

State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Waste Management

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
William L. Meyer, Director



March 27, 1997

Mr. William R. Lewis
Piedmont Landfill & Recycling Center
9900 Freeman Road
Kernersville, North Carolina 27284

Fac/Perm/Co. ID #	Date	Doc ID#
3406	7/22/201	DIN 14512

RE: Hydrogeologic Review Of The Site Study Application For The
Proposed PLFRC Expansion Project (Guilford County)

Dear Mr. Lewis,

The Solid Waste Section Hydrogeologic Unit has done the initial review of the above referenced Site Study Application. There are several items that need clarification and/or further documentation. Please have RUST Environment & Infrastructure provide a response to the following questions and comments:

LOCAL CHARACTERIZATION STUDY

Page 3-2: The text on page 3-2 and the Drawing 3-1a are not consistent. The text references an R6 zoning for an area "to the west of the proposed landfill facility" and states "The property to the northwest, north, and northeast is currently zoned residential". Drawing 3-1a does not have these zoning designations. Also, there is no legend for the zoning designations that do appear on Drawing 3-1a.

Page 3-3: The text on page 3-3 references "about 20 occupied residences within the study area", however I was only able to locate 16 residences on Drawing 3-1a, as designated with the PR symbol. There are a number of other structures shown on the drawing that do not have the PR designation. I assume these are barns, out buildings, or other unoccupied buildings.

Page 3-4: The text on Page 3-4 states that "groundwater beneath the (Kernersville disposal) facility most likely flows to the north toward the unnamed tributary", however the "watershed boundary" line and topography on Diagram 3-1b indicate a radial groundwater flow pattern from the Kernersville Landfill.

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Mr. William Lewis
PLFRC Expansion Site Study
Page 2

Page 3-7: The text describes surface water flow from the site "down four small coves via intermittent streams". Figure 4-16, which illustrates a number of Spring Locations at the site, would seem to indicate that significant portions of these streams may be perennial, rather than intermittent. This appeared to be the case during my site visit.

Drawing 3-2: The Aerial Photograph does not extend to the 2000 foot perimeter around the proposed facility boundary as required by Rule .1618(c)(2).

SITE HYDROGEOLOGIC STUDY

Page 4-6: On Page 4-6 reference is made to "veins of pegmatite" and on Page 4-7 reference is made to "diabase dikes". These types of features could cause preferential ground-water flow. Has there been any evidence of these types of features during excavation at the existing landfill, in boring logs, or in rock outcrops or stream beds, etc.?

Page 4-28: Please provide additional discussion regarding the effect of the stream relocation on the hydrogeology and monitoring of this area. If a pipe and gravel collector is installed in the original stream channel, how will this be monitored and is PLFRC prepared to treat this as leachate should contaminants be found?

Page 4-23: Additional evaluation and documentation for the perched conditions of spring SP-8 will be necessary in the Design Hydrogeologic Report.

Page 4-29: Conclusion 1 states "The site lies within the Charlotte Belt and Milton Belt geologic boundary". Is this contact actually within the proposed facility? Could there be preferential ground-water flow along the contact?

Table 4-3: The water table elevation information required by Rule .1623(a)(7)(A), (B), (C), and (D) is either not present or is poorly documented in the Report. Please provide the required information along with support documentation.

- (A) No time of boring or 24 hour water table elevations are provided.
- (B) Only one set of stabilized readings appear in the Table. And only two appear to be included in the Report. There should be water table readings for all piezometers taken at least monthly since the piezometers were installed. Readings for March and April are especially critical, since this is usually when the seasonal high water table conditions occur.
- (C) There is little discussion or documentation for the "estimation of the long-term seasonal high water table".
- (D) There is little or no "discussion of any natural or man-made activities that have the potential for causing water table fluctuations".

Figure 4-4: Figure 4-4, along with Figures 4-9, 4-10, 4-11, 4-16, 4-17, and 4-22, need to be submitted at a larger scale so the topographic lines, etc. are clearly legible and the data presented is more easily interpreted. - Rule .1603(b)(3).

