</td>
<td>5%</td>
<td>0.92</td>
<td>0.14</td>
</tr>
<tr>
<td>Water Harvesting</td>
<td>user defined</td>
<td>1.08</td>
<td>0.15</td>
</tr>
<tr>
<td>Wet Detention Pond</td>
<td>10%</td>
<td>1.01</td>
<td>0.11</td>
</tr>
<tr>
<td>Wetland</td>
<td>20%</td>
<td>1.08</td>
<td>0.12</td>
</tr>
</tbody>
</table>

*If treating commercial parking lot, TP effluent concentration = 0.16 mg/L.

To ensure this is the case, there is a built-in check in the worksheet. If the user enters a value that exceeds the total available area of that particular land use, the model displays an error message. **However, in order for this check to function, users must press the “Enter” key on the keyboard after entering the land use area; clicking on a different cell will NOT trigger the check to occur.**

The two columns to the right of the Catchment 6 area show the user how many acres of a given land use are available and how many are currently being treated. The two rows below the grey-shaded cells shows how many total acres are being treated by each BMP as well as by the series. **Remember that entering land areas for BMPs 2 or 3 in a series indicate that the BMP is accepting runoff from this area IN ADDITION TO the outflow from the previous BMP.** Not all of the watershed must be treated by a BMP; the Jordan Lake Nutrient Strategy requirements will dictate how much treatment needs to be included.

Two other checks have been incorporated into the BMP Characteristics worksheet. The first displays a warning message if a BMP is specified but there are no land areas entered. This prevents the user from inadvertently erasing land use areas and forgetting to the clear the BMP selection. The second warning is displayed if a BMP has not been selected but another catchment is being routed to it. Again, this is in
In case the user forgets to clear the catchment routing after a BMP is removed. To clear all entries in this worksheet, both land areas as well as catchment routing and BMPs, click the “Clear All Values” button at the top of the worksheet. **In order for the “Clear All Values” button to work macros, MUST be enabled.**

<table>
<thead>
<tr>
<th>Drainage Area Land Use</th>
<th>CATCHMENT 1</th>
<th>CATCHMENT 2</th>
<th>CATCHMENT 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BMP #1 Area treated by BMP (ft²)</td>
<td>BMP #2 Area treated by BMP #1 (ft²)</td>
<td>BMP #3 Area treated by BMP #1 or #2 (ft²)</td>
</tr>
<tr>
<td></td>
<td>BMP #1 Area treated by BMP (ft²)</td>
<td>BMP #2 Area treated by BMP #1 (ft²)</td>
<td>BMP #3 Area treated by BMP #1 or #2 (ft²)</td>
</tr>
<tr>
<td>COMMERCIAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking lot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roof</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open/Landscaped</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INDUSTRIAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking lot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roof</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open/Landscaped</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRANSPORTATION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Density (interstate, main)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Density (secondary, feeder)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sidewalk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MISC. PERVIOUS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managed perxious</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unmanaged (pasture)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RESIDENTIAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-ac lots (New)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-ac lots (Built after 1955)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-ac lots (New)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-ac lots (Built after 1955)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>½-ac lots (New)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>½-ac lots (Built after 1995)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾-ac lots (New)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾-ac lots (Built after 1995)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾-ac lots (New)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾-ac lots (Built after 1995)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾-ac lots (New)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾-ac lots (Built after 1995)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾-ac lots (New)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾-ac lots (Built after 1995)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾-ac lots (New)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾-ac lots (Built after 1995)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾-ac lots (New)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾-ac lots (Built after 1995)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Townhomes (New)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Townhomes (Built after 1995)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-family (New)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-family (Built after 1995)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-family (Built before 1995)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Custom Lot Size (New)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Custom Lot Size (Built after 1995)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roadway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driveway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking lot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roof</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sidewalk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lawn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managed perxious</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAND TAKEN UP BY BMP</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Figure 8. Section of the BMP Characteristics worksheet where information regarding land use of BMP drainage area(s) is entered.**
Development Summary
The final worksheet in the JLSLAT is the Development Summary; it displays all outputs for the development of interest. The worksheet is separated into 2 sections: Watershed Summary and BMP Summary.

Watershed Summary. The Watershed Summary section (Figure 9) displays outputs for ‘pre-development’ and ‘post-development’ conditions, as well as ‘post-development’ conditions with BMPs incorporated. These outputs include percent impervious, annual runoff volume, TN median effluent concentration, TN loading rate, TP median effluent concentration and TP loading rate. Values reported for the ‘post-development with BMPs’ condition account for portions of the watershed not treated by BMPs. The Documentation portion of this document explains how each of these values are calculated. The watershed TN and TP loading values are those that correspond with the required target loading rates set forth by the Jordan Lake Nutrient Strategy.

The lower portion of the Watershed Summary section reports percent differences between the various watershed conditions, including ‘pre-development’ and ‘post-development’ without BMP incorporation, ‘pre-development’ and ‘post-development’ with BMP incorporation, and ‘post-development’ without BMPs, and ‘post-development with BMPs’.

<table>
<thead>
<tr>
<th>REGION:</th>
<th>Pre-Dev.</th>
<th>Post-Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL DEVELOPMENT AREA (ft²):</td>
<td>1,883,320</td>
<td></td>
</tr>
<tr>
<td>Percent Impervious [%]</td>
<td>2.2%</td>
<td>21.0%</td>
</tr>
<tr>
<td>Annual Runoff Volume (c.f.)</td>
<td>375,361</td>
<td>1,385,321</td>
</tr>
<tr>
<td>Total Nitrogen EMC (mg/L)</td>
<td>2.93</td>
<td>1.88</td>
</tr>
<tr>
<td>Total Nitrogen Loading (lb/acre)</td>
<td>1.93</td>
<td>4.72</td>
</tr>
<tr>
<td>Total Phosphorus EMC (mg/L)</td>
<td>1.01</td>
<td>0.42</td>
</tr>
<tr>
<td>Total Phosphorus Loading (lb/acre)</td>
<td>0.74</td>
<td>1.06</td>
</tr>
</tbody>
</table>

Percent Difference Between:

<table>
<thead>
<tr>
<th>Percent Impervious [%]</th>
<th>Pre-Dev. &amp; Post-Dev. without BMP's</th>
<th>Pre-Dev. &amp; Post-Dev. with BMP's</th>
<th>BMP's &amp; Post-Dev. with</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Impervious</td>
<td>18%</td>
<td>18%</td>
<td>0%</td>
</tr>
<tr>
<td>Annual Runoff Volume (c.f.)</td>
<td>364%</td>
<td>222%</td>
<td>-12%</td>
</tr>
<tr>
<td>Total Nitrogen EMC (mg/L)</td>
<td>-29%</td>
<td>-50%</td>
<td>-30%</td>
</tr>
<tr>
<td>Total Nitrogen Loading (lb/acre)</td>
<td>15%</td>
<td>12%</td>
<td>-54%</td>
</tr>
<tr>
<td>Total Phosphorus EMC (mg/L)</td>
<td>-58%</td>
<td>-75%</td>
<td>-36%</td>
</tr>
<tr>
<td>Total Phosphorus Loading (lb/acre)</td>
<td>44%</td>
<td>-58%</td>
<td>-79%</td>
</tr>
</tbody>
</table>

*Negative percent difference values indicate a decrease in runoff volume, pollutant concentration or pollutant loading. Positive values indicate an increase.*

Figure 9. Watershed Summary section of the Development Summary worksheet.

BMP Summary. The BMP Summary section of the Development Summary (Figure 10) worksheet displays information regarding the BMPs treating the development. The total area treated by each BMP includes the area treated by previous BMPs in the series, as well as additional area draining to the BMP itself. The inflow volume is the total amount of water flowing into the BMP. The percent volume reduction is the volume reduction potential assigned to the BMP types within the specified physiographic region (the same value displayed in Figure 7). The inflow concentrations and loadings for TN and TP are displayed
for each BMP. Additionally, outflow loadings for TN and TP are also displayed for each BMP. Details on how these are calculated may be found in the Documentation portion of this document.

