Design Hydrogeologic Study

Prepared for

Lenoir County Subtitle D Landfill, Phase 2
La Grange, North Carolina

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1 INTRODUCTION

1.1 Purpose and Scope of Study

This *Design Hydrogeological Study* was undertaken to assess the local and regional geologic, hydrogeologic and hydrologic characteristics of the uppermost aquifer regime at the proposed Phase 2 portion of the Lenoir County Subtitle D Municipal Solid Waste Landfill Facility (MSWLF). Field information collected for this study was used to determine hydrogeologic and engineering properties of the subsurface, to perform evaluations of hydrogeologic and geologic conditions, to identify base grade elevations for compliance with vertical separation requirements and to design an effective monitoring plan for early detection of a release into groundwater. Data, conclusions and recommendations for hydrologic and geologic conditions are provided to fulfill the requirements for the Design Hydrogeologic Study described in the North Carolina Department of Environment and Natural Resources, Division of Waste Management, Solid Waste Section (NCDENR), under Rule 15A NCAC 13B, .1623 (b).

1.2 Facility Description

The Lenoir County MSWLF is located approximately 4.5 miles east of La Grange city limits at 2949 Hodges Farm Road, La Grange, North Carolina. The term *facility* is used in this report to cover all aspects of the landfill operations, and refers to the portion of land owned and controlled by Lenoir County as specified under Permit # 54-09.

The MSWLF encompasses about 127 acres with approximately 55 acres designated as site suitable for a Subtitle D landfill. The facility is comprised of the existing municipal solid waste (MSW) unit, a construction and demolition (C&D) unit, associated buffers and the operational portion of the facility; including a leachate lagoon, scale house, bailer, recycling area, tire storage and white goods processing areas. The existing unit, Phase 1, includes approximately 16.8 acres; Phase 2 includes approximately 9.2 acres and Phase 3 is planned to cover approximately 14.7 acres. The study area of investigation for this design study encompasses the disposal area of Phase 2 and the surrounding area subject to water quality monitoring which is 15.8 acres. A facility map is included as **Plate 1**.

The facility lies within the Coastal Plain Physiographic Province characterized by slightly rolling to nearly level topography. Total site relief is approximately 35 feet. The land area for the proposed Phase 2 development is currently open with tall grass, a few tree clusters and scattered ponds. The south central portion of the facility is currently used for agricultural purposes.

1.2.1 Drainage

Lenoir County is located within the Neuse River drainage basin. The Neuse River flows through the center of the county and is primarily responsible for draining a large portion of eastern North Carolina. At the landfill facility, surface drainage flows northwesterly towards Fredricks Branch[*], which flows northeasterly into Falling Creek and subsequently into the Neuse River. The Neuse River flows southeasterly where it eventually drains into Pamlico Sound. The site is generally bounded by Hodges Farm Road (NCSR 1524) on the west, Falling Creek on the east and Fredricks Branch on the north.

1.2.2 Facility History

Historically, this area has seen development in rural residential, farmland and forest areas. Site suitability analysis was performed in April 2002. The Phase 1 *Permit to Construct* was issued on August 28, 2001 and the *Permit to Operate* Phase 1 was issued on July 26, 2002. The MSW landfill, currently operating in Phase 1, is located adjacent to the closed unlined landfill and C&D landfill. A small portion of the unlined landfill was capped with a 24 inch soil cover and closed in October 1994. The remainder was closed in October 1998 using a cohesive cap of 18 inches of soil, with a permeability of 1×10^{-5} cm/sec, and 18 inches of erosive layer, as part of the *Transition Plan*.[18]

[*] The name of the creek was referenced as Fredricks Branch in the Transition Plan. The creek is not named on USGS Topographical Maps.

2 FIELD INVESTIGATION

2.1 Subsurface Investigation

Fourteen soil and rock borings (P2-1, P2-2, P2-3, P2-4, P2-5S, P2-5D, P2-6, P2-7, P2-8, P2-9, P2-10, P2-11S, P2-11D and P2-12) were installed under the supervision of MESCO personnel, by Derry's Well Drilling (Albemarle, NC) in and around the study area in August and September 2008. Piezometers were installed in all borings and their locations were surveyed by MESCO personnel in accordance with 15A NCAC 13B .1632. Boring locations were based on topographical features, access and information obtained during the Site Hydrogeologic Study[20] and the Phase 1 Design Hydrogeologic Study.[19]

All borings were completed with 7.75-inch outer-diameter (OD) hollow stem auger (HSA) drilling technology. Standard penetration tests (SPT) were conducted in accordance to ASTM Test Procedure D 1586-84, using a 140-pound hammer to drive a 2-inch OD split-spoon sampler at approximately five-foot intervals. Soil samples collected in split-spoon samplers were used for field boring notes.

Piezometers (wells) were constructed in the borings using five-foot long, 2-inch inside diameter (ID) Schedule 40 PVC pipe and 0.010 machine-slotted well screens with sufficient same-diameter riser to extend approximately three feet above the existing ground surface. Screens were set to bracket or span the static water table in the upper-most aquifer as observed during drilling. Deep well screens were set into water-bearing zones to assess vertical hydrogeological properties. No. 2 filter sand ("sand pack") was poured in the annular space to a height of approximately two feet above screen intervals, hydrated bentonite was placed as a sealer to a height of approximately two feet above the sand pack and a slurry grout mixture of cement and 5% bentonite was pumped or "tremied" into the annulus from the top of the bentonite to the ground surface. Piezometers were fitted with adjustable locking expansion caps to protect the integrity of the wells. Two clustered well sets, each comprised of one shallow well and one deep well (P2-5S/P2-5D and P2-11S/P2-11D) were installed to assess vertical gradients.

Elevations established from piezometers were used to define the potentiometric surface and groundwater flow characteristics. Locations of piezometers are provided on **Plate 2**. Piezometer geometries, showing the well constructions, are presented in **Table A-1**. Boring logs, based on field notes, well construction records, retained soil samples and laboratory results are included in **Appendix A**.

Groundwater levels were observed and recorded during drilling procedures and again 24-hours after piezometer installation to allow for the equilibration of localized groundwater. The 24-hour stabilized groundwater levels are depicted on the boring logs. Following installation, water levels were measured on a

monthly basis through September 2009. Water level data was employed to construct potentiometric contours that represent the geometry of a single-day stabilized water table surface, determine a seasonal high water table surface and estimate a long-term seasonal high water table. Methodology for determining seasonal high groundwater is discussed in **Section 5.8.** A single-day groundwater potentiometric surface, seasonal high water table and estimated long-term seasonal high water table are shown on **Plate 3, Plate 4A** and **Plate 4B**, respectively.

Extracted soil from selected borings was sampled for geotechnical analysis. Undisturbed samples collected with Shelby tube samplers were packaged and sent to Geotechnics (Raleigh, NC) for laboratory testing to determine soil properties including grain size distribution, permeability and soil classification. Detailed laboratory soil analysis is further discussed in **Section 2.2**. In addition to geotechnical laboratory analysis, MESCO conducted field slug tests on selected piezometers to determine in-situ hydraulic characteristics of the saturated aquifer within the study area. Slug test details are discussed in **Section 4.4.2**.

In addition to the information collected during the present field investigation, this hydrogeologic study includes additional information reported in the *Site Hydrogeologic Study* and *Phase 1 Design Hydrogeologic Study*; including, but not limited to, data collected during installation and/or construction of 11 piezometers and monitoring wells (P-3A, P-4, P-4A, P-5, P-11, P-13D, P-14, P1-14, MW-13, MW-14 and MW-15). The total boring density is thus the total number of borings used during investigation (14 borings installed for the Phase 2 design, the 11 additional borings, for a total of 25 borings) divided by the total area of investigation as discussed in **Section 1.2** (15.8 acres) equaling an average boring density of 1.58 borings per acre. Supplemental boring logs or well construction records are provided as **Appendix F**.

2.2 Laboratory Tests

Soil samples collected from field borings, described in **Section 2.1**, were visually inspected and classified by MESCO field personnel. Additionally, several samples were selected from various depths for geotechnical laboratory testing to help define the hydrogeologic and engineering properties necessary for phase characterization.

MESCO collected two bulk samples from auger cuttings or split spoons. Samples from borings P2-4 and P2-11D were tested in accordance with ASTM Standards for the following soil properties.

1. Grain size analysis either by sieve or with hydrometer (ASTM D-422-63)
2. Atterberg limits (ASTM D-4318-05)
3. Specific gravity (ASTM D-854-00)

Permeability tests were not performed because bulk samples are disturbed (composite) samples, therefore not representative in-situ (undisturbed) samples.

Shelby tube samples were collected from five borings (P2-2, P2-4, P2-7, P2-10 and P2-11D). In addition to the test methods performed on the bulk samples listed above, Geotechnics analyzed the samples in accordance with ASTM Standards for the following additional properties.

1. Moisture content (ASTM D-2216)
2. Permeability and total porosity (ASTM D-5084-90)

Table B-1 summarizes the laboratory results for the tested samples. Laboratory results are included in **Appendix B**. The laboratory-tested soil is classified as silty sand (SM) or clayey sand (SC) in accordance with the United Soil Classification System (USCS). Laboratory test results are further discussed throughout this report as applicable.

3 GEOLOGY

3.1 Regional Geology

Lenoir County is located in the Coastal Plain Physiographic Province of North Carolina with topography characterized by level to gently rolling slopes. The middle Pliocene-age Yorktown Formation underlies the soils at the landfill site.[27] The Yorktown Formation is subdivided into an upper Morgarts Beach Member and a lower Rushmere Member. These members formed a transgressive-regressive sequence during the transgressions of the Pliocene seas.[27] The Morgarts Beach Member consists of fine-to-very fine silty sand, sandy silt and silty clay. The Rushmere Member consists of moderately well to well-sorted, silty, very shelly sands.[27]

The Yorktown Formation is unconformably underlain by Cretaceous-age formations. The cretaceous-age sequence consists of the Cape Fear Formation, Middendorf Formation, Black Creek Formation and Peedee Formation.

- The Cape Fear Formation was deposited within a large deltaic sequence and is composed of thin to thick, interlayered sand and clay; principally, feldspathic quartz sand with cross-bedding ranging from fine-coarse grained and poorly sorted clayey sand.[22]
- The Middendorf Formation was formed in a deltaic system, derived from crystalline and metamorphic terranes. The composition is primarily light colored sand and clay with conglomerate inclusions.[22]
- The Black Creek Group consists of thinly laminated, gray to black clay interbedded with gray to tan, fine- to medium-grained sand. The clay and sand usually contain abundant lignitic wood with pyrite and some shell fragments and glauconite.[22] Three formations subdivide the Black Creek Group, from oldest to youngest, the Tar Heel Formation, the Bladen Formation and the Donoho Creek Formation. La Grange is located near the contact of the Tar Heel and Bladen Formations, which consist of pro-delta and delta front deposits from the Campanian stage of the Cretaceous. The Tar Heel Formation is largely feldspathic quartz sands which coarsen upwards.[22]
- The Peedee Formation consists of an overlying confining unit of clay, silty clay and sandy clay which is approximately 25 feet thick; followed by fine to medium sand interbedded with clay and silt.[13]

3.2 Local Geology

The proposed site lies above the Bladen Formation of the Black Creek Group. The Bladen Formation represents a delta front system composed of interlayers of laminated dark clay and glauconitic quartz sand with fossil molds and prints throughout. Lignitized wood is prevalent in this facies, which is the most common unit in the Bladen Formation.[19] Due to the nature of coastal plain geology available outcrops were limited. The surficial deposits, from boring logs, consisted of clayey sand and silty sand.

A review of readily-available geologic maps indicates no Holocene or older faults lie within two hundred feet of the property.[1] In addition, the facility does not lie within an identified seismic impact zone, indicating that the area has less than a 10 percent probability that the maximum expected horizontal acceleration expressed as a percentage of the earth's gravitational pull (*g*) will exceed 0.10*g* in 250 years.[1]

3.2.1 Subsurface Soil Conditions

The primary soils encountered from subsurface elevation were silty sand and clayey sand. According to the USDA web soil survey several coastal soils compose the landfill site.

- Wagram loamy sand (Wb/Wc), a well-drained loamy sand with slopes from 0-10% covers the largest percentage of land.
- Blanton sand (Bn) is a moderately well-drained sand to sandy loam with 0-6% slopes.
- The Pocalla loamy sand (Po) is somewhat excessively drained loamy sand to sandy loam with 0-6% slopes.
- Pamlico muck (Pc) is a very poorly drained muck to loamy sand with high chances of flooding.
- The Norfolk loamy sand (Na/Nb/Nc) is a well-drained loamy sand to sandy clay loam with slopes ranging from 0-10%.
- Other soils present on site include Bibb soils (BB), Pactolus loamy sand (Pa), Rains sandy loam (Ra) and Torhunta loam (Ta). The soil descriptions from drilling and laboratory analysis coincide with the USDA soil assessment for the area.

SPTs were conducted in all soil borings. Blow counts generally ranged from 10 to 30 blows per foot (bpf) which classifies the soils as “medium dense”. A clay layer, with a blow count range of 55 to 80 bpf, was observed in several wells including P2-1, P2-3, P2-4, P2-9, P2-10 and P2-12. **Plate 6A** and **Plate 6B,** depict cross-sections of the study area with identified soil stratigraphy compiled from the field boring data.

4 HYDROGEOLOGY

4.1 Stream Trace Analysis

According to 15A NCAC 13B.1623 (a)(1) no fracture trace analysis or rose diagram development is required for sites located within the Coastal Plain Physiographic Province.

4.2 Total Porosity

Porosity, a macroscopic porous medium property, is defined as "…the ratio of volume of the void space to the bulk volume of a porous medium."[2] In this report, the term *total porosity* is used to signify the total pore space within a porous medium regardless of interconnectivity of pore space.

The total porosity of soil samples was calculated from their respective void ratios as determined in laboratory testing, and discussed in **Section 2.2**. Void ratio (e) for each sample is converted to its total porosity counterpart (n) using the following formula:

$$n = \frac{e}{1+e} \tag{1}$$

Average porosity for encountered lithologies is summarized on **Table 4**. **Table B-1** demonstrates that the total porosities in the study area range from 23% to 47%.

Porosity values are comparable to published values by Domenico and Schwartz (1997) who suggest that a typical silt and fine sand yield a total porosity of 34-61% and 26-53% respectively.[8] Bear (1972) states that sand and gravel, whether uniform or mixed with other sedimentary material, typically exhibit a total porosity of 30-40%.[2] Freeze and Cherry (1979) gave a more inclusive range of 25-50% for sand material.[12] The porosity can become considerably lower when the material is poorly sorted; Bear mentions that a poorly sorted material can have porosity as low as 17%.[2] Porosity of unconsolidated materials also depends upon the packing of the grains, their shape, arrangement and size distribution as well as degree of compaction. Since compaction forces vary with depth porosity will also vary with depth, especially in clay and shale.[2]

4.3 Effective Porosity

The term *effective porosity* is defined as "…the volume of the void space through which water or other fluids can travel in rock or sediment, divided by the total volume of the solid matrix."[11] Effective porosity differs from the total porosity in that the effective porosity does not take into account disconnected or dead-end pores, while the total porosity is inclusive of all such pores. The effective porosity of a porous medium, therefore, never exceeds the total porosity of the same medium, and it is not uncommon in many circumstances to find the effective porosity of a soil being less than 50% of its total porosity.

Grain size has a direct influence on effective porosity and soils responsiveness to fluid flow. Smaller grain sizes, such as clays, have more surface area available for the surface tension of water to adhere, reducing the soils responsiveness to fluid flow. This is reflected in the fact that clay, which consists of a mass of very fine particles, exhibits a gap between total and effective porosities much larger than that of silt or sand.

Occasionally the term *specific yield* is used in lieu of *effective porosity*, especially in older literature. For the purposes of this report the two terms are considered equivalent.

4.3.1 Subsurface Soil Effective Porosity Method

There is no standard approach to determining effective porosity; however, one commonly used approach is to utilize a published relationship between effective porosity values and grain-size distributions. Johnson (1967) compiled a number of published effective porosity values and developed a relation between grain-size distribution and effective porosity; the effort of which is summarized into the "trilinear graph of textural classification" referred to in this report as the "Johnson Diagram".[17]

Laboratory grain-size analysis follows the ASTM method that uses particle-size boundaries different from those used in the Johnson Diagram. The grain-size distribution of each soil sample was recalculated to meet the following particle-size classification system:

Particle size (millimeters)	
Sand	2 – 0.0625
Silt	0.0625 – 0.004
Clay	<0.004

This system conforms to a recommendation made by the American Geophysical Union Subcommittee on Sediment Terminology, and is widely adopted in many United States Geological Survey (USGS) publications.[16] **Table B-2** presents the manner in which the new particle size boundaries of the soil samples were interpolated from their grain-size distribution table provided by the laboratory.

For example, for the calculation of the accumulated percentage of soil particles finer than 0.0625 mm for P2-7 the pre-determined accumulated percentages for the particle size boundaries of 0.0750 mm and 0.0285 mm were taken from the laboratory-provided wash sieve and hydrometer analysis (referred to as Ref_1 and Ref_2, respectively, in **Table B-2**). A target accumulated percentage of the 0.0625 mm particle-size threshold was calculated from Ref_1 and Ref_2 by log-linear interpolation as follows:

$$C_{0.0625} = C_{0.0750} - (C_{0.0750} - C_{0.0285}) \times \frac{\log_{10} 0.0750 - \log_{10} 0.0625}{\log_{10} 0.0750 - \log_{10} 0.0285} \quad (2)$$

where

$C_{0.0625}$ is the target-accumulated percentage

$C_{0.0750}$ is the % of grains sized 0.0750 mm retained

$C_{0.0285}$ is the % of grains sized 0.0285 mm retained

The new boundary was determined graphically by plugging the recalculated grain-size distributions into the Johnson trilinear graph to determine a corresponding effective porosity value. Values for all samples were calculated in this fashion.

4.3.2 Results

The effective porosity for soils collected during this design study ranged from 12.0% to 34.6%, yielding an average effective porosity of 18.1%. The average total porosity for the silty sand (SM) was 21.9% while the encountered clayey sand (SC) was 15.3%. As expected, the smaller grained soil, sandy clay, had a lower effective porosity.

Effective porosity appears to be roughly proportional to the sand content and inversely proportional to the clay content. Sighal and Gupta (1999) state that sand typically yields an effective porosity between 10-30% while silt yields 5-20%[21], comparable to the numbers calculated in **Table B-3**. Johnson (1967) states that the average effective porosity from compiled studies as:[17]

Material	Average Specific Yield (Presented in %)
Clay	2
Silt	8
Sandy Clay	7
Fine Sand	21
Medium Sand	26
Coarse Sand	27

Calculated effective porosities from laboratory samples are summarized in **Appendix B** on **Table B-3**. Effective porosities used for calculation of hydrology properties are summarized in **Table 4**.

4.4 Hydraulic Conductivity

Hydraulic conductivity (K) values of the saturated portion of the aquifer located beneath the proposed Phase 2 portion of the landfill site were calculated using in-situ slug test data recorded at fourteen piezometers installed for the Phase 2 Design Study as well as slug test results from six previously tested piezometers and monitoring wells. Piezometers were selected based on location, stratigraphic material and accessibility. Tests conducted in Phase 2 piezometers were recorded on September 10, 2009, coinciding with water level monitoring. Slug tests recorded for additional wells have variable dates relating to activities of the time and have been included to demonstrate continuity of K-values at this location. Prior to executing slug tests, wells were developed to remove stagnant water and any minor residual or suspended sediment, clearing the annular space to encourage a hydraulic connection with the aquifer.

Hydraulic conductivity values of soils in the unsaturated portion of the study area, located above the static water table, were determined by laboratory testing on Shelby tubes collected during drilling as discussed in **Section 2.2**.

4.4.1 Field Method

Two slug test methods were preformed dependent upon the initial conditions of the piezometer including recharge rate and static water level. The static water level in each well was measured prior to testing to ensure that the most current static water level was used for data analysis.

Static water level is measured above the top of screen; then an initial head is created by adding a predetermined volume of water. The well recovery of this "Injection Method" records the falling head in the well. It is particularly important to note that, under any circumstances, efforts were made not to inject water into a well when the static water level was below the top of the screen. Such an action would create an outflow of water into the vadose zone through the sand pack, leading to an overestimation of hydraulic conductivity due to the highly permeable nature of the sand pack column.[5]

When the static water level is recorded within the screened interval, a small (<2" diameter) submersible pump is used to withdraw water. This is referred to as "The Pump Method". A low-yield portable pump is used when the recharge rate is relatively low; a high-yield pump is used for piezometers with a high recharge rate. Well recovery from drawdown is recorded as rising head in the well.

An electronic data logger with a built-in pressure transducer recording real-time data was used to record the water level rebound. The collected rebound data was subsequently analyzed per Bouwer & Rice to determine

the K value. Note that Bouwer & Rice, in theory, allows either an addition of water to (slug in), or a withdrawal of water from (slug out), a piezometer without significantly affecting the resulting *K* value.

4.4.2 Slug Test Results

Bouwer & Rice[4] was used to analyze the slug test results for the Phase 2 wells to calculate hydraulic conductivity for the saturated portion of the study area. The calculated hydraulic conductivity for Phase 2 wells ranged from a low of 2.25 x 10^{-5} cm/sec to a high of 7.60 x 10^{-3} cm/sec with an average of 1.67 x 10^{-3} cm/sec. Average hydraulic conductivity for the dominant soil type (silty sand) was 1.98x 10^{-3} cm/sec and the average K value for the secondary soil type (clayey sand) was 5.15 x 10^{-4} cm/sec. The average hydraulic conductivity of the unsaturated portion of the study area, as calculated by laboratory analysis, ranged from a low of 6.6 x 10^{-7} cm/sec to a high of 9.3 x 10^{-5} cm/sec with an average of 2.18 x 10^{-5} cm/sec.

Both the in-situ (measured) and laboratory (calculated) hydraulic conductivities fell within the published ranges shown below.

Published Hydraulic Conductivity Ranges:

Material	(K) Range	Source
Silty Clay/Clayey Sand (CL)	10^{-9} – 10^{-6}	Fetter[11]
Silty Sand/Sandy Silt (SM)	10^{-3} – 10^{-5}	Fetter[11]
Silty Sand (SM)	10^{-1} –10^{-5}	Freeze[12]
Fractured Igneous and Metamorphic Rock	10^{-2} – 10^{-6}	Freeze[12]

Hydraulic conductivity results calculated by laboratory analysis are summarized in **Appendix B** on **Table B-1**. In-situ slug test results and hydraulic conductivity statistics are summarized in **Appendix C** on **Table C-1**. **Graph C-1** displays a graphical representation of the K values at the individual piezometer locations. A summary of compiled hydraulic conductivities for each lithological unit is shown in **Table 4**.

5 HYDROLOGY

5.1 Potable Sources

The area within a 2-mile perimeter of the site is a mix of rural agriculture and residential development. A receptor survey performed as part of the *Transition Plan* identified three potable water supply wells and one non-potable water supply well located within 2000 feet of the facility. An updated receptor survey was performed in 2007; Lenoir County has since purchased two of those properties. Connections to those potable water supply wells have been removed and the structures have been demolished or are in the process of being demolished. The status of the third water supply well is unknown. Property owners were unavailable; neither

a well nor a water meter was visually observed. This potential well is located approximately 2000 feet south of the facility. Municipal water is available to the surrounding area.

A non-potable water supply well is located at the facility used for equipment washing. The well is 1-inch diameter PVC encased in 3-inch PVC. The depth of the well was reported to be 155 feet with a screen interval from 75-100 feet.

5.2 Groundwater Regime

Regionally, the landfill is in the Coastal Plain groundwater region of the United States.[15] The surficial aquifer occurs in unconsolidated soils that overlie several regional confined aquifers, including the Peedee, Black Creek and Upper and Lower Cape Fear. The Peedee is the uppermost aquifer, located in the area near La Grange. The aquifers are separated by confining layers composed of clay, silty clay and sandy clay from upland streams [15]. There is some leaking between the confining units; however, the rate is slow, causing little influence in chemical and hydrogeological characteristics of individual aquifers. The region is drained by the Neuse River. Recharge occurs in inter-stream locations with percolation across inter-bedding. Discharge occurs through seepage to streams, estuaries and the ocean.

Locally, groundwater flow dynamics are primarily controlled by the local drainage features of Fredricks Branch and Falling Creek. Groundwater elevations recorded during sampling events are summarized in **Table 1**. Water elevations are consistent, generally falling 15 to 30 feet below top of pipe around the landfill. A single-day potentiometric map with flow directions for the uppermost aquifer is provided as **Plate 3** based on groundwater readings recorded on March 21, 2009. Groundwater flows northeast beneath the study area. Groundwater recharge of the site occurs south of the proposed landfill unit. Discharge is into the tributaries of Fredricks Branch and Falling Creak to the north.

5.3 Groundwater Flow Components

A single-day potentiometric map with projected flow directions for the uppermost aquifer is shown on **Plate 3** and was generated based upon groundwater readings collected on March 21, 2009. Flow directions were used to calculate the average linear velocity defined as:

$$v_x = \frac{Q}{n_e} = \frac{K}{n_e}\frac{dh}{dl} \tag{3}$$

where

v_x is the average linear velocity

Q is the specific discharge

K is the hydraulic conductivity

n_e is the effective porosity

$\frac{dh}{dl}$ is the hydraulic gradient

The horizontal hydraulic gradient at a piezometer was calculated graphically by first drawing a perpendicular line from each piezometer location to the nearest equipotential contour. The differences in hydraulic head (*dh*) were calculated by subtracting the contour elevation from the static groundwater elevation measured in the corresponding piezometer. The lateral distance (*dl*) was the horizontal length of the line segment from the well to the associated contour. Calculation of hydraulic gradient at a given piezometer location was determined by dividing *dh* by *dl*. **Table 2** summarizes the calculated flow rates in units of feet per year and the parameters used in the calculations. Average linear flow velocities range from a low of 4.02 ft/yr (MW-13) to a high of 596.56 ft/yr (P2-3).

5.4 Water Quality

Lenoir County MSW and C&D landfills are currently under water quality monitoring. The presence of metals occurring in the background samples, surface water samples, historic Subtitle D and C&D landfill samples as well as data from the USGS National Uranium Resources Evaluation (NURE) sediment sample database indicate that arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, nickel, selenium and zinc are all naturally occurring and don't represent contamination associated with the landfill. Their concentrations regularly fluctuate within or exceed North Carolina Groundwater Standards.[18]

Monitoring well installation can contribute to increased levels of metal detections due to alteration of groundwater chemistry during drilling activities and/or ground surface excavation. The altered chemistry may carry over the first semi-annual sampling event, as observed in past landfill construction activities. Dissolved carbon disulfide is common in groundwater sampling and has been observed in other MSWLFs across the state. Carbon disulfide is a natural product of anaerobic biodegradation and is a commonly detected constituent at MSWLFs; therefore, intermittent detections may occur even without landfill leakage.

Overall, the water of Lenoir County is of good chemical quality; however, occasional exceedances of organics and metals do occur at random and will be addressed on a case-by-case basis.

5.5 Leachate Impoundment

The existing leachate lagoon is located southwest of Phase 1 and the proposed Phase 3. It currently collects leachate from Phase 1 and will be utilized for Phase 2. Leachate generated from Phase 1 and Phase 2 will be gravity drained to the sump area where it is pumped to the lagoon through a force main pipe.

Groundwater in the area of the leachate lagoon generally flows east to northeast, with the bottom elevation approximately 90 feet AMSL. Historical water table elevation data from adjacent monitoring wells indicates that there is at least a 5-foot vertical separation between the leachate lagoon bottom and the water table. Prior analysis of groundwater from the monitoring wells shows no past leakage of the lagoon, and the addition of Phase 2 leachate should not cause additional concerns.

5.6 Local Precipitation

5.6.1 Introduction

North Carolina ranks sixth in the nation in annual average precipitation, with about 50 inches per year. Lenoir County receives approximately 50 inches of precipitation annually. The precipitation recorded in the La Grange area is distributed relatively evenly over the year. Roughly 72% of the precipitation in North Carolina is returned to the atmosphere through the process of evapotranspiration, while another 20% recharges groundwater systems.

Two climate stations located in Kinston, North Carolina provided precipitation data used to characterize the regional climate in the vicinity of the facility, courtesy of the State Climate Office of North Carolina (SCONC)[22]. The Kinston 7E Climate Station, its COOP ID *314684*, is located on the southwestern side of the City of Kinston. Records were obtained from 1960 until October 4, 2009, the most recent data retrieval. The Kinston Ag Research Climate Station, COOP ID *314689*, is located 12 miles north of the Kinston 7E station. Records were provided from 1966 up to September 30, 2009, the most recent time of data retrieval.

5.6.2 Climatic Trends

Kinston 7E

Data collected from the Kinston 7E station is consistent with the regional documented data listing annual precipitation from 40 - 55 inches; a high of 67.10 inches was recorded in 1971, and a low of 38.75 inches was recorded in 1970. **Table D-2** lists the 365-day averages based on recorded data averaged throughout the year. **Graph D-1** illustrates the variability from year to year since the early sixties.

Monthly totals, listed in **Table D-2**, were obtained by averaging the daily totals. The precipitation is relatively consistent from month to month, receiving the most precipitation in July and the least in November, on average. Kinston 7E averages around 4.2 inches of rain per month, as shown in **Table D-3**. **Graph D-2** shows the 30-day total precipitation.

Kinston Ag Research

Data collected from the Kinston Ag Research station is consistent with the regional documented data averaging between 40-50 inches of precipitation per year. **Table D-5** lists the annual averages with corresponding **Graph D-5**; the data is consistent with the Kinston 7E station. The lowest year of precipitation occurred in 2007 with 36.51 inches recorded; the high occurred in 1999 with 64 inches recorded.

Monthly totals, obtained by averaging daily totals, are listed in **Table D-6**. Kinston Ag Research station averages about 4.0 inches per month, receiving its maximum precipitation in July and its minimum in November. Minimal fluctuation is present between the weeks, months and seasons.

5.7 Water Table Fluctuation

5.7.1 Study Area Piezometer

Water level data from the 26-study area wells was collected over the course of September 2008 – September 2009 and are tabulated in **Table 1** as elevations above mean sea level (MSL). **Table 1** also contains:

1. Ground surface and datum elevations
2. Northing and Easting
3. Well Depth
4. Observed Seasonal High and Observed Seasonal Low water table
5. Observed fluctuation.
6. Estimated Long-Term Seasonal High water table

Water level data collected from wells retained from the Phase 1 *Design Hydrogeologic Study* and *Site Suitability* Report P-3A, P-4, P-4A, P-5, P-11, P-13D, P-14, P1-14, MW-13, MW-14, MW-15 (converted from P-5) were compared with levels collected during this study. Observed water levels and fluctuations were similar in both studies.

5.7.2 Vertical Gradient

Vertical hydraulic gradients in clustered wells were calculated using the EPA *Vertical Gradient with Well Screen Effects Calculator*.[10] Results from clustered wells indicate a slight downward gradient across the site. Cluster wells P2-5S/P2-5D and P2-11S/P2-11D produced downward gradients of 0.01 ft/ft and 0.13 ft/ft, respectively. An average downward gradient of 0.07 ft/ft was determined for the Phase 2 area. Calculated vertical flow components are shown on **Table 3**. Recharge/discharge features are expressed in cross-sections shown on **Plate 6A** and **Plate 6B.**

5.8 Seasonal High Groundwater Elevations

5.8.1 Seasonal High Groundwater

Groundwater levels for this design study were collected on approximately a monthly basis from September 2008 until September 2009.

The average annual precipitation received at the Kinston 7E station, from 1960-2009, was 51.15 ± 6.93 inches, with rainfall of 41.47 inches in 2008 and 50.17 inches to date in 2009. The average rainfall received at the Kinston Ag Research station, from 1966-2009, was 48.88 ± 7.31 inches, with rainfall of 46.32 inches in 2008 and 43.47 inches to date in 2009.

Observed seasonal high groundwater levels in study piezometers, along with the average rain fall at Kinston 7E and Ag Research climate stations indicates groundwater elevations collected during the Phase 2 Design Study are typical of a normal season. Seasonal highs were used to generate the seasonal high water table map on **Plate 4A**.

5.8.2 Long Term Seasonal High Estimation

Long-term seasonal high estimations were based on local characterization of the facility, readings collected from monitoring wells and piezometers and precipitation data. The method incorporates a sufficient "margin of error" to account for varying levels of uncertainty.

Precipitation accounts for a majority proportion of aquifer recharge. Directly or indirectly, precipitation's effect on water table fluctuations in an unconfined aquifer is not always significant. This is especially true during the summer months when the effect of evapotranspiration and phreatophytic consumption is high, leading to a linear decline of water table levels even though major rainfall events are common in the summer.
The seasonal highs for most wells were reported in March and April followed by a gradual decline in water level readings extending into the fall. As a conservative estimate, a correction factor of 1.5 feet was applied to observed seasonal high values to represent long-term seasonal high elevations. Long-term seasonal high elevations were used to generate a Long-Term Seasonal High Map included as **Plate 4B**.

The long-term potentiometric surface shows a similar flow trend to the single-day groundwater flow (**Plate 3**). Estimated long-term seasonal high groundwater, included in the *Permit to Construct*[18], was used for engineering purposes to develop final subgrade depths and to ensure compliance with the 4-foot separation in compliance with Rule .1624 (b)(4). Long-term seasonal high elevations were selected over seasonal high elevations for the 4-foot vertical separation requirement to adhere to a higher safety factor. Various cross sections depicting this separation and the subsurface conditions are included as **Plate 6A** and **Plate 6B**.

5.9 Subgrade

In compliance with Rule 15A NCAC13B .1624 (b) (4), the minimum 4-foot vertical separation requirement is based on the long-term seasonal high data. Long-term seasonal high elevations were chosen over seasonal high elevations for the four-foot vertical separation requirement to adhere to a higher safety factor. The long-term seasonal high features control subgrade elevation engineered above the long-term seasonal high groundwater. **Table 5** summarizes the vertical separation of subgrade above long-term seasonal high for piezometers located within the Phase 2 disposal area. Proposed subgrade is shown in **Appendix E** on **Plate A**. Additional vertical separation can be seen on cross sections provided as **Plate 6A** and **Plate 6B**.

6 GROUNDWATER QUALITY MONITORING SYSTEM

The intention of the water quality monitoring system is to create a plan to effectively detect an early release of hazardous constituents to the uppermost aquifer. The Groundwater and Surface Water Sampling and Analysis Plan is included as Appendix E. This section is an outline of that proposed plan.

This monitoring plan consists of nine monitoring wells numbered MW-13, MW-14, MW-15, MW-16, MW-17, MW-18, MW-19S, MW-19D and MW-20, one surface water monitoring point numbered SW-3, and two leachate collection points, LAGOON and LE2. Full details for all locations incorporated into the Sampling and Analysis Plan are presented in Appendix E.

In summary the following actions are proposed to provide groundwater, surface water and leachate monitoring for the Phase 2 unit of the Lenoir County Subtitle D Landfill.

1. Properly abandon eight wells in the Phase 2 footprint.
2. Convert P2-11S and P2-11D to monitoring wells MW-19S and MW-19D, respectively.
3. Install new monitoring well MW-20.
4. Continue use of Phase 1 monitoring wells.
5. Utilize MW-17 and MW-18 to monitor lagoon.
6. Use existing surface water monitoring point SW-3.

7 CLOSURE

This report fulfills the requirements for the Design Hydrogeologic Report for the proposed Lenoir County Subtitle D Landfill, Phase 2 as described in Rule 15A NCAC 13B .1623 (b). Geological and hydrological data, information and conclusions contained herein indicate no hindrance to the construction, development and monitoring of the proposed Phase 2 unit. The *Groundwater and Surface Water – Sampling and Analysis Plan* is designed to be effective in the early detection of any possible release of hazardous constituents from the Lenoir County Phase 2 unit or leachate surface impoundment to the uppermost aquifer.

Piezometers installed during subsurface exploration and not converted to permanent or semi-permanent monitoring wells or piezometers will be abandoned in accordance with the procedures for permanent abandonment of wells as described in 15A NCAC 2C Rule .0113(a)(2). The eight (8) piezometers to be abandoned are: P2-2, P2-3, P2-5S, P2-5D, P2-6, P2-7, P2-8, and P2-12.

8 REFERENCES

[1] Algermissen, S.T., Perkins, D.M., Thenhaus, P.C., Hanson, S.L., and Bender, B.I., 1990, Probabilistic earthquake acceleration and velocity maps for the United States and Puerto Rico: U.S. Geological Survey Miscellaneous Field Studies Map MF-2120, scale 1:7,500,000.

[2] Bear, J., 1972, *Dynamics of Fluids in Porous Media*: Dover Publications, Inc., New York, 764 p.

[3] Binkhorst, G.K., and Robbins. R.C., 1998, Conducting and interpreting slug test in monitoring wells with partially submerged screens: Ground Water, v. 36, n. 2, p. 225-229.

[4] Bouwer, H., and Rice, R.C., 1976, A slug test for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating well: Water Resources Research, v. 12, n. 3, p. 423-428.

[5] Bouwer, H., 1989, The Bouwer and Rice slug test – an update: Ground Water v. 27, n. 3, p. 304-309.

[6] Davis, S.N., and DeWiest, R.J.M. 1966, *Hydrogeology*: John Wiley & Sons, Inc., New York, 463 p.

[7] DeBisschop, K., Spreadsheet evaluation of slug tests, http://hydrotools.sorceforge.net/.

[8] Domenico, P.A., and Schwartz, F.W., 1997, *Physical and Chemical Hydrogeology*: John Wiley & Sons,

[9] Environment Canada, and Health Canada, 2000, Priority substance list assessment report - carbon disulfide: Canadian Environmental Protection Act.

[10] EPA On-line Tools for Site Assessment Calculation, Vertical Gradients with Well Screen Effects, http://www.epa.gov/athens/learn2model/part-two/onsite/vgradient02.htm

[11] Fetter, C.W., 1994, *Applied Hydrogeology* 3rd ed.: Prentice-Hall Inc., New Jersey, p. 93.

[12] Freeze, R.A. and Cherry, J.A., 1979, *Groundwater*: Prentice Hall, Inc., Englewood Cliffs, New Jersey, 604 p.

[13] Giese, G. L., Eimers, J. L., Coble, R. W., 1997, Simulation of Ground-Water flow in the Coastal Plain Aquifer System of North Carolina. U.S Geological Survey Professional Paper 1404-M, 142p.

[14] Hamill, L., and Bell, F.G., 1986, Groundwater resource development: Cambridge University Press, London.

[15] Heath, R.C., 1984, Groundwater regions of the United States: U.S. Geological Survey Water Supply Paper 2242, 78p.

[16] Howe, S.S., and Breton, P.L., 2000, Water resource data, North Carolina, water year 2000, vol. 2 groundwater records: U.S. Geological Survey Water-Data Report NC-00-2.

[17] Johnson, A.I. 1967, Specified yield-compilation of specific yields for various materials: U.S. Geological Survey Water-Supply Paper 1662-D.

[18] Municipal Engineering Services Company, P.A, 2008. *Assessment of Corrective Measures, Lenoir County, LaGrange, North Carolina.*

[19] Municipal Engineering Services Company, P.A, 2002. *MSWLF Design Hydrogeologic Study, Lenoir County Subtitle D Landfill, Phase 1, LaGrange, North Carolina*.

[20] Municipal Engineering Services Company, P.A., 2002 *Site Hydrogeologic Study, Lenoir County Subtitle D Landfill, Lenoir County, North Carolina*.

[21] Singhal, B.B.S., and Gupta, R.P., 1999, *Applied Hydrogeology of Fractured Rocks*: Kluwer Academic Publishers, Norwell, MA, 400 p.

[22] Sohl, N.F. and Owens, J.P., 1999, Cretaceous stratigraphy of the Carolina Coastal Plain *in* The Geology of the Carolinas, The University of Tennessee Press, Knoxville, Tennessee.

[23] State Climate Office of North Carolina. (SCONC), http://www.nc-climate.ncsu.edu/.

[24] Terziotti, S., Schrader, T.P., and Treece, M.W., Jr., 1994, Estimated water use, by county, in North Carolina, 1990: U.S. Geological Survey Open-File Report 94-522, p.17.

[25] Todd, D. K. 1980, Ground Water Hydrogeology: John Wiley & Sons, Inc, New York, 534p.

[26] United States Department of Agriculture (USDA), 1960, Soil Survey, Iredell County North Carolina Series 1960, N0. 14.

[27] Ward, L.W., Bailey, R.H., and Carter, J.G., 1991, Pliocene and early Pleistocene stratigraphy, depositional history and Molluscan paleobiogeography of the Coastal Plain *in* The Geology of the Carolinas, The University of Tennessee Press, Knoxville, Tennessee.

Table 1: Groundwater Elevation Summary

	Piezometer	Date Installed	Ground	Datum	Northing	Easting	Well Depth	Completion Elevation	Top of Confining Layer	Groundwater While Drilling	Groundwater 24 Hours After	Groundwater 7 Days After
New Piezometers	P2-1	09/02/2008	102.12	104.98	562633.1468	2385680.6972	31.52	70.60	83.62	79.85	79.91	104.98
	P2-2	09/03/2008	97.47	100.48	562999.3910	2385948.6095	30.25	67.22	-	76.70	76.72	76.58
	P2-3	09/02/2008	101.24	104.28	563055.7072	2385806.0569	33.84	67.40	97.74	77.76	77.88	-
	P2-4	09/03/2008	104.61	107.62	563200.7216	2385668.5419	33.72	70.89	90.61	78.49	78.52	-
	P2-5S	08/29/2008	98.42	101.46	563172.6422	2385881.7652	34.85	63.57	-	75.85	75.94	-
	P2-5D	08/30/2008	98.34	101.25	563166.5904	2385881.1318	50.81	47.53	-	72.87	75.56	-
	P2-6	09/02/2008	92.20	95.59	563145.3788	2386160.3334	29.05	63.15	-	74.18	74.24	-
	P2-7	09/03/2008	84.95	88.20	563350.4216	2386268.8629	25.56	59.39	-	72.23	72.25	-
	P2-8	09/30/2008	89.51	92.58	563406.7729	2386005.0590	30.15	59.36	-	73.10	73.13	-
	P2-9	08/30/2008	98.84	101.95	563402.0275	2385674.9715	33.19	65.65	89.84	75.60	80.74	-
	P2-10	08/30/2008	85.18	88.14	563725.4799	2385975.9306	26.36	58.82	76.68	71.20	71.23	-
	P2-11S	08/30/2008	82.80	85.76	563736.8299	2386344.0306	29.66	53.14	-	68.90	68.91	-
	P2-11D	08/30/2008	82.72	85.87	563734.8095	2386347.8205	44.62	38.10	-	65.60	66.82	-
	P2-12	09/03/2008	82.52	85.77	563565.1502	2386272.3325	24.75	57.77	74.02	70.58	70.76	-
Previous Installed Piezometers	P-3A	03/26/1995	80.46	82.19	563774.7930	2386589.8910	28.00	52.46	-	-	-	
	P-5	02/20/1995	74.59	77.26	564364.8976	2385824.2576	20.00	54.59	-	65.59	72.66	-
	P-4	02/21/1995	80.01	82.62	564100.2628	2386174.1040	22.15	57.86	-	65.48	73.59	-
	P-4A	03/24/1995	80.13	82.64	564101.8733	2386182.5940	23.00	57.13	-	-	-	
	P-11	02/27/1995	99.09	101.95	562548.4238	2386151.0793	33.00	66.09	90.09	76.09	78.51	-
	P-13D	08/22/2001	103.15	105.99	563001.2743	2385501.2652	38.97	64.18	93.15	83.65	81.91	-
	P-14	02/27/1995	100.66	104.07	562337.0780	2385697.0390	34.50	66.16	91.66	72.66	79.57	-
	P1-14	08/23/2001	66.76	69.22	563213.3990	2387140.9627	15.08	51.68	-	64.26	64.18	-
	MW-13	09/03/2003	105.43	107.75	562915.4800	2385559.9800	29.40	76.03	-	-	-	-
	MW-14	09/03/2003	72.80	74.80	563400.9900	2387015.4800	21.00	51.80	-	-	-	-
	MW-15	08/22/2001	68.69	71.64	563040.2456	2387073.4605	15.13	53.56	-	-	-	-

Table 1: Groundwater Elevation Summary

	Piezometer	07/15/2008	09/11/2008	11/03/2008	12/15/2008	01/19/2009	01/28/2009	02/17/2009	03/21/2009	04/22/2009	05/28/2009
New Piezometers	P2-1	-	79.77	79.13	78.90	78.78	-	78.83	79.33	79.95	79.77
	P2-2	-	76.58	75.98	75.63	75.40	-	75.41	75.67	76.38	76.51
	P2-3	-	77.71	77.00	76.66	76.47	-	76.48	76.78	77.48	77.62
	P2-4	-	78.37	77.54	77.06	76.83	-	76.75	77.14	77.78	77.91
	P2-5S	-	75.73	75.24	74.93	74.82	-	74.80	75.21	75.96	75.93
	P2-5D	-	75.57	74.97	74.84	74.75	-	74.62	75.12	75.70	75.61
	P2-6	-	74.18	73.85	73.68	73.76	-	73.56	74.21	74.89	-
	P2-7	-	72.29	72.13	72.10	72.19	-	72.30	73.38	73.95	70.10
	P2-8	-	73.17	72.97	72.86	71.90	-	72.95	73.93	74.38	73.74
	P2-9	-	75.91	75.09	75.14	75.04	-	74.64	75.43	75.65	75.42
	P2-10	-	71.73	71.13	71.49	71.55	-	71.13	72.32	72.21	71.73
	P2-11S	-	68.56	68.65	69.62	69.01	-	69.16	70.36	71.33	70.53
	P2-11D	-	66.65	66.35	68.96	66.82	-	66.59	67.49	67.79	67.78
	P2-12	-	70.85	70.78	70.90	71.05	-	71.28	72.57	73.22	72.01
Previous Installed Piezometers	P-3A	66.44	65.40	65.39	65.68	65.09	65.86	65.43	66.59	67.96	66.54
	P-5	-	-	-	-	-	-	-	-	-	-
	P-4	-	65.87	65.64	66.02	66.09	-	65.91	66.57	66.92	66.15
	P-4A	-	65.59	65.56	65.95	66.00	-	65.84	66.49	66.85	66.18
	P-11	-	-	-	-	-	-	-	-	-	-
	P-13D	-	79.21	79.15	78.85	78.65	-	78.58	78.85	79.51	79.54
	P-14	78.72	76.88	76.69	76.16	76.06	75.80	76.10	75.77	76.88	77.33
	P1-14	60.96	61.64	61.91	63.22	62.87	63.06	62.52	63.82	63.40	62.62
	MW-13	81.18	80.17	79.59	79.30	79.23	80.07	79.07	79.24	80.00	80.17
	MW-14	60.54	61.12	61.00	62.11	61.77	61.77	61.82	63.12	62.82	61.66
	MW-15	62.40	63.09	62.99	64.72	64.37	64.49	63.95	65.43	64.88	64.02

Table 1: Groundwater Elevation Summary

	Piezometer	07/07/2009	08/05/2009	09/10/2009	Observed Seasonal High	Observed Seasonal Low	Seasonal Fluctuation of High vs Low	Long-Term Seasonal High Correction Factor	Estimated Long-Term Seasonal High
New Piezometers	P2-1	80.25	79.94	79.34	80.25	78.78	1.47	1.5	81.75
	P2-2	76.58	76.30	75.79	76.58	75.40	1.18	1.5	78.08
	P2-3	77.78	77.43	76.85	77.78	76.47	1.31	1.5	79.28
	P2-4	77.87	77.56	76.99	78.37	76.75	1.62	1.5	79.87
	P2-5S	75.96	75.54	75.01	75.96	74.80	1.16	1.5	77.46
	P2-5D	75.65	75.26	74.74	75.70	74.62	1.08	1.5	77.20
	P2-6	74.55	74.07	73.66	74.89	73.56	1.33	1.5	76.39
	P2-7	73.28	72.52	72.20	73.95	70.10	3.85	1.5	75.45
	P2-8	73.96	73.43	72.93	74.38	71.90	2.48	1.5	75.88
	P2-9	75.50	75.16	74.57	75.91	74.57	1.34	1.5	77.41
	P2-10	71.73	71.50	70.74	72.32	70.74	1.58	1.5	73.82
	P2-11S	69.96	69.05	68.56	71.33	68.56	2.77	1.5	72.83
	P2-11D	67.01	66.55	66.16	68.96	66.16	2.80	1.5	70.46
	P2-12	72.20	71.42	70.81	73.22	70.78	2.44	1.5	74.72
Previous Installed Piezometers	P-3A	66.67	65.60	65.46	67.96	65.09	2.87	1.5	69.46
	P-5	-	-	-	-	-	-	-	-
	P-4	66.24	65.69	65.47	66.92	65.47	1.45	1.5	68.42
	P-4A	66.14	65.60	65.37	66.85	65.37	1.48	1.5	68.35
	P-11	-	-	-	-	-	-	-	-
	P-13D	79.55	79.25	78.60	79.55	78.58	0.97	1.5	81.05
	P-14	77.37	76.86	76.40	78.72	75.77	2.95	1.5	80.22
	P1-14	62.97	61.90	62.03	63.82	60.96	2.86	1.5	65.32
	MW-13	80.13	79.94	79.25	81.18	79.07	2.11	1.5	82.68
	MW-14	62.25	61.20	61.10	63.12	60.54	2.58	1.5	64.62
	MW-15	64.34	63.23	63.30	65.43	62.40	3.03	1.5	66.93

Table 2: Flow Rate Calculations

Piezometer	h_1 (ft)	h_2 (ft)	dh (ft)	dl (ft)	i	K (cm/sec)	n_e (%)	Q (ft/yr)	v (ft/yr)	Lithology
P2-1	79.33	78.00	1.33	42.92	0.03	3.01E-04	8%	9.67	117.87	Clayey Sand
P2-2	75.67	76.00	0.33	55.62	0.01	4.21E-04	17%	2.62	15.03	Silty Sand
P2-3	76.78	76.00	0.78	58.86	0.01	7.60E-03	17%	103.80	596.56	Silty Sand
P2-4	77.14	76.00	1.14	83.67	0.01	1.91E-03	17%	27.00	155.15	Silty Sand
P2-5S	75.21	76.00	0.79	65.81	0.01	1.16E-03	17%	14.41	82.80	Silty Sand
P2-5D	75.12	-	-	-	-	1.22E-03	8%	-	-	Clayey Sand
P2-6	74.21	74.00	0.21	26.04	0.01	3.54E-03	17%	30.10	172.99	Silty Sand
P2-7	73.38	72.00	1.38	108.73	0.01	6.53E-04	17%	8.57	49.25	Silty Sand
P2-8	73.93	74.00	0.07	13.46	0.01	3.31E-04	17%	1.81	10.38	Silty Sand
P2-9	75.43	76.00	0.57	61.25	0.01	2.39E-04	17%	2.31	13.25	Silty Sand
P2-10	72.32	72.00	0.32	23.45	0.01	2.15E-03	17%	30.17	173.37	Silty Sand
P2-11S	70.36	70.00	0.36	15.52	0.02	8.41E-04	17%	20.35	116.96	Silty Sand
P2-11D	67.49	-	-	-	-	1.22E-03	8%	-	-	Clayey Sand
P2-12	72.57	72.00	0.57	25.00	0.02	3.04E-03	17%	71.46	410.70	Silty Sand
P-3A	66.59	68.00	1.41	100.72	0.01	1.89E-03	17%	27.38	157.33	Silty Sand
P-4	66.57	68.00	1.43	104.99	0.01	1.61E-03	17%	22.70	130.48	Silty Sand
P-4A	66.49	68.00	1.51	107.68	0.01	1.89E-03	17%	27.40	157.49	Silty Sand
P-13D	78.85	-	-	-	-	2.15E-05	8%	-	-	Clayey Sand
P-14	75.77	76.00	0.23	6.59	0.03	1.89E-03	17%	68.25	392.24	Silty Sand
P1-14	63.82	64.00	0.18	19.85	0.01	5.56E-04	20%	5.22	26.08	Sand
MW-13	79.24	78.00	1.24	140.98	0.01	7.69E-05	17%	0.70	4.02	Silty Sand
MW-14	63.12	64.00	0.88	47.59	0.02	1.30E-03	17%	24.87	142.94	Silty Sand
MW-15	65.43	66.00	0.57	50.23	0.01	1.48E-03	17%	17.33	99.58	Silty Sand

NOTES:

1. Parameters *dh* and *dl* denote the difference in the hydraulic head and the horizontal distance, respectively, between two measurement points. A line is constructed from a piezometer to a perpendicular of the potentiometric contour in Plate 3 *Single day potentiometric map with flow directions.* The hydraulic head is the absolute value of the difference in the groundwater elevation at the piezometer, h_1, and the elevation of the corresponding potentiometric contour, h_2. The horizontal distance, *dh,* is the length of the line.

Notes continued on next page.....

Table 2: Flow Rate Calculations

Continued from previous page.....

2. Parameter *i* denotes the hydraulic gradient associate with the line, and is defined by the equation:

$$i = \frac{dh}{dl}$$

3. Parameter n_e denotes the effective porosity. Soil effective porosities were derived by calculating the average effective porosity for each lithology. Sandy Silt and Silty Sand generally fall in similar effective porosity ranges based on the Johnson trilinear graph and as such the average value of 17% was used. The average effective porosity of Clayey Sand was 8%.

4. *K* denotes the hydraulic conductivity determined from field slug tests. A lithological average hydraulic conductivity value was used as a substitute for those piezometers on which slug test were not performed. Hydraulic conductivity is shown on Table C-1. Values for piezometers with the prefixs other than P2- were obtained from the Phase 1 and Design Studies.

5. Parameters *Q* and *v* denote the specific discharge and the average linear velocity, respectively. The specific discharge is defined by the equation:

$$Q = -K\frac{dh}{dl}$$

The average linear velocity, denoted by *v*, is defined by the equation:

$$v = -\frac{K}{n_e}\frac{dh}{dl} = \frac{Q}{n_e}$$

6. Displayed flow direction are derived from the water level data taken on March 21, 2009.

7. Average K-values for Silty Sand used for P-3A, P-4A and P-14.

Table 3: Vertical Flow Compontents

Date	P2-5S	P2-5D	dh	dl (mid-point of saturated screen)	Vertical Gradient (dh/dl)
09/11/2008	75.73	75.57	-0.16	18.23	-0.009
11/03/2008	75.24	74.97	-0.27	17.99	-0.015
12/15/2008	74.93	74.84	-0.09	17.83	-0.005
01/19/2009	74.82	74.75	-0.07	17.78	-0.004
02/17/2009	74.80	74.62	-0.18	17.77	-0.010
03/21/2009	75.21	75.12	-0.09	17.97	-0.005
04/22/2009	75.96	75.70	-0.26	18.35	-0.014
05/28/2009	75.93	75.61	-0.32	18.33	-0.017
07/07/2009	75.96	75.65	-0.31	18.35	-0.017
08/05/2009	75.54	75.26	-0.28	18.14	-0.015
09/10/2009	75.01	74.74	-0.27	17.87	-0.015
		Average	**-0.21**		**-0.01**

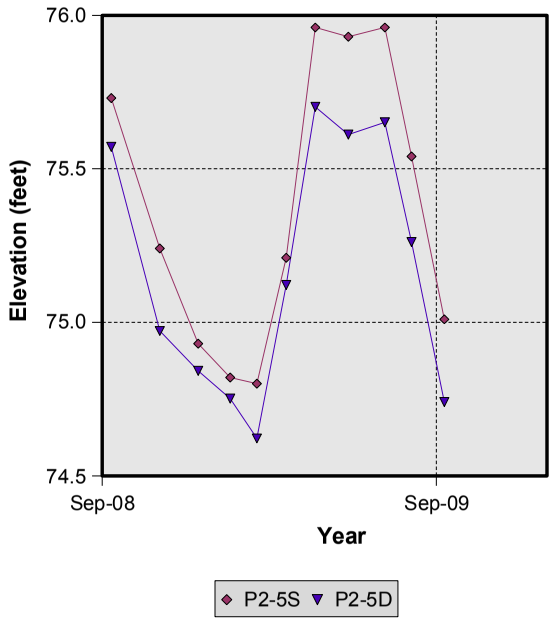


Table 3: Vertical Flow Compontents

Date	P2-11S	P2-11D	dh	dl (mid-point of saturated screen)	Vertical Gradient (dh/dl)
09/11/2008	68.56	66.65	-1.91	18.58	-0.10
11/03/2008	68.65	66.35	-2.30	18.63	-0.12
12/15/2008	69.62	68.96	-0.66	19.11	-0.03
01/19/2009	69.01	66.82	-2.19	18.81	-0.12
02/17/2009	69.16	66.59	-2.57	18.88	-0.14
03/21/2009	70.36	67.49	-2.87	19.48	-0.15
04/22/2009	71.33	67.79	-3.54	19.85	-0.18
05/28/2009	70.53	67.78	-2.75	19.57	-0.14
07/07/2009	69.96	67.01	-2.95	19.28	-0.15
08/05/2009	69.05	66.55	-2.50	18.83	-0.13
09/10/2009	68.56	66.16	-2.40	18.58	-0.13
		Average	**-2.42**		**-0.13**

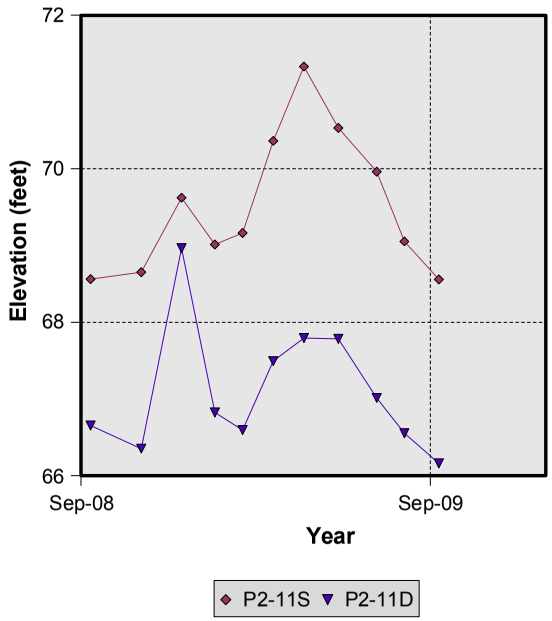


Table 4: Hydrogeologic Summary Table

Lithology	K (cm/sec)	Total Porosity (n)	Effective Porosity Range (n_e)	Effective Porosity (n_e)
Clayey Sand	3.91E-04	39%	12.0-18.5%	15%
Silty Sand	1.89E-03	35%	12.0-34.6%	22%

NOTES:

1. Hydraulic Conductivity (K) values represented in this table are based on average observed values calculated for this Design Study. A comprehensive list is located on Table C-1.
2. n and n_e were calculated based on averages derived from Tables B-1 and B-3.

Table 5: Subgrade Separation Summary

Piezometer	Proposed Subgrade	Observed Seasonal High Elevation	Estimated Long-Term Seasonal High	Vertical Separation of Subgrade above Seasonal High	Vertical Separation of Subgrade above Long-Term Seasonal High
P2-2	87.25	76.58	78.08	10.67	9.17
P2-3	87.50	77.78	79.28	9.72	8.22
P2-5S	89.75	75.96	77.46	13.79	12.29
P2-5D	89.75	75.70	77.20	14.05	12.55
P2-6	92.00	74.89	76.39	17.11	15.61
P2-7	81.25	73.95	75.45	7.30	5.80
P2-8	88.00	74.38	75.88	13.62	12.12
P2-12	80.00	73.22	74.72	6.78	5.28

Notes:
1. All data are in units of feet.
2. Proposed Subgrade elevations were extrapolated from the Application for Permit to Construct.

Table 6: Proposed Monitoring Well Specifications

Well	Elevation (feet)		Depth below ground (feet)		
	Ground surface	Estimated Long-Term Seasonal High	Estimated Long-Term Seasonal High	Top of Screen	Completion Depth
MW-19S (P2-11S)	82.80	72.83	9.97	14.66	29.66
MW19D5 (P2-11D)	82.72	70.46	12.26	39.62	44.62
MW-20	82.10	73.92	8.18	15.00	25.00

NOTES:
1. Estimated Long-Term Seasonal High elevations were extrapolated from adjacent piezometers.
2. MW-19S and MW-19D will be converted from piezometers P2-11S and P2-11D respectively.
3. Depth to the top of screen and completion depth are proposed depths and may change depending on field conditions.
4. Elevations and Depths for MW-20 were estimated from their respective Plates.

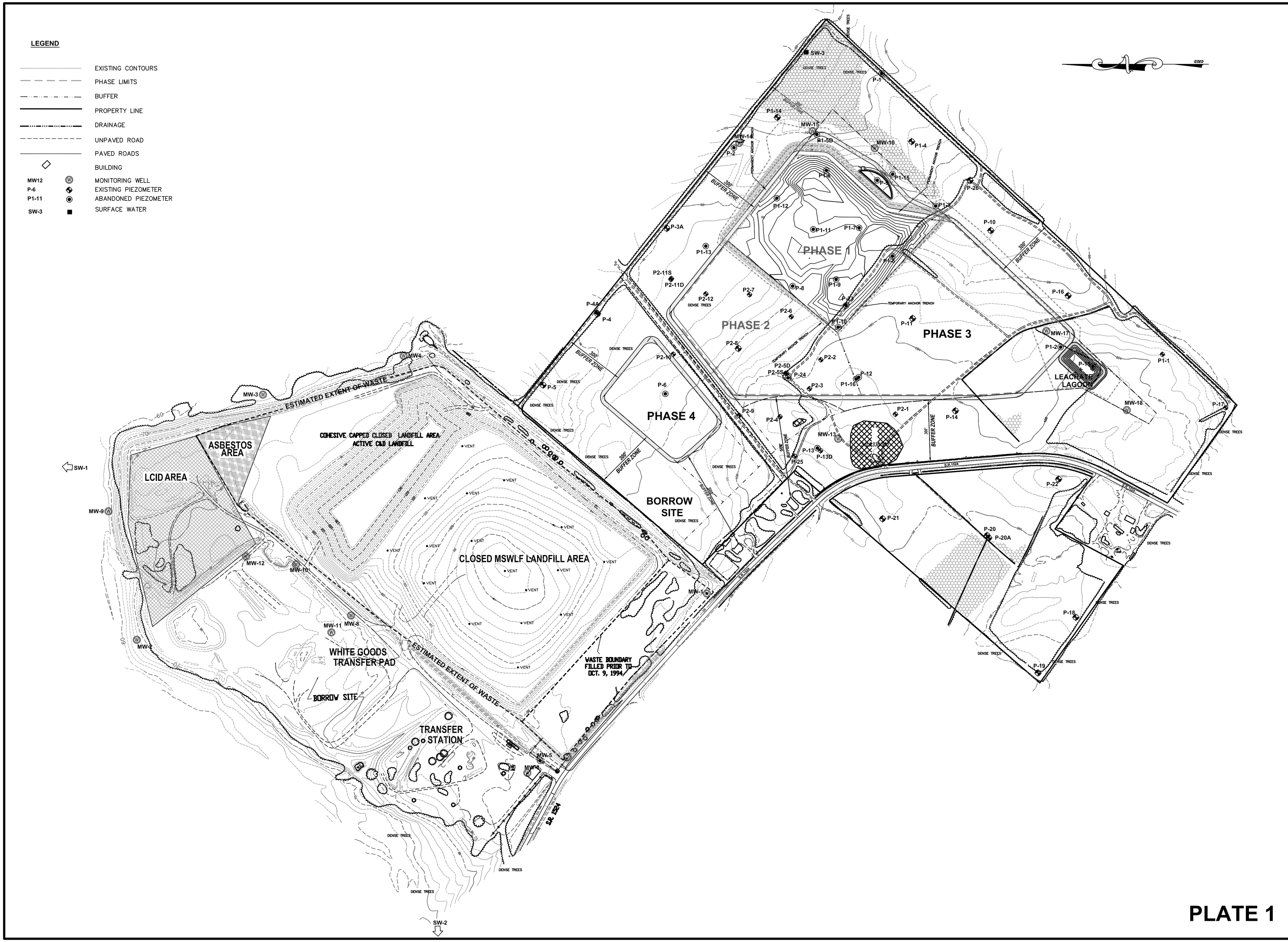


PLATE 1

LICENSE NUMBER: C-0281

Municipal Services
P.O. BOX 97 GARNER, N.C. 27529
(919) 772-5393

Engineering Company, P.A.
P.O. BOX 349 BOONE, N.C. 28607
(828) 262-1767
P.O. BOX 828 MOREHEAD CITY, N.C. 28557
(252) 726-9481

MUNICIPAL SOLID WASTE LANDFILL FACILTIY
LENOIR COUNTY NORTH CAROLINA

DATE	BY	REV.	DESCRIPTION

FACILTIY MAP

SCALE:	1" =200'
DATE:	11/30/2009
DRWN. BY:	M. GERMAN
CHKD. BY:	M. BROWN
PROJECT NUMBER	G07062.0
DRAWING NO.	PLATE 1
SHEET NO.	1 OF 1

NOTES

1. ARCHAEOLOGICAL SITE 31LR311 (CEMETERY) WILL NOT BE DISTURBED.
2. ARCHAEOLOGICAL SITE 31LR330 WILL BE DISTURBED.

LEGEND

- EXISTING CONTOURS
- 90 — PROPOSED BASE GRADE
- PROPERTY LINE
- EXISITING PATH
- BUFFER ZONE
- PHASES OF OPERATION
- REF # — ARCHAEOLOGICAL SITES
- WETLANDS
- P2-12 — EXISTING PIEZOMETER
- P1-9 — ABANDONED PIEZOMETER
- MW-13 — MONITORING WELL
- SW-3 — SURFACE WATER

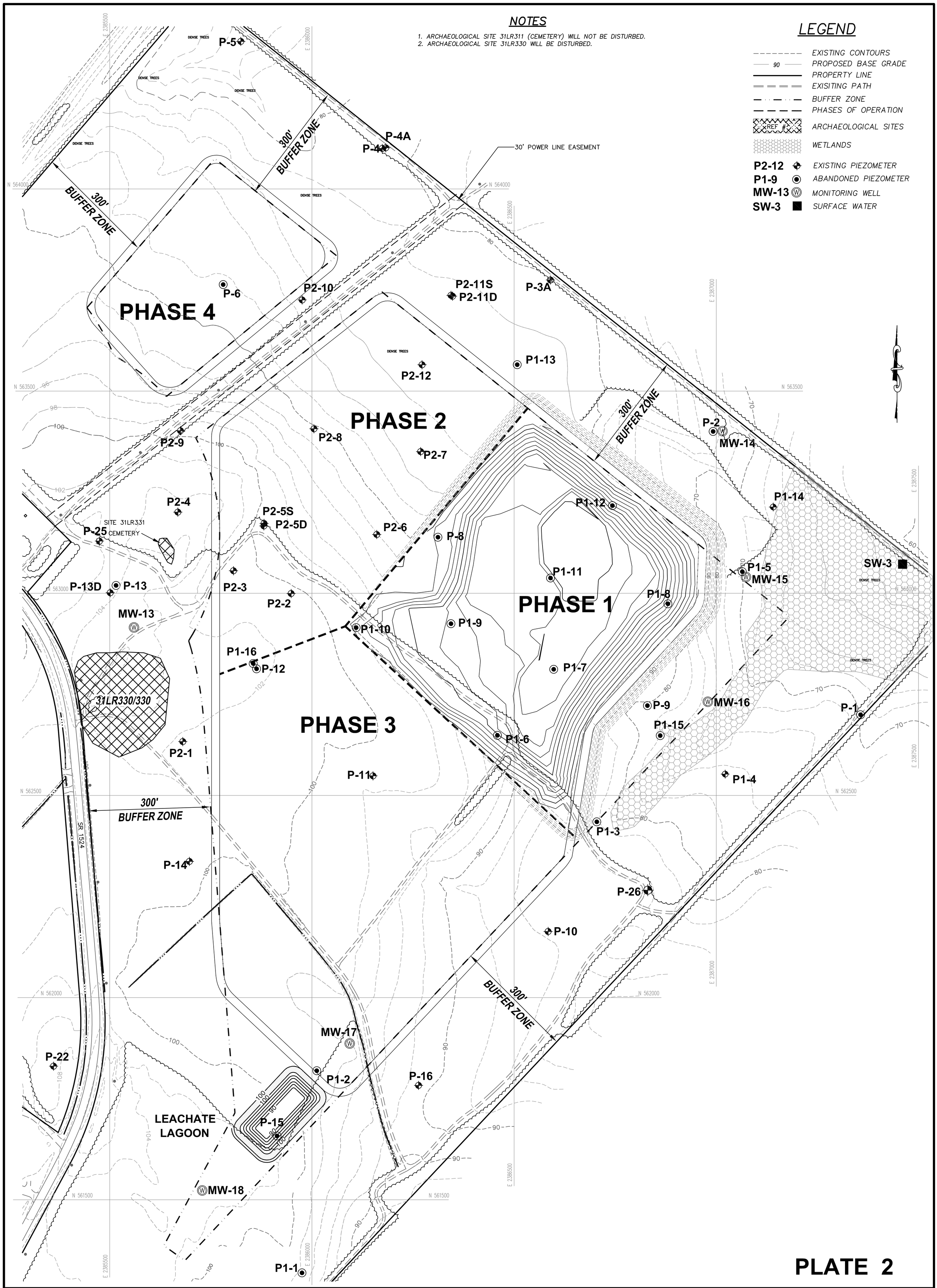


PLATE 2

DRAWING NO.	PROJECT NUMBER	CHKD. BY: M. BROWN	DRWN. BY: M. GERMAN	DATE: 11/30/2009	SCALE: 1"=100'
PLATE 2	G08095.6				
SHEET NO. 1 OF 1					

DATE	BY	REV.	DESCRIPTION

GENERAL SITE MAP

MUNICIPAL SOLID WASTE LANDFILL FACILITY
LENOIR COUNTY NORTH CAROLINA

LICENSE NUMBER: C-0281
Municipal Services Engineering Company, P.A.
P.O. BOX 97 GARNER, N.C. 27529 (919) 772-5393
P.O. BOX 349 BOONE, N.C. 28607 (828) 262-1767

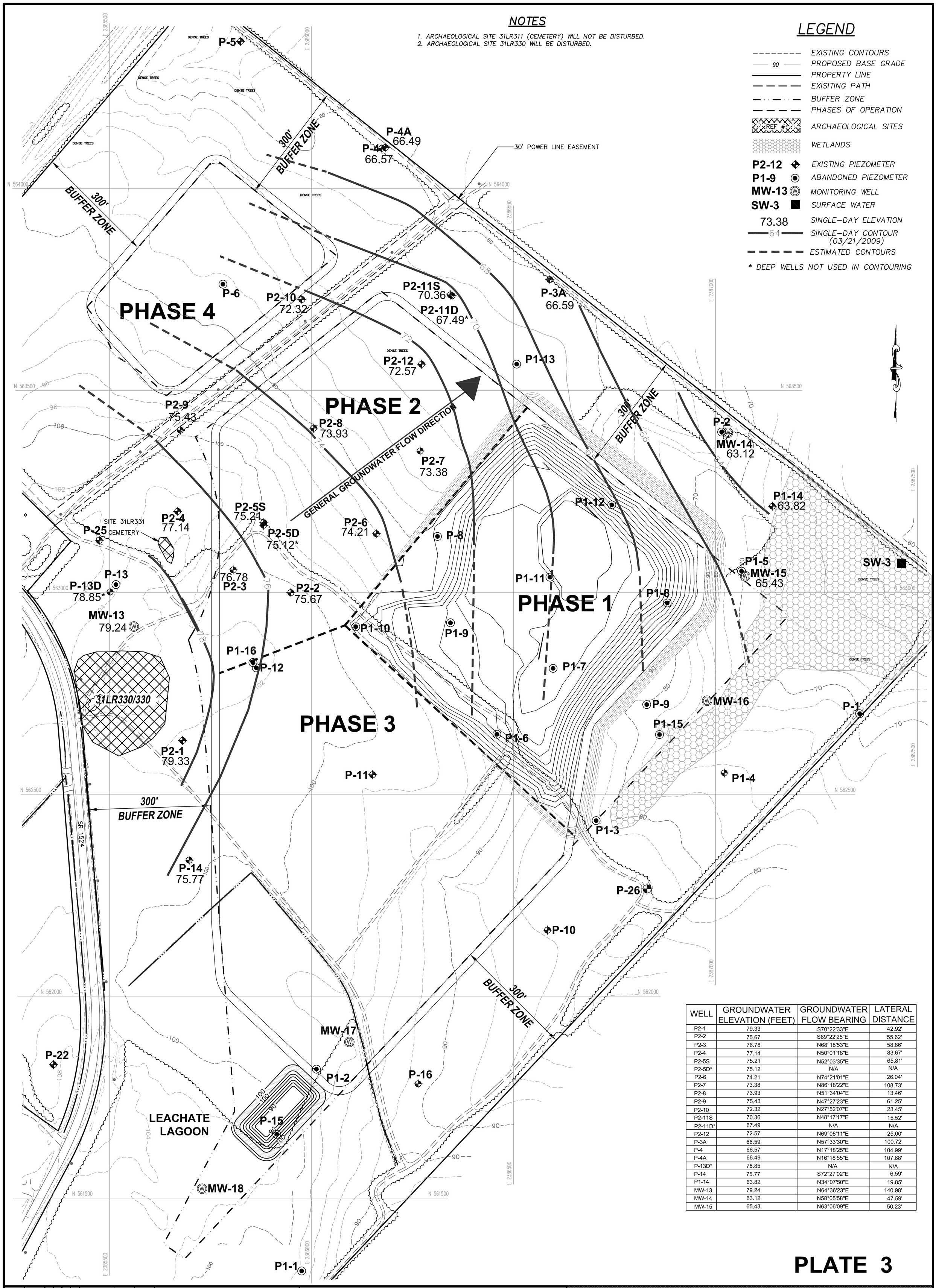
NOTES

1. ARCHAEOLOGICAL SITE 31LR311 (CEMETERY) WILL NOT BE DISTURBED.
2. ARCHAEOLOGICAL SITE 31LR330 WILL BE DISTURBED.

LEGEND

- EXISTING CONTOURS
- 90 — PROPOSED BASE GRADE
- PROPERTY LINE
- EXISITING PATH
- BUFFER ZONE
- PHASES OF OPERATION
- REF # — ARCHAEOLOGICAL SITES
- WETLANDS
- P2-12 — EXISTING PIEZOMETER
- P1-9 — ABANDONED PIEZOMETER
- MW-13 — MONITORING WELL
- SW-3 — SURFACE WATER
- 73.38 — SINGLE-DAY ELEVATION
- 64 — SINGLE-DAY CONTOUR (03/21/2009)
- ESTIMATED CONTOURS

* DEEP WELLS NOT USED IN CONTOURING



WELL	GROUNDWATER ELEVATION (FEET)	GROUNDWATER FLOW BEARING	LATERAL DISTANCE
P2-1	79.33	S70°22'33"E	42.92'
P2-2	75.67	S89°22'25"E	55.62'
P2-3	76.78	N68°18'53"E	58.86'
P2-4	77.14	N50°01'18"E	83.67'
P2-5S	75.21	N52°03'35"E	65.81'
P2-5D*	75.12	N/A	N/A
P2-6	74.21	N74°21'01"E	26.04'
P2-7	73.38	N86°18'22"E	108.73'
P2-8	73.93	N51°34'04"E	13.46'
P2-9	75.43	N47°27'23"E	61.25'
P2-10	72.32	N27°52'07"E	23.45'
P2-11S	70.36	N48°17'17"E	15.52'
P2-11D*	67.49	N/A	N/A
P2-12	72.57	N69°08'11"E	25.00'
P-3A	66.59	N57°33'30"E	100.72'
P-4	66.57	N17°18'25"E	104.99'
P-4A	66.49	N16°18'55"E	107.68'
P-13D*	78.85	N/A	N/A
P-14	75.77	S72°27'02"E	6.59'
P1-14	63.82	N34°07'50"E	19.85'
MW-13	79.24	N64°36'23"E	140.98'
MW-14	63.12	N58°05'58"E	47.59'
MW-15	65.43	N63°06'09"E	50.23'

PLATE 3

DATE	BY	REV.	DESCRIPTION

SINGLE-DAY POTENTIOMETRIC MAP WITH FLOW DIRECTION

SCALE: 1"=100'
DATE: 11/30/2009
DRWN. BY: M. GERMAN
CHKD. BY: M. BROWN
PROJECT NUMBER G08095.6
DRAWING NO. PLATE 3
SHEET NO. 1 OF 1

MUNICIPAL SOLID WASTE LANDFILL FACILITY
LENOIR COUNTY NORTH CAROLINA

LICENSE NUMBER: C-0281
Municipal Services Engineering Company, P.A.
P.O. BOX 97 GARNER, N.C. 27529 (919) 772-5393
P.O. BOX 349 BOONE, N.C. 28607 (828) 262-1767

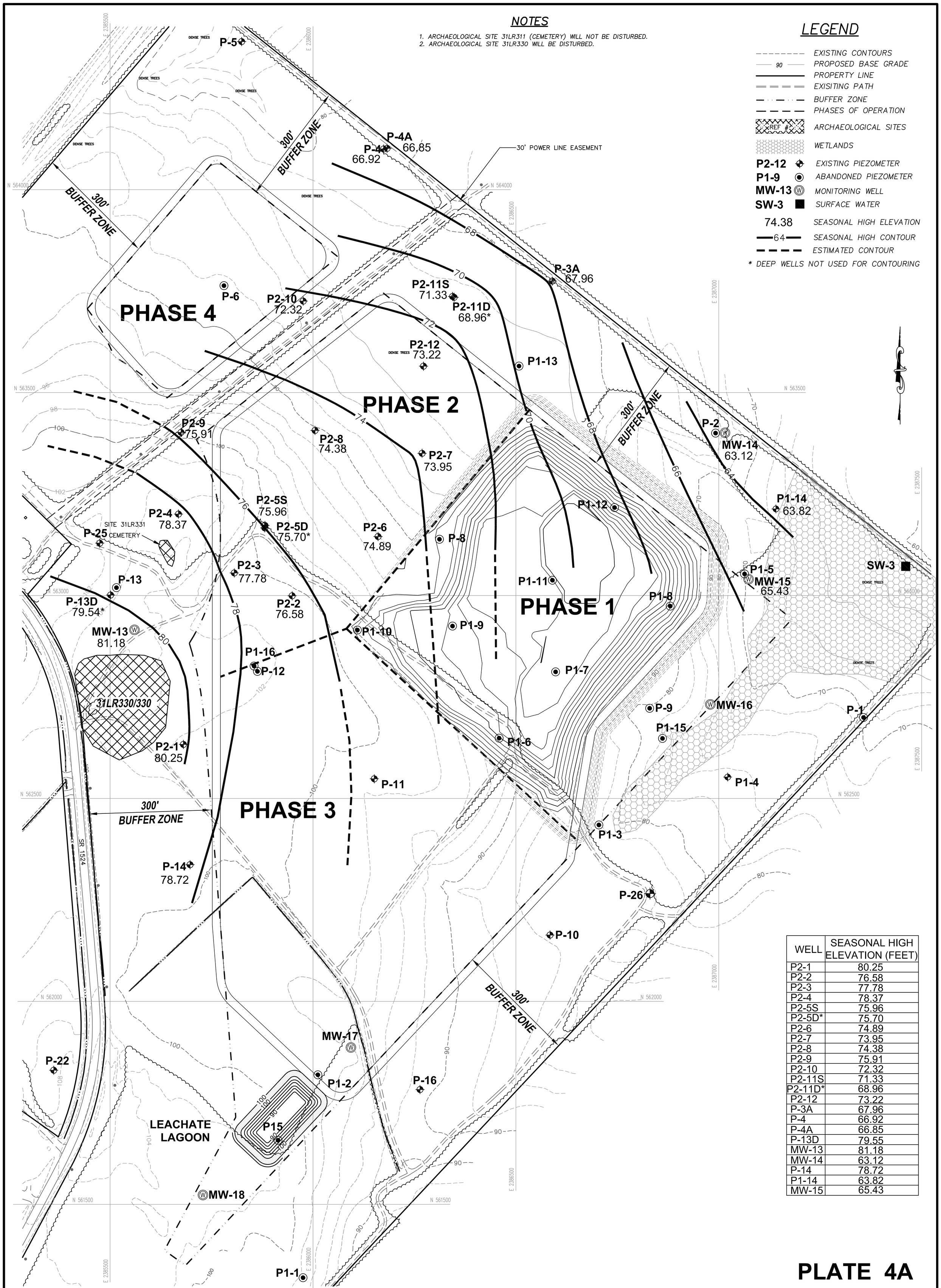
NOTES

1. ARCHAEOLOGICAL SITE 31LR311 (CEMETERY) WILL NOT BE DISTURBED.
2. ARCHAEOLOGICAL SITE 31LR330 WILL BE DISTURBED.

LEGEND

- EXISTING CONTOURS
- 90 PROPOSED BASE GRADE
- PROPERTY LINE
- EXISITING PATH
- BUFFER ZONE
- PHASES OF OPERATION
- REF # ARCHAEOLOGICAL SITES
- WETLANDS
- P2-12 EXISTING PIEZOMETER
- P1-9 ABANDONED PIEZOMETER
- MW-13 MONITORING WELL
- SW-3 SURFACE WATER
- 74.38 SEASONAL HIGH ELEVATION
- 64 SEASONAL HIGH CONTOUR
- ESTIMATED CONTOUR

* DEEP WELLS NOT USED FOR CONTOURING



WELL	SEASONAL HIGH ELEVATION (FEET)
P2-1	80.25
P2-2	76.58
P2-3	77.78
P2-4	78.37
P2-5S	75.96
P2-5D*	75.70
P2-6	74.89
P2-7	73.95
P2-8	74.38
P2-9	75.91
P2-10	72.32
P2-11S	71.33
P2-11D*	68.96
P2-12	73.22
P-3A	67.96
P-4	66.92
P-4A	66.85
P-13D	79.55
MW-13	81.18
MW-14	63.12
P-14	78.72
P1-14	63.82
MW-15	65.43

PLATE 4A

DRAWING NO.	SHEET NO.	PROJECT NUMBER	CHKD. BY: M. BROWN	DRWN. BY: M. GERMAN	DATE: 11/30/2009	SCALE: 1"=100'
PLATE 4A	1 OF 1	G08095.6				

DATE	BY	REV.	DESCRIPTION

SEASONAL HIGH WATER TABLE

MUNICIPAL SOLID WASTE LANDFILL FACILITY
LENOIR COUNTY NORTH CAROLINA

LICENSE NUMBER: C-0281
Municipal Services
Engineering Company, P.A.
P.O. BOX 97 GARNER, N.C. 27529 (919) 772-5393
P.O. BOX 349 BOONE, N.C. 28607 (828) 262-1767

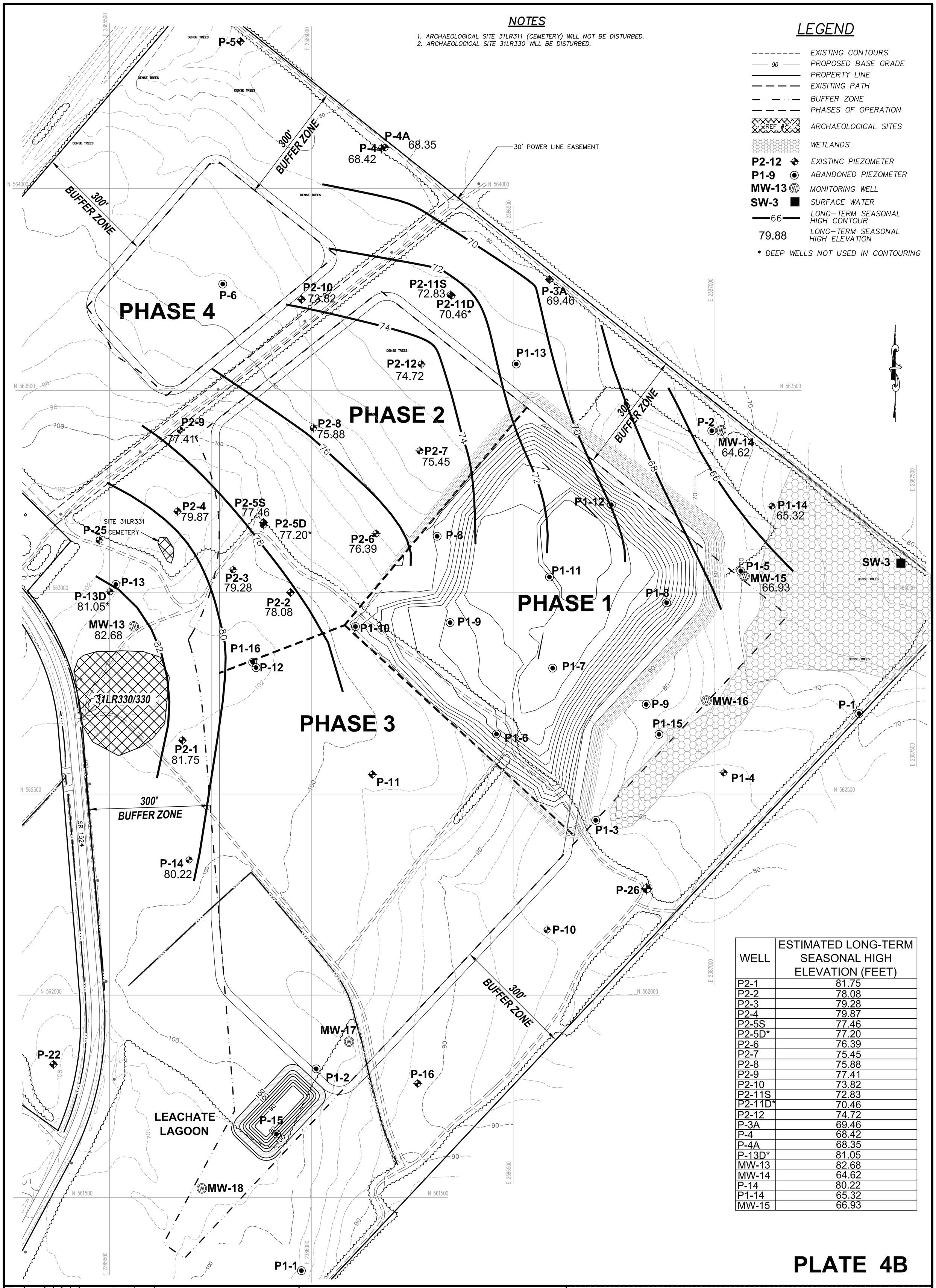
NOTES

1. ARCHAEOLOGICAL SITE 31LR311 (CEMETERY) WILL NOT BE DISTURBED.
2. ARCHAEOLOGICAL SITE 31LR330 WILL BE DISTURBED.

LEGEND

- EXISTING CONTOURS
- 90 — PROPOSED BASE GRADE
- PROPERTY LINE
- EXISITING PATH
- BUFFER ZONE
- PHASES OF OPERATION
- REF # — ARCHAEOLOGICAL SITES
- WETLANDS
- P2-12 — EXISTING PIEZOMETER
- P1-9 — ABANDONED PIEZOMETER
- MW-13 — MONITORING WELL
- SW-3 — SURFACE WATER
- 66 — LONG-TERM SEASONAL HIGH CONTOUR
- 79.88 — LONG-TERM SEASONAL HIGH ELEVATION

* DEEP WELLS NOT USED IN CONTOURING



WELL	ESTIMATED LONG-TERM SEASONAL HIGH ELEVATION (FEET)
P2-1	81.75
P2-2	78.08
P2-3	79.28
P2-4	79.87
P2-5S	77.46
P2-5D*	77.20
P2-6	76.39
P2-7	75.45
P2-8	75.88
P2-9	77.41
P2-10	73.82
P2-11S	72.83
P2-11D*	70.46
P2-12	74.72
P-3A	69.46
P-4	68.42
P-4A	68.35
P-13D*	81.05
MW-13	82.68
MW-14	64.62
P-14	80.22
P1-14	65.32
MW-15	66.93

PLATE 4B

DATE	BY	REV.	DESCRIPTION

ESTIMATED LONG-TERM SEASONAL HIGH WATER TABLE

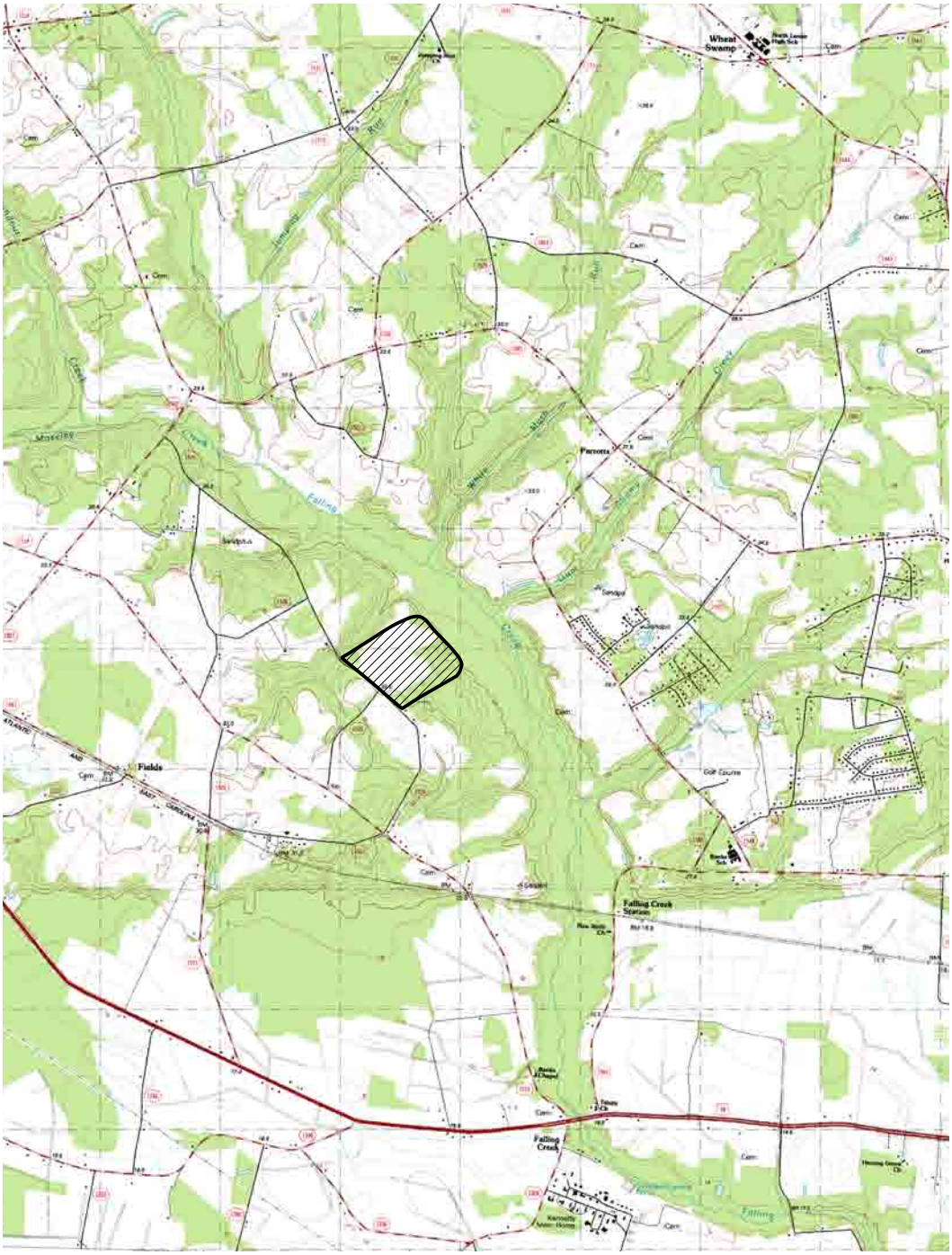
MUNICIPAL SOLID WASTE LANDFILL FACILITY
LENOIR COUNTY NORTH CAROLINA

DRAWING NO. PLATE 4B
SHEET NO. 1 OF 1
PROJECT NUMBER G08095.6
CHKD. BY: M. BROWN
DRWN. BY: M. GERMAN
DATE: 11/30/2009
SCALE: 1"=100'

LICENSE NUMBER: C-0281
Municipal Services Engineering Company, P.A.
P.O. BOX 97 GARNER, N.C. 27529 (919) 772-5393
P.O. BOX 349 BOONE, N.C. 28607 (828) 262-1767

PLATE 5 Regional Characterization Map

Design Hydrogeologic Study - Lenoir County Landfill, Phase 2



Date Completed	5/31/2007
Created By	M. German
Project Name	Design Hydrogeologic Study, Phase 2
Site Name	Lenoir County Sanitary Landfill
Project Number	G08095.6

Municipal Engineering Services Company, PA

QUADRANGLE LEGEND

ROAD CLASSIFICATION

Primary highway, hard surface

Light-duty road, hard or improved surface

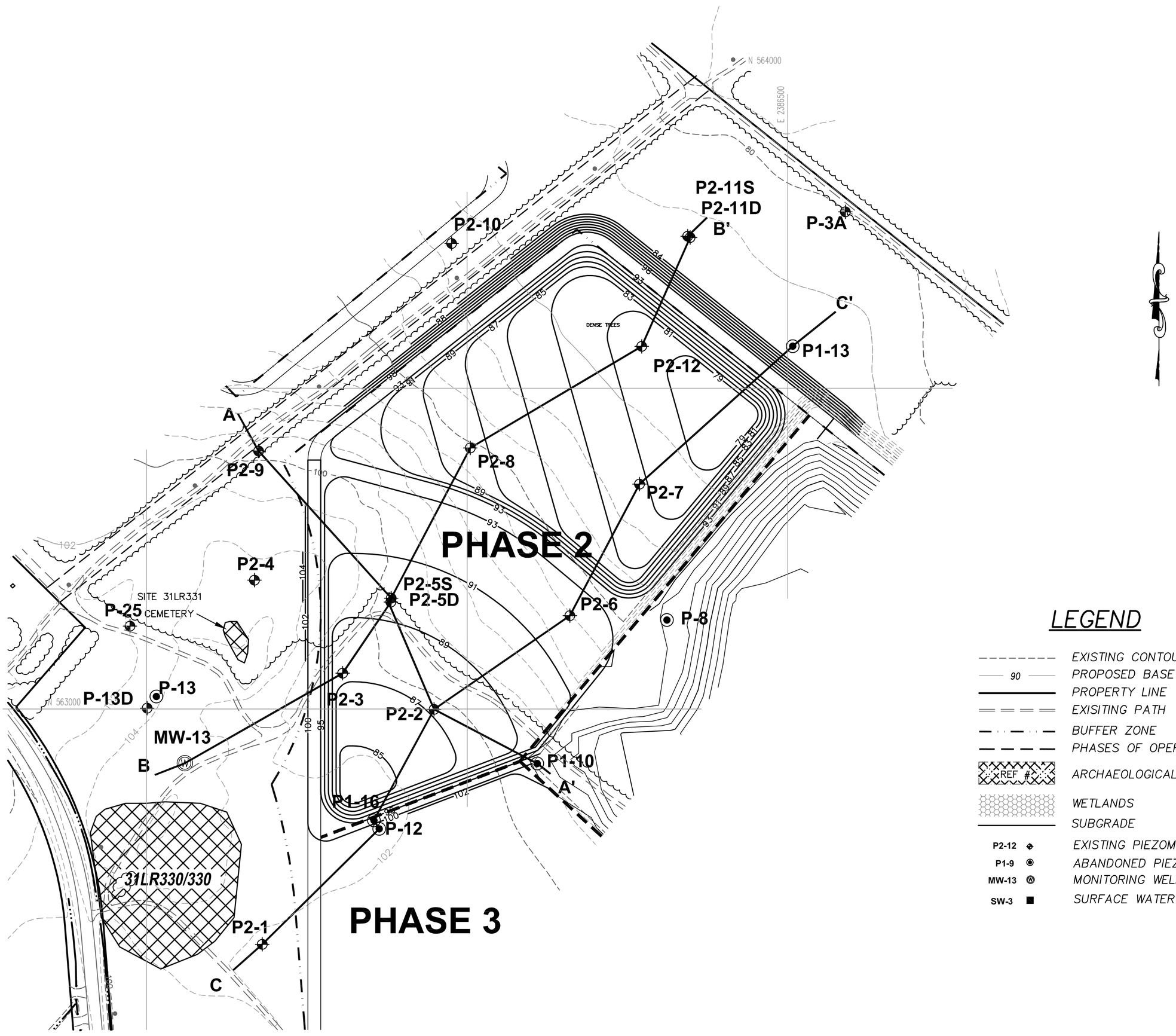
Secondary highway, hard surface

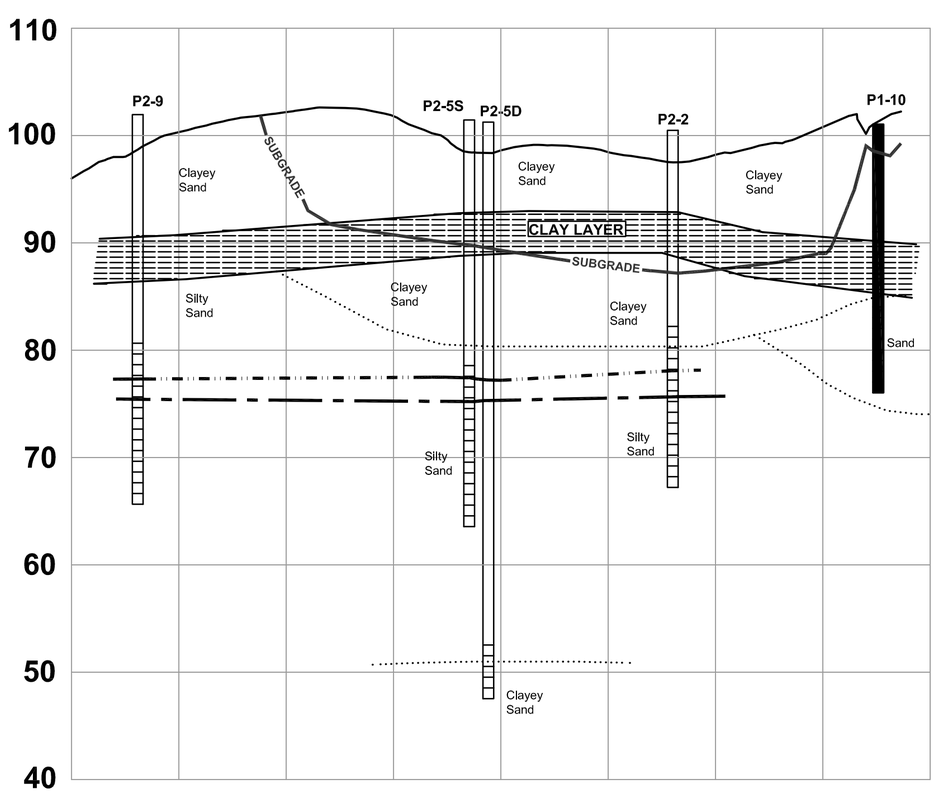
Unimproved road

Interstate Route

U. S. Route

State Route





LEGEND:

- EXISTING GROUND SURFACE
- ESTIMATED STRATIGRAPIC CONTACT
- ESTIMATED LONG-TERM SEASONAL HIGH GROUNDWATER
- SINGLE DAY GROUNDWATER (MEASURED 3-21-09)

P2-6 — PIEZOMETER; SCREENED SECTION

P1-10 — ABANDONED PIEZOMETER

SECTION A-A'

SCALE HORIZ. 1" = 100'
VERT. 1" = 10'

NOTE:
- NUMBERS SHOWN IN THIS PLATE ARE IN UNITS OF FEET UNLESS INDICATED OTHERWISE.
- SOIL PROFILES SHOWN HEREIN ARE INTERPOLATED FROM AVAILABLE BORING RECORDS.
- SOIL PROFILE BOUNDARIES DO NOT NECESSARILY INDICATE ABRUPT CHANGE IN SOIL TEXTURES.
- LONG-TERM SEASONAL HIGH WATER TABLE WAS DERIVED FROM ITS RESPECTIVE CONTOUR SURFACE IN PLATE 4B.

PLATE 6A

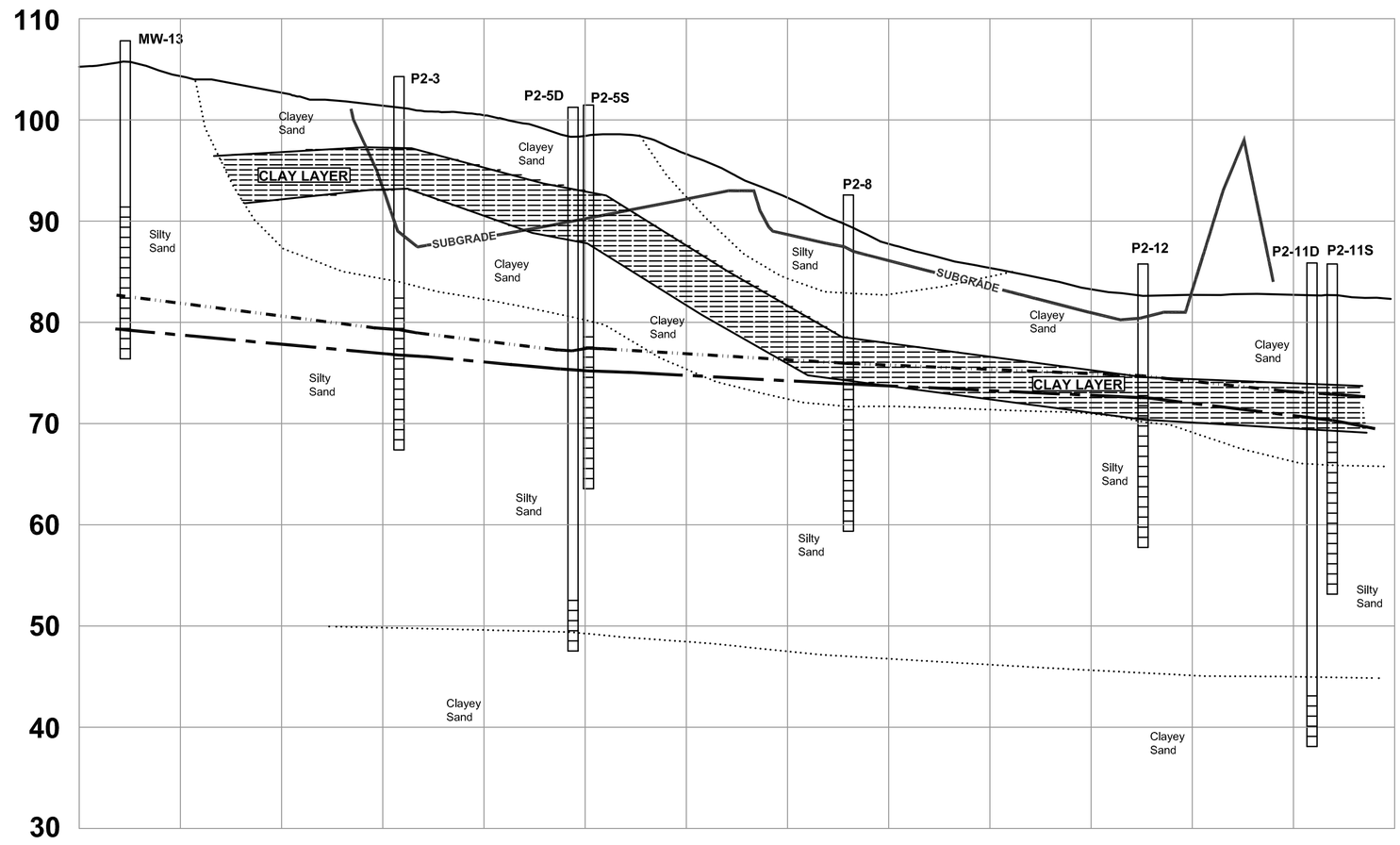
DRAWING NO.	PROJECT NUMBER	CHKD. BY:	DRWN. BY:	DATE:	SCALE:
PLATE 6A	G08095.6	M. BROWN	M. GERMAN	11/30/2009	AS SHOWN
SHEET NO. 1 OF 2					

DATE	BY	REV.	DESCRIPTION

CROSS SECTION AND MAP

MUNICIPAL SOLID WASTE LANDFILL FACILITY
LENOIR COUNTY
NORTH CAROLINA

LICENSE NUMBER: C-0281
Municipal Services Engineering Company, P.A.
P.O. BOX 97 GARNER, N.C. 27529 (919) 772-5393
P.O. BOX 349 BOONE, N.C. 28607 (828) 262-1767



SECTION B-B'

SCALE HORIZ. 1" = 100'
VERT. 1" = 10'

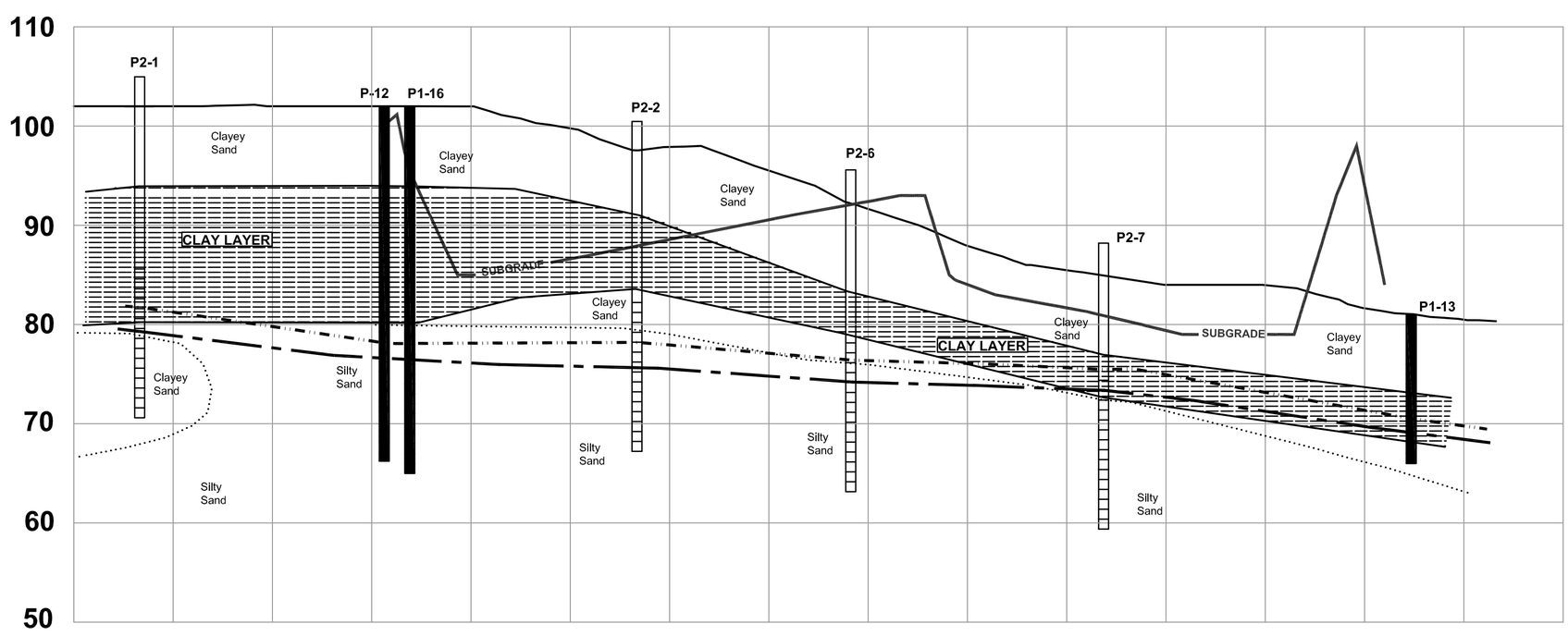
LEGEND:

- EXISTING GROUND SURFACE
- ESTIMATED STRATIGRAPIC CONTACT
- ESTIMATED LONG–TERM SEASONAL HIGH GROUNDWATER
- SINGLE DAY GROUNDWATER (MEASURED 3–21–09)

P2-6 — PIEZOMETER

SCREENED SECTION

P-12 — ABANDONED PIEZOMETER



SECTION C-C'

SCALE HORIZ. 1" = 100'
VERT. 1" = 10'

NOTE:
- NUMBERS SHOWN IN THIS PLATE ARE IN UNITS OF FEET UNLESS INDICATED OTHERWISE.
- SOIL PROFILES SHOWN HEREIN ARE INTERPOLATED FROM AVAILABLE BORING RECORDS.
- SOIL PROFILE BOUNDARIES DO NOT NECESSARILY INDICATE ABRUPT CHANGE IN SOIL TEXTURES.
- ESTIMATED LONG–TERM SEASONAL HIGH WATER TABLE WAS DERIVED FROM ITS RESPECTIVE CONTOUR SURFACE IN PLATE 4B.
- REFER TO PLATE 6A FOR CROSS SECTION LOCATION.

