

## TOWN POLICY

<b>TOWN OF FUQUAY-VARINA</b>			
<b>Subject: Stormwater Management</b>	Number:	Effective Date:	No. of Pages: 39
	<b>Supercedes: All Previous</b>	<b>Prepared By: Engineering Dept.</b>	<b>Recommended By:</b>

Adopted this \_\_\_\_\_ day of \_\_\_\_\_, 2004

\_\_\_\_\_  
Rose John, Town Clerk

### TOWN POLICY FOR STORMWATER MANAGEMENT

Subject: Implementation of a policy for the Town to manage the impact of increased runoff due to development of land.

1.0 Purpose:

The purpose of this policy is to protect, maintain, and enhance the public health, safety, and general welfare by establishing minimum requirements and procedures to control the adverse effects of increased stormwater runoff associated with land development within the Town of Fuquay-Varina. Proper management of stormwater runoff will minimize damage to public and private property, insure a functional drainage system, reduce the effects of development on land and stream channel erosion, assist in the attainment and maintenance of water quality standards, enhance the local environment associated with the drainage system, reduce local flooding and drainage problems, maintain as nearly as possible the pre-developed runoff characteristics of the area, and facilitate economic development by mitigating associated flooding and drainage impacts.

The application of this policy and the provisions expressed herein shall be the minimum stormwater discharge control requirements and shall not be deemed a limitation or repeal of any other obligations imposed by State statute or judicial

decisions. Consequently, if site characteristics indicate that complying with these minimum requirements will not provide adequate designs or protection for local property or residents, it is the designer's responsibility to exceed the minimum requirements as necessary. The Town Engineer or designee shall be responsible for the coordination and enforcement of the provisions of this chapter.

2.0 Departments Involved:

Administration  
Planning Department  
Engineering Department  
Public Works Department

3.0 Jurisdiction:

This policy shall apply to all areas within the Planning Jurisdiction (Town Limits and ET J) as defined on official Town maps that may be amended from time to time.

4.0 Definitions:

As used in this policy, unless the context clearly indicates otherwise, the following terms, phrases and words, and their derivatives, shall have the meaning given herein:

*As-built plan.* Plans reflecting actual field conditions which may include the construction plans with any changes identified and shown on the plan.

*Designer.* A professional who is permitted by the Town of Fuquay-Varina to prepare and submit plans and studies required by this policy.

*Detention structure.* A permanent structure for the temporary storage of stormwater runoff that is designed so as not to create a permanent pool of water.

*Develop.* The construction, landscaping, clearing projects or any other project that in any manner alters the natural structure of the landmass.

*Development.* Any site plan or subdivision.

*Developed peak discharge rates.* The peak discharge rates, in cubic feet per second, calculated using Town approved methods and based on developed land use conditions.

*Easement.* Right of use over the property of another for a specific purpose or reservation by the owner of the land for the use of such land by others for a

specific purpose or purposes, and which must be included in the conveyance of land affected by such easement.

*Existing land use conditions.* The land use conditions existing at the time the design plans are submitted for approval, including previously approved upstream developments.

*Impervious surface.* Any material that significantly reduces and prevents natural infiltration of water into the soil. Impervious surfaces include but are not limited to roof, patios, balconies, decks, streets, parking areas, driveways, sidewalks, and any concrete, stone, brick, asphalt or compacted gravel surface.

*Infiltration.* The passage or movement of water into the soil sub-surface.

*Maintenance.* Any action necessary to preserve drainage and flood control facilities in proper working condition, so that such facilities shall continue to comply with the standards of this chapter and to prevent failure of such facilities. Maintenance shall not include actions taken solely for the purpose of enhancing the aesthetics aspects associated with the stormwater discharge control facilities.

*Off-site stormwater runoff rate.* The stormwater runoff resulting from a designated design storm which flows through the subject site either naturally or via storm drainage systems from off the subject site. Off-site stormwater runoff rate shall be calculated assuming contributing offsite properties are fully developed.

