VOLUNTARY REMEDIATION PLAN APPLICATION

Former Imperial Cleaners
1233B Alpharetta Street
Roswell, Fulton County, Georgia

Prepared For:

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1.0 INTRODUCTION

MACTEC Engineering and Consulting, Inc. (MACTEC) has prepared this Voluntary Remediation Plan Application (VRPA) for the Former Imperial Cleaners site (Site). The Site is located within the King's Creek Shopping Center (Shopping Center) property at 1233B Alpharetta Highway in Roswell, Fulton County, Georgia which consists of one building containing several tenants and associated parking areas. The Site is listed on the Hazardous Site Inventory (HSI) as Site No. 10690. A Site Location/Topographic Map is provided as Figure 1.

A Legal Description and Survey Plat are provided in Appendix A, along with a Tax Map showing the Site located within tax parcels 12-1993-0450-063-5 and 12-1993-0450-062-7. Note that the VRPA Site boundary covers a total of 3.935 acres of the northern portion of the shopping center, which is different than the 9.11 acres described in the HSI listing. A Site and Vicinity Aerial Photograph (Figure 2) shows the Shopping Center property and the designated Site boundary as described in the Legal Description.

The subject Site is currently owned by PM, Ltd. with Wright Management, Inc. as the sole general partner. PM Ltd. is a Georgia Limited Partnership. Wright Management, Inc is the sole general partner of PM Ltd. Partnership shares of PM Ltd. are held in two or three trusts which are managed by SunTrust Bank as Trustee. These trusts were established under the will of William Wright for the benefit of his widow, his two children and their descendents. The real estate asset (Kings Creek) is managed out of an Investment Advisory Account of which SunTrust is the investment advisor. Title has been held this way and the property managed this way since PM Ltd. was set up sometime around 1986. The Site meets the criteria of a "qualifying property" as defined by the Act.

On January 5, 2001, the Georgia Environmental Protection Division (EPD) listed the Site on the HSI due to the detection of tetrachloroethene (PCE) in soil and vinyl chloride (VC) in groundwater. PCE, cis-1,2-dichloroethene (cis-1,2-DCE) and trans-1,2-dichloroethene (trans-1,2-DCE) were also found in groundwater. PM, Ltd. has submitted several documents to EPD presenting the results of various investigations to characterize the geologic and hydrogeologic conditions and to assess the presence, concentrations, and limits of releases of constituents to Site soils, groundwater, surface water and indoor air. These include a Compliance Status Report (CSR) and Revised CSR, a Corrective Action Plan (CAP) for Groundwater with subsequent revisions and six Semi-Annual Groundwater Monitoring Reports prepared in accordance with the approved CAP.

The previous reports have summarized the Site history and facility operations, presented the results of all previous Site investigations, and described the horizontal and vertical extent of regulated substances in Site soils and groundwater in relation to risk-reduction standards (RRS). This voluntary remediation plan describes proposed corrective actions consistent with provisions of the Georgia Voluntary Remediation Program Act (the "Act").

This VRPA is submitted with the intention of moving the Site from the Hazardous Sites Response and Remediation Program into the Voluntary Remediation Program and activities under the approved CAP have been suspended pending EPD's review and approval of this VRP application.

Background

Imperial Cleaners was a tenant dry cleaning business located in Suite B, at the northern end of the Shopping Center and operated on Site between 1991 and 2000. Another dry cleaner at the same location operated on Site as early as 1986. In 2000, the dry cleaner operations terminated at the Shopping Center and the dry cleaning machine and related equipment were removed from the building. The dry cleaner was the subject of two environmental assessments conducted by Boykin & Associates (Boykin) in March 1993 and Environmental Corporation of America (ECA) in June and July, 2000. The results of these assessments identified PCE and several of its breakdown products in soil and groundwater on Site, both beneath the building floor slab and outside the building.

Based on the soil and groundwater testing results, on August 15, 2000, PM Ltd. notified the Georgia Environmental Protection Division (GA-EPD), pursuant to Hazardous Site Response Act (HSRA) requirements, of the presence of a release to soil and groundwater at the Shopping Center property.

The property was placed on the HSI on January 5, 2001 as a Class II site, designated as HSI Site Number 10690. Following the listing of the Site on the HSI, LAW Engineering and Environmental Services, Inc. (predecessor by merger to MACTEC) was engaged to conduct additional assessment to delineate the soil and groundwater contamination at the Site. LAW/MACTEC (MACTEC) then prepared a CSR for the subject Site which was submitted to the GA-EPD on behalf of PM Ltd. on August 9, 2002. The CSR was revised on the basis of EPD comments in August 2005.

A Corrective Action Plan (CAP) and a Revised CAP were submitted in 2005 and 2006, respectively. The CAP recommended a program of monitored natural attenuation (MNA) and was approved by EPD on January 11, 2007. Since that time, quarterly monitoring of groundwater and surface water have been reported semi-annually by MACTEC. This work has also included additional sampling and testing of soils and four indoor air monitoring events to further investigate potential source areas and the potential for vapor intrusion into the building.

2.0 SITE SETTING

Understanding the site setting is important in evaluating the fate and transport of contaminants in the subsurface.

2.1 SITE SPECIFIC GEOLOGY

The property is located in the Piedmont Geologic Region of the Appalachian Province in an area underlain by late Precambrian to early Paleozoic bedrock of the Powers Ferry Formation which is part of the Sandy Springs Group (McConnell and Abrams, 1984). The Powers Ferry Formation in the area of the Site is mapped as consisting of gneiss, mica schist and amphibolite. The residual soils present in this geologic area have been formed by the in-place chemical and physical weathering of the parent rock types. Weathering is facilitated by fractures, joints, and by the presence of less resistant rock types. The typical residual soil profile consists of clayey soils near the ground surface, transitioning to sandy silts and silty sands that generally become harder with depth to the top of parent rock.

The subject property is located within a south-trending stream valley, typical of the surrounding area. This valley is occupied by Hog Wallow Creek which forms the eastern boundary of the Site.

The original topography of the Site sloped east toward Hog Wallow Creek. During construction of the Shopping Center, the western portion of the property was cut into the slope and the eastern portion was filled to level the ground surface. The depth to bedrock and the thickness of the overlying material (either fill material, alluvial sediment or residual soil) varies significantly at the Site, depending on the depth of fill and the proximity to the valley bottom (see boring logs in Appendix E and Figures 3 through 6). Rock is exposed within the creek bed of Hog Wallow Creek and was found at a maximum depth of approximately 37 feet in MW-3.

The soil test borings generally encountered a significant amount of fill soil which consisted of silty fine to medium sand with small rock fragments (see Boring Logs in Appendix E for soil descriptions). Undisturbed virgin soils, including both alluvial sediments and residual soils, were encountered at depths ranging from less than one foot to 24 feet. The presence of deep fill behind (east of) the shopping center building is consistent with filling this area during Site development, above the flood plain of Hog Wallow Creek, located near the eastern corner of the shopping center. MW-8, installed in the western portion of

the Shopping Center, did not encounter fill material as this area of the property had been cut into the original ground slope. Immediately beyond the Shopping Center's rear driveway, the land surface drops off sharply to Hog Wallow Creek or the creek's flood plain. A thin layer of alluvium was also encountered in several borings in the eastern portion of the Site. This alluvium is believed to be associated with the flood plain of Hog Wallow Creek, a portion of which has been covered by fill soil. Because of the substantial clay content of the alluvial soils, the hydraulic conductivity of such soils is expected to be lower than that of the residual soils or fill material.

Partially weathered rock was encountered at depths ranging from 10 to 25 feet below ground surface in the area near the building. The partially weathered rock was generally characterized as silty fine to coarse sand which exhibited standard penetration resistances of greater than 100 blows per foot. Bedrock is distinguished from the overlying partially weathered rock by its greater density, generally resulting in hollow-stem auger refusal. The contact between the bedrock and the overlying partially weathered rock is gradational and was selected as the depth of auger refusal. The rock/partially weathered rock contact, as defined by auger refusal, was encountered in several borings installed by MACTEC at depths ranging up to 37 feet below ground surface. The depth to rock was shallowest in the western portion of the Site, where cuts had been made in the original ground slope and deepest in the eastern portion of the Site where significant filling had occurred.

The rock/partially weathered rock contact occurred at the highest elevation in the northern portion of the Site, near MW-6, and at the lowest elevation in the eastern portion of the Site, in the vicinity of Hog Wallow Creek. The rock elevation data indicates a general downward sloping of the rock surface from west to east, toward the creek, paralleling the original topography.. Rock outcroppings form the creek bottom along the stretch of creek behind the former dry cleaner space.

Rock core samples obtained from monitoring well MW-3 indicate that the underlying bedrock on Site consists predominantly of interlayered muscovite-biotite gneiss and hornblende amphibolite (see Appendix E for well logs). The rock obtained from MW-3 tended to alternate between highly weathered amphibolite and lightly weathered gneiss. The rock core recovered during the initial ten-foot coring run consisted primarily of lightly to highly weathered gray, muscovite-biotite gneiss which exhibited numerous fractures. However, the first core run exhibited a recovery of only 30%, indicating that much of the material was too highly weathered to remain intact. The pattern of weathering observed in MW-3 was also evident during the drilling of MW-6, MW-7, MW-13, MW-14 and MW-15 which were extended

into rock using an air hammer. Although core samples were not obtained, substantial variations in the hardness of the rock were noted during air hammer advancement. MW-8 was terminated at auger refusal at a depth of 20 feet. Difficult drilling conditions were noted in the lower 10 feet of this boring as the rock alternated between thin layers of relatively hard rock and thicker layers of softer, more highly weathered material. These wells also required the use of an air hammer to extend the borings to sufficient depth to allow well installation.

Significant fracturing was noted in relatively shallow rock in MW-3. These fractures tended to be small in scale and their orientations were widely distributed. The relatively random distribution of fracture orientations indicates that numerous intersections of fracture planes are likely. The presence of a layer of highly weathered rock and large numbers of randomly oriented fractures with numerous intersections indicates that flow through the rock would likely replicate flow through a porous medium. Under such conditions, it is very unlikely that a preferred flow direction would be established as a result of the rock structure. Therefore, groundwater within the fractured rock is expected to flow in a direction similar to the groundwater above the top of rock.

Because original grain boundaries and pore-space relationships within the rocks of the Atlanta area have been altered through metamorphic recrystallization, the primary permeability of the local bedrock is very low. Groundwater flow through the bedrock aquifer occurs primarily through fractures in the bedrock. Groundwater recharge to fractured bedrock occurs primarily through seepage of precipitation through the overlying mantle of residual material. In parts of the Site, the groundwater table lies beneath the top of rock, which could potentially alter groundwater flow patterns depending on fracture orientation. However, due to the highly fractured nature of the shallow rock, as observed in MW-3, groundwater flow is expected to follow a path similar to that within the soil overburden.

2.2 SITE SPECIFIC HYDROGEOLOGY

Hog Wallow Creek is a tributary of Big Creek, which is located approximately one mile south of the Site. Big Creek enters the Chattahoochee River approximately two miles south of the subject Site.

2.2.1 Hydraulic conductivity

As detailed in the Revised CSR, Slug tests were performed in three wells on Site to evaluate hydraulic conductivity. The three wells were selected on the basis of the type of media in which they were

screened. MW-3 was screened in rock, MW-8 was screened in residual soil/partially weathered rock and MW-9 was screened across the boundaries of fill, alluvium and residuum. The slug tests were performed by lowering a solid "slug" into each well and measuring the recovery rate of the water within the well (slug in). After the water level within the well had stabilized, the slug was removed and the recharge rate was measured (slug out). The hydraulic conductivities calculated from the slug test data are summarized in Table 4.

The slug test results indicate hydraulic conductivities vary at the Site from approximately $9x10^{-5}$ cm/sec in the fill/alluvial soil, 2 to $6x10^{-5}$ cm/sec in the residual soil and 20 to $30x10^{-5}$ cm/sec within the upper portion of the bedrock aquifer.

Based on the groundwater elevation data, the horizontal groundwater gradient within the shallow portion of the aquifer on Site appears to be relatively consistent at approximately 4.0%. This value was utilized for the purpose of calculating the groundwater flow rate.

The hydraulic conductivity values obtained from the slug tests performed at the Site are equivalent to approximately 0.06 to 0.58 ft/day. The deep well, MW-3, exhibited a somewhat higher hydraulic conductivity; however, the difference between this well and MW-8 was relatively minor (less than one order of magnitude). As it appears that the bulk of the groundwater contaminant plume occurs within the zone of fill soil behind the Shopping Center building, the slug-in hydraulic conductivity value measured for MW-9, which was screened primarily in fill and alluvium, was utilized in the calculation of groundwater flow velocity. This hydraulic conductivity (0.27 ft/day) is also between the values exhibited by the strata within the highest (rock) and lowest (residuum) values measured on Site.

Effective porosity was assumed to be 15% (Applied Hydrology, C.W. Fetter, 1994). The formula used to calculate the groundwater flow rate is as follows (Applied Hydrology, C.W. Fetter, 1994):

$$\text{Velocity} = \frac{K\,i}{n_e}$$

where: K = hydraulic conductivity (feet per day) = 0.27 ft/day
i = hydraulic gradient (feet per foot) = 0.04 ft/ft
n_e = effective porosity (unitless) = 0.15

Based on the data input, an estimated groundwater velocity of 0.072 feet/day, or approximately 26 feet/year was calculated. We note, however, that PCE does not migrate at the same rate as groundwater and also is diluted as it migrates. This is evidenced by the substantial drop off in contaminant concentrations in wells located in the vicinity of Hog Wallow Creek, located approximately 100 feet from the suspected source area.

2.2.2 Vertical Hydraulic Gradient

The vertical hydraulic gradient at the Site was calculated by comparing groundwater elevations within the deep well MW-3 and nearby shallow wells. MW-2 and MW-3 are located relatively close to one another (approximately 20 feet apart) and are screened at different depths within the upper aquifer. In July 2005, the relative elevations of the groundwater within each well were measured and determined to be within 0.86 feet of each other. This differential in water table elevation is consistent with the hydraulic gradient measured in the wells screened within the upper aquifer. Given the slope of the potentiometric surface between the two wells, the groundwater elevation measured in MW-3 is consistent with those of the surrounding wells. This indicates that there is little or no vertical gradient in the vicinity of MW-3. MW-7 and DW-1 are located adjacent to one another near the building. Comparison of groundwater elevations from these two wells indicates an upward hydraulic gradient of approximately 0.02 ft/ft. Such conditions are not unexpected in the vicinity of a surface water body such as Hog Wallow Creek, which is shown by the data to act as a groundwater discharge zone.

A stronger upward hydraulic gradient would be expected in the area closer to the creek as the creek acts as a local groundwater discharge area. The lack of a significant downward vertical hydraulic gradient reduces the chance for dissolved contamination to migrate downward through the water column or beyond the creek alignment. This effect is evidenced by the lack of significant levels of PCE or its breakdown constituents within the deep groundwater of MW-3 or DW-1 and the lack of contamination in MW-12 on the opposite side of the creek from the Shopping Center.

2.2.3 Groundwater flow Direction

The monitoring wells were surveyed to determine their elevations relative to the National Geodetic Vertical Datum (NGVD). On March 30, 2010, the depth to groundwater from the top of each well casing was measured by MACTEC in all monitoring wells on Site in conjunction with the most recent quarterly

groundwater monitoring event. The water level data, along with well construction data are tabulated in Table 3. The groundwater depths were used to develop the groundwater elevation contours presented on the attached potentiometric surface map (see Figure 7).

The groundwater elevations and the interpreted flow direction indicate that groundwater flow across the Site is generally eastward on the southern portion of the Shopping Center property. Although minor variations in depth to water and groundwater flow direction have been observed over time, groundwater flow is consistently in an easterly direction toward Hog Wallow Creek. Groundwater in this region typically discharges into creeks or impoundments that lie in topographically low areas and is expected to discharge to Hog Wallow Creek located along the eastern boundary of the Site. No other obvious variations in the local geologic conditions were identified which would be expected to cause changes in the groundwater flow direction in the area.

3.0 REGULATED CONSTITUENTS

The presence of regulated constituents was characterized in various media between 1993 and 2010.

3.1 SOURCE

With the removal of the dry cleaner and associated equipment in 2000, all known ongoing contributions to subsurface impacts have been eliminated.

3.2 SOIL QUALITY CONDITIONS

Since 2001, MACTEC has conducted extensive soil sampling and testing, both within and outside of the former dry cleaner space. The regulated substances identified in soil at the Site are tetrachloroethene (CAS No. 127-18-4), trichloroethene (CAS No. 79-01-6), acetone (CAS No. 67-64-1) and toluene (CAS No. 108-88-3). As detailed in the Revised CSR, based on the results of the soil sampling and testing conducted by MACTEC, delineation of the lateral and vertical extent of contamination has been completed (see Figures 8 and 9). Laboratory results from all soil samples analyzed to date are summarized on Table 1.

Dry cleaners reportedly operated on Site from approximately 1986 until 2000. The former dry cleaner was the subject of two environmental assessments prior to MACTEC's involvement at the Site in 2001. MACTEC conducted a series of investigations in 2001 and 2002, prior to the submission of the original CSR. Additional assessments have been conducted by MACTEC in 2005, 2009 and 2010 to further characterize soil conditions at the Site. The results of all soil testing activities conducted on Site are summarized in Table 1 and on Figure 8.

The first assessment was conducted by Boykin and Associates (Boykin) in March 1993 and included the installation of four hand auger borings outside the building (designated B-1 through B-4, see Figure 8 for locations). PCE was detected in each of these soil samples at concentrations ranging from 20 to 260 parts per billion (ppb). The highest concentrations were detected just outside the back door of the dry cleaner in boring B-1. Other VOCs were not detected in soil during this assessment.

In June and July, 2000 Environmental Corporation of America (ECA) performed additional environmental assessment at approximately the time that Imperial Cleaners was vacating the property. ECA installed a total of six soil test borings on the Site (designated SB-1 through SB-6, see Figure 8 for locations of all soil test borings). Borings SB-1 through SB-3 were drilled soil test borings located outside the building in the rear parking area and driveway of the shopping center. Borings SB-1 and SB-2 were intended to be converted to groundwater monitoring wells. However, SB-1 encountered refusal above the groundwater table and was terminated. Boring SB-2, was advanced to below the groundwater table and converted to monitoring well MW-2. A shallow (1-foot deep) soil sample was collected from SB-3. ECA also installed three hand auger borings within the dry cleaner's space (SB-4 through SB-6) to assess shallow soil conditions in the immediate vicinity of the dry cleaning equipment.

The results of the first two sampling events indicated that a notifiable release to soil, as defined under the Hazardous Site Response Act (HSRA) had occurred at the Site. A release to groundwater was also identified as discussed in Section 5.0. On August 15, 2000, PM Ltd. submitted a release notification package to the Georgia EPD. On January 5, 2001, the Site was listed on the Hazardous Site Inventory (Site No. 10690) for releases to both soil and groundwater.

Following the Site's listing on the HSI, MACTEC was requested by PM Ltd. to conduct additional assessment at the Site prior to the renovation of the then vacant Imperial Cleaners tenant space. This work initially included the installation of five Geoprobe borings within the building to begin the delineation of soil contamination.

In May 2001, five Geoprobe soil borings (GP-1 through GP-5) were installed on the subject Site to further assess the extent and concentration of soil contamination. One boring, GP-5, was located by the former dry cleaning machine, adjacent to ECA boring SB-6, which had previously exhibited the highest PCE concentrations. This boring was extended to Geoprobe refusal and sampled throughout to allow vertical profiling of the soil contamination in the suspected source area. The remaining borings were spaced just outside of this area.

Three additional soil test borings (MW-3, SB-7 and SB-8) were installed by MACTEC outside the building to further investigate the extent of soil contamination and attempt to identify the source of the groundwater contamination. MW-3 was located in the rear driveway of the shopping center, in an area interpreted to be downgradient of the former dry cleaner. This boring was converted to a deep groundwater monitoring well

to attempt to provide vertical delineation of the extent of groundwater impact. Boring SB-7 was located just outside the rear door of the former dry cleaner in an area of stained and corroded pavement. This stained area was believed to be related to a condensate discharge line which exited the building at this location. This boring was intended to characterize the vertical distribution of soil contamination in this area and evaluate it as a possible source of groundwater contamination and was extended to auger refusal, which occurred several feet above the groundwater table. Boring SB-8 was located in the grassy area northeast of the parking lot and was intended to provide lateral delineation of soil contamination in this area.

Soil samples were collected at five-foot intervals above the top of rock using a split-spoon sampling device and the standard penetration test method. One sample each from borings MW-3 and SB-8 were selected for laboratory testing. All of the samples collected from SB-7 were tested in order to characterize the vertical distribution of contamination within this boring as this area had been identified as a potential source area. With the exception of the uppermost sample, PCE was detected throughout the depth of SB-7. VOCs were not detected in SB-8. Very low levels of PCE were detected in MW-3.

In March 2002, MACTEC installed a series of four additional soil test borings (MW-6, MW-8, MW-9 and MW-10) in an attempt to complete the lateral delineation of contamination at the Site. These borings were then converted to groundwater monitoring wells. MW-6 was located in the parking area north of the former dry cleaner. MW-8 was located in the main Shopping Center parking lot, west of the former dry cleaner. MW-9 was located in the rear driveway of the Shopping Center and MW-10 was located along Hog Wallow Creek, east of the former dry cleaner, near the bottom of the fill slope.

MW-6, MW-8, and MW-9 were drilled using a truck-mounted drill rig and were extended to a depth approximately five feet below the groundwater table. In the case of MW-6, an air hammer attachment was necessary to extend the boring below the top of rock. MW-8 was terminated at the top of rock. Soil samples were collected at five-foot intervals using a split-spoon sampler and the standard penetration test method. MW-10 was located adjacent to Hog Wallow Creek and was installed using a hand auger. The two-foot sample was collected as the only soil sample above the groundwater table from this boring. The shallowest sample from each of these boring was selected for laboratory testing.

Following the receipt of the soil testing results from MW-6 through MW-10, MACTEC installed two additional hand auger borings to continue the lateral delineation of soil contamination. HA-1 and HA-2 were both installed along Hog Wallow Creek. HA-1 was located in the vicinity of MW-11, while HA-2 was located adjacent to MW-5. VOCs were not detected in either of the samples tested.

At the request of GA-EPD, in July 2005 two additional soil delineation samples were collected along Hog Wallow Creek in the areas downgradient of Borings B-2 and B-4. HA-3 was located downgradient of B-2, while HA-4 was located downgradient of B-4. Chlorinated VOCs were not detected in either of the samples tested. However, acetone and toluene were detected in HA-3, located near the creek, downgradient of boring B-3.

No obvious source of either the acetone or toluene has been identified and neither compound has previously been detected in either soil or groundwater on Site. Acetone is commonly detected as a false positive due to laboratory contamination. Laboratory representatives indicated that no evidence of laboratory induced contamination was evident and that the acetone detected may be an artifact of the sample preservation method as sodium bisulfate has been shown to react with certain soils to produce acetone.
Toluene has not been previously detected in soil on Site and does not appear to be related to the dry cleaner release. The extent of the toluene contamination has been delineated to the south, west and north by existing borings. Boring HA-3, in which the toluene was detected, was located near Hog Wallow Creek. The eastward extent of the toluene in soil is limited by the creek, as the creek bottom is the top of rock in this area.

Between January 2006 and August 2009, eight Geoprobe borings (SB-10 through SB-17) and nine auger drilled soil test borings (SB-10 through SB-28) were installed inside the building. The purpose of these borings was to further attempt to pinpoint the source of the release or any remaining source materials. The borings were extended to Geoprobe or auger refusal. Three of the auger borings were then extended into rock and converted to monitoring wells as discussed in Section 3.3.

PCE was the only chlorinated VOC detected in the 36 soil samples tested during these two phases of the assessment. No other degradation products of PCE were detected in soil. These findings were generally consistent with previous soil testing results obtained from the Site. The highest PCE concentrations were detected in the western portion of the former dry cleaners space. None of the soil samples tested exhibited PCE concentrations in excess of the Type 4 RRS of 1,200 ug/kg approved for the Site. Acetone

was the only other constituent detected, at concentrations below its approved RRS. As discussed in Section 3.3. Groundwater testing conducted within the building had failed to identify an obvious source area for the groundwater impacts in MW-2 and MW-7.

At GA-EPD's request, in March 2010, six more soil test borings (SB-29 through SB-34) were installed around MW-7 to again try to identify a specific source for the groundwater impacts identified in MW-7. SB-29 through SB-31 were installed closest to MW-7, while SB-32 through SB-34 were located farther out from MW-7. The plan was to test soil samples from the inner ring of borings and, if warranted by the initial findings, test additional samples from the outer ring of borings. The borings were extended to Geoprobe refusal which was encountered just below the water table. The laboratory testing results again identified PCE as the only chlorinated VOC detected in the nine soil samples tested, at a maximum concentration well below the Type 4 RRS. Two samples also exhibited acetone, at concentrations well below its approved RRS. These findings were generally consistent with previous soil testing results obtained from the Site.

Based on the relatively low concentrations of VOCs detected in the borings immediately surrounding MW-7, soils from the outer ring of borings were not tested. The soil testing results obtained from this area were consistent with the findings of the previous soil assessments and did not identify an obvious source of groundwater contamination.

3.3 GROUNDWATER QUALITY CONDITIONS

Refer to Figure 9 for the locations of groundwater monitoring wells, along with the following discussion. The regulated substances identified in groundwater at the Site are tetrachloroethene (CAS No. 127-18-4), trichloroethene (CAS No. 79-01-6), 1,2-dichloroethene (CAS No. 253-32-3302), vinyl chloride (CAS No. 75-01-4) and chloroform (CAS No. 67-66-3). Laboratory results from all groundwater samples analyzed to date are summarized on Table 2.

In July, 2000, ECA performed an Environmental Site Investigation in the surrounding area of the former Imperial Cleaners facility to explore the potential for a release from the dry cleaning facility. ECA initially installed four soil borings (SB-1 through SB-4) around and within the dry cleaning facility which was just being vacated at that time. One soil boring, SB-2, was extended below the groundwater table and converted to a groundwater monitoring well (MW-2). Boring SB-1 was also intended to be converted to a well (MW-

1), but auger refusal was encountered above the water table and the boring was discontinued. ECA collected a groundwater sample from MW-2 and analyzed it for VOCs. The laboratory results identified PCE, TCE, DCE and vinyl chloride in the groundwater sample at concentrations above the laboratory detection limits.

In August, 2001, MACTEC installed three monitoring wells (MW-3 through MW-5) at the subject Site. MW-3 was a deep Type III well located behind and downgradient of the former dry cleaners. This well was intended to evaluate whether deep groundwater within the rock had been impacted by the release from the former dry cleaner. MW-4 and MW-5 were located near Hog Wallow Creek to attempt to define the downgradient extent of the plume. PCE and cis-1,2-DCE were detected in the groundwater sample collected from MW-4 at very low concentrations. Chloroform was detected in the deep well, MW-3, at a low concentration. The chloroform is thought to be related to the use of potable water during rock coring, and is not related to the reported release. Neither PCE nor any of its breakdown products were detected in MW-3. VOCs were not detected in MW-5.

In March, 2002, MACTEC installed five additional monitoring wells (MW-6, MW-7, MW-8, MW-9 and MW-10) on the Site to attempt to delineate the lateral extent of groundwater contamination. MW-6 was installed in the parking lot north of the former dry cleaner. MW-7 was located near a condensate discharge line just outside the back door of the former dry cleaner and was intended to investigate groundwater conditions in this potential source area. MW-8 was located in the front parking lot of the shopping center, northwest of the former dry cleaner. MW-9 was located in the rear driveway of the shopping center, southwest of the former dry cleaner. MW-10 was located along Hog Wallow Creek, near the upstream boundary of the shopping center property.

Groundwater samples from the five additional wells were collected and analyzed for VOCs. Of the five wells installed, only one, MW-7 exhibited VOCs related to the former dry cleaning operations. This well was located just outside the rear door of the former dry cleaners. Chloroform was detected in MW-9, southwest of the former dry cleaners. The chloroform detected is believed to be related to a leaking water line located behind the shopping center building which was in the process of being replaced at the time of MACTEC's assessment and was not detected in a subsequent sampling event.

In April 2002, MACTEC installed an additional monitoring well, MW-11, along the western bank of Hog Wallow Creek. This well was installed in the area interpreted to be directly downgradient of the source of the groundwater contamination, based on the March 2002 groundwater elevation data. Low levels of PCE and its breakdown products were detected in MW-11.

In order to confirm that the creek represented the horizontal delineation of groundwater contamination downgradient of the suspected source area, MACTEC obtained permission from the adjacent property owner, Mr. Maxwell Thomas, to install an additional well on the eastern bank of Hog Wallow Creek. Based on the local hydrogeology, Hog Wallow Creek was expected to act as a discharge zone for shallow groundwater in the Site vicinity. MW-12 was located in the area downgradient of the former dry cleaner, across the creek to the east of MW-11. VOCs were not detected in MW-12.

In July 2005, MACTEC resampled each of the wells on Site. The July 2005 sampling event indicated groundwater conditions were generally similar to those encountered in the previous assessments with the exception that VOCs were not detected in monitoring well MW-11, whereas low concentrations had previously been detected. VOC concentrations in MW-2 were somewhat higher than those measured in 2000, the last time that well had been sampled. VOC concentrations in MW-4 and MW-7 remained consistent with previously measured values.

The 2007 CAP approval stipulated that groundwater samples be collected from six wells located on Site. Two of the wells (MW-2 and MW-7) are located just outside the former dry cleaner space. Three of the wells (MW-4R, MW-5 and MW-11R) are located downgradient, near Hog Wallow Creek. The sixth well (MW-12R) is located off Site, just across Hog Wallow Creek. MW-5 and MW-12R are considered sentinel wells as no VOCs have been detected in either of these wells during previous assessments. EPD subsequently requested that the two deep bedrock wells located on Site (MW-3 and DW-1) also be sampled during regular monitoring events.

The cumulative results of the quarterly groundwater monitoring events conducted on Site are summarized on the attached Table 2 and Figure 9. In summary, VOCs have not been detected in the sentinel wells MW-5 and MW-12. Monitoring wells MW-3, MW-4, MW-11 and DW-1 have exhibited sporadic occurrences of low concentrations of PCE and its breakdown products. Monitoring wells MW-2 and MW-7 have exhibited consistently elevated concentrations of VOCs.

In 2007, three 24-hour high vacuum extraction (HVE) events were completed at the Site. This procedure involved the high vacuum extraction of impacted groundwater and vapors from monitoring wells MW-2 and MW-7. Subsequent monitoring indicated the VOC concentrations dropped considerably following the three HVE events. Subsequently, VOC concentrations rebounded for a time in MW-2 but have dropped considerably since. VOC concentrations in MW-7 also rebounded but have not yet followed the decreasing trend observed in MW-2.

A fourth 24-hour HVE event has recently been completed at the Site. In addition to extraction from MW-2 and MW-7, as conducted previously, this HVE event also included two wells (MW-13 and MW-14) located inside the building. Although only very low concentrations of chlorinated VOCs had previously been detected in groundwater from the wells inside the building, these interior wells were included in the recent HVE event to aid in the removal of soil vapors contained within the vadose zone beneath the building. The four HVE events have resulted in the cumulative removal of approximately 950 gallons of water and 7.52 pounds of non-methane VOCs.

3.4 SURFACE WATER QUALITY CONDITIONS

During the July 2001 sampling event, MACTEC collected surface water samples from two locations along Hog Wallow Creek to evaluate potential impact to the surface water from the groundwater plume. SW-1 was collected near the upstream boundary of the Site and was intended as a background sample location for comparison purposes. The second surface water sample, SW-2, was collected just downstream of monitoring well MW-4. VOCs were not detected in the surface water samples.

In July 2005 another round of surface water sampling was completed which included a third sample collected from the area between MW-11 and MW-12, directly downgradient of the former dry cleaner. No VOCs were detected in this surface water sampling event.

Since March 2007, surface water samples have been collected during each of the quarterly groundwater monitoring events. To date, no chlorinated VOCs have been detected in the surface water. Styrene was detected in each sample, including the upstream sample, during the March 2010 event. However this compound is not related to any cleaning products and it was apparent from the findings that it was related to an off-Site release. Styrene was not detected in the subsequent June 2010 sampling event.

3.5 INDOOR AIR QUALITY CONDITIONS

MACTEC has conducted indoor air monitoring within the former dry cleaner space, the former Tuesday Morning retail space which encompassed the dry cleaner space and the adjacent Thai House restaurant adjacent to the former Tuesday Morning space. The initial testing, conducted in 2001, shortly after the dry cleaner space was vacated, identified PCE in the two air samples tested. Follow-up testing conducted in January 2008 at the request of GA-EPD, identified PCE concentrations which were significantly lower than those measured in 2001. However, both PCE and TCE still exceeded Target Indoor Air Concentration (TIAC). Two additional testing events were conducted in March 2008 and April 2008 following maintenance to and minor modifications of the HVAC system. Those results indicated that VOC concentrations had decreased further, although PCE concentrations in three of the four interior samples remained just slightly above the TIAC.

At EPD's request, in July 2010 an air sample from the nearest currently occupied tenant space, the Thai House restaurant, was also tested. The results identified a very low concentration of PCE which was below the TIAC. TCE or other breakdown products of PCE were not detected. Refer to Figure 10 and Table 5 for a summary of the air monitoring data.

4.0 DELINEATION CRITERIA

The data collected in MACTEC's assessments conducted between 2001 and 2005 were used to delineate the extent of regulated constituents in soil, groundwater and surface water on Site.

4.1 SOIL

As detailed in the Revised CSR, extensive soil testing conducted on Site has delineated the lateral extent of PCE and its breakdown products to background concentrations (i.e. laboratory reporting limits) within the boundaries of the Kingscreek Shopping Center (see Figure 8). Vertical delineation sampling indicates that the vertical extent of impacted soil extends to the water table in some locations (see Figures 3 and 4). With the exception of one soil sample (SB-6) collected by ECA in 2000, no soils on Site have been found to exceed the approved Type 4 RRS. Extensive soil testing conducted by MACTEC in the very near vicinity of ECA's SB-6 has not confirmed the presence of the elevated concentration of PCE reported by ECA.

4.2 GROUNDWATER

Groundwater testing conducted between 2000 and 2005 indicates that the lateral extent of impacted groundwater has been delineated to background within the Site boundaries (see Figure 9). Chlorinated VOCs have not been detected to date in the sentinel wells MW-5 and MW-12, nor in any of the surface water samples collected. Minor VOC impacts have been detected recently in the deep well DW-1 (see Figure 5). As noted in Section 3.1.2 an upward hydraulic gradient in the vicinity of Hog Wallow Creek will limit potential vertical migration of chlorinated VOCs in the downgradient vicinity of the release. Groundwater analytical results are summarized in Table 2 and on Figure 9.

4.3 SURFACE WATER

Surface water samples collected by MACTEC between 2001 and 2010 have not identified chlorinated VOC impacts to Hog Wallow Creek. Based on data obtained to date, surface water is not being impacted above laboratory reporting limits as a result of the groundwater plume discharging to Hog Wallow Creek. Surface water analytical results are summarized in Table 2 and on Figure 9.

5.0 REMEDIATION CRITERIA AND EXPOSURE

An examination of potential exposure pathways and receptors was conducted for the Site. Based on the data collected to date, the potential exposure pathways include:

- Potential exposure to regulated constituents in soil;
- Potential exposure to regulated constituents in groundwater;
- Potential exposure to regulated constituents in surface water;
- Potential exposure to regulated constituents due to vapor intrusion from impacted soil or groundwater beneath the building.

5.1 SOIL CRITERIA

The potential for direct exposure of commercial workers to impacted soil at the Site is incomplete as the primary area of soil impact is located beneath the building while other impacted areas are covered by asphalt pavement. In addition, soil concentrations are below the approved direct exposure risk reduction standards for construction workers and utility workers in the event that ground-disturbing activities are performed in the future.

Although the Site consists of non-residential property, MACTEC calculated both residential and non-residential Risk Reduction Standards (RRS) for constituents detected in soil. Type 1, 2, 3 and 4 RRS were calculated for PCE, TCE, acetone and toluene using default exposure assumptions (see Appendix B). As shown in Appendix B, the Site satisfies all RRS criteria calculated for potential exposure to soil for TCE, acetone and toluene. The HSRA Type 1 through Type 4 RRS criteria for soil for the regulated substances are shown below along with the highest concentration detected and the corresponding sample location.

The maximum concentration of PCE detected by MACTEC in soil between 2001 and 2006 was 1,200 µg/kg. This concentration is well below the direct contact RRS of 16,000 µg/kg. Only one other sample collected by another consultant during an earlier assessment in 2000 reported a higher concentration of PCE in soil (7,700 µg/kg) which was also below the direct contact RRS. MACTEC has resampled soils in that same area on three separate occasions and has not been able to replicate the previous elevated finding. Based on the data collected, we believe the area of higher impact has been attenuated such that VOCs are no longer present at such elevated concentrations as those observed in 2000.

In order to evaluate the potential for VOCs to leach from the contaminated soils and impact groundwater, in 2003, two samples were collected from the beneath the former dry cleaners where PCE concentrations were detected up to 1,200 µg/kg (the maximum concentration ever detected by MACTEC). The samples were tested for leachability using the Synthetic Precipitation Leaching Procedure (SPLP). As a result of the leachability testing results, GA-EPD has previously approved a Type 4 RRS for PCE of 1,200 µg/kg for the Site. The results of the leachability tests are presented in Table 7.

5.2 GROUNDWATER CRITERIA

As detailed in the Revised CSR, MACTEC previously conducted a water usage survey for the area surrounding the Site to identify active drinking water sources in the Site vicinity. The nearest domestic drinking water well is located approximately 0.8 miles from the Site. This well is located along a tributary of Hog Wallow Creek, upstream of the subject Site and will not be impacted by the release. No active domestic drinking water wells are located downgradient within one mile of the Site. Another unconfirmed domestic drinking water well in the general vicinity of the Site is located approximately 1.5 miles to the southeast across both Hog Wallow Creek and across Big Creek along Grimes Bridge Road. The regional groundwater flow in this area is toward the Chattahoochee River to the south. Therefore, this well is located sidegradient of the regional groundwater flow path and separated from the Site by two drainage divides, Hog Wallow Creek and Big Creek. As stated above, in our opinion, only the shallow groundwater at the subject Site has been affected by the release and there is an upward hydraulic gradient in the area of the release. The Grimes Bridge Road well is set within the bedrock aquifer, at a depth of over 300 feet. In addition, it is located across both Hog Wallow Creek and Big Creek from the Site, both of which would serve as barriers to prevent the migration of shallow groundwater from the Site to this well. Based on our research, no drinking water wells have been identified which could be impacted by the release from the Site.

The City of Roswell obtains much of its water from the Fulton County municipal water system, although it also maintains a surface water intake on Big Creek, located just upstream from the confluence with Hog Wallow Creek. Because the City of Roswell intake on Big Creek is located upstream from the Hog Wallow Creek confluence, there is no potential for impact to the surface water intake. For these reasons, the groundwater exposure pathway is also incomplete.

Previous groundwater testing results as well as groundwater fate and transport modeling results indicate that migration of groundwater will be limited to the area of the Site located between the former dry cleaner and Hog Wallow Creek. Lateral migration of impacted groundwater off the Shopping Center property has not been identified in the past and is not predicted in the future based on Site hydrogeology and groundwater modeling results.

MACTEC calculated RRS for the constituents detected in groundwater on Site. Again the Type 1, 2, 3 and 4 RRS criteria were derived using default exposure assumptions. Based on the groundwater samples obtained from MW-2 and MW-7, the Site does not comply with any of the groundwater RRS for PCE, TCE or vinyl chloride. The Site currently meets Type 4 RRS for cis-1,2-dichloroethene and trans-1,2-dichloroethene. As documented in the previously submitted Addendum to Revised CSR, dated April 11, 2006 and our Response to Comments dated October 4, 2006, although groundwater conditions are not currently in compliance with applicable RRS, the risk to human health and the environment posed by the groundwater on Site is negligible. Further, the condition of the groundwater on Site is expected to improve over time due to the natural attenuation of regulated constituents as observed in MW-2 in recent sampling events.

5.3 SOURCE

Concentrations of dissolved VOCs in groundwater are all well below the aqueous solubilities for the various compounds detected on Site. No evidence of highly contaminated soils indicative of a potential free product condition has been identified. The concentrations of PCE detected in groundwater from MW-7 have been slightly in excess of 1% of the aqueous solubility of PCE during some of the monitoring events. However, the PCE concentrations detected to date are still well below those that would strongly indicate the presence of a dense non-aqueous phase liquid (DNAPL) condition and no direct indications of a DNAPL condition have been observed. The latest PCE concentration in MW-7 is 4,800 µg/L as of June 2010.

There is the possibility that a small amount of DNAPL has infiltrated the subsurface down to the water table. Because the water table roughly coincides with the top of rock in the apparent source area, it is possible that some DNAPL may have infiltrated the rock. Groundwater testing from the two deep wells near the source area indicates this is unlikely. However, should DNAPL be present in the rock, there is currently no practicable manner in which to actively remediate such a condition. As detailed in Section

6.4, even if such a condition exists, the slow release of PCE into the groundwater over time from a DNAPL source is not expected to impact Hog Wallow Creek in excess of regulatory thresholds.

5.4 SURFACE WATER

On-Site groundwater discharges into Hog Wallow Creek located along the Site's eastern boundary. To date, VOCs have not been detected in surface water samples tested or in groundwater across the creek from the Site. Because the creek acts as a groundwater discharge feature for shallow groundwater in the area, VOCs in groundwater are not expected to migrate beyond the creek and impact other properties. Testing of deep groundwater on Site indicates that the extent of groundwater impact is primarily confined to the upper portion of the aquifer. In addition, a vertically upward hydraulic gradient has been measured on Site near the source area. This upward gradient will reduce the tendency of dissolved constituents to migrate into the deeper portions of the groundwater.

As discussed in Appendix C, MACTEC modeled the fate and transport of VOCs in the groundwater on Site and the potential impact of regulated constituents in groundwater on the surface water quality of Hog Wallow Creek. The mixing of impacted groundwater and surface water in Hog Wallow Creek was calculated based on recent groundwater testing data and measured hydrogeologic conditions on Site. MACTEC calculated maximum allowable concentrations of VOCs in MW-11R that would still be protective of applicable in-stream water quality standards. These calculations were conservatively based on anticipated low flow conditions within Hog Wallow Creek. As detailed in Appendix C, the modeling results indicate that the most recent concentrations in MW-11R are at least approximately two orders of magnitude below the predicted maximum allowable concentration. In addition, the maximum allowable VOC concentrations in MW-11R are well below the maximum VOC concentrations historically detected anywhere on Site, including the source area.

The field-observed concentrations of COCs dissolved in groundwater at the Site, the results of the analytical groundwater fate and transport model for the VOCs in question and the results of the analytical model of mixing between the impacted water and surface water in Hog Wallow Creek show that in-stream water quality standards are not exceeded currently, and are not predicted to be exceeded in the future.

5.5 AIR

The results of the April 2008 indoor air testing in 2008 within the Tuesday Morning store showed that PCE and TCE concentrations were just slightly above their respective target indoor air concentration (TIAC) in at least one sample. No other breakdown products of PCE have been detected in the air samples tested. The Tuesday Morning Store has been vacant since August 2009. Testing conducted in July 2010 indicated the tenant space adjacent to the former Tuesday Morning store had not been impacted above applicable thresholds.

Over 30 organic compounds have been detected in the air samples tested. The vast majority of these compounds must have emanated from interior sources as they have not been previously detected in soil or groundwater on Site. The exact source or sources of VOCs is not known but was suspected to be primarily merchandise brought into the Tuesday Morning store for retail sale and cleaning products used in the store. It is possible that at least some of these goods/supplies may have contained low levels of residual PCE and/or TCE which could have increased their measured concentrations in the indoor air.

Note that chlorinated VOC concentrations in the indoor air decreased significantly following the implementation of the HVAC system modifications completed in early 2008 and were only slightly in excess of applicable TIACs. The two elevated PCE readings were less than 2 $\mu g/m^3$ above the TIAC. The one elevated TCE reading was 0.04 $\mu g/m^3$ above the TIAC. The store goods and/or cleaning supplies could have contributed this much to the indoor air. Some seasonal fluctuation is also to be expected which could slightly raise or lower the measured concentrations of VOCs.

The recent HVE event discussed in Section 4.3 included vacuum extraction from two wells located inside the building to aid in reducing vadose zone concentrations of chlorinated VOCs. Prior to a new tenant leasing the vacant space, additional upgrades of the existing HVAC system are planned. These changes will likely further improve the indoor air quality. MACTEC plans to conduct the next air monitoring event when the vacant tenant space is leased.

6.0 PLANNED CORRECTIVE ACTIONS

It is PM, Ltd's intent to remove the Site from the Hazardous Site Inventory (HSI) through implementation of a voluntary remediation plan that is protective of human health and the environment. Based on the completed delineation of constituents in soil and groundwater and the absence of complete pathways of exposure to constituents in soil and groundwater and to the limited potential risk posed to surface waters, PM, Ltd. proposes the following voluntary remediation remedies:

- The horizontal and vertical extents of contaminants in surface and subsurface soils have been adequately delineated; soil-sampling locations with chlorinated VOC concentrations exceeding approved RRS have not been identified by MACTEC. The floor slab and asphalt pavement precludes direct exposure of facility personnel to impacted soils or soil leaching to groundwater, rendering potential exposure pathways incomplete. For these reasons, PM, Ltd. proposes no additional corrective action related to on-Site soils.

- The horizontal and vertical extents of constituents in groundwater have been adequately delineated. No impacted groundwater flows off Site. Minimal impact to the deeper water-bearing zone has been detected. Significant natural attenuation of chlorinated VOCs has been observed in on-Site wells downgradient from the source area and is expected to continue in the future. On-Site groundwater is not a current source of potable or industrial use at the facility and no downgradient drinking water wells or withdrawal points have been identified within one mile of the Site. As such, there are no complete pathways for exposure of on-Site or off-Site receptors to impacted groundwater. PM, Ltd. proposes a deed restriction to prevent future use of groundwater on Site for human consumption in order to ensure the maintenance of an incomplete pathway.

- An additional "point of demonstration" well is proposed to be installed in the area downgradient of MW-7. This well will be located approximately half way between MW-7 and MW-11R and will be used to provide additional data regarding the migration and attenuation of the plume downgradient of the potential source area. Within six months of the Site's enrollment in the Voluntary Remediation Program, a groundwater fate and transport model will be submitted to include projected concentration trends for the point of demonstration well.