PLATE 6B

DRAWING NO.	SHEET NO.	PROJECT NUMBER	CHKD. BY:	DRWN. BY:	DATE:	SCALE:
PLATE 6B	2 OF 2	G08095.6	M. BROWN	M. GERMAN	11/30/2009	AS SHOWN

DATE	BY	REV.	DESCRIPTION

CROSS SECTIONS

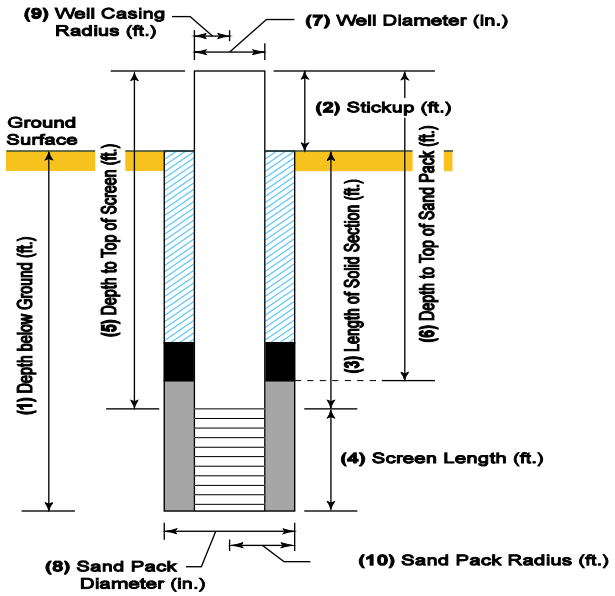
MUNICIPAL SOLID WASTE LANDFILL FACILITY
LENOIR COUNTY NORTH CAROLINA

LICENSE NUMBER: C–0281
Municipal Services Engineering Company, P.A.
P.O. BOX 97 GARNER, N.C. 27529 (919) 772-5393
P.O. BOX 349 BOONE, N.C. 28607 (828) 262-1767

APPENDIX A

Table A-1. Piezometer geometry summary

Well	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
P2-1	31.52	2.86	16.52	15	19.38	15.26	2	7.75	0.08	0.32
P2-2	30.25	3.01	15.25	15	18.26	13.84	2	7.75	0.08	0.32
P2-3	33.84	3.04	18.84	15	21.88	17.55	2	7.75	0.08	0.32
P2-4	33.72	3.01	18.72	15	21.73	17.60	2	7.75	0.08	0.32
P2-5S	34.85	3.04	19.85	15	22.89	18.56	2	7.75	0.08	0.32
P2-5D	50.81	2.91	45.81	5	48.72	44.66	2	7.75	0.08	0.32
P2-6	29.05	3.39	14.05	15	17.44	12.98	2	7.75	0.08	0.32
P2-7	25.56	3.25	10.56	15	13.81	9.25	2	7.75	0.08	0.32
P2-8	30.15	3.07	15.15	15	18.22	14.08	2	7.75	0.08	0.32
P2-9	33.19	3.11	18.19	15	21.30	17.05	2	7.75	0.08	0.32
P2-10	26.36	2.96	11.36	15	14.32	10.25	2	7.75	0.08	0.32
P2-11S	29.66	2.96	14.66	15	17.62	13.40	2	7.75	0.08	0.32
P2-11D	44.62	3.15	39.62	5	42.77	38.25	2	7.75	0.08	0.32
P2-12	24.75	3.25	9.75	15	13.00	8.63	2	7.75	0.08	0.32



NOTE:
1. Parameters in the table are numbered (1) through (10), and correspond to the numbers in the diagram.
2. All data in this table is in units of feet except for well diameter (7) and and pack diameter (8) which are in units of inches.

LOG OF BORING: P2-1

Lenoir County MSWLF Phase 2 **Project No. G08095.6**

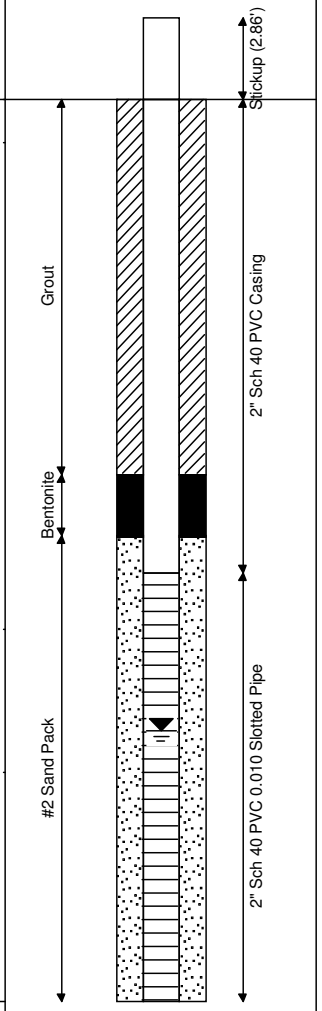
Drilling contractor: Derry's Well Drilling
Drill rig & method: 7.75" OD HSA, SPT
Logged by: J. Pfohl

Date started: 9/2/2008
Date ended: 9/2/2008
Completion depth: 31.52 ft
Stickup height: 2.86 ft

Surface elevation: 102.12 ft (MSL)
Top of pipe elevation: 104.98 ft (MSL)
Depth to water (TOB): 22.00 ft
Depth to water (24hrs): 22.07 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	14			Top Soil; light grey organic silty sand, root debris, dry
5	12			Clayey Sand; red brown, cohesive, homogeneous, moist
10	52			Clayey Sand; red brown, fine to medium grained cemented sand, dense, cohesive, moist
15	52			Clayey Sand; same as above
20	73			Silty Sand; light brown, poorly graded cemented sand, few smooth translucent quartz fragments, dense, dry
25	15			Clayey Sand; medium to dark grey fine grained sand with cohesive grey clay, wet
30	17			Clayey Sand; medium to dark grey, fine to medium grained sand with cohesive clay, saturated
35				Boring terminated at 31.5 feet
40				
45				

Well Diagram



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LOG OF BORING: P2-2

Lenoir County MSWLF Phase 2 **Project No. G08095.6**

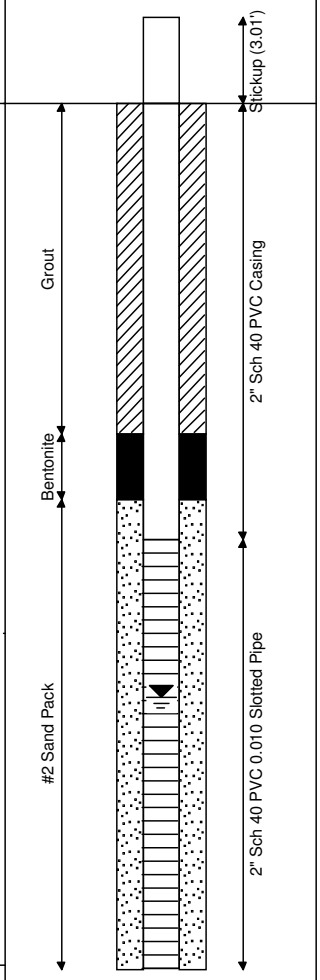
Drilling contractor: Derry's Well Drilling
Drill rig & method: 7.75" OD HSA w/ SPT
Logged by: J. Pfohl

Date started: 9/3/2008
Date ended: 9/3/2008
Completion depth: 30.11 ft
Stickup height: 3.01 ft

Surface elevation: 97.47 ft (MSL)
Top of pipe elevation: 100.48 ft (MSL)
Depth to water (TOB): 20.00 ft
Depth to water (24hrs): 20.76 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	13			Clayey Sand; red brown, fine grained,moist
	19			Clayey Sand; red brown to orange, cohesive, mosit
5				Clayey Sand (CL) orange, Gravel=0.02%, Sand=73.85%, Silt & Clay=26.13%, LL=27%, PL=18%, PI=9%
	29			Clayey Sand; red brown, fine to medium grained, homogeneous, cohesive, dry
10				
	22			Clayey Sand; same as above
15				
	18			Silty Sand; light brown, poorly graded fine to gravel size sand, damp
20				
	18			Silty Sand; same as above
25				
	19			Silty Sand; light brown, fine grained, trace clay nodules, wet
30				Boring terminated at 30.1 feet
35				
40				
45				

Well Diagram



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LOG OF BORING: P2-3

Lenoir County MSWLF Phase 2 **Project No. G08095.6**

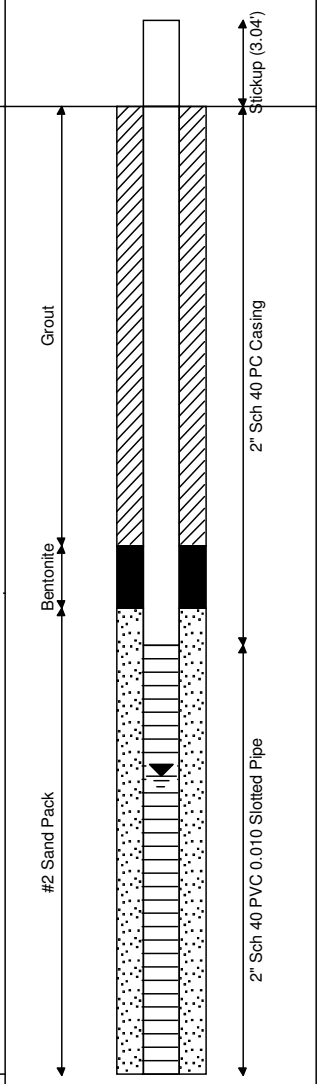
Drilling contractor: Derry's Well Drilling
Drill rig & method: 7.75" OD HSA w/ SPT
Logged by: J.Pfohl

Date started: 9/2/2008
Date ended: 9/2/2008
Completion depth: 33.84 ft
Stickup height: 3.04 ft

Surface elevation: 101.24 ft (MSL)
Top of pipe elevation: 104.28 ft (MSL)
Depth to water (TOB): 24.00 ft
Depth to water (24hrs): 23.40 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	14			Clayey Sand; reddish brown, fine graind, highly cohesive, moist
5	56			Clayey Sand; red brown, fine grained cemented sand laminated with cohesive clay, very dense, moist
10	61			Clayey Sand; same as above
15	34			Clayey Sand; red brown, poorly graded sand, trace silt, dry
20	19			Sand with Silt; poorly graded, red brown to orange, coarse grained, homogeneous, dry
25	30			Silty Sand; light brown, poorly graded sand fine to gravel sand size, moist
30	24			Silty Sand; same as above
35				Boring terminated at 33.8 feet
40				
45				

Well Diagram



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LOG OF BORING: P2-4

Lenoir County MSWLF Phase 2 **Project No. G08095.6**

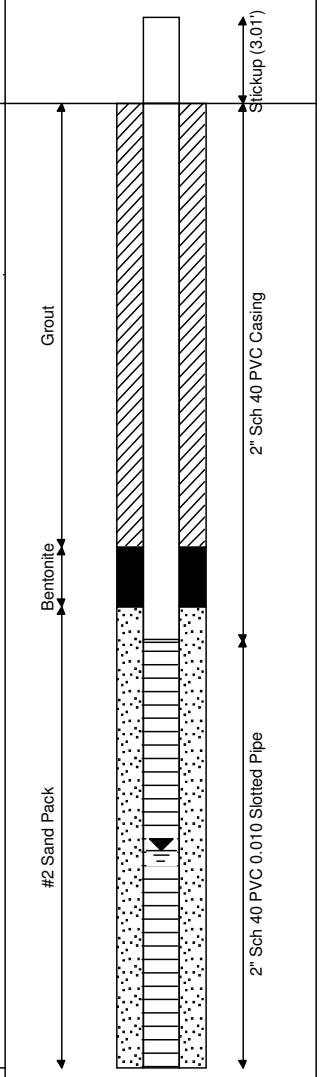
Drilling contractor: Derry's Well Drilling
Drill rig & method: 7.75" OD HSA w/SPT
Logged by: J. Pfohl

Date started: 9/3/2008
Date ended: 9/3/2008
Completion depth: 33.72 ft
Stickup height: 3.01 ft

Surface elevation: 104.61 ft (MSL)
Top of pipe elevation: 107.62 ft (MSL)
Depth to water (TOB): 24.00 ft
Depth to water (24hrs): 26.10 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	14			Clayey Sand; red brown, few grey clay nodules, dry
	18			Clayey Sand; red brown, cohesive clay nodules, dry
5				
	52			Silty Sand; red brown, homogeneous, dense cemented sand, trace clay nodules, dry
10				
				Silty Sand (SM) light brown, Gravel=0%, Sand=64.41%, Silt & Clay=35.59%
	59			Silty Sand; light brown, poorly graded, coarse to fine grained, cohesive clay nodules, dry
15				
	53			Silty Sand; light brown, poorly graded, trace silt and clay, dry
20				
	24			Sand with Silt; poorly graded, red brown to orange, coarse grained, homogeneous, dry
25				
	16			Silty Sand; light brown, poorly graded with trace silt, moist
30				
				Boring terminated at 33.7 feet
35				
40				
45				

Well Diagram



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LOG OF BORING: P2-5S

Lenoir County MSWLF Phase 2 **Project No. G08095.6**

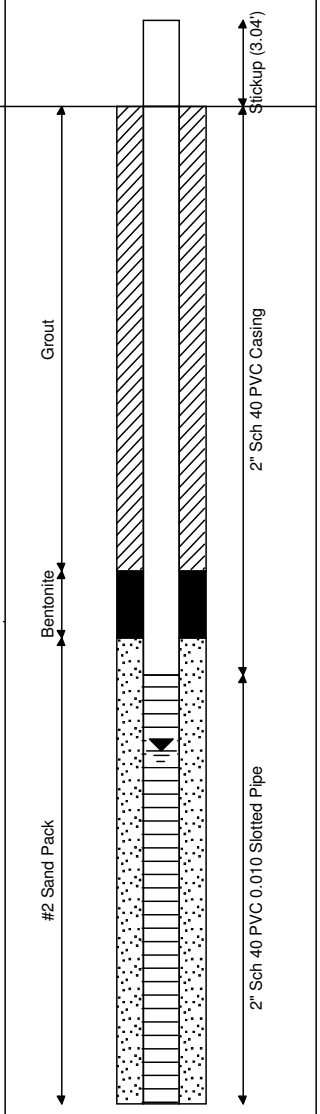
Drilling contractor: Derry's Well Drilling
Drill rig & method: 7.75" OD HSA
Logged by: J. Pfohl

Date started: 8/29/2008
Date ended: 8/29/2008
Completion depth: 34.85 ft
Stickup height: 3.04 ft

Surface elevation: 98.42 ft (MSL)
Top of pipe elevation: 101.46 ft (MSL)
Depth to water (TOB): 25.00 ft
Depth to water (24hrs): 22.52 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	18			Clayey Sand; brown, fine to medium grained sand laminated with red brown clay, moist
	13			Clayey Sand; red brown, fine to medium grained, cohesive, moist
5				
	20			Clayey Sand; same as above
10				
	21			Clayey Sand; red brown, fine to medium grained, dry
15				
	28			Silty Sand; dark brown, medium to coarse grained, trace cohesive clay nodules, dry
20				
	30			Silty Sand; dark brown, medium to coarse grained, trace cohesive clay nodules, damp
25				
	31			Silty Sand; same as above
30				
	17			Silty Sand; brown, poorly graded sand, trace clay nodules, homogeneous, moist
35				
				Boring terminated at 34.9 feet
40				
45				

Well Diagram



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LOG OF BORING: P2-5D

Lenoir County MSWLF Phase 2 **Project No. G08095.6**

Drilling contractor: Derry's Well Drilling
Drill rig & method: 7.75" OD HSA w/ SPT
Logged by: J. Pfohl

Date started: 8/30/2008
Date ended: 8/30/2008
Completion depth: 50.81 ft
Stickup height: 2.91 ft

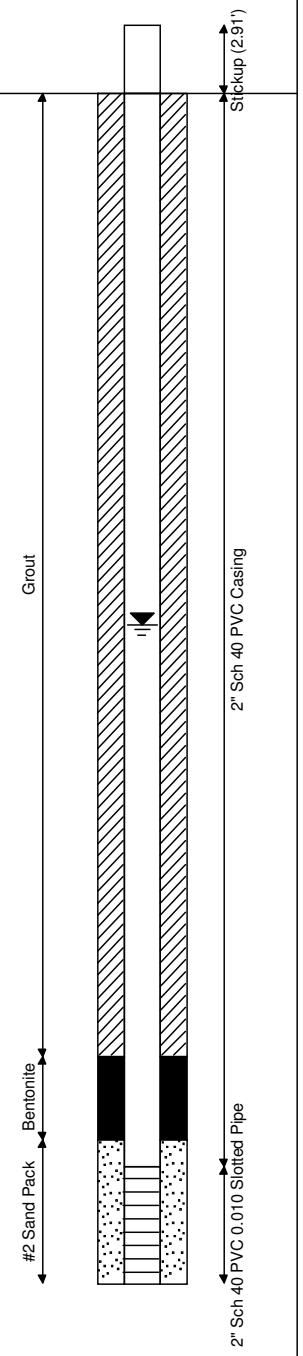
Surface elevation: 98.34 ft (MSL)
Top of pipe elevation: 101.25 ft (MSL)
Depth to water (TOB): 25.00 ft
Depth to water (24hrs): 22.69 ft

Depth (ft)	SPT (bpf)	Description of Material & Remarks
	18	Clayey Sand; brown, fine to medium grained sand laminated with red brown clay, moist
5	13	Clayey Sand; red brown, fine to medium grained, cohesive, moist
10	20	Clayey Sand; same as above
15	21	Clayey Sand; red brown, fine to medium grained, dry
20	28	Silty Sand; dark brown, medium to coarse grained, trace cohesive clay nodules, dry
25	30	Silty Sand; dark brown, medium to coarse grained, trace cohesive clay nodules, damp
30	31	Silty Sand; same as above
35	17	Silty Sand; brown, poorly graded sand, trace clay nodules, homogeneous, moist
40	18	Silty Sand; brown, poorly graded sand, trace clay nodules, homogeneous, wet
45	21	Silty Sand; same as above
50		Clayey Sand; black, cohesive, thinly laminated black clay with grey, fine to medium grained sand, some lignitic wood, moist
55		Boring terminated at 50.8 feet

Soil Type Symbol

Sample

Well Diagram



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LOG OF BORING: P2-6

Lenoir County MSWLF Phase 2 **Project No. G08095.6**

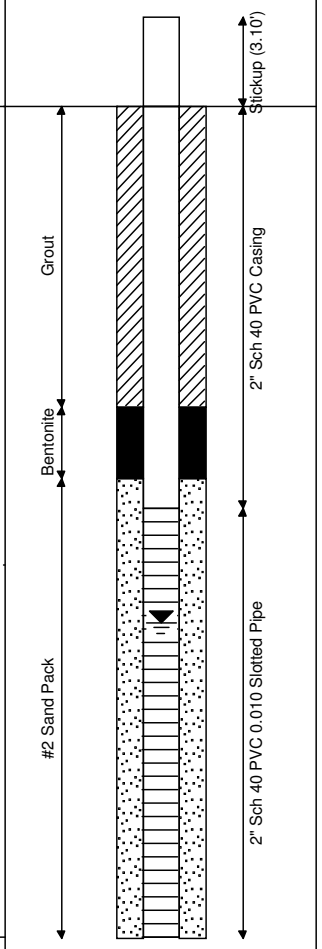
Drilling contractor: Derry's Well Drilling
Drill rig & method: 7.75" OD HSA w/ SPT
Logged by: J. Pfohl

Date started: 9/2/2008
Date ended: 9/2/2008
Completion depth: 29.05 ft
Stickup height: 3.10 ft

Surface elevation: 92.20 ft (MSL)
Top of pipe elevation: 95.29 ft (MSL)
Depth to water (TOB): 18.00 ft
Depth to water (24hrs): 18.05 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	17			Clayey Sand; brown yellow, fine to medium grained sand laminated with cohesive light grey clay, moist
5	17			Clayey Sand; brown to brown yellow, fine to medium grained, cohesive, moist
10	22			Clay Sand; brown to brown yellow, fine grained, few black silt partings, dry
15	20			Clayey Sand; same as above
20	37			Silty Sand; brown yellow, poorly graded, trace silt, moist
25	19			Silty Sand; brown yellow, poorly graded, less dense, wet
30				Boring terminated at 29.1 feet
35				
40				
45				

Well Diagram



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LOG OF BORING: P2-7

Lenoir County MSWLF Phase 2 **Project No. G08095.6**

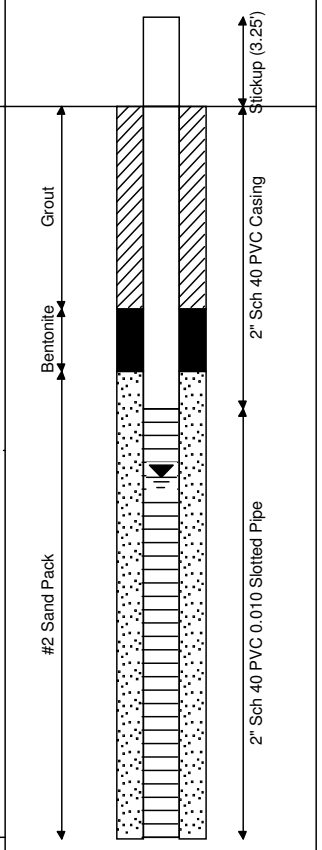
Drilling contractor: Derry's Well Drilling
Drill rig & method: 7.75" HSA w/ SPT
Logged by: J. Pfohl

Date started: 9/3/2008
Date ended: 9/3/2008
Completion depth: 25.56 ft
Stickup height: 3.25 ft

Surface elevation: 84.95 ft (MSL)
Top of pipe elevation: 88.20 ft (MSL)
Depth to water (TOB): 13.00 ft
Depth to water (24hrs): 12.95 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	21			Clayey Sand; brown to brown yellow, fine grained, trace organic top soil with root debris, dry
	14			Clayey Sand; brown to brown yellow, fine grained, dry
5				
	21			Clayey Sand; same as above
10				
	38			Silty Sand; light brown, poorly graded, trace silt, moist
15				Silty Sand (ML) tan, Gravel=0.0%, Sand=59.48%, Silt & Clay=40.52%, LL=45%, PL=29%, PI=16%
	19			Silty Sand; light brown, fine grained, wet
20				
	20			Silty Sand; brown yellow, poorly graded, wet
25				Boring terminated at 25.6 feet
30				
35				
40				
45				

Well Diagram



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LOG OF BORING: P2-8

Lenoir County MSWLF Phase 2 **Project No. G08095.6**

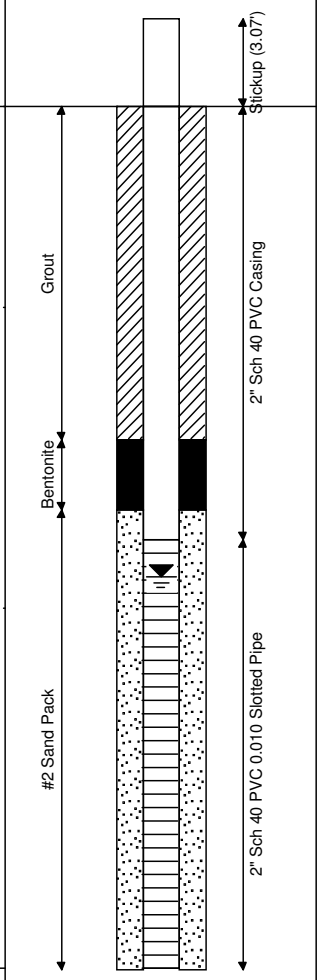
Drilling contractor: Derry's Well Drilling
Drill rig & method: 7.75" HSA w/ SPT
Logged by: J. Pfohl

Date started: 8/30/2008
Date ended: 8/30/2008
Completion depth: 30.15 ft
Stickup height: 3.07 ft

Surface elevation: 89.51 ft (MSL)
Top of pipe elevation: 92.58 ft (MSL)
Depth to water (TOB): 16.50 ft
Depth to water (24hrs): 16.45 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
				Silty Sand; tan grey, wet, medium dense, coarse grained
5	11			
				Clayey Sand; tan and grey layers, moist, medium dense
10	46			
15	15			Clayey Sand; wet, medium dense, less clay
				Silty Sand; grey brown, wet, medium dense, fine grained
20	10			
25				Soil description (0'-27.5') taken from log for overdrilled well P-7
30	13			Silty Sand; grey brown, fine grained, saturated
				Boring terminated at 30.1 feet
35				
40				
45				

Well Diagram



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LOG OF BORING: P2-9

Lenoir County MSWLF Phase 2 **Project No. G08095.6**

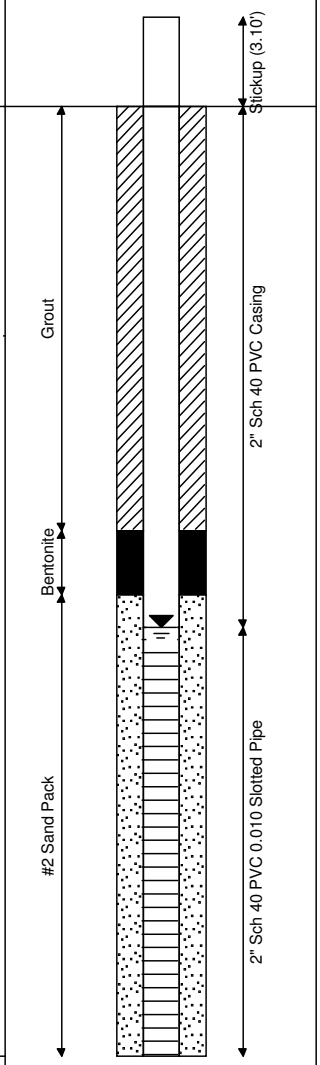
Drilling contractor: Derry's Well Drilling
Drill rig & method: 7.75" OD HSA w/SPT
Logged by: J. Pfohl

Date started: 8/30/2008
Date ended: 8/30/2008
Completion depth: 33.19 ft
Stickup height: 3.10 ft

Surface elevation: 98.84 ft (MSL)
Top of pipe elevation: 101.95 ft (MSL)
Depth to water (TOB): 23.00 ft
Depth to water (24hrs): 18.21 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	17			Clayey Sand; red brown, few grey clay nodules, dry
5	18			Clayey Sand; red brown, fine grained sand laminated with cohesive clay, moist
10	62			Silty Sand; red brown, homogeneous, dense cemented sand, dry
15	39			Sand with Silt; poorly graded, red brown to orange, coarse grained, dry
20	36			Silty Sand; light brown, poorly graded dry
25	23			Silty Sand; light brown to orange, few cobble size smooth translucent quartz fragments, damp
30	21			Silty Sand; light brown, poorly graded with trace silt, wet
35				Boring terminated at 33.2 feet
40				
45				

Well Diagram



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LOG OF BORING: P2-10

Lenoir County MSWLF Phase 2 **Project No. G08095.6**

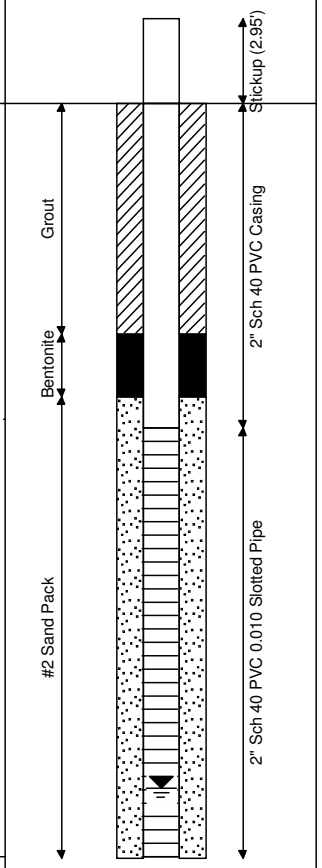
Drilling contractor: Derry's Well Drilling
Drill rig & method: 7.75" OD HSA w/ SPT
Logged by: J. Pfohl

Date started: 8/30/2008
Date ended: 8/30/2008
Completion depth: 26.36 ft
Stickup height: 2.95 ft

Surface elevation: 85.18 ft (MSL)
Top of pipe elevation: 88.14 ft (MSL)
Depth to water (TOB): 14.00 ft
Depth to water (24hrs): 23.91 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	9			Clayey Sand; orange, medium grained, loose, dry
	18			Clayey Sand; red brown, medium grained, moderately dense, slight relict structure, dry
5				Clayey Sand (CL) orange brown, Gravel=0.0%, Sand=73.55%, Silt & Clay=26.45%, LL=29%, PL=15%, PI=14%
	80			Clayey Sand; red brown, medium to fine grained, very dense, dry
10				
	37			Silty Sand; tan, medium grained, damp
15				
	28			Silty Sand; tan, medium grained, moderately dense, moist
20				
	26			Silty Sand; tan, medium grained, moderately dense, few black silt partings, wet
25				
				Boring terminated at 26.4 feet
30				
35				
40				
45				

Well Diagram



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LOG OF BORING: P2-11S

Lenoir County MSWLF Phase 2 **Project No. G08095.6**

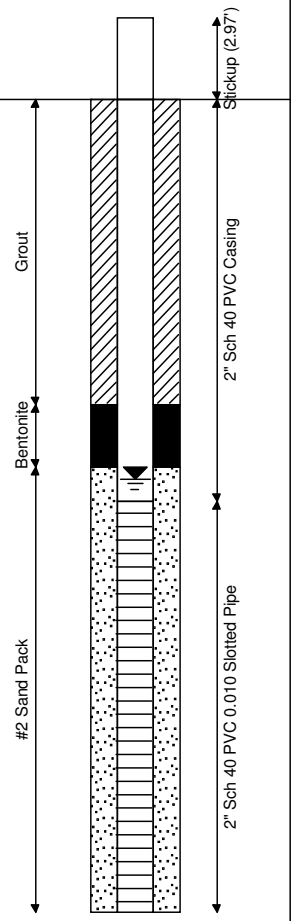
Drilling contractor: Derry's Well Drilling
Drill rig & method: 7.75" OD HSA
Logged by: J. Pfohl

Date started: 8/30/2008
Date ended: 8/30/2008
Completion depth: 29.66 ft
Stickup height: 2.97 ft

Surface elevation: 82.80 ft (MSL)
Top of pipe elevation: 85.76 ft (MSL)
Depth to water (TOB): 14.00 ft
Depth to water (24hrs): 13.85 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	13			Clayey Sand; light brown, fine grained sand laminated with grey cohesive clay, moist
	18			Clayey Sand; light brown, medium grained sand laminated with brown to grey cohesive clay, moist
5				
	49			Clayey Sand; red brown, poorly graded sand with cohesive clay, dry
10				
	32			Clayey Sand; brown, medium grained sand with cohesive grey clay, moist
15				
	17			Silty Sand with Clay, light brown, fine to medium grained sand with cohesive clay, moist
20				
	31			Silty Sand with Clay; light brown, clay lense, cohesive, wet
25				
	26			Silty Sand with Clay; same as above
30				Boring terminated at 29.7 feet
35				
40				
45				

Well Diagram



Municipal Engineering Services Company, P.A.
Operation/Construction Managers Civil/Sanitary Engineers Environmental Studies
PO Box 97, Garner, North Carolina 27529 (919) 772-5393 PO Box 349, Boone, North Carolina 28607 (828) 262-1767

LOG OF BORING: P2-11D

Lenoir County MSWLF Phase 2 **Project No. G08095.6**

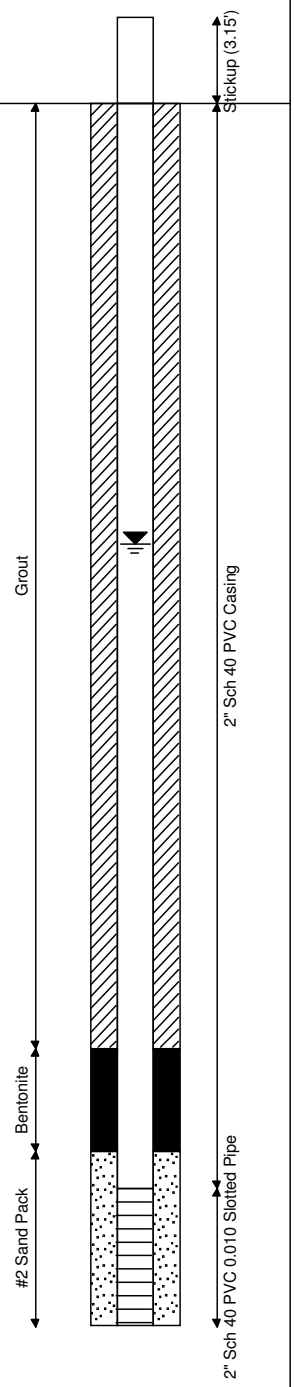
Drilling contractor: Derry's Well Drilling
Drill rig & method: 7.75" OD HSA w/ SPT
Logged by: J. Pfohl

Date started: 8/30/2008
Date ended: 8/30/2008
Completion depth: 44.62 ft
Stickup height: 3.15 ft

Surface elevation: 82.72 ft (MSL)
Top of pipe elevation: 85.87 ft (MSL)
Depth to water (TOB): 14.00 ft
Depth to water (24hrs): 16.05 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	13			Clayey Sand; light brown, fine grained sand laminated with grey cohesive clay, moist
	18			Clayey Sand; light brown, medium grained sand laminated with brown to grey cohesive clay, moist
5				
	49			Clayey Sand; red brown, poorly graded sand with cohesive clay, dry
10				
				Clayey Sand (CL) brown, Gravel=0.0%, Sand=72.06%, Silt & Clay=27.94%, LL=36%, PL=19%, PI=17%
15	32			Clayey Sand; brown, medium grained sand with cohesive grey clay, moist
	17			Silty Sand with Clay, light brown, fine to medium grained sand with cohesive clay, moist
20				
	31			Silty Sand with Clay; light brown, clay lense, cohesive, wet
25				
	26			Silty Sand with Clay; same as above
30				
	24			Silty Sand with Clay; same as above
35				
	23			Clayey Sand; black, thinly laminated black clay interbedded with grey fine to medium grained sand, some lignitic wood, moist
40				
45				Boring terminated at 44.6 feet

Well Diagram



Municipal Engineering Services Company, P.A.
Operation/Construction Managers Civil/Sanitary Engineers Environmental Studies
PO Box 97, Garner, North Carolina 27529 (919) 772-5393 PO Box 349, Boone, North Carolina 28607 (828) 262-1767

LOG OF BORING: P2-12

Lenoir County MSWLF Phase 2 **Project No. G08095.6**

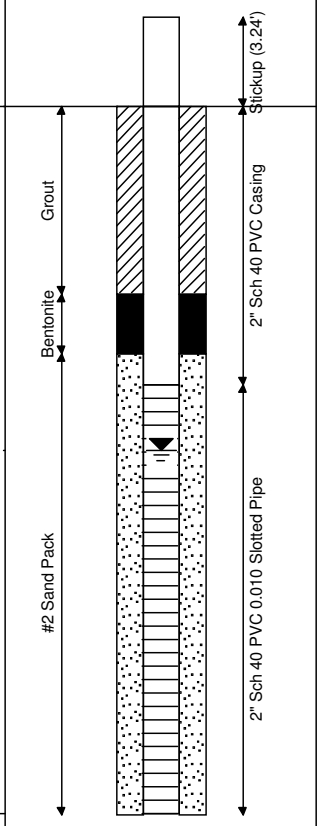
Drilling contractor: Derry's Well Drilling
Drill rig & method: 7.75" OD HSA w/ SPT
Logged by: J. Pfohl

Date started: 8/30/2008
Date ended: 8/30/2008
Completion depth: 24.75 ft
Stickup height: 3.24 ft

Surface elevation: 82.52 ft (MSL)
Top of pipe elevation: 85.77 ft (MSL)
Depth to water (TOB): 12.00 ft
Depth to water (24hrs): 12.01 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	8			Clayey Sand; light brown, fine grained sand laminated with grey cohesvie clay, moist
5	14			Clayey Sand; light brown, medium grained sand laminated with gray cohesive clay, moist
10	62			Clayey Sand; red brown, poorly graded sand, few smooth cobble size translucent quartz fragments, dry
15	22			Silty Sand; light brown, poorly graded sand, few grey clay nodules, moist
20	16			Silty Sand; light brown, fine grained, homogeneous, wet
25				Boring terminated at 24.8 feet
30				
35				
40				
45				

Well Diagram



Municipal Engineering Services Company, P.A.
Operation/Construction Managers Civil/Sanitary Engineers Environmental Studies
PO Box 97, Garner, North Carolina 27529 (919) 772-5393 PO Box 349, Boone, North Carolina 28607 (828) 262-1767

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2663

1. WELL CONTRACTOR:

Derry Huneycutt
Well Contractor (Individual) Name

Derry's Well Drilling Inc.
Well Contractor Company Name

STREET ADDRESS 44283-A NC 24/27/73

Albemarle | NC | 28002
City or Town | State | Zip Code

(704) 982-3070
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) P2-1

WELL CONSTRUCTION PERMIT#(if applicable)

OTHER ASSOCIATED PERMIT #(if applicable)

3. WELL USE (Check Applicable Box) Monitoring☐ Municipal/Public☐ Industrial/Commercial☐ Agricultural☐ Recovery☐ Injection☐ Irrigation☐ Other■ (list use) Temp. Piez. for Hydro Study

DATE DRILLED 9/2/08

TIME COMPLETED 1:00 AM☐ PM■

4. WELL LOCATION:

CITY: LaGrange COUNTY Lenoir

2949 Hodges Farm Rd. 28501
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ■ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE N35.289029

LONGITUDE W77.70529

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ■ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

5. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Lenoir Co. Sub. D MSWLF, Ph. 2

STREET ADDRESS 2949 Hodges Farm Rd.

LaGrange | NC | 28501
City or Town | State | Zip Code

CONTACT PERSON Mr. Tom Miller (Solid Waste Dir.)

MAILING ADDRESS PO Box 3289

Kinston | NC | 28502
City or Town | State | Zip Code

(252) 566-4194
Area code - Phone number

6. WELL DETAILS:

a. TOTAL DEPTH: 31.52

b. DOES WELL REPLACE EXISTING WELL? YES☐ NO■

c. WATER LEVEL Below Top of Casing: 25.07 FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 3.00 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. YIELD (gpm): na METHOD OF TEST na

f. DISINFECTION: Type na Amount na

g. WATER ZONES (depth):
From 22.07 To >31.52 From ___ To ___
From ___ To ___ From ___ To ___
From ___ To ___ From ___ To ___

7. CASING:

From	To	Ft.	Diameter	Thickness/Weight	Material
+3	16.52	2		sch40	PVC

8. GROUT:

From	To	Ft.	Material	Method
13.10	15.26		Bent. Chips	Gravity
0	13.10		Cement/Bent.	Tremie

9. SCREEN:

From	To	Ft.	Diameter	Slot Size	Material
16.52	31.52		2 in.	0.01 in.	PVC
			in.	in.	
			in.	in.	

10. SAND/GRAVEL PACK:

From	To	Ft.	Size	Material
15.26	13.52		#2	Filter Sand

11. DRILLING LOG

From	To	Formation Description
0	1.5	Top Soil
1.5	18	Clayey Sand; R. Brown
18	22	Silty Sand; Lt. Brown
22	31.52	Clayey Sand; Med. to Dark Gray

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE 8/25/08

Derry Huneycutt
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt., 1617 Mail Service Center – Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b
Rev.12/07

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2663

1. WELL CONTRACTOR:

Derry Huneycutt
Well Contractor (Individual) Name

Derry's Well Drilling Inc.
Well Contractor Company Name

STREET ADDRESS 44283-A NC 24/27/73

Albemarle | NC | 28002
City or Town | State | Zip Code

(704) 982-3070
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) P2-2

WELL CONSTRUCTION PERMIT#(if applicable)

OTHER ASSOCIATED PERMIT #(if applicable)

3. WELL USE (Check Applicable Box) Monitoring☐ Municipal/Public☐ Industrial/Commercial☐ Agricultural☐ Recovery☐ Injection☐ Irrigation☐ Other■ (list use) Temp. Piez. for Hydro Stud)

DATE DRILLED 9/3/08

TIME COMPLETED 2:00 AM☐ PM■

4. WELL LOCATION:

CITY: LaGrange COUNTY Lenoir

2949 Hodges Farm Rd. 28501
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ■ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE N35.290005
LONGITUDE W77.7065436

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ■ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

5. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Lenoir Co. Sub. D MSWLF, Ph. 2

STREET ADDRESS 2949 Hodges Farm Rd.

LaGrange | NC | 28501
City or Town | State | Zip Code

CONTACT PERSON Mr. Tom Miller (Solid Waste Dir.)

MAILING ADDRESS PO Box 3289

Kinston | NC | 28502
City or Town | State | Zip Code

(252) 566-4194
Area code - Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 30.11

b. **DOES WELL REPLACE EXISTING WELL?** YES☐ NO■

c. **WATER LEVEL** Below Top of Casing: 23.62 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** na **METHOD OF TEST** na

f. **DISINFECTION: Type** na **Amount** na

g. **WATER ZONES** (depth):
From 20.62 To >30.11 From To
From To From To
From To From To

7. CASING:

Depth		Diameter	Thickness/Weight	Material
From +3	To 15.11	Ft. 2	sch40	PVC
From	To	Ft.		
From	To	Ft.		

8. GROUT:

Depth		Material	Method
From 11.55	To 13.84	Ft. Bent. Chips	Gravity
From 0	To 11.55	Ft. Cement/Bent.	Tremie
From	To	Ft.	

9. SCREEN:

Depth		Diameter	Slot Size	Material
From 15.11	To 30.11	Ft. 2 in.	0.01 in.	PVC
From	To	Ft. in.	in.	
From	To	Ft. in.	in.	

10. SAND/GRAVEL PACK:

Depth		Size	Material
From 13.84	To 30.11	Ft. #2	Filter Sand
From	To	Ft.	
From	To	Ft.	

11. DRILLING LOG

From	To	Formation Description
0	18	Clayey Sand; R. Brown
18	30.11	Silty Sand; Lt. Brown

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE 8/25/08

Derry Huneycutt
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt., 1617 Mail Service Center – Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b
Rev.12/07

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2663

1. WELL CONTRACTOR:

Derry Huneycutt
Well Contractor (Individual) Name

Derry's Well Drilling Inc.
Well Contractor Company Name

STREET ADDRESS 44283-A NC 24/27/73

Albemarle | NC | 28002
City or Town | State | Zip Code

(704) 982-3070
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) P2-3

WELL CONSTRUCTION PERMIT#(if applicable)

OTHER ASSOCIATED PERMIT #(if applicable)

3. WELL USE (Check Applicable Box) Monitoring☐ Municipal/Public☐ Industrial/Commercial☐ Agricultural☐ Recovery☐ Injection☐ Irrigation☐ Other■ (list use) Temp. Piez. for Hydro Study

DATE DRILLED 9/2/08

TIME COMPLETED 11:00 AM■ PM☐

4. WELL LOCATION:

CITY: LaGrange COUNTY Lenoir

2949 Hodges Farm Rd. 28501
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ■ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE N35.290164

LONGITUDE W77.707058

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ■ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

5. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Lenoir Co. Sub. D MSWLF, Ph. 2

STREET ADDRESS 2949 Hodges Farm Rd.

LaGrange | NC | 28501
City or Town | State | Zip Code

CONTACT PERSON Mr. Tom Miller (Solid Waste Dir.)

MAILING ADDRESS PO Box 3289

Kinston | NC | 28502
City or Town | State | Zip Code

(252) 566-4194
Area code - Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 33.84

b. **DOES WELL REPLACE EXISTING WELL?** YES☐ NO☐

c. **WATER LEVEL** Below Top of Casing: 26.40 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** na **METHOD OF TEST** na

f. **DISINFECTION: Type** na **Amount** na

g. **WATER ZONES** (depth):
From 23.40 To >33.84 From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

7. CASING:

From	To	Ft.	Diameter	Thickness/Weight	Material
+3	18.84	2		sch40	PVC

8. GROUT:

From	To	Ft.	Material	Method
15.34	17.55		Bent. Chips	Gravity
0	15.34		Cement/Bent.	Tremie

9. SCREEN:

From	To	Ft.	Diameter in.	Slot Size in.	Material
18.84	33.84	2		0.01	PVC

10. SAND/GRAVEL PACK:

From	To	Ft.	Size	Material
17.55	33.84		#2	Filter Sand

11. DRILLING LOG

From	To	Formation Description
0	17	Clayey Sand; R. Brown
17	22	Sand w/ Silt; R. Brown
22	33.84	Silty Sand; Lt. Brown

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE 8/25/08

Derry Huneycutt
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt., 1617 Mail Service Center – Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b
Rev.12/07

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2663

1. WELL CONTRACTOR:

Derry Huneycutt
Well Contractor (Individual) Name

Derry's Well Drilling Inc.
Well Contractor Company Name

STREET ADDRESS 44283-A NC 24/27/73

Albemarle NC 28002
City or Town State Zip Code

(704) 982-3070
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) P2-4

WELL CONSTRUCTION PERMIT#(if applicable)

OTHER ASSOCIATED PERMIT #(if applicable)

3. WELL USE (Check Applicable Box) Monitoring☐ Municipal/Public☐ Industrial/Commercial☐ Agricultural☐ Recovery☐ Injection☐ Irrigation☐ Other■ (list use) Temp. Piez. for Hydro Study

DATE DRILLED 9/3/08

TIME COMPLETED 5:00 AM☐ PM■

4. WELL LOCATION:

CITY: LaGrange COUNTY Lenoir

2949 Hodges Farm Rd. 28501
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ■ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE N35.2904988

LONGITUDE W77.707514

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ■ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

5. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Lenoir Co. Sub. D MSWLF, Ph. 2

STREET ADDRESS 2949 Hodges Farm Rd.

LaGrange NC 28501
City or Town State Zip Code

CONTACT PERSON Mr. Tom Miller (Solid Waste Dir.)

MAILING ADDRESS PO Box 3289

Kinston NC 28502
City or Town State Zip Code

(252) 566-4194
Area code - Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 33.72

b. **DOES WELL REPLACE EXISTING WELL?** YES☐ NO■

c. **WATER LEVEL** Below Top of Casing: 29.10 FT
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** na **METHOD OF TEST** na

f. **DISINFECTION: Type** na **Amount** na

g. **WATER ZONES** (depth):
From 26.10 To >33.72 From To
From To From To
From To From To

7. CASING:

From	To	Ft.	Diameter	Thickness/Weight	Material
+3	18.72	2		sch40	PVC

8. GROUT:

From	To	Ft.	Material	Method
15.50	17.60		Bent. Chips	Gravity
0	15.50		Cement/Bent.	Tremie

9. SCREEN:

From	To	Ft.	Diameter in.	Slot Size in.	Material
18.72	33.72	2		0.01	PVC

10. SAND/GRAVEL PACK:

From	To	Ft.	Size	Material
17.60	33.72		#2	Filter Sand

11. DRILLING LOG

From	To	Formation Description
0	6	Clayey Sand; R. Brown
6	20	Silty Sand
20	28	Poorly Graded Sand w/ Silt
28	33.72	Silty Sand; Lt. Brown

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE 8/25/08

Derry Huneycutt
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt., 1617 Mail Service Center – Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b
Rev.12/07

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2663

1. WELL CONTRACTOR:

Derry Huneycutt
Well Contractor (Individual) Name

Derry's Well Drilling Inc.
Well Contractor Company Name

STREET ADDRESS 44283-A NC 24/27/73

Albemarle | NC | 28002
City or Town | State | Zip Code

(704) 982-3070
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) P2-5S

WELL CONSTRUCTION PERMIT#(if applicable)

OTHER ASSOCIATED PERMIT #(if applicable)

3. WELL USE (Check Applicable Box) Monitoring☐ Municipal/Public☐ Industrial/Commercial☐ Agricultural☐ Recovery☐ Injection☐ Irrigation☐ Other■ (list use) Temp. Piez. for Hydro Stud

DATE DRILLED 8/29/08

TIME COMPLETED 4:00 AM☐ PM■

4. WELL LOCATION:

CITY: LaGrange COUNTY Lenoir

2949 Hodges Farm Rd. 28501
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ■ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE N35.2904988

LONGITUDE W77.7068375

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ■ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

5. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Lenoir Co. Sub. D MSWLF, Ph. 2

STREET ADDRESS 2949 Hodges Farm Rd.

LaGrange | NC | 28501
City or Town | State | Zip Code

CONTACT PERSON Mr. Tom Miller (Solid Waste Dir.)

MAILING ADDRESS PO Box 3289

Kinston | NC | 28502
City or Town | State | Zip Code

(252) 566-4194
Area code - Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 34.85

b. **DOES WELL REPLACE EXISTING WELL?** YES☐ NO■

c. **WATER LEVEL** Below Top of Casing: 25.52 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** na **METHOD OF TEST** na

f. **DISINFECTION: Type** na **Amount** na

g. **WATER ZONES** (depth):
From 22.52 To >34.85 From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

7. CASING:

Depth		Diameter	Thickness/Weight	Material
From +3	To 19.85	Ft 2	sch40	PVC
From ____	To ____	Ft ____	____	____
From ____	To ____	Ft ____	____	____

8. GROUT:

Depth		Material	Method
From 16.23	To 18.56	Ft Bent. Chips	Gravity
From 0	To 16.23	Ft Cement/Bent.	Tremie
From ____	To ____	Ft ____	____

9. SCREEN:

Depth		Diameter	Slot Size	Material
From 19.85	To 34.85	Ft 2 in.	0.01 in.	PVC
From ____	To ____	Ft ____ in.	____ in.	____
From ____	To ____	Ft ____ in.	____ in.	____

10. SAND/GRAVEL PACK:

Depth		Size	Material
From 18.56	To 34.85	Ft #2	Filter Sand
From ____	To ____	Ft ____	____
From ____	To ____	Ft ____	____

11. DRILLING LOG

From	To	Formation Description
0	22	Clayey Sand; R. Brown
22	34.85	Silty Sand; Dark Brown

12. REMARKS:

Shallow counterpart to adjacent cluster P2-5D

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR | 8/25/08 DATE

Derry Huneycutt
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt., 1617 Mail Service Center – Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b
Rev.12/07

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2663

1. WELL CONTRACTOR:

Derry Huneycutt
Well Contractor (Individual) Name

Derry's Well Drilling Inc.
Well Contractor Company Name

STREET ADDRESS 44283-A NC 24/27/73

Albemarle | NC | 28002
City or Town | State | Zip Code

(704) 982-3070
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) P2-5D

WELL CONSTRUCTION PERMIT#(if applicable)

OTHER ASSOCIATED PERMIT #(if applicable)

3. WELL USE (Check Applicable Box) Monitoring☐ Municipal/Public☐ Industrial/Commercial☐ Agricultural☐ Recovery☐ Injection☐ Irrigation☐ Other■ (list use) Temp. Piez. for Hydro Stud)

DATE DRILLED 8/30/08

TIME COMPLETED 6:00 AM☐ PM■

4. WELL LOCATION:

CITY: LaGrange COUNTY Lenoir

2949 Hodges Farm Rd. 28501
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ■ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE N35.2904988

LONGITUDE W77.7068375

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ■ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

5. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Lenoir Co. Sub. D MSWLF, Ph. 2

STREET ADDRESS 2949 Hodges Farm Rd.

LaGrange | NC | 28501
City or Town | State | Zip Code

CONTACT PERSON Mr. Tom Miller (Solid Waste Dir.)

MAILING ADDRESS PO Box 3289

Kinston | NC | 28502
City or Town | State | Zip Code

(252) 566-4194
Area code - Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 50.81

b. **DOES WELL REPLACE EXISTING WELL?** YES☐ NO■

c. **WATER LEVEL** Below Top of Casing: 25.69 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** na **METHOD OF TEST** na

f. **DISINFECTION: Type** na **Amount** na

g. **WATER ZONES** (depth):
From 22.69 To >50.81 From To
From To From To
From To From To

7. CASING:

Depth		Diameter	Thickness/Weight	Material
From +3	To 45.81	Ft. 2	sch40	PVC
From	To	Ft.		
From	To	Ft.		

8. GROUT:

Depth		Material	Method
From 41.10	To 44.66	Ft. Bent. Chips	Gravity
From 0	To 41.10	Ft. Cement/Bent.	Tremie
From	To	Ft.	

9. SCREEN:

Depth		Diameter	Slot Size	Material
From 45.81	To 50.81	Ft. 2 in.	0.01 in.	PVC
From	To	Ft. in.	in.	
From	To	Ft. in.	in.	

10. SAND/GRAVEL PACK:

Depth		Size	Material
From 44.66	To 50.81	Ft. #2	Filter Sand
From	To	Ft.	
From	To	Ft.	

11. DRILLING LOG

From	To	Formation Description
0	22	Clayey Sand; R. Brown
22	49.50	Silty Sand; Dark Brown
49.50	50.85	Clayey Sand; Black
		No Refusal

12. REMARKS:

~~Deeper counterpart to adjacent cluster P2-5S.~~

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE 8/25/08

Derry Huneycutt
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt., 1617 Mail Service Center – Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b
Rev.12/07

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2663

1. WELL CONTRACTOR:

Derry Huneycutt
Well Contractor (Individual) Name

Derry's Well Drilling Inc.
Well Contractor Company Name

STREET ADDRESS 44283-A NC 24/27/73

Albemarle | NC | 28002
City or Town | State | Zip Code

(704) 982-3070
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) P2-6

WELL CONSTRUCTION PERMIT#(if applicable)

OTHER ASSOCIATED PERMIT #(if applicable)

3. WELL USE (Check Applicable Box) Monitoring☐ Municipal/Public☐ Industrial/Commercial☐ Agricultural☐ Recovery☐ Injection☐ Irrigation☐ Other■ (list use) Temp. Piez. for Hydro Study

DATE DRILLED 9/2/08

TIME COMPLETED 11:00 AM☑ PM☐

4. WELL LOCATION:

CITY: LaGrange COUNTY Lenoir

2949 Hodges Farm Rd. 28501
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ■ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE N35.2900005
LONGITUDE W77.7065436

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ■ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

5. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Lenoir Co. Sub. D MSWLF, Ph. 2

STREET ADDRESS 2949 Hodges Farm Rd.

LaGrange | NC | 28501
City or Town | State | Zip Code

CONTACT PERSON Mr. Tom Miller (Solid Waste Dir.)

MAILING ADDRESS PO Box 3289

Kinston | NC | 28502
City or Town | State | Zip Code

(252) 566-4194
Area code - Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 29.05

b. **DOES WELL REPLACE EXISTING WELL?** YES☐ NO■

c. **WATER LEVEL** Below Top of Casing: 21.05 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** na **METHOD OF TEST** na

f. **DISINFECTION: Type** na **Amount** na

g. **WATER ZONES** (depth):
From 18.05 To >29.05 From To
From To From To
From To From To

7. CASING:

From	To	Ft.	Diameter	Thickness/Weight	Material
+3	14.05	2		sch40	PVC

8. GROUT:

From	To	Ft.	Material	Method
10.48	12.98		Bent. Chips	Gravity
0	10.48		Cement/Bent.	Tremie

9. SCREEN:

From	To	Ft.	Diameter	Slot Size	Material
14.05	29.05	2	in.	0.01 in.	PVC
			in.	in.	
			in.	in.	

10. SAND/GRAVEL PACK:

From	To	Ft.	Size	Material
12.98	29.05		#2	Filter Sand

11. DRILLING LOG

From	To	Formation Description
0	6	Clayey Sand; R. Brown
6	20	Silty Sand; Dark Brown
20	28	Poorly Graded Sand w/ Silt
28	29.05	Silty Sand; Lt. Brown

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE 8/25/08

Derry Huneycutt
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt., 1617 Mail Service Center – Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b
Rev.12/07

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2663

1. WELL CONTRACTOR:

Derry Huneycutt
Well Contractor (Individual) Name

Derry's Well Drilling Inc.
Well Contractor Company Name

STREET ADDRESS 44283-A NC 24/27/73

Albemarle NC 28002
City or Town State Zip Code

(704) 982-3070
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) P2-7

WELL CONSTRUCTION PERMIT#(if applicable)

OTHER ASSOCIATED PERMIT #(if applicable)

3. WELL USE (Check Applicable Box) Monitoring☐ Municipal/Public☐ Industrial/Commercial☐ Agricultural☐ Recovery☐ Injection☐ Irrigation☐ Other■ (list use) Temp. Piez. for Hydro Study

DATE DRILLED 9/3/08

TIME COMPLETED 9:00 AM■ PM☐

4. WELL LOCATION:

CITY: LaGrange COUNTY Lenoir

2949 Hodges Farm Rd. 28501
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ■ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE N35.291041

LONGITUDE W77.7054234

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ■ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

5. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Lenoir Co. Sub. D MSWLF, Ph. 2

STREET ADDRESS 2949 Hodges Farm Rd.

LaGrange NC 28501
City or Town State Zip Code

CONTACT PERSON Mr. Tom Miller (Solid Waste Direct

MAILING ADDRESS PO Box 3289

Kinston NC 28502
City or Town State Zip Code

(252) 566-4194
Area code - Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 25.56

b. **DOES WELL REPLACE EXISTING WELL?** YES☐ NO■

c. **WATER LEVEL** Below Top of Casing: 15.95 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** na **METHOD OF TEST** na

f. **DISINFECTION: Type** na **Amount** na

g. **WATER ZONES** (depth):
From 12.95 To >25.56 From To
From To From To
From To From To

7. CASING:

Depth		Diameter	Thickness/Weight	Material
From +3.00	To 10.56	Ft. 2	scH40	PVC
From	To	Ft.		
From	To	Ft.		

8. GROUT:

Depth		Material	Method
From 7.06	To 9.25	Ft. Bent. Chips	Gravity
From 0	To 7.06	Ft. Cement/Bent.	Tremie
From	To	Ft.	

9. SCREEN:

Depth		Diameter	Slot Size	Material
From 10.56	To 25.56	Ft. 2 in.	0.01 in.	PVC
From	To	Ft. in.	in.	
From	To	Ft. in.	in.	

10. SAND/GRAVEL PACK:

Depth		Size	Material
From 9.25	To 25.56	Ft. #2	Filter Sand
From	To	Ft.	
From	To	Ft.	

11. DRILLING LOG

From	To	Formation Description
0	12	Clayey Sand; Br. to Br. Yellow
12	25.56	Silty Sand; Lt. Brown

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 8/25/08 DATE

Derry Huneycutt
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt., 1617 Mail Service Center – Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b
Rev.12/07

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2663

1. WELL CONTRACTOR:

Derry Huneycutt
Well Contractor (Individual) Name

Derry's Well Drilling Inc.
Well Contractor Company Name

STREET ADDRESS 44283-A NC 24/27/73

Albemarle NC 28002
City or Town State Zip Code

(704) 982-3070
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) P2-8

WELL CONSTRUCTION PERMIT#(if applicable)

OTHER ASSOCIATED PERMIT #(if applicable)

3. WELL USE (Check Applicable Box) Monitoring☐ Municipal/Public☐ Industrial/Commercial☐ Agricultural☐ Recovery☐ Injection☐ Irrigation☐ Other■ (list use) Temp. Piez. for Hydro Study

DATE DRILLED 8/30/08

TIME COMPLETED 8:00 AM☑ PM☐

4. WELL LOCATION:

CITY: LaGrange COUNTY Lenoir

2949 Hodges Farm Rd. 28501
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ■ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE N35.29114894

LONGITUDE W77.7063779

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ■ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

5. FACILITY - is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Lenoir Co. Sub. D MSWLF, Ph. 2

STREET ADDRESS 2949 Hodges Farm Rd.

LaGrange NC 28501
City or Town State Zip Code

CONTACT PERSON Mr. Tom Miller (Solid Waste Direct

MAILING ADDRESS PO Box 3289

Kinston NC 28502
City or Town State Zip Code

(252) 566-4194
Area code - Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 30.15

b. **DOES WELL REPLACE EXISTING WELL?** YES■ NO☐

c. **WATER LEVEL** Below Top of Casing: 19.45 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** na **METHOD OF TEST** na

f. **DISINFECTION: Type** na **Amount** na

g. **WATER ZONES** (depth):
From 16.45 To >30.15 From To
From To From To
From To From To

7. CASING:

Depth		Diameter	Thickness/Weight	Material
From +3.00	To 15.15	Ft. 2	scH40	PVC
From	To	Ft.		
From	To	Ft.		

8. GROUT:

Depth		Material	Method
From 11.65	To 14.08	Ft. Bent. Chips	Gravity
From 0	To 11.65	Ft. Cement/Bent.	Tremie
From	To	Ft.	

9. SCREEN:

Depth		Diameter	Slot Size	Material
From 15.15	To 30.15	Ft. 2 in.	0.01 in.	PVC
From	To	Ft. in.	in.	
From	To	Ft. in.	in.	

10. SAND/GRAVEL PACK:

Depth		Size	Material
From 14.08	To 30.15	Ft. #2	Filter Sand
From	To	Ft.	
From	To	Ft.	

11. DRILLING LOG

From	To	Formation Description
0	7	Silty Sand;
7	17.5	Clayey Sand
17.5	30.15	Silty Sand

12. REMARKS:

~~Installed in exact location as Old P-7 after removed.~~
~~P-7 installed w/out grout annulus so overdrilled.~~

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER

Derry L Huneycutt 8/25/08
SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE

Derry Huneycutt
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt., 1617 Mail Service Center – Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b
Rev.12/07

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2663

1. WELL CONTRACTOR:

Derry Huneycutt
Well Contractor (Individual) Name

Derry's Well Drilling Inc.
Well Contractor Company Name

STREET ADDRESS 44283-A NC 24/27/73

Albemarle | NC | 28002
City or Town | State | Zip Code

(704) 982-3070
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) P2-9

WELL CONSTRUCTION PERMIT#(if applicable)

OTHER ASSOCIATED PERMIT #(if applicable)

3. WELL USE (Check Applicable Box) Monitoring☐ Municipal/Public☐ Industrial/Commercial☐ Agricultural☐ Recovery☐ Injection☐ Irrigation☐ Other■ (list use) Temp. Piez. for Hydro Study

DATE DRILLED 8/30/08

TIME COMPLETED 8:00 AM■ PM☐

4. WELL LOCATION:

CITY: LaGrange COUNTY Lenoir

2949 Hodges Farm Rd. 28501
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ■ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE N35.2911934

LONGITUDE W77.707333

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ■ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

5. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Lenoir Co. Sub. D MSWLF, Ph. 2

STREET ADDRESS 2949 Hodges Farm Rd.

LaGrange | NC | 28501
City or Town | State | Zip Code

CONTACT PERSON Mr. Tom Miller (Solid Waste Direct

MAILING ADDRESS PO Box 3289

Kinston | NC | 28502
City or Town | State | Zip Code

(252) 566-4194
Area code - Phone number

6. WELL DETAILS:

a. TOTAL DEPTH: 33.19

b. DOES WELL REPLACE EXISTING WELL? YES☐ NO☐

c. WATER LEVEL Below Top of Casing: 26.21 FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 3.00 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. YIELD (gpm): na METHOD OF TEST na

f. DISINFECTION: Type na Amount na

g. WATER ZONES (depth):
From 23.21 To >33.19 From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

7. CASING:

From	To	Ft.	Diameter	Thickness/Weight	Material
+3.00	18.19	2		scH40	PVC

8. GROUT:

From	To	Ft.	Material	Method
14.83	33.19		Bent. Chips	Gravity
0	14.83		Cement/Bent.	Tremie

9. SCREEN:

From	To	Ft.	Diameter	Slot Size	Material
18.19	33.19	2	in.	0.01 in.	PVC
			in.	in.	
			in.	in.	

10. SAND/GRAVEL PACK:

From	To	Ft.	Size	Material
17.05	33.19		#2	Filter Sand

11. DRILLING LOG

From	To	Formation Description
0	8	Clayey Sand; Reddish Brown
8	13	Silty Sand; R. Brown
13	17	Poorly Graded Sand w/ Silt
17	33.19	Silty Sand; Light Brown
		No Refusal

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Derry L Huneycutt — 8/25/08
SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE

Derry Huneycutt
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt., 1617 Mail Service Center – Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b
Rev.12/07

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2663

1. WELL CONTRACTOR:

Derry Huneycutt
Well Contractor (Individual) Name

Derry's Well Drilling Inc.
Well Contractor Company Name

STREET ADDRESS 44283-A NC 24/27/73

Albemarle | NC | 28002
City or Town | State | Zip Code

(704) 982-3070
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) P2-10

WELL CONSTRUCTION PERMIT#(if applicable)

OTHER ASSOCIATED PERMIT #(if applicable)

3. WELL USE (Check Applicable Box) Monitoring☐ Municipal/Public☐ Industrial/Commercial☐ Agricultural☐ Recovery☐ Injection☐ Irrigation☐ Other■ (list use) Temp. Piez. for Hydro Study

DATE DRILLED 8/30/08

TIME COMPLETED 2:00 AM☐ PM■

4. WELL LOCATION:

CITY: LaGrange COUNTY Lenoir

2949 Hodges Farm Rd. 28501
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ■ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE N35.292027

LONGITUDE W77.70641775

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ■ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

5. FACILITY- is the name of the business where the well is located

FACILITY ID #(if applicable)

NAME OF FACILITY Lenoir Co. Sub. D MSWLF, Ph. 2

STREET ADDRESS 2949 Hodges Farm Rd.

LaGrange | NC | 28501
City or Town | State | Zip Code

CONTACT PERSON Mr. Tom Miller (Solid Waste Direct

MAILING ADDRESS PO Box 3289

Kinston | NC | 28502
City or Town | State | Zip Code

(252) 566-4194
Area code - Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 26.36

b. **DOES WELL REPLACE EXISTING WELL?** YES☐ NO☐

c. **WATER LEVEL** Below Top of Casing: 16.91 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** na **METHOD OF TEST** na

f. **DISINFECTION: Type** na **Amount** na

g. **WATER ZONES** (depth):
From 13.91 To >26.36 From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

7. CASING:

Depth		Diameter	Thickness/Weight	Material
From +3.00	To 11.36	Ft. 2	scH40	PVC
From ____	To ____	Ft. ____	____	____
From ____	To ____	Ft. ____	____	____

8. GROUT:

Depth		Material	Method
From 8.05	To 10.25	Ft. Bent. Chips	Gravity
From 0	To 8.05	Ft. Cement/Bent.	Tremie
From ____	To ____	Ft. ____	____

9. SCREEN:

Depth		Diameter	Slot Size	Material
From 11.36	To 26.36	Ft. 2 in.	0.01 in.	PVC
From ____	To ____	Ft. ____ in.	____ in.	____
From ____	To ____	Ft. ____ in.	____ in.	____

10. SAND/GRAVEL PACK:

Depth		Size	Material
From 10.25	To 26.36	Ft. #2	Filter Sand
From ____	To ____	Ft. ____	____
From ____	To ____	Ft. ____	____

11. DRILLING LOG

From	To	Formation Description
0	11	Clayey Sand; Reddish Brown
11	26.36	Silty Sand; Tan
		No Refusal

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Derry L Huneycutt — 8/25/08
SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE

Derry Huneycutt
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt., 1617 Mail Service Center – Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b
Rev.12/07

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2663

1. WELL CONTRACTOR:

Derry Huneycutt
Well Contractor (Individual) Name

Derry's Well Drilling Inc.
Well Contractor Company Name

STREET ADDRESS 44283-A NC 24/27/73

Albemarle NC 28002
City or Town State Zip Code

(704) 982-3070
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) P2-11S

WELL CONSTRUCTION PERMIT#(if applicable)

OTHER ASSOCIATED PERMIT #(if applicable)

3. WELL USE (Check Applicable Box) Monitoring☐ Municipal/Public☐ Industrial/Commercial☐ Agricultural☐ Recovery☐ Injection☐ Irrigation☐ Other■ (list use) Temp. Piez. for Hydro Study

DATE DRILLED 8/30/08

TIME COMPLETED 5:00 AM☐ PM■

4. WELL LOCATION:

CITY: LaGrange COUNTY Lenoir

2949 Hodges Farm Rd. 28501
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ■ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE N35.2921040

LONGITUDE W77.7051911

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ■ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

5. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Lenoir Co. Sub. D MSWLF, Ph. 2

STREET ADDRESS 2949 Hodges Farm Rd.

LaGrange NC 28501
City or Town State Zip Code

CONTACT PERSON Mr. Tom Miller (Solid Waste Director)

MAILING ADDRESS PO Box 3289

Kinston NC 28502
City or Town State Zip Code

(252) 566-4194
Area code - Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 29.66

b. **DOES WELL REPLACE EXISTING WELL?** YES☐ NO■

c. **WATER LEVEL** Below Top of Casing: 16.85 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** na **METHOD OF TEST** na

f. **DISINFECTION: Type** na **Amount** na

g. **WATER ZONES** (depth):
From 13.85 To >29.66 From To
From To From To
From To From To

7. CASING:

From	To	Ft.	Diameter	Thickness/Weight	Material
+3.00	14.66	2		scH40	PVC

8. GROUT:

From	To	Ft.	Material	Method
11.13	13.40		Bent. Chips	Gravity
0	11.13		Cement/Bent.	Tremie

9. SCREEN:

From	To	Ft.	Diameter	Slot Size	Material
14.66	29.66	2	in.	0.01 in.	PVC
			in.	in.	
			in.	in.	

10. SAND/GRAVEL PACK:

From	To	Ft.	Size	Material
13.40	29.66		#2	Filter Sand

11. DRILLING LOG

From	To	Formation Description
0	17	Clayey Sand; Lt. Brown
17	29.66	Silty Sand w/ Clay; Lt. Brown
		No Refusal

12. REMARKS:

~~Shallow Counterpart to adjacent P2-11D.~~

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Derry L Huneycutt 8/25/08
SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE

Derry Huneycutt
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt., 1617 Mail Service Center – Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b
Rev.12/07

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2663

1. WELL CONTRACTOR:

Derry Huneycutt
Well Contractor (Individual) Name

Derry's Well Drilling Inc.
Well Contractor Company Name

STREET ADDRESS 44283-A NC 24/27/73

Albemarle NC 28002
City or Town State Zip Code

(704) 982-3070
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) P2-11D

WELL CONSTRUCTION PERMIT#(if applicable)

OTHER ASSOCIATED PERMIT #(if applicable)

3. WELL USE (Check Applicable Box) Monitoring☐ Municipal/Public☐ Industrial/Commercial☐ Agricultural☐ Recovery☐ Injection☐ Irrigation☐ Other■ (list use) Temp. Piez. for Hydro Study

DATE DRILLED 8/30/08

TIME COMPLETED 8:00 AM☐ PM☑

4. WELL LOCATION:

CITY: LaGrange COUNTY Lenoir

2949 Hodges Farm Rd. 28501
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ■ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE N35.2921040

LONGITUDE W77.7051911

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ■ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

5. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Lenoir Co. Sub. D MSWLF, Ph. 2

STREET ADDRESS 2949 Hodges Farm Rd.

LaGrange NC 28501
City or Town State Zip Code

CONTACT PERSON Mr. Tom Miller (Solid Waste Director)

MAILING ADDRESS PO Box 3289

Kinston NC 28502
City or Town State Zip Code

(252) 566-4194
Area code - Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 44.62

b. **DOES WELL REPLACE EXISTING WELL?** YES☐ NO■

c. **WATER LEVEL** Below Top of Casing: 19.05 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** na **METHOD OF TEST** na

f. **DISINFECTION: Type** na **Amount** na

g. **WATER ZONES** (depth):
From 16.05 To >44.62 From To
From To From To
From To From To

7. CASING:

Depth		Diameter	Thickness/Weight	Material
From +3.00	To 39.62	Ft. 2	scH40	PVC
From	To	Ft.		
From	To	Ft.		

8. GROUT:

Depth		Material	Method
From 34.51	To 38.25	Ft. Bent. Pellets	Tremie
From 0	To 34.51	Ft. Cement/Bent.	Tremie
From	To	Ft.	

9. SCREEN:

Depth		Diameter	Slot Size	Material
From 39.62	To 44.62	Ft. 2 in.	0.01 in.	PVC
From	To	Ft. in.	in.	
From	To	Ft. in.	in.	

10. SAND/GRAVEL PACK:

Depth		Size	Material
From 38.25	To 44.62	Ft. #2	Filter Sand
From	To	Ft.	
From	To	Ft.	

11. DRILLING LOG

From	To	Formation Description
0	17	Clayey Sand; Lt. Brown
17	38	Silty Sand w/ Clay; Lt. Brown
38	44.62	Clayey Sand; Black Cohesive
		No Refusal

12. REMARKS:

~~Deeper Counterpart to adjacent P2-11S.~~

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE 8/25/08

Derry Huneycutt
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt., 1617 Mail Service Center – Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b
Rev.12/07

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2663

1. WELL CONTRACTOR:

Derry Huneycutt
Well Contractor (Individual) Name

Derry's Well Drilling Inc.
Well Contractor Company Name

STREET ADDRESS 44283-A NC 24/27/73

Albemarle NC 28002
City or Town State Zip Code

(704) 982-3070
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) P2-12

WELL CONSTRUCTION PERMIT#(if applicable)

OTHER ASSOCIATED PERMIT #(if applicable)

3. WELL USE (Check Applicable Box) Monitoring☐ Municipal/Public☐ Industrial/Commercial☐ Agricultural☐ Recovery☐ Injection☐ Irrigation☐ Other■ (list use) Temp. Piez. for Hydro Study

DATE DRILLED 9/3/08

TIME COMPLETED 7:00 AM☐ PM■

4. WELL LOCATION:

CITY: LaGrange COUNTY Lenoir

2949 Hodges Farm Rd. 28501
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ■ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE N35.291561

LONGITUDE W77.705427527

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ■ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

5. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Lenoir Co. Sub. D MSWLF, Ph. 2

STREET ADDRESS 2949 Hodges Farm Rd.

LaGrange NC 28501
City or Town State Zip Code

CONTACT PERSON Mr. Tom Miller (Solid Waste Director)

MAILING ADDRESS PO Box 3289

Kinston NC 28502
City or Town State Zip Code

(252) 566-4194
Area code - Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 24.75

b. **DOES WELL REPLACE EXISTING WELL?** YES☐ NO■

c. **WATER LEVEL** Below Top of Casing: 15.01 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 3.00 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** na **METHOD OF TEST** na

f. **DISINFECTION: Type** na **Amount** na

g. **WATER ZONES** (depth):
From 12.01 To >24.75 From To
From To From To
From To From To

7. CASING:

Depth		Diameter	Thickness/Weight	Material
From +3.00	To 9.75	Ft. 2	scH40	PVC
From	To	Ft.		
From	To	Ft.		

8. GROUT:

Depth		Material	Method
From 6.57	To 8.63	Ft. Bent. Pellets	Tremie
From 0	To 6.57	Ft. Cement/Bent.	Tremie
From	To	Ft.	

9. SCREEN:

Depth		Diameter	Slot Size	Material
From 9.75	To 24.75	Ft. 2 in.	0.01 in.	PVC
From	To	Ft. in.	in.	
From	To	Ft. in.	in.	

10. SAND/GRAVEL PACK:

Depth		Size	Material
From 8.63	To 24.75	Ft. #2	Filter Sand
From	To	Ft.	
From	To	Ft.	

11. DRILLING LOG

From	To	Formation Description
0	0.25	Top Soil
0.25	12	Clayey Sand; Lt. Brown
12	24.75	Silty Sand; Lt. Brown
		No Refusal

12. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Derry L Huneycutt 8/25/08
SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE

Derry Huneycutt
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt., 1617 Mail Service Center – Raleigh, NC 27699-1617 Phone No. (919) 733-7015 ext 568.

Form GW-1b
Rev 12/07

LOG OF BORING NO. P2-1

Project: Lenoir Co. MSWLF, Ph. 2 | Project No.: G08095.6

Type: 7.75" OD HSA, SPT | Drilling Company: Derry's Well Drilling

Municipal Services, Garner, N.C. — Engineering Company, P.A., Boone, N.C.

In crop field currently soybeans.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Retr.	Description of Material	Comments
	6-7-7	(14)	0-1.5	X	Top Soil; Light gray organic silty Sand Top soil, Root debris, high organic content, dry.	0-1.5' Top Soil 1.5-18' Clay Soil 18-22' Silty Sa 22-31.52 Clayey Sand.
	5			X	Clayey Sand; R. Brown, cohesive, homogeneous, moist	
5	5-6-6	(12)	3.5-5			Hard 8-20'
10	19-24-28	(52)	8.5-10	X	Clayey Sand; R. Brown, fine to med. cemented sand, dense, cohesive, moist.	
15	20-25-27	(52)	13.5-15	X	Same as above	
						18' Lighter Brown
20	31-35-38	(73)	18.5-20	X	Silty Sand; Lt. Brown poorly graded cemented sand, few smooth translucent qtz. fragments, very dense, dry	
			22.03-27			
25	7-7-8	(15)	23.5-25	X	Clayey Sand; Med to Dark gray fine grained sand w/ cohesive gray clay, wet.	
			~27'	—	Saturated cuttings	
30	6-8-9	(17)	28.5-30	X	Clayey Sand; Med. to Dark Gray, ~~cohesive clay~~, fine to med. graded sand w/ cohesive clay, saturated.	
			31.52	—	Terminated NO refusal	
35					Well Dimensions Screen 16.52-31.52 (0.01") Sand 15.36-31.52 (#2) Bent 13.10-15.26 (3/8 chips) Grout 0-13.10 (Cement/Bent. slurry) Stickup 3.00' TM	
40						

Completion Depth 31.52' BGS | Depth to Water in Boring 25.07' BTOP 23.07' BGS | ☐ Set ☑ 24 Hrs ✓

Date 9/2/08 | Field Agent J. Pfehl

1 of 1

LOG OF BORING NO. P2-2

Project: Lenoir Co. MSWLF, Ph. 2 Project No.: G08095.6

Type: 7.75" OD HSA w SPT Drilling Company: Derry's Well Drilling

Municipal Services Garner, N.C. — Engineering Company, P.A. Boone, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
	6-6-7	(13)	0-1.5'	X	Clayey Sand; Reddish Brown, fine grained, high clay content, moist	0-18' clayey Sand; 18'-30.11' Silty Sand
5	8-9-10	(19)	3.5-5, 5-5.67	X	Clayey Sand; Reddish Brown to orange, cohesive, moist.	
10	11-13-16	(29)	8.5-10	X	Clayey Sand; Reddish Brown, fine to med. grained, homogeneous, cohesive, dry	
15	6-10-12	(22)	13.5-15	X	Clayey Sand;	
18						18' softer less clay
20	7-9-9	(18)	18.5-20	X	Silty Sand; Lt. Brown, poorly graded sand fine to gravel size sand, damp	▽~20' WD
25	9-9-9	(18)	23.5-25	X	Silty Sand; Same as above	
30	8-9-10	(19)	28.5-30	X	Silty Sand; Lt. Brown, fine grained, trace clay nodules, wet.	
			30.11		Terminated NO refusal	
35					Well Dimensions (BGS) Screen 15.11 - 30.11 (0.01") Sand 13.84 - 30.11 (#2) Bent 11.55 - 13.84 (3/8 chips) Grout 0 - 11.55 (cement/bent slurry) Stickup 3.00' TM	
40						

Completion Depth 30.11 BGS Depth to Water in Boring 23.62' BTOP 20.62' BGS ☐ Set ☑ 24 Hrs ✓

Date 9/3/08 Field Agent J Pfohl

1 of 1

LOG OF BORING NO. P2-3

Project: Lenoir Co. MSWLF, Ph. 2 Project No.: G08095.6

Type: 7.75" OD HSA w/ SPT Drilling Company: Derry's Well Drilling

Municipal Services Garner, N.C. — Engineering Company, P.A. Boone, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
	6-6-8	(14)	0-1.5	X	Clayey Sand; Reddish Brown, fine grained, highly cohesive, moist	0-17' Clayey Sand 17-22' Sand w/ silt 22-33.84 Silty Sand
5	28-27-28	(56)	3.5-5	X	Clayey Sand; R. Brown, fine grained cemented sand laminated w/ cohesive clay, very dense, moist	4-12 Roll H.A.
10	27-30-31	(61)	8.5-10	X	Clayey Sand; same as above	
15	9-16-18	(34)	13.5-15	X	Clayey Sand; R. Brown poorly graded sand, trace silt, less dense, dry	
20	9-8-11	(19)	18.5-20	X	Poorly Graded Sand w/ Silt; R. Brown to Orange, coarse grained, homogeneous, dry.	
25	12-13-17	(30)	23.5-25	X	Silty Sand; Lt. Brown poorly graded sand fine to gravel size sand, moist	23.4' WB
30	9-11-13	(24)	28.5-30	X	Silty Sand; Lt. Brown same as above.	
35			33.84		Terminated NO refusal	
40					Well Dimensions (BGS) Screen: 18.84 - 33.84 (0.01") Sand: 17.55 - 33.84 (#2) Bent.: 15.34 - 17.55 (3/8 chips) Grout: 0 - 15.34 (Cement/Bent. slurry) Stickup: 3.00' (TM)	

Completion Depth 33.84 BGS Depth to Water in Boring 26.40 BTOP 23.40' BGS ☐ Set ☑ 24 Hrs

Date 9/2/08 Field Agent J. Pfohl

1 of 1

LOG OF BORING NO. P2-4

Project: Lenoir Co. MSWLF, Ph. 2 Project No.: G08095.6

Type: 7.75 OD HSA w/ SPT Drilling Company: Derry's Well Drilling

Municipal Services Garner, N.C. — Engineering Company, P.A. Boone, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
	6-7-7	(14)	0-1.5	X	Clayey Sand; R. Brown, few gray clay nodules, dry	0 - 6 clay Sand 6 - 20 Silt, Sand 20 - 28 Poorly graded Sand 28 - 33.72 Silty Sand
5	8-9-9	(18)	3.5-5	X	Clayey Sand; R. Brown, cohesive clay nodules, no relict structure, dry.	
10	23-24-28	(52)	8.5-10	X	Silty Sand; Reddish Brown, homogeneous, very dense cemented sand, trace clay nodules, dry.	12 - 12.67' ST
12				■	Silty Sand; Lt. Brown	~~14 - 14.67 ST~~
15	26-28-31	(59)	13.5-15	X	Silty Sand; Lt. Brown, poorly graded coarse to fine grained, few cohesive clay nodules, dry.	6-20' Hard
20	19-26-27	(53)	18.5-20	X	Silty Sand; Lt. Brown, poorly graded, trace silt & clay, dry.	
25	9-11-13	(24)	23.5-25	X	Poorly Graded Sand w/ silt; R. Brown to orange, Coarse grained, homogeneous, no relict structure, dry.	▽ 24' WD Bulk Sample 25'
30	7-8-9	(16)	28.5-30	X	Silty Sand; Lt. Brown, poorly graded w/ trace silt, moist.	
			33.72'	—	Terminated No HSA Refusal	
35					Well Dimensions (BGS) Screen: 18.72 - 33.72 (0.01) Sand: 17.60 - 33.72 (#2) Bent: 15.50 - 17.60 (3/8" chips) Grout: 0 - 15.50 Cement/Bent. slurry (Portland < 5% Bent./vol.) Stickup: 3.00' TM	
40						

Completion Depth 33.72 BGS Depth to Water in Boring 31.10 BTOP 30.10' BGS ☐ Set ☑ 24 Hrs

Date 9/3/08 Field Agent J Pfohl

1 of 1

LOG OF BORING NO. P2-5S

Project: Lenoir Co. MSWLF, Ph. 2 Project No.: G08095.6

Type: 7.75" Hollow Stem Drilling Company: Derry's Well Drilling

Municipal Services Garner, N.C. | Engineering Company, P.A. Boone, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
						0-22' clayey Sand
					Installed in exact location of P-24 which was	22-34.85' Silty Sand
					previously installed for the site suitability study but	
5					lacked grout annulus. Since located w/in footprint	
					pulled the entire 1" PVC out & drilled P2-5S so would	
					avoid future abandonment issues.	
					No SPT see P2-5D for Soil Descriptions.	
10						
15						
20						
25			25'	▽ WB		
30						
35			34.85		Terminated NO HSA refusal	
					Well Dimensions (BGS)	
					Screen 19.85 - 34.85 (0.01")	
					Sand 18.56 - 34.85 (#2)	
					Bent 16.23 - 18.56 (3/8")	
40					Grout 0 - 16.23 Stickup: 3.00' TM	

Completion Depth 34.85' BGS Depth to Water in Boring 25.52 BTOP 22.52 BGS ☐ Set ☑ 24 Hrs

Date 8/29/08 Field Agent J. Pfohl

1 of 1

LOG OF BORING NO. P2- 5D

Project: Lenoir Co. MSWLF, Ph. 2 Project No.: G08095.6

Type: 7.75 OD HSA w/ SPT Drilling Company: Derry's Well Drilling

Municipal Services Garner, N.C. — Engineering Company, P.A. Boone, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
	7-9-9	(18)	0-1.5	X	Clayey Sand; Brown fine to med. grained sand laminated w/ R. Brown clay, moist	0-22' clayey Sand 22'-49.5 Silty Sand 49.5-50.81' clayey Sand
5	6-6-7	(13)	3.5-5	X	Clayey Sand; R. Brown, fine to med. grained, cohesive, moist	
10	7-9-11	(20)	8.5-10	X	Clayey Sand; Same as above,	
15	8-10-11	(21)	13.5-15	X	Clayey Sand; R. Brown, fine to med. grained, dry	
20	11-13-15	(28)	18.5-20	X	Silty Sand; Dark Brown, med. to coarse grained, trace cohesive clay nodules, dry	
25	12-14-16	(30)	23.5-25 25.9 WD	X	Silty Sand; Same as above, damp.	
30	12-15-16	(31)	28.5-30	X	Silty Sand; Same as above,	
35	8-7-10	(17)	33.5-35	X	Silty Sand; Brown, poorly graded sand, trace clay nodules, homogeneous, moist.	
40	6-9-9	(18)	38.5-40	X	Silty Sand; same as above, wet.	

Completion Depth 50.81' BGS Depth to Water in Boring 25.69 BTOP 22.69 BGS ☐ Set ☑ 24 Hrs ✓

Date 8/20/08 Field Agent J. Pfohl

1 of 2

LOG OF BORING NO. P2-5D

Project: Lenoir Co. MSWLF, Ph.2 Project No.: G08095.6

Type: 7.75" OD HSA w/ SPT Drilling Company: Derry's Well Drilling

Municipal Services Garner, N.C. — Engineering Company, P.A. Benson, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
45	9-10-11	(21)	45.45	X	Silty Sand; Same as above, wet.	
			49.5' →		Clayey Sand; Black very cohesive, thinly laminated black clay w/ gray fine to med. graded sand, some lignitic wood, moist.	
50			50.81	—	Terminated No Refusal	
55						
60						
65					Well Dimensions Screen : 45.81-50.81 Sand : 44.66-50.81 Bent : 41.10 - 44.66 1/4" Pellets Grout : 0 - 41.10 Stickup : 3.00' TM	
70						
75						
80						

Completion Depth 50.81' BGS

Date 8/30/08 Field Agent J. Pfohl

Depth to Water in Boring 23.69 BTOP 23.69 BGS ☐ Set ☑ 24 Hrs

2 of 2

LOG OF BORING NO. P2-6

Project: Lenoir Co. MSWLF, Ph. 2 Project No.: G08095.6

Type: 9.75" OD HSA w/ SPT Drilling Company: Derry's Well Drilling

Municipal Services Garner, N.C. — Engineering Company, P.A. Boone, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
1	7-7-10	(17)	0-15	X	Clayey Sand; Br. Yellow, fine to medium grained sand laminated w/ cohesive lt. gray clay, moist.	0-16' clayey Sand; 16-29.05 Silty Sand
5	6-8-9	(17)	3.5-5	X	Clayey Sand; Br. to Br. Yellow, fine to med. grained, cohesive, moist	
10	8-9-13	(22)	8.5-10	X	Clay Sand; Br. to Br. Y, fine grained, few black silt partings, dry.	
15	9-9-11	(20)	13.5-15	X	Clayey Sand; same as above	~16' less clay
			18'ish	32		
20	11-18-19	(37)	18.5-20	X	Silty Sand; Br. Yellow poorly graded, trace silt, moist	
25	9-9-10	(19)	23.5-25	X	Silty Sand; Br. Yellow poorly graded, less dense, wet.	
			29.05'	—	Terminated No HSA Refusal	
30						
35						
40						

Well Dimensions (BGS)

Screen : 14.05 - 29.05 (0.01)
Sand : 12.98 - 29.05 (#2)
Bent : 10.48 - 12.98 (3/8" chips)
Grout : 0 - 10.48 Cement/Bent. slurry
Stickup : 3.00' TM

Completion Depth 29.05' BGS

Date 9/2/08 Field Agent J. Pfohl

Depth to Water in Boring 21.05 BTOP (18.05 BGS) ☐ Set ☑ 24 Hrs ✓

1 of 1

LOG OF BORING NO. P2-7

Project: Lenoir Co. MSWLF, Ph. 2 | Project No.: G08095.6

Type: 7.25" HSA w/ SPT | Drilling Company: Derry's Well Drilling

Municipal Services Garner, N.C. — Engineering Company, P.A. Boone, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
	7-9-12	(21)	0-1.5	X	Clayey Sand; Br. to Br. Yellow, fine grained, trace organic top soil w/ root debris, dry.	0-12' Clayey Sand 12-25.56' Silty Sand
5	5-7-7	(14)	3.5-5	X	Clayey Sand; Br. to Br. Yellow, fine grained, dry	
10	6-8-13	(21)	8.5-10	X		
			11.5	▽		
15	12-19-19	(38)	13.5-15	X	Silty Sand; Lt. Brown poorly graded, trace silt, moist.	
			15-17.25	■		ST 15-17.25' "wet" sample
20	9-9-10	(19)	18.5-20	X	Silty Sand; Lt. Brown, fine grained, wet.	
25	9-10-10	(20)	23.5-25	X	Silty Sand; Br. Yellow poorly graded, wet	
			25.56'		Terminated No HSA refusal	
30					Well Dimensions Screen: 10.56-25.56 (0.01) Sand 9.25-25.56 (#2) Bent: 7.06-9.25 (3/8" chips) Grout: 0-7.06' (Cement/Bent Slurry) Stickup: 3.00' TM	
35						
40						

Completion Depth 25.56 BGS | Depth to Water in Boring 15.95 BTOP 12.95' BGS | ☐ Set ☑ 24 Hrs ✓

Date 9/3/08 | Field Agent J. Pfohl

1 of 1

LOG OF BORING NO. P2-8

Project: Lenoir Co. MSWLF, Ph. 2 Project No.: G08095.6

Type: 7.75" HSA w/ SPT Drilling Company: Derry's Well Drilling

Municipal Services Garner, N.C. — Engineering Company, P.A. Boone, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
					Installed in exact location of P-7 since this piezometer lacked a grout annulus. P-7 (1") pulled out & P2-8 drilled correctly. P-7 would have had to be overdrilled to abandon in the future since w/in the proposed footprint.	
5					No SPT 0-28.5 since same boring as P-7. see log for P-7 for soil Descriptions.	From P-7 log 0-7 Silty Sand 7-17.5 Clayey Sand 17.5-27.5 Silty Sand
10						
15			16.5' ▽			
20						
25						
30	4-6-7	(13)	28.5-30 30.15'	X	Silty Sand; Grayish Brown, fine grained, saturated. Terminated No HSA refusal	
					Well Dimensions (BGS) Screen: 15.15-30.15 Sand: 14.08-30.15 Bent: 11.65-14.08 Grout: 0-11.65 Stickup 3.00' TM	
35						
40						

Completion Depth 30.15 BGS Depth to Water in Boring 19.45 BTOP 16.45' BGS ☐ Set ☑ 24 Hrs

Date 8/30/08 Field Agent J Pfohl

1 of 1

LOG OF BORING NO. P2-9

Project: Lenoir Co. MSWLF, Ph. 2 Project No.: G08095.6

Type: 7.75" OD HSA w/SPT Drilling Company: Derry's Well Drilling

Municipal Services Garner, N.C. — Engineering Company, P.A. Boone, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
	3-8-9	(17)	0-1.5'	X	Clayey Sand; R. Brown, few gray clay nodules, dry.	0-8 Clayey Sand 8-13 Silty Sand 13-17 Poorly Graded Sand 17-33.19 Silty Sand
5	8-8-10	(18)	3.5-5	X	Clayey Sand; R. Brown fine grained sand laminated w/ cohesive clay, moist.	
8					8' Hammer	
10	26-31-31	(62)	8.5-10	X	Silty Sand; R. Brown, homogeneous, very dense cemented sand, dry.	
15	16-15-24	(39)	13.5-15	X	Poorly graded Sand w/ silt; R. Brown to Orange, predominately coarse grained, dry.	
			17'		More Silt Begins	
20	17-18-18	(36)	18.5-20	X	Silty sand; Lt. Brown, poorly graded, dry	18'
			22' WB			
25	10-11-13	(23)	23.5-25	X	Silty Sand; Lt. Brown to Orange, few cobble size smooth translucent qtz. fragments, damp.	
30	9-10-11	(21)	28.5-30	X	Silty Sand; Lt. Brown, poorly graded w/ trace silt, wet.	30' Bulk sample
			33.19		Terminated No HSA Refusal	
35					Well Dimensions (BGS)	
					Screen : 18.19-33.19 (0.01)	
					Sand : 17.05-33.19 (#2)	
					Bent : 14.83-33.19 (3/8")	
					Stickup : 3.00' TM	
40					Grout : 0-14.83 (Cement/Bent. Slurry)	

Completion Depth 33.19 BGS Depth to Water in Boring 26.21 BTOP 23.21' BGS ☐ Set ☑ 24 Hrs.

Date 8/20/08 Field Agent J. Pfohl

1 of 1

LOG OF BORING NO. P2-1D

Project: Lenoir Co. MSWLF, Ph. 2 Project No.: G08095.6

Type: 7.75" OD HSA w/ SPT Drilling Company: Derry's Well Drilling

Municipal Service Garner, N.C. — Engineering Company, P.A. Boone, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
	3-4-5	(9)	0-1.5	X	Clayey Sand; Orange, Medium grained, loose, dry	0-11' clayey Sand 11'-36.36' Silty Sand.
5	7-8-10	(18)	3.5-5 6-6.5'	X	Clayey Sand; Reddish Brown, Medium grained, Med. Density, slight relict structure, dry.	
10	26-37-43	(80)	8.5-10	X	Clayey Sand; Reddish Brown, Medium to fine grained, very dense, dry.	- solidified 11'
15	19-19-19	(37)	13.5-15	X	Silty Sand; Tan, Medium grained, damp.	
20	10-13-15	(28)	18.5-20	X	Silty Sand; Tan, Med. grained, Medium density, moist.	
25	9-13-13	(26)	23.5-25	X	Silty Sand; Tan, med. grained & density, few black silt partings, wet.	
			36.36'		Terminated No HSA Refusal	

Well Dimensions

Screen: 11.36 - 26.36 (0.01")
Sand: 10.35 - 26.36 (#2)
Bent: 8.05 - 10.35 (3/8")
Grout: 0 - 8.05 (Cement/Bent slurry)
Stickup: 3.00' (TM)

Completion Depth 26.36' BGS Depth to Water in Boring 16.91 BTOP 13.91 BGS ☐ Set ☑ 24 Hrs ✓

Date 8/30/08 Field Agent J Pfohl

1 of 1

LOG OF BORING NO. P2-11S

Project: Lenoir Co. MSWLF, Ph. 2 Project No.: G08095.6

Type: 7.75" OD HSA [redacted] Drilling Company: Derry's Well Drilling

Municipal Service Garner, N.C. — Engineering Company, P.A. Boone, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
					Adjacent to P2-11D so No SPT due to redundancy see Log for P2-11D for soil Descriptions.	0-17' clayey Sand 17-29.66 Silty Sand w/clay
5						
10						
			14.40	2		
15						
20						
25						
30			29.66		Terminated, No Refusal	
					Well Dimensions (BGS)	
					Screen: 14.66 - 29.66 (0.01)	
					Sand: 13.40 - 29.66 (#2)	
35					Bent: 11.13 - 13.40 (3/8")	
					Grout: 0 - 11.13 (cement/Bent slurry)	
					Stickup: 3.00' TM	
40						

Completion Depth 29.66' BGS Depth to Water in Boring 16.85' BTOP 13.85' BGS ☐ Set ☑ 24 Hrs

Date 8/30/08 Field Agent J Pfohl

1 of 1

LOG OF BORING NO. P2- 11D

Project: Lenoir Co. MSWLF, Ph. 2 Project No.: G08095.6

Type: 7.75" OD HSA w/ SPT Drilling Company: Derry's Well Drilling

Municipal Services Garner, N.C. — Engineering Company, P.A. Boone, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Refr.	Description of Material	Comments
	6-6-7	(13)	0-1.5	X	Clayey Sand; Lt. Brown fine grained sand laminated w/ gray cohesive clay, moist.	0-17 clayey Sand 17-38 silt, Sand w/ clay 38-44.62 clayey Sand
5	8-9-9	(18)	3.5-5	X	Clayey Sand; Lt. Brown med. grained sand laminated w/ brown to gray cohesive clay, moist.	~8' Brown to Red
10	19-24-25	(49)	8.5-10	X	Clayey Sand; R. Brown poorly graded sand w/ cohesive clay, dry.	
			12.85-13.52	■		ST 12.85'-13.52'
14			14'	X	Clayey Sand; Brown, medium grained sand w/ cohesive gray clay, moist	
15	13-15-17	(32)	13.5-15	X		
17			17'		less clay content & softer	17' clayey Sand to silty Sand
20	7-8-9	(17)	17.5-20	X	Silty Sand w/ clay; Lt. Brown fine to medi. grained sand w/ cohesive clay lenses, moist.	
25	10-15-16	(31)	23.5-25	X	Silty Sand w/ Clay; Lt. Brown, clay lense cohesive, wet	~23'-30' some clay
30	12-12-14	(26)	28.5-30	X	Silty Sand w/ Clay; Same as above, wet.	
35	9-11-13	(24)	33.5-35	X	Silty Sand w/ Clay; Same as above, wet.	Bulk Sample from 44' switched
40	10-16-17	(33)	38.5-40	X	Clayey Sand; Black, thinly laminated black clay interbedded w/ gray fine to med. grained sand, some lignitic wood, moist.	

Completion Depth 44.62' BGS Depth to Water in Boring 19.05' BTOP 16.05' BGS ☐ Set ☑ 24 Hrs

Date 8/30/08 Field Agent J. Pfohl

1 of 2

LOG OF BORING NO. P2-11 D

Project: Lenoir Co. MSWLF, Ph.2 Project No.: G08095.6

Type: 7.75 OD HSA w/ SPT Drilling Company: Derry's Well Drilling

Municipal Services, Garner, N.C. — Engineering Company, P.A., Boone, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
					Clayey Sand; "Black creek Formation"	
45			44.62	—	Terminated No Refusal	Bulk sample taken 44'
50						
					Well Dimensions	
55					Screen 39.62-44.62	
					Sand 38.25-44.62	
					Bent. 34.51-38.25 (1/4" Pellets)	
					Grout 0-34.51	
					Stick up 3.00' TM	
60						
65						
70						
75						
80						

Completion Depth 44.62' BGS

Date 8/30/08 Field Agent J. Pfohl

Depth to Water in Boring NDS BTOP 16.05' BGS ☐ Set ☑ 24 Hrs

2 of 2

LOG OF BORING NO. P2-12

Project: Lenoir Co. MSWLF, Ph. 2 Project No.: G08095.6

Type: 7.75" OD HSA w/ SPT Drilling Company: Derry's Well Drilling

Municipal Services Garner, N.C. — Engineering Company, P.A. Boone, N.C.

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Retr.	Description of Material	Comments
	3-3-5	(8)	0-1.5	X	0-0.25' Top Soil; Black Clayey Sand; Lt. Brown fine grained sand laminated w/ gray cohesive clay, moist.	0 - 0.25' Topsoil 0.25-12' clayey Sand 12-24.75' Silty Sand
5	4-6-8	(14)	3.5-5	X	Clayey Sand; Lt. Brown med. grained sand laminated w/ gray cohesive clay, moist	
10	26-30-32	(62)	8.5-10	X	Clayey Sand; Reddish Brown poorly graded sand, few smooth cobble size translucent qtz. fragments, dry.	
					~12' WD	
15	9-10-12	(22)	13.5-15	X	Silty Sand; Lt. Brown poorly graded sand, few gray clay nodules, moist.	
20	7-8-9	(16)	18.5-20	X	Silty Sand; Lt. Brown, fine grained homogeneous, wet.	
			24.75			
25					Terminated. No HSA Refusal	
					Well Dimensions	
					Screen: 9.75 - 24.75 (0.01)	
30					Sand: 8.63 - 24.75 (#2)	
					Bent: 6.57 - 8.63 (3/8" chips)	
					Grout: 0 - 6.57' (Cement/Bent. slurry)	
					Stickup: 3.00' TM	
35						
40						

Completion Depth 24.75' BGS Depth to Water in Boring 15.01 BTOP 12.01' BGS ☐ Set ☑ 24 Hrs ✓

Date 7/3/09 Field Agent J. Pfohl

1 of 1

APPENDIX B

Table B-1: Summary of Laboratory Analysis of Soil Samples

Sample No.	Depth (ft)	Laboratory	USCS Grain Size Distribution (%)			USCS Classification	USCS Symbol	Specific Gravity	Atterberg Limit		
			Gravel	Sand	Silt & Clay				LL	PL	PI
P2-2	5 - 5.67	Geotechnics	0.02	73.85	26.13	Clayey Sand	SC	2.68	27	18	9
P2-4	12 - 12.67	Geotechnics	0.00	64.41	35.59	Silty Sand	SM	2.72	NPL	NPL	NPL
P2-4	25	Geotechnics	0.22	91.68	8.10	Sand with Silt	SP-SM	2.75	NPL	NPL	NPL
P2-7	15 - 17.25	Geotechnics	0.00	59.48	40.52	Silty Sand	SM	2.66	45	29	16
P2-10	6 - 6.5	Geotechnics	0.00	73.55	26.45	Clayey Sand	SC	2.73	29	15	14
P2-11D	12.85 - 13.52	Geotechnics	0.00	72.06	27.94	Clayey Sand	SC	2.78	36	19	17
P2-11D	44	Geotechnics	0.04	74.06	25.90	Clayey Sand	SC	2.76	39	19	20

Sample No.	Depth (ft)	Dry Density (pcf)	Moisture Content	Conductivity (cm/sec)	Total Porosity
P2-2	5 - 5.67	108.4	13.3%	6.60E-07	36%
P2-4	12 - 12.67	129.4	5.5%	9.30E-05	23%
P2-4	25	-	12.6%	-	-
P2-7	15 - 17.25	88.8	32.2%	1.20E-05	47%
P2-10	6 - 6.5	120.6	10.8%	1.90E-06	40%
P2-11D	12.85 - 13.52	98.6	20.9%	1.50E-06	42%
P2-11D	44	-	32.1%	-	-

NOTE:

1. Atterberg Limit LL is liquid limit, PL is plastic limit, and PI is plasticity index.
2. Porosity was calculated from its corresponding void ratio by using the Equation n = e/(e+1) where n and e denote the porosity and void ratio.

Table B-2. Recalculation of Grains Size Distribution

Sample No.	Depth (ft)	% Finer than 0.0625 mm						% Finer than 0.004 mm					
		Ref_1		Ref_2		Target		Ref_1		Ref_2		Target	
		Size (mm)	%	Size (mm)	%	Size (mm)	%	Size (mm)	%	Size (mm)	%	Size (mm)	%
P2-2	5 - 5.67	0.0750	26.1%	0.0328	16.2%	0.0625	**23.9%**	0.0061	14.2%	0.0030	13.8%	0.004	**14.0%**
P2-4	12 - 12.67	0.0750	35.6%	0.0305	25.0%	0.0625	**33.4%**	0.0059	15.1%	0.0030	8.2%	0.004	**11.1%**
P2-4	25	0.0750	8.1%	0.0339	7.1%	0.0625	**7.9%**	0.0062	7.1%	0.0030	6.2%	0.004	**6.6%**
P2-7	15 - 17.25	0.0750	40.5%	0.0285	37.8%	0.0625	**40.0%**	0.0055	31.5%	0.0027	29.5%	0.004	**30.6%**
P2-10	6 - 6.5	0.0750	26.5%	0.0317	18.9%	0.0625	**24.9%**	0.0059	14.9%	0.0030	12.0%	0.004	**13.2%**
P2-11D	12.85 - 13.52	0.0750	27.9%	0.0300	25.0%	0.0625	**27.4%**	0.0057	20.1%	0.0028	19.1%	0.004	**19.6%**
P2-11D	44	0.0750	25.9%	0.0303	24.1%	0.0625	**25.5%**	0.0056	23.1%	0.0028	21.2%	0.004	**22.2%**

Sample No.	Depth (ft)	Sand	Silt	Clay
P2-2	5 - 5.67	**76.1%**	**10.0%**	**14.0%**
P2-4	12 - 12.67	**66.6%**	**22.3%**	**11.1%**
P2-4	25	**92.1%**	**1.3%**	**6.6%**
P2-7	15 - 17.25	**60.0%**	**9.4%**	**30.6%**
P2-10	6 - 6.5	**75.1%**	**11.6%**	**13.2%**
P2-11D	12.85 - 13.52	**72.6%**	**7.8%**	**19.6%**
P2-11D	44	**74.5%**	**3.4%**	**22.2%**

NOTE:

Accumulative percentages of the target grain sizes (0.0625mm and 0.004mm) were interpolated form the grain-size percentages at either end of a specific segment (denoted Ref1 and Ref2, respectively) in which a target grain size falls. The numbers were taken from the grain size analysis report submitted by Geotechnics.

