URS

HYDROGEOLOGIC INVESTIGATION

CHESAPEAKE ENERGY CENTER
CHESAPEAKE, VIRGINIA

PREPARED BY:

URS Corporation
5540 Falmouth Street, Suite 201
Richmond, Virginia 23230

URS Job No. 49498-001-155

September 21, 2001

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HYRDOGEOLOGIC INVESTIGATION

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1.0 BACKGROUND AND OBJECTIVES

URS Corporation (URS) was retained by Dominion to provide engineering support services, groundwater modeling, and a risk assessment for an approximate 200-acre parcel (the Site) located in Chesapeake, Virginia. Fly ash will be used as fill material for construction of a golf course at the Site. As part of a feasibility study for the proposed use of fly ash, it was determined that an evaluation of the potential impact of fly ash on groundwater at the proposed Site was necessary. To complete the evaluation, a hydrogeologic study was conducted concurrently with an evaluation of the stabilization requirements of the ash, groundwater modeling, and risk assessment. This report provides the results of the hydrogeologic investigation.

Specifically, the objectives of the investigation were to evaluate hydrogeologic conditions and existing groundwater quality at the Site through:

- A preliminary evaluation of potential receptors;
- An evaluation of current soil and groundwater chemical conditions;
- Collection of site specific physical data; and,
- A preliminary analysis of groundwater flow conditions/aquifer characteristics.

2.0 SITE LOCATION AND DESCRIPTION

The Site is an approximate 200-acre parcel located at the southwest corner of the intersection of Centerville Turnpike and Whittamore Road in Chesapeake, Virginia (Figure 1). The Site is located within the city limits of Chesapeake, Virginia in an area transitioning from rural agricultural and residential to suburban residential. Current land use within 2,000 feet of the facility is residential and agricultural. Reportedly, the Site has historically been used for agricultural purposes.

The Site is bounded on the north by Whittamore Road and agricultural fields, on the south by residential properties, on the west by Centerville Turnpike and residential properties, and on the east by undeveloped, wooded property and residential properties. Water supply wells are not present on the Site; however, the surrounding properties utilize private water supply wells for domestic potable use. Additional information regarding these water supply wells is presented in Section 4.0. Based on knowledge of the area and inquiries with the City of Chesapeake Public Utilities office, public water supply is not currently available to the Site. Public water is available to a subdivision located west of the Site, and a water main is located between 300 to 1,000 feet south of the Site along Centerville Turnpike.

The Site is represented on the Fentress, Virginia 7.5-minute USGS topographic quadrangle at an approximate elevation of 10 to 15 feet (ft) above mean sea level (MSL). The Site slopes in an easterly direction and east-west trending drainage swales are located across the Site. Based on a review of the USGS topographic map, the swales appear to drain to a tributary to the Pocaty River, which is located approximately 3.25 miles east of the Site. The Pocaty River flows eastward into North Landing River, which flows south and discharges into Currituck Sound in North Carolina approximately 15 miles southeast of the Site.

3.0 GEOLOGY AND HYDROGEOLOGY

The Site is located within the Coastal Plain Physiographic Province of Virginia, in an area of "unconsolidated sediments consisting primarily of sand, clay, silt, and gravel with variable amounts of shell material" (Hamilton and Larson, 1988). Sediments range in age from early Cretaceous to Quaternary. Within the Site vicinity, an unconfined and six confined aquifers and six confining units are documented (Meng and Harsh, 1988, McFarland, 1999) as shown in the generalized hydrogeologic section in Figure 2. The total thickness of the sediment (aquifers and confining units) is estimated to exceed 3,000 feet in the Chesapeake area. The lithologic units are discussed from the deepest to the shallowest unit in this section.

Bedrock generally consists of gently eastward-dipping erosional surfaced crystalline rocks. This surface slopes eastward from the surface along the north-south trending "Fall Line", 80 miles west of the Site. The Fall Line passes through Richmond, Virginia. The crystalline rock surface has a slope of 50 to 100 feet per mile immediately east of the Fall Line. The slope of the rock surface ultimately decreases to approximately 40 feet per mile. The Fall Line marks the maximum westernmost extent of the unconsolidated units overlying the bedrock and is the primary recharge area for all but the Yorktown-Eastover and Columbia aquifers.

The Potomac Formation consists of three aquifers and confining units and directly overlies the bedrock. These aquifers are termed the Lower, and Middle Potomac, and the Brightseat-Upper Potomac aquifers. As with the other regional aquifers, the Potomac is thinnest along its western limit near the Fall Line and thickens seaward. They reach a total thickness of approximately 1,500 feet in the study area. The aquifers generally consist of interbedded sequences of medium to very coarse-grained sand, clayey sand, and clay with interbedded gravel. The confining units, like the aquifers, thicken seaward. These three aquifers are the most productive in the region with typical yields of 100 to

800 gallons per minute (gpm) in the Lower, 20 to 160 gpm in the Middle, and 20 to 400 gpm in the Brightseat-Upper Potomac aquifers.

The Aquia aquifer overlies the Brightseat-Upper Potomac along a 40 to 60-mile band between the Fall Line and the Site and is absent east of the Site. The Aquia aquifer is 65 feet thick west of the Site but gradationally changes from sandy sediments to clay. The Aquia aquifer is an important groundwater resource in the region west of the Site (15 to 210 gpm typical yields). The Aquia aquifer is confined by the Nanjemoy-Marlboro confining unit.

The Chickahominy and Piney Point Formations comprise the Chickahominy-Piney Point aquifer that overlies the Nanjemoy-Marlboro confining unit. It is approximately 180 feet thick in the vicinity of the Site and consists of shelly, glauconitic sand; interbedded with silt, clay, and thin indurated shell beds. This aquifer is an important groundwater resource in this region and is used for domestic, small industrial and municipal water supplies. It typically yields 10 to 110 gpm. It is overlain by the Calvert Confining unit.

The Yorktown and Eastover Formations of the Chesapeake Group comprise the Yorktown-Eastover aquifer. The deepest aquifer used by residential wells near the Site and is approximately 350 feet thick. The aquifer is unconfined along a band parallel to the Fall Line to the west but confined in the vicinity of the Site. The aquifer consists of interfingered shelly, very fine- to coarse-grained sand, interbedded with silt, clay, shell beds, and gravel. This aquifer is used as a source of groundwater for domestic, commercial and light industrial uses and is considered an important recharge source for lower aquifers. The aquifer is confined by a bedded clay and silty clay unit formed by the fining-upwards of depositional sequences that formed the underlying sandy sediments of the Yorktown-Eastover aquifer. This confining unit is highly dissected and may be absent less than 5 miles east and west of the Site resulting in a connection between the Yorktown-Eastover aquifer and the unconfined Columbia aquifer.

The uppermost aquifer is the Columbia aquifer. This aquifer is part of the Columbia Group and is the Lynnhaven Member of the Tabb Formation. The Tabb Formation consists of a fining-upward sequence of sediments composed of fine to coarse, gray sand with pebbles and cobbles grading upward into clayey and silty, fine sand and sandy silt. Locally, the aquifer is 20 to 50-feet thick and is unconfined throughout its extent. The Columbia aquifer is an important groundwater resource for rural and domestic users as well as a major source of recharge to the underlying aquifer system.

4.0 WELL RECORDS REVIEW

Water supply wells are not present on the Site; however, surrounding properties utilize private water supply wells for domestic potable use. A site visit was conducted to obtain addresses of nearby residences and visually observe the presence/absence of private water supply wells. No private water supply wells were noted during reconnaissance in the near vicinity of the Site. A request, which included specific residential addresses and tax parcel identification information, was submitted to the City of Chesapeake Health Department to obtain information regarding construction of local water supply wells.

The Health Department provided information for three wells located along Whittamore Road (northeast of the Site) and 14 wells along Murray Road (south of the Site). Copies of the information provided by the Health Department are included as Appendix A. Well information is summarized in Table 1. The average well yield is 18 gallons per minute (gpm) and the average well depth is 66 ft below ground surface (bgs). Well depths, water bearing zones, and stratigraphy were reviewed to evaluate which wells have been completed in the unconfined water table aquifer (Columbia aquifer) and which wells have been completed in the uppermost confined aquifer (Yorktown aquifer). Ten wells are completed to a depth of less than 53 ft bgs and appear to intersect water-bearing zones between 20 and 53 ft bgs. These ten wells are believed to utilize water from the Columbia aquifer. Five wells are completed to depths between 80 and 90 ft bgs within a water-bearing zone noted between 70 and 90 ft bgs. In most borings, a clay rich zone was observed above the 70 to 90 ft bgs water-bearing zone. The clay layer is similar to descriptions of the Yorktown confining layer and the deeper water-bearing zone appears to be part of the Yorktown-Eastover aquifer. The remaining two wells were advanced to depths of 122 and 130 ft bgs and are screened across a water bearing zone from approximately 70 to 130 ft bgs, again presumed to be part of the Yorktown aquifer.

5.0 SUBSURFACE INVESTIGATION

To assess Site soil and groundwater conditions, seven soil borings were advanced at the Site. Five soil borings were completed as groundwater monitoring wells. Soil and groundwater samples were collected from each location for analysis of geotechnical and chemical parameters. Field testing of aquifer characteristics by slug testing was also conducted.

To evaluate current subsurface conditions in the vicinity of proposed ash placement areas, and minimize potential disturbance during future construction; boring and monitoring well locations were positioned in areas outside of proposed ash fill area(s). Boring and monitoring well locations, as well as proposed ash fill areas, are identified on Figure 3.

5.1 SOIL BORINGS/MONITORING WELL CONSTRUCTION

Drilling activities were conducted on July 24 and 25, 2001. Two borings, B-1 and B-2, were advanced using an all-terrain vehicle (ATV) mounted, mud rotary drill rig. Mud rotary drilling was necessary to support and stabilize the borehole walls to prevent caving caused by heaving sands. The remaining borings (B-1A, B-1B, B-3, B-4, B-5) were advanced using an ATV-mounted, hollow-stem auger drill rig. Borings B-1A, B-2, B-3, B-4, and B-5 were completed as two-inch diameter groundwater monitoring wells. Monitoring wells were positioned to: 1) evaluate Site chemistry (soil and groundwater) and soil physical properties at the Site, 2) determine the direction of groundwater flow, and 3) potentially provide long-term monitoring capabilities. At each location, borings were sampled continuously from the ground surface to a depth of 10 ft bgs and every five feet thereafter to a total depth of 25 ft bgs using split-spoon sampling equipment.

Split spoon samples were visually classified by a URS geologist. Samples for geotechnical testing were collected from Shelby tubes or as bulk samples and samples for chemical analysis were collected from split spoons. Copies of the boring logs are included as Appendix B.

Borings B-1, B-1A, and B-1B were co-located. Boring B-1, located in the central portion of the study Site was advanced to a depth of 50 ft bgs to evaluate subsurface stratigraphy and to evaluate if a confining layer was present within 50 feet of ground surface. As previously mentioned, boring B-1A was completed as two-inch diameter groundwater monitoring well. Boring B1-B was advanced to 2.5 ft bgs for collection of shallow samples for geotechnical testing.

Monitoring well construction consisted of installing 10 feet of two-inch diameter, 0.010-inch slotted PVC screen at depths of 15 to 25 ft bgs. Each well was completed with approximately 17 feet of two-inch diameter PVC casing and a locking steel casing. The screened interval was selected in order to monitor groundwater conditions at depths similar to that intersected by nearby shallow water supply wells. The filter pack for each monitoring well consisted of a mix of artificial sand and natural sand pack as a result of "running sands" entering the annular space. The filter pack for each monitoring well was extended approximately two feet above the well screen. A two-foot bentonite seal was installed above the sand pack, and the remaining annular space was filled to the ground surface with a bentonite/cement grout mixture. Well completion diagrams are included in Appendix B. Well construction data are summarized on Table 2.

Drill cuttings were spread around each area of drilling. Mud rotary boreholes were abandoned after completion by backfilling to ground surface with a bentonite/cement grout mixture. Following installation, each well was developed by surging and pumping using a submersible pump until the development water was clear and no longer visually turbid. Development water was discharged to the ground surface in the vicinity of each well.

5.2 SOIL SAMPLING

Geotechnical Soil Sampling

Shelby tube samples were collected from borings B-1, B-1B, B-2, and B-3. Borings B-2 and B-3 were located in the presumed downgradient portion of the Site. One Shelby tube sample was collected at 0.5 to 2.5 ft bgs from boring B-1B, located approximately 10 feet west of boring B-1. One Shelby tube was collected at 20 to 22 ft bgs from boring B-1 and at 18 to 20 ft bgs from borings B-2 and B-3. A bulk sample of drill cuttings was also obtained from the borings at a similar depth as the Shelby tube samples. Four Shelby tube samples and bulk samples were submitted for laboratory analysis of permeability, specific gravity, grain size analysis, Atterberg limits, moisture content, unit weight, total organic carbon, and classification by the Unified Soil Classification System (USCS). Results are discussed in Section 6.0.

Chemical Soil Sampling

Soil samples were collected for chemical analyses using a split spoon samples at a depth of 20 to 22 ft bgs in boring B-1, 23 to 25 ft bgs in boring B-2, and 20 to 22 ft bgs in boring B-3. Each soil sample was placed in a clean stainless steel bowl and thoroughly homogenized before placement in a soil jar. One duplicate sample was collected for laboratory analysis from boring B-1. Four soil samples were submitted for laboratory analysis of selected metals (silver, arsenic, cadmium, chromium, lead, selenium, thallium, vanadium, aluminum, barium, beryllium, boron, calcium, copper, iron, potassium, magnesium, manganese, sodium, nickel, and zinc), and major cations and anions (total phosphorus, chloride, sulfate, fluoride, nitrate, and bromide). Results are discussed in Section 6.0.

5.3 WELL SURVEY AND WATER LEVELS

Following installation of the wells, their locations and elevations were surveyed to the nearest 0.1 foot by Hassell & Folkes, P.C. The surveyors tied the elevation data to the existing Site survey used for development of Site plans for the proposed golf course.

On August 1, 2001, water levels were measured in each of the five wells prior to groundwater sampling. Water levels were measured from the top of the PVC casing, to the nearest 0.01 foot, in each monitoring well using an electronic water-level indicator. Water level and elevation data are summarized in Table 2.

5.4 GROUNDWATER SAMPLING

Groundwater samples were collected on August 1, 2001. Samples were collected from MW-1, MW-2, and MW-3. These three wells are located in the center and downgradient portions of the Site and at the same locations that were sampled for soil analysis (B-1, B-2, and B-3). The monitoring wells were purged and sampled using disposable, Teflon® bailers. Three well volumes (including the well casing and filterpack) were purged from each well. Stabilization within 0.1 standard units (SU) for pH and 3% for specific conductance was achieved prior to sampling.

Because field measurements of tubidity exceeded the field criteria of 5 nephelolometric turbidity units (NTU), samples for metals analysis were filtered in the field through a 0.45 micron filter and then properly preserved. Samples were placed in an ice-filled cooler for shipment to the laboratory. Samples were submitted for analysis of selected metals (silver, arsenic, cadmium, chromium, lead, selenium, thallium, vanadium, aluminum, barium, beryllium, boron, calcium, copper, iron, potassium, magnesium, manganese, sodium, nickel, and zinc), major cations and anions (total phosphorus, chloride, sulfate, fluoride, nitrate, and bromide). Results are presented and discussed in Section 6.0.

5.5 AQUIFER CHARACTERIZATION

Aquifer testing consisted of both falling head and rising head slug tests in monitoring wells MW-2 and MW-4. The slug tests were conducted to determine an estimate of the hydraulic conductivity of the aquifer near the well.

To conduct the test, the static water level of each well was measured using an electronic water-level indicator. A pressure transducer and data logger (Troll) was then placed in the well and the static water level was allowed to recover. The Troll was connected to a laptop computer to record the start and end of each test. A slug, consisting of a sand-filled PVC pipe connected to a length of rope, was first dropped into the wells resulting in a rapid displacement of water. Falling water levels were then recorded as the well returned to static conditions.

The slug was then removed from the well resulting in rapid displacement of water downward. Rising water levels were then recorded as the well returned to static conditions. Data collected from the falling head and rising head tests for each well are presented in Appendix C and results are discussed in Section 6.0.

6.0 RESULTS OF FIELD INVESTIGATION

Field investigations were performed to ascertain information on Site geology, hydrogeology, soil and groundwater chemistry, soil physical properties, and aquifer characteristics.

6.1 SITE GEOLOGY AND HYDROGEOLOGY

The results of the field investigation and geotechnical testing of the soil indicate the presence of the Columbia Group and the Yorktown Formation (top of the Yorktown confining unit). Soil geotechnical results are summarized in Table 3 and presented in Appendix D.

Columbia Group - Shallow soils at the Site consist of dark olive brown to black-gray fine sandy silts and clays ranging in depths from 0 to 5.5 ft bgs. Geotechnical laboratory results indicate that the soil sample collected from boring B-1 from 0.5 to 2.5 ft bgs was classified as lean clay (CL). The porosity for this soil sample was reported at 38.2 percent and total organic carbon was reported at 0.3 percent. Vertical permeability testing conducted on an undisturbed soil sample was reported as 8.2×10^{-7} centimeters per second (cm/sec).

From approximately 5.5 to 25 ft bgs in four borings and to 43 ft bgs in one boring, soils consisted of gray to dark gray and greenish gray medium to fine sand. Geotechnical laboratory results indicate that soil samples from three borings (B-1, B-2, and B-3) at depths ranging from 18 to 25 feet bgs were classified as poorly graded sands and silty sands (SP to SM). Silt and clay lenses were observed approximately 24 to 25 ft bgs in the upgradient borings (B-4 and B-5). Porosity values for the three samples ranged from 40.7 to 41.7 percent and total organic carbon results ranged from 0.2 to 0.3 percent. Vertical permeability testing was conducted on remolded bulk samples (remolded to the undisturbed density and moisture content) and results ranged from 2.4×10^{-3} to 3.0×10^{-3} cm/sec.

Yorktown Formation (top of the Yorktown confining unit) - From approximately 43 ft to 50 ft bgs in boring B-1, soils were described as dark greenish gray, fine sandy silts with some clay. Based upon visual classification the soils are described as silts (ML), very fine sands (SP), and clays (CL).

A subsurface investigation was also completed by McCallum Testing Laboratories, Inc., (McCallum) and was provided to URS by Combustion Products Management (CPM). It is our understanding that CPM will be responsible for placement of fly ash at the Site. McCallum collected samples from 12 borings advanced to 25.5 ft bgs throughout the subject property. A copy of the McCallum Report is included as Appendix E.

McCallum collected continuous samples by split spoon to 10 ft bgs, and every five feet thereafter. Samples were visually examined and classified by laboratory personnel. Their report presents boring logs and generalized cross-sections traversing the Site in a generally east-west direction. The cross-sections indicate fine silty sands and clays ranging from ground surface to a depth between 4 and 6 ft bgs, followed by fine to medium sands to boring termination. There appear to be lenses of silty and clayey sands at varying depths throughout the Site, with peat and clay observed at 22 to 25.5 ft bgs in two borings. The findings from their report are generally consistent with stratigraphic conditions observed during this field investigation.

Site Hydrogeology

During drilling, groundwater and wet soil conditions were observed directly below the shallow clayey layer, at an approximate depth of 5 to 6 ft bgs. Water levels were measured in the five monitoring wells on August 1, 2001. Water level data and survey information are summarized in Table 2. Based on groundwater elevations measured on August 1, 2001, the hydraulic gradient between upgradient well MW-5 and downgradient well MW-3 is 0.0016 (unitless). The groundwater elevations were utilized to generate a groundwater contour map (Figure 4). The results indicate that groundwater flows in an east to southeasterly direction.

6.2 SOIL ANALYTICAL RESULTS

Four soil samples were submitted to the North Canton, Ohio location of Severn Trent Laboratories. Samples were analyzed using USEPA SW-846 Methods or Methods of Chemical Analysis of Water and Waste (MCAWW). Soil chemical results are summarized in Table 4 and Laboratory Analytical Data Packages are presented in Appendix F. The following analytes were detected in soil samples submitted for this study; arsenic, chromium, lead, selenium, vanadium, aluminum, barium, beryllium, calcium, iron, manganese, zinc, chloride, sulfate, and phosphorous. These data will be used as representative of Site conditions for the groundwater modeling and risk assessment portions of the study.

6.3 GROUNDWATER RESULTS

Four groundwater samples were submitted to the North Canton, Ohio location of Severn Trent Laboratories. Samples were analyzed using USEPA SW-846 Methods or MCAWW.

Groundwater chemical results are summarized in Table 5 and Laboratory Analytical Data Packages are presented in Appendix F. The following analytes were detected in groundwater samples submitted for this study; calcium, iron, potassium, magnesium, manganese, and sodium.

In addition, reportable concentrations of bicarbonate alkalinity, alkalinity, chloride, sulfate, total dissolved solids and total organic carbon were detected. These data will be used as representative of Site conditions for the groundwater modeling and risk assessment portions of the study.

6.4 QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

Soil Results

A field duplicate soil sample (B-1A Dup) was collected to provide a measure of accuracy and precision for laboratory analysis. The results of the duplicate indicate that the relative percent differences (RPD) in the results for sample B-1A and its associated duplicate sample, B-1A Dup were within control limits (20 percent) except for analysis of chloride. The RPD value observed outside of the control limits is likely a result of sample heterogeneity based on the results of the laboratory QA/QC, which indicated instrument and analytical performance within specified criteria. No action was necessary based on these results.

A review of the laboratory QA/QC indicates the following:

- The temperature of the cooler upon sample receipt was 11.7°C; however, it was noted that the temperature blank was not located proximal to the ice in the cooler.
- Targeted constituents were not detected in the laboratory method blank samples.
- Laboratory control sample recoveries and relative percent differences (RPDs) were within the limits specified by the laboratory.
- Matrix spike and matrix spike duplicate recoveries were within the limits specified by the laboratory, except for aluminum, iron and phosphorous. The QA/QC anomalies for aluminum and phosphorous are likely the result of matrix heterogeneity. Iron QA/QC anomalies are attributed to high natural iron levels in the soil.

Groundwater Results

A field duplicate groundwater sample (MW-NE 2 Dup) was collected to provide a measure of accuracy and precision for laboratory analysis. Results of the field QA/QC

indicate the RPD in the results for sample MW-2 and its associated duplicate sample, MW-2 Dup were within control limits (20 percent).

A review of the laboratory QA/QC indicates the following:

- Targeted constituents were not detected in the laboratory method blank.
- Laboratory control sample recoveries were within the limits specified by the laboratory.
- Matrix spike and matrix spike duplicate recoveries were within the limits specified by the laboratory; except for sulfate in the duplicate sample. The QA/QC anomaly for sulfate is likely the result of matrix interferences attributed to elevated sulfate levels in the groundwater samples.

6.5 AQUIFER TEST ANALYSIS

Data from slug testing was reduced and imported into AQTESOLV (version 2.5) to calculate aquifer characteristics.

The Bouwer-Rice solution method for a slug test was used to determine hydraulic conductivity (K) values for both the rising head and falling head tests. Hydraulic conductivity values for rising head slug test analysis for MW-2 and MW-4 are 1.1×10^{-3} and 2.6×10^{-3} cm/sec, respectively. Hydraulic conductivity values for falling head slug test analysis for MW-2 and MW-4 are 8.5×10^{-4} and 2.6×10^{-3} cm/sec, respectively. Slug test data are presented in Appendix C. Note that URS used late-time data in our analysis to minimize potential impacts of the sandpack and well construction.

To estimate groundwater flow velocity using the slug test results, Darcy's equation was used:

$$V = \frac{K i}{N_e}$$

Where:

V = Velocity
K = Hydraulic Conductivity (cm/sec)
i = Hydraulic Gradient (unitless; based on site specific data, this report)
N_e = Effective Porosity (40%; based on site specific data, this report)

Substituting Site maximum conductivity values yields:

$$\frac{V = (2.6 \times 10^{-3})(0.0016)}{(0.30)}$$

$$V = 1.4 \times 10^{-5} \text{ cm/sec or } 14.49 \text{ ft/yr}$$

Substituting minimum conductivity values yields:

$$\frac{V = (8.5 \times 10^{-4})(0.0016)}{(0.30)}$$

$$V = 4.5 \times 10^{-6} \text{ cm/sec or } 4.66 \text{ ft/yr}$$

Therefore, groundwater flow velocity beneath the Site is in the range of 4.7 to 14.5 feet per year. This velocity is representative of the flow of groundwater and does not reflect the rate of chemical migration which is dependent on factors that will be addressed in the groundwater modeling and risk assessment report.

7.0 CONCLUSIONS

- Geologic conditions beneath the Site consist of the Tabb Formation (or Columbia Group), a fining-upward sequence of sediments composed of fine to coarse, gray sand with pebbles and cobbles grading upward into clayey and silty, fine sand and sandy silt. The Columbia Group is underlain at approximately 50 ft bgs by the Yorktown Formation, which consists of an upper clay-rich unit and a lower sandy unit.

- Hydrogeologic conditions beneath the Site consist of an upper, unconfined water-table aquifer in the Tabb Formation bounded below by the upper Yorktown confining unit. The upper Yorktown confining unit is underlain by a confined aquifer within the Yorktown Formation.

- A total of 17 private, domestic water supply wells were identified in the immediate Site area. Wells derive their water from both the upper water table and lower confined aquifers.

- Groundwater is present at approximately 2 to 5 ft bgs and flows in an east-southeasterly direction.

- Soil geotechnical analyses indicate that the upper portion of the Columbia Group is clay with a vertical hydraulic conductivity of 8.2 x 10-7 cm/sec and a porosity of 38.2%. The lower portion of the Columbia Group is a sand with vertical hydraulic conductivity values ranging from 2.4 x 10-3 to 3.0 x 10-3 cm/sec, and a porosity of 40.7 to 41.1 percent.

- Aquifer slug testing and analysis indicates that horizontal hydraulic conductivity values range from 2.6 x 10^{-3} to 8.5 x 10^{-4} cm/sec. Groundwater flow velocity ranges from 4.7 to 14.5 ft/yr.

- Soil and groundwater chemical results are within acceptable QA/QC limits and will be used in the groundwater modeling and risk assessment portions of the study.

8.0 REFERENCES

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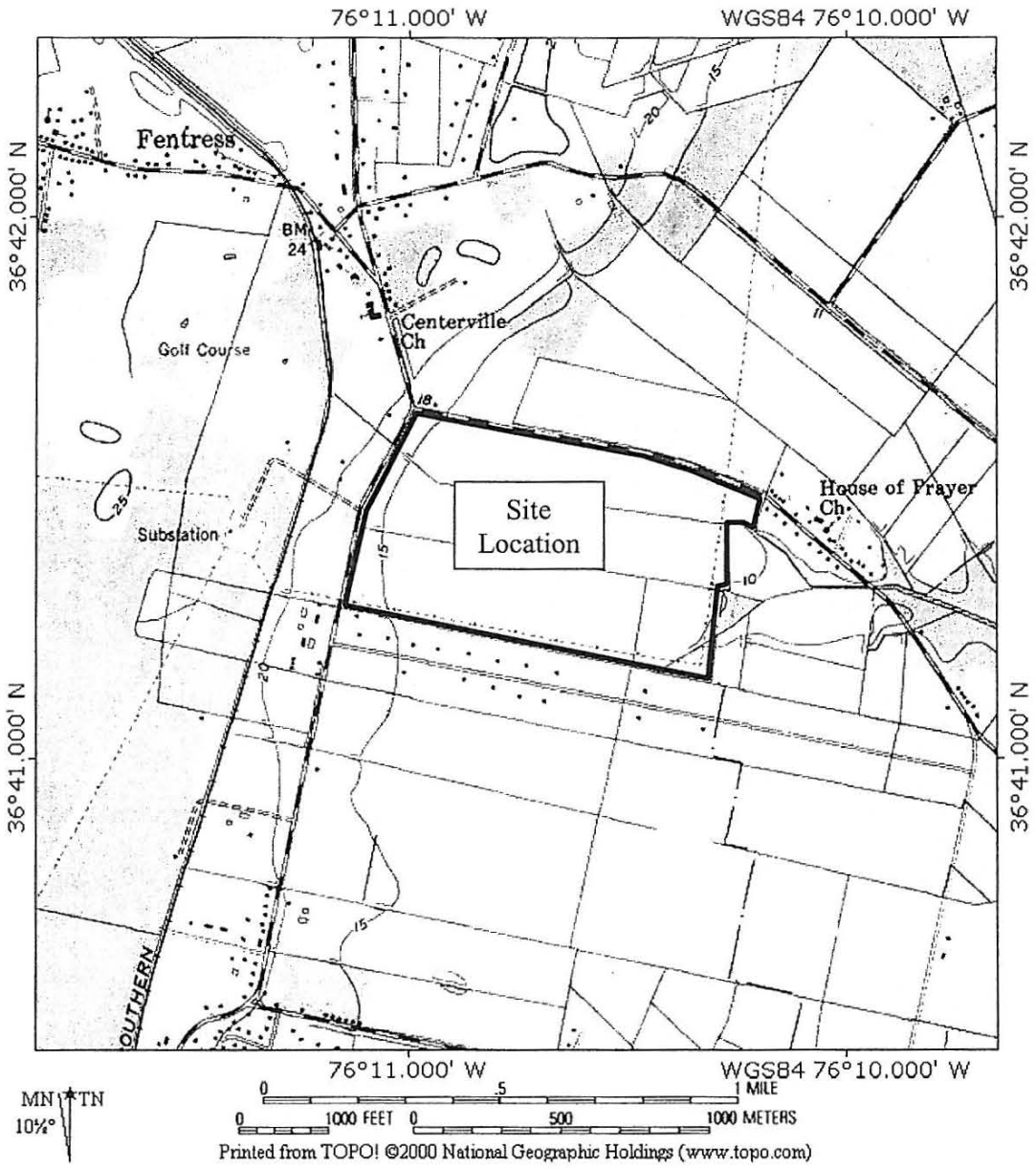
Siudyla, E.A., A.E. May, and D.W. Hawthorne, 1981. "Ground Water Resources of the Four Cities Area, Virginia", Commonwealth of Virginia, State Water Control Board, Planning Bulletin 331, 1981.

FIGURES



Boundaries are approximate.

Reference: USGS 7.5 minute Quadrangle
Fentress, VA. 1982 Revised 1986

Figure 1
Site Location Map
Chesapeake Energy Center
Proposed Golf Course Project
Chesapeake, Virginia

July 2001

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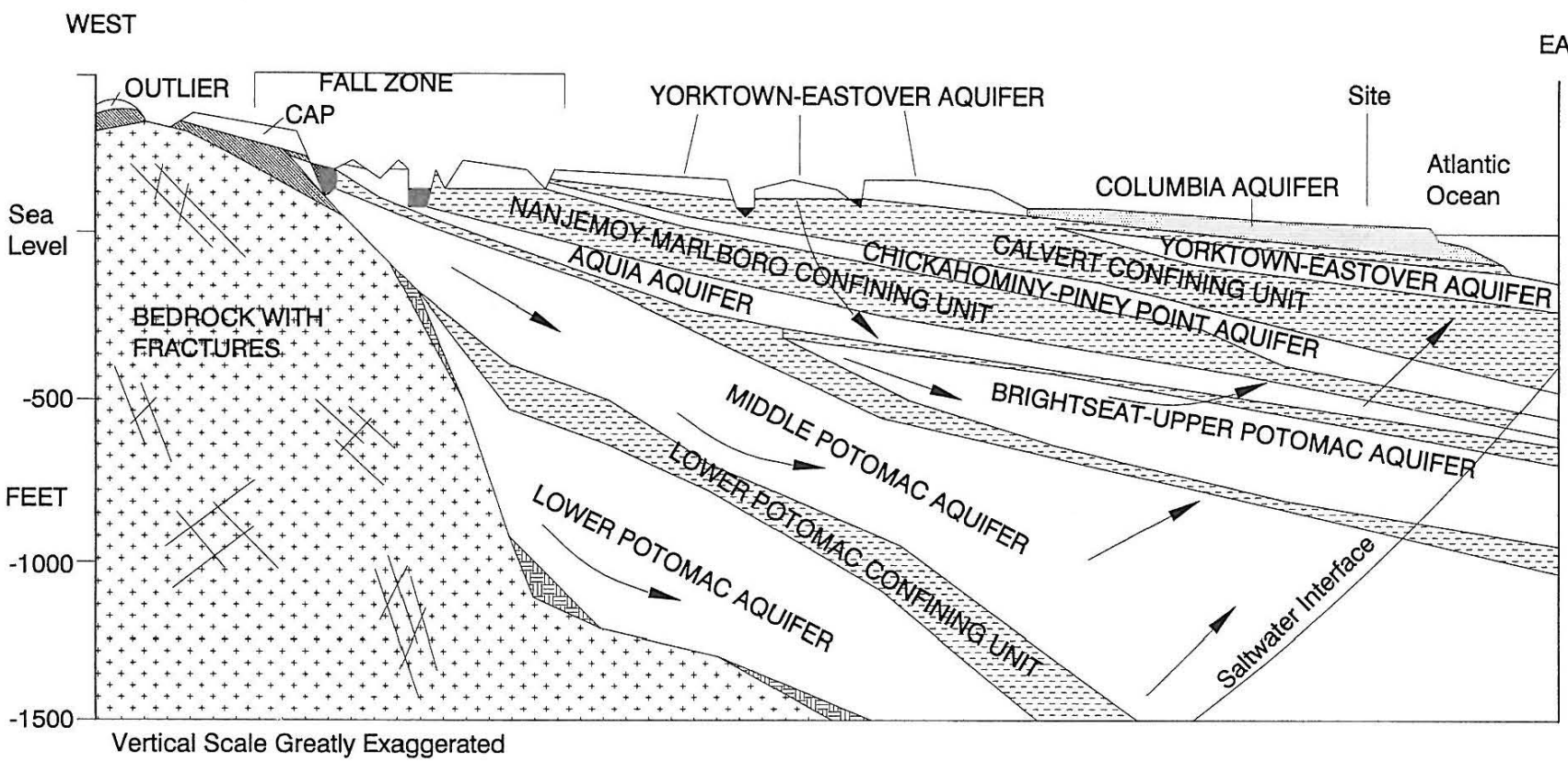
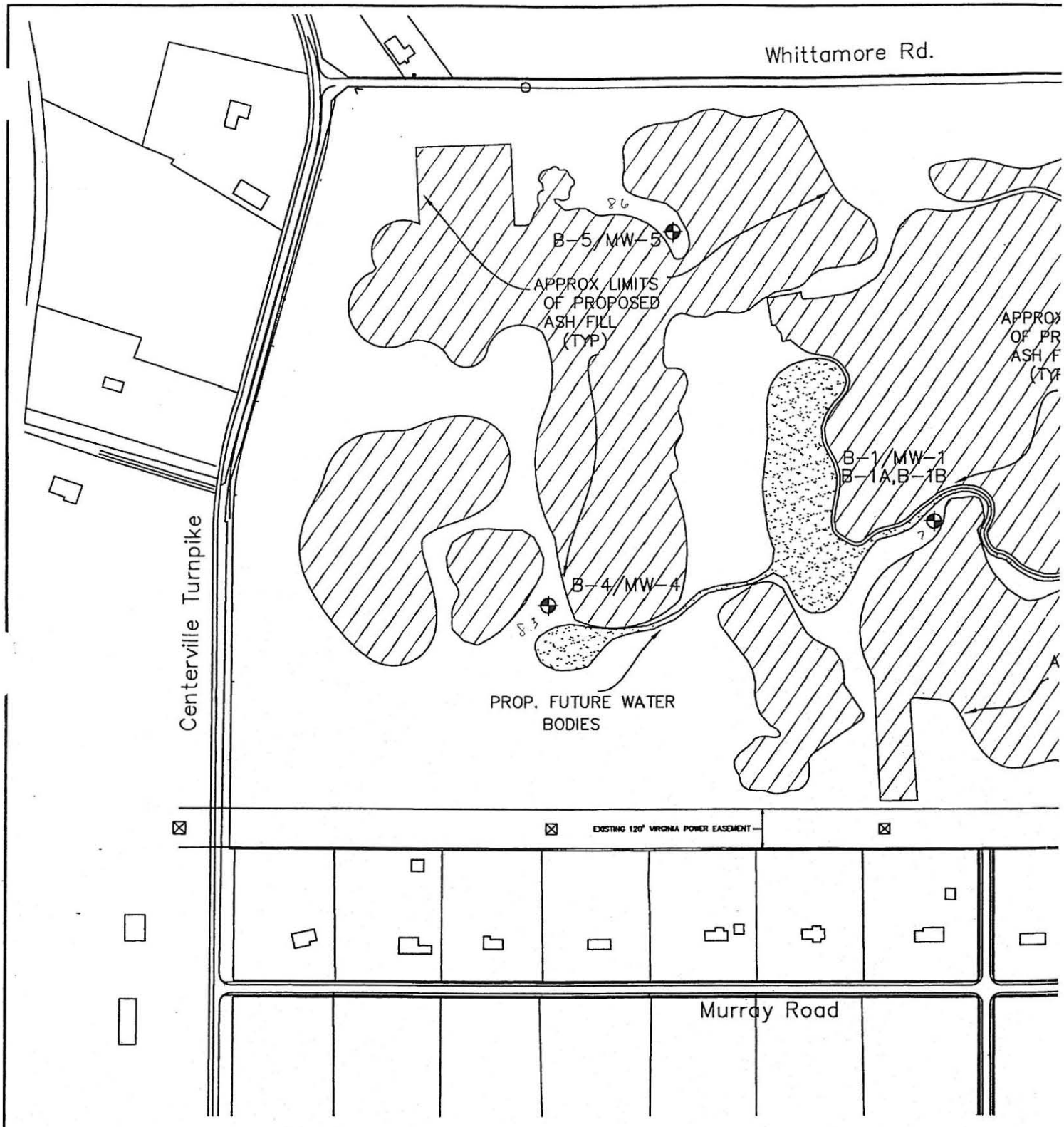


FIGURE 2

GENERALIZED HYDROGEOLOGIC CROSS SECTION

DATE:	DRAWN BY:	URS
SEPTEMBER 2001	DMG	
JOB NUMBER: 49498-001-155	FILE NAME: AQUIFERS.DWG	5540 FALMOUTH ST. SUITE 201 RICHMOND, VA 23230 PHONE: 804-965-9000 FAX: 804-965-9764

20026



0 400 800

APPROXIMATE SCALE IN FEET

Base drawing

20027

TABLES

TABLE 1
LOCAL WATER SUPPLY WELL SUMMARY
CHESAPEAKE ENERGY CENTER
PROPOSED GOLF COURSE
CHESAPEAKE, VIRGINIA

Property Owner	Property Address	Date Drilled	Total Well Depth (ft bgs)	Yield (gpm)	Water Zones (ft bgs)	Screened Zone (ft bgs)	Static Water Level (ft bgs)	Stabilized Water Level (ft bgs)	Driller	Rock Type
Willie L. Phillips	1405 Whittamore Road	Aug-95	55	10	30-55	30-55	12	na	Willets Well Drilling Service	0-2 top soil 2-10 clay 10-30 sugar sand 30- 55 coarse sand
Willie L. Phillips	1405 Whittamore Road	Aug-95	41	10	20-41	20-41	12	na	Willets Well Drilling Service	0-2 top soil 2-8 clay 8-20 sugar sand 20-41 coarse sand
Willie L. Phillips	1405 Whittamore Road	Aug-95	55	10	30-55	40-55	12	na	Willets Well Drilling Service	0-2 top soil 2-10 clay 10-30 sugar sand 30- 55 coarse sand
Michael D. Clifton	1104 Murray Road	Mar-96	122	18	85-90 112-122	107-122	8	10	Gildersleeve Pump & Well	0-11 gray clay 11-42 gray sand 42-65 gray sand/clay/shell 65-85 gray clay/shell 85-90 gray sand 90-113 gray clay 113-122 fine shell
John C. Munday, Jr.	1204 Murray Road	Sep-86	80	12	7-45 65-80	67-80	8	10	Johnson Well Drilling	0-7 clay 7-45 gray sand 45-65 clay 65-80 gray sand
Paul J. Romeo	1208 Murray Road	Jan-96	50	25	40-50	40-50	7	12	Saunders	0-10 clay 10-20 sand clay 20-30 clay 30-40 clay, bedrock 40-50 bedrock
Joseph E. Diaz, Jr.	1215 Murray Road	Aug-90	43	25	20-25 35-43	38-43	5	16	Saunders	0-10 clay silt sand 10-20 sand 20-25 bedrock 25-35 clay silt 35-43 bedrock

20029

TABLE 1 (continued)

Property Owner	Property Address	Date Drilled	Total Well Depth (ft bgs)	Yield (gpm)	Water Zones (ft bgs)	Screened Zone (ft bgs)	Static Water Level (ft bgs)	Stabilized Water Level (ft bgs)	Driller	Rock Type
Jesse C. Whitley, Jr.	1305 Murray Road	Nov-86	42	25	20-42	32-42	8	10	Pinkston Pump & Well	0-12 top soil, clay & sand 12-20 fine sand 20-42 coarse sand & gravel
Gerald T. Kanter	1313 Murray Road	Dec-94	80	20	70-80	50-80	15	15	Virginia Well Service	top soil heavy sand gray sand clay clay shell 70-80 sand shell
"	"	Dec-94	80	20	70-80	60-80	15	16	Virginia Well Service	0-10 clay 10-20 sand 20-70 clay 70-80 shell
Michael D. Hall	1317 Murray Road	Feb-94	48	25	43-48	40-48	9	na	Pinkston Well ?	0-11 top soil and clay 11-26 sand 26-36 mud 36-48 sand
Donald L. Froehler	1325 Murray Road	Jul-98	32	15	25-32	25-32	12	16	Chesapeake Well & Pump Service	0-8 clay 8-15 sand 15-21 clay 21-32 sand
Terry E. Jackson	1316 Murray Road	Jun-86	130	20	15-25 40-50 70-130	70-130	8	15	L.E. Stillman	0-5 top soil, clay 5-15 clay 15-25 fine gray sand 25-40 black clay 40-50 coarse gray sand 50-70 fine sand and clay 70-130 shell + fine salt and pepper sand

20030

TABLE 1 (continued)

Property Owner	Property Address	Date Drilled	Total Well Depth (ft bgs)	Yield (gpm)	Water Zones (ft bgs)	Screened Zone (ft bgs)	Static Water Level (ft bgs)	Stabilized Water Level (ft bgs)	Driller	Rock Type
William N. Deck	1320 Murray Road	Jun-87	80	18	26-32 65-80	65-80	9	25	T. E. Gildersleeve Pump & Well	0-6 brown clay 6-14 fine sand and gray clay 14-18 gray clay 18-24 fine gray sand 24-32 coarse gray sand 32-38 coarse gray sand, clay breaks 38-55 gray clay 55-65 fine gray silt and clay 65-80 fine gray sand and shell
Hank R. Chitwood	1324 Murray Road	Jul-87	90	10	40-45 85-90	85-90	8	16	Joe Saunders Well Drilling	0-10 clay silt sand 10-20 clay 20-30 clay silt sand 30-40 silty sand 40-45 bedrock 45-55 clay silt 55-65 silt clay 65-75 clay 75-85 silt clay 85-90 bedrock
Brian R. Lomax	1328 Murray Road	1993	45	20	40-45	35-45	4	23	Joe Saunders Well Drilling	0-10 clay silt sand 10-20 silt sand 20-25 clay silt sand 25-35 bedrock silt sand 35-45 bedrock
	1379 Murray Drive	8/19/1994	53	20	45-53	42-53	9	23	Joe Saunders Well Drilling	0-10 clay silt sand 10-20 silt sand 20-30 bedrock 30-40 clay 40-50 bedrock 50-53 bedrock

ft bgs - feet below ground surface
gpm - gallons per minute

Statistics	Total Depth (ft bgs)	Yield (gpm)
Maximum	130	25
Minimum	32	10
Average	66	18
Median	55	20
Mode	80	20

20031

TABLE 2
SUMMARY OF WELL CONSTRUCTION DATA
CHESAPEAKE, VIRGINIA
PROPOSED GOLF COURSE
CHESAPEAKE, VIRGINIA

Monitoring Well ID	Ground Surface Elevation (ft MSL)	Top of Casing Elevation (ft MSL)	Depth to Bentonite (ft bgs)	Depth to Top of Sand (ft bgs)	Depth to Bottom of Well (ft bgs)	Depth to Groundwater (ft BTOC)	Groundwater Elevation (ft MSL)
MW-1	9.90	13.16	11	13	25	6.18	6.98
MW-2	9.86	13.11	11	13	25	6.80	6.31
MW-3	9.71	12.75	11	13	25	7.67	5.08
MW-4	11.13	14.09	11	13	25	5.70	8.39
MW-5	10.53	13.23	11	13	25	4.63	8.60

Notes:
Monitoring well locations and elevations provided by Hassell & Folkes, P.C.
ft MSL feet above mean sea level
ft bgs feet below ground surface
ft BTOC feet below top of PVC casing
ID identification

TABLE 3
SUMMARY OF GEOTECHNICAL RESULTS
CHESAPEAKE ENERGY CENTER
PROPOSED GOLF COURSE
CHESAPEAKE, VIRGINIA

Boring No.	Depth (ft)	Moisture Content (%)	Atterberg Limit[1]			Grain Size Analysis[2]				USCS[3]	Specific Gravity	Unit Wt. (lbs/cu ft)		Porosity (%)	Total Organic Carbon (%)	Permeability (cm/sec)
			LL	PL	PI	Gravel (%)	Sand (%)	Silt (%)	Clay (%)			Wet	Dry			
B-1B	0.5-2.5	23.6	40	20	20	0	7	65	28	CL	2.66	126.90	102.7	38.2	0.3	8.2×10^{-7}
B-1	20-22	22.2	NP	NP	NP	0	96	3	1	SP	2.68	119.30	97.6	41.7	0.2	2.8×10^{-3}
B-2	18-20	22.1	NP	NP	NP	0	90	7	3	SP-SM	2.68	121.10	99.2	40.7	0.3	3.0×10^{-3}
B-3	18-20	19.7	NP	NP	NP	0	95	4	1	SP	2.67	117.40	98.1	41.1	0.3	2.4×10^{-3}

Notes

(1) Atterberg Limits:

LL: Liquid Limit

PL: Plasticity Limit

PI: Plasticity Index (PI = LL - PL)

NP: Nonplastic

(2) Grain Size Analysis:

Gravel: Particles of rock that are retained on a 4.75 mm (No. 4) sieve

Sand: Particles that will pass a 4.75 mm sieve, but are retained on a 0.075 mm (no.200) sieve

(3) USCS: Unified Soil Classification System

%	percent
ft	feet
Wt.	weight
lbs/cu ft	pounds per cubic foot
cm/sec	centimeters per second

20033

Table 4
Soil Analytical Results
Chesapeake Energy Center
Proposed Golf Course
Chesapeake, Virginia

Sample ID Sample Depth (ft) Date Sampled Parameter	Units	Method	B-1A 20-22 7/24/2001	B-1A Dup. 20-22 7/24/2001	B-2 23-25 7/25/2001	B-3 20-22 7/25/2001	B-1B 0.5-2.5 7/25/2001
Metals							
Aluminum	mg/kg	6010B	337	403	287	428	6860
Arsenic	mg/kg	6010B	1.7	1.9	0.86 B	0.99 B	1.7
Barium	mg/kg	6010B	<20.0	<20.0	<20.0	<20.0	41.7
Beryllium	mg/kg	6010B	<0.50	<0.50	<0.50	<0.50	0.54
Boron	mg/kg	6010B	<20.0	<20.0	<20.0	<20.0	<20.0
Cadmium	mg/kg	6010B	<0.20	<0.20	<0.20	<0.20	<0.20
Calcium	mg/kg	6010B	<500	<500	<500	<500	1230
Chromium	mg/kg	6010B	1.3	1.5	1.5	1.6	7.9
Copper	mg/kg	6010B	<2.5	<2.5	<2.5	<2.5	<2.5
Iron	mg/kg	6010B	1640	1970	1360	1250	2800
Lead	mg/kg	6010B	0.69	0.71	0.48	0.59	5.1
Magnesium	mg/kg	6010B	<500	<500	<500	<500	<500
Manganese	mg/kg	6010B	12.8	14.9	11.3	11.2	27.1
Mercury	mg/kg	7471A	<0.10	<0.10	<0.10	<0.10	<0.10
Nickel	mg/kg	6010B	<4.0	<4.0	<4.0	<4.0	<4.0
Potassium	mg/kg	6010B	<500	<500	<500	<500	<500 L
Selenium	mg/kg	6010B	<0.50	<0.50	<0.50	<0.50	0.64
Silver	mg/kg	6010B	<0.50	<0.50	<0.50	<0.50	<0.50
Sodium	mg/kg	6010B	<500	<500	<500	<500	<500
Thallium	mg/kg	6010B	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium	mg/kg	6010B	<5.0	<5.0	<5.0	<5.0	8.5
Zinc	mg/kg	6010B	2.9	3.2	6.8	16.6	3.9 L
Inorganic Analysis							
Bromide	mg/kg	300.0A	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride	mg/kg	300.0A	34.5	10.6	27.3	21.1	17.7
Fluoride	mg/kg	300.0A	<10.0	<10.0	<10.0	<10.0	<10.0
Nitrate as N	mg/kg	300.0A	<5.0	<5.0	<5.0	<5.0	<5.0
Sulfate	mg/kg	300.0A	42.5	43.0	43.4	40.4	21.7
Total Phosphorus	mg/kg	365.2	<10	<10	<10	21	120
Total Residue	% Solid	160.3 mod	79.3	81.7	81.8	78.6	79.5

Notes:

* = Data is presented in mg/kg.

B = Estimated result. Result less than RL.

L = Serial dilution of a digestate in the analytical batch indicates that physical and chemical interferences are present.

RL = Reporting Limit

Table 5
Groundwater Analytical Results
Chesapeake Energy Center
Proposed Golf Course
Chesapeake, Virginia

Sample ID Date Sampled Parameter	Units	Method	MW-1 8/1/2001	MW-2 8/1/2001	MW-2 Duplicate 8/1/2001	MW-3 8/1/2001
Dissolved Metals						
Aluminum	ug/L	6010B	<200	<200	<200	<200
Arsenic	ug/L	6010B	<10.0	<10.0	<10.0	<10.0
Barium	ug/L	6010B	<200	<200	<200	<200
Beryllium	ug/L	6010B	<5.0	<5.0	<5.0	<5.0
Boron	ug/L	6010B	<200	<200	<200	<200
Cadmium	ug/L	6010B	<2.0	<2.0	<2.0	<2.0
Calcium	ug/L	6010B	92000	37800	38800	77300
Chromium	ug/L	6010B	<5.0	<5.0	<5.0	<5.0
Copper	ug/L	6010B	<25.0	<25.0	<25.0	<25.0
Iron	ug/L	6010B	10200	4860	4750	4790
Lead	ug/L	6010B	<3.0	<3.0	<3.0	<3.0
Magnesium	ug/L	6010B	13200	18700	19100	15600
Manganese	ug/L	6010B	339	237	242	160
Mercury	ug/L	7471A	<0.20	<0.20	<0.20	<0.20
Nickel	ug/L	6010B	<40.0	<40.0	<40.0	<40.0
Potassium	ug/L	6010B	<5000	8190	8340	<5000
Selenium	ug/L	6010B	<5.0	<5.0	<5.0	<5.0
Silver	ug/L	6010B	<5.0	<5.0	<5.0	<5.0
Sodium	ug/L	6010B	32400	34000	34700	48200
Thallium	ug/L	6010B	<10.0	<10.0	<10.0	<10.0
Vanadium	ug/L	6010B	<7.0	<7.0	<7.0	<7.0
Zinc	ug/L	6010B	<20.0	<20.0	<20.0	<20.0
Inorganic Analysis						
Bicarbonate Alkalinity	mg/L	310.1	130	75	75	160
Alkalinity	mg/L	310.1	130	75	9.7	160
Bromide	ug/L	300.0A	<500	<500	<500	<500
Chloride	ug/L	300.0A	74300	54000	54000	53300
Fluoride	ug/L	300.0A	<1000	<1000	<1000	<1000
Nitrate as N	ug/L	300.0A	<100	<100	<100	<100
Sulfate	ug/L	300.0A	139000	103000	103000	112000
Total Phosphorus	ug/L	365.2	210	170	190	390
Filterable Residue (TDS)	mg/L	160.1	510	390	380	460
Total Organic Carbon	mg/L	415.1	3	2	2	6
Field Analysis						
pH	S.U.		7.04	5.82	5.82	6.25
temperature	°C		18	17.8	17.8	16.2
conductivity	uS		765	545	545	699
dissolved oxygen	mg/L		1.4	1.78	1.78	1.88
turbidity	NTU		68.1	89.2	89.2	62.9

Notes:
S.U. = standard units for pH
°C = Celsius
uS = microsiemans per square centimeter at 25 degrees Celsius
mg/L = milligrams per Liter
NTU = nephelolometric turbidity units

APPENDIX A

City of Chesapeake Health Department
Residential Water Supply Well Records

1.5C 1/17/96

B1 H
Lot 1A

Class III B well
drinking water

Commonwealth for Virginia
Uniform Water Well Completion Report

Owner Willie Phillips
Address 1401 Louis Drive
Chesapeake VA
Phone 543-7688
Location well at 1405 Whitamore Rd

Tax Map ID M5062100400012
VDH Permit
VWCB Permit
VWCB ID 234-95-2035
County

Well Data

Drilling Method rotary Date Completed 8-12-95 Total Dept of Well 55 ft
Depth to Bedrock NA Yield 10 (GPM) Length of Test 1 hour
Static Water Level 12 Stabilized Water Level NA Natural Flow NA
Well Disinfected(Y/N) yes Disinfectant Used Chlorine Amount Used 1 gal

10 ft. wellpoint

Casing
From ___ To 30 ft From ___ To ___ From ___ To ___
Size 1 1/4 Material PVC Size ___ Material ___ Size ___ Material ___
Weight/Schedule PR200 Weight/Schedule ___ Weight/Schedule ___

Gravel Pack
From ___ To 55 ft From ___ To ___ From ___ To ___

Grout
From ___ To 30 ft From ___ To ___ From ___ To ___
Bore Hole Size 4 3/4 Bore Hole Sixe ___ Bore Hole Size ___
Type Neat cement Type ___ Type ___
Method pour pump Method ___ Method ___

Water Zones or Screened Intervals
From ___ To ___ From ___ To ___ From ___ To ___
Mesh Size 010 Diam ___ Mesh Size ___ Diam ___ Mesh Size ___ Diam ___
From ___ To ___ From ___ To ___ From ___ To ___
Mesh Size ___ Diam ___ Mesh Size ___ Diam ___ Mesh Size ___ Diam ___

Class III B
Use Data
(Private Well) Domestic ___ Agriculture ___ Industrial ___ Monitoring ___
Public Well: Community ___ Non Community ___

Abondonment Information

Bored or Dug Wells
Casing Removed, Y/N?
If Y Depth to which casing was removed
Depth and Type of Fill:
Source of Fill:
Bentonite Plugs: From ___ To ___
From ___ To ___
Method of permanently marking location

Wells other than Bored Wells
Casing removed Y/N?
If Y Depth to which casing was removed
If Applicable, depth(s), and type of gravel/sand fill:
Source of gravel or sand
Cement: From ___ to ___
Form ___ to ___

RECEIVED
JAN - 7

20037

DRILLERS LOG

Depth	Description of Formation or Sediment	Remarks
55 ft	0-2 ft top soil 2-10 ft Clay 10-30 ft Sugar sand 30-55 ft coarse sand	55 ft ← Water bearing

(Use additional sheets if necessary)

I certify that the information contained here is true and that this well was installed and constructed in accordance with the permit and further that the well complies with all applicable state and local regulations, ordinances and laws.

WILLETTS WELL DRILLING SERVICE
2121 CEDAR ROAD
CHESAPEAKE, VA 23323
(804)487 8755

DRILLERS SIGNATURE John H. Willetts
DATE 12-28-95 REPRESENTING WILLETTS WELL DRILLING SERVICE

20038

Ches MS 62A
Lot 12

Commonwealth for Virginia
Uniform Water Well Completion Report

Owner Willie Phillips
Address 1401 Louis Drive
Chesapeake VA
Phone 543-7698
Location well was done at 1405 Whitamore Rd

Tax Map ID M5062100400012
VDH Permit
VWCB Permit
VWCB ID 234-95-2035
County [redacted]

Well Data

Drilling Method rotary Date Completed 8-12-95 Total Depth of Well 41 ft
Depth to Bedrock NA Yield 10 (GPM) Length of Test 1 hour
Static Water Level 12 Stabilized Water Level NA Natural Flow NA
Well Disinfected (Y/N) Yes Disinfectant Used Chlorine Amount Used 1 gal

10 ft. wellpoint

Casing
From To 20ft Form To From To
Size 1 1/4 Material PVC Size Material Size Material
Weight/Schedule PR200 Weight/Schedule Weight/Schedule

Gravel Pack
From To 41ft From To From To

Grout
From To 20ft From To From To
Bore Hole Size 4 3/4 Bore Hole Size Bore Hole Size
Type Neat cement Type Type
Method pour pump Method Method

Water Zones or Screened Intervals
From To From To From To
Mesh Size 10/0 Diam Mesh Size Diam Mesh Size Diam
From To From To From To
Mesh Size Diam Mesh Size Diam Mesh Size Diam

[redacted]

Use Data

(Private Well) Domestic Agriculture Industrial Monitoring
Public Well: Community Non Community

Abandonment Information

Bored or Dug Wells
Casing Removed, Y/N?
If Y Depth to which casing was removed
Depth and Type of Fill:
Source of Fill:
Bentonite Plugs: From To
From To
Method of Permanently Marking Location

Wells other than Bored Wells
Casing Removed Y/N?
If Y Depth to which casing was removed
If Applicable, Depth(s), and type of gravel/sand fill:
Source of gravel or sand:
Cement: From To
From To

20039

DRILLERS LOG

Depth	Description of Formation or Sediment	Remarks
41 ft	0-2 ft top soil 2-8 ft clay 8-20 ft sugar sand 20-41 ft coarse sand & water bearing	41 ft

(Use additional sheets if necessary)

I certify that the information contained here is true and that this well was installed and constructed in accordance with the permit and further that the well complies with all applicable state and local regulations, ordinances and laws.

WILLETTS WELL DRILLING SERVICE
2121 CEDAR ROAD
CHESAPEAKE, VA 23323
(804)487 8755

DRILLERS SIGNATURE John H. Willetts
DATE 8-15-95 REPRESENTING WILLETTS WELL DRILLING SERVICE

VIRGINIA CONTRACTORS LICENSE NUMBER 9506423 1995

20040

MS62A
B/L 4
Lot 1B

Class III B
well
drinking water

GGO
1/24/96

Commonwealth for Virginia
Uniform Water Well Completion Report

Owner Willie Phillips
Address 1401 Lewis Drive
Chesapeake VA
Phone 543-7698
Location well was at 1405 Whitamore Rd

Tax Map ID M5062100400006
VDH Permit
VWCB Permit
VWCB ID 234-95-2035
County

Well Data

Drilling Method rotary Date Completed 8-12-95 Total Dept of Well 55ft
Depth to Bedrock NA Yield 10 (GPM) Length of Test 1 hour
Static Water Level 12 Stabilized Water Level NA Natural Flow NA
Well Disinfected(Y/N) YES Disinfectant Used Chlorine Amount Used 1gal

15 ft. wellpoint

Casing
From 0ft To 55ft From____ To____ From____ To____
Size___ Material____ Size___ Material___ Size___ Material____
Weight/Schedule____ Weight/Schedule____ Weight/Schedule____

Gravel Pack
From 40ft To 55ft From____ To____ From____ To____

Grout
From 0ft To 40ft From____ To____ From____ To____
Bore Hole Size 43/4 Bore Hole Sixe____ Bore Hole Size____
Type neat cement Type____ Type____
Method pour pump Method____ Method____

Water Zones or Screened Intervals
From____ To____ From____ To____ From____ To____
Mesh Size .010 Diam____ Mesh Size___ Diam____ Mesh Size___ Diam____
From____ To____ From____ To____ From____ To____
Mesh Size___ Diam____ Mesh Size___ Diam____ Mesh Size___ Diam____

Class III B *Use Data*
Private Well: (Domestic) Agriculture____ Industrial____ Monitoring____
Public Well: Community____ Non Community____

Abondonment Information

Bored or Dug Wells
Casing Removed, Y/N?____
If Y Depth to which casing was removed____
Depth and Type of Fill:____

Source of Fill:____
Bentonite Plugs: From___ To____
From____ To____
Method of permanently marking location N/A could not find old

Wells other than Bored Wells
Casing removed Y/N?____
If Y Depth to which casing was removed____
If Applicable, depth(s), and type of gravel/sand fill:____
Source of gravel or sand____
Cement: From____ to____
Form____ to____

20041

DRILLERS LOG

Depth	Description of Formation or Sediment	Remarks
55ft	0-2ft Top soil 2-10ft clay 10-30ft sugar sand 30-55ft coarse sand	55ft water bearing

(Use additional sheets if necessary)

I certify that the information contained here is true and that this well was installed and constructed in accordance with the permit and further that the well complies with all applicable state and local regulations, ordinances and laws.

WILLETTS WELL DRILLING SERVICE
2121 CEDAR ROAD
CHESAPEAKE, VA 23323
(804)487 8755

DRILLERS SIGNATURE John H. Willetts
DATE 1-22-96 REPRESENTING WILLETTS WELL DRILLING SERVICE

20042

Hastings Laboratories, Inc.
118 CYPRESS AVENUE
RGINIA BEACH, VA 23451
ELEPHONE 804/425/1498
ACSIMILE 804/422/9176

ANALYTICAL CHEMISTS

ertificate of Analysis

TO W. Phillips
1401 Louis Dr.
Chesapeake, Va. 23320

DATE 9/12/95

SAMPLE DESCRIPTION Drinking Water

ANALYSIS NO 95-3045

Sample received: 9/11/95 @ 10:55 a.m.
Sample taken: 9/11/95 @ 10:15 a.m.
Sample marked: 1405 Whittamore Rd.
Chesapeake, Va.

Total Coliform.....Negative

"This water sample is bacteriologically safe for consumption."

cc: Chesapeake Health Department

Chemist

20043

* NOT TO SCALE *

Health Department
Identification Number 234-95-32-35

Schematic drawing of sewage disposal and/or water supply system and topographic features.

Show the lot lines of the building site, sketch of property showing any topographic features which may impact on the design of the well or sewage disposal system, including existing and/or proposed structures and sewage disposal systems and wells within 200 feet. The schematic drawing of the well site or area and/or sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be permitted, show all sources of pollution within 200 feet.

