STORMWATER MANAGEMENT

DESIGN AND CONSTRUCTION CRITERIA

The following criteria will be used for the design and construction of all stormwater facilities within extraterritorial boundaries of the City of Greenville.

GENERAL:

- Design and installation of all stormwater impoundment facilities must comply with applicable Federal, State, and local laws. Attention should be given to the City of Greenville Soil Erosion and Sediment Ordinance and the North Carolina Dam Safety Law.

- In no case shall a habitable structure be located within the impoundment area of any stormwater storage facility.

- No utilities (sewer lines, power lines, water lines, etc.) shall be located within or immediately around any impoundment facility.

- All impoundment facilities will be considered permanent.

- All facilities shall be protected by a "Drainage Easement" or as a common lot recorded at Pitt County Register of Deeds office.

STORMWATER PLAN:

A stormwater plan acceptable by the City Engineer's standards will include the following:

I. Stormwater Management Plan

  a. General

    i. Vicinity Map

    ii. Legend, North arrow and Scale

    iii. Title Block with development name, owner, engineering firm, engineer's seal, and signature.

    iv. Existing and proposed contours at not more than 2' intervals

    v. All published flood hazard boundaries identified

    vi. Existing and proposed improvements (built upon area)

    vii. Existing and proposed ground cover

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b. Drainage

    i. Existing and proposed drainage patterns and structures (BMP's, pipe systems, ditches/streams, ponds, etc.)

    ii. Size, length, and grade of pipes and swales

    iii. Drainage area map

    iv. Soil types

c. Calculations

    i. First Flush

    ii. Attenuation of 1-year, 24-hour storm

    iii. Underdrain calculations (if necessary)

    iv. Sizing of treatment area

    v. Pipe/swale sizing calculations

d. Maintenance

    i. BMP maintenance agreement

    ii. Check to record agreement (Pitt County Register of Deeds)

    iii. Maintenance Plan

    iv. Adequate access to perform required maintenance

    v. Easement (if required)

e. Erosion Control

    i. Construction sequence

    ii. Location of BMP erosion control measures (if necessary)

II. Stormwater Management Narrative

a. Description of project

b. Calculations of runoff

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c. Calculations for design of stormwater impoundment & facility.

d. Staging of project

e. Soil conditions

f. Soil type

g. Susceptibility to erosion and preventive measures

h. Seeding formula

NUTRIENT REDUCTIONS :

- All facilities constructed to achieve nutrient reductions shall meet all requirements specified in the North Carolina Division of Water Quality Stormwater Best Management Practices Manual.

ATTENUATION :

- Various methods of which impoundment storage volume is approximated may be utilized; however, the result must at least equal that volume approximated using the method described within this manual.

- All required storage volume approximations must be included with the submitted design.

PRIMARY OUTLET DEVICE :

- All outlet devices must be constructed adhering to current construction standards as described in the City of Greenville's "Manual of Standard Designs and Details."

- Alternate outlet devices not referred to in this publication may be approved at the discretion of the City Engineer. Such approval must be specifically requested upon submittal of the drainage plan.

- The water velocity generated by any outlet device must meet the requirements set forth by the City of Greenville Soil Erosion and Sediment Control Ordinance.

SECONDARY OUTLET DEVICE (EMERGENCY SPILLWAY)

- It is recommended that all vegetated spillways be constructed in nonfilled or cut areas. However, emergency spillways may be constructed in fill areas provided they are asphalt or concrete lined and have sufficient approach and exit areas.

- Any emergency spillways as a minimum must pass the peak 25-year flood, as approved by the City Engineer, after the storage facility has reached its capacity.

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FACILITY LIFE :

- All stormwater impoundments are to be permanent facilities.

- All materials used in the construction of a stormwater impoundment facility must have a life expectancy to that of the total facility or a regularly scheduled replacement program must be provided.

Determination of Impoundment Storage Volume

On-site detention involves the storage of stormwater runoff and the controlled release of that runoff and is applicable for all proposed sites required to meet the City of Greenville's Stormwater Management Program. See this program and any amendments for requirements. The excess runoff from the developed site is less than or equal to the rate of stormwater runoff prior to the installation of the impervious cover for storms up to and including the 1-year (80% of 2-year) storm. All impoundments will have an emergency device or "spillway" that will safely pass the 25-year storm, as approved by the City Engineer. The weir will be sized to carry the 25-year storm safely with an additional one foot of freeboard.

Flood routing is an algebraic method for determining the time and magnitude of a particular flood situation with regard to the rate of inflow storage versus the rate of outflow discharge. For the purpose of this manual, the routing procedure is based on the procedure described in the "Design Approaches of Stormwater Management in Urban Areas" by Dr. H. Rooney Malcolm, Jr. of N.C. State University.

Maximum Permissible Release Rate

The maximum release rate must be limited to that rate of runoff discharged from the site immediately prior to the proposed development during the 1-year (80% of 2-year) storm. This rate can be calculated according to the Rational Method described in this manual.

A group of hydrographs can be developed where the intensity is varied by using storms with different durations. The volume of runoff associated with each hydrograph is calculated by multiplying the maximum runoff rate with the respective storm duration (Note that runoff is measured in cubic feet per second and the duration is in minutes).

Once the hydrographs have been developed it is necessary to convert the maximum runoff rates for each rainfall to storm runoff volumes. These volumes should be computed in cubic feet.

This is only an approximation which is applicable to small basins. Many different methods may be used in the design of impoundment facilities and innovative designs will be considered by the City Engineer provided the maximum permissible release rate and storage facility requirements are met with a safety factor. In all cases, the design will be routed for confirmation.

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