Table B-3. Effective Porosity Summary

Sample No.	Depth (ft)	AGU Classification	AGU Grain Size Distribution			Effective Porosity
			Sand	Silt	Clay	
P2-2	5 - 5.67	Silty Sand	76.1%	10.0%	14.0%	**17.8%**
P2-4	12 - 12.67	Silty Sand	66.6%	22.3%	11.1%	**19.0%**
P2-4	25	Sand	92.1%	1.3%	6.6%	**34.6%**
P2-7*	15 - 17.25	Sandy Clay	60.0%	9.4%	30.6%	**12.0%**
P2-10	6 - 6.5	Silty Sand	75.1%	11.6%	13.2%	**18.5%**
P2-11D	12.85 - 13.52	Silty Sand	72.6%	7.8%	19.6%	**12.9%**
P2-11D*	44	Clay-Sand	74.5%	3.4%	22.2%	**12.0%**

NOTE:

1. The proportions of sand, silt, and clay displayed in Table B-3 are in accordance with the recommendation made by the America Geophysical Union (AGU) Subcommittee on Sediment Terminology. This particle-size classification system is widely adopted in recent USGS publications. Because the AGU soil classification system is different for that defined in the Unified Soil Classification System (USCS), the grain sizes for a soil sample were recalculated in Table B-2. Note that determining particle-size distribution by the AGU classification system is a prerequisite for using Johnson's trilinear graph for effective porosity calculation.
2. Johnson's trilinear graph was used to graphically determine the effective porosity of a soil sample.
3. * Effective porosity of P2-7 and P2-11D fell into an “area of no samples” on the trilinear graph, and was estimated based on published results (Fetter 1994).

Geotechnics

.....GEOTECHNICAL, GEOENVIRONMENTAL, AND GEOSYNTHETIC LABORATORIES

October 6, 2008

Project No. 2008-629-01

Mr. Wayne Sullivan
Municipal Engineering Co.
P.O. Box 98
Garner, NC 27529

Transmittal
Laboratory Test Results
Lenoir Co. Sub.D Landfill Phase II

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was faxed to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

Michael P. Smith
Regional Manager

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

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INTEGRITY IN TESTING

MOISTURE CONTENT

ASTM D 2216 (SOP-S1)

Client	MESCO
Client Reference	LENOIR CO. SUB. D LF PH.2
Project No.	2008-629-01

Lab ID	.001	.002	.003	.004	.005
Boring No.	P2-7	P2-11D	P2-11D	P2-2	P2-10
Depth (ft)	15-17.25	12.85-13.52	44	5-5.67	6-6.6
Sample No.	NA	NA	NA	NA	NA
Tare Number	216	212	201	P-12	217
Wt. of Tare & WS (gm)	411.99	304.96	984.73	483	291.83
Wt. of Tare & DS (gm)	353.2	281.89	787.03	449.32	280.07
Wt. of Tare (gm)	170.7	171.59	170.71	196.53	171.16
Wt. of Water (gm)	58.79	23.07	197.7	33.68	11.76
Wt. of DS (gm)	182.5	110.3	616.32	252.79	108.91
Water Content (%)	**32.2**	**20.9**	**32.1**	**13.3**	**10.8**

Lab ID	.006	.007
Boring No.	P2-4	P2-4
Depth (ft)	12-12.67	25
Sample No.	NA	NA
Tare Number	203	200
Wt. of Tare & WS (gm)	466.46	462.72
Wt. of Tare & DS (gm)	451.09	430.22
Wt. of Tare (gm)	171.11	171.85
Wt. of Water (gm)	15.37	32.5
Wt. of DS (gm)	279.98	258.37
Water Content (%)	**5.5**	**12.6**

Notes : *NA*

Tested By *TMS* *Date* *9/23/2008* *Checked By* *GEM* *Date* *10-7-08*

page 1 of 1 DCN: CT-S1 DATE 6-30-98 REVISION: 2 *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-01 #10 Split Hydro rev 8.xls]Sheet1*

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INTEGRITY IN TESTING

SPECIFIC GRAVITY

ASTM D 854-00 (SOP - S5)

Client	MESCO	Boring No.	P2-7
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	15-17.25
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-01	Visual Description	**TAN SILTY SAND**
			(MInus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	R 242	R 280
Weight of Pycnometer + Soil + Water (gm)	700.72	715.49
Temperature, T (°Celsius)	24.2	24.1
Weight of Pycnometer + Water (gm)	670.06	685.34
Tare Number	318	820
Weight of Tare + Dry Soil (gm)	256.8	256.89
Weight of Tare (gm)	208.07	208.02
Weight of Dry Soil (gm)	48.73	48.87
Specific Gravity of Soil @ T	2.696	2.610
Specific Gravity of Water @ T	0.9973	0.9973
Conversion Factor for Temperature T	0.9991	0.9991
Specific Gravity @ 20° Celsius	2.699	2.612

Average Specific Gravity @ 20° Celsius	2.66

Tested By TMS *Date* 9/22/2008 *Checked By* MMB *Date* 10-7-08

DCN: CT-S5 Date: 03/24/05 Revision: 10R *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-01 Specific Gravity Soils 1Raleigh.xls]Sheet1*

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INTEGRITY IN TESTING

SPECIFIC GRAVITY

ASTM D 854-00 (SOP - S5)

Client	MESCO	Boring No.	P2-11D
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	12.85-13.52
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-02	Visual Description	**BROWN CLAYEY SAND** (MInus No.4 sieve material, airdried)

Replicate Number		**1**		**2**
Pycnometer ID	R	242	R	280
Weight of Pycnometer + Soil + Water (gm)		700.89		716.16
Temperature, T (°Celsius)		27.0		27.0
Weight of Pycnometer + Water (gm)		669.70		684.98
Tare Number		212		216
Weight of Tare + Dry Soil (gm)		220.25		219.51
Weight of Tare (gm)		171.53		170.75
Weight of Dry Soil (gm)		48.72		48.76
Specific Gravity of Soil @ T		2.780		2.774
Specific Gravity of Water @ T		0.9965		0.9965
Conversion Factor for Temperature T		0.9983		0.9983
Specific Gravity @ 20° Celsius		2.784		2.779

Average Specific Gravity @ 20° Celsius	2.78

Tested By JBD *Date* 9/18/2008 *Checked By* MK *Date* 10-7-08

DCN: CT-S5 Date: 03/24/05 Revision: 10R

\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-02 Specific Gravity.xls]Sheet1

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INTEGRITY IN TESTING

SPECIFIC GRAVITY

ASTM D 854-00 (SOP - S5)

Client	MESCO	Boring No.	P2-11D
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	44
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-03	Visual Description	**BLACK CLAYEY SAND**
			(MInus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	R 242	R 280
Weight of Pycnometer + Soil + Water (gm)	701.26	716.79
Temperature, T (°Celsius)	24.9	24.0
Weight of Pycnometer + Water (gm)	669.98	685.26
Tare Number	214	200
Weight of Tare + Dry Soil (gm)	220.6	221.04
Weight of Tare (gm)	171.38	171.76
Weight of Dry Soil (gm)	49.22	49.28
Specific Gravity of Soil @ T	2.744	2.777
Specific Gravity of Water @ T	0.9971	0.9973
Conversion Factor for Temperature T	0.9989	0.9991
Specific Gravity @ 20° Celsius	2.747	2.779

Average Specific Gravity @ 20° Celsius	2.76

Tested By TMS *Date* 9/23/2008 *Checked By* MMS *Date* 10-1-08

DCN: CT-S5 Date: 03/24/05 Revision: 10R

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SPECIFIC GRAVITY

ASTM D 854-00 (SOP - S5)

Client	MESCO	Boring No.	P2-2
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	5-5.67
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-04	Visual Description	**ORANGE CLAYEY SAND** (MInus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	R 280	R 242
Weight of Pycnometer + Soil + Water (gm)	716.32	700.75
Temperature, T (°Celsius)	24.8	25.0
Weight of Pycnometer + Water (gm)	685.27	669.96
Tare Number	G-15	G-13
Weight of Tare + Dry Soil (gm)	200.67	202.89
Weight of Tare (gm)	151.12	153.63
Weight of Dry Soil (gm)	49.55	49.26
Specific Gravity of Soil @ T	2.679	2.667
Specific Gravity of Water @ T	0.9971	0.9971
Conversion Factor for Temperature T	0.9989	0.9989
Specific Gravity @ 20° Celsius	2.682	2.670

Average Specific Gravity @ 20° Celsius	2.68

Tested By *TMS* *Date* *9/24/2008* *Checked By* GZM *Date* 9-23-08

DCN: CT-S5 Date: 03/24/05 Revision: 10R *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-04 Specific Gravity Soils 1Raleigh.xls]Sheet1*

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SPECIFIC GRAVITY

ASTM D 854-00 (SOP - S5)

Client	MESCO	Boring No.	P2-10
Client Reference	IREDELL CO C&D LF	Depth (ft)	6-6.5
Project No.	2007-558-01	Sample No.	NA
Lab ID	2007-558-01-05	Visual Description	**ORANGE BROWN CLAYEY SAND** (MInus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	R 280	R 242
Weight of Pycnometer + Soil + Water (gm)	716.89	701.28
Temperature, T (°Celsius)	24.6	25.0
Weight of Pycnometer + Water (gm)	685.29	669.96
Tare Number	250	211
Weight of Tare + Dry Soil (gm)	219.11	220.76
Weight of Tare (gm)	169.33	171.17
Weight of Dry Soil (gm)	49.78	49.59
Specific Gravity of Soil @ T	2.738	2.714
Specific Gravity of Water @ T	0.9972	0.9971
Conversion Factor for Temperature T	0.9990	0.9989
Specific Gravity @ 20° Celsius	2.740	2.717

Average Specific Gravity @ 20° Celsius	2.73

Tested By TMS *Date* 9/23/2008 *Checked By* GBM *Date* 9-22-08

DCN: CT-S5 Date: 03/24/05 Revision: 10R *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-05 Specific Gravity Soils 1Raleigh.xls]Sheet1*

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SPECIFIC GRAVITY

ASTM D 854-00 (SOP - S5)

Client	MESCO	Boring No.	P2-4
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	12-12.67
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-06	Visual Description	**TAN SILTY SAND**
			(MInus No.4 sieve material, airdried)

Replicate Number		**1**		**2**
Pycnometer ID	R	280	R	242
Weight of Pycnometer + Soil + Water (gm)		716.98		701.43
Temperature, T (°Celsius)		24.0		24.0
Weight of Pycnometer + Water (gm)		685.37		670.09
Tare Number		397		318
Weight of Tare + Dry Soil (gm)		258.3		258.84
Weight of Tare (gm)		208.38		209.08
Weight of Dry Soil (gm)		49.92		49.76
Specific Gravity of Soil @ T		2.727		2.702
Specific Gravity of Water @ T		0.9973		0.9973
Conversion Factor for Temperature T		0.9991		0.9991
Specific Gravity @ 20° Celsius		2.729		2.704

Average Specific Gravity @ 20° Celsius	2.72

Tested By TMS *Date* 9/24/2008 *Checked By* GEM *Date* 9-24-08

DCN: CT-S5 Date: 03/24/05 Revision: 10R

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SPECIFIC GRAVITY

ASTM D 854-00 (SOP - S5)

Client	MESCO	Boring No.	P2-4
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	25
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-07	Visual Description	**ORANGE SAND WITH SILT**
			(MInus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	R 280	R 242
Weight of Pycnometer + Soil + Water (gm)	716.99	698.21
Temperature, T (°Celsius)	24.5	24.3
Weight of Pycnometer + Water (gm)	685.31	670.05
Tare Number	200	250
Weight of Tare + Dry Soil (gm)	221.68	213.92
Weight of Tare (gm)	171.86	169.67
Weight of Dry Soil (gm)	49.82	44.25
Specific Gravity of Soil @ T	2.747	2.750
Specific Gravity of Water @ T	0.9972	0.9973
Conversion Factor for Temperature T	0.9990	0.9990
Specific Gravity @ 20° Celsius	2.750	2.753

Average Specific Gravity @ 20° Celsius	2.75

Tested By TMS *Date* 9/24/2008 *Checked By* GM *Date* 9-25-08

DCN: CT-S5 Date: 03/24/05 Revision: 10R *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-07 Specific Gravity Soils 1Raleigh.xls]Sheet1*

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	MESCO	Boring No.	P2-7
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	15-17.25
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-01	Soil Description	**TAN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

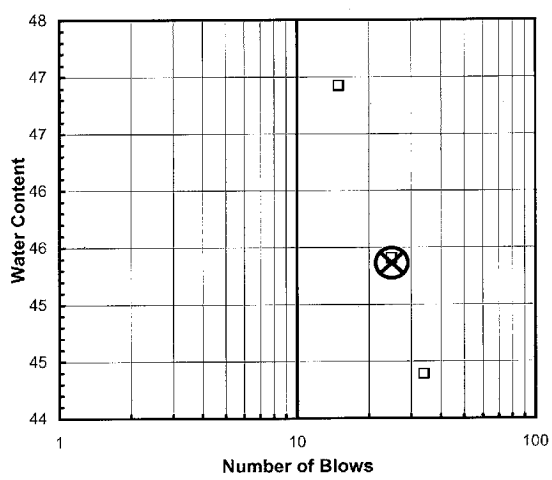
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A-H	A-O	T	MULTIPOINT
Wt. of Tare & WS (gm)	27.24	28.27	26.65	
Wt. of Tare & DS (gm)	23.51	24.27	23.13	
Wt. of Tare (gm)	15.56	15.46	15.20	
Wt. of Water (gm)	3.7	4.0	3.5	
Wt. of DS (gm)	8.0	8.8	7.9	
Moisture Content (%)	**46.9**	**45.4**	**44.4**	
Number of Blows	**15**	**25**	**34**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	H	S	
Wt. of Tare & WS (gm)	23.11	22.14	
Wt. of Tare & DS (gm)	21.30	20.56	
Wt. of Tare (gm)	15.13	15.21	
Wt. of Water (gm)	1.8	1.6	
Wt. of DS (gm)	6.2	5.4	
Moisture Content (%)	**29.3**	**29.5**	**-0.2**

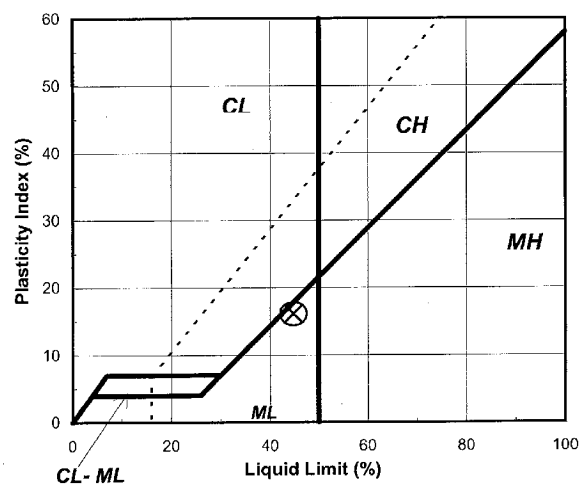
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**45**
Plastic Limit (%)	**29**
Plasticity Index (%)	**16**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 9/19/2008 *Checked By* GEM *Date* 9-24-08

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ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	MESCO	Boring No.	P2-11D
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	12.85-13.52
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-02	Soil Description	**BROWN LEAN CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

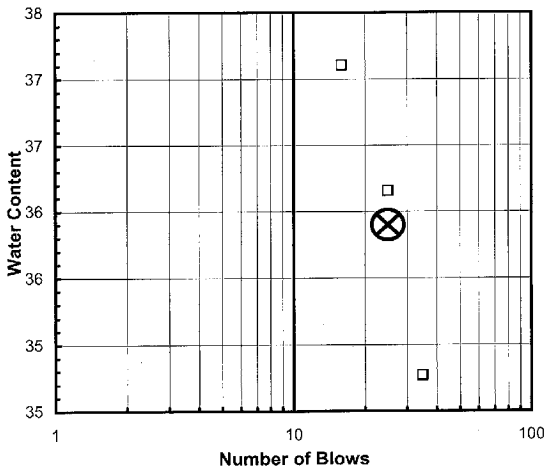
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	K-A	F	A-L	MULTIPOINT
Wt. of Tare & WS (gm)	26.66	26.86	29.63	
Wt. of Tare & DS (gm)	23.64	23.74	25.99	
Wt. of Tare (gm)	15.50	15.11	15.52	
Wt. of Water (gm)	3.0	3.1	3.6	
Wt. of DS (gm)	8.1	8.6	10.5	
Moisture Content (%)	**37.1**	**36.2**	**34.8**	
Number of Blows	**16**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-C	A-I	
Wt. of Tare & WS (gm)	24.00	24.14	
Wt. of Tare & DS (gm)	22.63	22.74	
Wt. of Tare (gm)	15.58	15.49	
Wt. of Water (gm)	1.4	1.4	
Wt. of DS (gm)	7.1	7.3	
Moisture Content (%)	**19.4**	**19.3**	**0.1**

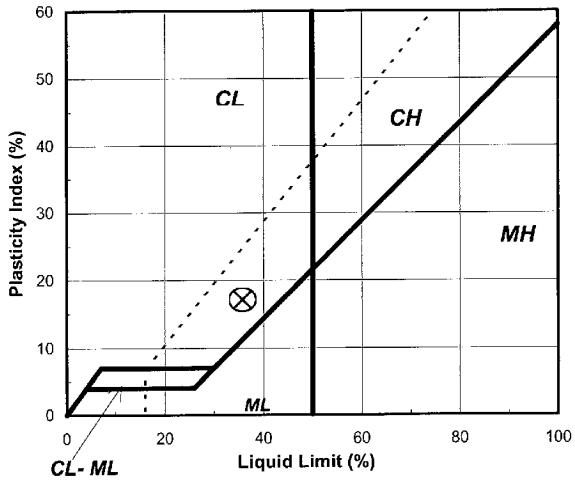
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**36**
Plastic Limit (%)	**19**
Plasticity Index (%)	**17**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By SD *Date* 9/18/2008 *Checked By* GZM *Date* 9-24-08

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	MESCO	Boring No.	P2-11D
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	44
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-03	Soil Description	**BLACK LEAN CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

(Minus No. 40 sieve material, Airdried)

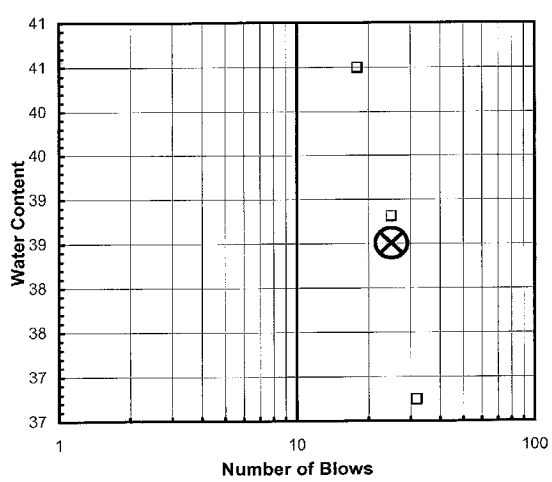
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	M	J	W	MULTIPOINT
Wt. of Tare & WS (gm)	27.04	26.56	26.79	
Wt. of Tare & DS (gm)	23.61	23.37	23.66	
Wt. of Tare (gm)	15.14	15.15	15.14	
Wt. of Water (gm)	3.4	3.2	3.1	
Wt. of DS (gm)	8.5	8.2	8.5	
Moisture Content (%)	**40.5**	**38.8**	**36.7**	
Number of Blows	**18**	**25**	**32**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	O	D	
Wt. of Tare & WS (gm)	22.61	21.74	
Wt. of Tare & DS (gm)	21.44	20.68	
Wt. of Tare (gm)	15.24	15.19	
Wt. of Water (gm)	1.2	1.1	
Wt. of DS (gm)	6.2	5.5	
Moisture Content (%)	**18.9**	**19.3**	**-0.4**

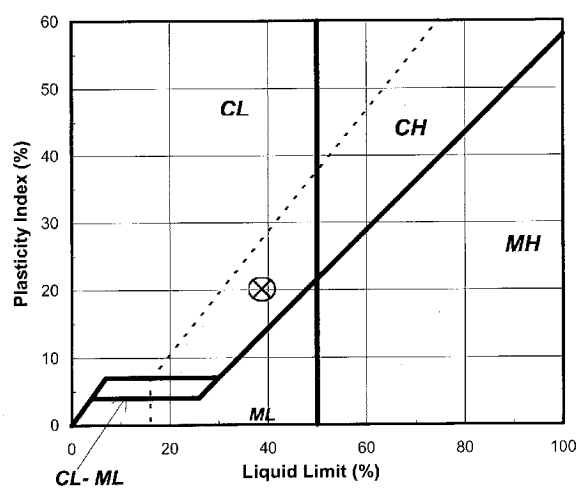
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**39**
Plastic Limit (%)	**19**
Plasticity Index (%)	**20**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By *SD* *Date* *9/18/2008* *Checked By* GEM *Date* 9-22-08

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	MESCO	Boring No.	P2-2
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	5-5.67
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-04	Soil Description	**ORANGE LEAN CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

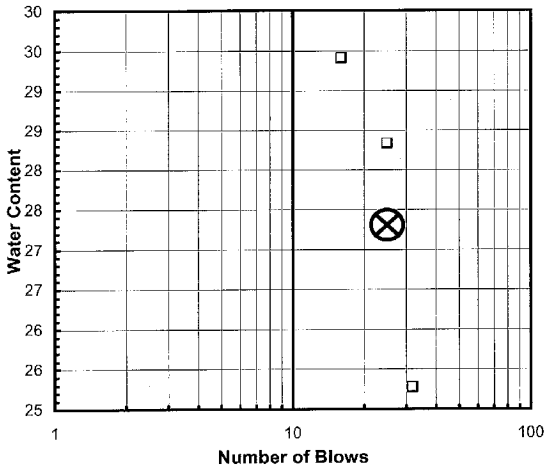
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A-P	K-A	A-D	MULTIPOINT
Wt. of Tare & WS (gm)	30.64	29.44	30.18	
Wt. of Tare & DS (gm)	27.22	26.36	27.20	
Wt. of Tare (gm)	15.59	15.49	15.41	
Wt. of Water (gm)	3.4	3.1	3.0	
Wt. of DS (gm)	11.6	10.9	11.8	
Moisture Content (%)	**29.4**	**28.3**	**25.3**	
Number of Blows	**16**	**25**	**32**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-O	A-H	
Wt. of Tare & WS (gm)	22.50	23.06	
Wt. of Tare & DS (gm)	21.45	21.91	
Wt. of Tare (gm)	15.46	15.56	
Wt. of Water (gm)	1.1	1.2	
Wt. of DS (gm)	6.0	6.4	
Moisture Content (%)	**17.5**	**18.1**	**-0.6**

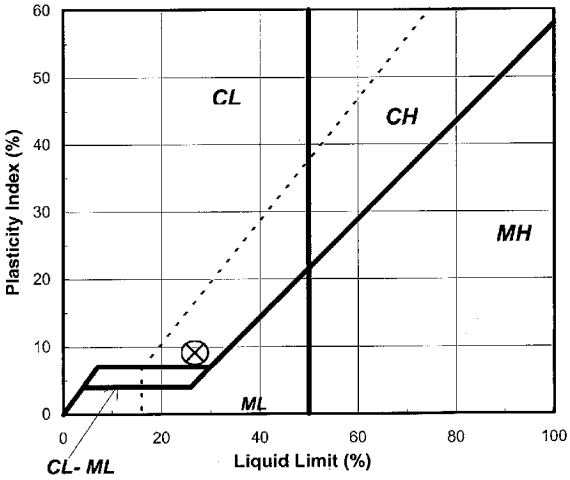
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**27**
Plastic Limit (%)	**18**
Plasticity Index (%)	**9**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By SD *Date* 9/17/2008 *Checked By* GEM *Date* 9-18-08

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	MESCO	Boring No.	P2-10
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	6-6.5
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-05	Soil Description	**ORANGE BROWN LEAN CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

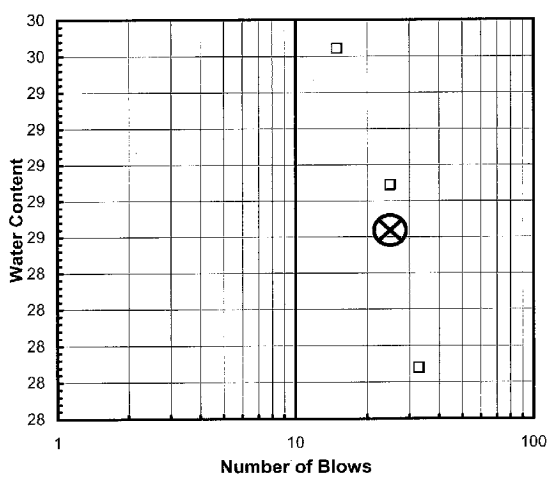
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	K-A	A-P	A-D	MULTIPOINT
Wt. of Tare & WS (gm)	30.24	28.52	28.84	
Wt. of Tare & DS (gm)	26.87	25.62	25.91	
Wt. of Tare (gm)	15.50	15.58	15.40	
Wt. of Water (gm)	3.4	2.9	2.9	
Wt. of DS (gm)	11.4	10.0	10.5	
Moisture Content (%)	**29.6**	**28.9**	**27.9**	
Number of Blows	**15**	**25**	**33**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-H	A-O	
Wt. of Tare & WS (gm)	22.15	23.75	
Wt. of Tare & DS (gm)	21.29	22.65	
Wt. of Tare (gm)	15.56	15.46	
Wt. of Water (gm)	0.9	1.1	
Wt. of DS (gm)	5.7	7.2	
Moisture Content (%)	**15.0**	**15.3**	**-0.3**

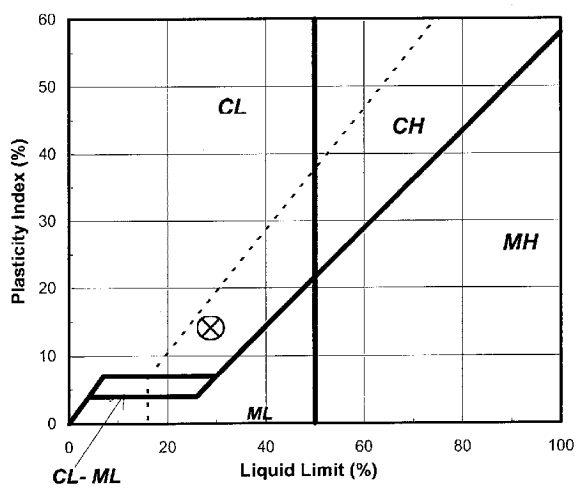
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**29**
Plastic Limit (%)	**15**
Plasticity Index (%)	**14**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By SD *Date* 9/18/2008 *Checked By* GEM *Date* 9-22-08

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ATTERBERG LIMIT

ASTM D 4318-00 (SOP - S4)

Client	MESCO	Boring No.	P2-4
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	12-12.67
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-06	Visual Description	**TAN**
			(MInus No. 40 sieve material, Wet Method)

NON - PLASTIC MATERIAL

Tested By *JBD* *Date* *9/17/2008* *Checked By* GEM *Date* 9-18-08

page 1 of 1 DCN: CT-S4C DATE: 7-11-97 REVISION : 2 *\\Server\c\Data Sheets\[Limit-(NP).xls]Sheet1*

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ATTERBERG LIMIT

ASTM D 4318-00 (SOP - S4)

Client	MESCO	Boring No.	P2-4
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	25
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-07	Visual Description	**ORANGE**
			(MInus No. 40 sieve material, Wet Method)

NON - PLASTIC MATERIAL

Tested By SD *Date* 9/17/2008 *Checked By* GEM *Date* 9-22-08

page 1 of 1 DCN: CT-S4C DATE: 7-11-97 REVISION : 2 *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-07 Limit-(NP).xls]Sheet1*

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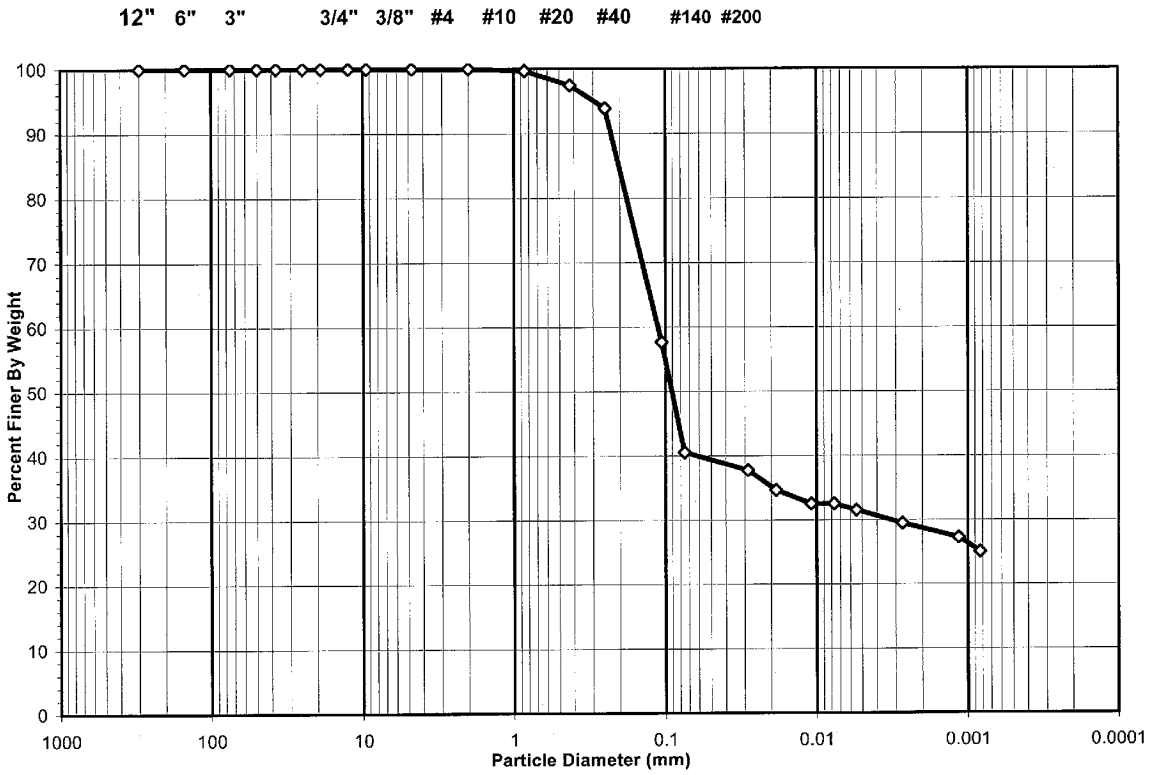
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-7
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	15-17.25
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-01	Soil Color	**LIGHT BROWN TAN**

	SIEVE ANALYSIS				*HYDROMETER*	
USCS	**cobbles**	**gravel**	**sand**		**silt and clay fraction**	
USDA	**cobbles**	**gravel**	**sand**		**silt**	**clay**



USCS Summary

Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.00
#4 To #200	*Sand*	59.48
Finer Than #200	*Silt & Clay*	40.52

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND***

page 1 of 4

DCN: CT-S3P DATE:02/15/05 REVISION:8 *Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-01 #10 Split Hydro rev 8.xls]Sheet1*

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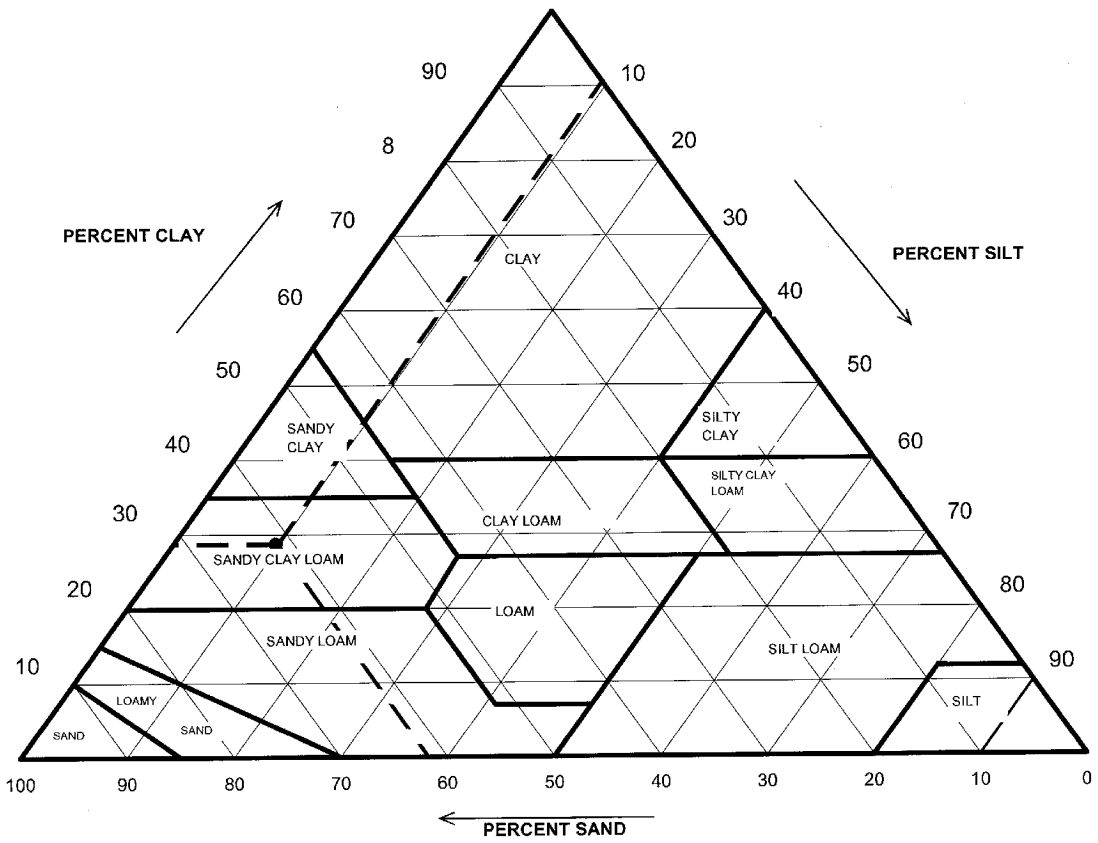
USDA CLASSIFICATION CHART

Client	MESCO	Boring No.	P2-7
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	15-17.25
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-01	Soil Color	LIGHT BROWN TAN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	0.02	**0.00**
2	99.98	*Sand*	61.67	**61.68**
0.05	38.31	*Silt*	9.60	**9.60**
0.002	28.72	*Clay*	28.72	**28.72**

USDA Classification: ***SANDY CLAY LOAM***

page 2 of 4

DCN: CT-S3P DATE:02/15/05 REVISION:8\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-01 #10 Split Hydro rev 8.xls]Sheet1

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INTEGRITY IN TESTING

WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-7
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	15-17.25
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-01	Soil Color	**LIGHT BROWN TAN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	216	Tare No.	K-1
Wgt.Tare + Wet Soil (gm)	411.99	Wgt.Tare + Wet Soil (gm)	59.93
Wgt.Tare + Dry Soil (gm)	352.20	Wgt.Tare + Dry Soil.(gm)	58.40
Weight of Tare (gm)	170.70	Weight of Tare (gm)	22.01
Weight of Water (gm)	59.79	Weight of Water (gm)	1.53
Weight of Dry Soil (gm)	181.50	Weight of Dry Soil (gm)	36.39
Moisture Content (%)	**32.9**	**Moisture Content (%)**	**4.2**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	241.29	Weight of the Dry Sample (gm)	277.51
Dry Weight +#10 Material(gm)	181.5	Weight of minus #200 material (gm)	38.91
Wet Weight Hydro. Material.(gm)	100.05	Weight of plus #200 material (gm)	238.60
Dry Weight Hydro. Material (gm)	96.01		
Total Dry Weight Sample (gm)	277.51	**J-FACTOR (%FINER THAN #10)**	**0.9998**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.00	0.00	0.00	100.00	**100.00**
#10	2.00	0.03	0.02	0.02	99.98	**99.98**
#20	0.85	0.28	0.29	0.29	99.71	**99.69**
#40	0.425	2.14	2.23	2.52	97.48	**97.46**
#60	0.250	3.45	3.59	6.11	93.89	**93.87**
#140	0.106	34.75	36.19	42.31	57.69	**57.68**
#200	0.075	16.48	17.16	59.47	40.53	**40.52**
Pan	-	38.91	40.53	100.00	-	-

Notes :

Tested By JP Date 9/25/2008 Checked By GEM Date 10-7-08

page 3 of 4 DCN: CT-S3P DATE:02/15/05 REVISION:8 *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-01 #10 Split Hydro rev 8.xls]Sheet1*

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HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-7
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	15-17.25
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-01	Soil Color	**LIGHT BROWN TAN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	40.0	40.0	24.4	3.67	36.3	37.8	0.01292	0.0285	**37.8**
5		37.0	24.4	3.67	33.3	34.6	0.01292	0.0185	**34.6**
15		35.0	24.4	3.67	31.3	32.6	0.01292	0.0108	**32.6**
30		35.0	24.4	3.67	31.3	32.6	0.01292	0.0077	**32.6**
60		34.0	24.4	3.67	30.3	31.5	0.01292	0.0055	**31.5**
250		32.0	24.6	3.62	28.4	29.5	0.01289	0.0027	**29.5**
1440		30.0	24.2	3.73	26.3	27.3	0.01295	0.0012	**27.3**
2880		28.0	23.7	3.88	24.1	25.1	0.01302	0.0008	**25.1**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	96.01	a - Factor	0.998
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	99.98
Weight of Dry Material (gm)	96.01		
		Specific Gravity	2.66 Measured

Note:

Tested By JBD Date 9/22/2008 Checked By GEM Date 10-7-08

page 4 of 4 DCN: CT-S3P DATE:02/15/05 REVISION:8 *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-01 #10 Split Hydro rev 8.xls]Sheet1*

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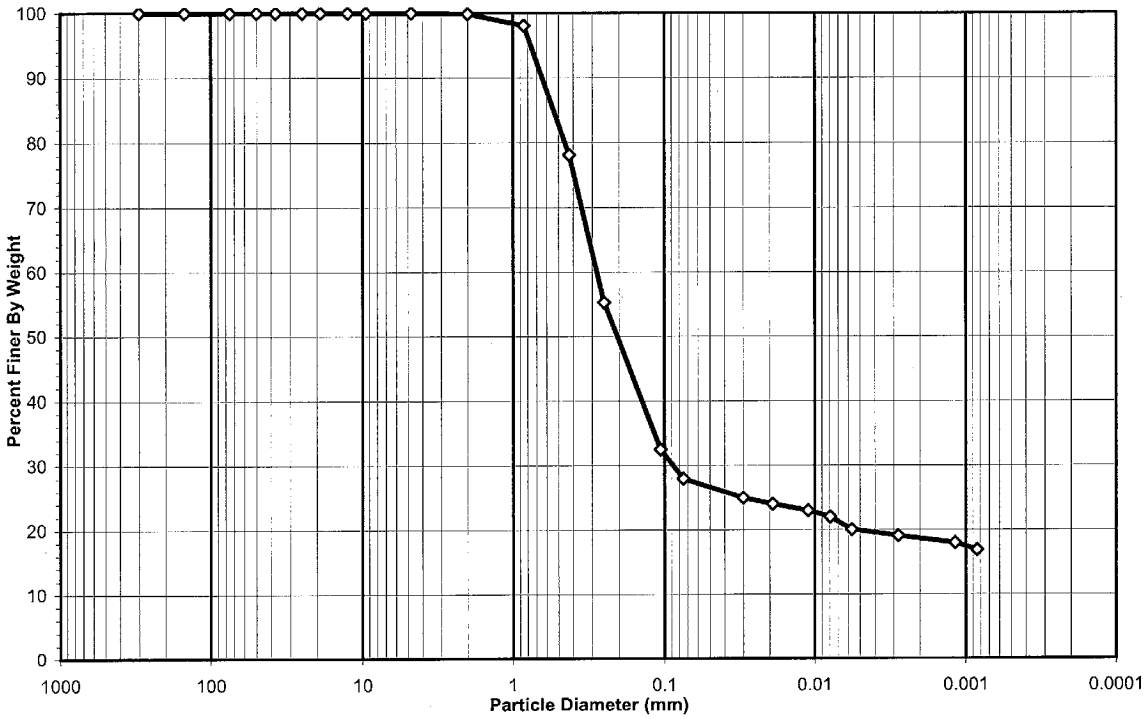
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-11D
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	12.85-13.52
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-02	Soil Color	**BROWN**

	SIEVE ANALYSIS					*HYDROMETER*
USCS	**cobbles**	**gravel**	**sand**			**silt and clay fraction**
USDA	**cobbles**	**gravel**	**sand**		**silt**	**clay**

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



Sieve Sizes (mm)	**USCS Summary**	**Percentage**
Greater Than #4	*Gravel*	0.00
#4 To #200	*Sand*	72.06
Finer Than #200	*Silt & Clay*	27.94

USCS Symbol ***SC, TESTED***

USCS Classification ***CLAYEY SAND***

page 1 of 4

DCN: CT-S3P DATE:02/15/05 REVISION:3 *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-02 #10 Split Hydro rev 8.xls]Sheet1*

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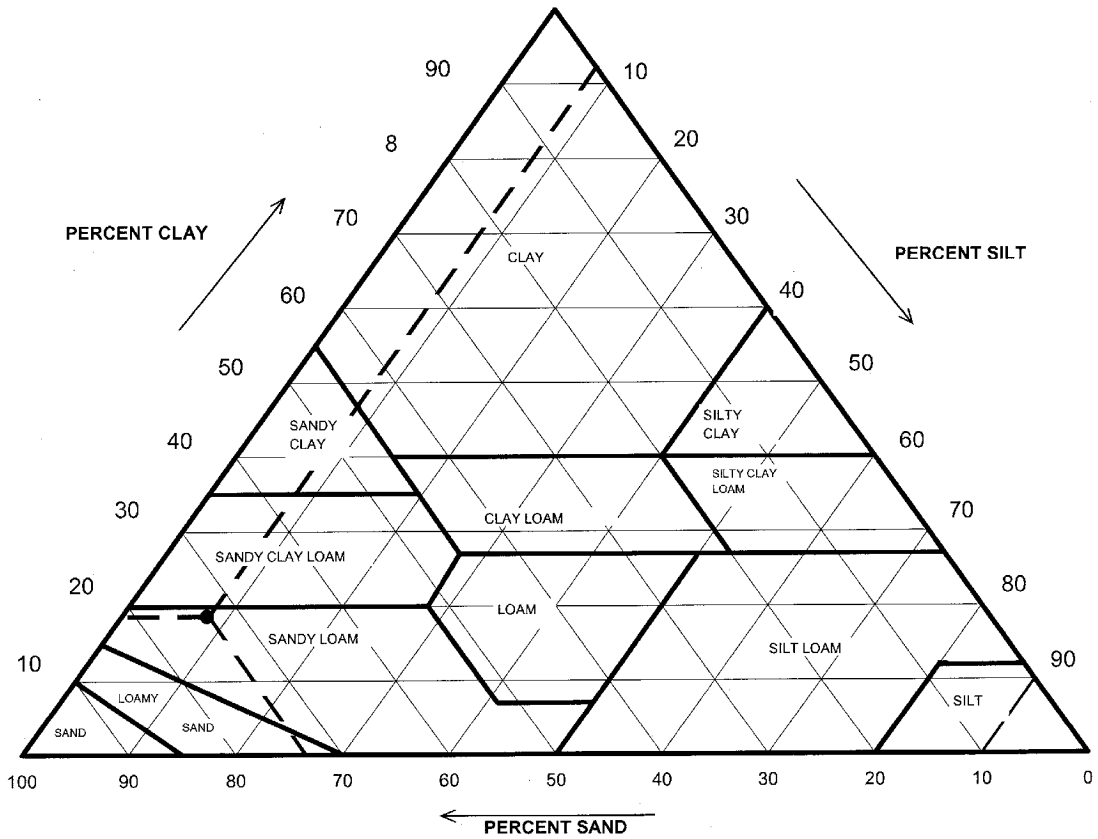
USDA CLASSIFICATION CHART

Client	MESCO	Boring No.	P2-11D
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	12.85-13.52
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-02	Soil Color	BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	0.12	**0.00**
2	99.88	*Sand*	73.25	**73.34**
0.05	26.63	*Silt*	7.96	**7.97**
0.002	18.67	*Clay*	18.67	**18.69**

USDA Classification: ***SANDY LOAM***

page 2 of 4

DCN: CT-S3P DATE:02/15/05 REVISION:8\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-02 #10 Split Hydro rev 8.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-11D
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	12.85-13.52
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-02	Soil Color	**BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	212	Tare No.	F-1
Wgt.Tare + Wet Soil (gm)	304.96	Wgt.Tare + Wet Soil (gm)	65.03
Wgt.Tare + Dry Soil (gm)	281.89	Wgt.Tare + Dry Soil (gm)	64.42
Weight of Tare (gm)	171.59	Weight of Tare (gm)	21.99
Weight of Water (gm)	23.07	Weight of Water (gm)	0.61
Weight of Dry Soil (gm)	110.30	Weight of Dry Soil (gm)	42.43
Moisture Content (%)	**20.9**	**Moisture Content (%)**	**1.4**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	133.37	Weight of the Dry Sample (gm)	208.91
Dry Weight +#10 Material(gm)	110.3	Weight of minus #200 material (gm)	27.58
Wet Weight Hydro. Material.(gm)	100.03	Weight of plus #200 material (gm)	181.33
Dry Weight Hydro. Material (gm)	98.61		
Total Dry Weight Sample (gm)	208.91	**J-FACTOR (%FINER THAN #10)**	**0.9988**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.00	0.00	0.00	100.00	**100.00**
#10	2.00	0.13	0.12	0.12	99.88	**99.88**
#20	0.85	1.79	1.82	1.82	98.18	**98.07**
#40	0.425	19.71	19.99	21.80	78.20	**78.11**
#60	0.250	22.60	22.92	44.72	55.28	**55.21**
#140	0.106	22.44	22.76	67.48	32.52	**32.49**
#200	0.075	4.49	4.55	72.03	27.97	**27.94**
Pan	-	27.58	27.97	100.00	-	**-**

Notes :

Tested By JP Date 9/25/2008 Checked By GEM Date 9-25-08

page 3 of 4 DCN: CT-S3P DATE:02/15/05 REVISION:1 *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-02 #10 Split Hydro rev 8.xls]Sheet1*

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-11D
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	12.85-13.52
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-02	Soil Color	**BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	29.0	29.0	24.4	3.67	25.3	25.0	0.01247	0.0300	**25.0**
5		28.0	24.4	3.67	24.3	24.0	0.01247	0.0191	**24.0**
15		27.0	24.4	3.67	23.3	23.0	0.01247	0.0111	**23.0**
30		26.0	24.4	3.67	22.3	22.1	0.01247	0.0079	**22.0**
60		24.0	24.4	3.67	20.3	20.1	0.01247	0.0057	**20.1**
250		23.0	24.5	3.65	19.4	19.1	0.01246	0.0028	**19.1**
1440		22.0	24.1	3.76	18.2	18.0	0.01252	0.0012	**18.0**
2880		21.0	23.7	3.88	17.1	16.9	0.01258	0.0008	**16.9**

Soil Specimen Data		Other Corrections	
Tare + Dry Material (gm)	98.61	a - Factor	0.974
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	99.88
Weight of Dry Material (gm)	98.61		
		Specific Gravity	2.78 Measured

Note:

Tested By JBD Date 9/22/2008 Checked By GZM Date 9-25-08

page 4 of 4 DCN: CT-S3P DATE:02/15/05 REVISION:8 *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-01 #10 Split Hydro rev 8.xls]Sheet1*

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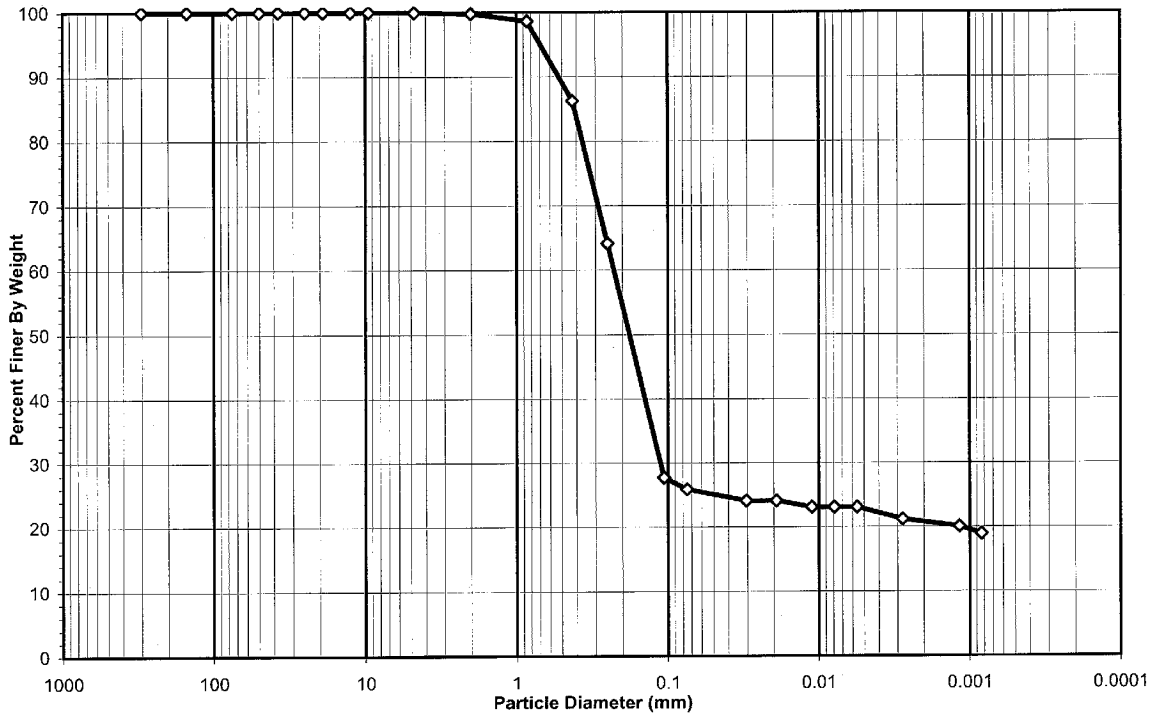
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-11D
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	44
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-03	Soil Color	**BLACK**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.04
#4 To #200	*Sand*	74.06
Finer Than #200	*Silt & Clay*	25.90

USCS Symbol ***SC, TESTED***

USCS Classification ***CLAYEY SAND***

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DCN: CT-S3P DATE:02/15/05 REVISION:8 *Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-01 #10 Split Hydro rev 8.xls]Sheet1*

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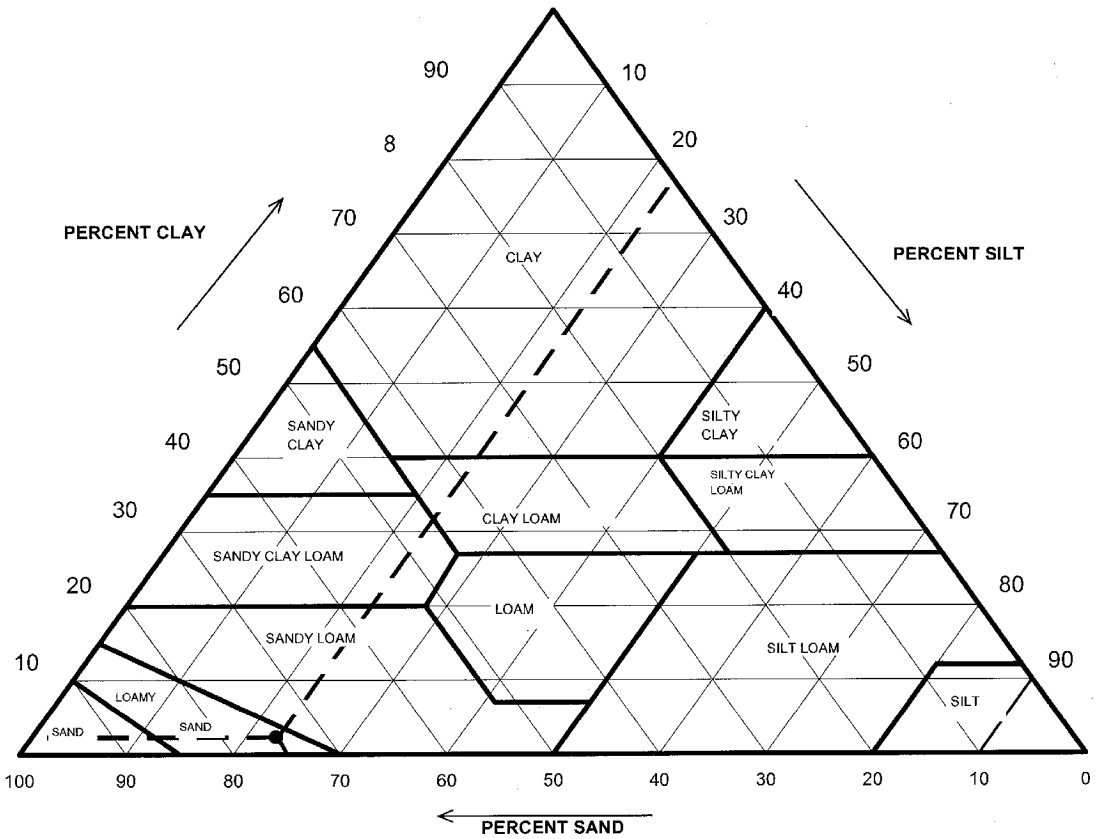
USDA CLASSIFICATION CHART

Client	MESCO	Boring No.	P2-11D
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	44
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-03	Soil Color	BLACK



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	0.24	**0.00**
2	99.76	*Sand*	74.67	**74.85**
0.05	25.09	*Silt*	22.79	**22.85**
0.002	2.30	*Clay*	2.30	**2.30**

USDA Classification: ***LOAMY SAND***

page 2 of 4

DCN: CT-S3P DATE:02/15/05 REVISION:8\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-01 #10 Split Hydro rev 8.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-11D
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	44
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-03	Soil Color	**BLACK**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	201	Tare No.	445
Wgt.Tare + Wet Soil (gm)	984.73	Wgt.Tare + Wet Soil (gm)	93.20
Wgt.Tare + Dry Soil (gm)	787.03	Wgt.Tare + Dry Soil (gm)	92.37
Weight of Tare (gm)	170.71	Weight of Tare (gm)	38.06
Weight of Water (gm)	197.70	Weight of Water (gm)	0.83
Weight of Dry Soil (gm)	616.32	Weight of Dry Soil (gm)	54.31
Moisture Content (%)	**32.1**	**Moisture Content (%)**	**1.5**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	814.02	Weight of the Dry Sample (gm)	714.82
Dry Weight +#10 Material(gm)	616.3	Weight of minus #200 material (gm)	25.57
Wet Weight Hydro. Material.(gm)	100.01	Weight of plus #200 material (gm)	689.25
Dry Weight Hydro. Material (gm)	98.50		
Total Dry Weight Sample (gm)	714.82	**J-FACTOR (%FINER THAN #10)**	**0.9976**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.24	0.04	0.04	99.96	**99.96**
#10	2.00	1.22	0.20	0.24	99.76	**99.76**
#20	0.85	1.12	1.14	1.14	98.86	**98.63**
#40	0.425	12.22	12.41	13.54	86.46	**86.25**
#60	0.250	21.83	22.16	35.70	64.30	**64.14**
#140	0.106	35.96	36.51	72.21	27.79	**27.72**
#200	0.075	1.80	1.83	74.04	25.96	**25.90**
Pan	-	25.57	25.96	100.00	-	-

Notes :

Tested By SD Date 9/25/2008 Checked By GEM Date 9-25-08

page 3 of 4 DCN: CT-S3P DATE:02/15/05 REVISION:8 *Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-01 #10 Split Hydro rev 8.xls]Sheet1*

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INTEGRITY IN TESTING

HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-11D
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	44
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-03	Soil Color	**BLACK**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	28.0	28.0	24.4	3.67	24.3	24.2	0.01254	0.0303	**24.1**
5		28.0	24.4	3.67	24.3	24.2	0.01254	0.0192	**24.1**
15		27.0	24.4	3.67	23.3	23.2	0.01254	0.0112	**23.1**
30		27.0	24.4	3.67	23.3	23.2	0.01254	0.0079	**23.1**
60		27.0	24.4	3.67	23.3	23.2	0.01254	0.0056	**23.1**
250		25.0	24.6	3.62	21.4	21.2	0.01252	0.0028	**21.2**
1440		24.0	24.2	3.73	20.3	20.1	0.01257	0.0012	**20.1**
2880		23.0	23.7	3.88	19.1	19.0	0.01265	0.0008	**18.9**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	98.50	a - Factor	0.978
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	99.76
Weight of Dry Material (gm)	98.50		
		Specific Gravity	2.76 Measured

Note:

Tested By JBD Date 9/22/2008 Checked By CAM Date 9-25-08

page 4 of 4 DCN: CT-S3P DATE:02/15/05 REVISION:8 *Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-01 #10 Split Hydro rev 8.xls]Sheet1*

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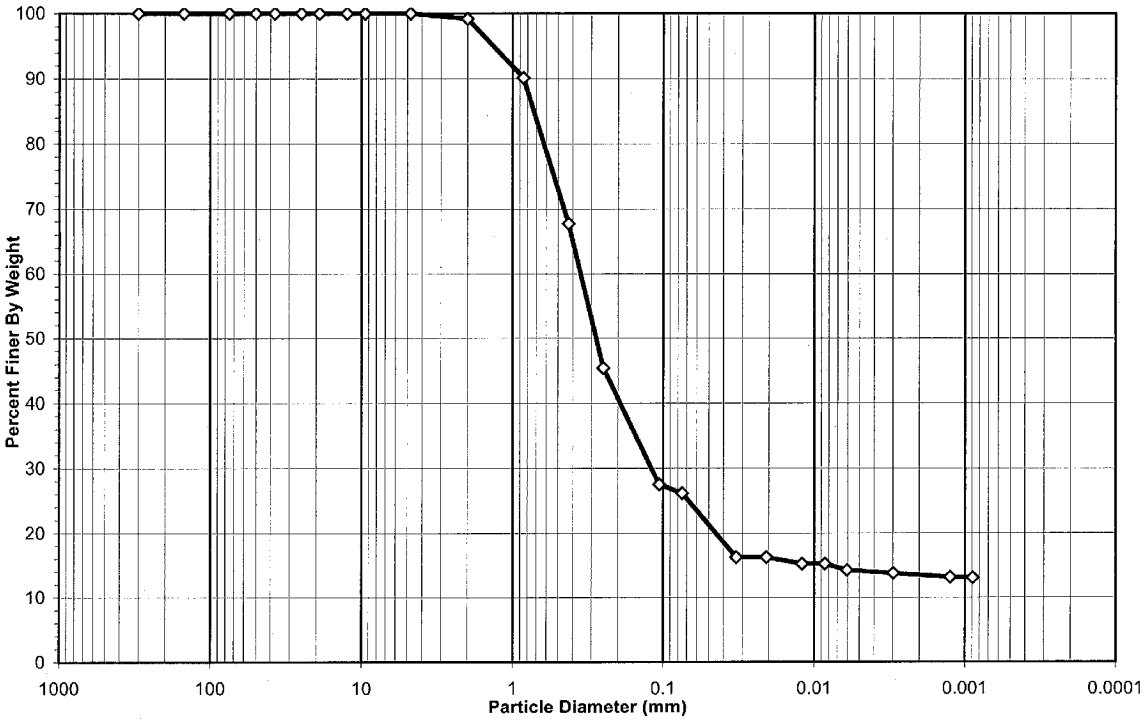
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-2
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	5-5.67
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-04	Soil Color	**ORANGE**

	SIEVE ANALYSIS			*HYDROMETER*	
USCS	**cobbles**	**gravel**	**sand**	**silt and clay fraction**	
USDA	**cobbles**	**gravel**	**sand**	**silt**	**clay**

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.02
#4 To #200	*Sand*	73.85
Finer Than #200	*Silt & Clay*	26.13

USCS Symbol ***SC, TESTED***

USCS Classification ***CLAYEY SAND***

page 1 of 4

DCN: CT-S3P DATE:02/15/05 REVISION:8 *Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-04 #10 Split Hydro rev 8.xls]Sheet1*

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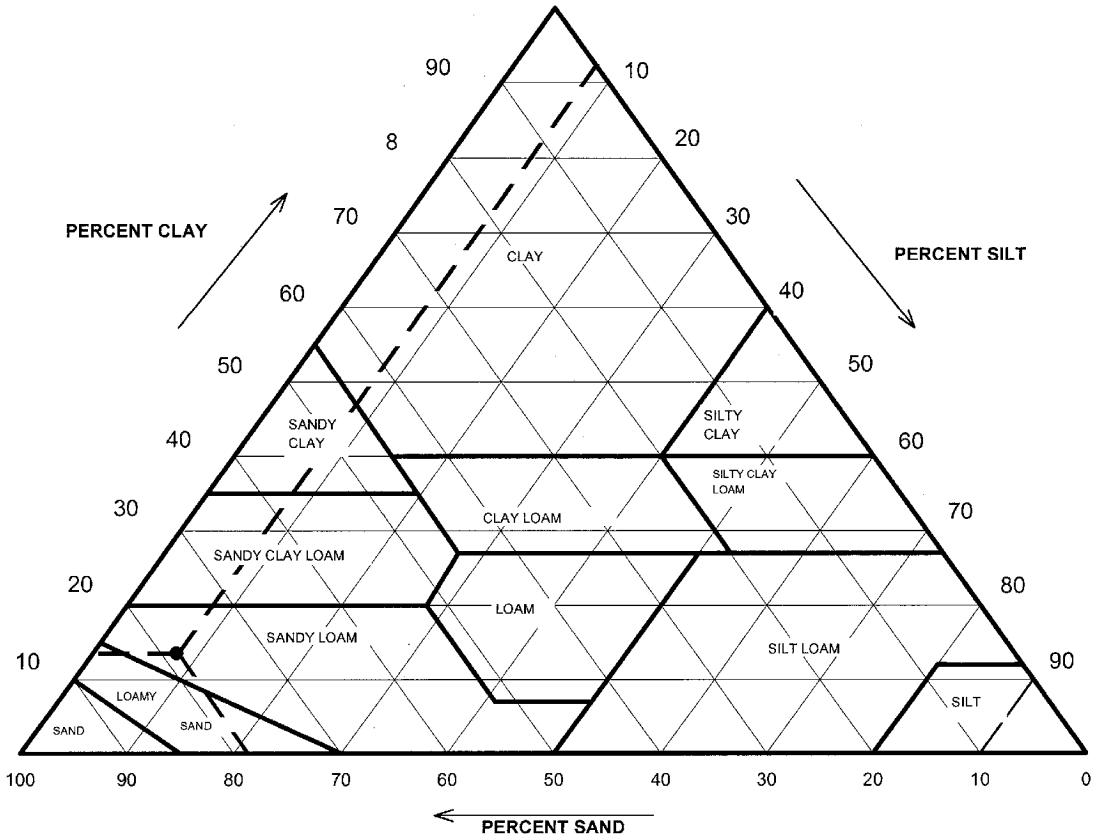
USDA CLASSIFICATION CHART

Client	MESCO	Boring No.	P2-2
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	5-5.67
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-04	Soil Color	ORANGE



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	0.81	**0.00**
2	99.19	*Sand*	77.91	**78.55**
0.05	21.28	*Silt*	7.80	**7.86**
0.002	13.48	*Clay*	13.48	**13.59**

USDA Classification: ***SANDY LOAM***

page 2 of 4

DCN: CT-S3P DATE:02/15/05 REVISION:a\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-04 #10 Split Hydro rev 8.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-2
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	5-5.67
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-04	Soil Color	**ORANGE**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	P-12	Tare No.	E-2
Wgt.Tare + Wet Soil (gm)	483.00	Wgt.Tare + Wet Soil (gm)	68.74
Wgt.Tare + Dry Soil (gm)	449.32	Wgt.Tare + Dry Soil (gm)	68.40
Weight of Tare (gm)	196.53	Weight of Tare (gm)	22.85
Weight of Water (gm)	33.68	Weight of Water (gm)	0.34
Weight of Dry Soil (gm)	252.79	Weight of Dry Soil (gm)	45.55
Moisture Content (%)	**13.3**	**Moisture Content (%)**	**0.7**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	286.47	Weight of the Dry Sample (gm)	352.05
Dry Weight +#10 Material(gm)	252.8	Weight of minus #200 material (gm)	26.15
Wet Weight Hydro. Material.(gm)	100.00	Weight of plus #200 material (gm)	325.90
Dry Weight Hydro. Material (gm)	99.26		
Total Dry Weight Sample (gm)	352.05	**J-FACTOR (%FINER THAN #10)**	**0.9919**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.05	0.02	0.02	99.98	**99.98**
#10	2.00	1.99	0.79	0.81	99.19	**99.19**
#20	0.85	9.07	9.14	9.14	90.86	**90.13**
#40	0.425	22.44	22.61	31.75	68.25	**67.70**
#60	0.250	22.28	22.45	54.19	45.81	**45.44**
#140	0.106	17.95	18.08	72.28	27.72	**27.50**
#200	0.075	1.37	1.38	73.66	26.34	**26.13**
Pan	-	26.15	26.34	100.00	-	-

Notes :

Tested By JP Date 9/25/08 Checked By GEM Date 9-25-08

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HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-2
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	5-5.67
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-04	Soil Color	**ORANGE**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	20.0	20.0	24.4	3.67	16.3	16.3	0.01284	0.0328	**16.2**
5		20.0	24.4	3.67	16.3	16.3	0.01284	0.0207	**16.2**
15		19.0	24.4	3.67	15.3	15.3	0.01284	0.0120	**15.2**
30		19.0	24.4	3.67	15.3	15.3	0.01284	0.0085	**15.2**
60		18.0	24.4	3.67	14.3	14.3	0.01284	0.0061	**14.2**
250		17.5	24.5	3.65	13.9	13.9	0.01282	0.0030	**13.8**
1440		17.0	24.1	3.76	13.2	13.3	0.01288	0.0012	**13.1**
2880		17.0	23.7	3.88	13.1	13.1	0.01294	0.0009	**13.0**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	99.26	a - Factor	0.994
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	99.19
Weight of Dry Material (gm)	99.26		
		Specific Gravity	2.68 Measured

Note:

Tested By JBD Date 9/22/2008 Checked By GEM Date 9-25-08

page 4 of 4 DCN: CT-S3P DATE:02/15/05 REVISION:4 *Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-04 #10 Split Hydro rev 8.xls]Sheet1*

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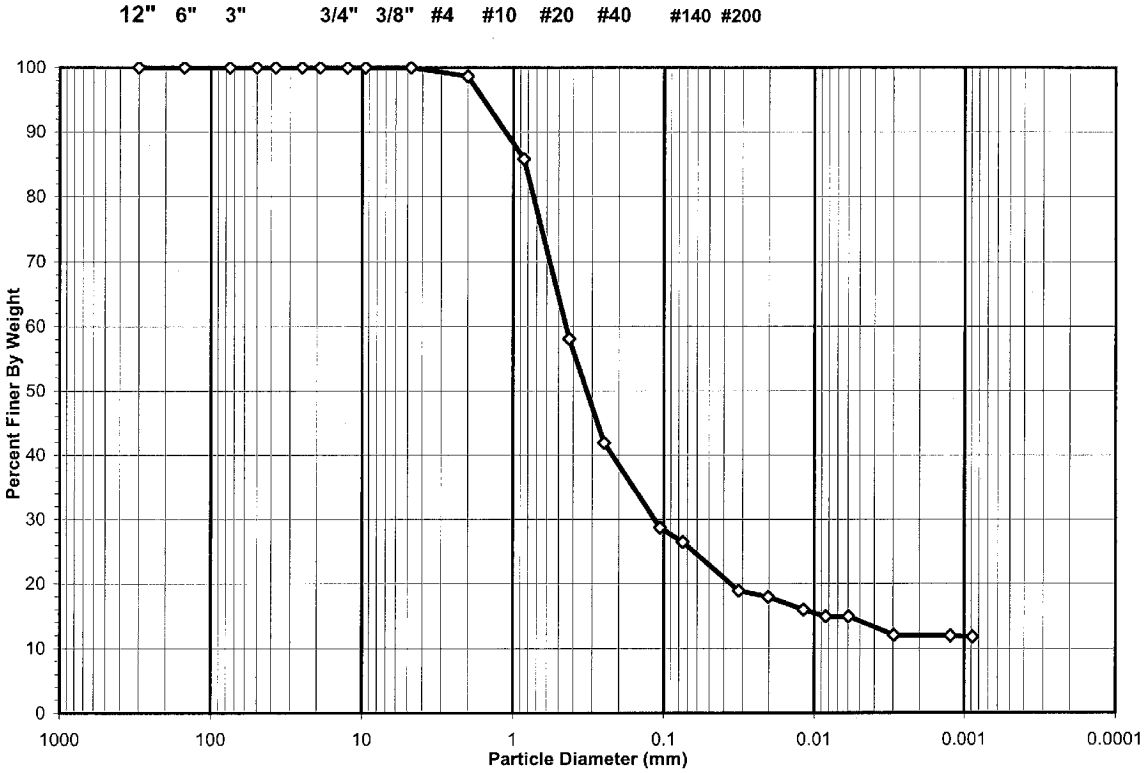
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-10
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	6-6.5
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-05	Soil Color	**ORANGE BROWN**

	SIEVE ANALYSIS			*HYDROMETER*	
USCS	**cobbles**	**gravel**	**sand**	**silt and clay fraction**	
USDA	**cobbles**	**gravel**	**sand**	**silt**	**clay**



USCS Summary

Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.00
#4 To #200	*Sand*	73.55
Finer Than #200	*Silt & Clay*	26.45

USCS Symbol ***SC, TESTED***

USCS Classification ***CLAYEY SAND***

page 1 of 4

DCN: CT-S3P DATE:02/15/05 REVISION:8 *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-05 #10 Split Hydro rev 8.xls]Sheet1*

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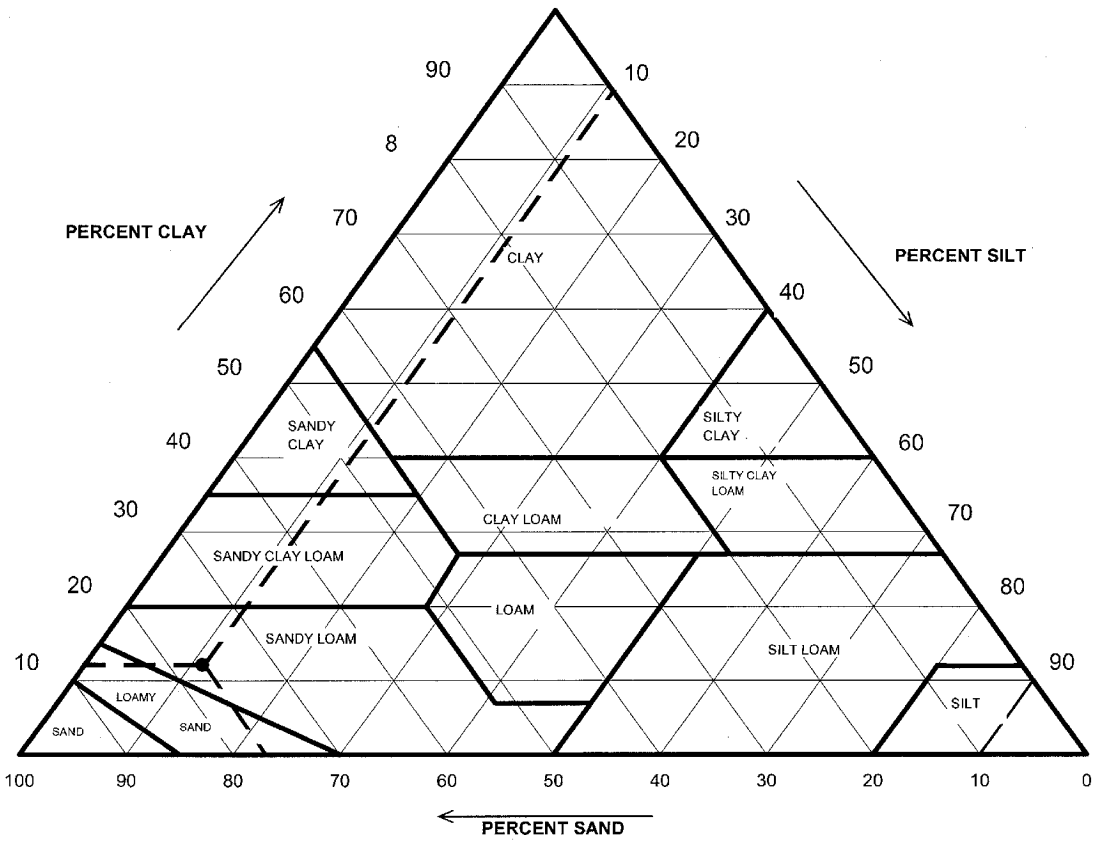
USDA CLASSIFICATION CHART

Client	MESCO	Boring No.	P2-10
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	6-6.5
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-05	Soil Color	ORANGE BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.37	**0.00**
2	98.63	*Sand*	75.74	**76.79**
0.05	22.89	*Silt*	10.92	**11.07**
0.002	11.97	*Clay*	11.97	**12.13**

USDA Classification: ***SANDY LOAM***

page 2 of 4

DCN: CT-S3P DATE:02/15/05 REVISION:8\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-05 #10 Split Hydro rev 8.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-10
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	6-6.5
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-05	Soil Color	**ORANGE BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	217	Tare No.	E-1
Wgt.Tare + Wet Soil (gm)	291.83	Wgt.Tare + Wet Soil (gm)	92.16
Wgt.Tare + Dry Soil (gm)	280.07	Wgt.Tare + Dry Soil (gm)	91.73
Weight of Tare (gm)	171.16	Weight of Tare (gm)	22.06
Weight of Water (gm)	11.76	Weight of Water (gm)	0.43
Weight of Dry Soil (gm)	108.91	Weight of Dry Soil (gm)	69.67
Moisture Content (%)	**10.8**	**Moisture Content (%)**	**0.6**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	120.67	Weight of the Dry Sample (gm)	208.30
Dry Weight +#10 Material(gm)	108.9	Weight of minus #200 material (gm)	26.66
Wet Weight Hydro. Material.(gm)	100.00	Weight of plus #200 material (gm)	181.64
Dry Weight Hydro. Material (gm)	99.39		
Total Dry Weight Sample (gm)	208.30	**J-FACTOR (%FINER THAN #10)**	**0.9863**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.00	0.00	0.00	100.00	**100.00**
#10	2.00	1.49	1.37	1.37	98.63	**98.63**
#20	0.85	12.92	13.00	13.00	87.00	**85.81**
#40	0.425	27.92	28.09	41.09	58.91	**58.10**
#60	0.250	16.36	16.46	57.55	42.45	**41.87**
#140	0.106	13.26	13.34	70.89	29.11	**28.71**
#200	0.075	2.27	2.28	73.18	26.82	**26.45**
Pan	-	26.66	26.82	100.00	-	-

Notes :

Tested By JP Date 10/6/2008 Checked By GEM Date 10-7-08

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-10
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	6-6.5
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-05	Soil Color	**ORANGE BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	23.0	23.0	24.4	3.67	19.3	19.1	0.01265	0.0317	**18.9**
5		22.0	24.4	3.67	18.3	18.1	0.01265	0.0202	**17.9**
15		20.0	24.4	3.67	16.3	16.2	0.01265	0.0118	**15.9**
30		19.0	24.2	3.73	15.3	15.1	0.01268	0.0084	**14.9**
60		19.0	24.2	3.73	15.3	15.1	0.01268	0.0059	**14.9**
250		16.0	24.3	3.70	12.3	12.2	0.01267	0.0030	**12.0**
1440		16.0	24.0	3.79	12.2	12.1	0.01271	0.0012	**11.9**
2880		16.0	23.3	4.00	12.0	11.9	0.01282	0.0009	**11.7**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	99.39	a - Factor	0.984
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.63
Weight of Dry Material (gm)	99.39		
		Specific Gravity	2.73 Measured

Note:

Tested By JBD Date 9/30/2008 Checked By GEM Date 10-7-08

page 4 of 4 DCN: CT-S3P DATE:02/15/05 REVISION:8 *Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-05 #10 Split Hydro rev 8.xls]Sheet1*

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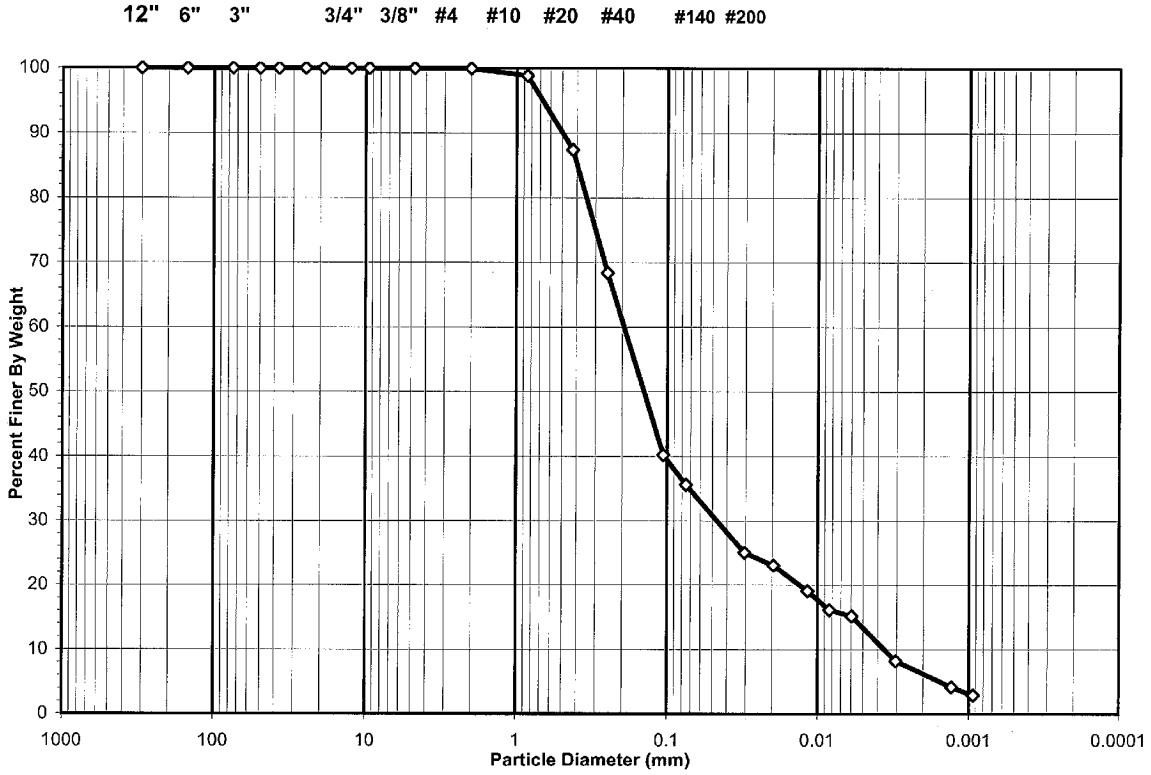
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-4
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	12-12.67
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-06	Soil Color	**TAN**

	SIEVE ANALYSIS			*HYDROMETER*	
USCS	**cobbles**	**gravel**	**sand**	**silt and clay fraction**	
USDA	**cobbles**	**gravel**	**sand**	**silt**	**clay**



Sieve Sizes (mm)	**USCS Summary**	**Percentage**
Greater Than #4	*Gravel*	0.00
#4 To #200	*Sand*	64.41
Finer Than #200	*Silt & Clay*	35.59

USCS Symbol ***SM, TESTED NON PLASTIC FINES)***

USCS Classification ***SILTY SAND***

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DCN: CT-S3P DATE:02/15/05 REVISION:8 *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-06 #10 Split Hydro rev 8.xls]Sheet1*

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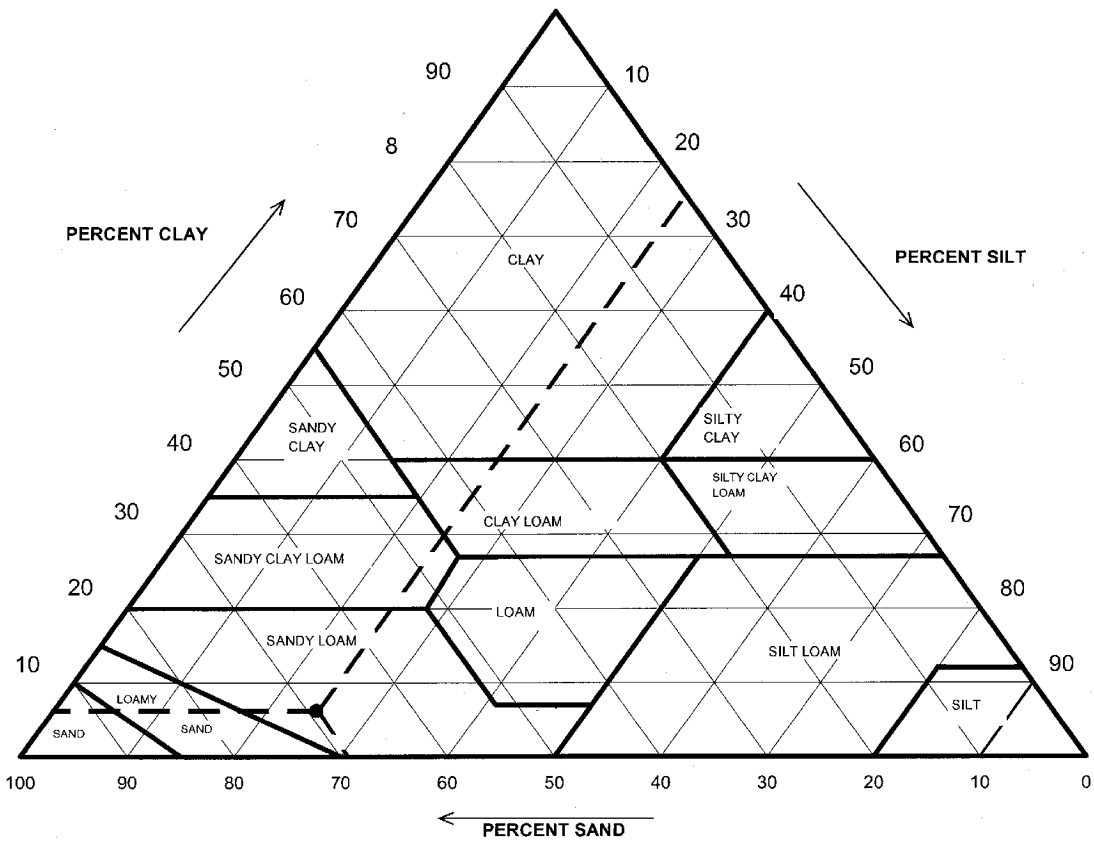
USDA CLASSIFICATION CHART

Client	MESCO	Boring No.	P2-4
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	12-12.67
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-06	Soil Color	TAN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	0.04	**0.00**
2	99.96	*Sand*	69.14	**69.17**
0.05	30.82	*Silt*	24.61	**24.62**
0.002	6.21	*Clay*	6.21	**6.21**

USDA Classification: ***SANDY LOAM***

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DCN: CT-S3P DATE:02/15/05 REVISION:8\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-06 #10 Split Hydro rev 8.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-4
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	12-12.67
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-06	Soil Color	**TAN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	203	Tare No.	L-1
Wgt.Tare + Wet Soil (gm)	466.46	Wgt.Tare + Wet Soil (gm)	84.31
Wgt.Tare + Dry Soil (gm)	451.09	Wgt.Tare + Dry Soil (gm)	84.12
Weight of Tare (gm)	171.11	Weight of Tare (gm)	15.78
Weight of Water (gm)	15.37	Weight of Water (gm)	0.19
Weight of Dry Soil (gm)	279.98	Weight of Dry Soil (gm)	68.34
Moisture Content (%)	**5.5**	**Moisture Content (%)**	**0.3**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	295.35	Weight of the Dry Sample (gm)	379.71
Dry Weight +#10 Material(gm)	280.0	Weight of minus #200 material (gm)	35.51
Wet Weight Hydro. Material.(gm)	100.01	Weight of plus #200 material (gm)	344.20
Dry Weight Hydro. Material (gm)	99.73		
Total Dry Weight Sample (gm)	379.71	**J-FACTOR (%FINER THAN #10)**	**0.9996**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.00	0.00	0.00	100.00	**100.00**
#10	2.00	0.11	0.04	0.04	99.96	**99.96**
#20	0.85	1.09	1.09	1.09	98.91	**98.87**
#40	0.425	11.40	11.43	12.52	87.48	**87.44**
#60	0.250	19.02	19.07	31.59	68.41	**68.38**
#140	0.106	28.11	28.19	59.78	40.22	**40.20**
#200	0.075	4.60	4.61	64.39	35.61	**35.59**
Pan	-	35.51	35.61	100.00	-	**-**

Notes :

Tested By JP Date 10/6/2008 Checked By GZM Date 10-7-08

page 3 of 4 DCN: CT-S3P DATE:02/15/05 REVISION:3 *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-06 #10 Split Hydro rev 8.xls]Sheet1*

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HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-4
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	12-12.67
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-06	Soil Color	**TAN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	29.0	29.0	24.3	3.70	25.3	25.0	0.01270	0.0305	**25.0**
5		27.0	24.3	3.70	23.3	23.0	0.01270	0.0196	**23.0**
15		23.0	24.3	3.70	19.3	19.1	0.01270	0.0116	**19.1**
30		20.0	24.4	3.67	16.3	16.1	0.01269	0.0084	**16.1**
60		19.0	24.4	3.67	15.3	15.2	0.01269	0.0059	**15.1**
250		12.0	24.3	3.70	8.3	8.2	0.01270	0.0030	**8.2**
1440		8.0	24.0	3.79	4.2	4.2	0.01275	0.0013	**4.2**
2880		7.0	23.1	4.05	2.9	2.9	0.01288	0.0009	**2.9**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	99.73	a - Factor	0.986
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	99.96
Weight of Dry Material (gm)	99.73		
		Specific Gravity	2.72 Measured

Note:

Tested By JBD Date 9/30/2008 Checked By GDM Date 10-7-08

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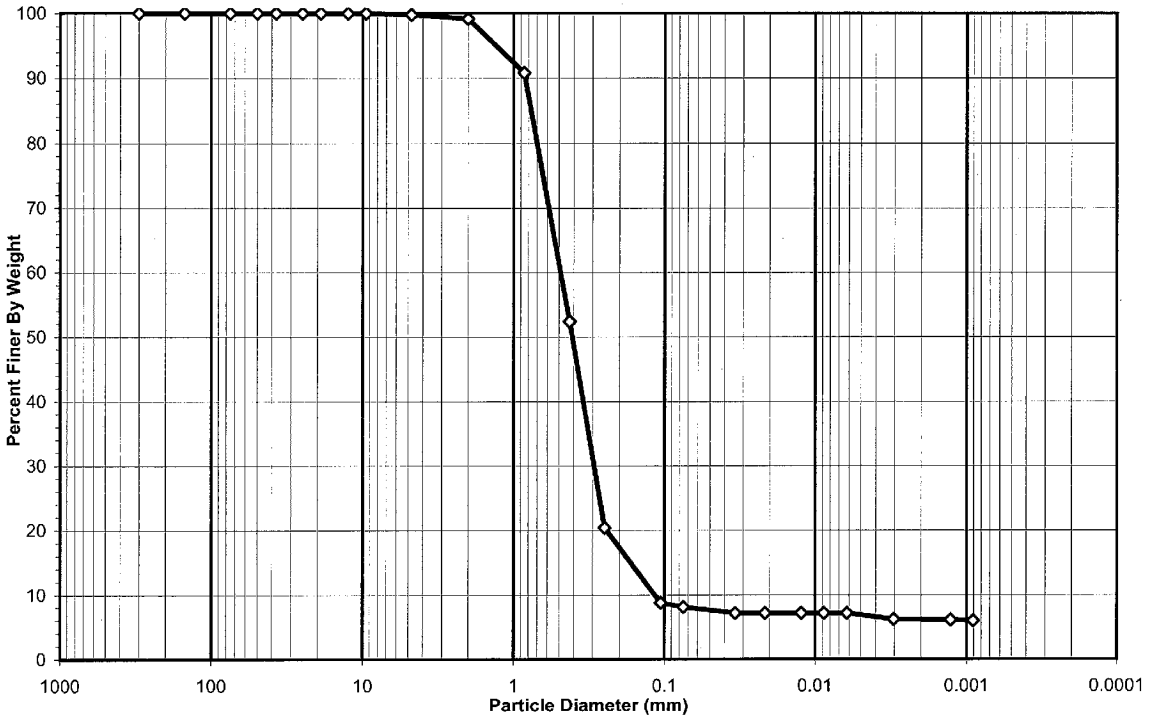
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-4
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	25
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-07	Soil Color	**ORANGE**

	SIEVE ANALYSIS					*HYDROMETER*	
USCS	cobbles	gravel		sand		silt and clay fraction	
USDA	cobbles	gravel		sand		silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



Sieve Sizes (mm)	**USCS Summary**	**Percentage**
Greater Than #4	*Gravel*	0.22
#4 To #200	*Sand*	91.68
Finer Than #200	*Silt & Clay*	8.10

		D60 =	**0.488**			
USCS Symbol	***SP-SM, TESTED (NON PLASTIC FINES)***	**D30 =**	**0.293**	**CC =**	**1.52**
USCS Classification	***POORLY GRADED SAND WITH SILT***	**D10 =**	**0.116**	**CU =**	**4.20**

page 1 of 4

DCN: CT-S3P DATE:02/15/05 REVISION:3 *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-04 #10 Split Hydro rev 8.xls]Sheet1*

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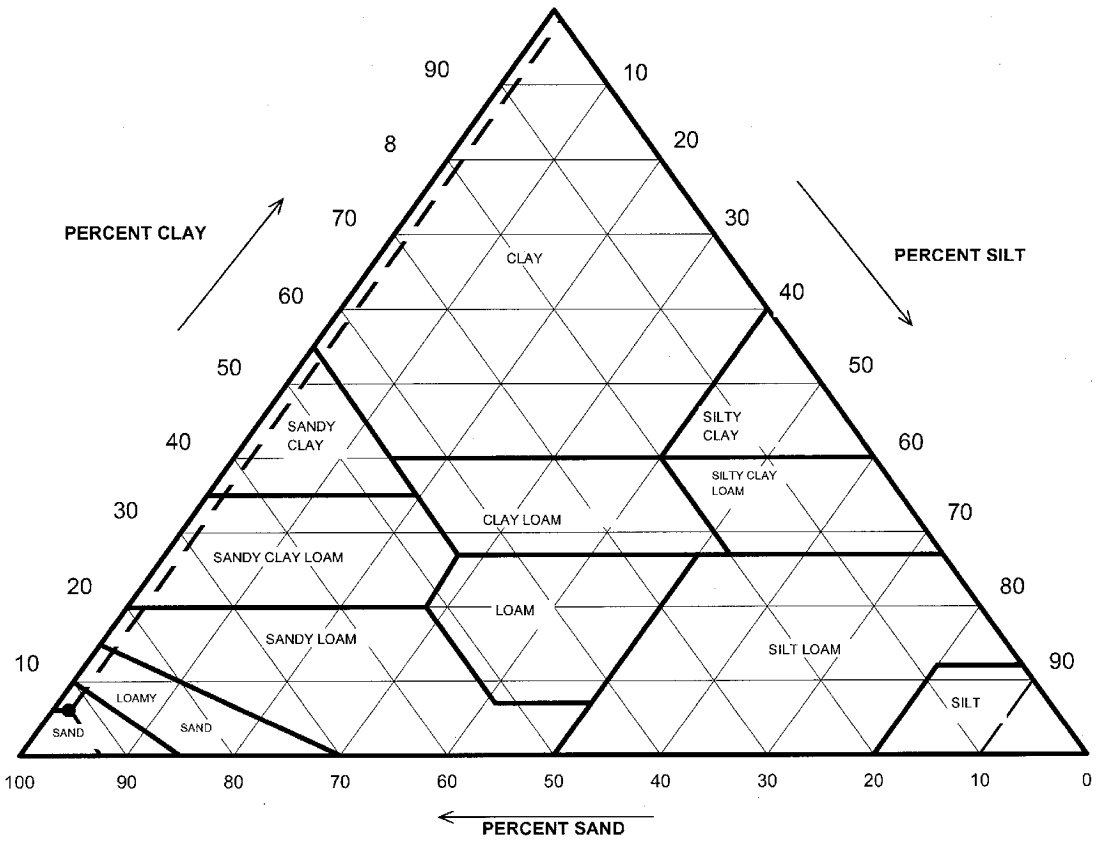
USDA CLASSIFICATION CHART

Client	MESCO	Boring No.	P2-4
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	25
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-07	Soil Color	ORANGE



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	0.83	**0.00**
2	99.17	*Sand*	91.57	**92.33**
0.05	7.61	*Silt*	1.47	**1.48**
0.002	6.14	*Clay*	6.14	**6.19**

USDA Classification: ***SAND***

page 2 of 4

DCN: CT-S3P DATE:02/15/05 REVISION:8\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-04 #10 Split Hydro rev 8.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-4
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	25
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-07	Soil Color	**ORANGE**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	200	Tare No.	N-1
Wgt.Tare + Wet Soil (gm)	462.72	Wgt.Tare + Wet Soil (gm)	62.29
Wgt.Tare + Dry Soil (gm)	430.22	Wgt.Tare + Dry Soil (gm)	62.19
Weight of Tare (gm)	171.85	Weight of Tare (gm)	21.88
Weight of Water (gm)	32.50	Weight of Water (gm)	0.10
Weight of Dry Soil (gm)	258.37	Weight of Dry Soil (gm)	40.31
Moisture Content (%)	**12.6**	**Moisture Content (%)**	**0.2**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	290.87	Weight of the Dry Sample (gm)	358.12
Dry Weight +#10 Material(gm)	258.4	Weight of minus #200 material (gm)	8.14
Wet Weight Hydro. Material.(gm)	100.00	Weight of plus #200 material (gm)	349.98
Dry Weight Hydro. Material (gm)	99.75		
Total Dry Weight Sample (gm)	358.12	**J-FACTOR (%FINER THAN #10)**	**0.9917**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.57	0.22	0.22	99.78	**99.78**
#10	2.00	1.57	0.61	0.83	99.17	**99.17**
#20	0.85	8.40	8.42	8.42	91.58	**90.82**
#40	0.425	38.71	38.81	47.23	52.77	**52.34**
#60	0.250	32.09	32.17	79.40	20.60	**20.43**
#140	0.106	11.74	11.77	91.17	8.83	**8.76**
#200	0.075	0.67	0.67	91.84	8.16	**8.10**
Pan	-	8.14	8.16	100.00	-	**-**

Notes :

Tested By SD Date 9/25/2008 Checked By GEM Date 9-25-08

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HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MESCO	Boring No.	P2-4
Client Reference	LENOIR CO. SUB. D LF PH.2	Depth (ft)	25
Project No.	2008-629-01	Sample No.	NA
Lab ID	2008-629-01-07	Soil Color	**ORANGE**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	11.0	11.0	24.4	3.67	7.3	7.2	0.01258	0.0339	**7.1**
5		11.0	24.4	3.67	7.3	7.2	0.01258	0.0214	**7.1**
15		11.0	24.4	3.67	7.3	7.2	0.01258	0.0124	**7.1**
30		11.0	24.4	3.67	7.3	7.2	0.01258	0.0087	**7.1**
60		11.0	24.4	3.67	7.3	7.2	0.01258	0.0062	**7.1**
250		10.0	24.5	3.65	6.4	6.2	0.01257	0.0030	**6.2**
1440		10.0	24.1	3.76	6.2	6.1	0.01262	0.0013	**6.1**
2880		10.0	23.7	3.88	6.1	6.0	0.01268	0.0009	**6.0**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	99.75	a - Factor	0.98
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	99.17
Weight of Dry Material (gm)	99.75		
		Specific Gravity	2.75 Measured

Note:

Tested By JBD Date 9/22/2008 Checked By CEM Date 9-25-08

page 4 of 4 DCN: CT-S3P DATE:02/15/05 REVISION:6 *\\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-04 #10 Split Hydro rev 8.xls]Sheet1*

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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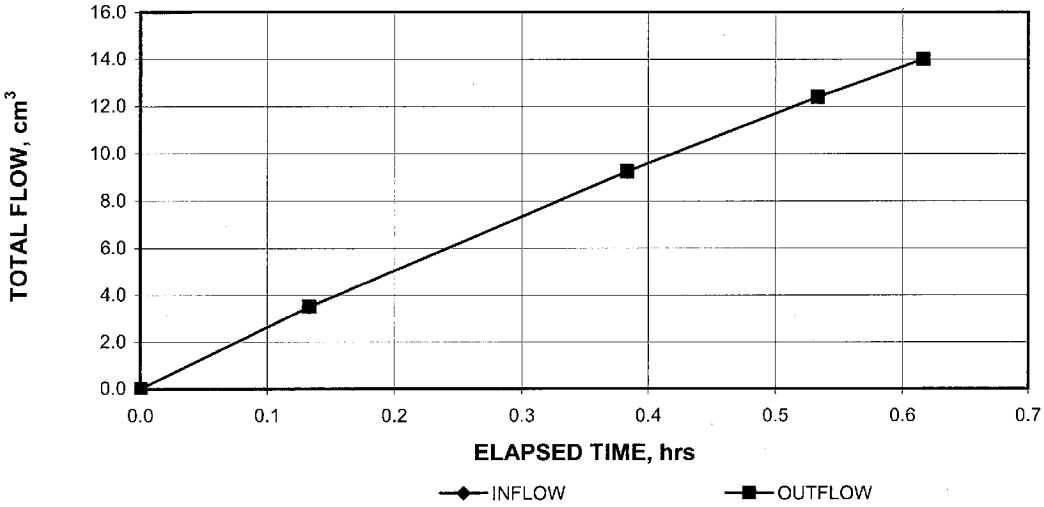
INTEGRITY IN TESTING

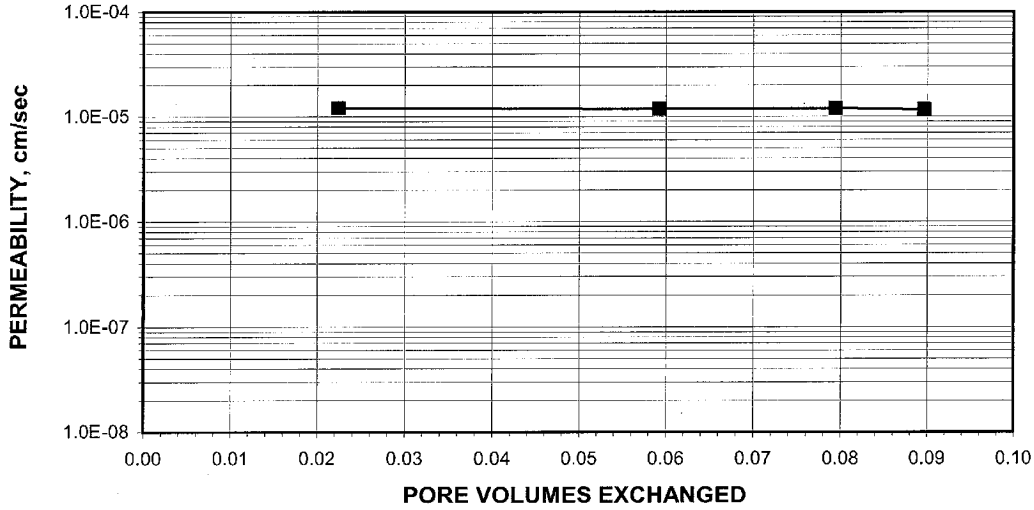
Client	MESCO	Boring No.	P2-7
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	15-17.25
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-01		

AVERAGE PERMEABILITY = 1.2E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.2E-07 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 9/17/2008 Checked By: GEM Date: 9-18-08

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
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INTEGRITY IN TESTING

Client	MESCO	Boring No.	P2-7
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	15-17.25
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-01		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: LIGHT BROWN SILTY SAND

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	6	A-1
Wt. of Tare & WS (gm.)	165.32	474.69
Wt. of Tare & DS (gm.)	137.11	382.49
Wt. of Tare (gm.)	36.85	97.86
Wt. of Water (gm.)	28.21	92.20
Wt. of DS (gm.)	100.26	284.63
Moisture Content (%)	**28.1**	**32.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	616.02	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	616.02	636.48
Length 1 (in.)	3.200	3.161
Length 2 (in.)	3.228	3.210
Length 3 (in.)	3.214	3.203
Top Diameter (in.)	2.855	2.858
Middle Diameter (in.)	2.851	2.853
Bottom Diameter (in.)	2.869	2.847
Average Length (in.)	3.21	3.19
Average Area (in.^{2})	6.42	6.39
Sample Volume (cm^3)	337.96	334.25
Unit Wet Wt. (gm./ cm^3)	1.82	1.90
Unit Wet Wt. (pcf)	113.8	118.9
Unit Dry Wt. (pcf)	88.8	89.8
Unit Dry Wt. (gm./ cm^3)	1.42	1.44
Void Ratio, e	0.90	0.88
Porosity, n	0.47	0.47
Pore Volume (cm^3)	159.9	156.2
Total Wgt. Of Sample After Test		626.7

Tested By: TMS Date: 9/17/08 Checked By: [illegible] Date: 10-7-08

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	MESCO	Boring No.	P2-7
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	15-17.25
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-01		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	28.8	Sample Length (cm), L	8.11
Bottom Cap (psi)	30.0	Sample Diameter (cm)	7.25
Cell (psi)	35.0	Sample Area (cm^2), A	41.23
Total Pressure Head (cm)	84.4	Inflow Burette Area (cm^2), a-in	0.877
Hydraulic Gradient	10.41	Outflow Burette Area (cm^2), a-out	0.886
		B Parameter (%)	95

AVERAGE PERMEABILITY = 1.2E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.2E-07 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/17/2008	11	16	0.0	0.0	0.0	110.4	0	24.1	NA
9/17/2008	11	24	0.1	3.5	3.5	102.5	0	24.1	1.2E-05
9/17/2008	11	39	0.4	9.3	9.3	89.6	0	24.1	1.2E-05
9/17/2008	11	48	0.5	12.4	12.4	82.6	0	24.1	1.2E-05
9/17/2008	11	53	0.6	14.0	14.0	79.0	1	24.1	1.2E-05

Tested By: TMS Date: 9/17/2008 Checked By: GEM Date: 9-18-08

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
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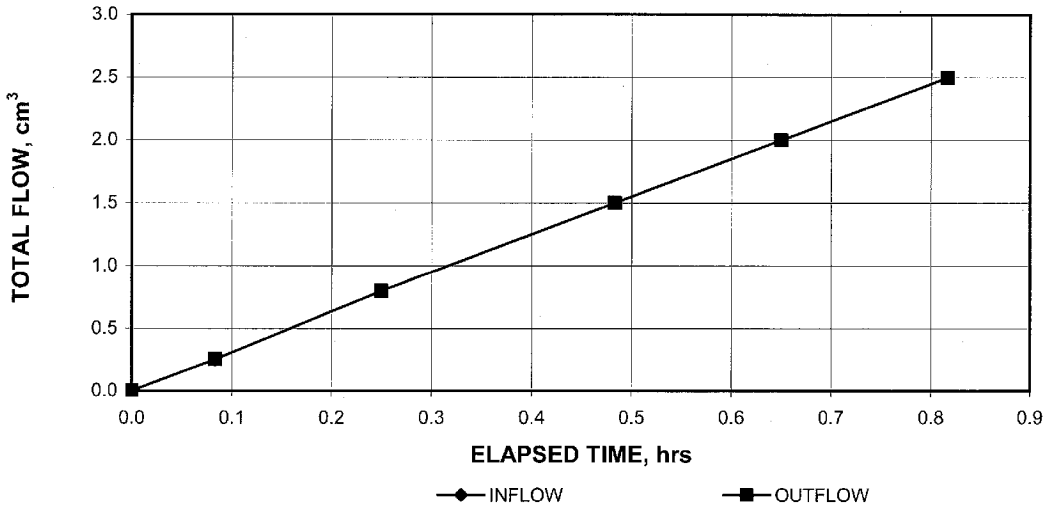
INTEGRITY IN TESTING

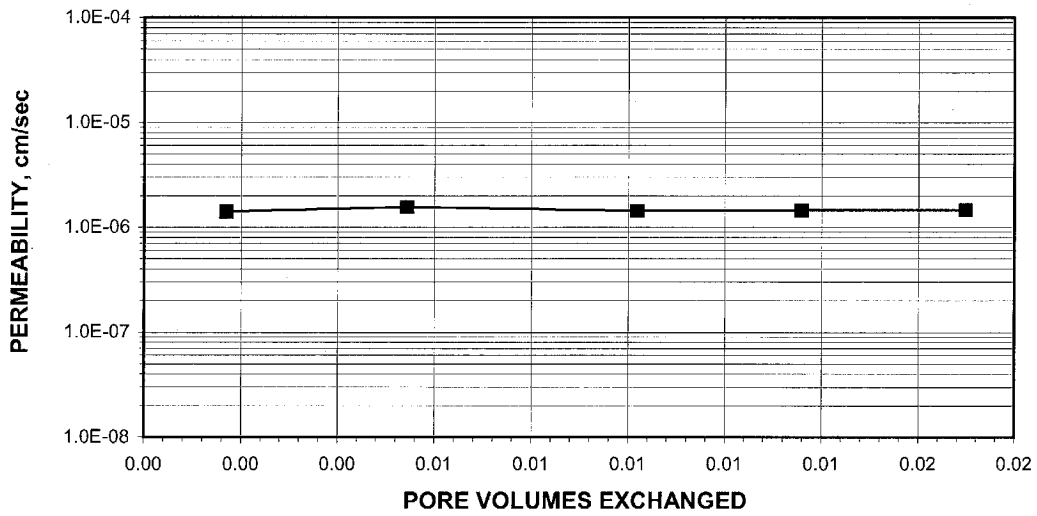
Client	MESCO	Boring No.	P2-11D
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	12.85-13.52
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-02		

