

J. R.

DIVISION OF WATER QUALITY

GROUNDWATER SECTION

RECEIVED
WATER QUALITY SECTION
MAR 02 2004

February 13, 2004

MEMORANDUM

To: Kim Colson

cc: Sherri Knight, GWS-RO

Through: Debra Watts *for DS*

From: David Goodrich *DS*

Subject: City of Burlington / Land Application Program
Forsyth County
WQ0000520/GW03142

The Groundwater Section is in receipt of the subject application to renew and modify existing Permit Number WQ0000520, issued on June 6, 2001. The existing permit allows the applicant to apply 8,000 dry tons of wastewater residuals from four of the city's wastewater treatment facilities onto approximately 3,378.9 acres of farmland on 204 sites in the counties of Alamance, Caswell, Chatham, and Orange. Although no groundwater monitoring is required at any of the sites, some of the sites have application restrictions due to their soil characteristics.

The proposed modifications involve removing 88 of the existing sites from the program, adding five new sites (NC-CH-251-01, 02, 03, 04 and 05), and renewing all of the remaining 116 existing sites (see Figures 1 through 88). In order to evaluate the collective ability of the 2,375.80 acres on 121 sites to treat the residuals, the rate of applying Plant Available Nitrogen (PAN) was compared to the ability of the crops to utilize the loadings. According to laboratory analyses performed on the residuals, a total of 312,800 pounds of PAN will be applied to the sites each year (assuming surface application). If the residuals are incorporated or injected into the soil, the PAN loading will be 359,200 pounds. Allowing for the slow mineralization rate of nitrogen in the soil, the five-year maximum adjusted loadings are 485,600 pounds per year (surface application) or 532,000 pounds per year (incorporation or injection). In actuality, 2,072.00 acres will receive surface applications and the remaining 303.80 acres will receive residuals by incorporation or injection. The surface application area will be planted in fescue, which has a PAN utilization rate of 250 pounds per acre per year. Thus, the surface application area has a treatment capacity of 518,000 pounds of PAN per year. This leaves 14,000 pounds of PAN to be applied to, and treated by, incorporation or injection on the remaining 303.80 acres. The remaining acreage will be planted in corn, soybeans, and small grains. The most conservative of these three crops is small grains, with a PAN consumption rate of 100 pounds per acre per year. Using the most conservative crop, the 14,000 pounds of PAN will require a treatment area of at least 140 acres. A total area of 303.80 acres is available.

The Groundwater Section recommends that the conditions listed in the existing permit that pertain to sites which are being renewed be carried forward into the new permit.

The Groundwater Section has reviewed the subject application for the renewal and modification of the permit recommends re-issuance of the permit with the following conditions:

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APPLICATION AREAS COVERED BY THIS PERMIT

| Site/Field | Owner/Operator | County | Status (e.g. new or existing) | Net Acres | Condition (see below) | Figure# |
|-------------|-----------------------------------|----------|--|--------------|-----------------------------|---------|
| NC-AM-13-1 | Kathleen Tinnin/ James Hadley | Alamance | Existing | 13.10 | GW-A | 1, 2 |
| NC-AM-13-2 | Kathleen Tinnin/ James Hadley | Alamance | Existing | 31.30 | GW-A | 1, 2 |
| NC-AM-13-3 | Kathleen Tinnin/ James Hadley | Alamance | Existing | 42.00 | GW-A | 1, 2 |
| NC-AM-35-1 | Joe Rice | Alamance | Existing | 6.80 | GW-A | 3, 4 |
| NC-AM-35-2 | Joe Rice | Alamance | Existing | 12.40 | GW-A | 3, 4 |
| NC-AM-35-3 | Joe Rice | Alamance | Existing | 23.40 | GW-A | 3, 4 |
| NC-AM-35-4 | Joe Rice | Alamance | Existing | 19.50 | GW-A | 3, 4 |
| NC-AM-35-5 | Joe Rice | Alamance | Existing | 31.90 | GW-A | 3, 5 |
| NC-AM-55-2 | Ruth Pegg/ Joe Rice | Alamance | Existing | 3.70 | GW-A | 6, 7 |
| NC-AM-55-3 | Ruth Pegg/ Joe Rice | Alamance | Existing | 5.70 | GW-A | 6, 7 |
| NC-AM-55-4 | Ruth Pegg/ Joe Rice | Alamance | Existing | 2.50 | GW-A | 6, 7 |
| NC-AM-55-5 | Ruth Pegg/ Joe Rice | Alamance | Existing | 22.00 | GW-A | 6, 8 |
| NC-AM-57-1 | Jerry Watkins | Alamance | Existing | 15.00 | GW-A | 9, 10 |
| NC-AM-58-1 | Amy Sarvay/ Leonidas Newlin | Alamance | Existing | 8.20 | GW-A | 11, 12 |
| NC-AM-72-1 | Harold Justice | Alamance | Existing | 6.20 | GW-A | 13, 14 |
| NC-AM-72-2 | Harold Justice | Alamance | Existing | 10.00 | GW-A | 13, 14 |
| NC-AM-73-1 | Leonidas Newlin | Alamance | Existing | 20.00 | GW-E | 15, 16 |
| NC-AM-73-2 | Leonidas Newlin | Alamance | Existing | 7.20 | GW-A | 15, 16 |
| NC-AM-73-3 | Leonidas Newlin | Alamance | Existing | 9.60 | GW-A | 15, 16 |
| NC-AM-98-1 | F.C. McPherson/ Eric McPherson | Alamance | Existing | 19.00 | GW-A | 17, 18 |
| NC-AM-98-2 | F.C. McPherson/ Eric McPherson | Alamance | Existing | 38.00 | GW-A | 17, 18 |
| NC-AM-98-4 | Eric McPherson | Alamance | Existing | 42.00 | GW-A | 19, 20 |
| NC-AM-99-1 | City of Burlington | Alamance | Existing | 15.30 | GW-A | 21, 22 |
| NC-AM-100-1 | Terry McPherson | Alamance | Existing | 30.00 | GW-A | 23, 24 |
| NC-AM-103-1 | Jerry Watkins | Alamance | Existing | 23.00 | GW-A | 25, 26 |
| NC-AM-109-1 | Chap McQueen/ Blair Thompson | Alamance | Existing | 16.20 | GW-A | 27, 28 |