Figure 4-7: Why are some of the drainage features within (and in the vicinity of) the proposed facility marked on the Geologic Lineament Map, and other drainage features are not marked?

Figure 4-12: Some of the information seems to be plotted slightly incorrectly. It would be easier to interpret the data on the Cross-Sections and Hydrogeologic Cross-Sections if the figures were prepared at a larger (standard engineering) scale.

Drawing 7-2: This drawing indicates proposed borrow activities within the proposed facility boundary buffer zones. This is not allowed. The Landfill Construction Plan needs to be modified to preserve the 300 foot buffer zones.

Appendix C: A number of the boring logs indicate soils with low SPT blow counts. This could indicate potential problems with foundation stability and settling, especially in the soft silt/clay alluvial soils in the creek beds and the floodplain.

Appendix D: The Piezometer Construction Records indicate that extended sand filter packs were installed for several of the piezometers. When the filter packs extend across more than one hydrogeologic unit it makes it difficult to assign the hydraulic test values to a particular unit. Also, when abandoning these piezometers, they will need to be re-drilled in order to properly grout the boreholes.

Appendix E: Only two sets of water table elevation data have been submitted. Readings should have been taken at least monthly, since the time of piezometer installation. If this has not been done, additional water table readings need to be obtained immediately, before the Spring seasonal high period ends (when the vegetation comes out and evapotranspiration becomes a significant factor).

Rule .1623(a)(4)(E) requires information on "Saturated hydraulic conductivity, porosity, and effective porosity for each lithologic unit of the uppermost aquifer". A table needs to be prepared that summarizes the representative data for the various lithologic (hydrogeologic) units. Further definition may be necessary based upon differences in fine grained soils and coarser grained soils. Rule .1631(c) requires this information for both "unsaturated and saturated geologic units".

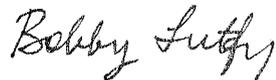
Rule .1623(a)(8) requires information on "The horizontal and vertical dimensions of ground-water flow". Further evaluation of the three-dimensional flow regime is needed based upon additional water table elevation readings. At what point does the aquifer begin to be present in the unconsolidated sediments? Identify recharge and discharge areas. In the nested piezometers, are the vertical flow patterns consistent over time?

Rule .1623(a)(13)(D) requires a discussion of "the ground-water flow regime of the uppermost aquifer at the site and the ability to effectively monitor the MSWLF units". Please provide more detailed discussion on this, focusing especially on the proposed relocation of a portion of the stream and the possible effects on the ground-water discharge situation.

Mr. William Lewis
PLFRC Expansion Site Study
Page 5

Please provide the revisions and additional information requested so the hydrogeologic technical review of the Piedmont Landfill expansion Site Study can be continued by the Solid Waste Section. If you have any questions or would like to schedule a meeting to discuss this letter, you may contact me at (919) 733-0692, extension 258.

Sincerely,



Bobby Lutfy
Hydrogeologist
Solid Waste Section

cc: Sherri Coghill, Solid Waste Section
Brent Rockett, SWS - Winston-Salem
Peter Walls, RUST Environmental

Piedmont

pg 3-2

+ Drawing 3-1a

legend of zoning designations AG = ?

location of R-6 on Drawing?