- No impacts to surface water in Hog Wallow Creek have been detected to date. Surface water modeling presented in Section 6.4 indicates that the potential to impact the creek in the future above in-stream water quality standards is negligible.

- PM, Ltd. proposes to continue the existing quarterly groundwater monitoring program, including surface water monitoring, for a period of three years to demonstrate the continued attenuation of the contaminant plume and to confirm the groundwater and surface water modeling results.

- Future workers in the former Tuesday Morning tenant space (currently vacant) may be subject to vapors emanating from residual constituents, primarily PCE and TCE that remain in soils below the floor slab in these areas. MACTEC's most recent indoor air quality testing found only slight exceedences of TIACs for PCE and TCE. Recent remedial activities and planned HVAC upgrades are expected to reduce indoor air concentrations of PCE and TCE to acceptable levels. Prior to the next occupancy of the space with encompasses the former dry cleaner, the indoor air of the space will be sampled and tested again to confirm that indoor air meets applicable TIACs for PCE and TCE. Testing prior to tenant occupancy will eliminate the contributions of store goods and cleaning supplies thought to have compromised previous air sampling events. Should the test results meet TIAC criteria, further corrective action regarding the air pathway will not be performed.

- PM, Ltd. proposes that compliance with the following criteria by the end of the three year monitoring period will warrant removal of the Site from the HSI:

    - Stabilization or decrease in VOC concentrations in MW-2;
    - Stabilization or decrease in VOC concentrations in MW-7;
    - VOC concentrations in "point of demonstration" well are consistent with values predicted by the groundwater fate and transport model;
    - VOC concentrations in MW-7, MW-11 and the "point of demonstration" well do not exceed values established through surface water modeling which would result in impacts to Hog Wallow Creek in excess of ISWQS;
    - No exceedences of ISWQS are measured in surface water samples collected from Hog Wallow Creek;

7.0 MILESTONE SCHEDULE AND COST ESTIMATE

Upon acceptance of the VRP Application, a schedule will be prepared that describes the planned activities and a schedule for their implementation and reporting and an estimate of the anticipated cost. PM, Ltd. has issued a letter of credit for $300,000 as its financial assurance instrument to cover the cost of the approved HSRA CAP, which will be extended as necessary to cover the planned activities herein as approved by EPD.

MACTEC

engineering and constructing a better tomorrow

October 14, 2010

Ms. Alexandra Cleary
Hazardous Sites Response Program
Georgia Environmental Protection Division
2 Martin Luther King, Jr. Drive, SE
Suite 1462 East Floyd Tower
Atlanta, Georgia 30334

Subject: **Voluntary Remediation Plan Application and Fee**
Pursuant to the Georgia Voluntary Remediation Program Act
Former Imperial Cleaners – Kingscreek Shopping Center
1233B Alpharetta Highway
Roswell, Georgia
HSI Site No. 10690
MACTEC Project 6305-05-0319

Dear Ms. Cleary:

On behalf of PM, Ltd., MACTEC Engineering and Consulting, Inc. (MACTEC) respectfully submits this Voluntary Remediation Plan Application along with the attached $5,000.00 application fee to enroll this site under the Georgia Voluntary Remediation Program Act.

Please contact the undersigned if any questions arise.

Sincerely,

MACTEC Engineering and Consulting, Inc.

Stephen R. Foley, P.G.
Senior Geologist

Charles T. Ferry, P.E.
Senior Principal Engineer

Enclosures

cc: Ms. Nancy Shannon, PM, Ltd. c/o SunTrust Bank
Barbara Gallo, Krevolin & Horst, LLC

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Voluntary Remediation Plan Application Form and Checklist

VRP APPLICANT INFORMATION

COMPANY NAME	PM, LTD. with Wright Management, Inc. as the sole general partner				
CONTACT PERSON/TITLE	Nancy Shannon				
ADDRESS	25 Park Place, 2nd Floor, Atlanta, Georgia 30303				
PHONE	404-588-7234	**FAX**	404-588-7875	**E-MAIL**	Nancy.shannon@suntrust.com

GEORGIA CERTIFIED PROFESSIONAL GEOLOGIST OR PROFESSIONAL ENGINEER OVERSEEING CLEANUP

NAME	Charles T. Ferry	**GA PE/PG NUMBER**	PE 10957
COMPANY	MACTEC Engineering and Consulting, Inc.		
ADDRESS	396 Plasters Avenue		

PHONE	404-873-4761	**FAX**	404-817-0183	**E-MAIL**	ctferry@mactec.com

APPLICANT'S CERTIFICATION

In order to be considered a qualifying property for the VRP:

(1) The property must have a release of regulated substances into the environment;
(2) The property shall not be:
- (A) Listed on the federal National Priorities List pursuant to the federal Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. Section 9601.
- (B) Currently undergoing response activities required by an order of the regional administrator of the federal Environmental Protection Agency; or
- (C) A facility required to have a permit under Code Section 12-8-66.

(3) Qualifying the property under this part would not violate the terms and conditions under which the division operates and administers remedial programs by delegation or similar authorization from the United States Environmental Protection Agency.
(4) Any lien filed under subsection (e) of Code Section 12-8-96 or subsection (b) of Code Section 12-13-12 against the property shall be satisfied or settled and released by the director pursuant to Code Section 12-8-94 or Code Section 12-13-6.

In order to be considered a participant under the VRP:
- (1) The participant must be the property owner of the voluntary remediation property or have express permission to enter another's property to perform corrective action.
- (2) The participant must not be in violation of any order, judgment, statute, rule, or regulation subject to the enforcement authority of the director.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I also certify that this property is eligible for the Voluntary Remediation Program (VRP) as defined in Code Section 12-8-105 and I am eligible as a participant as defined in Code Section 12-8-106.

APPLICANT'S SIGNATURE	**PM Ltd. a Georgia Limited Partnership By Wright Management, Inc. its sole general partner** By: Nancy G. Shannon		
APPLICANT'S NAME/TITLE (PRINT)	**Nancy G. Shannon/President Wright Management, Inc**	**DATE**	**October 7, 2010**

5.a.	Within the first 12 months after enrollment, the participant must complete horizontal delineation of the release and associated constituents of concern on property where access is available at the time of enrollment;	**Section 4.0**	
5.b.	Within the first 24 months after enrollment, the participant must complete horizontal delineation of the release and associated constituents of concern extending onto property for which access was not available at the time of enrollment;	**Section 4.0**	
5.c.	Within 30 months after enrollment, the participant must update the site CSM to include vertical delineation, finalize the remediation plan and provide a preliminary cost estimate for implementation of remediation and associated continuing actions; and	**Section 4.0** **Section 7.0**	
5.d.	Within 60 months after enrollment, the participant must submit the compliance status report required under the VRP, including the requisite certifications.	**Appendix C**	
6.	**SIGNED AND SEALED PE/PG CERTIFICATION** AND SUPPORTING DOCUMENTATION: "I certify under penalty of law that this report and all attachments were prepared by me or under my direct supervision in accordance with the Voluntary Remediation Program Act (O.C.G.A. Section 12-8-101, et seq.). I am a professional engineer/professional geologist who is registered with the Georgia State Board of Registration for Professional Engineers and Land Surveyors/Georgia State Board of Registration for Professional Geologists and I have the necessary experience and am in charge of the investigation and remediation of this release of regulated substances. Furthermore, to document my direct oversight of the Voluntary Remediation Plan development, implementation of corrective action, and long term monitoring, I have attached a monthly summary of hours invoiced and description of services provided by me to the Voluntary Remediation Program participant since the previous submittal to the Georgia Environmental Protection Division. The information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." Charles T. Ferry #10957 Printed Name and GA PE/PG Number 10/15/10 Date Charles T. Ferry Signature and Stamp 		

TABLES

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TABLE 1 - SUMMARY OF SOIL TESTING RESULTS, ug/kg

BOYKIN AND ASSOCIATES, INC. – March 1993

Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
B-1	1	3/93	100	<10	<100	<10
B-1	5	3/93	260	<10	<100	<10
B-2	1	3/93	32	<10	<100	<10
B-2	5	3/93	20	<10	<100	<10
B-3	8	3/93	60	<10	<100	<10
B-4	5	3/93	20	<10	<100	<10

ENVIRONMENTAL CORPORATION OF AMERICA – June-July 2000

Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
SB-1	5	6-7/00	<5	<5	<100	<5
SB-2/MW-2	5	6-7/00	14	<5	<100	<5
SB-3	1	6-7/00	532	<5	<100	<5
SB-4	2	6-7/00	210	<5	<100	<5
SB-5	1.5	6-7/00	359	<5	<100	<5
SB-6	2	6-7/00	7,700	<5	<100	<5

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC. (MACTEC) – May 2001

Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
GP-1-2	2	5/01	<5	<5	NT	NT
GP-1-10	10	5/01	<5	<5	NT	NT
GP-2-6	6	5/01	25	<5	NT	NT
GP-2-10	10	5/01	1,100	<5	NT	NT
GP-3-4	4	5/01	650	<5	NT	NT
GP-3-10	10	5/01	310	<5	NT	NT
GP-4-2	2	5/01	8	<5	NT	NT
GP-4-10	10	5/01	410	<5	NT	NT
GP-5-4	4	5/01	10	<5	NT	NT
GP-5-8	8	5/01	11	<5	NT	NT
GP-5-12	12	5/01	270	<5	NT	NT
GP-5-16	16	5/01	1,200	<5	NT	NT
GP-5-20	20	5/01	<5	<5	NT	NT

µg/kg - micrograms per kilogram (equivalent to parts per billion)

TABLE 1 - SUMMARY OF SOIL TESTING RESULTS, ug/kg (Continued)

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC. (MACTEC) – August 2001						
Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
SB-7	5	8/01	<5.9	<5.9	<120	<5.9
SB-7	10	8/01	110	<5.9	<120	<5.9
SB-7	15	8/01	260	<6.3	<130	<6.3
SB-7	20	8/01	84	<6.1	<120	<6.1
SB-7	25	8/01	10	6.5	<120	<5.8
SB-8	5	8/01	<7.1	<7.1	<140	<7.1
MW-3	5	8/01	7.0	<5.7	<110	<5.7
LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC. (MACTEC) – March 2002						
Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
MW-6	5	3/02	<6.1	<6.1	<120	<6.1
MW-8	5	3/02	<5.6	<5.6	<110	<5.6
MW-9	5	3/02	<6.1	<6.1	<120	<6.1
MW-10	2	3/02	<6.2	<6.2	<120	<6.2
HA-1	2	4/02	<6.9	<6.9	<140	<6.9
HA-2	2	4/02	<5.9	<5.9	<120	<5.9
MACTEC ENGINEERING AND CONSULTING, INC. – July 2005						
Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
HA-3	2	7/05	<3.6	<3.6	150	13
HA-4	2	7/05	<7.8	<7.8	<160	<7.8
HA-5	1	7/05	8.5	<5.5	<110	<5.5
HA-5 (Dup)	1	7/05	6.9	<5.5	<110	<5.5
HA-5	3	7/05	20	<5.2	<100	<5.2

µg/kg - micrograms per kilogram (equivalent to parts per billion)

TABLE 1 - SUMMARY OF SOIL TESTING RESULTS, ug/kg (Continued)

MACTEC ENGINEERING AND CONSULTING, INC. – JANUARY 2006						
Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
SB-10	4	1/06	34	<6.3	<130	<6.3
SB-11	12	1/06	55	<5.3	<110	<5.3
SB-11	16	1/06	77	<6.1	<110	<6.1
SB-11	20	1/06	930	7.8	<120	<6.1
SB-12	8	1/06	34	<6.5	<130	<6.5
SB-12	16	1/06	230	<7.2	<140	<7.2
SB-12	20	1/06	21	<6.3	<130	<6.3
SB-13	8	1/06	41	<6.2	<120	<6.2
SB-13	12	1/06	100	<6.6	<130	<6.6
SB-13	16	1/06	640	<5.8	<120	<5.8
SB-16	8	1/06	<6.3	<6.3	<130	<6.3
SB-16	12	1/06	530	<6.0	<120	<6.0
SB-16	16	1/06	130	<6.3	<130	<6.3
SB-17	8	1/06	9	<7.4	<110	<7.4
SB-17	12	1/06	730	<6.5	<130	<6.5
SB-17	16	1/06	390	<7.1	<140	<7.1

µg/kg - micrograms per kilogram (equivalent to parts per billion)

TABLE 1 - SUMMARY OF SOIL TESTING RESULTS, ug/kg (Continued)

MACTEC ENGINEERING AND CONSULTING, INC. – AUGUST 2009						
Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
SB-21-20	20	8/09	<5.0	<7.3	<150	<7.3
SB-22-2.5	2.5	8/09	16	<6.3	<130	<6.3
SB-22-7.5	7.5	8/09	38	<4.9	<98	<4.9
SB-22-12.5	12.5	8/09	180	<5.4	<110	<5.4
SB-23-2	2	8/09	11	<5.8	<120	<5.8
SB-23-7.5	7.5	8/09	6.2	<5.8	<120	<5.8
SB-23-12.5	12.5	8/09	37	<5.3	<110	<5.3
SB-24-2	2	8/09	<5.0	<5.7	<110	<5.7
SB-24-5	5	8/09	5.5	<4.8	<96	<4.8
SB-24-7.5	7.5	8/09	13	<5.9	<120	<5.9
SB-25-2.5	2.5	8/09	<4.8	<4.8	<96	<4.8
SB-25-7.5	7.5	8/09	<5.4	<5.4	<110	<5.4
SB-25-12.5	12.5	8/09	390	<4.9	<98	<4.9
SB-26-5	5	8/09	35	<5.9	<120	<5.9
SB-26-17.5	17.5	8/09	<4.8	<4.8	<96	<4.8
SB-26-17.5 Ft. (Dup)	17.5	8/09	<5.0	<5.0	<100	<5.0
SB-27-12.5	12.5	8/09	960	<4.8	<96	<4.8
SB-28-12.5	12.5	8/09	240	<5.9	<120	<5.9
SB-28-12.5 Ft. (Dup)	12.5	8/09	200	<5.9	<120	<5.9
SB-28-20	20	8/09	1,100	<4.6	<93	<4.6
MACTEC ENGINEERING AND CONSULTING, INC. – MARCH 2010						
Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
SB-29	2	3/10	<7.3	<7.3	<150	<7.3
SB-29	12	3/10	48	<6.2	<120	<6.2
SB-29	20	3/10	180	<7.0	150	<7.0
SB-30	2	3/10	<7.5	<7.5	<150	<7.5
SB-30	12	3/10	440E	<8.1	<160	<8.1
SB-30	20	3/10	230	<7.7	<150	<7.7
SB-31	2	3/10	<6.0	<6.0	<120	<6.0
SB-31	12	3/10	<6.8	<6.8	<140	<6.8
SB-31	20	3/10	49	<7.8	<160	<7.8

µg/kg - micrograms per kilogram (equivalent to parts per billion)

TABLE 2 – SUMMARY OF GROUNDWATER/SURFACE WATER TESTING, µg/l

Well No.	Sampling Date	PCE	TCE	Trans-1,2-DCE	Cis-1,2-DCE	Vinyl Chloride	Chloroform	Styrene
MW-2	7/00	790	303	171	626	3	<2	<2
	7/8/05	880	440	450	2600	55	<5	<5
	9/11/06	2700	560	98	2200	150	<5	<5
	3/21/07	1200	280	160	2000	620	<5	<5
	7/3/07	1200	140	30	600	710	<5	<5
	8/17/07	250	61	37	540	1100	<5	<5
	11/07	660	220	16	590	660	<5	<5
	1/18/08	370	120	8.8	340	160	<5	<5
	4/29/08	410	150	14	390	310	<5	<5
	8/15/08	510	170	10	260	390	<5	<5
	10/28/08	350	130	12	320	190	<5	<5
	2/27/09	620	230	6.1	300	480	<5	<5
	8/19/09	220	240	7.2	400	190	<5	<5
	12/16/09	160	840	70	1100	43	<5	<5
	3/30/10	270	920	78	790	93	<5	<5
	6/30/10	43	690	83	1200	100	<5	<5
MW-3	8/15/01	<2	<2	<2	<2	<2	10	<2
	7/13/05	<5	<5	<5	<5	<2	<5	<5
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	10/28/08(dup)	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	3/30/10	6.4	<5	<5	<5	<2	<5	<5
	6/30/10	<5	<5	<5	<5	<2	<5	<5
	6/30/10 (dup)	<5	<5	<5	<5	<2	<5	<5
MW-4	8/15/01	3	<2	<2	10	<2	<2	<2
	7/13/05	15	<5	<5	<5	<2	<5	<5
	9/11/06	<5	<5	<5	14	2	<5	<5
	3/21/07	5.9	<5	<5	<5	<2	<5	<5
MW-4R	7/3/07	6.9	<5	<5	6.9	<2	<5	<5
	11/07	8.4	<5	<5	<5	<2	<5	<5
	1/18/08	<5	<5	<5	<5	<2	<5	<5
	4/29/08	<5	<5	<5	<5	<2	<5	<5
	8/15/08	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	5.8	<5	<5	<5	<2	<5	<5
	3/30/10	<5	5.8	<5	9.8	<2	<5	<5
	6/30/10	<5	6.5	<5	9.8	<2	<5	<5
MW-5	8/15/01	<2	<2	<2	<2	<2	<2	<2
	7/8/05	<5	<5	<5	<5	<2	<5	<5
	3/21/07	<5	<5	<5	<5	<2	<5	<5
	7/3/07	<5	<5	<5	<5	<2	<5	<5
	11/07	<5	<5	<5	<5	<2	<5	<5
	1/18/08	<5	<5	<5	<5	<2	<5	<5
	4/29/08	<5	<5	<5	<5	<2	<5	<5
	8/15/08	<5	<5	<5	<5	<2	<5	<5
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	<5	<2	<5	<5
	2/27/09 (dup)	<5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	3/30/10	<5	<5	<5	<5	<2	<5	<5
	6/30/10	<5	<5	<5	<5	<2	<5	<5
MW-6	3/14/02	<2	<2	<2	<2	<2	<2	<2
	7/8/05	<5	<5	<5	<5	<5	<5	<5

TABLE 2 – SUMMARY OF GROUNDWATER/SURFACE WATER TESTING, µg/l (CONT.)

Well No.	Sampling Date	PCE	TCE	Trans-1,2-DCE	Cis-1,2-DCE	Vinyl Chloride	Chloroform	Styrene
MW-7	3/14/02	830	130	18	45	<2	<2	<5
	7/8/05	1000	180	18	67	<2	<5	<5
	9/11/06	1800	260	58	100	<2	<5	<5
	3/21/07	2200	270	30	98	<2	<5	<5
	7/3/07	2900	210	37	87	<2	<5	<5
	7/3/07 (dup)	2400	200	29	96	<2	<5	<5
	8/17/07	1400	85	<5	43	<2	<5	<5
	11/07	1900	240	27	180	<2	<5	<5
	11/07 (dup)	1600	280	23	110	<2	<5	<5
	1/18/08	1700	130	14	85	<2	<5	<5
	1/18/08 (dup)	1800	140	11	70	<2	<5	<5
	4/29/08	3100	220	11	75	<2	<5	<5
	4/29/08 (dup)	3100	190	12	84	<2	<5	<5
	8/15/08	2100	190	6	91	<2	<5	<5
	10/28/08	2100	350	12	100	<2	<5	<5
	2/27/09	1800	370	9.9	120	<2	<5	<5
	8/19/09	2900	370	13	89	<2	<5	<5
	12/16/09	4400	680	47	250	<2	<5	<5
	3/30/10	3800	560	47	210	<2	<5	<5
	6/30/10	4800	830	69	280	<2	<5	<5
MW-8	3/14/02	<2	<2	<2	<2	<2	<2	<2
	7/8/05	<5	<5	<5	<5	<2	<5	<5
MW-9	3/14/02	<2	<2	<2	<2	<2	7	<2
	7/8/05	<5	<5	<5	<5	<2	<5	<5
MW-10	3/14/02	<2	<2	<2	<2	<2	<2	<2
	7/8/05	<5	<5	<5	<5	<5	<5	<5
MW-11	4/4/02	18	18	4	28	2	<2	<2
	7/8/05	<5	<5	<5	<5	<2	<5	<5
	3/21/07	<5	<5	<5	<5	<2	<5	<5
MW-11R	7/3/07	<5	<5	<5	5.6	<2	<5	<2
	11/07	<5	<5	<5	<5	<2	<5	<5
	1/18/08	<5	<5	<5	5.5	<2	<5	<5
	4/29/08	<5	8.6	<5	26	2.2	<5	<5
	8/15/08	<5	<5	<5	<5	<2	<5	<5
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	7.6	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	3/30/10	110	65	11	170	5.7	<5	<5
	6/30/10	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample
MW-12	6/12/02	<2	<2	<2	<2	<2	<2	<2
	7/13/05	<5	<5	<5	<5	<2	<5	<5
	3/21/07	<5	<5	<5	<5	<2	<5	<5
MW-12R	7/3/07	<5	<5	<5	<5	<2	<5	<5
	11/07	<5	<5	<5	<5	<2	<5	<5
	1/18/08	<5	<5	<5	<5	<2	<5	<5
	4/29/08	<5	<5	<5	<5	<2	<5	<5
	8/15/08	<5	<5	<5	<5	<2	<5	<5
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	3/30/10	<5	<5	<5	<5	<2	<5	<5
	6/30/10	<5	<5	<5	<5	<2	<5	<5
DW-1	3/22/06	<5	<5	<5	<5	<2	<5	<5
	10/28/08	6.6	<5	<5	<5	<2	<5	<5
	2/27/09	8.5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09 (dup)	<5	<5	<5	<5	<2	<5	<5
	3/30/10	26	<5	<5	<5	<2	<5	<5
	3/30/10 (dup)	27	<5	<5	<5	<2	<5	<5
	6/30/10	34	6.4	<5	<5	<2	<5	<5

µg/l - micrograms per liter

TABLE 2 – SUMMARY OF GROUNDWATER/SURFACE WATER TESTING, µg/l (CONT.)

Well No.	Sampling Date	PCE	TCE	Trans-1,2-DCE	Cis-1,2-DCE	Vinyl Chloride	Chloroform	Styrene
MW-13	8/19/09	43	9.5	<5	6.3	<2	<5	<5
MW-14	8/19/09	<5	<5	<5	<5	<2	<5	<5
	8/19/09 (dup)	<5	<5	<5	<5	<2	<5	<5
MW-15	8/19/09	<5	<5	<5	<5	<2	<5	<5
SW-1	8/15/01	<5	<5	<5	<5	<2	<5	<5
	3/21/07	<5	<5	<5	<5	<2	<5	<5
	7/3/07	<5	<5	<5	<5	<2	<5	<5
	11/07	<5	<5	<5	<5	<2	<5	<5
	1/18/08	<5	<5	<5	<5	<2	<5	<5
	4/29/08	<5	<5	<5	<5	<2	<5	<5
	8/15/08	<5	<5	<5	<5	<2	<5	<5
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	3/30/10	<5	<5	<5	<5	<2	<5	5.1
	6/30/10	<5	<5	<5	<5	<2	<5	<5
SW-2	8/15/01	<5	<5	<5	<5	<2	<5	<5
	3/21/07	<5	<5	<5	<5	<2	<5	<5
	7/3/07	<5	<5	<5	<5	<2	<5	<5
	11/07	<5	<5	<5	<5	<2	<5	<5
	1/18/08	<5	<5	<5	<5	<2	<5	<5
	4/29/08	<5	<5	<5	<5	<2	<5	<5
	8/15/08	<5	<5	<5	<5	<2	<5	<5
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	3/30/10	<5	<5	<5	<5	<2	<5	5.6
	6/30/10	<5	<5	<5	<5	<2	<5	<5
SW-3	7/8/05	<5	<5	<5	<5	<2	<5	<5
	3/2107	<5	<5	<5	<5	<2	<5	<5
	7/3/07	<5	<5	<5	<5	<2	<5	<5
	11/07	<5	<5	<5	<5	<2	<5	<5
	1/18/08	<5	<5	<5	<5	<2	<5	<5
	4/29/08	<5	<5	<5	<5	<2	<5	<5
	8/15/08	<5	<5	<5	<5	<2	<5	<5
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	3/30/10	<5	<5	<5	<5	<5	<5	5.6
	6/30/10	<5	<5	<5	<5	<5	<5	<5

µg/l - micrograms per liter

TABLE 3 - MONITORING WELL CONSTRUCTION DATA AND GROUNDWATER LEVELS - 3/30/10

Well No.	Well Depth, BGS, Ft.	Screened Interval, Ft.	Ground Surface Elevation, Ft.	Top of Casing Elevation, Ft.	Depth to Water, TOC Ft.	Water Table Elevation, Ft.
MW-2	24	14 - 24	1027.15	1026.80	21.15	1005.65
MW-3	52	47 - 52	1026.99	1026.83	22.91	1003.92
MW-4R	7	5 - 7	1006.87	1009.62	8.12	1001.50
MW-5	6	4 – 6	1005.06	1007.51	5.71	1001.80
MW-6	33	23 – 33	1030.35	1030.08	24.11	1005.97
MW-7	33	23 -33	1029.91	1029.59	23.91	1005.68
MW-8	21	11 - 21	1029.96	1029.61	21.04	1016.32
MW-9	30	20 - 30	1027.69	1027.44	21.04	1006.40
MW-10	3.5	1.5 – 3.5	1002.65	1006.56	4.46	1002.10
MW-11R	5.5	3 – 5.5	1005.32	1007.52	Dry	NA
MW-12R	5.5	3 – 5.5	1003.57	1004.82	4.06	1000.76
MW-13	35	25 – 35	1032.12	1031.92	NM	NM
MW-14	35	25 – 35	1032.15	1031.84	NM	NM
MW-15	35	25 – 35	1032.10	1031.94	NM	NM
DW-1	55.5	50.5 – 55.5	1029.76	1029.46	24.21	1005.25

BGS - Below Ground Surface
TOC - Top of Casing
NM - Not measured

TABLE 4 – SUMMARY OF SLUG TEST DATA

Well No.	Hydraulic Conductivity, cm/sec (Slug-In)	Hydraulic Conductivity, cm/sec (Slug-Out)	Strata Measured
MW-3	20.05×10^{-5}	30.08×10^{-5}	Fractured Rock
MW-8	2.140×10^{-5}	6.553×10^{-5}	Residual Soil/Partially Weathered Rock
MW-9	9.396×10^{-5}	9.194×10^{-5}	Fill, Alluvial Soil, Residual Soil

cm/sec – centimeters per second

TABLE 5 – CUMULATIVE SUMMARY OF AIR MONITORING DATA, 2001 - 2010, mg/m^3

Sample Location	Constituent	5/01	1/08	3/08	4/08	7/10	Target Indoor Air Concentration
AS-1	Tetrachloroethene	780	33	9.4	8.0	NT	7.0
	Trichloroethene	<60	0.43	0.22	0.34	NT	0.36
	Cis-1,2-Dichloroethene	<60	<0.25	<0.13	<0.13	NT	35
	Trans-1,2-Dichloroethene	<60	<0.25	<0.13	<0.13	NT	70
	Vinyl Chloride	<60	<2.5	<0.13	<0.13	NT	5.0
AS-2	Tetrachloroethene	630	44	12	9.7	NT	7.0
	Trichloroethene	<60	0.64	0.21	0.24	NT	0.36
	Cis-1,2-Dichloroethene	<60	<0.26	<0.13	<0.13	NT	35
	Trans-1,2-Dichloroethene	<60	<0.26	<0.13	<0.13	NT	70
	Vinyl Chloride	<60	<2.5	<0.13	<0.13	NT	5.0
AS-3	Tetrachloroethene	NT	50	10	7.0	NT	7.0
	Trichloroethene	NT	0.76	0.17	0.40	NT	0.36
	Cis-1,2-Dichloroethene	NT	<0.27	<0.13	<0.13	NT	35
	Trans-1,2-Dichloroethene	NT	<0.27	<0.13	<0.13	NT	70
	Vinyl Chloride	NT	<2.5	<0.13	<0.13	NT	5.0
AS-4	Tetrachloroethene	NT	35	10	6.2	NT	7.0
	Trichloroethene	NT	0.55	0.25	0.33	NT	0.36
	Cis-1,2-Dichloroethene	NT	<0.26	<0.13	<0.13	NT	35
	Trans-1,2-Dichloroethene	NT	<0.26	<0.13	<0.13	NT	70
	Vinyl Chloride	NT	<2.6	<0.13	<0.13	NT	5.0
AS-5 (Background)	Tetrachloroethene	NT	<0.54	NT	NT	NT	7.0
	Trichloroethene	NT	<0.27	NT	NT	NT	0.36
	Cis-1,2-Dichloroethene	NT	<0.27	NT	NT	NT	35
	Trans-1,2-Dichloroethene	NT	<0.27	NT	NT	NT	70
	Vinyl Chloride	NT	<2.7	NT	NT	NT	5.0
TH-1 (Thai House)	Tetrachloroethene	NT	NT	NT	NT	3.2	7.0
	Trichloroethene	NT	NT	NT	NT	<0.21	0.36
	Cis-1,2-Dichloroethene	NT	NT	NT	NT	<0.79	35
	Trans-1,2-Dichloroethene	NT	NT	NT	NT	<0.79	70
	Vinyl Chloride	NT	NT	NT	NT	<0.51	5.0

$\mu g/m^3$ - micrograms per cubic meter
NT - Not tested
Shaded values exceed Target Indoor Air Concentrations

TABLE 6 – SUMMARY OF NATURAL ATTENUATION PARAMETERS IN GROUNDWATER

Well No.	Sampling Date	pH	Specific Conductivity mS/cm	Turbidity NTU	Dissolved Oxygen mg/L	Oxidation-Reduction Potential mV
MW-2	3/30/10 6/30/10	5.71 5.90	0.287 0.910	168 7.8	6.00 2.02	270 -39
MW-5	3/30/10 6/30/10	5.68 5.29	0.198 1.32	11 10.2	6.71 1.53	157 98
MW-7	3/30/10 6/30/10	4.81 4.80	0.231 0.191	2.91 10.4	4.64 2.32	479 331

mg/l - milligrams per liter (parts per million)
µg/l - micrograms per liter (parts per billion)
mS/cm - microSiemens per centimeter
mV - millivolts
NTU - Nephelometric Turbidity Units

TABLE 6 – SUMMARY OF NATURAL ATTENUATION PARAMETERS IN GROUNDWATER (Continued)

Well No.	Sampling Date	Alkalinity mg/L	Sulfide mg/L	Ferrous Iron mg/L	Methane µg/l	Ethene µg/l	Ethane µg/l	Chloride mg/l	Nitrate mg/l	Nitrite mg/l	Sulfate mg/l
MW-2	3/30/10 6/30/10	102 103	<2.0 <2.0	27.0 33.4	1400 1100	11 10	<9 <9	NT 11	NT <0.25	NT <0.25	NT 6.8
MW-5	3/30/10 6/30/10	45.5 32.8	<2.0 <2.0	1.40 1.38	21 44	<7 <7	<9 <9	NT 15	NT 0.71	NT <0.25	NT 4.8
MW-7	3/30/10 6/30/10	15.0 15.9	<2.0 <2.0	<0.10 <0.10	5.0 14	<7 <7	<9 <9	NT 24	NT 4.7	NT <0.25	NT 15

mg/l - milligrams per liter (parts per million)
µg/l - micrograms per liter (parts per billion)

TABLE 7 – SOIL LEACHABILITY TESTING RESULTS

Constituent	GP-3-4 / LCH-1		GP-5-16 / LCH-2	
	Total VOC Result, µg/kg	SPLP Result, mg/l	Total VOC Result, µg/kg	SPLP Result, mg/l
PCE	650	<0.2	1,200	<0.2
TCE	<5	<0.2	<5	<0.2
Cis-1,2-DCE	<5	<0.2	<5	<0.2
Trans-1,2-DCE	<5	<0.2	<5	<0.2
Vinyl Chloride	<5	<0.2	<5	<0.2

µ/kg - micrograms per kilogram
mg/l - milligrams per liter

TABLE 8 – SUMMARY OF SOIL AND GROUNDWATER RISK REDUCTION STANDARDS

SOIL

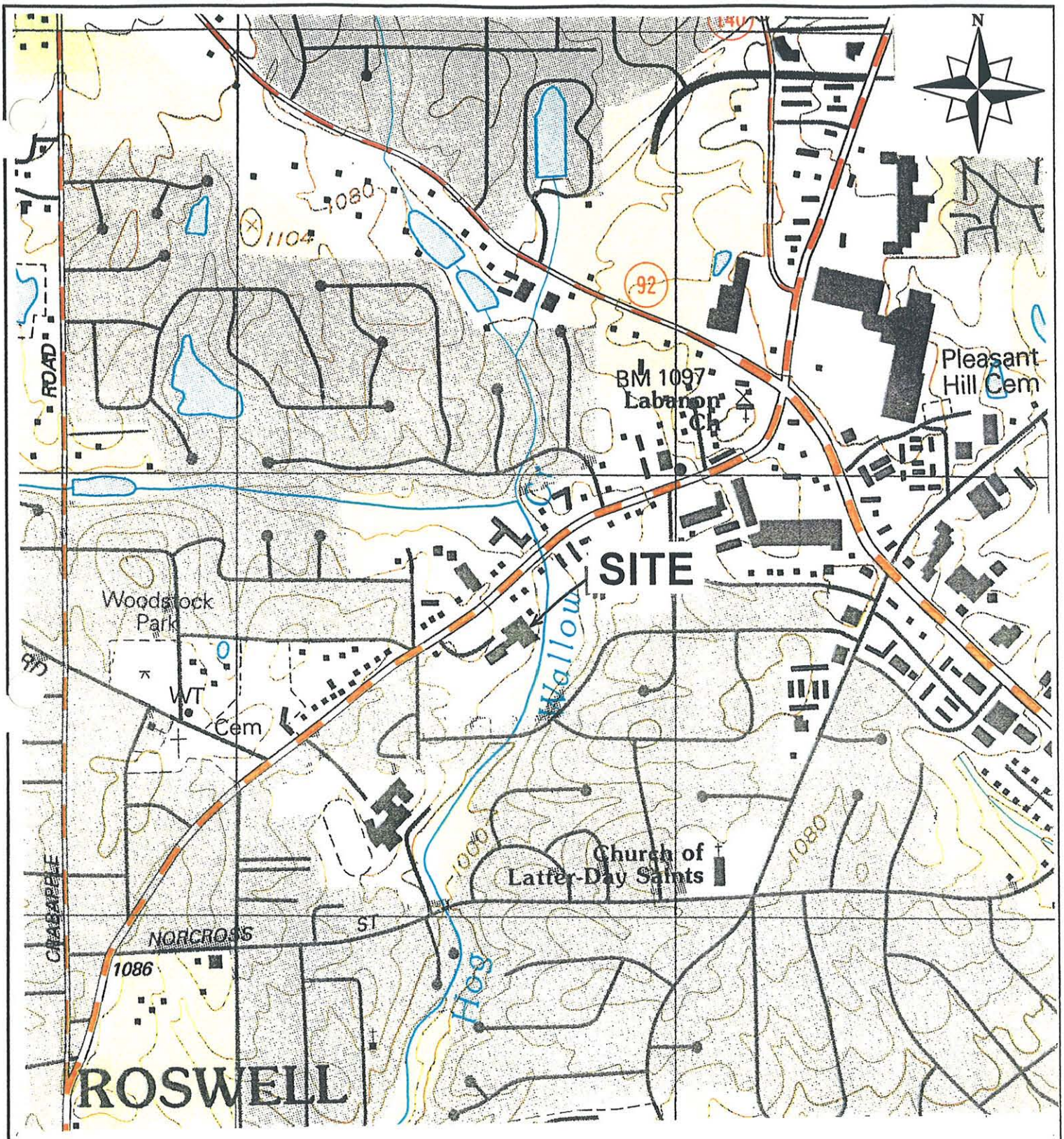
Regulated Substance	Highest Concentration, µg/kg	Location	Type 1 RRS Criteria, µg/kg (Residential Default)	Type 2 RRS Criteria, µg/kg (Residential Calculated)	Type 3 RRS Criteria, µg/kg (Non-Residential Default)	Type 4 RRS Criteria, µg/kg (Non-Residential Calculated)
Tetrachloroethene	7,700	SB-6	500	340	500	1,200
Trichloroethene	7.8	SB-11	500	360	500	360
Acetone	150	HA-3	400,000	22,000	400,000	22,000
Toluene	13	HA-3	100,000	77,000	100,000	77,000

GROUNDWATER

Regulated Substance	Highest Concentration, µg/l 3/30/10	Location	Type 1 RRS Criteria, µg/l (Residential Default)	Type 2 RRS Criteria, µg/l (Residential Calculated)	Type 3 RRS Criteria, µg/l (Non-Residential Default)	Type 4 RRS Criteria, µg/l (Non-Residential Calculated)
Tetrachloroethene	4,800	MW-7	5	1.3	5	3.8
Trichloroethene	830	MW-2	5	0.35	5	0.65
Cis-1,2-Dichloroethene	280	MW-2	2.5	160	2.5	1,000
Trans-1,2-Dichloroethene	83	MW-2	100	310	100	2,000
Vinyl Chloride	100	MW-2	2	2	2	3.2

µg/kg - micrograms per kilogram (equivalent to parts per billion)
µg/L - micrograms per liter (equivalent to parts per billion)
Note - Shaded values indicate compliance with RRS

FIGURES



Source: USGS Topographic Map, Roswell, GA Quadrangle, dated 1992

FORMER IMPERIAL
CLEANERS
ROSWELL, GEORGIA

MACTEC
Mactec Engineering and Consulting, Inc.
396 PLASTERS AVENUE NE.
ATLANTA, GEORGIA 30324
(404)873-4761

SITE LOCATION / TOPOGRAPHIC MAP

JOB NO: 6305050319	DATE: Sept. 2010	FIGURE: 1

J:_PLASTERS CAD\Atlanta Projects\FORMER IMPERIAL CLEANERS\SEPT 2010\AERIAL-1.dwg - Layout1 10/13/2010 4:25pm TGLADSTO

SOURCE: USGS HIGH RESOLUTION ORTHOIMAGERY FOR THE ATLANTA, GEORGIA, URBAN 2008.

SCALE IN FEET

0 200 400

FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

MACTEC
MACTEC Engineering and Consulting, Inc.
3200 TOWN POINT DRIVE, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

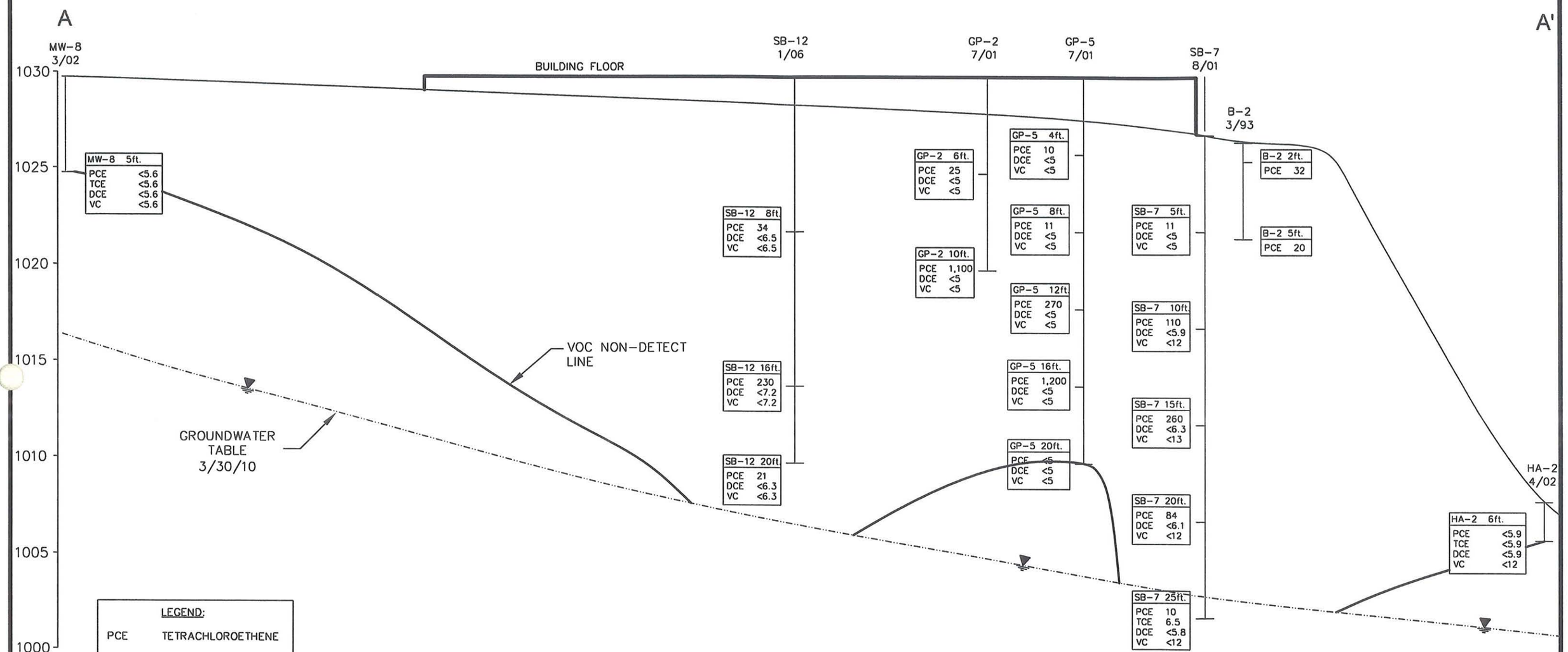
SITE AND VICINITY AERIAL PHOTOGRAPH

JOB NO. 6305-05-0319 FIGURE 2

PREPARED BY/DATE TG

CHECKED BY/DATE SF

J:_PLASTERS CAD\Atlanta Projects\FORMER IMPERIAL CLEANERS\0319-SITEPLAN.dwg - CROSS-SECTION A-A 09/30/2010 2:02pm rthorpe



LEGEND:

PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
DCE	DICHLOROETHENE
VC	VINYL CHLORIDE

5'
0 25'

NOTE: ALL RESULTS PRESENTED IN MICROGRAMS PER KILOGRAM (µg/kg)

SCALE:
VERTICAL: 1"=5'
HORIZONTAL: 1"=25'

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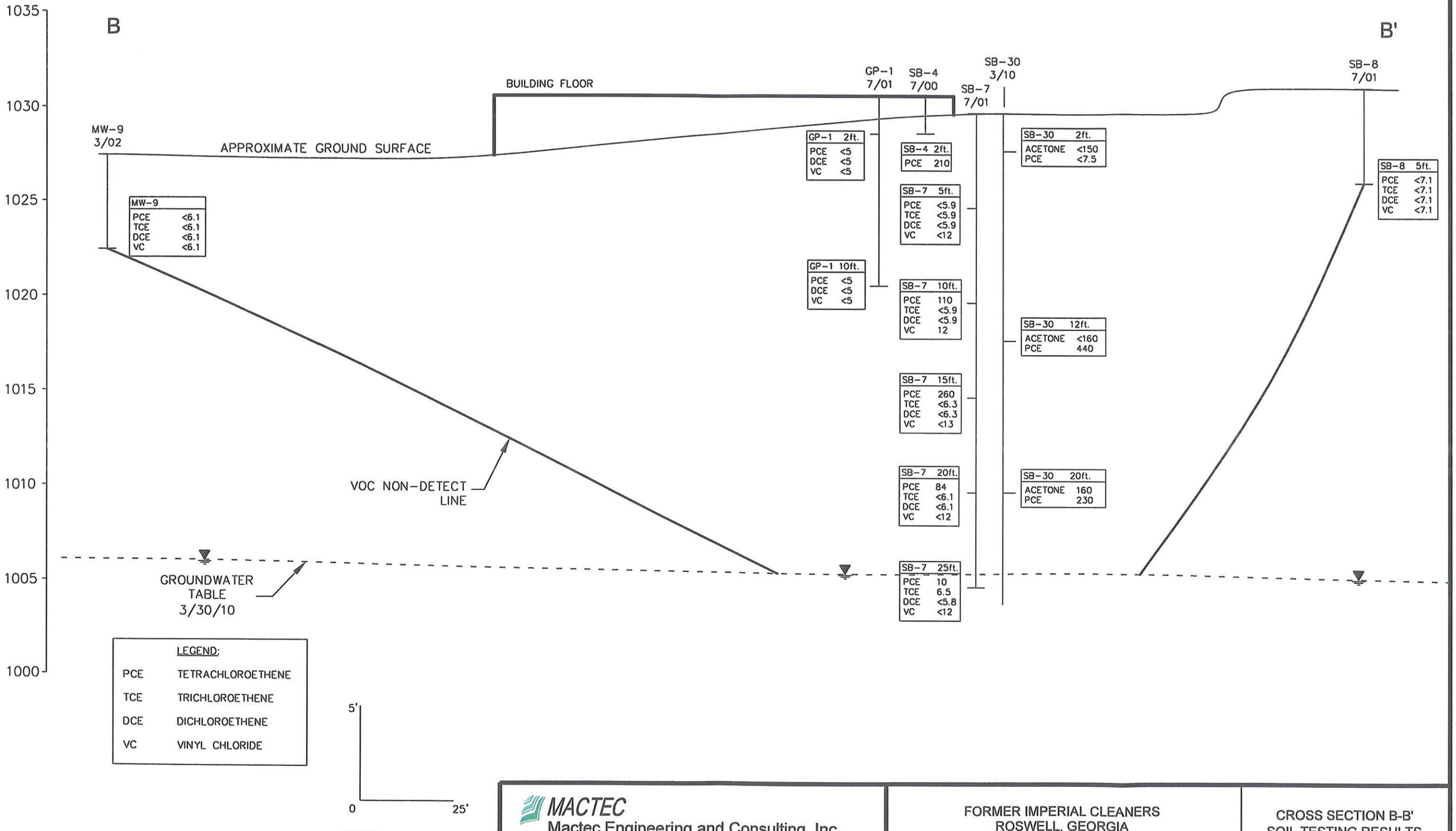
FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

CROSS SECTION A-A'
SOIL TESTING RESULTS

Job Number	Task	Date	Scale	Drawn By	Approved By	Figure
6305-05-0319	12	SEPT. 2010	AS SHOWN	RBT	SRF	3

J:_PLASTERS CAD\Atlanta Projects\FORMER IMPERIAL CLEANERS\0319-SITEPLAN.dwg - CROSS-SECTION B-B 09/30/2010 2:02pm rthorpe



NOTE: ALL RESULTS PRESENTED IN MICROGRAMS PER LITER (µg/l)

SCALE:
VERTICAL: 1"=5'
HORIZONTAL: 1"=25'