*New
buffer map*

| | | | | | | |
|--------------|---|----------|----------|-------|------|--------|
| NC-AM-109-2 | Chap McQueen/ Blair Thompson | Alamance | Existing | 6.50 | GW-A | 27, 28 |
| NC-AM-109-3 | Chap McQueen/ Blair Thompson | Alamance | Existing | 7.30 | GW-E | 27, 28 |
| NC-AM-110-1 | Leonidas Newlin | Alamance | Existing | 28.20 | GW-A | 29, 30 |
| NC-AM-110-2 | Leonidas Newlin | Alamance | Existing | 9.00 | GW-A | 29, 30 |
| NC-AM-116-1 | H.W. Byrd | Alamance | Existing | 19.30 | GW-A | 31, 32 |
| NC-AM-116-3 | H.W. Byrd | Alamance | Existing | 45.30 | GW-A | 31, 33 |
| NC-AM-116-4 | H.W. Byrd | Alamance | Existing | 29.40 | GW-A | 31, 33 |
| NC-AM-116-5 | H.W. Byrd | Alamance | Existing | 51.50 | GW-A | 31, 33 |
| NC-AM-116-6 | H.W. Byrd | Alamance | Existing | 11.60 | GW-A | 31, 34 |
| NC-AM-116-7 | H.W. Byrd | Alamance | Existing | 81.50 | GW-A | 31, 33 |
| NC-AM-116-8 | H.W. Byrd | Alamance | Existing | 71.60 | GW-A | 31, 34 |
| NC-AM-116-9 | H.W. Byrd | Alamance | Existing | 44.90 | GW-A | 35, 36 |
| NC-AM-116-10 | H.W. Byrd | Alamance | Existing | 12.90 | GW-A | 35, 36 |
| NC-AM-116-11 | H.W. Byrd | Alamance | Existing | 49.80 | GW-A | 35, 36 |
| NC-AM-116-12 | H.W. Byrd | Alamance | Existing | 32.00 | GW-A | 35, 36 |
| NC-AM-116-13 | H.W. Byrd | Alamance | Existing | 53.30 | GW-A | 35, 37 |
| NC-AM-118-1 | Simon Ross Stephens | Alamance | Existing | 28.00 | GW-A | 38, 39 |
| NC-AM-118-2 | Simon Ross Stephens | Alamance | Existing | 13.00 | GW-A | 38, 40 |
| NC-AM-118-3 | Simon Ross Stephens | Alamance | Existing | 16.00 | GW-A | 38, 40 |
| NC-AM-118-4 | Simon Ross Stephens | Alamance | Existing | 22.00 | GW-A | 38, 40 |
| NC-AM-118-5 | Simon Ross Stephens | Alamance | Existing | 12.00 | GW-A | 38, 41 |
| NC-AM-118-6 | Simon Ross Stephens | Alamance | Existing | 30.00 | GW-A | 38, 41 |
| NC-AM-118-7 | Simon Ross Stephens | Alamance | Existing | 7.00 | GW-A | 38, 41 |
| NC-AM-118-8 | Simon Ross Stephens | Alamance | Existing | 11.00 | GW-A | 38, 42 |
| NC-AM-118-9 | Simon Ross Stephens | Alamance | Existing | 25.50 | GW-A | 38, 42 |
| NC-AM-118-10 | Simon Ross Stephens | Alamance | Existing | 3.40 | GW-A | 38, 39 |
| NC-AM-119-1 | Nelda Stevens Kiser/ Simon Ross Stephens | Alamance | Existing | 20.30 | GW-A | 43, 44 |
| NC-AM-119-2 | Nelda Stevens Kiser/ Simon Ross Stephens | Alamance | Existing | 20.00 | GW-A | 43, 44 |
| NC-AM-120-1 | Max Cartner | Alamance | Existing | 11.00 | GW-C | 45, 46 |
| NC-AM-121-1 | Edgar Cashwell/ Max Cartner | Alamance | Existing | 9.00 | GW-C | 47, 48 |
| NC-AM-122-1 | Robert M. Clore/ Max Cartner | Alamance | Existing | 14.80 | GW-A | 49, 50 |
| NC-AM-123-1 | Elwood Cheek/ Max Cartner | Alamance | Existing | 10.00 | GW-C | 51, 52 |
| NC-AM-125-1 | Billy McPherson/ Terry McPherson | Alamance | Existing | 21.40 | GW-A | 53, 54 |
| NC-AM-125-2 | Billy McPherson/ Terry McPherson | Alamance | Existing | 8.00 | GW-A | 53, 54 |
| NC-AM-125-3 | Billy McPherson/ Terry McPherson | Alamance | Existing | 13.80 | GW-A | 53, 54 |
| NC-AM-125-4 | Billy McPherson/ | Alamance | Existing | 3.70 | GW-A | 53, 54 |