*On-site stormwater discharge control facilities.* The design and construction of a facility necessary to control stormwater runoff within and for a single development.

*Opaque Screening.* A substance that cannot be seen through when viewed perpendicularly at the same elevation from the ground to at least a height of six (6) feet. Composition of the opaque screen may include a wall, fence, landscaped earthen berm, planted vegetation, existing vegetation, or any appropriate combination of the elements. At least 75 percent of the planted vegetation shall be evergreen species locally adapted to the area.

*Predevelopment stormwater runoff rate.* Stormwater runoff resulting from a designated design storm with the subject site in its natural condition prior to any development activity.

*Post development stormwater runoff rate.* The stormwater runoff resulting from a designated design storm after the site has been fully developed.

*Regional retention/detention facilities.* The design and construction of a facility to control stormwater runoff within or outside a development and for one or more developments.

*Retention structures.* A permanent structure that provides for the storage of runoff and is designed to maintain a permanent pool of water.

*Storm drainage facilities.* The man-made system of inlets, conduits or other such facilities, and appurtenances which collect, store and convey stormwater.

*Stormwater discharge control design plan.* The set of drawings and other documents that comprise all of the information and specifications for the drainage systems, structures, concepts and techniques that will be used to control stormwater discharges as required by this chapter. Also included are the supporting engineering calculations, input data for any computer analysis, and results of any computer analysis.

*Ten-year and one hundred-year design storms.* The stormwater runoff resulting from a rainfall intensity based on statistical data and of a duration that will produce the maximum peak rate of runoff for the watershed of interest under average moisture conditions. A ten-year storm has statistically a 10% chance of occurring in any given year and a 100-year storm has statistically a 1% chance of occurring in any given year.

## 5.0 Scope and Exclusions

5.1 No person shall develop any land without having provided for appropriate stormwater discharge control measures to control or manage stormwater runoff, in compliance with this policy, unless exempted under paragraph 5.2.

5.2 The following development activities are exempt from the provisions of this policy:

5.2.1 Projects grandfathered based on the following criteria:

5.2.1.1 Industrial and commercial projects under construction as of the effective date of this policy

5.2.1.2 Industrial and commercial projects with approved construction plans as of the effective date of this policy

5.2.1.3 Industrial and commercial projects within the Town's review cycle prior to the effective date of this policy

5.2.1.4 Residential single phase projects within the Town's review cycle, with approved preliminary subdivision plat, approved construction plans, or under construction as of the effective date of this policy

5.2.1.5 Residential multi-phase projects within the Town’s review cycle, with approved preliminary subdivision plat, approved construction plans, or under construction as of the effective date, with the provision that exempt phases must be under construction within 5-years of the effective date of this policy. If changes to the approved preliminary subdivision plat result in an increase in the number of lots and/or an increase in the overall impervious surface area by ten percent or more, this policy would then apply to that changed phase of the project.

- 5.3 Additions or modifications to existing detached single-family dwellings.
- 5.4 Residential site plans consisting of one single family or one duplex dwelling, or one structure of a two-unit townhouse dwelling.
- 5.5 Expansion of existing developments that increases stormwater runoff less than 10 percent.
- 5.6 Compliance with this policy would result in greater adverse downstream impact, such as local flooding, as determined by Town approved engineering studies.

6.0 Minimum Runoff Control Requirements

The minimum stormwater runoff control requirements shall provide:

- 6.1 Control measures necessary to control velocities of flow from stormwater discharge control facilities to a level which will comply with the “North Carolina Sedimentation Pollution Control Act of 1973”;
- 6.2 Compliance with any applicable local, state, and/or federal Neuse River Basin and Cape Fear River Basin rules;
- 6.3 Reduce post-development runoff rate to pre-development runoff rate for the 1-year, 24-hour design storm and the 10-year, 24-hour design storm, by installing stormwater discharge control facilities.
- 6.4 Provide sufficient storage volume to retain on-site the runoff from the first inch of rainfall (first flush) for 24 to 72 hours.
- 6.5 The Town reserves the right to require additional stormwater management measures for projects complying with this policy if stormwater runoff from the project will cause adverse effects on other properties including without limitation public streets, sidewalks, greenways, and utility easements.

