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**CAL GAS**  
15595 WASHINGTON AVENUE  
SAN LORENZO, CA 94580

January 17, 2007

**Mr. Barney Chan**  
ACHCSA  
1131 Harbor Bay Parkway, Suite 250  
Alameda, California 94502-6577

**SUBJECT: ADDITIONAL OFF-SITE SOIL & GROUNDWATER  
INVESTIGATION AND FOURTH QUARTER OF 2006  
GROUNDWATER MONITORING & SAMPLING  
REPORT FOR THE PROEPRTY**  
15595 Washington Avenue, San Lorenzo, CA

Dear Mr. Chan:

Enclosed, please find a copy of the January 15, 2007 subject Additional Off-Site Soil & Groundwater Investigation and Fourth Quarter of 2006 Groundwater Monitoring and Sampling Report prepared by my consultant, Enviro Soil Tech Consultants.

I declare, under penalty of perjury, that the information and/or recommendations contained in this report are true and correct to the best of my knowledge.

Sincerely,

*M. Mohammadian*  
MEHDI MOHAMMADIAN

**ADDITIONAL OFF-SITE SOIL & GROUNDWATER  
INVESTIGATION AND FOURTH QUARTER OF 2006  
GROUNDWATER MONITORING AND SAMPLING  
FOR THE PROPERTY  
LOCATED AT 15595 WASHINGTON AVENUE  
SAN LORENZO, CALIFORNIA  
JANUARY 15, 2007**

**PREPARED FOR:  
MR. MEHDI MOHAMMADIAN  
CAL GAS  
15595 WASHINGTON AVENUE  
SAN LORENZO, CALIFORNIA 94580**

**BY:  
ENVIRO SOIL TECH CONSULTANTS  
131 TULLY ROAD  
SAN JOSE, CALIFORNIA 95111**

**ENVIRO SOIL TECH CONSULTANTS**

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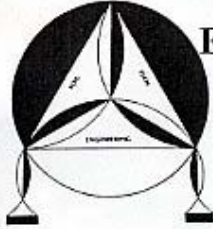
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## **ENVIRO SOIL TECH CONSULTANTS**

Environmental & Geotechnical Consultants  
*131 TULLY ROAD, SAN JOSE, CALIFORNIA 95111*  
Tel: (408) 297-1500 Fax: (408) 292-2116

January 15, 2007

File No. 12-99-702-SI

**Mr. Mehdi Mohammadian**  
Cal Gas  
15595 Washington Avenue  
San Lorenzo, California 94580

**SUBJECT: ADDITIONAL OFF-SITE SOIL & GROUNDWATER  
INVESTIGATION AND FOURTH QUARTER OF 2006  
GROUNDWATER MONITORING & SAMPLING  
REPORT FOR THE PROPERTY**

Located at 15595 Washington Avenue, in  
San Lorenzo, California

Dear Mr. Mohammadian:

At the direction of Alameda County Health Care Services Agency-Environmental Health Services (ACHCSA-EHS) in a letter dated July 14, 2006, Enviro Soil Tech Consultants (ESTC) has performed additional drilling at your site to further investigate the vertical and lateral extent of gasoline contamination beneath your property. The field work was conducted on October 24 and November 2, and associated laboratory testing was performed between November 3 and November 15. Groundwater monitoring was performed on December 14. This report presents the results of the work conducted during the fourth quarter.



File No. 12-99-702-SI

Several new borings were drilled and sampled at 15595 Washington Avenue this quarter. Five groundwater monitoring wells were also monitored and sampled.

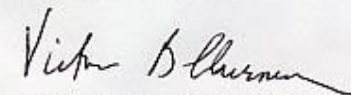
A copy of this report must be forwarded to ACHCSA for their comments and recommendations.

If you have any questions or require additional information, please feel free to contact our office at (408) 297-1500.

Sincerely,

**ENVIRO SOIL TECH CONSULTANTS**

  
FRANK HAMEDI-FARD  
GENERAL MANAGER

  
VICTOR B. CHERVEN, PH.D.  
PROFESSIONAL GEOLOGIST #3475

  
LAWRENCE KOO, P.E.  
C. E. #34928



**ENVIRO SOIL TECH CONSULTANTS**

## **SITE DESCRIPTION**

The site is located on the northwest corner of Washington Avenue and Via Enrico Street, in San Lorenzo, California (Figure 1), and is currently being used as a service station. The site contains one single story building. The underground storage tanks are located at the center portion of the property south of the pump islands. The subject property is located in an area of commercial and residential development.

## **BACKGROUND**

Several parties have owned or operated this service station in the past 30 years. From 1974 to 1983 it was owned and operated by the Calleri family. In 1983, the Calleri's sold it to Texaco, Inc. Texaco owned the site from 1983 to 1986, but the site was not in operation during that time. Texaco removed the existing USTs in 1986, and subsurface contamination was detected in the fuel tank excavation.

After removing the UST's and discovering the contamination, Texaco sold the property to Bertram Kubo in 1986 or 1987. Mr. Kubo installed three new 10,000-gallon fuel tanks at a new location and reopened as a retail service station. He sold the property in 1990 to the current owner, Mr. Mehdi Mohammadian.

Groundwater Technology conducted a soil and groundwater investigation on behalf of Texaco in 1986. Three monitoring wells (MW-1 to MW-3) and three soil borings were installed. No hydrocarbon impact to the soil was detected, but shallow groundwater was impacted in these wells. Investigation was suspended at that time, and no further work took place under Mr. Kubo's ownership after he purchased the site from Texaco.

After purchasing the site in 1990 and re-sampling the three monitoring wells in 1992, Mr. Mohammadian retained Toxichem Management Systems, Inc. in 1998 to conduct further subsurface investigation. Two additional wells (MW-4 and MW-5) were installed to the north of the three existing wells, and five additional borings were drilled to assess soil conditions in areas not addressed during the 1986 investigation. Four of the five borings detected the gasoline oxygenate methyl tertiary butyl ether (MTBE) in soil samples collected at a depth of 10 feet. All five borings detected MTBE and four of the five detected one or more volatile aromatic compounds (BTEX) in water samples collected at depths of 11-16 feet. Gasoline and/or some of its constituent compounds were also detected in all five monitoring wells at that time. The highest concentrations were found in the central portion of the site in monitoring wells MW-1, MW-2, and MW-3 and boring SB-D. Quarterly monitoring of all five wells began in August 1998 and has continued to the present.

ESTC continued the investigation in 2000 by drilling several new borings west and southwest of the site, in the presumed downgradient direction. Since then, ESTC has continued to monitor the five wells and re-mapped the concentrations of various analytes in the groundwater over time. The analytical data indicate that the distribution of various contaminants has changed during the course of the investigation. For example, in early 1999, the laboratory reported an MTBE concentration of 117,000 parts per billion (ppb) and a TPHg concentration of 3,500 ppb at MW-1. At MW-3, these concentrations were 151,000 ppb MTBE but less than 1,000 ppb TPHg. A year later, the concentrations were 74,000 and 33,000 ppb at MW-1 and 200,000 and 48,000 ppb at MW-3. The concentration of both analytes remained higher in MW-3 than in MW-1 through 2001, suggesting that the source of the contamination was closer to MW-3 than to MW-1 and favoring the interpretation that the old (pre-1986) UST's were the major source. This interpretation was bolstered when the concentrations dropped suddenly in MW-1 in early

2002 and continued to decline rapidly thereafter, but remained high in MW-3 for another 30 months through the middle of 2004. Meanwhile, concentrations were low in MW-5 through 2000 but jumped sharply in early 2001 and have continued to climb since then, and this is now the most contaminated well. This leads to the conclusion that the plume of contaminated groundwater has migrated to the northwest over time, but does not unequivocally indicate whether both the first and second set of UST's are contaminant sources.

ACHCSA-EHS has requested Mr. Mohammadian to conduct further investigation to resolve the uncertainties regarding contaminant sources and subsequent development and migration of the contaminant plume(s). A work plan to address these issues was approved by ACHCSA-EHS on July 14, 2006.

## **SCOPE OF PRESENT WORK**

The scope of work included the following tasks:

- Obtain access agreements and Encroachment permits from nearby property owners and the City of San Lorenzo
- Contact Underground Services Alert and private locator to locate and mark buried utility lines in the vicinity of proposed boring locations
- Coordinate field schedules with subcontractors and the County of Alameda
- Mobilize a limited-access Geoprobe drilling rig to the site to drill and continuously sample eight borings at pre-determined locations

- Screen the samples for evidence of petroleum hydrocarbons and preserve selected samples for subsequent laboratory analysis
- Collect a groundwater sample from each boring and preserve for laboratory analysis
- Mobilize a cone penetrometer testing (CPT) drilling rig to the site to drill three borings at pre-determined locations
- Identify the water-bearing zone(s) in each boring and collect a water sample from each for subsequent laboratory analysis
- Backfill the CPT and Geoprobe borings with cement grout
- Measure the depth to groundwater, purge and sample the monitoring wells
- Analyze the soil and water samples for Total Petroleum Hydrocarbons in the range of gasoline, Benzene, Toluene, Ethylbenzene, Total Xylenes (BTEX), gasoline oxygenates, and lead scavengers
- Review results and prepare a report of the investigation.

## **FIELD ACTIVITIES**

On October 24, 2006, a registered geologist from ESTC supervised the drilling of eight direct-push soil borings. To expedite the drilling operation, two Geoprobe drill rigs were used at the site in the same day simultaneously. The boring locations are shown in Figure 2. Two of the borings were drilled near the perimeter of the present underground

storage tank cavity to determine whether residual soil contamination is present in that area. Three other borings were drilled in the vicinity of the location of the pre-1986 storage tanks to determine whether residual soil contamination is present in that area. The objective of these five borings was to make it possible to resolve the uncertainties regarding the contaminant source.

Three additional borings were drilled northwest of the UST facilities to assess the magnitude of contamination downgradient of the source. One of these is located on private property between apartment buildings.

All of the borings were drilled to at least 25 feet below surface grade. If evidence of hydrocarbons was observed, the borings were drilled to a depth of 10 feet below the last apparent contamination, so some borings, such as GP-4, were deeper than 30 feet. Each boring was continuously sampled in transparent polyethylene tubes. The field geologist described and logged the core and used a portable photo-ionization detector (PID) to screen the core and select samples for subsequent laboratory analysis. For example, PID readings of 50 and 105 parts per million were measured at 13 feet and 17 feet in boring GP-2, and samples at these depths were preserved for analysis. The boring logs are attached in Appendix "C".

Temporary casing was inserted into each boring to collect a groundwater sample when the boring reached its total depth. The water samples were poured into 40-ml glass vials and preserved in a cooled ice chest for later analysis.

On November 2, a registered geologist from ESTC supervised the drilling of three CPT borings at the site. These boring locations are also shown in Figure 2. Boring CPT-1 was located next to the existing UST cavity. If these UST's are the principal source of groundwater contamination, a location near this facility is the most appropriate for determining whether gasoline has migrated downward through the shallow water-bearing zone to deeper aquifers. The other two borings were located to the southwest, to assess the possibility of groundwater plume migration in that direction toward the non-operative domestic water well that is located on private property southwest of the site.

In each case, a CPT log was obtained and inspected, and permeable and/or water-bearing zones were identified on the log. The logs are contained in Appendix "C", along with the drilling report from Gregg Drilling, Inc. in Appendix "F". The CPT rig was then moved over a short distance and a second boring was drilled. Drilling was temporarily suspended at each identified water-bearing zone and a stainless steel bailer was lowered through the drill stem to obtain a water sample. Two or three samples were obtained from each boring, and were preserved in 40-ml glass vials for analysis. After the borings were terminated, they were backfilled with cement grout.

## **SOIL DESCRIPTION**

All of the Geoprobe borings encountered multiple sediment layers. Beds are mostly 2 to 5 feet thick, but contacts are usually gradational and not distinct. However, correlation of these beds between borings is tentative because of differences in color,

grain size, and bed thickness. Similar difficulties are encountered when trying to correlate the Geoprobe borings to auger borings that were drilled by Groundwater Technology (GTI) in 1986 and those that were drilled by Toxichem Management Systems (TMS) in 1998. This is illustrated in Figure 3, which is a site map on which generalized boring logs are shown for all of the on-site borings. In some borings, fine-grained sediment is present near the surface and coarser sediment is present below 10 feet, whereas in others the opposite is true.

For example, in GP-1, the sediment is yellow-brown to dark brown and ranges from silt to silty sand in the upper 8 feet. This zone appears to correlate roughly with the section from 0 to 10 feet in GP-3, which is characterized by dark gray clayey sand and light brown fine to medium-grained sand. In GP-4, however, this section is composed of dark gray gravelly clay, and in GP-2 the section from 4 to 14 feet is predominantly brown very-fine to fine-grained sand. Below 8 feet, the sediment in GP-1 is mostly olive-gray clay or silt, with thin stringers of sand or gravel, whereas the sediment in GP-4 is brown or light brown sand or clay below 20 feet.

Integrating the lithologic logs with the CPT logs helps to resolve some of the correlation problems. Several beds can be traced through all three CPT borings, and some of the shallow beds are also identifiable in the lithologic logs (Figure 4). Beneath the site, there are two relatively “clean” sand bodies between the surface and 60 feet. There are also two “dirty” (clayey) sand beds in this interval. To the south, in CPT-3, there are two more clean sand beds that are either not present or were not reached in the on-site borings. Finer-grained beds that range from moderately plastic clay to silty, sandy, or gravelly clay separate the sand beds. Details of these correlations are discussed below.



A thin, fine-grained, clayey sand bed is present at a depth of approximately 10 feet in most of the borings. This bed has a reduced signature with two small peaks on the CPT logs and is shown as sandy silt on the report from Gregg Drilling. Due to its poor log signature, it was interpreted to be a poor aquifer and water samples were not collected from this bed in either CPT-1 or CPT-2. In CPT-3, a sample was collected with minor difficulty and the laboratory results are shown in Figure 4. Soil samples were not collected from this bed in either GP-4 or GP-5, but were collected from the clay beds that overlie and underlie it in GP-4, and Figure 4 shows that TPHg was detected in both soil samples and also in the water sample. A sample was also collected from the clay bed that overlies this sand bed in GP-5, but gasoline was not detected in that sample.

A thicker and cleaner sand bed is present at approximately 20 feet. It is thickest in GP-4, and it grades laterally to silt in GP-5 and CPT-2 and has a reduced (silty) log signature in CPT-3, as shown in Figure 4. Two soil samples and a water sample were collected from it in GP-4, as well as a water sample from both CPT-1 and CPT-2. MTBE was detected in all five samples, and the TPHg concentration exceeded the detection limit in the soil samples from GP-4.

The third sand bed, again with reduced CPT response, is present between 25 and 30 feet. Except for GP-4, where this bed consists of clayey very-fine to fine-grained light brown sand, the Geoprobe borings were too shallow to reach this bed. Soil samples from this bed and from the overlying clay bed were not impacted by hydrocarbons (Figure 4). Water samples were not collected from this bed, which appeared to have low permeability on the CPT logs.

Thicker and cleaner sand beds are present below 30 feet and were encountered in the CPT borings. One of these, at a depth of approximately 55 feet, is relatively easy to trace through all three CPT logs. The logs suggest that this bed has a relatively sharp base and a more gradational top, which implies an upward decrease in grain size. This type of log signature is characteristic of both fluvial channel deposits and transgressive shoreline deposits, either of which could be compatible with the general environmental setting of the site. The relatively uniform thickness of this bed in the three borings may tend to favor the shoreline interpretation. Water samples were collected from this bed in all three borings. The other two sand bodies, both of which were drilled only in CPT-3, are more than 5 feet thick and have strong log signatures, implying that they are coarse grained and permeable. The upper one, from 30-37 feet, pinches out abruptly between CPT-3 and CPT-2, and is probably a channel deposit. A water sample was also collected from this bed. None of these samples were impacted by gasoline hydrocarbons.

## **ANALYTICAL RESULTS**

Soil and groundwater samples were analyzed for Total Petroleum Hydrocarbons as gasoline (TPHg), BTEX, gasoline oxygenates, and lead scavengers. The results are summarized in Tables 1, 2, and 3, and the laboratory reports are contained in Appendix "A".

### *Geoprobe and CPT Samples*

A total of 31 soil samples were analyzed. No BTEX compounds were detected in any of these, although Butylbenzene and Propylbenzene were reported in the EPA 8260

analysis. Two gasoline oxygenates, MTBE and TBA, were detected in several samples. The MTBE concentration was in the range of 0.005-0.010 milligram per kilogram (mg/Kg) in samples from GP-1, -3, -7, and -8, but was between 0.05 and 0.18 mg/Kg in GP-4 and a value of 0.072 mg/Kg was obtained on one sample from GP-2. The latter two borings also have the highest TBA concentrations. These two borings and GP-7 were the only ones in which the TPHg concentration exceeded the detection limit.

Boring GP-4 appears to have identified a “hotspot” where residual soil contamination is still present south of the pre-1986 underground storage tanks. The five shallowest samples (at 7, 8, 14, 19, and 23 feet) from this boring were all impacted by gasoline, at TPHg concentrations ranging from 0.23 mg/Kg to 1,100 mg/Kg. This hotspot is at least 75 feet south of GP-2 and GP-7, and these borings are probably too far from the release site to have become impacted by gasoline migration in the unsaturated zone. Rather, gasoline in GP-2 and GP-7 is probably due to migration in the saturated zone as a result of northwestward groundwater flow.

The water sample from GP-4 also had the highest hydrocarbon concentrations (Tables 2 and 3). The sum of the MTBE and TBA concentrations, 10,900 microgram per liter ( $\mu\text{g/L}$ ), slightly exceeds the Total Hydrocarbon (TPHg) concentration of 9,100  $\mu\text{g/L}$ , implying that these two compounds are the predominant species in the groundwater. This is also true of the results from GP-2, although not from GP-7, where Naphthalene and several Benzene isomers are the predominant species. Of the CPT samples, only the sample at 23 feet from CPT-1 contained TPHg above the detection limit, and the only slightly smaller MTBE concentration (39  $\mu\text{g/L}$ ) implies that this is the compound that was detected in the TPHg analysis. The only other sample in which a gasoline compound

was detected was the sample at 21 feet from CPT-2 (Table 3). No gasoline compounds were detected in the samples from CPT-3, but two chlorinated solvents (Trichloroethene and Tetrachloroethene—TCE and PCE) were detected in the sand bed at 30 feet in this boring. As shown in Figure 4, this bed is not present beneath the site, and it therefore appears that these chlorinated hydrocarbons entered this bed from a more distant source.

### *Monitoring Well Samples*

On December 14, 2006, ESTC's staff monitored the five monitoring wells and collected water samples. Depth measurements and other observations were recorded on the field monitoring sheet, and are shown in Table 4. Rainbow sheen was noted in monitoring well MW-5.

After the depth to groundwater was measured, approximately four to five well volumes of water were bailed from each well in order to purge standing water from the casing and assure that water samples would be representative of surrounding groundwater. The purged water was stored on site in a plastic storage tank.

Water samples were collected after purging. A stainless steel bailer was used for sample collection. Water sampling equipment was decontaminated before and after each well was sampled using Tri-sodium Phosphate (TSP) and water wash, followed by double rinsing. The samples were preserved in 40-milliliter glass vials sealed with Teflon-lined screw caps, labeled and placed in a cold ice chest and then transported to Entech Analytical Labs, a state-certified laboratory for analysis, with proper chain-of-custody. The sampling was conducted in accordance with ESTC's Standard Operation Procedures (Appendix "E") and ACHCSA-EHS guidelines.

The monitoring wells were sampled on December 14, 2006 approximately 45 days after the CPT water samples were collected. The results are shown in Table 4 and the laboratory report is in Appendix "G". The results are integrated with the Geoprobe and CPT sample results and contoured in Figures 5, 6, and 7.

MTBE was detected at 4.3 µg/L in MW-1, but the TPHg concentration of 56 µg/L barely exceeded the detection limit. This concentration is statistically equal to the 53 µg/L detected in CPT-1. These two data points, located on the north and west margins of the new UST facility, along with non-detect concentrations in Geoprobe borings GP-5 and GP-6 to the south and east of the facility, imply that this facility is at the eastern margin of the groundwater contaminant plume.

Except for MTBE, which was detected at 1.4 µg/L, no hydrocarbons were detected in MW-2. The well defines the southeastern limit of the contaminant plume.

MTBE and TBA were detected in MW-3, and the TPHg concentration of 81 µg/L exceeds the detection limit by about 30 µg/L. In the previous quarter, the concentration in this well was less than 25 µg/L, which implies that the western limit of the TPHg plume is close to this well and fluctuates from east to west slightly. This is confirmed by the results from GP-1 and GP-3, which were less than 25 µg/L and 29 µg/L respectively (Figure 5). The previously discussed hotspot at GP-4, between the western limit defined by GP-3 and MW-3 and the eastern limit defined by MW-2 and GP-5, is easily visible in the figure.