SCALE = 1" = 40'

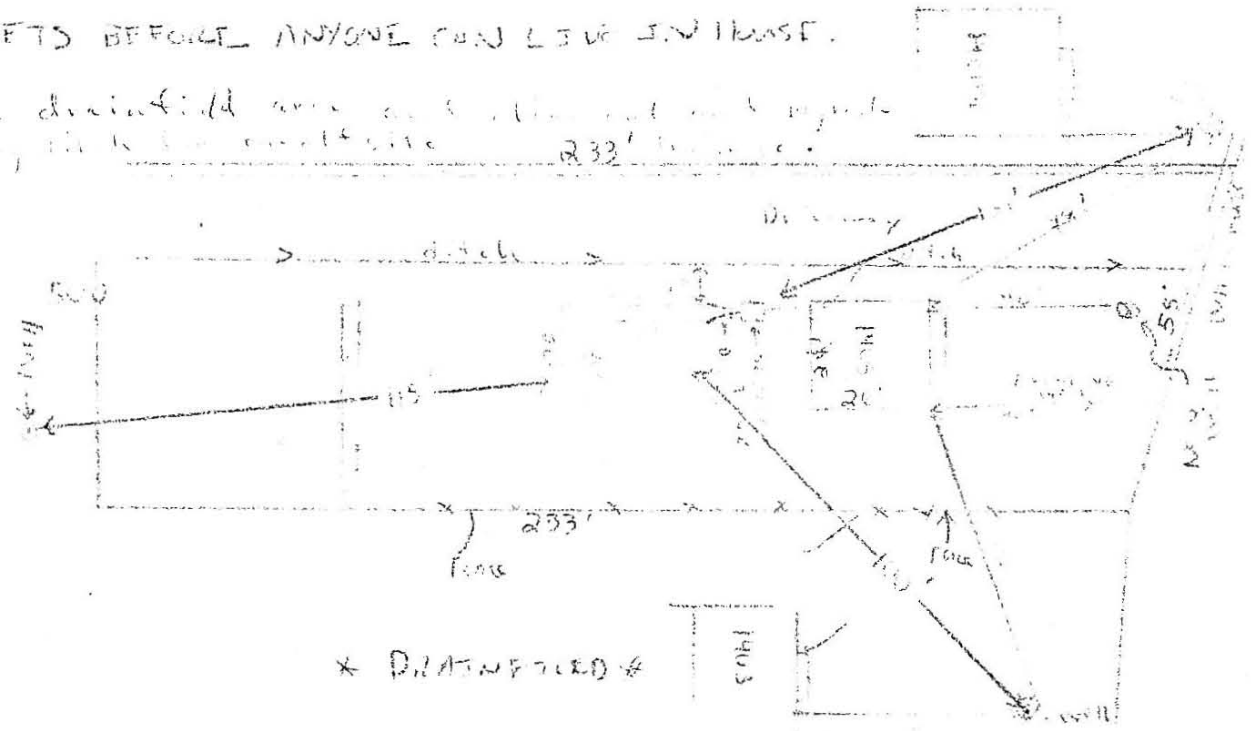
☐ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.

(1) SEE ATTACHED SHEETS.

(2) MUST SUBMIT WELL ABANDONMENT REPORT.

(3) HEALTH DEPARTMENT MUST INSPECT SYSTEM & TOILETS BEFORE ANYONE CAN LIVE IN HOUSE.

4) Grade drainfield [illegible]



This sewage disposal system and/or water supply is to be constructed as specified by the permit Y or attached plans and specifications Y.

SEE ATTACHED VARIANCE.

This sewage disposal system and/or well construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: _____ **Issued by:** _____
Sanitarian

Date: 7-11-95 **Reviewed by:** _____
Supervisory Sanitarian

This Construction Permit Valid until
[illegible]

If FHA or VA financing

Reviewed by Date _____ _____ **Date** _____ _____
Supervisory Sanitarian Regional Sanitarian

C.H.S. 202B

FILE COPY

20044

Commonwealth of Virginia
Uniform Water Well Completion Report

Owner WARRIOR CONSTRUCTION
Address 521 WEST 25th
NORFOLK, VA 23517
Phone 627-2187
Location 1317 MURRAY DR, CHESAPEAKE, VA

Tax Map ID 234-93-1002
VDH Permit
VWCB Permit MS 4TC Lot 7
VWCB ID
County

* Well Data *

General Information

Drilling Method ROTARY	Date Completed 2/1/94	Total Depth of Well 48'
Depth to Bedrock —	Yield 25 (GPM)	Length of Test 1 HR
Static Water Level 9	Stabilized Water Level —	Natural Flow (Rate) N
Well Disinfected (Y or N) Y	Disinfectant Used CHLOROX	Amount Used 1 GAL

Casing

From 0 to 43	From ___ to ___	From ___ to ___
Size 1 1/4 Material PVC	Size ___ Material ___	Size ___ Material ___
Weight/Schedule SDR 200	Weight/Schedule ___	Weight/Schedule ___

Gravel Pack

From 40 to 48	From ___ to ___	From ___ to ___

Grout

From 0 to 20	From ___ to ___	From ___ to ___
Bore Hole Size 4 1/2	Bore Hole Size ___	Bore Hole Size ___
Type Bentonite	Type ___	Type ___
Method Poured	Method ___	Method ___

Water Zones or Screened Intervals

From 43 to 48	From ___ to ___	From ___ to ___
Mesh Size .010 Diam. 1 1/4	Mesh Size ___ Diam. ___	Mesh Size ___ Diam. ___
From ___ to ___	From ___ to ___	From ___ to ___
Mesh Size ___ Diam. ___	Mesh Size ___ Diam. ___	Mesh Size ___ Diam. ___

* Use Data *

Private Well:	Domestic ✓	Agricultural ___	Industrial ___	Monitoring ___
Public Well:	Community ___	Non Community ___		

1317 MURRAY DR

Drillers Log *
(Use additional sheets if necessary)

Depth	Description of Formation or Sediment	Remarks
0-11	TOPSOIL & CLAY	
11-26	SAND	
26-36	MUD	
36-48	SAND	

I certify that the information contained here is true and that this well was installed and constructed in accordance with the per that the well complies with all applicable state and local regulations, ordinances and laws.

Name LARRY PINKSTON
Address 2525 FLORIDA DR
VA BEACH, VA
Phone 621-2643 / 426-2018

Drillers Signature Larry Pinkston Date 2/27/94 Representing PINKSTON WELL

Virginia Contractors License Number 016859

FEB 28 '94 10:47 LARRY PINKSTON 8044262018 TO: 8045477549 P01

20046

Health Department
Identification Number _____

Schematic drawing of sewage disposal system and topographic features. PAGE ___ OF ___

Show the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of the system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and reserve area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all sources of pollution within 100 feet.

☐ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.

The sewage disposal system is to be constructed as specified by the permit ☐ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: _____ Issued by: _____
Sanitarian

This Construction Permit Valid until _____

Date: _____ Reviewed by: _____
Supervisory Sanitarian

If FHA or VA financing

Reviewed by Date _____ _____ Date _____ _____
Supervisory Sanitarian Regional Sanitarian

C.H.S. 202B Revised 6/84

II-2A

FILE COPY

20047

1978-10,000

WATER WELL COMPLETION REPORT

• BWCM No. 1 OR

(Certification of Completion/County Permit)

State Water Control Board
P. O. Box 11143
2111 North Hamilton St.
Richmond, Va. 23230

SWCB Permit
County Permit
Certification of inspecting official:
This well does ____ does not ____
meet code/low requirements.
S.
Date
For Office Use

County/City Chesapeake Va
County/City Stamp

• Virginia Plane Coordinates
N
E
Latitude & Longitude
N
W
Topo. Map No.
• Elevation ft.
• Formation
• Lithology
• River Basin
• Province
• Type Logs
• Cuttings
• Water Analysis
• Aquifer Test

• Owner Eric C. Smith
• Well Designation or Number
Address 520 John Gilbridge Rd Chesap Va
Phone 421 2244

• Drilling Contractor Joe Saunders Well Drilling
Address 9410 Mt. Pleasant Rd Chesapeake Va - 23320
Phone 482 1408

~~Tax Map~~ I.D. No. 234-90-0131
Subdivision Greenhaven
Section MS-61C
Block BK-2-plat 23
Lot 1 - (23)
Class Well: I ____, IIA ____,
IIB ____, IIIA ✓, IIIB ____
IIIC ____ IIID ____ IIIE ____

WELL LOCATION: ____ (feet/miles ____ direction) of ____
and ____ feet/miles ____ (direction) of ____
(If possible please include map showing location marked)

Date started 8-3-90 • Date completed 9-3-90 Type rig Hyd-Drill

WELL DATA: New ✓ Reworked ____ Deepened ____
• Total depth 43' ft.
• Depth to bedrock 35 ft.
• Hole size (Also include reamed zones)
• 6 inches from 0 to 43 ft.
• ____ inches from ____ to ____ ft.
• ____ inches from ____ to ____ ft.

• Casing size (I.D.) and material
• 2 inches from 0 to 38' ft.
Material PVC
Wt. per foot ____ or wall thickness ____ in.
• ____ inches from ____ to ____ ft.
Material ____
Wt. per foot ____ or wall thickness ____ in.
• ____ inches from ____ to ____ ft.
Material ____
Wt. per foot ____ or wall thickness ____ in.

• Screen size and mesh for each zone (where applicable)
• 2 inches from 38 to 43 ft.
• Mesh size .012 Type PVC
• ____ inches from ____ to ____ ft.
• Mesh size ____ Type ____
• ____ inches from ____ to ____ ft.
• Mesh size ____ Type ____
• ____ inches from ____ to ____ ft.
• Mesh size ____ Type ____

• Gravel pack
• From 35 to 43 ft.
• From ____ to ____ ft.

• Grout
• From 0 to 22 ft., Type Cement
• From ____ to ____ ft., Type ____

2. WATER DATA • Water temperature 63° °F
• Static water level (unpumped level-measured) 5 ft.
• Stabilized measured pumping water level 16 ft.
• Stabilized yield 25 gpm after 2 hours
Natural Flow: Yes ____ No ✓, flow rate. ____ g pm
Comment on quality Good

3. WATER ZONES: From 20 To 25
From 35 To 43 From ____ To ____
From ____ To ____ From ____ To ____

4. USE DATA:
Type of use: Drinking ✓, Livestock Watering ____,
Irrigation ____ Food processing ____, Household ____,
Manufacturing ____, Fire safety ____, Cleaning ____,
Recreation ____, Aesthetic ____, Cooling or heating ____,
Injection ____, Other ____
• Type of facility: Domestic ✓, Public water supply ____,
Public institution ____, Farm ____, Industry ____,
Commercial ____, Other ____

5. PUMP DATA: Type ____ • Rated H.P. 3/4
• Intake depth ____ • Capacity ____ at ____ head

6. WELLHEAD: Type well seal ____
Pressure tank ____ gal., Loc. ____
Sample tap ____, Measurement port ____
Well vent ____, Pressure relief valve ____
Gate valve ____, Check valve (when required) at well head
Electrical disconnect switch on power supply ____

7. DISINFECTION: Well disinfected ✓ yes ____ no
Date 8-3-90, Disinfectant used Clorox
Amount 65/8oz/1, Hours used 24

8. ABANDONMENT (where applicable) • yes ____ no ✓
Casing pulled yes ____ no ____ not applicable ____
Plugging grout From ____ to ____ material ____

OVER

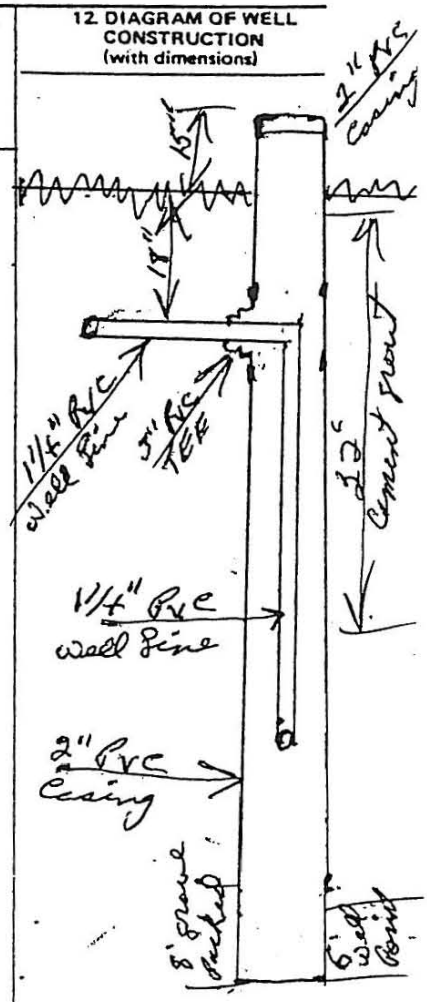
20048

9. State law requires submitting to the Virginia State Water Control Board information about groundwater and wells for every well made in the State intended for water, or any other non-exempt well. This information must be submitted whether the well is completed, on standby, or abandoned. Information required includes: an accurately and completely prepared water well completion report, full data from any aquifer pumping tests, drill cuttings taken at ten foot intervals (unless exemption is secured), the results of any chemical analyses, and copies of any geophysical logs. Quarterly-pumpage and use reports are required from owners of public supply and industrial wells. County or State permits to drill may be required in some parts of the state. Some counties require submission of a water well completion report. The Virginia State Health Department requires a water well completion report for public supply wells.

10. DRILLERS LOG (use additional Sheets if necessary)

DEPTH (feet) From	To	TYPE OF ROCK OR SOIL (color, material, fossils, hardness, etc.)	REMARKS (water, caving, cavities, broken, core, shot, (etc.)	11. Drilling Time (Min.)
0	10	Clay silt sand		120
10	20	Sand		
20	25	Bed Rock		
25	35	clay silt		
35	43	Bed Rock		

12. DIAGRAM OF WELL CONSTRUCTION (with dimensions)



13. Well lot dedicated? _____; Size _____ ft. X _____ ft., Well house? _____
Distance to nearest pollutant source _____ ft., Type _____
Distance to nearest property line _____ ft., Building 100 ft.

14. WATER SERVICE PIPE: Checked under _____ p.s.i. for _____ minutes. Pipe size _____ inches, Material _____
Installer _____
Date _____

15. I certify that the information contained herein is true and correct and that this well and/or system has been installed and constructed in accordance with the requirements for well construction as specified in compliance with appropriate county or independent city ordinances and the laws and rules of the Commonwealth of Virginia.

Signature Joe Saunders (Seal), Date 8-6-90
(Well driller or authorized person)
License No. 0002601

State Water Control Board Regional Offices

Valley Reg. Off.
16 North Main Street
P. O. Box 268
Bridgewater, Va. 22812
703-828-2595

Southwest Reg. Off.
108 East Main Street
P. O. Box 476
Abingdon, Va. 24210
703-628-5183

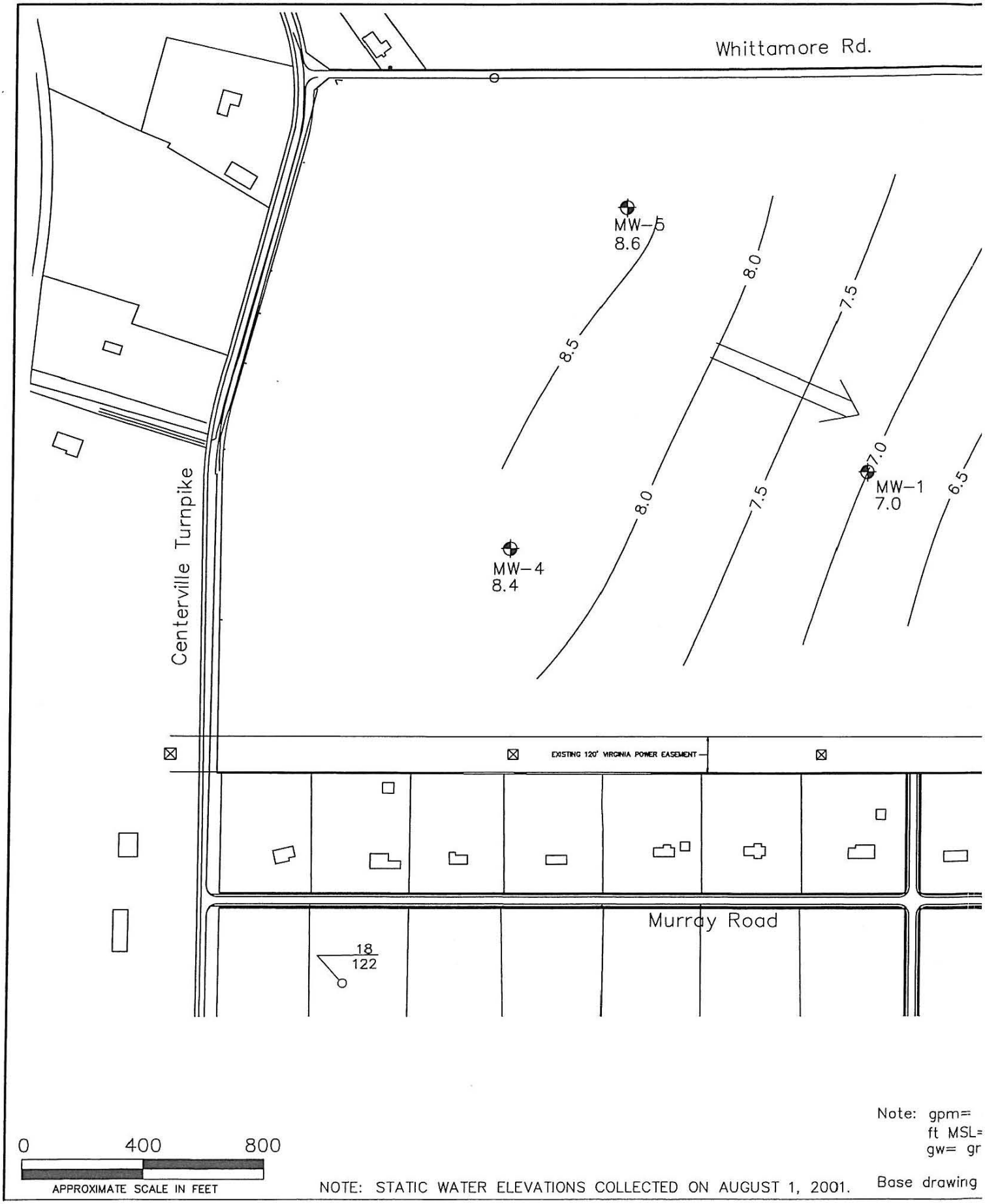
West Central Reg. Off.
Executive Park
3312 Peters Creek Road
Roanoke, Va. 24019
703-982-7432

Piedmont Reg. Off.
4010 West Broad Street
P. O. Box 6616
Richmond, Va. 23230
804-257-1006

Tidewater Reg. Off.
287 Pembroke Office Park
Suite 310 Pembroke No. 2
Va. Beach, Va. 23462
804-499-8742

Northern Virginia Reg. Off.
5515 Cherokee Avenue
Suite 404
Alexandria, Va. 22312
703-750-9111

20049



NOTE: STATIC WATER ELEVATIONS COLLECTED ON AUGUST 1, 2001.

Note: gpm=
ft MSL=
gw= gr

Base drawing

20050

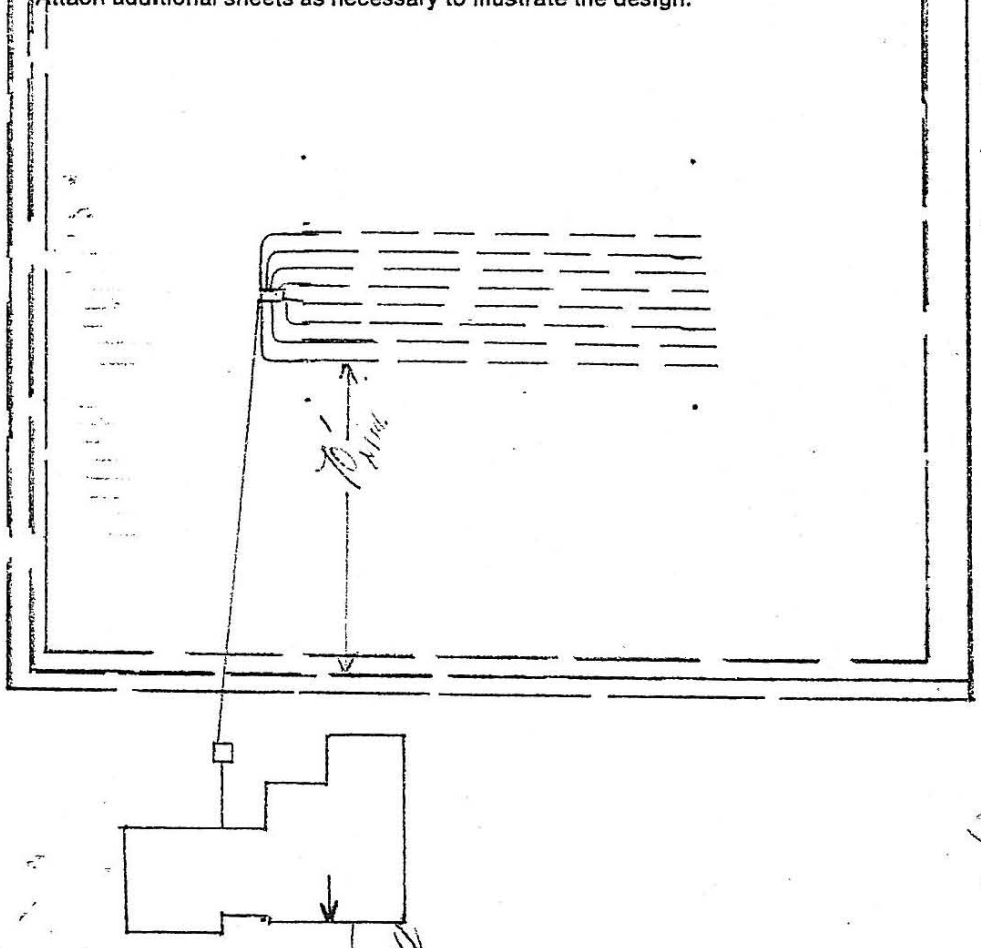
Health Department
Identification Number 235-90 7121

Schematic drawing of sewage disposal system and topographic features.

PAGE 2 OF 2

Show the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of the system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and reserve area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all sources of pollution within 100 feet.

☐ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.



1. Drainfield will require 4-100 Ft Lines 2 Ft wide
2. Septic Tank Must have at least 900 gal Cap.
3. Drainfield must be in area as shown on the Soil Drainage Management Plan.
4. well Must be at least 100 Ft From house Foundation & Drainfields.
5. Drainfield AREA Must be Landscaped & Graded to Comply w/ The Soil Drainage Management Plan. This Must be Inspected & Approved by This Office.

Designed for Three (3) bedrooms

The sewage disposal system is to be constructed as specified by the permit ☑ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 7-31-90 Issued by: Curtis L. Ethel
Sanitarian

Date: 7-31-90 Reviewed by: W R Hoddinott
Supervisory Sanitarian

This Construction Permit Valid until 1-2-

If FHA or VA financing

Reviewed by Date _____ _____ Date _____ _____
Supervisory Sanitarian Regional Sanitarian

C.H.S. 202B Revised 6/84

II-2A

FILE COPY

20051

ennings Laboratories Inc.
18 CYPRESS AVENUE
RGINIA BEACH, VA 23451
LEPHONE 804/425/1498
.CSIMILE 804/422/9176

ANALYTICAL CHEMISTS

ertificate of Analysis

TO Joe Wilkey
Remax Associates
123 S. Lynnhaven Road
Virginia Beach, Va 23452

DATE 3/18/94

SAMPLE DESCRIPTION Drinking water
Sample received 3/15/94 @ 1:35 p.m.
Sample taken 3/14/94 @ 5:00 p.m.
Sample Marked: 1465 Whittamore Road
Chesapeake, VA 23322

MS #62A Lot #10 HDID #234-93-0029

ANALYSIS NO. 94-713

Total Coliform . . . . . Negative

"This water sample is bacteriologically safe for consumption."

Copy: Chesapeake Health Dept

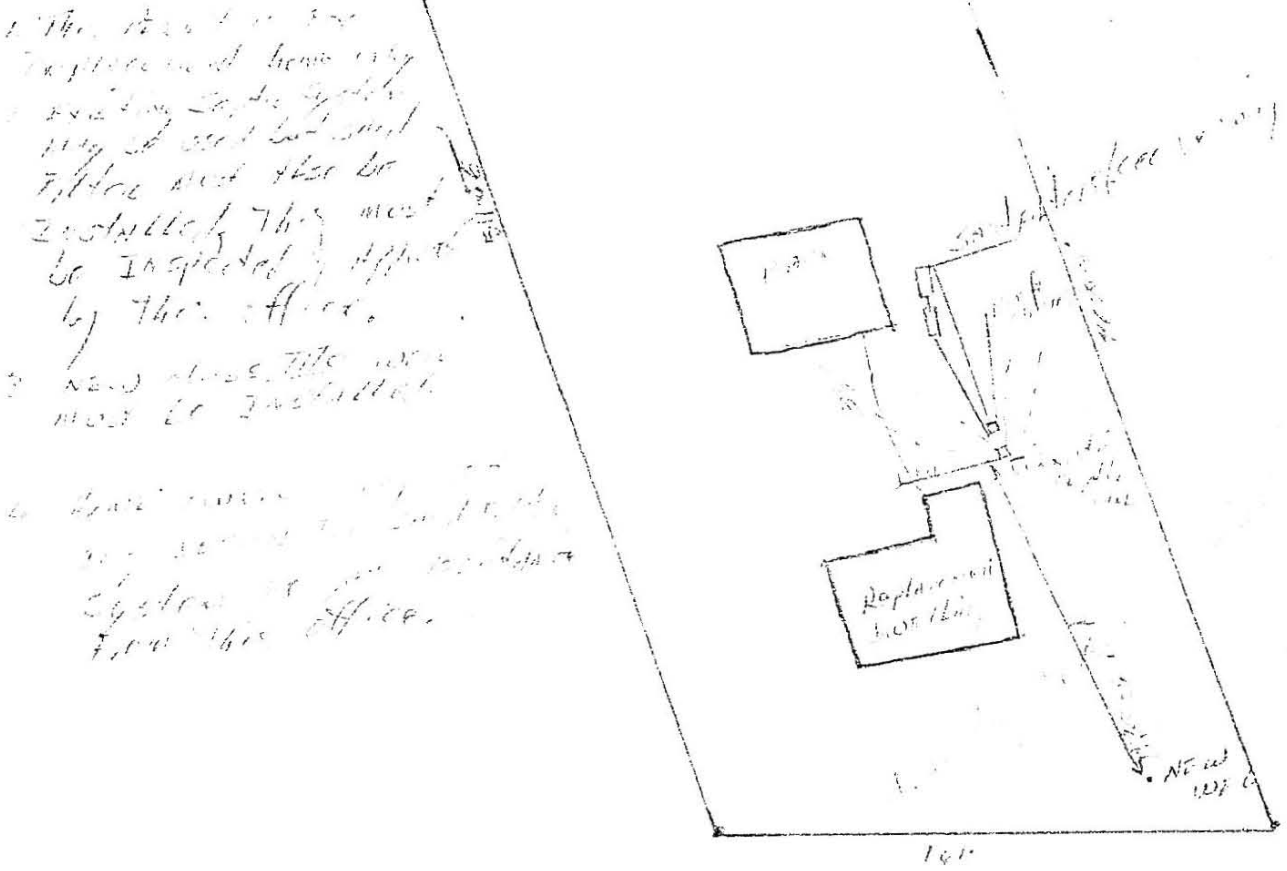
20052

Health Department
Identification Number _____

Schematic drawing of sewage disposal system and topographic features. PAGE __ OF 4

Show the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of the system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and reserve area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all sources of pollution within 100 feet.

☑ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.



The sewage disposal system is to be constructed as specified by the permit ☑ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 4-6-92 Issued by: _____ Sanitarian

Date: 4-6-92 Reviewed by: _____ Supervisory Sanitarian

This Construction Permit Valid until 10-11

If FHA or VA financing

Reviewed by Date _____ _____ Supervisory Sanitarian Date _____ _____ Regional Sanitarian

C.H.S. 202B Revised 6/84

II-2A

FILE COPY

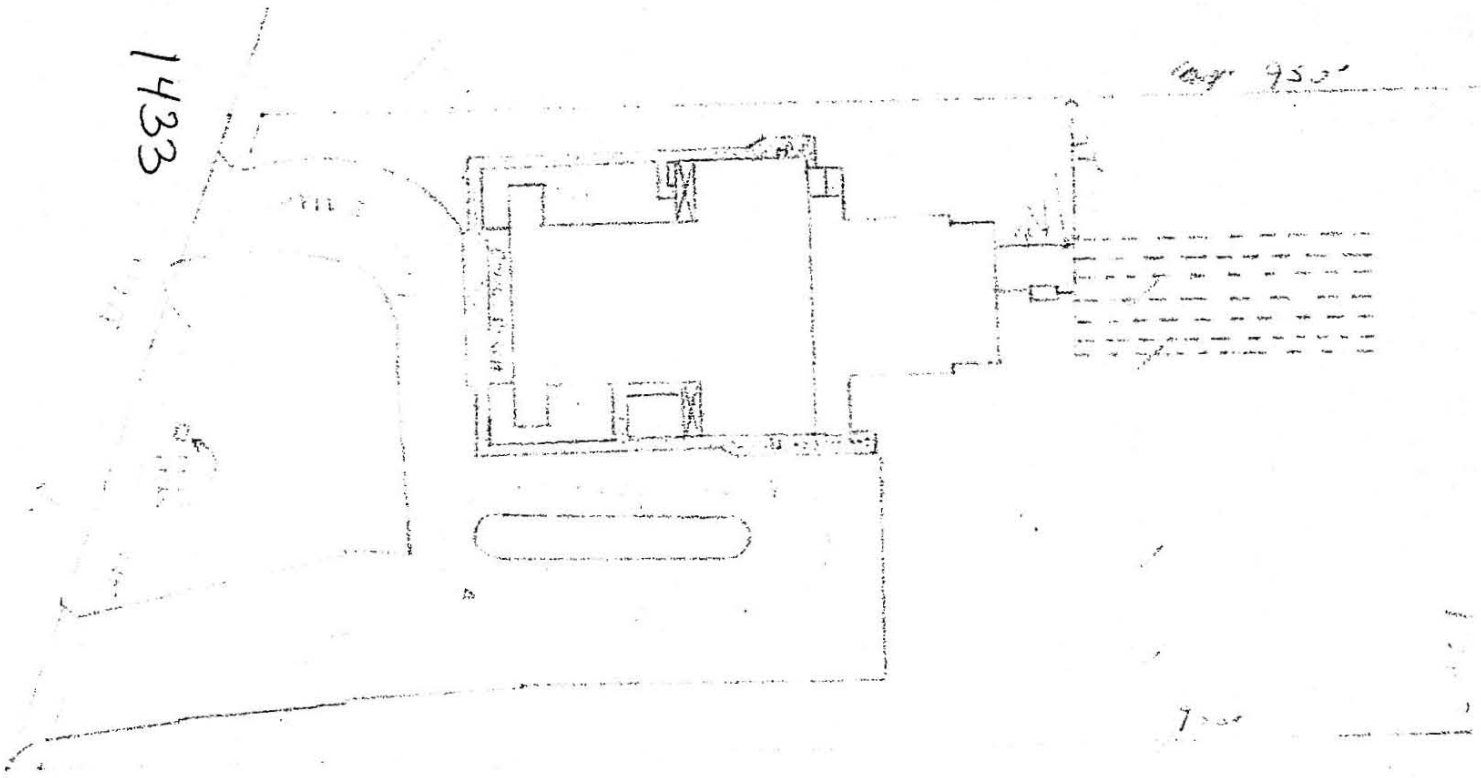
20053

Health Department
Identification Number 23A 91-1225

Schematic drawing of sewage disposal system and topographic features. PAGE 3 OF 3

Show the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of the system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and reserve area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all sources of pollution within 100 feet.

☐ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.



The sewage disposal system is to be constructed as specified by the permit ☐ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 1-24-91 Issued by: _____
Sanitarian

Date: _____ Reviewed by: _____
Supervisory Sanitarian

This Construction Permit Valid until 7-25

If FHA or VA financing

Reviewed by Date _____ _____ Date _____ _____
Supervisory Sanitarian Regional Sanitarian

C.H.S. 202B Revised 6/84

20054

COMMONWEALTH OF VIRGINIA

Form GW-2 1978-10,000

WATER WELL COMPLETION REPORT

(Certification of Completion/County Permit)

• BWCM No. ______

State Water Control Board
P. O. Box 11143
2111 North Hamilton St.
Richmond, Va. 23230

SWCB Permit ______
County Permit ______

Certification of inspecting official:
This well does ______ does not ______
meet code/low requirements.
S. ______
Date ______

For Office Use

County/City Chesapeake Va

County/City Stamp

• Virginia Plane Coordinates ______ N ______ E
Latitude & Longitude ______ N ______ W
Topo. Map No. ______
• Elevation ______ ft.
• Formation ______
• Lithology ______
River Basin ______
Province ______
Type Logs ______
Cuttings ______
Water Analysis ______
Aquifer Test ______

• Owner Jeffery S. Spicher
• Well Designation or Number Lot 41 new # 19 - Chesap-
Address 633 Biltmore Drive
Va. Beach Va.
Phone 4637953

• Drilling Contractor Joe Saunders Well Drilling
Address 941 Mt. Pleasant Rd
Chesapeake Va 23320
Phone 4821408

~~Tax Map~~ I.D. No. ______
Subdivision Greenhaven
Section MS-61C
Block ______
Lot old - 41 - new # 19
Class Well: I ______, IIA ______, IIB ______, IIIA ✓, IIIB ______, IIIC ______, IIID ______, IIIE ______

WELL LOCATION: ______ (feet/miles ______ direction) of ______
and ______ feet/miles ______ (direction) of ______
(If possible please include map showing location marked)

Date started 7-24-87 • Date completed 7-24-87 Type rig Hydraulic Drill

WELL DATA: New ✓ Reworked ______ Deepened ______

• Total depth 90 ft.
• Depth to bedrock 85 ft.
• Hole size (Also include reamed zones)
• 6 inches from 0 to 90 ft.
• ______ inches from ______ to ______ ft.
• ______ inches from ______ to ______ ft.

• Casing size (I.D.) and material
• 2 inches from 0 to 85 ft.
Material PVC
Wt. per foot ______ or wall thickness ______ in.
• ______ inches from ______ to ______ ft.
Material ______
Wt. per foot ______ or wall thickness ______ in.
• ______ inches from ______ to ______ ft.
Material ______
Wt. per foot ______ or wall thickness ______ in.

• Screen size and mesh for each zone (where applicable)
• 2 inches from 85 to 90 ft.
• Mesh size .012 Type PVC
• ______ inches from ______ to ______ ft.
• Mesh size ______ Type ______
• ______ inches from ______ to ______ ft.
• Mesh size ______ Type ______
• ______ inches from ______ to ______ ft.
• Mesh size ______ Type ______

Gravel pack
• From 80 to 90 ft.
• From ______ to ______ ft.

Grout
• From 0 to 22 ft., Type Cement
• From ______ to ______ ft., Type ______

2. WATER DATA • Water temperature 63° °F
• Static water level (unpumped level-measured) 8 ft.
• Stabilized measured pumping water level 16 ft.
• Stabilized yield 10 gpm after 2 hours
Natural Flow: Yes ______ No ✓, flow rate ______ gpm
Comment on quality Very good for this Area

3. WATER ZONES: From 40 To 45
From 85 To 90. From ______ To ______
From ______ To ______. From ______ To ______

4. USE DATA:
Type of use: Drinking ✓, Livestock Watering ______,
Irrigation ______ Food processing ______, Household ______
Manufacturing ______, Fire safety ______, Cleaning ______,
Recreation ______, Aesthetic ______, Cooling or heating ______,
Injection ______, Other ______
• Type of facility: Domestic ✓, Public water supply ______,
Public institution ______, Farm ______, Industry ______,
Commercial ______, Other ______

5. PUMP DATA: Type ______ • Rated H.P. 3/4 Max.
• Intake depth ______ • Capacity ______ at ______ head

6. WELLHEAD: Type well seal ______
Pressure tank ______ gal., Loc. ______
Sample tap ______, Measurement port ______
Well vent ✓, Pressure relief valve ______
Gate valve ______, Check valve (when required) at Well head
Electrical disconnect switch on power supply ______

7. DISINFECTION: Well disinfected ✓ yes ______ no
Date 7-24-87, Disinfectant used clorine
Amount 65/Nq/1, Hours used 1

8. ABANDONMENT (where applicable) • yes ______ no ✓
Casing pulled yes ______ no ______ not applicable ______
Plugging grout From ______ to ______ material ______

20055

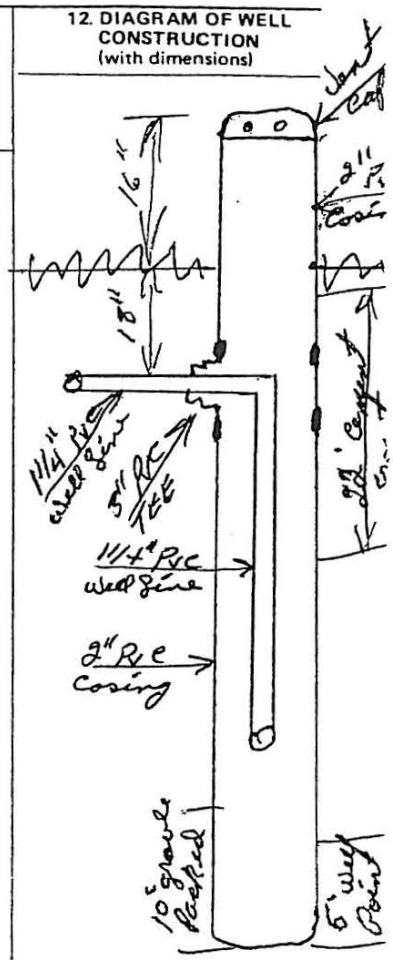
Joe Saunders

9. State law requires submitting to the Virginia State Water Control Board information about groundwater and wells for every well made in the State intended for water, or any other non-exempt well. This information must be submitted whether the well is completed, on standby, or abandoned. Information required includes: an accurately and completely prepared water well completion report, full data from any aquifer pumping tests, drill cuttings taken at ten foot intervals (unless exemption is secured), the results of any chemical analyses, and copies of any geophysical logs. Quarterly pumpage and use reports are required from owners of public supply and industrial wells. County or State permits to drill may be required in some parts of the state. Some counties require submission of a water well completion report. The Virginia State Health Department requires a water well completion report for public supply wells.

10. DRILLERS LOG (use additional Sheets if necessary)

DEPTH (feet) From	To	TYPE OF ROCK OR SOIL (color, material, fossils, hardness, etc.)	REMARKS (water, caving, cavities, broken, core, shot, (etc.)	11. Drilling Time (Min.)
0	10	clay silt sand		70
10	20	clay		
20	30	clay silt sand		
30	40	silt sand		
40	45	Bed Rock		
45	55	clay silt		
55	65	silt clay		
65	75	clay		
75	85	silt clay		
85	90	Bed Rock		

12. DIAGRAM OF WELL CONSTRUCTION (with dimensions)



13. Well lot dedicated? _____; Size _____ ft. X _____ ft.; Well house? _____
Distance to nearest pollutant source _____ ft., Type _____
Distance to nearest property line _____ ft., Building 100 ft.

14. WATER SERVICE PIPE: Checked under _____ p.s.i. for _____
minutes. Pipe size _____ inches, Material _____
Installer _____
Date _____

15. I certify that the information contained herein is true and correct and that this well and/or system has been installed and constructed in accordance with the requirements for well construction as specified in compliance with appropriate county or independent city ordinances and the laws and rules of the Commonwealth of Virginia.

Signature Joe Saunders (Seal), Date 7-24-87
(Well driller or authorized person)
License No. 70018

State Water Control Board Regional Offices

Valley Reg. Off.
116 North Main Street
P. O. Box 268
Bridgewater, Va. 22812
703-828-2595

Piedmont Reg. Off.
4010 West Broad Street
P. O. Box 6616
Richmond, Va. 23230
804-257-1006

Southwest Reg. Off.
408 East Main Street
P. O. Box 476
Abingdon, Va. 24210
703-628-5183

Tidewater Reg. Off.
287 Pembroke Office Park
Suite 310 Pembroke No. 2
Va. Beach, Va. 23462
804-499-8742

West Central Reg. Off.
Executive Park
5312 Peters Creek Road
Roanoke, Va. 24019
703-982-7432

Northern Virginia Reg. Off.
5515 Cherokee Avenue
Suite 404
Alexandria, Va. 22312
703-750-9111

20056

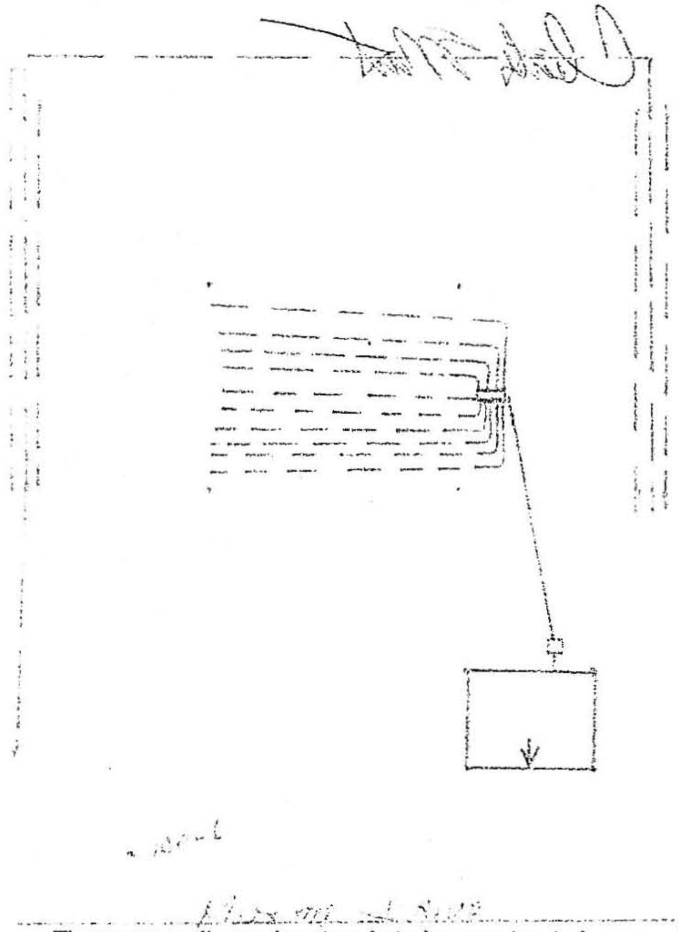
Health Department
Identification Number ____________

Schematic drawing of sewage disposal system and topographic features.

Show the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of the system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and reserve area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all sources of pollution within 100 feet.

Not To Scale

☐ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design. [illegible]



1. Drainfield will require [illegible] lines 3 ft wide.
2. Septic tank will require at least 1000 Gal Cap.
3. Drainfield must be [illegible] as shown on Soil Drainage Management Plan. Drain Field must be [illegible] 50 ft from any [illegible].
4. Landscaping & grading must comply with the Soil Drainage Management Plan. This must be [illegible] [illegible] [illegible].
5. Well must be [illegible] feet from house foundation & drainfields.

The sewage disposal system is to be constructed as specified by the permit ☑ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 6-2-87 Issued by: [signature]
Sanitarian

Date: 6-2-87 Reviewed by: [signature]
Supervisory Sanitarian

This Construction Permit Valid until ____________

If FHA or VA financing

Reviewed by Date ____________ ____________ Date ____________ ____________

Supervisory Sanitarian — Regional Sanitarian

C.H.S. 202B Revised 6/84

II-2A

20057

chesap.
lt. 94
\

MS# 6N

Commonwealth of Virginia
Uniform Water Well Completion Report

Owner albert Viola
Address Po Box 6186 chesap. Va

Phone 4873987
Location Murray Drive - in Green Haven
1328

Tax Map ID Sat. 42
VDH Permit 234-93-1138
VWCB Permit
VWCB ID
County

* Well Data *

General Information

Drilling Method Hyd-Drill	Date Completed 1-26-94	Total Depth of Well 45
Depth to Bedrock 30	Yield 20 (GPM)	Length of Test 2 HRS
Static Water Level 4	Stabilized Water Level 23	Natural Flow (Rate) no
Well Disinfected (Y or N) yes	Disinfectant Used clorine	Amount Used 65/N9/1

Casing

From 0 to 40	From ___ to ___	From ___ to ___
Size 2 Material pvc	Size ___ Material ___	Size ___ Material ___
Weight/Schedule ___	Weight/Schedule ___	Weight/Schedule ___

Gravel Pack

From 38 to 45	From ___ to ___	From ___ to ___

Grout

From 0 to 20	From ___ to ___	From ___ to ___
Bore Hole Size 6	Bore Hole Size ___	Bore Hole Size ___
Type Cement & Bent Seal	Type ___	Type ___
Method pour	Method ___	Method ___

Water Zones or Screened Intervals

From 40 to 45	From ___ to ___	From ___ to ___
Mesh Size .012 Diam. 2	Mesh Size ___ Diam. ___	Mesh Size ___ Diam. ___
From ___ to ___	From ___ to ___	From ___ to ___
Mesh Size ___ Diam. ___	Mesh Size ___ Diam. ___	Mesh Size ___ Diam. ___

* Use Data *

Private Well: Domestic ✓ Agricultural ___ Industrial ___ Municipal ___
Public Well: Community ___ Non Community ___

20058

Drillers Log
(Use additional sheets if necessary)

Depth	Description of Formation or Sediment	Rem
0 to 10'	clay silt sand	
10 - 20	silt sand	
20 - 25	clay silt sand	
25 - 35	Bed Rock silt sand	
35 - 45	Bed Rock	

I certify that the information contained here is true and that this well was installed and con[illegible]d in accordance with the permit and further that the well complies with all applicable state [illegible]ocal regulations, ordinances and laws.

Drilling Contractor Joe Saunders Well Drilling
Address 1941 Mt. Pleasant Rd
Chesapeake Va 23320
Phone 482-1408

Drillers Signature Joe Saunders Date 1-26-94
Representing
Virginia Contractors License Number 018280

20059

Health Department
Identification Number 234-93-1138

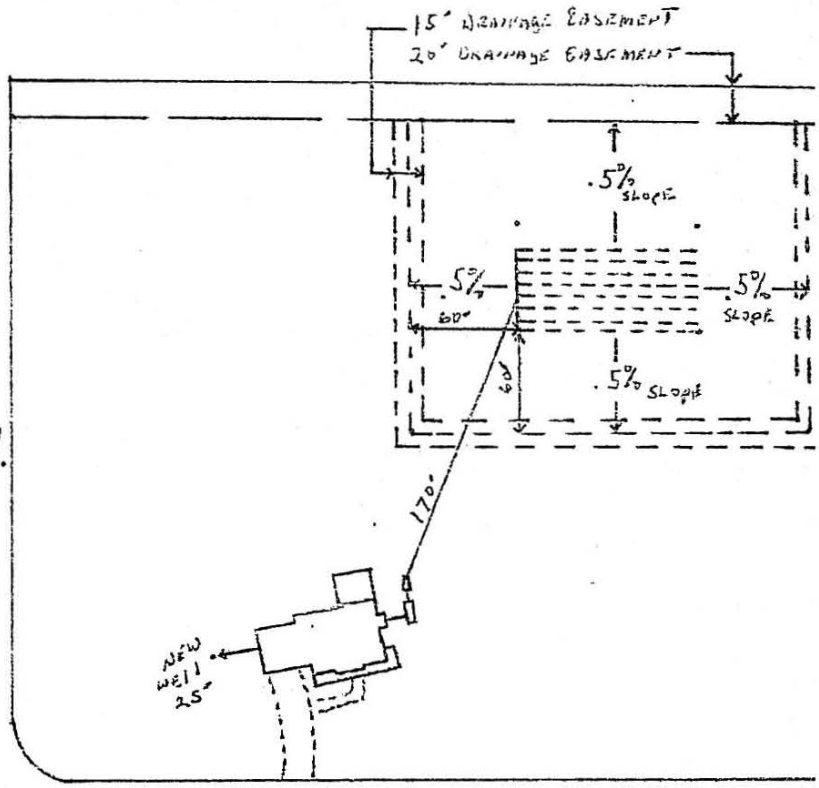
Schematic drawing of sewage disposal system and topographic features. PAGE 2 OF 3

Show the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of the system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and reserve area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all sources of pollution within 100 feet.

☐ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.

1) 8-2'x100' DRAINFIELD TRENCHES.
2) MAX. DEPTH of DRAINFIELD TRENCHES - 18".
3) GRADE BOARDS REQUIRED.
4) PUMP REQUIRED (SEE Pg 3 OF 3)
5) FOUR (4) BEDROOMS ONLY.
6) COMPLY W/APPROVED SOIL DRAINAGE MANAGEMENT PLAN.
7) FINAL GRADE MUST BE COMPLETED AND INSPECTED BY HEALTH DEPT.
8) KEEP WELL 25' FROM HOUSE, 50' FROM SEPTIC TANK & PUMP AND 100' FROM DRAINFIELD.
9) A G.W.-2 IS REQUIRED FROM WELL DRILLER.
10) WATER SAMPLE REQUIRED - MUST BE SCHEDULED W/ HEALTH DEPT.

SCALE 1" = 100'



The sewage disposal system is to be constructed as specified by the permit ☐ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 11-18-93 Issued by: Sanitarian

Date: 11-18-93 Reviewed by: Supervisory Sanitarian

This Construction Permit Valid until 5-95

If FHA or VA financing

Reviewed by Date _____ Supervisory Sanitarian Date _____ Regional Sanitarian

C.H.S. 202B Revised 6/84

20060

orm GW-2
978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT
(Certification of Completion/County Permit)

• BWCM No. _____

ter Control Board
x 11143
11 North Hamilton St.
lichmond, Va. 23230

SWCB Permit _____
County Permit _____
Certification of inspecting official:
This well does ____ does not ____ meet code/low requirements.
S. _____
Date _____
For Office Use

County/City _____
County/City Stamp

• Virginia Plane Coordinates
_____ N
_____ E
Latitude & Longitude
_____ N
_____ W
• Topo. Map No. _____
• Elevation _____ ft.
• Formation _____
• Lithology _____
• River Basin _____
• Province _____
• Type Logs _____
• Cuttings _____
• Water Analysis _____
• Aquifer Test _____

• Owner WHITLEY
• Well Designation or Number _____
Address 1305 MURRAY DR
CHESAPEAKE
Phone _____

• Drilling Contractor PINKSTON PUMP & WELL CO
Address 2525 ONTRADA DR
VIRGINIA BEACH VA
Phone 804-426-2018

Tax Map I.D. No. _____
Subdivision _____
Section _____
Block _____
Lot _____
Class Well: I ____, IIA ____,
IIB ____, IIIA ____, IIIB ____
IIIC ✓ IIID ____ IIIE ____

WELL LOCATION: _____ (feet/miles _____ direction) of _____
and _____ feet/miles _____ (direction) of _____
(If possible please include map showing location marked)

Date started 11/21 • Date completed 11/21/86 Type rig H&B · TOP DRIVE

WELL DATA: New ✓ Reworked ____ Deepened ____
depth 42 ft.
to bedrock — ft.
• Hole size (Also include reamed zones)
• 4½ inches from 0 to 42 ft.
• _____ inches from _____ to _____ ft.
• _____ inches from _____ to _____ ft.
• Casing size (I.D.) and material
• 2 inches from 0 to 20 ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• 1¼ inches from 20 to 32 ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• Screen size and mesh for each zone (where applicable)
• 1¼ inches from 32 to 42 ft.
• Mesh size .010 Type PVC
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
I pack
rom 30 to 42 ft.
• From _____ to _____ ft.
• Grout
• From 0 to 20 ft., Type PORTLAND
• From _____ to _____ ft., Type _____

2. WATER DATA • Water temperature 60 °F
• Static water level (unpumped level-measured) 8 ft.
• Stabilized measured pumping water level 10 ft.
• Stabilized yield 25 gpm after 1½ hours
Natural Flow: Yes ____ No ✓, flow rate: _____ g pm
Comment on quality 20 FE

3. WATER ZONES: From 20 To 42
From _____ To _____ . From _____ To _____
From _____ To _____ . From _____ To _____

4. USE DATA:
Type of use: Drinking ✓, Livestock Watering ____,
Irrigation ____ Food processing ____, Household ____,
Manufacturing ____, Fire safety ____, Cleaning ____,
Recreation ____, Aesthetic ____, Cooling or heating ____,
Injection ____, Other _____
• Type of facility: Domestic ✓, Public water supply ____,
Public institution ____, Farm ____, Industry ____,
Commercial ____, Other _____

5. PUMP DATA: Type _____ • Rated H.P. _____
• Intake depth _____ • Capacity _____ at _____ head

6. WELLHEAD: Type wellseal _____
Pressure tank _____ Gal. Loc. _____
Sample tap _____, Measurement port _____
Well vent _____ Pressure relief valve _____
Gate valve _____ Check valve (when required) _____
Electrical disconnect switch on power supply _____

7. DISINFECTION: Well disinfected ✓ yes ____ no
Date 11/21/86 Disinfectant used CHLORINE DIOX
Amount 402 How used 48

8. ABANDONMENT (where applicable) yes ____ no ____
Casing pulled yes ____ no ____ not applicable ____
Plugging grout From _____ to _____ material _____

20061

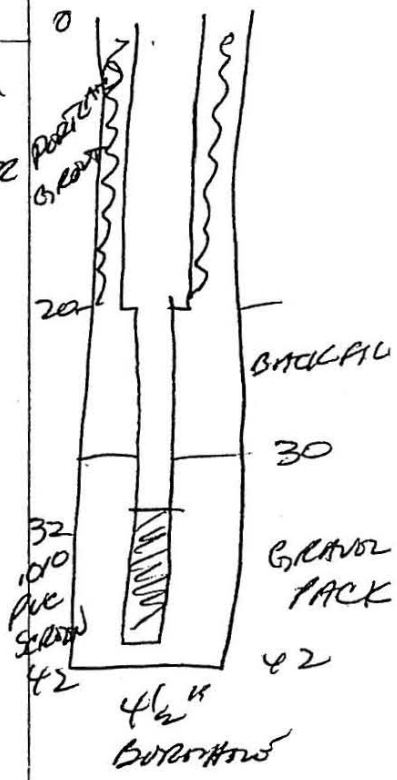
Owner _____ BWCM No. _____

9. State law requires submitting to the Virginia State Water Control Board information about groundwater and wells for every well made in the State intended for water, or any other non-exempt well. This information must be submitted whether the well is completed, on standby, or abandoned. Information required includes: an accurately and completely prepared water well completion report, full data from any aquifer pumping tests, drill cuttings taken at ten foot intervals (unless exemption is secured), the results of any chemical analyses, and copies of any geophysical logs. Quarterly pumpage and use reports are required from owners of public supply and industrial wells. County or State permits to drill may be required in some parts of the state. Some counties require submission of a water well completion report. The Virginia State Health Department requires a water well completion report for public supply wells.

10. DRILLERS LOG (use additional Sheets if necessary)

DEPTH (feet) From	To	TYPE OF ROCK OR SOIL (color, material, fossils, hardness, etc.)	REMARKS (water, caving, cavities, broken, core, shot, (etc.)	11. Drilling Time (Min.)
0	12	TOP SOIL CLAY & SAND		↑
12	20	FINE SAND		1 HR
20	42	COARSE SAND & GRAVEL		↓

12. DIAGRAM OF WELL CONSTRUCTION (with dimensions)



13. Well lot dedicated? _____; Size _____ ft. X _____ ft.; Well house? _____
Distance to nearest pollutant source _____ ft., Type _____
Distance to nearest property line _____ ft., Building _____ ft.

14. WATER SERVICE PIPE: Checked under _____ p.s.i. for _____
minutes. Pipe size _____ inches, Material _____
Installer _____
Date _____

15. I certify that the information contained herein is true and correct and that this well and/or system has been installed and constructed in accordance with the requirements for well construction as specified in compliance with appropriate county or independent city ordinances and the laws and rules of the Commonwealth of Virginia.

Signature Larry Rountree (Seal), Date 11/21/84
(Well driller or authorized person)
License No. 030472

State Water Control Board Regional Offices

Valley Reg. Off.
116 North Main Street
P. O. Box 268
Bridgewater, Va. 22812
703-828-2595

Piedmont Reg. Off.
4010 West Broad Street
P. O. Box 6616
Richmond, Va. 23230
804-257-1006

Southwest Reg. Off.
408 East Main Street
P. O. Box 476
Abingdon, Va. 24210
703-628-5183

Tidewater Reg. Off.
287 Pembroke Office Park
Suite 310 Pembroke No. 2
Va. Beach, Va. 23462
804-499-8742

West Central Reg. Off.
Executive Park
5312 Peters Creek Road
Roanoke, Va. 24019
703-982-7432

Northern Virginia Reg. Off.
5515 Cherokee Avenue
Suite 404
Alexandria, Va. 22312
703-750-9111

20062

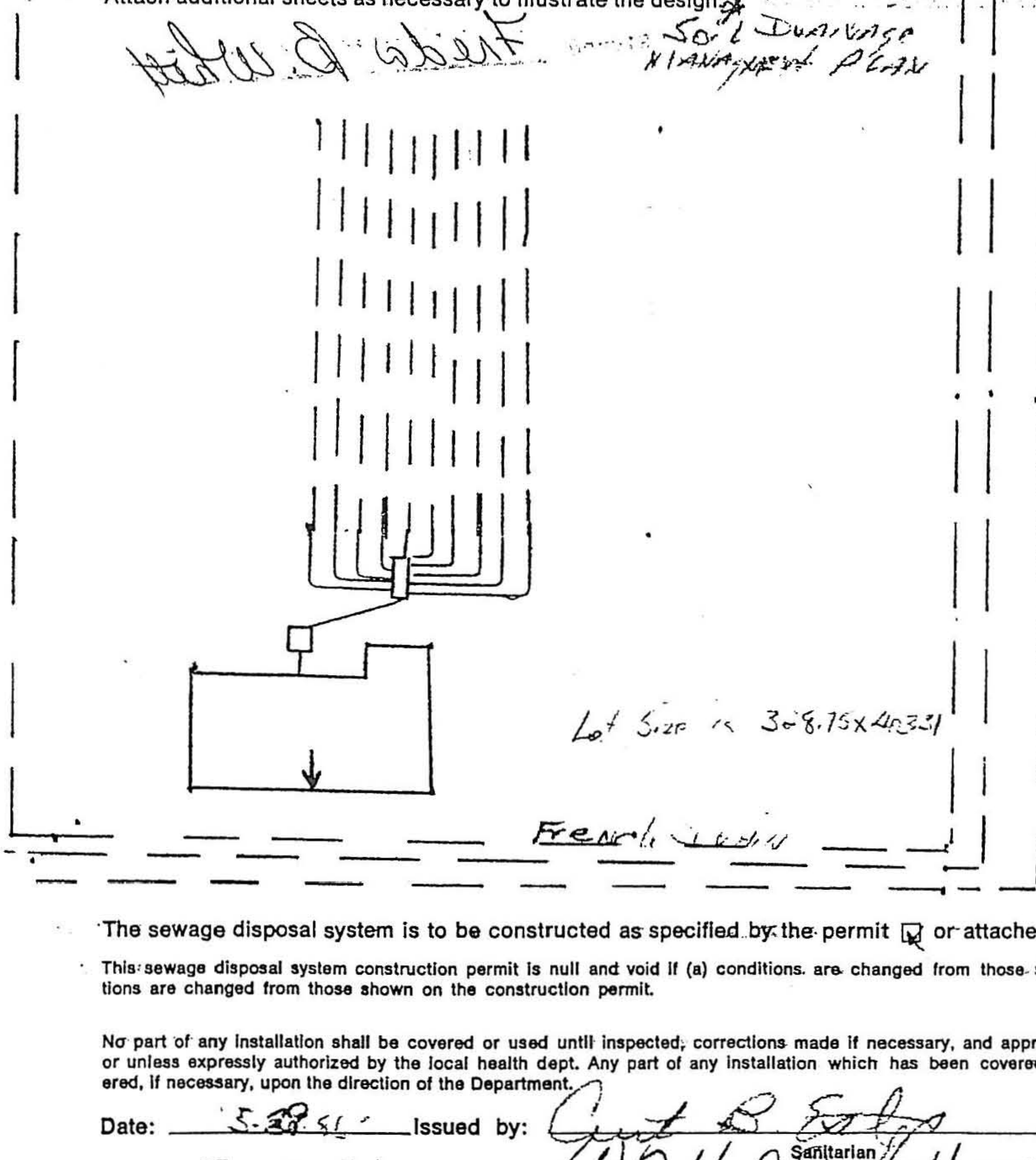
Health Department
Identification Number ______________

Schematic drawing of sewage disposal system and topographic features.

Show the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of the system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and reserve area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all sources of pollution within 100 feet.

Not To Scale

☑ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.



1. Drain Field will Require 10-100 Ft Line 2 Ft wide.
2. Septic tank will Require 900 GAL. Cap.
3. Distribution box Must have 10 [illegible]
4. Drain Field Must be in Area as shown on Soil Drainage Management Plan. Landscaping & grading Must Comply with plan & be inspected by this office prior to house being occupied.
5. Well Must be 100 Ft From Drainfield & house Foundation.
6. Keep all underground utilities at least [illegible] Ft From septic system

The sewage disposal system is to be constructed as specified by the permit ☑ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 5-28-86 Issued by: [signature]
Sanitarian

Date: 5-29-86 Reviewed by: WR Holdinott [signature]
Supervisory Sanitarian

This Construction Permit Valid until 11-88

If FHA or VA financing

Reviewed by Date ______________ ______________ Date ______________ ______________
Supervisory Sanitarian Regional Sanitarian

C.H.S. 202B Revised 6/84

20063

20064

THIS BOTTLE CONTAINS THIOSULPHATE

FORM LHS-154

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF GENERAL SERVICES
DIVISION OF CONSOLIDATED LABORATORY SERVICES - BUREAU OF MICROBIOLOGICAL SCIENCE

REPORT ON BACTERIOLOGICAL EXAMINATION OF WATER

DO NOT WRITE IN SPACE BELOW.

PUBLIC SUPPLY
Community ☐
Non-Community ☐

NON-PUBLIC SUPPLY ☒

DATE COLLECTED 7/27 TIME 10:15 NAME OF CITY OR COUNTY Chesapeake

NAME OF SUPPLY 1321 Murray Dr

SUPPLY OWNED BY Johnny Robinson

SAMPLE COLLECTED BY Pvt. E. Hughes

SAMPLE WAS TAKEN FROM Sustaion Faucet (WELL; APPROVED TAP, ETC.)

IS SUPPLY CHLORINATED? YES ☐ NO ☒

WAS CHLORINE TEST MADE AT SAMPLING POINT YES ☐ NO ☒

RES. CL. _____ PPM.

- REPORT RESULTS TO -

PRINT
Johnny Robinson
1321 Murray Dr.
Chesapeake, Va 23320

See reverse side for collection information

DCLS-02-078 (REV. 3-79)

Portion Of Sample Tested	Bact. of Coliform Group	Portion Of Sample Tested	Bact. of Coliform Group	SAMPLE NO.
.0001 ml.		10 ml.	—	18552
.001 ml.		10 ml.	—	
.01 ml.		10 ml.	—	RECEIVED PD Chief #1127
.1 ml.		10 ml.	—	
1 ml.		10 ml.	—	COMPLETED 8-3-87 TL-RM

Membrane Filter _____ Coliforms per 100 ml.

Results Based on Confirmed Tests Unless Otherwise Specified

+ Opposite Portion Tested Means Bacteria Indicating Contamination WERE Present.

— Means Bacteria Indicating Contamination WERE NOT Present.

Health Department
Identification Number 234-86-0268

Schematic drawing of sewage disposal system and topographic features. PAGE 1 OF 2

Show the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of the system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and reserve area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all sources of pollution within 100 feet.