| | | | | | | | |
|-------------|---|---------|----------|-------|------|--------|--|
| | Terry McPherson | | | | | | |
| NC-CH-39-1 | James B. Brewer | Chatham | Existing | 13.80 | GW-A | 55, 56 | |
| NC-CH-39-2 | James B. Brewer | Chatham | Existing | 14.10 | GW-A | 55, 56 | |
| NC-CH-40-1 | Rufus A. Brewer Estate/ James B. Brewer | Chatham | Existing | 25.00 | GW-A | 57, 58 | |
| NC-CH-94-1 | Mark Metcalf/ Terry McPherson | Chatham | Existing | 50.80 | GW-A | 59, 60 | |
| NC-CH-95-1 | Gary Moon | Chatham | Existing | 16.90 | GW-A | 61, 62 | |
| NC-CH-95-2 | Gary Moon | Chatham | Existing | 9.10 | GW-A | 61, 62 | |
| NC-CH-95-3 | Gary Moon | Chatham | Existing | 12.70 | GW-E | 61, 62 | |
| NC-CH-95-4 | Gary Moon | Chatham | Existing | 9.00 | GW-A | 61, 62 | |
| NC-CH-95-5 | Gary Moon | Chatham | Existing | 9.50 | GW-A | 61, 62 | |
| NC-CH-95-6 | Gary Moon | Chatham | Existing | 11.50 | GW-A | 61, 62 | |
| NC-CH-95-8 | Gary Moon | Chatham | Existing | 8.60 | GW-E | 61, 62 | |
| NC-CH-97-2 | Betty Lindley/ Sammy Lindley | Chatham | Existing | 23.10 | GW-A | 63, 64 | |
| NC-CH-251-1 | Charles Lutterloh | Chatham | New | 27.00 | GW-A | 65, 66 | |
| NC-CH-251-2 | Charles Lutterloh | Chatham | New | 11.60 | GW-A | 65, 66 | |
| NC-CH-251-3 | Charles Lutterloh | Chatham | New | 31.60 | GW-A | 65, 66 | |
| NC-CH-251-4 | Charles Lutterloh | Chatham | New | 5.40 | GW-A | 65, 66 | |
| NC-CH-251-5 | Charles Lutterloh | Chatham | New | 23.50 | GW-A | 65, 66 | |
| NC-OR-22-1 | James Foust | Orange | Existing | 16.00 | GW-A | 67, 68 | |
| NC-OR-22-2 | James Foust | Orange | Existing | 42.00 | GW-A | 67, 68 | |
| NC-OR-22-3 | James Foust | Orange | Existing | 15.00 | GW-A | 67, 68 | |
| NC-OR-22-4 | James Foust | Orange | Existing | 12.00 | GW-A | 67, 68 | |
| NC-OR-64-1 | James Thompson | Orange | Existing | 31.70 | GW-A | 69, 70 | |
| NC-OR-64-3 | James Thompson | Orange | Existing | 14.10 | GW-A | 69, 70 | |
| NC-OR-64-4 | James Thompson | Orange | Existing | 24.80 | GW-A | 69, 70 | |
| NC-OR-64-5 | James Thompson | Orange | Existing | 17.50 | GW-A | 69, 71 | |
| NC-OR-64-6 | James Thompson | Orange | Existing | 11.50 | GW-A | 69, 72 | |
| NC-OR-64-7 | James Thompson | Orange | Existing | 23.00 | GW-A | 69, 70 | |
| NC-OR-64-8 | James Thompson | Orange | Existing | 29.20 | GW-E | 69, 72 | |
| NC-OR-64-9 | James Thompson | Orange | Existing | 18.30 | GW-A | 69, 72 | |
| NC-OR-64-10 | James Thompson | Orange | Existing | 5.00 | GW-E | 69, 70 | |
| NC-OR-64-11 | James Thompson | Orange | Existing | 11.70 | GW-A | 69, 72 | |
| NC-OR-64-12 | James Thompson | Orange | Existing | 21.00 | GW-A | 69, 72 | |
| NC-OR-79-1 | Jeff Sykes | Orange | Existing | 8.00 | GW-A | 73, 74 | |
| NC-OR-79-2 | Jeff Sykes | Orange | Existing | 30.00 | GW-A | 73, 75 | |
| NC-OR-79-3 | Jeff Sykes | Orange | Existing | 23.20 | GW-A | 73, 74 | |
| NC-OR-79-4 | Jeff Sykes | Orange | Existing | 12.50 | GW-A | 73, 74 | |
| NC-OR-79-5 | Jeff Sykes | Orange | Existing | 28.00 | GW-A | 73, 74 | |
| NC-OR-79-6 | Jeff Sykes | Orange | Existing | 10.30 | GW-A | 73, 76 | |
| NC-CS-36-1 | Dennis A. Simmons | Caswell | Existing | 4.40 | GW-E | 77, 78 | |
| NC-CS-36-2 | Dennis A. Simmons | Caswell | Existing | 3.10 | GW-E | 77, 78 | |
| NC-CS-36-3 | Dennis A. Simmons | Caswell | Existing | 2.30 | GW-E | 77, 78 | |