<table>
<thead>
<tr>
<th>CATCHMENT 1</th>
<th>CATCHMENT 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMP 1</td>
<td>BMP 2</td>
</tr>
<tr>
<td>Grassed Swale</td>
<td>Bioretention with IWS</td>
</tr>
<tr>
<td>Total Area Treated [ac]</td>
<td>2.00</td>
</tr>
<tr>
<td>Total Inflow Volume [c.f.]</td>
<td>339,814</td>
</tr>
<tr>
<td>Percent Volume Reduced [%]</td>
<td>0%</td>
</tr>
<tr>
<td>Inflow Nitrogen EMC [mg/L]</td>
<td>1.40</td>
</tr>
<tr>
<td>Total Inflow Nitrogen [lb/yr]</td>
<td>13.98</td>
</tr>
<tr>
<td>Inflow Phosphorus EMC [mg/L]</td>
<td>0.520</td>
</tr>
<tr>
<td>Total Inflow Phosphorus [lb/yr]</td>
<td>5.15</td>
</tr>
<tr>
<td>BMP Outflow Nitrogen [lb/yr]</td>
<td>12.05</td>
</tr>
<tr>
<td>BMP Outflow Phosphorus [lb/yr]</td>
<td>2.57</td>
</tr>
<tr>
<td>Catchment Outflow Nitrogen EMC [mg/L]</td>
<td>1.00</td>
</tr>
<tr>
<td>Catchment Outflow Total Nitrogen [lb/yr]</td>
<td>4.99</td>
</tr>
<tr>
<td>Percent Reduction in Nitrogen Load [%]</td>
<td>62%</td>
</tr>
<tr>
<td>Catchment Outflow Phosphorus EMC [mg/L]</td>
<td>0.148</td>
</tr>
<tr>
<td>Catchment Outflow Total Phosphorus [lb/yr]</td>
<td>0.735</td>
</tr>
<tr>
<td>Percent Reduction in Phosphorus Load [%]</td>
<td>88%</td>
</tr>
</tbody>
</table>

Figure 10. BMP Summary section of the Development Summary worksheet.

This section of the worksheet also displays outflow data for each catchment. These data include outflow concentrations, loadings and percent reductions for TN and TP for each catchment. The last BMP in each of the series releases water of this quality and these values account for any catchment routing that is specified in the BMP Characteristics tabs. Note that these values are NOT the watershed outflow values – these are only pertinent to the outflow leaving each catchment treated by BMPs. Overall watershed outflow information is displayed in the Watershed Summary section of the Development Summary worksheet under the ‘post-development with BMPs’ condition.

The buttons to the right of the Watershed Summary tables allow the user to navigate among the various worksheets, as well as print the Development Summary worksheet. The “Print Summary” button, when clicked, will print the Watershed Summary portion of the worksheet on page 1 and the BMP Summary portion of the worksheet on page 2. Note that the button will only print to the default printer. Macros MUST be enabled for this button to work.
II. Model Documentation

Governing Principles and Limitations
Calculations performed within the model are governed by two basic principles: Simple Method (for runoff volume and pollutant loading calculations) and the median effluent concentration BMP efficiency metric (for BMP reduction calculations). Each of these principles is described below.

Simple Method
The Simple Method is a method for estimating the volume of stormwater runoff and the pollutant load exported within that runoff leaving a small urban catchment. Volume calculations are based upon impervious cover of a catchment, which is represented by the runoff coefficient $R_v$:

$$ R_v = 0.05 + (0.009 \times I) \quad (1) $$

where $R_v$ = Simple Method runoff coefficient; and
$I$ = percent impervious cover of the catchment (%).

The volume is a function of the runoff coefficient, $R_v$, the area of the catchment and the annual rainfall amount. Some variations of the Simple Method are applied on an individual storm basis, in which case the precipitation value would be the depth of rainfall that one wishes to estimate runoff for. For JLSLAT applications, annual precipitation values are used.

$$ V = R_v \times A \times (P/12) \quad (2) $$

where $V$ = volume of runoff (ft$^3$),
$A$ = area of catchment (ft$^2$), and
$P$ = average annual rainfall depth (in).

To estimate the mass of pollutant that leaves the catchment on an annual basis, Equation 3 is used.

$$ L = (P \times P_j \times R_v) \div (12 \times C \times A \times 2.72) \quad (3) $$

where $L$ = average annual pollutant load (lbs),
$P_j$ = fraction of rainfall events that produce runoff, and
$C$ = event mean concentration of the pollutant (mg/L).

CWP, 2007 recommends a $P_j$ value of 0.9, indicating that 90% of rainfall events produce runoff. However, for the JLSLAT a value of 1.0 was used in order to provide a conservative estimate of the pollutant load leaving the site. The event mean concentrations used for certain land uses will be discussed in detail in the “Watershed Characteristics” section of this document.

Several assumptions/limitations accompany the Simple Method (taken from CWP, 2007):

1. The Simple Method should be used on catchments with areas of 1 square mile (640 acres) or less; and
2. The Simple Method only estimates pollutants loads leaving the catchment via stormwater runoff.
Determining Representative Pollutant Concentrations for Various Types of Land Uses

A literature review was conducted to establish representative pollutant concentrations for various land use types. Only peer-reviewed literature was considered in this endeavor; however, geographic limitations were not imposed. Only data that were reported for the specific land use of interest (i.e. not multi-use watersheds) were used. If multiple data were available, the average of the data was taken as the representative pollutant concentration (unless otherwise noted). Table 2 displays the representative TN and TP concentration values for various land uses, as well as the references from which the values were derived. Raw data from individual studies used to compute these values may be found in Appendix A.

Determining Percent Imperviousness for Various Residential Lot Sizes

This section was compiled by the Center for Watershed Protection, Inc. (the Center) and presents the methodology for identifying types of impervious cover (IC) in suburban residential land uses. The polygons used in this study were suburban in nature and most of the development was constructed after 1970 and before 2001. Although these estimates were developed using data from the Chesapeake Bay region, it is assumed that these numbers provide a reasonable estimate suburban development trends that can be transferred to other regions outside this watershed. However, the IC estimates presented herein apply to recent suburban development, and may not be transferrable to ultra-urban or older development areas.

Using GIS data from Baltimore County (MD), Howard County (MD), James City County (VA), and Lancaster County, (PA), the Center analyzed IC coefficients for single family residential suburban land uses. Homogenous land use polygons were analyzed using Geographic Information Systems (GIS) data. Land use polygons were defined using the descriptions presented in Table 3.

The following criteria were used to select single family residential polygons for analysis:

- For residential land uses, the parcel boundary information was used to first classify parcels based on acreage (shown in the description in Table 3). Development patterns that most closely matched the land use category (e.g., ¼ acre lots) were selected for sampling. Because most subdivisions do not have uniform lot sizes, subdivisions were selected if the majority of lots or average lot size met the general criteria for the land use category.
- Because of difficulty in finding subdivisions that met the above criteria for polygon delineation, no minimum area was set for the polygon size for residential areas. Instead, it was decided that each residential polygon must include a minimum of 5 lots.
- Polygons were drawn by following the lot lines of contiguous parcels and excluding areas of “unbuildable” land located in the interior of the polygon. Stream valleys that did not originate within the subdivision were excluded from the land use polygons, as were other “unbuildable” lands such as floodplains, wetlands, and conservation areas. The basis behind this rule is that not all development sites include these types of characteristics. When predicting future impervious cover, a planner could estimate the areas based on existing mapping and based on local codes and ordinances that determine “unbuildable” acreage. This acreage could then be removed from the total acreage of the planning area.
- Stormwater ponds and open water were not considered to be impervious cover because they are generally small in area and are not always associated with a single land use. While water surfaces do act as impervious surfaces in a hydrologic sense, they do not generally have similar consequences on stream quality, watershed health, or pollutant loading as more conventional impervious cover such as roads, parking lots, and rooftops.
Table 2. Representative TN and TP concentrations for various land uses.

<table>
<thead>
<tr>
<th>Land Use Type</th>
<th>TN (mg/L)</th>
<th>TP (mg/L)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residential</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driveway</td>
<td>1.44</td>
<td>0.39</td>
<td>Passeport et al. (2009) (using industrial values)</td>
</tr>
<tr>
<td>Roof</td>
<td>1.08**</td>
<td>0.15*</td>
<td>*Moran (2004) and Bannerman (1993) **Moran (2004)</td>
</tr>
<tr>
<td>Lawn</td>
<td>2.24</td>
<td>0.44</td>
<td>Skipper (2008) and NCDENR Tar-Pam Model</td>
</tr>
<tr>
<td><strong>Commercial/Ultra-Urban</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking lot</td>
<td>1.44**</td>
<td>0.16*</td>
<td>*Bannerman (1993) and Passeport et al. (2009); **Passeport et al. (2009)</td>
</tr>
<tr>
<td>Roof</td>
<td>1.08**</td>
<td>0.15*</td>
<td>*Moran (2004) and Bannerman (1993), **Moran (2004)</td>
</tr>
<tr>
<td>Open/Landscaped</td>
<td>2.24</td>
<td>0.44</td>
<td>Skipper (2008) and NCDENR Tar-Pam Model</td>
</tr>
<tr>
<td><strong>Industrial</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking lot</td>
<td>1.44**</td>
<td>0.39*</td>
<td>*Bannerman (1993); **Passeport et al. (2009)</td>
</tr>
<tr>
<td>Roof</td>
<td>1.08**</td>
<td>0.15*</td>
<td>*Moran (2004) and Bannerman (1993), **Moran (2004)</td>
</tr>
<tr>
<td>Open/Landscaped</td>
<td>2.24</td>
<td>0.44</td>
<td>Skipper (2008) and NCDENR Tar-Pam Model</td>
</tr>
<tr>
<td><strong>Transportation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High density (interstate, main)</td>
<td>3.67</td>
<td>0.43</td>
<td>Wu et al. (1998), urban</td>
</tr>
<tr>
<td>Low density (secondary, feeder)</td>
<td>1.40</td>
<td>0.52</td>
<td>Wu et al. (1998), semi-urban</td>
</tr>
<tr>
<td>Rural</td>
<td>1.14</td>
<td>0.47</td>
<td>Wu et al. (1998), rural</td>
</tr>
<tr>
<td>Sidewalks</td>
<td>1.43**</td>
<td>1.16*</td>
<td>*Bannerman (1993); Passport et al. (2009)</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woods</td>
<td>1.47</td>
<td>0.25</td>
<td>Line et al. (2002) median</td>
</tr>
<tr>
<td>Maintained grass</td>
<td>3.06</td>
<td>0.59</td>
<td>Skipper (2008)</td>
</tr>
<tr>
<td>Pasture</td>
<td>3.61</td>
<td>1.56</td>
<td>Line et al. (2002) median</td>
</tr>
</tbody>
</table>
Table 3. Land Use Categories and Descriptions

