PRELIMINARY
STORMWATER IMPACT ANALYSIS

FOR

Cole Place CUP
Modification

CHATHAM COUNTY, NC

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Cole Place Townhome Development is located in North Chatham County on the east side of US Highway 15-501 at the intersection with Manns Chapel Road and directly in back of Cole Park Plaza Shopping Center. The original PUD including Cole Park Plaza was approved in the 1980's. This phase of the development is 9.24 acres. This modification to the PUD includes the addition of 16 townhomes to the existing 60 townhomes already constructed. This modification will result in a total impervious area of 12.5% on this parcel. The maximum in this watershed is 36% impervious area.

The parcel is undeveloped with medium growth trees on a portion of the property. The older growth timber is located close to the creek where no land disturbance is proposed. The soil type on the property is Wedowee. Wedowee are moderately to well drained and are classification C. Cub Creek flows from the north along the eastern property boundary. Cub Creek is a perennial creek with a 50-foot buffer on each side of the creek. The entire property slopes toward Cub Creek.

This site is located in the B. Everett Jordan Lake water-supply watershed and must comply with the Chatham County Watershed Protection Ordinance. The site must also comply with the NPDES Phase II post-construction runoff stormwater management control requirements.

The existing townhome project has a stormwater basin constructed which provides stormwater quality and quantity reduction for the stormwater running off the site today. Our additional 16 townhomes and asphalt driveway will require the size of the existing pond to be increased slightly. There is ample area adjacent to the existing pond for any increase in surface area. The stormwater pond is ideally located at the low point of the site where it can capture all of the runoff from the site. The existing wet pond provides the high level of stormwater treatment required for the project to comply with the strict County stormwater regulations and Jordan Lake water supply watershed regulations.

The site also complies with the high-density option of the NPDES Phase II regulations for stormwater management controls. Those specific regulations include:

a. Stormwater from the post-development runoff for the 1-year, 24-hour storm event shall not exceed the pre-development conditions for the same event.
b. The stomwater facility shall be designed to capture a minimum of 85% Total Suspended Solids (TSS) from the runoff leaving the developed conditions.

The proposed stormwater wet pond has been sized based on the preliminary plans for this project. Addition design and details will be required once exact site design and site surveying is conducted. Runoff from the proposed conditions was computed for the 1-year, 24-hour storm event and the pond was sized for this condition. The predevelopment runoff may be subtracted from the post-developed conditions but was not. This will make the pond oversized by 20% or so and is good practice at this phase of preliminary design. The surface area of the wet pond was computed using the requirements set forth in the NC Division of Water Quality BMP Manual, 1999 edition.

The following are the Design Requirements for a Wet Basin taken from the NC Division of Water Quality Stormwater Manual of Best Management Practices, 1999:

1.3 Design Requirements

The following design requirements provide guidance for water quality control. Water quantity control may also be required by the local government or municipal authority.

1. Permanent Water Quality Pool

    a. The surface area required can be determined using the permanent pool surface area / drainage area (SA/DA) ratio for given levels of impervious cover and basin depths as outlined in Table 1.1. The SA/DA table is based upon 85% TSS removal in the piedmont. SA/DA Tables for the coastal counties are available from your local DWQ Regional Office.

    b. Average permanent water quality pool depths should be between 3 to 6 feet with a required minimum of 3 feet.

    c. Impervious areas used for sizing should be those that are expected in the final buildout of the development and any offsite runoff that drains to the pond.

    d. Enough volume should be included in the permanent pool to store the sediment that will accumulate between cleanout periods.

    e. A forebay (which may be established by a weir) must be included to encourage early settling. This allows drainage of only a portion of the basin in order to excavate accumulated sediment. The forebay volume should equal about 20% of the total basin volume. Multiple inlets may require additional forebay volume.

2. Temporary Water Quality Pool

    a. The temporary water quality pool is sized to detain the runoff volume from the first inch of rain. This requirement refers to volume and not a particular design storm.

    b. The temporary water quality pool for extended detention must be located above the permanent water quality pool.

    c. The outlet device for this temporary water quality pool should be sized to release the runoff volume associated with the first 1-inch of rainfall over a drawdown period of 48 to 120 hours (2 to 5 days).

3. General

a. Basin shape should minimize dead storage areas and short circuiting. Length to width ratios should be 3:1 or greater. (Barfield, et al., 1981, pp. 426-429; Florida DEP, 1982, pg. 6-289).

b. If the basin is used as a sediment trap during construction, all sediment deposited during construction must be removed before normal operation begins.

c. Aquatic vegetation should be included for a wetland type detention basin (Maryland DNR, March 1987; Schueler, 1987, Chapter 4 and 9). A minimum ten foot wide shallow sloped shelf is needed at the edge of the basin for safety and to provide appropriate conditions for aquatic vegetation (Schueler, 1987). This shelf should be sloped 6:1 or flatter and extend to a depth of 2 feet below the surface of the permanent pool (Shaver and Maxted, DNREC, 1994). A list of suitable wetland species and propagation techniques are provided in Schueler (1987) and Maryland DNR (1987).

d. An emergency drain (with a pipe sized to drain the pond in less than 24 hours) should be installed in all ponds to allow access for riser repairs and sediment removal (Schueler, 1987).

Table 1.1 Surface Area to Drainage Area Ratio For Permanent Pool Sizing For 85% Pollutant Removal Efficiency in the Piedmont

% Impervious Cover	Permanent Pool Depth (feet)						
	3.0	4.0	5.0	6.0	7.0	8.0	9.0
10	0.59	0.49	0.43	0.35	0.31	0.29	0.26
20	0.97	0.79	0.70	0.59	0.51	0.46	0.44
30	1.34	1.08	0.97	0.83	0.70	0.64	0.62
40	1.73	1.43	1.25	1.05	0.90	0.82	0.77
50	2.06	1.73	1.50	1.30	1.09	1.00	0.92
60	2.40	2.03	1.71	1.51	1.29	1.18	1.10
70	2.88	2.40	2.07	1.79	1.54	1.35	1.26
80	3.36	2.78	2.38	2.10	1.86	1.60	1.42
90	3.74	3.10	2.66	2.34	2.11	1.83	1.67

Notes: Numbers given in the body of the table are given in percentages.
Coastal SA/DA ratios can be obtained from the local DWQ Regional Office.

From these requirements, the wet pond preliminary sizing is as follows:

SA / DA: The wet pond drainage area is approximately 8.2 acres.
The total impervious area is approximately 4.76 acres.
The % impervious is 58% for the area draining to the proposed wet pond (4.76/8.2).
We will assume a permanent pool depth = 4.0 feet.

The SA/DA ratio from the chart above is 1.97.

Wet Pond Surface Area Requirement

Permanent Pool = 1.97/100 x 8.2 acres = 0.16 acres = 7,036 sf.

Existing Wet Pond Permanent Pool Area Provided = 6,650 SF

The existing WET POND is large enough if the average permanent pool depth is greater than 4 feet. The existing pond surface area can be increased 400 square feet or the depth of the permanent pool can be increased. This will be determined at the construction drawing phase.