The results from wells and borings north of GP-4 prove that the contaminant plume flares out northward, and becomes skewed to the west. In the third and fourth quarters of 2006, the TPHg concentration in MW-4 was 65 µg/L and 75 µg/L, respectively, implying that the eastern limit of the plume is slightly east of this well. This is also true of MTBE, where the concentration was 12 µg/L and 7 µg/L in September and December. The Benzene limit, however, is west of this well (Figure 6). The highest TPHg concentrations, exceeding 10,000 µg/L, appear to be located beneath the service station building near its front (eastern) wall. The concentration declines to less than 5,000 µg/L (3,100 µg/L in September) in MW-5 near the northwest corner of the building, and declines further to about 150 µg/L in the vicinity of GP-8 west of the property boundary (Figure 5). The MTBE results are compatible with the TPHg distribution and the maps are quite similar (c.f. Figures 5 and 7); Benzene is less widespread (Figure 6).

## **GROUNDWATER FLOW DIRECTION**

Depth to groundwater measurements and calculated groundwater elevations are given in Table 4, and the elevation data are contoured in Figure 8. Due to a somewhat elevated water table in MW-3 or a depressed water table in MW-2, the contours are more arcuate than usual and they imply a slight bowing of the water table. This creates an apparent slope to the south in the vicinity of MW-2, whereas the water table slopes westward between MW-1 and MW-5. We infer that the principal groundwater flow direction is westward, although there may be a temporary component of southward flow until water levels in MW-2 and MW-3 equilibrate and stabilize.

## **CONCLUSIONS**

The maps in Figures 5-7 strongly suggest that the source of the plume is the soil hotspot near GP-4 and that the plume trends to the north from this source area before turning to the northwest. The maps do not suggest a contaminant source in the vicinity of the new (existing) underground storage tanks. Based on our analysis of the data, we conclude that residual soil contamination south of the pre-1986 UST's is continuing to leach hydrocarbons to groundwater in the sand body that is present at approximately 20 feet below grade.

As shown in Figure 4, bedding beneath the site has an apparent dip to the north. For example, the top of the contaminated sand body is at 20 feet below grade in CPT-3, 21 feet below grade in CPT-2, and 21.5 feet below grade in CPT-1. The sand body at 54.5 feet in CPT-3 is present at 55.5 feet in CPT-2 and 57 feet in CPT-1. Several beds also appear to thicken to the north, from CPT-3 toward CPT-1. These data, along with the fact that the two most obviously channelized (fluvial) sand bodies are present only in the southern portion of the site area, imply that depositional dip was to the north or northwest, toward San Francisco Bay. This explains why this is the predominant direction of groundwater flow at the site. The absence of hydrocarbons in samples below the 20-foot sand body supports the conclusion that contaminated groundwater flows downdip to the northwest along the basal contact of this sand body rather than downward into underlying strata, which are acting as a local barrier to vertical groundwater flow.

Because the soil samples from GP-1 and GP-3 were below the detection limit for gasoline, these two borings help to define the western limit of the soil hotspot. The eastern limit is defined by MW-2 and GP-5, because soil samples from these borings were also below the TPH-g detection limit. These four borings, plus the laboratory data from GP-4, can be used to derive a rough estimate of the dimensions of the hotspot and the volume of contaminated soil:

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North-south length (L) = 30 feet; East-west width (W) = 35 feet; thickness (T) = 25 feet

$$\text{Volume} = L \times W \times T = 30 \text{ ft} \times 35 \text{ ft} \times 25 \text{ ft} = 26,250 \text{ ft}^3 = 972 \text{ cubic yards}$$

The true volume is probably somewhat less than this because the contaminated sand body does not have a uniform thickness of 25 feet. As shown in the cross section, it thins away from GP-4.

## **RECOMMENDATION**

The recognition of a residual hotspot of soil contamination is significant for the future of the groundwater contaminant plume. Left unaddressed, concentrations in the hotspot are sufficient to feed the groundwater plume for many years to come, and neither passive nor active groundwater remediation is likely to be successful in the short term. Therefore, as a first step toward site cleanup and restoration of groundwater quality, we recommend developing a Soil Remediation Plan to remove the residual source. The Plan should consider both ex-situ and in-situ methods in light of their overall cost effectiveness, as well as desirable time frames for site closure and impact on site business operations. If ACHCSA-EHS agrees with this recommendation in a timely manner, a reasonable deadline for submission of this Plan would be the middle of the second quarter of 2007. It might then be possible to secure the necessary permits, cost estimates, and approvals and begin implementation of the Plan by the end of the year.



Although there has been a very dramatic and significant decline in hydrocarbon concentrations in samples from monitoring wells MW-1 and MW-3 since monitoring began in the 1990's, the realization that the source of groundwater contamination is the contaminated soil that is still present south of the pre-1986 underground storage tanks implies that a rapid reduction in groundwater concentrations is unlikely in the near future. Changes are likely to occur gradually, at least until soil concentrations have been mitigated, and therefore quarterly well sampling is not likely to be particularly cost effective. We therefore recommend that the next sampling event be during the second quarter of 2007, and that sampling be performed semi-annually until a plan for soil remediation has been submitted, accepted by the regulatory agency, and implemented. Monitoring of groundwater depths and construction of groundwater flow maps should continue on a quarterly basis to ensure that the flow direction remains consistent, but if changes in direction are observed then sampling of the wells should resume on a quarterly basis.

A copy of this report should be forwarded to ACHCSA-EHS and Regional Water Quality Control Board for their review and comments.

## **LIMITATIONS**

This report and the associated work have been provided in accordance with the general principles and practices currently employed in the environmental consulting profession. The contents of this report reflect the conditions of the site at this particular time. The findings of this report are based on:

- 1) The observations of field personnel.
- 2) The results of laboratory analyses performed by a state-certified laboratory.

It is possible that variations in the soil and groundwater could exist beyond the points explored in this investigation. Also, changes in groundwater conditions of a property can occur with the passage of time due to variations in rainfall, temperature, regional water usage and other natural processes or the works of man on this property or adjacent property.

The services that ESTC provided have been in accordance with generally accepted environmental professional practices for the nature and conditions of work completed in the same or similar localities at the time the work was performed. The contents of this report reflect the conditions of the subject site at this particular time. No other warranties, expressed or implied as to the professional advice provided are made.

**A P P E N D I X "A"**

**TABLES**

**TABLE 1**  
**SUMMARY OF SOIL SAMPLES FROM GEOPROBE**  
**ANALYTICAL RESULTS**  
**IN MICROGRAM PER KILOGRAM ( $\mu\text{g}/\text{Kg}$ )**

Date	Sample No.	Depth feet	TPHg	B	T	E	X	MTBE	PCE	TBA	TCE	VOCs (EPA 8260B)
10/24/06	702-GP-1-9	9	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	n-Propylbenzene 5.5
	702-GP-1-17	17	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	n-Propylbenzene 5.5
	702-GP-1-21	21	ND <100	ND<5	ND<5	ND<5	ND<10	6.1	ND<5	ND<40	ND<5	n-Propylbenzene 5.4
10/24/06	702-GP-2-13	13	53000	ND<250	ND<250	ND<250	ND<500	ND<250	ND<250	ND<2000	ND<250	n-Propylbenzene 320
	702-GP-2-17	17	250	ND<5	ND<5	ND<5	ND<10	72	ND<5	940	ND<5	n-Propylbenzene 5.5
	702-GP-2-19.5	19.5	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	n-Propylbenzene 5.5
	702-GP-2-24.5	24.5	57000	ND<250	ND<250	ND<250	ND<500	ND<250	ND<250	ND<2000	ND<250	n-Propylbenzene 340
10/24/06	702-GP-3-7	7	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	n-Propylbenzene 5.4
	702-GP-3-14	14	ND <100	ND<5	ND<5	ND<5	ND<10	9.3	ND<5	ND<40	ND<5	n-Propylbenzene 5.4
	702-GP-3-23	23	ND <100	ND<5	ND<5	ND<5	ND<10	7.7	ND<5	ND<40	ND<5	n-Propylbenzene 5.4
10/24/06	702-GP-4-7	7	660	ND<5	ND<5	ND<5	ND<10	54	ND<5	94	ND<5	None Detected<5
	702-GP-4-8	8	1300	ND<5	ND<5	ND<5	ND<10	46	ND<5	40	ND<5	n-Butylbenzene 9 sec-Butylbenzene 10
	702-GP-4-14	14	230	ND<10	ND<10	ND<10	ND<20	180	ND<10	250	ND<10	n-Propylbenzene 11
	702-GP-4-19	19	200000	ND<1200	ND<1200	ND<1200	ND<2500	ND<1200	ND<1200	ND<10000	ND<1200	n-Butylbenzene 1900 n-Propylbenzene 2300
	702-GP-4-23.5	23.5	1100000	ND<1200	ND<1200	ND<1200	ND<2500	ND<1200	ND<1200	ND<10000	ND<1200	n-Propylbenzene 18000
	702-GP-4-27	27	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	n-Propylbenzene 5.4
	702-GP-4-31	31	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	n-Propylbenzene 5.6

**TABLE 1 CONT'D**  
**SUMMARY OF SOIL SAMPLES FROM GEOPROBE**  
**ANALYTICAL RESULTS**  
**IN MICROGRAM PER KILOGRAM ( $\mu\text{g}/\text{Kg}$ )**

Date	Sample No.	Depth feet	TPHg	B	T	E	X	MTBE	PCE	TBA	TCE	VOCs (EPA 8260B)
10/24/06	702-GP-5-9	9	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	None Detected<5
	702-GP-5-14	14	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	None Detected<5
	702-GP-5-24	24	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	None Detected<5
10/24/06	702-GP-6-6	6	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	None Detected<5
	702-GP-6-11.5	11.5	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	None Detected<5
	702-GP-6-18	18	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	None Detected<5
	702-GP-6-23	23	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	None Detected<5
10/24/06	702-GP-7-9	9	ND <100	ND<5	ND<5	ND<5	ND<10	5.6	ND<5	120	ND<5	None Detected<5
	702-GP-7-12	12	9800	ND<50	ND<50	ND<50	ND<100	ND<50	ND<50	ND<400	ND<50	n-Butylbenzene 140 n-Propylbenzene 240 Naphthalene 860
	702-GP-7-21	21	1200	ND<12	ND<12	ND<12	ND<25	ND<12	ND<12	110	ND<12	n-Propylbenzene 24 Naphthalene 59
	702-GP-7-24	24	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	n-Propylbenzene 5.5
10/24/06	702-GP-8-10	10	ND <100	ND<5	ND<5	ND<5	ND<10	ND<5	ND<5	ND<40	ND<5	None Detected<5
	702-GP-8-15	15	ND <100	ND<5	ND<5	ND<5	ND<10	6.4	ND<5	ND<40	ND<5	None Detected<5
	702-GP-8-22	22	ND <100	ND<5	ND<5	ND<5	ND<10	8.3	ND<5	ND<40	ND<5	None Detected<5

**ENVIRO SOIL TECH CONSULTANTS**

**TABLE 1 CONT'D**  
**SUMMARY OF SOIL SAMPLES FROM GEOPROBE**  
**ANALYTICAL RESULTS**  
**IN MICROGRAM PER KILOGRAM ( $\mu\text{g}/\text{Kg}$ )**

**TPHg** – Total Petroleum Hydrocarbon as gasoline

**MTBE** – Methyl Tertiary Butyl Ether

**TBA** – tert-Butanol

**VOCs** – Volatile Organic Compounds

**BTEX** – Benzene, Toluene, Ethylbenzene, Total Xylenes

**PCE** – Tetrachloroethene

**TCE** – Trichloroethene

**ND** – None Detected (Below Laboratory Detection Limit)

**TABLE 2**  
**SUMMARY OF GROUNDWATER SAMPLES**  
**ANALYTICAL RESULTS FROM GEOPROBE BOREHOLES**  
**IN MICROGRAM PER LITER (µg/L)**

Date	Sample No.	TPHg	B	T	E	X	MTBE	PCE	TBA	TCE	EPA 8260B
10/24/06	702-GP-1	ND<25	ND<0.5	ND<0.5	ND<0.5	ND<0.5	8.4	ND<0.5	ND<10	ND<0.5	None Detected<0.5
	701-GP-2	3600	ND<5	ND<5	ND<5	ND<5	580	ND<5	3300	ND<5	n-Propylbenzene 64
	702-GP-3	29	ND<0.5	ND<0.5	ND<0.5	0.71	23	ND<0.5	ND<10	ND<0.5	None Detected<0.5
	702-GP-4	9100	ND<50	ND<50	ND<50	ND<50	4200	ND<50	6700	ND<50	None Detected<50
	702-GP-5	ND<25	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1.7	ND<0.5	ND<10	ND<0.5	None Detected<0.5
	702-GP-6	ND<25	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1	ND<0.5	ND<10	ND<0.5	None Detected<0.5
	702-GP-7	12000	ND<10	ND<10	370	ND<10	220	ND<10	ND<200	ND<10	1,2,4-Trimethylbenzene 100 Isopropylbenzene 200 n-Butylbenzene 110 n-Propylbenzene 750 Naphthalene 640
	702-GP-8	160	ND<0.5	ND<0.5	ND<0.5	ND<0.5	87	ND<0.5	11	ND<0.5	None Detected<0.5

**TPHg** – Total Petroleum Hydrocarbon as gasoline

**MTBE** – Methyl Tertiary Butyl Ether

**TBA** – tert-Butanol

**EPA 8260B** – Other Fuel Hydrocarbon Oxygenates by 8260B

**ND** – Not Detected (Below Laboratory Detection Limit)

**BTEX** – Benzene, Toluene, Ethylbenzene, Total Xylenes

**PCE** – Tetrachloroethene

**TCE** - Trichloroethene

**TABLE 3**  
**SUMMARY OF GROUNDWATER SAMPLES**  
**ANALYTICAL RESULTS FROM CPT BOREHOLES**  
**IN MICROGRAM PER LITER ( $\mu\text{g/L}$ )**

Date	Sample No.	Depth feet	TPHg	B	T	E	X	MTBE	PCE	TBA	TCE	EPA 8260B
11/02/06	702-CPT1-23	23	53	ND<0.5	ND<0.5	ND<0.5	ND<0.5	39	ND<0.5	ND<10	ND<0.5	None Detected<0.5
	702-CPT1-40	40	ND<25	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1	ND<0.5	ND<10	ND<0.5	None Detected<0.5
	702-CPT1-58	58	ND<25	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1	ND<0.5	ND<10	ND<0.5	None Detected<0.5
	702-CPT2-21	21	ND<25	ND<0.5	ND<0.5	ND<0.5	ND<0.5	3.5	ND<0.5	ND<10	ND<50	None Detected<0.5
	702-CPT2-57	57	ND<25	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1	ND<0.5	ND<10	ND<0.5	None Detected<0.5
	702-CPT3-10	10	ND<25	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1	ND<0.5	ND<10	ND<0.5	None Detected<0.5
	702-CPT3-32	32	ND<25	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1	3.2	ND<10	0.72	None Detected<0.5
	702-CPT3-57	57	ND<25	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1	ND<0.5	ND<10	ND<0.5	None Detected<0.5

**TPHg** – Total Petroleum Hydrocarbon as gasoline

**MTBE** – Methyl Tertiary Butyl Ether

**TBA** – tert-Butanol

**EPA 8260B** – Other Fuel Hydrocarbon Oxygenates by 8260B

**ND** – Not Detected (Below Laboratory Detection Limit)

**BTEX** – Benzene, Toluene, Ethylbenzene, Total Xylenes

**PCE** – Tetrachloroethene

**TCE** - Trichloroethene

**ENVIRO SOIL TECH CONSULTANTS**



**TABLE 4  
GROUNDWATER MONITORING DATA (feet)  
AND ANALYTICAL RESULTS (µg/L)**

Date	Well No./ Elevation	Depth of Well	Depth of Perf.	Depth to Water	GW Elev.	Well Observation	TPHg	B	T	E	X	MTBE	PCE	TBA	TCE	Other VOCs By EPA 8260B
8/08/86	MW-1 (N/A)	15	10	N/A	N/A	N/A	N/A	ND <500	ND <500	NA	82	NA	NA	NA	NA	Not Analyzed
11/12/92				11.37†	N/A	N/A	720	3	0.5	1	1	NA	NA	NA	NA	Not Analyzed
3/24/94	(22.93) feet (MSL)			8.71*	14.22	Odor	1300	110	ND <0.5	19	ND <0.5	NA	NA	NA	NA	Not Analyzed
12/15/95				8.49*	14.44	No sheen Weakly petro. odor	350	18	2.9	3.5	2.8	NA	NA	NA	NA	Not Analyzed
8/26/98	(22.96) resurveyed			9.30*	13.66	N/A	ND <500	17	ND<5	ND<5	ND<5	340000	NA	NA	NA	Not Analyzed
1/26/99				7.96*	15.00	N/A	ND <50000	ND <500	ND <500	ND <500	ND <500	269000	NA	NA	NA	Not Analyzed
4/06/99				8.01*	14.95	N/A	3500	296	ND <10	43	18.6	117000	NA	NA	NA	Not Analyzed
5/24/00	(23.05) resurveyed			8.24*	14.81	No sheen or odor	33000	ND <5000	ND <5000	ND <5000	ND <5000	74000	ND <5000	ND <20000	ND <5000	None Detected<5000
8/24/00				9.43*	13.62	No sheen or odor	11000	ND <2000	ND <2000	ND <2000	ND <2000	32000	ND <2500	ND <10000	ND <2500	None Detected<2500
11/22/00				9.28*	13.77	L. rainbow sheen No odor	24000	ND <2500	ND <2500	ND <2500	ND <2500	35000	ND <2500	ND <10000	ND <2500	None Detected<2500
2/22/01				7.86*	15.19	No sheen or odor	19000	ND <5000	ND <5000	ND <5000	ND <5000	51000	ND <5000	ND <20000	ND <5000	None Detected<5000
5/29/01				8.96*	14.09	No sheen or odor	30000	ND <5000	ND <5000	ND <5000	ND <5000	110000	ND <5000	ND <20000	ND <5000	None Detected<5000
8/22/01				9.66*	13.39	No sheen or odor	46000	ND <2500	ND <2500	ND <2500	ND <2500	70000	ND <2500	11000	ND <2500	None Detected<2500
12/06/01				8.36*	14.69	No sheen or odor	25000	ND <2500	ND <2500	ND <2500	ND <2500	37000	ND <2500	ND <10000	ND <2500	None Detected<2500
3/25/02	(23.05) resurveyed			7.84*	15.21	L. rainbow sheen No odor	770	ND <830	ND <830	ND <830	ND <830	20000	ND <830	NA	ND <830	None Detected<830
7/02/02				8.96*	14.14	No sheen or odor	550	ND <500	ND <500	ND <500	ND <500	13000	ND <500	NA	ND <500	None Detected<500
10/05/02				9.58*	13.47	No sheen or odor	880•	ND <250	ND <250	ND <250	ND <250	3800	ND <250	ND <1000	ND <250	None Detected<250

**TABLE 4 CONT'D  
GROUNDWATER MONITORING DATA (feet)  
AND ANALYTICAL RESULTS (µg/L)**

Date	Well No./ Elevation	Depth of Well	Depth of Perf.	Depth to Water	GW Elev.	Well Observation	TPHg	B	T	E	X	MTBE	PCE	TBA	TCE	Other VOCs By EPA 8260B
1/17/03	MW-1 (23.05)	15	10	7.72*	15.33	No sheen or odor	8200a	ND <500	ND <500	ND <500	ND <500	11000	ND <500	2200	ND <500	None Detected<500
4/17/03				8.48*	14.57	No sheen or odor	390	ND <2.5	ND <2.5	ND <2.5	ND <2.5	1400	ND <2.5	NA	ND <2.5	n-Propylbenzene 3.1
7/24/03				9.20*	13.85	No sheen or odor	490•	ND <100	ND <100	ND <100	ND <100	590	ND <100	ND <200	ND <100	None Detected<100
10/22/03				9.88*	13.17	No sheen or odor	430c	ND<50	ND<50	ND<50	ND<50	540	ND <50	ND <100	ND <50	None Detected<50
1/17/04				8.18*	14.87	No sheen or odor	420d	ND<25	ND<25	ND<25	ND<25	340	ND <25	ND <50	D <25	None Detected<25
4/05/04				7.96*	15.09	No sheen or odor	520n	ND<5	ND<5	ND<5	ND<10	700	ND<5	ND <100	ND<5	None Detected<5
7/06/04				9.13*	13.92	No sheen or odor	150c	ND <0.5	ND <0.5	ND <0.5	ND<1	120	ND <0.5	ND <10	ND <0.5	None Detected<0.5
9/27/04				9.46*	13.59	No sheen or odor	110	5.3	1.2	2	4.3	47	ND <0.5	ND <10	ND <0.5	None Detected<0.5
12/17/04				8.38*	14.67	No sheen or odor	160	13	15	3.2	13	34	ND <0.5	ND <10	ND <0.5	None Detected<0.5
3/21/05				7.62*	15.43	No sheen or odor	450	ND<5	ND<5	ND<5	ND<5	520	ND<5	ND <100	ND<5	None Detected<5
6/18/05				8.18*	14.87	No sheen or odor	270	ND <2.5	ND <2.5	ND <2.5	ND <2.5	210	ND <2.5	63	ND <2.5	None Detected
9/15/05				8.84*	14.21	No sheen or odor	110	ND <0.5	ND <0.5	ND <0.5	ND <0.5	47	ND <0.5	15	ND <0.5	Carbon Disulfide 0.74
12/09/05				8.64*	14.41	No sheen or odor	70	ND <0.5	ND <0.5	ND <0.5	ND <0.5	16	ND <0.5	13	ND <0.5	None Detected<0.5
3/16/06				7.48*	15.57	No sheen or odor	280	ND <2.5	ND <2.5	ND <2.5	ND <2.5	270	ND <2.5	87	ND <2.5	None Detected<2.5
6/20/06				8.36*	14.69	No sheen or odor	220	ND <0.5	ND <0.5	ND <0.5	ND <0.5	58	ND <0.5	22	ND <0.5	None Detected<0.5
9/21/06				9.00*	14.05	No sheen Sewerage odor	120	ND <0.5	ND <0.5	ND <0.5	ND <0.5	17	ND <0.5	ND <10	ND <0.5	None Detected<0.5
12/14/06				8.18*	14.87	No sheen or odor	56	ND <0.5	ND <0.5	ND <0.5	ND <0.5	4.3	ND <0.5	ND <10	ND <0.5	None Detected<0.5