NOT TO SCALE

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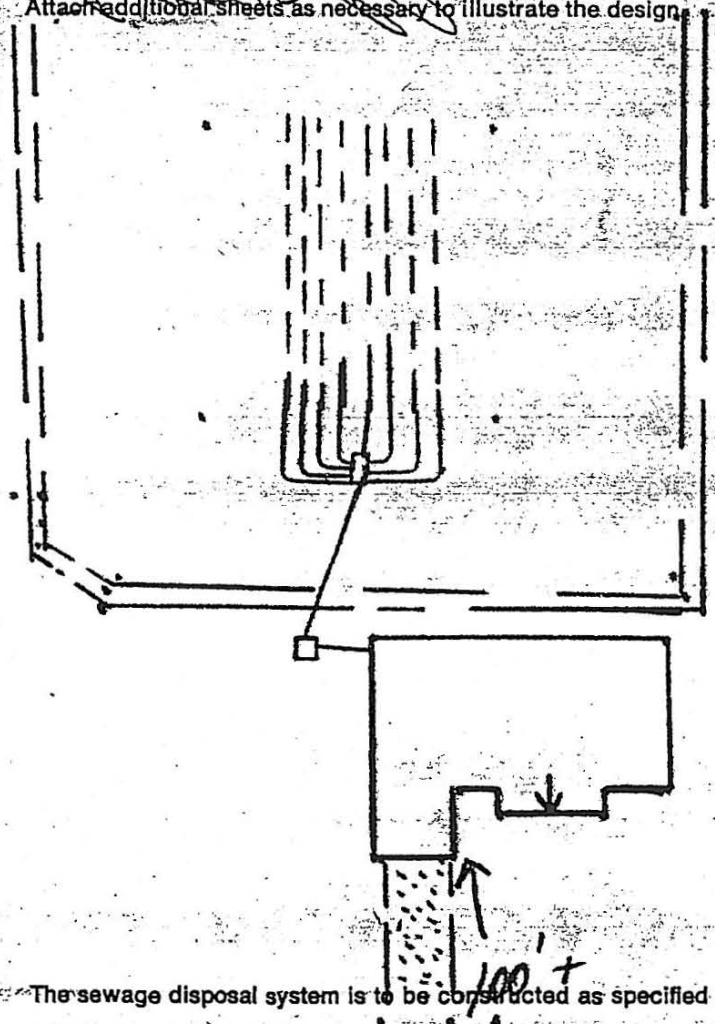

1. DRAINFIELD WILL REQUIRE 8-100FT LINES 3FT WIDE.
2. SEPTIC TANK MUST HAVE AT LEAST 1000 GAL. CAP.
3. DRAINFIELD MUST BE IN AREA AS SHOWN ON SOIL DRAINAGE MANAGMENT PLAN
4. LANDSCAPING & GRADING MUST COMPLY WITH ESCP'S THIS MUST BE INSPECTED & APPROVED BY THIS OFF. PRIOR TO HOUSE CONSTR.
5. WELL MUST BE AT LEAST 100FT FROM UNDER GROUND HOUSE FOUNDATION.
6. KEEP ALL UNDERGROUND UTILITY AT LEAST 10FT FROM SEPTIC SYSTEM.

The sewage disposal system is to be constructed as specified by the permit ☑ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 6-25-86 Issued by: [signature] Sanitarian

Date: 6-26-86 Reviewed by: [signature] Supervisory Sanitarian

This Construction Permit Valid until 6-88

If FHA or VA financing

Reviewed by Date _____ Supervisory Sanitarian

Date _____ Regional Sanitarian

20065

hematic drawing of sewage disposal system and topographic features. PAGE ____ OF ____

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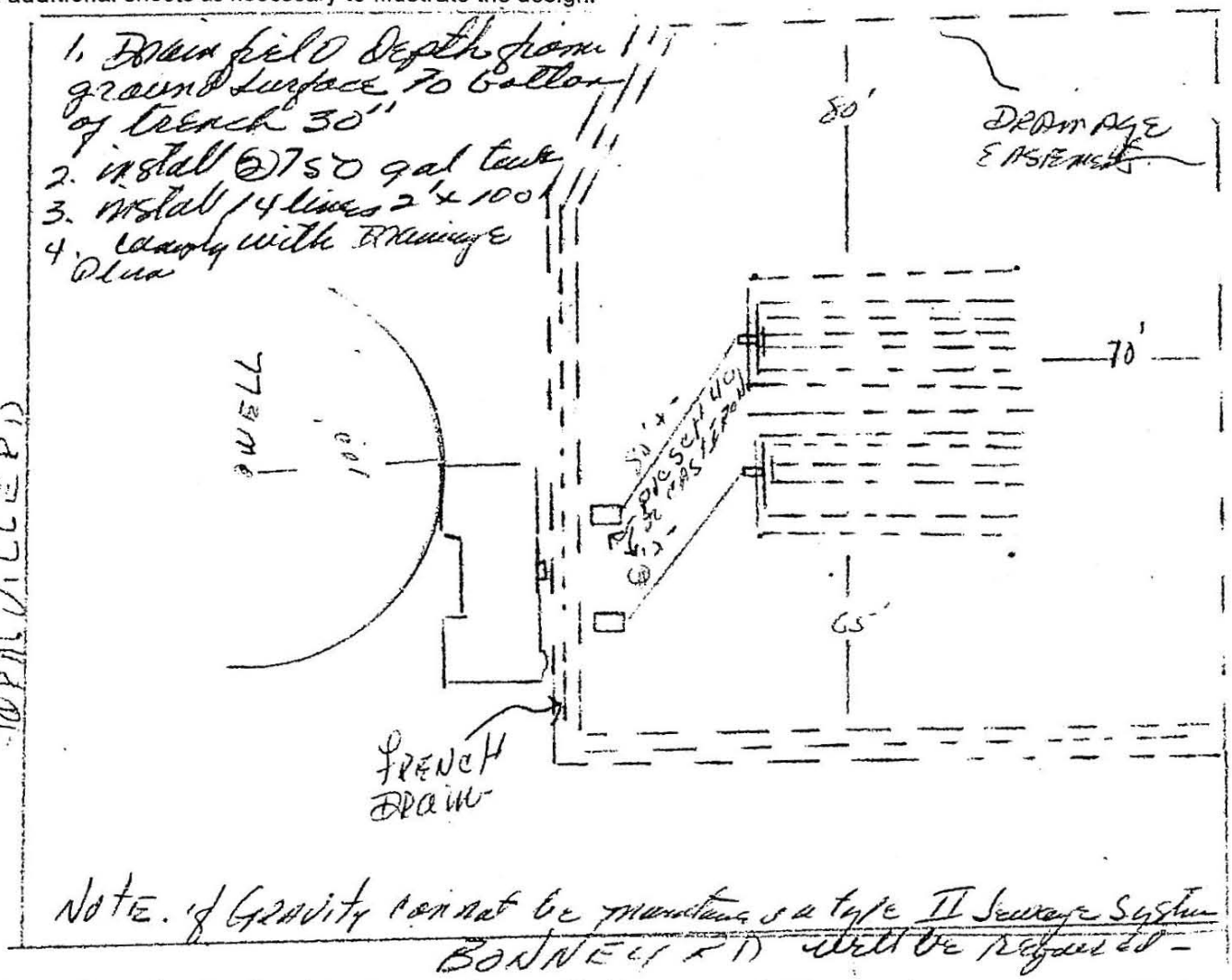
NOT TO SCALE

The information required above has been drawn on the attached copy of the sketch submitted with the application. ttach additional sheets as necessary to illustrate the design.



Note. If Gravity cannot be maintained a type II Sewage System BOARD APPROVED will be required -

he sewage disposal system is to be constructed as specified by the permit ☐ or attached plans and specifications ☐.

his sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit. If construction has not commenced within 12 months of date of issuance, the nstruction permit must be revalidated.

) part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

ate: 5-23-1984 Issued by: _____ Sanitarian

ate: 5-23-84 Reviewed by: _____ Supervisory Sanitarian

If FHA or VA financing

eviewed by Date _____ _____ Date _____ _____

Supervisory Sanitarian Regional Sanitarian

20066

orm GW-2
978-10,000

COMMONWEALTH OF VIRGINIA MS 61C Bl Lot 20

WATER WELL COMPLETION REPORT • BWCM No. _____

(Certification of Completion/County Permit)

tate Water Control Board
O. Box 11143
111 North Hamilton St.
ichmond, Va. 23230

SWCB Permit _____
County Permit _____
Certification of inspecting official:
This well does ____ does not ____ meet code/low requirements.
S. _____
Date _____
For Office Use

ounty/City _____

County/City Stamp

Virginia Plane Coordinates
_____ N
_____ E
Latitude & Longitude
_____ N
_____ W
Topo. Map No. _____
Elevation _____ ft.
Formation _____
Lithology _____
River Basin _____
Province _____
Type Logs _____
Cuttings _____
Water Analysis _____
Aquifer Test _____

• Owner (Builder) Don Hansen (John Munday)
• Well Designation or Number _____
Address 1204 Murray
Chesapeake Va
Phone 482 5709

• Drilling Contractor Johnson Well Drilling
Address 232 Green St.
Chesapeake, Va
Phone 487-0561

Tax Map I.D. No. _____
Subdivision _____
Section 61C
Block 1
Lot 20
Class Well: I _____, IIA _____, IIB _____, IIIA _____, IIIB _____, IIIC _____ IIID _____ IIIE _____

WELL LOCATION: _____(feet/miles _____direction) of _____
and _____feet/miles _____(direction) of _____
(If possible please include map showing location marked)

Date started 9/15/86 • Date completed _____ Type rig Rotary

WELL DATA: New ✓ Reworked _____ Deepened _____
Total depth 80 ft.
Depth to bedrock _____ ft.
Hole size (Also include reamed zones)
• 3⅞ inches from 0 to 80 ft.
• _____ inches from _____ to _____ ft.
• _____ inches from _____ to _____ ft.
Casing size (I.D.) and material
• 2 inches from 0 to 20 ft.
Material PVC
Wt. per foot _____ or wall thickness Sch 40 in.
• 4 inches from 0 to 80 ft.
Material PVC
Wt. per foot _____ or wall thickness Sch 40 in.
• _____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
Screen size and mesh for each zone (where applicable)
• 4 inches from 67 to 80 ft.
• Mesh size .010 Type PVC
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
Gravel pack
• From 66 to 80 ft.
• From _____ to _____ ft.
Grout
• From -1 to 20 ft., Type Portland
• From _____ to _____ ft., Type _____

2. WATER DATA • Water temperature _____ °F
• Static water level (unpumped level-measured) 8 ft.
• Stabilized measured pumping water level 10 ft.
• Stabilized yield 12 gpm after 1 hours
Natural Flow: Yes ____ No ____, flow rate. _____ g pm
Comment on quality _____

3. WATER ZONES: From 7 To 45
From 65 To 80. From _____ To _____
From _____ To _____. From _____ To _____

4. USE DATA:
Type of use: Drinking ✓, Livestock Watering _____,
Irrigation _____ Food processing _____, Household _____,
Manufacturing _____, Fire safety ___, Cleaning _____,
Recreation _____, Aesthetic _____, Cooling or heating _____,
Injection _____, Other _____
• Type of facility: Domestic ✓, Public water supply _____,
Public institution _____, Farm _____, Industry _____,
Commercial _____, Other _____

5. PUMP DATA: Type _____ • Rated H.P. _____,
• Intake depth _____ • Capacity _____ at _____ head

6. WELLHEAD: Type well seal _____
Pressure tank _____ gal., Loc. _____
Sample tap _____, Measurement port _____
Well vent _____, Pressure relief valve _____
Gate valve _____, Check valve (when required) _____
Electrical disconnect switch on power supply _____

7. DISINFECTION: Well disinfected ✓ yes _____ no
Date _____, Disinfectant used _____
Amount _____, Hours used _____

8. ABANDONMENT (where applicable) • yes ____ no ____
Casing pulled yes ____ no ____ not applicable _____
Plugging grout From _____ to _____ material _____

OVER

20067

Owner

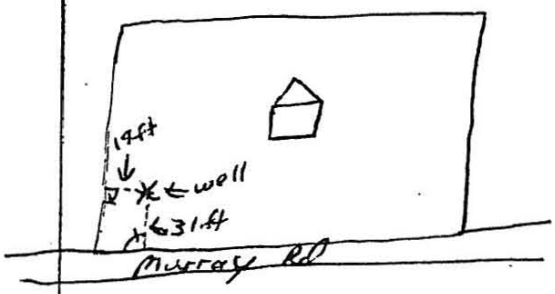
BWCM No.

9. State law requires submitting to the Virginia State Water Control Board information about groundwater and wells for every well made in the State intended for water, or any other non-exempt well. This information must be submitted whether the well is completed, on standby, or abandoned. Information required includes: an accurately and completely prepared water well completion report, full data from any aquifer pumping tests, drill cuttings taken at ten foot intervals (unless exemption is secured), the results of any chemical analyses, and copies of any geophysical logs. Quarterly pumpage and use reports are required from owners of public supply and industrial wells. County or State permits to drill may be required in some parts of the state. Some counties require submission of a water well completion report. The Virginia State Health Department requires a water well completion report for public supply wells.

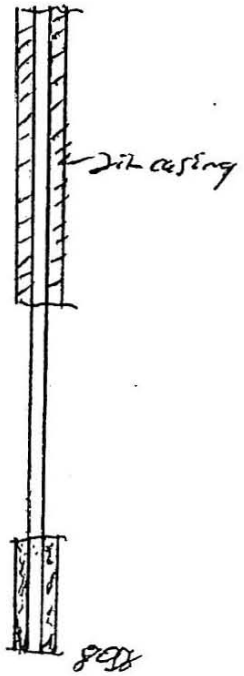
10. DRILLERS LOG (use additional Sheets if necessary)

DEPTH (feet) From	To	TYPE OF ROCK OR SOIL (color, material, fossils, hardness, etc.)	REMARKS (water, caving, cavities, broken, core, shot, (etc.)	11. Drilling Time (Min.)
0	7	clay		
7	45	gray sand		
45	65	clay		
65	80	gray sand		

Well Location



12. DIAGRAM OF WELL CONSTRUCTION (with dimensions)



13. Well lot dedicated? _____; Size _____ ft. X _____ ft.; Well house? _____
Distance to nearest pollutant source _____ ft., Type _____
Distance to nearest property line _____ ft., Building _____ ft.

14. WATER SERVICE PIPE: Checked under _____ p.s.i. for _____ minutes. Pipe size _____ inches, Material _____
Installer _____
Date _____

15. I certify that the information contained herein is true and correct and that this well and/or system has been installed and constructed in accordance with the requirements for well construction as specified in compliance with appropriate county or independent city ordinances and the laws and rules of the Commonwealth of Virginia.

Signature Frederick Johnson (Seal), Date 10/26/84
(Well driller or authorized person)
License No. 033160

State Water Control Board Regional Offices

Valley Reg. Off.
116 North Main Street
P. O. Box 268
Bridgewater, Va. 22812
703-828-2595

Piedmont Reg. Off.
4010 West Broad Street
P. O. Box 6616
Richmond, Va. 23230
804-257-1006

Southwest Reg. Off.
408 East Main Street
P. O. Box 476
Abingdon, Va. 24210
703-628-5183

Tidewater Reg. Off.
287 Pembroke Office Park
Suite 310 Pembroke No. 2
Va. Beach, Va. 23462
804-499-8742

West Central Reg. Off.
Executive Park
5312 Peters Creek Road
Roanoke, Va. 24019
703-982-7432

Northern Virginia Reg. Off.
5515 Cherokee Avenue
Suite 404
Alexandria, Va. 22312
703-750-9111

20068

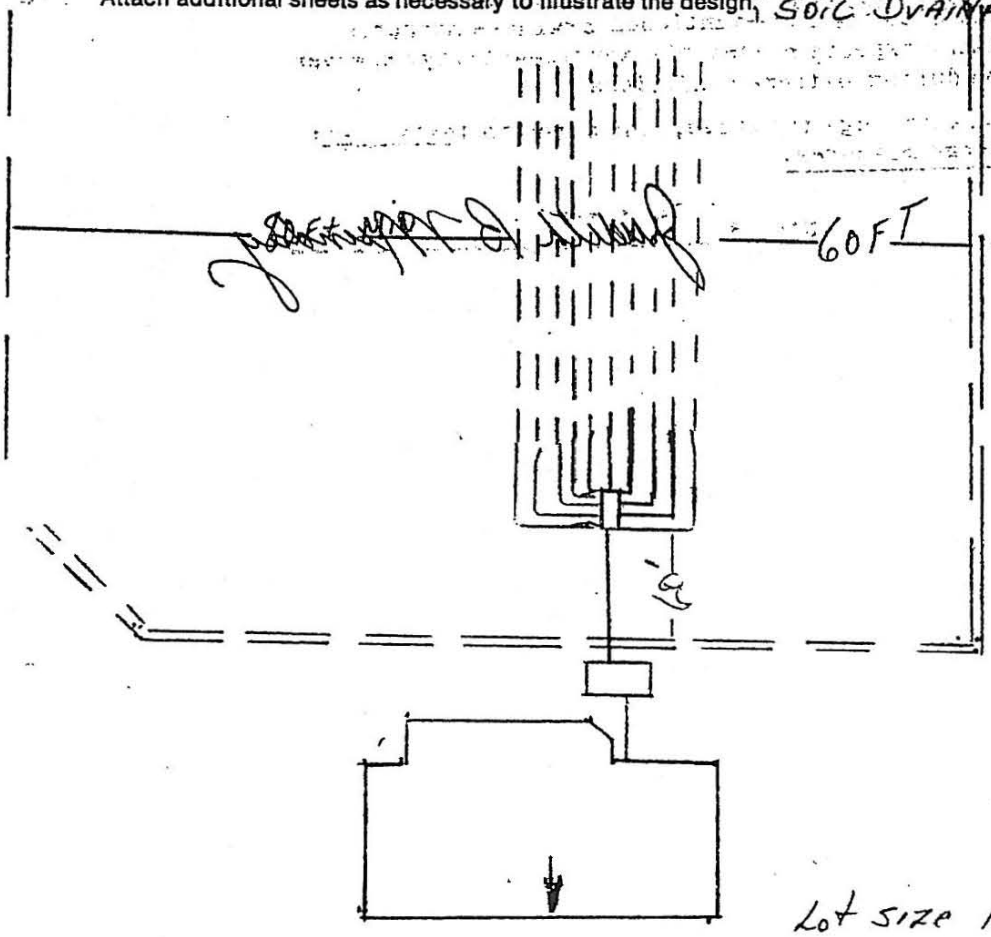
Health Department Identification Number 234-86-0199

Schematic drawing of sewage disposal system and topographic features. PAGE 2 OF 2

Show the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of the system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and reserve area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all sources of pollution within 100 feet.

NOT TO SCALE

☒ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.



SOIL DRAINAGE MANAGEMENT PLAN

1. DRAINFIELD WILL REQUIRE 10-100FT LINES 2FT WIDE
2. SEPTIC TANK WILL REQUIRE 1000GAL CAP.
3. DRAINFIELD MUST BE IN AREA SHOWN ON S.D.M.P. LANDSCAPING GRADING MUST COMPLY WITH S.D.M.P. & BE INSPECTED BY THIS OFF PRIOR TO HOUSE BEING OCC
4. WELL MUST BE 100FT FROM HOUSE FOUNDATIONS & DRAINFIELD
5. KEEP ALL UNDERGROUND UTILITIES 10 FT FROM SEPTIC SYSTEM.

Lot size is 3 Acres

The sewage disposal system is to be constructed as specified by the permit ☐ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 5-7-86 Issued by: Curtis C. Estes
Sanitarian

Date: 5-9-86 Reviewed by: W R Hollowell
Supervisory Sanitarian

This Construction Permit Valid until 11-88

If FHA or VA financing

Reviewed by Date _____ _____ Date _____ _____
Supervisory Sanitarian Regional Sanitarian

20069

Occupancy Case #134-86-0199
ms 61C [illegible]

PUBLIC SUPPLY
Community ☐
Non-Community ☐

NON-PUBLIC SUPPLY ☒

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF GENERAL SERVICES
DIVISION OF CONSOLIDATED LABORATORY SERVICES - BUREAU OF MICROBIOLOGICAL SCIENCE

REPORT ON BACTERIOLOGICAL EXAMINATION OF WATER

THIS BOTTLE CONTAINS THIOSULPHATE

FORM LHS-154

DATE COLLECTED 4/28/87 TIME 10:25 NAME OF CITY ~~OR~~ COUNTY Chesapeake

NAME OF SUPPLY 1204 Murray Dr.

SUPPLY OWNED BY John C. Mundey

SAMPLE COLLECTED BY Robt. E. Hughes

SAMPLE WAS TAKEN FROM Kitchen Faucet (WELL; APPROVED TAP, ETC.)

SUPPLY CHLORINATED? YES ☐ NO ☒

WAS CHLORINE TEST MADE AT SAMPLING POINT YES ☐ NO ☒

RES. CL. ________ PPM.

1987 APR 28 AM 10: 06

- REPORT RESULTS TO -

PRINT
Chesapeake Health Dept.
P.O. Box 1463
Chesapeake, VA. 23320

See reverse side for collection information

DCLS-02-078 (REV. 3-79) Ph. 482-5709

DO NOT WRITE IN SPACE BELOW.

Portion Of Sample Tested	Bact. of Coliform Group	Portion Of Sample Tested	Bact. of Coliform Group
.0001 ml.		ml.	+
.001 ml.		ml.	—
.01 ml.		10 ml.	—
.1 ml.		10 ml.	—
1 ml.		10 ml.	—

Repeated 5-6-87

SAMPLE NO. 08255

RECEIVED NIC r

COMPLETED 5/4/87 G

Membrane Filter ________ Coliforms per 100 ml.

Results Based on Confirmed Tests Unless Otherwise Specified

\+ Opposite Portion Tested Means Bacteria Indicating Contamination WERE Present.

— Means Bacteria Indicating Contamination WERE NOT Present.

Sample #1

20070

Occupancy
Cont. 234-86-0194
M561C Lot# 20

NON-PUBLIC SUPPLY ☒

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF GENERAL SERVICES
DIVISION OF CONSOLIDATED LABORATORY SERVICES

Sample #08255 of First Report

REPORT ON BACTERIOLOGICAL EXAMINATION OF WATER

THIS BOTTLE CONTAINS THIOSULPHATE

DATE COLLECTED 5-6-87 TIME 10:55 NAME OF CITY OR COUNTY Chesapeake

ADDRESS OF SUPPLY 804 Murray Dr.

SUPPLY OWNED BY John C. McInday

SAMPLE COLLECTED BY Robt. E. Hughes

SAMPLE WAS TAKEN FROM Outside Faucet (WELL; APPROVED TAP, ETC.)

IS SUPPLY CHLORINATED? YES ☐ NO ☒

WAS CHLORINE TEST MADE AT SAMPLING POINT YES ☐ NO ☒

RES. CL. ______ PPM.

- REPORT RESULTS TO -

PRINT
CHESAPEAKE HEALTH DEPT.
P.O. BOX 1443
CHESAPEAKE, VA. 23320

See reverse side for collection information

FORM LHS-154

DGS-22-058 (6-85)

DO NOT WRITE IN SPACE BELOW.

Portion Of Sample Tested	Bact. of Coliform Group	Portion Of Sample Tested	Bact. of Coliform Group
.0001 ml.		10 ml.	—
.001 ml.		10 ml.	—
.01 ml.		10 ml.	—
.1 ml.		10 ml.	—
1 ml.		10 ml.	—

SAMPLE NO.
9353

RECEIVED
WC IK
08255

COMPLETED
5/11/87 KM

Results Based on Confirmed Tests Unless Otherwise Specified

Membrane Filter ______ Coliforms per 100 ml.

+ Opposite Portion Tested Means Bacteria Indicating Contamination WERE Present.
— Means Bacteria Indicating Contamination WERE NOT Present.

9353

20071

Form GW-2
978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT
(Certification of Completion/County Permit)

MS61C Bl2 Lot 18 CE
• BWCM No. (Plat #40)

tate Water Control Board
O. Box 11143
111 North Hamilton St.
ichmond, Va. 23230

SWCB Permit
County Permit
Certification of inspecting official:
This well does ____ does not ____
meet code/low requirements.
S.
Date
For Office Use

ounty/City Chesapeake
County/City Stamp

Virginia Plane Coordinates
N
E
Latitude & Longitude
N
W
Topo. Map No.
• Elevation ft.
• Formation
• Lithology
• River Basin
• Province
• Type Logs
• Cuttings
• Water Analysis
• Aquifer Test

• Owner Roy Mendelsohn
• Well Designation or Number Class 2 B
Address Lot 40 1320 Murray Drive
Chesapeake, Va.
Phone 420-7249

• Drilling Contractor T.E. Gildersleeve Pump & Well, Inc
Address 5855-A Hargrove Street
Norfolk, Virginia 23502
Phone 461-7867/ 464-0461

Tax Map I.D. No.
Subdivision
Section
Block
Lot
Class Well: I ____, IIA ____,
IIB X, IIIA ____, IIIB ____
IIIC ____ IIID ____ IIIE ____

WELL LOCATION: 60 (feet ~~from~~ in front direction) of house
and 15' feet/~~from~~ from (direction) of driveway (see enclosed site plan)
(If possible please include map showing location marked) well head completed 1" above ground pe
code

Date started 6-21-87 • Date completed 6-21-87 Type rig mud rotary

WELL DATA: New X Reworked ____ Deepened ____
• Total depth 80' ft.
• Depth to bedrock n/a ft.
• Hole size (Also include reamed zones)
• 7 inches from 0 to 80 ft.
• ____ inches from ____ to ____ ft.
• ____ inches from ____ to ____ ft.
• Casing size (I.D.) and material
• 4 inches from 0 to 65 ft.
Material
Wt. per foot ____ or wall thickness ____ in.
• ____ inches from ____ to ____ ft.
Material
Wt. per foot ____ or wall thickness ____ in.
• ____ inches from ____ to ____ ft.
Material
Wt. per foot ____ or wall thickness ____ in.
• Screen size and mesh for each zone (where applicable)
• 4 inches from 65 to 80 ft.
• Mesh size .010 Type Timco slotted pvc
• ____ inches from ____ to ____ ft.
• Mesh size ____ Type ____
• ____ inches from ____ to ____ ft.
• Mesh size ____ Type ____
• ____ inches from ____ to ____ ft.
• Mesh size ____ Type ____
• Gravel pack
• From 60 to 80 ft.
• From ____ to ____ ft.
• Grout
• From 0 to 50 ft., Type Portland Type 2
• From ____ to ____ ft., Type ____

2. WATER DATA • Water temperature 60 °F
• Static water level (unpumped level-measured) 9' ft.
• Stabilized measured pumping water level 25 ft.
• Stabilized yield 18 gpm after 2 hours
Natural Flow: Yes ____ No X, flow rate: ____ g pm
Comment on quality ph 7.0, iron 0.6 ppm, hardness 2

3. WATER ZONES: From 26 To 32 chlor 350 ppm
From 65 To 80, From ____ To ____
From ____ To ____, From ____ To ____

4. USE DATA:
Type of use: Drinking X, Livestock Watering ____
Irrigation ____ Food processing ____, Household X
Manufacturing ____, Fire safety ____, Cleaning ____
Recreation ____, Aesthetic ____, Cooling or heating ____
Injection ____, Other ____
• Type of facility: Domestic X, Public water supply ____
Public institution ____, Farm ____, Industry ____
Commercial ____, Other ____

5. PUMP DATA: Type sub. • Rated H.P. 1/2
• Intake depth 45' • Capacity 18gpm at 30 psi head

6. WELLHEAD: Type well seal pitless adapter &
Pressure tank X-trol gal., Loc. garage
Sample tap X, Measurement port X
Well vent X, Pressure relief valve X
Gate valve X, Check valve (when required) X
Electrical disconnect switch on power supply X

7. DISINFECTION: Well disinfected X yes ____ no
Date 6-21-87, Disinfectant used chlorine tablets
Amount 6 (six), Hours used 4 (four)

8. ABANDONMENT (where applicable) • yes ____ no ____
Casing pulled yes ____ no ____ not applicable ____
Plugging grout From ____ to ____ material ____

OVER

20072

Owner Roy Mendelsohn

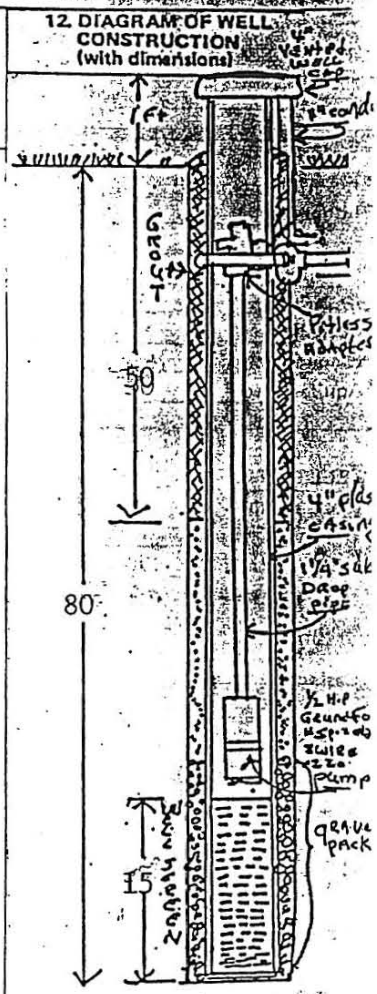
BWCM No.

9. State law requires submitting to the Virginia State Water Control Board information about groundwater and wells for every well made in the State intended for water, or any other non-exempt well. This information must be submitted whether the well is completed, on standby, or abandoned. Information required includes: an accurately and completely prepared water well completion report, full data from any aquifer pumping tests, drill cuttings taken at ten foot intervals (unless exemption is secured), the results of any chemical analyses, and copies of any geophysical logs. Quarterly pumpage and use reports are required from owners of public supply and industrial wells. County or State permits to drill may be required in some parts of the state. Some counties require submission of a water well completion report. The Virginia State Health Department requires a water well completion report for public supply wells.

10. DRILLERS LOG (use additional Sheets if necessary)

DEPTH (feet) From	To	TYPE OF ROCK OR SOIL (color, material, fossils, hardness, etc.)	REMARKS (water, caving, cavities, broken, core, shot, (etc.)	11. Drilling Time (Min.)
0	6	brown clay		
6	14	fine sand and gray clay		
14	18	gray clay		
18	24	fine gray sand		
24	32	coarse gray sand	water bearing	
32	38	coarse gray sand, clay breaks		
38	55	gray clay		
55	65	fine gray silt and clay		
65	80	fine gray sand and shell	water bearing	

12. DIAGRAM OF WELL CONSTRUCTION (with dimensions)



13. Well lot dedicated? No ; Size ____ ft. X ____ ft.; Well house? no
Distance to nearest pollutant source 60 ft., Type foundation treatment
Distance to nearest property line 15 ft., Building 60 ft.

14. WATER SERVICE PIPE: Checked under 75 p.s.i. for 60 minutes. Pipe size 1¼ inches, Material pvc sch 40
Installer Michael A. Gildersleeve
Date 6-21-87

15. I certify that the information contained herein is true and correct and that this well and/or system has been installed and constructed in accordance with the requirements for well construction as specified in compliance with appropriate county or independent city ordinances and the laws and rules of the Commonwealth of Virginia.

Signature Michael A. Gildersleeve (Seal), Date 6-22-87
(Well driller or authorized person)
License No# 021427

State Water Control Board Regional Offices

Valley Reg. Off.
116 North Main Street
P. O. Box 268
Bridgewater, Va. 22812
703-828-2595

Piedmont Reg. Off.
4010 West Broad Street
P. O. Box 6616
Richmond, Va. 23230
804-257-1006

Southwest Reg. Off.
408 East Main Street
P. O. Box 476
Abingdon, Va. 24210
703-628-5183

Tidewater Reg. Off.
287 Pembroke Office Park
Suite 310 Pembroke No. 2
Va. Beach, Va. 23462
804-499-8742

West Central Reg. Off.
Executive Park
5312 Peters Creek Road
Roanoke, Va. 24019
703-982-7432

Northern Virginia Reg. Off.
5515 Cherokee Avenue
Suite 404
Alexandria, Va. 22312
703-750-9111

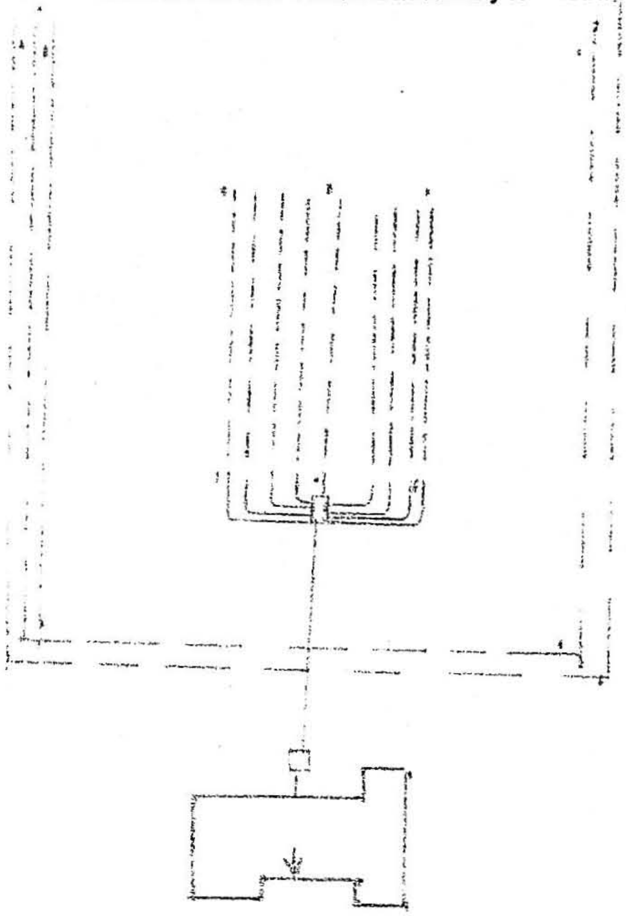
20073

Health Department Identification Number [illegible]

Schematic drawing of sewage disposal system and topographic features. PAGE [illegible] OF [illegible]

Show the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of the system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and reserve area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all sources of pollution within 100 feet.

☐ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design. [illegible]



1. Drainfield will require [illegible] lines [illegible] wide.
2. Septic tank will require [illegible] Gal. min.
3. Drainfield must be [illegible] as shown on [illegible] plans.
4. Final grading & landscaping must comply with [illegible] plan. This must be [illegible] approved by the [illegible]
5. Keep well [illegible] construction.

The sewage disposal system is to be constructed as specified by the permit ☐ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: [illegible] Issued by: [signature]
Sanitarian

Date: [illegible] Reviewed by: [signature]
Supervisory Sanitarian

This Construction Permit Valid until [illegible]

If FHA or VA financing

Reviewed by Date ________ ________ Date ________ ________
Supervisory Sanitarian — Regional Sanitarian

20074

US EXPRESS AVENUE
VIRGINIA BEACH VA 23451
PHONE 804 425 1198
FAX 804 422 9176

MS 6/C
Lot 21

ANALYTICAL CHEMISTS

Certificate of Analysis

TO PAUL ROMEO
1208 MURRAY DRIVE
CHESAPEAKE VA 23322

DATE 05/12/97

DESCRIPTION

ANALYSIS NO 97-2357

Drinking Water
Sample received: 05/09/97 @ 2:40 p.m.
Sample collected: 05/09/97 @ 1:30 p.m.
Sample marked: 1208 Murray Drive
Chesapeake, Virginia
Sampled by: Paul Romeo

Total Coliform.....Negative

"This water sample is bacteriologically safe for human consumption."

✓ copy to: Chesapeake Health Department

20075

CBE 4/16/98
MJ 6/C Lot 21

Commonwealth of Virginia
Uniform Water Well Completion Report

Owner Paul J Romeo
Address Lot 21, Green Acres (Murray Drive)
Chesapeake
Phone 331 0566
Location Front yard

Tax Map ID [illegible] Lot 21
VDH Permit 234-95-3604
VWCB Permit
VWCB ID
County

* Well Data *

General Information
Drilling Method Hyd Rotary
Depth to Bedrock 35
Static Water Level 7
Well Disinfected (Y or N) yes

Date Completed 1-23-98
Yield 25 (GPM)
Stabilized Water Level 11
Disinfectant Used Clorine

Total Depth of Well 50
Length of Test 2 hrs
Natural Flow (Rate) 10
Amount Used 85 1/2 gal

Casing
From 0 to 40
Size ____ Material ____
Weight/Schedule 21

From ____ to ____
Size ____ Material ____
Weight/Schedule ____

From ____ to ____
Size ____ Material ____
Weight/Schedule ____

Gravel Pack
From 38 to 50

From ____ to ____

From ____ to ____

Grout
From 0 to 20
Bore Hole Size 6"
Type Cement + Bent Seal
Method Pour

From ____ to ____
Bore Hole Size ____
Type ____
Method ____

From ____ to ____
Bore Hole Size ____
Type ____
Method ____

Water Zones or Screened Intervals
From 40 to 50
Mesh Size .012 Diam. 2"
From ____ to ____
Mesh Size ____ Diam. ____

From ____ to ____
Mesh Size ____ Diam. ____
From ____ to ____
Mesh Size ____ Diam. ____

From ____ to ____
Mesh Size ____ Diam. ____
From ____ to ____
Mesh Size ____ Diam. ____

* Use Data *

Private Well: Domestic ✓ Agricultural ____ Industrial ____ Monitoring ____
Public Well: Community ____ Non Community ____

20076

(Use additional sheets if necessary)

Depth	Description of Formation or Sediment	Remarks
0	clay	
10	clay sand	
10 26	sand clay	
20 30	clay	
30 40	clay, Bed Rock	
40 50	Bed Rock	

I certify that the information contained here is true and that this well was installed and constructed in accordance with the permit and further that the well complies with all applicable state and local regulations, ordinances and laws.

Drilling Contractor Richard Saunders Well Drilling
Address 941 Mt Pleasant Rd
Chesapeake Va 23322
Phone 482 1409

Drillers Signature Richard Saunders Date 1, 23, 95
Representing Richard Saunders Well Drilling
Virginia Contractors License Number 2705 030400

Health Department
Identification Number 234-95-2604

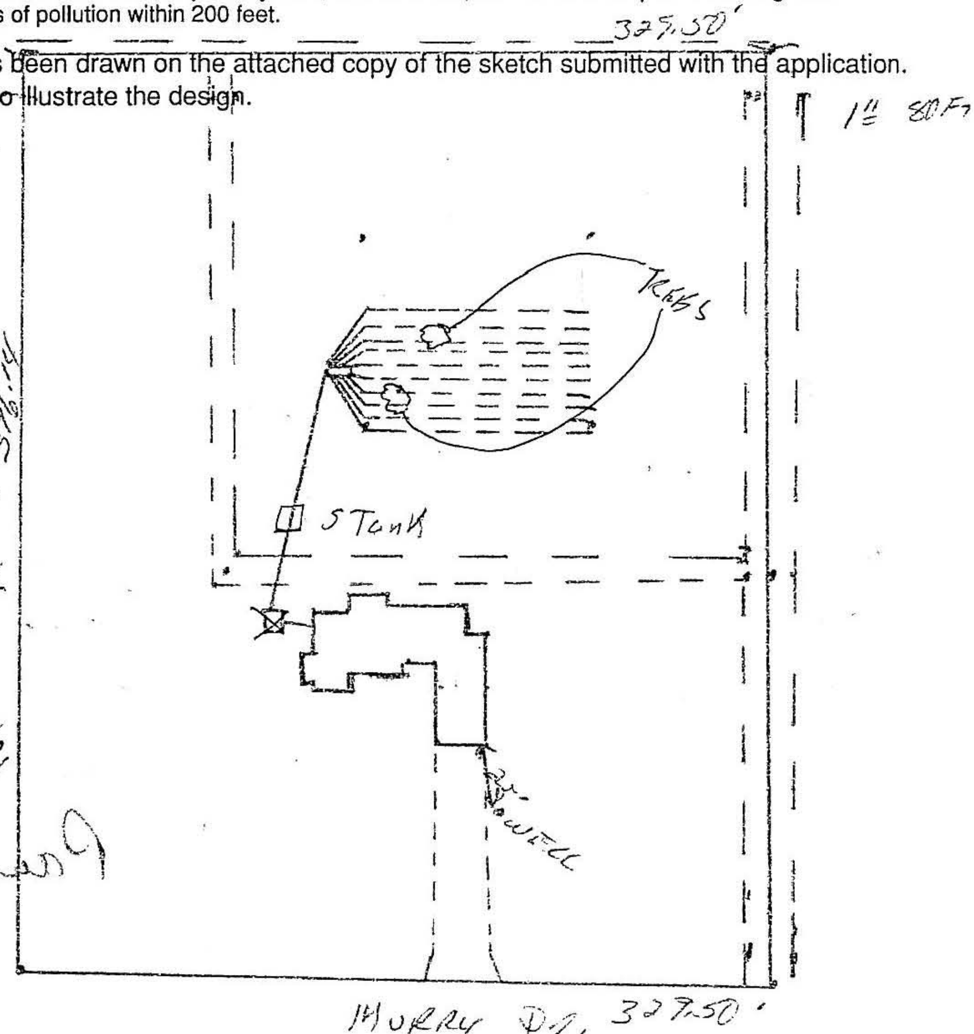
Schematic drawing of sewage disposal and/or water supply system and topographic features.

Show the lot lines of the building site, sketch of property showing any topographic features which may impact on the design of the well or sewage disposal system, including existing and/or proposed structures and sewage disposal systems and wells within 200 feet. The schematic drawing of the well site or area and/or sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be permitted, show all sources of pollution within 200 feet.

☒ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.

1. Drainfield will require 10-100 ft lines 3 ft wide.
2. Comply with all rules & regs of Soil Drainage Management.
3. Well must be class IIIc cased & grouted to 50 ft, at least 100 ft from drainfield & 50 ft from septic tank.
4. Drainfield area must be landscaped & graded to comply with the Soil Drainage Management Plan. This office must inspect & approve prior to house being occupied.

Designed for Four bedrooms



This sewage disposal system and/or water supply is to be constructed as specified by the permit_____ or attached plans and specifications_____ .

This sewage disposal system and/or well construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 10-13-95 **Issued by:** [signature]
Sanitarian

Date: _____ **Reviewed by:** _____
Supervisory Sanitarian

This Construction Permit Valid until 4-98

If FHA or VA financing

Reviewed by Date _____ _____ **Date** _____ _____

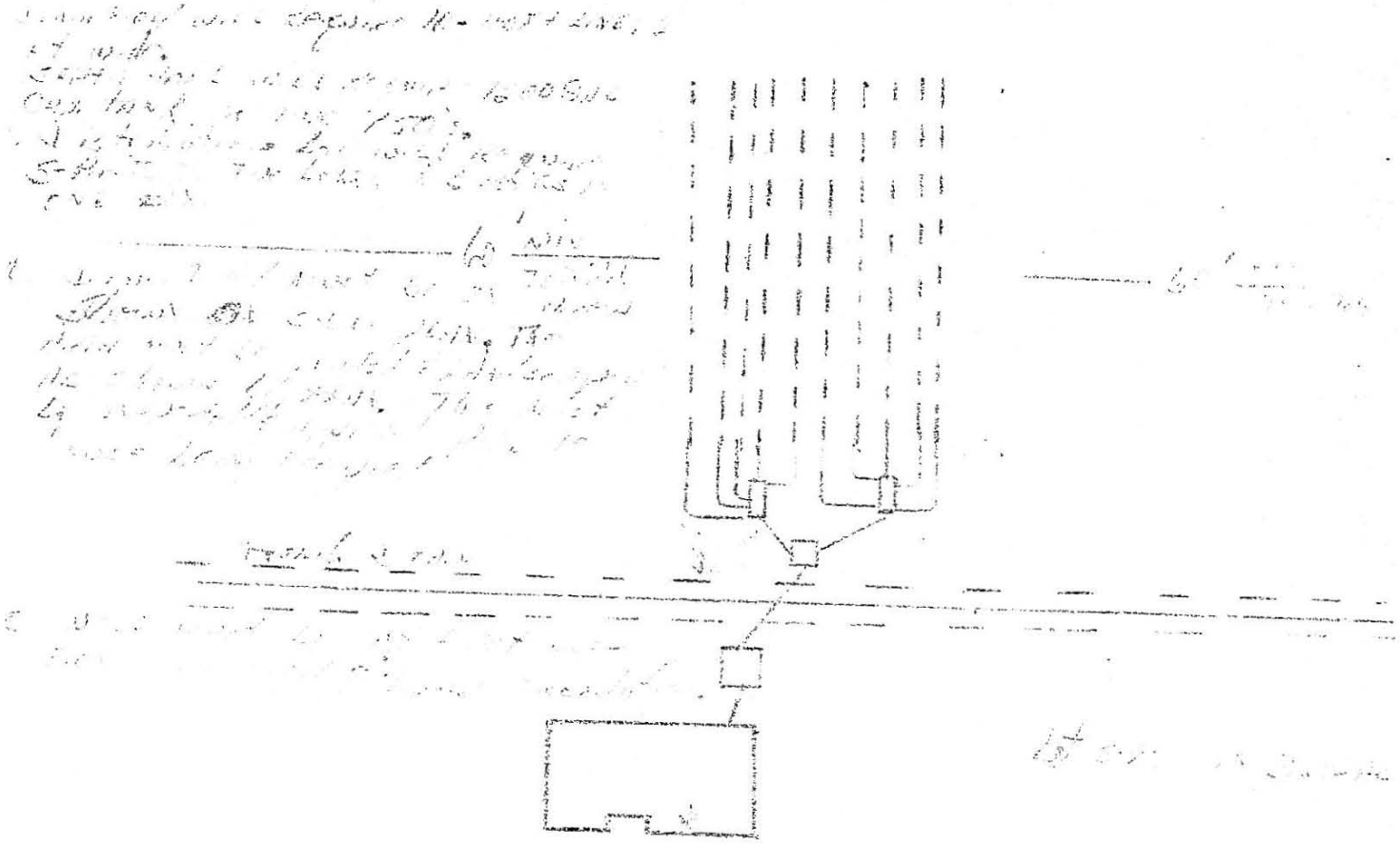
1305 Murray Dr

Health Department
Identification Number 226-05-0220

Schematic drawing of sewage disposal system and topographic features. PAGE ___ OF ___

Show the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of the system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and reserve area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all sources of pollution within 100 feet.

☐ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.



The sewage disposal system is to be constructed as specified by the permit ☐ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 8-1-07 Issued by: _____
Sanitarian

Date: 8-10-07 Reviewed by: _____
Supervisory Sanitarian

This Construction Permit Valid until _____

If FHA or VA financing

Reviewed by Date _____ _____ Date _____ _____
Supervisory Sanitarian Regional Sanitarian

C.H.S. 202B Revised 6/84

II-2A

20079

CBE
3/21/96

Commonwealth of Virginia
Uniform Water Well Completion Report

(1104)

Owner MICHAEL CLIFTON
Address 1106 MURRY DR
CHESAPEAKE, VA
Phone
Location

Tax Map ID Lot 13
VDH Permit 234-93-0800
VWCB Permit
VWCB ID
County

* Well Data *

General Information
Drilling Method MUD ROTARY
Depth to Bedrock N/A
Static Water Level 8
Well Disinfected (Y or N) Y

Date Completed 3-4-96
Yield 18 (GPM)
Stabilized Water Level 10
Disinfectant Used Chlorine

Total Depth of Well 122
Length of Test 2 HRS
Natural Flow (Rate) N/A
Amount Used ½ GAL

Casing
From 0 to 112
Size 4" Material PVC
Weight/Schedule 40

From ____ to ____
Size ____ Material ____
Weight/Schedule ____

From ____ to ____
Size ____ Material ____
Weight/Schedule ____

Gravel Pack
From 107 to 122

From ____ to ____

From ____ to ____

Grout
From 0 to 25
Bore Hole Size 7 7/8"
Type BENTONITE
Method PUMP

From ____ to ____
Bore Hole Size ____
Type ____
Method ____

From ____ to ____
Bore Hole Size ____
Type ____
Method ____

Water Zones or Screened Intervals
From 112 to 122
Mesh Size .010 Diam. 4"
From ____ to ____
Mesh Size ____ Diam. ____

From ____ to ____
Mesh Size ____ Diam. ____
From ____ to ____
Mesh Size ____ Diam. ____

From ____ to ____
Mesh Size ____ Diam. ____
From ____ to ____
Mesh Size ____ Diam. ____

* Use Data *

Private Well: Domestic ____ Agricultural ____ Industrial ____ Monitoring ____
Public Well: Community ____ Non Community ____

"NEW WELL"

Drillers Log *
*(Use additional sheets if necessary)

1106 MURRY DR.

Depth	Description of Formation or Sediment	Remarks
0-11	GRAY CLAY	
11-42	GRAY SAND	
42-65	GRAY SAND/CLAY/SHELL	
65-85	GRAY CLAY/SHELL	
85-90	GRAY SAND	WATER
90-113	GRAY CLAY	
113-122	FINE SHELL	WATER

I certify that the information contained here is true and that this well was installed and constructed in accordance with the permit and further that the well complies with all applicable state and local regulations, ordinances and laws.

Drilling Contractor Gildersleeve Pump & Well, Inc.
Address 5855-A Hargrove Street
Norfolk, Va. 23502-4636
Phone (804) 461-2867

Drillers Signature Kevin Finney Date 3-4-96
Representing Gildersleeve Pump & Well, Inc.
Virginia Contractors License Number 2701 021427

20081

Jennings Laboratories INC
1118 CYPRESS AVENUE
VIRGINIA BEACH, VA 23451
TELEPHONE 804/425/1498
FACSIMILE 804/422/9176

CBE
3/11/96 CI
Lot 13

ANALYTICAL CHEMISTS

Certificate of Analysis

TO GILDERSLEEVE WELL & PUMP
5855A HARGROVE STREET
NORFOLK VIRGINIA 23502

DATE 03/06/96

SAMPLE DESCRIPTION

Drinking Water
Sample received: 03/05/96 @ 3:50 p.m.
Sample taken: 03/04/96 @ 4:30 p.m.
Sample marked: Clifton
1106 Murray Drive
Virginia Beach, Virginia

ANALYSIS NO 96-1077

Total Coliform.....Negative

"This water sample is bacteriologically safe for consumption."

Chemist W. A. Jennings

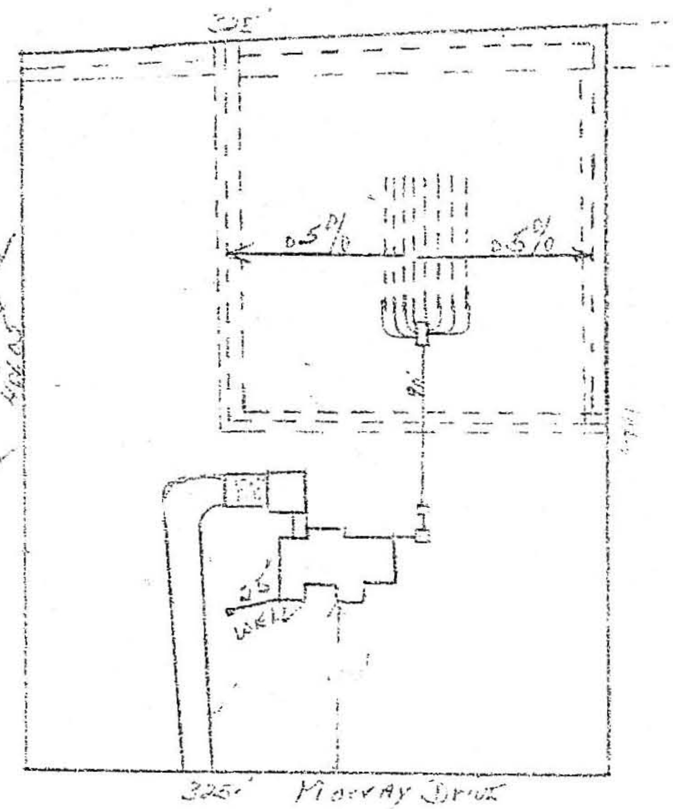
OFFICIAL METHODS OF A.O.A.C., A.P.H.A., A.S.T.M., E.P.A., A.P.H.A. & N.S.P.A. USED IN ALL ANALYSIS UNLESS OTHERWISE STATED

20082

chematic drawing of sewage disposal system and topographic features.

ow the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of tem, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance sys- subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all of pollution within 100 feet.

| The information required above has been drawn on the attached copy of the sketch submitted with the application. ttach additional sheets as necessary to illustrate the design.



The sewage disposal system is to be constructed as specified by the permit ☑ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 3-1-94 Issued by: ____________
Sanitarian

This Construction Permit Valid until 3-97

Reviewed by: ____________
Supervisory Sanitarian

If FHA or VA financing

d by Date ______ ____________ Date ______ ____________
Supervisory Sanitarian Regional Sanitarian

o...n GW-2
978-10,000

COMMONWEALTH OF VIRGINIA

WATER WELL COMPLETION REPORT • BWCM No. _____

(Certification of Completion/County Permit)

tate Water Control Board
O. Box 11143
111 North Hamilton St.
ichmond, Va. 23230

SWCB Permit _____
County Permit _____
Certification of inspecting official:
This well does _____ does not _____
meet code/low requirements.
S. _____
Date _____
For Office Use

ounty/City _____
County/City Stamp

Virginia Plane Coordinates
_____ N
_____ E
Latitude & Longitude
_____ N
_____ W
Topo. Map No. _____
Elevation _____ ft.
Formation _____
Lithology _____
River Basin _____
Province _____
Type Logs _____
Cuttings _____
Water Analysis _____
Aquifer Test _____

• Owner Henry Schepers
• Well Designation or Number _____
Address 1316 Murray Ave
Chesapeake Va
Phone _____
• Drilling Contractor L.E. STILLMAN SR
Address 1513 HAWTHORNE DR
Chesapeake VA
Phone 420 0001

Tax Map I.D. No. _____
Subdivision _____
Section _____
Block _____
Lot _____
Class Well I _____, IIA _____,
IIB _____, IIIA ✓, IIIB _____
IIIC _____ IIID _____ IIIE _____

WELL LOCATION: 100 (feet/~~miles~~) North (direction) of house
and 75 feet/miles West (direction) of East property line
(If possible please include map showing location marked)

Date started 6-9-86 • Date completed 6-10-86 Type rig Mud Rotary

WELL DATA: New ✓ Reworked _____ Deepened _____
Total depth 130 ft.
Depth to bedrock _____ ft.
Hole size (Also include reamed zones)
• 6 inches from 0 to 20 ft.
• 3 inches from 20 to 130 ft.
• _____ inches from _____ to _____ ft.
Casing size (I.D.) and material
• 2 inches from +1 to 70 ft.
Material PVC
Wt per foot _____ or wall thickness SCH40 in.
• _____ inches from _____ to _____ ft
Material _____
Wt. per foot _____ or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
Screen size and mesh for each zone (where applicable)
• 1¼ inches from 70 to 130 ft.
• Mesh size .008 Type PVC
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft
• Mesh size _____ Type _____
Gravel pack
• From 70 to 130 ft.
• From _____ to _____ ft.
Grout
• From 0 to 20 ft., Type Neat
• From _____ to _____ ft., Type _____

2. WATER DATA • Water temperature 59 °F
• Static water level (unpumped level-measured) 8 ft
• Stabilized measured pumping water level 15 ft
• Stabilized yield 20 gpm after 4 hours
Natural Flow Yes _____ No ✓, flow rate _____ g pm
Comment on quality _____
3. WATER ZONES: From 15 To 25
From 40 To 50 From 70 To 130
From _____ To _____ From _____ To _____
4. USE DATA:
Type of use. Drinking ✓, Livestock Watering _____,
Irrigation _____, Food processing _____, Household _____
Manufacturing _____, Fire safety _____, Cleaning _____,
Recreation _____, Aesthetic _____, Cooling or heating _____,
Injection _____, Other _____
• Type of facility Domestic ✓, Public water supply _____,
Public institution _____, Farm _____, Industry _____,
Commercial _____, Other _____
5. PUMP DATA: Type _____ • Rated H.P. _____,
• Intake depth _____ • Capacity _____ at _____ head
6. WELLHEAD: Type well seal _____
Pressure tank _____ gal, Loc. _____
Sample tap _____, Measurement port _____
Well vent _____, Pressure relief valve _____
Gate valve _____, Check valve (when required) _____
Electrical disconnect switch on power supply _____
7. DISINFECTION: Well disinfected ✓ yes _____ no
Date 6-9-86, Disinfectant used Chlorine
Amount 200 PPM, Hours used 24
8. ABANDONMENT (where applicable) • yes _____ no _____
Casing pulled yes _____ no _____ not applicable _____
Plugging grout From _____ to _____ material _____

OVER

20084

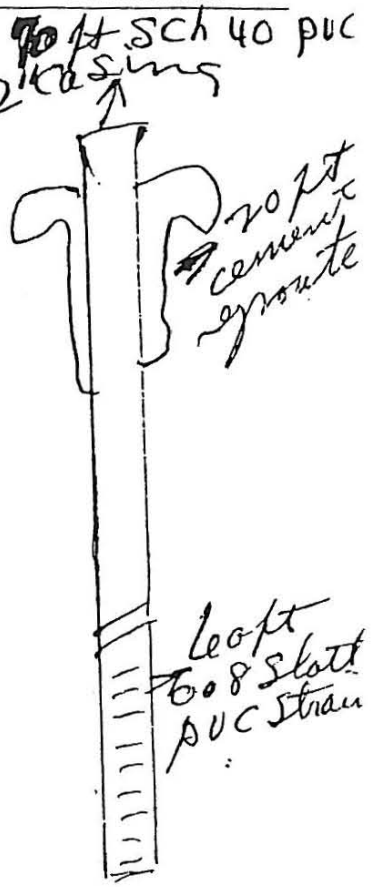
Owner Henry Scheiders BWCM No. _____

9. State law requires submitting to the Virginia State Water Control Board information about groundwater and wells for every well made in the State intended for water, or any other non-exempt well. This information must be submitted whether the well is completed, on standby, or abandoned. Information required includes an accurately and completely prepared water well completion report, full data from any aquifer pumping tests, drill cuttings taken at ten foot intervals (unless exemption is secured), the results of any chemical analyses, and copies of any geophysical logs. Quarterly pumpage and use reports are required from owners of public supply and industrial wells. County or State permits to drill may be required in some parts of the state. Some counties require submission of a water well completion report. The Virginia State Health Department requires a water well completion report for public supply wells.

10. DRILLERS LOG (use additional Sheets if necessary)

DEPTH (feet) From	To	TYPE OF ROCK OR SOIL (color, material, fossils, hardness, etc.)	REMARKS (water, caving, cavities, broken, core, shot, (etc.)	11. Drilling Time (Min.)
0	5	Top Soil & clay		
5	15	clay		
		Fine grey Sand		
15	25			
25	40	clay Black		
40	50	Sand Coarse grey		
50	70	Fine Sand & Clay		
70	130	Shell & Fine Salt & pepper Sand		

12. DIAGRAM OF WELL CONSTRUCTION (with dimensions)



13. Well lot dedicated? _____ ; Size _____ ft. X _____ ft., Well house? _____
Distance to nearest pollutant source 150 ft., Type Septic tank
Distance to nearest property line 10 ft., Building 100 ft.

14. WATER SERVICE PIPE: Checked under _____ p.s.i. for _____
minutes. Pipe size _____ inches, Material _____
Installer _____
Date _____

15. I certify that the information contained herein is true and correct and that this well and/or system has been installed and constructed in accordance with the requirements for well construction as specified in compliance with appropriate county or independent city ordinances and the laws and rules of the Commonwealth of Virginia.

Signature L E Stillman Jr (Seal), Date 12-10-86
(Well driller or authorized person)
License No. 000852

State Water Control Board Regional Offices

Valley Reg. Off.
116 North Main Street
P. O. Box 268
Bridgewater, Va. 22812
703-828-2595

Piedmont Reg. Off.
4010 West Broad Street
P. O. Box 6616
Richmond, Va. 23230
804-257-1006

Southwest Reg. Off.
408 East Main Street
P. O. Box 476
Abingdon, Va. 24210
703-628-5183

Tidewater Reg. Off.
287 Pembroke Office Park
Suite 310 Pembroke No. 2
Va. Beach, Va. 23462
804-499-8742

West Central Reg. Off.
Executive Park
5312 Peters Creek Road
Roanoke, Va. 24019
703-982-7432

Northern Virginia Reg. Off.
5515 Cherokee Avenue
Suite 404
Alexandria, Va. 22312
703-750-9111

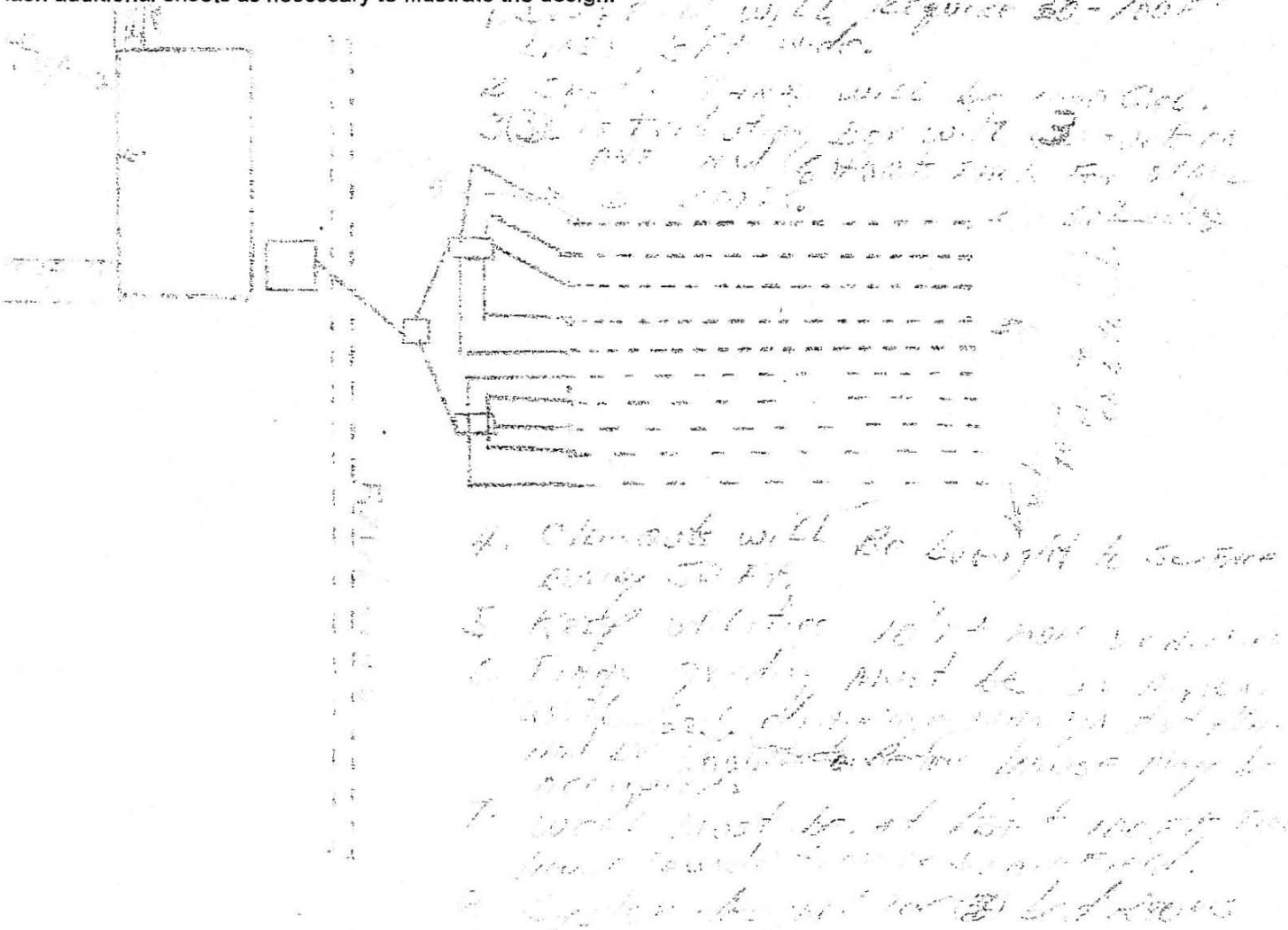
20085

Identification Number _____

hematic drawing of sewage disposal system and topographic features. PAGE ___ OF ___

ow the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and rea. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance sys- subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all pollution within 100 feet.

The information required above has been drawn on the attached copy of the sketch submitted with the application. tach additional sheets as necessary to illustrate the design.