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FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

CROSS SECTION B-B'
SOIL TESTING RESULTS

Job Number	Task	Date	Scale	Drawn By	Approved By	Figure
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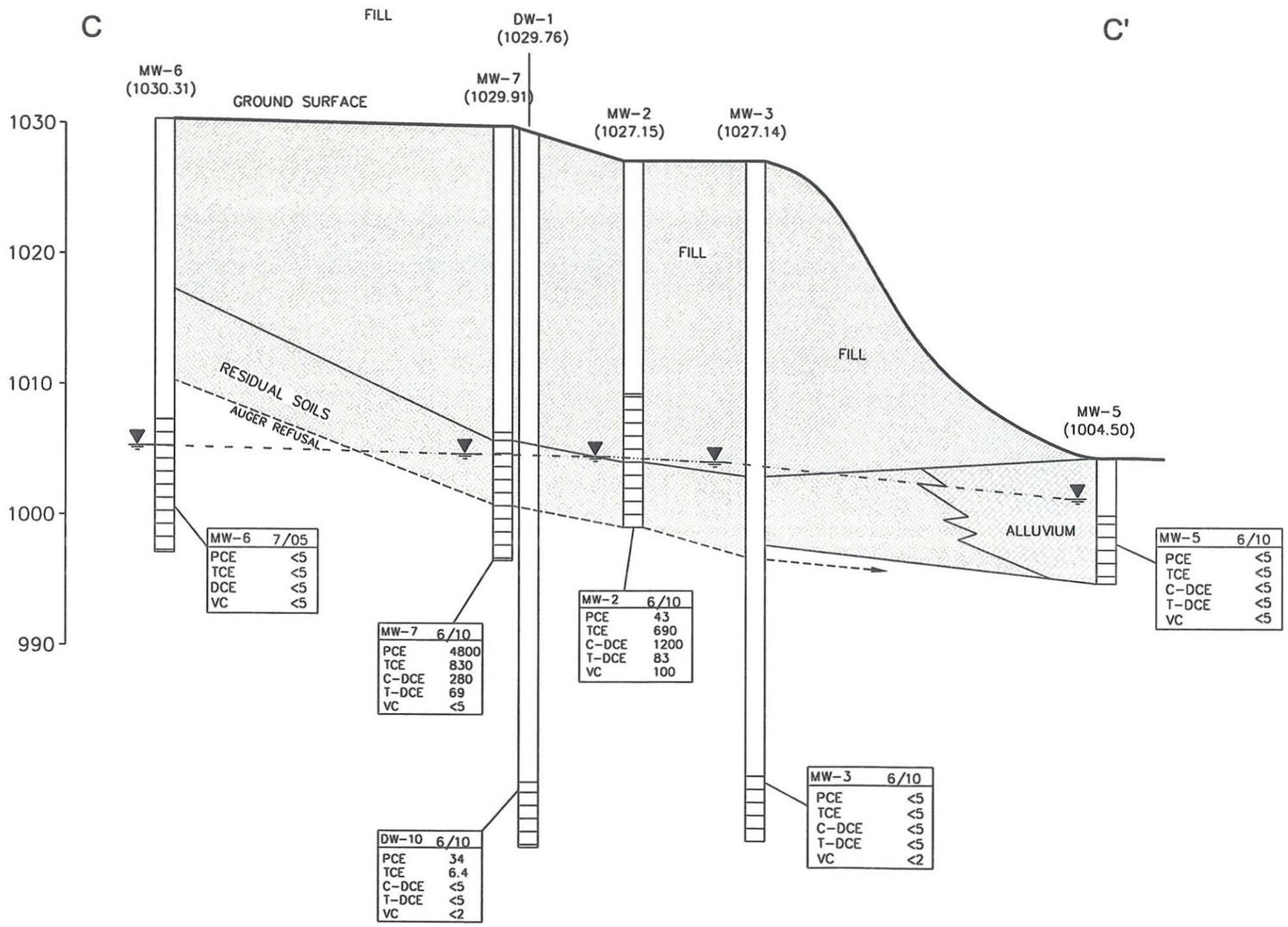
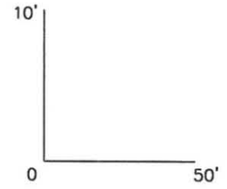


LEGEND:

PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
DCE	DICHLOROETHENE
C-DCE	CIS-1,2-DICHLOROETHENE
T-DCE	TRANS-1,2-DICHLOROETHENE
VC	VINYL CHLORIDE

FILL
RESIDUAL SOILS
ALLUVIUM

NOTE: ALL RESULTS PRESENTED IN MICROGRAMS PER LITER (µg/l)



SCALE:
VERTICAL: 1"=10'
HORIZONTAL: 1"=50'

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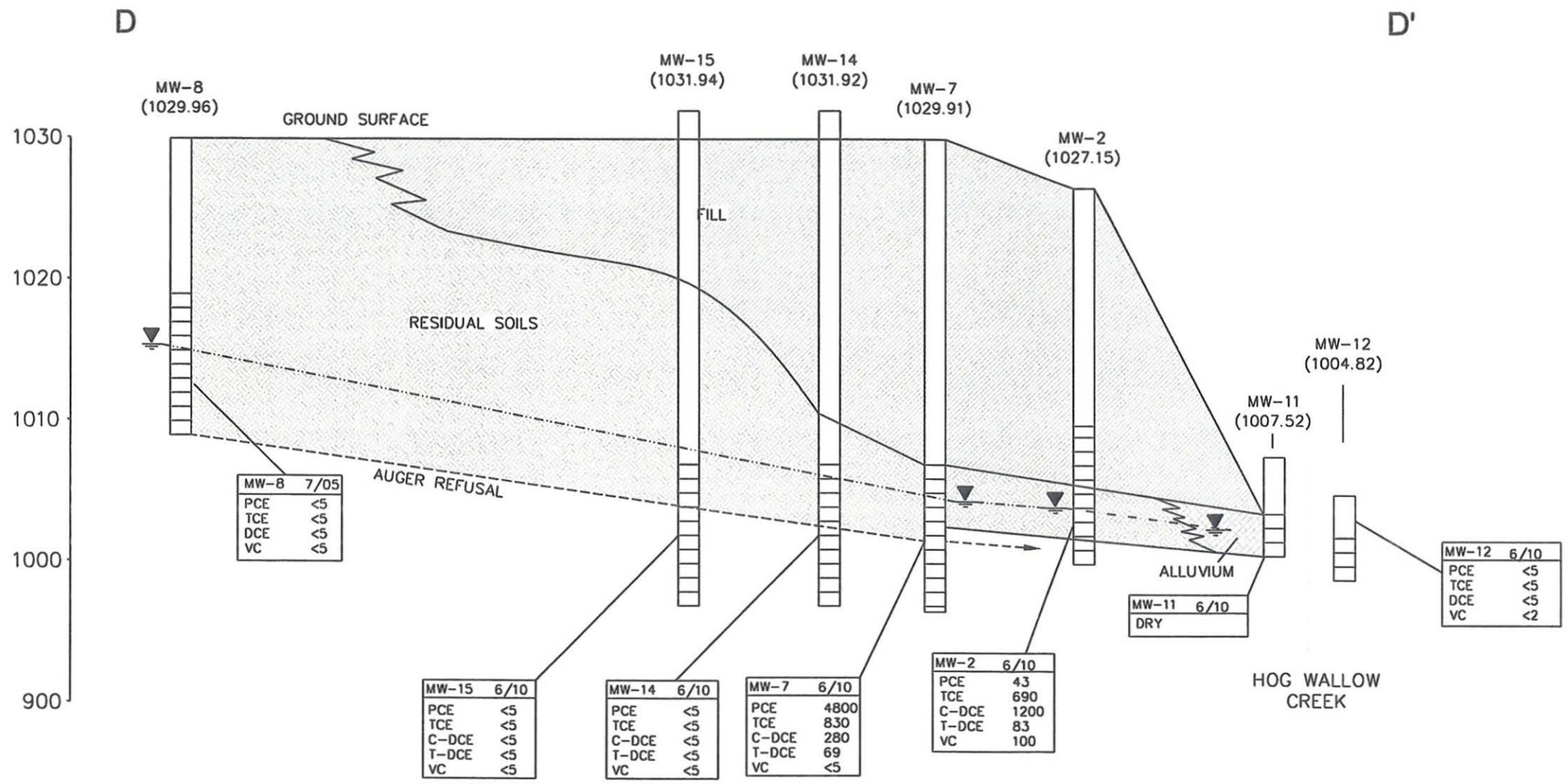
FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

CROSS SECTION C-C'
RECENT GROUNDWATER
TESTING RESULTS

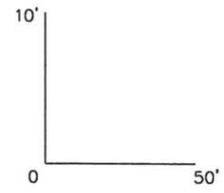
Job Number	Task	Date	Scale	Drawn By	Approved By	Figure
6305-05-0319	12	SEPT. 2010	AS SHOWN	RBT	SRF	5



LEGEND:

PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
DCE	DICHLOROETHENE
C-DCE	CIS-1,2-DICHLOROETHENE
T-DCE	TRANS-1,2-DICHLOROETHENE
VC	VINYL CHLORIDE
	FILL
	RESIDUAL SOILS
	ALLUVIUM

NOTE: ALL RESULTS PRESENTED IN MICROGRAMS PER LITER (µg/l)



SCALE:
VERTICAL: 1"=10'
HORIZONTAL: 1"=50'

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FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

CROSS SECTION D-D'
RECENT GROUNDWATER
TESTING RESULTS

Job Number	Task	Date	Scale	Drawn By	Approved By	Figure
6305-05-0319	12	SEPT. 2010	AS SHOWN	RBT	SRF	6

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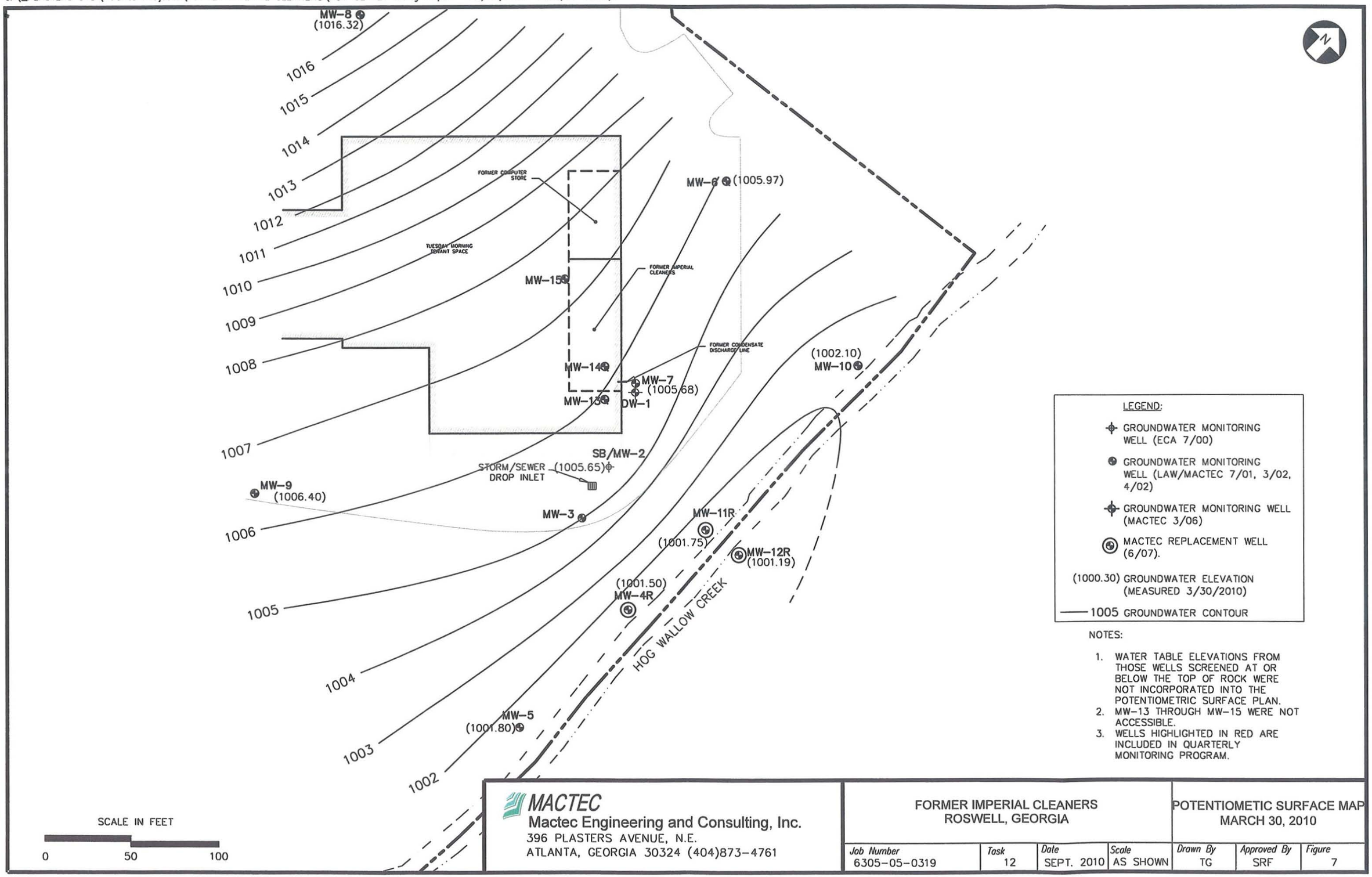

LEGEND:

- GROUNDWATER MONITORING WELL (ECA 7/00)
- GROUNDWATER MONITORING WELL (LAW/MACTEC 7/01, 3/02, 4/02)
- GROUNDWATER MONITORING WELL (MACTEC 3/06)
- MACTEC REPLACEMENT WELL (6/07).
- (1000.30) GROUNDWATER ELEVATION (MEASURED 3/30/2010)
- 1005 GROUNDWATER CONTOUR

NOTES:

1. WATER TABLE ELEVATIONS FROM THOSE WELLS SCREENED AT OR BELOW THE TOP OF ROCK WERE NOT INCORPORATED INTO THE POTENTIOMETRIC SURFACE PLAN.
2. MW-13 THROUGH MW-15 WERE NOT ACCESSIBLE.
3. WELLS HIGHLIGHTED IN RED ARE INCLUDED IN QUARTERLY MONITORING PROGRAM.

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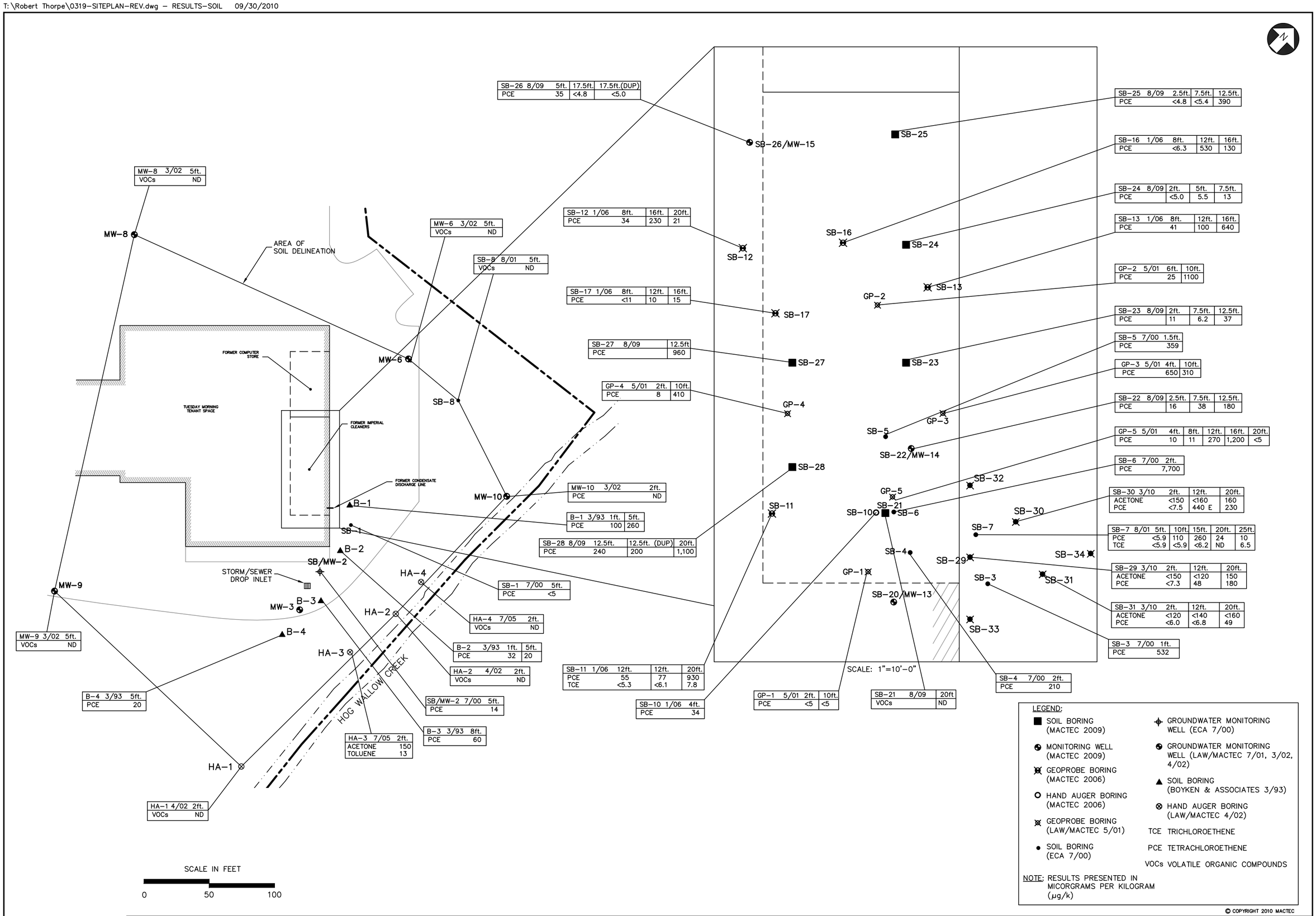
FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

POTENTIOMETIC SURFACE MAP
MARCH 30, 2010

Job Number	Task	Date	Scale	Drawn By	Approved By	Figure
6305-05-0319	12	SEPT. 2010	AS SHOWN	TG	SRF	7

T:\Robert Thorpe\0319-SITEPLAN-REV.dwg - RESULTS-SOIL 09/30/2010



REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED
DRAWN RBT
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DATE SEPT. 2010

FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

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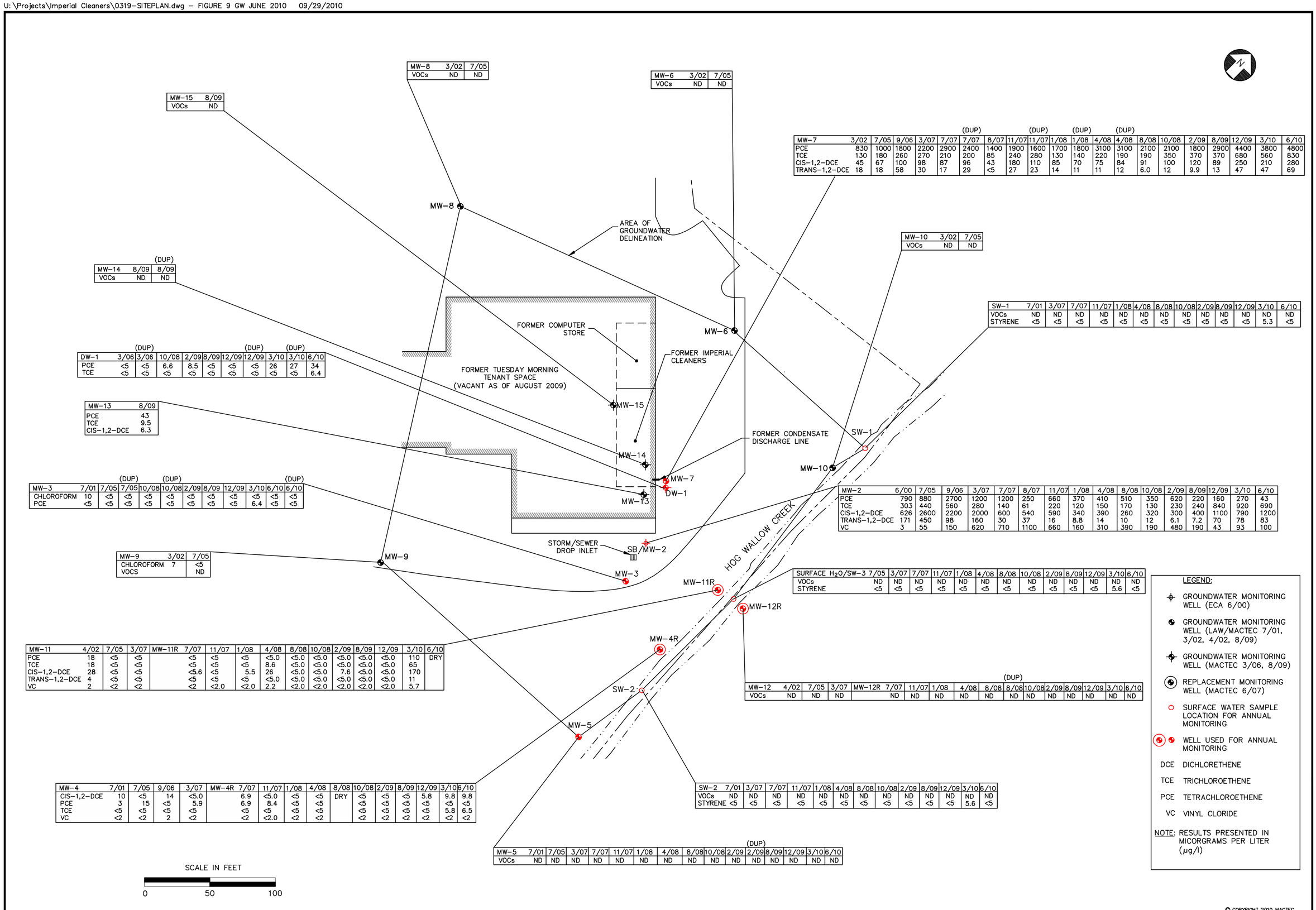
SOIL TESTING RESULTS

SCALE AS SHOWN
CONTRACT 6305-05-0319
FIGURE NO. 8 REV PAGE NO



MW-8	3/02	7/05
VOCs	ND	ND

MW-6	3/02	7/05
VOCs	ND	ND

MW-15	8/09
VOCs	ND

MW-10	3/02	7/05
VOCs	ND	ND

MW-7	3/02	7/05	9/06	3/07	7/07	7/07 (DUP)	8/07	11/07	11/07 (DUP)	1/08	1/08 (DUP)	4/08	4/08 (DUP)	8/08	10/08	2/09	8/09	12/09	3/10	6/10
PCE	830	1000	1800	2200	2900	2400	1400	1900	1600	1700	1800	3100	3100	2100	2100	1800	2900	4400	3800	4800
TCE	130	180	260	270	210	200	85	240	280	130	140	220	190	190	350	370	370	680	560	830
CIS-1,2-DCE	45	67	100	98	87	96	43	180	110	85	70	75	84	91	100	120	89	250	210	280
TRANS-1,2-DCE	18	18	58	30	17	29	<5	27	23	14	11	11	12	6.0	12	9.9	13	47	47	69

MW-14	8/09	8/09 (DUP)
VOCs	ND	ND

DW-1	3/06	3/06 (DUP)	10/08	2/09	8/09	12/09	12/09 (DUP)	3/10	3/10 (DUP)	6/10
PCE	<5	<5	6.6	8.5	<5	<5	<5	26	27	34
TCE	<5	<5	<5	<5	<5	<5	<5	<5	<5	6.4

SW-1	7/01	3/07	7/07	11/07	1/08	4/08	8/08	10/08	2/09	8/09	12/09	3/10	6/10
VOCs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
STYRENE	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	5.3	<5

MW-13	8/09
PCE	43
TCE	9.5
CIS-1,2-DCE	6.3

MW-3	7/01	7/05	7/05 (DUP)	10/08	10/08 (DUP)	2/09	8/09	12/09	3/10	6/10	6/10 (DUP)
CHLOROFORM	10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
PCE	<5	<5	<5	<5	<5	<5	<5	<5	6.4	<5	<5

MW-2	6/00	7/05	9/06	3/07	7/07	8/07	11/07	1/08	4/08	8/08	10/08	2/09	8/09	12/09	3/10	6/10
PCE	790	880	2700	1200	1200	250	660	370	410	510	350	620	220	160	270	43
TCE	303	440	560	280	140	61	220	120	150	170	130	230	240	840	920	690
CIS-1,2-DCE	626	2600	2200	2000	600	540	590	340	390	260	320	300	400	1100	790	1200
TRANS-1,2-DCE	171	450	98	160	30	37	16	8.8	14	10	12	6.1	7.2	70	78	83
VC	3	55	150	620	710	1100	660	160	310	390	190	480	190	43	93	100

MW-9	3/02	7/05
CHLOROFORM	7	<5
VOCS		ND

SURFACE H_2O/SW-3	7/05	3/07	7/07	11/07	1/08	4/08	8/08	10/08	2/09	8/09	12/09	3/10	6/10
VOCs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
STYRENE	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	5.6	<5

MW-11	4/02	7/05	3/07	MW-11R	7/07	11/07	1/08	4/08	8/08	10/08	2/09	8/09	12/09	3/10	6/10
PCE	18	<5	<5		<5	<5	<5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	110	DRY
TCE	18	<5	<5		<5	<5	<5	8.6	<5.0	<5.0	<5.0	<5.0	<5.0	65	
CIS-1,2-DCE	28	<5	<5		<5.6	<5	5.5	26	<5.0	<5.0	7.6	<5.0	<5.0	170	
TRANS-1,2-DCE	4	<5	<5		<5	<5	<5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	11	
VC	2	<2	<2		<2	<2.0	<2.0	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	5.7	

MW-12	4/02	7/05	3/07	MW-12R	7/07	11/07	1/08	4/08	8/08	8/08 (DUP)	10/08	2/09	8/09	12/09	3/10	6/10
VOCs	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

MW-4	7/01	7/05	9/06	3/07	MW-4R	7/07	11/07	1/08	4/08	8/08	10/08	2/09	8/09	12/09	3/10	6/10
CIS-1,2-DCE	10	<5	14	<5.0		6.9	<5.0	<5	<5	DRY	<5	<5	<5	5.8	9.8	9.8
PCE	3	15	<5	5.9		6.9	8.4	<5	<5		<5	<5	<5	<5	<5	<5
TCE	<5	<5	<5	<5		<5	<5	<5	<5		<5	<5	<5	<5	5.8	6.5
VC	<2	<2	2	<2		<2	<2.0	<2	<2		<2	<2	<2	<2	<2	<2

SW-2	7/01	3/07	7/07	11/07	1/08	4/08	8/08	10/08	2/09	8/09	12/09	3/10	6/10
VOCs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
STYRENE	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	5.6	<5

MW-5	7/01	7/05	3/07	7/07	11/07	1/08	4/08	8/08	10/08	2/09	2/09 (DUP)	8/09	12/09	3/10	6/10
VOCs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

LEGEND:

- GROUNDWATER MONITORING WELL (ECA 6/00)
- GROUNDWATER MONITORING WELL (LAW/MACTEC 7/01, 3/02, 4/02, 8/09)
- GROUNDWATER MONITORING WELL (MACTEC 3/06, 8/09)
- REPLACEMENT MONITORING WELL (MACTEC 6/07)
- SURFACE WATER SAMPLE LOCATION FOR ANNUAL MONITORING
- WELL USED FOR ANNUAL MONITORING

DCE DICHLORETHENE
TCE TRICHLOROETHENE
PCE TETRACHLOROETHENE
VC VINYL CLORIDE

NOTE: RESULTS PRESENTED IN MICORGRAMS PER LITER (µg/l)

REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED
DRAWN RBT
CHECKED SF
IN CHARGE
DATE SEP. 2010

FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

MACTEC
Mactec Engineering and Consulting, Inc.
396 PLASTERS AVENUE, N.E.
ATLANTA, GEORGIA (404) 873-4761

CUMULATIVE GROUNDWATER TESTING RESULTS

SCALE AS SHOWN
CONTRACT 6305-05-0319
FIGURE NO. 9 REV PAGE NO

J:_PLASTERS CAD\Atlanta Projects\FORMER IMPERIAL CLEANERS\0319-SITEPLAN.dwg - CROSS-SECTION B-B 09/30/2010 2:02pm rthorpe

AS-3	1/08	3/08	4/08
PCE	50	10	7.0
TCE	0.76	0.17	0.40
CIS-1,2-DCE	<0.27	<0.13	<0.13
TRANS-1,2-DCE	<0.27	<0.13	<0.13
VINYL CHLORIDE	<2.5	<0.13	<0.13

AS-3

FORMER COMPUTER STORE

AS-1	5/01	1/08	3/08	4/08
PCE	780	33	9.4	8.0
TCE	<60	0.43	0.22	0.34
CIS-1,2-DCE	<60	<0.25	<0.13	<0.13
TRANS-1,2-DCE	<60	<0.25	<0.13	<0.13
VINYL CHLORIDE	<60	<2.5	<0.13	<0.13

AS-1

AS-5	1/08
PCE	<0.54
TCE	<0.27
CIS-1,2-DCE	<0.27
TRANS-1,2-DCE	<0.27
VINYL CHLORIDE	<2.7

AS-5
(BACKGROUND SAMPLE ON ROOF)

THAI HOUSE RESTAURANT

FORMER TUESDAY MORNING TENANT SPACE

TH-1	7/10
PCE	3.2
TCE	<0.21
CIS-1,2-DCE	<0.79
TRANS-1,2-DCE	<0.79
VINYL CHLORIDE	<0.51

TH-1

FORMER IMPERIAL CLEANERS

AS-2	5/01	1/08	3/08	4/08
PCE	630	44	12	9.7
TCE	<60	0.64	0.21	0.24
CIS-1,2-DCE	<60	<0.26	<0.13	<0.13
TRANS-1,2-DCE	<60	<0.26	<0.13	<0.13
VINYL CHLORIDE	<60	<2.5	<0.13	<0.13

AS-2

AS-4

AS-4	1/08	3/08	4/08
PCE	35	10	6.2
TCE	0.55	0.25	0.33
CIS-1,2-DCE	<0.26	<0.13	<0.13
TRANS-1,2-DCE	<0.26	<0.13	<0.13
VINYL CHLORIDE	<2.6	<0.13	<0.13

FORMER CONDENSATE DISCHARGE LINE

LEGEND:

□	AIR SAMPLING LOCATION
DCE	DICHLOROETHENE
TCE	TRICHLOROETHENE
PCE	TETRACHLOROETHENE
NT	NOT TESTED

NOTE: RESULTS PRESENTED IN MICORGRAMS PER CUBIC METER ($\mu g/M^3$)

SCALE IN FEET

0 20 40

MACTEC
Mactec Engineering and Consulting, Inc.
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ATLANTA, GEORGIA 30324 (404)873-4761

FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

AIR TESTING RESULTS

Job Number	Task	Date	Scale	Drawn By	Approved By	Figure
6305-05-0319	03	MAR. 2008	AS SHOWN	RBT		10

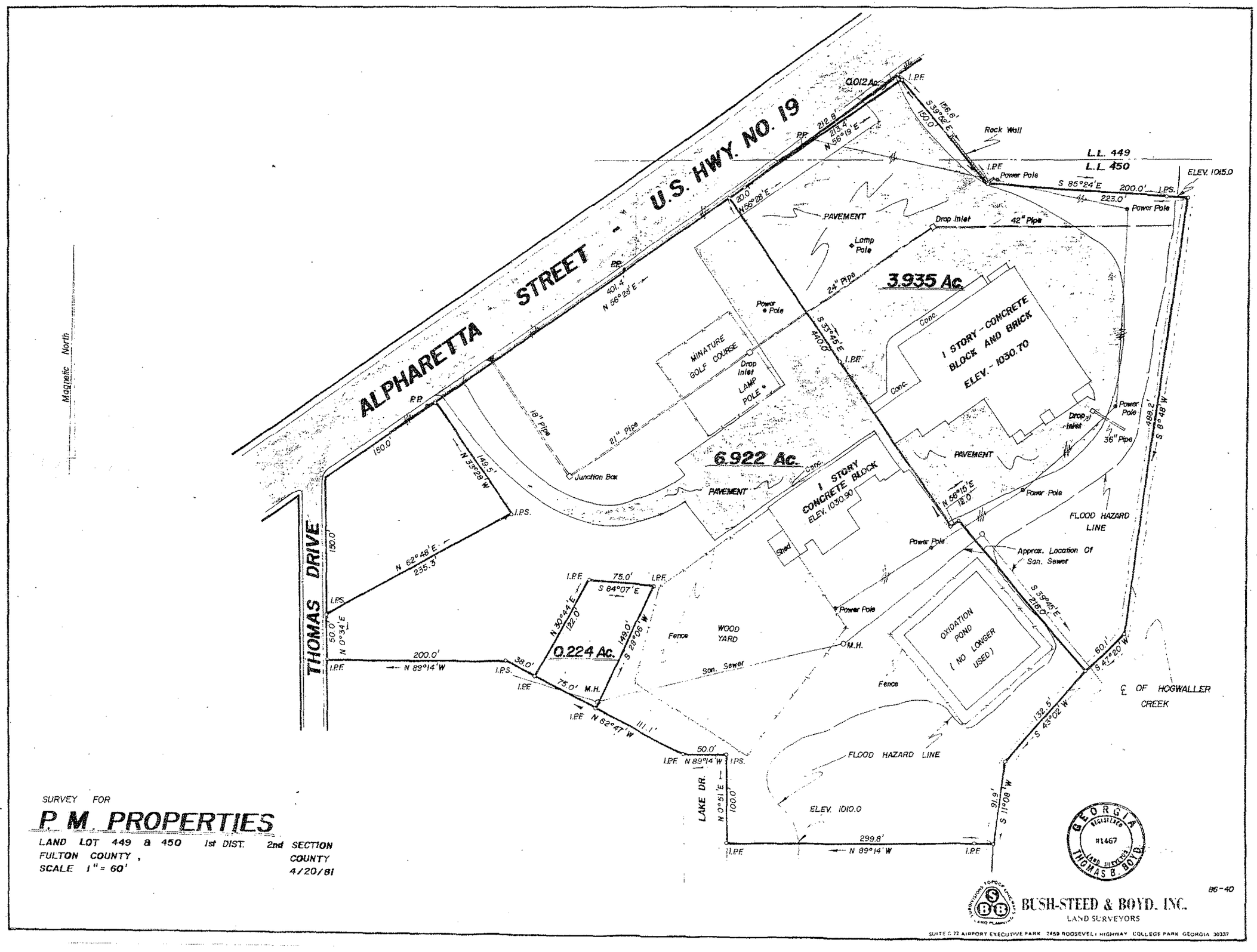
APPENDIX A

LEGAL DESCRIPTION
SURVEY PLAT
TAX MAP

LEGAL DESCRIPTION

All that tract or parcel of land lying and being in Land Lots 449 and 450 of the 1st District, 2nd Section, City of Roswell, Fulton County, Georgia as shown on a survey prepared for P. M. Properties by Bush-Steed and Boyd, Inc. Land Surveyors, dated 4/20/81, and more particularly described as follows.

Beginning at a point located at the intersection of the easterly right-of-way of Thomas Drive and the southern right-of-way of Alpharetta Street (U.S. Highway No. 19) running along said right of way North 56 degrees 28 minutes East, 571.4 feet, thence North 56 degrees 19 minutes East, 213.4 feet to an iron pin which marks the True Point of Beginning, thence leaving said right of way, running South 39 degrees 52 minutes East, 150.0 feet to an iron pin, thence South 85 degrees 24 minutes East, 223.0 feet to the centerline of Hog Wallow Creek, thence South 8 degrees 48 minutes West, 488.2 feet along the center line of Hog Wallow Creek, thence, thence South 47 degrees 20 minutes West, 60.1 feet along the center line of Hog Wallow Creek, thence leaving said creek centerline, North 39 degrees 45 minutes West, 218.0 feet, thence South 56 degrees 15 minutes West, 12.0 feet, thence North 33 degrees 45 minutes East, 440.0 feet, thence North 56 degrees 28 minutes East, 20.0 feet, thence North 56 degrees 19 minutes, 213.4 feet to the Point of Beginning, said parcel containing 3.935 acres, more or less.



SURVEY FOR

P. M. PROPERTIES

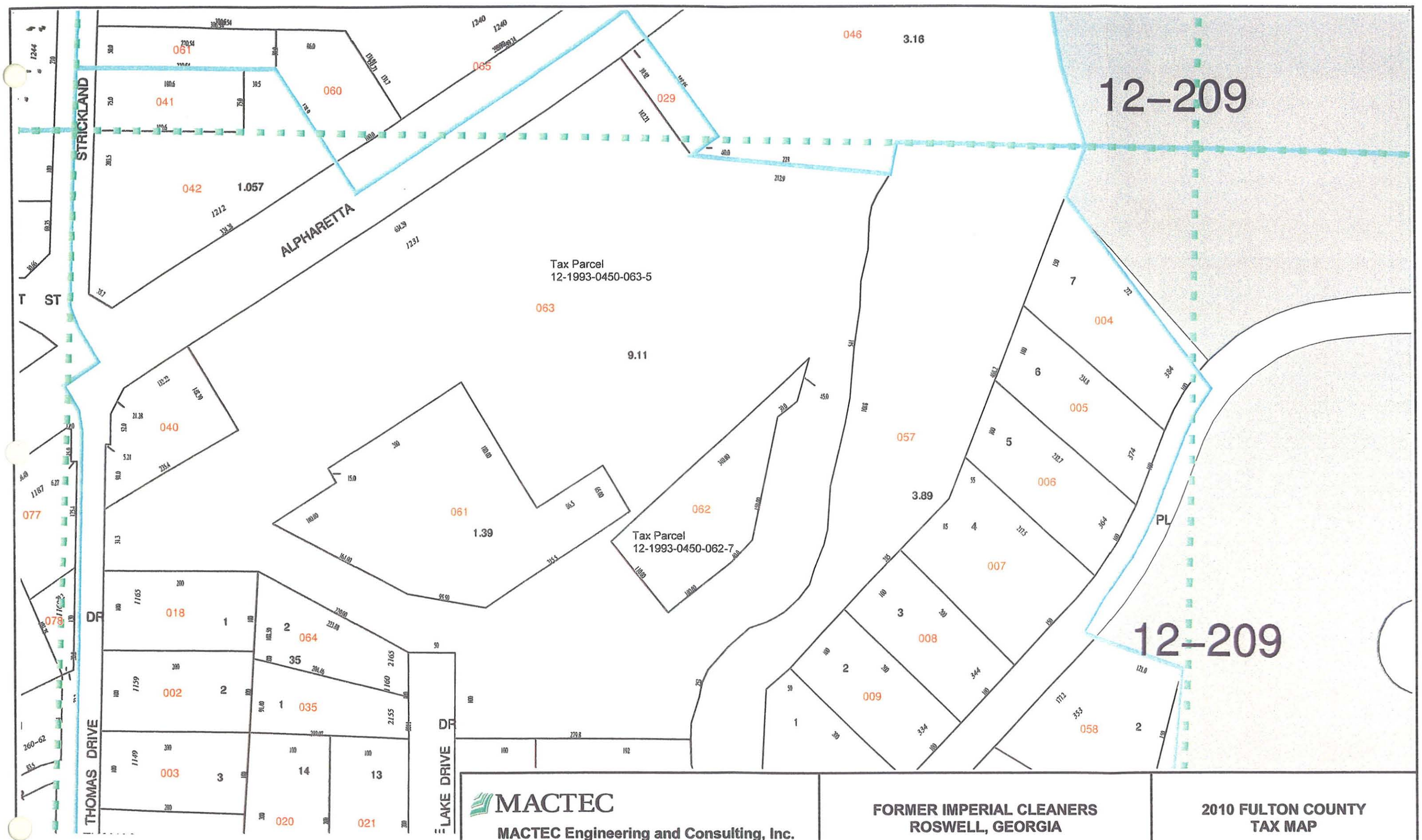
LAND LOT 449 & 450 1st DIST. 2nd SECTION
FULTON COUNTY,
SCALE 1" = 60'

COUNTY
4/20/81

86-40

BUSH-STEED & BOYD, INC.
LAND SURVEYORS

SUITE C 22 AIRPORT EXECUTIVE PARK 2459 ROOSEVELT HIGHWAY COLLEGE PARK GEORGIA 30337



Source: Tax Parcel Map for Fulton County, Georgia
Fulton County Board of Assessors and Department of Environment and Community Development, May 2010

MACTEC
MACTEC Engineering and Consulting, Inc.
396 PLASTERS AVENUE, N.E.
ATLANTA, GEORGIA 30324 (404)873-4761

FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

2010 FULTON COUNTY TAX MAP

Job Number	Task	Date	Scale	Drawn By	Approved By	Figure
6305-05-0319	12	October 2010	As Shown	RBT	SRF	A-1

APPENDIX B

RISK REDUCTION STANDARD CALCULATIONS

Table A-1
Type 1 through Type 4 Ground Water RRS, mg/L

Parameter	Chronic Reference Dose Oral (mg/kg/day)	Chronic Reference Dose Inhalation (mg/kg/day)	Cancer Slope Factor Oral (mg/kg/day)-1	Cancer Slope Factor Inhalation (mg/kg/day)-1	Weight of Evidence	Source for Chronic Rfds and CSFs	Type 1/ Type 3 (mg/L)		Type 2 Standard (mg/L) Adult Noncarcinogenic	Type 2 Standard (mg/L) Adult Carcinogenic	Type 2 Standard (mg/L) Child Noncarcinogenic	Type 2 Standard (mg/L) Child Carcinogenic	Type 2 Overall	Type 4 (mg/L) Industrial Worker Noncarcinogenic	Type 4 (mg/L) Industrial Worker Carcinogenic	Type 4 Overall
Acetone	9.00E-02	ND	ND	ND	D	IRIS	4		3.3	ND	1.4	ND	1.4	9.2	ND	9.2
cis-1,2-Dichloroethene	1.00E-02	ND	ND	ND	D	PPRTV	**0.07**	CaEPD	0.37	ND	0.16	ND	**0.16**	1.0	ND	**1.0**
trans-1,2-Dichloroethene	2.00E-02	ND	ND	ND	D	IRIS	**0.1**		0.73	ND	0.31	ND	**0.31**	2.0	ND	**2.0**
Tetrachloroethene	1.00E-02	1.00E-02	5.40E-01	2.10E-02	B-C2	IRIS, Cal EPA	**0.005**		0.06	0.0013	0.02	0.0026	**0.0013**	0.09	0.004	**0.0038**
Toluene	2.00E-01	1.14E-01	ND	ND	D	IRIS	1		0.75	ND	0.22	ND	**0.22**	1.1	ND	**1.1**
Trichloroethene	3.00E-04	1.00E-02	4.00E-01	4.00E-01	B2	NCEA	**0.005**		0.010	0.00035	0.0038	0.00054	**0.00035**	0.024	0.00065	**0.00065**
Vinyl chloride (lifetime)	3.00E-03	2.86E-02	1.50E+00	3.10E-02	A	IRIS	**0.002**		0.072	0.00051	0.026	0.0011	**0.00051**	0.15	0.0016	**0.0016**
Vinyl Chloride (adult)	3.00E-03	2.86E-02	7.50E-01	1.54E-02	A	IRIS	**0.002**		0.072	0.0010	0.026	0.0021	**0.0010**	0.15	0.0032	**0.0032**

Source Description: IRIS - Integrated Risk Information System, USEPA.
HEAST - Health Effects Assessment Summary Table FY1997, USEPA.
NCEA - National Center for Exposure Assessment, USEPA.
PPRTV - Provisional Peer Reviewed Toxicity Values, USEPA.
Cal EPA - California Environmental Protection Agency

ND Toxicity values not available

Equation 2 (Noncarcinogens):

$$C = \frac{THI \times BW \times AT \times 365 days/year}{EF \times ED \times [(1/RfDi \times K \times IRa) + (1/RfDo \times IRw)]}$$

Where:
THI = Target Hazard Index =
BW = Body Weight =
AT = Averaging Time =
EF = Exposure Frequency =

ED = Exposure Duration =
RfDi = Inhalation Reference Dose =
K = Volatilization Factor = 0.0005 x 1000 L/m3 =
IRa = Inhalation Rate for Air =
RfDo = Oral Reference Dose =
IRw = Ingestion Rate for Water =
TR = Target Risk =

CSFo = Oral Cancer Slope Factor =
CSFi = Inhalation Cancer Slope Factor =

ND Toxicity values not available

Equation 1 (Carcinogens):

$$C = \frac{TR \times BW \times AT \times 365 days/year}{EF \times ED \times [(SFi \times K \times IRa) + (SFo \times IRw)]}$$

Type 2 Adult	Type 2 Parameters Child	Type 4 Industrial Worker Parameters
1	1	1
70 kg	15 kg	70 kg
30 years (noncarc.); 70 (carcinogen	6	25 years for noncarcinogens, 70 years for carcinogens
350 days/year	350 days/year	250 day/year
30 years	6 years	25 year
Chemical Specific	Chemical Specific	Chemical Specific
0.5 L/m3	0.5 L/m3	0.5 L/m3
20 m3/day	15 m3/day	20 m3/day
Chemical Specific	Chemical Specific	Chemical Specific
2 L/day	1 L/day	1 L/day
0.00001 (Class A and B);	0.00001 (Class A and B);	0.00001 (Class A and B),
0.0001 (Class C)	0.0001 (Class C)	0.0001 (Class C)
Chemical Specific	Chemical Specific	Chemical Specific
Chemical Specific	Chemical Specific	Chemical Specific

