Design Hydrogeologic Study

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Statesville, North Carolina

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1 INTRODUCTION

1.1 Purpose and Scope of Study

This study was undertaken, as part of the Permit to Construct,[26] to define, with borings and piezometers, the soils, rock types, and conditions of the uppermost aquifer regime at the proposed Phase 4 area (study area)* of the Iredell County Subtitle D Municipal Solid Waste Landfill Facility (MSWLF) (facility)ξ. Furthermore, this study provides an understanding of the groundwater regime to local and regional hydrogeologic features. This report was prepared in accordance to the requirements set forth by 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 Facility is located at 3260 Twin Oaks Road, S.R. 2319, Statesville, North Carolina; approximately one mile east of the Statesville city limits in the Piedmont physiographic province. Gently rolling hills and drainage features with moderate slopes are characteristic of this province. The facility operates under Permit No. 49-03 and is comprised of two Municipal Solid Waste (MSW) units, a Construction and Demolition (C&D) unit, associated buffers, and the operational portion of the facility; including leachate lagoon, scale house, bailer, recycling, tire storage and white goods processing. An unnamed creek separates the two MSW units. The eastern unit disposal area is composed of Phase 1 (17 acres), Phase 2 (12 acres) and future Phase 5 (23 acres). The western unit disposal area is Phase 3 (17 acres) and Phase 4 (12 acres). The study area of investigation for this design study encompasses the disposal area of Phase 4 and the surrounding area subject to water quality monitoring which is 23.8 acres. A facility map is included as Plate 1.

1.2.1 Drainage

Iredell County is located within two drainage basins: the western part of the county is in the Catawba River basin and the eastern portion in the Yadkin River basin. The facility is part of the Yadkin River basin.[23] The South Yadkin River is primarily responsible for draining the region. It flows through the center of the county. The South Yadkin River originates in Alexander County and continues on to become the border of Davie and Rowan counties before connecting with the Yadkin River. The Third and Fourth Creeks flow through Iredell County almost parallel to one another and assist with the draining of the Yadkin River.[23] Fourth Creek is slightly north of the facility and Third Creek is located south of the facility. Several small surface drains carry surface runoff southward towards an unnamed easterly flowing creek. Several interconnected creeks in and

* The term study area is in reference to the area of investigation for this design study.
ξ The term facility is in reference to the entire permit boundary.

around the facility are responsible for surficial drainage. The unnamed creeks converge and ultimately feed Fourth Creek.

1.2.2 Facility History

The facility was acquired through multiple property transactions beginning February 1987, with the most recent acquisition (approximately 55 acres) including the Ebony Acres development being completed in April 1999. Historically this area has been rural residential, farmland, and forest. The original permit to construct Phase 1 was issued April 1, 1993, with the permit to operate being issued October 8, 1993. Lateral expansion of the unit with Phase 2 permit to construct was issued on January 8, 1998, and the permit to operate Phase 2 was issued on September 28, 1998

Site suitability for the western unit disposal area was completed in April 2000. Phase 3 permit to construct was issued on August 28, 2001, and the permit to operate Phase 3 was issued on July 26, 2002. The MSW landfill is currently operating in Phase 1, 2 & 3.

2 FIELD INVESTIGATION

Municipal Engineering Services Company P.A. (MESCO) installed 18 soil and rock borings (P4-1D, P4-1S, P4-2, P4-3, P4-4, P4-5, P4-6, P4-7D, P4-7S, P4-8D, P4-8S, P4-9, P4-10, P4-11, P4-12, P4-13D, P4-13S, and P4-14) in and around the study area in December 2004 thru January 2005. Locations of the borings were based on topographical features and information obtained during the Site Hydrogeologic Study[28] and the Phase 3 Design Hydrogeologic Study.[27] Piezometers were installed in the borings, and their locations were surveyed by MESCO personnel in accordance with 15A NCAC 13B .1632.

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

Under the supervision of MESCO personnel, Graham and Currie Well Drilling completed installation of the aforementioned borings with piezometers. All borings were installed using 8.5-inch outer-diameter (OD) Hollow Stem Auger (HSA) drilling technology. Standard penetration tests (SPT) were conduced in accordance to ASTM Test Procedure D 1586-84, using a 2-inch OD split-barrel sampler at approximately five-foot intervals. Samples collected in split-barrel samplers were used for field boring notes. Borings P4-3, P4-

7D, P4-8D, P4-11, P4-13D were drilled to refusal with HSA and SPT technology. Boring P4-7D continued into rock using NQ2 Core Technology with a 2-inch inner diameter (ID) core barrel.

Piezometers were installed in the borings with 2-inch schedule 40 PVC pipe and 2-inch schedule 40 PVC 0.010 slotted screens. Screens were set to span the groundwater levels in the upper most aquifer as observed during drilling. Deep well screens were set into water bearing zones or on top of bedrock to assess vertical hydrogeological properties. A filter sand pack was placed to a depth of 2 feet above screen intervals, hydrated bentonite was placed as a sealer to a depth of 2 feet above the sand pack and a slurry grout mixture of cement and 5% bentonite was pumped 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. Of the 18 new piezometers, 4 were installed as well clusters (P4-1S/P4-1D, P4-7S/P4-7D, P4-8S/P4-8D, P4-13S/P4-13D).

Groundwater levels were observed and recorded during drilling procedures. To allow for the equilibration of the groundwater levels, groundwater was measured and recorded again 24 hours after piezometers were installed. The 24-hour stabilized groundwater levels are depicted on the boring logs. Following installation water levels were measured on a roughly monthly basis through March 2006. Water level data was utilized to construct a potentiometeric surface contour that represents the geometry of a single day stabilized water table surface; as well as determining seasonal high water table surface, and estimating 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 in Plate 3, Plate 4A, and Plate 4B, respectively.

Soils from selected borings were sampled for geotechnical analysis. Soils collected were taken in undisturbed samples with Shelby tube samplers. The soils were sent to Geotechnics for laboratory testing to determine such soil properties as grain size distribution, permeability, and soil classification. Details laboratory soil analysis are further discussed in Section 2.1. In addition to geotechnical laboratory analysis, MESCO conducted field slug tests on the selected piezometers to determine in-situ hydraulic characteristics of the saturated aquifer within the study area. Details of the slug tests are discussed in Section 4.4.3.

This hydrogeologic study utilized additional information from 19 Site Hydrogeologic Study and Phase 3 Design Hydrogeologic Study piezometers and monitoring wells to provide a more detailed understanding of the study area (P-2, P-4, P-5, P-6, P-9S, P-9D, P-14S, P-17S, P-17D, P-21S, P-21D, MW-2, MW-17, MW-18, MW-19S, MW-19D, MW-20, MW-21S, and MW-21D). The total boring density is thus the total number of borings used during investigation (18 borings installed for the Phase 4 design, the 19 additional borings, for a total of 37 borings) divided by the total area of investigation as discussed in Section 1.2 (23.8 acres) equaling a

total boring density of 1.55 borings per acre. Supplemental boring logs or well construction records are provided as Appendix F.

2.1 Laboratory Tests

Soil samples collected from field borings, described in Section 2, were visually inspected and classified by MESCO field personnel. In addition to classifying soils by texture and color, several samples were selected for geotechnical laboratory testing in order to help define the hydrogeologic and engineering properties necessary for phase characterization. Samples selected for laboratory analysis were collected from various depths in order to provide a uniform representation of the subsurface soils.

Undisturbed samples were collected in Shelby tubes for analysis from P4-8D, and two samples were collected from P4-1D and, P4-13D. Geotechnics analyzed the Shelby tubes in accordance with ASTM Standards for the following properties:

1. Moisture Content (ASTM D 2216)
2. Specific Gravity (ASTM D 854-00)
3. Atterberg Limits (ASTM D 4318-98)
4. Permeability Test (ASTM D 5084-90)
5. Sieve and Hydrometer Analysis (ASTM D 422-63)

Table B-1 summarizes the laboratory results for the tested samples. Laboratory results are included in Appendix B. The majority of laboratory-tested soil is classified as silty sand mixtures with the symbol SM, by United Soil Classification System (USCS). Some sandy clay was also present in the shallow sample of piezometers wells P4-1D and P4-13D. Laboratory test results are further discussed through out this report as applicable.

3 GEOLOGY

3.1 Regional Geology

Iredell County lies within the Inner Piedmont belt of the Piedmont physiographic and geologic province; bounded by the Chauga and Blue Ridge belts on the northwestern side and the Kings Mountain and Charlotte belts to the Southeast.[7] The geologic history of the area began with sedimentary deposition and igneous activity followed by three periods of concurrent and subsequent metamorphism, and Paleozoic folding and faulting.[18] The final period of geological activity is believed to have occurred during the Mesozoic[23] and consisted of normal and shear faulting along the pre-existing Paleozoic faults. This final period of activity erased nearly all evidence of thrust faulting, now only apparent by locating dissimilar rock[18] and resulted in the approximately 2 km wide Eufola Fault Zone.

Rocks of the Inner Piedmont consist of thinly layered mica schist and biotite gneiss with interlayered amphibolite, calc-silicate rock, hornblend, gneiss, quartzite and marble. The mica schist is thinly laminated and interlayered with various other rocks, occurring in northeastern trending belts. A schist granite complex composed of alternating bands of schist and granite, with thickness ranging from cm to km, formed as a result of the granite intrusions. Granite from the late Paleozoic intruded after the metamorphism of the country rock.[23] Composite gneiss, the primary rock below the landfill property, and most of Iredell county, formed when intrusions assimilated the schist forming a gneiss and schist of granitic composition. The composite gneiss is often seen in contact with the schist granite complex, however, it is difficult and arbitrary to distinguish between the two. Hornblende gneiss is also common in large bodies throughout the county.

The Eufola Shear Fault zone is thought to be a product of Mesozoic faulting along the pre-existing faults from the Paleozoic; its relationship to the facility is discussed in more detail in Section 3.2. The fault zone marks the boundary between the Inner Piedmont rocks of the west and the Kings Mountain or Charlotte Belt rocks to the east. These rocks are distinctively different which is important in identifying the boundary, and the fault. The fault was unable to be identified in the field due to lack of rock exposure. It would be possible to locate the fault during the boring process using the presence or absence of mylonitic texture and rock type. The fault strikes east–west, within the vicinity of the landfill and consists of silicified microbreccia overprinting on earlier mylonitic rock fabric.[27] [18] Also notable is the 2-kilometer width of the fault.

North of the shear zone, the basal unit of Inner Piedmont rock (Czbga) is composed of interlayered biotite gneiss, hornblende gneiss, amphibolite, and some mica schist. This is overlain by (CZbg) layered grey to dark grey bitotie, quartz, feldspar gneiss interlayered with mica, sillimanite-mica schist and amhibolite. South of the shear zone rocks of the Kings Mountatin suite include fine-grained biotite gneiss of granodiorite composition (bgf) and metavolcanics (mvm) of fine to medium grained metamorphosed tuffs. Foliation trends vary from due North to due East, and N25^{o}W toN50^{o}W with dips between 10-70° to the south or southwest.[30]

3.2 Local Geology

The facility is located on the southeast limb of the Newton Anticline, in the composite gneiss.[27] Rock cores studied for this phase, the prior three (3) Phases, and the Site Hydrogeologic Study confirmed the presence of mica schist, amphibolite, and medium to coarse-grained hornblende to biotite gneiss. These rock types represent typical rocks north of the fault zone. Cores showed decreased weathering with increased depth, as well as increasing in rock quality and recovery with increased depth. Fractures tend to run parallel to the compositional layering.

A review of available geologic maps indicates no recently active faults lie within two hundred feet of the property; however, the Eufola Shear Fault Zone is located southeast of the property but was last active in the Mesozoic. This fault location is based on detailed work preformed by Michie and the results of the core drillings undertaken in the facility, therefore, it is in slightly a different location than shown on the USGS regional characterization (Plate 5) map.[25] [30] In addition, no evidence of mylonitization is observable, further confirming that the facility is located north of the fault.

The facility is located within a seismic impact zone defined as; having a greater than 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

Iredell soils within the study area were classified as Cecil clay loam, which consists of moderately well drained soils, underlain by weathered gneiss.[35] Regolith encountered in borings during the subsurface investigation included sandy silt/silty sand non-uniformly grading to moderately developed saprolitic sandy clay/clayey sand. Soils encountered differ slightly from those encountered during the previous investigation. Laboratory results confirm that the soils in the Phase 4 area were slightly more clayey in nature. This difference may be attributed to the western most creek that acts as a source of recharge for the groundwater. Soils closer to the recharge would experience more in-situ weathering allowing for development of clay. Distinct lenses or soil packages were not identified. Silt, which was encountered in Phase 3, was only identified in boring P4-9.

Standard Penetration Tests (SPT) were conducted on all of the borings. No significant downward increase in blow counts was observed. Blow counts were generally in the 15 to 20 blows per foot which classifies the soils as medium dense. Plates 8A, and 8B, depict cross-sections of the study area with identified soil stratigraphy and lithology information compiled from the field boring data.

3.2.2 Subsurface Litholgical Conditions

Rock core was collected from piezometer P4-7D to characterize the subsurface lithological conditions. Rock core collected from Design Hydrogeologic Study, Phase 3 piezometers P-3D, P-9D, P-10D, P-12D, P-15D, P-17D, P-20D, and P-21D was also used to characterize the subsurface lithological conditions. In addition to collected rock core available references used to determine the geological characterization of the study area include facility visits to locate outcrops near stream valleys, Geological map of the Charlotte 1° X 2° quadrangle, North Carolina and South Carolina prepared by Goldsmith (1988), and Geology and ground water in the Statesville area by LeGrand (1954)

Lithology encountered beneath the study area consisted of gray, foliated, medium grain, biotite Gneiss. The identified Gneiss agrees with the Regional Characterization Map (Goldsmith 1988) and the geology as reported by LeGrand (1954). In addition to rock core several borings were drilled to auger refusal at top of competent rock surface (P4-3, P4-8D, P4-11, P4-13D). Top of competent rock surface, on average, is 66 feet below existing ground surface in the proposed disposal area. Vertical separation of top of competent rock to the proposed subgrade is expressed on Table 5. An estimated top of competent rock (TOR) surface was developed and depicted in Plate 7. The TOR surface identified a basin feature in the study sloping toward piezometers P4-13S/D and reconfirmed the "pinnacle" in the Phase 3 area.

4 HYDROGEOLOGY

4.1 Stream Trace Analysis

A stream trace analysis was performed within a 3-mile radius of the facility. Structural control features were traced from the 7.5 min USGS Statesville East quadrangle. Plate 6 depicts the stream trace analysis; the Rose diagram portrays the lengths and orientations of linear segments representing streams and drainages. Dominant directional trends are N 0-5°W, N 20-25°W, and N 30-35°E. Structural geological features, such as strike and dip of bedding and foliation, as seen on the Regional Characterization map, do not seem to play a role in primary stream drainage. The N50-55°E directional trend can be associated with the Eufola Fault.

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 2.1. 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 specified lithologies encountered are summarized on Table 4. Table B-1 shows that the total porosities in the study area range from 38% to 52%. Include in Table B-1 are laboratory result from the Phase 3 study.

Porosity values are comparable to the values published 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.[10] Bear (1972) states that sand and gravel, whether uniform or mixed with other sedimentary material, typically exhibits a total porosity

of 30-40%.[2] Freeze and Cherry (1979) give more inclusive ranges of 25-50% for sand material, and 35-50% for silt.[14] 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. The degree of compaction also affects porosity. 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.[13] 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 well reflected in the fact that clay, which consists of mass of very fine particles, exhibits a gap between the 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 equivalent.

4.3.1 Subsurface Soil Effective Porosity Method

While we must emphasize that there is no standard approach to determining effective porosity, one viable, and commonly used approach is to use 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 the effective porosity, the effort of which is summarized into the "trilinear graph of textural classification" referred to in this report as the Johnson diagram.[22]

Laboratory grain-size analysis follows the ASTM method which uses particle-size boundaries different from the ones 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 the recommendation made by the American Geophysical Unison Subcommittee on Sediment Terminology, and is widely adopted in many United State Geological Survey (USGS) publications.[19] Table B-2 shows 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.

Calculation of the accumulated percentage of soil particles finer then 0.0625 mm for P4-8, for example, the pre-determined accumulated percentages for the particle size boundaries of 0.0750 mm and 0.0313 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). 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:

$$C_{0.0625} = C_{0.0750} - (C_{0.0750} - C_{0.0313}) \times \frac{\log_{10} 0.0750 - \log_{10} 0.0625}{\log_{10} 0.0750 - \log_{10} 0.0313} \quad (2)$$

where

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

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

$C_{0.0313}$ is the % of grains sized 0.0313 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 Fractured Rock Effective Porosity

Fractured rock formations are made up of two porosity systems, the inter-granular porosity or matrix porosity former by inter-granular void spaces, and the secondary porosity developed due to fracture and solution cavities, often termed as fracture porosity. Fracture porosity is considerably less than matrix porosity. Matrix porosity generally reported to vary from 0.1% to 8% and fracture porosity from 0.001% to 0.01%.[32] Most crystalline and carbonate rock aquifers in North America are permeable primarily because of the effective porosity provided by the fractures within the rock rather than that of the rock matrix, which is relatively impervious.[24]

Although the porosities of igneous and metamorphic rocks are usually less than 1% when no fractures are present, and for most practical purposes can be considered zero[16], intense weathering can result in excessively higher porosities.[13] The depth of weathering is usually less than 50 feet, and in many terrains is less than 4 feet, but in regions of intense weathering such as humid tropics it may extend over 300 feet.[8] The following table shows representative values of porosity (n) and effective porosity (n_e) of crystalline rocks in three different forms by the degree of fracture/weathering.

Representative Value of Porosity (n) and Effective Porosity (n_e)
(after Singhal and Gupta, 1999)[32]

Rock Type	n (%)	n_e (%)
Dense crystalline rock	0 – 5	0 – 3
Fractured crystalline rock	5 – 10	2 – 5
Weathered crystalline Rock	20 – 40	10 – 20

This table suggests that the effective porosity of crystalline rock is typically 40 to 50% of the corresponding total porosity.

4.3.3 Results

The effective porosity for soils collected during this design study range from 6.5% to 22.5%. The average total porosity for the silty sand (SM) is 21.4% while the encountered sandy clay is 6.8%. As expected the soil with the smaller grain size, sandy clay has a lower effective porosity.

The soils effective porosity appears to be roughly proportional to the content of sand and inversely proportional to the content of clay. Sighal and Gupta (1999) state that sand typically yields an effective porosity between 10-30% while silt yields 5-20%[32], comparable to the numbers calculated in Table C-3. Johnson (1967) states that the average effective porosity from compiled studies as:[22]

Material	Average Specific Yield
Clay	2
Silt	8
Sandy Clay	7
Fine Sand	21
Medium Sand	26
Coarse Sand	27

Observations made on recovered core samples indicate there are zones of high degree fracturing and weathering residing in the uppermost portion of the fractured bedrock unit. Based on these observations,

published values for the fractured crystalline rock, in respect to the gneiss observed in the subsurface, is estimated to be 5%.

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) of the saturated portion of the aquifer at the proposed landfill unit was determined from the results of field slug test performed on selected piezometers. Piezometers were selected based on location, stratigraphic material, and accessibility. The tests were conducted during several events, coinciding with the water level monitoring. Prior to slug tests, wells were developed to remove residual mud and smear caused during drilling. Slug test were not performed on piezometers that did not develop low visual turbidity levels.

Hydraulic conductivity of soils in the unsaturated portion of the study area was determined by laboratory testing on Shelby tubes collected during drilling and discussed in Section 2.1.

4.4.1 Field Method

Several different field methods were used depending on the initial conditions of the piezometers. The appropriate field method was chosen based principally on the following two initial conditions:

1. Recharge rate of the well on which the test was being performed
2. Position of the static water on which the test was being performed

Static water level was measured prior to proceeding with the test in order to ensure that the most current static water level is used for data analysis. When the static water level was slightly above the top of the screen, water was added to the piezometer to create an initial head change, this method is referred to as “injection”. When the static water level was within the screened section or the distance between the static water level and the top of the screened section was significant, a pump was used to withdraw water; this method is referred to as “pump”. The “pump” method is employed by a submersible pump small enough to fit into a 2-inch diameter well. The equipment used to withdraw water was selected based on the rate of recharge: a low-yield portable pump was used when the recharge rate was relatively low, and a high-yield pump was used for a piezometer with a high recharge rate. When a piezometer yielded a high recharge rate, in which a significant draw down would not occur with the “pump” method, a solid slug was used. The solid slug was inserted into the piezometer, once static water level was achieved, the rapid removal of the slug followed causing water level displacement. This method is referred to as “slug”.

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 a overestimation of hydraulic conductivity due to the highly permeable nature of the sand pack column.[5]

An electronic data logger with a built-in pressure transducer recording real-time data* was used in each method to record the water level rebound. The collected rebound data was subsequently analyzed per the Bouwer & Rice mathematical model to determine the K value. The following section provides an overview of the Bouwer & Rice method and other relevant formulas used in the calculation of the hydraulic conductivity of the aquifer material in the study area. It should be noted that the Bouwer & Rice method in theory allows either an addition of water to, or a withdrawal of water from a piezometer without significantly affecting the resulting *K* value.

4.4.2 Bouwer & Rice Method

The Bouwer & Rice method can be performed either on open boreholes or on screened wells. The wells can be partially screened, perforated, or otherwise open. The slug test can be based on quickly withdrawing a volume of water from the well and measuring the subsequent rate of water level rise in the well or by adding a slug of water and measuring the subsequent rate of water level fall in the well. This method was originally developed for unconfined aquifers, but can also be used for confined or stratified aquifers if the top of the screen is some distance below the upper confining layer.[4] The governing equation of the Bouwer & Rice method is:

$$K = \frac{r_c^2 \ln(R_e / r_w)}{2L_e} \frac{1}{t} \ln\left(\frac{H_o}{H_t}\right) \tag{3}$$

where

K is the hydraulic conductivity (ft/sec)

r_c is the radius of the well casing (ft)

r_w is the radius of the gravel envelope

R_e is the effective radial distance over which the head is dissipated (ft)

L_e is the length of the screen or open section of the well through which water can enter (ft)

Note that the height of the initial water column becomes L_e when the initial water table is below the top of the perforated section. The effective radial distance is also the distance from the well over which the average

* In-Situ® miniTROLL data logger, In-Situ, Inc., 210 S Third Street, Laramin, WY 82070.

value of *K* is being measured. If the water level rises in the screen or open section of the well with a gravel or sand pack around it, the thickness and the porosity of the gravel/sand pack column should be taken into account by replacing the original r_c with the modified r_c which is defined by following equation:

$$\text{modified } r_c = \sqrt{(1-n)r_c^2 + nr_w^2} \tag{4}$$

where *n* is the porosity of the gravel/sand pack assumed to be 30%. This does not apply if the water level stays above the top of the gravel/sand pack column during the entire recovery period. The ratio $ln(R_e/r_w)$ in Equation (3) can be replace by either of the following equations:

$$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{A + B\cdot\ln[(h-L_w)/r_w]}{L_e/r_w}\right]^{-1} \text{ for } L_w < h \tag{5}$$

$$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1} \text{ for } L_w = h \tag{6}$$

where

L_w is the distance between the static water level and the bottom of the well screen (ft)

h is the height of the aquifer (ft)

The term $ln[(h - L_w)/r_w]$ in Equation (5) has the effective upper limit of 6 (unitless) and should be replaced with 6 if *h* is considered infinity.[4] The parameters A, B and C are dimensionless numbers that can be plotted as functions of L_e/r_w. These three parameters are sometimes referred to as the *shape factors* owing to the fact that they are solely dependent on the geometry of the well on which the slug test is performed. The relationships between the shape factors and L_e/r_w, as referred to as the *shape curves*, are empirically derived and provided in Figure C-1. The following formulas are mathematical approximations of the shape curves developed via regression analysis by DeBisschop.[9]

$$A = \begin{cases} 1.638445671 + 0.166908063X + 0.000740459e^{6.1710528X - 1.054747686X^2} & (X < 2.554422663) \quad (7) \\ 11.00393028 - 170.7752217e^{-1.509639982X} & (X \geq 2.554422663) \quad (8) \end{cases}$$

$$B = \begin{cases} 0.174811819 + 0.060059188X + 0.007965502e^{2.05337686X - 0.007790328X^2} & (X < 2.596774459) \quad (9) \\ 4.133124586 - 93.06136936e^{-1.43537099X} & (X \geq 2.596774459) \quad (10) \end{cases}$$

$$C = \begin{cases} 0.074711376 + 1.083958569X + 0.00557352e^{2.929493814X - 0.001028433X^2} & (X < 2.200426117) \quad (11) \\ 15.66887372 - 178.4329289e^{-1.322779744X} & (X \geq 2.200426117) \quad (12) \end{cases}$$

In some cases, the plot of head versus time yields a curve with multiple straight-line segments. Such a case occurs when the water in the gravel pack drains rapidly into the well,[4] or a partially submerged screen becomes resubmerged during the recovery period.[3] Thus, data gathered under such conditions should be properly interpreted in order to derive a *K* value that truly represents the formation of interest.

4.4.3 Slug Test Results

The hydraulic conductivity of the saturated portion of the study area, as determined in-situ with slug tests, ranges from a low of 4.03 x 10^{-5} cm/sec to a high of 5.00 x 10^{-3} cm/sec with an average of 9.35 x 10^{-4} cm/sec. Average hydraulic conductivity per lithological unit is summarized on table C-1. Silty Sand/Sandy Silt soils had an average hydraulic conductivity of 6.19 x 10^{-4} cm/sec, Clayey Sand/Sandy Clay of 1.18 x 10^{-3} cm/sec, and Gneiss of 3.58 x 10^{-4} cm/sec.

Hydraulic conductivities on the unsaturated portion of the study area, as determined by Laboratory analysis, were an order of 100 magnitude lower than measured in-situ. Laboratory hydraulic conductivity ranged from a low of 2.7 x 10^{-7} cm/sec to a high of 2.7 10^{-5} cm/sec.

In-situ measured hydraulic conductivities fall within the published ranges.

Publish Hydraulic Conductivity Ranges:

Material	(K) Range	Source
Silty Sands (SM)	10^{-3} – 10^{-5}	Fetter [11]
Silty Sand (SM)	10^{-1} – 10^{-5}	Freeze [14]
Fractured Igneous and Metamorphic Rock	10^{-2} – 10^{-6}	Freeze [14]

Results of the field slug tests and summary statistics of hydraulic conductivity (K) 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. Results of hydraulic conductivity calculated by laboratory analysis are summarized in Appendix B on Table B-1.

5 HYDROLOGY

5.1 Potable Sources

The area within a 2-mile perimeter of the site is a mixed density of rural agriculture, residential, and industrial. The majority of the area relies on community wells and municipal water for there drinking water. Interviews with surrounding property owners were conducted during the Design Hydrogeological Study,[27] five (5) residences were identified as relying on a private well. The nearest private well is located approximately 700

feet north of the study area. The nearest community well is located north of the facility at Twin Oaks Golf Club. Refer to the Regional Characterization Study 2-Mile Perimeter Map from the Site Study[29] and Locations of Residences Interviewed for Water Use Survey[27] for locations of the water supply wells.

5.2 Regional Hydrology

Iredell County is located in the Catawba Drainage Basin to the west and the Yadkin River Basin to the east. Drainage in the Statesville area is eastward along Third and Fourth Creeks. Third and Fourth creeks converge and enter the south Yadkin river on the Davie/Rowan county boarder. The South Yadkin river flows southeast and becomes part of the Yadkin river at the Davie/Rowan/Davidson county boarders.

Regionally the landfill is in the Piedmont groundwater region of the United States.[17] This area typically has the characteristics of two hydrogeological units, the fractured crystalline bedrock and the overlying regolith comprising all the unconsolidated sediments/saprolitic soils. The bedrock inherently has low porosity and permeability due to the crystalline nature of the rock having small, disconnected pore spaces; therefore, interconnected joints, fractures, and faults are the primary means of water transport through the bedrock. The water bearing capacity for the regolith relies on the pore space between grains, storing most of the groundwater due to its high porosity and permeability. The two units are interconnected hydrogeologicaly through the fractures and faults of the bedrock.

Recharge occurs in upland regions between creeks and drainage ravines through the infiltration of precipitation into the unsaturated regolith. Discharge occurs through surface seepage base flow into creeks. Infiltration occurs when precipitation reaches the land surface and penetrates the unsaturated soil. Water then moves laterally and downward through a temporarily saturated zone. Ultimately, water will move to the water table and be transported to the point of discharge.[17] It is possible for the top portion of the water table to be recharged from both precipitation and the underlying fractured bedrock. This occurs when the deeper part of the aquifer has greater hydraulic potential. The facility geology is conductive to this flow condition; the discharge zone within close proximity lowers the hydraulic potential of the aquifer towards areas of discharge, creating hydraulic gradient in the direction of the deeper to shallower portions of the aquifer.[27]

5.3 Local Groundwater Regime

Locally the several small unnamed creeks, which are responsible for surficial drainage, are the most influential features affecting groundwater. Groundwater encountered in the uppermost aquifer occurs in the unconsolidated regolith and varies in depth from 5 to 37 feet below ground surface, which is topographically dependent on the proximity to the unnamed creeks. A single day potentiometeric map with flow directions for the uppermost aquifer is shown on Plate 3, and was created based on groundwater readings collected on September 16, 2005. Groundwater flows northwest to southeast across the study area. Recharge of

groundwater occurs in the northwest of the study area. Discharge is into the ephemeral creek located on the western side of the study area and the unnamed tributary of Forth creek which flows south of the study area.

5.3.1 Groundwater Flow Components

A single day potentiometeric map with flow directions for the uppermost aquifer is shown on Plate 3 and was created based groundwater readings collected on September 16, 2005. The flow directions were used to calculate the average linear velocity defined as:

$$v_x = \frac{Q}{n_e} = \frac{K}{n_e}\frac{dh}{dl} \tag{13}$$

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 hydraulic gradient was calculated graphically by first drawing a line from each piezometer location to a perpendicular of the equipotential line. The elevations of the hydraulic head (*dh*) were calculated by subtracting the equipotential elevations from the groundwater elevation for the corresponding piezometer. The lateral distance (*dl*) is the horizontal length of the line. Calculation of the hydraulic gradient at a given piezometer location was determined by dividing *dh* by *dl*. Table 2 shows the results of the flow rate calculations in units of feet per year and the parameters used in the calculations. Velocities range from a low of 2.73 ft/yr at P4-9 to a high of 915.86 ft/yr at P4-14. Average velocity for sandy silt/silty sandy is 37.1 ft/yr and for sandy clay/clayey sand is 230.4 ft/yr.

5.3.2 Vertical Flow Components

Vertical hydraulic gradients in clustered wells were calculated using the EPA Vertical Gradient with Well Screen Effects Calculator.[12] Calculated vertical flow components are shown on Table 3. An average downward gradient was observed in cluster wells P4-1S/P4-1D, P4-8S/P4-8D, P4-13S/P4-13D, and MW-19S/MW-19D. An average upward gradient was observed in cluster wells P4-7S/P4-7D, P-9S/P-9D, and MW-21S/MW-21D. As expected the discharge is seen primarily in the clustered wells located within close proximity to the creeks; while recharge is occurring northwest of the study area. Recharge/discharge features are expressed in cross-sections shown on Plate 8A and Plate 8B.

5.4 Water Quality

Iredell County MSW and C&D landfills are currently under water quality monitoring. Baseline and subsequent water quality samples have indicated groundwater in the area contains naturally occurring metals: barium, beryllium, chromium, cobalt, lead, vanadium, and zinc. Their concentrations regularly fluctuate within or exceed North Carolina Groundwater Standards. Bariums concentrations have been noticeably high in past samples and similar water chemistry will probably occur in future water analysis.[27]

After monitoring well instillation, metals concentrations increased sharply, due to alteration of groundwater chemistry caused by drilling activities and/or the excavation of ground surface. This altered chemistry may carry over the first semi-annual sampling events, as seen in past landfill construction activities. Detection of carbon disulfide is also common in groundwater sampling, as has been observed in other MSWLF's across the state. Carbon disulfide is produced naturally as a result of microorganism activity, vegetation, forest and grass fires, as well as volcanism.[11] Carbon disulfide is also a commonly detected constituent at municipal solid waste landfills; therefore, intermittent detections may occur even without landfill leakage.

Overall, the water of Iredell County is of good chemical quality, the highly silicious rock is relatively insoluble in pure water, not permitting mineral content from the rock to leach into the groundwater system. Low levels of dissolved material are also intermittently detected.[23] Occasional exceedances of organics and metals do occur at random.

Both the surface and groundwater have potential threats of contamination. Runoff from the warehouse facilities and the adjacent landfill, along with potential breaks in the sewer line along the tributary of the Fourth Creek are potential sources of contamination of surface water.

5.5 Leachate Impoundment

The existing leachate lagoon is located east of Phase 2; it currently collects leachate from Phases 1-3 and will also be utilized for Phase 4. A sump will be installed at the lowest elevation within the phase limit located near abandoned well P-6. The sump will pump the leachate up though a series of pipes running along the waste boundary and connect to the force main on the east side of the Phase 3 unit where it will transport through the existing pipes to the leachate lagoon.

Groundwater in the area of the leachate lagoon generally flows northeasterly, with the bottom elevation approximately 790 feet above Mean Sea Level. There is usually about one foot in depth of collected leachate in the lagoon with minor fluctuations. 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 4 leachate will 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. Iredell County receives approximately 46 inches of precipitation annually. The precipitation received by the Statesville area is distributed relatively evenly over the year. Roughly 72% of the precipitation is returned to the atmosphere through the process of evapotranspiration, while another 20% recharges groundwater systems.

Two climate stations, one located in Statesville, North Carolina and the other in Mocksville 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)[33]. The Statesville climate station, its COOP ID *Statesville 2 NNE*, is located on the northern side of the City of Statesville. The Mocksville climate station, *Mocksville 5 SE* is located 20 miles east of the Statesville station. Both stations provided records from 1960 up to most recent time of data retrieval.

5.6.2 Statesville

Data collected from the Statesville station is consistent with the regional data having annual precipitation ranging from forty to fifty inches; a high of 63 inches was reached in 2003, and a low of 27 inches was reached in 1986. Table D-2 lists the 365-day averages based on data collected and averaged throughout the year. Graph D-3 illustrates the variability from year to year since the early sixties, clearly showing the drought that began late in 1998 and lasted into the early part of 2003.

Monthly totals, listed in Table D-1, are obtained by averaging the daily totals. The precipitation is relatively consistent from month to month, receiving the most precipitation in June and the least in November, on average. Statesville averages around 3.7 inches of rain per month, as shown in Table D-3. Graph D-4 shows the 30-Day total precipitation with noticeably small seasonal fluctuations.

5.6.3 Mocksville

Data collected from the Mocksville station is consistent with the regional data averaging between forty and fifty inches of precipitation per year. Table D-5 lists the annual averages with corresponding Graph D-6; the data is consistent with the Statesville station. The lowest year of precipitation occurred in 2001 with only 27 inches, the high occurred in 2003 with 64 inches.

Monthly totals, obtained by averaging daily totals are listed in Table D-4. Mocksville averages about 3.7 inches per month, receiving its maximum precipitation in March and its minimum in November. Minimal fluctuation is present between the weeks, months and seasons.

5.6.4 Effect of Precipitation on Aquifer

Precipitation is the principal source of groundwater recharge. The amount of precipitation recharging groundwater depends upon the infiltration capacity of the overlying soil, which is in turn controlled by such parameters as moisture content, compaction level, ground surface slope, and vegetation. In the event of continuous rainfall, the infiltration capacity of the soil will diminish with time and reach the equilibrium infiltration capacity.[14] This means the soil can no longer hold water, additional precipitation forms surface water or runoff. Precipitation, either directly or indirectly, accounts for the majority of aquifer recharge; additionally, precipitation causes several other events that are noted below.

During the summer months the levels of evapotranspiration and vegetation consumption increase with the increased temperature, decreasing the percentage of water able to recharge groundwater. A linear decline of the water table, even though major rainfall events occur, is common during summer months. In the absence of plant uptake of infiltrated water, the effect of precipitation on the fluctuation of a water table becomes visible to a varying degree, depending upon the depth of the water table and the conductivity of the soil in the unsaturated zone.

Abnormally large rise in water level is commonly noticed as a result of a heavy rainstorm, this in part is due to air entrapment within the saturated zone.[14] Air entrapment occurs when an inverted zone of saturation is created at the ground surface and the advancing wet front traps air between itself and the water table. Air pressures in this zone build up to values much higher than atmospheric.[14] This rise in water level is limited in the relation to recharge. Data collected during these events would result in a higher than actual ground water level. These anomalous rises usually dissipate within a few hours.[14]

5.7 Water Table Fluctuation

5.7.1 Study Area Piezometer

Water level data from the 28-study area wells was collected over the course of January 2003 – March 2006, 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. Seasonal high and observed low water table
5. Observed fluctuation.
6. Estimated long-term seasonal high water table as described in section 5.8

To visualize the fluctuation trends of the water table, the collected water level data was statistically pooled into a singular parameter referred to in this report as *Relative Fluctuation Index* (RFI). The RFI ranges between 0 and 1, and is define by:

$$RFI_i = \frac{1}{N_i} \sum_j \frac{h_{ij} - h_{\min}^j}{(h_{ij} - h_{\min}^j)_{\max}^j} \tag{14}$$

where

RFI_i is the RFI for measured event i

N_i is the number of wells measured during measurement event i (dimensionless)

h_{ij} is the hydraulic head in well j on measured event i (feet)

$h_{\min}^j$ is the lowest recorded hydraulic head of all measurement events in well j (feet)

$(h_{ij} - h_{\max}^j)_{\max}^j$ is the highest value of $h_{ij} - h_{\min}^j$ for well j (feet)

The RFI represents an overall water table elevation normalized to the highest score over the subject period, such that the value equal or closest to one (1) is associated with the date of the highest water table, while the value equal or closest to zero (0) is associated with the date of the lowest water table. The RFI plotted with respect to dates is displayed in Appendix D on Graph D-1. Graph D-1 illustrates the general trend of "spring high" and "fall low".

Water levels data collected from study area wells which were retained from the Phase 3 Design Hydrogeologic Study P-4, P-9S, P-9D, MW-19S (converted from P-16S), MW-21D (converted from P-15D), and, MW-21S (converted from P-15S) were compared with levels collected during this Phase 4 Design Hydrogeologic Study. Observed water levels and fluctuations were similar in both studies.

5.8 Seasonal High Groundwater Elevations

5.8.1 Seasonal High Groundwater

Groundwater levels for this design study were collected on a roughly monthly basis from January 2005 until March 2006.

The average annual precipitation received at the Mocksville station, from 1960-2005, was 45.11 ± 7.54 inches, with rainfall of 39.42 inches in 2005. The average rainfall received at the Statesville station, from 1960-2005, was 45.53 ± 6.85 inches, with rainfall of 43.04 inches in 2005.

Observed seasonal high groundwater levels in study piezometers, along with the average rain fall at Mocksville and Statesville climate stations indicates groundwater elevations collected during the Phase 4 Design Study are typical of a normal season. Several monitoring wells and a Phase 3 piezometer with a longer period of data on record observed seasonal highs in 2003. 2003 was shown to be an above average season with the climate stations Mocksville (64.02 in) and Statesville (62.73 in) showing significantly higher than average rainfall. The 2003 observed readings were used as seasonal high for a more conservative representation of seasonal high. Seasonal highs were used to generate the seasonal high water table map on Plate 4A.

5.8.2 Estimation of Long Term Seasonal High

In order to comply with rule .1624 (b)(4), the minimum 4 foot vertical separation requirement is based on the estimated long-term season high data. 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.

Long-term seasonal high water levels were estimated based on local characterization of the facility, readings collected from Phase 3 piezometers, Phase 4 piezometers and monitoring wells, precipitation data, topographical location of wells and fluctuation patterns of wells. The method incorporates a sufficient "margin of error" to account for varying levels of uncertainty. Long-term seasonal high is determined independently for each boring; initially, all well data is analyzed to establish the date on which the seasonal high occurred. The wells were then topographically analyzed and generally categorized; given that monitoring wells and Phase 3 piezometers have a longer period of data, they were used to determine general trends of the area. Graphs of fluctuation patterns are included in Appendix D.

The growing season is a primary factor in well fluctuation and the determination of the estimated long-term seasonal high. The majority of Phase 4 piezometers saw their seasonal high in February and March, which is associated with the local growing season. The growing season is typically considered "when the normal mean daily temperature rises above 50 to 55 degrees Fahrenheit."[31] Data from local climate stations Statesville and Mocksville was reviewed and it was determined that the average mean daily temperature exceeds 55 degrees in April. Local precipitation data collected from the Statesville and Mocksville stations was reviewed to identify trends associated with unusually high spring readings. The highest reading for the February-March-April period at the Statesville station occurred in 2003 with 21.69 inches and at Mocksville in 2003 with 21.94

inches. Unfortunately data was not collected in spring of 2003, which would have included the possible long-term seasonal high associated with the spring 2003 event. A correction factor must be applied to wells to account for this observed precipitation.

Recharge wells P-4 and MW-17 have similar fluctuation patterns and observed seasonal highs associated with the above average year of 2003. Their annual fluctuation (March 2005 through March 2006) is 2.77 feet and 2.40 feet, respectively. A correction factor of 3.0 feet, to represent conservative long-term seasonal high elevations, was applied to their observed seasonal high value, which occurred in 2003. Discharge wells, MW-18, MW-19S, MW-19D and MW-20 observed fairly consistent groundwater elevations, outside of extreme lows, however fluctuations related to seasonal elevations were not apparent, which is indicative of stream influences. Based on their close proximity of the stream their estimated long-term seasonal high is 2.00 feet below their respective ground surface. Transition wells P-9S, P-9D, MW-21S, and MW-21D for the most part have observed similar fluctuations. MW-21S and MW-21D observed their highest reading in July of 2003 and they have an annual fluctuation (March 2005 through March 2006) of approximately 2.5 feet. The annual fluctuation was applied as a correction factor to the observed seasonal high occurring in July of 2003. This long-term seasonal high value is approximately 4.0 feet below the February 1, 2006 seasonal high, this value was applied to the February 1, 2006 seasonal high of P-9S and P-9D for the conservative long-term seasonal high.

The initial estimates for long-term seasonal high were used to correlate the estimated long-term seasonal high values for the Phase 4 piezometers. P4-1S, P4-1D, and P4-2, topographically are associated with recharge wells, and typically have similar fluctuation patterns. The slight variation in fluctuation patterns might be influenced by their proximity to the paved road. P4-1S and P4-1D elevations average 4.0 feet above P-4 and MW-17, while P4-2 is on average 6.3 feet below P-4 and MW-17. Correction factors of 4.0 feet and 6.3 feet were applied to their respective seasonal highs for the estimated long-term seasonal high. Piezometers P4-3, P4-4, P4-5, P4-6, P4-7D, P4-8S, P4-8D, P4-9, P4-10, P4-11, P4-12, P4-13S, P4-13D, and P4-14 fluctuation patterns and topographical location show characteristics associated with transition wells. Estimated long-term seasonal high elevations in transition wells P-9S and MW-21S are on average 4.14 feet below the spring 2006 readings. This average value was applied as the correction factor to Phase 4 transition piezometers for the estimated long-term seasonal high elevations. Piezometer P4-7S, observed unique fluctuation not indicative on the typical spring high/fall lows. This unique fluctuation is most likely attributed to creek influences, as with the other discharge wells, estimated long-term seasonal high of 2.00 feet below ground surface.

Estimated long-term seasonal highs were used to create a potentiometric surface as shown on Plate 4B. Lon-term seasonal high generated from the Phase 3 Hydrogeological design was incorporated onto Plate 4B to

provide a uniform representation of the long-term seasonal high potentiometric surface. Phase 4 estimated long-term seasonal high correspond with the long-term seasonal high generated during the Phase 3 Hydrogeologic Design Study. The potentiometric surface shows a similar flow trend to the single day groundwater flow (Plate 3). Estimated long-term seasonal high groundwater was used for engineering purposes to develop final subgrade depths and to ensure compliance with the 4-foot separation and was included in the Permit to Construct.[26] Various cross sections depicting this separation and the subsurface conditions are included as Plate 8A, and Plate 8B.

6 GROUNDWATER QUALITY MONITORING SYSTEM

6.1 Introduction

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 Ground and Surface Water Sampling and Analysis Plan is included as Appendix E. This section is a summary of that proposed plan.

Groundwater in the proposed Phase 4 area generally flows southeast towards the tributary of Fourth Creek. A small stream feeding this tributary is located within the 300 foot buffer on the West side of Phase 4; however, little interaction is expected from this stream. The tributary of Fourth Creek serves as a major zone of discharge for the majority of the Phase 4 as well as Phase 3; in the unlikely event of a leak it would be reflected in the water quality of the tributary. The monitoring plan consists of eleven (11) monitoring wells numbered MW-17, MW-18, MW-19D, MW-19SR, MW-20, MW-21D, MW-21S, MW-27D, MW-27S, MW-28 and MW-29 one (1) surface water monitoring point numbered SW-5, and one (1) leachate collection point referred to as FORCEMAIN. Four (4) monitoring wells, MW-27D, MW-27S, MW-28 and MW-29, have recently been incorporated into the monitoring plan for inclusion of Phase 4.

6.2 Review/Compliance Boundaries

The proposed compliance boundary is 250 feet from the waste limit with a 125 feet review boundary surrounding the majority of Phase 4, designed based on hydrologic and geologic features. On the southernmost border adjacent to the Phase 3 unit, the tributary to Fourth Creek exists affecting the direction of groundwater flow; requiring a more stringent compliance boundary of 50 feet from the center of the tributary, in accordance with Solid Waste Rule .0503(2)(f)(iii). Proposed compliance and review boundaries are shown on Plate 2.

6.3 Groundwater Monitoring Well

Four monitoring wells (MW-27S, MW-27D, MW-28 and MW-29) will be converted from piezometers, the monitoring wells from the Phase 3 (MW-17, MW-18, MW-19-SR, MW-19D, MW-20, MW-21S, and MW-21D) will continue to be utilized.

MW-27S and MW-27D, currently piezometers P-13S and P-13D, are located approximately 95 feet from the waste limit. These down gradient wells will intercept the majority of groundwater that does not pass into the jurisdiction of the Phase 3 monitoring wells. They will also be responsible for monitoring the sump area for any possible leaks. MW-27S straddles the water table with its screened section, allowing for significant seasonal fluctuation. MW-27D is screened on top of rock to monitor for deep contamination traveling along the top of rock of the observed basin feature.

MW-28, currently piezometer P4-11, is located at the compliance boundary west of the waste limit. It will serve as a down gradient compliance well to intercept the groundwater flowing south, and detect changes in the small, unnamed stream.

MW-29, currently piezometer P4-12, is located approximately 200 feet southwest from the waste limit. Established as a down gradient review well it will monitor groundwater flow between MW-28 and MW-27S/MW-27D.

The aforementioned monitoring wells will efficiently monitor the groundwater traveling throughout the Phase 4 unit, ensuring early detection should a leak occur. All proposed monitoring is conducted in accordance with North Carolina Well Construction Standards (NCAC 15A 2C). Plate B illustrates a typical monitoring well schematic.

Monitoring wells will be tagged, labeled, locked with vented caps, and have their locations surveyed. Testing will be done in accordance with and using the methods set forth in North Carolina regulations for subtitle D landfills. All wells will be tested semiannually for the Appendix I chemical constituents. Proposed monitoring well specifications are provided in Table 6.

6.4 Leachate Monitoring

Due to the fact the existing leachate lagoon will be utilized by the proposed Phase 4 unit, the wells currently used for monitoring, MW-7 and MW-8, will continue with their intended use. Leachate from existing Phase 1 and 2 areas is currently sampled from the inflow pipe at the lagoon. Phase 3 and 4 leachate will be sampled from the riser pipe located immediately down gradient of the Phase 3 sump, west of the stream. This is the

location Phase 3 is currently sampled from and is referred to as FORCEMAIN. All collected leachate samples are tested for biochemical oxygen demand (BOD), chemical oxygen demand (COD), phosphorus, sulfate, nitrate, nitrite, and pH, in addition to the Appendix I constituents.

6.5 Surface Water Monitoring

Surface water monitoring is conducted to catch potential discharge of leachate from the MSWLF into the creeks. The previously established monitoring point SW-5 will be sufficient, since the tributary of Fourth Creek is the only known surface water in contact with the groundwater migrating from the landfill area. SW-5 is located downstream from the junction of the tributary and the stream. This location intercepts both the water from upstream of the tributary and the unnamed stream west of the property. A down stream surface water sample is collected as part of the Phase 1 and Phase 2 sampling and is designated SW-1. The surface water sampling is conducted semiannually and tested for the Appendix I chemical constituents, as well. Its location is provided on Plate A.

6.6 Summary

In summary the following actions are proposed to provide groundwater, surface water, and leachate monitoring for the Phase 4 unit of the Iredell County Subtitle D Landfill.

1. Convert four piezometers to monitoring wells (MW-27S/D, MW-28 and MW-29)
2. Continue use of Phase 3 monitoring wells.
3. Use existing surface water monitoring point SW-5.
4. MW-27S/D will monitor sump area.

7 CLOSURE

This report completes the requirements for the geological and hydrological features for the Design Hydrogeologic Report for the proposed Iredell County Subtitle D Landfill, Phase 4 as described in rule 15A NCAC 13B .1623 (b). Geological and hydrological data, information, and conclusions contained herein indicate no hindrance to the development and monitoring of the described Phase 4. The ground and surface water-monitoring plan is designed to be effective in the early detection of any possible release of any possible release of hazardous constituents from the Iredell County Phase 4 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 piezometers to be abandoned are:

P4-1D, P4-1S, P4-2, P4-3, P4-4, P4-5, P4-6, P4-7D, P4-7S, P4-8D, P4-8S, P4-9, P4-10, P4-14, P-6, P-9D, and P-9S.

Respectfully submitted,

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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] Committee on Fracture Characterization and Fluid Flow, U.S.National Committee for Rock Mechanics, Geotechnical Board, Board on Energy and Environmental Systems, Commission on Engineering and Technical Systems, and National Research Council, 1996, Rock fracture and fluid flow - contemporary understanding and applications: National Academy Press, Washington, D.C., p. 201.

[7] Daniel, C.C., and Dahlen, P.R., 2002, Preliminary Hydrogeologic Assessment and study plan for a Regional Groundwater Resource Investigation of the Blue Ridge and Piedmont Physiographic provinces of North Carolina, U.S. Geological Survey Water-Resources Investigations Report 02-4105.

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

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

[10] Domenico, P.A., and Schwartz, F.W., 1997, Physical and chemical hydrogeology: John Wiley & Sons,

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

[12] 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

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

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

[15] Goldsmith, R., Milton, D.J. and Horton, J. W., Jr., 1988 Geologic map of Charlotte 1° x 2° quadrangle, North Carolina: U.S. Geologic Survey Miscellaneous Investigations Series, Map I-1251-E Scale 1:250,000, one sheet plus text.

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

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

[18] Horton, J.W, Jr., McConnell, K.I., 1991, The Western Piedmont, in Horton, J.W., Jr., and Zullo, V.A., eds., The Geology of the Carolinas: The University of Tennessee Press, p. 59-78.

[19] Howe, S. S., and Breton, P.L., 1998, Water resource data, North Carolina, water year 1998, vol.2 groundwater records: U.S.Geological Survey Water-Data Report NC-97-2.

[20] Howe, S. S., and Breton, P.L., 1999, Water resource data, North Carolina, water year 1999, vol.2 groundwater records: U.S.Geological Survey Water-Data Report NC-98-2.

[21] 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.

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

[23] LeGrand, H.E., 1954, Geology and ground water in the Statesville area, North Carolina: Raleigh, North Carolina Department of Conservation and Development, Division of Mineral Resources, Bulletin 68, 68 p.

[24] Mackay, D.M., and Cherry, J.A., 1989, Groundwater contamination: pump-and-treat remediation: Environmental Sciences & Technology, v. 23, n. 6, American Chemical Society.

[25] Michie, J., 1985, Geology of the Northern Kings Mountain Belt in Catawba and Iredell Counties, North Carolina [M.S.Thesis]: Texas A&M College Station, Texas.

[26] Municipal Engineering Services Company, P.A, 2006. MSWLF Facility Permit to Construct Phase 4, Iredell County, Statesville North Carolina.

[27] Municipal Engineering Services Company, P.A, 2001. MSWLF Design Hydrogeologic Study, Iredell County Subtitle D Landfill, Phase 3, Statesville North Carolina.

[28] Municipal Engineering Services Company, P.A., 2000, Site Hydrogeologic Study Iredell County Subtitle D Landfill, Iredell County, North Carolina.

[29] Municipal Engineering Services Company, P.A., 2000, MSWLF Facility Site Study, Iredell County Subtitle D Landfill, Iredell County, North Carolina.

[30] Municipal Engineering Services Company, P.A, 2004. MSWLF Site Hydrogeologic Study, C&D Phase 2&3, Iredell County, Statesville North Carolina.

[31] Schroeder, P.R., Aziz, N.M., Lloyd, C.M. and Zappi, P.A., 1994, The Hydrologic Evaluation of Landfill Performance (HELP) Model: User's Guide for Version 3, EPA/600/R-94/168a, September 1994, U.S. Environmental Protection Agency Office of Research and Development, Washington, DC.

[32] Singhal, B.B.S., and Gupta, R.P., 1999, Applied hydrogeology of fractured rocks: Kluwer Academic Publishers, Norwell, MA, 400 p.

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

[34] 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.

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

Table 1: Groundwater elevation summary

Name	Date Installed	Date Surveyed	Ground	Datum	Northing	Easting	Well Depth	Completion Depth	Top of Rock	Time of Boring	24 Hours After	7 Days After
P4-1D	12/30/2004	01/14/2005	842.29	844.99	740970.6270	1454876.5378	48.21	794.08	-	811.72	823.12	823.00
P4-1S	12/30/2004	01/14/2005	841.68	844.53	740965.5433	1454879.5152	27.13	814.55	-	825.96	823.11	823.19
P4-2	12/20/2004	01/14/2005	849.59	852.24	740879.5597	1455528.6878	40.78	808.81	-	811.65	811.65	811.64
P4-3	12/20/2004	01/14/2005	846.54	849.35	740689.5103	1455281.1347	47.33	799.21	770.54	-	814.74	814.88
P4-4	12/27/2004	01/14/2005	828.80	831.41	740555.0711	1455469.4236	33.07	795.73	-	809.14	809.19	809.06
P4-5	12/22/2004	01/14/2005	838.66	841.07	740581.7274	1455119.3884	35.96	802.7	-	815.47	815.77	815.47
P4-6	12/29/2004	01/14/2005	824.88	826.50	740544.6631	1454776.8560	20.24	804.64	-	816.80	816.69	816.46
P4-7D	12/30/2004	01/14/2005	816.60	819.00	740296.3219	1454796.4812	39.44	777.16	788.60	808.50	808.90	808.90
P4-7S	12/29/2004	01/14/2005	815.92	818.47	740296.4256	1454791.6952	17.05	798.87	-	808.55	808.92	808.85
P4-8D	12/29/2004	01/14/2005	836.88	839.82	740343.1466	1455252.2564	85.46	751.58	751.58	805.88	807.00	806.84
P4-8S	12/27/2004	01/14/2005	836.54	839.54	740338.0699	1455249.3485	40.45	796.09	-	805.38	807.18	807.24
P4-9	12/22/2004	01/14/2005	823.96	826.96	740205.7258	1455475.9453	30.42	793.54	-	801.02	798.04	797.96
P4-10	12/27/2004	01/14/2005	819.95	822.90	739976.7632	1455332.9683	28.45	791.5	-	799.19	799.21	799.65
P4-11	12/27/2004	04/14/2005	807.49	810.17	739909.1137	1454801.6825	12.42	795.09	795.09	802.86	803.01	802.80
P4-12	12/27/2004	01/14/2005	805.89	808.30	739760.6473	1455042.9925	17.68	788.21	-	799.30	799.39	799.07
P4-13D	01/03/2005	01/14/2005	803.75	806.60	739632.7528	1455481.2901	44.42	759.45	759.45	795.30	-	795.35
P4-13S	01/03/2005	01/14/2005	803.90	807.25	739636.7940	1455482.2598	20.09	783.81	-	795.43	-	795.36
P4-14	12/22/2004	01/14/2005	823.73	826.67	740220.8794	1455013.8652	26.19	797.54	-	805.01	804.98	805.09
P-4	11/04/1998	01/14/2005	837.21	839.25	740711.0736	1454861.3479	25.00	812.21	-	818.74	-	-
P-9D	02/09/2000	01/15/2005	823.46	826.05	739974.6378	1455015.1971	50.00	773.46	783.26	802.76	-	-
P-9S	01/26/2000	01/14/2005	823.45	825.99	739969.4824	1455019.5261	39.00	784.45	-	794.26	801.01	801.16
MW-17	05/09/2002	-	850.94	854.35	740839.9932	1455212.1876	45.00	805.94	-	-	-	-
MW-18	06/02/2000	-	796.09	800.72	739676.2175	1455843.9831	20.00	776.09	-	-	-	-
MW-19D	05/09/2002	-	793.26	795.81	740112.4245	1456381.3605	59.00	734.26	-	-	-	-
MW-19S	05/30/2000	-	792.32	793.59	740102.2779	1456383.4973	20.00	772.32	-	789.32	788.92	-
MW-20	06/02/2000	-	793.38	795.93	739852.8540	1456213.3906	20.00	773.38	-	-	-	-
MW-21D	06/17/2000	-	819.25	822.76	740700.7368	1456394.6656	138.25	681.00	704.25	789.25	790.96	-
MW-21S	06/02/2000	-	821.03	823.97	740701.9913	1456378.3929	41.00	780.03	-	790.53	790.33	-

NOTES: 1. All elevations are in units of feet above mean sea level.

Table 1: Groundwater elevation summary

Name	01/22/03	01/23/03	07/16/03	07/18/03	01/05/05	01/27/05	03/24/05	05/27/05	07/07/05	07/20/05	08/17/05	09/16/05	09/29/05	10/28/05
P4-1D	NA	NA	NA	NA	823.00	823.09	823.29	822.89	822.06	NA	821.84	821.46	819.98	820.10
P4-1S	NA	NA	NA	NA	823.19	823.22	823.46	822.97	822.01	NA	821.96	821.58	819.92	820.04
P4-2	NA	NA	NA	NA	811.70	811.55	812.12	812.60	812.31	NA	811.99	811.63	810.34	810.92
P4-3	NA	NA	NA	NA	814.93	814.67	815.33	815.71	815.13	NA	815.09	813.20	813.52	814.13
P4-4	NA	NA	NA	NA	809.31	809.13	807.44	809.49	808.99	NA	808.95	807.07	807.40	808.14
P4-5	NA	NA	NA	NA	815.82	815.64	NA	813.18	815.56	NA	815.32	812.83	813.70	814.42
P4-6	NA	NA	NA	NA	816.46	816.36	816.75	815.87	815.50	NA	815.72	814.78	813.74	815.26
P4-7D	NA	NA	NA	NA	808.90	808.84	809.35	808.74	808.30	NA	808.64	807.43	805.86	807.66
P4-7S	NA	NA	NA	NA	808.85	807.15	809.49	806.39	808.15	NA	808.49	807.32	805.70	807.53
P4-8D	NA	NA	NA	NA	806.84	806.80	805.62	807.38	807.06	NA	806.93	804.57	804.80	806.31
P4-8S	NA	NA	NA	NA	805.69	805.63	806.83	808.59	807.04	NA	807.52	805.13	806.12	806.84
P4-9	NA	NA	NA	NA	799.47	799.35	NA	801.33	800.61	NA	801.07	798.68	799.66	800.56
P4-10	NA	NA	NA	NA	797.13	797.11	797.10	795.89	798.48	NA	799.08	796.69	797.52	798.46
P4-11	NA	NA	NA	NA	802.82	802.78	803.00	802.39	802.07	NA	802.52	801.55	800.12	802.00
P4-12	NA	NA	NA	NA	799.10	798.99	799.22	798.62	NA	NA	798.85	797.98	796.79	798.19
P4-13D	NA	NA	NA	NA	795.45	795.30	795.71	794.98	795.00	NA	795.17	794.57	793.47	794.74
P4-13S	NA	NA	NA	NA	795.46	795.33	796.36	794.97	795.07	NA	795.20	794.34	793.45	794.76
P4-14	NA	NA	NA	NA	805.26	805.14	804.50	803.52	805.04	NA	805.04	802.65	803.44	804.72
P-4	819.45	NA	NA	NA	817.60	817.52	NA	816.42	818.20	818.15	817.95	817.54	816.22	817.46
P-9D	NA	NA	NA	NA	802.48	802.40	802.60	802.20	801.67	801.75	801.61	801.17	799.83	801.08
P-9S	801.90	NA	NA	NA	802.20	802.13	802.34	801.89	801.29	801.31	801.31	800.87	799.52	800.82
MW-17	817.22	NA	821.22	NA	816.93	816.47	816.70	817.18	819.10	819.04	818.60	818.23	816.80	817.38
MW-18	NA	791.81	792.52	NA	792.20	790.43	792.19	791.92	791.65	791.85	792.00	791.82	790.65	791.96
MW-19D	787.51	NA	NA	787.69	787.29	787.65	787.76	787.64	787.17	787.33	787.65	787.31	785.61	787.02
MW-19S	787.26	NA	NA	787.38	787.14	787.65	787.84	787.72	787.55	787.58	788.02	787.68	785.49	786.90
MW-20	NA	790.33	790.70	NA	790.05	789.82	790.00	789.60	790.19	789.70	790.13	789.43	788.17	789.58
MW-21D	791.79	NA	NA	792.78	790.57	791.58	791.94	791.53	791.01	790.86	790.78	790.20	789.19	790.24
MW-21S	790.30	NA	NA	791.83	790.34	788.08	788.51	788.10	789.76	789.79	789.67	789.09	788.06	789.10

Table 1: Groundwater elevation summary

Name	11/10/05	12/16/05	02/01/06	02/24/06	03/15/06	03/31/06	Seasonal High	Date Seasonal High Observed	Observed Low	Fluctuation	Correction Factor	Estimated Long-Term Seasonal High	Topographic Setting
P4-1D	819.88	821.28	821.35	822.55	822.45	822.35	823.29	03/24/2005	819.88	3.41	4	827.29	Recharge
P4-1S	819.72	821.11	821.18	822.70	822.60	822.28	823.46	03/24/2005	819.72	3.74	4	827.46	Recharge
P4-2	810.81	810.75	810.82	811.19	811.28	811.38	812.60	05/27/2005	810.34	2.26	6.3	818.90	Recharge
P4-3	814.06	814.05	814.75	814.79	814.85	814.82	815.71	05/27/2005	813.20	2.51	4.14	819.85	Transition
P4-4	808.25	808.24	809.63	809.64	809.29	809.19	809.64	02/24/2006	807.07	2.57	4.14	813.78	Transition
P4-5	814.37	814.35	815.55	815.80	815.82	815.87	815.87	03/31/2006	812.83	3.04	4.14	820.01	Transition
P4-6	815.20	815.46	816.41	816.19	816.17	816.19	816.75	03/24/2005	813.74	3.01	4.14	820.89	Transition
P4-7D	807.61	807.87	809.05	808.94	808.85	808.95	809.35	03/24/2005	805.86	3.49	4.14	813.49	Transition
P4-7S	807.44	807.70	808.98	808.83	808.73	808.88	809.49	03/24/2005	805.70	3.79	4.43	813.92	Discharge
P4-8D	806.17	806.45	807.53	807.83	807.80	807.41	807.83	02/24/2006	804.57	3.26	4.14	811.97	Transition
P4-8S	806.68	806.94	808.15	808.46	808.47	807.99	808.59	05/27/2005	805.13	3.46	4.14	812.73	Transition
P4-9	800.65	801.25	801.97	802.11	801.99	801.84	802.11	02/24/2006	798.68	3.43	4.14	806.25	Transition
P4-10	798.47	799.08	799.55	799.69	799.65	799.58	799.69	02/24/2006	795.89	3.80	4.14	803.83	Transition
P4-11	801.94	802.55	802.86	802.72	802.57	802.65	803.00	03/24/2005	800.12	2.88	4.14	807.14	Transition
P4-12	798.16	798.80	799.15	798.94	798.86	798.92	799.22	03/24/2005	796.79	2.43	4.14	803.36	Transition
P4-13D	794.58	795.23	795.56	795.25	795.11	795.07	795.71	03/24/2005	793.47	2.24	4.14	799.85	Transition
P4-13S	794.59	795.24	795.64	795.30	795.13	795.09	796.36	03/24/2005	793.45	2.91	4.14	800.50	Transition
P4-14	804.21	804.78	805.61	805.88	805.97	805.93	805.97	03/15/2006	802.65	3.32	4.14	810.11	Transition
P-4	817.43	818.13	818.99	818.94	818.84	818.96	819.45	01/22/2003	816.22	3.23	3	822.45	Recharge
P-9D	801.08	801.71	802.74	802.61	802.60	802.57	802.74	02/01/2006	799.83	2.91	4	806.74	Transition
P-9S	800.81	801.41	802.50	802.34	802.31	802.28	802.50	02/01/2006	799.52	2.98	4	806.50	Transition
MW-17	817.28	817.98	817.81	818.11	818.02	818.10	821.22	07/16/2003	816.47	4.75	3	824.22	Recharge
MW-18	791.72	792.29	792.28	792.13	792.07	792.05	792.52	07/16/2003	790.43	2.09	2.57	795.09	Discharge
MW-19D	786.81	787.37	787.92	787.56	787.38	787.35	787.92	02/01/2006	785.61	2.31	4.34	792.26	Discharge
MW-19S	786.75	787.31	790.14	787.55	787.32	787.29	790.14	02/01/2006	785.49	4.65	1.18	791.32	Discharge
MW-20	789.42	789.98	790.45	790.03	789.85	789.94	790.70	07/16/2003	788.17	2.53	1.68	792.38	Discharge
MW-21D	790.26	790.78	791.31	791.02	791.28	791.48	792.78	07/18/2003	789.19	3.59	2.50	795.28	Transition
MW-21S	789.10	789.65	790.16	789.89	790.24	790.46	791.83	07/18/2003	788.06	3.77	2.50	794.33	Transition

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
P4-1D	821.46	Deep wells not contoured				2.21E-4	7.5%	-	-	Clayey Sand
P4-1S	821.58	820.00	1.58	96.47	0.02	2.33E-4	22.3%	3.95	17.71	Silty Sand/Silty Clay
P4-2	811.63	810.00	1.63	56.81	0.03	1.18E-3	7.5%	35.03	467.06	Clayey Sand
P4-3	813.20	810.00	3.20	109.89	0.03	4.21E-4	7.5%	12.68	169.12	Clayey Sand
P4-4	807.07	805.00	2.07	82.84	0.02	4.03E-5	7.5%	1.04	13.89	Clayey Sand
P4-5	812.83	810.00	2.83	95.49	0.03	1.06E-4	7.5%	3.25	43.34	Clayey Sand
P4-6	814.78	810.00	4.78	152.89	0.03	7.46E-4	7.5%	24.13	321.75	Clayey Sand
P4-7D	807.43	Deep wells not contoured				4.33E-4	5.0%	-	-	Gneiss
P4-7S	807.32	805.00	2.32	111.01	0.02	3.58E-4	7.5%	7.74	103.21	Clayey Sand
P4-8D	804.57	Deep wells not contoured				1.26E-4	7.5%	-	-	Clayey Sand
P4-8S	805.13	800.00	5.13	198.48	0.03	5.26E-5	7.5%	1.63	21.77	Clayey Sand
P4-9	798.68	795.00	3.68	321.12	0.01	5.14E-5	22.3%	0.61	2.73	Sandy Silt
P4-10	796.69	795.00	1.69	226.82	0.01	5.77E-4	22.3%	4.45	19.95	Silty Sand
P4-11	801.55	Not Used				1.52E-3	22.3%	-	-	Silty Sand
P4-12	797.98	800.00	2.02	140.65	0.01	7.70E-4	22.3%	11.44	51.31	Silty Sand
P4-13D	794.57	Deep wells not contoured				4.67E-4	7.5%	-	-	Clayey Sand
P4-13S	794.34	795.00	0.66	82.72	0.01	5.62E-4	22.3%	4.64	20.80	Silty Sand
P4-14	802.65	800.00	2.65	199.58	0.01	5.00E-3	7.5%	68.69	915.86	Clayey Sand
P-4	817.54	815.00	2.54	114.01	0.02	4.51E-5	4.5%	1.04	23.10	Silt
P-9D	801.17	Deep wells not contoured				3.58E-4	5.0%	-	-	Gneiss
P9S	800.87	800.00	0.87	43.12	0.02	6.19E-4	22.3%	12.92	57.95	Sandy Silt
MW-17	818.23	815.00	3.23	94.91	0.03	6.19E-4	22.3%	21.80	97.74	Sandy Silt
MW-18	791.82	795.00	3.18	319.11	0.01	6.19E-4	22.3%	6.38	28.62	Sandy Silt
MW-19D	787.31	Deep wells not contoured				3.58E-4	5.0%	-	-	Gneiss
MW-19S	787.68	790.00	2.32	142.39	0.02	6.19E-4	22.3%	10.43	46.79	Sandy Silt
MW-20	789.43	790.00	0.57	59.18	0.01	6.19E-4	22.3%	6.17	27.66	Sandy Silt
MW-21D	790.20	Deep wells not contoured				4.51E-5	4.5%	-	-	Silt
MW-21S	789.09	790.00	0.91	51.34	0.02	3.58E-5	5.0%	0.66	13.13	Gneiss

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 piezometers 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.

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 in table B-3. The effective porosity for rock, which included mica schist and gneiss, was estimated at 5%, based on published values.

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. The average hydraulic conductivity are shown on Table C-1. Values for piezometers with the prefix P- were obtained from the design study.

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

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

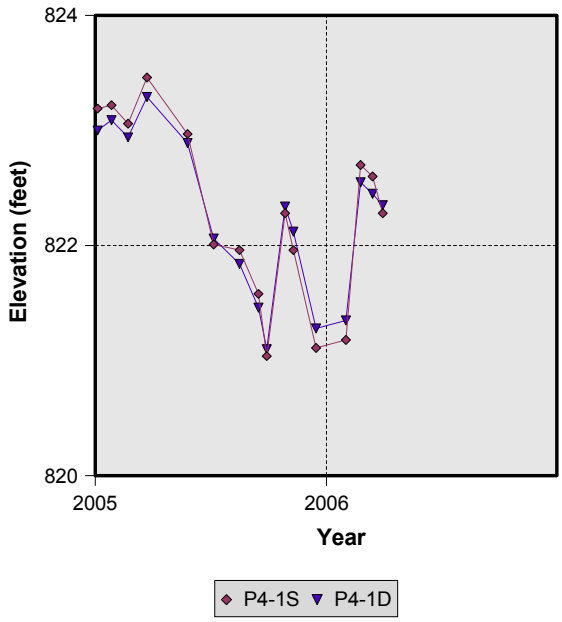
The average linear velocity, denoted by *v*, is defined by the equation:

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

6. Displayed flow direction are derived from the water level data taken on September 16, 2005.

Table 3: Vertical Flow Compontents

Date	P4-1S	P4-1D	dh
01/05/2005	823.19	823.00	-0.19
01/27/2005	823.22	823.09	-0.13
02/22/2005	823.06	822.94	-0.12
03/24/2005	823.46	823.29	-0.17
05/27/2005	822.97	822.89	-0.08
07/07/2005	822.01	822.06	0.05
08/17/2005	821.96	821.84	-0.12
09/16/2005	821.58	821.46	-0.12
09/29/2005	821.04	821.10	0.06
10/28/2005	822.28	822.34	0.06
11/10/2005	821.96	822.12	0.16
12/16/2005	821.11	821.28	0.17
02/01/2006	821.18	821.35	0.17
02/24/2006	822.70	822.55	-0.15
03/15/2006	822.60	822.45	-0.15
03/31/2006	822.28	822.35	0.07
		Average	**-0.03**



Vertical Gradient with Well Screen Effects

WELL	DATUM ELEVATION	DEPTH TO WELL SCREEN (BELOW DATUM)	SCREEN LENGTH	GROUND WATER ELEVATION	DEPTH TO WATER (BELOW DATUM)
P4-1S	844.53	12.13	15	822.28	22.25
P4-1D	844.99	43.21	5	822.35	22.64

Distance	dl	MAGNITUDE dh/dl	FLOW DIRECTION
low-high	15.62	0.0045	Up
high-high	20.50	0.0034	Up
mid-point	20.56	0.0034	Up
low-low	20.62	0.0034	Up
high-low	25.50	0.0027	Up

high:high
mid-point
low:low
high:low
low:high

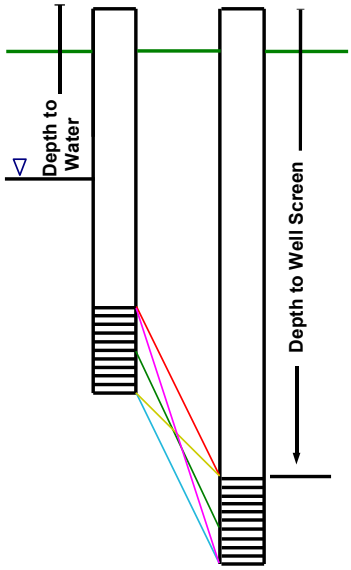
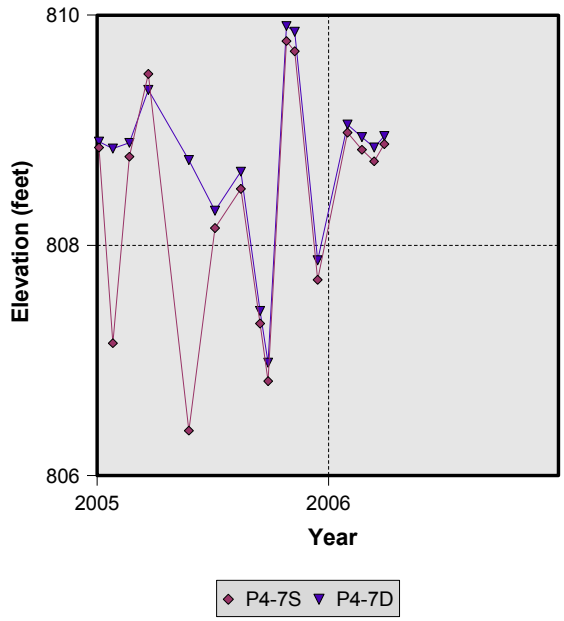


Table 3: Vertical Flow Compontents

Date	P4-7S	P4-7D	dh
01/05/2005	808.85	808.90	0.05
01/27/2005	807.15	808.84	1.69
02/22/2005	808.77	808.89	0.12
03/24/2005	809.49	809.35	-0.14
05/27/2005	806.39	808.74	2.35
07/07/2005	808.15	808.30	0.15
08/17/2005	808.49	808.64	0.15
09/16/2005	807.32	807.43	0.11
09/29/2005	806.82	806.98	0.16
10/28/2005	809.78	809.91	0.13
11/10/2005	809.69	809.86	0.17
12/16/2005	807.70	807.87	0.17
02/01/2006	808.98	809.05	0.07
02/24/2006	808.83	808.94	0.11
03/15/2006	808.73	808.85	0.12
03/31/2006	808.88	808.95	0.07
		Average	**0.34**



Vertical Gradient with Well Screen Effect

WELL	DATUM ELEVATION	DEPTH TO WELL SCREEN (BELOW DATUM)	SCREEN LENGTH	GROUND WATER ELEVATION	DEPTH TO WATER (BELOW DATUM)
P4-7S	818.47	7.05	10	808.88	9.59
P4-7D	819.00	34.44	15	808.95	10.05

Distance	dl	GNITUDE dh/dl	FLOW DIRECTION
low-high	16.86	0.0042	Up
high-high	24.32	0.0029	Up
mid-point	28.09	0.0025	Up
low-low	31.86	0.0022	Up
high-low	39.32	0.0018	Up

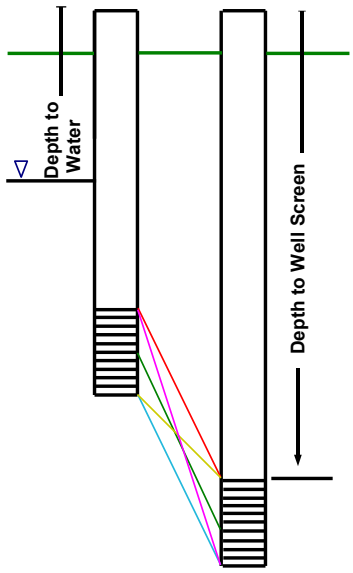
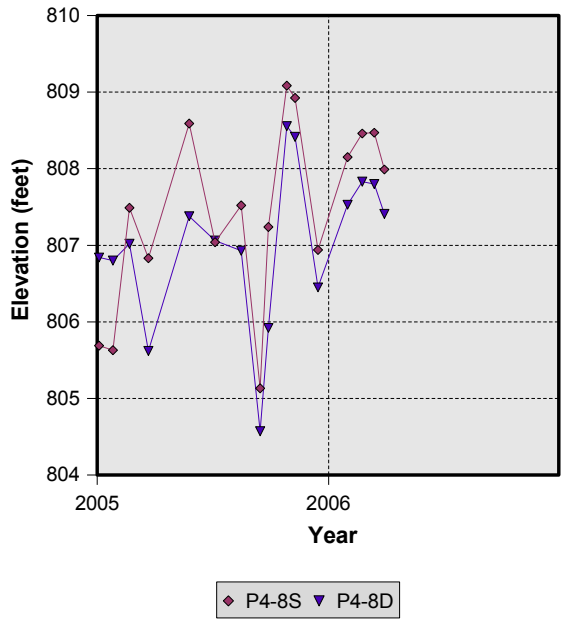


Table 3: Vertical Flow Compontents

Date	P4-8S	P4-8D	dh
01/05/2005	805.69	806.84	1.15
01/27/2005	805.63	806.80	1.17
02/22/2005	807.49	807.02	-0.47
03/24/2005	806.83	805.62	-1.21
05/27/2005	808.59	807.38	-1.21
07/07/2005	807.04	807.06	0.02
08/17/2005	807.52	806.93	-0.59
09/16/2005	805.13	804.57	-0.56
09/29/2005	807.24	805.92	-1.32
10/28/2005	809.09	808.56	-0.53
11/10/2005	808.93	808.42	-0.51
12/16/2005	806.94	806.45	-0.49
02/01/2006	808.15	807.53	-0.62
02/24/2006	808.46	807.83	-0.63
03/15/2006	808.47	807.80	-0.67
03/31/2006	807.99	807.41	-0.58
		Average	**-0.44**



Vertical Gradient with Well Screen Effects

WELL	DATUM ELEVATION	DEPTH TO WELL SCREEN (BELOW DATUM)	SCREEN LENGTH	GROUND WATER ELEVATION	DEPTH TO WATER (BELOW DATUM)
P4-8S	839.54	25.45	15	807.99	31.55
P4-8D	839.82	80.46	5	807.41	32.41

Distance	dl	MAGNITUDE dh/dl	FLOW DIRECTION
low-high	39.73	0.0146	Down
high-high	48.63	0.0119	Down
mid-point	46.68	0.0124	Down
low-low	44.73	0.0130	Down
high-low	53.63	0.0108	Down

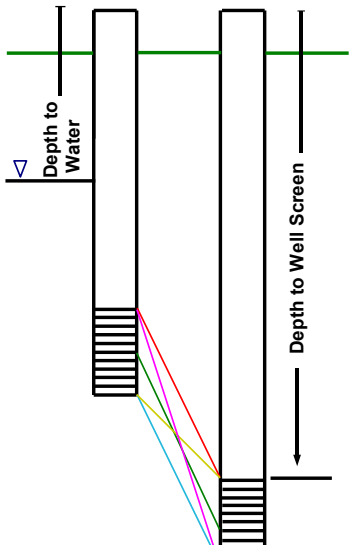
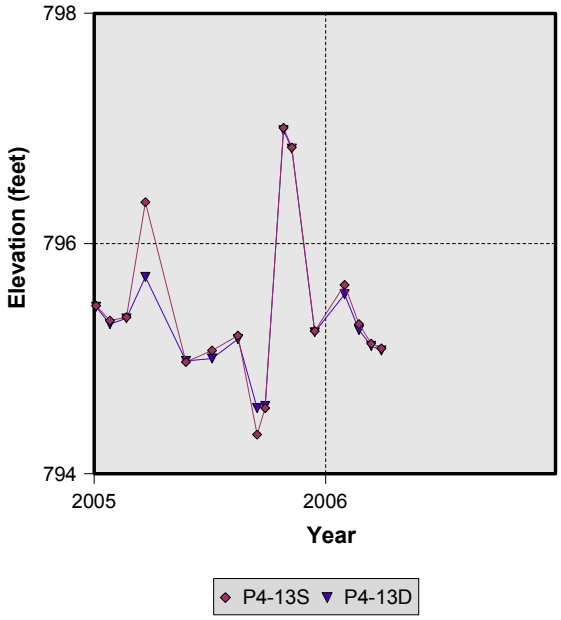


Table 3: Vertical Flow Compontents

Date	P4-13S	P4-13D	dh
01/05/2005	795.46	795.45	-0.01
01/27/2005	795.33	795.30	-0.03
02/22/2005	795.36	795.35	-0.01
03/24/2005	796.36	795.71	-0.65
05/27/2005	794.97	794.98	0.01
07/07/2005	795.07	795.00	-0.07
08/17/2005	795.20	795.17	-0.03
09/16/2005	794.34	794.57	0.23
09/29/2005	794.57	794.59	0.02
10/28/2005	797.01	796.98	-0.02
11/10/2005	796.84	796.82	-0.01
12/16/2005	795.24	795.23	-0.01
02/01/2006	795.64	795.56	-0.08
02/24/2006	795.30	795.25	-0.05
03/15/2006	795.13	795.11	-0.02
03/31/2006	795.09	795.07	-0.02
		Average	**-0.05**



Vertical Gradient with Well Screen Effects

WELL	DATUM ELEVATION	DEPTH TO WELL SCREEN (BELOW DATUM)	SCREEN LENGTH	GROUND WATER ELEVATION	DEPTH TO WATER (BELOW DATUM)
P4-13S	807.25	5.09	15	795.09	12.16
P4-13D	804.06*	39.42	5	795.07	8.99

* Original datum elevation 806.6' until 8-17-05 when broken by a mower.

Distance	dl	MAGNITUDE dh/dl	FLOW DIRECTION
low-high	-7.91	-0.0025	Down
high-high	0.02	1.0000	Down
mid-point	833.05	0.0000	Down
low-low	831.58	0.0000	Down
high-low	839.51	0.0000	Down

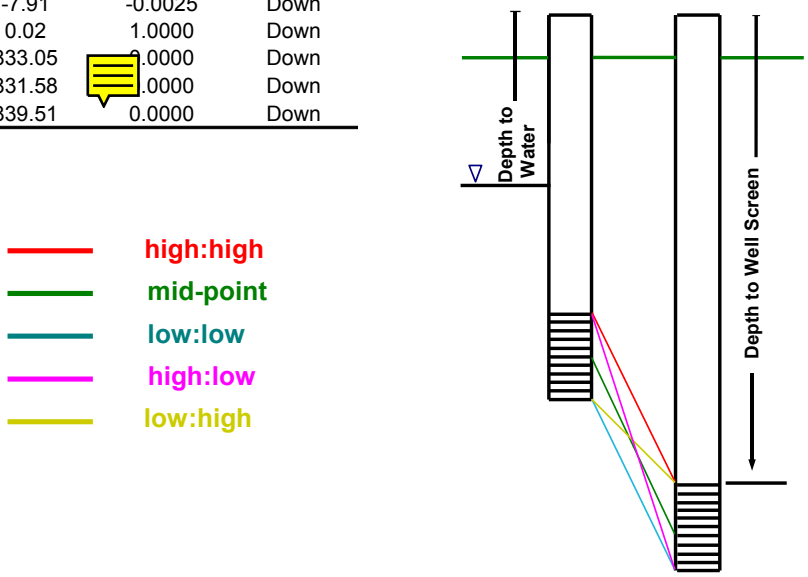
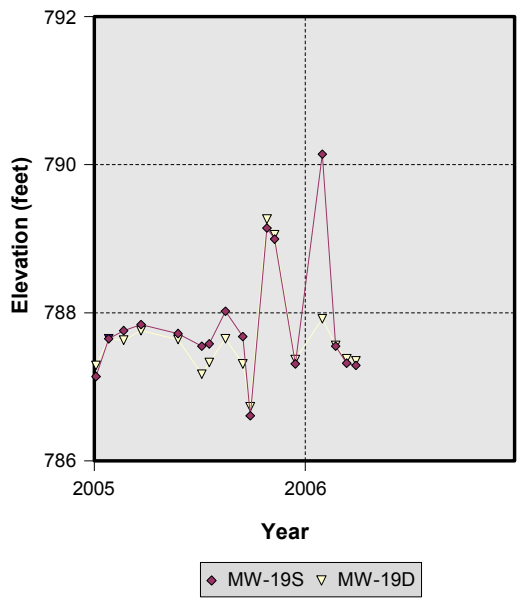


Table 3: Vertical Flow Compontents

Date	MW-19S	MW-19D	dh
01/05/2005	787.14	787.29	0.15
01/27/2005	787.65	787.65	0.00
02/22/2005	787.76	787.63	-0.13
03/24/2005	787.84	787.76	-0.08
05/27/2005	787.72	787.64	-0.08
07/07/2005	787.55	787.17	-0.38
07/20/2005	787.58	787.33	-0.25
08/17/2005	788.02	787.65	-0.37
09/16/2005	787.68	787.31	-0.37
09/29/2005	786.61	786.73	0.12
10/28/2005	789.15	789.27	0.12
11/10/2005	789.00	789.06	0.06
12/16/2005	787.31	787.37	0.06
02/01/2006	790.14	787.92	-2.22
02/24/2006	787.55	787.56	0.01
03/15/2006	787.32	787.38	0.06
03/31/2006	787.29	787.35	0.06
		Average	**-0.19**



Vertical Gradient with Well Screen Effect

WELL	DATUM ELEVATION	DEPTH TO WELL SCREEN (BELOW DATUM)	SCREEN LENGTH	GROUND WATER ELEVATION	DEPTH TO WATER (BELOW DATUM)
MW-19S	793.50	5.00	15	787.29	6.21
MW-19D	795.68	49.00	10	787.35	8.33

Distance	dl	MAGNITUDE dh/dl	FLOW DIRECTION
low-high	26.82	0.0022	Up
high-high	40.61	0.0015	Up
mid-point	38.72	0.0015	Up
low-low	36.82	0.0016	Up
high-low	50.61	0.0012	Up

high:high
mid-point
low:low
high:low
low:high

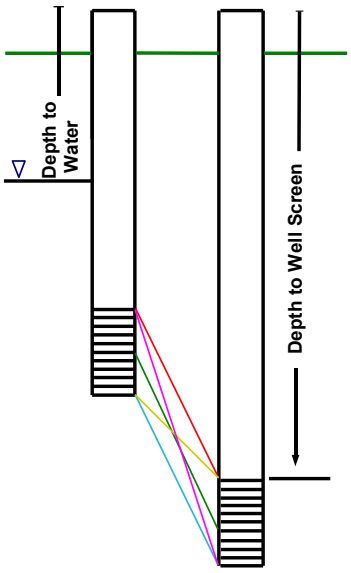
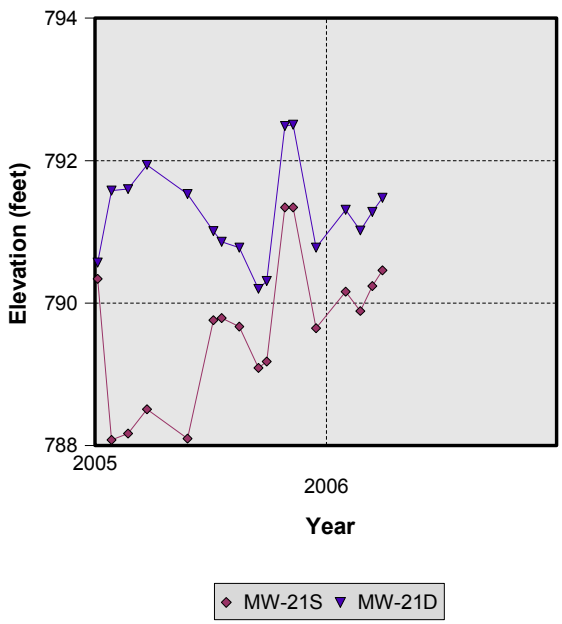


Table 3: Vertical Flow Compontents

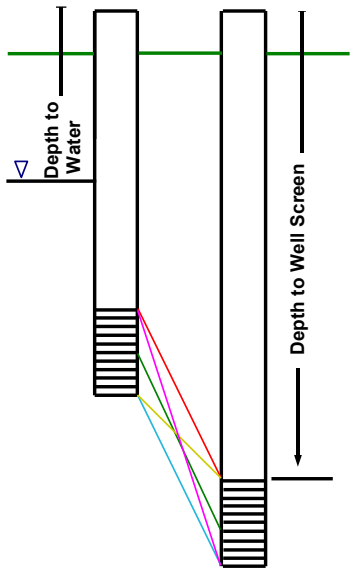
Date	MW-21S	MW-21D	dh
01/05/2005	790.34	790.57	0.23
01/27/2005	788.08	791.58	3.50
02/22/2005	788.17	791.60	3.43
03/24/2005	788.51	791.94	3.43
05/27/2005	788.10	791.53	3.43
07/07/2005	789.76	791.01	1.25
07/20/2005	789.79	790.86	1.07
08/17/2005	789.67	790.78	1.11
09/16/2005	789.09	790.20	1.11
09/29/2005	789.18	790.31	1.13
10/28/2005	791.35	792.49	1.14
11/10/2005	791.35	792.51	1.16
12/16/2005	789.65	790.78	1.13
02/01/2006	790.16	791.31	1.15
02/24/2006	789.89	791.02	1.13
03/15/2006	790.24	791.28	1.04
03/31/2006	790.46	791.48	1.02
		Average	**1.62**



Vertical Gradient with Well Screen Effect

WELL	DATUM ELEVATION	DEPTH TO WELL SCREEN (BELOW DATUM)	SCREEN LENGTH	GROUND WATER ELEVATION	DEPTH TO WATER (BELOW DATUM)
MW-21S	823.97	26	15	790.46	33.51
MW-21D	822.76	128	10	791.48	31.28

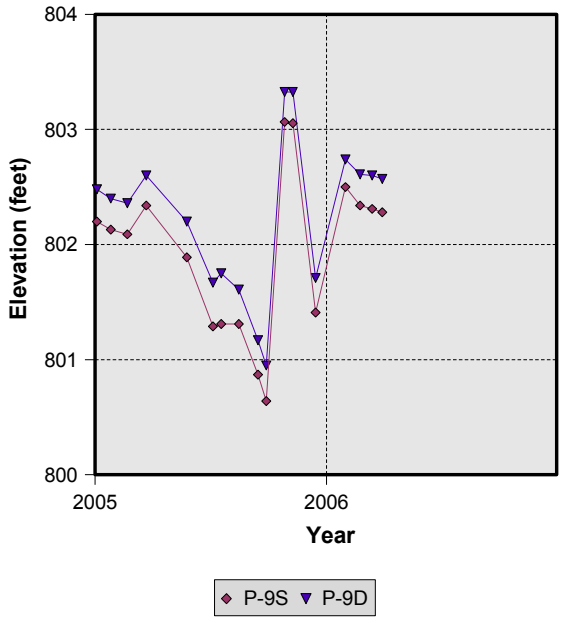
Distance	dl	MAGNITUDE dh/dl	FLOW DIRECTION
low-high	88.21	0.0116	Up
high-high	95.70	0.0107	Up
mid-point	96.96	0.0105	Up
low-low	98.21	0.0104	Up
high-low	105.70	0.0096	Up



high:high
mid-point
low:low
high:low
low:high

Table 3: Vertical Flow Compontents

Date	P-9S	P-9D	dh
01/05/2005	802.20	802.48	0.28
01/27/2005	802.13	802.40	0.27
02/22/2005	802.09	802.36	0.27
03/24/2005	802.34	802.60	0.26
05/27/2005	801.89	802.20	0.31
07/07/2005	801.29	801.67	0.38
07/20/2005	801.31	801.75	0.44
08/17/2005	801.31	801.61	0.30
09/16/2005	800.87	801.17	0.30
09/29/2005	800.64	800.95	0.31
10/28/2005	803.07	803.33	0.26
11/10/2005	803.06	803.33	0.27
12/16/2005	801.41	801.71	0.30
02/01/2006	802.50	802.74	0.24
02/24/2006	802.34	802.61	0.27
03/15/2006	802.31	802.60	0.29
03/31/2006	802.28	802.57	0.29
		Average	**0.30**



Vertical Gradient with Well Screen Effects

WELL	DATUM ELEVATION	DEPTH TO WELL SCREEN (BELOW DATUM)	SCREEN LENGTH	GROUND WATER ELEVATION	DEPTH TO WATER (BELOW DATUM)
P-9S	825.99	24	15	802.28	23.71
P-9D	826.05	45	5	802.57	23.48

Distance	dl	MAGNITUDE dh/dl	FLOW DIRECTION
low-high	5.94	0.0488	Up
high-high	20.94	0.0138	Up
mid-point	15.94	0.0182	Up
low-low	10.94	0.0265	Up
high-low	25.94	0.0112	Up

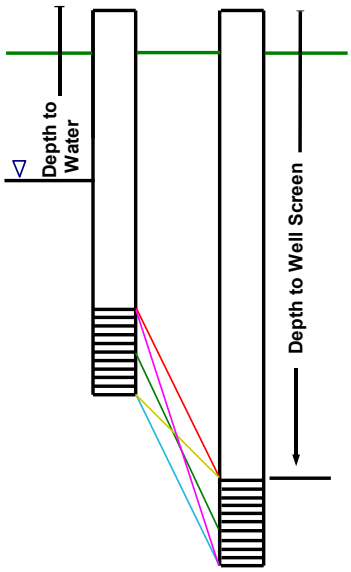


Table 4: Hydrogeologic Summary Table

Lithology	K (cm/sec)	Total Porosity (n)	Effective Porosity Range (n_e)	Effective Porosity (n_e)
Sandy Clay/Clayey Sand	1.18E-03	40%	6.5 - 9%	7.5%
Silty Sand/Sandy Silt	6.19E-04	48%	14.6 - 30%	22.3%
Silt	4.51E-05	44%	3 - 15%	4.8%
Gneiss	3.58E-04	5 - 10%	2 - 5%	5.0%

NOTES:
1. Hydraulic Conductivity (K) values represented in this table are based on average observed values calculated for this Design Study.
2. n and n_e were calculated based on the average derived from Table B-1 and B-3. n and n_e for Gneiss are based of published porosity ranges (see Section 4.3.2).
3. Values for Silt obtained from Design Hydrogeologic Study, Phase 3

Table 5: Subgrade Separation Summary

Piezometer	Proposed Subgrade	Seasonal High Elevation	Long-Term Season High Elevation	Top of Competent Rock	Vertical Separation of Subgrade above Seasonal High	Vertical Separation of Subgrade above Long-Term Seasonal High	Vertical Separation of Subgrade above Top of Competent Rock
P4-3	825	815.71	819.85	770.54	9.29	5.15	54.46
P4-4	821	809.64	813.78	770.50*	11.36	7.22	50.50
P4-5	824	815.87	820.01	775.25*	8.13	4.00	48.75
P4-8S	817	808.59	812.73	751.58	8.41	4.27	65.42
P4-8D	817	807.83	811.97	751.58	9.17	5.03	65.42
P4-9	815	802.11	806.25	763.75*	12.89	8.75	51.25
P4-10	809	799.69	803.83	760.15*	9.31	5.17	48.85
P4-14	814.11	805.97	810.11	778.36*	8.14	4.00	35.75

Notes:
1. All data are in units of feet.
2. Proposed Subgrade elevation were extrapolated from Application for Permit to Construct
3. Seasonal High and Long-Term Seasonal High Elevations were based on elevations applicable from Design Hydrogeologic Study Plate 4A and Plate 4B
4. Top of competent Rock Elevations were based on corresponding adjacent clustered deep well or extrapolated from Design Hydrogeologic Study Plate 7
5. * Indicates data that was extrapolated from its location on the corresponding plate.

Table 6: Proposed Monitoring Well Specifications

Well	Elevation (feet)			Depth below ground (feet)				
	Ground surface	Estimated long-term seasonal high	Estimated top of rock	Estimated long-term seasonal high	Estimated top of rock	Top of screen	Screen Length	Completion depth
MW-27D (P4-13D)	803.75	799.85	759.5	3.90	44.3	39.4	5	44.4
MW-27S (P4-13S)	803.90	800.50	759.0	3.40	44.9	5.1	15	20.0
MW-28 (P4-11)	807.49	807.14	795.1	0.35	12.4	7.4	5	12.4
MW-29 (P4-12)	805.89	803.36	785.0	2.53	20.9	7.7	10	17.7

NOTE:
ALL EXISTING HOUSES AND ROADS SHOWN ON COUNTY PROPERTY WILL BE REMOVED AT TIME OF CONTRUCTION.

LEGEND
- SANITARY SEWER EASEMENT
- PHASE LIMITS
- CREEK
- EXISTING CONTOURS
- PROPERTY LINE
- BUFFER ZONE
- MONITORING WELL
- EXISTING TEMPORARY DIVERSION BERM

PLATE 1

Municipal Engineering Services Company, P.A.
P.O. BOX 349 BOONE, N.C. 28607 (704) 262-1767
P.O. BOX 97 GARNER, N.C. 27529 (919) 772-5393

MUNICIPAL SOLID WASTE LANDFILL FACILITY
IREDELL COUNTY NORTH CAROLINA

DATE	BY	REV.	DESCRIPTION
03/01/02	LCH	2	REVISED EXISTING CONDITIONS AND ADDED PROPOSED C & D
5/24/01	LCH	1	REVISED SAN. SEWER NOTE AND PROPERTY LINE

FACILITY PLAN
AREAL LIMITS

SCALE:	1"=200'
DATE:	11/9/00
DRWN. BY:	B. BADEY
CHKD. BY:	W. SULLIVAN
PROJECT NUMBER	G99087.6
DRAWING NO.	PLATE 1
SHEET NO.	1 OF 1

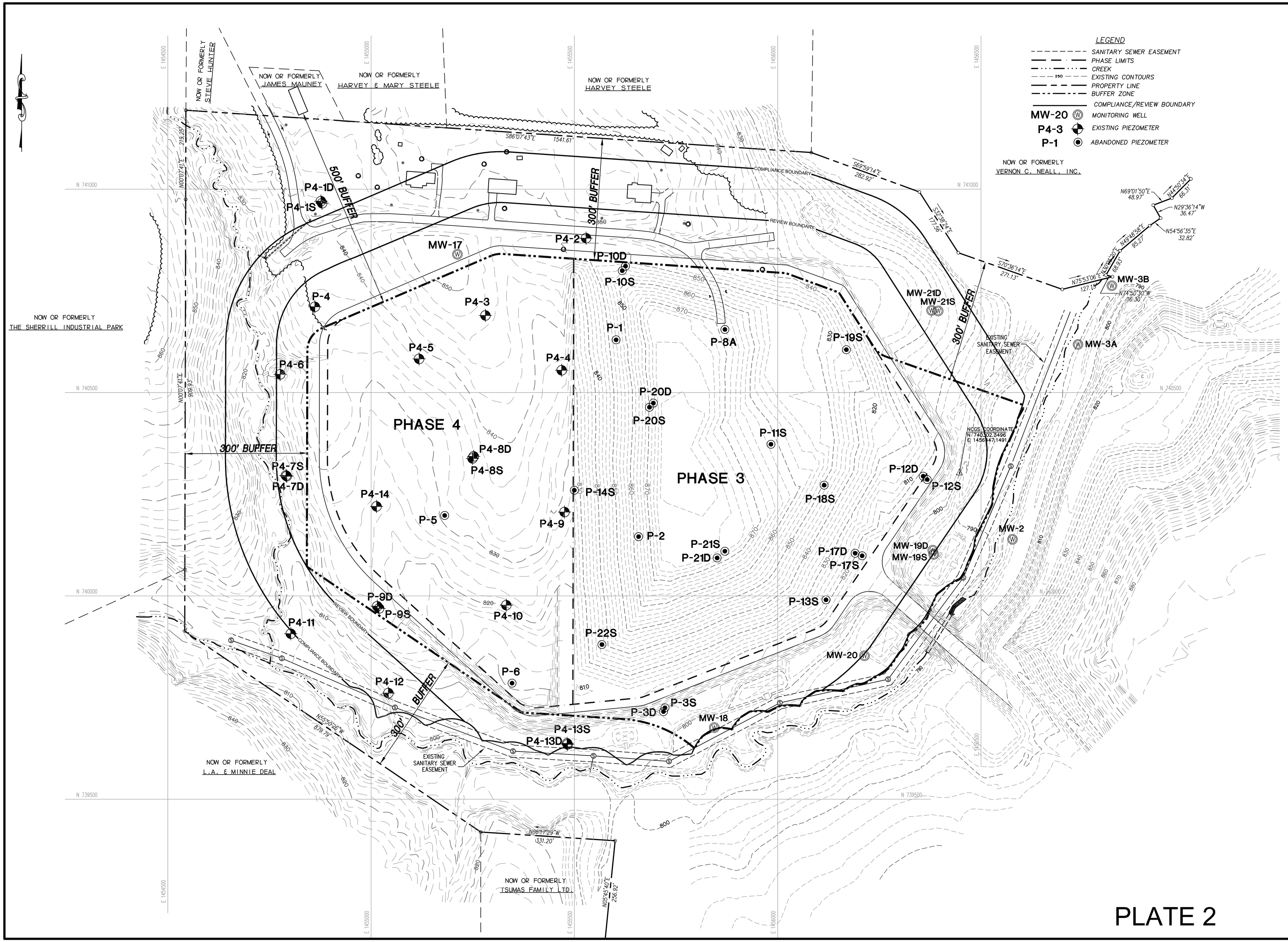


PLATE 2

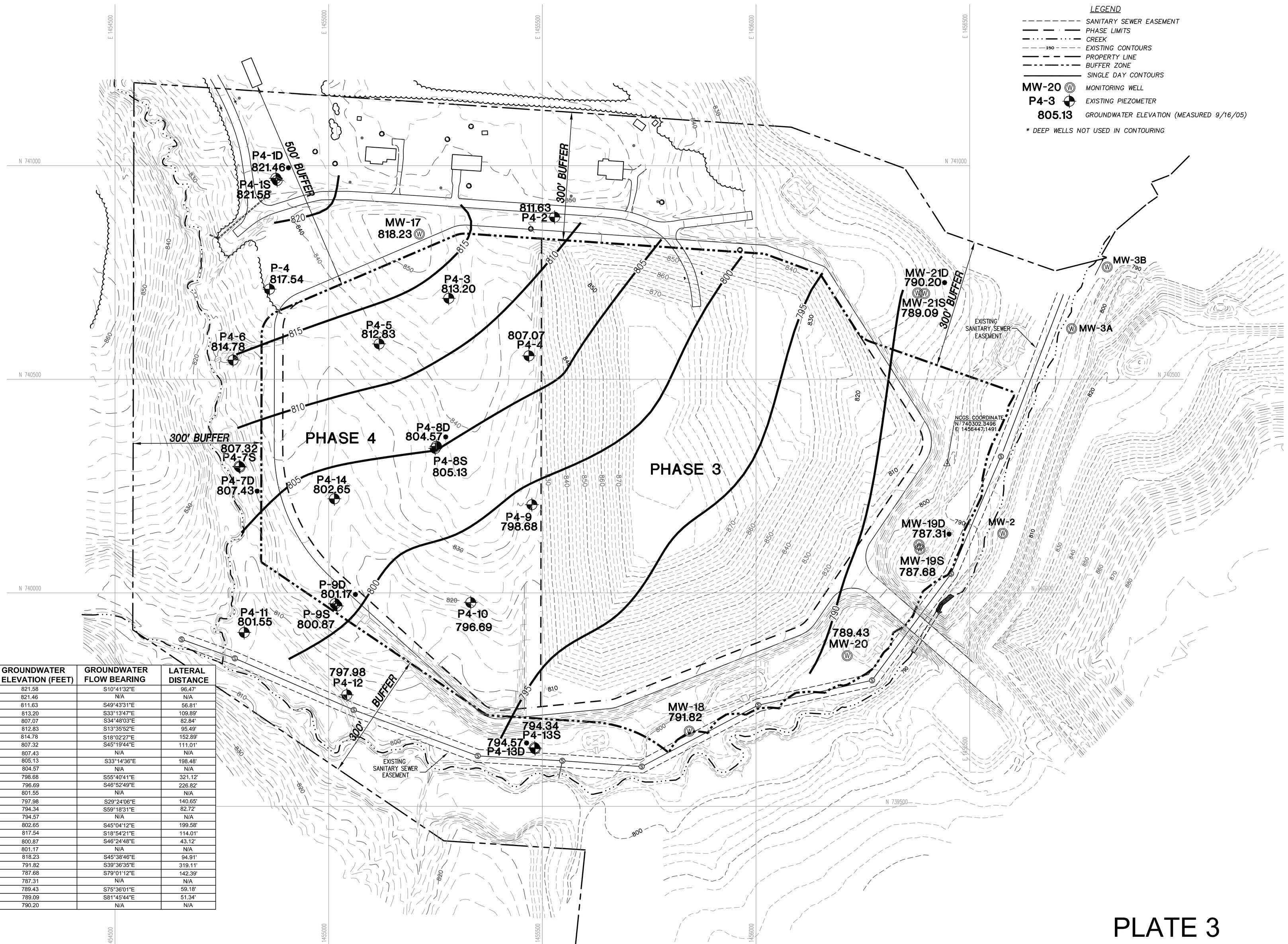
Municipal Engineering Services Company, P.A.
P.O. BOX 97 GARNER, N.C. 27529 (919) 772-5393
P.O. BOX 349 BOONE, N.C. 28607 (828) 262-1767
P.O. BOX 828 MOREHEAD CITY, N.C. 28557 (252) 726-9481

MUNICIPAL SOLID WASTE LANDFILL
IREDELL COUNTY
NORTH CAROLINA

DATE	BY	REV.	DESCRIPTION

WESTERN UNIT DISPOSAL AREA MAP

SCALE:	1" = 100'
DATE:	10/13/06
DRWN. BY:	M. CLEMENT
CHKD. BY:	E. CALDWELL
PROJECT NUMBER	G06035.6
DRAWING NO.	PLATE 2
SHEET NO.	1 of 1



WELL	GROUNDWATER ELEVATION (FEET)	GROUNDWATER FLOW BEARING	LATERAL DISTANCE
P4-1S	821.58	S10°41'32"E	96.47'
P4-1D	821.46	N/A	N/A
P4-2	811.63	S49°43'31"E	56.81'
P4-3	813.20	S33°13'47"E	109.89'
P4-4	807.07	S34°48'03"E	82.84'
P4-5	812.83	S13°35'52"E	95.49'
P4-6	814.78	S18°02'27"E	152.89'
P4-7S	807.32	S45°19'44"E	111.01'
P4-7D	807.43	N/A	N/A
P4-8S	805.13	S33°14'36"E	198.48'
P4-8D	804.57	N/A	N/A
P4-9	798.68	S55°40'41"E	321.12'
P4-10	796.69	S46°52'49"E	226.82'
P4-11	801.55	N/A	N/A
P4-12	797.98	S29°24'06"E	140.65'
P4-13S	794.34	S59°18'31"E	82.72'
P4-13D	794.57	N/A	N/A
P4-14	802.65	S45°04'12"E	199.58'
P-4	817.54	S18°54'21"E	114.01'
P-9S	800.87	S46°24'48"E	43.12'
P-9D	801.17	N/A	N/A
MW-17	818.23	S45°38'46"E	94.91'
MW-18	791.82	S39°36'35"E	319.11'
MW-19S	787.68	S79°01'12"E	142.39'
MW-19D	787.31	N/A	N/A
MW-20	789.43	S75°36'01"E	59.18'
MW-21S	789.09	S81°45'44"E	51.34'
MW-21D	790.20	N/A	N/A

PLATE 3

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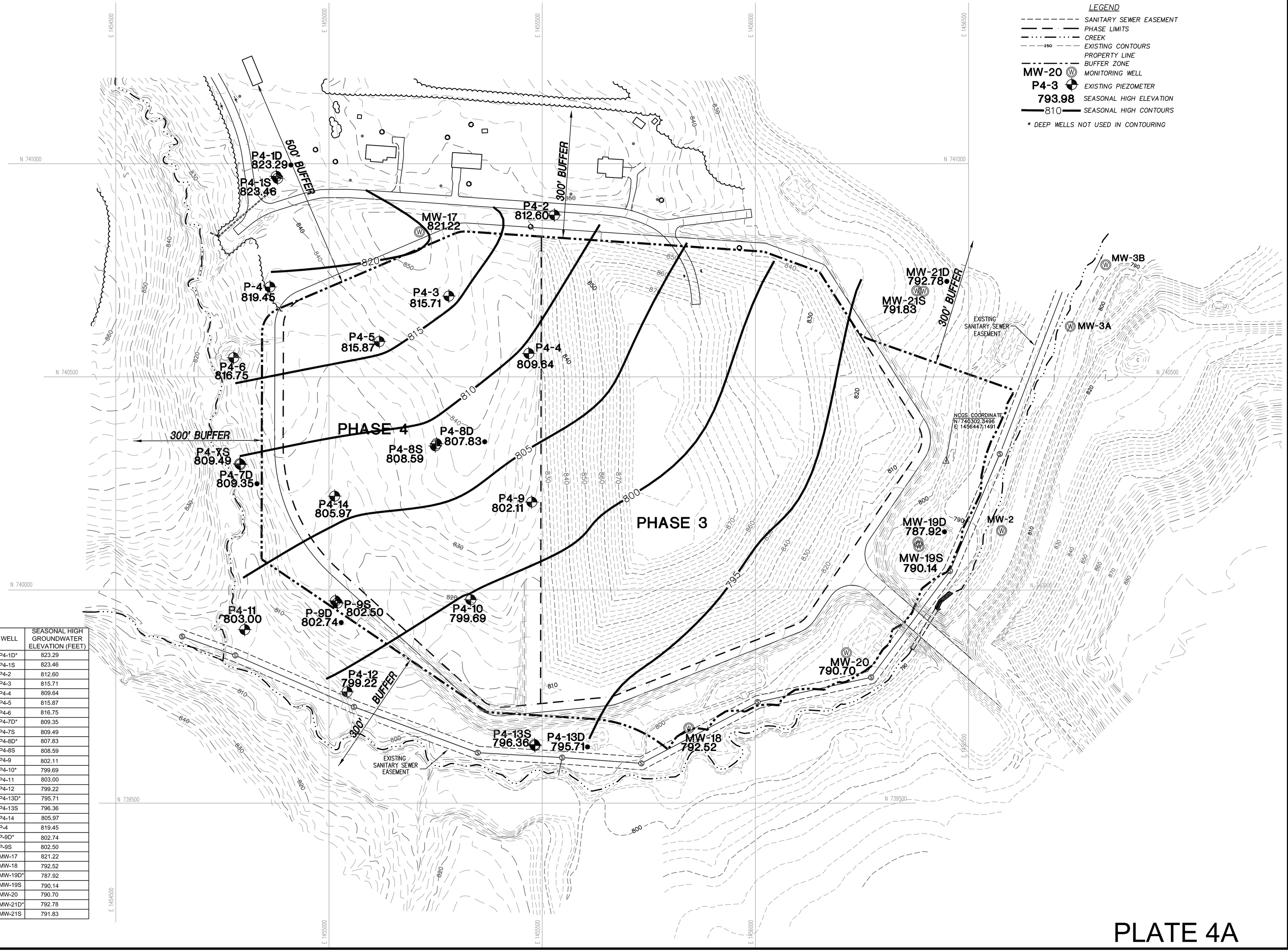
P.O. BOX 349 BOONE, N.C. 28607 (828) 262-1767
P.O. BOX 828 MOREHEAD CITY, N.C. 28557 (252) 726-9481

MUNICIPAL SOLID WASTE LANDFILL
IREDELL COUNTY
NORTH CAROLINA

DATE	BY	REV.	DESCRIPTION

SINGLE DAY POTENTIOMETRIC MAP WITH FLOW DIRECTIONS

SCALE: 1" = 100'
DATE: 10/13/06
DRWN. BY: M. CLEMENT
CHKD. BY: E. CALDWELL
PROJECT NUMBER G06035.6
DRAWING NO. PLATE 3
SHEET NO. 1 of 1



WELL	SEASONAL HIGH GROUNDWATER ELEVATION (FEET)
P4-1D*	823.29
P4-1S	823.46
P4-2	812.60
P4-3	815.71
P4-4	809.64
P4-5	815.87
P4-6	816.75
P4-7D*	809.35
P4-7S	809.49
P4-8D*	807.83
P4-8S	808.59
P4-9	802.11
P4-10*	799.69
P4-11	803.00
P4-12	799.22
P4-13D*	795.71
P4-13S	796.36
P4-14	805.97
P-4	819.45
P-9D*	802.74
P-9S	802.50
MW-17	821.22
MW-18	792.52
MW-19D*	787.92
MW-19S	790.14
MW-20	790.70
MW-21D*	792.78
MW-21S	791.83

PLATE 4A

Municipal Services Engineering Company, P.A.
P.O. BOX 97 GARNER, N.C. 27529 (919) 772-5393
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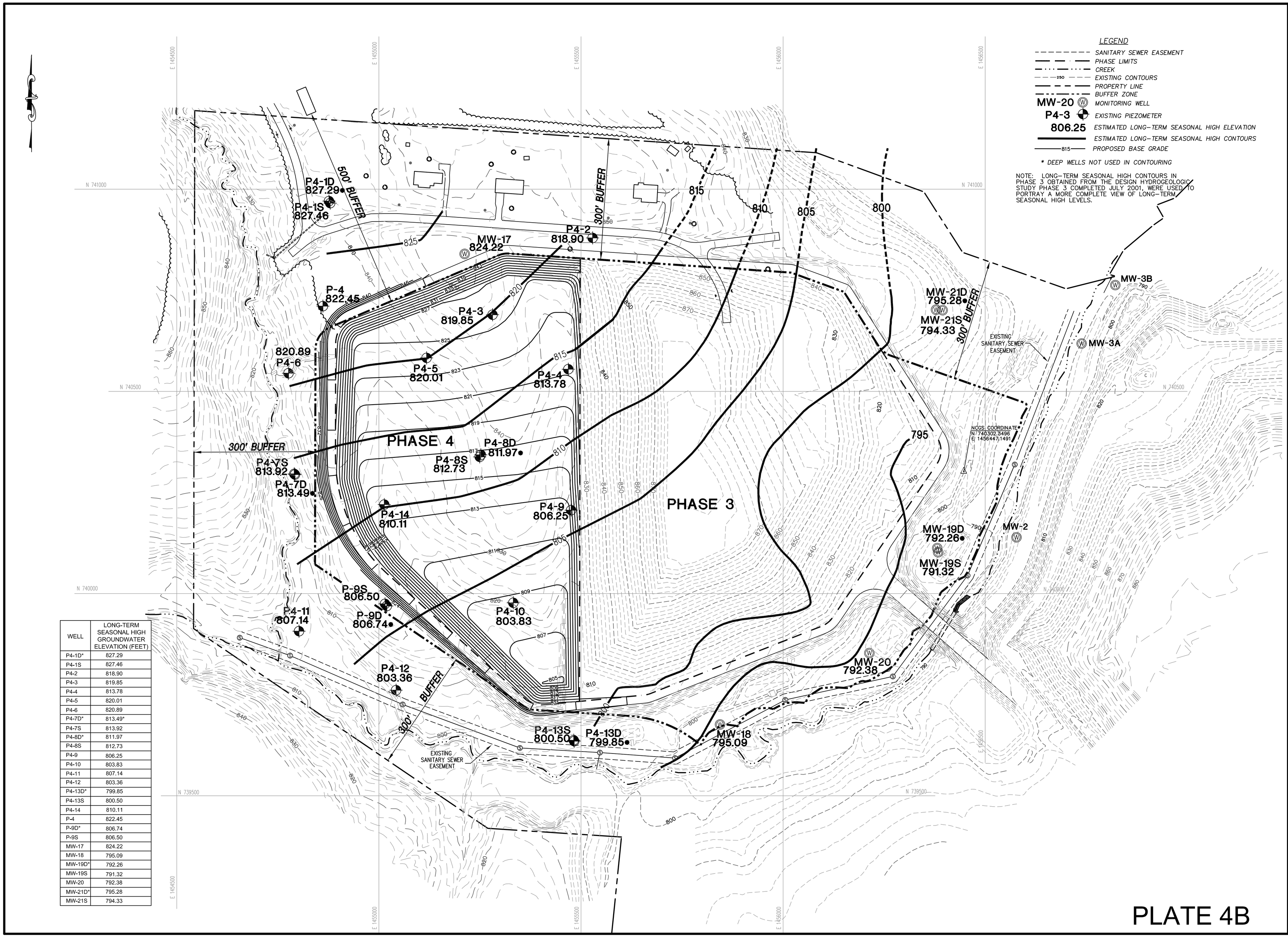
P.O. BOX 828 MOREHEAD CITY, N.C. 28557 (252) 726-9481

MUNICIPAL SOLID WASTE LANDFILL
IREDELL COUNTY
NORTH CAROLINA

DATE	BY	REV.	DESCRIPTION

SEASONAL HIGH WATER TABLE

SCALE:	1" = 100'
DATE:	10/13/06
DRWN. BY:	M. CLEMENT
CHKD. BY:	E. CALDWELL
PROJECT NUMBER	G06035.6
DRAWING NO.	PLATE 4A
SHEET NO.	1 of 2



WELL	LONG-TERM SEASONAL HIGH GROUNDWATER ELEVATION (FEET)
P4-1D*	827.29
P4-1S	827.46
P4-2	818.90
P4-3	819.85
P4-4	813.78
P4-5	820.01
P4-6	820.89
P4-7D*	813.49*
P4-7S	813.92
P4-8D*	811.97
P4-8S	812.73
P4-9	806.25
P4-10	803.83
P4-11	807.14
P4-12	803.36
P4-13D*	799.85
P4-13S	800.50
P4-14	810.11
P-4	822.45
P-9D*	806.74
P-9S	806.50
MW-17	824.22
MW-18	795.09
MW-19D*	792.26
MW-19S	791.32
MW-20	792.38
MW-21D*	795.28
MW-21S	794.33

PLATE 4B

Municipal Services Engineering Company, P.A.
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P.O. BOX 828 MOREHEAD CITY, N.C. 28557 (252) 726-9481

MUNICIPAL SOLID WASTE LANDFILL
IREDELL COUNTY NORTH CAROLINA

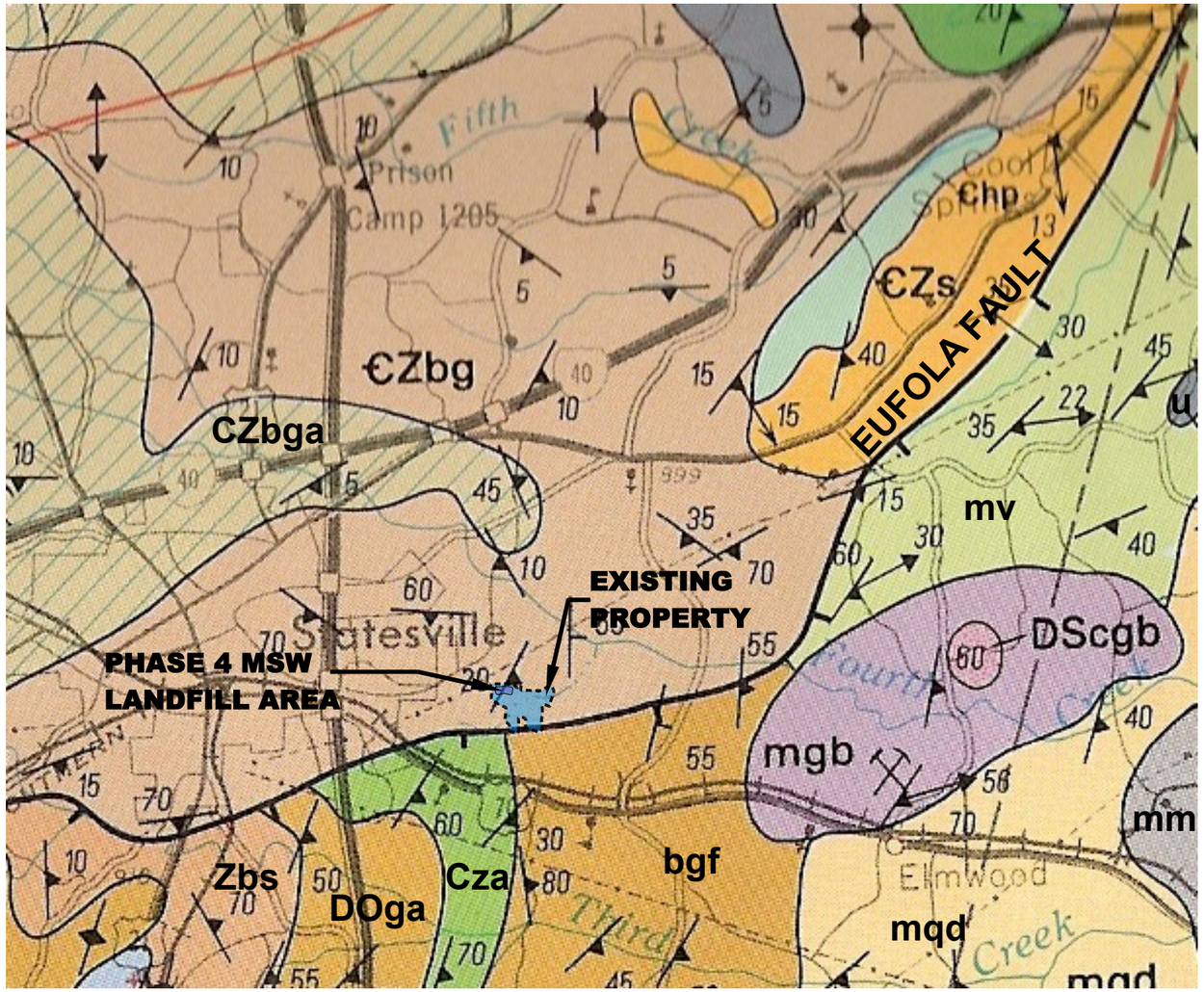
DATE	BY	REV.	DESCRIPTION
3/14/2007	EJC	1	ADJUSTED ESTIMATED LONG-TERM SEASONAL HIGH

ESTIMATED LONG-TERM SEASONAL HIGH WATER TABLE

SCALE: 1" = 100'
DATE: 10/13/06
DRWN. BY: M. CLEMENT
CHKD. BY: E. CALDWELL
PROJECT NUMBER G06035.6
DRAWING NO. PLATE 4B
SHEET NO. 2 of 2

Regional Characterization Map

Design Hydrogeologic Study – Iredell County, Phase 4



Date Completed	10/13/2006
Created By	M. Clement
Project Name	Design Hydrogeologic Study
Site Name	Iredell County, Phase 4
Project Number	G06035.6

Municipal Engineering Services Company, PA

GEOLOGIC MAP LEGEND

- 10 — Strike and dip of bedding (inclined)
- Formation boundary
- 40 — Strike and Dip of folliation
- Syncline
- Anticline

FORMATION DESCRIPTION

Inner Piedmont Belt

Chp: Henderson Gneiss- Cambrian, fine grained, with subhedral megacrysts, commonly have rapakivi texture, and tend to be arranged in a flow pattern, commonly containing garnet.

CZs: White Mica Schist- Yellow grey to blue grey, medium to coarse grained schist composed of white mica, quartz, minor biotite and local oligoclase. Garnet secondary chlorite and tourmaline are common, staurolite and kyanite are sporadic, Typically, coarse grained and quartz rich near the Cherryville Granite.

CZbg: Biotite Gneiss – Grey to dark grey, thin to thick layered biotite, quartz, feldspar gneiss, garnetiferous, locally inequigranular and porphyroblastic, interlayered with calc-silicate rock, sillimanite-mica schist, mica schist, and amphibolite.

CZa: Amphibolite- Dark grey, fine to medium grained, thin to thick layered amphibolite composed mostly of plagioclase, hornblende and smaller amounts of diopside, epidote, and quartz. pods and thin layers of calc-silicate rock are present. Small non-layered masses of metadiorite and metagabbro are included in the unit.

CZbga: biotite gneiss and amphibolite- Interlayered biotite gneiss, hornblende, gneiss, amphibolite, metagabbro, and subordinate mica schist. Locally contains much granitoid rock, forms migmatite resembling migmatic granitoid gneiss.

Kings Mountain Belt

Zbs: Quartz-Sericite Schist- Battleground formation, very fine to medium grained quartz sericite schist and phyllite, very light grey light blueish grey, light brown or yellow grey in color. Typically greater than 50% quartz with sericitic white mica; accessory minerals include chloritoid, biotite, pyrite, hematite, kyanite, andelusite, sillmanite, staurolite, garnet, albite, chlorite, tourmaline, zircon, and graphite.

Charlotte Belt

DScgb: Gabbro of Concord Plutonic Suite-Devonian and Silurian, Gabbro, norite, gabrronorite and hornblende gabbro. Major minerals are plagioclase, clinopyroxene and orthopyroxene, hornblende, biotite, and olivine or quartz.

bfg: Fine Grained Biotite Gniess- dominantly of granodiorite composition, probably metamorphosed dacitic volcanics.

mv: undivided metavolcanic rock-Commonly interbedded felsic metavolcanic and mafic, with intermediate metavolcanic type, those in the Charlotte Belt probably correlative, in part with the Battleground Formation

mgb: Metagabbro- Dark coarse grained, abundant amphibole replaces olivine and pyroxene, epidote is common, biotite and spinel may be present, plagioclase is less abundant than mafic minerals, quartz is rare or absent.

mqd: Metamorphosed quartz diorite and tonalite- Grey, medium to coarse grained, foliated rock composed dominantly of plagioclase, quartz, biotite, hornblende, and epidote. Biotite, hornblende, and epidote occur in clots replacing the original mafic phenocrysts.

mm: Metamorphosed mafic complex- Metamorphic equivalents of gabbroic and ultramafic intrusives, hypabyssal and extrusive basalts.

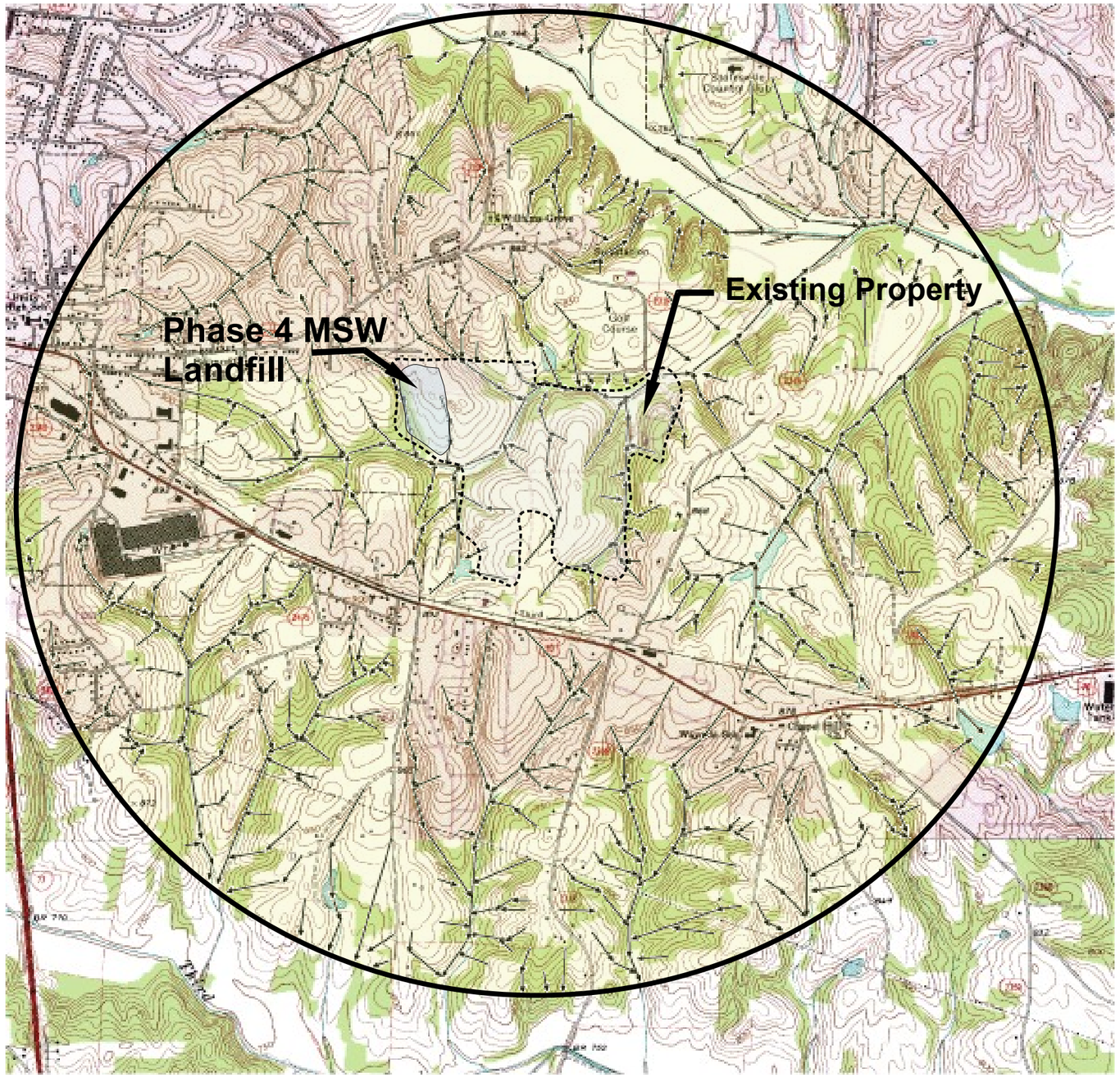
Intrusive and Altered Rock

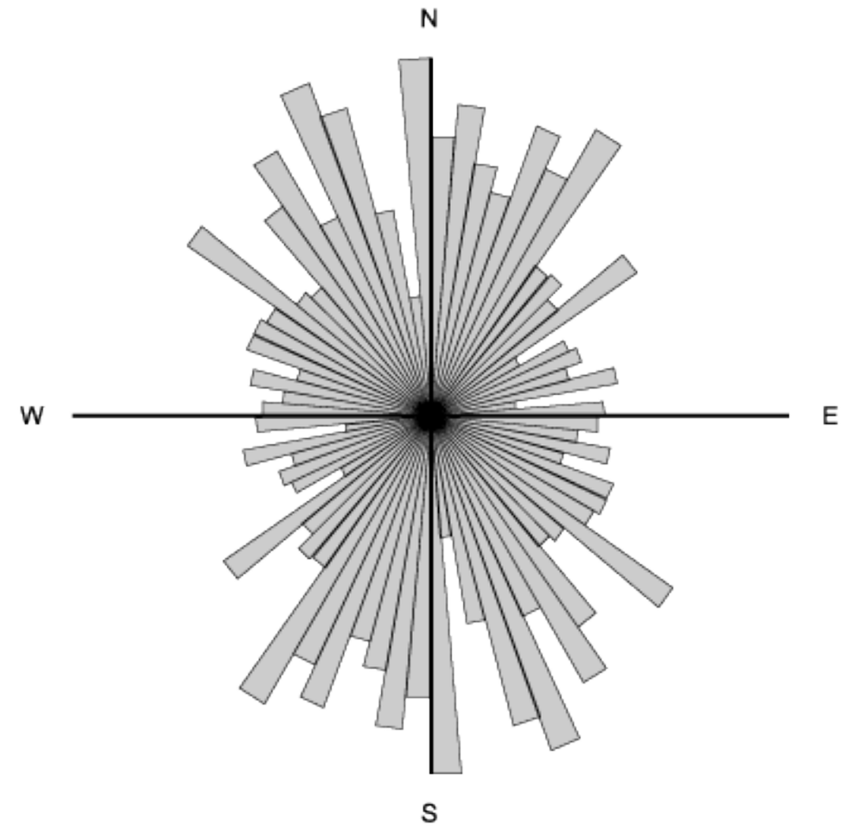
u: Ultramafic Rock- variably altered ultramafic rocks, weakly to strongly foliated, consist of serpentine, amphibole, talc, chlorite, scapolite, opaque minerals,relict pyroxene, and rare olivine in different proportions and combinations.