<table>
<thead>
<tr>
<th>Residential Land Use</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Acre Lots</td>
<td>Lot size ranges from 1.70 to 2.30 acres</td>
</tr>
<tr>
<td>1 Acre Lots</td>
<td>Lot size ranges from 0.75 to 1.25 acres</td>
</tr>
<tr>
<td>1/2 Acre Lots</td>
<td>Lot size ranges from 0.40 to 0.60 acres</td>
</tr>
<tr>
<td>1/4 Acre Lots</td>
<td>Lot size ranges from 0.20 to 0.30 acres</td>
</tr>
<tr>
<td>1/8 Acre Lots</td>
<td>Lot size ranges from 0.10 to 0.16 acres, includes duplexes</td>
</tr>
<tr>
<td>Townhomes</td>
<td>5-10 units/acre, attached single family units that include a lot area</td>
</tr>
<tr>
<td>Multifamily</td>
<td>10-20 units/acre, residential condominiums and apartments with no lot area associated with the units</td>
</tr>
</tbody>
</table>

Once a development area was selected, the criteria used to delineate the polygons were generally as follows:

- Parcel lines were used as guides for drawing the polygon boundaries.
- “Unbuildable” land such as floodplains, steep slopes, and conservation areas were not included in the polygons.
- Subdivision lots that were not built out were not included in the polygons.
- Large forested areas located outside parcel boundaries were not included in the polygons.
- Local and arterial roads were included in the polygons if the parcels bordering each side of the road had the same land use.
- If a local or arterial road bordering a parcel had a different land use bordering the other side of the road, only half the road was included in the polygon. Interstate and state highways were not included in the polygons.
- Parcel data such as a business or owner name was used to verify land use.
- Orthophotos were also used to verify land use.

A direct measurement technique was used to assess the IC for each land use polygon. This involved clipping planimetric IC layers (e.g., buildings, roads, parking lots) to the land use polygons using GIS. For IC types not available as planimetric data (e.g., sidewalks, driveways), the following major assumptions were made:

**Other Impervious Surfaces**
Orthophotos were used to digitize an impervious cover layer that included tennis courts, garages, and other impervious surfaces not included in the buildings, parking lots, roads, driveways, or sidewalks layers. This layer was included in the processing and calculation of total impervious cover.

**Sidewalk Estimation**
Sidewalks were identified only as lines in the GIS layers, so orthophotos were used to measure the length of sidewalks in each polygon, which was then multiplied by 4 feet (assumed sidewalk width). The resulting numbers were added to the data table for calculation of total impervious cover.
Driveway Estimation

Driveway data was not available so GIS orthophotos were used to determine an average driveway size for each polygon, which was then multiplied by the number of homes within the polygon. The resulting numbers were added to data table for calculation of total impervious cover.

Results for each land use polygon were used to compute an average IC by type for various suburban residential land uses. More detailed information on the sampling protocol and impervious cover measurement can be found in Cappiella and Brown, 2001.

The current zoning code classifications for the City of Durham, NC are shown in Table 4. The information in this table can be used to guide the application of the IC coefficients to residential zoning classifications in North Carolina.

Table 4. Zoning Classifications for Durham, NC (City of Durham, N.C.)

<table>
<thead>
<tr>
<th>Durham Zoning Code</th>
<th>Minimum Lot Area (square feet)</th>
<th>Minimum Lot Area (acre)</th>
<th>Equivalent Land Use from Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-20</td>
<td>20,000</td>
<td>0.46</td>
<td>1/2 ac</td>
</tr>
<tr>
<td>R-15</td>
<td>15,000</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td>R-10</td>
<td>10,000</td>
<td>0.23</td>
<td>1/4 ac</td>
</tr>
<tr>
<td>R-8</td>
<td>8,000</td>
<td>0.18</td>
<td></td>
</tr>
<tr>
<td>R-5</td>
<td>5,000</td>
<td>0.11</td>
<td>1/8 ac</td>
</tr>
<tr>
<td>R-3</td>
<td>3,000</td>
<td>0.07</td>
<td></td>
</tr>
</tbody>
</table>

The results of the analysis are presented in Table 5. For single family residential categories, driveways consistently made up about 4% of the polygon area, while roads and buildings comprised an equal percentage that progressively increased with development density. Sidewalks in residential areas composed from <1% to 2% of the polygon area, and this number also increased with development density.

Table 5. Results of the IC Analysis by Land Use and Type of IC

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Number of Polygons</th>
<th>Total % IC</th>
<th>% Roads</th>
<th>% Buildings</th>
<th>% Parking</th>
<th>% Driveways</th>
<th>% Sidewalks</th>
<th>% Other Impervious</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Acre Lots</td>
<td>12</td>
<td>10.6%</td>
<td>3.4%</td>
<td>3.3%</td>
<td>0.0%</td>
<td>3.8%</td>
<td>0.0%</td>
<td>0.1%</td>
</tr>
<tr>
<td>1 Acre Lots</td>
<td>23</td>
<td>14.3%</td>
<td>4.8%</td>
<td>5.1%</td>
<td>0.0%</td>
<td>4.1%</td>
<td>0.1%</td>
<td>0.2%</td>
</tr>
<tr>
<td>1/2 Acre Lots</td>
<td>20</td>
<td>21.2%</td>
<td>7.5%</td>
<td>7.9%</td>
<td>0.0%</td>
<td>4.4%</td>
<td>1.2%</td>
<td>0.2%</td>
</tr>
<tr>
<td>1/4 Acre Lots</td>
<td>23</td>
<td>27.8%</td>
<td>10.8%</td>
<td>11.0%</td>
<td>0.0%</td>
<td>4.4%</td>
<td>1.6%</td>
<td>0.1%</td>
</tr>
<tr>
<td>1/8 Acre Lots</td>
<td>10</td>
<td>32.6%</td>
<td>13.4%</td>
<td>12.2%</td>
<td>0.0%</td>
<td>4.7%</td>
<td>2.2%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Townhomes</td>
<td>20</td>
<td>40.9%</td>
<td>12.6%</td>
<td>16.4%</td>
<td>6.4%</td>
<td>2.1%</td>
<td>2.7%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Multifamily</td>
<td>18</td>
<td>44.4%</td>
<td>13.1%</td>
<td>15.9%</td>
<td>13.0%</td>
<td>0.0%</td>
<td>1.4%</td>
<td>1.0%</td>
</tr>
</tbody>
</table>
Determining Percent Imperviousness for Residential Lots of Various Ages

This section was compiled by the Center for Watershed Protection, Inc. (the Center) and presents the methodology for identifying impervious cover (IC) values in suburban residential land uses for a sampling of developments in four age ranges: developments built prior to 1995 (older than 15 years), developments built after 1995 (0-15 years old), developments built prior to 1985 (older than 25 years) and developments built after 1985 (0-25 years old).

The land use polygons used in this study were suburban in nature and most of the development was constructed after 1970 and before 2005. Although these estimates were developed using data from the Chesapeake Bay region, it is assumed that these numbers provide a reasonable estimate of suburban development trends that can be transferred to other regions outside this watershed. The IC estimates presented herein apply to relatively recent suburban development, and may not be transferrable to ultra-urban or older development areas.

Using GIS data from Frederick County, MD, the Center analyzed IC coefficients for single family residential suburban land uses. Homogenous land use polygons were analyzed using Geographic Information Systems (GIS) data. Land use polygons were defined using the descriptions presented in Table 6.