Prepared by: CMB 7/16/04
Checked by: LMS 4/3/06

Table A-2
Type 1 and 3 Soil Calculations, mg/kg

SUBSTANCE	Volatilization Factor (m^3/kg)	Appendix I	Type 1 GW x 100	Number 1	Risk-Based Residential Type 1 NC-Type 1	C-Type 1	Type 1 RRS	Least of 1,2, & 3	Overall Type 1 RRS	Risk-Based Nonresidential Type 3 NC-Type 3	C-Type 3	Surface Soil Type 3 RRS	Subsurface Soil Type 3 RRS	Overall Soil Type 3 RRS
trans-1,2-Dichloroethene	2.29E+03	5.30E-01	1.00E+01	1.0E+01	1.3E+04	ND	1.3E+04	1.0E+01	1.0E+01	4.1E+04	ND	1.0E+01	1.0E+01	1.0E+01
Acetone	2.88E+03	2.74E+00	4.00E+02	4.0E+02	1.8E+05	ND	1.8E+05	4.0E+02	4.0E+02	1.8E+05	ND	4.0E+02	4.0E+02	4.0E+02
Dichloroethylene, N.O.S.	2.84E+03	5.30E-01	7.00E+00	7.0E+00	6.4E+03	ND	6.4E+03	7.0E+00	7.0E+00	2.0E+04	ND	7.0E+00	7.0E+00	7.0E+00
Tetrachloroethene	2.82E+03	1.80E-01	5.00E-01	5.0E-01	1.5E+03	9.8E+00	9.8E+00	5.0E-01	5.0E-01	1.8E+03	1.6E+01	5.0E-01	5.0E-01	5.0E-01
Toluene	4.70E+03	1.44E+01	1.00E+02	1.0E+02	2.6E+03	ND	2.6E+03	1.0E+02	1.0E+02	2.7E+03	ND	2.7E+03	1.0E+02	1.0E+02
Trichloroethene	3.76E+03	1.30E-01	5.00E-01	5.0E-01	9.4E+01	1.0E+00	1.0E+00	5.0E-01	5.0E-01	1.5E+02	1.3E+00	5.0E-01	5.0E-01	5.0E-01
Vinyl Chloride (lifetime)	5.37E+02	4.00E-02	2.00E-01	2.0E-01	7.2E+01	1.6E+00	1.6E+00	2.0E-01	2.0E-01	7.7E+01	2.3E+00	2.3E+00	2.0E-01	2.0E-01
Vinyl Chloride (adult)	5.37E+02	4.00E-02	2.00E-01	2.0E-01	7.2E+01	3.3E+00	3.3E+00	2.0E-01	2.0E-01	7.7E+01	4.7E+00	4.7E+00	2.0E-01	2.0E-01

NC Noncarcinogen
C Carcinogen
RRS Risk Reduction Standard
DL Detection Limit
NA Not Available

Prepared by: CMB 7/17/04
Checked by: LMS 7/20/05

Summary of Soil Risk Reduction Standards
Type 1 through Type 4, mg/kg

Parameter	Type 1 RRS	Type 2 RRS	Type 2 w/o Leaching RRS	Type 3 RRS	Type 4 RRS	Type 4 w/o Leaching RRS
Acetone	400	59	7040	400	390	1.84E+05
trans-1,2-Dichloroethylene	10	8.0	1560	10	51	4.09E+04
Dichloroethylene, N.O.S.	7.0	3.0	780	7.0	18	20440
Tetrachloroethylene	0.50	0.34	8.3	0.50	0.34	16
Toluene	100	77	540	77	85	2720
Trichloroethene	0.50	0.36	0.79	0.50	0.36	1.3
Vinyl Chloride	0.20	0.027	1.3	0.20	0.042	4.7

RRS Risk Reduction Standard

Table A-4
Type 4 Soil Calculations, mg/kg

SUBSTANCE	Volatilization Factor (m^3/kg)	Nonresidential Leaching Criteria	Industrial NC-Type 4	Industrial C-Type 4	Industrial Worker Overall Type 4 RRS	Industrial Worker (w/o Leaching) Type 4 RRS
Acetone	2.88E+03	3.89E+02	1.84E+05	ND	3.89E+02	1.84E+05
trans-1,2-Dichloroethene	2.29E+03	5.10E+01	4.09E+04	ND	5.10E+01	4.09E+04
Dichloroethylene, N.O.S.	2.84E+03	1.80E+01	2.04E+04	ND	1.80E+01	2.04E+04
Tetrachloroethene	2.82E+03	3.40E-01	1.43E+02	1.63E+01	3.40E-01	1.63E+01
Toluene	4.70E+03	8.50E+01	2.72E+03	ND	8.50E+01	2.72E+03
Trichloroethene	3.76E+03	3.60E-01	1.46E+02	1.33E+00	3.60E-01	1.33E+00
Vinyl Chloride (adult)	5.37E+02	4.20E-02	7.75E+01	4.68E+00	4.20E-02	4.68E+00

NC Noncarcinogen
C Carcinogen
RRS Risk Reduction Standard
ND No Data

Prepared by: CMB 7/16/04
Checked by: LMS 4/3/06

Table A-5
Exposure Parameters for Soil and Ground Water

Exposure Parameters for Type 4 Soil	Industrial Worker	Units
Hazard Index	1	
Target Risk	1E-05	
Body Weight	70	kg
Averaging Time, Carcinogen	70	years
Averaging Time, Noncarcinogen	25	years
Exposure Duration	25	years
Exposure Frequency	250	days/yr
Soil Ingestion Rate	50	mg/day
Air Inhalation Rate	20	m^3/day
PEF	4 63E+09	m^3/kg
CF	1E-06	kg/mg

Exposure Parameters for Type 2 Soil:	Residential Child	Residential Adult	Units
Hazard Index	1	1	
Target Risk	1E-05	1E-05	
Body Weight	15	70	kg
Averaging Time, Carcinogen	70	70	years
Averaging Time, Noncarcinogen	6	30	years
Exposure Duration	6	30	years
Exposure Frequency	350	350	days/yr
Soil Ingestion Rate	200	100	mg/day
Air Inhalation Rate	15	20	m^3/day
PEF	4.63E+09	4.63E+09	m^3/kg
CF	1E-06	1E-06	kg/mg

Exposure Parameters for Type 1 and Type 3 Soils:	Residential Type 1	Nonresidential Type 3	Units
Hazard Index	1	1	
Target Risk	1.E-05	1E-05	
Body Weight	70	70	kg
Averaging Time, Carcinogen	70	70	years
Averaging Time, Noncarcinogen	30	25	years
Exposure Duration	30	25	years
Exposure Frequency	350	250	days/yr
Soil Ingestion Rate	114	50	mg/day
Air Inhalation Rate	15	20	m^3/day
PEF	4 63E+09	4.63E+09	m^3/kg
CF	1E-06	1E-06	kg/mg

Exposure Parameters for Type 4 Ground Water	Industrial Worker	Units
Hazard Index	1	
Target Risk	1E-05	(Class A and B);
	1E-04	(Class C)
Body Weight	70	kg
Averaging Time, Carcinogen	70	years
Averaging Time, Noncarcinogen	25	years
Exposure Duration	25	years
Exposure Frequency	250	day/year
Water Ingestion Rate	1	L/day
Air Inhalation Rate	20	m^3/day
Volatilization Factor = 0 0005 x 1000 L/m3 =	0.25	L/m3

Exposure Parameters for Type 2 Ground Water:	Residential Child	Residential Adult	Units
Hazard Index	1	1	
Target Risk	1E-05	1E-05	(Class A and B);
	1E-04	1E-04	(Class C)
Body Weight	15	70	kg
Averaging Time, Carcinogen	70	70	years
Averaging Time, Noncarcinogen	6	30	years
Exposure Duration	6	30	years
Exposure Frequency	350	350	day/year
Water Ingestion Rate	1	2	L/day
Air Inhalation Rate	15	20	m^3/day
Volatilization Factor = 0 0005 x 1000 L/m3 =	0 5	0 5	L/m3

Prepared by CMB 7/16/04
Checked by LMS 4/3/06

Table A-6
Toxicity Values

SUBSTANCE	ORAL RFD (mg/kg-day)	INHALATION RFD (mg/kg-day)	ORAL CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$	INH. CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$	CARCINOGEN CLASS	SOURCE	COMMENTS
Acetone	9.00E-02	ND	ND	ND	D	IRIS	
trans-1,2-Dichloroethene	2.0E-02	ND	ND	ND	D	IRIS	
Dichloroethylene, N.O.S	1.00E-02	ND	ND	ND	D	PPRTV	Value for cis 1,2-DCE isomer from HEAST.
Tetrachloroethylene	1.00E-02	1.40E-01	5.40E-01	2.10E-02	C-B2	IRIS, Cal EPA	
Toluene	2.00E-01	1.14E-01	ND	ND	D	IRIS	
Trichloroethene	3.00E-04	1.00E-02	4.00E-01	4.00E-01	B2	NCEA	
Vinyl Chloride	3.0E-03	2.86E-02	1.5E+00	3.1E-02	A	IRIS	
Vinyl Chloride (adult)	3.0E-03	2.86E-02	7.5E-01	1.54E-02	A	IRIS	

Prepared by: CMB 7/16/04
Checked by: LMS 4/3/06

Table A-7
Soil to Ground water Leachability

	K_d (a) (L/kg)	K_{oc} (L/kg)	Source	$Ø_w$	Øa	H' (unitless)	Øw+Øa*H'/P_b	Groundwater Type 1/3 RRS (mg/L)	C_w*20	Pathway Type 1/3 C_s (mg/kg)	Groundwater Type 2 RRS (mg/L)	C_w*20	Pathway Type 2 C_s	Residential Cs (mg/kg)	Groundwater Type 4 RRS (C_w, mg/L)	C_w*20	Pathway Type 4 C_s (mg/kg)	Overall Cs (mg/kg)	
Acetone	1.15E-02	5.75E-01	SSG	0.3	0.13	1.59E-03	0.2001	4.0E+00	8.0E+01	1.7E+01	1.4E+01	2.8E+02	5.9E+01	5.9E+01	9.2E+01	1.8E+03	3.9E+02	3.9E+02	
cis-1,2-Dichloroethene	7.10E-01	3.55E+01	SSG	0.3	0.13	1.67E-01	0.2145	7.0E-02	1.4E+00	1.3E+00	1.6E-01	3.2E+00	3.0E+00	3.0E+00	1.0E+00	2.0E+01	1.8E+01	1.8E+01	
trans-1,2-Dichloroethene	1.05E+00	5.25E+01	SSG	0.3	0.13	3.85E-01	0.233366667	1.0E-01	2.0E+00	2.6E+00	3.1E-01	6.2E+00	8.0E+00	8.0E+00	2.0E+00	4.0E+01	5.1E+01	5.1E+01	
Tetrachloroethene	3.10E+00	1.55E+02	SSG	0.3	0.13	7.54E-01	0.265346667	5.0E-03	1.0E-01	3.4E-01	1.3E-03	2.6E-02	8.7E-02	3.4E-01	3.8E-03	7.6E-02	2.6E-01	3.4E-01	(b)
Toluene	3.64E+00	1.82E+02	SSG	0.3	0.13	2.72E-01	0.223573333	1.0E+00	2.0E+01	7.7E+01	2.2E-01	4.4E+00	1.7E+01	7.7E+01	1.1E+00	2.2E+01	8.5E+01	8.5E+01	
Trichloroethene	3.32E+00	1.66E+02	SSG	0.3	0.13	4.22E-01	0.236573333	5.0E-03	1.0E-01	3.6E-01	3.5E-04	7.0E-03	2.5E-02	3.6E-01	6.5E-04	1.3E-02	4.6E-02	3.6E-01	(b)
Vinyl Chloride	3.72E-01	1.86E+01	SSG	0.3	0.13	1.11E+00	0.2962	2.0E-03	4.0E-02	2.7E-02	5.1E-04	1.0E-02	6.8E-03	2.7E-02	3.2E-03	6.3E-02	4.2E-02	4.2E-02	

1. Kd values taken from USEPA, Soil Screening Guidance:
Technical Background Document, EPA/540/R95/129, May 1996.
2. Kd values taken from the Superfund Chemical Data Matrix, June 1996.
3. Values used for the Cw term are Type 1 RRS rather Type 2.

SSG Soil Screening Guidance (US Environmental Protection Agency, 1996)

$Ø_w$ Water-filled soil porosity = 0.3 (L/L)

$Ø_a$ Air-filled soil porosity = 0.13 (L/L)

H' Dimensionless Henry Law Constant (HLC x 41) (unitless)

Þb Dry soil bulk density = 1.5 kg/L

RRS Risk Reduction Standard

C_w Target Leachate Concentration (mg/L)

C_s Screening Level in soil (mg/kg)

(a) $K_d = K_{oc} * f_{oc}$ where f_{oc} equal 0.02 (Georgia EPD HSRA Rules)

(b) C_s based on Type 1 RRS higher than C_s based on Type 4 RRS

Prepared by : CMB 7/16/04
Checked by: LMS 4/3/06

APPENDIX C

FATE AND TRANSPORT OF CONSTITUENTS OF CONCERN IN GROUNDWATER

APPENDIX C

FATE AND TRANSPORT OF CONSTITUENTS OF CONCERN IN GROUNDWATER

FORMER IMPERIAL CLEANERS, ROSWELL, GA

C1.0 Introduction

The future fate and transport of the constituents of concern (COCs) in groundwater underlying the Former Imperial Cleaners site in Roswell, Georgia (the Site) were modeled using the software program BIOCHLOR. This program, approved by the U.S. Environmental Protection Agency, is an analytical model that simulates remediation by the natural attenuation of dissolved solvents in groundwater (Aziz et al., 2000; Aziz, Newel and Gonzales, 2002). The software, programmed in a Microsoft© Excel spreadsheet environment and based on the Domenico analytical solute transport model (Domenico, 1987), has the ability to simulate one-dimensional advection, 3-dimensional dispersion, linear adsorption, and biotransformation via reductive dechlorination which is the dominant biotransformation process at most chlorinated solvent sites (Sun and Clement, 1999; Sun et al., 1999). The reductive dechlorination of the parent solvent to daughter product is assumed to be a first-order process. The daughter products are produced by the first-order degradation of the preceding parent compound. Therefore, the daughter product can simultaneously undergo both production and degradation in the model area. The COCs at the Site include tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2- and trans-1,2-dichloroethene (DCE), and vinyl chloride (VC).

The model predicts the extent of dissolved-phase plume migration and concentration of COCs within the plume, which may then be compared to the applicable protection standards at the point of exposure to groundwater. When the groundwater discharges into a surface water body such as Hog Wallow Creek at the Site, the concentrations of COCs predicted by the model can be used to calculate the resulting concentrations in the surface stream after mixing and compare them with the applicable in-stream water quality standards. Analytical groundwater transport models have seen wide application for this purpose for over 15 years now (e.g., ASTM, 1995) and experience has shown such models can produce reliable results when site conditions in the plume area are relatively uniform. As stated by the U.S. EPA, BIOCHLOR allows groundwater remediation managers to identify sites where natural attenuation is most likely to be protective of human health and the environment. It also allows regulators to carry out an independent assessment of treatability studies and remedial investigations that propose the use of natural attenuation (Aziz et al., 2000).

BIOCHLOR is used to simulate the fate and transport of chlorinated solvents at the Site because of the clear evidence of biodegradation, namely a decrease of contaminant concentrations downgradient of the source area and the presence of degradation (daughter) products of PCE such as TCE, cis-1,2-DCE and VC.

The concentrations of the COCs observed in the field and the results of the analytical fate and transport model are used to calculate current and predict future impacts of groundwater discharge to Hog Wallow Creek and compare them with applicable in-stream water quality standards.

C2.0 Model Input Parameters

C2.1 Groundwater Velocity

The representative seepage velocity (v) of groundwater flow through the interstitial space of the saturated porous media is calculated by multiplying hydraulic conductivity (K) by hydraulic gradient (i) and dividing by effective porosity (n_e)

$v = (K \times i)/n_e$

As emphasized by the BIOCHLOR manual, it is strongly recommended that actual site data be used for hydraulic conductivity and hydraulic gradient data parameters whereas effective porosity can be estimated based on predominant soil type in the saturated zone (aquifer).

The site-specific representative hydraulic conductivity is 0.27 ft/day (see Section 3.2.1 of the VRP Application) and the average hydraulic gradient of 0.04 at the Site is calculated from the March 2010 potentiometric map (see attached Figure C1) as the change in the hydraulic head between the southeast corner of the Former Imperial Cleaners building (contour line 1005.5 ft) and Hog Wallow Creek (elevation 1001.5 ft) divided by the distance between these two elevations along a groundwater flow path: (1005.5 ft - 1001.5 ft) / 100 ft = 0.04. The effective porosity is estimated at 15% and the resulting seepage velocity used in the model is 2.54×10^{-5} cm/s or 26.3 ft/year.

2.2 Dispersion

Dispersion refers to the process by which a dissolved solvent will be spatially distributed longitudinally (along the direction of groundwater flow), transversely (perpendicular to groundwater flow), and vertically (downward) because of mechanical mixing and chemical diffusion in the aquifer. These processes develop the common plume shape that is the spatial distribution of the dissolved solvent mass in the aquifer. The selection of dispersivity values is a difficult process, given the impracticability of measuring dispersion in the field. However, simple estimation techniques based on the length of the plume are available from a compilation of field test data (Aziz et al., 2000). Based on the 2010 field data, the plume of COCs is estimated to be approximately 100 feet long as it has reached MW-11R or the monitoring well adjacent to Hog Wallow Creek. The longitudinal dispersivity (alpha x) of 10 feet is estimated based on the default option in BIOCHLOR which assumes that alpha x is 10% of the estimated plume length. By default, the transverse dispersivity is estimated as alpha y: alpha x = 0.10. To yield a conservative estimate of vertical dispersion, the default value used in BIOCHLOR is set to a very low number (E-99).

2.3 Adsorption

Adsorption to the soil matrix can reduce the concentration of dissolved contaminants moving through the groundwater. In BIOCHLOR this process is described with the retardation factor (R) which is the ratio of the groundwater seepage velocity to the rate that organic chemicals migrate in the groundwater. The degree of retardation depends on both aquifer and constituent properties. The model calculates R from the values of distribution (partition) coefficient for the solute (K_d), soil bulk density (ρ_b), effective porosity (n), organic carbon partition coefficient (K_{oc}), and soil fraction organic carbon (f_{oc}) using the following equation:

$$R = 1 + \frac{K_d \rho_b}{n}$$

where $K_d = K_{oc} \times f_{oc}$

Organic carbon partition coefficients (K_{oc}) for PCE, TCE, DCE and VC at 20° C are 426 L/kg, 130 L/kg, 125 L/kg and 29.6 L/kg respectively (BIOCHLOR manual), and aquifer (soil) bulk density is estimated to be 1.6 kg/L (default value in BIOCHLOR). The fraction organic carbon of 0.00157 for the saturated soils is estimated as the average of two deepest soil samples from the Site which were collected slightly above the water table: 1,690 mg/Kg and 1,450 mg/Kg at soil borings SB-21 and SB-21 respectively (see Figure 8 of the VRP Application). Based on the values of the required input parameters, the representative R for the four COCs calculated by the model is 3.18.

It should be noted that BIOCHLOR uses one retardation factor for all the constituents, not individual retardation factors. It calculates the median retardation factor and uses that value in all calculations. Alternatively, the user can select another retardation value that may result in a better overall model calibration for all modeled constituents combined. At the Site, the calibrated common value for R is 2.75 resulting in a better model match for VC which is the most mobile solute of the four COCs. The sensitivity analysis described in Section 2.7 is conducted to evaluate the effect of the common retardation factor on the model results.

2.4 Biotransformation Rate Constants

The best approach for determining biotransformation rate constants is to calibrate BIOCHLOR to field data for a given sampling event (Aziz et al., 2000; Aziz, Newel and Gonzales, 2002). Rate constants are estimated by changing the rate constant for PCE degradation until the PCE predicted concentrations match the TCE field data. Then, the TCE rate constant is adjusted until the TCE predicted concentrations match the field data; and the same is repeated for DCE and VC. In this way, site-specific rate constants are estimated, and the model is then considered calibrated for the given set of model input parameters including hydraulic conductivity, hydraulic gradient, sorption (retardation), and dispersion. Using the site-specific rate constants, predictive simulations can be conducted by increasing the simulation time to estimate future plume behavior (Aziz et al., 2000; Aziz, Newel and Gonzales, 2002).

Table C1 shows the site-specific information used for the model calibration. The three monitoring wells are generally aligned within the bounding groundwater flow lines from the assumed source zone to Hog Wallow Creek as schematically shown in the attached Figure C1. MW-7 is the monitoring well assumed to represent a source zone, and MW-11R is the farthest away.

Table C1 - Site-specific information used for model calibration

Well ID	Distance from Source (ft)	Concentration (µg/L) March 2010			
		PCE	TCE	DCE	VC
MW-7	0	4800	830	349	(1.0)*
MW-2	20	43	690	1283	100
MW-11R	90	100	65	181	5.7

*The value in parentheses of ½ detection limit for VOC was used in the model

Generally, the more highly chlorinated the compound, the more rapidly it is reduced by reductive dechlorination (Vogel and McCarty, 1985; Vogel and McCarty, 1987). Therefore, it is possible for daughter products to increase in concentration before they decrease (Aziz et al., 2000) as evident for VC at MW-2 for example (all historic groundwater analytical results are summarized in Table 2 and on Figure 9 of the VRP Application).

Table C2 shows the calibrated biotransformation rate constants for the four COCs. These constants were adjusted so that the best overall match is achieved for the observed PCE and VC concentrations downgradient of the assumed source zone because these two COCs have the most stringent in-stream water quality standards. The model closely matches the observed PCE concentrations at MW-11R and has the best prediction for VC at two downgradient monitoring wells (see Section 2.6).

Table C2 - Biotransformation rate constants (λ), in 1/yr.

Constituent	λ	Equivalent half-life in years
PCE	0.231	3.0
TCE	0.330	2.1
DCE	0.365	1.9
VC	2.772	0.25

It should be noted that the prevalent geochemical conditions that drive natural biotransformation processes and therefore the estimated rate constants, may change spatially as the COCs migrate with the groundwater downgradient of the assumed source zone. For example, it appears that PCE may be degrading faster and/or retarding more than what was simulated between the assumed source zone and MW-2. In general, the calibrated biotransformation constants fall within ranges of typical values reported

in the BIOCHLOR manual: PCE 0.07 to 1.20 yr^{-1}; TCE 0.05 to 0.9 yr^{-1}; cis-1,2-DCE 0.18 to 3.3 yr^{-1}; VC 0.12 to 2.6 yr^{-1}.

C2.5 Source Data

The source of COCs dissolved in groundwater at the Site is assumed to be in close proximity to the monitoring well MW-7 (see attached Figure C1) which currently has the highest dissolved concentration of PCE of 4800 µg/L (as of June 2010). The concentrations in excess of 1 to 10% of the aqueous solubility for PCE (which is approximately 150 mg/L) may be indicative of the possible presence of free-phase or residual phase dense non-aqueous phase liquids or DNAPLs (Pankow and Cherry, 1996). Although the concentrations of PCE detected in groundwater from MW-7 have been slightly in excess of 1% of the aqueous solubility of PCE during some of the monitoring events, these concentrations detected to date are still well below those that would strongly indicate the presence of a DNAPL condition. In addition, numerous soil borings in and around the Former Imperial Cleaners building, including those in close proximity to MW-7, as well as the soil leachability testing results did not indicate the presence of potential vadose zone sources that would impact future groundwater quality above applicable criteria (see Section 6.1 of the VRP Application text).

However, in order to conservatively represent possible DNAPL conditions at the Site, the source area in the model is assumed to be a plane 75 feet long and 10 feet deep (thickness of the impacted saturated zone at MW-7) as schematically shown on the attached Figure C1. This source zone extends from MW-7 to some distance upgradient from MW-2 even though all historic analytical results for MW-2 do not indicate a DNAPL condition and the PCE concentrations at MW-2 have decreased two orders of magnitude in less than four years: from 2700 µg/L in September 2006 to 43 µg/L in June 2010.

Source Strength

Free-phase or residual phase DNAPLs can act as continuing sources of groundwater contamination. The rate at which constituents in the DNAPL or source dissolve into the groundwater ultimately determines the concentration of dissolved contaminants in the plume and the lifetime of a dissolved plume. The historic analytical results for MW-2 indicate that any free-phase or residual-phase DNAPL that may have been present upgradient from it has been dissipated to the extent that it does not represent a constant source of groundwater contamination anymore. In contrast, several recent sampling results at MW-7 show that dissolved concentrations of PCE have slightly increased. At the same time, based on the results of extensive field investigations in the assumed source area, it appears that the aquifer volume that may still have residual DNAPL impacting MW-7, if any, is very limited. Nevertheless, the entire assumed source zone shown schematically on the attached Figure C1 is simulated in the model as a constant, non-decaying source of groundwater contamination.

Initial Source Concentrations and Simulation Time

In order to calibrate the model to the field-observed concentrations of COCs in March 2010, the concentrations of four COCs for the source zone represented by MW-7 had to be taken into account for some time prior to 2010 due to the transient (time-dependent) nature of the fate and transport of dissolved COCs. The initial source concentrations and the model run time were estimated based on the calculated groundwater velocity of 26.3 ft/year, the attenuating effects of longitudinal dispersion and retardation, and

the effects of biodegradation. The model run time of 4 years and the initial source concentrations for COCs observed at MW-7 in November 2006 were ultimately selected during model calibration.

The attached Figure C2 shows the BIOCHLOR model input screen with all input parameters required to run the model.

2.6 Model Results

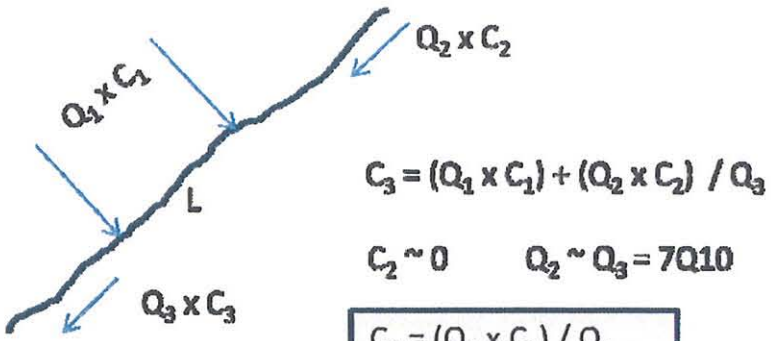
The attached Figures C3 through C5 show the model-calculated concentrations of COCs at the monitoring wells vs. the field-observed concentrations in March 2010. The predicted future concentrations of all four COCs at the Site for years 2013 and 2020 are shown in attached Figures C7 through C14. It should be noted that these future predictions are conservative because both the concentrations of COCs in the assumed source zone and the areal extent of the source zone are kept constant for the entire simulated future period of 10 years through 2020.

As mentioned earlier, the prevalent geochemical conditions that drive natural biotransformation processes and therefore the estimated rate constants may change spatially as the COCs migrate with the groundwater. For example, this is evident in the case of PCE at the Site, as seen in attached Figure C3. Namely, it appears that PCE may be degrading faster in a segment between the assumed source zone (represented by the dissolved concentration at MW-7) and monitoring well MW-2. Nevertheless, the calibrated model shows a high degree of accuracy in simulating the overall field-observed distribution of all four COCs.

For comparison, on all the figures showing the results of the analytical fate and transport model incorporating the documented sequential degradation of PCE, TCE, DCE and VC at the Site, there is also a graph of concentration vs. distance from the source if no degradation were taking place. Even under this unrealistic assumption and assuming a constant non-decaying source in an unrealistically wide area, the model predicts that the concentrations of all four COCs at the monitoring well MW-11R would be protective of the water quality standard in Hog Wallow Creek for the entire simulated future period of 20 years as demonstrated in Section 2.7.

2.7 Resulting Concentrations of COCs in Hog Wallow Creek

As described in Section 4.4 of the VRP Application, none of the four COCs present in groundwater at the Site was detected in Hog Wallow Creek since surface water monitoring began in 2001, including during the last sampling event in June 2010. This is consistent with the BIOCHLOR modeling results and a quantitative analysis of COC concentrations in Hog Wallow Creek resulting from the discharge of impacted groundwater and mixing with surface water. The schematic below shows key elements of this analysis where:



Q_1 is the flow rate of impacted groundwater entering the stream segment (in ft^3/sec)
Q_2 is the 7Q10 low flow in the stream immediately upgradient of the Site (in ft^3/sec)
Q_3 is the 7Q10 low flow in the stream immediately downgradient of the Site; $Q_3 = Q_2$ since $Q_2 >> Q_1$
C_1 is dissolved concentration of COC in groundwater (in µg/L) represented by MW-11R.
C_3 is the resulting concentration of COC in the stream after mixing (in µg/L)
C_2 is the upgradient concentration in the stream (assumed 0).
L is the length of the stream segment receiving impacted groundwater.

The representative 7Q10 minimum flow in Hog Wallow Creek is calculated based on information compiled by Carter and Putnam (1978) and provided on the U.S. Geological Survey web page at http://ga2.er.usgs.gov/lowflow/mappicksite.cfm. Since Hog Wallow Creek does not have direct long term stream flow measurements by the USGS, the applicable 7Q10 low flow is calculated from the USGS 7Q10 yields (i.e., cfs per square mile of drainage area) reported at the four closest USGS gage sites with similar hydrologic characteristics:

Big Creek near Alpharetta, GA
Drainage area is 72 mi^2; 7Q10 is 5.9 cubic feet per second (cfs) or 0.08 cfs/mi^2

Rottenwood Creek (Terrell Mill Road) near Marietta, GA
Drainage area is 14 mi^2; 7Q10 is 3.6 cfs or 0.26 cfs/mi^2

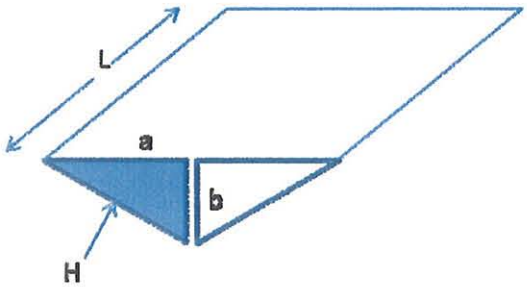
Nf Peachtree Creek at Clairmont Road near Atlanta, GA
Drainage area is 28 mi^2; 7Q10 is 0.85 cfs or 0.03cfs/mi^2

Nancy Creek at W. Paces Ferry Road at Atlanta, GA
Drainage area is 37 mi^2; 7Q10 is 3.7 cfs or 0.1 cfs/mi2

The average 7Q10 flow for all four watersheds is 0.12 cfs/mi^2 and the drainage area of Hog Wallow Creek at the Site is 3.14 mi^2. This gives 0.38 cfs as the representative 7Q10 low flow at the Site.

The flux of impacted groundwater discharging into Hog Wallow Creek (Q_1) is calculated using the following equations (see also schematic below):

$$Q_1 = A \times v_D$$
$$Q_1 = L \times H \times K \times i$$



where
v_D is the groundwater (Darcy) velocity
A is the cross-sectional area of discharge
a is the half-width of the surface stream
b is the depth of water in the stream
H is the side-face of groundwater discharge calculated from a and b.

Table C3 shows the result of calculation for the given input parameters together with the applicable in-stream water quality criteria for the four COCs detected in MW-11R adjacent to the Hog Wallow Creek. As can be seen, concentrations of all four COCs in Hog Wallow Creek after mixing of surface water with the impacted groundwater are currently orders of magnitude below applicable in-stream water quality criteria and also less than the laboratory detection limits.

Table C3 - Calculation of current COC concentrations in Hog Wallow Creek after mixing with impacted groundwater

K (ft/s)	i	L (ft)	a (ft)	b (ft)	H (ft)	A (ft^2)	v_D (ft/s)	Q_1 (cfs)
0.0000031	0.05	85	10.00	0.50	10.01	851.06	0.000000155	0.000131915

COC	C_1 (ug/L)	Q_1 (cfs)	$Q_2 = Q_3$ = 7Q10 (cfs)	C_3 (ug/L)	In-stream Criteria (ug/L)
PCE	110	0.000131915	0.38	0.0381859	3.3
TCE	65	0.000131915	0.38	0.0225644	30
DCE	181	0.000131915	0.38	0.0628332	10,000
VC	5.7	0.000131915	0.38	0.0019787	2.4

Note: in-stream criterion for DCE is utilized for trans-1,2-DCE as there is no in-stream criterion for cis-1,2-DCE

The maximum allowable concentrations of COCs at MW-11R that would still be protective of the applicable in-stream water quality criteria are shown in Table C4 (value C_1). The concentrations for the four COCs are many times higher than the maximum concentrations observed in the field to date. When compared with the results of the predictive analytical groundwater fate and transport model shown in attached Figures C7 through C14, it can be seen that even for the simulated unrealistically conservative source zone conditions the predicted concentrations of all four COCs at MW-11R, which is located approximately 90 feet from the assumed source zone, would still be significantly lower than the maximum concentration allowed.

Table C4 - Maximum allowable concentrations of COCs at MW-11R protective of in-stream water quality standards, parameter C_1

COC	C_1 (ug/L)	Q_1 (cfs)	$Q_2 = Q_3 = 7Q10$ (cfs)	C_3 (ug/L)	In-stream Criteria (ug/L)
PCE	9,500	0.000131915	0.38	3.297875	3.3
TCE	86,500	0.000131915	0.38	30.0280197	30
DCE	28,810,000	0.000131915	0.38	10001.2399	10,000
VC	6,900	0.000131915	0.38	2.39529868	2.4

2.8 Sensitivity Analysis

Sensitivity analysis of the following BIOCHLOR model input parameters was performed by increasing and decreasing their baseline values for the calibrated model: hydraulic conductivity, longitudinal dispersivity, retardation factor and biotransformation/degradation rates expressed as degradation half-life of individual constituents. The results of the analysis are shown in Table C5 for monitoring well MW-11R which is the farthest downgradient well with detectable concentrations of COCs. This well is adjacent to Hog Wallow Creek and, therefore, most representative of potential groundwater impacts on the in-stream water quality.

As discussed in Section 2 Model Input Parameters, the model has several built-in default values which help explain why certain parameters have varying degrees of sensitivity for individual COCs. For example, the common baseline value of the calibrated retardation factor, R=2.75, is used by default for all four COCs but it is higher than the 1.50 calculated by the model individually for VC. However, Table C4 shows that using R 1.5x lower than the baseline value results in a significant over prediction of VC at MW-11R. Table C5 therefore clearly demonstrates that the baseline (calibrated) model input parameters provide the best overall match for all four COCs.

Table C5 - Model sensitivity analysis; concentrations are calculated for March 2010 at MW-11R

Hydraulic Conductivity (Baseline = 9.52 x 10^{-5} cm/s)				
Constituent	Concentration (ug/L or ppb)			
	1.5x Baseline	Baseline	0.5xBaseline*	Observed
PCE	491.0	96.9	0.51	100
TCE	182.1	37.3	0.20	65
DCE	370.8	73.1	0.38	181
VC	34.0	6.7	0.03	5.7

Longitudinal Dispersivity (Baseline = 10 feet)				
Constituent	Concentration (ug/L or ppb)			
	1.5x Baseline*	Baseline	0.5xBaseline	Observed
PCE	202.7	96.9	12.4	100
TCE	75.9	37.3	4.9	65
DCE	153.1	73.1	9.3	181
VC	14.1	6.7	0.9	5.7

Retardation Factor (Baseline = 2.75)				
Constituent	Concentration (ug/L or ppb)			
	1.5x Baseline*	Baseline	0.5xBaseline	Observed
PCE	8.0	96.9	793.2	100
TCE	2.6	37.3	397.8	65
DCE	6.1	73.1	605.6	181
VC	0.6	6.7	55.6	5.7

Biotransformation Half-life in Years (Baseline: PCE = 3.0; TCE = 2.1; DCE=1.9; VC=0.25)				
Constituent	Concentration (ug/L or ppb)			
	1.5x Baseline	Baseline	0.5xBaseline	Observed
PCE	106.6	96.9	72.9	100
TCE	34.5	37.3	40.2	65
DCE	81.0	73.1	56.2	181
VC	7.3	6.7	5.1	5.7

2.9 Predicted Concentrations of COCs at Point of Demonstration Well

An additional "point of demonstration" well is proposed to be installed in the area downgradient of MW-7. This well will be located approximately half way between MW-7 and MW-11R and will be used to provide additional data regarding the migration and attenuation of the plume downgradient of the potential source area. Within six months of the Site's enrollment in the Voluntary Remediation Program, a groundwater fate and transport model will be submitted to include projected concentration trends for the point of demonstration well.

2.10 Conclusion

Based on the field-observed concentrations of COCs dissolved in groundwater at the Former Imperial Cleaners site in Roswell, Georgia, the results of the analytical groundwater fate and transport model for the four COCs, and the results of the analytical model of mixing between the impacted water and surface water in Hog Wallow Creek show that in-stream water quality criteria are not exceeded currently, and are not predicted to be exceeded in the future.

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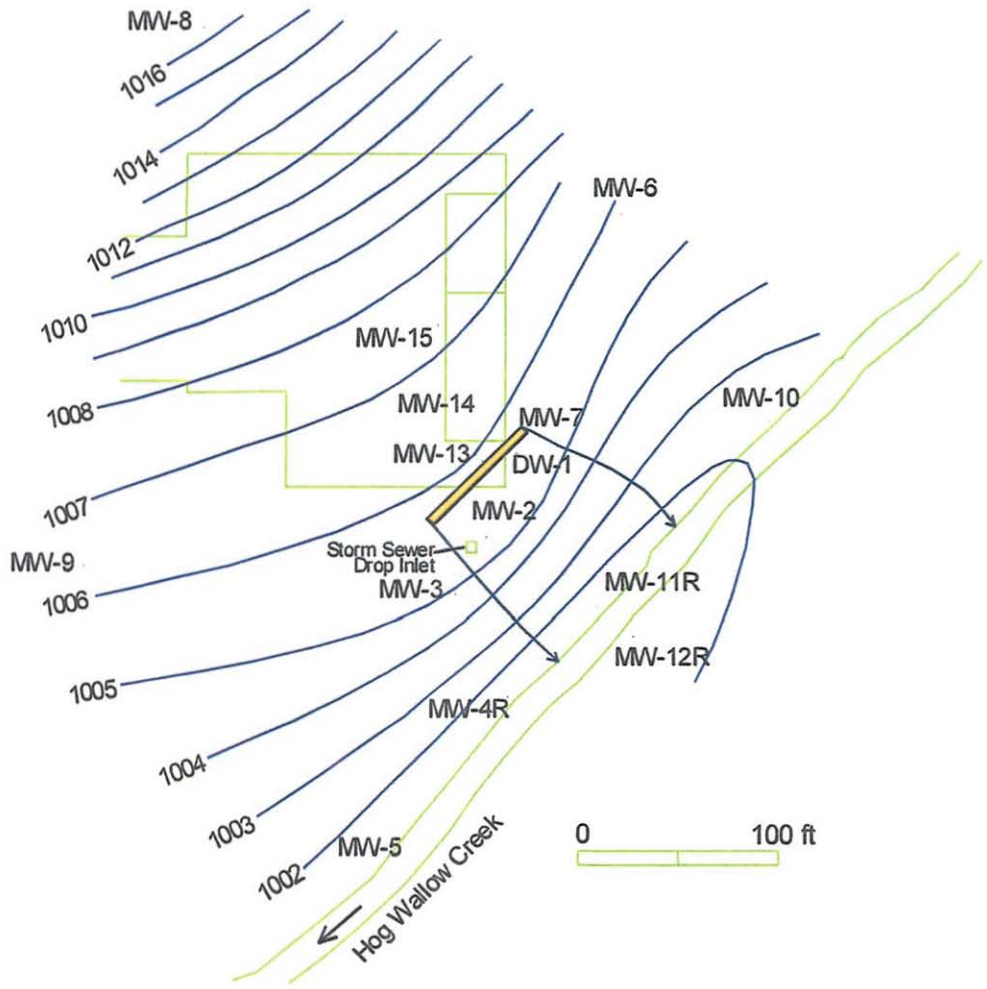


Figure C-1 Schematic of assumed source zone (orange quadrangle) and flow of impacted groundwater flow toward Hog Wallow Creek (arrow lines). Potentiometric contour lines, in feet asl, are for March 2010.

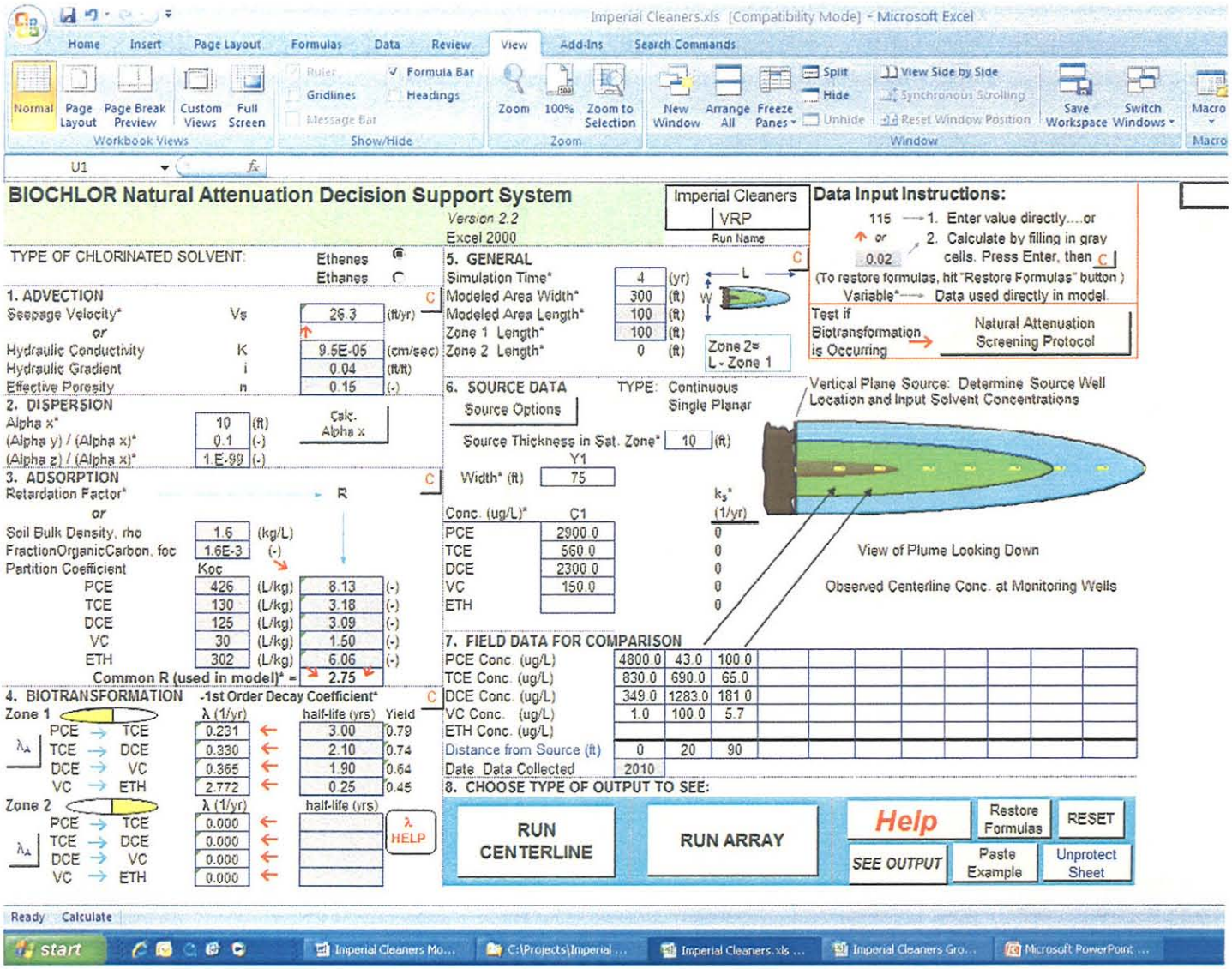


Figure C-2 BIOCHLOR Input Screen

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (ug/L) at Z=0

	Distance from Source (ft)										
PCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	2900.000	2774.010	2537.791	2184.805	1744.357	1275.890	846.661	505.888	270.629	129.068	54.701
Biotransformation	2899.9997	2598.107	2249.428	1852.154	1427.846	1016.440	660.572	388.410	205.216	96.925	40.765

	Monitoring Well Locations (ft)										
	0	20	90								
Field Data from Site	4800.000	43.000	100.000								

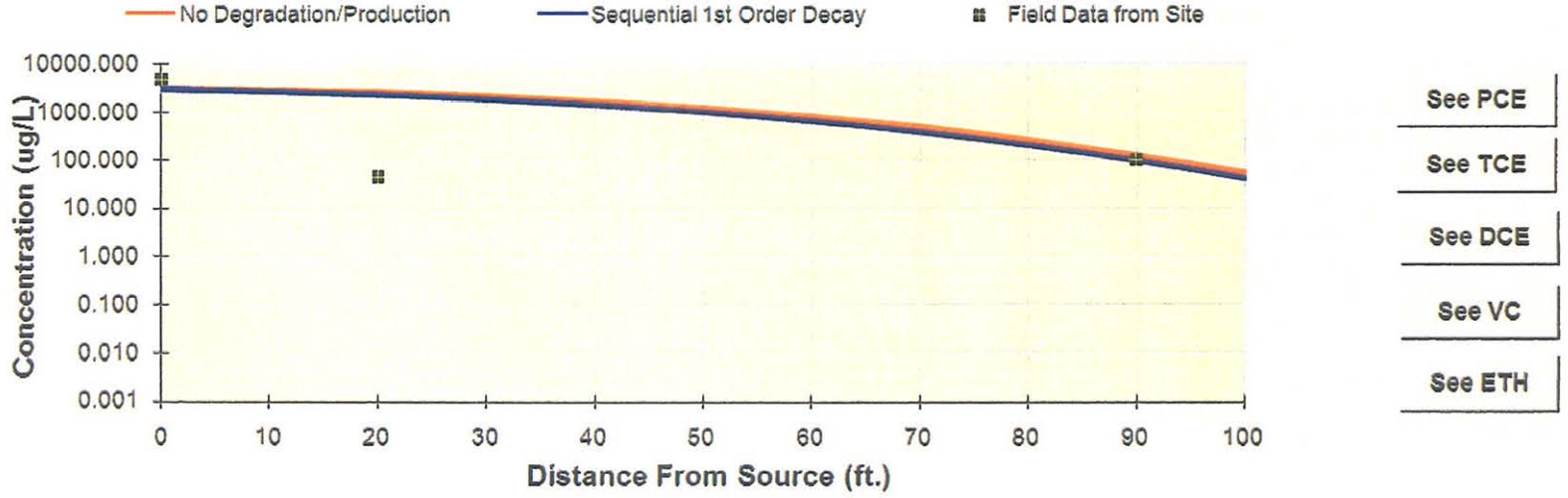
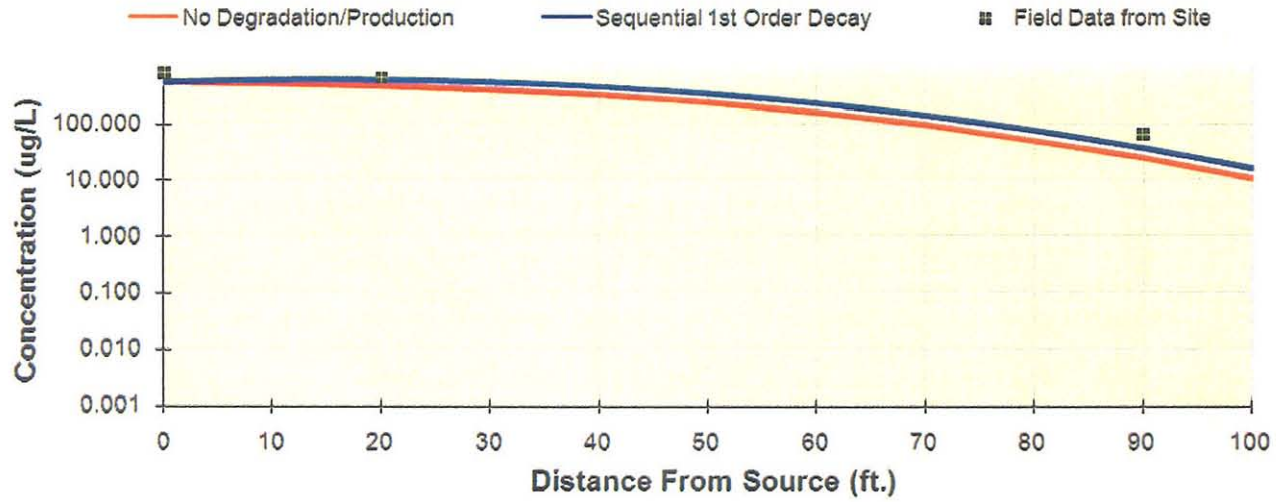


Figure C-3 PCE concentration vs. distance from source for the calibrated model.