AVERAGE PERMEABILITY = 1.5E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.5E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 9/16/2008 Checked By: GEM Date: 9-17-08

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	MESCO	Boring No.	P2-11D
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	12.85-13.52
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-02		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: BROWN/GRAY CLAYEY SAND

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	B-4	SS-4
Wt. of Tare & WS (gm.)	541.16	304.88
Wt. of Tare & DS (gm.)	445.37	269.94
Wt. of Tare (gm.)	98.75	100.14
Wt. of Water (gm.)	95.79	34.94
Wt. of DS (gm.)	346.62	169.80
Moisture Content (%)	**27.6**	**20.6**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	749.20	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	749.20	707.77
Length 1 (in.)	3.526	3.457
Length 2 (in.)	3.538	3.506
Length 3 (in.)	3.531	3.474
Top Diameter (in.)	2.853	2.849
Middle Diameter (in.)	2.863	2.842
Bottom Diameter (in.)	2.864	2.870
Average Length (in.)	3.53	3.48
Average Area (in.^{2})	6.42	6.40
Sample Volume (cm^3)	371.79	364.63
Unit Wet Wt. (gm./ cm^3)	2.02	1.94
Unit Wet Wt. (pcf)	125.8	121.2
Unit Dry Wt. (pcf)	98.6	100.5
Unit Dry Wt. (gm./ cm^3)	1.58	1.61
Void Ratio, e	0.71	0.68
Porosity, n	0.42	0.40
Pore Volume (cm^3)	154.4	147.2
Total Wgt. Of Sample After Test		762.2

Tested By: TMS Date: 9/16/2008 Checked By: GJM Date: 9-17-08

Page 2 of 3 DCN: CT-22 DATE: 01-08-99 REVISION:2 \\Server\c\2008 PROJECTS\2008-629 MESCO\[2008-629-01-02 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

Client	MESCO	Boring No.	P2-11D
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	12.85-13.52
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-02		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	38.7	Sample Length (cm), L	8.84
Bottom Cap (psi)	40.0	Sample Diameter (cm)	7.25
Cell (psi)	45.0	Sample Area (cm^2), A	41.26
Total Pressure Head (cm)	91.4	Inflow Burette Area (cm^2), a-in	0.852
Hydraulic Gradient	10.34	Outflow Burette Area (cm^2), a-out	0.972
		B Parameter (%)	95

AVERAGE PERMEABILITY = 1.5E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.5E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/16/2008	14	46	0.0	0.0	0.0	118.2	0	22.6	NA
9/16/2008	14	51	0.1	0.3	0.3	117.6	0	22.6	1.4E-06
9/16/2008	15	1	0.3	0.8	0.8	116.4	0	22.8	1.6E-06
9/16/2008	15	15	0.5	1.5	1.5	114.9	0	22.9	1.4E-06
9/16/2008	15	25	0.6	2.0	2.0	113.8	0	22.9	1.4E-06
9/16/2008	15	35	0.8	2.5	2.5	112.7	1	23.0	1.5E-06

Tested By: TMS Date: 9/16/2008 Checked By: GEM Date: 9-17-08

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PERMEABILITY TEST

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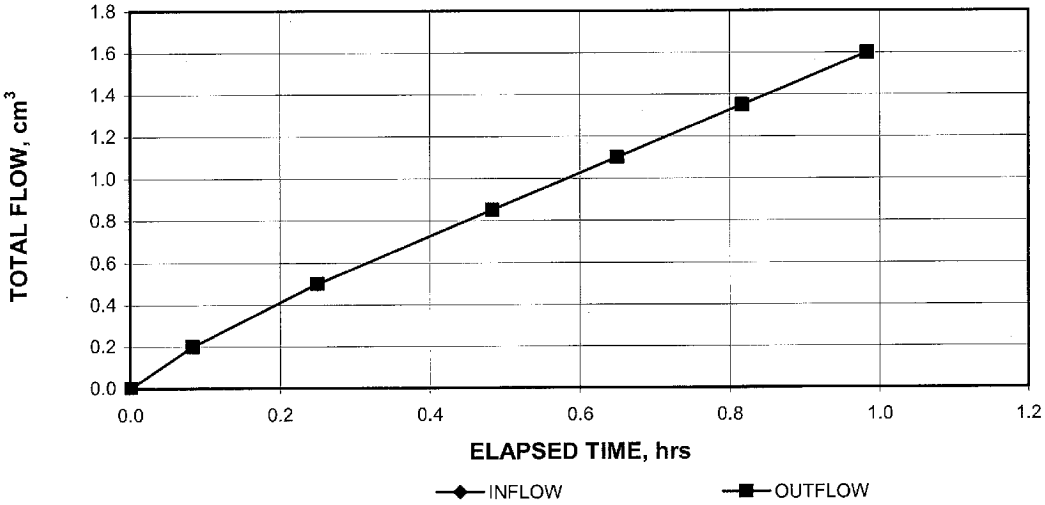
geotechnics
INTEGRITY IN TESTING

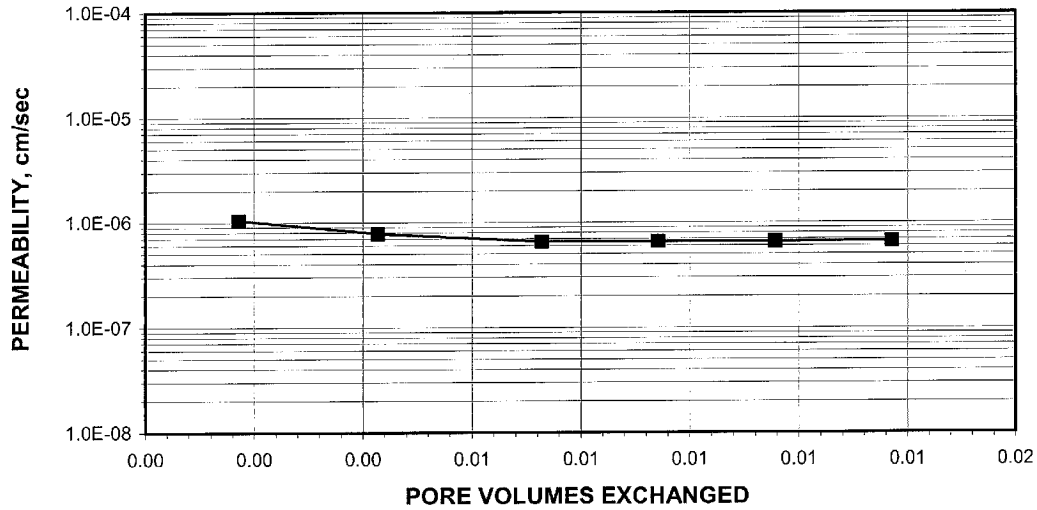
Client	MESCO	Boring No.	P2-2
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	5-5.67
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-04		

AVERAGE PERMEABILITY = 6.6E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 6.6E-09 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 9/16/2008 Checked By: GEM Date: 9-17-08

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geotechnics
INTEGRITY IN TESTING

Client	MESCO	Boring No.	P2-2
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	5-5.67
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-04		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: ORANGE CLAYEY SAND

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	887	B-1
Wt. of Tare & WS (gm.)	571.49	468.85
Wt. of Tare & DS (gm.)	499.63	412.08
Wt. of Tare (gm.)	98.59	100.85
Wt. of Water (gm.)	71.86	56.77
Wt. of DS (gm.)	401.04	311.23
Moisture Content (%)	**17.9**	**18.2**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	664.93	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	664.93	666.75
Length 1 (in.)	3.118	3.112
Length 2 (in.)	3.128	3.103
Length 3 (in.)	3.117	3.104
Top Diameter (in.)	2.847	2.855
Middle Diameter (in.)	2.844	2.862
Bottom Diameter (in.)	2.840	2.844
Average Length (in.)	3.12	3.11
Average Area (in.^{2})	6.35	6.40
Sample Volume (cm^3)	324.82	325.57
Unit Wet Wt. (gm./ cm^3)	2.05	2.05
Unit Wet Wt. (pcf)	127.8	127.8
Unit Dry Wt. (pcf)	108.4	108.1
Unit Dry Wt. (gm./ cm^3)	1.74	1.73
Void Ratio, e	0.56	0.56
Porosity, n	0.36	0.36
Pore Volume (cm^3)	116.0	116.7
Total Wgt. Of Sample After Test		675.2

Tested By: TMS Date: 9/16/2008 Checked By: GEM Date: 9-17-08

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geotechnics
INTEGRITY IN TESTING

Client	MESCO	Boring No.	P2-2
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	5-5.67
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-04		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	38.7	Sample Length (cm), L	7.89
Bottom Cap (psi)	40.0	Sample Diameter (cm)	7.25
Cell (psi)	45.0	Sample Area (cm^2), A	41.26
Total Pressure Head (cm)	91.4	Inflow Burette Area (cm^2), a-in	0.977
Hydraulic Gradient	11.58	Outflow Burette Area (cm^2), a-out	0.868
		B Parameter (%)	95

AVERAGE PERMEABILITY = 6.6E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 6.6E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/16/2008	14	47	0.0	0.0	0.0	115.2	0	22.6	NA
9/16/2008	14	52	0.1	0.2	0.2	114.7	0	22.6	1.0E-06
9/16/2008	15	2	0.3	0.5	0.5	114.1	0	22.8	7.8E-07
9/16/2008	15	16	0.5	0.9	0.9	113.3	0	22.9	6.5E-07
9/16/2008	15	26	0.7	1.1	1.1	112.8	0	23.0	6.6E-07
9/16/2008	15	36	0.8	1.4	1.4	112.2	0	23.0	6.6E-07
9/16/2008	15	46	1.0	1.6	1.6	111.7	1	23.0	6.6E-07

Tested By: TMS Date: 9/16/2008 Checked By: GEM Date: 9-17-08

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
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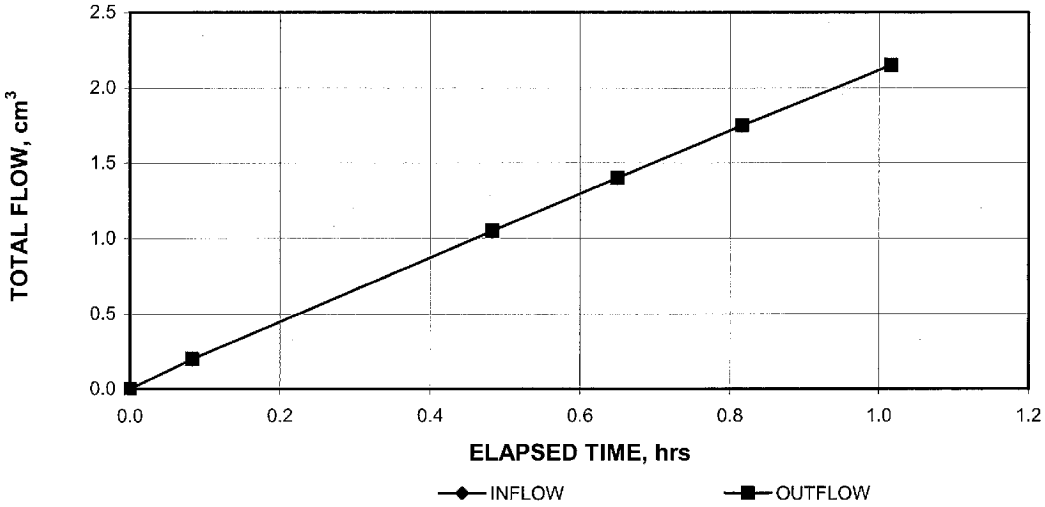
geotechnics
INTEGRITY IN TESTING

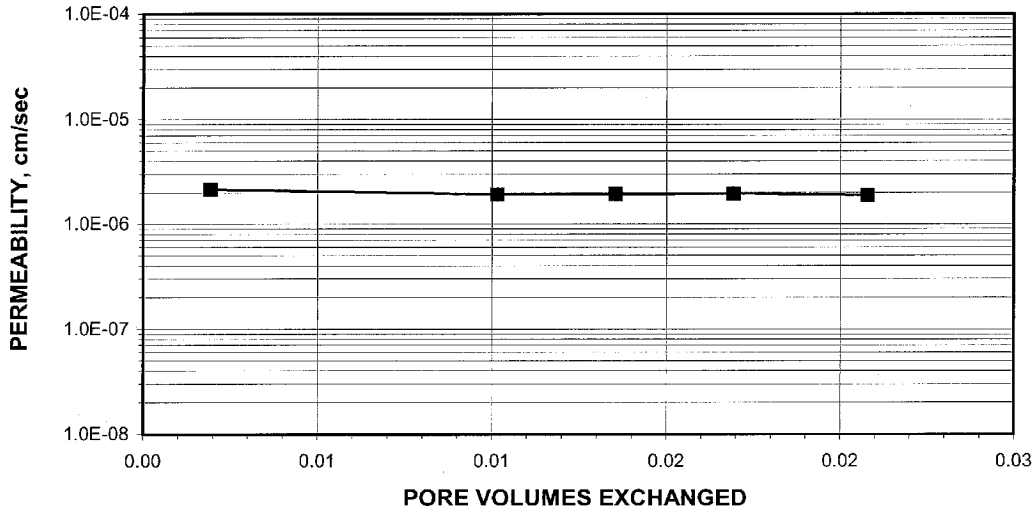
Client	MESCO	Boring No.	P2-10
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	6-6.5
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-05		

AVERAGE PERMEABILITY = 1.9E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.9E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 9/16/2008 Checked By: GEM Date: 9-18-08

DCN: CT-22 DATE: 01-08-99 REVISION: 2 [illegible]c:\2008 PROJECTS\2008-629 MESCO\[2008-629-01-05 GM PERM.xls]Sheet1

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PERMEABILITY TEST

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geotechnics
INTEGRITY IN TESTING

Client	MESCO	Boring No.	P2-10
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	6-6.5
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-05		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: ORANGE CLAYEY SAND

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	A-5	Y-11
Wt. of Tare & WS (gm.)	282.34	405.26
Wt. of Tare & DS (gm.)	269.72	372.08
Wt. of Tare (gm.)	98.87	98.75
Wt. of Water (gm.)	12.62	33.18
Wt. of DS (gm.)	170.85	273.33
Moisture Content (%)	**7.4**	**12.1**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	816.63	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	816.63	852.77
Length 1 (in.)	3.796	3.749
Length 2 (in.)	3.823	3.753
Length 3 (in.)	3.790	3.782
Top Diameter (in.)	2.838	2.839
Middle Diameter (in.)	2.834	2.807
Bottom Diameter (in.)	2.836	2.815
Average Length (in.)	3.80	3.76
Average Area (in.^{2})	6.32	6.25
Sample Volume (cm^3)	393.67	385.06
Unit Wet Wt. (gm./ cm^3)	2.07	2.21
Unit Wet Wt. (pcf)	129.5	138.2
Unit Dry Wt. (pcf)	120.6	123.3
Unit Dry Wt. (gm./ cm^3)	1.93	1.97
Void Ratio, e	0.40	0.37
Porosity, n	0.28	0.27
Pore Volume (cm^3)	112.0	103.4
Total Wgt. Of Sample After Test		844.1

Tested By: TMS Date: 9/16/08 Checked By: [illegible] Date: 10-7-08

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PERMEABILITY TEST

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(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

Client	MESCO	Boring No.	P2-10
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	6-6.5
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-05		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	49.4	Sample Length (cm), L	9.55
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.16
Cell (psi)	55.0	Sample Area (cm^2), A	40.30
Total Pressure Head (cm)	42.2	Inflow Burette Area (cm^2), a-in	0.878
Hydraulic Gradient	4.42	Outflow Burette Area (cm^2), a-out	0.871
		B Parameter (%)	97

AVERAGE PERMEABILITY = 1.9E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.9E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/16/2008	14	45	0.0	0.0	0.0	68.4	0	22.6	NA
9/16/2008	14	50	0.1	0.2	0.2	68.0	0	22.6	2.1E-06
9/16/2008	15	14	0.5	1.1	1.1	66.1	0	22.9	1.9E-06
9/16/2008	15	24	0.7	1.4	1.4	65.3	0	22.9	1.9E-06
9/16/2008	15	34	0.8	1.8	1.8	64.5	0	23.0	1.9E-06
9/16/2008	15	46	1.0	2.2	2.2	63.6	1	23.0	1.9E-06

Tested By: TMS Date: 9/16/2008 Checked By: GEM Date: 9-18-08

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PERMEABILITY TEST

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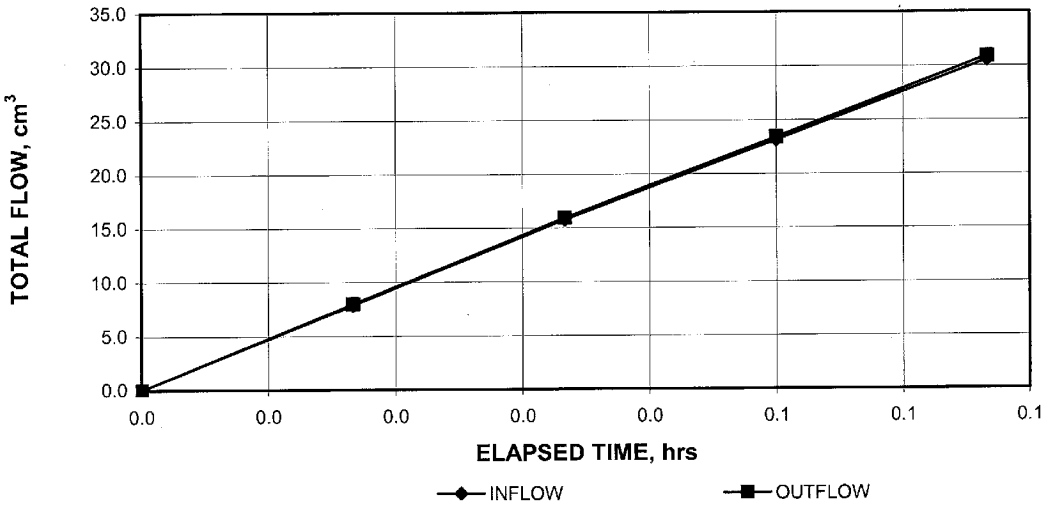
INTEGRITY IN TESTING

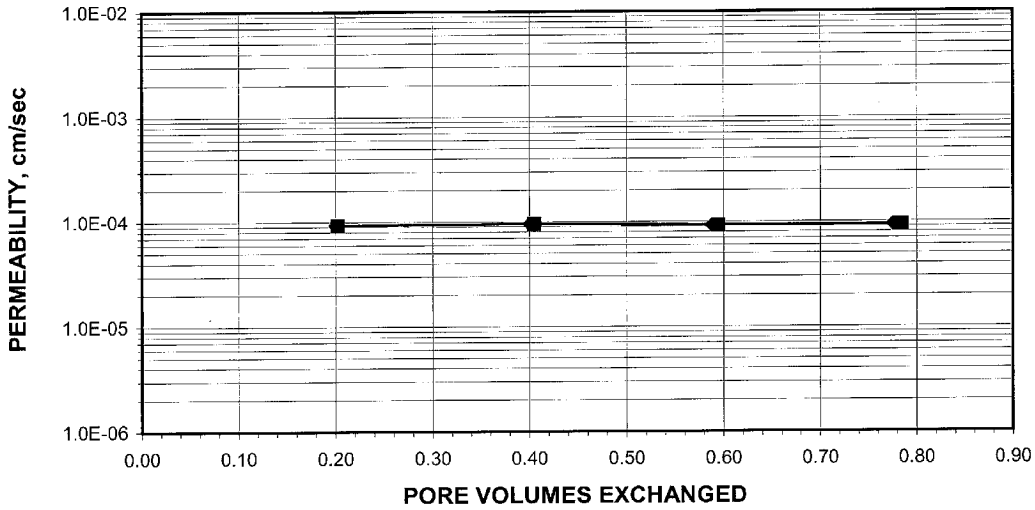
Client	MESCO	Boring No.	P2-4
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	12-12.67
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-06		

AVERAGE PERMEABILITY = 9.3E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 9.3E-07 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 9/16/2008 Checked By: GEM Date: 9-18-08

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PERMEABILITY TEST

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geotechnics
INTEGRITY IN TESTING

Client	MESCO	Boring No.	P2-4
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	12-12.67
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-06		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: TAN SILTY SAND

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	A-1	Y-1
Wt. of Tare & WS (gm.)	445.00	439.55
Wt. of Tare & DS (gm.)	434.30	398.59
Wt. of Tare (gm.)	97.85	98.31
Wt. of Water (gm.)	10.70	40.96
Wt. of DS (gm.)	336.45	300.28
Moisture Content (%)	**3.2**	**13.6**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	328.56	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	328.56	361.87
Length 1 (in.)	1.505	1.523
Length 2 (in.)	1.475	1.473
Length 3 (in.)	1.529	1.511
Top Diameter (in.)	2.816	2.856
Middle Diameter (in.)	2.821	2.865
Bottom Diameter (in.)	2.818	2.836
Average Length (in.)	1.50	1.50
Average Area (in.^{2})	6.24	6.39
Sample Volume (cm^3)	153.65	157.31
Unit Wet Wt. (gm./ cm^3)	2.14	2.30
Unit Wet Wt. (pcf)	133.5	143.6
Unit Dry Wt. (pcf)	129.4	126.4
Unit Dry Wt. (gm./ cm^3)	2.07	2.02
Void Ratio, e	0.30	0.33
Porosity, n	0.23	0.25
Pore Volume (cm^3)	35.7	39.4
Total Wgt. Of Sample After Test		341.6

Tested By: TMS Date: 9/16/08 Checked By: MMS Date: 10-7-08

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geotechnics
INTEGRITY IN TESTING

Client	MESCO	Boring No.	P2-4
Client Project	LENOIR CO. SUB. D LF PH.2	Depth (ft.)	12-12.67
Project No.	2008-629-01	Sample No.	NA
Lab ID No.	2008-629-01-06		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.5	Sample Length (cm), L	3.82
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.24
Cell (psi)	55.0	Sample Area (cm^2), A	41.22
Total Pressure Head (cm)	105.5	Inflow Burette Area (cm^2), a-in	4.730
Hydraulic Gradient	27.64	Outflow Burette Area (cm^2), a-out	4.899
		B Parameter (%)	95

AVERAGE PERMEABILITY = 9.3E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 9.3E-07 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/16/2008	14	40	0.0	0.0	0.0	125.1	0	22.6	NA
9/16/2008	14	41	0.0	7.9	8.0	121.8	0	22.6	9.3E-05
9/16/2008	14	42	0.0	15.8	15.9	118.5	0	22.9	9.5E-05
9/16/2008	14	43	0.1	23.2	23.4	115.4	0	22.9	9.1E-05
9/16/2008	14	44	0.1	30.6	30.9	112.3	1	23.0	9.4E-05

Tested By: TMS Date: 9/16/2008 Checked By: GEM Date: 9-18-08

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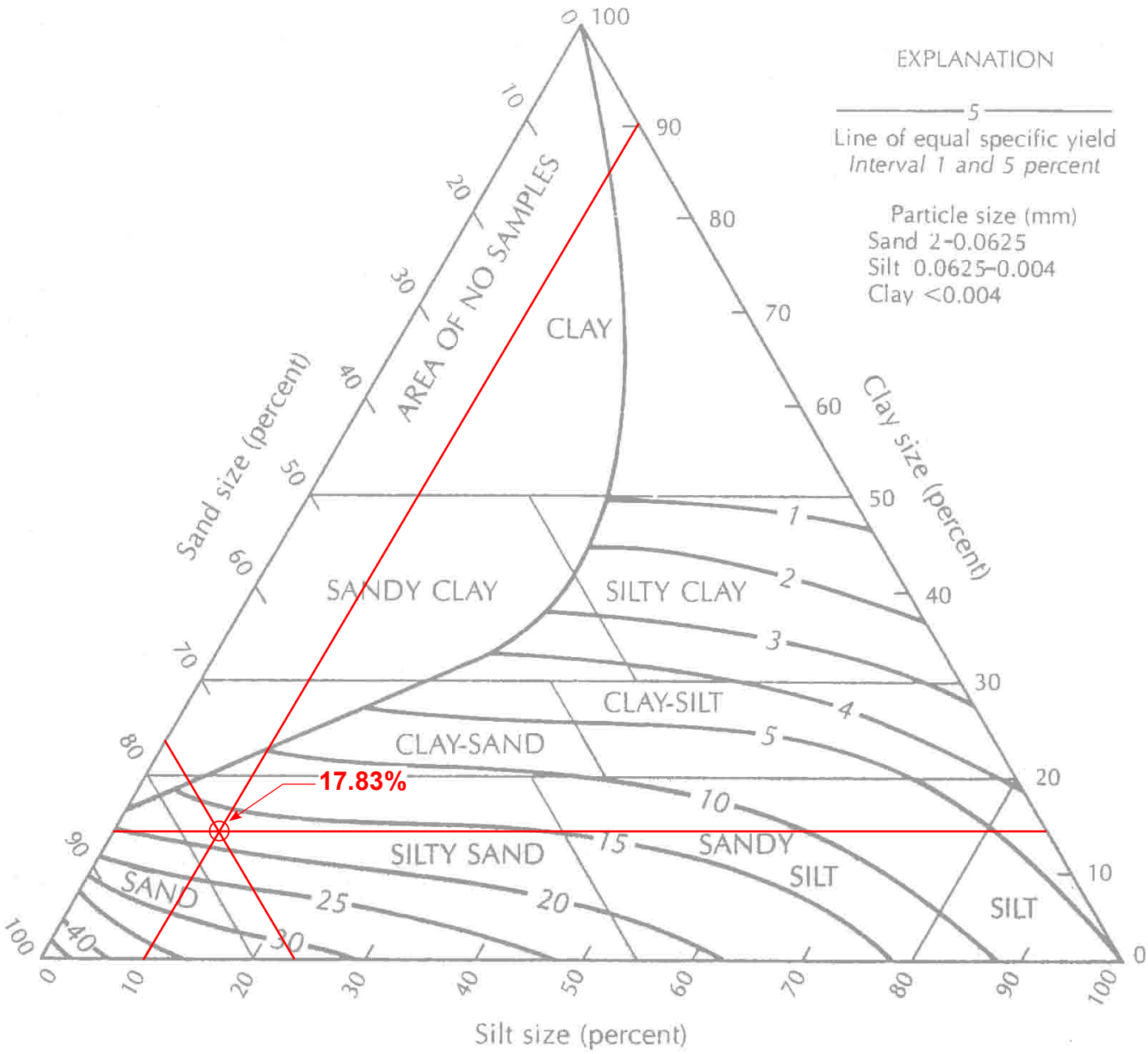
Figure B-1: Calculation of effective porosity from re-calculated grain size distribution, P2-2 5-5.67'



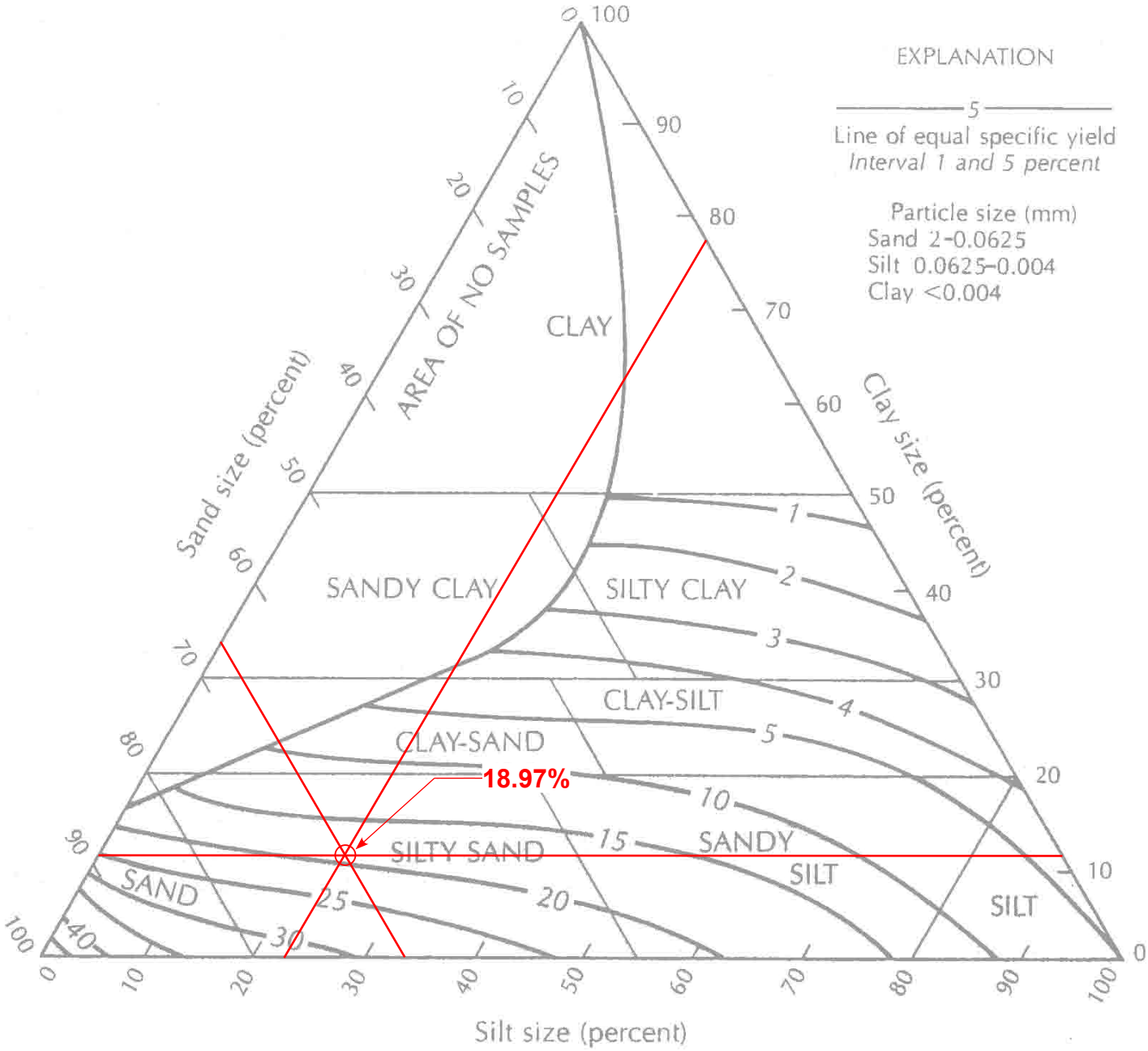
P2-2 5-5.67'

Soil Type	Proportion (%)
Sand	76.1%
Silt	10.0%
Clay	14.0%

AGU Soil Classification
Silty Sand

Effective Porosity
n_e=17.83%

Figure B-2: Calculation of effective porosity from re-calculated grain size distribution, P2-4 12-12.67'



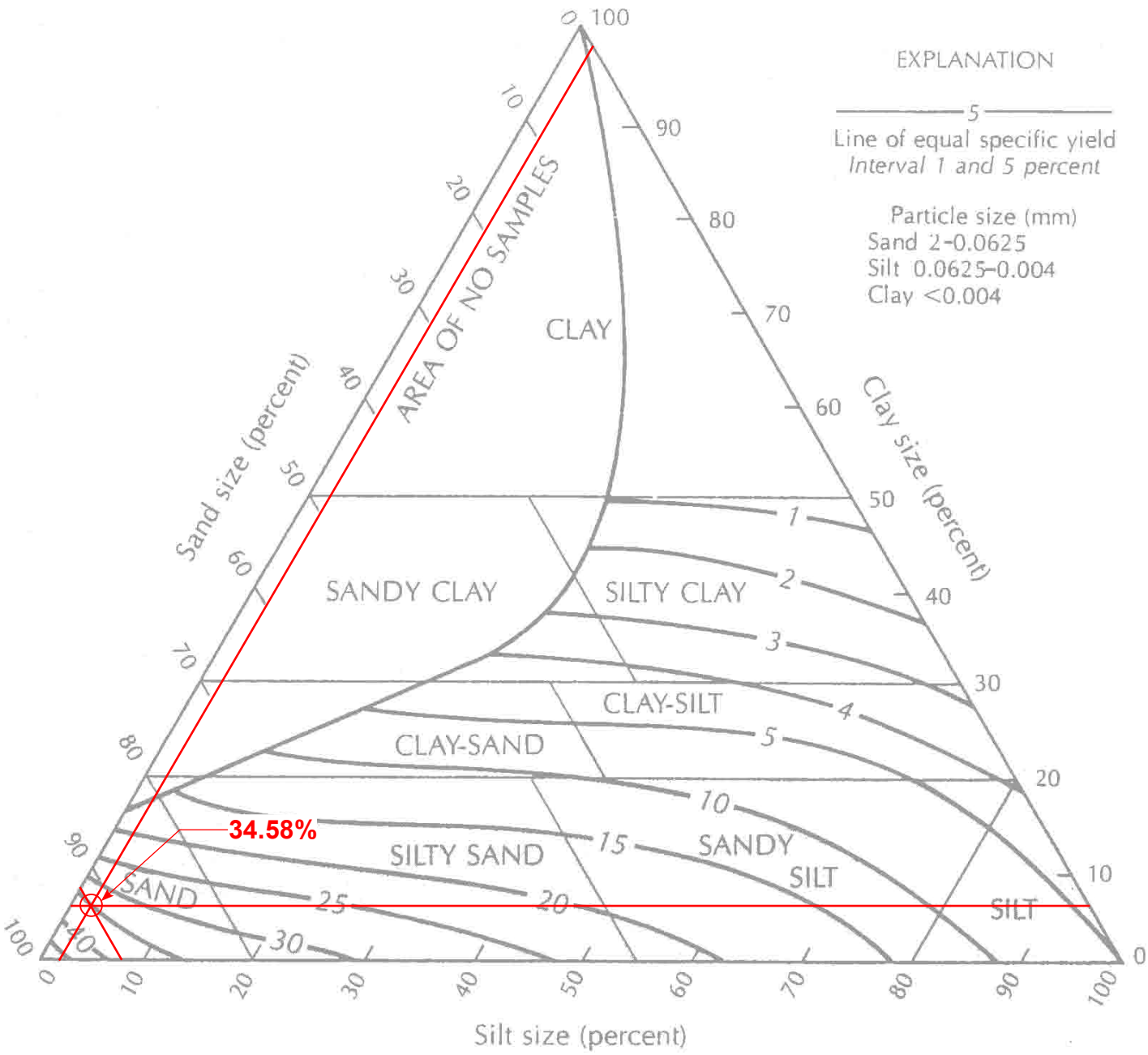
P2-4 12-12.67'

Soil Type	Proportion (%)
Sand	66.6%
Silt	22.3%
Clay	11.1%

AGU Soil Classification
Silty Sand

Effective Porosity
n_e=18.97%

Figure B-3: Calculation of effective porosity from re-calculated grain size distribution, P2-4 25'



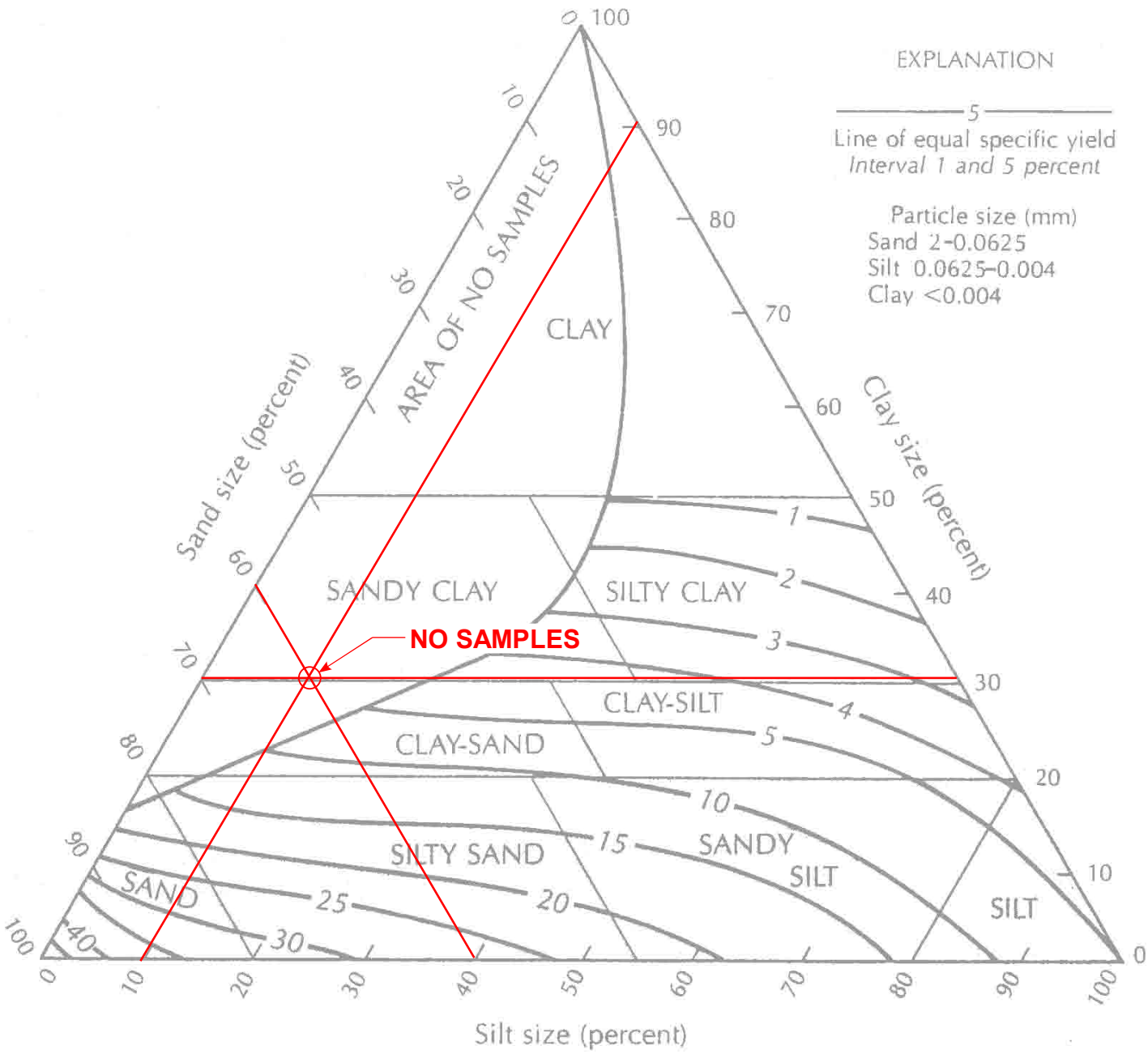
P2-4 25'

Soil Type	Proportion (%)
Sand	92.1%
Silt	1.3%
Clay	6.6%

AGU Soil Classification
Sand

Effective Porosity
n_e=34.58%

Figure B-4: Calculation of effective porosity from re-calculated grain size distribution, P2-7 15-17.25'



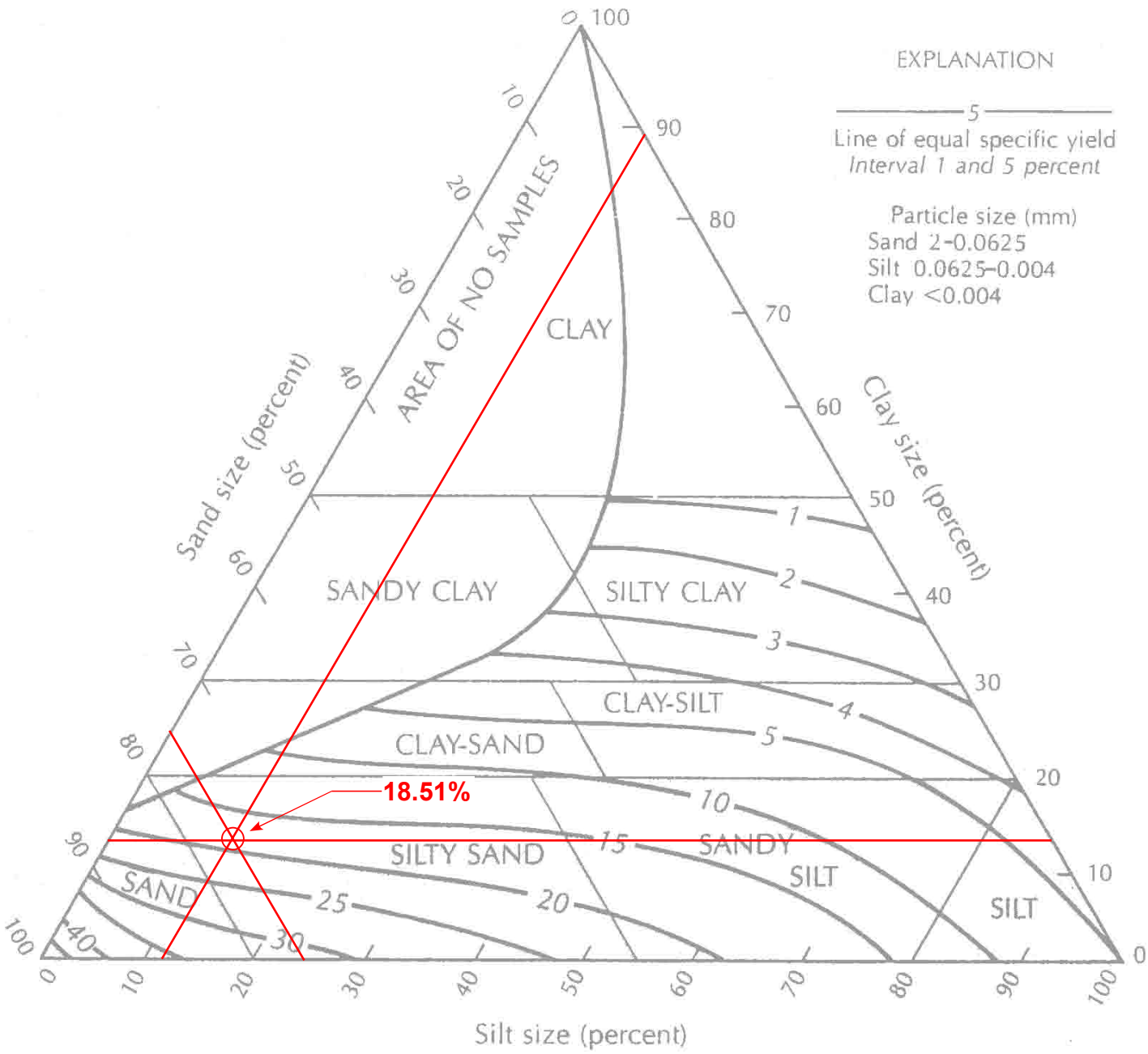
P2-7 15-17.25'

Soil Type	Proportion (%)
Sand	60.0%
Silt	9.4%
Clay	30.6%

AGU Soil Classification
Sandy Clay

Effective Porosity
N/A

Figure B-5: Calculation of effective porosity from re-calculated grain size distribution, P2-10 6-6.5'



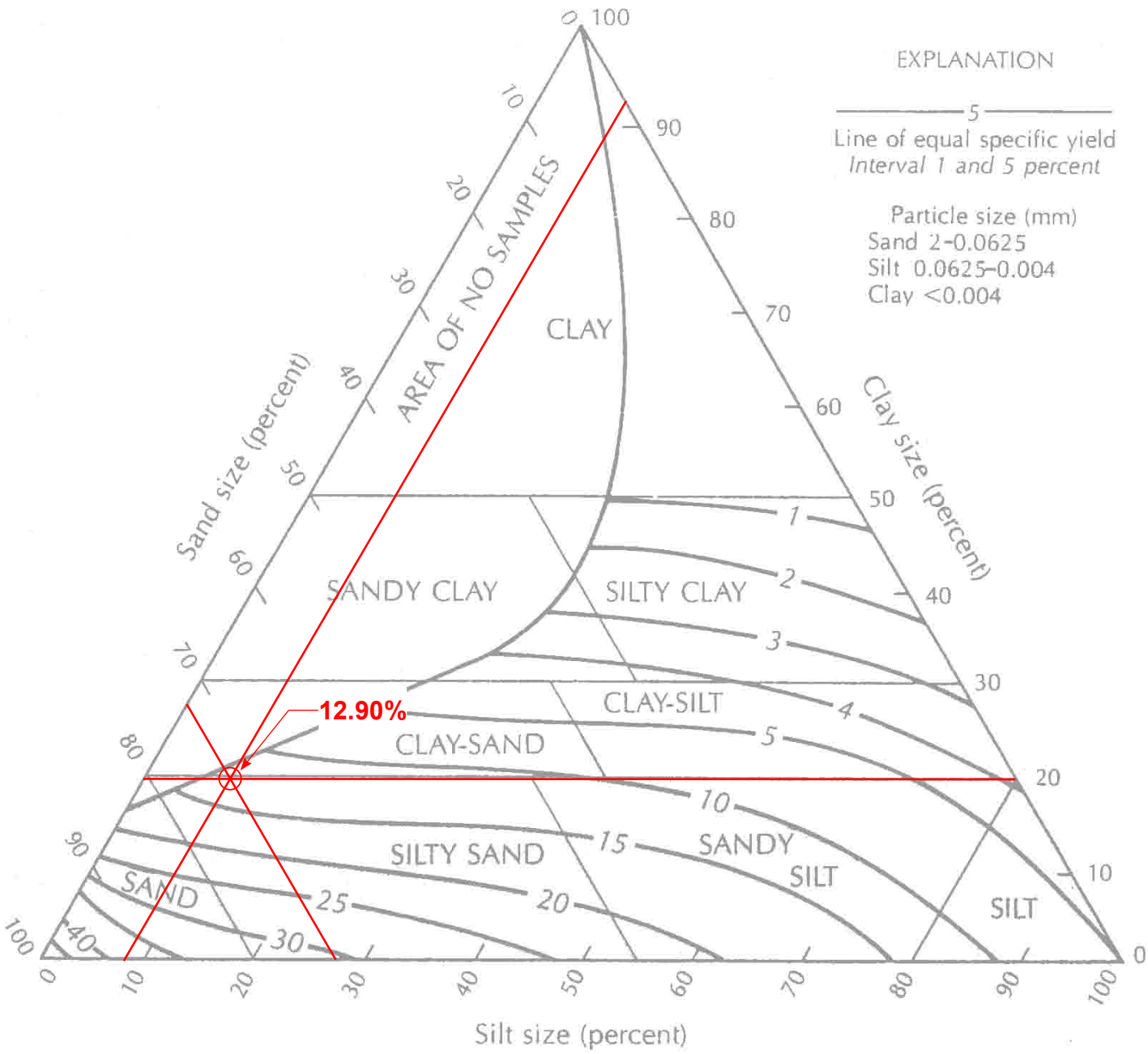
P2-10 6-6.5'

Soil Type	Proportion (%)
Sand	75.1%
Silt	11.6%
Clay	13.2%

AGU Soil Classification
Silty Sand

Effective Porosity
n_e=18.51%

Figure B-6: Calculation of effective porosity from re-calculated grain size distribution, P2-11D 12.85-13.52'



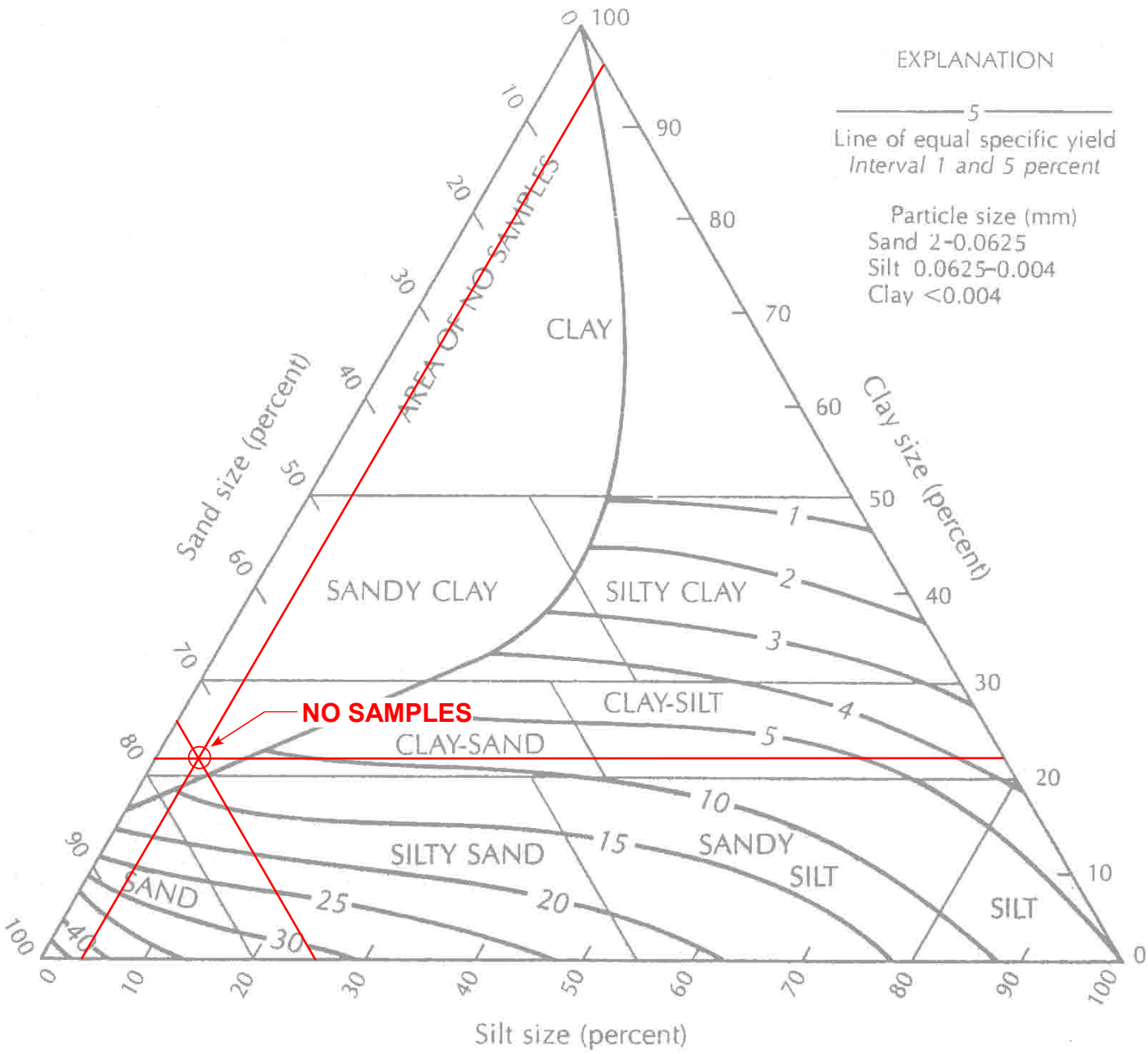
P2-11D 12.85-13.52'

Soil Type	Proportion (%)
Sand	72.6%
Silt	7.8%
Clay	19.6%

AGU Soil Classification
Silty Sand

Effective Porosity
n_e=12.90%

Figure B-7: Calculation of effective porosity from re-calculated grain size distribution, P2-11D 44'



P2-11D 44'

Soil Type	Proportion (%)
Sand	74.5%
Silt	3.4%
Clay	22.2%

AGU Soil Classification
Clay-Sand

Effective Porosity
N/A

APPENDIX C

Table C-1: Slug Test Summary

Well	Test Date	Initial Head Change (ft)	Depth to Top of Sand Pack (ft) BTOP	Depth to Top of Screen (ft) BTOP	Initial Depth to Water (ft) BTOP	K (cm/sec)	Displacement Method	Lithology
P2-1	09/10/2009	5.11	18.12	19.38	25.64	3.01E-04	Pump	Clayey Sand
P2-2	09/10/2009	4.51	16.85	18.26	24.69	4.21E-04	Pump	Silty Sand
P2-3	09/10/2009	1.46	20.59	21.88	27.43	7.60E-03	Pump	Silty Sand
P2-4	09/10/2009	3.80	20.61	21.73	30.63	1.91E-03	Pump	Silty Sand
P2-5S	09/10/2009	2.51	21.60	22.89	26.45	1.16E-03	Pump	Silty Sand
P2-5D	09/10/2009	4.19	47.57	48.72	26.51	2.25E-05	Injection	Clayey Sand
P2-6	09/10/2009	1.95	16.37	17.44	21.63	3.54E-03	Pump	Silty Sand
P2-7	09/10/2009	4.27	12.50	13.81	16.00	6.53E-04	Pump	Silty Sand
P2-8	09/10/2009	5.86	17.15	18.22	19.65	3.31E-04	Pump	Silty Sand
P2-9	09/10/2009	3.51	20.16	21.30	27.38	2.39E-04	Pump	Silty Sand
P2-10	09/10/2009	0.99	13.21	14.32	17.04	2.15E-03	Pump	Silty Sand
P2-11S	09/10/2009	5.14	16.36	17.62	17.20	7.43E-04	Pump	Silty Sand
P2-11D	09/10/2009	3.16	41.40	42.77	19.71	1.22E-03	Injection	Clayey Sand
P2-12	09/10/2009	3.96	11.88	13.00	14.96	3.04E-03	Pump	Silty Sand

Summary Statistics			
Mean	1.67E-3	Minimum	2.25E-5
Median	9.52E-4	Maximum	7.60E-3
Standard Deviation	2.02E-3	Count	14
Silty Sand			
Mean	1.98E-3	Minimum	2.39E-4
Median	1.16E-3	Maximum	7.60E-3
Standard Deviation	2.18E-3	Count	11
Clayey Sand			
Mean	5.15E-4	Minimum	2.25E-5
Median	3.01E-4	Maximum	1.22E-3
Standard Deviation	6.27E-4	Count	3

NOTES:

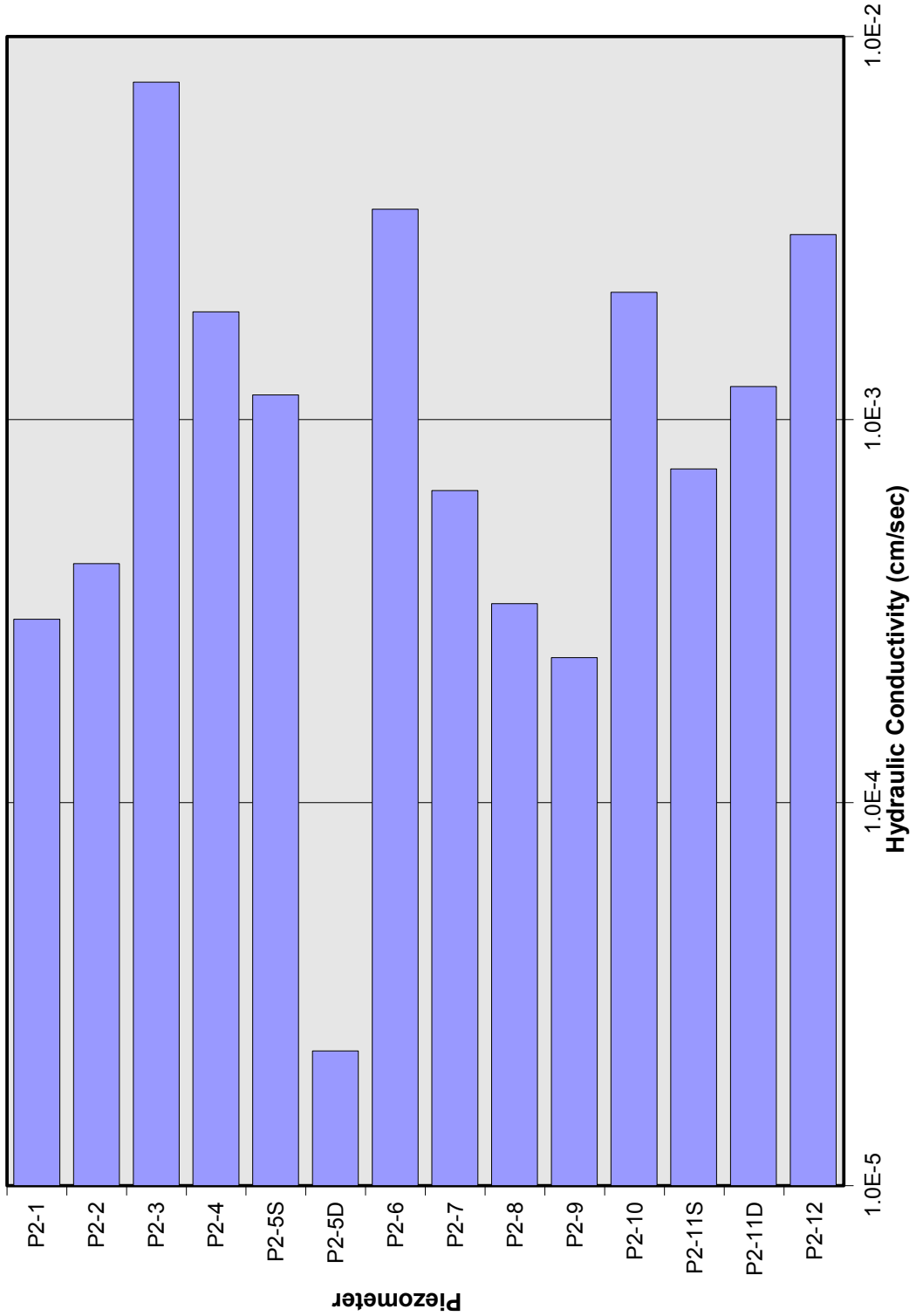
1. The Bouwer & Rice method was used for slug test calculations (see Section 4.4 for details of this method).

2. Initial head change refers to the maximum displacement from the initial static water level caused by prior pump pumping, injection, or other method to perturb the initial condition.

3. The value of K represents th hydraulic condictivity derived from slug test data. All slug test data are included in this appendix.

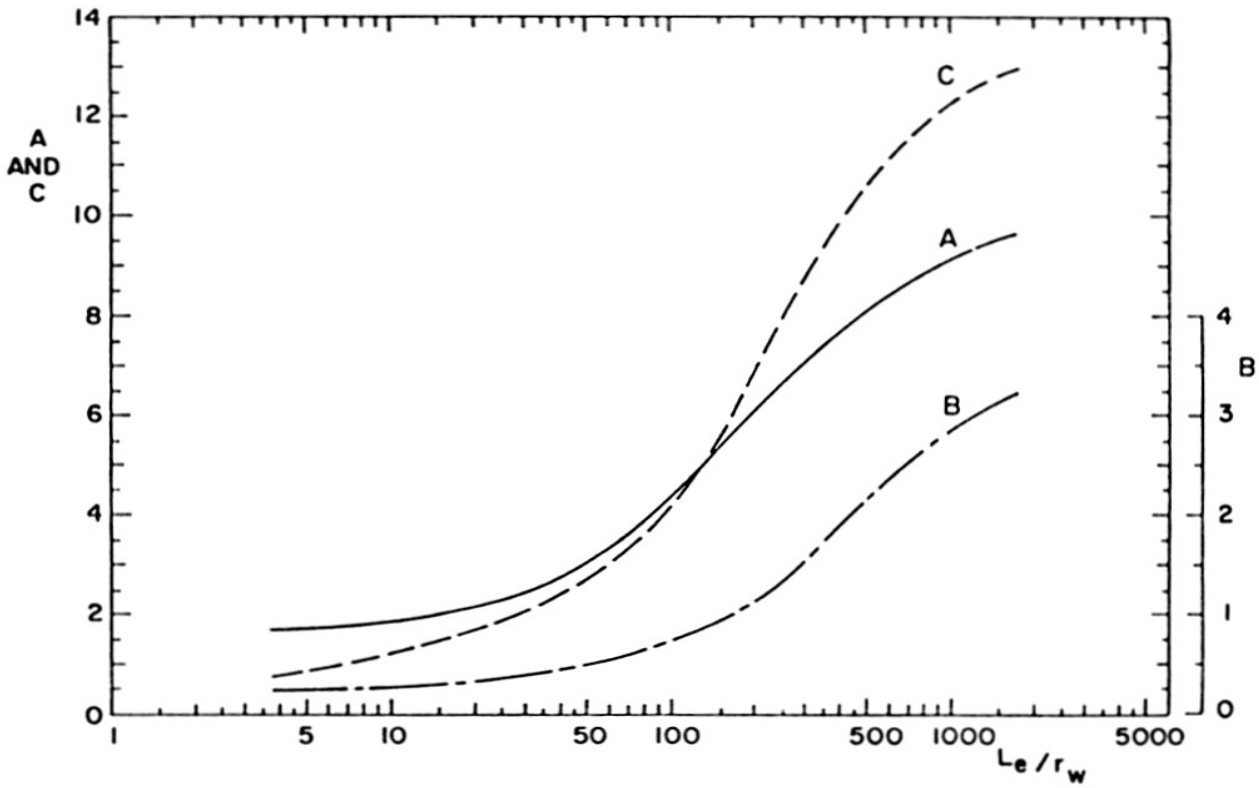
4. The *Lithology* column gives a description of the dominant soil type within the perforated secton of the piezometer.

5. Water was displaced by pumping, injection of water, or removal of slug to create an initial head change. The *Displacement Method* column indicates which method was used for a given piezometer.



Graph C-1: Slug Test Summary

Figure C-1: Bouwer & Rice shape curve depicting empirical relationships between parameters *A, B* and *C*, and L_e/r_w (excerpted from Bouwer, 1989)



While the relationships presented in the above graph are derived via electrical resistance network simulations, they can be approximated by the following expressions that were determined by regression analysis. Let $X = \mathrm{Log}(L_e/r_w)$, then

$A = \begin{cases} \\ \\ \end{cases}$	$1.638445671 + 0.166908063X + 0.000740459e^{6.1710528X - 1.054747686X^2}$	$(X < 2.554422663)$
	$11.00393028 - 170.7752217e^{-1.509639982X}$	$(X \geq 2.554422663)$

$B = \begin{cases} \\ \\ \end{cases}$	$0.174811819 + 0.060059188X + 0.007965502e^{2.05337686X - 0.007790328X^2}$	$(X < 2.596774459)$
	$4.133124586 - 93.06136936e^{-1.43537099X}$	$(X \geq 2.596774459)$

$C = \begin{cases} \\ \\ \end{cases}$	$0.074711376 + 1.083958569X + 0.00557352e^{2.929493814X - 0.001028433X^2}$	$(X < 2.200426117)$
	$15.66887372 - 178.4329289e^{-1.322779744X}$	$(X \geq 2.200426117)$

These approximation formulae were developed by Karl DeBisschop, and can be found on the internet at http://hydrotools.sourceforge.net. For the purpose of our slug test analysis, the numerical approximations of the shape factors (A, B and C) were used instead of their graphical counterparts in order to achieve data consistency and to minimize potential introductions of errors. Refer to Section 4.4.2 for detailed description of the slug test method.

Slug Test P2-1

Initial offset in logger reading (feet):	-0.140	Date:	09/10/2009
Offset increment in logger reading (feet/sec):	0.000112		
Initial depth to water table (feet):	25.64		
Depth of probe below water table (feet):	5.568		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 13:56:55	50215.0	0.0	0.38	0.454	5.114	0.70873
9/10/2009 13:56:56	50216.0	1.0	0.44	0.517	5.051	0.70335
9/10/2009 13:56:57	50217.0	2.0	0.50	0.577	4.991	0.69817
9/10/2009 13:56:58	50218.5	3.5	0.57	0.640	4.928	0.69267
9/10/2009 13:57:01	50221.0	6.0	0.63	0.708	4.859	0.68657
9/10/2009 13:57:04	50224.0	9.0	0.70	0.769	4.799	0.68111
9/10/2009 13:57:07	50227.0	12.0	0.76	0.830	4.738	0.67559
9/10/2009 13:57:10	50230.0	15.0	0.81	0.887	4.680	0.67027
9/10/2009 13:57:13	50233.0	18.0	0.87	0.944	4.624	0.66498
9/10/2009 13:57:16	50236.5	21.5	0.93	1.005	4.563	0.65925
9/10/2009 13:57:19	50239.5	24.5	0.99	1.057	4.510	0.65421
9/10/2009 13:57:23	50243.5	28.5	1.04	1.111	4.457	0.64902
9/10/2009 13:57:28	50248.5	33.5	1.09	1.164	4.403	0.64378
9/10/2009 13:57:36	50256.5	41.5	1.15	1.218	4.349	0.63842
9/10/2009 13:57:42	50262.5	47.5	1.20	1.271	4.297	0.63316
9/10/2009 13:57:47	50267.0	52.0	1.25	1.321	4.246	0.62803
9/10/2009 13:57:51	50271.5	56.5	1.30	1.371	4.197	0.62293
9/10/2009 13:57:57	50277.0	62.0	1.35	1.422	4.146	0.61758
9/10/2009 13:58:03	50283.5	68.5	1.41	1.476	4.091	0.61186
9/10/2009 13:58:09	50289.5	74.5	1.46	1.528	4.040	0.60638
9/10/2009 13:58:15	50295.0	80.0	1.51	1.575	3.993	0.60125
9/10/2009 13:58:21	50301.0	86.0	1.56	1.626	3.941	0.59564
9/10/2009 13:58:27	50307.0	92.0	1.61	1.672	3.896	0.59061
9/10/2009 13:58:32	50312.0	97.0	1.66	1.720	3.848	0.58518
9/10/2009 13:58:37	50317.0	102.0	1.70	1.765	3.803	0.58013
9/10/2009 13:58:42	50322.0	107.0	1.75	1.812	3.756	0.57468
9/10/2009 13:58:47	50327.0	112.0	1.80	1.858	3.710	0.56940
9/10/2009 13:58:52	50332.5	117.5	1.85	1.907	3.661	0.56358
9/10/2009 13:58:57	50337.5	122.5	1.89	1.949	3.618	0.55851
9/10/2009 13:59:02	50342.5	127.5	1.93	1.993	3.575	0.55327
9/10/2009 13:59:07	50347.0	132.0	1.97	2.034	3.533	0.54820
9/10/2009 13:59:12	50352.5	137.5	2.02	2.082	3.486	0.54233
9/10/2009 13:59:17	50357.5	142.5	2.07	2.125	3.443	0.53689
9/10/2009 13:59:22	50362.5	147.5	2.11	2.167	3.401	0.53163
9/10/2009 13:59:27	50367.5	152.5	2.15	2.207	3.361	0.52644
9/10/2009 13:59:33	50373.0	158.0	2.19	2.250	3.317	0.52079
9/10/2009 13:59:38	50378.5	163.5	2.24	2.293	3.275	0.51521
9/10/2009 13:59:44	50384.0	169.0	2.28	2.334	3.234	0.50969
9/10/2009 13:59:49	50389.5	174.5	2.32	2.375	3.193	0.50423
9/10/2009 13:59:54	50394.5	179.5	2.36	2.412	3.156	0.49911
9/10/2009 13:59:59	50399.5	184.5	2.40	2.450	3.117	0.49378
9/10/2009 14:00:05	50405.5	190.5	2.44	2.490	3.078	0.48827
9/10/2009 14:00:12	50412.0	197.0	2.47	2.526	3.042	0.48312
9/10/2009 14:00:18	50418.5	203.5	2.51	2.561	3.006	0.47806

Slug Test P2-1

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 14:00:25	50425.5	210.5	2.55	2.597	2.970	0.47280
9/10/2009 14:00:32	50432.5	217.5	2.58	2.632	2.936	0.46776
9/10/2009 14:00:39	50439.5	224.5	2.62	2.667	2.901	0.46252
9/10/2009 14:00:46	50446.0	231.0	2.65	2.703	2.865	0.45706
9/10/2009 14:00:52	50452.0	237.0	2.69	2.737	2.830	0.45183
9/10/2009 14:00:57	50457.5	242.5	2.73	2.773	2.795	0.44636
9/10/2009 14:01:03	50463.5	248.5	2.76	2.805	2.763	0.44131
9/10/2009 14:01:10	50470.5	255.5	2.79	2.837	2.730	0.43622
9/10/2009 14:01:18	50478.0	263.0	2.82	2.870	2.698	0.43107
9/10/2009 14:01:25	50485.5	270.5	2.86	2.902	2.666	0.42586
9/10/2009 14:01:33	50493.0	278.0	2.89	2.934	2.634	0.42059
9/10/2009 14:01:40	50500.5	285.5	2.93	2.970	2.598	0.41459
9/10/2009 14:01:47	50507.5	292.5	2.96	3.001	2.566	0.40934
9/10/2009 14:01:54	50514.0	299.0	2.99	3.032	2.536	0.40419
9/10/2009 14:01:59	50519.5	304.5	3.02	3.062	2.506	0.39895
9/10/2009 14:02:01	50521.0	306.0	3.05	3.091	2.477	0.39393
9/10/2009 14:02:03	50523.0	308.0	3.09	3.126	2.442	0.38779
9/10/2009 14:02:05	50525.0	310.0	3.11	3.154	2.413	0.38264
9/10/2009 14:02:09	50529.0	314.0	3.15	3.186	2.382	0.37693
9/10/2009 14:02:18	50538.5	323.5	3.18	3.214	2.354	0.37180
9/10/2009 14:02:23	50543.0	328.0	3.21	3.244	2.323	0.36614
9/10/2009 14:02:27	50547.5	332.5	3.24	3.277	2.291	0.36002
9/10/2009 14:02:30	50550.0	335.0	3.27	3.305	2.262	0.35455
9/10/2009 14:02:32	50552.0	337.0	3.30	3.332	2.236	0.34937
9/10/2009 14:02:34	50554.0	339.0	3.32	3.359	2.209	0.34414
9/10/2009 14:02:36	50556.0	341.0	3.35	3.386	2.182	0.33884
9/10/2009 14:02:38	50558.0	343.0	3.38	3.415	2.153	0.33308
9/10/2009 14:02:39	50559.5	344.5	3.40	3.439	2.128	0.32804
9/10/2009 14:02:41	50561.5	346.5	3.43	3.468	2.100	0.32213
9/10/2009 14:02:43	50563.5	348.5	3.46	3.500	2.068	0.31551
9/10/2009 14:02:45	50565.5	350.5	3.50	3.533	2.035	0.30857
9/10/2009 14:02:48	50568.0	353.0	3.52	3.557	2.010	0.30326
9/10/2009 14:02:52	50572.0	357.0	3.55	3.582	1.986	0.29792
9/10/2009 14:02:58	50578.5	363.5	3.57	3.606	1.961	0.29258
9/10/2009 14:03:06	50586.5	371.5	3.60	3.629	1.938	0.28744
9/10/2009 14:03:10	50590.5	375.5	3.62	3.652	1.916	0.28236
9/10/2009 14:03:16	50596.0	381.0	3.64	3.674	1.893	0.27725
9/10/2009 14:03:21	50601.5	386.5	3.67	3.701	1.867	0.27116
9/10/2009 14:03:25	50605.0	390.0	3.69	3.723	1.844	0.26587
9/10/2009 14:03:31	50611.5	396.5	3.72	3.746	1.822	0.26059
9/10/2009 14:03:37	50617.5	402.5	3.74	3.767	1.801	0.25548
9/10/2009 14:03:45	50625.5	410.5	3.76	3.790	1.778	0.24988
9/10/2009 14:03:53	50633.0	418.0	3.78	3.811	1.757	0.24468
9/10/2009 14:04:01	50641.5	426.5	3.81	3.832	1.736	0.23944
9/10/2009 14:04:10	50650.5	435.5	3.83	3.852	1.716	0.23441
9/10/2009 14:04:18	50658.0	443.0	3.85	3.872	1.695	0.22928
9/10/2009 14:04:26	50666.5	451.5	3.87	3.892	1.675	0.22411
9/10/2009 14:04:35	50675.0	460.0	3.89	3.912	1.655	0.21889
9/10/2009 14:04:43	50683.5	468.5	3.91	3.931	1.636	0.21386

Slug Test P2-1

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 14:04:51	50691.5	476.5	3.93	3.952	1.616	0.20849
9/10/2009 14:05:00	50700.0	485.0	3.95	3.972	1.596	0.20307
9/10/2009 14:05:08	50708.0	493.0	3.97	3.992	1.576	0.19757
9/10/2009 14:05:16	50716.0	501.0	3.99	4.011	1.557	0.19227
9/10/2009 14:05:23	50723.0	508.0	4.01	4.029	1.539	0.18716
9/10/2009 14:05:30	50730.0	515.0	4.03	4.047	1.521	0.18199
9/10/2009 14:05:37	50737.0	522.0	4.05	4.067	1.500	0.17618
9/10/2009 14:05:43	50743.5	528.5	4.07	4.085	1.483	0.17115
9/10/2009 14:05:51	50751.0	536.0	4.09	4.103	1.465	0.16580
9/10/2009 14:05:59	50759.0	544.0	4.11	4.125	1.443	0.15920
9/10/2009 14:06:06	50766.0	551.0	4.13	4.143	1.425	0.15368
9/10/2009 14:06:12	50772.5	557.5	4.15	4.162	1.405	0.14777
9/10/2009 14:06:19	50779.0	564.0	4.17	4.179	1.389	0.14271
9/10/2009 14:06:25	50785.0	570.0	4.18	4.195	1.373	0.13758
9/10/2009 14:06:32	50792.0	577.0	4.20	4.212	1.355	0.13210
9/10/2009 14:06:37	50797.5	582.5	4.22	4.229	1.339	0.12682
9/10/2009 14:06:45	50805.0	590.0	4.24	4.247	1.321	0.12089
9/10/2009 14:06:50	50810.5	595.5	4.25	4.262	1.306	0.11580
9/10/2009 14:06:56	50816.5	601.5	4.27	4.278	1.289	0.11034
9/10/2009 14:07:02	50822.5	607.5	4.29	4.294	1.274	0.10515
9/10/2009 14:07:10	50830.0	615.0	4.30	4.310	1.258	0.09960
9/10/2009 14:07:14	50834.5	619.5	4.32	4.324	1.243	0.09457
9/10/2009 14:07:21	50841.0	626.0	4.34	4.340	1.228	0.08920
9/10/2009 14:07:26	50846.5	631.5	4.35	4.354	1.214	0.08409
9/10/2009 14:07:33	50853.0	638.0	4.37	4.369	1.198	0.07859
9/10/2009 14:07:39	50859.5	644.5	4.38	4.384	1.184	0.07339
9/10/2009 14:07:46	50866.0	651.0	4.40	4.399	1.169	0.06775
9/10/2009 14:07:51	50871.0	656.0	4.41	4.413	1.154	0.06235
9/10/2009 14:07:56	50876.5	661.5	4.43	4.428	1.140	0.05691
9/10/2009 14:08:01	50881.5	666.5	4.44	4.441	1.127	0.05176
9/10/2009 14:08:06	50886.5	671.5	4.46	4.456	1.112	0.04616
9/10/2009 14:08:11	50891.5	676.5	4.47	4.469	1.099	0.04088
9/10/2009 14:08:17	50897.0	682.0	4.49	4.483	1.084	0.03515
9/10/2009 14:08:24	50904.0	689.0	4.50	4.499	1.069	0.02902
9/10/2009 14:08:28	50908.5	693.5	4.51	4.511	1.057	0.02391
9/10/2009 14:08:34	50914.5	699.5	4.53	4.524	1.043	0.01840
9/10/2009 14:08:40	50920.0	705.0	4.54	4.537	1.031	0.01322
9/10/2009 14:08:46	50926.5	711.5	4.56	4.550	1.018	0.00759
9/10/2009 14:08:52	50932.5	717.5	4.57	4.562	1.005	0.00230
9/10/2009 14:08:59	50939.5	724.5	4.58	4.576	0.992	-0.00345
9/10/2009 14:09:05	50945.5	730.5	4.60	4.588	0.980	-0.00888
9/10/2009 14:09:13	50953.0	738.0	4.61	4.601	0.967	-0.01475
9/10/2009 14:09:19	50959.5	744.5	4.62	4.613	0.954	-0.02030
9/10/2009 14:09:26	50966.5	751.5	4.63	4.625	0.943	-0.02543
9/10/2009 14:09:33	50973.5	758.5	4.65	4.637	0.931	-0.03109
9/10/2009 14:09:41	50981.0	766.0	4.66	4.648	0.920	-0.03633
9/10/2009 14:09:47	50987.5	772.5	4.67	4.660	0.907	-0.04216
9/10/2009 14:09:55	50995.5	780.5	4.68	4.671	0.896	-0.04750
9/10/2009 14:10:02	51002.5	787.5	4.70	4.684	0.884	-0.05346

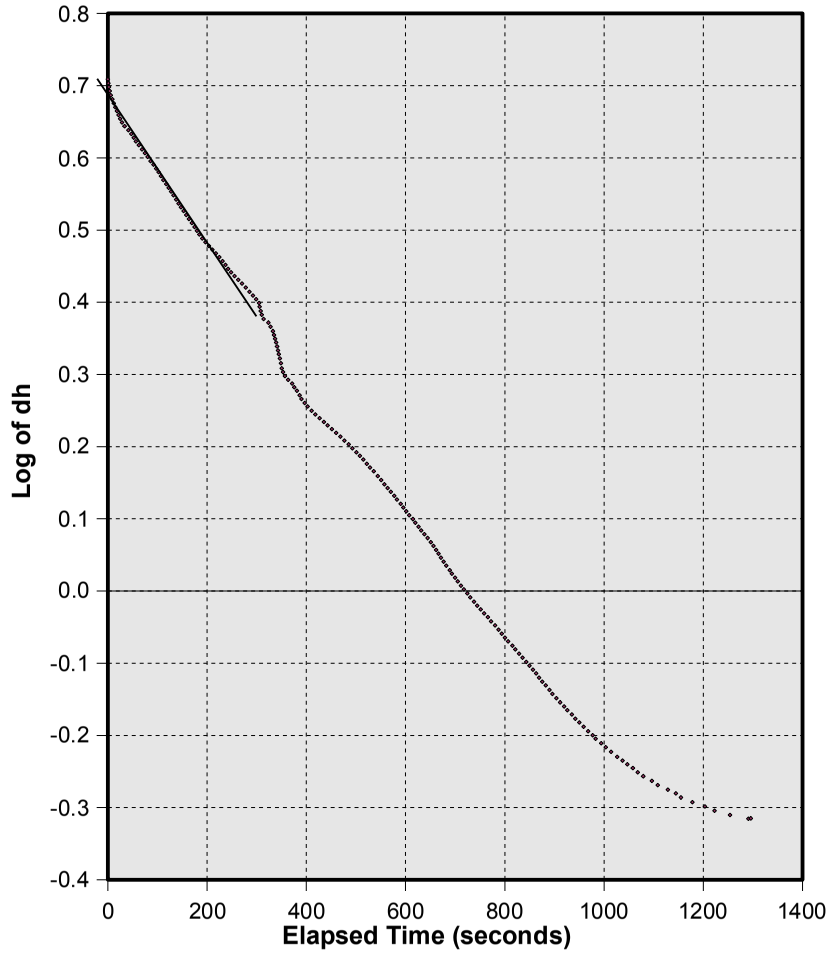
Slug Test P2-1

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 14:10:09	51009.0	794.0	4.71	4.695	0.873	-0.05903
9/10/2009 14:10:15	51015.5	800.5	4.72	4.706	0.862	-0.06467
9/10/2009 14:10:22	51022.0	807.0	4.73	4.716	0.851	-0.06988
9/10/2009 14:10:30	51030.5	815.5	4.74	4.727	0.840	-0.07555
9/10/2009 14:10:36	51036.5	821.5	4.76	4.738	0.830	-0.08092
9/10/2009 14:10:43	51043.5	828.5	4.77	4.749	0.819	-0.08683
9/10/2009 14:10:50	51050.5	835.5	4.78	4.759	0.809	-0.09228
9/10/2009 14:10:58	51058.0	843.0	4.79	4.770	0.797	-0.09831
9/10/2009 14:11:04	51064.5	849.5	4.80	4.780	0.788	-0.10339
9/10/2009 14:11:11	51071.5	856.5	4.81	4.790	0.778	-0.10905
9/10/2009 14:11:18	51078.0	863.0	4.82	4.799	0.769	-0.11426
9/10/2009 14:11:24	51084.0	869.0	4.83	4.809	0.758	-0.12013
9/10/2009 14:11:30	51090.5	875.5	4.84	4.819	0.749	-0.12547
9/10/2009 14:11:37	51097.5	882.5	4.85	4.828	0.740	-0.13085
9/10/2009 14:11:45	51105.0	890.0	4.86	4.838	0.730	-0.13685
9/10/2009 14:11:51	51111.0	896.0	4.87	4.847	0.720	-0.14244
9/10/2009 14:11:59	51119.0	904.0	4.88	4.857	0.710	-0.14857
9/10/2009 14:12:06	51126.5	911.5	4.89	4.867	0.701	-0.15420
9/10/2009 14:12:14	51134.5	919.5	4.90	4.876	0.692	-0.15988
9/10/2009 14:12:21	51141.0	926.0	4.91	4.884	0.684	-0.16510
9/10/2009 14:12:30	51150.0	935.0	4.92	4.893	0.675	-0.17084
9/10/2009 14:12:37	51157.0	942.0	4.93	4.902	0.666	-0.17681
9/10/2009 14:12:45	51165.0	950.0	4.94	4.910	0.657	-0.18213
9/10/2009 14:12:54	51174.0	959.0	4.95	4.919	0.648	-0.18811
9/10/2009 14:13:03	51183.0	968.0	4.96	4.928	0.639	-0.19417
9/10/2009 14:13:12	51192.0	977.0	4.97	4.936	0.631	-0.19963
9/10/2009 14:13:18	51198.0	983.0	4.98	4.944	0.624	-0.20470
9/10/2009 14:13:29	51209.5	994.5	4.99	4.952	0.615	-0.21080
9/10/2009 14:13:38	51218.5	1003.5	5.00	4.960	0.607	-0.21647
9/10/2009 14:13:49	51229.0	1014.0	5.01	4.969	0.599	-0.22282
9/10/2009 14:14:01	51241.5	1026.5	5.02	4.979	0.589	-0.22984
9/10/2009 14:14:12	51252.5	1037.5	5.03	4.985	0.582	-0.23485
9/10/2009 14:14:22	51262.0	1047.0	5.04	4.992	0.575	-0.24005
9/10/2009 14:14:33	51273.0	1058.0	5.04	4.999	0.569	-0.24519
9/10/2009 14:14:43	51283.0	1068.0	5.05	5.007	0.561	-0.25124
9/10/2009 14:14:54	51294.0	1079.0	5.06	5.014	0.554	-0.25651
9/10/2009 14:15:11	51311.5	1096.5	5.07	5.022	0.546	-0.26286
9/10/2009 14:15:23	51323.0	1108.0	5.08	5.030	0.538	-0.26903
9/10/2009 14:15:43	51343.5	1128.5	5.09	5.037	0.531	-0.27528
9/10/2009 14:15:59	51359.5	1144.5	5.10	5.043	0.524	-0.28039
9/10/2009 14:16:10	51370.0	1155.0	5.11	5.050	0.518	-0.28607
9/10/2009 14:16:33	51393.0	1178.0	5.12	5.058	0.510	-0.29234
9/10/2009 14:16:58	51418.5	1203.5	5.13	5.065	0.503	-0.29845
9/10/2009 14:17:17	51437.5	1222.5	5.13	5.072	0.496	-0.30442
9/10/2009 14:17:49	51469.0	1254.0	5.14	5.078	0.490	-0.31011
9/10/2009 14:18:26	51506.0	1291.0	5.15	5.084	0.484	-0.31532
9/10/2009 14:18:30	51510.5	1295.5	5.15	5.083	0.484	-0.31486

Slug Test P2-1

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	31.52	ft
Stick up height:	2.86	ft
Depth to sand pack (BGS):	15.26	ft
Depth to screened interval (BGS):	16.52	ft
Well diameter:	2.00	in
Diameter of annular space:	7.75	in
Initial depth to water table from top of pipe:	25.64	ft
Initial Head Change:	5.11	ft
Total well length:	34.38	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.1901	ft
r_c:	0.1901	ft
Radius of gravel pack (r_w):	0.3229	ft
Screened interval:	15.00	ft
Length of open section (L_e):	8.74	ft
L_e / r_w:	27.0658	
A (dimensionless):	2.464	
B (dimensionless):	0.409	
Drawdown at time = 0 (y_0):	4.85	ft
Drawdown at time = t (y_t):	3.06	ft
Elapsed Time between y_0 and y_t (t):	187.5	sec
Initial water column in well (L_w):	8.74	ft
$\ln(R_e/r_w)$ =	1.94	
K =	9.88E-06	ft/sec
	3.01E-04	**cm/sec**
	311.59	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P2-2

Initial offset in logger reading (feet):	0.037	Date:	09/10/2009
Offset increment in logger reading (feet/sec):	0.000015		
Initial depth to water table (feet):	24.69		
Depth of probe below water table (feet):	6.370		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 15:42:49	56569.0	0.0	1.90	1.863	4.507	0.65391
9/10/2009 15:42:50	56570.5	1.5	2.00	1.960	4.410	0.64446
9/10/2009 15:42:51	56571.5	2.5	2.12	2.077	4.293	0.63278
9/10/2009 15:42:52	56572.0	3.0	2.20	2.156	4.214	0.62472
9/10/2009 15:42:52	56572.5	3.5	2.28	2.241	4.129	0.61587
9/10/2009 15:42:53	56573.0	4.0	2.37	2.330	4.040	0.60641
9/10/2009 15:42:53	56573.5	4.5	2.46	2.418	3.952	0.59685
9/10/2009 15:42:54	56574.0	5.0	2.55	2.505	3.865	0.58718
9/10/2009 15:42:54	56574.5	5.5	2.64	2.597	3.773	0.57672
9/10/2009 15:42:55	56575.0	6.0	2.73	2.689	3.681	0.56600
9/10/2009 15:42:55	56575.5	6.5	2.82	2.780	3.590	0.55513
9/10/2009 15:42:56	56576.0	7.0	2.92	2.876	3.494	0.54336
9/10/2009 15:42:56	56576.5	7.5	3.00	2.957	3.413	0.53317
9/10/2009 15:42:57	56577.0	8.0	3.08	3.034	3.336	0.52327
9/10/2009 15:42:57	56577.5	8.5	3.13	3.088	3.282	0.51618
9/10/2009 15:42:58	56578.5	9.5	3.19	3.152	3.218	0.50763
9/10/2009 15:42:59	56579.5	10.5	3.23	3.191	3.179	0.50234
9/10/2009 15:43:01	56581.0	12.0	3.28	3.236	3.133	0.49601
9/10/2009 15:43:02	56582.5	13.5	3.33	3.283	3.086	0.48945
9/10/2009 15:43:04	56584.0	15.0	3.38	3.333	3.036	0.48236
9/10/2009 15:43:05	56585.5	16.5	3.41	3.368	3.001	0.47733
9/10/2009 15:43:07	56587.5	18.5	3.45	3.409	2.960	0.47136
9/10/2009 15:43:09	56589.5	20.5	3.49	3.443	2.926	0.46635
9/10/2009 15:43:12	56592.5	23.5	3.52	3.480	2.890	0.46083
9/10/2009 15:43:16	56596.5	27.5	3.56	3.515	2.855	0.45554
9/10/2009 15:43:20	56600.0	31.0	3.60	3.553	2.817	0.44973
9/10/2009 15:43:24	56604.0	35.0	3.63	3.589	2.781	0.44415
9/10/2009 15:43:27	56607.5	38.5	3.67	3.623	2.747	0.43882
9/10/2009 15:43:31	56611.0	42.0	3.70	3.658	2.712	0.43326
9/10/2009 15:43:34	56614.5	45.5	3.73	3.690	2.680	0.42811
9/10/2009 15:43:37	56617.5	48.5	3.76	3.721	2.649	0.42307
9/10/2009 15:43:40	56620.5	51.5	3.80	3.753	2.617	0.41780
9/10/2009 15:43:44	56624.0	55.0	3.83	3.787	2.583	0.41212
9/10/2009 15:43:47	56627.0	58.0	3.86	3.818	2.552	0.40689
9/10/2009 15:43:50	56630.5	61.5	3.89	3.851	2.519	0.40124
9/10/2009 15:43:53	56633.5	64.5	3.92	3.881	2.489	0.39605
9/10/2009 15:43:57	56637.0	68.0	3.96	3.914	2.456	0.39026
9/10/2009 15:44:00	56640.5	71.5	3.99	3.946	2.424	0.38458
9/10/2009 15:44:04	56644.0	75.0	4.02	3.979	2.391	0.37863
9/10/2009 15:44:07	56647.0	78.0	4.05	4.008	2.362	0.37334
9/10/2009 15:44:10	56650.0	81.0	4.08	4.037	2.332	0.36780
9/10/2009 15:44:13	56653.0	84.0	4.11	4.064	2.305	0.36275
9/10/2009 15:44:16	56656.5	87.5	4.14	4.093	2.276	0.35726
9/10/2009 15:44:19	56659.5	90.5	4.16	4.120	2.250	0.35209

Slug Test P2-2

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 15:44:23	56663.0	94.0	4.19	4.149	2.221	0.34647
9/10/2009 15:44:26	56666.5	97.5	4.22	4.176	2.194	0.34116
9/10/2009 15:44:30	56670.0	101.0	4.25	4.205	2.165	0.33539
9/10/2009 15:44:33	56673.5	104.5	4.27	4.230	2.140	0.33036
9/10/2009 15:44:37	56677.0	108.0	4.30	4.255	2.115	0.32527
9/10/2009 15:44:40	56680.5	111.5	4.32	4.280	2.090	0.32011
9/10/2009 15:44:44	56684.0	115.0	4.35	4.305	2.065	0.31490
9/10/2009 15:44:48	56688.0	119.0	4.38	4.332	2.038	0.30919
9/10/2009 15:44:52	56692.0	123.0	4.40	4.356	2.014	0.30406
9/10/2009 15:44:55	56695.5	126.5	4.42	4.380	1.990	0.29886
9/10/2009 15:44:59	56699.0	130.0	4.45	4.403	1.967	0.29383
9/10/2009 15:45:03	56703.0	134.0	4.47	4.426	1.944	0.28873
9/10/2009 15:45:07	56707.0	138.0	4.49	4.449	1.921	0.28358
9/10/2009 15:45:11	56711.0	142.0	4.52	4.472	1.898	0.27836
9/10/2009 15:45:14	56714.5	145.5	4.54	4.495	1.875	0.27308
9/10/2009 15:45:19	56719.0	150.0	4.56	4.517	1.852	0.26773
9/10/2009 15:45:22	56722.5	153.5	4.58	4.540	1.829	0.26232
9/10/2009 15:45:26	56726.5	157.5	4.61	4.562	1.808	0.25708
9/10/2009 15:45:30	56730.5	161.5	4.63	4.584	1.786	0.25178
9/10/2009 15:45:34	56734.5	165.5	4.65	4.607	1.763	0.24616
9/10/2009 15:45:38	56738.5	169.5	4.68	4.631	1.739	0.24022
9/10/2009 15:45:43	56743.0	174.0	4.70	4.654	1.716	0.23445
9/10/2009 15:45:47	56747.0	178.0	4.72	4.675	1.695	0.22912
9/10/2009 15:45:50	56750.5	181.5	4.74	4.696	1.674	0.22372
9/10/2009 15:45:55	56755.0	186.0	4.77	4.721	1.649	0.21720
9/10/2009 15:45:59	56759.0	190.0	4.79	4.742	1.628	0.21165
9/10/2009 15:46:03	56763.0	194.0	4.81	4.761	1.609	0.20657
9/10/2009 15:46:06	56766.5	197.5	4.82	4.780	1.590	0.20142
9/10/2009 15:46:10	56770.5	201.5	4.84	4.799	1.571	0.19622
9/10/2009 15:46:14	56774.0	205.0	4.86	4.818	1.552	0.19095
9/10/2009 15:46:18	56778.5	209.5	4.88	4.837	1.533	0.18562
9/10/2009 15:46:22	56782.5	213.5	4.90	4.859	1.511	0.17936
9/10/2009 15:46:26	56786.5	217.5	4.92	4.876	1.493	0.17417
9/10/2009 15:46:30	56790.5	221.5	4.94	4.895	1.474	0.16863
9/10/2009 15:46:34	56794.5	225.5	4.96	4.913	1.457	0.16331
9/10/2009 15:46:38	56798.5	229.5	4.98	4.931	1.439	0.15793
9/10/2009 15:46:42	56802.5	233.5	4.99	4.948	1.422	0.15279
9/10/2009 15:46:46	56806.0	237.0	5.01	4.965	1.405	0.14758
9/10/2009 15:46:50	56810.0	241.0	5.03	4.982	1.388	0.14231
9/10/2009 15:46:54	56814.5	245.5	5.05	5.001	1.369	0.13634
9/10/2009 15:46:59	56819.0	250.0	5.06	5.018	1.352	0.13093
9/10/2009 15:47:03	56823.5	254.5	5.08	5.035	1.335	0.12546
9/10/2009 15:47:08	56828.0	259.0	5.10	5.051	1.319	0.12025
9/10/2009 15:47:12	56832.0	263.0	5.11	5.067	1.303	0.11496
9/10/2009 15:47:16	56836.0	267.0	5.13	5.083	1.287	0.10962
9/10/2009 15:47:21	56841.0	272.0	5.14	5.098	1.272	0.10455
9/10/2009 15:47:25	56845.0	276.0	5.16	5.113	1.257	0.09942
9/10/2009 15:47:29	56849.5	280.5	5.17	5.128	1.242	0.09423
9/10/2009 15:47:34	56854.5	285.5	5.19	5.143	1.226	0.08863

Slug Test P2-2

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 15:47:39	56859.0	290.0	5.21	5.159	1.210	0.08295
9/10/2009 15:47:44	56864.0	295.0	5.22	5.173	1.197	0.07792
9/10/2009 15:47:48	56868.5	299.5	5.23	5.188	1.182	0.07247
9/10/2009 15:47:53	56873.5	304.5	5.25	5.202	1.168	0.06732
9/10/2009 15:47:57	56877.5	308.5	5.26	5.216	1.154	0.06210
9/10/2009 15:48:03	56883.0	314.0	5.28	5.230	1.140	0.05683
9/10/2009 15:48:08	56888.0	319.0	5.29	5.245	1.125	0.05111
9/10/2009 15:48:13	56893.5	324.5	5.31	5.259	1.111	0.04570
9/10/2009 15:48:18	56898.0	329.0	5.32	5.272	1.098	0.04062
9/10/2009 15:48:22	56902.5	333.5	5.33	5.285	1.085	0.03547
9/10/2009 15:48:27	56907.0	338.0	5.34	5.298	1.072	0.03026
9/10/2009 15:48:32	56912.0	343.0	5.36	5.312	1.058	0.02458
9/10/2009 15:48:36	56916.5	347.5	5.37	5.325	1.045	0.01924
9/10/2009 15:48:42	56922.0	353.0	5.39	5.338	1.031	0.01342
9/10/2009 15:48:47	56927.0	358.0	5.40	5.351	1.018	0.00794
9/10/2009 15:48:51	56931.0	362.0	5.41	5.363	1.007	0.00282
9/10/2009 15:48:54	56934.5	365.5	5.42	5.376	0.994	-0.00280
9/10/2009 15:48:58	56938.5	369.5	5.44	5.389	0.981	-0.00850
9/10/2009 15:49:02	56942.0	373.0	5.45	5.401	0.969	-0.01382
9/10/2009 15:49:06	56946.5	377.5	5.46	5.414	0.956	-0.01966
9/10/2009 15:49:11	56951.5	382.5	5.47	5.426	0.944	-0.02511
9/10/2009 15:49:15	56955.5	386.5	5.48	5.437	0.933	-0.03017
9/10/2009 15:49:22	56962.0	393.0	5.50	5.449	0.921	-0.03575
9/10/2009 15:49:28	56968.0	399.0	5.51	5.462	0.908	-0.04188
9/10/2009 15:49:35	56975.0	406.0	5.52	5.475	0.895	-0.04810
9/10/2009 15:49:42	56982.5	413.5	5.53	5.487	0.883	-0.05390
9/10/2009 15:49:47	56987.5	418.5	5.55	5.498	0.872	-0.05931
9/10/2009 15:49:55	56995.5	426.5	5.56	5.509	0.860	-0.06527
9/10/2009 15:50:01	57001.0	432.0	5.57	5.520	0.850	-0.07081
9/10/2009 15:50:07	57007.5	438.5	5.58	5.530	0.840	-0.07590
9/10/2009 15:50:13	57013.5	444.5	5.59	5.540	0.830	-0.08106
9/10/2009 15:50:19	57019.5	450.5	5.60	5.551	0.819	-0.08681
9/10/2009 15:50:26	57026.0	457.0	5.61	5.562	0.808	-0.09263
9/10/2009 15:50:33	57033.0	464.0	5.62	5.572	0.798	-0.09799
9/10/2009 15:50:40	57040.5	471.5	5.63	5.583	0.787	-0.10395
9/10/2009 15:50:48	57048.0	479.0	5.64	5.595	0.775	-0.11056
9/10/2009 15:50:55	57055.5	486.5	5.65	5.606	0.764	-0.11671
9/10/2009 15:51:03	57063.5	494.5	5.66	5.615	0.754	-0.12236
9/10/2009 15:51:11	57071.5	502.5	5.67	5.625	0.745	-0.12808
9/10/2009 15:51:16	57076.5	507.5	5.68	5.634	0.736	-0.13332
9/10/2009 15:51:25	57085.5	516.5	5.69	5.644	0.726	-0.13919
9/10/2009 15:51:35	57095.0	526.0	5.70	5.654	0.716	-0.14513
9/10/2009 15:51:41	57101.0	532.0	5.71	5.663	0.707	-0.15057
9/10/2009 15:51:49	57109.5	540.5	5.72	5.673	0.697	-0.15668
9/10/2009 15:51:58	57118.0	549.0	5.73	5.682	0.688	-0.16224
9/10/2009 15:52:04	57124.5	555.5	5.74	5.689	0.680	-0.16726
9/10/2009 15:52:11	57131.5	562.5	5.75	5.697	0.672	-0.17233
9/10/2009 15:52:19	57139.0	570.0	5.76	5.706	0.664	-0.17811
9/10/2009 15:52:28	57148.0	579.0	5.76	5.714	0.656	-0.18329

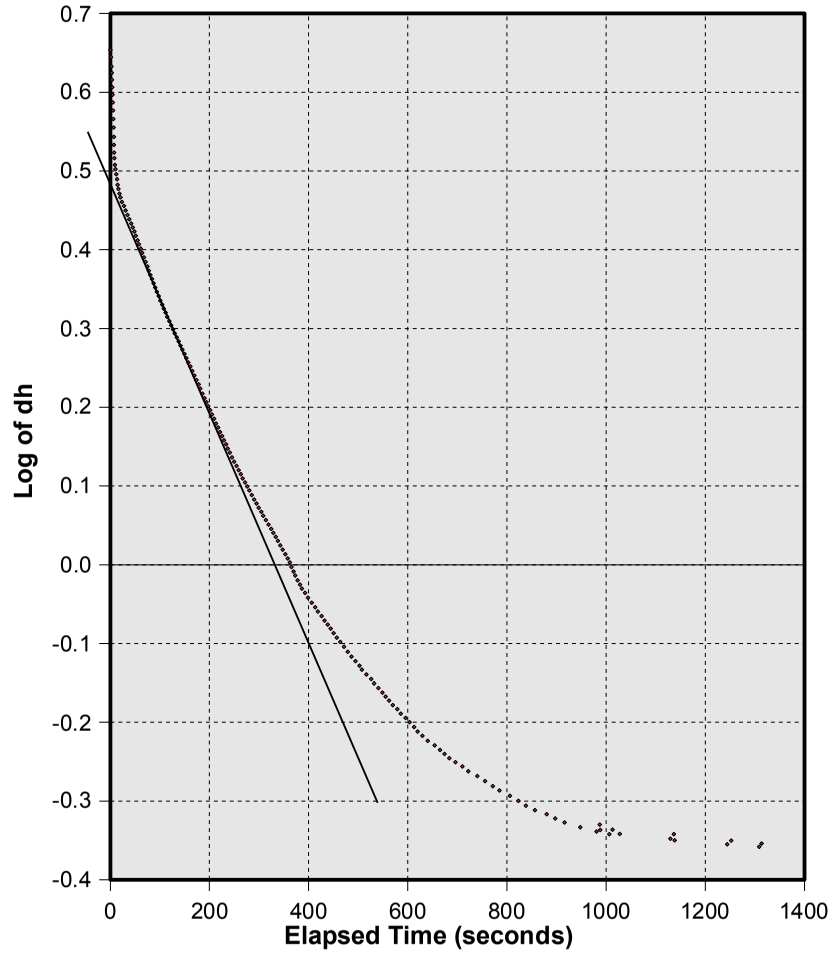
Slug Test P2-2

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 15:52:35	57155.0	586.0	5.77	5.723	0.647	-0.18922
9/10/2009 15:52:44	57164.5	595.5	5.78	5.731	0.639	-0.19453
9/10/2009 15:52:52	57172.5	603.5	5.79	5.739	0.631	-0.19992
9/10/2009 15:53:02	57182.0	613.0	5.80	5.748	0.622	-0.20606
9/10/2009 15:53:09	57189.0	620.0	5.81	5.756	0.614	-0.21161
9/10/2009 15:53:18	57198.5	629.5	5.81	5.763	0.606	-0.21720
9/10/2009 15:53:29	57209.5	640.5	5.82	5.772	0.598	-0.22358
9/10/2009 15:53:43	57223.0	654.0	5.83	5.780	0.590	-0.22928
9/10/2009 15:53:54	57234.0	665.0	5.84	5.788	0.582	-0.23509
9/10/2009 15:54:03	57243.0	674.0	5.85	5.795	0.575	-0.24025
9/10/2009 15:54:13	57253.0	684.0	5.85	5.802	0.568	-0.24545
9/10/2009 15:54:25	57265.0	696.0	5.86	5.808	0.561	-0.25070
9/10/2009 15:54:39	57279.0	710.0	5.87	5.815	0.555	-0.25599
9/10/2009 15:54:51	57291.0	722.0	5.88	5.823	0.547	-0.26216
9/10/2009 15:55:09	57309.0	740.0	5.88	5.831	0.539	-0.26834
9/10/2009 15:55:25	57325.0	756.0	5.89	5.839	0.531	-0.27464
9/10/2009 15:55:40	57340.5	771.5	5.90	5.846	0.524	-0.28104
9/10/2009 15:55:54	57354.0	785.0	5.91	5.853	0.517	-0.28672
9/10/2009 15:56:15	57375.0	806.0	5.91	5.861	0.509	-0.29323
9/10/2009 15:56:32	57392.0	823.0	5.92	5.869	0.501	-0.29990
9/10/2009 15:56:47	57407.0	838.0	5.93	5.875	0.495	-0.30581
9/10/2009 15:57:05	57425.5	856.5	5.94	5.882	0.488	-0.31176
9/10/2009 15:57:29	57449.0	880.0	5.94	5.888	0.482	-0.31682
9/10/2009 15:57:46	57466.5	897.5	5.95	5.893	0.476	-0.32203
9/10/2009 15:58:05	57485.0	916.0	5.95	5.899	0.471	-0.32728
9/10/2009 15:58:37	57517.0	948.0	5.96	5.906	0.464	-0.33335
9/10/2009 15:59:09	57549.5	980.5	5.97	5.911	0.459	-0.33854
9/10/2009 15:59:16	57556.0	987.0	5.96	5.902	0.468	-0.33001
9/10/2009 15:59:17	57557.0	988.0	5.97	5.909	0.461	-0.33655
9/10/2009 15:59:35	57575.5	1006.5	5.97	5.915	0.455	-0.34198
9/10/2009 15:59:42	57582.0	1013.0	5.97	5.909	0.461	-0.33620
9/10/2009 15:59:56	57596.5	1027.5	5.97	5.915	0.455	-0.34169
9/10/2009 16:01:38	57698.5	1129.5	5.98	5.921	0.449	-0.34793
9/10/2009 16:01:45	57705.5	1136.5	5.97	5.915	0.455	-0.34206
9/10/2009 16:01:47	57707.0	1138.0	5.98	5.923	0.447	-0.34975
9/10/2009 16:03:33	57813.0	1244.0	5.99	5.928	0.442	-0.35507
9/10/2009 16:03:41	57821.0	1252.0	5.98	5.923	0.447	-0.35006
9/10/2009 16:04:37	57877.5	1308.5	5.99	5.931	0.438	-0.35808
9/10/2009 16:04:42	57882.5	1313.5	5.99	5.927	0.443	-0.35406

Slug Test P2-2

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	30.25	ft
Stick up height:	3.01	ft
Depth to sand pack (BGS):	13.84	ft
Depth to screened interval (BGS):	15.25	ft
Well diameter:	2.00	in
Diameter of annular space:	7.75	in
Initial depth to water table from top of pipe:	24.69	ft
Initial Head Change:	4.51	ft
Total well length:	33.26	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.1901	ft
r_c:	0.1901	ft
Radius of gravel pack (r_w):	0.3229	ft
Screened interval:	15.00	ft
Length of open section (L_e):	8.57	ft
L_e / r_w:	26.5394	
A (dimensionless):	2.447	
B (dimensionless):	0.406	
Drawdown at time = 0 (y_0):	3.02	ft
Drawdown at time = t (y_t):	1.33	ft
Elapsed Time between y_0 and y_t (t):	241	sec
Initial water column in well (L_w):	8.57	ft
$\ln(R_e/r_w)$ =	1.92	
K =	1.38E-05	ft/sec
	4.21E-04	**cm/sec**
	436.02	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Tets P2-3