"residential" NW, N, + NE location on Drawing?

number of structures w/out PR designation

3-3

"20 residences" ≠ Drawing 1b

3-4

Old Kernersville LF

SW flow directions) N ... radial

ref. Drawing 3-1b

3-7

Reroute 1400 of stream

3.6.1-4 on-site "intermittent" streams

Aerial Photo does not extend out 2000'

- Fig 4-6 Veins of pegmatite
- 4-7 Diabase dikes
- 4-28 piping of original stream bed ?
- 4-29 Geologic contact
- 4-30 Seasonal High Potentiometric Map - caveat
- 4-31 underdrains
- 5-7 unstable area evaluation - alluvium
- Table 4-3 No ToB, 24hr, on-going WT elevations
- Figures 4-4 too small
- Figure 4-6 Diabase Dikes ?
- Figure 4-7 lineaments ?
- Figure 4-10 too small
- Figure 4-11
- Figure 4-12 4-12 vert. exaggeration
4-13 4-19 +
4-14 4-20 scale size
4-15 4-21
- Figure 4-16 4-17 too small
4-22
- Drawing 7-1 relocated creek
- Drawing 7-2 borrow areas in Buffer Zone
- Boring logs Floodplain soft silt/clay Alluviums (low SPT esp in)
settlement/foundation problems? (B-8, 9, 10) B-11, B-13 B-14, B-15 B-20
- Piez Crest Records P-1D Sand Pack R3, (P-6), P-12,
Abandon properly (drill + grout)
- Apex GW level meas. Only 2 measurements
- Apex F Slug Tests
- Apex G Soil Lab Tests

Piedmont

3-26-97

<u>Piezometer</u>	<u>Screen length</u>	<u>Filter Pack Length</u>			
P-1	5	6		59-65	PWR
P-1D	5	23	X	69-92	Gneiss
P-2	5	12	-	16-28	PWR/Rock
P-3	5	64	X	7-71	(PWR)/Gneiss
P-4	5	7		50-57	Rock
P-5	5	12	-	51-63	Rock
P-6	5	18	X	38.5-56.3	PWR/Gneiss
P-7	5	7		44.5-51.5	PWR
P-7D	5	12	-	60-72	Rock
P-8	5	8		23.5-31.5	Silt/PWR
P-9	5	7		20-27	Silty Sand
P-10	5	6		20.5-26.5	Clay/Sand/PWR
P-11	5	6		27-33	PWR
P-12	5	33	X	21-54	PWR/Gneiss
P-13	5	7.5		19.5-27	Silty Sand/PWR
P-14	5	7		31.5-38.5	Silt/PWR
P-14S	5	6		9-15	Clay/Silt
P-15	5	6		45.5-51.5	PWR
P-16	5	5.5		37-42.5	PWR
P-17	5	8		50-58	PWR
P-18	5	7.5		75-82.5	PWR
P-19	5	10.5	-	79-89.5	PWR
P-20	5	6		31-37	PWR

TABLE 4-2
SUMMARY OF GEOTECHNICAL TESTING RESULTS
SOILS PERFORMANCE PROPERTIES
HYDROGEOLOGIC INVESTIGATION
PIEDMONT LANDFILL AND RECYCLING CENTER
KERNERSVILLE, NORTH CAROLINA
Rust Project No. 34957.330

Piezometer I.D.	Sample Depth (feet)	Specific Gravity	Natural Moisture Content (%)	Natural Unit Weight (pcf)	Consolidation	Parameters	CU Triaxial Shear Test		Controlled Gradient Permeability (cm/sec)
							Total	Effective	
P-1	10.0-12.0	2.76	8.3	98.2	-	C/φ	1.0 ksf/8.0 Deg	0 ksf/33.0 Deg	-
P-2	7.0-9.0	2.66	14.2	123.7	-	-	-	-	-
P-4	1.0-3.0	2.84	10.8	136.2	-	-	-	-	1.40E-06
P-9	6.0-7.5	-	16.5	121.7	-	-	-	-	-
P-10	15.0-17.0	2.73	30.2	127.7	See Appendix E	-	-	-	2.40E-07
P-11	15.0-17.0	-	18.2	117.7	-	*	*	*	-
P-12	5.0-5.5	-	17.1	115.4	-	-	-	-	-
P-14S	5.0-7.0	2.74	24.2	124.3	See Appendix E	-	-	-	1.90E-07
P-20	10.0-12.0	2.84	19.2	139.0	-	-	-	-	-

* Not enough sample to perform test