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (ug/L) at Z=0

	Distance from Source (ft)										
TCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	560.000	535.671	490.056	421.893	336.841	246.379	163.493	97.689	52.259	24.923	10.563
Biotransformation	560.0001	616.007	616.488	562.923	467.430	351.123	237.331	143.665	77.579	37.256	15.872

	Monitoring Well Locations (ft)										
	0	20	90								
Field Data from Site	830.000	690.000	65.000								



See PCE

See TCE

See DCE

See VC

See ETH

Figure C-4 TCE concentration vs. distance from source for the calibrated model.

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (ug/L) at Z=0

	Distance from Source (ft)										
DCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	2300.000	2200.077	2012.731	1732.776	1383.455	1011.913	671.490	401.221	214.637	102.364	43.384
Biotransformation	2299.9997	2027.228	1734.776	1416.968	1086.513	770.734	499.737	293.397	154.860	73.093	30.727

	Monitoring Well Locations (ft)										
	0	20	90								
Field Data from Site	349.000	1283.000	181.000								

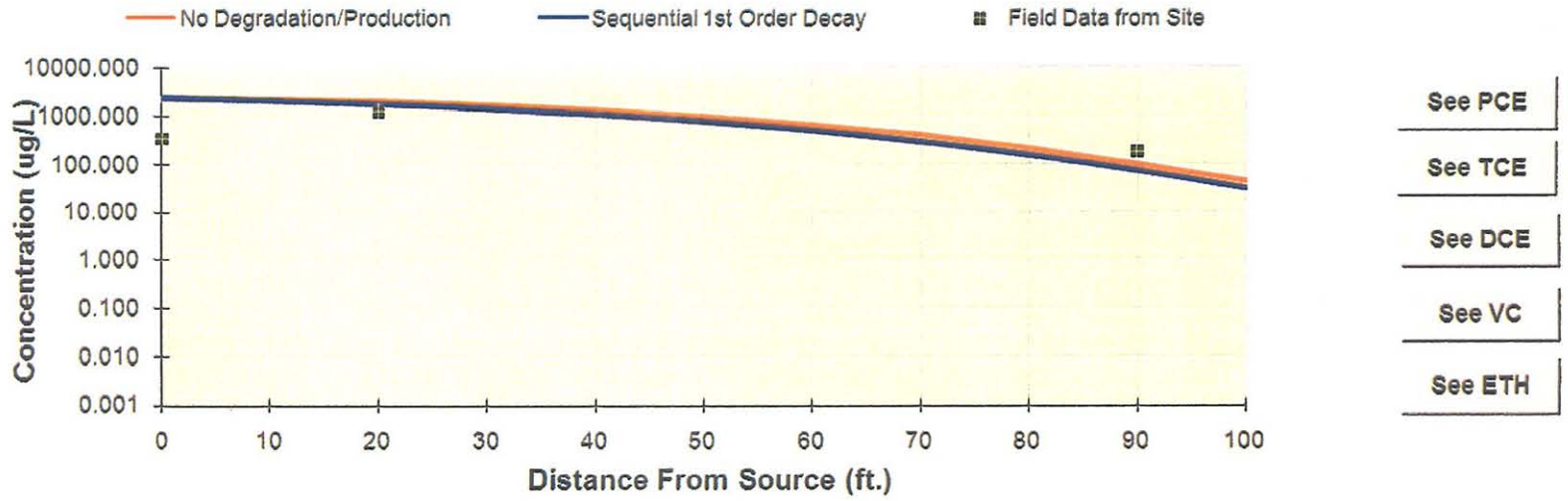


Figure C-5 DCE concentration vs. distance from source for the calibrated model.

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (ug/L) at Z=0

	Distance from Source (ft)										
VC	0	10	20	30	40	50	60	70	80	90	100
No Degradation	150.000	143.483	131.265	113.007	90.225	65.994	43.793	26.167	13.998	6.676	2.829
Biotransformation	150.0000	156.429	145.420	124.004	97.306	69.910	45.658	26.920	14.245	6.734	2.834

	Monitoring Well Locations (ft)										
	0	20	90								
Field Data from Site	1.000	100.000	6.700								

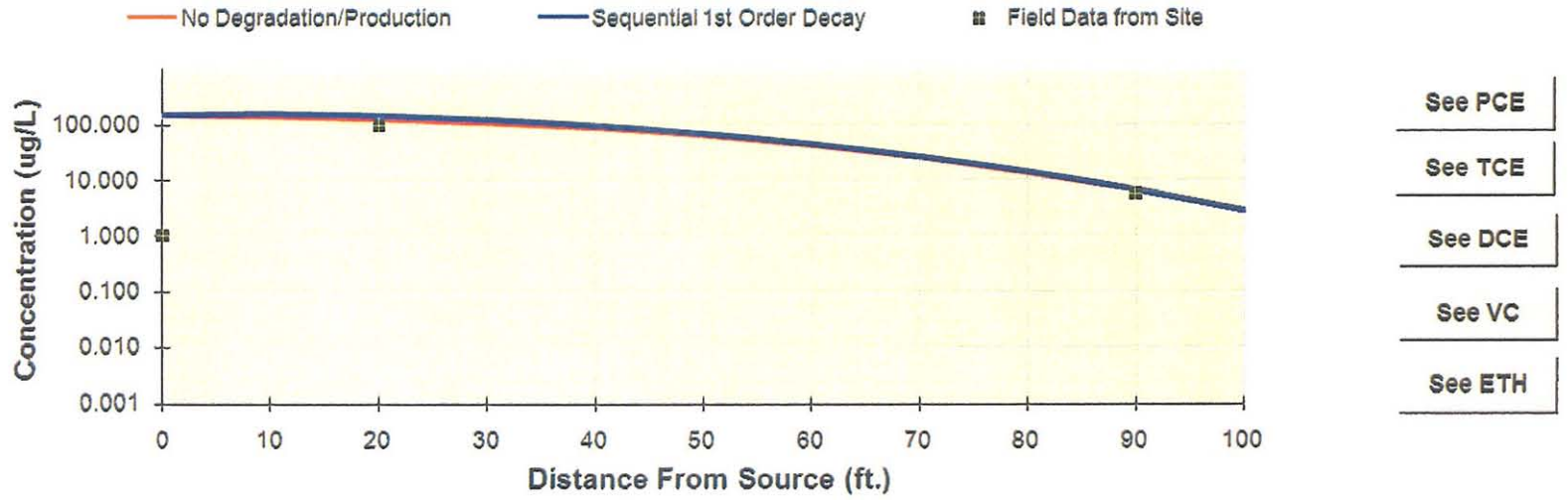


Figure C-6 VC concentration vs. distance from source for the calibrated model.

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (ug/L) at Z=0

	Distance from Source (ft)										
PCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	2900.000	2866.235	2797.810	2680.748	2504.231	2264.867	1969.922	1637.806	1294.839	969.216	684.440
Biotransformation	2899.9998	2658.192	2418.559	2173.864	1918.866	1652.311	1378.352	1106.499	849.653	620.815	429.743

	Monitoring Well Locations (ft)										
	0	20	90								
Field Data from Site	4800.000	43.000	100.000								

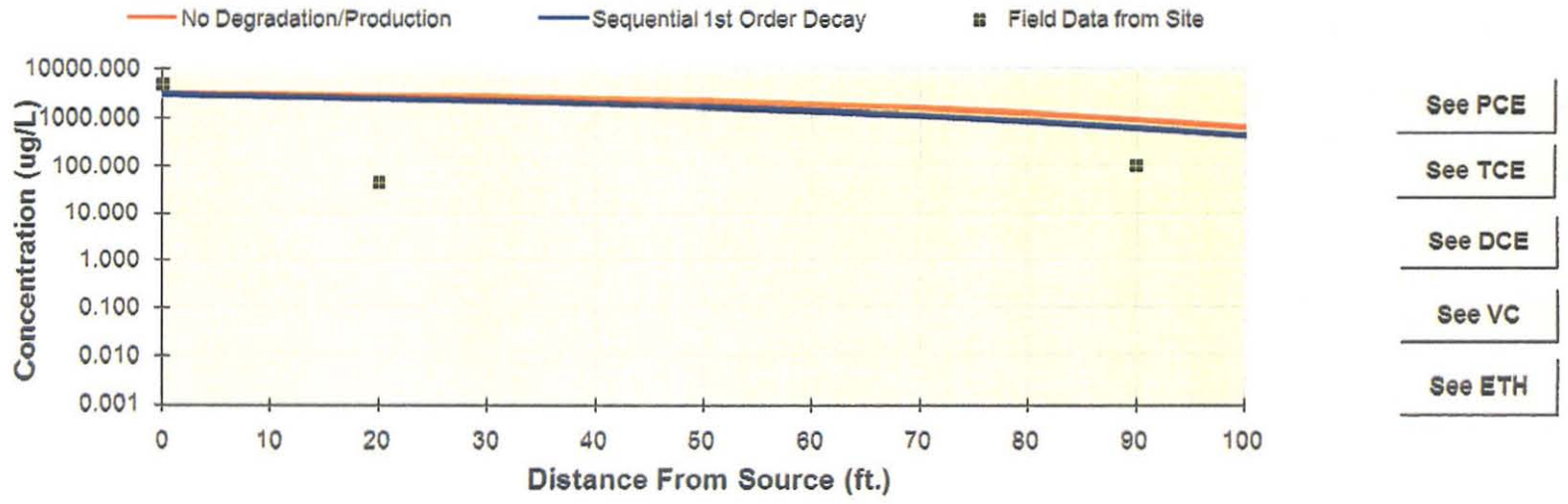


Figure C-7 Predicted PCE concentration in year 2013 vs. distance from source.

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (ug/L) at Z=0

TCE	Distance from Source (ft) 0	10	20	30	40	50	60	70	80	90	100
No Degradation	560.000	553.480	540.267	517.662	483.576	437.354	380.399	316.266	250.038	187.159	132.168
Biotransformation	560.0001	644.241	696.121	714.906	700.500	654.804	582.710	492.241	393.517	296.873	210.814

	Monitoring Well Locations (ft) 0	20	90								
Field Data from Site	830.000	690.000	65.000								

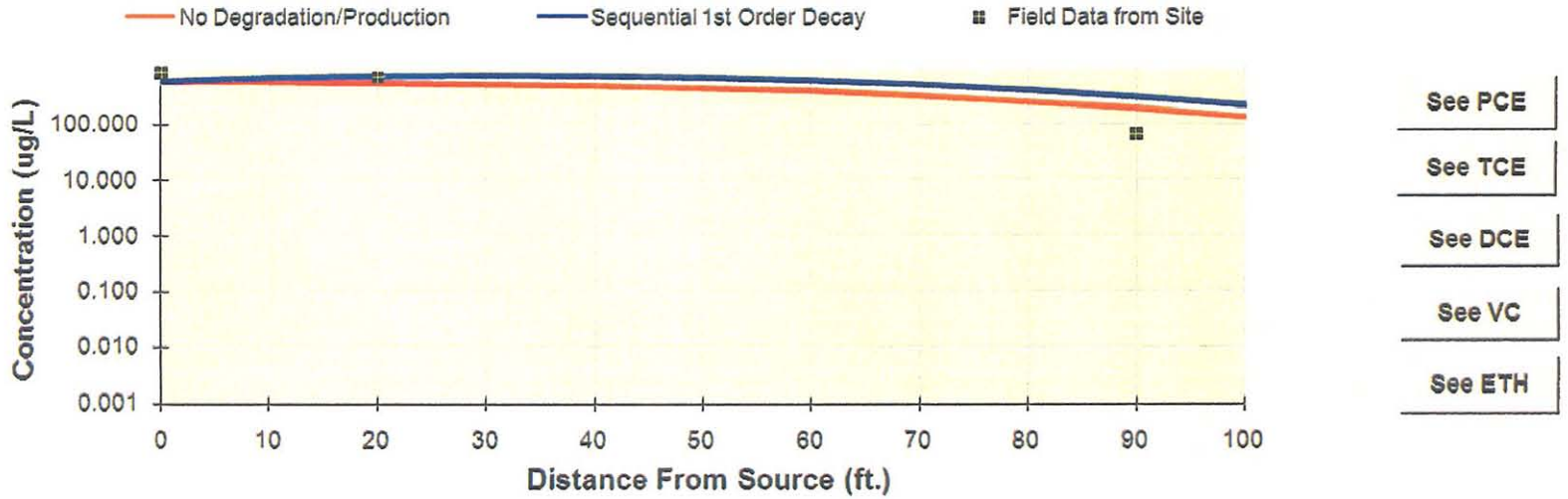


Figure C-8 Predicted TCE concentration in year 2013 vs. distance from source.

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (ug/L) at Z=0

	Distance from Source (ft)										
DCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	2300.000	2273.221	2218.953	2126.110	1986.115	1796.274	1562.352	1298.950	1026.942	768.688	542.832
Biotransformation	2299.9998	2072.712	1862.824	1660.593	1458.480	1252.650	1044.040	838.309	644.277	471.323	326.700

	Monitoring Well Locations (ft)										
	0	20	90								
Field Data from Site	349.000	1283.000	181.000								

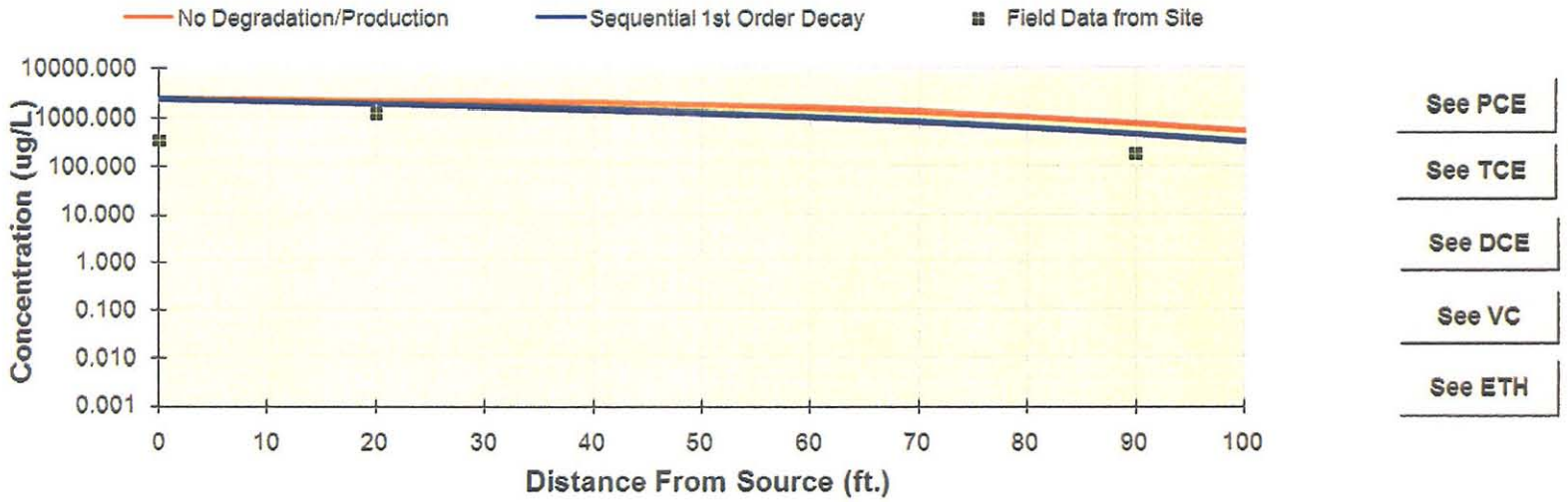


Figure C-9 Predicted DCE concentration in year 2013 vs. distance from source.

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (ug/L) at Z=0

	Distance from Source (ft)										
VC	0	10	20	30	40	50	60	70	80	90	100
No Degradation	150.000	148.254	144.714	138.659	129.529	117.148	101.893	84.714	66.974	50.132	35.402
Biotransformation	150.0000	160.624	157.230	146.470	131.602	114.334	95.820	77.122	59.318	43.394	30.068

	Monitoring Well Locations (ft)										
	0	20	90								
Field Data from Site	1.000	100.000	5.700								

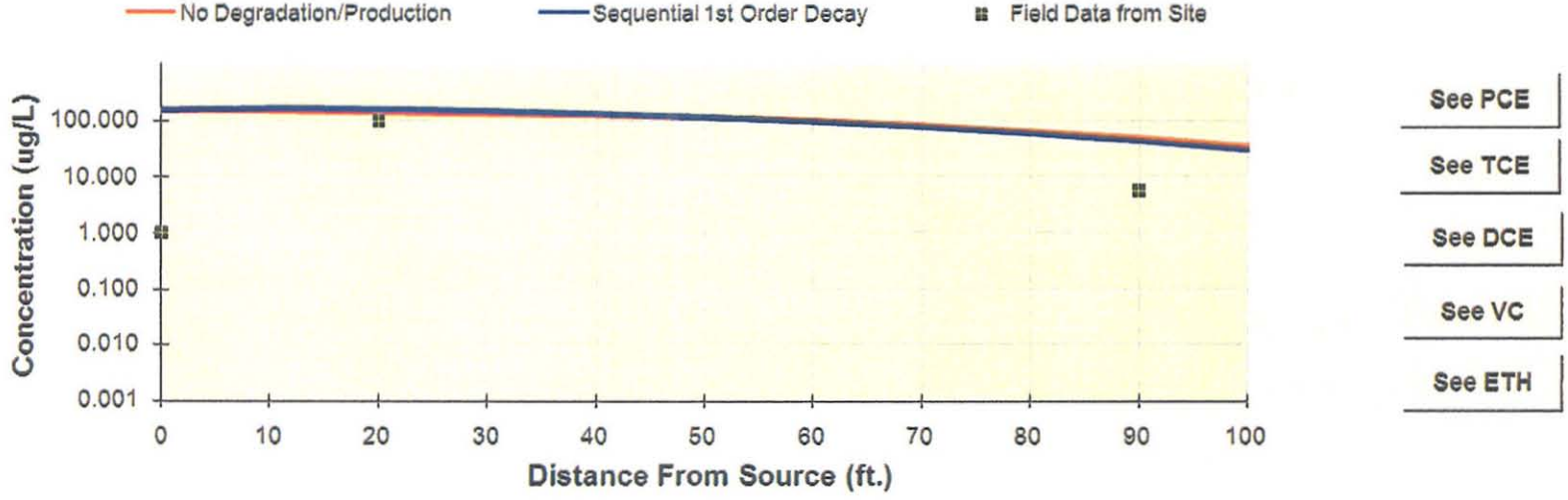
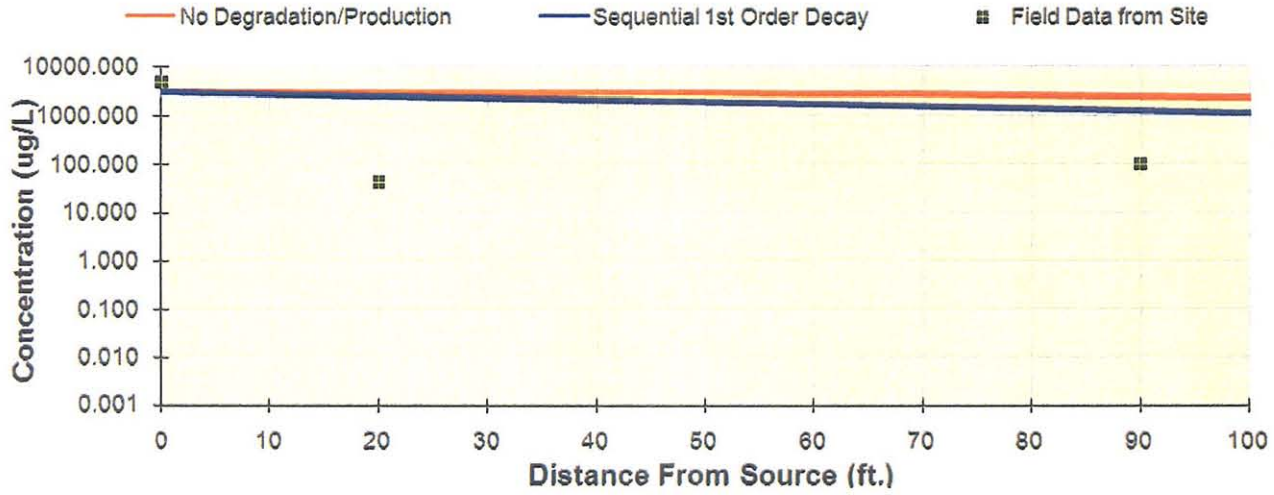


Figure C-10 Predicted VC concentration in year 2013 vs. distance from source.

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (ug/L) at Z=0

	Distance from Source (ft)										
PCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	2900.000	2897.211	2891.227	2879.932	2860.379	2828.657	2780.092	2709.837	2613.612	2488.444	2333.347
Biotransformation	2899.9998	2672.797	2462.512	2267.255	2085.027	1913.642	1750.838	1594.533	1443.040	1295.217	1150.576

	Monitoring Well Locations (ft)										
	0	20	90								
Field Data from Site	4800.000	43.000	100.000								



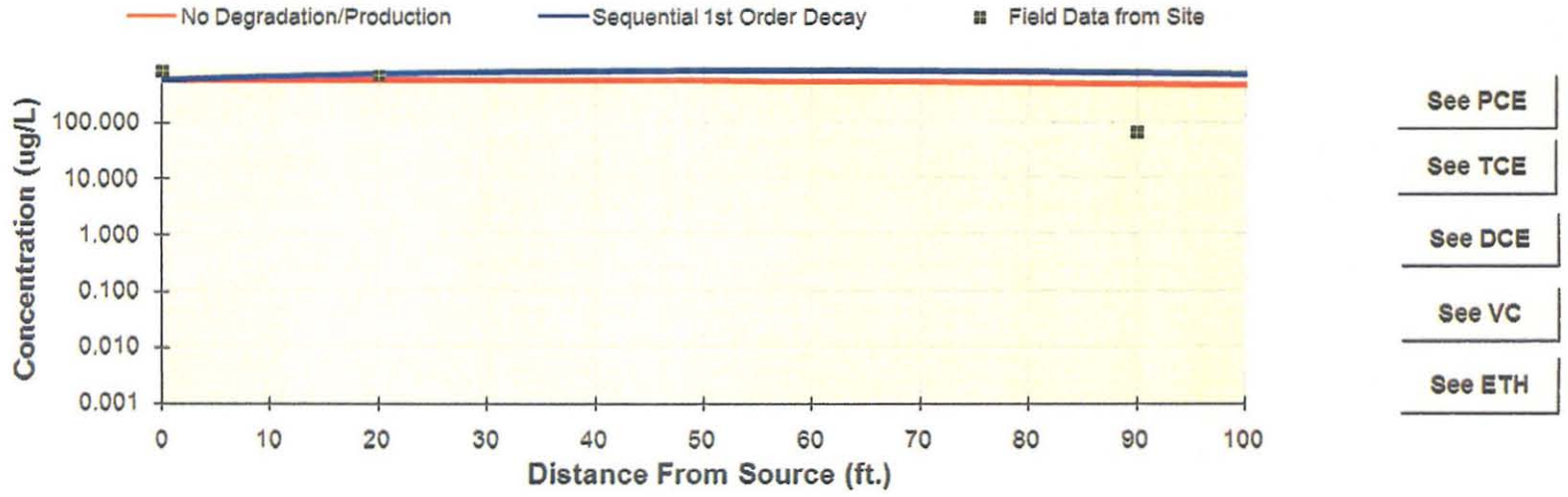
See PCE | See TCE | See DCE | See VC | See ETH

Figure C-11 Predicted PCE concentration in year 2020 vs. distance from source.

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (ug/L) at Z=0

TCE	Distance from Source (ft) 0	10	20	30	40	50	60	70	80	90	100
No Degradation	560.000	559.462	558.306	556.125	552.349	546.223	536.845	523.279	504.697	480.527	450.577
Biotransformation	560.0001	653.645	724.466	775.288	808.326	825.200	827.039	814.679	788.903	750.657	701.217

	Monitoring Well Locations (ft) 0	20	90								
Field Data from Site	830.000	690.000	65.000								



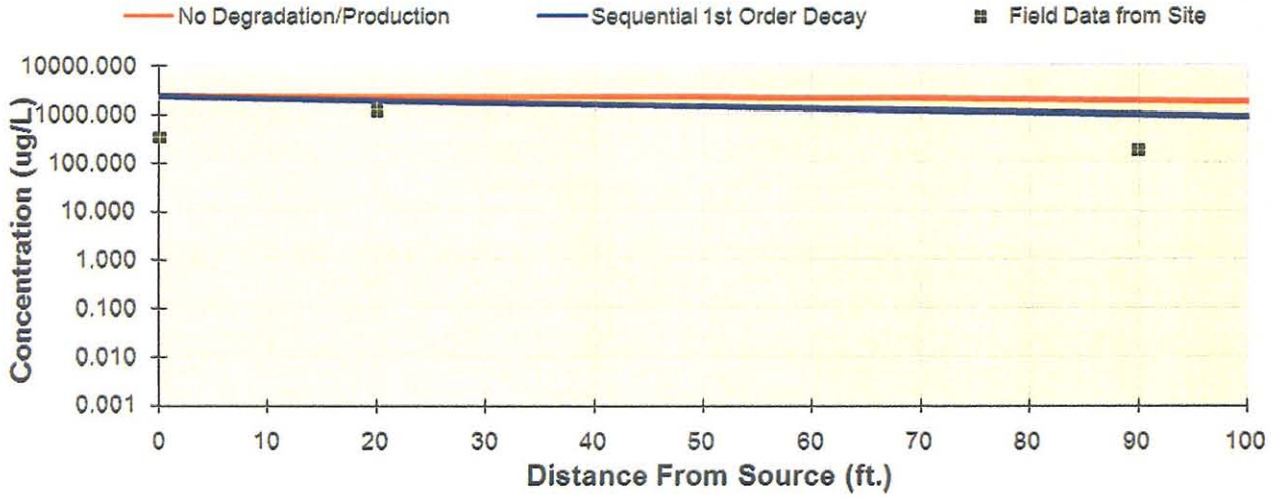
See PCE | See TCE | See DCE | See VC | See ETH

Figure C-12 Predicted TCE concentration in year 2020 vs. distance from source.

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (ug/L) at Z=0

DCE	Distance from Source (ft)										
	0	10	20	30	40	50	60	70	80	90	100
No Degradation	2300.000	2297.788	2293.042	2284.084	2268.577	2243.418	2204.901	2149.181	2072.864	1973.594	1850.586
Biotransformation	2299.9998	2084.457	1898.191	1735.815	1592.502	1463.821	1345.733	1234.716	1127.897	1023.163	919.236

	Monitoring Well Locations (ft)										
	0	20	90								
Field Data from Site	349.000	1283.000	181.000								



See PCE

See TCE

See DCE

See VC

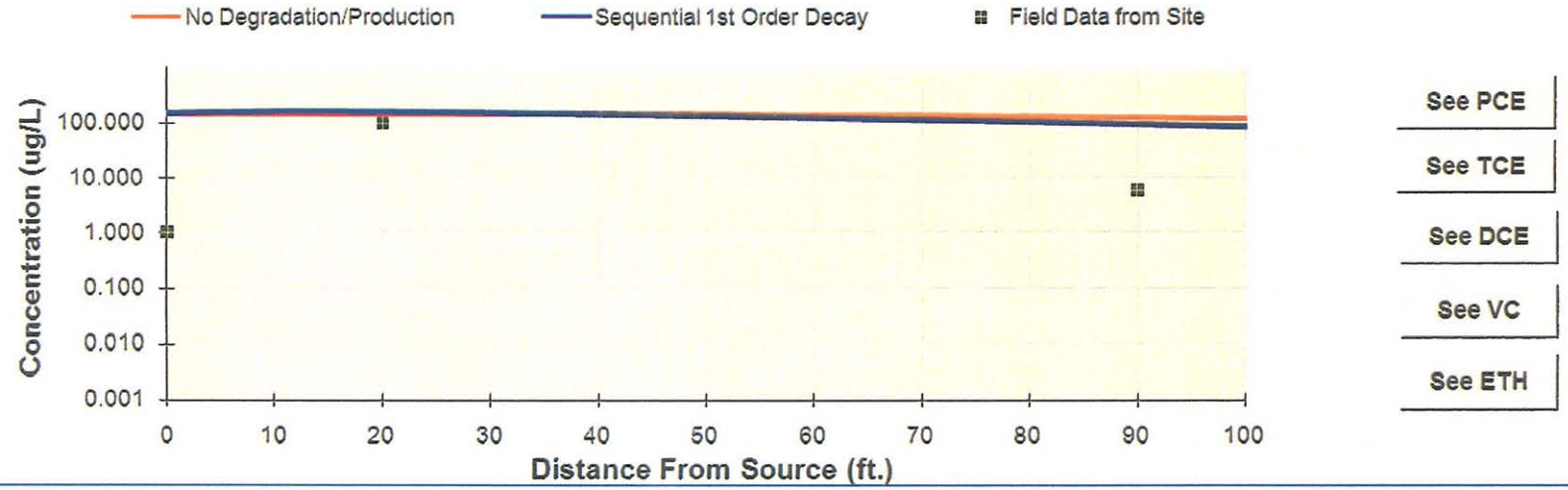
See ETH

Figure C-13 Predicted DCE concentration in year 2020 vs. distance from source.

DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (ug/L) at Z=0

	Distance from Source (ft)										
VC	0	10	20	30	40	50	60	70	80	90	100
No Degradation	150.000	149.856	149.546	148.962	147.951	146.310	143.798	140.164	135.187	128.713	120.690
Biotransformation	150.0000	161.690	160.441	153.297	143.764	133.493	123.182	113.059	103.141	93.372	83.700

	Monitoring Well Locations (ft)										
	0	20	90								
Field Data from Site	1.000	100.000	5.700								

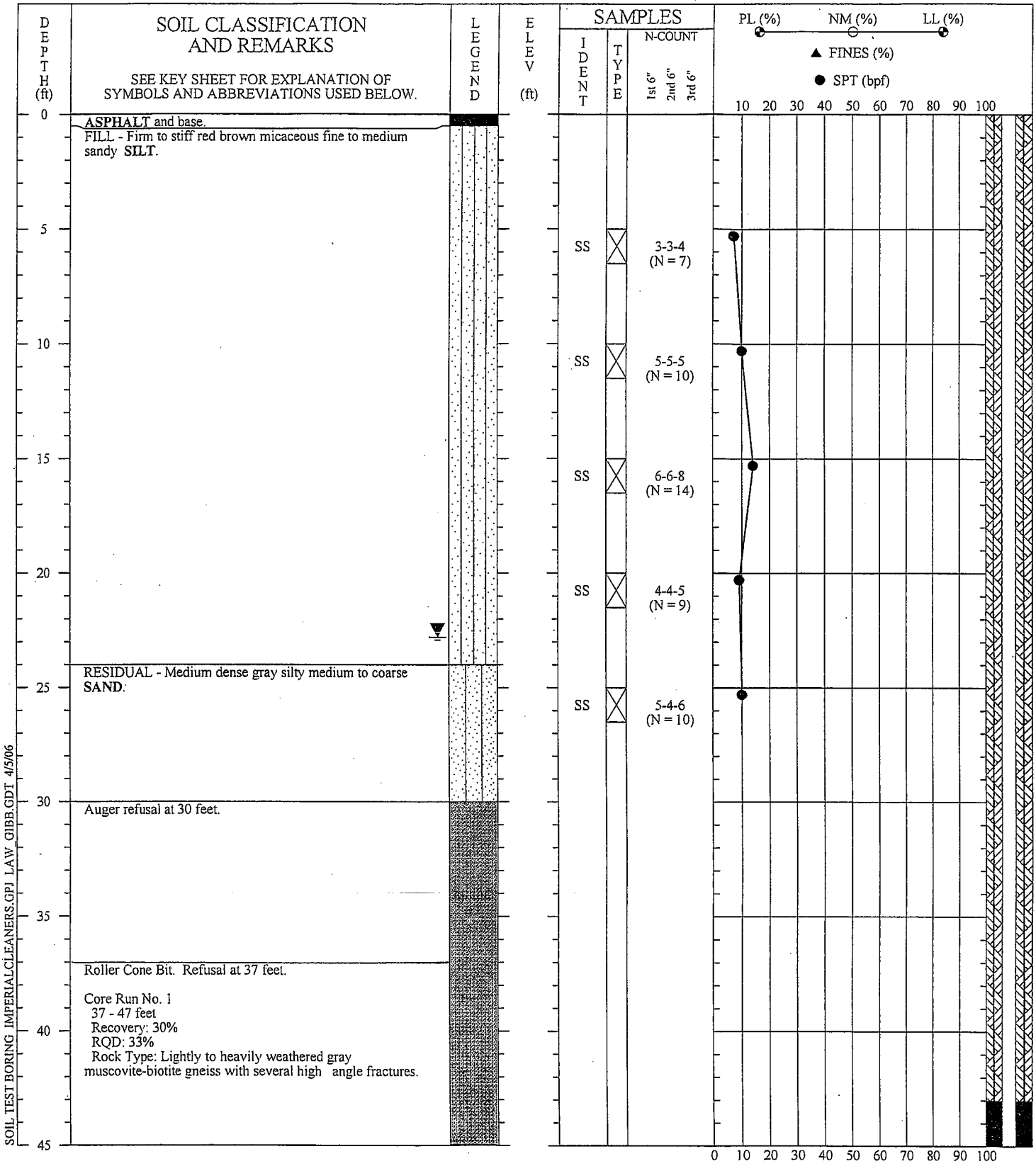


See PCE
See TCE
See DCE
See VC
See ETH

Figure C-14 Predicted VC concentration in year 2020 vs. distance from source.

APPENDIX D

MONITORING WELL AND SOIL BORING LOGS



DRILLER:	MACTEC-Jimmy Oglesby
EQUIPMENT:	CME-75
METHOD:	Hollow Stem Auger/Core Drill
HOLE DIA.:	8 inches/4 inches
REMARKS:	Type III well installed. Stabilized groundwater depth 22.80 feet on 8/23/01.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: MW-3
PROJECT: Imperial Cleaners
LOCATION: Atlanta, Georgia
DRILLED: August 7, 2001
PROJECT NO.: 6305-05-0319

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	SAMPLES N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100
45	Core Run No. 2 47-52 feet Recovery: 100% RQD: 21% Rock Type: Lightly weathered grey muscovite-biotite gneiss.						
50	Boring terminated at 52 feet.						
55							
60							
65							
70							
75							
80							
85							
90							0 10 20 30 40 50 60 70 80 90 100

SOIL IMPERIAL.GPJ LAW_GIBB.GDT 9/26/01

DRILLER: Oglesby
EQUIPMENT: CME 75
METHOD: Hollow Stem Auger/Core Drill
HOLE DIA.: 8"/4"
REMARKS: Type III well installed. Stabilized groundwater depth 22.80 feet on 8/23/01.

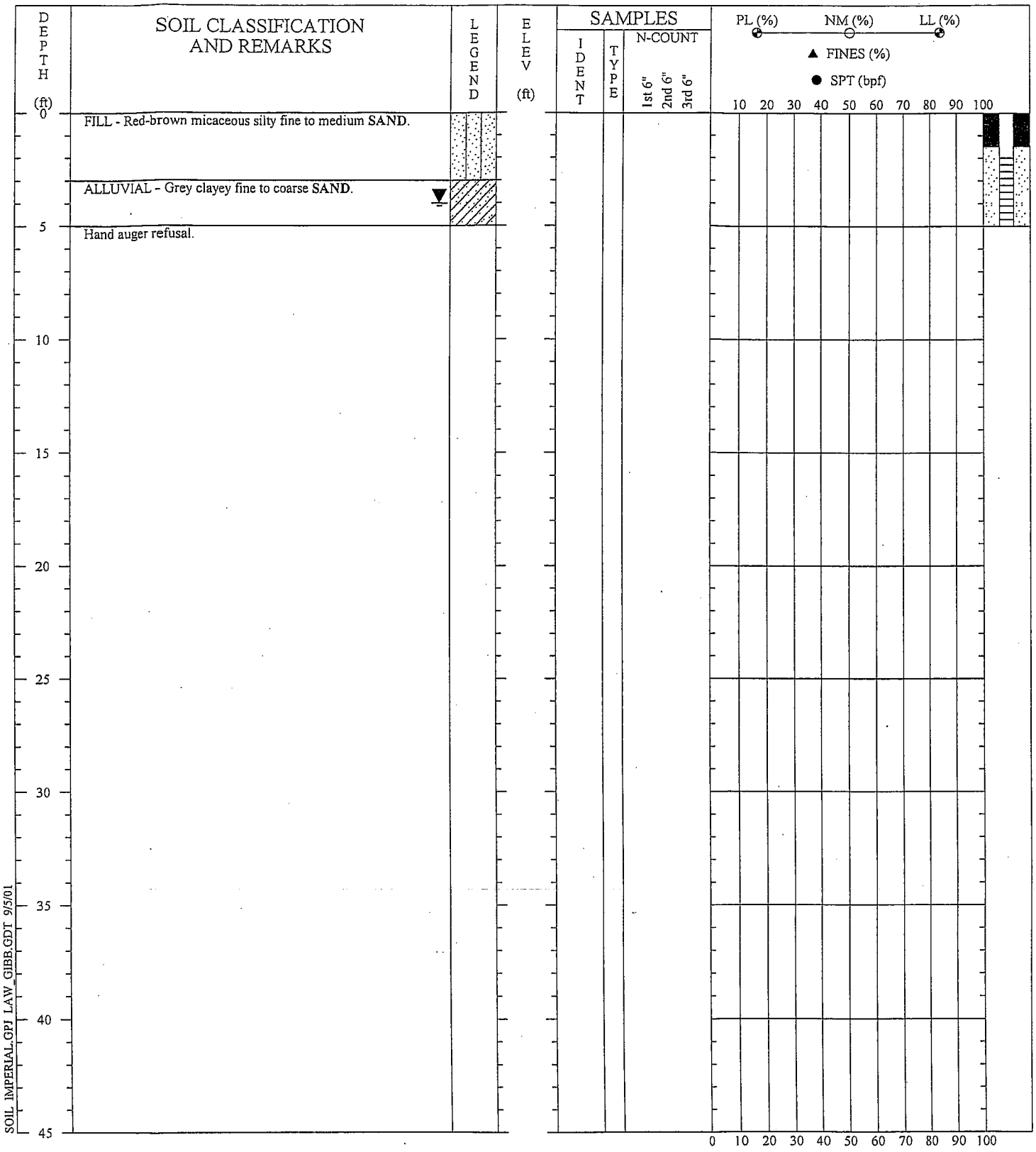
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-3
PROJECT: Imperial Cleaners

DRILLED: August 7, 2001
PROJECT No: 12110-1-0013

LAW
LAWGIBB Group Member



SOIL IMPERIAL.GPJ LAW_GIBB.GDT 9/5/01

DRILLER: Foley
EQUIPMENT: Hand Auger
METHOD:
HOLE DIA.: 4"
REMARKS: Type I groundwater monitoring well installed.

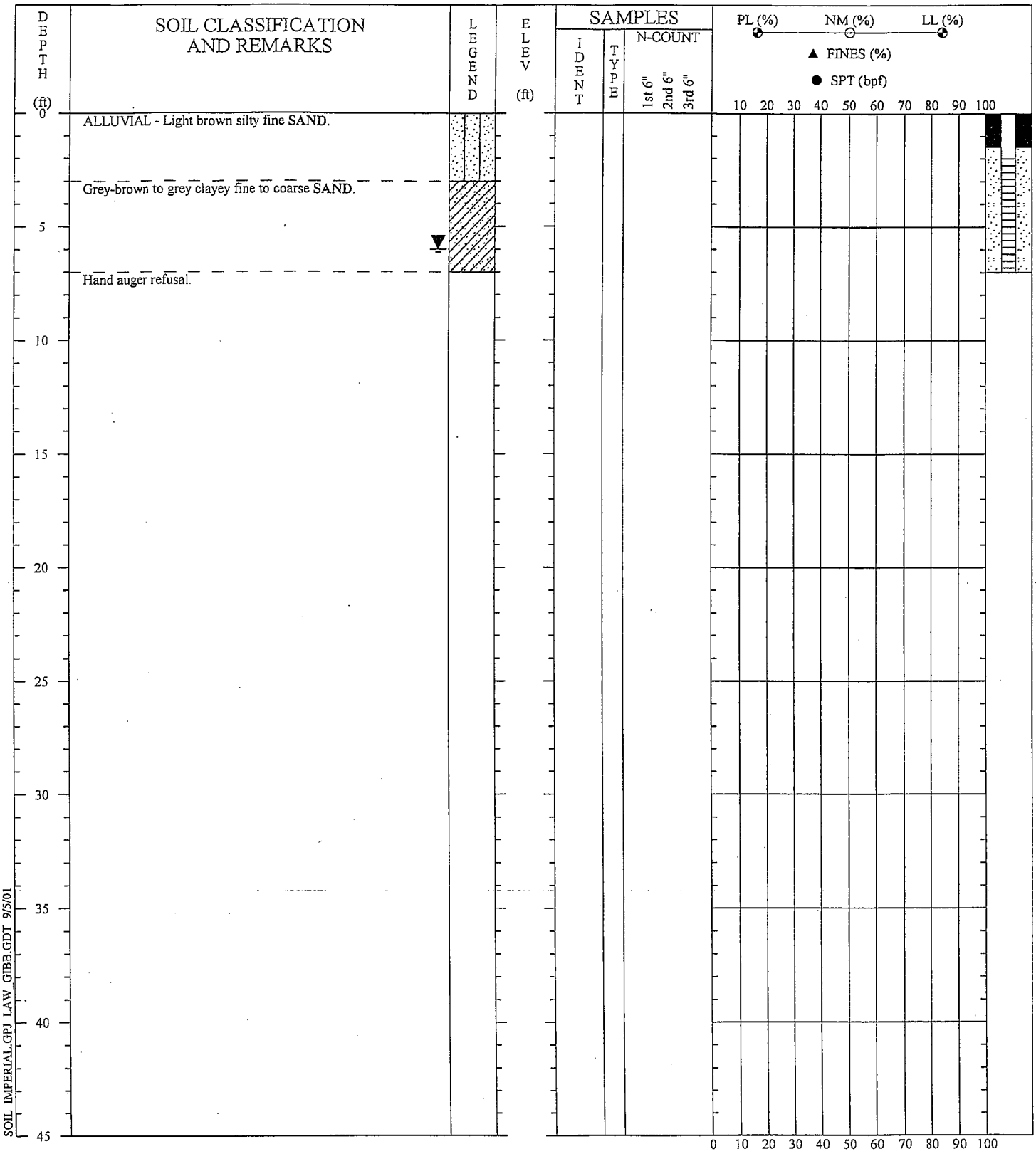
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-4
PROJECT: Imperial Cleaners

DRILLED: August 14, 2001
PROJECT No: 12110-1-0013 PAGE 1 OF 1

LAW
LAWGIBB Group Member



SOIL IMPERIAL.GPJ LAW GIBB.GDT 9/5/01

DRILLER: Foley
EQUIPMENT: Hand Auger
METHOD:
HOLE DIA.: 4"
REMARKS: Type I groundwater monitoring well installed.