7.0 Stormwater Control Facilities:

- 7.1 Stormwater discharge control facilities may include both structural and nonstructural elements. Natural swales and other natural runoff conduits shall be retained where practicable, but where additional stormwater

discharge control facilities are required to satisfy the minimum control requirements, the following measures are examples of what may be used:

- 7.1.1 Stormwater detention structures (dry basins).
  - 7.1.2 Stormwater retention structures (wet ponds).
  - 7.1.3 Detention swales.
  - 7.1.4 Bio-retention areas (requires geotechnical report to establish suitability of fill material for bioretention area).
  - 7.1.5 Other methods acceptable to the Town Engineer that meets the policy requirements and assures no harm to downstream properties.
- 7.2 Where detention and retention structures are used, designs that consolidate these facilities into a limited number of large structures will be preferred over designs that utilize a large number of small structures.
- 7.3 Stormwater discharge control design plans can be rejected by the Town Engineer if they incorporate structures and facilities that will demand considerable maintenance, will be difficult to maintain, or utilize numerous small structures if other alternatives are physically possible.

## 8.0 Design Procedures

All stormwater discharge control facilities shall be designed in accordance with procedures approved by the Town Engineer. Pre-approved procedures include:

### 8.1 Peak Runoff Calculation

8.1.1 For drainage areas less than 100-acres – Rational Method. The following Intensity-Duration-Frequency chart shall be utilized:

**Table 8.1.1 - Fuquay-Varina I-D-F Table**

Duration (minutes)	1-year (in/hr)	10-year (in/hr)	25-year (in/hr)	50-year (in/hr)	100-year (in/hr)
5	5.10	7.22	8.19	8.96	9.72
10	4.20	6.13	7.01	7.71	8.40
15	3.50	5.25	6.03	6.64	7.24
30	2.38	3.28	4.32	4.80	5.28
60	1.50	2.41	2.84	3.17	3.50
120	0.89	1.37	1.62	1.81	2.00
180	0.65	1.02	1.21	1.35	1.50
360	0.38	0.65	0.77	0.86	0.96
720	0.23	0.39	0.46	0.52	0.57
1440	0.13	0.22	0.27	0.30	0.33
24-hour rainfall	3.00 inches	5.38 inches	6.41 inches	7.21 inches	8.00 inches

- 8.1.2 For drainage areas 26-acres to 640-acres – U.S. Geological Survey Water –Resources Investigations Reports 01-4207 (Table 5 - Rural Flood-Frequency Coastal equations) and 96-4084 (Table 7 – North Carolina Flood-Frequency Equations).
- 8.1.3 For drainage areas greater than 640-acres – United States Army Corps of Engineers Hydrologic Engineering Center computer programs HEC-1 or HEC-MMS, or Haestad Methods “Pondpack”. These programs shall include evaluation of multiple sub-basins and storage areas.

## 8.2 Runoff Volume Calculation

- 8.2.1 The “Simple Method” as described by Schueler (1987) and referenced in NCDENR’s “Stormwater Best Management Practices” dated April 1999 shall be used for calculating the post development runoff volume resulting from the first inch of rainfall.
- 8.2.2 For drainage areas up to 640-acres - Urban Hydrology for Small Watersheds, TR-55 (Technical Release 55) published by the Engineering Division, United States Natural Resource Conservation Service (formerly known as the Soil Conservation Service) United States Department of Agriculture, June 1986, except as noted in 8.2.1.
- 8.2.3 For drainage areas greater than 640-acres – United States Army Corps of Engineers Hydrologic Engineering Center computer programs HEC-1 or HEC-MMS, or Haestad Methods “Pondpack”. These programs shall include evaluation of multiple sub-basins and storage areas.

