

Town of Chapel Hill
Stormwater Impact Statement and Stormwater Management Plan Guidelines
(Revised March 14, 2003)
(Revised August 22, 2003)

I. INTRODUCTION

Pursuant to the Town of Chapel Hill Land Use Management Ordinance Section 5.4, Stormwater Management, all applications for developments or subdivisions and any building (some single-family or two-family dwellings resulting in less than or equal to 5,000 square feet of land disturbance may not be subject to these requirements) within the Town of Chapel Hill Planning Jurisdiction must include a Stormwater Impact Statement and a Stormwater Management Plan. As authorized by the Chapel Hill Land Use Management Ordinance, affirmative exemption to all or part of the requirements of the Stormwater Impact Statement may be granted by the Town Manager.

II. STORMWATER IMPACT STATEMENT (THE FOLLOWING INFORMATION SHALL BE PROVIDED, UNLESS OTHERWISE NOTED, FOR ALL DEVELOPMENT OTHER THAN SINGLE-FAMILY OR TWO-FAMILY DWELLINGS INVOLVING LESS THAN OR EQUAL TO 5,000 SF OF LAND DISTURBANCE.)

II-A. SITE ANALYSIS AND NARRATIVE

A pre-application discussion with the Town Stormwater Management Engineer is encouraged to determine the limits of study and to define study elements required. Elements of the analysis should include, but are not limited to:

1. Land use, density, impervious surface area, and phasing;
2. Location, topography, on-site and off-site drainage conditions;
3. Upstream and/or downstream volumes, discharges and velocities;
4. Backwater impacts, effects on existing upstream and/or downstream drainage conveyance facilities;
5. Ability of natural drainage channel to convey additional volume, discharges and velocities;
6. Potential mitigation measures; and
7. Delineation of the Resource Conservation District (RCD) for perennial and intermittent streams as determined by the Town, jurisdictional wetlands, soil series, and regulatory FEMA Special Flood Hazard Areas.

Note: If it is believed that an intermittent or perennial stream may be on or within 150 feet of the property to be developed, the applicant should submit a request for a stream determination to be performed by Town staff.

II-B. RELEASE RATE MANAGEMENT

Accepted engineering practices will be required for determining both pre-development and post-development stormwater peak discharge data. Hydrographs may be required on a site-specific basis.

The peak discharge rate for the post-development conditions shall be no greater than the peak discharge rate for the pre-development conditions for the local 1-year, 24-hour duration, 2-year, 24-hour duration and the 25-year, 24-hour duration return period storms. Acceptable methodologies for computing peak flow rates include: the Rational Method, HEC-1 or HEC-HMS methods, USDA TR-55, or other methods subject to approval by the Town Stormwater Management Engineer.

Depending on the development site location, size/area and the condition of the existing conveyance system and associated lands, the Manager may waive or change the peak discharge rate criteria in part or in whole if, based on an approved Stormwater Impact Statement, it is demonstrated that detention would intensify existing peak discharges or might otherwise create problems on abutting and/or downstream properties.

II-C. VOLUME MANAGEMENT (Not applicable for single-family and two-family lots existing prior to January 27, 2003)

Using USDA Soil Conservations Service Curve Number (CN) method for total run-off volume (or other approved method) the increase in volume from pre-development conditions to post-development conditions for the 2-year/24-hour storm, (where $P=3.6''$) shall be managed on-site using infiltration, re-use or other approved BMP/IMP methods.

II-D. WATER QUALITY MANAGEMENT

The applicant shall utilize stormwater Integrated Management Practices (IMP's) and/or Best Management Practices (BMP's), as approved by the Manager, to treat stormwater runoff from all disturbed, built-upon, and impervious areas associated with the development. The IMP/BMP shall be minimally designed to remove 85% average annual total suspended solids (TSS) from post-development stormwater runoff. The IMP/BMP may also be used to provide for volume management and release rate management as approved by the Manager. Further information regarding the IMP/BMP practices will be made available in the Town Design Manual.