**TABLE 4 CONT'D**  
**GROUNDWATER MONITORING DATA (feet)**  
**AND ANALYTICAL RESULTS (µg/L)**

Date	Well No./ Elevation	Depth of Well	Depth of Perf.	Depth to Water	GW Elev.	Well Observation	TPHg	B	T	E	X	MTBE	PCE	TBA	TCE	Other VOCs By EPA 8260B
8/08/86	MW-2 (N/A)	15	10	N/A	N/A	N/A	NA	ND<50	ND<50	NA	ND<50	NA	NA	NA	NA	Not Analyzed
11/12/92	(22.09) feet (MSL)			10.55†	N/A	N/A	ND<10	ND <0.3	ND <0.3	ND <0.3	ND <0.5	NA	NA	NA	NA	Not Analyzed
3/24/94				7.87*	14.22	NA	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	NA	NA	NA	NA	Not Analyzed
12/15/95				4.62*	17.47	No sheen or odor	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	NA	NA	NA	NA	Not Analyzed
2/28/98	(22.07) resurveyed			8.40*	13.67	N/A	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	210000	NA	NA	NA	Not Analyzed
1/26/99				7.29*	14.78	N/A	ND <2000	ND <20	ND <20	ND <20	ND <20	9450	NA	NA	NA	Not Analyzed
4/06/99				7.28*	14.79	N/A	ND <1000	ND <10	ND <10	ND <10	ND <10	209000	NA	NA	NA	Not Analyzed
5/24/00	(21.94) resurveyed			7.22*	14.72	No sheen or odor	46000	ND <12500	ND <12500	ND <12500	ND <12500	180000	ND <12500	ND <50000	ND <12500	None Detected<12500
8/24/00				8.39*	13.55	No sheen or odor	21000	ND <2500	ND <2500	ND <2500	ND <2500	70000	ND <2500	ND <10000	ND <2500	None Detected<2500
11/22/00				8.24*	13.70	No sheen or odor	29000	ND <2500	ND <2500	ND <2500	ND <2500	43000	ND <2500	ND <10000	ND <2500	None Detected<2500
2/22/01				6.52*	15.42	No sheen or odor	20000	ND <5000	ND <5000	ND <5000	ND <5000	61000	ND <5000	ND <20000	ND <5000	None Detected<5000
5/29/01				7.90*	14.04	No sheen or odor	9100	ND <1000	ND <1000	ND <1000	ND <1000	24000	ND <1000	ND <4000	ND <1000	None Detected<1000
8/22/01				8.62*	13.32	No sheen or odor	8700	ND <500	ND <500	ND <500	ND <500	12000	ND <500	ND <2000	ND <500	None Detected<500
12/06/01				7.28*	14.66	No sheen or odor	11000	ND <1250	ND <1250	ND <1250	ND <1250	22000	ND <1250	ND <5000	ND <1250	None Detected<1250
3/25/02	(21.94) resurveyed			6.86*	15.08	No sheen or odor	ND<50	ND <830	ND <830	ND <830	ND <830	25000	ND <830	NA	ND <830	None Detected<830
7/02/02				7.96*	13.98	No sheen or odor	ND<50	ND <170	ND <170	ND <170	ND <170	6000	ND <170	NA	ND <170	None Detected<170
10/05/02				8.54*	13.40	No sheen or odor	820●	ND <250	ND <250	ND <250	ND <250	3400	ND <250	ND <1000	ND <250	None Detected<250

**TABLE 4 CONT'D**  
**GROUNDWATER MONITORING DATA (feet)**  
**AND ANALYTICAL RESULTS (µg/L)**

Date	Well No./ Elevation	Depth of Well	Depth of Perf.	Depth to Water	GW Elev.	Well Observation	TPHg	B	T	E	X	MTBE	PCE	TBA	TCE	Other VOCs By EPA 8260B
1/17/03	MW-2 (21.94)	15	10	6.76*	15.18	No sheen or odor	7000a	ND <500	ND <500	ND <500	ND <500	6800	ND <500	1100	ND <500	None Detected<500
4/17/03				7.38*	14.56	No sheen or odor	ND <500	ND<5	ND<5	ND<5	ND <5	3100	ND<5	NA	ND<5	None Detected<5
7/24/03				8.14*	13.80	No sheen or odor	720a	ND<5	ND<5	ND<5	ND<5	1400	ND 250	ND <500	ND <250	None Detected<250
10/22/03				8.82*	13.12	No sheen or odor	420c	ND<50	ND <50	ND <50	ND<50	580	ND<50	ND <100	ND<50	None Detected<50
10/22/03				8.82*	13.12	No sheen or odor	420c	ND<50	ND <50	ND <50	ND<50	580	ND<50	ND <100	ND<50	None Detected<100
1/17/04				7.14*	14.80	No sheen or odor	860c	ND <100	ND <100	ND <100	ND <100	1800	ND<5	250	ND<5	None Detected<5
4/05/04				6.94*	15.00	No sheen or odor	330n	ND<5	ND<5	ND<5	ND<10	500	ND<5	260	ND<5	None Detected<5
7/06/04				8.05*	13.89	No sheen or odor	200e	ND<1	ND<1	ND<1	ND<2	220	ND<1	ND<20	ND<1	None Detected<1
9/27/04				8.38*	13.11	No sheen or odor	54e	1.1	ND 0.5	ND <0.5	ND<1	72	ND <0.5	ND<10	ND <0.5	None Detected<0.5
12/17/04				7.31*	14.63	No sheen or odor	160	22	25	5.1	21	86	ND <0.5	39	ND <0.5	None Detected<0.5
3/21/05				6.54*	15.40	No sheen or odor	59	1.2	3.2	0.87	4.8	63	ND <0.5	30	ND <0.5	None Detected<0.5
6/18/05				7.16*	14.78	No sheen or odor	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	41	ND <0.5	12	ND <0.5	None Detected<0.5
9/15/05				7.74*	14.20	No sheen or odor	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	20	ND <0.5	ND<10	ND <0.5	None Detected<0.5
12/09/05				7.56*	14.38	No sheen or odor	ND<50	ND<1	ND<1	ND<1	ND<1	9.7	ND <0.5	ND<10	ND <0.5	None Detected<0.5
3/16/06				6.60*	15.34	No sheen or odor	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	8	ND <0.5	ND<10	ND <0.5	None Detected<0.5
6/20/06				7.30*	14.64	No sheen or odor	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	6	ND <0.5	ND<10	ND <0.5	None Detected<0.5
9/21/06				7.94*	14.00	No sheen or odor	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	2.4	ND <0.5	ND<10	ND <0.5	None Detected<0.5
12/14/06				7.10*	14.84	No sheen or odor	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	1.4	ND <0.5	ND<10	ND <0.5	None Detected<0.5

**TABLE 4 CONT'D  
GROUNDWATER MONITORING DATA (feet)  
AND ANALYTICAL RESULTS (µg/L)**

Date	Well No./ Elevation	Depth of Well	Depth of Perf.	Depth to Water	GW Elev.	Well Observation	TPHg	B	T	E	X	MTBE	PCE	TBA	TCE	Other VOCs By EPA 8260B
8/08/96	MW-3 (N/A)	16	10	N/A	N/A	N/A	NA	ND<50	ND<50	NA	ND<50	NA	NA	NA	NA	Not Analyzed
11/12/92				11.32†	N/A	N/A	69	ND <0.3	ND <0.3	ND <0.3	ND <0.3	NA	NA	NA	NA	Not Analyzed
3/24/94	(22.73) feet (MSL)			8.69*	14.04	N/A	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	NA	NA	NA	NA	Not Analyzed
12/15/95				8.31*	14.42	No sheen or odor	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	NA	NA	NA	NA	Not Analyzed
8/26/98	(22.74) resurveyed			9.29*	13.45	N/A	ND <500	36	ND<5	ND<5	ND<5	99000	NA	NA	NA	Not Analyzed
12/16/98				8.00*	14.74	N/A	ND <500	ND<50	ND<50	ND<50	ND<50	19800	NA	NA	NA	Not Analyzed
4/06/99	(22.56) resurveyed			8.00*	14.74	N/A	ND <1000	ND<10	ND<10	ND<10	ND<10	151000	NA	NA	NA	Not Analyzed
5/24/00				8.08*	14.47	No sheen or odor	48000	ND <12500	ND <12500	ND <12500	ND <12500	200000	ND <12500	ND <50000	ND <12500	None Detected<12500
8/24/00				9.24*	13.32	No sheen or odor	52000	ND <5000	ND <5000	ND <5000	ND <5000	170000	ND <5000	ND <20000	ND <5000	None Detected<5000
11/22/00				9.08*	13.48	No sheen or odor	69000	ND <10000	ND <10000	ND <10000	ND <10000	160000	ND <10000	ND <40000	ND <10000	None Detected<10000
2/22/01				7.58*	14.98	No sheen or odor	30000	ND <5000	ND <5000	ND <5000	ND <5000	130000	ND <5000	ND <20000	ND <5000	None Detected<5000
5/29/01				8.76*	13.80	No sheen or odor	29000	ND <2500	ND <2500	ND <2500	ND <2500	78000	ND <2500	ND <10000	ND <2500	None Detected<2500
8/22/01				9.46*	13.10	No sheen or	37000	ND <5000	ND <5000	ND <5000	ND <5000	98000	ND <5000	ND <20000	ND <5000	None Detected<5000
12/06/01				8.06*	14.50	No sheen or odor	33000	ND <5000	ND <5000	ND <5000	ND <5000	94000	ND <5000	ND <20000	ND <5000	None Detected<5000
3/25/02	(22.56) resurveyed			7.62*	14.94	No sheen or odor	ND<50	ND <2500	ND <2500	ND <2500	ND <2500	62000	ND <2500	NA	ND <2500	None Detected<2500
7/02/02				7.78*	14.78	No sheen or odor	73Z	ND <2000	ND <2000	ND <2000	ND <2000	67000	NND <2000	NA	ND <2000	None Detected<2000
10/05/02				9.38*	13.18	No sheen or odor	25000●	ND <2500	ND <2500	ND <2500	ND <2500	55000	ND <2500	ND <10000	ND <2500	Methylene Chloride 7000
1/17/03				7.46*	15.10	No sheen or odor	32000*	ND <2500	ND <2500	ND <2500	ND <2500	49000	ND <2500	ND <5000	ND <2500	None Detected<2500

**TABLE 4 CONT'D  
GROUNDWATER MONITORING DATA (feet)  
AND ANALYTICAL RESULTS (µg/L)**

Date	Well No./ Elevation	Depth of Well	Depth of Perf.	Depth to Water	GW Elev.	Well Observation	TPHg	B	T	E	X	MTBE	PCE	TBA	TCE	Other VOCs By EPA 8260B
4/17/03	MW-3 (22.56)	16	10	8.22*	14.34	No sheen or odor	ND <10000	ND <100	ND <100	ND <100	ND <100	38000	ND <100	NA	ND <100	None Detected<100
7/24/03				9.02*	13.54	No sheen or odor	16000*	ND <2500	ND <2500	ND <2500	ND <2500	31000	ND <2500	ND <5000	ND <2500	None Detected<2500
10/22/03				9.66*	12.90	No sheen or odor	17000c	ND <2500	ND <2500	ND <2500	ND <2500	29000	ND <2500	ND\	ND <2500	None Detected<2500
1/17/04				7.92*	14.64	No sheen or odor	11000d	ND <2000	ND <2000	ND <2000	ND <2000	23000	ND <2000	ND <4000	ND <2000	None Detected<2000
4/05/04				7.46*	15.10	No sheen or odor	13000n	ND <200	ND <200	ND <200	ND <400	22000	ND <200	ND <4000	ND <200	None Detected<200
7/06/04				8.92*	13.64	No sheen or odor	13000e	ND<50	ND<50	ND<50	ND <100	12000	ND<50	ND <1000	ND<50	None Detected<50
9/27/04				9.24*	13.32	No sheen or odor	4200e	ND<50	ND<50	ND<50	ND <100	6800	ND<50	ND <1000	ND<50	None Detected<50
12/17/04				8.12*	14.44	No sheen or odor	4000c	ND<50	ND<50	ND<50	ND<50	5400	ND<50	ND <1000	ND<50	None Detected<50
3/21/05				7.38*	15.18	No sheen or odor	3500c	ND<50	ND<50	ND<50	ND<50	6400	ND<50	4300	ND<50	None Detected<50
6/18/05				8.02*	14.54	No sheen or odor	650	ND<25	ND<25	ND<25	ND<25	700	ND<25	9200	ND<25	None Detected<25
9/15/05				8.64*	13.92	No sheen or odor	180	ND<10	ND<10	ND<10	ND<10	110	ND<10	7300	ND<10	None Detected<10
12/09/05				8.42*	14.14	No sheen or odor	ND<50	ND<5	ND<5	ND<5	ND<5	15	ND<5	2500	ND<5	None Detected<5
3/16/06				7.24*	15.32	No sheen or odor	ND<50	ND <2.5	ND <2.5	ND <2.5	ND <2.5	ND<5	ND <2.5	1600	ND <2.5	None Detected<2.5
6/20/06				8.18*	14.38	No sheen or odor	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	8.6	ND <0.5	12	ND <0.5	None Detected<0.5
9/21/06				8.82*	13.74	No sheen or odor	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	8.6	ND <0.5	39	ND <0.5	None Detected<0.5
12/14/06				7.88*	14.68	No sheen or odor	81	ND <0.5	ND <0.5	ND <0.5	ND <0.5	6.1	ND <0.5	14	ND <0.5	None Detected<0.5
8/26/98	MW-4 (23.51) feet (MSL)	19	N/A	9.87	13.64	N/A	170	2	0.74	1.3	1	150	NA	NA	NA	Not Analyzed
1/26/99				8.54	14.97	N/A	140	ND <0.5	ND <0.5	ND <0.5	ND <0.5	7.6	NA	NA	NA	Not Analyzed

**TABLE 4 CONT'D  
GROUNDWATER MONITORING DATA (feet)  
AND ANALYTICAL RESULTS (µg/L)**

Date	Well No./ Elevation	Depth of Well	Depth of Perf.	Depth to Water	GW Elev.	Well Observation	TPHg	B	T	E	X	MTBE	PCE	TBA	TCE	Other VOCs By EPA 8260B
4/06/99	MW-4 (23.51) feet (MSL)	19	N/A	8.34	15.17	N/A	390	3.94	ND <0.5	1.52	0.808	15.2	NA	NA	NA	Not Analyzed
5/24/00	(23.40) resurveyed			8.72	14.68	No sheen or odor	210	ND<5	ND<5	ND<5	ND<5	40	ND<5	ND<20	ND<5	None Detected<5
8/24/00				9.88	13.52	No sheen or odor	160	ND<5	7.4	ND<5	ND<5	44	ND<5	ND<20	ND<5	None Detected<5
11/22/00				9.76	13.64	No sheen or odor	140	ND<5	ND<5	ND<5	ND<5	25	ND<5	ND<20	ND<5	None Detected<5
2/22/01				8.42	14.98	No sheen or odor	160	ND<5	ND<5	ND<5	ND<5	32	ND<5	ND<20	ND<5	None Detected<5
5/29/01				9.42	13.98	No sheen or odor	160	ND<5	ND<5	ND<5	ND<5	31	ND<5	ND<20	ND<5	None Detected<5
8/22/01				10.10	13.30	No sheen or odor	96	N<5	ND<5	ND<5	ND<5	28	ND<5	ND<20	ND<5	None Detected<5
12/06/01				8.68	14.72	No sheen or odor	160	ND<5	ND<5	ND<5	ND<5	25	ND<5	ND<20	ND<5	None Detected<5
3/25/02				8.28	15.12	No sheen or odor	150	ND<5	ND<5	ND<5	ND<5	14	ND<5	NA	ND<5	None Detected<5
7/02/02				9.36	14.04	No sheen or odor	120	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	NA	ND<5	None Detected<5
10/05/02				10.12	13.28	No sheen or odor	110	ND<5	ND<5	ND<5	ND<5	53	ND<5	ND<20	ND<5	None Detected<5
1/17/03				8.10	15.30	No sheen or odor	86c	ND<5	ND<5	ND<5	ND<5	23	ND <05	NA	ND <0.5	Naphthalene 0.81
4/17/03				8.88	14.52	No sheen or odor	110	3	2.8	1.1	2.84	89	ND<5	ND<10	ND<5	None Detected<5
7/24/03				9.74	13.66	No sheen or odor	130b	ND<5	ND<5	ND<5	ND<5	71	ND<5	ND<10	ND<5	None Detected<5
10/22/03				10.40	13.00	No sheen or odor	130b	ND<5	ND<5	ND<5	ND<5	81	ND<5	ND<10	ND<5	None Detected<5
1/17/04				8.72	14.68	No sheen or odor	180d	ND<5	ND<5	ND<5	ND<5	65	ND <0.5	ND<10	ND <0.5	None Detected<0.5
4/05/04				8.48	14.92	No sheen or odor	94	ND <0.5	ND <0.5	ND <0.5	ND<1	38	ND <0.5	ND<10	ND <0.5	None Detected<0.5
7/06/04				9.67	13.73	No sheen or odor	61e	ND <0.5	ND <0.5	ND <0.5	ND<1	79	ND <0.5	ND<10	ND <0.5	None Detected<0.5
9/27/04				10.02	13.38	No sheen or odor	230	3.8	0.8	1.3	2.3	57	ND <0.5	ND<10	ND <0.5	None Detected<0.5
12/17/04				8.88	14.52	No sheen or odor	430	62	68	13	53	42	ND <0.5	ND<10	ND <0.5	1,2,4-Trimethylbenzene 6.9
3/21/05				8.02	15.38	No sheen or odor	71	2.3	5.1	1.2	6.9	15	ND <0.5	ND<10	ND <0.5	None Detected<0.5
6/18/05				8.72	14.68	No sheen or odor	98	ND <0.5	ND <0.5	ND <0.5	ND <0.5	29	ND <0.5	11	ND <0.5	None Detected<0.5

**TABLE 4 CONT'D  
GROUNDWATER MONITORING DATA (feet)  
AND ANALYTICAL RESULTS (µg/L)**

Date	Well No./ Elevation	Depth of Well	Depth of Perf.	Depth to Water	GW Elev.	Well Observation	TPHg	B	T	E	X	MTBE	PCE	TBA	TCE	Other VOCs By EPA 8260B
9/15/05	MW-4 (23.40)	15	N/A	9.38	14.02	No sheen or odor	150	ND <0.5	ND <0.5	ND <0.5	ND <0.5	35	ND <0.5	12	ND <0.5	None Detected<0.5
12/09/05				9.20	14.20	No sheen or odor	110	ND <0.5	ND <0.5	ND <0.5	ND <0.5	23	ND <0.5	14	ND <0.5	None Detected<0.5
3/16/06				7.88	15.52	No sheen or odor	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	12	ND <0.5	ND<10	ND <0.5	None Detected<0.5
6/20/06				8.86	14.54	No sheen or odor	ND<50	ND <0.5	ND <0.5	ND <0.5	ND <0.5	9.8	ND <0.5	ND<10	ND <0.5	None Detected<0.5
9/21/06				9.54	13.86	No sheen or odor	65	ND <0.5	ND <0.5	ND <0.5	ND <0.5	12	ND <0.5	ND<10	ND <0.5	None Detected<0.5
12/14/06				8.76	14.64	No sheen or odor	75	ND <0.5	ND <0.5	ND <0.5	ND <0.5	7	ND <0.5	ND<10	ND <0.5	None Detected<0.5
8/26/98	MW-5 (23.85) feet (MSL)	19	N/A	10.51	13.34	N/A	6600	240	ND <50	380	84	ND <250	NA	NA	NA	Not Analyzed
1/26/99				10.26	13.59	N/A	371	11.7	ND <0.5	3.22	ND <0.5	36.4	NA	NA	NA	Not Analyzed
4/06/99				9.32	14.53	N/A	7680	266	ND <10	280	ND <10	ND<10	NA	NA	NA	Not Analyzed
5/24/00	(23.86) resurveyed			9.39	14.47	Rainbow sheen No odor	3300	180	ND <25	140	ND <25	200	ND <25	ND <100	ND <25	Isopropylbenzene 55 n-Butylbenzene 42 n-Propylbenzene 200 Naphthalene 120
8/24/00				10.54	13.32	Light rainbow sheen No odor	3200	150	ND <10	91	ND <10	300	ND <10	ND <40	ND <10	1,2,4-Trimethylbenzene 15 Isopropylbenzene 38 n-Butylbenzene 29 n-Propylbenzene 140 Naphthalene 87 p-Isopropyltoluene 28 sec-Butylbenzene 12
11/22/00				10.42	13.44	No sheen Light sewerage odor	520	120	ND <25	46	ND <25	510	ND <25	ND <100	ND <25	Isopropylbenzene 31 n-Propylbenzene 100 Naphthalene 37