## 8.3 Hydrograph Development

- 8.3.1 For drainage areas less than 100-acres – Unit Hydrograph per “Elements of Urban Stormwater Design” by H. Rooney Malcom, P.E.
- 8.3.2 For drainage areas up to 640-acres - Urban Hydrology for Small Watersheds, TR-55 (Technical Release 55) published by the Engineering Division, United States Natural Resource Conservation Service (formerly known as the Soil Conservation Service) United States Department of Agriculture, June 1986.
- 8.3.3 For drainage areas greater than 640-acres – United States Army Corps of Engineers Hydrologic Engineering Center computer programs HEC-1 or HEC-MMS, or Haestad Methods “Pondpack”. These programs shall include evaluation for multiple sub-basins and storage areas.

- 8.4 Other hydraulic methods may be used if the designer demonstrates that the methods are appropriate for the intended use and calibrated to local conditions.
- 9.0 Stormwater Discharge Control Design Plan and Report Requirements
  - 9.1 Stormwater discharge control design plans/reports shall include the following:
    - 9.1.1 Delineation of drainage basins
    - 9.1.2 All project existing and proposed impervious surfaces clearly delineated and listed in square feet.
    - 9.1.3 All surface waters: FEMA 100-year floodplain and floodway lines; flood hazard soils areas; wetlands; reserved open spaces; and the location, dimensions and arrangements of all drainage ways; watershed, riparian, and other buffers including associated setbacks.
    - 9.1.4 A determination that the proposed stormwater discharge control facility will not create flooding or drainage problems for adjacent structures for the 10- and 100-year flood events.
    - 9.1.5 A designation of all easements needed for inspection and maintenance of the stormwater discharge control facilities. The location of all stormwater management facilities shall be specified prior to recording of easements.
    - 9.1.6 A plan for maintenance of all stormwater discharge control facilities shall be included as part of the stormwater discharge control design plan. The maintenance plan should include an estimated maintenance budget.
    - 9.1.7 Landscaping/screening to enhance the aesthetic qualities of the stormwater discharge control facilities. Landscaping inside detention/retention basins side slopes is allowed as long as the landscaping does not significantly decrease storage volume or create maintenance problems. Any screening used shall be opaque in nature.
  - 9.2 The hydrologic criteria to be used for the stormwater discharge control design plans and calculations included on the plans or in the report shall be as follows:
    - 9.2.1 Post development discharge shall be at pre-development levels for the 1-year, 24-hour and 10-year, 24-hour design storms for all stormwater discharge facilities.
    - 9.2.2 Emergency spillways will be designed at a minimum for 50-year storms.

9.2.3 All stormwater discharge control designs shall be checked using the 100-year storm for analysis of local flooding and possible flood hazards to adjacent structures and/or property.

9.3 Record (as-built) drawings (reproducible mylars and magnetic form in .dwg or .dxf files) for all stormwater management facilities depicting as-built conditions including, but not limited to, size, depth, field location and elevations, must be certified by an authorized registered professional as to the completeness of the as-builts and that the stormwater management devices and their installation are in compliance with this policy and the approved plans, and a copy provided to the Town of Fuquay-Varina for permanent record.

#### 10.0 Professional Registration Requirements

10.1 Stormwater discharge control design plans shall be prepared by a qualified registered North Carolina Professional Engineer, using acceptable engineering standards and practices.

#### 11.0 Ownership and Maintenance of Stormwater Discharge Control Facilities

11.1 Any stormwater discharge control facility that serves a single lot or development other than detached single-family dwellings and their accessory uses will be privately owned and continuously maintained by the served property owners. Stormwater discharge control facilities that serve detached single-family dwelling developments and their accessory uses will be privately owned and continuously maintained by the individual homeowner associations.