Submit proposal(s) for IMP's/BMP's to the Town Stormwater Management Engineer for review. The assumed TSS removal efficiencies for properly designed IMP's/BMP's are as follows:

Retention Basins	85%
Sand Filters	85%
Bioretention Areas	85%
Grassed Swales (100 linear ft. per drained acre)	35%
Detention Basins	50%

Filter Strips	25-40%
Infiltration Devices	85%
Level Spreaders & Buffers (50' minimum length)	40%
Manufactured Products	(Varies)

Single devices may be used or devices may be used in combination to achieve the required pollutant removal of 85% average annual TSS. As experience grows in the use and effectiveness of the devices and methods, other IMP's/BMP's and/or other specifications may be considered for use in Chapel Hill. The NCDWQ and the Town of Chapel Hill will continue to review and modify both design and removal efficiencies as appropriate.

II-E. NUTRIENT LOADING CALCULATIONS (Not applicable for development involving less than 1 acre of land disturbance)

Nutrient loading calculations shall be included with the Stormwater Impact Statement. Yearly loads are calculated by multiplying the area of each land use by the appropriate loading coefficient as provided in Table 1. Required calculations shall include the pollutant loading of total nitrogen and total phosphorus. Treating stormwater for nutrient loads is not currently required by the Town.

TABLE 1

Chapel Hill Pollutant Loading Coefficients (lbs/acre/yr)*

<u>LAND USE TYPE</u>	<u>TOTAL N</u>	<u>TOTAL P</u>
Low Density Residential (< 12% impervious or < 1 unit/acre)	5.2	0.7
Moderate/High Density Residential (> 12% impervious or > 1 unit/acre)	7.4	1.2
Office/Institutional	8.8	1.6
Commercial	13.2	1.6
Industrial	11.2	1.4
Undeveloped/Forest/Open	0.6	0.08
Pasture	2.6	0.5

* Values calibrated for the Town of Chapel Hill and based on data from Hartigan (1983), CDM (1989), Haith (1992), and Schueler (1987).

In order to perform these loading calculations, the land use types and relative acreage must first be determined. For example, a proposed development contains 100 residential half acre lots (moderate density). A 20 acre commercial district is also planned. The remaining tracts (15 acres) will remain

undeveloped open space. The total nitrogen loading calculations for this proposed development would be as follows:

Moderate Residential	- 100 lots x 1/2 acre.....	50 acres
	- 50 acres x 7.4 lbs/acre/yr.....	370 lbs/yr
Commercial	- 20 acres x 13.2lbs/acre/yr.....	264 lbs/yr
Undeveloped	- 15 acres x 0.6 lbs/acre/yr.....	9 lbs/yr
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Total Nitrogen Load.....		643 lb/yr

II-F. MAINTENANCE AND OPERATIONS PLAN

The Stormwater Impact Statement shall include a Maintenance and Operations Plan. This plan shall detail the types and frequency of inspection and maintenance operations (major and minor), equipment necessary to perform maintenance activities, access to the stormwater control facility, disposal methods for uncontaminated and contaminated materials, and information regarding the facility owner(s) and party or parties responsible for facility operation and maintenance. The Town will require a maintenance plan and may require that a perpetual maintenance bond be posted.

III. STORMWATER MANAGEMENT PLAN (SEE SECTION IV FOR FURTHER INSTRUCTIONS REGARDING SINGLE-FAMILY OR TWO-FAMILY DWELLINGS)

A *preliminary* Stormwater Management Plan shall be submitted with the Stormwater Impact Statement detailing site location, existing and proposed stormdrainage system(s), stormwater detention structure(s), BMP's/IMP's, grading, landscaping, erosion control features, and Resource Conservation District location(s). The plan must present the existing and proposed conditions and features at a scale and quality suitable to include all impacted areas (on-site and off-site). For certain applications, a pre-application discussion with the Town Stormwater Management Engineer is suggested to discuss alternatives. A *final* Stormwater Management Plan shall be submitted prior to issuance of a Zoning Compliance Permit.

III-A. EROSION AND SEDIMENT MANAGEMENT

Any development causing the disturbance of more than 5000 sf of land area requires erosion and sedimentation control measures. For disturbance greater than 20,000 sf of land area, an Erosion Control Permit is required by Orange County. For development causing one (1) acre or more of land disturbance, the applicant must also submit an erosion control performance guarantee or bond with the Town. Contact the Engineering Department for the required dollar value of this guarantee

A general description of the proposed erosion and sediment control measures shall be indicated on the Stormwater Management Plan. If applicable, a phasing schedule for construction and/or removal

of proposed control devices will also be required to ensure adequate protection for all phases of the development. Inspection and approval of the installed devices by the Town or Orange County is required.