Taken From: Goldsmith, R, Milton, D.J., Horton, J.W.Jr., The Charlotte 1°x2° Quadrangle, North and South Carolina, 1988.

PLATE 5

Stream Trace Analysis - Iredell County Landfill, Statesville, North Carolina





NOTE

1. Each pedal in the above Rose diagram represents a 5-degree slot.
2. The axial length of a pedal represents the total score of the pedal normalized to the highest score.

LEGEND

PROPOSED LANDFILL AREA

PROPERTY OWNED BY IREDELL COUNTY

TRACE LINE

1 0 1 MILE

Date Completed	10/18/2006
Created By	K. Yoshida
Project Name	Design Hydrogeologic Study
Site Name	Iredell County Landfill, Phase 4
Project Number	G06035.6

Municipal Engineering Services Company, PA

ROAD CLASSIFICATION

Primary highway, hard surface

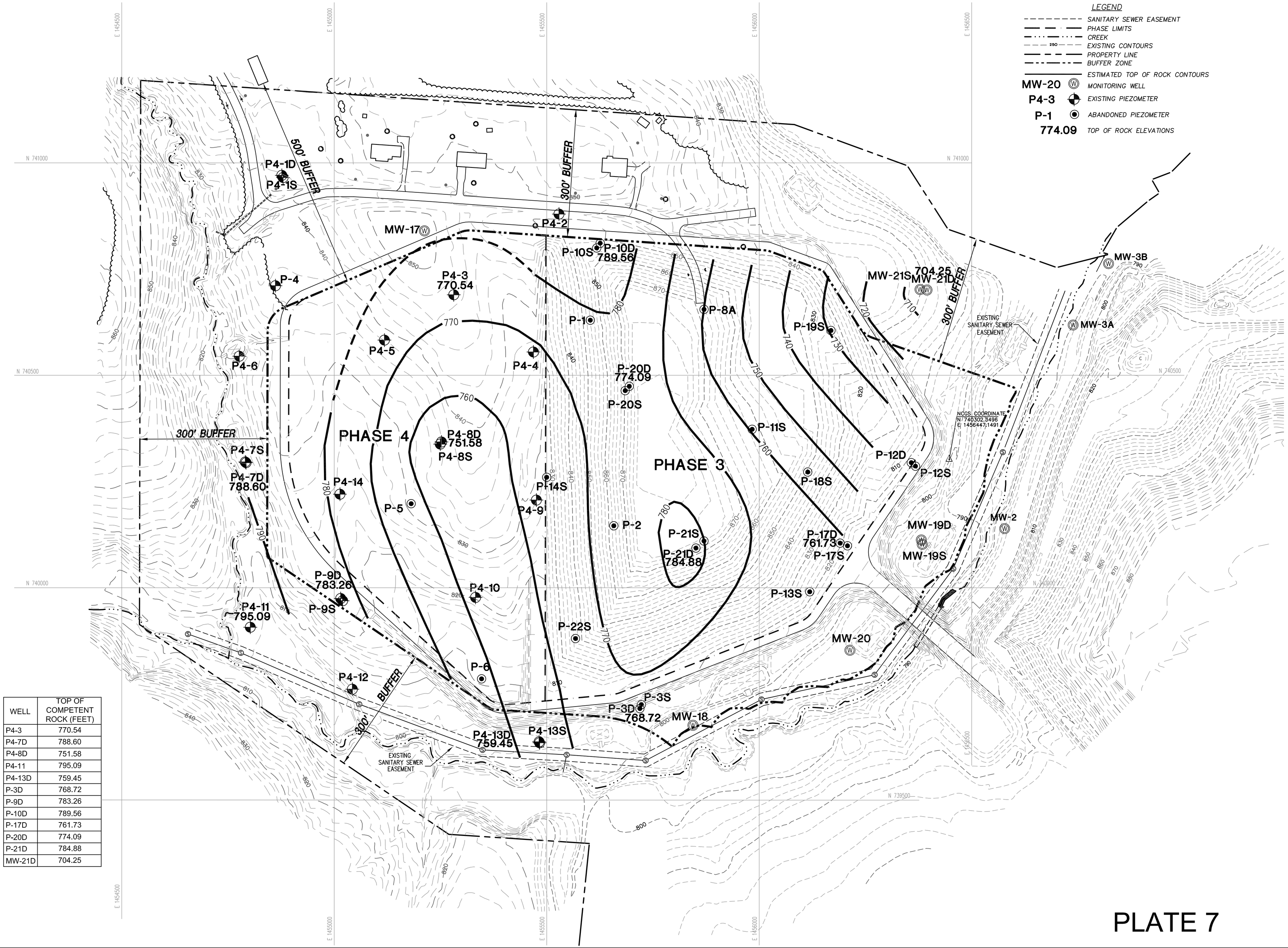
Light-duty road, hard or improved surface

Secondary highway, hard surface

Unimproved road

Interstate Route U. S. Route State Route

PLATE 6



WELL	TOP OF COMPETENT ROCK (FEET)
P4-3	770.54
P4-7D	788.60
P4-8D	751.58
P4-11	795.09
P4-13D	759.45
P-3D	768.72
P-9D	783.26
P-10D	789.56
P-17D	761.73
P-20D	774.09
P-21D	784.88
MW-21D	704.25

PLATE 7

Municipal Services Engineering Company, P.A.
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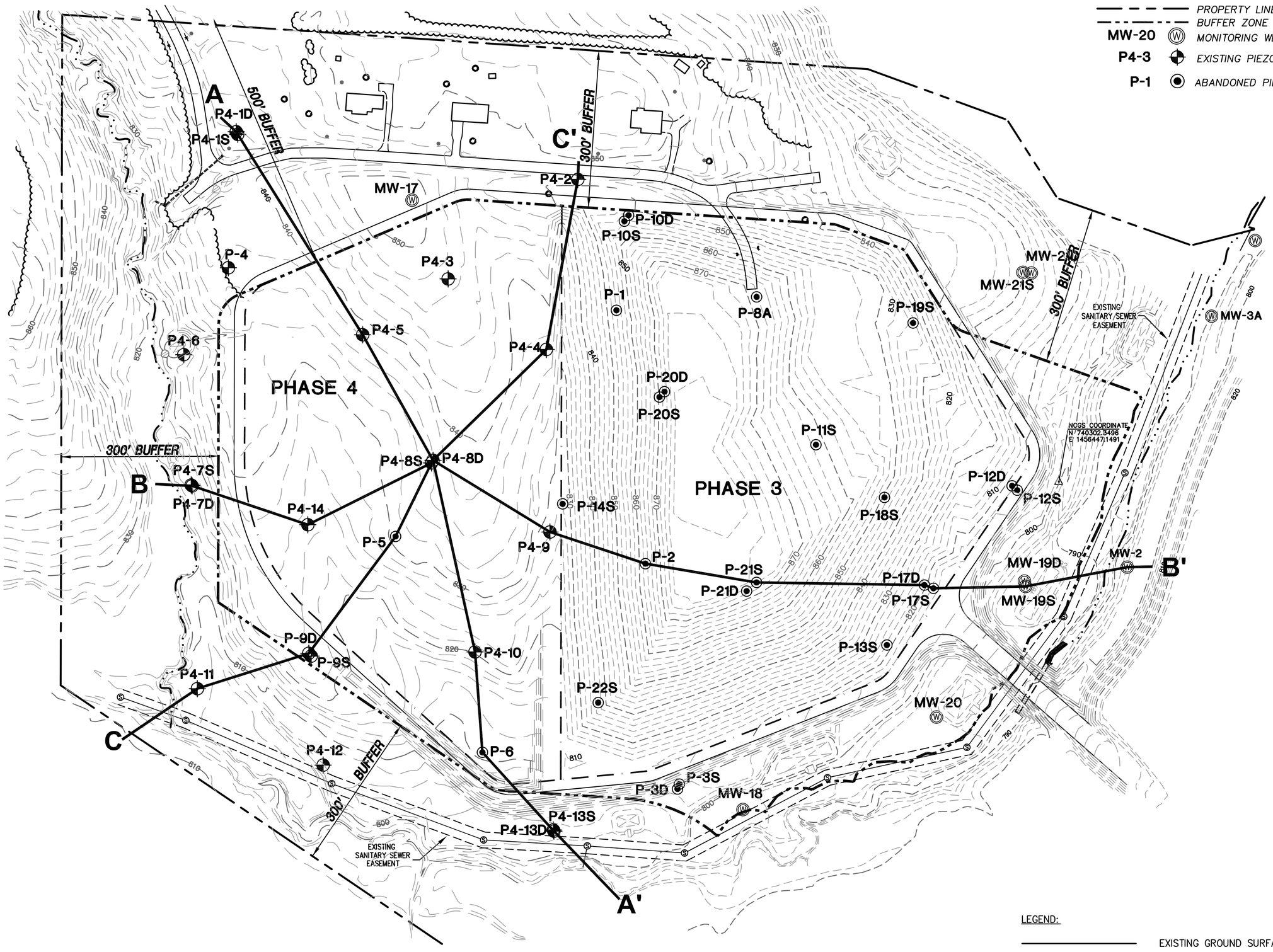
P.O. BOX 828 MOREHEAD CITY, N.C. 28557 (252) 726-9481

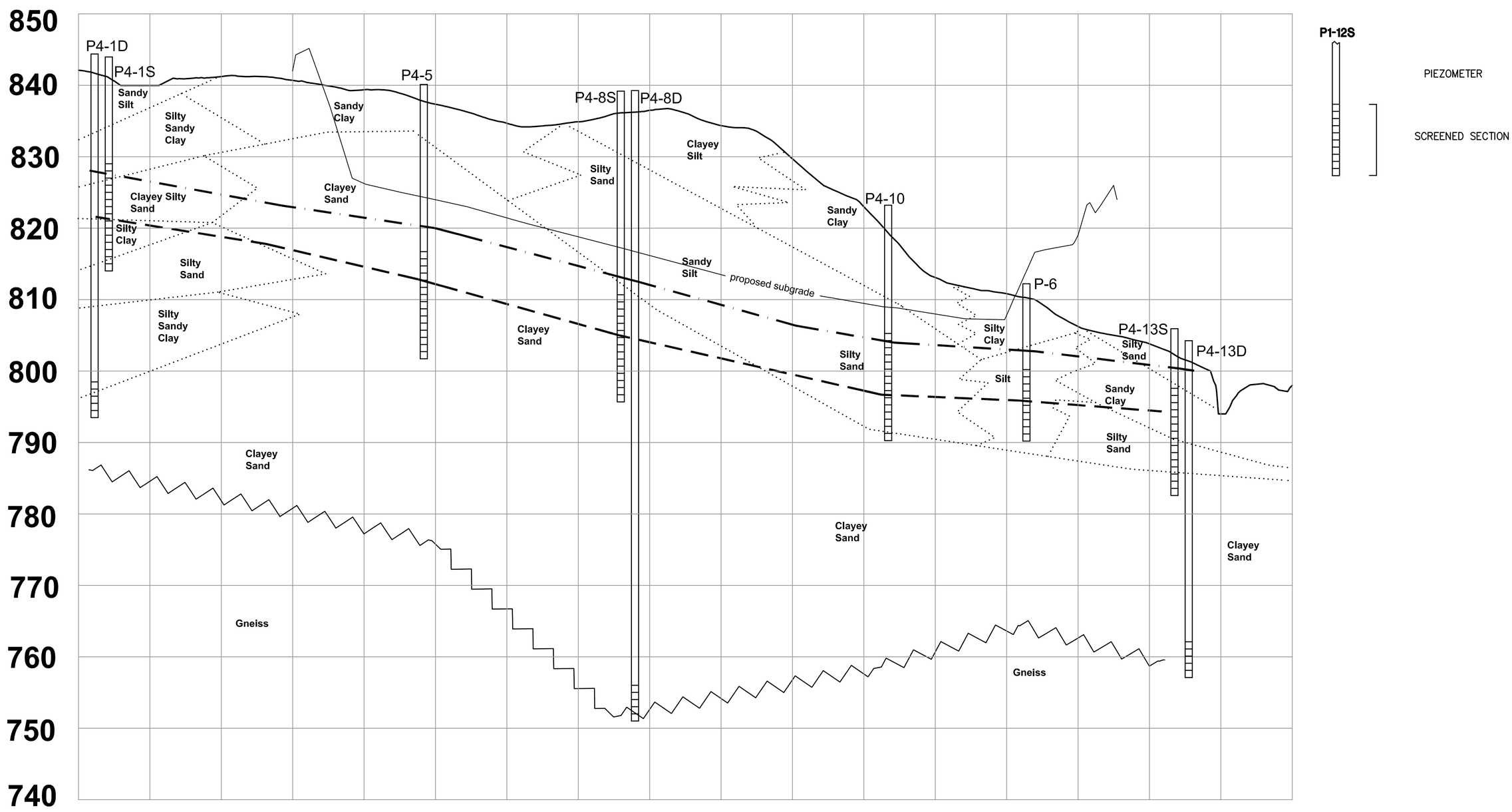
MUNICIPAL SOLID WASTE LANDFILL
IREDELL COUNTY
NORTH CAROLINA

DATE	BY	REV.	DESCRIPTION

ESTIMATED TOP OF COMPETENT ROCK

SCALE:	1" = 100'
DATE:	10/17/06
DRWN. BY:	M. CLEMENT
CHKD. BY:	E. CALDWELL
PROJECT NUMBER	G06035.6
DRAWING NO.	PLATE 7
SHEET NO.	1 of 1





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 AND TOP OF ROCK SURFACES WERE DERIVED FROM THEIR RESPECTIVE CONTOUR SURFACES IN PLATES 4B AND 7.

PLATE 8A

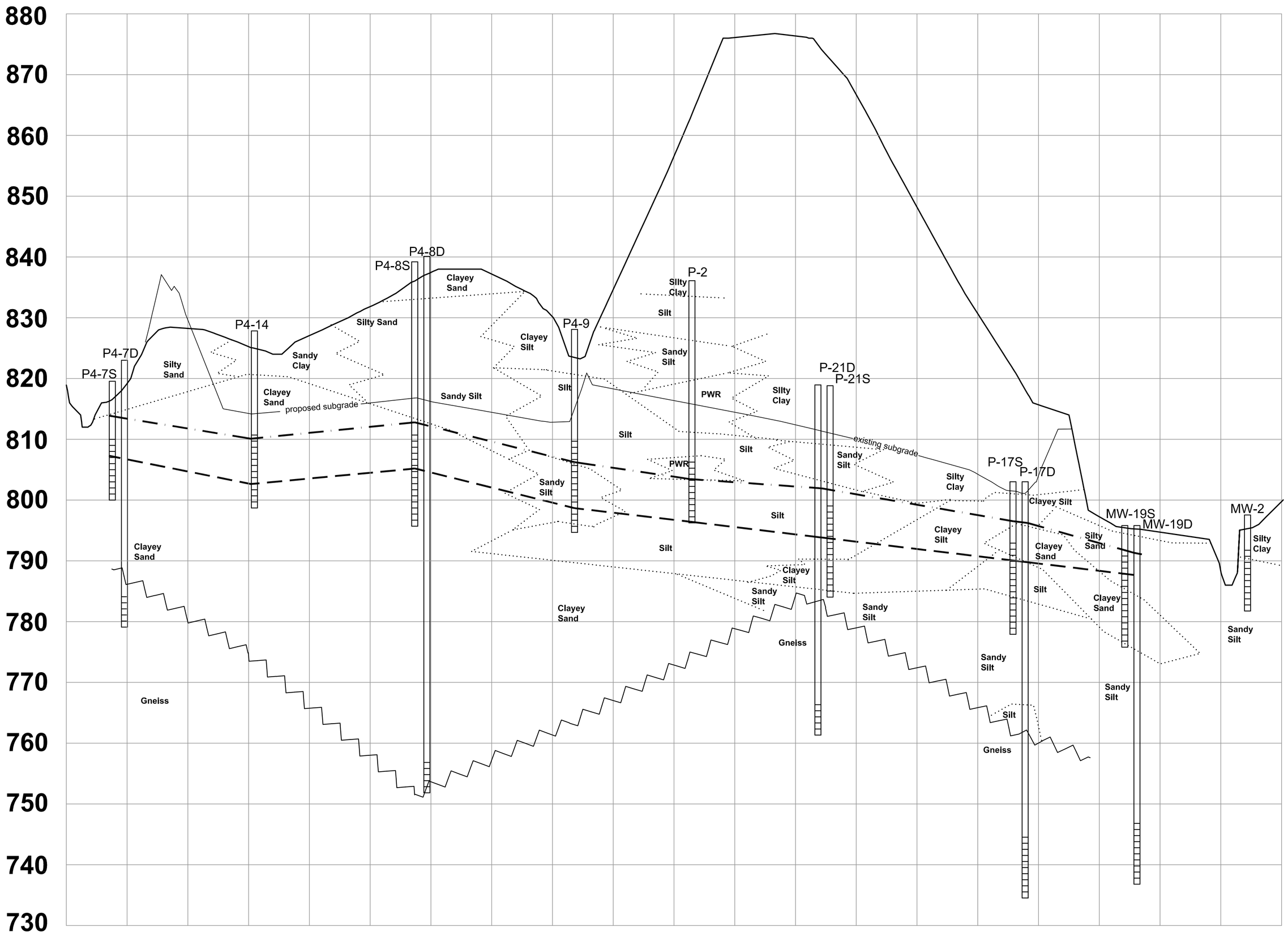
DATE	BY	REV.	DESCRIPTION
3/14/2007	MMC	1	ADJUSTED ESTIMATED LONG-TERM SEASONAL HIGH

CROSS SECTION MAP

DRAWING NO. PLATE 8A
SHEET NO. 1 of 2
PROJECT NUMBER G06035.6
CHKD. BY: E. CALDWELL
DRWN. BY: M. CLEMENT
DATE: 10/17/06
SCALE: 1" = 100'

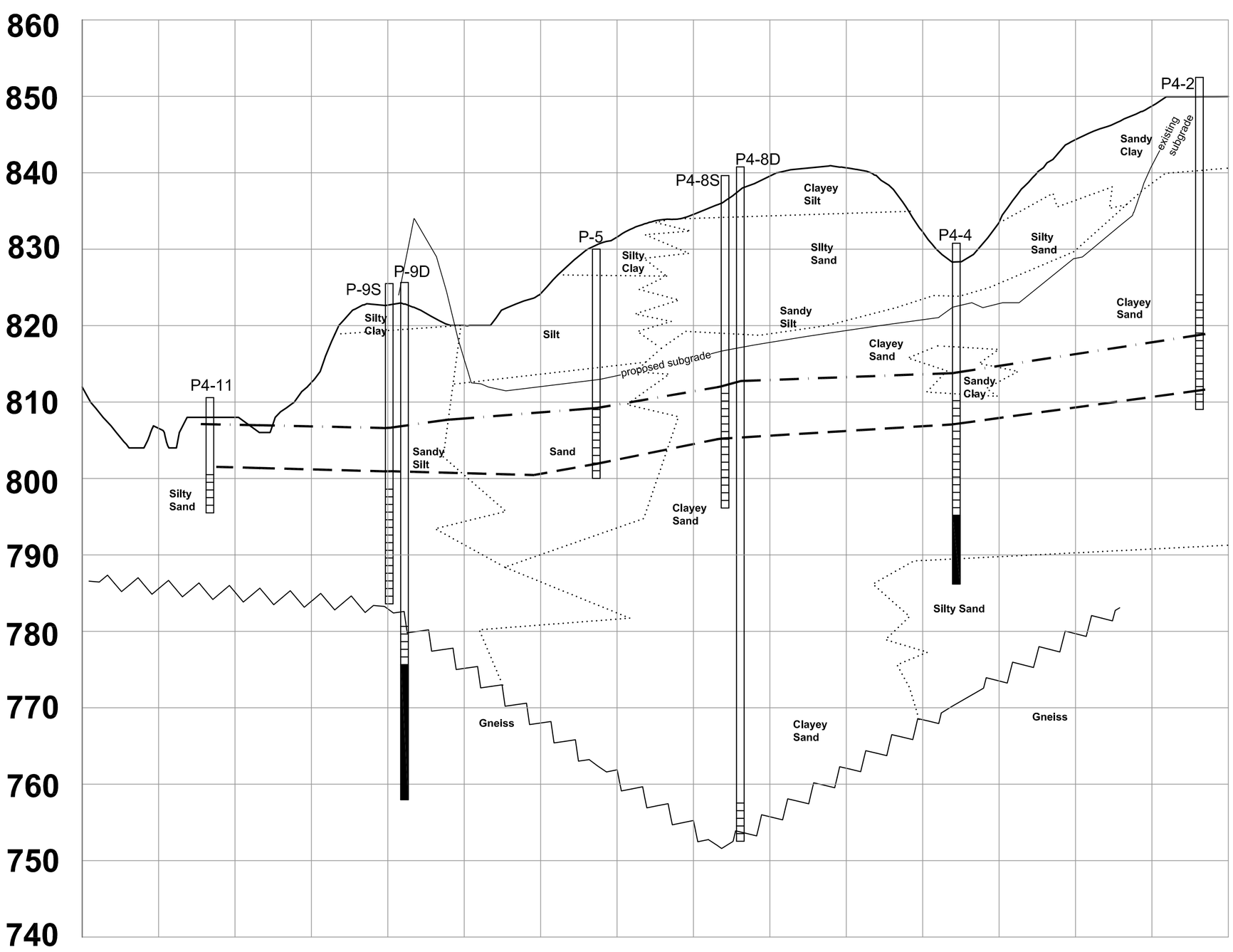
MUNICIPAL SOLID WASTE LANDFILL
IREDELL COUNTY
NORTH CAROLINA

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
P.O. BOX 828 MOREHEAD CITY, N.C. 28557 (252) 726-9481



SECTION B-B'

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



LEGEND:

- EXISTING GROUND SURFACE
- ESTIMATED STRATIGRAPIC CONTACT
- TOP OF COMPETENT ROCK
- LONG-TERM SEASONAL HIGH GROUNDWATER
- SINGLE DAY

P1-12S — PIEZOMETER

SCREENED SECTION

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.
- LONG-TERM SEASONAL HIGH WATER TABLE AND TOP OF ROCK SURFACES WERE DERIVED FROM THEIR RESPECTIVE CONTOUR SURFACES IN PLATES 4B AND 7.
- REFER TO PLATE 8-A FOR CROSS SECTION LOCATION.

PLATE 8B

DATE	BY	REV.	DESCRIPTION
3/14/2007	MMC	1	ADJUSTED ESTIMATED LONG-TERM SEASONAL HIGH

CROSS SECTION MAP

DRAWING NO. PLATE 8B
SHEET NO. 2 of 2
PROJECT NUMBER G06035.6
CHKD. BY: E. CALDWELL
DRWN. BY: M. CLEMENT
DATE: 10/17/06
SCALE: 1" = 100'

MUNICIPAL SOLID WASTE LANDFILL
IREDELL COUNTY
NORTH CAROLINA

Municipal Services
P.O. BOX 97 GARNER, N.C. 27529
(919) 772-5393
Engineering Company, P.A.
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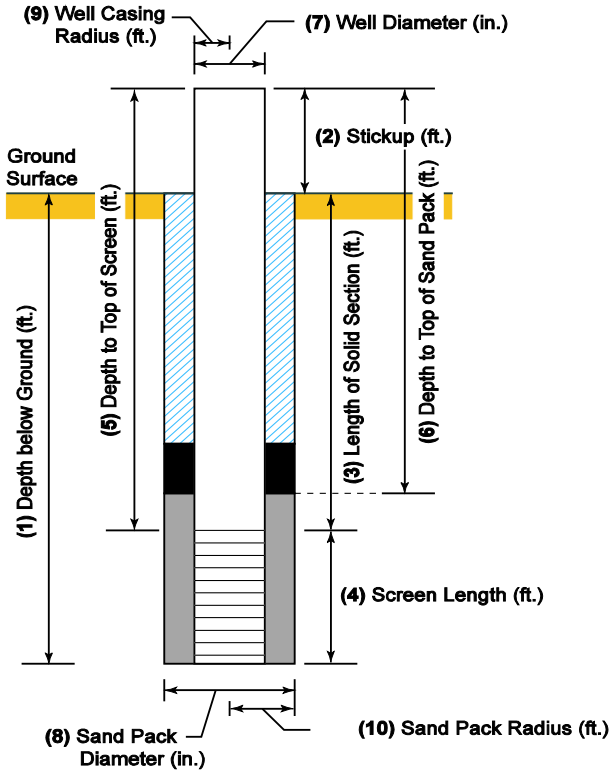
(828) 262-1767
P.O. BOX 828 MOREHEAD CITY, N.C. 28557
(252) 726-9481

APPENDIX A

Table A-1. Piezometer geometry summary

Well	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
P4-1D	48.21	2.70	43.21	5	45.91	42.70	2	8.5	0.08	0.35
P4-1S	27.13	2.85	12.13	15	14.98	12.85	2	8.5	0.08	0.35
P4-2	40.78	2.65	25.78	15	28.43	25.65	2	8.5	0.08	0.35
P4-3	47.33	2.80	32.33	15	35.13	35.80	2	8.5	0.08	0.35
P4-4	33.07	2.61	18.07	15	20.68	18.61	2	8.5	0.08	0.35
P4-5	35.96	2.41	20.96	15	23.37	20.41	2	8.5	0.08	0.35
P4-6	20.24	1.62	7.24	13	8.86	6.62	2	8.5	0.08	0.35
P4-7D	39.44	2.40	34.44	15	36.84	34.40	2	8.5	0.08	0.35
P4-7S	17.05	2.55	7.05	10	9.60	6.55	2	8.5	0.08	0.35
P4-8D	85.46	2.94	80.46	5	83.40	80.44	2	8.5	0.08	0.35
P4-8S	40.45	3.00	25.45	15	28.45	27.00	2	8.5	0.08	0.35
P4-9	30.42	3.00	15.42	15	18.42	17.25	2	8.5	0.08	0.35
P4-10	28.45	2.95	13.45	15	16.40	14.95	2	8.5	0.08	0.35
P4-11	12.42	2.68	7.42	5	10.10	7.68	2	8.5	0.08	0.35
P4-12	17.68	2.41	7.68	10	10.09	8.66	2	8.5	0.08	0.35
P4-13D	44.42	2.85	39.42	5	42.27	39.85	2	8.5	0.08	0.35
P4-13S	20.09	3.35	5.09	15	8.44	6.35	2	8.5	0.08	0.35
P4-14	26.19	2.94	14.13	12.06	17.07	14.94	2	8.5	0.08	0.35



NOTE:

1. Parameters in the table are numbered (1) through (10), and correspond to the numbers in the diagram below the table.
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.

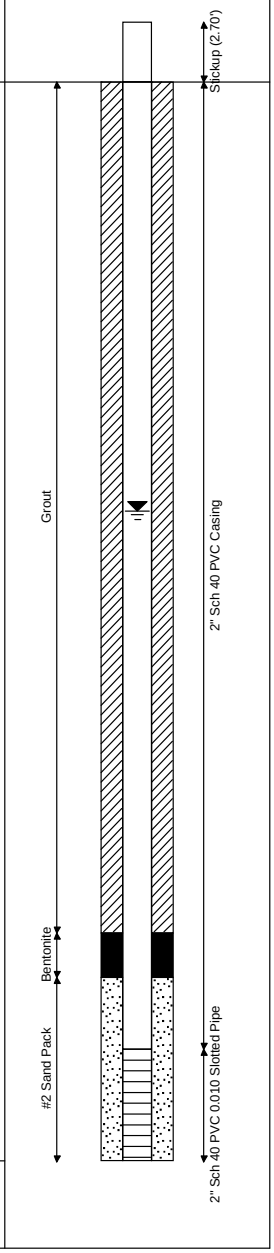
LOG OF BORING: P4-1D

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/30/2004	Surface elevation:	842.29 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/30/2004	Top of pipe elevation:	844.99 ft (MSL)
Logged by:	E. Caldwell	Completion depth:	48.21 ft	Depth to water (TOB):	30.57 ft
		Stickup height:	2.70 ft	Depth to water (24hrs):	19.17 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	10			Sandy SILT, yellow brown, organic matter, slightly micaceous, moist.
5	18			Sandy SILT, dark yellow brown, moist
10				Silty Sandy CLAY (CH), brown, Gravel = 0.73%, Sand = 36.37%, Silt = 26.25%, Clay = 34.88%, LL = 68%, PL = 31%, PI = 37%
15	9			Clayey Silty SAND, pale olive, saprolitic, interbedded white/black partings, micaceous, 40 degree foliation, moist
20	6			Silty CLAY, yellow brown, slight 1/4" nodules, moist
25				Silty SAND (SM), light brown, Gravel = 0.12%, Sand = 56.67%, Silt = 33.53%, Clay = 4.28%, Non-Plastic
30	15			Sandy Silty CLAY, dark green gray, saprolitic, interbedded white/black partings, micaceous, wet
35	18			Sandy CLAY, dark green gray, saprolitic, interbedded partings, quartz sand, very poorly sorted, micaceous, wet
40	18			Clayey SAND, slight olive brown, saprolitic, quartz sand, very poorly sorted, micaceous, wet
45	20			As Above
50				Boring terminated at 48.2 feet *Log of Boring classified soils based on retained soil samples, field boring log observations, and laboratory results.

Well Diagram



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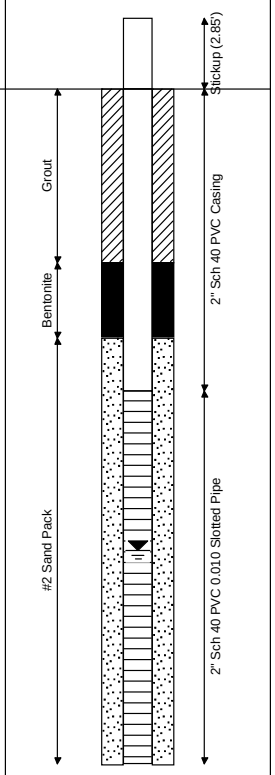
LOG OF BORING: P4-1S

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/30/2004	Surface elevation:	841.68 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/30/2004	Top of pipe elevation:	844.53 ft (MSL)
Logged by:	E. Caldwell	Completion depth:	27.13 ft	Depth to water (TOB):	15.72 ft
		Stickup height:	2.85 ft	Depth to water (24hrs):	18.57 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	10			Soil Description to 27 feet from adjacent P4-1D - Sandy SILT, yellow brown, organic matter, slightly micaceous, moist
5	18			Sandy SILT, dark yellow brown, moist
10				Silty Sandy CLAY (CH), brown, Gravel = 0.73%, Sand = 36.37%, Silt = 26.25%, Clay = 34.88, LL = 68%, PL = 31%, PI = 37%
15	9			Clayey Silty SAND, pale olive, saprolitic, interbedded white/black partings, micaceous, 40 degree foliation, moist
20	6			Silty CLAY, yellow brown, slight 1/4" nodules, moist
25				Silty SAND (SM), light brown, Gravel = 0.12%, Sand = 56.67%, Silt = 33.53%, Clay = 4.28%, Non-Plastic.
				Boring terminated at 27.1 feet
30				
35				
40				*Log of Borings classified soils based on retained soil samples, field boring log observations, and laboratory results.
45				

Well Diagram



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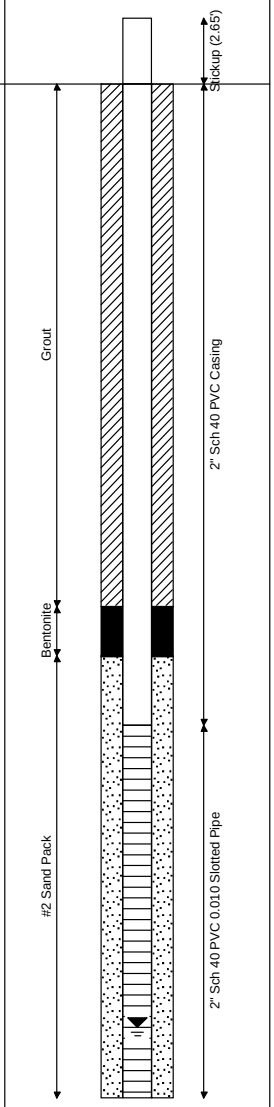
LOG OF BORING: P4-2

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/20/2004	Surface elevation:	849.59 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/20/2004	Top of pipe elevation:	852.24 ft (MSL)
Logged by:	E. Caldwell	Completion depth:	40.78 ft	Depth to water (TOB):	37.94 ft
		Stickup height:	2.65 ft	Depth to water (24hrs):	37.94 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	23			Sandy CLAY, light brown, moist
5	11			As Above
10	7			Clayey SAND, dark yellow brown, saprolitic, fine grain, very poorly sorted, very micaceous, moist
15	13			Clayey SAND, moderate yellow brown, saprolitic, moist
20	14			Clayey SAND, moderate yellow brown, saprolitic, with white weathered feldspar partings, moist
25	12			Clayey SAND, moderate yellow brown, saprolitic, interbedded white/black partings, moist
30	28			As Above
35	16			Clayey SAND, pale yellow orange, saprolitic, medium grained, very poorly sorted, wet
40	40			Clayey SAND, dark yellow orange, saprolitic, medium grained, very poorly sorted, with black partings, wet
				Boring terminated at 40.8 feet
45				*Log of Borings classified soils based on retained soil samples, field boring log observations, and laboratory results.

Well Diagram



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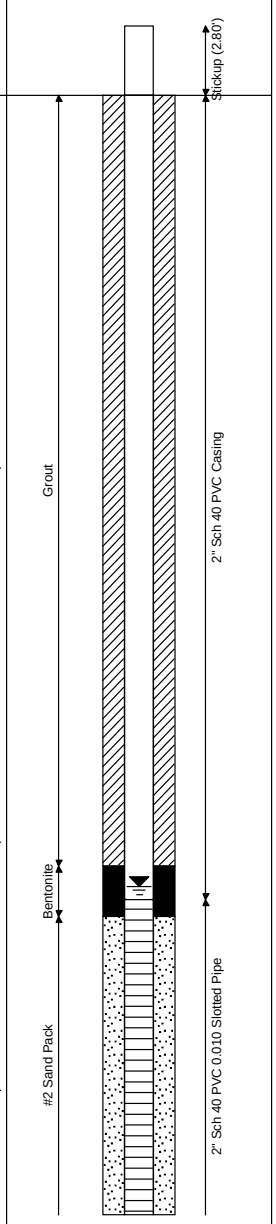
LOG OF BORING: P4-3

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/20/2004	Surface elevation:	846.55 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/20/2004	Top of pipe elevation:	849.35 ft (MSL)
Logged by:	E. Caldwell	Completion depth:	76.00 ft	Depth to water (TOB):	NM
		Stickup height:	2.80 ft	Depth to water (24hrs):	31.80 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	6			Sandy CLAY, moderate red brown, dry
5	20			Sandy CLAY, moderate red brown, micaceous, moist
10	16			As Above
15	23			Clayey SAND, pale red brown, saprolitic, white partings, fine grained, micaceous, moist
20	21			As Above
25	11			As Above
30	24			Clayey SAND, pale yellow orange, saprolitic, medium grained, very poorly sorted, clay weathered feldspar partings, wet
35	12			As Above
40	23			Clayey SAND, bluish gray, saprolitic, interbedded white/black partings, fine grained, very poorly sorted micaceous, wet
45				

Well Diagram



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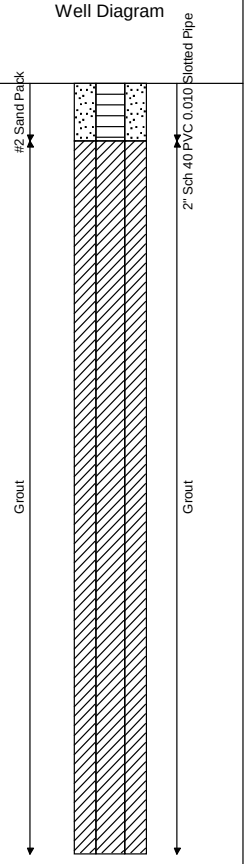
LOG OF BORING: P4-3

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/20/2004	Surface elevation:	846.55 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/20/2004	Top of pipe elevation:	849.35 ft (MSL)
Logged by:	E. Caldwell	Completion depth:	76.00 ft	Depth to water (TOB):	NM
		Stickup height:	2.80 ft	Depth to water (24hrs):	31.80 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	12			As Above
50	21			As Above
55	22			As Above
60	21			As Above
65	15			As Above
70	19			Clayey SAND, moderate brown, saprolitic, black partings, very poorly sorted, micaceous, wet
75	19			As Above Auger Refusal
				Boring terminated at 76.0 feet
80				
85				*Log of Borings classified soils based on retained soil samples, field boring log observations, and laboratory results.
90				

Well Diagram



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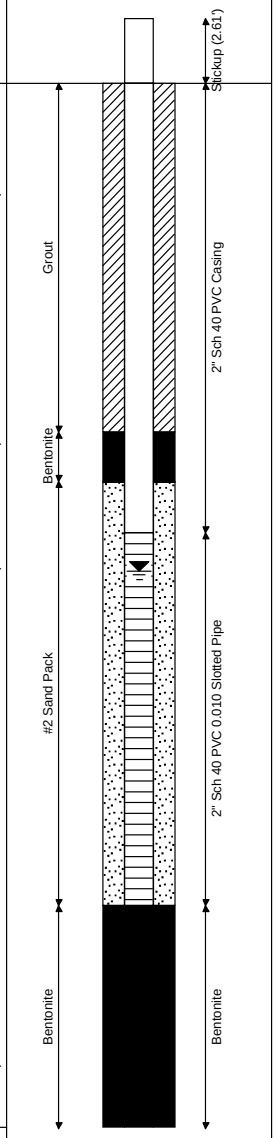
LOG OF BORING: P4-4

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/27/2004	Surface elevation:	828.80 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/27/2004	Top of pipe elevation:	831.41 ft (MSL)
Logged by:	E Caldwell	Completion depth:	42.00 ft	Depth to water (TOB):	19.66 ft
		Stickup height:	2.61 ft	Depth to water (24hrs):	19.61 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	9			Silty SAND, light brown, fine grained, poorly sorted
5	8			Clayey SAND, moderate yellow brown, saprolitic, fine grained, slightly micaceous
10	7			Clayey SAND, moderate red brown, saprolitic, fine grained, micaecous, black partings
15	7			Sandy CLAY, moderate yellow brown, saprolitic, fine grained, micaceous
20	9			Clayey SAND, blue gray, saprolitic, quartz sand, very poorly sorted, micaceous
25	7			As Above
30	11			As Above - with coarse grained quartz sand
35	21			As above - slight white mottling
40	17			Silty SAND, moderate olive brown, saprolitic
				Boring terminated at 42.0 feet
45				*Log of Borings classified soils based on retained soil samples, field boring log observations, and laboratory results.

Well Diagram



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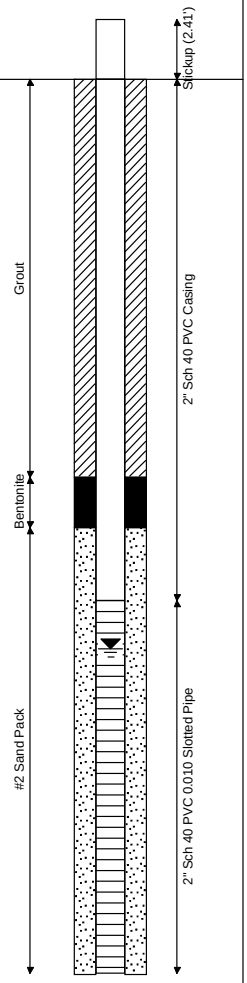
LOG OF BORING: P4-5

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/21/2004	Surface elevation:	838.66 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/21/2004	Top of pipe elevation:	841.07 ft (MSL)
Logged by:	E. Caldwell	Completion depth:	36.00 ft	Depth to water (TOB):	23.19 ft
		Stickup height:	2.41 ft	Depth to water (24hrs):	22.89 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	9			Soil Description to 36 feet from adjacent B4-5 - Sandy CLAY, red brown, moist
5	16			Clayey SAND, gray orange, fine grained, very poorly sorted, slight white mottling, wet
10	11			As Above - moist
15	9			Clayey SAND, dark yellow orange, saprolitic, medium grained, very poorly sorted, moist
20	9			As Above
25	13			Clayey SAND, blue gray, saprolitic, interbedded white/black partings, quartz sand, very poorly sorted, micaceous, 15 degree foliation, wet
30	16			Clayey SAND, blue gray, saprolitic, interbedded white/black partings, quartz sand, very poorly sorted, micaceous, wet
35	20			As Above
				Boring terminated at 36.0 feet
40				*Log of Borings classified soils based on retained soil samples, field boring log observations, and laboratory results.
45				

Well Diagram



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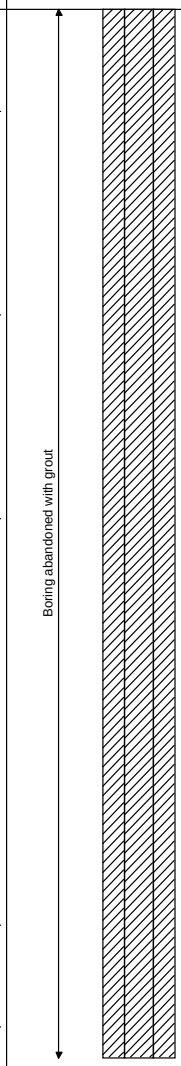
LOG OF BORING: B4-5

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/21/2004	Surface elevation:	
Drill rig & method:	8.5" O.D HSA	Date ended:	12/21/2004	Top of pipe elevation:	
Logged by:	E. Caldwell	Completion depth:	50.00 ft	Depth to water (TOB):	
		Stickup height:		Depth to water (24hrs):	

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	9			Sandy CLAY, reddish brown, moist
5	16			Clayey SAND, grayish orange, fine grained, very poorly sorted, slight white mottling, wet
10	11			As Above - moist
15	9			Clayey SAND, dark yellowish orange, saprolitic, medium grained, very poorly sorted, moist
20	9			As Above
25	13			Clayey SAND, bluish gray, saprolitic, interbedded white/black partings, quartz sand, very poorly sorted, micaceous, 15 degree foliation, wet
30	16			Clayey SAND, bluish gray, saprolitic, interbedded white/black partings, quartz sand, very poorly sorted, micaceous, wet
35	20			As Above
40	24			As Above
45	43			Clayey SAND,moderate brown, saprolitic, interbedded white/black partings, quartz sand, very poorly sorted, micaceous, wet
50	21			Silty SAND, moderate olive brown, saprolitic
				Boring terminated at 50.0 feet
55				*Log of Borings classified soils based on retained soil samples, field boring log observations, and laboratory results.

Well Diagram



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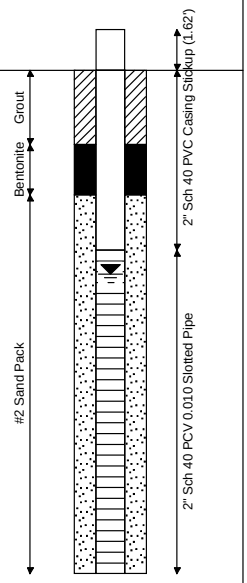
LOG OF BORING: P4-6

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/29/2004	Surface elevation:	824.88 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/29/2004	Top of pipe elevation:	826.50 ft (MSL)
Logged by:	E. Caldwell	Completion depth:	20.00 ft	Depth to water (TOB):	8.08 ft
		Stickup height:	1.62 ft	Depth to water (24hrs):	8.19 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	6			Clayey SAND, yellow brown, fine grained, slight organic matter, wet
5	4			No Recovery
10	3			Clayey SAND, yellow brown, interbedded white/black partings, fine grained, wet
15	3			Clayey SAND, yellow brown, interbedded white/black partings, fine grained, slightly micaceous, wet
20	6			Clayey SAND, yellow brown, saprolitic, white feldspar partings
				Boring terminated at 20.0 feet
25				
30				
35				
40				*Log of Boring classified soils based on retained soil samples, field boring log observations, and laboratory results.
45				

Well Diagram



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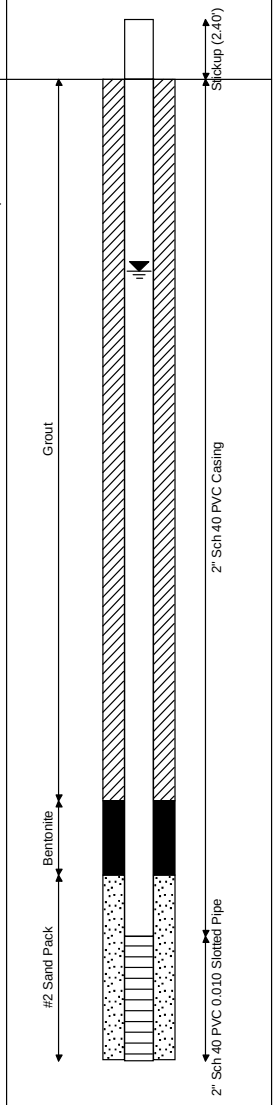
LOG OF BORING: P4-7D

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/30/2004	Surface elevation:	816.60 ft (MSL)
Drill rig & method:	8.5" O.D HSA - 4" O.D HQ Core	Date ended:	12/30/2004	Top of pipe elevation:	819.00 ft (MSL)
Logged by:	E. Caldwell	Completion depth:	41.50 ft	Depth to water (TOB):	8.10 ft
		Stickup height:	2.40 ft	Depth to water (24hrs):	7.70 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	8			Soil description to 17 feet from adjacent P4-7S - Silty SAND, dark yellow orange, moist
5	6			Clayey SAND, blue gray, saprolitic, quartz sand, very poorly sorted, micaceous, moist
10	5			As Above - very micaceous
15	7			Clayey SAND, blue gray, saprolitic, interbedded white/gray partings, quartz sand, very poorly sorted, micaceous, wet
20	14			Clayey SAND, blue gray, saprolitic, quartz sand, very poorly sorted, micaceous, wet
25	14			As Above
				Auger Refusal Core - Run #1 No recovery (28-33.5)
30				
35				Run #2 (REC) 4.9'/8.0' = 61.3%; (RQD) 4.0'/8.0' = 50% (33.5' - 41.5') Gneiss - 25 degree foliation, undulated fractures along biotite mica layers parallel to foliation, slight iron stained weathering on upper portion of recovered core
40				
				Boring terminated at 41.5 feet
45				*Log of Borings classified soils based on retained soil samples, field boring log observations, and laboratory results.

Well Diagram



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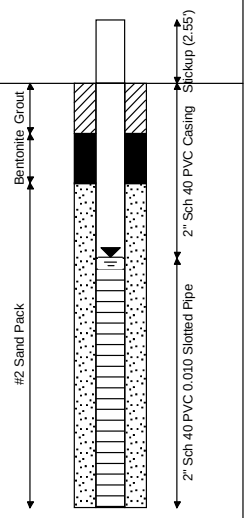
LOG OF BORING: P4-7S

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/29/2004	Surface elevation:	815.92 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/29/2004	Top of pipe elevation:	818.47 ft (MSL)
Logged by:	E. Caldwell	Completion depth:	17.00 ft	Depth to water (TOB):	7.37 ft
		Stickup height:	2.55 ft	Depth to water (24hrs):	7.00 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	8			Silty SAND, dark yellow orange, moist
5	6			Clayey SAND, blue gray, saprolitic, quartz sand, very poorly sorted, micaceous, moist
10	5			As Above - very micaceous
15	7			Clayey SAND, blue gray, saprolitic, interbedded white/gray partings, quartz sand, very poorly sorted, micaceous, wet
				Boring terminated at 17.0 feet
20				
25				
30				
35				
40				
45				

Well Diagram



*Log of Boring classified soils based on retained soil samples, field boring log observations, and laboratory results

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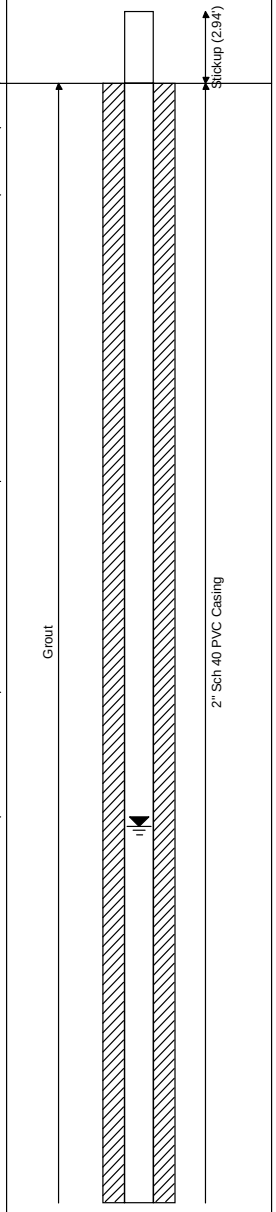
LOG OF BORING: P4-8D

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/27/2004	Surface elevation:	836.88 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/28/2004	Top of pipe elevation:	839.82 ft (MSL)
Logged by:	J. Pfohl/E. Caldwell	Completion depth:	85.33 ft	Depth to water (TOB):	31.00 ft
		Stickup height:	2.94 ft	Depth to water (24hrs):	29.88 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	12			Top soil
				Clayey SILT, red, slightly cohesive, micaceous, frozen
5	17			Silty SAND, moderate red brown, fine grained, poorly sorted, dry
10				Silty SAND (SM), light pink brown, Gravel = 0.17%, Sand = 58.77%, Silt = 32.38%, Clay = 5.07%, Non Plastic
15	13			Sandy SILT, brown, relict structure, black silt partings, white silt pockets, micaceous, dry
20	10			As Above
25	14			Clayey SAND, dark yellow orange, saprolitic, fine grained, poorly sorted
30	16			Clayey SAND, moderate brown, saprolitic, fine grained, poorly sorted, micaceous, dry
35	19			As Above
40	21			As Above
45	14			As Above

Well Diagram



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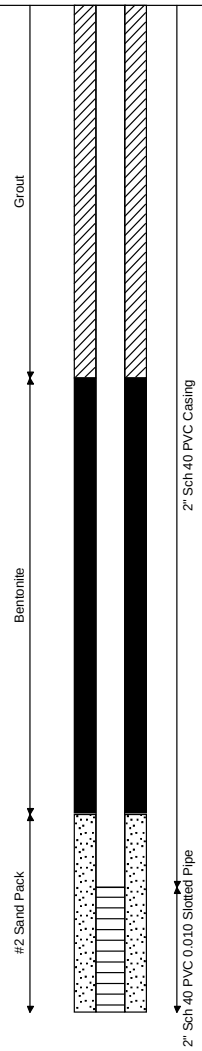
LOG OF BORING: P4-8D

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/27/2004	Surface elevation:	836.88 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/28/2004	Top of pipe elevation:	839.82 ft (MSL)
Logged by:	J. Pfohl/E. Caldwell	Completion depth:	85.33 ft	Depth to water (TOB):	31.00 ft
		Stickup height:	2.94 ft	Depth to water (24hrs):	29.88 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
50	23			Clayey SAND, dark yellow brown, saprolitic, medium grained, very poorly sorted, slightly micaceous
55	17			As Above
60	27			As Above
65	29			As Above
70	34			No recovery
				Hard layer 72' - 73' - HSA plugged no split spoons taken
75				
80				
85				Auger Refusal
				Boring terminated at 85.3 feet
90				*Log of Borings classified soils based on retained soil samples, field boring log observations, and laboratory results.

Well Diagram



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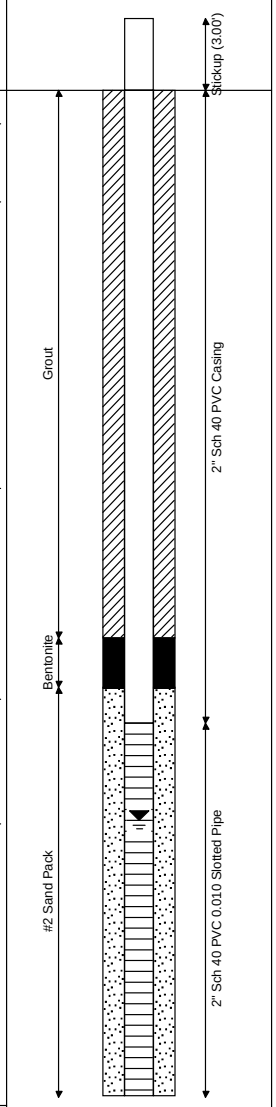
LOG OF BORING: P4-8S

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/27/2004	Surface elevation:	836.54 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/27/2004	Top of pipe elevation:	839.54 ft (MSL)
Logged by:	J. Pfohl/E. Caldwell	Completion depth:	40.45 ft	Depth to water (TOB):	31.16 ft
		Stickup height:	3.00 ft	Depth to water (24hrs):	29.36 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	12			Soil description from adjacent P4-8D - Topsoil
				Clayey SILT, red, slightly cohesive, micaceous, frozen
5	17			Silty SAND, moderate red brown, fine grained, poorly sorted, dry
10				Silty SAND (SM), light pink brown, Gravel = 0.17%, Sand 58.77%, Silt = 32.38%, Clay = 5.07%, Non Plastic
15	13			Sandy SILT, brown, relict structure, black silt partings, white silt pockets, micaceous, dry
20	10			As Above
25	14			Clayey SAND, dark yellow orange, saprolitic, fine grained, poorly sorted
30	16			Clayey SAND, moderate brown, saprolitic, fine grained, poorly sorted, micaceous, dry
35	19			As Above
40	21			As Above
				Boring terminated at 40.5 feet
45				*Log of Borings classified soils based on retained soil samples, field boring log observations, and laboratory results.

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

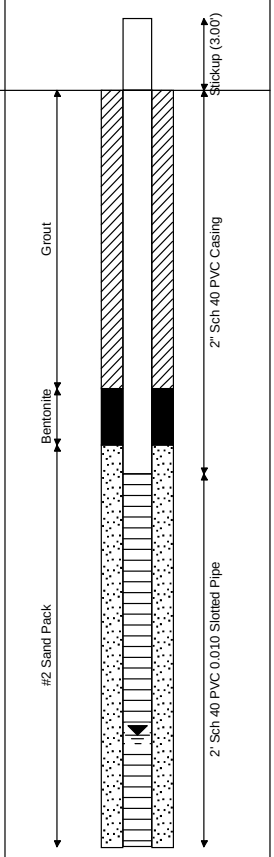
LOG OF BORING: P4-9

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/22/2004	Surface elevation:	823.96 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/22/2004	Top of pipe elevation:	826.96 ft (MSL)
Logged by:	Jonathon Pfohl	Completion depth:	30.42 ft	Depth to water (TOB):	22.94 ft
		Stickup height:	3.00 ft	Depth to water (24hrs):	25.92 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	11			Clayey SILT, red, cohesive, micaceous, moist
5	13			SILT, pink, saprolitic, relict structure, black silt partings, micaceous, moist
10	12			SILT, brown with pink bands, relict structure, black silt pockets, micaceous
15	13			As Above - with minor quartz, moist
20	13			Sandy SILT, brown, saprolitic, relict structure, 1/2" quartz seam, micaceous, moist
30	21			SILT, white, saprolitic, with quartz, wet
				Boring terminated at 30.4 feet
35				
40				*Log of Borings classified soils based on retained soil samples, field boring log observations, and laboratory results
45				

Well Diagram



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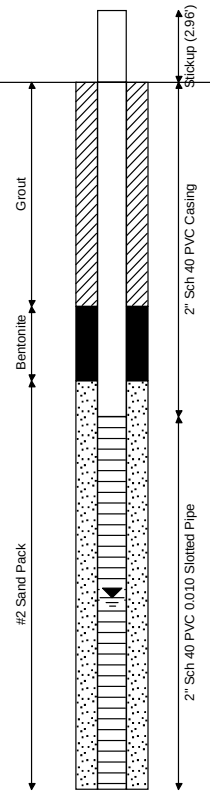
LOG OF BORING: P4-10

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/27/2004	Surface elevation:	819.94 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/27/2004	Top of pipe elevation:	822.90 ft (MSL)
Logged by:	E. Caldwell	Completion depth:	30.00 ft	Depth to water (TOB):	20.76 ft
		Stickup height:	2.96 ft	Depth to water (24hrs):	20.74 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
5	26			Sandy CLAY, dark yellow orange
10	14			Silty SAND, pale yellow orange, fine grained, very poorly sorted
15	12			As Above
20	11			Silty SAND, pale yellow orange, saprolitic, fine grained, very poorly sorted, wet
25	11			
30	8			Clayey SAND, bluish gray, saprolitic, very poorly sorted, micaceous
				Boring terminated at 30.0 feet
35				
40				*Log of Borings classified soils based on retained soil samples, field boring log observations, and laboratory results.
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

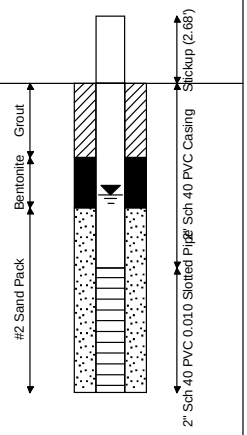
LOG OF BORING: P4-11

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/27/2004	Surface elevation:	807.49 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/27/2004	Top of pipe elevation:	810.17 ft (MSL)
Logged by:	E. Caldwell	Completion depth:	12.42 ft	Depth to water (TOB):	4.63 ft
		Stickup height:	2.68 ft	Depth to water (24hrs):	4.48 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	4			Silty SAND, dark yellow brown, fine grained, moderately sorted, with root matter
5	4			Silty SAND, dark yellow brown, medium grained, moderately sorted
10	18			No recovery
				Auger Refusal
				Boring terminated at 12.4 feet
15				
20				
25				
30				
35				
40				*Log of Borings classified soils based on retained soil samples, field boring log observations, and laboratory results.
45				

Well Diagram



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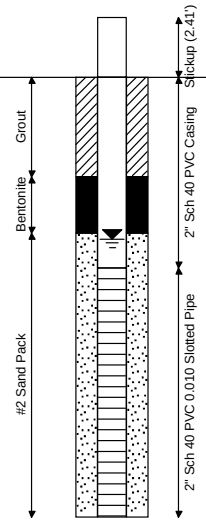
LOG OF BORING: P4-12

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/27/2004	Surface elevation:	805.89 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/27/2004	Top of pipe elevation:	808.30 ft (MSL)
Logged by:	Jonathon Pfohl	Completion depth:	17.68 ft	Depth to water (TOB):	6.59 ft
		Stickup height:	2.41 ft	Depth to water (24hrs):	6.50 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
				Soil description based drillers well construction record. - Topsoil
				Silty SAND, white/tan
				Silty SAND, brown/orange/white/tan
5				
10				
15				
				Boring terminated at 17.7 feet
20				
25				
30				
35				
40				*Log of Borings classified soils based on retained soil samples, field boring log observations, and laboratory results.
45				

Well Diagram



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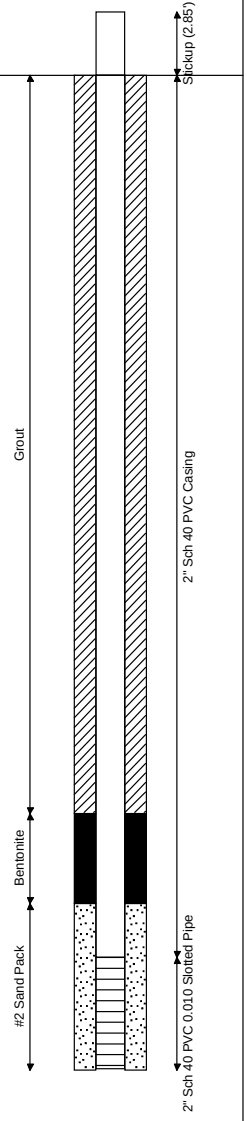
LOG OF BORING: P4-13D

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	1/3/2005	Surface elevation:	803.75 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	1/3/2005	Top of pipe elevation:	806.60 ft (MSL)
Logged by:	E. Caldwell	Completion depth:	44.28 ft	Depth to water (TOB):	8.45 ft
		Stickup height:	2.85 ft	Depth to water (24hrs):	NM

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	8			Silty SAND, moderate brown, medium grained, very poorly sorted, root matter
5				Sandy CLAY (CL), brown, Gravel = 0.28%, Sand = 47.99%, Silt = 24.76%, Clay = 26.64%, LL = 39%, PL = 21%, PI = 18%.
10				Silty SAND (SM), brown, Gravel = 0.29%, Sand = 54.89%, Silt = 25.45%, Clay = 3.79%, LL = 50%, PL = 38%, PI = 12%
15	15			Clayey SAND, dark yellow orange, saprolitic, white partings, medium grained, very poorly sorted, wet
20	26			As Above
25	24			Clayey SAND, dark yellow orange, saprolitic, black partings, medium grained, very poorly sorted, 30 degree foliation, wet
30	34			Clayey SAND, dark yellow orange, saprolitic, white partings, medium grained, very poorly sorted, wet
35	39			Clayey SAND, dark yellow orange, saprolitic, interbedded white/black partings, medium grained, very poorly sorted, wet
40	27			Clayey SAND, dark yellow orange, saprolitic, white partings, medium grained, very poorly sorted, 20 degree foliation
				Auger Refusal
45				Boring terminated at 44.3 feet
50				*Log of Boring classified soils based on retained soil samples, field boring log observations, and laboratory results.

Well Diagram



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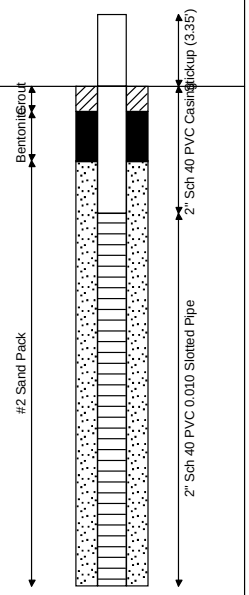
LOG OF BORING: P4-13S

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	1/3/2005	Surface elevation:	803.90 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	1/3/2005	Top of pipe elevation:	807.25 ft (MSL)
Logged by:	E. Caldwell	Completion depth:	20.00 ft	Depth to water (TOB):	8.47 ft
		Stickup height:	3.35 ft	Depth to water (24hrs):	NM

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	8			Soil Description from adjacent P4-13D - Silty SAND, moderate brown, medium grained, very poorly sorted, root matter
5				Sandy CLAY (CL), brown, Gravel = 0.28%, Sand = 47.99%, Silt = 24.76%, Clay = 26.64%, LL = 39%, PL = 21%, PI = 18%.
10				Silty SAND (SM), brown, Gravel = 0.29%, Sand = 54.89%, Silt = 25.45%, Clay = 3.79%, LL = 50%, PL = 38%, PI = 12%
15	15			Clayey SAND, dark yellow orange, saprolitic, white partings, medium grained, very poorly sorted, wet
20	26			As Above
				Boring terminated at 20.0 feet
25				
30				
35				
40				*Log of Boring classified soils based on retained soil samples, field boring log observations, and laboratory results.
45				

Well Diagram



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Page 1 of 1

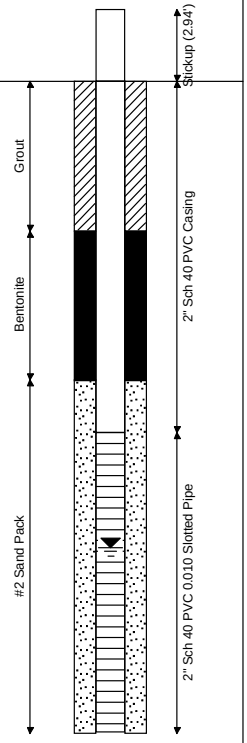
LOG OF BORING: P4-14

Iredell County Landfill - Phase 4 **Project No. G04099.0**

Drilling contractor:	Geologic Explorations	Date started:	12/22/2004	Surface elevation:	823.73 ft (MSL)
Drill rig & method:	8.5" O.D HSA	Date ended:	12/22/2004	Top of pipe elevation:	826.67 ft (MSL)
Logged by:	E. Caldwell	Completion depth:	26.19 ft	Depth to water (TOB):	18.72 ft
		Stickup height:	2.94 ft	Depth to water (24hrs):	18.75 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	11			Sandy CLAY, pale yellow orange, with root matter
5	7			Clayey SAND, gray yellow, sarpolitic, sligthly micaceous
10	3			As Above
15	6			Clayey SAND, pale olive, sarpolitic, sligthly micaceous
20	7			Clayey SAND, moderate yellow brown, sarpolitic, sligthly micaceous
25				As Above
				Boring terminated at 26.2 feet
30				
35				
40				*Log of Boring classified soils based on retained soil samples, field boring log observations, and laboratory results.
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

Page 1 of 1

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MARK GETTYS CERTIFICATION # 2345

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☐ Slope ☐ Valley ☒ Flat
(check appropriate box)
Latitude/longitude of well location
35.77205/80.83779
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 12/30/04
5. TOTAL DEPTH: 48.21 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 33.4 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.7 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 N/A
10. WATER ZONES (depth): 19.0'BGS

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	5.0	RED CLAY
5.0	10.0	GOLD SANDY CLAY
10.0	20.0	TAN SILTY CLAY
20.0	48.21	TAN SANDY SILT

11. DISINFECTION: Type N/A Amount N/A
12. CASING:

	Depth From	To	Ft	Diameter	Wall Thickness or Weight/Ft.	Material
	0.0	43.21	Ft	2 INCH	SCH 40	PVC
			Ft.			
			Ft.			

13. Grout:

	Depth From	To	Ft.	Material	Method
	0.0	38.0	Ft.	Portland Bentonite	Slurry
			Ft.		

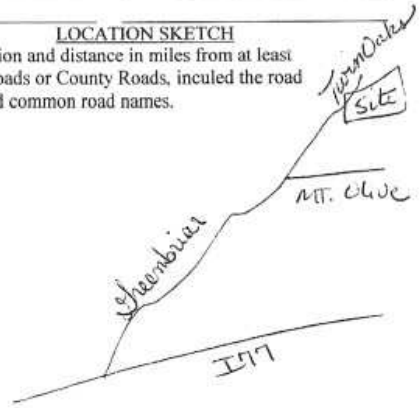
14. SCREEN:

	Depth From	To	Ft.	Diameter	in.	Slot Size	in	Material
	43.21	48.21	Ft.	2.0	in.	0.01	in	PVC
			Ft.		in.		in	

15. SAND/GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	40.0	48.21	Ft.	#2	FINE SILICA SAND
			Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-1D BENTONITE SEAL FROM 38.0 TO 40.0 FEET

I DO HEARBY 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 2/9/05

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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MARK GETTYS CERTIFICATION # 2345

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION, INC PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☐ Slope ☐ Valley ☒ Flat
(check appropriate box)
Latitude/longitude of well location
35.77204/80.83778
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 12/30/04
5. TOTAL DEPTH: 27.13 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 18.65 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.85 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 N/A
10. WATER ZONES (depth): 19.0'BGS

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	5.0	RED CLAY
5.0	10.0	GOLD SANDY CLAY
10.0	20.0	TAN SILTY CLAY
20.0	27.13	TAN SANDY SILT

11. DISINFECTION: Type N/A Amount N/A
12. CASING:

	Depth From	Depth To		Diameter	Wall Thickness or Weight/Ft.	Material
	0.0	12.13	Ft	2 INCH	SCH 40	PVC
			Ft.			
			Ft.			

13. Grout:

Depth From	Depth To		Material	Method
0.0	7.0	Ft.	Portland Bentonite	Slurry
		Ft.		

14. SCREEN:

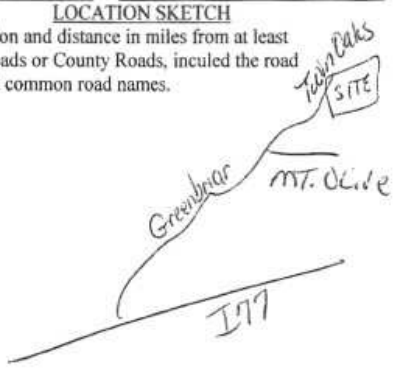
Depth From	Depth To		Diameter		Slot Size		Material
12.13	27.13	Ft.	2.0	in.	0.01	in	PVC
		Ft.		in.		in	

15. SAND/GRAVEL PACK:

Depth From	Depth To		Size	Material
10.0	27.13	Ft.	#2	FINE SILICA SAND
		Ft.		

LOCATION SKETCH

Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-1S BENTONITE SEAL FROM 7.0 TO 10.0 FEET

I DO HEARBY 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

Mark K. Gettys 2/9/05

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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MARK GETTYS CERTIFICATION # 2345

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☐ Slope ☐ Valley ☒ Flat
(check appropriate box)
Latitude/longitude of well location
35.77184/80.83559
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	10.0	ORANGE CLAYEY SILT
10.0	28.0	BROWN CLAYEY SILT
28.0	40.78	ROCKY BROWN SILT QUARTZ

4. DATE DRILLED 12/20/04
5. TOTAL DEPTH: 40.78 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 40.7 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.65 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 N/A
10. WATER ZONES (depth): 32.0'BGS
11. DISINFECTION: Type N/A Amount N/A
12. CASING:

	Depth			Diameter	Wall Thickness or Weight/Ft.	Material
From 0.0	To 25.78	Ft		2 INCH	SCH 40	PVC
From	To	Ft.				
From	To	Ft.				

13. Grout:

	Depth			Material	Method
From 0.0	To 21.0	Ft.		Portland Bentonite	Slurry
From	To	Ft.			

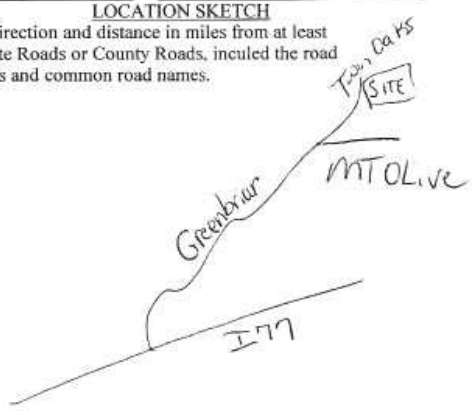
14. SCREEN:

	Depth			Diameter	Slot Size	Material
From 25.78	To 40.78	Ft.		2.0 in.	0.01 in	PVC
From	To	Ft.		in.	in	

15. SAND/GRAVEL PACK:

	Depth			Size	Material
From 23.0	To 40.78	Ft.		#2	FINE SILICA SAND
From	To	Ft.			

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-2 BENTONITE SEAL FROM 21.0 TO23.0 FEET

I DO HEARBY 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

Mark K. Gettys 2/9/05

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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MARK GETTYS CERTIFICATION # 2345

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☒ Slope ☐ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.76853/80.83641
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 12/20/04
5. TOTAL DEPTH: 47.33 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 34.69 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.8 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 N/A
10. WATER ZONES (depth): 37.0'BGS

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	5.0	RED SANDY CLAY
5.0	20.0	RED/BROWN SILT
20.0	45.0	TAN/ORANGE CLAYEY SILT
45.0	47.33	BROWN CLAYEY SILT

11. DISINFECTION: Type N/A Amount N/A
12. CASING:

	Depth From	To	Ft	Diameter	Wall Thickness or Weight/Ft.	Material
	0.0	32.33	Ft	2 INCH	SCH 40	PVC
			Ft.			
			Ft.			

13. Grout:

	Depth From	To	Ft.	Material	Method
	0.0	31.0	Ft.	Portland Bentonite	Slurry
	47.33	76.0	Ft.	Portland Bentonite	Slurry

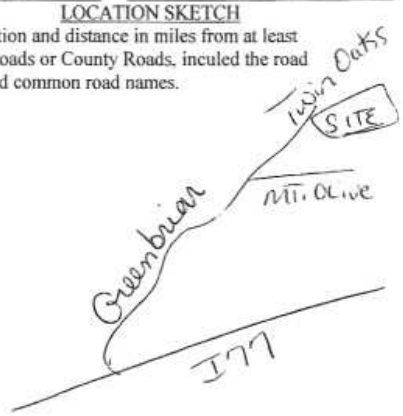
14. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
	32.33	47.33	Ft.	2.0 in.	0.01 in	PVC
			Ft.	in.	in	

15. SAND/GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	33.0	47.33	Ft.	#2	FINE SILICA SAND
			Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-3 BENTONITE SEAL FROM 31.0 TO 33.0 FEET

I DO HEARBY 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

Mark K. Gettys 2/9/05
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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MIKE MCCONAHEY CERTIFICATION # 2402

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☒ Slope ☐ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.77094/80.83577
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 12/27/04
5. TOTAL DEPTH: 33.07 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 22.35 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.61 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 N/A
10. WATER ZONES (depth): 31.0'BGS

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	1.0	TOPSOIL
1.0	4.0	ORANGE/TAN SANDY SILT
4.0	20.0	BROWN/ORANGE/TAN SANDY SILT
20.0	33.07	WHITE/TAN SILTY SAND

11. DISINFECTION: Type N/A Amount N/A
12. CASING:

	Depth From	Depth To		Diameter	Wall Thickness or Weight/Ft.	Material
	0.0	18.07	Ft	2 INCH	SCH 40	PVC
			Ft.			
			Ft.			

13. Grout:

Depth From	Depth To		Material	Method
0.0	14.0	Ft.	Portland Bentonite	Slurry
		Ft.		

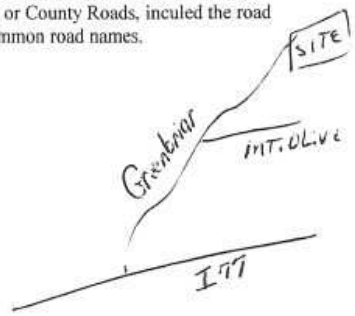
14. SCREEN:

Depth From	Depth To		Diameter		Slot Size		Material
18.07	33.07	Ft.	2.0	in.	0.01	in	PVC
		Ft.		in.		in	

15. SAND/GRAVEL PACK:

Depth From	Depth To		Size	Material
16.0	33.07	Ft.	#2	FINE SILICA SAND
		Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-4 BENTONITE SEAL FROM 14.0 TO 16.0 FEET

I DO HEARBY 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 2/9/05

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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MARK GETTYS CERTIFICATION # 2345

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☒ Slope ☐ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.77100/80.83695
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 12/22/04
5. TOTAL DEPTH: 35.96 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 25.9 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.41 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 N/A
10. WATER ZONES (depth): 25.0'BGS
11. DISINFECTION: Type N/A Amount N/A

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	5.0	ORANGE SANDY SILT
5.0	10.0	TAN SILTY SAND
10.0	20.0	TAN SANDY SILT
20.0	35.96	TAN/BROWN SANDY SILT

12. CASING:

	Depth From	To	Ft	Diameter	Wall Thickness or Weight/Ft.	Material
	0.0	20.96	Ft	2 INCH	SCH 40	PVC
			Ft.			
			Ft.			

13. Grout:

Depth From	To	Ft.	Material	Method
0.0	16.0	Ft.	Portland Bentonite	Slurry
		Ft.		

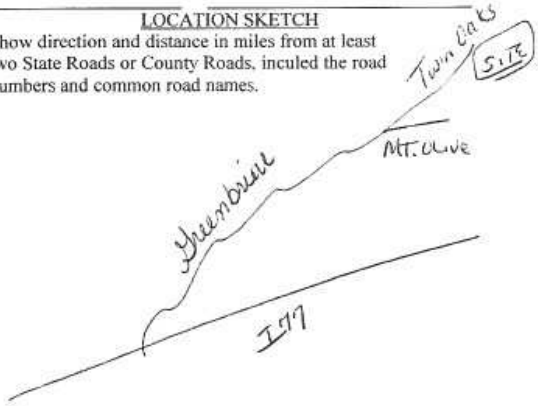
14. SCREEN:

Depth From	To	Ft.	Diameter	Slot Size	Material
20.96	35.96	Ft.	2.0 in.	0.01 in	PVC
		Ft.	in.	in	

15. SAND/GRAVEL PACK:

Depth From	To	Ft.	Size	Material
18.0	35.96	Ft.	#2	FINE SILICA SAND
		Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-5 BENTONITE SEAL FROM 16.0 TO 18.0 FEET/ SOIL DESCRIPTIONS TAKEN FROM OFFSET BORING WHICH WAS ABANDONED.

I DO HEARBY 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

Mark K. Gettys 2/9/05

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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MIKE MCCONAHEY CERTIFICATION # 2402

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☐ Slope ☒ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.770588/80.83810
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 12/29/04
5. TOTAL DEPTH: 20.24 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 9.85 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 1.62 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 N/A
10. WATER ZONES (depth): 8.0'BGS

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	1.0	TOPSOIL
1.0	4.0	ORANGE/TAN SANDY SILT
4.0	20.24	BROWN/ORANGE/TAN SANDY SILT

11. DISINFECTION: Type N/A Amount N/A
12. CASING:

	Depth From	Depth To		Diameter	Wall Thickness or Weight/Ft.	Material
From	0.0	7.24	Ft	2 INCH	SCH 40	PVC
From			Ft.			
From			Ft.			

13. Grout:

	Depth From	Depth To		Material	Method
From	0.0	3.0	Ft.	Portland Bentonite	Slurry
From			Ft.		

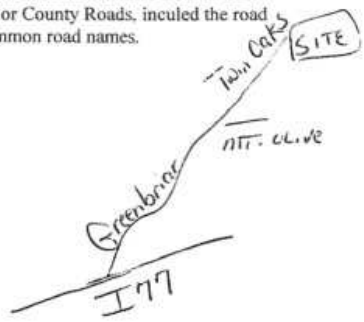
14. SCREEN:

	Depth From	Depth To		Diameter		Slot Size		Material
From	7.24	20.24	Ft.	2.0	in.	0.01	in	PVC
From			Ft.		in.		in	

15. SAND/GRAVEL PACK:

	Depth From	Depth To		Size	Material
From	5.0	20.24	Ft.	#2	FINE SILICA SAND
From			Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-6 BENTONITE SEAL FROM 3.0 TO 5.0 FEET

I DO HEARBY 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

Mike McConahey 2/9/05
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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MIKE MCCONAHEY CERTIFICATION # 2402

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☐ Slope ☒ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.77020/80.83802
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 12/30/04
5. TOTAL DEPTH: 39.44 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 10.5 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.4 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 N/A
10. WATER ZONES (depth): 37.0'BGS

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	1.0	WEEDS/TOPSOIL
1.0	5.0	ORANGE/TAN SILTY SAND
5.0	20.0	BROWN/TAN SILTY SAND
20.0	28.0	TAN SILTY CLAYEY SAND
28.0	39.44	WHITE/BLACK/TAN
		WEATHERED ROCK

11. DISINFECTION: Type N/A Amount N/A
12. CASING:

	Depth From	To	Ft	Diameter	Wall Thickness or Weight/Ft.	Material
From	0.0	To 34.44	Ft	2 INCH	SCH 40	PVC
From		To	Ft.			
From		To	Ft.			

13. Grout:

	Depth From	To	Ft.	Material	Method
From	0.0	To 29.0	Ft.	Portland Bentonite	Slurry
From		To	Ft.		

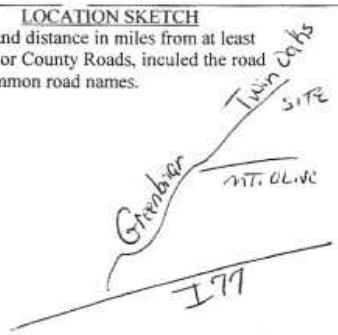
14. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
From	34.44	To 39.44	Ft.	2.0 in.	0.01 in	PVC
From		To	Ft.	in.	in	

15. SAND/GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
From	32.0	To 39.44	Ft.	#2	FINE SILICA SAND
From		To	Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-7D BENTONITE SEAL FROM 29.0 TO 32.0 FEET

I DO HEARBY 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

Mike McConahey 2/9/05
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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MIKE MCCONAHEY CERTIFICATION # 2402

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☐ Slope ☒ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.77020/80.83804
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 12/29/04
5. TOTAL DEPTH: 17.05 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 9.92 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.55 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 N/A
10. WATER ZONES (depth): 9.0'BGS

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	1.0	WEEDS/TOPSOIL
1.0	5.0	ORANGE/TAN SILTY SAND
5.0	17.05	BROWN/TAN SILTY SAND

11. DISINFECTION: Type N/A Amount N/A
12. CASING:

	Depth From	Depth To		Diameter	Wall Thickness or Weight/Ft.	Material
	0.0	7.05	Ft	2 INCH	SCH 40	PVC
			Ft.			
			Ft.			

13. Grout:

Depth From	Depth To		Material	Method
0.0	2.0	Ft.	Portland Bentonite	Slurry
		Ft.		

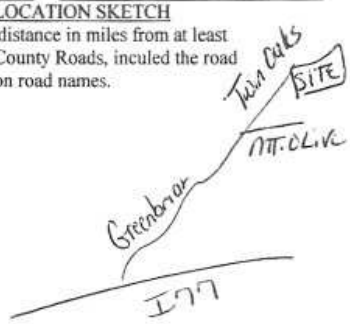
14. SCREEN:

Depth From	Depth To		Diameter		Slot Size		Material
7.05	17.05	Ft.	2.0	in.	0.01	in	PVC
		Ft.		in.		in	

15. SAND/GRAVEL PACK:

Depth From	Depth To		Size	Material
4.0	17.05	Ft.	#2	FINE SILICA SAND
		Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-7S BENTONITE SEAL FROM 2.0 TO 4.0 FEET

I DO HEARBY 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 2/9/05 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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MARK GETTYS CERTIFICATION # 2345

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☒ Slope ☐ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.77035/80.83649
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 12/29/04
5. TOTAL DEPTH: 85.46 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 34.11 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.94 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 N/A
10. WATER ZONES (depth): 30.0'BGS

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	5.0	RED CLAY
5.0	17.0	ORANGE CLAYEY SILT
17.0	28.0	TAN/BROWN SANDY SILT
28.0	60.0	BROWN SANDY SILT
60.0	75.0	GRAY/BROWN SANDY SILT
75.0	85.46	BROWN/WHITE/BLACK
		PARTIALLY WEATHERED ROCK

11. DISINFECTION: Type N/A Amount N/A
12. CASING:

	Depth			Diameter	Wall Thickness or Weight/Ft.	Material
From 0.0	To 80.46	Ft		2 INCH	SCH 40	PVC
From	To	Ft.				
From	To	Ft.				

13. Grout:

	Depth			Material	Method
From 0.0	To 60.0	Ft.		Portland Bentonite	Slurry
From	To	Ft.			

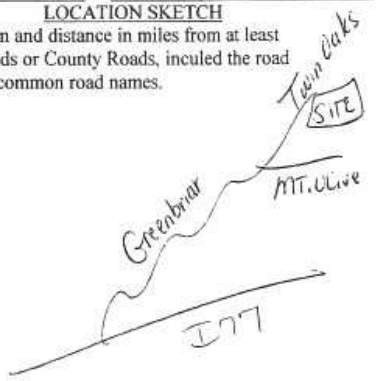
14. SCREEN:

	Depth			Diameter		Slot Size		Material
From 80.46	To 85.46	Ft.		2.0	in.	0.01	in	PVC
From	To	Ft.			in.		in	

15. SAND/GRAVEL PACK:

	Depth			Size	Material
From 77.5	To 85.46	Ft.		#2	FINE SILICA SAND
From	To	Ft.			

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-8D BENTONITE SEAL FROM 60.0 TO 77.5 FEET

I DO HEARBY 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

Mark K. Gettys 2/9/05

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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MARK GETTYS CERTIFICATION # 2345

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION, INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☒ Slope ☐ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.77034/80.83650
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 12/27/04
5. TOTAL DEPTH: 40.45 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 34.28 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3.0 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 N/A
10. WATER ZONES (depth): 29.0'BGS

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	5.0	RED CLAY
5.0	17.0	ORANGE CLAYEY SILT
17.0	28.0	TAN/BROWN SANDY SILT
28.0	40.45	BROWN SANDY SILT

11. DISINFECTION: Type N/A Amount N/A
12. CASING:

	Depth From	Depth To		Diameter	Wall Thickness or Weight/Ft.	Material
From	0.0	25.45	Ft	2 INCH	SCH 40	PVC
From			Ft.			
From			Ft.			

13. Grout:

	Depth From	Depth To		Material	Method
From	0.0	22.0	Ft.	Portland Bentonite	Slurry
From			Ft.		

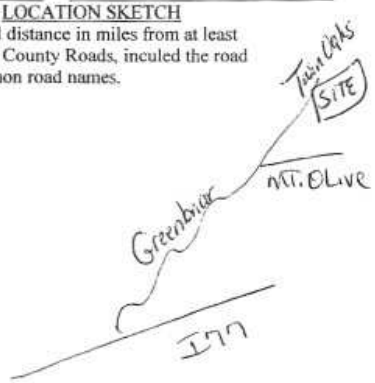
14. SCREEN:

	Depth From	Depth To		Diameter		Slot Size		Material
From	25.45	40.45	Ft.	2.0	in.	0.01	in	PVC
From			Ft.		in.		in	

15. SAND/GRAVEL PACK:

	Depth From	Depth To		Size	Material
From	24.0	40.45	Ft.	#2	FINE SILICA SAND
From			Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-8S BENTONITE SEAL FROM 22.0 TO 24.0 FEET

I DO HEARBY 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

Mark K. Gettys 2/9/05

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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MIKE MCCONAHEY CERTIFICATION # 2402

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☒ Slope ☐ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.76998/80.83573
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 12/22/04
5. TOTAL DEPTH: 30.42 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 26.02 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3.0 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 N/A
10. WATER ZONES (depth): 21.0'BGS

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	1.0	TOPSOIL
1.0	4.0	WHITE/TAN SANDY SILT
4.0	20.0	BROWN/ORANGE/TAN SANDY SILT
20.0	30.42	WHITE/TAN SILTY SAND

11. DISINFECTION: Type N/A Amount N/A
12. CASING:

	Depth			Diameter	Wall Thickness or Weight/Ft.	Material
From 0.0	To 15.42	Ft		2 INCH	SCH 40	PVC
From	To	Ft.				
From	To	Ft.				

13. Grout:

	Depth			Material	Method
From 0.0	To 12.0	Ft.		Portland Bentonite	Slurry
From	To	Ft.			

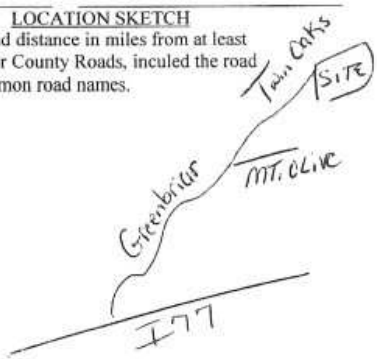
14. SCREEN:

	Depth			Diameter	Slot Size	Material
From 15.42	To 30.42	Ft.		2.0 in.	0.01 in	PVC
From	To	Ft.		in.	in	

15. SAND/GRAVEL PACK:

	Depth			Size	Material
From 14.25	To 30.42	Ft.		#2	FINE SILICA SAND
From	To	Ft.			

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-9 BENTONITE SEAL FROM 12.0 TO 14.25 FEET

I DO HEARBY 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 2/9/05

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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MARK GETTYS CERTIFICATION # 2345

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☒ Slope ☐ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.76935/80.83619
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 12/27/04
5. TOTAL DEPTH: 28.45 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 23.72 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.95 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 N/A
10. WATER ZONES (depth): 18.0'BGS
11. DISINFECTION: Type N/A Amount N/A

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	5.0	RED CLAY
5.0	15.0	ORANGE CLAYEY SILT
15.0	28.45	TAN/BROWN SANDY SILT

12. CASING:

	Depth From	Depth To		Diameter	Wall Thickness or Weight/Ft.	Material
From	0.0	13.45	Ft	2 INCH	SCH 40	PVC
From			Ft.			
From			Ft.			

13. Grout:

	Depth From	Depth To		Material	Method
From	0.0	9.0	Ft.	Portland Bentonite	Slurry
From			Ft.		

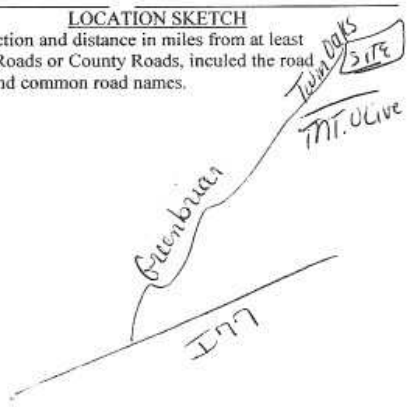
14. SCREEN:

	Depth From	Depth To		Diameter		Slot Size		Material
From	13.45	28.45	Ft.	2.0	in.	0.01	in	PVC
From			Ft.		in.		in	

15. SAND/GRAVEL PACK:

	Depth From	Depth To		Size	Material
From	12.0	28.45	Ft.	#2	FINE SILICA SAND
From			Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-10 BENTONITE SEAL FROM 9.0 TO 12.0 FEET

I DO HEARBY 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

Mark K. Gettys 2/9/05
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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MIKE MCCONAHEY CERTIFICATION # 2402

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☒ Slope ☐ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.76913/80.83798
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 12/22/04
5. TOTAL DEPTH: 12.42 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 7.37 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.68 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 N/A
10. WATER ZONES (depth): 5.0'BGS
11. DISINFECTION: Type N/A Amount N/A

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	1.0	TOPSOIL
1.0	11.0	WHITE/TAN SANDY SILT
11.0	12.42	TAN/WHITE WEATHERED ROCK

12. CASING:

	Depth From	To		Diameter	Wall Thickness or Weight/Ft.	Material
From	0.0	To 7.42	Ft	2 INCH	SCH 40	PVC
From		To	Ft.			
From		To	Ft.			

13. Grout:

	Depth From	To		Material	Method
From	0.0	To 3.0	Ft.	Portland Bentonite	Slurry
From		To	Ft.		

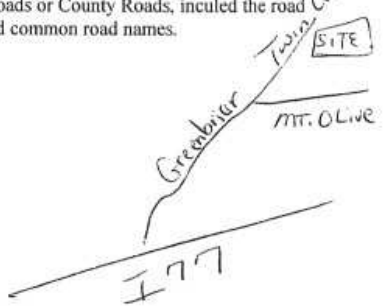
14. SCREEN:

	Depth From	To		Diameter		Slot Size		Material
From	7.42	To 12.42	Ft.	2.0	in.	0.01	in	PVC
From		To	Ft.		in.		in	

15. SAND/GRAVEL PACK:

	Depth From	To		Size	Material
From	5.0	To 12.42	Ft.	#2	FINE SILICA SAND
From		To	Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-11 BENTONITE SEAL FROM 3.0 TO 5.0 FEET

I DO HEARBY 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

Mike McConahey 2/9/05
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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MIKE MCCONAHEY CERTIFICATION # 2402

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

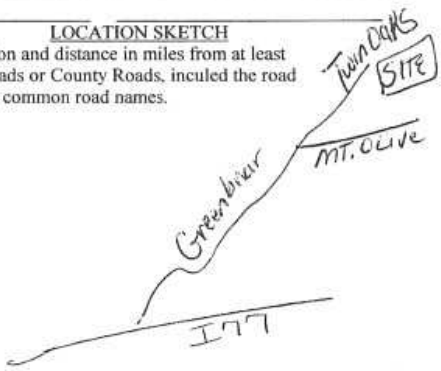
Topographic/Land setting
☐ Ridge ☐ Slope ☒ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.76874/80.83716
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	1.0	Topsoil
1.0	4.0	White/tan silty sand
4.0	17.5	Brown/orange/white/tan silty sand

4. DATE DRILLED 12/27/04
5. TOTAL DEPTH: 17.68 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 9.14 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.41 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 N/A
10. WATER ZONES (depth): 6.0' BGS
11. DISINFECTION: Type N/A Amount N/A

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



12. CASING:

	Depth From	Depth To		Diameter	Wall Thickness or Weight/Ft.	Material
	0.0	7.68	Ft	2 INCH	SCH 40	PVC
			Ft.			
			Ft.			

13. Grout:

Depth From	Depth To		Material	Method
0.0	4.0	Ft.	Portland Bentonite	Slurry
		Ft.		

14. SCREEN:

Depth From	Depth To		Diameter		Slot Size		Material
7.68	17.68	Ft.	2.0	in.	0.01	in	PVC
		Ft.		in.		in	

15. SAND/GRAVEL PACK:

Depth From	Depth To		Size	Material
6.25	17.68	Ft.	#2	FINE SILICA SAND
		Ft.		

16. REMARKS: P4-12 BENTONITE SEAL FROM 4.0 TO 6.25 FEET

I DO HEARBY 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

Mike McConahey 2/9/05
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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MIKE MCCONAHEY CERTIFICATION # 2402

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☐ Slope ☒ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.76841/80.83567
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 01/03/05
5. TOTAL DEPTH: 44.42 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 11.35 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.85 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 N/A
10. WATER ZONES (depth): 7.0/BGS

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	1.0	TOPSOIL
1.0	4.0	WHITE/TAN SANDY SILT
4.0	20.0	BROWN/ORANGE/TAN SANDY SILT
20.0	44.42	ORANGE/TAN/WHITE SILTY SAND

11. DISINFECTION: Type N/A Amount N/A
12. CASING:

	Depth From	Depth To		Diameter	Wall Thickness or Weight/Ft.	Material
	0.0	39.42	Ft	2 INCH	SCH 40	PVC
			Ft.			
			Ft.			

13. Grout:

Depth From	Depth To		Material	Method
0.0	33.0	Ft.	Portland Bentonite	Slurry
		Ft.		

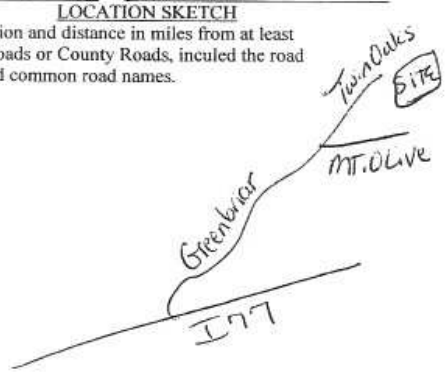
14. SCREEN:

Depth From	Depth To		Diameter		Slot Size		Material
39.42	44.42	Ft.	2.0	in.	0.01	in	PVC
		Ft.		in.		in	

15. SAND/GRAVEL PACK:

Depth From	Depth To		Size	Material
37.0	44.42	Ft.	#2	FINE SILICA SAND
		Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-13D BENTONITE SEAL FROM 33.0 TO 37.0 FEET

I DO HEARBY 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 2/9/05

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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MIKE MCCONAHEY CERTIFICATION # 2402

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☐ Slope ☒ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.76842/80.83567
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 01/03/05
5. TOTAL DEPTH: 20.09 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 11.85 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3.35 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 N/A
10. WATER ZONES (depth): 7.0'BGS

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	1.0	TOPSOIL
1.0	4.0	WHITE/TAN SANDY SILT
4.0	20.09	BROWN/ORANGE/TAN SANDY SILT

11. DISINFECTION: Type N/A Amount N/A
12. CASING:

	Depth From	Depth To		Diameter	Wall Thickness or Weight/Ft.	Material
From	0.0	5.09	Ft	2 INCH	SCH 40	PVC
From			Ft.			
From			Ft.			

13. Grout:

	Depth From	Depth To		Material	Method
From	0.0	1.0	Ft.	Portland Bentonite	Slurry
From			Ft.		

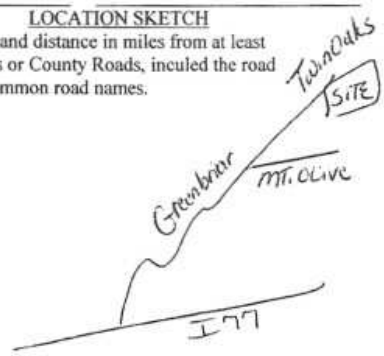
14. SCREEN:

	Depth From	Depth To		Diameter		Slot Size		Material
From	5.09	20.09	Ft.	2.0	in.	0.01	in	PVC
From			Ft.		in.		in	

15. SAND/GRAVEL PACK:

	Depth From	Depth To		Size	Material
From	3.0	20.09	Ft.	#2	FINE SILICA SAND
From			Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-13S BENTONITE SEAL FROM 1.0 TO 3.0 FEET

I DO HEARBY 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

Mike McConahey 2/9/05
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

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) MIKE MCCONAHEY CERTIFICATION # 2402

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION., INC. PHONE # (704) 872-7686

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 Temp. Piez. for Hydro Study

2. WELL LOCATION:
Nearest Town: Statesville County Iredell
3260 Twin Oaks Road 28687
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐ Ridge ☒ Slope ☐ Valley ☐ Flat
(check appropriate box)
Latitude/longitude of well location
35.77000/80.83728
(degrees/minutes/seconds)
Latitude/longitude source: ☒ GPS ☐ Topographic map
(check box)

3. OWNER: Iredell Co. Landfill
Address 3260 Twin Oaks Road
(Street or Route No.)
Statesville NC 28687
City or Town State Zip Code
(704) 878-5430
Area Code – Phone Number

4. DATE DRILLED 12/22/04
5. TOTAL DEPTH: 26.19 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: 21.55 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.94 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 N/A
10. WATER ZONES (depth): 18.5'BGS

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	1.0	TOPSOIL
1.0	10.0	ORANGE/TAN SANDY SILT
10.0	26.19	BROWN/BLACK/ORANGE/TAN SILTY SAND

11. DISINFECTION: Type N/A Amount N/A
12. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
From	0.0	14.13 Ft	2 INCH	SCH 40	PVC
From		Ft.			
From		Ft.			

13. Grout:

	Depth From	Depth To	Material	Method
From	0.0	6.0 Ft.	Portland Bentonite	Slurry
From		Ft.		

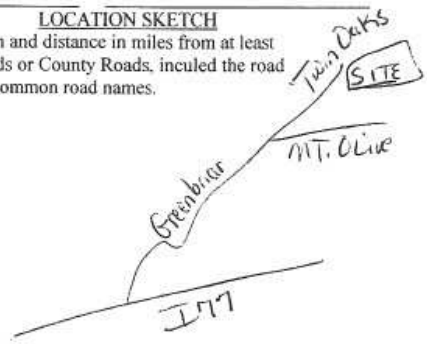
14. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
From	14.13	26.19 Ft.	2.0 in.	0.01 in	PVC
From		Ft.	in.	in	

15. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
From	12.0	26.19 Ft.	#2	FINE SILICA SAND
From		Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: P4-14 BENTONITE SEAL FROM 6.0 TO 12.0 FEET

I DO HEARBY 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

Mike McConahey 2/9/05
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

LOG OF BORING NO. P.4-1A

Project IREDELL CO. SUBTITLE D Project No. G04099.6
Type 2.5" HSTAW 5.5' PHASE 4 Drilling Company Geologic Explorations

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

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
0	5/5/5	1	0	17	17" BROWN CL W ORGANIC MATERIAL MOIST TO WET	NOT GROUND WATER
5	4/6/12	2	5	17	4" RED BROWN CL 13" TAN CL	
10		3	10		DRY SHELBY TUBE	
15	4/4/5	4	15 16.5	18	6" RED BROWN CL W BLACK SPECKS 12" BROWN GREEN SANDY SILT W/ WHITE BANDS 40° FOLIATION QUARTZ PARTICLES + MICA MOIST	
20	3/3/3	5	20	5	5" RED BROWN CL 3" BROWN SANDY SILT VERY MOIST	
25		6			WET SHELBY TUBE	
30	7/7/8	7	30'	18	5" BROWN CL WET 13" SANDY SILT W/ BLACK WHITE BANDS + QUARTZ CHIPS WET MICA	
35	6/7/11	8	35	16	15" SANDY SILT W/ BLACK WHITE BROWN + GRAY BANDS QUARTZ CHIPS AND MICA WET	
40	6/7/11	9	40'	16	SANDY SILT SAME AS SAMPLE 8 AT 35'	

Completion Depth 47.91 BGS Depth to Water in Boring 19'
Date 12/30/04 Field Agent ROBERT HOFFMAN Location

1 of 2

LOG OF BORING NO. P4-1D

Project Iredell Co Phase 4. Project No. 604099.6

Type 8 SHSA Drilling Company Geologic Explorations

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

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
45	7/8/12	10	45'	11"	11" SAME AS SAMPLE 8 & 9	
50						
55						
60						
65						
70						
75						
80						

Completion Depth 47.91 BGS Depth to Water in Boring 19

Date 12/30/04 Field Agent ROBERT HOFFMAN Location

2 of 2

LOG OF BORING NO. P4- 2

Project Iredell Co. Subtitle D phase 4 Project No. 604099.6
Type 3.8 HSAW 5.5 Drilling Company Geologic Explorations

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
0	10/11/12	1	0 1.5	18	18" RED BROWN CL SLIGHTLY MOIST	
5	3/4/7	2	5 5.7	9	9" RED BROWN CL SLIGHTLY MOIST	
10	3/3/4	3	10 11.5	13	14" RED BROWN CL W/ QUARTZ SAND YELLOW & BLACK SPECKS .5" RED BROWN CLW BLACK BAND 3.5' BROWN SILT W/SAND SLIGHTLY MOIST	
15	3/4/9	4	15 16.5	18"	9" RED BROWN 9" RED BROWN SILTY CL W/ YELLOW & BLACK SPECKS AND QUARTZ GRAVEL SLIGHTLY MOIST	
20	4/5/9	5	20 21.2	14"	4.5" RED BROWN CL 5" RED BROWN SILTY CL W/ WHITE BANDS + QUARTZ BLACK SPECKS. 4.5" RED BROWN SILTY CL W/BLACK BANDS SLIGHTLY MOIST	
25	4/6/7	6	25 26.5	13	5" RED BROWN SANDY CL 13" BROWN SANDY SILT W/ WHITE + BLACK BANDS SLIGHTLY MOIST	
30	7/12/16	7	30 31.5	18"	7.5" RED BROWN CL W/ YELLOW MOTTLING 3" RED BROWN SILT W GRAVEL 7.5" RED BROWN CL W/ YELLOW & BLACK SPECKS SLIGHTLY MOIST	
35	8/6/10	8	35	16"	5.75 RED BROWN CL 4" SAPROLITE 1" RED BROWN CL 4" SAPROLITE 1.25" SILT WET ON BOTTOM	
40	10/15/25	9	40	12	6" BROWN SILT W/ BLACK + WHITE BANDS 6" SAPROLITE MOSTLY QUARTZ MOIST 1" RED BROWN CL	

Completion Depth 40 BGS Depth to Water in Boring 22'
Date 12/20/04 Field Agent ROBERT HOFFMAN Location

1 of

LOG OF BORING NO. P4- 3

Project Iredell Co. Subtitle D phase 4 Project No. 604099.6

Type 3.5 HSA Bit 5.5 Drilling Company Geologic Explorations

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

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Rem.	Description of Material	Comments
0	2/2/4	1	0	13"	RED BROWN CL	
5	5/8/12	2	5 6.5	18	5" RED BROWN CL 13" RED BROWN SILT W/ WHITE BANDS SLIGHTLY MOIST	
10	7/7/8	3	10 11.5	18	5" RED BROWN CL W/ YELLOW + BROWN STREAKS 13" SANDY SILT W/ BLACK, WHITE + GRAY SPECKS HORIZONTAL BANDING SLIGHTLY MOIST	
15	7/8/15	4	15 16.5	18"	7" RED BROWN SILTY CL 11" BROWN MICATIONS SILT WITH WHITE BANDS MOIST	
20	6/7/14	5	20 21.5	18	7.5" RED BROWN SILT WITH WHITE AND GRAY BANDS 2" LARGE GRAIN QUARTS SAND AND SILT 8.5" BROWN MICATIONS SILT MOIST	
25	3/4/7	6	25 26.5	18	8" RED BROWN SILTY CL W/ QUARTZ PARTILLES 7.5 RED BROWN CL W/ YELLOW MOTELING BLACK + WHITE BANDS 2.5" SAPROLITE W/ WHITE + BLACK BANDS MOIST	
30	7/8/16	7	30 31.5	18	5" RED BROWN CL W/ WHITE VEINS 13" SAPROLITE W/ WHITE, BROWN + BLACK BANDS 0 TO 5" FOLIATION WET	
35	4/5/7	8	35	18	4" RED BROWN CL W/ WHITE VEINS 2.5" SAPROLITE WHITE BLACK BANDS 3.5" RED BROWN SILT W/ BLACK BANDS 0.5" QUARTZ 2 6.5" BROWN SILT WITH BLACK BANDS" MOIST	
40	7/8/15	9	40 41.5	18	3" RED BROWN SILT 1" WHITE BAND 7" SILT	

Completion Depth 76 41.5 BGS Depth to Water in Boring 37'

Date 12/20/04 Field Agent ROBERT HOFFMAN Location

1 of 2

LOG OF BORING NO. P4-3

Project _____ Project No. _____

Type _____ Drilling Company Geologic Explorations

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
			40 41.5		0.5" WHITE BAND 6" GRAY BROWN SILT WET	
45	3/4/8	10	45 46.5		3" RED BROWN SILT W GRAY BAND 6" BROWN SILT W/ QUARTZ GRAVEL & MICA 0.5" WHITE BAND 3" BROWN SILT W/ WHITE BANDS 6" BROWN SILT WET	
50	6/6/16	11	50 51.5	15	5" RED BROWN SILT 2" GRAY BROWN SILT W/ QUARTZ SAND 5" SAPROLITE 3° FOLIATION WET	
55	10/11/11	12	55 56.1	13	SAPROLITE SILTY W QUARTZ PARTICLES 0° FOLIATION WET	
60	5/6/15	13	60 60.9	11	6.5" BROWN SILT W/ BLACK BANDS 2.5" QUARTZ SAND 2" BROWN SILT W/ WHITE BANDS & BLACK VEINS	
65	7/7/8	14	65 65.8	9	9" BROWN SILT W QUARTZ SAND & BLACK BANDS	
70	7/8/11	15	70 71.2	14	6.5" BROWN SILT W/ MICA 1.5" RED BROWN CL W/ QUARTZ PARTICLES 6" SAPROLITE BROWN TO GRAY W/ BLACK BANDS & WHITE SPECKS	
75	7/8/11	16	75 76	12	2" BROWN SILT 3" SAPROLITE W/ WHITE & GRAY BANDS 7" BROWN GRAY SILT WITH QUARTZ GRAVEL WET 76' TOP OF ROCK	
80						

Completion Depth 76' BGS Depth to Water in Boring 37'

Date _____ Field Agent _____ Location _____

2 of 2

LOG OF BORING NO. P4-4

32.30' T.D P4-10

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

Project Iredell Co. Subtitle D phase 4 Project No. 604009.6

Type 8.5" HSA w S.S Drilling Company Geologic Explorations

Deitrich Track Mounted

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
	4-4-5		0-1.5'	X		
			4.5-6'			
5	3-3-5			X		
			9.5-11'			
10	2-3-4			X		
			14.5-16			
15	2-3-4			X		
			19.5-21'			
20	4-5-4			X		
25	3-4-5		24.5-26	X		
30	4-5-7		29.5-31	X		Over Drilled to 42'
35	9-10-7		34.5-36	X		
40	9-10-11					

Completion Depth 33.07 BGS Drilled to 42' BGS Depth to Water in Boring _____

Date 12/27/04 Field Agent J. Fall Location _____

1 of 1

LOG OF BORING NO. B4-5

Project Iredell Co. Subtitle D phase 4 Project No. 604099.6

Type 8.5 HSAW 5.5 Drilling Company Geologic Explorations

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

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
0	4/4/5	1	0	13"	13" RED BROWN CL MOIST	
			1.5			
5	7/8/8	2	5	16	4" RED BROWN CL WET 12" TAN SANDY CL W/ WHITE + BROWN BANDS VERY MOIST	
10	4/4/7	3	10	16	3.5" RED BROWN CL 2.25" TAN CL 10.25" FINE QUARTZ SAND W/TAN + BROWN BANDS MOIST	
15	4/4/5	4	15	13	4" TAN SANDY CL 1.5" RED BROWN CL W/ BLACK VEINS + WHITE SPECKS 12.5 BROWN SILT MOIST	
20	4/4/5	5	20	13	1" RED BROWN CL 2" TAN SANDY CL 4" BROWN CL W/WHITE BANDS + QUARTZ PARTICLES 6" TAN SANDY CL W/WHITE BANDS MOIST 2.5" BROWN SILT W/BLACK BANDS + MICA	
25	3/4/9	6	25	13	2.5" SAPROLITE WET 2" TAN CL WET 16" SAPROLITE W/BROWN, BLACK WHITE BANDS MICA 15° FOLIATION VERY MOIST	
30	7/8/3	7	30	13	4" BROWN CL W/WHITE SPECKS 9" SAPROLITE W/WHITE & BROWN + BLACK BANDS WET	
35	6/9/11	8	35	14	4" BROWN SILT W MICA WET 10" SAPROLITE W/WHITE BLACK + BROWN BANDS QUARTZ GRAVEL 3.5" RED BROWN CL 6.5" BROWN SILT W/ MICA + BLACK + BROWN BANDS	
40	8/11/17	9	40	18	3.5" RED BROWN SILT W/BLACK BANDS 4.6" BROWN SILT W/WHITE BANDS	

Completion Depth 55 BGS Depth to Water in Boring 20-25'

Date 12/21/04 Field Agent ROBERT HOFFMAN Location

1 of 2

LOG OF BORING NO. P4-5

Project IREDELL CO, SUBTITLE D PHASE 4 Project No. 604099.6

Type _____ Drilling Company Geologic Explorations

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
45	8/19/24	10	45	13	5" RED BROWN CL W/WHITE SPECKS 8" SAPROLITE W QUARTZ GRAVEL BLACK, BROWN, WHITE BANDS HORIZONTAL MOIST	
50	8/9/12	11	50	8	8" SICT BROWN W/ BLACK & WHITE SPECKS	
55						
60						
65						
70						
75						
80						

Completion Depth _____ BGS

Date _____ Field Agent _____

Depth to Water in Boring _____

Location _____

2 of 2

LOG OF BORING NO. P4-6

Project Iredell Co. Subtitle D phase 4 Project No. 604099.6

Type 8.5" O.D HSAWS.S Drilling Company Geologic Explorations

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	3/3/3	1	0 1.5	20	12" BROWN RED SANDY CL W/ORGANIC MATERIAL 8" TAN SANDY SILT VERY MOIST	
5	1/2/2	2	5	0"	NO RECOVERY	
10	1/1/2	3	10 11	12	8" BROWN CL MOIST 4" SANDY SILT W/ WHITE BANDS & BLACK SPECKS WET	
15	WOH/2/1	4	15 1.5	18	4" BROWN CL 14" SILTY SAND W/ BLACK & WHITE BANDS WET	
20	2/2/4	5	20'	12"	12" SILTY SAND W/ BLACK & WHITE BANDS	
25						
30						
35						
40						

Completion Depth 20 BGS Depth to Water in Boring 8'

Date 12/29/14 Field Agent Bob Hoffman Location

1 of 1

LOG OF BORING NO. P4-7D

Project IREDELL Co. SUBTITLE D PHASE 4 Project No. G04099.6

Type 8.5 HSAW 5.5' Drilling Company Geologic Explorations

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
5						
10					SEE P4-7S	
15						
20	6/7/7	1	20	12"	11" SANDY SILT W/ MICA AND QUARTZ SAND 1" SAPROLITE WET	
25	4/6/8	2	25		14" SAPROLITE	
28					AUGER REFUSAL PWR	
30					CORE NO RECOVERY	
33.5					MW GNEISS RUBLE 5.5" GNEISS PLANAR PARALLEL 2" GNEISS UNDULAR	
35					2" MW GNEISS FRACTURED 9" GNEISS PLANAR FRES 15" GNEISS PLANAR PARALLEL	
					17.5" GNEISS UNDULAR 1" GNEISS MW FRACTURE 2.5" GNEISS UNDULAR	
					RQD = 0.4869 REC = 0.625	
40	41.5					

Completion Depth 41.5 BGS

Date 12/30/04 Field Agent ROBERT HOFFMAN

Depth to Water in Boring 38.0

Location

1 of

LOG OF BORING NO. P4- 75

Project Iredell Co. Subtitle D phase 4 Project No. 604099.6

Type 8.5" HSA W 5.5 Drilling Company Geologic Explorations

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	4/4/4	1	0 1.5	18	3" RED BROWN CL W ORGANIC MATERIEL 15" BROWN CL SLIGHTLY SANDY MOIST	
5	2/3/3	2	5 6.5	18	9" RED BROWN CL VERY MOIST 9" BROWN TO GRAY SILTY CL W/MICA & SAND MOIST	
10	2/2/3	3	10 11.5	18	6" RED BROWN CL 12" BROWN SILT W/ WHITE BANDS & MICA WET	
15	2/3/4	4	15'	18"	7" GRAY SILT W MICA & WHITE SPECKS WET 11" BROWN SILT W/ RED, WHITE & GRAY BANDS WET	
20						
25						
30						
35						
40						

Completion Depth 17' BGS Depth to Water in Boring 9'

Date 12/29/04 Field Agent ROBERT HOFFMAN Location

1 of 1

LOG OF BORING NO. P4-8D

Project Iredell Co. Subtitle D phase 4 Project No. 604099.6

Type 8.5" O.D HSA w/SS Drilling Company Geologic Explorations

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

B-58 Mobile Truck Rig

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Refr.	Description of Material	Comments
	5-5-7		0-1.5	X	Clayey Silt; Red, slightly Colesive, micaceous, Top Soil 6", Frozen	
5	4-6-11		4.5-6	X	Clayey Silt; Red; colesive, Micaceous, No Fractures, Dry	
10	Shelby Tube		9.5-11.79			ST 2.29'
15	4-4-9		16	X	Sandy Silt; Brown, Relict Structure, black silt partings, white silt pockets, mica., Dry	
20	3-4-6		19.5-21	X		0-20' 12/27/04
25	6-7-7		24.5-26	X		
30	7-8-8		29.5-31	X		
35	6-7-12		34.5-36	X		
40	5-6-15		39.5-41	X		

Completion Depth BGS

Date 12/27/04 12/28/04 Field Agent J. Pfohl

Depth to Water in Boring

Location

1 of 2

LOG OF BORING NO. P4-8D

Project Iredell Co. Subtitle D phase 4 Project No. G04099.6

Type 8.5" O.D HSA Drilling Company Geologic Explorations

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
			44.5-46			
45	4-5-9			X		
50	4-8-15		49.5-51	X		
55	4-5-12		54.5-56	X		
60	7-8-19		59.5-61	X		
65	7-8-21		64.5-66	X		
70	8-12-22		69.5-71	X		Very Muddy in HSA in whole SPT. Hammer Not able to Retrieve Samples from 71' on.
					72-73' Hard layer 1,000 lbs. 1st Gear No Cutting About called Refusal But Broke through.	
75						
80						

Completion Depth 85.78 BGS Depth to Water in Boring _____

Date 12/27/04 12/28/04 Field Agent J. Pfohl Location _____

2 of 2

LOG OF BORING NO. P4-8S

Project Iredell Co. Subtitle D phase 4 Project No. 604009.6
Type 8.5" O.D HSA w/ S.S Drilling Company Geologic Explorations

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
					Mobile Truck Mounted [Mark Driller]	
5						
10					No Soil Samples Taken See Log for P4-8D for Soil Descriptions.	
15						
20						
25					Well Dimensions Screen: 40.45 - 25.45 Sand: 40.45 - 24 Bent: 24 - 22 Stickup: 3.00' TM	
30					Water Levels WD = ~29' BGS Set = 34.28' BTOP 24Hrs: 32.48' BTOP	
35						
40					Boring Terminated 40.45' BGS No Refusal	

Completion Depth 40.45' BGS
Date 12/27/04 Field Agent S. Pfohl
Depth to Water in Boring 32.48' BTOP 24Hr.
Location Center of Proposed cell

1 of 1

LOG OF BORING NO. P4-9

Project Iredell Co. Subtitle D phase 4 Project No. 604099.6
Type 8.5" O.D HSA w/ 5.5 Drilling Company Geologic Explorations

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
	5-5-6		0-1.5'	X	Clayey Silt; Red, cohesive, moist, micaceous.	
	~~3-3-4~~		4.5-6'	X	Silt; Pink saprolite, relict structure, black silt partings Mica., moist	
5	4-6-7					
			9.5-11			
10	3-6-6			X	Silt; Brown w/pink bands, relict structure, black silt pockets, micaceous,	
			14.5-16			
15	4-6-7			X	Silt; Brown same as above but few clear Qtz. fragments, moist	
						≈ 19' W.D
		19' ▽ WD				
20	5-6-7		19.5-21	X	Sandy Silt; Brown Saprolite, Relict Structure, 1/2" white Qtz. seam, Micas. Moist.	
25			2			
			29.5-30.5	X	Silt; White saprolite, opaque white Qtz. wet	
30	7-9-12					
35						
40						

Completion Depth 30.42' BGS Depth to Water in Boring 26.03' BGS Set
Date 12/22/04 Field Agent J. Pfohl Location Along phase 2

1 of 1

LOG OF BORING NO. P4-10

Project Iredell Co. Subtitle D phase 4 Project No. 604099.6
Type 8.5" O.D HSA w/ 5.5 Drilling Company Geologic Explorations

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

Depth (ft.)	Blows per Foot	Samples #	Samples Beg. Depth	Samples Retr.	Description of Material	Comments
			0-1.5'			
5	2-11-15		5-6.5	X		
10	6-7-7		10-11.5	X		
15	5-5-7		15-16.5	X		
20	3-4-7		20-21.5	X		
25	4-4-7		25-26.5	X		
30	2-2-6		30-31.5	X		
35						
40						

Completion Depth 28.15 BGS Depth to Water in Boring _____
Date 12/27/04 Field Agent J. Pfohl Location _____

1 of 1

LOG OF BORING NO. P4- 11

Project Iredell Co. Subtitle D phase 4 Project No. 604099.6
Type 8.5" O.D HSA w/S.S Drilling Company Geologic Explorations

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
						Deidrich D-50 Rig
	2-2-2		0-1.5	X		
5	1-2-2		4.5-6	X		
10	6-8-10		9.5-11	X		
					HSA Refusal @ 12.42	
15						
20					Screen 12.42 - 7.42	
					Sand 12.42 - 5	
					Bent 5 - 3	
					stickup = 2.68 ' T.M	
25					TD = 15.10' BTOP	
					▽ Set 7.37' BTOP	
30						
35						
40						

Completion Depth 12.42' BGS Depth to Water in Boring _____
Date 12/27/04 Field Agent J. Pfohl Location By Creek & Sewer Line

1 of 1

LOG OF BORING NO. P4-12

Project Iredell Co. Subtitle D phase 4 Project No. 604099.6

Type 8.5" O.D HSA w/ S.S Drilling Company Geologic Explorations

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
			0-1.5'	X		
5			4.5-6'	X		
10			9.5-11'	X		
15			14.5-16	X		
					Terminated No HSA refusal 17.68'	
20			~~[illegible]~~	X		
25						
30						
35						
40						

Completion Depth 17.68 BGS

Date 12/07/04 Field Agent J. Pfohl

Depth to Water in Boring 9.05' BTOP 24 Hrs

Location Along Sewer Right of Way

1 of 1

LOG OF BORING NO. P4-13 D

Project Iredell Co. Subtitle D phase 4 Project No. 604099.6
Type 3.5 HSAW 5.5 Drilling Company Geologic Explorations

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	4/4/4	1	0	15"	11" RED BROWN CL W BLACK SPECKS	
			1.25			
		2	3		3 TO 5' SHELBY TUBE	
5						
10		3	10		SHELBY TUBE 10-12'	
15	4/7/8	4	15	18"	3" BROWN CL W BLACK SPECKS & SAND 3" SANDY SILT YELLOW W/ RED BROWN BANDS & STREAKS 12" TAN SANDY SILT W/ WHITE BANDS WET	
20	7/12/14	5	20	0	7" BROWN SILTY CL W/ QUARTZ GRAVEL 11" SANDY SILT W BROWN & WHITE BANDS & WHITE STREAKS	
25	8/11/13	6	25	10.5	10.5" SANDY SILT W/ WHITE & BLACK BANDS 20° FOLIATION 1 HORIZONTAL WHITE BAND & BLACK BANDS OPOSITE FOLIATION	
30	10/16/13	7	30	18	19" BROWN SANDY SILT WET 9" TAN SANDY SILT W/ WHITE BANDS & QUARTZ GRAVEL	
35	14/14/21	8	35	14	4" BROWN SANDY SILT W/ QUARTZ GRAVEL WET 10" SANDY SILT TAN W/ WHITE & BLACK BANDS QUARTZ PARTICLES & MICA	
40	16/18/19	9	40	18"	7" BROWN SANDY SILT W QUARTZ GRAVEL	

Completion Depth 44.2 BGS Depth to Water in Boring 7
Date 01/03/06 Field Agent ROBERT HOFFMAN Location

1 of

LOG OF BORING NO. PU-13D

Project IREDELL CO SUBTITLED PHASE 4 Project No. 604099.6

Type 8.5 HSA w 5.5 Drilling Company Geologic Explorations

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
	40	9			2" BLACK SILT W QUARTZ GRAVEL	
					9" TAN SANDY SILT W BLACK	
					+ WHITE BANDS 20° FOLIATION	
44					44' BGS AUGER REFUSAL	
45						
50						
55						
60						
65						
70						
75						
80						

Completion Depth 44.28 BGS Depth to Water in Boring 7

Date 01/03/06 Field Agent ROBERT HOFFMAN Location

2 of 2

LOG OF BORING NO. P4-14

Project Iredell Co. Subtitle D phase 4 Project No. 604099.6
Type 8.5" O.D HSA w/ S.S Drilling Company Geologic Explorations

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
	5-5-6		0-1.5'	X		
	3-3-4		4.5-6'	X		
5						
10	2-3-3		9.5-11	X		
	2-3-3		14.5-16	X		
15						
			19.5-21			
20	2-3-4			X		
			24.5-26			
25				X		
					Well Dimensions	
30					Screen: 26.19 - 14.13	
					Sand: 26.19 - 18	
					Bent: 18 - 6	
					Grout: 6 - 0	
					Stickup: 2.94' T.M	
35						
40						

Completion Depth 26.19 BGS Depth to Water in Boring _____
Date 12/22/04 Field Agent J. Pfahl Location _____

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
P4-1D	10 - 12	Geotechnics	0.73	36.37	62.90	Sandy Fat Clay	CH	2.75	68	31	37
P4-1D	25 - 27	Geotechnics	0.12	56.67	43.21	Silty Sand (non-plastic fines)	SM	2.76	-	NPL	N/A
P4-8D	9.5 - 11.79	Geotechnics	0.17	58.77	41.06	Silty Sand (non-plastic fines)	SM	2.67	-	NPL	N/A
P4-13D	3 - 5	Geotechnics	0.28	47.99	51.73	Sandy Lean Clay	CL	2.74	39	21	18
P4-13D	10 - 12	Geotechnics	0.29	54.89	44.82	Silty Sand	MH	2.65	50	38	12
P-8A	1 - 8	Geotechnics	0.71	27.45	71.83	Silt with Sand	ML	2.75	-	NPL	N/A
P-8A	8 - 15	Geotechnics	1.02	36.02	62.96	Sandy Silt	ML	2.75	42	30	12
P-9D	9 - 11	Engineering Tectonics	0.00	78.60	21.40	Silty Sand	SM	2.64	24	NPL	N/A
P-10D	14 - 16	Engineering Tectonics	0.00	65.30	34.70	Silty Sand	SM	2.64	31	NPL	N/A
P-11S	1 - 15	Engineering Tectonics	0.70	41.80	57.50	Sandy Silt	ML	2.65	44	41	3
P-12D	6.5 - 8.5	Engineering Tectonics	6.60	83.00	10.40	Silty Sand	SW-SM	2.65	31	NPL	N/A
P-12D	16.5 - 18.5	Engineering Tectonics	1.20	62.60	36.20	Silty Sand	SM	2.65	31	NPL	N/A
P-17D	14 - 16	Geotechnics	4.34	62.88	32.78	Silty Sand	SM	2.74	-	NPL	N/A
P-19S	23 - 25	Geotechnics	0.00	57.17	42.83	Silty Sand	SM	2.72	-	NPL	N/A
P-20D	40 - 42	Geotechnics	3.22	58.54	38.24	Silty Sand	SM	2.79	-	NPL	N/A
P-22S	30 - 32	Geotechnics	0.00	72.04	27.96	Silty Sand	SM	2.74	-	NPL	N/A

Sample No.	Depth (ft)	Dry Density (pcf)	Moisture Content	Conductivity (cm/sec)	Total Porosity
P4-1D	10 - 12	101.7	28.7%	2.60E-06	40%
P4-1D	25 - 27	87.3	34.3%	3.70E-05	48%
P4-8D	9.5 - 11.79	81.4	30.7%	2.90E-05	52%
P4-13D	3 - 5	103.4	27.1%	2.70E-07	40%
P4-13D	10 - 12	102.1	18.6%	2.40E-06	38%
P-8A	1 - 8	95.7	26.4%	1.10E-06	44%
P-8A	8 - 15	102.4	19.7%	9.40E-07	40%
P-9D	9 - 11	75.3	25.5%	9.63E-07	54%
P-10D	14 - 16	78.8	17.8%	1.27E-06	52%
P-11S	1 - 15	93.5	27.9%	4.35E-07	43%
P-12D	6.5 - 8.5	93.5	12.9%	2.57E-06	43%
P-12D	16.5 - 18.5	74.9	31.3%	2.19E-06	54%
P-17D	14 - 16	108.0	19.5%	9.30E-05	37%
P-19S	23 - 25	79.7	32.1%	2.60E-05	53%
P-20D	40 - 42	91.2	28.1%	5.00E-05	48%
P-22S	30 - 32	79.8	41.5%	2.60E-04	53%

NOTE:

1. Atterburg 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.
3. Data for piezometers prefixed “P-” obtained from Phase 3 study.

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)	%
P4-1D	10 - 12	0.0750	62.9%	0.0276	58.0%	0.0625	**62.0%**	0.0054	42.3%	0.0027	38.6%	0.004	**40.7%**
P4-1D	25 - 27	0.0750	43.2%	0.0303	31.9%	0.0625	**40.9%**	0.0061	9.8%	0.0030	6.6%	0.004	**7.9%**
P4-8D	9.5 - 11.79	0.0750	41.1%	0.0313	33.3%	0.0625	**39.5%**	0.0063	10.2%	0.0031	6.8%	0.004	**8.0%**
P4-13D	3 - 5	0.0750	51.7%	0.0305	51.0%	0.0625	**51.6%**	0.0059	35.7%	0.0029	29.0%	0.004	**32.0%**
P4-13D	10 - 12	0.0750	44.8%	0.0359	16.1%	0.0625	**37.7%**	0.0067	6.3%	0.0033	4.8%	0.004	**5.2%**

Sample No.	Depth (ft)	Sand	Silt	Clay
P4-1D	10 - 12	**38.0%**	**21.3%**	**40.7%**
P4-1D	25 - 27	**59.1%**	**33.0%**	**7.9%**
P4-8D	10 - 12	**60.5%**	**31.5%**	**8.0%**
P4-13D	3 - 5	**48.4%**	**19.5%**	**32.0%**
P4-13D	10 - 12	**62.3%**	**32.5%**	**5.2%**

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.

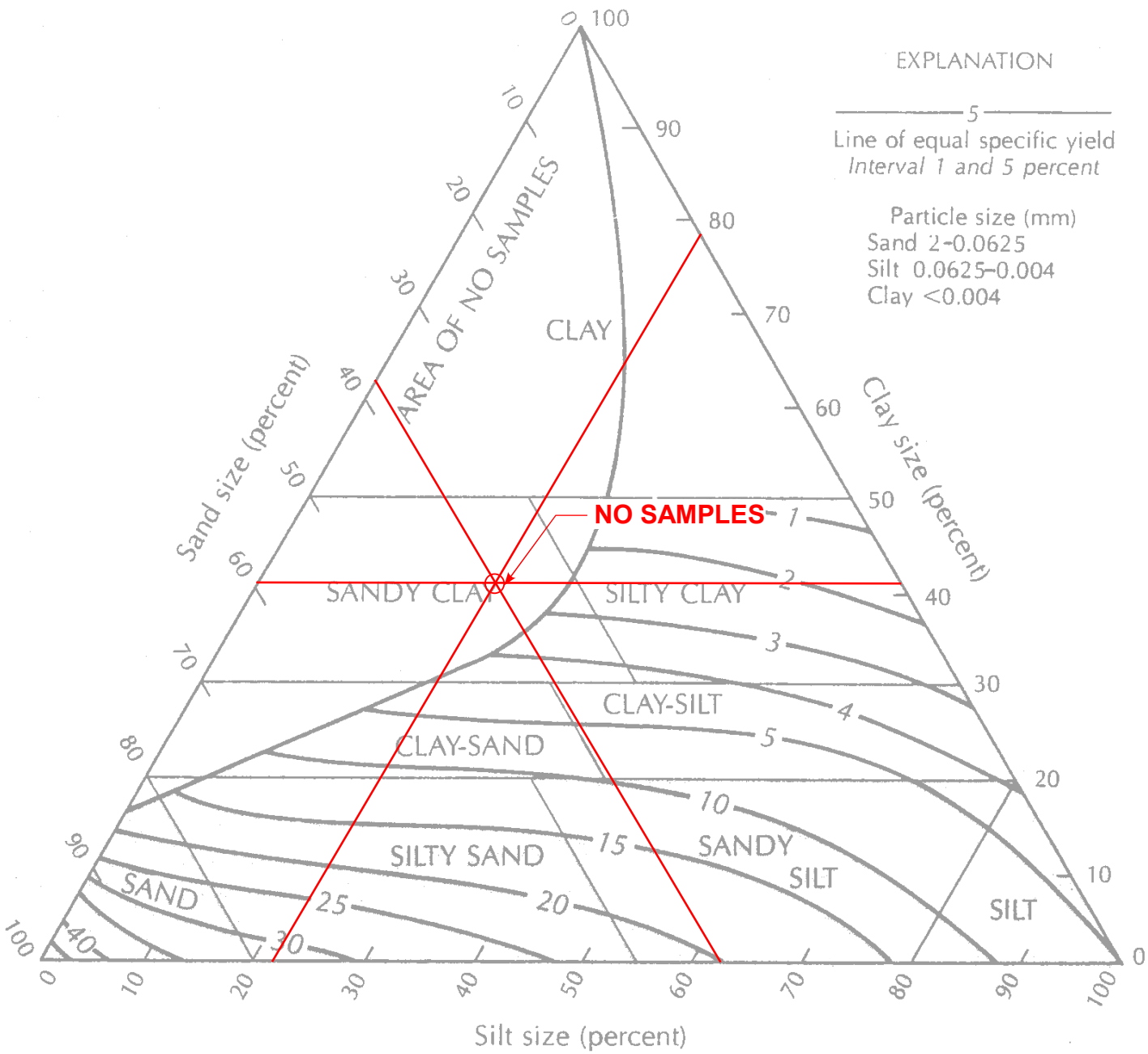
Table B-3. Effective Porosity Summary

Sample No.	Depth (ft)	AGU Classification	AGU Grain Size Distribution			Effective Porosity
			Sand	Silt	Clay	
P4-1D*	10 - 12	Sandy Clay	38.0%	21.3%	40.7%	**7.0%**
P4-1D	25 - 27	Silty Sand	59.1%	33.0%	7.9%	**22.5%**
P4-8D	9.5 - 11.79	Silty Sand	60.5%	31.5%	8.0%	**21.0%**
P4-13D*	3 - 5	Sandy Clay	48.4%	19.5%	32.0%	**6.5%**
P4-13D	10 - 12	Silty Sand	62.3%	32.5%	5.2%	**20.6%**
P-8A	1 - 8	Clay Silt	34.0%	39.5%	26.5%	**4.8%**
P-8A	8 - 15	Silty Sand	44.3%	41.9%	13.8%	**14.6%**
P-9D	9 - 11	Sand	80.9%	4.2%	14.9%	**18.0%**
P-10D	14 - 16	Silty Sand	69.2%	15.5%	15.5%	**15.0%**
P-11S	1 - 15	Sandy Clay	44.9%	47.8%	47.8%	**-**
P-12D	6.5 - 8.5	Sand	91.2%	8.0%	0.8%	**38.0%**
P-12D	16.5 - 18.5	Clayey Sand	65.1%	10.9%	24.0%	**9.0%**
P-17D	14 - 16	Silty Sand	72.9%	26.2%	0.9%	**30.0%**
P-19S	23 - 25	Silty Sand	64.8%	32.9%	2.3%	**26.6%**
P-20D	40 - 42	Silty Sand	68.4%	29.5%	2.1%	**27.8%**
P-22S	30 - 32	Sand	82.1%	17.1%	0.8%	**32.5%**

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 graphs was used to graphically determine the effective porosity of a soil sample.
3. * Effective porosity of P4-1D, and P4-13D fell into an “area of no samples” on the trilinear graph, and was estimated based on published results (Fetter 1994)
4. Data for piezometers prefixed “P-” obtained from Phase 3 study.