**TABLE 4 CONT'D**  
**GROUNDWATER MONITORING DATA (feet)**  
**AND ANALYTICAL RESULTS (µg/L)**

Date	Well No./ Elevation	Depth of Well	Depth of Perf.	Depth to Water	GW Elev.	Well Observation	TPHg	B	T	E	X	MTBE	PCE	TBA	TCE	Other VOCs by EPA 8260B
2/22/01	MW-5 (23.86)	19	N/A	8.88	14.98	No sheen or odor	5400	100	ND <50	94	ND <50	700	ND <50	ND <200	ND <50	n-Propylbenzene 160 Naphthalene 90
5/29/01				10.08	13.78	Rainbow sheen No odor	3700	83	ND <50	58	ND <50	860	ND <50	ND <200	ND <50	n-Propylbenzene 130 Naphthalene 64
8/22/01				10.76	13.10	Light rainbow sheen No odor	5900	150	ND <10	ND <10	ND <10	1700	ND <5	ND <20	ND <5	None Detected<5
12/06/01				9.48	14.38	Rainbow sheen Light petroleum odor	4900	ND <50	ND <50	ND <50	ND <50	1900	ND <50	ND <200	ND <50	None Detected<50
3/25/02				9.08	14.78	No sheen or odor	4000	170	ND <83	ND <83	ND <83	2200	ND <83	NA	ND <83	Propylbenzene 180
7/02/02				10.02	13.84	No sheen or odor	6100	ND <130	ND <130	ND <130	ND <130	2600	ND <130	NA	ND <130	Propylbenzene 240
10/05/02				10.72	13.14	No sheen or odor	5500	110	ND <100	ND <100	ND <100	2500	ND <100	ND <400	ND <100	n-Propylbenzene 230 Naphthalene 120
1/17/03				8.76	15.10	No sheen or odor	3900 <sup>a</sup>	ND <100	ND <100	ND <100	ND <100	2000	ND <100	310	ND <100	n-Propylbenzene 140
4/17/03				9.58	14.28	No sheen or odor	7500	110	ND <10	61	ND <10	3500	ND <10	NA	ND <10	Isopropylbenzene 71 n-Propylbenzene 270 sec-Butylbenzene 21 Naphthalene 140
7/24/03				10.36	13.50	No sheen or odor	7000 <sup>a</sup>	ND <250	ND <250	ND <250	ND <250	3300	ND <250	520	ND <250	None Detected<250
10/22/03				11.02	12.84	No sheen Sewerage odor	7100	ND <500	ND <500	ND <500	ND <500	6100	ND <500	ND <1000	ND <500	None Detected<500
1/17/04				9.30	14.56	No sheen Sewerage odor	7100 <sup>n</sup>	ND <500	ND <500	ND <500	ND <500	4200	ND <500	ND <1000	ND <500	None Detected<500
4/05/04				9.06	14.80	No sheen Light sewerage odor	6200 <sup>n</sup>	100	ND <50	ND <50	ND <100	4800	ND <50	ND <1000	ND <50	None Detected<50
7/06/04				10.30	13.56	No sheen Sewerage odor	7800	110	ND <25	44	ND <50	5600	ND <25	ND <500	ND <25	Isopropylbenzene 81 n-Propylbenzene 350
9/27/04				10.92	12.94	No sheen Sewerage odor	6100 <sup>e</sup>	83	ND <50	ND <50	ND <100	4000	ND <50	ND <1000	ND <50	None Detected<50
12/17/04				9.47	14.39	Slight sheen Sewerage odor	5700	110	54	27	ND <25	4200	ND <25	ND <500	ND <25	None Detected<25

**TABLE 4 CONT'D  
GROUNDWATER MONITORING DATA (feet)  
AND ANALYTICAL RESULTS (µg/L)**

Date	Well No./ Elevation	Depth of Well	Depth of Perf.	Depth to Water	GW Elev.	Well Observation	TPHg	B	T	E	X	MTBE	PCE	TBA	TCE	Other VOCs By EPA 8260B
3/21/05	MW-5 (23.86)	19	N/A	8.58	15.28	No sheen Sewerage odor	5600	60	ND <50	ND <50	ND <50	4600	ND <50	1300	ND <50	None Detected<50
6/18/05				9.32	14.54	Rainbow sheen Petroleum odor	8100	66	ND <50	ND <50	ND <50	4800	ND <50	1400	ND <50	None Detected<50
9/15/05				10.02	13.84	Rainbow sheen Petroleum odor	7600	ND <50	ND <50	ND <50	ND <50	4500	ND <50	1500	ND <50	None Detected<50
12/09/05				9.82	14.04	Rainbow sheen Petroleum odor	5000	28	ND <25	ND <25	ND <25	2600	ND <25	1300	ND <25	None Detected<25
3/16/06				8.50	15.36	Rainbow sheen No odor	6000	33	ND <25	ND <25	ND <25	3000	ND <25	1400	ND <25	n-Propylbenzene 310
6/20/06				9.50	14.36	Rainbow sheen Petroleum odor	7100	21	ND <10	16	ND <10	1200	ND <10	900	ND <10	n-Propylbenzene 260 Naphthalene 200
9/21/06				10.20	13.66	Rainbow sheen Petroleum odor	3100	20	ND <10	14	ND <10	1000	ND <10	1400	ND <10	n-Propylbenzene 240 Naphthalene 120
12/14/06				9.26	14.60	Rainbow sheen No odor	4800	11	ND<5	12	ND<5	440	ND<5	740	ND<5	n-Propylbenzene 190 Naphthalene 84

**TPHg** - Total Petroleum Hydrocarbons as gasoline

**MTBE** - Methyl Tertiary Butyl Ether

**TBA** - tert-Butanol

**VOCs** - Volatile Organic Compounds

**MSL** - Mean Sea Level

**N/A** - Not Applicable

**ND** - Not Detected (Below Laboratory Detection Limit)

† Well screens are not submerged

**Z** - Sample exhibits unknown single peak or peaks

**BTEX** - Benzene, Toluene, Ethylbenzene, Total Xylenes

**PCE** - Tetrachloroethene

**TCE** - Trichloroethene

**Perf.** - Perforation

**GW Elev.** - Groundwater Elevation

**NA** - Not Analyzed

\* Well screens are submerged

**TABLE 4 CONT'D**

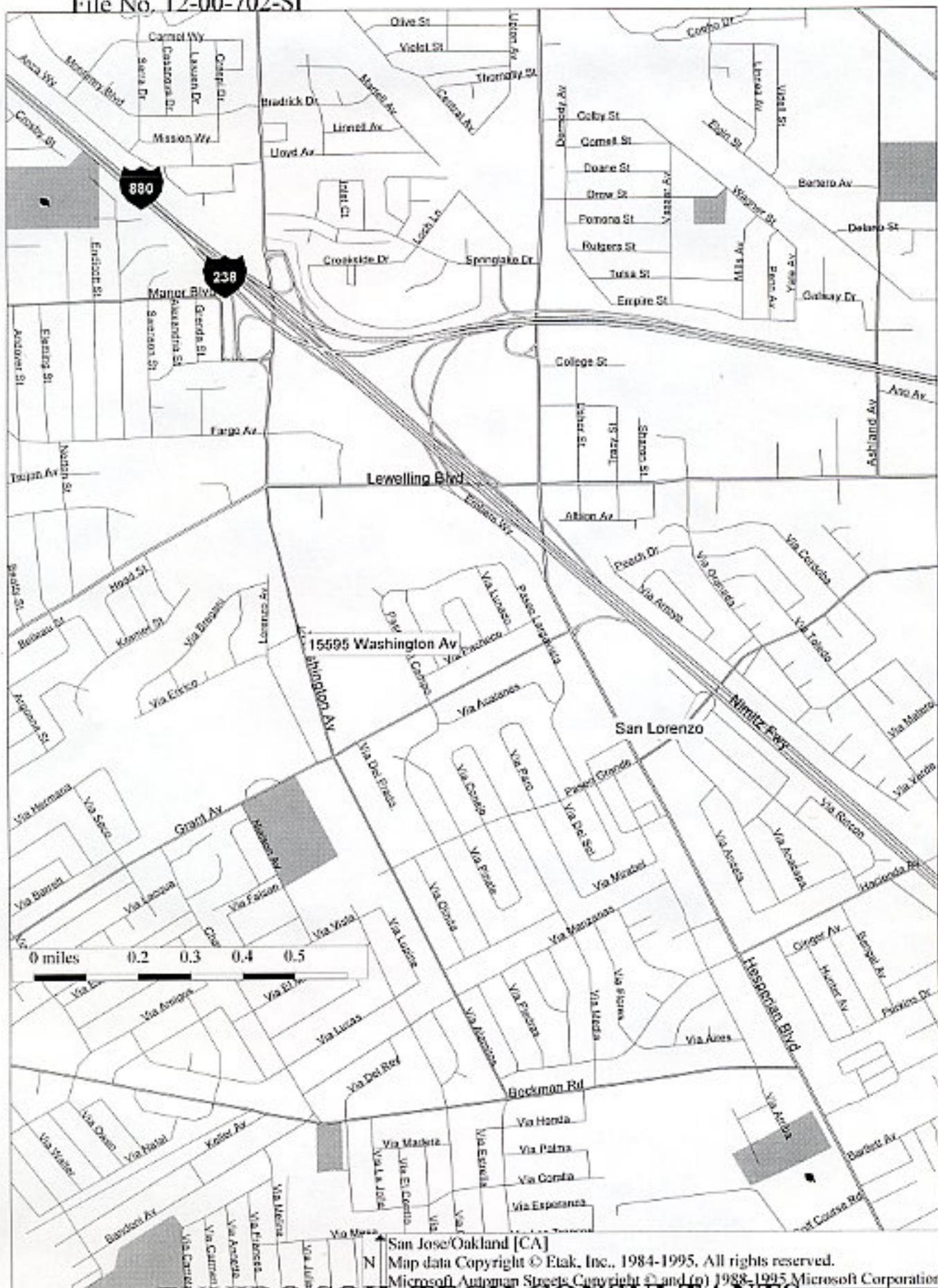
**ENVIRO SOIL TECH CONSULTANTS**

**GROUNDWATER MONITORING DATA (feet)  
AND ANALYTICAL RESULTS (µg/L)**

- TPH as gasoline reported value due to high concentrations of MTBE which are present in the TPH as gasoline quantitation range
- a** Report TPH as gasoline value is the result of high concentrations of discrete peak (MTBE) within the TPH as gasoline quantitation range
- b** TPH as gasoline value is the result of high concentrations of MTBE and high boiling point hydrocarbon mixture within the TPH as gasoline quantitation range
- c** Report TPH as gasoline value contains the result of high concentrations of MTBE within the TPH as gasoline quantitation range
- d** TPH as gasoline value contains high concentration of MTBE and a typical gasoline pattern within the TPH as gasoline quantitation range
- e** TPH as gasoline reported value due to high concentrations of MTBE present in the TPH as gasoline
- n** Report TPH as gasoline value contains the result of high concentrations of MTBE within the TPH as gasoline quantitation range.  
High surrogate recovery for 4-BFB due to matrix interference. See TFT results.

**A P P E N D I X "B"**

**FIGURES**



**ENVIRO SOIL TECH CONSULTANTS**

Figure 1

**Enviro Soil Tech  
Consultants**

131 Tully Road  
San Jose, CA 95112

**PROJECT**

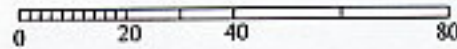
15595 Washington Avenue  
San Lorenzo, California

PROJECT # 12-99-702-SI  
DATE: 12/14/2006

**Figure 2**

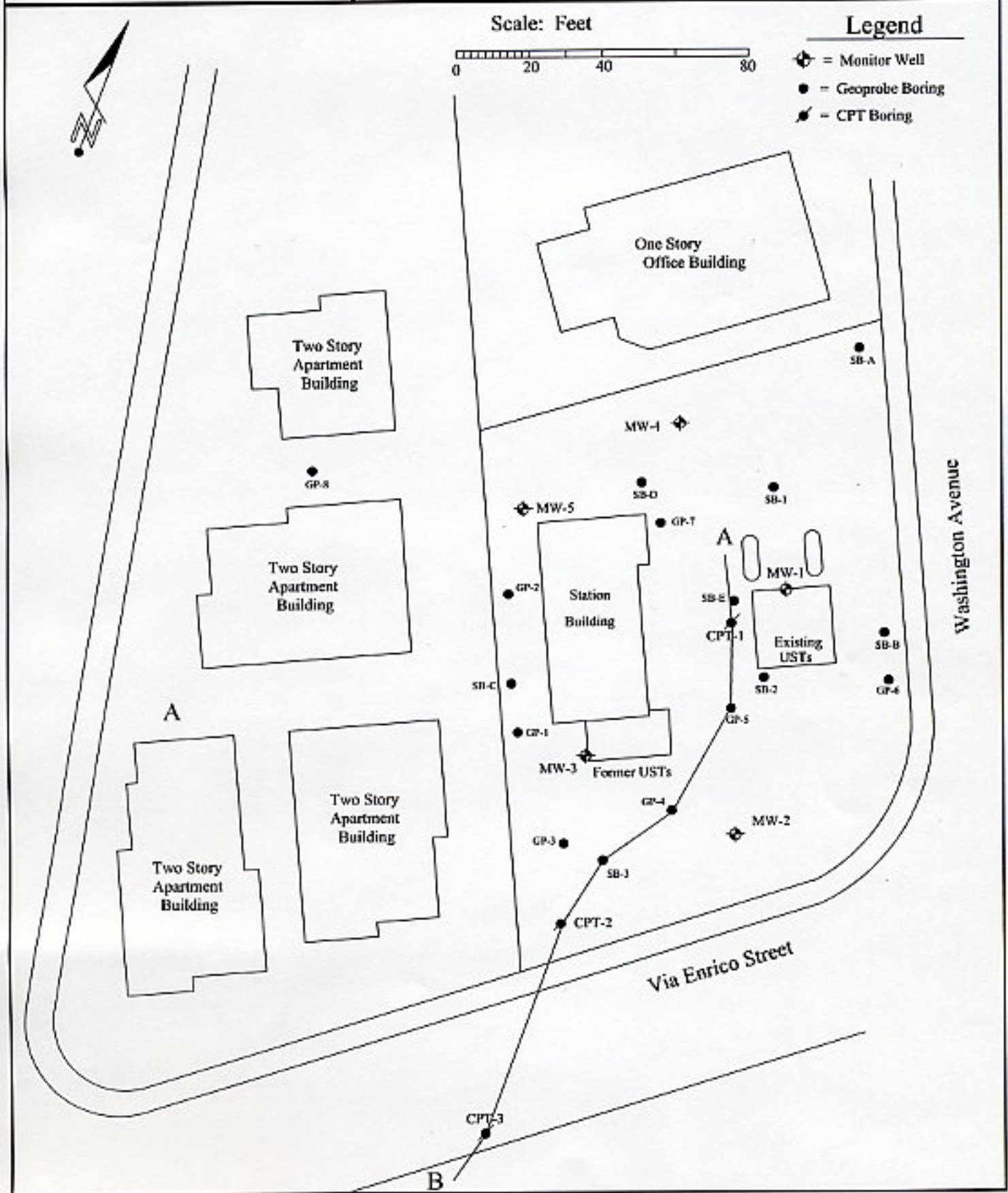
**Site Map**

Scale: Feet

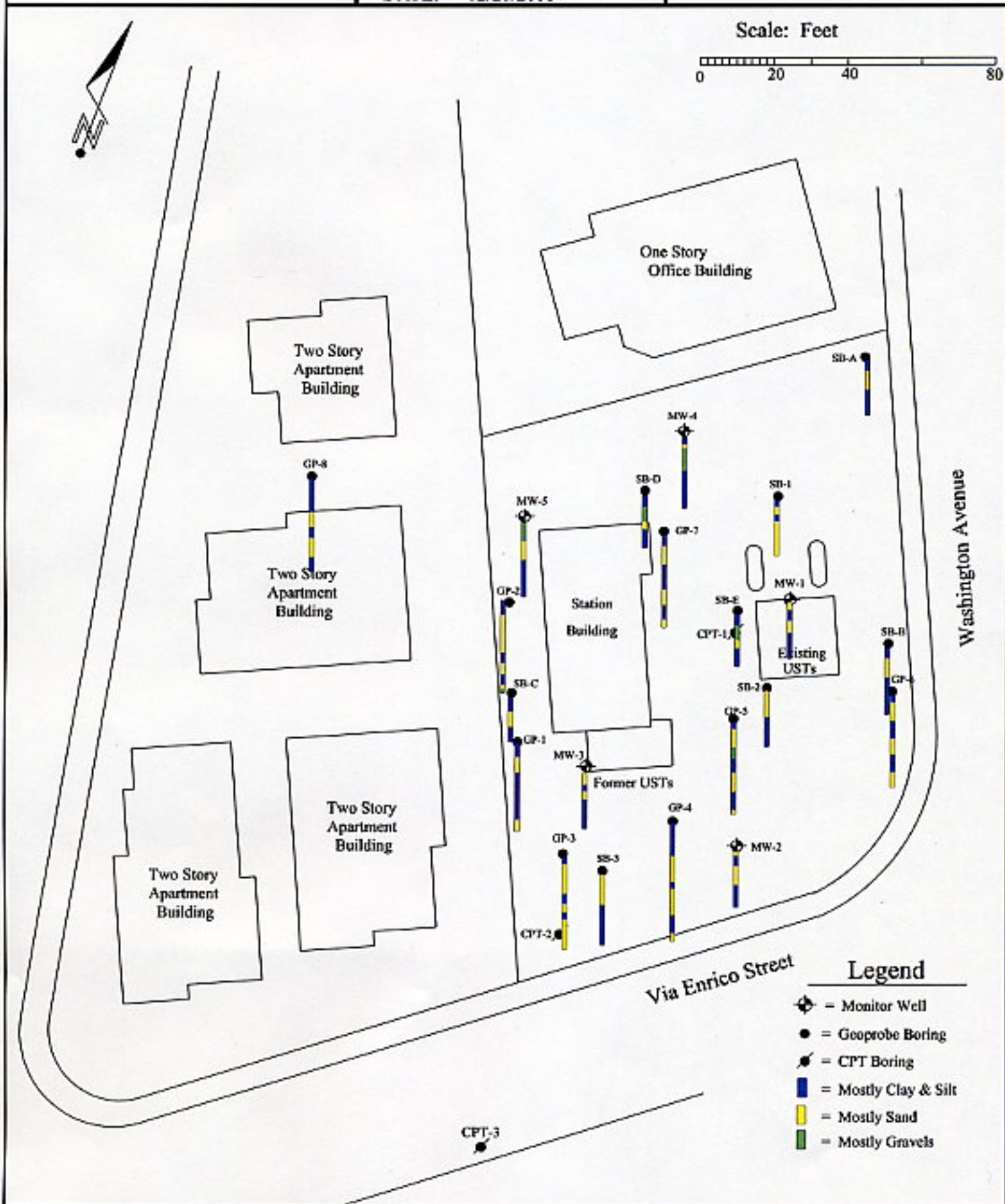
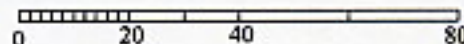