<table>
<thead>
<tr>
<th>Residential Land Use</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low Density Residential (VLDR)</td>
<td>Lot sizes greater than 1 acre (less than 1 dwelling unit per acre)</td>
</tr>
<tr>
<td>Low Density Residential (LDR)</td>
<td>Lot size ranges from 0.25 to 1 acre (1 to 4 dwelling units per acre)</td>
</tr>
<tr>
<td>Medium Density Residential (MDR)</td>
<td>Lot size ranges from 0.1 to 0.2 acres (5 to 10 dwelling units per acre)</td>
</tr>
<tr>
<td>High Density Residential (HDR)</td>
<td>Lot sizes less than 0.1 acre (greater than 10 dwelling units per acre)</td>
</tr>
</tbody>
</table>

The current zoning code classifications for the City of Durham, NC are shown in Table 7. The information in this table can be used to guide the application of the IC coefficients to residential zoning classifications in North Carolina.

<table>
<thead>
<tr>
<th>Durham Zoning Code</th>
<th>Minimum Lot Area (square feet)</th>
<th>Minimum Lot Area (acre)</th>
<th>Equivalent Land Use from This Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-20</td>
<td>20,000</td>
<td>0.46</td>
<td>LDR</td>
</tr>
<tr>
<td>R-15</td>
<td>15,000</td>
<td>0.34</td>
<td>LDR</td>
</tr>
<tr>
<td>R-10</td>
<td>10,000</td>
<td>0.23</td>
<td>LDR</td>
</tr>
<tr>
<td>R-8</td>
<td>8,000</td>
<td>0.18</td>
<td>MDR</td>
</tr>
<tr>
<td>R-5</td>
<td>5,000</td>
<td>0.11</td>
<td>MDR</td>
</tr>
<tr>
<td>R-3</td>
<td>3,000</td>
<td>0.07</td>
<td>HDR</td>
</tr>
</tbody>
</table>
The following criteria were used to select residential polygons for analysis:

- Residential polygons were selected at random by using a Random Number Generator in Excel to assign a numerical number to each subdivision in the County’s GIS data. The random selection process was limited to subdivisions built after 1973. Subdivisions were then analyzed in numerical order of the random numbers.

- For each subdivision, the parcel boundary information was used to first classify parcels based on acreage (shown in the description in Table 6). Development patterns that most closely matched the land use category (e.g., ¼ acre lots) were selected for sampling. Because most subdivisions do not have uniform lot sizes, subdivisions were selected if the majority of lots or average lot size met the general criteria for the land use category.

- Because of difficulty in finding subdivisions that met the above criteria for polygon delineation, no minimum area was set for the polygon size for residential areas. Instead, it was decided that each residential polygon must include a minimum of 5 lots unless it was in the very low density residential category.

- Stormwater ponds and open water and pools were not considered to be impervious cover because they are generally small in area and are not always associated with a single land use. While water surfaces do act as impervious surfaces in a hydrologic sense, they do not generally have similar consequences on stream quality, watershed health, or pollutant loading as more conventional impervious cover such as roads, parking lots, and rooftops.

Once a development area was selected, the following methods were used to delineate land use polygons:

- Residential polygons generally included individual lots as well as common land owned by the homeowner’s association or developer. The subdivision names in the County’s subdivision layer were used to determine which residential areas to include within a given land use polygon. Lots that were not yet built were not included as part of the subdivision.

- Interstate/state highways were not included in the polygons. Interior roads (e.g., subdivision roads) were included within the land use polygons. Local and arterial roads were included in the polygons if the parcels bordering each side of the road had the same land use. If a local or arterial road bordering a parcel had a different land use bordering the other side of the road, only half the road was included in the polygon.

- Sample polygons were drawn by following the lot lines of contiguous parcels.

- After delineating each polygon, the appropriate land use type (i.e., VLDR, LDR, MDR, or HDR) was assigned. The owner listed in the tax map data, as well as 2007 aerial photos supplied by the County were used to verify land use.

- The age range of each neighborhood (0-15 years, 0-25 years, older than 25 years or older than 15 years) was determined by using the build date in the County’s tax map data. Age range was assigned based on the most common build dates of the lots within each subdivision.

After the delineation of sample polygons, the following methods were used to determine impervious cover based on residential land use type and age:

- Impervious cover data was obtained from a 2007 planimetric layer provided by the County. This layer included impervious cover in the form of buildings, driveways, roads, sidewalks, and parking lots.

- The impervious cover data was intersected with the residential sample polygons to determine the total percentage of impervious cover on each polygon. These percentages were then analyzed by residential land use type and included the mean, median, minimum, maximum, first and third
quartiles, and standard deviation. The results are represented by box and whisker plots, as well as tables in the following section.

Results of the analysis are shown in Figure 11 below. For neighborhoods older than 15 years, median impervious cover coefficients were 7.2%, 20.2%, 30.3% and 36.0% for VLDR, LDR, MDR, and HDR, respectively (Figure 12, Table 8). For neighborhoods newer than 15 years, median impervious cover coefficients were 2.7%, 27.8%, 36.1% and 35.9% for VLDR, LDR, MDR, and HDR, respectively (Figure 13, Table 9). With the exception of the VLDR land use, median impervious cover coefficients were greater in developments newer than 15 years. It should be noted that the number of polygons for the developments newer than 15 years is relatively small, particularly for the LDR land use category.

![Figure 11. Median, 25% quartile (Q1), 75% quartile (Q3), minimum, and maximum values for neighborhoods older than 15 years.](image)

<table>
<thead>
<tr>
<th>Statistic</th>
<th>VLDR</th>
<th>LDR</th>
<th>MDR</th>
<th>HDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>3.4</td>
<td>16.2</td>
<td>26.6</td>
<td>32.1</td>
</tr>
<tr>
<td>Min</td>
<td>0.9</td>
<td>5.9</td>
<td>22.1</td>
<td>14.6</td>
</tr>
<tr>
<td>Median</td>
<td>7.2</td>
<td>20.2</td>
<td>30.3</td>
<td>36.0</td>
</tr>
<tr>
<td>Max</td>
<td>16.3</td>
<td>32.5</td>
<td>39.9</td>
<td>53.6</td>
</tr>
<tr>
<td>Q3</td>
<td>9.5</td>
<td>24.6</td>
<td>33.4</td>
<td>46.1</td>
</tr>
<tr>
<td>Mean</td>
<td>7.0</td>
<td>20.0</td>
<td>30.1</td>
<td>37.4</td>
</tr>
<tr>
<td>STD</td>
<td>3.9</td>
<td>7.6</td>
<td>5.3</td>
<td>9.9</td>
</tr>
<tr>
<td>n</td>
<td>61</td>
<td>19</td>
<td>14</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 8. Percent Impervious Cover for Neighborhoods Older than 15 Years
In order to increase the sample size for “newer” development, differences between IC values for neighborhoods newer and older than 25 years were also evaluated. For neighborhoods older than 25 years, median impervious cover coefficients were 8.7%, 16.3%, 30.0%, and 41.7% for VLDR, LDR, MDR, and HDR, respectively (Figure 14, Table 10). For neighborhoods newer than 25 years, median impervious cover coefficients were 4.1%, 23.2%, 32.3% and 35.9% for VLDR, LDR, MDR, and HDR, respectively (Figure 15, Table 11). For this analysis, median impervious cover coefficients for the LDR and MDR were greater in developments newer than 25 years. Median impervious cover coefficients for the VLDR and HDR were greater in developments older than 25 years.
Figure 13. Median, Q1, Q3, minimum, and maximum values for neighborhoods older than 25 years.

Table 10. Percent Impervious Cover for Neighborhoods Older than 25 Years

<table>
<thead>
<tr>
<th>Statistic</th>
<th>VLDR</th>
<th>LDR</th>
<th>MDR</th>
<th>HDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>5.4</td>
<td>12.2</td>
<td>26.6</td>
<td>33.9</td>
</tr>
<tr>
<td>Min</td>
<td>1.7</td>
<td>5.9</td>
<td>23.2</td>
<td>24.0</td>
</tr>
<tr>
<td>Median</td>
<td>8.7</td>
<td>16.3</td>
<td>30.0</td>
<td>41.7</td>
</tr>
<tr>
<td>Max</td>
<td>14.9</td>
<td>30.9</td>
<td>33.3</td>
<td>47.6</td>
</tr>
<tr>
<td>Q3</td>
<td>10.4</td>
<td>21.0</td>
<td>31.7</td>
<td>46.5</td>
</tr>
<tr>
<td>Mean</td>
<td>8.0</td>
<td>17.3</td>
<td>28.8</td>
<td>38.7</td>
</tr>
<tr>
<td>STD</td>
<td>3.4</td>
<td>7.9</td>
<td>5.2</td>
<td>9.8</td>
</tr>
<tr>
<td>n</td>
<td>30</td>
<td>9</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>
Table 11. Percent Impervious Cover for Neighborhoods Newer than 25 Years