Figure B-1: Calculation of effective porosity from re-calculated grain size distribution, P4-1D 10-12'



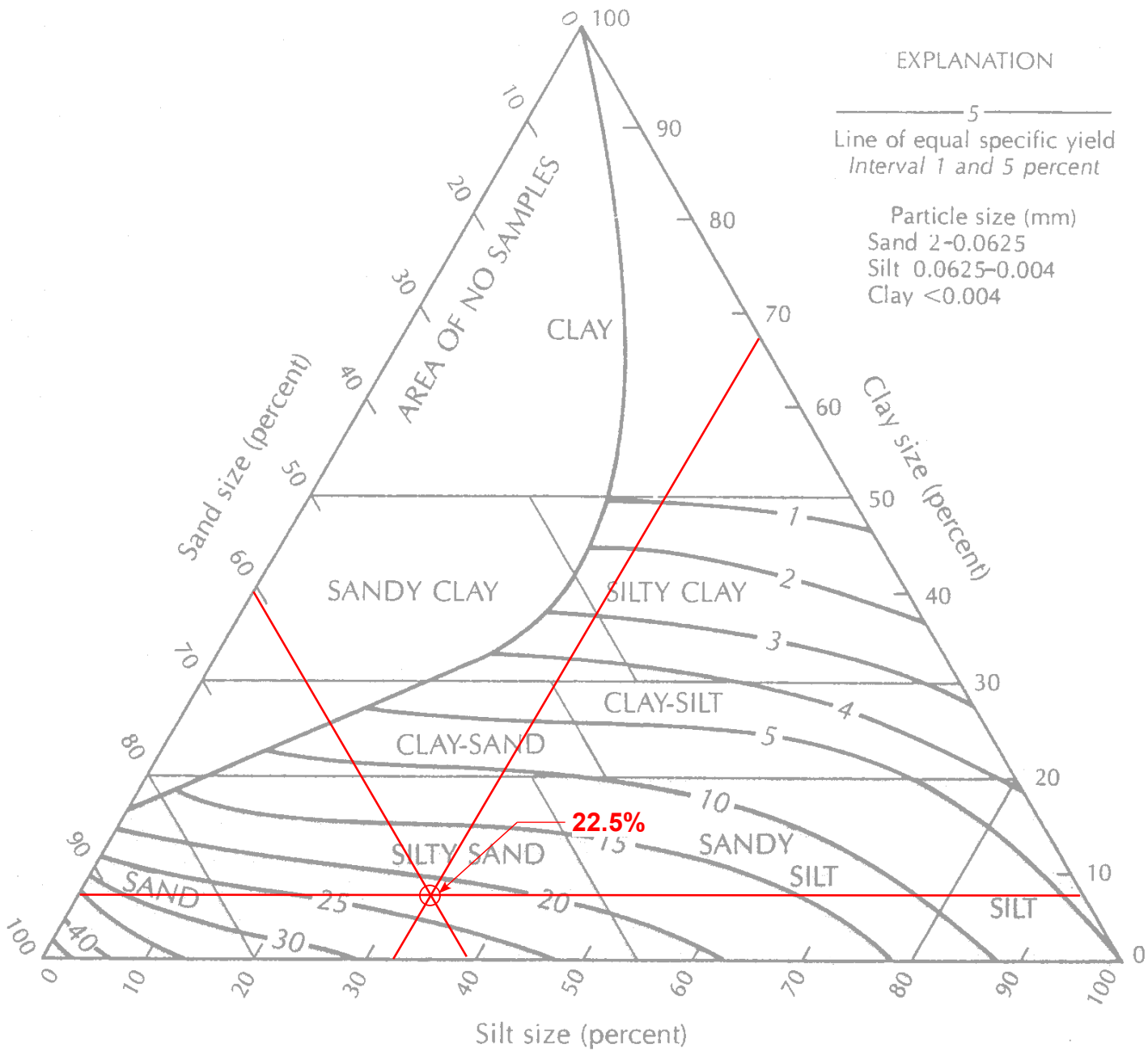
P4-1D 10-12'

Soil Type	Proportion (%)
Sand	38.0%
Silt	21.3%
Clay	40.7%

AGU Soil Classification
Sandy Clay

Effective Porosity
N/A

Figure B-2: Calculation of effective porosity from re-calculated grain size distribution, P4-1D 25-27'



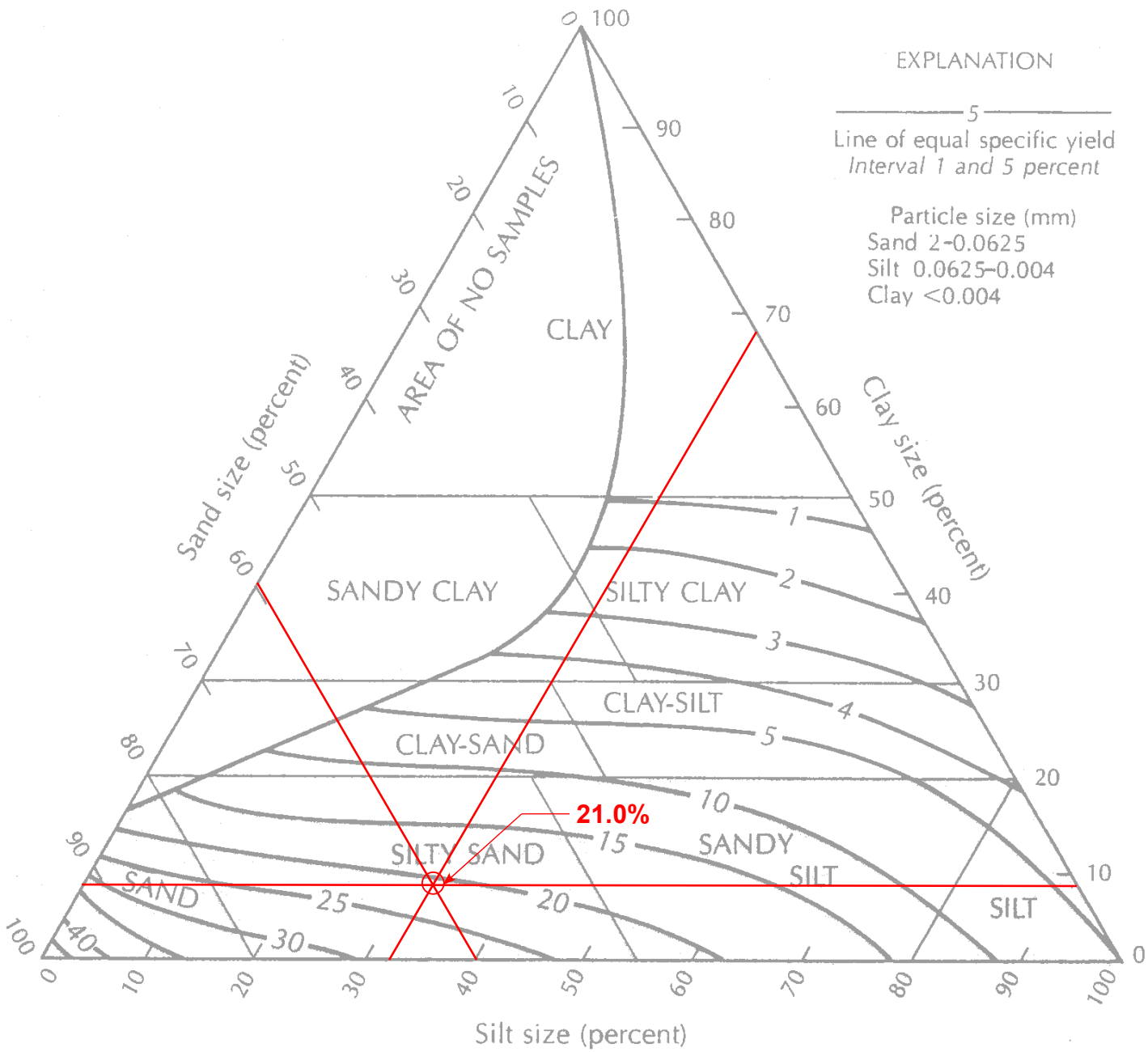
P4-1D 25-27'

Soil Type	Proportion (%)
Sand	59.1%
Silt	33.0%
Clay	7.9%

AGU Soil Classification
Silty Sand

Effective Porosity
n_e=22.5%

Figure B-3: Calculation of effective porosity from re-calculated grain size distribution, P4-8D 9.5-11.8'



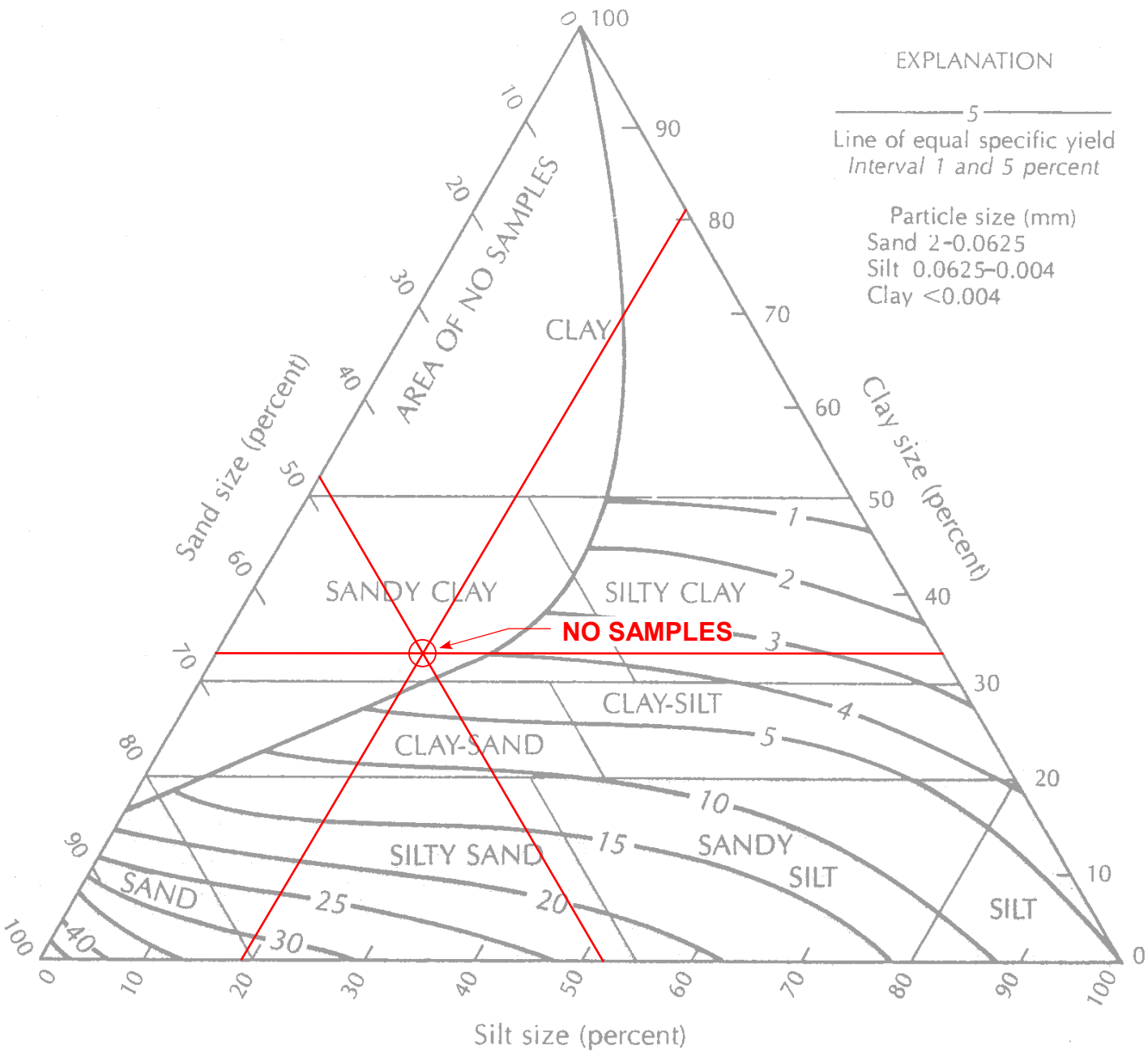
P4-8D

Soil Type	Proportion (%)
Sand	60.5%
Silt	31.5%
Clay	8.0%

AGU Soil Classification
Silty Sand

Effective Porosity
n_e=21.0%

Figure B-4: Calculation of effective porosity from re-calculated grain size distribution, P4-13D 3-5'



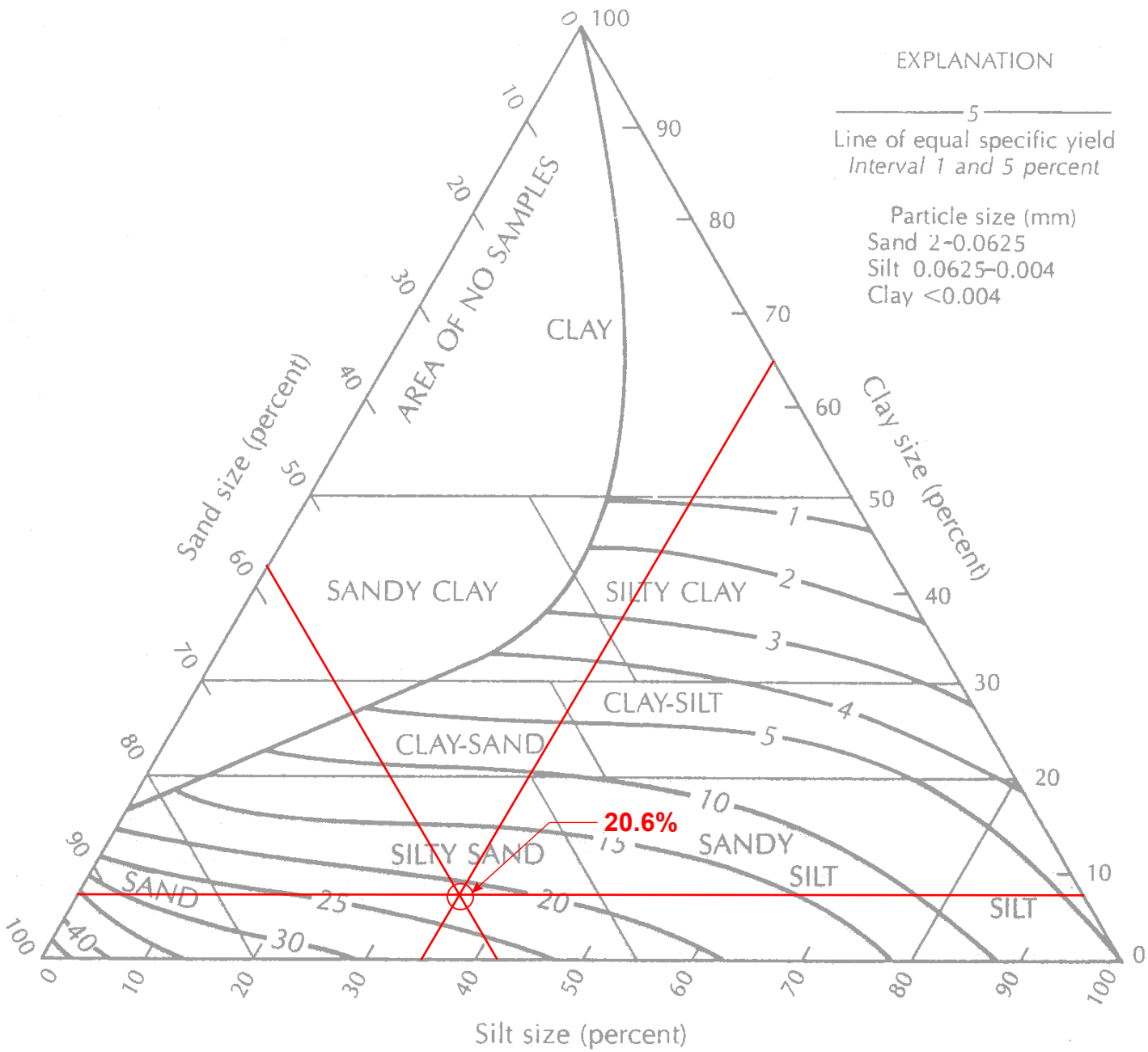
P1-13D 3-5'

Soil Type	Proportion (%)
Sand	48.4%
Silt	19.5%
Clay	32.0%

AGU Soil Classification
Sandy Clay

Effective Porosity
N/A

Figure B-5: Calculation of effective porosity from re-calculated grain size distribution, P4-13D 10-12'



P4-13D 10-12'

Soil Type	Proportion (%)
Sand	62.3%
Silt	32.5%
Clay	5.2%

AGU Soil Classification
Silty-Sand

Effective Porosity
n_e=20.6%

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

LABORATORY TEST REPORT

January 20, 2005

Project No.: NA

MUNICIPAL ENGINEERING
JAN 27 2005

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

RE: Soils Testing – IREDELL CO. LANDFILL Geotechnics No.: 2004-595-03

Transmitted herein are the results of the soils testing performed for the above referenced project verified on the Project Verification Form, submitted January 3, 2005. The testing was performed in accordance with the ASTM methods listed on the enclosed data sheets.

Disclaimer

The test results are believed to be representative of the samples submitted but are indicative only of the specimens which were evaluated. Geotechnics has no direct knowledge of the origin of the samples, implies no position with regard to the disposition of the test results, i.e. pass/fail, and makes 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 of the Client and Geotechnics. 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.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please do not hesitate to contact our office.

Respectively submitted,

Michael P. Smith
Regional Manager

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INTEGRITY IN TESTING

MOISTURE CONTENT

ASTM D 2216 (SOP-S1)

JAN 27 2005

Client	MUNICIPAL ENGINEERING SERVICES CO.
Client Reference	IREDELL CO. LANDFILL
Project No.	2004-595-03

Lab ID	595-03-01	595-03-02	595-03-03
Boring No.	P4-1D	P4-13D	P4-8D
Depth (ft)	10-12'	10-12'	9.5-11.79
Sample No.	NA	WET	NA
Tare Number	K-2	K-7	H-4
Wt. of Tare & WS (gm)	475.86	1008.50	583.10
Wt. of Tare & DS (gm)	403.60	874.10	482.20
Wt. of Tare (gm)	152.20	152.51	153.63
Wt. of Water (gm)	72.26	134.4	100.9
Wt. of DS (gm)	251.4	721.59	328.57
Water Content (%)	**28.7**	**18.6**	**30.7**

Notes : *NA*

Tested By *MCW* *Date* *1/11/2005* *Checked By* GBM *Date* 1-20-05

page 1 of 1 DCN: CT-S1 DATE 6-30-98 REVISION: 2 *\\Lab1\c\2004 Projects\2004-595-04 MESCO\[2004-595-04 WATCONT.XLS]Sheet1*

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INTEGRITY IN TESTING

SPECIFIC GRAVITY

ASTM D 854-00 / AASHTO T100-03 (SOP - S5)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	10-12
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-01	Visual Description	**LIGHT BROWN SILT** (MInus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	R 241	R 242
Weight of Pycnometer + Soil + Water (gm)	698	702
Temperature, T (°Celsius)	23.0	23.0
Weight of Pycnometer + Water (gm)	666.90	670.10
Tare Number	G-14	G-13
Weight of Tare + Dry Soil (gm)	202.39	202.6
Weight of Tare (gm)	152.86	153.09
Weight of Dry Soil (gm)	49.53	49.51
Specific Gravity of Soil @ T	2.688	2.812
Specific Gravity of Water @ T	0.9976	0.9976
Conversion Factor for Temperature T	0.9993	0.9993
Specific Gravity @ 20° Celsius	2.689	2.814

Average Specific Gravity @ 20° Celsius	2.75

Tested By MCW *Date* 01/07/05 *Checked By* SEM *Date* 1-17-05

DCN: CT-S5 Date10/05/04 Revision:9R C:\Data Sheets\[Specific Gravity - Soils.xls]Sheet1

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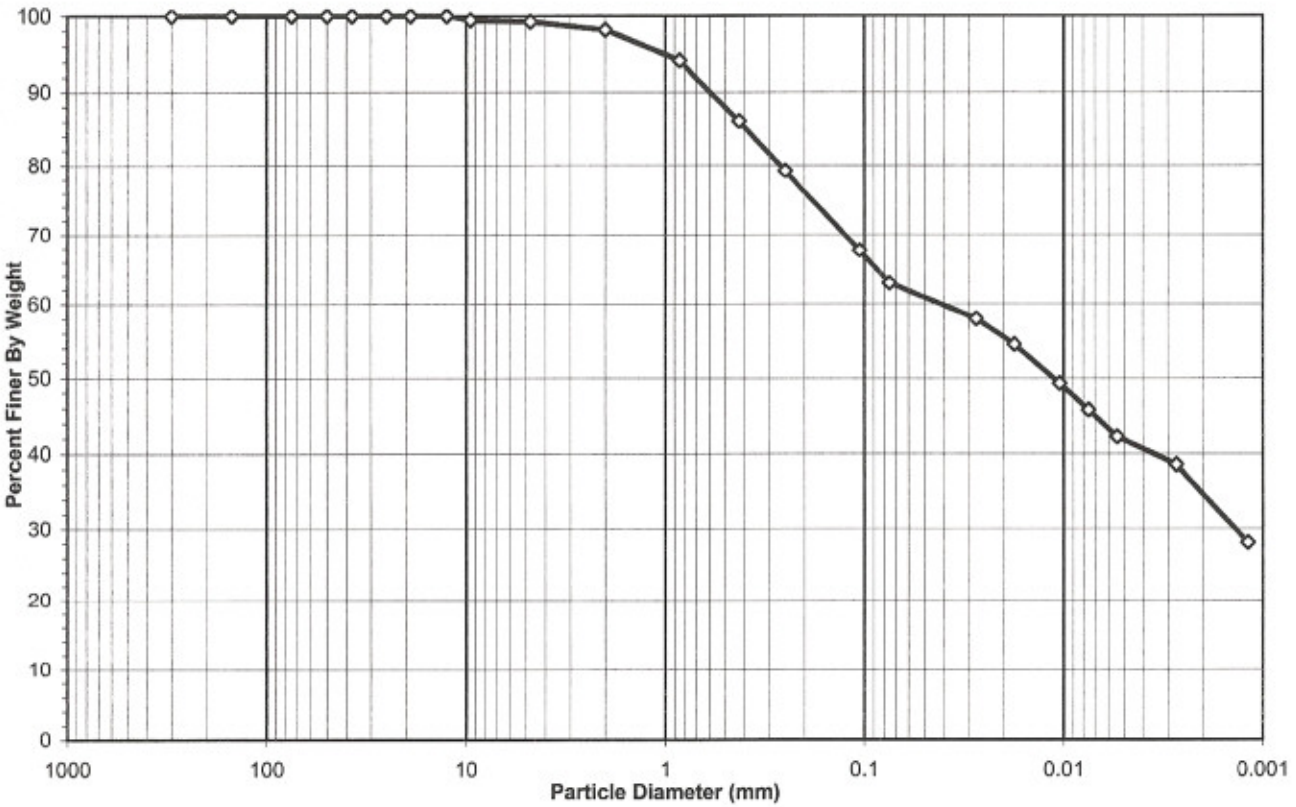
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	10-12
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-01	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



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.73
#4 To #200	*Sand*	36.37
Finer Than #200	*Silt & Clay*	62.90

USCS Symbol ***CH, TESTED***

USCS Classification ***SANDY FAT CLAY***

page 1 of 4

DCN: CT-S3P DATE: 03/07/01 REVISION: 1 \\b1\C\2004 Projects\2004-595-03 MESCO\[2004-595-03-01 #10 Split Hydrometer.xls]Sheet1

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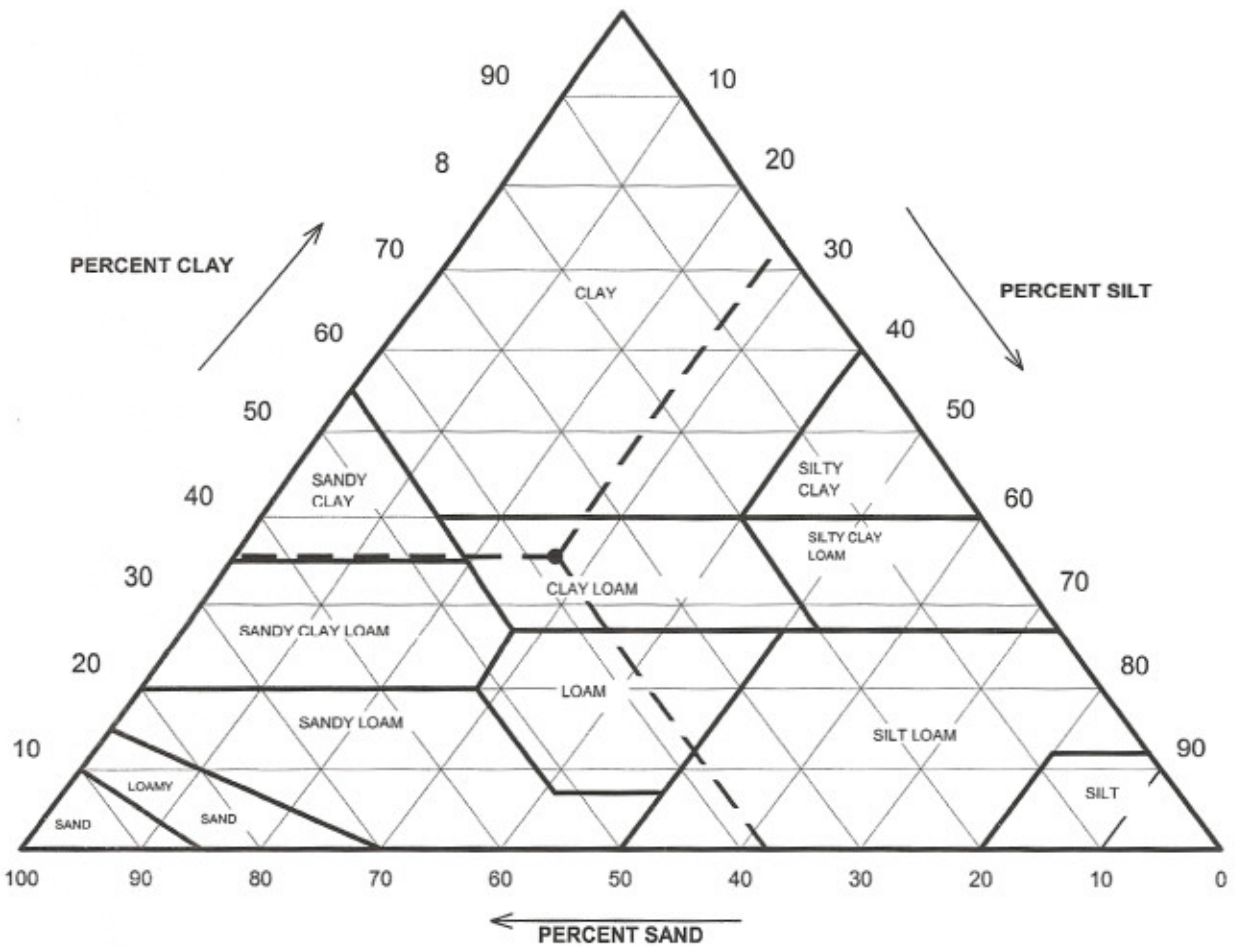
INTEGRITY IN TESTING

USDA CLASSIFICATION CHART

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	10-12
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-01	Soil Color	**BROWN**



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.85	**0.00**
2	98.15	*Sand*	37.03	**37.72**
0.05	61.13	*Silt*	26.25	**26.74**
0.002	34.88	*Clay*	34.88	**35.54**

USDA Classification: ***CLAY LOAM***

page 2 of 4

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	10-12
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-01	Soil Color	**BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	K-2	Tare No.	F-1
Wgt.Tare + Wet Soil (gm)	475.86	Wgt.Tare + Wet Soil (gm)	42.05
Wgt.Tare + Dry Soil (gm)	403.60	Wgt.Tare + Dry Soil (gm)	40.16
Weight of Tare (gm)	152.20	Weight of Tare (gm)	21.97
Weight of Water (gm)	72.26	Weight of Water (gm)	1.89
Weight of Dry Soil (gm)	251.40	Weight of Dry Soil (gm)	18.19
Moisture Content (%)	**28.7**	**Moisture Content (%)**	**10.4**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	323.66	Weight of the Dry Sample (gm)	306.52
Dry Weight +#10 Material(gm)	251.4	Weight of minus #200 material (gm)	35.32
Wet Weight Hydro. Material.(gm)	60.85	Weight of plus #200 material (gm)	271.20
Dry Weight Hydro. Material (gm)	55.12		
Total Dry Weight Sample (gm)	306.52	**J-FACTOR (%FINER THAN #10)**	**0.9815**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	0.00	0.0	0.0	100.0	**100.0**
3/4"	19.0	0.00	0.0	0.0	100.0	**100.0**
1/2"	12.5	0.00	0.0	0.0	100.0	**100.0**
3/8"	9.50	1.28	0.5	0.5	99.5	**99.5**
#4	4.75	0.56	0.2	0.7	99.3	**99.3**
#10	2.00	2.80	1.1	1.8	98.2	**98.2**
#20	0.85	2.23	4.0	4.0	96.0	**94.2**
#40	0.425	4.54	8.2	12.3	87.7	**86.1**
#60	0.250	3.86	7.0	19.3	80.7	**79.2**
#140	0.106	6.46	11.7	31.0	69.0	**67.7**
#200	0.075	2.71	4.9	35.9	64.1	**62.9**
Pan	-	35.32	64.1	100.0	-	-

Notes :

Tested By MCW Date 1/4/2005 Checked By GBM Date 1-18-05

page 3 of 4 DCN: CT-S3P DATE: 03/07/01 REVISION: Lab1\C\2004 Projects\2004-595-03 MESCO\[2004-595-03-01 #10 Split Hydrometer.xls]Sheet1

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INTEGRITY IN TESTING

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

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	10-12
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-01	Soil Color	**BROWN**

Bulb Ser.#
667986

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	43.0	43.0	22.8	9.76	33.2	59.1	0.01282	0.0276	**58.0**
5		41.0	22.8	9.76	31.2	55.5	0.01282	0.0177	**54.5**
15		38.0	22.9	9.75	28.2	50.2	0.01280	0.0105	**49.3**
30		36.0	22.8	9.76	26.2	46.6	0.01282	0.0075	**45.8**
60		34.0	22.8	9.76	24.2	43.1	0.01282	0.0054	**42.3**
250		32.0	21.8	9.86	22.1	39.4	0.01297	0.0027	**38.6**
1440		26.0	21.5	9.88	16.1	28.7	0.01302	0.0012	**28.1**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	55.12	a - Factor	0.98
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.15
Weight of Dry Material (gm)	55.12		
		Specific Gravity	2.75 Tested

Note:

Tested By MCW Date 1/7/2005 Checked By GEM Date 1-18-05

page 4 of 4 DCN: CT-S3P DATE: 03/07/01 REVISION: Lab1\C\2004 Projects\2004-595-03 MESCO\[2004-595-03-01 #10 Split Hydrometer.xls]Sheet1

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INTEGRITY IN TESTING

ATTERBERG LIMITS

ASTM D 4318-98 / AASHTO T89 (SOP - S4A)

Client	MUNICIPAL ENGINEERING SERVICES CO.	Boring No.	P4-1D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	10-12
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-01	Soil Description	**BROWN FAT 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)

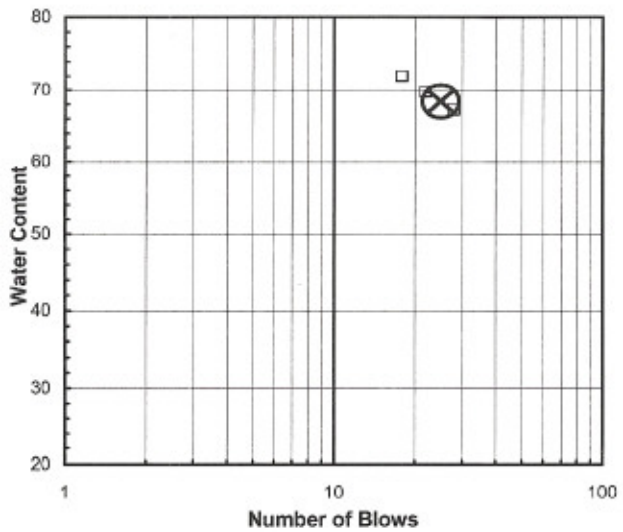
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	E-1	A-T	B-1	MULTIPOINT
Wt. of Tare & WS (gm)	30.59	22.95	29.51	
Wt. of Tare & DS (gm)	27.04	19.94	26.54	
Wt. of Tare (gm)	22.10	15.62	22.12	
Wt. of Water (gm)	3.6	3.0	3.0	
Wt. of DS (gm)	4.9	4.3	4.4	
Moisture Content (%)	**71.9**	**69.7**	**67.2**	
Number of Blows	**18**	**22**	**28**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	U-1	Z-1	
Wt. of Tare & WS (gm)	28.87	28.12	
Wt. of Tare & DS (gm)	27.21	26.64	
Wt. of Tare (gm)	21.95	21.86	
Wt. of Water (gm)	1.7	1.5	
Wt. of DS (gm)	5.3	4.8	
Moisture Content (%)	**31.6**	**31.0**	**0.6**

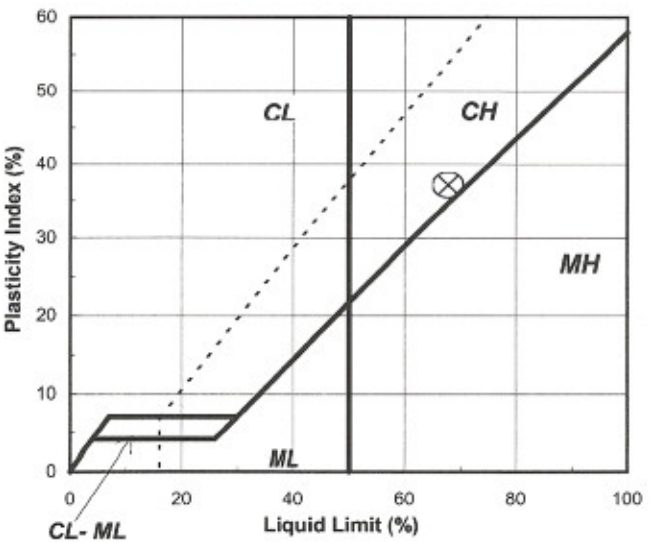
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**68**
Plastic Limit (%)	**31**
Plasticity Index (%)	**37**
USCS Symbol	**CH**

Flow Curve



Plasticity Chart



Tested By *JRB* *Date* *1/6/2205* *Checked By* Gem *Date* 1-11-05

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

\\Lab1\c\2004 Projects\2004-595-03 MESCO\[2004-595-03-01 ATTERBERG 3pttlimit.xls]Sheet1

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INTEGRITY IN TESTING

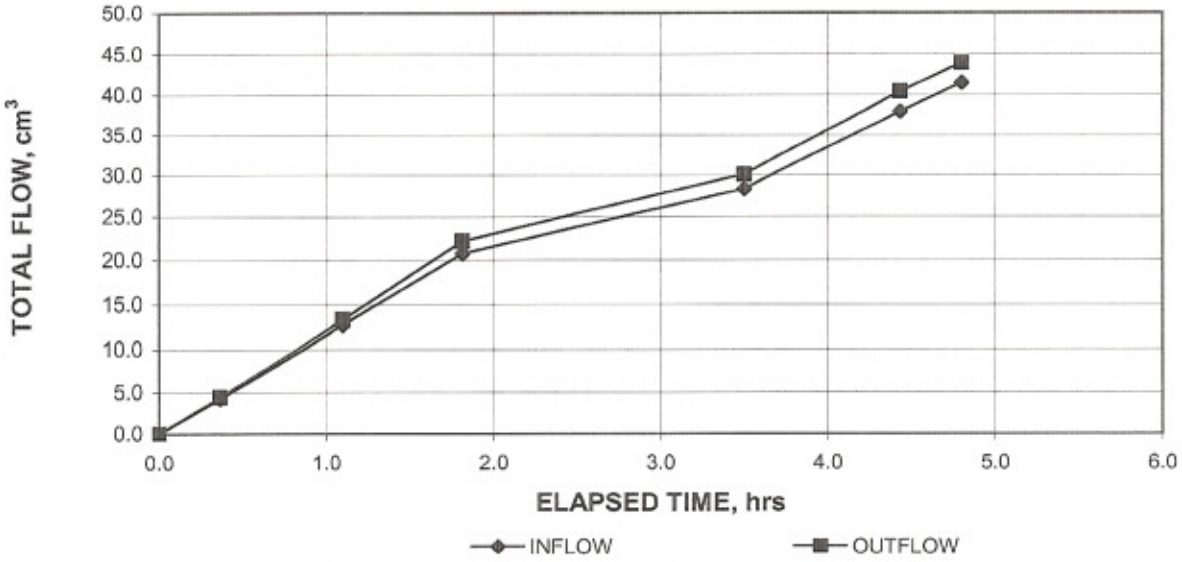
PERMEABILITY TEST

ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

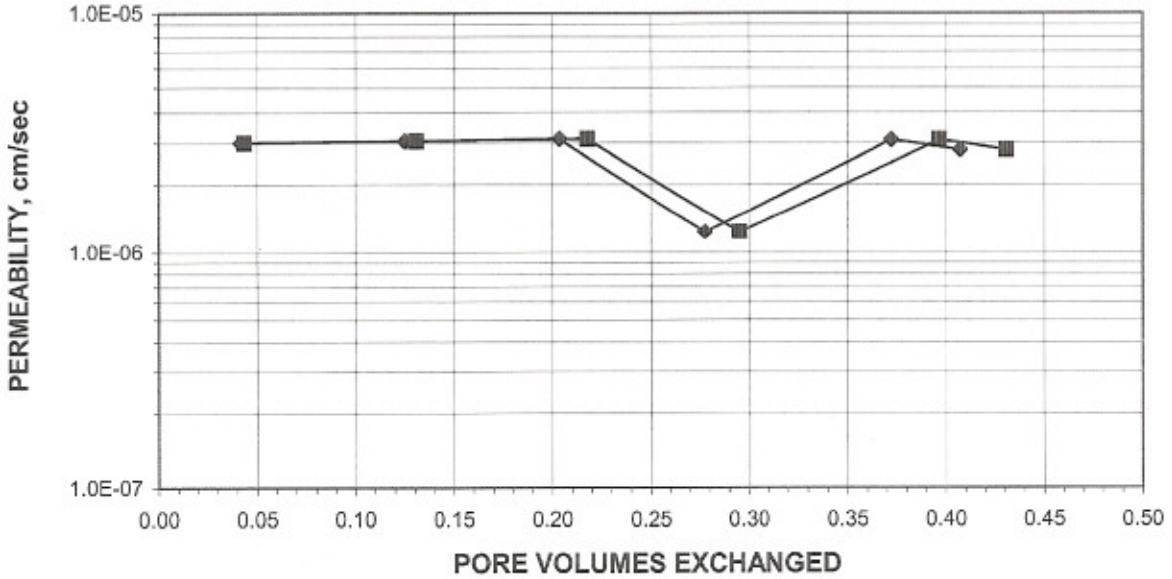
Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	10-12
Project No.	2004-595-03	Sample No.	NA
Lab ID No.	2004-595-03-01		

AVERAGE PERMEABILITY = 2.6E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.6E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: MCW Date: 1/3/2005 Checked By: GBM Date: 1-12-05

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	10-12
Project No.	2004-595-03	Sample No.	NA
Lab ID No.	2004-595-03-01		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: LIGHT BROWN CLAYEY SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	F-4	Y-3
Wt. of Tare & WS (gm.)	328.74	540.90
Wt. of Tare & DS (gm.)	293.96	530.00
Wt. of Tare (gm.)	100.45	101.24
Wt. of Water (gm.)	34.78	10.90
Wt. of DS (gm.)	193.51	428.76
Moisture Content (%)	**18.0**	**2.5**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	532.40	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	532.40	462.76
Length 1 (in.)	2.643	2.617
Length 2 (in.)	2.674	2.541
Length 3 (in.)	2.646	2.570
Top Diameter (in.)	2.852	2.874
Middle Diameter (in.)	2.846	2.851
Bottom Diameter (in.)	2.843	2.821
Average Length (in.)	2.65	2.58
Average Area (in.^{2})	6.37	6.37
Sample Volume (cm^3)	276.90	269.04
Unit Wet Wt. (gm./ cm^3)	1.92	1.72
Unit Wet Wt. (pcf)	120.0	107.4
Unit Dry Wt. (pcf)	101.7	104.7
Unit Dry Wt. (gm./ cm^3)	1.63	1.68
Void Ratio, e	0.66	0.61
Porosity, n	0.40	0.38
Pore Volume (cm^3)	109.8	101.9

Tested By: MCW Date: 1/3/2005 Checked By: GEM Date: 1-12-05

DCN: CT-22 DATE: 01-08-99 REVISION:2 \\Lab1\c\2004 Projects\2004-595-03 MESCO\[2004-595-03-01 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	10-12
Project No.	2004-595-03	Sample No.	NA
Lab ID No.	2004-595-03-01		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.0	Sample Length (cm), L	6.54
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.24
Cell (psi)	55.0	Sample Area (cm^2), A	41.12
Total Pressure Head (cm)	140.6	Inflow Burette Area (cm^2), a-in	4.426
Hydraulic Gradient	21.49	Outflow Burette Area (cm^2), a-out	4.873
		B Parameter (%)	99

AVERAGE PERMEABILITY = 2.6E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.6E-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)
1/7/2005	11	54	0.0	0.0	0.0	160.5	0	23.5	NA
1/7/2005	12	16	0.4	4.2	4.4	158.7	0	23.8	3.0E-06
1/7/2005	13	0	1.1	12.7	13.3	154.9	0	23.8	3.0E-06
1/7/2005	13	43	1.8	20.7	22.2	151.3	0	23.7	3.1E-06
1/7/2005	15	24	3.5	28.3	30.1	148.0	0	23.7	1.2E-06
1/7/2005	16	20	4.4	37.9	40.4	143.7	0	22.2	3.1E-06
1/7/2005	16	42	4.8	41.5	43.9	142.2	1	22.2	2.8E-06

Tested By: MCW Date: 1/3/2005 Checked By: GEM Date: 1-12-05

Page 3 of 3 DCN: CT-22 DATE: 01-08-99 REVISION:2 \\Lab1\c\2004 Projects\2004-595-03 MESCO\[2004-595-03-01 PERM.xls]Sheet1

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INPUT BURETTE NO. AND CONDITIONS

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INTEGRITY IN TESTING

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	10-12
Project No.	2004-595-03	Sample No.	NA
Lab ID No.	2004-595-03-01		

Pressure Heads (Constant)	
Top Cap (psi)	48.0
Bottom Cap (psi)	50.0
Cell (psi)	55.0
Total Pressure Head (cm)	140.6

INFLOW (HEADWATER) BURETTE		**OUTFLOW (HEADWATER) BURETTE**	
BURETTE No.	R 7	BURETTE No.	R 8
BURETTE FACTOR	5	BURETTE FACTOR	5
INFLOW AREA (cm^2), a-in	4.426	OUTFLOW AREA (cm^2), a-out	4.873
VOLUME CORR. FACTOR	0.943	VOLUME CORR. FACTOR	0.986
SLOPE	1.065	SLOPE	1.012
INTERCEPT	64.45	INTERCEPT	63.82
		B Parameter (%)	99

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	INFLOW R7 (div.)	OUTFLOW R8 (div.)	FLOW (0 flow) (1 stop)	TEMP. (°C)	FLOW RATIO
1/7/2005	11	54	2.3	21.5	0	23.5	
1/7/2005	12	16	3.2	20.6	0	23.8	1.000
1/7/2005	13	0	5.0	18.8	0	23.8	1.000
1/7/2005	13	43	6.7	17.0	0	23.7	1.059
1/7/2005	15	24	8.3	15.4	0	23.7	1.000
1/7/2005	16	20	10.4	13.3	0	22.2	1.024
1/7/2005	16	42	11.1	12.6	1	22.2	0.933

Tested By: MCW Date: 1/3/2005 Checked By: BEM Date: 1-12-05

Page 4 (Checking) DCN: CT-22 DATE: 01-08-99 REVISION: 2 ab1\c\2004 Projects\2004-595-03 MESCO\[2004-595-03-01 PERM.xls]Sheet1

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INTEGRITY IN TESTING

SPECIFIC GRAVITY

ASTM D 854-00 / AASHTO T100-03 (SOP - S5)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	25-27
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-03	Visual Description	**BROWN**
			(MInus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	R 241	R 242
Weight of Pycnometer + Soil + Water (gm)	699.2	701.8
Temperature, T (°Celsius)	21.5	21.2
Weight of Pycnometer + Water (gm)	667.07	670.30
Tare Number	H-1	G-11
Weight of Tare + Dry Soil (gm)	200.32	202.76
Weight of Tare (gm)	150.43	152.94
Weight of Dry Soil (gm)	49.89	49.82
Specific Gravity of Soil @ T	2.809	2.719
Specific Gravity of Water @ T	0.9979	0.9980
Conversion Factor for Temperature T	0.9997	0.9997
Specific Gravity @ 20° Celsius	2.810	2.720

Average Specific Gravity @ 20° Celsius	2.76

Tested By MCW *Date* 01/07/05 *Checked By* GEM *Date* 1-17-05

DCN: CT-S5 Date10/05/04 Revision:9R C:\2004 Projects\2004-595-03 MESCO\[2004-595-03 Specific Gravity.xls]Sheet1

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ATTERBERG LIMIT

ASTM D 4318-00 (SOP - S4)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	25-27
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-03	Visual Description	**BROWN SILT**
			(MInus No. 40 sieve material, Wet Method)

NON - PLASTIC MATERIAL

Tested By JRB *Date* 01/18/05 *Checked By* Gom *Date* 1-20-05

page 1 of 1 DCN: CT-S4C DATE: 7-11-97 REVISION : 2 *C:\2004 Projects\2004-595-03 MESCO\[2004-595-03-03 Limit-(NP).xls]Sheet1*

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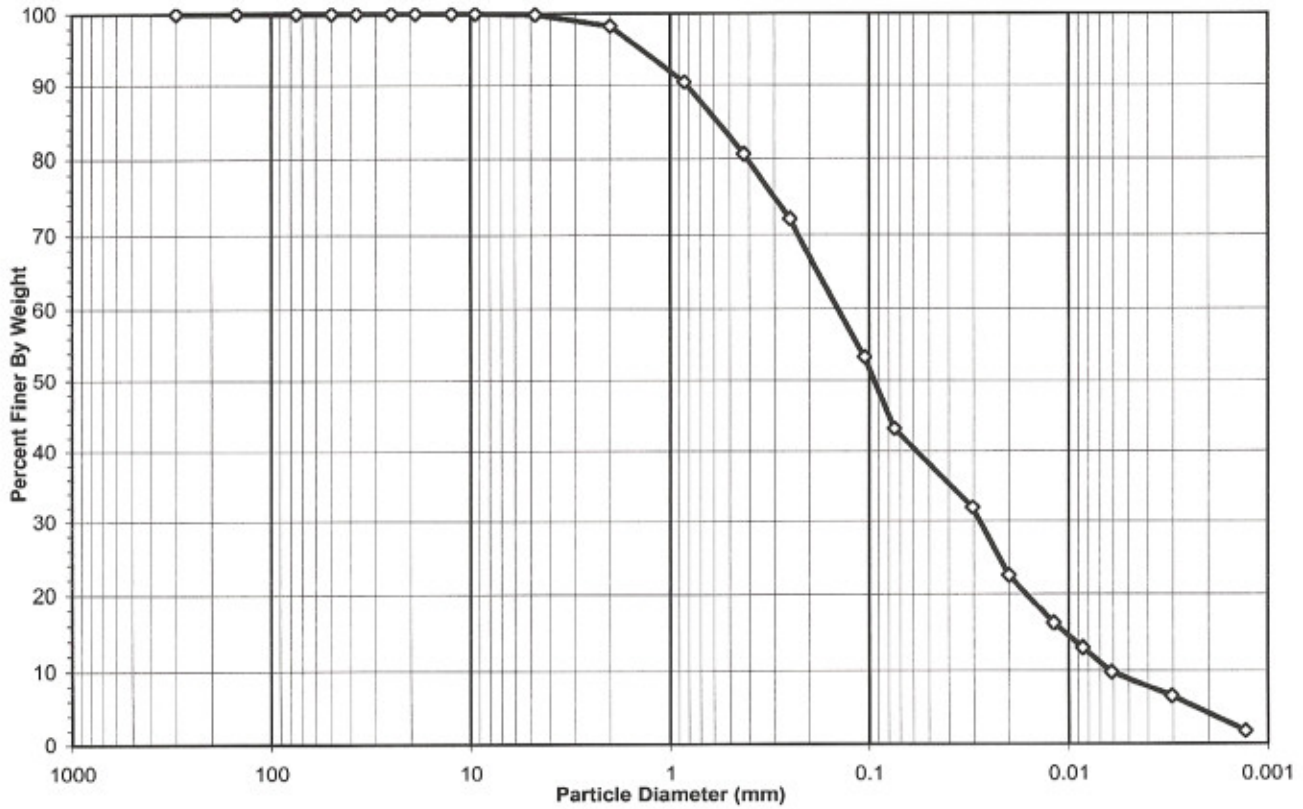
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	25-27
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-03	Soil Color	**LIGHT 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



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.12
#4 To #200	*Sand*	56.67
Finer Than #200	*Silt & Clay*	43.21

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND (NON-PLASTIC FINES)***

page 1 of 4 DCN: CT-S3P DATE: 03/07/01 REVISION: 5 *C:\2004 Projects\2004-595-03 MESCO\[2004-595-03-03 #10 Split Hydrometer.xls]Sheet1*

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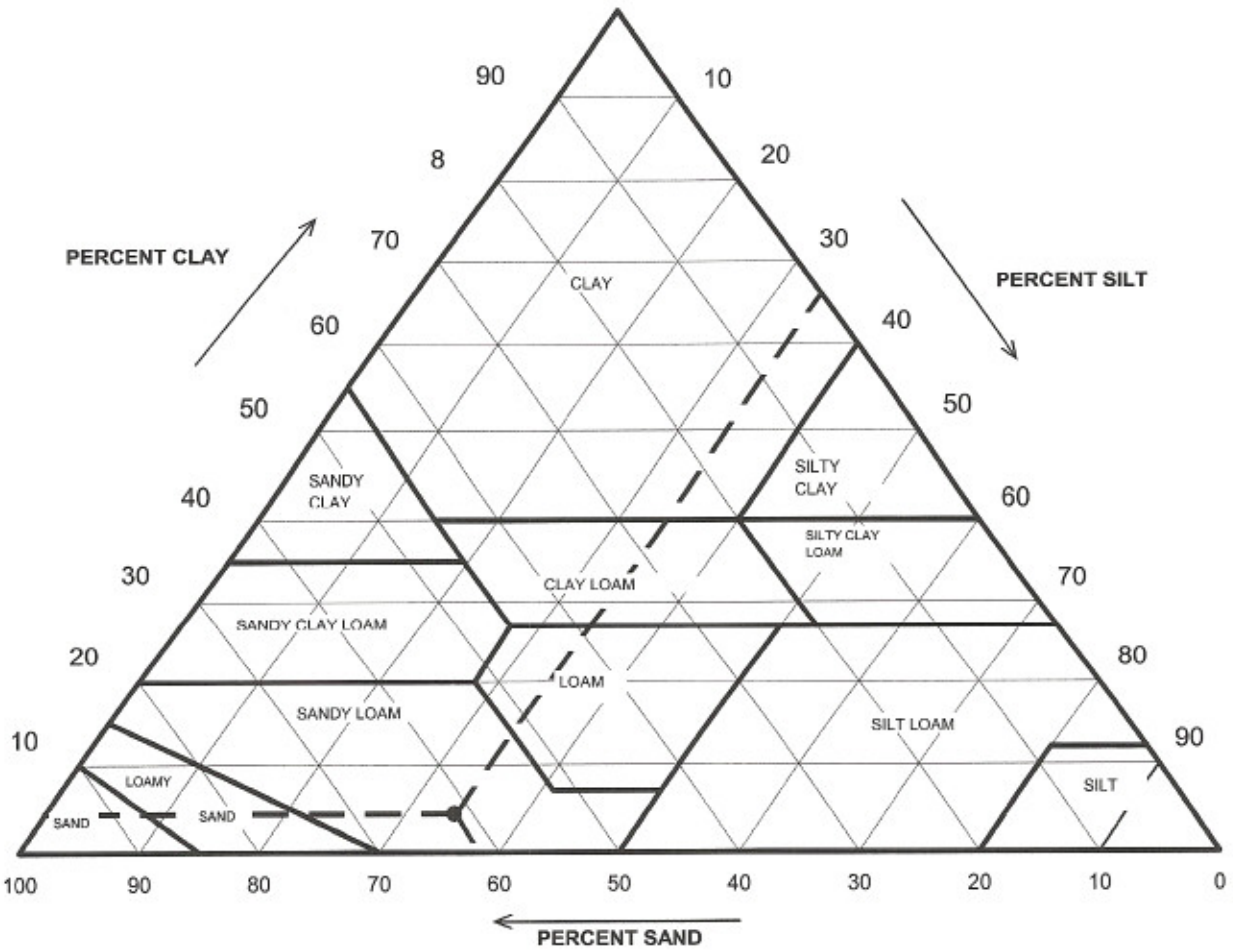
USDA CLASSIFICATION CHART

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	25-27
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-03	Soil Color	**LIGHT BROWN**



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.68	**0.00**
2	98.32	*Sand*	60.50	**61.54**
0.05	37.82	*Silt*	33.53	**34.11**
0.002	4.28	*Clay*	4.28	**4.35**

USDA Classification: ***SANDY LOAM***

page 2 of 4

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	25-27
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-03	Soil Color	**LIGHT BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	G-13	Tare No.	M-1
Wgt.Tare + Wet Soil (gm)	522.90	Wgt.Tare + Wet Soil (gm)	40.23
Wgt.Tare + Dry Soil (gm)	426.10	Wgt.Tare + Dry Soil (gm)	38.19
Weight of Tare (gm)	153.19	Weight of Tare (gm)	22.09
Weight of Water (gm)	96.80	Weight of Water (gm)	2.04
Weight of Dry Soil (gm)	272.91	Weight of Dry Soil (gm)	16.10
Moisture Content (%)	**35.5**	**Moisture Content (%)**	**12.7**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	369.71	Weight of the Dry Sample (gm)	333.95
Dry Weight +#10 Material(gm)	272.9	Weight of minus #200 material (gm)	26.83
Wet Weight Hydro. Material.(gm)	68.77	Weight of plus #200 material (gm)	307.12
Dry Weight Hydro. Material (gm)	61.04		
Total Dry Weight Sample (gm)	333.95	**J-FACTOR (%FINER THAN #10)**	**0.9832**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	0.00	0.0	0.0	100.0	**100.0**
3/4"	19.0	0.00	0.0	0.0	100.0	**100.0**
1/2"	12.5	0.00	0.0	0.0	100.0	**100.0**
3/8"	9.50	0.00	0.0	0.0	100.0	**100.0**
#4	4.75	0.33	0.1	0.1	99.9	**99.9**
#10	2.00	4.26	1.6	1.7	98.3	**98.3**
#20	0.85	4.90	8.0	8.0	92.0	**90.4**
#40	0.425	6.09	10.0	18.0	82.0	**80.6**
#60	0.250	5.29	8.7	26.7	73.3	**72.1**
#140	0.106	11.69	19.2	45.8	54.2	**53.3**
#200	0.075	6.24	10.2	56.0	44.0	**43.2**
Pan	-	26.83	44.0	100.0	-	**-**

Notes :

Tested By MCW Date 01/05/05 Checked By Gen Date 1-20-05

page 3 of 4 DCN: CT-S3P DATE: 03/07/01 REVISION: 5 *C:\2004 Projects\2004-595-03 MESCO\[2004-595-03-03 #10 Split Hydrometer.xls]Sheet1*

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INTEGRITY IN TESTING

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

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	25-27
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-03	Soil Color	**LIGHT BROWN**

Bulb Ser.#
667986

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	31.0	31.0	22.8	10.76	20.2	32.5	0.01282	0.0303	**31.9**
5		25.0	22.8	10.76	14.2	22.9	0.01282	0.0200	**22.5**
15		21.0	22.5	10.79	10.2	16.4	0.01286	0.0119	**16.1**
30		19.0	22.5	10.79	8.2	13.2	0.01286	0.0085	**13.0**
60		17.0	22.3	10.81	6.2	9.9	0.01289	0.0061	**9.8**
250		15.0	21.9	10.85	4.2	6.7	0.01295	0.0030	**6.6**
1440		12.0	21.5	10.88	1.1	1.8	0.01302	0.0013	**1.8**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	61.04	a - Factor	0.98
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.32
Weight of Dry Material (gm)	61.04		
		Specific Gravity	2.75 Tested

Note:

Tested By MCW Date 01/05/05 Checked By GEM Date 1-20-05

page 4 of 4 DCN: CT-S3P DATE: 03/07/01 REVISION: 5 *C:\2004 Projects\2004-595-03 MESCO\[2004-595-03-03 #10 Split Hydrometer.xls]Sheet1*

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INTEGRITY IN TESTING

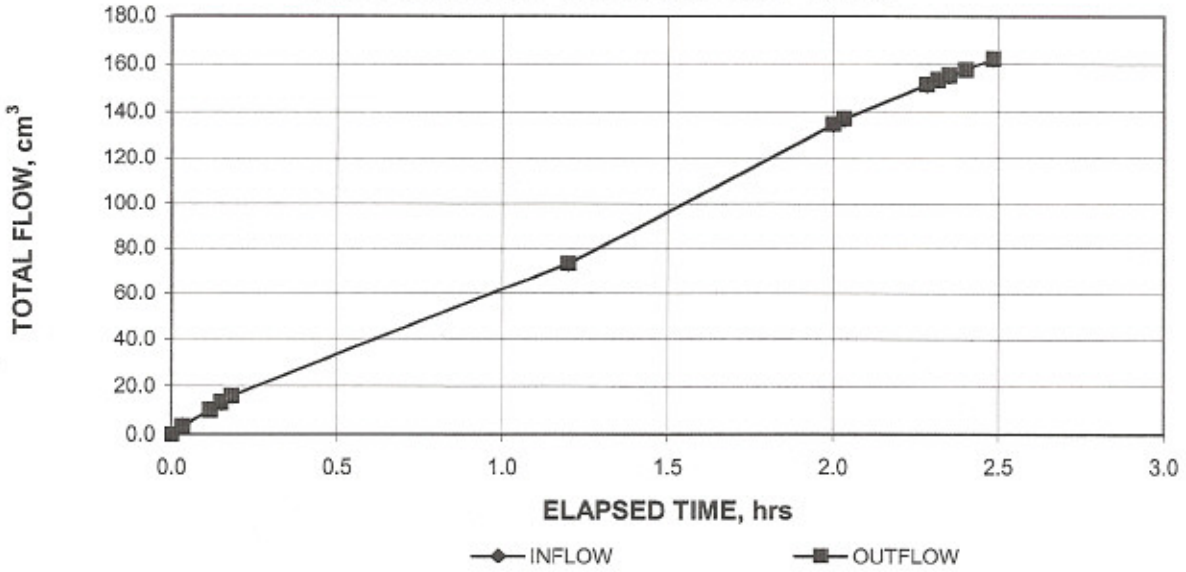
PERMEABILITY TEST

ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

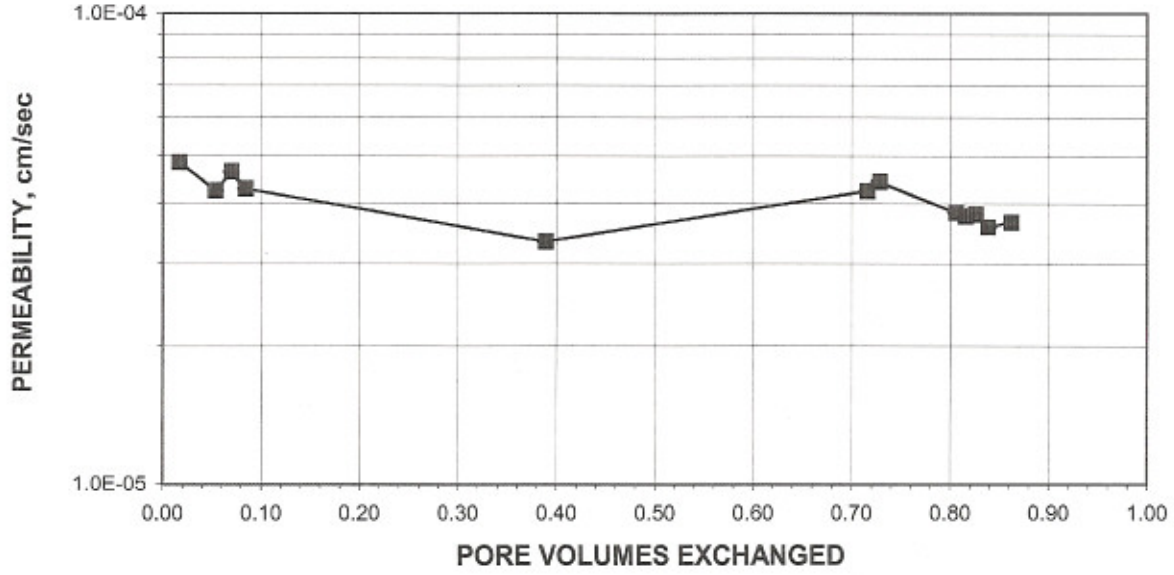
Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	25-27
Project No.	2004-595-03	Sample No.	NA
Lab ID No.	2004-595-03-03		

AVERAGE PERMEABILITY = 3.7E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.7E-07 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: MCW Date: 01/05/05 Checked By: GEM Date: 1-11-05

DCN: CT-22 DATE: 01-08-99 REVISION:2 C:\2004 Projects\2004-595-03 MESCO\[2004-595-03-03 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	25-27
Project No.	2004-595-03	Sample No.	NA
Lab ID No.	2004-595-03-03		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: LIGHT BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	Z-12	Y-1
Wt. of Tare & WS (gm.)	292.39	823.70
Wt. of Tare & DS (gm.)	243.24	630.20
Wt. of Tare (gm.)	99.91	99.45
Wt. of Water (gm.)	49.15	193.50
Wt. of DS (gm.)	143.33	530.75
Moisture Content (%)	**34.3**	**36.5**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	726.60	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	726.60	738.32
Length 1 (in.)	3.800	3.714
Length 2 (in.)	3.766	3.772
Length 3 (in.)	3.830	3.762
Top Diameter (in.)	2.818	2.819
Middle Diameter (in.)	2.814	2.844
Bottom Diameter (in.)	2.805	2.850
Average Length (in.)	3.80	3.75
Average Area (in.^{2})	6.21	6.32
Sample Volume (cm^3)	386.68	388.57
Unit Wet Wt. (gm./ cm^3)	1.88	1.90
Unit Wet Wt. (pcf)	117.3	118.6
Unit Dry Wt. (pcf)	87.3	86.9
Unit Dry Wt. (gm./ cm^3)	1.40	1.39
Void Ratio, e	0.93	0.94
Porosity, n	0.48	0.48
Pore Volume (cm^3)	186.3	188.2

Tested By: MCW Date: 01/05/05 Checked By: GCM Date: 1-11-05

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	25-27
Project No.	2004-595-03	Sample No.	NA
Lab ID No.	2004-595-03-03		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.6	Sample Length (cm), L	9.52
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.21
Cell (psi)	60.0	Sample Area (cm^2), A	40.80
Total Pressure Head (cm)	98.4	Inflow Burette Area (cm^2), a-in	4.534
Hydraulic Gradient	10.34	Outflow Burette Area (cm^2), a-out	4.803
		B Parameter (%)	99

AVERAGE PERMEABILITY = 3.7E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.7E-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)
01/06/05	10	48	0.0	0.0	0.0	121.0	0	22.8	NA
01/06/05	10	50	0.0	3.2	3.2	119.6	0	22.8	4.9E-05
01/06/05	10	55	0.1	10.2	10.1	116.7	0	22.9	4.2E-05
01/06/05	10	57	0.1	12.9	13.3	115.4	0	22.9	4.6E-05
01/06/05	10	59	0.2	15.7	15.9	114.2	0	22.9	4.3E-05
01/06/05	12	0	1.2	73.0	73.2	89.7	1	23.2	3.3E-05
01/06/05	2	47	1.2	73.0	73.2	120.7	0	23.9	NA
01/06/05	3	35	2.0	134.4	134.7	94.3	0	23.9	4.2E-05
01/06/05	3	37	2.0	136.7	137.1	93.3	0	23.9	4.4E-05
01/06/05	3	52	2.3	151.5	151.7	87.0	0	24.2	3.8E-05
01/06/05	3	54	2.3	153.4	153.6	86.2	0	24.2	3.8E-05
01/06/05	3	56	2.4	155.2	155.4	85.4	0	24.2	3.8E-05
01/06/05	3	59	2.4	158.0	157.8	84.3	0	24.2	3.6E-05
01/06/05	4	4	2.5	162.1	162.3	82.5	1	24.2	3.7E-05

Tested By: MCW Date: 01/05/05 Checked By: GEM Date: 1-11-05

Page 3 of 3 DCN: CT-22 DATE: 01-08-99 REVISION:2 C:\2004 Projects\2004-595-03 MESCO\[2004-595-03-03 PERM.xls]Sheet1

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INPUT BURETTE NO. AND CONDITIONS

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INTEGRITY IN TESTING

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-1D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	25-27
Project No.	2004-595-03	Sample No.	NA
Lab ID No.	2004-595-03-03		

Pressure Heads (Constant)

Top Cap (psi)	48.6
Bottom Cap (psi)	50.0
Cell (psi)	60.0
Total Pressure Head (cm)	98.4

INFLOW (HEADWATER) BURETTE

BURETTE No.	R 5
BURETTE FACTOR	5
INFLOW AREA (cm^2), a-in	4.534
VOLUME CORR. FACTOR	0.924
SLOPE	1.019
INTERCEPT	63.82

OUTFLOW (HEADWATER) BURETTE

BURETTE No.	R 6
BURETTE FACTOR	5
OUTFLOW AREA (cm^2), a-out	4.803
VOLUME CORR. FACTOR	1.061
SLOPE	1.105
INTERCEPT	67.31

B Parameter (%)	99

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	INFLOW R5 (div.)	OUTFLOW R6 (div.)	FLOW (0 flow) (1 stop)	TEMP. (°C)	FLOW RATIO
01/06/05	10	48	0.2	23.8	0	22.8	
01/06/05	10	50	0.9	23.2	0	22.8	0.857
01/06/05	10	55	2.4	21.9	0	22.9	0.867
01/06/05	10	57	3.0	21.3	0	22.9	1.000
01/06/05	10	59	3.6	20.8	0	22.9	0.833
01/06/05	12	0	16.0	10.0	1	23.2	0.871
01/06/05	2	47	0.2	23.5	0	23.9	0.854
01/06/05	3	35	13.5	11.9	0	23.9	0.872
01/06/05	3	37	14.0	11.5	0	23.9	0.900
01/06/05	3	52	17.2	8.7	0	24.2	0.859
01/06/05	3	54	17.6	8.4	0	24.2	0.875
01/06/05	3	56	18.0	8.0	0	24.2	0.875
01/06/05	3	59	18.6	7.6	0	24.2	0.750
01/06/05	4	4	19.5	6.7	1	24.2	0.944

Tested By: MCW Date: 01/05/05 Checked By: GEM Date: 1-11-05

Page 4 (Checking) DCN: CT-22 DATE: 01-08-99 REVISION:2 C:\2004 Projects\2004-595-03 MESCO\[2004-595-03-03 PERM.xls]Sheet1

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INTEGRITY IN TESTING

SPECIFIC GRAVITY

ASTM D 854-00 / AASHTO T100-03 (SOP - S5)

Client	MUNICIPAL ENGINEERING SERVICES CO.	Boring No.	P4-8D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	9.5-11.79
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-02	Visual Description	**BROWN**
			(MInus No.4 sieve material, airdried)

Replicate Number		**1**		**2**
Pycnometer ID	R	241	R	242
Weight of Pycnometer + Soil + Water (gm)		698		701
Temperature, T (°Celsius)		23.5		24.0
Weight of Pycnometer + Water (gm)		666.84		669.98
Tare Number		H-1		G-7
Weight of Tare + Dry Soil (gm)		200.12		200.11
Weight of Tare (gm)		150.5		150.3
Weight of Dry Soil (gm)		49.62		49.81
Specific Gravity of Soil @ T		2.688		2.651
Specific Gravity of Water @ T		0.9974		0.9973
Conversion Factor for Temperature T		0.9992		0.9991
Specific Gravity @ 20° Celsius		2.690		2.654

Average Specific Gravity @ 20° Celsius	2.67

Tested By MCW *Date* 01/07/05 *Checked By* GBM *Date* 1-11-05

DCN: CT-S5 Date10/05/04 Revision:9R C:\2004 Projects\2004-595-03 MESCO\[2004-595-03-02 Specific Gravity.xls]Sheet1

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ATTERBERG LIMIT

ASTM D 4318-00 (SOP - S4)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-8D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	9.5-11.79
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-02	Visual Description	**REDDISH BROWN SILT**
			(MInus No. 40 sieve material, Wet Method)

NON - PLASTIC MATERIAL

Tested By JRB *Date* 01/11/05 *Checked By* Gem *Date* 1-20-05

page 1 of 1 DCN: CT-S4C DATE: 7-11-97 REVISION : 2 *C:\2004 Projects\2004-595-03 MESCO\[2004-595-03-02 Limit-(NP).xls]Sheet1*

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MUNICIPAL ENGINEERING
JAN 27 2005

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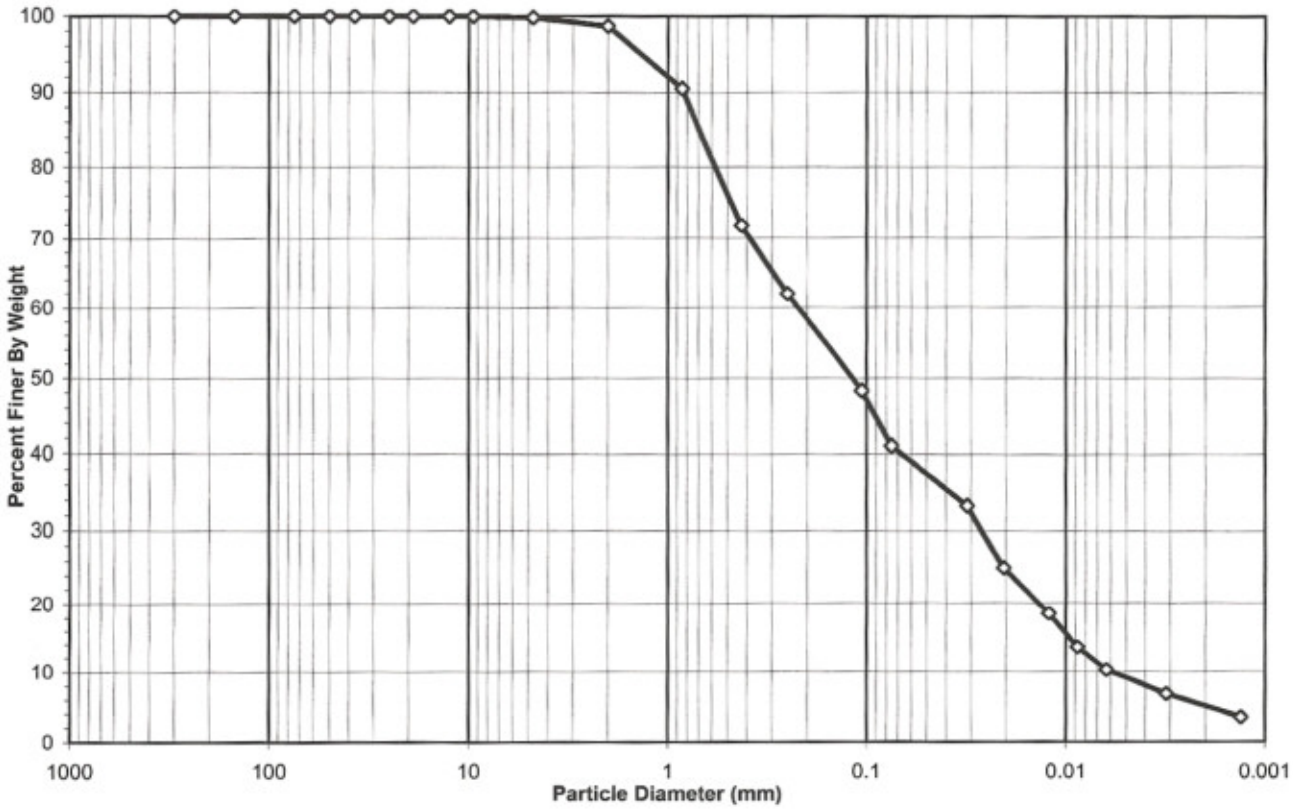
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-8D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	9.5-11.79
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-02	Soil Color	**LIGHT PINKISH 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



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.17
#4 To #200	*Sand*	58.77
Finer Than #200	*Silt & Clay*	41.06

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND (NON-PLASTIC FINES)***

page 1 of 4

DCN: CT-S3P DATE: 03/07/01 REVISION: 5 *ab1\c\2004 Projects\2004-595-03 MESCO\[2004-595-03-02 #10 Split Hydrometer.xls]Sheet1*

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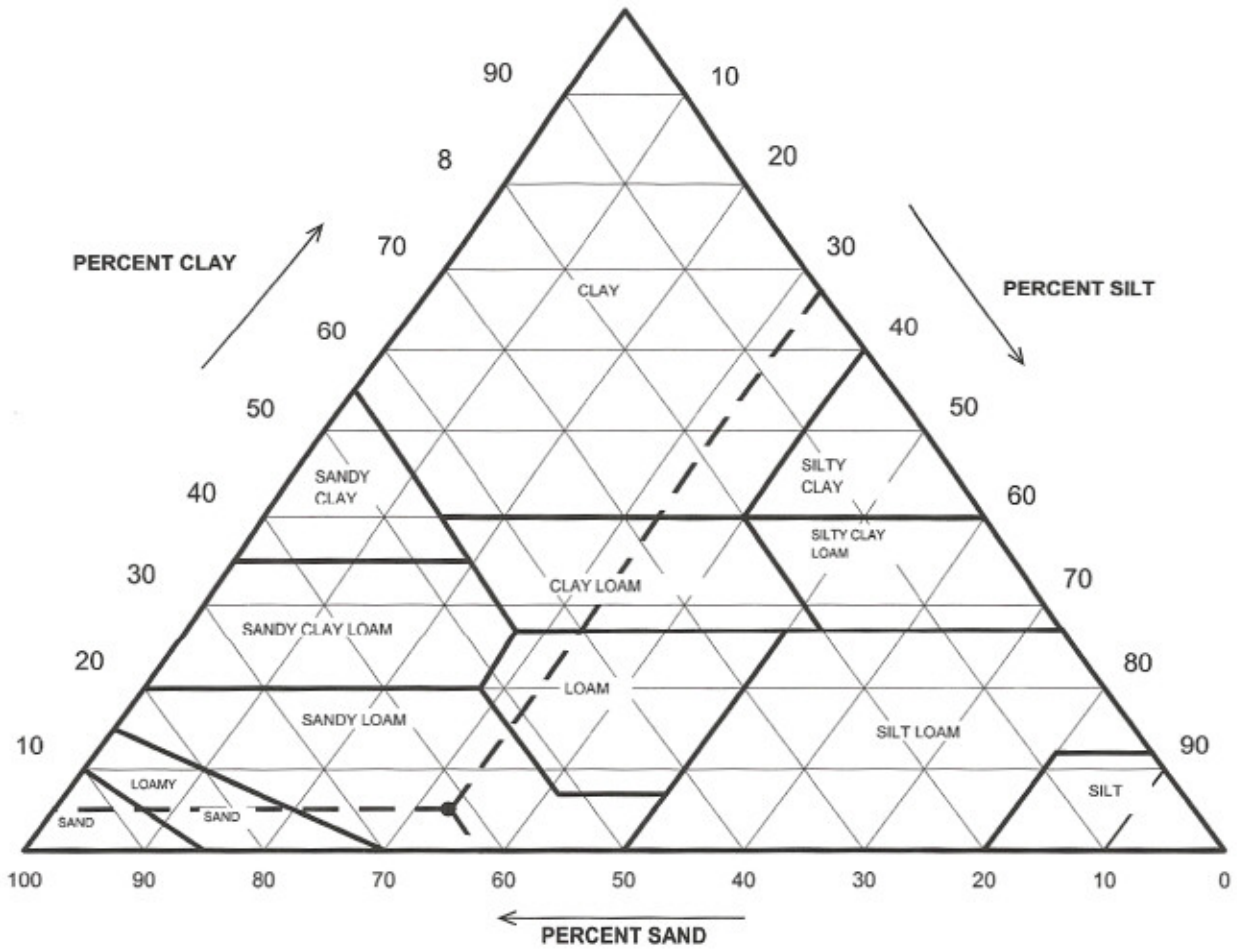
INTEGRITY IN TESTING

USDA CLASSIFICATION CHART

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-8D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	9.5-11.79
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-02	Soil Color	**LIGHT PINKISH BROWN**



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.32	**0.00**
2	98.68	*Sand*	61.24	**62.06**
0.05	37.44	*Silt*	32.38	**32.81**
0.002	5.07	*Clay*	5.07	**5.13**

USDA Classification: ***SANDY LOAM***

page 2 of 4

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-8D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	9.5-11.79
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-02	Soil Color	**LIGHT PINKISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	H-4	Tare No.	F-1
Wgt.Tare + Wet Soil (gm)	583.10	Wgt.Tare + Wet Soil (gm)	42.46
Wgt.Tare + Dry Soil (gm)	482.20	Wgt.Tare + Dry Soil (gm)	42.13
Weight of Tare (gm)	153.63	Weight of Tare (gm)	21.95
Weight of Water (gm)	100.90	Weight of Water (gm)	0.33
Weight of Dry Soil (gm)	328.57	Weight of Dry Soil (gm)	20.18
Moisture Content (%)	**30.7**	**Moisture Content (%)**	**1.6**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	429.47	Weight of the Dry Sample (gm)	388.32
Dry Weight +#10 Material(gm)	328.6	Weight of minus #200 material (gm)	24.86
Wet Weight Hydro. Material.(gm)	60.73	Weight of plus #200 material (gm)	363.46
Dry Weight Hydro. Material (gm)	59.75		
Total Dry Weight Sample (gm)	388.32	**J-FACTOR (%FINER THAN #10)**	**0.9868**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	0.00	0.0	0.0	100.0	**100.0**
3/4"	19.0	0.00	0.0	0.0	100.0	**100.0**
1/2"	12.5	0.00	0.0	0.0	100.0	**100.0**
3/8"	9.50	0.00	0.0	0.0	100.0	**100.0**
#4	4.75	0.57	0.2	0.2	99.8	**99.8**
#10	2.00	3.77	1.1	1.3	98.7	**98.7**
#20	0.85	4.95	8.3	8.3	91.7	**90.5**
#40	0.425	11.35	19.0	27.3	72.7	**71.8**
#60	0.250	5.96	10.0	37.3	62.7	**61.9**
#140	0.106	8.23	13.8	51.0	49.0	**48.3**
#200	0.075	4.40	7.4	58.4	41.6	**41.1**
Pan	-	24.86	41.6	100.0	-	-

Notes :

Tested By JRB Date 1/17/2005 Checked By GEM Date 1-20-05

DCN: CT-S3P DATE: 03/07/01 REVISION:\\lab1\c\2004 Projects\2004-595-03 MESCO\[2004-595-03-02 #10 Split Hydrometer.xls]Sheet1

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

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-8D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	9.5-11.79
Project No.	2004-595-03	Sample No.	NA
Lab ID	2004-595-03-02	Soil Color	**LIGHT PINKISH BROWN**

Bulb Ser.#
667986

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	30.0	30.0	22.7	9.77	20.2	33.7	0.01314	0.0313	**33.3**
5		25.0	22.7	9.77	15.2	25.4	0.01314	0.0205	**25.0**
15		21.0	22.7	9.77	11.2	18.7	0.01314	0.0122	**18.5**
30		18.0	22.7	9.77	8.2	13.7	0.01314	0.0088	**13.5**
60		16.0	22.5	9.79	6.2	10.3	0.01317	0.0063	**10.2**
250		14.0	21.8	9.86	4.1	6.9	0.01328	0.0031	**6.8**
1440		12.0	21.5	9.88	2.1	3.5	0.01332	0.0013	**3.5**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	59.75	a - Factor	0.996
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.68
Weight of Dry Material (gm)	59.75		
		Specific Gravity	2.67 Tested

Note:

Tested By MCW Date 1/4/2005 Checked By GBM Date 1-20-05

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DCN: CT-S3P DATE: 03/07/01 REVISION:\\lab1\c\2004 Projects\2004-595-03 MESCO\[2004-595-03-02 #10 Split Hydrometer.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

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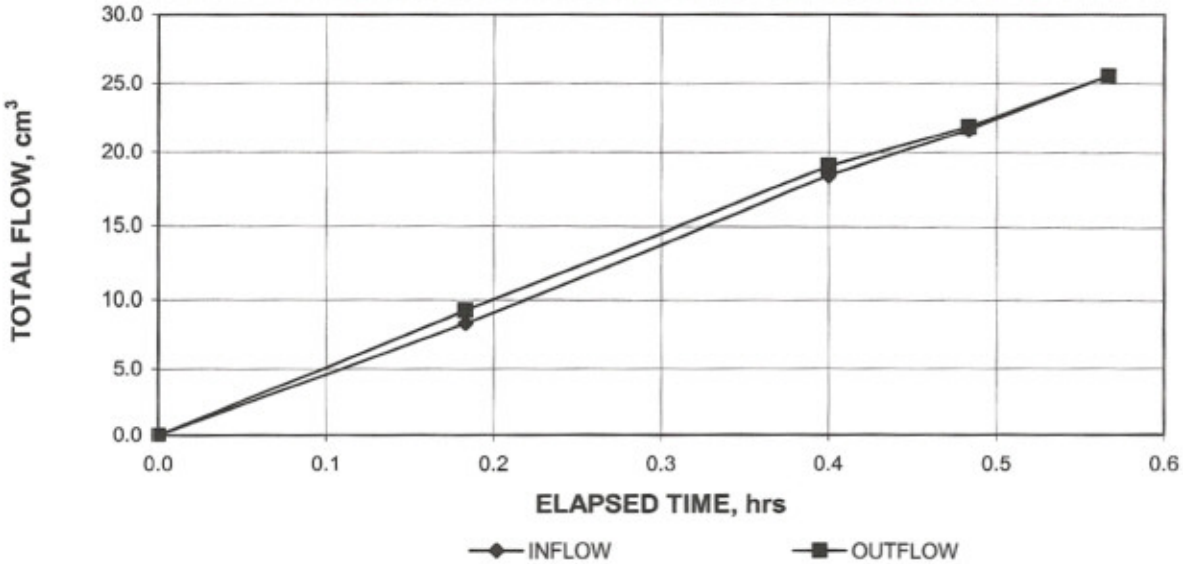
INTEGRITY IN TESTING

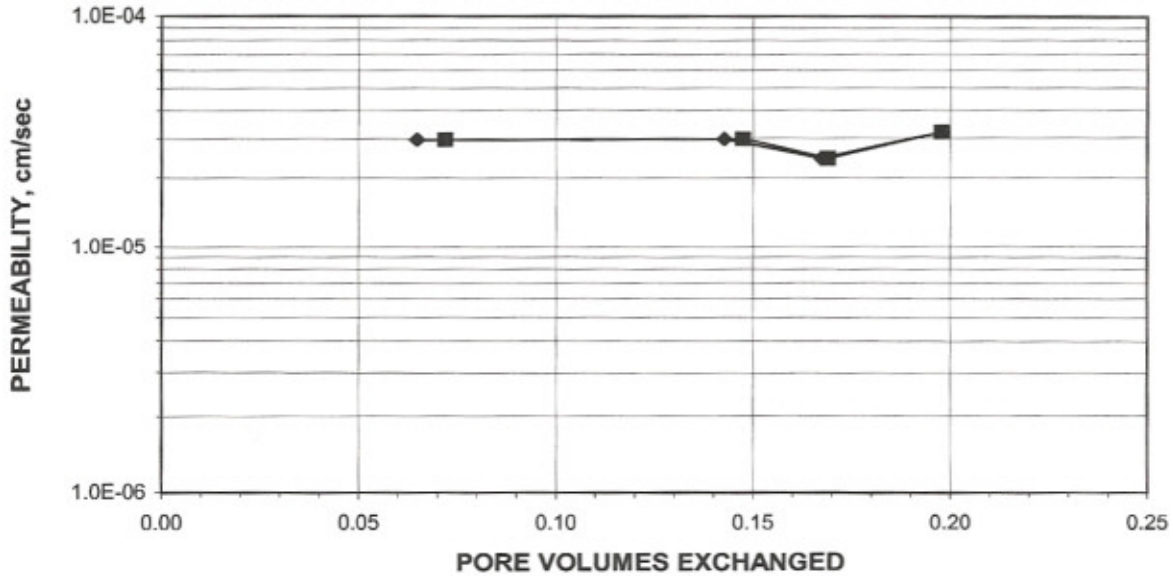
Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-8D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	9.5-11.79
Project No.	2004-595-03	Sample No.	NA
Lab ID No.	2004-595-03-02		

AVERAGE PERMEABILITY = 2.9E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.9E-07 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: MCW Date: 01/04/05 Checked By: GEM Date: 1-24-05

Page 1 of 3 DCN: CT-22 DATE: 01-08-99 REVISION:2 C:\2004 Projects\2004-595-03 MESCO\[2004-595-03-02 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-8D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	9.5-11.79
Project No.	2004-595-03	Sample No.	NA
Lab ID No.	2004-595-03-02		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: LIGHT PINKISH BROWN SILTY SAND

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	ZZ-1	SS-1
Wt. of Tare & WS (gm.)	413.90	588.52
Wt. of Tare & DS (gm.)	330.52	469.90
Wt. of Tare (gm.)	100.19	100.62
Wt. of Water (gm.)	83.38	118.62
Wt. of DS (gm.)	230.33	369.28
Moisture Content (%)	**36.2**	**32.1**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	451.20	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	451.20	437.69
Length 1 (in.)	2.467	2.425
Length 2 (in.)	2.448	2.420
Length 3 (in.)	2.477	2.418
Top Diameter (in.)	2.856	2.863
Middle Diameter (in.)	2.827	2.849
Bottom Diameter (in.)	2.808	2.817
Average Length (in.)	2.46	2.42
Average Area (in.^{2})	6.29	6.35
Sample Volume (cm^3)	254.04	251.85
Unit Wet Wt. (gm./ cm^3)	1.78	1.74
Unit Wet Wt. (pcf)	110.9	108.5
Unit Dry Wt. (pcf)	81.4	82.1
Unit Dry Wt. (gm./ cm^3)	1.30	1.32
Void Ratio, e	1.07	1.05
Porosity, n	0.52	0.51
Pore Volume (cm^3)	131.3	129.2

Tested By: MCW Date: 01/04/05 Checked By: GBM Date: 1-24-05

Page 2 of 3 DCN: CT-22 DATE: 01-08-99 REVISION:2 C:\2004 Projects\2004-595-03 MESCO\[2004-595-03-02 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-8D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	9.5-11.79
Project No.	2004-595-03	Sample No.	NA
Lab ID No.	2004-595-03-02		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	49.1	Sample Length (cm), L	6.15
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.22
Cell (psi)	55.0	Sample Area (cm^2), A	40.96
Total Pressure Head (cm)	63.3	Inflow Burette Area (cm^2), a-in	4.703
Hydraulic Gradient	10.29	Outflow Burette Area (cm^2), a-out	4.530
		B Parameter (%)	98

AVERAGE PERMEABILITY = 2.9E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.9E-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)
01/11/05	11	20	0.0	0.0	0.0	70.5	0	19.5	NA
01/11/05	11	31	0.2	8.4	9.3	66.7	0	19.5	3.0E-05
01/11/05	11	44	0.4	18.4	19.0	62.4	0	19.8	3.0E-05
01/11/05	11	49	0.5	21.6	21.8	61.1	0	19.8	2.4E-05
01/11/05	11	54	0.6	25.6	25.5	59.5	1	19.8	3.2E-05

Tested By: MCW Date: 01/04/05 Checked By: GBM Date: 1-24-05

 DCN: CT-22 DATE: 01-08-99 REVISION:2 C:\2004 Projects\2004-595-03 MESCO\[2004-595-03-02 PERM.xls]Sheet1

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

JAN 27 2005

LABORATORY TEST REPORT

January 21, 2005

Project No.: NA

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

RE: Soils Testing – IREDELL CO. LANDFILL Geotechnics No.: 2004-595-04

Transmitted herein are the results of the soils testing performed for the above referenced project verified on the Project Verification Form, submitted January 16, 2005. The testing was performed in accordance with the ASTM methods listed on the enclosed data sheets.

Disclaimer

The test results are believed to be representative of the samples submitted but are indicative only of the specimens which were evaluated. Geotechnics has no direct knowledge of the origin of the samples, implies no position with regard to the disposition of the test results, i.e. pass/fail, and makes 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 of the Client and Geotechnics. 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.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please do not hesitate to contact our office.

Respectively submitted,

Michael P. Smith
Regional Manager

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INTEGRITY IN TESTING

MOISTURE CONTENT

ASTM D 2216 (SOP-S1)

JAN 27 2005

Client	MUNICIPAL ENGINEERING SERVICES CO.
Client Reference	IREDELL CO. LANDFILL
Project No.	2004-595-04

Lab ID	595-04-01	595-04-02
Boring No.	P4-13D	P4-13D
Depth (ft)	3-5'	10-12'
Sample No.	NA	NA
Tare Number	F-4	B-4
Wt. of Tare & WS (gm)	203.47	226.80
Wt. of Tare & DS (gm)	181.50	206.67
Wt. of Tare (gm)	100.45	99.20
Wt. of Water (gm)	21.97	20.13
Wt. of DS (gm)	81.05	107.47
Water Content (%)	**27.1**	**18.7**

Notes : *NA*

Tested By *JRB* *Date* *1/11/2005* *Checked By* GEM *Date* 1-17-05

page 1 of 1 DCN: CT-S1 DATE 6-30-98 REVISION: 2 *\\Lab1\c\2004 Projects\2004-595-04 MESCO\[2004-595-04 WATCONT.XLS]Sheet1*

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INTEGRITY IN TESTING

SPECIFIC GRAVITY

ASTM D 854-00 / AASHTO T100-03 (SOP - S5)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	3-5'
Project No.	2004-595-04	Sample No.	DRY
Lab ID	2004-595-04-01	Visual Description	**BROWN SILTY CLAY**
			(MInus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	R 241	R 242
Weight of Pycnometer + Soil + Water (gm)	698.2	701.7
Temperature, T (°Celsius)	24.2	22.8
Weight of Pycnometer + Water (gm)	666.75	670.12
Tare Number	G-6	G-7
Weight of Tare + Dry Soil (gm)	273.3	199.87
Weight of Tare (gm)	223.56	150.36
Weight of Dry Soil (gm)	49.74	49.51
Specific Gravity of Soil @ T	2.719	2.761
Specific Gravity of Water @ T	0.9973	0.9976
Conversion Factor for Temperature T	0.9990	0.9994
Specific Gravity @ 20° Celsius	2.722	2.763

Average Specific Gravity @ 20° Celsius	2.74

Tested By MCW *Date* 1/14/2005 *Checked By* GBM *Date* 1-17-05

DCN: CT-S5 Date10/05/04 Revision:9R *\\Lab1\c\2004 Projects\2004-595-04 MESCO\[2004-595-04-01 SPECIFIC GRAVITY.xls]Sheet1*

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INTEGRITY IN TESTING

SPECIFIC GRAVITY

ASTM D 854-00 / AASHTO T100-03 (SOP - S5)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	10-12
Project No.	2004-595-04	Sample No.	WET
Lab ID	2004-595-04-02	Visual Description	**LIGHT BROWN**
			(Minus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	R 241	R 242
Weight of Pycnometer + Soil + Water (gm)	698.2	701.7
Temperature, T (°Celsius)	22.5	22.0
Weight of Pycnometer + Water (gm)	666.96	670.21
Tare Number	K-2	G-13
Weight of Tare + Dry Soil (gm)	202.6	203.7
Weight of Tare (gm)	152.16	153.27
Weight of Dry Soil (gm)	50.44	50.43
Specific Gravity of Soil @ T	2.627	2.662
Specific Gravity of Water @ T	0.9977	0.9978
Conversion Factor for Temperature T	0.9995	0.9996
Specific Gravity @ 20° Celsius	2.629	2.663

Average Specific Gravity @ 20° Celsius	2.65

Tested By MCW *Date* 1/18/2005 *Checked By* GEM *Date* 1-18-05

DCN: CT-S5 Date10/05/04 Revision:9R *\\Lab1\C\2004 Projects\2004-595-04 MESCO\[2004-595-04-02 Specific Gravity - Soils.xls]Sheet1*

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INTEGRITY IN TESTING

ATTERBERG LIMITS

ASTM D 4318-98 / AASHTO T89 (SOP - S4A)

Client	MUNICIPAL ENGINEERING SERVICES CO	Boring No.	P4-13D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	3-5'
Project No.	2004-595-04	Sample No.	WET
Lab ID	2004-595-04-01	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)

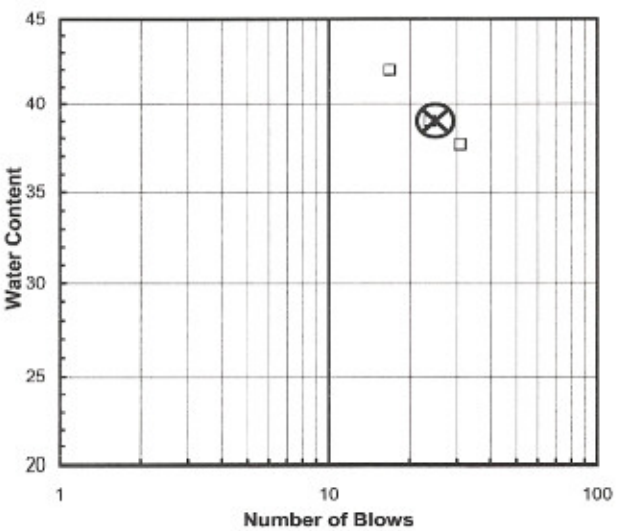
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	H	K-1	E-1	MULTIPOINT
Wt. of Tare & WS (gm)	32.97	39.93	40.13	
Wt. of Tare & DS (gm)	27.70	34.90	35.20	
Wt. of Tare (gm)	15.14	22.00	22.10	
Wt. of Water (gm)	5.3	5.0	4.9	
Wt. of DS (gm)	12.6	12.9	13.1	
Moisture Content (%)	**42.0**	**39.0**	**37.6**	
Number of Blows	**17**	**24**	**31**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	Y-1	Z-1	
Wt. of Tare & WS (gm)	29.11	29.66	
Wt. of Tare & DS (gm)	27.90	28.30	
Wt. of Tare (gm)	22.12	21.94	
Wt. of Water (gm)	1.2	1.4	
Wt. of DS (gm)	5.8	6.4	
Moisture Content (%)	**20.9**	**21.4**	**-0.4**

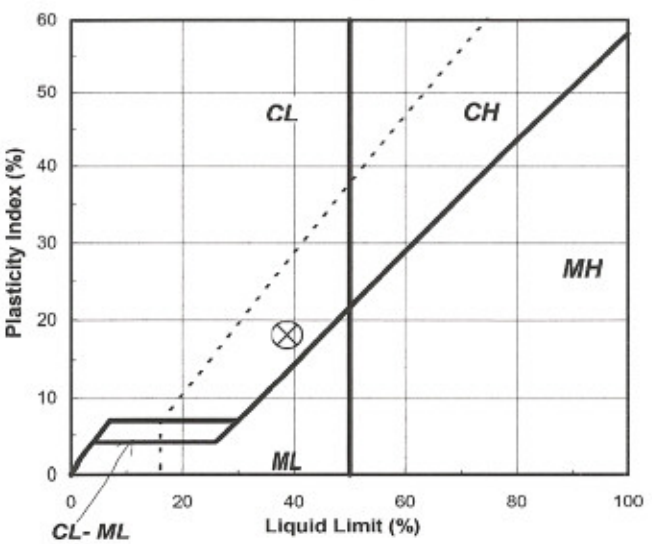
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**39**
Plastic Limit (%)	**21**
Plasticity Index (%)	**18**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By JDR *Date* 1/20/2005 *Checked By* GEM *Date* 1-24-05

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

\\Lab1\c\2004 Projects\2004-595-04 MESCO\[2004-595-04-01 ATTERBERG.xls]Sheet1

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MUNICIPAL ENGINEERING
JAN 27 2005

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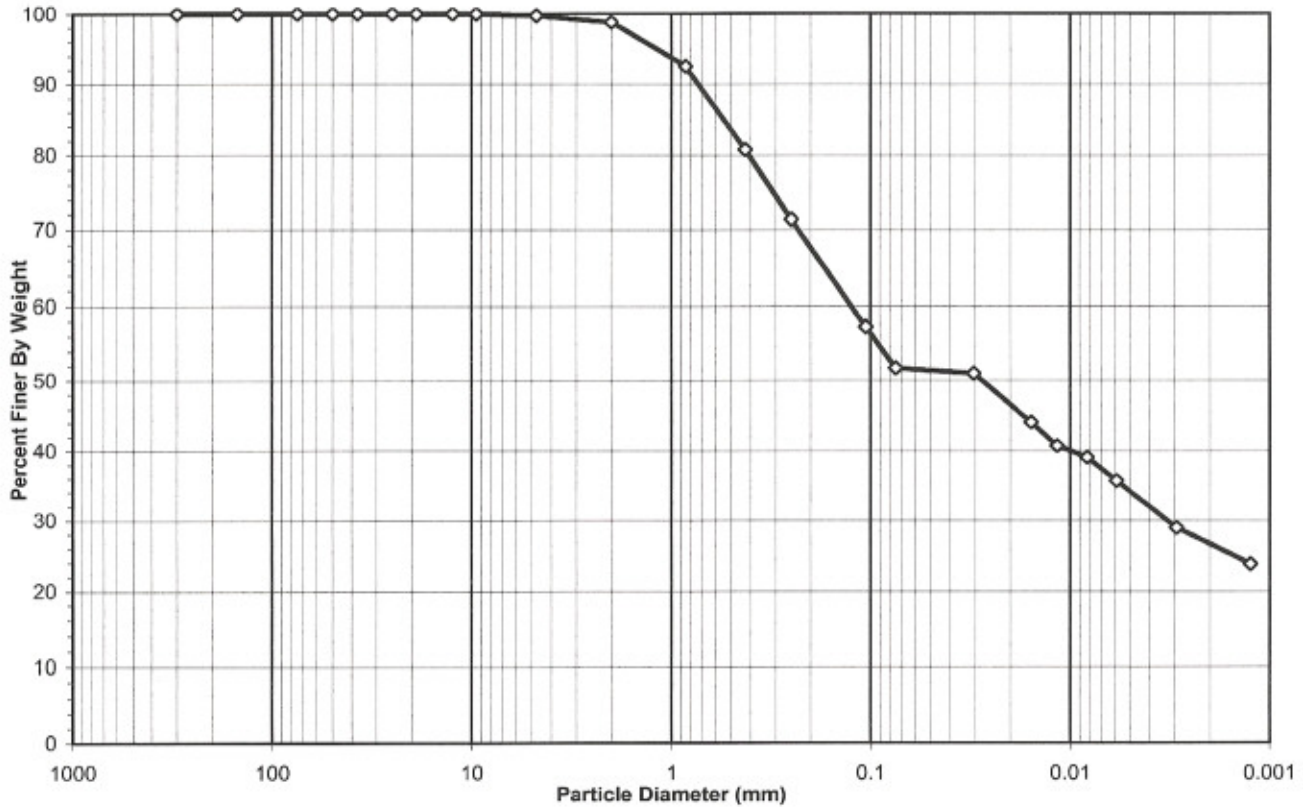
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	3-5'
Project No.	2004-595-04	Sample No.	DRY
Lab ID	2004-595-04-01	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



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.28
#4 To #200	*Sand*	47.99
Finer Than #200	*Silt & Clay*	51.73

USCS Symbol ***CL, TESTED***

USCS Classification ***SANDY LEAN CLAY***

page 1 of 4

DCN: CT-S3P DATE: 03/07/01 REVISION:\\sb1\c\2004 Projects\2004-595-04 MESCO\[2004-595-04-01 #10 Split Hydrometer.xls]Sheet1

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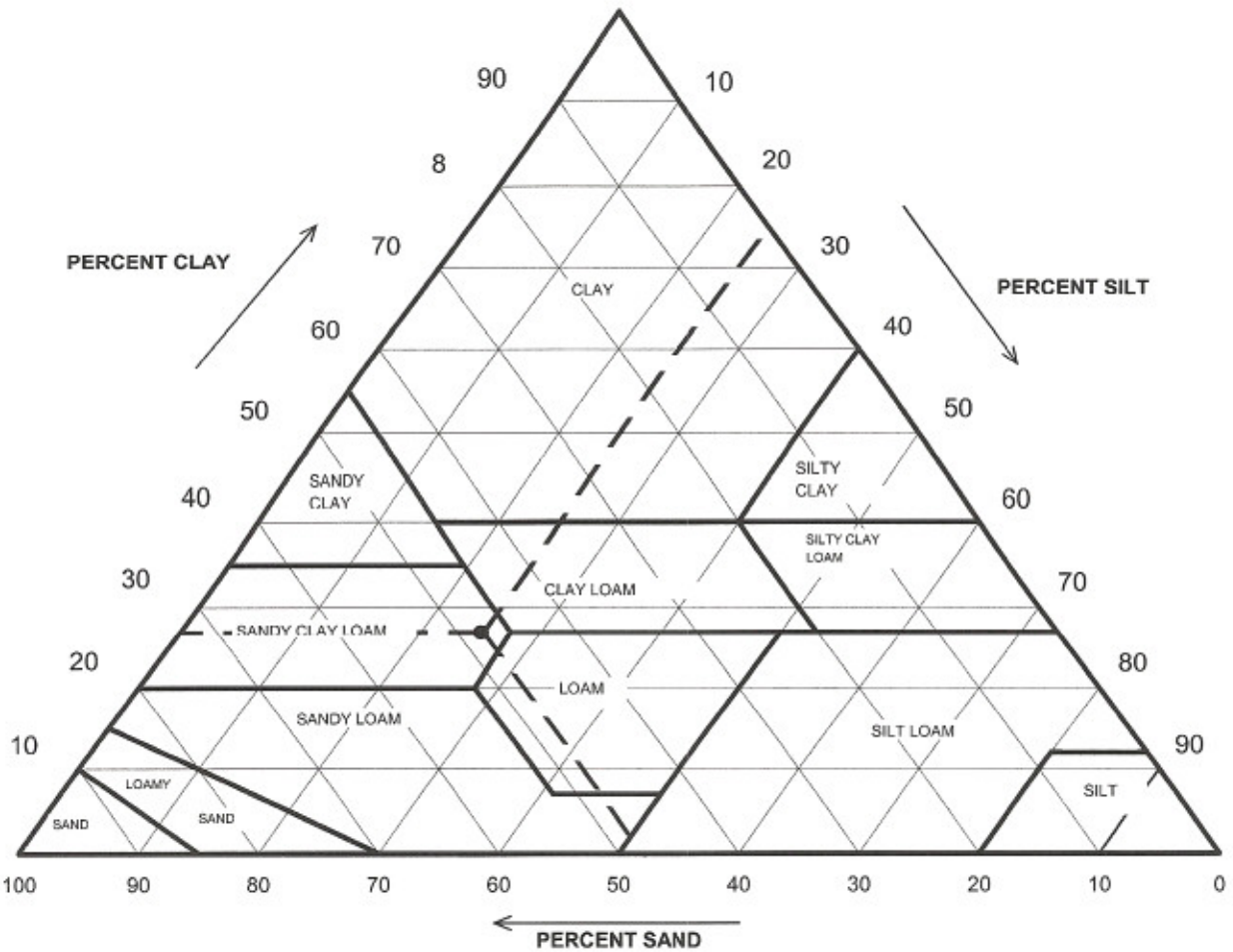
geotechnics
INTEGRITY IN TESTING

USDA CLASSIFICATION CHART

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	3-5'
Project No.	2004-595-04	Sample No.	DRY
Lab ID	2004-595-04-01	Soil Color	**BROWN**



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.22	**0.00**
2	98.78	*Sand*	47.38	**47.97**
0.05	51.40	*Silt*	24.76	**25.07**
0.002	26.64	*Clay*	26.64	**26.97**

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

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INTEGRITY IN TESTING

WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	3-5'
Project No.	2004-595-04	Sample No.	DRY
Lab ID	2004-595-04-01	Soil Color	**BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	G-5	Tare No.	P-1
Wgt.Tare + Wet Soil (gm)	718.70	Wgt.Tare + Wet Soil (gm)	43.35
Wgt.Tare + Dry Soil (gm)	599.20	Wgt.Tare + Dry Soil (gm)	41.86
Weight of Tare (gm)	148.73	Weight of Tare (gm)	21.91
Weight of Water (gm)	119.50	Weight of Water (gm)	1.49
Weight of Dry Soil (gm)	450.47	Weight of Dry Soil (gm)	19.95
Moisture Content (%)	**26.5**	**Moisture Content (%)**	**7.5**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	569.97	Weight of the Dry Sample (gm)	506.99
Dry Weight +#10 Material(gm)	450.5	Weight of minus #200 material (gm)	29.60
Wet Weight Hydro. Material.(gm)	60.74	Weight of plus #200 material (gm)	477.39
Dry Weight Hydro. Material (gm)	56.52		
Total Dry Weight Sample (gm)	506.99	**J-FACTOR (%FINER THAN #10)**	**0.9878**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	0.00	0.0	0.0	100.0	**100.0**
3/4"	19.0	0.00	0.0	0.0	100.0	**100.0**
1/2"	12.5	0.00	0.0	0.0	100.0	**100.0**
3/8"	9.50	0.00	0.0	0.0	100.0	**100.0**
#4	4.75	1.26	0.3	0.3	99.7	**99.7**
#10	2.00	4.23	0.9	1.2	98.8	**98.8**
#20	0.85	3.59	6.4	6.4	93.6	**92.5**
#40	0.425	6.72	11.9	18.2	81.8	**80.8**
#60	0.250	5.40	9.6	27.8	72.2	**71.3**
#140	0.106	8.06	14.3	42.1	57.9	**57.2**
#200	0.075	3.15	5.6	47.6	52.4	**51.7**
Pan	-	29.60	52.4	100.0	-	**-**

Notes :

Tested By MCW Date 1/20/2005 Checked By GEM Date 1-24-05

page 3 of 4 DCN: CT-S3P DATE: 03/07/01 REVISION:\\Lab1\c\2004 Projects\2004-595-04 MESCO\[2004-595-04-01 #10 Split Hydrometer.xls]Sheet1

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

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	3-5'
Project No.	2004-595-04	Sample No.	DRY
Lab ID	2004-595-04-01	Soil Color	**BROWN**

Bulb Ser.#
667986

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	36.0	36.0	19.3	6.29	29.7	51.6	0.01340	0.0305	**51.0**
8		32.0	19.5	6.27	25.7	44.7	0.01337	0.0157	**44.2**
15		30.0	19.5	6.27	23.7	41.2	0.01337	0.0116	**40.7**
30		29.0	19.8	6.24	22.8	39.5	0.01332	0.0083	**39.1**
60		27.0	20.4	6.19	20.8	36.2	0.01322	0.0059	**35.7**
250		23.0	21.0	6.13	16.9	29.3	0.01313	0.0029	**29.0**
1440		20.0	21.0	6.13	13.9	24.1	0.01313	0.0012	**23.8**
2880		20.0	20.8	6.13	13.9	24.1	0.01316	0.0009	**23.8**

Soil Specimen Data		Other Corrections	
Tare + Dry Material (gm)	56.52	a - Factor	0.982
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.78
Weight of Dry Material (gm)	56.52		
		Specific Gravity	2.74 TESTED

Note:

Tested By MCW Date 1/20/2005 Checked By Gem Date 1-24-05

page 4 of 4 DCN: CT-S3P DATE: 03/07/01 REVISION:Lab1\c\2004 Projects\2004-595-04 MESCO\[2004-595-04-01 #10 Split Hydrometer.xls]Sheet1

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INTEGRITY IN TESTING

PERMEABILITY TEST

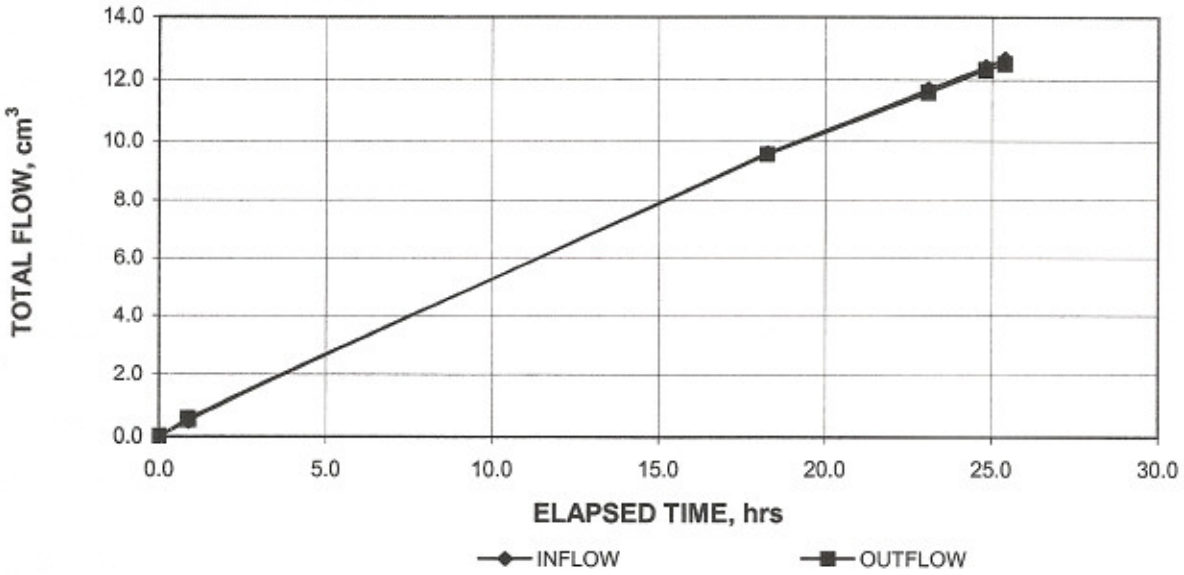
ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	3-5'
Project No.	2004-595-04	Sample No.	DRY
Lab ID No.	2004-595-04-01		

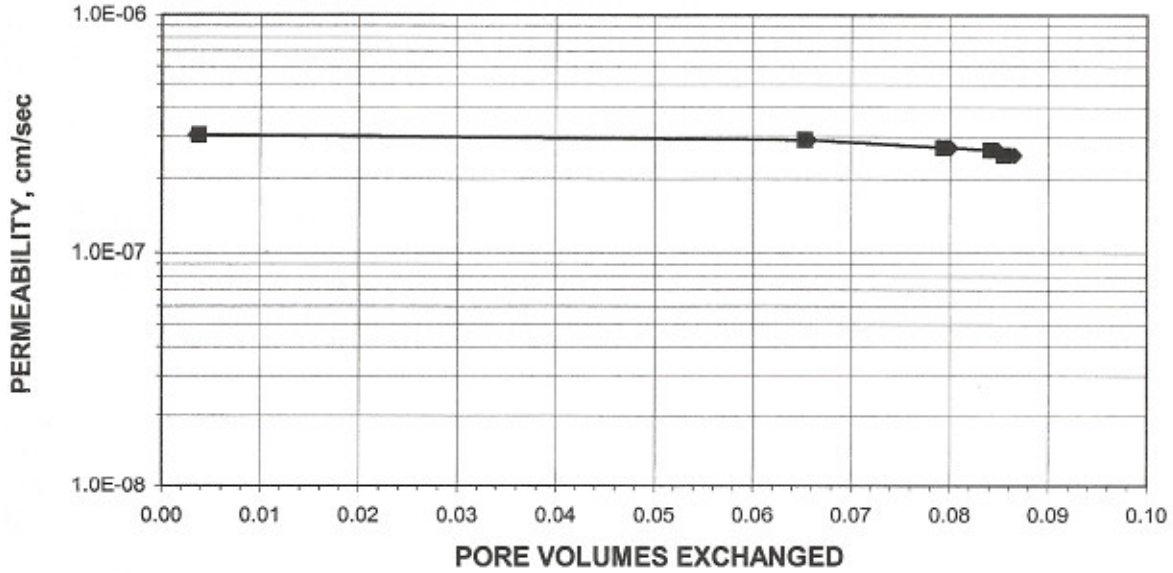
JAN 27 2005

AVERAGE PERMEABILITY = 2.7E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.7E-09 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: MCW Date: 1/11/2005 Checked By: GGM Date: 1-17-05

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	3-5'
Project No.	2004-595-04	Sample No.	DRY
Lab ID No.	2004-595-04-01		
		Specific Gravity	2.74 Measured
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN CLAYEY SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	Y-4	P-8
Wt. of Tare & WS (gm.)	294.54	899.34
Wt. of Tare & DS (gm.)	258.22	759.70
Wt. of Tare (gm.)	100.04	98.74
Wt. of Water (gm.)	36.32	139.64
Wt. of DS (gm.)	158.18	660.96
Moisture Content (%)	**23.0**	**21.1**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	798.30	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	798.30	786.39
Length 1 (in.)	3.773	3.743
Length 2 (in.)	3.793	3.713
Length 3 (in.)	3.728	3.748
Top Diameter (in.)	2.856	2.823
Middle Diameter (in.)	2.837	2.817
Bottom Diameter (in.)	2.840	2.830
Average Length (in.)	3.76	3.73
Average Area (in.^{2})	6.35	6.26
Sample Volume (cm^3)	391.99	383.15
Unit Wet Wt. (gm./ cm^3)	2.04	2.05
Unit Wet Wt. (pcf)	127.1	128.1
Unit Dry Wt. (pcf)	103.4	105.8
Unit Dry Wt. (gm./ cm^3)	1.66	1.69
Void Ratio, e	0.65	0.62
Porosity, n	0.40	0.38
Pore Volume (cm^3)	155.0	146.2

Tested By: MCW Date: 1/11/2005 Checked By: GEM Date: 1-17-05

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	3-5'
Project No.	2004-595-04	Sample No.	DRY
Lab ID No.	2004-595-04-01		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.6	Sample Length (cm), L	9.49
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.17
Cell (psi)	55.0	Sample Area (cm^2), A	40.39
Total Pressure Head (cm)	98.4	Inflow Burette Area (cm^2), a-in	0.979
Hydraulic Gradient	10.38	Outflow Burette Area (cm^2), a-out	0.906
		B Parameter (%)	97

AVERAGE PERMEABILITY = 2.7E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.7E-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)
1/12/2005	15	36	0.0	0.0	0.0	121.5	0	22.0	NA
1/12/2005	16	29	0.9	0.5	0.6	120.3	0	22.3	3.0E-07
1/13/2005	9	52	18.3	9.6	9.6	101.1	0	22.4	2.9E-07
1/13/2005	14	42	23.1	11.7	11.6	96.7	0	22.0	2.7E-07
1/13/2005	16	25	24.8	12.4	12.3	95.2	0	22.0	2.6E-07
1/13/2005	17	0	25.4	12.7	12.5	94.8	1	22.0	2.5E-07

Tested By: MCW Date: 1/11/2005 Checked By: GEM Date: 1-17-05

DCN: CT-22 DATE: 01-08-99 REVISION:2 \\Lab1\c\2004 Projects\2004-595-04 MESCO\[2004-595-04-01 PERM.xls]Sheet1

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INTEGRITY IN TESTING

ATTERBERG LIMITS

ASTM D 4318-98 / AASHTO T89 (SOP - S4A)

Client	MUNICIPAL ENGINEERING SERVICES CO	Boring No.	P4-13D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	10-12'
Project No.	2004-595-04	Sample No.	WET
Lab ID	2004-595-04-02	Soil Description	**LIGHT BROWN ELASTIC 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)

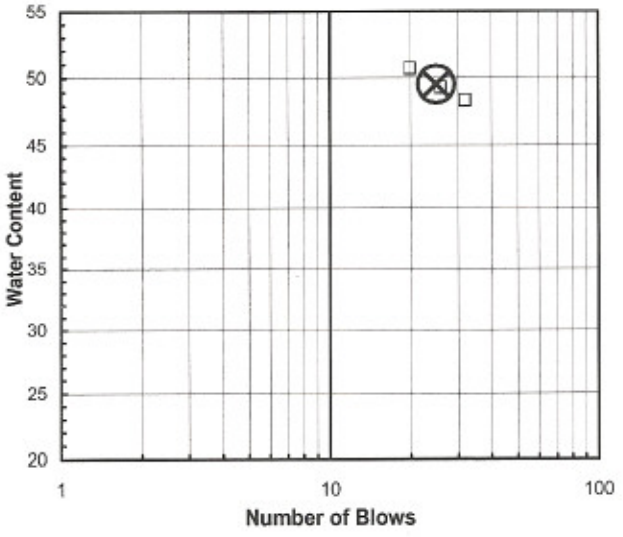
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	F	T-1	M	MULTIPOINT
Wt. of Tare & WS (gm)	24.10	28.90	26.80	
Wt. of Tare & DS (gm)	21.20	26.59	22.90	
Wt. of Tare (gm)	15.20	21.90	15.20	
Wt. of Water (gm)	2.9	2.3	3.9	
Wt. of DS (gm)	6.0	4.7	7.7	
Moisture Content (%)	**48.3**	**49.3**	**50.6**	
Number of Blows	**32**	**26**	**20**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	G	Z-Y	
Wt. of Tare & WS (gm)	22.00	22.90	
Wt. of Tare & DS (gm)	20.10	20.90	
Wt. of Tare (gm)	15.00	15.80	
Wt. of Water (gm)	1.9	2.0	
Wt. of DS (gm)	5.1	5.1	
Moisture Content (%)	**37.3**	**39.2**	**-2.0**

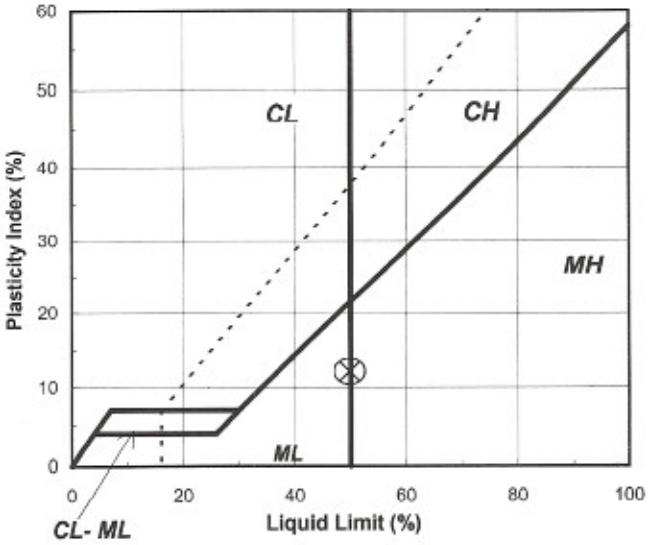
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**50**
Plastic Limit (%)	**38**
Plasticity Index (%)	**12**
USCS Symbol	**MH**

Flow Curve



Plasticity Chart



Tested By *JRB* *Date* *1/18/2005* *Checked By* Gem *Date* 1-19-05

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

\\Lab1\c\2004 Projects\2004-595-04 MESCO\[2004-599-04-02 ATTERBERG.xls]Sheet1

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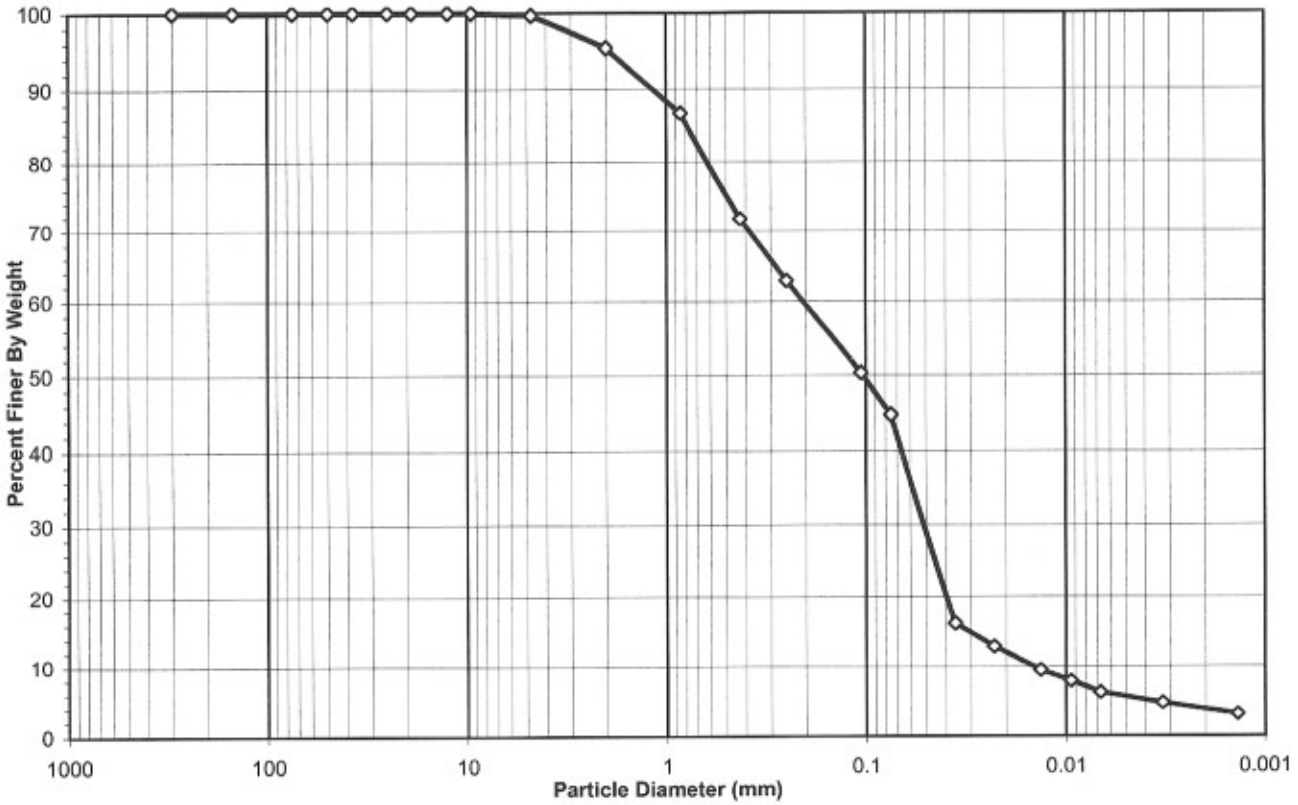
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	10-12'
Project No.	2004-595-04	Sample No.	WET
Lab ID	2004-595-04-02	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



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.29
#4 To #200	*Sand*	54.89
Finer Than #200	*Silt & Clay*	44.82

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND***

page 1 of 4

DCN: CT-S3P DATE: 03/07/01 REVISION: 5 *C:\2004 Projects\2004-595-04 MESCO\[2004-595-04-02 #10 Split Hydrometer.xls]Sheet1*

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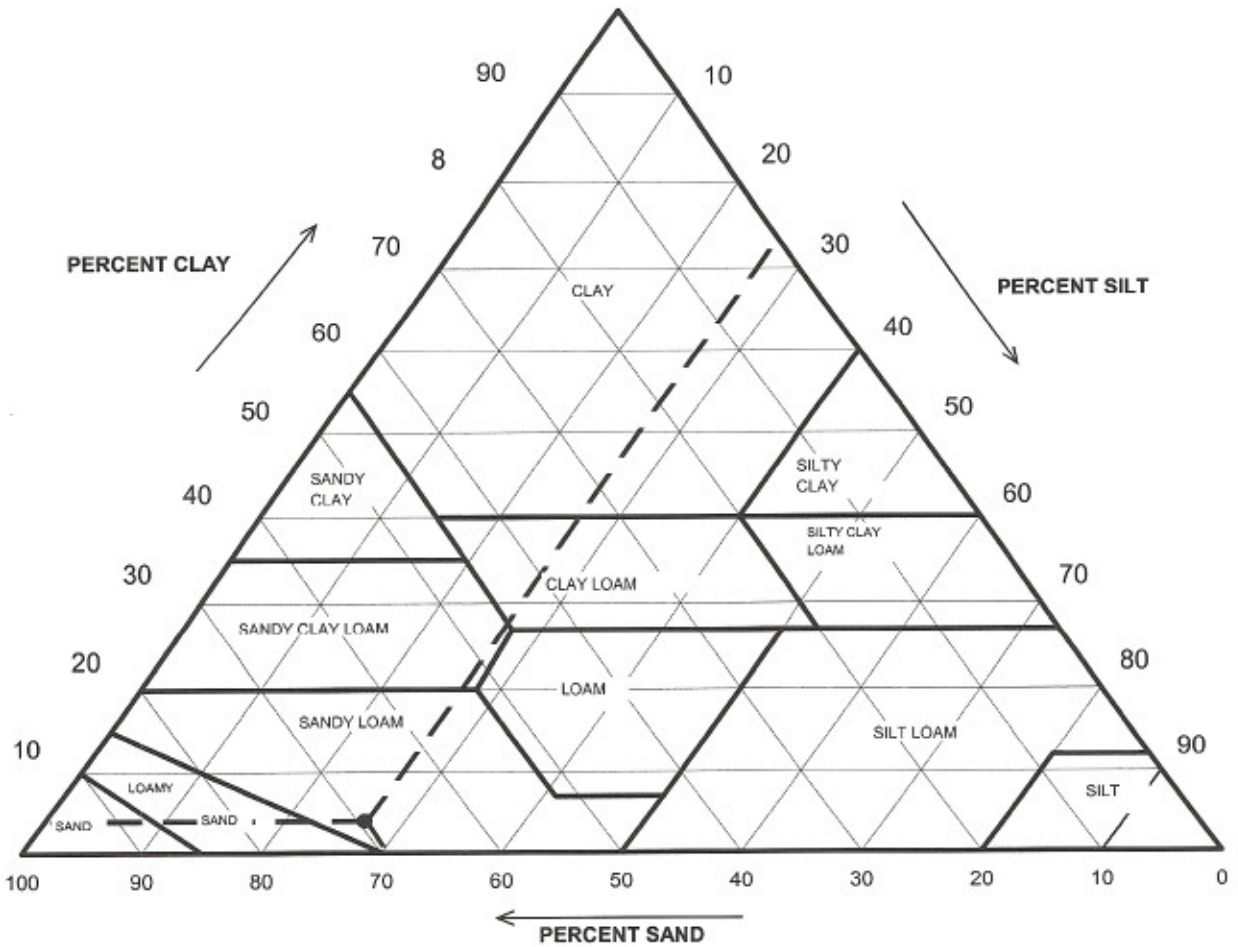
USDA CLASSIFICATION CHART

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	10-12'
Project No.	2004-595-04	Sample No.	WET
Lab ID	2004-595-04-02	Soil Color	**BROWN**



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	4.56	**0.00**
2	95.44	*Sand*	66.21	**69.37**
0.05	29.23	*Silt*	25.45	**26.66**
0.002	3.79	*Clay*	3.79	**3.97**

USDA Classification: ***SANDY LOAM***

page 2 of 4

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INTEGRITY IN TESTING

WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	10-12'
Project No.	2004-595-04	Sample No.	WET
Lab ID	2004-595-04-02	Soil Color	**BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	K-7	Tare No.	A-T
Wgt.Tare + Wet Soil (gm)	1008.50	Wgt.Tare + Wet Soil (gm)	32.06
Wgt.Tare + Dry Soil (gm)	874.10	Wgt.Tare + Dry Soil (gm)	31.20
Weight of Tare (gm)	152.51	Weight of Tare (gm)	15.61
Weight of Water (gm)	134.40	Weight of Water (gm)	0.86
Weight of Dry Soil (gm)	721.59	Weight of Dry Soil (gm)	15.59
Moisture Content (%)	**18.6**	**Moisture Content (%)**	**5.5**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	855.99	Weight of the Dry Sample (gm)	779.15
Dry Weight +#10 Material(gm)	721.6	Weight of minus #200 material (gm)	27.03
Wet Weight Hydro. Material.(gm)	60.74	Weight of plus #200 material (gm)	752.12
Dry Weight Hydro. Material (gm)	57.56		
Total Dry Weight Sample (gm)	779.15	**J-FACTOR (%FINER THAN #10)**	**0.9544**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	0.00	0.0	0.0	100.0	**100.0**
3/4"	19.0	0.00	0.0	0.0	100.0	**100.0**
1/2"	12.5	0.00	0.0	0.0	100.0	**100.0**
3/8"	9.50	0.00	0.0	0.0	100.0	**100.0**
#4	4.75	2.07	0.3	0.3	99.7	**99.7**
#10	2.00	30.84	4.3	4.6	95.4	**95.4**
#20	0.85	5.23	9.1	9.1	90.9	**86.8**
#40	0.425	9.08	15.8	24.9	75.1	**71.7**
#60	0.250	5.40	9.4	34.2	65.8	**62.8**
#140	0.106	7.52	13.1	47.3	52.7	**50.3**
#200	0.075	3.30	5.7	53.0	47.0	**44.8**
Pan	-	27.03	47.0	100.0	-	-

Notes :

Tested By MCW Date 01/20/05 Checked By GEM Date 1-20-05

page 3 of 4 DCN: CT-S3P DATE: 03/07/01 REVISION: 5 *C:\2004 Projects\2004-595-04 MESCO\[2004-595-04-02 #10 Split Hydrometer.xls]Sheet1*

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Reference	IREDELL CO. LANDFILL	Depth (ft)	10-12'
Project No.	2004-595-04	Sample No.	WET
Lab ID	2004-595-04-02	Soil Color	**BROWN**

Bulb Ser.#
667986

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	45.0	16.0	19.4	6.28	9.7	16.9	0.01374	0.0359	**16.1**
5		14.0	19.5	6.27	7.7	13.4	0.01373	0.0230	**12.8**
15		12.0	19.5	6.27	5.7	10.0	0.01373	0.0134	**9.5**
30		11.0	20.0	6.22	4.8	8.3	0.01365	0.0095	**7.9**
60		10.0	20.1	6.21	3.8	6.6	0.01363	0.0067	**6.3**
250		9.0	21.0	6.13	2.9	5.0	0.01348	0.0033	**4.8**
1440		8.0	20.8	6.15	1.9	3.2	0.01352	0.0014	**3.1**
2880		8.0	20.9	6.15	1.9	3.2	0.01350	0.0010	**3.1**

Soil Specimen Data		Other Corrections	
Tare + Dry Material (gm)	57.56	a - Factor	1
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	95.44
Weight of Dry Material (gm)	57.56		
		Specific Gravity	2.65 TESTED

Note:

Tested By MCW Date 01/20/05 Checked By GEM Date 1-20-05

page 4 of 4 DCN: CT-S3P DATE: 03/07/01 REVISION: 5 *C:\2004 Projects\2004-595-04 MESCO\[2004-595-04-02 #10 Split Hydrometer.xls]Sheet1*

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geotechnics
INTEGRITY IN TESTING

PERMEABILITY TEST

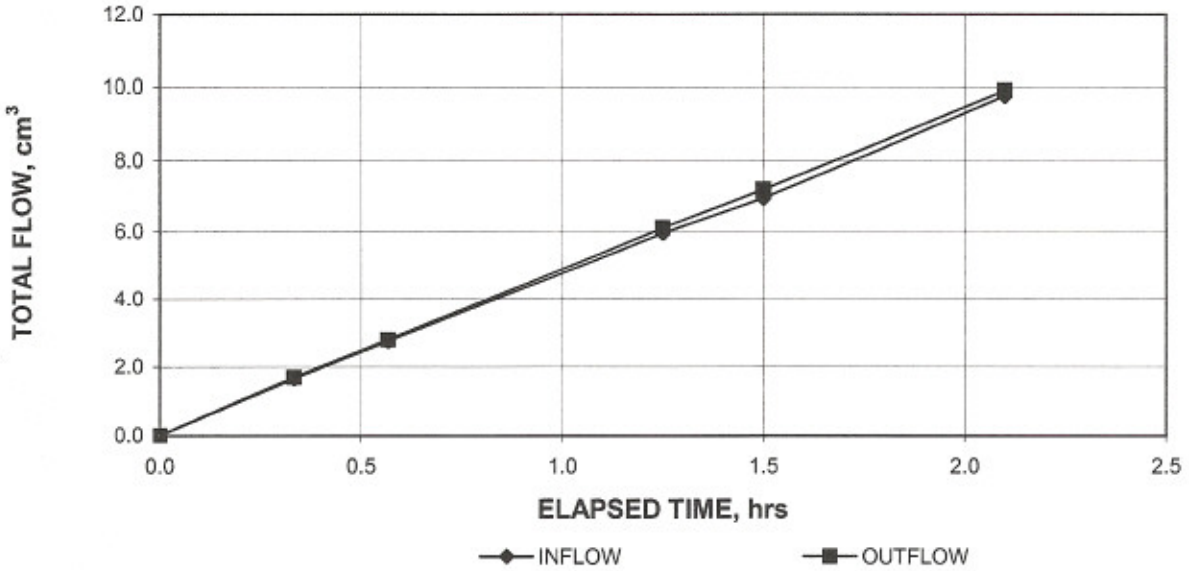
ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	10-12'
Project No.	2004-595-04	Sample No.	WET
Lab ID No.	2004-595-04-02		

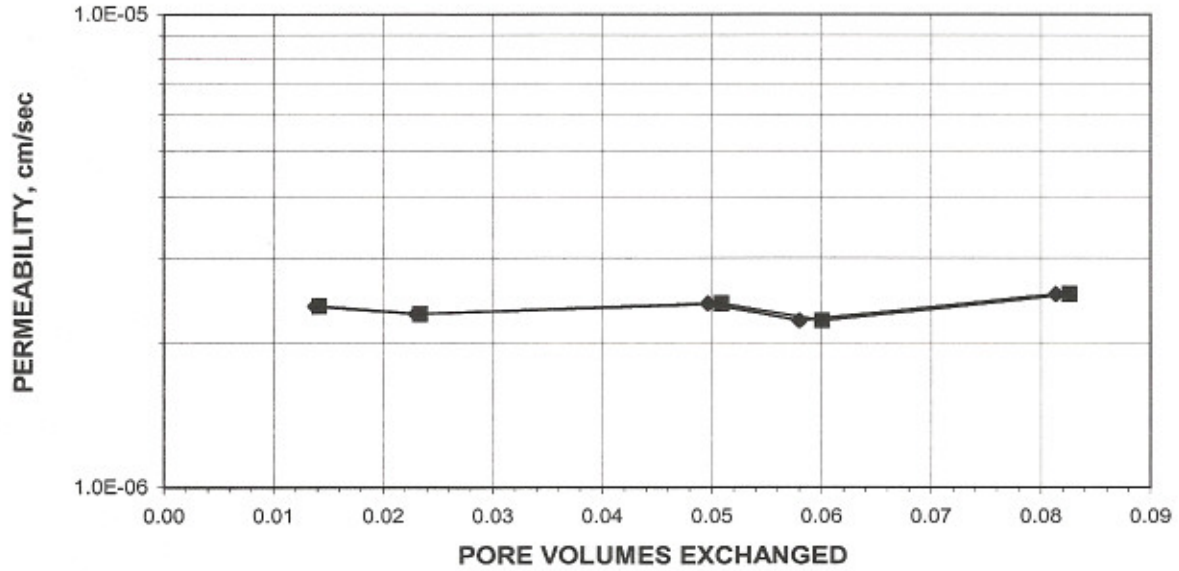
JAN 27 2005

AVERAGE PERMEABILITY = 2.4E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.4E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: MCW Date: 01/11/05 Checked By: GEM Date: 1-18-05

DCN: CT-22 DATE: 01-08-99 REVISION:2 C:\2004 Projects\2004-595-04 MESCO\[2004-595-04-02 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	10-12'
Project No.	2004-595-04	Sample No.	WET
Lab ID No.	2004-595-04-02		
		Specific Gravity	2.65 Measured
		Sample Condition	Undisturbed

Visual Description: LIGHT BROWN SANDY SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	F-1	B-1
Wt. of Tare & WS (gm.)	316.15	742.60
Wt. of Tare & DS (gm.)	276.60	626.80
Wt. of Tare (gm.)	98.24	100.48
Wt. of Water (gm.)	39.55	115.80
Wt. of DS (gm.)	178.36	526.32
Moisture Content (%)	**22.2**	**22.0**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	647.90	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	647.90	646.99
Length 1 (in.)	3.179	3.143
Length 2 (in.)	3.117	3.068
Length 3 (in.)	3.169	3.065
Top Diameter (in.)	2.835	2.858
Middle Diameter (in.)	2.832	2.830
Bottom Diameter (in.)	2.812	2.819
Average Length (in.)	3.16	3.09
Average Area (in.^{2})	6.27	6.32
Sample Volume (cm^3)	324.37	319.99
Unit Wet Wt. (gm./ cm^3)	2.00	2.02
Unit Wet Wt. (pcf)	124.7	126.2
Unit Dry Wt. (pcf)	102.1	103.4
Unit Dry Wt. (gm./ cm^3)	1.63	1.66
Void Ratio, e	0.62	0.60
Porosity, n	0.38	0.37
Pore Volume (cm^3)	124.3	119.9

Tested By: MCW Date: 01/11/05 Checked By: GEM Date: 1-18-05

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 1997)
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	10-12'
Project No.	2004-595-04	Sample No.	WET
Lab ID No.	2004-595-04-02		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.8	Sample Length (cm), L	7.85
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.20
Cell (psi)	55.0	Sample Area (cm^2), A	40.74
Total Pressure Head (cm)	84.4	Inflow Burette Area (cm^2), a-in	0.951
Hydraulic Gradient	10.74	Outflow Burette Area (cm^2), a-out	0.972
		B Parameter (%)	99

AVERAGE PERMEABILITY = 2.4E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.4E-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)
01/12/05	14	58	0.0	0.0	0.0	108.3	0	21.8	NA
01/12/05	15	18	0.3	1.7	1.7	104.8	0	22.0	2.4E-06
01/12/05	15	32	0.6	2.8	2.8	102.5	0	22.0	2.3E-06
01/12/05	16	13	1.3	6.0	6.1	95.8	0	22.2	2.4E-06
01/12/05	16	28	1.5	7.0	7.2	93.6	0	22.3	2.2E-06
01/12/05	17	4	2.1	9.8	9.9	87.9	1	22.5	2.5E-06

Tested By: MCW Date: 01/11/05 Checked By: GBM Date: 1-18-05

Page 3 of 3 DCN: CT-22 DATE: 01-08-99 REVISION:2 C:\2004 Projects\2004-595-04 MESCO\[2004-595-04-02 PERM.xls]Sheet1

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INPUT BURETTE NO. AND CONDITIONS

geotechnics
INTEGRITY IN TESTING

Client	MUNICIPAL ENGINEERING CO.	Boring No.	P4-13D
Client Project	IREDELL CO. LANDFILL	Depth (ft.)	10-12'
Project No.	2004-595-04	Sample No.	WET
Lab ID No.	2004-595-04-02		

Pressure Heads (Constant)

Top Cap (psi)	48.8
Bottom Cap (psi)	50.0
Cell (psi)	55.0
Total Pressure Head (cm)	84.4

INFLOW (HEADWATER) BURETTE

BURETTE No.	R 3
BURETTE FACTOR	1
INFLOW AREA (cm^2), a-in	0.951
VOLUME CORR. FACTOR	0.983
SLOPE	1.045
INTERCEPT	64.45

OUTFLOW (HEADWATER) BURETTE

BURETTE No.	R 4
BURETTE FACTOR	1
OUTFLOW AREA (cm^2), a-out	0.972
VOLUME CORR. FACTOR	0.929
SLOPE	1.025
INTERCEPT	63.98

B Parameter (%)	99

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	INFLOW R3 (div.)	OUTFLOW R4 (div.)	FLOW (0 flow) (1 stop)	TEMP. (°C)	FLOW RATIO
01/12/05	14	58	0.2	23.0	0	21.8	
01/12/05	15	18	1.8	21.3	0	22.0	1.030
01/12/05	15	32	2.9	20.2	0	22.0	1.000
01/12/05	16	13	6.1	16.9	0	22.2	1.031
01/12/05	16	28	7.1	15.8	0	22.3	1.100
01/12/05	17	4	9.9	13.1	1	22.5	0.964

Tested By: MCW Date: 01/11/05 Checked By: Gem Date: 1-18-05

Page 4 (Checking) DCN: CT-22 DATE: 01-08-99 REVISION:2 C:\2004 Projects\2004-595-04 MESCO\[2004-595-04-02 PERM.xls]Sheet1

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APPENDIX C

Table C-1: Slug Test Summary

	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
P4-1D	03/31/2006	6.18	42.70	45.91	22.64	2.21E-04	Injection	Clayey Sand
P4-1S	03/31/2006	5.08	12.85	14.98	22.25	2.33E-04	Pump	Silty Sand/Silty Clay
P4-3	09/29/2005	2.03	35.80	35.13	34.53	4.21E-04	Injection	Clayey Sand
P4-4	03/31/2006	2.30	18.61	20.68	22.22	4.03E-05	Pump	Clayey Sand
P4-5	03/15/2006	5.72	20.41	23.37	25.25	1.06E-04	Pump	Clayey Sand
P4-6	03/31/2006	5.49	6.62	8.86	10.31	7.46E-04	Pump	Clayey Sand
P4-7D	02/23/2005	6.71	34.40	36.44	10.11	3.58E-04	Injection	Gneiss
P4-7S	03/31/2006	5.98	6.55	9.60	9.59	4.64E-03	Pump	Clayey Sand
P4-8D	09/29/2005	9.81	80.44	83.40	32.41	1.26E-04	Injection	Clayey Sand
P4-8S	09/29/2005	5.45	27.00	28.45	31.55	5.26E-05	Pump	Clayey Sand
P4-9	03/31/2006	5.04	17.25	18.42	25.12	5.14E-05	Pump	Sandy Silt
P4-10	03/15/2006	4.44	14.95	16.40	23.25	5.77E-04	Pump	Silty Sand
P4-11	03/16/2006	5.18	7.68	10.10	7.60	1.52E-03	Injection	Silty Sand
P4-12	03/31/2006	5.47	8.66	10.09	9.38	7.70E-04	Pump	Silty Sand
P4-13D	03/15/2006	5.82	39.85	42.27	8.95	4.67E-04	Injection	Clayey Sand
P4-13S	03/15/2006	5.68	6.35	8.44	12.12	5.62E-04	Pump	Silty Sand
P4-14	03/15/2006	4.71	14.94	17.07	20.74	5.00E-03	Pump	Clayey Sand

Summary Statistics			
Mean	9.35E-4	Sample Variance	2.28E-6
Standard Error	3.66E-4	Minimum	4.03E-5
Median	4.21E-4	Maximum	5.00E-3
Mode	N/A	Count	17
Standard Deviation	1.51E-3		
Silty Sand/Sandy Silt			
Mean	6.19E-4	Minimum	5.14E-5
Count	6	Maximum	1.52E-3
Clayey Sand/Sandy Clay			
Mean	1.18E-3	Minimum	4.03E-5
Count	10	Maximum	5.00E-3
Gneiss			
Mean	3.58E-04	Count	1

NOTES:

1. The Bouwer & Rice method was used for all slug test calculations performed (see Section 4.4.2 for the details of the 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 conductivity 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 or rock type within the perforated section 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* indicates which method was used for a given piezometer.