AM
126-151
127-1
128 147
P

Through
mod.

NC-CH-98-1
↓
98-10P
99-1
99-2

150-1
to
150-5

mod

GW-B

GW-B

| | | | | | | |
|-------------|-----------------------------------|---------|----------|-------|------|-------------------|
| NC-CS-36-4 | Dennis A. Simmons | Caswell | Existing | 5.30 | GW-A | 77, 78 |
| NC-CS-36-5 | Dennis A. Simmons | Caswell | Existing | 15.00 | GW-E | 77, 78 |
| NC-CS-36-6 | Dennis A. Simmons | Caswell | Existing | 18.00 | GW-E | 79, 80 |
| NC-CS-36-7 | Dennis A. Simmons | Caswell | Existing | 18.90 | GW-A | 79, 80 |
| NC-CS-36-8 | Dennis A. Simmons | Caswell | Existing | 12.90 | GW-A | 79, 80 |
| NC-CS-36-9 | Dennis A. Simmons | Caswell | Existing | 6.00 | GW-A | 79, 80 |
| NC-CS-36-10 | Dennis A. Simmons | Caswell | Existing | 17.20 | GW-A | 79, 80 |
| NC-CS-36-11 | Dennis A. Simmons | Caswell | Existing | 26.40 | GW-E | 79, 81 |
| NC-CS-36-12 | Dennis A. Simmons | Caswell | Existing | 24.00 | GW-E | 79, 81 |
| NC-CS-113-1 | Doug Simmons | Caswell | Existing | 12.00 | GW-E | 82, 83 |
| NC-CS-113-2 | Doug Simmons | Caswell | Existing | 13.60 | GW-E | 82, 83 |
| NC-CS-113-3 | Doug Simmons | Caswell | Existing | 31.00 | GW-E | 82, 84 |
| NC-CS-113-4 | Doug Simmons | Caswell | Existing | 29.40 | GW-E | 82, 84 |
| NC-CS-114-1 | Foy Davis Osborne | Caswell | Existing | 28.30 | GW-E | 85, 86 |
| NC-CS-117-2 | Blanche Jefferies/ Henry Jones | Caswell | Existing | 11.60 | GW-A | 87, 88 |
| NC-CS-117-3 | Blanche Jefferies/ Henry Jones | Caswell | Existing | 32.00 | GW-C | 87, 88 |
| NC-CS-117-4 | Blanche Jefferies/ Henry Jones | Caswell | Existing | 13.40 | GW-A | 87, 88 |
| NC-CS-117-5 | Blanche Jefferies/ Henry Jones | Caswell | Existing | 15.00 | GW-A | 87, 88 |

