



North Carolina Department of Environment and Natural Resources

Division of Water Quality

Coleen H. Sullins

Director

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Governor

Dee Freeman
Secretary

October 14, 2011

RICHARD L. MANN – VICE CHANCELLOR FINANCE & ADMINISTRATION
THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
CB#1000 – 302A SOUTH BUILDING
CHAPEL HILL, NORTH CAROLINA 27599-1000

Subject: Application No. WQ0023896
Additional Information Request
UNC-CH Bingham Facility
Wastewater Irrigation System
Orange County

Dear Vice Chancellor Mann:

Central and Regional Aquifer Protection Section staff have completed their review of the application package received August 18, 2011. However, additional information is required before the review may be completed. Please address the items on the following pages no later than the close of business on November 13, 2011.

Please be aware that you are responsible for meeting all requirements set forth in North Carolina rules and regulations. Any oversights that occurred in the review of the subject application package are still the Applicant's responsibility. In addition, any omissions made in responding to the outstanding items shall result in future requests for additional information.

Please reference the subject application number when providing the requested information. All revised and/or additional documentation shall be signed, sealed and dated, with **three copies** submitted to my attention at the address below. Please note that failure to provide this additional information on or before the above requested date may result in your application being returned as incomplete.

If you have any questions regarding this request, please do not hesitate to contact me at (919) 715-6160. Thank you for your cooperation.

Sincerely,

Nathaniel D. Thornburg
Environmental Engineer

cc: Matthew D. Fleahman, PG – Raleigh Regional Office, Aquifer Protection Section
Charles D. Riley, Jr., PE – McKim & Creed
Scott J. Frederick, LSS – Soil, Water & Environmental Group, PLLC
Edwin Andrews, PG, LSS – Edwin Andrews & Associates
Permit Application File WQ0023896

AQUIFER PROTECTION SECTION
1636 Mail Service Center, Raleigh, North Carolina 27699-1636
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Notes:

1. When providing an additional information response to the Division, please provide a letter addressing each comment and provide a reference as to the location of the requested information in the updated application package.

Application:

1. Please amend Application Item II.5. to include the submittal data for the Stormwater Management Plan. While the Stormwater Management Plan does not need to be approved prior to issuance of this non-discharge permit modification, the plan shall at least be submitted to the appropriate agency for review.
2. Amend Application Item III.5. to include the estimated influent concentrations for nitrate, nitrite, total nitrogen and total phosphorus. In addition, amend this item to include the designed effluent concentrations for all of the listed parameters, not the 15A NCAC 02T .0505(b) limits. These values can either be based upon the wastewater treatment facility's design calculations to remove the listed parameters, or can be based upon actual sampled measurements. Please note that the Division needs these values to verify the submitted agronomic calculations.
3. Amend Application Item IV.2. to include the actual minimum field measured distance from the irrigation system and treatment/storage units to each applicable item listed in 15A NCAC 02T .0506. Distances greater than 500 feet may be marked N/A.
4. Amend the two tables in Application Item VI.5. to include the correct effective or total volumes for the two storage structures. The current tables list the effective volume as equal to the total volume. Please note that the total volume is the volume between the top of the embankment and the basin bottom. The effective volume is the volume between the two-foot freeboard elevation and the basin bottom or outlet pipe, whichever is higher.
5. Application Item VII.7. states that the recommended annual loading rate is 10.28 inches per year (in/yr). However, Page 10 of the soil evaluation recommends an annual loading rate of 8.2 in/yr. Please amend.
6. Application Item VII.10.a. states that the proposed irrigation area is 249,163 square feet (ft²). Using the proposed average daily flow of 3,556 gallons per day (GPD), this equates to a design annual loading rate of 8.36 in/yr. Please amend this item to include the correct designed annual loading rate.
7. Amend the second table in Application Item VII.10.a. to state the wetted diameter of the nozzles is 80 feet, and that its wetted area is 5,027 ft².
8. Please note that the Division did not verify the calculations in Application Item VII.11. because the proper designed effluent concentrations were not provided in Application Item III.5.

Soil Evaluation:

1. Table 1 on Page IV states that the irrigation shall be seasonal, however, Application Item VII.7. states annual. Please amend for consistency.
2. Section 4.1 on Page 4 states that spray irrigation shall not occur within 25 feet of non-SA surface waters. Per 15A NCAC 02T .0506(a), this setback shall be 100 feet. Please amend.
3. Section 5.2 on Page 8 makes note of having a Sodium Adsorption Ratio (SAR) of less than 10. Please clarify whether or not excessive salts are anticipated to be in the effluent waste stream.
4. Page 10 of the soil evaluation recommends an annual loading rate of 8.2 in/yr, however, Application Item VII.7. states that the recommended annual loading rate is 10.28 in/yr. Please amend.
5. Per Application Instruction E and 15A NCAC 02T .0504(b)(4), provide a standard soil fertility analysis for both the Georgeville and Herndon soil series.

Agronomist Report:

1. Please note that the agronomic calculations have not been verified by the Division because the designed effluent concentrations in Application Item III.5. were not provided.
2. Pages 4 and 5 again make mention of the Sodium Adsorption Ratio (SAR), and recommends that the SAR be analyzed. Accordingly, please clarify whether or not high salt concentrations will be present in the effluent.