The sewage disposal system is to be constructed as specified by the permit ☐ or attached plans and specifications ☐.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit. If construction has not commenced within 12 months of date of issuance, the construction permit must be revalidated.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: _____ Issued by: _____
Sanitarian

Date: _____ Reviewed by: _____
Supervisory Sanitarian

If FHA or VA financing

Reviewed by Date _____ _____ Date _____ _____
Supervisory Sanitarian Regional Sanitarian

C.H.S. 202B Revised 4/83

20086

cheap
RBV
2.2.19.V

Commonwealth of Virginia
Uniform Water Well Completion Report

Sat - 10

Owner Norman Const -
Address 5125 Witchduck Const - Suite 102
Va Beach Va
Phone 4999834
Location Green Haven - 1379 Murry Drive

Tax Map ID N15-61C
VDH Permit #34-94-0075
VWCB Permit
VWCB ID
County

* Well Data *

General Information
Drilling Method Mud-Drill
Depth to Bedrock 40
Static Water Level 9
Well Disinfected (Y or N) yes

Date Completed 8-19-94
Yield 20 (GPM)
Stabilized Water Level 23
Disinfectant Used Clorine

Total Depth of Well 53
Length of Test 1 HRS
Natural Flow (Rate) N0
Amount Used 65/N9/11

Casing
From 0 to 45
Size 7 Material PVC
Weight/Schedule

From ____ to ____
Size ____ Material ____
Weight/Schedule ____

From ____ to ____
Size ____ Material ____
Weight/Schedule ____

Gravel Pack
From 42 to 53

From ____ to ____

From ____ to ____

Grout
From 0 to 20
Bore Hole Size 6
Type Cement & Bent Seal
Method pour

From ____ to ____
Bore Hole Size ____
Type ____
Method ____

From ____ to ____
Bore Hole Size ____
Type ____
Method ____

Water Zones or Screened Intervals
From 45 to 53
Mesh Size .012 Diam. 2
From ____ to ____
Mesh Size ____ Diam. ____

From ____ to ____
Mesh Size ____ Diam. ____
From ____ to ____
Mesh Size ____ Diam. ____

From ____ to ____
Mesh Size ____ Diam. ____
From ____ to ____
Mesh Size ____ Diam. ____

* Use Data *

Private Well: Domestic ✓ Agricultural ____ Industrial ____ Monitoring ____
Public Well: Community ____ Non Community ____

20087

Drillers Log *
(Use additional sheets if necessary)

Depth	Description of Formation or Sediment	Rem
0 To 10'	clay silt and	
10 - 20	silt and	
20 - 30	Bed Rock	
30 - 40	clay	
40 - 50	Bed Rock	
50 - 53	Bed Rock	

I certify that the information contained here is true and that this well was installed and con[illegible]d in accordance with the permit and further that the well complies with all applicable state [illegible]ocal regulations, ordinances and laws.

Drilling Contractor Joe Saunders Well Drilling
Address 1941 Mt. Pleasant Rd
Chesapeake Va 23320
Phone 482-1408

Drillers Signature Joe Saunders Date 5-19-94
Representing
Virginia Contractors License Number 018280

20088

Jennings Laboratories
1118 CYPRESS AVENUE
VIRGINIA BEACH, VA 23451
TELEPHONE 804/425/1498
FACSIMILE 804/422/9176

ANALYTICAL CHEMISTS

Certificate of Analysis

TO Norman Construction
5125 Witchduck Court, Suite 102
Virginia Beach, Va 23462

DATE 10/13/94

SAMPLE DESCRIPTION Drinking water
Sample received 10/3/94 @ 9:35 a.m.
Sample taken 10/3/94 @ 9:10 a.m.
Sample Marked: 1329 Murray Drive
Chesapeake, Va
MS #61C Lot #10 or 32 HDID #234-94-0075

ANALYSIS NO 94-3803

Total Coliform..... Negative

"This sample is bacteriologically safe for human consumption."

✓ Copy: Chesapeake Health Dept

Chemist W. R. Jennings Jr.

20089

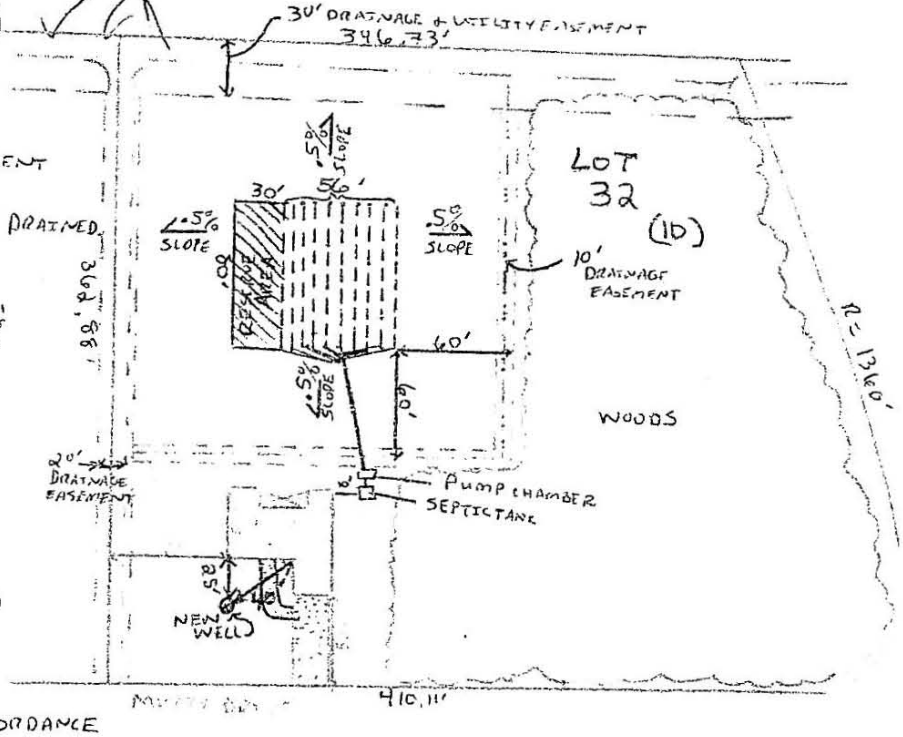
Health Department
Identification Number 234-94-0075

Schematic drawing of sewage disposal and/or water supply system and topographic features.

Show the lot lines of the building site, sketch of property showing any topographic features which may impact on the design of the well or sewage disposal system, including existing and/or proposed structures and sewage disposal systems and wells within 200 feet. The schematic drawing of the well site or area and/or sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be permitted, show all sources of pollution within 200 feet.

☐ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.

(1) 10 - 2' x 80' DRAINFIELD TRENCH LINES.
(2) MAXIMUM DEPTH OF DRAINFIELD - 18"
(3) GRADE BOARDS REQUIRED.
(4) COMPLY WITH SOIL DRAINAGE MANAGEMENT PLAN.
(5) 25% OF TOTAL DITCHES MAY BE FRENCH DRAINED.
(6) (4) BEDROOMS ONLY.
(7) KEEP WELL 25' FROM HOUSE FOUNDATION & 50' FROM SEPTIC TANK & PUMP CHAMBER.
(8) FINAL GRADE MUST BE COMPLETED & INSPECTED BEFORE THIS OFFICE CAN ALLOW HOUSE TO BE OCCUPIED.
(9) WELL DRILLER MUST SUBMIT A G.W.2 TO THIS OFFICE.
(10) ONE (1) CLASS II WELL TO BE INSTALLED FOR DRINKING WATER. MUST BE CASED & GROUTED TO 20' minimum.
(11) PUMP CHAMBER TO BE INSTALLED IN ACCORDANCE TO SECTION 4.23B. SEE PAGE 3 of 3.
(12) A WATER SAMPLE MUST BE TAKEN & TESTED BY AN APPROVED LABORATORY.



This sewage disposal system and/or water supply is to be constructed as specified by the permit X or attached plans and specifications ____.

This sewage disposal system and/or well construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 6-14-94 **Issued by:** _____
Sanitarian

Date: 6-14-94 **Reviewed by:** _____
Supervisory Sanitarian

This Construction Permit Valid until
November 1994

If FHA or VA financing

Reviewed by Date _____ _____ **Date** _____ _____
Supervisory Sanitarian Regional Sanitarian

20090

Commonwealth of Virginia

Uniform Water Well Completion Report

Owner Don Froehler
Address 911 Wingate
Chesapeake, Va
Phone 547-0192
Location 1325 Murray Dr 98230

Tax Map ID
VDH Permit 2349-97-3289
VWCB Permit
VWCB ID
County

* Well Data *

General Information
Drilling Method Mud Rotary
Depth to Bedrock 25 FT.
Static Water Level 12 FT
Well Disinfected (Y or N) Y

Date Completed 7-14-98
Yield 15 (GPM)
Stabilized Water Level 16FT.
Disinfectant Used Chlorine

Total Depth of Well 32 FT.
Length of Test 1 Hour
Natural Flow (Rate) No
Amount Used 50/Gl

Casing
From 1 To 25
Size 2 Material PVC
Weight/Schedule 200

From ____ To ____
Size ____ Material ____
Weight/Schedule ____

From ____ To ____
Size ____ Material ____
Weight/Schedule ____

Gravel Pack
From 25 To 32 FT.

From ____ To ____

From ____ To ____

Grout
From 1 To 25
Bore Hole Size 5 7/8
Type Benseal
Method POURED

From ____ To ____
Bore Hole Size ____
Type ____
Method ____

From ____ To ____
Bore Hole Size ____
Type ____
Method ____

Water Zones or Screened Intervals
From 25 To 32
Mesh Size 10th Diam 2"
From ____ To ____
Mesh Size ____ Diam ____

From ____ To ____
Mesh Size ____ Diam ____
From ____ To ____
Mesh Size ____ Diam ____

From ____ To ____
Mesh Size ____ Diam ____
From ____ To ____
Mesh Size ____ Diam ____

* Use Data *

Private Well: Domestic ✓ Agricultural ____ Industrial ____ Monitoring ____
Public Well: Community ____ Non Community ____

* Abandonment Information *

Bored or Dug Wells
Casing Removed, Y or N?:____
If Y, Depth to which casing was removed:____
Depth and Type of Fill:____
Source of Fill____
Bentonite Plugs: From ____ to ____ From ____ to____

Wells other than Bored Wells
Casing removed, Y or N? ____
Depth to which casing was removed:____
Applicable, depth(s), and type of gravel/sand fill:____
Source of gravel or sand:____
Cement: From ____ to ____ From ____ to ____

Method of permanently marking location:____

Post-it® Fax Note 7671 Date 12-6-5 # of pages ▶ 3

20091

Depth	Description of Formation or Sediment	Remarks
0 - 8	Clay	
8 - 15	Sand	
15 - 21	Clay	
21 - 32	Sand	

... HEALTH DEPARTMENT
...ELL INSPECTED AND APPROVED BASED
ON WATER WELL COMPLETION REPORT

SIGNATURE

12-29-98
DATE

I certify that the information contained here is true and that this well was installed and constructed in accordance with the permit and further that the well complies with all applicable state and local regulations, ordinances and laws.

Drilling Contractor: Chesapeake Well & Pump Service Inc.
Address: P.O Box 15280
Chesapeake, VA 23328
Phone: 804-436-2665

Drillers Signature: ______ Date: 12-1-98
Representing: Chesapeake Well & Pump Service Inc.
Virginia Contractors License Number: 030034

12/21/98
MS 6/C
Bk 2
Lt 9

ANALYTICAL CHEMISTS

Certificate of Analysis

TO CHESAPEAKE WELL & PUMP SERVICE
ATTN: GIGI
P.O. BOX 15280
CHESAPEAKE, VA 23328-5280

DATE 12/3/98

SAMPLE DESCRIPTION

ANALYSIS NO

Water 98-6889
SampleReceived: 12/1/98 2:00 p.m.
SampleCollected: 12/1/98 9:00 a.m.
Sample Location: 1325 Murray Dr., Chesapeake (234-97-5289)
Sample Marked: Tap
Collected By: Steve

TOTAL COLIFORM .....NEGATIVE

Based on Virginia State Requirements for Drinking Water
"Negative Coliform Bacteria" indicates that
"This water sample is bacteriologically safe for human consumption."

Method: SM 9222 B

Chemist

20093

Health Department
Identification Number 234-97-5289

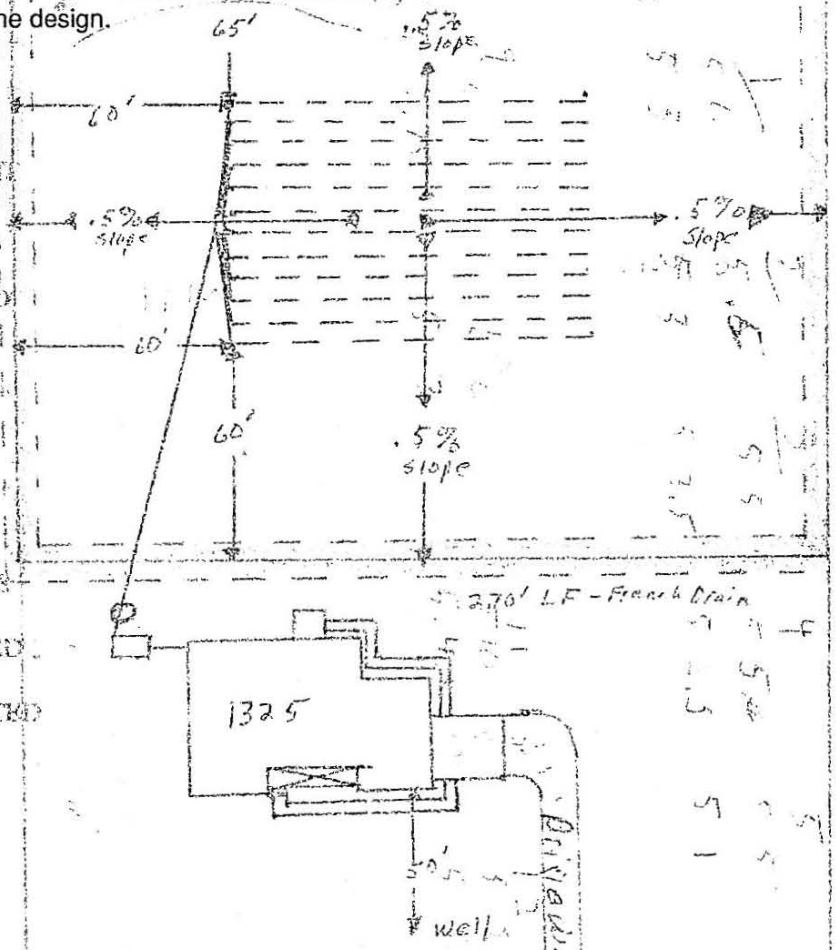
Schematic drawing of sewage disposal and/or water supply system and topographic features. Not to Scale

Show the lot lines of the building site, sketch of property showing any topographic features which may impact on the design of the well or sewage disposal system, including existing and/or proposed structures and sewage disposal systems and wells within 200 feet. The schematic drawing of the well site or area and/or sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be permitted, show all sources of pollution within 200 feet.

☐ The information required above has been drawn on the attached copy of the sketch submitted with the application.

Attach additional sheets as necessary to illustrate the design.

1. THIS PERMIT GOOD FOR 4 BEDROOMS ONLY.
2. INSTALL 12 - 3' X 100' DRAINFIELD LINES.
3. COMPLY WITH SOIL DRAINAGE MANAGEMENT PLAN.
4. TRENCH DEPTH TO START AT 18" WITH 2" Fall, Max. trench depth 24" max
5. GRADE DRIVEWAY TO SLOPE OF DRAINFIELD
6. DRIVEWAY MUST BE WITHIN 10' OF SDMD EATCH EASEMENT.
7. FINAL GRADE MUST BE COMPLETED AND APPROVED BY THIS OFFICE BEFORE AN OPERATION PERMIT CAN BE ISSUED.
8. SEE PAGE 3 FOR PUMP SPECIFICATIONS.
9. INSTALL ONE CLASS III C WELL FOR DRINKING WATER.
10. WELL DRILLER MUST SUBMIT A GWI TO THIS OFFICE.
11. WATER SAMPLE REPORT FROM AN APPROVED LABORATORY IS REQUIRED.
12. WATER SOFTNER SHOULD NOT BE CONNECTED TO SEPTIC SYSTEM.



This sewage disposal system and/or water supply is to be constructed as specified by the permit ✓ or attached plans and specifications ____ .

This sewage disposal system and/or well construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 3-6-98 **Issued by:** _____
Sanitarian

Date: _____ **Reviewed by:** _____
Supervisory Sanitarian

This Construction Permit Valid until 8-99

If FHA or VA financing

Reviewed by Date _____ _____ **Date** _____ _____
Supervisory Sanitarian Regional Sanitarian

C H.S. 2028

FILE COPY

20094

Lot 28

Commonwealth of Virginia
Uniform Water Well Completion Report

Owner GEARLD T. KANTER
Address 1346 BOXWOOD CIRCLE NORFOLK
1313 MURRAY LOT (28) (6)
Phone 588-7164
Location 234 - GREEN HAVEN (MAP

Tax Map ID
VDH Permit 234-94-0067
VWCB Permit
VWCB ID
County

* Well Data *

General Information
Drilling Method Rotary
Depth to Bedrock 70
Static Water Level 15
Well Disinfected (Y or N) Yes

Date Completed 12-27-94
Yield 20 (GPM)
Stabilized Water Level 20 15
Disinfectant Used Chlorine tablet

Total Depth of Well 80
Length of Test 1:45
Natural Flow (Rate) 20
Amount Used all

Casing
From 80 to 0
Size 2" inc Material PVC
Weight/Schedule 40

From ____ to ____
Size ____ Material ____
Weight/Schedule ____

From ____ to ____
Size ____ Material ____
Weight/Schedule ____

Gravel Pack
From 80 to 50

From ____ to ____

From ____ to ____

Grout
From 50 to 0
Bore Hole Size 5 1/2
Type Bensea 1
Method Pour

From ____ to ____
Bore Hole Size ____
Type ____
Method ____

From ____ to ____
Bore Hole Size ____
Type ____
Method ____

Water Zones or Screened Intervals
From 70 to 80
Mesh Size 10,000 Diam. 1 1/4
From ____ to ____
Mesh Size ____ Diam. ____

From ____ to ____
Mesh Size ____ Diam. ____
From ____ to ____
Mesh Size ____ Diam. ____

From ____ to ____
Mesh Size ____ Diam. ____
From ____ to ____
Mesh Size ____ Diam. ____

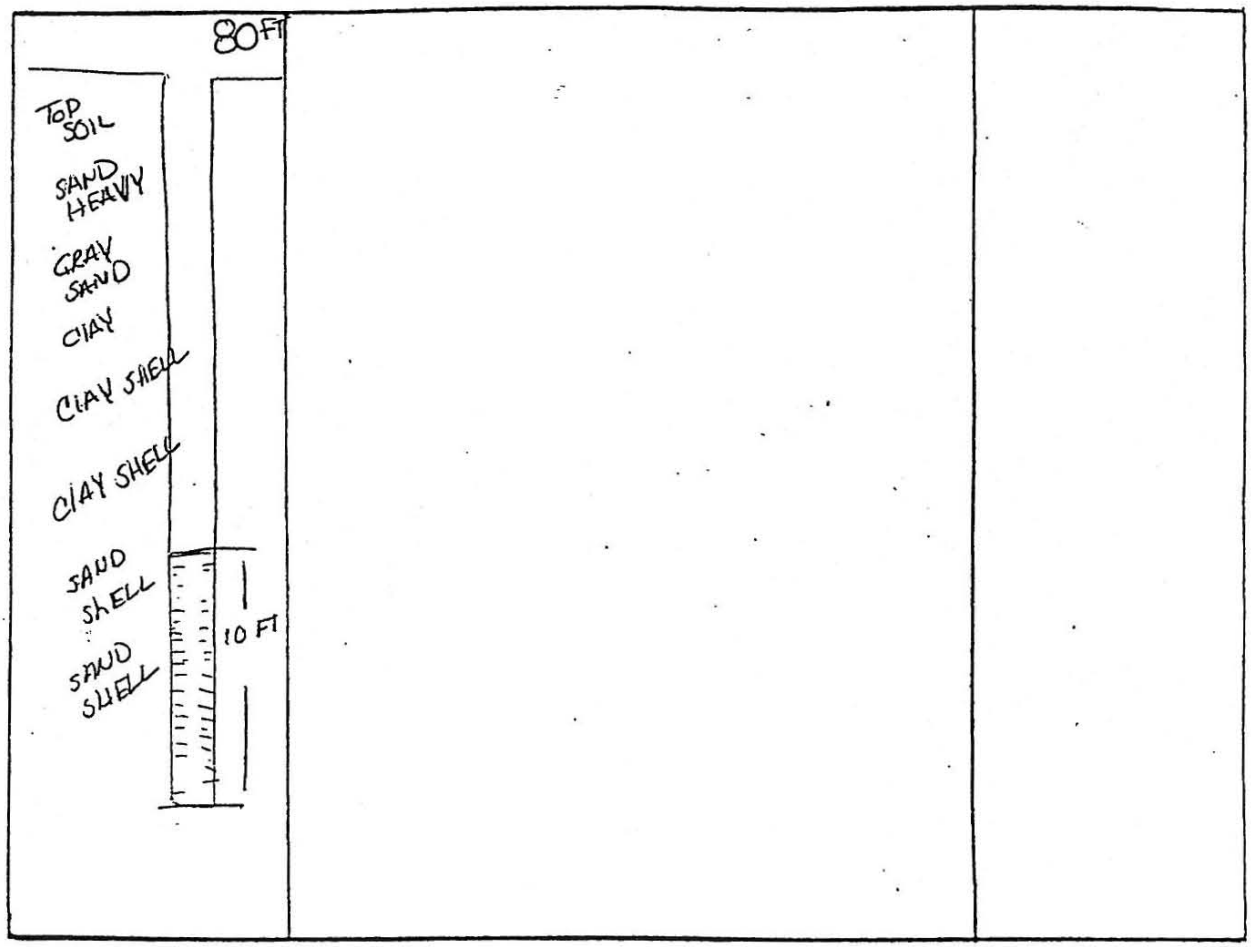
* Use Data *

Private Well: Domestic ✓ Agricultural ____ Industrial ____ Monitoring ____
Public Well: Community ____ Non Community ____

20095

Drillers Log *
(Use additional sheets if necessary)

Depth	Description of Formation or Sediment	Remarks



I certify that the information contained here is true and that this well was installed and constructed in accordance with the that the well complies with all applicable state and local regulations, ordinances and laws.

Name Virginia Well Service
Address 820 Lynnhaven Pkwy. Ste 114
Va. Beach, Va. 23452
Phone 468-1484

Drillers Signature Tony Gallo Date _____ Representing _____

Virginia Contractors License Number 2705-021830

20096

Commonwealth of Virginia
Uniform Water Well Completion Report

Owner Gerald Kanter
Address 1313 Murray Dr
Chesapeake
Phone
Location

Tax Map ID 61 A Lot 28
VDH Permit
VWCB Permit
VWCB ID 234-94-0067
County

* Well Data *

General Information
Drilling Method Rotary
Depth to Bedrock 70'
Static Water Level 15'
Well Disinfected (Y or N) Y

Date Completed 12-27-94
Yield 20 (GPM)
Stabilized Water Level 16'
Disinfectant Used Chlorine

Total Depth of Well 80
Length of Test 20 min
Natural Flow (Rate) 16 Open
Amount Used 320

Casing
From 70 to 0
Size 2" Material PVC
Weight/Schedule 40

From ____ to ____
Size ____ Material ____
Weight/Schedule ____

From ____ to ____
Size ____ Material ____
Weight/Schedule ____

Gravel Pack
From 80 to 60

From ____ to ____

From ____ to ____

Grout
From 60 to 0
Bore Hole Size 5 1/4
Type Hole Plug
Method Pour

From ____ to ____
Bore Hole Size ____
Type ____
Method ____

From ____ to ____
Bore Hole Size ____
Type ____
Method ____

Water Zones or Screened Intervals
From 80 to 70
Mesh Size 10,000 Diam. 1/4
From ____ to ____
Mesh Size ____ Diam. ____

From ____ to ____
Mesh Size ____ Diam. ____
From ____ to ____
Mesh Size ____ Diam. ____

From ____ to ____
Mesh Size ____ Diam. ____
From ____ to ____
Mesh Size ____ Diam. ____

* Use Data *

Private Well: Domestic ✓ Agricultural ____ Industrial ____ Monitoring ____
Public Well: Community ____ Non Community ____

20097

Drillers Log *
(Use additional sheets if necessary)

Depth	Description of Formation or Sediment	Remarks
10	clay	
20	Sand	
	clay	
70	shell	
80		

I certify that the information contained here is true and that this well was installed and constructed in accordance with the pe that the well complies with all applicable state and local regulations, ordinances and laws.

Name VIRGINIA WELLSERVICE
Address 829 LYNNHAVEN PKWY #114
VA BEACH, VA 23452
Phone 468-1484

Drillers Signature [signature] Date 3-30-95 Representing Va Well

Virginia Contractors License Number 2705-02183a

20098

GAO 1-31-95

18 CYPRESS AVENUE
RGINIA BEACH, VA 23451
LEPHONE 804/425/1498
CSIMILE 804/422/9176

ANALYTICAL CHEMISTS

ertificate of Analysis

TO Mr Kanter
1346 Boxwood Circle
Norfolk, Va 23518

DATE 1/27/95

SAMPLE DESCRIPTION Drinking water
Sample received 1/24/95 @ 4:35 p.m.
Sample taken 1/24/95 @ 1:00 p.m.
Sample Marked: 1313 Murray Drive
Chesapeake, Va

ANALYSIS NO 95-213

MS #61A Lot #28 HDID #234-94-0067

Total Coliform..... Negative

" This water sample is bacteriologically safe for consumption."

Copy: Chesapeake Health Dept

20099

Health Department
Identification Number 234-94- 6376 7

Schematic drawing of sewage disposal and/or water supply system and topographic features.

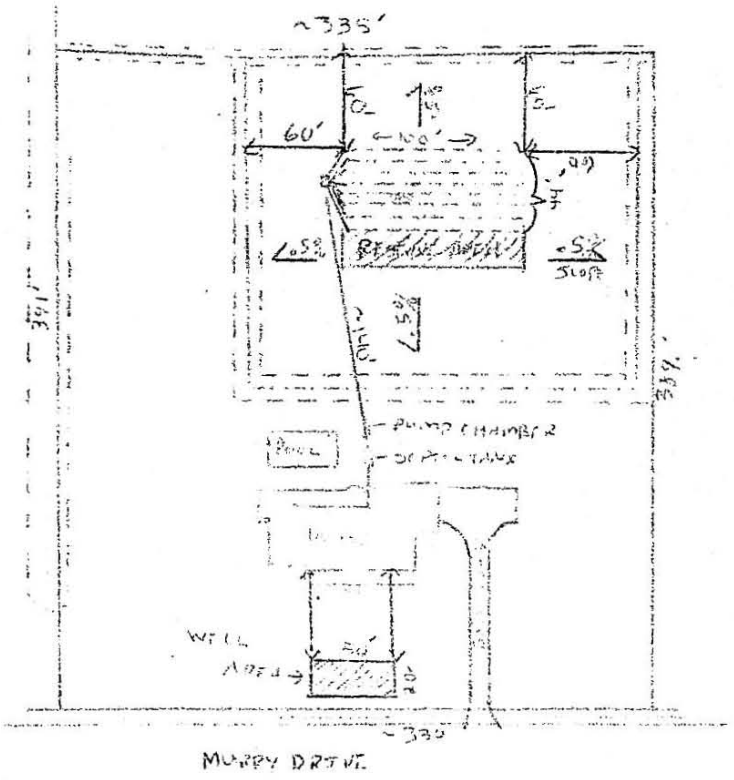
Show the lot lines of the building site, sketch of property showing any topographic features which may impact on the design of the well or sewage disposal system, including existing and/or proposed structures and sewage disposal systems and wells within 200 feet. The schematic drawing of the well site or area and/or sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be permitted, show all sources of pollution within 200 feet.

☐ The information required above has been drawn on the attached copy of the sketch submitted with the application.
Attach additional sheets as necessary to illustrate the design.

1. 8 - 2 'x 100' Drainfield Trench Lines.
2. Maximum Depth of Drainfield Trenches- 18".
3. Grade Boards Required
4. (3) THREE Bedrooms Only.
5. Comply with Soil Drainage Managment Plan.
6. Final grade must be completed and inspected before this office can issue an operation permit.
7. Keep well 50' from house foundation & 50' from septic tank & pump chamber.
8. One (1) Class III C well to be installed for drinking water. Well must be cased and grouted to 20' Minimum.
9. Well Driller must submit a GW2 to this office.

   Pump Chamber to be installed in accordance to section 4.233. See Page 2 of 2.
11. Owner must arrange to have a water sample taken and tested by an approved laboratory.

SCALE: 1" = 100'



This sewage disposal system and/or water supply is to be constructed as specified by the permit X or attached plans and specifications X .

This sewage disposal system and/or well construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

SAT 9/13 and 9/14

Date: 9/29/94 **Issued by:** [signature] REHS
Sanitarian

Date: 9-29-94 **Reviewed by:** [signature]
Supervisory Sanitarian

This Construction Permit Valid until
March 1996

If FHA or VA financing

Reviewed by _____ **Date** _____
Supervisory Sanitarian

_____ **Date** _____
Regional Sanitarian

20100

APPENDIX B

URS Boring Logs and Well Construction Diagrams

BORING LOG

Project:	Chesapeake Golf Course	Project No.:	49498–001
Location:	Chesapeake, Virginia	Boring No.:	B–1
Observer:	M.R.	Date of Boring:	7/24/01
Type of Boring:	4–in Mud Rotary	Elevation (ground):	9.90'
Drilling Contractor:	Fishburne Drilling Inc.	File Name:	log1.dwg

Depth ft.	Stratum Description	Depth of Sample	Sample Blows*	Sample Description
0 – 1 – 2	Fine SANDY SILT CLAY	0–2		Top soil, dark olive brown (2.5Y,3/3) with yellowish brown mottles (10YR,5/6) Fine SANDY SILTY CLAY, dry.
3 – 4	Fine SANDY SILT ▽	2–4	7–7–7–7	Black–gray (10YR,3/2) Fine SANDY SILT, moist.
5 – 6		4–6	7–8–11–11	Dark grayish brown (10YR,3/2) Fine SANDY SILT, moist. 5' Increasing sand, becoming Medium SAND. 5.5' Becoming olive brown (2.5Y,4/3). 6' Becoming gray, wet.
7 – 8		6–8	10–11–11–13	Olive gray (5Y,5/2), Medium SAND, wet. 7.6' Gray (5Y,5/1), Fine SAND, wet.
9 – 10	Medium to Fine SAND	8–10		Gray (2.5Y,5/0), Fine SAND, wet.
11 – 12 – 13		10–13		
14 – 15		13–15		Same as above.
16 – 17 – 18		15–18		
19 – 20		18–20	5–6–10–11	18.75' Dark gray (5Y,4/1), Medium SAND with some pebbles (quartz, rounded), wet.
21 – 22		20–22		Shelby tube
23		22–23		
24 – 25		23–25	1–1–2–3	Gray (5Y,6/1) Medium–Fine SAND with some shell fragments and black heavy minerals, wet.

GROUNDWATER DATA: Groundwater encountered at ~ 6.0 ft bgs.
Water Level is _____ ft. below ground surface 24 hours after completion.

* No. of Blows 140–Lb. Hammer, 30–in fall, required to drive 2–in O.D., 1.375 I.D. sampler 6 inches.

Note: Survey data provided by Hassell & Folks, P.C.

URS

BORING LOG

Project:	Chesapeake Golf Course	Project No.:	49498-001
Location:	Chesapeake, Virginia	Boring No.:	B-1
Observer:	M.R.	Date of Boring:	7/24/01
Type of Boring:	4-in Mud Rotary	Elevation (ground):	9.90'
Drilling Contractor:	Fishburne Drilling Inc.	File Name:	log2.DWG

Depth ft.	Stratum Description	Depth of Sample	Sample Blows*	Sample Description
25 – 26 – 27 –		25–28		
28 – 29 – 30 – 31 – 32 – 33 –	Medium to Coarse SAND	28–30	12–17–25–29	Olive-gray (5Y,5/2), Medium-Coarse SAND. 28.5' Light gray (5Y,6/1), Medium-Coarse SAND, with some fines (coarse grains-pink, green, black), wet.
		30–33		
34 – 35 – 36 – 37 – 38 –	Medium SAND with SILT	33–35	10–12–15–16	Very dark gray (5Y,3/1), Medium SAND with some SILT, wet.
		35–38		
39 – 40 – 41 – 42 – 43 –	Fine to Medium SAND	38–40	3–5–6–6	Olive gray (5Y,4/2) Fine-Medium SAND with shell fragments (tan,pink), wet.
		40–43		
44 – 45 – 46 – 47 – 48 –	Fine SILTY SAND / Fine SANDY SILT	43–45	4–4–6–6	Olive gray (5Y,4/2) Fine SILTY SAND to Fine SANDY SILT, with some shell fragments, wet.
		45–48		
49 – 50	Fine SANDY SILT with CLAY	48–50	2–2–2–3	Olive gray (5Y,4/2) Fine SANDY SILT with some CLAY, wet.

GROUNDWATER DATA: Groundwater Encountered at ~ 6.0 ft.
Water Level is _____ ft. below ground surface 24 hours after completion.

* No. of Blows 140-Lb. Hammer, 30-in fall, required to drive 2-in O.D., 1.375 I.D. sampler 6 inches.

Note: Survey data provided by Hassell & Folks, P.C.

URS

BORING LOG

Project:	Chesapeake Golf Course	Project No.:	49498-001
Location:	Chesapeake, Virginia	Boring No.:	B-1A
Observer:	M.R.	Date of Boring:	7/24/01
Type of Boring:	4 1/4-in HSA	Elevation (ground):	
Drilling Contractor:	Fishburne Drilling Inc.	File Name:	log3.DWG

Depth ft.	Stratum Description	Depth of Sample	Sample Blows*	Sample Description
0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 – 11 – 12 – 13 – 14 – 15 – 16 – 17 – 18 – 19 – 20 – 21 – 22 – 23 – 24 – 25	Boring Terminated @ 25.0 FT.	20-22		Dark gray (5Y,4/1), Medium-Coarse SAND, with pebbles.

GROUNDWATER DATA: Groundwater Encountered at ~
Water Level is _____ ft. below ground surface 24 hours after completion.

* No. of Blows 140-Lb. Hammer, 30-in fall, required to drive 2-in O.D., 1.375 I.D. sampler 6 inches.

Note: Survey data provided by Hassell & Folks, P.C.

URS

BORING LOG

Project:	Chesapeake Golf Course	Project No.:	49498-001
Location:	Chesapeake, Virginia	Boring No.:	B-2
Observer:	M.R.	Date of Boring:	7/25/01
Type of Boring:	4-in Mud Rotary	Elevation (ground):	
Drilling Contractor:	Fishburne Drilling Inc.	File Name:	log4.DWG

Depth ft.	Stratum Description	Depth of Sample	Sample Blows*	Sample Description
0–2	Fine SANDY CLAYEY SILT / Stiff SILTY CLAY	0–2	2–3–4–4	Top soil, Olive brown (2.5Y,4/3), Fine SANDY CLAYEY SILT, dry, grading to stiff SILTY CLAY with light olive brown mottles (2.5Y, 5/6), moist.
2–4	Fine SANDY CLAY / Fine SILTY SAND	2–4	4–4–4–4	Dark gray (5Y,4/1) Fine SANDY CLAY with brownish yellow mottles (10YR,6/8) grading to gray (2.5Y,6/1) fine SILTY SAND with brownish yellow mottles (10YR,6/8), moist
4–6	Fine SANDY CLAY ▽	4–6	3–4–6–10	Mottled yellowish brown (10YR,5/8) and gray (5Y,6/1) Fine SANDY 4.6. CLAY wet Alternating brown Medium to Coarse SAND, wet.
6–8	Medium to Coarse SAND / Fine to Medium SAND	6–8	8–8–13–10	Yellow–brown (10YR 5/6) Medium–Coarse SAND. 6.9'–Gray, light brown and tan (2.5Y,5/0) (7.5Y, 6/3) Fine–Medium SAND, wet.
8–10	Fine SAND	8–10	6–11–12–10	Olive gray (5Y, 5/2), Fine SAND, wet.
10–13		10–13		
13–15		13–15	8–9–9–11	Same as above, wet.
15–18		15–18		
18–20		18–20		Shelby tube
20–23		20–23		
23–25	Medium SAND Boring Terminated @ 25 FT.	23–25	6–7–9–16	Dark gray (5Y,4/1) Medium SAND, wet.

GROUNDWATER DATA: Groundwater Encountered at ~ 5.0 ft.
Water Level is _____ ft. below ground surface 24 hours after completion.

* No. of Blows 140–Lb. Hammer, 30–in fall, required to drive 2–in O.D., 1.375 I.D. sampler 6 inches.

Note: Survey data provided by Hassell & Folks, P.C.

URS

BORING LOG

Project:	Chesapeake Golf Course	Project No.:	49498-001
Location:	Chesapeake, Virginia	Boring No.:	B-3
Observer:	M.R.	Date of Boring:	7/24/01
Type of Boring:	4 1/4 in-HSA	Elevation (ground):	9.71'
Drilling Contractor:	Fishburne Drilling Inc.	File Name:	log5.DWG

Depth ft.	Stratum Description	Depth of Sample	Sample Blows*	Sample Description
0 – 1 – 2 – 3 – 4	SILT with CLAY	0-2	2-3-3-3	Very dark grayish brown (10YR,3/2) SILT with some CLAY, gray (10YR,6/1) and yellowish brown (10YR,5/6) mottles, moist.
		2-4	4-5-5-5	Mottles becoming more brownish yellow (10YR,6/6), moist.
5 – 6	CLAY with SILT	4-6	2-3-3-3	5.5 Very dark brown (7.5YR, 2.5/2) SILTY CLAY with light Olive brown Mottles (2.5YR, 5/6), moist.
7 – 8	Medium SAND ▽	6-8	6-11-10-11	Gray (7.5YR,6/0), Medium SAND with pebbles.
	Fine SAND			6.8' Light yellow-brown (10YR,6/4) Fine SAND, wet.
9 – 10 – 11 – 12 – 13	Medium SAND	8-10	3-4-4-5	Gray (5Y,5/1), Medium SAND with angular to subangular grains, wet.
		10-13		
14 – 15 – 16 – 17 – 18 – 19 – 20	Fine to Medium SAND	13-15	5-8-10-10	Gray (5Y,5/1), Fine to Medium SAND, wet.
		15-18		
		18-20		Shelby tube
21 – 22 – 23 – 24 – 25	Medium SAND	20-22	4-5-5-4	Dark gray (2.5Y,4/1), Medium SAND with some shell fragments, wet.
		22-25	5-6-7-7	Becoming more gray (5Y,4/1), wet.
	Boring Terminated @ 25.0 FT.			

GROUNDWATER DATA: Groundwater Encountered at ~ 6.8 ft.
Water Level is _____ ft. below ground surface 24 hours after completion.

* No. of Blows 140-Lb. Hammer, 30-in fall, required to drive 2-in O.D., 1.375 I.D. sampler 6 inches.

Note: Survey data provided by Hassell & Folks, P.C.

URS

BORING LOG

Project:	Chesapeake Golf Course	Project No.:	49498-001
Location:	Chesapeake, Virginia	Boring No.:	B-4
Observer:	M.R.	Date of Boring:	7/25/01
Type of Boring:	4 1/4 in Mud Rotary	Elevation (ground):	11.13'
Drilling Contractor:	Fishburne Drilling Inc.	File Name:	log6.DWG

Depth ft.	Stratum Description	Depth of Sample	Sample Blows*	Sample Description
0 – 1 – 2	Fine SILTY CLAYEY SAND / Fine SAND	0–2	2–2–2–3	Black (5Y,2.5/1), Fine, SILTY, CLAYEY, SAND, moist. 1.5' Very dark grayish brown (2.5Y,3/2) Fine SAND, moist 1.75' Grading to dark olive gray (5Y,3/2), moist.
3 – 4	Fine SANDY CLAY / Fine SILTY CLAYEY SAND	2–4	2–3–2–2	Dark grayish brown (2.5Y,3/2), Fine SANDY CLAY, moist. 2.5'–Grading to olive brown (2.5Y,4/3), Fine–Medium SAND with some SILT, Dark grayish brown (2.5Y,3/2) CLAY,wet.
5 – 6	Fine to Medium SAND	4–6	1–5–8–10	Olive brown (2.5Y,4/4), Fine–medium SAND, saturated 4.5'–Gray (5Y,6/1) Fine–Medium SAND with some pebbles, wet.
7 – 8	Fine SAND	6–8	7–8–9–10	Gray (5Y,5/1), Fine SAND, wet.
9 – 10		8–10	3–7–10–11	Same as above, wet.
11 – 12 – 13		10–13		
14 – 15		13–15	4–2–3–3	Same as above, wet.
16 – 17 – 18		15–18		
19 – 20		18–20	4–4–3–4	Grading to dark olive gray (5Y,4/1) with black mineral grains, wet.
21 – 22 – 23		20–23		
24 – 25	Medium CLAYEY SAND Boring Terminated 25.0 FT.	23–25		24.5–Gray (5Y,5/1), Medium SAND with black mineral grains and thin CLAYEY lenses, wet.

GROUNDWATER DATA: Groundwater Encountered at ~ 2.5 ft.
Water Level is ____ ft. below ground surface 24 hours after completion.

* No. of Blows 140–Lb. Hammer, 30–in fall, required to drive 2–in O.D., 1.375 I.D. sampler 6 inches.

Note: Survey data provided by Hassell & Folks, P.C.

URS

BORING LOG

Project:	Chesapeake Golf Course	Project No.:	49498-001
Location:	Chesapeake, Virginia	Boring No.:	B-5
Observer:	M.R.	Date of Boring:	7/25/01
Type of Boring:	4 1/4 in HSA	Elevation (ground):	10.53'
Drilling Contractor:	Fishburne Drilling Inc.	File Name:	log7.DWG

Depth ft.	Stratum Description	Depth of Sample	Sample Blows*	Sample Description
0	CLAYEY SANDY SILT	0-2	2-3-5-5	Dark olive brown (2.5Y,3/3), CLAYEY SILT with some SAND.
1				0.9' Mottled (yellow, brown) (10YR, 5/6), dark gray (5Y,3/1) SILTY CLAY, moist.
2	SILTY CLAY			
3	Medium to Fine SAND ▽	2-4	6-5-10-9	Black (5Y, 2.5/2) SILTY CLAY, moist.
4				2.2'-Light yellowish brown and gray (2.5Y,6/3) (5Y,6/2) Medium-Fine SAND, moist.
5		4-6	5-5-7-10	4.0' Grading to pale yellow (2.5Y,7/3), moist.
6	SILTY CLAY			4.2' Black (2.5Y,2.5/1) SILTY CLAY, moist.
7	Fine SAND	6-8	6-7-7-8	4.3' Light olive brown (2.5Y,5/4), dark gray (5Y,4/1) Fine SAND, saturated.
8	Medium SAND			6.0-Grading to gray (5Y,5/1), wet.
				6.5'-Gray (5Y,5/1), Medium SAND,wet.
9	Fine to Medium SAND	8-10	2-6-7-6	Dark greenish (5GY,4/1), Fine-Medium SAND, wet.
10				
11		10-13		
12				
13				
14		13-15	5-4-5-6	Same as above, wet.
15				
16		15-18		
17				
18				
19		18-20	5-4-6-1	Grading dark gray (2.5Y,4/1), Fine-Medium SAND, wet.
20				19' Wood fragments
21		20-23		
22				
23				
24	Medium SAND	23-25	1-1-2-2	Dark gray (5Y,4/1), Medium SAND, saturated 23.5' Grading to SANDY SILT with CLAY to SILTY CLAY and soft CLAY, wet.
25	CLAYEY SANDY SILT / SILTY CLAY			

Boring Terminated @ 25.0 FT.

GROUNDWATER DATA: Groundwater Encountered at ~ 4.0 ft.
Water Level is ____ ft. below ground surface 24 hours after completion.

* No. of Blows 140-Lb. Hammer, 30-in fall, required to drive 2-in O.D., 1.375 I.D. sampler 6 inches.

Note: Survey data provided by Hassell & Folks, P.C.

URS

MONITORING WELL CONSTRUCTION LOG

MONITORING WELL: MW-1 JOB NO.: 49498-001 DATE: 7-24-01

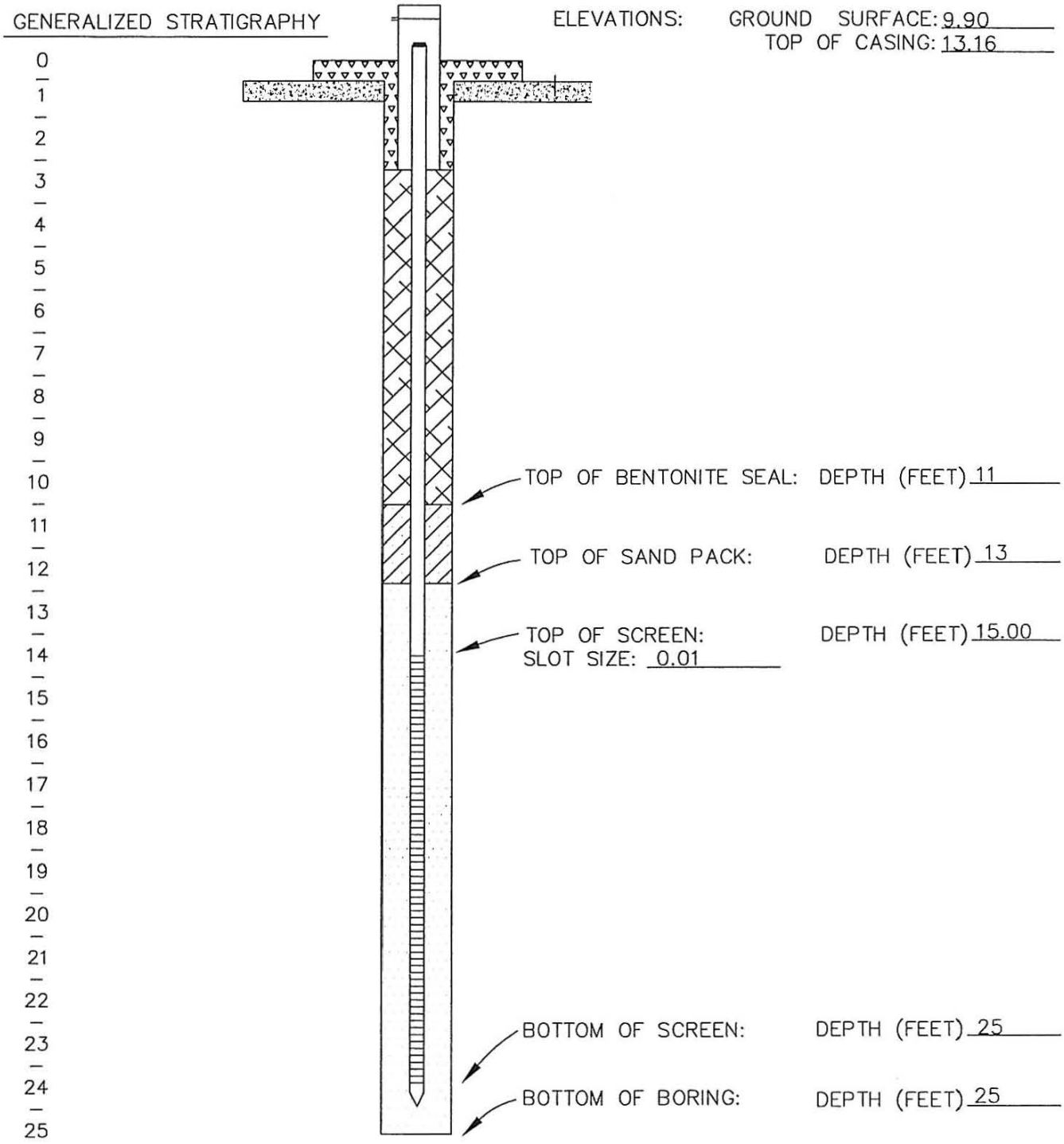
PROJECT: Chesapeake Golf Course

SITE LOCATION: Chesapeake, Virginia GEOLOGIST: M.R.

DRILLING CONTRACTOR: Fishburne Drilling Inc.

URS

GENERALIZED STRATIGRAPHY



ELEVATIONS: GROUND SURFACE: 9.90

TOP OF CASING: 13.16

TOP OF BENTONITE SEAL: DEPTH (FEET) 11

TOP OF SAND PACK: DEPTH (FEET) 13

TOP OF SCREEN: DEPTH (FEET) 15.00

SLOT SIZE: 0.01

BOTTOM OF SCREEN: DEPTH (FEET) 25

BOTTOM OF BORING: DEPTH (FEET) 25

20109

MONITORING WELL CONSTRUCTION LOG

MONITORING WELL: MW-2 JOB NO.: 49498-001 DATE: 7-24-01

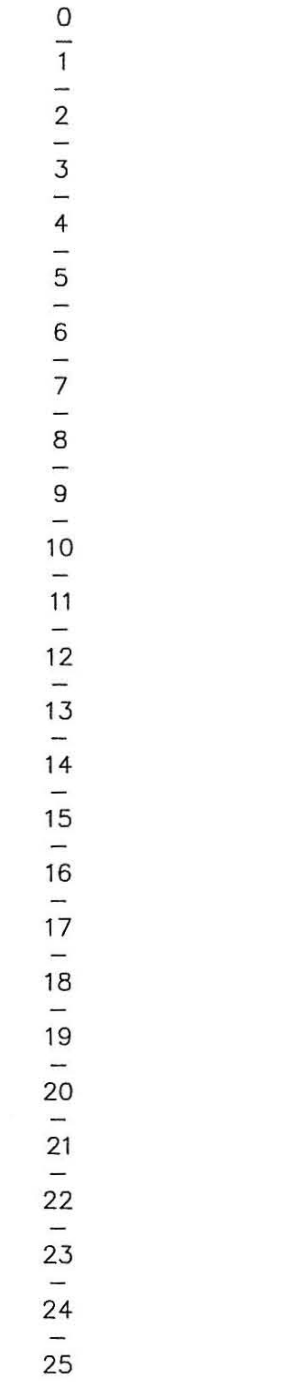
PROJECT: Chesapeake Golf Course

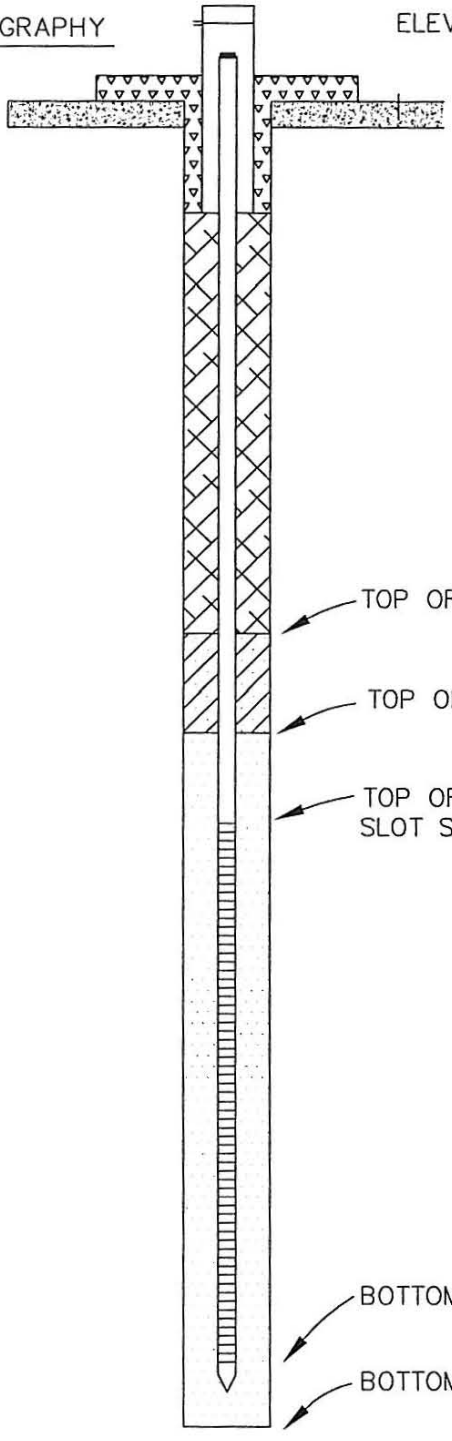
SITE LOCATION: Chesapeake, Virginia GEOLOGIST: M.R.

DRILLING CONTRACTOR: Fishburne Drilling Inc.

URS

GENERALIZED STRATIGRAPHY





ELEVATIONS: GROUND SURFACE: 9.86

TOP OF CASING: 13.11

TOP OF BENTONITE SEAL: DEPTH (FEET) 11

TOP OF SAND PACK: DEPTH (FEET) 13

TOP OF SCREEN: DEPTH (FEET) 15

SLOT SIZE: 0.01

BOTTOM OF SCREEN: DEPTH (FEET) 25

BOTTOM OF BORING: DEPTH (FEET) 25

20110

MONITORING WELL CONSTRUCTION LOG

MONITORING WELL: MW-3 JOB NO.: 49498-001 DATE: 7-25-01

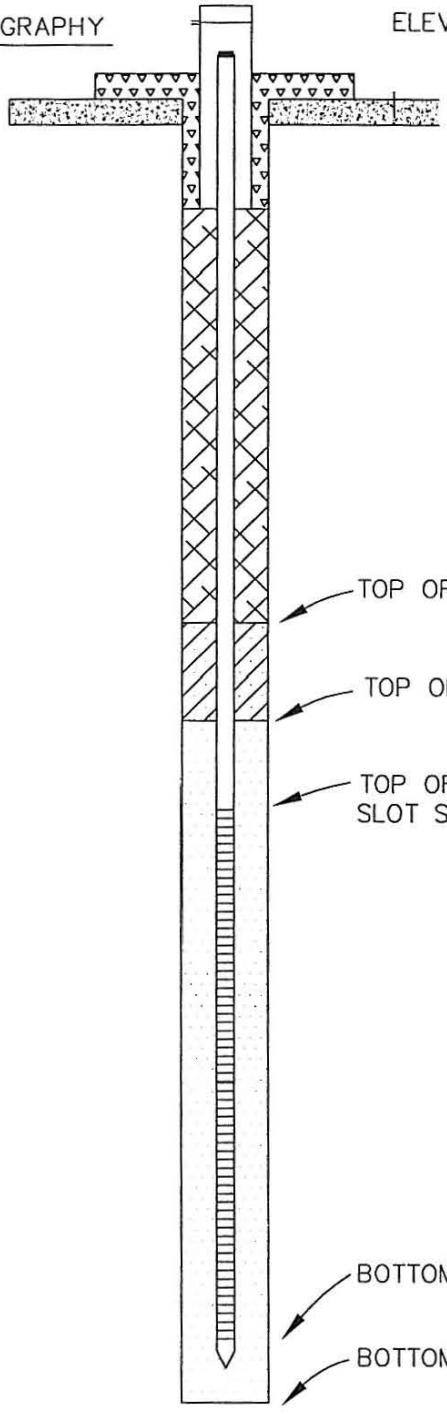
PROJECT: Chesapeake Golf Course

SITE LOCATION: Chesapeake, Virginia GEOLOGIST: M.R./B.F.

DRILLING CONTRACTOR: Fishburne Drilling Inc.

URS

GENERALIZED STRATIGRAPHY



ELEVATIONS: GROUND SURFACE: 9.71

TOP OF CASING: 12.75

TOP OF BENTONITE SEAL: DEPTH (FEET) 11

TOP OF SAND PACK: DEPTH (FEET) 13

TOP OF SCREEN: DEPTH (FEET) 15

SLOT SIZE: 0.01

BOTTOM OF SCREEN: DEPTH (FEET) 25

BOTTOM OF BORING: DEPTH (FEET) 25

20111

MONITORING WELL CONSTRUCTION LOG

MONITORING WELL: MW-4 JOB NO.: 49498-001 DATE: 7-25-01

PROJECT: Chesapeake Golf Course

SITE LOCATION: Chesapeake, Virginia GEOLOGIST: M.R.

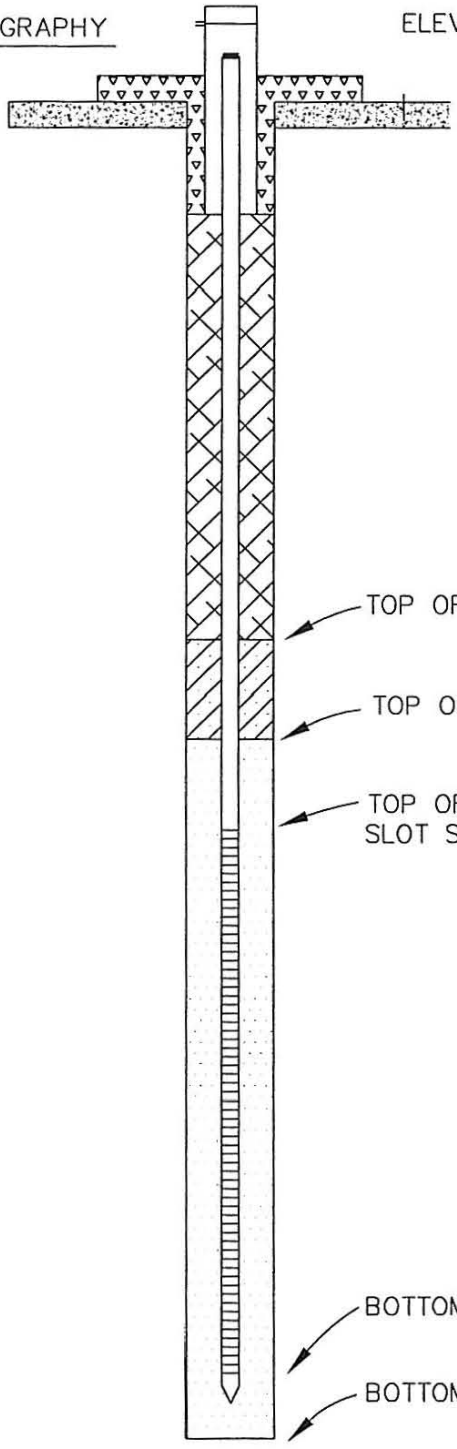
DRILLING CONTRACTOR: Fishburne Drilling Inc.

URS

GENERALIZED STRATIGRAPHY

ELEVATIONS: GROUND SURFACE: 11.13

TOP OF CASING: 14.10



TOP OF BENTONITE SEAL: DEPTH (FEET) 11

TOP OF SAND PACK: DEPTH (FEET) 13

TOP OF SCREEN: DEPTH (FEET) 15

SLOT SIZE: 0.01

BOTTOM OF SCREEN: DEPTH (FEET) 25

BOTTOM OF BORING: DEPTH (FEET) 25

20112

MONITORING WELL CONSTRUCTION LOG

MONITORING WELL: MW-5 JOB NO.: 49498-001 DATE: 7-25-01

PROJECT: Chesapeake Golf Course

SITE LOCATION: Chesapeake, Virginia GEOLOGIST: M.R.

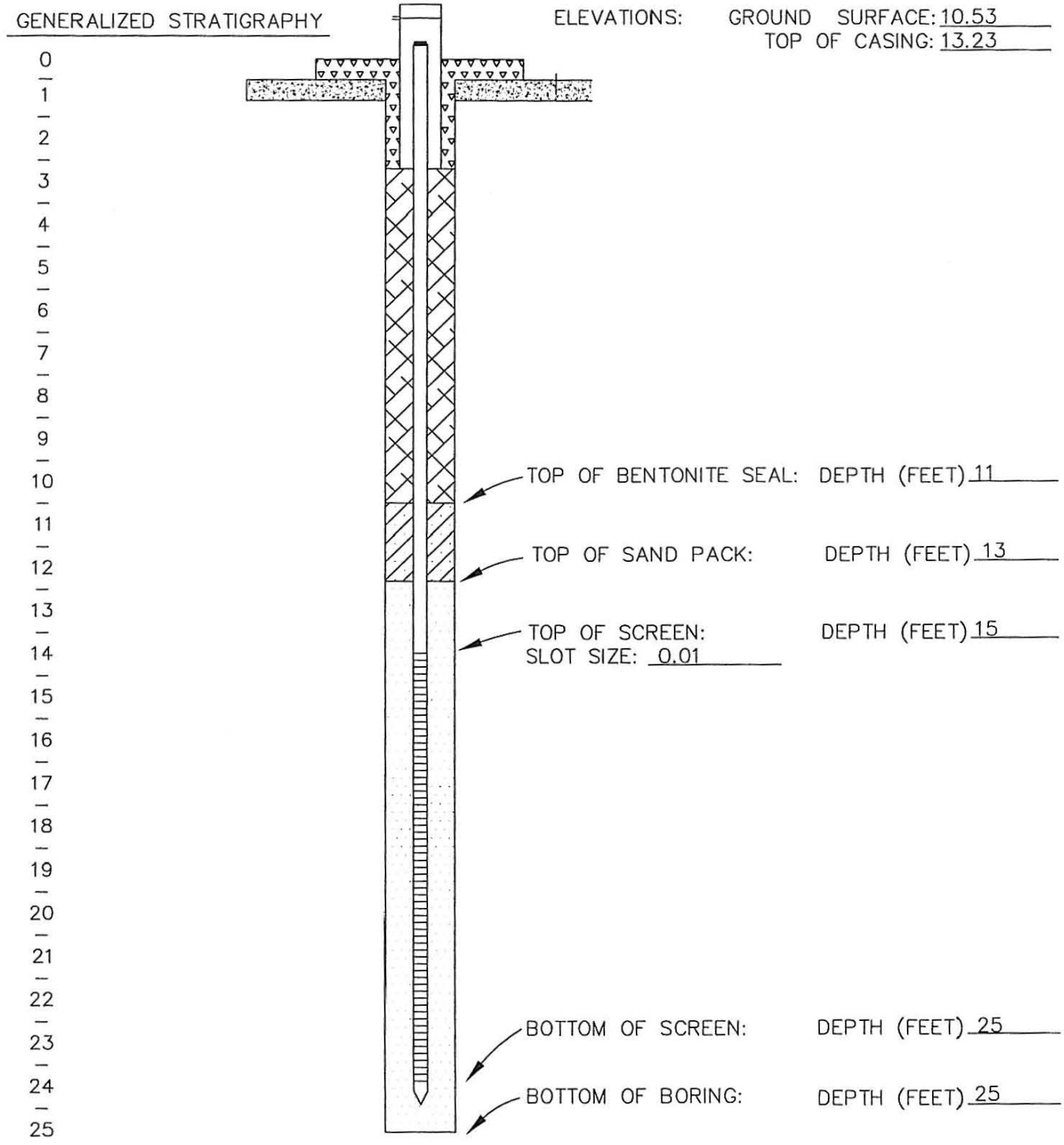
DRILLING CONTRACTOR: Fishburne Drilling Inc.

