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Town of Chapel Hill

Stormwater Impact Statement Guidelines

(Effective January 1, 1997)

(Revised October 22, 2002)

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INTRODUCTION

All applications for developments or subdivisions which create four (4) or more lots and all Special Use Permit applications or any development (other than single-family or two-family dwellings) resulting in 5,000 or more square feet of land disturbance within the Town of Chapel Hill (Town) Planning Jurisdiction must include a Stormwater Impact Statement. Stormwater Impact Statements submitted to the Town of Chapel Hill shall comply with these Stormwater Impact Statement Guidelines. We encourage each applicant to arrange a pre-application meeting with the Town Stormwater Management Engineer to clarify any issues and to define and agree upon the scope of the required analysis. 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 (Manager).

SITE ANALYSIS AND NARRATIVE

A site analysis and narrative shall be provided with the submittal of a Stormwater Impact Statement. Characteristics of the existing site and proposed development shall include the following:

- A. Land use, density, and impervious surface area;
- B. Location, topography, on-site and off-site drainage conditions;
- C. Phasing and timing of project; and
- D. Existing delineation of the Resource Conservation District (RCD), Jurisdictional wetlands, soil series, perennial and intermittent streams as indicated on the Orange County Soil Survey and/or the USGS 7.5 Minute quadrangle map, Federal/State wildlife lands, and regulatory FEMA Special Flood Hazard Areas. If an intermittent or perennial stream is identified within 150 feet of the property to be developed, the applicant must submit a request for a field determination/confirmation to be performed by Town staff for each identified stream.

A map or maps shall be included in the Stormwater Impact Statement detailing site location, existing and proposed stormdrainage system(s), stormwater detention structure(s), and Resource Conservation District location(s). The map(s) 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) as agreed upon in the pre-application meeting with the Town Stormwater Management Engineer.

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IMPACT STATEMENT STATEMENT ANALYSES

A. SCOPE OF IMPACTED AREA

A pre-application meeting with the Town Stormwater Management Engineer is encouraged to determine the upstream and downstream limits of study to be included in the Stormwater Impact Statement, and to define study elements required. Possible study elements of concern may include, but are not limited to:

1. Backwater impacts;
2. Effects on existing upstream and/or downstream drainage conveyance facilities;
3. Upstream and/or downstream volumes, discharges and velocities;
4. Ability of natural drainage channel to handle additional volume discharges and velocities;
5. Potential mitigation measures; and
6. Site-specific considerations.

B. STORMWATER MODELING

Accepted engineering practice will be required. The Stormwater Impact Statement shall show both pre-development and post-development stormwater peak discharge data and hydrographs may be required on a site-specific basis. Final calculations and a detailed Stormwater Management Plan must be submitted and approved before a Zoning Compliance Permit (ZCP) for any phase of the project will be issued.

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.

C. NUTRIENT LOADING

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)*

LAND USE TYPE	TOTAL N	TOTAL P
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
Total Nitrogen Load.....		643 lb/yr

Although nutrient runoff is currently not regulated in Chapel Hill, this nutrient analysis is required as part of the Stormwater Impact Statement data submittal.

D. STORMWATER BMP CRITERIA:

The applicant shall utilize stormwater Integrated Management Practices (IMP's) and/or Best Management Practices (BMP's), as approved by the North Carolina Division of Water Quality (NCDWQ) and 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. See the NCDWQ Stormwater BMP Manual (latest) or contact the Town Stormwater Management Engineer for further information regarding IMP/BMP details.

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

Wet Detention Ponds	85 %
Extended Detention Wetlands	85 %
Pocket Wetlands	35 %
Sand Filters	85 %
Bioretention Areas	85 %
Grassed Swales (100 linear ft. per drained acre)	35 %
Extended Dry Detention Areas	50 %
Filter Strips	35 %
Infiltration Devices	85 %
Level Spreaders & Buffers	85 %

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.

E. EROSION AND SEDIMENT MANAGEMENT

The Stormwater Impact Statement must include a general description of the proposed erosion and sediment control measures. This description should include a list of control devices and placements necessary to comply with the requirements of the Chapel Hill Erosion and Sedimentation Control Ordinance which is enforced by the Orange County Sedimentation and Erosion Control Officer. A phasing schedule for construction and/or removal of proposed control devices and for the conversion of temporary devices to the permanent IMP's/BMP/s will also be required to ensure adequate protection for all phases of the development. Final inspection and approval by the Town is required.

F. MITIGATION MEASURES

If calculations indicate that the post-development peak discharge rate of runoff exceeds the pre-development rate, mitigation measures will be required. Mitigation measures may also be required for those developments that would significantly impact water quality based on the Stormwater Impact Statement findings. According to the location of the proposed development, mitigation measures may include but are not limited to, inlet/outlet control, reinforced channels, level-spreaders, buffers, curb cuts, grassed swales, wet or extended dry detention facilities, bioretention areas, and other IMP's/ BMP's.

G. MAINTENANCE AND OPERATIONS PLAN

The Stormwater Impact Statement for developments proposing stormwater control facilities 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 may require that a perpetual maintenance bond be posted.

H. RESERVED STORM DRAINAGEWAY EASEMENT

All engineered stormwater facilities intended for mitigation of peak discharges and/or to provide water quality treatment shall be located within an easement entitled: "Reserved Storm Drainage Easement". 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.

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

REFERENCES CITED

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.

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