Initial offset in logger reading (feet):	-0.133	Date:	09/10/2009
Offset increment in logger reading (feet/sec):	0.000145		
Initial depth to water table (feet):	27.43		
Depth of probe below water table (feet):	5.647		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 13:15:29	47729.5	0.0	4.12	4.190	1.457	0.16338
9/10/2009 13:15:30	47730.0	0.5	4.17	4.234	1.413	0.15008
9/10/2009 13:15:30	47730.5	1.0	4.23	4.292	1.355	0.13190
9/10/2009 13:15:31	47731.0	1.5	4.27	4.332	1.315	0.11891
9/10/2009 13:15:32	47732.0	2.5	4.31	4.373	1.274	0.10520
9/10/2009 13:15:32	47732.5	3.0	4.32	4.388	1.259	0.10009
9/10/2009 13:15:33	47733.0	3.5	4.34	4.404	1.243	0.09456
9/10/2009 13:15:33	47733.5	4.0	4.36	4.420	1.226	0.08860
9/10/2009 13:15:34	47734.0	4.5	4.37	4.439	1.207	0.08185
9/10/2009 13:15:34	47734.5	5.0	4.39	4.459	1.187	0.07462
9/10/2009 13:15:35	47735.0	5.5	4.41	4.474	1.173	0.06913
9/10/2009 13:15:35	47735.5	6.0	4.43	4.495	1.152	0.06131
9/10/2009 13:15:36	47736.0	6.5	4.45	4.511	1.136	0.05526
9/10/2009 13:15:36	47736.5	7.0	4.47	4.532	1.115	0.04718
9/10/2009 13:15:37	47737.0	7.5	4.49	4.553	1.094	0.03895
9/10/2009 13:15:37	47737.5	8.0	4.50	4.567	1.080	0.03338
9/10/2009 13:15:38	47738.0	8.5	4.52	4.588	1.059	0.02489
9/10/2009 13:15:38	47738.5	9.0	4.54	4.608	1.039	0.01664
9/10/2009 13:15:39	47739.0	9.5	4.57	4.630	1.017	0.00737
9/10/2009 13:15:39	47739.5	10.0	4.59	4.655	0.992	-0.00340
9/10/2009 13:15:40	47740.0	10.5	4.61	4.675	0.972	-0.01222
9/10/2009 13:15:40	47740.5	11.0	4.64	4.699	0.947	-0.02350
9/10/2009 13:15:41	47741.0	11.5	4.65	4.717	0.929	-0.03179
9/10/2009 13:15:41	47741.5	12.0	4.68	4.742	0.904	-0.04360
9/10/2009 13:15:42	47742.0	12.5	4.70	4.766	0.881	-0.05524
9/10/2009 13:15:42	47742.5	13.0	4.72	4.787	0.860	-0.06569
9/10/2009 13:15:43	47743.0	13.5	4.75	4.810	0.837	-0.07743
9/10/2009 13:15:43	47743.5	14.0	4.77	4.835	0.812	-0.09057
9/10/2009 13:15:44	47744.0	14.5	4.80	4.859	0.788	-0.10356
9/10/2009 13:15:44	47744.5	15.0	4.82	4.879	0.768	-0.11468
9/10/2009 13:15:45	47745.0	15.5	4.84	4.906	0.741	-0.13019
9/10/2009 13:15:45	47745.5	16.0	4.87	4.929	0.718	-0.14384
9/10/2009 13:15:46	47746.0	16.5	4.91	4.971	0.676	-0.16997
9/10/2009 13:15:46	47746.5	17.0	4.93	4.992	0.655	-0.18362
9/10/2009 13:15:47	47747.0	17.5	4.95	5.009	0.638	-0.19499
9/10/2009 13:15:47	47747.5	18.0	4.97	5.029	0.617	-0.20947
9/10/2009 13:15:48	47748.0	18.5	4.98	5.045	0.601	-0.22082
9/10/2009 13:15:48	47748.5	19.0	5.01	5.068	0.578	-0.23770
9/10/2009 13:15:49	47749.0	19.5	5.03	5.089	0.558	-0.25370
9/10/2009 13:15:49	47749.5	20.0	5.05	5.110	0.537	-0.27031
9/10/2009 13:15:50	47750.0	20.5	5.07	5.131	0.516	-0.28759
9/10/2009 13:15:50	47750.5	21.0	5.09	5.148	0.499	-0.30208
9/10/2009 13:15:51	47751.0	21.5	5.10	5.164	0.483	-0.31618
9/10/2009 13:15:51	47751.5	22.0	5.11	5.177	0.470	-0.32796

Slug Tets P2-3

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 13:15:52	47752.0	22.5	5.13	5.194	0.453	-0.34389
9/10/2009 13:15:52	47752.5	23.0	5.14	5.206	0.441	-0.35548
9/10/2009 13:15:53	47753.0	23.5	5.16	5.221	0.426	-0.37043
9/10/2009 13:15:53	47753.5	24.0	5.17	5.231	0.416	-0.38067
9/10/2009 13:15:54	47754.0	24.5	5.18	5.247	0.400	-0.39762
9/10/2009 13:15:54	47754.5	25.0	5.19	5.254	0.392	-0.40630
9/10/2009 13:15:55	47755.0	25.5	5.20	5.266	0.380	-0.41971
9/10/2009 13:15:55	47755.5	26.0	5.22	5.280	0.367	-0.43591
9/10/2009 13:15:56	47756.0	26.5	5.23	5.292	0.355	-0.45027
9/10/2009 13:15:56	47756.5	27.0	5.24	5.303	0.344	-0.46387
9/10/2009 13:15:57	47757.0	27.5	5.25	5.312	0.335	-0.47530
9/10/2009 13:15:57	47757.5	28.0	5.26	5.322	0.325	-0.48837
9/10/2009 13:15:58	47758.0	28.5	5.27	5.331	0.316	-0.50048
9/10/2009 13:15:58	47758.5	29.0	5.28	5.343	0.304	-0.51719
9/10/2009 13:15:59	47759.0	29.5	5.29	5.352	0.295	-0.53014
9/10/2009 13:15:59	47759.5	30.0	5.30	5.360	0.287	-0.54197
9/10/2009 13:16:00	47760.0	30.5	5.31	5.370	0.277	-0.55725
9/10/2009 13:16:00	47760.5	31.0	5.31	5.376	0.271	-0.56664
9/10/2009 13:16:01	47761.0	31.5	5.32	5.385	0.262	-0.58117
9/10/2009 13:16:01	47761.5	32.0	5.33	5.394	0.252	-0.59793
9/10/2009 13:16:02	47762.0	32.5	5.34	5.402	0.244	-0.61179
9/10/2009 13:16:02	47762.5	33.0	5.35	5.411	0.236	-0.62795
9/10/2009 13:16:03	47763.0	33.5	5.36	5.419	0.228	-0.64281
9/10/2009 13:16:03	47763.5	34.0	5.37	5.427	0.220	-0.65821
9/10/2009 13:16:04	47764.0	34.5	5.38	5.436	0.211	-0.67623
9/10/2009 13:16:04	47764.5	35.0	5.38	5.444	0.203	-0.69288
9/10/2009 13:16:05	47765.0	35.5	5.39	5.452	0.195	-0.71019
9/10/2009 13:16:05	47765.5	36.0	5.40	5.461	0.186	-0.73056
9/10/2009 13:16:06	47766.0	36.5	5.41	5.466	0.181	-0.74222
9/10/2009 13:16:06	47766.5	37.0	5.41	5.474	0.173	-0.76166
9/10/2009 13:16:07	47767.0	37.5	5.42	5.481	0.166	-0.77940
9/10/2009 13:16:07	47767.5	38.0	5.43	5.489	0.158	-0.80063
9/10/2009 13:16:08	47768.0	38.5	5.43	5.492	0.154	-0.81154
9/10/2009 13:16:08	47768.5	39.0	5.44	5.500	0.146	-0.83444
9/10/2009 13:16:09	47769.0	39.5	5.44	5.504	0.142	-0.84625
9/10/2009 13:16:09	47769.5	40.0	5.45	5.511	0.136	-0.86790
9/10/2009 13:16:10	47770.0	40.5	5.46	5.517	0.130	-0.88731
9/10/2009 13:16:10	47770.5	41.0	5.46	5.523	0.124	-0.90764
9/10/2009 13:16:11	47771.0	41.5	5.47	5.529	0.118	-0.92897
9/10/2009 13:16:11	47771.5	42.0	5.48	5.536	0.111	-0.95530
9/10/2009 13:16:12	47772.0	42.5	5.48	5.542	0.105	-0.97916
9/10/2009 13:16:12	47772.5	43.0	5.49	5.548	0.099	-1.00442
9/10/2009 13:16:13	47773.0	43.5	5.49	5.554	0.093	-1.03124
9/10/2009 13:16:13	47773.5	44.0	5.50	5.561	0.086	-1.06483
9/10/2009 13:16:14	47774.0	44.5	5.51	5.566	0.081	-1.09041
9/10/2009 13:16:14	47774.5	45.0	5.51	5.573	0.074	-1.12914
9/10/2009 13:16:15	47775.0	45.5	5.52	5.577	0.069	-1.15895
9/10/2009 13:16:15	47775.5	46.0	5.53	5.584	0.062	-1.20465
9/10/2009 13:16:16	47776.0	46.5	5.53	5.588	0.058	-1.23287

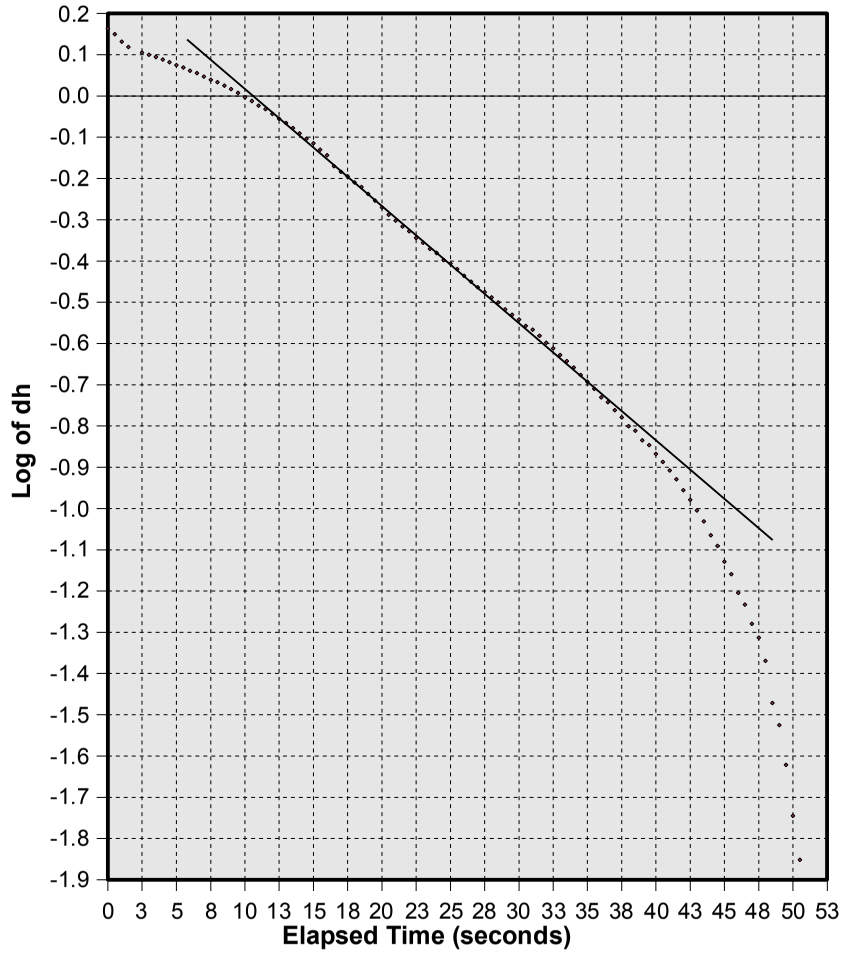
Slug Tets P2-3

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 13:16:16	47776.5	47.0	5.54	5.594	0.053	-1.27927
9/10/2009 13:16:17	47777.0	47.5	5.54	5.598	0.049	-1.31299
9/10/2009 13:16:17	47777.5	48.0	5.55	5.604	0.043	-1.36943
9/10/2009 13:16:18	47778.0	48.5	5.55	5.613	0.034	-1.47125
9/10/2009 13:16:18	47778.5	49.0	5.56	5.617	0.030	-1.52492
9/10/2009 13:16:19	47779.0	49.5	5.56	5.623	0.024	-1.62102
9/10/2009 13:16:19	47779.5	50.0	5.57	5.629	0.018	-1.74461
9/10/2009 13:16:20	47780.0	50.5	5.57	5.633	0.014	-1.85148

Slug Test P2-3

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	33.84	ft
Stick up height:	3.04	ft
Depth to sand pack (BGS):	17.55	ft
Depth to screened interval (BGS):	18.84	ft
Well diameter:	2.00	in
Diameter of annular space:	7.75	in
Initial depth to water table from top of pipe:	27.43	ft
Initial Head Change:	1.46	ft
Total well length:	36.88	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.1901	ft
r_c:	0.1901	ft
Radius of gravel pack (r_w):	0.3229	ft
Screened interval:	15.00	ft
Length of open section (L_e):	9.45	ft
L_e / r_w:	29.2645	
A (dimensionless):	2.535	
B (dimensionless):	0.422	
Drawdown at time = 0 (y_0):	0.93	ft
Drawdown at time = t (y_t):	0.19	ft
Elapsed Time between y_0 and y_t (t):	24	sec
Initial water column in well (L_w):	9.45	ft
$\ln(R_e/r_w)$ =	2.00	
K =	2.49E-04	ft/sec
	7.60E-03	**cm/sec**
	7867.13	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P2-4

Initial offset in logger reading (feet):	0.027	Date:	09/10/2009
Offset increment in logger reading (feet/sec):	0.000044		
Initial depth to water table (feet):	30.63		
Depth of probe below water table (feet):	4.739		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 14:34:27	52467.5	0.0	0.98	0.942	3.797	0.57946
9/10/2009 14:34:29	52469.0	1.5	1.05	1.009	3.730	0.57173
9/10/2009 14:34:30	52470.0	2.5	1.10	1.065	3.674	0.56517
9/10/2009 14:34:31	52471.5	4.0	1.17	1.127	3.612	0.55779
9/10/2009 14:34:32	52472.5	5.0	1.21	1.172	3.567	0.55235
9/10/2009 14:34:33	52473.5	6.0	1.26	1.216	3.523	0.54696
9/10/2009 14:34:34	52474.5	7.0	1.30	1.261	3.478	0.54139
9/10/2009 14:34:35	52475.5	8.0	1.34	1.305	3.434	0.53586
9/10/2009 14:34:36	52476.5	9.0	1.40	1.357	3.383	0.52924
9/10/2009 14:34:37	52477.5	10.0	1.45	1.406	3.334	0.52291
9/10/2009 14:34:38	52478.5	11.0	1.49	1.447	3.293	0.51754
9/10/2009 14:34:39	52479.5	12.0	1.52	1.485	3.255	0.51251
9/10/2009 14:34:41	52481.0	13.5	1.58	1.540	3.199	0.50498
9/10/2009 14:34:42	52482.5	15.0	1.62	1.583	3.156	0.49911
9/10/2009 14:34:44	52484.0	16.5	1.66	1.622	3.117	0.49372
9/10/2009 14:34:46	52486.0	18.5	1.70	1.659	3.080	0.48854
9/10/2009 14:34:48	52488.5	21.0	1.74	1.701	3.038	0.48260
9/10/2009 14:34:50	52490.5	23.0	1.78	1.739	3.000	0.47714
9/10/2009 14:34:53	52493.0	25.5	1.82	1.783	2.956	0.47074
9/10/2009 14:34:55	52495.0	27.5	1.86	1.823	2.916	0.46484
9/10/2009 14:34:56	52496.5	29.0	1.90	1.860	2.879	0.45931
9/10/2009 14:34:58	52498.0	30.5	1.94	1.904	2.835	0.45263
9/10/2009 14:34:59	52499.5	32.0	1.99	1.946	2.794	0.44616
9/10/2009 14:35:01	52501.0	33.5	2.08	2.038	2.702	0.43162
9/10/2009 14:35:02	52502.0	34.5	2.12	2.082	2.658	0.42450
9/10/2009 14:35:03	52503.0	35.5	2.15	2.112	2.627	0.41941
9/10/2009 14:35:04	52504.0	36.5	2.18	2.143	2.596	0.41426
9/10/2009 14:35:05	52505.0	37.5	2.22	2.174	2.565	0.40905
9/10/2009 14:35:06	52506.0	38.5	2.25	2.205	2.534	0.40378
9/10/2009 14:35:07	52507.0	39.5	2.28	2.236	2.503	0.39844
9/10/2009 14:35:08	52508.0	40.5	2.31	2.268	2.471	0.39286
9/10/2009 14:35:09	52509.0	41.5	2.34	2.298	2.441	0.38756
9/10/2009 14:35:10	52510.0	42.5	2.37	2.329	2.410	0.38202
9/10/2009 14:35:11	52511.0	43.5	2.40	2.360	2.379	0.37641
9/10/2009 14:35:12	52512.5	45.0	2.44	2.403	2.336	0.36850
9/10/2009 14:35:13	52513.5	46.0	2.47	2.431	2.308	0.36327
9/10/2009 14:35:14	52514.5	47.0	2.50	2.458	2.281	0.35817
9/10/2009 14:35:16	52516.0	48.5	2.54	2.498	2.241	0.35050
9/10/2009 14:35:17	52517.5	50.0	2.57	2.533	2.206	0.34367
9/10/2009 14:35:19	52519.0	51.5	2.61	2.566	2.173	0.33714
9/10/2009 14:35:20	52520.5	53.0	2.64	2.598	2.141	0.33071
9/10/2009 14:35:22	52522.0	54.5	2.67	2.628	2.112	0.32460

Slug Test P2-4

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 14:35:23	52523.5	56.0	2.69	2.653	2.087	0.31944
9/10/2009 14:35:25	52525.0	57.5	2.72	2.677	2.063	0.31443
9/10/2009 14:35:27	52527.0	59.5	2.75	2.708	2.031	0.30766
9/10/2009 14:35:29	52529.0	61.5	2.78	2.733	2.006	0.30230
9/10/2009 14:35:31	52531.0	63.5	2.80	2.758	1.981	0.29687
9/10/2009 14:35:33	52533.0	65.5	2.82	2.781	1.958	0.29182
9/10/2009 14:35:35	52535.5	68.0	2.85	2.808	1.931	0.28581
9/10/2009 14:35:38	52538.5	71.0	2.87	2.832	1.907	0.28041
9/10/2009 14:35:42	52542.0	74.5	2.90	2.855	1.884	0.27518
9/10/2009 14:35:48	52548.0	80.5	2.92	2.878	1.861	0.26967
9/10/2009 14:35:54	52554.5	87.0	2.94	2.900	1.839	0.26458
9/10/2009 14:36:00	52560.0	92.5	2.97	2.922	1.817	0.25941
9/10/2009 14:36:06	52566.0	98.5	2.99	2.944	1.795	0.25418
9/10/2009 14:36:12	52572.0	104.5	3.01	2.966	1.773	0.24865
9/10/2009 14:36:19	52579.0	111.5	3.03	2.988	1.751	0.24330
9/10/2009 14:36:25	52585.0	117.5	3.05	3.010	1.729	0.23788
9/10/2009 14:36:32	52592.5	125.0	3.08	3.032	1.708	0.23240
9/10/2009 14:36:39	52599.5	132.0	3.10	3.051	1.688	0.22736
9/10/2009 14:36:46	52606.5	139.0	3.12	3.071	1.668	0.22227
9/10/2009 14:36:54	52614.0	146.5	3.14	3.092	1.648	0.21685
9/10/2009 14:37:02	52622.5	155.0	3.16	3.112	1.627	0.21138
9/10/2009 14:37:10	52630.5	163.0	3.18	3.133	1.606	0.20583
9/10/2009 14:37:18	52638.5	171.0	3.20	3.151	1.588	0.20076
9/10/2009 14:37:26	52646.0	178.5	3.22	3.171	1.568	0.19535
9/10/2009 14:37:35	52655.0	187.5	3.24	3.191	1.548	0.18988
9/10/2009 14:37:43	52663.5	196.0	3.26	3.210	1.529	0.18434
9/10/2009 14:37:51	52671.5	204.0	3.28	3.229	1.510	0.17902
9/10/2009 14:37:59	52679.0	211.5	3.30	3.247	1.492	0.17390
9/10/2009 14:38:06	52686.0	218.5	3.31	3.264	1.475	0.16872
9/10/2009 14:38:14	52694.5	227.0	3.33	3.282	1.457	0.16350
9/10/2009 14:38:20	52700.5	233.0	3.35	3.299	1.440	0.15849
9/10/2009 14:38:27	52707.0	239.5	3.37	3.315	1.424	0.15342
9/10/2009 14:38:34	52714.0	246.5	3.38	3.332	1.407	0.14830
9/10/2009 14:38:41	52721.0	253.5	3.40	3.349	1.390	0.14311
9/10/2009 14:38:48	52728.5	261.0	3.42	3.368	1.372	0.13724
9/10/2009 14:38:55	52735.0	267.5	3.43	3.383	1.356	0.13224
9/10/2009 14:39:00	52740.5	273.0	3.45	3.399	1.340	0.12716
9/10/2009 14:39:07	52747.0	279.5	3.47	3.415	1.324	0.12204
9/10/2009 14:39:12	52752.5	285.0	3.48	3.431	1.308	0.11651
9/10/2009 14:39:18	52758.0	290.5	3.50	3.447	1.292	0.11124
9/10/2009 14:39:23	52763.5	296.0	3.52	3.464	1.275	0.10557
9/10/2009 14:39:28	52768.0	300.5	3.53	3.479	1.260	0.10050
9/10/2009 14:39:32	52772.5	305.0	3.55	3.494	1.246	0.09537
9/10/2009 14:39:37	52777.5	310.0	3.56	3.508	1.231	0.09019
9/10/2009 14:39:43	52783.5	316.0	3.58	3.524	1.215	0.08460
9/10/2009 14:39:49	52789.5	322.0	3.59	3.539	1.200	0.07930

Slug Test P2-4

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 14:39:56	52796.5	329.0	3.61	3.555	1.185	0.07359
9/10/2009 14:40:03	52803.5	336.0	3.62	3.569	1.170	0.06817
9/10/2009 14:40:11	52811.0	343.5	3.64	3.583	1.156	0.06306
9/10/2009 14:40:18	52818.0	350.5	3.65	3.597	1.143	0.05789
9/10/2009 14:40:25	52825.5	358.0	3.67	3.610	1.129	0.05266
9/10/2009 14:40:33	52833.5	366.0	3.68	3.625	1.114	0.04699
9/10/2009 14:40:42	52842.0	374.5	3.69	3.639	1.101	0.04165
9/10/2009 14:40:48	52848.0	380.5	3.71	3.651	1.088	0.03659
9/10/2009 14:40:56	52856.5	389.0	3.72	3.665	1.074	0.03112
9/10/2009 14:41:04	52864.5	397.0	3.73	3.678	1.062	0.02598
9/10/2009 14:41:12	52872.0	404.5	3.75	3.690	1.049	0.02076
9/10/2009 14:41:20	52880.5	413.0	3.76	3.703	1.036	0.01550
9/10/2009 14:41:29	52889.0	421.5	3.77	3.716	1.023	0.00976
9/10/2009 14:41:37	52897.5	430.0	3.79	3.729	1.010	0.00436
9/10/2009 14:41:45	52905.0	437.5	3.80	3.741	0.998	-0.00069
9/10/2009 14:41:53	52913.5	446.0	3.81	3.753	0.986	-0.00621
9/10/2009 14:42:02	52922.5	455.0	3.82	3.765	0.974	-0.01135
9/10/2009 14:42:10	52930.0	462.5	3.84	3.778	0.962	-0.01704
9/10/2009 14:42:20	52940.0	472.5	3.85	3.790	0.949	-0.02275
9/10/2009 14:42:30	52950.0	482.5	3.86	3.802	0.937	-0.02807
9/10/2009 14:42:39	52959.0	491.5	3.88	3.814	0.925	-0.03395
9/10/2009 14:42:48	52968.0	500.5	3.89	3.826	0.913	-0.03943
9/10/2009 14:42:56	52976.0	508.5	3.90	3.837	0.903	-0.04453
9/10/2009 14:43:05	52985.0	517.5	3.91	3.848	0.891	-0.05015
9/10/2009 14:43:14	52994.0	526.5	3.92	3.861	0.878	-0.05633
9/10/2009 14:43:21	53001.5	534.0	3.94	3.873	0.867	-0.06214
9/10/2009 14:43:29	53009.0	541.5	3.95	3.883	0.856	-0.06752
9/10/2009 14:43:33	53013.0	545.5	3.96	3.893	0.846	-0.07254
9/10/2009 14:43:38	53018.5	551.0	3.97	3.903	0.836	-0.07757
9/10/2009 14:43:44	53024.5	557.0	3.98	3.913	0.826	-0.08318
9/10/2009 14:43:47	53027.5	560.0	3.99	3.923	0.816	-0.08840
9/10/2009 14:43:51	53031.0	563.5	4.00	3.935	0.804	-0.09476
9/10/2009 14:43:54	53034.0	566.5	4.01	3.945	0.794	-0.10012
9/10/2009 14:43:57	53037.5	570.0	4.02	3.955	0.784	-0.10554
9/10/2009 14:44:01	53041.5	574.0	4.03	3.965	0.774	-0.11101
9/10/2009 14:44:04	53044.0	576.5	4.04	3.974	0.766	-0.11603
9/10/2009 14:44:08	53048.0	580.5	4.05	3.983	0.756	-0.12164
9/10/2009 14:44:12	53052.5	585.0	4.06	3.993	0.746	-0.12731
9/10/2009 14:44:15	53055.5	588.0	4.07	4.002	0.737	-0.13250
9/10/2009 14:44:20	53060.5	593.0	4.08	4.012	0.727	-0.13830
9/10/2009 14:44:24	53064.5	597.0	4.09	4.023	0.716	-0.14481
9/10/2009 14:44:30	53070.5	603.0	4.10	4.032	0.707	-0.15075
9/10/2009 14:44:35	53075.0	607.5	4.11	4.042	0.697	-0.15682
9/10/2009 14:44:39	53079.5	612.0	4.12	4.051	0.688	-0.16234
9/10/2009 14:44:46	53086.5	619.0	4.13	4.061	0.678	-0.16850

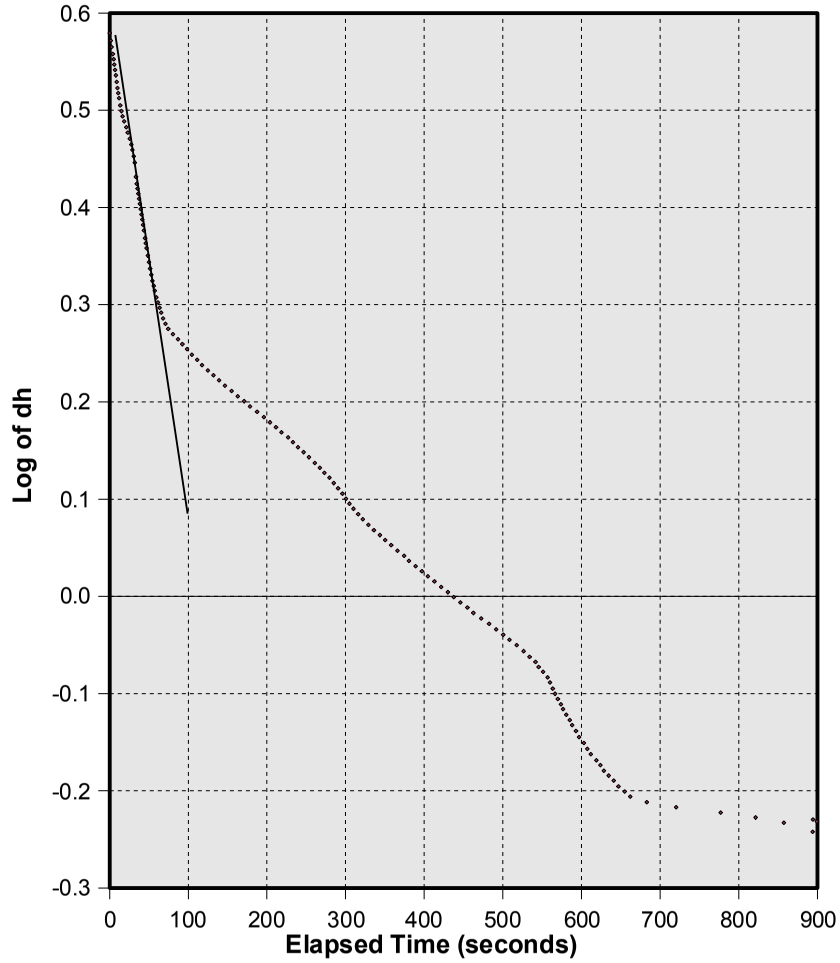
Slug Test P2-4

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 14:44:51	53091.5	624.0	4.14	4.069	0.671	-0.17351
9/10/2009 14:44:56	53096.0	628.5	4.14	4.077	0.662	-0.17925
9/10/2009 14:45:02	53102.0	634.5	4.15	4.085	0.654	-0.18435
9/10/2009 14:45:08	53108.5	641.0	4.16	4.093	0.646	-0.18950
9/10/2009 14:45:14	53114.5	647.0	4.17	4.102	0.638	-0.19541
9/10/2009 14:45:22	53122.5	655.0	4.18	4.109	0.630	-0.20065
9/10/2009 14:45:29	53129.5	662.0	4.19	4.117	0.622	-0.20599
9/10/2009 14:45:50	53150.5	683.0	4.19	4.125	0.614	-0.21166
9/10/2009 14:46:28	53188.0	720.5	4.20	4.132	0.607	-0.21689
9/10/2009 14:47:24	53244.5	777.0	4.21	4.140	0.599	-0.22229
9/10/2009 14:48:09	53289.0	821.5	4.22	4.147	0.592	-0.22742
9/10/2009 14:48:45	53325.0	857.5	4.23	4.154	0.585	-0.23289
9/10/2009 14:49:21	53361.5	894.0	4.25	4.167	0.573	-0.24219
9/10/2009 14:49:22	53362.0	894.5	4.23	4.150	0.590	-0.22947
9/10/2009 14:49:27	53367.0	899.5	4.23	4.152	0.587	-0.23152

Slug Test P2-4

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	33.72	ft
Stick up height:	3.01	ft
Depth to sand pack (BGS):	17.60	ft
Depth to screened interval (BGS):	18.72	ft
Well diameter:	2.00	in
Diameter of annular space:	7.75	in
Initial depth to water table from top of pipe:	30.63	ft
Initial Head Change:	3.80	ft
Total well length:	36.73	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.1901	ft
r_c:	0.1901	ft
Radius of gravel pack (r_w):	0.3229	ft
Screened interval:	15.00	ft
Length of open section (L_e):	6.10	ft
L_e / r_w:	18.8903	
C (dimensionless):	1.692	
Drawdown at time = 0 (y_0):	2.81	ft
Drawdown at time = t (y_t):	1.91	ft
Elapsed Time between y_0 and y_t (t):	39.5	sec
Initial water column in well (L_w):	6.10	ft
$\ln(R_e/r_w)$ =	2.16	
K =	6.26E-05	ft/sec
	1.91E-03	**cm/sec**
	1973.15	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Initial offset in logger reading (feet):	-0.040	Date:	09/10/2009
Offset increment in logger reading (feet/sec):	0.000075		
Initial depth to water table (feet):	26.45		
Depth of probe below water table (feet):	8.096		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 11:43:47	42227.5	0.0	5.57	5.583	2.512	0.40006
9/10/2009 11:43:51	42231.0	3.5	5.61	5.617	2.478	0.39419
9/10/2009 11:43:51	42231.5	4.0	5.68	5.691	2.405	0.38103
9/10/2009 11:43:52	42232.0	4.5	5.82	5.826	2.270	0.35594
9/10/2009 11:43:52	42232.5	5.0	5.79	5.799	2.297	0.36109
9/10/2009 11:43:53	42233.0	5.5	5.83	5.839	2.257	0.35346
9/10/2009 11:43:53	42233.5	6.0	5.87	5.880	2.216	0.34551
9/10/2009 11:43:54	42234.0	6.5	5.91	5.914	2.182	0.33880
9/10/2009 11:43:54	42234.5	7.0	5.93	5.943	2.153	0.33299
9/10/2009 11:43:55	42235.0	7.5	5.96	5.968	2.128	0.32793
9/10/2009 11:43:55	42235.5	8.0	5.99	5.999	2.097	0.32156
9/10/2009 11:43:56	42236.0	8.5	6.02	6.032	2.064	0.31468
9/10/2009 11:43:56	42236.5	9.0	6.05	6.063	2.033	0.30812
9/10/2009 11:43:57	42237.0	9.5	6.08	6.092	2.004	0.30189
9/10/2009 11:43:57	42237.5	10.0	6.11	6.120	1.976	0.29578
9/10/2009 11:43:58	42238.5	11.0	6.15	6.157	1.939	0.28759
9/10/2009 11:43:59	42239.5	12.0	6.18	6.185	1.910	0.28106
9/10/2009 11:44:00	42240.5	13.0	6.20	6.208	1.887	0.27582
9/10/2009 11:44:01	42241.5	14.0	6.23	6.235	1.860	0.26958
9/10/2009 11:44:02	42242.5	15.0	6.26	6.264	1.831	0.26277
9/10/2009 11:44:03	42243.5	16.0	6.28	6.289	1.806	0.25682
9/10/2009 11:44:04	42244.5	17.0	6.30	6.310	1.786	0.25176
9/10/2009 11:44:06	42246.0	18.5	6.33	6.335	1.761	0.24566
9/10/2009 11:44:07	42247.0	19.5	6.35	6.356	1.740	0.24047
9/10/2009 11:44:08	42248.5	21.0	6.38	6.385	1.711	0.23320
9/10/2009 11:44:10	42250.0	22.5	6.41	6.416	1.680	0.22529
9/10/2009 11:44:11	42251.5	24.0	6.43	6.439	1.657	0.21933
9/10/2009 11:44:12	42252.5	25.0	6.46	6.463	1.632	0.21275
9/10/2009 11:44:13	42253.5	26.0	6.48	6.486	1.609	0.20660
9/10/2009 11:44:14	42254.5	27.0	6.50	6.506	1.589	0.20119
9/10/2009 11:44:16	42256.0	28.5	6.53	6.533	1.562	0.19378
9/10/2009 11:44:17	42257.5	30.0	6.55	6.558	1.537	0.18681
9/10/2009 11:44:19	42259.0	31.5	6.57	6.581	1.515	0.18029
9/10/2009 11:44:20	42260.0	32.5	6.59	6.599	1.497	0.17512
9/10/2009 11:44:21	42261.5	34.0	6.62	6.623	1.473	0.16814
9/10/2009 11:44:22	42262.5	35.0	6.64	6.642	1.454	0.16252
9/10/2009 11:44:24	42264.0	36.5	6.66	6.665	1.431	0.15563
9/10/2009 11:44:25	42265.5	38.0	6.68	6.683	1.412	0.14986
9/10/2009 11:44:27	42267.0	39.5	6.70	6.710	1.385	0.14151
9/10/2009 11:44:28	42268.0	40.5	6.72	6.726	1.369	0.13649
9/10/2009 11:44:29	42269.0	41.5	6.74	6.743	1.352	0.13108
9/10/2009 11:44:30	42270.5	43.0	6.76	6.762	1.333	0.12498
9/10/2009 11:44:32	42272.0	44.5	6.77	6.780	1.316	0.11911
9/10/2009 11:44:33	42273.5	46.0	6.80	6.801	1.295	0.11216
9/10/2009 11:44:34	42274.5	47.0	6.81	6.816	1.280	0.10712
9/10/2009 11:44:36	42276.0	48.5	6.83	6.834	1.262	0.10101
9/10/2009 11:44:37	42277.5	50.0	6.85	6.851	1.245	0.09516

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 11:44:39	42279.0	51.5	6.87	6.871	1.224	0.08781
9/10/2009 11:44:40	42280.5	53.0	6.88	6.889	1.206	0.08142
9/10/2009 11:44:41	42281.5	54.0	6.90	6.906	1.189	0.07528
9/10/2009 11:44:43	42283.0	55.5	6.92	6.920	1.175	0.07018
9/10/2009 11:44:44	42284.5	57.0	6.93	6.936	1.159	0.06427
9/10/2009 11:44:46	42286.0	58.5	6.95	6.955	1.141	0.05713
9/10/2009 11:44:47	42287.5	60.0	6.97	6.975	1.121	0.04950
9/10/2009 11:44:49	42289.0	61.5	6.99	6.990	1.106	0.04369
9/10/2009 11:44:50	42290.0	62.5	7.00	7.006	1.090	0.03739
9/10/2009 11:44:51	42291.0	63.5	7.01	7.019	1.077	0.03221
9/10/2009 11:44:52	42292.5	65.0	7.03	7.032	1.063	0.02657
9/10/2009 11:44:53	42293.5	66.0	7.04	7.047	1.048	0.02043
9/10/2009 11:44:55	42295.0	67.5	7.06	7.064	1.031	0.01337
9/10/2009 11:44:56	42296.0	68.5	7.07	7.076	1.019	0.00832
9/10/2009 11:44:57	42297.5	70.0	7.09	7.091	1.004	0.00193
9/10/2009 11:44:59	42299.0	71.5	7.10	7.105	0.991	-0.00411
9/10/2009 11:45:00	42300.5	73.0	7.11	7.118	0.978	-0.00980
9/10/2009 11:45:01	42301.5	74.0	7.13	7.130	0.966	-0.01513
9/10/2009 11:45:04	42304.0	76.5	7.14	7.145	0.951	-0.02184
9/10/2009 11:45:07	42307.0	79.5	7.16	7.162	0.933	-0.03004
9/10/2009 11:45:08	42308.5	81.0	7.17	7.173	0.922	-0.03514
9/10/2009 11:45:10	42310.5	83.0	7.19	7.193	0.902	-0.04458
9/10/2009 11:45:11	42311.0	83.5	7.20	7.206	0.889	-0.05087
9/10/2009 11:45:12	42312.0	84.5	7.23	7.231	0.865	-0.06321
9/10/2009 11:45:12	42312.5	85.0	7.24	7.245	0.851	-0.07028
9/10/2009 11:45:13	42313.0	85.5	7.26	7.263	0.833	-0.07955
9/10/2009 11:45:13	42313.5	86.0	7.27	7.273	0.823	-0.08478
9/10/2009 11:45:14	42314.0	86.5	7.29	7.292	0.804	-0.09491
9/10/2009 11:45:14	42314.5	87.0	7.30	7.304	0.792	-0.10142
9/10/2009 11:45:15	42315.0	87.5	7.32	7.319	0.777	-0.10971
9/10/2009 11:45:15	42315.5	88.0	7.33	7.330	0.766	-0.11588
9/10/2009 11:45:16	42316.0	88.5	7.34	7.346	0.750	-0.12503
9/10/2009 11:45:16	42316.5	89.0	7.36	7.359	0.737	-0.13260
9/10/2009 11:45:17	42317.0	89.5	7.37	7.369	0.727	-0.13851
9/10/2009 11:45:17	42317.5	90.0	7.38	7.381	0.715	-0.14572
9/10/2009 11:45:18	42318.0	90.5	7.39	7.396	0.700	-0.15491
9/10/2009 11:45:18	42318.5	91.0	7.40	7.406	0.690	-0.16113
9/10/2009 11:45:19	42319.0	91.5	7.41	7.416	0.680	-0.16745
9/10/2009 11:45:19	42319.5	92.0	7.43	7.429	0.666	-0.17646
9/10/2009 11:45:20	42320.0	92.5	7.44	7.441	0.654	-0.18433
9/10/2009 11:45:20	42320.5	93.0	7.45	7.449	0.646	-0.18965
9/10/2009 11:45:21	42321.0	93.5	7.46	7.462	0.633	-0.19845
9/10/2009 11:45:21	42321.5	94.0	7.47	7.471	0.624	-0.20464
9/10/2009 11:45:22	42322.0	94.5	7.48	7.482	0.613	-0.21233
9/10/2009 11:45:23	42323.0	95.5	7.49	7.494	0.601	-0.22086
9/10/2009 11:45:24	42324.5	97.0	7.51	7.509	0.586	-0.23175
9/10/2009 11:45:26	42326.0	98.5	7.52	7.517	0.579	-0.23763
9/10/2009 11:45:28	42328.5	101.0	7.52	7.525	0.571	-0.24353
9/10/2009 11:45:30	42330.0	102.5	7.53	7.532	0.564	-0.24881
9/10/2009 11:45:32	42332.0	104.5	7.54	7.540	0.556	-0.25489
9/10/2009 11:45:34	42334.5	107.0	7.55	7.547	0.548	-0.26104
9/10/2009 11:45:36	42336.5	109.0	7.56	7.556	0.539	-0.26811

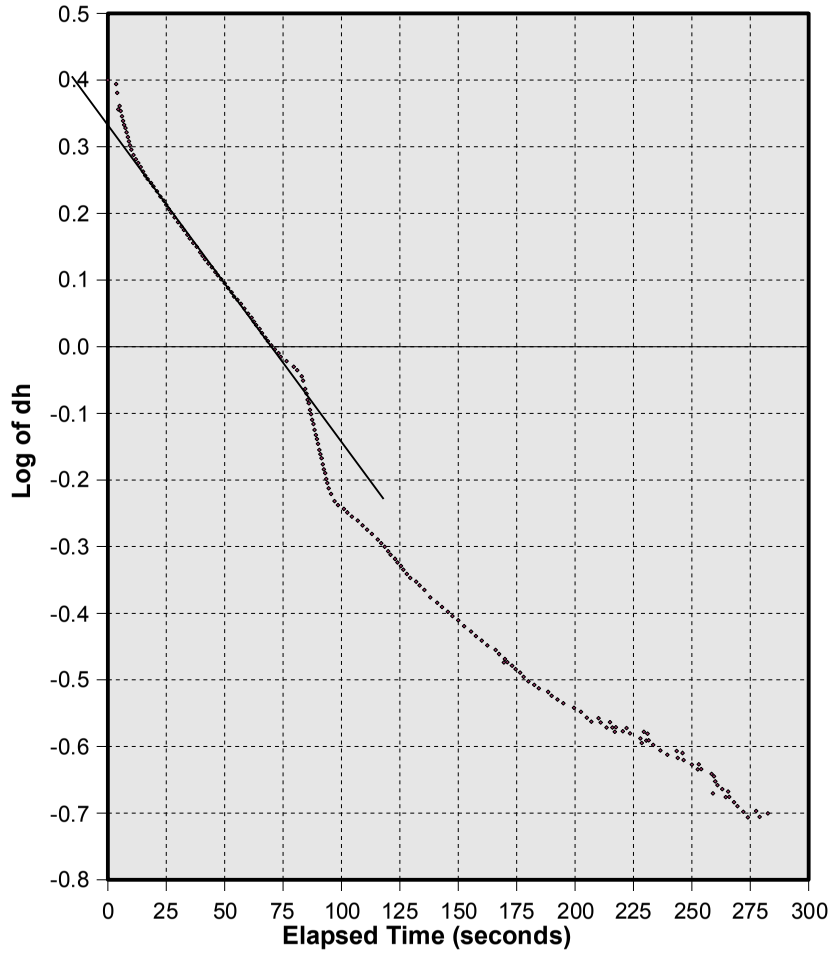
Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 11:45:38	42338.5	111.0	7.56	7.564	0.532	-0.27448
9/10/2009 11:45:40	42340.5	113.0	7.57	7.572	0.524	-0.28094
9/10/2009 11:45:43	42343.0	115.5	7.58	7.582	0.514	-0.28915
9/10/2009 11:45:44	42344.5	117.0	7.59	7.589	0.507	-0.29502
9/10/2009 11:45:46	42346.0	118.5	7.59	7.594	0.501	-0.30009
9/10/2009 11:45:47	42347.5	120.0	7.60	7.602	0.493	-0.30698
9/10/2009 11:45:48	42348.5	121.0	7.61	7.608	0.487	-0.31223
9/10/2009 11:45:50	42350.5	123.0	7.62	7.615	0.480	-0.31838
9/10/2009 11:45:51	42351.5	124.0	7.62	7.621	0.474	-0.32377
9/10/2009 11:45:53	42353.0	125.5	7.63	7.627	0.469	-0.32919
9/10/2009 11:45:54	42354.0	126.5	7.63	7.633	0.463	-0.33472
9/10/2009 11:45:55	42355.5	128.0	7.64	7.640	0.456	-0.34123
9/10/2009 11:45:57	42357.0	129.5	7.65	7.646	0.450	-0.34688
9/10/2009 11:45:59	42359.5	132.0	7.65	7.651	0.444	-0.35253
9/10/2009 11:46:01	42361.0	133.5	7.66	7.657	0.438	-0.35832
9/10/2009 11:46:03	42363.0	135.5	7.67	7.664	0.431	-0.36517
9/10/2009 11:46:05	42365.5	138.0	7.68	7.675	0.421	-0.37619
9/10/2009 11:46:08	42368.5	141.0	7.68	7.683	0.413	-0.38430
9/10/2009 11:46:10	42370.5	143.0	7.69	7.689	0.407	-0.39050
9/10/2009 11:46:13	42373.0	145.5	7.70	7.695	0.400	-0.39783
9/10/2009 11:46:15	42375.0	147.5	7.70	7.701	0.394	-0.40423
9/10/2009 11:46:17	42377.5	150.0	7.71	7.707	0.388	-0.41068
9/10/2009 11:46:20	42380.0	152.5	7.72	7.715	0.381	-0.41950
9/10/2009 11:46:23	42383.0	155.5	7.72	7.722	0.374	-0.42730
9/10/2009 11:46:25	42385.0	157.5	7.73	7.728	0.368	-0.43415
9/10/2009 11:46:27	42387.5	160.0	7.74	7.733	0.362	-0.44107
9/10/2009 11:46:30	42390.0	162.5	7.74	7.739	0.356	-0.44810
9/10/2009 11:46:33	42393.5	166.0	7.75	7.745	0.351	-0.45515
9/10/2009 11:46:35	42395.0	167.5	7.75	7.750	0.346	-0.46124
9/10/2009 11:46:37	42397.0	169.5	7.76	7.760	0.336	-0.47380
9/10/2009 11:46:37	42397.5	170.0	7.76	7.756	0.340	-0.46861
9/10/2009 11:46:38	42398.5	171.0	7.76	7.760	0.336	-0.47365
9/10/2009 11:46:40	42400.5	173.0	7.77	7.763	0.332	-0.47866
9/10/2009 11:46:42	42402.0	174.5	7.77	7.767	0.328	-0.48377
9/10/2009 11:46:44	42404.0	176.5	7.78	7.771	0.324	-0.48890
9/10/2009 11:46:45	42405.5	178.0	7.78	7.776	0.320	-0.49549
9/10/2009 11:46:47	42407.5	180.0	7.79	7.781	0.315	-0.50213
9/10/2009 11:46:50	42410.0	182.5	7.79	7.785	0.311	-0.50743
9/10/2009 11:46:52	42412.0	184.5	7.79	7.789	0.307	-0.51284
9/10/2009 11:46:56	42416.0	188.5	7.80	7.792	0.303	-0.51811
9/10/2009 11:46:57	42417.5	190.0	7.80	7.796	0.299	-0.52371
9/10/2009 11:47:00	42420.0	192.5	7.81	7.800	0.296	-0.52928
9/10/2009 11:47:02	42422.5	195.0	7.81	7.804	0.292	-0.53492
9/10/2009 11:47:07	42427.0	199.5	7.81	7.808	0.287	-0.54191
9/10/2009 11:47:10	42430.0	202.5	7.82	7.812	0.283	-0.54766
9/10/2009 11:47:12	42432.5	205.0	7.82	7.818	0.278	-0.55666
9/10/2009 11:47:14	42434.5	207.0	7.83	7.822	0.274	-0.56273
9/10/2009 11:47:17	42437.5	210.0	7.83	7.819	0.277	-0.55765
9/10/2009 11:47:18	42438.5	211.0	7.83	7.823	0.273	-0.56385
9/10/2009 11:47:21	42441.0	213.5	7.83	7.827	0.268	-0.57157
9/10/2009 11:47:22	42442.5	215.0	7.83	7.822	0.273	-0.56337
9/10/2009 11:47:23	42443.5	216.0	7.83	7.827	0.268	-0.57127

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 11:47:24	42444.5	217.0	7.84	7.831	0.264	-0.57767
9/10/2009 11:47:25	42445.0	217.5	7.83	7.827	0.268	-0.57109
9/10/2009 11:47:28	42448.0	220.5	7.84	7.831	0.265	-0.57724
9/10/2009 11:47:29	42449.5	222.0	7.84	7.828	0.268	-0.57216
9/10/2009 11:47:31	42451.0	223.5	7.84	7.833	0.263	-0.58016
9/10/2009 11:47:35	42455.5	228.0	7.85	7.837	0.258	-0.58794
9/10/2009 11:47:36	42456.0	228.5	7.85	7.841	0.254	-0.59465
9/10/2009 11:47:37	42457.0	229.5	7.84	7.831	0.264	-0.57778
9/10/2009 11:47:38	42458.0	230.5	7.85	7.839	0.256	-0.59100
9/10/2009 11:47:38	42458.5	231.0	7.84	7.833	0.262	-0.58089
9/10/2009 11:47:39	42459.0	231.5	7.85	7.839	0.257	-0.59087
9/10/2009 11:47:41	42461.0	233.5	7.85	7.843	0.253	-0.59744
9/10/2009 11:47:44	42464.0	236.5	7.86	7.848	0.248	-0.60572
9/10/2009 11:47:47	42467.0	239.5	7.86	7.851	0.244	-0.61239
9/10/2009 11:47:51	42471.0	243.5	7.86	7.848	0.247	-0.60656
9/10/2009 11:47:51	42471.5	244.0	7.86	7.854	0.241	-0.61716
9/10/2009 11:47:53	42473.5	246.0	7.86	7.850	0.246	-0.60976
9/10/2009 11:47:54	42474.0	246.5	7.87	7.856	0.240	-0.62043
9/10/2009 11:47:57	42477.5	250.0	7.87	7.860	0.236	-0.62726
9/10/2009 11:48:00	42480.0	252.5	7.87	7.863	0.232	-0.63433
9/10/2009 11:48:00	42480.5	253.0	7.87	7.859	0.236	-0.62684
9/10/2009 11:48:01	42481.5	254.0	7.87	7.863	0.232	-0.63413
9/10/2009 11:48:06	42486.0	258.5	7.88	7.867	0.229	-0.64103
9/10/2009 11:48:06	42486.5	259.0	7.89	7.882	0.214	-0.67044
9/10/2009 11:48:07	42487.0	259.5	7.88	7.869	0.227	-0.64471
9/10/2009 11:48:07	42487.5	260.0	7.88	7.873	0.223	-0.65237
9/10/2009 11:48:08	42488.5	261.0	7.89	7.876	0.220	-0.65811
9/10/2009 11:48:10	42490.5	263.0	7.89	7.879	0.217	-0.66378
9/10/2009 11:48:12	42492.0	264.5	7.90	7.885	0.211	-0.67574
9/10/2009 11:48:13	42493.0	265.5	7.89	7.881	0.215	-0.66743
9/10/2009 11:48:13	42493.5	266.0	7.90	7.884	0.211	-0.67551
9/10/2009 11:48:15	42495.5	268.0	7.90	7.888	0.207	-0.68350
9/10/2009 11:48:17	42497.0	269.5	7.90	7.891	0.204	-0.68959
9/10/2009 11:48:19	42499.5	272.0	7.91	7.895	0.201	-0.69777
9/10/2009 11:48:21	42501.5	274.0	7.91	7.899	0.197	-0.70619
9/10/2009 11:48:25	42505.0	277.5	7.91	7.895	0.201	-0.69689
9/10/2009 11:48:26	42506.5	279.0	7.91	7.898	0.197	-0.70537
9/10/2009 11:48:30	42510.0	282.5	7.91	7.896	0.199	-0.70041

Slug Test P2-5S

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	34.85	ft
Stick up height:	3.04	ft
Depth to sand pack (BGS):	18.56	ft
Depth to screened interval (BGS):	19.85	ft
Well diameter:	2.00	in
Diameter of annular space:	7.75	in
Initial depth to water table from top of pipe:	26.45	ft
Initial Head Change:	2.51	ft
Total well length:	37.89	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.1901	ft
r_c:	0.1901	ft
Radius of gravel pack (r_w):	0.3229	ft
Screened interval:	15.00	ft
Length of open section (L_e):	11.44	ft
L_e / r_w:	35.4271	
A (dimensionless):	2.733	
B (dimensionless):	0.456	
Drawdown at time = 0 (y_0):	1.98	ft
Drawdown at time = t (y_t):	0.97	ft
Elapsed Time between y_0 and y_t (t):	64	sec
Initial water column in well (L_w):	11.44	ft
$\ln(R_e/r_w)$ =	2.16	
K =	3.82E-05	ft/sec
	1.16E-03	**cm/sec**
	1204.27	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P2-5D

Initial offset in logger reading (feet):	0.039	Date:	09/10/2009
Offset increment in logger reading (feet/sec):	-0.000021		
Initial depth to water table (feet):	26.51		
Depth of probe below water table (feet):	4.720		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 11:58:25	43105.5	0.0	8.95	8.909	4.189	0.62211
9/10/2009 11:58:39	43119.5	14.0	8.90	8.860	4.139	0.61693
9/10/2009 11:59:00	43140.5	35.0	8.85	8.812	4.092	0.61191
9/10/2009 11:59:26	43166.5	61.0	8.80	8.764	4.043	0.60673
9/10/2009 11:59:53	43193.0	87.5	8.75	8.713	3.993	0.60128
9/10/2009 12:00:24	43224.0	118.5	8.70	8.665	3.945	0.59599
9/10/2009 12:00:50	43250.5	145.0	8.65	8.619	3.899	0.59096
9/10/2009 12:01:22	43282.0	176.5	8.61	8.572	3.852	0.58566
9/10/2009 12:01:52	43312.0	206.5	8.56	8.527	3.806	0.58051
9/10/2009 12:02:22	43342.5	237.0	8.51	8.482	3.762	0.57542
9/10/2009 12:02:52	43372.0	266.5	8.47	8.438	3.718	0.57027
9/10/2009 12:03:22	43402.5	297.0	8.42	8.394	3.673	0.56506
9/10/2009 12:03:51	43431.5	326.0	8.38	8.351	3.631	0.56002
9/10/2009 12:04:21	43461.5	356.0	8.34	8.308	3.588	0.55480
9/10/2009 12:04:53	43493.5	388.0	8.30	8.267	3.546	0.54977
9/10/2009 12:05:24	43524.0	418.5	8.25	8.224	3.504	0.54455
9/10/2009 12:05:54	43554.5	449.0	8.21	8.184	3.464	0.53952
9/10/2009 12:06:26	43586.0	480.5	8.17	8.143	3.422	0.53430
9/10/2009 12:06:55	43615.5	510.0	8.13	8.103	3.383	0.52928
9/10/2009 12:07:26	43646.5	541.0	8.09	8.064	3.343	0.52420
9/10/2009 12:07:56	43676.5	571.0	8.05	8.024	3.303	0.51892
9/10/2009 12:08:28	43708.0	602.5	8.01	7.985	3.265	0.51385
9/10/2009 12:09:00	43740.0	634.5	7.97	7.946	3.225	0.50859
9/10/2009 12:09:30	43770.5	665.0	7.93	7.909	3.188	0.50353
9/10/2009 12:10:02	43802.0	696.5	7.89	7.870	3.150	0.49828
9/10/2009 12:10:34	43834.5	729.0	7.85	7.832	3.111	0.49296
9/10/2009 12:11:06	43866.0	760.5	7.82	7.795	3.074	0.48772
9/10/2009 12:11:38	43898.0	792.5	7.78	7.758	3.038	0.48256
9/10/2009 12:12:12	43932.0	826.5	7.74	7.722	3.002	0.47734
9/10/2009 12:12:39	43959.0	853.5	7.71	7.688	2.967	0.47233
9/10/2009 12:13:11	43991.5	886.0	7.67	7.652	2.932	0.46713
9/10/2009 12:13:42	44022.5	917.0	7.64	7.618	2.897	0.46202
9/10/2009 12:14:14	44054.5	949.0	7.60	7.584	2.863	0.45684
9/10/2009 12:14:48	44088.5	983.0	7.56	7.548	2.828	0.45146
9/10/2009 12:15:20	44120.5	1015.0	7.53	7.514	2.794	0.44615
9/10/2009 12:15:53	44153.0	1047.5	7.50	7.481	2.760	0.44094
9/10/2009 12:16:23	44183.5	1078.0	7.46	7.448	2.728	0.43582
9/10/2009 12:16:56	44216.0	1110.5	7.43	7.415	2.695	0.43049
9/10/2009 12:17:28	44248.5	1143.0	7.40	7.384	2.663	0.42541
9/10/2009 12:18:01	44281.0	1175.5	7.36	7.351	2.631	0.42011
9/10/2009 12:18:32	44312.5	1207.0	7.33	7.321	2.601	0.41507
9/10/2009 12:19:02	44342.5	1237.0	7.30	7.291	2.570	0.40997
9/10/2009 12:19:34	44374.0	1268.5	7.27	7.259	2.539	0.40465
9/10/2009 12:20:07	44407.0	1301.5	7.24	7.230	2.510	0.39961

Slug Test P2-5D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 12:20:40	44440.5	1335.0	7.21	7.200	2.479	0.39433
9/10/2009 12:21:12	44472.5	1367.0	7.18	7.169	2.449	0.38899
9/10/2009 12:21:42	44502.5	1397.0	7.15	7.141	2.421	0.38393
9/10/2009 12:22:16	44536.0	1430.5	7.12	7.113	2.392	0.37882
9/10/2009 12:22:50	44570.0	1464.5	7.09	7.084	2.364	0.37366
9/10/2009 12:23:17	44597.5	1492.0	7.06	7.057	2.337	0.36859
9/10/2009 12:23:49	44629.5	1524.0	7.03	7.030	2.309	0.36349
9/10/2009 12:24:24	44664.5	1559.0	7.01	7.001	2.281	0.35814
9/10/2009 12:24:55	44695.0	1589.5	6.98	6.974	2.254	0.35290
9/10/2009 12:25:28	44728.5	1623.0	6.95	6.947	2.226	0.34761
9/10/2009 12:25:59	44759.5	1654.0	6.92	6.921	2.200	0.34244
9/10/2009 12:26:31	44791.0	1685.5	6.90	6.895	2.175	0.33741
9/10/2009 12:27:05	44825.5	1720.0	6.87	6.870	2.149	0.33234
9/10/2009 12:27:36	44856.0	1750.5	6.84	6.845	2.124	0.32718
9/10/2009 12:28:07	44887.5	1782.0	6.82	6.820	2.100	0.32218
9/10/2009 12:28:41	44921.5	1816.0	6.79	6.795	2.075	0.31692
9/10/2009 12:29:13	44953.5	1848.0	6.77	6.771	2.050	0.31180
9/10/2009 12:29:44	44984.5	1879.0	6.74	6.746	2.026	0.30661
9/10/2009 12:30:18	45018.5	1913.0	6.72	6.723	2.003	0.30159
9/10/2009 12:30:51	45051.5	1946.0	6.69	6.699	1.978	0.29629
9/10/2009 12:31:26	45086.5	1981.0	6.67	6.675	1.955	0.29115
9/10/2009 12:31:59	45119.0	2013.5	6.65	6.651	1.931	0.28572
9/10/2009 12:32:35	45155.0	2049.5	6.62	6.628	1.907	0.28046
9/10/2009 12:33:06	45186.0	2080.5	6.60	6.605	1.884	0.27511
9/10/2009 12:33:44	45224.5	2119.0	6.57	6.580	1.860	0.26950
9/10/2009 12:34:13	45253.5	2148.0	6.55	6.559	1.839	0.26448
9/10/2009 12:34:49	45289.0	2183.5	6.53	6.538	1.817	0.25943
9/10/2009 12:35:23	45323.5	2218.0	6.51	6.516	1.796	0.25432
9/10/2009 12:35:56	45356.5	2251.0	6.48	6.495	1.775	0.24914
9/10/2009 12:36:28	45388.5	2283.0	6.46	6.475	1.754	0.24414
9/10/2009 12:37:02	45422.5	2317.0	6.44	6.454	1.733	0.23884
9/10/2009 12:37:37	45457.0	2351.5	6.42	6.432	1.712	0.23348
9/10/2009 12:38:13	45493.0	2387.5	6.40	6.411	1.691	0.22805
9/10/2009 12:38:49	45529.5	2424.0	6.38	6.390	1.669	0.22257
9/10/2009 12:39:23	45563.0	2457.5	6.36	6.371	1.650	0.21752
9/10/2009 12:39:57	45597.0	2491.5	6.34	6.351	1.631	0.21242
9/10/2009 12:40:30	45630.5	2525.0	6.31	6.331	1.611	0.20698
9/10/2009 12:41:03	45663.5	2558.0	6.29	6.312	1.591	0.20174
9/10/2009 12:41:41	45701.0	2595.5	6.27	6.291	1.571	0.19619
9/10/2009 12:42:18	45738.0	2632.5	6.25	6.272	1.552	0.19085
9/10/2009 12:42:54	45774.5	2669.0	6.23	6.253	1.533	0.18544
9/10/2009 12:43:29	45809.5	2704.0	6.21	6.234	1.513	0.17994
9/10/2009 12:44:06	45846.0	2740.5	6.19	6.215	1.494	0.17439
9/10/2009 12:44:40	45880.5	2775.0	6.17	6.196	1.476	0.16905
9/10/2009 12:45:14	45914.0	2808.5	6.16	6.179	1.459	0.16393
9/10/2009 12:45:52	45952.5	2847.0	6.14	6.160	1.439	0.15818
9/10/2009 12:46:32	45992.5	2887.0	6.12	6.142	1.421	0.15267
9/10/2009 12:47:03	46023.0	2917.5	6.10	6.125	1.405	0.14764
9/10/2009 12:47:40	46060.5	2955.0	6.08	6.108	1.388	0.14229

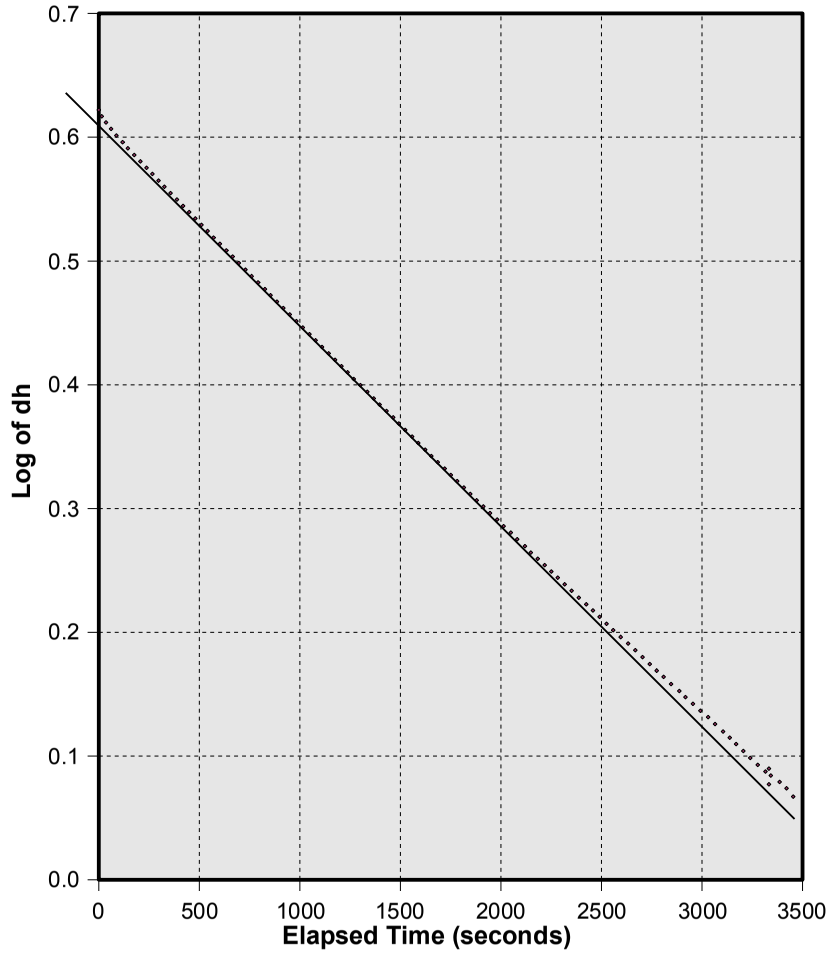
Slug Test P2-5D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 12:48:17	46097.0	2991.5	6.06	6.090	1.369	0.13655
9/10/2009 12:48:56	46136.5	3031.0	6.05	6.074	1.353	0.13140
9/10/2009 12:49:30	46170.0	3064.5	6.03	6.056	1.336	0.12581
9/10/2009 12:50:10	46210.0	3104.5	6.01	6.038	1.318	0.11987
9/10/2009 12:50:44	46244.0	3138.5	5.99	6.023	1.303	0.11481
9/10/2009 12:51:15	46275.0	3169.5	5.98	6.008	1.287	0.10966
9/10/2009 12:51:51	46311.0	3205.5	5.96	5.991	1.271	0.10415
9/10/2009 12:52:26	46346.0	3240.5	5.94	5.975	1.255	0.09856
9/10/2009 12:53:02	46382.5	3277.0	5.93	5.959	1.239	0.09290
9/10/2009 12:53:40	46420.5	3315.0	5.91	5.944	1.223	0.08754
9/10/2009 12:53:58	46438.5	3333.0	5.88	5.915	1.195	0.07726
9/10/2009 12:53:59	46439.0	3333.5	5.92	5.950	1.230	0.08981
9/10/2009 12:54:07	46447.5	3342.0	5.90	5.934	1.214	0.08418
9/10/2009 12:54:52	46492.0	3386.5	5.89	5.920	1.200	0.07913
9/10/2009 12:55:25	46525.5	3420.0	5.87	5.906	1.186	0.07392
9/10/2009 12:55:59	46559.5	3454.0	5.85	5.888	1.167	0.06718

Slug Test P2-5D

Slug Test by Bouwer and Rice

Displacement Method:	Injection	
Well depth:	50.81	ft
Stick up height:	2.91	ft
Depth to sand pack (BGS):	44.66	ft
Depth to screened interval (BGS):	45.81	ft
Well diameter:	2.00	in
Diameter of annular space:	7.75	in
Initial depth to water table from top of pipe:	26.51	ft
Initial Head Change:	4.19	ft
Total well length:	53.72	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.1901	ft
r_c:	0.0833	ft
Radius of gravel pack (r_w):	0.3229	ft
Screened interval:	5.00	ft
Length of open section (L_e):	5.00	ft
L_e / r_w:	15.4839	
C (dimensionless):	1.546	
Drawdown at time = 0 (y_0):	3.56	ft
Drawdown at time = t (y_t):	1.70	ft
Elapsed Time between y_0 and y_t (t):	1997	sec
Initial water column in well (L_w):	27.21	ft
$\ln(R_e/r_w)$ =	2.87	
K =	7.39E-07	ft/sec
	2.25E-05	**cm/sec**
	23.29	ft/yr



Water above sand pack:	Yes
%Duration below sand pack:	0.00%
Water above screen:	Yes
%Duration below screen:	0.00%

Slug Test P2-6

Initial offset in logger reading (feet):	-0.001	Date:	09/10/2009
Offset increment in logger reading (feet/sec):	0.000149		
Initial depth to water table (feet):	21.63		
Depth of probe below water table (feet):	8.208		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 10:37:54	38274.5	0.0	6.35	6.255	1.952	0.29057
9/10/2009 10:37:55	38275.0	0.5	6.55	6.453	1.754	0.24415
9/10/2009 10:37:55	38275.5	1.0	6.45	6.355	1.853	0.26777
9/10/2009 10:37:56	38276.0	1.5	6.61	6.515	1.693	0.22856
9/10/2009 10:37:56	38276.5	2.0	6.46	6.363	1.845	0.26592
9/10/2009 10:37:57	38277.0	2.5	6.55	6.455	1.753	0.24372
9/10/2009 10:37:57	38277.5	3.0	6.58	6.484	1.724	0.23650
9/10/2009 10:37:58	38278.0	3.5	6.61	6.511	1.697	0.22966
9/10/2009 10:37:58	38278.5	4.0	6.63	6.538	1.670	0.22271
9/10/2009 10:37:59	38279.0	4.5	6.66	6.567	1.641	0.21513
9/10/2009 10:37:59	38279.5	5.0	6.69	6.591	1.616	0.20848
9/10/2009 10:38:00	38280.0	5.5	6.71	6.618	1.589	0.20118
9/10/2009 10:38:00	38280.5	6.0	6.74	6.643	1.564	0.19432
9/10/2009 10:38:01	38281.0	6.5	6.76	6.665	1.542	0.18819
9/10/2009 10:38:01	38281.5	7.0	6.79	6.692	1.515	0.18054
9/10/2009 10:38:02	38282.0	7.5	6.81	6.717	1.491	0.17333
9/10/2009 10:38:02	38282.5	8.0	6.84	6.744	1.464	0.16542
9/10/2009 10:38:03	38283.0	8.5	6.87	6.771	1.437	0.15735
9/10/2009 10:38:03	38283.5	9.0	6.89	6.798	1.410	0.14914
9/10/2009 10:38:04	38284.0	9.5	6.93	6.829	1.379	0.13950
9/10/2009 10:38:04	38284.5	10.0	6.95	6.856	1.352	0.13094
9/10/2009 10:38:05	38285.0	10.5	6.98	6.881	1.327	0.12286
9/10/2009 10:38:05	38285.5	11.0	7.00	6.908	1.300	0.11395
9/10/2009 10:38:06	38286.0	11.5	7.03	6.933	1.275	0.10555
9/10/2009 10:38:06	38286.5	12.0	7.05	6.955	1.252	0.09767
9/10/2009 10:38:07	38287.0	12.5	7.08	6.981	1.226	0.08858
9/10/2009 10:38:07	38287.5	13.0	7.09	6.997	1.210	0.08290
9/10/2009 10:38:08	38288.0	13.5	7.12	7.019	1.188	0.07496
9/10/2009 10:38:09	38289.0	14.5	7.15	7.051	1.157	0.06316
9/10/2009 10:38:09	38289.5	15.0	7.17	7.069	1.139	0.05638
9/10/2009 10:38:10	38290.0	15.5	7.18	7.084	1.124	0.05065
9/10/2009 10:38:10	38290.5	16.0	7.20	7.102	1.106	0.04367
9/10/2009 10:38:11	38291.0	16.5	7.22	7.119	1.089	0.03697
9/10/2009 10:38:11	38291.5	17.0	7.23	7.134	1.074	0.03097
9/10/2009 10:38:12	38292.0	17.5	7.25	7.150	1.058	0.02448
9/10/2009 10:38:12	38292.5	18.0	7.26	7.165	1.043	0.01831
9/10/2009 10:38:13	38293.0	18.5	7.28	7.180	1.027	0.01163
9/10/2009 10:38:13	38293.5	19.0	7.29	7.195	1.012	0.00527
9/10/2009 10:38:14	38294.0	19.5	7.31	7.209	0.998	-0.00074
9/10/2009 10:38:14	38294.5	20.0	7.32	7.226	0.981	-0.00817
9/10/2009 10:38:15	38295.0	20.5	7.34	7.241	0.966	-0.01482
9/10/2009 10:38:15	38295.5	21.0	7.36	7.257	0.951	-0.02204
9/10/2009 10:38:16	38296.0	21.5	7.37	7.276	0.932	-0.03077
9/10/2009 10:38:16	38296.5	22.0	7.39	7.288	0.920	-0.03637

Slug Test P2-6

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 10:38:17	38297.0	22.5	7.41	7.309	0.899	-0.04637
9/10/2009 10:38:17	38297.5	23.0	7.42	7.324	0.884	-0.05364
9/10/2009 10:38:18	38298.0	23.5	7.44	7.340	0.868	-0.06154
9/10/2009 10:38:18	38298.5	24.0	7.45	7.355	0.853	-0.06907
9/10/2009 10:38:19	38299.0	24.5	7.47	7.369	0.839	-0.07622
9/10/2009 10:38:19	38299.5	25.0	7.48	7.384	0.824	-0.08401
9/10/2009 10:38:20	38300.0	25.5	7.50	7.397	0.810	-0.09142
9/10/2009 10:38:20	38300.5	26.0	7.51	7.412	0.795	-0.09949
9/10/2009 10:38:21	38301.0	26.5	7.52	7.424	0.783	-0.10605
9/10/2009 10:38:21	38301.5	27.0	7.54	7.441	0.766	-0.11554
9/10/2009 10:38:22	38302.0	27.5	7.55	7.453	0.754	-0.12235
9/10/2009 10:38:22	38302.5	28.0	7.56	7.462	0.746	-0.12752
9/10/2009 10:38:23	38303.0	28.5	7.58	7.480	0.728	-0.13809
9/10/2009 10:38:23	38303.5	29.0	7.59	7.495	0.713	-0.14709
9/10/2009 10:38:24	38304.5	30.0	7.62	7.518	0.690	-0.16124
9/10/2009 10:38:25	38305.0	30.5	7.63	7.531	0.677	-0.16946
9/10/2009 10:38:25	38305.5	31.0	7.64	7.540	0.668	-0.17522
9/10/2009 10:38:26	38306.0	31.5	7.65	7.554	0.654	-0.18437
9/10/2009 10:38:26	38306.5	32.0	7.67	7.568	0.639	-0.19440
9/10/2009 10:38:27	38307.0	32.5	7.68	7.580	0.627	-0.20258
9/10/2009 10:38:27	38307.5	33.0	7.70	7.595	0.612	-0.21303
9/10/2009 10:38:28	38308.0	33.5	7.71	7.607	0.600	-0.22158
9/10/2009 10:38:28	38308.5	34.0	7.72	7.622	0.585	-0.23251
9/10/2009 10:38:29	38309.0	34.5	7.73	7.634	0.574	-0.24145
9/10/2009 10:38:29	38309.5	35.0	7.75	7.651	0.557	-0.25446
9/10/2009 10:38:30	38310.0	35.5	7.77	7.665	0.543	-0.26546
9/10/2009 10:38:30	38310.5	36.0	7.78	7.676	0.532	-0.27429
9/10/2009 10:38:31	38311.0	36.5	7.79	7.688	0.520	-0.28415
9/10/2009 10:38:31	38311.5	37.0	7.80	7.701	0.507	-0.29508
9/10/2009 10:38:32	38312.0	37.5	7.81	7.710	0.498	-0.30280
9/10/2009 10:38:32	38312.5	38.0	7.82	7.723	0.485	-0.31422
9/10/2009 10:38:33	38313.0	38.5	7.83	7.729	0.479	-0.31956
9/10/2009 10:38:33	38313.5	39.0	7.84	7.740	0.467	-0.33050
9/10/2009 10:38:34	38314.5	40.0	7.85	7.751	0.456	-0.34071
9/10/2009 10:38:35	38315.0	40.5	7.86	7.757	0.450	-0.34639
9/10/2009 10:38:36	38316.0	41.5	7.87	7.767	0.441	-0.35599
9/10/2009 10:38:37	38317.0	42.5	7.88	7.774	0.434	-0.36280
9/10/2009 10:38:38	38318.0	43.5	7.88	7.783	0.425	-0.37175
9/10/2009 10:38:39	38319.0	44.5	7.89	7.791	0.417	-0.37985
9/10/2009 10:38:40	38320.0	45.5	7.90	7.799	0.408	-0.38917
9/10/2009 10:38:41	38321.0	46.5	7.91	7.807	0.400	-0.39760
9/10/2009 10:38:41	38321.5	47.0	7.91	7.812	0.395	-0.40298
9/10/2009 10:38:43	38323.0	48.5	7.93	7.823	0.385	-0.41498
9/10/2009 10:38:44	38324.0	49.5	7.93	7.831	0.377	-0.42394
9/10/2009 10:38:45	38325.0	50.5	7.94	7.837	0.371	-0.43074
9/10/2009 10:38:46	38326.0	51.5	7.95	7.843	0.365	-0.43764
9/10/2009 10:38:47	38327.0	52.5	7.95	7.850	0.357	-0.44709
9/10/2009 10:38:48	38328.5	54.0	7.96	7.858	0.349	-0.45665
9/10/2009 10:38:50	38330.0	55.5	7.97	7.866	0.342	-0.46642

Slug Test P2-6

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 10:38:51	38331.0	56.5	7.98	7.875	0.333	-0.47782
9/10/2009 10:38:52	38332.0	57.5	7.98	7.879	0.329	-0.48288
9/10/2009 10:38:53	38333.5	59.0	7.99	7.883	0.324	-0.48923
9/10/2009 10:38:54	38334.5	60.0	7.99	7.890	0.317	-0.49851
9/10/2009 10:38:55	38335.5	61.0	8.00	7.896	0.311	-0.50659
9/10/2009 10:38:56	38336.5	62.0	8.00	7.900	0.308	-0.51199
9/10/2009 10:38:57	38337.5	63.0	8.01	7.904	0.304	-0.51747
9/10/2009 10:38:58	38338.5	64.0	8.01	7.908	0.300	-0.52301
9/10/2009 10:38:59	38339.5	65.0	8.02	7.912	0.296	-0.52862
9/10/2009 10:39:00	38340.5	66.0	8.02	7.917	0.290	-0.53729
9/10/2009 10:39:02	38342.0	67.5	8.03	7.921	0.286	-0.54298
9/10/2009 10:39:03	38343.0	68.5	8.03	7.925	0.283	-0.54886
9/10/2009 10:39:04	38344.0	69.5	8.04	7.931	0.277	-0.55794
9/10/2009 10:39:05	38345.5	71.0	8.04	7.935	0.273	-0.56391
9/10/2009 10:39:06	38346.0	71.5	8.05	7.940	0.268	-0.57182
9/10/2009 10:39:08	38348.0	73.5	8.05	7.944	0.263	-0.57951
9/10/2009 10:39:09	38349.5	75.0	8.05	7.948	0.260	-0.58578
9/10/2009 10:39:11	38351.0	76.5	8.06	7.952	0.256	-0.59215
9/10/2009 10:39:12	38352.0	77.5	8.06	7.956	0.252	-0.59874
9/10/2009 10:39:13	38353.5	79.0	8.07	7.960	0.247	-0.60705
9/10/2009 10:39:15	38355.0	80.5	8.07	7.964	0.243	-0.61374
9/10/2009 10:39:16	38356.0	81.5	8.08	7.968	0.240	-0.62067
9/10/2009 10:39:17	38357.0	82.5	8.08	7.972	0.236	-0.62771
9/10/2009 10:39:18	38358.5	84.0	8.08	7.975	0.233	-0.63286
9/10/2009 10:39:20	38360.5	86.0	8.09	7.978	0.229	-0.63982
9/10/2009 10:39:22	38362.0	87.5	8.09	7.983	0.224	-0.64897
9/10/2009 10:39:23	38363.5	89.0	8.10	7.987	0.221	-0.65634
9/10/2009 10:39:25	38365.5	91.0	8.10	7.991	0.217	-0.66369
9/10/2009 10:39:27	38367.0	92.5	8.10	7.994	0.213	-0.67132
9/10/2009 10:39:30	38370.0	95.5	8.11	7.997	0.211	-0.67655
9/10/2009 10:39:30	38370.5	96.0	8.11	8.000	0.208	-0.68263
9/10/2009 10:39:32	38372.0	97.5	8.11	8.004	0.204	-0.69060
9/10/2009 10:39:34	38374.0	99.5	8.12	8.007	0.200	-0.69856
9/10/2009 10:39:36	38376.0	101.5	8.12	8.011	0.196	-0.70666
9/10/2009 10:39:39	38379.0	104.5	8.13	8.017	0.191	-0.71912
9/10/2009 10:39:41	38381.0	106.5	8.13	8.020	0.187	-0.72762
9/10/2009 10:39:44	38384.0	109.5	8.14	8.024	0.184	-0.73594
9/10/2009 10:39:47	38387.5	113.0	8.14	8.028	0.179	-0.74667
9/10/2009 10:39:51	38391.5	117.0	8.14	8.031	0.177	-0.75253
9/10/2009 10:39:52	38392.5	118.0	8.15	8.034	0.174	-0.75960
9/10/2009 10:39:55	38395.5	121.0	8.15	8.036	0.171	-0.76602
9/10/2009 10:39:59	38399.5	125.0	8.15	8.040	0.168	-0.77474
9/10/2009 10:40:02	38402.5	128.0	8.16	8.043	0.164	-0.78402
9/10/2009 10:40:03	38403.0	128.5	8.16	8.041	0.167	-0.77858
9/10/2009 10:40:06	38406.0	131.5	8.16	8.045	0.163	-0.78795
9/10/2009 10:40:06	38406.5	132.0	8.16	8.043	0.165	-0.78245
9/10/2009 10:40:07	38407.0	132.5	8.16	8.045	0.163	-0.78755
9/10/2009 10:40:07	38407.5	133.0	8.16	8.046	0.161	-0.79271
9/10/2009 10:40:08	38408.5	134.0	8.16	8.044	0.163	-0.78696

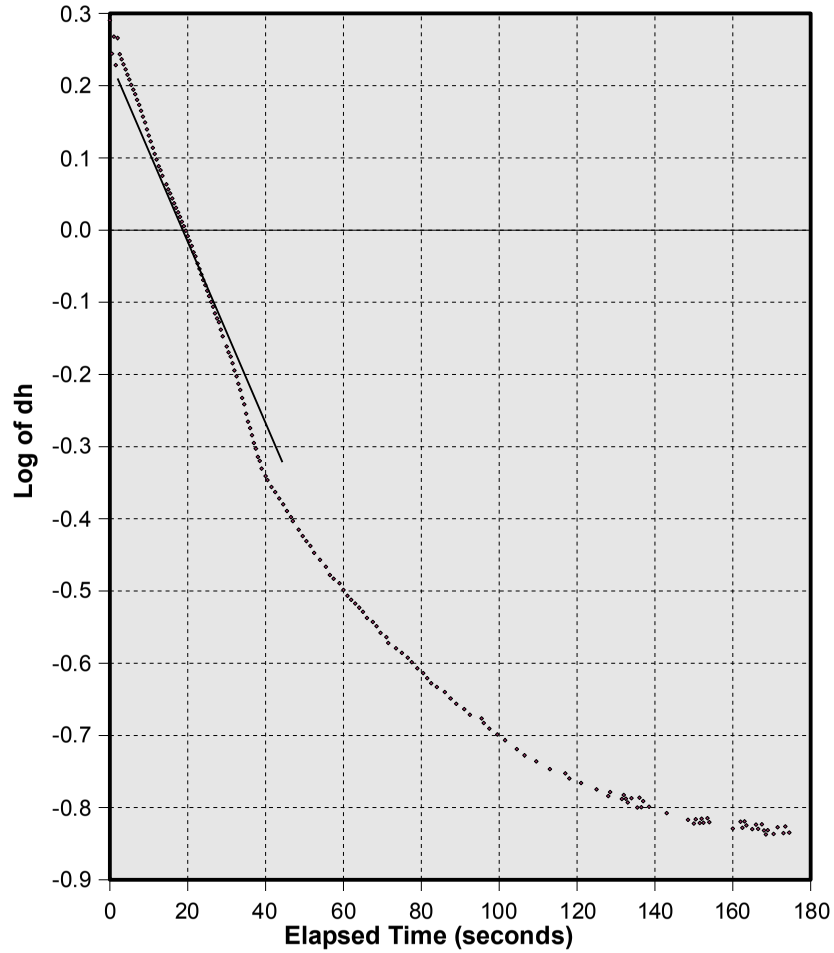
Slug Test P2-6

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 10:40:10	38410.0	135.5	8.16	8.049	0.159	-0.79985
9/10/2009 10:40:10	38410.5	136.0	8.16	8.044	0.164	-0.78617
9/10/2009 10:40:11	38411.0	136.5	8.16	8.049	0.159	-0.79944
9/10/2009 10:40:11	38411.5	137.0	8.16	8.046	0.162	-0.79111
9/10/2009 10:40:13	38413.0	138.5	8.16	8.049	0.159	-0.79863
9/10/2009 10:40:17	38417.5	143.0	8.17	8.052	0.156	-0.80782
9/10/2009 10:40:23	38423.0	148.5	8.17	8.055	0.152	-0.81679
9/10/2009 10:40:24	38424.5	150.0	8.17	8.057	0.151	-0.82189
9/10/2009 10:40:25	38425.0	150.5	8.17	8.055	0.153	-0.81595
9/10/2009 10:40:26	38426.0	151.5	8.17	8.057	0.151	-0.82124
9/10/2009 10:40:26	38426.5	152.0	8.17	8.055	0.153	-0.81531
9/10/2009 10:40:27	38427.0	152.5	8.17	8.057	0.151	-0.82082
9/10/2009 10:40:28	38428.0	153.5	8.17	8.054	0.153	-0.81468
9/10/2009 10:40:28	38428.5	154.0	8.17	8.056	0.151	-0.82017
9/10/2009 10:40:34	38434.5	160.0	8.18	8.059	0.148	-0.82919
9/10/2009 10:40:36	38436.5	162.0	8.18	8.056	0.151	-0.81963
9/10/2009 10:40:37	38437.0	162.5	8.18	8.059	0.149	-0.82810
9/10/2009 10:40:37	38437.5	163.0	8.18	8.056	0.152	-0.81920
9/10/2009 10:40:38	38438.0	163.5	8.18	8.058	0.150	-0.82475
9/10/2009 10:40:39	38439.5	165.0	8.18	8.060	0.148	-0.82994
9/10/2009 10:40:40	38440.5	166.0	8.18	8.058	0.150	-0.82368
9/10/2009 10:40:41	38441.0	166.5	8.18	8.059	0.148	-0.82929
9/10/2009 10:40:42	38442.0	167.5	8.18	8.057	0.150	-0.82303
9/10/2009 10:40:42	38442.5	168.0	8.18	8.060	0.147	-0.83157
9/10/2009 10:40:43	38443.0	168.5	8.18	8.062	0.145	-0.83728
9/10/2009 10:40:43	38443.5	169.0	8.18	8.060	0.148	-0.83113
9/10/2009 10:40:45	38445.0	170.5	8.18	8.062	0.146	-0.83639
9/10/2009 10:40:46	38446.0	171.5	8.18	8.059	0.149	-0.82711
9/10/2009 10:40:47	38447.5	173.0	8.18	8.062	0.146	-0.83529
9/10/2009 10:40:48	38448.0	173.5	8.18	8.058	0.149	-0.82624
9/10/2009 10:40:49	38449.0	174.5	8.18	8.061	0.146	-0.83463

Slug Test P2-6

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	29.05	ft
Stick up height:	3.39	ft
Depth to sand pack (BGS):	12.98	ft
Depth to screened interval (BGS):	14.05	ft
Well diameter:	2.00	in
Diameter of annular space:	7.75	in
Initial depth to water table from top of pipe:	21.63	ft
Initial Head Change:	1.95	ft
Total well length:	32.44	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.1901	ft
r_c:	0.1901	ft
Radius of gravel pack (r_w):	0.3229	ft
Screened interval:	15.00	ft
Length of open section (L_e):	10.81	ft
L_e / r_w:	33.4761	
A (dimensionless):	2.671	
B (dimensionless):	0.445	
Drawdown at time = 0 (y_0):	1.28	ft
Drawdown at time = t (y_t):	0.77	ft
Elapsed Time between y_0 and y_t (t):	15.5	sec
Initial water column in well (L_w):	10.81	ft
$\ln(R_e/r_w)$ =	2.11	
K =	1.16E-04	ft/sec
	3.54E-03	**cm/sec**
	3661.15	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P2-7

Initial offset in logger reading (feet):	-0.178	Date:	09/10/2009
Offset increment in logger reading (feet/sec):	0.000011		
Initial depth to water table (feet):	16		
Depth of probe below water table (feet):	9.718		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 9:35:42	34542.0	0.0	5.28	5.451	4.267	0.63008
9/10/2009 9:35:43	34543.0	1.0	5.35	5.519	4.199	0.62311
9/10/2009 9:35:43	34543.5	1.5	5.41	5.578	4.140	0.61696
9/10/2009 9:35:44	34544.0	2.0	5.46	5.629	4.089	0.61158
9/10/2009 9:35:45	34545.0	3.0	5.53	5.700	4.018	0.60397
9/10/2009 9:35:46	34546.5	4.5	5.59	5.756	3.962	0.59788
9/10/2009 9:35:48	34548.0	6.0	5.64	5.806	3.912	0.59236
9/10/2009 9:35:49	34549.5	7.5	5.69	5.856	3.862	0.58678
9/10/2009 9:35:51	34551.0	9.0	5.73	5.904	3.814	0.58135
9/10/2009 9:35:52	34552.5	10.5	5.78	5.951	3.767	0.57596
9/10/2009 9:35:54	34554.0	12.0	5.83	5.998	3.720	0.57051
9/10/2009 9:35:55	34555.5	13.5	5.88	6.048	3.670	0.56464
9/10/2009 9:35:57	34557.0	15.0	5.93	6.102	3.616	0.55820
9/10/2009 9:35:58	34558.0	16.0	5.97	6.145	3.573	0.55301
9/10/2009 9:35:59	34559.0	17.0	6.03	6.205	3.513	0.54565
9/10/2009 9:36:00	34560.0	18.0	6.11	6.278	3.440	0.53653
9/10/2009 9:36:00	34560.5	18.5	6.15	6.318	3.400	0.53145
9/10/2009 9:36:01	34561.5	19.5	6.22	6.393	3.325	0.52177
9/10/2009 9:36:02	34562.5	20.5	6.28	6.451	3.267	0.51413
9/10/2009 9:36:03	34563.5	21.5	6.33	6.497	3.221	0.50797
9/10/2009 9:36:04	34564.5	22.5	6.38	6.549	3.169	0.50090
9/10/2009 9:36:05	34565.5	23.5	6.43	6.597	3.121	0.49428
9/10/2009 9:36:07	34567.0	25.0	6.47	6.640	3.078	0.48825
9/10/2009 9:36:09	34569.0	27.0	6.51	6.679	3.039	0.48272
9/10/2009 9:36:11	34571.0	29.0	6.54	6.714	3.004	0.47769
9/10/2009 9:36:13	34573.5	31.5	6.58	6.755	2.963	0.47173
9/10/2009 9:36:15	34575.5	33.5	6.62	6.791	2.927	0.46642
9/10/2009 9:36:18	34578.0	36.0	6.66	6.835	2.883	0.45985
9/10/2009 9:36:20	34580.0	38.0	6.70	6.872	2.846	0.45424
9/10/2009 9:36:22	34582.0	40.0	6.74	6.910	2.808	0.44840
9/10/2009 9:36:24	34584.0	42.0	6.78	6.947	2.771	0.44265
9/10/2009 9:36:26	34586.0	44.0	6.81	6.982	2.736	0.43713
9/10/2009 9:36:28	34588.0	46.0	6.85	7.017	2.701	0.43154
9/10/2009 9:36:30	34590.0	48.0	6.88	7.048	2.670	0.42653
9/10/2009 9:36:32	34592.0	50.0	6.91	7.079	2.639	0.42147
9/10/2009 9:36:34	34594.0	52.0	6.94	7.112	2.606	0.41601
9/10/2009 9:36:36	34596.0	54.0	6.97	7.144	2.574	0.41064
9/10/2009 9:36:38	34598.0	56.0	7.00	7.175	2.543	0.40539
9/10/2009 9:36:40	34600.0	58.0	7.04	7.206	2.512	0.40006
9/10/2009 9:36:42	34602.0	60.0	7.07	7.237	2.481	0.39467
9/10/2009 9:36:44	34604.0	62.0	7.10	7.269	2.449	0.38904
9/10/2009 9:36:46	34606.0	64.0	7.13	7.301	2.417	0.38333
9/10/2009 9:36:48	34608.0	66.0	7.16	7.332	2.386	0.37773
9/10/2009 9:36:50	34610.0	68.0	7.19	7.361	2.357	0.37243

Slug Test P2-7

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 9:36:52	34612.0	70.0	7.22	7.390	2.328	0.36705
9/10/2009 9:36:54	34614.0	72.0	7.25	7.419	2.299	0.36162
9/10/2009 9:36:56	34616.0	74.0	7.28	7.447	2.271	0.35630
9/10/2009 9:36:58	34618.0	76.0	7.30	7.473	2.244	0.35111
9/10/2009 9:37:00	34620.0	78.0	7.34	7.506	2.211	0.34468
9/10/2009 9:37:02	34622.0	80.0	7.37	7.537	2.180	0.33856
9/10/2009 9:37:04	34624.0	82.0	7.40	7.566	2.152	0.33274
9/10/2009 9:37:06	34626.0	84.0	7.42	7.594	2.124	0.32706
9/10/2009 9:37:08	34628.5	86.5	7.46	7.625	2.093	0.32068
9/10/2009 9:37:10	34630.5	88.5	7.48	7.652	2.066	0.31504
9/10/2009 9:37:12	34632.5	90.5	7.51	7.679	2.039	0.30933
9/10/2009 9:37:14	34634.5	92.5	7.54	7.706	2.012	0.30355
9/10/2009 9:37:16	34636.5	94.5	7.57	7.736	1.982	0.29703
9/10/2009 9:37:18	34638.5	96.5	7.59	7.761	1.957	0.29152
9/10/2009 9:37:20	34640.5	98.5	7.62	7.786	1.932	0.28594
9/10/2009 9:37:22	34642.5	100.5	7.64	7.813	1.905	0.27983
9/10/2009 9:37:24	34644.5	102.5	7.67	7.838	1.880	0.27410
9/10/2009 9:37:26	34646.5	104.5	7.69	7.863	1.855	0.26829
9/10/2009 9:37:28	34648.5	106.5	7.72	7.890	1.828	0.26193
9/10/2009 9:37:30	34650.0	108.0	7.74	7.913	1.805	0.25643
9/10/2009 9:37:32	34652.0	110.0	7.76	7.934	1.784	0.25135
9/10/2009 9:37:34	34654.0	112.0	7.79	7.955	1.763	0.24622
9/10/2009 9:37:35	34655.5	113.5	7.81	7.978	1.740	0.24052
9/10/2009 9:37:37	34657.0	115.0	7.83	8.001	1.717	0.23474
9/10/2009 9:37:38	34658.5	116.5	7.85	8.023	1.695	0.22914
9/10/2009 9:37:40	34660.0	118.0	7.87	8.044	1.674	0.22373
9/10/2009 9:37:42	34662.0	120.0	7.90	8.067	1.651	0.21773
9/10/2009 9:37:43	34663.5	121.5	7.92	8.092	1.626	0.21111
9/10/2009 9:37:44	34664.5	122.5	7.94	8.111	1.607	0.20601
9/10/2009 9:37:45	34665.5	123.5	7.97	8.135	1.583	0.19948
9/10/2009 9:37:46	34666.5	124.5	7.99	8.161	1.557	0.19229
9/10/2009 9:37:47	34667.5	125.5	8.02	8.188	1.530	0.18469
9/10/2009 9:37:48	34668.5	126.5	8.05	8.217	1.501	0.17638
9/10/2009 9:37:49	34669.5	127.5	8.08	8.246	1.472	0.16791
9/10/2009 9:37:50	34670.5	128.5	8.10	8.269	1.449	0.16108
9/10/2009 9:37:51	34671.5	129.5	8.12	8.290	1.428	0.15474
9/10/2009 9:37:53	34673.0	131.0	8.14	8.309	1.409	0.14893
9/10/2009 9:37:54	34674.5	132.5	8.16	8.327	1.391	0.14335
9/10/2009 9:37:57	34677.0	135.0	8.18	8.346	1.372	0.13739
9/10/2009 9:37:59	34679.5	137.5	8.19	8.363	1.355	0.13198
9/10/2009 9:38:02	34682.0	140.0	8.21	8.380	1.338	0.12651
9/10/2009 9:38:04	34684.5	142.5	8.23	8.396	1.322	0.12129
9/10/2009 9:38:07	34687.0	145.0	8.25	8.415	1.303	0.11502
9/10/2009 9:38:09	34689.0	147.0	8.26	8.430	1.288	0.11000
9/10/2009 9:38:11	34691.5	149.5	8.28	8.449	1.269	0.10355
9/10/2009 9:38:14	34694.0	152.0	8.30	8.465	1.253	0.09805
9/10/2009 9:38:16	34696.0	154.0	8.31	8.480	1.238	0.09283
9/10/2009 9:38:18	34698.5	156.5	8.33	8.496	1.222	0.08719
9/10/2009 9:38:21	34701.0	159.0	8.34	8.514	1.204	0.08076

Slug Test P2-7

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 9:38:23	34703.5	161.5	8.36	8.530	1.188	0.07496
9/10/2009 9:38:25	34705.5	163.5	8.38	8.545	1.173	0.06946
9/10/2009 9:38:28	34708.5	166.5	8.39	8.560	1.157	0.06351
9/10/2009 9:38:30	34710.5	168.5	8.41	8.575	1.142	0.05785
9/10/2009 9:38:33	34713.0	171.0	8.42	8.592	1.126	0.05135
9/10/2009 9:38:35	34715.5	173.5	8.44	8.606	1.112	0.04592
9/10/2009 9:38:37	34717.5	175.5	8.45	8.619	1.099	0.04082
9/10/2009 9:38:40	34720.0	178.0	8.47	8.636	1.082	0.03406
9/10/2009 9:38:42	34722.0	180.0	8.48	8.649	1.069	0.02882
9/10/2009 9:38:44	34724.5	182.5	8.49	8.663	1.055	0.02310
9/10/2009 9:38:47	34727.0	185.0	8.51	8.678	1.040	0.01689
9/10/2009 9:38:49	34729.5	187.5	8.52	8.692	1.026	0.01102
9/10/2009 9:38:52	34732.0	190.0	8.54	8.707	1.011	0.00463
9/10/2009 9:38:54	34734.5	192.5	8.55	8.721	0.997	-0.00142
9/10/2009 9:38:57	34737.0	195.0	8.57	8.734	0.984	-0.00710
9/10/2009 9:38:59	34739.5	197.5	8.58	8.747	0.971	-0.01287
9/10/2009 9:39:01	34741.5	199.5	8.59	8.759	0.959	-0.01826
9/10/2009 9:39:03	34743.5	201.5	8.60	8.770	0.948	-0.02326
9/10/2009 9:39:05	34745.5	203.5	8.61	8.782	0.936	-0.02878
9/10/2009 9:39:07	34747.5	205.5	8.62	8.793	0.925	-0.03391
9/10/2009 9:39:10	34750.0	208.0	8.64	8.805	0.913	-0.03957
9/10/2009 9:39:12	34752.0	210.0	8.65	8.817	0.901	-0.04530
9/10/2009 9:39:14	34754.5	212.5	8.66	8.829	0.889	-0.05111
9/10/2009 9:39:17	34757.5	215.5	8.67	8.841	0.877	-0.05700
9/10/2009 9:39:19	34759.5	217.5	8.68	8.852	0.866	-0.06247
9/10/2009 9:39:21	34761.5	219.5	8.69	8.862	0.856	-0.06750
9/10/2009 9:39:23	34763.5	221.5	8.70	8.872	0.846	-0.07259
9/10/2009 9:39:26	34766.0	224.0	8.72	8.885	0.833	-0.07930
9/10/2009 9:39:28	34768.5	226.5	8.73	8.897	0.821	-0.08559
9/10/2009 9:39:31	34771.0	229.0	8.74	8.908	0.810	-0.09143
9/10/2009 9:39:33	34773.5	231.5	8.75	8.918	0.800	-0.09681
9/10/2009 9:39:36	34776.0	234.0	8.76	8.931	0.787	-0.10391
9/10/2009 9:39:39	34779.0	237.0	8.78	8.944	0.774	-0.11112
9/10/2009 9:39:41	34781.5	239.5	8.79	8.954	0.764	-0.11675
9/10/2009 9:39:44	34784.0	242.0	8.80	8.964	0.754	-0.12246
9/10/2009 9:39:45	34785.5	243.5	8.80	8.973	0.745	-0.12766
9/10/2009 9:39:48	34788.0	246.0	8.81	8.983	0.735	-0.13351
9/10/2009 9:39:51	34791.0	249.0	8.83	8.994	0.724	-0.14004
9/10/2009 9:39:53	34793.5	251.5	8.84	9.004	0.714	-0.14606
9/10/2009 9:39:55	34795.5	253.5	8.84	9.013	0.705	-0.15155
9/10/2009 9:39:58	34798.5	256.5	8.86	9.025	0.692	-0.15961
9/10/2009 9:40:01	34801.0	259.0	8.87	9.033	0.684	-0.16464
9/10/2009 9:40:03	34803.5	261.5	8.88	9.043	0.675	-0.17101
9/10/2009 9:40:06	34806.0	264.0	8.88	9.052	0.666	-0.17682
9/10/2009 9:40:08	34808.5	266.5	8.89	9.060	0.658	-0.18206
9/10/2009 9:40:10	34810.5	268.5	8.90	9.068	0.650	-0.18736
9/10/2009 9:40:12	34812.5	270.5	8.91	9.076	0.642	-0.19273
9/10/2009 9:40:15	34815.5	273.5	8.92	9.085	0.633	-0.19884
9/10/2009 9:40:18	34818.0	276.0	8.93	9.093	0.625	-0.20435

Slug Test P2-7

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 9:40:20	34820.5	278.5	8.93	9.101	0.617	-0.20992
9/10/2009 9:40:23	34823.0	281.0	8.94	9.110	0.608	-0.21629
9/10/2009 9:40:26	34826.0	284.0	8.95	9.118	0.600	-0.22202
9/10/2009 9:40:28	34828.5	286.5	8.96	9.126	0.592	-0.22783
9/10/2009 9:40:31	34831.0	289.0	8.97	9.135	0.583	-0.23447
9/10/2009 9:40:33	34833.5	291.5	8.98	9.143	0.575	-0.24045
9/10/2009 9:40:36	34836.0	294.0	8.98	9.150	0.568	-0.24575
9/10/2009 9:40:39	34839.5	297.5	8.99	9.158	0.560	-0.25188
9/10/2009 9:40:42	34842.5	300.5	9.00	9.167	0.551	-0.25889
9/10/2009 9:40:45	34845.0	303.0	9.01	9.175	0.543	-0.26522
9/10/2009 9:40:48	34848.5	306.5	9.02	9.183	0.535	-0.27163
9/10/2009 9:40:51	34851.5	309.5	9.02	9.191	0.527	-0.27815
9/10/2009 9:40:53	34853.5	311.5	9.03	9.198	0.520	-0.28394
9/10/2009 9:40:56	34856.0	314.0	9.04	9.204	0.514	-0.28895
9/10/2009 9:40:59	34859.0	317.0	9.04	9.210	0.508	-0.29402
9/10/2009 9:41:01	34861.5	319.5	9.05	9.216	0.502	-0.29916
9/10/2009 9:41:04	34864.0	322.0	9.06	9.223	0.495	-0.30523
9/10/2009 9:41:07	34867.0	325.0	9.06	9.229	0.489	-0.31049
9/10/2009 9:41:10	34870.5	328.5	9.07	9.235	0.483	-0.31582
9/10/2009 9:41:13	34873.0	331.0	9.07	9.241	0.477	-0.32122
9/10/2009 9:41:15	34875.5	333.5	9.08	9.247	0.471	-0.32669
9/10/2009 9:41:18	34878.0	336.0	9.09	9.254	0.464	-0.33316
9/10/2009 9:41:21	34881.5	339.5	9.09	9.260	0.458	-0.33877
9/10/2009 9:41:24	34884.0	342.0	9.10	9.266	0.452	-0.34447
9/10/2009 9:41:27	34887.5	345.5	9.10	9.271	0.446	-0.35023
9/10/2009 9:41:31	34891.5	349.5	9.11	9.278	0.439	-0.35705
9/10/2009 9:41:35	34895.0	353.0	9.12	9.284	0.434	-0.36298
9/10/2009 9:41:38	34898.5	356.5	9.12	9.290	0.428	-0.36899
9/10/2009 9:41:41	34901.0	359.0	9.13	9.295	0.423	-0.37407
9/10/2009 9:41:44	34904.5	362.5	9.13	9.301	0.417	-0.38024
9/10/2009 9:41:47	34907.5	365.5	9.14	9.308	0.410	-0.38756
9/10/2009 9:41:51	34911.0	369.0	9.15	9.314	0.404	-0.39393
9/10/2009 9:41:55	34915.0	373.0	9.15	9.320	0.398	-0.40038
9/10/2009 9:41:59	34919.5	377.5	9.16	9.326	0.392	-0.40693
9/10/2009 9:42:04	34924.0	382.0	9.17	9.332	0.386	-0.41358
9/10/2009 9:42:07	34927.0	385.0	9.17	9.337	0.381	-0.41920
9/10/2009 9:42:12	34932.0	390.0	9.18	9.343	0.375	-0.42603
9/10/2009 9:42:16	34936.5	394.5	9.18	9.349	0.369	-0.43298
9/10/2009 9:42:20	34940.5	398.5	9.19	9.355	0.363	-0.44005
9/10/2009 9:42:25	34945.5	403.5	9.19	9.361	0.357	-0.44722
9/10/2009 9:42:28	34948.0	406.0	9.20	9.366	0.352	-0.45331
9/10/2009 9:42:35	34955.5	413.5	9.21	9.372	0.346	-0.46067
9/10/2009 9:42:40	34960.5	418.5	9.21	9.378	0.340	-0.46819
9/10/2009 9:42:46	34966.0	424.0	9.22	9.383	0.335	-0.47454
9/10/2009 9:42:50	34970.0	428.0	9.22	9.387	0.331	-0.47969
9/10/2009 9:42:53	34973.0	431.0	9.22	9.391	0.327	-0.48492
9/10/2009 9:42:57	34977.5	435.5	9.23	9.395	0.322	-0.49154
9/10/2009 9:43:02	34982.5	440.5	9.23	9.399	0.319	-0.49688
9/10/2009 9:43:07	34987.5	445.5	9.24	9.403	0.315	-0.50229