URS

GENERALIZED STRATIGRAPHY

ELEVATIONS: GROUND SURFACE: 10.53

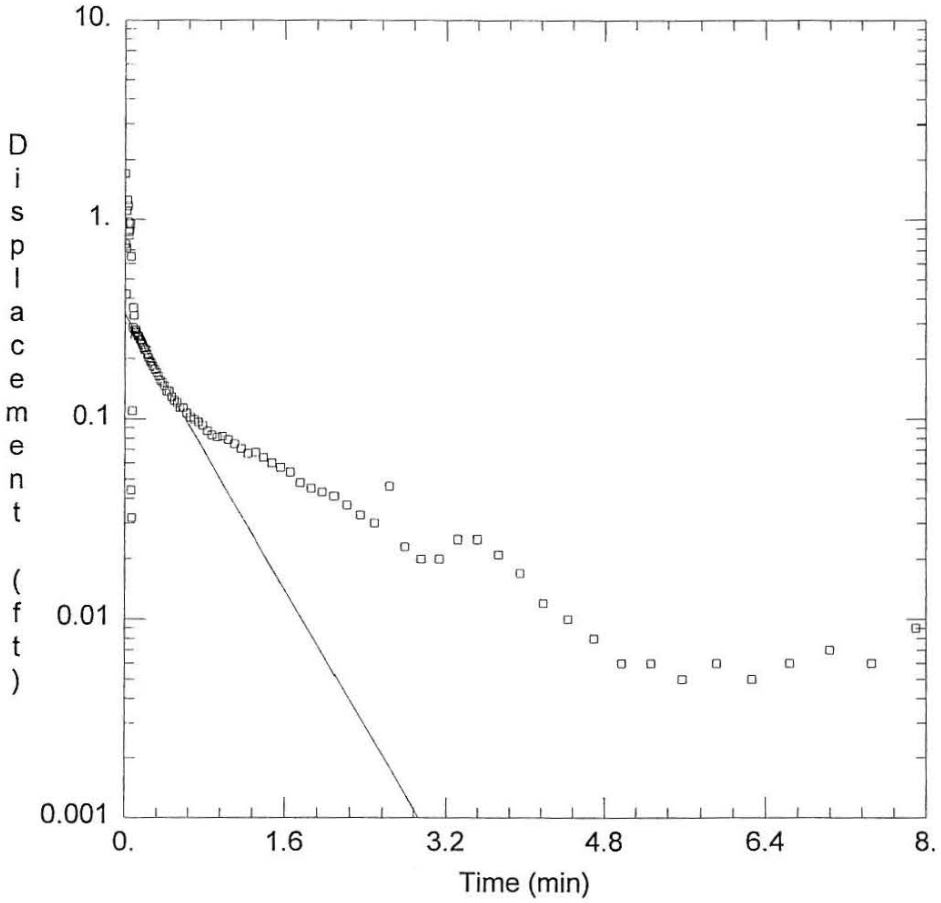
TOP OF CASING: 13.23



20113

APPENDIX C

Aquifer Test Data



WELL TEST ANALYSIS

Data Set: P:\Dominion Chesapeake GC\Hydro Study\03 - Slug Test\Cleveland Files\mw02fh.aqt
Date: 09/07/01 Time: 12:40:19

PROJECT INFORMATION

Test Well: Falling Head

AQUIFER DATA

Saturated Thickness: 36. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW2)

Initial Displacement: 1.706 ft
Wellbore Radius: 0.333 ft
Screen Length: 10. ft
Casing Radius: 0.08333 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 17. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0008455 cm/sec
y0 = 0.3348 ft

In-Situ Inc. Troll

Report generated: 08/10/01 14:27:50
Report from file: P:\Dominion Chesapeake GC\Hydro Study\03- Slug Test\Mw2nefh.bin
DataMgr Version 3.68

Serial number: 00012080
Firmware Version 6.24
Unit name: SP4000

Test name: MW2NEfh

Test defined on: 08/01/01 16:09:16
Test started on: 08/01/01 16:13:53
Test stopped on: 08/01/01 16:34:18
Test extracted on: 08/02/01 12:16:45

Data gathered using Logarithmic testing
Maximum time between data points: 5.0000 Minutes.
Number of data samples: 113

TOTAL DATA SAMPLES 113

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 15 PSI.

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] PSI
08/01/01	16:13:53	0.0000	14.88	10.366
08/01/01	16:13:53	0.0050	14.88	9.413
08/01/01	16:13:53	0.0100	14.89	9.082
08/01/01	16:13:53	0.0150	14.89	9.377
08/01/01	16:13:54	0.0200	14.90	9.760
08/01/01	16:13:54	0.0250	14.90	9.912
08/01/01	16:13:54	0.0300	14.90	9.826
08/01/01	16:13:55	0.0350	14.90	9.627
08/01/01	16:13:55	0.0400	14.91	9.526
08/01/01	16:13:55	0.0450	14.92	9.547
08/01/01	16:13:56	0.0500	14.92	9.608
08/01/01	16:13:56	0.0550	14.92	9.615
08/01/01	16:13:56	0.0600	14.92	9.309
08/01/01	16:13:56	0.0650	14.93	8.704
08/01/01	16:13:57	0.0700	14.93	8.692
08/01/01	16:13:57	0.0750	14.93	8.770
08/01/01	16:13:57	0.0800	14.93	8.945
08/01/01	16:13:58	0.0850	14.94	9.020
08/01/01	16:13:58	0.0900	14.95	8.990
08/01/01	16:13:58	0.0950	14.95	8.938
08/01/01	16:13:59	0.1000	14.95	8.924
08/01/01	16:13:59	0.1058	14.95	8.932
08/01/01	16:13:59	0.1120	14.95	8.939
08/01/01	16:14:00	0.1185	14.96	8.929
08/01/01	16:14:00	0.1255	14.96	8.922
08/01/01	16:14:00	0.1328	14.96	8.919
08/01/01	16:14:01	0.1407	14.96	8.918
08/01/01	16:14:01	0.1490	14.96	8.910
08/01/01	16:14:02	0.1578	14.97	8.906
08/01/01	16:14:03	0.1672	14.98	8.901
08/01/01	16:14:03	0.1770	14.99	8.894
08/01/01	16:14:04	0.1875	15.00	8.886
08/01/01	16:14:04	0.1985	15.00	8.882

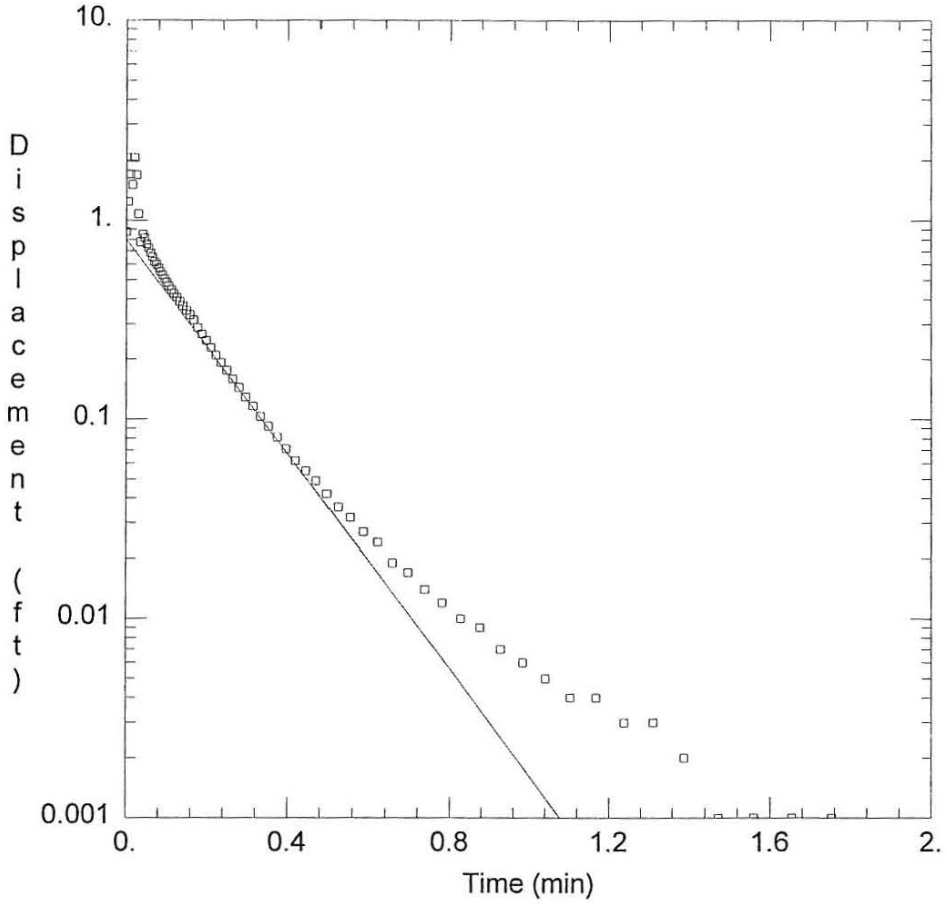
08/01/01	16:14:05	0.2102	15.00	8.882
08/01/01	16:14:06	0.2227	15.00	8.870
08/01/01	16:14:07	0.2358	15.00	8.862
08/01/01	16:14:07	0.2498	15.01	8.855
08/01/01	16:14:08	0.2647	15.01	8.850
08/01/01	16:14:09	0.2803	15.01	8.843
08/01/01	16:14:10	0.2970	15.01	8.837
08/01/01	16:14:11	0.3147	15.01	8.831
08/01/01	16:14:13	0.3333	15.02	8.824
08/01/01	16:14:14	0.3532	15.02	8.816
08/01/01	16:14:15	0.3742	15.02	8.813
08/01/01	16:14:16	0.3963	15.02	8.807
08/01/01	16:14:18	0.4198	15.02	8.798
08/01/01	16:14:19	0.4447	15.02	8.798
08/01/01	16:14:21	0.4697	15.02	8.789
08/01/01	16:14:22	0.4963	15.02	8.784
08/01/01	16:14:24	0.5247	15.02	8.781
08/01/01	16:14:26	0.5547	15.02	8.774
08/01/01	16:14:28	0.5863	15.02	8.774
08/01/01	16:14:30	0.6213	15.02	8.767
08/01/01	16:14:32	0.6580	15.02	8.762
08/01/01	16:14:34	0.6963	15.02	8.759
08/01/01	16:14:37	0.7380	15.02	8.756
08/01/01	16:14:39	0.7813	15.02	8.753
08/01/01	16:14:42	0.8280	15.02	8.747
08/01/01	16:14:45	0.8763	15.02	8.743
08/01/01	16:14:48	0.9280	15.02	8.741
08/01/01	16:14:51	0.9830	15.02	8.742
08/01/01	16:14:55	1.0413	15.02	8.739
08/01/01	16:14:59	1.1030	15.02	8.735
08/01/01	16:15:03	1.1680	15.01	8.731
08/01/01	16:15:07	1.2380	15.02	8.727
08/01/01	16:15:11	1.3113	15.02	8.728
08/01/01	16:15:16	1.3897	15.01	8.724
08/01/01	16:15:21	1.4730	15.01	8.720
08/01/01	16:15:26	1.5613	15.04	8.717
08/01/01	16:15:32	1.6547	15.06	8.714
08/01/01	16:15:38	1.7530	15.03	8.708
08/01/01	16:15:44	1.8580	15.07	8.705
08/01/01	16:15:51	1.9680	15.06	8.703
08/01/01	16:15:58	2.0847	15.07	8.701
08/01/01	16:16:05	2.2097	15.09	8.697
08/01/01	16:16:13	2.3413	15.13	8.693
08/01/01	16:16:21	2.4813	15.10	8.690
08/01/01	16:16:30	2.6297	15.17	8.706
08/01/01	16:16:40	2.7863	15.20	8.683
08/01/01	16:16:50	2.9530	15.22	8.680
08/01/01	16:17:00	3.1297	15.19	8.680
08/01/01	16:17:11	3.3163	15.17	8.685
08/01/01	16:17:23	3.5147	15.15	8.685
08/01/01	16:17:36	3.7247	15.13	8.681
08/01/01	16:17:49	3.9463	15.12	8.677
08/01/01	16:18:03	4.1813	15.11	8.672
08/01/01	16:18:18	4.4297	15.10	8.670
08/01/01	16:18:34	4.6930	15.09	8.668
08/01/01	16:18:51	4.9730	15.08	8.666
08/01/01	16:19:09	5.2697	15.12	8.666
08/01/01	16:19:27	5.5830	15.10	8.665
08/01/01	16:19:47	5.9147	15.08	8.666
08/01/01	16:20:08	6.2663	15.07	8.665
08/01/01	16:20:31	6.6397	15.07	8.666
08/01/01	16:20:55	7.0347	15.05	8.667
08/01/01	16:21:20	7.4530	15.04	8.666
08/01/01	16:21:46	7.8963	15.03	8.669
08/01/01	16:22:14	8.3663	15.02	8.666
08/01/01	16:22:44	8.8647	15.04	8.663
08/01/01	16:23:16	9.3913	15.02	8.661
08/01/01	16:23:49	9.9497	15.04	8.662
08/01/01	16:24:25	10.5413	15.02	8.660
08/01/01	16:25:03	11.1680	15.06	8.659

08/01/01	16:25:42	11.8313	15.04	8.659
08/01/01	16:26:25	12.5347	15.04	8.659
08/01/01	16:27:09	13.2797	15.07	8.662
08/01/01	16:27:57	14.0697	15.05	8.660
08/01/01	16:28:47	14.9063	15.04	8.660
08/01/01	16:29:40	15.7913	15.06	8.660
08/01/01	16:30:36	16.7297	15.06	8.660
08/01/01	16:31:36	17.7230	15.04	8.660
08/01/01	16:32:39	18.7763	15.06	8.662
08/01/01	16:33:46	19.8913	15.13	8.660

0	10.366
0.005	9.413
0.01	9.082
0.015	9.377
0.02	9.76
0.025	9.912
0.03	9.826
0.035	9.627
0.04	9.526
0.045	9.547
0.05	9.608
0.055	9.615
0.06	9.309
0.065	8.704
0.07	8.692
0.075	8.77
0.08	8.945
0.085	9.02
0.09	8.99
0.095	8.938
0.1	8.924
0.1058	8.932
0.112	8.939
0.1185	8.929
0.1255	8.922
0.1328	8.919
0.1407	8.918
0.149	8.91
0.1578	8.906
0.1672	8.901
0.177	8.894
0.1875	8.886
0.1985	8.882
0.2102	8.882
0.2227	8.87
0.2358	8.862
0.2498	8.855
0.2647	8.85
0.2803	8.843
0.297	8.837
0.3147	8.831
0.3333	8.824
0.3532	8.816
0.3742	8.813
0.3963	8.807
0.4198	8.798
0.4447	8.798
0.4697	8.789
0.4963	8.784

0.5247	8.781
0.5547	8.774
0.5863	8.774
0.6213	8.767
0.658	8.762
0.6963	8.759
0.738	8.756
0.7813	8.753
0.828	8.747
0.8763	8.743
0.928	8.741
0.983	8.742
1.0413	8.739
1.103	8.735
1.168	8.731
1.238	8.727
1.3113	8.728
1.3897	8.724
1.473	8.72
1.5613	8.717
1.6547	8.714
1.753	8.708
1.858	8.705
1.968	8.703
2.0847	8.701
2.2097	8.697
2.3413	8.693
2.4813	8.69
2.6297	8.706
2.7863	8.683
2.953	8.68
3.1297	8.68
3.3163	8.685
3.5147	8.685
3.7247	8.681
3.9463	8.677
4.1813	8.672
4.4297	8.67
4.693	8.668
4.973	8.666
5.2697	8.666
5.583	8.665
5.9147	8.666
6.2663	8.665
6.6397	8.666
7.0347	8.667
7.453	8.666
7.8963	8.669
8.3663	8.666

8.8647	8.663
9.3913	8.661
9.9497	8.662
10.5413	8.66
11.168	8.659
11.8313	8.659
12.5347	8.659
13.2797	8.662
14.0697	8.66
14.9063	8.66
15.7913	8.66
16.7297	8.66
17.723	8.66
18.7763	8.662
19.8913	8.66



WELL TEST ANALYSIS

Data Set: P:\Dominion Chesapeake GC\Hydro Study\03 - Slug Test\Cleveland Files\mw04rs.aqt
Date: 09/07/01 Time: 12:30:21

PROJECT INFORMATION

Test Well: Rising Head

AQUIFER DATA

Saturated Thickness: 36. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW4)

Initial Displacement: 2.065 ft
Wellbore Radius: 0.333 ft
Screen Length: 10. ft
Casing Radius: 0.08333 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 17. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.002639 cm/sec
y0 = 0.7981 ft

In-Situ Inc. Troll

Report generated: 08/10/01 14:46:25
Report from file: P:\Dominion Chesapeake GC\Hydro Study\03- Slug Test\Mw4swrh.bin
DataMgr Version 3.68

Serial number: 00012080
Firmware Version 6.24
Unit name: SP4000

Test name: MW4SWrh

Test defined on: 08/01/01 17:19:15
Test started on: 08/01/01 17:33:14
Test stopped on: 08/01/01 17:39:24
Test extracted on: 08/02/01 12:18:15

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 92

TOTAL DATA SAMPLES 92

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

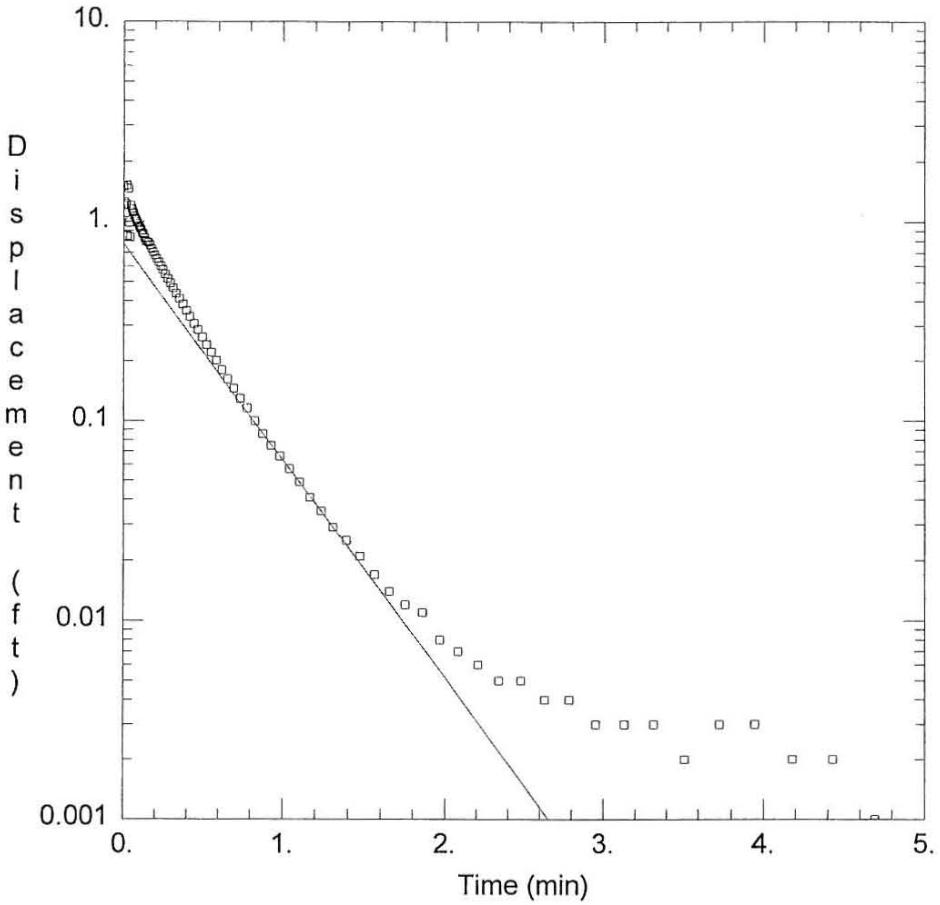
Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 15 PSI.

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] PSI
08/01/01	17:33:14	0.0000	15.41	8.312
08/01/01	17:33:14	0.0050	15.41	7.945
08/01/01	17:33:14	0.0100	15.42	7.478
08/01/01	17:33:14	0.0150	15.42	7.669
08/01/01	17:33:15	0.0200	15.42	7.120
08/01/01	17:33:15	0.0250	15.43	7.492
08/01/01	17:33:15	0.0300	15.43	8.109
08/01/01	17:33:16	0.0350	15.43	8.409
08/01/01	17:33:16	0.0400	15.44	8.331
08/01/01	17:33:16	0.0450	15.44	8.371
08/01/01	17:33:17	0.0500	15.44	8.426
08/01/01	17:33:17	0.0550	15.44	8.460
08/01/01	17:33:17	0.0600	15.45	8.502
08/01/01	17:33:17	0.0650	15.45	8.533
08/01/01	17:33:18	0.0700	15.45	8.568
08/01/01	17:33:18	0.0750	15.45	8.587
08/01/01	17:33:18	0.0800	15.45	8.610
08/01/01	17:33:19	0.0850	15.46	8.634
08/01/01	17:33:19	0.0900	15.46	8.656
08/01/01	17:33:19	0.0950	15.46	8.678
08/01/01	17:33:20	0.1000	15.46	8.699
08/01/01	17:33:20	0.1058	15.46	8.719
08/01/01	17:33:20	0.1120	15.47	8.738
08/01/01	17:33:21	0.1185	15.47	8.757
08/01/01	17:33:21	0.1255	15.47	8.776
08/01/01	17:33:21	0.1328	15.47	8.796
08/01/01	17:33:22	0.1407	15.47	8.815
08/01/01	17:33:22	0.1490	15.48	8.833
08/01/01	17:33:23	0.1578	15.48	8.851
08/01/01	17:33:24	0.1672	15.48	8.870
08/01/01	17:33:24	0.1770	15.50	8.897
08/01/01	17:33:25	0.1875	15.50	8.917
08/01/01	17:33:25	0.1985	15.50	8.937

08/01/01	17:33:26	0.2102	15.50	8.956
08/01/01	17:33:27	0.2227	15.51	8.976
08/01/01	17:33:28	0.2358	15.50	8.993
08/01/01	17:33:28	0.2498	15.50	9.009
08/01/01	17:33:29	0.2647	15.50	9.026
08/01/01	17:33:30	0.2803	15.51	9.041
08/01/01	17:33:31	0.2970	15.50	9.056
08/01/01	17:33:32	0.3147	15.51	9.069
08/01/01	17:33:34	0.3333	15.51	9.082
08/01/01	17:33:35	0.3532	15.51	9.093
08/01/01	17:33:36	0.3742	15.50	9.104
08/01/01	17:33:37	0.3963	15.50	9.114
08/01/01	17:33:39	0.4198	15.50	9.123
08/01/01	17:33:40	0.4447	15.50	9.130
08/01/01	17:33:42	0.4697	15.50	9.136
08/01/01	17:33:43	0.4963	15.50	9.143
08/01/01	17:33:45	0.5247	15.50	9.149
08/01/01	17:33:47	0.5547	15.50	9.153
08/01/01	17:33:49	0.5863	15.50	9.158
08/01/01	17:33:51	0.6213	15.49	9.161
08/01/01	17:33:53	0.6580	15.49	9.166
08/01/01	17:33:55	0.6963	15.48	9.168
08/01/01	17:33:58	0.7380	15.48	9.171
08/01/01	17:34:00	0.7813	15.48	9.173
08/01/01	17:34:03	0.8280	15.48	9.175
08/01/01	17:34:06	0.8763	15.47	9.176
08/01/01	17:34:09	0.9280	15.47	9.178
08/01/01	17:34:12	0.9830	15.46	9.179
08/01/01	17:34:16	1.0413	15.46	9.180
08/01/01	17:34:20	1.1030	15.45	9.181
08/01/01	17:34:24	1.1680	15.45	9.181
08/01/01	17:34:28	1.2380	15.44	9.182
08/01/01	17:34:32	1.3113	15.43	9.182
08/01/01	17:34:37	1.3897	15.42	9.183
08/01/01	17:34:42	1.4730	15.42	9.184
08/01/01	17:34:47	1.5613	15.41	9.184
08/01/01	17:34:53	1.6547	15.40	9.184
08/01/01	17:34:59	1.7530	15.39	9.184
08/01/01	17:35:05	1.8580	15.39	9.185
08/01/01	17:35:12	1.9680	15.38	9.185
08/01/01	17:35:19	2.0847	15.37	9.185
08/01/01	17:35:26	2.2097	15.36	9.184
08/01/01	17:35:34	2.3413	15.35	9.185
08/01/01	17:35:42	2.4813	15.34	9.185
08/01/01	17:35:51	2.6297	15.33	9.185
08/01/01	17:36:01	2.7863	15.32	9.185
08/01/01	17:36:11	2.9530	15.33	9.184
08/01/01	17:36:21	3.1297	15.33	9.184
08/01/01	17:36:32	3.3163	15.39	9.184
08/01/01	17:36:44	3.5147	15.36	9.185
08/01/01	17:36:57	3.7247	15.34	9.185
08/01/01	17:37:10	3.9463	15.32	9.185
08/01/01	17:37:24	4.1813	15.30	9.185
08/01/01	17:37:39	4.4297	15.27	9.184
08/01/01	17:37:55	4.6930	15.30	9.184
08/01/01	17:38:12	4.9730	15.31	9.185
08/01/01	17:38:30	5.2697	15.28	9.185
08/01/01	17:38:48	5.5830	15.26	9.185
08/01/01	17:39:08	5.9147	15.27	9.185

0	8.312
0.005	7.945
0.01	7.478
0.015	7.669
0.02	7.12
0.025	7.492
0.03	8.109
0.035	8.409
0.04	8.331
0.045	8.371
0.05	8.426
0.055	8.46
0.06	8.502
0.065	8.533
0.07	8.568
0.075	8.587
0.08	8.61
0.085	8.634
0.09	8.656
0.095	8.678
0.1	8.699
0.1058	8.719
0.112	8.738
0.1185	8.757
0.1255	8.776
0.1328	8.796
0.1407	8.815
0.149	8.833
0.1578	8.851
0.1672	8.87
0.177	8.897
0.1875	8.917
0.1985	8.937
0.2102	8.956
0.2227	8.976
0.2358	8.993
0.2498	9.009
0.2647	9.026
0.2803	9.041
0.297	9.056
0.3147	9.069
0.3333	9.082
0.3532	9.093
0.3742	9.104
0.3963	9.114
0.4198	9.123
0.4447	9.13
0.4697	9.136
0.4963	9.143

0.5247	9.149
0.5547	9.153
0.5863	9.158
0.6213	9.161
0.658	9.166
0.6963	9.168
0.738	9.171
0.7813	9.173
0.828	9.175
0.8763	9.176
0.928	9.178
0.983	9.179
1.0413	9.18
1.103	9.181
1.168	9.181
1.238	9.182
1.3113	9.182
1.3897	9.183
1.473	9.184
1.5613	9.184
1.6547	9.184
1.753	9.184
1.858	9.185
1.968	9.185
2.0847	9.185
2.2097	9.184
2.3413	9.185
2.4813	9.185
2.6297	9.185
2.7863	9.185
2.953	9.184
3.1297	9.184
3.3163	9.184
3.5147	9.185
3.7247	9.185
3.9463	9.185
4.1813	9.185
4.4297	9.184
4.693	9.184
4.973	9.185
5.2697	9.185
5.583	9.185
5.9147	9.185



WELL TEST ANALYSIS

Data Set: P:\Dominion Chesapeake GC\Hydro Study\03 - Slug Test\Cleveland Files\mw02rs.aqt
Date: 09/07/01 Time: 12:01:16

PROJECT INFORMATION

Test Well: Rising Head

AQUIFER DATA

Saturated Thickness: 36. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW2)

Initial Displacement: 1.5 ft
Wellbore Radius: 0.333 ft
Screen Length: 10. ft
Casing Radius: 0.08333 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 17. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.001066 cm/sec
y0 = 0.7745 ft

In-Situ Inc. Troll

Report generated: 08/10/01 14:27:04
Report from file: P:\Dominion Chesapeake GC\Hydro Study\03- Slug Test\Mw2nerh.bin
DataMgr Version 3.68

Serial number: 00012080
Firmware Version 6.24
Unit name: SP4000

Test name: MW2NErh

Test defined on: 08/01/01 16:09:50
Test started on: 08/01/01 16:35:18
Test stopped on: 08/01/01 16:43:18
Test extracted on: 08/02/01 12:01:14

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 97

TOTAL DATA SAMPLES 97

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

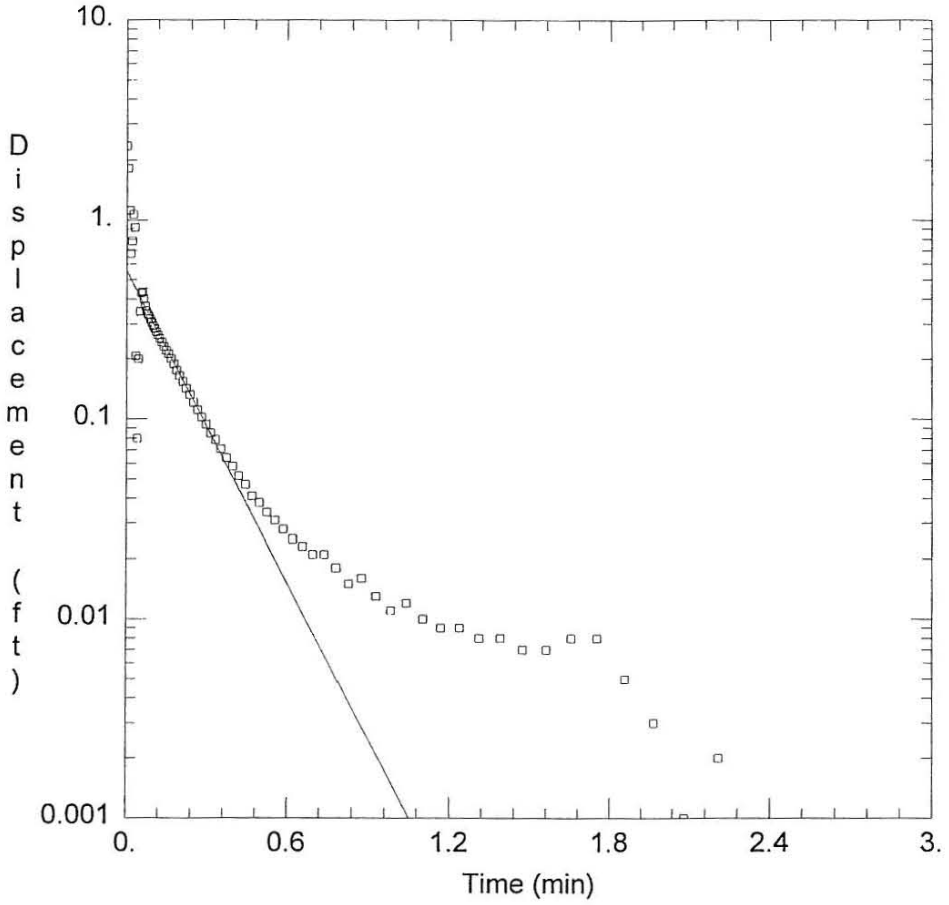
Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 15 PSI.

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] PSI
08/01/01	16:35:18	0.0000	15.10	7.456
08/01/01	16:35:18	0.0050	15.10	7.408
08/01/01	16:35:18	0.0100	15.10	7.555
08/01/01	16:35:18	0.0150	15.10	7.431
08/01/01	16:35:19	0.0200	15.11	7.143
08/01/01	16:35:19	0.0250	15.12	7.811
08/01/01	16:35:19	0.0300	15.12	7.191
08/01/01	16:35:20	0.0350	15.12	7.672
08/01/01	16:35:20	0.0400	15.12	7.822
08/01/01	16:35:20	0.0450	15.13	7.458
08/01/01	16:35:21	0.0500	15.13	7.499
08/01/01	16:35:21	0.0550	15.13	7.522
08/01/01	16:35:21	0.0600	15.14	7.542
08/01/01	16:35:21	0.0650	15.15	7.565
08/01/01	16:35:22	0.0700	15.14	7.599
08/01/01	16:35:22	0.0750	15.15	7.628
08/01/01	16:35:22	0.0800	15.15	7.641
08/01/01	16:35:23	0.0850	15.15	7.667
08/01/01	16:35:23	0.0900	15.15	7.682
08/01/01	16:35:23	0.0950	15.16	7.705
08/01/01	16:35:24	0.1000	15.16	7.725
08/01/01	16:35:24	0.1058	15.16	7.738
08/01/01	16:35:24	0.1120	15.16	7.753
08/01/01	16:35:25	0.1185	15.17	7.780
08/01/01	16:35:25	0.1255	15.17	7.797
08/01/01	16:35:25	0.1328	15.17	7.834
08/01/01	16:35:26	0.1407	15.17	7.861
08/01/01	16:35:26	0.1490	15.18	7.869
08/01/01	16:35:27	0.1578	15.18	7.877
08/01/01	16:35:28	0.1672	15.19	7.898
08/01/01	16:35:28	0.1770	15.20	7.930
08/01/01	16:35:29	0.1875	15.21	7.955
08/01/01	16:35:29	0.1985	15.21	7.981

08/01/01	16:35:30	0.2102	15.21	8.007
08/01/01	16:35:31	0.2227	15.21	8.034
08/01/01	16:35:32	0.2358	15.21	8.061
08/01/01	16:35:32	0.2498	15.21	8.087
08/01/01	16:35:33	0.2647	15.22	8.115
08/01/01	16:35:34	0.2803	15.22	8.142
08/01/01	16:35:35	0.2970	15.22	8.169
08/01/01	16:35:36	0.3147	15.22	8.196
08/01/01	16:35:38	0.3333	15.22	8.223
08/01/01	16:35:39	0.3532	15.22	8.249
08/01/01	16:35:40	0.3742	15.22	8.276
08/01/01	16:35:41	0.3963	15.22	8.302
08/01/01	16:35:43	0.4198	15.23	8.327
08/01/01	16:35:44	0.4447	15.22	8.353
08/01/01	16:35:46	0.4697	15.22	8.375
08/01/01	16:35:47	0.4963	15.23	8.398
08/01/01	16:35:49	0.5247	15.22	8.420
08/01/01	16:35:51	0.5547	15.23	8.441
08/01/01	16:35:53	0.5863	15.23	8.460
08/01/01	16:35:55	0.6213	15.23	8.481
08/01/01	16:35:57	0.6580	15.23	8.499
08/01/01	16:35:59	0.6963	15.22	8.515
08/01/01	16:36:02	0.7380	15.25	8.531
08/01/01	16:36:04	0.7813	15.27	8.545
08/01/01	16:36:07	0.8280	15.28	8.561
08/01/01	16:36:10	0.8763	15.27	8.575
08/01/01	16:36:13	0.9280	15.27	8.586
08/01/01	16:36:16	0.9830	15.27	8.595
08/01/01	16:36:20	1.0413	15.30	8.604
08/01/01	16:36:24	1.1030	15.33	8.612
08/01/01	16:36:28	1.1680	15.32	8.620
08/01/01	16:36:32	1.2380	15.33	8.626
08/01/01	16:36:36	1.3113	15.36	8.632
08/01/01	16:36:41	1.3897	15.39	8.636
08/01/01	16:36:46	1.4730	15.41	8.640
08/01/01	16:36:51	1.5613	15.39	8.644
08/01/01	16:36:57	1.6547	15.38	8.647
08/01/01	16:37:03	1.7530	15.36	8.649
08/01/01	16:37:09	1.8580	15.41	8.650
08/01/01	16:37:16	1.9680	15.39	8.653
08/01/01	16:37:23	2.0847	15.37	8.654
08/01/01	16:37:30	2.2097	15.36	8.655
08/01/01	16:37:38	2.3413	15.34	8.656
08/01/01	16:37:46	2.4813	15.34	8.656
08/01/01	16:37:55	2.6297	15.32	8.657
08/01/01	16:38:05	2.7863	15.32	8.657
08/01/01	16:38:15	2.9530	15.30	8.658
08/01/01	16:38:25	3.1297	15.30	8.658
08/01/01	16:38:36	3.3163	15.28	8.658
08/01/01	16:38:48	3.5147	15.27	8.659
08/01/01	16:39:01	3.7247	15.28	8.658
08/01/01	16:39:14	3.9463	15.30	8.658
08/01/01	16:39:28	4.1813	15.28	8.659
08/01/01	16:39:43	4.4297	15.27	8.659
08/01/01	16:39:59	4.6930	15.25	8.660
08/01/01	16:40:16	4.9730	15.24	8.660
08/01/01	16:40:34	5.2697	15.23	8.660
08/01/01	16:40:52	5.5830	15.22	8.660
08/01/01	16:41:12	5.9147	15.21	8.660
08/01/01	16:41:33	6.2663	15.22	8.659
08/01/01	16:41:56	6.6397	15.20	8.661
08/01/01	16:42:20	7.0347	15.22	8.658
08/01/01	16:42:45	7.4530	15.21	8.659
08/01/01	16:43:11	7.8963	15.25	8.659

0	7.456
0.005	7.408
0.01	7.555
0.015	7.431
0.02	7.143
0.025	7.811
0.03	7.191
0.035	7.672
0.04	7.822
0.045	7.458
0.05	7.499
0.055	7.522
0.06	7.542
0.065	7.565
0.07	7.599
0.075	7.628
0.08	7.641
0.085	7.667
0.09	7.682
0.095	7.705
0.1	7.725
0.1058	7.738
0.112	7.753
0.1185	7.78
0.1255	7.797
0.1328	7.834
0.1407	7.861
0.149	7.869
0.1578	7.877
0.1672	7.898
0.177	7.93
0.1875	7.955
0.1985	7.981
0.2102	8.007
0.2227	8.034
0.2358	8.061
0.2498	8.087
0.2647	8.115
0.2803	8.142
0.297	8.169
0.3147	8.196
0.3333	8.223
0.3532	8.249
0.3742	8.276
0.3963	8.302
0.4198	8.327
0.4447	8.353
0.4697	8.375
0.4963	8.398

0.5247	8.42
0.5547	8.441
0.5863	8.46
0.6213	8.481
0.658	8.499
0.6963	8.515
0.738	8.531
0.7813	8.545
0.828	8.561
0.8763	8.575
0.928	8.586
0.983	8.595
1.0413	8.604
1.103	8.612
1.168	8.62
1.238	8.626
1.3113	8.632
1.3897	8.636
1.473	8.64
1.5613	8.644
1.6547	8.647
1.753	8.649
1.858	8.65
1.968	8.653
2.0847	8.654
2.2097	8.655
2.3413	8.656
2.4813	8.656
2.6297	8.657
2.7863	8.657
2.953	8.658
3.1297	8.658
3.3163	8.658
3.5147	8.659
3.7247	8.658
3.9463	8.658
4.1813	8.659
4.4297	8.659
4.693	8.66
4.973	8.66
5.2697	8.66
5.583	8.66
5.9147	8.66
6.2663	8.659
6.6397	8.661
7.0347	8.658
7.453	8.659
7.8963	8.659



WELL TEST ANALYSIS

Data Set: P:\Dominion Chesapeake GC\Hydro Study\03 - Slug Test\Cleveland Files\mw04fh.aqt
Date: 09/07/01 Time: 12:00:49

PROJECT INFORMATION

Test Well: Falling Head

AQUIFER DATA

Saturated Thickness: 36. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW4)

Initial Displacement: 2.361 ft
Wellbore Radius: 0.333 ft
Screen Length: 10. ft
Casing Radius: 0.08333 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 17. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.002554 cm/sec
y0 = 0.5526 ft

In-Situ Inc. Troll

Report generated: 08/10/01 14:42:20
Report from file: P:\Dominion Chesapeake GC\Hydro Study\03- Slug Test\Mw4swfh.bin
DataMgr Version 3.68

Serial number: 00012080
Firmware Version 6.24
Unit name: SP4000

Test name: MW4SWfh

Test defined on: 08/01/01 17:18:39
Test started on: 08/01/01 17:22:22
Test stopped on: 08/01/01 17:32:29
Test extracted on: 08/02/01 12:05:13

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 101

TOTAL DATA SAMPLES 101

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 15 PSI.

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] PSI
08/01/01	17:22:22	0.0000	15.73	11.544
08/01/01	17:22:22	0.0050	15.73	11.005
08/01/01	17:22:22	0.0100	15.73	10.300
08/01/01	17:22:22	0.0150	15.74	9.859
08/01/01	17:22:23	0.0200	15.74	9.967
08/01/01	17:22:23	0.0250	15.74	10.247
08/01/01	17:22:23	0.0300	15.74	10.100
08/01/01	17:22:24	0.0350	15.75	9.390
08/01/01	17:22:24	0.0400	15.75	9.263
08/01/01	17:22:24	0.0450	15.75	9.383
08/01/01	17:22:25	0.0500	15.76	9.530
08/01/01	17:22:25	0.0550	15.76	9.611
08/01/01	17:22:25	0.0600	15.76	9.617
08/01/01	17:22:25	0.0650	15.77	9.585
08/01/01	17:22:26	0.0700	15.77	9.552
08/01/01	17:22:26	0.0750	15.77	9.532
08/01/01	17:22:26	0.0800	15.77	9.519
08/01/01	17:22:27	0.0850	15.77	9.511
08/01/01	17:22:27	0.0900	15.77	9.500
08/01/01	17:22:27	0.0950	15.77	9.489
08/01/01	17:22:28	0.1000	15.77	9.477
08/01/01	17:22:28	0.1058	15.78	9.468
08/01/01	17:22:28	0.1120	15.79	9.457
08/01/01	17:22:29	0.1185	15.79	9.447
08/01/01	17:22:29	0.1255	15.79	9.437
08/01/01	17:22:29	0.1328	15.79	9.426
08/01/01	17:22:30	0.1407	15.79	9.414
08/01/01	17:22:30	0.1490	15.79	9.404
08/01/01	17:22:31	0.1578	15.79	9.395
08/01/01	17:22:32	0.1672	15.80	9.384
08/01/01	17:22:32	0.1770	15.81	9.371
08/01/01	17:22:33	0.1875	15.81	9.358
08/01/01	17:22:33	0.1985	15.82	9.347

08/01/01	17:22:34	0.2102	15.82	9.337
08/01/01	17:22:35	0.2227	15.82	9.325
08/01/01	17:22:36	0.2358	15.82	9.315
08/01/01	17:22:36	0.2498	15.84	9.304
08/01/01	17:22:37	0.2647	15.84	9.294
08/01/01	17:22:38	0.2803	15.83	9.285
08/01/01	17:22:39	0.2970	15.84	9.277
08/01/01	17:22:40	0.3147	15.85	9.268
08/01/01	17:22:42	0.3333	15.85	9.262
08/01/01	17:22:43	0.3532	15.84	9.254
08/01/01	17:22:44	0.3742	15.84	9.247
08/01/01	17:22:45	0.3963	15.86	9.241
08/01/01	17:22:47	0.4198	15.85	9.235
08/01/01	17:22:48	0.4447	15.86	9.230
08/01/01	17:22:50	0.4697	15.87	9.224
08/01/01	17:22:51	0.4963	15.86	9.221
08/01/01	17:22:53	0.5247	15.87	9.217
08/01/01	17:22:55	0.5547	15.89	9.214
08/01/01	17:22:57	0.5863	15.88	9.211
08/01/01	17:22:59	0.6213	15.87	9.208
08/01/01	17:23:01	0.6580	15.86	9.206
08/01/01	17:23:03	0.6963	15.85	9.204
08/01/01	17:23:06	0.7380	15.85	9.204
08/01/01	17:23:08	0.7813	15.84	9.201
08/01/01	17:23:11	0.8280	15.84	9.198
08/01/01	17:23:14	0.8763	15.83	9.199
08/01/01	17:23:17	0.9280	15.85	9.196
08/01/01	17:23:20	0.9830	15.85	9.194
08/01/01	17:23:24	1.0413	15.85	9.195
08/01/01	17:23:28	1.1030	15.84	9.193
08/01/01	17:23:32	1.1680	15.82	9.192
08/01/01	17:23:36	1.2380	15.80	9.192
08/01/01	17:23:40	1.3113	15.81	9.191
08/01/01	17:23:45	1.3897	15.84	9.191
08/01/01	17:23:50	1.4730	15.81	9.190
08/01/01	17:23:55	1.5613	15.79	9.190
08/01/01	17:24:01	1.6547	15.77	9.191
08/01/01	17:24:07	1.7530	15.76	9.191
08/01/01	17:24:13	1.8580	15.74	9.188
08/01/01	17:24:20	1.9680	15.72	9.186
08/01/01	17:24:27	2.0847	15.70	9.184
08/01/01	17:24:34	2.2097	15.72	9.185
08/01/01	17:24:42	2.3413	15.73	9.183
08/01/01	17:24:50	2.4813	15.77	9.181
08/01/01	17:24:59	2.6297	15.73	9.182
08/01/01	17:25:09	2.7863	15.70	9.186
08/01/01	17:25:19	2.9530	15.71	9.184
08/01/01	17:25:29	3.1297	15.68	9.183
08/01/01	17:25:40	3.3163	15.70	9.184
08/01/01	17:25:52	3.5147	15.66	9.183
08/01/01	17:26:05	3.7247	15.63	9.184
08/01/01	17:26:18	3.9463	15.60	9.183
08/01/01	17:26:32	4.1813	15.57	9.182
08/01/01	17:26:47	4.4297	15.54	9.184
08/01/01	17:27:03	4.6930	15.51	9.185
08/01/01	17:27:20	4.9730	15.49	9.184
08/01/01	17:27:38	5.2697	15.46	9.184
08/01/01	17:27:56	5.5830	15.43	9.185
08/01/01	17:28:16	5.9147	15.45	9.184
08/01/01	17:28:37	6.2663	15.44	9.183
08/01/01	17:29:00	6.6397	15.46	9.183
08/01/01	17:29:24	7.0347	15.50	9.183
08/01/01	17:29:49	7.4530	15.52	9.183
08/01/01	17:30:15	7.8963	15.57	9.182
08/01/01	17:30:43	8.3663	15.51	9.184
08/01/01	17:31:13	8.8647	15.48	9.183
08/01/01	17:31:45	9.3913	15.43	9.184
08/01/01	17:32:18	9.9497	15.51	9.183

0	11.544
0.005	11.005
0.01	10.3
0.015	9.859
0.02	9.967
0.025	10.247
0.03	10.1
0.035	9.39
0.04	9.263
0.045	9.383
0.05	9.53
0.055	9.611
0.06	9.617
0.065	9.585
0.07	9.552
0.075	9.532
0.08	9.519
0.085	9.511
0.09	9.5
0.095	9.489
0.1	9.477
0.1058	9.468
0.112	9.457
0.1185	9.447
0.1255	9.437
0.1328	9.426
0.1407	9.414
0.149	9.404
0.1578	9.395
0.1672	9.384
0.177	9.371
0.1875	9.358
0.1985	9.347
0.2102	9.337
0.2227	9.325
0.2358	9.315
0.2498	9.304
0.2647	9.294
0.2803	9.285
0.297	9.277
0.3147	9.268
0.3333	9.262
0.3532	9.254
0.3742	9.247
0.3963	9.241
0.4198	9.235
0.4447	9.23
0.4697	9.224
0.4963	9.221

0.5247	9.217
0.5547	9.214
0.5863	9.211
0.6213	9.208
0.658	9.206
0.6963	9.204
0.738	9.204
0.7813	9.201
0.828	9.198
0.8763	9.199
0.928	9.196
0.983	9.194
1.0413	9.195
1.103	9.193
1.168	9.192
1.238	9.192
1.3113	9.191
1.3897	9.191
1.473	9.19
1.5613	9.19
1.6547	9.191
1.753	9.191
1.858	9.188
1.968	9.186
2.0847	9.184
2.2097	9.185
2.3413	9.183
2.4813	9.181
2.6297	9.182
2.7863	9.186
2.953	9.184
3.1297	9.183
3.3163	9.184
3.5147	9.183
3.7247	9.184
3.9463	9.183
4.1813	9.182
4.4297	9.184
4.693	9.185
4.973	9.184
5.2697	9.184
5.583	9.185
5.9147	9.184
6.2663	9.183
6.6397	9.183
7.0347	9.183
7.453	9.183
7.8963	9.182
8.3663	9.184

8.8647	9.183
9.3913	9.184
9.9497	9.183

APPENDIX D

Physical Testing Results

PERMEABILITY TEST REPORT

TEST DATA:
Specimen Height (cm): 7.11
Specimen Diameter (cm): 7.18
Dry Unit Weight (pcf): 102.7
Moisture Before Test (%): 23.6
Moisture After Test (%): 21.1
Run Number: 1 ● 2 ▲
Cell Pressure (psi): 70.0

Sat. Pressure (psi): 60.0
Diff. Head (psi): 2.3

Perm. (cm/sec): 8.20 x 10^-7

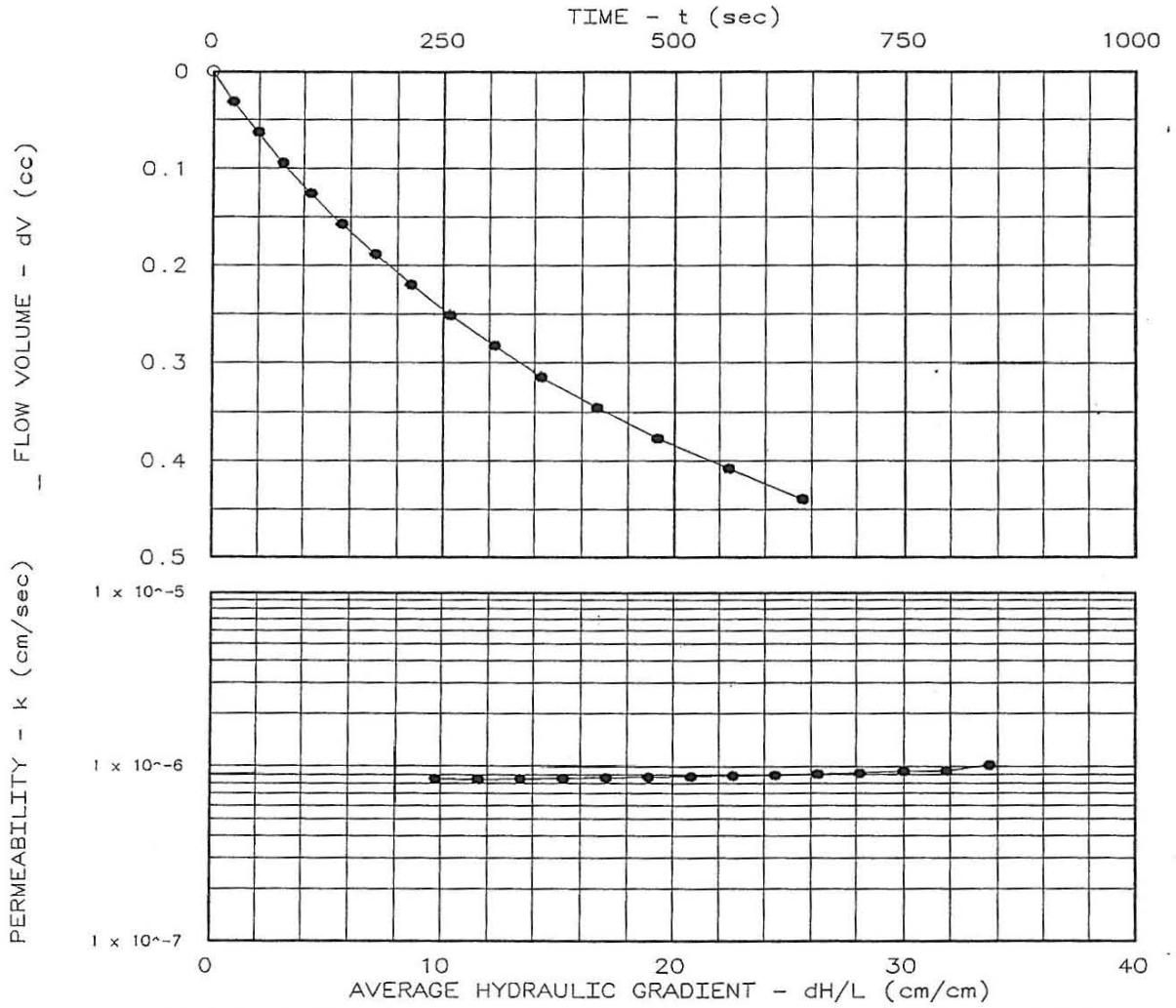
SAMPLE DATA:
Sample Identification: B-1B, 0.5'-2.5'

Visual Description: Dark Gray Clayey SILT

Remarks: ASTM D5084

Maximum Dry Density (pcf):
Optimum Moisture Content (%):

Percent Compaction:
Permeameter type: Flexable Wall
Sample type: Undisturbed



Project: URS - CHESAPEAKE GOLF Location: Date: 8/10/01	Project No.: RC01-196 File No.: Lab No.: Tested by: RB Checked by: Test: CV - Constant volume
PERMEABILITY TEST REPORT **Atlantic Geotechnical Services, Inc.**	

20139

REPORT NUMBER R215-003

Robbie

A&L EASTERN AGRICULTURAL LABORATORIES, INC.

7621 Whitepine Road • Richmond, Virginia 23237 • (804) 743-9401
Fax No. (804) 271-6446

ACCT # 73723

SEND TO: ATLANTIC GEOTECHNICAL SERVICES INC
10971 RICHARDSON RD
ASHLAND VA 23005

GROWER: CHESAPEAKE GOLF RC01-196

SAMPLES SUBMITTED BY: ROBBIE BARBOUR

DATE RECEIVED 08/02/2001
DATE OF ANALYSIS 08/03/2001

DATE OF REPORT 08/07/2001 PAGE 1

SOIL ANALYSIS REPORT

SAMPLE NUMBER	LAB NUMBER	ORGANIC MATTER %	ORGANIC MATTER ENR lbs/A	PHOSPHORUS BRAY P1 ppm	RATE	PHOSPHORUS BRAY P2 ppm	RATE	POTASSIUM K ppm	RATE	MAGNESIUM MG ppm	RATE	CALCIUM CA ppm	RATE	SODIUM NA ppm	RATE	pH SOIL pH	pH BUFFER INDEX	ACIDITY H meq/100g	C.E.C. meq/100g
B-1	02584	0.4																	
B-1B	02585	0.5																	
B-2	02586	0.6																	
B-3	02587	0.6																	

SAMPLE NUMBER	PERCENT BASE SATURATION K %	Mg %	Ca %	Na %	H %	NITRATE NO_3-N ppm	RATE	SULFUR SO_4-S ppm	RATE	ZINC ZN ppm	RATE	~~MANGANESE~~ % TOC *	IRON FE ppm	RATE	COPPER CU ppm	RATE	BORON B ppm	RATE	SOLUBLE SALTS ms/cm	RATE	CHLORIDE CL ppm	RATE	MOLYBDENUM MO ppm	RATE
B-1												0.2												
B-1B												0.3												
B-2												0.3												
B-3												0.3												

Values on this report represent the plant available nutrients in the soil.
Explanation of symbols: Values are expressed as % (percent), ppm (parts per million), or lbs/A (pounds per acre).
Rating after each value: VL (Very Low), L (Low), M (Medium), H (High), VH (Very High).
ENR – Estimated Nitrogen Release. C.E.C. – Cation Exchange Capacity.
To convert to lbs/A, multiply the results in ppm by 2.

This report applies to the sample(s) tested. Samples are retained a maximum of thirty days after testing. Soil Analysis prepared by:

A & L EASTERN AGRICULTURAL LABORATORIES, INC.

by C. NORMAN JONES

20140

10971 Richardson Road
Ashland, Virginia 23005
(804) 550-2203 Phone
(804) 550-2204 Fax

JOB NO. RCO-196 DATE 8/28/01 SHEET ___ OF ___

PROJECT NAME URS - Chesapeake Golf

CALC. BY _____ CHECKED BY _____ DATE _____

B-1, 20'-22'

Wt of Sample + Specimen + Tube + bottom, Tube + Coupling = 14.35 lbs

Wt of Tube + Coupling = 5.30 lbs

Wt of Sample = 9.05 lbs

Vol. Specimen Tube = 0.0356 ft³

Wet Density = 119.1 lbs/ft³

Moisture Content = 21.5%

Dry Density = 98.1 lbs/ft³

i = 10.62 - 6.55 / 11.58 = 0.35

A = 193.61 cm²

A/2 = 96.99 cm²

Time	t, sec	Reading	Q	V = Q/At
16:29:00		58.50		
16:34:00	300	59.10	72.00	3.0×10^{-3} ✓
16:39:00	300	57.80	54.00	2.8×10^{-3} ✓
16:44:00	300	57.50	54.00	2.8×10^{-3} ✓
16:49:00	300	57.20	54.00	2.8×10^{-3} ✓
16:54:00	300	56.90	54.00	2.8×10^{-3} ✓

Ave K = 2.8×10^{-3} ✓

ags
10971 Richardson Road
Ashland, Virginia 23005
(804) 550-2203 Phone
(804) 550-2204 Fax

JOB NO. RC01-106 DATE 2/9/01 SHEET ____ OF ____

PROJECT NAME URS - Chesapeake Crossing

CALC. BY ________ CHECKED BY ________ DATE ________

B-2, 18'-20'

Wt of Sample + tubes + Coupling = 15.00 lbs
Wt of tubes + Coupling = 5.90 lbs
Wt of Sample = 9.10 lbs
Vol. of Specimen tube = 0.0756 ft³

Wet Density = 120.4 lbs/ft³
Moisture Content = 22.0 %
Dry Density = 98.7 lbs/ft³

l = 9.35
A = 183.61 cm²
A_{1-2} = 181.49 cm²

Time	t, sec	Reading	Q	$k = \frac{Q}{iAt}$
13:17:00	600	51.10		
13:27:00	600	50.40	127.39	3.3×10^{-3}
13:37:00	600	49.80	109.19	2.8×10^{-3} ✓
13:47:00	600	49.15	118.29	3.1×10^{-3} ✓
13:57:00	600	48.50	118.29	3.1×10^{-3} ✓
14:07:00	600	47.95	100.09	2.6×10^{-3}

Ave. $k = 3.0 \times 10^{-3}$

10971 Richardson Road
Ashland, Virginia 23005
(804) 550-2203 Phone
(804) 550-2204 Fax

JOB NO. [illegible] DATE [illegible] SHEET ____ OF ____

PROJECT NAME [illegible]

CALC. BY ________ CHECKED BY ________ DATE ________

B-3, 18' - 20'

Wt of Sample + tubes + Coupling = 14.84 lbs
Wt of tubes + Coupling = 5.90 lbs
Wt of Sample = 8.94 lbs
Vol. of Specimen tube = 0.0756 ft³

Wet Density = 118.3 lbs/ft³
Moisture Content = 20.2 %
Dry Density = 98.4 lbs/ft³

i = 0.35
A = 183.61 cm²
A_t = 184.29 cm²

Time	t sec	Reading	Q	k = Q/iAt
7:15:00		55.00		
7:30:00	900	54.30	127.93	2.2x10⁻³
7:45:00	900	53.50	145.59	2.5x10⁻³
8:00:00	900	52.75	136.49	2.4x10⁻³
8:15:00	900	52.00	136.49	2.4x10⁻³
8:30:00	900	51.25	136.49	2.4x10⁻³
8:45:00	900	50.50	136.49	2.4x10⁻³

Avg k = 2.4x10⁻³

WATER (MOISTURE) CONTENT/VISUAL CLASSIFICATION
(ASTM D 2216, D 2488)

Project No. [illegible] Project Name: _____

Tested By: _____ Date Tested: 2/7/01

Computed By: _____ Checked By: _____

Hole No.	Sample No.	Depth, Ft.	Tare No.	Tare, Grams	Wet Wt. + Tare	Dry Wt. + Tare	Water Content, %	Soil Description
B-1		20'-22'	468	35.40	211.35	180.71	(23.2) 21.5	Remolded Room Temp.
B-2		18'-20'	D18	35.35	240.57	203.50	(22.1) 22.0	
B-3		18'-20'	E26	35.09	236.20	202.6	(19.7) 20.2	

Remarks: _____

Water.vis

20144

12" CONSTANT HEAD PERMEAMETER

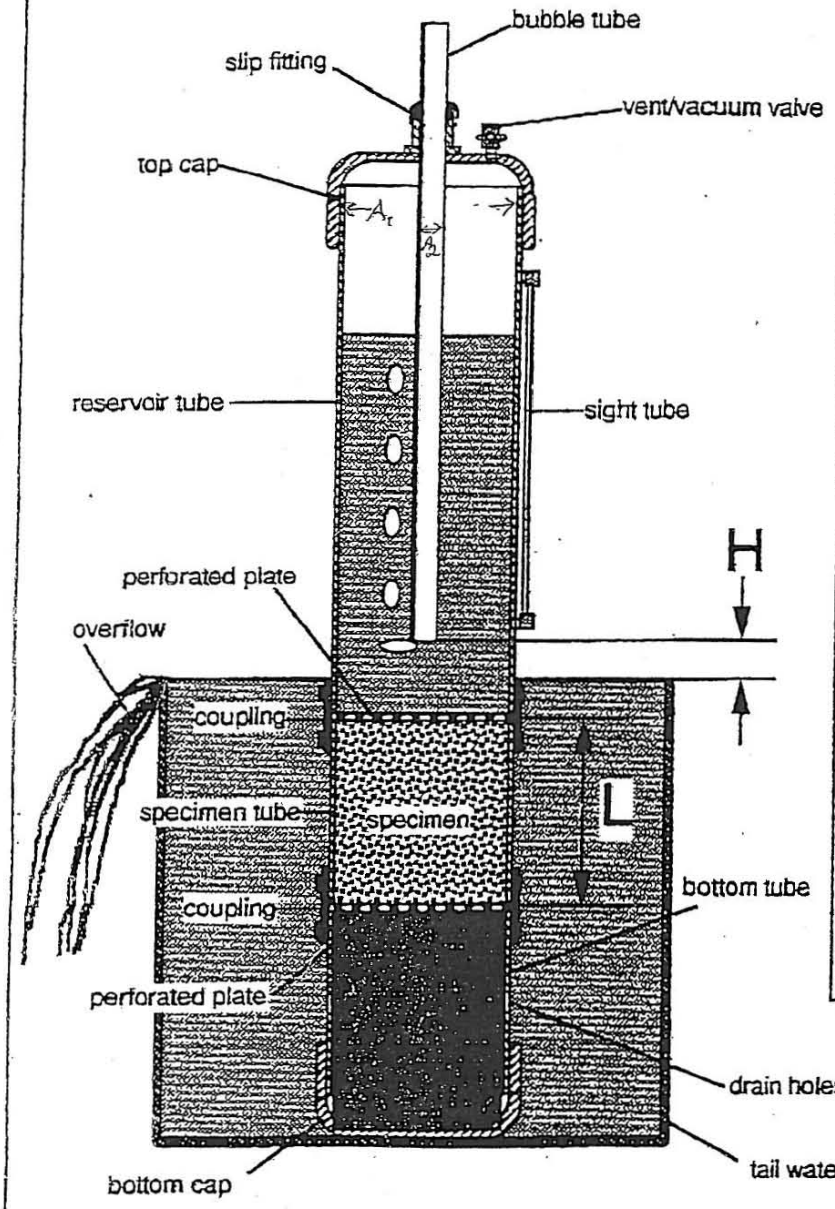


Figure 1. Test Set Up

The 12" Constant Head Permeameter is designed to accommodate the high flow rates associated with testing coarse grain soils. The unique design eliminates the use of valves, fittings, and small diameter tubing, all of which contribute head losses that interfere with test measurements.

A typical test set up is shown in Fig. 1. The permeameter is placed in a tub which is used to maintain a constant tail water elevation. The tub rim is located a few inches above the specimen top. During testing, water flows from the reservoir tube, through the specimen, out the bottom drains and into the tub. The tub is maintained full such the water overflows the top. As water flows out of the reservoir tube through the specimen, bubbles emerge from the bubble tube. The head difference across the specimen is the height difference between the bottom of the bubble tube and the top of the tub. The gradient is determined as follows:

$$i = \frac{H}{L}$$

Hydraulic conductivity is determined as follows:

$$k = \frac{Q}{i \cdot A \cdot t}$$

where Q is determined by noting the water elevation drop in the sight tube and multiplying it by the inner area of the reservoir tube (minus the area of the bubble tube).

$Q = A_1 - A_2$

$A = A_1$

N	X FACTOR	N	FACTOR
20°	0.974	26°	1.005
21°	0.979	27°	1.009
22°	0.984	28°	1.014
23°	0.990	29°	1.018
24°	0.995	30°	1.022
25°	1.000		

EM 1110-2-1906
Appendix III
Change 2
20 Aug 86

LIQUID AND PLASTIC LIMIT TESTS

For use of this form, see EM 1110-2-1906.