6.Slug test was not performed on P4-2 due to insufficient water volume

Table 2: Hydraulic Conductivity at Piezometer Locations

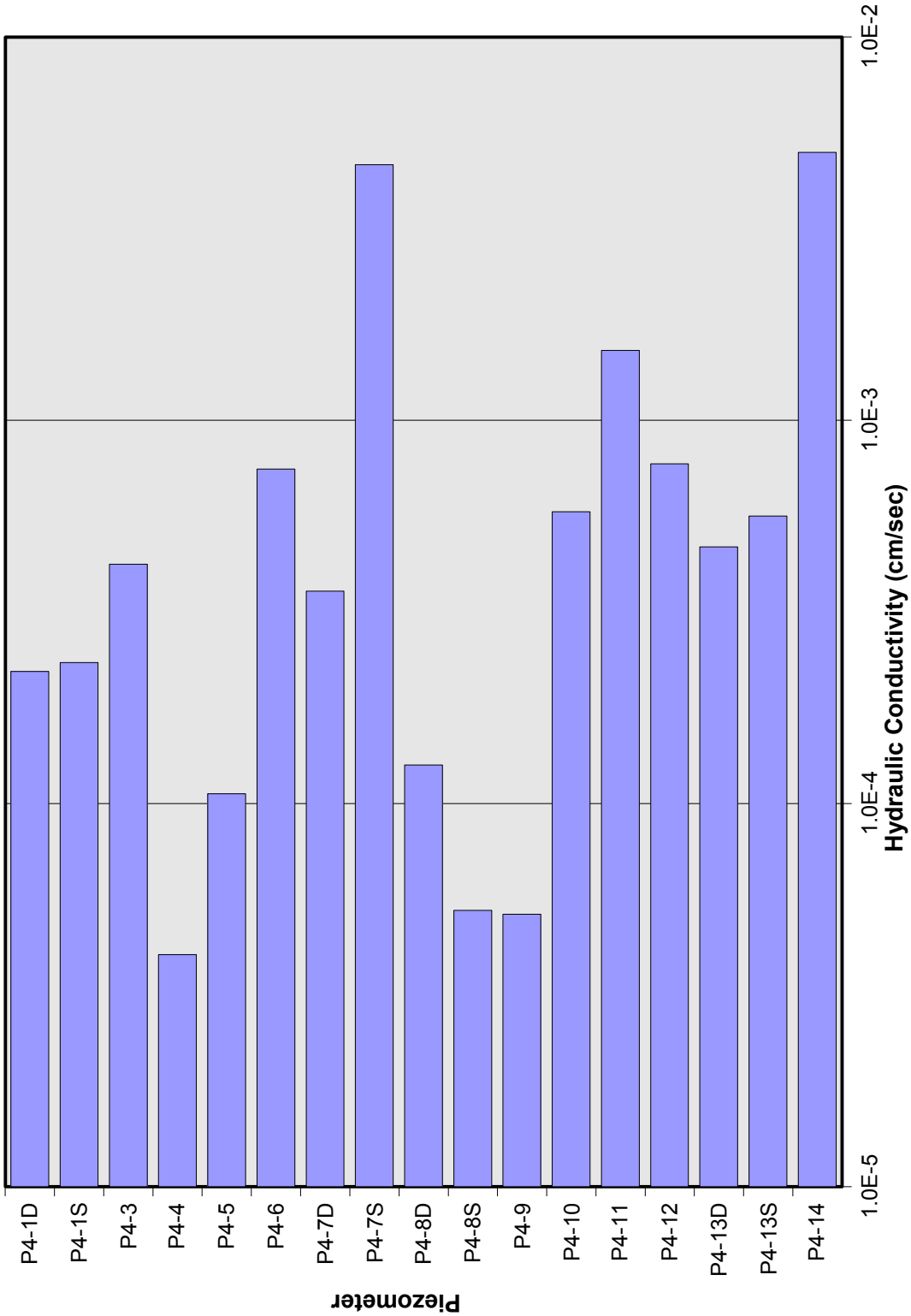
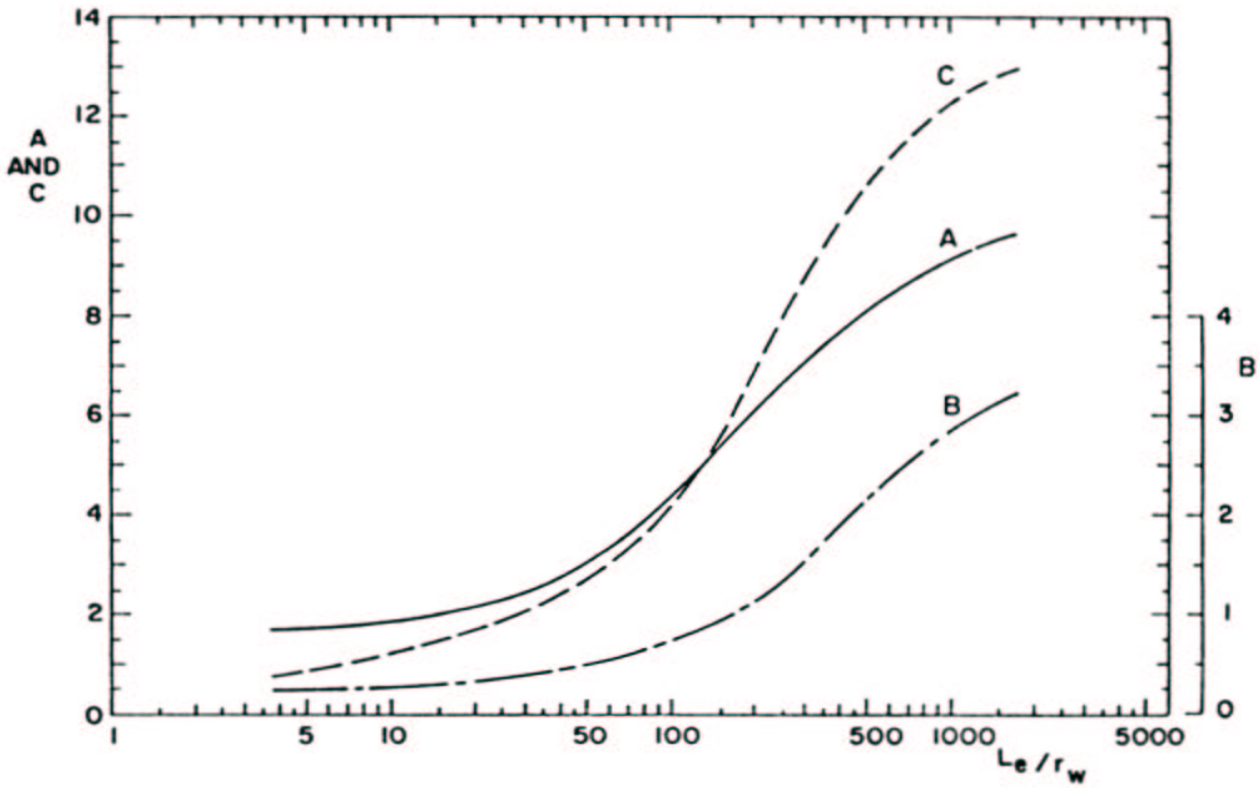


Figure C-1: Bouwer & Rice shape curve depicting empirical relationships between parameters *A, B* and *C*, and L_e/r_w (excerpted from Bouwer, 1989)



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 = Log(L_e/r_w), then

$A=\{$	$1.638445671 + 0.166908063X + 0.000740459e^{6.1710528X - 1.054747686X^2}$	$(X < 2.554422663)$
	$11.00393028 - 170.7752217e^{-1.509639982X}$	$(X \geq 2.554422663)$

$B=\{$	$0.174811819 + 0.060059188X + 0.007965502e^{2.05337686X - 0.007790328X^2}$	$(X < 2.596774459)$
	$4.133124586 - 93.06136936e^{-1.43537099X}$	$(X \geq 2.596774459)$

$C=\{$	$0.074711376 + 1.083958569X + 0.00557352e^{2.929493814X - 0.001028433X^2}$	$(X < 2.200426117)$
	$15.66887372 - 178.4329289e^{-1.322779744X}$	$(X \geq 2.200426117)$

These approximation formulae were developed by Karl DeBisschop, and can be found on the internet at http://hydrotoools.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 slut test method.

Slug Test P4-1D

Initial offset in logger reading (feet):	0.153	Date:	03/31/2006
Offset increment in logger reading (feet/sec):	0.000002		
Initial depth to water table (feet):	22.64		
Depth of probe below water table (feet):	5.08		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 17:01:05	61265.0	0.0	11.42	11.26	6.18	0.79
3/31/2006 17:01:11	61271.0	6.0	11.19	11.04	5.96	0.77
3/31/2006 17:01:16	61276.5	11.5	10.97	10.82	5.74	0.76
3/31/2006 17:01:22	61282.0	17.0	10.78	10.62	5.54	0.74
3/31/2006 17:01:27	61287.5	22.5	10.59	10.43	5.35	0.73
3/31/2006 17:01:33	61293.5	28.5	10.39	10.24	5.16	0.71
3/31/2006 17:01:39	61299.5	34.5	10.20	10.05	4.97	0.70
3/31/2006 17:01:45	61305.5	40.5	10.03	9.87	4.79	0.68
3/31/2006 17:01:51	61311.5	46.5	9.86	9.70	4.62	0.67
3/31/2006 17:01:57	61317.5	52.5	9.70	9.54	4.46	0.65
3/31/2006 17:02:03	61323.5	58.5	9.54	9.39	4.31	0.63
3/31/2006 17:02:10	61330.0	65.0	9.38	9.23	4.15	0.62
3/31/2006 17:02:16	61336.5	71.5	9.23	9.08	4.00	0.60
3/31/2006 17:02:23	61343.0	78.0	9.09	8.94	3.86	0.59
3/31/2006 17:02:29	61349.5	84.5	8.95	8.80	3.72	0.57
3/31/2006 17:02:36	61356.0	91.0	8.82	8.67	3.59	0.55
3/31/2006 17:02:42	61362.5	97.5	8.70	8.54	3.46	0.54
3/31/2006 17:02:49	61369.0	104.0	8.57	8.42	3.34	0.52
3/31/2006 17:02:55	61375.5	110.5	8.46	8.30	3.22	0.51
3/31/2006 17:03:02	61382.0	117.0	8.34	8.19	3.11	0.49
3/31/2006 17:03:08	61388.5	123.5	8.23	8.08	3.00	0.48
3/31/2006 17:03:15	61395.0	130.0	8.13	7.98	2.90	0.46
3/31/2006 17:03:21	61401.5	136.5	8.03	7.88	2.80	0.45
3/31/2006 17:03:28	61408.0	143.0	7.93	7.78	2.70	0.43
3/31/2006 17:03:35	61415.0	150.0	7.83	7.68	2.60	0.41
3/31/2006 17:03:42	61422.0	157.0	7.74	7.58	2.50	0.40
3/31/2006 17:03:49	61429.0	164.0	7.65	7.49	2.41	0.38
3/31/2006 17:03:55	61435.5	170.5	7.56	7.41	2.33	0.37
3/31/2006 17:04:02	61442.0	177.0	7.48	7.33	2.25	0.35
3/31/2006 17:04:09	61449.0	184.0	7.40	7.25	2.17	0.34
3/31/2006 17:04:16	61456.0	191.0	7.32	7.17	2.09	0.32
3/31/2006 17:04:22	61462.5	197.5	7.25	7.10	2.02	0.30
3/31/2006 17:04:29	61469.5	204.5	7.18	7.02	1.94	0.29
3/31/2006 17:04:36	61476.0	211.0	7.11	6.95	1.87	0.27
3/31/2006 17:04:42	61482.5	217.5	7.04	6.89	1.81	0.26
3/31/2006 17:04:49	61489.5	224.5	6.98	6.83	1.75	0.24
3/31/2006 17:04:56	61496.0	231.0	6.92	6.76	1.68	0.23
3/31/2006 17:05:03	61503.0	238.0	6.86	6.70	1.62	0.21
3/31/2006 17:05:10	61510.0	245.0	6.80	6.64	1.56	0.19
3/31/2006 17:05:16	61516.5	251.5	6.74	6.59	1.51	0.18
3/31/2006 17:05:23	61523.5	258.5	6.69	6.53	1.45	0.16
3/31/2006 17:05:30	61530.5	265.5	6.64	6.48	1.40	0.15
3/31/2006 17:05:37	61537.0	272.0	6.58	6.43	1.35	0.13
3/31/2006 17:05:44	61544.5	279.5	6.53	6.38	1.30	0.11

Slug Test P4-1D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 17:05:51	61551.0	286.0	6.49	6.33	1.25	0.10
3/31/2006 17:05:58	61558.0	293.0	6.44	6.29	1.21	0.08
3/31/2006 17:06:05	61565.0	300.0	6.40	6.24	1.16	0.07
3/31/2006 17:06:11	61571.5	306.5	6.36	6.20	1.12	0.05
3/31/2006 17:06:18	61578.5	313.5	6.32	6.16	1.08	0.03
3/31/2006 17:06:25	61585.5	320.5	6.27	6.12	1.04	0.02
3/31/2006 17:06:33	61593.0	328.0	6.24	6.08	1.00	0.00
3/31/2006 17:06:39	61599.5	334.5	6.20	6.05	0.97	-0.01
3/31/2006 17:06:46	61606.0	341.0	6.17	6.01	0.93	-0.03
3/31/2006 17:06:52	61612.5	347.5	6.14	5.98	0.90	-0.05
3/31/2006 17:06:58	61618.5	353.5	6.10	5.95	0.87	-0.06
3/31/2006 17:07:05	61625.5	360.5	6.07	5.92	0.84	-0.08
3/31/2006 17:07:12	61632.0	367.0	6.04	5.89	0.81	-0.09
3/31/2006 17:07:19	61639.0	374.0	6.01	5.86	0.78	-0.11
3/31/2006 17:07:26	61646.0	381.0	5.99	5.83	0.75	-0.12
3/31/2006 17:07:32	61652.5	387.5	5.96	5.80	0.72	-0.14
3/31/2006 17:07:39	61659.0	394.0	5.93	5.78	0.70	-0.16
3/31/2006 17:07:45	61665.5	400.5	5.91	5.75	0.67	-0.17
3/31/2006 17:07:52	61672.5	407.5	5.88	5.73	0.65	-0.19
3/31/2006 17:07:59	61679.5	414.5	5.86	5.70	0.62	-0.20
3/31/2006 17:08:06	61686.5	421.5	5.83	5.68	0.60	-0.22
3/31/2006 17:08:12	61692.5	427.5	5.81	5.66	0.58	-0.24
3/31/2006 17:08:19	61699.5	434.5	5.79	5.64	0.56	-0.25
3/31/2006 17:08:25	61705.5	440.5	5.77	5.62	0.54	-0.27
3/31/2006 17:08:32	61712.0	447.0	5.75	5.60	0.52	-0.29
3/31/2006 17:08:39	61719.0	454.0	5.73	5.58	0.50	-0.30
3/31/2006 17:08:44	61724.5	459.5	5.72	5.56	0.48	-0.32
3/31/2006 17:08:52	61732.0	467.0	5.70	5.54	0.46	-0.33
3/31/2006 17:08:57	61737.0	472.0	5.68	5.53	0.45	-0.35
3/31/2006 17:09:03	61743.5	478.5	5.66	5.51	0.43	-0.37
3/31/2006 17:09:09	61749.5	484.5	5.65	5.49	0.41	-0.38
3/31/2006 17:09:14	61754.5	489.5	5.63	5.48	0.40	-0.40
3/31/2006 17:09:22	61762.0	497.0	5.62	5.47	0.39	-0.41
3/31/2006 17:09:28	61768.0	503.0	5.61	5.45	0.37	-0.43
3/31/2006 17:09:32	61772.5	507.5	5.59	5.44	0.36	-0.45
3/31/2006 17:09:41	61781.5	516.5	5.58	5.42	0.34	-0.46
3/31/2006 17:09:46	61786.5	521.5	5.57	5.41	0.33	-0.48
3/31/2006 17:09:53	61793.0	528.0	5.55	5.40	0.32	-0.50
3/31/2006 17:09:57	61797.5	532.5	5.54	5.39	0.31	-0.51
3/31/2006 17:10:03	61803.5	538.5	5.53	5.38	0.30	-0.53
3/31/2006 17:10:11	61811.0	546.0	5.52	5.36	0.28	-0.55
3/31/2006 17:10:16	61816.0	551.0	5.51	5.35	0.27	-0.57
3/31/2006 17:10:25	61825.0	560.0	5.50	5.34	0.26	-0.58
3/31/2006 17:10:31	61831.0	566.0	5.49	5.33	0.25	-0.60
3/31/2006 17:10:36	61836.0	571.0	5.48	5.32	0.24	-0.62
3/31/2006 17:10:42	61842.5	577.5	5.47	5.31	0.23	-0.63
3/31/2006 17:10:48	61848.5	583.5	5.46	5.30	0.22	-0.65
3/31/2006 17:10:53	61853.0	588.0	5.45	5.29	0.21	-0.67
3/31/2006 17:11:00	61860.5	595.5	5.44	5.28	0.20	-0.69

Slug Test P4-1D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 17:11:05	61865.0	600.0	5.43	5.28	0.20	-0.71
3/31/2006 17:11:11	61871.5	606.5	5.42	5.27	0.19	-0.72
3/31/2006 17:11:17	61877.0	612.0	5.42	5.26	0.18	-0.74
3/31/2006 17:11:22	61882.5	617.5	5.41	5.25	0.17	-0.76
3/31/2006 17:11:28	61888.5	623.5	5.40	5.25	0.17	-0.78
3/31/2006 17:11:36	61896.5	631.5	5.39	5.24	0.16	-0.80
3/31/2006 17:11:42	61902.5	637.5	5.38	5.23	0.15	-0.82
3/31/2006 17:11:51	61911.5	646.5	5.38	5.22	0.14	-0.84
3/31/2006 17:11:54	61914.0	649.0	5.37	5.22	0.14	-0.86
3/31/2006 17:11:57	61917.5	652.5	5.37	5.21	0.13	-0.88
3/31/2006 17:12:04	61924.5	659.5	5.36	5.21	0.13	-0.89
3/31/2006 17:12:10	61930.5	665.5	5.36	5.20	0.12	-0.91
3/31/2006 17:12:15	61935.5	670.5	5.35	5.20	0.12	-0.93
3/31/2006 17:12:20	61940.0	675.0	5.35	5.19	0.11	-0.95
3/31/2006 17:12:23	61943.5	678.5	5.34	5.19	0.11	-0.97
3/31/2006 17:12:32	61952.0	687.0	5.34	5.18	0.10	-0.99
3/31/2006 17:12:39	61959.0	694.0	5.33	5.18	0.10	-1.01
3/31/2006 17:12:43	61963.5	698.5	5.33	5.17	0.09	-1.03
3/31/2006 17:12:50	61970.0	705.0	5.32	5.17	0.09	-1.05
3/31/2006 17:12:54	61974.0	709.0	5.32	5.16	0.08	-1.08
3/31/2006 17:13:00	61980.5	715.5	5.31	5.16	0.08	-1.10
3/31/2006 17:13:07	61987.0	722.0	5.31	5.15	0.07	-1.13
3/31/2006 17:13:10	61990.0	725.0	5.30	5.15	0.07	-1.16
3/31/2006 17:13:20	62000.0	735.0	5.30	5.14	0.06	-1.19
3/31/2006 17:13:26	62006.0	741.0	5.30	5.14	0.06	-1.22
3/31/2006 17:13:30	62010.5	745.5	5.29	5.14	0.06	-1.24
3/31/2006 17:13:32	62012.5	747.5	5.29	5.14	0.06	-1.25
3/31/2006 17:13:33	62013.0	748.0	5.29	5.14	0.06	-1.24
3/31/2006 17:13:34	62014.0	749.0	5.29	5.14	0.06	-1.25
3/31/2006 17:13:34	62014.5	749.5	5.29	5.14	0.06	-1.24
3/31/2006 17:13:35	62015.0	750.0	5.29	5.14	0.06	-1.25
3/31/2006 17:13:37	62017.5	752.5	5.29	5.13	0.05	-1.27
3/31/2006 17:13:40	62020.0	755.0	5.29	5.13	0.05	-1.29
3/31/2006 17:13:40	62020.5	755.5	5.29	5.13	0.05	-1.27
3/31/2006 17:13:41	62021.0	756.0	5.29	5.13	0.05	-1.29
3/31/2006 17:13:43	62023.5	758.5	5.28	5.13	0.05	-1.31
3/31/2006 17:13:44	62024.5	759.5	5.29	5.13	0.05	-1.29
3/31/2006 17:13:45	62025.0	760.0	5.28	5.13	0.05	-1.31
3/31/2006 17:13:47	62027.5	762.5	5.28	5.13	0.05	-1.33
3/31/2006 17:13:48	62028.5	763.5	5.28	5.13	0.05	-1.31
3/31/2006 17:13:49	62029.0	764.0	5.28	5.13	0.05	-1.33
3/31/2006 17:13:51	62031.0	766.0	5.28	5.12	0.04	-1.36
3/31/2006 17:13:55	62035.5	770.5	5.28	5.12	0.04	-1.38
3/31/2006 17:13:56	62036.5	771.5	5.28	5.12	0.04	-1.36
3/31/2006 17:13:57	62037.0	772.0	5.28	5.12	0.04	-1.38
3/31/2006 17:14:00	62040.0	775.0	5.27	5.12	0.04	-1.40
3/31/2006 17:14:01	62041.5	776.5	5.28	5.12	0.04	-1.38
3/31/2006 17:14:02	62042.0	777.0	5.27	5.12	0.04	-1.40
3/31/2006 17:14:03	62043.0	778.0	5.27	5.12	0.04	-1.43

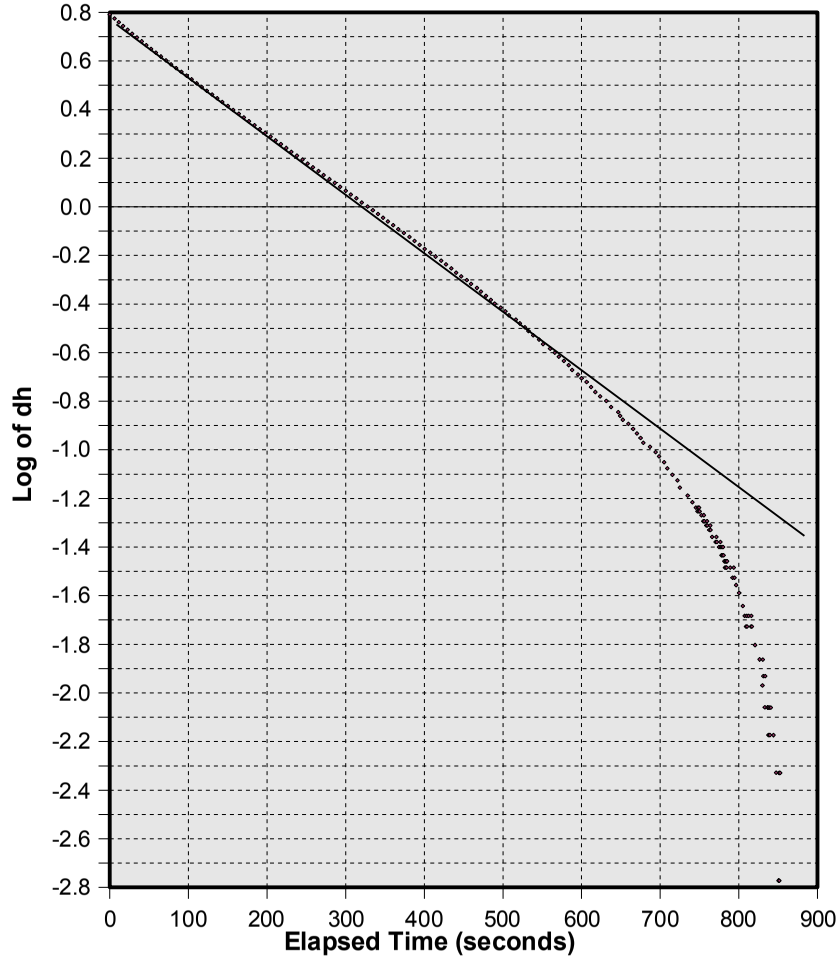
Slug Test P4-1D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 17:14:03	62043.5	778.5	5.27	5.12	0.04	-1.40
3/31/2006 17:14:04	62044.0	779.0	5.27	5.12	0.04	-1.43
3/31/2006 17:14:05	62045.0	780.0	5.27	5.12	0.04	-1.40
3/31/2006 17:14:05	62045.5	780.5	5.27	5.12	0.04	-1.43
3/31/2006 17:14:06	62046.5	781.5	5.27	5.11	0.03	-1.46
3/31/2006 17:14:07	62047.5	782.5	5.27	5.11	0.03	-1.48
3/31/2006 17:14:08	62048.0	783.0	5.27	5.11	0.03	-1.46
3/31/2006 17:14:08	62048.5	783.5	5.27	5.11	0.03	-1.48
3/31/2006 17:14:09	62049.0	784.0	5.27	5.11	0.03	-1.46
3/31/2006 17:14:09	62049.5	784.5	5.27	5.11	0.03	-1.48
3/31/2006 17:14:10	62050.0	785.0	5.27	5.11	0.03	-1.46
3/31/2006 17:14:14	62054.0	789.0	5.27	5.11	0.03	-1.48
3/31/2006 17:14:17	62057.0	792.0	5.26	5.11	0.03	-1.53
3/31/2006 17:14:18	62058.5	793.5	5.27	5.11	0.03	-1.48
3/31/2006 17:14:19	62059.5	794.5	5.26	5.11	0.03	-1.53
3/31/2006 17:14:21	62061.5	796.5	5.26	5.11	0.03	-1.56
3/31/2006 17:14:25	62065.5	800.5	5.26	5.11	0.03	-1.59
3/31/2006 17:14:30	62070.0	805.0	5.26	5.10	0.02	-1.64
3/31/2006 17:14:32	62072.5	807.5	5.26	5.10	0.02	-1.68
3/31/2006 17:14:34	62074.0	809.0	5.25	5.10	0.02	-1.73
3/31/2006 17:14:35	62075.0	810.0	5.26	5.10	0.02	-1.68
3/31/2006 17:14:35	62075.5	810.5	5.25	5.10	0.02	-1.73
3/31/2006 17:14:37	62077.5	812.5	5.26	5.10	0.02	-1.68
3/31/2006 17:14:40	62080.5	815.5	5.25	5.10	0.02	-1.73
3/31/2006 17:14:41	62081.0	816.0	5.26	5.10	0.02	-1.68
3/31/2006 17:14:41	62081.5	816.5	5.25	5.10	0.02	-1.73
3/31/2006 17:14:45	62085.5	820.5	5.25	5.10	0.02	-1.80
3/31/2006 17:14:51	62091.5	826.5	5.25	5.09	0.01	-1.86
3/31/2006 17:14:55	62095.0	830.0	5.25	5.09	0.01	-1.97
3/31/2006 17:14:55	62095.5	830.5	5.25	5.09	0.01	-1.86
3/31/2006 17:14:56	62096.0	831.0	5.25	5.09	0.01	-1.93
3/31/2006 17:14:58	62098.0	833.0	5.24	5.09	0.01	-2.06
3/31/2006 17:14:58	62098.5	833.5	5.25	5.09	0.01	-1.93
3/31/2006 17:15:01	62101.5	836.5	5.24	5.09	0.01	-2.06
3/31/2006 17:15:02	62102.5	837.5	5.24	5.09	0.01	-2.17
3/31/2006 17:15:03	62103.0	838.0	5.24	5.09	0.01	-2.06
3/31/2006 17:15:03	62103.5	838.5	5.24	5.09	0.01	-2.17
3/31/2006 17:15:04	62104.0	839.0	5.24	5.09	0.01	-2.06
3/31/2006 17:15:04	62104.5	839.5	5.24	5.09	0.01	-2.17
3/31/2006 17:15:05	62105.5	840.5	5.24	5.09	0.01	-2.06
3/31/2006 17:15:09	62109.0	844.0	5.24	5.09	0.01	-2.17
3/31/2006 17:15:12	62112.5	847.5	5.24	5.08	0.00	-2.33
3/31/2006 17:15:15	62115.5	850.5	5.24	5.08	0.00	-2.77
3/31/2006 17:15:16	62116.0	851.0	5.24	5.08	0.00	-2.33
3/31/2006 17:15:16	62116.5	851.5	5.24	5.08	0.00	-2.77
3/31/2006 17:15:17	62117.0	852.0	5.24	5.08	0.00	-2.33
3/31/2006 17:15:17	62117.5	852.5	5.24	5.08	0.00	-2.33

Slug Test P4-1D

Slug Test by Bouwer and Rice

Displacement Method:	Injection	
Well depth:	48.21	ft
Stick up height:	2.70	ft
Depth to sand pack (BGS):	40.00	ft
Depth to screened interval (BGS):	43.21	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	22.64	ft
Initial Head Change:	6.18	ft
Total well length:	50.91	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.0833	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	5.00	ft
Length of open section (L_e):	5.00	ft
L_e / r_w:	14.1176	
A (dimensionless):	2.052	
B (dimensionless):	0.327	
Drawdown at time = 0 (y_0):	4.00	ft
Drawdown at time = t (y_t):	0.25	ft
Elapsed Time between y_0 and y_t (t):	494.5	sec
Initial water column in well (L_w):	28.27	ft
$\ln(R_e/r_w)$ =	1.87	
K =	7.26E-06	ft/sec
	2.21E-04	**cm/sec**
	228.86	ft/yr



Water above sand pack:	Yes
%Duration below sand pack:	0.00%
Water above screen:	Yes
%Duration below screen:	0.00%

Slug Test P4-1S

Initial offset in logger reading (feet):	0.115	Date:	03/31/2006
Offset increment in logger reading (feet/sec):	0.000015		
Initial depth to water table (feet):	22.25		
Depth of probe below water table (feet):	5.29		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 16:28:39	59319.5	0.0	0.33	0.21	5.08	0.71
3/31/2006 16:28:40	59320.0	0.5	0.46	0.34	4.95	0.69
3/31/2006 16:28:40	59320.5	1.0	0.63	0.51	4.78	0.68
3/31/2006 16:28:41	59321.0	1.5	0.80	0.68	4.61	0.66
3/31/2006 16:28:41	59321.5	2.0	0.88	0.76	4.53	0.66
3/31/2006 16:28:42	59322.0	2.5	0.95	0.83	4.46	0.65
3/31/2006 16:28:42	59322.5	3.0	1.02	0.90	4.39	0.64
3/31/2006 16:28:43	59323.0	3.5	1.08	0.96	4.33	0.64
3/31/2006 16:28:43	59323.5	4.0	1.14	1.02	4.27	0.63
3/31/2006 16:28:44	59324.0	4.5	1.19	1.07	4.22	0.63
3/31/2006 16:28:44	59324.5	5.0	1.24	1.12	4.17	0.62
3/31/2006 16:28:45	59325.0	5.5	1.29	1.17	4.12	0.62
3/31/2006 16:28:46	59326.0	6.5	1.37	1.25	4.04	0.61
3/31/2006 16:28:47	59327.0	7.5	1.46	1.34	3.95	0.60
3/31/2006 16:28:48	59328.0	8.5	1.54	1.42	3.88	0.59
3/31/2006 16:28:49	59329.0	9.5	1.62	1.50	3.80	0.58
3/31/2006 16:28:50	59330.0	10.5	1.69	1.57	3.72	0.57
3/31/2006 16:28:51	59331.0	11.5	1.77	1.65	3.64	0.56
3/31/2006 16:28:52	59332.0	12.5	1.85	1.73	3.56	0.55
3/31/2006 16:28:53	59333.0	13.5	1.92	1.80	3.49	0.54
3/31/2006 16:28:54	59334.0	14.5	1.99	1.87	3.42	0.53
3/31/2006 16:28:55	59335.0	15.5	2.06	1.94	3.35	0.53
3/31/2006 16:28:56	59336.0	16.5	2.13	2.01	3.28	0.52
3/31/2006 16:28:57	59337.0	17.5	2.19	2.07	3.22	0.51
3/31/2006 16:28:58	59338.0	18.5	2.24	2.12	3.17	0.50
3/31/2006 16:28:59	59339.0	19.5	2.30	2.18	3.12	0.49
3/31/2006 16:29:00	59340.0	20.5	2.34	2.22	3.07	0.49
3/31/2006 16:29:01	59341.0	21.5	2.39	2.27	3.02	0.48
3/31/2006 16:29:02	59342.0	22.5	2.43	2.31	2.98	0.47
3/31/2006 16:29:03	59343.0	23.5	2.47	2.35	2.94	0.47
3/31/2006 16:29:04	59344.0	24.5	2.51	2.39	2.90	0.46
3/31/2006 16:29:05	59345.0	25.5	2.55	2.43	2.87	0.46
3/31/2006 16:29:06	59346.0	26.5	2.58	2.46	2.83	0.45
3/31/2006 16:29:07	59347.0	27.5	2.61	2.49	2.80	0.45
3/31/2006 16:29:08	59348.5	29.0	2.66	2.54	2.75	0.44
3/31/2006 16:29:10	59350.0	30.5	2.70	2.58	2.71	0.43
3/31/2006 16:29:11	59351.5	32.0	2.74	2.62	2.67	0.43
3/31/2006 16:29:13	59353.0	33.5	2.77	2.65	2.64	0.42
3/31/2006 16:29:15	59355.0	35.5	2.81	2.69	2.60	0.41
3/31/2006 16:29:17	59357.0	37.5	2.85	2.73	2.57	0.41
3/31/2006 16:29:18	59358.5	39.0	2.88	2.76	2.54	0.40
3/31/2006 16:29:20	59360.5	41.0	2.91	2.79	2.51	0.40
3/31/2006 16:29:22	59362.5	43.0	2.94	2.82	2.48	0.39
3/31/2006 16:29:25	59365.0	45.5	2.97	2.85	2.44	0.39

Slug Test P4-1S

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 16:29:27	59367.0	47.5	3.00	2.88	2.41	0.38
3/31/2006 16:29:29	59369.5	50.0	3.03	2.91	2.38	0.38
3/31/2006 16:29:32	59372.5	53.0	3.06	2.94	2.35	0.37
3/31/2006 16:29:36	59376.5	57.0	3.09	2.97	2.32	0.37
3/31/2006 16:29:41	59381.5	62.0	3.12	3.00	2.29	0.36
3/31/2006 16:29:48	59388.5	69.0	3.15	3.03	2.26	0.35
3/31/2006 16:29:54	59394.5	75.0	3.18	3.06	2.24	0.35
3/31/2006 16:30:02	59402.5	83.0	3.20	3.08	2.21	0.34
3/31/2006 16:30:10	59410.0	90.5	3.23	3.11	2.18	0.34
3/31/2006 16:30:18	59418.5	99.0	3.25	3.13	2.16	0.33
3/31/2006 16:30:27	59427.5	108.0	3.28	3.16	2.13	0.33
3/31/2006 16:30:36	59436.0	116.5	3.31	3.19	2.11	0.32
3/31/2006 16:30:44	59444.0	124.5	3.33	3.21	2.08	0.32
3/31/2006 16:30:52	59452.0	132.5	3.36	3.24	2.06	0.31
3/31/2006 16:30:59	59459.5	140.0	3.38	3.26	2.03	0.31
3/31/2006 16:31:08	59468.5	149.0	3.41	3.29	2.00	0.30
3/31/2006 16:31:18	59478.0	158.5	3.44	3.31	1.98	0.30
3/31/2006 16:31:25	59485.5	166.0	3.46	3.34	1.96	0.29
3/31/2006 16:31:35	59495.5	176.0	3.49	3.36	1.93	0.29
3/31/2006 16:31:43	59503.5	184.0	3.51	3.39	1.91	0.28
3/31/2006 16:31:51	59511.5	192.0	3.53	3.41	1.88	0.27
3/31/2006 16:32:00	59520.0	200.5	3.56	3.43	1.86	0.27
3/31/2006 16:32:09	59529.0	209.5	3.58	3.46	1.84	0.26
3/31/2006 16:32:18	59538.5	219.0	3.60	3.48	1.81	0.26
3/31/2006 16:32:25	59545.0	225.5	3.62	3.50	1.79	0.25
3/31/2006 16:32:32	59552.5	233.0	3.65	3.52	1.77	0.25
3/31/2006 16:32:39	59559.5	240.0	3.67	3.54	1.75	0.24
3/31/2006 16:32:47	59567.0	247.5	3.69	3.56	1.73	0.24
3/31/2006 16:32:53	59573.5	254.0	3.71	3.59	1.71	0.23
3/31/2006 16:33:01	59581.5	262.0	3.73	3.61	1.69	0.23
3/31/2006 16:33:11	59591.0	271.5	3.75	3.63	1.66	0.22
3/31/2006 16:33:20	59600.0	280.5	3.78	3.65	1.64	0.22
3/31/2006 16:33:32	59612.5	293.0	3.80	3.67	1.62	0.21
3/31/2006 16:33:39	59619.0	299.5	3.82	3.69	1.60	0.20
3/31/2006 16:33:45	59625.0	305.5	3.84	3.71	1.58	0.20
3/31/2006 16:33:53	59633.0	313.5	3.86	3.73	1.56	0.19
3/31/2006 16:34:01	59641.5	322.0	3.88	3.75	1.54	0.19
3/31/2006 16:34:07	59647.5	328.0	3.90	3.77	1.52	0.18
3/31/2006 16:34:14	59654.0	334.5	3.92	3.79	1.50	0.18
3/31/2006 16:34:24	59664.5	345.0	3.93	3.81	1.48	0.17
3/31/2006 16:34:37	59677.5	358.0	3.95	3.83	1.46	0.17
3/31/2006 16:34:56	59696.0	376.5	3.97	3.85	1.45	0.16
3/31/2006 16:35:14	59714.0	394.5	3.99	3.87	1.43	0.15
3/31/2006 16:35:36	59736.0	416.5	4.01	3.88	1.41	0.15
3/31/2006 16:35:57	59757.0	437.5	4.03	3.90	1.39	0.14
3/31/2006 16:36:18	59778.5	459.0	4.05	3.92	1.37	0.14
3/31/2006 16:36:40	59800.5	481.0	4.06	3.94	1.36	0.13
3/31/2006 16:37:00	59820.5	501.0	4.08	3.95	1.34	0.13
3/31/2006 16:37:22	59842.5	523.0	4.10	3.97	1.32	0.12

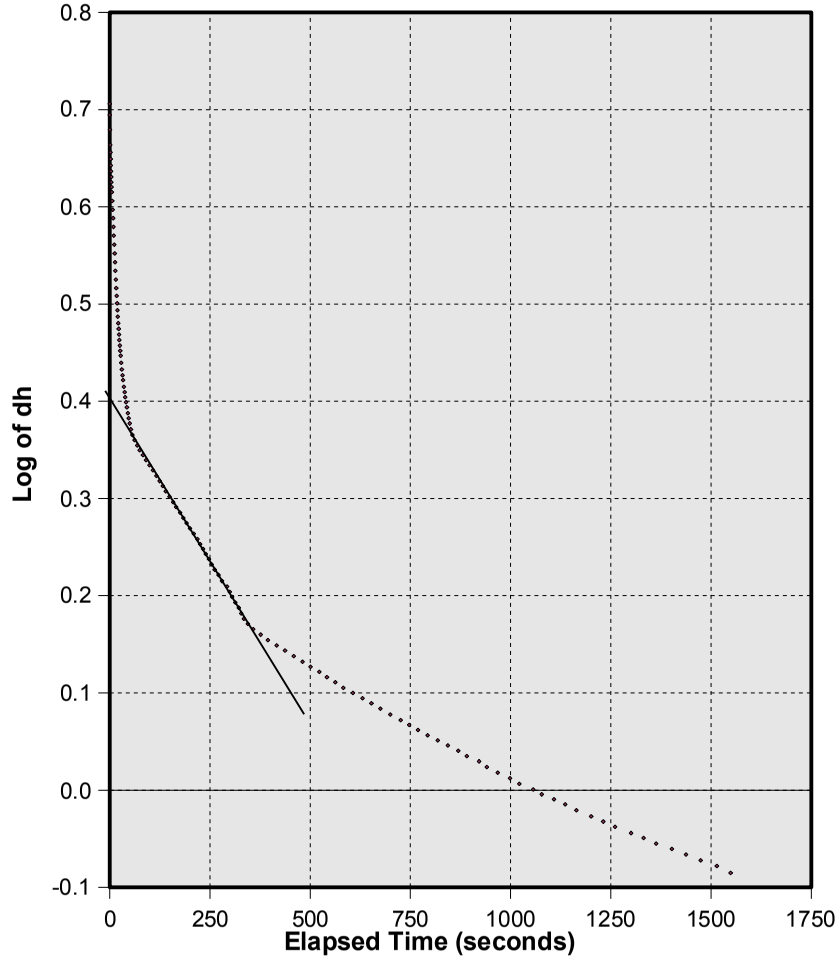
Slug Test P4-1S

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 16:37:41	59861.5	542.0	4.11	3.99	1.31	0.12
3/31/2006 16:38:02	59882.5	563.0	4.13	4.00	1.29	0.11
3/31/2006 16:38:22	59902.5	583.0	4.15	4.02	1.27	0.11
3/31/2006 16:38:46	59926.5	607.0	4.16	4.03	1.26	0.10
3/31/2006 16:39:10	59950.5	631.0	4.18	4.05	1.24	0.09
3/31/2006 16:39:32	59972.5	653.0	4.19	4.06	1.23	0.09
3/31/2006 16:39:54	59994.5	675.0	4.21	4.08	1.21	0.08
3/31/2006 16:40:19	60019.5	700.0	4.23	4.10	1.20	0.08
3/31/2006 16:40:45	60045.5	726.0	4.24	4.11	1.18	0.07
3/31/2006 16:41:06	60066.5	747.0	4.26	4.13	1.17	0.07
3/31/2006 16:41:28	60088.5	769.0	4.27	4.14	1.15	0.06
3/31/2006 16:41:52	60112.5	793.0	4.29	4.15	1.14	0.06
3/31/2006 16:42:18	60138.0	818.5	4.30	4.17	1.13	0.05
3/31/2006 16:42:43	60163.0	843.5	4.31	4.18	1.11	0.05
3/31/2006 16:43:09	60189.0	869.5	4.33	4.19	1.10	0.04
3/31/2006 16:43:30	60210.0	890.5	4.34	4.21	1.08	0.04
3/31/2006 16:44:01	60241.0	921.5	4.36	4.22	1.07	0.03
3/31/2006 16:44:20	60260.0	940.5	4.37	4.24	1.06	0.02
3/31/2006 16:44:47	60287.5	968.0	4.38	4.25	1.04	0.02
3/31/2006 16:45:18	60318.0	998.5	4.40	4.26	1.03	0.01
3/31/2006 16:45:41	60341.5	1022.0	4.41	4.28	1.02	0.01
3/31/2006 16:46:16	60376.0	1056.5	4.43	4.29	1.00	0.00
3/31/2006 16:46:37	60397.5	1078.0	4.44	4.30	0.99	0.00
3/31/2006 16:47:08	60428.0	1108.5	4.45	4.31	0.98	-0.01
3/31/2006 16:47:35	60455.5	1136.0	4.46	4.33	0.97	-0.01
3/31/2006 16:48:03	60483.5	1164.0	4.48	4.34	0.95	-0.02
3/31/2006 16:48:40	60520.5	1201.0	4.49	4.35	0.94	-0.03
3/31/2006 16:49:10	60550.5	1231.0	4.50	4.36	0.93	-0.03
3/31/2006 16:49:40	60580.0	1260.5	4.51	4.38	0.92	-0.04
3/31/2006 16:50:20	60620.0	1300.5	4.53	4.39	0.90	-0.04
3/31/2006 16:50:51	60651.0	1331.5	4.54	4.40	0.89	-0.05
3/31/2006 16:51:22	60682.5	1363.0	4.55	4.41	0.88	-0.05
3/31/2006 16:52:01	60721.5	1402.0	4.56	4.42	0.87	-0.06
3/31/2006 16:52:37	60757.0	1437.5	4.58	4.43	0.86	-0.07
3/31/2006 16:53:13	60793.5	1474.0	4.59	4.45	0.85	-0.07
3/31/2006 16:53:54	60834.0	1514.5	4.60	4.46	0.84	-0.08
3/31/2006 16:54:28	60868.5	1549.0	4.61	4.47	0.82	-0.09

Slug Test P4-1S

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	27.13	ft
Stick up height:	2.85	ft
Depth to sand pack (BGS):	10.00	ft
Depth to screened interval (BGS):	12.13	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	22.25	ft
Initial Head Change:	5.08	ft
Total well length:	29.98	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.2061	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	15.00	ft
Length of open section (L_e):	7.73	ft
L_e / r_w:	21.8259	
A (dimensionless):	2.378	
B (dimensionless):	0.394	
Drawdown at time = 0 (y_0):	2.38	ft
Drawdown at time = t (y_t):	1.48	ft
Elapsed Time between y_0 and y_t (t):	299	sec
Initial water column in well (L_w):	7.73	ft
$\ln(R_e/r_w)$ =	1.74	
K =	7.64E-06	ft/sec
	2.33E-04	**cm/sec**
	240.99	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P4-3

Initial offset in logger reading (feet):	0.018	Date:	09/29/2005
Offset increment in logger reading (feet/sec):	0.000003		
Initial depth to water table (feet):	34.53		
Depth of probe below water table (feet):	7.00		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/29/2005 12:24:07	44647.5	0.0	9.05	9.04	2.03	0.31
9/29/2005 12:24:08	44648.0	0.5	9.00	8.98	1.97	0.30
9/29/2005 12:24:08	44648.5	1.0	8.96	8.94	1.94	0.29
9/29/2005 12:24:09	44649.5	2.0	8.90	8.88	1.88	0.27
9/29/2005 12:24:10	44650.0	2.5	8.87	8.85	1.85	0.27
9/29/2005 12:24:10	44650.5	3.0	8.82	8.81	1.80	0.26
9/29/2005 12:24:11	44651.0	3.5	8.79	8.77	1.77	0.25
9/29/2005 12:24:11	44651.5	4.0	8.76	8.74	1.74	0.24
9/29/2005 12:24:12	44652.0	4.5	8.73	8.71	1.71	0.23
9/29/2005 12:24:12	44652.5	5.0	8.70	8.68	1.68	0.23
9/29/2005 12:24:13	44653.0	5.5	8.68	8.66	1.66	0.22
9/29/2005 12:24:13	44653.5	6.0	8.65	8.63	1.63	0.21
9/29/2005 12:24:14	44654.0	6.5	8.62	8.60	1.60	0.20
9/29/2005 12:24:14	44654.5	7.0	8.60	8.58	1.58	0.20
9/29/2005 12:24:15	44655.0	7.5	8.57	8.55	1.55	0.19
9/29/2005 12:24:15	44655.5	8.0	8.55	8.53	1.53	0.18
9/29/2005 12:24:16	44656.0	8.5	8.52	8.50	1.50	0.18
9/29/2005 12:24:16	44656.5	9.0	8.50	8.48	1.48	0.17
9/29/2005 12:24:17	44657.0	9.5	8.48	8.46	1.46	0.16
9/29/2005 12:24:17	44657.5	10.0	8.45	8.43	1.43	0.16
9/29/2005 12:24:18	44658.0	10.5	8.43	8.41	1.41	0.15
9/29/2005 12:24:18	44658.5	11.0	8.41	8.39	1.39	0.14
9/29/2005 12:24:19	44659.0	11.5	8.39	8.37	1.37	0.14
9/29/2005 12:24:19	44659.5	12.0	8.37	8.35	1.35	0.13
9/29/2005 12:24:20	44660.0	12.5	8.35	8.33	1.33	0.12
9/29/2005 12:24:20	44660.5	13.0	8.33	8.31	1.31	0.12
9/29/2005 12:24:21	44661.0	13.5	8.31	8.30	1.29	0.11
9/29/2005 12:24:21	44661.5	14.0	8.30	8.28	1.27	0.11
9/29/2005 12:24:22	44662.0	14.5	8.28	8.26	1.26	0.10
9/29/2005 12:24:22	44662.5	15.0	8.26	8.24	1.24	0.09
9/29/2005 12:24:23	44663.5	16.0	8.23	8.21	1.21	0.08
9/29/2005 12:24:24	44664.0	16.5	8.21	8.20	1.19	0.08
9/29/2005 12:24:24	44664.5	17.0	8.20	8.18	1.18	0.07
9/29/2005 12:24:25	44665.0	17.5	8.18	8.16	1.16	0.07
9/29/2005 12:24:25	44665.5	18.0	8.17	8.15	1.15	0.06
9/29/2005 12:24:26	44666.0	18.5	8.16	8.14	1.13	0.05
9/29/2005 12:24:26	44666.5	19.0	8.14	8.12	1.12	0.05
9/29/2005 12:24:27	44667.0	19.5	8.13	8.11	1.11	0.04
9/29/2005 12:24:27	44667.5	20.0	8.11	8.09	1.09	0.04
9/29/2005 12:24:28	44668.5	21.0	8.09	8.07	1.07	0.03
9/29/2005 12:24:29	44669.0	21.5	8.07	8.06	1.05	0.02
9/29/2005 12:24:30	44670.0	22.5	8.05	8.03	1.03	0.01
9/29/2005 12:24:31	44671.0	23.5	8.03	8.01	1.01	0.00
9/29/2005 12:24:31	44671.5	24.0	8.02	8.00	0.99	0.00

Slug Test P4-3

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/29/2005 12:24:32	44672.5	25.0	7.99	7.98	0.97	-0.01
9/29/2005 12:24:33	44673.5	26.0	7.97	7.95	0.95	-0.02
9/29/2005 12:24:34	44674.5	27.0	7.96	7.94	0.93	-0.03
9/29/2005 12:24:35	44675.5	28.0	7.93	7.91	0.91	-0.04
9/29/2005 12:24:36	44676.5	29.0	7.92	7.90	0.90	-0.05
9/29/2005 12:24:37	44677.5	30.0	7.90	7.88	0.88	-0.06
9/29/2005 12:24:38	44678.5	31.0	7.89	7.87	0.86	-0.06
9/29/2005 12:24:39	44679.0	31.5	7.88	7.86	0.85	-0.07
9/29/2005 12:24:40	44680.0	32.5	7.86	7.85	0.84	-0.07
9/29/2005 12:24:41	44681.0	33.5	7.85	7.83	0.83	-0.08
9/29/2005 12:24:42	44682.0	34.5	7.83	7.82	0.81	-0.09
9/29/2005 12:24:43	44683.0	35.5	7.82	7.80	0.80	-0.10
9/29/2005 12:24:44	44684.0	36.5	7.81	7.79	0.79	-0.10
9/29/2005 12:24:45	44685.0	37.5	7.79	7.78	0.77	-0.11
9/29/2005 12:24:46	44686.0	38.5	7.78	7.76	0.76	-0.12
9/29/2005 12:24:47	44687.0	39.5	7.77	7.75	0.75	-0.13
9/29/2005 12:24:48	44688.0	40.5	7.76	7.74	0.74	-0.13
9/29/2005 12:24:49	44689.0	41.5	7.75	7.73	0.73	-0.14
9/29/2005 12:24:50	44690.0	42.5	7.74	7.72	0.72	-0.14
9/29/2005 12:24:51	44691.0	43.5	7.73	7.71	0.71	-0.15
9/29/2005 12:24:52	44692.5	45.0	7.72	7.70	0.70	-0.16
9/29/2005 12:24:53	44693.5	46.0	7.71	7.69	0.69	-0.16
9/29/2005 12:24:54	44694.5	47.0	7.70	7.68	0.68	-0.17
9/29/2005 12:24:55	44695.5	48.0	7.69	7.67	0.67	-0.17
9/29/2005 12:24:57	44697.0	49.5	7.68	7.66	0.66	-0.18
9/29/2005 12:24:58	44698.5	51.0	7.67	7.65	0.65	-0.19
9/29/2005 12:24:59	44699.5	52.0	7.66	7.64	0.64	-0.19
9/29/2005 12:25:01	44701.5	54.0	7.65	7.63	0.63	-0.20
9/29/2005 12:25:03	44703.0	55.5	7.64	7.62	0.62	-0.21
9/29/2005 12:25:05	44705.0	57.5	7.63	7.61	0.60	-0.22
9/29/2005 12:25:06	44706.0	58.5	7.62	7.60	0.60	-0.22
9/29/2005 12:25:08	44708.0	60.5	7.61	7.59	0.59	-0.23
9/29/2005 12:25:09	44709.5	62.0	7.60	7.58	0.58	-0.24
9/29/2005 12:25:11	44711.0	63.5	7.59	7.57	0.57	-0.24
9/29/2005 12:25:13	44713.5	66.0	7.58	7.56	0.56	-0.25
9/29/2005 12:25:15	44715.0	67.5	7.58	7.56	0.56	-0.26
9/29/2005 12:25:16	44716.5	69.0	7.57	7.55	0.55	-0.26
9/29/2005 12:25:18	44718.5	71.0	7.56	7.54	0.54	-0.27
9/29/2005 12:25:21	44721.0	73.5	7.55	7.53	0.53	-0.27
9/29/2005 12:25:23	44723.5	76.0	7.55	7.53	0.53	-0.28
9/29/2005 12:25:25	44725.5	78.0	7.54	7.52	0.52	-0.29
9/29/2005 12:25:27	44727.5	80.0	7.53	7.51	0.51	-0.29
9/29/2005 12:25:30	44730.5	83.0	7.52	7.51	0.50	-0.30
9/29/2005 12:25:34	44734.0	86.5	7.52	7.50	0.50	-0.30
9/29/2005 12:25:37	44737.5	90.0	7.51	7.49	0.49	-0.31
9/29/2005 12:25:42	44742.0	94.5	7.50	7.48	0.48	-0.32
9/29/2005 12:25:46	44746.5	99.0	7.49	7.48	0.47	-0.32
9/29/2005 12:25:49	44749.5	102.0	7.49	7.47	0.47	-0.33
9/29/2005 12:25:57	44757.0	109.5	7.48	7.46	0.46	-0.34

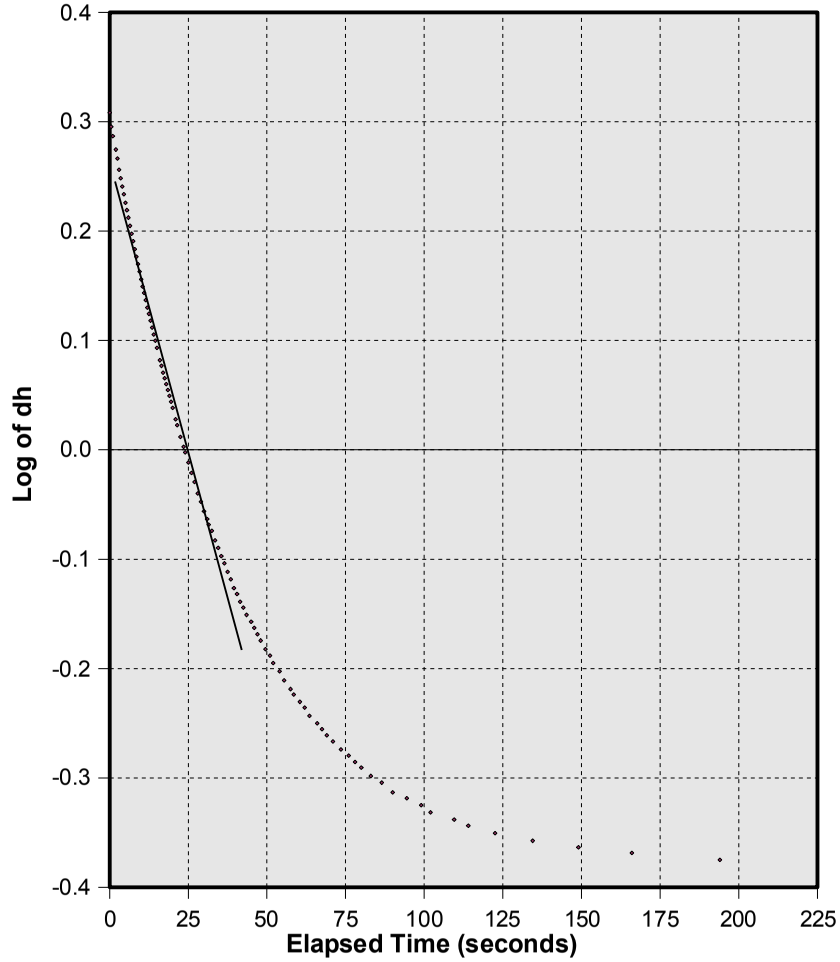
Slug Test P4-3

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/29/2005 12:26:01	44761.5	114.0	7.47	7.46	0.45	-0.34
9/29/2005 12:26:10	44770.0	122.5	7.47	7.45	0.45	-0.35
9/29/2005 12:26:22	44782.0	134.5	7.46	7.44	0.44	-0.36
9/29/2005 12:26:36	44796.5	149.0	7.45	7.44	0.43	-0.36
9/29/2005 12:26:53	44813.5	166.0	7.45	7.43	0.43	-0.37
9/29/2005 12:27:21	44841.5	194.0	7.44	7.42	0.42	-0.37
9/29/2005 12:29:08	44948.5	301.0	7.44	7.42	0.42	-0.38
9/29/2005 12:29:25	44965.5	318.0	7.44	7.42	0.42	-0.38
9/29/2005 12:30:13	45013.5	366.0	7.44	7.42	0.42	-0.38
9/29/2005 12:30:15	45015.5	368.0	7.44	7.42	0.42	-0.38
9/29/2005 12:30:16	45016.5	369.0	7.44	7.42	0.42	-0.38
9/29/2005 12:30:18	45018.0	370.5	7.44	7.42	0.42	-0.38
9/29/2005 12:30:31	45031.0	383.5	7.44	7.42	0.42	-0.38
9/29/2005 12:30:37	45037.0	389.5	7.44	7.42	0.42	-0.38
9/29/2005 12:30:45	45045.0	397.5	7.44	7.42	0.42	-0.38
9/29/2005 12:30:47	45047.5	400.0	7.44	7.42	0.42	-0.38
9/29/2005 12:30:52	45052.0	404.5	7.44	7.42	0.42	-0.38
9/29/2005 12:30:58	45058.0	410.5	7.44	7.42	0.42	-0.38
9/29/2005 12:32:08	45128.0	480.5	7.44	7.41	0.41	-0.38
9/29/2005 12:32:09	45129.5	482.0	7.44	7.42	0.42	-0.38
9/29/2005 12:40:19	45619.0	971.5	7.45	7.43	0.42	-0.37
9/29/2005 12:40:20	45620.5	973.0	7.44	7.42	0.42	-0.38
9/29/2005 12:40:45	45645.0	997.5	7.45	7.43	0.42	-0.37
9/29/2005 12:40:49	45649.5	1002.0	7.44	7.42	0.42	-0.38
9/29/2005 12:40:54	45654.0	1006.5	7.45	7.43	0.42	-0.37
9/29/2005 12:40:54	45654.5	1007.0	7.44	7.42	0.42	-0.38
9/29/2005 12:41:09	45669.5	1022.0	7.45	7.43	0.42	-0.37
9/29/2005 12:41:16	45676.0	1028.5	7.44	7.42	0.42	-0.38
9/29/2005 12:41:19	45679.5	1032.0	7.45	7.43	0.42	-0.37
9/29/2005 12:41:22	45682.0	1034.5	7.44	7.42	0.42	-0.38
9/29/2005 12:41:24	45684.0	1036.5	7.45	7.43	0.42	-0.37
9/29/2005 12:45:42	45942.0	1294.5	7.45	7.43	0.43	-0.37
9/29/2005 12:45:45	45945.5	1298.0	7.45	7.43	0.42	-0.37
9/29/2005 12:45:52	45952.0	1304.5	7.45	7.43	0.43	-0.37
9/29/2005 12:48:54	46134.0	1486.5	7.46	7.44	0.44	-0.36
9/29/2005 12:48:56	46136.5	1489.0	7.46	7.43	0.43	-0.37
9/29/2005 12:51:39	46299.0	1651.5	7.46	7.44	0.44	-0.36
9/29/2005 12:52:09	46329.0	1681.5	7.46	7.43	0.43	-0.37
9/29/2005 12:52:09	46329.5	1682.0	7.46	7.44	0.44	-0.36
9/29/2005 12:52:45	46365.5	1718.0	7.46	7.43	0.43	-0.37
9/29/2005 12:52:46	46366.5	1719.0	7.46	7.44	0.44	-0.36
9/29/2005 12:57:46	46666.0	2018.5	7.47	7.44	0.44	-0.36
9/29/2005 12:57:48	46668.5	2021.0	7.46	7.44	0.43	-0.36
9/29/2005 12:58:22	46702.0	2054.5	7.47	7.44	0.44	-0.36
9/29/2005 13:04:57	47097.5	2450.0	7.48	7.45	0.45	-0.35
9/29/2005 13:05:05	47105.0	2457.5	7.47	7.44	0.44	-0.36
9/29/2005 13:05:19	47119.0	2471.5	7.48	7.45	0.45	-0.35
9/29/2005 13:05:52	47152.0	2504.5	7.48	7.45	0.45	-0.35

Slug Test P4-3

Slug Test by Bouwer and Rice

Displacement Method:	Injection	
Well depth:	47.33	ft
Stick up height:	2.80	ft
Depth to sand pack (BGS):	33.00	ft
Depth to screened interval (BGS):	32.33	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	34.53	ft
Initial Head Change:	2.03	ft
Total well length:	50.13	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.0833	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	15.00	ft
Length of open section (L_e):	15.00	ft
L_e / r_w:	42.3529	
A (dimensionless):	2.950	
B (dimensionless):	0.493	
Drawdown at time = 0 (y_0):	1.58	ft
Drawdown at time = t (y_t):	0.90	ft
Elapsed Time between y_0 and y_t (t):	22	sec
Initial water column in well (L_w):	15.60	ft
$\ln(R_e/r_w)$ =	2.33	
K =	1.38E-05	ft/sec
	4.21E-04	**cm/sec**
	435.54	ft/yr



Water above sand pack:	Yes
%Duration below sand pack:	0.00%
Water above screen:	Yes
%Duration below screen:	0.00%

Slug Test P4-4

Initial offset in logger reading (feet):	0.173	Date:	03/31/2006
Offset increment in logger reading (feet/sec):	-0.000002		
Initial depth to water table (feet):	22.22		
Depth of probe below water table (feet):	9.90		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 12:02:27	43347.0	0.0	2.30	7.60	2.30	0.36
3/31/2006 12:02:27	43347.5	0.5	2.49	2.31	7.58	0.88
3/31/2006 12:02:30	43350.0	3.0	2.59	2.41	7.48	0.87
3/31/2006 12:02:32	43352.0	5.0	2.69	2.51	7.38	0.87
3/31/2006 12:02:33	43353.5	6.5	2.81	2.63	7.26	0.86
3/31/2006 12:02:35	43355.0	8.0	2.92	2.75	7.15	0.85
3/31/2006 12:02:36	43356.0	9.0	3.01	2.83	7.06	0.85
3/31/2006 12:02:37	43357.0	10.0	3.09	2.92	6.98	0.84
3/31/2006 12:02:38	43358.0	11.0	3.18	3.01	6.89	0.84
3/31/2006 12:02:39	43359.0	12.0	3.27	3.10	6.79	0.83
3/31/2006 12:02:40	43360.0	13.0	3.37	3.20	6.70	0.83
3/31/2006 12:02:41	43361.0	14.0	3.47	3.30	6.60	0.82
3/31/2006 12:02:42	43362.0	15.0	3.57	3.40	6.50	0.81
3/31/2006 12:02:43	43363.0	16.0	3.66	3.49	6.41	0.81
3/31/2006 12:02:44	43364.0	17.0	3.76	3.59	6.31	0.80
3/31/2006 12:02:45	43365.0	18.0	3.85	3.68	6.21	0.79
3/31/2006 12:02:46	43366.0	19.0	3.95	3.77	6.12	0.79
3/31/2006 12:02:47	43367.0	20.0	4.04	3.87	6.03	0.78
3/31/2006 12:02:48	43368.0	21.0	4.13	3.96	5.94	0.77
3/31/2006 12:02:49	43369.0	22.0	4.22	4.05	5.85	0.77
3/31/2006 12:02:50	43370.0	23.0	4.31	4.14	5.76	0.76
3/31/2006 12:02:51	43371.0	24.0	4.40	4.23	5.67	0.75
3/31/2006 12:02:52	43372.0	25.0	4.49	4.31	5.58	0.75
3/31/2006 12:02:53	43373.0	26.0	4.57	4.40	5.50	0.74
3/31/2006 12:02:54	43374.0	27.0	4.66	4.48	5.41	0.73
3/31/2006 12:02:55	43375.0	28.0	4.75	4.58	5.31	0.73
3/31/2006 12:02:56	43376.0	29.0	4.86	4.69	5.21	0.72
3/31/2006 12:02:57	43377.0	30.0	4.96	4.79	5.11	0.71
3/31/2006 12:02:58	43378.0	31.0	5.06	4.89	5.01	0.70
3/31/2006 12:02:59	43379.0	32.0	5.15	4.98	4.92	0.69
3/31/2006 12:03:00	43380.0	33.0	5.24	5.07	4.83	0.68
3/31/2006 12:03:01	43381.0	34.0	5.33	5.16	4.74	0.68
3/31/2006 12:03:02	43382.0	35.0	5.42	5.25	4.65	0.67
3/31/2006 12:03:03	43383.0	36.0	5.51	5.34	4.56	0.66
3/31/2006 12:03:04	43384.0	37.0	5.60	5.43	4.47	0.65
3/31/2006 12:03:05	43385.0	38.0	5.68	5.51	4.39	0.64
3/31/2006 12:03:06	43386.0	39.0	5.76	5.59	4.31	0.63
3/31/2006 12:03:07	43387.0	40.0	5.84	5.66	4.23	0.63
3/31/2006 12:03:08	43388.0	41.0	5.91	5.74	4.16	0.62
3/31/2006 12:03:09	43389.0	42.0	5.98	5.81	4.09	0.61
3/31/2006 12:03:10	43390.0	43.0	6.05	5.88	4.02	0.60
3/31/2006 12:03:11	43391.0	44.0	6.11	5.94	3.95	0.60
3/31/2006 12:03:12	43392.0	45.0	6.18	6.01	3.89	0.59
3/31/2006 12:03:13	43393.0	46.0	6.24	6.07	3.83	0.58

Slug Test P4-4

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 12:03:14	43394.0	47.0	6.30	6.13	3.77	0.58
3/31/2006 12:03:15	43395.0	48.0	6.35	6.18	3.71	0.57
3/31/2006 12:03:16	43396.0	49.0	6.41	6.24	3.66	0.56
3/31/2006 12:03:17	43397.0	50.0	6.46	6.29	3.61	0.56
3/31/2006 12:03:18	43398.0	51.0	6.51	6.34	3.56	0.55
3/31/2006 12:03:19	43399.0	52.0	6.56	6.39	3.51	0.55
3/31/2006 12:03:20	43400.0	53.0	6.61	6.43	3.46	0.54
3/31/2006 12:03:21	43401.0	54.0	6.65	6.48	3.42	0.53
3/31/2006 12:03:22	43402.0	55.0	6.69	6.52	3.38	0.53
3/31/2006 12:03:23	43403.5	56.5	6.75	6.58	3.32	0.52
3/31/2006 12:03:25	43405.0	58.0	6.80	6.63	3.27	0.51
3/31/2006 12:03:26	43406.5	59.5	6.84	6.67	3.23	0.51
3/31/2006 12:03:28	43408.5	61.5	6.88	6.71	3.19	0.50
3/31/2006 12:03:31	43411.0	64.0	6.92	6.75	3.14	0.50
3/31/2006 12:03:34	43414.5	67.5	6.96	6.79	3.11	0.49
3/31/2006 12:03:43	43423.0	76.0	7.00	6.83	3.07	0.49
3/31/2006 12:04:01	43441.0	94.0	7.04	6.87	3.03	0.48
3/31/2006 12:04:37	43477.0	130.0	7.08	6.91	2.99	0.48
3/31/2006 12:05:07	43507.0	160.0	7.11	6.94	2.96	0.47
3/31/2006 12:05:40	43540.5	193.5	7.15	6.98	2.92	0.47
3/31/2006 12:06:08	43568.5	221.5	7.18	7.01	2.89	0.46
3/31/2006 12:06:39	43599.0	252.0	7.22	7.04	2.85	0.46
3/31/2006 12:07:11	43631.0	284.0	7.25	7.08	2.82	0.45
3/31/2006 12:08:02	43682.0	335.0	7.28	7.11	2.79	0.45
3/31/2006 12:08:45	43725.5	378.5	7.32	7.14	2.75	0.44
3/31/2006 12:09:19	43759.0	412.0	7.35	7.18	2.72	0.43
3/31/2006 12:09:55	43795.0	448.0	7.38	7.21	2.69	0.43
3/31/2006 12:10:22	43822.5	475.5	7.41	7.24	2.66	0.42
3/31/2006 12:10:56	43856.5	509.5	7.44	7.27	2.62	0.42
3/31/2006 12:11:30	43890.5	543.5	7.47	7.30	2.59	0.41
3/31/2006 12:11:54	43914.0	567.0	7.50	7.33	2.56	0.41
3/31/2006 12:12:17	43937.5	590.5	7.54	7.36	2.53	0.40
3/31/2006 12:12:38	43958.5	611.5	7.57	7.39	2.50	0.40
3/31/2006 12:13:00	43980.0	633.0	7.59	7.42	2.47	0.39
3/31/2006 12:13:27	44007.5	660.5	7.62	7.45	2.44	0.39
3/31/2006 12:13:50	44030.0	683.0	7.65	7.48	2.41	0.38
3/31/2006 12:14:16	44056.0	709.0	7.68	7.51	2.39	0.38
3/31/2006 12:14:45	44085.5	738.5	7.71	7.54	2.36	0.37
3/31/2006 12:15:15	44115.5	768.5	7.74	7.57	2.33	0.37
3/31/2006 12:15:49	44149.0	802.0	7.77	7.60	2.30	0.36
3/31/2006 12:16:20	44180.5	833.5	7.79	7.62	2.27	0.36
3/31/2006 12:16:46	44206.5	859.5	7.82	7.65	2.25	0.35
3/31/2006 12:17:20	44240.5	893.5	7.85	7.68	2.22	0.35
3/31/2006 12:17:52	44272.5	925.5	7.87	7.70	2.20	0.34
3/31/2006 12:18:24	44304.5	957.5	7.90	7.73	2.17	0.34
3/31/2006 12:18:56	44336.0	989.0	7.92	7.75	2.14	0.33
3/31/2006 12:19:31	44371.5	1024.5	7.95	7.78	2.12	0.33
3/31/2006 12:20:08	44408.5	1061.5	7.98	7.81	2.09	0.32
3/31/2006 12:20:42	44442.0	1095.0	8.00	7.83	2.06	0.31

Slug Test P4-4

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 12:21:18	44478.5	1131.5	8.03	7.86	2.04	0.31
3/31/2006 12:21:55	44515.5	1168.5	8.05	7.88	2.01	0.30
3/31/2006 12:22:34	44554.5	1207.5	8.08	7.91	1.99	0.30
3/31/2006 12:23:14	44594.0	1247.0	8.10	7.93	1.97	0.29
3/31/2006 12:23:52	44632.0	1285.0	8.13	7.96	1.94	0.29
3/31/2006 12:24:27	44667.5	1320.5	8.15	7.98	1.92	0.28
3/31/2006 12:24:55	44695.0	1348.0	8.17	8.00	1.90	0.28
3/31/2006 12:25:32	44732.5	1385.5	8.19	8.02	1.87	0.27
3/31/2006 12:25:59	44759.5	1412.5	8.22	8.05	1.85	0.27
3/31/2006 12:26:36	44796.5	1449.5	8.24	8.07	1.83	0.26
3/31/2006 12:27:01	44821.0	1474.0	8.26	8.09	1.80	0.26
3/31/2006 12:27:22	44842.5	1495.5	8.28	8.11	1.78	0.25
3/31/2006 12:27:42	44862.0	1515.0	8.30	8.14	1.76	0.25
3/31/2006 12:27:58	44878.0	1531.0	8.33	8.16	1.74	0.24
3/31/2006 12:28:14	44894.0	1547.0	8.35	8.18	1.72	0.24
3/31/2006 12:28:37	44917.5	1570.5	8.37	8.20	1.70	0.23
3/31/2006 12:29:03	44943.0	1596.0	8.39	8.22	1.68	0.22
3/31/2006 12:29:37	44977.0	1630.0	8.41	8.24	1.66	0.22
3/31/2006 12:30:15	45015.5	1668.5	8.43	8.26	1.64	0.21
3/31/2006 12:30:50	45050.0	1703.0	8.45	8.28	1.62	0.21
3/31/2006 12:31:23	45083.0	1736.0	8.47	8.30	1.60	0.20
3/31/2006 12:31:57	45117.5	1770.5	8.49	8.32	1.58	0.20
3/31/2006 12:32:36	45156.5	1809.5	8.51	8.34	1.56	0.19
3/31/2006 12:33:23	45203.0	1856.0	8.52	8.35	1.54	0.19
3/31/2006 12:33:59	45239.5	1892.5	8.54	8.37	1.52	0.18
3/31/2006 12:34:43	45283.5	1936.5	8.56	8.39	1.50	0.18
3/31/2006 12:35:27	45327.0	1980.0	8.58	8.41	1.48	0.17
3/31/2006 12:36:07	45367.0	2020.0	8.60	8.43	1.47	0.17
3/31/2006 12:36:50	45410.0	2063.0	8.62	8.45	1.45	0.16
3/31/2006 12:37:38	45458.0	2111.0	8.63	8.46	1.43	0.16
3/31/2006 12:38:23	45503.0	2156.0	8.65	8.48	1.41	0.15
3/31/2006 12:39:17	45557.5	2210.5	8.67	8.50	1.39	0.14
3/31/2006 12:39:59	45599.0	2252.0	8.69	8.52	1.38	0.14
3/31/2006 12:40:42	45642.0	2295.0	8.70	8.54	1.36	0.13
3/31/2006 12:41:35	45695.0	2348.0	8.72	8.55	1.35	0.13
3/31/2006 12:42:32	45752.0	2405.0	8.74	8.57	1.33	0.12
3/31/2006 12:43:28	45808.0	2461.0	8.75	8.59	1.31	0.12
3/31/2006 12:44:27	45867.5	2520.5	8.77	8.60	1.30	0.11
3/31/2006 12:45:16	45916.0	2569.0	8.78	8.62	1.28	0.11
3/31/2006 12:46:26	45986.5	2639.5	8.80	8.63	1.26	0.10
3/31/2006 12:47:28	46048.0	2701.0	8.82	8.65	1.25	0.10
3/31/2006 12:48:35	46115.0	2768.0	8.83	8.67	1.23	0.09
3/31/2006 12:49:30	46170.0	2823.0	8.85	8.68	1.22	0.09
3/31/2006 12:50:28	46228.0	2881.0	8.86	8.69	1.20	0.08
3/31/2006 12:51:31	46291.0	2944.0	8.88	8.71	1.19	0.07
3/31/2006 12:52:22	46342.0	2995.0	8.89	8.72	1.17	0.07
3/31/2006 12:53:17	46397.5	3050.5	8.90	8.74	1.16	0.06
3/31/2006 12:54:20	46460.5	3113.5	8.92	8.75	1.15	0.06
3/31/2006 12:55:31	46531.0	3184.0	8.93	8.77	1.13	0.05

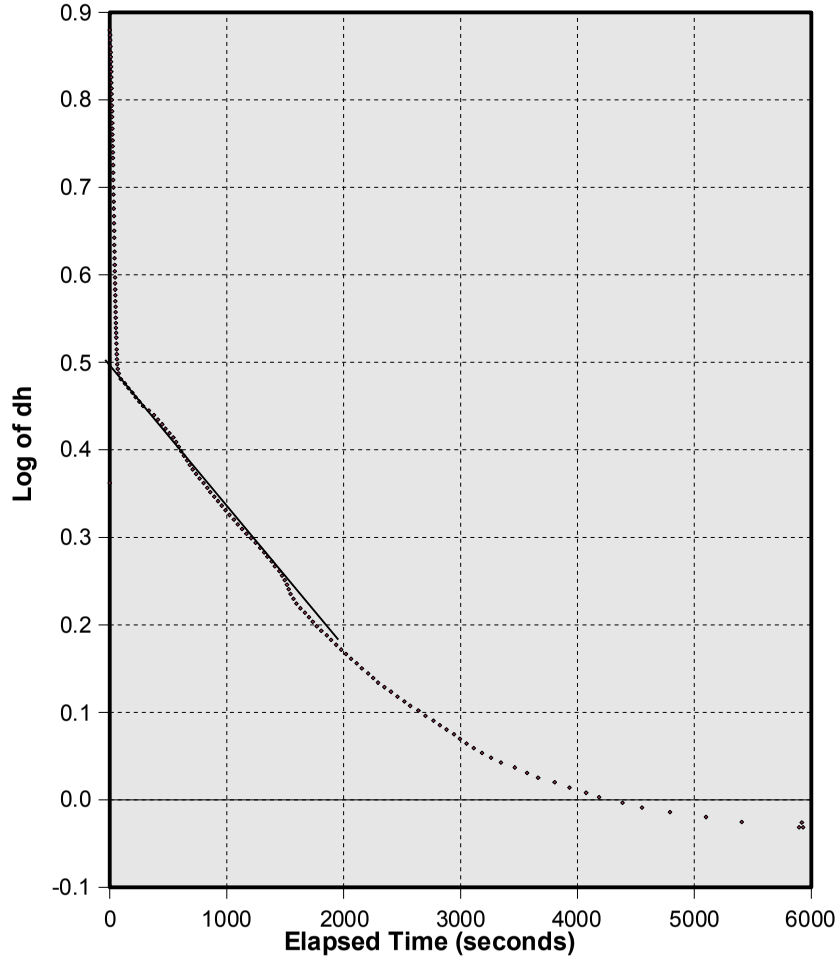
Slug Test P4-4

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 12:56:48	46608.5	3261.5	8.95	8.78	1.12	0.05
3/31/2006 12:58:12	46692.5	3345.5	8.96	8.79	1.10	0.04
3/31/2006 13:00:11	46811.5	3464.5	8.97	8.81	1.09	0.04
3/31/2006 13:01:57	46917.0	3570.0	8.99	8.82	1.07	0.03
3/31/2006 13:03:31	47011.0	3664.0	9.00	8.84	1.06	0.03
3/31/2006 13:05:52	47152.5	3805.5	9.01	8.85	1.05	0.02
3/31/2006 13:07:59	47279.0	3932.0	9.03	8.86	1.03	0.01
3/31/2006 13:10:21	47421.0	4074.0	9.04	8.88	1.02	0.01
3/31/2006 13:12:11	47531.0	4184.0	9.05	8.89	1.01	0.00
3/31/2006 13:15:32	47732.0	4385.0	9.07	8.90	0.99	0.00
3/31/2006 13:18:20	47900.0	4553.0	9.08	8.92	0.98	-0.01
3/31/2006 13:22:18	48138.0	4791.0	9.09	8.93	0.97	-0.01
3/31/2006 13:27:26	48446.5	5099.5	9.10	8.94	0.96	-0.02
3/31/2006 13:32:32	48752.0	5405.0	9.12	8.95	0.94	-0.03
3/31/2006 13:40:42	49242.5	5895.5	9.13	8.97	0.93	-0.03
3/31/2006 13:41:06	49266.5	5919.5	9.12	8.95	0.94	-0.03
3/31/2006 13:41:17	49277.0	5930.0	9.13	8.97	0.93	-0.03
3/31/2006 13:44:02	49442.0	6095.0	9.12	8.96	0.94	-0.03
3/31/2006 13:44:04	49444.5	6097.5	9.13	8.97	0.93	-0.03
3/31/2006 13:50:53	49853.5	6506.5	9.14	8.98	0.92	-0.04
3/31/2006 14:03:51	50631.0	7284.0	9.15	8.99	0.91	-0.04
3/31/2006 14:18:38	51518.0	8171.0	9.16	9.00	0.90	-0.05
3/31/2006 14:33:48	52428.0	9081.0	9.17	9.01	0.88	-0.05
3/31/2006 14:36:03	52563.0	9216.0	9.17	9.01	0.88	-0.05

Slug Test P4-4

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	33.07	ft
Stick up height:	2.61	ft
Depth to sand pack (BGS):	16.00	ft
Depth to screened interval (BGS):	18.07	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	22.22	ft
Initial Head Change:	2.30	ft
Total well length:	35.68	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.2061	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	15.00	ft
Length of open section (L_e):	13.46	ft
L_e / r_w:	38.0047	
A (dimensionless):	2.815	
B (dimensionless):	0.470	
Drawdown at time = 0 (y_0):	3.06	ft
Drawdown at time = t (y_t):	1.82	ft
Elapsed Time between y_0 and y_t (t):	1378.5	sec
Initial water column in well (L_w):	13.46	ft
$\ln(R_e/r_w)$ =	2.22	
K =	1.32E-06	ft/sec
	4.03E-05	**cm/sec**
	41.72	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P4-5

Initial offset in logger reading (feet):	0.155	Date:	03/15/2006
Offset increment in logger reading (feet/sec):	0.000009		
Initial depth to water table (feet):	25.25		
Depth of probe below water table (feet):	9.35		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 13:18:49	47929.5	0.0	3.79	3.63	5.72	0.76
3/15/2006 13:18:50	47930.5	1.0	4.01	3.85	5.50	0.74
3/15/2006 13:18:51	47931.0	1.5	4.10	3.94	5.41	0.73
3/15/2006 13:18:52	47932.0	2.5	4.21	4.05	5.30	0.72
3/15/2006 13:18:54	47934.0	4.5	4.30	4.14	5.21	0.72
3/15/2006 13:18:58	47938.5	9.0	4.39	4.23	5.13	0.71
3/15/2006 13:19:03	47943.5	14.0	4.47	4.31	5.04	0.70
3/15/2006 13:19:08	47948.5	19.0	4.56	4.40	4.96	0.70
3/15/2006 13:19:13	47953.0	23.5	4.64	4.48	4.87	0.69
3/15/2006 13:19:18	47958.5	29.0	4.72	4.56	4.79	0.68
3/15/2006 13:19:24	47964.5	35.0	4.80	4.64	4.71	0.67
3/15/2006 13:19:30	47970.0	40.5	4.88	4.72	4.63	0.67
3/15/2006 13:19:35	47975.0	45.5	4.96	4.80	4.55	0.66
3/15/2006 13:19:40	47980.5	51.0	5.03	4.87	4.48	0.65
3/15/2006 13:19:46	47986.5	57.0	5.11	4.95	4.41	0.64
3/15/2006 13:19:53	47993.0	63.5	5.18	5.02	4.33	0.64
3/15/2006 13:20:00	48000.5	71.0	5.26	5.09	4.26	0.63
3/15/2006 13:20:08	48008.5	79.0	5.33	5.16	4.19	0.62
3/15/2006 13:20:17	48017.5	88.0	5.40	5.23	4.12	0.61
3/15/2006 13:20:25	48025.5	96.0	5.46	5.30	4.05	0.61
3/15/2006 13:20:32	48032.0	102.5	5.53	5.37	3.98	0.60
3/15/2006 13:20:36	48036.0	106.5	5.60	5.44	3.92	0.59
3/15/2006 13:20:39	48039.0	109.5	5.66	5.50	3.85	0.59
3/15/2006 13:20:41	48041.0	111.5	5.73	5.57	3.78	0.58
3/15/2006 13:20:43	48043.0	113.5	5.80	5.64	3.71	0.57
3/15/2006 13:20:45	48045.5	116.0	5.87	5.71	3.64	0.56
3/15/2006 13:20:48	48048.5	119.0	5.93	5.77	3.58	0.55
3/15/2006 13:20:54	48054.5	125.0	5.99	5.83	3.52	0.55
3/15/2006 13:21:03	48063.5	134.0	6.05	5.89	3.47	0.54
3/15/2006 13:21:15	48075.0	145.5	6.10	5.94	3.41	0.53
3/15/2006 13:21:28	48088.0	158.5	6.16	6.00	3.35	0.53
3/15/2006 13:21:39	48099.5	170.0	6.22	6.05	3.30	0.52
3/15/2006 13:21:54	48114.5	185.0	6.27	6.11	3.24	0.51
3/15/2006 13:22:09	48129.5	200.0	6.33	6.16	3.19	0.50
3/15/2006 13:22:24	48144.5	215.0	6.38	6.22	3.13	0.50
3/15/2006 13:22:36	48156.5	227.0	6.43	6.27	3.08	0.49
3/15/2006 13:22:49	48169.5	240.0	6.49	6.33	3.03	0.48
3/15/2006 13:23:03	48183.5	254.0	6.54	6.37	2.98	0.47
3/15/2006 13:23:16	48196.5	267.0	6.59	6.42	2.93	0.47
3/15/2006 13:23:31	48211.0	281.5	6.63	6.47	2.88	0.46
3/15/2006 13:23:47	48227.0	297.5	6.68	6.52	2.84	0.45
3/15/2006 13:24:00	48240.5	311.0	6.73	6.56	2.79	0.45
3/15/2006 13:24:15	48255.5	326.0	6.77	6.61	2.74	0.44
3/15/2006 13:24:32	48272.0	342.5	6.82	6.66	2.70	0.43

Slug Test P4-5

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 13:24:49	48289.5	360.0	6.87	6.70	2.65	0.42
3/15/2006 13:25:06	48306.5	377.0	6.91	6.75	2.61	0.42
3/15/2006 13:25:21	48321.5	392.0	6.95	6.79	2.57	0.41
3/15/2006 13:25:37	48337.5	408.0	6.99	6.83	2.52	0.40
3/15/2006 13:25:52	48352.5	423.0	7.04	6.87	2.48	0.39
3/15/2006 13:26:10	48370.0	440.5	7.08	6.91	2.44	0.39
3/15/2006 13:26:25	48385.5	456.0	7.12	6.95	2.40	0.38
3/15/2006 13:26:43	48403.0	473.5	7.16	6.99	2.36	0.37
3/15/2006 13:26:58	48418.0	488.5	7.20	7.03	2.32	0.37
3/15/2006 13:27:18	48438.0	508.5	7.24	7.07	2.28	0.36
3/15/2006 13:27:34	48454.0	524.5	7.28	7.11	2.24	0.35
3/15/2006 13:27:51	48471.0	541.5	7.31	7.15	2.21	0.34
3/15/2006 13:28:09	48489.0	559.5	7.35	7.19	2.17	0.34
3/15/2006 13:28:24	48504.0	574.5	7.39	7.22	2.13	0.33
3/15/2006 13:28:44	48524.0	594.5	7.43	7.26	2.09	0.32
3/15/2006 13:29:03	48543.0	613.5	7.46	7.30	2.06	0.31
3/15/2006 13:29:22	48562.5	633.0	7.50	7.33	2.02	0.31
3/15/2006 13:29:39	48579.5	650.0	7.53	7.37	1.99	0.30
3/15/2006 13:29:57	48597.0	667.5	7.57	7.40	1.95	0.29
3/15/2006 13:30:18	48618.0	688.5	7.60	7.43	1.92	0.28
3/15/2006 13:30:34	48634.0	704.5	7.63	7.46	1.89	0.28
3/15/2006 13:30:49	48649.5	720.0	7.66	7.49	1.86	0.27
3/15/2006 13:31:08	48668.5	739.0	7.69	7.52	1.83	0.26
3/15/2006 13:31:28	48688.0	758.5	7.72	7.56	1.80	0.25
3/15/2006 13:31:46	48706.0	776.5	7.75	7.59	1.77	0.25
3/15/2006 13:32:06	48726.5	797.0	7.78	7.61	1.74	0.24
3/15/2006 13:32:25	48745.0	815.5	7.81	7.64	1.71	0.23
3/15/2006 13:32:43	48763.0	833.5	7.84	7.67	1.68	0.23
3/15/2006 13:33:01	48781.0	851.5	7.87	7.70	1.66	0.22
3/15/2006 13:33:21	48801.0	871.5	7.90	7.73	1.63	0.21
3/15/2006 13:33:36	48816.5	887.0	7.92	7.75	1.60	0.20
3/15/2006 13:33:51	48831.0	901.5	7.95	7.78	1.57	0.20
3/15/2006 13:34:05	48845.5	916.0	7.98	7.81	1.55	0.19
3/15/2006 13:34:20	48860.5	931.0	8.00	7.83	1.52	0.18
3/15/2006 13:34:35	48875.5	946.0	8.03	7.86	1.50	0.17
3/15/2006 13:34:49	48889.0	959.5	8.05	7.88	1.47	0.17
3/15/2006 13:35:03	48903.5	974.0	8.08	7.91	1.44	0.16
3/15/2006 13:35:21	48921.5	992.0	8.11	7.94	1.42	0.15
3/15/2006 13:35:40	48940.5	1011.0	8.13	7.96	1.39	0.14
3/15/2006 13:35:57	48957.0	1027.5	8.15	7.98	1.37	0.14
3/15/2006 13:36:18	48978.5	1049.0	8.18	8.00	1.35	0.13
3/15/2006 13:36:32	48992.5	1063.0	8.20	8.03	1.33	0.12
3/15/2006 13:36:54	49014.5	1085.0	8.22	8.05	1.30	0.12
3/15/2006 13:37:10	49030.0	1100.5	8.24	8.07	1.28	0.11
3/15/2006 13:37:27	49047.5	1118.0	8.26	8.09	1.26	0.10
3/15/2006 13:37:49	49069.5	1140.0	8.28	8.11	1.24	0.09
3/15/2006 13:38:03	49083.5	1154.0	8.31	8.13	1.22	0.09
3/15/2006 13:38:23	49103.5	1174.0	8.33	8.15	1.20	0.08
3/15/2006 13:38:43	49123.0	1193.5	8.35	8.18	1.18	0.07

Slug Test P4-5

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 13:39:01	49141.0	1211.5	8.37	8.19	1.16	0.06
3/15/2006 13:39:14	49154.5	1225.0	8.39	8.21	1.14	0.06
3/15/2006 13:39:33	49173.5	1244.0	8.40	8.23	1.12	0.05
3/15/2006 13:39:55	49195.0	1265.5	8.42	8.25	1.10	0.04
3/15/2006 13:40:10	49210.5	1281.0	8.44	8.27	1.08	0.03
3/15/2006 13:40:33	49233.0	1303.5	8.46	8.29	1.06	0.03
3/15/2006 13:40:52	49252.0	1322.5	8.48	8.31	1.05	0.02
3/15/2006 13:41:08	49268.0	1338.5	8.50	8.32	1.03	0.01
3/15/2006 13:41:29	49289.5	1360.0	8.52	8.34	1.01	0.00
3/15/2006 13:41:49	49309.0	1379.5	8.53	8.36	0.99	0.00
3/15/2006 13:42:11	49331.0	1401.5	8.55	8.38	0.97	-0.01
3/15/2006 13:42:32	49352.5	1423.0	8.57	8.40	0.96	-0.02
3/15/2006 13:42:48	49368.5	1439.0	8.59	8.41	0.94	-0.03
3/15/2006 13:43:12	49392.5	1463.0	8.60	8.43	0.92	-0.03
3/15/2006 13:43:34	49414.0	1484.5	8.62	8.44	0.91	-0.04
3/15/2006 13:43:52	49432.5	1503.0	8.63	8.46	0.89	-0.05
3/15/2006 13:44:16	49456.5	1527.0	8.65	8.47	0.88	-0.06
3/15/2006 13:44:39	49479.5	1550.0	8.67	8.49	0.86	-0.06
3/15/2006 13:44:57	49497.5	1568.0	8.68	8.51	0.85	-0.07
3/15/2006 13:45:16	49516.5	1587.0	8.69	8.52	0.83	-0.08
3/15/2006 13:45:40	49540.5	1611.0	8.71	8.53	0.82	-0.09
3/15/2006 13:46:05	49565.0	1635.5	8.72	8.55	0.80	-0.09
3/15/2006 13:46:22	49582.5	1653.0	8.74	8.56	0.79	-0.10
3/15/2006 13:46:46	49606.5	1677.0	8.75	8.58	0.78	-0.11
3/15/2006 13:47:13	49633.5	1704.0	8.77	8.59	0.76	-0.12
3/15/2006 13:47:38	49658.5	1729.0	8.78	8.60	0.75	-0.13
3/15/2006 13:48:07	49687.5	1758.0	8.80	8.62	0.73	-0.13
3/15/2006 13:48:24	49704.0	1774.5	8.81	8.63	0.72	-0.14
3/15/2006 13:48:44	49724.0	1794.5	8.82	8.64	0.71	-0.15
3/15/2006 13:49:07	49747.0	1817.5	8.83	8.65	0.70	-0.16
3/15/2006 13:49:29	49769.5	1840.0	8.85	8.67	0.69	-0.16
3/15/2006 13:50:01	49801.0	1871.5	8.86	8.68	0.67	-0.17
3/15/2006 13:50:11	49811.5	1882.0	8.87	8.69	0.66	-0.18
3/15/2006 13:50:12	49812.5	1883.0	8.85	8.68	0.68	-0.17
3/15/2006 13:50:22	49822.0	1892.5	8.87	8.69	0.66	-0.18
3/15/2006 13:50:47	49847.0	1917.5	8.88	8.70	0.65	-0.19
3/15/2006 13:51:21	49881.0	1951.5	8.89	8.71	0.64	-0.19
3/15/2006 13:51:28	49888.5	1959.0	8.88	8.70	0.66	-0.18
3/15/2006 13:51:31	49891.0	1961.5	8.89	8.71	0.64	-0.19
3/15/2006 13:51:34	49894.5	1965.0	8.87	8.69	0.66	-0.18
3/15/2006 13:51:35	49895.5	1966.0	8.89	8.71	0.65	-0.19
3/15/2006 13:51:37	49897.0	1967.5	8.90	8.72	0.63	-0.20
3/15/2006 13:51:37	49897.5	1968.0	8.89	8.71	0.64	-0.19
3/15/2006 13:51:39	49899.5	1970.0	8.90	8.72	0.63	-0.20
3/15/2006 13:52:17	49937.5	2008.0	8.91	8.73	0.62	-0.21
3/15/2006 13:52:57	49977.0	2047.5	8.93	8.75	0.61	-0.22
3/15/2006 13:53:24	50004.0	2074.5	8.94	8.76	0.60	-0.23
3/15/2006 13:53:28	50008.5	2079.0	8.93	8.75	0.61	-0.22
3/15/2006 13:53:30	50010.0	2080.5	8.94	8.76	0.60	-0.23

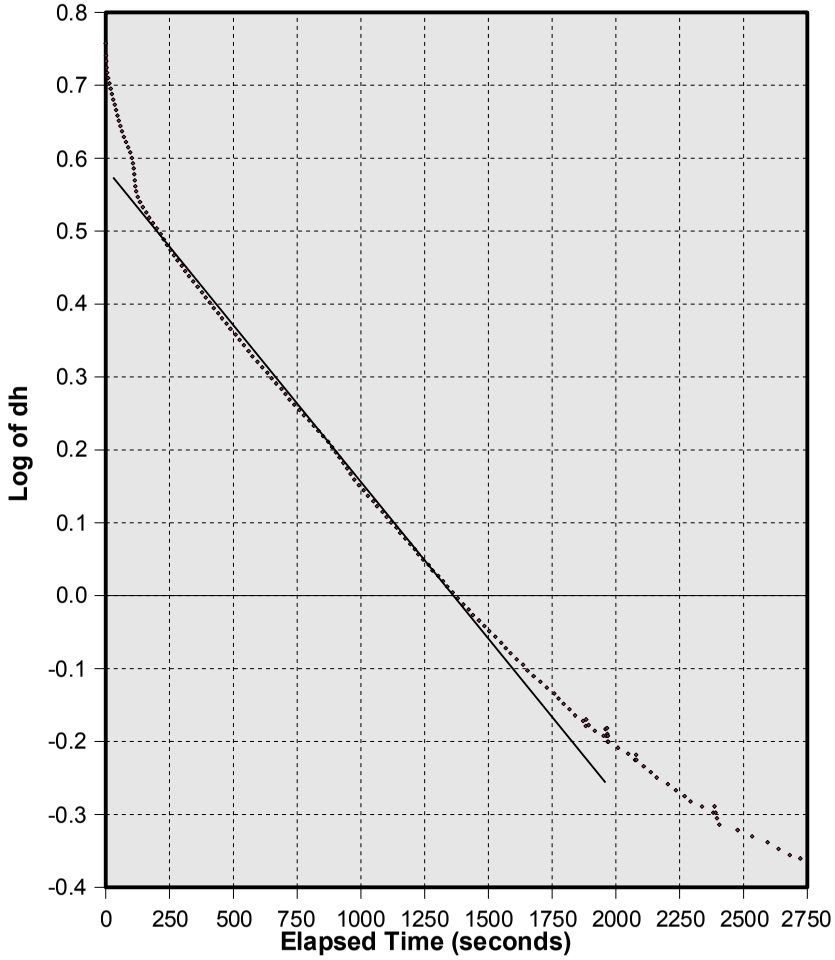
Slug Test P4-5

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 13:53:58	50038.5	2109.0	8.95	8.77	0.58	-0.23
3/15/2006 13:54:26	50066.0	2136.5	8.96	8.78	0.57	-0.24
3/15/2006 13:54:49	50089.0	2159.5	8.97	8.79	0.56	-0.25
3/15/2006 13:55:33	50133.0	2203.5	8.98	8.80	0.55	-0.26
3/15/2006 13:56:04	50164.0	2234.5	8.99	8.81	0.54	-0.27
3/15/2006 13:56:38	50198.5	2269.0	9.00	8.82	0.53	-0.27
3/15/2006 13:57:02	50222.0	2292.5	9.01	8.83	0.52	-0.28
3/15/2006 13:57:46	50266.5	2337.0	9.02	8.84	0.51	-0.29
3/15/2006 13:58:30	50310.5	2381.0	9.03	8.85	0.50	-0.30
3/15/2006 13:58:36	50316.0	2386.5	9.02	8.84	0.51	-0.29
3/15/2006 13:58:40	50320.5	2391.0	9.03	8.85	0.50	-0.30
3/15/2006 13:58:45	50325.0	2395.5	9.04	8.86	0.50	-0.31
3/15/2006 13:58:54	50334.5	2405.0	9.05	8.87	0.49	-0.31
3/15/2006 14:00:06	50406.5	2477.0	9.06	8.88	0.48	-0.32
3/15/2006 14:01:03	50463.5	2534.0	9.07	8.89	0.47	-0.33
3/15/2006 14:02:04	50524.0	2594.5	9.08	8.89	0.46	-0.34
3/15/2006 14:02:46	50566.5	2637.0	9.09	8.90	0.45	-0.35
3/15/2006 14:03:30	50610.5	2681.0	9.10	8.91	0.44	-0.36
3/15/2006 14:04:12	50652.0	2722.5	9.10	8.92	0.44	-0.36

Slug Test P4-5

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	35.96	ft
Stick up height:	2.41	ft
Depth to sand pack (BGS):	18.00	ft
Depth to screened interval (BGS):	20.96	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	25.25	ft
Initial Head Change:	5.72	ft
Total well length:	38.37	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.2061	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	15.00	ft
Length of open section (L_e):	13.12	ft
L_e / r_w:	37.0447	
A (dimensionless):	2.753	
B (dimensionless):	0.460	
Drawdown at time = 0 (y_0):	3.05	ft
Drawdown at time = t (y_t):	0.96	ft
Elapsed Time between y_0 and y_t (t):	1185	sec
Initial water column in well (L_w):	13.12	ft
$\ln(R_e/r_w)$ =	2.21	
K =	3.48E-06	ft/sec
	1.06E-04	**cm/sec**
	109.78	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P4-6

Initial offset in logger reading (feet):	0.123	Date:	03/31/2006
Offset increment in logger reading (feet/sec):	0.000045		
Initial depth to water table (feet):	10.31		
Depth of probe below water table (feet):	8.60		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 15:58:13	57493.0	0.0	3.25	3.11	5.49	0.74
3/31/2006 15:58:14	57494.0	1.0	3.42	3.29	5.32	0.73
3/31/2006 15:58:14	57494.5	1.5	3.57	3.44	5.17	0.71
3/31/2006 15:58:15	57495.0	2.0	3.71	3.58	5.03	0.70
3/31/2006 15:58:15	57495.5	2.5	3.85	3.71	4.89	0.69
3/31/2006 15:58:16	57496.0	3.0	3.97	3.84	4.76	0.68
3/31/2006 15:58:16	57496.5	3.5	4.09	3.96	4.65	0.67
3/31/2006 15:58:17	57497.0	4.0	4.20	4.07	4.53	0.66
3/31/2006 15:58:17	57497.5	4.5	4.31	4.17	4.43	0.65
3/31/2006 15:58:18	57498.5	5.5	4.50	4.36	4.24	0.63
3/31/2006 15:58:19	57499.5	6.5	4.67	4.54	4.06	0.61
3/31/2006 15:58:20	57500.5	7.5	4.83	4.70	3.91	0.59
3/31/2006 15:58:21	57501.5	8.5	4.97	4.84	3.76	0.58
3/31/2006 15:58:22	57502.5	9.5	5.11	4.98	3.63	0.56
3/31/2006 15:58:23	57503.5	10.5	5.24	5.11	3.50	0.54
3/31/2006 15:58:24	57504.5	11.5	5.36	5.22	3.38	0.53
3/31/2006 15:58:25	57505.5	12.5	5.47	5.34	3.27	0.51
3/31/2006 15:58:26	57506.5	13.5	5.58	5.44	3.16	0.50
3/31/2006 15:58:27	57507.5	14.5	5.68	5.54	3.06	0.49
3/31/2006 15:58:28	57508.5	15.5	5.77	5.64	2.96	0.47
3/31/2006 15:58:29	57509.5	16.5	5.86	5.73	2.87	0.46
3/31/2006 15:58:30	57510.5	17.5	5.95	5.82	2.79	0.44
3/31/2006 15:58:31	57511.5	18.5	6.03	5.90	2.70	0.43
3/31/2006 15:58:32	57512.5	19.5	6.11	5.98	2.62	0.42
3/31/2006 15:58:33	57513.5	20.5	6.19	6.06	2.55	0.41
3/31/2006 15:58:34	57514.5	21.5	6.26	6.13	2.48	0.39
3/31/2006 15:58:35	57515.5	22.5	6.33	6.20	2.41	0.38
3/31/2006 15:58:36	57516.5	23.5	6.40	6.27	2.34	0.37
3/31/2006 15:58:37	57517.5	24.5	6.46	6.33	2.27	0.36
3/31/2006 15:58:38	57518.5	25.5	6.52	6.39	2.21	0.35
3/31/2006 15:58:39	57519.5	26.5	6.58	6.45	2.15	0.33
3/31/2006 15:58:40	57520.5	27.5	6.64	6.51	2.10	0.32
3/31/2006 15:58:41	57521.5	28.5	6.70	6.56	2.04	0.31
3/31/2006 15:58:42	57522.5	29.5	6.75	6.62	1.98	0.30
3/31/2006 15:58:43	57523.5	30.5	6.80	6.67	1.93	0.29
3/31/2006 15:58:44	57524.5	31.5	6.85	6.72	1.88	0.27
3/31/2006 15:58:45	57525.5	32.5	6.90	6.77	1.83	0.26
3/31/2006 15:58:46	57526.5	33.5	6.95	6.82	1.79	0.25
3/31/2006 15:58:47	57527.5	34.5	7.00	6.86	1.74	0.24
3/31/2006 15:58:48	57528.5	35.5	7.04	6.91	1.70	0.23
3/31/2006 15:58:49	57529.5	36.5	7.08	6.95	1.65	0.22
3/31/2006 15:58:51	57531.0	38.0	7.14	7.00	1.60	0.20
3/31/2006 15:58:52	57532.0	39.0	7.17	7.04	1.56	0.19
3/31/2006 15:58:53	57533.5	40.5	7.23	7.09	1.51	0.18

Slug Test P4-6

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 15:58:55	57535.0	42.0	7.27	7.13	1.47	0.17
3/31/2006 15:58:56	57536.5	43.5	7.31	7.17	1.43	0.16
3/31/2006 15:58:58	57538.0	45.0	7.34	7.21	1.39	0.14
3/31/2006 15:59:00	57540.0	47.0	7.38	7.24	1.36	0.13
3/31/2006 15:59:02	57542.5	49.5	7.42	7.28	1.32	0.12
3/31/2006 15:59:04	57544.5	51.5	7.45	7.31	1.29	0.11
3/31/2006 15:59:07	57547.5	54.5	7.49	7.35	1.25	0.10
3/31/2006 15:59:10	57550.5	57.5	7.52	7.39	1.22	0.09
3/31/2006 15:59:13	57553.5	60.5	7.55	7.42	1.19	0.07
3/31/2006 15:59:17	57557.0	64.0	7.58	7.45	1.16	0.06
3/31/2006 15:59:20	57560.5	67.5	7.61	7.47	1.13	0.05
3/31/2006 15:59:25	57565.0	72.0	7.64	7.50	1.10	0.04
3/31/2006 15:59:29	57569.0	76.0	7.66	7.53	1.08	0.03
3/31/2006 15:59:33	57573.0	80.0	7.69	7.56	1.05	0.02
3/31/2006 15:59:38	57578.0	85.0	7.72	7.58	1.02	0.01
3/31/2006 15:59:41	57581.5	88.5	7.74	7.61	1.00	0.00
3/31/2006 15:59:45	57585.5	92.5	7.76	7.63	0.98	-0.01
3/31/2006 15:59:49	57589.5	96.5	7.79	7.65	0.95	-0.02
3/31/2006 15:59:54	57594.0	101.0	7.81	7.68	0.93	-0.03
3/31/2006 15:59:58	57598.5	105.5	7.84	7.70	0.90	-0.04
3/31/2006 16:00:03	57603.0	110.0	7.86	7.72	0.88	-0.05
3/31/2006 16:00:08	57608.0	115.0	7.88	7.74	0.86	-0.06
3/31/2006 16:00:12	57612.0	119.0	7.90	7.76	0.84	-0.07
3/31/2006 16:00:17	57617.0	124.0	7.92	7.78	0.82	-0.09
3/31/2006 16:00:21	57621.5	128.5	7.94	7.80	0.80	-0.10
3/31/2006 16:00:25	57625.5	132.5	7.96	7.82	0.78	-0.11
3/31/2006 16:00:30	57630.0	137.0	7.98	7.84	0.76	-0.12
3/31/2006 16:00:34	57634.0	141.0	8.00	7.86	0.74	-0.13
3/31/2006 16:00:38	57638.5	145.5	8.02	7.88	0.72	-0.14
3/31/2006 16:00:42	57642.0	149.0	8.04	7.90	0.71	-0.15
3/31/2006 16:00:46	57646.0	153.0	8.05	7.92	0.69	-0.16
3/31/2006 16:00:48	57648.0	155.0	8.07	7.93	0.67	-0.17
3/31/2006 16:00:51	57651.0	158.0	8.09	7.95	0.66	-0.18
3/31/2006 16:00:54	57654.0	161.0	8.11	7.97	0.64	-0.20
3/31/2006 16:00:57	57657.0	164.0	8.12	7.98	0.62	-0.21
3/31/2006 16:01:00	57660.0	167.0	8.14	8.00	0.60	-0.22
3/31/2006 16:01:03	57663.0	170.0	8.15	8.01	0.59	-0.23
3/31/2006 16:01:06	57666.0	173.0	8.17	8.03	0.58	-0.24
3/31/2006 16:01:09	57669.0	176.0	8.18	8.04	0.56	-0.25
3/31/2006 16:01:13	57673.0	180.0	8.20	8.06	0.55	-0.26
3/31/2006 16:01:16	57676.5	183.5	8.21	8.07	0.53	-0.27
3/31/2006 16:01:21	57681.0	188.0	8.22	8.08	0.52	-0.28
3/31/2006 16:01:24	57684.0	191.0	8.24	8.10	0.51	-0.29
3/31/2006 16:01:28	57688.5	195.5	8.25	8.11	0.49	-0.31
3/31/2006 16:01:33	57693.5	200.5	8.26	8.12	0.48	-0.32
3/31/2006 16:01:37	57697.0	204.0	8.27	8.13	0.47	-0.33
3/31/2006 16:01:41	57701.0	208.0	8.29	8.15	0.46	-0.34
3/31/2006 16:01:46	57706.5	213.5	8.30	8.16	0.44	-0.35
3/31/2006 16:01:52	57712.5	219.5	8.31	8.17	0.43	-0.37

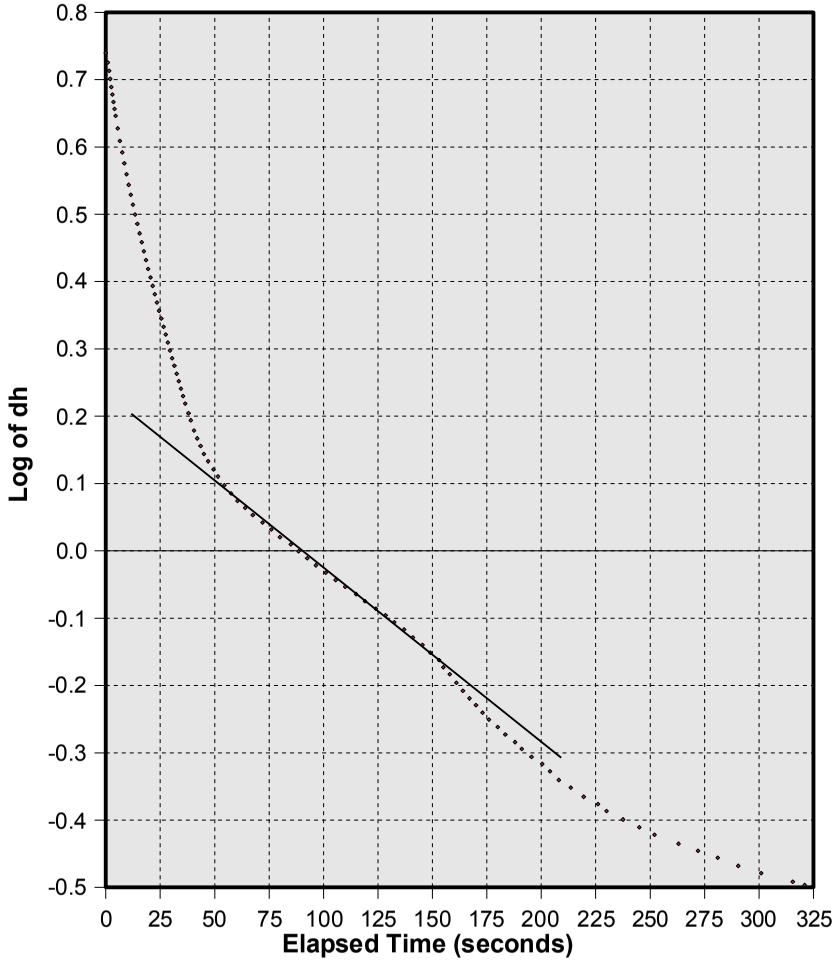
Slug Test P4-6

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 16:01:59	57719.0	226.0	8.33	8.18	0.42	-0.38
3/31/2006 16:02:03	57723.0	230.0	8.34	8.19	0.41	-0.39
3/31/2006 16:02:10	57730.5	237.5	8.35	8.20	0.40	-0.40
3/31/2006 16:02:18	57738.0	245.0	8.36	8.21	0.39	-0.41
3/31/2006 16:02:25	57745.0	252.0	8.37	8.22	0.38	-0.42
3/31/2006 16:02:36	57756.0	263.0	8.38	8.24	0.37	-0.44
3/31/2006 16:02:45	57765.0	272.0	8.39	8.24	0.36	-0.45
3/31/2006 16:02:54	57774.0	281.0	8.40	8.25	0.35	-0.46
3/31/2006 16:03:03	57783.5	290.5	8.41	8.26	0.34	-0.47
3/31/2006 16:03:14	57794.0	301.0	8.42	8.27	0.33	-0.48
3/31/2006 16:03:28	57808.5	315.5	8.43	8.28	0.32	-0.49
3/31/2006 16:03:34	57814.0	321.0	8.43	8.28	0.32	-0.50

Slug Test P4-6

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	20.24	ft
Stick up height:	1.62	ft
Depth to sand pack (BGS):	5.00	ft
Depth to screened interval (BGS):	7.24	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	10.31	ft
Initial Head Change:	5.49	ft
Total well length:	21.86	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.2061	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	13.00	ft
Length of open section (L_e):	11.55	ft
L_e / r_w:	32.6118	
A (dimensionless):	2.668	
B (dimensionless):	0.445	
Drawdown at time = 0 (y_0):	1.31	ft
Drawdown at time = t (y_t):	0.66	ft
Elapsed Time between y_0 and y_t (t):	107	sec
Initial water column in well (L_w):	11.55	ft
$\ln(R_e/r_w)$ =	2.09	
K =	2.45E-05	ft/sec
	7.46E-04	**cm/sec**
	771.83	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P4-7D

Initial offset in logger reading (feet):	0.011	Date:	02/23/2005
Offset increment in logger reading (feet/sec):	0.000014		
Initial depth to water table (feet):	10.11		
Depth of probe below water table (feet):	3.17		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
2/23/2005 10:56:04	39364.0	0.0	9.90	9.88	6.71	0.83
2/23/2005 10:56:06	39366.5	2.5	9.73	9.71	6.54	0.82
2/23/2005 10:56:10	39370.5	6.5	9.56	9.54	6.38	0.80
2/23/2005 10:56:14	39374.0	10.0	9.41	9.40	6.23	0.79
2/23/2005 10:56:18	39378.0	14.0	9.25	9.24	6.07	0.78
2/23/2005 10:56:21	39381.5	17.5	9.12	9.10	5.93	0.77
2/23/2005 10:56:25	39385.5	21.5	8.96	8.94	5.78	0.76
2/23/2005 10:56:29	39389.5	25.5	8.81	8.79	5.62	0.75
2/23/2005 10:56:33	39393.5	29.5	8.66	8.64	5.48	0.74
2/23/2005 10:56:37	39397.5	33.5	8.52	8.51	5.34	0.73
2/23/2005 10:56:41	39401.0	37.0	8.40	8.38	5.21	0.72
2/23/2005 10:56:44	39404.5	40.5	8.28	8.26	5.09	0.71
2/23/2005 10:56:48	39408.0	44.0	8.16	8.14	4.97	0.70
2/23/2005 10:56:51	39411.5	47.5	8.04	8.02	4.86	0.69
2/23/2005 10:56:55	39415.0	51.0	7.93	7.91	4.74	0.68
2/23/2005 10:56:58	39418.5	54.5	7.82	7.80	4.63	0.67
2/23/2005 10:57:02	39422.0	58.0	7.71	7.69	4.52	0.66
2/23/2005 10:57:05	39425.5	61.5	7.60	7.58	4.41	0.64
2/23/2005 10:57:09	39429.0	65.0	7.49	7.47	4.30	0.63
2/23/2005 10:57:12	39432.5	68.5	7.39	7.37	4.20	0.62
2/23/2005 10:57:16	39436.0	72.0	7.28	7.26	4.10	0.61
2/23/2005 10:57:19	39439.5	75.5	7.18	7.16	4.00	0.60
2/23/2005 10:57:23	39443.0	79.0	7.08	7.06	3.90	0.59
2/23/2005 10:57:26	39446.5	82.5	6.99	6.97	3.80	0.58
2/23/2005 10:57:30	39450.0	86.0	6.89	6.87	3.70	0.57
2/23/2005 10:57:33	39453.5	89.5	6.80	6.78	3.61	0.56
2/23/2005 10:57:36	39456.5	92.5	6.72	6.70	3.53	0.55
2/23/2005 10:57:40	39460.0	96.0	6.63	6.61	3.44	0.54
2/23/2005 10:57:43	39463.0	99.0	6.55	6.53	3.36	0.53
2/23/2005 10:57:46	39466.5	102.5	6.46	6.44	3.27	0.51
2/23/2005 10:57:50	39470.0	106.0	6.37	6.35	3.18	0.50
2/23/2005 10:57:53	39473.5	109.5	6.29	6.27	3.10	0.49
2/23/2005 10:57:57	39477.0	113.0	6.21	6.19	3.02	0.48
2/23/2005 10:58:00	39480.0	116.0	6.14	6.12	2.95	0.47
2/23/2005 10:58:03	39483.5	119.5	6.06	6.04	2.87	0.46
2/23/2005 10:58:06	39486.5	122.5	5.99	5.97	2.80	0.45
2/23/2005 10:58:09	39489.5	125.5	5.92	5.90	2.74	0.44
2/23/2005 10:58:12	39492.5	128.5	5.86	5.84	2.67	0.43
2/23/2005 10:58:15	39495.5	131.5	5.80	5.78	2.61	0.42
2/23/2005 10:58:18	39498.5	134.5	5.73	5.71	2.55	0.41
2/23/2005 10:58:21	39501.5	137.5	5.67	5.65	2.48	0.39
2/23/2005 10:58:24	39504.5	140.5	5.61	5.59	2.42	0.38
2/23/2005 10:58:27	39507.5	143.5	5.55	5.53	2.36	0.37
2/23/2005 10:58:30	39510.5	146.5	5.49	5.47	2.31	0.36