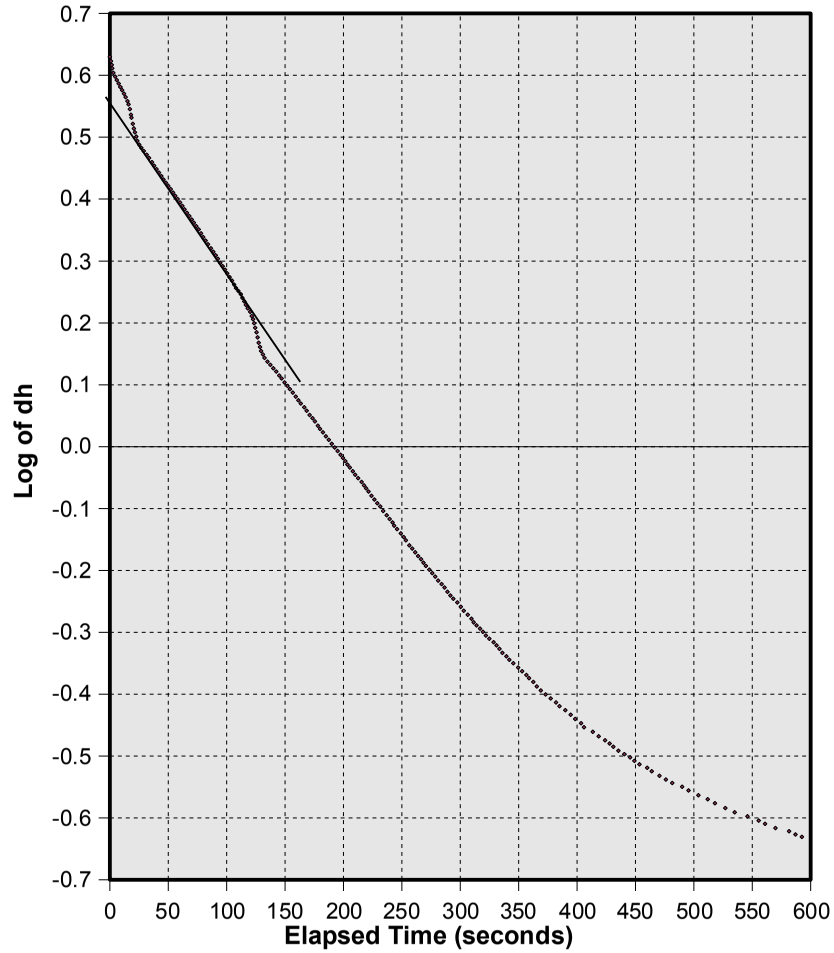
Slug Test P2-7

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 9:43:11	34991.0	449.0	9.24	9.407	0.311	-0.50780
9/10/2009 9:43:15	34995.5	453.5	9.25	9.411	0.307	-0.51336
9/10/2009 9:43:22	35002.0	460.0	9.25	9.415	0.303	-0.51895
9/10/2009 9:43:26	35006.0	464.0	9.25	9.419	0.299	-0.52467
9/10/2009 9:43:32	35012.5	470.5	9.26	9.424	0.294	-0.53189
9/10/2009 9:43:38	35018.0	476.0	9.26	9.428	0.290	-0.53775
9/10/2009 9:43:43	35023.5	481.5	9.27	9.432	0.286	-0.54369
9/10/2009 9:43:52	35032.0	490.0	9.27	9.436	0.282	-0.54966
9/10/2009 9:43:57	35037.5	495.5	9.27	9.440	0.278	-0.55577
9/10/2009 9:44:06	35046.0	504.0	9.28	9.445	0.273	-0.56350
9/10/2009 9:44:14	35054.0	512.0	9.28	9.449	0.269	-0.56976
9/10/2009 9:44:20	35060.0	518.0	9.29	9.453	0.265	-0.57615
9/10/2009 9:44:29	35069.0	527.0	9.29	9.457	0.260	-0.58425
9/10/2009 9:44:37	35077.0	535.0	9.30	9.461	0.257	-0.59082
9/10/2009 9:44:48	35088.0	546.0	9.30	9.465	0.253	-0.59743
9/10/2009 9:44:57	35097.5	555.5	9.30	9.469	0.249	-0.60418
9/10/2009 9:45:03	35103.0	561.0	9.31	9.472	0.246	-0.60934
9/10/2009 9:45:12	35112.0	570.0	9.31	9.476	0.242	-0.61628
9/10/2009 9:45:23	35123.5	581.5	9.31	9.479	0.239	-0.62147
9/10/2009 9:45:29	35129.0	587.0	9.32	9.482	0.236	-0.62684
9/10/2009 9:45:34	35134.5	592.5	9.32	9.484	0.234	-0.63042

Slug Test P2-7

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	25.56	ft
Stick up height:	3.25	ft
Depth to sand pack (BGS):	9.25	ft
Depth to screened interval (BGS):	10.56	ft
Well diameter:	2.00	in
Diameter of annular space:	7.75	in
Initial depth to water table from top of pipe:	16.00	ft
Initial Head Change:	4.27	ft
Total well length:	28.81	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.1901	ft
r_c:	0.1901	ft
Radius of gravel pack (r_w):	0.3229	ft
Screened interval:	15.00	ft
Length of open section (L_e):	12.81	ft
L_e / r_w:	39.6697	
A (dimensionless):	2.867	
B (dimensionless):	0.479	
Drawdown at time = 0 (y_0):	3.17	ft
Drawdown at time = t (y_t):	1.63	ft
Elapsed Time between y_0 and y_t (t):	99	sec
Initial water column in well (L_w):	12.81	ft
$\ln(R_e/r_w)$ =	2.25	
K =	2.14E-05	ft/sec
	6.53E-04	**cm/sec**
	676.06	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P2-8

Initial offset in logger reading (feet):	0.016	Date:	09/10/2009
Offset increment in logger reading (feet/sec):	-0.000004		
Initial depth to water table (feet):	19.65		
Depth of probe below water table (feet):	10.722		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 10:50:15	39015.0	0.0	4.87	4.859	5.864	0.76819
9/10/2009 10:50:17	39017.0	2.0	4.95	4.930	5.793	0.76290
9/10/2009 10:50:19	39019.0	4.0	5.03	5.013	5.710	0.75663
9/10/2009 10:50:21	39021.0	6.0	5.11	5.090	5.633	0.75073
9/10/2009 10:50:23	39023.0	8.0	5.18	5.164	5.559	0.74499
9/10/2009 10:50:25	39025.0	10.0	5.25	5.235	5.488	0.73940
9/10/2009 10:50:27	39027.0	12.0	5.32	5.301	5.422	0.73415
9/10/2009 10:50:29	39029.0	14.0	5.38	5.368	5.355	0.72875
9/10/2009 10:50:31	39031.0	16.0	5.45	5.430	5.293	0.72369
9/10/2009 10:50:33	39033.5	18.5	5.52	5.507	5.216	0.71732
9/10/2009 10:50:36	39036.0	21.0	5.59	5.578	5.145	0.71137
9/10/2009 10:50:38	39038.5	23.5	5.66	5.648	5.075	0.70542
9/10/2009 10:50:41	39041.0	26.0	5.73	5.717	5.006	0.69947
9/10/2009 10:50:43	39043.5	28.5	5.80	5.780	4.943	0.69397
9/10/2009 10:50:46	39046.0	31.0	5.86	5.845	4.878	0.68822
9/10/2009 10:50:48	39048.5	33.5	5.92	5.907	4.816	0.68267
9/10/2009 10:50:51	39051.0	36.0	5.98	5.965	4.758	0.67740
9/10/2009 10:50:53	39053.5	38.5	6.04	6.023	4.700	0.67207
9/10/2009 10:50:56	39056.0	41.0	6.09	6.079	4.644	0.66687
9/10/2009 10:50:58	39058.5	43.5	6.15	6.135	4.588	0.66160
9/10/2009 10:51:01	39061.0	46.0	6.20	6.189	4.534	0.65645
9/10/2009 10:51:03	39063.5	48.5	6.26	6.243	4.480	0.65125
9/10/2009 10:51:06	39066.0	51.0	6.31	6.295	4.428	0.64618
9/10/2009 10:51:09	39069.0	54.0	6.37	6.355	4.368	0.64025
9/10/2009 10:51:12	39072.0	57.0	6.43	6.413	4.310	0.63444
9/10/2009 10:51:14	39074.5	59.5	6.48	6.463	4.260	0.62938
9/10/2009 10:51:17	39077.5	62.5	6.53	6.519	4.204	0.62363
9/10/2009 10:51:20	39080.5	65.5	6.59	6.575	4.148	0.61780
9/10/2009 10:51:23	39083.5	68.5	6.65	6.631	4.092	0.61190
9/10/2009 10:51:26	39086.5	71.5	6.70	6.683	4.040	0.60634
9/10/2009 10:51:29	39089.5	74.5	6.75	6.737	3.986	0.60049
9/10/2009 10:51:32	39092.5	77.5	6.81	6.791	3.932	0.59457
9/10/2009 10:51:35	39095.5	80.5	6.86	6.840	3.883	0.58912
9/10/2009 10:51:38	39098.5	83.5	6.91	6.892	3.831	0.58326
9/10/2009 10:51:41	39101.5	86.5	6.96	6.942	3.781	0.57756
9/10/2009 10:51:44	39104.5	89.5	7.01	6.990	3.733	0.57201
9/10/2009 10:51:47	39107.5	92.5	7.06	7.040	3.683	0.56615
9/10/2009 10:51:50	39110.5	95.5	7.10	7.088	3.635	0.56045
9/10/2009 10:51:53	39113.5	98.5	7.15	7.133	3.590	0.55504
9/10/2009 10:51:56	39116.5	101.5	7.20	7.180	3.543	0.54931
9/10/2009 10:51:59	39119.5	104.5	7.24	7.226	3.496	0.54363
9/10/2009 10:52:02	39122.5	107.5	7.28	7.269	3.453	0.53826
9/10/2009 10:52:05	39125.5	110.5	7.33	7.313	3.409	0.53269
9/10/2009 10:52:08	39128.5	113.5	7.37	7.357	3.365	0.52704

Slug Test P2-8

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 10:52:11	39131.5	116.5	7.41	7.398	3.324	0.52172
9/10/2009 10:52:14	39134.5	119.5	7.45	7.437	3.285	0.51659
9/10/2009 10:52:17	39137.5	122.5	7.49	7.479	3.243	0.51100
9/10/2009 10:52:20	39140.5	125.5	7.53	7.518	3.204	0.50575
9/10/2009 10:52:23	39143.5	128.5	7.57	7.558	3.164	0.50029
9/10/2009 10:52:26	39146.5	131.5	7.61	7.596	3.126	0.49504
9/10/2009 10:52:29	39149.5	134.5	7.65	7.633	3.089	0.48987
9/10/2009 10:52:32	39152.5	137.5	7.69	7.671	3.051	0.48449
9/10/2009 10:52:35	39155.5	140.5	7.73	7.710	3.012	0.47891
9/10/2009 10:52:38	39158.5	143.5	7.76	7.746	2.976	0.47368
9/10/2009 10:52:42	39162.0	147.0	7.80	7.787	2.935	0.46766
9/10/2009 10:52:45	39165.0	150.0	7.84	7.822	2.900	0.46244
9/10/2009 10:52:48	39168.0	153.0	7.88	7.860	2.862	0.45671
9/10/2009 10:52:51	39171.0	156.0	7.91	7.893	2.829	0.45168
9/10/2009 10:52:54	39174.0	159.0	7.94	7.928	2.794	0.44627
9/10/2009 10:52:57	39177.0	162.0	7.98	7.962	2.760	0.44095
9/10/2009 10:53:00	39180.5	165.5	8.02	8.000	2.722	0.43493
9/10/2009 10:53:04	39184.0	169.0	8.05	8.037	2.685	0.42898
9/10/2009 10:53:07	39187.0	172.0	8.08	8.068	2.654	0.42394
9/10/2009 10:53:10	39190.0	175.0	8.12	8.101	2.621	0.41850
9/10/2009 10:53:13	39193.0	178.0	8.15	8.132	2.590	0.41333
9/10/2009 10:53:16	39196.0	181.0	8.18	8.164	2.558	0.40793
9/10/2009 10:53:19	39199.0	184.0	8.21	8.195	2.527	0.40264
9/10/2009 10:53:22	39202.0	187.0	8.24	8.225	2.497	0.39745
9/10/2009 10:53:25	39205.0	190.0	8.27	8.254	2.468	0.39237
9/10/2009 10:53:28	39208.0	193.0	8.30	8.285	2.437	0.38688
9/10/2009 10:53:31	39211.0	196.0	8.33	8.316	2.406	0.38132
9/10/2009 10:53:34	39214.5	199.5	8.36	8.347	2.375	0.37568
9/10/2009 10:53:37	39217.5	202.5	8.39	8.376	2.346	0.37035
9/10/2009 10:53:41	39221.0	206.0	8.42	8.407	2.315	0.36457
9/10/2009 10:53:44	39224.0	209.0	8.45	8.434	2.288	0.35947
9/10/2009 10:53:47	39227.0	212.0	8.48	8.463	2.259	0.35393
9/10/2009 10:53:50	39230.0	215.0	8.50	8.489	2.233	0.34890
9/10/2009 10:53:53	39233.0	218.0	8.53	8.516	2.206	0.34361
9/10/2009 10:53:56	39236.0	221.0	8.56	8.543	2.179	0.33826
9/10/2009 10:53:59	39239.0	224.0	8.58	8.568	2.154	0.33325
9/10/2009 10:54:02	39242.0	227.0	8.61	8.593	2.129	0.32818
9/10/2009 10:54:05	39245.0	230.0	8.63	8.618	2.104	0.32304
9/10/2009 10:54:08	39248.0	233.0	8.66	8.643	2.079	0.31785
9/10/2009 10:54:11	39251.0	236.0	8.68	8.668	2.054	0.31259
9/10/2009 10:54:14	39254.0	239.0	8.71	8.693	2.029	0.30727
9/10/2009 10:54:17	39257.5	242.5	8.74	8.721	2.002	0.30145
9/10/2009 10:54:20	39260.5	245.5	8.76	8.746	1.977	0.29599
9/10/2009 10:54:23	39263.5	248.5	8.78	8.769	1.954	0.29091
9/10/2009 10:54:26	39266.5	251.5	8.81	8.792	1.931	0.28576
9/10/2009 10:54:30	39270.0	255.0	8.83	8.817	1.906	0.28010
9/10/2009 10:54:33	39273.0	258.0	8.85	8.840	1.883	0.27482
9/10/2009 10:54:36	39276.0	261.0	8.88	8.862	1.861	0.26972
9/10/2009 10:54:39	39279.5	264.5	8.90	8.887	1.836	0.26384

Slug Test P2-8

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 10:54:43	39283.0	268.0	8.93	8.913	1.810	0.25764
9/10/2009 10:54:46	39286.0	271.0	8.95	8.935	1.788	0.25233
9/10/2009 10:54:49	39289.5	274.5	8.97	8.958	1.765	0.24670
9/10/2009 10:54:53	39293.0	278.0	9.00	8.981	1.742	0.24100
9/10/2009 10:54:56	39296.0	281.0	9.02	9.002	1.721	0.23573
9/10/2009 10:54:59	39299.5	284.5	9.04	9.025	1.698	0.22988
9/10/2009 10:55:03	39303.0	288.0	9.06	9.048	1.675	0.22395
9/10/2009 10:55:06	39306.5	291.5	9.08	9.069	1.654	0.21847
9/10/2009 10:55:10	39310.0	295.0	9.10	9.090	1.633	0.21292
9/10/2009 10:55:13	39313.5	298.5	9.12	9.110	1.613	0.20756
9/10/2009 10:55:16	39316.5	301.5	9.15	9.131	1.592	0.20186
9/10/2009 10:55:20	39320.0	305.0	9.17	9.152	1.571	0.19609
9/10/2009 10:55:23	39323.5	308.5	9.19	9.173	1.550	0.19024
9/10/2009 10:55:27	39327.0	312.0	9.21	9.194	1.529	0.18431
9/10/2009 10:55:30	39330.5	315.5	9.23	9.215	1.508	0.17830
9/10/2009 10:55:34	39334.0	319.0	9.25	9.234	1.489	0.17279
9/10/2009 10:55:37	39337.0	322.0	9.27	9.252	1.471	0.16750
9/10/2009 10:55:40	39340.5	325.5	9.28	9.269	1.454	0.16245
9/10/2009 10:55:44	39344.0	329.0	9.30	9.288	1.435	0.15673
9/10/2009 10:55:47	39347.0	332.0	9.32	9.305	1.418	0.15155
9/10/2009 10:55:50	39350.0	335.0	9.34	9.322	1.401	0.14631
9/10/2009 10:55:53	39353.5	338.5	9.35	9.340	1.383	0.14069
9/10/2009 10:55:57	39357.0	342.0	9.37	9.359	1.364	0.13467
9/10/2009 10:56:00	39360.5	345.5	9.39	9.376	1.347	0.12922
9/10/2009 10:56:04	39364.0	349.0	9.41	9.392	1.331	0.12402
9/10/2009 10:56:07	39367.5	352.5	9.43	9.412	1.311	0.11744
9/10/2009 10:56:11	39371.5	356.5	9.44	9.430	1.292	0.11143
9/10/2009 10:56:15	39375.0	360.0	9.46	9.445	1.277	0.10635
9/10/2009 10:56:18	39378.5	363.5	9.48	9.464	1.258	0.09984
9/10/2009 10:56:23	39383.0	368.0	9.49	9.480	1.242	0.09428
9/10/2009 10:56:26	39386.0	371.0	9.51	9.495	1.227	0.08900
9/10/2009 10:56:29	39389.5	374.5	9.53	9.511	1.211	0.08330
9/10/2009 10:56:33	39393.0	378.0	9.54	9.526	1.196	0.07788
9/10/2009 10:56:37	39397.0	382.0	9.55	9.540	1.182	0.07276
9/10/2009 10:56:39	39399.5	384.5	9.57	9.554	1.168	0.06758
9/10/2009 10:56:44	39404.0	389.0	9.58	9.570	1.152	0.06159
9/10/2009 10:56:48	39408.0	393.0	9.60	9.585	1.137	0.05589
9/10/2009 10:56:51	39411.5	396.5	9.61	9.599	1.123	0.05051
9/10/2009 10:56:55	39415.0	400.0	9.63	9.612	1.110	0.04545
9/10/2009 10:56:59	39419.0	404.0	9.64	9.626	1.096	0.03993
9/10/2009 10:57:02	39422.5	407.5	9.65	9.639	1.083	0.03474
9/10/2009 10:57:06	39426.0	411.0	9.67	9.653	1.069	0.02909
9/10/2009 10:57:10	39430.0	415.0	9.68	9.666	1.056	0.02377
9/10/2009 10:57:14	39434.5	419.5	9.69	9.680	1.042	0.01797
9/10/2009 10:57:18	39438.0	423.0	9.71	9.694	1.028	0.01209
9/10/2009 10:57:22	39442.0	427.0	9.72	9.706	1.016	0.00698
9/10/2009 10:57:26	39446.0	431.0	9.73	9.718	1.004	0.00182
9/10/2009 10:57:30	39450.0	435.0	9.75	9.731	0.991	-0.00385
9/10/2009 10:57:33	39453.5	438.5	9.76	9.743	0.979	-0.00914

Slug Test P2-8

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 10:57:38	39458.5	443.5	9.77	9.758	0.964	-0.01586
9/10/2009 10:57:43	39463.5	448.5	9.78	9.770	0.952	-0.02130
9/10/2009 10:57:47	39467.5	452.5	9.80	9.781	0.941	-0.02636
9/10/2009 10:57:51	39471.5	456.5	9.81	9.793	0.929	-0.03194
9/10/2009 10:57:55	39475.5	460.5	9.82	9.804	0.918	-0.03712
9/10/2009 10:57:59	39479.5	464.5	9.83	9.815	0.907	-0.04236
9/10/2009 10:58:04	39484.5	469.5	9.84	9.827	0.895	-0.04816
9/10/2009 10:58:09	39489.0	474.0	9.85	9.840	0.882	-0.05452
9/10/2009 10:58:14	39494.0	479.0	9.87	9.852	0.870	-0.06048
9/10/2009 10:58:18	39498.0	483.0	9.88	9.862	0.860	-0.06551
9/10/2009 10:58:23	39503.0	488.0	9.89	9.873	0.849	-0.07111
9/10/2009 10:58:28	39508.0	493.0	9.90	9.883	0.839	-0.07626
9/10/2009 10:58:32	39512.0	497.0	9.91	9.895	0.828	-0.08200
9/10/2009 10:58:36	39516.5	501.5	9.92	9.905	0.818	-0.08729
9/10/2009 10:58:41	39521.0	506.0	9.93	9.915	0.808	-0.09264
9/10/2009 10:58:46	39526.5	511.5	9.94	9.926	0.797	-0.09861
9/10/2009 10:58:51	39531.5	516.5	9.95	9.936	0.787	-0.10410
9/10/2009 10:58:56	39536.5	521.5	9.96	9.946	0.777	-0.10967
9/10/2009 10:59:01	39541.0	526.0	9.97	9.956	0.767	-0.11531
9/10/2009 10:59:06	39546.5	531.5	9.98	9.966	0.757	-0.12102
9/10/2009 10:59:12	39552.0	537.0	9.99	9.976	0.747	-0.12681
9/10/2009 10:59:17	39557.0	542.0	10.00	9.985	0.738	-0.13209
9/10/2009 10:59:22	39562.5	547.5	10.01	9.995	0.728	-0.13803
9/10/2009 10:59:28	39568.5	553.5	10.02	10.005	0.718	-0.14405
9/10/2009 10:59:33	39573.5	558.5	10.03	10.014	0.709	-0.14954
9/10/2009 10:59:40	39580.0	565.0	10.04	10.024	0.699	-0.15573
9/10/2009 10:59:45	39585.0	570.0	10.05	10.032	0.691	-0.16074
9/10/2009 10:59:50	39590.0	575.0	10.05	10.041	0.682	-0.16645
9/10/2009 10:59:55	39595.5	580.5	10.06	10.049	0.674	-0.17159
9/10/2009 11:00:01	39601.5	586.5	10.07	10.057	0.666	-0.17680
9/10/2009 11:00:07	39607.0	592.0	10.08	10.066	0.657	-0.18273
9/10/2009 11:00:13	39613.0	598.0	10.09	10.075	0.648	-0.18874
9/10/2009 11:00:19	39619.5	604.5	10.10	10.083	0.640	-0.19415
9/10/2009 11:00:25	39625.0	610.0	10.10	10.091	0.631	-0.19963
9/10/2009 11:00:31	39631.5	616.5	10.11	10.100	0.622	-0.20589
9/10/2009 11:00:37	39637.5	622.5	10.12	10.108	0.614	-0.21152
9/10/2009 11:00:45	39645.0	630.0	10.13	10.116	0.606	-0.21723
9/10/2009 11:00:51	39651.0	636.0	10.14	10.125	0.597	-0.22375
9/10/2009 11:00:58	39658.5	643.5	10.15	10.133	0.589	-0.22962
9/10/2009 11:01:06	39666.0	651.0	10.15	10.141	0.581	-0.23558
9/10/2009 11:01:13	39673.5	658.5	10.16	10.149	0.573	-0.24162
9/10/2009 11:01:18	39678.5	663.5	10.17	10.156	0.566	-0.24697
9/10/2009 11:01:25	39685.0	670.0	10.18	10.163	0.559	-0.25239
9/10/2009 11:01:33	39693.0	678.0	10.18	10.171	0.551	-0.25868
9/10/2009 11:01:42	39702.0	687.0	10.19	10.179	0.543	-0.26505
9/10/2009 11:01:48	39708.0	693.0	10.20	10.186	0.536	-0.27071
9/10/2009 11:01:57	39717.0	702.0	10.21	10.194	0.528	-0.27726
9/10/2009 11:02:07	39727.5	712.5	10.22	10.202	0.520	-0.28393
9/10/2009 11:02:14	39734.0	719.0	10.22	10.208	0.514	-0.28899

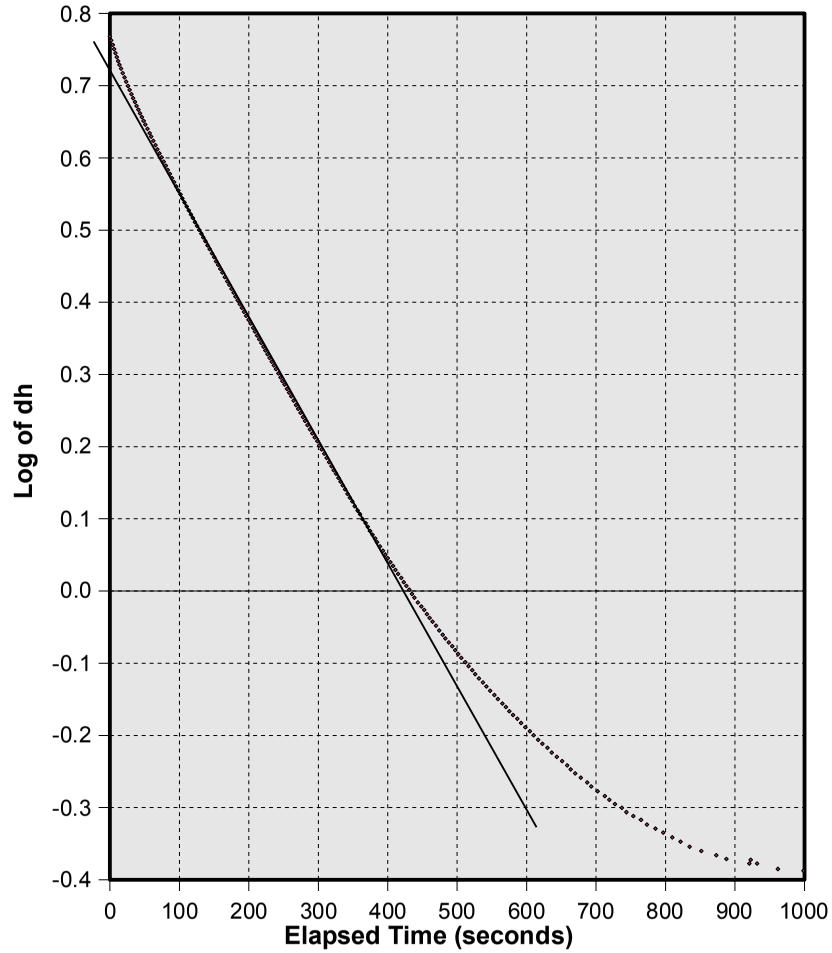
Slug Test P2-8

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 11:02:22	39742.0	727.0	10.23	10.215	0.507	-0.29497
9/10/2009 11:02:32	39752.0	737.0	10.23	10.221	0.501	-0.30018
9/10/2009 11:02:38	39758.5	743.5	10.24	10.228	0.494	-0.30631
9/10/2009 11:02:48	39768.5	753.5	10.25	10.235	0.488	-0.31165
9/10/2009 11:02:59	39779.5	764.5	10.25	10.241	0.482	-0.31706
9/10/2009 11:03:08	39788.0	773.0	10.26	10.248	0.475	-0.32345
9/10/2009 11:03:20	39800.5	785.5	10.27	10.254	0.469	-0.32902
9/10/2009 11:03:31	39811.5	796.5	10.27	10.260	0.463	-0.33465
9/10/2009 11:03:44	39824.5	809.5	10.28	10.267	0.456	-0.34132
9/10/2009 11:03:56	39836.5	821.5	10.29	10.273	0.450	-0.34713
9/10/2009 11:04:09	39849.5	834.5	10.29	10.280	0.443	-0.35399
9/10/2009 11:04:26	39866.5	851.5	10.30	10.286	0.437	-0.35998
9/10/2009 11:04:48	39888.0	873.0	10.30	10.292	0.430	-0.36608
9/10/2009 11:05:02	39902.5	887.5	10.31	10.297	0.425	-0.37121
9/10/2009 11:05:35	39935.5	920.5	10.32	10.303	0.419	-0.37752
9/10/2009 11:05:37	39937.5	922.5	10.31	10.298	0.424	-0.37238
9/10/2009 11:05:46	39946.5	931.5	10.32	10.303	0.419	-0.37756
9/10/2009 11:06:16	39976.5	961.5	10.32	10.310	0.412	-0.38500
9/10/2009 11:06:53	40013.5	998.5	10.32	10.312	0.410	-0.38727

Slug Test P2-8

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	33.19	ft
Stick up height:	3.07	ft
Depth to sand pack (BGS):	14.08	ft
Depth to screened interval (BGS):	15.15	ft
Well diameter:	2.00	in
Diameter of annular space:	7.75	in
Initial depth to water table from top of pipe:	19.65	ft
Initial Head Change:	5.86	ft
Total well length:	36.26	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.1901	ft
r_c:	0.1901	ft
Radius of gravel pack (r_w):	0.3229	ft
Screened interval:	18.04	ft
Length of open section (L_e):	16.61	ft
L_e / r_w:	51.4374	
A (dimensionless):	3.008	
B (dimensionless):	0.514	
Drawdown at time = 0 (y_0):	4.45	ft
Drawdown at time = t (y_t):	1.12	ft
Elapsed Time between y_0 and y_t (t):	346.5	sec
Initial water column in well (L_w):	16.61	ft
$\ln(R_e/r_w)$ =	2.52	
K =	1.09E-05	ft/sec
	3.31E-04	**cm/sec**
	342.90	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P2-9

Initial offset in logger reading (feet):	0.042	Date:	09/10/2009
Offset increment in logger reading (feet/sec):	0.000040		
Initial depth to water table (feet):	27.38		
Depth of probe below water table (feet):	6.983		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 15:07:42	54462.5	0.0	3.52	3.469	3.513	0.54574
9/10/2009 15:07:43	54463.0	0.5	3.58	3.524	3.459	0.53889
9/10/2009 15:07:44	54464.0	1.5	3.66	3.605	3.378	0.52860
9/10/2009 15:07:44	54464.5	2.0	3.59	3.538	3.445	0.53714
9/10/2009 15:07:45	54465.0	2.5	3.69	3.636	3.347	0.52460
9/10/2009 15:07:49	54469.0	6.5	3.73	3.678	3.305	0.51914
9/10/2009 15:07:53	54473.5	11.0	3.77	3.719	3.264	0.51374
9/10/2009 15:07:57	54477.5	15.0	3.81	3.757	3.226	0.50868
9/10/2009 15:08:02	54482.0	19.5	3.85	3.795	3.188	0.50356
9/10/2009 15:08:06	54486.5	24.0	3.89	3.835	3.147	0.49796
9/10/2009 15:08:11	54491.5	29.0	3.93	3.873	3.110	0.49271
9/10/2009 15:08:17	54497.0	34.5	3.96	3.910	3.073	0.48755
9/10/2009 15:08:22	54502.5	40.0	4.00	3.949	3.034	0.48203
9/10/2009 15:08:28	54508.0	45.5	4.04	3.985	2.998	0.47688
9/10/2009 15:08:33	54513.5	51.0	4.07	4.020	2.963	0.47167
9/10/2009 15:08:39	54519.5	57.0	4.11	4.056	2.927	0.46639
9/10/2009 15:08:44	54524.5	62.0	4.14	4.090	2.893	0.46135
9/10/2009 15:08:50	54530.0	67.5	4.18	4.128	2.855	0.45564
9/10/2009 15:08:55	54535.5	73.0	4.22	4.164	2.819	0.45016
9/10/2009 15:09:00	54540.5	78.0	4.25	4.196	2.787	0.44508
9/10/2009 15:09:06	54546.0	83.5	4.29	4.230	2.753	0.43978
9/10/2009 15:09:11	54551.0	88.5	4.32	4.265	2.718	0.43426
9/10/2009 15:09:16	54556.5	94.0	4.35	4.299	2.684	0.42883
9/10/2009 15:09:22	54562.0	99.5	4.39	4.332	2.651	0.42333
9/10/2009 15:09:27	54567.0	104.5	4.42	4.364	2.619	0.41809
9/10/2009 15:09:32	54572.0	109.5	4.45	4.397	2.586	0.41261
9/10/2009 15:09:37	54577.5	115.0	4.49	4.429	2.554	0.40724
9/10/2009 15:09:43	54583.0	120.5	4.52	4.460	2.523	0.40198
9/10/2009 15:09:49	54589.0	126.5	4.55	4.491	2.492	0.39648
9/10/2009 15:09:54	54594.0	131.5	4.58	4.520	2.463	0.39143
9/10/2009 15:10:00	54600.0	137.5	4.61	4.549	2.434	0.38633
9/10/2009 15:10:05	54605.5	143.0	4.64	4.579	2.404	0.38098
9/10/2009 15:10:11	54611.0	148.5	4.67	4.607	2.375	0.37575
9/10/2009 15:10:16	54616.0	153.5	4.69	4.636	2.347	0.37045
9/10/2009 15:10:21	54621.0	158.5	4.72	4.664	2.319	0.36528
9/10/2009 15:10:26	54626.0	163.5	4.75	4.693	2.290	0.35985
9/10/2009 15:10:32	54632.5	170.0	4.78	4.722	2.261	0.35437
9/10/2009 15:10:39	54639.0	176.5	4.81	4.751	2.232	0.34862
9/10/2009 15:10:45	54645.0	182.5	4.84	4.778	2.205	0.34338
9/10/2009 15:10:51	54651.0	188.5	4.86	4.805	2.178	0.33808
9/10/2009 15:10:57	54657.0	194.5	4.89	4.832	2.151	0.33271
9/10/2009 15:11:03	54663.0	200.5	4.92	4.856	2.127	0.32768
9/10/2009 15:11:09	54669.0	206.5	4.94	4.881	2.102	0.32259
9/10/2009 15:11:15	54675.0	212.5	4.97	4.907	2.076	0.31724

Slug Test P2-9

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 15:11:21	54681.0	218.5	4.99	4.934	2.049	0.31161
9/10/2009 15:11:27	54687.5	225.0	5.02	4.958	2.025	0.30633
9/10/2009 15:11:33	54693.5	231.0	5.04	4.983	2.000	0.30099
9/10/2009 15:11:39	54699.5	237.0	5.07	5.009	1.974	0.29536
9/10/2009 15:11:46	54706.5	244.0	5.10	5.034	1.949	0.28988
9/10/2009 15:11:53	54713.0	250.5	5.12	5.057	1.926	0.28456
9/10/2009 15:11:59	54719.5	257.0	5.14	5.080	1.903	0.27941
9/10/2009 15:12:05	54725.0	262.5	5.17	5.103	1.880	0.27417
9/10/2009 15:12:12	54732.0	269.5	5.19	5.126	1.857	0.26890
9/10/2009 15:12:18	54738.5	276.0	5.21	5.148	1.835	0.26355
9/10/2009 15:12:24	54744.5	282.0	5.24	5.172	1.811	0.25788
9/10/2009 15:12:31	54751.5	289.0	5.26	5.194	1.789	0.25264
9/10/2009 15:12:37	54757.5	295.0	5.28	5.215	1.768	0.24758
9/10/2009 15:12:43	54763.5	301.0	5.30	5.235	1.748	0.24245
9/10/2009 15:12:49	54769.5	307.0	5.32	5.256	1.727	0.23726
9/10/2009 15:12:55	54775.5	313.0	5.34	5.277	1.706	0.23201
9/10/2009 15:13:02	54782.0	319.5	5.36	5.297	1.686	0.22695
9/10/2009 15:13:07	54787.5	325.0	5.38	5.317	1.666	0.22157
9/10/2009 15:13:12	54792.5	330.0	5.41	5.340	1.643	0.21558
9/10/2009 15:13:17	54797.0	334.5	5.42	5.359	1.624	0.21058
9/10/2009 15:13:21	54801.5	339.0	5.45	5.381	1.602	0.20471
9/10/2009 15:13:26	54806.0	343.5	5.47	5.400	1.583	0.19957
9/10/2009 15:13:32	54812.0	349.5	5.48	5.418	1.565	0.19440
9/10/2009 15:13:38	54818.0	355.5	5.50	5.437	1.546	0.18916
9/10/2009 15:13:44	54824.0	361.5	5.52	5.455	1.528	0.18414
9/10/2009 15:13:50	54830.0	367.5	5.54	5.474	1.509	0.17878
9/10/2009 15:13:57	54837.5	375.0	5.56	5.492	1.491	0.17336
9/10/2009 15:14:03	54843.5	381.0	5.58	5.510	1.473	0.16816
9/10/2009 15:14:11	54851.0	388.5	5.60	5.529	1.454	0.16261
9/10/2009 15:14:16	54856.0	393.5	5.61	5.546	1.437	0.15756
9/10/2009 15:14:24	54864.0	401.5	5.63	5.565	1.418	0.15158
9/10/2009 15:14:30	54870.0	407.5	5.65	5.582	1.401	0.14641
9/10/2009 15:14:35	54875.5	413.0	5.67	5.599	1.384	0.14118
9/10/2009 15:14:43	54883.5	421.0	5.69	5.616	1.366	0.13560
9/10/2009 15:14:48	54888.5	426.0	5.70	5.633	1.350	0.13023
9/10/2009 15:14:56	54896.0	433.5	5.72	5.649	1.334	0.12515
9/10/2009 15:15:02	54902.5	440.0	5.74	5.666	1.317	0.11966
9/10/2009 15:15:08	54908.5	446.0	5.75	5.682	1.300	0.11410
9/10/2009 15:15:15	54915.0	452.5	5.77	5.698	1.285	0.10881
9/10/2009 15:15:21	54921.0	458.5	5.78	5.713	1.270	0.10380
9/10/2009 15:15:28	54928.5	466.0	5.80	5.732	1.251	0.09735
9/10/2009 15:15:36	54936.0	473.5	5.82	5.747	1.236	0.09187
9/10/2009 15:15:43	54943.5	481.0	5.84	5.764	1.219	0.08596
9/10/2009 15:15:49	54949.5	487.0	5.85	5.779	1.204	0.08067
9/10/2009 15:15:57	54957.0	494.5	5.87	5.796	1.187	0.07461
9/10/2009 15:16:04	54964.0	501.5	5.88	5.811	1.172	0.06882
9/10/2009 15:16:11	54971.5	509.0	5.90	5.826	1.157	0.06334
9/10/2009 15:16:18	54978.5	516.0	5.91	5.840	1.143	0.05816
9/10/2009 15:16:25	54985.5	523.0	5.93	5.854	1.129	0.05253

Slug Test P2-9

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 15:16:31	54991.5	529.0	5.94	5.869	1.114	0.04681
9/10/2009 15:16:39	54999.0	536.5	5.96	5.883	1.100	0.04144
9/10/2009 15:16:45	55005.5	543.0	5.97	5.896	1.087	0.03638
9/10/2009 15:16:53	55013.5	551.0	5.99	5.911	1.072	0.03008
9/10/2009 15:17:01	55021.0	558.5	6.00	5.924	1.059	0.02490
9/10/2009 15:17:09	55029.5	567.0	6.01	5.938	1.045	0.01926
9/10/2009 15:17:17	55037.0	574.5	6.03	5.950	1.033	0.01395
9/10/2009 15:17:25	55045.0	582.5	6.04	5.964	1.019	0.00816
9/10/2009 15:17:31	55051.5	589.0	6.05	5.979	1.004	0.00184
9/10/2009 15:17:39	55059.5	597.0	6.07	5.991	0.992	-0.00368
9/10/2009 15:17:46	55066.5	604.0	6.08	6.003	0.980	-0.00884
9/10/2009 15:17:55	55075.0	612.5	6.09	6.016	0.967	-0.01449
9/10/2009 15:18:02	55082.5	620.0	6.10	6.027	0.955	-0.01977
9/10/2009 15:18:12	55092.0	629.5	6.12	6.042	0.941	-0.02647
9/10/2009 15:18:19	55099.5	637.0	6.13	6.054	0.929	-0.03190
9/10/2009 15:18:25	55105.5	643.0	6.14	6.066	0.917	-0.03743
9/10/2009 15:18:34	55114.0	651.5	6.16	6.079	0.904	-0.04395
9/10/2009 15:18:44	55124.0	661.5	6.17	6.090	0.893	-0.04907
9/10/2009 15:18:50	55130.5	668.0	6.18	6.102	0.881	-0.05482
9/10/2009 15:18:59	55139.5	677.0	6.19	6.113	0.870	-0.06059
9/10/2009 15:19:08	55148.0	685.5	6.20	6.124	0.859	-0.06594
9/10/2009 15:19:16	55156.5	694.0	6.22	6.135	0.847	-0.07187
9/10/2009 15:19:25	55165.5	703.0	6.23	6.146	0.837	-0.07736
9/10/2009 15:19:32	55172.0	709.5	6.24	6.156	0.827	-0.08244
9/10/2009 15:19:41	55181.0	718.5	6.25	6.166	0.816	-0.08807
9/10/2009 15:19:47	55187.0	724.5	6.26	6.177	0.806	-0.09383
9/10/2009 15:19:56	55196.5	734.0	6.27	6.187	0.796	-0.09904
9/10/2009 15:20:06	55206.0	743.5	6.28	6.196	0.786	-0.10432
9/10/2009 15:20:13	55213.0	750.5	6.29	6.207	0.776	-0.11028
9/10/2009 15:20:22	55222.0	759.5	6.30	6.217	0.766	-0.11571
9/10/2009 15:20:30	55230.5	768.0	6.31	6.227	0.755	-0.12179
9/10/2009 15:20:38	55238.5	776.0	6.32	6.236	0.747	-0.12681
9/10/2009 15:20:46	55246.5	784.0	6.33	6.246	0.737	-0.13247
9/10/2009 15:20:56	55256.5	794.0	6.34	6.256	0.727	-0.13876
9/10/2009 15:21:06	55266.0	803.5	6.35	6.266	0.717	-0.14455
9/10/2009 15:21:16	55276.0	813.5	6.36	6.276	0.707	-0.15040
9/10/2009 15:21:24	55284.5	822.0	6.37	6.284	0.699	-0.15575
9/10/2009 15:21:33	55293.0	830.5	6.38	6.293	0.690	-0.16117
9/10/2009 15:21:42	55302.5	840.0	6.39	6.303	0.680	-0.16726
9/10/2009 15:21:53	55313.0	850.5	6.40	6.313	0.670	-0.17407
9/10/2009 15:22:03	55323.0	860.5	6.41	6.323	0.660	-0.18033
9/10/2009 15:22:18	55338.5	876.0	6.42	6.332	0.651	-0.18655
9/10/2009 15:22:25	55345.5	883.0	6.43	6.341	0.642	-0.19240
9/10/2009 15:22:35	55355.0	892.5	6.44	6.348	0.634	-0.19759
9/10/2009 15:22:45	55365.5	903.0	6.45	6.357	0.626	-0.20350
9/10/2009 15:22:56	55376.0	913.5	6.45	6.365	0.618	-0.20879
9/10/2009 15:23:06	55386.0	923.5	6.46	6.373	0.610	-0.21487
9/10/2009 15:23:17	55397.0	934.5	6.47	6.381	0.602	-0.22028
9/10/2009 15:23:28	55408.0	945.5	6.48	6.388	0.595	-0.22577

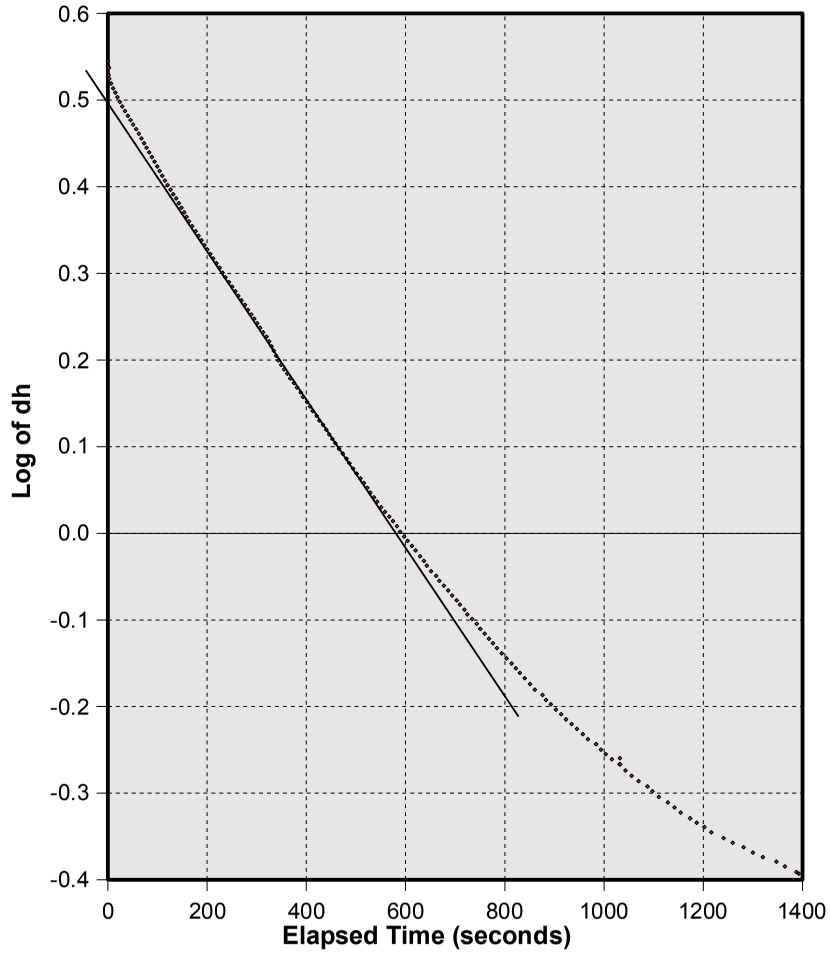
Slug Test P2-9

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 15:23:39	55419.5	957.0	6.49	6.397	0.586	-0.23205
9/10/2009 15:23:50	55430.0	967.5	6.50	6.404	0.578	-0.23770
9/10/2009 15:24:06	55446.5	984.0	6.50	6.412	0.571	-0.24324
9/10/2009 15:24:16	55456.0	993.5	6.51	6.420	0.563	-0.24984
9/10/2009 15:24:26	55466.0	1003.5	6.52	6.427	0.556	-0.25496
9/10/2009 15:24:38	55478.5	1016.0	6.53	6.434	0.548	-0.26086
9/10/2009 15:24:54	55494.0	1031.5	6.54	6.442	0.541	-0.26674
9/10/2009 15:24:54	55494.5	1032.0	6.53	6.433	0.550	-0.25956
9/10/2009 15:24:55	55495.0	1032.5	6.54	6.442	0.541	-0.26671
9/10/2009 15:25:05	55505.5	1043.0	6.54	6.450	0.533	-0.27364
9/10/2009 15:25:18	55518.0	1055.5	6.55	6.458	0.525	-0.27980
9/10/2009 15:25:32	55532.0	1069.5	6.56	6.465	0.518	-0.28600
9/10/2009 15:25:50	55550.0	1087.5	6.57	6.473	0.510	-0.29214
9/10/2009 15:26:00	55560.0	1097.5	6.58	6.479	0.504	-0.29779
9/10/2009 15:26:13	55573.0	1110.5	6.58	6.487	0.496	-0.30429
9/10/2009 15:26:31	55591.0	1128.5	6.59	6.494	0.489	-0.31070
9/10/2009 15:26:44	55604.5	1142.0	6.60	6.500	0.483	-0.31647
9/10/2009 15:26:57	55617.0	1154.5	6.61	6.507	0.476	-0.32236
9/10/2009 15:27:16	55636.0	1173.5	6.61	6.514	0.469	-0.32901
9/10/2009 15:27:29	55649.5	1187.0	6.62	6.520	0.463	-0.33409
9/10/2009 15:27:45	55665.0	1202.5	6.63	6.525	0.458	-0.33916
9/10/2009 15:27:59	55679.0	1216.5	6.63	6.531	0.452	-0.34530
9/10/2009 15:28:23	55703.5	1241.0	6.64	6.538	0.445	-0.35210
9/10/2009 15:28:42	55722.0	1259.5	6.65	6.544	0.439	-0.35727
9/10/2009 15:29:03	55743.5	1281.0	6.65	6.549	0.434	-0.36237
9/10/2009 15:29:22	55762.5	1300.0	6.66	6.555	0.428	-0.36865
9/10/2009 15:29:42	55782.5	1320.0	6.67	6.560	0.423	-0.37396
9/10/2009 15:30:10	55810.0	1347.5	6.67	6.565	0.418	-0.37901
9/10/2009 15:30:27	55827.0	1364.5	6.68	6.570	0.413	-0.38457
9/10/2009 15:30:50	55850.0	1387.5	6.68	6.576	0.406	-0.39101
9/10/2009 15:30:55	55855.0	1392.5	6.69	6.578	0.405	-0.39294

Slug Test P2-9

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	33.19	ft
Stick up height:	3.11	ft
Depth to sand pack (BGS):	17.05	ft
Depth to screened interval (BGS):	18.19	ft
Well diameter:	2.00	in
Diameter of annular space:	7.75	in
Initial depth to water table from top of pipe:	27.38	ft
Initial Head Change:	3.51	ft
Total well length:	36.30	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.1901	ft
r_c:	0.1901	ft
Radius of gravel pack (r_w):	0.3229	ft
Screened interval:	15.00	ft
Length of open section (L_e):	8.92	ft
L_e / r_w:	27.6232	
A (dimensionless):	2.482	
B (dimensionless):	0.413	
Drawdown at time = 0 (y_0):	2.52	ft
Drawdown at time = t (y_t):	1.05	ft
Elapsed Time between y_0 and y_t (t):	444	sec
Initial water column in well (L_w):	8.92	ft
$\ln(R_e/r_w)$ =	1.96	
K =	7.83E-06	ft/sec
	2.39E-04	**cm/sec**
	247.00	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P2-10

Initial offset in logger reading (feet):	-0.033	Date:	09/10/2009
Offset increment in logger reading (feet/sec):	-0.000014		
Initial depth to water table (feet):	17.04		
Depth of probe below water table (feet):	9.725		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 16:29:32	59372.5	0.0	8.69	8.732	0.993	-0.00314
9/10/2009 16:29:33	59373.0	0.5	8.71	8.751	0.974	-0.01154
9/10/2009 16:29:33	59373.5	1.0	8.77	8.815	0.910	-0.04107
9/10/2009 16:29:34	59374.0	1.5	8.76	8.803	0.922	-0.03538
9/10/2009 16:29:34	59374.5	2.0	8.81	8.857	0.868	-0.06160
9/10/2009 16:29:35	59375.0	2.5	8.83	8.875	0.850	-0.07071
9/10/2009 16:29:35	59375.5	3.0	8.85	8.890	0.835	-0.07845
9/10/2009 16:29:36	59376.0	3.5	8.86	8.902	0.823	-0.08474
9/10/2009 16:29:36	59376.5	4.0	8.87	8.913	0.812	-0.09059
9/10/2009 16:29:37	59377.0	4.5	8.88	8.923	0.802	-0.09598
9/10/2009 16:29:37	59377.5	5.0	8.89	8.934	0.791	-0.10198
9/10/2009 16:29:38	59378.5	6.0	8.91	8.950	0.775	-0.11086
9/10/2009 16:29:39	59379.5	7.0	8.93	8.968	0.757	-0.12108
9/10/2009 16:29:40	59380.5	8.0	8.94	8.985	0.740	-0.13096
9/10/2009 16:29:41	59381.5	9.0	8.96	8.999	0.726	-0.13927
9/10/2009 16:29:42	59382.5	10.0	8.97	9.016	0.709	-0.14957
9/10/2009 16:29:43	59383.5	11.0	8.99	9.030	0.695	-0.15825
9/10/2009 16:29:44	59384.5	12.0	9.00	9.045	0.680	-0.16774
9/10/2009 16:29:45	59385.5	13.0	9.01	9.056	0.669	-0.17483
9/10/2009 16:29:46	59386.5	14.0	9.03	9.071	0.654	-0.18470
9/10/2009 16:29:47	59387.5	15.0	9.04	9.085	0.640	-0.19411
9/10/2009 16:29:48	59388.5	16.0	9.06	9.098	0.627	-0.20304
9/10/2009 16:29:49	59389.0	16.5	9.06	9.106	0.619	-0.20862
9/10/2009 16:29:49	59389.5	17.0	9.07	9.114	0.611	-0.21428
9/10/2009 16:29:50	59390.0	17.5	9.08	9.121	0.604	-0.21929
9/10/2009 16:29:50	59390.5	18.0	9.09	9.129	0.596	-0.22510
9/10/2009 16:29:51	59391.5	19.0	9.10	9.143	0.582	-0.23544
9/10/2009 16:29:52	59392.5	20.0	9.11	9.157	0.568	-0.24603
9/10/2009 16:29:53	59393.5	21.0	9.13	9.170	0.554	-0.25611
9/10/2009 16:29:54	59394.5	22.0	9.14	9.182	0.542	-0.26562
9/10/2009 16:29:55	59395.5	23.0	9.15	9.192	0.532	-0.27371
9/10/2009 16:29:56	59396.0	23.5	9.16	9.199	0.525	-0.27947
9/10/2009 16:29:57	59397.0	24.5	9.17	9.209	0.515	-0.28782
9/10/2009 16:29:58	59398.0	25.5	9.17	9.217	0.507	-0.29463
9/10/2009 16:29:59	59399.0	26.5	9.18	9.225	0.499	-0.30154
9/10/2009 16:30:00	59400.0	27.5	9.19	9.233	0.491	-0.30857
9/10/2009 16:30:01	59401.0	28.5	9.20	9.241	0.483	-0.31571
9/10/2009 16:30:02	59402.0	29.5	9.21	9.250	0.474	-0.32388
9/10/2009 16:30:03	59403.0	30.5	9.22	9.258	0.466	-0.33128
9/10/2009 16:30:04	59404.0	31.5	9.22	9.264	0.460	-0.33692
9/10/2009 16:30:05	59405.0	32.5	9.23	9.271	0.454	-0.34263
9/10/2009 16:30:06	59406.0	33.5	9.24	9.279	0.446	-0.35036
9/10/2009 16:30:07	59407.0	34.5	9.24	9.285	0.440	-0.35625
9/10/2009 16:30:08	59408.0	35.5	9.25	9.291	0.434	-0.36223

Slug Test P2-10

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 16:30:09	59409.0	36.5	9.25	9.298	0.427	-0.36930
9/10/2009 16:30:10	59410.5	38.0	9.26	9.306	0.419	-0.37753
9/10/2009 16:30:11	59411.5	39.0	9.27	9.312	0.413	-0.38381
9/10/2009 16:30:13	59413.0	40.5	9.28	9.324	0.401	-0.39663
9/10/2009 16:30:14	59414.5	42.0	9.29	9.330	0.395	-0.40319
9/10/2009 16:30:16	59416.0	43.5	9.30	9.340	0.385	-0.41435
9/10/2009 16:30:17	59417.0	44.5	9.30	9.347	0.378	-0.42233
9/10/2009 16:30:19	59419.5	47.0	9.31	9.355	0.370	-0.43166
9/10/2009 16:30:21	59421.0	48.5	9.32	9.361	0.364	-0.43878
9/10/2009 16:30:22	59422.5	50.0	9.32	9.367	0.358	-0.44602
9/10/2009 16:30:23	59423.5	51.0	9.33	9.373	0.352	-0.45338
9/10/2009 16:30:25	59425.0	52.5	9.34	9.379	0.346	-0.46087
9/10/2009 16:30:26	59426.0	53.5	9.34	9.383	0.342	-0.46594
9/10/2009 16:30:27	59427.0	54.5	9.34	9.387	0.338	-0.47107
9/10/2009 16:30:28	59428.5	56.0	9.35	9.393	0.332	-0.47887
9/10/2009 16:30:29	59429.5	57.0	9.36	9.400	0.325	-0.48815
9/10/2009 16:30:31	59431.5	59.0	9.36	9.406	0.319	-0.49628
9/10/2009 16:30:33	59433.0	60.5	9.37	9.410	0.315	-0.50179
9/10/2009 16:30:34	59434.0	61.5	9.37	9.414	0.311	-0.50736
9/10/2009 16:30:35	59435.0	62.5	9.38	9.420	0.305	-0.51585
9/10/2009 16:30:36	59436.5	64.0	9.38	9.425	0.300	-0.52306
9/10/2009 16:30:38	59438.0	65.5	9.39	9.429	0.296	-0.52892
9/10/2009 16:30:39	59439.0	66.5	9.39	9.433	0.292	-0.53485
9/10/2009 16:30:41	59441.5	69.0	9.39	9.438	0.287	-0.54241
9/10/2009 16:30:42	59442.5	70.0	9.40	9.442	0.283	-0.54853
9/10/2009 16:30:44	59444.0	71.5	9.40	9.447	0.278	-0.55631
9/10/2009 16:30:45	59445.5	73.0	9.41	9.451	0.274	-0.56265
9/10/2009 16:30:47	59447.0	74.5	9.41	9.455	0.270	-0.56908
9/10/2009 16:30:49	59449.0	76.5	9.42	9.459	0.266	-0.57561
9/10/2009 16:30:50	59450.0	77.5	9.42	9.463	0.262	-0.58222
9/10/2009 16:30:51	59451.5	79.0	9.42	9.467	0.258	-0.58895
9/10/2009 16:30:54	59454.0	81.5	9.43	9.471	0.254	-0.59580
9/10/2009 16:30:54	59454.5	82.0	9.43	9.474	0.251	-0.60098
9/10/2009 16:30:56	59456.0	83.5	9.43	9.478	0.247	-0.60801
9/10/2009 16:30:57	59457.5	85.0	9.44	9.482	0.243	-0.61515
9/10/2009 16:30:59	59459.5	87.0	9.44	9.486	0.239	-0.62242
9/10/2009 16:31:01	59461.5	89.0	9.45	9.490	0.235	-0.62982
9/10/2009 16:31:03	59463.0	90.5	9.45	9.494	0.230	-0.63733
9/10/2009 16:31:05	59465.5	93.0	9.45	9.498	0.226	-0.64500
9/10/2009 16:31:08	59468.0	95.5	9.46	9.502	0.222	-0.65281
9/10/2009 16:31:09	59469.0	96.5	9.46	9.505	0.219	-0.65874
9/10/2009 16:31:11	59471.0	98.5	9.46	9.508	0.216	-0.66477
9/10/2009 16:31:14	59474.0	101.5	9.47	9.512	0.212	-0.67296
9/10/2009 16:31:17	59477.5	105.0	9.47	9.517	0.208	-0.68133
9/10/2009 16:31:19	59479.5	107.0	9.48	9.521	0.204	-0.68981
9/10/2009 16:31:22	59482.0	109.5	9.48	9.524	0.201	-0.69631
9/10/2009 16:31:24	59484.5	112.0	9.48	9.528	0.197	-0.70511
9/10/2009 16:31:27	59487.0	114.5	9.49	9.532	0.193	-0.71409
9/10/2009 16:31:30	59490.0	117.5	9.49	9.535	0.190	-0.72098

Slug Test P2-10

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 16:31:33	59493.5	121.0	9.49	9.538	0.187	-0.72801
9/10/2009 16:31:39	59499.5	127.0	9.50	9.542	0.183	-0.73760
9/10/2009 16:31:41	59501.5	129.0	9.50	9.545	0.180	-0.74485
9/10/2009 16:31:46	59506.0	133.5	9.50	9.547	0.178	-0.74986
9/10/2009 16:31:48	59508.0	135.5	9.51	9.551	0.174	-0.75980
9/10/2009 16:31:51	59511.0	138.5	9.51	9.553	0.172	-0.76494
9/10/2009 16:31:51	59511.5	139.0	9.51	9.551	0.174	-0.75993
9/10/2009 16:31:52	59512.0	139.5	9.51	9.553	0.172	-0.76497
9/10/2009 16:31:54	59514.0	141.5	9.51	9.555	0.170	-0.77013
9/10/2009 16:31:55	59515.5	143.0	9.51	9.553	0.172	-0.76510
9/10/2009 16:31:56	59516.0	143.5	9.51	9.555	0.170	-0.77020
9/10/2009 16:31:56	59516.5	144.0	9.51	9.553	0.172	-0.76514
9/10/2009 16:31:57	59517.0	144.5	9.51	9.555	0.170	-0.77024
9/10/2009 16:31:57	59517.5	145.0	9.51	9.558	0.167	-0.77800
9/10/2009 16:31:58	59518.0	145.5	9.51	9.555	0.170	-0.77028
9/10/2009 16:31:58	59518.5	146.0	9.51	9.558	0.167	-0.77804
9/10/2009 16:31:59	59519.0	146.5	9.51	9.555	0.170	-0.77031
9/10/2009 16:31:59	59519.5	147.0	9.51	9.558	0.167	-0.77808
9/10/2009 16:32:01	59521.0	148.5	9.51	9.555	0.170	-0.77039
9/10/2009 16:32:04	59524.5	152.0	9.52	9.560	0.165	-0.78351
9/10/2009 16:32:05	59525.5	153.0	9.52	9.562	0.163	-0.78885
9/10/2009 16:32:06	59526.5	154.0	9.52	9.560	0.165	-0.78358
9/10/2009 16:32:07	59527.5	155.0	9.52	9.562	0.163	-0.78893
9/10/2009 16:32:09	59529.0	156.5	9.52	9.564	0.161	-0.79436
9/10/2009 16:32:09	59529.5	157.0	9.52	9.562	0.163	-0.78901
9/10/2009 16:32:10	59530.0	157.5	9.52	9.566	0.159	-0.79985
9/10/2009 16:32:18	59538.0	165.5	9.52	9.569	0.155	-0.80846
9/10/2009 16:32:18	59538.5	166.0	9.52	9.567	0.157	-0.80293
9/10/2009 16:32:19	59539.5	167.0	9.52	9.569	0.155	-0.80852
9/10/2009 16:32:20	59540.0	167.5	9.52	9.567	0.157	-0.80299
9/10/2009 16:32:22	59542.5	170.0	9.52	9.569	0.155	-0.80864
9/10/2009 16:32:23	59543.0	170.5	9.52	9.567	0.157	-0.80311
9/10/2009 16:32:23	59543.5	171.0	9.52	9.569	0.155	-0.80868
9/10/2009 16:32:24	59544.0	171.5	9.53	9.571	0.153	-0.81433
9/10/2009 16:32:25	59545.5	173.0	9.52	9.570	0.155	-0.80876
9/10/2009 16:32:26	59546.0	173.5	9.53	9.572	0.153	-0.81441
9/10/2009 16:32:29	59549.0	176.5	9.53	9.574	0.151	-0.82023
9/10/2009 16:32:32	59552.0	179.5	9.53	9.577	0.148	-0.82906
9/10/2009 16:32:32	59552.5	180.0	9.53	9.575	0.150	-0.82326
9/10/2009 16:32:34	59554.0	181.5	9.53	9.577	0.148	-0.82914
9/10/2009 16:32:34	59554.5	182.0	9.53	9.575	0.150	-0.82334
9/10/2009 16:32:35	59555.0	182.5	9.53	9.577	0.148	-0.82918
9/10/2009 16:32:37	59557.5	185.0	9.53	9.575	0.150	-0.82346
9/10/2009 16:32:38	59558.0	185.5	9.53	9.577	0.148	-0.82931
9/10/2009 16:32:41	59561.0	188.5	9.53	9.579	0.146	-0.83534
9/10/2009 16:32:41	59561.5	189.0	9.53	9.577	0.148	-0.82946
9/10/2009 16:32:42	59562.0	189.5	9.53	9.579	0.146	-0.83538
9/10/2009 16:32:42	59562.5	190.0	9.53	9.577	0.148	-0.82950
9/10/2009 16:32:43	59563.0	190.5	9.53	9.579	0.146	-0.83542

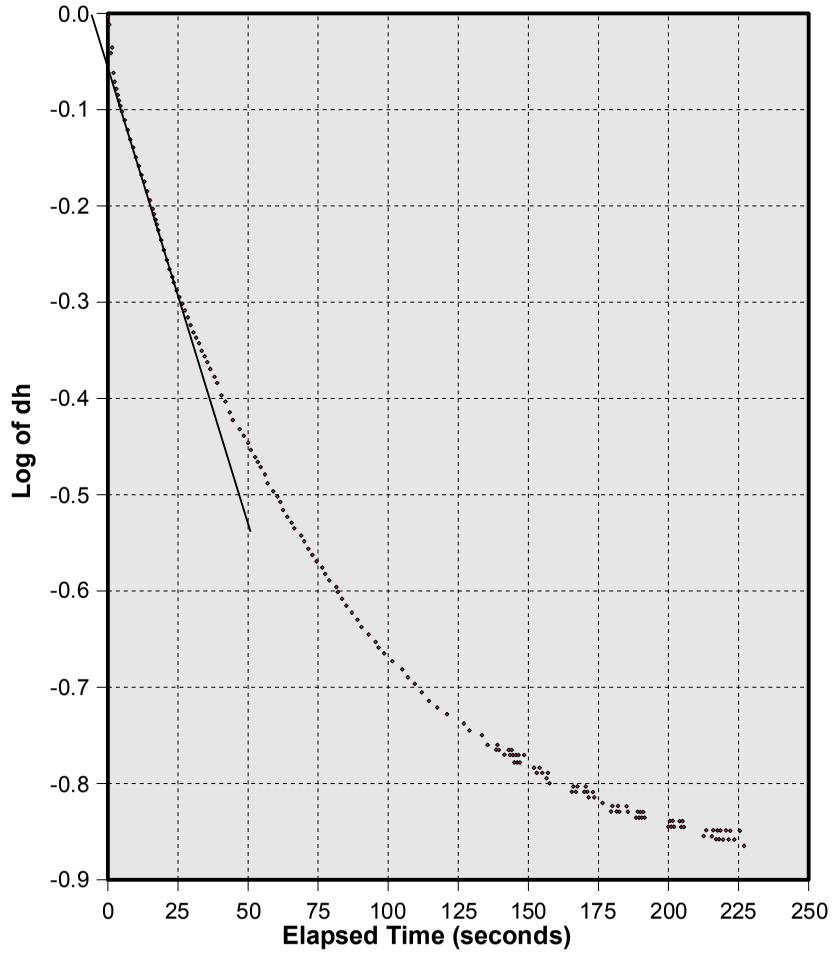
Slug Test P2-10

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 16:32:43	59563.5	191.0	9.53	9.577	0.148	-0.82954
9/10/2009 16:32:44	59564.0	191.5	9.53	9.579	0.146	-0.83547
9/10/2009 16:32:52	59572.5	200.0	9.54	9.582	0.143	-0.84485
9/10/2009 16:32:53	59573.0	200.5	9.53	9.580	0.145	-0.83883
9/10/2009 16:32:53	59573.5	201.0	9.54	9.582	0.143	-0.84489
9/10/2009 16:32:54	59574.0	201.5	9.53	9.580	0.145	-0.83888
9/10/2009 16:32:54	59574.5	202.0	9.54	9.582	0.143	-0.84493
9/10/2009 16:32:56	59576.5	204.0	9.53	9.580	0.145	-0.83898
9/10/2009 16:32:57	59577.0	204.5	9.54	9.582	0.143	-0.84504
9/10/2009 16:32:57	59577.5	205.0	9.53	9.580	0.145	-0.83903
9/10/2009 16:32:58	59578.0	205.5	9.54	9.582	0.143	-0.84508
9/10/2009 16:33:05	59585.0	212.5	9.54	9.585	0.140	-0.85461
9/10/2009 16:33:06	59586.0	213.5	9.54	9.583	0.142	-0.84848
9/10/2009 16:33:08	59588.0	215.5	9.54	9.585	0.140	-0.85474
9/10/2009 16:33:08	59588.5	216.0	9.54	9.583	0.142	-0.84859
9/10/2009 16:33:09	59589.5	217.0	9.54	9.586	0.139	-0.85793
9/10/2009 16:33:10	59590.0	217.5	9.54	9.583	0.142	-0.84866
9/10/2009 16:33:10	59590.5	218.0	9.54	9.586	0.139	-0.85798
9/10/2009 16:33:11	59591.0	218.5	9.54	9.583	0.142	-0.84870
9/10/2009 16:33:12	59592.0	219.5	9.54	9.586	0.139	-0.85804
9/10/2009 16:33:13	59593.0	220.5	9.54	9.583	0.142	-0.84879
9/10/2009 16:33:14	59594.0	221.5	9.54	9.586	0.139	-0.85813
9/10/2009 16:33:14	59594.5	222.0	9.54	9.583	0.142	-0.84886
9/10/2009 16:33:16	59596.0	223.5	9.54	9.586	0.139	-0.85822
9/10/2009 16:33:18	59598.0	225.5	9.54	9.583	0.142	-0.84901
9/10/2009 16:33:19	59599.5	227.0	9.54	9.588	0.137	-0.86469

Slug Test P2-10

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	26.36	ft
Stick up height:	2.96	ft
Depth to sand pack (BGS):	10.25	ft
Depth to screened interval (BGS):	11.36	ft
Well diameter:	2.00	in
Diameter of annular space:	7.75	in
Initial depth to water table from top of pipe:	17.04	ft
Initial Head Change:	0.99	ft
Total well length:	29.32	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.1901	ft
r_c:	0.1901	ft
Radius of gravel pack (r_w):	0.3229	ft
Screened interval:	15.00	ft
Length of open section (L_e):	12.28	ft
L_e / r_w:	38.0284	
A (dimensionless):	2.815	
B (dimensionless):	0.470	
Drawdown at time = 0 (y_0):	0.85	ft
Drawdown at time = t (y_t):	0.47	ft
Elapsed Time between y_0 and y_t (t):	27	sec
Initial water column in well (L_w):	12.28	ft
$\ln(R_e/r_w)$ =	2.22	
K =	7.05E-05	ft/sec
	2.15E-03	**cm/sec**
	2224.09	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P2-11S

Initial offset in logger reading (feet):	-0.002	Date:	09/10/2009
Offset increment in logger reading (feet/sec):	0.000087		
Initial depth to water table (feet):	17.2		
Depth of probe below water table (feet):	10.739		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 8:36:01	30961.5	0.0	5.65	5.603	5.136	0.71063
9/10/2009 8:36:03	30963.0	1.5	5.72	5.673	5.065	0.70459
9/10/2009 8:36:04	30964.0	2.5	5.81	5.760	4.978	0.69707
9/10/2009 8:36:05	30965.0	3.5	5.89	5.837	4.901	0.69031
9/10/2009 8:36:06	30966.0	4.5	5.96	5.905	4.833	0.68425
9/10/2009 8:36:07	30967.0	5.5	6.03	5.977	4.761	0.67774
9/10/2009 8:36:08	30968.5	7.0	6.09	6.041	4.698	0.67188
9/10/2009 8:36:10	30970.5	9.0	6.15	6.095	4.644	0.66687
9/10/2009 8:36:13	30973.0	11.5	6.21	6.160	4.579	0.66077
9/10/2009 8:36:15	30975.5	14.0	6.27	6.220	4.518	0.65497
9/10/2009 8:36:18	30978.0	16.5	6.33	6.280	4.458	0.64918
9/10/2009 8:36:20	30980.5	19.0	6.39	6.340	4.399	0.64332
9/10/2009 8:36:23	30983.0	21.5	6.45	6.400	4.339	0.63738
9/10/2009 8:36:25	30985.5	24.0	6.51	6.461	4.278	0.63125
9/10/2009 8:36:27	30987.5	26.0	6.56	6.510	4.228	0.62616
9/10/2009 8:36:30	30990.0	28.5	6.62	6.568	4.170	0.62019
9/10/2009 8:36:32	30992.0	30.5	6.68	6.629	4.110	0.61381
9/10/2009 8:36:33	30993.5	32.0	6.75	6.693	4.046	0.60700
9/10/2009 8:36:34	30994.5	33.0	6.79	6.741	3.998	0.60183
9/10/2009 8:36:35	30995.5	34.0	6.84	6.787	3.952	0.59681
9/10/2009 8:36:37	30997.0	35.5	6.90	6.848	3.891	0.59007
9/10/2009 8:36:38	30998.5	37.0	6.95	6.901	3.837	0.58402
9/10/2009 8:36:40	31000.0	38.5	7.01	6.952	3.786	0.57822
9/10/2009 8:36:41	31001.5	40.0	7.06	7.006	3.732	0.57200
9/10/2009 8:36:43	31003.0	41.5	7.11	7.059	3.680	0.56580
9/10/2009 8:36:44	31004.5	43.0	7.17	7.113	3.626	0.55940
9/10/2009 8:36:46	31006.0	44.5	7.22	7.165	3.574	0.55314
9/10/2009 8:36:47	31007.5	46.0	7.26	7.211	3.528	0.54753
9/10/2009 8:36:49	31009.0	47.5	7.31	7.258	3.480	0.54160
9/10/2009 8:36:50	31010.5	49.0	7.36	7.303	3.435	0.53596
9/10/2009 8:36:52	31012.0	50.5	7.40	7.348	3.390	0.53025
9/10/2009 8:36:53	31013.5	52.0	7.45	7.391	3.348	0.52472
9/10/2009 8:36:55	31015.0	53.5	7.49	7.435	3.304	0.51899
9/10/2009 8:36:56	31016.5	55.0	7.53	7.479	3.260	0.51319
9/10/2009 8:36:58	31018.0	56.5	7.57	7.520	3.219	0.50771
9/10/2009 8:36:59	31019.5	58.0	7.61	7.560	3.179	0.50230
9/10/2009 8:37:01	31021.0	59.5	7.65	7.597	3.141	0.49709
9/10/2009 8:37:03	31023.0	61.5	7.70	7.642	3.096	0.49085
9/10/2009 8:37:05	31025.0	63.5	7.75	7.690	3.049	0.48409
9/10/2009 8:37:07	31027.0	65.5	7.79	7.735	3.004	0.47766
9/10/2009 8:37:09	31029.0	67.5	7.83	7.776	2.963	0.47171
9/10/2009 8:37:11	31031.0	69.5	7.87	7.816	2.923	0.46584
9/10/2009 8:37:13	31033.0	71.5	7.91	7.854	2.884	0.46003
9/10/2009 8:37:15	31035.0	73.5	7.95	7.892	2.846	0.45429

Slug Test P2-11S

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 8:37:17	31037.0	75.5	7.99	7.930	2.809	0.44848
9/10/2009 8:37:19	31039.0	77.5	8.03	7.969	2.770	0.44244
9/10/2009 8:37:21	31041.0	79.5	8.07	8.011	2.728	0.43583
9/10/2009 8:37:23	31043.0	81.5	8.11	8.052	2.687	0.42928
9/10/2009 8:37:24	31044.5	83.0	8.14	8.084	2.654	0.42394
9/10/2009 8:37:26	31046.0	84.5	8.18	8.122	2.616	0.41770
9/10/2009 8:37:27	31047.0	85.5	8.21	8.156	2.582	0.41203
9/10/2009 8:37:28	31048.0	86.5	8.27	8.210	2.529	0.40287
9/10/2009 8:37:29	31049.0	87.5	8.32	8.264	2.475	0.39351
9/10/2009 8:37:30	31050.0	88.5	8.38	8.318	2.421	0.38394
9/10/2009 8:37:31	31051.0	89.5	8.42	8.364	2.375	0.37562
9/10/2009 8:37:32	31052.0	90.5	8.46	8.401	2.338	0.36882
9/10/2009 8:37:33	31053.0	91.5	8.49	8.428	2.311	0.36379
9/10/2009 8:37:34	31054.5	93.0	8.51	8.455	2.284	0.35871
9/10/2009 8:37:36	31056.5	95.0	8.54	8.486	2.252	0.35262
9/10/2009 8:37:38	31058.5	97.0	8.57	8.515	2.223	0.34702
9/10/2009 8:37:40	31060.5	99.0	8.60	8.542	2.197	0.34175
9/10/2009 8:37:42	31062.5	101.0	8.63	8.569	2.170	0.33642
9/10/2009 8:37:44	31064.5	103.0	8.65	8.596	2.143	0.33101
9/10/2009 8:37:46	31066.5	105.0	8.68	8.623	2.115	0.32534
9/10/2009 8:37:48	31068.5	107.0	8.71	8.652	2.086	0.31938
9/10/2009 8:37:50	31070.5	109.0	8.74	8.677	2.061	0.31418
9/10/2009 8:37:52	31072.5	111.0	8.76	8.704	2.035	0.30849
9/10/2009 8:37:54	31074.5	113.0	8.79	8.731	2.008	0.30273
9/10/2009 8:37:56	31076.5	115.0	8.82	8.758	1.981	0.29688
9/10/2009 8:37:58	31078.5	117.0	8.85	8.785	1.953	0.29074
9/10/2009 8:38:00	31080.5	119.0	8.87	8.812	1.926	0.28473
9/10/2009 8:38:02	31082.5	121.0	8.90	8.839	1.900	0.27864
9/10/2009 8:38:04	31084.5	123.0	8.93	8.866	1.873	0.27247
9/10/2009 8:38:06	31086.5	125.0	8.95	8.893	1.846	0.26620
9/10/2009 8:38:08	31088.5	127.0	8.98	8.918	1.821	0.26032
9/10/2009 8:38:10	31090.5	129.0	9.00	8.941	1.797	0.25460
9/10/2009 8:38:12	31092.0	130.5	9.02	8.963	1.775	0.24928
9/10/2009 8:38:14	31094.0	132.5	9.05	8.988	1.751	0.24317
9/10/2009 8:38:15	31095.5	134.0	9.07	9.009	1.730	0.23796
9/10/2009 8:38:17	31097.5	136.0	9.09	9.032	1.707	0.23219
9/10/2009 8:38:19	31099.5	138.0	9.12	9.056	1.683	0.22608
9/10/2009 8:38:21	31101.5	140.0	9.14	9.080	1.658	0.21963
9/10/2009 8:38:23	31103.5	142.0	9.17	9.105	1.633	0.21308
9/10/2009 8:38:25	31105.0	143.5	9.19	9.125	1.613	0.20776
9/10/2009 8:38:27	31107.0	145.5	9.21	9.146	1.593	0.20212
9/10/2009 8:38:29	31109.0	147.5	9.23	9.168	1.571	0.19613
9/10/2009 8:38:31	31111.0	149.5	9.25	9.191	1.548	0.18977
9/10/2009 8:38:33	31113.0	151.5	9.27	9.211	1.527	0.18389
9/10/2009 8:38:35	31115.5	154.0	9.30	9.234	1.504	0.17736
9/10/2009 8:38:38	31118.0	156.5	9.32	9.257	1.482	0.17073
9/10/2009 8:38:41	31121.0	159.5	9.34	9.279	1.460	0.16431
9/10/2009 8:38:43	31123.0	161.5	9.36	9.298	1.441	0.15867
9/10/2009 8:38:45	31125.5	164.0	9.38	9.317	1.421	0.15267

Slug Test P2-11S

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 8:38:48	31128.0	166.5	9.40	9.335	1.403	0.14720
9/10/2009 8:38:50	31130.5	169.0	9.42	9.354	1.385	0.14135
9/10/2009 8:38:52	31132.5	171.0	9.44	9.371	1.368	0.13604
9/10/2009 8:38:55	31135.0	173.5	9.46	9.391	1.348	0.12972
9/10/2009 8:38:57	31137.5	176.0	9.47	9.409	1.329	0.12362
9/10/2009 8:39:00	31140.0	178.5	9.49	9.428	1.311	0.11744
9/10/2009 8:39:02	31142.5	181.0	9.51	9.444	1.295	0.11218
9/10/2009 8:39:04	31144.5	183.0	9.52	9.459	1.280	0.10718
9/10/2009 8:39:06	31146.5	185.0	9.54	9.476	1.263	0.10143
9/10/2009 8:39:08	31148.5	187.0	9.56	9.491	1.247	0.09595
9/10/2009 8:39:10	31150.5	189.0	9.57	9.507	1.231	0.09041
9/10/2009 8:39:13	31153.0	191.5	9.59	9.525	1.214	0.08409
9/10/2009 8:39:15	31155.0	193.5	9.61	9.540	1.199	0.07875
9/10/2009 8:39:17	31157.0	195.5	9.62	9.554	1.185	0.07371
9/10/2009 8:39:19	31159.0	197.5	9.64	9.568	1.170	0.06825
9/10/2009 8:39:21	31161.5	200.0	9.65	9.582	1.156	0.06310
9/10/2009 8:39:23	31163.5	202.0	9.66	9.597	1.142	0.05750
9/10/2009 8:39:26	31166.0	204.5	9.68	9.614	1.125	0.05106
9/10/2009 8:39:28	31168.5	207.0	9.70	9.628	1.111	0.04571
9/10/2009 8:39:30	31170.5	209.0	9.71	9.640	1.098	0.04067
9/10/2009 8:39:33	31173.0	211.5	9.72	9.654	1.084	0.03518
9/10/2009 8:39:35	31175.5	214.0	9.74	9.669	1.070	0.02922
9/10/2009 8:39:38	31178.5	217.0	9.75	9.685	1.054	0.02278
9/10/2009 8:39:41	31181.0	219.5	9.77	9.700	1.039	0.01665
9/10/2009 8:39:44	31184.0	222.5	9.78	9.713	1.025	0.01087
9/10/2009 8:39:46	31186.0	224.5	9.80	9.726	1.013	0.00540
9/10/2009 8:39:48	31188.5	227.0	9.81	9.738	1.001	0.00031
9/10/2009 8:39:50	31190.5	229.0	9.82	9.751	0.988	-0.00529
9/10/2009 8:39:53	31193.5	232.0	9.83	9.763	0.975	-0.01092
9/10/2009 8:39:56	31196.0	234.5	9.85	9.777	0.961	-0.01711
9/10/2009 8:39:59	31199.0	237.5	9.86	9.792	0.947	-0.02382
9/10/2009 8:40:02	31202.0	240.5	9.87	9.804	0.935	-0.02924
9/10/2009 8:40:04	31204.0	242.5	9.89	9.815	0.924	-0.03429
9/10/2009 8:40:07	31207.0	245.5	9.90	9.828	0.910	-0.04080
9/10/2009 8:40:09	31209.0	247.5	9.91	9.839	0.900	-0.04600
9/10/2009 8:40:12	31212.0	250.5	9.92	9.851	0.888	-0.05170
9/10/2009 8:40:14	31214.5	253.0	9.93	9.862	0.877	-0.05701
9/10/2009 8:40:17	31217.0	255.5	9.95	9.873	0.865	-0.06288
9/10/2009 8:40:20	31220.0	258.5	9.96	9.888	0.850	-0.07035
9/10/2009 8:40:22	31222.5	261.0	9.97	9.898	0.841	-0.07537
9/10/2009 8:40:25	31225.0	263.5	9.98	9.908	0.831	-0.08045
9/10/2009 8:40:26	31226.5	265.0	9.99	9.919	0.820	-0.08617
9/10/2009 8:40:27	31227.5	266.0	10.00	9.928	0.810	-0.09146
9/10/2009 8:40:28	31228.5	267.0	10.01	9.938	0.800	-0.09680
9/10/2009 8:40:30	31230.0	268.5	10.02	9.949	0.789	-0.10274
9/10/2009 8:40:31	31231.5	270.0	10.03	9.961	0.777	-0.10932
9/10/2009 8:40:33	31233.0	271.5	10.05	9.972	0.767	-0.11544
9/10/2009 8:40:35	31235.0	273.5	10.06	9.986	0.753	-0.12334
9/10/2009 8:40:37	31237.0	275.5	10.07	9.997	0.742	-0.12963

Slug Test P2-11S

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 8:40:39	31239.0	277.5	10.08	10.008	0.730	-0.13661
9/10/2009 8:40:41	31241.0	279.5	10.09	10.018	0.720	-0.14250
9/10/2009 8:40:42	31242.5	281.0	10.10	10.027	0.711	-0.14788
9/10/2009 8:40:45	31245.0	283.5	10.11	10.037	0.702	-0.15389
9/10/2009 8:40:47	31247.5	286.0	10.12	10.047	0.692	-0.15999
9/10/2009 8:40:49	31249.5	288.0	10.13	10.056	0.683	-0.16557
9/10/2009 8:40:52	31252.5	291.0	10.14	10.067	0.671	-0.17309
9/10/2009 8:40:55	31255.0	293.5	10.15	10.075	0.663	-0.17816
9/10/2009 8:40:57	31257.0	295.5	10.16	10.083	0.656	-0.18331
9/10/2009 8:40:58	31258.0	296.5	10.17	10.092	0.647	-0.18926
9/10/2009 8:41:02	31262.5	301.0	10.18	10.099	0.639	-0.19440
9/10/2009 8:41:05	31265.5	304.0	10.19	10.109	0.629	-0.20107
9/10/2009 8:41:09	31269.0	307.5	10.19	10.118	0.621	-0.20711
9/10/2009 8:41:13	31273.0	311.5	10.20	10.126	0.613	-0.21249
9/10/2009 8:41:16	31276.5	315.0	10.21	10.136	0.602	-0.22014
9/10/2009 8:41:20	31280.0	318.5	10.22	10.145	0.594	-0.22645
9/10/2009 8:41:24	31284.0	322.5	10.23	10.153	0.586	-0.23209
9/10/2009 8:41:27	31287.5	326.0	10.24	10.161	0.577	-0.23858
9/10/2009 8:41:31	31291.5	330.0	10.25	10.169	0.570	-0.24438
9/10/2009 8:41:35	31295.5	334.0	10.26	10.177	0.562	-0.25025
9/10/2009 8:41:39	31299.5	338.0	10.26	10.184	0.554	-0.25620
9/10/2009 8:41:42	31302.5	341.0	10.27	10.191	0.548	-0.26152
9/10/2009 8:41:47	31307.5	346.0	10.28	10.199	0.540	-0.26756
9/10/2009 8:41:52	31312.0	350.5	10.29	10.206	0.532	-0.27372
9/10/2009 8:41:55	31315.0	353.5	10.29	10.213	0.526	-0.27925
9/10/2009 8:42:00	31320.0	358.5	10.30	10.220	0.518	-0.28555
9/10/2009 8:42:05	31325.5	364.0	10.31	10.228	0.511	-0.29190
9/10/2009 8:42:10	31330.0	368.5	10.32	10.236	0.503	-0.29842
9/10/2009 8:42:14	31334.5	373.0	10.32	10.242	0.496	-0.30416
9/10/2009 8:42:20	31340.0	378.5	10.33	10.250	0.489	-0.31080
9/10/2009 8:42:24	31344.0	382.5	10.34	10.255	0.483	-0.31585
9/10/2009 8:42:28	31348.5	387.0	10.34	10.261	0.478	-0.32092
9/10/2009 8:42:32	31352.5	391.0	10.35	10.268	0.471	-0.32701
9/10/2009 8:42:37	31357.5	396.0	10.36	10.273	0.465	-0.33217
9/10/2009 8:42:42	31362.5	401.0	10.36	10.279	0.460	-0.33740
9/10/2009 8:42:47	31367.0	405.5	10.37	10.284	0.454	-0.34273
9/10/2009 8:42:51	31371.5	410.0	10.38	10.291	0.448	-0.34909
9/10/2009 8:42:58	31378.0	416.5	10.38	10.296	0.442	-0.35440
9/10/2009 8:43:02	31382.5	421.0	10.39	10.302	0.437	-0.35994
9/10/2009 8:43:08	31388.5	427.0	10.40	10.309	0.430	-0.36644
9/10/2009 8:43:13	31393.0	431.5	10.40	10.314	0.424	-0.37214
9/10/2009 8:43:20	31400.0	438.5	10.41	10.321	0.418	-0.37873
9/10/2009 8:43:27	31407.5	446.0	10.41	10.326	0.413	-0.38432
9/10/2009 8:43:33	31413.0	451.5	10.42	10.331	0.407	-0.39017
9/10/2009 8:43:40	31420.5	459.0	10.43	10.337	0.402	-0.39591
9/10/2009 8:43:46	31426.5	465.0	10.43	10.342	0.396	-0.40187
9/10/2009 8:43:55	31435.0	473.5	10.44	10.348	0.390	-0.40879
9/10/2009 8:44:03	31443.0	481.5	10.45	10.354	0.385	-0.41473
9/10/2009 8:44:10	31450.0	488.5	10.45	10.359	0.379	-0.42086

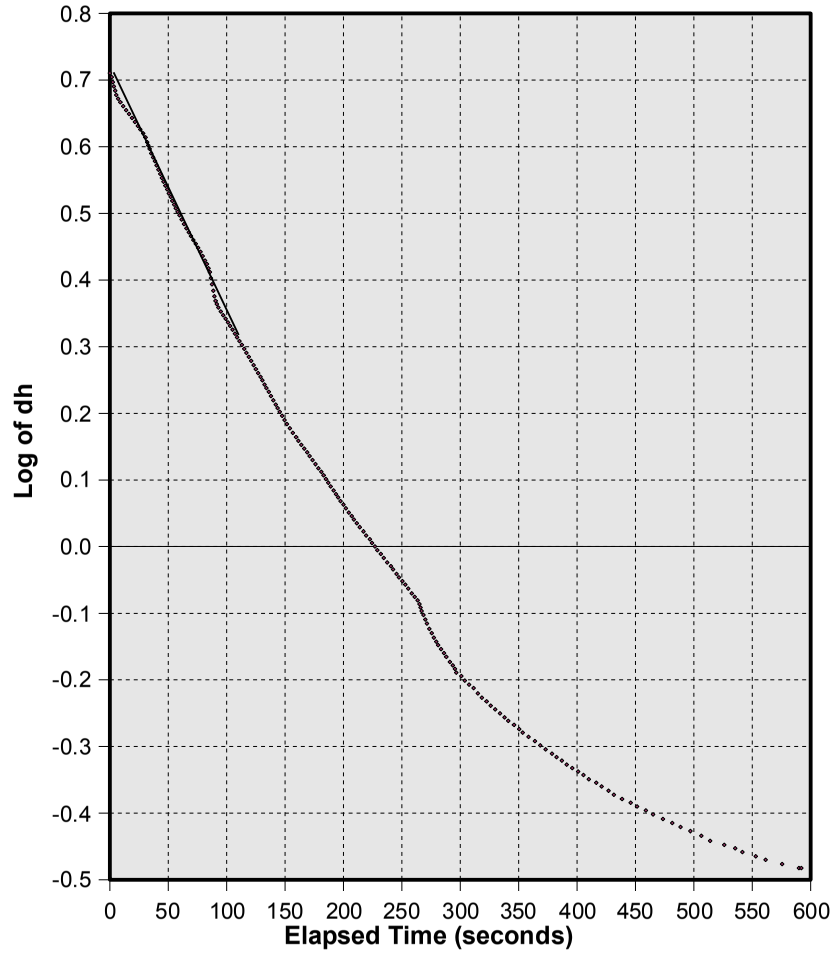
Slug Test P2-11S

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 8:44:18	31458.5	497.0	10.46	10.364	0.374	-0.42693
9/10/2009 8:44:28	31468.0	506.5	10.46	10.371	0.368	-0.43415
9/10/2009 8:44:35	31475.5	514.0	10.47	10.377	0.362	-0.44171
9/10/2009 8:44:47	31487.5	526.0	10.48	10.382	0.357	-0.44771
9/10/2009 8:44:57	31497.0	535.5	10.48	10.386	0.353	-0.45282
9/10/2009 8:45:03	31503.0	541.5	10.49	10.391	0.348	-0.45837
9/10/2009 8:45:14	31514.5	553.0	10.49	10.396	0.343	-0.46466
9/10/2009 8:45:23	31523.0	561.5	10.50	10.400	0.339	-0.47009
9/10/2009 8:45:37	31537.0	575.5	10.50	10.405	0.334	-0.47627
9/10/2009 8:45:51	31551.5	590.0	10.51	10.409	0.329	-0.48247
9/10/2009 8:45:53	31553.5	592.0	10.51	10.409	0.329	-0.48225

Slug Test P2-11S

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	29.66	ft
Stick up height:	2.96	ft
Depth to sand pack (BGS):	13.40	ft
Depth to screened interval (BGS):	14.66	ft
Well diameter:	2.00	in
Diameter of annular space:	7.75	in
Initial depth to water table from top of pipe:	17.20	ft
Initial Head Change:	5.14	ft
Total well length:	32.62	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.1901	ft
r_c:	0.1901	ft
Radius of gravel pack (r_w):	0.3229	ft
Screened interval:	15.00	ft
Length of open section (L_e):	15.00	ft
L_e / r_w:	46.4516	
A (dimensionless):	3.076	
B (dimensionless):	0.514	
Drawdown at time = 0 (y_0):	4.27	ft
Drawdown at time = t (y_t):	2.53	ft
Elapsed Time between y_0 and y_t (t):	62	sec
Initial water column in well (L_w):	15.42	ft
$\ln(R_e/r_w)$ =	2.40	
K =	2.44E-05	ft/sec
	7.43E-04	**cm/sec**
	768.79	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	91.82%

Slug Test P2-11D

Initial offset in logger reading (feet):	0.003	Date:	09/10/2009
Offset increment in logger reading (feet/sec):	-0.000213		
Initial depth to water table (feet):	19.71		
Depth of probe below water table (feet):	3.999		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 8:57:03	32223.0	0.0	7.15	7.157	3.158	0.49936
9/10/2009 8:57:04	32224.5	1.5	7.05	7.060	3.061	0.48586
9/10/2009 8:57:05	32225.5	2.5	6.98	6.990	2.991	0.47584
9/10/2009 8:57:06	32226.5	3.5	6.91	6.917	2.918	0.46514
9/10/2009 8:57:07	32227.5	4.5	6.84	6.848	2.849	0.45463
9/10/2009 8:57:08	32228.5	5.5	6.77	6.778	2.779	0.44386
9/10/2009 8:57:09	32229.5	6.5	6.70	6.710	2.711	0.43313
9/10/2009 8:57:10	32230.5	7.5	6.63	6.642	2.643	0.42214
9/10/2009 8:57:11	32231.5	8.5	6.57	6.579	2.579	0.41153
9/10/2009 8:57:12	32232.5	9.5	6.50	6.516	2.517	0.40082
9/10/2009 8:57:13	32233.5	10.5	6.44	6.454	2.455	0.39003
9/10/2009 8:57:14	32234.5	11.5	6.38	6.394	2.395	0.37932
9/10/2009 8:57:15	32235.5	12.5	6.32	6.337	2.338	0.36890
9/10/2009 8:57:17	32237.0	14.0	6.24	6.256	2.257	0.35346
9/10/2009 8:57:18	32238.5	15.5	6.16	6.178	2.179	0.33824
9/10/2009 8:57:19	32239.5	16.5	6.11	6.127	2.128	0.32800
9/10/2009 8:57:20	32240.5	17.5	6.06	6.077	2.078	0.31772
9/10/2009 8:57:22	32242.0	19.0	5.99	6.006	2.007	0.30248
9/10/2009 8:57:23	32243.5	20.5	5.93	5.941	1.942	0.28825
9/10/2009 8:57:25	32245.0	22.0	5.86	5.877	1.878	0.27377
9/10/2009 8:57:26	32246.0	23.0	5.82	5.834	1.835	0.26352
9/10/2009 8:57:27	32247.5	24.5	5.76	5.773	1.774	0.24892
9/10/2009 8:57:29	32249.0	26.0	5.70	5.716	1.717	0.23481
9/10/2009 8:57:30	32250.5	27.5	5.64	5.661	1.661	0.22050
9/10/2009 8:57:32	32252.0	29.0	5.59	5.610	1.611	0.20704
9/10/2009 8:57:33	32253.5	30.5	5.54	5.558	1.559	0.19288
9/10/2009 8:57:35	32255.0	32.0	5.49	5.510	1.510	0.17911
9/10/2009 8:57:36	32256.5	33.5	5.44	5.460	1.461	0.16458
9/10/2009 8:57:38	32258.0	35.0	5.40	5.416	1.417	0.15140
9/10/2009 8:57:39	32259.5	36.5	5.36	5.373	1.374	0.13811
9/10/2009 8:57:41	32261.0	38.0	5.31	5.333	1.334	0.12507
9/10/2009 8:57:42	32262.5	39.5	5.27	5.291	1.292	0.11128
9/10/2009 8:57:44	32264.0	41.0	5.24	5.254	1.255	0.09877
9/10/2009 8:57:45	32265.5	42.5	5.20	5.219	1.220	0.08625
9/10/2009 8:57:47	32267.0	44.0	5.16	5.183	1.184	0.07335
9/10/2009 8:57:48	32268.5	45.5	5.13	5.148	1.149	0.06044
9/10/2009 8:57:50	32270.0	47.0	5.10	5.116	1.117	0.04791
9/10/2009 8:57:51	32271.5	48.5	5.07	5.087	1.088	0.03661
9/10/2009 8:57:53	32273.0	50.0	5.03	5.053	1.054	0.02295
9/10/2009 8:57:54	32274.5	51.5	5.00	5.025	1.026	0.01098
9/10/2009 8:57:56	32276.0	53.0	4.98	4.997	0.998	-0.00091
9/10/2009 8:57:57	32277.5	54.5	4.95	4.968	0.969	-0.01357
9/10/2009 8:57:59	32279.0	56.0	4.92	4.942	0.943	-0.02569
9/10/2009 8:58:00	32280.5	57.5	4.89	4.917	0.918	-0.03722

Slug Test P2-11D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 8:58:02	32282.0	59.0	4.87	4.892	0.893	-0.04906
9/10/2009 8:58:03	32283.5	60.5	4.85	4.870	0.871	-0.06023
9/10/2009 8:58:05	32285.0	62.0	4.82	4.847	0.848	-0.07169
9/10/2009 8:58:06	32286.5	63.5	4.80	4.824	0.825	-0.08347
9/10/2009 8:58:08	32288.0	65.0	4.78	4.801	0.801	-0.09611
9/10/2009 8:58:10	32290.0	67.0	4.75	4.776	0.777	-0.10964
9/10/2009 8:58:11	32291.5	68.5	4.73	4.755	0.756	-0.12136
9/10/2009 8:58:13	32293.0	70.0	4.71	4.735	0.736	-0.13340
9/10/2009 8:58:14	32294.5	71.5	4.69	4.715	0.716	-0.14518
9/10/2009 8:58:16	32296.5	73.5	4.67	4.693	0.694	-0.15847
9/10/2009 8:58:18	32298.0	75.0	4.65	4.676	0.677	-0.16967
9/10/2009 8:58:19	32299.5	76.5	4.63	4.657	0.658	-0.18183
9/10/2009 8:58:21	32301.5	78.5	4.61	4.636	0.637	-0.19563
9/10/2009 8:58:23	32303.0	80.0	4.59	4.622	0.623	-0.20575
9/10/2009 8:58:25	32305.0	82.0	4.57	4.601	0.602	-0.22034
9/10/2009 8:58:26	32306.5	83.5	4.56	4.586	0.587	-0.23106
9/10/2009 8:58:28	32308.0	85.0	4.54	4.573	0.574	-0.24130
9/10/2009 8:58:29	32309.5	86.5	4.53	4.559	0.560	-0.25178
9/10/2009 8:58:31	32311.0	88.0	4.52	4.545	0.546	-0.26252
9/10/2009 8:58:33	32313.0	90.0	4.50	4.528	0.529	-0.27672
9/10/2009 8:58:35	32315.0	92.0	4.48	4.514	0.515	-0.28801
9/10/2009 8:58:37	32317.0	94.0	4.47	4.499	0.500	-0.30134
9/10/2009 8:58:38	32318.5	95.5	4.46	4.487	0.488	-0.31162
9/10/2009 8:58:40	32320.5	97.5	4.44	4.472	0.473	-0.32478
9/10/2009 8:58:42	32322.5	99.5	4.43	4.458	0.459	-0.33837
9/10/2009 8:58:44	32324.5	101.5	4.41	4.445	0.446	-0.35043
9/10/2009 8:58:46	32326.0	103.0	4.40	4.435	0.436	-0.36096
9/10/2009 8:58:48	32328.5	105.5	4.39	4.421	0.422	-0.37460
9/10/2009 8:58:50	32330.0	107.0	4.38	4.412	0.412	-0.38467
9/10/2009 8:58:52	32332.0	109.0	4.37	4.400	0.401	-0.39704
9/10/2009 8:58:54	32334.0	111.0	4.36	4.389	0.390	-0.40865
9/10/2009 8:58:56	32336.0	113.0	4.34	4.379	0.380	-0.42058
9/10/2009 8:58:57	32337.5	114.5	4.34	4.370	0.371	-0.43062
9/10/2009 8:59:00	32340.0	117.0	4.32	4.359	0.360	-0.44426
9/10/2009 8:59:01	32341.5	118.5	4.31	4.350	0.351	-0.45487
9/10/2009 8:59:03	32343.5	120.5	4.30	4.339	0.340	-0.46816
9/10/2009 8:59:05	32345.5	122.5	4.29	4.331	0.332	-0.47925
9/10/2009 8:59:07	32347.5	124.5	4.29	4.323	0.324	-0.48928
9/10/2009 8:59:09	32349.5	126.5	4.28	4.314	0.315	-0.50230
9/10/2009 8:59:11	32351.5	128.5	4.27	4.306	0.307	-0.51289
9/10/2009 8:59:14	32354.0	131.0	4.26	4.298	0.299	-0.52503
9/10/2009 8:59:16	32356.0	133.0	4.25	4.290	0.291	-0.53619
9/10/2009 8:59:17	32357.5	134.5	4.24	4.283	0.284	-0.54628
9/10/2009 8:59:20	32360.0	137.0	4.24	4.275	0.276	-0.55942
9/10/2009 8:59:22	32362.5	139.5	4.23	4.268	0.269	-0.56972
9/10/2009 8:59:25	32365.0	142.0	4.22	4.262	0.263	-0.58028
9/10/2009 8:59:27	32367.0	144.0	4.21	4.254	0.255	-0.59298
9/10/2009 8:59:29	32369.0	146.0	4.21	4.248	0.249	-0.60431
9/10/2009 8:59:31	32371.5	148.5	4.20	4.241	0.242	-0.61575

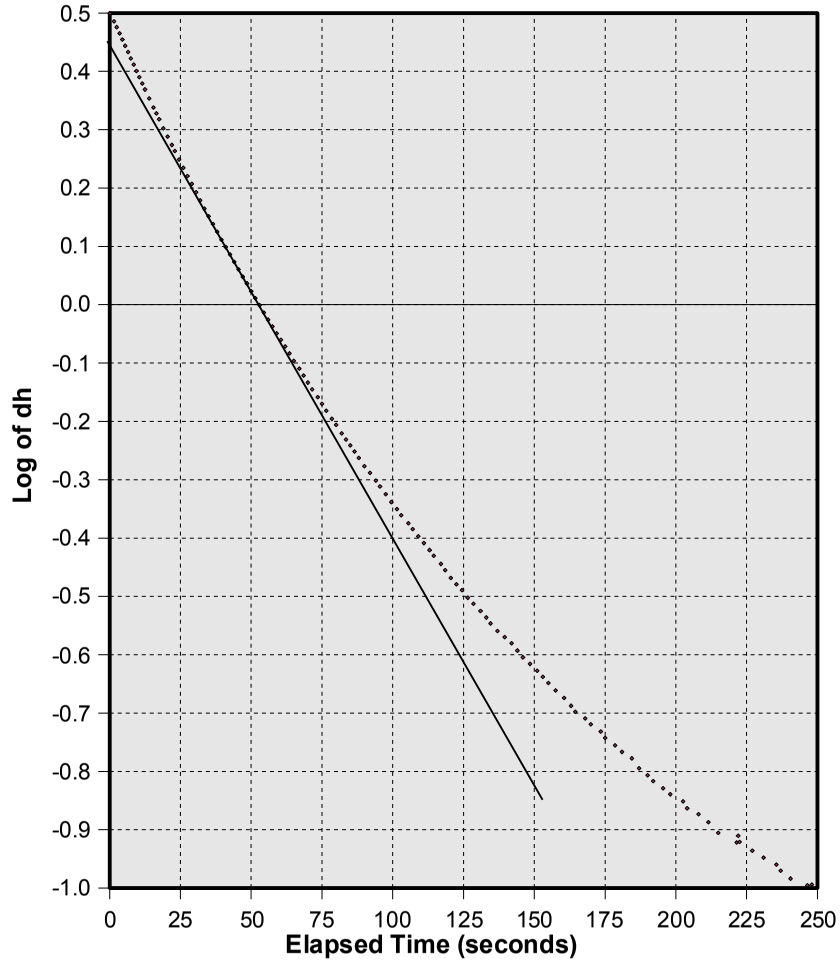
Slug Test P2-11D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 8:59:34	32374.0	151.0	4.19	4.235	0.236	-0.62751
9/10/2009 8:59:36	32376.0	153.0	4.19	4.229	0.230	-0.63790
9/10/2009 8:59:38	32378.0	155.0	4.18	4.224	0.225	-0.64855
9/10/2009 8:59:40	32380.5	157.5	4.17	4.217	0.218	-0.66123
9/10/2009 8:59:43	32383.5	160.5	4.17	4.211	0.212	-0.67409
9/10/2009 8:59:46	32386.0	163.0	4.16	4.204	0.205	-0.68756
9/10/2009 8:59:47	32387.5	164.5	4.15	4.200	0.201	-0.69757
9/10/2009 8:59:51	32391.0	168.0	4.15	4.194	0.195	-0.70910
9/10/2009 8:59:53	32393.0	170.0	4.14	4.190	0.191	-0.71939
9/10/2009 8:59:56	32396.5	173.5	4.14	4.185	0.186	-0.73151
9/10/2009 8:59:58	32398.0	175.0	4.13	4.180	0.181	-0.74261
9/10/2009 9:00:01	32401.5	178.5	4.13	4.175	0.176	-0.75541
9/10/2009 9:00:04	32404.0	181.0	4.12	4.170	0.171	-0.76661
9/10/2009 9:00:07	32407.5	184.5	4.12	4.166	0.167	-0.77754
9/10/2009 9:00:10	32410.0	187.0	4.11	4.160	0.160	-0.79470
9/10/2009 9:00:13	32413.0	190.0	4.10	4.155	0.156	-0.80667
9/10/2009 9:00:15	32415.0	192.0	4.10	4.152	0.152	-0.81674
9/10/2009 9:00:18	32418.5	195.5	4.10	4.147	0.148	-0.82903
9/10/2009 9:00:21	32421.0	198.0	4.09	4.144	0.145	-0.83931
9/10/2009 9:00:25	32425.5	202.5	4.09	4.140	0.141	-0.85160
9/10/2009 9:00:27	32427.0	204.0	4.08	4.136	0.137	-0.86311
9/10/2009 9:00:31	32431.0	208.0	4.08	4.133	0.134	-0.87321
9/10/2009 9:00:34	32434.5	211.5	4.07	4.129	0.130	-0.88723
9/10/2009 9:00:38	32438.0	215.0	4.07	4.123	0.124	-0.90520
9/10/2009 9:00:44	32444.5	221.5	4.06	4.119	0.120	-0.92163
9/10/2009 9:00:45	32445.0	222.0	4.06	4.122	0.123	-0.91051
9/10/2009 9:00:45	32445.5	222.5	4.06	4.119	0.120	-0.92086
9/10/2009 9:00:50	32450.0	227.0	4.06	4.115	0.116	-0.93574
9/10/2009 9:00:54	32454.0	231.0	4.05	4.112	0.113	-0.94770
9/10/2009 9:00:58	32458.5	235.5	4.05	4.109	0.110	-0.95957
9/10/2009 9:01:00	32460.0	237.0	4.05	4.106	0.107	-0.97031
9/10/2009 9:01:03	32463.5	240.5	4.04	4.103	0.104	-0.98372
9/10/2009 9:01:09	32469.5	246.5	4.04	4.100	0.101	-0.99526
9/10/2009 9:01:11	32471.0	248.0	4.04	4.101	0.101	-0.99389

Slug Test P2-11D

Slug Test by Bouwer and Rice

Displacement Method:	Injection	
Well depth:	44.62	ft
Stick up height:	3.15	ft
Depth to sand pack (BGS):	38.25	ft
Depth to screened interval (BGS):	39.62	ft
Well diameter:	2.00	in
Diameter of annular space:	7.75	in
Initial depth to water table from top of pipe:	19.71	ft
Initial Head Change:	3.16	ft
Total well length:	47.77	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.1901	ft
r_c:	0.0833	ft
Radius of gravel pack (r_w):	0.3229	ft
Screened interval:	5.00	ft
Length of open section (L_e):	5.00	ft
L_e / r_w:	15.4839	
C (dimensionless):	1.546	
Drawdown at time = 0 (y_0):	1.70	ft
Drawdown at time = t (y_t):	0.76	ft
Elapsed Time between y_0 and y_t (t):	40	sec
Initial water column in well (L_w):	28.06	ft
$\ln(R_e/r_w)$ =	2.89	
K =	4.02E-05	ft/sec
	1.22E-03	**cm/sec**
	1267.06	ft/yr