DATE 8/24/01

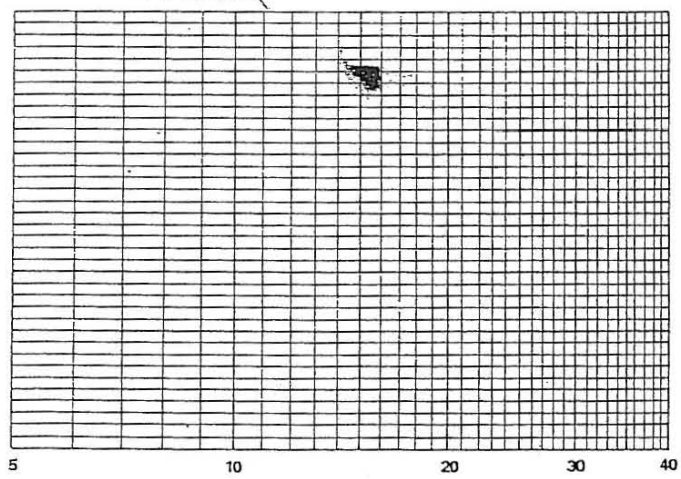
PROJECT RC01-1960

BORING NO. B-18 SAMPLE NO. ST, 0.5'-2.5'

LIQUID LIMIT

	RUN NO.	1	2	3	4	5	6
	TARE NO.	F13	205	A4			
WEIGHT IN GRAMS	TARE PLUS WET SOIL	46.58	45.88				
	TARE PLUS DRY SOIL	38.24	37.36				
	WATER W_w						
	TARE	17.15	17.03	21.65			
	DRY SOIL W_s						
	WATER CONTENT, % w	29.5	29.2				
	NUMBER OF BLOWS	26	28				

1.009



LL 40

PL 20

PI 20

Symbol from plasticity chart

PLASTIC LIMIT

	RUN NO.	1	2	3	4	5	NATURAL WATER CONTENT
	TARE NO.	A1	01				
WEIGHT IN GRAMS	TARE PLUS WET SOIL	20.51	13.19				
	TARE PLUS DRY SOIL	19.37	12.14				
	WATER W_w						
	TARE	13.50	8.84				
	DRY SOIL W_s						
	WATER CONTENT, % w	19.4	19.8				
	PLASTIC LIMIT						

REMARKS

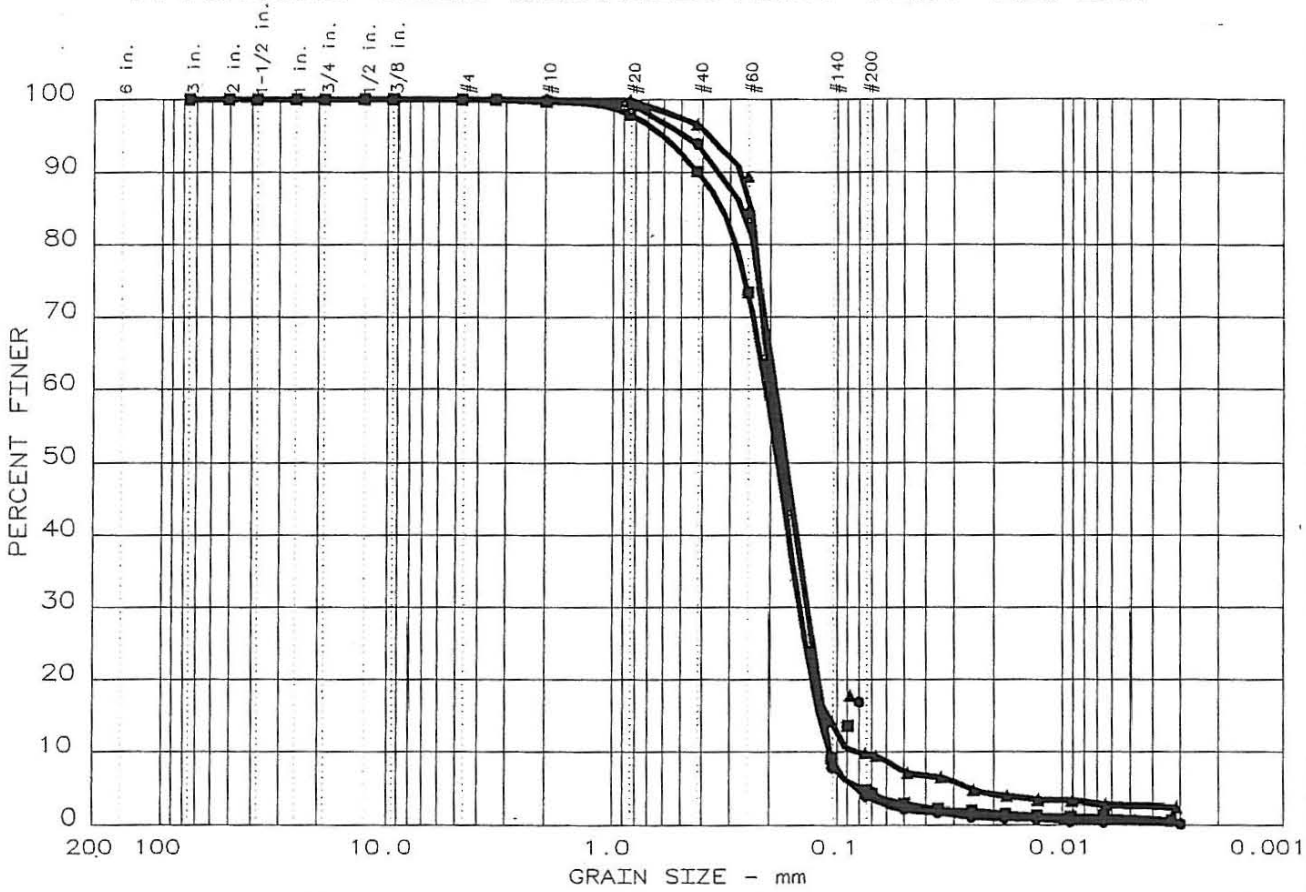
TECHNICIAN COMPUTED BY CHECKED BY

ENG FORM 3838 1 JUN 65

GPO : 1983 0 - 407-134

PLATE III-1

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	1	0.0	0.0	96.2	3.4	0.4	SP		NP
▲	2	0.0	0.0	90.1	7.3	2.6	SP-SM		NP
■	3	0.0	0.0	95.3	3.8	0.9	SP		NP

SIEVE inches size	PERCENT FINER ●	▲	■
3	100.0	100.0	100.0
2	100.0	100.0	100.0
1.5	100.0	100.0	100.0
1		100.0	100.0
0.75	100.0	100.0	100.0
0.5	100.0	100.0	100.0
0.375	100.0	100.0	100.0
	GRAIN SIZE		
D_{60}	0.190	0.197	0.208
D_{30}			
D_{10}	0.108	0.0838	0.108
	COEFFICIENTS		
C_c	0.90	1.32	0.97
C_u	1.8	2.4	1.9

SIEVE number size	PERCENT FINER ●	▲	■
4	100.0	100.0	100.0
6	100.0	100.0	100.0
10	100.0	99.9	99.7
20	99.4	99.9	97.9
40	93.9	96.6	90.1
60	84.4	89.4	73.4
140	7.8	14.3	9.1
200	3.8	9.9	4.7

Sample information:

● B-1, 20'-22' Gray Poorly Graded SAND

▲ B-2, 18'-20' Gray Poorly Graded SAND w/Silt

■ B-3, 18'-20' Gray Poorly Graded SAND

Remarks:

ATLANTIC GEOTECHNICAL SERVICES, INC.

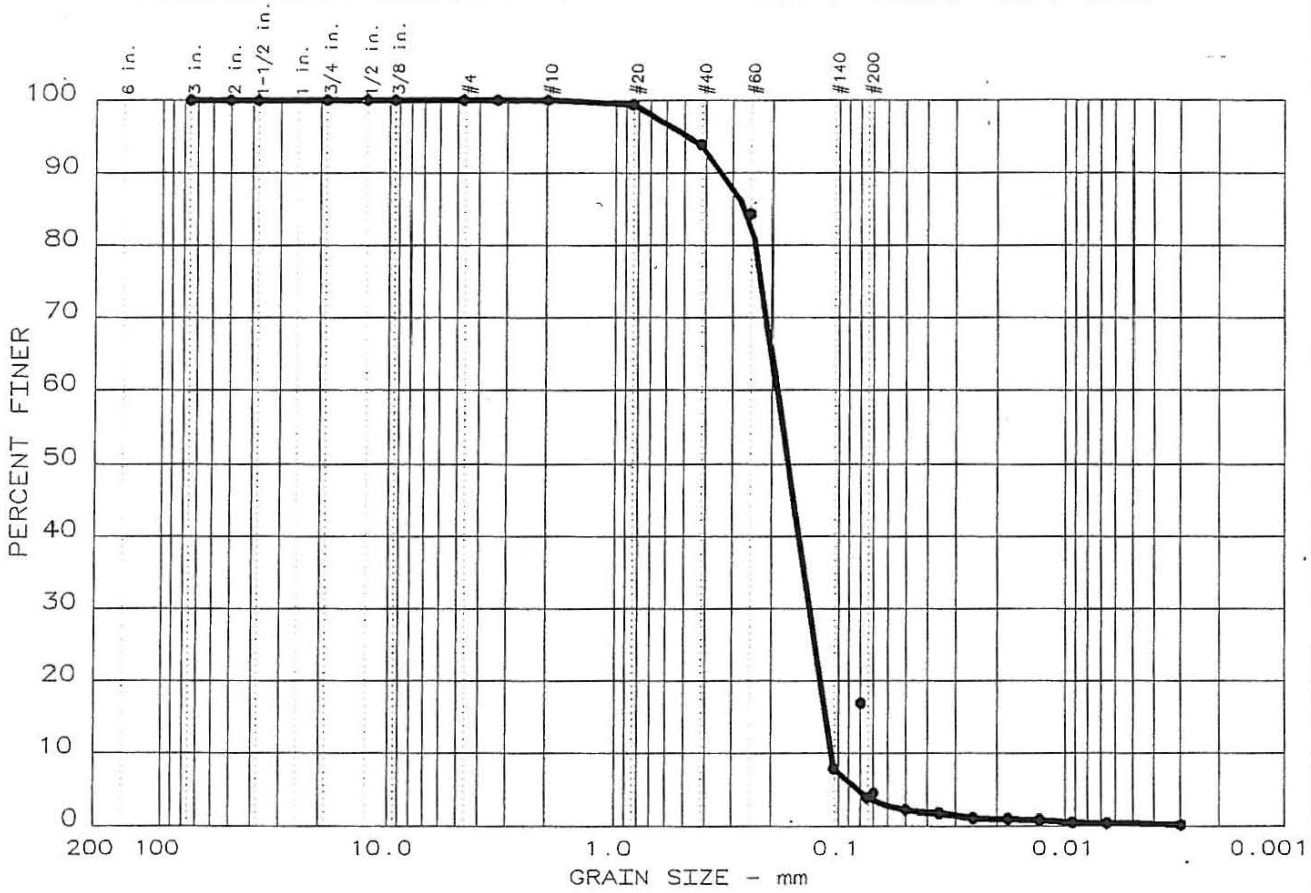
Project No.: RC01-196

Project: URS - CHESAPEAKE GOLF

Date: 8/06/01 Fig. No.:_____

20147

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	1	0.0	0.0	96.2	3.4	0.4	SP		NP

SIEVE inches size	PERCENT FINER ●		
3	100.0		
2	100.0		
1.5	100.0		
0.75	100.0		
0.5	100.0		
0.375	100.0		
	GRAIN SIZE		
D_{60}	0.190		
D_{30}			
D_{10}	0.108		
	COEFFICIENTS		
C_c	0.90		
C_u	1.8		

SIEVE number size	PERCENT FINER ●		
4	100.0		
6	100.0		
10	100.0		
20	99.4		
40	93.9		
60	84.4		
140	7.8		
200	3.8		

Sample information:
● B-1, 20'-22'
Gray Poorly Graded SAND

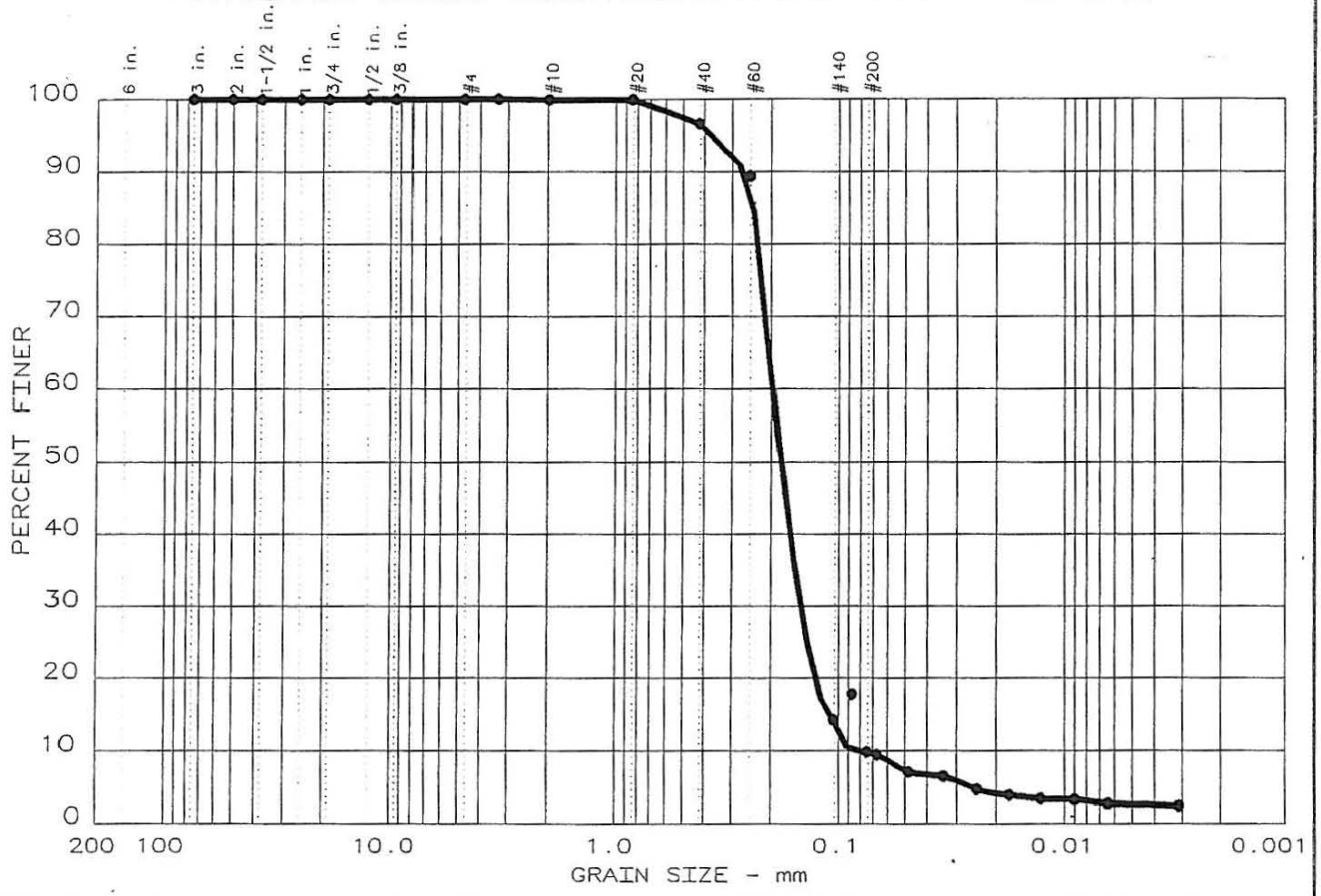
Remarks:

ATLANTIC GEOTECHNICAL SERVICES, INC.

Project No.: RC01-196
Project: URS - CHESAPEAKE GOLF
Date: 8/06/01 Fig. No.:_____

20148

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	2	0.0	0.0	90.1	7.3	2.6	SP-SM		NP

SIEVE inches size	PERCENT FINER ●		
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
0.75	100.0		
0.5	100.0		
0.375	100.0		
GRAIN SIZE			
D_{60}	0.197		
D_{30}			
D_{10}	0.0838		
COEFFICIENTS			
C_c	1.32		
C_u	2.4		

SIEVE number size	PERCENT FINER ●		
4	100.0		
6	100.0		
10	99.9		
20	99.9		
40	96.6		
60	89.4		
140	14.3		
200	9.9		

Sample information:
● B-2, 18'-20'
Gray Poorly Graded
SAND w/Silt

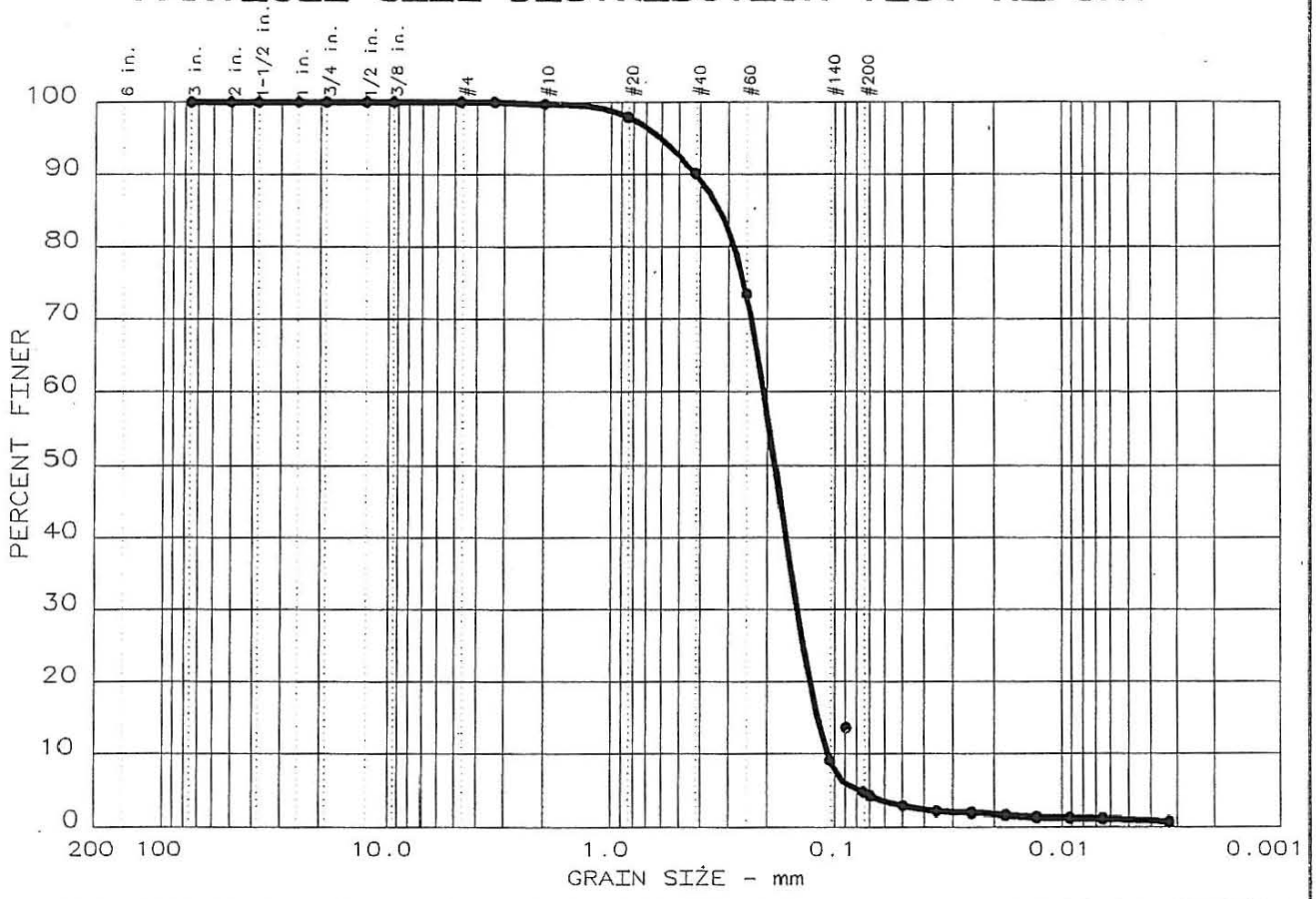
Remarks:

ATLANTIC GEOTECHNICAL SERVICES, INC.

Project No.: RC01-196
Project: URS - CHESAPEAKE GOLF
Date: 8/06/01 Fig. No.:_____

20149

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	3	0.0	0.0	95.3	3.8	0.9	SP		NP

SIEVE inches size	PERCENT FINER ●		
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
0.75	100.0		
0.5	100.0		
0.375	100.0		
GRAIN SIZE			
D_{60}	0.208		
D_{30}			
D_{10}	0.108		
COEFFICIENTS			
C_c	0.97		
C_u	1.9		

SIEVE number size	PERCENT FINER ●		
4	100.0		
6	100.0		
10	99.7		
20	97.9		
40	90.1		
60	73.4		
140	9.1		
200	4.7		

Sample information:

● B-3, 18'-20'
Gray Poorly Graded SAND

Remarks:

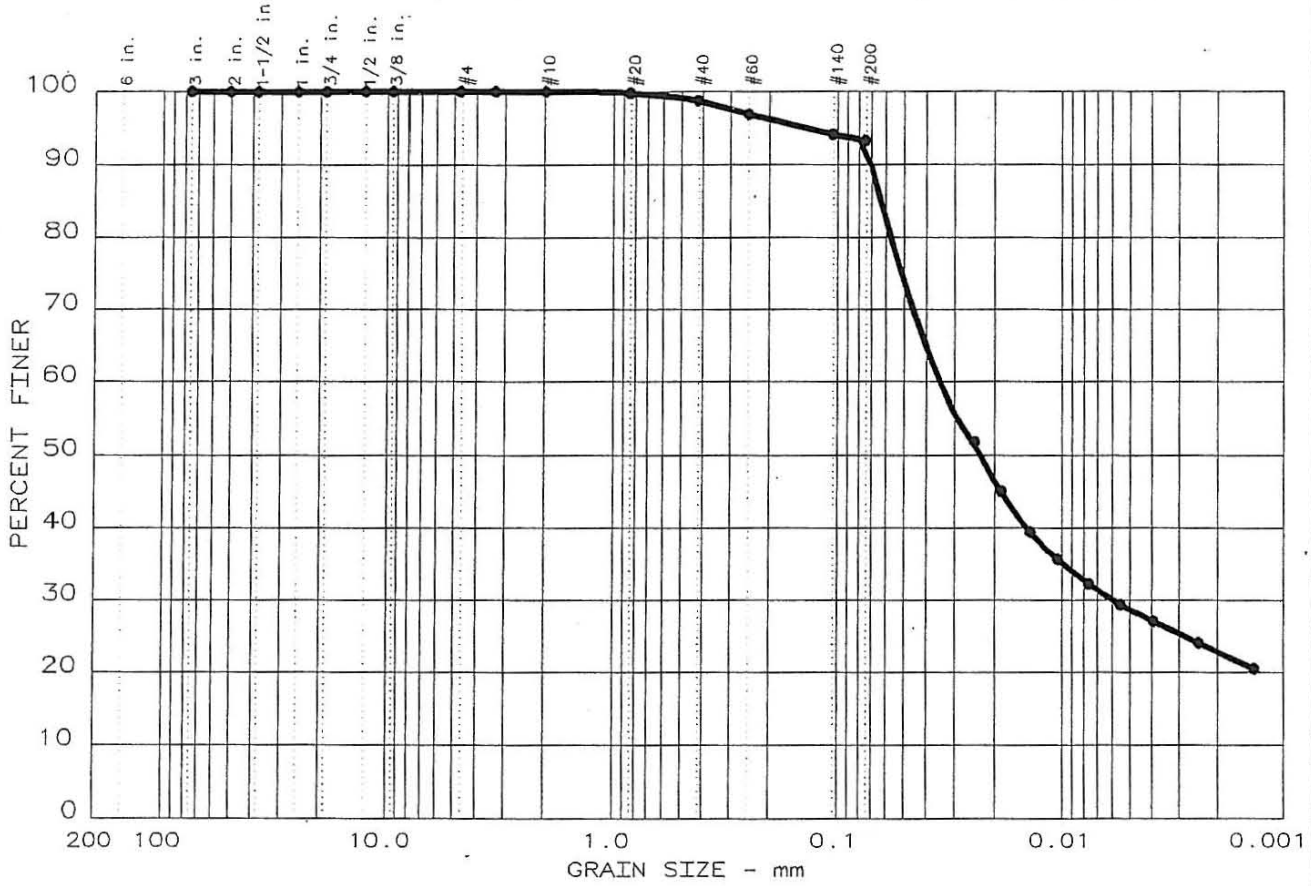
ATLANTIC GEOTECHNICAL SERVICES, INC.

Project No.: RC01-196
Project: URS - CHESAPEAKE GOLF

Date: 8/06/01 Fig. No.:_____

20150

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	4	0.0	0.0	6.7	64.7	28.6	CL	40	20

SIEVE inches size	PERCENT FINER ●		
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
0.75	100.0		
0.5	100.0		
0.375	100.0		
GRAIN SIZE			
D_{60}			
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ●		
4	100.0		
6	100.0		
10	100.0		
20	99.8		
40	98.7		
60	96.9		
140	94.1		
200	93.3		

Sample information:
● B-1B, 0.5'-2.5'
Dark Gray Clayey SILT

Remarks:

ATLANTIC GEOTECHNICAL SERVICES, INC.

Project No.: RC01-196
Project: URS - CHESAPEAKE GOLF
Date: 8/06/01 Fig. No.: _____

20151

SPECIFIC GRAVITY OF SOILS DATA SHEET

(– #4 SIEVE SOIL)

PROJECT NUMBER: 2201-196 BORING NUMBER: B-1

PROJECT NAME: US 29 - Chesapeake Gate SAMPLE NUMBER: _____

DATE: 8/12/01 DEPTH: 20' - 22'

DESCRIPTION: _____

TESTED BY: ZD COMPUTED BY: _____ CHECKED BY: _____

VOL. FLASK NO.: C

DISH NO.: _____

WT. OF SOIL & DISH, DRY: 257.65 g

WT. OF DISH: 152.59 g

A) WT. OF SOIL: 105.06 g

B) WT. OF VOL. FLASK & WATER (FROM VOL. FLASK CHART) 651.0 g WATER TEMPERATURE: 21

C) WT. OF VOL. FLASK, SOIL & WATER 716.9 g

D) SPECIFIC GRAVITY = $\frac{A}{A+(B-C)}$ = 2.683

E) SPECIFIC GRAVITY (CORRECTED) G_s = D x K = 2.682

WATER TEMPERATURE DEGREES C	CORRECTION FACTOR, K
18	1.0004
19	1.0002
20	1.0000
21	0.9998
22	0.9996
23	0.9993
24	0.9991
25	0.9989
26	0.9986
27	0.9980
28	0.9983
29	0.9977
30	0.9974

F) SOIL DESCRIPTION: Grey Poorly Graded SAND (SP)

FILE: SPECGRAV

20152

SPECIFIC GRAVITY OF SOILS DATA SHEET

(– #4SIEVE SOIL)

PROJECT NUMBER: RC01-196 BORING NUMBER: B-1

PROJECT NAME: Cheasapeake Cove SAMPLE NUMBER: ______

DATE: ______ DEPTH: 20' - 22

DESCRIPTION: ______

TESTED BY: ______ COMPUTED BY: ______ CHECKED BY: ______

VOL. FLASK NO.: A

DISH NO.: ______

WT. OF SOIL & DISH, DRY: 289.55 g

WT. OF DISH: 152.72 g

A) WT. OF SOIL: 136.83 g

B) WT. OF VOL. FLASK & WATER (FROM VOL. FLASK CHART) 650.9 g WATER TEMPERATURE: 20.8

C) WT. OF VOL. FLASK, SOIL & WATER 737.3 g

D) SPECIFIC GRAVITY $= \frac{A}{A+(B-C)}$ = 2.71

E) SPECIFIC GRAVITY (CORRECTED) $G_s = D \times K$ = 2.71

WATER TEMPERATURE DEGREES C	CORRECTION FACTOR, K
18	1.0004
19	1.0002
20	1.0000
21	0.9998
22	0.9996
23	0.9993
24	0.9991
25	0.9989
26	0.9986
27	0.9980
28	0.9983
29	0.9977
30	0.9974

F) SOIL DESCRIPTION: ______

FILE: SPECGRAV

SPECIFIC GRAVITY OF SOILS DATA SHEET

(– #4SIEVE SOIL)

PROJECT NUMBER: R-01-196 BORING NUMBER: B-1B

PROJECT NAME: Chesapeake Gale SAMPLE NUMBER:

DATE: DEPTH: 0.5' – 2.5'

DESCRIPTION:

TESTED BY: COMPUTED BY: CHECKED BY:

VOL. FLASK NO.:

DISH NO.: B

WT. OF SOIL & DISH, DRY: 219.39 g

WT. OF DISH: 165.38 g

A) WT. OF SOIL: 54.01 g

B) WT. OF VOL. FLASK & WATER (FROM VOL. FLASK CHART) 663.5 g WATER TEMPERATURE: 20.5

C) WT. OF VOL. FLASK, SOIL & WATER 697.2 g

D) SPECIFIC GRAVITY = $\frac{A}{A+(B-C)}$ = 2.66

E) SPECIFIC GRAVITY (CORRECTED) $G_s = D \times K$ = 2.66

WATER TEMPERATURE DEGREES C	CORRECTION FACTOR, K
18	1.0004
19	1.0002
20	1.0000
21	0.9998
22	0.9996
23	0.9993
24	0.9991
25	0.9989
26	0.9986
27	0.9980
28	0.9983
29	0.9977
30	0.9974

F) SOIL DESCRIPTION: Dark Gray Clay SILT (CL)
LL = 40 PI = 20

FILE: SPECGRAV

SPECIFIC GRAVITY OF SOILS DATA SHEET

(- #4 SIEVE SOIL)

PROJECT NUMBER: 2601-126 BORING NUMBER: B-13

PROJECT NAME: Chesapeake Golf SAMPLE NUMBER: _____

DATE: _____ DEPTH: 0.5' - 2.5'

DESCRIPTION: _____

TESTED BY: _____ COMPUTED BY: _____ CHECKED BY: _____

VOL. FLASK NO.: A

DISH NO.: _____

WT. OF SOIL & DISH, DRY: 213.43 g

WT. OF DISH: 152.73 g

A) WT. OF SOIL: 60.7 g

B) WT. OF VOL. FLASK & WATER (FROM VOL. FLASK CHART) 650.9 g WATER TEMPERATURE: 20.4

C) WT. OF VOL. FLASK, SOIL & WATER 688.8 g

D) SPECIFIC GRAVITY = $\frac{A}{A+(B-C)}$ = 2.66

E) SPECIFIC GRAVITY (CORRECTED) G_s = D x K = 2.66

WATER TEMPERATURE DEGREES C	CORRECTION FACTOR, K
18	1.0004
19	1.0002
20	1.0000
21	0.9998
22	0.9996
23	0.9993
24	0.9991
25	0.9989
26	0.9986
27	0.9980
28	0.9983
29	0.9977
30	0.9974

F) SOIL DESCRIPTION: _____

FILE: SPECGRAV

20155

SPECIFIC GRAVITY OF SOILS DATA SHEET

(– #4SIEVE SOIL)

PROJECT NUMBER: 2-01-126 BORING NUMBER: B-2

PROJECT NAME: USA - Chesapeake Gate SAMPLE NUMBER: _____

DATE: 2/12/01 DEPTH: 18' - 20'

DESCRIPTION: _____

TESTED BY: ZB COMPUTED BY: _____ CHECKED BY: _____

VOL. FLASK NO.: A

DISH NO.: _____

WT. OF SOIL & DISH, DRY: 271.26 g

WT. OF DISH: 152.73 g

A) WT. OF SOIL: 118.53 g

B) WT. OF VOL. FLASK & WATER (FROM VOL. FLASK CHART) 651.2 g WATER TEMPERATURE: 20

C) WT. OF VOL. FLASK, SOIL & WATER 775.5 g

D) SPECIFIC GRAVITY = $\frac{A}{A+(B-C)}$ = 2.680

E) SPECIFIC GRAVITY (CORRECTED) G_s = D x K = 2.693

WATER TEMPERATURE DEGREES C	CORRECTION FACTOR, K
18	1.0004
19	1.0002
20	1.0000
21	0.9998
22	0.9996
23	0.9993
24	0.9991
25	0.9989
26	0.9986
27	0.9980
28	0.9983
29	0.9977
30	0.9974

F) SOIL DESCRIPTION: Gray Poorly Graded Sand w Silt (SP-SM)

FILE: SPECGRAV

20156

SPECIFIC GRAVITY OF SOILS DATA SHEET

(– #4 SIEVE SOIL)

PROJECT NUMBER: [illegible] BORING NUMBER: B-2

PROJECT NAME: [illegible] SAMPLE NUMBER: _____

DATE: _____ DEPTH: 15' – 20'

DESCRIPTION: _____

TESTED BY: _____ COMPUTED BY: _____ CHECKED BY: _____

VOL. FLASK NO.: 2

DISH NO.: _____

WT. OF SOIL & DISH, DRY: 292.34 g

WT. OF DISH: 165.35 g

A) WT. OF SOIL: 126.99 g

B) WT. OF VOL. FLASK & WATER (FROM VOL. FLASK CHART) 663.5 g WATER TEMPERATURE: 19.0

C) WT. OF VOL. FLASK, SOIL & WATER 743.5 g

D) SPECIFIC GRAVITY = $\frac{A}{A+(B-C)}$ = 2.70

E) SPECIFIC GRAVITY (CORRECTED) G_s = D x K = 2.70

WATER TEMPERATURE DEGREES C	CORRECTION FACTOR, K
18	1.0004
19	1.0002
20	1.0000
21	0.9998
22	0.9996
23	0.9993
24	0.9991
25	0.9989
26	0.9986
27	0.9980
28	0.9983
29	0.9977
30	0.9974

F) SOIL DESCRIPTION: _____

FILE: SPECGRAV

20157

SPECIFIC GRAVITY OF SOILS DATA SHEET

(– #4SIEVE SOIL)

PROJECT NUMBER: [illegible]

BORING NUMBER: B-2

PROJECT NAME: [illegible]

SAMPLE NUMBER:

DATE:

DEPTH: 18 – 20'

DESCRIPTION:

TESTED BY: [illegible]

COMPUTED BY:

CHECKED BY:

VOL. FLASK NO.: 6

DISH NO.:

WT. OF SOIL & DISH, DRY: 263.33 g

WT. OF DISH: 152.57 g

A) WT. OF SOIL: 110.76 g

B) WT. OF VOL. FLASK & WATER (FROM VOL. FLASK CHART) 650.9 g

WATER TEMPERATURE: 20.3

C) WT. OF VOL. FLASK, SOIL & WATER 720.2 g

D) SPECIFIC GRAVITY = $\frac{A}{A+(B-C)}$ = 2.67

E) SPECIFIC GRAVITY (CORRECTED) G_s = D x K = 2.67

WATER TEMPERATURE DEGREES C	CORRECTION FACTOR, K
18	1.0004
19	1.0002
20	1.0000
21	0.9998
22	0.9996
23	0.9993
24	0.9991
25	0.9989
26	0.9986
27	0.9980
28	0.9983
29	0.9977
30	0.9974

F) SOIL DESCRIPTION: Gray Tan [illegible] Graded Sand (SP)

FILE: SPECGRAV

ags
10971 Richardson Road
Ashland, Virginia 23005
(804) 550-2203 Phone
(804) 550-2204 Fax

JOB NO. RC01-196 DATE 8/12/01 SHEET ____ OF ____

PROJECT NAME URS - Chesapeake Golf

CALC. BY [illegible] CHECKED BY MDN DATE 8-13-01

B-1, 20' - 22'

Approx Sample Length = 15.25 in ⇒ 38.74 cm
Approx Sample Diameter = 2.87 ⇒ 7.29 cm
Area = 6.47 in^2 ⇒ 41.74 cm^2
Vol = 0.0571 ft^3 ⇒ 1617.01 cm^3

Wt of Sample + Tube = 11.62 lbs
Wt. of Tube = 4.81 lbs
Approx Wt of Sample = 6.81 lbs ⇒ 3089.02 g

Moisture Content (ave) = 22.2
Wet Unit Wt = 119.3 lbs/ft^3
Dry Unit Wt = 97.6

$P = \frac{V_v}{V_t}$ where: P = Porosity
V_v = Vol Voids, cc
$V_v = V_t - V_s$
V_t = total Vol, cc
W = total wet wt of Sample, grams
A = area, cm^2
L = length, cm
V_s = Vol. Solids, cc
$V_s = \frac{W}{G_s \times (1 + MC)}$
G_s = Specific Gravity

$V_t = 1617.01$ cm^3 ✓

$V_s = \frac{3089.02}{2.68 \times 1.222} = 943.22$ cm^3 ✓

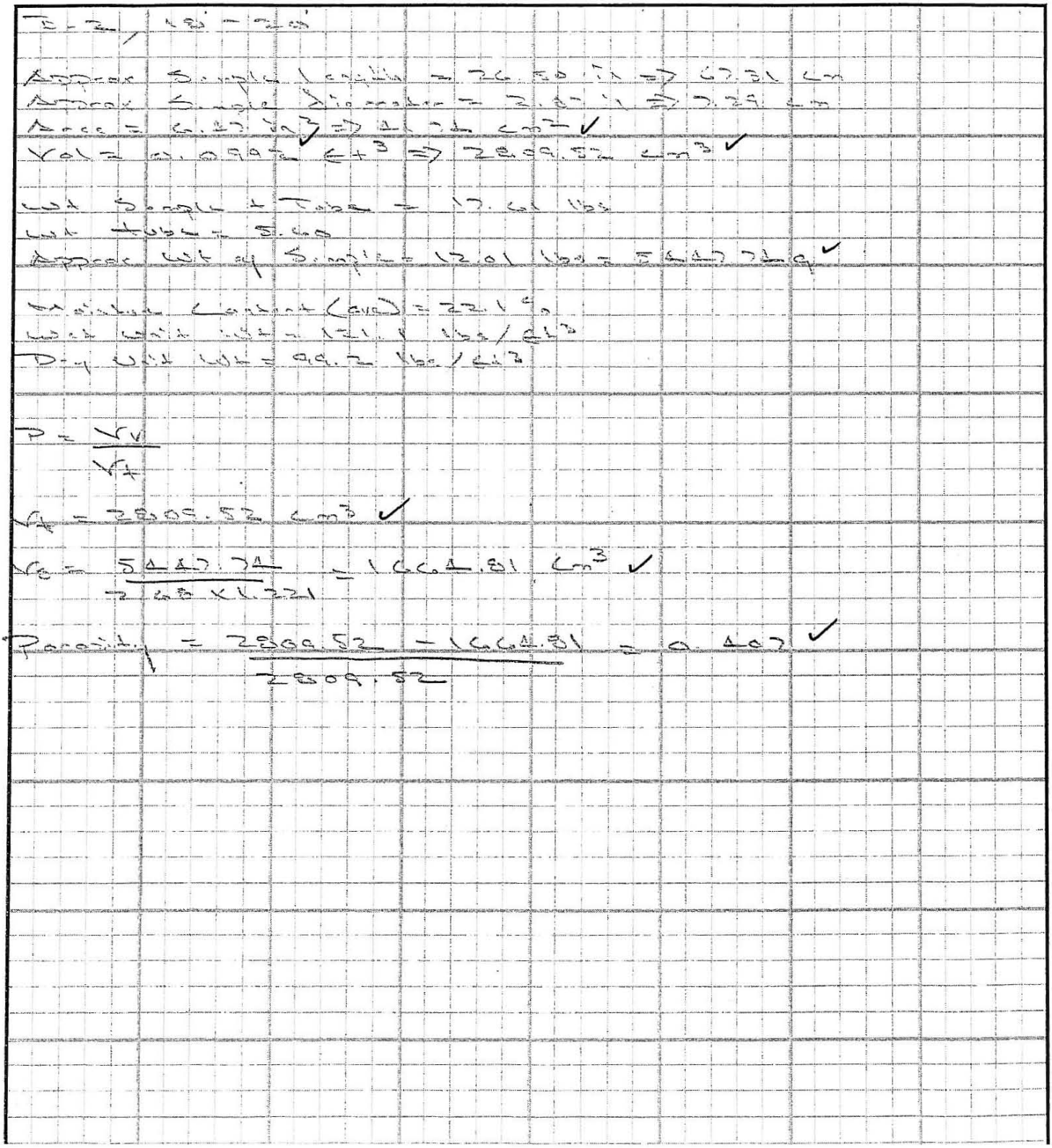
$P = \frac{1617.01 - 943.22}{1617.01} = 0.417$ ✓

10971 Richardson Road
Ashland, Virginia 23005
(804) 550-2203 Phone
(804) 550-2204 Fax

JOB NO. 20160 DATE 8/12/21 SHEET ___ OF ___

PROJECT NAME UBS – Chesapeake Golf

CALC. BY RB CHECKED BY ___ DATE ___

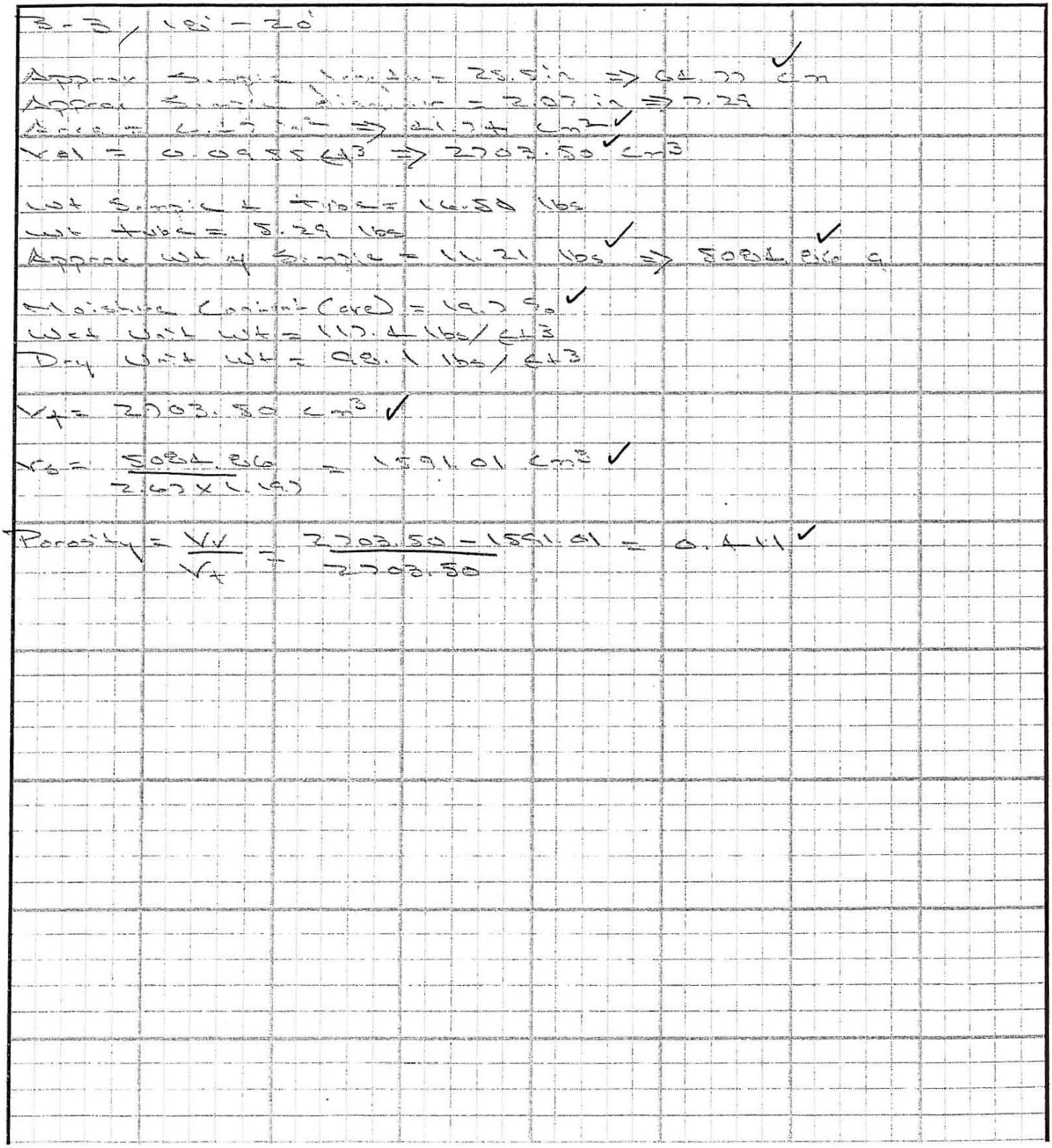


10971 Richardson Road
Ashland, Virginia 23005
(804) 550-2203 Phone
(804) 550-2204 Fax

JOB NO. [illegible] DATE [illegible] SHEET ___ OF ___

PROJECT NAME [illegible]

CALC. BY ___ CHECKED BY ___ DATE ___



WATER (MOISTURE) CONTENT/VISUAL CLASSIFICATION
(ASTM D 2216, D 2488)

Project No. [illegible] Project Name: __________

Tested By: __________ Date Tested: __________

Computed By: __________ Checked By: __________

Hole No.	Sample No.	Depth, Ft.	Tare No.	Tare, Grams	Wet Wt. + Tare	Dry Wt. + Tare	Water Content, %	Soil Description
B-1	[illegible]	20-22	28	34.42	254.30	217.63	22.0	
	[illegible]		C43	35.14	298.15	250.79	22.0	
	[illegible]		C45	35.15	304.05	257.55	21.9	
B-2		18-20	BT108	35.35	360.65	305.49	20.6	
			E12	35.64	286.73	240.42	22.6	
			BT112	35.94	300.65	250.75	23.2	
B-3		18-20	BT109	35.40	309.24	283.25	20.1	
			265	35.12	410.37	349.05	19.5	
			C46	35.03	355.52	303.52	19.2	

Remarks: __________

Water.vis

APPENDIX E

McCallum Subsurface Investigation Report

McCALLUM
TESTING LABORATORIES, INC.
Geotechnical Engineering, Materials Testing & Environmental Services

SUBSURFACE EXPLORATION

PROPOSED ETHERIDGE GREENS GOLF COURSE

CHESAPEAKE, VIRGINIA

MTL PROJECT #01-2004

1808 HAYWARD AVENUE, CHESAPEAKE, VA 23320 ✦ P.O. BOX 13337, CHESAPEAKE, VA 23325-0337
PHONE (757) 420-2520 ✦ FAX (757) 424-2874

McCALLUM
TESTING LABORATORIES, INC.

Geotechnical Engineering, Materials Testing & Environmental Services

April 5, 2001

Hassell and Folkes, P.C.
325 Volvo Parkway
Chesapeake, VA 23320

Attention: **Jack Claud**

Subject: **Subsurface Exploration**
Proposed Etheridge Greens Golf Course
Chesapeake, Virginia
MTL Project 012004

Dear **Mr. Claud:**

McCallum Testing Laboratories, Inc. has completed the requested subsurface exploration services for the above referenced project. A total of 12 soil test borings were drilled extending to depths of 25.5 ft. beneath the existing ground surface. Standard Penetration Tests (SPT's) were performed at 2 ft. intervals in the upper 10 ft. of boring and at 5 ft. intervals below 10 ft. All drilling and sampling were performed in accordance with applicable ASTM Standards. At the completion of drilling, groundwater level measurements were made within the completed bore holes. In addition, temporary monitoring wells were installed at 4 of the 12 boring locations and the stabilized groundwater level was measured in each. All samples obtained from the borings were visually examined and classified by our laboratory personnel according to the Unified Soils Classification System. Please note that the engineering properties of the obtained samples were not evaluated by a Geotechnical Engineer. The detailed results of the field sampling and testing are attached along with a Test Boring Location Plan.

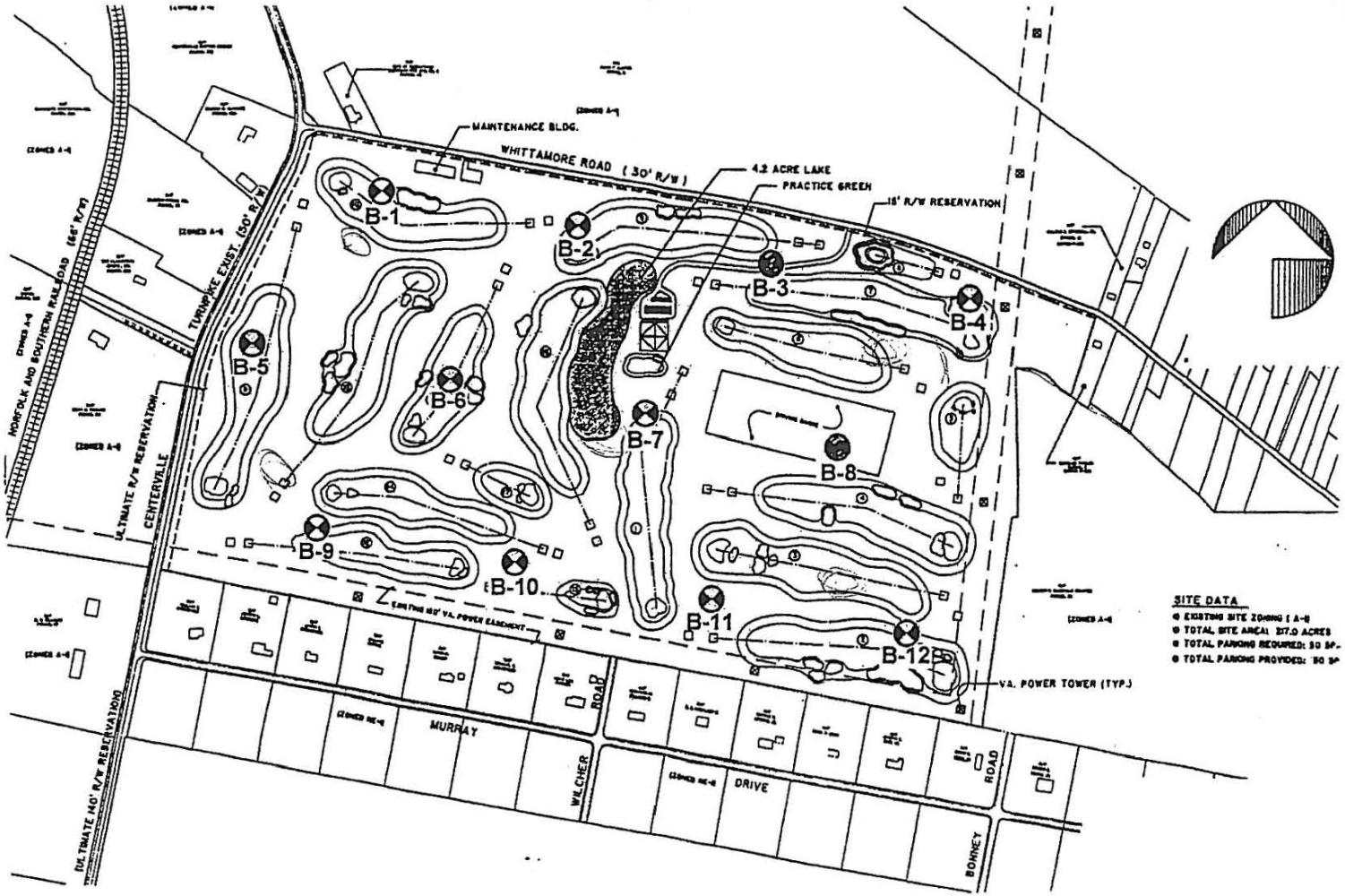
Should you have any questions concerning this matter, please contact this office at your earliest convenience.

Very truly yours,

McCALLUM TESTING LABORATORIES, INC.

David P. Rediger

David P. Rediger, E.I.T.
Laboratory Manager



Ref: Original plan provided by Hassell & Folkes, P.C.

McCALLUM TESTING LABORATORIES, INC. 1808 Hayward Avenue Chesapeake, Virginia 23325-0337			
Scale: ---	Approved By: David P. Rediger, E.I.T.	Date:	4/5/01
Project:	Proposed Etheridge Greens Golf Course Chesapeake, Virginia		
Drawing Title:	Test Boring Location Plan	Drawing Number:	1-01-2004

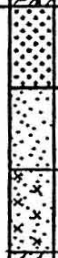
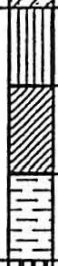
20166

McCALLUM

TESTING LABORATORIES, INC.

CHESAPEAKE, VIRGINIA

Unified Soil Classification System
ASTM Designation D 2487

Coarse Grained Soils (More than 50% of material retained on the No. 200 Sieve)	Gravels (more than 50% retained on the No. 4 Sieve)		GW	Well graded gravels, gravel–sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel–sand mixtures, little or no fines
			GM	Silty gravels, gravel–sand–silt mixtures
			GC	Clayey gravels, gravel–sand–clay mixtures
	Sands (more than 50% passing the No. 4 Sieve)		SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands, gravelly sands, little or no fines
			SM	Silty sands, sand–silt mixtures
			SC	Clayey sands, sand–clay mixtures
Fine Grained Soils (More than 50% of material passes the No. 200 Sieve)	Silts & Clays (LL less than 50)		ML	Inorganic silts, very fine sands, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy
			OL	Organic silts and organic silty clays of low plasticity
	Silts & Clays (LL greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, plastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
	Highly Organic Soil		PEAT	Peat and other highly organic soils

Standard Penetration Test (SPT)
Resistance Correlations

Coarse Grained Soils

SPT
vs.
Relative Density

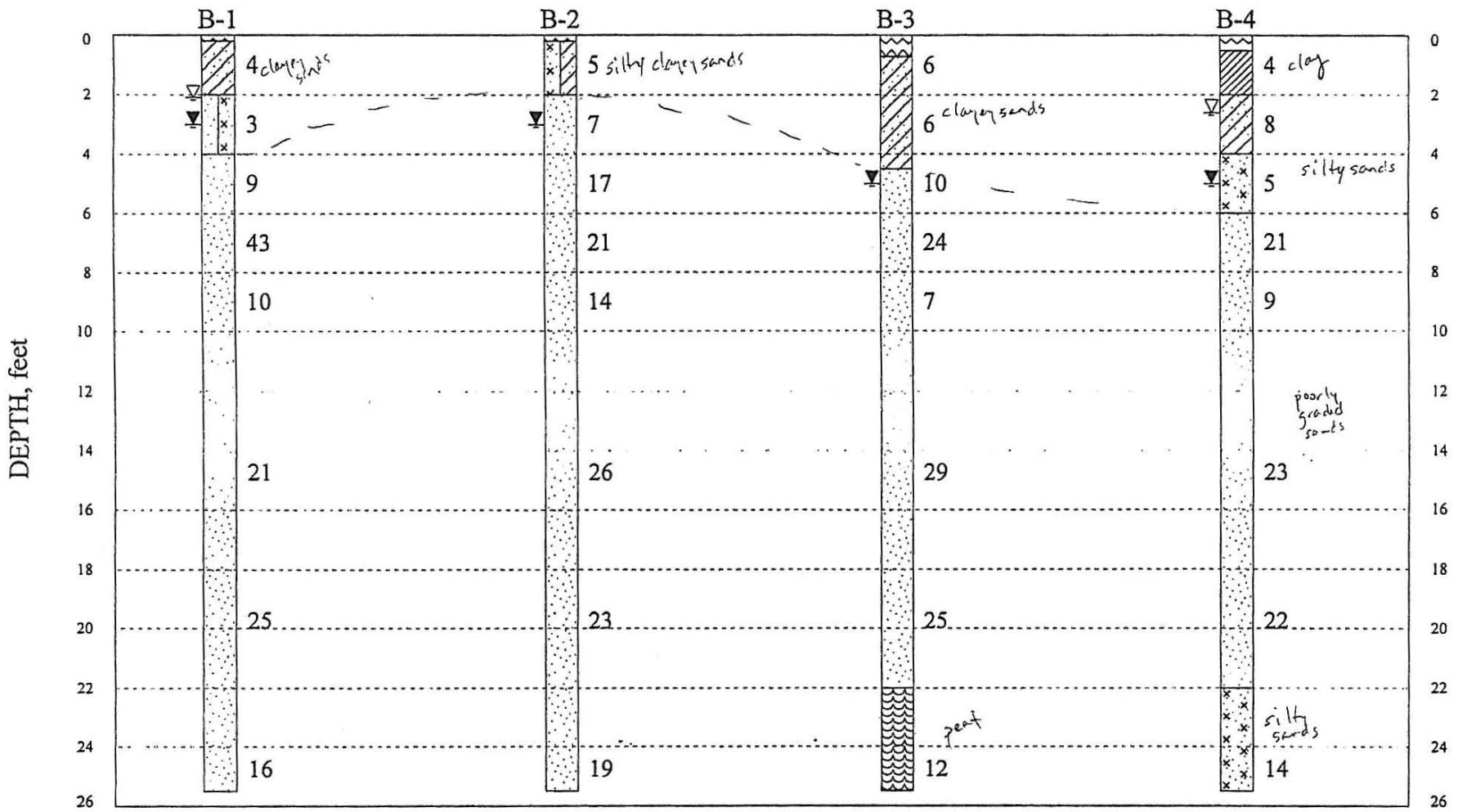
Blows/Ft	Relative Density
0–4	Very Loose
5–10	Loose
11–30	Medium Compact
31–50	Compact
Over 50	Very Compact

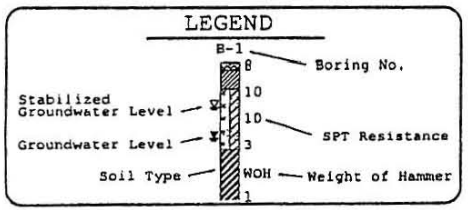
Fine Grained Soils

SPT
vs.
Consistency

Blows/Ft	Consistency
0–2	Very Soft
3–4	Soft
5–8	Medium Stiff
9–15	Stiff
16–30	Very Stiff
31–50	Hard
Over 50	Very Hard

20167





Subsurface Profile

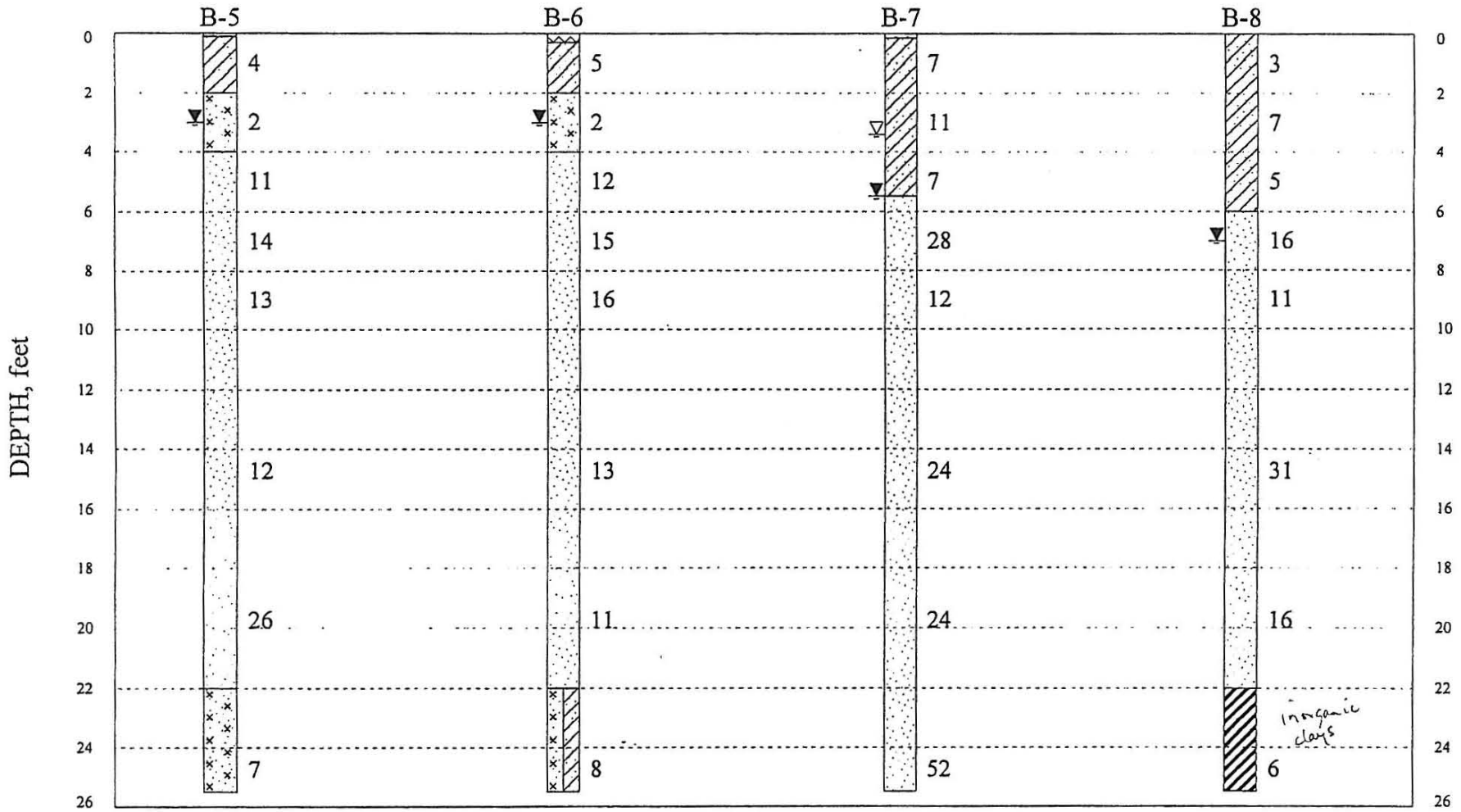
Drawing 2

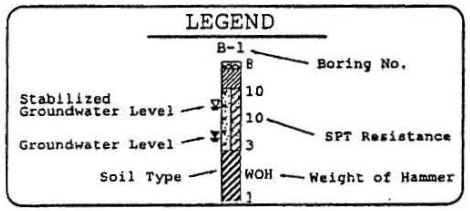
PROJECT Proposed Etheridge Greens Golf Course

PROJECT NO. 01-2004

McCALLUM TESTING LABORATORIES, INC.

20168





Subsurface Profile

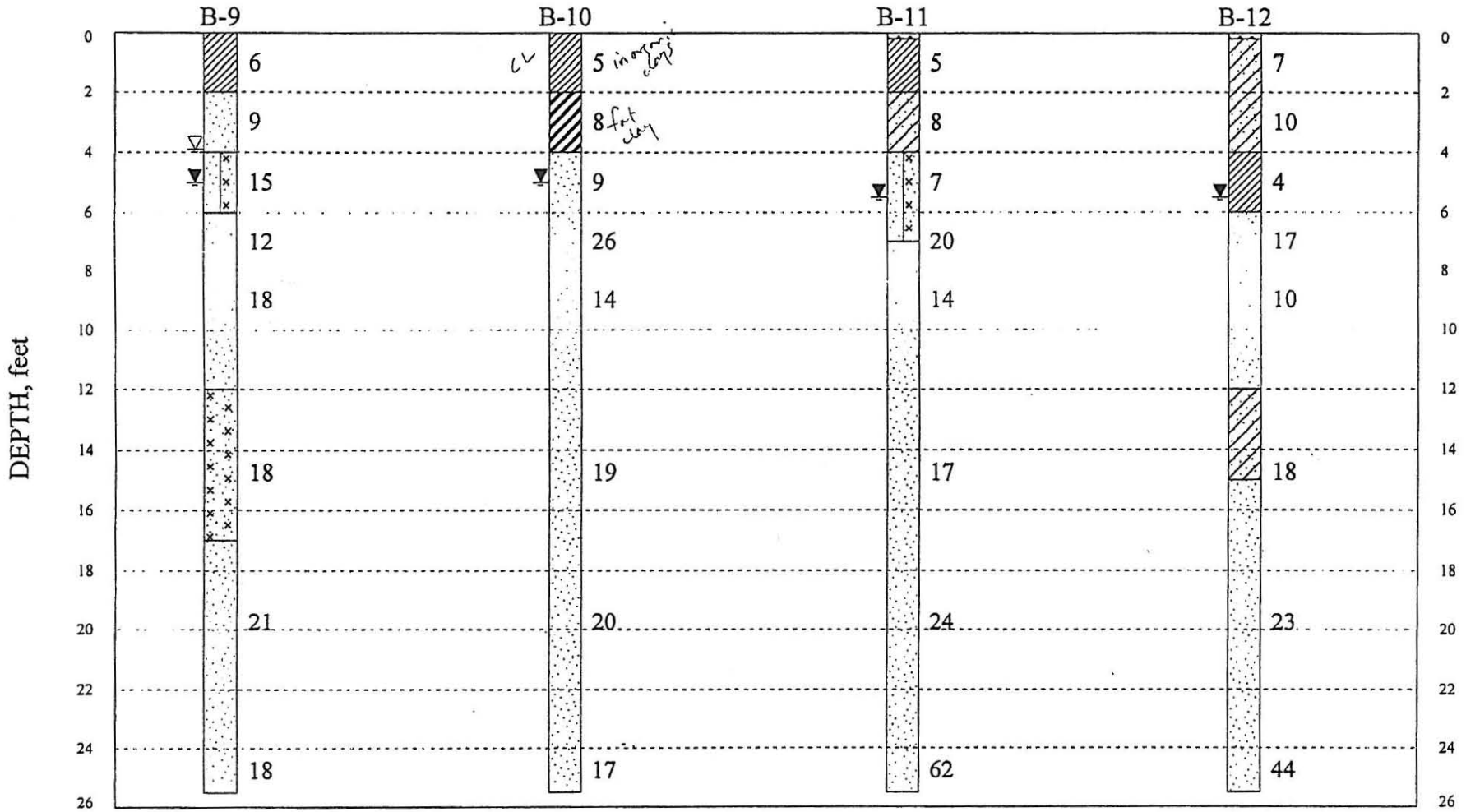
Drawing 3

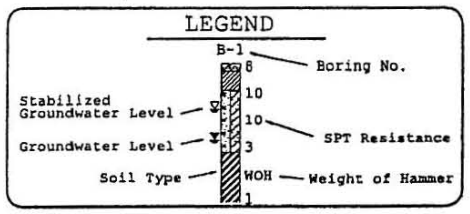
PROJECT Proposed Etheridge Greens Golf Course

PROJECT NO. 01-2004

McCALLUM TESTING LABORATORIES, INC.

