



**PRELIMINARY STORMWATER
MANAGEMENT CALCULATIONS**

**The Extra Garage III
Chatham County, North Carolina**

January 2, 2014

ECE Project No. 13-029

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PRELIMINARY STORMWATER MANAGEMENT CALCULATIONS

Project Name: **The Extra Garage III**
Project Number: 13-029
Report Date: January 2, 2014
Purpose: The purpose of this report is to provide preliminary design of stormwater management facilities based on current building design provided by the Architect and current stormwater design standards for Chatham County.

SITE DESCRIPTION:

Project Location: Western side of the intersection of WH Jones Road and Pea Ridge Road in Chatham County, North Carolina.
Site Size: 11.17 acres by GIS and partial survey.
Soil Types: Predominantly MdB with a small area of CrB:
CrB – Creedmoor-Green Level Complex: Hydrologic Group C
MdB - Mardon: Hydrologic Group C/D
Hydrologic Group C used for calculation purposes
Watershed: WS-IV NSW / Jordan Lake
River Basin: Cape Fear River Basin
Site Characteristics: The site is a heavily wooded, 11.17 tract currently developed as a residential lot with a single family home and several outbuildings.
Drainage Characteristics: Although all runoff is directed westward from the roadway, the site is divided by a ridgeline which runs northwestward and divides drainage into a northern and southern basin; these basins converge shortly after leaving the property and prior to entering the Jordan Lake. Slopes on the site average 5%-8% and runoff consists generally of shallow concentrated flow through wooded vegetation.

PROPOSED DEVELOPMENT:

Proposed Usage: The proposed development consists of an RV and boat storage facility. Overall impervious area will be held at a maximum of 24%.
Proposed Drainage: Proposed drainage for the development mimics the existing site characteristics and directs the runoff to a wet detention pond sized for the following:

- 90% TSS removal, allowing direct discharge of runoff without need for a level spreader device
- Nutrient reduction of phosphorus and nitrogen below thresholds required by the state. Buydown of Nitrogen will still be required
- Peak flow attenuation of all storms between the 1 and 10 year events.

REQUIREMENTS:

Stormwater Management Chatham County requires that new development comply with the following rules regarding stormwater management and conveyance:

1. Provide Stormwater Quality Treatment by removing 85% TSS from the runoff produced from the 1-yr, 1hr storm event (1.43 inches)
2. Provide peak rate reduction for the 1-, 2-, 5-, and 10-year, 24 hour storm events to pre-development rates unless otherwise exempted through analysis of the 10% rule.
3. Conveyance systems shall meet or exceed the guidelines outlined by the NCDOT Hydraulics Unit, provide non-erosive flow at discharge points, accommodate all drainage which is directed to the system, and shall protect the subject and adjacent property from flooding during the 50-year storm.

ANALYSIS:

Stormwater Management (Quality)

All impervious area is directed a wet pond facility designed to treat a volume of runoff produced from the 1-yr, 1-hr storm event. This facility is designed in accordance with the current state regulations and incorporates a forebay, vegetative shelf, and a flow control structure. Additionally, the facility provided is designed to remove 90% of TSS, thus removing the requirement for a level spreader device from this facility. Nutrient removal was calculated using the Accounting Tool required by the state for development with the Jordan Lake Watersheds.

Stormwater Management (Peak Flow Attenuation)

The wet pond provided is sized to provide peak flow attenuation during storms from the 1-year to 10-year storm event. Calculations were performed using Hydraflow Hydrographs in accordance with Chatham County guidelines.

Stormwater Conveyance Calculations:

Although the pipe system is shown, sizing calculations were not performed as part of the preliminary design. Instead, the summary charts provided in Appendix B was used to get a rough guideline for the pipe size required.

RESULTS:

Detailed calculations are provided in the Attachments at the end of this report. The results of the required calculations are summarized below.

Stormwater Management

The wet pond provided meets the following:

- 90% TSS removal design guidelines
- Diffuse flow requirements through the use of enhanced TSS removal
- Nutrient reduction below maximum thresholds, but buydown will still be required for Nitrogen.

Peak Flow Attenuation

The wet pond facility is sized to provide adequate area for peak-flow attenuation of the 1-year through 10-year storm events. Placement of discharge pipes is designed to help prevent any downstream issues during larger storm events.

Pipe and Ditch Calculations

Although the stormwater conveyance calculations were not part of the scope of this report, the preliminary pipe systems indicated are routed to prevent erosion or downstream drainage issues.

CONCLUSION:

Based on the above results, the proposed development is capable of providing the required stormwater management measures required by the state and Chatham County.

ATTACHMENTS:

Exhibits

Chatham Co. Soils Map	Site location highlighted
Chatham County GIS	Site location highlighted
USGS 7.5 Minute Quad Map	Site location highlighted
FEMA Map download	Site location highlighted

Stormwater Management Calculations

Treatment Design

Treatment Sizing	EXCEL worksheet
Jordan Lake Accounting Tool	EXCEL worksheet

Peak Flow Attenuation

Drainage Exhibits	ACAD exhibits for Pre and Post Development
Hydrographs	Hydraflow Worksheets

Appendix A

Preliminary Soils Report	Report
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Appendix B

Preliminary Pipe Size Chart	Excel Worksheet based on Drainage Area and Flow Capacity
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