Total Area 2,375.8

Note: Basis of Approval for the indicated field is Condition GW-A, GW-C, or GW-E as follows:

GW-A. These sites are dominated by soils with mean seasonal high water tables greater than three (3) feet below the land surface. Application of residuals may occur throughout the year.

GW-C. These sites are dominated by soils or site conditions, which readily produce perched water table conditions or have very shallow depths to bedrock. Application of residuals shall be budgeted such that the total allowable annual PAN will not be applied in any single application event. These sites may otherwise receive residuals throughout the year, provided the vertical separation between the depth of application and the water table is verified at greater than three (3) feet.

GW-E. Other conditions as follows:

Site NC-AM-73-1: A 25-foot buffer shall be maintained around the drainage way

Sites NC-AM-109-3, NC-CS-113-1, and NC-CS-113-3 & NC-CS-113-4: An active vegetative cover shall be present during residuals applications.

Sites NC-OR-68-8, NC-OR-64-10, NC-CS-36-1, NC-CS-36-2, NC-CS-36-3, NC-CS-36-5, and NC-CS-36-6: Due to massive clays at shallow depths and/or wet soils, no residuals shall be applied to these sites during the period from December through March, inclusive.

Site NC-CS-36-5: Residuals shall not be applied to the Helena soils.

Site NC-CS-36-6: Residuals shall not be applied to the Wilkes soils.

Sites NC-CS-36-11 & 36-12: An active vegetative cover shall be present during residuals applications and conservative application rates (2/3 the application rates

113-5?

GW-B

113-5 P

116-1 B

116-5 P

mod.

FN

old permit condition remove

GW-B

Soils
Not same
why this
condition was
put in old
permit.

x before? }
x before?

listed in Condition II.5.) shall be observed. Applications shall not occur along linear runs and concave depressions. *old condition updated buffer map*

Site NC-CS-113-1: This land application site is covered in part by soils having a perched/seasonal high water table at depths of less than three feet below land surface. This field, therefore, shall receive residuals only during the months of April through November, inclusive. *water issue* } GW-B

Sites NC-CS-113-2 & NC-CH-95-8: ~~An active vegetative cover shall be present during residuals applications.~~ A 25-foot buffer shall be maintained from drainageways and a 25-foot buffer shall be maintained from rock outcrops. (FN) FN

Site NC-CS-114-1: Residual application on this field shall be limited to one half the application rate listed in Condition II.5. }

Site NC-CH-95-3: A 50-foot buffer shall be maintained from the low, wet areas and wet weather drainageways in this field. } x

Sites NC-OR-64-8 & 64-10: Due to the presence of massive clays, residual application on these fields is limited to one half the application rate listed in Condition II. 5. These sites consist of areas of weathered rock soils at two feet below the land surface. These fields, therefore, shall receive residuals at half the normal application rates, and only during the months of April through November, inclusive. } x

*Has specific buffer map
new buffer map
old GW-B*

1) **Applicable Boundaries:**

- a) The COMPLIANCE BOUNDARY for the disposal system is specified by regulations in 15A NCAC 2L, Groundwater Classifications and Standards. The Compliance Boundary for the disposal system individually permitted on or after December 30, 1983 is established at either 250 feet from the waste disposal area, or 50 feet within the property boundary, whichever is closest to the waste disposal area. An exceedance of Groundwater Quality Standards at or beyond the Compliance Boundary is subject to remediation action according to 15A NCAC 2L .0106(d)(2).
- b) The REVIEW BOUNDARY is established around the disposal systems midway between the Compliance Boundary and the perimeter of the waste disposal area. Any exceedance of standards at the Review Boundary shall require action in accordance with 15A NCAC 2L .0106(d)(1).

2) **Additional Requirements:**

Any groundwater quality monitoring, as deemed necessary by the Division, shall be provided.

If there are any questions please call David Goodrich at (919) 715-6162.

Attachments: FIGURES 1 through 88.