20169





Subsurface Profile

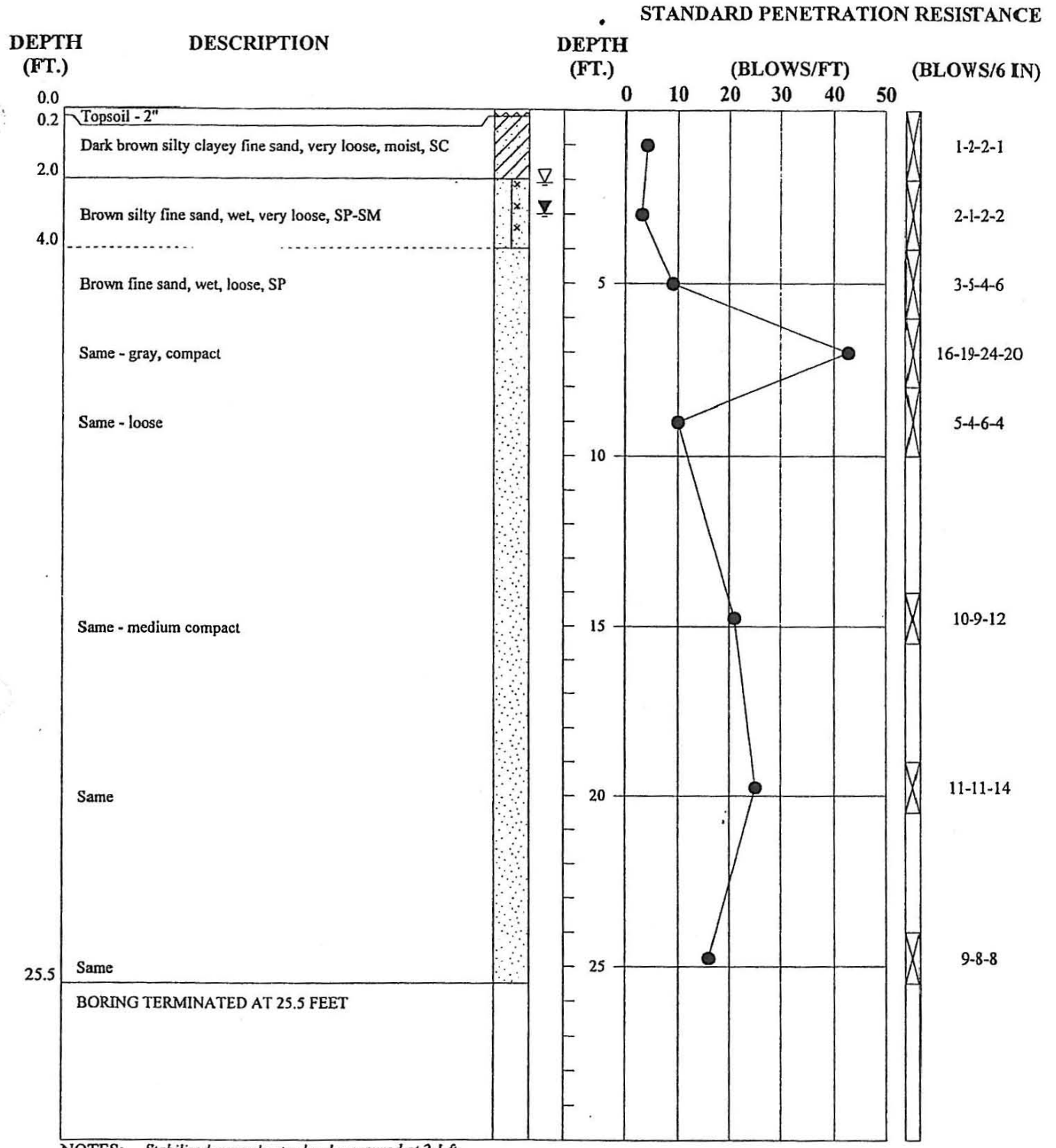
Drawing 4

PROJECT Proposed Etheridge Greens Golf Course

PROJECT NO. 01-2004

McCALLUM TESTING LABORATORIES, INC.

20170



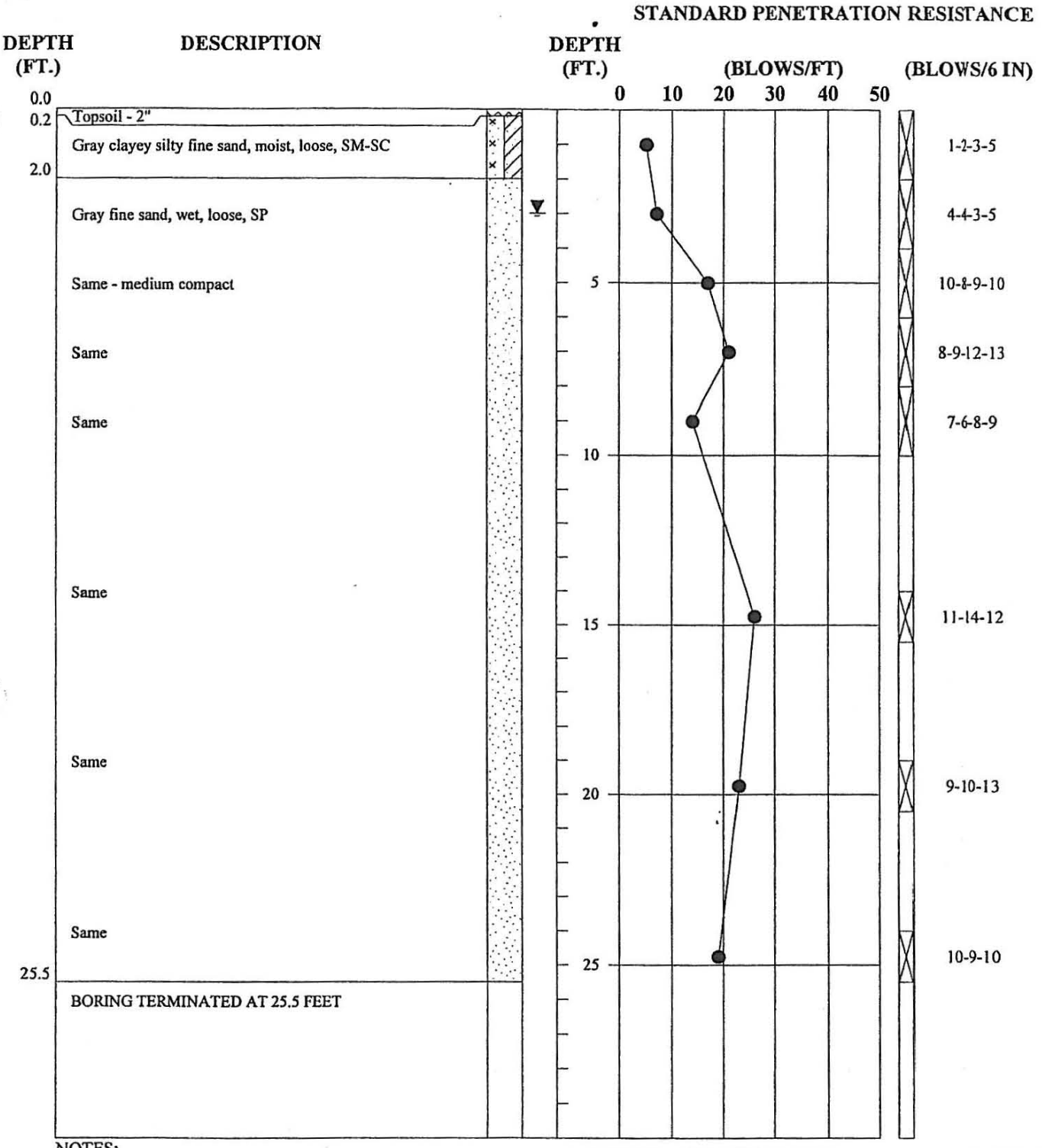
NOTES: *Stabilized groundwater level measured at 2.1 ft. in temporary monitoring well.*

- ------- - Gradual Stratum Change
- - - - - - Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- ⊠ - Standard Penetration Test
- ▮ - Undisturbed Sample
- ▼ - Groundwater Level at Time of Boring
- ▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-1
DATE DRILLED	March 16, 2001
PROJECT NUMBER	01-2004
PROJECT	Proposed Etheridge Greens Golf Course
LOCATION	Chesapeake, Virginia

McCALLUM TESTING LABORATORIES, INC.



NOTES:

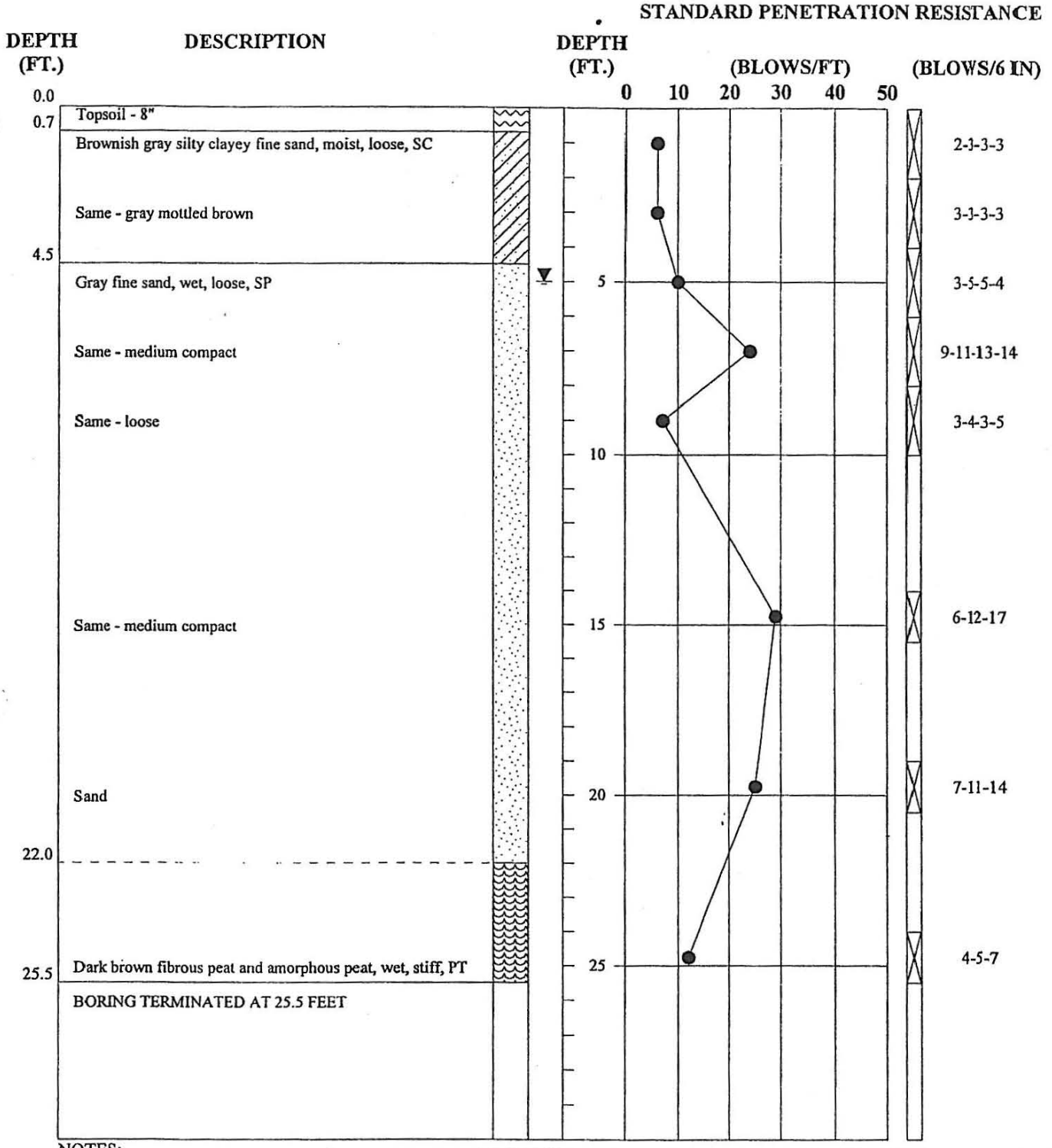
- ------- - Gradual Stratum Change
- - - - - - Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- ▒ - Standard Penetration Test
- ▌ - Undisturbed Sample
- ▼ - Groundwater Level at Time of Boring
- ▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-2
DATE DRILLED	March 16, 2001
PROJECT NUMBER	01-2004
PROJECT	Proposed Etheridge Greens Golf Course
LOCATION	Chesapeake, Virginia

McCALLUM TESTING LABORATORIES, INC.

20172



NOTES:

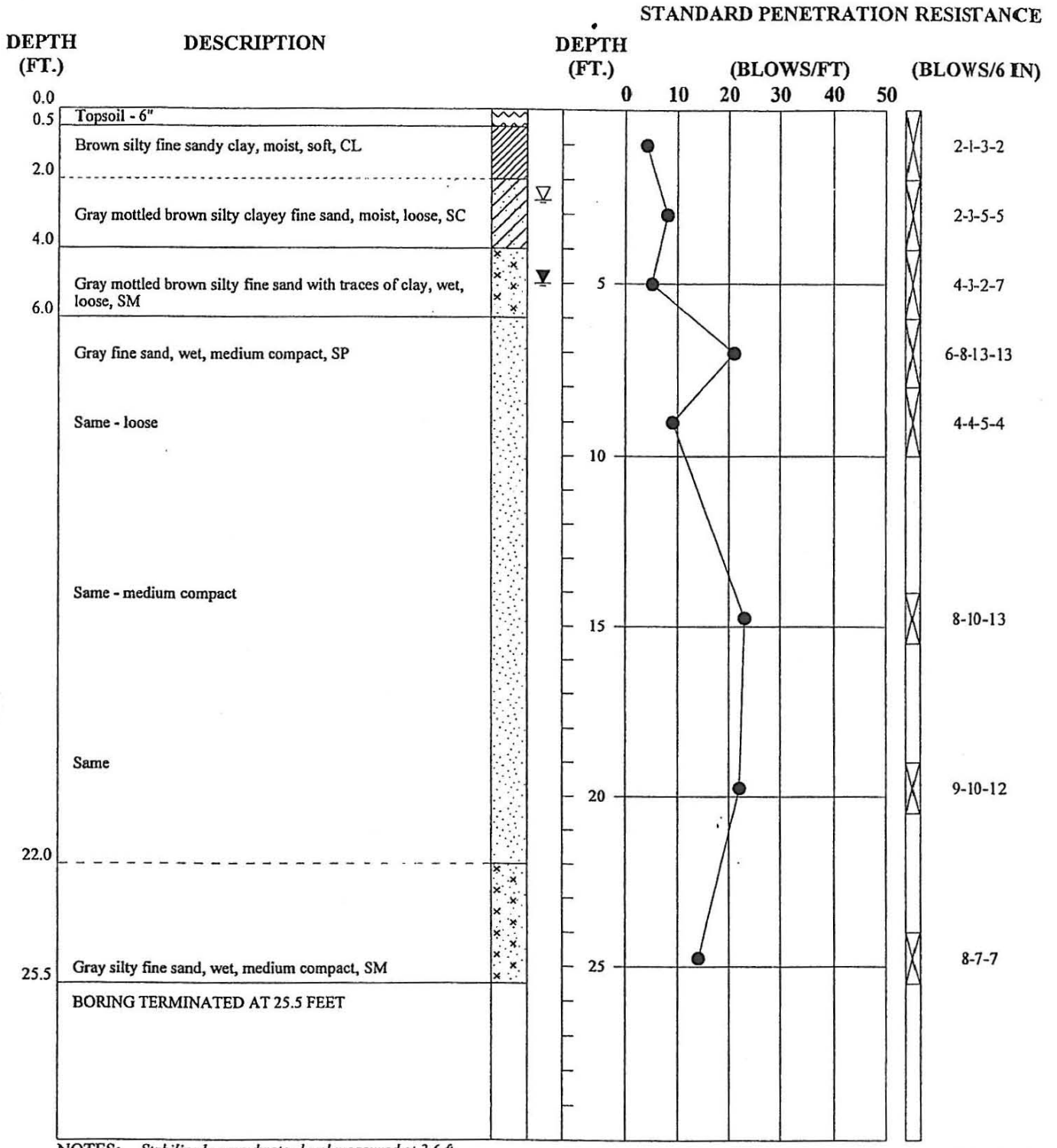
- ------- - Gradual Stratum Change
- - - - - - Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- ▩ - Standard Penetration Test
- ▮ - Undisturbed Sample
- ▼ - Groundwater Level at Time of Boring
- ▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-3
DATE DRILLED	March 16, 2001
PROJECT NUMBER	01-2004
PROJECT	Proposed Etheridge Greens Golf Course
LOCATION	Chesapeake, Virginia

McCALLUM TESTING LABORATORIES, INC.

20173



NOTES: *Stabilized groundwater level measured at 2.6 ft. in temporary monitoring well.*

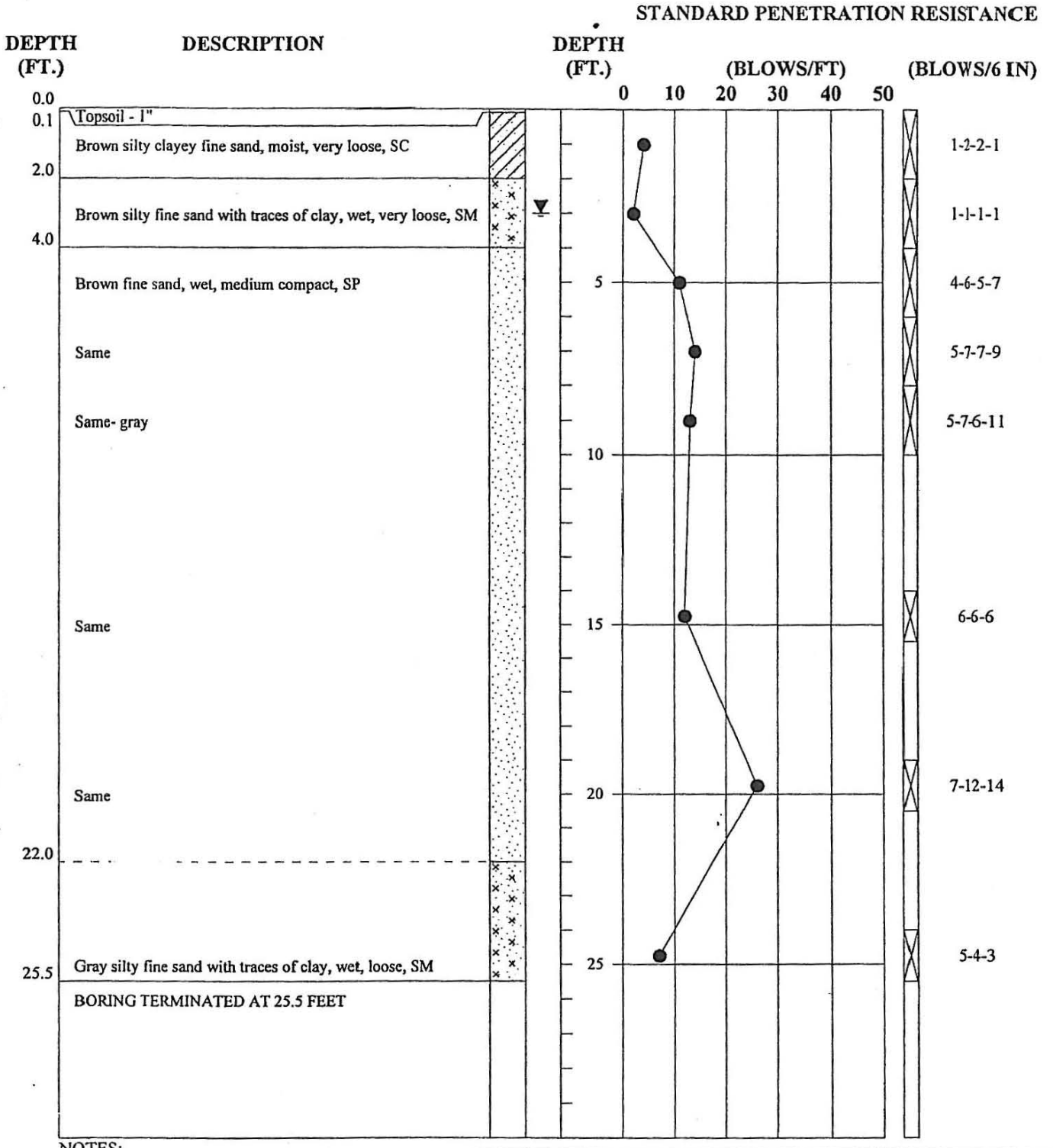
- ------- - Gradual Stratum Change
- - - - - - Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- ▒ - Standard Penetration Test
- ▌ - Undisturbed Sample
- ▼ - Groundwater Level at Time of Boring
- ▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-4
DATE DRILLED	March 16, 2001
PROJECT NUMBER	01-2004
PROJECT	Proposed Etheridge Greens Golf Course
LOCATION	Chesapeake, Virginia

McCALLUM TESTING LABORATORIES, INC.

20174



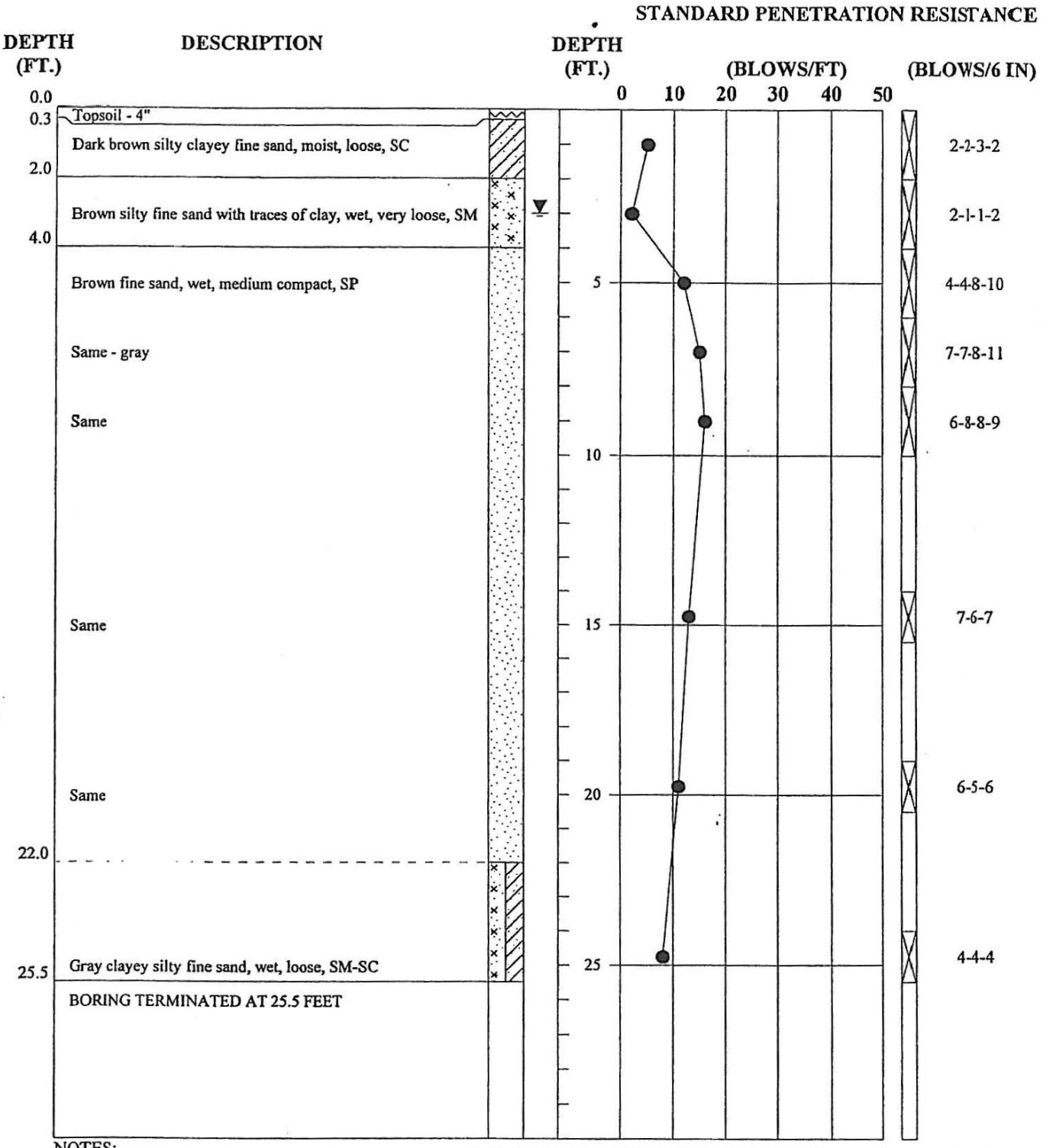
NOTES:

- - - - - Gradual Stratum Change
- - - - - Approximate Stratum Change
● - Penetration Resistance (N - value)
▒ - Standard Penetration Test
▌ - Undisturbed Sample
▼ - Groundwater Level at Time of Boring
▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-5
DATE DRILLED	March 16, 2001
PROJECT NUMBER	01-2004
PROJECT	Proposed Etheridge Greens Golf Course
LOCATION	Chesapeake, Virginia

McCALLUM TESTING LABORATORIES, INC.



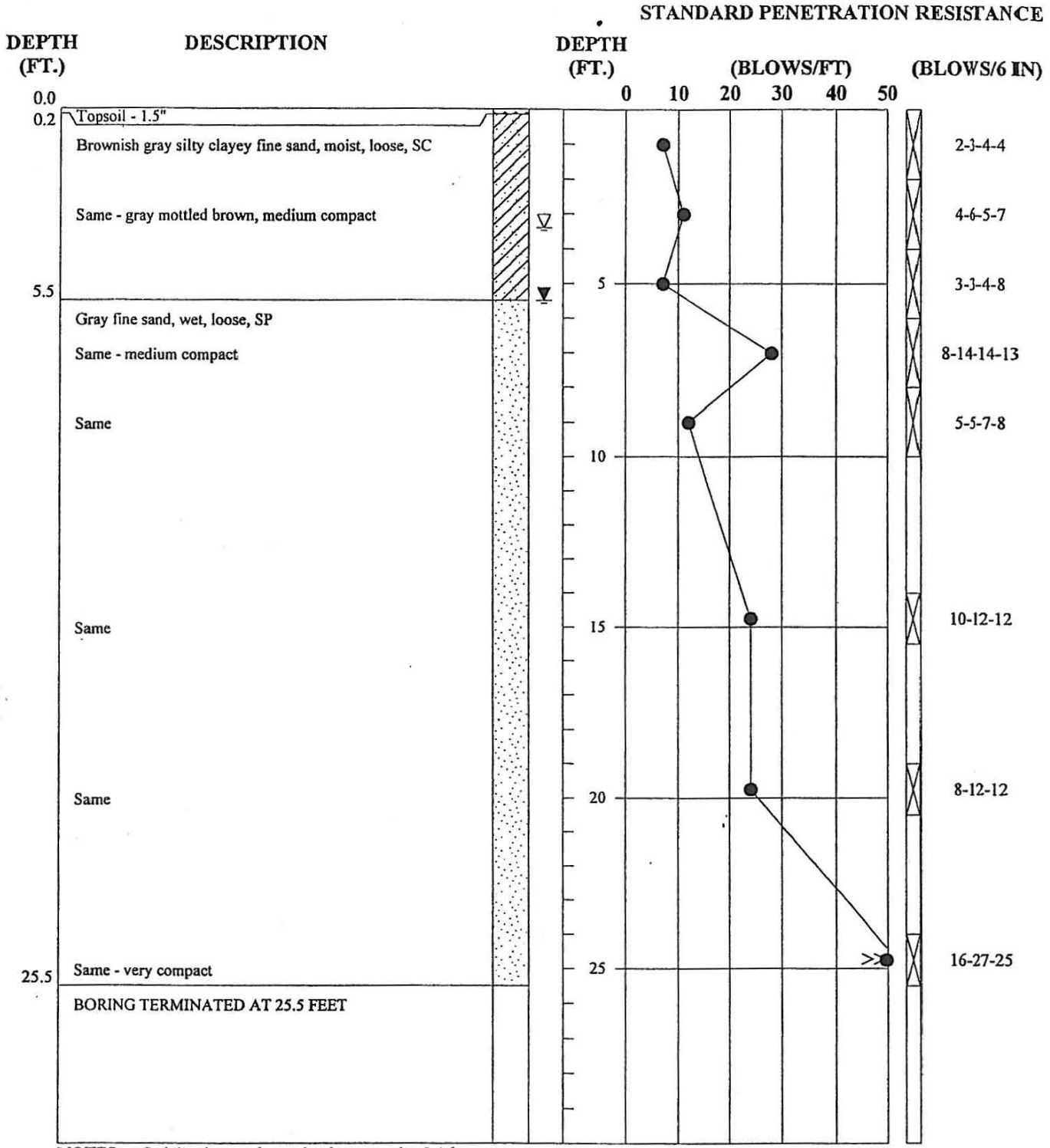
NOTES:

- - - - - Gradual Stratum Change
- - - - - - Approximate Stratum Change
● - Penetration Resistance (N - value)
⊠ - Standard Penetration Test
▮ - Undisturbed Sample
▼ - Groundwater Level at Time of Boring
▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-6
DATE DRILLED	March 16, 2001
PROJECT NUMBER	01-2004
PROJECT	Proposed Etheridge Greens Golf Course
LOCATION	Chesapeake, Virginia

McCALLUM TESTING LABORATORIES, INC.



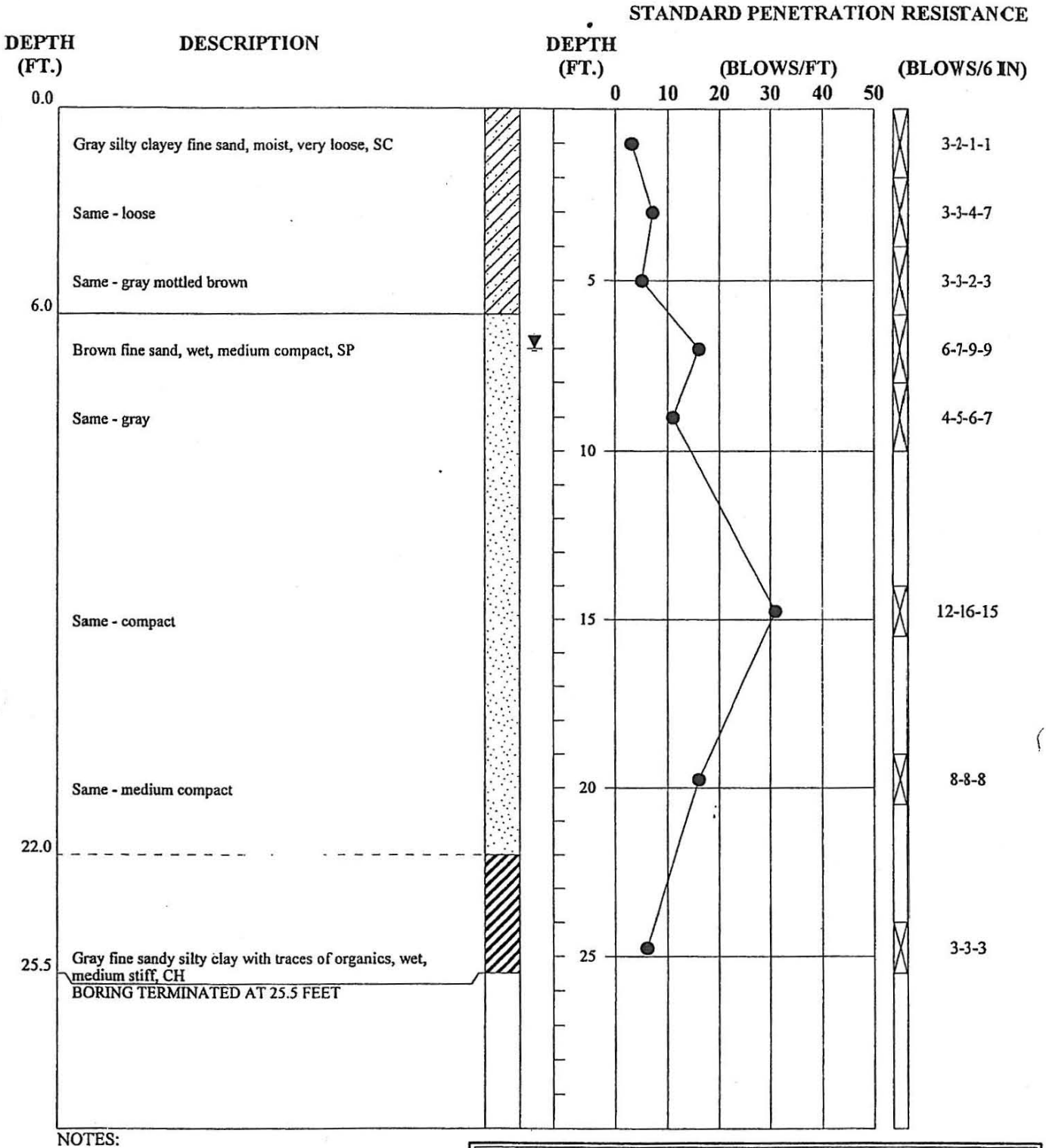
NOTES: *Stabilized groundwater level measured at 3.4 ft. in temporary monitoring well.*

- Gradual Stratum Change
- Approximate Stratum Change
- Penetration Resistance (N - value)
- Standard Penetration Test
- Undisturbed Sample
- Groundwater Level at Time of Boring
- Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-7
DATE DRILLED	March 16, 2001
PROJECT NUMBER	01-2004
PROJECT	Proposed Etheridge Greens Golf Course
LOCATION	Chesapeake, Virginia

McCALLUM TESTING LABORATORIES, INC.



NOTES:

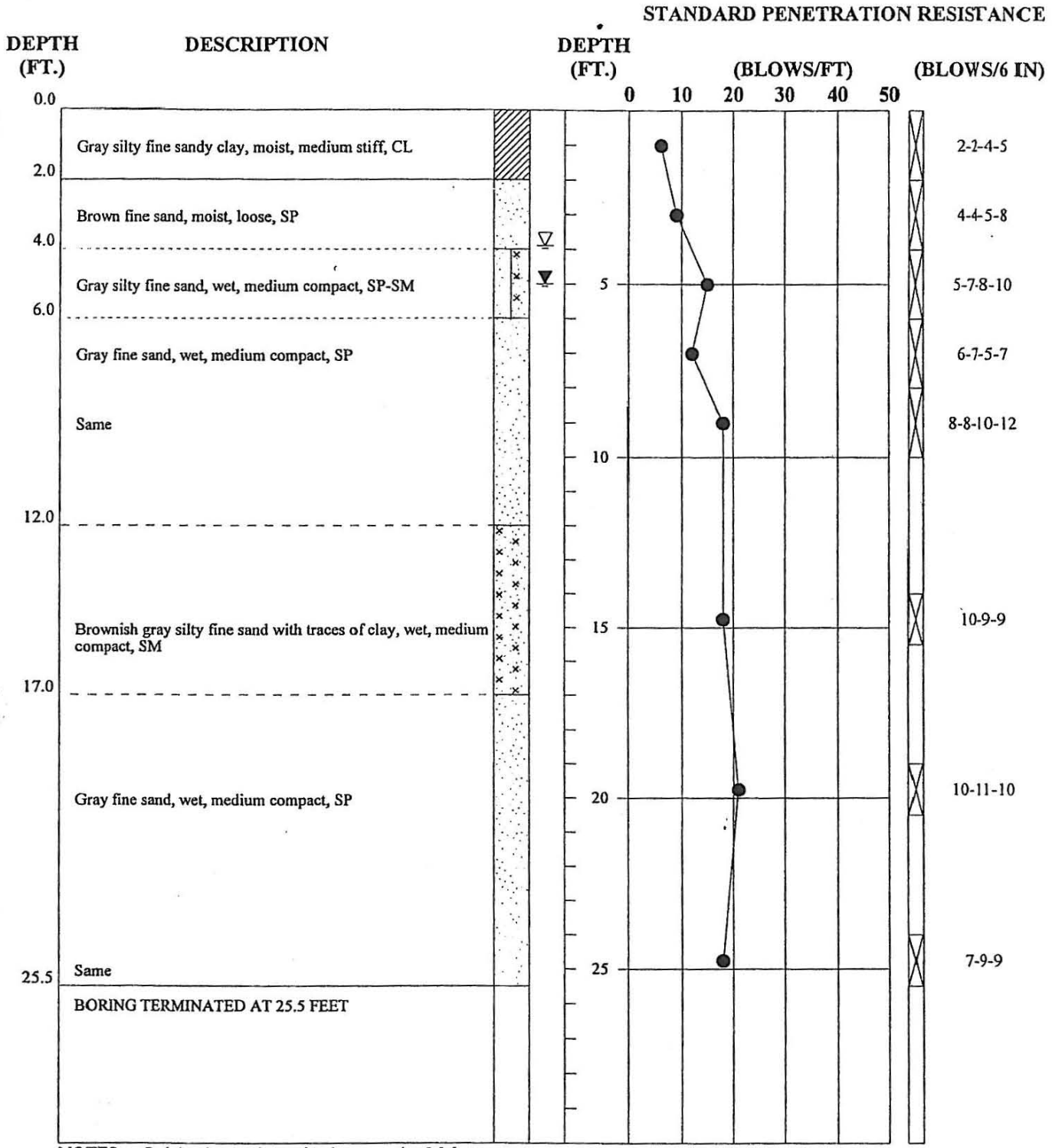
- ------- - Gradual Stratum Change
- - - - - - Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- ▒ - Standard Penetration Test
- ▌ - Undisturbed Sample
- ▼ - Groundwater Level at Time of Boring
- ▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-8
DATE DRILLED	March 14, 2001
PROJECT NUMBER	01-2004
PROJECT	Proposed Etheridge Greens Golf Course
LOCATION	Chesapeake, Virginia

McCALLUM TESTING LABORATORIES, INC.

20178



NOTES: *Stabilized groundwater level measured at 3.9 ft. in temporary monitoring well.*

- ------- - Gradual Stratum Change
- - - - - - Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- ▒ - Standard Penetration Test
- ▌ - Undisturbed Sample
- ▼ - Groundwater Level at Time of Boring
- ▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-9
DATE DRILLED	March 14, 2001
PROJECT NUMBER	01-2004
PROJECT	Proposed Etheridge Greens Golf Course
LOCATION	Chesapeake, Virginia

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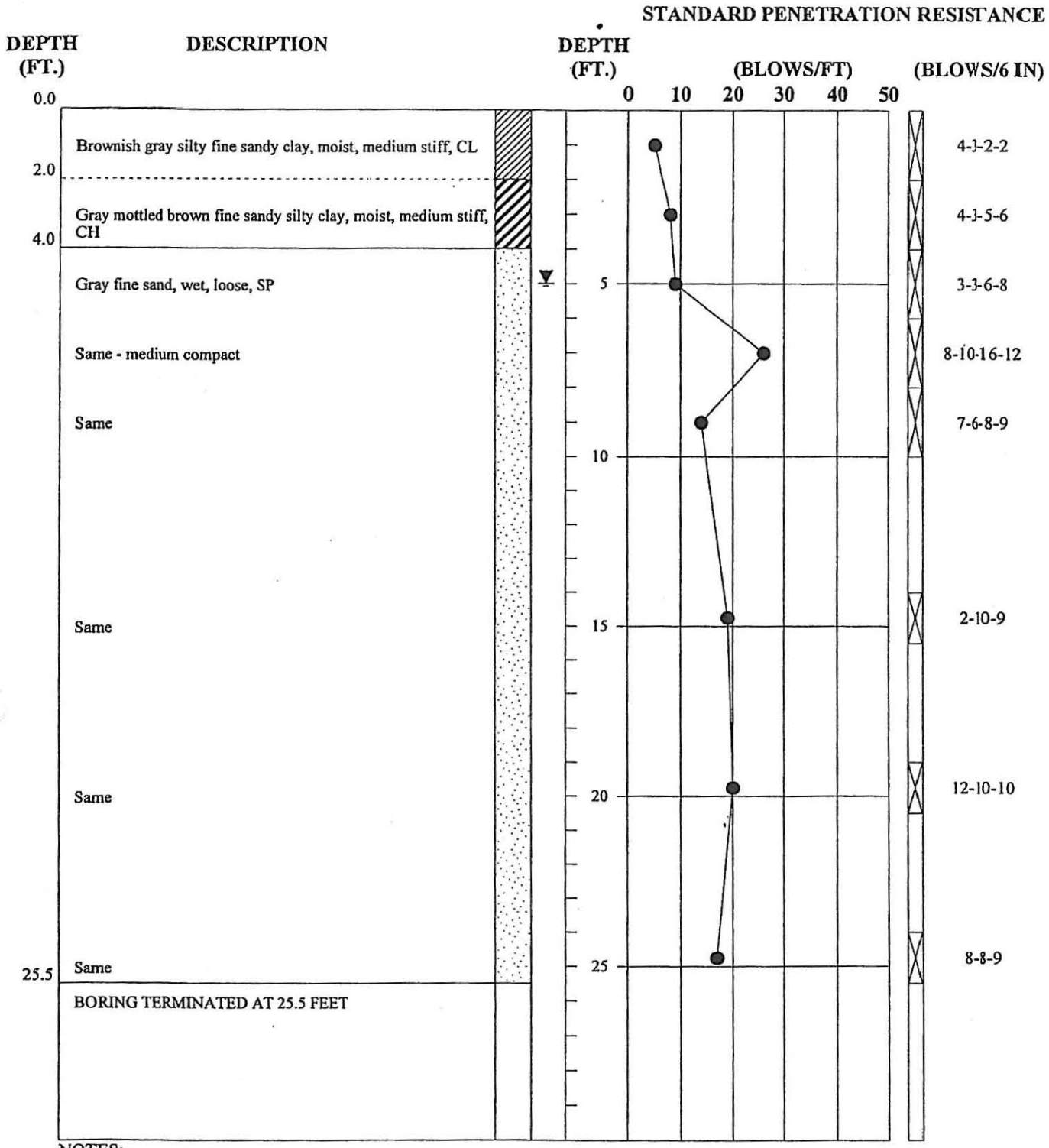


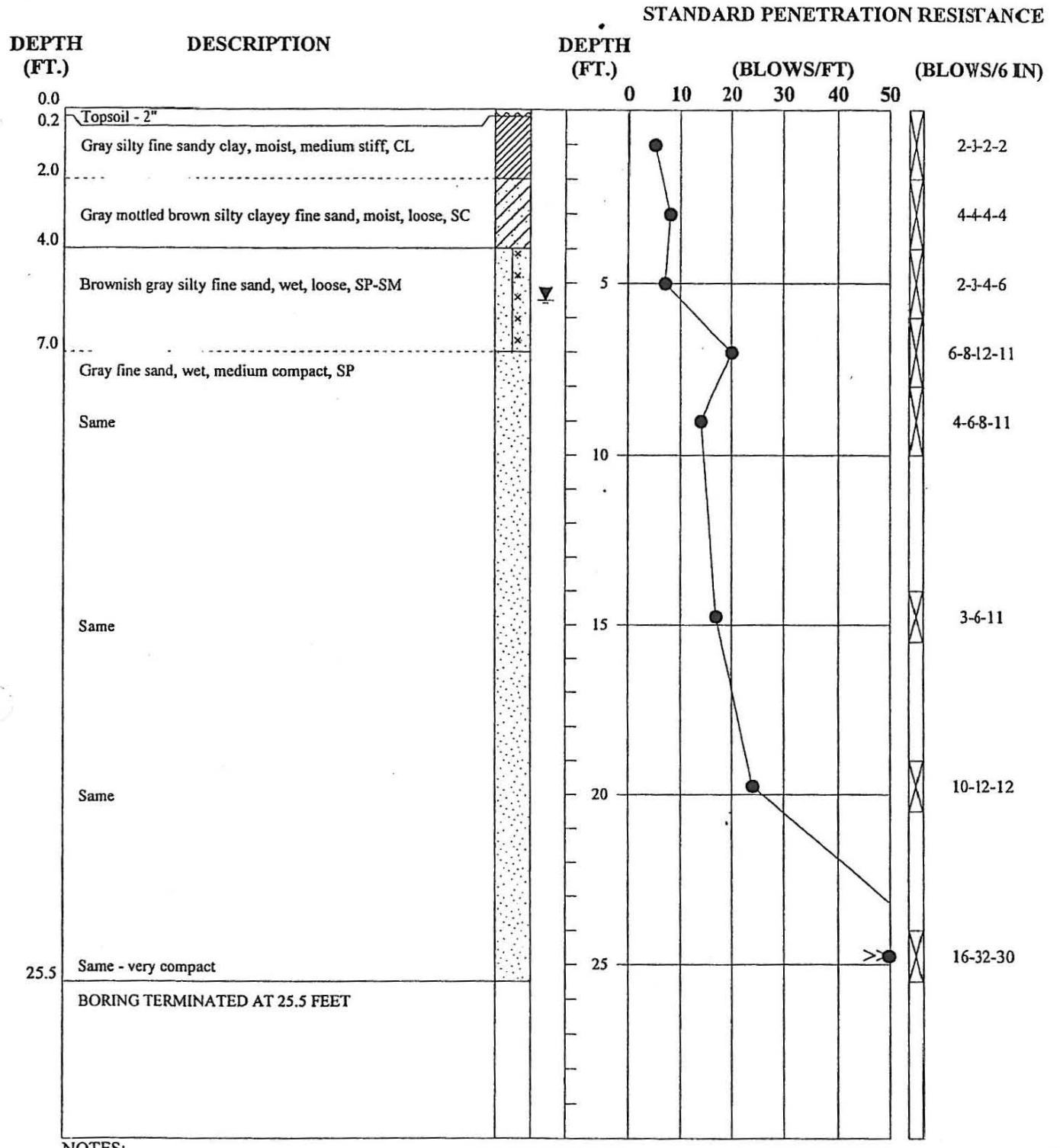
NOTES:

- ------- - Gradual Stratum Change
- - - - - - Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- ▒ - Standard Penetration Test
- ▌ - Undisturbed Sample
- ▼ - Groundwater Level at Time of Boring
- ▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-10
DATE DRILLED	March 14, 2001
PROJECT NUMBER	01-2004
PROJECT	Proposed Etheridge Greens Golf Course
LOCATION	Chesapeake, Virginia

McCALLUM TESTING LABORATORIES, INC.



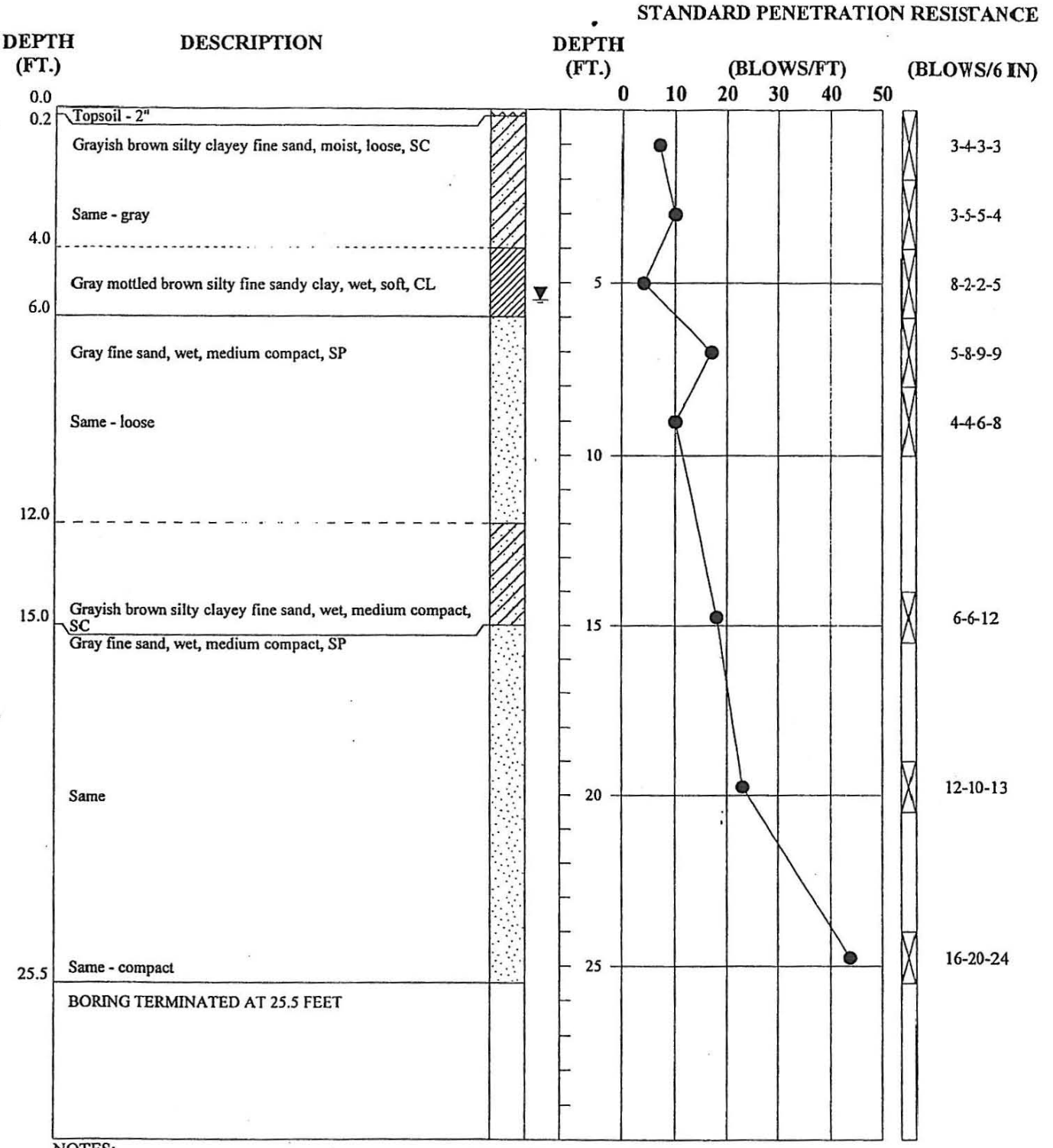
NOTES:

- -- - Gradual Stratum Change
- - - - Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- ⊠ - Standard Penetration Test
- ▌ - Undisturbed Sample
- ▼ - Groundwater Level at Time of Boring
- ▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-11
DATE DRILLED	March 14, 2001
PROJECT NUMBER	01-2004
PROJECT	Proposed Etheridge Greens Golf Course
LOCATION	Chesapeake, Virginia

McCALLUM TESTING LABORATORIES, INC.



NOTES:

- ------- - Gradual Stratum Change
- - - - - - Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- ▯ - Standard Penetration Test
- ▮ - Undisturbed Sample
- ▼ - Groundwater Level at Time of Boring
- ▽ - Stabilized Groundwater Level Reading

TEST BORING RECORD

BORING NUMBER	B-12
DATE DRILLED	March 14, 2001
PROJECT NUMBER	01-2004
PROJECT	Proposed Etheridge Greens Golf Course
LOCATION	Chesapeake, Virginia

McCALLUM TESTING LABORATORIES, INC.

APPENDIX F

Analytical Results

FINAL

SEVERN TRENT SERVICES

STL North Canton
4101 Shuffel Drive NW
North Canton, OH 44720-6961

Tel: 330 497 9396
Fax: 330 497 0772
www.stl-inc.com

ANALYTICAL REPORT

PROJECT NO. 49498-001

CHESAPEAKE GC, CHESAPEAKE, VA

Lot #: A1H020245

MARGIE RAY

URS
5540 Faimouth Street
Suite 201
Richmond, VA 23230

SEVERN TRENT LABORATORIES, INC.

Alesia M. Danford
Project Manager

August 28, 2001

CASE NARRATIVE

A1H020245

The following report contains the analytical results for four water samples submitted to STL North Canton by URS from the Chesapeake GC, Chesapeake, VA Site, project number 49498-001. The samples were received August 2, 2001, according to documented sample acceptance procedures. Margie Ray of URS added additional parameters on August 16, 2001.

STL North Canton utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the analytical methods summary page in accordance with the methods indicated. A summary of QC data for these analyses is included at the rear of the report.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The samples were received at the laboratory at a temperature of 2.5° C.

GENERAL CHEMISTRY

Additional analyses for TDS, Bicarbonate Alkalinity, and Total Alkalinity were requested after the recommended sample holding times had been exceeded.

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

STL North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. STL North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed below.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

- *for analyses run on TJA Trace ICP, ICPMS or GFAA only*

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

QUALITY CONTROL ELEMENTS OF SW-846 METHODS
(Continued)

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable. The acceptance criteria do not apply to samples that are diluted for organics if the native sample amount is 4x the concentration of the spike.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepped and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepped and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide, PCB, PAH, and Herbicide methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria.

ANALYTICAL METHODS SUMMARY

A1H020245

PARAMETER	ANALYTICAL METHOD
Alkalinity	MCAWW 310.1
Bicarbonate Alkalinity	MCAWW 310.1
Bromide	MCAWW 300.0A
Chloride	MCAWW 300.0A
Filterable Residue (TDS)	MCAWW 160.1
Fluoride	MCAWW 300.0A
Inductively Coupled Plasma (ICP) Metals	SW846 6010B
Mercury in Liquid Waste (Manual Cold-Vapor)	SW846 7470A
Nitrate as N	MCAWW 300.0A
Sulfate	MCAWW 300.0A
Total phosphorus	MCAWW 365.2
Total Organic Carbon	MCAWW 415.1
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010B

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

A1H020245

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
EHD49	001	MW-1 CENTER	08/01/01	13:00
EHD5M	002	MW-2 NE	08/01/01	14:15
EHD5N	003	MW-2 NE DUP.	08/01/01	14:20
EHD5P	004	MW-3 SE	08/01/01	15:25

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

URS

Client Sample ID: MW-1 CENTER

DISSOLVED Metals

Lot-Sample #...: A1H020245-001 **Matrix.....:** WG
Date Sampled...: 08/01/01 13:00 **Date Received..:** 08/02/01

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1218124						
Silver	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD491A0
		Dilution Factor: 1				
Aluminum	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHD491AH
		Dilution Factor: 1				
Arsenic	ND	10.0	ug/L	SW846 6010B	08/06-08/09/01	EHD491A1
		Dilution Factor: 1				
Barium	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHD491AJ
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD491AK
		Dilution Factor: 1				
Boron	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHD491AL
		Dilution Factor: 1				
Chromium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD491A3
		Dilution Factor: 1				
Copper	ND	25.0	ug/L	SW846 6010B	08/06-08/09/01	EHD491AN
		Dilution Factor: 1				
Iron	**10200**	**100**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD491AP**
		Dilution Factor: 1				
Calcium	**92000**	**5000**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD491AM**
		Dilution Factor: 1				
Cadmium	ND	2.0	ug/L	SW846 6010B	08/06-08/09/01	EHD491A2
		Dilution Factor: 1				
Mercury	ND	0.20	ug/L	SW846 7470A	08/06-08/07/01	EHD491AX
		Dilution Factor: 1				
Potassium	ND	5000	ug/L	SW846 6010B	08/06-08/09/01	EHD491AQ
		Dilution Factor: 1				
Magnesium	**13200**	**5000**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD491AR**
		Dilution Factor: 1				

(Continued on next page)

URS

Client Sample ID: MW-1 CENTER

DISSOLVED Metals

Lot-Sample #...: A1H020245-001 Matrix.....: WG

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Manganese	339	15.0	ug/L	SW846 6010B	08/06-08/09/01	EHD491AT
		Dilution Factor: 1				
Sodium	32400	5000	ug/L	SW846 6010B	08/06-08/09/01	EHD491AU
		Dilution Factor: 1				
Nickel	ND	40.0	ug/L	SW846 6010B	08/06-08/09/01	EHD491AV
		Dilution Factor: 1				
Lead	ND	3.0	ug/L	SW846 6010B	08/06-08/09/01	EHD491A4
		Dilution Factor: 1				
Selenium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD491A5
		Dilution Factor: 1				
Thallium	ND	10.0	ug/L	SW846 6010B	08/06-08/09/01	EHD491A6
		Dilution Factor: 1				
Vanadium	ND	7.0	ug/L	SW846 6010B	08/06-08/09/01	EHD491A7
		Dilution Factor: 1				
Zinc	ND	20.0	ug/L	SW846 6010B	08/06-08/09/01	EHD491AW
		Dilution Factor: 1				

URS

Client Sample ID: MW-1 CENTER

General Chemistry

Lot-Sample #...: A1H020245-001 Work Order #...: EHD49 Matrix.....: WG
Date Sampled...: 08/01/01 13:00 Date Received..: 08/02/01

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Bicarbonate Alkalinity	130	5.0	mg/L	MCAWW 310.1	08/16/01	1229494
		Dilution Factor: 1				
Bromide	ND	500	ug/L	MCAWW 300.0A	08/03/01	1215219
		Dilution Factor: 1				
Chloride	74300	1000	ug/L	MCAWW 300.0A	08/03/01	1215220
		Dilution Factor: 1				
Fluoride	ND	1000	ug/L	MCAWW 300.0A	08/03/01	1215221
		Dilution Factor: 1				
Nitrate	ND	100	ug/L	MCAWW 300.0A	08/03/01	1215223
		Dilution Factor: 1				
Sulfate	139000	1000	ug/L	MCAWW 300.0A	08/03/01	1215224
		Dilution Factor: 1				
Total phosphorus	210	100	ug/L	MCAWW 365.2	08/07/01	1219373
		Dilution Factor: 1				
Total Alkalinity	130	5.0	mg/L	MCAWW 310.1	08/16/01	1229495
		Dilution Factor: 1				
Total Dissolved Solids	510	10	mg/L	MCAWW 160.1	08/16-08/20/01	1229172
		Dilution Factor: 1				
Total Organic Carbon	3	1	mg/L	MCAWW 415.1	08/17/01	1232204
		Dilution Factor: 1				

URS

Client Sample ID: MW-2 NE

DISSOLVED Metals

Lot-Sample #...: A1H020245-002 **Matrix.....:** WG
Date Sampled...: 08/01/01 14:15 **Date Received..:** 08/02/01

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1218124						
Silver	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1A0
		Dilution Factor: 1				
Aluminum	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1AH
		Dilution Factor: 1				
Arsenic	ND	10.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1A1
		Dilution Factor: 1				
Barium	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1AJ
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1AK
		Dilution Factor: 1				
Boron	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1AL
		Dilution Factor: 1				
Calcium	**37800**	**5000**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5M1AM**
		Dilution Factor: 1				
Cadmium	ND	2.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1A2
		Dilution Factor: 1				
Chromium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1A3
		Dilution Factor: 1				
Copper	ND	25.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1AN
		Dilution Factor: 1				
Iron	**4860**	**100**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5M1AP**
		Dilution Factor: 1				
Mercury	ND	0.20	ug/L	SW846 7470A	08/06-08/07/01	EHD5M1AX
		Dilution Factor: 1				
Potassium	**8190**	**5000**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5M1AQ**
		Dilution Factor: 1				
Magnesium	**18700**	**5000**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5M1AR**
		Dilution Factor: 1				

(Continued on next page)

URS

Client Sample ID: MW-2 NE

DISSOLVED Metals

Lot-Sample #...: A1H020245-002 Matrix.....: WG

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Manganese	237	15.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1AT
		Dilution Factor: 1				
Sodium	34000	5000	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1AU
		Dilution Factor: 1				
Nickel	ND	40.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1AV
		Dilution Factor: 1				
Lead	ND	3.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1A4
		Dilution Factor: 1				
Selenium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1A5
		Dilution Factor: 1				
Thallium	ND	10.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1A6
		Dilution Factor: 1				
Vanadium	ND	7.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1A7
		Dilution Factor: 1				
Zinc	ND	20.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5M1AW
		Dilution Factor: 1				

URS

Client Sample ID: MW-2 NE

General Chemistry

Lot-Sample #...: A1H020245-002 Work Order #...: EHD5M Matrix.....: WG
Date Sampled...: 08/01/01 14:15 Date Received..: 08/02/01

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Bicarbonate Alkalinity	75	5.0	mg/L	MCAWW 310.1	08/17/01	1229494
		Dilution Factor: 1				
Bromide	ND	500	ug/L	MCAWW 300.0A	08/03/01	1215219
		Dilution Factor: 1				
Chloride	54000	1000	ug/L	MCAWW 300.0A	08/03/01	1215220
		Dilution Factor: 1				
Fluoride	ND	1000	ug/L	MCAWW 300.0A	08/03/01	1215221
		Dilution Factor: 1				
Nitrate	ND	100	ug/L	MCAWW 300.0A	08/03/01	1215223
		Dilution Factor: 1				
Sulfate	103000	1000	ug/L	MCAWW 300.0A	08/03/01	1215224
		Dilution Factor: 1				
Total phosphorus	170	100	ug/L	MCAWW 365.2	08/07/01	1219373
		Dilution Factor: 1				
Total Alkalinity	75	5.0	mg/L	MCAWW 310.1	08/17/01	1229495
		Dilution Factor: 1				
Total Dissolved Solids	390	10	mg/L	MCAWW 160.1	08/16-08/20/01	1229172
		Dilution Factor: 1				
Total Organic Carbon	2	1	mg/L	MCAWW 415.1	08/17/01	1232204
		Dilution Factor: 1				

URS

Client Sample ID: MW-2 NE DUP.