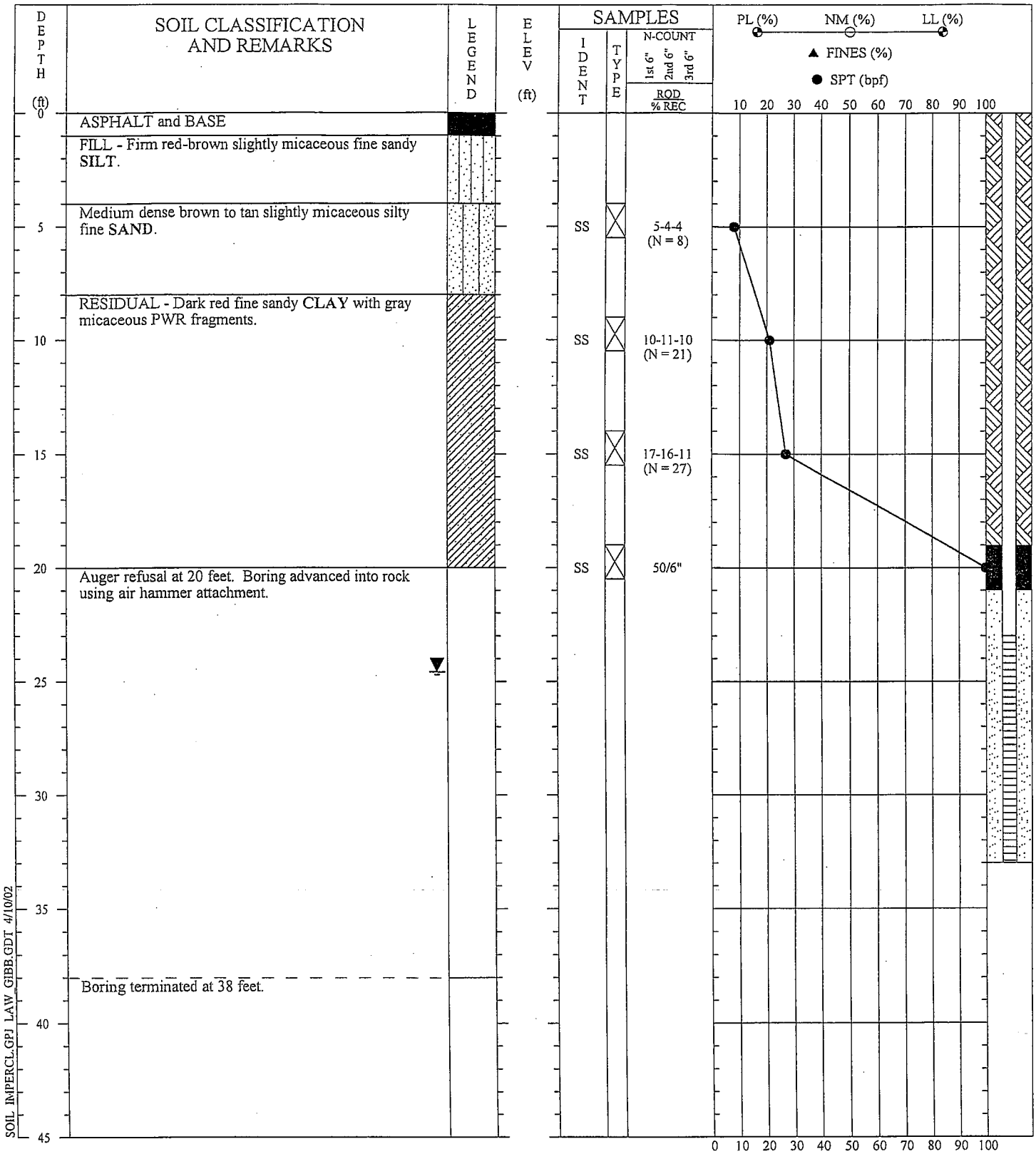
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-5
PROJECT: Imperial Cleaners

DRILLED: August 14, 2001
PROJECT No: 12110-1-0013

LAW
LAWGIBB Group Member



SOIL_IMPERCL.GPJ LAW_GIBB.GDT 4/10/02

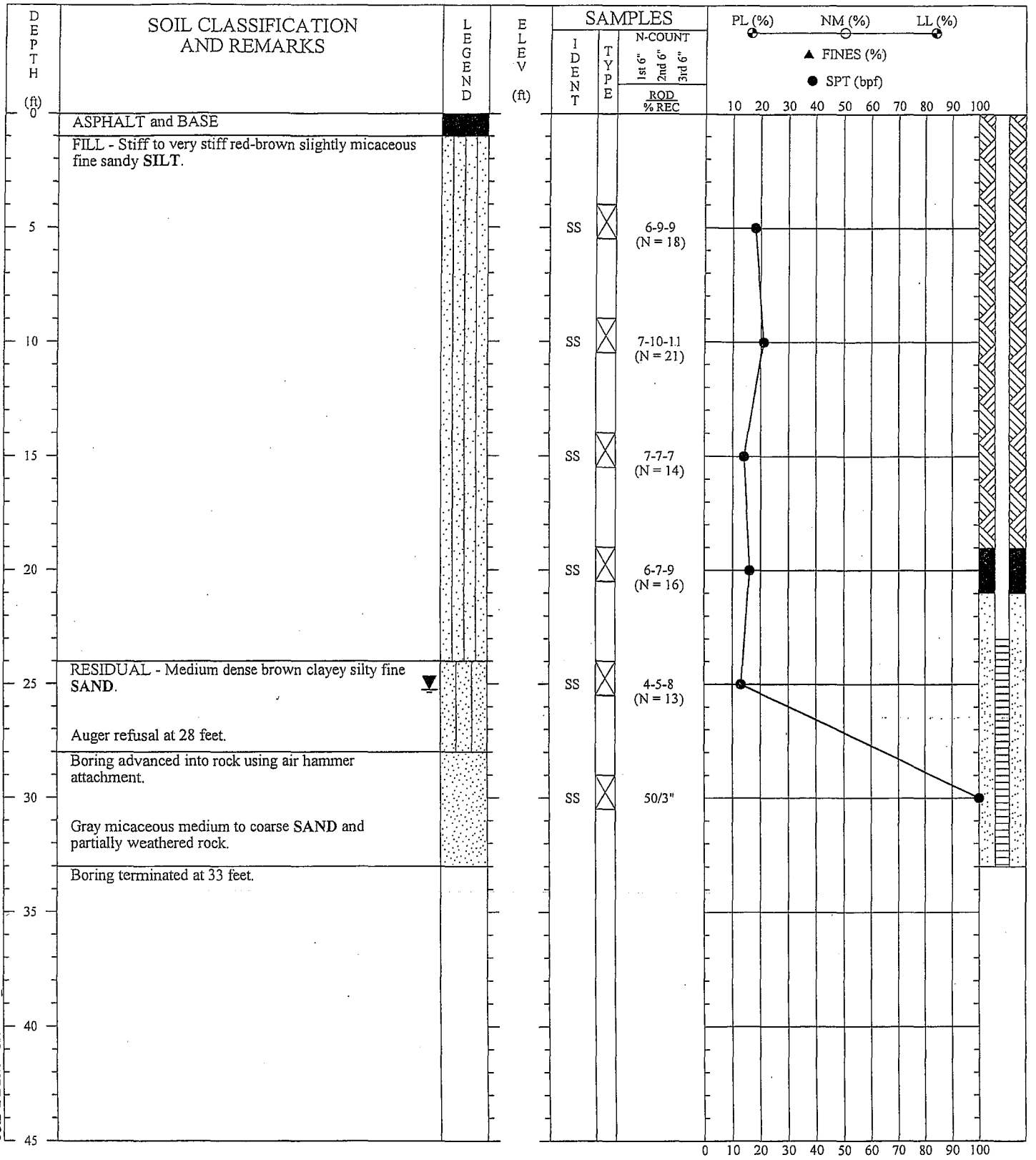
DRILLER:	Piedmont
EQUIPMENT:	CME 75
METHOD:	Hollow Stem Auger/Air Hammer
HOLE DIA.:	8"/4"
REMARKS:	Type II monitoring well installed. Stabilized groundwater depth 24.58 feet.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-6
PROJECT: Imperial Cleaners
LOCATION:
DRILLED: March 4, 2002
PROJECT NO: 12110-1-0013 PAGE 1 OF 1

LAW
LAWGIBB Group Member



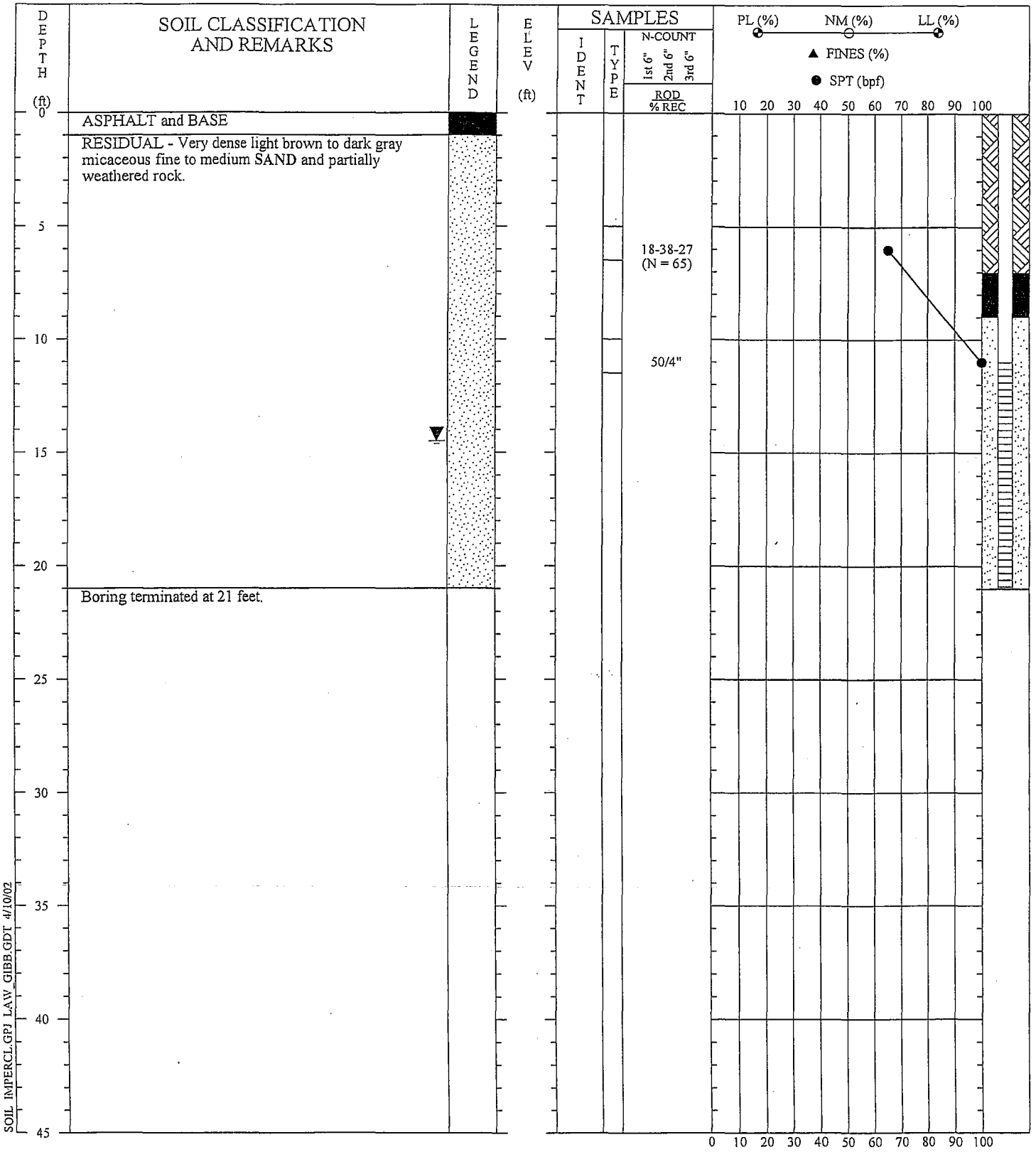
DRILLER:	Piedmont
EQUIPMENT:	CME 75
METHOD:	Hollow Stem Auger/Air Hammer
HOLE DIA.:	8"/4"
REMARKS:	Type II monitoring well installed. Stabilized groundwater depth 25.26 feet.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-7
PROJECT: Imperial Cleaners
LOCATION:
DRILLED: March 4, 2002
PROJECT NO: 12110-1-0013

LAW
LAWGIBB Group Member



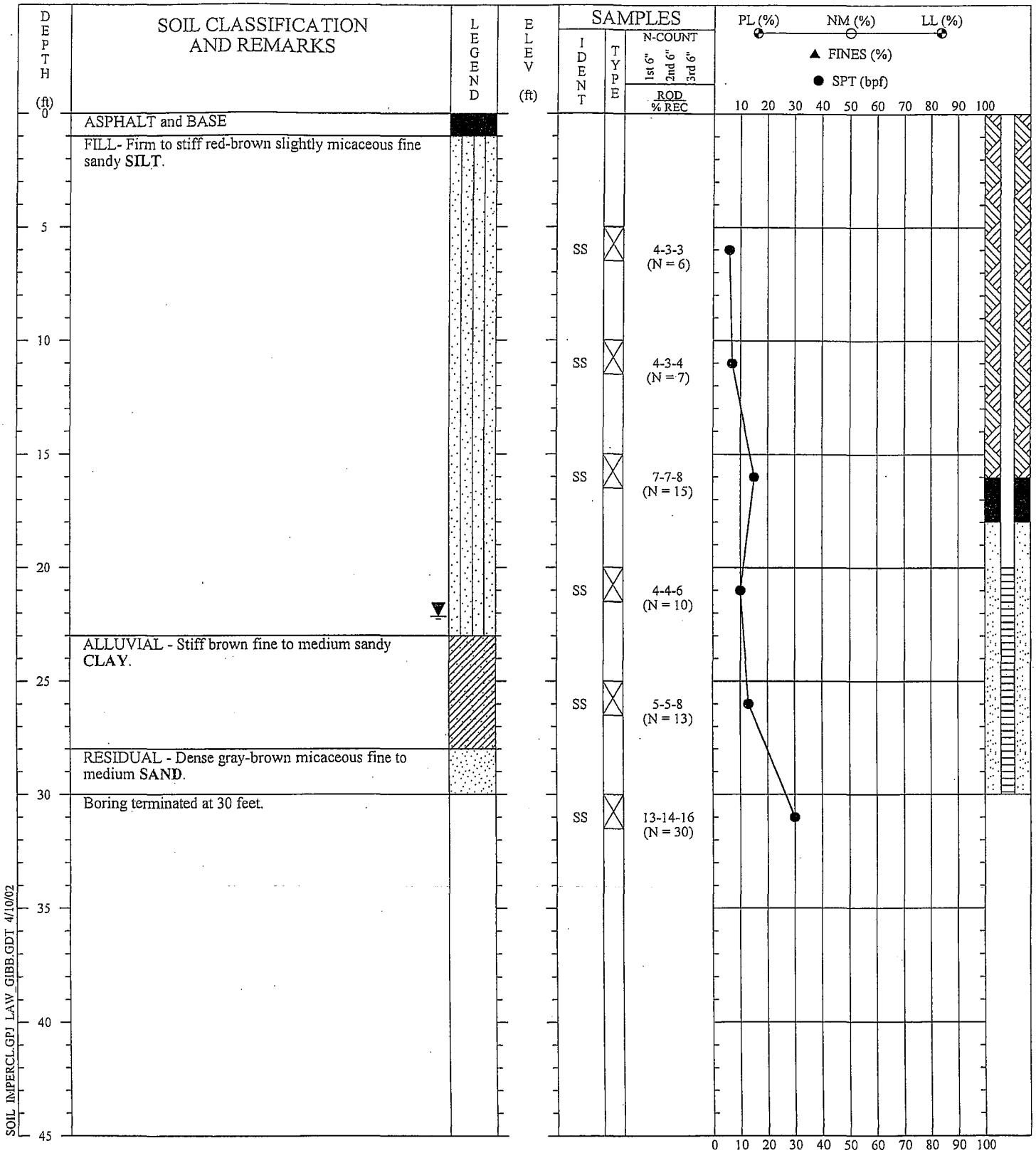
DRILLER:	Piedmont
EQUIPMENT:	CME 75
METHOD:	Hollow Stem Auger
HOLE DIA.:	8"
REMARKS:	Type II monitoring well installed. Stabilized groundwater depth 14.52 feet.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO:	MW-8
PROJECT:	Imperial Cleaners
LOCATION:	
DRILLED:	March 5, 2002
PROJECT NO:	12110-1-0013

LAW
LAWGIBB Group Member



DRILLER:	Piedmont
EQUIPMENT:	CME 75
METHOD:	Hollow Stem Auger
HOLE DIA.:	8"
REMARKS:	Type II monitoring well installed. Stabilized groundwater depth 22.15 feet.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-9
PROJECT: Imperial Cleaners
LOCATION:
DRILLED: March 5, 2002
PROJECT NO: 12110-1-0013 PAGE 1 OF 1

LAW
LAWGIBB Group Member

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)
0	FILL - Red-brown micaceous silty fine to medium SAND.		
	ALLUVIAL - Gray-brown clayey fine to coarse SAND.		
	Hand auger refusal at 3.5 feet.		

SAMPLES: IDENT | TYPE | N-COUNT (1st 6" / 2nd 6" / 3rd 6") | ROD % REC

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

10 20 30 40 50 60 70 80 90 100

0 10 20 30 40 50 60 70 80 90 100

SOIL IMPERCL.GPJ LAW_GIBB.GDT 4/10/02

DRILLER:	Steve Foley
EQUIPMENT:	Hand Auger
METHOD:	
HOLE DIA.:	4"
REMARKS:	Type I monitoring well installed. Stabilized groundwater depth 5.15 feet below TOC.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO:	MW-10
PROJECT:	Imperial Cleaners
LOCATION:	
DRILLED:	March 14, 2002
PROJECT NO:	12110-1-0013

LAW
LAWGIBB Group Member

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)	SAMPLES: IDENT	SAMPLES: TYPE	SAMPLES: N-COUNT (1st 6" / 2nd 6" / 3rd 6") / ROD % REC
0	ALLUVIAL - Brown clayey medium to coarse SAND.					
	Hand auger refusal at 3 feet.					

PL (%) NM (%) LL (%)
▲ FINES (%)
● SPT (bpf)

10 20 30 40 50 60 70 80 90 100

5 10 15 20 25 30 35 40 45

0 10 20 30 40 50 60 70 80 90 100

SOIL IMPERCL.GPJ LAW_GIBB.GDT 4/10/02

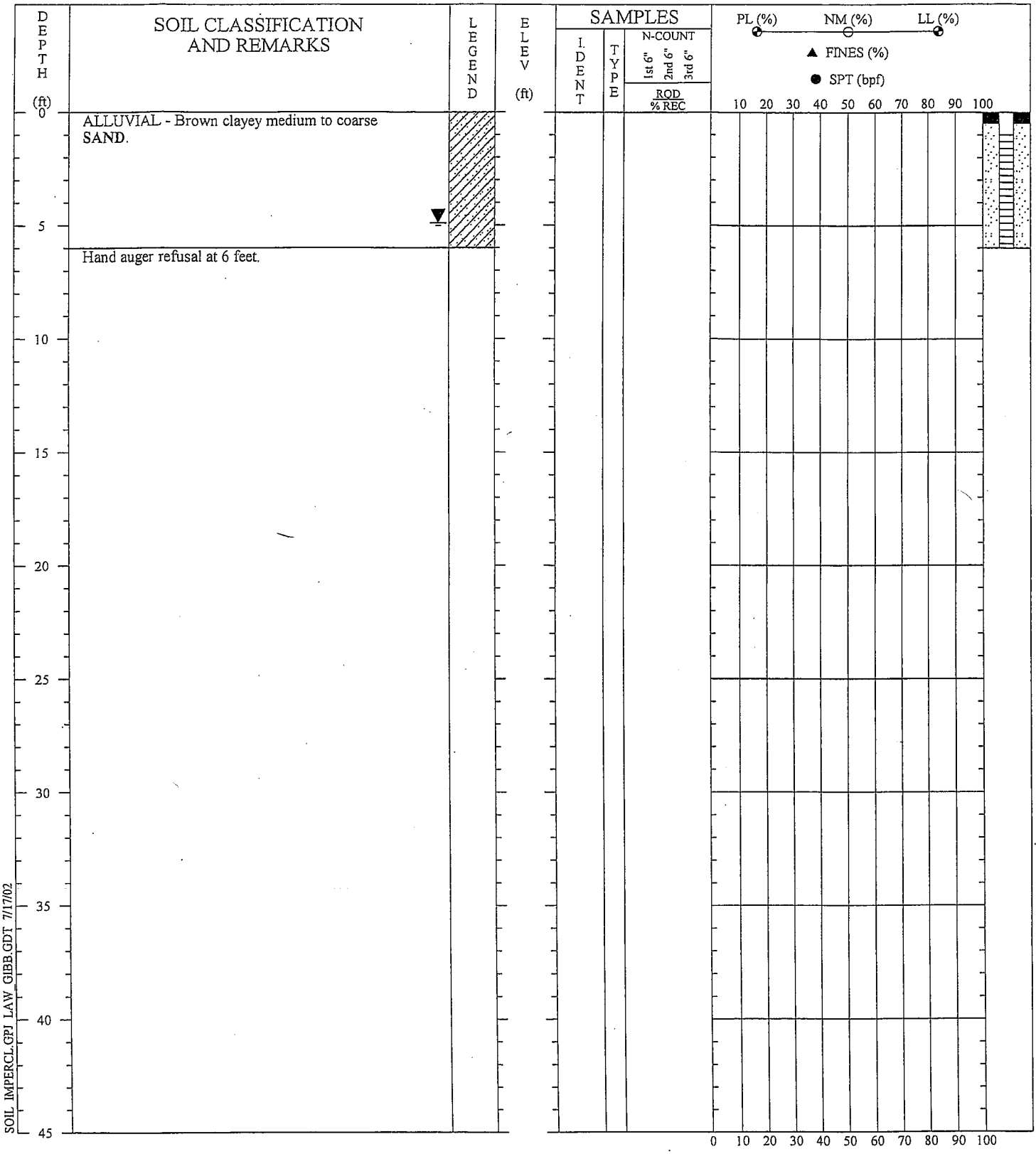
DRILLER: Steve Foley
EQUIPMENT: Hand Auger
METHOD:
HOLE DIA.: 4"
REMARKS: Type I monitoring well installed. Stabilized groundwater depth 5.80 feet below TOC.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-11
PROJECT: Imperial Cleaners
LOCATION:
DRILLED: April 4, 2002
PROJECT NO: 12110-1-0013 **PAGE 1 OF 1**

LAW
LAWGIBB Group Member



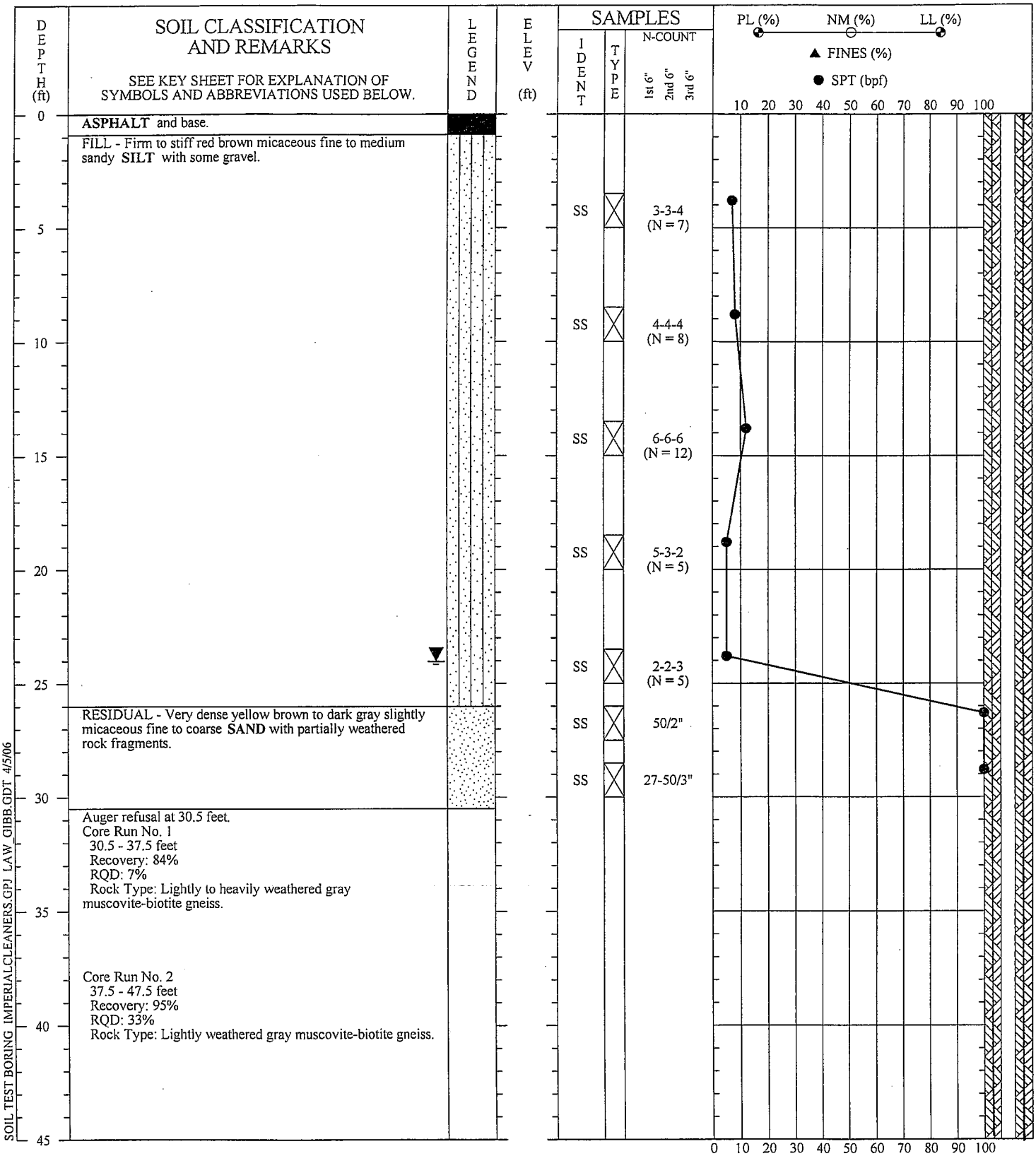
DRILLER:	Steve Foley
EQUIPMENT:	Hand Auger
METHOD:	
HOLE DIA.:	4"
REMARKS:	Type I monitoring well installed. Stabilized groundwater depth 4.91 feet below TOC.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-12
PROJECT: Imperial Cleaners
LOCATION:
DRILLED: June 12, 2002
PROJECT NO: 12110-1-0013 **PAGE 1 OF 1**

LAW
LAWGIBB Group Member



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

DRILLER:	MACTEC
EQUIPMENT:	CME-54
METHOD:	Hollow Stem Auger/Core Drill
HOLE DIA.:	8 inches/4 inches
REMARKS:	Type III well installed. Outer casing grouted at 30.5 feet. Stabilized groundwater depth 24.03 on 3/31/06.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

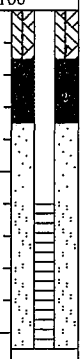
SOIL TEST BORING RECORD

BORING NO.: DW-1
PROJECT: Imperial Cleaners
LOCATION: Atlanta, Georgia
DRILLED: March 15, 2006
PROJECT NO.: 6305-05-0319

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: IDENT	SAMPLES: TYPE	SAMPLES: N-COUNT (1st 6" / 2nd 6" / 3rd 6")
45						
	Core Run No. 3 47.5 - 55.5 feet Recovery: 100% RQD: 63% Rock type: Lightly weathered to fresh gray muscovite-biotite gneiss					
55	Boring terminated at 55.5 feet.					
60						
65						
70						
75						
80						
85						
90						

PL (%) NM (%) LL (%)
▲ FINES (%)
● SPT (bpf)
10 20 30 40 50 60 70 80 90 100
0 10 20 30 40 50 60 70 80 90 100



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

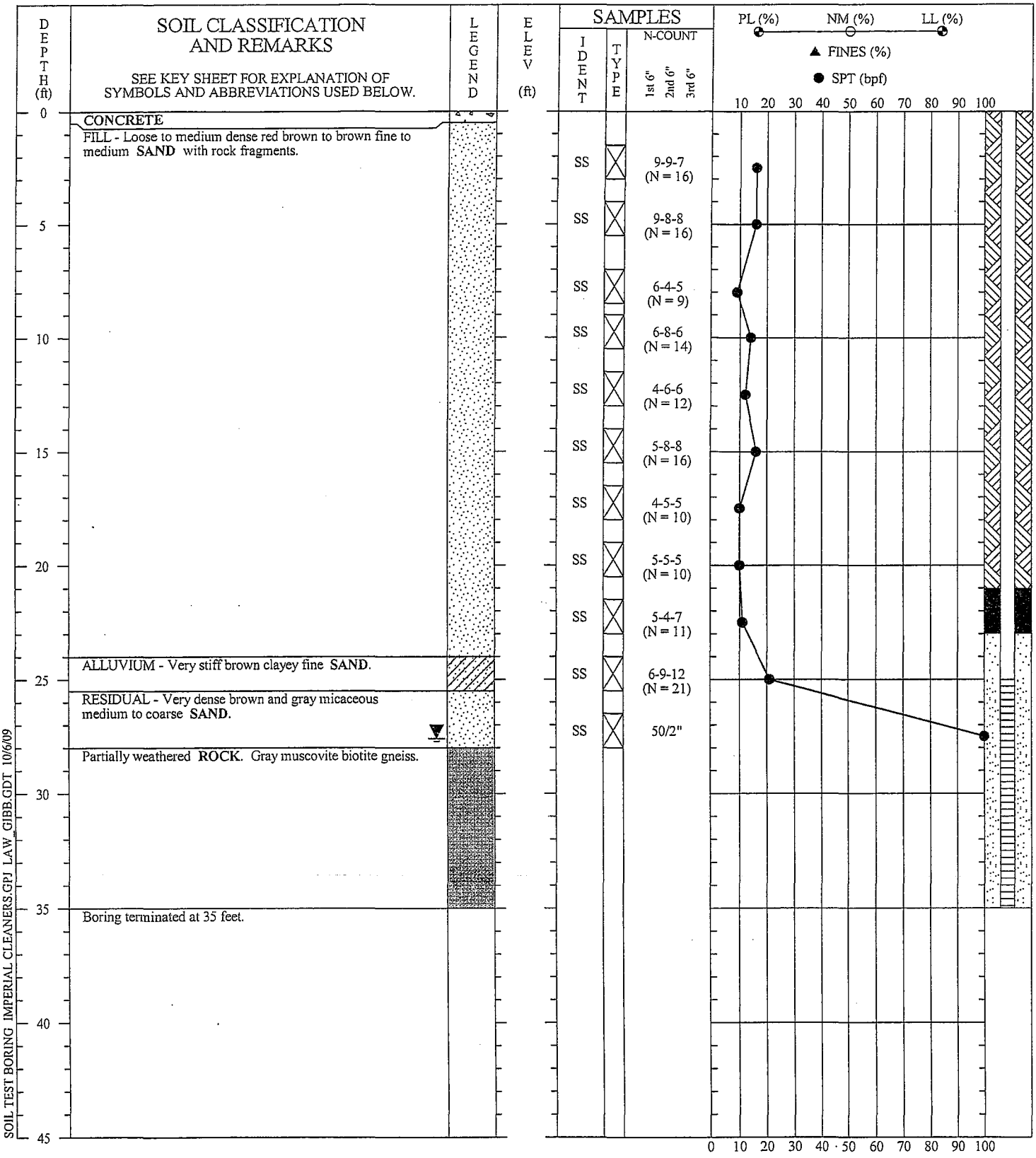
DRILLER:	MACTEC
EQUIPMENT:	CME-54
METHOD:	Hollow Stem Auger/Core Drill
HOLE DIA.:	8 inches/4 inches
REMARKS:	Type III well installed. Outer casing grouted at 30.5 feet. Stabilized groundwater depth 24.03 on 3/31/06.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: DW-1
PROJECT: Imperial Cleaners
LOCATION: Atlanta, Georgia
DRILLED: March 15, 2006
PROJECT NO.: 6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 10/6/09

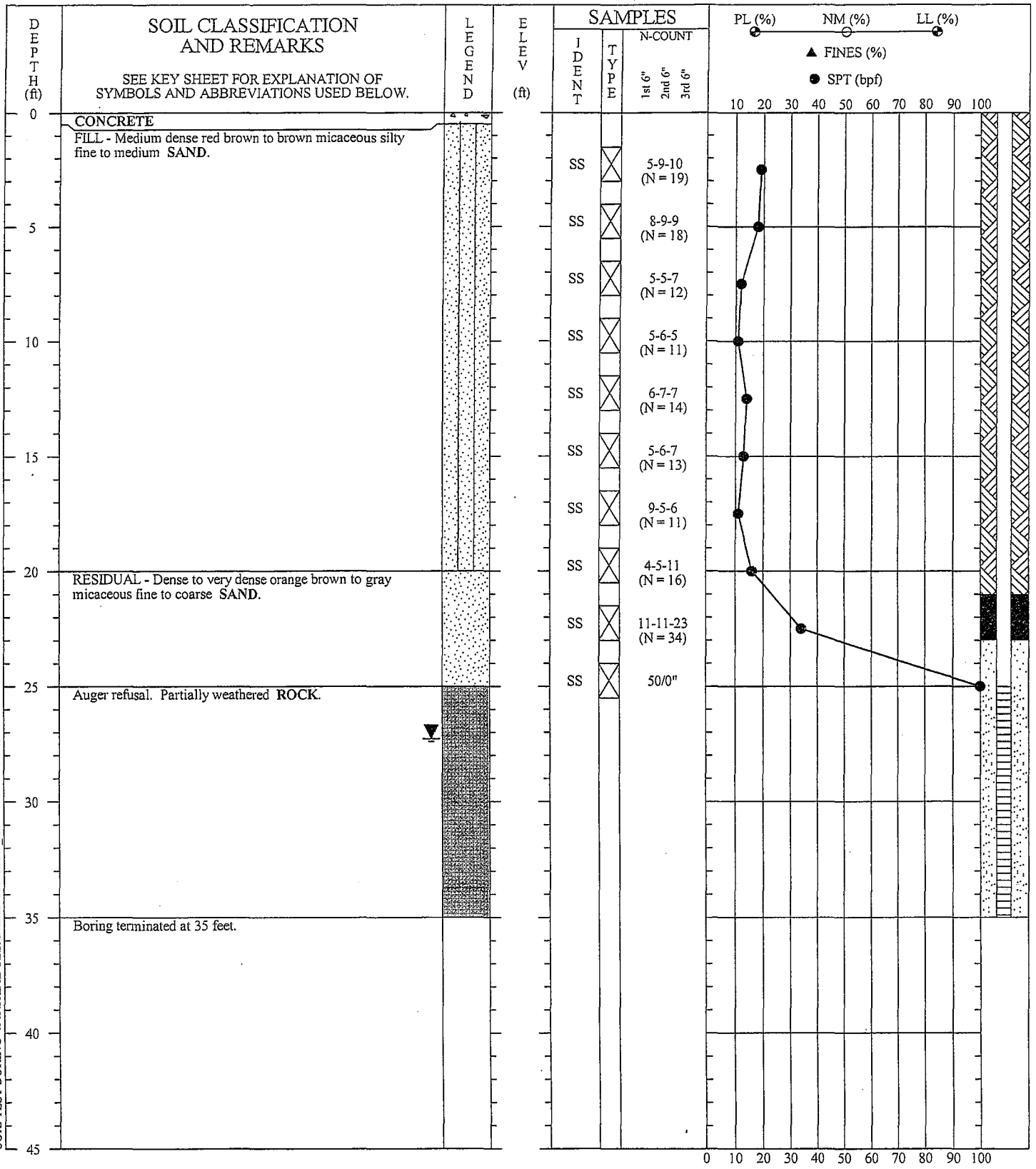
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger/Air Hammer
HOLE DIA.:	8 inches
REMARKS:	Type II monitoring well installed. Stabilized grounwater depth 27.60 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-20/MW-13
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	August 12, 2009
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 10/6/09

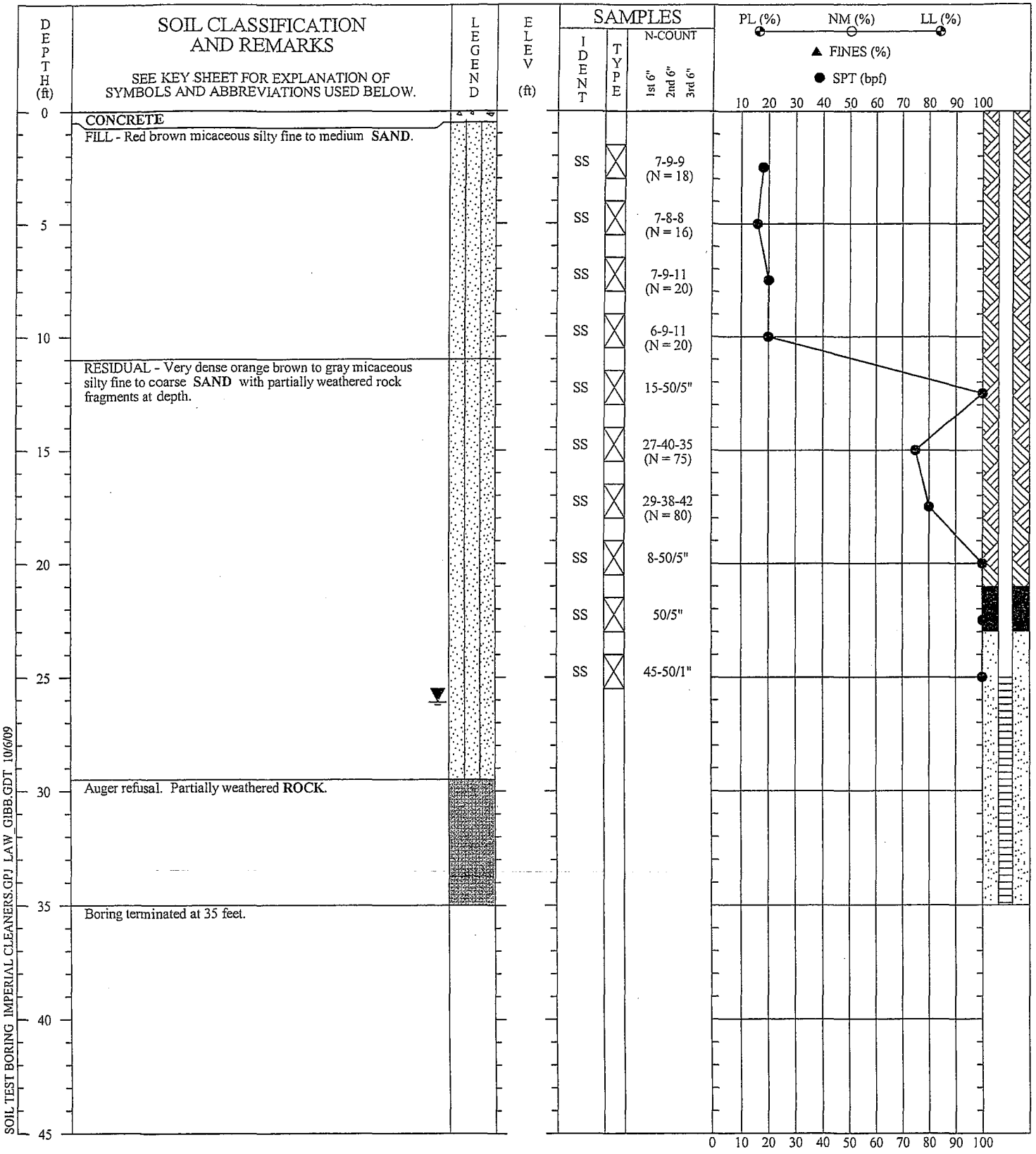
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger/Air Hammer
HOLE DIA.:	8 inches
REMARKS:	Type II monitoring well installed. Stabilized grounwater depth 27.28 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-22/MW-14
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	August 13, 2009
PROJECT NO.:	6305-05-0319

MACTEC



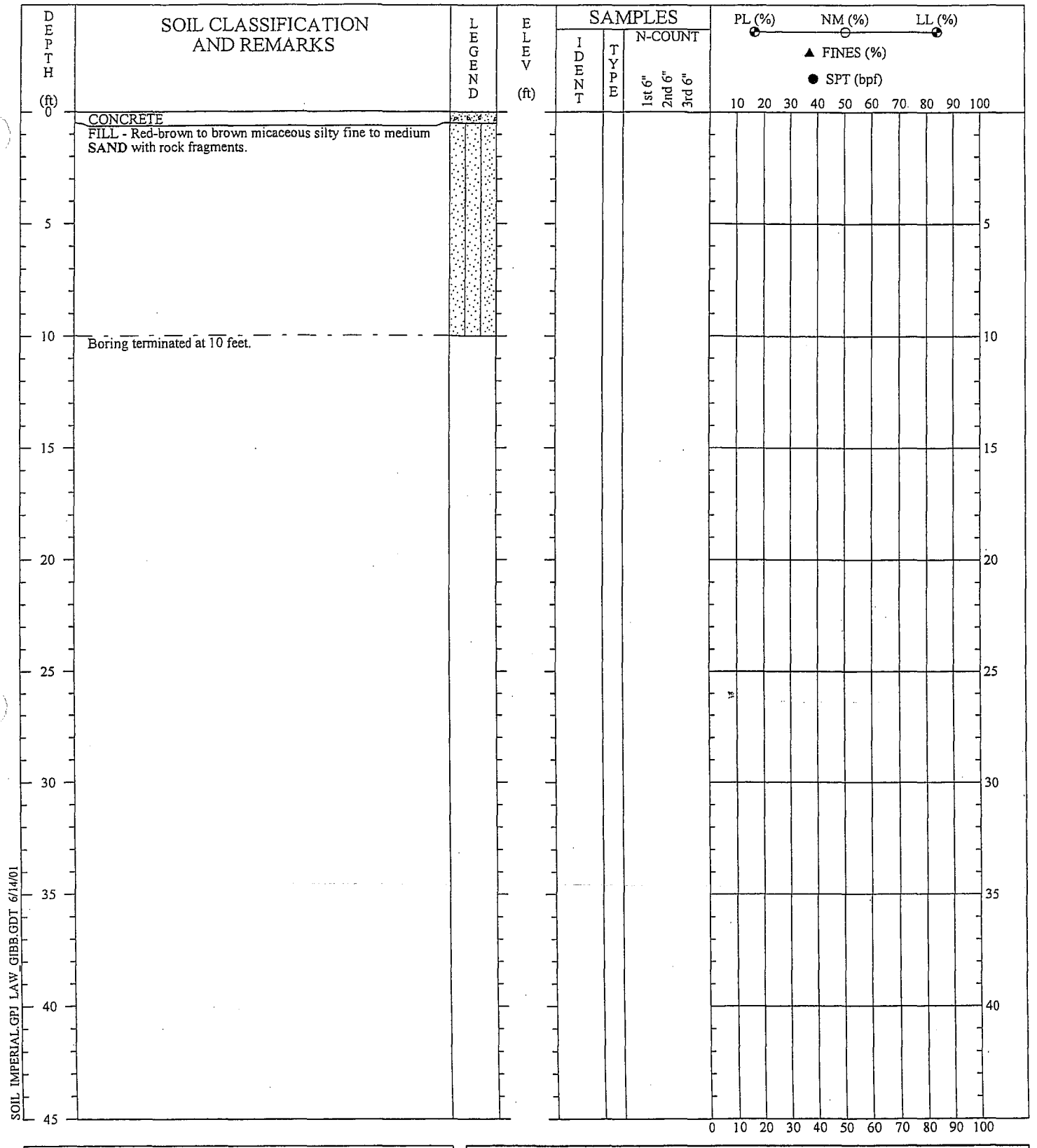
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger/Air Hammer
HOLE DIA.:	8 inches
REMARKS:	Type II monitoring well installed. Stabilized grounwater depth 26.10 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-26/MW-15
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	August 14, 2009
PROJECT NO.:	6305-05-0319

MACTEC



SOIL IMPERIAL.GPJ LAW_GIBB.GDT 6/14/01

DRILLER:	ESN Southeast
EQUIPMENT:	Geoprobe
METHOD:	Direct Push
HOLE DIA.:	1.5"
REMARKS:	No groundwater encountered.

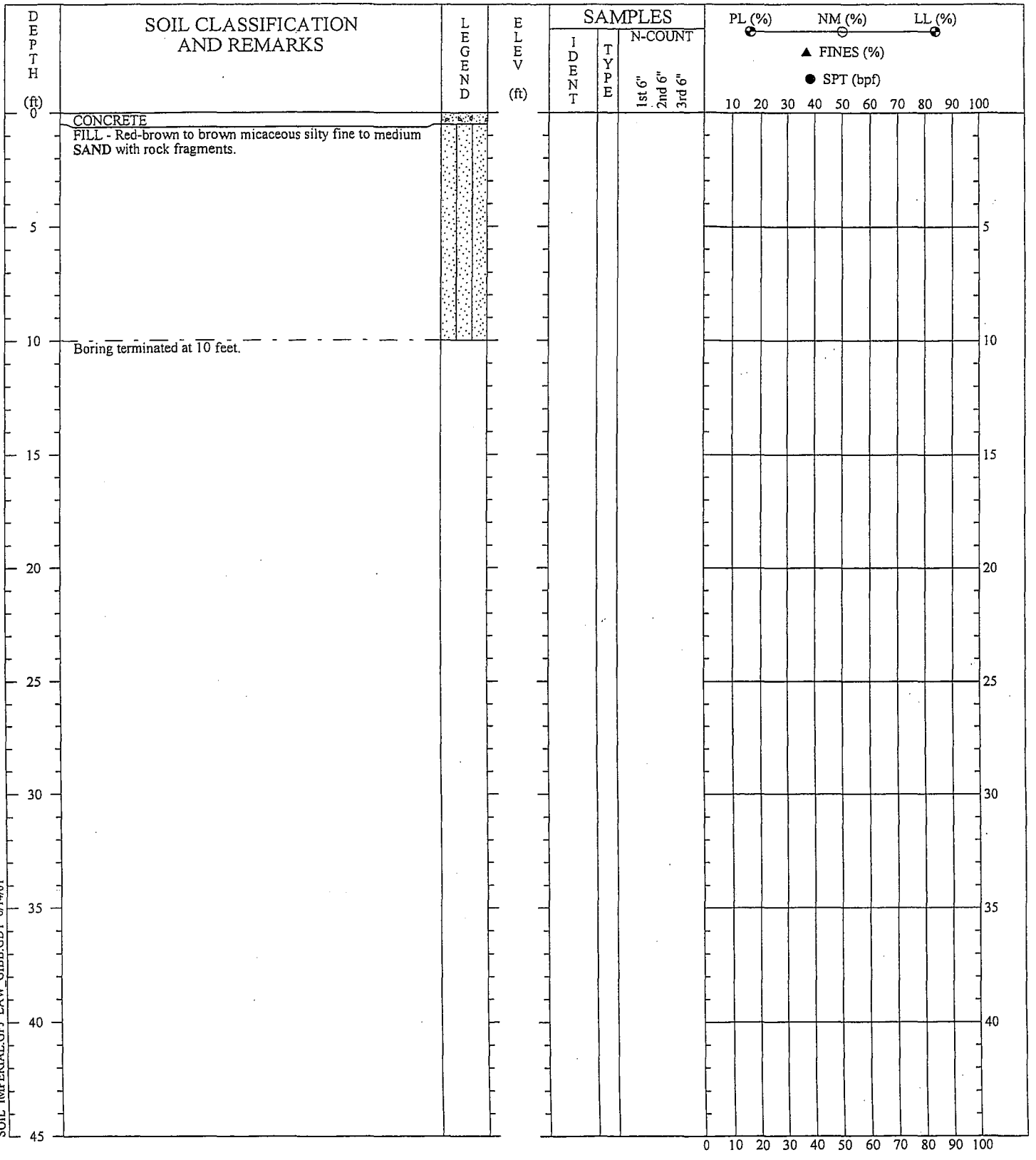
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: GP-1
PROJECT: Imperial Cleaners

DRILLED: May 21, 2001
PROJECT No: 12110-1-0013

LAW
LAWGIBB Group Member



DRILLER: ESN Southeast
EQUIPMENT: Geoprobe
METHOD: Direct Push
HOLE DIA.: 1.5"
REMARKS: No groundwater encountered.