**Legend**

- = Monitor Well
- = Geoprobe Boring
- = CPT Boring



Scale: Feet

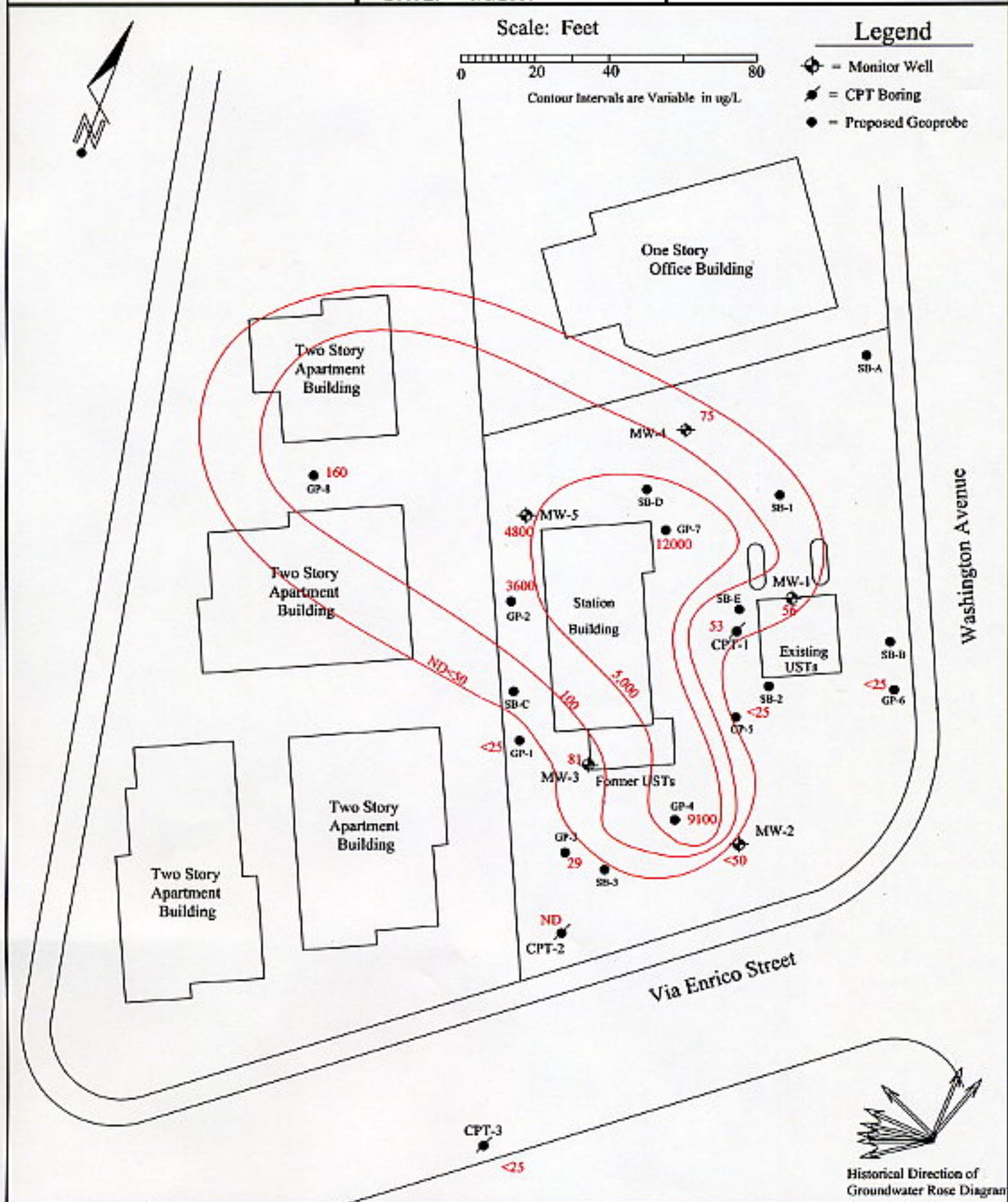


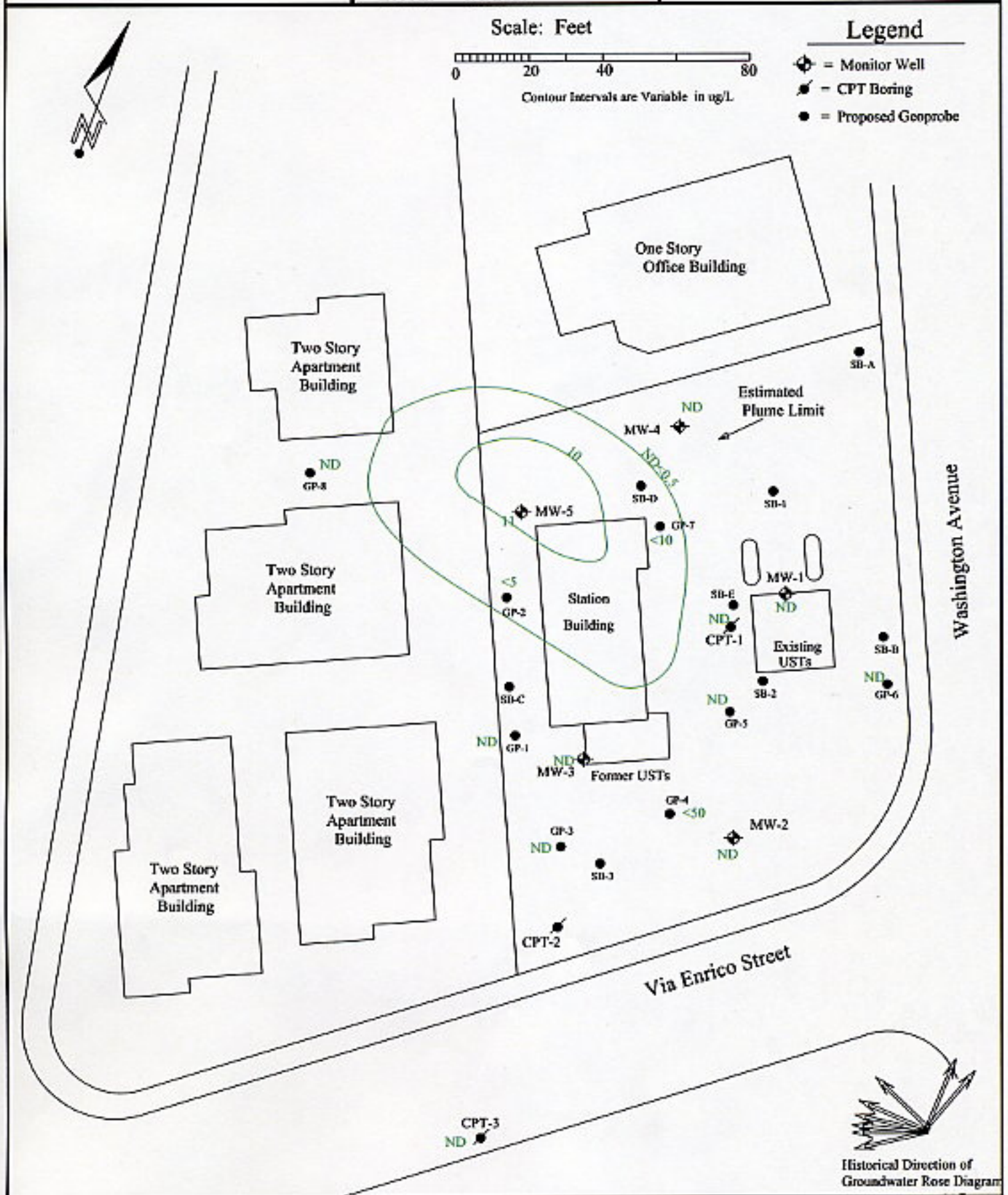
**Legend**

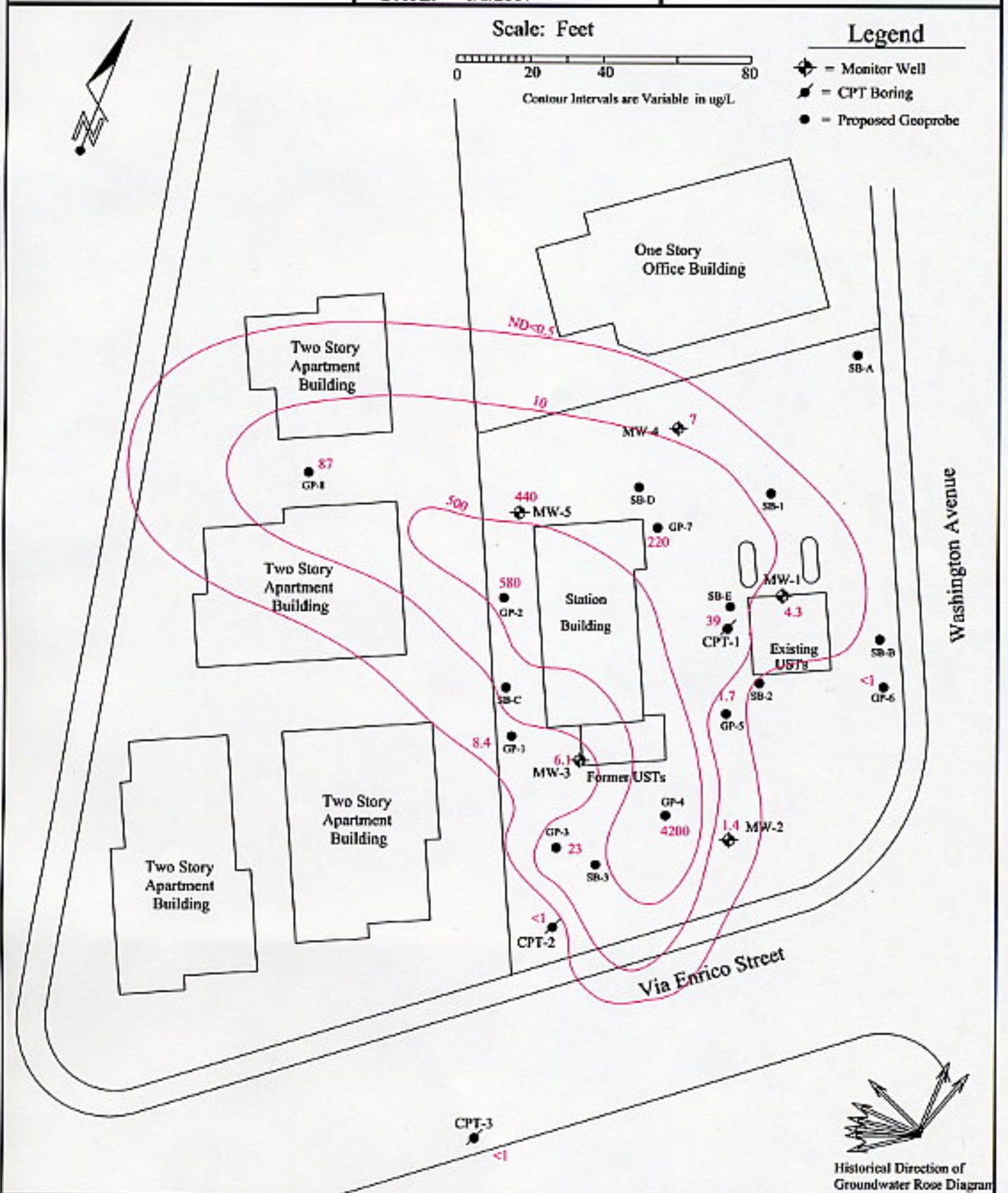
- ◆ = Monitor Well
- = Geoprobe Boring
- = CPT Boring
- = Mostly Clay & Silt
- = Mostly Sand
- = Mostly Gravels







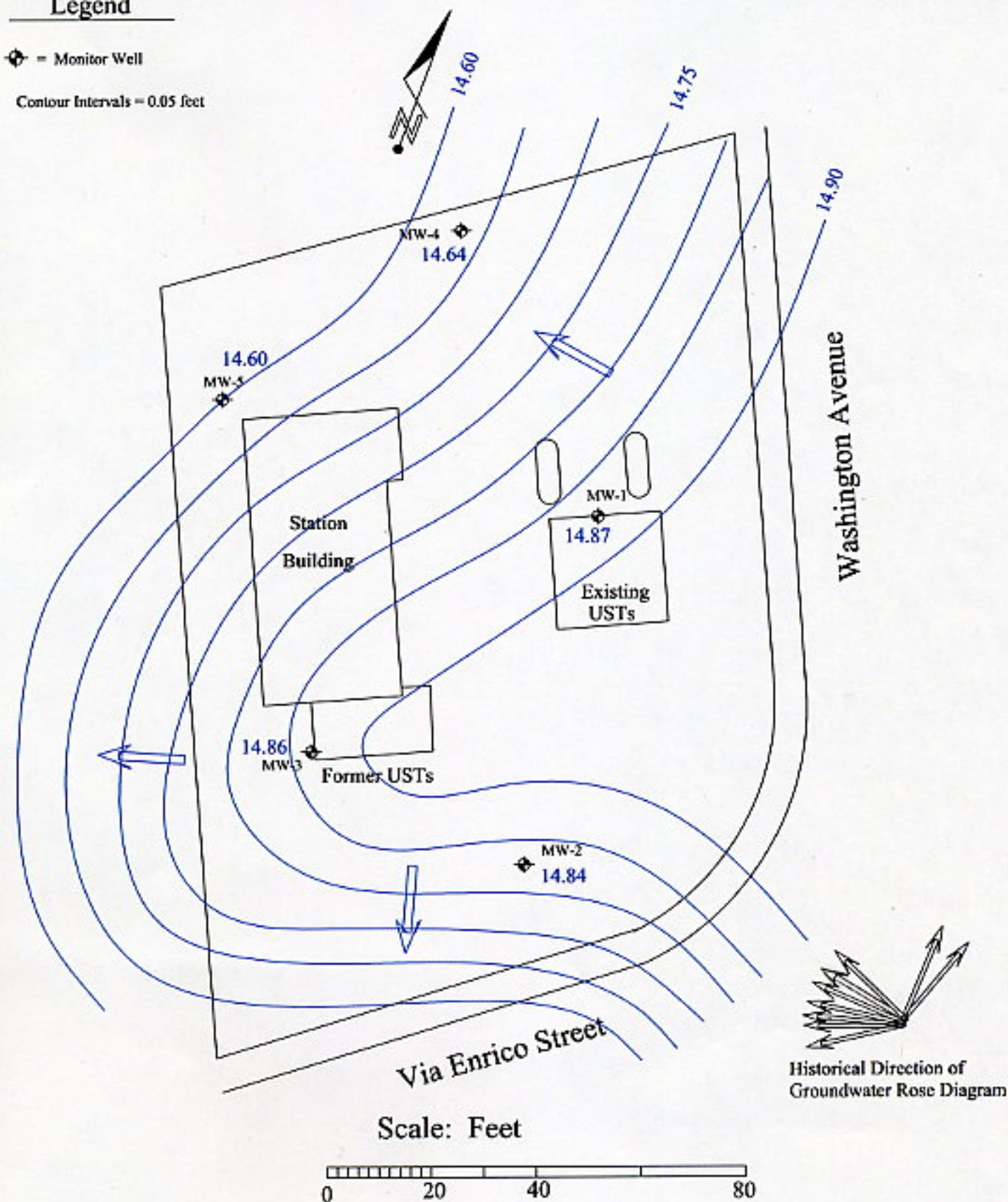




Legend

◆ = Monitor Well

Contour Intervals = 0.05 feet



**A P P E N D I X "C"**

**BORING LOGS**

**ENVIRO SOIL TECH CONSULTANTS**

ENVIRO SOIL TECH CONSULTANTS

BORING LOCATION 15595 Washington Avenue, San Lorenzo				GROUND SURFACE ELEVATION: TOP OF WELL CASING ELEVATION:									
DRILLING AGENCY Vironex, Inc.		DRILLER John McAssey		DATE STARTED: 10/24/06		DATE FINISHED: 10/24/06							
DRILLING EQUIPMENT Geoprobe				COMPLETION DEPTH (ft) 24 feet									
DRILLING METHOD Direct Push		DRILL BIT		HAMMER		SAMPLER 2" Polyethylene							
SIZE AND TYPE OF CASING				NUMBER OF SAMPLES		BULK: DRIVE:							
TYPE OF PERFORATION		FROM TO		WATER FIRST DEPTH		COMPL.: 24 hrs.							
SIZE AND TYPE OF PACK		FROM TO		LOGGED BY Clyde Hebbbron		CHECKED BY Lawrence Koo							
TYPE OF SEAL		TYPE FR TO		TYPE FR TO		<b>LOG OF BORING 702-GP-1</b>							
No. 1:				No. 3:									
No. 2:				No. 4:									
DEPTH (feet)	MATERIAL DESCRIPTION	USCS	SOIL GRAPHIC	WELL GRAPHIC	PID, ppm	WATER LEVEL	DEPTH (feet)	SAMPLES			INDEX PROPERTIES		
								NUMBER TYPE	POCKET PEN. hf	BLOWS/ foot	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)
0	Fill material.	FILL					0						
	Dark brown silt, firm.	ML											
5	Yellow-brown silty sand, loose.	SM			0		5						
	Yellow-brown silty sand, loose. More clayey at 7 feet.	ML											
10	Olive-gray clay (slightly plasticity) with trace of sand and cobbles.	CL			0		10						
	Occasionally sandy/gravelly stringers.												
15	Olive-gray silt (slightly plasticity) with trace of sand and cobbles.	ML					15						
	Olive-gray silty clay (slightly plasticity), more clayey than above.	CL-ML			0		20						
20	Olive-gray sand (very fine to medium grained) with trace of cobbles.	SM					20						
25	Boring terminated.						25						
30							30						
35							35						
12-99-702-SI						PROJECT NO. 12-99-702-SI			FIGURE:				

ENVIRO SOIL TECH CONSULTANTS

BORING LOCATION 15595 Washington Avenue, San Lorenzo		GROUND SURFACE ELEVATION: TOP OF WELL CASING ELEVATION:	
DRILLING AGENCY Vironex, Inc.	DRILLER John McAssey	DATE STARTED: 10/24/06	DATE FINISHED: 10/24/06
DRILLING EQUIPMENT Geoprobe		COMPLETION DEPTH (ft) 25 feet	
DRILLING METHOD Direct Push	DRILL BIT	HAMMER	SAMPLER 2" Polyethylene
SIZE AND TYPE OF CASING		NUMBER OF SAMPLES	BULK: DRIVE:
TYPE OF PERFORATION		FROM TO	WATER FIRST: DEPTH COMPL.: 24 hrs.
SIZE AND TYPE OF PACK		FROM TO	LOGGED BY Clyde Hebbroon CHECKED BY Lawrence Koo

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO	<b>LOG OF BORING 702-GP-2</b>
	No. 1.			No. 3:			
	No. 2.			No. 4:			

DEPTH (feet)	MATERIAL DESCRIPTION	USCS	SOIL GRAPHIC	WELL GRAPHIC	PID, ppm	WATER LEVEL	DEPTH (feet)	SAMPLES				INDEX PROPERTIES		
								NUMBER TYPE	POCKET PEN. hf	BLOWS/foot	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	
0	Fill material.	FILL					0							
	Dark brown silt with fine grained sand, loose.	ML												
5	Brown sand (very fine to fine grain, good sorting), loose.	SM					5							
10							10							
					50		13	2-						
15	Dark gray clay (plasticity), trace of sand and cobbles, hydrocarbon odor.	CL					15							
	Dark gray sand (very fine grained), fair hydrocarbons odor.	SC			105		17	2-						
20	Olive-gray plasticity clay.	CL			10		20	1-9%						
	Light brown fine to coarse grained sand.	SC			0		25	2-						
25	Gravel to gravelly mix ore (grades to slightly gravelly mixture). Boring terminated.						25	1-11						
30							30							
35							35							

ENVIRO SOIL TECH CONSULTANTS

BORING LOCATION	15595 Washington Avenue, San Lorenzo		GROUND SURFACE ELEVATION: TOP OF WELL CASING ELEVATION:	
DRILLING AGENCY	Vironex, Inc.	DRILLER	John McAssey	
DRILLING EQUIPMENT	Geoprobe		DATE STARTED: 10/24/06 DATE FINISHED: 10/24/06	
DRILLING METHOD	Direct Push	DRILL BIT	COMPLETION DEPTH (ft) 24 feet	
SIZE AND TYPE OF CASING			NUMBER OF SAMPLES	BULK: DRIVE:
TYPE OF PERFORATION	FROM	TO	WATER FIRST: DEPTH	COMPL.: 24 hrs.
SIZE AND TYPE OF PACK	FROM	TO	LOGGED BY	CHECKED BY
			Clyde Hebbron	Lawrence Koo

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO	<b>LOG OF BORING 702-GP-3</b>
	No. 1:			No. 3:			
	No. 2:			No. 4:			

DEPTH (feet)	MATERIAL DESCRIPTION	USCS	SOIL GRAPHIC	WELL GRAPHIC	PID, ppm	WATER LEVEL	DEPTH (feet)	SAMPLES			INDEX PROPERTIES		
								NUMBER	POCKET	BLOWS/	MOISTURE	DRY	UNCONFINED
								TYPE	PEN. 1bf	foot	CONTENT (%)	DENSITY (pcf)	COMPRESSIVE STRENGTH (pcf)
0	Fill material.	FILL	[Cross-hatched]				0						
5	Dark gray clayey sand with trace of cobbles.	SC	[Diagonal lines]				5						
	Light brown sand (fine medium grain, well-sorted), loose.	SP	[Dotted]		5		3-7						
10	Dark gray clay (slightly plasticity).	CL	[Horizontal lines]		5		10						
	Light brown silty clayey sand (very fine grain).	SC-SM	[Diagonal lines]										
15	Dark gray clay (slightly plasticity) with trace of sand and cobbles.	CL	[Horizontal lines]				15						
	Brown sand (fine to medium grain, well sorted). Low sample recovery.	SP	[Diagonal lines]										
20							20						
25	Boring terminated.						25						
30							30						
35							35						

12-99-702-SI

PROJECT NO. 12-99-702-SI

FIGURE:



ENVIRO SOIL TECH CONSULTANTS

BORING LOCATION	15595 Washington Avenue, San Lorenzo		GROUND SURFACE ELEVATION:	
DRILLING AGENCY	Vironex, Inc.	DRILLER	John McAssey	TOP OF WELL CASING ELEVATION:
DRILLING EQUIPMENT	Geoprobe		DATE STARTED:	10/24/06
DRILLING METHOD	Direct Push	DRILL BIT	DATE FINISHED:	10/24/06
SIZE AND TYPE OF CASING			COMPLETION DEPTH (ft)	32 feet
TYPE OF PERFORATION	FROM	TO	WATER FIRST DEPTH	COMPL: 24 hrs.
SIZE AND TYPE OF PACK	FROM	TO	LOGGED BY	Clyde Hebbbron
			CHECKED BY	Lawrence Koo

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO	<b>LOG OF BORING 702-GP-4</b>
	No. 1:			No. 3:			
	No. 2:			No. 4:			

DEPTH 0 (feet)	MATERIAL DESCRIPTION	USCS	SOIL GRAPHIC	WELL GRAPHIC	PID, ppm	WATER LEVEL	DEPTH (feet)	SAMPLES			INDEX PROPERTIES		
								NUMBER TYPE	POCKET PEN. lbf	BLOWS/ foot	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)
0	Fill material.	FILL	[Cross-hatched pattern]				0						
5	Dark gray gravelly clay (low plasticity ).	CL	[Diagonal lines pattern]		60		5						
	Dark gray gravelly clay (low plasticity) , less gravel and more coarse sand.						4-7						
							4-8						
10	Dark gray clayey sand (fine to coarse grain), hydrocarbon odor.	SC	[Dotted pattern]				10						
	Strong hydrocarbon odor at contact.												
15	Dark gray clay (slightly plasticity), slightly hydrocarbon odor.	CL	[Diagonal lines pattern]		1500		15						
					5		4-14						
	Dark gray sandy (very fine) clayey (low plasticity) silt.	ML	[Vertical lines pattern]										
20	Dark gray sand (very fine to medium grain), hydrocarbon odor.	SC	[Dotted pattern]		80		20						
							4-19						
25	Brown sand (fine-grained, well-sorted).	SP	[Dotted pattern]		5		25						
							4-23						
30	Light brown clay (slightly plasticity).	CL	[Diagonal lines pattern]				30						
							4-27						
35	Light brown clayey sand (very fine to fine grain).	SC	[Dotted pattern]		0		35						
	Boring terminated.						4-31						

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PROJECT NO. 12-99-702-SI

FIGURE:

ENVIRO SOIL TECH CONSULTANTS

BORING LOCATION	15595 Washington Avenue, San Lorenzo		GROUND SURFACE ELEVATION:	
DRILLING AGENCY	Vironex, Inc.	DRILLER	John McAssey	TOP OF WELL CASING ELEVATION:
DRILLING EQUIPMENT	Geoprobe		DATE STARTED:	10/24/06
DRILLING METHOD	Direct Push	DRILL BIT	DATE FINISHED:	10/24/06
SIZE AND TYPE OF CASING			COMPLETION DEPTH (ft)	25 feet
TYPE OF PERFORATION	FROM	TO	NUMBER OF SAMPLES	BULK: DRIVE:
SIZE AND TYPE OF PACK	FROM	TO	WATER FIRST DEPTH	COMPL: 24 hrs.
			LOGGED BY	Clyde Hebbbron
			CHECKED BY	Lawrence Koo

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO	<b>LOG OF BORING 702-GP-5</b>
	No. 1:			No. 3:			
	No. 2:			No. 4:			

DEPTH (feet)	MATERIAL DESCRIPTION	USCS	SOIL GRAPHIC	WELL GRAPHIC	PID, ppm	WATER LEVEL	DEPTH (feet)	SAMPLES				INDEX PROPERTIES		
								NUMBER TYPE	POCKET PEN. lbf	BLOWS/foot	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	
0	Fill material.	FILL					0							
	Dark gray silty sand.	SM												
5	Dark brown sand (fine to medium grain, well sorted), coarse downward.	SP					5							
	Slightly clayey, sandy gravel.	GC					5-9							
10	Dark gray clay (slightly plasticity).	CL					10							
	Gray-brown clayey sand (very fine to fine grained).	SC			0		5-14							
15	Dark gray clay (low plasticity).	CL					15							
20	Gray-brown silt with trace of coarse sand and cobbles.	ML					20							
	Light brown fine grained sand.	SP					5-24							
25	Boring terminated.						25							
30							30							
35							35							

12-99-702-SI

PROJECT NO. 12-99-702-SI

FIGURE:

ENVIRO SOIL TECH CONSULTANTS

BORING LOCATION	15595 Washington Avenue, San Lorenzo		GROUND SURFACE ELEVATION: TOP OF WELL CASING ELEVATION:	
DRILLING AGENCY	Vironex, Inc.	DRILLER	John McAssey	
DRILLING EQUIPMENT	Geoprobe		COMPLETION DEPTH (ft)	24 feet
DRILLING METHOD	Direct Push	DRILL BIT	HAMMER	SAMPLER 2" Polyethylene
SIZE AND TYPE OF CASING			NUMBER OF SAMPLES	BULK: DRIVE:
TYPE OF PERFORATION	FROM	TO	WATER FIRST: DEPTH	COMPL: 24 hrs.
SIZE AND TYPE OF PACK	FROM	TO	LOGGED BY	Clyde Hebbbron CHECKED BY Lawrence Koo

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO	<b>LOG OF BORING 702-GP-6</b>
	No. 1:			No. 3:			
	No. 2:			No. 4:			

DEPTH (feet)	MATERIAL DESCRIPTION	USCS	SOIL GRAPHIC	WELL GRAPHIC	PID, ppm	WATER LEVEL	DEPTH (feet)	SAMPLES			INDEX PROPERTIES		
								NUMBER TYPE	POCKET PEN 1/4'	BLOWS/ foot	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)
0	Fill material.	FILL					0						
5	Clayey sand (very fine to fine-grain).	SC					5						
10	Dark gray clay (slightly plasticity) with trace of sand.	CL					10						
15	Light brown sand (fine to medium grain, moderately well-sorted), loose.	SC			0		15						
20	Gray-brown silt (firm, non-plasticity) with some sand.	ML					20						
25	Brown very clayey sand (fine to fine-grained), loose.	SC					25						
35	Boring terminated.						35						

12-99-702-SI

PROJECT NO. 12-99-702-SI

FIGURE:



**ENVIRO SOIL TECH CONSULTANTS**

BORING LOCATION 15595 Washington Avenue, San Lorenzo		GROUND SURFACE ELEVATION: TOP OF WELL CASING ELEVATION:	
DRILLING AGENCY Vironex, Inc.	DRILLER John McAssey	DATE STARTED: 10/24/06	DATE FINISHED: 10/24/06
DRILLING EQUIPMENT Geoprobe		COMPLETION DEPTH (ft) 25 feet	
DRILLING METHOD Direct Push	DRILL BIT	HAMMER	SAMPLER 2" Polyethylene
SIZE AND TYPE OF CASING		NUMBER OF SAMPLES	BULK: DRIVE:
TYPE OF PERFORATION	FROM TO	WATER FIRST: DEPTH	COMPL: 24 hrs.
SIZE AND TYPE OF PACK	FROM TO	LOGGED BY Clyde Hebbbron	CHECKED BY Lawrence Koo

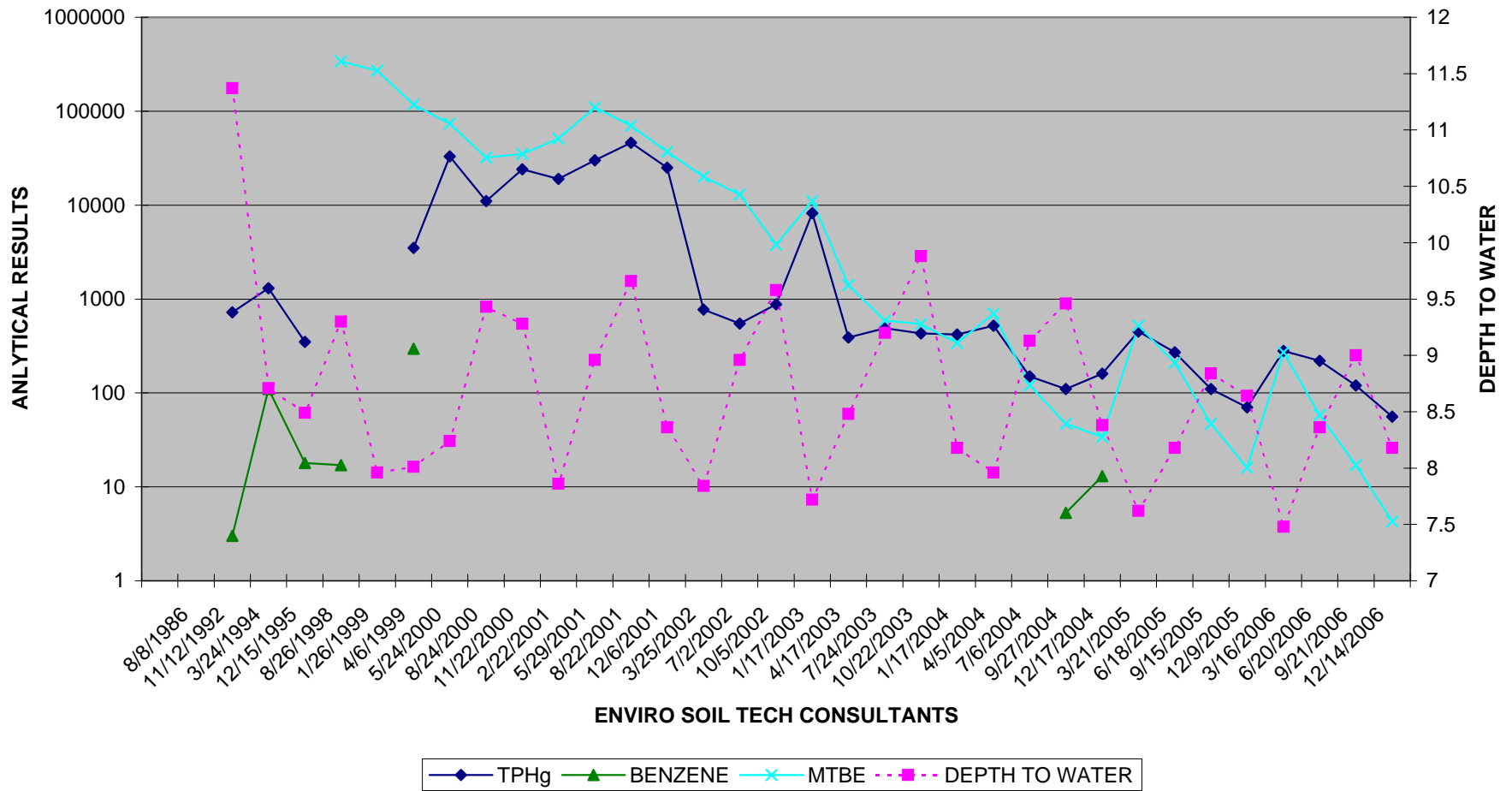
TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO	<b>LOG OF BORING 702-GP-8</b>
	No. 1:			No. 3:			
	No. 2:			No. 4:			

DEPTH (feet)	MATERIAL DESCRIPTION	USCS	SOIL GRAPHIC	WELL GRAPHIC	PID, ppm	WATER LEVEL	DEPTH (feet)	SAMPLES			INDEX PROPERTIES		
								NUMBER	POCKET PEN 1st	BLOWS/foot	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (pcf)
0	Fill material.	FILL	[Cross-hatched pattern]				0						
0-5	Dark brown silt with trace of cobbles.	ML	[Vertical line pattern]				5						
10	Gray clayey sand (very fine grained).	SC	[Diagonal line pattern]				10	8-10					
15	Numerous thin (6" to 12") alternating silt and very fine sand.	ML	[Vertical line pattern]				15	8-15					
20		SC	[Diagonal line pattern]				20						
25	Gray-brown clay, 10" sand stringer at 22 feet.	CL	[Diagonal line pattern]				25	8-22					
25	Boring terminated.						35						

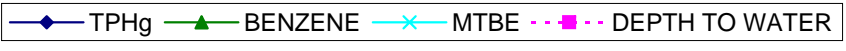
**A P P E N D I X "D"**

**HYDROGRAPHS**

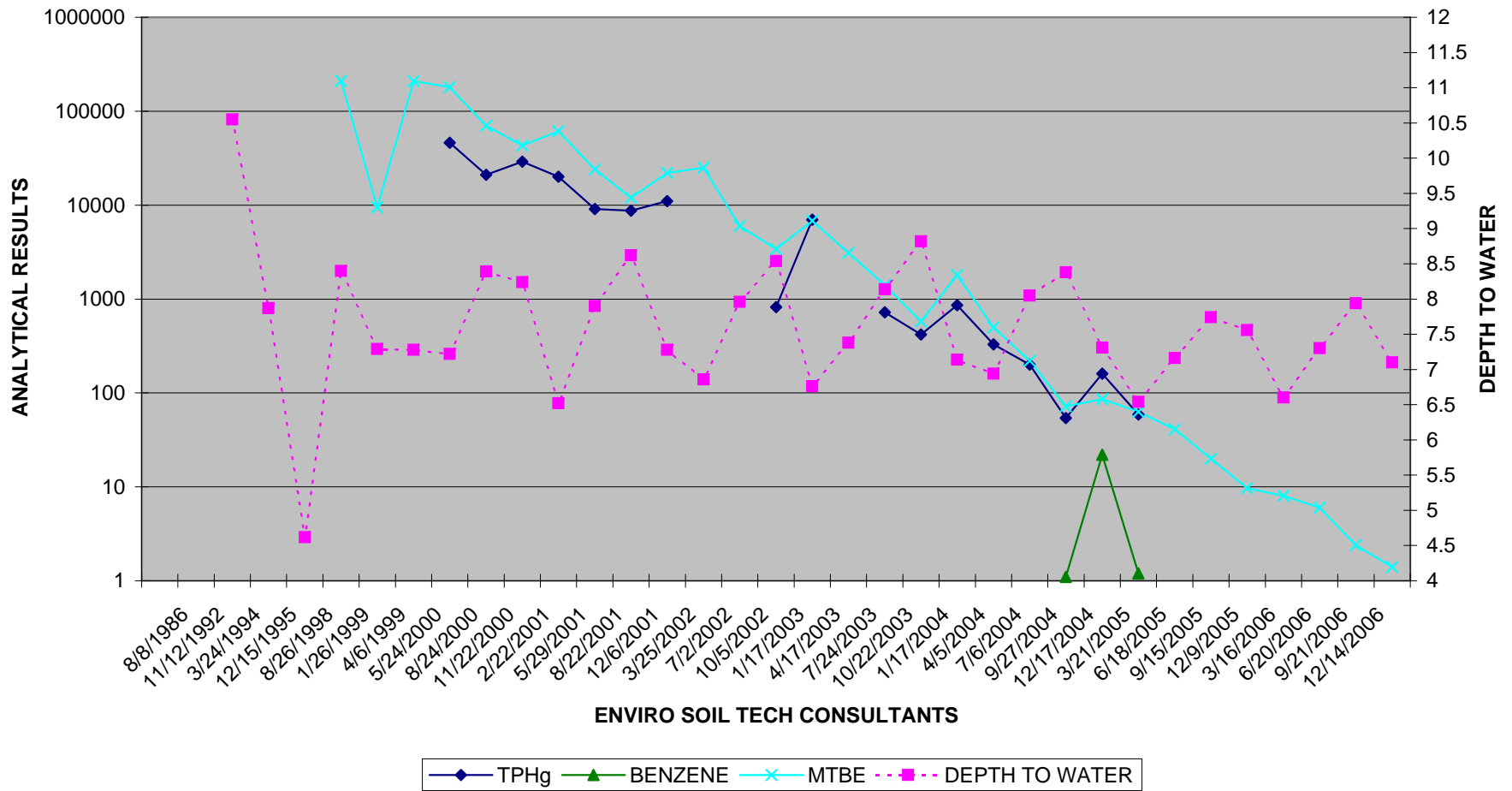
**File No.: 12-99-702-SI**  
**TPHg, BENZENE & MTBE FOR MW-1 (µg/L)**  
**AND DEPTH TO WATER MEASUREMENT (Feet)**



ENVIRO SOIL TECH CONSULTANTS

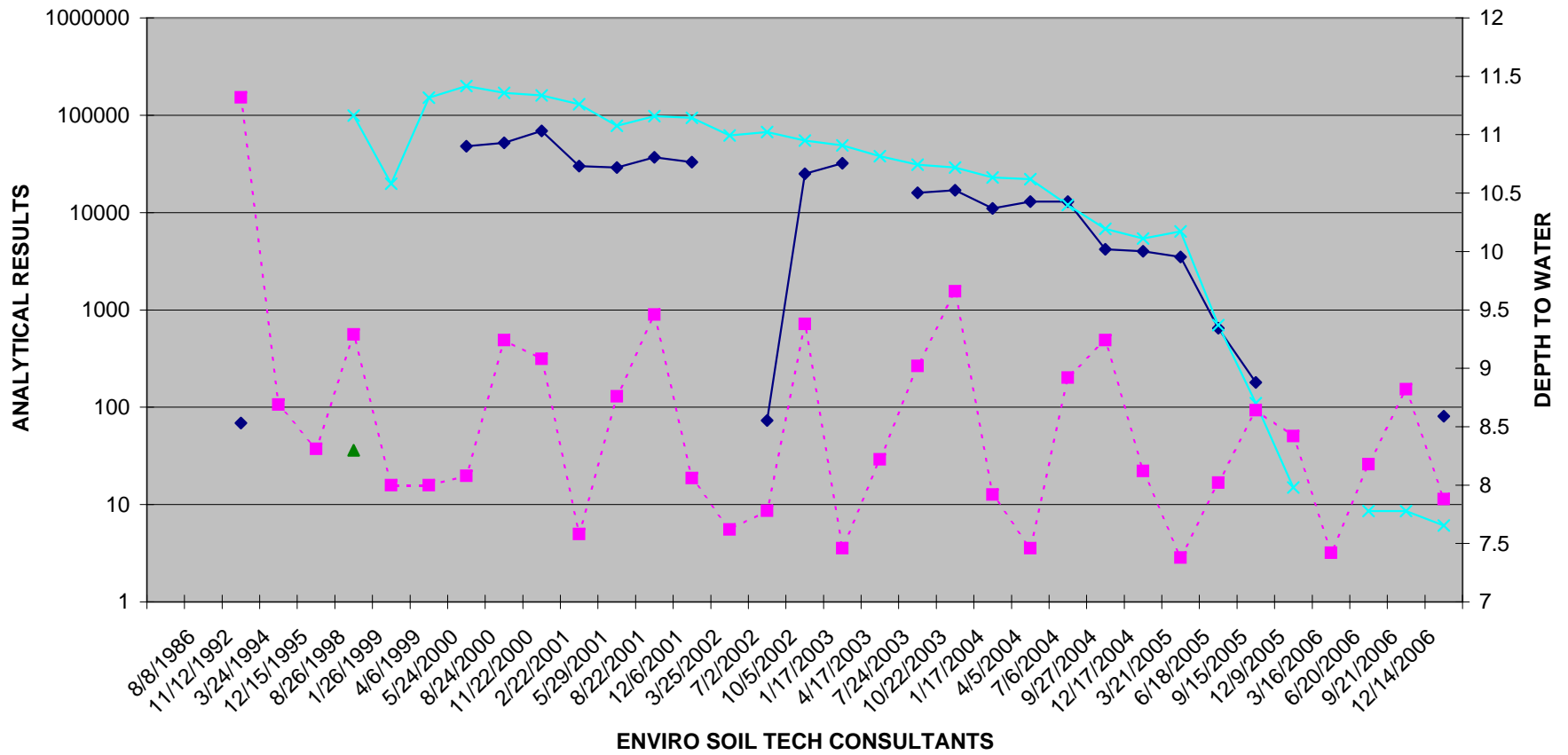


**File No.: 12-99-702-SI**  
**TPHg, BENZENE & MTBE RESULTS FOR MW-2 (µg/L)**  
**AND DEPTH TO WATER MEASUREMENT (Feet)**