DISSOLVED Metals

Lot-Sample #...: A1H020245-003 Matrix.....: WG
Date Sampled...: 08/01/01 14:20 Date Received..: 08/02/01

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1218124						
Silver	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1A0
		Dilution Factor: 1				
Aluminum	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1AH
		Dilution Factor: 1				
Arsenic	ND	10.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1A1
		Dilution Factor: 1				
Barium	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1AJ
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1AK
		Dilution Factor: 1				
Boron	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1AL
		Dilution Factor: 1				
Calcium	**38800**	**5000**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5N1AM**
		Dilution Factor: 1				
Cadmium	ND	2.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1A2
		Dilution Factor: 1				
Chromium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1A3
		Dilution Factor: 1				
Copper	ND	25.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1AN
		Dilution Factor: 1				
Iron	**4750**	**100**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5N1AP**
		Dilution Factor: 1				
Mercury	ND	0.20	ug/L	SW846 7470A	08/06-08/07/01	EHD5N1AX
		Dilution Factor: 1				
Potassium	**8340**	**5000**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5N1AQ**
		Dilution Factor: 1				
Magnesium	**19100**	**5000**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5N1AR**
		Dilution Factor: 1				

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URS

Client Sample ID: MW-2 NE DUP.

DISSOLVED Metals

Lot-Sample #...: A1H020245-003 Matrix.....: WG

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Manganese	**242**	**15.0**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5N1AT**
		Dilution Factor: 1				
Sodium	**34700**	**5000**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5N1AU**
		Dilution Factor: 1				
Nickel	ND	40.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1AV
		Dilution Factor: 1				
Lead	ND	3.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1A4
		Dilution Factor: 1				
Selenium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1A5
		Dilution Factor: 1				
Thallium	ND	10.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1A6
		Dilution Factor: 1				
Vanadium	ND	7.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1A7
		Dilution Factor: 1				
Zinc	ND	20.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5N1AW
		Dilution Factor: 1				

URS

Client Sample ID: MW-2 NE DUP.

General Chemistry

Lot-Sample #...: A1H020245-003 Work Order #...: EHD5N Matrix.....: WG
Date Sampled...: 08/01/01 14:20 Date Received..: 08/02/01

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Bicarbonate Alkalinity	73	5.0	mg/L	MCAWW 310.1	08/24/01	1239436
		Dilution Factor: 1				
Bromide	ND	500	ug/L	MCAWW 300.0A	08/03/01	1215219
		Dilution Factor: 1				
Chloride	54000	1000	ug/L	MCAWW 300.0A	08/03/01	1215220
		Dilution Factor: 1				
Fluoride	ND	1000	ug/L	MCAWW 300.0A	08/03/01	1215221
		Dilution Factor: 1				
Nitrate	ND	100	ug/L	MCAWW 300.0A	08/03/01	1215223
		Dilution Factor: 1				
Sulfate	103000	1000	ug/L	MCAWW 300.0A	08/03/01	1215224
		Dilution Factor: 1				
Total phosphorus	190	100	ug/L	MCAWW 365.2	08/07/01	1219373
		Dilution Factor: 1				
Total Alkalinity	73	5.0	mg/L	MCAWW 310.1	08/24/01	1240129
		Dilution Factor: 1				
Total Dissolved Solids	380	10	mg/L	MCAWW 160.1	08/16-08/20/01	1229172
		Dilution Factor: 1				
Total Organic Carbon	2	1	mg/L	MCAWW 415.1	08/17/01	1232204
		Dilution Factor: 1				

URS

Client Sample ID: MW-3 SE

DISSOLVED Metals

Lot-Sample #...: A1H020245-004 Matrix.....: WG
Date Sampled...: 08/01/01 15:25 Date Received..: 08/02/01

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1218124						
Silver	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1A0
		Dilution Factor: 1				
Aluminum	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1AH
		Dilution Factor: 1				
Arsenic	ND	10.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1A1
		Dilution Factor: 1				
Barium	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1AJ
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1AK
		Dilution Factor: 1				
Boron	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1AL
		Dilution Factor: 1				
Calcium	**77300**	**5000**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5P1AM**
		Dilution Factor: 1				
Cadmium	ND	2.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1A2
		Dilution Factor: 1				
Chromium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1A3
		Dilution Factor: 1				
Copper	ND	25.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1AN
		Dilution Factor: 1				
Iron	**4790**	**100**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5P1AP**
		Dilution Factor: 1				
Mercury	ND	0.20	ug/L	SW846 7470A	08/06-08/07/01	EHD5P1AX
		Dilution Factor: 1				
Potassium	ND	5000	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1AQ
		Dilution Factor: 1				
Magnesium	**15600**	**5000**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5P1AR**
		Dilution Factor: 1				

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URS

Client Sample ID: MW-3 SE

DISSOLVED Metals

Lot-Sample #...: A1H020245-004 Matrix.....: WG

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Manganese	**160**	**15.0**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5P1AT**
		Dilution Factor: 1				
Sodium	**48200**	**5000**	**ug/L**	**SW846 6010B**	**08/06-08/09/01**	**EHD5P1AU**
		Dilution Factor: 1				
Nickel	ND	40.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1AV
		Dilution Factor: 1				
Lead	ND	3.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1A4
		Dilution Factor: 1				
Selenium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1A5
		Dilution Factor: 1				
Thallium	ND	10.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1A6
		Dilution Factor: 1				
Vanadium	ND	7.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1A7
		Dilution Factor: 1				
Zinc	ND	20.0	ug/L	SW846 6010B	08/06-08/09/01	EHD5P1AW
		Dilution Factor: 1				

URS

Client Sample ID: MW-3 SE

General Chemistry

Lot-Sample #...: A1H020245-004 Work Order #...: EHD5P Matrix.....: WG
Date Sampled...: 08/01/01 15:25 Date Received..: 08/02/01

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Bicarbonate Alkalinity	160	5.0	mg/L	MCAWW 310.1	08/17/01	1229494
		Dilution Factor: 1				
Bromide	ND	500	ug/L	MCAWW 300.0A	08/03/01	1215219
		Dilution Factor: 1				
Chloride	53300	1000	ug/L	MCAWW 300.0A	08/03/01	1215220
		Dilution Factor: 1				
Fluoride	ND	1000	ug/L	MCAWW 300.0A	08/03/01	1215221
		Dilution Factor: 1				
Nitrate	ND	100	ug/L	MCAWW 300.0A	08/03/01	1215223
		Dilution Factor: 1				
Sulfate	112000	1000	ug/L	MCAWW 300.0A	08/03/01	1215224
		Dilution Factor: 1				
Total phosphorus	390	100	ug/L	MCAWW 365.2	08/07/01	1219373
		Dilution Factor: 1				
Total Alkalinity	160	5.0	mg/L	MCAWW 310.1	08/17/01	1229495
		Dilution Factor: 1				
Total Dissolved Solids	460	10	mg/L	MCAWW 160.1	08/16-08/20/01	1229172
		Dilution Factor: 1				
Total Organic Carbon	6	1	mg/L	MCAWW 415.1	08/17/01	1232204
		Dilution Factor: 1				

QUALITY CONTROL SECTION

METHOD BLANK REPORT

DISSOLVED Metals

Client Lot #...: A1H020245 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: A1H060000-124 **Prep Batch #...:** 1218124						
Aluminum	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1CU
		Dilution Factor: 1				
Arsenic	ND	10.0	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1DC
		Dilution Factor: 1				
Barium	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1CV
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1CW
		Dilution Factor: 1				
Boron	ND	200	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1CX
		Dilution Factor: 1				
Cadmium	ND	2.0	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1DD
		Dilution Factor: 1				
Calcium	ND	5000	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1C0
		Dilution Factor: 1				
Chromium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1DE
		Dilution Factor: 1				
Copper	ND	25.0	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1C1
		Dilution Factor: 1				
Iron	ND	100	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1C2
		Dilution Factor: 1				
Lead	ND	3.0	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1DF
		Dilution Factor: 1				
Magnesium	ND	5000	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1C4
		Dilution Factor: 1				
Manganese	ND	15.0	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1C5
		Dilution Factor: 1				
Mercury	ND	0.20	ug/L	SW846 7470A	08/06-08/07/01	EHHRK1C9
		Dilution Factor: 1				
Nickel	ND	40.0	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1C7
		Dilution Factor: 1				

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METHOD BLANK REPORT

DISSOLVED Metals

Client Lot #...: A1H020245 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	ND	5000	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1C3
		Dilution Factor: 1				
Selenium	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1DG
		Dilution Factor: 1				
Silver	ND	5.0	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1DA
		Dilution Factor: 1				
Sodium	ND	5000	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1C6
		Dilution Factor: 1				
Thallium	ND	10.0	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1DH
		Dilution Factor: 1				
Vanadium	ND	7.0	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1DJ
		Dilution Factor: 1				
Zinc	ND	20.0	ug/L	SW846 6010B	08/06-08/09/01	EHHRK1C8
		Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

Client Lot #...: A1H020245 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Bicarbonate Alkalinity		Work Order #: EH7QR1AA		MB Lot-Sample #:	A1H170000-494	
	ND	5.0	mg/L	MCAWW 310.1	08/16/01	1229494
		Dilution Factor: 1				
Bicarbonate Alkalinity		Work Order #: EJMRH1AA		MB Lot-Sample #:	A1H270000-436	
	ND	5.0	mg/L	MCAWW 310.1	08/24/01	1239436
		Dilution Factor: 1				
Bromide		Work Order #: EHF4M1AA		MB Lot-Sample #:	A1H030000-219	
	ND	500	ug/L	MCAWW 300.0A	08/02/01	1215219
		Dilution Factor: 1				
Chloride		Work Order #: EHF3P1AA		MB Lot-Sample #:	A1H030000-220	
	ND	1000	ug/L	MCAWW 300.0A	08/02/01	1215220
		Dilution Factor: 1				
Fluoride		Work Order #: EHF271AA		MB Lot-Sample #:	A1H030000-221	
	ND	1000	ug/L	MCAWW 300.0A	08/02/01	1215221
		Dilution Factor: 1				
Nitrate		Work Order #: EHF4N1AA		MB Lot-Sample #:	A1H030000-223	
	ND	100	ug/L	MCAWW 300.0A	08/02/01	1215223
		Dilution Factor: 1				
Sulfate		Work Order #: EHF4T1AA		MB Lot-Sample #:	A1H030000-224	
	ND	1000	ug/L	MCAWW 300.0A	08/02/01	1215224
		Dilution Factor: 1				
Total phosphorus		Work Order #: EHKRW1AA		MB Lot-Sample #:	A1H070000-373	
	ND	100	ug/L	MCAWW 365.2	08/07/01	1219373
		Dilution Factor: 1				
Total Alkalinity		Work Order #: EH7Q01AA		MB Lot-Sample #:	A1H170000-495	
	ND	5.0	mg/L	MCAWW 310.1	08/16/01	1229495
		Dilution Factor: 1				
Total Alkalinity		Work Order #: EJMRE1AA		MB Lot-Sample #:	A1H280000-129	
	ND	5.0	mg/L	MCAWW 310.1	08/24/01	1240129
		Dilution Factor: 1				
Total Dissolved Solids		Work Order #: EJAX21AA		MB Lot-Sample #:	A1H170000-172	
	ND	10	mg/L	MCAWW 160.1	08/16-08/20/01	1229172
		Dilution Factor: 1				

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METHOD BLANK REPORT

General Chemistry

Client Lot #...: A1H020245 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Organic Carbon		Work Order #: EH8N61AA		MB Lot-Sample #:	A1H200000-204	
	ND	1	mg/L	MCAWW 415.1	08/17/01	1232204
		Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

DISSOLVED Metals

Client Lot #...: A1H020245 **Matrix.....:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: A1H060000-124 **Prep Batch #...:** 1218124					
Aluminum	99	(80 - 120)	SW846 6010B Dilution Factor: 1	08/06-08/09/01	EHHRK1EC
Barium	97	(80 - 120)	SW846 6010B Dilution Factor: 1	08/06-08/09/01	EHHRK1ED
Beryllium	99	(80 - 120)	SW846 6010B Dilution Factor: 1	08/06-08/09/01	EHHRK1EE
Boron	99	(80 - 120)	SW846 6010B Dilution Factor: 1	08/06-08/09/01	EHHRK1EF
Calcium	99	(80 - 120)	SW846 6010B Dilution Factor: 1	08/06-08/09/01	EHHRK1EG
Copper	99	(80 - 120)	SW846 6010B Dilution Factor: 1	08/06-08/09/01	EHHRK1EH
Iron	106	(77 - 127)	SW846 6010B Dilution Factor: 1	08/06-08/09/01	EHHRK1EJ
Potassium	105	(80 - 120)	SW846 6010B Dilution Factor: 1	08/06-08/09/01	EHHRK1EK
Magnesium	102	(80 - 120)	SW846 6010B Dilution Factor: 1	08/06-08/09/01	EHHRK1EL
Manganese	101	(80 - 120)	SW846 6010B Dilution Factor: 1	08/06-08/09/01	EHHRK1EM
Sodium	103	(80 - 120)	SW846 6010B Dilution Factor: 1	08/06-08/09/01	EHHRK1EN
Nickel	98	(80 - 120)	SW846 6010B Dilution Factor: 1	08/06-08/09/01	EHHRK1EP
Zinc	101	(80 - 120)	SW846 6010B Dilution Factor: 1	08/06-08/09/01	EHHRK1EQ
Mercury	84	(70 - 118)	SW846 7470A Dilution Factor: 1	08/06-08/07/01	EHHRK1ER

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LABORATORY CONTROL SAMPLE EVALUATION REPORT

DISSOLVED Metals

Client Lot #...: A1H020245 **Matrix.....:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Silver	110	(80 - 120)	SW846 6010B	08/06-08/09/01	EHHRK1ET
		Dilution Factor: 1			
Arsenic	101	(80 - 120)	SW846 6010B	08/06-08/09/01	EHHRK1EU
		Dilution Factor: 1			
Cadmium	99	(80 - 120)	SW846 6010B	08/06-08/09/01	EHHRK1EV
		Dilution Factor: 1			
Chromium	98	(80 - 120)	SW846 6010B	08/06-08/09/01	EHHRK1EW
		Dilution Factor: 1			
Lead	99	(80 - 120)	SW846 6010B	08/06-08/09/01	EHHRK1EX
		Dilution Factor: 1			
Selenium	105	(80 - 120)	SW846 6010B	08/06-08/09/01	EHHRK1E0
		Dilution Factor: 1			
Thallium	100	(80 - 120)	SW846 6010B	08/06-08/09/01	EHHRK1E1
		Dilution Factor: 1			
Vanadium	98	(80 - 120)	SW846 6010B	08/06-08/09/01	EHHRK1E2
		Dilution Factor: 1			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Lot-Sample #...: A1H020245 **Matrix.....:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Bromide		WO#:EHF4M1AC-LCS/EHF4M1AD-LCSD			LCS Lot-Sample#: A1H030000-219		
	96	(90 - 110)			MCAWW 300.0A	08/02/01	1215219
	96	(90 - 110)	0.20	(0-20)	MCAWW 300.0A	08/02/01	1215219
		Dilution Factor: 1					
Fluoride		WO#:EHF271AC-LCS/EHF271AD-LCSD			LCS Lot-Sample#: A1H030000-221		
	96	(90 - 110)			MCAWW 300.0A	08/02/01	1215221
	96	(90 - 110)	0.0	(0-20)	MCAWW 300.0A	08/02/01	1215221
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: A1H020245 **Matrix.....:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Chloride		Work Order #: EHF3P1AC LCS Lot-Sample#: A1H030000-220			
	94	(90 - 110)	MCAWW 300.0A	08/02/01	1215220
		Dilution Factor: 1			
Nitrate		Work Order #: EHF4N1AC LCS Lot-Sample#: A1H030000-223			
	97	(90 - 110)	MCAWW 300.0A	08/02/01	1215223
		Dilution Factor: 1			
Sulfate		Work Order #: EHF4T1AC LCS Lot-Sample#: A1H030000-224			
	100	(90 - 110)	MCAWW 300.0A	08/02/01	1215224
		Dilution Factor: 1			
Total phosphorus		Work Order #: EHKRW1AC LCS Lot-Sample#: A1H070000-373			
	94	(53 - 134)	MCAWW 365.2	08/07/01	1219373
		Dilution Factor: 1			
Total Alkalinity		Work Order #: EH7Q01AC LCS Lot-Sample#: A1H170000-495			
	102	(90 - 127)	MCAWW 310.1	08/16/01	1229495
		Dilution Factor: 1			
Total Alkalinity		Work Order #: EJMRE1AC LCS Lot-Sample#: A1H280000-129			
	102	(90 - 127)	MCAWW 310.1	08/24/01	1240129
		Dilution Factor: 1			
Total Dissolved Solids		Work Order #: EJAX21AC LCS Lot-Sample#: A1H170000-172			
	101	(69 - 120)	MCAWW 160.1	08/16-08/20/01	1229172
		Dilution Factor: 1			
Total Organic Carbon		Work Order #: EH8N61AC LCS Lot-Sample#: A1H200000-204			
	95	(88 - 115)	MCAWW 415.1	08/17/01	1232204
		Dilution Factor: 1			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

DISSOLVED Metals

Client Lot #...: A1H020245 **Matrix.....:** WATER
Date Sampled...: 08/02/01 14:40 **Date Received..:** 08/03/01

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: A1H030197-003 **Prep Batch #...:** 1218124							
Boron	100	(75 - 125)			SW846 6010B	08/06-08/09/01	EHF551EU
	99	(75 - 125)	1.3	(0-20)	SW846 6010B	08/06-08/09/01	EHF551EV
		Dilution Factor: 1					
Thallium	99	(75 - 125)			SW846 6010B	08/06-08/09/01	EHF551EX
	98	(75 - 125)	0.78	(0-20)	SW846 6010B	08/06-08/09/01	EHF551E0
		Dilution Factor: 1					
Vanadium	98	(75 - 125)			SW846 6010B	08/06-08/09/01	EHF551E2
	97	(75 - 125)	0.87	(0-20)	SW846 6010B	08/06-08/09/01	EHF551E3
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: A1H020245 **Matrix.....:** WATER
Date Sampled...: 08/15/01 10:00 **Date Received..:** 08/16/01

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Chloride		WO#: EHC031GQ-MS/EHC031GR-MSD				MS Lot-Sample #: A1H020152-001	
	94	(56 - 137)			MCAWW 300.0A	08/02/01	1215220
	93	(56 - 137)	0.86	(0-20)	MCAWW 300.0A	08/02/01	1215220
		Dilution Factor: 2					
Nitrate		WO#: EHC031GU-MS/EHC031GV-MSD				MS Lot-Sample #: A1H020152-001	
	101	(47 - 154)			MCAWW 300.0A	08/02/01	1215223
	100	(47 - 154)	1.6	(0-30)	MCAWW 300.0A	08/02/01	1215223
		Dilution Factor: 2					
Sulfate		WO#: EHC031G2-MS/EHC031G3-MSD				MS Lot-Sample #: A1H020152-001	
	94	(38 - 155)			MCAWW 300.0A	08/02/01	1215224
	91	(38 - 155)	1.0	(0-20)	MCAWW 300.0A	08/02/01	1215224
		Dilution Factor: 2					
Total phosphorus		WO#: EHD761AQ-MS/EHD761AR-MSD				MS Lot-Sample #: A1H020246-001	
	33	(10 - 156)			MCAWW 365.2	08/07/01	1219373
	147	(10 - 156)	6.7	(0-26)	MCAWW 365.2	08/07/01	1219373
		Dilution Factor: 1					
Total Alkalinity		WO#: EH4101AM-MS/EH4101AN-MSD				MS Lot-Sample #: A1H160194-007	
	23	(10 - 160)			MCAWW 310.1	08/16/01	1229495
	19	(10 - 160)	19	(0-24)	MCAWW 310.1	08/16/01	1229495
		Dilution Factor: 1					
Total Organic Carbon		WO#: EH4101AU-MS/EH4101AV-MSD				MS Lot-Sample #: A1H160194-007	
	89	(72 - 136)			MCAWW 415.1	08/17/01	1232204
	89	(72 - 136)	0.86	(0-20)	MCAWW 415.1	08/17/01	1232204
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: A1H160194 **Matrix.....:** WG
Date Sampled...: 08/15/01 10:00 **Date Received..:** 08/16/01

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Chloride		WO#: EH4101AC-MS/EH4101AD-MSD MS Lot-Sample #: A1H160194-007					
	82	(56 - 137)			MCAWW 300.0A	08/17/01	1232422
	69	(56 - 137)	0.96	(0-20)	MCAWW 300.0A	08/17/01	1232422
		Dilution Factor: 10					
					Instrument ID..: NO INST	Analyst ID.....: 002509	
Nitrate		WO#: EH4101AF-MS/EH4101AG-MSD MS Lot-Sample #: A1H160194-007					
	103	(47 - 154)			MCAWW 300.0A	08/16/01	1229149
	106	(47 - 154)	3.4	(0-30)	MCAWW 300.0A	08/16/01	1229149
		Dilution Factor: 1					
					Instrument ID..: NO INST	Analyst ID.....: 002509	
Sulfate		WO#: EH4101AJ-MS/EH4101AK-MSD MS Lot-Sample #: A1H160194-007					
	42	(38 - 155)			MCAWW 300.0A	08/17/01	1232423
	18	(38 - 155)	1.5	(0-20)	MCAWW 300.0A	08/17/01	1232423
		Dilution Factor: 10					
					Instrument ID..: NO INST	Analyst ID.....: 002509	
Total Alkalinity		WO#: EH4101AM-MS/EH4101AN-MSD MS Lot-Sample #: A1H160194-007					
	23	(10 - 160)			MCAWW 310.1	08/16/01	1229495
	19	(10 - 160)	19	(0-24)	MCAWW 310.1	08/16/01	1229495
		Dilution Factor: 1					
					Instrument ID..: NO INST	Analyst ID.....: 000012	
Total Organic Carbon		WO#: EH4101AU-MS/EH4101AV-MSD MS Lot-Sample #: A1H160194-007					
	89	(72 - 136)			MCAWW 415.1	08/17/01	1232204
	89	(72 - 136)	0.86	(0-20)	MCAWW 415.1	08/17/01	1232204
		Dilution Factor: 1					
					Instrument ID..: NO INST	Analyst ID.....: 000014	
Total Sulfide		WO#: EH4101AQ-MS/EH4101AR-MSD MS Lot-Sample #: A1H160194-007					
	96	(72 - 110)			MCAWW 376.1	08/20/01	1233564
	97	(72 - 110)	0.79	(0-20)	MCAWW 376.1	08/20/01	1233564
		Dilution Factor: 1					
					Instrument ID..: NO INST	Analyst ID.....: 000012	

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: A1H020245 **Work Order #...:** EHD5N-SMP EHD5N-DUP **Matrix.....:** WG

Date Sampled...: 08/01/01 14:20 **Date Received..:** 08/02/01

% Moisture.....: **Dilution Factor:** **Initial Wgt/Vol:**

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Bicarbonate Alkalinity						SD Lot-Sample #: A1H020245-003		
	73	73	mg/L	0.47	(0-20)	MCAWW 310.1	08/24/01	1239436

Dilution Factor: 1

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: A1H020245 **Work Order #...:** EH0QD-SMP EH0QD-DUP **Matrix.....:** WATER

Date Sampled...: 08/13/01 08:30 **Date Received..:** 08/14/01

% Moisture.....: 100 **Dilution Factor:** **Initial Wgt/Vol:**

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Dissolved Solids						SD Lot-Sample #: H1H140225-001		
	99	94	mg/L	5.2	(0-20)	MCAWW 160.1	08/16-08/20/01	1229172

Dilution Factor: 1

Chain of Custody Record

SEVERN TRENT SERVICES — Severn Trent Laboratories, Inc.

33

STL-4124 (1200)

Client: URS Corp	Project Manager: Margie Ray	Date: 8-1-01	Chain of Custody Number: 076073
Address: 5540 Falmouth St.	Telephone Number (Area Code)/Fax Number: 804/965-9000 / 804-965-9764	Lab Number:	Page 1 of 1
City: Richmond; State: VA; Zip Code: 23230	Site Contact: Margie Ray	Lab Contact: A. Danford	
Project Name and Location (State): Chesapeake GC, Chesapeake, VA	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.: 49498-001			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed	Soil	Containers & Preservatives: Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Special Instructions/ Conditions of Receipt
MW-1 Center	8-1-01	1:00		✓			1	1	1				See attached list for parameters, metals field filtered
MW-2 NE	8-1-01	2:15		✓			1	1	1				
MW-2 NE Dup.	8-1-01	2:20		✓			1	1	1				
MW-3 SE	8-1-01	3:25		✓			1	1	1				

Analysis (Attach list if more space is needed)

Possible Hazard Identification: ☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other Per Quote attached

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: Margie Ray	8-1-01	6:15 pm	1. Received By:	8-2-01	0930
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with the Sample, CANARY - Returned to Client with Report: PINK - Field Copy

STL North Canton

20216

SEVERN TRENT SERVICES

STL North Canton
4101 Shuffel Drive NW
North Canton, OH 44720-6961

Tel: 330 497 9396
Fax: 330 497 0772
www.stl-inc.com

ANALYTICAL REPORT

PROJECT NO. 49498-001

CHESAPEAKE GOLF COURSE, VA

Lot #: A1G270273

MARGIE RAY

URS
5540 Faimouth Street
Suite 201
Richmond, VA 23230

SEVERN TRENT LABORATORIES, INC.

Alesia M. Danford
Project Manager

August 20, 2001

CASE NARRATIVE
A1G270273

The following report contains the analytical results for five solid samples submitted to STL North Canton by URS from the Chesapeake Golf Course, VA site, project number 49-49498-001. The samples were received July 27, 2001, according to documented sample acceptance procedures.

The pH analysis was requested by Margie Ray on August 16, 2001.

STL North Canton utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the analytical methods summary page in accordance with the methods indicated. Preliminary results were provided to Margie Ray on August 10, 13 and 17, 2001.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperature of the cooler upon sample receipt was 11.7° C. The samples were received with wet ice present.

See STL's Cooler Receipt Form for additional information.

METALS

Serial dilution of a sample in this lot indicates that physical and chemical interferences were present. Refer to the sample report pages for the affected analytes.

GENERAL CHEMISTRY

Some samples had elevated reporting limits due to matrix interferences or dilution.

STL Cooler Receipt Form/Narrative
North Canton Facility

Client: URS Corp Project: Quote#: 4324
Cooler Received on 7/27/01 Chesapeake Golf Course Opened on: 7/27/01 by: Anne Sanders (Signature)
Fedx ☑ Client Drop Off ☐ UPS ☐ Airborne ☐
Other:
Cooler ☐ Safe ☐ Foam Box ☑ Client Cooler ☐ Other:
STL Shipper No#:

1. Were custody seals on the outside of the cooler and intact? Yes ☐ No ☑
   If YES, Quantity Location
   Were the custody seals signed and dated? Yes ☐ No ☐ NA ☑
2. Shipper's packing slip attached to this form? Yes ☑ No ☐
3. Were custody papers included inside the cooler and relinquished? Yes ☑ No ☐
4. Did you sign the custody papers in the appropriate place? Yes ☑ No ☐
5. Packing material used:
   Peanuts ☐ Bubble Wrap ☑ Vermiculite ☐ Foam ☐ None ☐ Other :
6. Cooler temperature upon receipt 11.7 °C (see back of form for multiple coolers/temp)
   METHOD: Temperature Vial ☑ Between Coolant & Sample Container ☐ Against Bottles ☐
   COOLANT: Wet Ice ☑ Blue Ice ☐ Dry Ice ☐ Water ☐ None ☐
7. Were all the bottles sealed in separate plastic bags? Yes ☐ No ☑
8. Did all bottles arrive in good condition (Unbroken)? Yes ☑ No ☐
9. Did all bottle labels and tags agree with the custody papers? Yes ☐ No ☑
10. Were samples at the correct pH? Yes ☐ No ☐ NA ☑
11. Were correct bottles used for the tests indicated? Yes ☑ No ☐
12. Were air bubbles >6 mm in any VOA vials? Yes ☐ No ☐ NA ☑
13. Was a sufficient amount of sample sent in each bottle? Yes ☑ No ☐

Contacted PM DJP Date: 7/27 by: via Voice Mail ☐ Verbal ☐ Other ☑
Concerning: SR1B, high temp

√		MACRO	MACRO
	1. CHAIN OF CUSTODY		
	SR1A	Samples were received under proper custody procedures and without discrepancies.	
✓	SR1B	The chain of custody and sample bottles did not agree. The following discrepancies occurred: did not receive BI dup 20-22 7/24/01 1:43 Received BIA 20-22 7/24/01 @ 142 > not on coc will log. BIA 20-22 7/24/01 @ 142 DUP	7/27
	2. SAMPLE CONDITION		
	SR2A	Sample(s) were received or requested after the recommended holding time had expired.	
	SR2B	Sample(s) were received with insufficient volume	
	SR2C	Sample(s) were received in a broken container.	
	3. SAMPLE PRESERVATION		
	SR3A	Sample(s) were further preserved in sample receiving to meet recommended pH level(s).	
	SR3B	Sample(s) were received with bubble > 6 mm in diameter (cc: PM)	
	4. NCM		
	SR4A	NCM has been generated. Refer to Clouseau for details	IDs logged per bottles
	5. Other Anomalies (see below or back)		

Temp vial not near ICE

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

STL North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. STL North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed below.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

- *for analyses run on TJA Trace ICP, ICPMS or GFAA only*

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable. The acceptance criteria do not apply to samples that are diluted for organics if the native sample amount is 4x the concentration of the spike.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepped and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepped and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide, PCB, PAH, and Herbicide methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria.

ANALYTICAL METHODS SUMMARY

A1G270273

PARAMETER	ANALYTICAL METHOD
Bromide	MCAWW 300.0A
Chloride	MCAWW 300.0A
Fluoride	MCAWW 300.0A
Inductively Coupled Plasma (ICP) Metals	SW846 6010B
Mercury in Solid Waste (Manual Cold-Vapor)	SW846 7471A
Nitrate as N	MCAWW 300.0A
Soil and Waste pH	SW846 9045C
Sulfate	MCAWW 300.0A
Total phosphorus	MCAWW 365.2
Total Residue as Percent Solids	MCAWW 160.3 MOD
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010B

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

A1G270273

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
EG375	001	B-1A 20-22	07/24/01	13:4
EG38A	002	B-1A DUP 20-22	07/24/01	13:4
EG38E	003	B-3 20-22	07/25/01	09:5
EG38H	004	B-2 23-25	07/25/01	16:3
EG38L	005	B-1B 0.5-2.5	07/25/01	15:3

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

QUALITY CONTROL SECTION

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: A1G270273 **Matrix.....:** SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: A1G300000-123 **Prep Batch #...:** 1211123						
Aluminum	ND	20.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG5PJ1AK
Barium	ND	20.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG5PJ1AL
Beryllium	ND	0.50 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG5PJ1AM
Boron	ND	20.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG5PJ1AN
Calcium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG5PJ1AP
Copper	ND	2.5 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG5PJ1AQ
Iron	ND	10.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG5PJ1AR
Magnesium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG5PJ1AU
Manganese	ND	1.5 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG5PJ1A0
Nickel	ND	4.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG5PJ1AW
Potassium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG5PJ1AT
Sodium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG5PJ1AV
Zinc	ND	2.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG5PJ1AX
Mercury	ND	0.10 Dilution Factor: 1	mg/kg	SW846 7471A	07/30/01	EG5PJ1A1
Arsenic	ND	1.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG5PJ1AC

(Continued on next page)

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: A1G270273 **Matrix.....:** SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Cadmium	ND	0.20	mg/kg	SW846 6010B	07/30/01	EG5PJ1AD
		Dilution Factor: 1				
Chromium	ND	0.50	mg/kg	SW846 6010B	07/30/01	EG5PJ1AE
		Dilution Factor: 1				
Lead	ND	0.30	mg/kg	SW846 6010B	07/30/01	EG5PJ1AF
		Dilution Factor: 1				
Selenium	ND	0.50	mg/kg	SW846 6010B	07/30/01	EG5PJ1AG
		Dilution Factor: 1				
Silver	ND	0.50	mg/kg	SW846 6010B	07/30/01	EG5PJ1AA
		Dilution Factor: 1				
Thallium	ND	1.0	mg/kg	SW846 6010B	07/30/01	EG5PJ1AH
		Dilution Factor: 1				
Vanadium	ND	5.0	mg/kg	SW846 6010B	07/30/01	EG5PJ1AJ
		Dilution Factor: 1				

MB Lot-Sample #: A1H140000-379 **Prep Batch #...:** 1226379

Aluminum	ND	20.0	mg/kg	SW846 6010B	08/15/01	EH0MT1AE
		Dilution Factor: 1				
Arsenic	ND	1.0	mg/kg	SW846 6010B	08/15/01	EH0MT1AA
		Dilution Factor: 1				
Chromium	ND	0.50	mg/kg	SW846 6010B	08/15/01	EH0MT1AC
		Dilution Factor: 1				
Iron	ND	10.0	mg/kg	SW846 6010B	08/15/01	EH0MT1AF
		Dilution Factor: 1				
Lead	ND	0.30	mg/kg	SW846 6010B	08/15/01	EH0MT1AD
		Dilution Factor: 1				
Manganese	ND	1.5	mg/kg	SW846 6010B	08/15/01	EH0MT1AH
		Dilution Factor: 1				
Zinc	ND	2.0	mg/kg	SW846 6010B	08/15/01	EH0MT1AG
		Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

Client Lot #...: A1G270273 **Matrix.....:** SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Bromide		Work Order #: EHRCV1AA		MB Lot-Sample #:	A1H090000-192	
	ND	5.0	mg/kg	MCAWW 300.0A	08/08/01	1221192
		Dilution Factor: 1				
Chloride		Work Order #: EHRCX1AA		MB Lot-Sample #:	A1H090000-193	
	ND	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221193
		Dilution Factor: 1				
Fluoride		Work Order #: EHQ8L1AA		MB Lot-Sample #:	A1H090000-194	
	ND	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221194
		Dilution Factor: 1				
Nitrate		Work Order #: EHRCP1AA		MB Lot-Sample #:	A1H090000-195	
	ND	5.0	mg/kg	MCAWW 300.0A	08/08/01	1221195
		Dilution Factor: 1				
Percent Solids		Work Order #: EG66D1AA		MB Lot-Sample #:	A1G300000-397	
	ND	10.0	%	MCAWW 160.3 MOD	07/30-07/31/01	1211397
		Dilution Factor: 1				
Sulfate		Work Order #: EHRC31AA		MB Lot-Sample #:	A1H090000-196	
	ND	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221196
		Dilution Factor: 1				
Total phosphorus		Work Order #: EG9D11AA		MB Lot-Sample #:	A1H010000-168	
	ND	10	mg/kg	MCAWW 365.2	08/02/01	1213168
		Dilution Factor: 1				

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: A1G270273 **Matrix.....:** SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: A1G300000-123 **Prep Batch #...:** 1211123					
Aluminum	96	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1CA
		Dilution Factor: 1			
Barium	90	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1CC
		Dilution Factor: 1			
Beryllium	99	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1CD
		Dilution Factor: 1			
Boron	88	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1CE
		Dilution Factor: 1			
Calcium	96	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1CF
		Dilution Factor: 1			
Copper	91	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1CG
		Dilution Factor: 1			
Iron	100	(73 - 137)	SW846 6010B	07/30/01	EG5PJ1CH
		Dilution Factor: 1			
Potassium	91	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1CJ
		Dilution Factor: 1			
Magnesium	92	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1CK
		Dilution Factor: 1			
Sodium	87	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1CL
		Dilution Factor: 1			
Nickel	89	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1CM
		Dilution Factor: 1			
Zinc	97	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1CN
		Dilution Factor: 1			
Manganese	100	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1CP
		Dilution Factor: 1			
Mercury	107	(52 - 127)	SW846 7471A	07/30/01	EG5PJ1CQ
		Dilution Factor: 1			

(Continued on next page)

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: A1G270273 **Matrix.....:** SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Silver	101	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1A2
		Dilution Factor: 1			
Arsenic	91	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1A3
		Dilution Factor: 1			
Cadmium	95	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1A4
		Dilution Factor: 1			
Chromium	94	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1A5
		Dilution Factor: 1			
Lead	93	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1A6
		Dilution Factor: 1			
Selenium	92	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1A7
		Dilution Factor: 1			
Thallium	92	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1A8
		Dilution Factor: 1			
Vanadium	92	(80 - 120)	SW846 6010B	07/30/01	EG5PJ1A9
		Dilution Factor: 1			
LCS Lot-Sample#: A1H140000-379 **Prep Batch #...:** 1226379					
Arsenic	89	(80 - 120)	SW846 6010B	08/15/01	EH0MT1AJ
		Dilution Factor: 1			
Chromium	91	(80 - 120)	SW846 6010B	08/15/01	EH0MT1AK
		Dilution Factor: 1			
Lead	91	(80 - 120)	SW846 6010B	08/15/01	EH0MT1AL
		Dilution Factor: 1			
Aluminum	96	(80 - 120)	SW846 6010B	08/15/01	EH0MT1AM
		Dilution Factor: 1			
Iron	101	(73 - 137)	SW846 6010B	08/15/01	EH0MT1AN
		Dilution Factor: 1			
Zinc	95	(80 - 120)	SW846 6010B	08/15/01	EH0MT1AP
		Dilution Factor: 1			

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LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: A1G270273 **Matrix.....:** SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Manganese	92	(80 - 120)	SW846 6010B	08/15/01	EH0MT1AQ

Dilution Factor: 1

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Lot-Sample #...: A1G270273 **Matrix.....:** SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Bromide		WO#:EHRCV1AC-LCS/EHRCV1AD-LCSD LCS Lot-Sample#: A1H090000-192					
	96	(90 - 110)			MCAWW 300.0A	08/08/01	1221192
	96	(90 - 110)	0.0	(0-20)	MCAWW 300.0A	08/08/01	1221192
		Dilution Factor: 1					
Chloride		WO#:EHRCX1AC-LCS/EHRCX1AD-LCSD LCS Lot-Sample#: A1H090000-193					
	93	(90 - 110)			MCAWW 300.0A	08/08/01	1221193
	93	(90 - 110)	0.15	(0-20)	MCAWW 300.0A	08/08/01	1221193
		Dilution Factor: 1					
Fluoride		WO#:EHQ8L1AC-LCS/EHQ8L1AD-LCSD LCS Lot-Sample#: A1H090000-194					
	94	(89 - 112)			MCAWW 300.0A	08/08/01	1221194
	94	(89 - 112)	0.85	(0-21)	MCAWW 300.0A	08/08/01	1221194
		Dilution Factor: 1					
Nitrate		WO#:EHRCP1AC-LCS/EHRCP1AD-LCSD LCS Lot-Sample#: A1H090000-195					
	96	(90 - 112)			MCAWW 300.0A	08/08/01	1221195
	96	(90 - 112)	0.83	(0-20)	MCAWW 300.0A	08/08/01	1221195
		Dilution Factor: 1					
Sulfate		WO#:EHRC31AC-LCS/EHRC31AD-LCSD LCS Lot-Sample#: A1H090000-196					
	93	(90 - 110)			MCAWW 300.0A	08/08/01	1221196
	94	(90 - 110)	0.21	(0-20)	MCAWW 300.0A	08/08/01	1221196
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: A1G270273 **Matrix.....:** SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH (solid)		Work Order #: EH5W21AA	LCS Lot-Sample#: A1H160000-560		
	100	(97 - 103)	SW846 9045C	08/16/01	1228560
		Dilution Factor: 1			
Total phosphorus		Work Order #: EG9D11AC	LCS Lot-Sample#: A1H010000-168		
	88	(75 - 125)	MCAWW 365.2	08/02/01	1213168
		Dilution Factor: 1			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: A1G270273 **Matrix.....:** SO
Date Sampled...: 07/24/01 13:42 **Date Received..:** 07/27/01

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: A1G270273-001 **Prep Batch #...:** 1211123							
Barium	90	(75 - 125)			SW846 6010B	07/30/01	EG3751CV
	95	(75 - 125)	5.5	(0-20)	SW846 6010B	07/30/01	EG3751CW
		Dilution Factor: 1					
Beryllium	98	(75 - 125)			SW846 6010B	07/30/01	EG3751CX
	104	(75 - 125)	5.9	(0-20)	SW846 6010B	07/30/01	EG3751C0
		Dilution Factor: 1					
Boron	87	(75 - 125)			SW846 6010B	07/30/01	EG3751C1
	92	(75 - 125)	5.9	(0-20)	SW846 6010B	07/30/01	EG3751C2
		Dilution Factor: 1					
Calcium	94	(75 - 125)			SW846 6010B	07/30/01	EG3751C3
	100	(75 - 125)	6.1	(0-20)	SW846 6010B	07/30/01	EG3751C4
		Dilution Factor: 1					
Copper	89	(75 - 125)			SW846 6010B	07/30/01	EG3751C5
	95	(75 - 125)	6.4	(0-20)	SW846 6010B	07/30/01	EG3751C6
		Dilution Factor: 1					
Magnesium	92	(75 - 125)			SW846 6010B	07/30/01	EG3751DC
	98	(75 - 125)	5.9	(0-20)	SW846 6010B	07/30/01	EG3751DD
		Dilution Factor: 1					
Nickel	88	(75 - 125)			SW846 6010B	07/30/01	EG3751DG
	93	(75 - 125)	5.3	(0-20)	SW846 6010B	07/30/01	EG3751DH
		Dilution Factor: 1					
Potassium	88	(75 - 125)			SW846 6010B	07/30/01	EG3751C9
	93	(75 - 125)	5.6	(0-20)	SW846 6010B	07/30/01	EG3751DA
		Dilution Factor: 1					
Sodium	85	(75 - 125)			SW846 6010B	07/30/01	EG3751DE
	90	(75 - 125)	6.0	(0-20)	SW846 6010B	07/30/01	EG3751DF
		Dilution Factor: 1					
Mercury	107	(10 - 209)			SW846 7471A	07/30/01	EG3751DN
	108	(10 - 209)	1.0	(0-20)	SW846 7471A	07/30/01	EG3751DP
		Dilution Factor: 1					

(Continued on next page)

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: A1G270273 **Matrix.....:** SO
Date Sampled...: 07/24/01 13:42 **Date Received..:** 07/27/01

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Cadmium	93	(75 - 125)			SW846 6010B	07/30/01	EG3751CE
	99	(75 - 125)	5.8	(0-20)	SW846 6010B	07/30/01	EG3751CF
		Dilution Factor: 1					
Selenium	89	(75 - 125)			SW846 6010B	07/30/01	EG3751CL
	95	(75 - 125)	5.5	(0-20)	SW846 6010B	07/30/01	EG3751CM
		Dilution Factor: 1					
Silver	98	(75 - 125)			SW846 6010B	07/30/01	EG3751A9
	103	(75 - 125)	4.7	(0-20)	SW846 6010B	07/30/01	EG3751CA
		Dilution Factor: 1					
Thallium	90	(75 - 125)			SW846 6010B	07/30/01	EG3751CN
	95	(75 - 125)	5.6	(0-20)	SW846 6010B	07/30/01	EG3751CP
		Dilution Factor: 1					
Vanadium	91	(75 - 125)			SW846 6010B	07/30/01	EG3751CQ
	96	(75 - 125)	5.7	(0-20)	SW846 6010B	07/30/01	EG3751CR
		Dilution Factor: 1					
MS Lot-Sample #: A1G270273-001 **Prep Batch #...:** 1226379							
Aluminum	308 N	(75 - 125)			SW846 6010B	08/15/01	EG3751EK
	299 N	(75 - 125)	1.9	(0-20)	SW846 6010B	08/15/01	EG3751EL
		Dilution Factor: 1					
Arsenic	89	(75 - 125)			SW846 6010B	08/15/01	EG3751ED
	91	(75 - 125)	1.9	(0-20)	SW846 6010B	08/15/01	EG3751EE
		Dilution Factor: 1					
Chromium	92	(75 - 125)			SW846 6010B	08/15/01	EG3751EF
	94	(75 - 125)	1.8	(0-20)	SW846 6010B	08/15/01	EG3751EG
		Dilution Factor: 1					
Iron	NC,MSB	(75 - 125)			SW846 6010B	08/15/01	EG3751EM
	NC,MSB	(75 - 125)		(0-20)	SW846 6010B	08/15/01	EG3751EN
		Dilution Factor: 1					
Lead	91	(75 - 125)			SW846 6010B	08/15/01	EG3751EH
	92	(75 - 125)	1.5	(0-20)	SW846 6010B	08/15/01	EG3751EJ
		Dilution Factor: 1					

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MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: A1G270273 **Matrix.....:** SO
Date Sampled...: 07/24/01 13:42 **Date Received..:** 07/27/01

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Manganese	93	(75 - 125)			SW846 6010B	08/15/01	EG3751ER
	93	(75 - 125)	0.25	(0-20)	SW846 6010B	08/15/01	EG3751ET
		Dilution Factor: 1					
Zinc	93	(75 - 125)			SW846 6010B	08/15/01	EG3751EP
	95	(75 - 125)	2.4	(0-20)	SW846 6010B	08/15/01	EG3751EQ
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

N Spiked analyte recovery is outside stated control limits.

NC The recovery and/or RPD were not calculated.

MSB The recovery and RPD were not calculated because the sample amount was greater than four times the spike amount.

MATRIX SPIKE SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: A1G270273 **Matrix.....:** SOLID
Date Sampled...: 07/27/01 09:00 **Date Received..:** 07/28/01

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total phosphorus		WO#: EG5141EH-MS/EG5141EJ-MSD				MS Lot-Sample #: A1G300119-001	
	146 N	(75 - 125)			MCAWW 365.2	08/02/01	1213168
	17 N,*	(75 - 125)	30	(0-20)	MCAWW 365.2	08/02/01	1213168
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

N Spiked analyte recovery is outside stated control limits.

Results and reporting limits have been adjusted for dry weight.

* Relative percent difference (RPD) is outside stated control limits.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: A1G270273 **Work Order #...:** EG3MM-SMP EG3MM-DUP **Matrix.....:** SOLID

Date Sampled...: 07/26/01 16:25 **Date Received..:** 07/27/01

% Moisture.....: 14

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Percent Solids						SD Lot-Sample #: A1G270175-018		
	86.5	89.9	%	3.9	(0-20)	MCAWW 160.3 MOD	07/30-07/31/01	121139

Dilution Factor: 1

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: A1G270273 **Work Order #...:** EG375-SMP EG375-DUP **Matrix.....:** SO

Date Sampled...: 07/24/01 13:42 **Date Received..:** 07/27/01

% Moisture.....: 21

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Percent Solids						SD Lot-Sample #: A1G270273-001		
	79.3	79.8	%	0.59	(0-20)	MCAWW 160.3 MOD	07/30-07/31/01	121139

Dilution Factor: 1

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: A1G270273 **Work Order #...:** EG38A-SMP **Matrix.....:** SO
EG38A-DUP
Date Sampled...: 07/24/01 13:42 **Date Received..:** 07/27/01
% Moisture.....: 18

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH (solid)						SD Lot-Sample #: A1G270273-002		
	5.1	5.1	No Units	0.20	(0-20)	SW846 9045C	08/16/01	122856(

Dilution Factor: 1

Chain of Custody Record

SEVERN TRENT SERVICES — Severn Trent Laboratories, Inc.

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STL-4124 (1200)

Client	Project Manager	Date	Chain of Custody Number
URS Corp.	Margie Ray	7-26-01	076072
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 1**
5540 Falmouth St Suite 201	804/965-9000 804/965-9764		
City / State / Zip Code	**Site Contact**	**Lab Contact**	**Analysis (Attach list if more space is needed)**
Richmond / VA / 23230	Margie Ray	A. Danford	
Project Name and Location (State)	**Carrier/Waybill Number**		
Chesapeake Golf Course, VA			
Contract/Purchase Order/Quote No.			
49498-001			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres	H_2SO_4	HNOS	HCl	NaOH	ZnAc/NaOH	Special Instructions/ Conditions of Receipt
B-1 20-22	7/24/01	1:42				✓	✓						see attached for parametos (methodology per STL quote - also attached)
B-1 Dup 20-22	7/24/01	1:43				✓	✓						
B-3 20-22	7/25/01	9:50				✓	✓						
B-2 23-25	7/25/01	4:36				✓	✓						
B-1B 0.5-2.5	7/25/01	3:30				✓	✓						

Possible Hazard Identification
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other Standard

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: Margie W. Ray	7-26-01	4:00	1. Received By: Ann Sanders	7/27/01	940
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

20241

STL North Canton

URS

Client Sample ID: B-1A 20-22

TOTAL Metals

Lot-Sample #...: A1G270273-001 **Matrix.....:** SO
Date Sampled...: 07/24/01 13:42 **Date Received..:** 07/27/01
% Moisture.....: 21

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1211123						
Barium	ND	20.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG3751AU
Beryllium	ND	0.50 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG3751AV
Boron	ND	20.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG3751AW
Calcium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG3751AX
Copper	ND	2.5 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG3751A0
Potassium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG3751A2
Magnesium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG3751A3
Sodium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG3751A4
Nickel	ND	4.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG3751A5
Mercury	ND	0.10 Dilution Factor: 1	mg/kg	SW846 7471A	07/30/01	EG3751A8
Silver	ND	0.50 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG3751AJ
Cadmium	ND	0.20 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG3751AL
Selenium	ND	0.50 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG3751AP
Thallium	ND	1.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30/01	EG3751AQ

(Continued on next page)

URS

Client Sample ID: B-1A 20-22

TOTAL Metals

Lot-Sample #...: A1G270273-001 Matrix.....: SO

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Vanadium	ND	5.0	mg/kg	SW846 6010B	07/30/01	EG3751AR
		Dilution Factor: 1				
Prep Batch #...: 1226379						
Aluminum	337	20.0	mg/kg	SW846 6010B	08/15/01	EG3752AT
		Dilution Factor: 1				
Arsenic	1.7	1.0	mg/kg	SW846 6010B	08/15/01	EG3752AK
		Dilution Factor: 1				
Chromium	1.3	0.50	mg/kg	SW846 6010B	08/15/01	EG3752AM
		Dilution Factor: 1				
Iron	1640	10.0	mg/kg	SW846 6010B	08/15/01	EG3752A1
		Dilution Factor: 1				
Manganese	12.8	1.5	mg/kg	SW846 6010B	08/15/01	EG3752A7
		Dilution Factor: 1				
Lead	0.69	0.30	mg/kg	SW846 6010B	08/15/01	EG3752AN
		Dilution Factor: 1				
Zinc	2.9	2.0	mg/kg	SW846 6010B	08/15/01	EG3752A6
		Dilution Factor: 1				

URS

Client Sample ID: B-1A 20-22

General Chemistry

Lot-Sample #...: A1G270273-001 Work Order #...: EG375 Matrix.....: SO
Date Sampled...: 07/24/01 13:42 Date Received..: 07/27/01
% Moisture.....: 21

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH (solid)	**5.1**		**No Units**	**SW846 9045C**	**08/16/01**	**1228560**
		Dilution Factor: 1				
Bromide	ND	5.0	mg/kg	MCAWW 300.0A	08/08/01	1221192
		Dilution Factor: 1				
Chloride	**34.5**	**10.0**	**mg/kg**	**MCAWW 300.0A**	**08/08/01**	**1221193**
		Dilution Factor: 1				
Fluoride	ND	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221194
		Dilution Factor: 1				
Nitrate	ND	5.0	mg/kg	MCAWW 300.0A	08/08/01	1221195
		Dilution Factor: 1				
Percent Solids	**79.3**	**10.0**	**%**	**MCAWW 160.3 MOD**	**07/30-07/31/01**	**1211397**
		Dilution Factor: 1				
Sulfate	**42.5**	**10.0**	**mg/kg**	**MCAWW 300.0A**	**08/08/01**	**1221196**
		Dilution Factor: 1				
Total phosphorus	ND	10	mg/kg	MCAWW 365.2	08/02/01	1213168
		Dilution Factor: 1				

URS

Client Sample ID: B-1A DUP 20-22

TOTAL Metals

Lot-Sample #...: A1G270273-002 **Matrix.....:** SO
Date Sampled...: 07/24/01 13:42 **Date Received..:** 07/27/01
% Moisture.....: 18

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1211123						
Barium	ND	20.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38A1A5
Beryllium	ND	0.50 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38A1A6
Boron	ND	20.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38A1A7
Calcium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38A1A8
Copper	ND	2.5 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38A1AA
Potassium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38A1AD
Magnesium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38A1AE
Sodium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38A1AF
Nickel	ND	4.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38A1AG
Zinc	**4.8**	**2.0** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38A1AH**
Mercury	ND	0.10 Dilution Factor: 1	mg/kg	SW846 7471A	07/30/01	EG38A1AK
Silver	ND	0.50 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38A1AU
Cadmium	ND	0.20 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38A1AW
Selenium	ND	0.50 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38A1A1

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URS

Client Sample ID: B-1A DUP 20-22

TOTAL Metals

Lot-Sample #...: A1G270273-002 Matrix.....: SO

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Thallium	ND	1.0	mg/kg	SW846 6010B	07/30-07/31/01	EG38A1A2
		Dilution Factor: 1				
Vanadium	ND	5.0	mg/kg	SW846 6010B	07/30-07/31/01	EG38A1A3
		Dilution Factor: 1				
Prep Batch #...: 1226379						
Aluminum	403	20.0	mg/kg	SW846 6010B	08/15/01	EG38A2A4
		Dilution Factor: 1				
Arsenic	1.9	1.0	mg/kg	SW846 6010B	08/15/01	EG38A2AV
		Dilution Factor: 1				
Chromium	1.5	0.50	mg/kg	SW846 6010B	08/15/01	EG38A2AX
		Dilution Factor: 1				
Iron	1970	10.0	mg/kg	SW846 6010B	08/15/01	EG38A2AC
		Dilution Factor: 1				
Manganese	14.9	1.5	mg/kg	SW846 6010B	08/15/01	EG38A2AJ
		Dilution Factor: 1				
Lead	0.71	0.30	mg/kg	SW846 6010B	08/15/01	EG38A2A0
		Dilution Factor: 1				
Zinc	3.2	2.0	mg/kg	SW846 6010B	08/15/01	EG38A2AH
		Dilution Factor: 1				

URS

Client Sample ID: B-1A DUP 20-22

General Chemistry

Lot-Sample #...: A1G270273-002 Work Order #...: EG38A Matrix.....: SO
Date Sampled...: 07/24/01 13:42 Date Received..: 07/27/01
% Moisture.....: 18

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH (solid)	5.1		No Units	SW846 9045C	08/16/01	1228560
	Dilution Factor: 1					
Bromide	ND	5.0	mg/kg	MCAWW 300.0A	08/08/01	1221192
	Dilution Factor: 1					
Chloride	10.6	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221193
	Dilution Factor: 1					
Fluoride	ND	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221194
	Dilution Factor: 1					
Nitrate	ND	5.0	mg/kg	MCAWW 300.0A	08/08/01	1221195
	Dilution Factor: 1					
Percent Solids	81.7	10.0	%	MCAWW 160.3 MOD	07/30-07/31/01	1211397
	Dilution Factor: 1					
Sulfate	43.0	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221196
	Dilution Factor: 1					
Total phosphorus	ND	10	mg/kg	MCAWW 365.2	08/02/01	1213168
	Dilution Factor: 1					

URS

Client Sample ID: B-3 20-22

TOTAL Metals

Lot-Sample #...: A1G270273-003 **Matrix.....:** SO
Date Sampled...: 07/25/01 09:50 **Date Received..:** 07/27/01
% Moisture.....: 21

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1211123						
Aluminum	**428**	**20.0** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38E1A4**
Barium	ND	20.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38E1A5
Beryllium	ND	0.50 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38E1A6
Boron	ND	20.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38E1A7
Calcium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38E1A8
Copper	ND	2.5 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38E1AA
Iron	**1250**	**10.0** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38E1AC**
Potassium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38E1AD
Magnesium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38E1AE
Manganese	**11.2**	**1.5** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38E1AJ**
Sodium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38E1AF
Nickel	ND	4.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38E1AG
Zinc	**16.6**	**2.0** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38E1AH**
Mercury	ND	0.10 Dilution Factor: 1	mg/kg	SW846 7471A	07/30/01	EG38E1AK

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URS

Client Sample ID: B-3 20-22

TOTAL Metals

Lot-Sample #...: A1G270273-003 Matrix.....: SO

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Silver	ND	0.50	mg/kg	SW846 6010B	07/30-07/31/01	EG38E1AU
		Dilution Factor: 1				
Arsenic	**0.99 B**	**1.0**	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38E1AV**
		Dilution Factor: 1				
Cadmium	ND	0.20	mg/kg	SW846 6010B	07/30-07/31/01	EG38E1AW
		Dilution Factor: 1				
Chromium	**1.6**	**0.50**	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38E1AX**
		Dilution Factor: 1				
Lead	**0.59**	**0.30**	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38E1A0**
		Dilution Factor: 1				
Selenium	ND	0.50	mg/kg	SW846 6010B	07/30-07/31/01	EG38E1A1
		Dilution Factor: 1				
Thallium	ND	1.0	mg/kg	SW846 6010B	07/30-07/31/01	EG38E1A2
		Dilution Factor: 1				
Vanadium	ND	5.0	mg/kg	SW846 6010B	07/30-07/31/01	EG38E1A3
		Dilution Factor: 1				

NOTE(S):

B Estimated result. Result is less than RL.

URS

Client Sample ID: B-3 20-22

General Chemistry

Lot-Sample #...: A1G270273-003 Work Order #...: EG38E Matrix.....: SO
Date Sampled...: 07/25/01 09:50 Date Received..: 07/27/01
% Moisture.....: 21

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH (solid)	6.9		No Units	SW846 9045C	08/16/01	1228560
		Dilution Factor: 1				
Bromide	ND	5.0	mg/kg	MCAWW 300.0A	08/08/01	1221192
		Dilution Factor: 1				
Chloride	21.1	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221193
		Dilution Factor: 1				
Fluoride	ND	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221194
		Dilution Factor: 1				
Nitrate	ND	5.0	mg/kg	MCAWW 300.0A	08/08/01	1221195
		Dilution Factor: 1				
Percent Solids	78.6	10.0	%	MCAWW 160.3 MOD	07/30-07/31/01	1211397
		Dilution Factor: 1				
Sulfate	40.4	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221196
		Dilution Factor: 1				
Total phosphorus	21	10	mg/kg	MCAWW 365.2	08/02/01	1213168
		Dilution Factor: 1				

URS

Client Sample ID: B-2 23-25

TOTAL Metals

Lot-Sample #...: A1G270273-004 **Matrix.....:** SO
Date Sampled...: 07/25/01 16:36 **Date Received..:** 07/27/01
% Moisture.....: 18

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1211123						
Aluminum	**287**	**20.0** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38H1A4**
Barium	ND	20.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38H1A5
Beryllium	ND	0.50 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38H1A6
Boron	ND	20.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38H1A7
Calcium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38H1A8
Copper	ND	2.5 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38H1AA
Iron	**1360**	**10.0** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38H1AC**
Potassium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38H1AD
Magnesium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38H1AE
Manganese	**11.3**	**1.5** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38H1AJ**
Sodium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38H1AF
Nickel	ND	4.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38H1AG
Zinc	**6.8**	**2.0** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38H1AH**
Mercury	ND	0.10 Dilution Factor: 1	mg/kg	SW846 7471A	07/30/01	EG38H1AK

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URS

Client Sample ID: B-2 23-25

TOTAL Metals

Lot-Sample #...: A1G270273-004 Matrix.....: SO

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Silver	ND	0.50 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38H1AU
Arsenic	**0.86 B**	**1.0** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38H1AV**
Cadmium	ND	0.20 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38H1AW
Chromium	**1.5**	**0.50** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38H1AX**
Lead	**0.48**	**0.30** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38H1A0**
Selenium	ND	0.50 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38H1A1
Thallium	ND	1.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38H1A2
Vanadium	ND	5.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38H1A3

NOTE(S):

B Estimated result. Result is less than RL.

URS

Client Sample ID: B-2 23-25

General Chemistry

Lot-Sample #...: A1G270273-004 Work Order #...: EG38H Matrix.....: SO
Date Sampled...: 07/25/01 16:36 Date Received..: 07/27/01
% Moisture.....: 18

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH (solid)	4.5		No Units	SW846 9045C	08/16/01	1228560
	Dilution Factor: 1					
Bromide	ND	5.0	mg/kg	MCAWW 300.0A	08/08/01	1221192
	Dilution Factor: 1					
Chloride	27.3	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221193
	Dilution Factor: 1					
Fluoride	ND	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221194
	Dilution Factor: 1					
Nitrate	ND	5.0	mg/kg	MCAWW 300.0A	08/08/01	1221195
	Dilution Factor: 1					
Percent Solids	81.8	10.0	%	MCAWW 160.3 MOD	07/30-07/31/01	1211397
	Dilution Factor: 1					
Sulfate	43.4	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221196
	Dilution Factor: 1					
Total phosphorus	ND	10	mg/kg	MCAWW 365.2	08/02/01	1213168
	Dilution Factor: 1					

URS

Client Sample ID: B-1B 0.5-2.5

TOTAL Metals

Lot-Sample #...: A1G270273-005 **Matrix.....:** SO
Date Sampled...: 07/25/01 15:30 **Date Received..:** 07/27/01
% Moisture.....: 20

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1211123						
Aluminum	**6860**	**20.0** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38L1A4**
Barium	**41.7**	**20.0** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38L1A5**
Beryllium	**0.54**	**0.50** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38L1A6**
Boron	ND	20.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38L1A7
Calcium	**1230**	**500** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38L1A8**
Copper	ND	2.5 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38L1AA
Iron	**2800**	**10.0** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38L1AC**
Potassium	ND L	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38L1AD
Magnesium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38L1AE
Manganese	**27.1**	**1.5** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-08/02/01**	**EG38L1AJ**
Sodium	ND	500 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38L1AF
Nickel	ND	4.0 Dilution Factor: 1	mg/kg	SW846 6010B	07/30-07/31/01	EG38L1AG
Zinc	**3.9 L**	**2.0** Dilution Factor: 1	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38L1AH**
Mercury	ND	0.10 Dilution Factor: 1	mg/kg	SW846 7471A	07/30/01	EG38L1AK

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URS

Client Sample ID: B-1B 0.5-2.5

TOTAL Metals

Lot-Sample #...: A1G270273-005 Matrix.....: SO

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Silver	ND	0.50	mg/kg	SW846 6010B	07/30-07/31/01	EG38L1AU
		Dilution Factor: 1				
Arsenic	**1.7**	**1.0**	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38L1AV**
		Dilution Factor: 1				
Cadmium	ND	0.20	mg/kg	SW846 6010B	07/30-07/31/01	EG38L1AW
		Dilution Factor: 1				
Chromium	**7.9**	**0.50**	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38L1AX**
		Dilution Factor: 1				
Lead	**5.1**	**0.30**	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38L1A0**
		Dilution Factor: 1				
Selenium	**0.64**	**0.50**	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38L1A1**
		Dilution Factor: 1				
Thallium	ND	1.0	mg/kg	SW846 6010B	07/30-07/31/01	EG38L1A2
		Dilution Factor: 1				
Vanadium	**8.5**	**5.0**	**mg/kg**	**SW846 6010B**	**07/30-07/31/01**	**EG38L1A3**
		Dilution Factor: 1				

NOTE(S):

L Serial dilution of a digestate in the analytical batch indicates that physical and chemical interferences are present.

URS

Client Sample ID: B-1B 0.5-2.5

General Chemistry

Lot-Sample #...: A1G270273-005 Work Order #...: EG38L Matrix.....: SO
Date Sampled...: 07/25/01 15:30 Date Received..: 07/27/01
% Moisture.....: 20

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH (solid)	6.6		No Units	SW846 9045C	08/16/01	1228560
	Dilution Factor: 1					
Bromide	ND	5.0	mg/kg	MCAWW 300.0A	08/08/01	1221192
	Dilution Factor: 1					
Chloride	17.7	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221193
	Dilution Factor: 1					
Fluoride	ND	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221194
	Dilution Factor: 1					
Nitrate	ND	5.0	mg/kg	MCAWW 300.0A	08/08/01	1221195
	Dilution Factor: 1					
Percent Solids	79.5	10.0	%	MCAWW 160.3 MOD	07/30-07/31/01	1211397
	Dilution Factor: 1					
Sulfate	21.7	10.0	mg/kg	MCAWW 300.0A	08/08/01	1221196
	Dilution Factor: 1					
Total phosphorus	120	50	mg/kg	MCAWW 365.2	08/02/01	1213168
	Dilution Factor: 5					