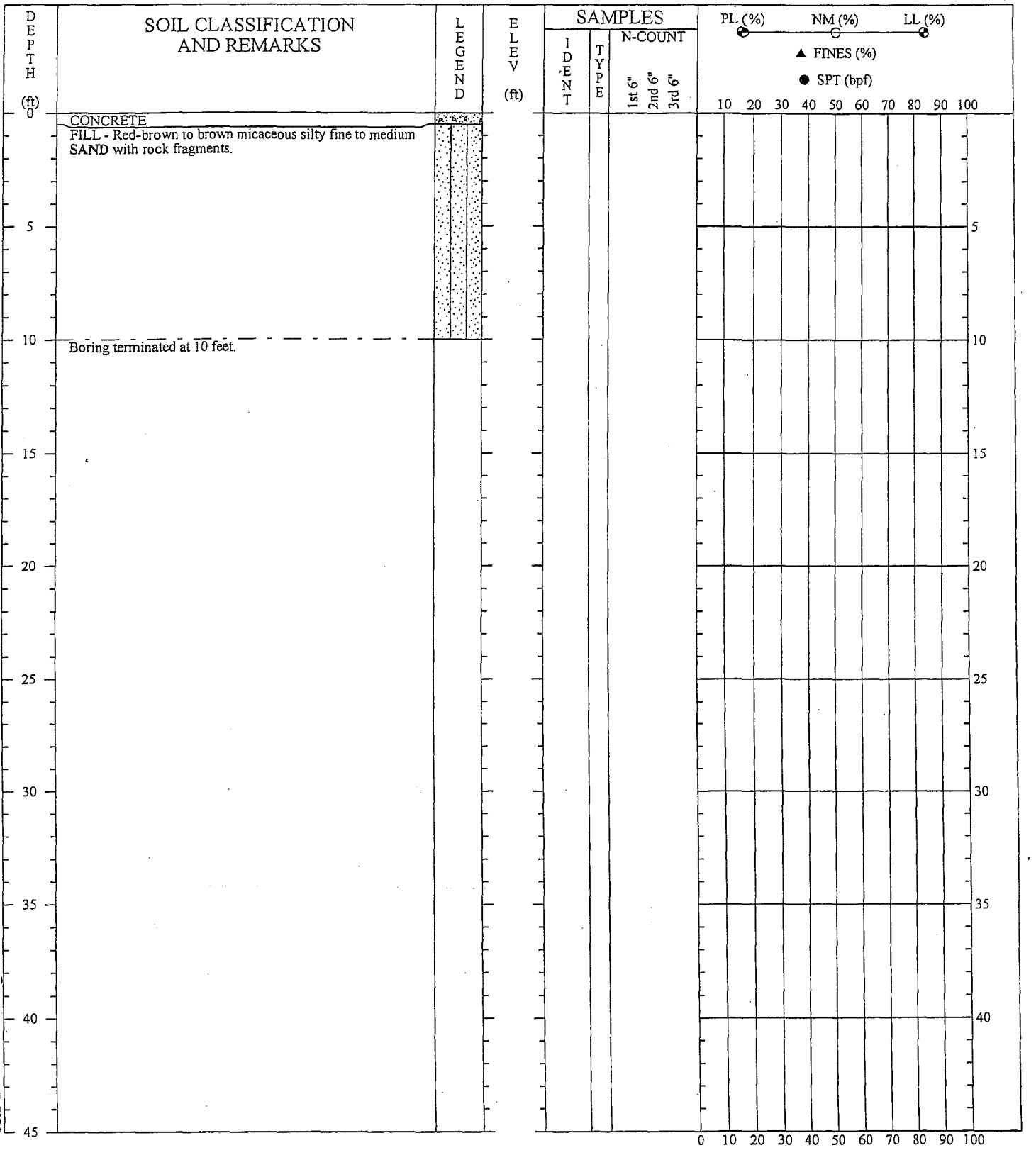
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: GP-2
PROJECT: Imperial Cleaners

DRILLED: May 21, 2001
PROJECT No: 12110-1-0013

LAW
LAWGIBB Group Member



SOIL IMPERIAL.GPJ LAW_GIBB.GDT 6/14/01

DRILLER:	ESN Southeast
EQUIPMENT:	Geoprobe
METHOD:	Direct Push
HOLE DIA.:	1.5"
REMARKS:	No groundwater encountered.

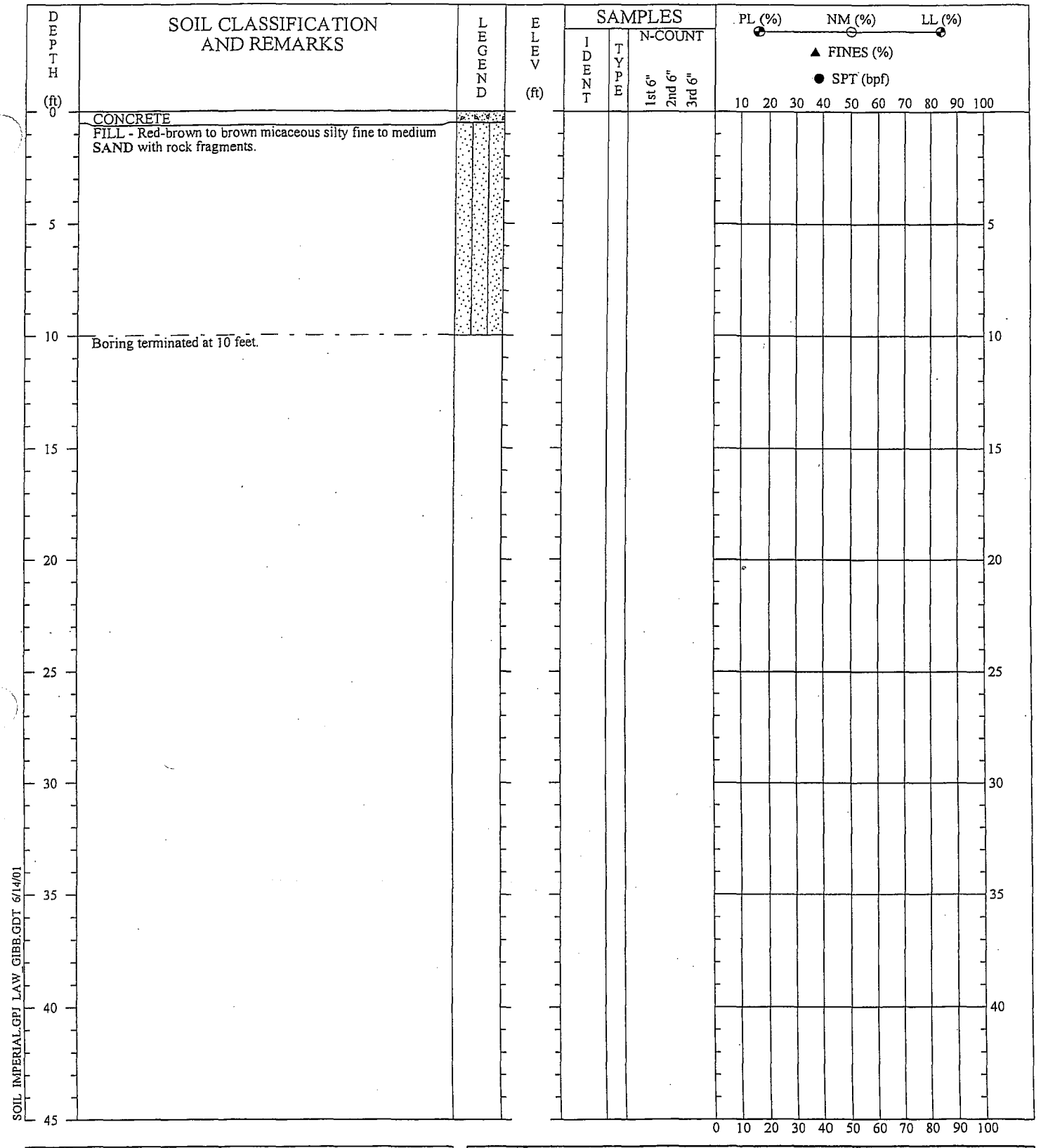
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: GP-3
PROJECT: Imperial Cleaners

DRILLED: May 21, 2001
PROJECT No: 12110-1-0013

LAW
LAWGIBB Group Member



DRILLER: ESN Southeast
EQUIPMENT: Geoprobe
METHOD: Direct Push
HOLE DIA.: 1.5"
REMARKS: No groundwater encountered.

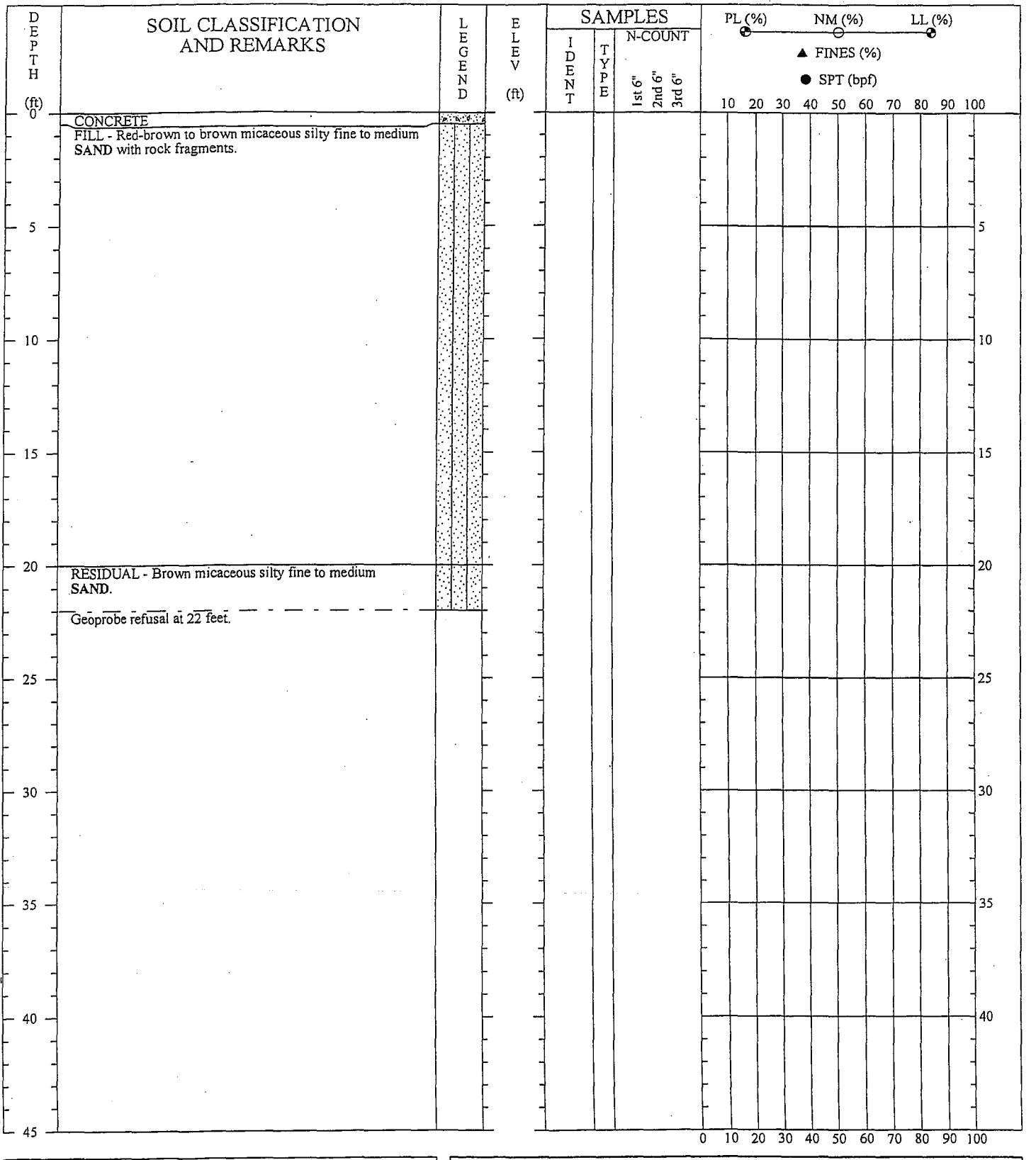
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: GP-4
PROJECT: Imperial Cleaners

DRILLED: May 21, 2001
PROJECT No: 12110-1-0013

LAW
LAWGIBB Group Member



SOIL_IMPERIAL.GPJ LAW_GIBB.GDT 6/15/01

DRILLER: ESN Southeast
EQUIPMENT: Geoprobe
METHOD: Direct Push
HOLE DIA.: 1.5"
REMARKS: Geoprobe refusal at 22 feet. No groundwater encountered.

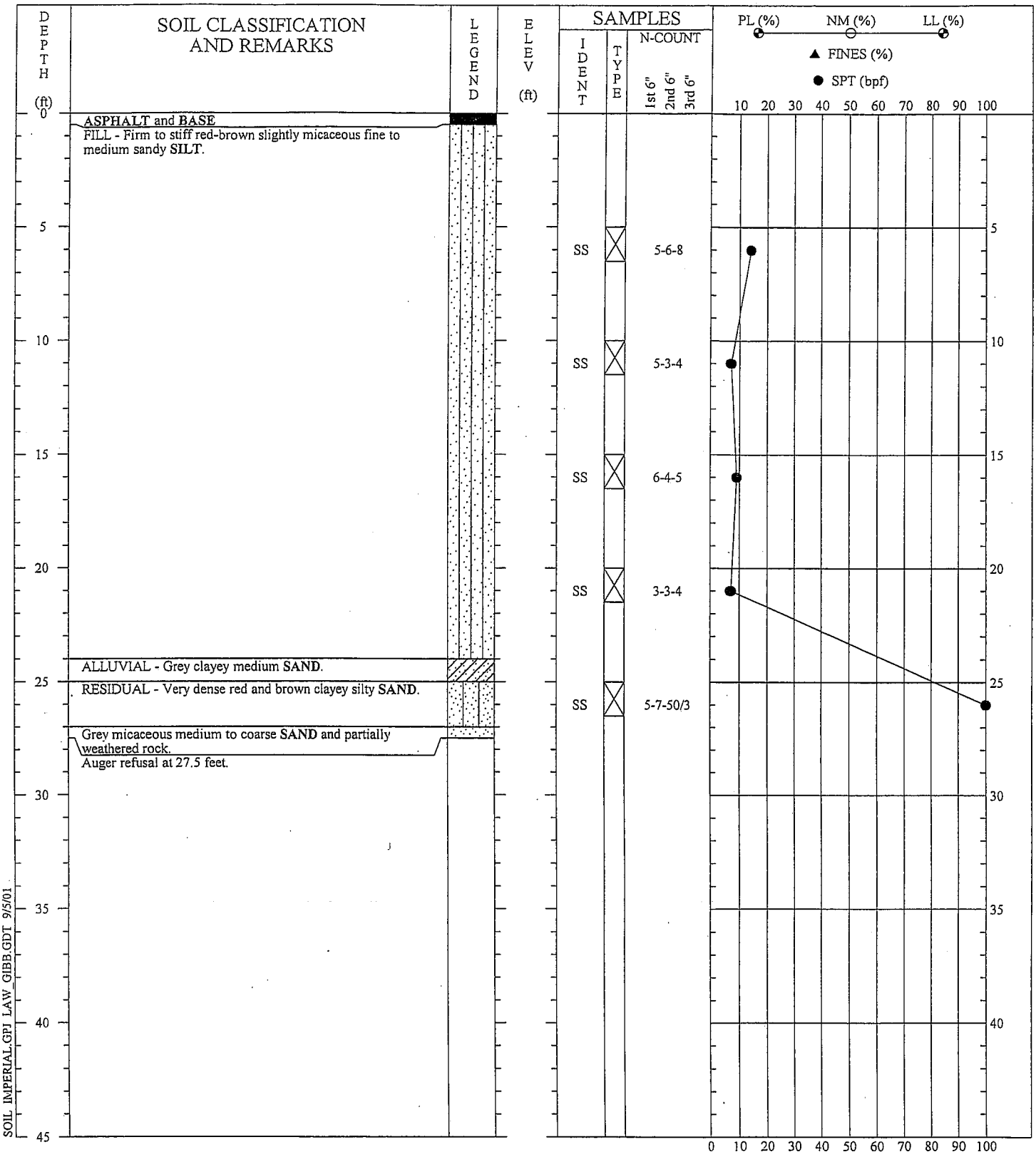
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: GP-5
PROJECT: Imperial Cleaners

DRILLED: May 21, 2001
PROJECT No: 12110-1-0013

LAW
LAWGIBB Group Member



SOIL IMPERIAL.GPJ LAW_GIBB.GDT 9/5/01

DRILLER: Oglesby
EQUIPMENT: CME 75
METHOD: Hollow Stem Auger
HOLE DIA.: 8"
REMARKS: Auger refusal at 27.5 feet. No groundwater encountered.

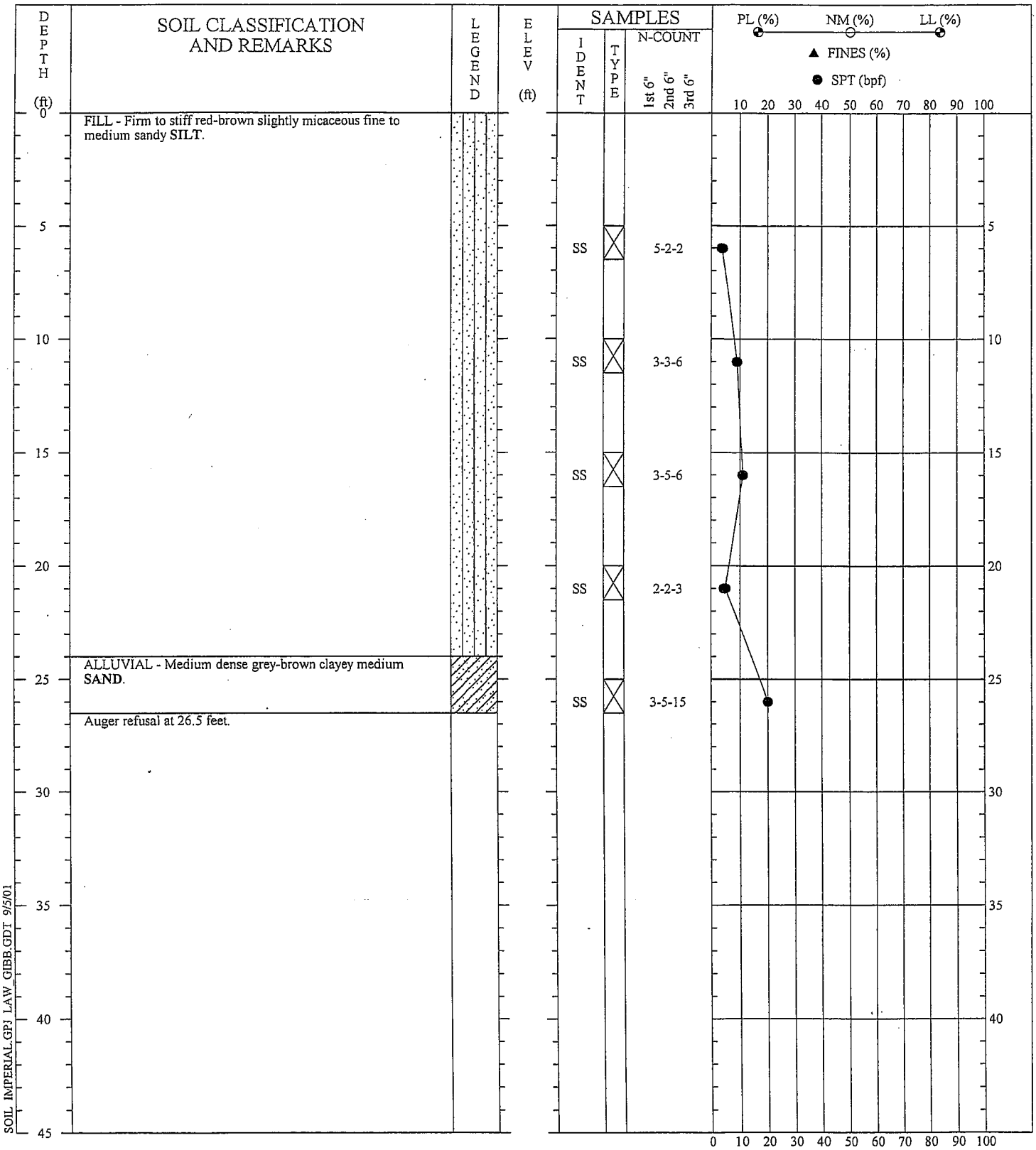
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: SB-7
PROJECT: Imperial Cleaners

DRILLED: August 7, 2001
PROJECT No: 12110-1-0013 PAGE 1 OF 1

LAW
LAWGIBB Group Member



SOIL IMPERIAL.GPJ LAW GIBB.GDT 9/5/01

DRILLER:	Oglesby
EQUIPMENT:	CME 75
METHOD:	Hollow Stem Auger
HOLE DIA.:	8"
REMARKS:	Auger refusal at 26.5 feet. No groundwater encounter.

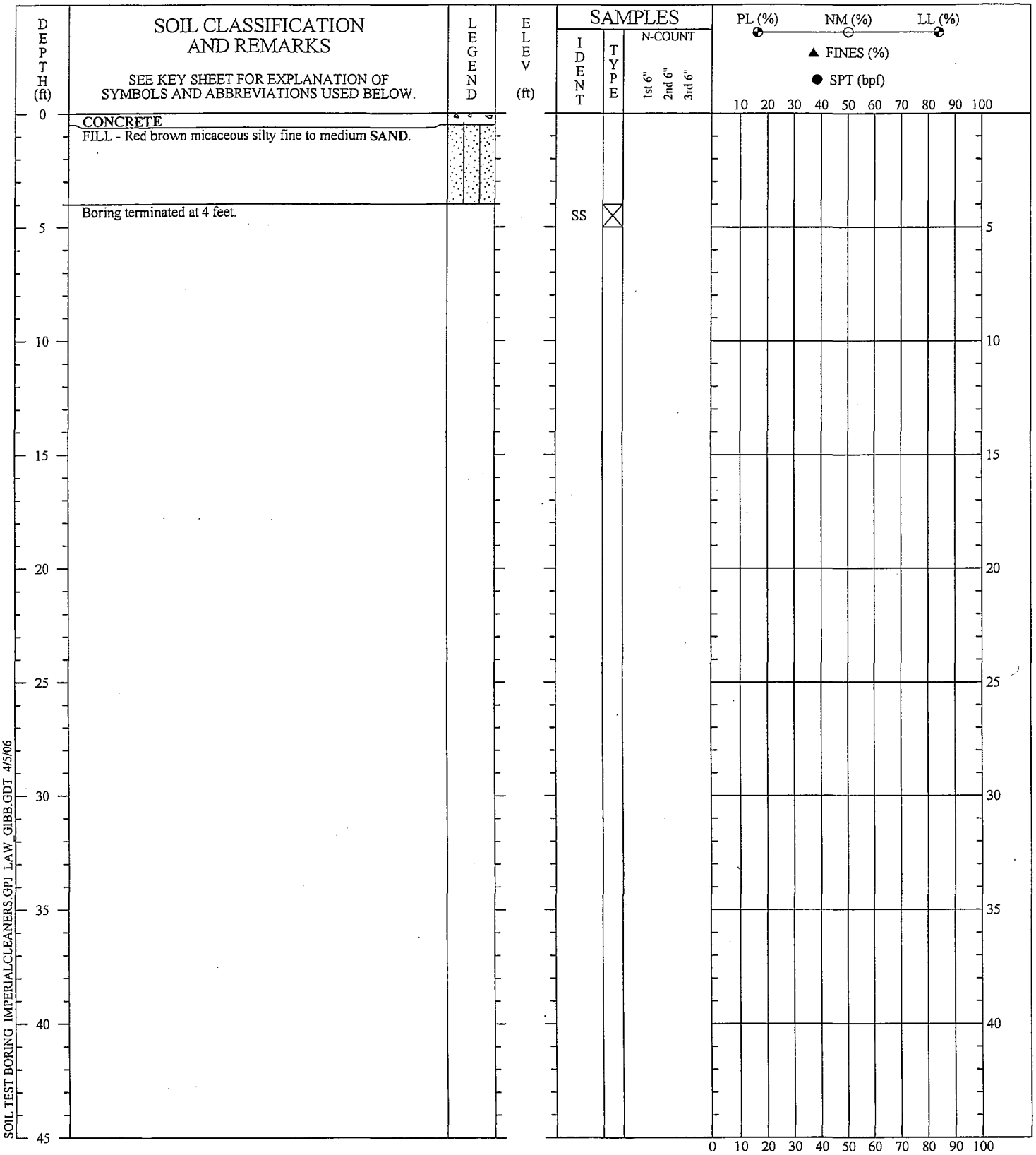
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: SB-8
PROJECT: Imperial Cleaners

DRILLED: August 8, 2001
PROJECT No: 12110-1-0013 PAGE 1 OF 1

LAW
LAWGIBB Group Member



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

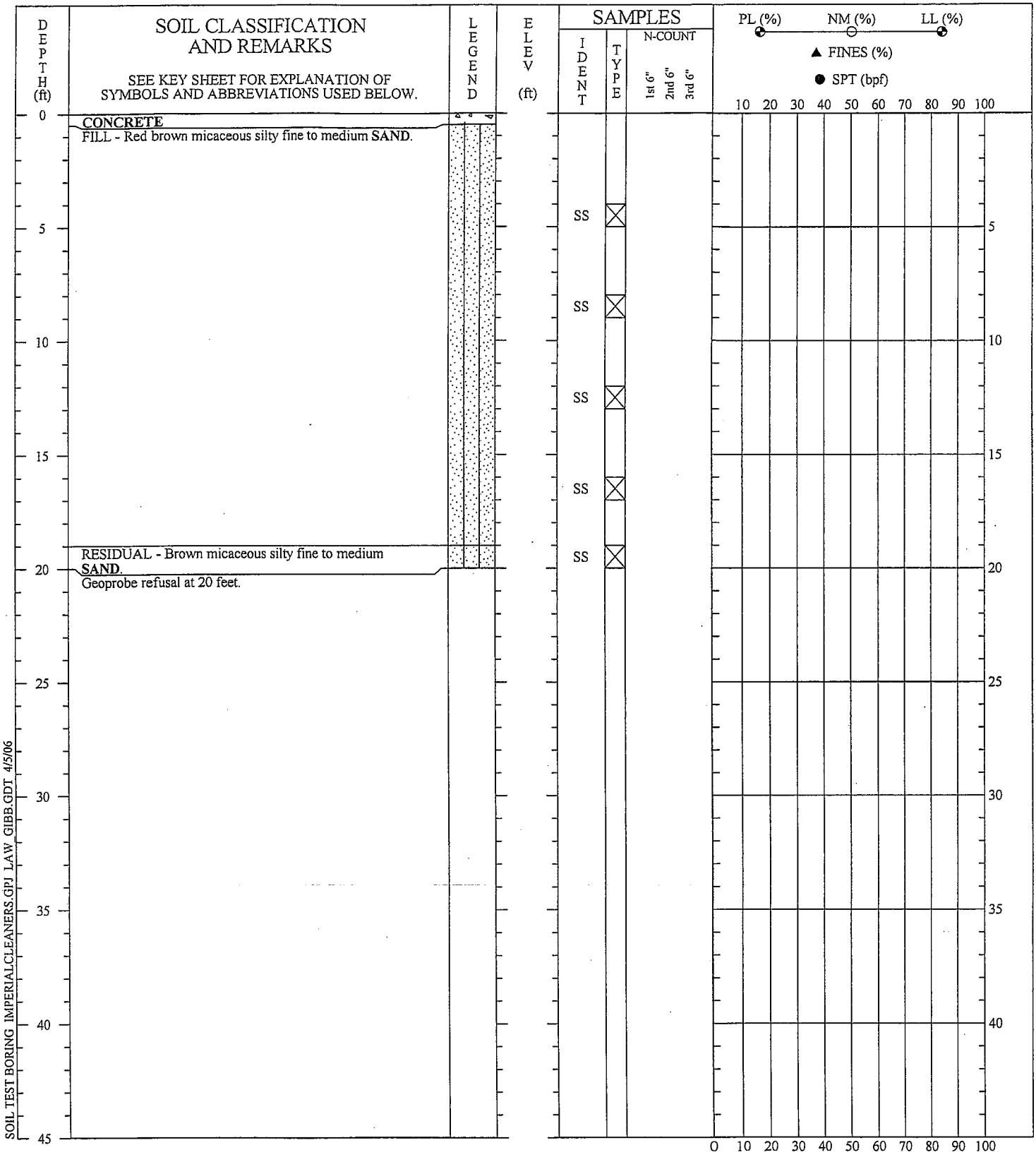
DRILLER:	MACTEC-Paul Gazzo
EQUIPMENT:	Hand Auger
METHOD:	Hand Auger
HOLE DIA.:	3 inches
REMARKS:	

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-10
PROJECT:	Imperial Cleaners
LOCATION:	Atlanta, Georgia
DRILLED:	January 27, 2006
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

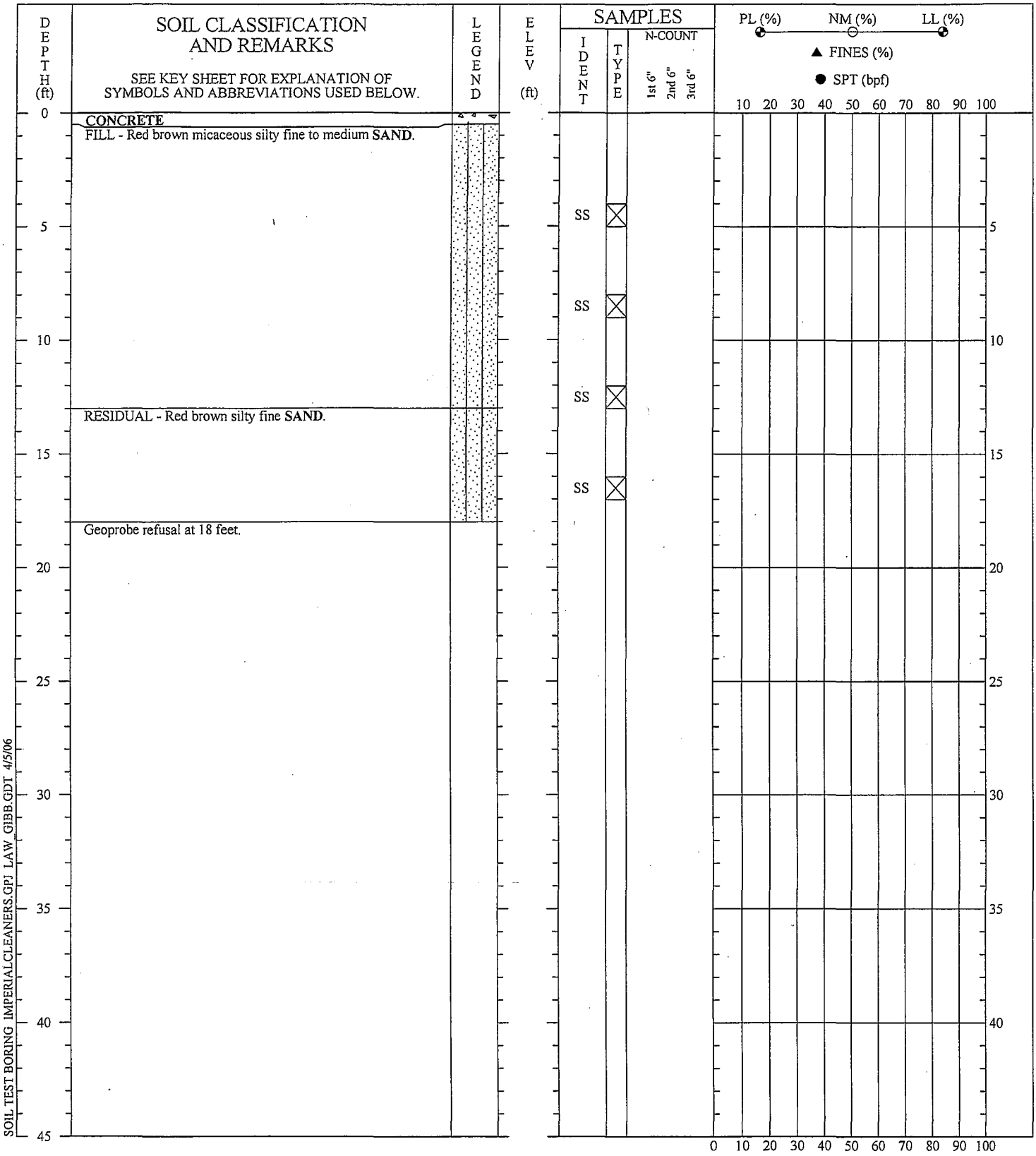
DRILLER:	ATLAS GeoSampling
EQUIPMENT:	GeoProbe
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Geoprobe refusal at 20 feet. No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: SB-11
PROJECT: Imperial Cleaners
LOCATION: Atlanta, Georgia
DRILLED: January 27, 2006
PROJECT NO.: 6305-05-0319

MACTEC



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

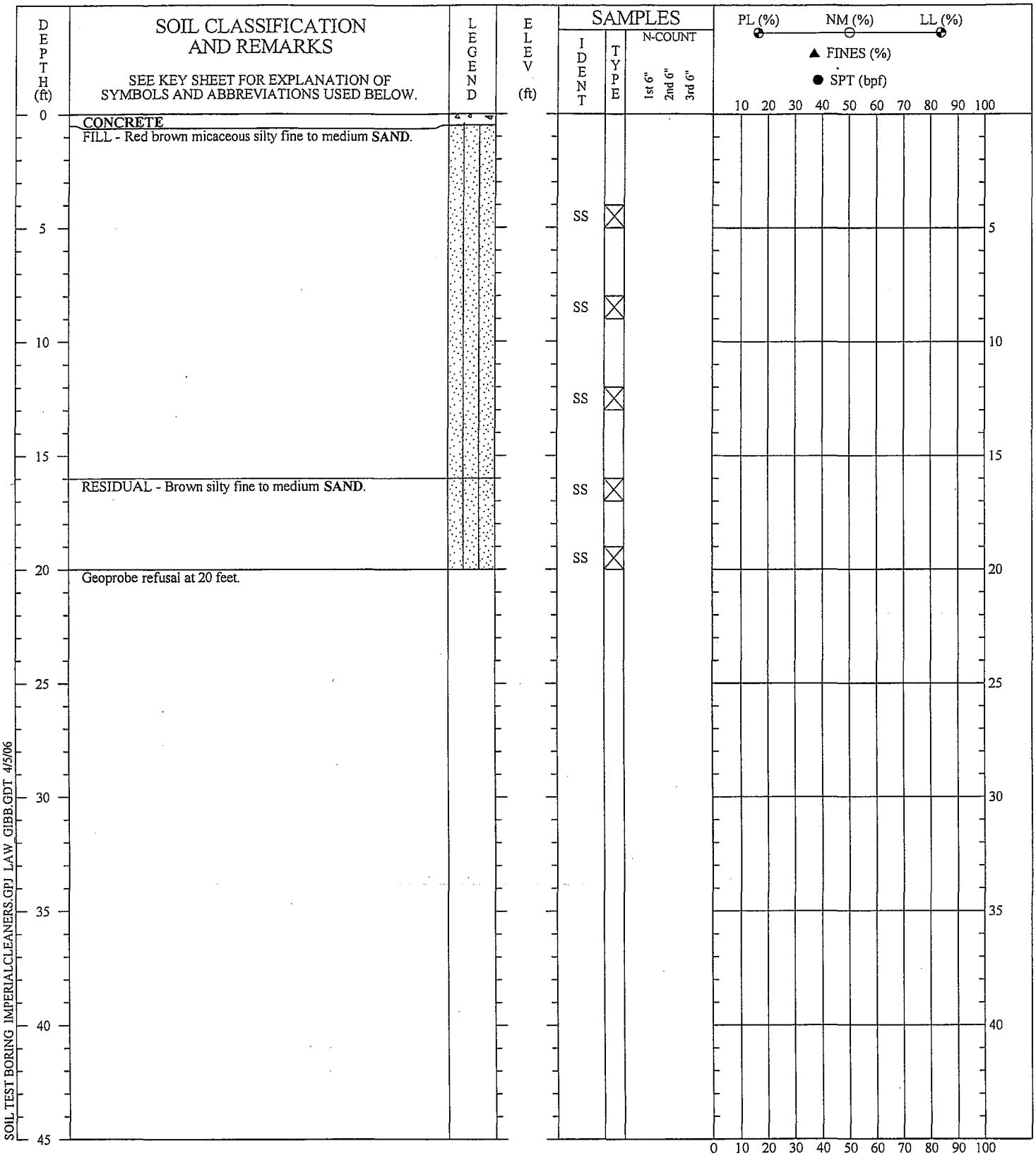
DRILLER:	ATLAS GeoSampling
EQUIPMENT:	GeoProbe
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Geoprobe refusal at 18 feet. No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: SB-12
PROJECT: Imperial Cleaners
LOCATION: Atlanta, Georgia
DRILLED: January 27, 2006
PROJECT NO.: 6305-05-0319

MACTEC



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

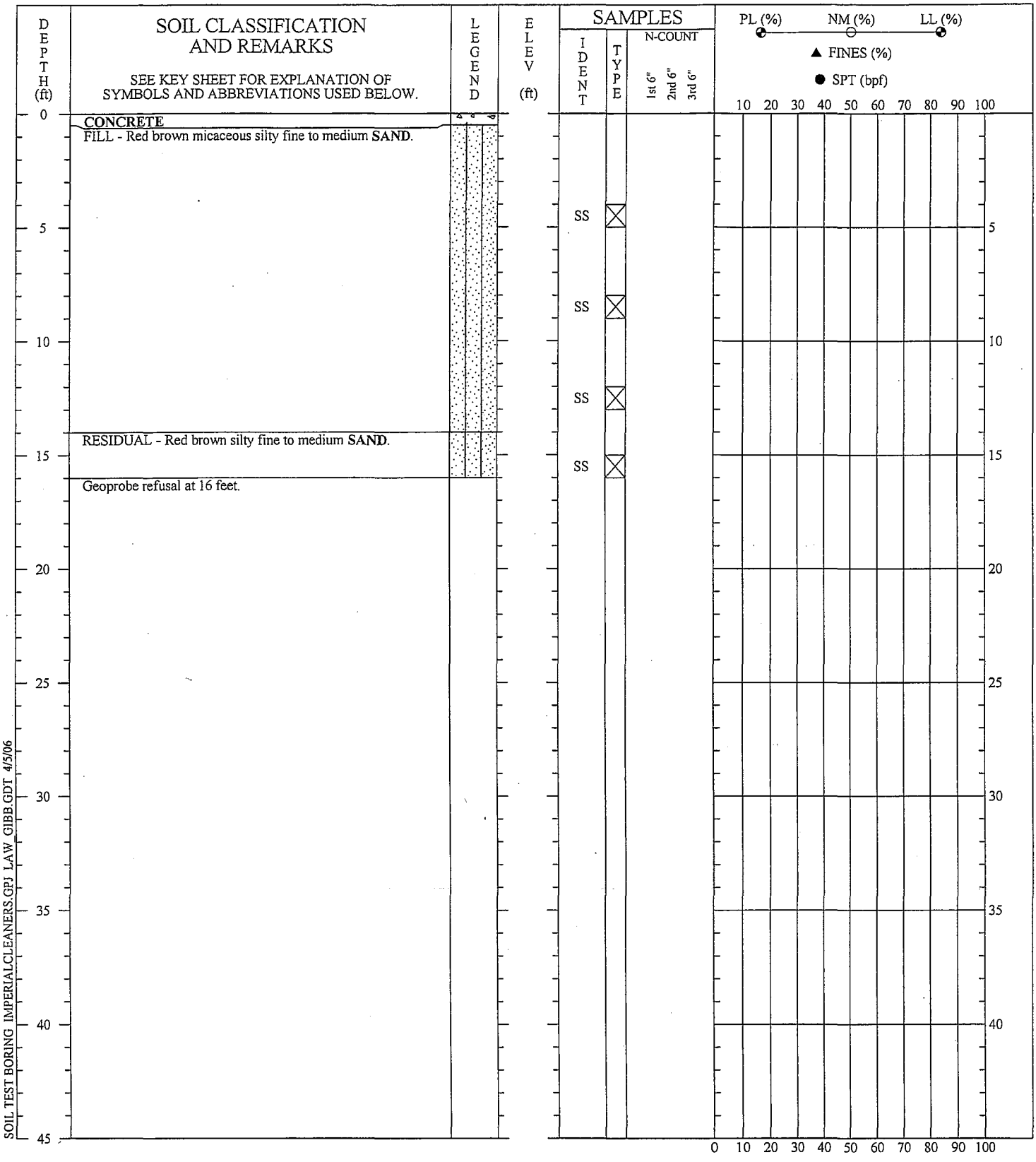
DRILLER:	ATLAS GeoSampling
EQUIPMENT:	GeoProbe
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Geoprobe refusal at 20 feet. No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: SB-13
PROJECT: Imperial Cleaners
LOCATION: Atlanta, Georgia
DRILLED: January 28, 2006
PROJECT NO.: 6305-05-0319

MACTEC



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

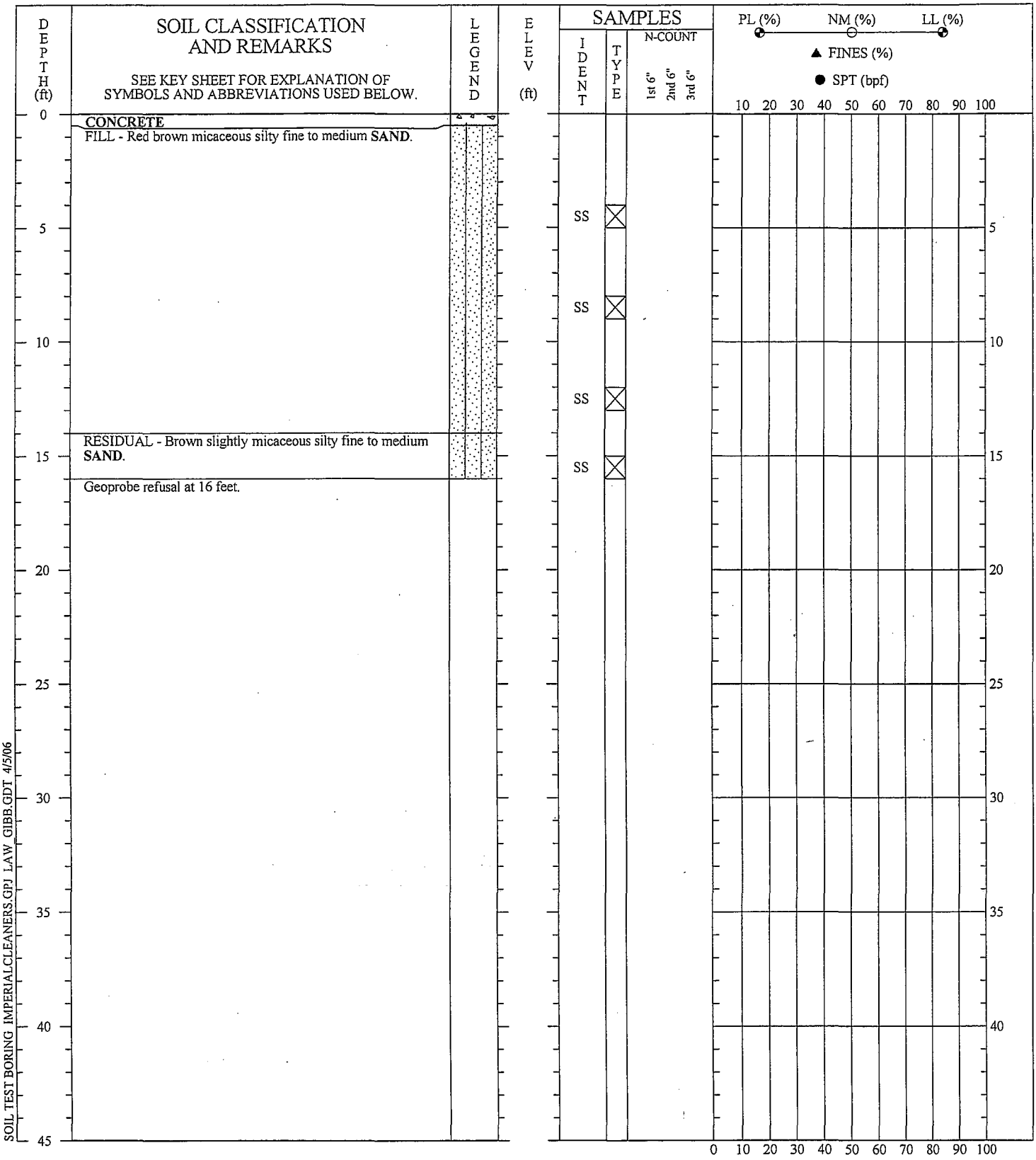
DRILLER:	ATLAS GeoSampling
EQUIPMENT:	GeoProbe
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Geoprobe refusal at 16 feet. No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-16
PROJECT:	Imperial Cleaners
LOCATION:	Atlanta, Georgia
DRILLED:	January 28, 2006
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