III-B. RESERVED STORM DRAINAGEWAY EASEMENT

All engineered stormwater facilities intended for management of peak discharges, volume, or water quality treatment shall be located within easements entitled: "RESERVED STORM DRAINAGEWAY EASEMENT" and shall be indicated on the Stormwater Management Plan. Unless specifically designated as being "Public", these easements and the facilities/functions they serve are considered by the Town to be private, and the Town assumes no responsibility for necessary inspection, operation, and/or maintenance duties.

IV. STORMWATER MANAGEMENT PLAN FOR SINGLE-FAMILY OR TWO-FAMILY DWELLINGS)

A Professional Engineer's Certification and Stormwater Management Plan are required for all Zoning Compliance Permit/Building Permit Applications for single or two-family development involving more than 5,000 square feet of land disturbance. The Stormwater Management Plan shall indicate the Best Management Practices (BMP's) and or Integrated Management Practices (IMP's) necessary to manage peak discharge rate, to provide 85% total suspended solids (TSS) removal and, if applicable, to provide volume management.

All design submittals shall be sealed by a professional engineer licensed in the State of North Carolina. The Stormwater Management Plan shall include all applicable stormwater impact calculations in lieu of a separate Stormwater Impact Statement. Erosion control measures and a Stormwater Operations and Maintenance Plan are required for all development disturbing more than 5,000 square feet of land area. Prior to issuance of a Certificate of Occupancy (CO), a P.E. Certification must be submitted certifying that the stormwater management measures were installed as shown on the approved Stormwater Management Plan, and the agreed upon stormwater easement(s) and covenant(s) must be recorded with the appropriate County Register of Deeds.

V. BEST MANAGEMENT PRACTICES AND INTEGRATED MANAGEMENT PRACTICES

If applicable, where the post-development peak discharge rate or volume of runoff exceeds the pre-development rate or volume and to achieve average annual 85% total suspended solids removal, BMP/IMP's will be required. These practices may include structural or non-structural measures. Structural measures may include, but are not limited to, level-spreaders, curb cuts or diffuse flow, grassed swales, wet or dry detention basins, wet retention basins, extended dry detention basins, bioretention areas, pervious pavement and other infiltration practices. Non-structural measures may include, but are not limited to, utilizing natural buffers, limiting impervious surfaces and limiting disturbed areas. Low impact design options are encouraged.

VI. ADJUSTMENTS OR WAIVERS

Information requirements may be adjusted or waived by the Town Manager for a particular development application upon written request of the applicant, provided that at least one of the following circumstances can be demonstrated:

- (a) Alternative measures for on-site and/or off-site management of stormwater have been proposed, and these measures are approved by the Town Manager and comply with local ordinance(s).
- (b) It is otherwise demonstrated that the proposed development will not produce any significant change to the existing pre-application hydrology.

If you have any questions regarding these Guidelines, contact the Town Stormwater Management Engineer at (919) 968-2833.

REFERENCES

CDM. 1989. Watershed Management Study: Lake Michie and Little River Reservoir Studies.

Field, Richard, M.L. O'Shea and K. K. Chin. 1993. Integrated Stormwater Management. Lewis Publishers. Boca Raton, FL.

Haith, D.A., et al. 1992. Generalized Watershed Loading Functions: User's Manual. NY.

Hartigan, J.P., et al. 1983. Calibration of NPS Model Loading Factors. Journal of Environmental Engineering Division. 109: no. 6 pp. 1259-1272.

Schueler, Thomas R. 1987. Controlling Urban Runoff: A Practice Manual for Planning and Designing Urban BMPs. Metropolitan Washington Council of Governments, Washington, DC.

Stormwater Best Management Practices 1999. North Carolina Department of Environment and Natural Resources, Division of Water Quality, Water Quality Section.

Urbonas, Ben, and P. Stahre. 1993. Stormwater Best Management Practices and Detention. Prentice Hall. Englewood Cliffs, NJ.