<table>
<thead>
<tr>
<th>Statistic</th>
<th>VLDR</th>
<th>LDR</th>
<th>MDR</th>
<th>HDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>2.1</td>
<td>20.2</td>
<td>27.1</td>
<td>30.8</td>
</tr>
<tr>
<td>Min</td>
<td>0.9</td>
<td>7.5</td>
<td>22.1</td>
<td>14.6</td>
</tr>
<tr>
<td>Median</td>
<td>4.1</td>
<td>23.2</td>
<td>32.3</td>
<td>35.9</td>
</tr>
<tr>
<td>Max</td>
<td>16.3</td>
<td>32.5</td>
<td>41.5</td>
<td>53.6</td>
</tr>
<tr>
<td>Q3</td>
<td>7.8</td>
<td>27.6</td>
<td>36.4</td>
<td>41.5</td>
</tr>
<tr>
<td>Mean</td>
<td>5.4</td>
<td>23.3</td>
<td>31.7</td>
<td>35.5</td>
</tr>
<tr>
<td>STD</td>
<td>3.9</td>
<td>6.3</td>
<td>5.9</td>
<td>10.4</td>
</tr>
<tr>
<td>n</td>
<td>40</td>
<td>13</td>
<td>18</td>
<td>27</td>
</tr>
</tbody>
</table>

Based on changes in development patterns over the years, the results showed that older developments were likely to have lower IC than newer developments; however, this was only true for the MDR and LDR land use categories. This may be due in part to the range of ages sampled (nothing prior to 1970), or to changes made by Frederick County MD as a result of a Site Planning Roundtable in 2000, or the nature of the VLDR category (estate homes). Further analysis is needed to hypothesize the specific reason for the lack of IC increase for the newer VLDR and HDR land use categories.

The data provided by the Center for Watershed Protection regarding the breakdown of different types of impervious surfaces within residential land uses were used to calculate a composite pollutant concentration. The concentrations assigned to a specific land use, coupled with the percent of watershed comprised of that particular land use, allowed for a weighted average concentration to be calculated. These results are displayed in Table 12.
Table 12. Representative pollutant concentrations for residential land uses of various ages.

<table>
<thead>
<tr>
<th></th>
<th>After 1995</th>
<th>Before 1995</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TN</td>
<td>TP</td>
</tr>
<tr>
<td>2-ac lots</td>
<td>2.22</td>
<td>0.44</td>
</tr>
<tr>
<td>1-ac lots</td>
<td>2.12</td>
<td>0.43</td>
</tr>
<tr>
<td>½-ac lots</td>
<td>2.06</td>
<td>0.43</td>
</tr>
<tr>
<td>¼-ac lots</td>
<td>2.00</td>
<td>0.42</td>
</tr>
<tr>
<td>⅛-ac lots</td>
<td>1.98</td>
<td>0.43</td>
</tr>
<tr>
<td>Townhomes</td>
<td>1.94</td>
<td>0.42</td>
</tr>
<tr>
<td>Multi-family</td>
<td>1.92</td>
<td>0.41</td>
</tr>
</tbody>
</table>

**BMP Efficiency: Median Effluent Concentration Method**

There are several methods for quantifying the efficiency of a best management practice (BMP). The method used by the JLSLAT is based upon a median effluent concentration of a given pollutant for a given BMP. This value will vary based upon the pollutant and the type of BMP. The concentrations used for the JLSLAT application will be explained in detail in the “Watershed Characteristics” section of this document.

To apply this BMP efficiency method, one must know the volume of water flowing into a BMP, the inflow concentration of the pollutant of interest, the percent of inflow volume that leaves the BMP as treated outflow and untreated overflow, as well as the outflow pollutant concentration for both of these outflow components. Assumptions made regarding these variables for the JLSLAT are discussed in detail in the “Watershed Characteristics” section of this document. Equation 4 is used to calculate total mass of pollutant leaving the BMP and Equation 5 is used to calculate the percent mass removal by the BMP.

\[
\text{Mass}_{\text{out}} = (\text{EC}_{\text{outflow}} \times \text{Volume}_{\text{outflow}} \times 6.2297\varepsilon^{-5}) + (\text{EC}_{\text{overflow}} \times \text{Volume}_{\text{overflow}} \times 6.2297\varepsilon^{-5}) \quad (4)
\]

where \( \text{Mass}_{\text{out}} = \) average annual mass of pollutant leaving the BMP (lbs),
\( \text{EC}_{\text{outflow}} \) = event median concentration for treated outflow portion of outflow (mg/L),
\( \text{Volume}_{\text{outflow}} \) = volume of water leaving the BMP as treated outflow (\( \text{ft}^3 \)),
\( \text{EC}_{\text{overflow}} \) = event median concentration for untreated overflow portion of outflow (mg/L), and
\( \text{Volume}_{\text{overflow}} \) = volume of water leaving the BMP as untreated overflow (\( \text{ft}^3 \)).

\[
\text{BMP}_{\%\text{rem}} = \left( (\text{EC}_{\text{inflow}} \times \text{Volume}_{\text{inflow}} \times 6.2297\varepsilon^{-5}) - \text{Mass}_{\text{out}} \right) \div (\text{EC}_{\text{inflow}} \times \text{Volume}_{\text{inflow}} \times 6.2297\varepsilon^{-5}) \times 100 \quad (5)
\]

where \( \text{EC}_{\text{inflow}} \) = event median concentration for inflow (mg/L), and
\( \text{Volume}_{\text{inflow}} \) = volume of water entering the BMP (\( \text{ft}^3 \)).
There are some assumptions regarding this BMP efficiency metric:

1. The effluent concentration is the median value of the concentrations exiting the BMP. This metric does not take into account maximum or minimum concentrations and the representative EC does not vary with storm size or intensity.

2. This metric assumes the BMP is designed and constructed appropriately to capture and treat the first flush (1 inch for non-CAMA locations, 1.5 inch for CAMA locations).

3. The outflow EC is not dependent upon the inflow EC, nor the inflow volume or outflow volume.

4. Due to the nature of the metric, the pollutant removal is controlled primarily by the volume reduction provided by the BMP; thus, BMPs with higher volume reductions will have greater pollutant removal capabilities.

Determining BMP Median Effluent Concentrations

A literature review was conducted to establish representative effluent concentrations for the BMPs in the JLSLAT. Only peer-reviewed literature was considered in this endeavor and only studies conducted in the Mid-Atlantic states were used (Georgia, South Carolina, North Carolina, Virginia, Maryland). Outliers were excluded from data sets for each BMP type and the median of the reported effluent concentrations was calculated. Green roofs, permeable pavement, and water harvesting effluent values were assumed to be the same as the concentrations entering the BMP. These results are shown in Table 13.

Table 13. Median effluent concentrations assigned to BMPs.

<table>
<thead>
<tr>
<th>BMPs</th>
<th>TN EMC (mg/L)</th>
<th>TP EMC (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioretention with IWS</td>
<td>0.95</td>
<td>0.12</td>
</tr>
<tr>
<td>Bioretention without IWS</td>
<td>1.00</td>
<td>0.12</td>
</tr>
<tr>
<td>Dry Detention Pond</td>
<td>1.20</td>
<td>0.20</td>
</tr>
<tr>
<td>Grassed Swale</td>
<td>1.21</td>
<td>0.26</td>
</tr>
<tr>
<td>Green Roof</td>
<td>1.08</td>
<td>0.15</td>
</tr>
<tr>
<td>Level Spreader, Filter Strip</td>
<td>1.20</td>
<td>0.15</td>
</tr>
<tr>
<td>Permeable Pavement</td>
<td>1.44</td>
<td>0.39*</td>
</tr>
<tr>
<td>Sand Filter</td>
<td>0.92</td>
<td>0.14</td>
</tr>
<tr>
<td>Water Harvesting</td>
<td>1.08</td>
<td>0.15</td>
</tr>
<tr>
<td>Wet Detention Pond</td>
<td>1.01</td>
<td>0.11</td>
</tr>
<tr>
<td>Wetland</td>
<td>1.08</td>
<td>0.12</td>
</tr>
</tbody>
</table>

*If replacing commercial parking lot, value is 0.16 mg/L.

Volume reductions were an integral part of calculating effluent loads from a given BMP. The volume reduction values assigned to each BMP type varied based upon the physiographic region. These assignments are displayed in Table 14 and are expressed as percent of the inflow volume.
Table 14. Fate of BMP inflow in terms of treated outflow, overflow and loss via ET/infiltration.