Slug Test P4-7D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
2/23/2005 10:58:33	39513.5	149.5	5.44	5.42	2.25	0.35
2/23/2005 10:58:36	39516.5	152.5	5.38	5.36	2.19	0.34
2/23/2005 10:58:39	39519.5	155.5	5.32	5.30	2.13	0.33
2/23/2005 10:58:42	39522.5	158.5	5.27	5.25	2.08	0.32
2/23/2005 10:58:45	39525.5	161.5	5.21	5.19	2.03	0.31
2/23/2005 10:58:48	39528.5	164.5	5.16	5.14	1.97	0.30
2/23/2005 10:58:51	39531.5	167.5	5.11	5.09	1.92	0.28
2/23/2005 10:58:54	39534.5	170.5	5.06	5.04	1.87	0.27
2/23/2005 10:58:57	39537.5	173.5	5.01	4.99	1.82	0.26
2/23/2005 10:59:00	39540.5	176.5	4.96	4.94	1.77	0.25
2/23/2005 10:59:03	39543.5	179.5	4.92	4.90	1.73	0.24
2/23/2005 10:59:06	39546.0	182.0	4.88	4.86	1.69	0.23
2/23/2005 10:59:09	39549.0	185.0	4.83	4.81	1.64	0.22
2/23/2005 10:59:11	39551.5	187.5	4.79	4.77	1.60	0.20
2/23/2005 10:59:14	39554.0	190.0	4.75	4.73	1.56	0.19
2/23/2005 10:59:17	39557.0	193.0	4.71	4.69	1.52	0.18
2/23/2005 10:59:19	39559.5	195.5	4.67	4.65	1.49	0.17
2/23/2005 10:59:22	39562.0	198.0	4.64	4.62	1.45	0.16
2/23/2005 10:59:24	39564.5	200.5	4.60	4.58	1.41	0.15
2/23/2005 10:59:27	39567.5	203.5	4.57	4.55	1.38	0.14
2/23/2005 10:59:30	39570.0	206.0	4.53	4.51	1.34	0.13
2/23/2005 10:59:33	39573.0	209.0	4.49	4.47	1.30	0.11
2/23/2005 10:59:36	39576.0	212.0	4.46	4.43	1.27	0.10
2/23/2005 10:59:38	39578.5	214.5	4.42	4.40	1.23	0.09
2/23/2005 10:59:41	39581.0	217.0	4.39	4.37	1.20	0.08
2/23/2005 10:59:43	39583.5	219.5	4.36	4.34	1.17	0.07
2/23/2005 10:59:46	39586.5	222.5	4.33	4.31	1.14	0.06
2/23/2005 10:59:49	39589.0	225.0	4.30	4.28	1.11	0.05
2/23/2005 10:59:51	39591.5	227.5	4.27	4.25	1.09	0.04
2/23/2005 10:59:54	39594.0	230.0	4.25	4.23	1.06	0.02
2/23/2005 10:59:56	39596.5	232.5	4.22	4.20	1.03	0.01
2/23/2005 10:59:59	39599.0	235.0	4.19	4.17	1.00	0.00
2/23/2005 11:00:01	39601.5	237.5	4.17	4.15	0.98	-0.01
2/23/2005 11:00:04	39604.0	240.0	4.14	4.12	0.95	-0.02
2/23/2005 11:00:06	39606.5	242.5	4.12	4.10	0.93	-0.03
2/23/2005 11:00:09	39609.0	245.0	4.09	4.07	0.90	-0.04
2/23/2005 11:00:11	39611.0	247.0	4.07	4.05	0.88	-0.05
2/23/2005 11:00:13	39613.5	249.5	4.05	4.03	0.86	-0.06
2/23/2005 11:00:16	39616.0	252.0	4.03	4.01	0.84	-0.08
2/23/2005 11:00:18	39618.5	254.5	4.00	3.98	0.81	-0.09
2/23/2005 11:00:21	39621.0	257.0	3.98	3.96	0.79	-0.10
2/23/2005 11:00:23	39623.5	259.5	3.96	3.94	0.77	-0.11
2/23/2005 11:00:26	39626.0	262.0	3.94	3.92	0.75	-0.13
2/23/2005 11:00:28	39628.5	264.5	3.92	3.90	0.73	-0.14
2/23/2005 11:00:30	39630.5	266.5	3.90	3.88	0.71	-0.15
2/23/2005 11:00:33	39633.0	269.0	3.88	3.86	0.69	-0.16
2/23/2005 11:00:35	39635.5	271.5	3.87	3.84	0.68	-0.17
2/23/2005 11:00:38	39638.0	274.0	3.85	3.83	0.66	-0.18
2/23/2005 11:00:40	39640.5	276.5	3.83	3.81	0.64	-0.19

Slug Test P4-7D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
2/23/2005 11:00:42	39642.5	278.5	3.82	3.79	0.63	-0.20
2/23/2005 11:00:45	39645.0	281.0	3.80	3.78	0.61	-0.22
2/23/2005 11:00:47	39647.5	283.5	3.78	3.76	0.59	-0.23
2/23/2005 11:00:49	39649.5	285.5	3.77	3.74	0.58	-0.24
2/23/2005 11:00:52	39652.0	288.0	3.75	3.73	0.56	-0.25
2/23/2005 11:00:54	39654.0	290.0	3.74	3.71	0.55	-0.26
2/23/2005 11:00:56	39656.5	292.5	3.72	3.70	0.53	-0.27
2/23/2005 11:00:58	39658.5	294.5	3.71	3.69	0.52	-0.29
2/23/2005 11:01:02	39662.0	298.0	3.69	3.67	0.50	-0.30
2/23/2005 11:01:04	39664.0	300.0	3.68	3.65	0.49	-0.31
2/23/2005 11:01:07	39667.0	303.0	3.67	3.64	0.47	-0.32
2/23/2005 11:01:08	39668.5	304.5	3.65	3.63	0.46	-0.33
2/23/2005 11:01:12	39672.0	308.0	3.64	3.62	0.45	-0.34
2/23/2005 11:01:13	39673.5	309.5	3.63	3.61	0.44	-0.36
2/23/2005 11:01:16	39676.5	312.5	3.62	3.60	0.43	-0.37
2/23/2005 11:01:19	39679.0	315.0	3.60	3.58	0.41	-0.38
2/23/2005 11:01:22	39682.0	318.0	3.59	3.57	0.40	-0.39
2/23/2005 11:01:24	39684.0	320.0	3.58	3.56	0.39	-0.41
2/23/2005 11:01:26	39686.5	322.5	3.57	3.55	0.38	-0.42
2/23/2005 11:01:29	39689.0	325.0	3.56	3.54	0.37	-0.43
2/23/2005 11:01:31	39691.0	327.0	3.55	3.53	0.36	-0.45
2/23/2005 11:01:34	39694.5	330.5	3.54	3.52	0.35	-0.46
2/23/2005 11:01:36	39696.5	332.5	3.53	3.51	0.34	-0.47
2/23/2005 11:01:39	39699.0	335.0	3.52	3.50	0.33	-0.48
2/23/2005 11:01:43	39703.0	339.0	3.51	3.49	0.32	-0.50
2/23/2005 11:01:46	39706.0	342.0	3.50	3.48	0.31	-0.51
2/23/2005 11:01:48	39708.0	344.0	3.49	3.47	0.30	-0.52
2/23/2005 11:01:51	39711.0	347.0	3.49	3.46	0.29	-0.53
2/23/2005 11:01:53	39713.5	349.5	3.48	3.46	0.29	-0.54
2/23/2005 11:01:55	39715.5	351.5	3.47	3.45	0.28	-0.55
2/23/2005 11:01:58	39718.5	354.5	3.46	3.44	0.27	-0.56
2/23/2005 11:02:00	39720.5	356.5	3.46	3.43	0.27	-0.57
2/23/2005 11:02:03	39723.0	359.0	3.45	3.43	0.26	-0.59
2/23/2005 11:02:06	39726.0	362.0	3.44	3.42	0.25	-0.60
2/23/2005 11:02:08	39728.5	364.5	3.44	3.41	0.25	-0.61
2/23/2005 11:02:11	39731.5	367.5	3.43	3.41	0.24	-0.62
2/23/2005 11:02:15	39735.0	371.0	3.42	3.40	0.23	-0.64
2/23/2005 11:02:17	39737.5	373.5	3.42	3.39	0.22	-0.65
2/23/2005 11:02:22	39742.0	378.0	3.41	3.38	0.22	-0.66
2/23/2005 11:02:24	39744.5	380.5	3.40	3.38	0.21	-0.68
2/23/2005 11:02:26	39746.0	382.0	3.40	3.37	0.20	-0.69
2/23/2005 11:02:31	39751.0	387.0	3.39	3.37	0.20	-0.70
2/23/2005 11:02:35	39755.5	391.5	3.38	3.36	0.19	-0.72
2/23/2005 11:02:40	39760.0	396.0	3.38	3.35	0.18	-0.73
2/23/2005 11:02:43	39763.0	399.0	3.37	3.35	0.18	-0.75
2/23/2005 11:02:46	39766.5	402.5	3.36	3.34	0.17	-0.76
2/23/2005 11:02:51	39771.5	407.5	3.36	3.34	0.17	-0.77
2/23/2005 11:02:53	39773.0	409.0	3.36	3.33	0.16	-0.79
2/23/2005 11:02:59	39779.0	415.0	3.35	3.33	0.16	-0.80

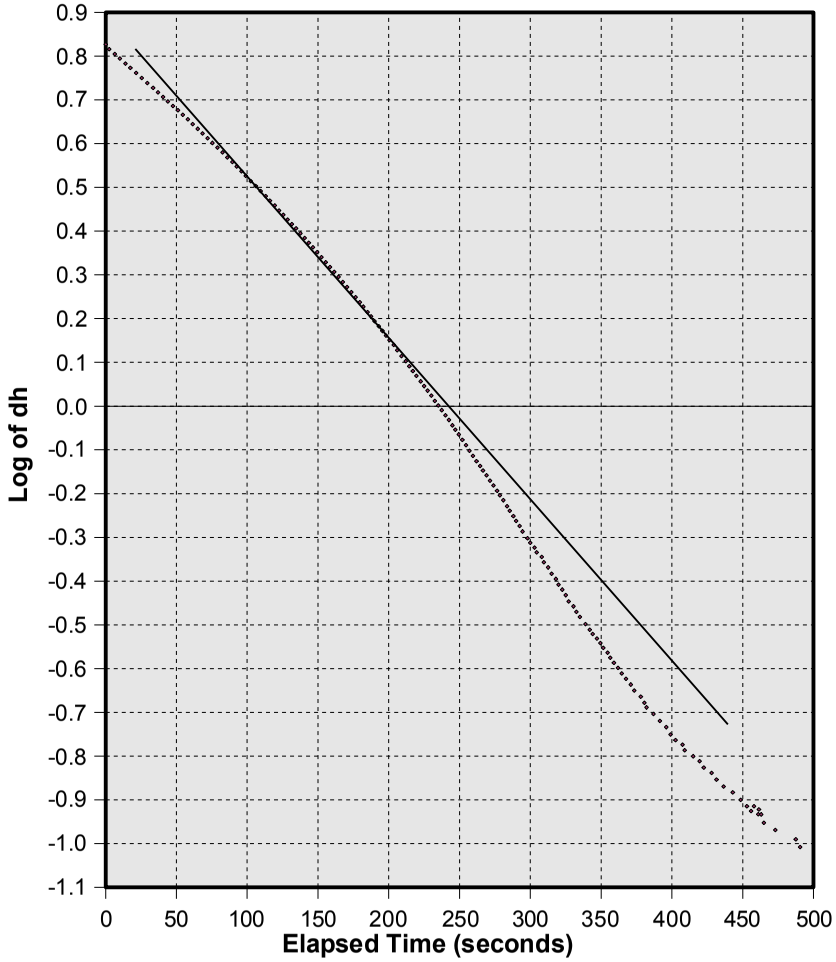
Slug Test P4-7D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
2/23/2005 11:03:03	39783.5	419.5	3.35	3.32	0.15	-0.81
2/23/2005 11:03:06	39786.5	422.5	3.34	3.32	0.15	-0.83
2/23/2005 11:03:12	39792.0	428.0	3.34	3.31	0.15	-0.84
2/23/2005 11:03:15	39795.5	431.5	3.33	3.31	0.14	-0.85
2/23/2005 11:03:20	39800.5	436.5	3.33	3.30	0.14	-0.87
2/23/2005 11:03:27	39807.0	443.0	3.32	3.30	0.13	-0.88
2/23/2005 11:03:32	39812.5	448.5	3.32	3.29	0.13	-0.90
2/23/2005 11:03:37	39817.0	453.0	3.31	3.29	0.12	-0.91
2/23/2005 11:03:40	39820.0	456.0	3.31	3.29	0.12	-0.93
2/23/2005 11:03:42	39822.0	458.0	3.31	3.29	0.12	-0.91
2/23/2005 11:03:45	39825.0	461.0	3.31	3.28	0.12	-0.93
2/23/2005 11:03:45	39825.5	461.5	3.31	3.29	0.12	-0.92
2/23/2005 11:03:47	39827.0	463.0	3.31	3.28	0.12	-0.93
2/23/2005 11:03:49	39829.0	465.0	3.30	3.28	0.11	-0.95
2/23/2005 11:03:57	39837.0	473.0	3.30	3.28	0.11	-0.97
2/23/2005 11:04:11	39851.5	487.5	3.30	3.27	0.10	-0.99
2/23/2005 11:04:14	39854.5	490.5	3.29	3.27	0.10	-1.01

Slug Test P4-7D

Slug Test by Bouwer and Rice

Displacement Method:	Injection	
Well depth:	39.44	ft
Stick up height:	2.40	ft
Depth to sand pack (BGS):	32.00	ft
Depth to screened interval (BGS):	34.44	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	10.11	ft
Initial Head Change:	6.71	ft
Total well length:	41.84	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.0833	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	5.00	ft
Length of open section (L_e):	5.00	ft
L_e / r_w:	14.1176	
A (dimensionless):	2.052	
B (dimensionless):	0.327	
Drawdown at time = 0 (y_0):	3.23	ft
Drawdown at time = t (y_t):	1.00	ft
Elapsed Time between y_0 and y_t (t):	131.5	sec
Initial water column in well (L_w):	31.73	ft
$\ln(R_e/r_w)$ =	1.89	
K =	1.17E-05	ft/sec
	3.58E-04	**cm/sec**
	369.91	ft/yr



Water above sand pack:	Yes
%Duration below sand pack:	0.00%
Water above screen:	Yes
%Duration below screen:	0.00%

Slug Test P4-7S

Initial offset in logger reading (feet):	0.143	Date:	03/31/2006
Offset increment in logger reading (feet/sec):	0.000035		
Initial depth to water table (feet):	9.59		
Depth of probe below water table (feet):	7.00		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 15:45:08	56708.5	0.0	1.17	1.03	5.98	0.78
3/31/2006 15:45:09	56709.5	1.0	1.28	1.13	5.87	0.77
3/31/2006 15:45:10	56710.0	1.5	1.40	1.25	5.76	0.76
3/31/2006 15:45:10	56710.5	2.0	1.52	1.37	5.63	0.75
3/31/2006 15:45:11	56711.0	2.5	1.64	1.49	5.51	0.74
3/31/2006 15:45:11	56711.5	3.0	1.76	1.61	5.39	0.73
3/31/2006 15:45:12	56712.0	3.5	1.86	1.71	5.29	0.72
3/31/2006 15:45:12	56712.5	4.0	1.96	1.81	5.20	0.72
3/31/2006 15:45:13	56713.0	4.5	2.05	1.90	5.11	0.71
3/31/2006 15:45:13	56713.5	5.0	2.13	1.98	5.03	0.70
3/31/2006 15:45:14	56714.0	5.5	2.21	2.06	4.95	0.69
3/31/2006 15:45:14	56714.5	6.0	2.28	2.13	4.87	0.69
3/31/2006 15:45:15	56715.0	6.5	2.36	2.21	4.80	0.68
3/31/2006 15:45:15	56715.5	7.0	2.43	2.28	4.72	0.67
3/31/2006 15:45:16	56716.0	7.5	2.50	2.35	4.66	0.67
3/31/2006 15:45:16	56716.5	8.0	2.56	2.42	4.59	0.66
3/31/2006 15:45:17	56717.0	8.5	2.63	2.49	4.52	0.66
3/31/2006 15:45:17	56717.5	9.0	2.70	2.55	4.45	0.65
3/31/2006 15:45:18	56718.0	9.5	2.76	2.62	4.39	0.64
3/31/2006 15:45:18	56718.5	10.0	2.83	2.68	4.33	0.64
3/31/2006 15:45:19	56719.0	10.5	2.89	2.74	4.27	0.63
3/31/2006 15:45:19	56719.5	11.0	2.94	2.80	4.21	0.62
3/31/2006 15:45:20	56720.0	11.5	3.00	2.85	4.15	0.62
3/31/2006 15:45:20	56720.5	12.0	3.06	2.91	4.10	0.61
3/31/2006 15:45:21	56721.0	12.5	3.11	2.96	4.04	0.61
3/31/2006 15:45:21	56721.5	13.0	3.16	3.01	3.99	0.60
3/31/2006 15:45:22	56722.0	13.5	3.22	3.07	3.94	0.60
3/31/2006 15:45:22	56722.5	14.0	3.27	3.12	3.89	0.59
3/31/2006 15:45:23	56723.0	14.5	3.32	3.17	3.83	0.58
3/31/2006 15:45:23	56723.5	15.0	3.37	3.22	3.79	0.58
3/31/2006 15:45:24	56724.0	15.5	3.42	3.27	3.74	0.57
3/31/2006 15:45:24	56724.5	16.0	3.47	3.32	3.69	0.57
3/31/2006 15:45:25	56725.0	16.5	3.52	3.37	3.63	0.56
3/31/2006 15:45:25	56725.5	17.0	3.57	3.42	3.58	0.55
3/31/2006 15:45:26	56726.0	17.5	3.63	3.48	3.53	0.55
3/31/2006 15:45:26	56726.5	18.0	3.68	3.53	3.48	0.54
3/31/2006 15:45:27	56727.0	18.5	3.72	3.57	3.43	0.54
3/31/2006 15:45:27	56727.5	19.0	3.77	3.62	3.38	0.53
3/31/2006 15:45:28	56728.0	19.5	3.81	3.66	3.34	0.52
3/31/2006 15:45:28	56728.5	20.0	3.85	3.70	3.30	0.52
3/31/2006 15:45:29	56729.0	20.5	3.90	3.75	3.26	0.51
3/31/2006 15:45:29	56729.5	21.0	3.94	3.79	3.22	0.51
3/31/2006 15:45:30	56730.0	21.5	3.97	3.82	3.18	0.50
3/31/2006 15:45:31	56731.0	22.5	4.05	3.90	3.11	0.49

Slug Test P4-7S

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 15:45:32	56732.0	23.5	4.11	3.96	3.04	0.48
3/31/2006 15:45:32	56732.5	24.0	4.15	4.00	3.00	0.48
3/31/2006 15:45:33	56733.5	25.0	4.22	4.07	2.94	0.47
3/31/2006 15:45:34	56734.5	26.0	4.28	4.13	2.87	0.46
3/31/2006 15:45:35	56735.0	26.5	4.31	4.16	2.84	0.45
3/31/2006 15:45:36	56736.0	27.5	4.37	4.22	2.78	0.44
3/31/2006 15:45:37	56737.0	28.5	4.43	4.28	2.72	0.44
3/31/2006 15:45:38	56738.0	29.5	4.49	4.34	2.67	0.43
3/31/2006 15:45:39	56739.0	30.5	4.54	4.39	2.61	0.42
3/31/2006 15:45:40	56740.0	31.5	4.59	4.44	2.56	0.41
3/31/2006 15:45:41	56741.0	32.5	4.65	4.50	2.51	0.40
3/31/2006 15:45:42	56742.0	33.5	4.70	4.55	2.46	0.39
3/31/2006 15:45:43	56743.0	34.5	4.75	4.60	2.41	0.38
3/31/2006 15:45:44	56744.0	35.5	4.79	4.64	2.36	0.37
3/31/2006 15:45:45	56745.0	36.5	4.84	4.69	2.32	0.37
3/31/2006 15:45:46	56746.0	37.5	4.88	4.73	2.27	0.36
3/31/2006 15:45:47	56747.0	38.5	4.93	4.78	2.23	0.35
3/31/2006 15:45:48	56748.0	39.5	4.97	4.82	2.19	0.34
3/31/2006 15:45:49	56749.0	40.5	5.01	4.86	2.15	0.33
3/31/2006 15:45:50	56750.0	41.5	5.05	4.90	2.11	0.32
3/31/2006 15:45:51	56751.0	42.5	5.09	4.94	2.07	0.32
3/31/2006 15:45:52	56752.0	43.5	5.13	4.97	2.03	0.31
3/31/2006 15:45:53	56753.0	44.5	5.16	5.01	1.99	0.30
3/31/2006 15:45:54	56754.0	45.5	5.20	5.05	1.96	0.29
3/31/2006 15:45:55	56755.0	46.5	5.23	5.08	1.92	0.28
3/31/2006 15:45:56	56756.0	47.5	5.26	5.11	1.89	0.28
3/31/2006 15:45:57	56757.0	48.5	5.30	5.14	1.86	0.27
3/31/2006 15:45:58	56758.0	49.5	5.33	5.18	1.83	0.26
3/31/2006 15:45:59	56759.0	50.5	5.36	5.21	1.80	0.25
3/31/2006 15:46:00	56760.0	51.5	5.39	5.24	1.77	0.25
3/31/2006 15:46:01	56761.0	52.5	5.42	5.27	1.74	0.24
3/31/2006 15:46:02	56762.0	53.5	5.44	5.29	1.71	0.23
3/31/2006 15:46:03	56763.0	54.5	5.47	5.32	1.68	0.23
3/31/2006 15:46:04	56764.0	55.5	5.50	5.35	1.65	0.22
3/31/2006 15:46:05	56765.0	56.5	5.53	5.38	1.63	0.21
3/31/2006 15:46:06	56766.0	57.5	5.56	5.40	1.60	0.20
3/31/2006 15:46:07	56767.0	58.5	5.58	5.43	1.58	0.20
3/31/2006 15:46:08	56768.0	59.5	5.60	5.45	1.55	0.19
3/31/2006 15:46:09	56769.0	60.5	5.63	5.48	1.53	0.18
3/31/2006 15:46:10	56770.0	61.5	5.65	5.50	1.51	0.18
3/31/2006 15:46:11	56771.0	62.5	5.67	5.52	1.48	0.17
3/31/2006 15:46:12	56772.0	63.5	5.70	5.55	1.46	0.16
3/31/2006 15:46:13	56773.0	64.5	5.72	5.56	1.44	0.16
3/31/2006 15:46:14	56774.0	65.5	5.74	5.59	1.42	0.15
3/31/2006 15:46:15	56775.0	66.5	5.76	5.61	1.40	0.15
3/31/2006 15:46:16	56776.0	67.5	5.78	5.63	1.38	0.14
3/31/2006 15:46:17	56777.0	68.5	5.80	5.65	1.36	0.13
3/31/2006 15:46:18	56778.0	69.5	5.82	5.67	1.34	0.13
3/31/2006 15:46:19	56779.0	70.5	5.83	5.68	1.32	0.12

Slug Test P4-7S

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 15:46:20	56780.0	71.5	5.85	5.70	1.30	0.12
3/31/2006 15:46:21	56781.0	72.5	5.87	5.72	1.29	0.11
3/31/2006 15:46:22	56782.0	73.5	5.89	5.73	1.27	0.10
3/31/2006 15:46:23	56783.0	74.5	5.90	5.75	1.25	0.10
3/31/2006 15:46:24	56784.0	75.5	5.92	5.77	1.23	0.09
3/31/2006 15:46:25	56785.0	76.5	5.94	5.79	1.22	0.09
3/31/2006 15:46:26	56786.0	77.5	5.95	5.80	1.20	0.08
3/31/2006 15:46:27	56787.0	78.5	5.97	5.82	1.19	0.07
3/31/2006 15:46:28	56788.0	79.5	5.98	5.83	1.17	0.07
3/31/2006 15:46:29	56789.0	80.5	6.00	5.85	1.16	0.06
3/31/2006 15:46:30	56790.5	82.0	6.02	5.87	1.14	0.06
3/31/2006 15:46:32	56792.0	83.5	6.04	5.89	1.12	0.05
3/31/2006 15:46:33	56793.0	84.5	6.05	5.90	1.10	0.04
3/31/2006 15:46:34	56794.0	85.5	6.07	5.92	1.09	0.04
3/31/2006 15:46:35	56795.5	87.0	6.09	5.93	1.07	0.03
3/31/2006 15:46:37	56797.0	88.5	6.11	5.95	1.05	0.02
3/31/2006 15:46:38	56798.5	90.0	6.12	5.97	1.04	0.02
3/31/2006 15:46:39	56799.5	91.0	6.13	5.98	1.03	0.01
3/31/2006 15:46:40	56800.5	92.0	6.15	5.99	1.01	0.00
3/31/2006 15:46:42	56802.0	93.5	6.16	6.01	1.00	0.00
3/31/2006 15:46:44	56804.0	95.5	6.18	6.02	0.98	-0.01
3/31/2006 15:46:45	56805.5	97.0	6.19	6.04	0.97	-0.01
3/31/2006 15:46:47	56807.0	98.5	6.20	6.05	0.95	-0.02
3/31/2006 15:46:48	56808.5	100.0	6.22	6.06	0.94	-0.03
3/31/2006 15:46:50	56810.0	101.5	6.23	6.08	0.93	-0.03
3/31/2006 15:46:51	56811.5	103.0	6.24	6.09	0.92	-0.04
3/31/2006 15:46:53	56813.0	104.5	6.25	6.10	0.91	-0.04
3/31/2006 15:46:54	56814.5	106.0	6.26	6.11	0.89	-0.05
3/31/2006 15:46:56	56816.0	107.5	6.28	6.12	0.88	-0.06
3/31/2006 15:46:58	56818.0	109.5	6.29	6.14	0.87	-0.06
3/31/2006 15:46:59	56819.5	111.0	6.30	6.15	0.85	-0.07
3/31/2006 15:47:01	56821.5	113.0	6.32	6.16	0.84	-0.08
3/31/2006 15:47:03	56823.0	114.5	6.33	6.17	0.83	-0.08
3/31/2006 15:47:05	56825.0	116.5	6.34	6.19	0.82	-0.09
3/31/2006 15:47:06	56826.5	118.0	6.35	6.20	0.81	-0.09
3/31/2006 15:47:08	56828.5	120.0	6.36	6.21	0.80	-0.10
3/31/2006 15:47:10	56830.5	122.0	6.37	6.22	0.78	-0.11
3/31/2006 15:47:12	56832.0	123.5	6.39	6.23	0.77	-0.11
3/31/2006 15:47:14	56834.0	125.5	6.40	6.24	0.76	-0.12
3/31/2006 15:47:16	56836.0	127.5	6.40	6.25	0.75	-0.12
3/31/2006 15:47:18	56838.5	130.0	6.41	6.26	0.74	-0.13
3/31/2006 15:47:20	56840.5	132.0	6.42	6.27	0.73	-0.13
3/31/2006 15:47:23	56843.0	134.5	6.43	6.28	0.73	-0.14
3/31/2006 15:47:26	56846.0	137.5	6.44	6.29	0.72	-0.15
3/31/2006 15:47:29	56849.0	140.5	6.45	6.30	0.70	-0.15
3/31/2006 15:47:33	56853.0	144.5	6.46	6.31	0.70	-0.16
3/31/2006 15:47:36	56856.5	148.0	6.47	6.32	0.69	-0.16
3/31/2006 15:47:40	56860.0	151.5	6.48	6.33	0.68	-0.17
3/31/2006 15:47:43	56863.5	155.0	6.49	6.34	0.67	-0.18

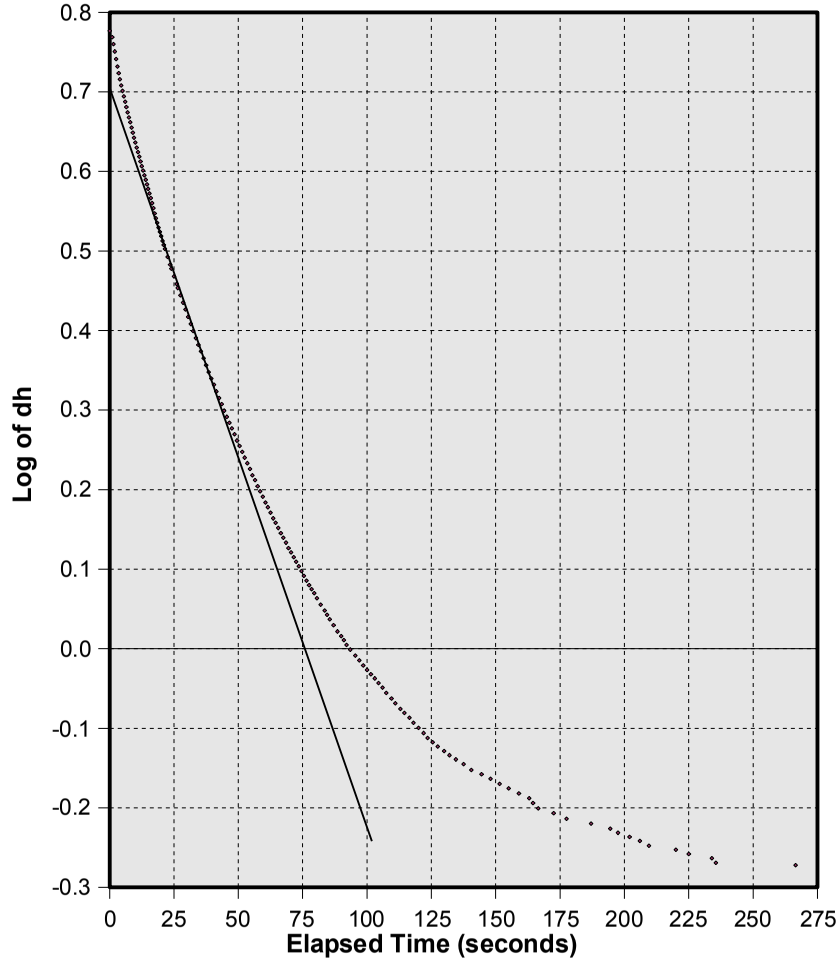
Slug Test P4-7S

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 15:47:47	56867.5	159.0	6.50	6.35	0.66	-0.18
3/31/2006 15:47:51	56871.5	163.0	6.51	6.36	0.65	-0.19
3/31/2006 15:47:53	56873.0	164.5	6.52	6.36	0.64	-0.19
3/31/2006 15:47:55	56875.0	166.5	6.53	6.37	0.63	-0.20
3/31/2006 15:48:01	56881.0	172.5	6.54	6.38	0.62	-0.21
3/31/2006 15:48:06	56886.0	177.5	6.55	6.39	0.61	-0.21
3/31/2006 15:48:15	56895.5	187.0	6.56	6.40	0.60	-0.22
3/31/2006 15:48:23	56903.0	194.5	6.57	6.41	0.59	-0.23
3/31/2006 15:48:26	56906.0	197.5	6.57	6.42	0.59	-0.23
3/31/2006 15:48:30	56910.5	202.0	6.58	6.42	0.58	-0.24
3/31/2006 15:48:34	56914.5	206.0	6.59	6.43	0.57	-0.24
3/31/2006 15:48:38	56918.0	209.5	6.60	6.44	0.57	-0.25
3/31/2006 15:48:48	56928.5	220.0	6.60	6.45	0.56	-0.25
3/31/2006 15:48:53	56933.5	225.0	6.61	6.45	0.55	-0.26
3/31/2006 15:49:02	56942.5	234.0	6.62	6.46	0.55	-0.26
3/31/2006 15:49:04	56944.0	235.5	6.62	6.47	0.54	-0.27
3/31/2006 15:49:35	56975.0	266.5	6.63	6.47	0.53	-0.27

Slug Test P4-7S

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	17.05	ft
Stick up height:	2.55	ft
Depth to sand pack (BGS):	4.00	ft
Depth to screened interval (BGS):	7.05	ft
Well diameter:	5.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	9.59	ft
Initial Head Change:	5.98	ft
Total well length:	19.60	ft
Radius of well casing:	0.2083	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2608	ft
r_c:	0.2608	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	10.00	ft
Length of open section (L_e):	10.00	ft
L_e / r_w:	28.2353	
A (dimensionless):	2.500	
B (dimensionless):	0.416	
Drawdown at time = 0 (y_0):	4.45	ft
Drawdown at time = t (y_t):	1.99	ft
Elapsed Time between y_0 and y_t (t):	35.5	sec
Initial water column in well (L_w):	10.01	ft
$\ln(R_e/r_w)$ =	1.98	
K =	1.52E-04	ft/sec
	4.64E-03	**cm/sec**
	4803.26	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	99.83%

Slug Test P4-8D

Initial offset in logger reading (feet):	0.026	Date:	09/29/2005
Offset increment in logger reading (feet/sec):	-0.000015		
Initial depth to water table (feet):	32.41		
Depth of probe below water table (feet):	4.34		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/29/2005 11:37:20	41840.0	0.0	14.17	14.15	9.81	0.99
9/29/2005 11:37:27	41847.0	7.0	13.96	13.94	9.60	0.98
9/29/2005 11:37:32	41852.5	12.5	13.76	13.74	9.40	0.97
9/29/2005 11:37:38	41858.0	18.0	13.57	13.54	9.21	0.96
9/29/2005 11:37:43	41863.5	23.5	13.38	13.35	9.02	0.96
9/29/2005 11:37:49	41869.0	29.0	13.19	13.16	8.83	0.95
9/29/2005 11:37:55	41875.0	35.0	12.99	12.97	8.63	0.94
9/29/2005 11:38:01	41881.0	41.0	12.80	12.77	8.44	0.93
9/29/2005 11:38:06	41886.5	46.5	12.62	12.60	8.26	0.92
9/29/2005 11:38:12	41892.5	52.5	12.44	12.42	8.09	0.91
9/29/2005 11:38:18	41898.5	58.5	12.27	12.24	7.91	0.90
9/29/2005 11:38:24	41904.5	64.5	12.10	12.07	7.74	0.89
9/29/2005 11:38:30	41910.5	70.5	11.93	11.90	7.57	0.88
9/29/2005 11:38:36	41916.5	76.5	11.76	11.74	7.41	0.87
9/29/2005 11:38:42	41922.5	82.5	11.61	11.59	7.25	0.86
9/29/2005 11:38:48	41928.5	88.5	11.46	11.43	7.10	0.85
9/29/2005 11:38:54	41934.5	94.5	11.31	11.29	6.95	0.84
9/29/2005 11:39:00	41940.5	100.5	11.16	11.14	6.80	0.83
9/29/2005 11:39:06	41946.5	106.5	11.02	11.00	6.66	0.82
9/29/2005 11:39:13	41953.0	113.0	10.87	10.85	6.51	0.81
9/29/2005 11:39:19	41959.5	119.5	10.73	10.70	6.37	0.80
9/29/2005 11:39:26	41966.0	126.0	10.58	10.56	6.22	0.79
9/29/2005 11:39:32	41972.5	132.5	10.45	10.43	6.09	0.78
9/29/2005 11:39:39	41979.0	139.0	10.31	10.29	5.96	0.77
9/29/2005 11:39:45	41985.5	145.5	10.19	10.16	5.83	0.77
9/29/2005 11:39:52	41992.0	152.0	10.06	10.04	5.70	0.76
9/29/2005 11:39:58	41998.5	158.5	9.93	9.91	5.58	0.75
9/29/2005 11:40:05	42005.0	165.0	9.81	9.79	5.46	0.74
9/29/2005 11:40:11	42011.5	171.5	9.69	9.67	5.34	0.73
9/29/2005 11:40:18	42018.0	178.0	9.58	9.56	5.22	0.72
9/29/2005 11:40:24	42024.5	184.5	9.46	9.44	5.11	0.71
9/29/2005 11:40:31	42031.0	191.0	9.36	9.33	5.00	0.70
9/29/2005 11:40:37	42037.5	197.5	9.25	9.23	4.89	0.69
9/29/2005 11:40:44	42044.0	204.0	9.15	9.12	4.79	0.68
9/29/2005 11:40:50	42050.5	210.5	9.04	9.02	4.69	0.67
9/29/2005 11:40:57	42057.0	217.0	8.94	8.92	4.58	0.66
9/29/2005 11:41:03	42063.5	223.5	8.85	8.83	4.49	0.65
9/29/2005 11:41:10	42070.0	230.0	8.75	8.73	4.39	0.64
9/29/2005 11:41:17	42077.0	237.0	8.65	8.63	4.29	0.63
9/29/2005 11:41:23	42083.5	243.5	8.56	8.54	4.21	0.62
9/29/2005 11:41:30	42090.0	250.0	8.47	8.45	4.12	0.61
9/29/2005 11:41:36	42096.5	256.5	8.38	8.36	4.03	0.61
9/29/2005 11:41:43	42103.5	263.5	8.30	8.28	3.94	0.60
9/29/2005 11:41:50	42110.0	270.0	8.21	8.19	3.86	0.59

Slug Test P4-8D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/29/2005 11:41:56	42116.5	276.5	8.13	8.11	3.78	0.58
9/29/2005 11:42:03	42123.0	283.0	8.05	8.04	3.70	0.57
9/29/2005 11:42:09	42129.5	289.5	7.98	7.96	3.62	0.56
9/29/2005 11:42:16	42136.0	296.0	7.90	7.88	3.54	0.55
9/29/2005 11:42:23	42143.0	303.0	7.82	7.80	3.47	0.54
9/29/2005 11:42:30	42150.0	310.0	7.75	7.73	3.39	0.53
9/29/2005 11:42:36	42156.5	316.5	7.68	7.66	3.32	0.52
9/29/2005 11:42:43	42163.5	323.5	7.60	7.58	3.25	0.51
9/29/2005 11:42:50	42170.5	330.5	7.53	7.51	3.18	0.50
9/29/2005 11:42:57	42177.5	337.5	7.46	7.44	3.11	0.49
9/29/2005 11:43:04	42184.0	344.0	7.40	7.38	3.04	0.48
9/29/2005 11:43:11	42191.0	351.0	7.33	7.31	2.97	0.47
9/29/2005 11:43:18	42198.0	358.0	7.27	7.25	2.91	0.46
9/29/2005 11:43:25	42205.0	365.0	7.20	7.19	2.85	0.45
9/29/2005 11:43:32	42212.0	372.0	7.14	7.12	2.79	0.44
9/29/2005 11:43:39	42219.0	379.0	7.08	7.06	2.73	0.44
9/29/2005 11:43:46	42226.0	386.0	7.02	7.00	2.67	0.43
9/29/2005 11:43:53	42233.5	393.5	6.96	6.94	2.61	0.42
9/29/2005 11:44:00	42240.5	400.5	6.91	6.89	2.55	0.41
9/29/2005 11:44:08	42248.0	408.0	6.85	6.83	2.49	0.40
9/29/2005 11:44:15	42255.0	415.0	6.79	6.78	2.44	0.39
9/29/2005 11:44:22	42262.0	422.0	6.74	6.72	2.39	0.38
9/29/2005 11:44:29	42269.5	429.5	6.69	6.67	2.33	0.37
9/29/2005 11:44:36	42276.5	436.5	6.64	6.62	2.29	0.36
9/29/2005 11:44:43	42283.5	443.5	6.59	6.58	2.24	0.35
9/29/2005 11:44:50	42290.5	450.5	6.55	6.53	2.19	0.34
9/29/2005 11:44:57	42297.5	457.5	6.50	6.48	2.14	0.33
9/29/2005 11:45:05	42305.0	465.0	6.45	6.43	2.10	0.32
9/29/2005 11:45:12	42312.5	472.5	6.40	6.39	2.05	0.31
9/29/2005 11:45:19	42319.5	479.5	6.36	6.34	2.01	0.30
9/29/2005 11:45:26	42326.5	486.5	6.32	6.30	1.96	0.29
9/29/2005 11:45:34	42334.0	494.0	6.28	6.26	1.92	0.28
9/29/2005 11:45:40	42340.5	500.5	6.24	6.22	1.88	0.27
9/29/2005 11:45:48	42348.0	508.0	6.20	6.18	1.84	0.27
9/29/2005 11:45:55	42355.5	515.5	6.16	6.14	1.81	0.26
9/29/2005 11:46:02	42362.5	522.5	6.12	6.10	1.77	0.25
9/29/2005 11:46:10	42370.0	530.0	6.08	6.07	1.73	0.24
9/29/2005 11:46:17	42377.0	537.0	6.04	6.03	1.69	0.23
9/29/2005 11:46:24	42384.5	544.5	6.01	5.99	1.65	0.22
9/29/2005 11:46:32	42392.0	552.0	5.97	5.96	1.62	0.21
9/29/2005 11:46:39	42399.5	559.5	5.94	5.92	1.58	0.20
9/29/2005 11:46:46	42406.0	566.0	5.90	5.89	1.55	0.19
9/29/2005 11:46:53	42413.5	573.5	5.87	5.85	1.52	0.18
9/29/2005 11:47:01	42421.5	581.5	5.83	5.82	1.48	0.17
9/29/2005 11:47:09	42429.5	589.5	5.80	5.79	1.45	0.16
9/29/2005 11:47:17	42437.0	597.0	5.77	5.76	1.42	0.15
9/29/2005 11:47:23	42443.5	603.5	5.74	5.73	1.39	0.14
9/29/2005 11:47:32	42452.0	612.0	5.71	5.70	1.36	0.13
9/29/2005 11:47:39	42459.0	619.0	5.68	5.67	1.33	0.12

Slug Test P4-8D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/29/2005 11:47:46	42466.5	626.5	5.65	5.64	1.30	0.11
9/29/2005 11:47:54	42474.5	634.5	5.62	5.61	1.27	0.11
9/29/2005 11:48:02	42482.5	642.5	5.60	5.58	1.24	0.10
9/29/2005 11:48:10	42490.5	650.5	5.57	5.55	1.22	0.09
9/29/2005 11:48:17	42497.5	657.5	5.54	5.53	1.19	0.08
9/29/2005 11:48:25	42505.0	665.0	5.51	5.50	1.16	0.07
9/29/2005 11:48:33	42513.0	673.0	5.49	5.48	1.14	0.06
9/29/2005 11:48:40	42520.0	680.0	5.47	5.45	1.12	0.05
9/29/2005 11:48:47	42527.5	687.5	5.44	5.43	1.09	0.04
9/29/2005 11:48:56	42536.0	696.0	5.42	5.41	1.07	0.03
9/29/2005 11:49:03	42543.0	703.0	5.40	5.38	1.05	0.02
9/29/2005 11:49:10	42550.5	710.5	5.37	5.36	1.02	0.01
9/29/2005 11:49:19	42559.0	719.0	5.35	5.34	1.00	0.00
9/29/2005 11:49:26	42566.5	726.5	5.33	5.31	0.98	-0.01
9/29/2005 11:49:34	42574.5	734.5	5.31	5.29	0.96	-0.02
9/29/2005 11:49:42	42582.5	742.5	5.28	5.27	0.93	-0.03
9/29/2005 11:49:49	42589.5	749.5	5.26	5.25	0.91	-0.04
9/29/2005 11:49:58	42598.0	758.0	5.24	5.23	0.89	-0.05
9/29/2005 11:50:05	42605.0	765.0	5.22	5.21	0.88	-0.06
9/29/2005 11:50:14	42614.0	774.0	5.20	5.19	0.85	-0.07
9/29/2005 11:50:21	42621.0	781.0	5.19	5.17	0.84	-0.08
9/29/2005 11:50:29	42629.0	789.0	5.17	5.15	0.82	-0.09
9/29/2005 11:50:38	42638.5	798.5	5.15	5.13	0.80	-0.10
9/29/2005 11:50:47	42647.5	807.5	5.13	5.11	0.78	-0.11
9/29/2005 11:50:55	42655.5	815.5	5.11	5.10	0.76	-0.12
9/29/2005 11:51:03	42663.5	823.5	5.09	5.08	0.74	-0.13
9/29/2005 11:51:11	42671.0	831.0	5.08	5.06	0.73	-0.14
9/29/2005 11:51:17	42677.0	837.0	5.06	5.05	0.71	-0.15
9/29/2005 11:51:28	42688.0	848.0	5.04	5.03	0.69	-0.16
9/29/2005 11:51:36	42696.0	856.0	5.03	5.02	0.68	-0.17
9/29/2005 11:51:44	42704.0	864.0	5.01	5.00	0.66	-0.18
9/29/2005 11:51:51	42711.0	871.0	5.00	4.98	0.65	-0.19
9/29/2005 11:51:59	42719.5	879.5	4.98	4.97	0.63	-0.20
9/29/2005 11:52:08	42728.0	888.0	4.97	4.96	0.62	-0.21
9/29/2005 11:52:15	42735.0	895.0	4.95	4.94	0.61	-0.22
9/29/2005 11:52:24	42744.0	904.0	4.94	4.93	0.59	-0.23
9/29/2005 11:52:31	42751.5	911.5	4.93	4.92	0.58	-0.24
9/29/2005 11:52:40	42760.5	920.5	4.91	4.90	0.56	-0.25
9/29/2005 11:52:49	42769.5	929.5	4.90	4.89	0.55	-0.26
9/29/2005 11:52:57	42777.5	937.5	4.88	4.87	0.54	-0.27
9/29/2005 11:53:06	42786.0	946.0	4.87	4.86	0.52	-0.28
9/29/2005 11:53:13	42793.5	953.5	4.86	4.85	0.51	-0.29
9/29/2005 11:53:23	42803.0	963.0	4.85	4.84	0.50	-0.30
9/29/2005 11:53:29	42809.5	969.5	4.84	4.83	0.49	-0.31
9/29/2005 11:53:37	42817.5	977.5	4.82	4.81	0.48	-0.32
9/29/2005 11:53:48	42828.5	988.5	4.81	4.80	0.47	-0.33
9/29/2005 11:53:55	42835.5	995.5	4.80	4.79	0.46	-0.34
9/29/2005 11:54:03	42843.0	1003.0	4.79	4.78	0.45	-0.35
9/29/2005 11:54:11	42851.5	1011.5	4.78	4.77	0.43	-0.36

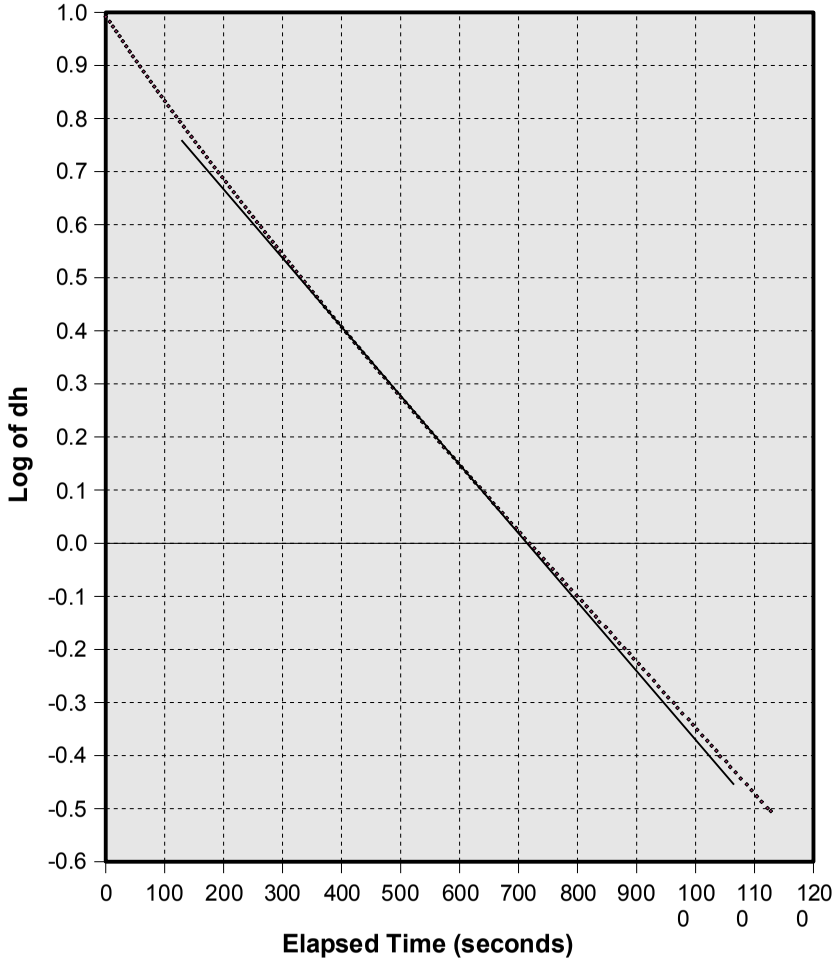
Slug Test P4-8D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/29/2005 11:54:20	42860.0	1020.0	4.77	4.76	0.42	-0.37
9/29/2005 11:54:27	42867.5	1027.5	4.76	4.75	0.42	-0.38
9/29/2005 11:54:35	42875.5	1035.5	4.75	4.74	0.41	-0.39
9/29/2005 11:54:41	42881.5	1041.5	4.74	4.73	0.40	-0.40
9/29/2005 11:54:52	42892.0	1052.0	4.73	4.72	0.39	-0.41
9/29/2005 11:54:59	42899.0	1059.0	4.72	4.72	0.38	-0.42
9/29/2005 11:55:08	42908.0	1068.0	4.71	4.71	0.37	-0.43
9/29/2005 11:55:16	42916.5	1076.5	4.70	4.70	0.36	-0.44
9/29/2005 11:55:27	42927.0	1087.0	4.70	4.69	0.35	-0.45
9/29/2005 11:55:35	42935.0	1095.0	4.69	4.68	0.34	-0.47
9/29/2005 11:55:44	42944.0	1104.0	4.68	4.67	0.33	-0.48
9/29/2005 11:55:52	42952.0	1112.0	4.67	4.66	0.33	-0.49
9/29/2005 11:56:02	42962.0	1122.0	4.66	4.65	0.32	-0.50
9/29/2005 11:56:07	42967.5	1127.5	4.66	4.65	0.31	-0.50

Slug Test P4-8D

Slug Test by Bouwer and Rice

Displacement Method:	Injection	
Well depth:	85.46	ft
Stick up height:	2.94	ft
Depth to sand pack (BGS):	77.50	ft
Depth to screened interval (BGS):	80.46	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	32.41	ft
Initial Head Change:	9.81	ft
Total well length:	88.40	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.0833	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	5.00	ft
Length of open section (L_e):	5.00	ft
L_e / r_w:	14.1176	
A (dimensionless):	2.052	
B (dimensionless):	0.327	
Drawdown at time = 0 (y_0):	3.63	ft
Drawdown at time = t (y_t):	0.79	ft
Elapsed Time between y_0 and y_t (t):	512	sec
Initial water column in well (L_w):	55.99	ft
$\ln(R_e/r_w)$ =	1.99	
K =	4.12E-06	ft/sec
	1.26E-04	**cm/sec**
	129.92	ft/yr



Water above sand pack:	Yes
%Duration below sand pack:	0.00%
Water above screen:	Yes
%Duration below screen:	0.00%

Slug Test P4-8S

Initial offset in logger reading (feet):	0.013	Date:	09/29/2005
Offset increment in logger reading (feet/sec):	0.000001		
Initial depth to water table (feet):	31.55		
Depth of probe below water table (feet):	6.33		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/29/2005 9:35:45	34545.5	0.0	0.80	0.79	5.54	0.74
9/29/2005 9:35:47	34547.0	1.5	0.94	0.93	5.40	0.73
9/29/2005 9:35:48	34548.0	2.5	1.09	1.08	5.25	0.72
9/29/2005 9:35:49	34549.5	4.0	1.24	1.23	5.10	0.71
9/29/2005 9:35:52	34552.0	6.5	1.37	1.36	4.97	0.70
9/29/2005 9:35:56	34556.0	10.5	1.49	1.47	4.85	0.69
9/29/2005 9:35:59	34559.5	14.0	1.61	1.59	4.74	0.68
9/29/2005 9:36:03	34563.5	18.0	1.72	1.71	4.62	0.66
9/29/2005 9:36:07	34567.5	22.0	1.84	1.82	4.51	0.65
9/29/2005 9:36:11	34571.5	26.0	1.94	1.93	4.40	0.64
9/29/2005 9:36:18	34578.0	32.5	2.05	2.03	4.30	0.63
9/29/2005 9:36:39	34599.5	54.0	2.14	2.13	4.20	0.62
9/29/2005 9:37:08	34628.0	82.5	2.24	2.23	4.10	0.61
9/29/2005 9:37:38	34658.5	113.0	2.34	2.32	4.01	0.60
9/29/2005 9:38:09	34689.5	144.0	2.43	2.41	3.92	0.59
9/29/2005 9:38:45	34725.0	179.5	2.52	2.50	3.83	0.58
9/29/2005 9:39:21	34761.5	216.0	2.61	2.59	3.74	0.57
9/29/2005 9:39:58	34798.0	252.5	2.69	2.68	3.65	0.56
9/29/2005 9:40:34	34834.5	289.0	2.78	2.76	3.56	0.55
9/29/2005 9:41:08	34868.5	323.0	2.86	2.85	3.48	0.54
9/29/2005 9:41:39	34899.5	354.0	2.94	2.93	3.40	0.53
9/29/2005 9:42:15	34935.0	389.5	3.03	3.01	3.32	0.52
9/29/2005 9:42:54	34974.5	429.0	3.10	3.09	3.24	0.51
9/29/2005 9:43:37	35017.5	472.0	3.18	3.16	3.17	0.50
9/29/2005 9:44:15	35055.5	510.0	3.25	3.24	3.09	0.49
9/29/2005 9:44:50	35090.5	545.0	3.32	3.31	3.02	0.48
9/29/2005 9:45:29	35129.5	584.0	3.39	3.38	2.95	0.47
9/29/2005 9:46:07	35167.0	621.5	3.46	3.45	2.88	0.46
9/29/2005 9:46:47	35207.0	661.5	3.53	3.51	2.81	0.45
9/29/2005 9:47:28	35248.0	702.5	3.59	3.58	2.75	0.44
9/29/2005 9:48:07	35287.0	741.5	3.66	3.64	2.69	0.43
9/29/2005 9:48:46	35326.0	780.5	3.72	3.70	2.62	0.42
9/29/2005 9:49:24	35364.0	818.5	3.78	3.76	2.56	0.41
9/29/2005 9:50:03	35403.0	857.5	3.84	3.82	2.50	0.40
9/29/2005 9:50:42	35442.5	897.0	3.90	3.88	2.45	0.39
9/29/2005 9:51:22	35482.0	936.5	3.95	3.94	2.39	0.38
9/29/2005 9:52:00	35520.0	974.5	4.01	4.00	2.33	0.37
9/29/2005 9:52:32	35552.0	1006.5	4.07	4.05	2.28	0.36
9/29/2005 9:52:48	35568.5	1023.0	4.12	4.10	2.22	0.35
9/29/2005 9:52:56	35576.5	1031.0	4.17	4.16	2.17	0.34
9/29/2005 9:53:04	35584.0	1038.5	4.22	4.21	2.12	0.33
9/29/2005 9:53:12	35592.0	1046.5	4.27	4.26	2.07	0.32
9/29/2005 9:53:20	35600.0	1054.5	4.32	4.31	2.02	0.31
9/29/2005 9:53:27	35607.5	1062.0	4.37	4.35	1.98	0.30

Slug Test P4-8S

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/29/2005 9:53:36	35616.0	1070.5	4.42	4.40	1.93	0.28
9/29/2005 9:53:44	35624.0	1078.5	4.46	4.45	1.88	0.27
9/29/2005 9:53:52	35632.0	1086.5	4.51	4.49	1.84	0.26
9/29/2005 9:54:01	35641.0	1095.5	4.55	4.53	1.79	0.25
9/29/2005 9:54:12	35652.5	1107.0	4.59	4.58	1.75	0.24
9/29/2005 9:54:27	35667.5	1122.0	4.63	4.62	1.71	0.23
9/29/2005 9:54:49	35689.5	1144.0	4.67	4.66	1.67	0.22
9/29/2005 9:55:18	35718.5	1173.0	4.71	4.70	1.63	0.21
9/29/2005 9:55:56	35756.0	1210.5	4.75	4.73	1.59	0.20
9/29/2005 9:56:35	35795.5	1250.0	4.79	4.77	1.56	0.19
9/29/2005 9:57:19	35839.0	1293.5	4.83	4.81	1.52	0.18
9/29/2005 9:58:05	35885.0	1339.5	4.86	4.85	1.48	0.17
9/29/2005 9:58:47	35927.5	1382.0	4.90	4.88	1.45	0.16
9/29/2005 9:59:29	35969.5	1424.0	4.93	4.91	1.41	0.15
9/29/2005 10:00:12	36012.5	1467.0	4.96	4.95	1.38	0.14
9/29/2005 10:00:57	36057.5	1512.0	5.00	4.98	1.35	0.13
9/29/2005 10:01:44	36104.0	1558.5	5.03	5.01	1.32	0.12
9/29/2005 10:02:32	36152.0	1606.5	5.06	5.04	1.28	0.11
9/29/2005 10:03:23	36203.0	1657.5	5.09	5.07	1.25	0.10
9/29/2005 10:04:14	36254.5	1709.0	5.12	5.10	1.22	0.09
9/29/2005 10:05:03	36303.5	1758.0	5.15	5.13	1.20	0.08
9/29/2005 10:05:56	36356.5	1811.0	5.18	5.16	1.17	0.07
9/29/2005 10:06:46	36406.5	1861.0	5.20	5.19	1.14	0.06
9/29/2005 10:07:38	36458.5	1913.0	5.23	5.21	1.11	0.05
9/29/2005 10:08:25	36505.0	1959.5	5.26	5.24	1.09	0.04
9/29/2005 10:10:12	36612.0	2066.5	5.31	5.29	1.04	0.02
9/29/2005 10:11:12	36672.5	2127.0	5.33	5.32	1.01	0.00
9/29/2005 10:12:12	36732.0	2186.5	5.36	5.34	0.98	-0.01
9/29/2005 10:13:12	36792.5	2247.0	5.39	5.37	0.96	-0.02
9/29/2005 10:14:12	36852.0	2306.5	5.41	5.40	0.93	-0.03
9/29/2005 10:15:12	36912.5	2367.0	5.44	5.42	0.90	-0.04
9/29/2005 10:16:12	36972.0	2426.5	5.46	5.45	0.88	-0.06
9/29/2005 10:17:12	37032.5	2487.0	5.49	5.47	0.86	-0.07
9/29/2005 10:18:12	37092.0	2546.5	5.51	5.49	0.83	-0.08
9/29/2005 10:19:12	37152.5	2607.0	5.54	5.52	0.81	-0.09
9/29/2005 10:20:12	37212.0	2666.5	5.56	5.54	0.78	-0.11
9/29/2005 10:21:12	37272.5	2727.0	5.58	5.56	0.76	-0.12
9/29/2005 10:22:12	37332.0	2786.5	5.60	5.58	0.74	-0.13
9/29/2005 10:23:12	37392.5	2847.0	5.62	5.60	0.72	-0.14
9/29/2005 10:24:12	37452.0	2906.5	5.64	5.62	0.70	-0.15
9/29/2005 10:25:12	37512.5	2967.0	5.66	5.64	0.69	-0.16
9/29/2005 10:26:12	37572.0	3026.5	5.68	5.66	0.67	-0.18
9/29/2005 10:28:12	37692.0	3146.5	5.71	5.69	0.64	-0.20
9/29/2005 10:29:12	37752.5	3207.0	5.73	5.71	0.62	-0.21
9/29/2005 10:30:12	37812.0	3266.5	5.75	5.73	0.60	-0.22
9/29/2005 10:31:12	37872.5	3327.0	5.76	5.75	0.58	-0.23
9/29/2005 10:32:12	37932.0	3386.5	5.78	5.76	0.57	-0.25
9/29/2005 10:33:12	37992.5	3447.0	5.79	5.78	0.55	-0.26
9/29/2005 10:34:12	38052.0	3506.5	5.81	5.79	0.54	-0.27

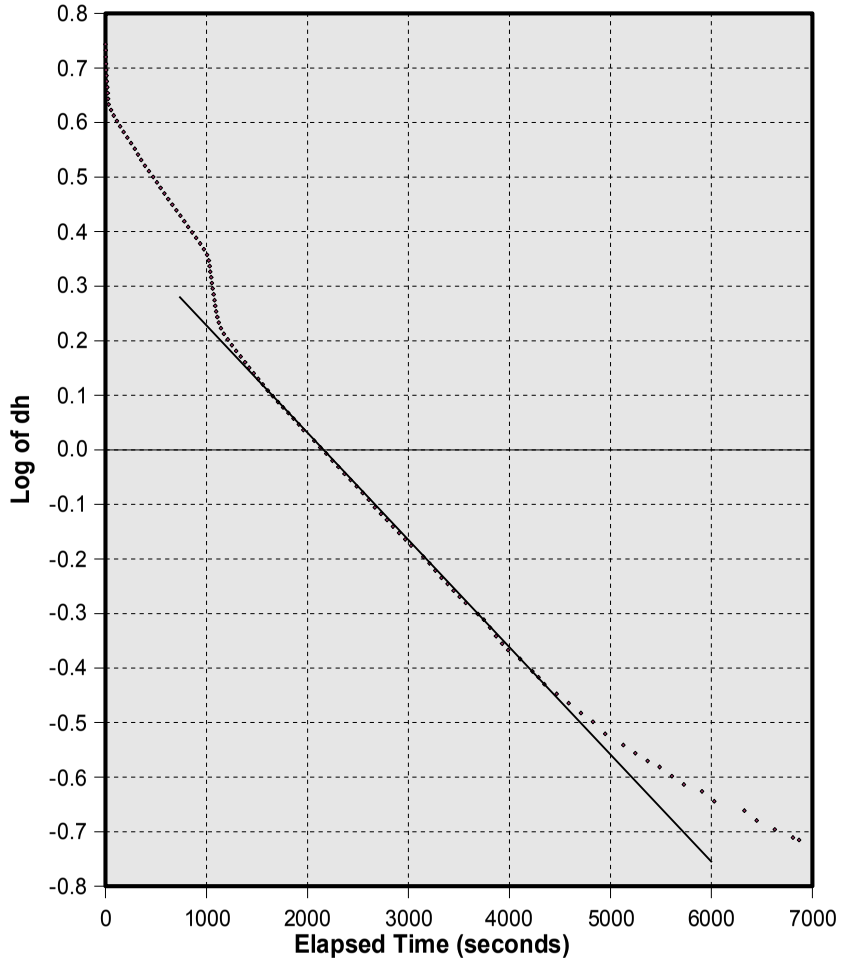
Slug Test P4-8S

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
9/29/2005 10:35:12	38112.5	3567.0	5.82	5.80	0.52	-0.28
9/29/2005 10:37:12	38232.5	3687.0	5.85	5.83	0.50	-0.30
9/29/2005 10:38:12	38292.0	3746.5	5.86	5.84	0.49	-0.31
9/29/2005 10:39:12	38352.5	3807.0	5.87	5.86	0.47	-0.33
9/29/2005 10:40:12	38412.0	3866.5	5.89	5.87	0.46	-0.34
9/29/2005 10:41:12	38472.5	3927.0	5.91	5.89	0.44	-0.36
9/29/2005 10:42:12	38532.0	3986.5	5.92	5.90	0.43	-0.37
9/29/2005 10:44:12	38652.0	4106.5	5.93	5.91	0.41	-0.38
9/29/2005 10:46:12	38772.0	4226.5	5.95	5.94	0.39	-0.41
9/29/2005 10:47:12	38832.5	4287.0	5.96	5.94	0.38	-0.42
9/29/2005 10:48:12	38892.0	4346.5	5.98	5.96	0.37	-0.43
9/29/2005 10:50:12	39012.0	4466.5	5.99	5.97	0.36	-0.45
9/29/2005 10:52:12	39132.0	4586.5	6.00	5.98	0.34	-0.46
9/29/2005 10:54:12	39252.0	4706.5	6.02	6.00	0.33	-0.48
9/29/2005 10:56:12	39372.0	4826.5	6.03	6.01	0.32	-0.50
9/29/2005 10:58:12	39492.0	4946.5	6.05	6.03	0.30	-0.52
9/29/2005 11:01:12	39672.5	5127.0	6.06	6.04	0.29	-0.54
9/29/2005 11:03:12	39792.5	5247.0	6.07	6.05	0.28	-0.56
9/29/2005 11:05:12	39912.5	5367.0	6.08	6.06	0.27	-0.57
9/29/2005 11:07:12	40032.5	5487.0	6.09	6.07	0.26	-0.58
9/29/2005 11:09:12	40152.5	5607.0	6.10	6.08	0.25	-0.60
9/29/2005 11:11:12	40272.5	5727.0	6.11	6.08	0.24	-0.61
9/29/2005 11:14:12	40452.0	5906.5	6.11	6.09	0.24	-0.63
9/29/2005 11:16:12	40572.0	6026.5	6.12	6.10	0.23	-0.64
9/29/2005 11:21:12	40872.5	6327.0	6.13	6.11	0.22	-0.66
9/29/2005 11:23:12	40992.5	6447.0	6.14	6.12	0.21	-0.68
9/29/2005 11:26:12	41172.0	6626.5	6.15	6.13	0.20	-0.70
9/29/2005 11:29:12	41352.5	6807.0	6.16	6.13	0.19	-0.71
9/29/2005 11:30:12	41412.0	6866.5	6.16	6.14	0.19	-0.72
9/29/2005 11:31:12	41472.5	6927.0	0.02	0.00		

Slug Test P4-8S

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	40.45	ft
Stick up height:	3.00	ft
Depth to sand pack (BGS):	24.00	ft
Depth to screened interval (BGS):	25.45	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	31.55	ft
Initial Head Change:	5.54	ft
Total well length:	43.45	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.2061	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	15.00	ft
Length of open section (L_e):	11.90	ft
L_e / r_w:	33.6000	
A (dimensionless):	2.607	
B (dimensionless):	0.434	
Drawdown at time = 0 (y_0):	1.48	ft
Drawdown at time = t (y_t):	0.35	ft
Elapsed Time between y_0 and y_t (t):	3181.5	sec
Initial water column in well (L_w):	11.90	ft
$\ln(R_e/r_w)$ =	2.14	
K =	1.73E-06	ft/sec
	5.26E-05	**cm/sec**
	54.43	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P4-9

Initial offset in logger reading (feet):	0.134	Date:	03/31/2006
Offset increment in logger reading (feet/sec):	0.000002		
Initial depth to water table (feet):	25.12		
Depth of probe below water table (feet):	5.57		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 9:20:56	33656.0	0.0	0.66	0.53	5.04	0.70
3/31/2006 9:20:58	33658.0	2.0	0.80	0.66	4.90	0.69
3/31/2006 9:21:03	33663.0	7.0	0.92	0.78	4.79	0.68
3/31/2006 9:21:09	33669.0	13.0	1.02	0.89	4.68	0.67
3/31/2006 9:21:15	33675.0	19.0	1.14	1.00	4.56	0.66
3/31/2006 9:21:19	33679.5	23.5	1.25	1.11	4.45	0.65
3/31/2006 9:21:23	33683.5	27.5	1.35	1.22	4.35	0.64
3/31/2006 9:21:28	33688.5	32.5	1.46	1.32	4.24	0.63
3/31/2006 9:21:34	33694.5	38.5	1.56	1.43	4.14	0.62
3/31/2006 9:21:39	33699.0	43.0	1.66	1.52	4.04	0.61
3/31/2006 9:21:44	33704.5	48.5	1.75	1.62	3.95	0.60
3/31/2006 9:21:51	33711.0	55.0	1.84	1.71	3.86	0.59
3/31/2006 9:21:56	33716.5	60.5	1.94	1.80	3.76	0.58
3/31/2006 9:22:02	33722.0	66.0	2.03	1.90	3.67	0.56
3/31/2006 9:22:07	33727.0	71.0	2.12	1.98	3.59	0.55
3/31/2006 9:22:12	33732.0	76.0	2.20	2.06	3.50	0.54
3/31/2006 9:22:42	33762.0	106.0	2.28	2.14	3.42	0.53
3/31/2006 9:23:07	33787.0	131.0	2.36	2.22	3.35	0.52
3/31/2006 9:23:35	33815.5	159.5	2.44	2.30	3.27	0.51
3/31/2006 9:24:08	33848.0	192.0	2.51	2.38	3.19	0.50
3/31/2006 9:24:32	33872.5	216.5	2.58	2.45	3.12	0.49
3/31/2006 9:24:48	33888.5	232.5	2.66	2.52	3.04	0.48
3/31/2006 9:25:06	33906.5	250.5	2.73	2.59	2.97	0.47
3/31/2006 9:25:36	33936.0	280.0	2.80	2.66	2.90	0.46
3/31/2006 9:26:17	33977.5	321.5	2.86	2.73	2.84	0.45
3/31/2006 9:27:02	34022.5	366.5	2.93	2.79	2.77	0.44
3/31/2006 9:27:42	34062.5	406.5	2.99	2.86	2.71	0.43
3/31/2006 9:28:16	34096.5	440.5	3.06	2.92	2.64	0.42
3/31/2006 9:28:55	34135.5	479.5	3.12	2.98	2.58	0.41
3/31/2006 9:29:39	34179.0	523.0	3.18	3.04	2.52	0.40
3/31/2006 9:30:34	34234.5	578.5	3.24	3.10	2.46	0.39
3/31/2006 9:31:31	34291.5	635.5	3.29	3.16	2.41	0.38
3/31/2006 9:32:22	34342.5	686.5	3.35	3.21	2.35	0.37
3/31/2006 9:33:13	34393.5	737.5	3.41	3.27	2.30	0.36
3/31/2006 9:34:07	34447.0	791.0	3.46	3.32	2.24	0.35
3/31/2006 9:35:02	34502.5	846.5	3.51	3.37	2.19	0.34
3/31/2006 9:36:01	34561.0	905.0	3.56	3.43	2.14	0.33
3/31/2006 9:36:56	34616.0	960.0	3.61	3.48	2.09	0.32
3/31/2006 9:37:44	34664.0	1008.0	3.66	3.53	2.04	0.31
3/31/2006 9:38:36	34716.0	1060.0	3.71	3.57	1.99	0.30
3/31/2006 9:39:27	34767.5	1111.5	3.76	3.62	1.95	0.29
3/31/2006 9:40:23	34823.5	1167.5	3.80	3.66	1.90	0.28
3/31/2006 9:41:15	34875.5	1219.5	3.85	3.71	1.86	0.27
3/31/2006 9:42:23	34943.0	1287.0	3.89	3.76	1.81	0.26

Slug Test P4-9

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 9:43:23	35003.5	1347.5	3.94	3.80	1.77	0.25
3/31/2006 9:44:22	35062.5	1406.5	3.98	3.84	1.72	0.24
3/31/2006 9:45:24	35124.5	1468.5	4.02	3.88	1.68	0.23
3/31/2006 9:46:24	35184.5	1528.5	4.06	3.92	1.64	0.22
3/31/2006 9:47:28	35248.5	1592.5	4.10	3.96	1.61	0.21
3/31/2006 9:48:27	35307.0	1651.0	4.14	4.00	1.57	0.20
3/31/2006 9:49:23	35363.5	1707.5	4.17	4.03	1.53	0.18
3/31/2006 9:50:17	35417.5	1761.5	4.21	4.07	1.49	0.17
3/31/2006 9:51:11	35471.0	1815.0	4.24	4.11	1.46	0.16
3/31/2006 9:52:05	35525.0	1869.0	4.28	4.14	1.42	0.15
3/31/2006 9:52:55	35575.0	1919.0	4.31	4.17	1.39	0.14
3/31/2006 9:53:47	35627.0	1971.0	4.35	4.21	1.36	0.13
3/31/2006 9:54:43	35683.0	2027.0	4.38	4.24	1.33	0.12
3/31/2006 9:55:45	35745.5	2089.5	4.41	4.27	1.30	0.11
3/31/2006 9:56:50	35810.0	2154.0	4.44	4.30	1.26	0.10
3/31/2006 9:58:00	35880.5	2224.5	4.47	4.33	1.23	0.09
3/31/2006 9:59:16	35956.5	2300.5	4.50	4.36	1.20	0.08
3/31/2006 10:00:27	36027.0	2371.0	4.53	4.39	1.18	0.07
3/31/2006 10:01:34	36094.0	2438.0	4.56	4.42	1.15	0.06
3/31/2006 10:02:36	36156.5	2500.5	4.59	4.45	1.12	0.05
3/31/2006 10:03:39	36219.5	2563.5	4.61	4.47	1.09	0.04
3/31/2006 10:04:53	36293.0	2637.0	4.64	4.50	1.07	0.03
3/31/2006 10:05:57	36357.5	2701.5	4.67	4.53	1.04	0.02
3/31/2006 10:07:06	36426.5	2770.5	4.69	4.55	1.01	0.01
3/31/2006 10:08:12	36492.5	2836.5	4.72	4.58	0.99	-0.01
3/31/2006 10:09:25	36565.5	2909.5	4.74	4.60	0.97	-0.02
3/31/2006 10:10:36	36636.0	2980.0	4.77	4.62	0.94	-0.03
3/31/2006 10:11:52	36712.0	3056.0	4.79	4.65	0.92	-0.04
3/31/2006 10:13:04	36784.5	3128.5	4.81	4.67	0.89	-0.05
3/31/2006 10:14:13	36853.5	3197.5	4.83	4.69	0.87	-0.06
3/31/2006 10:15:14	36914.0	3258.0	4.85	4.71	0.85	-0.07
3/31/2006 10:16:25	36985.5	3329.5	4.88	4.73	0.83	-0.08
3/31/2006 10:17:21	37041.0	3385.0	4.90	4.76	0.81	-0.09
3/31/2006 10:18:30	37110.0	3454.0	4.92	4.78	0.79	-0.10
3/31/2006 10:19:25	37165.5	3509.5	4.94	4.80	0.77	-0.11
3/31/2006 10:20:41	37241.5	3585.5	4.96	4.81	0.75	-0.12
3/31/2006 10:21:52	37312.5	3656.5	4.97	4.83	0.73	-0.13
3/31/2006 10:22:56	37376.5	3720.5	4.99	4.85	0.72	-0.14
3/31/2006 10:23:53	37433.0	3777.0	5.01	4.87	0.70	-0.15
3/31/2006 10:25:15	37515.0	3859.0	5.03	4.88	0.68	-0.17
3/31/2006 10:26:36	37596.5	3940.5	5.04	4.90	0.67	-0.18
3/31/2006 10:27:44	37664.5	4008.5	5.06	4.92	0.65	-0.19
3/31/2006 10:29:14	37754.0	4098.0	5.08	4.93	0.63	-0.20
3/31/2006 10:30:38	37838.5	4182.5	5.09	4.95	0.62	-0.21
3/31/2006 10:32:21	37941.5	4285.5	5.11	4.97	0.60	-0.22
3/31/2006 10:33:42	38022.0	4366.0	5.12	4.98	0.59	-0.23
3/31/2006 10:35:15	38115.0	4459.0	5.14	4.99	0.57	-0.24
3/31/2006 10:36:47	38207.0	4551.0	5.15	5.01	0.56	-0.25
3/31/2006 10:38:27	38307.5	4651.5	5.17	5.02	0.54	-0.26

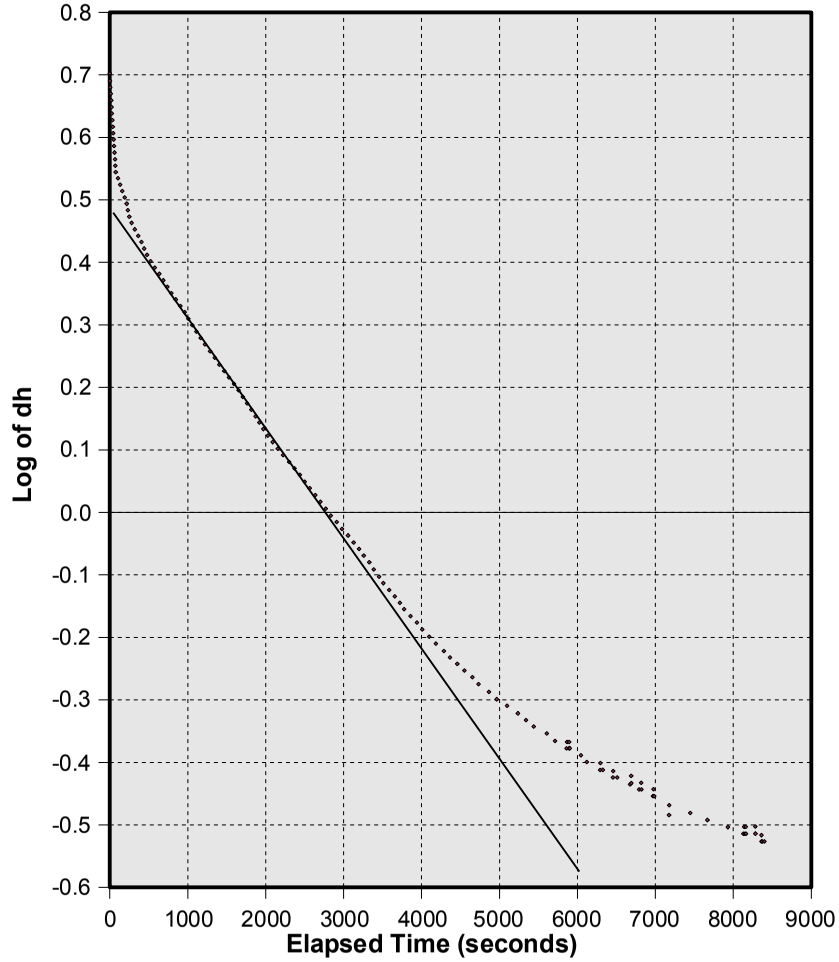
Slug Test P4-9

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 10:39:46	38386.0	4730.0	5.18	5.03	0.53	-0.27
3/31/2006 10:41:59	38519.0	4863.0	5.19	5.05	0.52	-0.29
3/31/2006 10:43:41	38621.0	4965.0	5.21	5.06	0.50	-0.30
3/31/2006 10:45:54	38754.0	5098.0	5.22	5.07	0.49	-0.31
3/31/2006 10:48:11	38891.5	5235.5	5.23	5.09	0.48	-0.32
3/31/2006 10:49:56	38996.0	5340.0	5.25	5.10	0.47	-0.33
3/31/2006 10:51:34	39094.5	5438.5	5.26	5.11	0.45	-0.34
3/31/2006 10:54:22	39262.0	5606.0	5.27	5.12	0.44	-0.35
3/31/2006 10:56:09	39369.5	5713.5	5.28	5.13	0.43	-0.37
3/31/2006 10:58:36	39516.5	5860.5	5.29	5.15	0.42	-0.38
3/31/2006 10:58:42	39522.0	5866.0	5.28	5.14	0.43	-0.37
3/31/2006 10:59:11	39551.0	5895.0	5.29	5.15	0.42	-0.38
3/31/2006 10:59:11	39551.5	5895.5	5.28	5.14	0.43	-0.37
3/31/2006 10:59:16	39556.0	5900.0	5.29	5.15	0.42	-0.38
3/31/2006 11:01:41	39701.5	6045.5	5.30	5.16	0.41	-0.39
3/31/2006 11:02:55	39775.0	6119.0	5.31	5.17	0.40	-0.40
3/31/2006 11:05:47	39947.0	6291.0	5.33	5.18	0.39	-0.41
3/31/2006 11:05:51	39951.5	6295.5	5.32	5.17	0.40	-0.40
3/31/2006 11:06:21	39981.5	6325.5	5.33	5.18	0.39	-0.41
3/31/2006 11:08:32	40112.5	6456.5	5.34	5.19	0.38	-0.42
3/31/2006 11:08:34	40114.5	6458.5	5.33	5.18	0.39	-0.41
3/31/2006 11:09:26	40166.5	6510.5	5.34	5.19	0.38	-0.42
3/31/2006 11:12:12	40332.0	6676.0	5.35	5.20	0.37	-0.44
3/31/2006 11:12:25	40345.5	6689.5	5.34	5.19	0.38	-0.42
3/31/2006 11:12:27	40347.0	6691.0	5.35	5.20	0.37	-0.43
3/31/2006 11:14:07	40447.0	6791.0	5.35	5.21	0.36	-0.44
3/31/2006 11:14:35	40475.0	6819.0	5.35	5.20	0.37	-0.43
3/31/2006 11:14:37	40477.5	6821.5	5.35	5.21	0.36	-0.44
3/31/2006 11:17:03	40623.5	6967.5	5.36	5.21	0.35	-0.45
3/31/2006 11:17:12	40632.5	6976.5	5.35	5.20	0.36	-0.44
3/31/2006 11:17:21	40641.0	6985.0	5.36	5.21	0.35	-0.45
3/31/2006 11:20:31	40831.5	7175.5	5.39	5.24	0.33	-0.48
3/31/2006 11:20:32	40832.0	7176.0	5.38	5.23	0.34	-0.47
3/31/2006 11:25:04	41104.0	7448.0	5.39	5.24	0.33	-0.48
3/31/2006 11:28:44	41324.0	7668.0	5.39	5.24	0.32	-0.49
3/31/2006 11:33:06	41586.5	7930.5	5.40	5.25	0.31	-0.50
3/31/2006 11:36:24	41784.0	8128.0	5.41	5.26	0.31	-0.51
3/31/2006 11:36:34	41794.0	8138.0	5.40	5.25	0.31	-0.50
3/31/2006 11:36:45	41805.0	8149.0	5.41	5.26	0.31	-0.51
3/31/2006 11:36:54	41814.5	8158.5	5.40	5.25	0.31	-0.50
3/31/2006 11:36:58	41818.5	8162.5	5.41	5.26	0.31	-0.51
3/31/2006 11:38:57	41937.5	8281.5	5.40	5.25	0.31	-0.50
3/31/2006 11:38:59	41939.5	8283.5	5.41	5.26	0.31	-0.51
3/31/2006 11:40:16	42016.5	8360.5	5.42	5.27	0.30	-0.53
3/31/2006 11:40:18	42018.0	8362.0	5.41	5.26	0.30	-0.52
3/31/2006 11:40:28	42028.5	8372.5	5.42	5.27	0.30	-0.53
3/31/2006 11:40:55	42055.0	8399.0	5.42	5.27	0.30	-0.53

Slug Test P4-9

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	30.42	ft
Stick up height:	3.00	ft
Depth to sand pack (BGS):	14.25	ft
Depth to screened interval (BGS):	15.42	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	25.12	ft
Initial Head Change:	5.04	ft
Total well length:	33.42	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.2061	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	15.00	ft
Length of open section (L_e):	8.30	ft
L_e / r_w:	23.4353	
A (dimensionless):	2.347	
B (dimensionless):	0.388	
Drawdown at time = 0 (y_0):	1.86	ft
Drawdown at time = t (y_t):	0.56	ft
Elapsed Time between y_0 and y_t (t):	3323	sec
Initial water column in well (L_w):	8.30	ft
$\ln(R_e/r_w)$ =	1.82	
K =	1.69E-06	ft/sec
	5.14E-05	**cm/sec**
	53.19	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P4-10

Initial offset in logger reading (feet):	0.161	Date:	03/15/2006
Offset increment in logger reading (feet/sec):	0.000005		
Initial depth to water table (feet):	23.25		
Depth of probe below water table (feet):	5.35		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 15:40:19	56419.5	0.0	1.07	0.91	4.44	0.65
3/15/2006 15:40:20	56420.5	1.0	1.20	1.04	4.31	0.63
3/15/2006 15:40:22	56422.0	2.5	1.32	1.15	4.20	0.62
3/15/2006 15:40:24	56424.5	5.0	1.43	1.26	4.08	0.61
3/15/2006 15:40:27	56427.0	7.5	1.53	1.37	3.98	0.60
3/15/2006 15:40:30	56430.0	10.5	1.65	1.48	3.87	0.59
3/15/2006 15:40:33	56433.0	13.5	1.75	1.59	3.76	0.58
3/15/2006 15:40:36	56436.0	16.5	1.85	1.68	3.66	0.56
3/15/2006 15:40:38	56438.5	19.0	1.94	1.78	3.57	0.55
3/15/2006 15:40:41	56441.0	21.5	2.03	1.87	3.48	0.54
3/15/2006 15:40:43	56443.0	23.5	2.12	1.96	3.39	0.53
3/15/2006 15:40:45	56445.0	25.5	2.25	2.08	3.27	0.51
3/15/2006 15:40:46	56446.0	26.5	2.33	2.17	3.18	0.50
3/15/2006 15:40:47	56447.0	27.5	2.42	2.25	3.09	0.49
3/15/2006 15:40:48	56448.0	28.5	2.51	2.35	3.00	0.48
3/15/2006 15:40:49	56449.5	30.0	2.63	2.47	2.88	0.46
3/15/2006 15:40:51	56451.0	31.5	2.74	2.58	2.77	0.44
3/15/2006 15:40:52	56452.5	33.0	2.83	2.67	2.68	0.43
3/15/2006 15:40:54	56454.5	35.0	2.90	2.74	2.61	0.42
3/15/2006 15:40:59	56459.0	39.5	2.97	2.80	2.55	0.41
3/15/2006 15:41:04	56464.0	44.5	3.03	2.87	2.48	0.39
3/15/2006 15:41:09	56469.0	49.5	3.10	2.94	2.41	0.38
3/15/2006 15:41:14	56474.0	54.5	3.16	3.00	2.35	0.37
3/15/2006 15:41:18	56478.5	59.0	3.22	3.06	2.29	0.36
3/15/2006 15:41:24	56484.0	64.5	3.29	3.13	2.22	0.35
3/15/2006 15:41:29	56489.5	70.0	3.35	3.18	2.16	0.34
3/15/2006 15:41:35	56495.5	76.0	3.40	3.24	2.11	0.32
3/15/2006 15:41:42	56502.0	82.5	3.46	3.29	2.05	0.31
3/15/2006 15:41:48	56508.5	89.0	3.51	3.35	2.00	0.30
3/15/2006 15:41:55	56515.5	96.0	3.57	3.40	1.95	0.29
3/15/2006 15:42:00	56520.5	101.0	3.62	3.45	1.89	0.28
3/15/2006 15:42:08	56528.5	109.0	3.67	3.50	1.84	0.27
3/15/2006 15:42:15	56535.5	116.0	3.71	3.55	1.80	0.25
3/15/2006 15:42:21	56541.0	121.5	3.76	3.60	1.75	0.24
3/15/2006 15:42:28	56548.0	128.5	3.80	3.64	1.71	0.23
3/15/2006 15:42:35	56555.5	136.0	3.85	3.69	1.66	0.22
3/15/2006 15:42:44	56564.0	144.5	3.90	3.73	1.61	0.21
3/15/2006 15:42:50	56570.5	151.0	3.94	3.78	1.57	0.20
3/15/2006 15:42:58	56578.0	158.5	3.98	3.82	1.53	0.18
3/15/2006 15:43:05	56585.5	166.0	4.03	3.86	1.49	0.17
3/15/2006 15:43:12	56592.5	173.0	4.06	3.90	1.45	0.16
3/15/2006 15:43:20	56600.5	181.0	4.10	3.94	1.41	0.15
3/15/2006 15:43:29	56609.0	189.5	4.14	3.98	1.37	0.14
3/15/2006 15:43:36	56616.0	196.5	4.18	4.01	1.33	0.13

Slug Test P4-10

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 15:43:45	56625.0	205.5	4.22	4.05	1.30	0.11
3/15/2006 15:43:53	56633.0	213.5	4.25	4.09	1.26	0.10
3/15/2006 15:44:01	56641.5	222.0	4.28	4.12	1.23	0.09
3/15/2006 15:44:09	56649.5	230.0	4.32	4.15	1.20	0.08
3/15/2006 15:44:18	56658.0	238.5	4.35	4.18	1.17	0.07
3/15/2006 15:44:24	56664.5	245.0	4.38	4.21	1.14	0.06
3/15/2006 15:44:34	56674.5	255.0	4.41	4.24	1.11	0.04
3/15/2006 15:44:43	56683.5	264.0	4.44	4.27	1.08	0.03
3/15/2006 15:44:52	56692.0	272.5	4.46	4.30	1.05	0.02
3/15/2006 15:45:01	56701.5	282.0	4.49	4.33	1.02	0.01
3/15/2006 15:45:11	56711.5	292.0	4.52	4.36	0.99	0.00
3/15/2006 15:45:19	56719.5	300.0	4.55	4.38	0.97	-0.01
3/15/2006 15:45:29	56729.5	310.0	4.57	4.41	0.94	-0.03
3/15/2006 15:45:38	56738.5	319.0	4.60	4.43	0.91	-0.04
3/15/2006 15:45:49	56749.0	329.5	4.62	4.46	0.89	-0.05
3/15/2006 15:45:57	56757.5	338.0	4.65	4.48	0.87	-0.06
3/15/2006 15:46:07	56767.5	348.0	4.67	4.51	0.84	-0.07
3/15/2006 15:46:18	56778.0	358.5	4.69	4.53	0.82	-0.09
3/15/2006 15:46:26	56786.5	367.0	4.72	4.55	0.80	-0.10
3/15/2006 15:46:37	56797.0	377.5	4.74	4.57	0.78	-0.11
3/15/2006 15:46:47	56807.0	387.5	4.76	4.59	0.76	-0.12
3/15/2006 15:46:57	56817.0	397.5	4.78	4.61	0.74	-0.13
3/15/2006 15:47:07	56827.5	408.0	4.80	4.63	0.72	-0.15
3/15/2006 15:47:18	56838.5	419.0	4.82	4.65	0.70	-0.16
3/15/2006 15:47:29	56849.0	429.5	4.84	4.67	0.68	-0.17
3/15/2006 15:47:39	56859.5	440.0	4.85	4.69	0.66	-0.18
3/15/2006 15:47:49	56869.0	449.5	4.87	4.71	0.64	-0.19
3/15/2006 15:48:01	56881.5	462.0	4.89	4.72	0.62	-0.21
3/15/2006 15:48:12	56892.0	472.5	4.91	4.74	0.61	-0.22
3/15/2006 15:48:23	56903.0	483.5	4.92	4.76	0.59	-0.23
3/15/2006 15:48:35	56915.5	496.0	4.94	4.77	0.57	-0.24
3/15/2006 15:48:45	56925.5	506.0	4.96	4.79	0.56	-0.25
3/15/2006 15:48:56	56936.0	516.5	4.97	4.81	0.54	-0.27
3/15/2006 15:49:10	56950.5	531.0	4.99	4.82	0.53	-0.28
3/15/2006 15:49:22	56962.5	543.0	5.00	4.84	0.51	-0.29
3/15/2006 15:49:34	56974.0	554.5	5.02	4.85	0.50	-0.30
3/15/2006 15:49:47	56987.5	568.0	5.03	4.87	0.48	-0.32
3/15/2006 15:50:03	57003.0	583.5	5.05	4.88	0.47	-0.33
3/15/2006 15:50:10	57010.0	590.5	5.06	4.89	0.46	-0.34
3/15/2006 15:50:22	57022.0	602.5	5.07	4.90	0.45	-0.35
3/15/2006 15:50:38	57038.0	618.5	5.08	4.91	0.43	-0.36
3/15/2006 15:50:47	57047.5	628.0	5.09	4.93	0.42	-0.37
3/15/2006 15:51:03	57063.5	644.0	5.10	4.94	0.41	-0.39
3/15/2006 15:51:19	57079.0	659.5	5.12	4.95	0.40	-0.40
3/15/2006 15:51:32	57092.5	673.0	5.13	4.96	0.39	-0.41
3/15/2006 15:51:45	57105.0	685.5	5.14	4.97	0.37	-0.43
3/15/2006 15:52:05	57125.0	705.5	5.15	4.98	0.36	-0.44
3/15/2006 15:52:18	57138.5	719.0	5.16	4.99	0.35	-0.45
3/15/2006 15:52:33	57153.5	734.0	5.17	5.00	0.35	-0.46

Slug Test P4-10

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 15:52:49	57169.5	750.0	5.18	5.01	0.34	-0.47
3/15/2006 15:53:08	57188.5	769.0	5.19	5.02	0.33	-0.49
3/15/2006 15:53:13	57193.5	774.0	5.18	5.01	0.34	-0.47
3/15/2006 15:53:16	57196.0	776.5	5.19	5.02	0.32	-0.49
3/15/2006 15:53:18	57198.5	779.0	5.18	5.01	0.34	-0.47
3/15/2006 15:53:19	57199.0	779.5	5.19	5.02	0.32	-0.49
3/15/2006 15:53:27	57207.0	787.5	5.20	5.03	0.31	-0.50
3/15/2006 15:53:44	57224.0	804.5	5.21	5.04	0.31	-0.51
3/15/2006 15:54:06	57246.5	827.0	5.22	5.05	0.30	-0.53
3/15/2006 15:54:27	57267.5	848.0	5.23	5.06	0.28	-0.55
3/15/2006 15:54:28	57268.0	848.5	5.22	5.05	0.29	-0.53
3/15/2006 15:54:38	57278.5	859.0	5.23	5.06	0.28	-0.55
3/15/2006 15:54:45	57285.5	866.0	5.24	5.07	0.27	-0.56
3/15/2006 15:54:46	57286.0	866.5	5.23	5.06	0.29	-0.54
3/15/2006 15:54:46	57286.5	867.0	5.24	5.07	0.28	-0.56
3/15/2006 15:54:47	57287.5	868.0	5.23	5.06	0.29	-0.54
3/15/2006 15:54:48	57288.0	868.5	5.24	5.07	0.28	-0.55
3/15/2006 15:55:03	57303.5	884.0	5.25	5.08	0.27	-0.57
3/15/2006 15:55:32	57332.5	913.0	5.25	5.09	0.26	-0.58
3/15/2006 15:55:38	57338.0	918.5	5.26	5.09	0.25	-0.60
3/15/2006 15:55:38	57338.5	919.0	5.25	5.08	0.27	-0.57
3/15/2006 15:55:39	57339.5	920.0	5.25	5.09	0.26	-0.58
3/15/2006 15:55:45	57345.0	925.5	5.26	5.09	0.26	-0.59
3/15/2006 15:56:07	57367.5	948.0	5.27	5.10	0.25	-0.60
3/15/2006 15:56:09	57369.5	950.0	5.26	5.09	0.26	-0.59
3/15/2006 15:56:11	57371.5	952.0	5.25	5.09	0.26	-0.58
3/15/2006 15:56:12	57372.0	952.5	5.26	5.09	0.25	-0.59
3/15/2006 15:56:20	57380.5	961.0	5.27	5.10	0.25	-0.61
3/15/2006 15:56:45	57405.0	985.5	5.28	5.11	0.24	-0.62
3/15/2006 15:57:15	57435.5	1016.0	5.28	5.11	0.23	-0.63
3/15/2006 15:57:42	57462.0	1042.5	5.29	5.12	0.23	-0.65
3/15/2006 15:58:14	57494.0	1074.5	5.30	5.13	0.22	-0.66
3/15/2006 15:58:26	57506.0	1086.5	5.29	5.12	0.23	-0.64
3/15/2006 15:58:27	57507.0	1087.5	5.30	5.13	0.22	-0.65
3/15/2006 15:58:37	57517.5	1098.0	5.30	5.13	0.22	-0.67
3/15/2006 15:58:43	57523.0	1103.5	5.30	5.13	0.22	-0.65
3/15/2006 15:58:44	57524.0	1104.5	5.30	5.13	0.22	-0.67
3/15/2006 15:58:55	57535.0	1115.5	5.30	5.13	0.22	-0.65
3/15/2006 15:58:58	57538.0	1118.5	5.30	5.13	0.22	-0.67
3/15/2006 15:59:33	57573.5	1154.0	5.31	5.14	0.21	-0.68
3/15/2006 16:00:06	57606.0	1186.5	5.32	5.15	0.20	-0.70
3/15/2006 16:00:18	57618.5	1199.0	5.31	5.14	0.21	-0.68
3/15/2006 16:00:20	57620.5	1201.0	5.32	5.15	0.20	-0.70
3/15/2006 16:00:26	57626.5	1207.0	5.32	5.15	0.19	-0.71
3/15/2006 16:00:27	57627.5	1208.0	5.32	5.15	0.20	-0.70
3/15/2006 16:00:28	57628.5	1209.0	5.32	5.15	0.19	-0.71
3/15/2006 16:00:29	57629.0	1209.5	5.32	5.15	0.20	-0.70
3/15/2006 16:00:31	57631.5	1212.0	5.31	5.14	0.21	-0.69
3/15/2006 16:00:33	57633.0	1213.5	5.32	5.15	0.20	-0.70

Slug Test P4-10

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 16:00:45	57645.5	1226.0	5.31	5.14	0.21	-0.69
3/15/2006 16:00:47	57647.0	1227.5	5.32	5.15	0.20	-0.71
3/15/2006 16:00:55	57655.0	1235.5	5.31	5.14	0.21	-0.69
3/15/2006 16:00:55	57655.5	1236.0	5.32	5.15	0.20	-0.71
3/15/2006 16:02:02	57722.0	1302.5	5.33	5.16	0.19	-0.72
3/15/2006 16:02:02	57722.5	1303.0	5.32	5.15	0.19	-0.71
3/15/2006 16:02:04	57724.0	1304.5	5.33	5.16	0.19	-0.72
3/15/2006 16:02:17	57737.5	1318.0	5.32	5.15	0.19	-0.71
3/15/2006 16:02:18	57738.0	1318.5	5.33	5.16	0.19	-0.72
3/15/2006 16:02:57	57777.5	1358.0	5.34	5.17	0.18	-0.74
3/15/2006 16:03:03	57783.0	1363.5	5.33	5.16	0.19	-0.73
3/15/2006 16:03:08	57788.0	1368.5	5.34	5.17	0.18	-0.74
3/15/2006 16:03:22	57802.5	1383.0	5.33	5.16	0.19	-0.73
3/15/2006 16:03:26	57806.0	1386.5	5.34	5.17	0.18	-0.74
3/15/2006 16:03:47	57827.0	1407.5	5.33	5.16	0.19	-0.73
3/15/2006 16:03:49	57829.5	1410.0	5.34	5.17	0.18	-0.74
3/15/2006 16:04:36	57876.0	1456.5	5.35	5.17	0.17	-0.76
3/15/2006 16:04:36	57876.5	1457.0	5.34	5.17	0.18	-0.75
3/15/2006 16:04:52	57892.0	1472.5	5.33	5.16	0.19	-0.73
3/15/2006 16:04:52	57892.5	1473.0	5.33	5.16	0.19	-0.71
3/15/2006 16:04:53	57893.0	1473.5	5.34	5.17	0.18	-0.74
3/15/2006 16:04:53	57893.5	1474.0	5.33	5.16	0.19	-0.73
3/15/2006 16:04:54	57894.0	1474.5	5.34	5.17	0.18	-0.75
3/15/2006 16:04:55	57895.5	1476.0	5.34	5.17	0.18	-0.74
3/15/2006 16:04:56	57896.5	1477.0	5.34	5.17	0.18	-0.75
3/15/2006 16:05:11	57911.5	1492.0	5.34	5.17	0.18	-0.74
3/15/2006 16:05:12	57912.0	1492.5	5.34	5.17	0.18	-0.75
3/15/2006 16:05:36	57936.5	1517.0	5.35	5.18	0.17	-0.77
3/15/2006 16:05:44	57944.0	1524.5	5.34	5.17	0.18	-0.75
3/15/2006 16:05:49	57949.0	1529.5	5.35	5.18	0.17	-0.77
3/15/2006 16:05:50	57950.0	1530.5	5.35	5.17	0.17	-0.76
3/15/2006 16:05:51	57951.0	1531.5	5.34	5.17	0.18	-0.75
3/15/2006 16:05:51	57951.5	1532.0	5.35	5.17	0.17	-0.76
3/15/2006 16:06:22	57982.5	1563.0	5.35	5.18	0.17	-0.77
3/15/2006 16:06:24	57984.5	1565.0	5.35	5.17	0.17	-0.76
3/15/2006 16:06:26	57986.5	1567.0	5.35	5.18	0.17	-0.77
3/15/2006 16:06:27	57987.0	1567.5	5.35	5.17	0.17	-0.76
3/15/2006 16:06:30	57990.0	1570.5	5.35	5.18	0.17	-0.77
3/15/2006 16:06:30	57990.5	1571.0	5.35	5.17	0.17	-0.76
3/15/2006 16:06:32	57992.5	1573.0	5.35	5.18	0.17	-0.77
3/15/2006 16:06:37	57997.5	1578.0	5.35	5.17	0.17	-0.76
3/15/2006 16:06:40	58000.0	1580.5	5.35	5.18	0.17	-0.77
3/15/2006 16:07:11	58031.5	1612.0	5.35	5.17	0.17	-0.76
3/15/2006 16:07:12	58032.0	1612.5	5.35	5.18	0.17	-0.77
3/15/2006 16:07:17	58037.0	1617.5	5.35	5.17	0.17	-0.76
3/15/2006 16:07:17	58037.5	1618.0	5.35	5.18	0.17	-0.77
3/15/2006 16:07:21	58041.5	1622.0	5.35	5.17	0.17	-0.76
3/15/2006 16:07:22	58042.0	1622.5	5.35	5.18	0.17	-0.77
3/15/2006 16:07:32	58052.5	1633.0	5.35	5.17	0.17	-0.76

Slug Test P4-10

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 16:07:33	58053.0	1633.5	5.35	5.18	0.17	-0.77
3/15/2006 16:07:37	58057.0	1637.5	5.36	5.18	0.16	-0.78
3/15/2006 16:07:37	58057.5	1638.0	5.35	5.18	0.17	-0.76
3/15/2006 16:07:40	58060.5	1641.0	5.35	5.18	0.17	-0.78
3/15/2006 16:07:45	58065.0	1645.5	5.35	5.18	0.17	-0.76
3/15/2006 16:07:48	58068.0	1648.5	5.35	5.18	0.17	-0.78
3/15/2006 16:07:54	58074.0	1654.5	5.35	5.18	0.17	-0.76
3/15/2006 16:07:59	58079.0	1659.5	5.35	5.18	0.17	-0.77
3/15/2006 16:08:02	58082.0	1662.5	5.35	5.18	0.17	-0.76
3/15/2006 16:08:08	58088.5	1669.0	5.35	5.18	0.17	-0.77
3/15/2006 16:08:10	58090.5	1671.0	5.35	5.18	0.17	-0.76
3/15/2006 16:08:11	58091.0	1671.5	5.35	5.18	0.17	-0.77
3/15/2006 16:08:11	58091.5	1672.0	5.35	5.18	0.17	-0.76
3/15/2006 16:08:12	58092.0	1672.5	5.35	5.18	0.17	-0.78
3/15/2006 16:08:13	58093.5	1674.0	5.35	5.17	0.18	-0.76
3/15/2006 16:08:19	58099.5	1680.0	5.35	5.18	0.17	-0.77
3/15/2006 16:08:25	58105.0	1685.5	5.35	5.17	0.18	-0.76
3/15/2006 16:08:25	58105.5	1686.0	5.35	5.18	0.17	-0.77
3/15/2006 16:09:39	58179.0	1759.5	5.36	5.19	0.16	-0.79
3/15/2006 16:09:40	58180.0	1760.5	5.35	5.18	0.17	-0.77
3/15/2006 16:10:01	58201.5	1782.0	5.35	5.17	0.18	-0.76
3/15/2006 16:10:02	58202.0	1782.5	5.35	5.18	0.17	-0.78
3/15/2006 16:10:03	58203.0	1783.5	5.35	5.17	0.17	-0.76
3/15/2006 16:10:03	58203.5	1784.0	5.35	5.18	0.17	-0.77
3/15/2006 16:10:04	58204.5	1785.0	5.35	5.17	0.17	-0.76
3/15/2006 16:10:05	58205.0	1785.5	5.35	5.18	0.17	-0.78
3/15/2006 16:10:14	58214.0	1794.5	5.35	5.17	0.17	-0.76
3/15/2006 16:10:15	58215.0	1795.5	5.35	5.18	0.17	-0.78
3/15/2006 16:10:20	58220.0	1800.5	5.36	5.19	0.16	-0.80
3/15/2006 16:10:21	58221.0	1801.5	5.35	5.18	0.17	-0.77
3/15/2006 16:10:28	58228.0	1808.5	5.36	5.18	0.16	-0.79
3/15/2006 16:10:38	58238.0	1818.5	5.35	5.18	0.17	-0.77
3/15/2006 16:10:38	58238.5	1819.0	5.36	5.18	0.16	-0.79
3/15/2006 16:10:39	58239.5	1820.0	5.35	5.17	0.18	-0.76
3/15/2006 16:10:40	58240.5	1821.0	5.36	5.19	0.16	-0.80
3/15/2006 16:10:41	58241.5	1822.0	5.35	5.18	0.17	-0.77
3/15/2006 16:10:43	58243.5	1824.0	5.36	5.19	0.16	-0.79
3/15/2006 16:10:44	58244.0	1824.5	5.35	5.18	0.17	-0.78
3/15/2006 16:11:17	58277.5	1858.0	5.36	5.19	0.16	-0.79
3/15/2006 16:11:18	58278.0	1858.5	5.35	5.18	0.17	-0.78
3/15/2006 16:11:19	58279.0	1859.5	5.35	5.17	0.17	-0.76
3/15/2006 16:11:19	58279.5	1860.0	5.35	5.18	0.17	-0.77
3/15/2006 16:11:22	58282.5	1863.0	5.36	5.18	0.16	-0.79
3/15/2006 16:11:23	58283.0	1863.5	5.35	5.18	0.17	-0.77
3/15/2006 16:11:23	58283.5	1864.0	5.36	5.18	0.16	-0.79
3/15/2006 16:11:25	58285.5	1866.0	5.35	5.18	0.17	-0.77
3/15/2006 16:11:27	58287.0	1867.5	5.36	5.19	0.16	-0.79
3/15/2006 16:11:28	58288.0	1868.5	5.35	5.18	0.17	-0.77
3/15/2006 16:11:30	58290.0	1870.5	5.36	5.18	0.16	-0.79

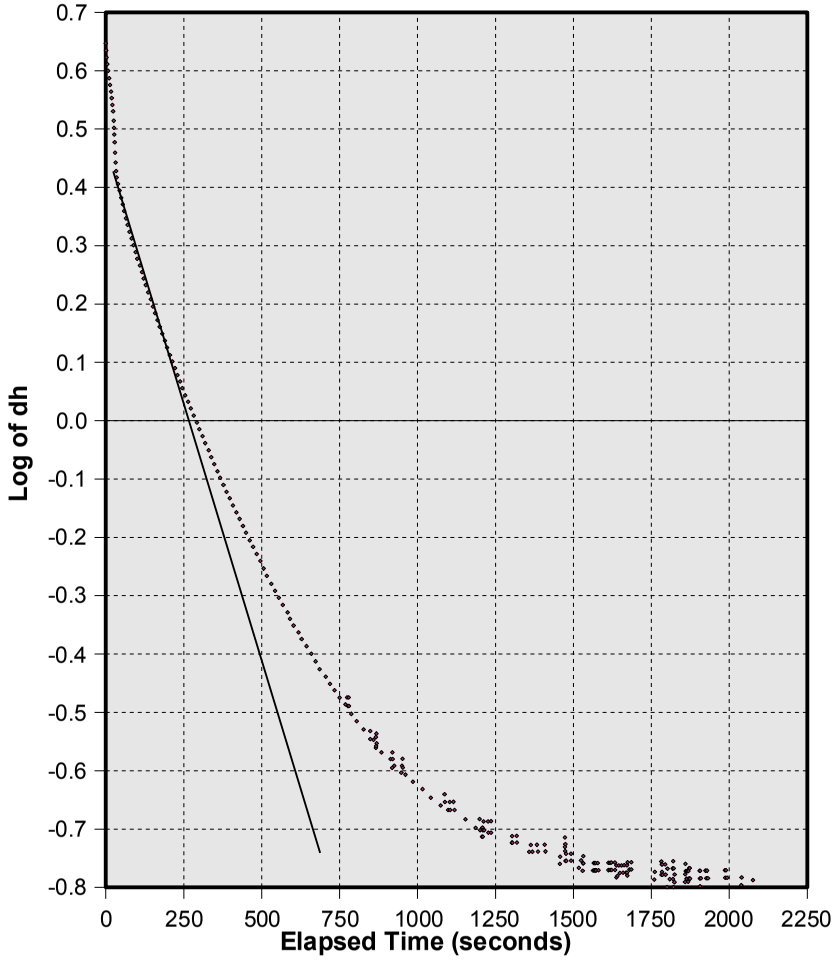
Slug Test P4-10

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 16:11:31	58291.0	1871.5	5.35	5.18	0.17	-0.77
3/15/2006 16:11:31	58291.5	1872.0	5.36	5.18	0.16	-0.79
3/15/2006 16:11:32	58292.5	1873.0	5.35	5.18	0.17	-0.77
3/15/2006 16:11:33	58293.5	1874.0	5.36	5.18	0.16	-0.79
3/15/2006 16:12:04	58324.0	1904.5	5.35	5.18	0.17	-0.77
3/15/2006 16:12:05	58325.0	1905.5	5.36	5.18	0.16	-0.78
3/15/2006 16:12:05	58325.5	1906.0	5.36	5.19	0.16	-0.80
3/15/2006 16:12:06	58326.0	1906.5	5.35	5.18	0.17	-0.77
3/15/2006 16:12:08	58328.0	1908.5	5.36	5.18	0.16	-0.78
3/15/2006 16:12:23	58343.0	1923.5	5.35	5.18	0.17	-0.77
3/15/2006 16:12:25	58345.5	1926.0	5.36	5.18	0.16	-0.78
3/15/2006 16:12:28	58348.0	1928.5	5.35	5.18	0.17	-0.77
3/15/2006 16:12:31	58351.0	1931.5	5.36	5.18	0.16	-0.78
3/15/2006 16:13:25	58405.0	1985.5	5.35	5.18	0.17	-0.77
3/15/2006 16:13:26	58406.5	1987.0	5.36	5.18	0.16	-0.78
3/15/2006 16:13:29	58409.0	1989.5	5.35	5.18	0.17	-0.77
3/15/2006 16:13:32	58412.5	1993.0	5.36	5.18	0.16	-0.78
3/15/2006 16:14:18	58458.0	2038.5	5.36	5.19	0.16	-0.80
3/15/2006 16:14:19	58459.0	2039.5	5.36	5.18	0.16	-0.78
3/15/2006 16:14:55	58495.5	2076.0	5.36	5.19	0.16	-0.79

Slug Test P4-10

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	28.45	ft
Stick up height:	2.95	ft
Depth to sand pack (BGS):	12.00	ft
Depth to screened interval (BGS):	13.45	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	23.25	ft
Initial Head Change:	4.44	ft
Total well length:	31.40	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.2061	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	15.00	ft
Length of open section (L_e):	8.15	ft
L_e / r_w:	23.0118	
A (dimensionless):	2.333	
B (dimensionless):	0.385	
Drawdown at time = 0 (y_0):	2.52	ft
Drawdown at time = t (y_t):	1.27	ft
Elapsed Time between y_0 and y_t (t):	170.5	sec
Initial water column in well (L_w):	8.15	ft
$\ln(R_e/r_w)$ =	1.81	
K =	1.89E-05	ft/sec
	5.77E-04	**cm/sec**
	597.42	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P4-11

Initial offset in logger reading (feet):	0.169	Date:	03/16/06
Offset increment in logger reading (feet/sec):	0.000105		
Initial depth to water table (feet):	7.60		
Depth of probe below water table (feet):	3.03		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/16/2006 9:47:55	35275.5	0.0	8.39	8.21	5.18	0.71
3/16/2006 9:47:56	35276.0	0.5	8.12	7.94	4.91	0.69
3/16/2006 9:47:56	35276.5	1.0	7.97	7.80	4.76	0.68
3/16/2006 9:47:57	35277.0	1.5	7.81	7.64	4.60	0.66
3/16/2006 9:47:57	35277.5	2.0	7.68	7.50	4.47	0.65
3/16/2006 9:47:58	35278.0	2.5	7.54	7.36	4.33	0.64
3/16/2006 9:47:58	35278.5	3.0	7.41	7.23	4.20	0.62
3/16/2006 9:47:59	35279.0	3.5	7.30	7.12	4.09	0.61
3/16/2006 9:47:59	35279.5	4.0	7.18	7.00	3.97	0.60
3/16/2006 9:48:00	35280.0	4.5	7.07	6.89	3.86	0.59
3/16/2006 9:48:00	35280.5	5.0	6.97	6.79	3.76	0.58
3/16/2006 9:48:01	35281.0	5.5	6.87	6.69	3.66	0.56
3/16/2006 9:48:01	35281.5	6.0	6.78	6.60	3.57	0.55
3/16/2006 9:48:02	35282.0	6.5	6.69	6.51	3.48	0.54
3/16/2006 9:48:02	35282.5	7.0	6.60	6.42	3.39	0.53
3/16/2006 9:48:03	35283.0	7.5	6.52	6.34	3.31	0.52
3/16/2006 9:48:03	35283.5	8.0	6.44	6.26	3.23	0.51
3/16/2006 9:48:04	35284.0	8.5	6.36	6.18	3.15	0.50
3/16/2006 9:48:04	35284.5	9.0	6.29	6.11	3.08	0.49
3/16/2006 9:48:05	35285.0	9.5	6.22	6.04	3.01	0.48
3/16/2006 9:48:05	35285.5	10.0	6.15	5.97	2.94	0.47
3/16/2006 9:48:06	35286.5	11.0	6.02	5.84	2.81	0.45
3/16/2006 9:48:07	35287.0	11.5	5.95	5.78	2.74	0.44
3/16/2006 9:48:08	35288.0	12.5	5.84	5.66	2.63	0.42
3/16/2006 9:48:08	35288.5	13.0	5.78	5.60	2.57	0.41
3/16/2006 9:48:09	35289.5	14.0	5.67	5.49	2.46	0.39
3/16/2006 9:48:10	35290.0	14.5	5.62	5.44	2.40	0.38
3/16/2006 9:48:11	35291.0	15.5	5.51	5.34	2.30	0.36
3/16/2006 9:48:12	35292.0	16.5	5.41	5.24	2.20	0.34
3/16/2006 9:48:13	35293.0	17.5	5.32	5.14	2.11	0.32
3/16/2006 9:48:14	35294.0	18.5	5.23	5.05	2.02	0.30
3/16/2006 9:48:15	35295.0	19.5	5.14	4.96	1.93	0.29
3/16/2006 9:48:16	35296.0	20.5	5.06	4.88	1.85	0.27
3/16/2006 9:48:17	35297.0	21.5	4.98	4.80	1.77	0.25
3/16/2006 9:48:18	35298.0	22.5	4.90	4.72	1.69	0.23
3/16/2006 9:48:19	35299.0	23.5	4.83	4.65	1.62	0.21
3/16/2006 9:48:19	35299.5	24.0	4.79	4.61	1.58	0.20
3/16/2006 9:48:20	35300.5	25.0	4.72	4.54	1.51	0.18
3/16/2006 9:48:21	35301.0	25.5	4.68	4.50	1.47	0.17
3/16/2006 9:48:22	35302.0	26.5	4.62	4.44	1.41	0.15
3/16/2006 9:48:22	35302.5	27.0	4.59	4.41	1.38	0.14
3/16/2006 9:48:23	35303.5	28.0	4.53	4.35	1.32	0.12
3/16/2006 9:48:24	35304.0	28.5	4.50	4.32	1.29	0.11
3/16/2006 9:48:25	35305.0	29.5	4.44	4.26	1.23	0.09

Slug Test P4-11

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/16/2006 9:48:26	35306.0	30.5	4.40	4.22	1.18	0.07
3/16/2006 9:48:26	35306.5	31.0	4.37	4.19	1.15	0.06
3/16/2006 9:48:27	35307.5	32.0	4.32	4.14	1.11	0.04
3/16/2006 9:48:28	35308.5	33.0	4.27	4.09	1.06	0.03
3/16/2006 9:48:29	35309.5	34.0	4.23	4.05	1.02	0.01
3/16/2006 9:48:30	35310.5	35.0	4.19	4.01	0.97	-0.01
3/16/2006 9:48:31	35311.5	36.0	4.15	3.97	0.94	-0.03
3/16/2006 9:48:32	35312.0	36.5	4.13	3.95	0.92	-0.04
3/16/2006 9:48:33	35313.0	37.5	4.09	3.91	0.88	-0.05
3/16/2006 9:48:34	35314.0	38.5	4.06	3.88	0.85	-0.07
3/16/2006 9:48:35	35315.0	39.5	4.03	3.85	0.81	-0.09
3/16/2006 9:48:36	35316.0	40.5	4.00	3.82	0.78	-0.11
3/16/2006 9:48:37	35317.0	41.5	3.96	3.78	0.75	-0.12
3/16/2006 9:48:38	35318.0	42.5	3.94	3.76	0.72	-0.14
3/16/2006 9:48:39	35319.0	43.5	3.91	3.73	0.69	-0.16
3/16/2006 9:48:40	35320.0	44.5	3.88	3.70	0.67	-0.17
3/16/2006 9:48:41	35321.0	45.5	3.86	3.68	0.64	-0.19
3/16/2006 9:48:42	35322.0	46.5	3.83	3.65	0.62	-0.21
3/16/2006 9:48:43	35323.0	47.5	3.81	3.63	0.60	-0.22
3/16/2006 9:48:44	35324.0	48.5	3.79	3.61	0.58	-0.24
3/16/2006 9:48:45	35325.0	49.5	3.77	3.59	0.56	-0.25
3/16/2006 9:48:46	35326.0	50.5	3.75	3.57	0.54	-0.27
3/16/2006 9:48:47	35327.0	51.5	3.73	3.55	0.52	-0.29
3/16/2006 9:48:47	35327.5	52.0	3.72	3.54	0.51	-0.30
3/16/2006 9:48:48	35328.5	53.0	3.71	3.52	0.49	-0.31
3/16/2006 9:48:49	35329.5	54.0	3.69	3.51	0.47	-0.32
3/16/2006 9:48:50	35330.5	55.0	3.67	3.49	0.46	-0.34
3/16/2006 9:48:51	35331.5	56.0	3.66	3.48	0.44	-0.35
3/16/2006 9:48:52	35332.5	57.0	3.64	3.46	0.43	-0.37
3/16/2006 9:48:53	35333.5	58.0	3.63	3.45	0.42	-0.38
3/16/2006 9:48:54	35334.5	59.0	3.62	3.43	0.40	-0.40
3/16/2006 9:48:55	35335.5	60.0	3.60	3.42	0.39	-0.41
3/16/2006 9:48:56	35336.5	61.0	3.59	3.41	0.38	-0.43
3/16/2006 9:48:57	35337.5	62.0	3.58	3.40	0.36	-0.44
3/16/2006 9:48:58	35338.5	63.0	3.57	3.38	0.35	-0.45
3/16/2006 9:48:59	35339.5	64.0	3.56	3.37	0.34	-0.47
3/16/2006 9:49:00	35340.5	65.0	3.55	3.36	0.33	-0.48
3/16/2006 9:49:01	35341.5	66.0	3.54	3.35	0.32	-0.50
3/16/2006 9:49:02	35342.5	67.0	3.53	3.34	0.31	-0.51
3/16/2006 9:49:03	35343.5	68.0	3.52	3.34	0.30	-0.52
3/16/2006 9:49:04	35344.0	68.5	3.51	3.33	0.30	-0.53
3/16/2006 9:49:05	35345.0	69.5	3.51	3.32	0.29	-0.54
3/16/2006 9:49:06	35346.0	70.5	3.50	3.31	0.28	-0.55
3/16/2006 9:49:07	35347.0	71.5	3.49	3.30	0.27	-0.56
3/16/2006 9:49:08	35348.0	72.5	3.48	3.30	0.27	-0.58
3/16/2006 9:49:09	35349.0	73.5	3.48	3.29	0.26	-0.59
3/16/2006 9:49:10	35350.0	74.5	3.47	3.28	0.25	-0.60
3/16/2006 9:49:11	35351.0	75.5	3.46	3.27	0.24	-0.62
3/16/2006 9:49:12	35352.0	76.5	3.45	3.27	0.23	-0.63

Slug Test P4-11

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/16/2006 9:49:13	35353.5	78.0	3.44	3.26	0.23	-0.65
3/16/2006 9:49:15	35355.0	79.5	3.44	3.25	0.22	-0.66
3/16/2006 9:49:16	35356.0	80.5	3.43	3.24	0.21	-0.68
3/16/2006 9:49:18	35358.0	82.5	3.42	3.23	0.20	-0.69
3/16/2006 9:49:19	35359.5	84.0	3.41	3.23	0.19	-0.71
3/16/2006 9:49:21	35361.0	85.5	3.40	3.22	0.19	-0.73
3/16/2006 9:49:22	35362.5	87.0	3.40	3.21	0.18	-0.74
3/16/2006 9:49:24	35364.0	88.5	3.39	3.20	0.17	-0.76
3/16/2006 9:49:25	35365.0	89.5	3.39	3.20	0.17	-0.78
3/16/2006 9:49:26	35366.5	91.0	3.38	3.20	0.16	-0.79
3/16/2006 9:49:27	35367.5	92.0	3.38	3.19	0.16	-0.80
3/16/2006 9:49:29	35369.0	93.5	3.37	3.19	0.15	-0.81
3/16/2006 9:49:30	35370.5	95.0	3.37	3.18	0.15	-0.83
3/16/2006 9:49:31	35371.0	95.5	3.36	3.18	0.14	-0.84
3/16/2006 9:49:33	35373.0	97.5	3.36	3.17	0.14	-0.86
3/16/2006 9:49:35	35375.0	99.5	3.35	3.16	0.13	-0.88
3/16/2006 9:49:35	35375.5	100.0	3.35	3.16	0.13	-0.89
3/16/2006 9:49:38	35378.0	102.5	3.35	3.16	0.13	-0.90
3/16/2006 9:49:40	35380.0	104.5	3.34	3.15	0.12	-0.92
3/16/2006 9:49:40	35380.5	105.0	3.34	3.15	0.12	-0.93
3/16/2006 9:49:42	35382.5	107.0	3.33	3.14	0.11	-0.96
3/16/2006 9:49:45	35385.5	110.0	3.33	3.14	0.11	-0.97
3/16/2006 9:49:47	35387.5	112.0	3.32	3.13	0.10	-0.99
3/16/2006 9:49:50	35390.5	115.0	3.32	3.13	0.10	-1.01
3/16/2006 9:49:52	35392.5	117.0	3.31	3.12	0.09	-1.04
3/16/2006 9:49:54	35394.5	119.0	3.31	3.12	0.09	-1.05
3/16/2006 9:49:55	35395.5	120.0	3.31	3.12	0.09	-1.06
3/16/2006 9:49:57	35397.0	121.5	3.31	3.12	0.09	-1.07
3/16/2006 9:49:58	35398.0	122.5	3.30	3.11	0.08	-1.08
3/16/2006 9:49:59	35399.5	124.0	3.30	3.11	0.08	-1.10
3/16/2006 9:50:01	35401.0	125.5	3.30	3.11	0.08	-1.11
3/16/2006 9:50:02	35402.0	126.5	3.30	3.11	0.08	-1.12
3/16/2006 9:50:02	35402.5	127.0	3.30	3.11	0.08	-1.11
3/16/2006 9:50:03	35403.0	127.5	3.30	3.11	0.08	-1.12
3/16/2006 9:50:04	35404.0	128.5	3.30	3.10	0.07	-1.14
3/16/2006 9:50:05	35405.5	130.0	3.29	3.10	0.07	-1.15
3/16/2006 9:50:06	35406.0	130.5	3.30	3.11	0.07	-1.13
3/16/2006 9:50:06	35406.5	131.0	3.29	3.10	0.07	-1.15
3/16/2006 9:50:07	35407.5	132.0	3.29	3.10	0.07	-1.17
3/16/2006 9:50:09	35409.5	134.0	3.29	3.10	0.07	-1.18
3/16/2006 9:50:11	35411.5	136.0	3.29	3.10	0.06	-1.20
3/16/2006 9:50:12	35412.5	137.0	3.28	3.09	0.06	-1.22
3/16/2006 9:50:13	35413.0	137.5	3.29	3.10	0.06	-1.20
3/16/2006 9:50:13	35413.5	138.0	3.28	3.09	0.06	-1.22
3/16/2006 9:50:14	35414.0	138.5	3.28	3.09	0.06	-1.23
3/16/2006 9:50:15	35415.5	140.0	3.28	3.09	0.06	-1.25
3/16/2006 9:50:18	35418.5	143.0	3.28	3.09	0.05	-1.27
3/16/2006 9:50:21	35421.0	145.5	3.28	3.08	0.05	-1.29
3/16/2006 9:50:23	35423.0	147.5	3.27	3.08	0.05	-1.31

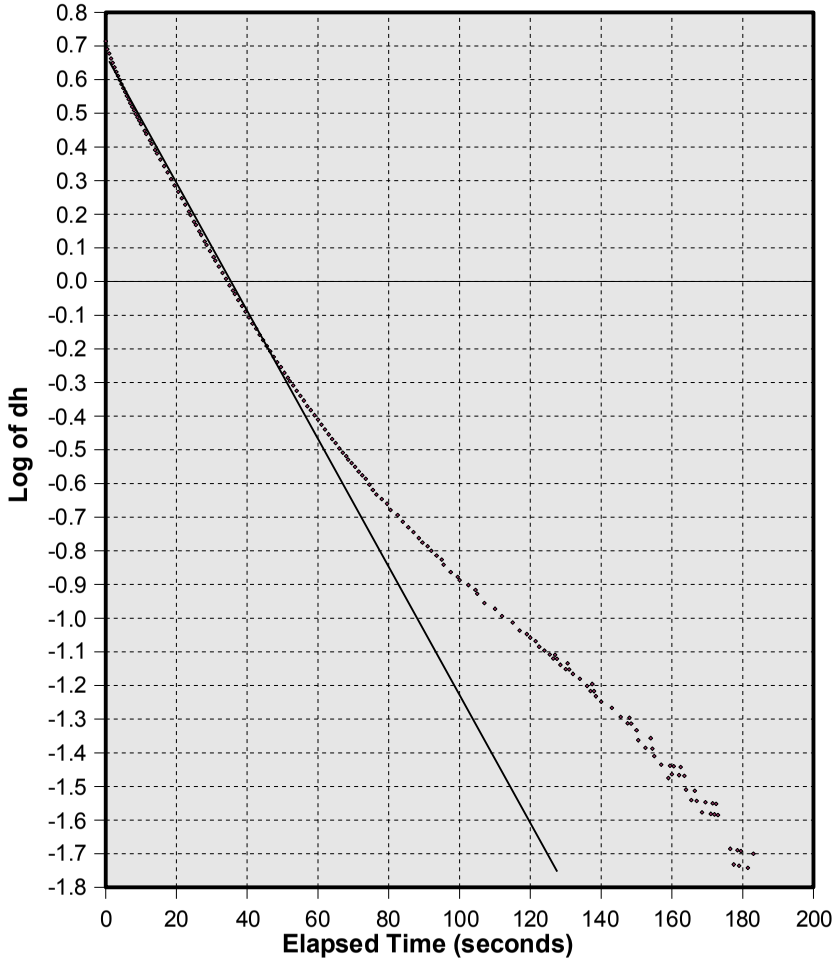
Slug Test P4-11

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/16/2006 9:50:23	35423.5	148.0	3.28	3.08	0.05	-1.30
3/16/2006 9:50:24	35424.0	148.5	3.27	3.08	0.05	-1.31
3/16/2006 9:50:25	35425.5	150.0	3.27	3.08	0.05	-1.33
3/16/2006 9:50:26	35426.0	150.5	3.27	3.08	0.04	-1.36
3/16/2006 9:50:28	35428.0	152.5	3.27	3.07	0.04	-1.39
3/16/2006 9:50:29	35429.5	154.0	3.27	3.08	0.04	-1.36
3/16/2006 9:50:30	35430.0	154.5	3.27	3.07	0.04	-1.39
3/16/2006 9:50:30	35430.5	155.0	3.26	3.07	0.04	-1.41
3/16/2006 9:50:32	35432.5	157.0	3.26	3.07	0.04	-1.44
3/16/2006 9:50:34	35434.5	159.0	3.26	3.07	0.03	-1.48
3/16/2006 9:50:35	35435.0	159.5	3.26	3.07	0.04	-1.44
3/16/2006 9:50:35	35435.5	160.0	3.26	3.07	0.03	-1.46
3/16/2006 9:50:36	35436.0	160.5	3.26	3.07	0.04	-1.44
3/16/2006 9:50:37	35437.5	162.0	3.26	3.07	0.03	-1.47
3/16/2006 9:50:38	35438.0	162.5	3.26	3.07	0.04	-1.44
3/16/2006 9:50:39	35439.0	163.5	3.26	3.07	0.03	-1.47
3/16/2006 9:50:39	35439.5	164.0	3.26	3.06	0.03	-1.51
3/16/2006 9:50:41	35441.0	165.5	3.26	3.06	0.03	-1.54
3/16/2006 9:50:42	35442.0	166.5	3.26	3.06	0.03	-1.51
3/16/2006 9:50:42	35442.5	167.0	3.26	3.06	0.03	-1.54
3/16/2006 9:50:44	35444.0	168.5	3.25	3.06	0.03	-1.58
3/16/2006 9:50:45	35445.0	169.5	3.26	3.06	0.03	-1.55
3/16/2006 9:50:46	35446.5	171.0	3.25	3.06	0.03	-1.58
3/16/2006 9:50:47	35447.0	171.5	3.26	3.06	0.03	-1.55
3/16/2006 9:50:47	35447.5	172.0	3.25	3.06	0.03	-1.58
3/16/2006 9:50:48	35448.0	172.5	3.26	3.06	0.03	-1.55
3/16/2006 9:50:48	35448.5	173.0	3.25	3.06	0.03	-1.58
3/16/2006 9:50:52	35452.0	176.5	3.25	3.05	0.02	-1.69
3/16/2006 9:50:53	35453.0	177.5	3.25	3.05	0.02	-1.73
3/16/2006 9:50:54	35454.0	178.5	3.25	3.05	0.02	-1.69
3/16/2006 9:50:54	35454.5	179.0	3.25	3.05	0.02	-1.74
3/16/2006 9:50:55	35455.0	179.5	3.25	3.05	0.02	-1.69
3/16/2006 9:50:57	35457.0	181.5	3.25	3.05	0.02	-1.74
3/16/2006 9:50:58	35458.5	183.0	3.25	3.05	0.02	-1.70