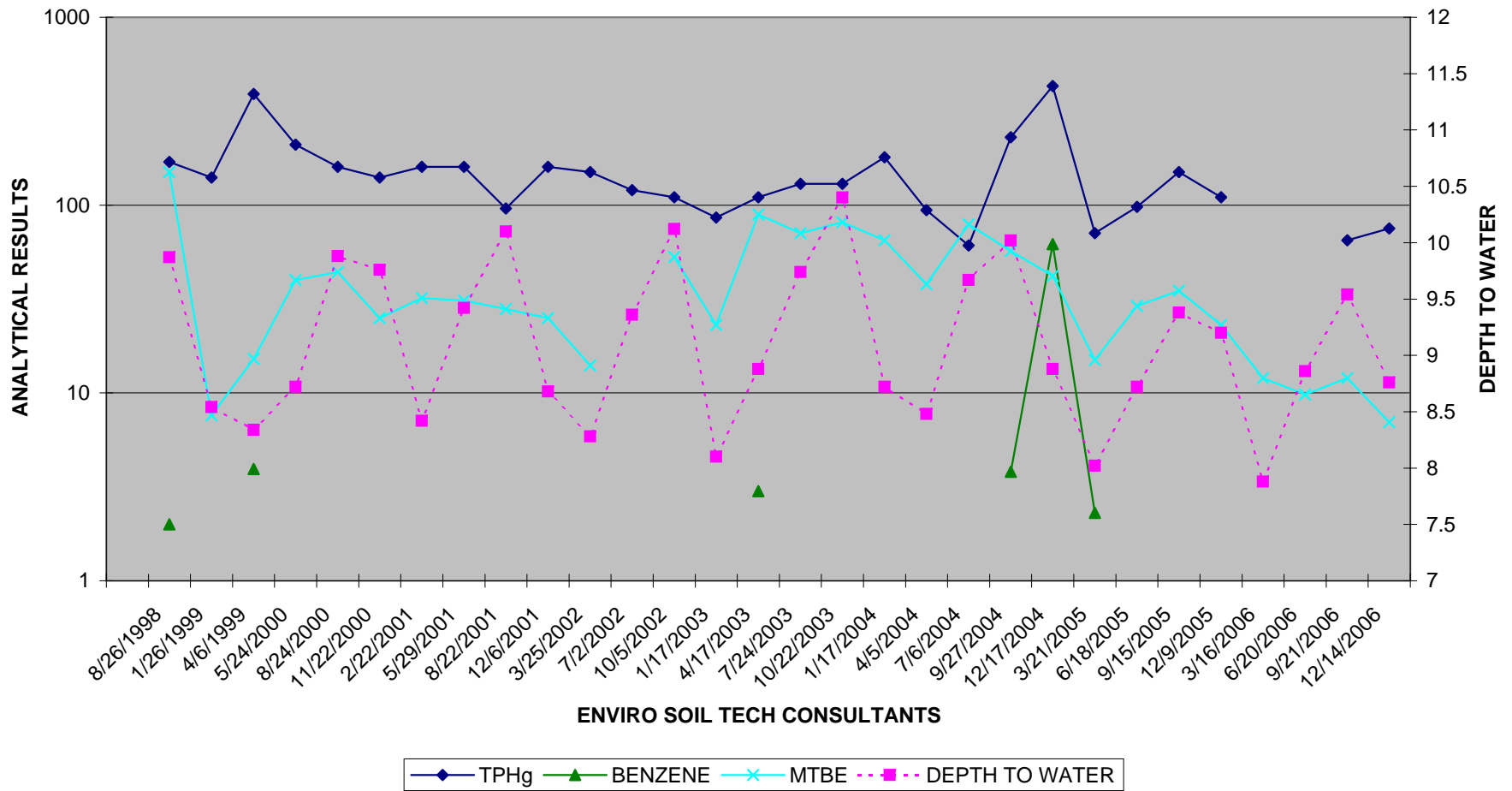


**File No.: 12-99-702-SI**  
**TPHg, BENZENE & MTBE RESULTS FOR MW-3 (µg/L)**  
**AND DEPTH TO WATER MEASUREMENT (Feet)**

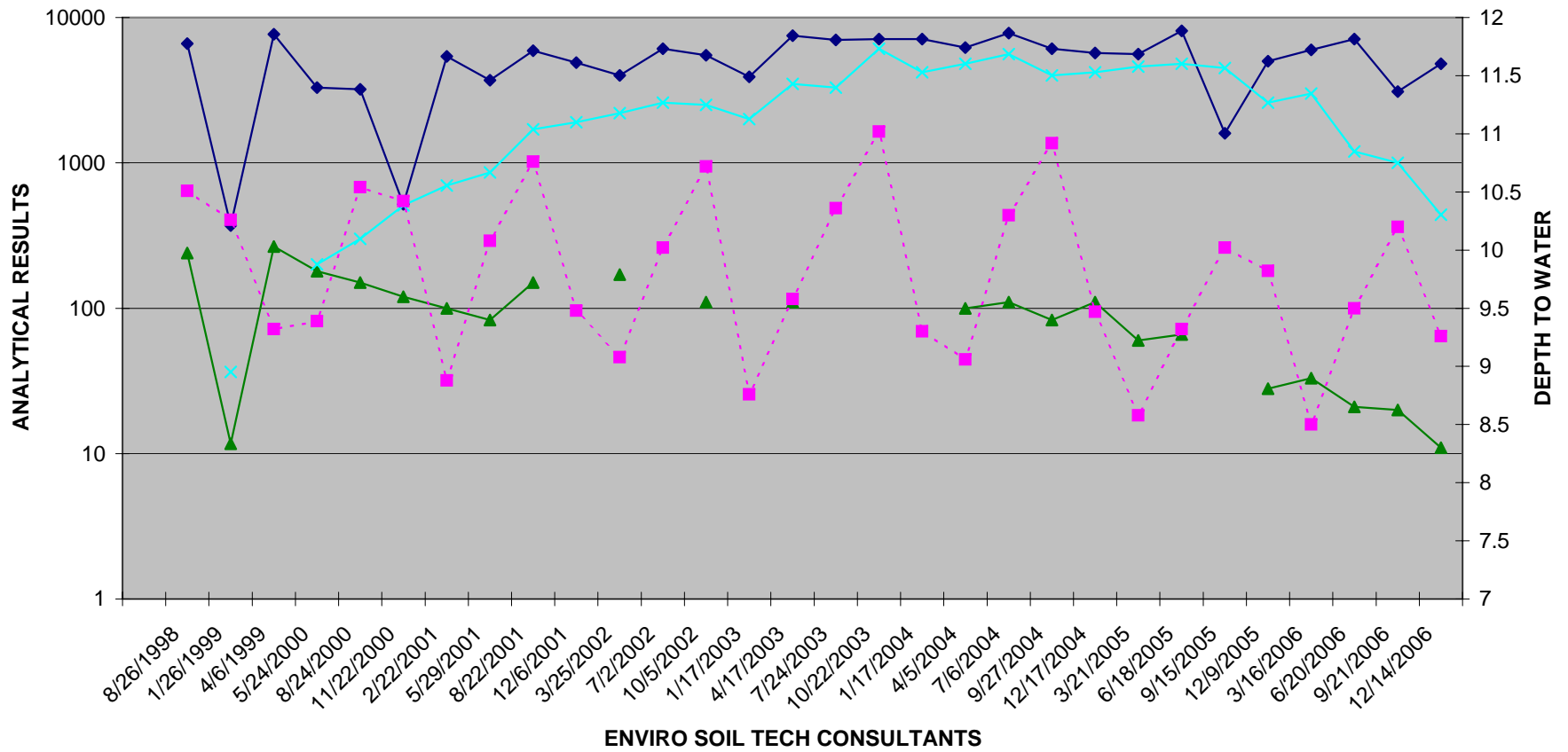


◆ TPHg    ▲ BENZENE    × MTBE    - - - ■ - - - DEPTH TO WATER

File No.: 12-99-702-SI  
**TPHg, BENZENE & MTBE RESULTS FOR MW-4 (µg/L)  
 AND DEPTH TO WATER MEASUREMENT (Feet)**



**File No.: 12-99-702-SI**  
**TPHg, BENZENE & MTBE RESULTS FOR MW-5 (µg/L)**  
**AND DEPTH TO WATER MEASUREMENT (Feet)**



ENVIRO SOIL TECH CONSULTANTS

TPHg    BENZENE    MTBE    DEPTH TO WATER

**A P P E N D I X "E"**

**STANDARD OPERATION PROCEDURES**

**ENVIRO SOIL TECH CONSULTANTS**

## **DRILLING AND SOIL SAMPLING PROCEDURE**

A direct push technology (Geoprobe) tool was used in drilling the boreholes to the desired depths.

Prior to drilling, all drilling equipment was thoroughly steam-cleaned to minimize the possibility of cross-contamination and/or vertical migration of possible contaminants.

In addition, sampling equipment was washed between samples with Tri-sodium Phosphate (TSP) solution or an equivalent EPA-approved detergent followed by a rinse in distilled water.

During the drilling operation, undisturbed soil samples were taken from the required depth by forcing a 2-inch sampler lined with polyethylene or brass tubes driven into undisturbed sediments at the bottom of the borehole by means of hydraulic push technologies.

The selected sampling tubes were immediately trimmed, the ends covered tightly with aluminum foil and plastic caps, sealed with tape labeled, placed in a plastic bag and stored in a cold ice chest in order to minimize the escape of any volatile present in the samples. Soil samples were sent to a state-certified hazardous waste laboratory for analysis accompanied by a chain-of-custody record.

Soil samples collected at each sampling interval were inspected for any possible contamination (odor or peculiar colors). Soil vapor concentrations were measured in the field by using a Photoionization Detector (PID), Photovac Tip Air Analyzer. The soil sample was sealed in a Zip-Loc plastic bag and placed in the sun to enhance volatilization of the hydrocarbons from the sample. The purpose of this field analysis is to qualitatively determine the presence or absence of hydrocarbons and to establish which soil samples were analyzed at the laboratory. The data was recorded on the drilling log at the depth corresponding to the sampling point.

Other soil samples may be collected to document the stratigraphy and estimate relative permeability of the subsurface materials.

Soil tailings that are obtained during drilling were stored at the site, pending the analytical test results to determine proper disposal.

## **GROUNDWATER SAMPLING**

Prior to collection of groundwater samples, all of the sampling equipment (i.e. bailer, cables, bladder pump, discharge lines and etc...) was cleaned by pumping TSP water solution followed by distilled water.

Prior to purging, the well “Water Sampling Field Survey Forms” was filled out (depth to water and total depth of water column will be measured and recorded). The well then was bailed or pumped to remove four to ten well volumes or until the discharged water temperature, conductivity and pH stabilized. “Stabilized” is defined as three consecutive readings within 15% of one another.

The groundwater sample was collected when the water level in the well recovered to 80% of its static level.

Forty milliliter (ml.) glass volatile organic analysis (VOA) vials with Teflon septa was used as sample containers. The groundwater sample was being decanted into each VOA vial in such a manner that there was a meniscus at the top. The cap quickly was placed over the top of the vial and securely tightened. The VOA vial was then be inverted and tapped to see if air bubbles is present. If none is present, then the sample was labeled and refrigerated for delivery under chain-of-custody to the laboratory. The label information has included a sample identification number, job identification number, date, time, type of analysis requested and the sampler’s name.

**A P P E N D I X "F"**

**CPT DRILING REPORT**

**ENVIRO SOIL TECH CONSULTANTS**





# GREGG IN SITU, INC.

GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION SERVICES

November 3, 2006

Enviro Soil Tech Consultants  
Attn: Dianna Nguyen  
131 Tully Rd.  
San Jose, California 94111

Subject: CPT Site Investigation  
Cal gas/Valero  
San Leandro, California  
GREGG Project Number: 06-375MA

Dear Ms. Nguyen:

The following report presents the results of GREGG Drilling & Testing's Cone Penetration Test investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	<input checked="" type="checkbox"/>
2	Pore Pressure Dissipation Tests	(PPD)	<input checked="" type="checkbox"/>
3	Seismic Cone Penetration Tests	(SCPTU)	<input type="checkbox"/>
4	Resistivity Cone Penetration Tests	(RCPTU)	<input type="checkbox"/>
5	UVIF Cone Penetration Tests	(UVIFCPTU)	<input checked="" type="checkbox"/>
6	Groundwater Sampling	(GWS)	<input checked="" type="checkbox"/>
7	Soil Sampling	(SS)	<input type="checkbox"/>
8	Vapor Sampling	(VS)	<input type="checkbox"/>
9	Vane Shear Testing	(VST)	<input type="checkbox"/>
10	SPT Energy Calibration	(SPTC)	<input type="checkbox"/>

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact our office at (925) 313-5800.

Sincerely,  
GREGG Drilling & Testing, Inc.

Mary Walden  
Operations Manager

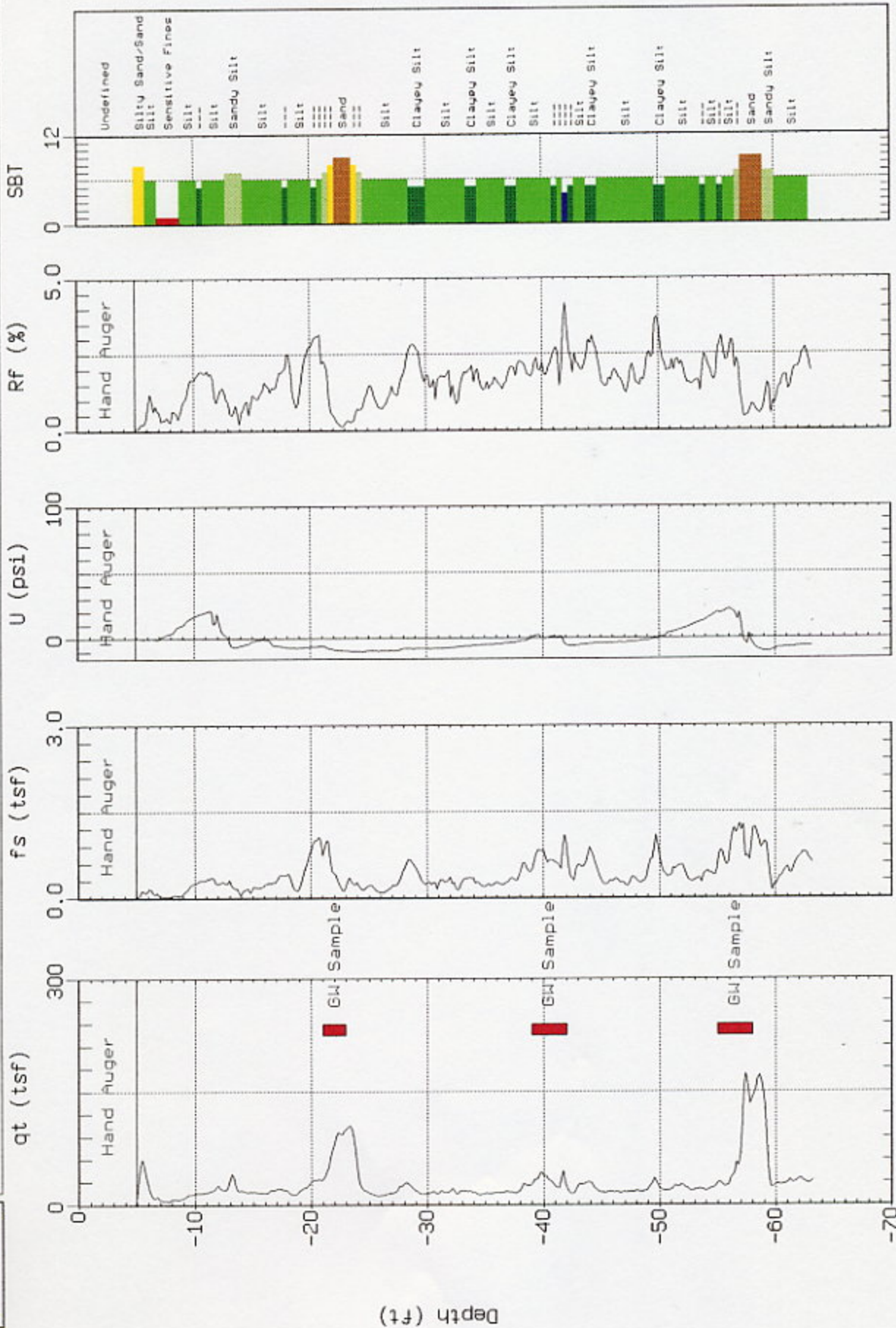




# ENVIRO SOIL TECH

Site: CAL GAS/VALERO  
Location: CPT-01

Geologist: U.CHERVEN  
Date: 11:02:106 09:37



SBT: Soil Behavior Type (Robertson 1990)

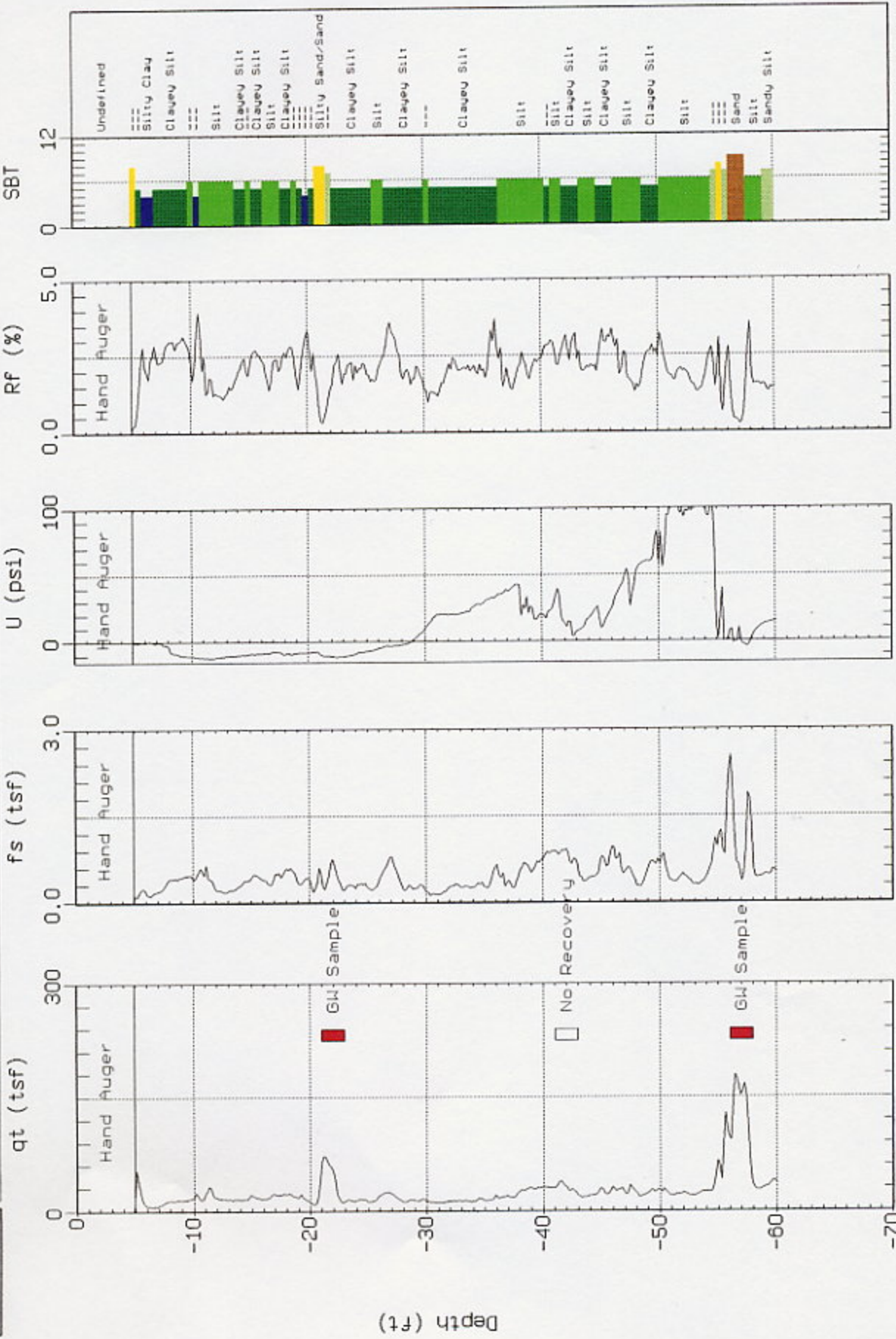
Max. Depth: 63.16 (ft)  
Depth Inc.: 0.164 (ft)



# ENVIRO SOIL TECH

Site: CAL GAS/UALERO  
Location: CPT-02

Geologist: U.CHERUEN  
Date: 11:02:106 14:37



SBT: Soil Behavior Type (Robertson 1990)

Max. Depth: 60.04 (ft)  
Depth Inc.: 0.164 (ft)

Depth (ft)