11.2 The ownership and continuous maintenance of the stormwater discharge control facility shall also apply to non-exclusive perpetual easements in favor of the Town for access to the facility. The Town will not be responsible for the maintenance of the access easements.

11.3 Maintenance requirements identified under paragraph 9.1.6 of this policy shall be a part of the deed for the affected property and recorded with the Wake County Register of Deeds.

11.4 The location and description of the stormwater discharge facility along with access/maintenance easements shall be indicated on subdivision map(s) and site plats recorded with the Wake County Register of Deeds.

11.5 Stormwater discharge control facilities shall be inspected a minimum of once annually by a licensed professional engineer, and inspection reports submitted to the Town Engineer during the period of December 1 to December 31 annually. At a minimum, the inspection reports shall include the information listed in the sample inspection reports included in Appendix B of this policy.

## 12.0 Maintenance Agreement for Privately Owned Facilities

12.1 A proposed maintenance agreement (Appendix A) shall be submitted to the Town for all private on-site stormwater discharge control facilities prior to the approval of the stormwater discharge control design plan and recordation of lots in a subdivision to be served by the discharge control facility. The agreement shall be recorded by the landowner with the Wake County Register of Deeds prior to subdivision recording and/or building permit, and shall be binding on all subsequent owners of land served by the discharge control facility. Such agreement shall be in a form and content acceptable to the Town and shall be the responsibility of the private owner. At a minimum, the agreement shall include the following:

- 12.1.1 The agreement shall identify who will have the maintenance responsibility.
- 12.1.2 The maintenance agreement shall specify how proper maintenance of the facilities will be accomplished.
- 12.1.3 The maintenance agreement shall provide for access to the facility by virtue of non-exclusive perpetual easements, minimum 25-feet in width, in favor of the Town, at reasonable times for inspection by the Town to ensure that the discharge control facilities are maintained in proper design working condition.
- 12.1.4 The frequency of inspection of the facilities and submission of inspection reports to the Town.
- 12.1.5 Establishment of an escrow account at the time of subdivision/plat recordation in the amount of 15% of the construction cost of the facility solely for the maintenance and management of the facility. The escrow account shall be supplemented annually with a sinking fund from homeowner association dues or property owner payments in accordance with an anticipated maintenance schedule identified under paragraph 9.1.6 of this policy and in addition, 60% of initial construction costs shall be deposited in the escrow account within 10-years following initial construction (such that the escrow account has 75% of initial construction costs in addition to maintenance costs), and 100% of initial construction costs within 20-years. A certified annual audit of the escrow account shall be submitted to the Town for its records.
- 12.1.6 If at any time the Town accepts the facility for public management and maintenance, the portion of the sinking fund based on initial construction costs shall be remitted to the Town at time of acceptance.
- 12.1.7 Allowance for the Town to recover from the landowner(s) any and all costs the Town expends to maintain or repair the facilities.
- 12.1.8 Statements that the Town is not obligated for the maintenance or repair of the facilities and that the Town shall not be liable for the condition or operation of the facility.

### 13.0 Exceptions from Requirements

13.1 The Town Board of Commissioners may grant an exception from the requirements of this policy if there are unique circumstances applicable to the site such that strict adherence to the provisions of the policy will result in unnecessary hardship and not fulfill the intent of the policy.

13.2 A written request for an exception shall be required and shall state the specific exception sought and the justification therefore. It shall include descriptions, drawings, calculations and any other information that is necessary to evaluate the proposed exception.

### 14.0 Liability

Neither the approval of a plan under the provisions of this policy nor the compliance with the provisions of this chapter shall relieve any person from the responsibility for damage to any person or property otherwise imposed by law nor shall it impose any liability upon the Town of Fuquay-Varina, North Carolina for damages to any person or property.

# APPENDIX A

Stormwater Facility Maintenance Agreement

# APPENDIX B

Standard Maintenance Inspection Reports