Slug Test P4-11

Slug Test by Bouwer and Rice

Displacement Method:	Injection	
Well depth:	12.42	ft
Stick up height:	2.68	ft
Depth to sand pack (BGS):	5.00	ft
Depth to screened interval (BGS):	7.42	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	7.60	ft
Initial Head Change:	5.18	ft
Total well length:	15.10	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.0833	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	5.00	ft
Length of open section (L_e):	5.00	ft
L_e / r_w:	14.1176	
A (dimensionless):	2.052	
B (dimensionless):	0.327	
Drawdown at time = 0 (y_0):	3.97	ft
Drawdown at time = t (y_t):	0.62	ft
Elapsed Time between y_0 and y_t (t):	40	sec
Initial water column in well (L_w):	7.50	ft
$\ln(R_e/r_w)$ =	1.55	
K =	5.00E-05	ft/sec
	1.52E-03	**cm/sec**
	1575.74	ft/yr



Water above sand pack:	Yes
%Duration below sand pack:	0.00%
Water above screen:	Yes
%Duration below screen:	0.00%

Slug Test P4-12

Initial offset in logger reading (feet):	0.094	Date:	03/31/2006
Offset increment in logger reading (feet/sec):	0.000060		
Initial depth to water table (feet):	9.38		
Depth of probe below water table (feet):	6.60		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 15:22:21	55341.0	0.0	1.26	1.13	5.47	0.74
3/31/2006 15:22:22	55342.5	1.5	1.46	1.33	5.27	0.72
3/31/2006 15:22:23	55343.5	2.5	1.61	1.48	5.12	0.71
3/31/2006 15:22:24	55344.5	3.5	1.75	1.62	4.98	0.70
3/31/2006 15:22:25	55345.5	4.5	1.88	1.76	4.85	0.69
3/31/2006 15:22:26	55346.5	5.5	2.02	1.89	4.71	0.67
3/31/2006 15:22:27	55347.5	6.5	2.14	2.01	4.59	0.66
3/31/2006 15:22:28	55348.5	7.5	2.26	2.14	4.47	0.65
3/31/2006 15:22:29	55349.5	8.5	2.38	2.25	4.35	0.64
3/31/2006 15:22:30	55350.5	9.5	2.48	2.35	4.25	0.63
3/31/2006 15:22:32	55352.0	11.0	2.61	2.48	4.12	0.62
3/31/2006 15:22:34	55354.0	13.0	2.72	2.59	4.01	0.60
3/31/2006 15:22:36	55356.0	15.0	2.83	2.71	3.90	0.59
3/31/2006 15:22:37	55357.5	16.5	2.93	2.81	3.80	0.58
3/31/2006 15:22:39	55359.5	18.5	3.05	2.92	3.68	0.57
3/31/2006 15:22:41	55361.5	20.5	3.16	3.03	3.57	0.55
3/31/2006 15:22:43	55363.5	22.5	3.25	3.13	3.48	0.54
3/31/2006 15:22:46	55366.5	25.5	3.34	3.22	3.39	0.53
3/31/2006 15:22:50	55370.0	29.0	3.42	3.30	3.31	0.52
3/31/2006 15:22:53	55373.5	32.5	3.51	3.38	3.22	0.51
3/31/2006 15:22:56	55376.5	35.5	3.59	3.46	3.15	0.50
3/31/2006 15:23:00	55380.5	39.5	3.66	3.53	3.07	0.49
3/31/2006 15:23:05	55385.0	44.0	3.74	3.61	2.99	0.48
3/31/2006 15:23:09	55389.5	48.5	3.81	3.68	2.92	0.47
3/31/2006 15:23:14	55394.0	53.0	3.88	3.75	2.85	0.46
3/31/2006 15:23:18	55398.5	57.5	3.95	3.82	2.79	0.44
3/31/2006 15:23:23	55403.0	62.0	4.02	3.89	2.72	0.43
3/31/2006 15:23:27	55407.0	66.0	4.08	3.95	2.65	0.42
3/31/2006 15:23:31	55411.0	70.0	4.15	4.02	2.58	0.41
3/31/2006 15:23:34	55414.5	73.5	4.22	4.09	2.52	0.40
3/31/2006 15:23:37	55417.0	76.0	4.28	4.15	2.46	0.39
3/31/2006 15:23:39	55419.5	78.5	4.34	4.20	2.40	0.38
3/31/2006 15:23:42	55422.0	81.0	4.40	4.26	2.34	0.37
3/31/2006 15:23:44	55424.5	83.5	4.45	4.32	2.28	0.36
3/31/2006 15:23:47	55427.0	86.0	4.51	4.38	2.23	0.35
3/31/2006 15:23:49	55429.5	88.5	4.56	4.43	2.17	0.34
3/31/2006 15:23:53	55433.0	92.0	4.62	4.49	2.12	0.33
3/31/2006 15:23:56	55436.5	95.5	4.67	4.54	2.07	0.32
3/31/2006 15:24:01	55441.5	100.5	4.72	4.59	2.02	0.30
3/31/2006 15:24:05	55445.5	104.5	4.77	4.64	1.97	0.29
3/31/2006 15:24:10	55450.0	109.0	4.82	4.68	1.92	0.28
3/31/2006 15:24:14	55454.5	113.5	4.86	4.73	1.88	0.27
3/31/2006 15:24:19	55459.0	118.0	4.91	4.77	1.83	0.26
3/31/2006 15:24:23	55463.0	122.0	4.95	4.82	1.79	0.25

Slug Test P4-12

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 15:24:27	55467.5	126.5	5.00	4.86	1.74	0.24
3/31/2006 15:24:31	55471.5	130.5	5.04	4.90	1.70	0.23
3/31/2006 15:24:36	55476.0	135.0	5.08	4.94	1.66	0.22
3/31/2006 15:24:40	55480.0	139.0	5.12	4.98	1.62	0.21
3/31/2006 15:24:44	55484.5	143.5	5.16	5.02	1.58	0.20
3/31/2006 15:24:49	55489.5	148.5	5.20	5.06	1.54	0.19
3/31/2006 15:24:54	55494.0	153.0	5.24	5.10	1.50	0.18
3/31/2006 15:24:59	55499.0	158.0	5.27	5.14	1.47	0.17
3/31/2006 15:25:04	55504.0	163.0	5.31	5.17	1.43	0.16
3/31/2006 15:25:08	55508.0	167.0	5.34	5.21	1.40	0.15
3/31/2006 15:25:12	55512.5	171.5	5.38	5.24	1.36	0.13
3/31/2006 15:25:17	55517.0	176.0	5.41	5.27	1.33	0.12
3/31/2006 15:25:21	55521.5	180.5	5.44	5.30	1.30	0.11
3/31/2006 15:25:26	55526.0	185.0	5.47	5.34	1.27	0.10
3/31/2006 15:25:31	55531.0	190.0	5.50	5.36	1.24	0.09
3/31/2006 15:25:36	55536.0	195.0	5.53	5.40	1.21	0.08
3/31/2006 15:25:41	55541.0	200.0	5.56	5.42	1.18	0.07
3/31/2006 15:25:46	55546.0	205.0	5.59	5.45	1.15	0.06
3/31/2006 15:25:51	55551.5	210.5	5.62	5.48	1.12	0.05
3/31/2006 15:25:57	55557.0	216.0	5.65	5.51	1.09	0.04
3/31/2006 15:26:01	55561.5	220.5	5.68	5.53	1.07	0.03
3/31/2006 15:26:06	55566.0	225.0	5.70	5.56	1.04	0.02
3/31/2006 15:26:10	55570.5	229.5	5.73	5.59	1.02	0.01
3/31/2006 15:26:16	55576.0	235.0	5.75	5.61	0.99	0.00
3/31/2006 15:26:20	55580.0	239.0	5.78	5.63	0.97	-0.01
3/31/2006 15:26:24	55584.0	243.0	5.80	5.66	0.94	-0.03
3/31/2006 15:26:29	55589.0	248.0	5.83	5.68	0.92	-0.04
3/31/2006 15:26:33	55593.0	252.0	5.85	5.71	0.90	-0.05
3/31/2006 15:26:37	55597.0	256.0	5.87	5.73	0.88	-0.06
3/31/2006 15:26:41	55601.0	260.0	5.89	5.75	0.86	-0.07
3/31/2006 15:26:45	55605.5	264.5	5.91	5.77	0.84	-0.08
3/31/2006 15:26:49	55609.5	268.5	5.93	5.79	0.82	-0.09
3/31/2006 15:26:52	55612.5	271.5	5.95	5.81	0.80	-0.10
3/31/2006 15:26:56	55616.5	275.5	5.97	5.83	0.78	-0.11
3/31/2006 15:27:00	55620.0	279.0	5.99	5.84	0.76	-0.12
3/31/2006 15:27:04	55624.5	283.5	6.01	5.86	0.74	-0.13
3/31/2006 15:27:09	55629.0	288.0	6.03	5.88	0.72	-0.14
3/31/2006 15:27:14	55634.0	293.0	6.05	5.90	0.70	-0.15
3/31/2006 15:27:17	55637.5	296.5	6.07	5.92	0.68	-0.17
3/31/2006 15:27:22	55642.0	301.0	6.08	5.94	0.67	-0.18
3/31/2006 15:27:26	55646.5	305.5	6.10	5.96	0.65	-0.19
3/31/2006 15:27:30	55650.5	309.5	6.12	5.97	0.63	-0.20
3/31/2006 15:27:35	55655.0	314.0	6.13	5.99	0.62	-0.21
3/31/2006 15:27:39	55659.5	318.5	6.15	6.00	0.60	-0.22
3/31/2006 15:27:44	55664.5	323.5	6.16	6.02	0.59	-0.23
3/31/2006 15:27:49	55669.0	328.0	6.18	6.03	0.57	-0.24
3/31/2006 15:27:54	55674.0	333.0	6.19	6.05	0.56	-0.25
3/31/2006 15:27:58	55678.5	337.5	6.21	6.06	0.54	-0.26
3/31/2006 15:28:03	55683.0	342.0	6.22	6.07	0.53	-0.28

Slug Test P4-12

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 15:28:07	55687.0	346.0	6.24	6.09	0.52	-0.29
3/31/2006 15:28:11	55691.0	350.0	6.25	6.10	0.50	-0.30
3/31/2006 15:28:15	55695.0	354.0	6.26	6.11	0.49	-0.31
3/31/2006 15:28:19	55699.0	358.0	6.28	6.13	0.47	-0.32
3/31/2006 15:28:24	55704.0	363.0	6.29	6.14	0.46	-0.33
3/31/2006 15:28:27	55707.0	366.0	6.30	6.15	0.45	-0.34
3/31/2006 15:28:31	55711.5	370.5	6.32	6.17	0.44	-0.36
3/31/2006 15:28:35	55715.5	374.5	6.33	6.18	0.43	-0.37
3/31/2006 15:28:38	55718.5	377.5	6.34	6.19	0.42	-0.38
3/31/2006 15:28:43	55723.0	382.0	6.35	6.20	0.41	-0.39
3/31/2006 15:28:48	55728.0	387.0	6.36	6.21	0.39	-0.40
3/31/2006 15:28:50	55730.0	389.0	6.37	6.22	0.38	-0.41
3/31/2006 15:28:51	55731.0	390.0	6.38	6.23	0.38	-0.43
3/31/2006 15:28:52	55732.5	391.5	6.39	6.24	0.36	-0.44
3/31/2006 15:28:54	55734.5	393.5	6.40	6.25	0.35	-0.45
3/31/2006 15:28:56	55736.0	395.0	6.41	6.26	0.35	-0.46
3/31/2006 15:28:57	55737.5	396.5	6.42	6.27	0.33	-0.48
3/31/2006 15:28:59	55739.0	398.0	6.43	6.28	0.32	-0.49
3/31/2006 15:29:00	55740.5	399.5	6.44	6.29	0.32	-0.50
3/31/2006 15:29:02	55742.0	401.0	6.45	6.30	0.30	-0.52
3/31/2006 15:29:03	55743.5	402.5	6.46	6.31	0.30	-0.53
3/31/2006 15:29:05	55745.0	404.0	6.47	6.31	0.29	-0.54
3/31/2006 15:29:06	55746.5	405.5	6.47	6.32	0.28	-0.55
3/31/2006 15:29:08	55748.0	407.0	6.48	6.33	0.28	-0.56
3/31/2006 15:29:09	55749.0	408.0	6.49	6.33	0.27	-0.57
3/31/2006 15:29:11	55751.0	410.0	6.50	6.34	0.26	-0.59
3/31/2006 15:29:13	55753.0	412.0	6.50	6.35	0.25	-0.60
3/31/2006 15:29:15	55755.0	414.0	6.51	6.36	0.25	-0.61
3/31/2006 15:29:17	55757.0	416.0	6.52	6.37	0.24	-0.62
3/31/2006 15:29:20	55760.0	419.0	6.52	6.37	0.23	-0.64
3/31/2006 15:29:22	55762.0	421.0	6.53	6.38	0.22	-0.65
3/31/2006 15:29:23	55763.0	422.0	6.54	6.39	0.22	-0.66
3/31/2006 15:29:25	55765.5	424.5	6.55	6.39	0.21	-0.68
3/31/2006 15:29:27	55767.0	426.0	6.55	6.40	0.21	-0.69
3/31/2006 15:29:28	55768.0	427.0	6.56	6.40	0.20	-0.70
3/31/2006 15:29:30	55770.0	429.0	6.56	6.41	0.20	-0.71
3/31/2006 15:29:32	55772.0	431.0	6.57	6.42	0.19	-0.73
3/31/2006 15:29:35	55775.0	434.0	6.58	6.42	0.18	-0.74
3/31/2006 15:29:37	55777.5	436.5	6.59	6.43	0.17	-0.77
3/31/2006 15:29:39	55779.0	438.0	6.59	6.44	0.17	-0.78
3/31/2006 15:29:41	55781.0	440.0	6.60	6.44	0.16	-0.80
3/31/2006 15:29:42	55782.0	441.0	6.60	6.45	0.15	-0.81
3/31/2006 15:29:45	55785.0	444.0	6.61	6.45	0.15	-0.82
3/31/2006 15:29:45	55785.5	444.5	6.61	6.46	0.15	-0.84
3/31/2006 15:29:49	55789.0	448.0	6.62	6.46	0.14	-0.85
3/31/2006 15:29:51	55791.5	450.5	6.62	6.47	0.14	-0.86
3/31/2006 15:29:53	55793.0	452.0	6.63	6.47	0.13	-0.88
3/31/2006 15:29:55	55795.5	454.5	6.63	6.48	0.13	-0.89
3/31/2006 15:29:57	55797.5	456.5	6.63	6.48	0.12	-0.91

Slug Test P4-12

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 15:29:59	55799.0	458.0	6.64	6.48	0.12	-0.92
3/31/2006 15:30:01	55801.0	460.0	6.64	6.49	0.11	-0.94
3/31/2006 15:30:03	55803.5	462.5	6.65	6.49	0.11	-0.96
3/31/2006 15:30:04	55804.5	463.5	6.65	6.50	0.11	-0.97
3/31/2006 15:30:06	55806.5	465.5	6.66	6.50	0.10	-0.99
3/31/2006 15:30:07	55807.5	466.5	6.66	6.51	0.10	-1.01
3/31/2006 15:30:08	55808.0	467.0	6.66	6.51	0.10	-1.02
3/31/2006 15:30:09	55809.5	468.5	6.67	6.51	0.09	-1.05
3/31/2006 15:30:12	55812.0	471.0	6.67	6.52	0.08	-1.07
3/31/2006 15:30:12	55812.5	471.5	6.67	6.52	0.09	-1.06
3/31/2006 15:30:17	55817.5	476.5	6.68	6.52	0.08	-1.09
3/31/2006 15:30:19	55819.5	478.5	6.68	6.52	0.08	-1.10
3/31/2006 15:30:20	55820.0	479.0	6.68	6.53	0.08	-1.11
3/31/2006 15:30:22	55822.0	481.0	6.68	6.53	0.08	-1.12
3/31/2006 15:30:23	55823.0	482.0	6.69	6.53	0.07	-1.13
3/31/2006 15:30:23	55823.5	482.5	6.68	6.53	0.08	-1.12
3/31/2006 15:30:24	55824.0	483.0	6.68	6.53	0.08	-1.11
3/31/2006 15:30:24	55824.5	483.5	6.69	6.53	0.07	-1.13
3/31/2006 15:30:28	55828.0	487.0	6.69	6.53	0.07	-1.14
3/31/2006 15:30:28	55828.5	487.5	6.69	6.53	0.07	-1.16
3/31/2006 15:30:29	55829.5	488.5	6.70	6.54	0.06	-1.19
3/31/2006 15:30:30	55830.5	489.5	6.70	6.54	0.06	-1.21
3/31/2006 15:30:31	55831.0	490.0	6.70	6.54	0.06	-1.19
3/31/2006 15:30:31	55831.5	490.5	6.70	6.54	0.06	-1.21
3/31/2006 15:30:33	55833.0	492.0	6.70	6.54	0.06	-1.22
3/31/2006 15:30:33	55833.5	492.5	6.70	6.55	0.06	-1.24
3/31/2006 15:30:34	55834.5	493.5	6.71	6.55	0.06	-1.26
3/31/2006 15:30:35	55835.0	494.0	6.71	6.55	0.05	-1.28
3/31/2006 15:30:35	55835.5	494.5	6.71	6.55	0.05	-1.29
3/31/2006 15:30:36	55836.5	495.5	6.71	6.56	0.05	-1.32
3/31/2006 15:30:38	55838.5	497.5	6.72	6.56	0.04	-1.36
3/31/2006 15:30:40	55840.0	499.0	6.72	6.56	0.04	-1.38
3/31/2006 15:30:40	55840.5	499.5	6.72	6.56	0.04	-1.36
3/31/2006 15:30:41	55841.0	500.0	6.72	6.56	0.04	-1.38
3/31/2006 15:30:43	55843.5	502.5	6.72	6.56	0.04	-1.40
3/31/2006 15:30:45	55845.0	504.0	6.72	6.57	0.04	-1.42
3/31/2006 15:30:45	55845.5	504.5	6.72	6.56	0.04	-1.40
3/31/2006 15:30:46	55846.5	505.5	6.72	6.57	0.04	-1.42
3/31/2006 15:30:47	55847.0	506.0	6.72	6.56	0.04	-1.40
3/31/2006 15:30:47	55847.5	506.5	6.72	6.57	0.04	-1.42
3/31/2006 15:30:48	55848.0	507.0	6.72	6.56	0.04	-1.40
3/31/2006 15:30:49	55849.0	508.0	6.72	6.57	0.04	-1.42
3/31/2006 15:30:53	55853.0	512.0	6.73	6.57	0.04	-1.45
3/31/2006 15:30:54	55854.5	513.5	6.73	6.57	0.03	-1.52
3/31/2006 15:30:55	55855.0	514.0	6.73	6.57	0.03	-1.48
3/31/2006 15:30:55	55855.5	514.5	6.73	6.57	0.03	-1.52
3/31/2006 15:30:56	55856.0	515.0	6.73	6.57	0.03	-1.48
3/31/2006 15:30:59	55859.0	518.0	6.73	6.57	0.03	-1.52
3/31/2006 15:30:59	55859.5	518.5	6.73	6.57	0.03	-1.54

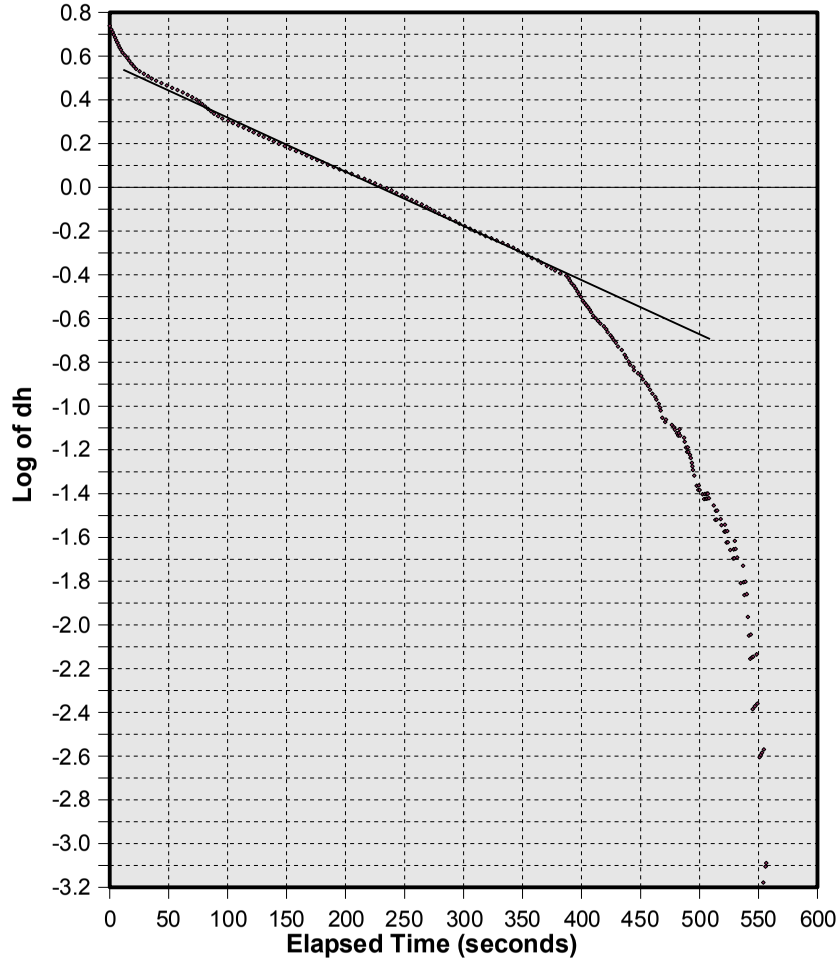
Slug Test P4-12

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/31/2006 15:31:02	55862.0	521.0	6.74	6.58	0.03	-1.57
3/31/2006 15:31:02	55862.5	521.5	6.73	6.57	0.03	-1.54
3/31/2006 15:31:03	55863.0	522.0	6.74	6.58	0.03	-1.57
3/31/2006 15:31:04	55864.0	523.0	6.74	6.58	0.02	-1.62
3/31/2006 15:31:04	55864.5	523.5	6.74	6.58	0.03	-1.57
3/31/2006 15:31:05	55865.0	524.0	6.74	6.58	0.02	-1.62
3/31/2006 15:31:07	55867.0	526.0	6.74	6.58	0.02	-1.66
3/31/2006 15:31:09	55869.5	528.5	6.74	6.58	0.02	-1.70
3/31/2006 15:31:10	55870.0	529.0	6.74	6.58	0.02	-1.65
3/31/2006 15:31:10	55870.5	529.5	6.74	6.58	0.02	-1.69
3/31/2006 15:31:11	55871.0	530.0	6.74	6.58	0.02	-1.62
3/31/2006 15:31:11	55871.5	530.5	6.74	6.58	0.02	-1.65
3/31/2006 15:31:13	55873.0	532.0	6.74	6.58	0.02	-1.69
3/31/2006 15:31:16	55876.0	535.0	6.75	6.59	0.02	-1.81
3/31/2006 15:31:18	55878.0	537.0	6.74	6.58	0.02	-1.73
3/31/2006 15:31:18	55878.5	537.5	6.75	6.59	0.02	-1.80
3/31/2006 15:31:19	55879.0	538.0	6.75	6.59	0.01	-1.86
3/31/2006 15:31:20	55880.0	539.0	6.75	6.59	0.02	-1.80
3/31/2006 15:31:21	55881.0	540.0	6.75	6.59	0.01	-1.86
3/31/2006 15:31:22	55882.0	541.0	6.75	6.59	0.01	-1.96
3/31/2006 15:31:23	55883.0	542.0	6.75	6.59	0.01	-2.05
3/31/2006 15:31:24	55884.0	543.0	6.76	6.60	0.01	-2.15
3/31/2006 15:31:24	55884.5	543.5	6.75	6.59	0.01	-2.04
3/31/2006 15:31:25	55885.5	544.5	6.76	6.60	0.01	-2.15
3/31/2006 15:31:26	55886.0	545.0	6.76	6.60	0.00	-2.38
3/31/2006 15:31:26	55886.5	545.5	6.76	6.60	0.01	-2.15
3/31/2006 15:31:28	55888.0	547.0	6.76	6.60	0.00	-2.37
3/31/2006 15:31:29	55889.5	548.5	6.76	6.60	0.01	-2.13
3/31/2006 15:31:30	55890.0	549.0	6.76	6.60	0.00	-2.36
3/31/2006 15:31:32	55892.0	551.0	6.76	6.60	0.00	-2.60
3/31/2006 15:31:33	55893.0	552.0	6.76	6.60	0.00	-2.59
3/31/2006 15:31:34	55894.0	553.0	6.76	6.60	0.00	-2.58
3/31/2006 15:31:35	55895.0	554.0	6.76	6.60	0.00	-3.18
3/31/2006 15:31:35	55895.5	554.5	6.76	6.60	0.00	-2.57
3/31/2006 15:31:37	55897.0	556.0	6.76	6.60	0.00	-3.10
3/31/2006 15:31:37	55897.5	556.5	6.76	6.60	0.00	-3.09

Slug Test P4-12

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	17.68	ft
Stick up height:	2.41	ft
Depth to sand pack (BGS):	6.25	ft
Depth to screened interval (BGS):	7.68	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	9.38	ft
Initial Head Change:	5.47	ft
Total well length:	20.09	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.2061	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	10.00	ft
Length of open section (L_e):	10.00	ft
L_e / r_w:	28.2353	
A (dimensionless):	2.502	
B (dimensionless):	0.416	
Drawdown at time = 0 (y_0):	3.25	ft
Drawdown at time = t (y_t):	0.39	ft
Elapsed Time between y_0 and y_t (t):	356	sec
Initial water column in well (L_w):	10.71	ft
$\ln(R_e/r_w)$ =	2.00	
K =	2.53E-05	ft/sec
	7.70E-04	**cm/sec**
	796.45	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	87.03%

Slug Test P4-13D

Initial offset in logger reading (feet):	0.163	Date:	03/15/2006
Offset increment in logger reading (feet/sec):	0.000022		
Initial depth to water table (feet):	8.95		
Depth of probe below water table (feet):	4.34		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 15:14:36	54876.0	0.0	10.33	10.16	5.82	0.77
3/15/2006 15:14:38	54878.5	2.5	10.14	9.98	5.64	0.75
3/15/2006 15:14:41	54881.0	5.0	9.97	9.80	5.46	0.74
3/15/2006 15:14:43	54883.5	7.5	9.80	9.63	5.30	0.72
3/15/2006 15:14:46	54886.0	10.0	9.64	9.48	5.14	0.71
3/15/2006 15:14:48	54888.5	12.5	9.49	9.32	4.99	0.70
3/15/2006 15:14:51	54891.0	15.0	9.35	9.18	4.85	0.69
3/15/2006 15:14:53	54893.5	17.5	9.22	9.05	4.71	0.67
3/15/2006 15:14:56	54896.0	20.0	9.09	8.92	4.59	0.66
3/15/2006 15:14:58	54898.5	22.5	8.96	8.80	4.46	0.65
3/15/2006 15:15:01	54901.0	25.0	8.84	8.68	4.34	0.64
3/15/2006 15:15:03	54903.5	27.5	8.73	8.56	4.22	0.63
3/15/2006 15:15:06	54906.0	30.0	8.61	8.44	4.11	0.61
3/15/2006 15:15:08	54908.5	32.5	8.50	8.33	4.00	0.60
3/15/2006 15:15:11	54911.0	35.0	8.39	8.22	3.89	0.59
3/15/2006 15:15:13	54913.5	37.5	8.29	8.12	3.79	0.58
3/15/2006 15:15:16	54916.0	40.0	8.19	8.02	3.69	0.57
3/15/2006 15:15:18	54918.5	42.5	8.09	7.92	3.59	0.55
3/15/2006 15:15:21	54921.0	45.0	7.99	7.83	3.49	0.54
3/15/2006 15:15:23	54923.5	47.5	7.90	7.73	3.40	0.53
3/15/2006 15:15:26	54926.0	50.0	7.81	7.64	3.31	0.52
3/15/2006 15:15:28	54928.5	52.5	7.72	7.55	3.22	0.51
3/15/2006 15:15:31	54931.0	55.0	7.64	7.47	3.14	0.50
3/15/2006 15:15:33	54933.5	57.5	7.55	7.39	3.05	0.48
3/15/2006 15:15:36	54936.0	60.0	7.47	7.31	2.97	0.47
3/15/2006 15:15:38	54938.5	62.5	7.40	7.23	2.90	0.46
3/15/2006 15:15:41	54941.0	65.0	7.32	7.15	2.82	0.45
3/15/2006 15:15:43	54943.5	67.5	7.24	7.08	2.74	0.44
3/15/2006 15:15:46	54946.0	70.0	7.17	7.01	2.67	0.43
3/15/2006 15:15:48	54948.5	72.5	7.10	6.93	2.60	0.41
3/15/2006 15:15:51	54951.0	75.0	7.03	6.87	2.53	0.40
3/15/2006 15:15:53	54953.5	77.5	6.97	6.80	2.46	0.39
3/15/2006 15:15:56	54956.0	80.0	6.90	6.74	2.40	0.38
3/15/2006 15:15:58	54958.5	82.5	6.84	6.67	2.33	0.37
3/15/2006 15:16:01	54961.0	85.0	6.78	6.61	2.27	0.36
3/15/2006 15:16:03	54963.5	87.5	6.72	6.55	2.21	0.35
3/15/2006 15:16:06	54966.0	90.0	6.66	6.49	2.16	0.33
3/15/2006 15:16:08	54968.5	92.5	6.60	6.43	2.10	0.32
3/15/2006 15:16:11	54971.0	95.0	6.54	6.38	2.04	0.31
3/15/2006 15:16:13	54973.5	97.5	6.49	6.32	1.98	0.30
3/15/2006 15:16:16	54976.5	100.5	6.43	6.26	1.92	0.28
3/15/2006 15:16:19	54979.5	103.5	6.36	6.20	1.86	0.27
3/15/2006 15:16:22	54982.0	106.0	6.32	6.15	1.81	0.26
3/15/2006 15:16:24	54984.5	108.5	6.27	6.10	1.77	0.25

Slug Test P4-13D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 15:16:27	54987.0	111.0	6.22	6.05	1.72	0.24
3/15/2006 15:16:29	54989.5	113.5	6.18	6.01	1.67	0.22
3/15/2006 15:16:32	54992.0	116.0	6.13	5.96	1.63	0.21
3/15/2006 15:16:34	54994.5	118.5	6.09	5.92	1.58	0.20
3/15/2006 15:16:37	54997.0	121.0	6.04	5.88	1.54	0.19
3/15/2006 15:16:39	54999.5	123.5	6.00	5.84	1.50	0.18
3/15/2006 15:16:42	55002.0	126.0	5.96	5.79	1.46	0.16
3/15/2006 15:16:44	55004.5	128.5	5.92	5.76	1.42	0.15
3/15/2006 15:16:47	55007.0	131.0	5.88	5.72	1.38	0.14
3/15/2006 15:16:49	55009.5	133.5	5.85	5.68	1.34	0.13
3/15/2006 15:16:52	55012.0	136.0	5.81	5.64	1.31	0.12
3/15/2006 15:16:54	55014.5	138.5	5.77	5.60	1.27	0.10
3/15/2006 15:16:57	55017.0	141.0	5.74	5.57	1.24	0.09
3/15/2006 15:16:59	55019.5	143.5	5.71	5.54	1.20	0.08
3/15/2006 15:17:02	55022.0	146.0	5.67	5.50	1.17	0.07
3/15/2006 15:17:04	55024.5	148.5	5.64	5.47	1.14	0.06
3/15/2006 15:17:07	55027.0	151.0	5.61	5.44	1.11	0.04
3/15/2006 15:17:09	55029.5	153.5	5.58	5.41	1.08	0.03
3/15/2006 15:17:12	55032.0	156.0	5.55	5.38	1.04	0.02
3/15/2006 15:17:15	55035.0	159.0	5.51	5.34	1.01	0.00
3/15/2006 15:17:17	55037.5	161.5	5.49	5.32	0.98	-0.01
3/15/2006 15:17:20	55040.0	164.0	5.46	5.29	0.96	-0.02
3/15/2006 15:17:22	55042.0	166.0	5.44	5.27	0.93	-0.03
3/15/2006 15:17:25	55045.0	169.0	5.41	5.24	0.90	-0.04
3/15/2006 15:17:27	55047.5	171.5	5.38	5.21	0.88	-0.06
3/15/2006 15:17:30	55050.0	174.0	5.35	5.19	0.85	-0.07
3/15/2006 15:17:32	55052.5	176.5	5.33	5.16	0.83	-0.08
3/15/2006 15:17:35	55055.0	179.0	5.31	5.14	0.80	-0.10
3/15/2006 15:17:37	55057.5	181.5	5.28	5.12	0.78	-0.11
3/15/2006 15:17:40	55060.0	184.0	5.26	5.09	0.76	-0.12
3/15/2006 15:17:42	55062.5	186.5	5.24	5.07	0.74	-0.13
3/15/2006 15:17:45	55065.0	189.0	5.22	5.05	0.72	-0.14
3/15/2006 15:17:47	55067.5	191.5	5.20	5.03	0.69	-0.16
3/15/2006 15:17:49	55069.5	193.5	5.18	5.01	0.68	-0.17
3/15/2006 15:17:52	55072.0	196.0	5.16	4.99	0.66	-0.18
3/15/2006 15:17:54	55074.5	198.5	5.14	4.97	0.64	-0.19
3/15/2006 15:17:57	55077.0	201.0	5.13	4.96	0.62	-0.21
3/15/2006 15:17:59	55079.5	203.5	5.11	4.94	0.60	-0.22
3/15/2006 15:18:02	55082.0	206.0	5.09	4.92	0.59	-0.23
3/15/2006 15:18:04	55084.5	208.5	5.07	4.90	0.57	-0.25
3/15/2006 15:18:07	55087.0	211.0	5.06	4.89	0.55	-0.26
3/15/2006 15:18:09	55089.5	213.5	5.04	4.87	0.53	-0.27
3/15/2006 15:18:11	55091.5	215.5	5.03	4.86	0.52	-0.28
3/15/2006 15:18:13	55093.5	217.5	5.01	4.84	0.51	-0.30
3/15/2006 15:18:16	55096.0	220.0	5.00	4.83	0.49	-0.31
3/15/2006 15:18:18	55098.5	222.5	4.98	4.81	0.48	-0.32
3/15/2006 15:18:21	55101.0	225.0	4.97	4.80	0.46	-0.33
3/15/2006 15:18:23	55103.0	227.0	4.96	4.79	0.45	-0.35
3/15/2006 15:18:25	55105.5	229.5	4.94	4.77	0.44	-0.36

Slug Test P4-13D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 15:18:27	55107.5	231.5	4.93	4.76	0.43	-0.37
3/15/2006 15:18:30	55110.0	234.0	4.92	4.75	0.41	-0.39
3/15/2006 15:18:32	55112.5	236.5	4.91	4.73	0.40	-0.40
3/15/2006 15:18:34	55114.5	238.5	4.89	4.72	0.39	-0.41
3/15/2006 15:18:36	55116.5	240.5	4.88	4.71	0.38	-0.42
3/15/2006 15:18:39	55119.0	243.0	4.87	4.70	0.37	-0.44
3/15/2006 15:18:41	55121.0	245.0	4.86	4.69	0.35	-0.45
3/15/2006 15:18:43	55123.5	247.5	4.85	4.68	0.34	-0.46
3/15/2006 15:18:45	55125.0	249.0	4.84	4.67	0.33	-0.48
3/15/2006 15:18:47	55127.5	251.5	4.83	4.66	0.32	-0.49
3/15/2006 15:18:50	55130.0	254.0	4.82	4.65	0.31	-0.50
3/15/2006 15:18:52	55132.0	256.0	4.81	4.64	0.30	-0.52
3/15/2006 15:18:53	55133.5	257.5	4.80	4.63	0.30	-0.53
3/15/2006 15:18:56	55136.5	260.5	4.79	4.62	0.29	-0.54
3/15/2006 15:18:59	55139.0	263.0	4.78	4.61	0.28	-0.56
3/15/2006 15:19:01	55141.5	265.5	4.78	4.60	0.27	-0.57
3/15/2006 15:19:03	55143.0	267.0	4.77	4.60	0.26	-0.58
3/15/2006 15:19:05	55145.5	269.5	4.76	4.59	0.25	-0.59
3/15/2006 15:19:07	55147.0	271.0	4.75	4.58	0.25	-0.61
3/15/2006 15:19:09	55149.5	273.5	4.75	4.58	0.24	-0.62
3/15/2006 15:19:10	55150.5	274.5	4.74	4.57	0.23	-0.63
3/15/2006 15:19:13	55153.5	277.5	4.73	4.56	0.22	-0.65
3/15/2006 15:19:16	55156.5	280.5	4.72	4.55	0.22	-0.67
3/15/2006 15:19:18	55158.0	282.0	4.72	4.54	0.21	-0.68
3/15/2006 15:19:20	55160.5	284.5	4.71	4.54	0.20	-0.69
3/15/2006 15:19:22	55162.5	286.5	4.70	4.53	0.20	-0.71
3/15/2006 15:19:24	55164.0	288.0	4.70	4.53	0.19	-0.72
3/15/2006 15:19:26	55166.0	290.0	4.69	4.52	0.18	-0.73
3/15/2006 15:19:27	55167.5	291.5	4.69	4.52	0.18	-0.74
3/15/2006 15:19:30	55170.0	294.0	4.68	4.51	0.17	-0.76
3/15/2006 15:19:33	55173.0	297.0	4.67	4.50	0.17	-0.78
3/15/2006 15:19:35	55175.5	299.5	4.67	4.49	0.16	-0.80
3/15/2006 15:19:36	55176.5	300.5	4.66	4.49	0.15	-0.81
3/15/2006 15:19:38	55178.0	302.0	4.66	4.49	0.15	-0.82
3/15/2006 15:19:40	55180.5	304.5	4.65	4.48	0.14	-0.84
3/15/2006 15:19:42	55182.0	306.0	4.65	4.48	0.14	-0.86
3/15/2006 15:19:44	55184.0	308.0	4.64	4.47	0.13	-0.87
3/15/2006 15:19:45	55185.5	309.5	4.64	4.47	0.13	-0.88
3/15/2006 15:19:48	55188.0	312.0	4.63	4.46	0.13	-0.90
3/15/2006 15:19:49	55189.0	313.0	4.63	4.46	0.12	-0.92
3/15/2006 15:19:50	55190.5	314.5	4.62	4.45	0.12	-0.94
3/15/2006 15:19:52	55192.0	316.0	4.62	4.45	0.11	-0.95
3/15/2006 15:19:52	55192.5	316.5	4.62	4.44	0.11	-0.97
3/15/2006 15:19:56	55196.0	320.0	4.61	4.44	0.10	-0.98
3/15/2006 15:19:56	55196.5	320.5	4.61	4.44	0.10	-0.99
3/15/2006 15:19:59	55199.0	323.0	4.61	4.43	0.10	-1.01
3/15/2006 15:20:01	55201.0	325.0	4.60	4.43	0.09	-1.03
3/15/2006 15:20:03	55203.0	327.0	4.60	4.42	0.09	-1.05
3/15/2006 15:20:04	55204.0	328.0	4.59	4.42	0.09	-1.07

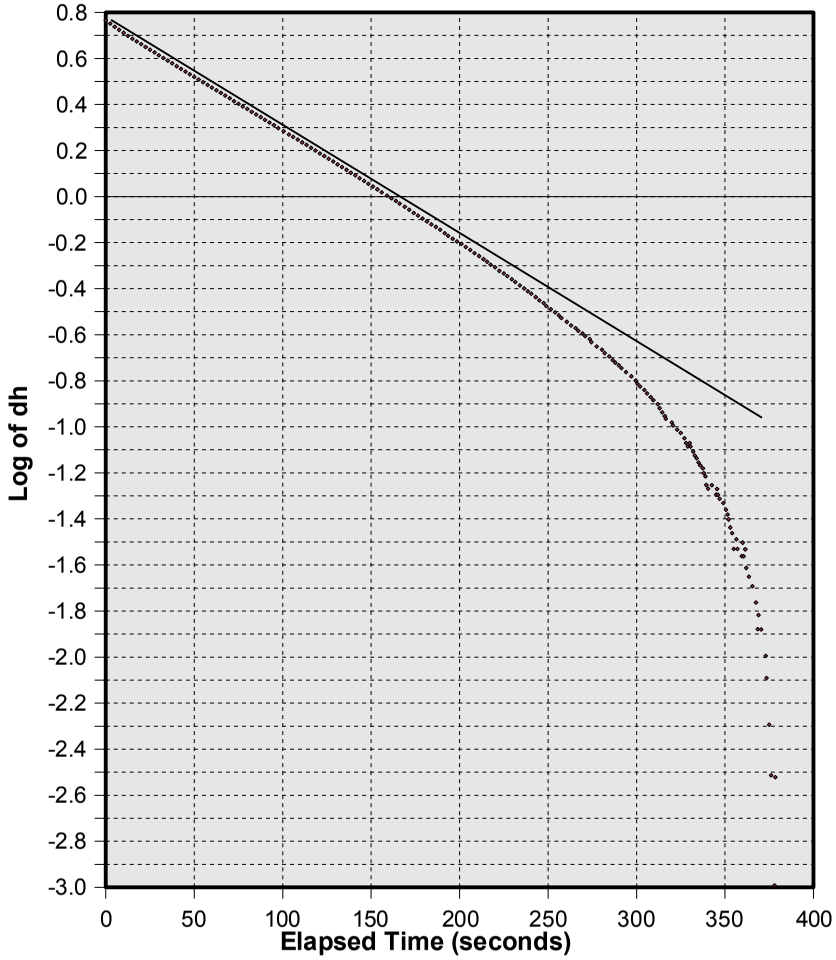
Slug Test P4-13D

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 15:20:05	55205.0	329.0	4.59	4.42	0.08	-1.09
3/15/2006 15:20:06	55206.0	330.0	4.59	4.42	0.09	-1.07
3/15/2006 15:20:06	55206.5	330.5	4.59	4.42	0.08	-1.09
3/15/2006 15:20:08	55208.0	332.0	4.59	4.41	0.08	-1.11
3/15/2006 15:20:09	55209.0	333.0	4.58	4.41	0.08	-1.12
3/15/2006 15:20:10	55210.0	334.0	4.58	4.41	0.07	-1.14
3/15/2006 15:20:11	55211.0	335.0	4.58	4.41	0.07	-1.16
3/15/2006 15:20:12	55212.0	336.0	4.58	4.40	0.07	-1.17
3/15/2006 15:20:13	55213.5	337.5	4.57	4.40	0.07	-1.18
3/15/2006 15:20:14	55214.0	338.0	4.57	4.40	0.06	-1.20
3/15/2006 15:20:15	55215.0	339.0	4.57	4.40	0.06	-1.22
3/15/2006 15:20:15	55215.5	339.5	4.56	4.39	0.06	-1.25
3/15/2006 15:20:16	55216.5	340.5	4.56	4.39	0.05	-1.27
3/15/2006 15:20:18	55218.5	342.5	4.56	4.39	0.06	-1.25
3/15/2006 15:20:21	55221.0	345.0	4.56	4.39	0.05	-1.29
3/15/2006 15:20:21	55221.5	345.5	4.56	4.39	0.05	-1.27
3/15/2006 15:20:22	55222.0	346.0	4.56	4.39	0.05	-1.29
3/15/2006 15:20:23	55223.0	347.0	4.56	4.38	0.05	-1.31
3/15/2006 15:20:25	55225.0	349.0	4.56	4.38	0.05	-1.33
3/15/2006 15:20:26	55226.5	350.5	4.55	4.38	0.04	-1.36
3/15/2006 15:20:27	55227.5	351.5	4.55	4.38	0.04	-1.38
3/15/2006 15:20:28	55228.0	352.0	4.55	4.38	0.04	-1.40
3/15/2006 15:20:29	55229.0	353.0	4.55	4.37	0.04	-1.44
3/15/2006 15:20:30	55230.0	354.0	4.54	4.37	0.03	-1.46
3/15/2006 15:20:31	55231.0	355.0	4.54	4.37	0.03	-1.53
3/15/2006 15:20:32	55232.5	356.5	4.54	4.37	0.03	-1.49
3/15/2006 15:20:33	55233.0	357.0	4.54	4.37	0.03	-1.53
3/15/2006 15:20:35	55235.5	359.5	4.54	4.36	0.03	-1.56
3/15/2006 15:20:36	55236.0	360.0	4.54	4.37	0.03	-1.50
3/15/2006 15:20:36	55236.5	360.5	4.54	4.36	0.03	-1.56
3/15/2006 15:20:37	55237.5	361.5	4.54	4.37	0.03	-1.53
3/15/2006 15:20:38	55238.0	362.0	4.53	4.36	0.02	-1.61
3/15/2006 15:20:39	55239.5	363.5	4.53	4.36	0.02	-1.65
3/15/2006 15:20:41	55241.5	365.5	4.53	4.36	0.02	-1.69
3/15/2006 15:20:43	55243.5	367.5	4.53	4.35	0.02	-1.76
3/15/2006 15:20:44	55244.5	368.5	4.52	4.35	0.01	-1.88
3/15/2006 15:20:45	55245.0	369.0	4.52	4.35	0.02	-1.82
3/15/2006 15:20:46	55246.5	370.5	4.52	4.35	0.01	-1.88
3/15/2006 15:20:49	55249.0	373.0	4.52	4.35	0.01	-1.99
3/15/2006 15:20:49	55249.5	373.5	4.52	4.34	0.01	-2.09
3/15/2006 15:20:51	55251.0	375.0	4.51	4.34	0.01	-2.29
3/15/2006 15:20:52	55252.0	376.0	4.51	4.34	0.00	-2.51
3/15/2006 15:20:54	55254.0	378.0	4.51	4.34	0.00	-2.99
3/15/2006 15:20:54	55254.5	378.5	4.51	4.34	0.00	-2.52

Slug Test P4-13D

Slug Test by Bouwer and Rice

Displacement Method:	Injection	
Well depth:	44.42	ft
Stick up height:	2.85	ft
Depth to sand pack (BGS):	37.00	ft
Depth to screened interval (BGS):	39.42	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	8.95	ft
Initial Head Change:	5.82	ft
Total well length:	47.27	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.0833	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	5.00	ft
Length of open section (L_e):	5.00	ft
L_e / r_w:	14.1176	
A (dimensionless):	2.052	
B (dimensionless):	0.327	
Drawdown at time = 0 (y_0):	5.72	ft
Drawdown at time = t (y_t):	0.32	ft
Elapsed Time between y_0 and y_t (t):	252	sec
Initial water column in well (L_w):	38.32	ft
$\ln(R_e/r_w)$ =	1.93	
K =	1.53E-05	ft/sec
	4.67E-04	**cm/sec**
	483.03	ft/yr



Water above sand pack:	Yes
%Duration below sand pack:	0.00%
Water above screen:	Yes
%Duration below screen:	0.00%

Slug Test P4-13S

Initial offset in logger reading (feet):	0.143	Date:	03/15/2006
Offset increment in logger reading (feet/sec):	0.000013		
Initial depth to water table (feet):	12.12		
Depth of probe below water table (feet):	7.12		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 14:54:36	53676.0	0.0	1.58	1.44	5.68	0.75
3/15/2006 14:54:37	53677.0	1.0	1.79	1.64	5.48	0.74
3/15/2006 14:54:37	53677.5	1.5	1.93	1.78	5.34	0.73
3/15/2006 14:54:38	53678.0	2.0	2.06	1.91	5.21	0.72
3/15/2006 14:54:38	53678.5	2.5	2.18	2.03	5.09	0.71
3/15/2006 14:54:39	53679.0	3.0	2.30	2.16	4.96	0.70
3/15/2006 14:54:39	53679.5	3.5	2.42	2.27	4.85	0.69
3/15/2006 14:54:40	53680.0	4.0	2.53	2.38	4.74	0.68
3/15/2006 14:54:40	53680.5	4.5	2.64	2.49	4.63	0.67
3/15/2006 14:54:41	53681.0	5.0	2.74	2.59	4.52	0.66
3/15/2006 14:54:41	53681.5	5.5	2.84	2.69	4.43	0.65
3/15/2006 14:54:42	53682.0	6.0	2.93	2.79	4.33	0.64
3/15/2006 14:54:42	53682.5	6.5	3.02	2.87	4.25	0.63
3/15/2006 14:54:43	53683.0	7.0	3.10	2.95	4.17	0.62
3/15/2006 14:54:43	53683.5	7.5	3.17	3.02	4.10	0.61
3/15/2006 14:54:44	53684.0	8.0	3.22	3.08	4.04	0.61
3/15/2006 14:54:44	53684.5	8.5	3.27	3.13	3.99	0.60
3/15/2006 14:54:45	53685.5	9.5	3.34	3.20	3.92	0.59
3/15/2006 14:54:47	53687.0	11.0	3.40	3.25	3.86	0.59
3/15/2006 14:54:49	53689.0	13.0	3.46	3.31	3.81	0.58
3/15/2006 14:54:51	53691.0	15.0	3.51	3.36	3.76	0.57
3/15/2006 14:54:53	53693.0	17.0	3.57	3.42	3.70	0.57
3/15/2006 14:54:54	53694.5	18.5	3.63	3.48	3.64	0.56
3/15/2006 14:54:55	53695.5	19.5	3.67	3.53	3.59	0.56
3/15/2006 14:54:56	53696.5	20.5	3.72	3.57	3.55	0.55
3/15/2006 14:54:58	53698.0	22.0	3.77	3.62	3.50	0.54
3/15/2006 14:55:00	53700.5	24.5	3.82	3.67	3.45	0.54
3/15/2006 14:55:02	53702.5	26.5	3.86	3.71	3.41	0.53
3/15/2006 14:55:04	53704.5	28.5	3.91	3.76	3.36	0.53
3/15/2006 14:55:06	53706.5	30.5	3.95	3.80	3.32	0.52
3/15/2006 14:55:09	53709.0	33.0	3.99	3.85	3.27	0.52
3/15/2006 14:55:11	53711.5	35.5	4.03	3.89	3.23	0.51
3/15/2006 14:55:13	53713.5	37.5	4.07	3.93	3.19	0.50
3/15/2006 14:55:15	53715.5	39.5	4.11	3.97	3.15	0.50
3/15/2006 14:55:18	53718.0	42.0	4.15	4.01	3.11	0.49
3/15/2006 14:55:20	53720.5	44.5	4.19	4.05	3.07	0.49
3/15/2006 14:55:22	53722.5	46.5	4.23	4.08	3.04	0.48
3/15/2006 14:55:25	53725.0	49.0	4.27	4.12	3.00	0.48
3/15/2006 14:55:27	53727.5	51.5	4.31	4.16	2.96	0.47
3/15/2006 14:55:30	53730.5	54.5	4.34	4.20	2.92	0.47
3/15/2006 14:55:34	53734.0	58.0	4.38	4.23	2.89	0.46
3/15/2006 14:55:36	53736.5	60.5	4.42	4.27	2.85	0.45
3/15/2006 14:55:39	53739.0	63.0	4.45	4.31	2.81	0.45
3/15/2006 14:55:41	53741.0	65.0	4.49	4.34	2.78	0.44

Slug Test P4-13S

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 14:55:42	53742.5	66.5	4.52	4.38	2.74	0.44
3/15/2006 14:55:44	53744.0	68.0	4.56	4.41	2.71	0.43
3/15/2006 14:55:46	53746.0	70.0	4.59	4.44	2.68	0.43
3/15/2006 14:55:48	53748.5	72.5	4.62	4.48	2.64	0.42
3/15/2006 14:55:51	53751.5	75.5	4.66	4.51	2.61	0.42
3/15/2006 14:55:54	53754.5	78.5	4.69	4.54	2.58	0.41
3/15/2006 14:55:57	53757.5	81.5	4.72	4.57	2.55	0.41
3/15/2006 14:56:00	53760.0	84.0	4.75	4.60	2.52	0.40
3/15/2006 14:56:03	53763.0	87.0	4.79	4.64	2.48	0.39
3/15/2006 14:56:06	53766.0	90.0	4.82	4.67	2.45	0.39
3/15/2006 14:56:09	53769.0	93.0	4.85	4.70	2.42	0.38
3/15/2006 14:56:11	53771.5	95.5	4.88	4.73	2.39	0.38
3/15/2006 14:56:14	53774.5	98.5	4.91	4.76	2.36	0.37
3/15/2006 14:56:17	53777.5	101.5	4.94	4.79	2.33	0.37
3/15/2006 14:56:20	53780.5	104.5	4.97	4.82	2.30	0.36
3/15/2006 14:56:23	53783.5	107.5	5.00	4.85	2.27	0.36
3/15/2006 14:56:25	53785.5	109.5	5.03	4.88	2.24	0.35
3/15/2006 14:56:27	53787.5	111.5	5.05	4.91	2.21	0.34
3/15/2006 14:56:30	53790.0	114.0	5.09	4.94	2.18	0.34
3/15/2006 14:56:32	53792.5	116.5	5.12	4.97	2.15	0.33
3/15/2006 14:56:34	53794.0	118.0	5.15	5.00	2.12	0.33
3/15/2006 14:56:35	53795.5	119.5	5.17	5.02	2.10	0.32
3/15/2006 14:56:37	53797.5	121.5	5.20	5.06	2.06	0.31
3/15/2006 14:56:39	53799.0	123.0	5.23	5.09	2.03	0.31
3/15/2006 14:56:40	53800.5	124.5	5.26	5.12	2.00	0.30
3/15/2006 14:56:41	53801.5	125.5	5.29	5.14	1.98	0.30
3/15/2006 14:56:42	53802.5	126.5	5.31	5.17	1.95	0.29
3/15/2006 14:56:43	53803.5	127.5	5.34	5.19	1.93	0.29
3/15/2006 14:56:45	53805.0	129.0	5.37	5.22	1.90	0.28
3/15/2006 14:56:47	53807.0	131.0	5.39	5.25	1.87	0.27
3/15/2006 14:56:51	53811.5	135.5	5.42	5.27	1.85	0.27
3/15/2006 14:56:56	53816.0	140.0	5.44	5.29	1.83	0.26
3/15/2006 14:57:02	53822.0	146.0	5.46	5.31	1.81	0.26
3/15/2006 14:57:08	53828.0	152.0	5.49	5.34	1.78	0.25
3/15/2006 14:57:12	53832.0	156.0	5.51	5.36	1.76	0.25
3/15/2006 14:57:16	53836.5	160.5	5.53	5.38	1.74	0.24
3/15/2006 14:57:21	53841.5	165.5	5.55	5.40	1.72	0.23
3/15/2006 14:57:25	53845.5	169.5	5.57	5.42	1.70	0.23
3/15/2006 14:57:30	53850.0	174.0	5.59	5.44	1.68	0.22
3/15/2006 14:57:34	53854.5	178.5	5.62	5.47	1.65	0.22
3/15/2006 14:57:38	53858.0	182.0	5.64	5.49	1.63	0.21
3/15/2006 14:57:42	53862.0	186.0	5.65	5.51	1.61	0.21
3/15/2006 14:57:45	53865.5	189.5	5.68	5.53	1.59	0.20
3/15/2006 14:57:48	53868.0	192.0	5.70	5.55	1.57	0.20
3/15/2006 14:57:50	53870.5	194.5	5.72	5.57	1.55	0.19
3/15/2006 14:57:52	53872.5	196.5	5.74	5.59	1.53	0.18
3/15/2006 14:57:54	53874.0	198.0	5.76	5.61	1.51	0.18
3/15/2006 14:57:55	53875.5	199.5	5.78	5.63	1.48	0.17
3/15/2006 14:57:57	53877.0	201.0	5.81	5.66	1.46	0.16

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Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 14:57:58	53878.5	202.5	5.83	5.68	1.44	0.16
3/15/2006 14:58:00	53880.5	204.5	5.84	5.69	1.43	0.15
3/15/2006 14:58:05	53885.0	209.0	5.86	5.71	1.40	0.15
3/15/2006 14:58:10	53890.5	214.5	5.88	5.73	1.39	0.14
3/15/2006 14:58:16	53896.0	220.0	5.90	5.75	1.37	0.14
3/15/2006 14:58:20	53900.5	224.5	5.92	5.77	1.35	0.13
3/15/2006 14:58:26	53906.0	230.0	5.93	5.78	1.34	0.13
3/15/2006 14:58:31	53911.5	235.5	5.95	5.80	1.32	0.12
3/15/2006 14:58:37	53917.0	241.0	5.96	5.82	1.30	0.12
3/15/2006 14:58:41	53921.5	245.5	5.98	5.83	1.29	0.11
3/15/2006 14:58:44	53924.0	248.0	6.00	5.85	1.27	0.10
3/15/2006 14:58:50	53930.0	254.0	6.01	5.86	1.26	0.10
3/15/2006 14:58:53	53933.5	257.5	6.03	5.88	1.24	0.09
3/15/2006 14:58:57	53937.5	261.5	6.04	5.89	1.22	0.09
3/15/2006 14:59:01	53941.5	265.5	6.06	5.91	1.21	0.08
3/15/2006 14:59:05	53945.0	269.0	6.07	5.92	1.19	0.08
3/15/2006 14:59:09	53949.0	273.0	6.09	5.94	1.18	0.07
3/15/2006 14:59:13	53953.5	277.5	6.10	5.95	1.17	0.07
3/15/2006 14:59:17	53957.5	281.5	6.12	5.97	1.15	0.06
3/15/2006 14:59:21	53961.0	285.0	6.13	5.98	1.14	0.06
3/15/2006 14:59:25	53965.0	289.0	6.15	6.00	1.12	0.05
3/15/2006 14:59:29	53969.0	293.0	6.16	6.01	1.11	0.05
3/15/2006 14:59:32	53972.5	296.5	6.17	6.02	1.10	0.04
3/15/2006 14:59:37	53977.5	301.5	6.19	6.04	1.08	0.03
3/15/2006 14:59:42	53982.0	306.0	6.20	6.05	1.07	0.03
3/15/2006 14:59:46	53986.0	310.0	6.22	6.07	1.05	0.02
3/15/2006 14:59:51	53991.5	315.5	6.23	6.08	1.04	0.02
3/15/2006 14:59:55	53995.0	319.0	6.24	6.09	1.03	0.01
3/15/2006 14:59:57	53997.5	321.5	6.25	6.10	1.02	0.01
3/15/2006 15:00:03	54003.0	327.0	6.27	6.12	1.00	0.00
3/15/2006 15:00:07	54007.5	331.5	6.28	6.13	0.99	0.00
3/15/2006 15:00:12	54012.5	336.5	6.29	6.14	0.98	-0.01
3/15/2006 15:00:15	54015.5	339.5	6.31	6.15	0.96	-0.02
3/15/2006 15:00:22	54022.0	346.0	6.32	6.17	0.95	-0.02
3/15/2006 15:00:26	54026.5	350.5	6.33	6.18	0.94	-0.03
3/15/2006 15:00:29	54029.5	353.5	6.34	6.19	0.93	-0.03
3/15/2006 15:00:33	54033.0	357.0	6.36	6.21	0.91	-0.04
3/15/2006 15:00:38	54038.0	362.0	6.37	6.22	0.90	-0.04
3/15/2006 15:00:41	54041.5	365.5	6.38	6.23	0.89	-0.05
3/15/2006 15:00:44	54044.0	368.0	6.39	6.24	0.88	-0.06
3/15/2006 15:00:47	54047.5	371.5	6.40	6.25	0.87	-0.06
3/15/2006 15:00:50	54050.0	374.0	6.41	6.26	0.86	-0.07
3/15/2006 15:00:53	54053.0	377.0	6.42	6.27	0.85	-0.07
3/15/2006 15:00:56	54056.5	380.5	6.44	6.29	0.83	-0.08
3/15/2006 15:01:00	54060.0	384.0	6.45	6.30	0.82	-0.09
3/15/2006 15:01:03	54063.5	387.5	6.46	6.31	0.81	-0.09
3/15/2006 15:01:05	54065.5	389.5	6.47	6.32	0.80	-0.10
3/15/2006 15:01:09	54069.5	393.5	6.49	6.34	0.78	-0.11
3/15/2006 15:01:13	54073.0	397.0	6.50	6.35	0.77	-0.11

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Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 15:01:16	54076.0	400.0	6.51	6.36	0.76	-0.12
3/15/2006 15:01:20	54080.0	404.0	6.52	6.37	0.75	-0.12
3/15/2006 15:01:25	54085.0	409.0	6.53	6.38	0.74	-0.13
3/15/2006 15:01:29	54089.5	413.5	6.54	6.39	0.73	-0.14
3/15/2006 15:01:34	54094.0	418.0	6.55	6.40	0.72	-0.14
3/15/2006 15:01:39	54099.5	423.5	6.56	6.41	0.71	-0.15
3/15/2006 15:01:43	54103.5	427.5	6.57	6.42	0.70	-0.15
3/15/2006 15:01:48	54108.5	432.5	6.58	6.43	0.69	-0.16
3/15/2006 15:01:53	54113.0	437.0	6.59	6.43	0.68	-0.16
3/15/2006 15:01:57	54117.5	441.5	6.59	6.44	0.68	-0.17
3/15/2006 15:02:04	54124.5	448.5	6.60	6.45	0.67	-0.18
3/15/2006 15:02:11	54131.0	455.0	6.62	6.46	0.66	-0.18
3/15/2006 15:02:17	54137.0	461.0	6.63	6.47	0.65	-0.19
3/15/2006 15:02:26	54146.0	470.0	6.64	6.48	0.64	-0.20
3/15/2006 15:02:30	54150.5	474.5	6.65	6.49	0.63	-0.20
3/15/2006 15:02:38	54158.0	482.0	6.66	6.50	0.62	-0.21
3/15/2006 15:02:45	54165.0	489.0	6.66	6.51	0.61	-0.22
3/15/2006 15:02:50	54170.5	494.5	6.67	6.52	0.60	-0.22
3/15/2006 15:02:54	54174.0	498.0	6.68	6.53	0.59	-0.23
3/15/2006 15:03:00	54180.0	504.0	6.69	6.54	0.58	-0.23
3/15/2006 15:03:09	54189.5	513.5	6.70	6.54	0.57	-0.24
3/15/2006 15:03:14	54194.0	518.0	6.70	6.55	0.57	-0.25
3/15/2006 15:03:18	54198.5	522.5	6.71	6.56	0.56	-0.25
3/15/2006 15:03:25	54205.5	529.5	6.72	6.57	0.55	-0.26
3/15/2006 15:03:32	54212.5	536.5	6.73	6.57	0.55	-0.26
3/15/2006 15:03:37	54217.5	541.5	6.73	6.58	0.54	-0.27
3/15/2006 15:03:45	54225.5	549.5	6.74	6.59	0.53	-0.27
3/15/2006 15:03:50	54230.5	554.5	6.75	6.59	0.53	-0.28
3/15/2006 15:03:57	54237.0	561.0	6.75	6.60	0.52	-0.28
3/15/2006 15:04:05	54245.5	569.5	6.76	6.61	0.51	-0.29
3/15/2006 15:04:09	54249.5	573.5	6.77	6.61	0.51	-0.30
3/15/2006 15:04:14	54254.0	578.0	6.77	6.62	0.50	-0.30
3/15/2006 15:04:19	54259.5	583.5	6.78	6.63	0.49	-0.31
3/15/2006 15:04:29	54269.5	593.5	6.79	6.63	0.48	-0.31
3/15/2006 15:04:36	54276.5	600.5	6.80	6.64	0.47	-0.32
3/15/2006 15:04:42	54282.5	606.5	6.81	6.65	0.47	-0.33
3/15/2006 15:04:51	54291.5	615.5	6.81	6.66	0.46	-0.34
3/15/2006 15:04:56	54296.0	620.0	6.82	6.67	0.45	-0.34
3/15/2006 15:05:05	54305.5	629.5	6.83	6.67	0.45	-0.35
3/15/2006 15:05:13	54313.5	637.5	6.83	6.68	0.44	-0.36
3/15/2006 15:05:21	54321.0	645.0	6.84	6.69	0.43	-0.36
3/15/2006 15:05:28	54328.5	652.5	6.85	6.69	0.43	-0.37
3/15/2006 15:05:30	54330.5	654.5	6.85	6.70	0.42	-0.38
3/15/2006 15:05:31	54331.0	655.0	6.85	6.69	0.43	-0.37
3/15/2006 15:05:32	54332.0	656.0	6.85	6.70	0.42	-0.38
3/15/2006 15:05:39	54339.5	663.5	6.86	6.70	0.41	-0.38
3/15/2006 15:05:46	54346.5	670.5	6.87	6.71	0.41	-0.39
3/15/2006 15:05:52	54352.0	676.0	6.87	6.72	0.40	-0.39
3/15/2006 15:06:01	54361.0	685.0	6.88	6.72	0.40	-0.40

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Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 15:06:09	54369.5	693.5	6.89	6.73	0.39	-0.41
3/15/2006 15:06:17	54377.5	701.5	6.89	6.74	0.38	-0.42
3/15/2006 15:06:27	54387.0	711.0	6.90	6.74	0.38	-0.43
3/15/2006 15:06:31	54391.0	715.0	6.90	6.75	0.37	-0.43
3/15/2006 15:06:38	54398.0	722.0	6.91	6.76	0.36	-0.44
3/15/2006 15:06:40	54400.5	724.5	6.91	6.75	0.37	-0.43
3/15/2006 15:06:44	54404.0	728.0	6.91	6.76	0.36	-0.44
3/15/2006 15:06:50	54410.5	734.5	6.92	6.76	0.36	-0.45
3/15/2006 15:06:55	54415.0	739.0	6.92	6.77	0.35	-0.45
3/15/2006 15:07:06	54426.5	750.5	6.93	6.77	0.35	-0.46
3/15/2006 15:07:12	54432.5	756.5	6.93	6.78	0.34	-0.46
3/15/2006 15:07:15	54435.5	759.5	6.94	6.78	0.34	-0.47
3/15/2006 15:07:21	54441.0	765.0	6.94	6.79	0.33	-0.48
3/15/2006 15:07:27	54447.5	771.5	6.95	6.79	0.33	-0.48
3/15/2006 15:07:30	54450.0	774.0	6.94	6.79	0.33	-0.48
3/15/2006 15:07:31	54451.0	775.0	6.95	6.79	0.33	-0.48
3/15/2006 15:07:35	54455.0	779.0	6.95	6.79	0.33	-0.49
3/15/2006 15:07:45	54465.5	789.5	6.96	6.80	0.32	-0.49
3/15/2006 15:07:47	54467.0	791.0	6.95	6.79	0.33	-0.49
3/15/2006 15:07:47	54467.5	791.5	6.96	6.80	0.32	-0.49
3/15/2006 15:07:50	54470.5	794.5	6.96	6.80	0.32	-0.50
3/15/2006 15:08:02	54482.0	806.0	6.97	6.81	0.31	-0.51
3/15/2006 15:08:09	54489.5	813.5	6.97	6.81	0.31	-0.51
3/15/2006 15:08:18	54498.5	822.5	6.97	6.82	0.30	-0.52
3/15/2006 15:08:29	54509.0	833.0	6.98	6.82	0.30	-0.53
3/15/2006 15:08:34	54514.5	838.5	6.98	6.83	0.29	-0.53
3/15/2006 15:08:45	54525.0	849.0	6.99	6.83	0.29	-0.54
3/15/2006 15:08:56	54536.0	860.0	6.99	6.84	0.28	-0.55
3/15/2006 15:09:11	54551.5	875.5	7.00	6.84	0.28	-0.55
3/15/2006 15:09:15	54555.0	879.0	7.00	6.84	0.27	-0.56
3/15/2006 15:09:26	54566.5	890.5	7.01	6.85	0.27	-0.57
3/15/2006 15:09:36	54576.0	900.0	7.00	6.85	0.27	-0.56
3/15/2006 15:09:37	54577.5	901.5	7.01	6.85	0.27	-0.57
3/15/2006 15:09:38	54578.5	902.5	7.01	6.86	0.26	-0.58
3/15/2006 15:09:39	54579.5	903.5	7.00	6.85	0.27	-0.56
3/15/2006 15:09:41	54581.0	905.0	7.01	6.85	0.27	-0.57
3/15/2006 15:09:47	54587.0	911.0	7.01	6.86	0.26	-0.58
3/15/2006 15:09:47	54587.5	911.5	7.01	6.85	0.27	-0.57
3/15/2006 15:09:48	54588.5	912.5	7.01	6.86	0.26	-0.58
3/15/2006 15:09:51	54591.5	915.5	7.02	6.86	0.26	-0.59
3/15/2006 15:10:02	54602.0	926.0	7.02	6.87	0.25	-0.60
3/15/2006 15:10:08	54608.5	932.5	7.02	6.86	0.26	-0.59
3/15/2006 15:10:09	54609.0	933.0	7.02	6.86	0.26	-0.59
3/15/2006 15:10:09	54609.5	933.5	7.02	6.86	0.26	-0.58
3/15/2006 15:10:10	54610.0	934.0	7.02	6.86	0.26	-0.59
3/15/2006 15:10:11	54611.5	935.5	7.03	6.87	0.25	-0.60
3/15/2006 15:10:12	54612.0	936.0	7.02	6.87	0.25	-0.60
3/15/2006 15:10:12	54612.5	936.5	7.02	6.86	0.26	-0.58
3/15/2006 15:10:13	54613.5	937.5	7.03	6.87	0.25	-0.60

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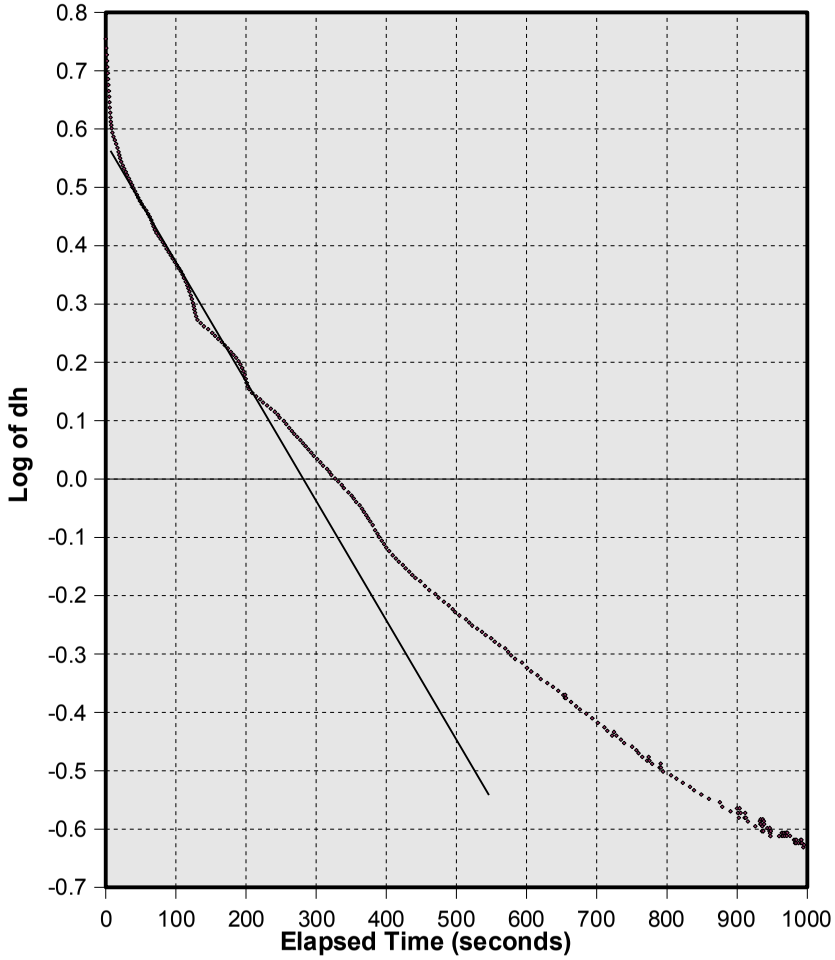
Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 15:10:14	54614.0	938.0	7.02	6.86	0.26	-0.59
3/15/2006 15:10:14	54614.5	938.5	7.02	6.86	0.26	-0.59
3/15/2006 15:10:19	54619.0	943.0	7.03	6.87	0.25	-0.60
3/15/2006 15:10:22	54622.0	946.0	7.03	6.87	0.25	-0.60
3/15/2006 15:10:22	54622.5	946.5	7.03	6.87	0.25	-0.60
3/15/2006 15:10:23	54623.0	947.0	7.03	6.87	0.25	-0.61
3/15/2006 15:10:23	54623.5	947.5	7.03	6.88	0.24	-0.61
3/15/2006 15:10:24	54624.0	948.0	7.03	6.87	0.25	-0.60
3/15/2006 15:10:36	54636.0	960.0	7.03	6.87	0.24	-0.61
3/15/2006 15:10:39	54639.5	963.5	7.03	6.87	0.25	-0.61
3/15/2006 15:10:40	54640.0	964.0	7.03	6.87	0.24	-0.61
3/15/2006 15:10:40	54640.5	964.5	7.03	6.87	0.25	-0.61
3/15/2006 15:10:41	54641.0	965.0	7.03	6.87	0.24	-0.61
3/15/2006 15:10:43	54643.0	967.0	7.03	6.87	0.25	-0.61
3/15/2006 15:10:44	54644.0	968.0	7.03	6.87	0.24	-0.61
3/15/2006 15:10:46	54646.0	970.0	7.03	6.87	0.25	-0.61
3/15/2006 15:10:47	54647.0	971.0	7.03	6.87	0.24	-0.61
3/15/2006 15:10:47	54647.5	971.5	7.03	6.87	0.25	-0.61
3/15/2006 15:10:51	54651.5	975.5	7.03	6.87	0.24	-0.61
3/15/2006 15:10:57	54657.0	981.0	7.04	6.88	0.24	-0.62
3/15/2006 15:10:58	54658.5	982.5	7.04	6.88	0.24	-0.62
3/15/2006 15:10:59	54659.0	983.0	7.04	6.88	0.24	-0.62
3/15/2006 15:11:00	54660.0	984.0	7.04	6.88	0.24	-0.62
3/15/2006 15:11:00	54660.5	984.5	7.04	6.88	0.24	-0.62
3/15/2006 15:11:03	54663.5	987.5	7.04	6.88	0.24	-0.62
3/15/2006 15:11:06	54666.5	990.5	7.04	6.88	0.24	-0.62
3/15/2006 15:11:07	54667.0	991.0	7.04	6.88	0.24	-0.62
3/15/2006 15:11:07	54667.5	991.5	7.04	6.88	0.24	-0.62
3/15/2006 15:11:08	54668.5	992.5	7.04	6.88	0.24	-0.62
3/15/2006 15:11:10	54670.5	994.5	7.04	6.89	0.23	-0.63
3/15/2006 15:11:11	54671.5	995.5	7.04	6.88	0.24	-0.63

Slug Test P4-13S

Slug Test by Bouwer and Rice

Displacement Method:	Pump	
Well depth:	20.09	ft
Stick up height:	3.35	ft
Depth to sand pack (BGS):	3.00	ft
Depth to screened interval (BGS):	5.09	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	12.12	ft
Initial Head Change:	5.68	ft
Total well length:	23.44	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.2061	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	15.00	ft
Length of open section (L_e):	11.32	ft
L_e / r_w:	31.9624	
A (dimensionless):	2.643	
B (dimensionless):	0.441	
Drawdown at time = 0 (y_0):	3.23	ft
Drawdown at time = t (y_t):	1.48	ft
Elapsed Time between y_0 and y_t (t):	164	sec
Initial water column in well (L_w):	11.32	ft
$\ln(R_e/r_w)$ =	2.07	
K =	1.84E-05	ft/sec
	5.62E-04	**cm/sec**
	581.24	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

Slug Test P4-14

Initial offset in logger reading (feet):	0.280	Date:	03/15/2006
Offset increment in logger reading (feet/sec):	-0.000156		
Initial depth to water table (feet):	20.74		
Depth of probe below water table (feet):	4.80		

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 14:21:21	51681.0	0.0	0.32	0.10	4.71	0.67
3/15/2006 14:21:22	51682.0	1.0	0.49	0.27	4.53	0.66
3/15/2006 14:21:23	51683.0	2.0	0.65	0.43	4.38	0.64
3/15/2006 14:21:24	51684.0	3.0	0.80	0.58	4.22	0.63
3/15/2006 14:21:25	51685.0	4.0	0.95	0.72	4.08	0.61
3/15/2006 14:21:26	51686.0	5.0	1.09	0.87	3.93	0.59
3/15/2006 14:21:27	51687.0	6.0	1.22	1.00	3.80	0.58
3/15/2006 14:21:28	51688.0	7.0	1.34	1.12	3.69	0.57
3/15/2006 14:21:29	51689.0	8.0	1.45	1.23	3.57	0.55
3/15/2006 14:21:30	51690.0	9.0	1.57	1.34	3.46	0.54
3/15/2006 14:21:31	51691.0	10.0	1.67	1.45	3.35	0.53
3/15/2006 14:21:32	51692.0	11.0	1.78	1.56	3.24	0.51
3/15/2006 14:21:33	51693.0	12.0	1.88	1.66	3.14	0.50
3/15/2006 14:21:34	51694.0	13.0	1.98	1.76	3.04	0.48
3/15/2006 14:21:35	51695.0	14.0	2.08	1.86	2.95	0.47
3/15/2006 14:21:36	51696.0	15.0	2.17	1.95	2.85	0.45
3/15/2006 14:21:37	51697.0	16.0	2.27	2.05	2.76	0.44
3/15/2006 14:21:38	51698.0	17.0	2.36	2.14	2.66	0.43
3/15/2006 14:21:39	51699.0	18.0	2.45	2.23	2.57	0.41
3/15/2006 14:21:40	51700.0	19.0	2.54	2.32	2.49	0.40
3/15/2006 14:21:41	51701.0	20.0	2.62	2.40	2.40	0.38
3/15/2006 14:21:42	51702.0	21.0	2.70	2.48	2.32	0.37
3/15/2006 14:21:43	51703.0	22.0	2.78	2.56	2.24	0.35
3/15/2006 14:21:44	51704.0	23.0	2.86	2.64	2.16	0.34
3/15/2006 14:21:45	51705.0	24.0	2.94	2.71	2.09	0.32
3/15/2006 14:21:45	51705.5	24.5	3.00	2.78	2.03	0.31
3/15/2006 14:21:46	51706.5	25.5	3.06	2.84	1.96	0.29
3/15/2006 14:21:47	51707.5	26.5	3.11	2.89	1.91	0.28
3/15/2006 14:21:48	51708.5	27.5	3.18	2.96	1.84	0.27
3/15/2006 14:21:49	51709.5	28.5	3.25	3.03	1.78	0.25
3/15/2006 14:21:50	51710.5	29.5	3.32	3.10	1.71	0.23
3/15/2006 14:21:51	51711.5	30.5	3.38	3.16	1.65	0.22
3/15/2006 14:21:52	51712.5	31.5	3.44	3.22	1.58	0.20
3/15/2006 14:21:53	51713.5	32.5	3.50	3.28	1.53	0.18
3/15/2006 14:21:54	51714.5	33.5	3.55	3.33	1.47	0.17
3/15/2006 14:21:55	51715.5	34.5	3.60	3.38	1.43	0.15
3/15/2006 14:21:56	51716.5	35.5	3.65	3.43	1.37	0.14
3/15/2006 14:21:57	51717.5	36.5	3.69	3.47	1.33	0.12
3/15/2006 14:21:58	51718.5	37.5	3.74	3.52	1.28	0.11
3/15/2006 14:21:59	51719.5	38.5	3.78	3.57	1.24	0.09
3/15/2006 14:22:00	51720.5	39.5	3.82	3.61	1.20	0.08
3/15/2006 14:22:01	51721.5	40.5	3.86	3.65	1.16	0.06
3/15/2006 14:22:02	51722.5	41.5	3.90	3.68	1.12	0.05
3/15/2006 14:22:03	51723.5	42.5	3.94	3.72	1.08	0.03

Slug Test P4-14

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 14:22:04	51724.5	43.5	3.98	3.76	1.04	0.02
3/15/2006 14:22:05	51725.5	44.5	4.01	3.80	1.01	0.00
3/15/2006 14:22:06	51726.5	45.5	4.05	3.83	0.97	-0.01
3/15/2006 14:22:07	51727.5	46.5	4.08	3.86	0.94	-0.03
3/15/2006 14:22:08	51728.5	47.5	4.11	3.89	0.91	-0.04
3/15/2006 14:22:09	51729.5	48.5	4.14	3.93	0.88	-0.06
3/15/2006 14:22:10	51730.5	49.5	4.17	3.95	0.85	-0.07
3/15/2006 14:22:11	51731.5	50.5	4.20	3.98	0.82	-0.09
3/15/2006 14:22:12	51732.5	51.5	4.23	4.01	0.79	-0.10
3/15/2006 14:22:13	51733.5	52.5	4.25	4.04	0.76	-0.12
3/15/2006 14:22:14	51734.5	53.5	4.28	4.07	0.74	-0.13
3/15/2006 14:22:15	51735.5	54.5	4.31	4.09	0.71	-0.15
3/15/2006 14:22:16	51736.5	55.5	4.33	4.11	0.69	-0.16
3/15/2006 14:22:17	51737.5	56.5	4.35	4.14	0.66	-0.18
3/15/2006 14:22:18	51738.5	57.5	4.38	4.16	0.64	-0.19
3/15/2006 14:22:19	51739.5	58.5	4.40	4.18	0.62	-0.21
3/15/2006 14:22:20	51740.5	59.5	4.42	4.21	0.60	-0.22
3/15/2006 14:22:21	51741.5	60.5	4.44	4.23	0.58	-0.24
3/15/2006 14:22:22	51742.5	61.5	4.46	4.25	0.55	-0.26
3/15/2006 14:22:23	51743.5	62.5	4.48	4.27	0.53	-0.27
3/15/2006 14:22:24	51744.5	63.5	4.50	4.29	0.51	-0.29
3/15/2006 14:22:25	51745.5	64.5	4.52	4.31	0.49	-0.31
3/15/2006 14:22:26	51746.0	65.0	4.54	4.32	0.48	-0.32
3/15/2006 14:22:27	51747.0	66.0	4.55	4.33	0.47	-0.33
3/15/2006 14:22:27	51747.5	66.5	4.56	4.35	0.46	-0.34
3/15/2006 14:22:28	51748.5	67.5	4.58	4.37	0.44	-0.36
3/15/2006 14:22:29	51749.0	68.0	4.59	4.38	0.43	-0.37
3/15/2006 14:22:30	51750.0	69.0	4.61	4.39	0.41	-0.39
3/15/2006 14:22:31	51751.0	70.0	4.62	4.41	0.39	-0.41
3/15/2006 14:22:32	51752.0	71.0	4.64	4.42	0.38	-0.42
3/15/2006 14:22:33	51753.0	72.0	4.65	4.44	0.36	-0.44
3/15/2006 14:22:34	51754.0	73.0	4.66	4.45	0.35	-0.45
3/15/2006 14:22:35	51755.0	74.0	4.68	4.46	0.34	-0.47
3/15/2006 14:22:36	51756.0	75.0	4.69	4.47	0.33	-0.48
3/15/2006 14:22:37	51757.0	76.0	4.70	4.48	0.32	-0.50
3/15/2006 14:22:38	51758.0	77.0	4.71	4.49	0.31	-0.51
3/15/2006 14:22:39	51759.0	78.0	4.72	4.50	0.30	-0.53
3/15/2006 14:22:40	51760.0	79.0	4.72	4.51	0.29	-0.54
3/15/2006 14:22:41	51761.5	80.5	4.73	4.52	0.28	-0.55
3/15/2006 14:22:43	51763.0	82.0	4.74	4.53	0.27	-0.57
3/15/2006 14:22:44	51764.5	83.5	4.75	4.54	0.26	-0.58
3/15/2006 14:22:46	51766.0	85.0	4.76	4.55	0.25	-0.60
3/15/2006 14:22:47	51767.0	86.0	4.77	4.56	0.25	-0.61
3/15/2006 14:22:48	51768.5	87.5	4.78	4.57	0.24	-0.63
3/15/2006 14:22:50	51770.0	89.0	4.78	4.57	0.23	-0.64
3/15/2006 14:22:51	51771.5	90.5	4.79	4.58	0.22	-0.66
3/15/2006 14:22:53	51773.5	92.5	4.80	4.59	0.21	-0.67
3/15/2006 14:22:54	51774.5	93.5	4.81	4.60	0.21	-0.69
3/15/2006 14:22:56	51776.0	95.0	4.81	4.60	0.20	-0.70

Slug Test P4-14

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 14:22:57	51777.5	96.5	4.82	4.61	0.19	-0.72
3/15/2006 14:22:58	51778.5	97.5	4.83	4.62	0.19	-0.73
3/15/2006 14:23:00	51780.5	99.5	4.83	4.62	0.18	-0.75
3/15/2006 14:23:01	51781.5	100.5	4.84	4.63	0.17	-0.76
3/15/2006 14:23:03	51783.0	102.0	4.84	4.63	0.17	-0.77
3/15/2006 14:23:04	51784.0	103.0	4.85	4.64	0.16	-0.78
3/15/2006 14:23:05	51785.5	104.5	4.85	4.64	0.16	-0.80
3/15/2006 14:23:07	51787.0	106.0	4.86	4.65	0.16	-0.81
3/15/2006 14:23:08	51788.0	107.0	4.86	4.65	0.15	-0.82
3/15/2006 14:23:09	51789.5	108.5	4.87	4.66	0.14	-0.84
3/15/2006 14:23:11	51791.5	110.5	4.87	4.66	0.14	-0.85
3/15/2006 14:23:13	51793.0	112.0	4.87	4.66	0.14	-0.86
3/15/2006 14:23:14	51794.5	113.5	4.88	4.67	0.13	-0.88
3/15/2006 14:23:16	51796.0	115.0	4.88	4.67	0.13	-0.89
3/15/2006 14:23:16	51796.5	115.5	4.88	4.68	0.12	-0.90
3/15/2006 14:23:18	51798.5	117.5	4.89	4.68	0.12	-0.92
3/15/2006 14:23:19	51799.0	118.0	4.89	4.68	0.12	-0.93
3/15/2006 14:23:20	51800.5	119.5	4.90	4.69	0.11	-0.95
3/15/2006 14:23:23	51803.0	122.0	4.90	4.69	0.11	-0.97
3/15/2006 14:23:23	51803.5	122.5	4.90	4.70	0.10	-0.98
3/15/2006 14:23:26	51806.0	125.0	4.91	4.70	0.10	-1.00
3/15/2006 14:23:28	51808.0	127.0	4.91	4.71	0.10	-1.01
3/15/2006 14:23:29	51809.5	128.5	4.91	4.71	0.09	-1.02
3/15/2006 14:23:30	51810.5	129.5	4.91	4.71	0.09	-1.03
3/15/2006 14:23:31	51811.5	130.5	4.92	4.71	0.09	-1.05
3/15/2006 14:23:32	51812.5	131.5	4.92	4.71	0.09	-1.06
3/15/2006 14:23:34	51814.0	133.0	4.92	4.72	0.08	-1.09
3/15/2006 14:23:35	51815.5	134.5	4.93	4.72	0.08	-1.10
3/15/2006 14:23:37	51817.5	136.5	4.93	4.73	0.08	-1.12
3/15/2006 14:23:38	51818.5	137.5	4.93	4.73	0.07	-1.13
3/15/2006 14:23:39	51819.0	138.0	4.93	4.73	0.08	-1.12
3/15/2006 14:23:40	51820.0	139.0	4.93	4.73	0.07	-1.13
3/15/2006 14:23:40	51820.5	139.5	4.93	4.73	0.08	-1.12
3/15/2006 14:23:41	51821.0	140.0	4.93	4.73	0.07	-1.13
3/15/2006 14:23:41	51821.5	140.5	4.93	4.73	0.07	-1.14
3/15/2006 14:23:43	51823.0	142.0	4.94	4.73	0.07	-1.16
3/15/2006 14:23:44	51824.0	143.0	4.94	4.74	0.07	-1.18
3/15/2006 14:23:45	51825.5	144.5	4.94	4.74	0.06	-1.19
3/15/2006 14:23:47	51827.5	146.5	4.94	4.74	0.06	-1.22
3/15/2006 14:23:49	51829.0	148.0	4.95	4.74	0.06	-1.23
3/15/2006 14:23:52	51832.0	151.0	4.95	4.75	0.06	-1.26
3/15/2006 14:23:54	51834.0	153.0	4.95	4.75	0.05	-1.28
3/15/2006 14:23:55	51835.5	154.5	4.95	4.75	0.05	-1.30
3/15/2006 14:23:57	51837.5	156.5	4.95	4.75	0.05	-1.32
3/15/2006 14:23:58	51838.5	157.5	4.96	4.76	0.05	-1.33
3/15/2006 14:23:59	51839.0	158.0	4.96	4.76	0.04	-1.35
3/15/2006 14:24:00	51840.5	159.5	4.96	4.76	0.04	-1.37
3/15/2006 14:24:02	51842.0	161.0	4.96	4.76	0.04	-1.40
3/15/2006 14:24:03	51843.5	162.5	4.96	4.76	0.04	-1.43

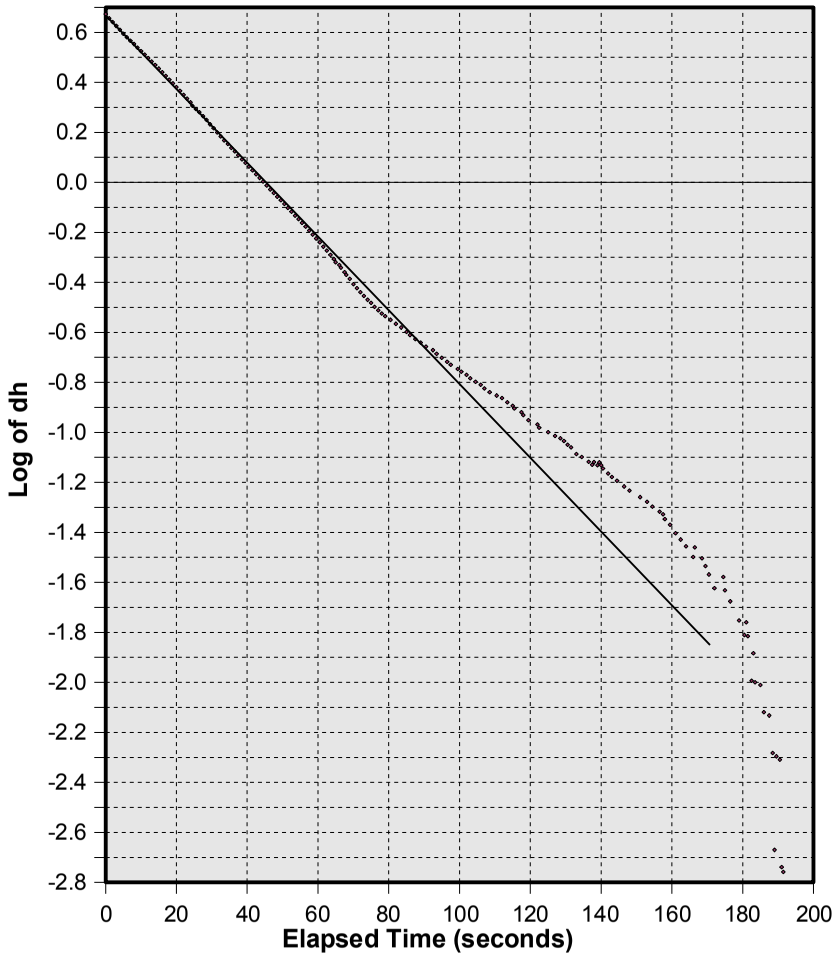
Slug Test P4-14

Time	Time (sec)	Elapsed Time (sec)	Logger Reading (ft)	Adjusted Reading (ft)	dh (ft)	Log of dh
3/15/2006 14:24:05	51845.0	164.0	4.97	4.77	0.04	-1.46
3/15/2006 14:24:07	51847.0	166.0	4.97	4.77	0.03	-1.50
3/15/2006 14:24:07	51847.5	166.5	4.97	4.77	0.03	-1.46
3/15/2006 14:24:09	51849.5	168.5	4.97	4.77	0.03	-1.50
3/15/2006 14:24:10	51850.5	169.5	4.97	4.77	0.03	-1.53
3/15/2006 14:24:11	51851.5	170.5	4.97	4.78	0.03	-1.57
3/15/2006 14:24:13	51853.0	172.0	4.98	4.78	0.02	-1.62
3/15/2006 14:24:15	51855.5	174.5	4.97	4.78	0.03	-1.58
3/15/2006 14:24:16	51856.0	175.0	4.98	4.78	0.02	-1.63
3/15/2006 14:24:17	51857.5	176.5	4.98	4.78	0.02	-1.68
3/15/2006 14:24:20	51860.0	179.0	4.98	4.78	0.02	-1.75
3/15/2006 14:24:21	51861.5	180.5	4.98	4.79	0.02	-1.81
3/15/2006 14:24:22	51862.0	181.0	4.98	4.78	0.02	-1.76
3/15/2006 14:24:22	51862.5	181.5	4.98	4.79	0.02	-1.82
3/15/2006 14:24:23	51863.5	182.5	4.99	4.79	0.01	-1.99
3/15/2006 14:24:24	51864.0	183.0	4.99	4.79	0.01	-1.88
3/15/2006 14:24:24	51864.5	183.5	4.99	4.79	0.01	-2.00
3/15/2006 14:24:26	51866.0	185.0	4.99	4.79	0.01	-2.01
3/15/2006 14:24:27	51867.0	186.0	4.99	4.79	0.01	-2.12
3/15/2006 14:24:28	51868.5	187.5	4.99	4.79	0.01	-2.13
3/15/2006 14:24:29	51869.5	188.5	4.99	4.80	0.01	-2.28
3/15/2006 14:24:30	51870.0	189.0	5.00	4.80	0.00	-2.67
3/15/2006 14:24:30	51870.5	189.5	4.99	4.80	0.01	-2.30
3/15/2006 14:24:31	51871.5	190.5	4.99	4.80	0.00	-2.31
3/15/2006 14:24:32	51872.0	191.0	5.00	4.80	0.00	-2.74
3/15/2006 14:24:32	51872.5	191.5	5.00	4.80	0.00	-2.76

Slug Test P4-14

Slug Test by Bouwer and Rice

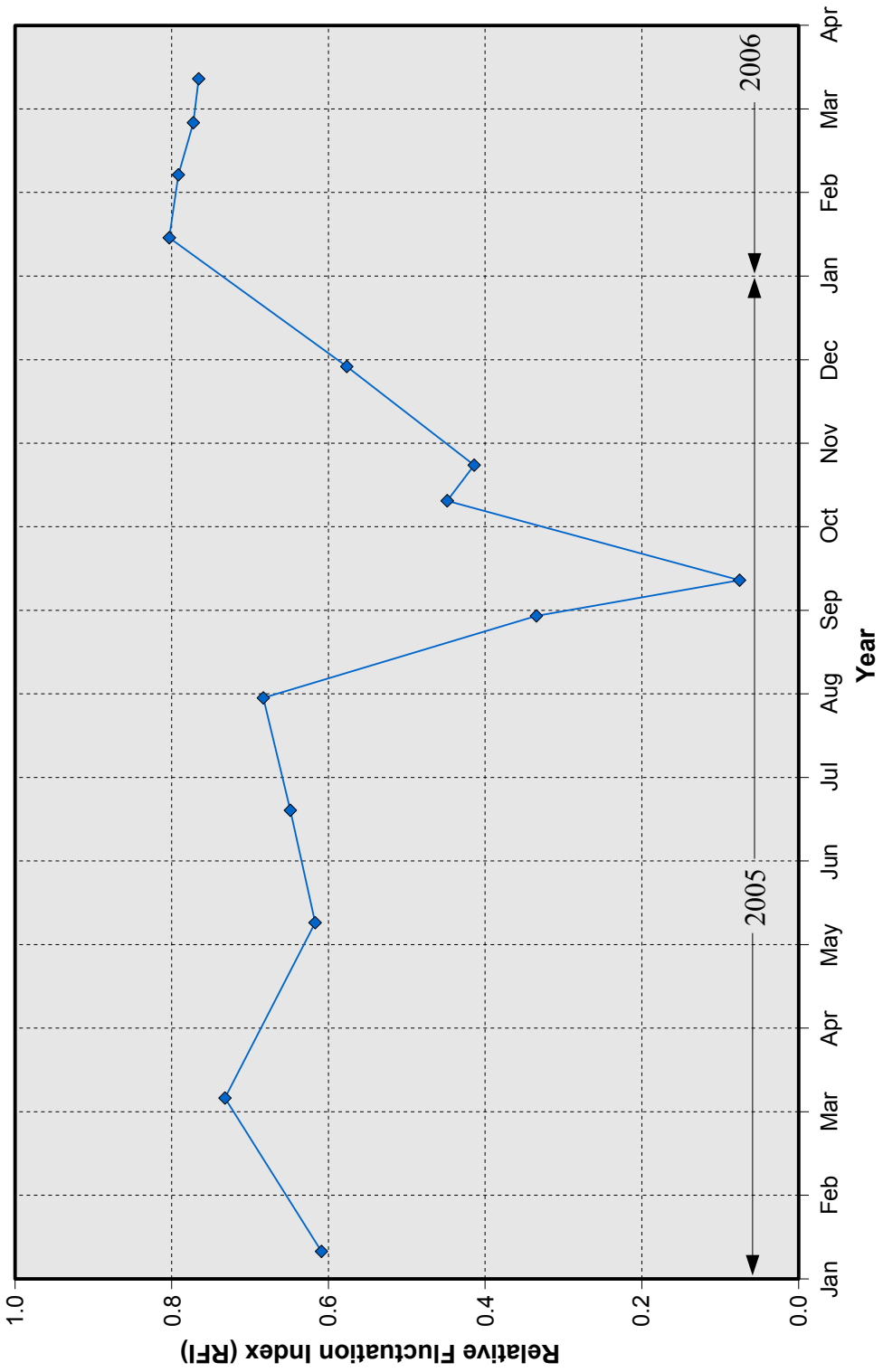
Displacement Method:	Pump	
Well depth:	26.19	ft
Stick up height:	2.94	ft
Depth to sand pack (BGS):	12.00	ft
Depth to screened interval (BGS):	14.13	ft
Well diameter:	2.00	in
Diameter of annular space:	8.50	in
Initial depth to water table from top of pipe:	20.74	ft
Initial Head Change:	4.71	ft
Total well length:	29.13	ft
Radius of well casing:	0.0833	ft
Assumed porosity of sand/gravel pack:	30%	
Adjusted radius of well casing:	0.2061	ft
r_c:	0.2061	ft
Radius of gravel pack (r_w):	0.3542	ft
Screened interval:	12.06	ft
Length of open section (L_e):	8.39	ft
L_e / r_w:	23.6894	
A (dimensionless):	2.279	
B (dimensionless):	0.375	
Drawdown at time = 0 (y_0):	3.14	ft
Drawdown at time = t (y_t):	0.64	ft
Elapsed Time between y_0 and y_t (t):	45.5	sec
Initial water column in well (L_w):	8.39	ft
$\ln(R_e/r_w)$ =	1.86	
K =	1.64E-04	ft/sec
	5.00E-03	**cm/sec**
	5174.34	ft/yr



Water above sand pack:	No
%Duration below sand pack:	100.00%
Water above screen:	No
%Duration below screen:	100.00%

APPENDIX D

Graph D-1: Relative Fluctuation Index (RFI) of on-site piezometers



NOTE: The RFI varies from 0 to 1 in a specified range. The highest RFI within that range indicates a condition in which the water level was the highest on average in that period, while the lowest RFI indicates the condition of the lowest water level in the same period. Refer to Section 5.7.2 for a detailed description of the RFI.

Table D-1: Monthly precipitation, Statesville COOP 318292

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1960	1	31	0	2.69	0.21	0.5	0.04	**6.22**
1960	2	29	0	2.16	0.24	0.53	0.05	**7.22**
1960	3	31	0	1.63	0.19	0.43	0.03	**5.65**
1960	4	30	0	1.3	0.13	0.29	0.02	**4.01**
1960	5	31	0	1.64	0.09	0.3	0.02	**2.68**
1960	6	30	0	2.42	0.19	0.48	0.04	**5.83**
1960	7	31	0	0.62	0.07	0.15	0	**2.19**
1960	8	31	0	1.22	0.08	0.23	0.01	**2.46**
1960	9	30	0	0.78	0.14	0.26	0.01	**4.08**
1960	10	31	0	0.9	0.17	0.27	0.01	**5.21**
1960	11	30	0	0.38	0.03	0.08	0	**1.03**
1960	12	31	0	1.11	0.06	0.21	0.01	**1.85**
1961	1	31	0	0.95	0.1	0.24	0.01	**2.92**
1961	2	28	0	1.38	0.22	0.4	0.03	**6.61**
1961	3	31	0	1.58	0.17	0.38	0.03	**5.22**
1961	4	30	0	1.13	0.15	0.29	0.01	**4.35**
1961	5	31	0	2.48	0.14	0.45	0.04	**4.11**
1961	6	30	0	2.25	0.19	0.43	0.03	**5.61**
1961	7	31	0	1.24	0.15	0.28	0.01	**4.35**
1961	8	31	0	0.96	0.18	0.29	0.01	**5.51**
1961	9	30	0	0.12	0.01	0.03	0	**0.28**
1961	10	31	0	0.33	0.02	0.07	0	**0.75**
1961	11	30	0	1.1	0.09	0.23	0.01	**2.64**
1961	12	31	0	2.05	0.25	0.51	0.05	**7.40**
1962	1	31	0	1.57	0.2	0.44	0.03	**6.02**
1962	2	28	0	1.02	0.15	0.27	0.01	**4.48**
1962	3	31	0	0.82	0.11	0.23	0.01	**3.45**
1962	4	30	0	1.15	0.11	0.24	0.01	**3.16**
1962	5	31	0	0.8	0.06	0.17	0.01	**1.76**
1962	6	30	0	1.45	0.23	0.38	0.03	**6.88**
1962	7	31	0	0.35	0.04	0.09	0	**1.22**
1962	8	31	0	1.36	0.06	0.25	0.01	**1.93**
1962	9	30	0	2.1	0.18	0.47	0.04	**5.51**
1962	10	31	0	0.41	0.04	0.11	0	**1.30**
1962	11	30	0	3.82	0.21	0.71	0.09	**6.31**
1962	12	31	0	1.21	0.11	0.3	0.02	**3.33**
1963	1	31	0	1.03	0.1	0.23	0.01	**2.94**
1963	2	28	0	0.84	0.11	0.23	0.01	**3.18**
1963	3	31	0	1.98	0.24	0.46	0.04	**7.13**
1963	4	30	0	1.74	0.14	0.37	0.03	**4.20**
1963	5	31	0	1.22	0.13	0.28	0.01	**4.00**
1963	6	30	0	0.64	0.1	0.19	0.01	**2.95**
1963	7	31	0	0.59	0.07	0.15	0	**2.23**
1963	8	31	0	0.62	0.08	0.16	0	**2.48**
1963	9	30	0	1.7	0.16	0.42	0.03	**4.82**
1963	10	31	0	0.03	0	0.01	0	**0.03**
1963	11	30	0	1.68	0.12	0.33	0.02	**3.58**
1963	12	31	0	1.3	0.09	0.25	0.01	**2.59**
1964	1	31	0	1.6	0.16	0.34	0.02	**4.85**
1964	2	29	0	1.33	0.13	0.28	0.01	**3.84**
1964	3	31	0	0.7	0.11	0.2	0.01	**3.38**
1964	4	30	0	1.88	0.17	0.39	0.03	**5.24**
1964	5	31	0	0.39	0.04	0.1	0	**1.25**
1964	6	30	0	1.67	0.22	0.43	0.03	**6.58**
1964	7	31	0	1.62	0.17	0.33	0.02	**5.14**
1964	8	31	0	1.74	0.19	0.43	0.03	**5.72**

Table D-1: Monthly precipitation, Statesville COOP 318292

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1964	9	30	0	0.85	0.07	0.18	0.01	**1.99**
1964	10	31	0	5.1	0.32	1.09	0.22	**9.47**
1964	11	30	0	2.78	0.11	0.5	0.05	**3.17**
1964	12	31	0	2.04	0.14	0.38	0.03	**4.23**
1965	1	31	0	0.66	0.07	0.16	0	**2.09**
1965	2	28	0	1.18	0.13	0.3	0.02	**3.95**
1965	3	31	0	2.39	0.2	0.47	0.04	**5.90**
1965	4	30	0	0.84	0.11	0.22	0.01	**3.26**
1965	5	31	0	0.6	0.04	0.12	0	**1.29**
1965	6	30	0	1.54	0.18	0.41	0.03	**5.54**
1965	7	31	0	1.75	0.16	0.4	0.03	**4.93**
1965	8	31	0	1.51	0.15	0.33	0.02	**4.44**
1965	9	30	0	0.47	0.04	0.11	0	**1.23**
1965	10	31	0	2.36	0.14	0.46	0.04	**4.11**
1965	11	30	0	0.47	0.05	0.11	0	**1.61**
1965	12	31	0	0.28	0.01	0.05	0	**0.34**
1966	1	30	0	0.83	0.08	0.17	0.01	**2.42**
1966	2	28	0	2.28	0.25	0.54	0.06	**7.59**
1966	3	31	0	1.47	0.06	0.26	0.01	**1.84**
1966	4	30	0	0.54	0.05	0.11	0	**1.40**
1966	5	31	0	1.51	0.1	0.28	0.01	**3.11**
1966	6	30	0	1.27	0.1	0.31	0.02	**2.89**
1966	7	31	0	1.7	0.1	0.33	0.02	**3.08**
1966	8	31	0	2.16	0.14	0.47	0.04	**4.28**
1966	9	30	0	2.65	0.16	0.52	0.05	**4.77**
1966	10	31	0	1.26	0.09	0.27	0.01	**2.83**
1966	11	30	0	0.62	0.05	0.14	0	**1.52**
1966	12	31	0	0.54	0.08	0.16	0	**2.39**
1967	1	31	0	0.98	0.07	0.2	0.01	**2.09**
1967	2	28	0	1.21	0.13	0.3	0.02	**3.88**
1967	3	31	0	0.79	0.1	0.21	0.01	**2.97**
1967	4	30	0	0.91	0.05	0.18	0.01	**1.54**
1967	5	31	0	1.26	0.19	0.31	0.02	**5.68**
1967	6	30	0	1.1	0.08	0.22	0.01	**2.47**
1967	7	31	0	0.82	0.09	0.19	0.01	**2.66**
1967	8	31	0	1.33	0.2	0.37	0.02	**5.98**
1967	9	30	0	1.06	0.09	0.27	0.01	**2.80**
1967	10	31	0	0.88	0.06	0.18	0.01	**1.83**
1967	11	30	0	0.77	0.07	0.18	0.01	**2.18**
1967	12	31	0	1.66	0.24	0.47	0.04	**7.17**
1968	1	31	0	1.47	0.13	0.32	0.02	**4.01**
1968	2	29	0	0.41	0.02	0.08	0	**0.66**
1968	3	31	0	2.65	0.15	0.48	0.04	**4.40**
1968	4	30	0	0.66	0.11	0.2	0.01	**3.39**
1968	5	31	0	2.13	0.19	0.5	0.04	**5.83**
1968	6	30	0	1	0.09	0.22	0.01	**2.70**
1968	7	31	0	1.14	0.17	0.36	0.02	**4.98**
1968	8	31	0	0.97	0.09	0.21	0.01	**2.76**
1968	9	30	0	0.39	0.02	0.08	0	**0.68**
1968	10	31	0	1.68	0.13	0.34	0.02	**4.00**
1968	11	30	0	2.3	0.2	0.53	0.05	**5.88**
1968	12	31	0	0.6	0.09	0.17	0.01	**2.83**
1969	1	31	0	0.93	0.08	0.23	0.01	**2.40**
1969	2	28	0	1.19	0.16	0.31	0.02	**4.66**
1969	3	31	0	1.31	0.17	0.35	0.02	**4.96**
1969	4	30	0	0.93	0.12	0.24	0.01	**3.63**

Table D-1: Monthly precipitation, Statesville COOP 318292

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1969	5	31	0	1.47	0.07	0.26	0.01	**2.19**
1969	6	30	0	1.34	0.15	0.29	0.02	**4.46**
1969	7	31	0	1	0.13	0.26	0.01	**4.00**
1969	8	31	0	0.62	0.1	0.16	0	**2.93**
1969	9	30	0	1.61	0.26	0.45	0.04	**7.91**
1969	10	31	0	1.35	0.08	0.29	0.01	**2.48**
1969	11	30	0	0.76	0.05	0.17	0.01	**1.64**
1969	12	31	0	1.87	0.14	0.41	0.03	**4.16**
1970	1	31	0	0.73	0.07	0.15	0	**2.00**
1970	2	28	0	1.16	0.13	0.3	0.02	**3.96**
1970	3	30	0	0.65	0.09	0.17	0	**2.77**
1970	4	30	0	1.17	0.14	0.32	0.02	**4.06**
1970	5	31	0	1.45	0.09	0.29	0.01	**2.75**
1970	6	30	0	0.85	0.11	0.21	0.01	**3.18**
1970	7	31	0	0.51	0.07	0.13	0	**2.06**
1970	8	31	0	6.39	0.35	1.15	0.24	**10.41**
1970	9	30	0	0.19	0.02	0.04	0	**0.47**
1970	10	31	0	2.35	0.16	0.44	0.03	**4.69**
1970	11	28	0	0.52	0.05	0.12	0	**1.41**
1970	12	31	0	0.73	0.06	0.17	0	**1.87**
1971	1	31	0	1.26	0.08	0.23	0.01	**2.31**
1971	2	28	0	1.19	0.17	0.34	0.02	**4.98**
1971	3	31	0	0.44	0.06	0.13	0	**1.76**
1971	4	30	0	1.31	0.09	0.26	0.01	**2.70**
1971	5	31	0	1.22	0.13	0.29	0.02	**4.00**
1971	6	29	0	1.8	0.12	0.34	0.02	**3.57**
1971	7	31	0	1.16	0.19	0.33	0.02	**5.72**
1971	8	31	0	0.73	0.07	0.16	0	**2.25**
1971	9	30	0	2.03	0.27	0.57	0.06	**8.19**
1971	10	31	0	1.51	0.2	0.39	0.03	**6.00**
1971	11	30	0	1.22	0.08	0.25	0.01	**2.36**
1971	12	31	0	1.22	0.09	0.26	0.01	**2.55**
1972	1	31	0	0.78	0.1	0.21	0.01	**3.02**
1972	2	28	0	0.45	0.09	0.15	0	**2.63**
1972	3	31	0	0.75	0.13	0.22	0.01	**3.88**
1972	4	30	0	0.67	0.07	0.15	0	**2.07**
1972	5	31	0	2.13	0.26	0.47	0.04	**7.88**
1972	6	30	0	7.68	0.34	1.41	0.36	**10.22**
1972	7	31	0	0.82	0.06	0.16	0	**1.73**
1972	9	30	0	1.46	0.06	0.27	0.01	**1.88**
1972	10	31	0	1.08	0.06	0.2	0.01	**1.90**
1972	11	30	0	1.41	0.16	0.37	0.02	**4.82**
1972	12	31	0	2.46	0.2	0.48	0.04	**6.01**
1973	1	31	0	1.11	0.12	0.23	0.01	**3.49**
1973	2	28	0	2.39	0.15	0.47	0.04	**4.53**
1973	3	31	0	1.89	0.25	0.39	0.03	**7.58**
1973	4	30	0	2.3	0.17	0.46	0.04	**5.08**
1973	5	31	0	2.6	0.18	0.53	0.05	**5.53**
1973	6	30	0	2.93	0.24	0.68	0.08	**7.29**
1973	7	31	0	1.96	0.1	0.36	0.02	**2.99**
1973	8	31	0	0.89	0.13	0.24	0.01	**4.02**
1973	9	30	0	1.28	0.06	0.24	0.01	**1.75**
1973	10	31	0	0.65	0.05	0.15	0	**1.64**
1973	11	30	0	0.81	0.05	0.16	0	**1.55**
1973	12	31	0	1.33	0.23	0.37	0.02	**7.02**
1974	1	31	0	2.16	0.17	0.4	0.03	**5.12**

Table D-1: Monthly precipitation, Statesville COOP 318292

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1974	2	28	0	0.74	0.12	0.22	0.01	**3.57**
1974	3	31	0	1.96	0.15	0.38	0.03	**4.58**
1974	4	30	0	1.15	0.09	0.23	0.01	**2.66**
1974	5	31	0	1.4	0.2	0.39	0.03	**5.87**
1974	6	30	0	0.65	0.11	0.19	0.01	**3.17**
1974	7	31	0	0.74	0.05	0.14	0	**1.38**
1974	8	31	0	2.39	0.23	0.5	0.05	**6.92**
1974	9	30	0	2.04	0.14	0.4	0.03	**4.10**
1974	10	31	0	0.6	0.03	0.11	0	**0.85**
1974	11	30	0	1.04	0.11	0.26	0.01	**3.40**
1974	12	31	0	1.46	0.14	0.3	0.02	**4.16**
1975	1	31	0	1.02	0.15	0.3	0.02	**4.39**
1975	2	28	0	1.33	0.15	0.28	0.01	**4.61**
1975	3	31	0	2	0.28	0.53	0.05	**8.28**
1975	4	30	0	0.46	0.06	0.13	0	**1.66**
1975	5	31	0	1.6	0.21	0.35	0.02	**6.37**
1975	6	30	0	0.88	0.13	0.25	0.01	**3.89**
1975	7	31	0	1.71	0.23	0.44	0.03	**7.03**
1975	8	31	0	0.66	0.05	0.15	0	**1.57**
1975	9	30	0	0.85	0.14	0.26	0.01	**4.18**
1975	10	31	0	1.62	0.12	0.38	0.03	**3.60**
1975	11	30	0	0.82	0.08	0.19	0.01	**2.47**
1975	12	31	0	0.97	0.13	0.26	0.01	**3.81**
1976	1	31	0	1.07	0.06	0.2	0.01	**1.95**
1976	2	29	0	0.73	0.06	0.18	0.01	**1.89**
1976	3	31	0	0.9	0.1	0.23	0.01	**3.07**
1976	4	30	0	0.16	0.01	0.04	0	**0.35**
1976	5	31	0	2.11	0.23	0.53	0.05	**6.77**
1976	6	30	0	0.95	0.14	0.25	0.01	**4.20**
1976	7	31	0	0.3	0.02	0.06	0	**0.75**
1976	8	31	0	1.61	0.2	0.47	0.04	**5.99**
1976	9	30	0	2.69	0.14	0.5	0.05	**4.34**
1976	10	31	0	2.79	0.23	0.54	0.05	**6.84**
1976	11	30	0	1.03	0.07	0.2	0.01	**2.14**
1976	12	31	0	1.52	0.17	0.34	0.02	**5.00**
1977	1	31	0	0.82	0.07	0.17	0.01	**2.14**
1977	2	28	0	0.42	0.03	0.1	0	**1.03**
1977	3	31	0	1.3	0.13	0.27	0.01	**3.87**
1977	4	30	0	1.52	0.1	0.29	0.02	**3.05**
1977	5	31	0	0.4	0.06	0.12	0	**1.94**
1977	6	30	0	0.87	0.12	0.24	0.01	**3.53**
1977	7	31	0	0.65	0.03	0.12	0	**0.83**
1977	8	31	0	1.01	0.12	0.23	0.01	**3.71**
1977	9	30	0	4.76	0.24	0.88	0.14	**7.34**
1977	10	31	0	3.33	0.17	0.6	0.06	**5.10**
1977	11	30	0	2.26	0.21	0.5	0.05	**6.35**
1977	12	31	0	0.83	0.1	0.19	0.01	**2.95**
1978	1	31	0	3.72	0.3	0.72	0.09	**9.01**
1978	2	28	0	1.16	0.05	0.22	0.01	**1.49**
1978	3	31	0	1.7	0.17	0.42	0.03	**5.11**
1978	4	30	0	1.51	0.11	0.33	0.02	**3.36**
1978	5	31	0	1.79	0.11	0.34	0.02	**3.19**
1978	6	30	0	2.33	0.14	0.43	0.03	**4.31**
1978	7	31	0	2.04	0.18	0.45	0.04	**5.44**
1978	8	31	0	1.04	0.1	0.21	0.01	**3.08**
1978	9	30	0	2.2	0.16	0.49	0.04	**4.74**

Table D-1: Monthly precipitation, Statesville COOP 318292

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1978	10	31	0	0.85	0.05	0.18	0.01	**1.63**
1978	11	30	0	0.6	0.1	0.19	0.01	**3.09**
1978	12	31	0	2	0.2	0.47	0.04	**6.02**
1979	1	31	0	1.71	0.2	0.4	0.03	**5.99**
1979	2	28	0	1.52	0.19	0.42	0.03	**5.55**
1979	3	31	0	2.11	0.15	0.39	0.03	**4.43**
1979	4	30	0	1.43	0.13	0.32	0.02	**4.00**
1979	5	31	0	2.17	0.19	0.45	0.04	**5.69**
1979	6	30	0	2.04	0.23	0.45	0.04	**6.87**
1979	7	31	0	1.77	0.18	0.34	0.02	**5.45**
1979	8	31	0	1.26	0.15	0.32	0.02	**4.40**
1979	9	30	0	3.01	0.37	0.72	0.1	**10.95**
1979	10	31	0	0.65	0.07	0.17	0	**2.14**
1979	11	30	0	1.3	0.13	0.34	0.02	**3.94**
1979	12	31	0	0.41	0.04	0.09	0	**1.22**
1980	1	31	0	1.56	0.15	0.35	0.02	**4.47**
1980	2	29	0	0.44	0.06	0.12	0	**1.70**
1980	3	31	0	1.19	0.23	0.35	0.02	**6.75**
1980	4	30	0	1.19	0.11	0.27	0.01	**3.42**
1980	5	31	0	1.53	0.12	0.36	0.02	**3.72**
1980	6	30	0	2.86	0.15	0.53	0.05	**4.57**
1980	7	31	0	1.87	0.14	0.37	0.02	**4.16**
1980	8	31	0	1.5	0.14	0.36	0.02	**4.18**
1980	9	30	0	1.89	0.18	0.38	0.03	**5.38**
1980	10	31	0	0.74	0.1	0.22	0.01	**3.15**
1980	11	30	0	0.8	0.11	0.23	0.01	**3.16**
1980	12	31	0	0.57	0.03	0.11	0	**0.89**
1981	1	31	0	0.5	0.03	0.1	0	**0.90**
1981	2	28	0	1.09	0.11	0.25	0.01	**3.39**
1981	3	31	0	1.42	0.1	0.3	0.02	**2.90**
1981	4	30	0	0.27	0.04	0.08	0	**1.11**
1981	5	31	0	1.6	0.12	0.32	0.02	**3.71**
1981	6	30	0	6.02	0.33	1.09	0.22	**9.87**
1981	7	31	0	2.62	0.14	0.48	0.04	**4.11**
1981	8	31	0	0.51	0.06	0.13	0	**1.88**
1981	9	30	0	1.74	0.15	0.37	0.03	**4.64**
1981	10	31	0	1.52	0.13	0.35	0.02	**3.93**
1981	11	30	0	0.55	0.04	0.11	0	**1.11**
1981	12	31	0	1.26	0.18	0.4	0.03	**5.55**
1982	1	31	0	1.44	0.12	0.29	0.01	**3.72**
1982	2	28	0	1.65	0.18	0.38	0.03	**5.48**
1982	3	31	0	0.86	0.06	0.16	0	**1.86**
1982	4	30	0	0.8	0.11	0.19	0.01	**3.43**
1982	5	31	0	0.73	0.14	0.23	0.01	**4.07**
1982	6	30	0	1.5	0.21	0.4	0.03	**6.39**
1982	7	31	0	1.53	0.14	0.33	0.02	**4.27**
1982	8	31	0	0.33	0.02	0.06	0	**0.56**
1982	9	30	0	0.72	0.08	0.17	0.01	**2.32**
1982	10	31	0	2.1	0.13	0.44	0.03	**3.94**
1982	11	30	0	1.68	0.14	0.35	0.02	**4.14**
1982	12	31	0	1.6	0.14	0.35	0.02	**4.23**
1983	1	31	0	0.3	0.04	0.08	0	**1.11**
1983	2	28	0	0.92	0.11	0.26	0.01	**3.28**
1983	3	31	0	1.42	0.19	0.39	0.03	**5.79**
1983	4	30	0	1.27	0.18	0.32	0.02	**5.28**
1983	5	31	0	0.61	0.11	0.16	0	**3.24**

Table D-1: Monthly precipitation, Statesville COOP 318292

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1983	6	30	0	1.29	0.1	0.26	0.01	**2.86**
1983	7	31	0	0.5	0.03	0.1	0	**0.86**
1983	8	31	0	2.38	0.15	0.49	0.04	**4.65**
1983	9	30	0	0.72	0.07	0.16	0	**1.97**
1983	10	31	0	1.54	0.13	0.32	0.02	**3.89**
1983	11	30	0	1.52	0.15	0.37	0.02	**4.40**
1983	12	31	0	1.9	0.21	0.45	0.04	**6.28**
1984	1	31	0	1.26	0.12	0.28	0.01	**3.45**
1984	2	29	0	2.14	0.21	0.5	0.05	**6.29**
1984	3	31	0	1.42	0.16	0.33	0.02	**4.75**
1984	4	30	0	1.99	0.18	0.41	0.03	**5.41**
1984	5	31	0	1.58	0.25	0.48	0.04	**7.58**
1984	6	30	0	0.43	0.05	0.12	0	**1.56**
1984	7	31	0	1.85	0.18	0.45	0.04	**5.50**
1984	8	31	0	0.5	0.05	0.11	0	**1.41**
1984	9	30	0	0.93	0.03	0.17	0.01	**0.93**
1984	10	31	0	1.08	0.07	0.22	0.01	**2.08**
1984	11	30	0	1.12	0.08	0.23	0.01	**2.41**
1984	12	31	0	0.82	0.06	0.17	0.01	**1.79**
1985	1	31	0	1	0.09	0.22	0.01	**2.70**
1985	2	28	0	1.6	0.19	0.41	0.03	**5.55**
1985	3	31	0	0.88	0.04	0.16	0	**1.20**
1985	4	30	0	0.68	0.05	0.14	0	**1.49**
1985	5	31	0	3.24	0.25	0.77	0.11	**7.54**
1985	6	30	0	1.58	0.13	0.33	0.02	**3.97**
1985	7	31	0	1.69	0.25	0.43	0.03	**7.51**
1985	8	31	0	2.1	0.15	0.39	0.03	**4.40**
1985	9	30	0	0.05	0	0.01	0	**0.05**
1985	10	31	0	1.78	0.1	0.32	0.02	**2.92**
1985	11	30	0	1.3	0.19	0.36	0.02	**5.69**
1985	12	31	0	0.56	0.05	0.13	0	**1.48**
1986	1	31	0	0.43	0.02	0.08	0	**0.75**
1986	2	28	0	0.34	0.05	0.09	0	**1.44**
1986	3	31	0	0.87	0.08	0.2	0.01	**2.32**
1986	4	30	0	0.14	0.01	0.04	0	**0.43**
1986	5	31	0	0.34	0.03	0.07	0	**0.84**
1986	6	30	0	0.72	0.03	0.13	0	**0.80**
1986	7	31	0	0.33	0.05	0.11	0	**1.62**
1986	8	31	0	1.55	0.18	0.35	0.02	**5.30**
1986	9	30	0	0.62	0.05	0.14	0	**1.46**
1986	10	31	0	1.04	0.11	0.28	0.01	**3.22**
1986	11	30	0	0.98	0.15	0.28	0.01	**4.46**
1986	12	31	0	2.3	0.14	0.43	0.03	**4.14**
1987	1	31	0	1.16	0.13	0.3	0.02	**3.79**
1987	2	28	0	1.3	0.15	0.33	0.02	**4.56**
1987	3	31	0	1.63	0.18	0.36	0.02	**5.29**
1987	4	30	0	0.91	0.13	0.25	0.01	**3.83**
1987	5	31	0	0.71	0.05	0.14	0	**1.63**
1987	6	30	0	3.88	0.25	0.76	0.11	**7.44**
1987	7	31	0	1.2	0.08	0.25	0.01	**2.30**
1987	8	31	0	1.51	0.09	0.3	0.02	**2.63**
1987	9	30	0	1.97	0.24	0.51	0.05	**7.19**
1987	10	31	0	0.98	0.04	0.17	0.01	**1.05**
1987	11	30	0	2.19	0.15	0.44	0.04	**4.51**
1987	12	31	0	1.23	0.13	0.29	0.02	**3.84**
1988	1	31	0	0.41	0.07	0.11	0	**2.01**

Table D-1: Monthly precipitation, Statesville COOP 318292

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1988	2	29	0	0.67	0.05	0.14	0	**1.48**
1988	3	31	0	1.02	0.09	0.21	0.01	**2.67**
1988	4	30	0	0.82	0.08	0.21	0.01	**2.36**
1988	5	31	0	0.8	0.07	0.18	0.01	**2.15**
1988	6	30	0	2.14	0.08	0.38	0.03	**2.42**
1988	7	31	0	1.6	0.12	0.31	0.02	**3.75**
1988	8	31	0	1	0.12	0.25	0.01	**3.65**
1988	9	30	0	2.17	0.22	0.51	0.05	**6.59**
1988	10	31	0	1.01	0.1	0.26	0.01	**2.92**
1988	11	30	0	1	0.13	0.27	0.01	**3.84**
1988	12	31	0	0.53	0.05	0.13	0	**1.60**
1989	1	31	0	0.7	0.06	0.14	0	**1.88**
1989	2	28	0	1.1	0.2	0.34	0.02	**6.12**
1989	3	31	0	1.02	0.15	0.23	0.01	**4.35**
1989	4	30	0	0.72	0.11	0.21	0.01	**3.36**
1989	5	31	0	1.27	0.16	0.34	0.02	**4.77**
1989	6	30	0	1.58	0.17	0.33	0.02	**5.06**
1989	7	31	0	2.6	0.25	0.63	0.07	**7.35**
1989	8	31	0	1.13	0.08	0.22	0.01	**2.38**
1989	9	30	0	2.88	0.23	0.59	0.06	**6.99**
1989	10	31	0	2.61	0.19	0.55	0.06	**5.56**
1989	11	30	0	0.7	0.1	0.2	0.01	**3.04**
1989	12	31	0	1.57	0.13	0.35	0.02	**3.85**
1990	1	31	0	1.17	0.16	0.28	0.01	**4.74**
1990	2	28	0	1.56	0.21	0.47	0.04	**6.38**
1990	3	31	0	2.46	0.16	0.46	0.04	**4.69**
1990	4	30	0	1.05	0.08	0.21	0.01	**2.48**
1990	5	31	0	1.83	0.27	0.49	0.04	**8.11**
1990	6	30	0	0.75	0.07	0.18	0.01	**1.98**
1990	7	31	0	1.55	0.08	0.28	0.01	**2.52**
1990	8	31	0	2.77	0.13	0.5	0.04	**3.91**
1990	9	30	0	0.16	0.01	0.03	0	**0.19**
1990	10	31	0	2.8	0.41	0.78	0.11	**12.23**
1990	11	30	0	1.26	0.08	0.25	0.01	**2.43**
1990	12	31	0	0.71	0.09	0.17	0.01	**2.84**
1991	1	31	0	1.54	0.15	0.34	0.02	**4.52**
1991	2	28	0	0.86	0.08	0.18	0.01	**2.43**
1991	3	31	0	3.65	0.24	0.69	0.08	**7.24**
1991	4	30	0	1.54	0.19	0.34	0.02	**5.58**
1991	5	31	0	2.87	0.15	0.51	0.05	**4.36**
1991	6	30	0	1.16	0.13	0.28	0.01	**3.77**
1991	7	31	0	1.34	0.16	0.35	0.02	**4.95**
1991	8	31	0	1.29	0.16	0.33	0.02	**4.93**
1991	9	30	0	1.07	0.07	0.21	0.01	**2.22**
1991	10	31	0	0.57	0.02	0.1	0	**0.58**
1991	11	30	0	1.4	0.06	0.25	0.01	**1.79**
1991	12	31	0	1	0.12	0.25	0.01	**3.64**
1992	1	31	0	0.99	0.08	0.22	0.01	**2.26**
1992	2	29	0	1.14	0.12	0.27	0.01	**3.47**
1992	3	31	0	1	0.09	0.22	0.01	**2.68**
1992	4	30	0	3.73	0.14	0.67	0.08	**4.27**
1992	5	31	0	0.7	0.11	0.21	0.01	**3.25**
1992	6	30	0	1.78	0.19	0.44	0.04	**5.73**
1992	7	31	0	1.62	0.14	0.33	0.02	**4.22**
1992	8	31	0	3.2	0.13	0.57	0.06	**3.90**
1992	9	30	0	1.65	0.17	0.39	0.03	**5.09**

Table D-1: Monthly precipitation, Statesville COOP 318292

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1992	10	31	0	2	0.14	0.4	0.03	**4.19**
1992	11	30	0	1.42	0.21	0.39	0.03	**6.18**
1992	12	31	0	0.83	0.11	0.24	0.01	**3.23**
1993	1	31	0	1.8	0.23	0.46	0.04	**6.82**
1993	2	28	0	1.97	0.14	0.39	0.03	**4.06**
1993	3	31	0	2.2	0.26	0.58	0.06	**7.68**
1993	4	30	0	0.91	0.11	0.24	0.01	**3.40**
1993	5	31	0	1.4	0.06	0.25	0.01	**1.85**
1993	6	30	0	1.77	0.08	0.33	0.02	**2.46**
1993	7	31	0	0.66	0.1	0.18	0.01	**2.93**
1993	8	31	0	0.6	0.05	0.12	0	**1.55**
1993	9	30	0	0.41	0.05	0.1	0	**1.35**
1993	10	31	0	1.13	0.04	0.2	0.01	**1.31**
1993	11	30	0	2.02	0.09	0.36	0.02	**2.77**
1993	12	31	0	1.55	0.13	0.3	0.02	**3.88**
1994	1	31	0	0.92	0.15	0.28	0.01	**4.35**
1994	2	28	0	0.97	0.1	0.24	0.01	**2.97**
1994	3	31	0	2.34	0.22	0.53	0.05	**6.69**
1994	4	30	0	0.58	0.06	0.14	0	**1.94**
1994	5	31	0	0.88	0.08	0.21	0.01	**2.55**
1994	6	30	0	1.22	0.16	0.32	0.02	**4.74**
1994	7	31	0	2.46	0.19	0.45	0.04	**5.60**
1994	8	31	0	3.35	0.19	0.6	0.07	**5.70**
1994	9	30	0	1.03	0.08	0.2	0.01	**2.44**
1994	10	31	0	1.57	0.08	0.29	0.01	**2.53**
1994	11	30	0	1.03	0.1	0.26	0.01	**3.06**
1994	12	31	0	0.61	0.05	0.14	0	**1.64**
1995	1	31	0	1.45	0.16	0.36	0.02	**4.78**
1995	2	28	0	1.24	0.15	0.31	0.02	**4.45**
1995	3	31	0	1.22	0.08	0.23	0.01	**2.50**
1995	4	30	0	0.2	0.01	0.05	0	**0.44**
1995	5	31	0	0.94	0.12	0.24	0.01	**3.48**
1995	6	30	0	1.51	0.31	0.44	0.04	**9.22**
1995	7	31	0	1.35	0.1	0.26	0.01	**3.00**
1995	8	31	0	4.53	0.18	0.8	0.11	**5.41**
1995	9	30	0	2.13	0.12	0.4	0.03	**3.63**
1995	10	31	0	2.59	0.23	0.57	0.06	**6.89**
1995	11	30	0	1.29	0.12	0.3	0.02	**3.52**
1995	12	31	0	0.66	0.06	0.14	0	**1.74**
1996	1	31	0	1.3	0.13	0.28	0.01	**3.95**
1996	2	29	0	1.87	0.11	0.35	0.02	**3.21**
1996	3	31	0	0.9	0.14	0.26	0.01	**4.11**
1996	4	30	0	1.07	0.12	0.23	0.01	**3.46**
1996	5	31	0	0.57	0.05	0.12	0	**1.42**
1996	6	30	0	1.5	0.14	0.34	0.02	**4.17**
1996	7	31	0	0.48	0.08	0.16	0	**2.30**
1996	8	31	0	2.06	0.23	0.46	0.04	**6.98**
1996	9	30	0	1.25	0.2	0.34	0.02	**6.01**
1996	10	31	0	1.25	0.07	0.24	0.01	**1.95**
1996	11	30	0	1.16	0.14	0.3	0.02	**4.12**
1996	12	31	0	1.92	0.17	0.38	0.03	**5.04**
1997	1	31	0	1	0.12	0.24	0.01	**3.47**
1997	2	28	0	1.24	0.16	0.3	0.02	**4.82**
1997	3	31	0	1.18	0.11	0.27	0.01	**3.38**
1997	4	30	0	2.76	0.29	0.63	0.07	**8.55**
1997	5	31	0	0.72	0.04	0.13	0	**1.28**