Water Balance:

1. The submitted water balance was truncated during printing/copying. Accordingly, the Division is unable to determine the temperature and precipitation data used, and therefore the water balance calculations have not been verified. Please resubmit copies of the original water balance that include all of the required data.
2. Please provide the top of berm surface areas for both of the wet weather storage basins.
3. Page 2-7 of Ed Andrew's report indicates that runoff was used in the truncated water balance. Please note that the Division respectfully disagrees with the proposed method of determining runoff using a straight 20% runoff calculation, which is not representative of rainfall intensity or soil surface infiltration rates. Therefore, if the Applicant intends to use runoff in the water balance calculations, the following information will need to be submitted:

- a. The Division recommends the following equation to determine runoff:

$$R = \frac{(P - 0.2S)^2}{P + 0.8S}, \text{ where } R = \text{runoff, } P = \text{precipitation and } S = \left(\frac{1000}{CN}\right) - 10$$

- b. Daily precipitation data from a 30 year time span that is from the same source used in the 80th percentile data in the water balance.

Water Balance (continued):

- c. Submit a copy of a referenced source (e.g., Soil Conservation Service) that includes the following information for North Carolina soils justifying the use of the selected Curve Number (CN):
 - i. Cover Type and Hydrologic Condition for the proposed site
 - ii. Hydrologic Soil Groups for North Carolina Soils identifying the soil classifications for Georgeville and Herndon (i.e., A, B, C or D)
 - iii. Curve Number (CN) for the Hydrologic Soil Group based on the Cover Type and Hydrologic Condition.

Using the justified CN and S value for the appropriate cover type and hydrologic soil condition, determine the potential runoff for each storm event that occurred in the data set (i.e., 30 year period), then sum the calculated runoff per month, and then average into annual monthly runoff values. Once 30-year monthly average runoff values are determined, it may be weighted to 80th percentile to be consistent with the precipitation data in the water balance. Note daily precipitation data may be downloaded from the State Climate Office of North Carolina (<http://www.nc-climate.ncsu.edu/>)

Engineering Calculations:

1. If actual sample measurements are not available, per Application Instruction Q and 15A NCAC 02T .0504(c)(3), amend the engineering calculations to include pollutant loading calculations for each treatment unit. Using the estimated influent concentrations listed in Application Item III.5., perform pollutant removal calculations for each listed parameter within each treatment unit. Once the final designed effluent concentrations have been determined, input those values into Application Item III.5. as the designed effluent concentrations. Next, use those applicable nutrient concentrations to determine the nitrogen and phosphorous balance calculations in the agronomist evaluation and subsequently listed in Application Item VII.11.
2. Per Application Instruction Q and 15A NCAC 02T .0504(c)(3), amend the Engineering Calculations to include buoyancy calculations for the chlorine contact chamber.
3. The storage calculations for the two wet weather storage ponds do not match the provided volumes in Application Item VI.5. Please review these calculations and amend the appropriate document as necessary.
4. Application Item III.2. states the average daily flow is 3,556 GPD; however, the design calculations for the chlorine contact chamber and the spray field use a flow of 3,500 GPD. Please revise these calculations to be consistent with other portions of the application package.

Site Map:

1. Review of the submitted site map shows that existing MW-1 is between the compliance and review boundaries, and existing MW-2 is outside the compliance boundary. Accordingly, the Applicant shall propose a new groundwater monitoring well network, where at least one upgradient and one downgradient monitoring well is located on the review boundary. In addition, the Applicant should consider the feasibility of installing a groundwater monitoring well network on the review boundary around the wet weather storage basins.

Operation and Maintenance Plan:

1. Please note the final Operation and Maintenance Plans are not required to be submitted until the final Engineering Certification is provided to the Division.

Per Application Instruction S and 15A NCAC 02T .0507, provide an Operation and Maintenance (O&M) Plan for the wastewater treatment and irrigation system. At a minimum, the O&M Plan shall include:

- a. Describe the operation of the system in sufficient detail to show what operations are necessary for the system to function and by whom the functions are to be conducted.
- b. Describe anticipated maintenance of the system.
- c. Include provisions for safety measures including restriction of access to the site and equipment.
- d. Include spill control provisions such as response to upsets and bypasses including control, containment and remediation, as well as contact information for plant personnel, emergency responders and regulatory agencies.

Residuals Management Plan:

1. Please note that per 15A NCAC 02T .0504(j), the Applicant shall obtain a written commitment from a permitted residuals disposal/utilization program and provide it to the Division prior to operation of the permitted system.

General:

1. At the recommended annual loading rate of 8.2 in/yr, the proposed irrigation fields will be hydraulically loaded to the proposed permitted capacity, yet well below the assimilative capacity of the soils. The Division is concerned that this design will not allow for operational control of the system, which could present possible future non-compliance. The Division requests that the Applicant either reevaluate the annual loading rate capacity of the proposed irrigation area, or add additional acreage to allow for greater flexibility when operating the system.

Please note that the recommended annual loading rate of 8.2 in/yr for Georgeville and Herndon soils is far lower than typical recommendations for these soils. In addition, the submitted water balance uses a K_{SAT} reduction factor of 4%. Since the K_{SAT} reduction factor may be in the range of 4 to 10%, it has been the Division's experience that for well drained soils, such as Georgeville and Herndon, a higher reduction factor is acceptable. Accordingly, the Division recommends that the Applicant consider these facts if reevaluating their water balance.