Water above sand pack:	Yes
%Duration below sand pack:	0.00%
Water above screen:	Yes
%Duration below screen:	0.00%

Slug Test P2-12

Initial offset in logger reading (feet):	-0.202	Date:	09/10/2009
Offset increment in logger reading (feet/sec):	0.000047		
Initial depth to water table (feet):	14.96		
Depth of probe below water table (feet):	8.479		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 10:06:15	36375.5	0.0	4.34	4.522	3.958	0.59745
9/10/2009 10:06:16	36376.0	0.5	4.48	4.665	3.815	0.58147
9/10/2009 10:06:18	36378.0	2.5	4.59	4.772	3.707	0.56901
9/10/2009 10:06:19	36379.0	3.5	4.71	4.891	3.588	0.55485
9/10/2009 10:06:20	36380.0	4.5	4.82	5.003	3.476	0.54108
9/10/2009 10:06:21	36381.0	5.5	4.93	5.113	3.366	0.52712
9/10/2009 10:06:22	36382.0	6.5	5.04	5.221	3.258	0.51297
9/10/2009 10:06:23	36383.0	7.5	5.14	5.321	3.158	0.49943
9/10/2009 10:06:24	36384.0	8.5	5.24	5.418	3.061	0.48589
9/10/2009 10:06:25	36385.0	9.5	5.33	5.514	2.965	0.47206
9/10/2009 10:06:26	36386.0	10.5	5.43	5.608	2.871	0.45808
9/10/2009 10:06:27	36387.0	11.5	5.52	5.698	2.781	0.44425
9/10/2009 10:06:28	36388.0	12.5	5.60	5.785	2.694	0.43046
9/10/2009 10:06:29	36389.0	13.5	5.69	5.868	2.611	0.41688
9/10/2009 10:06:30	36390.0	14.5	5.77	5.949	2.530	0.40320
9/10/2009 10:06:31	36391.0	15.5	5.85	6.028	2.452	0.38944
9/10/2009 10:06:32	36392.0	16.5	5.92	6.105	2.375	0.37559
9/10/2009 10:06:33	36393.0	17.5	6.00	6.179	2.301	0.36184
9/10/2009 10:06:34	36394.0	18.5	6.07	6.252	2.228	0.34785
9/10/2009 10:06:35	36395.0	19.5	6.14	6.323	2.157	0.33379
9/10/2009 10:06:36	36396.0	20.5	6.21	6.392	2.088	0.31968
9/10/2009 10:06:37	36397.0	21.5	6.28	6.460	2.020	0.30531
9/10/2009 10:06:38	36398.0	22.5	6.35	6.527	1.953	0.29067
9/10/2009 10:06:39	36399.0	23.5	6.41	6.588	1.891	0.27667
9/10/2009 10:06:40	36400.0	24.5	6.47	6.650	1.829	0.26220
9/10/2009 10:06:41	36401.0	25.5	6.53	6.711	1.768	0.24748
9/10/2009 10:06:42	36402.0	26.5	6.59	6.771	1.708	0.23250
9/10/2009 10:06:43	36403.0	27.5	6.65	6.827	1.652	0.21803
9/10/2009 10:06:44	36404.0	28.5	6.71	6.885	1.594	0.20252
9/10/2009 10:06:45	36405.0	29.5	6.76	6.939	1.540	0.18757
9/10/2009 10:06:46	36406.0	30.5	6.81	6.993	1.486	0.17209
9/10/2009 10:06:47	36407.0	31.5	6.87	7.045	1.434	0.15663
9/10/2009 10:06:48	36408.0	32.5	6.92	7.097	1.382	0.14061
9/10/2009 10:06:49	36409.0	33.5	6.97	7.145	1.334	0.12528
9/10/2009 10:06:50	36410.0	34.5	7.01	7.192	1.287	0.10972
9/10/2009 10:06:51	36411.0	35.5	7.06	7.243	1.236	0.09218
9/10/2009 10:06:52	36412.0	36.5	7.11	7.289	1.191	0.07573
9/10/2009 10:06:53	36413.0	37.5	7.15	7.332	1.148	0.05977
9/10/2009 10:06:54	36414.0	38.5	7.19	7.374	1.106	0.04360
9/10/2009 10:06:55	36415.0	39.5	7.24	7.417	1.063	0.02639
9/10/2009 10:06:56	36416.0	40.5	7.28	7.459	1.021	0.00890
9/10/2009 10:06:57	36417.0	41.5	7.32	7.498	0.982	-0.00800
9/10/2009 10:06:58	36418.0	42.5	7.36	7.538	0.942	-0.02605
9/10/2009 10:06:59	36419.0	43.5	7.40	7.575	0.905	-0.04343

Slug Test P2-12

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 10:07:00	36420.0	44.5	7.43	7.613	0.867	-0.06204
9/10/2009 10:07:01	36421.0	45.5	7.47	7.645	0.834	-0.07887
9/10/2009 10:07:02	36422.0	46.5	7.50	7.680	0.799	-0.09747
9/10/2009 10:07:03	36423.0	47.5	7.53	7.713	0.766	-0.11576
9/10/2009 10:07:04	36424.0	48.5	7.57	7.746	0.733	-0.13486
9/10/2009 10:07:04	36424.5	49.0	7.59	7.765	0.714	-0.14625
9/10/2009 10:07:05	36425.5	50.0	7.62	7.796	0.683	-0.16549
9/10/2009 10:07:06	36426.5	51.0	7.65	7.825	0.654	-0.18430
9/10/2009 10:07:07	36427.0	51.5	7.66	7.840	0.639	-0.19436
9/10/2009 10:07:08	36428.0	52.5	7.69	7.869	0.610	-0.21449
9/10/2009 10:07:08	36428.5	53.0	7.70	7.883	0.596	-0.22455
9/10/2009 10:07:09	36429.5	54.0	7.73	7.910	0.569	-0.24464
9/10/2009 10:07:10	36430.0	54.5	7.75	7.925	0.554	-0.25622
9/10/2009 10:07:11	36431.0	55.5	7.77	7.950	0.529	-0.27622
9/10/2009 10:07:12	36432.0	56.5	7.79	7.973	0.506	-0.29547
9/10/2009 10:07:12	36432.5	57.0	7.81	7.985	0.494	-0.30586
9/10/2009 10:07:13	36433.5	58.0	7.82	8.002	0.478	-0.32102
9/10/2009 10:07:14	36434.5	59.0	7.84	8.019	0.461	-0.33672
9/10/2009 10:07:15	36435.5	60.0	7.85	8.030	0.450	-0.34717
9/10/2009 10:07:17	36437.0	61.5	7.87	8.044	0.436	-0.36084
9/10/2009 10:07:19	36439.0	63.5	7.88	8.055	0.425	-0.37185
9/10/2009 10:07:21	36441.5	66.0	7.89	8.065	0.415	-0.38207
9/10/2009 10:07:25	36445.0	69.5	7.90	8.074	0.405	-0.39249
9/10/2009 10:07:31	36451.0	75.5	7.91	8.085	0.394	-0.40414
9/10/2009 10:07:38	36458.0	82.5	7.92	8.095	0.385	-0.41493
9/10/2009 10:07:46	36466.0	90.5	7.93	8.104	0.375	-0.42593
9/10/2009 10:07:53	36473.5	98.0	7.94	8.114	0.365	-0.43726
9/10/2009 10:08:02	36482.0	106.5	7.95	8.124	0.356	-0.44882
9/10/2009 10:08:11	36491.5	116.0	7.96	8.133	0.346	-0.46065
9/10/2009 10:08:20	36500.5	125.0	7.97	8.142	0.338	-0.47154
9/10/2009 10:08:28	36508.5	133.0	7.98	8.150	0.329	-0.48278
9/10/2009 10:08:38	36518.5	143.0	7.98	8.158	0.321	-0.49284
9/10/2009 10:08:46	36526.5	151.0	7.99	8.166	0.314	-0.50327
9/10/2009 10:08:56	36536.0	160.5	8.00	8.175	0.304	-0.51670
9/10/2009 10:09:05	36545.5	170.0	8.01	8.183	0.297	-0.52762
9/10/2009 10:09:15	36555.0	179.5	8.02	8.190	0.289	-0.53882
9/10/2009 10:09:22	36562.5	187.0	8.02	8.197	0.283	-0.54892
9/10/2009 10:09:33	36573.5	198.0	8.03	8.205	0.274	-0.56217
9/10/2009 10:09:42	36582.5	207.0	8.04	8.212	0.267	-0.57272
9/10/2009 10:09:54	36594.0	218.5	8.05	8.219	0.260	-0.58501
9/10/2009 10:10:01	36601.0	225.5	8.06	8.226	0.253	-0.59630
9/10/2009 10:10:12	36612.0	236.5	8.06	8.234	0.246	-0.60933
9/10/2009 10:10:23	36623.0	247.5	8.07	8.240	0.239	-0.62094
9/10/2009 10:10:32	36632.0	256.5	8.08	8.247	0.233	-0.63305
9/10/2009 10:10:39	36639.0	263.5	8.08	8.252	0.227	-0.64376
9/10/2009 10:10:48	36648.5	273.0	8.09	8.259	0.221	-0.65648
9/10/2009 10:10:59	36659.5	284.0	8.10	8.265	0.214	-0.66945
9/10/2009 10:11:11	36671.5	296.0	8.10	8.272	0.208	-0.68271
9/10/2009 10:11:19	36679.5	304.0	8.11	8.277	0.202	-0.69464

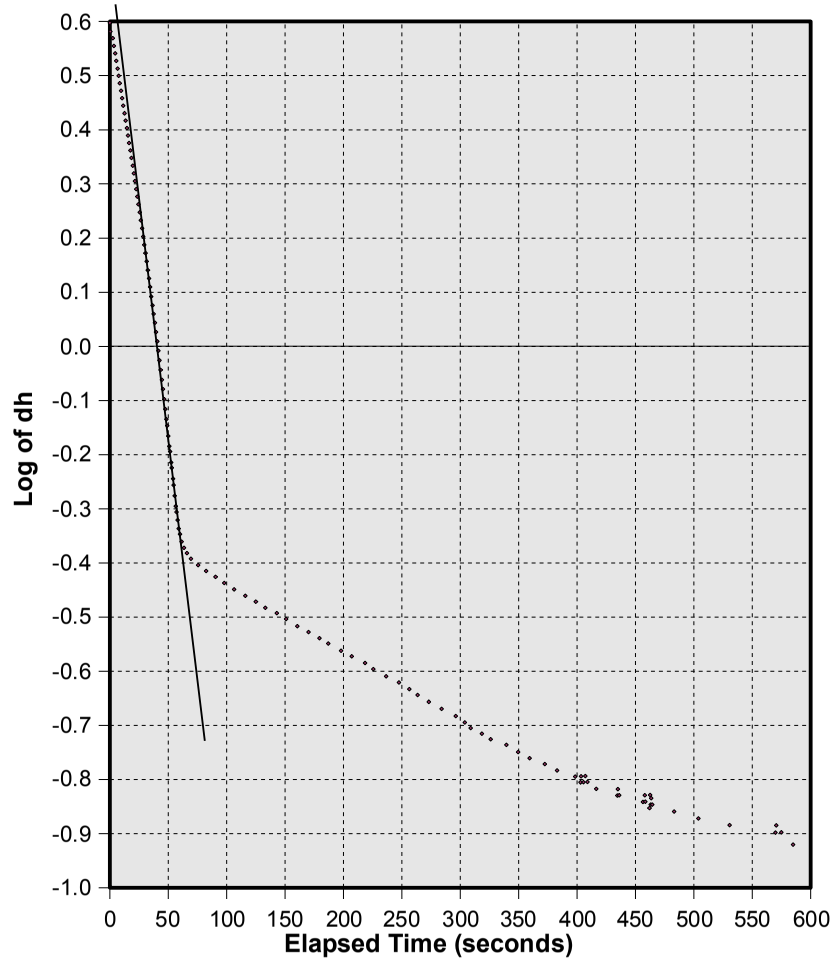
Slug Test P2-12

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/10/2009 10:11:24	36684.5	309.0	8.12	8.282	0.197	-0.70501
9/10/2009 10:11:34	36694.0	318.5	8.12	8.287	0.193	-0.71516
9/10/2009 10:11:41	36701.5	326.0	8.13	8.291	0.188	-0.72577
9/10/2009 10:11:55	36715.0	339.5	8.13	8.296	0.184	-0.73598
9/10/2009 10:12:05	36725.0	349.5	8.14	8.301	0.178	-0.74927
9/10/2009 10:12:15	36735.0	359.5	8.14	8.306	0.174	-0.76046
9/10/2009 10:12:28	36748.0	372.5	8.15	8.310	0.169	-0.77159
9/10/2009 10:12:38	36758.5	383.0	8.15	8.315	0.165	-0.78333
9/10/2009 10:12:54	36774.0	398.5	8.16	8.319	0.160	-0.79475
9/10/2009 10:12:58	36778.5	403.0	8.16	8.323	0.157	-0.80513
9/10/2009 10:12:59	36779.0	403.5	8.16	8.319	0.161	-0.79412
9/10/2009 10:13:01	36781.0	405.5	8.16	8.323	0.157	-0.80481
9/10/2009 10:13:02	36782.5	407.0	8.16	8.319	0.161	-0.79368
9/10/2009 10:13:04	36784.5	409.0	8.16	8.322	0.157	-0.80436
9/10/2009 10:13:12	36792.0	416.5	8.17	8.327	0.152	-0.81742
9/10/2009 10:13:30	36810.0	434.5	8.17	8.331	0.148	-0.82945
9/10/2009 10:13:30	36810.5	435.0	8.17	8.327	0.152	-0.81781
9/10/2009 10:13:31	36811.5	436.0	8.17	8.331	0.148	-0.82924
9/10/2009 10:13:52	36832.0	456.5	8.18	8.335	0.144	-0.84126
9/10/2009 10:13:53	36833.5	458.0	8.17	8.331	0.148	-0.82916
9/10/2009 10:13:54	36834.0	458.5	8.18	8.335	0.144	-0.84098
9/10/2009 10:13:57	36837.5	462.0	8.18	8.339	0.140	-0.85268
9/10/2009 10:13:58	36838.0	462.5	8.17	8.331	0.148	-0.82855
9/10/2009 10:13:58	36838.5	463.0	8.18	8.337	0.142	-0.84640
9/10/2009 10:13:59	36839.0	463.5	8.17	8.333	0.146	-0.83430
9/10/2009 10:14:00	36840.0	464.5	8.18	8.337	0.143	-0.84619
9/10/2009 10:14:18	36858.5	483.0	8.18	8.341	0.138	-0.85898
9/10/2009 10:14:39	36879.5	504.0	8.19	8.345	0.134	-0.87178
9/10/2009 10:15:06	36906.0	530.5	8.19	8.349	0.131	-0.88411
9/10/2009 10:15:45	36945.5	570.0	8.20	8.353	0.126	-0.89816
9/10/2009 10:15:46	36946.0	570.5	8.19	8.349	0.130	-0.88455
9/10/2009 10:15:50	36950.5	575.0	8.20	8.353	0.127	-0.89735
9/10/2009 10:16:00	36960.5	585.0	8.21	8.359	0.120	-0.92035

Slug Test P2-12

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	24.75	ft
Stick up height:	3.25	ft
Depth to sand pack (BGS):	8.63	ft
Depth to screened interval (BGS):	9.75	ft
Well diameter:	2.00	in
Diameter of annular space:	7.75	in
Initial depth to water table from top of pipe:	14.96	ft
Initial Head Change:	3.96	ft
Total well length:	28.00	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.1901	ft
r_c:	0.1901	ft
Radius of gravel pack (r_w):	0.3229	ft
Screened interval:	15.00	ft
Length of open section (L_e):	13.04	ft
L_e / r_w:	40.3819	
A (dimensionless):	2.889	
B (dimensionless):	0.483	
Drawdown at time = 0 (y_0):	2.30	ft
Drawdown at time = t (y_t):	0.40	ft
Elapsed Time between y_0 and y_t (t):	55	sec
Initial water column in well (L_w):	13.04	ft
$\ln(R_e/r_w)$ =	2.27	
K =	9.99E-05	ft/sec
	3.04E-03	**cm/sec**
	3149.36	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

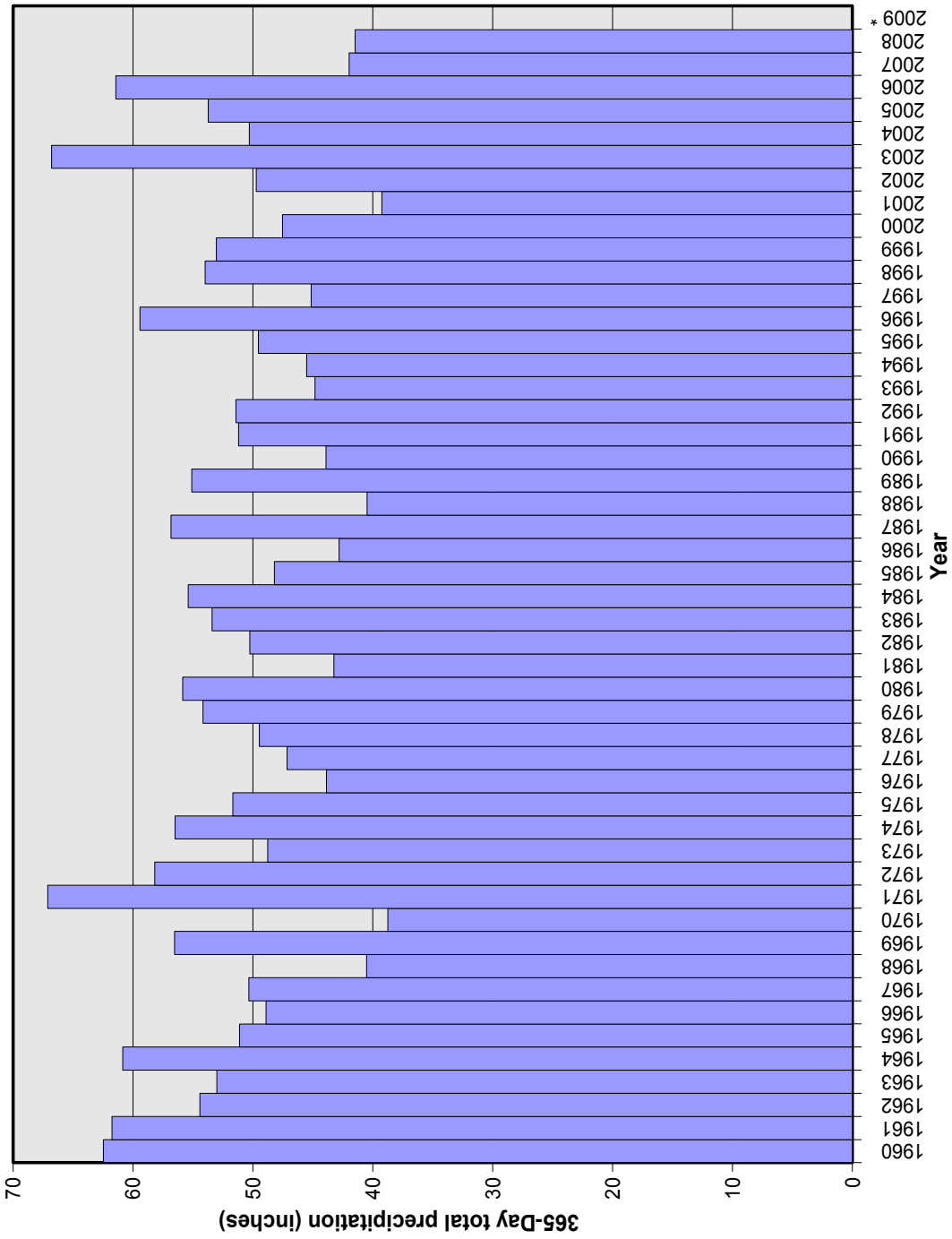
APPENDIX D

Table D-1: Annual precipitation, Kinston 7E COOP 314684

Year	Months	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	365-Day Average Total
1960	12	366	0	6.82	0.17	0.55	0.02	**62.47**
1961	12	365	0	4.52	0.17	0.47	0.01	**61.74**
1962	12	365	0	4.30	0.15	0.45	0.01	**54.41**
1963	12	365	0	2.18	0.15	0.37	0.01	**53.01**
1964	12	366	0	3.40	0.17	0.44	0.01	**60.85**
1965	12	364	0	2.70	0.14	0.37	0.01	**51.11**
1966	12	365	0	2.41	0.13	0.35	0.01	**48.91**
1967	12	364	0	2.38	0.14	0.35	0.01	**50.34**
1968	12	366	0	2.83	0.11	0.32	0.01	**40.52**
1969	12	365	0	4.81	0.15	0.48	0.01	**56.53**
1970	12	365	0	2.21	0.11	0.28	0.00	**38.75**
1971	12	365	0	4.05	0.18	0.45	0.01	**67.10**
1972	12	366	0	4.15	0.16	0.42	0.01	**58.18**
1973	12	365	0	3.66	0.13	0.39	0.01	**48.77**
1974	12	365	0	2.41	0.15	0.35	0.01	**56.49**
1975	11	334	0	2.62	0.14	0.35	0.01	**51.67**
1976	12	366	0	3.54	0.12	0.33	0.01	**43.87**
1977	12	365	0	2.98	0.13	0.37	0.01	**47.15**
1978	12	365	0	3.46	0.14	0.39	0.01	**49.47**
1979	12	365	0	3.01	0.15	0.39	0.01	**54.15**
1980	12	366	0	2.54	0.15	0.40	0.01	**55.85**
1981	12	364	0	3.44	0.12	0.34	0.01	**43.24**
1982	12	365	0	2.25	0.14	0.35	0.01	**50.26**
1983	12	365	0	2.73	0.15	0.35	0.01	**53.41**
1984	11	336	0	3.60	0.15	0.39	0.01	**55.39**
1985	12	365	0	5.51	0.13	0.45	0.01	**48.20**
1986	12	365	0	2.22	0.12	0.30	0.00	**42.80**
1987	12	365	0	2.99	0.16	0.42	0.01	**56.82**
1988	12	366	0	2.38	0.11	0.30	0.00	**40.47**
1989	12	365	0	2.71	0.15	0.34	0.01	**55.10**
1990	12	365	0	2.95	0.12	0.34	0.01	**43.90**
1991	12	365	0	4.55	0.14	0.41	0.01	**51.19**
1992	12	366	0	3.32	0.14	0.40	0.01	**51.42**
1993	12	365	0	2.52	0.12	0.31	0.00	**44.81**
1994	12	365	0	2.73	0.12	0.33	0.01	**45.51**
1995	12	365	0	2.92	0.14	0.35	0.01	**49.53**
1996	12	364	0	5.69	0.16	0.52	0.01	**59.42**
1997	12	365	0	2.97	0.12	0.32	0.01	**45.15**
1998	12	365	0	5.35	0.15	0.45	0.01	**53.98**
1999	12	359	0	5.50	0.15	0.47	0.01	**53.04**
2000	12	366	0	2.98	0.13	0.34	0.01	**47.53**
2001	12	358	0	3.82	0.11	0.35	0.01	**39.25**
2002	12	362	0	3.38	0.14	0.34	0.01	**49.73**
2003	12	354	0	4.44	0.18	0.51	0.01	**66.78**
2004	12	358	0	4.38	0.14	0.38	0.01	**50.29**
2005	12	354	0	4.96	0.15	0.43	0.01	**53.73**
2006	12	357	0	9.59	0.17	0.63	0.02	**61.44**
2007	12	365	0	4.16	0.11	0.39	0.01	**41.97**
2008	12	365	0	2.18	0.11	0.30	0.00	**41.47**
2009	10	271	0	1.70	0.14	0.33	0.01	**50.17**

NOTE: In order to compensate for the variable number of days in a year as well as the presence of missing data in some years, an annual total precipitation was standardized to a so-called "365-day average total", which was calculated by multiplying the average daily precipitation for a given year by 365 in order to remove a likely bias caused by the above conditions.

Graph D-1: Annual precipitation, Kinston 7E COOP 314684



NOTE: Years with available data of less than 300 were marked insufficient,further denoted with * , and are not presented in this graph

Table D-2: Monthly precipitation, Kinston 7E COOP 314684

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1960	1	31	0	1.95	0.19	0.44	0.03	**5.59**
1960	2	29	0	1.30	0.19	0.32	0.02	**5.80**
1960	3	31	0	1.21	0.11	0.26	0.01	**3.17**
1960	4	30	0	2.05	0.15	0.50	0.05	**4.52**
1960	5	31	0	1.96	0.18	0.45	0.04	**5.41**
1960	6	30	0	1.91	0.21	0.42	0.03	**6.33**
1960	7	31	0	3.98	0.34	0.82	0.12	**10.20**
1960	8	31	0	0.82	0.14	0.25	0.01	**4.15**
1960	9	30	0	6.82	0.33	1.28	0.30	**9.78**
1960	10	31	0	1.81	0.11	0.33	0.02	**3.39**
1960	11	30	0	0.61	0.04	0.12	0.00	**1.23**
1960	12	31	0	0.78	0.07	0.20	0.01	**2.12**
1961	1	31	0	1.25	0.08	0.24	0.01	**2.39**
1961	2	28	0	1.24	0.21	0.38	0.03	**6.38**
1961	3	31	0	1.15	0.08	0.21	0.01	**2.41**
1961	4	30	0	1.52	0.21	0.44	0.03	**6.20**
1961	5	31	0	1.70	0.25	0.45	0.04	**7.53**
1961	6	30	0	4.52	0.56	1.10	0.22	**16.85**
1961	7	31	0	0.70	0.10	0.21	0.01	**3.07**
1961	8	31	0	2.27	0.26	0.50	0.05	**7.71**
1961	9	30	0	1.63	0.15	0.36	0.02	**4.36**
1961	10	31	0	0.12	0.01	0.03	0.00	**0.31**
1961	11	30	0	1.93	0.07	0.35	0.02	**2.07**
1961	12	31	0	0.73	0.07	0.17	0.01	**2.04**
1962	1	31	0	1.81	0.19	0.35	0.02	**5.61**
1962	2	28	0	0.83	0.09	0.20	0.01	**2.57**
1962	3	31	0	0.98	0.13	0.27	0.01	**4.01**
1962	4	30	0	1.07	0.13	0.30	0.02	**3.81**
1962	5	31	0	0.26	0.02	0.05	0.00	**0.66**
1962	6	30	0	4.30	0.31	0.85	0.13	**9.25**
1962	7	31	0	4.23	0.23	0.76	0.10	**6.88**
1962	8	31	0	1.90	0.21	0.43	0.03	**6.20**
1962	9	30	0	1.77	0.18	0.39	0.03	**5.50**
1962	10	31	0	0.57	0.02	0.10	0.00	**0.59**
1962	11	30	0	3.02	0.21	0.58	0.06	**6.18**
1962	12	31	0	1.12	0.08	0.22	0.01	**2.44**
1963	1	31	0	1.30	0.18	0.38	0.03	**5.45**
1963	2	28	0	0.85	0.13	0.23	0.01	**3.92**
1963	3	31	0	1.26	0.08	0.24	0.01	**2.51**
1963	4	30	0	1.65	0.07	0.30	0.02	**2.10**
1963	5	31	0	1.63	0.26	0.49	0.04	**7.66**
1963	6	30	0	1.46	0.08	0.27	0.01	**2.31**
1963	7	31	0	1.42	0.21	0.38	0.03	**6.17**
1963	8	31	0	2.18	0.25	0.56	0.06	**7.40**
1963	9	30	0	1.81	0.20	0.51	0.05	**6.05**
1963	10	31	0	0.42	0.03	0.09	0.00	**1.00**
1963	11	30	0	1.69	0.17	0.39	0.03	**5.16**
1963	12	31	0	0.65	0.08	0.19	0.01	**2.45**
1964	1	31	0	1.24	0.18	0.33	0.02	**5.42**
1964	2	29	0	1.08	0.21	0.32	0.02	**6.30**
1964	3	31	0	1.45	0.12	0.29	0.01	**3.58**
1964	4	30	0	1.57	0.11	0.32	0.02	**3.28**
1964	5	31	0	0.95	0.08	0.22	0.01	**2.50**
1964	6	30	0	3.40	0.29	0.86	0.14	**8.68**

Table D-2: Monthly precipitation, Kinston 7E COOP 314684

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1964	7	31	0	1.08	0.19	0.30	0.02	**5.74**
1964	8	31	0	0.85	0.17	0.27	0.01	**5.19**
1964	9	30	0	3.20	0.29	0.69	0.09	**8.60**
1964	10	31	0	2.35	0.19	0.54	0.05	**5.79**
1964	11	30	0	0.86	0.05	0.18	0.01	**1.61**
1964	12	31	0	2.15	0.12	0.38	0.03	**3.49**
1965	1	31	0	0.65	0.08	0.16	0.00	**2.28**
1965	2	28	0	1.09	0.16	0.29	0.02	**4.93**
1965	3	31	0	0.94	0.13	0.26	0.01	**3.94**
1965	4	29	0	0.52	0.07	0.15	0.00	**2.17**
1965	5	31	0	1.17	0.14	0.32	0.02	**4.16**
1965	6	30	0	2.52	0.35	0.70	0.09	**10.55**
1965	7	31	0	2.70	0.45	0.65	0.07	**13.62**
1965	8	31	0	1.13	0.05	0.20	0.01	**1.36**
1965	9	30	0	0.94	0.10	0.25	0.01	**2.98**
1965	10	31	0	1.29	0.06	0.24	0.01	**1.74**
1965	11	30	0	1.55	0.06	0.28	0.01	**1.91**
1965	12	31	0	0.51	0.03	0.10	0.00	**0.79**
1966	1	31	0	1.63	0.20	0.42	0.03	**6.01**
1966	2	28	0	0.80	0.09	0.17	0.01	**2.59**
1966	3	31	0	1.88	0.15	0.46	0.04	**4.57**
1966	4	30	0	1.95	0.12	0.35	0.02	**3.47**
1966	5	31	0	1.22	0.18	0.32	0.02	**5.25**
1966	6	30	0	1.10	0.09	0.25	0.01	**2.72**
1966	7	31	0	1.21	0.12	0.28	0.01	**3.68**
1966	8	31	0	2.35	0.34	0.54	0.05	**10.14**
1966	9	30	0	1.27	0.12	0.31	0.02	**3.67**
1966	10	31	0	0.48	0.03	0.10	0.00	**0.95**
1966	11	30	0	0.21	0.02	0.05	0.00	**0.62**
1966	12	31	0	2.41	0.14	0.46	0.04	**4.25**
1967	1	31	0	1.10	0.16	0.27	0.01	**4.73**
1967	2	28	0	1.68	0.16	0.37	0.03	**4.83**
1967	3	31	0	0.23	0.02	0.05	0.00	**0.60**
1967	4	30	0	1.28	0.08	0.25	0.01	**2.49**
1967	5	31	0	0.84	0.13	0.24	0.01	**3.90**
1967	6	30	0	1.84	0.11	0.36	0.02	**3.29**
1967	7	31	0	1.44	0.28	0.41	0.03	**8.51**
1967	8	31	0	2.31	0.27	0.51	0.05	**8.02**
1967	9	30	0	2.38	0.13	0.45	0.04	**3.88**
1967	10	31	0	1.50	0.09	0.29	0.01	**2.57**
1967	11	29	0	2.00	0.10	0.37	0.03	**2.94**
1967	12	31	0	1.12	0.13	0.29	0.02	**3.78**
1968	1	31	0	0.73	0.12	0.21	0.01	**3.46**
1968	2	29	0	0.76	0.03	0.14	0.00	**1.01**
1968	3	31	0	2.83	0.20	0.56	0.06	**6.00**
1968	4	30	0	1.03	0.12	0.27	0.01	**3.46**
1968	5	31	0	2.56	0.15	0.48	0.04	**4.65**
1968	6	30	0	0.96	0.09	0.20	0.01	**2.76**
1968	7	31	0	1.44	0.21	0.37	0.02	**6.38**
1968	8	31	0	0.98	0.08	0.21	0.01	**2.39**
1968	9	30	0	0.56	0.03	0.11	0.00	**0.76**
1968	10	31	0	2.11	0.13	0.39	0.03	**3.94**
1968	11	30	0	1.25	0.10	0.30	0.02	**3.10**
1968	12	31	0	0.37	0.06	0.11	0.00	**1.80**

Table D-2: Monthly precipitation, Kinston 7E COOP 314684

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1969	1	31	0	1.32	0.09	0.27	0.01	**2.70**
1969	2	28	0	0.95	0.13	0.26	0.01	**3.90**
1969	3	31	0	1.91	0.16	0.43	0.03	**4.86**
1969	4	30	0	1.11	0.13	0.27	0.01	**3.87**
1969	5	31	0	3.99	0.18	0.72	0.09	**5.33**
1969	6	30	0	2.98	0.28	0.66	0.08	**8.43**
1969	7	31	0	1.64	0.19	0.39	0.03	**5.57**
1969	8	31	0	1.90	0.23	0.47	0.04	**7.05**
1969	9	30	0	1.05	0.08	0.20	0.01	**2.47**
1969	10	31	0	0.62	0.05	0.13	0.00	**1.44**
1969	11	30	0	4.81	0.17	0.86	0.14	**5.07**
1969	12	31	0	1.76	0.17	0.42	0.03	**5.03**
1970	1	31	0	1.12	0.10	0.26	0.01	**3.07**
1970	2	28	0	2.21	0.13	0.42	0.03	**3.81**
1970	3	31	0	1.12	0.11	0.22	0.01	**3.19**
1970	4	30	0	0.61	0.07	0.15	0.00	**2.17**
1970	5	31	0	0.58	0.04	0.13	0.00	**1.26**
1970	6	30	0	1.38	0.11	0.31	0.02	**3.39**
1970	7	31	0	1.39	0.20	0.39	0.03	**6.14**
1970	8	31	0	0.73	0.13	0.21	0.01	**3.98**
1970	9	30	0	1.64	0.15	0.36	0.02	**4.37**
1970	10	31	0	1.54	0.13	0.32	0.02	**3.90**
1970	11	30	0	0.46	0.04	0.11	0.00	**1.11**
1970	12	31	0	1.16	0.06	0.21	0.01	**1.84**
1971	1	31	0	1.73	0.21	0.42	0.03	**6.45**
1971	2	28	0	1.13	0.14	0.26	0.01	**4.17**
1971	3	31	0	2.20	0.18	0.46	0.04	**5.52**
1971	4	30	0	1.12	0.11	0.25	0.01	**3.25**
1971	5	31	0	2.05	0.19	0.48	0.04	**5.69**
1971	6	30	0	0.57	0.09	0.18	0.01	**2.63**
1971	7	31	0	2.23	0.35	0.63	0.07	**10.51**
1971	8	31	0	1.47	0.22	0.42	0.03	**6.68**
1971	9	30	0	2.08	0.23	0.53	0.05	**6.95**
1971	10	31	0	4.05	0.34	0.81	0.12	**10.32**
1971	11	30	0	0.69	0.07	0.17	0.01	**1.95**
1971	12	31	0	0.73	0.06	0.15	0.00	**1.71**
1972	1	31	0	1.21	0.15	0.27	0.01	**4.37**
1972	2	29	0	1.72	0.18	0.42	0.03	**5.49**
1972	3	31	0	1.26	0.12	0.27	0.01	**3.48**
1972	4	30	0	0.47	0.06	0.12	0.00	**1.82**
1972	5	31	0	1.70	0.19	0.38	0.03	**5.75**
1972	6	30	0	2.52	0.21	0.52	0.05	**6.21**
1972	7	31	0	4.15	0.27	0.75	0.10	**8.06**
1972	8	31	0	1.87	0.13	0.34	0.02	**3.94**
1972	9	30	0	2.34	0.24	0.58	0.06	**7.10**
1972	10	31	0	1.80	0.14	0.38	0.03	**4.25**
1972	11	30	0	1.22	0.14	0.33	0.02	**4.16**
1972	12	31	0	0.66	0.09	0.17	0.01	**2.80**
1973	1	31	0	1.20	0.16	0.29	0.02	**4.70**
1973	2	28	0	1.81	0.19	0.38	0.03	**5.66**
1973	3	31	0	0.57	0.10	0.16	0.00	**2.99**
1973	4	30	0	3.20	0.24	0.67	0.08	**7.34**
1973	5	31	0	0.60	0.08	0.15	0.00	**2.40**
1973	6	30	0	1.22	0.17	0.31	0.02	**5.08**

Table D-2: Monthly precipitation, Kinston 7E COOP 314684

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1973	7	31	0	1.42	0.11	0.29	0.02	**3.21**
1973	8	31	0	3.66	0.19	0.67	0.08	**5.83**
1973	9	30	0	1.21	0.06	0.24	0.01	**1.94**
1973	10	31	0	0.91	0.05	0.20	0.01	**1.61**
1973	11	30	0	0.23	0.02	0.06	0.00	**0.70**
1973	12	31	0	2.99	0.23	0.58	0.06	**6.77**
1974	1	31	0	0.99	0.13	0.25	0.01	**3.96**
1974	2	28	0	0.64	0.13	0.20	0.01	**3.86**
1974	3	31	0	1.53	0.17	0.36	0.02	**5.16**
1974	4	30	0	2.23	0.16	0.50	0.05	**4.94**
1974	5	31	0	2.41	0.20	0.46	0.04	**5.87**
1974	6	30	0	1.46	0.15	0.39	0.03	**4.60**
1974	7	31	0	1.50	0.16	0.35	0.02	**4.95**
1974	8	31	0	1.87	0.33	0.49	0.04	**10.01**
1974	9	30	0	1.16	0.14	0.26	0.01	**4.23**
1974	10	31	0	0.48	0.04	0.12	0.00	**1.29**
1974	11	30	0	0.93	0.08	0.23	0.01	**2.50**
1974	12	31	0	1.51	0.14	0.31	0.02	**4.21**
1975	1	31	0	0.70	0.13	0.22	0.01	**3.96**
1975	2	28	0	1.05	0.13	0.27	0.01	**3.95**
1975	4	30	0	1.01	0.12	0.23	0.01	**3.57**
1975	5	31	0	0.60	0.05	0.13	0.00	**1.53**
1975	6	30	0	1.85	0.11	0.35	0.02	**3.31**
1975	7	31	0	1.63	0.18	0.33	0.02	**5.50**
1975	8	31	0	2.62	0.11	0.47	0.04	**3.43**
1975	9	30	0	1.89	0.36	0.49	0.04	**10.79**
1975	10	31	0	1.60	0.11	0.37	0.02	**3.35**
1975	11	30	0	1.18	0.05	0.22	0.01	**1.55**
1975	12	31	0	2.04	0.19	0.43	0.03	**5.83**
1976	1	31	0	1.77	0.14	0.35	0.02	**4.35**
1976	2	29	0	1.20	0.05	0.22	0.01	**1.42**
1976	3	31	0	0.56	0.08	0.16	0.00	**2.26**
1976	4	30	0	0.45	0.02	0.08	0.00	**0.64**
1976	5	31	0	1.08	0.16	0.27	0.01	**4.76**
1976	6	30	0	1.75	0.17	0.39	0.03	**5.17**
1976	7	31	0	3.54	0.20	0.63	0.07	**5.89**
1976	8	31	0	1.42	0.12	0.29	0.02	**3.46**
1976	9	30	0	1.88	0.14	0.40	0.03	**4.32**
1976	10	31	0	0.81	0.07	0.18	0.01	**2.19**
1976	11	30	0	1.08	0.13	0.29	0.02	**3.75**
1976	12	31	0	1.27	0.16	0.35	0.02	**4.90**
1977	1	31	0	1.54	0.11	0.31	0.02	**3.28**
1977	2	28	0	1.14	0.06	0.22	0.01	**1.80**
1977	3	31	0	1.52	0.17	0.37	0.02	**5.05**
1977	4	30	0	0.57	0.06	0.14	0.00	**1.86**
1977	5	31	0	2.98	0.16	0.56	0.06	**4.89**
1977	6	30	0	0.75	0.13	0.22	0.01	**3.78**
1977	7	31	0	0.77	0.06	0.17	0.01	**1.79**
1977	8	31	0	1.92	0.18	0.45	0.04	**5.36**
1977	9	30	0	2.09	0.13	0.46	0.04	**3.91**
1977	10	31	0	2.46	0.23	0.55	0.05	**6.84**
1977	11	30	0	1.08	0.11	0.28	0.01	**3.34**
1977	12	31	0	1.19	0.14	0.30	0.02	**4.32**
1978	1	31	0	1.87	0.22	0.48	0.04	**6.45**

Table D-2: Monthly precipitation, Kinston 7E COOP 314684

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1978	2	28	0	0.34	0.04	0.10	0.00	**1.29**
1978	3	31	0	1.43	0.14	0.32	0.02	**4.06**
1978	4	30	0	3.20	0.22	0.61	0.07	**6.45**
1978	5	31	0	2.03	0.17	0.39	0.03	**5.07**
1978	6	30	0	0.85	0.13	0.25	0.01	**4.03**
1978	7	31	0	3.46	0.24	0.66	0.08	**7.26**
1978	8	31	0	1.87	0.14	0.34	0.02	**4.12**
1978	9	30	0	0.90	0.04	0.17	0.01	**1.27**
1978	10	31	0	1.02	0.04	0.18	0.01	**1.20**
1978	11	30	0	2.36	0.17	0.44	0.04	**5.00**
1978	12	31	0	1.16	0.08	0.25	0.01	**2.33**
1979	1	31	0	1.27	0.17	0.35	0.02	**5.09**
1979	2	28	0	2.04	0.19	0.42	0.03	**5.57**
1979	3	31	0	1.08	0.10	0.24	0.01	**3.08**
1979	4	30	0	1.01	0.13	0.27	0.01	**3.79**
1979	5	31	0	1.28	0.19	0.34	0.02	**5.72**
1979	6	30	0	1.36	0.16	0.35	0.02	**4.76**
1979	7	31	0	2.23	0.19	0.52	0.05	**5.67**
1979	8	31	0	1.65	0.10	0.31	0.02	**3.08**
1979	9	30	0	3.01	0.33	0.73	0.10	**10.03**
1979	10	31	0	0.88	0.05	0.16	0.00	**1.51**
1979	11	30	0	1.52	0.11	0.33	0.02	**3.40**
1979	12	31	0	0.98	0.07	0.21	0.01	**1.95**
1980	1	31	0	1.03	0.16	0.27	0.01	**4.81**
1980	2	29	0	0.96	0.10	0.22	0.01	**3.06**
1980	3	31	0	2.42	0.26	0.52	0.05	**7.70**
1980	4	30	0	2.08	0.15	0.46	0.04	**4.54**
1980	5	31	0	1.78	0.18	0.46	0.04	**5.49**
1980	6	30	0	1.27	0.11	0.31	0.02	**3.36**
1980	7	31	0	1.31	0.10	0.29	0.02	**2.91**
1980	8	31	0	1.59	0.13	0.36	0.02	**3.78**
1980	9	30	0	2.54	0.24	0.59	0.06	**7.27**
1980	10	31	0	2.36	0.17	0.44	0.03	**4.95**
1980	11	30	0	0.62	0.07	0.15	0.00	**2.15**
1980	12	31	0	1.87	0.16	0.41	0.03	**4.92**
1981	1	31	0	0.52	0.05	0.12	0.00	**1.64**
1981	2	28	0	0.78	0.10	0.20	0.01	**2.98**
1981	3	31	0	0.51	0.05	0.11	0.00	**1.39**
1981	4	30	0	0.28	0.03	0.07	0.00	**0.80**
1981	5	30	0	1.76	0.27	0.49	0.04	**8.19**
1981	6	30	0	1.52	0.17	0.33	0.02	**5.03**
1981	7	31	0	2.72	0.22	0.55	0.05	**6.61**
1981	8	31	0	3.44	0.29	0.67	0.08	**8.84**
1981	9	30	0	0.90	0.04	0.17	0.01	**1.33**
1981	10	31	0	0.45	0.04	0.11	0.00	**1.32**
1981	11	30	0	0.25	0.02	0.05	0.00	**0.54**
1981	12	31	0	0.95	0.13	0.24	0.01	**3.87**
1982	1	31	0	2.17	0.15	0.39	0.03	**4.35**
1982	2	28	0	0.76	0.16	0.26	0.01	**4.86**
1982	3	31	0	0.80	0.06	0.16	0.00	**1.77**
1982	4	30	0	1.26	0.12	0.28	0.01	**3.54**
1982	5	31	0	1.72	0.12	0.33	0.02	**3.57**
1982	6	30	0	1.38	0.20	0.39	0.03	**6.11**
1982	7	31	0	1.04	0.17	0.31	0.02	**5.05**

Table D-2: Monthly precipitation, Kinston 7E COOP 314684

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1982	8	31	0	1.43	0.10	0.29	0.02	**3.11**
1982	9	30	0	1.56	0.19	0.40	0.03	**5.57**
1982	10	31	0	2.21	0.11	0.40	0.03	**3.24**
1982	11	30	0	1.85	0.13	0.40	0.03	**3.87**
1982	12	31	0	2.25	0.16	0.43	0.03	**4.67**
1983	1	31	0	0.85	0.13	0.21	0.01	**3.76**
1983	2	28	0	1.31	0.23	0.38	0.03	**7.00**
1983	3	31	0	1.34	0.22	0.37	0.03	**6.67**
1983	4	30	0	2.19	0.21	0.45	0.04	**6.17**
1983	5	31	0	0.92	0.08	0.21	0.01	**2.39**
1983	6	30	0	2.73	0.24	0.64	0.08	**7.16**
1983	7	31	0	0.82	0.07	0.16	0.00	**1.96**
1983	8	31	0	0.69	0.04	0.13	0.00	**1.07**
1983	9	30	0	1.17	0.15	0.32	0.02	**4.59**
1983	10	31	0	0.67	0.04	0.15	0.00	**1.35**
1983	11	30	0	1.10	0.13	0.29	0.02	**3.78**
1983	12	31	0	1.89	0.24	0.46	0.04	**7.16**
1984	1	31	0	1.28	0.08	0.25	0.01	**2.53**
1984	2	29	0	3.60	0.23	0.69	0.09	**6.85**
1984	3	31	0	1.44	0.20	0.37	0.03	**5.93**
1984	4	30	0	0.64	0.10	0.19	0.01	**2.96**
1984	5	31	0	1.17	0.15	0.28	0.01	**4.56**
1984	6	30	0	0.74	0.05	0.16	0.00	**1.54**
1984	7	31	0	3.30	0.31	0.63	0.07	**9.44**
1984	8	31	0	0.94	0.20	0.31	0.02	**5.99**
1984	9	30	0	2.20	0.28	0.52	0.05	**8.28**
1984	10	31	0	0.53	0.03	0.11	0.00	**0.89**
1984	12	31	0	0.53	0.04	0.12	0.00	**1.24**
1985	1	31	0	0.77	0.11	0.22	0.01	**3.45**
1985	2	28	0	1.60	0.21	0.42	0.03	**6.16**
1985	3	31	0	0.67	0.06	0.15	0.00	**1.76**
1985	4	30	0	0.32	0.02	0.07	0.00	**0.64**
1985	5	31	0	0.48	0.05	0.13	0.00	**1.39**
1985	6	30	0	0.37	0.04	0.08	0.00	**1.13**
1985	7	31	0	1.49	0.29	0.41	0.03	**8.63**
1985	8	31	0	5.51	0.28	0.98	0.17	**8.46**
1985	9	30	0	3.98	0.17	0.73	0.10	**5.04**
1985	10	31	0	2.71	0.22	0.58	0.06	**6.63**
1985	11	30	0	1.23	0.10	0.25	0.01	**2.96**
1985	12	31	0	0.76	0.04	0.15	0.00	**1.31**
1986	1	31	0	0.96	0.07	0.19	0.01	**2.13**
1986	2	28	0	1.02	0.10	0.21	0.01	**2.90**
1986	3	31	0	0.75	0.07	0.20	0.01	**2.07**
1986	4	30	0	0.34	0.03	0.08	0.00	**0.93**
1986	5	31	0	0.65	0.10	0.20	0.01	**3.06**
1986	6	30	0	1.37	0.24	0.38	0.03	**7.20**
1986	7	31	0	1.76	0.13	0.37	0.02	**4.02**
1986	8	31	0	2.22	0.25	0.53	0.05	**7.64**
1986	9	30	0	0.66	0.03	0.12	0.00	**1.01**
1986	10	31	0	0.96	0.09	0.25	0.01	**2.80**
1986	11	30	0	0.99	0.11	0.23	0.01	**3.36**
1986	12	31	0	1.82	0.17	0.36	0.02	**4.99**
1987	1	31	0	1.55	0.23	0.40	0.03	**7.01**
1987	2	28	0	0.98	0.13	0.27	0.01	**3.92**

Table D-2: Monthly precipitation, Kinston 7E COOP 314684

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1987	3	31	0	1.71	0.14	0.38	0.03	**4.35**
1987	4	30	0	2.76	0.20	0.65	0.08	**6.01**
1987	5	31	0	1.14	0.10	0.28	0.01	**2.93**
1987	6	30	0	1.41	0.11	0.34	0.02	**3.29**
1987	7	31	0	2.27	0.24	0.53	0.05	**7.10**
1987	8	31	0	2.99	0.29	0.65	0.08	**8.64**
1987	9	30	0	1.51	0.15	0.34	0.02	**4.54**
1987	10	31	0	0.56	0.03	0.12	0.00	**0.96**
1987	11	30	0	1.60	0.09	0.30	0.02	**2.68**
1987	12	31	0	1.76	0.15	0.37	0.02	**4.47**
1988	1	31	0	1.40	0.13	0.31	0.02	**3.79**
1988	2	29	0	0.41	0.06	0.11	0.00	**1.75**
1988	3	31	0	0.73	0.07	0.18	0.01	**2.14**
1988	4	30	0	1.17	0.13	0.31	0.02	**3.83**
1988	5	31	0	1.56	0.20	0.39	0.03	**6.06**
1988	6	30	0	2.08	0.14	0.41	0.03	**4.16**
1988	7	31	0	0.87	0.09	0.19	0.01	**2.60**
1988	8	31	0	2.18	0.21	0.42	0.03	**6.37**
1988	9	30	0	0.70	0.09	0.20	0.01	**2.62**
1988	10	31	0	2.38	0.13	0.44	0.04	**3.83**
1988	11	30	0	0.63	0.07	0.16	0.00	**2.02**
1988	12	31	0	0.37	0.02	0.07	0.00	**0.62**
1989	1	31	0	0.48	0.08	0.12	0.00	**2.36**
1989	2	28	0	0.78	0.14	0.23	0.01	**4.22**
1989	3	31	0	1.55	0.21	0.33	0.02	**6.32**
1989	4	30	0	1.71	0.18	0.38	0.03	**5.38**
1989	5	31	0	1.20	0.16	0.29	0.01	**4.69**
1989	6	30	0	0.84	0.16	0.23	0.01	**4.92**
1989	7	31	0	2.71	0.22	0.54	0.05	**6.58**
1989	8	31	0	1.18	0.14	0.27	0.01	**4.24**
1989	9	30	0	2.21	0.22	0.51	0.05	**6.54**
1989	10	31	0	1.91	0.10	0.34	0.02	**3.03**
1989	11	30	0	1.03	0.07	0.22	0.01	**2.08**
1989	12	31	0	1.18	0.13	0.31	0.02	**3.98**
1990	1	31	0	1.33	0.12	0.28	0.01	**3.58**
1990	2	28	0	0.80	0.08	0.19	0.01	**2.43**
1990	3	31	0	1.80	0.13	0.40	0.03	**3.92**
1990	4	30	0	0.85	0.11	0.22	0.01	**3.36**
1990	5	31	0	1.42	0.18	0.32	0.02	**5.43**
1990	6	30	0	0.80	0.06	0.18	0.01	**1.80**
1990	7	31	0	0.77	0.11	0.22	0.01	**3.23**
1990	8	31	0	2.95	0.32	0.69	0.08	**9.75**
1990	9	30	0	0.53	0.02	0.10	0.00	**0.56**
1990	10	31	0	1.80	0.16	0.44	0.03	**4.74**
1990	11	30	0	1.97	0.09	0.36	0.02	**2.59**
1990	12	31	0	0.60	0.05	0.13	0.00	**1.60**
1991	1	31	0	1.11	0.16	0.27	0.01	**4.68**
1991	2	28	0	0.69	0.05	0.14	0.00	**1.64**
1991	3	31	0	3.21	0.21	0.61	0.07	**6.25**
1991	4	30	0	4.55	0.18	0.82	0.12	**5.36**
1991	5	31	0	1.98	0.15	0.38	0.03	**4.51**
1991	6	30	0	2.03	0.14	0.42	0.03	**4.28**
1991	7	31	0	1.61	0.30	0.48	0.04	**8.87**
1991	8	31	0	1.50	0.19	0.37	0.02	**5.68**

Table D-2: Monthly precipitation, Kinston 7E COOP 314684

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1991	9	30	0	0.85	0.08	0.18	0.01	**2.38**
1991	10	31	0	1.09	0.08	0.26	0.01	**2.39**
1991	11	30	0	1.11	0.05	0.20	0.01	**1.56**
1991	12	31	0	0.79	0.08	0.20	0.01	**2.53**
1992	1	31	0	1.83	0.18	0.45	0.04	**5.38**
1992	2	29	0	0.62	0.05	0.14	0.00	**1.64**
1992	3	31	0	1.01	0.08	0.20	0.01	**2.36**
1992	4	30	0	2.23	0.11	0.40	0.03	**3.36**
1992	5	31	0	0.80	0.13	0.24	0.01	**3.81**
1992	6	30	0	3.32	0.21	0.64	0.07	**6.23**
1992	7	31	0	0.33	0.03	0.07	0.00	**0.88**
1992	8	31	0	2.56	0.39	0.68	0.08	**11.71**
1992	9	30	0	0.82	0.09	0.20	0.01	**2.77**
1992	10	31	0	1.68	0.08	0.30	0.02	**2.45**
1992	11	30	0	1.94	0.21	0.45	0.04	**6.18**
1992	12	31	0	2.37	0.13	0.43	0.03	**3.82**
1993	1	31	0	1.09	0.19	0.32	0.02	**5.56**
1993	2	28	0	0.76	0.10	0.18	0.01	**2.91**
1993	3	31	0	1.43	0.16	0.38	0.03	**4.81**
1993	4	30	0	1.29	0.14	0.33	0.02	**4.10**
1993	5	31	0	0.47	0.05	0.11	0.00	**1.39**
1993	6	30	0	1.35	0.10	0.30	0.02	**3.14**
1993	7	31	0	1.70	0.17	0.40	0.03	**5.02**
1993	8	31	0	1.03	0.07	0.20	0.01	**2.11**
1993	9	30	0	2.52	0.18	0.49	0.04	**5.27**
1993	10	31	0	1.06	0.17	0.32	0.02	**5.25**
1993	11	30	0	0.70	0.05	0.13	0.00	**1.38**
1993	12	31	0	0.82	0.10	0.20	0.01	**3.15**
1994	1	31	0	0.95	0.15	0.27	0.01	**4.47**
1994	2	28	0	0.81	0.06	0.17	0.01	**1.75**
1994	3	31	0	2.21	0.20	0.46	0.04	**5.94**
1994	4	30	0	0.42	0.04	0.11	0.00	**1.21**
1994	5	31	0	0.81	0.07	0.19	0.01	**2.11**
1994	6	30	0	1.21	0.15	0.31	0.02	**4.39**
1994	7	31	0	1.71	0.15	0.34	0.02	**4.55**
1994	8	31	0	0.79	0.14	0.21	0.01	**4.35**
1994	9	30	0	1.84	0.17	0.44	0.03	**5.03**
1994	10	31	0	2.73	0.18	0.62	0.07	**5.32**
1994	11	30	0	1.30	0.11	0.27	0.01	**3.15**
1994	12	31	0	0.61	0.08	0.15	0.00	**2.39**
1995	1	31	0	1.11	0.12	0.24	0.01	**3.60**
1995	2	28	0	1.39	0.17	0.35	0.02	**5.23**
1995	3	31	0	1.21	0.14	0.31	0.02	**4.27**
1995	4	30	0	0.34	0.02	0.07	0.00	**0.65**
1995	5	31	0	0.70	0.09	0.18	0.01	**2.55**
1995	6	30	0	2.92	0.46	0.83	0.13	**13.89**
1995	7	31	0	1.31	0.14	0.29	0.02	**4.28**
1995	8	31	0	0.63	0.07	0.16	0.00	**2.23**
1995	9	30	0	0.92	0.10	0.25	0.01	**2.88**
1995	10	31	0	1.12	0.16	0.30	0.02	**4.92**
1995	11	30	0	0.95	0.10	0.21	0.01	**2.98**
1995	12	31	0	0.51	0.05	0.13	0.00	**1.63**
1996	1	31	0	0.73	0.13	0.21	0.01	**3.75**
1996	2	29	0	0.63	0.06	0.14	0.00	**1.85**

Table D-2: Monthly precipitation, Kinston 7E COOP 314684

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1996	3	31	0	2.16	0.17	0.43	0.03	**5.01**
1996	4	30	0	1.21	0.10	0.25	0.01	**2.98**
1996	5	31	0	0.89	0.14	0.29	0.02	**4.16**
1996	6	30	0	3.48	0.29	0.73	0.10	**8.74**
1996	7	31	0	4.58	0.24	0.81	0.12	**7.12**
1996	8	31	0	0.33	0.03	0.07	0.00	**1.04**
1996	9	28	0	5.69	0.39	1.06	0.21	**11.84**
1996	10	31	0	2.65	0.19	0.60	0.06	**5.82**
1996	11	30	0	1.35	0.12	0.31	0.02	**3.71**
1996	12	31	0	0.72	0.10	0.21	0.01	**3.09**
1997	1	31	0	0.84	0.09	0.20	0.01	**2.78**
1997	2	28	0	0.88	0.11	0.23	0.01	**3.19**
1997	3	31	0	1.55	0.12	0.31	0.02	**3.54**
1997	4	30	0	0.80	0.09	0.20	0.01	**2.63**
1997	5	31	0	0.87	0.08	0.18	0.01	**2.43**
1997	6	30	0	0.60	0.06	0.13	0.00	**1.81**
1997	7	31	0	2.07	0.28	0.53	0.05	**8.53**
1997	8	31	0	2.97	0.16	0.56	0.06	**4.90**
1997	9	30	0	1.26	0.11	0.28	0.01	**3.33**
1997	10	31	0	0.58	0.05	0.13	0.00	**1.40**
1997	11	30	0	1.19	0.16	0.35	0.02	**4.66**
1997	12	31	0	1.10	0.17	0.29	0.02	**5.21**
1998	1	31	0	1.27	0.19	0.32	0.02	**5.70**
1998	2	28	0	2.69	0.25	0.64	0.08	**7.44**
1998	3	31	0	1.64	0.13	0.34	0.02	**3.84**
1998	4	30	0	1.70	0.14	0.33	0.02	**4.30**
1998	5	31	0	1.25	0.15	0.29	0.01	**4.38**
1998	6	30	0	2.21	0.15	0.42	0.03	**4.36**
1998	7	31	0	1.81	0.20	0.43	0.03	**5.93**
1998	8	31	0	5.35	0.25	0.95	0.16	**7.45**
1998	9	30	0	1.97	0.09	0.36	0.02	**2.56**
1998	10	31	0	0.31	0.01	0.05	0.00	**0.42**
1998	11	30	0	1.00	0.06	0.19	0.01	**1.89**
1998	12	31	0	1.24	0.17	0.30	0.02	**5.11**
1999	1	30	0	1.42	0.16	0.39	0.03	**4.87**
1999	2	28	0	0.37	0.06	0.12	0.00	**1.85**
1999	3	31	0	1.12	0.12	0.25	0.01	**3.56**
1999	4	30	0	0.83	0.09	0.20	0.01	**2.67**
1999	5	31	0	0.90	0.07	0.19	0.01	**2.07**
1999	6	30	0	1.02	0.12	0.29	0.02	**3.69**
1999	7	31	0	2.18	0.25	0.60	0.07	**7.60**
1999	8	31	0	1.07	0.13	0.25	0.01	**3.78**
1999	9	28	0	5.50	0.40	1.05	0.21	**11.94**
1999	10	31	0	4.02	0.26	0.77	0.11	**7.65**
1999	11	30	0	0.75	0.06	0.17	0.01	**1.74**
1999	12	28	0	0.45	0.03	0.09	0.00	**0.90**
2000	1	31	0	1.18	0.17	0.28	0.01	**5.16**
2000	2	29	0	1.29	0.07	0.25	0.01	**2.19**
2000	3	31	0	2.98	0.14	0.54	0.05	**4.34**
2000	4	30	0	0.69	0.14	0.22	0.01	**4.22**
2000	5	31	0	1.51	0.08	0.28	0.01	**2.30**
2000	6	30	0	0.95	0.12	0.23	0.01	**3.47**
2000	7	31	0	2.27	0.23	0.45	0.04	**6.86**
2000	8	31	0	1.59	0.20	0.39	0.03	**6.02**

Table D-2: Monthly precipitation, Kinston 7E COOP 314684

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
2000	9	30	0	1.90	0.24	0.53	0.05	**7.29**
2000	10	31	0	0.11	0.00	0.02	0.00	**0.14**
2000	11	30	0	1.07	0.10	0.26	0.01	**2.96**
2000	12	31	0	0.70	0.06	0.14	0.00	**1.90**
2001	1	31	0	0.26	0.04	0.08	0.00	**1.10**
2001	2	28	0	0.85	0.10	0.23	0.01	**3.12**
2001	3	31	0	1.72	0.14	0.35	0.02	**4.16**
2001	4	26	0	0.79	0.05	0.16	0.00	**1.57**
2001	5	31	0	1.07	0.08	0.22	0.01	**2.53**
2001	6	30	0	3.82	0.30	0.77	0.11	**9.09**
2001	7	31	0	2.70	0.23	0.52	0.05	**6.92**
2001	8	31	0	0.96	0.15	0.27	0.01	**4.61**
2001	9	30	0	1.38	0.08	0.26	0.01	**2.26**
2001	10	31	0	1.12	0.04	0.20	0.01	**1.10**
2001	11	27	0	0.77	0.03	0.15	0.00	**1.02**
2001	12	31	0	0.47	0.03	0.09	0.00	**0.83**
2002	1	31	0	1.16	0.17	0.33	0.02	**5.00**
2002	2	28	0	1.00	0.07	0.21	0.01	**2.09**
2002	3	31	0	3.38	0.20	0.60	0.07	**6.12**
2002	4	30	0	2.67	0.15	0.50	0.05	**4.52**
2002	5	31	0	0.82	0.07	0.19	0.01	**2.06**
2002	6	30	0	1.13	0.16	0.32	0.02	**4.74**
2002	7	31	0	1.03	0.18	0.30	0.02	**5.36**
2002	8	31	0	1.70	0.21	0.41	0.03	**6.35**
2002	9	27	0	1.00	0.10	0.22	0.01	**2.86**
2002	10	31	0	0.89	0.08	0.22	0.01	**2.52**
2002	11	30	0	0.97	0.14	0.27	0.01	**4.27**
2002	12	31	0	0.86	0.10	0.20	0.01	**2.85**
2003	1	31	0	0.46	0.05	0.10	0.00	**1.54**
2003	2	28	0	2.00	0.20	0.43	0.04	**5.94**
2003	3	31	0	1.85	0.16	0.35	0.02	**4.67**
2003	4	30	0	1.74	0.18	0.41	0.03	**5.47**
2003	5	29	0	1.80	0.26	0.48	0.04	**7.92**
2003	6	30	0	0.56	0.14	0.20	0.01	**4.28**
2003	7	29	0	4.44	0.32	0.96	0.17	**9.70**
2003	8	31	0	1.83	0.15	0.37	0.03	**4.53**
2003	9	28	0	2.73	0.24	0.59	0.06	**7.18**
2003	10	26	0	4.10	0.28	0.85	0.14	**8.40**
2003	11	30	0	1.36	0.09	0.31	0.02	**2.56**
2003	12	31	0	1.51	0.15	0.38	0.03	**4.65**
2004	1	31	0	0.42	0.03	0.09	0.00	**1.04**
2004	2	29	0	1.16	0.15	0.26	0.01	**4.45**
2004	3	31	0	0.30	0.03	0.07	0.00	**0.78**
2004	4	30	0	2.17	0.14	0.44	0.03	**4.32**
2004	5	27	0	1.36	0.18	0.41	0.03	**5.53**
2004	6	30	0	1.67	0.25	0.44	0.04	**7.50**
2004	7	31	0	1.20	0.19	0.30	0.02	**5.59**
2004	8	31	0	4.38	0.28	0.80	0.11	**8.31**
2004	9	30	0	0.83	0.10	0.21	0.01	**3.14**
2004	10	27	0	1.26	0.08	0.25	0.01	**2.41**
2004	11	30	0	2.02	0.14	0.40	0.03	**4.05**
2004	12	31	0	0.50	0.08	0.17	0.01	**2.54**
2005	1	31	0	1.46	0.08	0.28	0.01	**2.50**
2005	2	28	0	0.69	0.07	0.16	0.00	**2.20**

Table D-2: Monthly precipitation, Kinston 7E COOP 314684

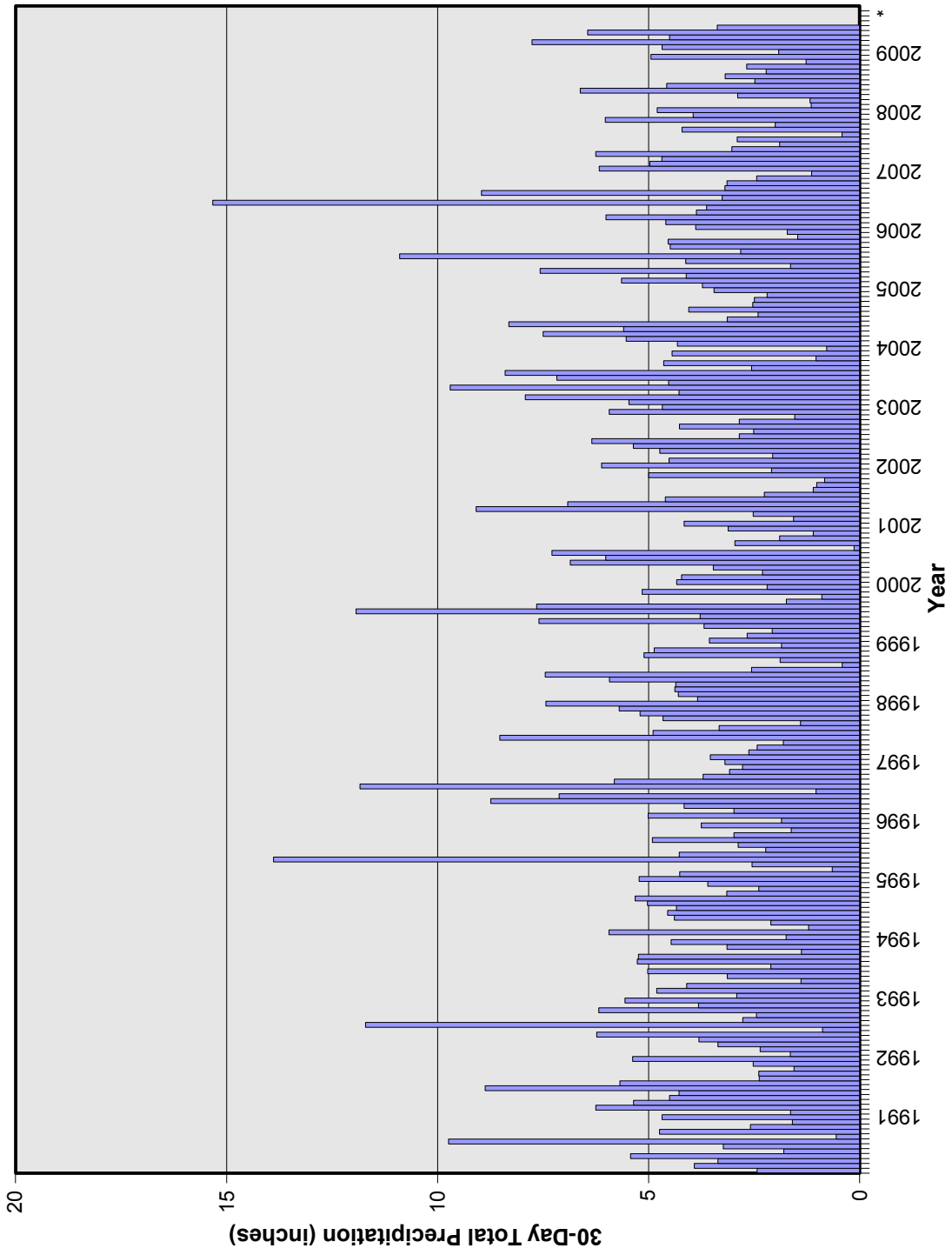
Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
2005	3	31	0	0.98	0.12	0.24	0.01	**3.45**
2005	4	30	0	1.00	0.12	0.26	0.01	**3.73**
2005	5	28	0	2.03	0.19	0.47	0.04	**5.65**
2005	6	30	0	1.48	0.14	0.36	0.02	**4.11**
2005	7	29	0	1.77	0.25	0.44	0.04	**7.57**
2005	8	30	0	0.92	0.05	0.18	0.01	**1.64**
2005	9	30	0	2.88	0.14	0.52	0.05	**4.12**
2005	10	29	0	4.96	0.36	0.99	0.18	**10.90**
2005	11	27	0	1.29	0.09	0.27	0.01	**2.82**
2005	12	31	0	0.91	0.15	0.28	0.01	**4.49**
2006	1	31	0	1.30	0.15	0.33	0.02	**4.54**
2006	2	28	0	0.73	0.05	0.14	0.00	**1.47**
2006	3	30	0	1.08	0.06	0.20	0.01	**1.72**
2006	4	27	0	0.83	0.13	0.26	0.01	**3.89**
2006	5	31	0	1.61	0.15	0.37	0.02	**4.60**
2006	6	28	0	1.33	0.20	0.35	0.02	**6.01**
2006	7	29	0	1.15	0.13	0.26	0.01	**3.87**
2006	8	31	0	1.08	0.12	0.27	0.01	**3.63**
2006	9	30	0	9.59	0.51	1.76	0.57	**15.33**
2006	10	31	0	1.80	0.11	0.33	0.02	**3.26**
2006	11	30	0	3.65	0.30	0.73	0.10	**8.96**
2006	12	31	0	1.62	0.11	0.36	0.02	**3.19**
2007	1	31	0	1.03	0.10	0.22	0.01	**3.15**
2007	2	28	0	1.17	0.08	0.25	0.01	**2.44**
2007	3	31	0	0.61	0.04	0.14	0.00	**1.14**
2007	4	30	0	4.16	0.21	0.80	0.12	**6.17**
2007	5	31	0	1.52	0.17	0.40	0.03	**4.97**
2007	6	30	0	1.24	0.16	0.34	0.02	**4.69**
2007	7	31	0	2.80	0.21	0.56	0.06	**6.25**
2007	8	31	0	1.57	0.10	0.33	0.02	**3.03**
2007	9	30	0	1.08	0.06	0.22	0.01	**1.90**
2007	10	31	0	1.32	0.10	0.29	0.02	**2.90**
2007	11	30	0	0.32	0.01	0.06	0.00	**0.42**
2007	12	31	0	2.00	0.14	0.39	0.03	**4.21**
2008	1	31	0	1.15	0.07	0.21	0.01	**2.00**
2008	2	29	0	1.85	0.20	0.47	0.04	**6.03**
2008	3	30	0	1.47	0.13	0.33	0.02	**3.95**
2008	4	30	0	2.18	0.16	0.40	0.03	**4.80**
2008	5	31	0	0.54	0.04	0.12	0.00	**1.15**
2008	6	30	0	0.63	0.04	0.12	0.00	**1.18**
2008	7	31	0	0.71	0.10	0.21	0.01	**2.89**
2008	8	31	0	1.40	0.22	0.40	0.03	**6.62**
2008	9	30	0	1.88	0.15	0.43	0.03	**4.57**
2008	10	31	0	0.96	0.08	0.21	0.01	**2.49**
2008	11	30	0	1.13	0.11	0.25	0.01	**3.19**
2008	12	31	0	0.78	0.07	0.15	0.00	**2.22**
2009	1	31	0	0.69	0.09	0.18	0.01	**2.68**
2009	2	28	0	0.96	0.04	0.18	0.01	**1.28**
2009	3	31	0	1.49	0.16	0.36	0.02	**4.95**
2009	4	30	0	0.87	0.06	0.19	0.01	**1.92**
2009	5	31	0	1.62	0.16	0.42	0.03	**4.68**
2009	6	28	0	1.70	0.26	0.52	0.05	**7.77**
2009	7	29	0	1.27	0.15	0.31	0.02	**4.51**
2009	8	31	0	1.49	0.21	0.37	0.03	**6.45**

Table D-2: Monthly precipitation, Kinston 7E COOP 314684

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
2009	9	28	0	1.11	0.11	0.25	0.01	**3.38**
2009	10	4	0	0.00	0.00	0.00	0.00	**0.00**

NOTE: In order to compensate for the variable number of days in a month as well as the presence of missing data in some months, a monthly total precipitation was standardized to the so-called “30-day average total”, which was calculated by multiplying the average daily water precipitation for a given month by 30 in order to remove a likely bias caused by the above conditions.

Graph D-2: Monthly precipitation, Kinston 7E COOP 314684

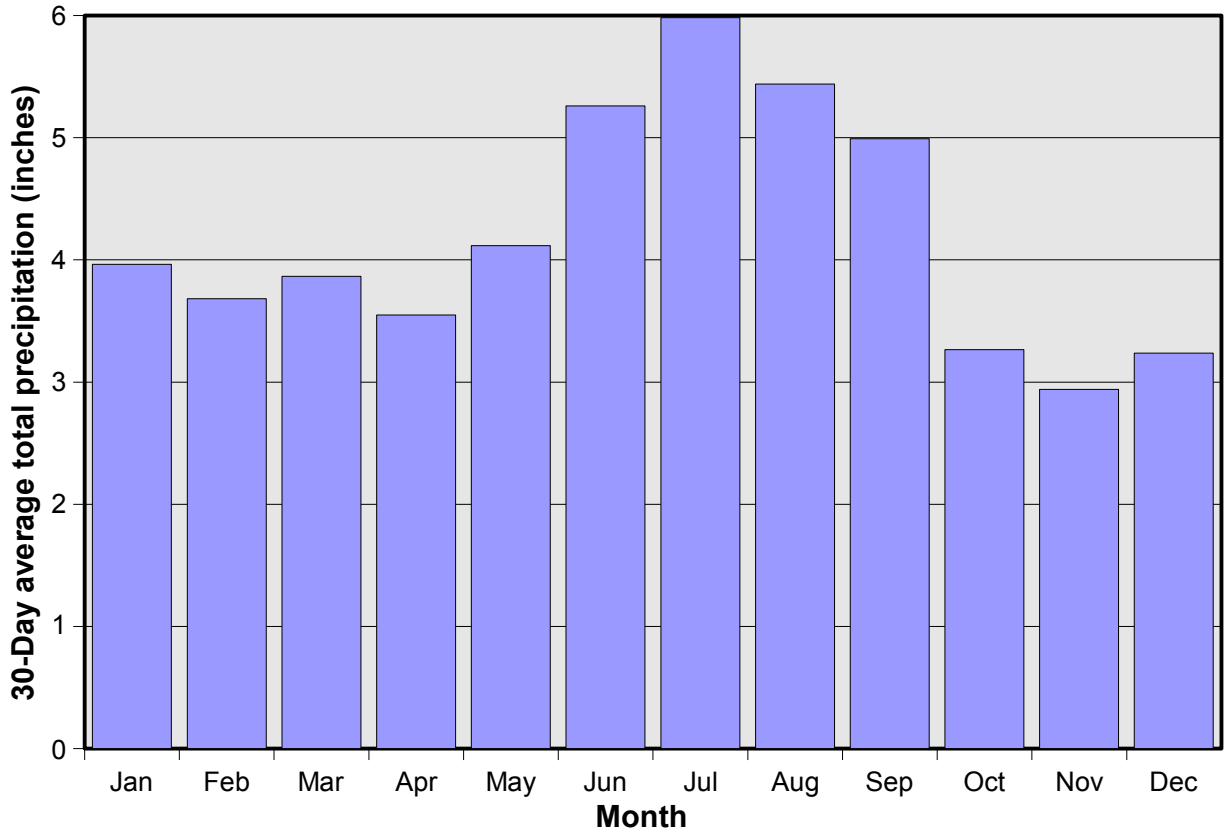


NOTE: Months with available data of less than 25 were marked insufficient,further denoted with * , and are not presented in this graph

Table D-3: Precipitation by month, Kinston 7E COOP 314684

Month	Total	Day Count	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
Jan	204.69	1549	0.13	0.30	0.01	**3.96**
Feb	173.42	1413	0.12	0.30	0.01	**3.68**
Mar	195.46	1517	0.13	0.34	0.01	**3.87**
Apr	176.56	1492	0.12	0.37	0.01	**3.55**
May	211.36	1540	0.14	0.35	0.01	**4.12**
Jun	262.28	1496	0.18	0.47	0.01	**5.26**
Jul	307.51	1542	0.20	0.48	0.01	**5.98**
Aug	280.80	1549	0.18	0.46	0.01	**5.44**
Sep	247.75	1489	0.17	0.55	0.01	**4.99**
Oct	164.57	1512	0.11	0.39	0.01	**3.27**
Nov	140.40	1433	0.10	0.32	0.01	**2.94**
Dec	163.56	1516	0.11	0.29	0.01	**3.24**

Graph D-3: Precipitation by month, Kinston 7E COOP 314684



NOTE: The 30-day aveage total precipitaion for a month was calculated by multiplying its daily average precipitation by 30 in order to elmiinate the slight bias due to the inconsistent number of days in different months.

Table D-4: Precipitation by month, Kinston 7E COOP 314684

Day	Total	Day Count	Daily Average	Std. Dev.	Std. Error	52-Week Average Total
Monday	365.97	2583	0.14	0.41	0.00	**7.368**
Tuesday	336.62	2583	0.13	0.35	0.00	**6.777**
Wednesday	354.64	2585	0.14	0.39	0.00	**7.134**
Thursday	377.73	2582	0.15	0.40	0.00	**7.607**
Friday	377.97	2578	0.15	0.44	0.00	**7.624**
Saturday	364.66	2571	0.14	0.39	0.00	**7.375**
Sunday	351	2566	0.14	0.38	0.00	**7.108**

Graph D-4: Precipitation by weekday, Kinston 7E COOP 314684

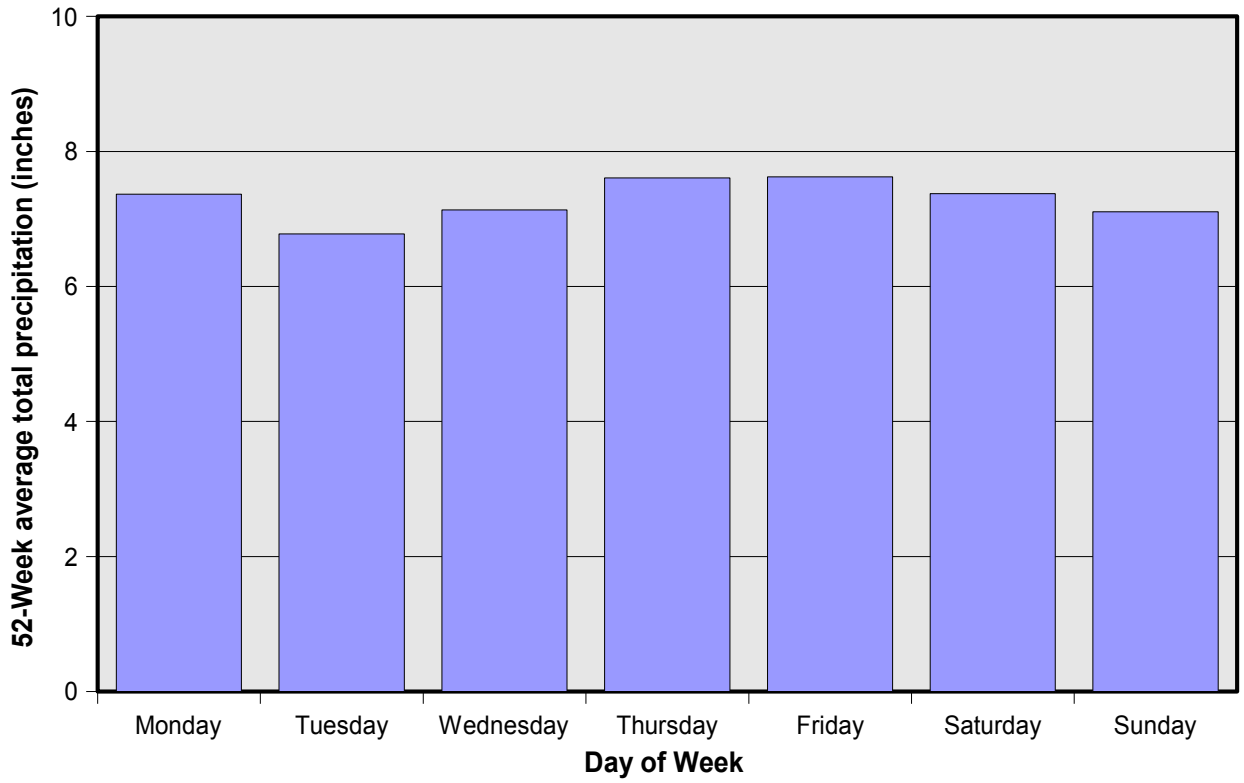
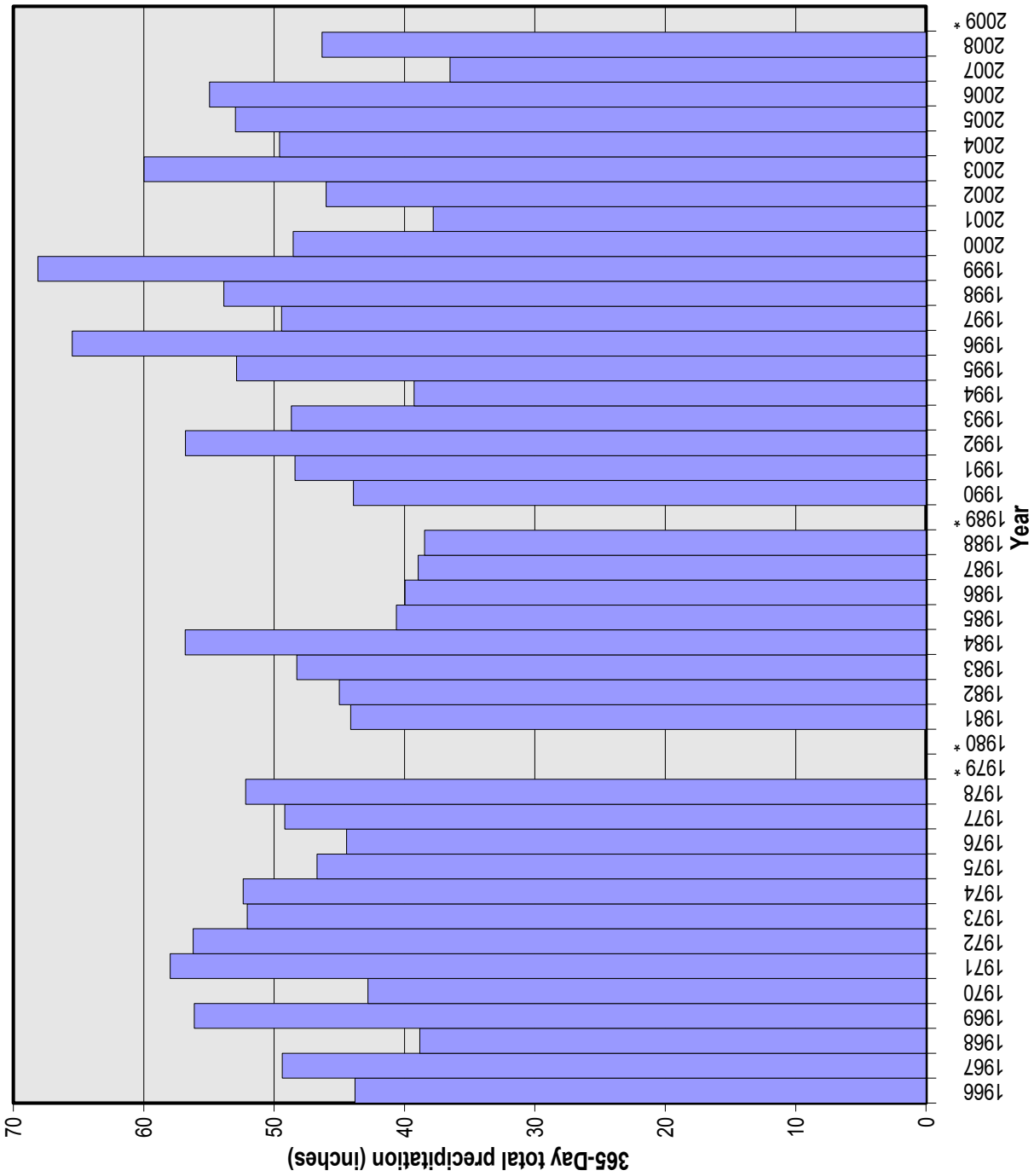


Table D-5: Annual precipitation, Kinston Ag Research COOP 314689

Year	Months	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	365-Day Average Total
1966	10	305	0	2.54	0.12	0.31	0.01	**43.80**
1967	12	364	0	3.99	0.14	0.40	0.01	**49.38**
1968	12	335	0	2.60	0.11	0.29	0.00	**38.83**
1969	12	362	0	4.61	0.15	0.44	0.01	**56.12**
1970	12	355	0	3.15	0.12	0.34	0.01	**42.81**
1971	12	362	0	4.63	0.16	0.47	0.01	**57.97**
1972	12	361	0	3.17	0.15	0.36	0.01	**56.22**
1973	10	303	0	4.75	0.14	0.47	0.01	**52.06**
1974	12	365	0	2.20	0.14	0.33	0.01	**52.38**
1975	12	359	0	2.13	0.13	0.29	0.00	**46.71**
1976	12	360	0	2.80	0.12	0.33	0.01	**44.45**
1977	12	360	0	3.36	0.13	0.43	0.01	**49.19**
1978	12	342	0	3.33	0.14	0.40	0.01	**52.19**
1979	12	289	0	2.46	0.15	0.38	0.01	**56.32**
1980	12	280	0	3.62	0.14	0.41	0.01	**50.72**
1981	12	313	0	2.58	0.12	0.33	0.01	**44.14**
1982	12	363	0	2.42	0.12	0.33	0.01	**45.01**
1983	12	365	0	4.35	0.13	0.37	0.01	**48.27**
1984	12	366	0	3.80	0.16	0.43	0.01	**56.82**
1985	12	365	0	3.59	0.11	0.35	0.01	**40.62**
1986	12	365	0	1.80	0.11	0.28	0.00	**39.96**
1987	12	365	0	2.74	0.11	0.33	0.01	**38.95**
1988	12	365	0	1.88	0.11	0.29	0.00	**38.46**
1989	7	212	0	2.80	0.13	0.32	0.01	**46.26**
1990	12	365	0	2.40	0.12	0.37	0.01	**43.92**
1991	12	363	0	3.45	0.13	0.39	0.01	**48.40**
1992	12	365	0	4.30	0.16	0.46	0.01	**56.81**
1993	12	361	0	1.95	0.13	0.34	0.01	**48.68**
1994	12	351	0	4.58	0.11	0.36	0.01	**39.27**
1995	12	363	0	4.99	0.14	0.39	0.01	**52.88**
1996	12	322	0	4.90	0.18	0.53	0.02	**65.48**
1997	12	355	0	5.02	0.14	0.42	0.01	**49.43**
1998	12	356	0	4.86	0.15	0.44	0.01	**53.86**
1999	12	340	0	12.40	0.19	0.85	0.04	**68.13**
2000	12	313	0	3.48	0.13	0.38	0.01	**48.55**
2001	12	363	0	2.59	0.10	0.33	0.01	**37.80**
2002	12	363	0	1.82	0.13	0.31	0.01	**46.01**
2003	12	358	0	3.82	0.16	0.45	0.01	**59.98**
2004	12	363	0	4.92	0.14	0.41	0.01	**49.59**
2005	12	364	0	3.40	0.15	0.45	0.01	**52.97**
2006	12	365	0	6.10	0.15	0.51	0.01	**54.96**
2007	12	365	0	2.95	0.10	0.35	0.01	**36.51**
2008	12	366	0	3.65	0.13	0.39	0.01	**46.32**
2009	9	188	0	2.00	0.12	0.32	0.01	**43.47**

NOTE: In order to compensate for the variable number of days in a year as well as the presence of missing data in some years, an annual total precipitation was standardized to a so-called “365-day average total”, which was calculated by multiplying the average daily precipitation for a given year by 365 in order to remove a likely bias caused by the above conditions.



Graph D-5: Annual precipitation, Kinston Ag Research COOP 314689

NOTE: Years with available data of less than 300 were marked insufficient,further denoted with *, and are not presented in this graph

Table D-6: Monthly precipitation, Kinston Ag Research COOP 314689

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1966	3	30	0	1.06	0.08	0.22	0.01	**2.37**
1966	4	30	0	1.99	0.13	0.37	0.03	**3.88**
1966	5	31	0	1.12	0.13	0.26	0.01	**3.91**
1966	6	30	0	1.21	0.12	0.30	0.02	**3.53**
1966	7	31	0	1.47	0.12	0.28	0.01	**3.57**
1966	8	31	0	1.56	0.34	0.46	0.04	**10.31**
1966	9	30	0	0.98	0.08	0.21	0.01	**2.37**
1966	10	31	0	0.58	0.03	0.10	0.00	**0.83**
1966	11	30	0	0.33	0.03	0.07	0.00	**0.76**
1966	12	31	0	2.54	0.14	0.47	0.04	**4.31**
1967	1	31	0	2.54	0.17	0.46	0.04	**4.98**
1967	2	28	0	1.61	0.15	0.32	0.02	**4.40**
1967	3	31	0	0.52	0.02	0.09	0.00	**0.62**
1967	4	30	0	1.15	0.07	0.22	0.01	**1.97**
1967	5	31	0	0.80	0.09	0.17	0.01	**2.58**
1967	6	30	0	0.92	0.12	0.23	0.01	**3.51**
1967	7	31	0	1.31	0.21	0.32	0.02	**6.26**
1967	8	30	0	3.24	0.28	0.65	0.08	**8.52**
1967	9	30	0	3.99	0.18	0.74	0.10	**5.53**
1967	10	31	0	1.37	0.09	0.27	0.01	**2.55**
1967	11	30	0	2.65	0.13	0.48	0.04	**3.75**
1967	12	31	0	1.01	0.14	0.28	0.01	**4.14**
1968	1	29	0	1.69	0.12	0.32	0.02	**3.70**
1968	2	29	0	0.56	0.02	0.10	0.00	**0.74**
1968	3	30	0	1.37	0.13	0.35	0.02	**3.91**
1968	4	30	0	1.22	0.15	0.32	0.02	**4.43**
1968	5	31	0	2.60	0.15	0.47	0.04	**4.46**
1968	6	30	0	0.80	0.13	0.22	0.01	**3.89**
1968	7	24	0	1.43	0.17	0.30	0.02	**4.96**
1968	8	10	0	0.13	0.01	0.04	0.00	**0.39**
1968	9	30	0	0.41	0.02	0.08	0.00	**0.73**
1968	10	31	0	1.42	0.15	0.37	0.02	**4.51**
1968	11	30	0	1.19	0.11	0.29	0.02	**3.31**
1968	12	31	0	0.44	0.05	0.11	0.00	**1.65**
1969	1	31	0	1.32	0.09	0.29	0.01	**2.61**
1969	2	28	0	0.80	0.14	0.24	0.01	**4.18**
1969	3	31	0	1.49	0.16	0.34	0.02	**4.67**
1969	4	30	0	1.11	0.12	0.27	0.01	**3.45**
1969	5	29	0	3.30	0.28	0.85	0.13	**8.47**
1969	6	30	0	1.06	0.17	0.25	0.01	**4.95**
1969	7	31	0	1.73	0.14	0.34	0.02	**4.31**
1969	8	30	0	1.76	0.21	0.41	0.03	**6.35**
1969	9	30	0	0.98	0.15	0.24	0.01	**4.53**
1969	10	31	0	1.45	0.07	0.26	0.01	**2.06**
1969	11	30	0	4.61	0.18	0.83	0.12	**5.42**
1969	12	31	0	1.54	0.15	0.38	0.03	**4.61**
1970	1	31	0	1.11	0.10	0.24	0.01	**2.88**
1970	2	28	0	2.52	0.18	0.49	0.04	**5.51**
1970	3	31	0	0.92	0.12	0.21	0.01	**3.49**
1970	4	30	0	1.01	0.09	0.23	0.01	**2.81**
1970	5	31	0	1.13	0.08	0.23	0.01	**2.40**
1970	6	21	0	0.24	0.02	0.06	0.00	**0.53**
1970	7	31	0	3.15	0.36	0.71	0.09	**10.92**
1970	8	31	0	1.99	0.18	0.40	0.03	**5.46**

Table D-6: Monthly precipitation, Kinston Ag Research COOP 314689

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1970	9	30	0	0.69	0.04	0.15	0.00	**1.22**
1970	10	31	0	0.85	0.07	0.20	0.01	**2.22**
1970	11	29	0	0.88	0.04	0.16	0.00	**1.26**
1970	12	31	0	0.91	0.08	0.20	0.01	**2.52**
1971	1	30	0	1.77	0.16	0.41	0.03	**4.75**
1971	2	28	0	1.90	0.18	0.43	0.04	**5.36**
1971	3	31	0	3.11	0.19	0.57	0.06	**5.65**
1971	4	29	0	1.56	0.11	0.33	0.02	**3.38**
1971	5	31	0	1.83	0.17	0.43	0.03	**5.08**
1971	6	30	0	1.36	0.08	0.27	0.01	**2.37**
1971	7	31	0	0.98	0.23	0.32	0.02	**6.82**
1971	8	31	0	2.13	0.17	0.43	0.03	**5.08**
1971	9	30	0	4.63	0.24	0.87	0.14	**7.08**
1971	10	31	0	3.41	0.26	0.67	0.08	**7.87**
1971	11	29	0	0.40	0.06	0.12	0.00	**1.93**
1971	12	31	0	0.55	0.05	0.14	0.00	**1.58**
1972	1	27	0	1.54	0.16	0.36	0.02	**4.84**
1972	2	29	0	1.16	0.17	0.33	0.02	**5.23**
1972	3	31	0	1.29	0.12	0.29	0.02	**3.49**
1972	4	30	0	1.25	0.09	0.25	0.01	**2.58**
1972	5	31	0	1.42	0.21	0.34	0.02	**6.29**
1972	6	29	0	1.37	0.11	0.27	0.01	**3.19**
1972	7	31	0	3.17	0.24	0.58	0.06	**7.26**
1972	8	31	0	1.15	0.16	0.32	0.02	**4.88**
1972	9	30	0	1.22	0.13	0.32	0.02	**4.03**
1972	10	31	0	1.20	0.11	0.30	0.02	**3.45**
1972	11	30	0	2.00	0.23	0.48	0.04	**6.78**
1972	12	31	0	0.82	0.11	0.23	0.01	**3.39**
1973	1	31	0	0.97	0.10	0.21	0.01	**3.10**
1973	2	28	0	1.61	0.20	0.42	0.03	**6.14**
1973	3	31	0	0.58	0.09	0.16	0.00	**2.71**
1973	4	30	0	4.75	0.28	0.90	0.15	**8.30**
1973	5	31	0	1.16	0.11	0.25	0.01	**3.41**
1973	8	31	0	1.00	0.13	0.27	0.01	**3.87**
1973	9	30	0	1.50	0.11	0.32	0.02	**3.35**
1973	10	31	0	3.86	0.15	0.69	0.09	**4.46**
1973	11	29	0	0.40	0.03	0.09	0.00	**0.90**
1973	12	31	0	3.17	0.22	0.62	0.07	**6.62**
1974	1	31	0	0.77	0.10	0.19	0.01	**2.96**
1974	2	28	0	1.06	0.13	0.25	0.01	**3.76**
1974	3	31	0	1.38	0.19	0.36	0.02	**5.77**
1974	4	30	0	0.75	0.08	0.18	0.01	**2.34**
1974	5	31	0	1.87	0.18	0.38	0.03	**5.48**
1974	6	30	0	0.88	0.09	0.20	0.01	**2.68**
1974	7	31	0	0.99	0.12	0.23	0.01	**3.53**
1974	8	31	0	2.20	0.47	0.63	0.07	**14.22**
1974	9	30	0	0.88	0.08	0.19	0.01	**2.40**
1974	10	31	0	0.75	0.05	0.17	0.01	**1.64**
1974	11	30	0	0.97	0.08	0.24	0.01	**2.30**
1974	12	31	0	1.79	0.14	0.36	0.02	**4.30**
1975	1	31	0	0.75	0.14	0.23	0.01	**4.11**
1975	2	28	0	1.07	0.18	0.33	0.02	**5.26**
1975	3	25	0	0.87	0.13	0.24	0.01	**4.03**
1975	4	30	0	1.57	0.12	0.30	0.02	**3.53**

Table D-6: Monthly precipitation, Kinston Ag Research COOP 314689

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1975	5	31	0	0.17	0.03	0.05	0.00	**1.00**
1975	6	30	0	0.87	0.05	0.16	0.00	**1.59**
1975	7	31	0	2.13	0.23	0.42	0.03	**7.00**
1975	8	31	0	1.12	0.06	0.21	0.01	**1.74**
1975	9	30	0	1.76	0.29	0.43	0.03	**8.71**
1975	10	31	0	0.81	0.06	0.17	0.01	**1.93**
1975	11	30	0	0.60	0.04	0.13	0.00	**1.33**
1975	12	31	0	1.39	0.20	0.37	0.02	**6.01**
1976	1	31	0	2.80	0.19	0.52	0.05	**5.72**
1976	2	29	0	0.63	0.03	0.13	0.00	**1.01**
1976	3	31	0	0.97	0.14	0.26	0.01	**4.05**
1976	4	30	0	0.28	0.02	0.07	0.00	**0.62**
1976	5	31	0	0.64	0.13	0.20	0.01	**3.95**
1976	6	30	0	2.35	0.25	0.52	0.05	**7.45**
1976	7	31	0	1.39	0.15	0.29	0.02	**4.36**
1976	8	31	0	1.22	0.10	0.26	0.01	**2.97**
1976	9	30	0	1.62	0.10	0.30	0.02	**3.11**
1976	10	31	0	0.73	0.09	0.19	0.01	**2.70**
1976	11	30	0	2.45	0.13	0.45	0.04	**3.85**
1976	12	25	0	1.27	0.13	0.31	0.02	**3.94**
1977	1	26	0	1.80	0.11	0.35	0.02	**3.35**
1977	2	28	0	1.05	0.07	0.21	0.01	**2.03**
1977	3	31	0	1.50	0.15	0.33	0.02	**4.52**
1977	4	30	0	0.47	0.03	0.09	0.00	**1.04**
1977	5	31	0	3.36	0.18	0.66	0.08	**5.52**
1977	6	30	0	2.25	0.14	0.42	0.03	**4.15**
1977	7	31	0	1.28	0.08	0.27	0.01	**2.50**
1977	8	31	0	2.55	0.21	0.50	0.04	**6.28**
1977	9	30	0	3.30	0.11	0.59	0.06	**3.30**
1977	10	31	0	1.81	0.21	0.47	0.04	**6.30**
1977	11	30	0	2.90	0.16	0.52	0.05	**4.74**
1977	12	31	0	1.00	0.15	0.28	0.01	**4.40**
1978	1	30	0	2.00	0.31	0.49	0.04	**9.19**
1978	2	28	0	0.38	0.04	0.09	0.00	**1.25**
1978	3	31	0	2.20	0.17	0.47	0.04	**5.09**
1978	4	29	0	3.33	0.19	0.64	0.08	**5.72**
1978	5	30	0	1.84	0.13	0.35	0.02	**3.84**
1978	6	24	0	2.30	0.21	0.49	0.05	**6.29**
1978	7	31	0	3.00	0.18	0.57	0.06	**5.33**
1978	8	28	0	1.10	0.13	0.26	0.01	**3.86**
1978	9	29	0	0.85	0.04	0.16	0.00	**1.13**
1978	10	26	0	1.14	0.05	0.22	0.01	**1.47**
1978	11	25	0	1.38	0.18	0.33	0.02	**5.45**
1978	12	31	0	1.02	0.09	0.24	0.01	**2.78**
1979	1	24	0	1.00	0.15	0.27	0.01	**4.45**
1979	2	23	0	2.00	0.33	0.56	0.07	**10.03**
1979	3	30	0	1.30	0.12	0.28	0.01	**3.57**
1979	4	30	0	1.98	0.15	0.40	0.03	**4.60**
1979	5	24	0	0.89	0.14	0.24	0.01	**4.05**
1979	6	27	0	2.00	0.14	0.41	0.03	**4.27**
1979	7	31	0	1.85	0.17	0.37	0.02	**5.01**
1979	8	24	0	2.00	0.22	0.48	0.05	**6.54**
1979	9	16	0	0.40	0.08	0.12	0.00	**2.27**
1979	10	23	0	2.46	0.15	0.50	0.05	**4.37**

Table D-6: Monthly precipitation, Kinston Ag Research COOP 314689

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1979	11	24	0	1.25	0.10	0.30	0.02	**2.85**
1979	12	13	0	0.58	0.06	0.16	0.01	**1.94**
1980	1	25	0	1.38	0.17	0.32	0.02	**5.17**
1980	2	29	0	0.90	0.07	0.18	0.01	**2.04**
1980	3	24	0	2.10	0.27	0.57	0.07	**7.97**
1980	4	23	0	0.00	0.00	0.00	0.00	**0.00**
1980	5	28	0	1.70	0.14	0.35	0.02	**4.06**
1980	6	20	0	2.45	0.17	0.54	0.07	**5.06**
1980	7	30	0	1.28	0.16	0.36	0.02	**4.86**
1980	8	27	0	0.85	0.08	0.20	0.01	**2.49**
1980	9	16	0	3.62	0.29	0.88	0.19	**8.66**
1980	10	26	0	2.03	0.17	0.45	0.04	**5.03**
1980	11	16	0	0.79	0.09	0.20	0.01	**2.76**
1980	12	16	0	0.90	0.10	0.22	0.01	**2.89**
1981	1	23	0	0.65	0.04	0.15	0.00	**1.28**
1981	2	26	0	1.05	0.07	0.21	0.01	**1.96**
1981	3	31	0	0.52	0.04	0.11	0.00	**1.25**
1981	4	28	0	0.42	0.03	0.10	0.00	**0.94**
1981	5	25	0	1.22	0.20	0.39	0.03	**5.98**
1981	6	25	0	0.88	0.15	0.27	0.01	**4.51**
1981	7	31	0	2.00	0.21	0.48	0.04	**6.33**
1981	8	31	0	2.58	0.33	0.66	0.08	**9.78**
1981	9	25	0	0.37	0.03	0.10	0.00	**1.03**
1981	10	28	0	0.95	0.07	0.20	0.01	**2.06**
1981	11	16	0	0.37	0.05	0.10	0.00	**1.35**
1981	12	24	0	0.93	0.17	0.27	0.02	**5.14**
1982	1	31	0	2.20	0.15	0.40	0.03	**4.56**
1982	2	26	0	1.02	0.18	0.30	0.02	**5.31**
1982	3	31	0	0.85	0.08	0.20	0.01	**2.32**
1982	4	30	0	2.42	0.16	0.47	0.04	**4.76**
1982	5	31	0	1.52	0.08	0.28	0.01	**2.44**
1982	6	30	0	1.55	0.14	0.31	0.02	**4.22**
1982	7	31	0	1.25	0.15	0.30	0.02	**4.58**
1982	8	31	0	1.24	0.10	0.25	0.01	**2.90**
1982	9	30	0	1.85	0.23	0.52	0.05	**6.76**
1982	10	31	0	0.00	0.00	0.00	0.00	**0.00**
1982	11	30	0	1.20	0.12	0.28	0.01	**3.56**
1982	12	31	0	1.30	0.11	0.28	0.01	**3.39**
1983	1	31	0	0.80	0.13	0.24	0.01	**3.80**
1983	2	28	0	1.60	0.22	0.43	0.04	**6.48**
1983	3	31	0	1.95	0.23	0.44	0.03	**7.03**
1983	4	30	0	1.50	0.15	0.30	0.02	**4.40**
1983	5	31	0	0.78	0.07	0.19	0.01	**2.15**
1983	6	30	0	4.35	0.23	0.81	0.12	**6.92**
1983	7	31	0	0.48	0.06	0.12	0.00	**1.78**
1983	8	31	0	1.30	0.06	0.23	0.01	**1.73**
1983	9	30	0	1.50	0.08	0.28	0.01	**2.47**
1983	10	31	0	0.66	0.04	0.13	0.00	**1.26**
1983	11	30	0	0.83	0.10	0.23	0.01	**3.07**
1983	12	31	0	1.77	0.23	0.44	0.03	**6.79**
1984	1	31	0	1.13	0.10	0.24	0.01	**2.96**
1984	2	29	0	3.80	0.21	0.72	0.10	**6.20**
1984	3	31	0	1.04	0.24	0.37	0.02	**7.06**
1984	4	30	0	0.93	0.10	0.24	0.01	**2.87**