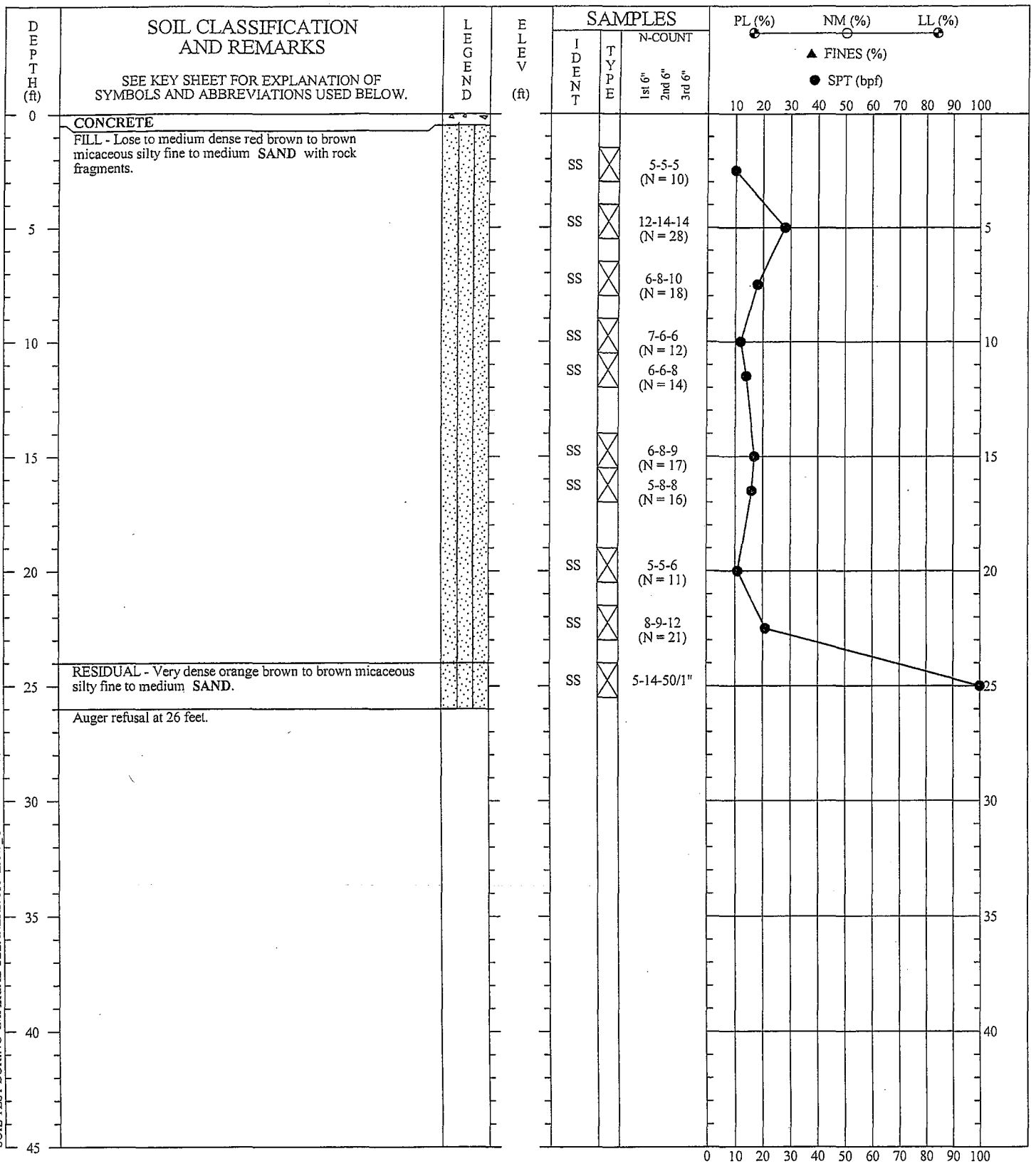
DRILLER:	ATLAS GeoSampling
EQUIPMENT:	GeoProbe
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Geoprobe refusal at 16 feet. No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-17
PROJECT:	Imperial Cleaners
LOCATION:	Atlanta, Georgia
DRILLED:	January 28, 2006
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 10/6/09

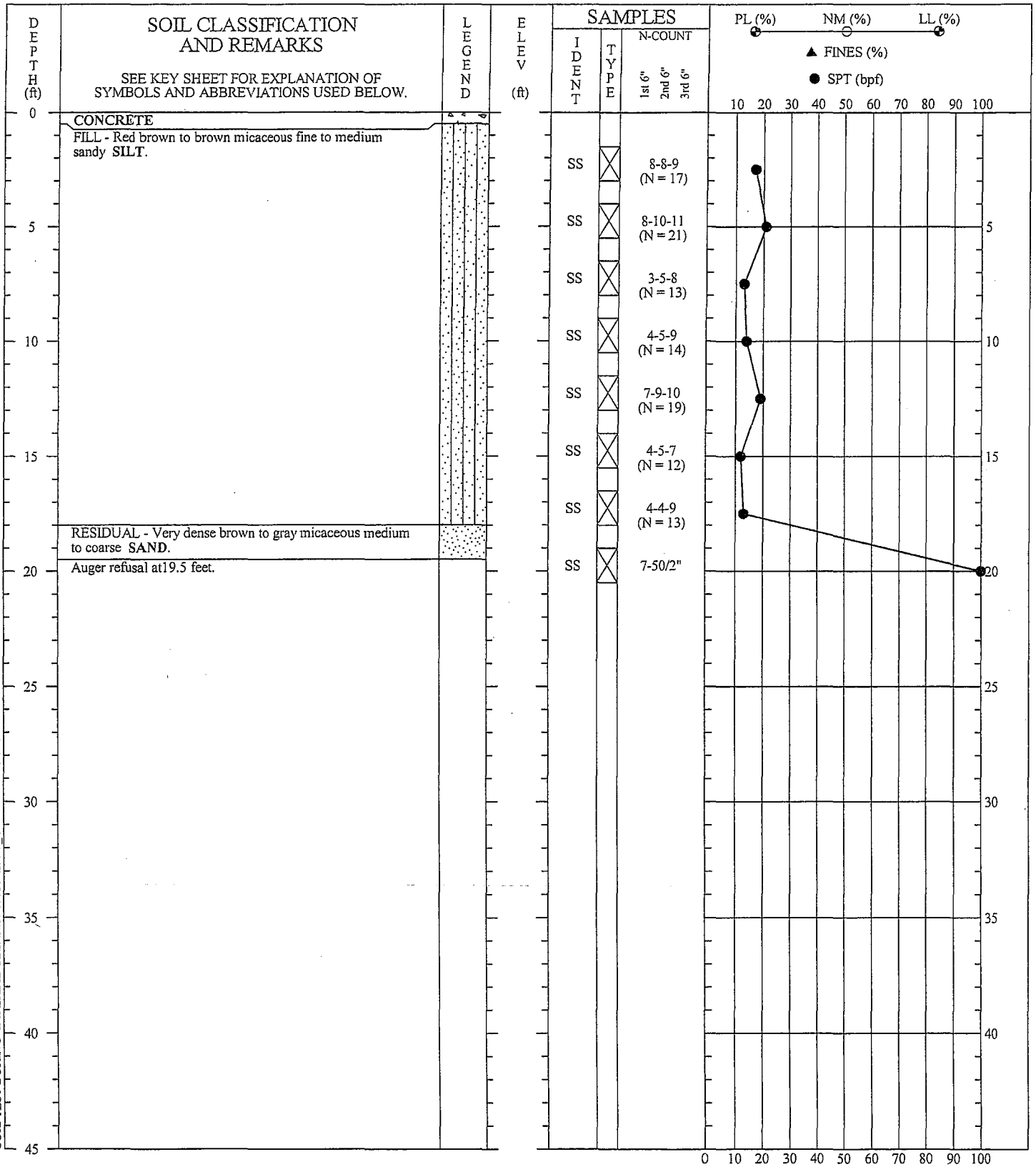
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger
HOLE DIA.:	8 inches
REMARKS:	No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-21
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	August 13, 2009
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 10/6/09

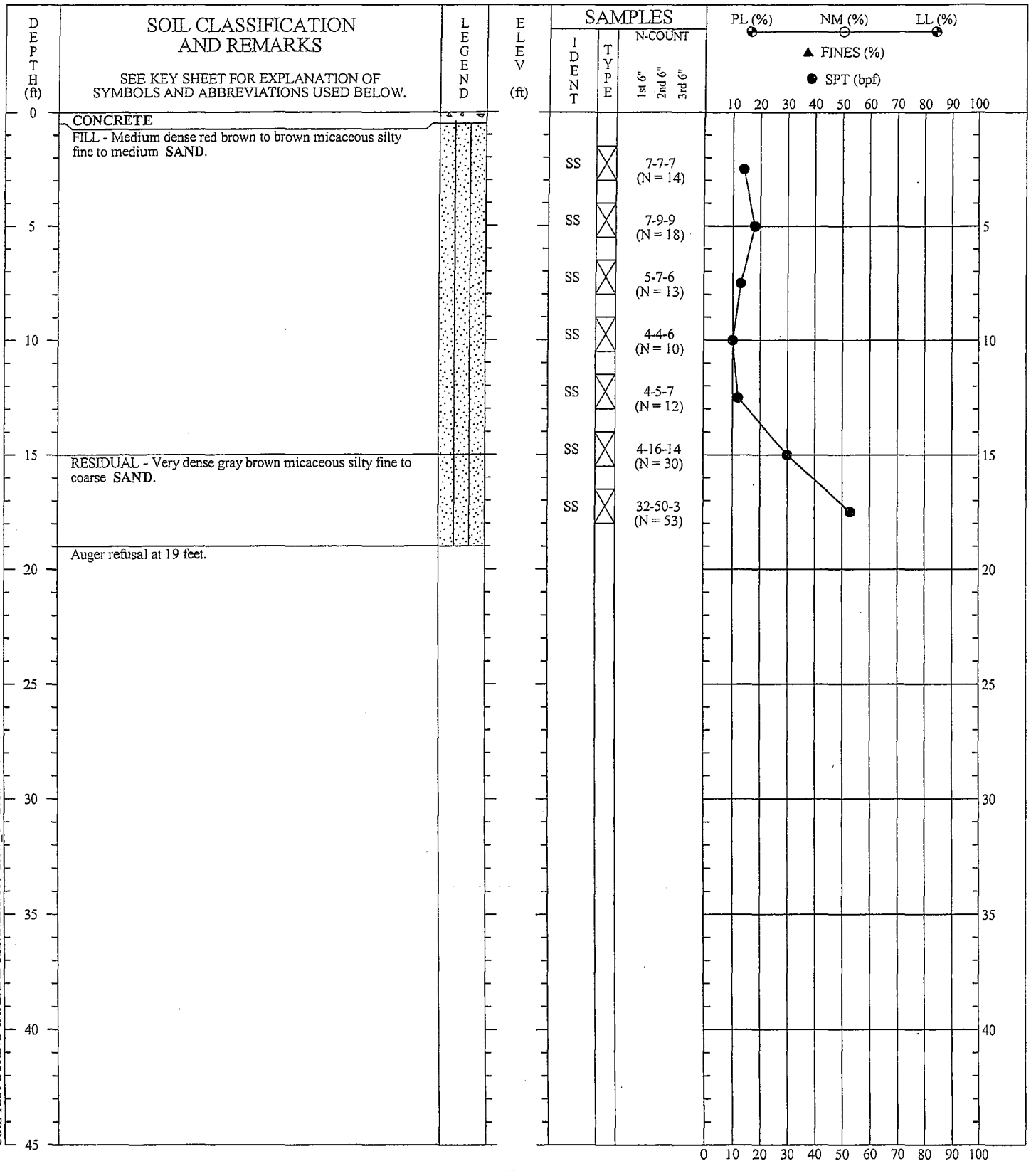
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger
HOLE DIA.:	8 inches
REMARKS:	No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-23
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	August 13, 2009
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 10/6/09

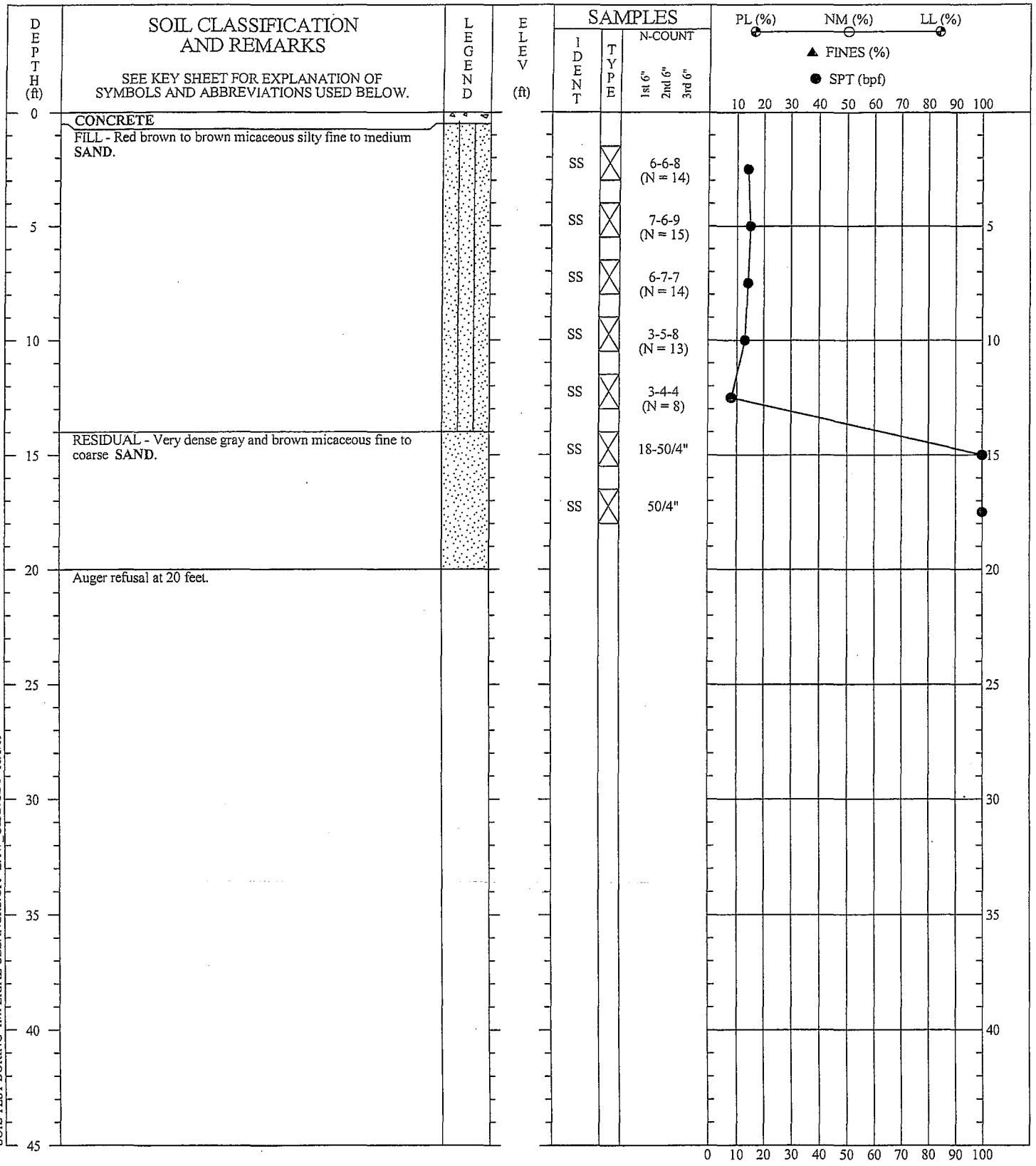
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger
HOLE DIA.:	8 inches
REMARKS:	No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-24
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	August 13, 2009
PROJECT NO.:	6305-05-0319

MACTEC



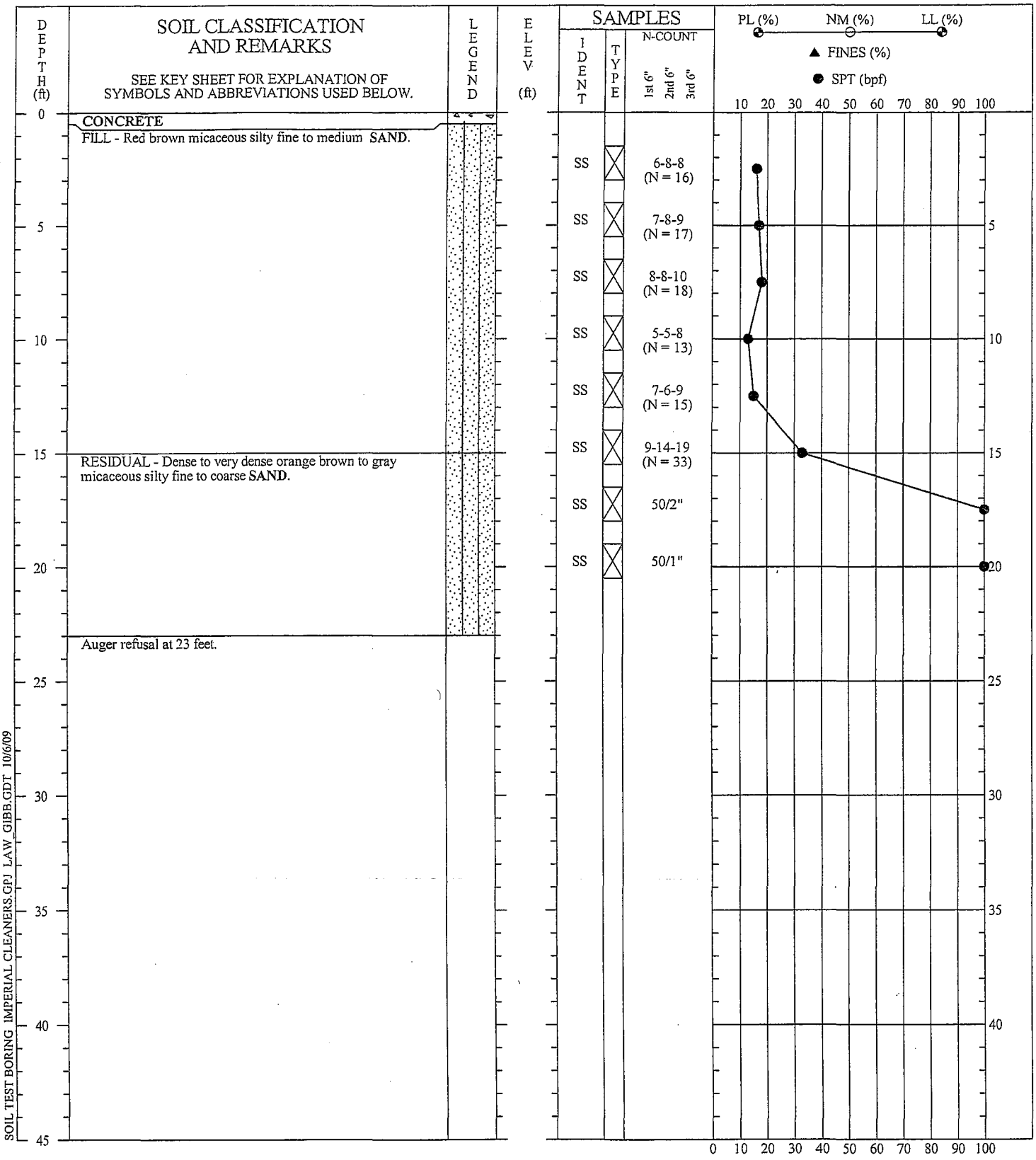
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger
HOLE DIA.:	8 inches
REMARKS:	No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: SB-25
PROJECT: Imperial Cleaners
LOCATION: Roswell, GA
DRILLED: August 14, 2009
PROJECT NO.: 6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 10/6/09

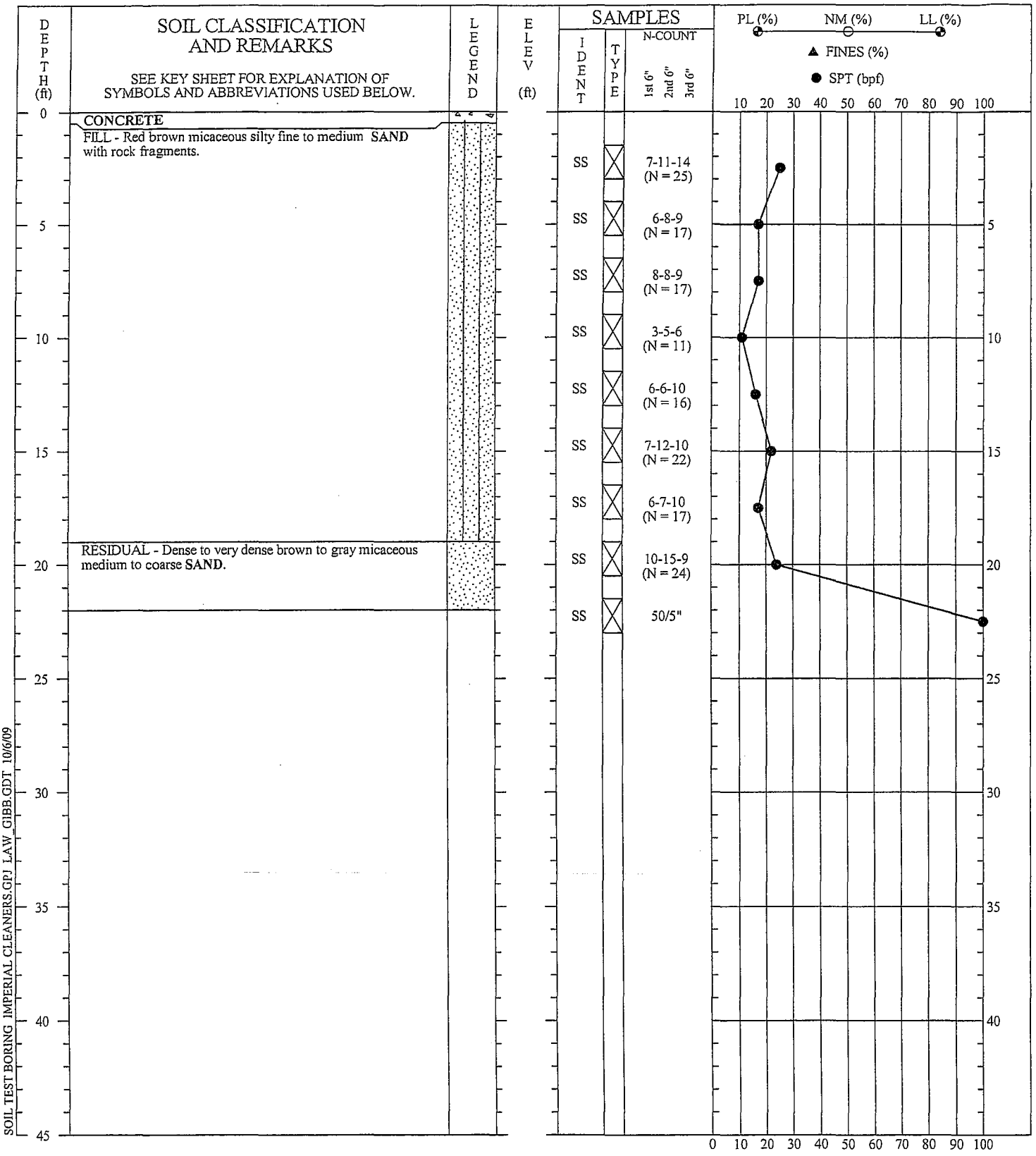
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger
HOLE DIA.:	8 inches
REMARKS:	No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: SB-27
PROJECT: Imperial Cleaners
LOCATION: Roswell, GA
DRILLED: August 14, 2009
PROJECT NO.: 6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 10/6/09

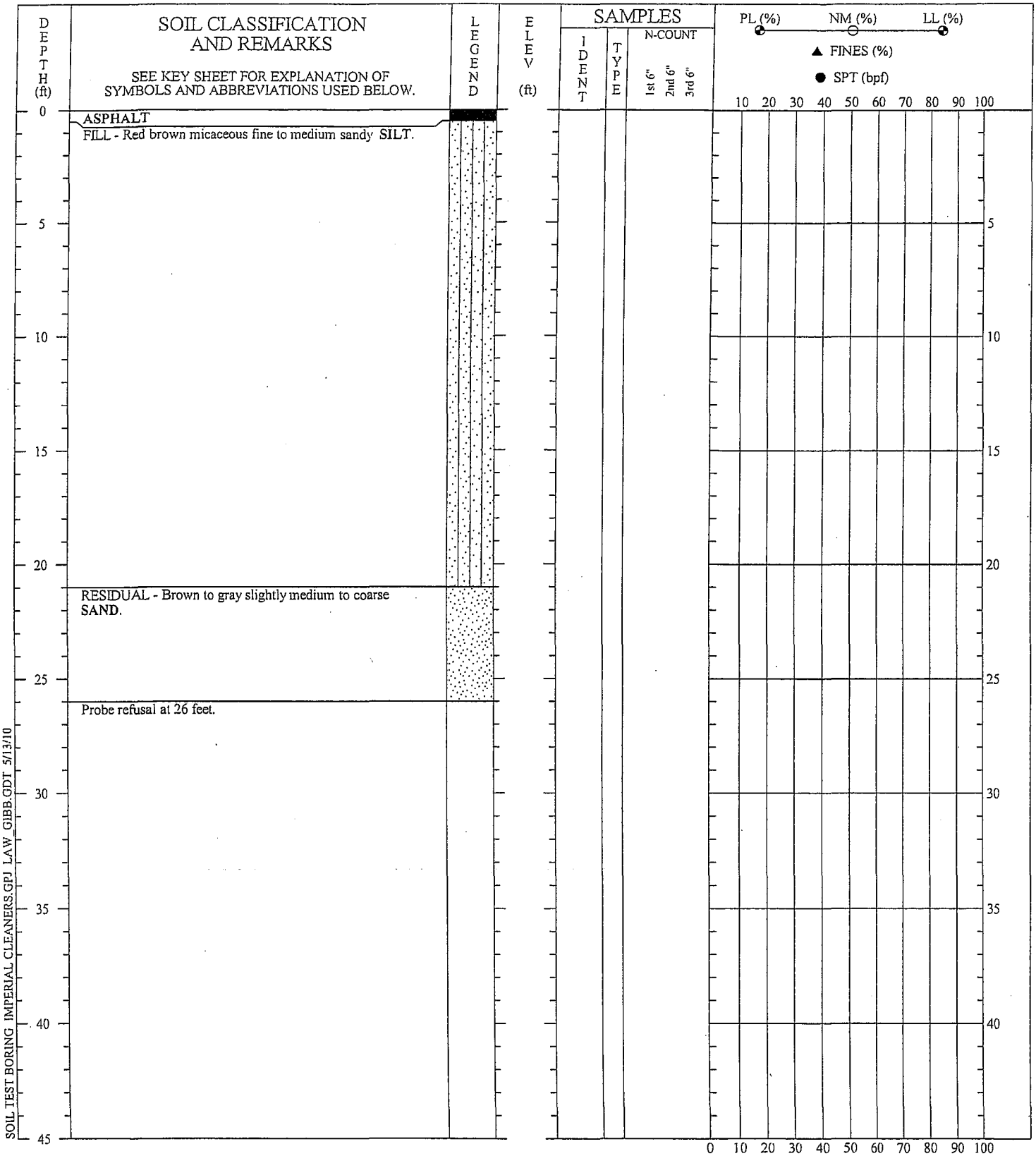
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger
HOLE DIA.:	8 inches
REMARKS:	No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-28
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	August 14, 2009
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 5/13/10

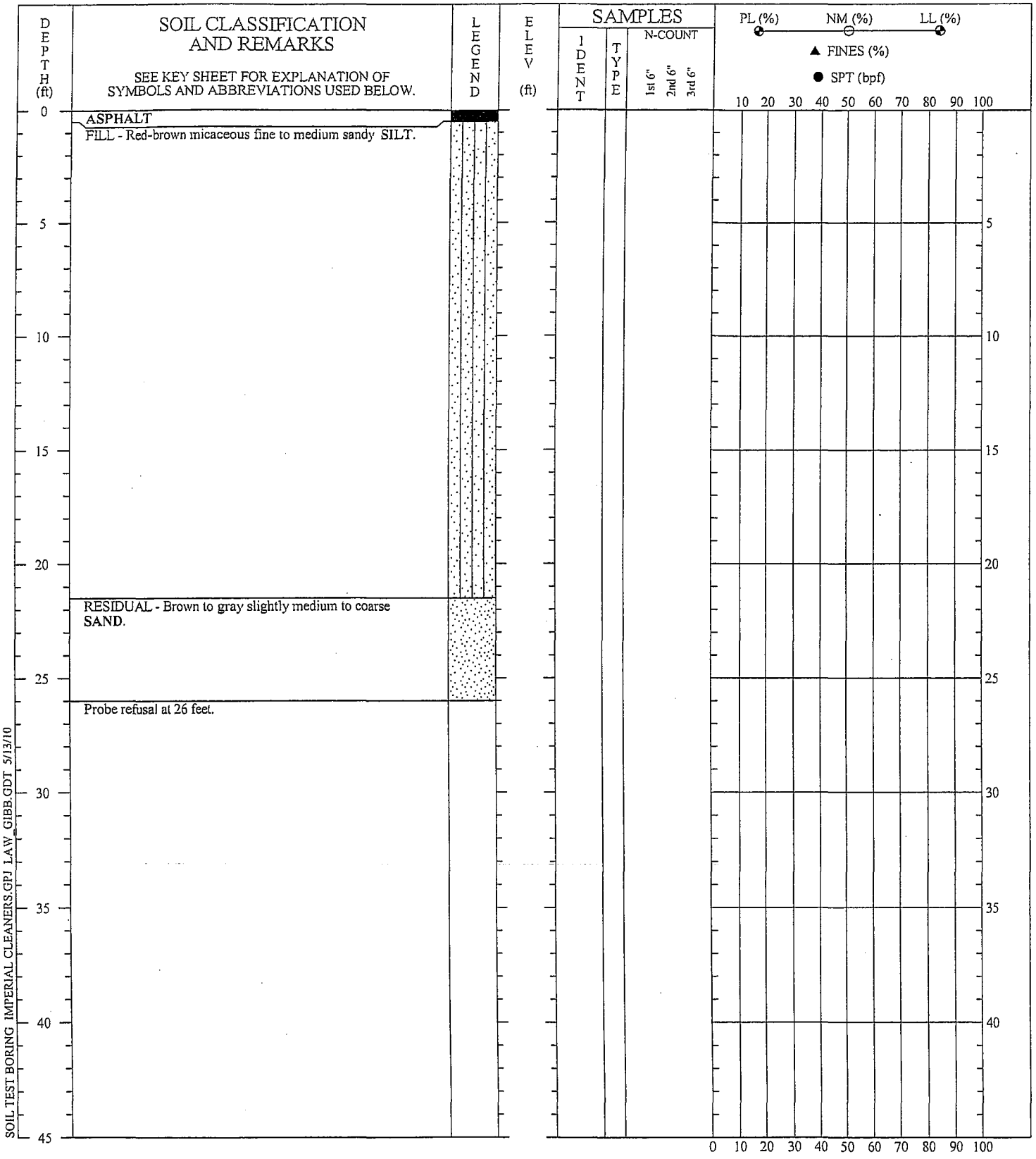
DRILLER:	Atlas GeoSampling
EQUIPMENT:	Power Probe 9100 VTR
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Groundwater encountered at approximately 24 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-29
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	March 29, 2010
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 5/13/10

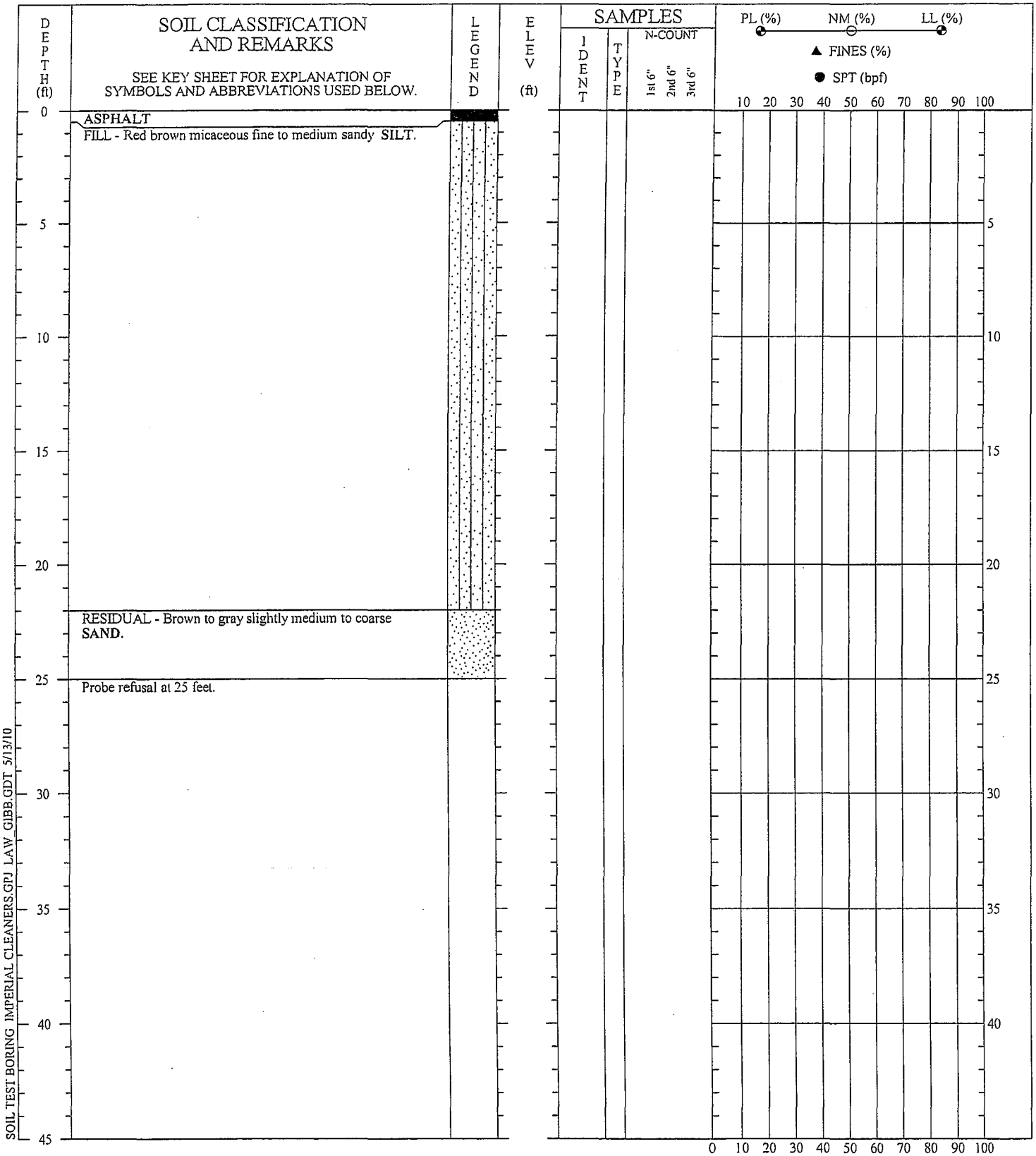
DRILLER:	Atlas GeoSampling
EQUIPMENT:	Power Probe 9100 VTR
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Groundwater encountered at approximately 24 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-30
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	March 29, 2010
PROJECT NO.:	6305-05-0319

MACTEC



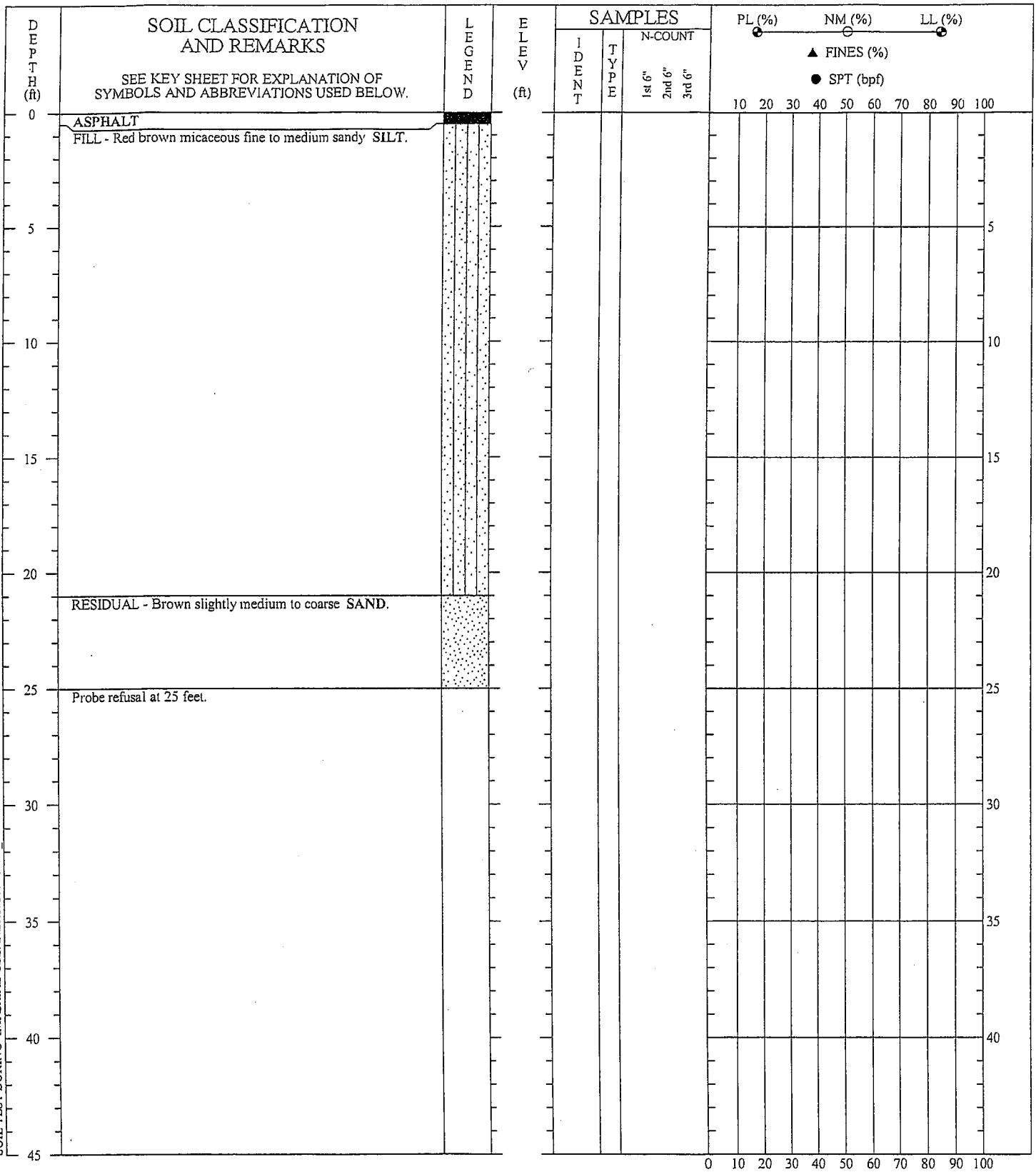
DRILLER:	Atlas GeoSampling
EQUIPMENT:	Power Probe 9100 VTR
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Groundwater encountered at approximately 24 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL

SOIL TEST BORING RECORD

BORING NO.:	SB-31
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	March 29, 2010
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 5/13/10

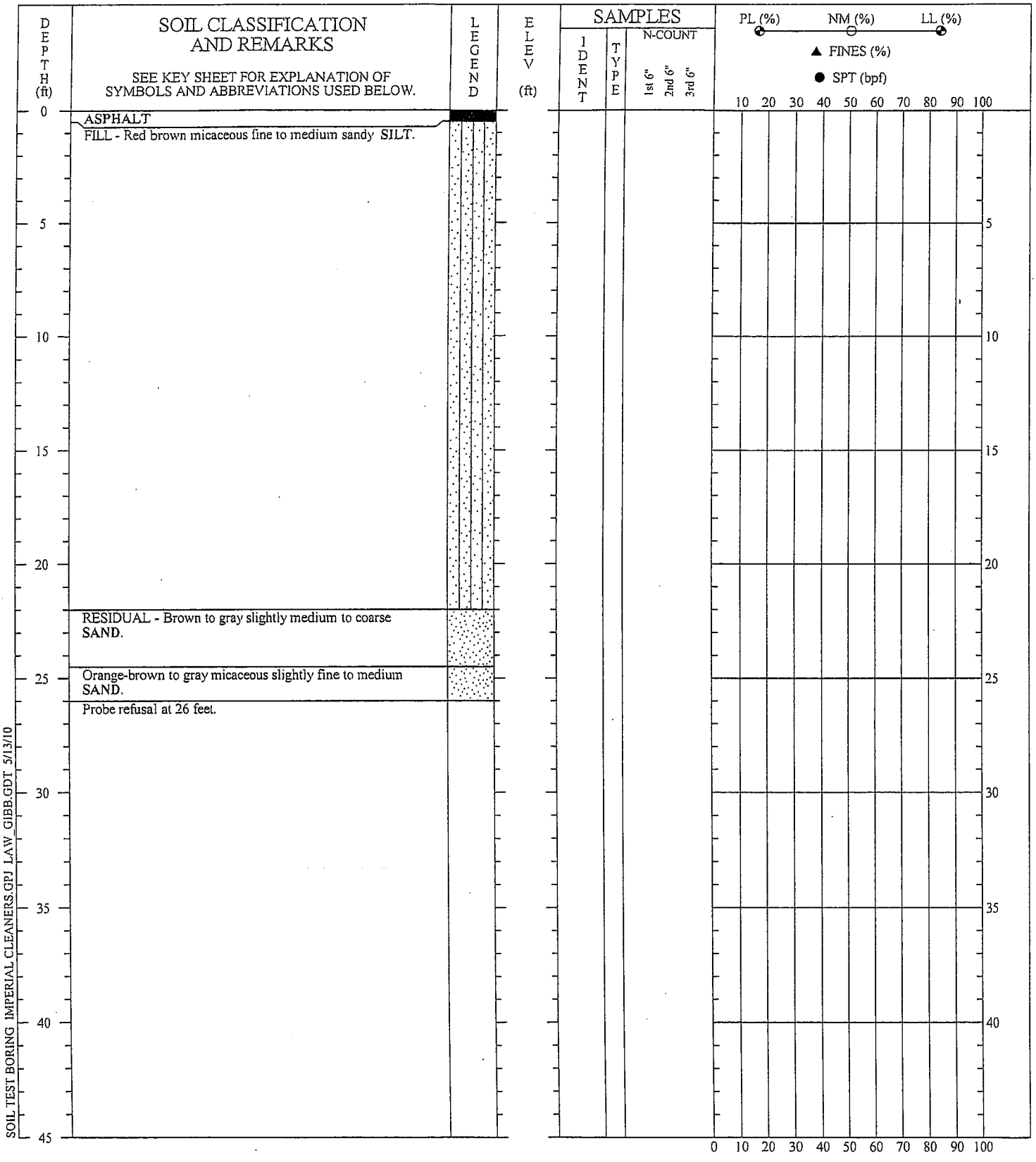
DRILLER:	Atlas GeoSampling
EQUIPMENT:	Power Probe 9100 VTR
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Groundwater encountered at approximately 24 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-32
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	March 29, 2010
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 5/13/10

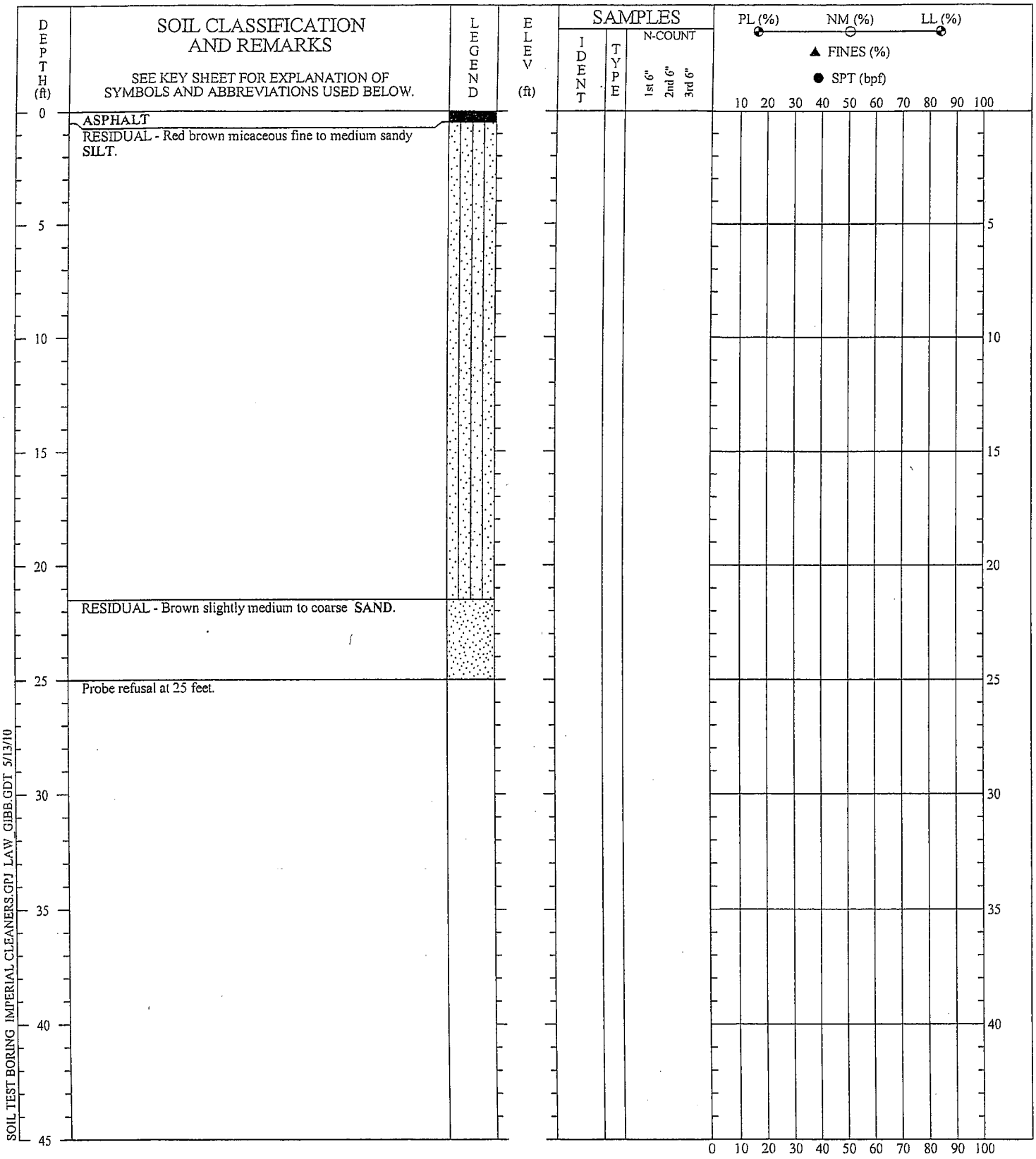
DRILLER:	Atlas GeoSampling
EQUIPMENT:	Power Probe 9100 VTR
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Groundwater encountered at approximately 24 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-33
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	March 29, 2010
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 5/13/10

DRILLER:	Atlas GeoSampling
EQUIPMENT:	Power Probe 9100 VTR
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Groundwater encountered at approximately 24 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-34
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	March 29, 2010
PROJECT NO.:	6305-05-0319

MACTEC