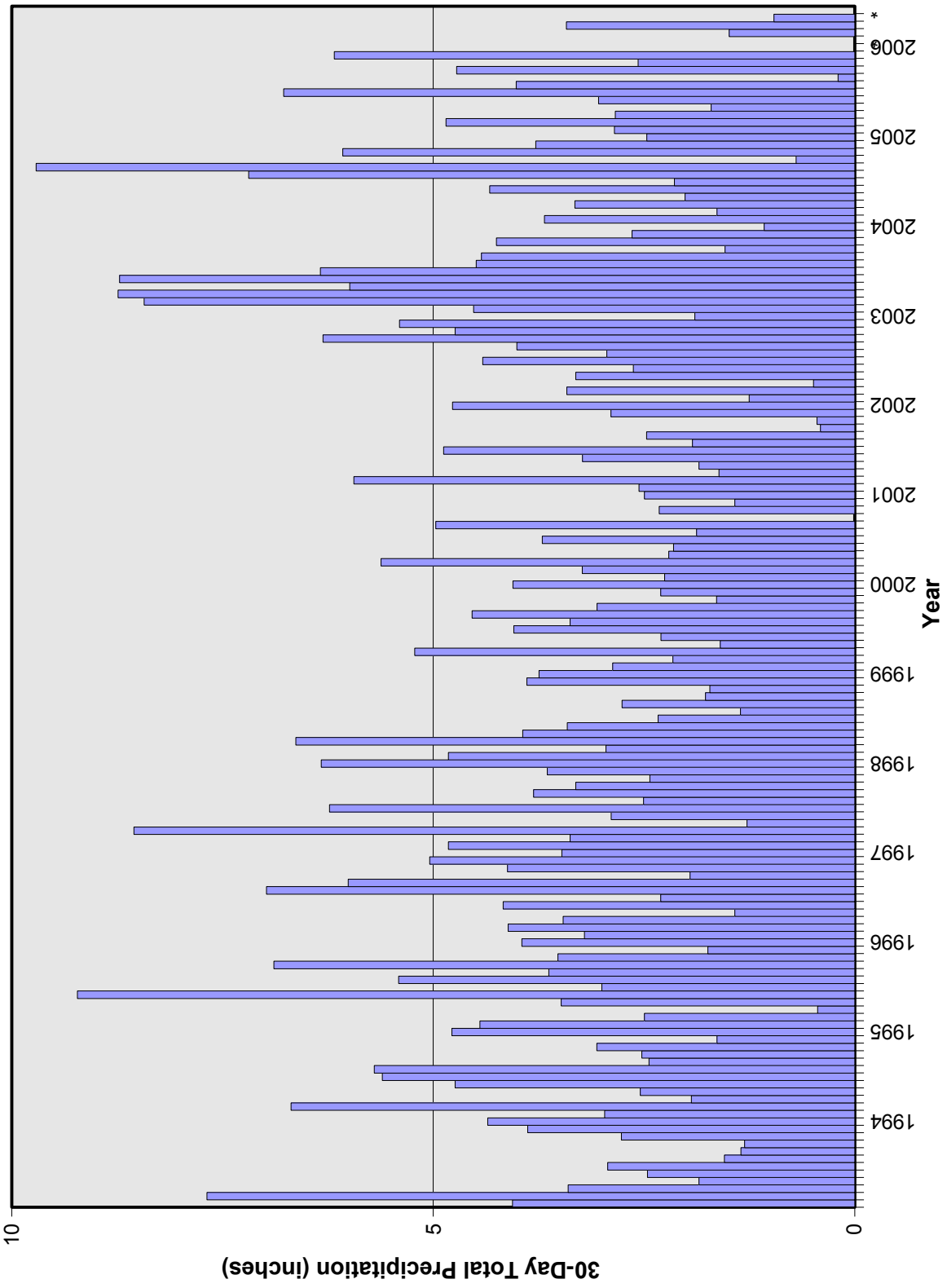
Table D-1: Monthly precipitation, Statesville COOP 318292

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1997	6	30	0	1.3	0.1	0.25	0.01	**2.89**
1997	7	31	0	2.7	0.21	0.51	0.05	**6.23**
1997	8	31	0	1.33	0.08	0.28	0.01	**2.51**
1997	9	30	0	1.66	0.13	0.35	0.02	**3.81**
1997	10	31	0	1.48	0.11	0.33	0.02	**3.31**
1997	11	30	0	0.52	0.08	0.15	0	**2.43**
1997	12	31	0	0.84	0.12	0.23	0.01	**3.65**
1998	1	31	0	1.75	0.21	0.42	0.03	**6.33**
1998	2	28	0	0.9	0.16	0.26	0.01	**4.82**
1998	3	31	0	1.65	0.1	0.33	0.02	**2.95**
1998	4	30	0	1.45	0.22	0.39	0.03	**6.63**
1998	5	31	0	0.79	0.13	0.23	0.01	**3.94**
1998	6	30	0	0.94	0.11	0.24	0.01	**3.41**
1998	7	31	0	1.15	0.08	0.21	0.01	**2.33**
1998	8	31	0	0.57	0.05	0.13	0	**1.35**
1998	9	30	0	0.96	0.09	0.25	0.01	**2.76**
1998	10	31	0	1.29	0.06	0.24	0.01	**1.77**
1998	11	30	0	0.47	0.06	0.12	0	**1.72**
1998	12	31	0	1.46	0.13	0.35	0.02	**3.89**
1999	1	31	0	1.22	0.12	0.28	0.01	**3.75**
1999	2	28	0	0.67	0.1	0.18	0.01	**2.87**
1999	3	31	0	0.8	0.07	0.18	0.01	**2.16**
1999	4	30	0	1.38	0.17	0.39	0.03	**5.22**
1999	5	31	0	1.1	0.05	0.2	0.01	**1.60**
1999	6	30	0	0.74	0.08	0.17	0.01	**2.30**
1999	7	31	0	1.68	0.13	0.38	0.03	**4.05**
1999	8	31	0	0.75	0.11	0.21	0.01	**3.38**
1999	9	30	0	1.32	0.15	0.33	0.02	**4.54**
1999	10	31	0	0.97	0.1	0.25	0.01	**3.06**
1999	11	30	0	0.8	0.05	0.18	0.01	**1.64**
1999	12	31	0	0.65	0.08	0.18	0.01	**2.30**
2000	1	31	0	0.95	0.14	0.26	0.01	**4.05**
2000	2	29	0	0.92	0.08	0.21	0.01	**2.26**
2000	3	31	0	1.68	0.11	0.32	0.02	**3.23**
2000	4	30	0	0.95	0.19	0.32	0.02	**5.62**
2000	5	31	0	0.72	0.07	0.16	0	**2.21**
2000	6	30	0	0.9	0.07	0.2	0.01	**2.15**
2000	7	31	0	1.9	0.12	0.36	0.02	**3.71**
2000	8	31	0	0.59	0.06	0.14	0	**1.88**
2000	9	30	0	1.79	0.17	0.37	0.03	**4.97**
2000	10	31	0	0	0	0	0	**0.00**
2000	11	30	0	1.01	0.08	0.2	0.01	**2.32**
2000	12	31	0	0.62	0.05	0.14	0	**1.42**
2001	1	31	0	0.98	0.08	0.2	0.01	**2.50**
2001	2	28	0	0.89	0.09	0.2	0.01	**2.56**
2001	3	31	0	1.74	0.2	0.38	0.03	**5.94**
2001	4	30	0	0.65	0.05	0.15	0	**1.61**
2001	5	31	0	0.75	0.06	0.14	0	**1.85**
2001	6	30	0	1.8	0.11	0.34	0.02	**3.23**
2001	7	31	0	1.75	0.16	0.33	0.02	**4.88**
2001	8	31	0	0.73	0.06	0.17	0.01	**1.93**
2001	9	30	0	1.1	0.08	0.24	0.01	**2.47**
2001	10	31	0	0.25	0.01	0.05	0	**0.41**
2001	11	30	0	0.43	0.02	0.08	0	**0.45**
2001	12	31	0	0.9	0.1	0.25	0.01	**2.89**
2002	1	31	0	1.86	0.16	0.39	0.03	**4.77**

Table D-1: Monthly precipitation, Statesville COOP 318292

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
2002	2	28	0	0.93	0.04	0.17	0.01	**1.25**
2002	3	31	0	0.79	0.11	0.2	0.01	**3.42**
2002	4	30	0	0.15	0.02	0.04	0	**0.49**
2002	5	30	0	1.92	0.11	0.36	0.02	**3.31**
2002	6	29	0	1.69	0.09	0.32	0.02	**2.63**
2002	7	31	0	1.34	0.15	0.35	0.02	**4.41**
2002	8	31	0	1.05	0.1	0.25	0.01	**2.94**
2002	9	30	0	1.04	0.13	0.29	0.01	**4.01**
2002	10	31	0	1.48	0.21	0.4	0.03	**6.31**
2002	11	30	0	1.41	0.16	0.37	0.03	**4.74**
2002	12	31	0	1.4	0.18	0.38	0.03	**5.40**
2003	1	31	0	0.63	0.06	0.14	0	**1.90**
2003	2	28	0	1.42	0.15	0.29	0.02	**4.52**
2003	3	31	0	4.2	0.28	0.79	0.11	**8.43**
2003	4	30	0	2.05	0.29	0.55	0.06	**8.74**
2003	5	31	0	1.56	0.2	0.38	0.03	**5.99**
2003	6	30	0	1.8	0.29	0.5	0.05	**8.72**
2003	7	31	0	1.85	0.21	0.42	0.03	**6.34**
2003	8	31	0	1.07	0.15	0.29	0.01	**4.49**
2003	9	30	0	2.01	0.15	0.48	0.04	**4.43**
2003	10	31	0	0.6	0.05	0.13	0	**1.54**
2003	11	30	0	2.12	0.14	0.41	0.03	**4.25**
2003	12	31	0	1.03	0.09	0.23	0.01	**2.64**
2004	1	31	0	0.45	0.04	0.1	0	**1.07**
2004	2	29	0	0.96	0.12	0.27	0.01	**3.68**
2004	3	31	0	0.6	0.05	0.13	0	**1.64**
2004	4	30	0	0.94	0.11	0.25	0.01	**3.32**
2004	5	31	0	1.03	0.07	0.19	0.01	**2.01**
2004	6	30	0	0.92	0.14	0.23	0.01	**4.33**
2004	7	30	0	0.62	0.07	0.16	0	**2.14**
2004	8	31	0	4.15	0.24	0.77	0.11	**7.19**
2004	9	30	0	4.2	0.32	0.97	0.17	**9.71**
2004	10	31	0	0.16	0.02	0.04	0	**0.70**
2004	11	28	0	1.59	0.2	0.43	0.04	**6.08**
2004	12	31	0	2.19	0.13	0.4	0.03	**3.78**
2005	1	31	0	1.65	0.08	0.31	0.02	**2.47**
2005	2	28	0	0.71	0.1	0.16	0	**2.85**
2005	3	31	0	1.86	0.16	0.37	0.02	**4.85**
2005	4	30	0	0.79	0.09	0.19	0.01	**2.84**
2005	5	31	0	0.55	0.06	0.12	0	**1.70**
2005	6	30	0	0.96	0.1	0.22	0.01	**3.04**
2005	7	31	0	3.24	0.23	0.59	0.06	**6.77**
2005	8	31	0	1.02	0.13	0.28	0.01	**4.02**
2005	9	30	0	0.13	0.01	0.02	0	**0.20**
2005	10	31	0	2.47	0.16	0.5	0.05	**4.72**
2005	11	30	0	1.1	0.09	0.24	0.01	**2.57**
2005	12	31	0	1.4	0.21	0.4	0.03	**6.17**
2006	1	10	0.01	0.95	0.24	0.32	0.03	**7.20**
2006	2	7	0	0.47	0.19	0.17	0.01	**5.66**
2006	3	30	0	0.95	0.05	0.17	0.01	**1.49**
2006	4	30	0	0.73	0.11	0.21	0.01	**3.42**
2006	5	31	0	0.5	0.03	0.09	0	**0.96**
2006	6	15	0	1.63	0.23	0.41	0.04	**6.94**

Graph D-2: Monthly precipitation, Statesville COOP 318292



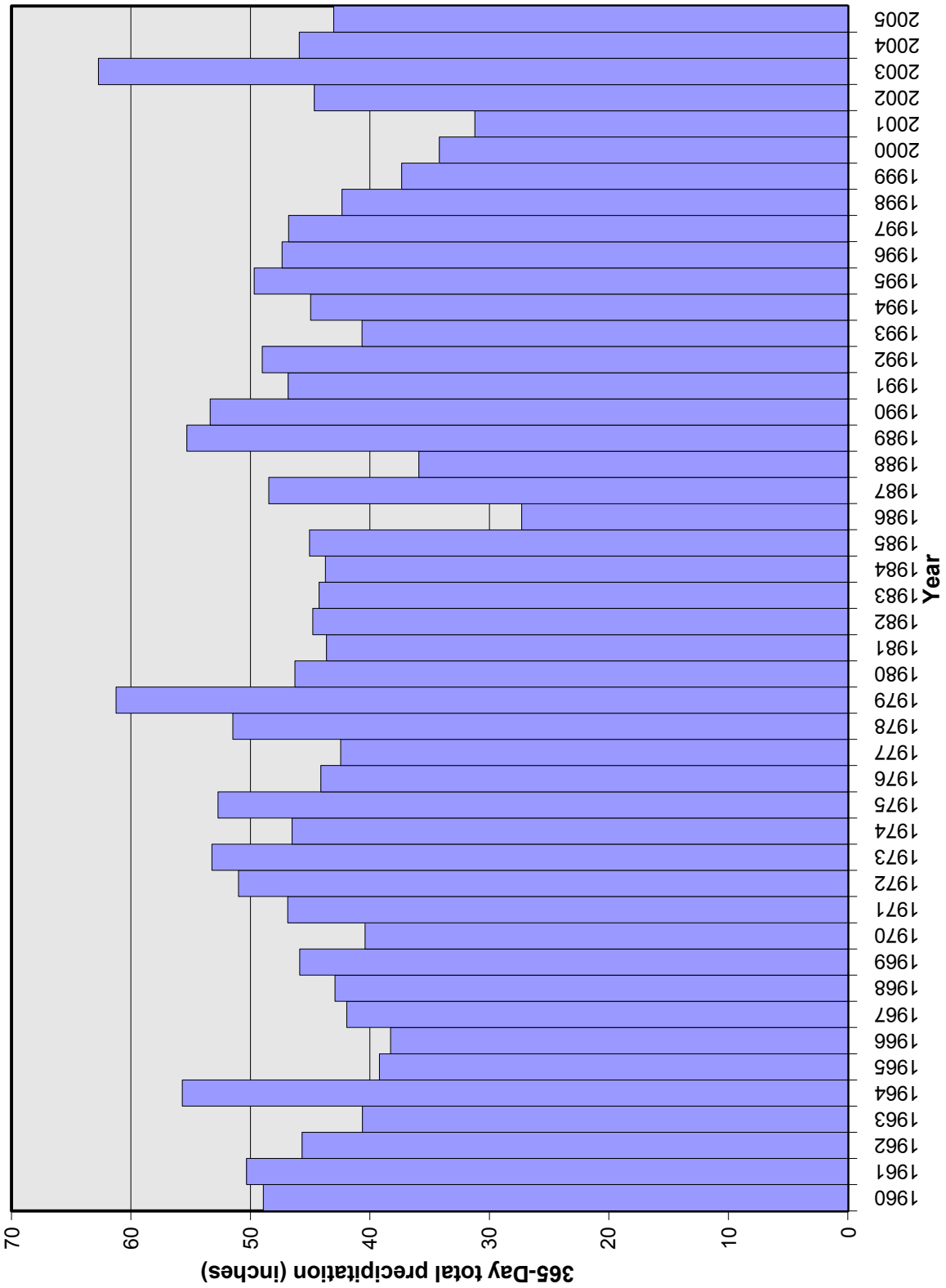
NOTE: Months with available data of less than 25 were marked insufficient,further denoted with *, and are not presented in this graph

Table D-2: Annual precipitation, Statesville COOP 318292

Year	Months	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	365-Day Average Total
1960	12	366	0	2.69	0.13	0.35	0.01	**48.93**
1961	12	365	0	2.48	0.14	0.34	0.01	**50.32**
1962	12	365	0	3.82	0.13	0.35	0.01	**45.67**
1963	12	365	0	1.98	0.11	0.29	0	**40.63**
1964	12	366	0	5.1	0.15	0.46	0.01	**55.71**
1965	12	365	0	2.39	0.11	0.31	0	**39.20**
1966	12	364	0	2.65	0.1	0.33	0.01	**38.28**
1967	12	365	0	1.66	0.11	0.28	0	**41.94**
1968	12	366	0	2.65	0.12	0.33	0.01	**42.93**
1969	12	365	0	1.87	0.13	0.3	0	**45.88**
1970	12	362	0	6.39	0.11	0.41	0.01	**40.41**
1971	12	364	0	2.03	0.13	0.32	0.01	**46.89**
1972	11	334	0	7.68	0.14	0.52	0.01	**51.00**
1973	12	365	0	2.93	0.15	0.39	0.01	**53.23**
1974	12	365	0	2.39	0.13	0.32	0.01	**46.51**
1975	12	365	0	2	0.14	0.32	0.01	**52.72**
1976	12	366	0	2.79	0.12	0.35	0.01	**44.12**
1977	12	365	0	4.76	0.12	0.39	0.01	**42.45**
1978	12	365	0	3.72	0.14	0.41	0.01	**51.48**
1979	12	365	0	3.01	0.17	0.4	0.01	**61.24**
1980	12	366	0	2.86	0.13	0.33	0.01	**46.27**
1981	12	365	0	6.02	0.12	0.43	0.01	**43.63**
1982	12	365	0	2.1	0.12	0.3	0	**44.79**
1983	12	365	0	2.38	0.12	0.31	0.01	**44.25**
1984	12	366	0	2.14	0.12	0.33	0.01	**43.72**
1985	12	365	0	3.24	0.12	0.37	0.01	**45.06**
1986	12	365	0	2.3	0.07	0.23	0	**27.29**
1987	12	365	0	3.88	0.13	0.38	0.01	**48.46**
1988	12	366	0	2.17	0.1	0.27	0	**35.91**
1989	12	365	0	2.88	0.15	0.38	0.01	**55.32**
1990	12	365	0	2.8	0.15	0.41	0.01	**53.37**
1991	12	365	0	3.65	0.13	0.36	0.01	**46.85**
1992	12	366	0	3.73	0.13	0.39	0.01	**49.02**
1993	12	365	0	2.2	0.11	0.33	0.01	**40.66**
1994	12	365	0	3.35	0.12	0.34	0.01	**44.97**
1995	12	365	0	4.53	0.14	0.4	0.01	**49.69**
1996	12	366	0	2.06	0.13	0.31	0	**47.35**
1997	12	365	0	2.76	0.13	0.34	0.01	**46.80**
1998	12	365	0	1.75	0.12	0.28	0	**42.34**
1999	12	365	0	1.68	0.1	0.26	0	**37.34**
2000	12	366	0	1.9	0.09	0.25	0	**34.20**
2001	12	365	0	1.8	0.09	0.24	0	**31.22**
2002	12	363	0	1.92	0.12	0.32	0.01	**44.66**
2003	12	365	0	4.2	0.17	0.43	0.01	**62.73**
2004	12	363	0	4.2	0.13	0.43	0.01	**45.92**
2005	12	365	0	3.24	0.12	0.33	0.01	**43.04**

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-3: Annual precipitation, Statesville COOP 318292

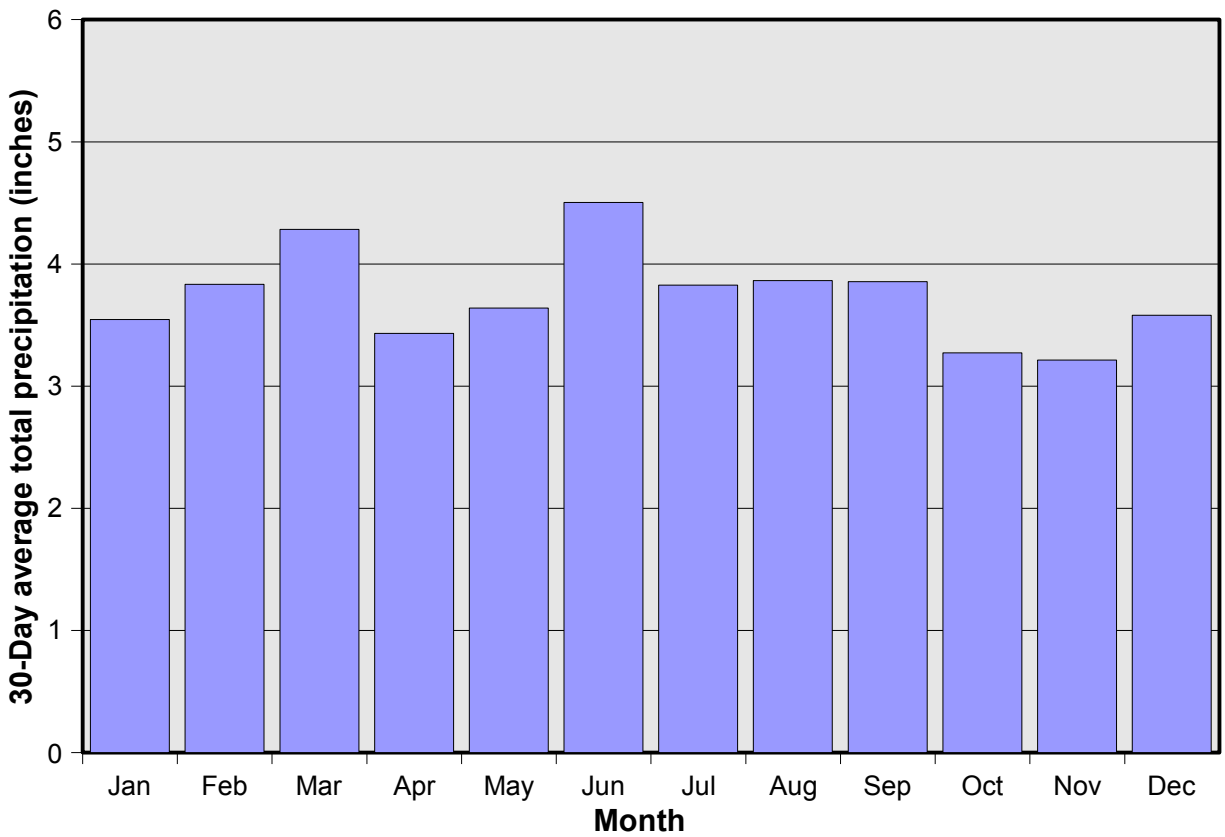


NOTE: Years with available data of less than 300 were marked insufficient,further denoted with *, and are not presented in this graph

Table D-3: Precipitation by month, Statesville COOP 318292

Month	Total	Day Count	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
Jan	169.63	1435	0.12	0.3	0.01	**3.55**
Feb	166.94	1306	0.13	0.31	0.01	**3.83**
Mar	207.77	1455	0.14	0.36	0.01	**4.28**
Apr	161.3	1410	0.11	0.3	0.01	**3.43**
May	176.57	1456	0.12	0.33	0.01	**3.64**
Jun	209.11	1393	0.15	0.44	0.01	**4.50**
Jul	181.75	1425	0.13	0.34	0.01	**3.83**
Aug	179.71	1395	0.13	0.4	0.01	**3.86**
Sep	177.36	1380	0.13	0.4	0.01	**3.86**
Oct	155.56	1426	0.11	0.37	0.01	**3.27**
Nov	147.42	1376	0.11	0.31	0.01	**3.21**
Dec	170.21	1426	0.12	0.31	0.01	**3.58**

Graph D-4: Precipitation by month, Statesville COOP 318292



NOTE: The 30-day aveage total precipitaion for a month was calculated by multiplying its dail average precipitation by 30 in order to elmiinate the slight bias die to the inconsistent number of days in different months.

Table D-4: Monthly precipitation, Mocksville COOP 315743

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1960	1	31	0	1.47	0.15	0.32	0.02	**4.52**
1960	2	29	0	1.34	0.24	0.43	0.03	**7.34**
1960	3	31	0	2.1	0.18	0.44	0.04	**5.55**
1960	4	30	0	1.23	0.11	0.26	0.01	**3.38**
1960	5	31	0	1.8	0.14	0.41	0.03	**4.22**
1960	6	30	0	1.49	0.11	0.29	0.02	**3.16**
1960	7	31	0	1.9	0.12	0.35	0.02	**3.54**
1960	8	31	0	0.32	0.04	0.09	0	**1.32**
1960	9	30	0	1.55	0.15	0.33	0.02	**4.44**
1960	10	31	0	0.84	0.1	0.2	0.01	**2.96**
1960	11	30	0	0.62	0.04	0.13	0	**1.30**
1960	12	31	0	0.93	0.05	0.17	0.01	**1.44**
1961	1	31	0	1.02	0.09	0.23	0.01	**2.57**
1961	2	28	0	1.03	0.16	0.3	0.02	**4.77**
1961	3	31	0	1.63	0.13	0.31	0.02	**3.98**
1961	4	30	0	2	0.16	0.41	0.03	**4.80**
1961	5	31	0	0.66	0.1	0.2	0.01	**3.06**
1961	6	30	0	2.42	0.21	0.52	0.05	**6.38**
1961	7	31	0	1.25	0.12	0.25	0.01	**3.54**
1961	8	31	0	2.98	0.21	0.54	0.05	**6.17**
1961	9	30	0	0.18	0.01	0.04	0	**0.37**
1961	10	31	0	0.74	0.04	0.16	0	**1.34**
1961	11	30	0	0.95	0.09	0.21	0.01	**2.55**
1961	12	31	0	2.26	0.21	0.47	0.04	**6.34**
1962	1	31	0	1.16	0.19	0.33	0.02	**5.85**
1962	2	28	0	1.17	0.16	0.32	0.02	**4.86**
1962	3	31	0	0.87	0.09	0.21	0.01	**2.81**
1962	4	30	0	1.45	0.12	0.31	0.02	**3.71**
1962	5	31	0	1.24	0.11	0.27	0.01	**3.40**
1962	6	30	0	2.23	0.29	0.54	0.05	**8.62**
1962	7	31	0	1.25	0.15	0.32	0.02	**4.62**
1962	8	31	0	0.81	0.05	0.15	0	**1.42**
1962	9	30	0	1.63	0.17	0.43	0.03	**5.21**
1962	10	31	0	0.28	0.03	0.08	0	**1.03**
1962	11	30	0	2.99	0.22	0.57	0.06	**6.55**
1962	12	31	0	0.84	0.12	0.24	0.01	**3.61**
1963	1	31	0	0.85	0.09	0.19	0.01	**2.76**
1963	2	28	0	0.78	0.1	0.21	0.01	**2.99**
1963	3	31	0	2.43	0.24	0.55	0.06	**7.07**
1963	4	30	0	1.4	0.09	0.32	0.02	**2.74**
1963	5	31	0	0.47	0.1	0.14	0	**2.91**
1963	6	30	0	0.96	0.11	0.25	0.01	**3.34**
1963	7	31	0	1.99	0.14	0.38	0.03	**4.08**
1963	8	31	0	0.99	0.06	0.19	0.01	**1.67**
1963	9	30	0	2.69	0.12	0.5	0.04	**3.72**
1963	10	31	0	0.03	0	0.01	0	**0.03**
1963	11	30	0	1.63	0.14	0.35	0.02	**4.06**
1963	12	31	0	0.52	0.06	0.14	0	**1.89**
1964	1	31	0	1.75	0.16	0.37	0.02	**4.88**
1964	2	29	0	1.08	0.15	0.28	0.01	**4.62**
1964	3	31	0	1.08	0.1	0.24	0.01	**2.95**
1964	4	30	0	1.07	0.12	0.25	0.01	**3.57**
1964	5	31	0	0.46	0.03	0.09	0	**0.93**
1964	6	30	0	2.34	0.18	0.52	0.05	**5.39**

Table D-4: Monthly precipitation, Mocksville COOP 315743

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1964	7	31	0	1.86	0.23	0.44	0.04	**6.96**
1964	8	31	0	1.32	0.17	0.33	0.02	**5.23**
1964	9	30	0	0.74	0.03	0.13	0	**0.95**
1964	10	31	0	3.17	0.29	0.78	0.11	**8.72**
1964	11	30	0	1.66	0.09	0.31	0.02	**2.79**
1964	12	31	0	1.99	0.14	0.36	0.02	**4.30**
1965	1	31	0	0.61	0.07	0.17	0	**2.07**
1965	2	28	0	1.16	0.13	0.27	0.01	**3.76**
1965	3	31	0	2.79	0.21	0.53	0.05	**6.15**
1965	4	30	0	0.64	0.08	0.18	0.01	**2.54**
1965	5	31	0	0.58	0.05	0.14	0	**1.65**
1965	6	30	0	2.22	0.17	0.44	0.04	**5.14**
1965	7	31	0	0.84	0.15	0.23	0.01	**4.59**
1965	8	31	0	1.65	0.09	0.3	0.02	**2.73**
1965	9	30	0	1.26	0.08	0.29	0.02	**2.42**
1965	10	31	0	2.05	0.15	0.42	0.03	**4.49**
1965	11	30	0	0.42	0.04	0.11	0	**1.13**
1965	12	31	0	0.24	0.01	0.04	0	**0.27**
1966	1	31	0	1.01	0.13	0.25	0.01	**3.87**
1966	2	28	0	1.56	0.18	0.37	0.03	**5.45**
1966	3	31	0	1.38	0.1	0.32	0.02	**2.90**
1966	4	30	0	0.31	0.05	0.09	0	**1.47**
1966	5	31	0	2.33	0.19	0.49	0.04	**5.61**
1966	6	30	0	1.19	0.08	0.24	0.01	**2.52**
1966	7	31	0	1.16	0.07	0.23	0.01	**2.16**
1966	8	31	0	0.93	0.15	0.27	0.01	**4.56**
1966	9	30	0	1.71	0.13	0.34	0.02	**3.88**
1966	10	31	0	1.22	0.08	0.23	0.01	**2.28**
1966	11	30	0	0.66	0.05	0.13	0	**1.35**
1966	12	31	0	0.8	0.08	0.2	0.01	**2.43**
1967	1	31	0	0.83	0.08	0.19	0.01	**2.40**
1967	2	28	0	1.24	0.12	0.27	0.01	**3.46**
1967	3	31	0	0.65	0.06	0.16	0	**1.86**
1967	4	30	0	0.67	0.07	0.19	0.01	**2.07**
1967	5	31	0	0.87	0.15	0.23	0.01	**4.43**
1967	6	30	0	0.35	0.04	0.08	0	**1.10**
1967	7	31	0	0.98	0.14	0.27	0.01	**4.19**
1967	8	31	0	1.57	0.13	0.31	0.02	**3.89**
1967	9	30	0	1.98	0.13	0.39	0.03	**3.84**
1967	10	31	0	0.58	0.05	0.12	0	**1.38**
1967	11	30	0	0.65	0.05	0.14	0	**1.50**
1967	12	31	0	1.49	0.23	0.42	0.03	**6.85**
1968	1	31	0	1.15	0.14	0.28	0.01	**4.15**
1968	2	29	0	0.32	0.02	0.07	0	**0.62**
1968	3	31	0	1.31	0.15	0.35	0.02	**4.53**
1968	4	30	0	0.89	0.1	0.2	0.01	**3.07**
1968	5	31	0	1.34	0.11	0.26	0.01	**3.39**
1968	6	30	0	1.41	0.15	0.34	0.02	**4.36**
1968	7	31	0	0.63	0.07	0.14	0	**2.02**
1968	8	31	0	1.25	0.14	0.32	0.02	**4.09**
1968	9	30	0	0.24	0.02	0.06	0	**0.62**
1968	10	31	0	1.24	0.12	0.28	0.01	**3.70**
1968	11	30	0	1.16	0.14	0.32	0.02	**4.22**
1968	12	31	0	0.61	0.08	0.16	0	**2.34**

Table D-4: Monthly precipitation, Mocksville COOP 315743

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1969	1	31	0	0.67	0.09	0.21	0.01	**2.64**
1969	2	28	0	0.86	0.13	0.24	0.01	**3.98**
1969	3	31	0	1.44	0.14	0.33	0.02	**4.20**
1969	4	30	0	0.94	0.1	0.2	0.01	**3.09**
1969	5	31	0	1.06	0.11	0.28	0.01	**3.27**
1969	6	30	0	2.25	0.19	0.52	0.05	**5.67**
1969	7	31	0	2.19	0.15	0.44	0.04	**4.46**
1969	8	31	0	1.34	0.12	0.29	0.01	**3.70**
1969	9	30	0	1.57	0.21	0.43	0.03	**6.27**
1969	10	31	0	1.52	0.09	0.3	0.02	**2.69**
1969	11	30	0	0.63	0.05	0.15	0	**1.38**
1969	12	31	0	1.68	0.17	0.44	0.03	**5.08**
1970	1	31	0	0.86	0.07	0.18	0.01	**2.25**
1970	2	28	0	1.94	0.14	0.38	0.03	**4.21**
1970	3	30	0	0.76	0.12	0.21	0.01	**3.66**
1970	4	30	0	0.64	0.09	0.17	0.01	**2.57**
1970	5	31	0	1.45	0.13	0.36	0.02	**3.97**
1970	6	30	0	2.88	0.25	0.65	0.08	**7.61**
1970	7	31	0	0.56	0.08	0.15	0	**2.28**
1970	8	31	0	4.84	0.31	0.91	0.15	**9.32**
1970	9	30	0	0.28	0.03	0.08	0	**0.88**
1970	10	31	0	2	0.16	0.42	0.03	**4.82**
1970	11	30	0	0.44	0.04	0.09	0	**1.27**
1970	12	31	0	0.59	0.05	0.13	0	**1.58**
1971	1	31	0	0.62	0.08	0.18	0.01	**2.51**
1971	2	28	0	1.13	0.17	0.28	0.02	**4.97**
1971	3	31	0	0.93	0.11	0.21	0.01	**3.36**
1971	4	30	0	1.42	0.09	0.27	0.01	**2.80**
1971	5	31	0	3.82	0.26	0.76	0.1	**7.94**
1971	6	30	0	0.91	0.12	0.25	0.01	**3.73**
1971	7	31	0	1.83	0.21	0.41	0.03	**6.18**
1971	8	31	0	1.87	0.11	0.34	0.02	**3.42**
1971	9	30	0	0.77	0.13	0.22	0.01	**3.80**
1971	10	31	0	1.81	0.28	0.54	0.05	**8.33**
1971	11	30	0	1.09	0.09	0.22	0.01	**2.73**
1971	12	31	0	0.63	0.08	0.17	0.01	**2.26**
1972	1	31	0	0.59	0.1	0.17	0.01	**3.02**
1972	2	29	0	0.88	0.13	0.24	0.01	**3.91**
1972	3	31	0	1.06	0.13	0.27	0.01	**3.94**
1972	4	30	0	0.95	0.09	0.2	0.01	**2.74**
1972	5	31	0	2.18	0.28	0.55	0.05	**8.29**
1972	6	30	0	4.76	0.29	0.93	0.16	**8.81**
1972	7	31	0	1	0.08	0.21	0.01	**2.37**
1972	8	31	0	0.73	0.05	0.15	0	**1.47**
1972	9	30	0	1.52	0.19	0.43	0.03	**5.78**
1972	10	31	0	1.41	0.11	0.31	0.02	**3.33**
1972	11	30	0	1.58	0.18	0.43	0.03	**5.45**
1972	12	31	0	1.52	0.18	0.38	0.03	**5.27**
1973	1	31	0	0.98	0.15	0.28	0.01	**4.47**
1973	2	28	0	1.5	0.1	0.29	0.02	**2.99**
1973	3	31	0	1.68	0.27	0.39	0.03	**7.98**
1973	4	30	0	2.24	0.21	0.55	0.06	**6.37**
1973	5	31	0	2.78	0.18	0.53	0.05	**5.38**
1973	6	30	0	1.76	0.18	0.39	0.03	**5.32**

Table D-4: Monthly precipitation, Mocksville COOP 315743

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1973	7	31	0	1.66	0.16	0.36	0.02	**4.81**
1973	8	31	0	2.17	0.1	0.38	0.03	**2.88**
1973	9	30	0	1.42	0.06	0.25	0.01	**1.88**
1973	10	31	0	1.05	0.09	0.26	0.01	**2.71**
1973	11	30	0	0.49	0.05	0.11	0	**1.47**
1973	12	31	0	1.16	0.2	0.33	0.02	**5.96**
1974	1	31	0	1.99	0.19	0.4	0.03	**5.82**
1974	2	28	0	0.56	0.11	0.19	0.01	**3.44**
1974	3	31	0	2.24	0.17	0.41	0.03	**5.19**
1974	4	30	0	1.43	0.09	0.28	0.01	**2.77**
1974	5	31	0	2	0.27	0.46	0.04	**8.02**
1974	6	30	0	0.6	0.12	0.19	0.01	**3.74**
1974	7	31	0	1.07	0.09	0.26	0.01	**2.83**
1974	8	31	0	2.32	0.17	0.44	0.03	**5.20**
1974	9	30	0	1.8	0.28	0.49	0.04	**8.27**
1974	10	31	0	0.39	0.03	0.09	0	**0.80**
1974	11	30	0	0.52	0.07	0.14	0	**2.17**
1974	12	31	0	1.94	0.17	0.42	0.03	**4.99**
1975	1	31	0	1.68	0.19	0.39	0.03	**5.70**
1975	2	28	0	1.5	0.14	0.3	0.02	**4.14**
1975	3	31	0	2.11	0.29	0.52	0.05	**8.70**
1975	4	30	0	0.71	0.07	0.17	0.01	**2.14**
1975	5	31	0	1.43	0.23	0.42	0.03	**6.85**
1975	6	30	0	1.11	0.08	0.22	0.01	**2.35**
1975	7	31	0	1.59	0.14	0.3	0.02	**4.10**
1975	8	31	0	0.17	0.02	0.05	0	**0.48**
1975	9	30	0	1.97	0.24	0.48	0.04	**7.29**
1975	10	31	0	1.32	0.08	0.3	0.02	**2.43**
1975	11	30	0	0.95	0.07	0.19	0.01	**1.98**
1975	12	31	0	1.12	0.08	0.24	0.01	**2.46**
1976	1	31	0	0.91	0.1	0.22	0.01	**3.07**
1976	2	29	0	0.79	0.06	0.18	0.01	**1.87**
1976	3	31	0	0.82	0.09	0.2	0.01	**2.85**
1976	4	30	0	0.46	0.02	0.09	0	**0.65**
1976	5	31	0	0.98	0.13	0.25	0.01	**3.75**
1976	6	30	0	2.64	0.25	0.61	0.07	**7.36**
1976	7	31	0	0.29	0.03	0.07	0	**0.84**
1976	8	31	0	1.29	0.08	0.24	0.01	**2.49**
1976	9	30	0	1.11	0.08	0.21	0.01	**2.25**
1976	10	31	0	4.4	0.28	0.79	0.11	**8.28**
1976	11	30	0	1.23	0.07	0.23	0.01	**2.17**
1976	12	31	0	1.64	0.15	0.35	0.02	**4.39**
1977	1	31	0	1.41	0.08	0.26	0.01	**2.35**
1977	2	28	0	0.56	0.06	0.15	0	**1.75**
1977	3	31	0	1.2	0.12	0.25	0.01	**3.70**
1977	4	30	0	1.38	0.11	0.28	0.01	**3.39**
1977	5	31	0	0.92	0.07	0.17	0.01	**2.04**
1977	6	30	0	0.43	0.05	0.1	0	**1.58**
1977	7	31	0	0.72	0.03	0.13	0	**1.02**
1977	8	31	0	2.2	0.21	0.48	0.04	**6.38**
1977	9	30	0	5.12	0.25	0.94	0.16	**7.55**
1977	10	31	0	3.71	0.21	0.68	0.08	**6.27**
1977	11	30	0	2.48	0.16	0.46	0.04	**4.88**
1977	12	31	0	0.88	0.12	0.22	0.01	**3.64**

Table D-4: Monthly precipitation, Mocksville COOP 315743

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1978	1	31	0	1.64	0.24	0.45	0.04	**7.34**
1978	2	28	0	0.11	0.01	0.03	0	**0.40**
1978	3	31	0	1.6	0.16	0.38	0.03	**4.93**
1978	4	30	0	1.95	0.11	0.36	0.02	**3.35**
1978	5	31	0	2.82	0.15	0.51	0.05	**4.45**
1978	6	30	0	1.71	0.11	0.33	0.02	**3.24**
1978	7	31	0	2.74	0.19	0.53	0.05	**5.83**
1978	8	31	0	1.76	0.16	0.35	0.02	**4.85**
1978	9	30	0	2.1	0.09	0.38	0.03	**2.84**
1978	10	31	0	1.22	0.06	0.22	0.01	**1.70**
1978	11	30	0	0.61	0.11	0.19	0.01	**3.23**
1978	12	31	0	1.31	0.15	0.33	0.02	**4.52**
1979	1	31	0	1.29	0.18	0.34	0.02	**5.47**
1979	2	28	0	2	0.2	0.46	0.04	**5.98**
1979	3	31	0	2.33	0.16	0.45	0.04	**4.81**
1979	4	30	0	1.09	0.12	0.28	0.01	**3.67**
1979	5	31	0	2.32	0.17	0.43	0.03	**5.10**
1979	6	30	0	3.26	0.19	0.59	0.06	**5.67**
1979	7	31	0	0.56	0.1	0.16	0	**2.86**
1979	8	31	0	1.08	0.08	0.23	0.01	**2.54**
1979	9	30	0	2.86	0.23	0.57	0.06	**6.82**
1979	10	31	0	1.58	0.09	0.3	0.02	**2.78**
1979	11	30	0	1.16	0.13	0.32	0.02	**4.02**
1979	12	31	0	0.51	0.04	0.11	0	**1.15**
1980	1	31	0	1.38	0.15	0.33	0.02	**4.56**
1980	2	29	0	0.36	0.05	0.11	0	**1.45**
1980	3	31	0	1.18	0.23	0.34	0.02	**6.95**
1980	4	30	0	0.72	0.1	0.18	0.01	**2.85**
1980	5	31	0	1.51	0.15	0.37	0.02	**4.46**
1980	6	30	0	1.61	0.11	0.34	0.02	**3.32**
1980	7	31	0	2.23	0.18	0.48	0.04	**5.54**
1980	8	31	0	0.31	0.03	0.08	0	**0.89**
1980	9	30	0	1.66	0.19	0.42	0.03	**5.73**
1980	10	30	0	1.04	0.11	0.26	0.01	**3.32**
1980	11	30	0	0.85	0.1	0.22	0.01	**3.09**
1980	12	31	0	0.48	0.03	0.09	0	**0.87**
1981	1	31	0	0.32	0.02	0.06	0	**0.52**
1981	2	28	0	1.13	0.11	0.26	0.01	**3.26**
1981	3	31	0	1.21	0.1	0.29	0.01	**3.04**
1981	4	30	0	0.26	0.03	0.07	0	**0.93**
1981	5	31	0	1.86	0.14	0.36	0.02	**4.33**
1981	6	30	0	2.52	0.15	0.46	0.04	**4.54**
1981	7	31	0	1.41	0.15	0.33	0.02	**4.45**
1981	8	31	0	0.62	0.07	0.15	0	**2.19**
1981	9	30	0	2.52	0.19	0.51	0.05	**5.55**
1981	10	31	0	2.07	0.15	0.41	0.03	**4.41**
1981	11	30	0	0.52	0.03	0.1	0	**0.87**
1981	12	31	0	1.44	0.19	0.37	0.03	**5.57**
1982	1	31	0	1	0.14	0.25	0.01	**4.12**
1982	2	28	0	1.54	0.18	0.38	0.03	**5.49**
1982	3	31	0	0.76	0.06	0.15	0	**1.68**
1982	4	30	0	0.57	0.1	0.16	0	**2.90**
1982	5	31	0	1.51	0.11	0.28	0.01	**3.45**
1982	6	30	0	1.57	0.2	0.4	0.03	**5.91**

Table D-4: Monthly precipitation, Mocksville COOP 315743

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1982	7	31	0	1.93	0.18	0.44	0.03	**5.32**
1982	8	31	0	1.14	0.07	0.22	0.01	**2.11**
1982	9	30	0	0.58	0.06	0.15	0	**1.80**
1982	10	31	0	2.12	0.14	0.42	0.03	**4.35**
1982	11	30	0	1.66	0.12	0.33	0.02	**3.58**
1982	12	31	0	1.13	0.12	0.27	0.01	**3.66**
1983	1	31	0	0.7	0.07	0.18	0.01	**2.04**
1983	2	28	0	1.39	0.19	0.42	0.03	**5.72**
1983	3	31	0	1.47	0.16	0.33	0.02	**4.82**
1983	4	30	0	0.93	0.17	0.25	0.01	**4.97**
1983	5	31	0	0.63	0.1	0.16	0	**3.06**
1983	6	30	0	1.42	0.13	0.29	0.02	**3.84**
1983	7	31	0	0.63	0.04	0.13	0	**1.26**
1983	8	31	0	0.66	0.05	0.13	0	**1.36**
1983	9	30	0	1	0.1	0.23	0.01	**3.10**
1983	10	31	0	1.46	0.12	0.3	0.02	**3.62**
1983	11	30	0	1.53	0.16	0.38	0.03	**4.70**
1983	12	31	0	1.67	0.2	0.43	0.03	**6.13**
1984	1	31	0	0.91	0.13	0.27	0.01	**3.76**
1984	2	29	0	2	0.22	0.53	0.05	**6.48**
1984	3	31	0	1.12	0.16	0.31	0.02	**4.81**
1984	4	30	0	2.15	0.16	0.42	0.03	**4.80**
1984	5	31	0	1.19	0.21	0.37	0.02	**6.44**
1984	6	30	0	1.14	0.11	0.31	0.02	**3.22**
1984	7	31	0	2.3	0.32	0.63	0.07	**9.48**
1984	8	31	0	0.79	0.08	0.19	0.01	**2.26**
1984	9	30	0	0.64	0.02	0.11	0	**0.64**
1984	10	31	0	0.94	0.06	0.18	0.01	**1.71**
1984	11	30	0	0.7	0.06	0.15	0	**1.66**
1984	12	31	0	0.73	0.06	0.16	0	**1.81**
1985	1	31	0	1.28	0.11	0.29	0.01	**3.34**
1985	2	28	0	1.54	0.17	0.37	0.03	**5.00**
1985	3	31	0	0.75	0.03	0.14	0	**1.02**
1985	4	30	0	1.24	0.08	0.25	0.01	**2.28**
1985	5	31	0	3.55	0.17	0.63	0.07	**5.07**
1985	6	30	0	1.53	0.14	0.33	0.02	**4.33**
1985	7	31	0	1.04	0.14	0.23	0.01	**4.07**
1985	8	31	0	3.12	0.29	0.63	0.07	**8.64**
1985	9	30	0	0.15	0.01	0.03	0	**0.27**
1985	10	31	0	2.25	0.14	0.45	0.04	**4.18**
1985	11	30	0	1.63	0.19	0.4	0.03	**5.76**
1985	12	31	0	0.53	0.05	0.11	0	**1.35**
1986	1	31	0	0.85	0.04	0.15	0	**1.16**
1986	2	28	0	0.33	0.05	0.09	0	**1.44**
1986	3	31	0	0.7	0.07	0.18	0.01	**2.18**
1986	4	30	0	0.25	0.02	0.06	0	**0.67**
1986	5	31	0	0.46	0.03	0.09	0	**1.04**
1986	6	30	0	0.5	0.02	0.09	0	**0.62**
1986	7	31	0	2.88	0.15	0.52	0.05	**4.55**
1986	8	31	0	1.46	0.22	0.42	0.03	**6.55**
1986	9	30	0	0.67	0.07	0.16	0	**1.99**
1986	10	31	0	1.62	0.13	0.36	0.02	**3.89**
1986	11	30	0	1.23	0.16	0.33	0.02	**4.92**
1986	12	31	0	1.26	0.12	0.27	0.01	**3.57**

Table D-4: Monthly precipitation, Mocksville COOP 315743

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1987	1	31	0	1.55	0.15	0.34	0.02	**4.46**
1987	2	28	0	1.42	0.16	0.35	0.02	**4.67**
1987	3	31	0	1.52	0.16	0.33	0.02	**4.90**
1987	4	30	0	2.27	0.23	0.58	0.06	**6.83**
1987	5	31	0	0.49	0.02	0.09	0	**0.68**
1987	6	30	0	1.63	0.1	0.31	0.02	**3.11**
1987	7	31	0	0.97	0.09	0.22	0.01	**2.57**
1987	8	31	0	1.53	0.09	0.28	0.01	**2.57**
1987	9	30	0	2.6	0.27	0.62	0.07	**8.12**
1987	10	31	0	0.75	0.03	0.13	0	**0.79**
1987	11	30	0	1.57	0.13	0.33	0.02	**3.75**
1987	12	31	0	1.18	0.13	0.28	0.01	**3.76**
1988	1	31	0	0.5	0.1	0.15	0	**3.03**
1988	2	29	0	0.76	0.06	0.15	0	**1.84**
1988	3	31	0	0.99	0.09	0.21	0.01	**2.70**
1988	4	30	0	0.75	0.09	0.2	0.01	**2.56**
1988	5	31	0	0.92	0.11	0.23	0.01	**3.35**
1988	6	30	0	0.87	0.07	0.19	0.01	**2.04**
1988	7	31	0	0.73	0.11	0.21	0.01	**3.37**
1988	8	31	0	2.87	0.23	0.59	0.06	**6.92**
1988	9	30	0	1.4	0.19	0.39	0.03	**5.79**
1988	10	31	0	1.17	0.12	0.29	0.02	**3.47**
1988	11	30	0	0.99	0.12	0.29	0.01	**3.67**
1988	12	31	0	0.57	0.04	0.11	0	**1.30**
1989	1	31	0	0.77	0.07	0.15	0	**2.01**
1989	2	28	0	1.2	0.2	0.34	0.02	**6.10**
1989	3	31	0	1.18	0.19	0.3	0.02	**5.69**
1989	4	30	0	0.95	0.14	0.28	0.01	**4.30**
1989	5	31	0	1.33	0.15	0.33	0.02	**4.59**
1989	6	30	0	1.15	0.23	0.35	0.02	**6.80**
1989	7	31	0	1.22	0.18	0.32	0.02	**5.26**
1989	8	31	0	1.16	0.11	0.27	0.01	**3.27**
1989	9	30	0	1.27	0.17	0.36	0.02	**5.03**
1989	10	31	0	3.35	0.23	0.75	0.1	**6.82**
1989	11	30	0	0.85	0.1	0.22	0.01	**2.86**
1989	12	31	0	1.5	0.12	0.32	0.02	**3.45**
1990	1	31	0	1.22	0.16	0.3	0.02	**4.82**
1990	2	28	0	1.6	0.21	0.47	0.04	**6.33**
1990	3	31	0	0.93	0.11	0.24	0.01	**3.18**
1990	4	30	0	1.27	0.11	0.27	0.01	**3.27**
1990	5	31	0	4.05	0.34	0.77	0.11	**10.19**
1990	6	30	0	0.75	0.06	0.16	0	**1.69**
1990	7	31	0	0.8	0.06	0.18	0.01	**1.81**
1990	8	31	0	0.95	0.08	0.19	0.01	**2.31**
1990	9	30	0	0.96	0.05	0.18	0.01	**1.51**
1990	10	31	0	4.82	0.41	0.98	0.17	**12.22**
1990	11	30	0	1.54	0.08	0.29	0.01	**2.51**
1990	12	31	0	0.48	0.09	0.15	0	**2.75**
1991	1	31	0	1.45	0.16	0.33	0.02	**4.92**
1991	2	28	0	0.81	0.07	0.17	0.01	**2.12**
1991	3	31	0	3.16	0.22	0.59	0.06	**6.71**
1991	4	30	0	2.6	0.22	0.49	0.04	**6.58**
1991	5	31	0	1.51	0.13	0.33	0.02	**3.90**
1991	6	30	0	0.71	0.07	0.17	0	**2.19**

Table D-4: Monthly precipitation, Mocksville COOP 315743

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1991	7	29	0	1.8	0.16	0.46	0.04	**4.91**
1993	4	30	0	1.42	0.12	0.32	0.02	**3.72**
1993	5	31	0	1.27	0.11	0.29	0.02	**3.33**
1993	6	30	0	1.23	0.07	0.23	0.01	**1.97**
1993	7	31	0	0.46	0.03	0.11	0	**0.97**
1993	8	31	0	0.64	0.07	0.16	0	**1.99**
1993	9	30	0	1.61	0.1	0.31	0.02	**2.96**
1993	10	30	0	1.06	0.05	0.19	0.01	**1.44**
1993	11	30	0	1.39	0.09	0.26	0.01	**2.55**
1993	12	31	0	1.28	0.13	0.29	0.01	**3.84**
1994	1	30	0	0.89	0.14	0.27	0.01	**4.19**
1994	2	28	0	1.11	0.13	0.27	0.01	**3.75**
1994	3	31	0	1.82	0.21	0.48	0.04	**6.38**
1994	4	30	0	0.5	0.05	0.12	0	**1.53**
1994	5	31	0	1.03	0.05	0.19	0.01	**1.45**
1994	6	30	0	1.62	0.18	0.4	0.03	**5.41**
1994	7	31	0	1.12	0.12	0.26	0.01	**3.71**
1994	8	31	0	1.13	0.18	0.32	0.02	**5.44**
1994	9	30	0	1.57	0.11	0.31	0.02	**3.31**
1994	10	31	0	0.71	0.05	0.14	0	**1.60**
1994	11	30	0	0.8	0.11	0.23	0.01	**3.36**
1994	12	31	0	0.83	0.05	0.15	0	**1.46**
1995	1	31	0	1.6	0.14	0.33	0.02	**4.27**
1995	2	28	0	1.36	0.15	0.33	0.02	**4.53**
1995	3	31	0	0.8	0.08	0.19	0.01	**2.30**
1995	4	30	0	0.31	0.01	0.06	0	**0.41**
1995	5	31	0	1.2	0.12	0.28	0.01	**3.63**
1995	6	30	0	2.12	0.29	0.53	0.05	**8.79**
1995	7	31	0	3.21	0.25	0.64	0.07	**7.45**
1995	9	30	0	0.95	0.1	0.27	0.01	**3.03**
1995	10	31	0	3.2	0.26	0.68	0.08	**7.80**
1995	11	30	0	1.1	0.15	0.28	0.01	**4.37**
1995	12	29	0	0.77	0.07	0.17	0.01	**1.96**
1996	1	31	0	1.28	0.12	0.28	0.01	**3.68**
1996	2	29	0	1.65	0.09	0.31	0.02	**2.64**
1996	3	30	0	0.95	0.13	0.26	0.01	**3.87**
1996	4	30	0	0.8	0.12	0.23	0.01	**3.62**
1996	5	30	0	0.81	0.07	0.16	0	**1.96**
1996	6	30	0	0.73	0.1	0.2	0.01	**2.86**
1996	7	31	0	2.32	0.17	0.5	0.04	**4.98**
1996	8	31	0	0.81	0.12	0.24	0.01	**3.69**
1996	9	30	0	1.08	0.17	0.29	0.02	**5.00**
1996	10	31	0	1	0.11	0.27	0.01	**3.15**
1996	11	30	0	0.9	0.12	0.25	0.01	**3.54**
1996	12	31	0	1.34	0.15	0.31	0.02	**4.35**
1997	1	31	0	0.63	0.09	0.19	0.01	**2.69**
1997	2	27	0	0.85	0.1	0.21	0.01	**3.01**
1997	3	30	0	1.25	0.15	0.3	0.02	**4.42**
1997	4	30	0	1.65	0.22	0.44	0.04	**6.64**
1997	5	31	0	0.71	0.08	0.18	0.01	**2.38**
1997	6	30	0	1.55	0.13	0.31	0.02	**3.98**
1997	7	31	0	2.6	0.23	0.55	0.05	**7.03**
1997	8	31	0	0.54	0.04	0.11	0	**1.11**
1997	9	30	0	1.12	0.09	0.23	0.01	**2.83**

Table D-4: Monthly precipitation, Mocksville COOP 315743

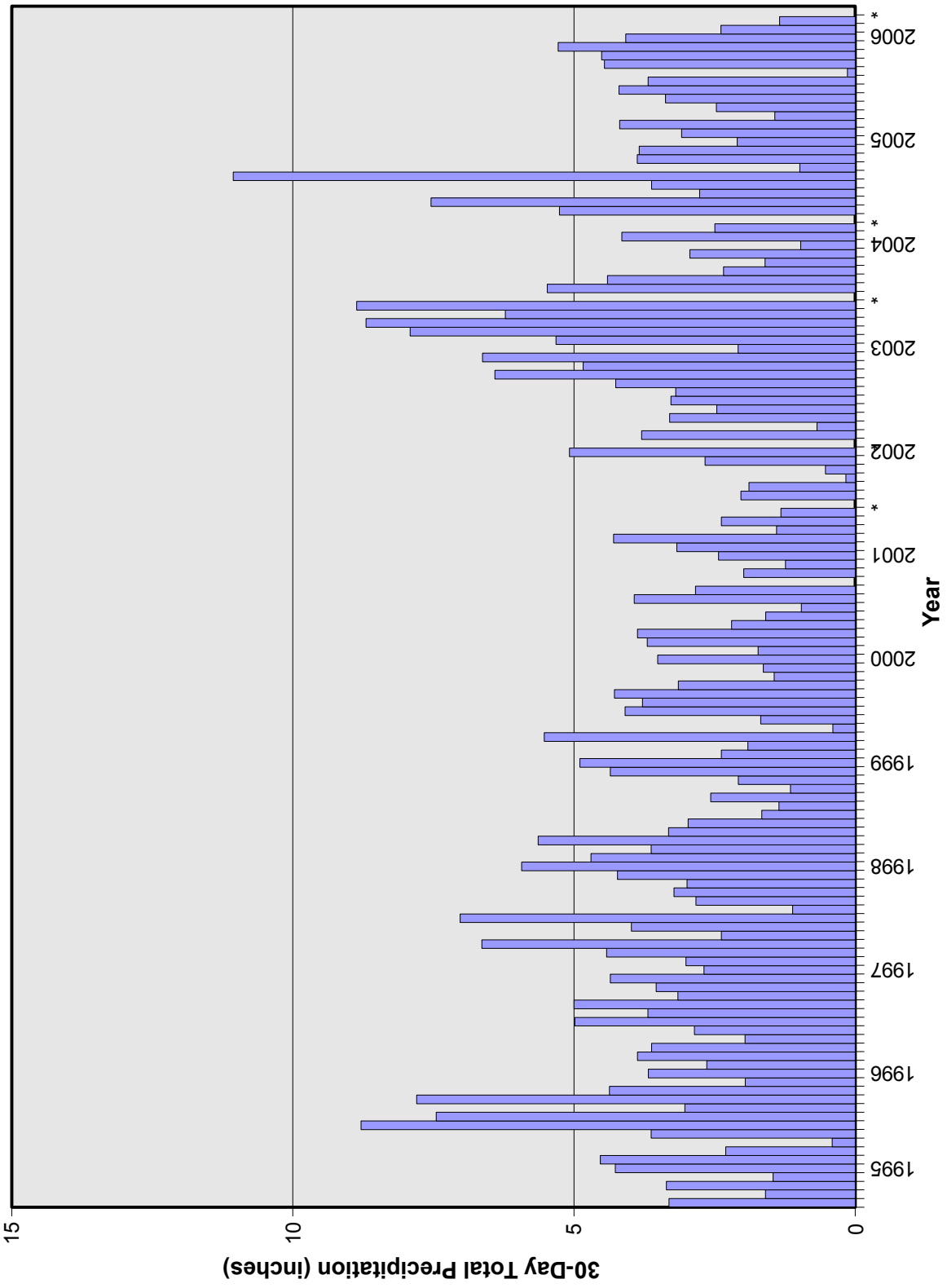
Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
1997	10	31	0	1.63	0.11	0.33	0.02	**3.22**
1997	11	30	0	1.17	0.1	0.26	0.01	**2.99**
1997	12	31	0	0.95	0.14	0.25	0.01	**4.23**
1998	1	31	0	2.18	0.2	0.43	0.03	**5.93**
1998	2	27	0	1.25	0.16	0.29	0.02	**4.70**
1998	3	30	0	1.06	0.12	0.29	0.01	**3.63**
1998	4	30	0	2.12	0.19	0.45	0.04	**5.64**
1998	5	31	0	0.6	0.11	0.19	0.01	**3.32**
1998	6	30	0	1.7	0.1	0.32	0.02	**2.97**
1998	7	30	0	0.92	0.06	0.19	0.01	**1.66**
1998	8	31	0	0.4	0.05	0.11	0	**1.35**
1998	9	30	0	1.38	0.09	0.3	0.02	**2.57**
1998	10	31	0	0.89	0.04	0.16	0	**1.15**
1998	11	30	0	0.52	0.07	0.15	0	**2.08**
1998	12	31	0	1.71	0.15	0.37	0.02	**4.35**
1999	1	31	0	2.04	0.16	0.46	0.04	**4.90**
1999	2	28	0	0.8	0.08	0.21	0.01	**2.38**
1999	3	31	0	0.61	0.06	0.16	0	**1.91**
1999	4	30	0	2.07	0.18	0.49	0.04	**5.53**
1999	5	31	0	0.27	0.01	0.05	0	**0.40**
1999	6	30	0	0.47	0.06	0.13	0	**1.68**
1999	7	31	0	1.15	0.14	0.32	0.02	**4.09**
1999	8	31	0	1.55	0.13	0.33	0.02	**3.78**
1999	9	30	0	1.19	0.14	0.31	0.02	**4.28**
1999	10	31	0	1.8	0.1	0.33	0.02	**3.15**
1999	11	30	0	0.46	0.05	0.12	0	**1.44**
1999	12	31	0	0.78	0.05	0.16	0	**1.64**
2000	1	31	0	1.08	0.12	0.27	0.01	**3.51**
2000	2	29	0	0.99	0.06	0.2	0.01	**1.73**
2000	3	31	0	1.14	0.12	0.29	0.01	**3.70**
2000	4	30	0	0.93	0.13	0.24	0.01	**3.87**
2000	5	31	0	1.04	0.07	0.21	0.01	**2.20**
2000	6	30	0	0.48	0.05	0.12	0	**1.59**
2000	7	31	0	0.3	0.03	0.07	0	**0.96**
2000	8	31	0	1	0.13	0.28	0.01	**3.93**
2000	9	30	0	1.19	0.09	0.25	0.01	**2.84**
2000	10	31	0	0	0	0	0	**0.00**
2000	11	30	0	0.61	0.07	0.16	0	**1.98**
2000	12	31	0	0.83	0.04	0.16	0	**1.24**
2001	1	31	0	0.92	0.08	0.19	0.01	**2.43**
2001	2	28	0	1.21	0.11	0.25	0.01	**3.17**
2001	3	31	0	1.6	0.14	0.34	0.02	**4.30**
2001	4	30	0	0.91	0.05	0.17	0.01	**1.40**
2001	5	31	0	0.78	0.08	0.18	0.01	**2.38**
2001	6	30	0	0.6	0.04	0.13	0	**1.32**
2001	7	25	0	2.65	0.17	0.54	0.06	**5.24**
2001	8	31	0	0.64	0.07	0.16	0	**2.03**
2001	9	30	0	0.6	0.06	0.15	0	**1.89**
2001	10	31	0	0.09	0.01	0.02	0	**0.16**
2001	11	30	0	0.53	0.02	0.1	0	**0.53**
2001	12	31	0	1.54	0.09	0.3	0.02	**2.67**
2002	1	31	0	1.75	0.17	0.39	0.03	**5.08**
2002	2	24	0	0.95	0.05	0.19	0.01	**1.41**
2002	3	30	0	1.24	0.13	0.27	0.01	**3.80**

Table D-4: Monthly precipitation, Mocksville COOP 315743

Year	Month	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
2002	4	30	0	0.52	0.02	0.09	0	**0.68**
2002	5	28	0	1.2	0.11	0.26	0.01	**3.30**
2002	6	30	0	1.1	0.08	0.25	0.01	**2.46**
2002	7	27	0	1.1	0.11	0.28	0.02	**3.28**
2002	8	31	0	0.78	0.11	0.23	0.01	**3.19**
2002	9	30	0	0.9	0.14	0.29	0.02	**4.26**
2002	10	31	0	1.56	0.21	0.37	0.03	**6.41**
2002	11	30	0	1.92	0.16	0.43	0.03	**4.84**
2002	12	31	0	3	0.22	0.62	0.07	**6.63**
2003	1	31	0	0.69	0.07	0.17	0.01	**2.08**
2003	2	26	0	1.15	0.18	0.34	0.02	**5.32**
2003	3	31	0	2.28	0.26	0.53	0.05	**7.92**
2003	4	30	0	2.05	0.29	0.56	0.06	**8.70**
2003	5	31	0	0.89	0.21	0.28	0.01	**6.22**
2003	6	27	0	1.87	0.3	0.53	0.05	**8.87**
2003	7	24	0	2.94	0.27	0.6	0.07	**8.23**
2003	8	31	0	1.9	0.18	0.43	0.03	**5.48**
2003	9	29	0	2.85	0.15	0.53	0.05	**4.41**
2003	10	31	0	0.85	0.08	0.2	0.01	**2.34**
2003	11	29	0	0.77	0.05	0.16	0	**1.60**
2003	12	31	0	1.08	0.1	0.27	0.01	**2.94**
2004	1	31	0	0.55	0.03	0.11	0	**0.97**
2004	2	29	0	1.22	0.14	0.3	0.02	**4.15**
2004	3	31	0	0.72	0.08	0.18	0.01	**2.50**
2004	4	25	0	1.75	0.11	0.36	0.03	**3.36**
2004	5	30	0	1.24	0.18	0.31	0.02	**5.26**
2004	6	28	0	2.43	0.25	0.57	0.06	**7.54**
2004	7	31	0	1.24	0.09	0.24	0.01	**2.77**
2004	8	31	0	1.3	0.12	0.31	0.02	**3.62**
2004	9	30	0	4.25	0.37	1.05	0.2	**11.06**
2004	10	31	0	0.42	0.03	0.09	0	**0.99**
2004	11	26	0	1.42	0.13	0.36	0.02	**3.88**
2004	12	31	0	2.4	0.13	0.43	0.03	**3.84**
2005	1	31	0	1.44	0.07	0.27	0.01	**2.10**
2005	2	28	0	0.98	0.1	0.22	0.01	**3.09**
2005	3	31	0	1.3	0.14	0.3	0.02	**4.19**
2005	4	29	0	0.51	0.05	0.1	0	**1.43**
2005	5	30	0	0.77	0.08	0.18	0.01	**2.47**
2005	6	28	0	1.07	0.11	0.23	0.01	**3.38**
2005	7	29	0	0.92	0.14	0.25	0.01	**4.20**
2005	8	29	0	2.1	0.12	0.39	0.03	**3.68**
2005	9	30	0	0.06	0	0.02	0	**0.14**
2005	10	31	0	2.18	0.15	0.43	0.03	**4.46**
2005	11	26	0	1.61	0.15	0.36	0.02	**4.51**
2005	12	31	0	1.88	0.18	0.44	0.03	**5.28**
2006	1	28	0	1.26	0.14	0.29	0.02	**4.08**
2006	2	28	0	0.48	0.08	0.14	0	**2.39**
2006	3	31	0	0.78	0.04	0.15	0	**1.35**
2006	4	3	0	0.16	0.06	0.07	0	**1.80**

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-5: Monthly precipitation, Mocksville COOP 315743



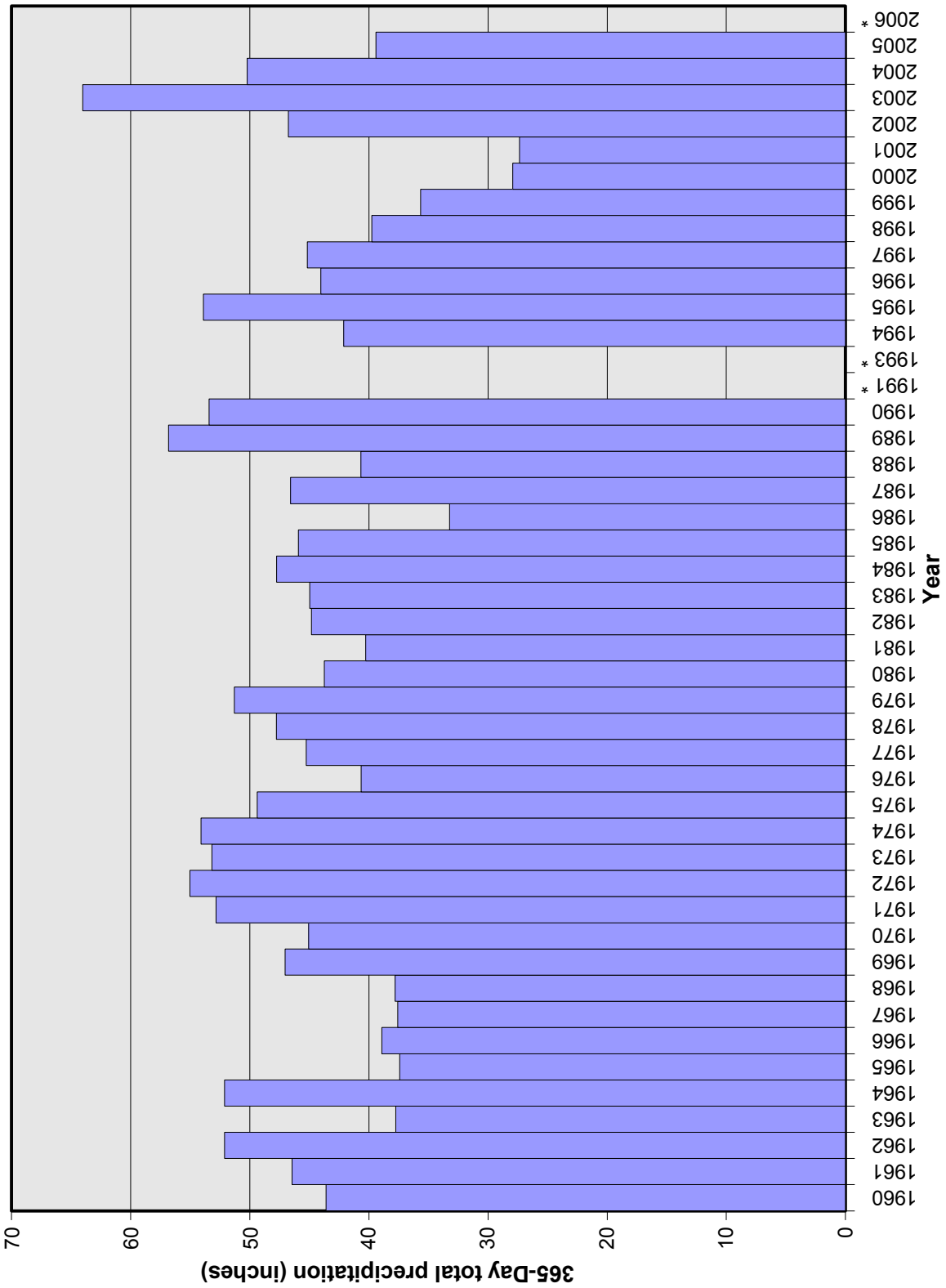
NOTE: Months with available data of less than 25 were marked insufficient,further denoted with *, and are not presented in this graph

Table D-5: Annual precipitation, Mocksville COOP 315743

Year	Months	Days	Low	High	Daily Average	Std. Dev.	Std. Err.	365-Day Average Total
1960	12	366	0	2.1	0.12	0.31	0.01	**43.59**
1961	12	365	0	2.98	0.13	0.34	0.01	**46.45**
1962	12	365	0	2.99	0.14	0.35	0.01	**52.11**
1963	12	365	0	2.69	0.1	0.31	0.01	**37.75**
1964	12	366	0	3.17	0.14	0.39	0.01	**52.12**
1965	12	365	0	2.79	0.1	0.3	0	**37.42**
1966	12	365	0	2.33	0.11	0.29	0	**38.92**
1967	12	365	0	1.98	0.1	0.26	0	**37.58**
1968	12	366	0	1.41	0.1	0.26	0	**37.80**
1969	12	365	0	2.25	0.13	0.34	0.01	**47.03**
1970	12	364	0	4.84	0.12	0.4	0.01	**45.06**
1971	12	365	0	3.82	0.14	0.37	0.01	**52.83**
1972	12	366	0	4.76	0.15	0.42	0.01	**55.03**
1973	12	365	0	2.78	0.15	0.37	0.01	**53.17**
1974	12	365	0	2.32	0.15	0.35	0.01	**54.10**
1975	12	365	0	2.11	0.14	0.34	0.01	**49.37**
1976	12	366	0	4.4	0.11	0.36	0.01	**40.66**
1977	12	365	0	5.12	0.12	0.43	0.01	**45.27**
1978	12	365	0	2.82	0.13	0.37	0.01	**47.76**
1979	12	365	0	3.26	0.14	0.38	0.01	**51.29**
1980	12	365	0	2.23	0.12	0.3	0	**43.75**
1981	12	365	0	2.52	0.11	0.32	0.01	**40.26**
1982	12	365	0	2.12	0.12	0.31	0	**44.82**
1983	12	365	0	1.67	0.12	0.29	0	**44.98**
1984	12	366	0	2.3	0.13	0.35	0.01	**47.74**
1985	12	365	0	3.55	0.13	0.38	0.01	**45.91**
1986	12	365	0	2.88	0.09	0.28	0	**33.24**
1987	12	365	0	2.6	0.13	0.36	0.01	**46.57**
1988	12	366	0	2.87	0.11	0.29	0	**40.67**
1989	12	365	0	3.35	0.16	0.36	0.01	**56.82**
1990	12	365	0	4.82	0.15	0.45	0.01	**53.42**
1991	7	210	0	3.16	0.15	0.4	0.01	**54.82**
1993	9	274	0	1.61	0.08	0.25	0	**30.79**
1994	12	364	0	1.82	0.12	0.29	0	**42.12**
1995	11	332	0	3.21	0.15	0.4	0.01	**53.89**
1996	12	364	0	2.32	0.12	0.29	0	**44.04**
1997	12	363	0	2.6	0.12	0.31	0	**45.17**
1998	12	362	0	2.18	0.11	0.3	0	**39.76**
1999	12	365	0	2.07	0.1	0.29	0	**35.67**
2000	12	366	0	1.19	0.08	0.21	0	**27.92**
2001	12	359	0	2.65	0.07	0.24	0	**27.36**
2002	12	353	0	3	0.13	0.34	0.01	**46.76**
2003	12	351	0	2.94	0.18	0.42	0.01	**64.02**
2004	12	354	0	4.25	0.14	0.44	0.01	**50.21**
2005	12	353	0	2.18	0.11	0.3	0	**39.42**
2006	4	90	0	1.26	0.08	0.2	0	**30.86**

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-6: Annual precipitation, Mocksville COOP 315743

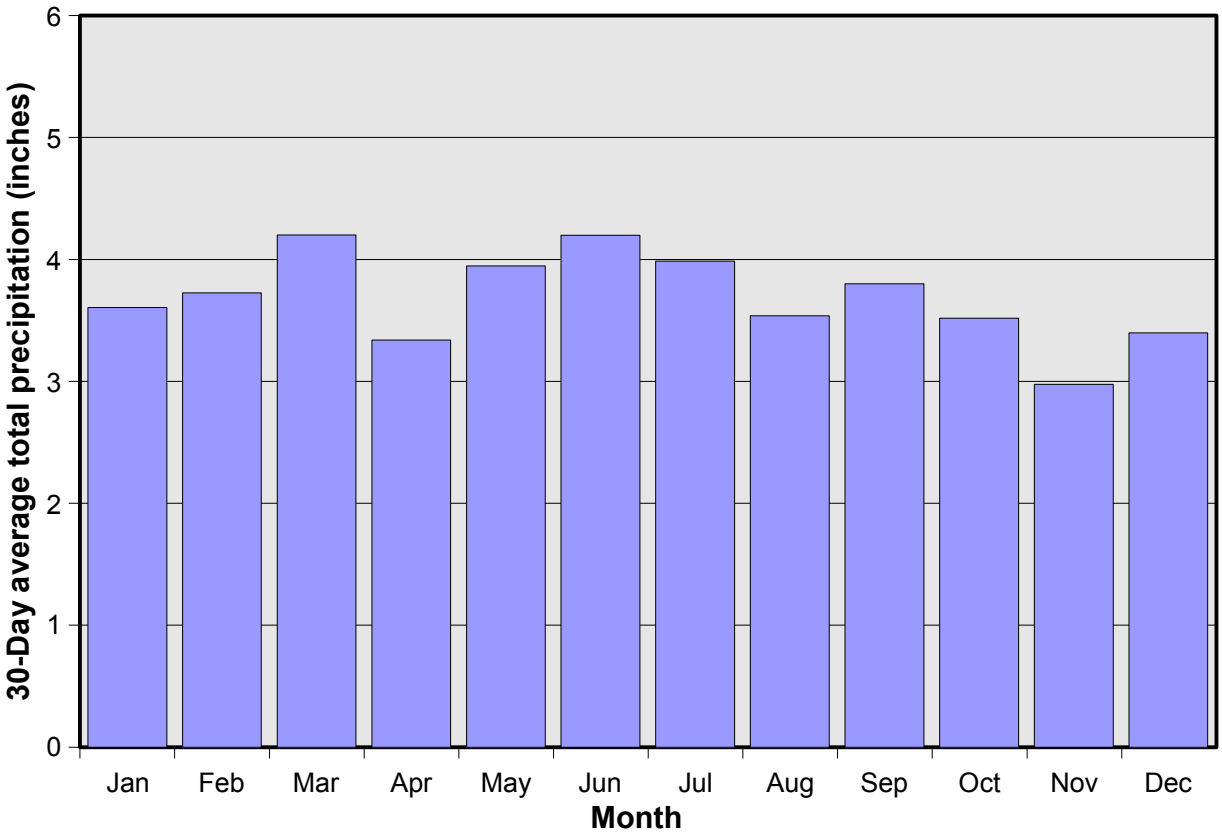


NOTE: Years with available data of less than 300 were marked insufficient,further denoted with *, and are not presented in this graph

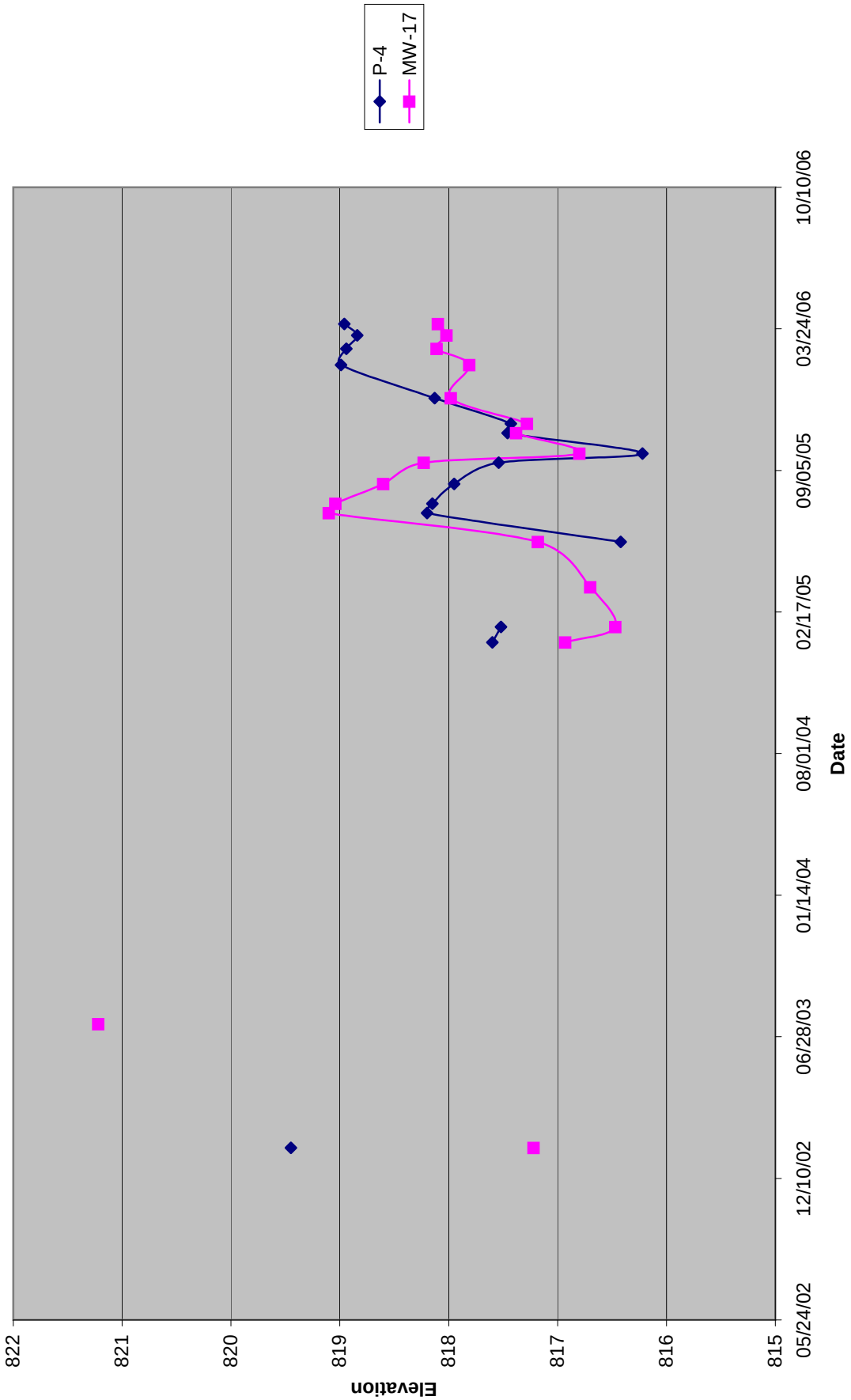
Table D-6: Precipitation by month, Mocksville COOP 315743

Month	Total	Day Count	Daily Average	Std. Dev.	Std. Err.	30-Day Average Total
Jan	167.21	1391	0.12	0.28	0.01	**3.61**
Feb	156.91	1263	0.12	0.3	0.01	**3.73**
Mar	194.68	1390	0.14	0.34	0.01	**4.20**
Apr	149.93	1347	0.11	0.3	0.01	**3.34**
May	182.76	1389	0.13	0.35	0.01	**3.95**
Jun	187.9	1343	0.14	0.39	0.01	**4.20**
Jul	182.4	1373	0.13	0.36	0.01	**3.99**
Aug	157.02	1331	0.12	0.34	0.01	**3.54**
Sep	167.04	1319	0.13	0.4	0.01	**3.80**
Oct	159.74	1362	0.12	0.4	0.01	**3.52**
Nov	130.07	1311	0.1	0.28	0.01	**2.98**
Dec	154.3	1362	0.11	0.3	0.01	**3.40**

Graph D-7: Precipitation by month, Mocksville COOP 315743

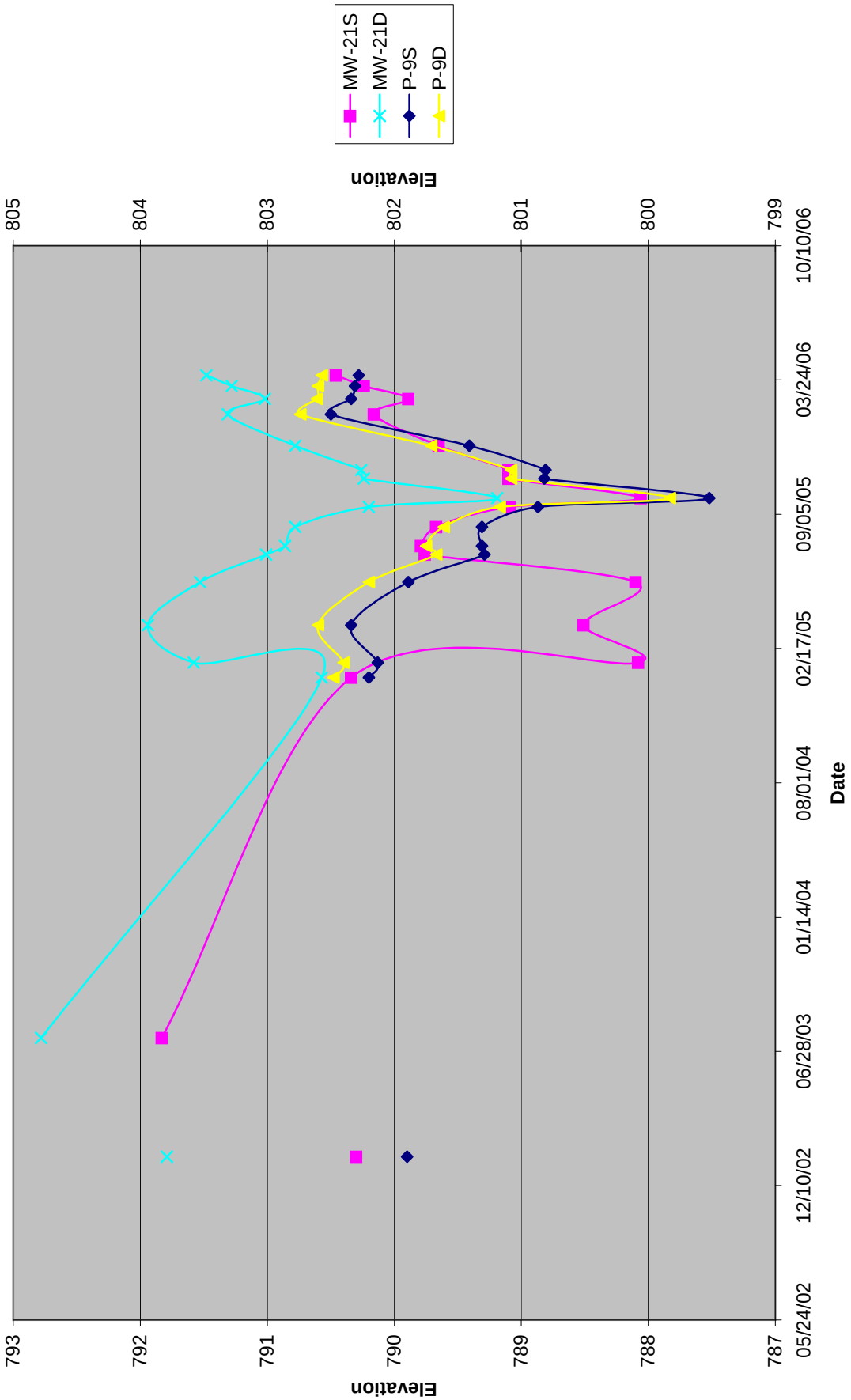


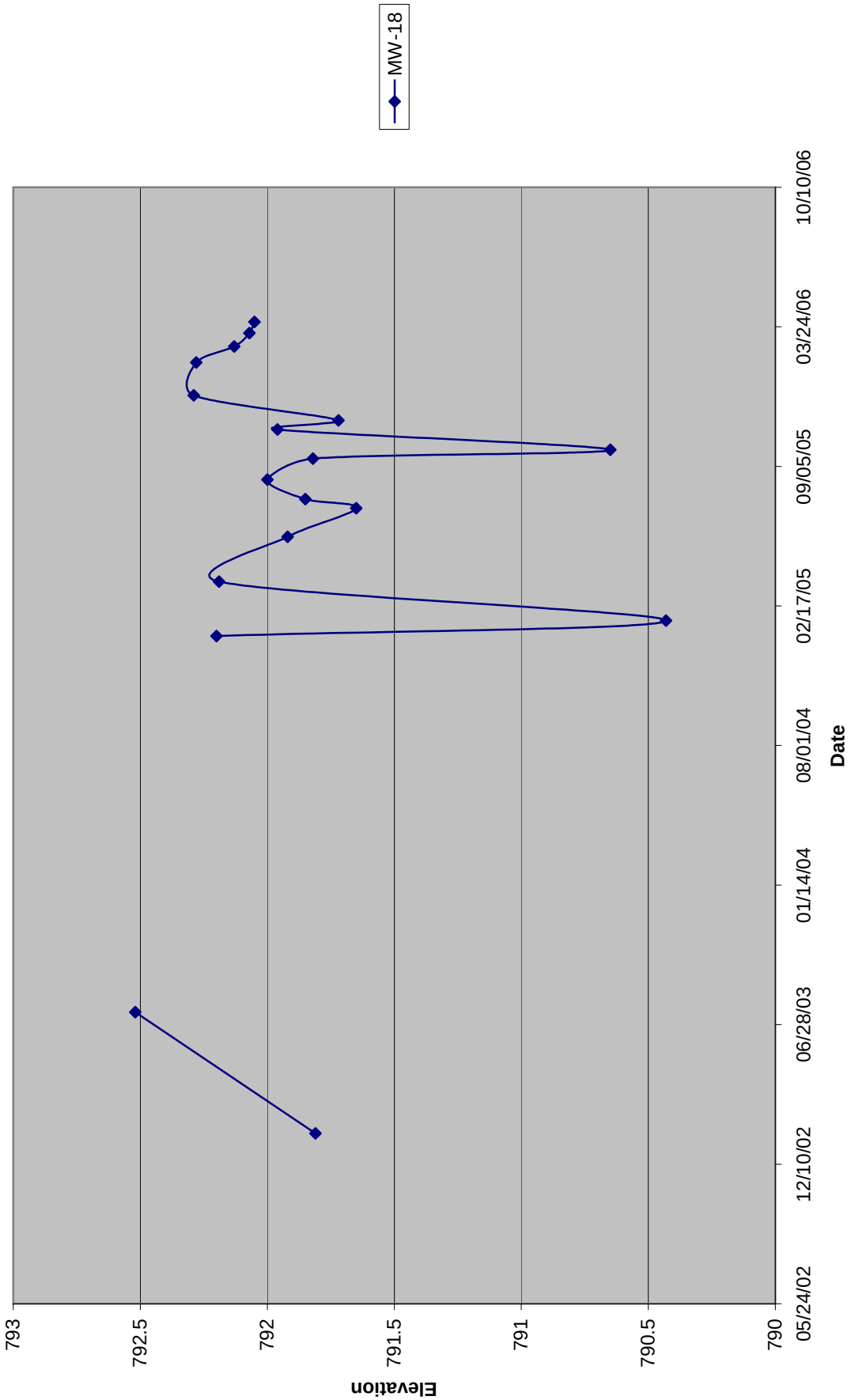
NOTE: The 30-day aveage total precipitaion for a month was calculated by multiplying its dail average precipitation by 30 in order to elmiinate the slight bias die to the inconsistent number of days in different months.



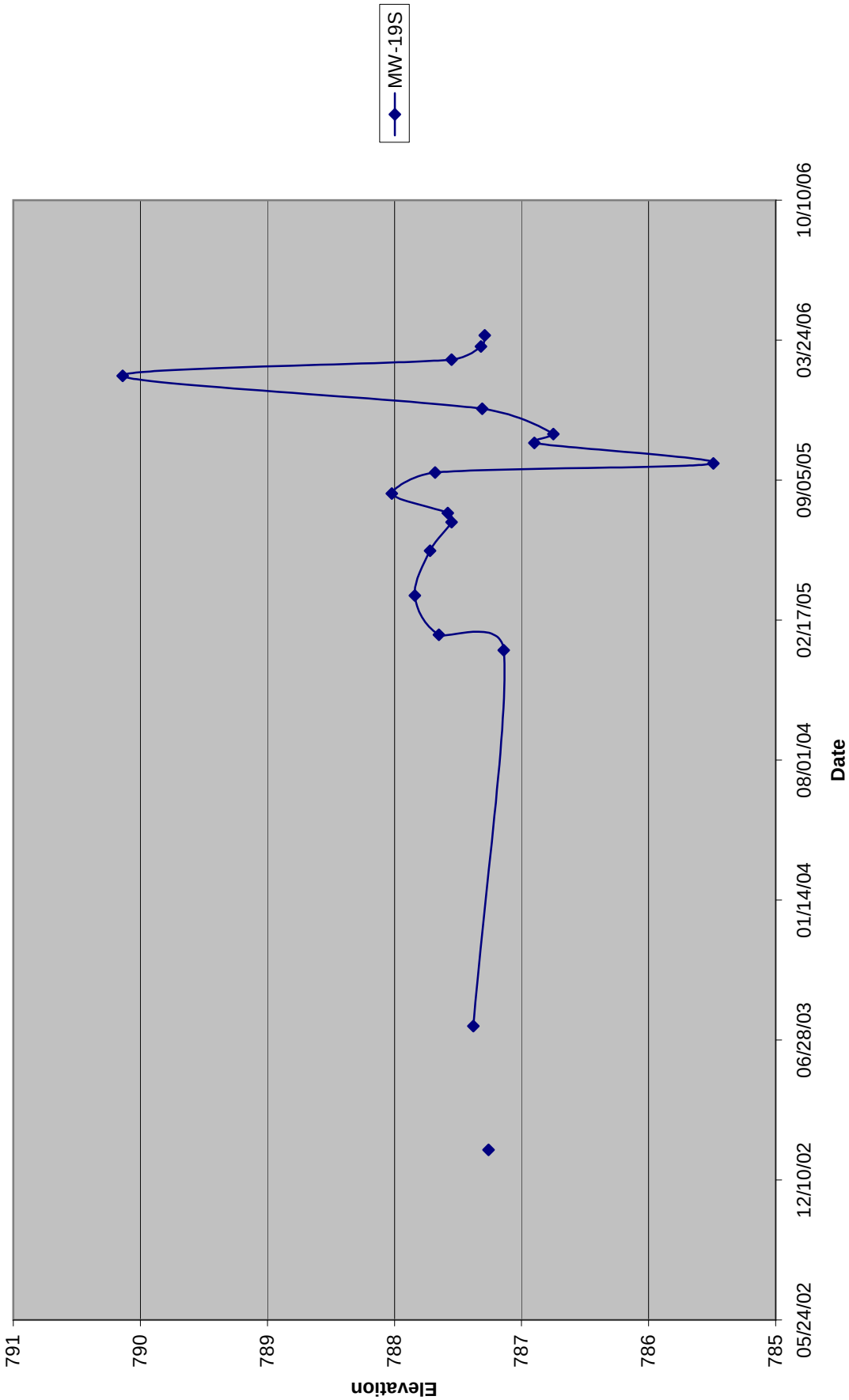
Graph D-8: Recharge Fluctuation Patterns P-4/MW-17

Graph D-9: Transition Wells Fluctuation Patterns

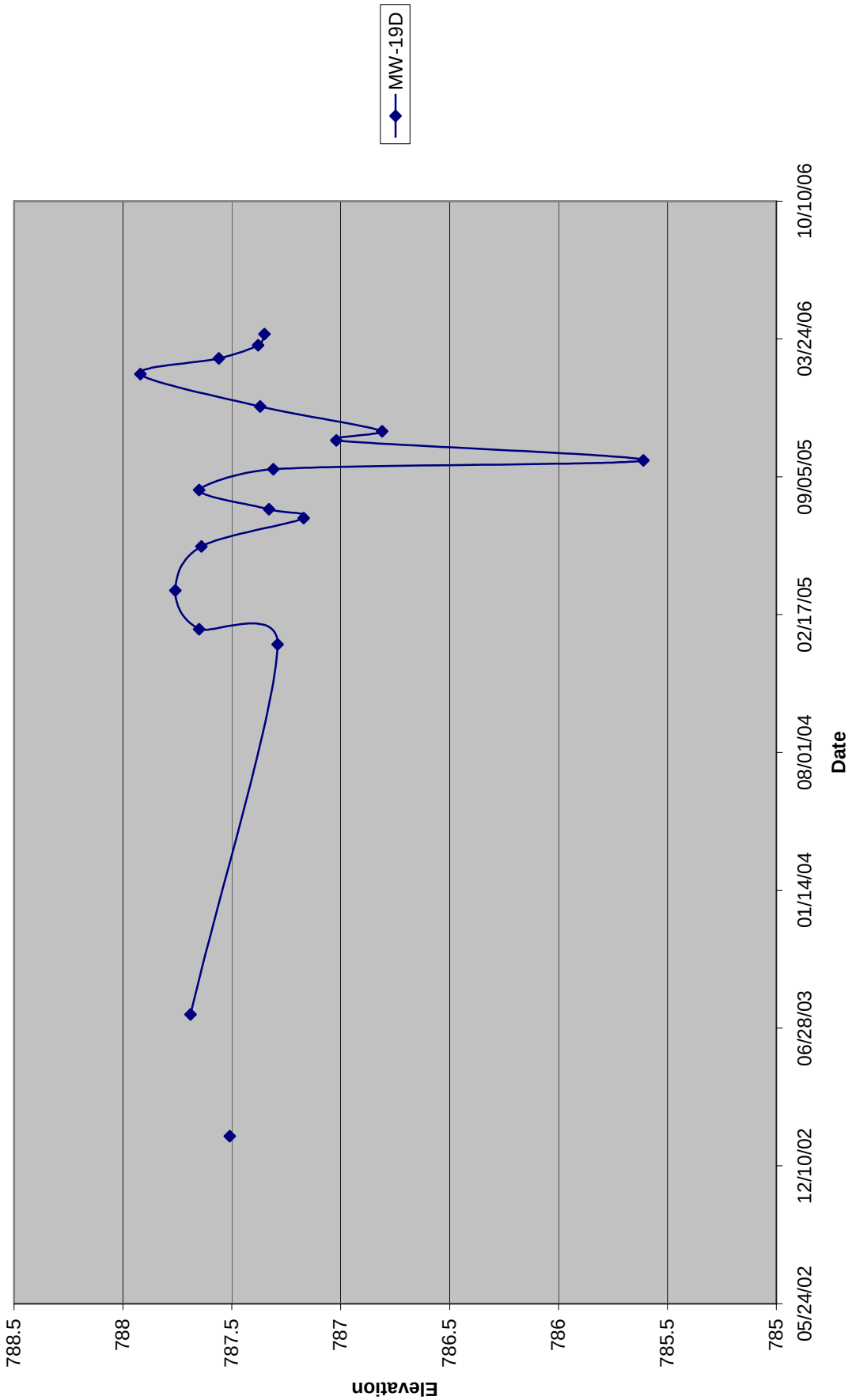




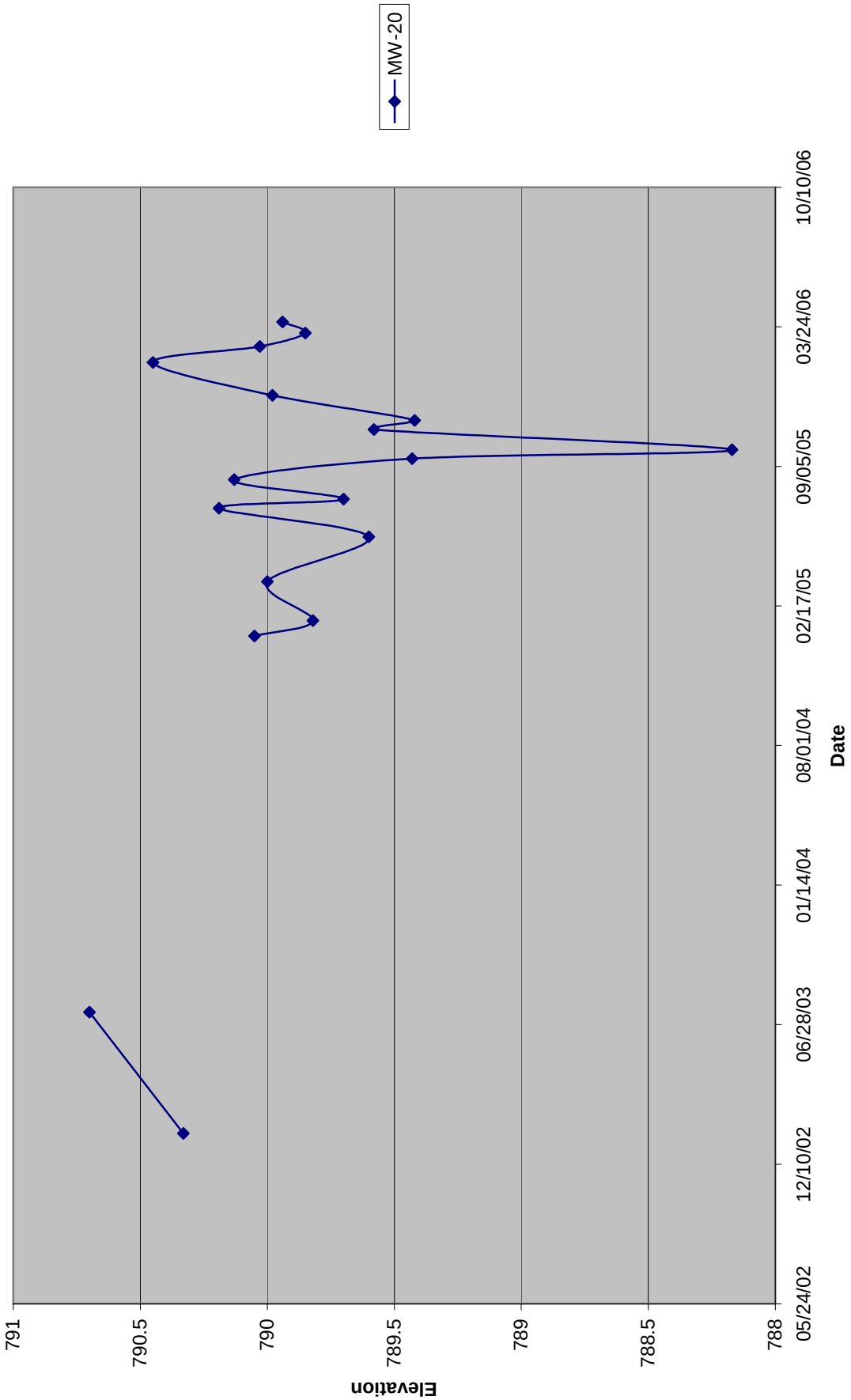
Graph D-10: Fluctuation Pattern MW-18



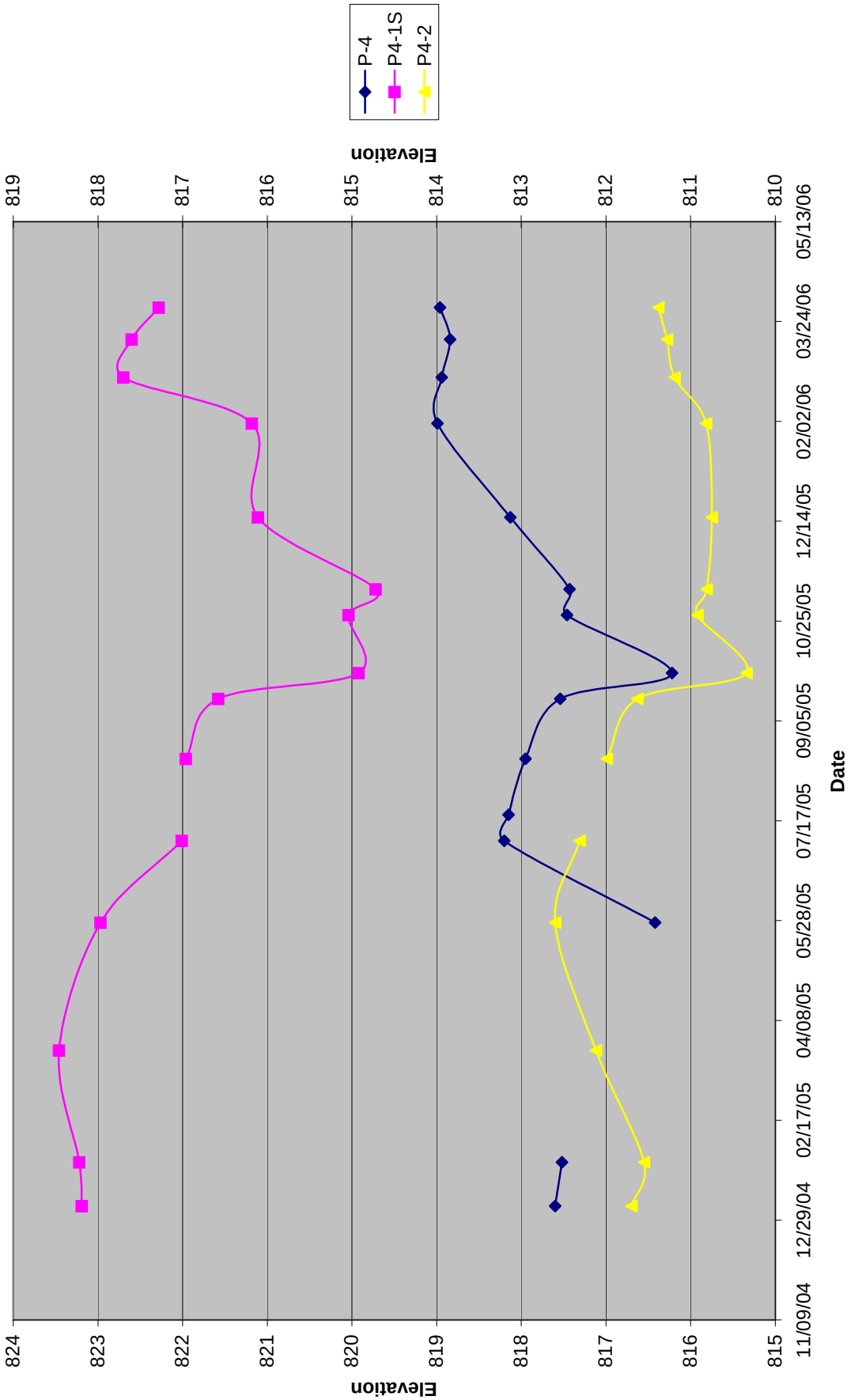
Graph D-11: Fluctuation Pattern MW-19S



Graph D-12: Fluctuation Pattern MW-19S

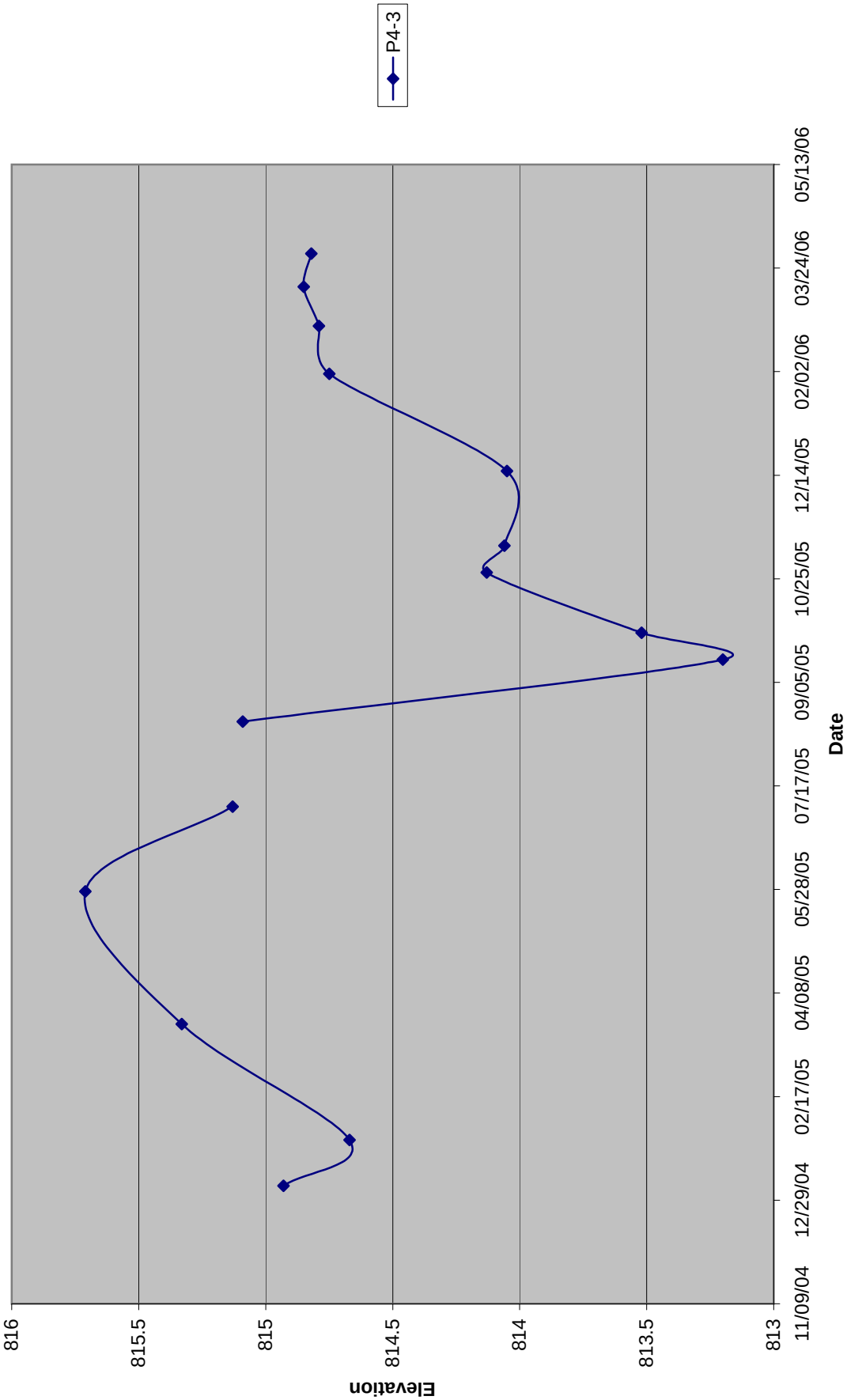


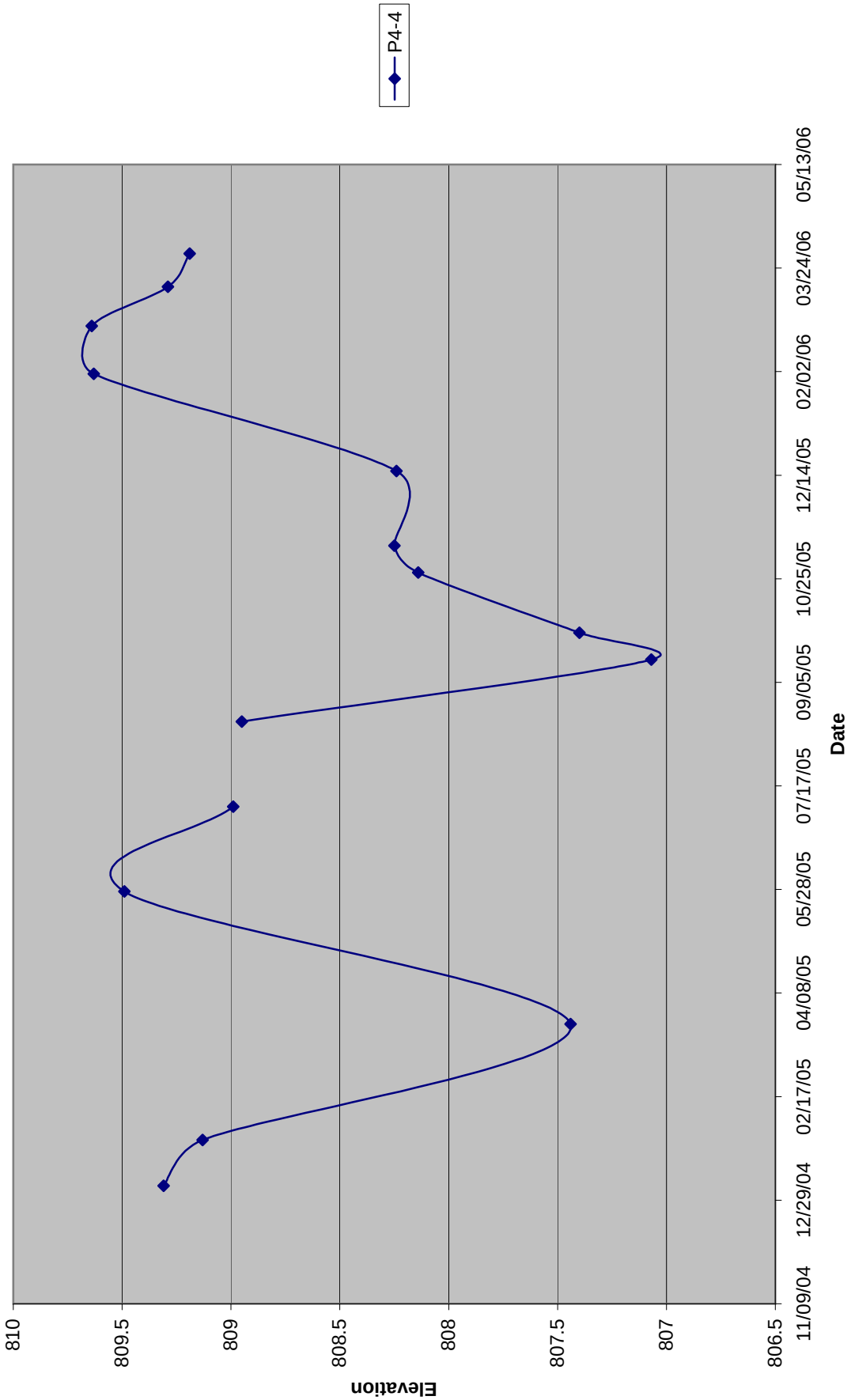
Graph D-13: Fluctuation Pattern MW-20



Graph D-14: Phase 4 Recharge Fluctuation Patterns

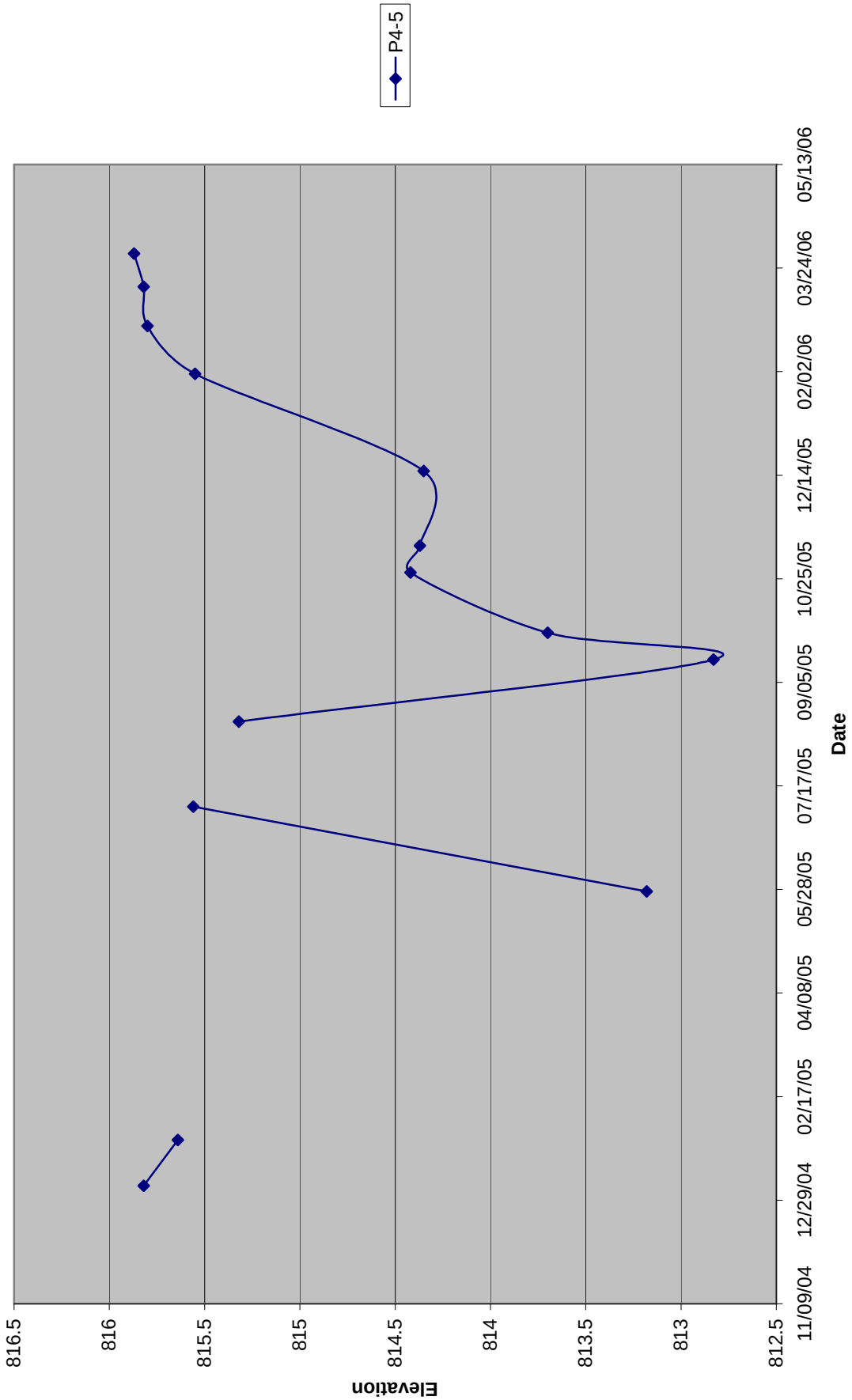
Graph D-15: Transition Fluctuation Pattern P4-3

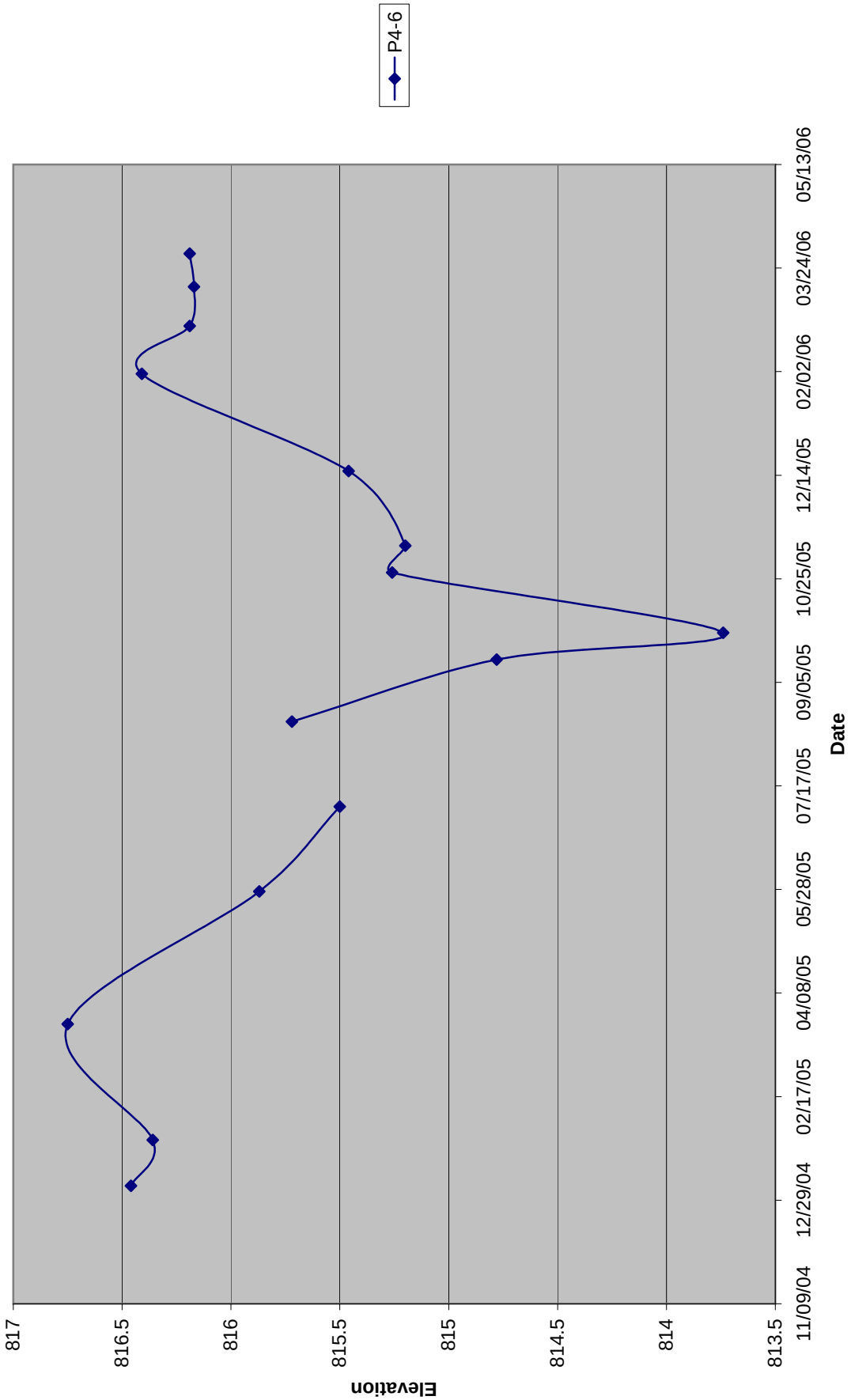




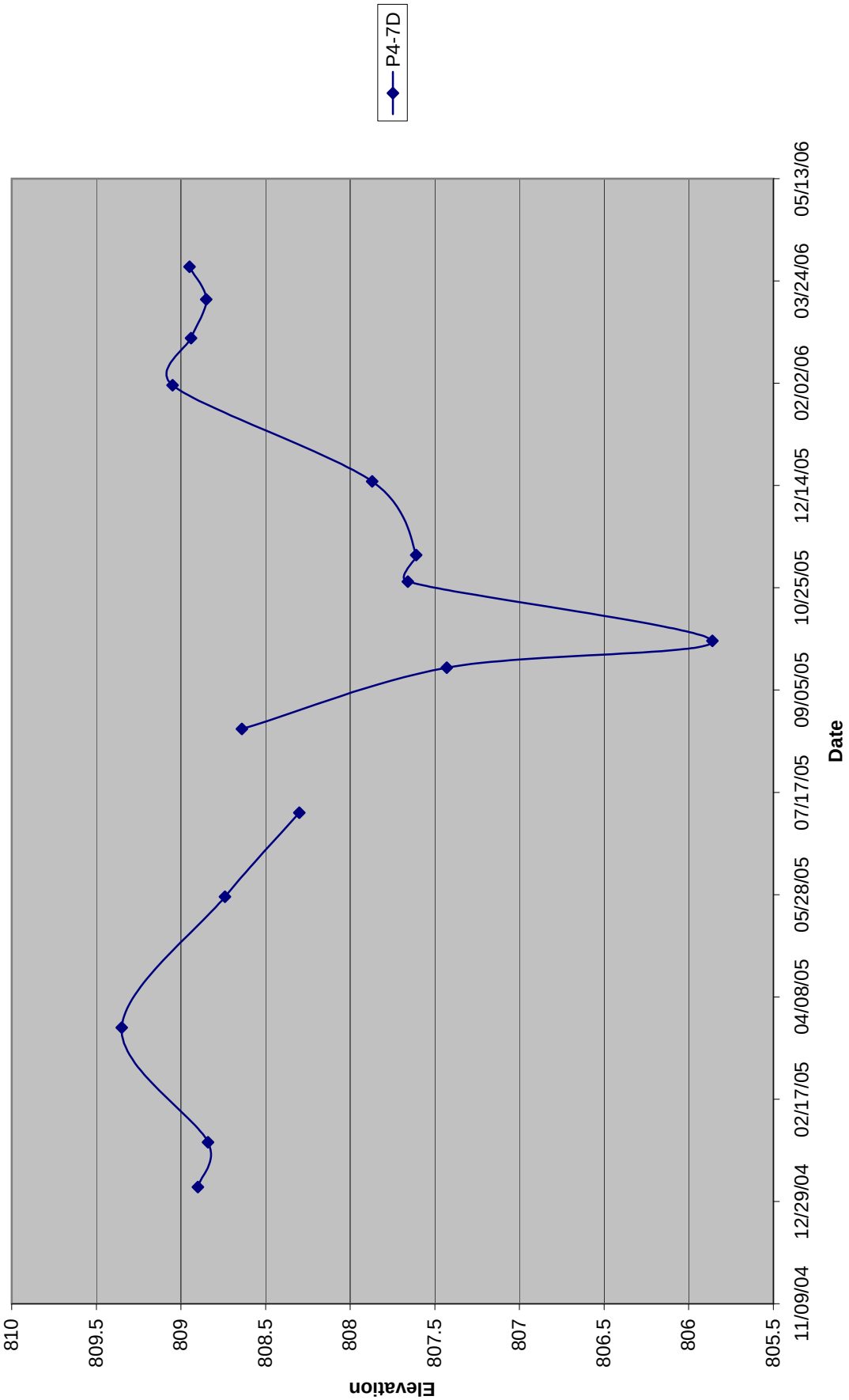
Graph D-16: Transition Fluctuation Pattern P4-4