<table>
<thead>
<tr>
<th>BMP Type</th>
<th>Treated Outflow (%)</th>
<th>Bypass (Overflow) (%)</th>
<th>Volume Reduction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAMA Region</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bioretention with IWS</td>
<td>10</td>
<td>10</td>
<td>80</td>
</tr>
<tr>
<td>Bioretention without IWS</td>
<td>40</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Dry Detention Pond</td>
<td>80</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Grassed Swale</td>
<td>90</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Green Roof</td>
<td>0</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Level Spreader, Filter Strip</td>
<td>45</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>Permeable Pavement</td>
<td>38</td>
<td>2</td>
<td>60</td>
</tr>
<tr>
<td>Sand Filter</td>
<td>85</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Wet Detention Pond</td>
<td>75</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Wetland</td>
<td>65</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td><strong>Coastal Region</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bioretention with IWS</td>
<td>10</td>
<td>10</td>
<td>80</td>
</tr>
<tr>
<td>Bioretention without IWS</td>
<td>40</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Dry Detention Pond</td>
<td>80</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Grassed Swale</td>
<td>90</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Green Roof</td>
<td>0</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Level Spreader, Filter Strip</td>
<td>45</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>Permeable Pavement</td>
<td>38</td>
<td>2</td>
<td>60</td>
</tr>
<tr>
<td>Sand Filter</td>
<td>85</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Wet Detention Pond</td>
<td>75</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Wetland</td>
<td>65</td>
<td>10</td>
<td>25</td>
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References


Lenhart, Hayes Austin. 2008. A North Carolina field study to evaluate the effect of a coastal stormwater wetland on water quality and quantity and nitrogen accumulation in five wetland plants in two constructed stormwater wetlands. A thesis published by the Graduate School of North Carolina State University under the direction of Dr. William F. Hunt, III.


Skipper, Gabrielle Marie. 2008. Watershed-Scale Stormwater Monitoring of a Mixed Land Use Watershed in the North Carolina Piedmont. A thesis published by the Graduate School of North Carolina State University, under the direction of Dr. William F. Hunt, III.


Table A1. Raw data used to compute representative pollutant concentrations for various land uses.

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**Industrial**

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**Transportation**

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EXAMPLE

ILLEGAL DISCHARGE SCREENING REPORT FORMS
# Outfall Identification and Flow Analysis Record

**Field ID:** _______ (AB)  
**Ogden ID:** _______  
**ADC Map #:** _______ (##L-##)  
**Sheet No.:** _______  
**GIS ID:** _______  

**Land Use in Drainage Area:**  
- Res  
- Com  
- Ind  
- Ag  
- Forest  
- Open

**Tar River Basin**  
**Neuse River Basin**  
**Falls Lake Watershed**  
**Name of Creek:** ____________________________________________

**Nearest St. address**  
________________________________________  
________________________________________  
________________________________________  
________________________________________

**Specific Location (direction & distance of fall from above address & nearby landmarks)**  
________________________________________  
________________________________________  
________________________________________

**Outfall Information**  
**Size:** _______ in/ft  
(diameter or width x height)

**Investigation**  
**Date:** _______  
**Time:** (24 hr clock) _______  
**Team:**  
- CO  
- GP  
- MF  
- BH  
- FL  
- MR  
- PW  
- JC

**Outfall Type (check one):**  
- Corrugated Metal Pipe  
- Box culvert  
- Concrete pipe  
- Cast Iron  
- Earthen Ditch  
- RipRap/Concrete Chan.  
- Other: ____________

**Weather:**  
Air Temp: _____ °C  
Rain w/in 72 hrs?  
Ground wet?

**Sky:**  
- Clear  
- P. Cloudy  
- Cloudy  
- Overcast

**Flow:**  
- dry  
- stand. H2O  
- Trickle  
- Moderate  
- High Flo

**Investigation Date:** _______  
**Time:** _______ (24 hr clock)

**Outfall Type (check one):**  
- Corrugated Metal Pipe  
- Box culvert  
- Concrete pipe  
- Cast Iron  
- Earthen Ditch  
- RipRap/Concrete Chan.  
- Other: ____________

**Physical Observations:**  
- Odor: ____________  
- Floatables: ____________  
- Turbidity: ____________  
- Deposits/stains: ____________  
- Damage to Outfall Structure: ____________

**Odor:**  
- none  
- musty  
- sewage  
- sulfide  
- fuel oil  
- gasoline  
- other:

**Floatables:**  
- none  
- petrol sheen  
- sewage  
- foam  
- other

**Turbidity:**  
- clear  
- cloudy  
- opaque  
- particles  
- black floc

**Deposits/stains:**  
- none  
- oily  
- algae  
- other  
- black floc

**Damage to Outfall Structure:**  
- N/A  
- paint peeling  
- concrete cracking/spalling  
- metal corrosion  
- concrete erosion  
- other:

**Outlet capacity significantly reduced by sediment**  
**Outlet area significantly eroded**

**Vegetation condition:** ____________________________________________

**Field Analysis:**  
**Field Instrument**  
- Pens  
- YSI

**Sample 1 Location:** ____________________________________________  
**Date:** _____  
**Time:** _______

**Temp:** _______ °C  
**DO:** _______ %  
**Chlorine:** _______ mg/L  
**Phosphate:** _______ mg/L  
**pH:** _______  
**DO:** _______ mg/L  
**Copper:** _______ mg/L  
**Ammonia:** _______ mg/L  
**TDS:** _______ g/L  
**Turbid.:** _______ NTU  
**Phenols:** _______ mg/L  
**Nitrates:** _______ mg/L  
**Sp Cnd:** _______ μs/cm  
**detergent:** ____________

**Sample 2 Location:** ____________________________________________  
**Date:** _____  
**Time:** _______

**Temp:** _______ °C  
**DO:** _______ %  
**Chlorine:** _______ mg/L  
**Phosphate:** _______ mg/L  
**pH:** _______  
**DO:** _______ mg/L  
**Copper:** _______ mg/L  
**Ammonia:** _______ mg/L  
**TDS:** _______ g/L  
**Turbid.:** _______ NTU  
**Phenols:** _______ mg/L  
**Nitrates:** _______ mg/L  
**Sp Cnd:** _______ μs/cm  
**detergent:** ____________

**Rate likelihood that water is contaminated (scale of 1 to 6)**  
- Investigate?  
- Revisit?  
- No Flow  
- Some possibility  
- Investigation Number: _____SI_____

**Very unlikely**  
**Likely**  
**Photo?**  
**File Name:** ____________

**Office:** _______ (Staff initials)
### Additional Field Analysis:

<table>
<thead>
<tr>
<th>Sample Location</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp: ______ °C</td>
<td>DO: ______ %</td>
<td>Chlorine: ______ mg/L</td>
</tr>
<tr>
<td><strong>Sample 4</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp: ______ °C</td>
<td>DO: ______ %</td>
<td>Chlorine: ______ mg/L</td>
</tr>
<tr>
<td><strong>Sample 5</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp: ______ °C</td>
<td>DO: ______ %</td>
<td>Chlorine: ______ mg/L</td>
</tr>
<tr>
<td><strong>Sample 6</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp: ______ °C</td>
<td>DO: ______ %</td>
<td>Chlorine: ______ mg/L</td>
</tr>
<tr>
<td><strong>Sample 7</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp: ______ °C</td>
<td>DO: ______ %</td>
<td>Chlorine: ______ mg/L</td>
</tr>
</tbody>
</table>

### Comments:

_______________________________________________________________________________
_______________________________________________________________________________
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_______________________________________________________________________________

---

Franklin County
**Water Quality Complaint / Inspection Record for 20___**

**Note:** Shaded areas should be filled in before going out to field

**CR File Number:** ________

(97CR999)

**ADC Map #:** ________

(####L-##)

### Complainant’s Description of Problem and Location:

**Description:** _______________________________________________________________________________________

**Location:** ___________________________________________________________________________________

### Complainant from:

**Name:** _______________________

**Address:** _____________________

**Home Phone #:** ________________

**Work Phone #:** ________________

**Other:** _______________________

(pager, e-mail, etc.)

### Field Observations (if different):

**Investigator’s Description:** ___________________________________________________________________

**Street Address (Nearest):** _________________________________________________________________

### Property Type

- [ ] Public
- [ ] Residential
- [ ] Commercial
- [ ] Industrial
- [ ] Unimproved

### Observations:

- [ ] Sheen . . . . .
- [ ] Odor . . . . .
- [ ] Floatables . .