Table D-6: Monthly precipitation, Kinston Ag Research COOP 314689

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1984	5	31	0	2.23	0.19	0.44	0.04	**5.74**
1984	6	30	0	1.08	0.09	0.24	0.01	**2.60**
1984	7	31	0	2.22	0.35	0.61	0.07	**10.62**
1984	8	31	0	1.56	0.15	0.36	0.02	**4.52**
1984	9	30	0	2.86	0.34	0.74	0.10	**10.15**
1984	10	31	0	0.55	0.03	0.10	0.00	**0.81**
1984	11	30	0	0.53	0.04	0.13	0.00	**1.31**
1984	12	31	0	0.62	0.04	0.13	0.00	**1.25**
1985	1	31	0	1.40	0.14	0.31	0.02	**4.20**
1985	2	28	0	1.32	0.17	0.36	0.03	**4.95**
1985	3	31	0	0.95	0.04	0.17	0.01	**1.30**
1985	4	30	0	0.33	0.02	0.06	0.00	**0.48**
1985	5	31	0	0.54	0.05	0.12	0.00	**1.39**
1985	6	30	0	0.45	0.04	0.10	0.00	**1.14**
1985	7	31	0	2.57	0.30	0.60	0.07	**9.04**
1985	8	31	0	1.35	0.14	0.30	0.02	**4.30**
1985	9	30	0	3.59	0.16	0.66	0.08	**4.67**
1985	10	31	0	1.46	0.14	0.31	0.02	**4.06**
1985	11	30	0	0.88	0.12	0.25	0.01	**3.51**
1985	12	31	0	1.05	0.04	0.19	0.01	**1.06**
1986	1	31	0	1.20	0.07	0.23	0.01	**2.01**
1986	2	28	0	0.64	0.07	0.15	0.00	**2.14**
1986	3	31	0	1.36	0.09	0.28	0.01	**2.56**
1986	4	30	0	0.61	0.05	0.14	0.00	**1.54**
1986	5	31	0	0.70	0.07	0.16	0.00	**2.02**
1986	6	30	0	1.68	0.30	0.49	0.04	**8.95**
1986	7	31	0	1.00	0.12	0.23	0.01	**3.45**
1986	8	31	0	1.48	0.20	0.33	0.02	**5.98**
1986	9	30	0	0.18	0.01	0.03	0.00	**0.32**
1986	10	31	0	0.91	0.08	0.20	0.01	**2.37**
1986	11	30	0	0.74	0.08	0.17	0.01	**2.36**
1986	12	31	0	1.80	0.19	0.42	0.03	**5.58**
1987	1	31	0	2.41	0.18	0.53	0.05	**5.55**
1987	2	28	0	1.03	0.16	0.32	0.02	**4.74**
1987	3	31	0	0.96	0.12	0.24	0.01	**3.53**
1987	4	30	0	1.71	0.09	0.32	0.02	**2.67**
1987	5	31	0	0.50	0.02	0.09	0.00	**0.74**
1987	6	30	0	1.43	0.12	0.35	0.02	**3.55**
1987	7	31	0	1.11	0.07	0.21	0.01	**2.22**
1987	8	31	0	1.73	0.15	0.39	0.03	**4.64**
1987	9	30	0	2.74	0.20	0.54	0.05	**5.85**
1987	10	31	0	0.26	0.02	0.06	0.00	**0.47**
1987	11	30	0	0.78	0.07	0.18	0.01	**2.03**
1987	12	31	0	1.50	0.09	0.30	0.02	**2.63**
1988	1	31	0	0.92	0.08	0.18	0.01	**2.40**
1988	2	29	0	0.40	0.05	0.10	0.00	**1.47**
1988	3	31	0	0.81	0.07	0.19	0.01	**2.19**
1988	4	30	0	1.80	0.14	0.44	0.04	**4.33**
1988	5	31	0	1.09	0.16	0.33	0.02	**4.65**
1988	6	30	0	1.30	0.15	0.37	0.02	**4.64**
1988	7	31	0	1.30	0.12	0.31	0.02	**3.53**
1988	8	31	0	1.39	0.17	0.34	0.02	**5.12**
1988	9	30	0	1.88	0.14	0.36	0.02	**4.14**
1988	10	31	0	1.31	0.09	0.26	0.01	**2.58**

Table D-6: Monthly precipitation, Kinston Ag Research COOP 314689

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1988	11	30	0	1.04	0.09	0.23	0.01	**2.63**
1988	12	30	0	0.12	0.00	0.02	0.00	**0.14**
1989	6	30	0	1.20	0.16	0.30	0.02	**4.84**
1989	7	31	0	1.55	0.12	0.31	0.02	**3.71**
1989	8	31	0	0.71	0.10	0.19	0.01	**2.91**
1989	9	30	0	2.80	0.20	0.53	0.05	**6.00**
1989	10	31	0	1.00	0.09	0.24	0.01	**2.67**
1989	11	30	0	0.80	0.09	0.20	0.01	**2.67**
1989	12	29	0	1.71	0.13	0.35	0.02	**3.89**
1990	1	31	0	0.84	0.08	0.21	0.01	**2.45**
1990	2	28	0	0.70	0.09	0.19	0.01	**2.82**
1990	3	31	0	1.82	0.14	0.40	0.03	**4.35**
1990	4	30	0	0.82	0.07	0.17	0.01	**2.07**
1990	5	31	0	1.97	0.32	0.58	0.06	**9.61**
1990	6	30	0	0.34	0.03	0.08	0.00	**0.87**
1990	7	31	0	0.56	0.06	0.14	0.00	**1.95**
1990	8	31	0	2.00	0.28	0.53	0.05	**8.25**
1990	9	30	0	2.05	0.07	0.37	0.02	**2.07**
1990	10	31	0	2.40	0.16	0.55	0.06	**4.95**
1990	11	30	0	1.97	0.08	0.35	0.02	**2.30**
1990	12	31	0	0.85	0.04	0.15	0.00	**1.34**
1991	1	31	0	1.10	0.16	0.25	0.01	**4.71**
1991	2	28	0	0.35	0.04	0.07	0.00	**1.08**
1991	3	31	0	3.45	0.21	0.65	0.08	**6.41**
1991	4	30	0	1.68	0.07	0.31	0.02	**2.12**
1991	5	31	0	2.00	0.13	0.38	0.03	**4.05**
1991	6	30	0	1.68	0.18	0.44	0.04	**5.45**
1991	7	31	0	3.02	0.25	0.59	0.06	**7.63**
1991	8	30	0	0.81	0.15	0.23	0.01	**4.63**
1991	9	30	0	2.63	0.17	0.52	0.05	**5.20**
1991	10	31	0	1.10	0.08	0.23	0.01	**2.28**
1991	11	30	0	1.00	0.05	0.18	0.01	**1.54**
1991	12	30	0	1.01	0.08	0.21	0.01	**2.27**
1992	1	31	0	3.15	0.18	0.58	0.06	**5.50**
1992	2	29	0	0.49	0.04	0.10	0.00	**1.26**
1992	3	31	0	1.32	0.08	0.24	0.01	**2.50**
1992	4	30	0	2.27	0.10	0.41	0.03	**2.96**
1992	5	31	0	1.12	0.11	0.27	0.01	**3.29**
1992	6	30	0	1.70	0.22	0.45	0.04	**6.51**
1992	7	31	0	1.30	0.11	0.28	0.01	**3.32**
1992	8	31	0	4.30	0.49	0.96	0.17	**14.66**
1992	9	30	0	1.52	0.10	0.31	0.02	**2.92**
1992	10	31	0	1.16	0.09	0.25	0.01	**2.74**
1992	11	30	0	1.83	0.20	0.41	0.03	**6.04**
1992	12	30	0	2.47	0.14	0.46	0.04	**4.09**
1993	1	31	0	1.82	0.20	0.38	0.03	**6.09**
1993	2	28	0	0.89	0.10	0.21	0.01	**2.89**
1993	3	31	0	1.41	0.18	0.39	0.03	**5.41**
1993	4	30	0	1.82	0.16	0.40	0.03	**4.84**
1993	5	31	0	1.21	0.09	0.25	0.01	**2.66**
1993	6	28	0	0.77	0.07	0.19	0.01	**1.97**
1993	7	31	0	1.80	0.20	0.44	0.04	**5.93**
1993	8	31	0	1.59	0.11	0.32	0.02	**3.17**
1993	9	30	0	1.95	0.18	0.50	0.05	**5.34**

Table D-6: Monthly precipitation, Kinston Ag Research COOP 314689

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1993	10	31	0	1.20	0.16	0.32	0.02	**4.67**
1993	11	28	0	0.72	0.05	0.14	0.00	**1.53**
1993	12	31	0	0.95	0.10	0.22	0.01	**3.03**
1994	1	29	0	1.06	0.12	0.27	0.01	**3.54**
1994	2	28	0	0.58	0.06	0.14	0.00	**1.68**
1994	3	31	0	3.05	0.19	0.55	0.05	**5.71**
1994	4	30	0	0.33	0.03	0.08	0.00	**0.87**
1994	5	31	0	0.70	0.05	0.14	0.00	**1.41**
1994	6	30	0	0.65	0.08	0.19	0.01	**2.33**
1994	7	31	0	1.26	0.13	0.26	0.01	**3.82**
1994	8	31	0	1.12	0.16	0.27	0.01	**4.74**
1994	9	30	0	1.20	0.14	0.35	0.02	**4.18**
1994	10	31	0	4.58	0.16	0.81	0.12	**4.92**
1994	11	27	0	1.17	0.11	0.25	0.01	**3.18**
1994	12	22	0	0.55	0.06	0.14	0.00	**1.69**
1995	1	31	0	1.17	0.11	0.24	0.01	**3.40**
1995	2	28	0	1.21	0.17	0.30	0.02	**5.13**
1995	3	31	0	1.50	0.13	0.31	0.02	**3.98**
1995	4	30	0	0.30	0.02	0.07	0.00	**0.68**
1995	5	31	0	0.68	0.10	0.18	0.01	**2.94**
1995	6	30	0	4.99	0.54	0.99	0.18	**16.13**
1995	7	31	0	0.80	0.11	0.19	0.01	**3.27**
1995	8	31	0	1.20	0.09	0.23	0.01	**2.58**
1995	9	30	0	0.83	0.08	0.19	0.01	**2.41**
1995	10	31	0	1.23	0.22	0.39	0.03	**6.45**
1995	11	30	0	0.80	0.11	0.22	0.01	**3.22**
1995	12	29	0	0.75	0.07	0.20	0.01	**2.05**
1996	1	30	0	1.03	0.11	0.24	0.01	**3.38**
1996	2	28	0	0.57	0.06	0.13	0.00	**1.88**
1996	3	22	0	1.27	0.11	0.27	0.02	**3.16**
1996	4	24	0	0.76	0.12	0.21	0.01	**3.46**
1996	5	31	0	2.09	0.13	0.41	0.03	**3.82**
1996	6	30	0	1.54	0.16	0.36	0.02	**4.65**
1996	7	31	0	2.96	0.32	0.66	0.08	**9.62**
1996	8	31	0	0.98	0.10	0.22	0.01	**2.95**
1996	9	24	0	4.50	0.52	1.07	0.23	**15.71**
1996	10	22	0	4.90	0.26	1.02	0.22	**7.75**
1996	11	30	0	2.11	0.14	0.41	0.03	**4.05**
1996	12	19	0	1.22	0.19	0.32	0.02	**5.78**
1997	1	23	0	0.90	0.10	0.23	0.01	**3.05**
1997	2	28	0	0.70	0.10	0.21	0.01	**2.85**
1997	3	31	0	1.69	0.15	0.38	0.03	**4.58**
1997	4	30	0	1.66	0.14	0.36	0.02	**4.13**
1997	5	31	0	0.73	0.07	0.16	0.00	**2.13**
1997	6	30	0	0.49	0.05	0.11	0.00	**1.63**
1997	7	31	0	3.23	0.25	0.60	0.07	**7.49**
1997	8	31	0	5.02	0.21	0.91	0.15	**6.23**
1997	9	30	0	1.65	0.18	0.38	0.03	**5.39**
1997	10	29	0	0.77	0.05	0.16	0.00	**1.62**
1997	11	30	0	1.95	0.18	0.45	0.04	**5.47**
1997	12	31	0	1.00	0.12	0.28	0.01	**3.66**
1998	1	31	0	1.60	0.20	0.41	0.03	**6.09**
1998	2	28	0	2.93	0.25	0.69	0.09	**7.56**
1998	3	30	0	1.12	0.13	0.29	0.02	**3.75**

Table D-6: Monthly precipitation, Kinston Ag Research COOP 314689

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1998	4	30	0	1.87	0.16	0.39	0.03	**4.90**
1998	5	31	0	1.12	0.13	0.28	0.01	**3.84**
1998	6	30	0	1.54	0.14	0.36	0.02	**4.10**
1998	7	31	0	1.25	0.18	0.38	0.03	**5.54**
1998	8	30	0	4.86	0.23	0.88	0.14	**6.77**
1998	9	30	0	1.46	0.07	0.27	0.01	**2.19**
1998	10	26	0	0.47	0.02	0.09	0.00	**0.54**
1998	11	28	0	0.93	0.08	0.20	0.01	**2.29**
1998	12	31	0	1.82	0.17	0.38	0.03	**5.00**
1999	1	31	0	2.56	0.19	0.54	0.05	**5.76**
1999	2	28	0	1.02	0.12	0.26	0.01	**3.58**
1999	3	31	0	0.45	0.07	0.14	0.00	**2.19**
1999	4	30	0	1.26	0.12	0.28	0.01	**3.64**
1999	5	31	0	1.39	0.10	0.27	0.01	**2.96**
1999	6	30	0	1.25	0.17	0.37	0.03	**5.07**
1999	7	31	0	1.43	0.14	0.30	0.02	**4.17**
1999	8	30	0	1.11	0.12	0.29	0.02	**3.56**
1999	9	30	0	12.40	0.86	2.46	1.11	**25.88**
1999	10	31	0	4.63	0.19	0.82	0.12	**5.65**
1999	11	15	0	0.13	0.01	0.03	0.00	**0.26**
1999	12	22	0	0.25	0.02	0.06	0.00	**0.57**
2000	1	16	0	1.66	0.21	0.50	0.06	**6.32**
2000	2	19	0	0.78	0.08	0.21	0.01	**2.26**
2000	3	23	0	3.48	0.20	0.72	0.11	**5.95**
2000	4	19	0	0.62	0.14	0.22	0.01	**4.34**
2000	5	26	0	0.83	0.07	0.20	0.01	**2.23**
2000	6	30	0	1.01	0.12	0.25	0.01	**3.54**
2000	7	31	0	1.71	0.18	0.35	0.02	**5.27**
2000	8	31	0	1.87	0.23	0.44	0.03	**6.86**
2000	9	30	0	2.52	0.24	0.58	0.06	**7.12**
2000	10	31	0	0.00	0.00	0.00	0.00	**0.00**
2000	11	30	0	1.03	0.09	0.25	0.01	**2.63**
2000	12	27	0	0.85	0.07	0.17	0.01	**1.96**
2001	1	30	0	0.55	0.04	0.10	0.00	**1.07**
2001	2	28	0	0.90	0.11	0.23	0.01	**3.35**
2001	3	31	0	1.83	0.12	0.35	0.02	**3.66**
2001	4	30	0	0.45	0.04	0.11	0.00	**1.29**
2001	5	31	0	1.06	0.11	0.27	0.01	**3.37**
2001	6	30	0	2.59	0.31	0.67	0.08	**9.23**
2001	7	31	0	1.91	0.14	0.36	0.02	**4.18**
2001	8	31	0	2.43	0.21	0.51	0.05	**6.15**
2001	9	30	0	1.22	0.08	0.25	0.01	**2.54**
2001	10	31	0	1.09	0.04	0.19	0.01	**1.05**
2001	11	30	0	0.90	0.03	0.16	0.00	**0.90**
2001	12	30	0	0.36	0.01	0.06	0.00	**0.40**
2002	1	31	0	1.22	0.20	0.39	0.03	**5.97**
2002	2	28	0	1.16	0.07	0.22	0.01	**1.95**
2002	3	31	0	1.82	0.20	0.47	0.04	**5.97**
2002	4	30	0	1.06	0.09	0.26	0.01	**2.75**
2002	5	31	0	0.89	0.07	0.23	0.01	**2.20**
2002	6	29	0	0.85	0.12	0.23	0.01	**3.53**
2002	7	31	0	1.05	0.17	0.30	0.02	**5.11**
2002	8	31	0	1.05	0.11	0.24	0.01	**3.45**
2002	9	29	0	0.89	0.06	0.19	0.01	**1.91**

Table D-6: Monthly precipitation, Kinston Ag Research COOP 314689

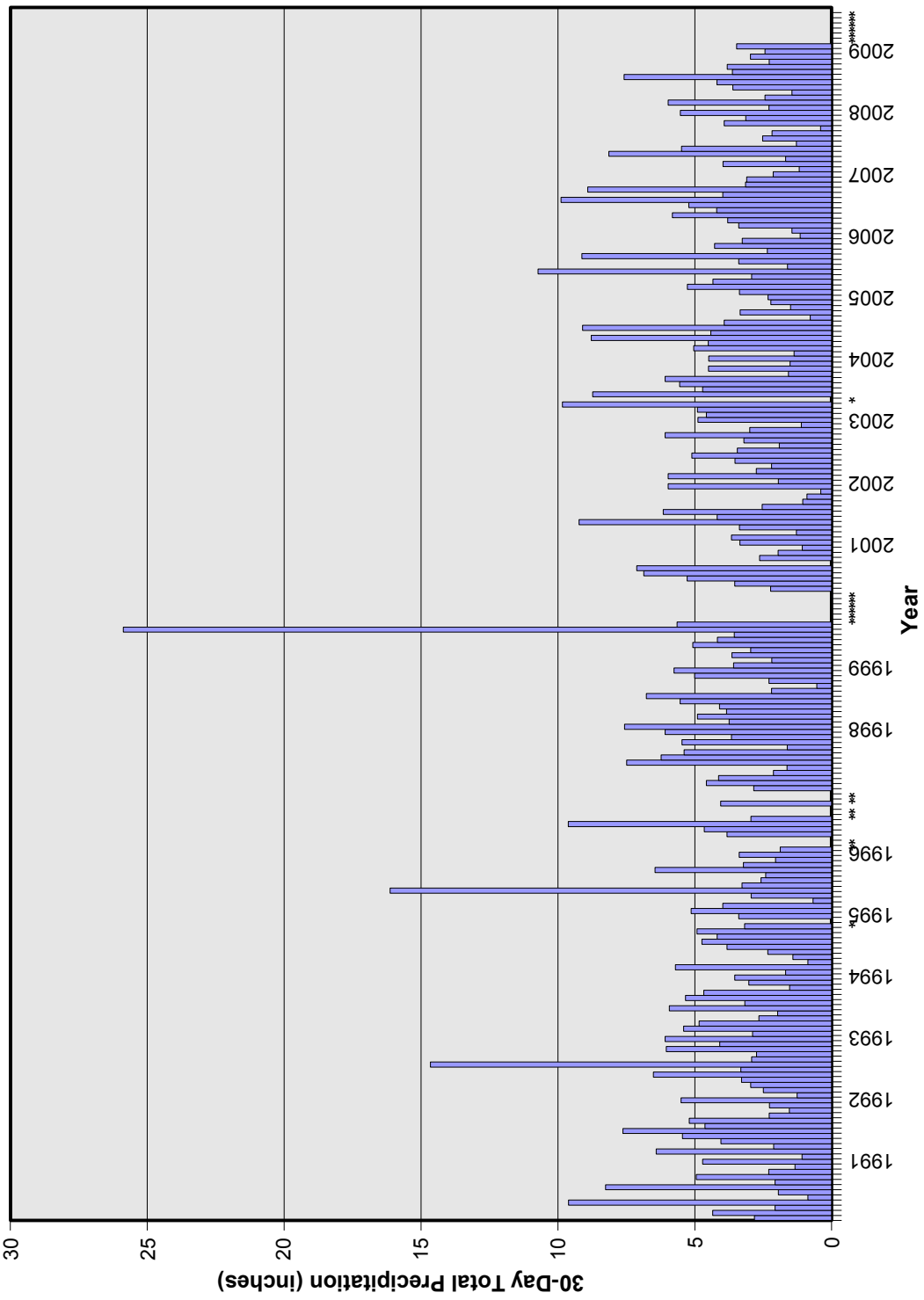
Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
2002	10	31	0	1.76	0.11	0.33	0.02	**3.20**
2002	11	30	0	1.70	0.20	0.42	0.03	**6.08**
2002	12	31	0	1.10	0.10	0.24	0.01	**2.99**
2003	1	31	0	0.42	0.04	0.10	0.00	**1.10**
2003	2	28	0	1.35	0.16	0.35	0.02	**4.89**
2003	3	31	0	1.16	0.15	0.31	0.02	**4.58**
2003	4	29	0	1.71	0.16	0.39	0.03	**4.90**
2003	5	31	0	2.47	0.33	0.68	0.08	**9.83**
2003	6	24	0	0.40	0.06	0.13	0.00	**1.93**
2003	7	31	0	2.10	0.29	0.50	0.04	**8.73**
2003	8	31	0	1.94	0.16	0.36	0.02	**4.71**
2003	9	30	0	3.23	0.19	0.60	0.07	**5.55**
2003	10	31	0	3.82	0.20	0.70	0.09	**6.09**
2003	11	30	0	0.63	0.05	0.15	0.00	**1.58**
2003	12	31	0	1.55	0.15	0.38	0.03	**4.50**
2004	1	31	0	0.56	0.05	0.13	0.00	**1.52**
2004	2	29	0	0.79	0.15	0.25	0.01	**4.49**
2004	3	31	0	1.00	0.05	0.18	0.01	**1.37**
2004	4	30	0	2.12	0.17	0.52	0.05	**5.04**
2004	5	31	0	1.05	0.15	0.33	0.02	**4.51**
2004	6	30	0	1.77	0.29	0.49	0.04	**8.78**
2004	7	31	0	0.85	0.15	0.25	0.01	**4.41**
2004	8	31	0	4.92	0.30	0.91	0.15	**9.10**
2004	9	30	0	1.16	0.13	0.29	0.02	**3.93**
2004	10	28	0	0.45	0.03	0.10	0.00	**0.78**
2004	11	30	0	2.00	0.11	0.39	0.03	**3.34**
2004	12	31	0	0.69	0.05	0.15	0.00	**1.50**
2005	1	31	0	1.30	0.07	0.25	0.01	**2.23**
2005	2	28	0	0.80	0.08	0.21	0.01	**2.33**
2005	3	31	0	0.94	0.11	0.24	0.01	**3.37**
2005	4	30	0	1.76	0.18	0.44	0.04	**5.27**
2005	5	30	0	3.30	0.14	0.60	0.06	**4.34**
2005	6	30	0	1.70	0.10	0.32	0.02	**2.92**
2005	7	31	0	3.40	0.36	0.71	0.09	**10.72**
2005	8	31	0	0.53	0.05	0.14	0.00	**1.62**
2005	9	30	0	2.12	0.11	0.39	0.03	**3.39**
2005	10	31	0	3.22	0.30	0.82	0.12	**9.13**
2005	11	30	0	1.68	0.08	0.31	0.02	**2.35**
2005	12	31	0	1.16	0.14	0.31	0.02	**4.28**
2006	1	31	0	0.90	0.11	0.23	0.01	**3.26**
2006	2	28	0	0.50	0.04	0.10	0.00	**1.15**
2006	3	31	0	1.35	0.05	0.24	0.01	**1.45**
2006	4	30	0	0.68	0.11	0.22	0.01	**3.39**
2006	5	31	0	1.08	0.13	0.27	0.01	**3.79**
2006	6	30	0	1.30	0.19	0.35	0.02	**5.82**
2006	7	31	0	1.08	0.14	0.26	0.01	**4.20**
2006	8	31	0	2.73	0.17	0.51	0.05	**5.22**
2006	9	30	0	6.10	0.33	1.11	0.23	**9.89**
2006	10	31	0	1.97	0.13	0.40	0.03	**3.98**
2006	11	30	0	5.11	0.30	0.93	0.16	**8.91**
2006	12	31	0	1.56	0.10	0.36	0.02	**3.15**
2007	1	31	0	1.21	0.10	0.26	0.01	**3.11**
2007	2	28	0	0.82	0.07	0.19	0.01	**2.13**
2007	3	31	0	0.66	0.04	0.13	0.00	**1.18**

Table D-6: Monthly precipitation, Kinston Ag Research COOP 314689

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
2007	4	30	0	2.95	0.13	0.54	0.05	**3.97**
2007	5	31	0	0.49	0.06	0.13	0.00	**1.68**
2007	6	30	0	2.57	0.27	0.63	0.07	**8.14**
2007	7	31	0	2.20	0.18	0.51	0.05	**5.49**
2007	8	31	0	0.80	0.04	0.17	0.01	**1.29**
2007	9	30	0	2.05	0.08	0.37	0.02	**2.52**
2007	10	31	0	1.01	0.07	0.21	0.01	**2.18**
2007	11	30	0	0.31	0.01	0.06	0.00	**0.41**
2007	12	31	0	1.40	0.13	0.34	0.02	**3.93**
2008	1	31	0	1.09	0.10	0.27	0.01	**3.14**
2008	2	29	0	2.11	0.18	0.46	0.04	**5.52**
2008	3	31	0	1.17	0.08	0.23	0.01	**2.29**
2008	4	30	0	3.65	0.20	0.69	0.09	**5.97**
2008	5	31	0	0.53	0.08	0.15	0.00	**2.44**
2008	6	30	0	1.26	0.05	0.23	0.01	**1.45**
2008	7	31	0	0.67	0.12	0.18	0.01	**3.61**
2008	8	31	0	1.71	0.14	0.36	0.02	**4.19**
2008	9	30	0	3.58	0.25	0.72	0.09	**7.58**
2008	10	31	0	1.54	0.12	0.33	0.02	**3.63**
2008	11	30	0	1.36	0.13	0.31	0.02	**3.81**
2008	12	31	0	0.74	0.08	0.19	0.01	**2.28**
2009	1	31	0	1.07	0.10	0.24	0.01	**2.97**
2009	2	28	0	1.00	0.08	0.25	0.01	**2.43**
2009	3	31	0	1.45	0.12	0.29	0.01	**3.47**
2009	4	13	0	0.20	0.02	0.05	0.00	**0.46**
2009	5	9	0	0.00	0.00	0.00	0.00	**0.00**
2009	6	15	0	2.00	0.17	0.50	0.07	**5.20**
2009	7	21	0	0.99	0.14	0.29	0.02	**4.16**
2009	8	22	0	1.38	0.22	0.44	0.04	**6.72**
2009	9	18	0	1.28	0.16	0.35	0.03	**4.70**

NOTE: In order to compensate for the variable number of days in a month as well as the presence of missing data in some months, a monthly total precipitation was standardized to the so-called “30-day average total”, which was calculated by multiplying the average daily water precipitation for a given month by 30 in order to remove a likely bias caused by the above conditions.

Graph D-6: Monthly precipitation, Kinston COOP 314689

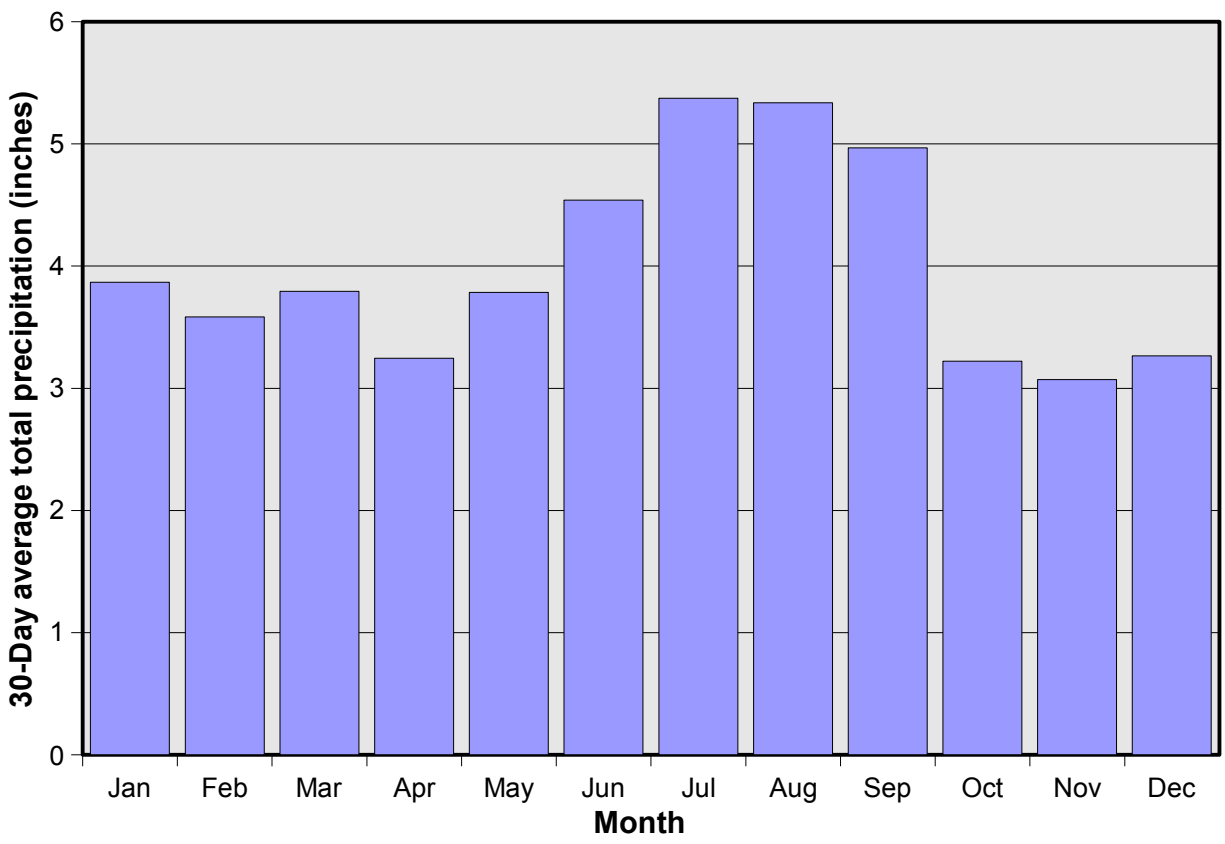


NOTE: Months with available data of less than 25 were marked insufficient,further denoted with *, and are not presented in this graph

Table D-7: Precipitation by month, Kinston Ag Research COOP 314689

Month	Total	Day Count	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
Jan	159.98	1241	0.13	0.33	0.01	**3.87**
Feb	139.43	1167	0.12	0.32	0.01	**3.58**
Mar	164.32	1299	0.13	0.35	0.01	**3.79**
Apr	134.63	1244	0.11	0.36	0.01	**3.25**
May	162.31	1286	0.13	0.36	0.01	**3.79**
Jun	186.44	1232	0.15	0.41	0.01	**4.54**
Jul	235.54	1315	0.18	0.41	0.01	**5.37**
Aug	233.89	1315	0.18	0.47	0.01	**5.34**
Sep	209.84	1267	0.17	0.63	0.02	**4.97**
Oct	138.87	1293	0.11	0.41	0.01	**3.22**
Nov	125.54	1226	0.10	0.35	0.01	**3.07**
Dec	135.56	1245	0.11	0.3	0.01	**3.27**

Graph D-7: Precipitation by month, Kinston Ag Research COOP 314689

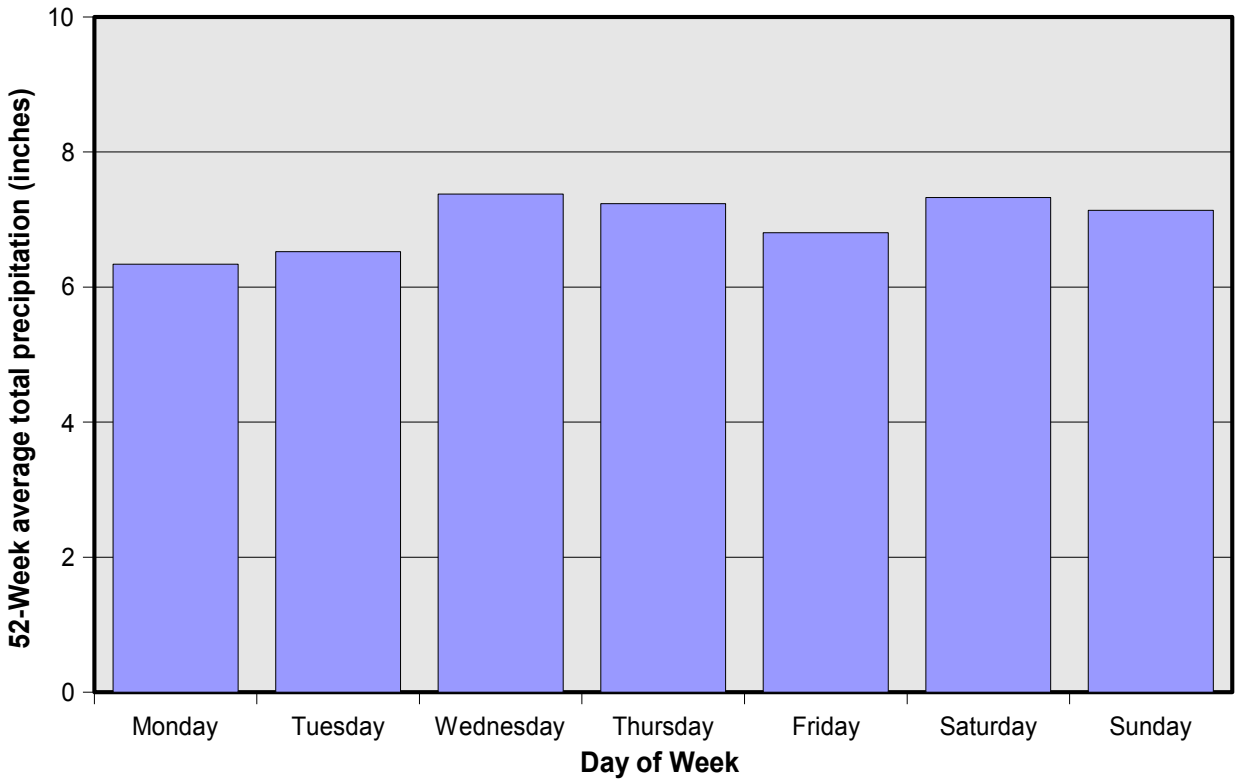


NOTE: The 30-day aveage total precipitaion for a month was calculated by multiplying its daily average precipitation by 30 in order to elmiinate the slight bias due to the inconsistent number of days in different months.

Table D-8: Precipitation by weekday, Kinston Ag Research COOP 314689

Day	Total	Day Count	Daily Average	Std. Dev.	Std. Error	52-Week Average Total
Monday	261.77	2147	0.12	0.32	0.00	**6.340**
Tuesday	273.98	2183	0.13	0.38	0.00	**6.526**
Wednesday	310.54	2188	0.14	0.42	0.00	**7.380**
Thursday	304.14	2185	0.14	0.47	0.00	**7.238**
Friday	286.18	2187	0.13	0.40	0.00	**6.804**
Saturday	298.89	2121	0.14	0.40	0.00	**7.328**
Sunday	290.85	2119	0.14	0.40	0.00	**7.137**

Graph D-8: Precipitation by weekday, Kinston Ag Research COOP 314689



Groundwater and Surface Water Sampling and Analysis Plan

Prepared for

Lenoir County Subtitle D Landfill
LaGrange, North Carolina

MESCO Project Number: G08095.6

This report is included as an Appendix E, part of the Design Hydrogeologic Study completed for the Lenoir County Subtitle D Landfill, Phase 2.

Completed: November 30, 2009

Madeline German
Geoscientist

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NORTH CAROLINA LICENSED SEAL 1711 GEOLOGIST STEPHEN MARK BROWN

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1 INTRODUCTION AND OBJECTIVE

The objective of the Groundwater and Surface Water Sampling and Analysis Plan is to provide clear guidelines and procedures for field and laboratory personnel when collecting and analyzing ground and surface water samples. This plan applies to the Phase 1 and Phase 2 portions of the Lenoir County Subtitle D Landfill. The sampling procedures outlined in this analysis plan are guidelines by which sampling will be performed. Deviation from the procedures may be warranted depending on facility conditions or unforeseen sampling variables. Alternative sampling procedures must conform to the N.C. Water Quality Monitoring Guidance Document for Solid Waste Facilities (Guidance Document).

Within six months of issuing the Phase 2 Permit to Operate, four independent sampling events of monitoring wells MW-19S, MW-19D and MW-20 will be collected with at least one sampling event occurring prior to receiving waste. The results of these sampling events will be used to establish a baseline for water quality information for the subsequent sampling events of Phase 2. Groundwater and surface water monitoring points will be sampled semi-annually thereafter for the Appendix I list of constituents.

2 ON LOCATION

2.1 Existing Conditions

This monitoring plan consists of six monitoring wells numbered MW-13, MW-14, MW-15, MW-16, MW-17 and MW-18, one (1) surface water monitoring point numbered SW-3, and one (1) leachate collection point referred to as LAGOON. Monitoring points included in this plan are summarized on Table E-1.

MW-13 is located approximately 500 feet west of the western corner of the Phase 1 unit, and serves as the background well for the MSW facility. Monitoring Well MW-14 is located approximately 250 feet north of the northeastern corner of the berm and monitors groundwater migration through the northern third of the Phase 1 area and the middle of the Phase 2 area. MW-15 is located on the eastern side of the sump area, monitoring groundwater migrating through the middle third of the Phase 1 area and the bottom of the Phase 2 unit. MW-15 will detect a sump leak should one occur. MW-16 is located near the southeastern berm and monitors groundwater migrating through the southern third of the Phase 1.

Monitoring Wells MW-17 and MW-18 are located in the immediate vicinity of the leachate lagoon, approximately 1000 feet southwest of Phase 1. These two monitoring wells serve as early detection of potential leachate lagoon leakage, should an event take place. MW-17 is approximately 200 feet northwest of the lagoon and serves as a down-gradient compliance well. MW-18 is located approximately 200 feet southwest of the lagoon and serves as a background well.

Surface water monitoring point SW-3 is located on the northeastern margin of the wetland alongside the access road.

2.2 Additions for Phase 2

Three (3) monitoring wells, MW-19S, MW-19D and MW-20 have recently been incorporated into the monitoring plan for inclusion of Phase 2. MW-19S and MW-19D will be converted from piezometers P2-11S and MW-19D respectively. MW-20 will be installed approximately 300 feet southeast of MW-19S and MW-19D.

MW-19S was converted from piezometer P2-11S to be used as a down-gradient monitoring well for the northern portion of the Phase 2 area. MW-19D was converted from piezometer P2-11D to be used as a deep, down-gradient well for the Phase 2 area.

MW-20 will be installed approximately 150 feet outside the Phase 1 and Phase 2 disposal areas. It will be used as additional coverage for Phase 2 and will help determine the origin of a leak, should one occur.

Leachate pumps will be installed at both low ends of the Phase 2. One pipe will run directly from the Phase 2 along the access road around future Phase 3 into the lagoon. A second leachate collection pipe will be run along Phase 1 and connect with the existing Phase 1 pipe. Should detection occur, two sampling locations provide more reliable data to determine the source.

3 SAMPLING

Wells will be sampled in order from least to greatest contamination unless no information is available; then they will be sampled in order working down gradient.

3.1 Set-Up

A clean sheet of plastic should be placed around the well to provide a clean surface for sampling equipment. The total well depth read from the well tag and the measured depth to water, determined using the water level indicator, will be used to compute the depth of water in the well. The total well depth will be measured and compared to the depth indicated on the well tag as a check for siltation or blockage at depth, using the chart on Plate C. For example, if a two-inch well is 29 feet deep and has a measured depth to water of 10 feet, there are 19 feet of standing water or 3.3 gallons in the well.

The EPA recommends the indicator parameters: pH, specific conductance and temperature will be measured on purged and recovered monitoring wells before collecting samples. When three consecutive measurements are within a 10% range, temperature and specific conductance are considered stable; pH is considered stable when three consecutive measurements are within a range of 0.2 units. All information will be recorded on a field data sheet or in a field logbook with copies submitted to the Division of Waste Management with the analytical results.

All meters will be calibrated immediately prior to purging and sampling and those readings recorded in a field logbook. The meters should be recalibrated at the end of each sampling event and those readings recorded in the log also. Entries will always include pre- and post- calibration readings as well as the model and serial number of the equipment and the date, time, and person performing the calibration(s). Two standards, which bracket the average or suspected measurements for pH and specific conductance, will be used at the site. Additionally, if an equipment blank needs to be run, it should be done before any sampling is started.

3.2 Equipment

Groundwater samples will be obtained in the field using a laboratory-cleaned, stainless steel bailer sanitized in accordance with the following procedure:

1. Completely disassemble bailer.
2. Phosphate-free, laboratory grade soap and organic-free, distilled water wash.
3. Organic-free, deionized water rinse.
4. Isopropyl alcohol rinse.
5. Organic-free, deionized water rinse.
6. Air dry.

7. Wrap bailer in aluminum foil, shiny side out.
8. Wrap bailer in plastic.

Alternative sampling equipment, such as a disposable Teflon bailer, may be warranted; all alternative equipment and procedures must conform to the Guidance Document. The standard equipment necessary to conduct sampling for each well consists of sample containers (including trip blanks and equipment blanks), one wide-mouth container, at least two 600-ft spools of 1/4-inch nylon rope, at least two boxes of latex gloves, one box of large plastic bags, temperature indicator, pH indicator, conductivity indicator, water level indicator, storage coolers, and ice. If the total depth of all wells to be sampled exceeds 1,200 feet, additional spools of rope will be required to complete the sampling. If the number of wells to be sampled exceeds one third of the number of pairs of gloves in stock, additional boxes of gloves will be necessary. The bailers, wrapped in foil and plastic, will be transported between pieces of peaked foam rubber to prevent damage to the wrappings. All equipment subject to damage and contamination will be transported in sealed, plastic bags.

Each sample container will be clearly labeled providing the site name, county location, well identification number, parameters to be analyzed, preservative added, date and time of sampling and initials of the sampler. Samples to be analyzed for organic content will be collected in four 40-ml glass vials with Teflon caps. The sample vials will be completely filled with no air left in the vials. Samples to be analyzed for inorganic contamination will be collected in a -quart/1-liter polyethylene container with ½ inch space for air permitted.

All sample containers will be obtained from an independent laboratory in a sterilized condition. Some of the containers will have a pre-measured amount of preservative in them as necessary. In this event, care will be taken not to rinse the container or allow the preservative to wash out during sampling.

3.3 Purging

Purging is done prior to sampling to remove stagnant water from the well and to introduce fresh groundwater for sampling. Each well will be purged three to five well volumes (quantity of water in the well), or until dry. In the previous example, 10 gallons would be adequate.

After determining the amount of water to be purged from a well, the equipment necessary will be assembled including rope, a 5-gallon bucket, bailer and gloves. Pull the top portion of foil away exposing the eyelet, keeping the bailer in a stable upright position. Using gloved hands: secure rope to the bailer via the eyelet hole and suspend to remove the remaining plastic and foil. These gloves are now contaminated and cannot touch the bailer or the rope. Clean, gloved hands will lower the suspended bailer into the well until the bailer contacts the bottom. Cut the rope to length and secure it, to prevent loss of the bailer, again replace contaminated gloves. During purging, the rope cannot touch the ground or contaminated surfaces including,

dirtied plastics, gloves, boots, etc. Many methods are available and it is to the sampler's discretion which method they prefer. The wind-mill method, looping the rope between thumbs, bucket method, where rope is lowered into a clean plastic bag lining a bucket, or simply placing plastic onto the ground near the well covering shoes, are all commonly used.

If purging and sampling of a well are performed at separate times, the bailer will be left suspended in the well, above the water table, with the rope secured. The remaining rope will be removed, in order to prevent contamination issues. The rope may be doubled and grasped in a tight loop in one hand then covered by pulling the corresponding hand's glove on top, inside out. The procedure can be repeated using the other hand if necessary. The glove-encased rope will be set on top of the well head until time to sample. Alternatively, the rope remaining after securing may be gathered in a tight loop and pushed into the 2-inch PVC well pipe and left. Even when sampling immediately follows purging, new gloves will be necessary.

Based on the number of wells to be sampled and their proximity to each other, all the wells may be purged one after another with sampling to follow. In this manner, if a well is purged dry, it may be allowed to recharge prior to sampling.

3.4 Groundwater

Lower the bailer into the well slowly, with gloved hands, to avoid releasing any volatiles from the groundwater; the bailer should not splash or smack the water surface. Once full, the bailer will be retrieved and containers filled by emptying the water through the hole at the bottom of the bailer. To top off the VOC's, collect some of the groundwater in the cap and pour it onto the sample's contents to acquire the needed meniscus to eliminate air bubbles. The polyethylene containers will be filled and sealed with the cap, leaving about 1/2 inch of airspace at the top. In addition to collecting the samples, water will be collected in the wide-mouth container for pH, temperature, and conductivity measurements. Upon completion of sampling, sample containers will be placed in labeled and sealed plastic bags, including equipment and trip blanks, and stored on ice in coolers. The contaminated latex gloves and rope will be discarded.

3.5 Surface Water

Surface water sampling will be taken with consideration to minimize turbulence and aeration. Surface water sample containers will be handled with gloves on, keeping one hand near the base. Containers will be dipped at location points with extreme caution in order to avoid contamination at the mouth of the container, pushing rapidly at an angle into the water, mouth up and tilted towards the stream current to fill, so as not to lose any of the preservative into the surrounding water. If there is little current movement, the container will be moved slowly through the water laterally. During times of drought, if the water is not deep enough to allow filling of the container, a pool may be scooped out of the bottom of the stream to obtain a sample. The pool will be

allowed to clear before sampling. All containers will be filled in the same manner and treated as the ground water samples were. The samples will be sealed in labeled, plastic bags, stored and transported on ice. In addition to collecting the samples, water will be collected in the wide-mouth container for pH, temperature and conductivity measurements.

3.6 Leachate Sampling

The Phase 2 leachate will be pumped from two locations. The Phase 2 pipe will run along the waste boundary to connect with the Phase 1 leachate and they will be sampled together for a composite sample at the current Phase 1 leachate sampling site (LAGOON). A second pipe will be run along the access road adjacent to future Phase 3 into the lagoon (LE-2). In both cases, leachate will be obtained from the invert at the lagoon. When collecting leachate samples, sample containers will be handled with extreme caution in order to avoid contamination at the mouth of the container. All containers will be filled in the same manner and treated the same as the ground water samples. The samples will be sealed in labeled, plastic bags, stored and transported on ice. In addition to the Appendix I list of constituents, leachate samples will also be tested for biochemical oxygen demand (BOD), chemical oxygen demand (COD), nitrate, nitrite, sulfate and total phosphorus. Water will also be collected in a wide-mouth container for pH, temperature and conductivity measurements.

3.7 Chain of Custody

Trip blanks, equipment blanks and sample containers will all travel and be stored together on ice in coolers. Trip blanks will remain in the condition they are received from the laboratory and will not be opened or tampered with during the sampling. A chain-of-custody record will be completed for each day's samples, indicating the date and time, sample location, sample matrix (soil, water, etc.) and laboratory analyses to be conducted. In addition, a field sampling data sheet will be completed indicating the depth to water, pH, temperature and specific conductivity of the sample measured in the field at each well sampled. Chain of custody forms are also used to document every time the samples change hands, for example from the sampler to the driver, or from the driver to the laboratory.

4 ANALYSIS

When the water samples reach the laboratory, they will be transferred to a sample custodian who will sign the chain of custody documentation as receipt of the samples. Internal control of the water samples in the laboratory will be in accordance with QA/QC procedures for the laboratory. Copies of QA/QC manuals for approved laboratories are on file at the Division of Solid Waste.

Groundwater and surface water will be analyzed for the Appendix I list of chemical constituents. In addition, practical quantitation limits (PQLs) for each of the constituents will be determined in accordance with the equipment that is used for laboratory testing. QA/QC procedures utilized during the testing will be in conformance with laboratory QA/QC manual.

5 CONCLUSION

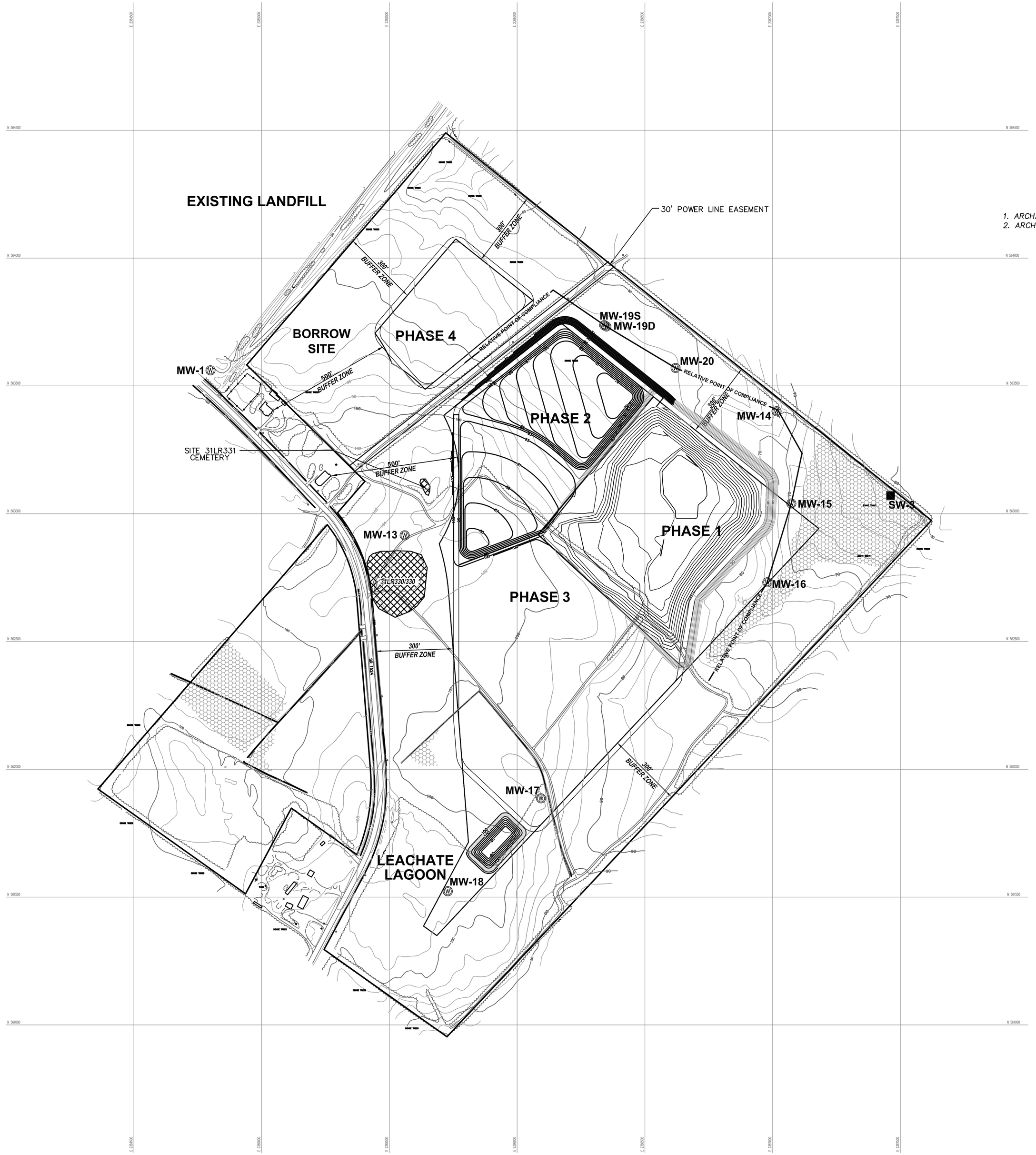
This report, included as part of the Design Hydrogeologic Report for the proposed Lenoir County Subtitle D Landfill Phase 2, completes the requirements as described in Rule 15A NCAC 13B .1623(b)(3). The groundwater and surface water monitoring plan is designed to be effective in the early detection of any possible release of hazardous constituents or the leachate surface impoundment to the uppermost aquifer.

Table E-1: Summary of Ground and Surface Water Monitoring Points

Sampling Point	Type	Gradient	Total Depth (ft)	Designation
MW-13	Monitoring Well	Up	29.4	Background
MW-14	Monitoring Well	Down	21	Phase 1 Monitoring Well
MW-15	Monitoring Well	Down	15.13	Phase 1 Monitoring Well
MW-16	Monitoring Well	Down	21	Phase 1 Monitoring Well
MW-17	Monitoring Well	Down	28	Leachate Monitoring Well
MW-18	Monitoring Well	Down	30.85	Leachate Monitoring Well
MW-19S	Monitoring Well	Down	29.66	Phase 2 Monitoring Well
MW-19D	Monitoring Well	Down	44.62	Phase 2 Monitoring Well
MW-20	Monitoring Well	Down	25	Phase 2 Monitoring Well
SW-3	Surface Water	Down Stream		Along Wetlands

LEGEND

- EXISTING CONTOURS
- 90 — PROPOSED BASE GRADE
- PROPERTY LINE
- EXISITING PATH
- BUFFER ZONE
- PHASES OF OPERATION
- SUBGRADE
- REF # — ARCHAEOLOGICAL SITES
- WETLANDS
- MW-20 — MONITORING WELL
- SW-3 — SURFACE WATER



NOTES

1. ARCHAEOLOGICAL SITE 31LR311 (CEMETERY) WILL NOT BE DISTURBED.
2. ARCHAEOLOGICAL SITE 31LR330 WILL BE DISTURBED.

Municipal Engineering Services Company, P.A.
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LICENSE NUMBER: C-0281

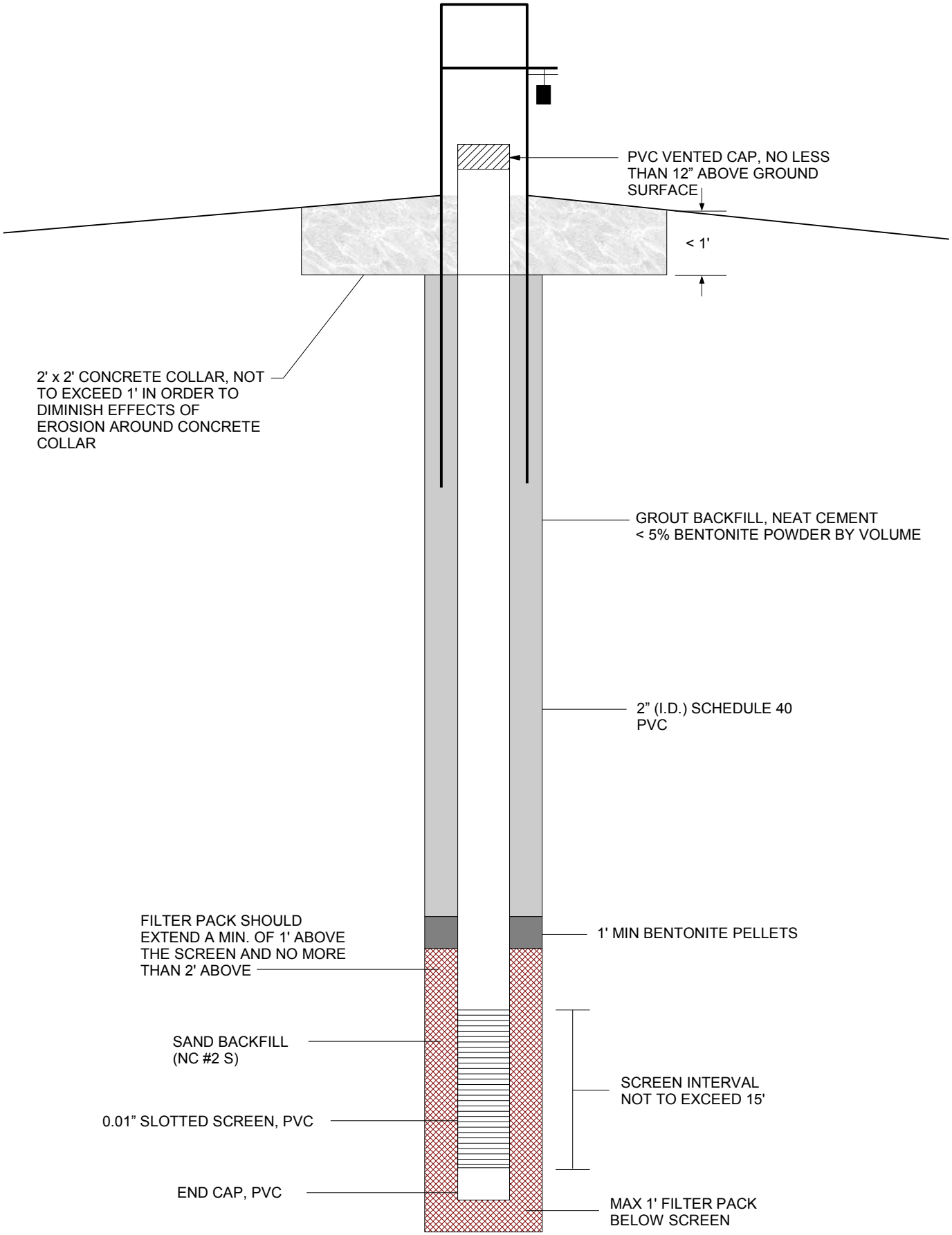
MUNICIPAL SOLID WASTE LANDFILL FACILITY
LENOIR COUNTY NORTH CAROLINA

DATE	BY	REV.	DESCRIPTION

PROPOSED MONITORING WELL AND SURFACE WATER LOCATIONS

SCALE:	1"=200'
DATE:	11/30/2009
DRWN. BY:	M. GERMAN
CHKD. BY:	M. BROWN
PROJECT NUMBER	G08095.6
DRAWING NO.	PLATE A
SHEET NO.	1 OF 1

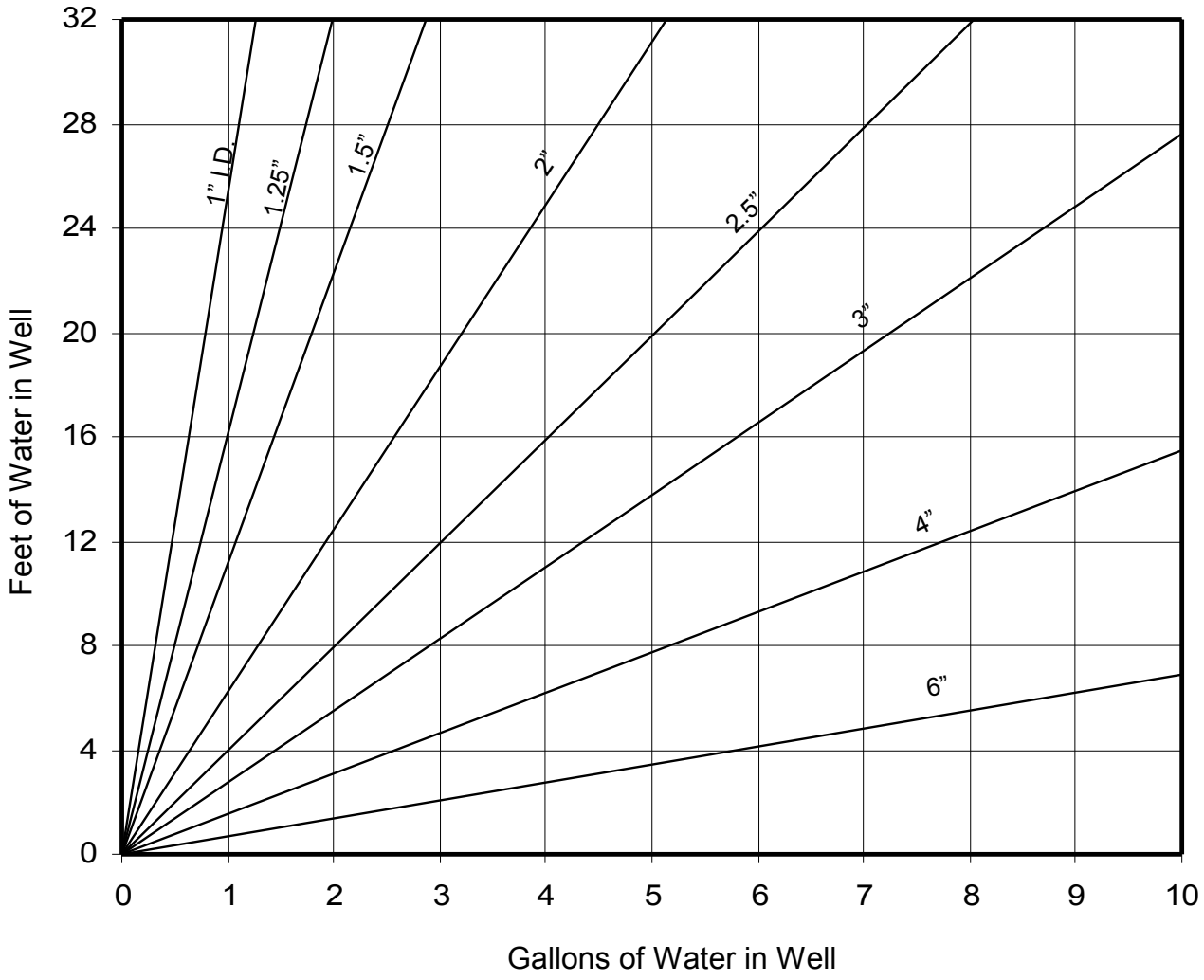
PLATE A



NOTE: SHALLOW WELLS REQUIRE A MINIMUM OF 5' COMBINED THICKNESS OF GROUT AND BENTONITE.

TYPICAL MONITORING WELL

PLATE B



GRAPHICAL PLOT OF STANDING VOLUMES OF WATER

PLATE C

APPENDIX F

PIEZOMETER CONSTRUCTION RECORD

DRILLING CONTRACTOR GAI Consultants

DRILLING REGISTRATION NUMBER 446

STATE WELL CONSTRUCTION PERMIT NUMBER: -

1. WELL LOCATION: (Show sketch of the location below) Piezometer 3A

Nearest Town: LaGrange County: Lenoir

2. Owner Lenoir County
3. Date Drilled 3-26-95
4. Total Depth 28.0'
5. Cuttings Collected Yes ☐ No ☒
6. Does Well Replace Existing Well? Yes ☐ No ☒
7. Static Water Level Below Top of Casing: 10.0 FT.
8. TOP OF CASING IS 1.57 FT. Above Land Surface

DEPTH From	To	DRILLING LOG Formation Description
See Log of Boring No. 3A		

9. CASING:

	Depth			Diameter	Wall Thickness or Weight/Ft.	Material
From	1.57	To 23.0	Ft.	2"	Sch 40	PVC
From		To	Ft.			
From		To	Ft.			

10. GROUT

	Depth			Material	Method
From	20.5	To 22.0	Ft.	bentonite	pellets
From		To	Ft.		

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

11. SCREEN:

	Depth			Diameter	Slot Size	Material
From	23.0	To 28.0	Ft	2 in	0.010 in	PVC
From		To	Ft	in	in	
From		To	Ft	in	in	

See Piezometer 3A on Plate 1

12. SAND/GRAVEL PACK

	Depth			Size	Material
From	22.0	To 28.0	Ft.	#2 in.	sand
From		To	Ft.	in.	

13. REMARKS:

I DO HEREBY ACKNOWLEDGE THAT THIS RECORD IS TRUE TO THE BEST OF MY KNOWLEDGE.

SIGNATURE OF CONTRACTOR OR AGENT DATE

LOG OF BORING NO. 4

PROJECT : Lenoir County Landfill
La Grange, North Carolina

JOB NO.: 95107.02

TYPE : HSA; SS

LOCATION : see Plan

DEPTH (FT)	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	WATER CONTENT %	LIQUID LIMIT	PLASTIC LIMIT	COHESION LB / SQ FT: PENETRO-METER	COHESION LB / SQ FT: UNCONFINED COMPRESSION	REMARKS
			Topsoil, 6 inches								
			CLAYEY SAND (SC); Tan, wet, very loose, coarse								
		X		2							
5											
		X	-grades medium dense	12							
10											
			SILTY SAND (SM); Tan, wet, medium dense, fine								
		X		14							
15			-grades saturated								
		X	-grades medium dense to dense	31							
20											
		X		23							
25			End of Boring								
30											
35											
40											

COMPLETION DEPTH: 25.0 ft

DEPTH TO WATER IN BORING: 14.9 ft WD, 6 ft 0 hrs AD, 9.1 ft 24 hrs AD

DATE: 2-21-95

GAI CONSULTANTS

PLATE A-6

PIEZOMETER CONSTRUCTION RECORD

DRILLING CONTRACTOR GAI Consultants

DRILLING REGISTRATION NUMBER 446

STATE WELL CONSTRUCTION PERMIT NUMBER: -

1. WELL LOCATION: (Show sketch of the location below) Piezometer 4

Nearest Town: La Grange County: Lenoir

2. Owner Lenoir County
3. Date Drilled 2-21-95
4. Total Depth 25.0'
5. Cuttings Collected Yes ☐ No ☒
6. Does Well Replace Existing Well? Yes ☐ No ☒
7. Static Water Level Below Top of Casing: 11.25 FT.
8. TOP OF CASING IS 2.15 FT. Above Land Surface

DEPTH From	To	DRILLING LOG Formation Description
See Log of Boring No. 4		

9. CASING:

	Depth			Diameter	Wall Thickness or Weight/Ft.	Material
From	+2.15	To 12.15	Ft.	1"	Sch 40	PVC
From		To	Ft.			
From		To	Ft.			

10. GROUT

	Depth			Material	Method
From	10.5	To 12.0	Ft.	bentonite	pellets
From		To	Ft.		

11. SCREEN:

	Depth			Diameter		Slot Size		Material
From	12.15	To 22.15	Ft	1	in	0.010	in	PVC
From		To	Ft		in		in	
From		To	Ft		in		in	

12. SAND/GRAVEL PACK

	Depth			Size		Material
From	12.0	To 25.0	Ft.	#2	in.	sand
From		To	Ft.		in.	

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Piezometer 4 on Plate 1

13. REMARKS: Initial water level 14.9' below ground surface

I DO HEREBY ACKNOWLEDGE THAT THIS RECORD IS TRUE TO THE BEST OF MY KNOWLEDGE.

Cheryl Marks 6-30-95

SIGNATURE OF CONTRACTOR OR AGENT DATE

PIEZOMETER CONSTRUCTION RECORD

DRILLING CONTRACTOR GAI Consultants

DRILLING REGISTRATION NUMBER 446

STATE WELL CONSTRUCTION PERMIT NUMBER: -

1. WELL LOCATION: (Show sketch of the location below) Piezometer 4A

Nearest Town: LaGrange County: Lenoir

2. Owner Lenoir County
3. Date Drilled 3-24-95
4. Total Depth 23.0'
5. Cuttings Collected Yes ☐ No ☒
6. Does Well Replace Existing Well? Yes ☐ No ☒
7. Static Water Level Below Top of Casing: 9.54 FT.
8. TOP OF CASING IS 1.77 FT. Above Land Surface

DEPTH From	To	DRILLING LOG Formation Description
See Log of Boring No. 4A		

9. CASING:

	Depth			Diameter	Wall Thickness or Weight/Ft.	Material
From	+1.77	To 18.0	Ft.	2"	Sch 40	PVC
From		To	Ft.			
From		To	Ft.			

10. GROUT

	Depth			Material	Method
From	12.0	To 16.0	Ft.	bentonite	pellets
From		To	Ft.		

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

11. SCREEN:

	Depth			Diameter	Slot Size	Material
From	18.0	To 23.0	Ft	2 in	0.010 in	PVC
From		To	Ft	in	in	
From		To	Ft	in	in	

See Piezometer 4A on Plate 1

12. SAND/GRAVEL PACK

	Depth			Size	Material
From	16.0	To 23.0	Ft.	#2 in.	sand
From		To	Ft.	in.	

13. REMARKS:

I DO HEREBY ACKNOWLEDGE THAT THIS RECORD IS TRUE TO THE BEST OF MY KNOWLEDGE.

SIGNATURE OF CONTRACTOR OR AGENT DATE

LOG OF BORING NO. 5

PROJECT : Lenoir County Landfill
La Grange, North Carolina

JOB NO.: 95107.02

TYPE : HSA; SS

LOCATION : see Plan

DEPTH (FT)	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	WATER CONTENT %	LIQUID LIMIT	PLASTIC LIMIT	COHESION LB / SQ FT: PENETRO-METER	COHESION LB / SQ FT: UNCONFINED COMPRESSION	REMARKS
			Topsoil, 6 inches								
			SAND (SP); Gray, wet, medium dense, coarse								
		X		20							
5											
			SILTY SAND (SM); Tan, wet, loose, fine, trace clay								
		X	-grades saturated	8							
10											
15											
20			End of Boring								
25											
30											
35											
40											

COMPLETION DEPTH: 20.0 ft

DEPTH TO WATER IN BORING: 9 ft WD, 11 ft 0 hrs AD, 4.6 ft 24 hrs AD

DATE: 2-20-95

GAI CONSULTANTS

PLATE A-7

PIEZOMETER CONSTRUCTION RECORD

DRILLING CONTRACTOR GAI Consultants

DRILLING REGISTRATION NUMBER 446

STATE WELL CONSTRUCTION PERMIT NUMBER: -

1. WELL LOCATION: (Show sketch of the location below) Piezometer 5

Nearest Town: La Grange County: Lenoir

2. Owner Lenoir County
3. Date Drilled 2-20-95
4. Total Depth 20.0'
5. Cuttings Collected Yes ☐ No ☒
6. Does Well Replace Existing Well? Yes ☐ No ☒
7. Static Water Level Below Top of Casing: 7.1 FT.
8. TOP OF CASING IS 2.5 FT. Above Land Surface

DEPTH From	To	DRILLING LOG Formation Description
See Log of Boring No. 5		

9. CASING:

	Depth			Diameter	Wall Thickness or Weight/Ft.	Material
From	+2.5	To 13.5	Ft.	1"	Sch 40	PVC
From		To	Ft.			
From		To	Ft.			

10. GROUT

	Depth			Material	Method
From	9.0	To 11.0	Ft.	bentonite	pellets
From		To	Ft.		

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Piezometer 5 on Plate 1

11. SCREEN:

	Depth			Diameter		Slot Size		Material
From	13.5	To 20.0	Ft	1	in	0.010	in	PVC
From		To	Ft		in		in	
From		To	Ft		in		in	

12. SAND/GRAVEL PACK

	Depth			Size		Material
From	11.0	To 20.0	Ft.	#2	in.	sand
From		To	Ft.		in.	

13. REMARKS: Initial water level 9.0' below ground surface

I DO HEREBY ACKNOWLEDGE THAT THIS RECORD IS TRUE TO THE BEST OF MY KNOWLEDGE.

Cheryl Marks 6-30-95

SIGNATURE OF CONTRACTOR OR AGENT DATE

LOG OF BORING NO. 11

PROJECT : Lenoir County Landfill
La Grange, North Carolina

JOB NO.: 95107.02

TYPE : HSA; SS

LOCATION : see Plan

DEPTH (FT)	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	WATER CONTENT %	LIQUID LIMIT	PLASTIC LIMIT	COHESION LB / SQ FT: PENETRO-METER	COHESION LB / SQ FT: UNCONFINED COMPRESSION	REMARKS
			Topsoil, 12 inches								
			CLAYEY SAND (SC); Orange tan, moist, dense, medium								
		X		31							
5											
		X	-grades tan, very dense, less clay	85							
10											
			SAND (SP); Red and tan, wet, very dense, coarse								
		X	-with silt above 14.5 feet								
			-grades light tan	65							
15											
		X		59							
20											
		X	SILTY SAND (SM); Gray brown, saturated, medium dense, fine	11							
25											
		X	-grades dense, some clay	48							
30											
35			End of Boring								
40											

COMPLETION DEPTH: 33.0 ft

DEPTH TO WATER IN BORING: 23 ft WD, 23.44 ft 0 hrs AD, 23.45 ft 24 hrs AD

DATE: 2-27-95

GAI CONSULTANTS

PLATE A-13

PIEZOMETER CONSTRUCTION RECORD

DRILLING CONTRACTOR GAI Consultants

DRILLING REGISTRATION NUMBER 446

STATE WELL CONSTRUCTION PERMIT NUMBER: -

1. WELL LOCATION: (Show sketch of the location below) Piezometer 11

Nearest Town: La Grange County: Lenoir

2. Owner Lenoir County

3. Date Drilled 2-27-95

4. Total Depth 33.0'

5. Cuttings Collected Yes ☐ No ☒

6. Does Well Replace Existing Well? Yes ☐ No ☒

7. Static Water Level Below Top of Casing: 26.15 FT.

8. TOP OF CASING IS 2.7 FT. Above Land Surface

DEPTH From	To	DRILLING LOG Formation Description
See Log of Boring No. 11		

9. CASING:

	Depth			Diameter	Wall Thickness or Weight/Ft.	Material
From	+2.7	To 18.0	Ft.	1"	Sch 40	PVC
From		To	Ft.			
		To	Ft.			

10. GROUT

	Depth			Material	Method
From	16.0	To 18.0	Ft.	bentonite	pellets
From		To	Ft.		

11. SCREEN:

	Depth			Diameter		Slot Size		Material
From	18.0	To 33.0	Ft	1	in	0.010	in	PVC
From		To	Ft		in		in	
From		To	Ft		in		in	

12. SAND/GRAVEL PACK

	Depth			Size		Material
From	18.0	To 33.0	Ft.	#2	in.	sand
From		To	Ft.		in.	

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Piezometer 11 on Plate 1

13. REMARKS: Initial water level 23.0' below ground surface

DO HEREBY ACKNOWLEDGE THAT THIS RECORD IS TRUE TO THE BEST OF MY KNOWLEDGE.

Cheryl Marks 6-30-95

SIGNATURE OF CONTRACTOR OR AGENT DATE

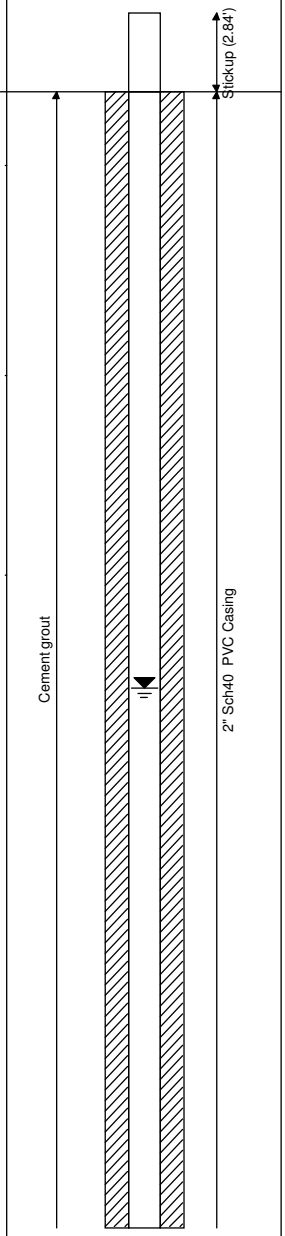
LOG OF BORING: P-13D

Lenoir County Proposed Landfill **Project No. G01046.6**

Drilling contractor: Carolina Drilling	Date started: 8/22/2001	Surface elevation: 103.00 ft (MSL)
Drill rig & method: 8" O.D HSA	Date ended: 8/22/2001	Top of pipe elevation: 105.00 ft (MSL)
Logged by: J. Pfohl	Completion depth: 57.00 ft	Depth to water (TOB): 19.00 ft
	Stickup height: 2.00 ft	Depth to water (24hrs): 21.00 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
				Top Soil
				Soil descriptions for 0-39' transcribed from adjacent nested P-13.
	14			CLAYEY SAND; (SC) Tan and red, moist, medium dense. -with gray layers above 4.5 feet.
5				
	41			CLAYEY SAND; (SC) Grades tan, dense
10				
				CLAY; (CH) Red and gray, moist, very stiff some fine sand.
	53			CLAY; (CH)
15				
	36			SILTY SAND; (SP-SM) Yellow, wet, dense, medium.
20				
	17			SILTY SAND; (SP-SM) Grades orange, medium dense.
25				
	15			SILTY SAND; (SP-SM) Grades tan, saturated, fine, some clay.
30				
35				
	10			SILTY SAND; (SP-SM) Brownish yellow, fine grained sand, wet.
40				

Well Diagram



Municipal Engineering Services Company, P.A.
Operation/Construction Managers Civil/Sanitary Engineers Environmental Studies
PO Box 97, Garner, North Carolina 27529 (919) 772-5393 *PO Box 349, Boone, North Carolina 28607 (828) 262-1767*

LOG OF BORING: P-13D

Lenoir County Proposed Landfill **Project No. G01046.6**

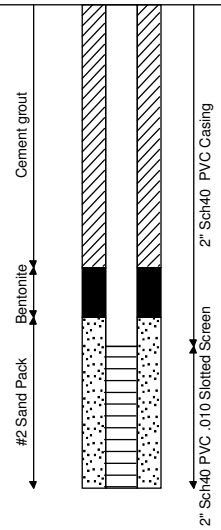
Drilling contractor: Carolina Drilling
Drill rig & method: 8" O.D HSA
Logged by: J. Pfohl

Date started: 8/22/2001
Date ended: 8/22/2001
Completion depth: 57.00 ft
Stickup height: 2.00 ft

Surface elevation: 103.00 ft (MSL)
Top of pipe elevation: 105.00 ft (MSL)
Depth to water (TOB): 19.00 ft
Depth to water (24hrs): 21.00 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
45	21			SILTY SAND; (SP-SM) Brownish yellow to yellowish red, fine to medium grains, saturated.
50	34			SILTY SAND; (SP-SM) Brownish yellow, fine grained sand, cemented layer w/ a few gravel size irregular rocks from 50-51', saturated.
55	9			CLAYEY SAND; (SC) Brownish yellow, fine grained sand, saturated.
				Boring terminated at 57.0 feet
60				
65				
70				
75				
80				

Well Diagram



Municipal Engineering Services Company, P.A.
Operation/Construction Managers Civil/Sanitary Engineers Environmental Studies
PO Box 97, Garner, North Carolina 27529 (919) 772-5393 *PO Box 349, Boone, North Carolina 28607 (828) 262-1767*

Page 2 of 2

Figure A-51. Well construction record for P-13D

North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section
1636 Mail Service Center - Raleigh, N.C. 27699-1636-Phone (919) 733-3221

WELL CONSTRUCTION RECORD

P-13D

WELL CONTRACTOR: BRIDGER DRILLING ENTP., INC. dba CAROLINA DRILLING
WELL CONTRACTOR CERTIFICATION #: 2394
STATE WELL CONSTRUCTION PERMIT#:

1. WELL USE (Check Applicable Box): Residential ☐ Municipal ☐ Industrial ☐ Agricultural ☐ Monitoring ☑ Recovery ☐ Heat Pump Water Injection ☐ Other ■ If Other, List Use: Temp. Piez. for Hydro Study
2. WELL LOCATION: (Show sketch of the location below)
   Nearest Town: LaGrange County: Lenoir
   ~4.5 Miles East of LaGrange on SR 1524
   (Road Name and Numbers, Community, or Subdivision and Lot No.)
3. OWNER Lenoir County Landfill
   Address P.O Box 3289 (Street or Route No.)
   Kinston (City or Town) NC (State) 28502 (Zip Code)
4. DATE DRILLED 8-22-01
5. TOTAL DEPTH 57
6. CUTTINGS COLLECTED YES ■ NO ☐
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ■
8. STATIC WATER LEVEL Below Top of Casing: _____ FT.
9. TOP OF CASING IS 2.75 (Use "+" If Above Top of Casing) FT. Above Land Surface*
   *Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118
10. YIELD (gpm): _____ METHOD OF TEST _____
11. WATER ZONES (depth): _____
12. CHLORINATION Type _____ Amount _____
13. CASING:

Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
+2.75	52	2	SCH 40	PVC

14. GROUT:

Depth From	To	Material	Method
0	49.25		

15. SCREEN:

Depth From	To	Diameter	Slot Size	Material
52	57	2 in.	010 in.	PVC
		in.	in.	
		in.	in.	

16. SAND/GRAVEL PACK:

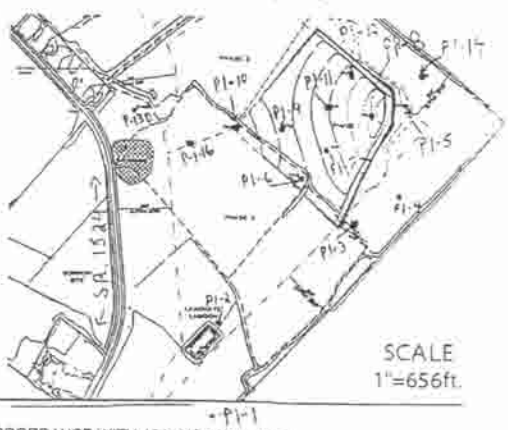
Depth From	To	Size	Material
51	57	#2	Topeclo

17. REMARKS _____

DEPTH From	To	DRILLING LOG Formation Description
0	0.5	Top Soil
0.5	10	Clayey Sand
10	17	Clay
17	53	Silty Sand
53	57	Clayey Sand

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)



I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

FOR OFFICE USE ONLY
Quad No: _____
Serial No. _____

[signature] 10-5-01
SIGNATURE OF PERSON CONSTRUCTING THE WELL DATE
Submit original to Division of Water Quality, Groundwater Section within 30 days

GW-1 REV 03/2000

LOG OF BORING NO. 14

PROJECT : Lenoir County Landfill
La Grange, North Carolina

JOB NO.: 95107.02

TYPE : HSA; SS

LOCATION : see Plan

DEPTH (FT)	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	WATER CONTENT %	LIQUID LIMIT	PLASTIC LIMIT	COHESION LB / SQ FT: PENETRO-METER	COHESION LB / SQ FT: UNCONFINED COMPRESSION	REMARKS
			Topsoil, 12 inches								
			SANDY CLAY (SC); Tan, moist, hard, fine								
		X		43							
5											
		X	-grades gray and red	82							
10			CLAYEY SAND (SC); Tan, moist, very dense, medium								
		X	-drilled through loose layers from 10 to 15 feet	50/5							
15											
		X	-grades red and gray, dense, fine	32							
20											
			SILTY SAND (SM); Tan orange, wet, medium dense, fine								
		X	-grades red and gray	12							
25											
		X	-grades gray tan, saturated	17							
30											
		X	-grades dense	32							
35			End of Boring								
40											

COMPLETION DEPTH: 34.5 ft **DEPTH TO WATER IN BORING:** 28 ft WD, 24.95 ft 0 hrs AD, 24.5 ft 24 hrs AD

DATE: 2-27-95

GAI CONSULTANTS

PLATE A-16

PIEZOMETER CONSTRUCTION RECORD

DRILLING CONTRACTOR GAI Consultants

DRILLING REGISTRATION NUMBER 446

STATE WELL CONSTRUCTION PERMIT NUMBER: -

1. WELL LOCATION: (Show sketch of the location below) Piezometer 14

Nearest Town: La Grange County: Lenoir

2. Owner Lenoir County
3. Date Drilled 2-27-95
4. Total Depth 34.5'
5. Cuttings Collected Yes ☐ No ☒
6. Does Well Replace Existing Well? Yes ☐ No ☒
7. Static Water Level Below Top of Casing: 27.7 FT.
8. TOP OF CASING IS 3.2 FT. Above Land Surface

DEPTH From	To	DRILLING LOG Formation Description
See Log of Boring No. 14		

9. CASING:

	Depth			Diameter	Wall Thickness or Weight/Ft.	Material
From	+3.2	To 17.0	Ft.	1"	Sch 40	PVC
From		To	Ft.			
From		To	Ft.			

10. GROUT

	Depth			Material	Method
From	15.0	To 17.0	Ft.	bentonite	pellets
From		To	Ft.		

11. SCREEN:

	Depth			Diameter	Slot Size	Material
From	17.0	To 34.5	Ft	1 in	0.010 in	PVC
From		To	Ft	in	in	
From		To	Ft	in	in	

12. SAND/GRAVEL PACK

	Depth			Size	Material
From	17.0	To 34.5	Ft.	#2 in.	sand
From		To	Ft.	in.	

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

See Piezometer 14 on Plate 1

13. REMARKS: Initial water level 28.0' below ground surface

I DO HEREBY ACKNOWLEDGE THAT THIS RECORD IS TRUE TO THE BEST OF MY KNOWLEDGE.

Cheryl Marks 6-30-95

SIGNATURE OF CONTRACTOR OR AGENT DATE

LOG OF BORING: P1-14

Lenoir County Proposed Landfill **Project No. G01046.6**

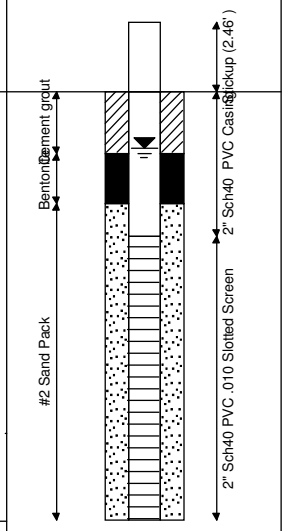
Drilling contractor: Carolina Drilling
Drill rig & method: 8" O.D HSA
Logged by: J. Pfohl

Date started: 8/23/2001
Date ended: 8/23/2001
Completion depth: 15.00 ft
Stickup height: 3.00 ft

Surface elevation: 66.00 ft (MSL)
Top of pipe elevation: 69.00 ft (MSL)
Depth to water (TOB): 2.00 ft
Depth to water (24hrs): 2.00 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
				TOP SOIL - moist w/ root and leaf debris.
	6			SILTY SAND; Black organic silt & white fine to medium grained sand, top soil intermixed, moist.
	10			SILTY SAND; Black silt and white to clear medium grained sand, saturated.
5				
	28			SILTY SAND; Black organic silt w/ root debris & medium grained white to light tan sand.
10				
	22			SAND; Light tan to white medium to coarse grained sand, "Playground sand".
15				Boring terminated at 15.0 feet
20				
25				
30				
35				
40				

Well Diagram



Municipal Engineering Services Company, P.A.
Operation/Construction Managers Civil/Sanitary Engineers Environmental Studies
PO Box 97, Garner, North Carolina 27529 (919) 772-5393 PO Box 349, Boone, North Carolina 28607 (828) 262-1767

Page 1 of 1

North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section
1636 Mail Service Center - Raleigh, N.C. 27699-1636-Phone (919) 733-3221

WELL CONSTRUCTION RECORD

P1-14

WELL CONTRACTOR: BRIDGER DRILLING ENTP., INC. dba CAROLINA DRILLING
WELL CONTRACTOR CERTIFICATION #: 2394
STATE WELL CONSTRUCTION PERMIT#:

1. **WELL USE (Check Applicable Box):** Residential ☐ Municipal ☐ Industrial ☐ Agricultural ☐ Monitoring ☑ Recovery ☐ Heat Pump Water Injection ☐ Other ■ If Other, List Use: Temp. Piez. for Hydro Study
2. WELL LOCATION: (Show sketch of the location below)
   Nearest Town: LaGrange County: Lenoir
   ~4.5 Miles East of LaGrange on SR 1524
   (Road Name and Numbers, Community, or Subdivision and Lot No.)
3. OWNER Lenoir County Landfill
   Address P.O Box 3289 (Street or Route No.)
   Kinston (City or Town) NC (State) 28502 (Zip Code)
4. DATE DRILLED 8-23-01
5. TOTAL DEPTH 15.08
6. CUTTINGS COLLECTED YES ■ NO ☐
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ■
8. STATIC WATER LEVEL Below Top of Casing: _____ FT. (Use "+" if Above Top of Casing)
9. TOP OF CASING IS 2.77 FT. Above Land Surface*
   *Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118
10. YIELD (gpm): _____ METHOD OF TEST _____
11. WATER ZONES (depth): _____
12. CHLORINATION: Type _____ Amount _____
13. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.77	5.08 Ft.	2	SCH40	PVC
		Ft.			
		Ft.			

14. GROUT:

	Depth From	Depth To	Material	Method
	0	2.16 Ft.		
		Ft.		

15. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	5.08	15.08 Ft.	2 in.	010 in.	PVC
		Ft.	in.	in.	
		Ft.	in.	in.	

16. SAND/GRAVEL PACK:

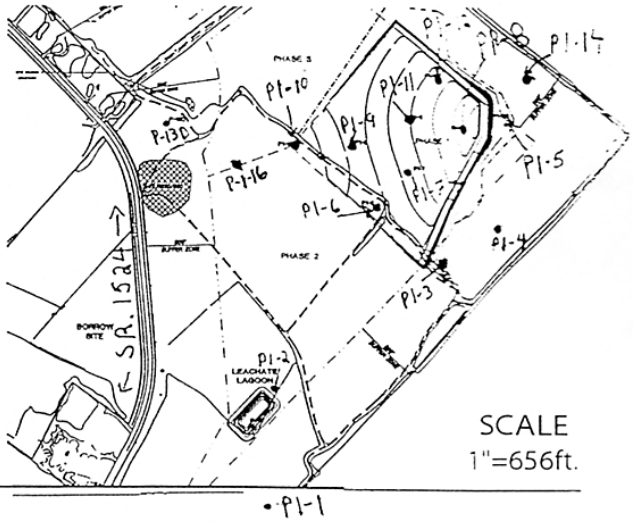
	Depth From	Depth To	Size	Material
	3.93	15.08 Ft.	#2	Torpedo
		Ft.		

17. REMARKS: _____

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0	0.5	Top Soil
0.5	12	Silty Sand
12	15.08	Sand

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)



I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF PERSON CONSTRUCTING THE WELL 10-5-01 DATE

Submit original to Division of Water Quality, Groundwater Section within 30 days

FOR OFFICE USE ONLY
Quad No: _____
Serial No. _____

GW-1 REV. 03/2000

MW-13

WELL CONSTRUCTION RECORD

North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Willie Brower CERTIFICATION # 2374

WELL CONTRACTOR COMPANY NAME Graham & Currie Well PHONE # 910 6732921

STATE WELL CONSTRUCTION PERMIT# _____ (if applicable) ASSOCIATED WQ PERMIT# _____ (if applicable)

1. WELL USE (Check Applicable Box): Residential ☐ Municipal/Public ☐ Industrial ☐ Agricultural ☐ Monitoring ☑ Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use _____

2. WELL LOCATION:
Nearest Town: LaGrange County Lenoir
2949 Hodges Farm Rd
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Engineer:
~~3. OWNER:~~ Municipal Engineering
Address PO Box 97
(Street or Route No.)
Garner NC 27529
City or Town State Zip Code
919-772 5393
Area code- Phone number

4. DATE DRILLED 9-3-03
5. TOTAL DEPTH: 29.4
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☑
7. STATIC WATER LEVEL Below Top of Casing: 20.45 FT. (Use "+" if Above Top of Casing)
8. TOP OF CASING IS +2.5 FT. Above Land Surface*
*Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118.
9. YIELD (gpm): N/A METHOD OF TEST _____
10. WATER ZONES (depth): N/A

Topographic/Land setting
☐Ridge ☐Slope ☐Valley ☑Flat
(check appropriate box)
Latitude/longitude of well location
Lat: 35-17-23.413 lon: 77-42-28.454
(degrees/minutes/seconds)
Latitude/longitude source: ☐GPS ☐Topographic map
(check box)

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0	30	Silty Sands

11. DISINFECTION: Type N/A Amount _____
12. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.5	14.4	2"	Sch 40	PVC

13. GROUT:

	Depth From	Depth To	Material	Method
	0	11	Portland	tremie

14. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	14.4	29.4	2 in.	10 in.	PVC
			in.	in.	

15. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
	13	29.4	10-30	Silica Sand

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads. Include the road numbers and common road names.

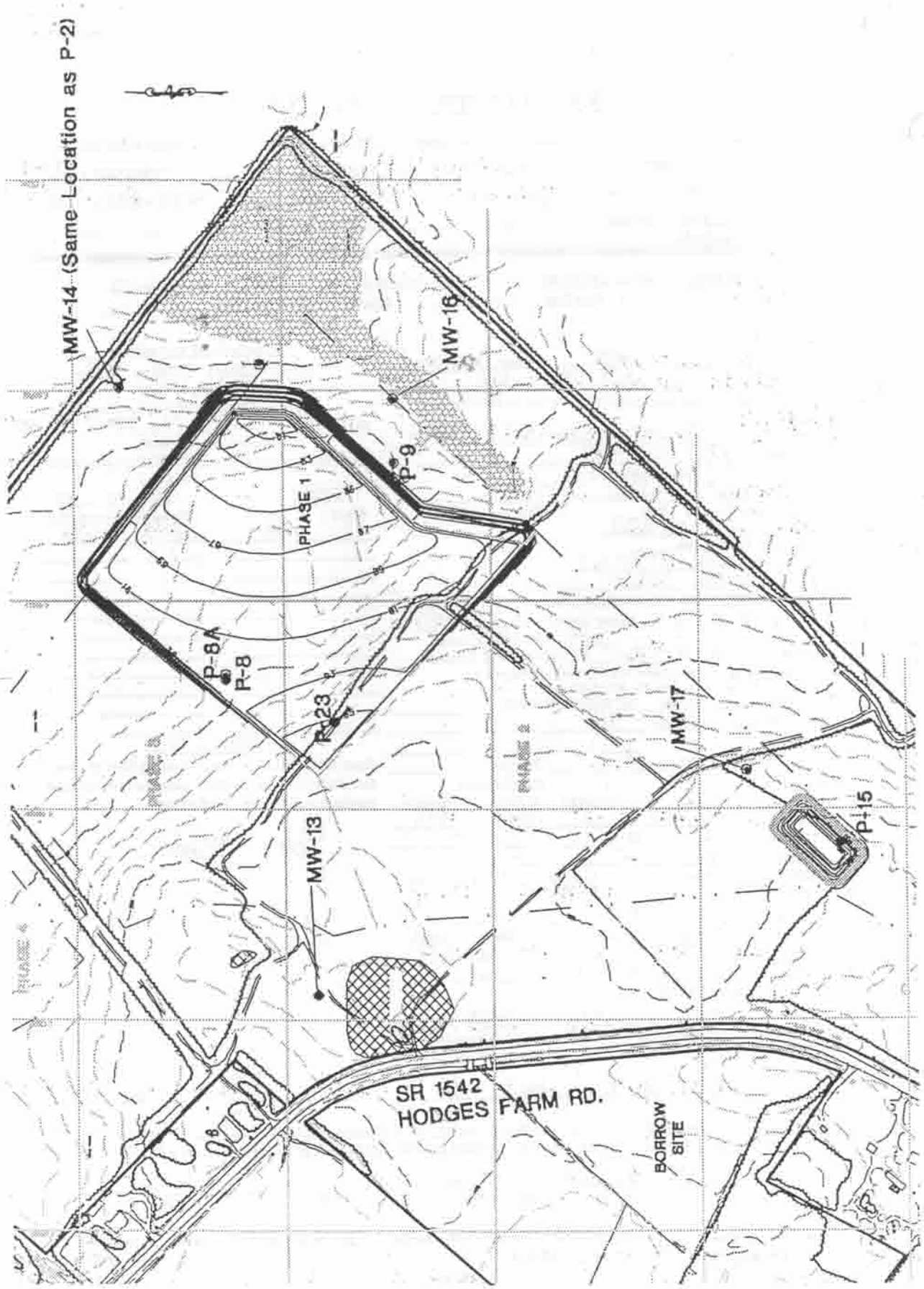
See Back

16. REMARKS: Bentonite Chips 11 to 13 FT (Phase 1 Monitor Well)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER

Willie Brower 9/5/03
SIGNATURE OF PERSON CONSTRUCTING THE WELL DATE

Submit the original to the Division of Water Quality, Groundwater Section, 1636 Mail Service Center - Raleigh, NC 27699-1636 Phone No. (919) 733-3221, within 30 days.
GW-1 REV. 07/2001


MW-14 (Same Location as P-2)
MW-16
P-9
PHASE 1
P-8A
P-8
P-23
MW-13
MW-17
P-15
SR 1542
HODGES FARM RD.
BORROW SITE

MW-14

WELL CONSTRUCTION RECORD

North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Willie Brower CERTIFICATION # 2374

WELL CONTRACTOR COMPANY NAME Graham & Currie Well PHONE # 910 6732921

STATE WELL CONSTRUCTION PERMIT# _____ (if applicable) ASSOCIATED WQ PERMIT# _____ (if applicable)

1. WELL USE (Check Applicable Box): Residential ☐ Municipal/Public ☐ Industrial ☐ Agricultural ☐ Monitoring ☑ Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use _____

2. WELL LOCATION:
Nearest Town: La Grange County Lenoir
2949 Hodges Farm Rd
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐Ridge ☐Slope ☐Valley ☑Flat
(check appropriate box)

Latitude/longitude of well location
Lat: 35-17-27.798 Lon: 77-42-10.784
(degrees/minutes/seconds)

Latitude/longitude source: ☐GPS ☐Topographic map
(check box)

3. OWNER: Engineer: Municipal Engineering
Address PO Box 97
(Street or Route No.)
Garner NC 27529
City or Town State Zip Code
(919) 772 5393
Area code- Phone number

4. DATE DRILLED 9-3-03
5. TOTAL DEPTH: 21
6. DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 13.09 FT.
(Use "+" If Above Top of Casing)
8. TOP OF CASING IS +2 FT. Above Land Surface*
*Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118.
9. YIELD (gpm): N/A METHOD OF TEST _____
10. WATER ZONES (depth): N/A
11. DISINFECTION: Type N/A Amount N/A

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0	21	Silty Sands

12. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2	6	2"	Sch 40	PVC

13. GROUT:

	Depth From	Depth To	Material	Method
	0	3	Portland	tremie

14. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	6	21	2 in.	10 in.	PVC
			in.	in.	

15. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
	5	21	10-30	Silica Sand

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads. Include the road numbers and common road names.

See back

16. REMARKS: Bentonite Chips 3 to 5 Feet

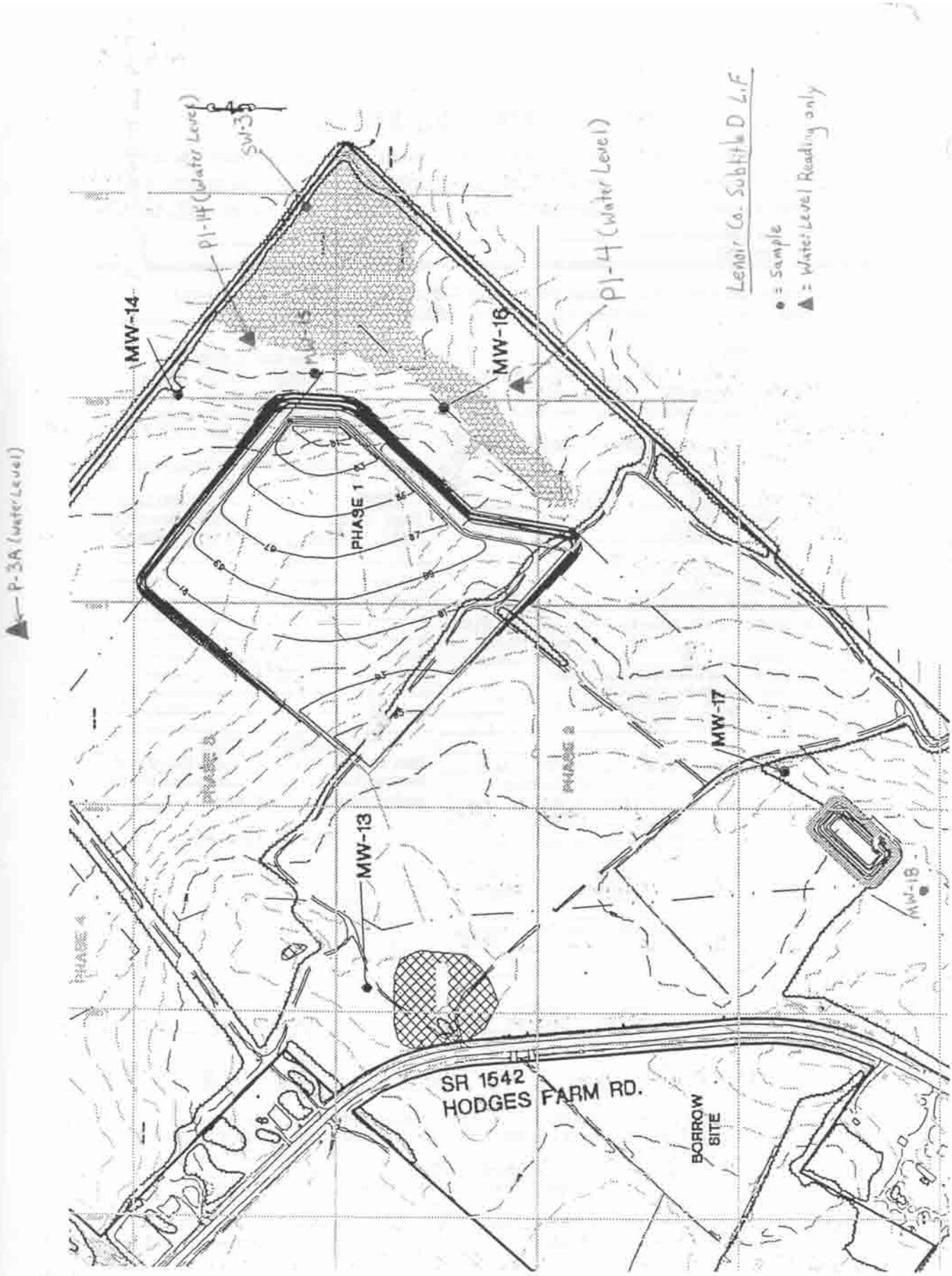
(Phase I Monitor Well)
* Replaced PZ #2

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Willie Brower 9/5/03
SIGNATURE OF PERSON CONSTRUCTING THE WELL DATE

Submit the original to the Division of Water Quality, Groundwater Section, 1636 Mail Service Center - Raleigh, NC 27699-1636 Phone No. (919) 733-3221, within 30 days.

GW-1 REV. 07/2001


P-3A (Water Level)
P1-14 (Water Level)
SW-3
MW-14
MW-15
MW-16
P1-4 (Water Level)
Lenoir Co. Subtitle D L.F
• = Sample
▲ = Water Level Reading only
PHASE 1
PHASE 3
PHASE 2
PHASE 4
MW-13
MW-17
MW-18
SR 1542
HODGES FARM RD.
BORROW SITE

Converted to MW-15

LOG OF BORING: P1-5

Lenoir County Proposed Landfill **Project No. G01046.6**

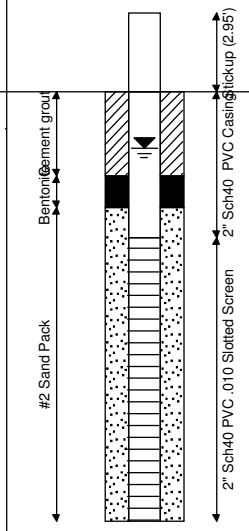
Drilling contractor: Carolina Drilling
Drill rig & method: 8" O.D HSA
Logged by: J. Pfohl

Date started: 8/21/2001
Date ended: 8/22/2001
Completion depth: 15.00 ft
Stickup height: 3.00 ft

Surface elevation: 72.00 ft (MSL)
Top of pipe elevation: 75.00 ft (MSL)
Depth to water (TOB): 2.00 ft
Depth to water (24hrs): 2.00 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
				TOP SOIL - moist w/ root and leaf debris.
	17			SILTY SAND; (SM) Light Brown fine to medium grained, wet.
5				SILTY, CLAYEY SAND; (SC-SM) Light Gray, 86% Sand & 14% Silt/Clay.
	24			SILTY SAND; (SM) Lt. Brown ro white fine to medium grained, saturated.
10				
				SILTY SAND; (SM) 13'-14.8' Lt. Brown to white fine to medium grained, slight proportion of silt, saturated. 14.8'-15' SILTY SAND; moderate reddish brown fine to medium grained, no rocks, saturated.
15				- 15.13' HSA refusal.
				Boring terminated at 15.0 feet
20				
25				
30				
35				
40				

Well Diagram



Municipal Engineering Services Company, P.A.
Operation/Construction Managers Civil/Sanitary Engineers Environmental Studies
PO Box 97, Garner, North Carolina 27529 (919) 772-5393 *PO Box 349, Boone, North Carolina 28607 (828) 262-1767*

Page 1 of 1

MW-15

MW-15

North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section
1636 Mail Service Center - Raleigh, N.C. 27699-1636-Phone (919) 733-3221

WELL CONSTRUCTION RECORD

converted from P1-5

WELL CONTRACTOR: BRIDGER DRILLING ENTP., INC., dba CAROLINA DRILLING
WELL CONTRACTOR CERTIFICATION #: 2394
STATE WELL CONSTRUCTION PERMIT#:

1. WELL USE (Check Applicable Box): Residential ☐ Municipal ☐ Industrial ☐ Agricultural ☐ Monitoring ☑ Recovery ☐ Heat Pump Water Injection ☐ Other ■ If Other, List Use: Temp. Piez. for Hydro Study

2. WELL LOCATION: (Show sketch of the location below)
Nearest Town: LaGrange County: Lenoir
~4.5 Miles East of LaGrange on SR 1524
(Road Name and Numbers, Community, or Subdivision and Lot No.)

3. OWNER: Lenoir County Landfill
Address: P.O Box 3289 (Street or Route No.)
Kinston (City or Town) NC (State) 28502 (Zip Code)

4. DATE DRILLED: 5-22-01
5. TOTAL DEPTH: 15.13
6. CUTTINGS COLLECTED: YES ■ NO ☐
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ■
8. STATIC WATER LEVEL Below Top of Casing: _____ FT.
9. TOP OF CASING IS 2.85 (Use "+" if Above Top of Casing) FT. Above Land Surface*
*Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118
10. YIELD (gpm): _____ METHOD OF TEST: _____
11. WATER ZONES (depth): _____
12. CHLORINATION: Type _____ Amount _____
13. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.85	5.13	2	Sch40	PVC

14. GROUT:

	Depth From	Depth To	Material	Method
	0	2.85		

15. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	5.13	15.13	2 in.	0.10 in.	PVC
			in.	in.	
			in.	in.	

16. SAND/GRAVEL PACK:

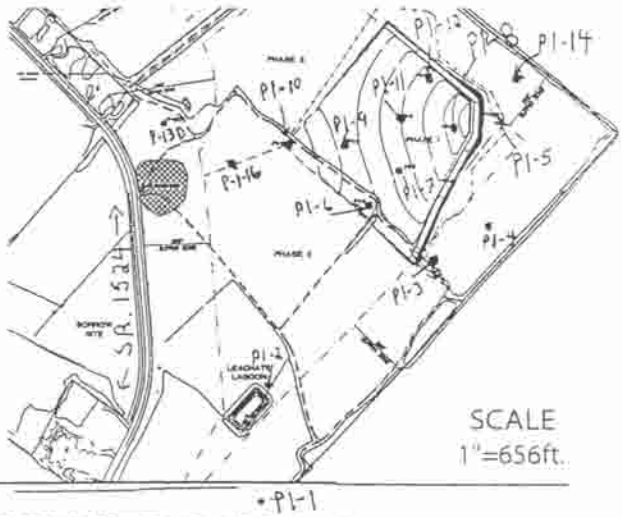
	Depth From	Depth To	Size	Material
	4.07	15.13	#2	Torpedo

17. REMARKS: MW-15 Converted from P1-5 By Antler Env. on 8/25/03

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0	1	Top Soil
1	5	Silty Sand
5	8	Silty, Clayey Sand (SC-SM)
8	15.13	Silty Sand

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)



SCALE 1"=656ft.

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF PERSON CONSTRUCTING THE WELL — DATE 10-9-01

Submit original to Division of Water Quality, Groundwater Section within 30 days

FOR OFFICE USE ONLY
Quad No. _____
Serial No. _____

GW-1 REV. 03/2000