Graph D-17: Transition Fluctuation Pattern P4-5

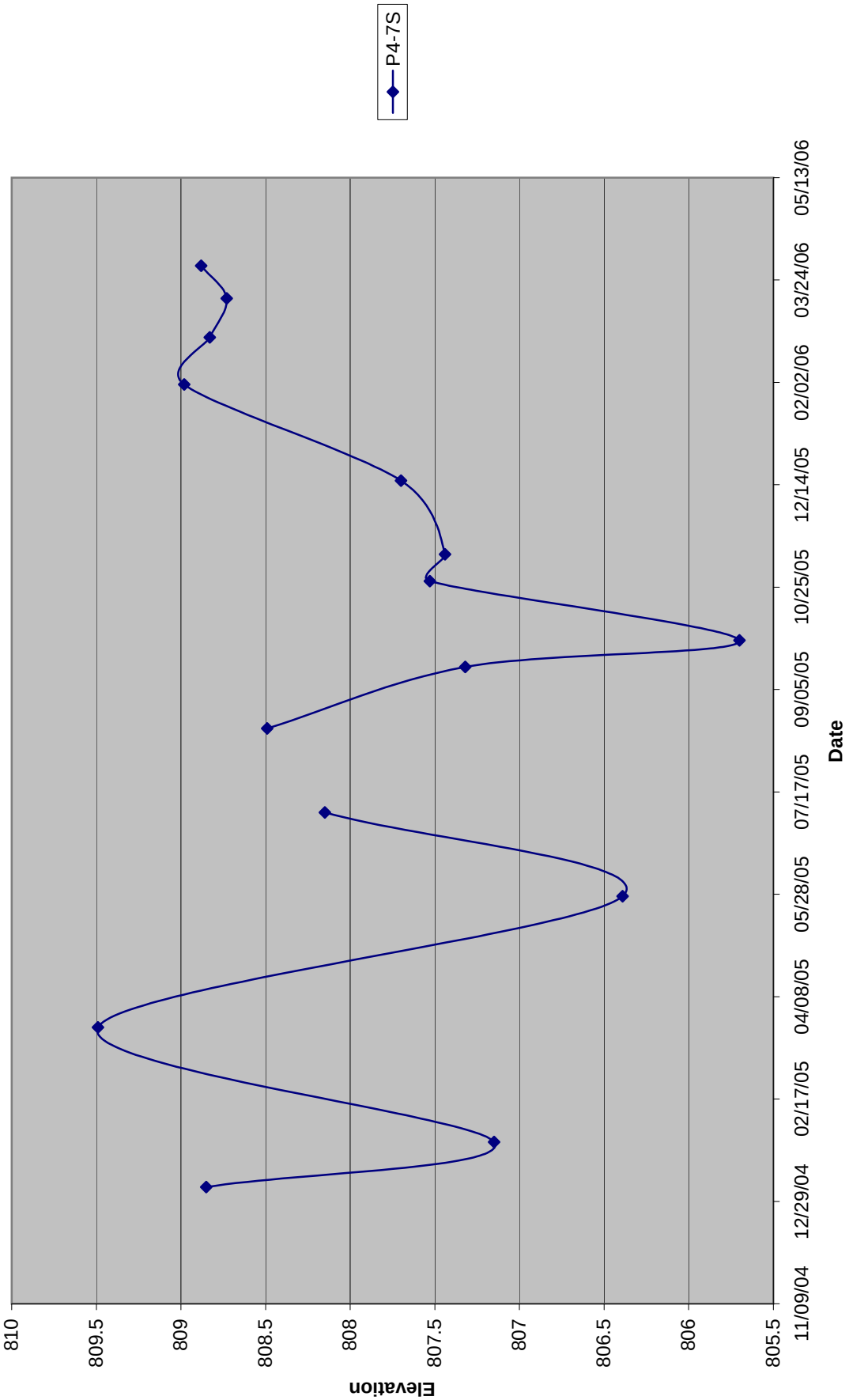




Graph D-18: Transition Fluctuation Pattern P4-6

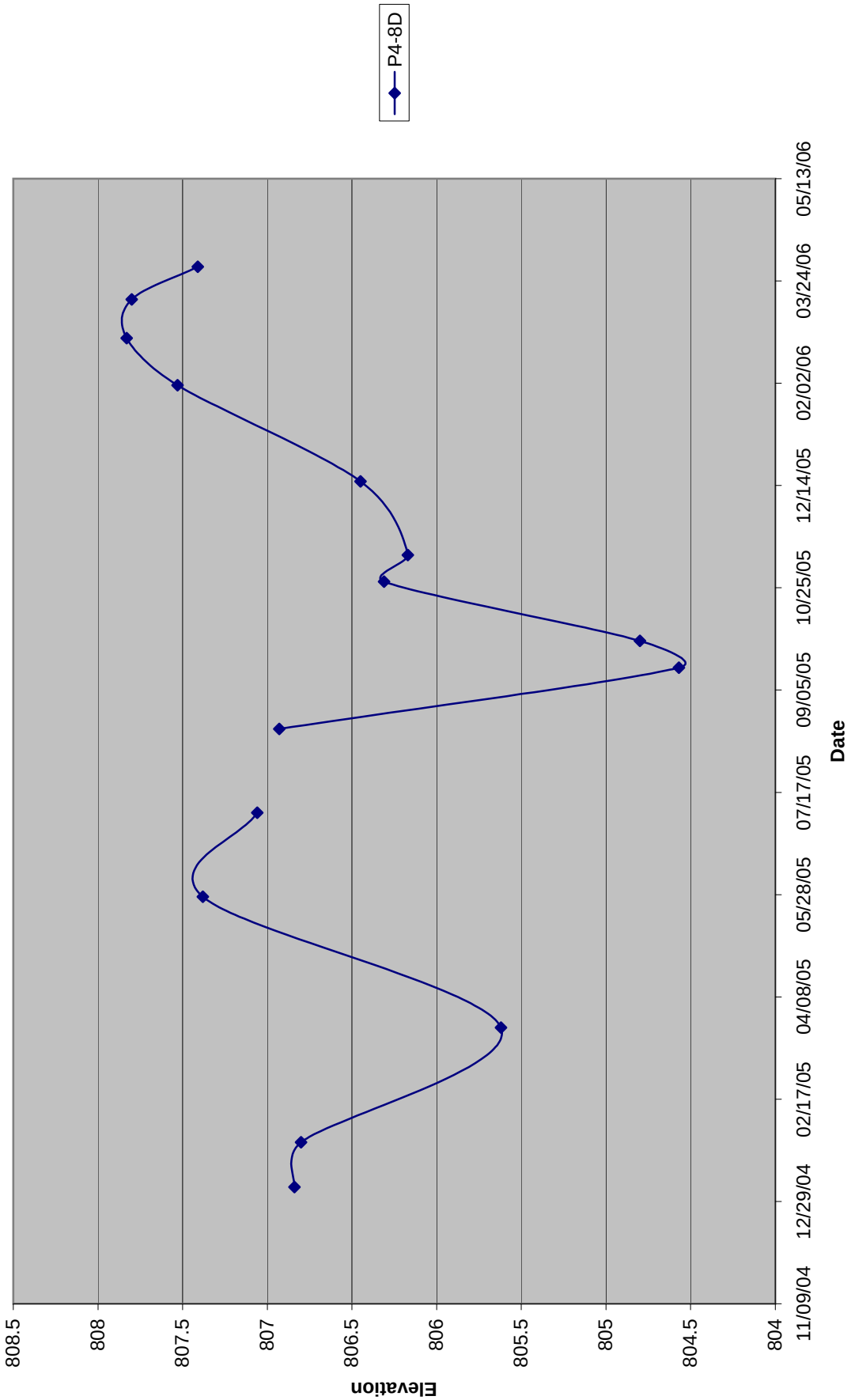


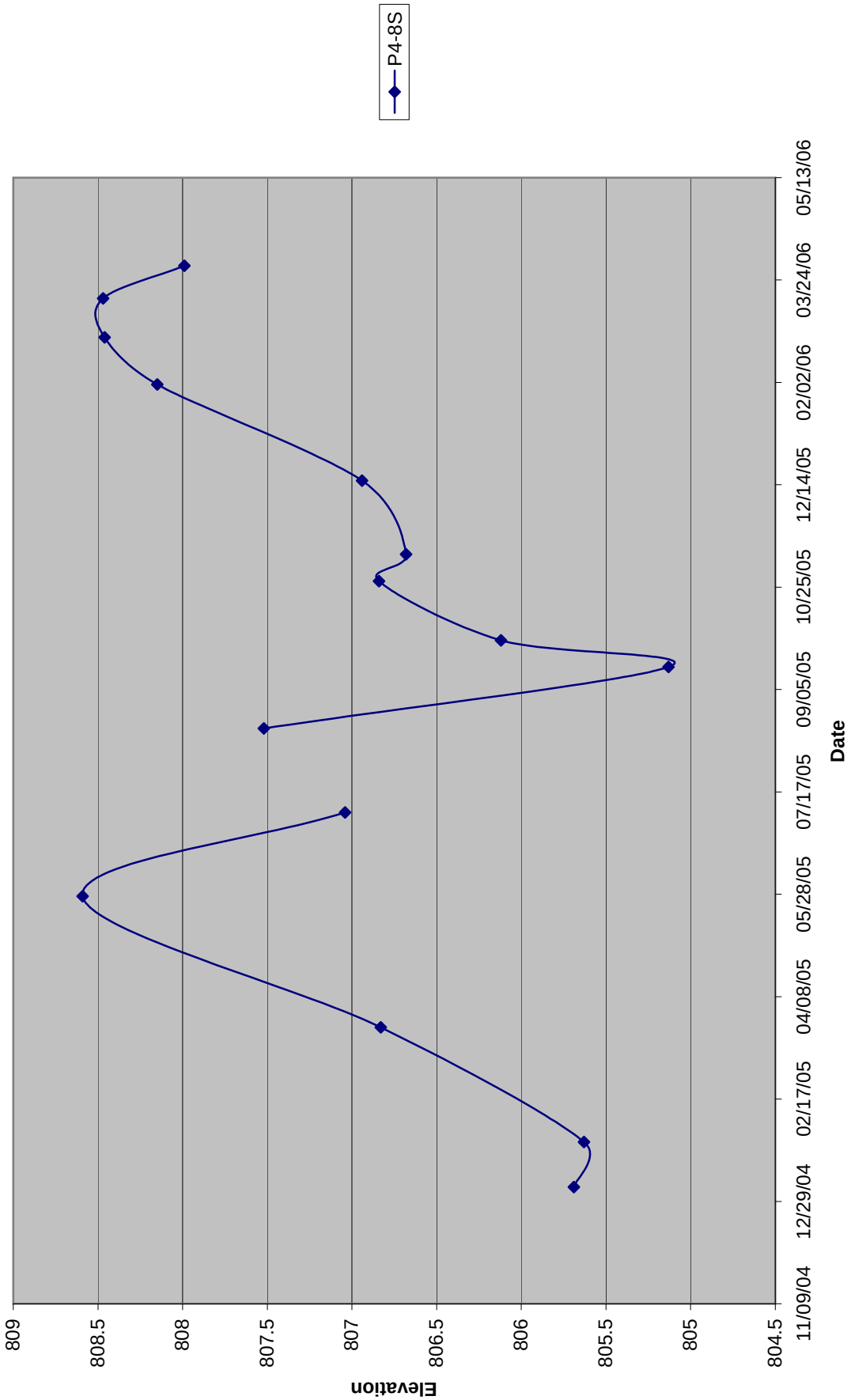
Graph D-19: Transition Fluctuation Pattern P4-7D



Graph D-20: Discharge Fluctuation Pattern P4-7S

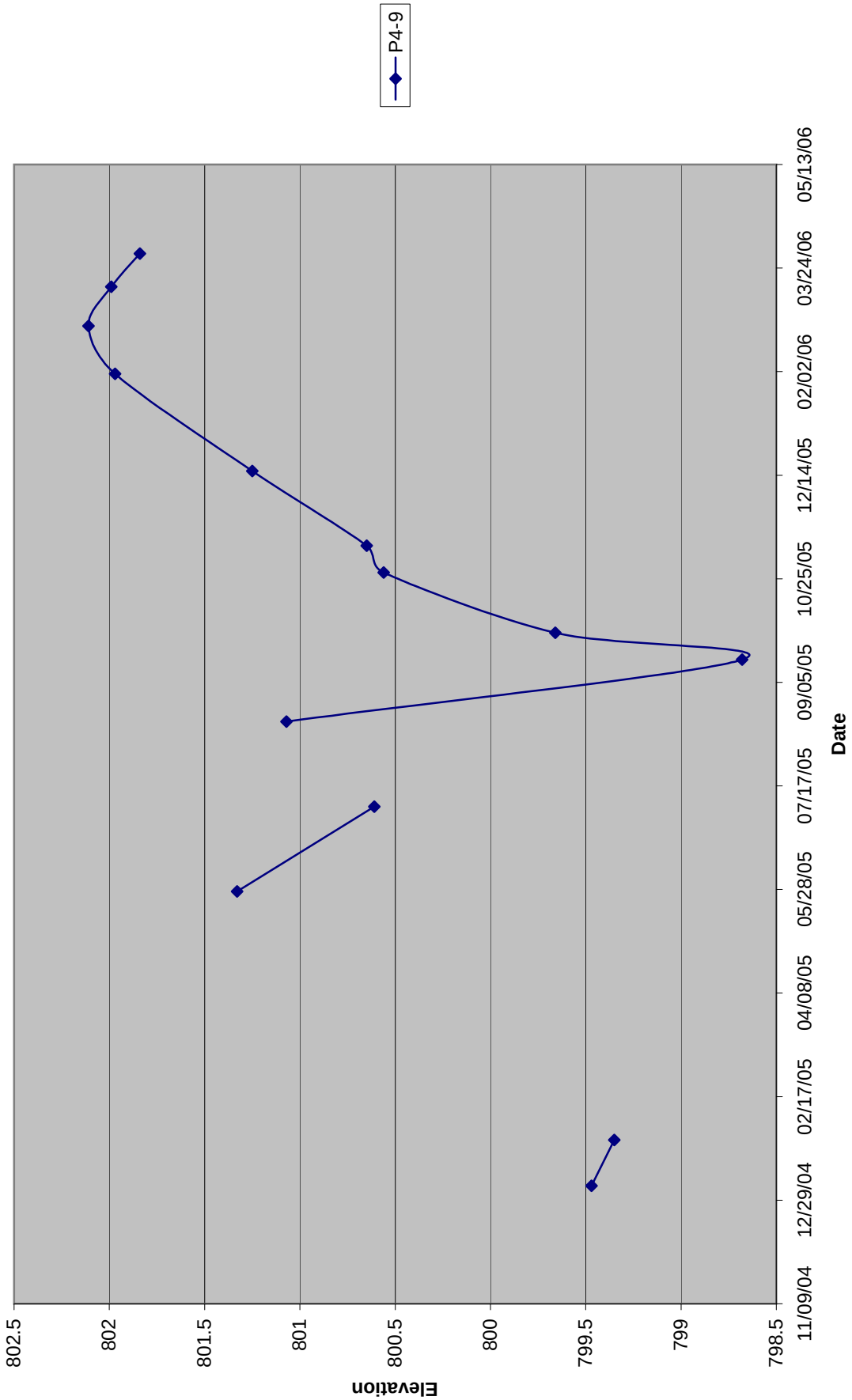
Graph D-21: Transition Fluctuation Pattern P4-8D

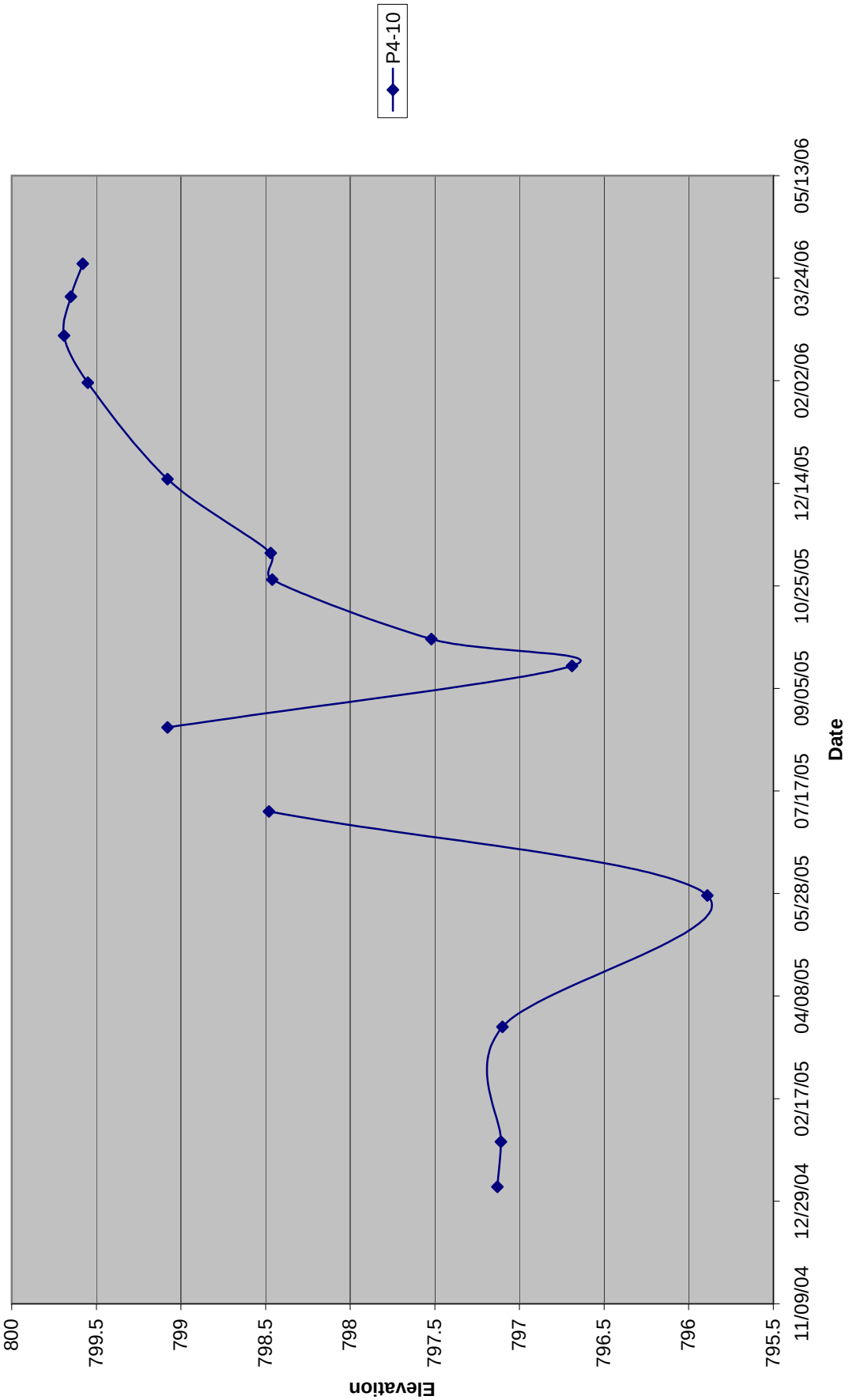




Graph D-22: Transition Fluctuation Pattern P4-8S

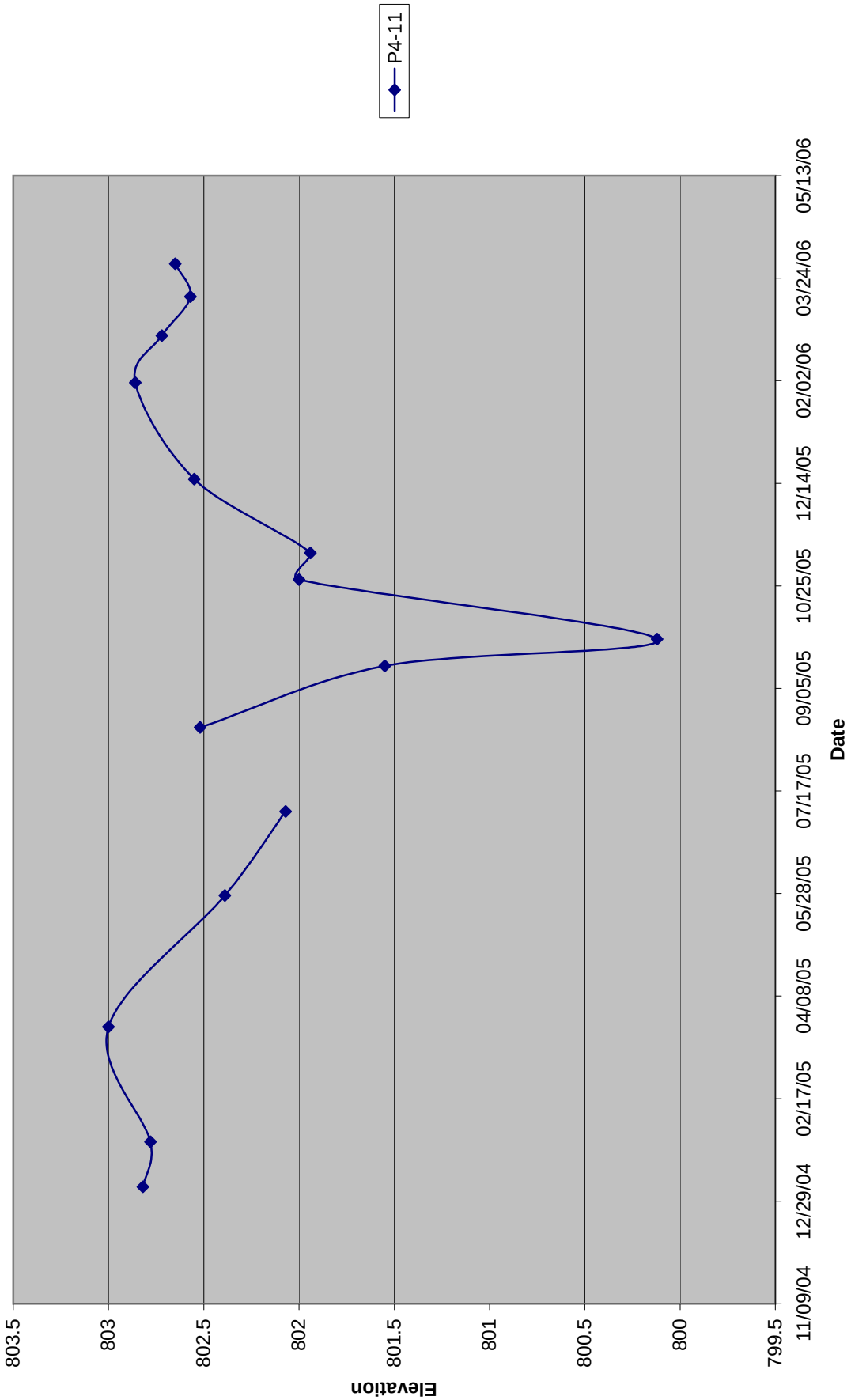
Graph D-23: Transition Fluctuation Pattern P4-9

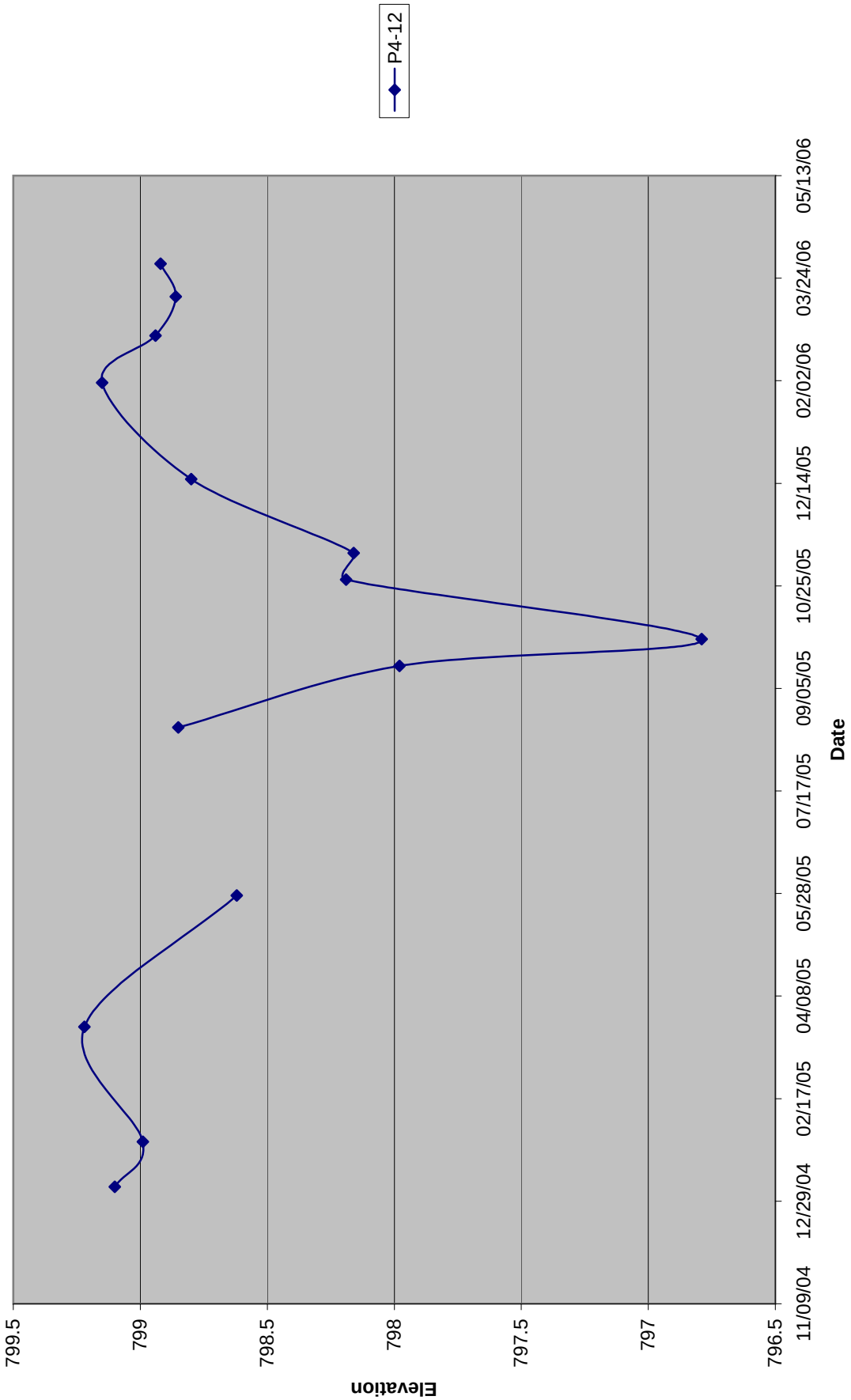




Graph D-24: Transition Fluctuation Pattern P4-10

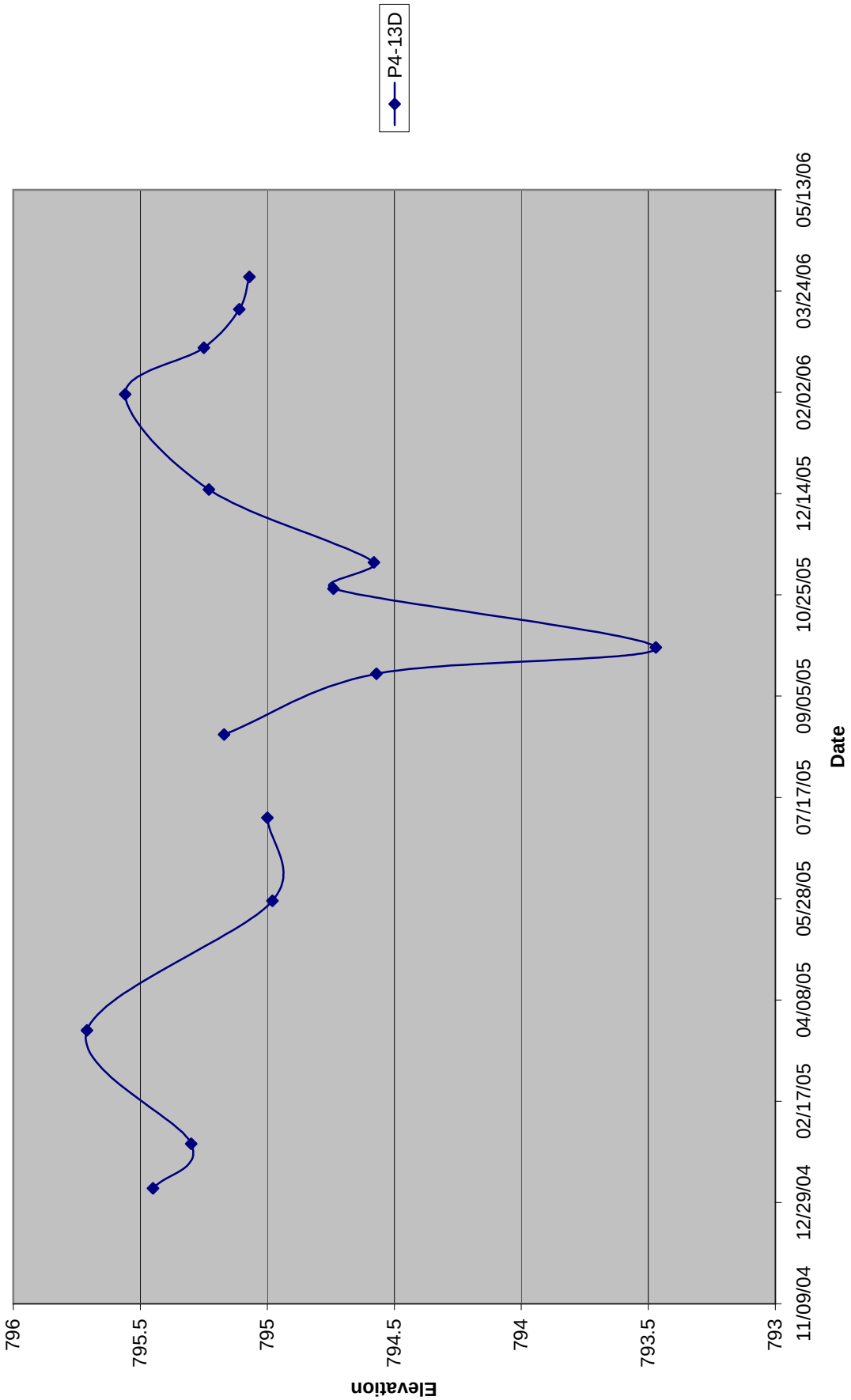
Graph D-25: Transition Fluctuation Pattern P4-11

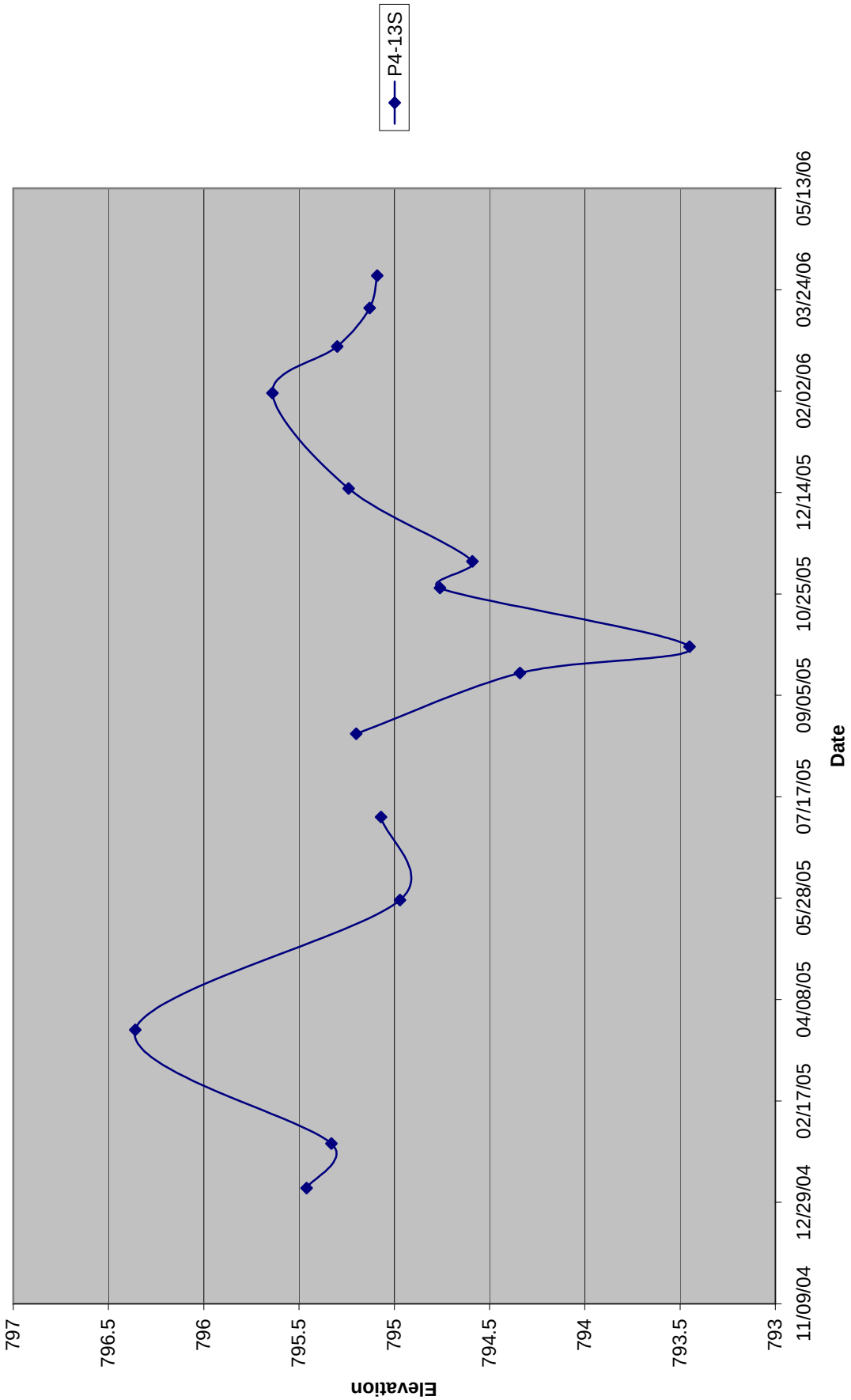




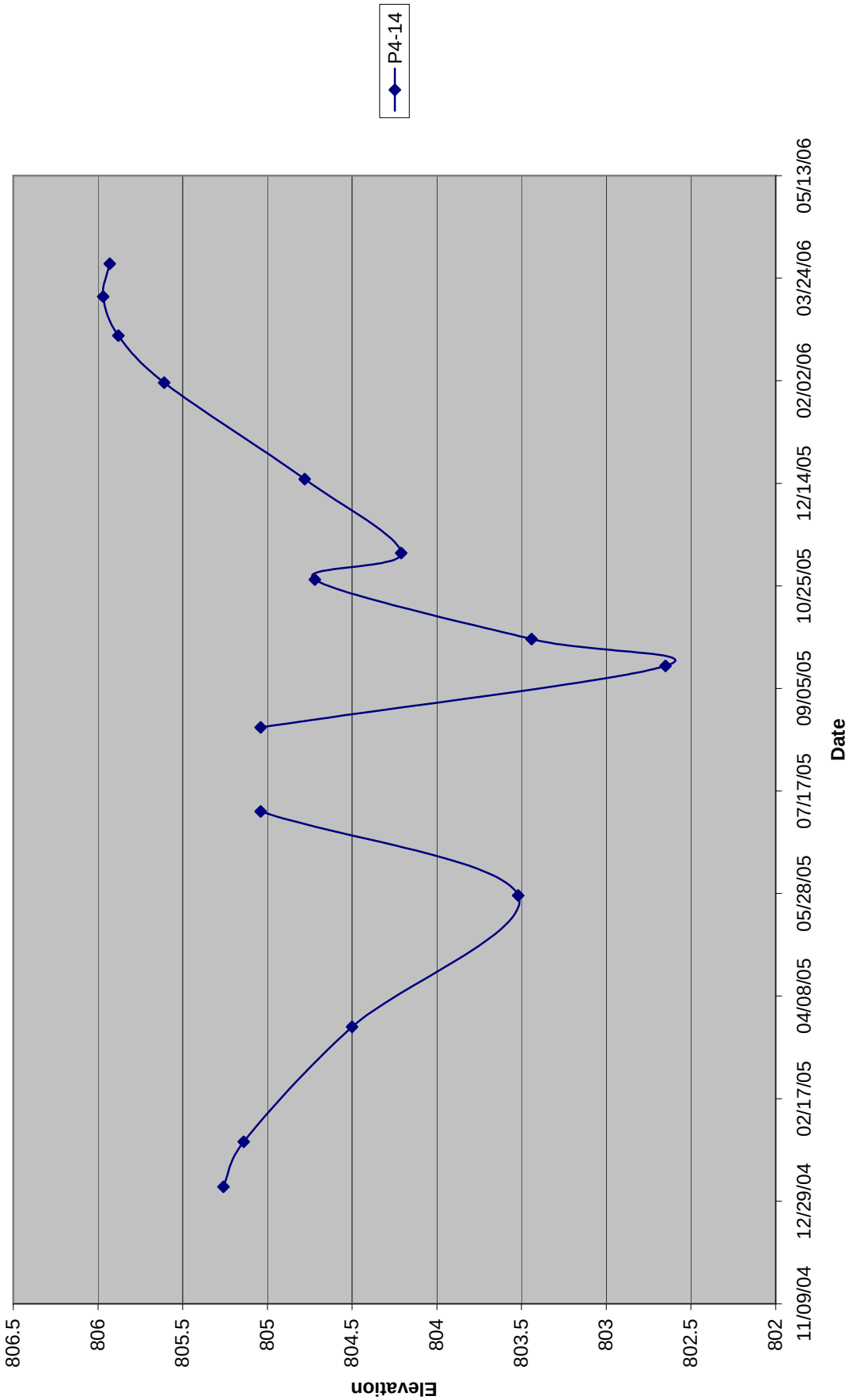
Graph D-26: Transition Fluctuation Pattern P4-12

Graph D-27: Transition Fluctuation Pattern P4-13D





Graph D-28: Transition Fluctuation Pattern P4-13S



Graph D-29: Transition Fluctuation Pattern P4-14

APPENDIX E

Ground and Surface Water Sampling and Analysis Plan

Prepared for

Iredell County Subtitle D Landfill
Statesville, North Carolina

MESCO Project Number: G06035.6

This report is included as an Appendix E part of the Design Hydrogeologic Study completed for the Iredell County Subtitle D Landfill, Phase 4.

Municipal Engineering Services Company, P.A.
Garner, Boone and Morehead City, North Carolina

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1 INTRODUCTION

1.1 Objective

The objective of the Ground and Surface Water Sampling and Analysis Plan is to provide clear guidelines and procedures for field and laboratory personnel when obtaining and testing ground and surface water samples. 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 need to conform to the N.C. Water Quality Monitoring Guidance Document for Solid Waste Facilities (Guidance Document). This plan applies to all of Phase 3 and Phase 4 portions of the Iredell County Subtitle D Landfill. Note that those ground and surface water monitoring points designed to monitor the Phase 4 area, in particular, shall be sampled a least once prior to acceptance of waste in the Phase 4 disposal area.

Four independent sampling events of monitoring wells MW-27S, MW-27D, MW-28 and MW-29 will be taken within six months after the date of issuance of the Permit to Operate for the Phase 4 disposal area, with at least one sampling event occurring prior to receiving waste. The results of these sampling events will be used as baseline water quality information for the subsequent sampling events of Phase 4. All ground and surface water monitoring points will be sampled semi-annually thereafter for the Appendix I list of constituents. In addition to the Appendix I list of constituents; the FORCEMAIN samples will also be tested for biochemical oxygen demand (BOD) chemical oxygen demand (COD), nitrate, nitrite, sulfate, total phosphorus, and pH.

1.2 Summary of Wells

This monitoring plan consists of eleven (11) monitoring wells numbered MW-17, MW-18, MW-19D, MW-19SR, MW-20, MW-21D, MW-21S, MW-27D, MW-27S, MW-28 and MW-29 one (1) surface water monitoring point numbered SW-5, and one (1) leachate collection point referred to as FORCEMAIN. Four (4) monitoring wells, MW-27S, MW-27D, MW-28 and MW-29 have recently been incorporated into the monitoring plan for inclusion of Phase 4. MW-28 will be converted from piezometer P4-11, MW-29 will be converted from P4-12, MW-27D will be converted from P4-13D and MW-27S will be converted from P4-13S. Monitoring points included in this plan are summarized on Table E-1. Note that the leachate lagoon is monitored under the Phase 1 and Phase 2 sampling. In addition down stream surface water point SW-1 is also monitored under the Phase1 and Phase 2 sampling.

MW-17 serves as the background monitoring well for the Phase 3 and Phase 4 portion of the facility. MW-17 is located up-gradient of the disposal area. MW-18 monitors the down gradient southern portion of the

Phase 3 waste limit. MW-19D and MW-19SR monitor down gradient of Phase 3 and the sum area for Phase 3. MW-20 monitors southeast of Phase 3. MW-21D and MW-21S monitor the northeast portion of Phase 3.

MW-27S and MW-27D, currently piezometers P4-13S and P4-13D are located approximately 95' from the waste limit. These down gradient wells will intercept the majority of groundwater that does not pass into the jurisdiction of the Phase 3 monitoring wells. They will also be responsible for monitoring the sump area for any possible leaks. MW-27S straddles the water table with its screened section, allowing for significant seasonal fluctuation. MW-27D is screened on top of rock to monitor for deep contamination traveling along the top of rock of the observed basin feature.

MW-28, currently piezometer P4-11, is located at the compliance boundary west of the waste limit. It will serve as a down gradient compliance well to intercept the groundwater flowing south, and detect changes in the small, unnamed stream.

MW-29, currently piezometer P4-12, is located approximately 200' southwest from the waste limit. Established as a down gradient review well it will monitor groundwater flow between MW-28 and MW-27S/D.

1.3 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.

2 SAMPLING

Wells will be sampled in order from least contamination, unless no information is available then the will be sampled in order working down gradient.

2.1 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.

2.2 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 hands 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.

2.3 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 samples 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.

2.4 Surface Water

Surface water sampling will be taken with given 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.

2.5 Leachate Sampling

The Phase 4 leachate will be pumped along the waste boundary to connect with the Phase 3 leachate and they will be sampled together at the current Phase 3 leachate sampling site (FORCEMAIN). Leachate will be obtained from the riser pipe located immediately down gradient of the Phase 3 sump, west of the stream. When collecting leachate samples, sample containers will be handled with extreme caution in order to avoid contamination at the mouth of the container. Fill containers by holding them under the spigot. 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 collecting the samples, water will be collected in the wide-mouth container for pH, temperature, and conductivity measurements.

2.6 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.

3 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 in the laboratory testing. QA/QC procedures utilized during the testing will be in conformance with laboratory QA/QC manual.

4 CONCLUSION

This report, included as part of the Design Hydrogeologic Report for the proposed Iredell County Subtitle D Landfill Phase 4, completes the requirements as described in rule 15A NCAC 13B .1623(b)(3). The ground 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.

Respectfully submitted,

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

Madeline Clement

Geoscientist

Ethan J. Caldwell, P.G.

Professional Geologist

NORTH CAROLINA LICENSED SEAL 1931 GEOLOGIST ETHAN J. CALDWELL

Table E-1: Summary of Ground and Surface Water Monitoring Points

Sampling Point	Type	Gradient	Total Depth (ft)	Designation
MW-17	Monitoring Well	Up	45	Background
MW-18	Monitoring Well	Down	20	Phase 3 Monitoring Well
MW-19SR	Monitoring Well	Down	22	Phase 3 Monitoring Well
MW-19D	Monitoring Well	Down	59	Phase 3 Monitoring Well
MW-20	Monitoring Well	Down	30	Phase 3 Monitoring Well
MW-21S	Monitoring Well	Down	41	Phase 3 Monitoring Well
MW-21D	Monitoring Well	Down	138.25	Phase 3 Monitoring Well
MW-27S	Monitoring Well	Down	20	Phase 4 Monitoring Well
MW-27D	Monitoring Well	Down	44.4	Phase 4 Monitoring Well
MW-28	Monitoring Well	Down	12.4	Phase 4 Monitoring Well
MW-29	Monitoring Well	Down	17.7	Phase 4 Monitoring Well
SW-5	Surface Water	Up Stream		Unnamed Stream Confluence

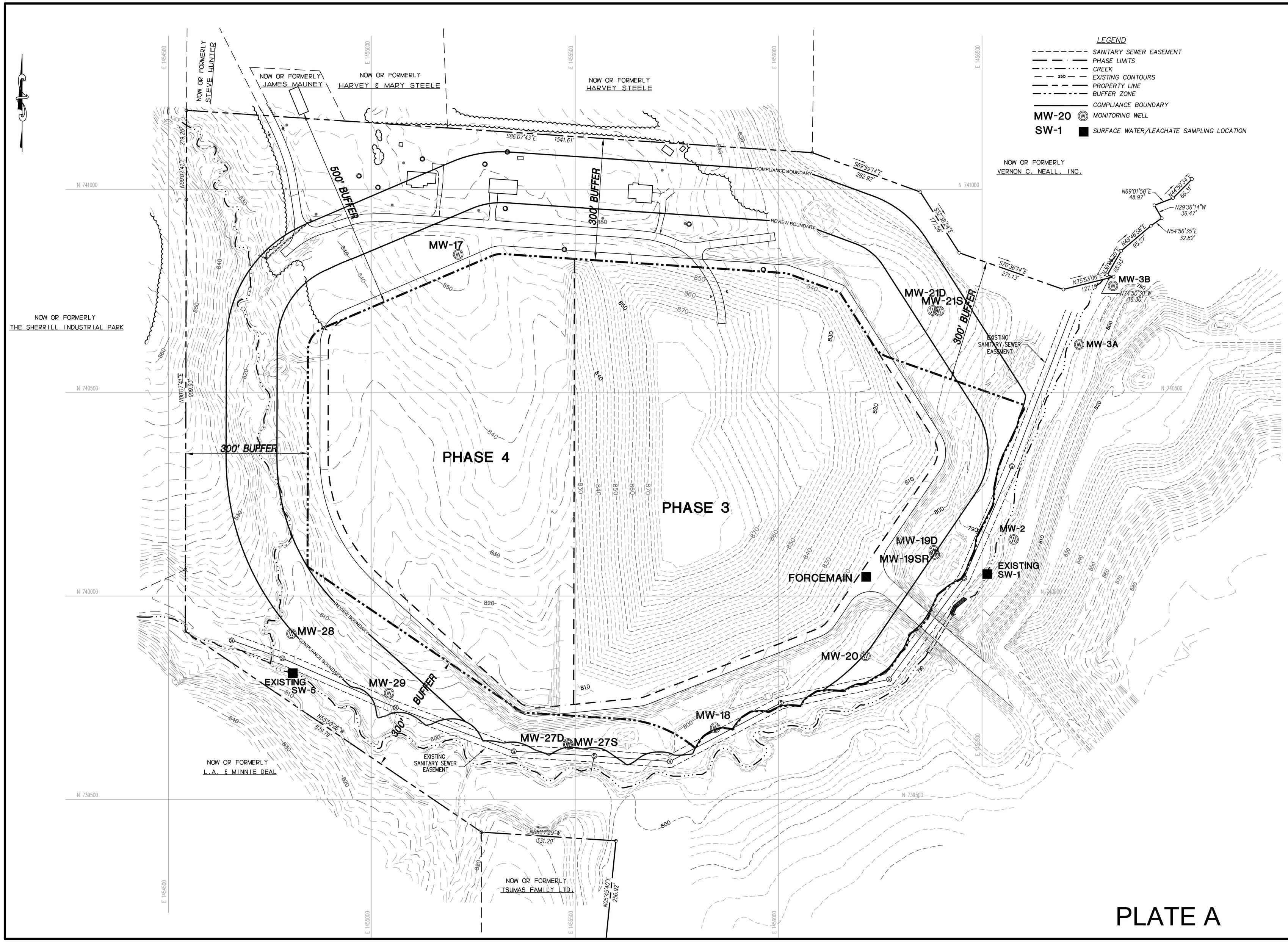


PLATE A

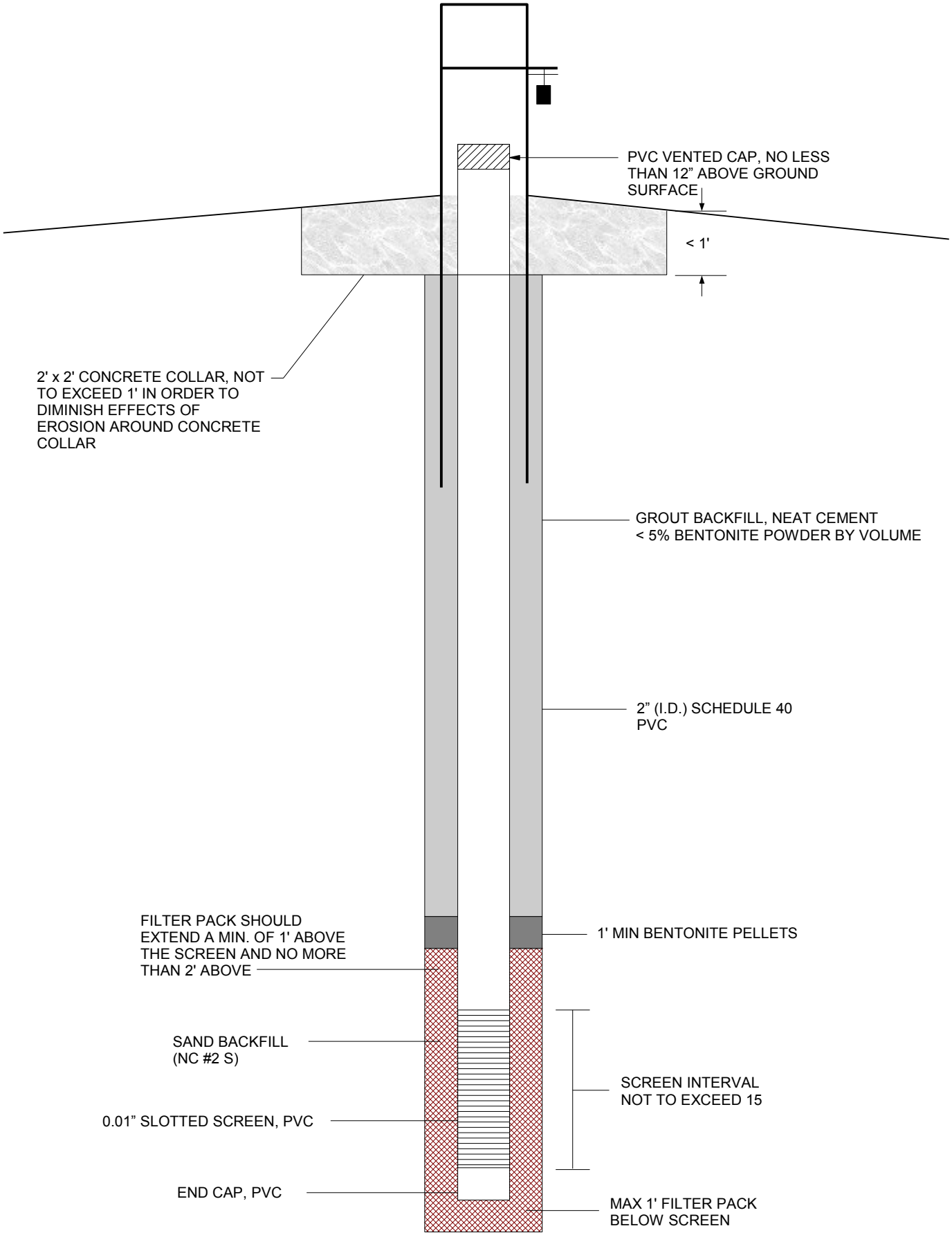
Municipal Engineering Services Company, P.A.
P.O. BOX 67 GARNER, N.C. 27529 (919) 772-5393
P.O. BOX 349 BOONE, N.C. 28607 (828) 262-1767
P.O. BOX 828 MOREHEAD CITY, N.C. 28557 (252) 726-9481

MUNICIPAL SOLID WASTE LANDFILL
IREDELL COUNTY NORTH CAROLINA

DATE	BY	REV.	DESCRIPTION

PROPOSED MONITORING AND SURFACE WELL LOCATIONS

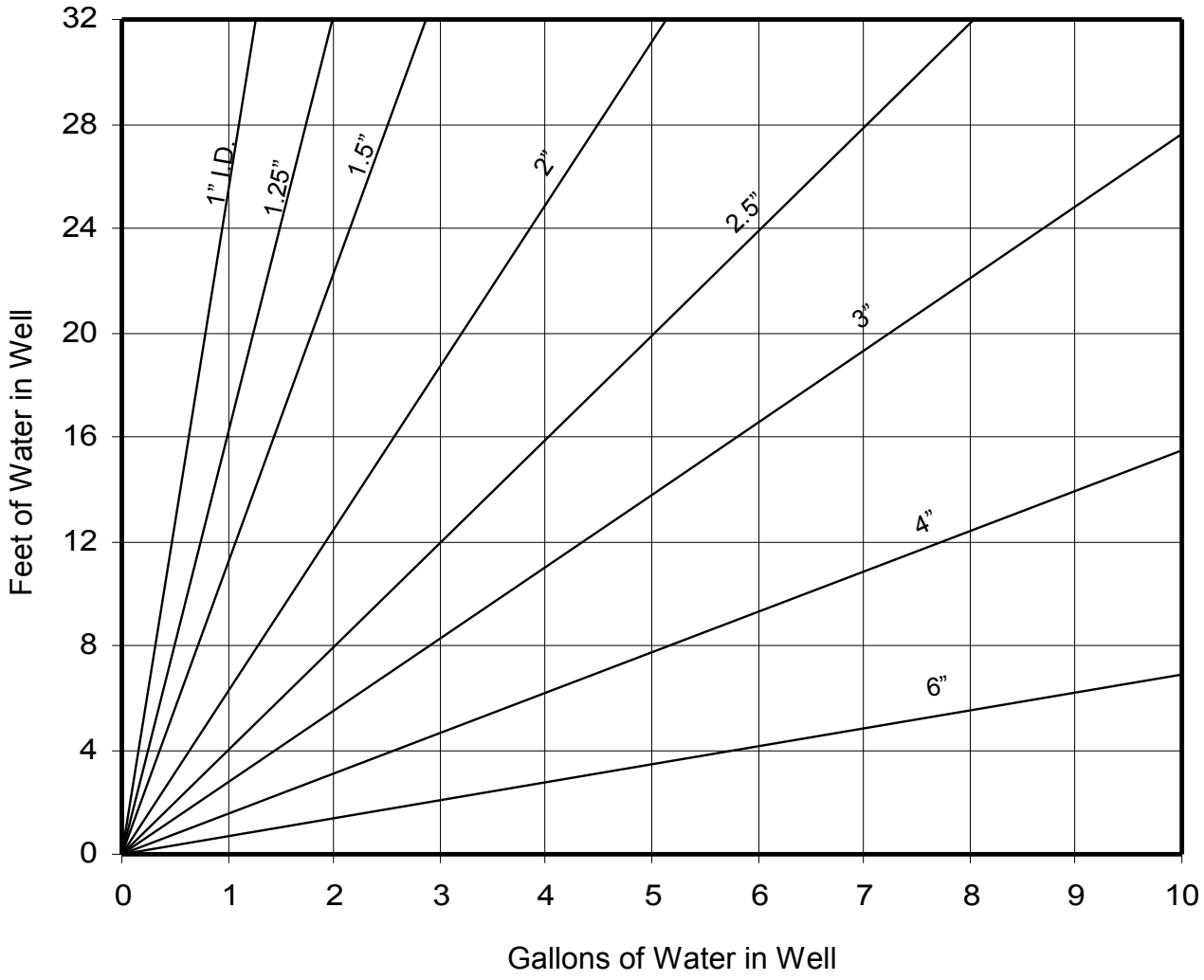
SCALE:	1" = 100'
DATE:	7/7/08
DRWN. BY:	M. GERMAN
CHKD. BY:	E. CALDWELL
PROJECT NUMBER	G06035.6
DRAWING NO.	PLATE A
SHEET NO.	1 of 1



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

LOG OF BORING: P-2

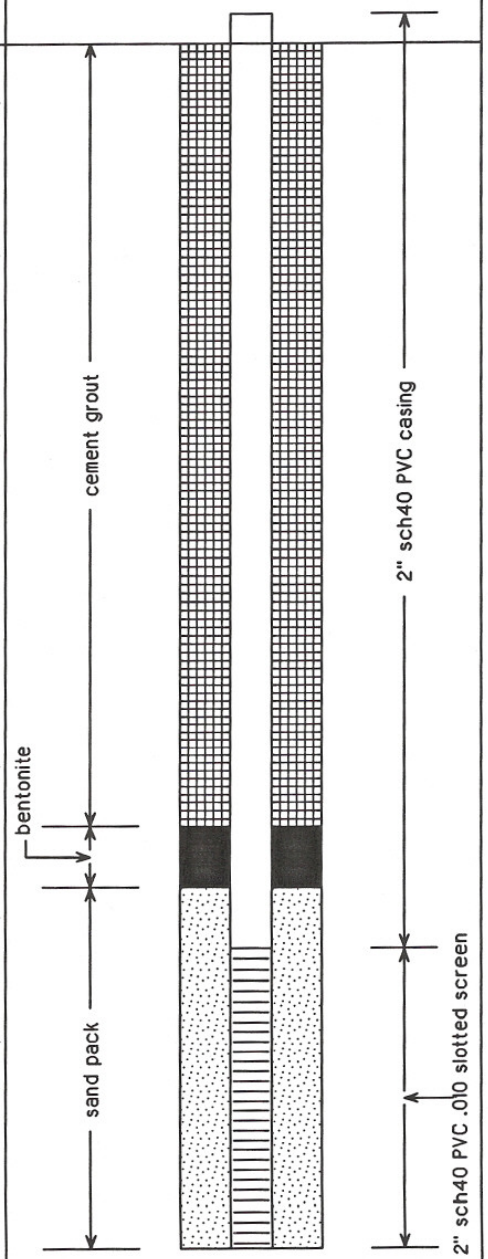
Project: Iredell Campbell Property
Project No. G98111.0
Type: HSA SS

Drilling Contractor: Engineering Tectonics
Registration Number: 835

Surface Elevation: 836.26ft
Top of Casing: 838.33ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
	15		X	SILTY CLAY (CL); red, stiff, dry, root debris
5	27		X	SILT (ML); red to orange, relict crystal structure, quartz vein
10	12		X	SANDY SILT (ML); orange and brown, quartz vein, micaceous
15	36		X	PARTIALLY WEATHERED ROCK; quartz fragments, some fine grained schistose fragments
20	33		X	-quartz fragments, damp
25	15		X	SILT (ML); reddish brown, soft, relict structure, damp
30			X	PARTIALLY WEATHERED ROCK; rock fragments in dark gray silt, relict foliation and fractures, damp
35	13		X	SILT (ML); brown to gray, relict structures, thin quartz veins
40				

PIEZOMETER DIAGRAM



Completion Depth: 40 ft
DATE: 11/3/98

Depth to Water: 36.65 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: Kohei Yoshida
Signature of Field Agent

LOG OF BORING: P-3D

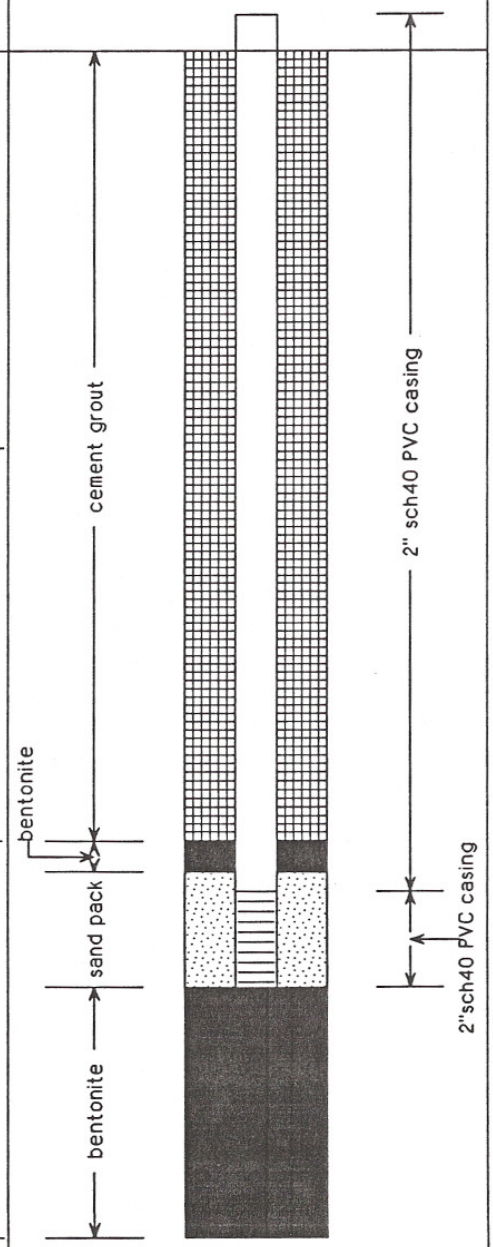
Project: Iredell Co. LF
Project No. G99087.0
e: 4.25"I.D HSA 8"O.D.SS

Drilling Contractor: Engineering Tectonics
Registration Number:

Surface Elevation: 807.22ft
Top of Casing: 808.98ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
5, 10, 15				HSA Drilled W/Out Sampling (0'-20') previously sampled @ P-3 11/4/98
20				
25	20		☒	- Sandy Silt (ML) Saprolite Brown & olive gray, saturated, no relict fractures, micaceous, some crystalline weathered feldspar, few gravel size quartz fragments.
30	29		☒	- 2 Quartz partings @~1/8" high proportion of white crystalline weathered feldspar.
35	33		☒	- Saturated, no fractures, few crystalline white feldspar particles.
				- Auger refusal @38.5' Reamed to 40 feet.
40				-40'- 50' REC=95.8%, RQD=10% Coarse grained gneiss w/ a more greenish tint, quartz layer w/ 45 degree fractures parallel to dip.
45				-40'-45.6' Highly weathered w/ numerous fractures and iron staining upon fractures.
50				-50'-60' REC=90.2%,RQD=76%
55				-Gneiss coarse grained, more intact and darker than run #1. -15 degree bedding visible w/ coarse grained quartz bands, some biotite, and amphiboles probably containing hornblende.
60				End of Boring @ 60.0 feet.

PIEZOMETER DIAGRAM



Completion Depth: 60 ft
DATE: 2/7/00

Depth to Water: 15 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: _____
Signature of Field Agent

LOG OF BORING: P-3

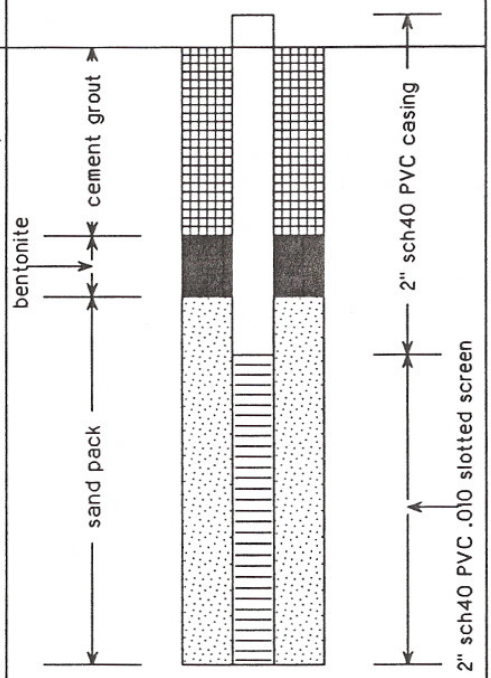
Project: Iredell Campbell Property
Project No. G98111.0
e: HSA SS

Drilling Contractor: Enigineering Tectonics
Registration Number: 835

Surface Elevation: 807.65ft
Top of Casing: 810.02ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
	15		X	SANDY SILT (ML); orange to yellow, some quartz grains, root debris
5	41		X	SAND (SM); orange to yellow, with silt, quartz fragments, micaceous
10	11		X	-relict foliations, damp
15	12		X	-relict gneissic structure, wet
20	10		X	-orange and white, quartz fragments
				End of Boring at 20.0 feet
25				
30				
35				
40				

PIEZOMETER DIAGRAM



Completion Depth: 20 ft
DATE: 11/4/98

Depth to Water: 13.97 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.
I acknowledge that this record is true to the best of my knowledge: _____
Signature of Field Agent

LOG OF BORING: P-4

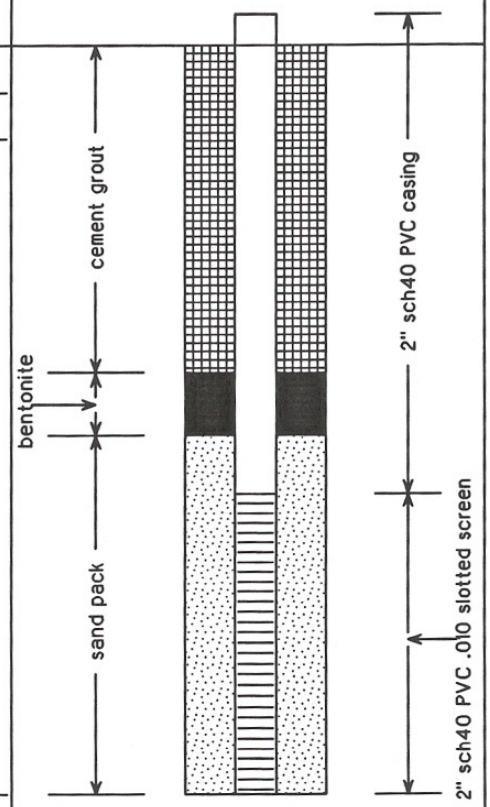
Project: Iredell Campbell Property
Project No. G98111.0
Type: HSA SS

Drilling Contractor: Engineering Tectonics
Registration Number: 835

Surface Elevation: 837.26ft
Top of Casing: 839.55ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
	19		X	Topsoil top 2"
				SILTY CLAY (CL); red to orange, firm, dry
				SILT (ML); brown to orange, firm, faint relict structure
5	12		X	
10	9		X	-grades with sand, quartz fragments, relict structure
15	6		X	-grades orange to yellow, relict foliation, damp
20	9		X	-grades wet
25	9		X	End of Boring at 25.0 feet
30				
35				
40				

PIEZOMETER DIAGRAM



Completion Depth: 25 ft
DATE: 11/4/98

Depth to Water: 18.57 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: Kohei Yoshida
Signature of Field Agent

LOG OF BORING: P-5

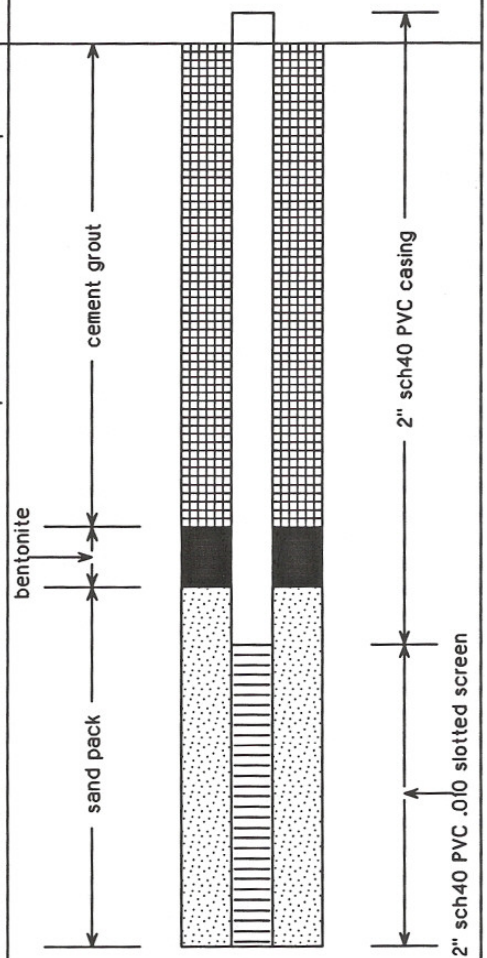
Project: Iredell Campbell Property
Project No. G98111.0
Type: HSA SS

Drilling Contractor: Engineering Tectonics
Registration Number: 835

Surface Elevation: 830.05ft
Top of Casing: 832.51ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
	10		X	SILTY CLAY (CL); orange to red, firm, dry, root debris
				SILT (ML); brown to orange, faint relict structure, trace clay
5	22		X	
10	9		X	-grades with less clay, some quartz fragments
				SAND (SM); yellow to tan, quartz fragments, micaceous
15	12		X	
20	11		X	-relict foliations, moist
25	11		X	-grades white and gray, relict gneissic structure, wet
30	16		X	-abundant quartz fragments, gneissic structure
				End of Boring at 30.0 feet
35				
40				

PIEZOMETER DIAGRAM



Completion Depth: 30 ft
DATE: 11/4/98

Depth to Water: 25.85 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: Kohi Toshiol
Signature of Field Agent

LOG OF BORING: P-6

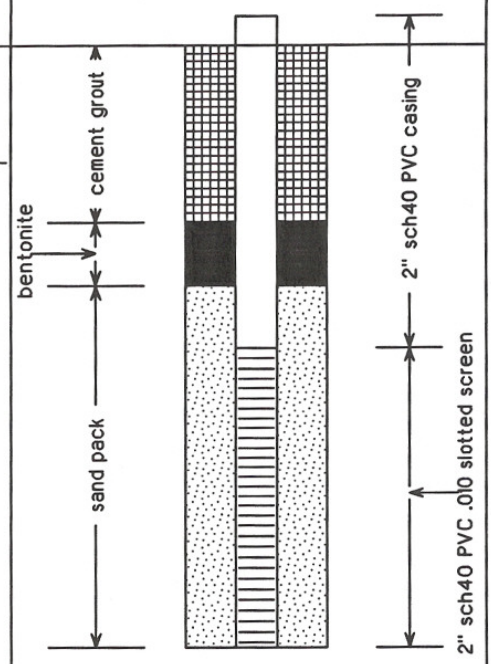
Project: Iredell Campbell Property
Project No. G98111.0
Type: HSA SS

Drilling Contractor: Engineering Tectonics
Registration Number: 835

Surface Elevation: 810.83ft
Top of Casing: 812.85ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
	17		X	SILTY CLAY (CL); red to orange, stiff, dry
5	17		X	SILT (ML); light brown with orange and white mottles, faint relict structure
10	9		X	-gray to white, relict foliations, damp
15	22		X	-grades with relict fractures, micaceous, trace rock fragments, wet
20	17		X	-grades with more rock fragments
				End of Boring at 20.0 feet
25				
30				
35				
40				

PIEZOMETER DIAGRAM



Completion Depth: 20 ft
DATE: 11/5/98

Depth to Water: 11.35 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: Kohie Yoshid
Signature of Field Agent

LOG OF BORING: P-9S

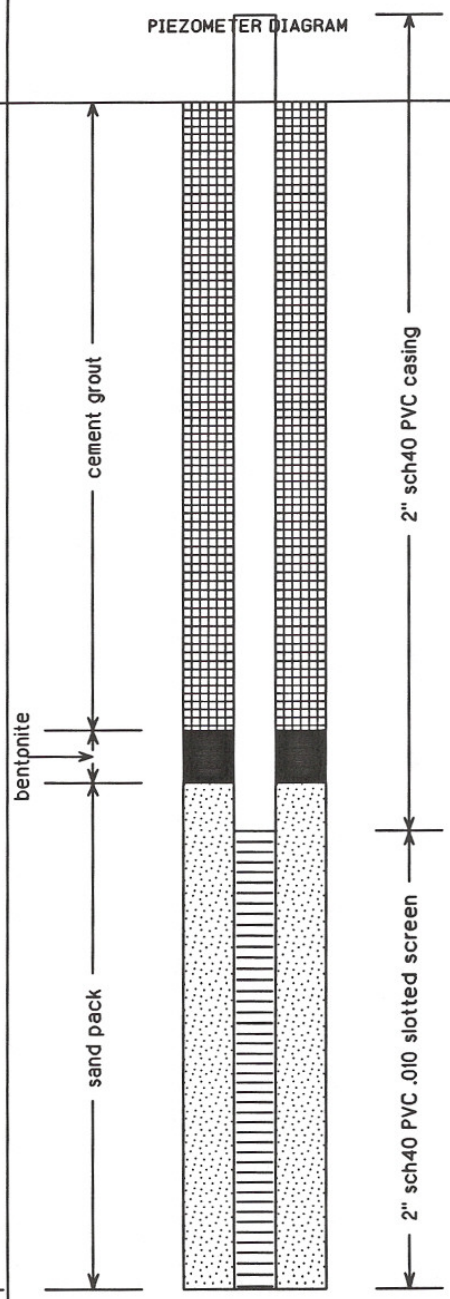
Project: Iredell Co. LF
Project No. G99087.0
Type: 4.25" ID HSA 8" OD

Drilling Contractor: Engineering Techtonics
Registration Number:

Surface Elevation: 823.26ft
Top of Casing: 826.188ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
5				
10				HSA Drilling Without any sampling. Turned from red to olive gray @ ~12.00'
15				
20				
25				
30				
35				
40				End of Boring @ 39.00 feet

PIEZOMETER DIAGRAM



Completion Depth: 39.0 ft
DATE: 1/26/2000

Depth to Water: 29.0 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: _____ Signature of Field Agent

LOG OF BORING: P-9D

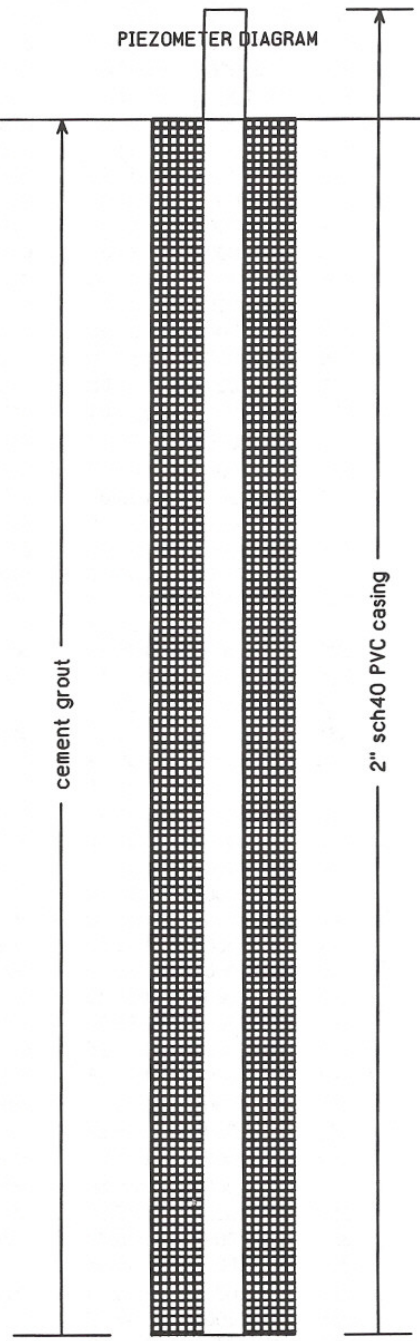
Project: Iredell Co. LF
Project No. G99087.0
Type: 4.25" I.D HSA 8"O.D SS&ST

Drilling Contractor: Engineering Tectonics
Registration Number:

Surface Elevation: 823.26ft
Top of Casing: 826.188ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
	21		X	- SILTY CLAY (CL);Yellow red to red, some sand size quartz fragments, very cohesive, dry, no fractures, micaceous.
5	20		X	-Red w/top portion highly cohesive white "Gumbo" clay, micaceous, white crystalline weathered feldspar partings, Dry.
	24		X	- Silty Clay (CL);7.5'-8.5' Micaceous Red silty clay, no fractures, dry.
10			■	- Sandy Silt (ML);8.5'-9' olive gray silt w/ yellowish red sand, micaceous, 2 relict fractures, dry.
15	12		X	- Sandy Silt (ML); Saprolite olive gray micaceous silt laminated w/ yellowish red sand, no relict fractures, few black spots 16.3'-16.5' change to yellowish red saprolite, dry.
20	13		⊠	- 2 relict fractures. Gravel size quartz parting @20.75, white crystalline weathered feldspar in very thin partings, Wet.
25	16		X	- 3 relict fractures, a 1"x.5" rock fragment, Wet.
30	21		X	- Sandy Silt (ML); Very consolidated saprolite, olive green, micaceous silt w/ some yellow red sand, no fractures, black & white thin crystalline partings, few sand size quartz fragments, wet.

PIEZOMETER DIAGRAM



Completion Depth: 64.75 ft
DATE: 2/9/00

Depth to Water: 20.5 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: _____ Signature of Field Agent

LOG OF BORING: P-9D

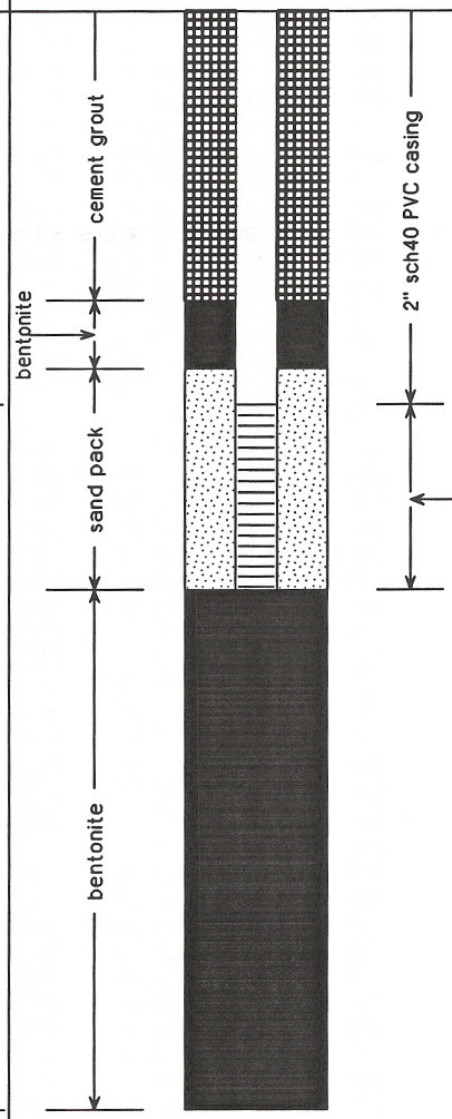
Project: Iredell Co. LF
Project No. G99087.0
Type: 4.25" I.D HSA 8"O.D SS&ST

Drilling Contractor: Engineering Tectonics
Registration Number:

Surface Elevation: 823.26ft
Top of Casing: 826.188ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
	49		X	- Sandy Silt (ML) Very Consolidated saprolite, Same as above.
39	50/2"		X	- Sandy Silt (ML); Very consolidated saprolite, Same as above. Auger refusal. @ 40.0'
44				- 44.75'-54.75' REC=90.6% RQD=33% - Whitish gneiss, muscovite, biotite, slight foliations. Fractures parallel to foliations. Highly weathered from 44.75'-45.25' w/iron.
49				- Highly weathered w/Fe 46.5'-46.9'
				- Highly weathered w/ Fe 48.95'-49.05'
				- Highly broken w/ near vertical fractures from 50.85'-52.15'w/ trace amounts of iron staining.
54				- 54.75'-64.75'REC=99.8% RQD=93% - Grayish gneiss w/ white banding. Foliations near horizontal fractures parallel to foliations. Highly broken at 55.8'-56.2'.
59				
64				
				End of Boring @ 64.75 feet

PIEZOMETER DIAGRAM



Completion Depth: 64.75 ft
DATE: 2/9/00

Depth to Water: 20.5 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: _____
Signature of Field Agent

LOG OF BORING: P-10D

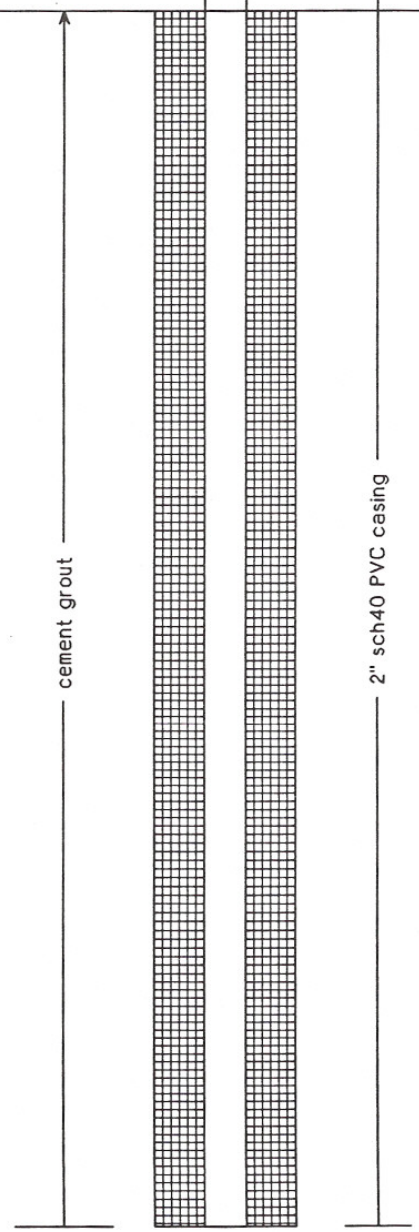
Project: Iredell Co. LF
Project No. G99087.0
: 4.25"I.D HSA 8"O.D S.S

Drilling Contractor: Engineering Tectonics
Registration Number:

Surface Elevation: 852.06ft
Top of Casing: 855.11ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
	15		X	- Silty Clay (CL) Red, micas., cohesive, Dry, no fractures.
5	14		X	- 3 relict fractures,small amount of white crystalline structure, some coarse quartz grains.
	14		X	- Less cohesive than above, 1 fracture, white crystalline structure, dry.
10	14		X	- Silty Clay (CL) Pale Red "Purplish sheen", micas. less cohesive than above, more sand properties, 2 fractures some white crstal. structure, some sand/silt laminations (Red&Tan), Dry.
15	12			- Sandy Silt (ML) Brown, Micas., 1 fracture, relict crystal structure few black organic silt pockets, Dry.
20	21		X	- 3 relict fractures, Greenish gray, yellowish red & white mottling, few organic silt pockets, dry.
25	15		X	- Reddish Brown, Micas., 4 relict fractures, white crystal structure, few coarse quartz grains, few organic silt pockets. Dry.
30	12		X	- Yellowish red silt laminated w/ brown sand, micas., 4 relict fractures, 1 quartz parting (1/8") @ 32.4" @ 45 degrees, few very small black spots, moist
35	13		X	- Yellowish Red to 35.5' then Brown to 36.3', 2 relict fractures, coarse quartz, parting (1/8") @ 35.2', Micas., very few small black spots, Wet.
40	22		X	- Yellowish red laminated silt & Sand w/ Ol. G. silt. Micas., 2 relict fractures @ quartz partings, few black spots, Wet.

PIEZOMETER DIAGRAM



Completion Depth: 83.0 ft
DATE: 2/2/00

Depth to Water: 34.0 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: _____
Signature of Field Agent

LOG OF BORING: P-10D

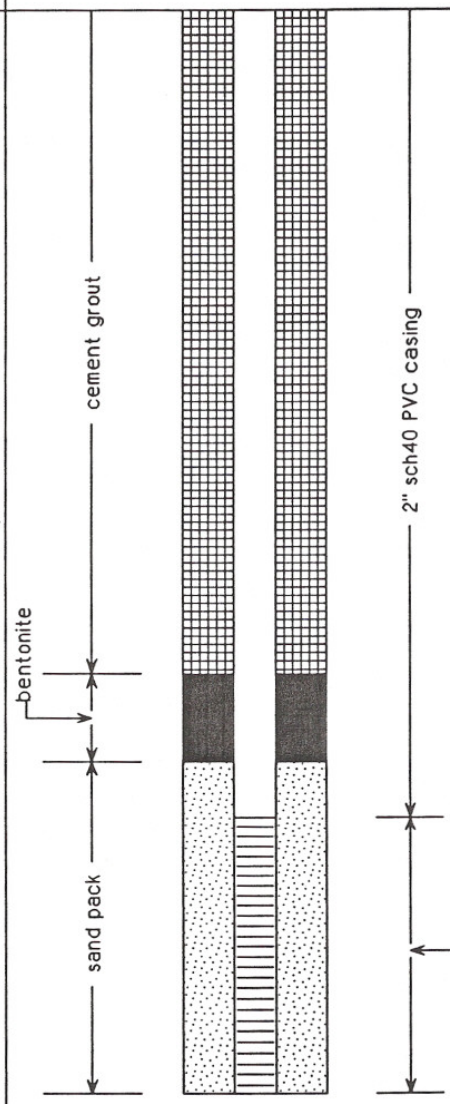
Project: Iredell Co. LF
Project No. G99087.0
e: 4.25"I.D HSA 8"O.D S.S

Drilling Contractor: Engineering Tectonics
Registration Number:

Surface Elevation: 852.06ft
Top of Casing: 855.11ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
	18		X	- Equal percent of Br. Y. sand laminated w/ Ol. G. silt, Micas., 5 relict fractures, 2 coarse white crystalline quartz fracture seams (1/4") @ 45.7' & 46.8', Saturated, few black spots.
49	38		X	- 2 relict fractures, relict gneissic structure 51.2'-51.5'. few black spots, Saturated.
54	50/4"		X	- Few gravel size qtz. fragments. 2" seam of white crystalline structure @ 55.5', few black spots, saturated.
59	18			
64				- Auger refusal @ 62.5' - 63'-70.5' REC=34.4% RQD=0% Gneiss 63'-64.6' layer of abundant white feldspar, Breaks parallel to foliations in the gneiss, foliations dipping 70 degrees.
69				- 70.5'-75' REC=72.2% RQD=24% Weathered gneiss w/ abundant foliations @ 74.3'-75.0'
74				- 75'-79.5' REC=57.4% RQD=0% - Weathered gneiss 75'-75.7'
79				- Highly weathered gneiss 75'-79.5' w/ near vertical fractures - 79.5'-83' REC=69% RQD=0% Slightly weathered fractured gneiss, some quartz feldspar, Micas., light greenish Gray.
84				End of Boring @ 83.00 feet

PIEZOMETER DIAGRAM



Completion Depth: 83.0 ft
DATE: 2/2/00

Depth to Water: 34.0 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: _____ Signature of Field Agent

LOG OF BORING: P-12D

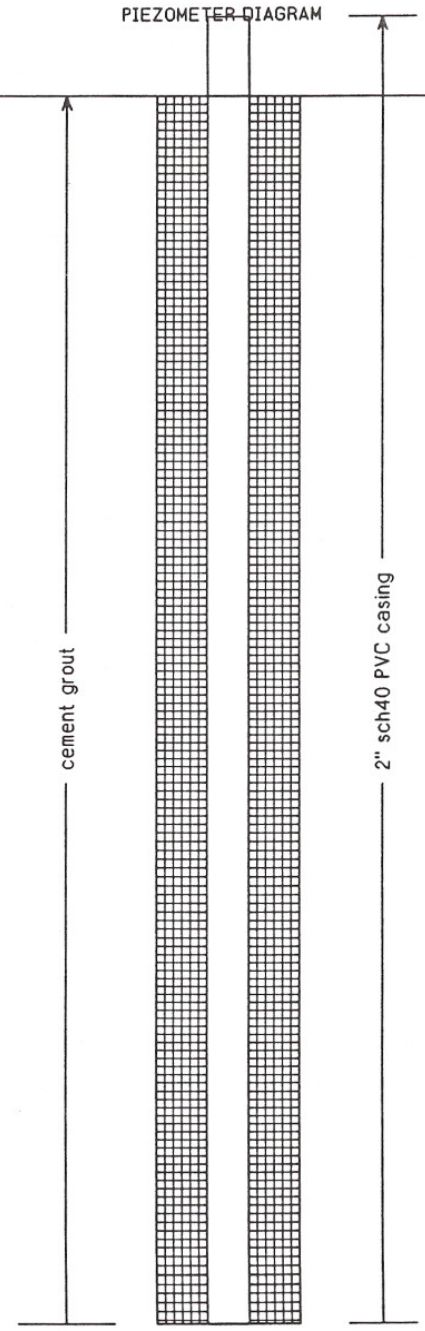
Project: Iredell Co. LF
Project No. G99087.0
: 4.25" I.D HSA 8"O.D ss

Drilling Contractor: Engineering Tectonics
Registration Number:

Surface Elevation: 809.39ft
Top of Casing: 812.37ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
	16			- Silty Clay (CL) Red, No relict fractures, Micas., Dry, Cohesive, stiff.
5	14			- 2 relict fractures
10	9			- Sandy Silt (ML) Brownish Yellow, 1 relict fracture, micas., very few black spots, gradesw/sand, dry.
15	10			- Yellowish Red, Sand/Silt laminated than sand @16.3' 1 gravel size qtz. seam 1"@16' few black spots, white crystalline weathered feldspar partings. micas., damp.
20	8			- No fractures, 3/4" Qtz. seam @ 21.1', white crystalline weathered feldspar partings, few black pockets, micas., saturated.
25	12			- Brownish Yellow, No fractures, 2" quartz seam. few black spots, white crystln. weathered feldspar partings. micas., saturated.
30	13			- Brownish Yellow sand laminated w/Ol. G. silt. saprolite, micas, very fine white crystalline weathered feldspar partings, saturated.
35	9			- Silt (ML) Olive Gray saprolite, Micas., no fractures, few black spots, fine weathered white crystalline feldspar partings, saturated.
40	16			- Sandy Silt (ML) Saprolite, Brownish Y. sand to 41' than Ol.G. silt to 41.3',micas.,m very fine white crstalline structure. no fractures. saturated.
45	22			-Weathered white crystlline feldspar partings,sand size quartz fragments saturated, gravel size quartz fragments.

PIEZOMETER DIAGRAM



Completion Depth: 83 ft
DATE: 2/3/00

Depth to Water: 20 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: _____ Signature of Field Agent

LOG OF BORING: P-12D

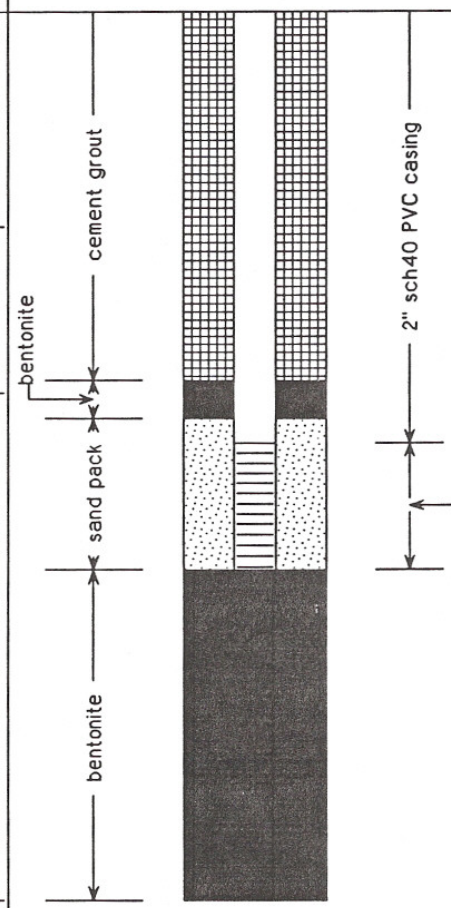
Project: Iredell Co. LF
Project No. G99087.0
: 4.25" I.D HSA 8"O.D ss

Drilling Contractor: Engineering Tectonics
Registration Number:

Surface Elevation: 809.39ft
Top of Casing: 812.37ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
	57			- Same as above but drilling harder from 50' to 55'.
53	50/4"			- Same as above but contains an 1/8" white quartz parting.
58				- Partially weathered gneiss, 37/8" drilled no sampling 56.5'-63.0'
63				- REC=62.8% RQD=0% Weathered gneiss.
				- Weathered gneiss to 66.1', Dark gray to Brown, feldspar, quartz, muscovite, hornblende w/ orthoclase feldspar.
68				- REC=99.5% RQD=49%
73				- Type same as above
				- 74.45'-75.42' partially annealed fracture 80-90 degrees.
78				- Foliation dip angle varies from near horizontal to 45 degrees on all of core #2
				- 78.1' fracture dipping @ 30 degrees.
				- REC=100% RQD=58%
83				- End of boring @ 83 feet.
88				- Couldn't ream deeper than 70' with tri-cone bit. Remaining core 70'-83' plugged w/bentonite & a 5' screen installed.
93				

PIEZOMETER DIAGRAM



Completion Depth: 83 ft
DATE: 2/3/00

Depth to Water: 20 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: _____ Signature of Field Agent

LOG OF BORING: P-14S

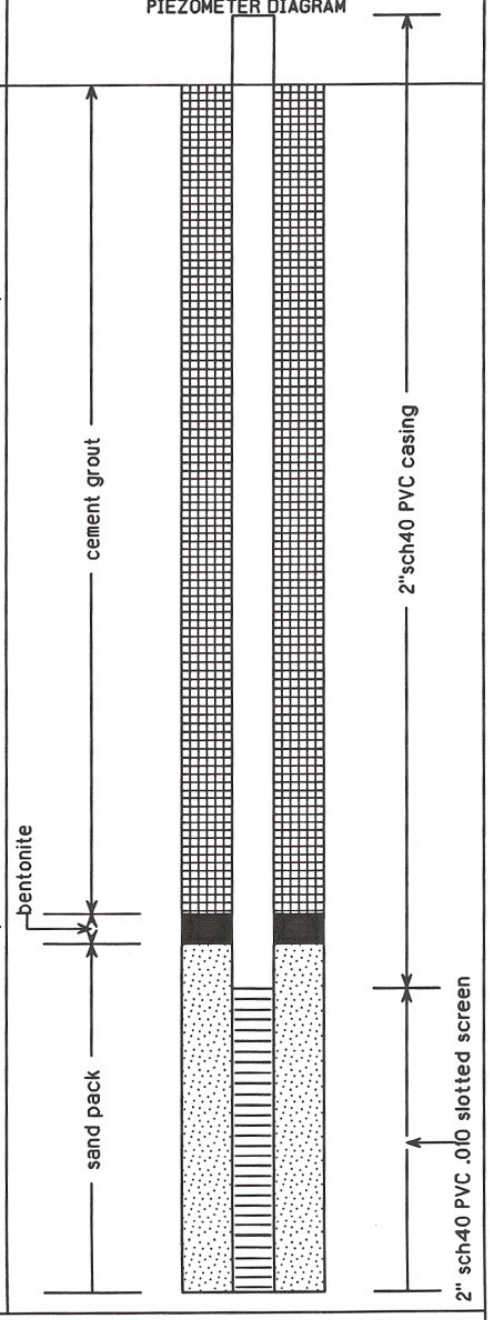
Project: Iredell Co. LF
Project No. G99087.0
Type: 4.25"I.D HSA 8"O.D ss

Drilling Contractor: Engineering Tectonics
Registration Number:

Surface Elevation: 829.39ft
Top of Casing: 831.66ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
	11			- Silty Clay (CL) Red, Micas., very cohesive, Dry.
5	14			- Cohesive but less than above, Dry.
	13			- Sandy Silt (ML) Yelowish Red, Micas., 2 relict fractures, some qtz. grains, 2.5" seam of orange, white, black grains & Qtz.
10	14			- 1 relict fracture, laminated silt & sand , few highly weathered black organic silt pockets. similiar to above.
15	18			- Pale red, purplish sheen, 3 black horiz. partings, 2 seams of relict crystal feldspar, few black organic silt pockets, micas, dry.
20	17			- Sandy Silt (ML) Y.R. w/ Pink, orange & white mottles, 2 Qtz. partings, 2 black horizontal partings, micas., relict banding w/ 3 relict fractures, dry.
25	13			- Saprolite, Olive gray & brownish yellow. No relict fractures, Moist, few black organic silt pockets, Gray is silt, yellow is more sandy, micas., relict white cystalline structure.
30	15			- Silt (ML) olive gray, white relict structure, few gravel size qtz. fragments. A 1' thick Qtz. seam @ 31.3', micas., moist.
35	22			- Olive gray w/ brownish yellow. 3" soft white feldspar seam @ 36', 2" Qtz. seam @35.5'. Few gravel size Qtz. fragments, Micas, moist
40	45			

PIEZOMETER DIAGRAM



Completion Depth: 45.0 ft
DATE: 1/24/00

Depth to Water: 33 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: _____ Signature of Field Agent

LOG OF BORING: P-14S

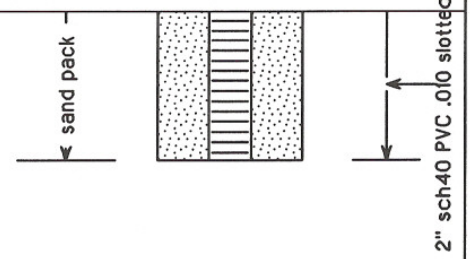
Project: Iredell Co. LF
Project No. G99087.0
Type: 4.25"I.D HSA 8"O.D ss

Drilling Contractor: Engineering Tectonics
Registration Number:

Surface Elevation: 829.39ft
Top of Casing: 831.66ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
			X	- 3 relict fractures, 2 gravel size qtz. fragments, few highly weathered org. silt pockets, micas., saturated.
45	50/3"		X	- White relict crystal structure, micas., saturated.
				End of boring @ 45.00 feet
50				
55				
60				
65				
70				
75				
80				

PIEZOMETER DIAGRAM



Completion Depth: 45.0 ft
DATE: 1/24/00

Depth to Water: 33 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: _____ Signature of Field Agent

LOG OF BORING: P-17S

Iredell County Landfill, Phase 3 - Statesville, North Carolina **Project No. G99087.6**

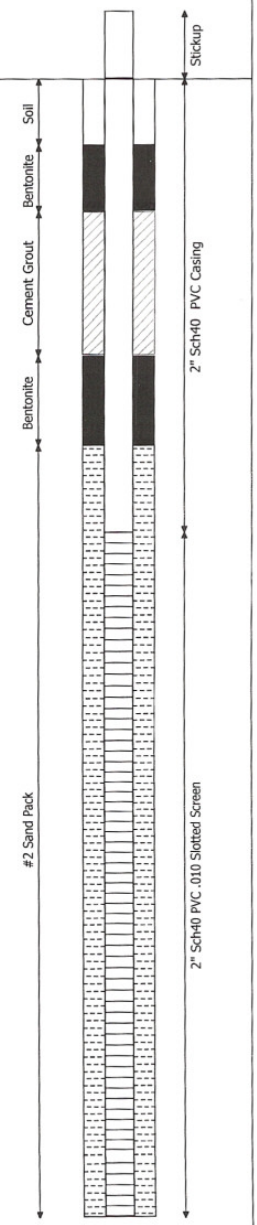
Drilling contractor: Geologic Explorations
Drill rig & method: 8.5" O.D. HSA SS
Logged by: C. (Nathan) Nallainathan

Date started: 5/29/2000
Date ended: 5/29/2000
Completion depth: 25.0 ft
Stickup height: 3.26 ft

Surface elevation: 803.55 ft (MSL)
Top of pipe elevation: 806.81 ft (MSL)
Depth to water (TOB): 13.00 ft
Depth to water (24hrs): 13.60 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
5				HSA without sampling (see P-17D for soil classifications)
10				- Water encountered while drilling at 13 feet.
15				
20				
25				Boring terminated at 25.0 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*

Page 1 of 1

LOG OF BORING: P-17D

Iredell County Landfill, Phase 3 - Statesville, North Carolina

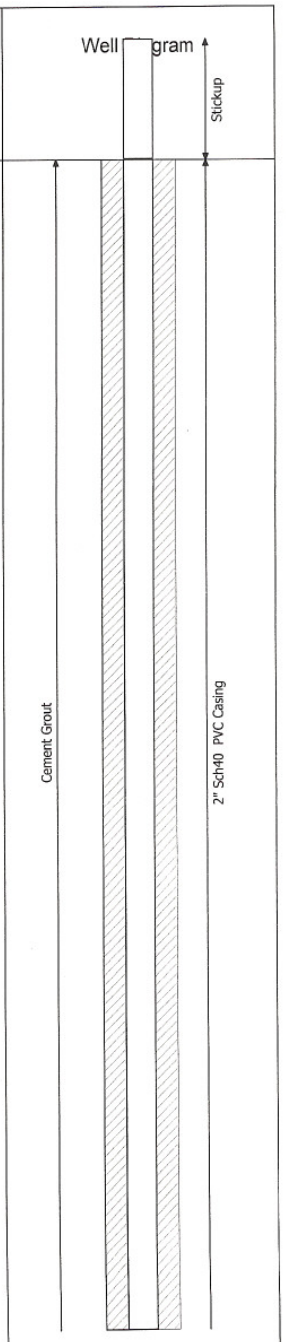
Project No. G99087.6

Drilling contractor: Geologic Explorations
Drill rig & method: 6" O.D. DTH & UD
Logged by: C. (Nathan) Nallainathan

Date started: 6/6/2000
Date ended: 6/22/2000
Completion depth: 71.0 ft
Stickup height: 3.94 ft

Surface elevation: 804.73 ft (MSL)
Top of pipe elevation: 808.67 ft (MSL)
Depth to water (TOB): 13.00 ft
Depth to water (24hrs): 14.06 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	16			SILTY CLAY; Reddish brown w/some mica and sand. Trace amount of quartz fragments. Moist to wet.
	11			- Tannish red silty clay to clayey silt, micaceous w/some sand and quartz fragments.
5				
	9			CLAYEY SILT; Tannish brown clayey silt to clayey sand, micaceous w/quartz fagments. Moist.
				CLAYEY SAND; Brownish red to tan, w/some trace wood fragments. Wet.
10				
				- Water first observed at 13 feet.
				- UD Shelby tube extracted.
15	7			SILT; Gray, black, and tan, micacesous w/some sand and quartz/feldspar fragments. Wet.
20	12			SANDY SILT; Grayish black to brown, micaceous, quartz and feldspar fragments. Iron staining present. Wet.
25				
30	9			SILT; Grayish green to yellowish black layered at an angle. Saprolite. Wet.
35				
				- Hard layer encountered.
40				



Municipal Engineering Services Company, P.A.
Operation/Construction Managers Civil/Sanitary Engineers Environmental Studies
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Page 1 of 2

LOG OF BORING: P-17D

Iredell County Landfill, Phase 3 - Statesville, North Carolina

Project No. G99087.6

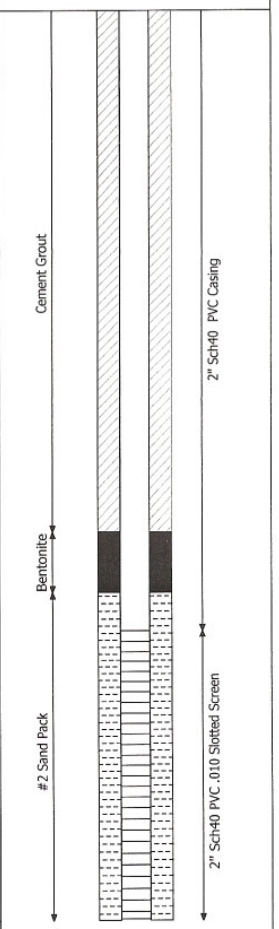
Drilling contractor: Geologic Explorations
Drill rig & method: 6" O.D. DTH & UD
Logged by: C. (Nathan) Nallainathan

Date started: 6/6/2000
Date ended: 6/22/2000
Completion depth: 71.0 ft
Stickup height: 3.94 ft

Surface elevation: 804.73 ft (MSL)
Top of pipe elevation: 808.67 ft (MSL)
Depth to water (TOB): 13.00 ft
Depth to water (24hrs): 14.06 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	50/3"			- No sample recovered.
				- Auger refusal at 43 feet.
45				
50				GNEISS; REC=70%, RQD=37%. Blackish brown, biotite, quartz, coarse grained, mineralogical dip 15 degrees (51'-54').
55				- REC=77%, RQD=8%. Greenish gray, fine grained, muscovite, quartz.
60				- REC=100%, RQD=22%. Same as above, interbedded, most fractures follow bedding, a few at 30 and 60 degrees.
65				- REC=100%, RQD=33%. Greenish gray, coarse grained, muscovite, quartz, thick quartz layers, fractures nearly vertical.
70				Boring terminated at 71.0 feet
75				
80				

Well Diagram



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Page 2 of 2

LOG OF BORING: P-20D

Iredell County Landfill, Phase 3 - Statesville, North Carolina **Project No. G99087.6**

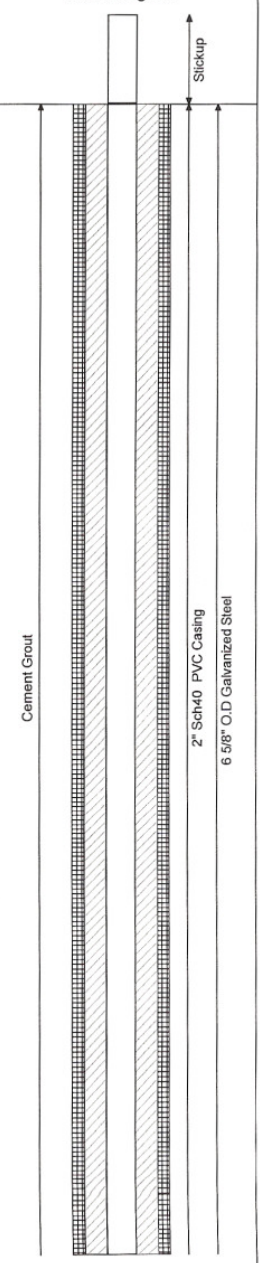
Drilling contractor: Geologic Explorations
Drill rig & method: 8" O.D. HSA, 6" O.D DTH & UD
Logged by: C. (Nathan) Nallainathan

Date started: 6/6/2000
Date ended: 6/28/2000
Completion depth: 88.0 ft
Stickup height: 3.35 ft

Surface elevation: 844.09 ft (MSL)
Top of pipe elevation: 847.44 ft (MSL)
Depth to water (TOB): 40.00 ft
Depth to water (24hrs): 38.99 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
5				8" O.D. HSA without sampling to 40 feet (see P-20S for soil descriptions.)
10				
15				
20				
25				
30				
35				
40				- Water encountered while drilling at 40 feet. - Shelby tube (UD) sample obtained from 40' to 42'.
45				

Well Diagram



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Page 1 of 2

LOG OF BORING: P-20D

Iredell County Landfill, Phase 3 - Statesville, North Carolina **Project No. G99087.6**

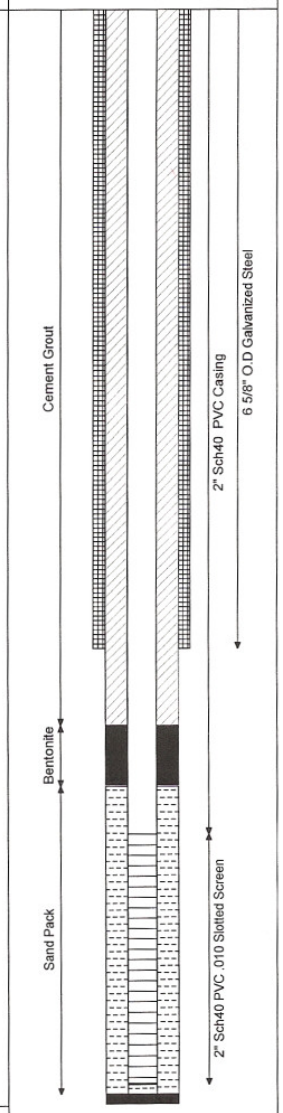
Drilling contractor: Geologic Explorations
Drill rig & method: 8" O.D. HSA, 6" O.D DTH & UD
Logged by: C. (Nathan) Nallainathan

Date started: 6/6/2000
Date ended: 6/28/2000
Completion depth: 88.0 ft
Stickup height: 3.35 ft

Surface elevation: 844.09 ft (MSL)
Top of pipe elevation: 847.44 ft (MSL)
Depth to water (TOB): 40.00 ft
Depth to water (24hrs): 38.99 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
50				
55				
60	7		☒	SILT; Tannish orange, micaceous, nearly horizontal layers w/quartz and feldspar fragments and black stain. Wet.
65				
70				- Auger refusal at 70 feet. Quartz and partially weathered rock fragments.
				GNEISS; REC=27%, RQD=0%. Greenish gray, biotite, quartz, orthoclase feldspathic, highly weathered and fractured. Iron staining on fractures.
75				- REC=61%, RQD=0%. Same as above. Mineralogical layering near horizontal, fractures nearly horizontal parallel to layering.
80				- REC=100%, RQD=0%. Same as above.
				- REC=100%, RQD=0%. Same as above.
85				
				Boring terminated at 88.0 feet
90				

Well Diagram



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Operation/Construction Managers Civil/Sanitary Engineers Environmental Studies
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Page 2 of 2

LOG OF BORING: P-20S

Iredell County Landfill, Phase 3 - Statesville, North Carolina **Project No. G99087.6**

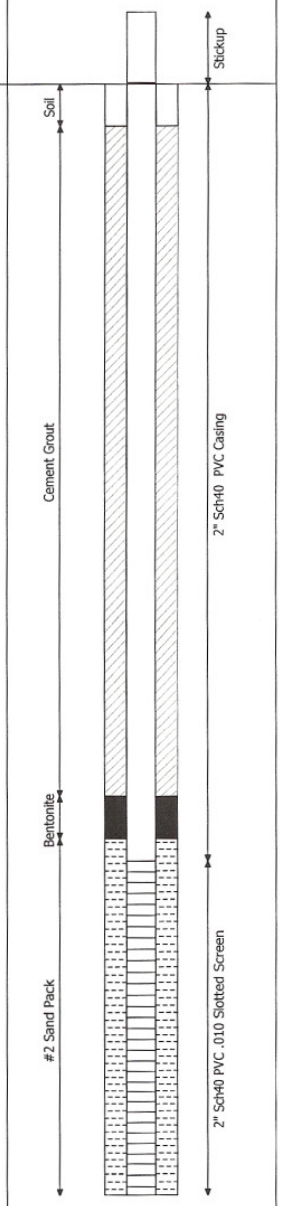
Drilling contractor: Geologic Explorations
Drill rig & method: 8.5" O.D. HSA SS
Logged by: C. (Nathan) Nallainathan

Date started: 6/1/2000
Date ended: 6/1/2000
Completion depth: 50.0 ft
Stickup height: 3.33 ft

Surface elevation: 843.82 ft (MSL)
Top of pipe elevation: 847.15 ft (MSL)
Depth to water (TOB): 40.00 ft
Depth to water (24hrs): 39.25 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	21		X	CLAYEY SILT; Reddish brown and tan w/mica and trace amounts of sand and quartz fragments. Dry to moist.
5	15		X	- Same as above.
10	16		X	- Same as above except for more quartz fragments, . SILT; Orangish tan, layered micaceous silt, black stains/streaks present, saprolite, moist.
15	13		X	- Orangish tan w/mica and quartz fragments. Saprolite. Moist.
20	12		X	- Same as above.
25	18		X	- Same as above w/some sand.
30	14		X	CLAYEY SILT; Orangish brown, micaceous, moist. - Whitish tan, micaceous silt w/sand. Quartz/feldspar fragments. Saprolite.
35	13		X	- SILT; tannish, orangish, grayish to brownish, micaceous, quartz/feldspar fragments, cool and moist. Saprolite.
40	7		X	- Grayish tan, micaceous, moist to wet.
45	13		X	- Orangish, brownish, tannish gray, micaceous. - Numerous quartz/feldspar fragments.
50	6		X	- Orangish tan and grayish tan, micaceous, some quartz/feldspar fragments. Wet.
				Boring terminated at 50.0 feet

Well Diagram



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LOG OF BORING: P-21S

Iredell County Landfill, Phase 3 - Statesville, North Carolina **Project No. G99087.6**

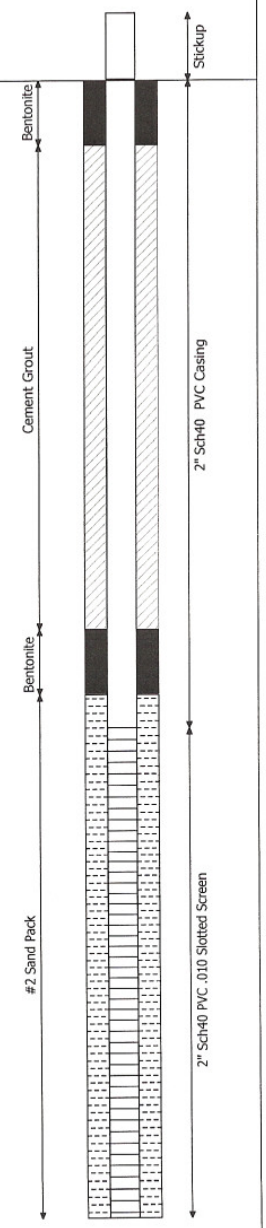
Drilling contractor: Geologic Explorations
Drill rig & method: 8.5" O.D HSA
Logged by: C. (Nathan) Nallainathan

Date started: 6/2/2000
Date ended: 6/2/2000
Completion depth: 35.0 ft
Stickup height: 3.30 ft

Surface elevation: 819.88 ft (MSL)
Top of pipe elevation: 823.18 ft (MSL)
Depth to water (TOB): 25.00 ft
Depth to water (24hrs): 22.40 ft

Depth (ft)	SPT (bpf)	Description of Material & Remarks
	15	SILTY CLAY; Reddish brown, micaceous, moist.
	15	- Reddish Brown and tan, micaceous, moist.
5		
	17	- Same as above.
		- Tannish white silt w/mica and some sand. Moist.
10		SANDY SILT; whitish orangish red sandy silt w/mica and quartz fragments. Moist.
15	12	SILT; Tannish white w/sand, micaceous, and quartz fragments, moist.
20	9	- Tannish white w/sand, micaceous, quartz fragments, moist.
		- Numerous quartz/feldspar fragments and black stains.
25	7	- Orangish tan to black, some quartz/feldspar fragments, micaceous, wet.
30	49	CLAYEY SILT; Reddish brown to tan w/quarts and mica fragments.
		- Grayish white silt w/sand, micaceous. Fragments of partially weathered rock present. Wet.
	50/6"	SANDY SILT; Orangish brown to grayish white, micaceous, w/numerous quarts fragments and partially weathered rock fragments.
35		Boring terminated at 35.0 feet

Well Diagram



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Page 1 of 1

LOG OF BORING: P-21D

Iredell County Landfill, Phase 3 - Statesville, North Carolina **Project No. G99087.6**

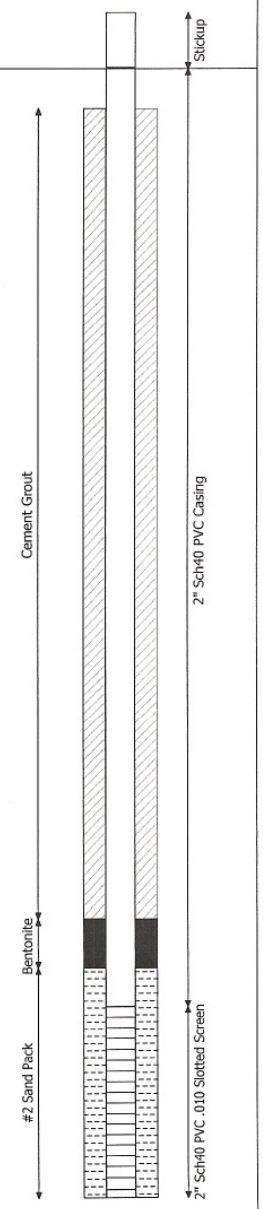
Drilling contractor: Geologic Explorations
Drill rig & method: 8.5" O.D. HSA; 6" DTH & UD
Logged by: J. Pfohl

Date started: 6/26/2000
Date ended: 6/30/2000
Completion depth: 58.0 ft
Stickup height: 2.90 ft

Surface elevation: 819.88 ft (MSL)
Top of pipe elevation: 822.78 ft (MSL)
Depth to water (TOB): 25.00 ft
Depth to water (24hrs):

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
5				
10				8" O.D HSA without sampling from 0' to 35' (see P-21S for soil descriptions).
15				
20				
25				
30				
35				- No Sampling.
				GNEISS; REC=97%, RQD=78%. Greenish gray, biotite, quartz, fine grained, mineralogical layering at dip of 30 to 15 degrees, traces of orthoclase feldspar layers, fractures following layering at 15 to 30 degrees.
40				- REC=100%, RQD= 65%. Same as above.
45				- REC=98%, RQD=65%. Same as above.
50				- 45 and 60 degree fractures cutting across layering at right angles to each other.
55				- REC= 97%, RQD=87%. Same as above. - Fractures following layering at 15 degrees.
				Boring terminated at 58.0 feet
60				

Well Diagram



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Page 1 of 1

LOG OF BORING: P-7

(Converted to MW-17)

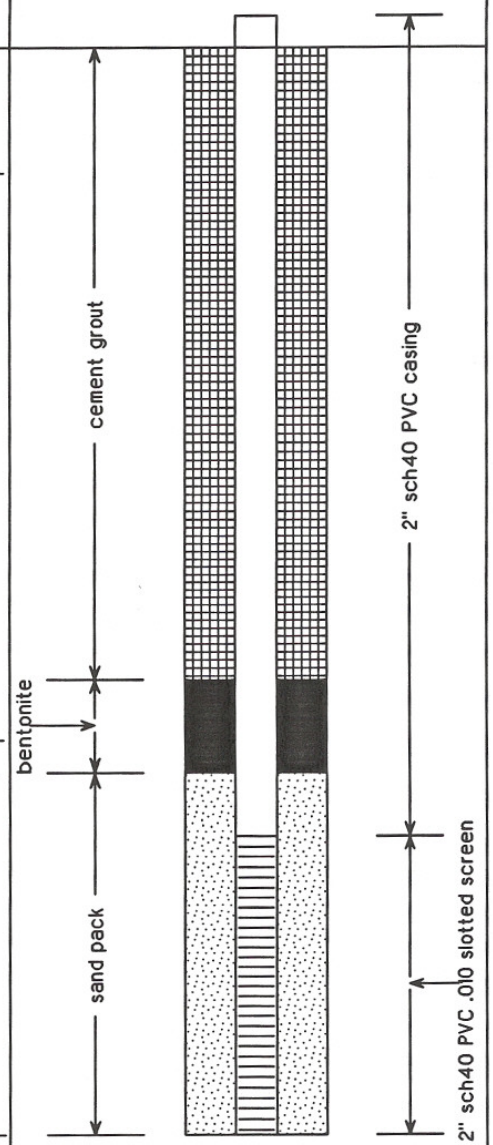
Project: Iredell Campbell Property
Project No. G98111.0
Type: HSA SS

Drilling Contractor: Engineering Tectonics
Registration Number: 835

Surface Elevation: 850.81ft
Top of Casing: 853.26ft

DEPTH (ft)	BLOWS PER FOOT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL
	15		X	SILTY CLAY (CL); red, firm, dry, root debris
5	14		X	SILT (ML); purple to pink, relict folication, micaceous
10	15		X	-relict fractures and veins, trace quartz fragments
15	16		X	-grades white to pink, relict fractures with iron staining
20	16		X	-grades with sand, relict structure, iron mineralization
25	18		X	SANDY SILT (ML); pink to white, relict structure and fractures, trace quartz fragments, damp
30	15		X	-grades with more quartz fragments
35	16		X	-relict fracture near vertical with iron staining, wet
40				End of Boring at 36.0 feet

PIEZOMETER DIAGRAM



Completion Depth: 36 ft
DATE: 11/5/98

Depth to Water: 30.32 ft WD

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

I acknowledge that this record is true to the best of my knowledge: _____ Signature of Field Agent

JUL-23-2002 08:55 GEOLOGIC EXPLORATION 704 872 0248 P.03/09

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) DANNY SUMMERS CERTIFICATION # 2579

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION, INC. PHONE # (704) 872-7686

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: STATESVILLE County IREDELL
TWIN OAKS 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
_____
(degrees/minutes/seconds)
Latitude/longitude source: ☐ GPS ☐ Topographic map
(check box)

3. OWNER: IREDELL CO. SOLID WASTE FACILITY
Address 354 TWIN OAKS RD.
(Street or Route No.)
STATESVILLE NC 28625
City or Town State Zip Code
( )
Area Code – Phone Number

4. DATE DRILLED 5-9-02
5. TOTAL DEPTH: 20.0 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: _____ FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.71 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 N/A
10. WATER ZONES (depth): N/A
11. DISINFECTION: Type N/A Amount _____

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	20.0	TAN/GREY SILT

12. CASING:

	Depth			Diameter	Wall Thickness or Weight/Ft.	Material
From 0.0	To 5.0	Ft		2 INCH	SCH 40	PVC
From	To	Ft.				
From	To	Ft.				

13. Grout:

	Depth			Material	Method
From 0.0	To 2.0	Ft.		Portland Bentonite	Slurry
From	To	Ft.			

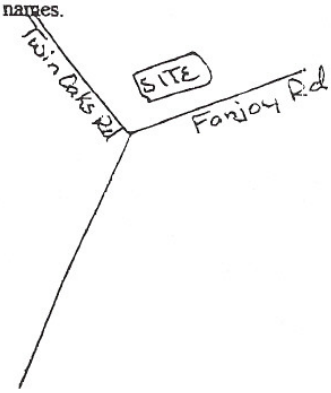
14. SCREEN:

	Depth			Diameter		Slot Size		Material
From 5.0	To 20.0	Ft.		2.0	in.	.010	in	PVC
From	To	Ft.			in.		in	

15. SAND/GRAVEL PACK:

	Depth			Size	Material
From 4.0	To 20.0	Ft.		20-40	FINE SILICA SAND
From	To	Ft.			

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: MW-18 BENTONITE SEAL FROM 2.0 TO 4.0 FEET

I DO HEARBY 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

David R Summers 5/28/02
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

(Converted to MW-19S)

LOG OF BORING: P-16S

Iredell County Landfill, Phase 3 - Statesville, North Carolina

Project No. G99087.6

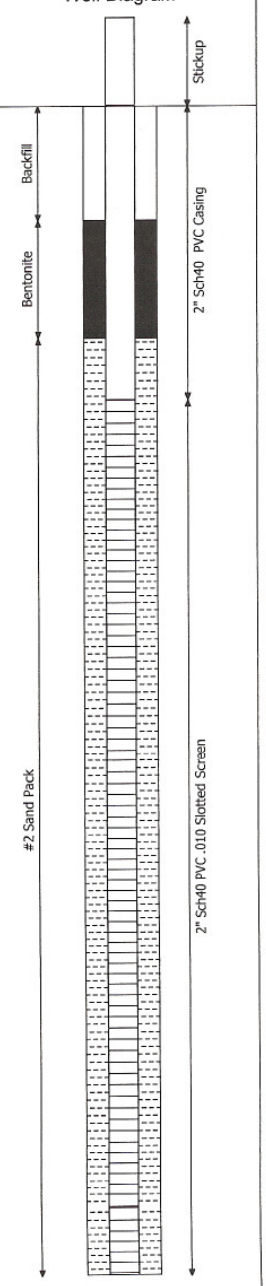
Drilling contractor: Geologic Explorations
Drill rig & method: 8.5" O.D HSA
Logged by: C. (Nathan) Nallainathan

Date started: 5/30/2000
Date ended: 5/30/2000
Completion depth: 20.0 ft
Stickup height: 2.65 ft

Surface elevation: 791.34 ft (MSL)
Top of pipe elevation: 793.99 ft (MSL)
Depth to water (TOB): 3.00 ft
Depth to water (24hrs): 3.40 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	5			CLAYEY SILT; Olive Gray to Brown. Moist.
				SILTY SAND; Grayish brown silt (tip of spoon wet).
				- First indication of water.
	8			CLAYEY SAND; Grayish brown w/quartz fragments (sample wet to saturated).
5				
	17			SANDY SILT; Olive gray to white w/quartz fragments. Saprolite. Wet.
10				
				- 13 ft. hard drilling begins.
15	20			- Black, gray, white, tan, horizontally layered. Micaceous w/quartz and feldspar fragments. Saprolite. Moist.
	24			- Same as above.
20				Boring terminated at 20.0 feet

Well Diagram



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JUL-23-2002 13:31 GEOLOGIC EXPLORATION 704 872 0248 P.07/07

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) DANNY SUMMERS CERTIFICATION # 2579

WELL CONTRACTOR COMPANY NAME Geologic Exploration, Inc. PHONE # (704) 872-7686

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: STATESVILLE County IREDELL
TWIN OAKS 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
_____
(degrees/minutes/seconds)
Latitude/longitude source: ☐ GPS ☐ Topographic map
(check box)

3. OWNER: IREDELL CO. SOLID WASTE FACILITY
Address 354 TWIN OAKS RD.
(Street or Route No.)
STATESVILLE NC 28625
City or Town State Zip Code
( )
Area Code – Phone Number

4. DATE DRILLED 5-09-02
5. TOTAL DEPTH: 59.0 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: _____ FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2.8 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 N/A
10. WATER ZONES (depth): N/A
11. DISINFECTION: Type N/A Amount _____

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0.0	38.0	Tan/Grey Silt
38.0	47.0	Grey Clay with Gravel
47.0	59.0	Rock

12. CASING:

	Depth From	To	Ft	Diameter	Wall Thickness or Weight/Ft.	Material
	0.0	49.0	Ft	2 INCH	SCH 40	PVC
			Ft.			
			Ft.			

13. Grout:

	Depth From	To	Ft.	Material	Method
	0.0	46.0	Ft.	Portland Bentonite	Slurry
			Ft.		

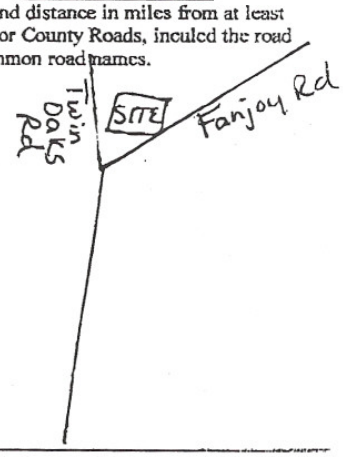
14. SCREEN:

	Depth From	To	Ft.	Diameter	in.	Slot Size	in	Material
	49.0	59.0	Ft.	2.0	in.	.010	in	PVC
			Ft.		in.		in	

15. SAND/GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	48.0	59.0	Ft.	20-40	FINE SILICA SAND
			Ft.		

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: MW-19D BENTONITE SEAL FROM 46.0 TO 48.0 FEET

I DO HEARBY 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

David R Summers 7/23/02
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

TOTAL P.07

JUL-23-2002 13:29 GEOLOGIC EXPLORATION 704 872 0248 P.03/07

WELL CONSTRUCTION RECORD

North Carolina – Department of Environmental and Natural Resources – Division of Water Quality – Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) DANNY SUMMERS CERTIFICATION # 2579

WELL CONTRACTOR COMPANY NAME GEOLOGIC EXPLORATION, INC. PHONE # (704) 872-7686

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: STATESVILLE County IREDELL
TWIN OAKS 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
_____
(degrees/minutes/seconds)
Latitude/longitude source: ☐ GPS ☐ Topographic map
(check box)

3. OWNER: IREDELL CO. SOLID WASTE FACILITY
Address 354 TWIN OAKS RD.
(Street or Route No.)
STATESVILLE NC 28625
City or Town State Zip Code
( )
Area Code – Phone Number

4. DATE DRILLED 5-9-02
5. TOTAL DEPTH: 20.0 FEET
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: _____ FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 1.85 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 N/A
10. WATER ZONES (depth): N/A
11. DISINFECTION: Type N/A Amount _____

DEPTH From	To	DRILLING LOG Formation Description
0.0	20.0	TAN/GREY SILT

12. CASING:

	Depth			Diameter	Wall Thickness or Weight/Ft.	Material
From 0.0	To 5.0	Ft		2 INCH	SCH 40	PVC
From	To	Ft.				
From	To	Ft.				

13. Grout:

	Depth			Material	Method
From 0.0	To 2.0	Ft.		Portland Bentonite	Slurry
From	To	Ft.			

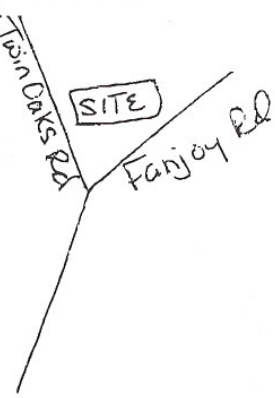
14. SCREEN:

	Depth			Diameter	Slot Size	Material
From 5.0	To 20.0	Ft.		2.0 in.	.010 in	PVC
From	To	Ft.		in.	in	

15. SAND/GRAVEL PACK:

	Depth			Size	Material
From 4.0	To 20.0	Ft.		20-40	FINE SILICA SAND
From	To	Ft.			

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads, inculed the road numbers and common road names.



16. REMARKS: MW-20 BENTONITE SEAL FROM 2.0 TO 4.0 FEET

I DO HEARBY 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

Danny R Summers 5/28/02
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

(Converted to MW-21S)

LOG OF BORING: P-15S

Iredell County Landfill, Phase 3 - Statesville, North Carolina **Project No. G99087.6**

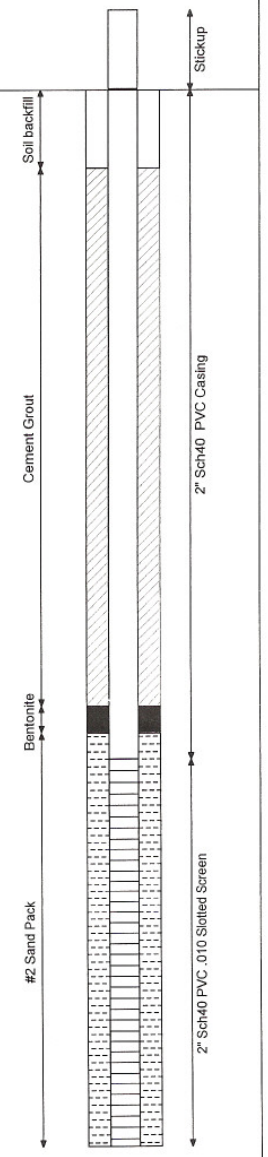
Drilling contractor: Geologic Explorations
Drill rig & method: 8.5" O.D HSA
Logged by: C. (Nathan) Nallainathan

Date started: 6/2/2000
Date ended: 6/2/2000
Completion depth: 41.0 ft
Stickup height: 2.94 ft

Surface elevation: 821.03 ft (MSL)
Top of pipe elevation: 823.97 ft (MSL)
Depth to water (TOB): 30.50 ft
Depth to water (24hrs): 30.70 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	36		X	CLAYEY SILT; Reddish Brown, micaceous w/quartz fragments. Dry to moist.
	26		X	SILT; Orangish brownish tan, micaceous w/sand and quartz fragments. Saprolite. Dry to moist.
5				
	14		X	- Same as above.
10				
	18		X	- Olive gray to tan, micaceous. Saprolite. Moist.
15				
	18		X	- Same as above w/horizontal layering.
20				
	26		X	- Same as above.
25				
	21		X	- Same as above w/quartz fragments. Wet at end of sample.
30				
	12		X	- Same as above. Some partially weathered rock fragments. Wet.
35				
	8		X	- Same as above.
40				
				Boring terminated at 41.0 feet
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*

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(Converted to MW-21D)

LOG OF BORING: P-15D

Iredell County Landfill, Phase 3 - Statesville, North Carolina **Project No. G99087.6**

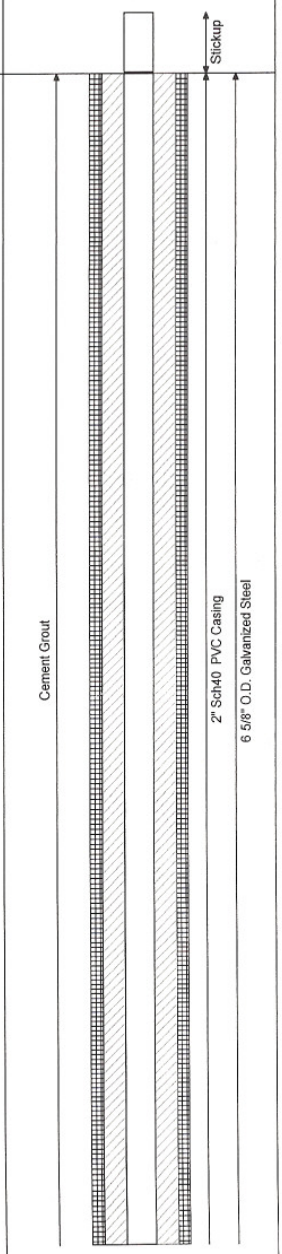
Drilling contractor: Geologic Explorations
Drill rig & method: 8" HSA, 6" O.D DTH & UD
Logged by: C. (Nathan) Nallainathan

Date started: 6/6/2000
Date ended: 6/28/2000
Completion depth: 138.3 ft
Stickup height: 3.51 ft

Surface elevation: 819.25 ft (MSL)
Top of pipe elevation: 822.76 ft (MSL)
Depth to water (TOB): 30.00 ft
Depth to water (24hrs): 28.29 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
5				
10				- 8" O.D HSA without sampling from 0' to 50' (see P-15S for soil descriptions).
15				
20				
25				
30				- Water encountered at 30' while drilling.
35				
40				
45				
				- Harder drilling began at 48'.
50	16			SILT; Brownish orange w/some feldspar and trace amounts of sand, micaceous. Layered at a 45 degree angle. Trace amounts of partially weathered rock fragments. Wet.
55				
60	34			- Gray and white, micaceous w/some feldspar and trace amounts of sand. Layered at a 45 degree angle. Wet.
65				
70				

Well Diagram



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(Converted to MW-21D)

LOG OF BORING: P-15D

Iredell County Landfill, Phase 3 - Statesville, North Carolina **Project No. G99087.6**

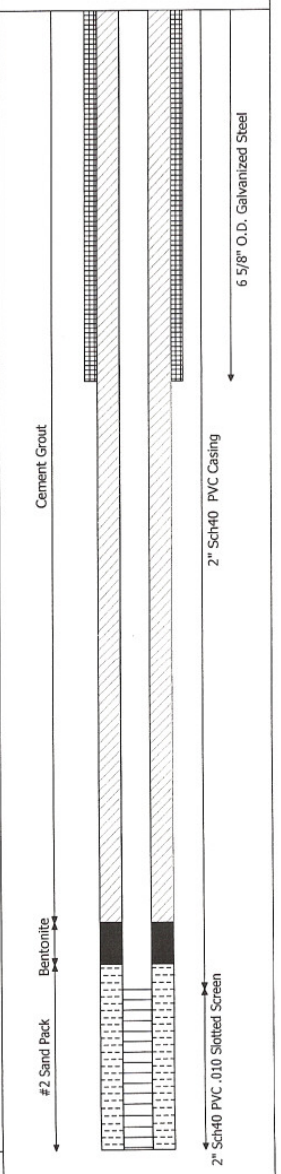
Drilling contractor: Geologic Explorations
Drill rig & method: 8" HSA, 6" O.D DTH & UD
Logged by: C. (Nathan) Nallainathan

Date started: 6/6/2000
Date ended: 6/28/2000
Completion depth: 138.3 ft
Stickup height: 3.51 ft

Surface elevation: 819.25 ft (MSL)
Top of pipe elevation: 822.76 ft (MSL)
Depth to water (TOB): 30.00 ft
Depth to water (24hrs): 28.29 ft

Depth (ft)	SPT (bpf)	Soil Type Symbol	Sample	Description of Material & Remarks
	40			Gray, dark green to white, micaceous w/sand and some quartz fragments. Near-horizontally layered. Wet.
75				
80	46			- No recovery (only washings and cuttings).
85				
90	42			SILTY SAND; Olive Gray, micaceous (drilling extremely hard).
95				PARTIALLY WEATHERED ROCK; REC=0%, RQD=0%. No recovery in core barrel believed to be washed away.
100				
105	50/1"			Gneissic in texture. Blackish gray to white, flaky.
110				
115				- Tricone roller bit refusal.
				GNEISS; REC=61%, RQD=0%. Light brownish black, biotite, quartz, medium to coarse grains. Mineralogical layering 10 to 15 degrees. Fractures parallel to layering. Trace amounts of orthoclase feldspar.
120				- REC=98%, RQD=0%. Same as above.
				- REC=83%, RQD=8%. Same as above.
125				
				- REC=58%, RQD=0%. Same as above.
130				
				- REC=86%, RQD=0%. Same as above.
135				
140				Boring terminated at 138.3 feet

Well Diagram



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