### Drainage Basin

- [ ] Crk
- [ ] Sub-Basin

### Probable Source of Water Quality Problem (check main items that apply):

**Construction Erosion & Sed:**

- [ ] Controls not provided
- [ ] Controls not maintained
- [ ] Sediment in drainage system

**On-site sewage treatment:**

- [ ] Discharging sand filter system
- [ ] Failing septic leachfield
- [ ] Piping failure, leak, etc (on-site only)
- [ ] Laundry discharge (household)

**Private Connection to County System:**

- [ ] Sewer lateral (house/duplex)
- [ ] Sewer lateral (apart/commercial)

**County Sanitary Sewer System:**

- [ ] Overflow
- [ ] Leak (small flow)
- [ ] Break (large flow)

**Sub:** _____ **Basin:** _____ **Manhole:** Up-MH: _____ **Down-MH:** _____

**Other:**

- [ ] Illicit Connection
- [ ] Contaminated Groundwater
- [ ] Petroleum spill/release
- [ ] Paint spill/release/dumping
- [ ] Grease/Cooking oil/food wastes
- [ ] Improper Housekeeping
- [ ] Trash/Garbage in Channel
- [ ] Yard wastes/leaves
- [ ] Source Unknown
- [ ] Water Leak
- [ ] Other WQ Prob (see details)
- [ ] No WQ Prob Found
- [ ] Drainage Problem

### Details, Sample Locations, Findings, Actions:

- [ ] Need NOV? Date Sent ________
- [ ] Tax Map #:

- [ ] Health Dept. [ ] Land Qual

- [ ] W&S Maint.. [ ] DOT

- [ ] W&S Eng. [ ] Other :

Continue on back, if necessary

[ ] Entered In Database? By: ________(staff initials)

Franklin County
### Water Quality Complaint / Inspection Record, Cont.

#### Additional Details, Sample Locations, Findings, Actions:

| Sample 1 Location: _______________________________________________ | Date: _____ | Time: _____ |
|---------------------------------------------------------------|-------------|
| Details:______________________________________________________|             |
| Temp: _____ °C  DO: _____ %  Chlorine: _____ mg/L  Phosphate: _____ mg/L  |             |
| pH: _______  DO: _____ mg/L  Copper: _____ mg/L  Ammonia: _____ mg/L |             |
| TDS: _____ g/L  Turbidity: _____ NTU  Phenols: _____ mg/L  |             |
| Sp Cnd: _____ μs/cm  detergent: _____ mg/L  |             |

| Sample 2 Location: _______________________________________________ | Date: _____ | Time: _____ |
|---------------------------------------------------------------|-------------|
| Details:______________________________________________________|             |
| Temp: _____ °C  DO: _____ %  Chlorine: _____ mg/L  Phosphate: _____ mg/L  |             |
| pH: _______  DO: _____ mg/L  Copper: _____ mg/L  Ammonia: _____ mg/L |             |
| TDS: _____ g/L  Turbidity: _____ NTU  Phenols: _____ mg/L  |             |
| Sp Cnd: _____ μs/cm  detergent: _____ mg/L  |             |

| Sample 3 Location: _______________________________________________ | Date: _____ | Time: _____ |
|---------------------------------------------------------------|-------------|
| Details:______________________________________________________|             |
| Temp: _____ °C  DO: _____ %  Chlorine: _____ mg/L  Phosphate: _____ mg/L  |             |
| pH: _______  DO: _____ mg/L  Copper: _____ mg/L  Ammonia: _____ mg/L |             |
| TDS: _____ g/L  Turbidity: _____ NTU  Phenols: _____ mg/L  |             |
| Sp Cnd: _____ μs/cm  detergent: _____ mg/L  |             |

| Sample 4 Location: _______________________________________________ | Date: _____ | Time: _____ |
|---------------------------------------------------------------|-------------|
| Details:______________________________________________________|             |
| Temp: _____ °C  DO: _____ %  Chlorine: _____ mg/L  Phosphate: _____ mg/L  |             |
| pH: _______  DO: _____ mg/L  Copper: _____ mg/L  Ammonia: _____ mg/L |             |
| TDS: _____ g/L  Turbidity: _____ NTU  Phenols: _____ mg/L  |             |
| Sp Cnd: _____ μs/cm  detergent: _____ mg/L  |             |

| Sample 5 Location: _______________________________________________ | Date: _____ | Time: _____ |
|---------------------------------------------------------------|-------------|
| Details:______________________________________________________|             |
| Temp: _____ °C  DO: _____ %  Chlorine: _____ mg/L  Phosphate: _____ mg/L  |             |
| pH: _______  DO: _____ mg/L  Copper: _____ mg/L  Ammonia: _____ mg/L |             |
| TDS: _____ g/L  Turbidity: _____ NTU  Phenols: _____ mg/L  |             |
| Sp Cnd: _____ μs/cm  detergent: _____ mg/L  |             |

| Sample 6 Location: _______________________________________________ | Date: _____ | Time: _____ |
|---------------------------------------------------------------|-------------|
| Details:______________________________________________________|             |
| Temp: _____ °C  DO: _____ %  Chlorine: _____ mg/L  Phosphate: _____ mg/L  |             |
| pH: _______  DO: _____ mg/L  Copper: _____ mg/L  Ammonia: _____ mg/L |             |
| TDS: _____ g/L  Turbidity: _____ NTU  Phenols: _____ mg/L  |             |
| Sp Cnd: _____ μs/cm  detergent: _____ mg/L  |             |

### Additional Details, Sample Locations, Findings, Actions:
**Franklin County Industrial Inspections Report**

Date _______
Time _______
Inspector _______
Account # ____________

(Office Only)
ADC Map # ________
Basin ________
Sub-Basin ________

**Industry Information**

Site Name ________________________________
(Business/industry name and identification of site)
Contact ___________________________ Phone _____________
Mailing Address ___________________________
Street Address ____________________________________

**Field Observations**

☐ Inspection N/A?

☐ Material Waste (M/W) Storage Areas  (Petroleum products and hazardous materials/wastes)

<table>
<thead>
<tr>
<th>No.</th>
<th>Material or Waste</th>
<th>Storage</th>
<th>Containment?</th>
<th>Concerns?</th>
<th>Description of Concern (spill, leak, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Secondary</td>
<td>No</td>
<td></td>
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<tr>
<td>2</td>
<td></td>
<td>Secondary</td>
<td>No</td>
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<td>3</td>
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<td>Secondary</td>
<td>No</td>
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</tr>
<tr>
<td>4</td>
<td></td>
<td>Secondary</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

☐ M/W Drainage

☐ Material Transfer Areas

☐ Loading Dock
☐ Conveyer
☐ Pipe nozzles
☐ Loader
☐ Other
☐ Spill Containment?

☐ Manufacturing Areas

☐ Spill Containment?
☐ Evidence of spills/leaks (Mfgr. Area)?
If so, what material spilled? _______________

☐ Floor Drains

☐ MT Drainage

☐ Manufacturing Areas

☐ Floor Drains

☐ FD Locations

Housekeeping Comments _________________________________________________

☐ Vehicle Maintenance Area

☐ Spill Containment?
☐ Evidence of spills/leaks (Maint.)?
If so, what material spilled? _______________

☐ Vehicle Fueling

Drainage __________________________________________

Storm Drainage System

☐ Stormwater drainage system accessible?
☐ Current Precipitation or Precipitation Within 72 Hours?

Stormwater Flow

☐ Dry, no flow
☐ Standing Water
☐ Dry Weather Flow
☐ Wet Weather Flow
☐ Other ________

Water Characteristics

☐ Color
☐ Odor
☐ Stains
☐ Foam

Storm Drainage System Condition

☐ Erosion
☐ Sedimentation
☐ Corrosion

Comments __________________________________________

☐ Follow up needed? ___________ ☐ Entered in D-Base? _____

Franklin County
FIELD SCREENING
PROGRAM PROGRESS

Field screening is a component of the County’s dry weather monitoring program to identify and eliminate illicit discharges and improper disposal. The dry weather monitoring program is an integrated outfall field survey program that incorporates outfall identification, inspection and inventory; field screening; and preliminary follow-up field investigation. Additional investigation and follow-up may be required to accomplish the elimination of an illicit discharge or improper disposal practice. Furthermore, the field survey program will identify and inspect additional stormwater outfalls located in the field.

When precipitation has occurred within 72 hours, outfalls would be located or identified, and inspected. Later, during dry weather, the field team would return to any outfall having evidence of flow to determine whether the outfall had a dry weather flow, and, for those dry weather flows, to conduct field screening.

When precipitation has not occurred within 72 hours, the outfall identification, inspection and inventory step will be followed immediately by field screening of any dry weather flows that were observed.

FIELD SCREENING PARAMETERS AND METHODOLOGY

The field screening conducted under the Part 1 permit application included physical observations at the selected field screening points, and grab sampling and field analysis of dry weather flows. Where dry weather flows were observed, a second follow-up grab sample was collected and field analyzed within the ensuing 24 hour period.

Field analysis evaluated pH, total chlorine, total soluble copper, phenols, and detergents (anionic surfactants) using the CHEMetrics M-1000 Stormwater Discharge Kit, using visual evaluation of colormetric results using color comparators.

The current field screening program incorporates the methodology and parameters used in the Part 1 permit application, with some minor modifications. One change is that the current methodology allows outfall identification and inspection to occur during periods that do not meet dry weather criteria, provided there is subsequent follow up during dry weather to determine whether a dry weather flows exist. In the ‘old industrial areas’ of the pilot basin, field investigators have found a number of pipes that terminate at the open channel and that were not identified in the stormwater outfall inventory. Some of these pipes appear to be abandoned, while others appeared to be floor drain or yard drain discharges. Where such pipes exist, performing the identification and investigation work during wet weather can help to establish whether the pipe is currently used to discharge stormwater. Furthermore, during wet weather it is easier to identify stormwater outfalls that may be overgrown and obscured by vegetation.

Unknown pipes terminating in stormwater channels are expected to be very rare outside of the ‘old industrial areas’ identified in the Part 2 permit application. In most other areas in the County, it is expected that outfall identification and inspection work will be accomplished during dry weather and will coincide with field analytical chemistry testing, as indicated in the Part II permit application.

Another modification to the field screening program is the availability of two additional monitoring parameters for field screening. Field investigators will carry CHEMetrics colormetric test kits for ammonia and phosphates. Existing data on water quality of urban streams within Franklin County
the County indicates three sites periodically have some combination of high fecal coliform bacteria, high BOD, or low dissolved oxygen. In addition, ongoing discussions with Public Health personnel indicate that there are numerous failing on-site, non-discharge systems within the County. In drainage basins where fecal contamination is suspected, the availability of an ammonia test to the field screening parameters will be useful in identifying and isolating cross-connections, as well as flows originating from failing septic systems. Similarly, the availability of a phosphate test will be useful upstream of ponds that have been impacted by heavy growth of algae.

When deemed appropriate for follow-up investigations, field investigators will have the capability of measuring the additional parameters of dissolved oxygen and total dissolved solids in the field.

Copies of the field form for outfall identification and inspection and the field form for flow inspection and field analysis are attached. Note that the flow inspection form can also be used, when appropriate, for investigation of water quality complaints referred to the County by Citizen’s or other agencies.

The screening methodology has been developed into a set of standard operating procedures (SOPs). These SOPs provide both general guidance and, where appropriate, detailed, step-by-step instructions for field investigators in order to promote safety, consistency and quality in data collection and field analysis. The procedures cover:

- checklists,
- personal protective equipment,
- instrument calibrations and maintenance,
- equipment maintenance
- observations and record keeping
- field analysis, and
- preliminary evaluation of field data.

The field SOPs for the dry weather program have been tested and refined. Additional refinements will be made as necessary.

SCHEDULING
A schedule has been established for completing the field screening within the permit period. This schedule is based on conducting field screening on approximately 35 outfalls per month. It is anticipated that the field screening would be substantially complete by the time a permit renewal application would be submitted.

The Part II application identified priority areas within the County, generally following land use patterns, with “old industrial areas” having the highest priority, followed by industrial/commercial areas, and then by older residential areas. Initial priority for the field screening program is based on completing field screening of the pilot basin selected in the Part II permit application.

TRAINING
A training program has been developed for field investigators. Initial training has been provided, but training is an on-going activity within the field screening component.

Classroom training has been provided on the overall intent of the program, the specific components of the outfall identification and inspection, and flow inspection and analysis tasks. Field investigators have received First Responder training in dealing with hazardous materials.
spills, and have had classroom training in field safety, including a review of all MSDS sheets for chemicals being used in the program.

Hands-on training has been provided in the use and maintenance of field instruments, the use of the CHEMetrics field analytical chemistry kits, and the use of field data collection forms. Field practice sessions have been conducted using all tests and measurements.

Detailed standard operating procedures have been developed for the field outfall survey work covering: record keeping; safety and use of personal protective equipment; receipt and use of chemicals; use, calibration and maintenance of field analytical equipment; sample collection; field analysis; and dye testing to identify/locate illicit drains. These procedures also provide guidance in making a preliminary evaluation of field results to assist timely information collection for follow-up investigation. The SOPs also serve as a training resource for field personnel.

DATABASES AND GEOGRAPHIC INFORMATION SYSTEMS
Microsoft Access relational database software has been selected to maintain database information for the program as an interim measure. A database has been developed for the field screening component containing separate (but related) tables for:

- outfall identification and inspection, and
- dry weather flow inspection and analysis.

In addition, a table has been developed for water quality data from urban stream sampling, and one is planned for data from wet weather sampling.

A database on potential sources of contamination has also been developed incorporating tables for:

- NCDWQ Incident Management Contamination Sites
- Emergency Management spills reports
- NCDWQ General Stormwater Permits
- NCDWQ NPDES Permits
- NCDWQ Non-discharge Permits
- Fire Department Inspection Reports (inspections of industrial and related facilities)

A third database on potential sources of contamination contains information on hazardous substances reported pursuant to SARA Title III tier II reporting requirements.

The sources databases will be utilized to identify likely sources of illicit discharge and improper disposal, or of any other source of contamination encountered.

Reports are currently being developed to allow some data analysis and reporting within MS Access. For greater flexibility, data can be exported from MS Access to a MS Excel spreadsheet for analysis.

A grid system has been developed for tracking field screening and sources databases in MS Access, and is currently being implemented in all the appropriate source database tables. Once the GIS system has been developed for the pilot facilities inventory program, and existing facilities have been inventoried, it is planned that the field screening and sources databases will be imported into the GIS system to facilitate more accurate and more detailed geographic evaluation of data.
APPENDIX Q

EXAMPLE

LETTER TO PREVENT ILLEGAL DISCHARGES
Dear ________________,

It appears the above referenced property is in violation of the Franklin County Unified Development Ordinance (UDO). Specifically, Section ________ states that ____________.

You are hereby given ____ days to comply with the UDO or face further code enforcement measures.

You are encouraged to contact our office with any questions or concerns you may have.

Sincerely,

Code Enforcement Officer
Franklin County Planning
APPENDIX R

SAMPLE PUBLIC EDUCATION ACTION PLAN AND REPORT
### Public Education Action Report and Plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Point Value</th>
<th># Done Last Yr (7/___ - 6/___)</th>
<th>Points</th>
<th>Cost</th>
<th># Planned Next Yr (7/___ - 6/___)</th>
<th>Points Anticipated</th>
<th>Anticipated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Demonstration Sites (for BMPs)</td>
<td>4 each</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Local Newspaper Article</td>
<td>2 each</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Technical Workshop (1st year, 2 required)</td>
<td>4 each</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4 Environmental Contest / Field Day</td>
<td>4 each</td>
<td></td>
<td></td>
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<tr>
<td>5 Arrange Speakers For Civic Organizations</td>
<td>1 each</td>
<td></td>
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<tr>
<td>6 Clean Water Proclamation, with Newspaper Article</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>7 Web Page / Web Site Links</td>
<td>2 / year</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>8 Pet Waste Ordinance</td>
<td>5 / year</td>
<td></td>
<td></td>
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<tr>
<td>9 Factsheets/Brochures/Flyers/Enviro freebies (public places)</td>
<td>2 / year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Utility Bill Inserts or Messages on Bills</td>
<td>3 / year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Close-out Packages / Info for New Homeowners</td>
<td>3 / year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>12 Storm Drain Marking (24 minimum per year)</td>
<td>2 / year</td>
<td></td>
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<td></td>
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<tr>
<td>13 Sponsor new/expand Adopt-A-(Street-or-Stream) Program</td>
<td>4 / year</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>14 Recognition Program (environmentally friendly participants)</td>
<td>1 / year</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>15 Toll Free Environmental Hotline (1-800 or Local)</td>
<td>3 / year</td>
<td></td>
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<tr>
<td>16 VWIN Monitoring Force (Water Quality Reporting)</td>
<td>6 / year</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>17 Other Water Quality Reporting Program</td>
<td>3 / year</td>
<td></td>
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<td></td>
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<tr>
<td>18 Major Media Advertising</td>
<td>6 / year</td>
<td></td>
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<td></td>
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<tr>
<td>19 Local Access TV or Radio Spots</td>
<td>3 / year</td>
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</tr>
</tbody>
</table>

Total Points Reported: [Total]  
Total Points Planned: [Total]

Please attach copies of articles, flyers, photographs, etc. documenting your activities, labeled for each type of activity.

**Note:** Ongoing Activities will continue to receive the education points for each year that they are in effect.

**Note:** If your locality has put together an exceptional effort for any of the above activities, you may be entitled to additional points for that activity. Please attach a description of the activity, a merit rationale, and a point proposal.

Submitted By:                                                                 Title:                      
Date:                                                                                   Signature:
### Detail of Reported Activities

<table>
<thead>
<tr>
<th>Brief Description of Activity</th>
<th>Targeted Audience</th>
<th>Date</th>
<th>Cost</th>
<th>Comments / Attachments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

### Detail of Planned Activities

<table>
<thead>
<tr>
<th>Brief Description of Activity</th>
<th>Targeted Audience</th>
<th>Date Planned</th>
<th>Anticipated Cost</th>
<th>Comments / Attachments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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