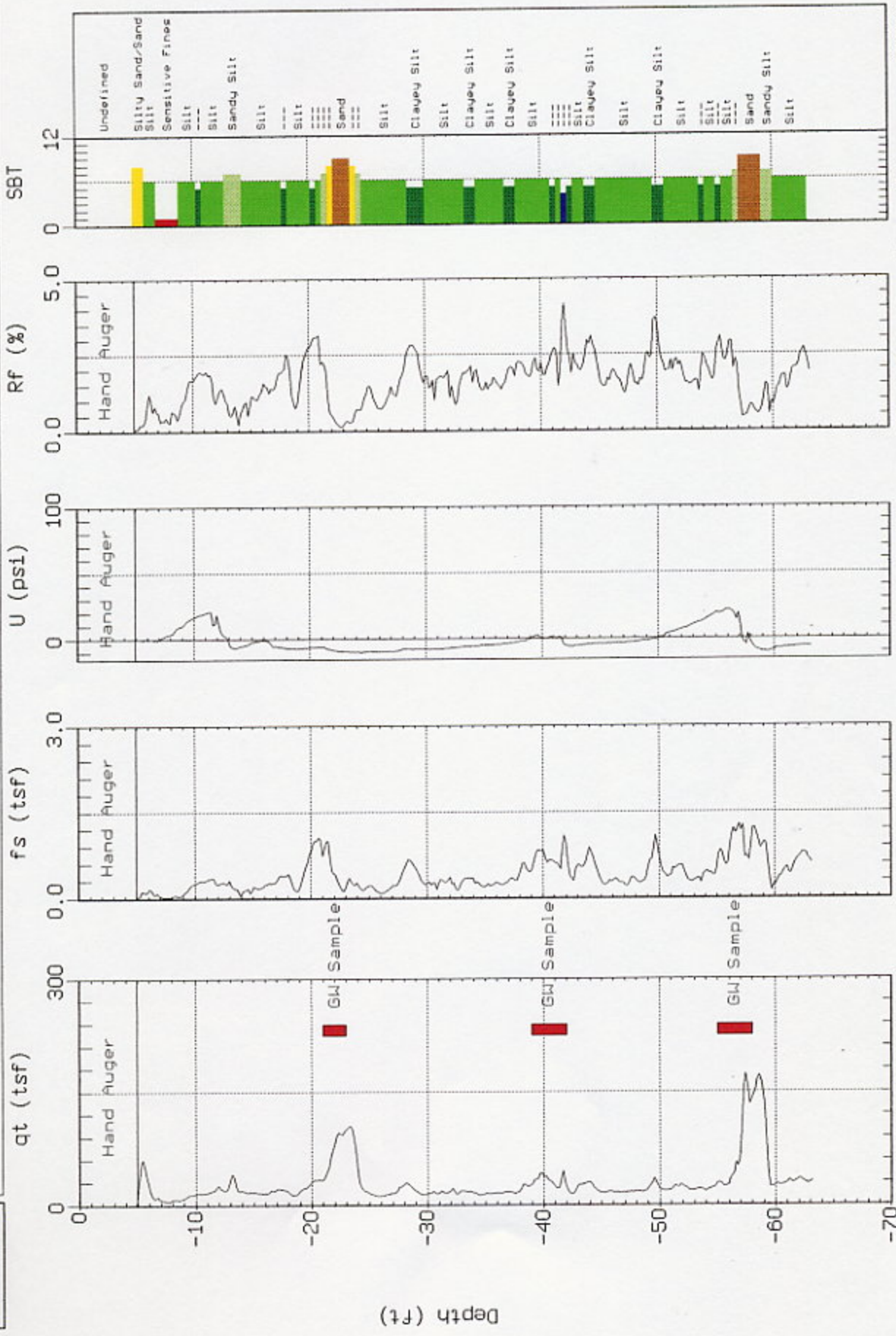




# ENVIRO SOIL TECH

Site: CAL GAS/VALERO  
Location: CPT-01

Geologist: U.CHERVEN  
Date: 11:02:106 09:37



Max. Depth: 63.16 (ft)  
Depth Inc.: 0.164 (ft)

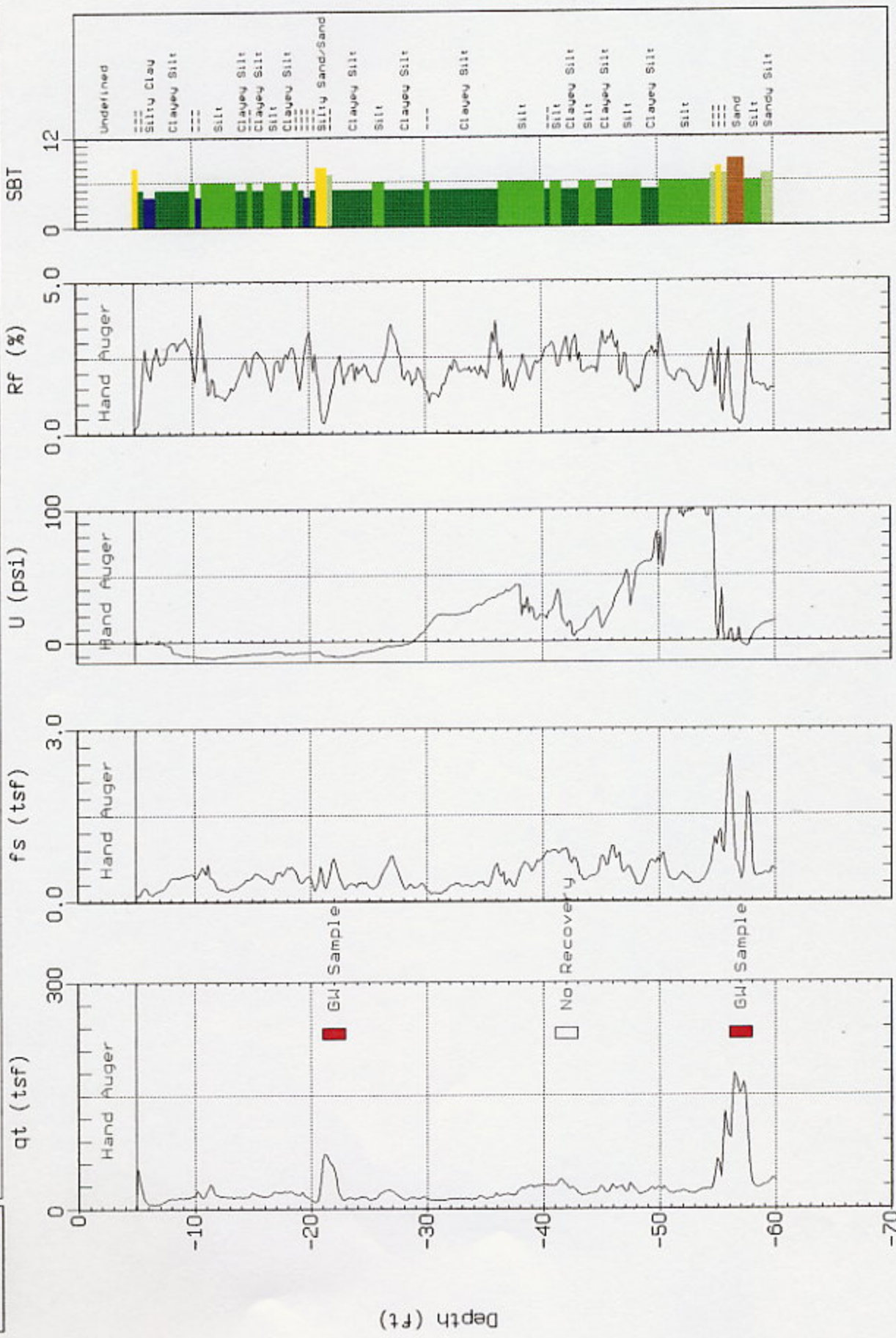
SBT: Soil Behavior Type (Robertson 1990)



# ENVIRO SOIL TECH

Site: CAL GAS/VALERO  
Location: CPT-02

Geologist: U.CHERVEN  
Date: 11:02:106 14:37



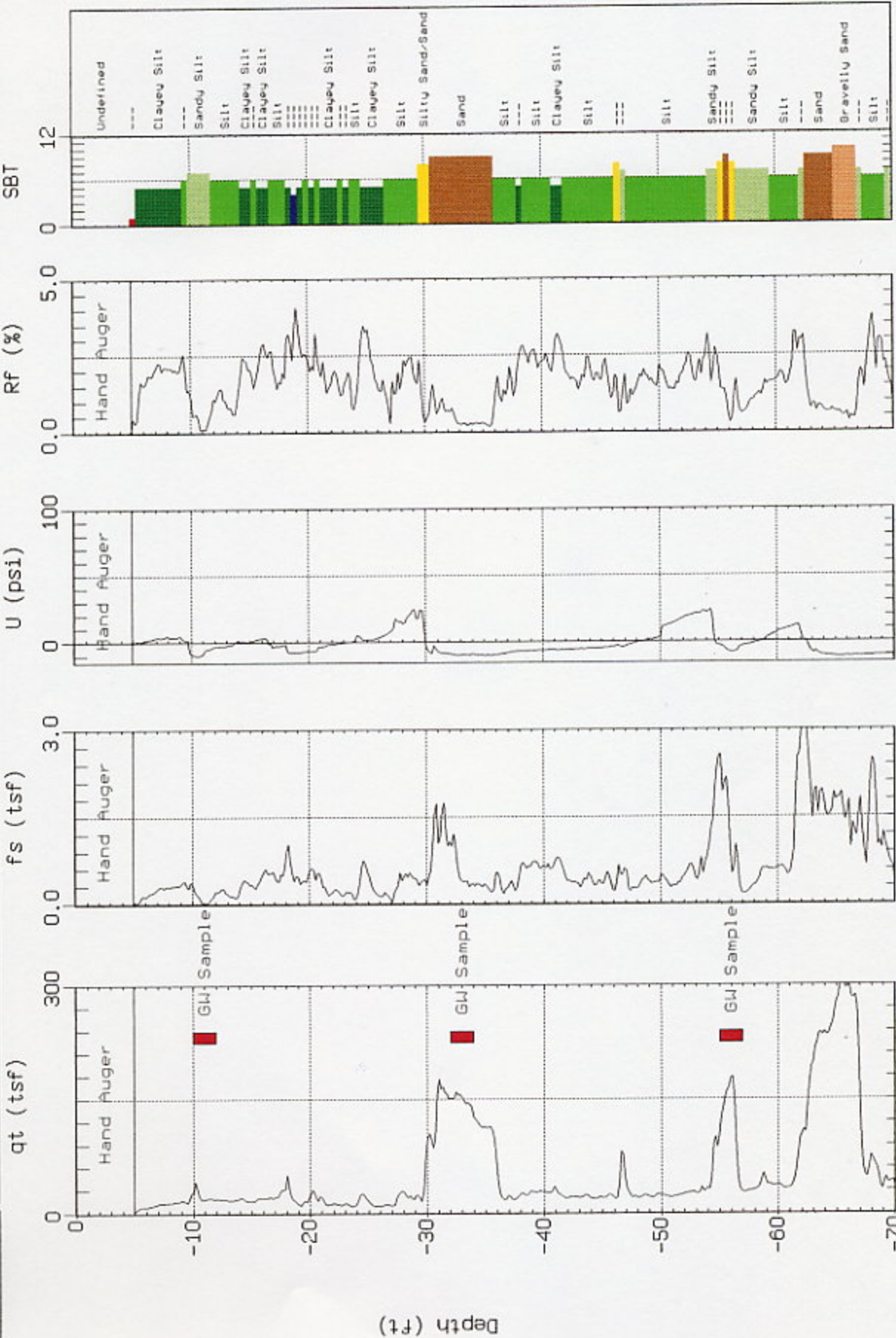
SBT: Soil Behavior Type (Robertson 1990)



# ENVIRO SOIL TECH

Site: CAL GAS/VALERO  
Location: CPT-03

Geologist: U.CHERUEN  
Date: 11:02:106 12:06



SBT: Soil Behavior Type (Robertson 1990)

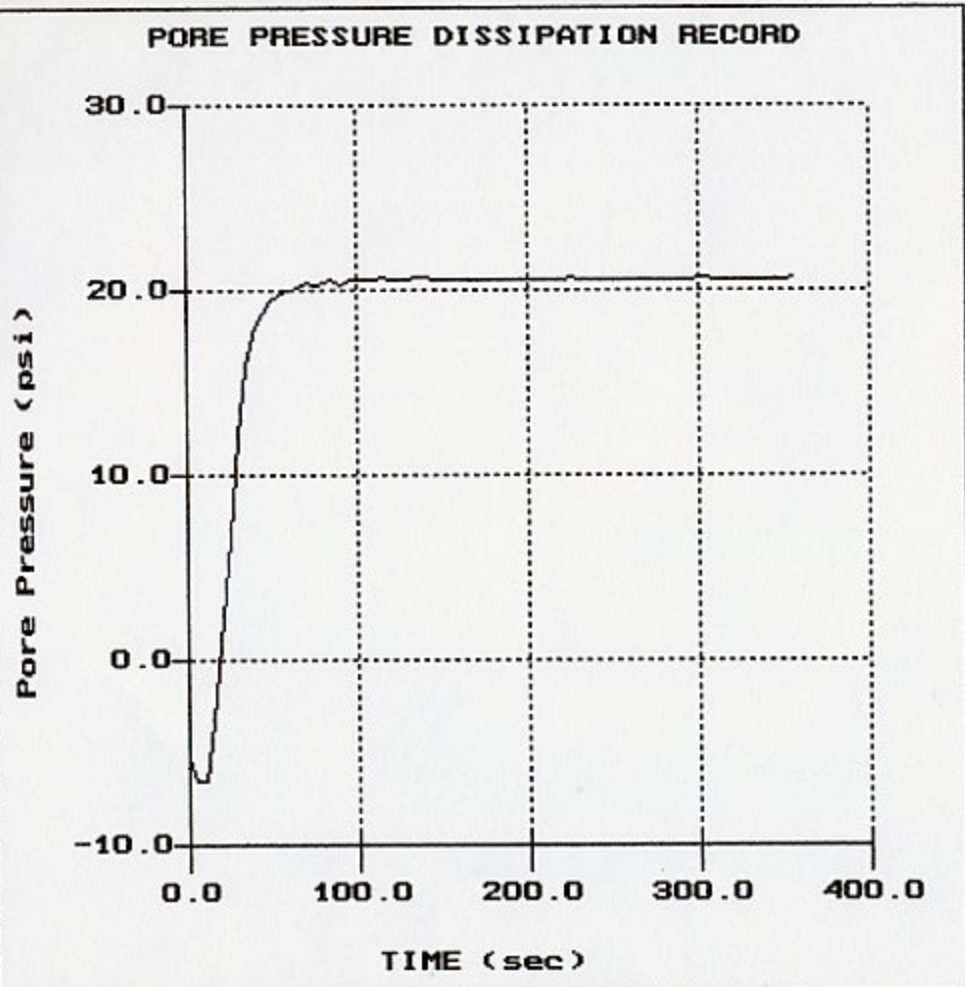
Max. Depth: 70.05 (ft)  
Depth Inc.: 0.164 (ft)



ENVIRO SOIL TECH

Site: CAL GAS/VALERO  
Location: CPT-01

Oversite: U.CHERVEN  
Date: 11:02:106 09:37



File: 375U01.PPC  
Depth (m): 17.55  
(ft): 57.58  
Duration: 355.0s  
U-min: -6.50 10.0s  
U-max: 20.70 355.0s



## Cone Penetration Test Data & Interpretation

Soil behavior type and stratigraphic interpretation is based on relationships between cone bearing ( $q_c$ ), sleeve friction ( $f_s$ ), and pore water pressure ( $u_2$ ). The friction ratio ( $R_f$ ) is a calculated parameter defined by  $100f_s/q_c$  and is used to infer soil behavior type. Generally:

Cohesive soils (clays)

- High friction ratio ( $R_f$ ) due to small cone bearing ( $q_c$ )
- Generate large excess pore water pressures ( $u_2$ )

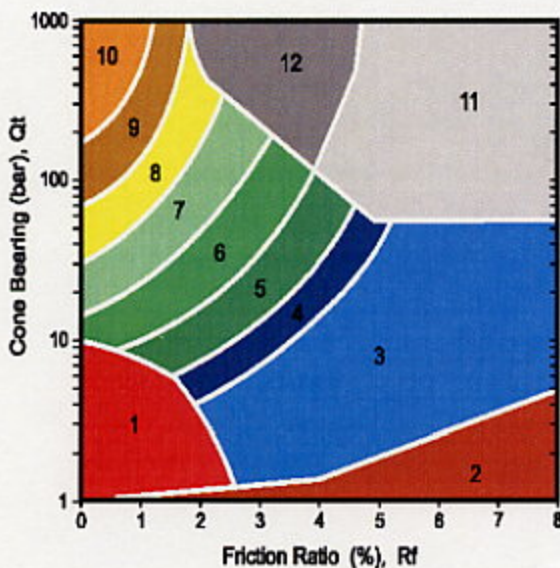
Cohesionless soils (sands)

- Low friction ratio ( $R_f$ ) due to large cone bearing ( $q_c$ )
- Generate very little excess pore water pressures ( $u_2$ )

A complete set of baseline readings are taken prior to and at the completion of each sounding to determine temperature shifts and any zero load offsets. Corrections for temperature shifts and zero load offsets can be extremely important, especially when the recorded loads are relatively small. In sandy soils, however, these corrections are generally negligible.

The cone penetration test data collected from your site is presented in graphical form in Appendix CPT. The data includes CPT logs of measured soil parameters, computer calculations of interpreted soil behavior types (SBT), and additional geotechnical parameters. A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

Soil interpretation for this project was conducted using recent correlations developed by Robertson, 1990, *Figure SBT*. Note that it is not always possible to clearly identify a soil type based solely on  $q_c$ ,  $f_s$ , and  $u_2$ . In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the soil behavior type.



ZONE	Qt/N	SBT
1	2	Sensitive, fine grained
2	1	Organic materials
3	1	Clay
4	1.5	Silty clay to clay
5	2	Clayey silt to silty clay
6	2.5	Sandy silt to clayey silt
7	3	Silty sand to sandy silt
8	4	Sand to silty sand
9	5	Sand
10	6	Gravelly sand to sand
11	1	Very stiff fine grained*
12	2	Sand to clayey sand*

\*over consolidated or cemented

Figure SBT

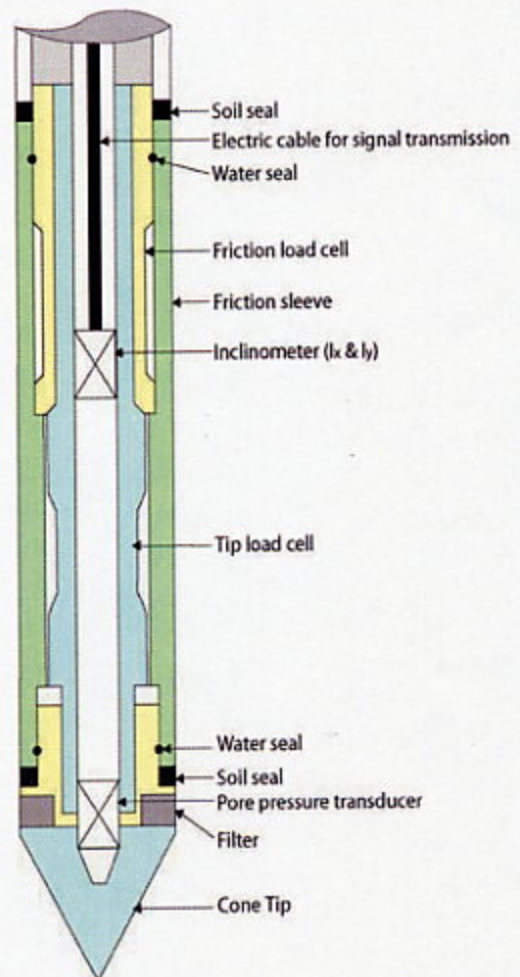


## Cone Penetration Testing Procedure (CPT)

Gregg In Situ, Inc. carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*. The soundings were conducted using a 20 ton capacity cone with a tip area of 15 cm<sup>2</sup> and a friction sleeve area of 225 cm<sup>2</sup>. The cone is designed with an equal end area friction sleeve and a tip end area ratio of 0.85.

The cone takes measurements of cone bearing ( $q_c$ ), sleeve friction ( $f_s$ ) and penetration pore water pressure ( $u_2$ ) at 5-cm intervals during penetration to provide a nearly continuous hydrogeologic log. CPT data reduction and interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored on disk for further analysis and reference. All CPT soundings are performed in accordance with revised (2002) ASTM standards (D 5778-95).

The cone also contains a porous filter element located directly behind the cone tip ( $u_2$ ), *Figure CPT*. It consists of porous plastic and is 5.0mm thick. The filter element is used to obtain penetration pore pressure as the cone is advanced as well as Pore Pressure Dissipation Tests (PPDT's) during appropriate pauses in penetration. It should be noted that prior to penetration, the element is fully saturated with silicon oil under vacuum pressure to ensure accurate and fast dissipation.



*Figure CPT*

When the soundings are complete, the test holes are grouted using a Gregg In Situ support rig. The grouting procedures generally consist of pushing a hollow CPT rod with a "knock out" plug to the termination depth of the test hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.



## Pore Pressure Dissipation Tests (PPDT)

Pore Pressure Dissipation Tests (PPDT's) conducted at various intervals measured hydrostatic water pressures and determined the approximate depth of the ground water table. A PPDT is conducted when the cone is halted at specific intervals determined by the field representative. The variation of the penetration pore pressure ( $u$ ) with time is measured behind the tip of the cone and recorded by a computer system.

Pore pressure dissipation data can be interpreted to provide estimates of:

- Equilibrium piezometric pressure
- Phreatic surface
- In situ horizontal coefficient of consolidation ( $c_h$ )
- In situ horizontal coefficient of permeability ( $k_h$ )

In order to correctly interpret the equilibrium piezometric pressure and/or the phreatic surface, the pore pressure must be monitored until such time as there is no variation in pore pressure with time, *Figure PPDT*. This time is commonly referred to as  $t_{100}$ , the point at which 100% of the excess pore pressure has dissipated.

A complete reference on pore pressure dissipation tests is presented by Robertson et al. 1992.

A summary of the pore pressure dissipation tests is summarized in Table 1. Pore pressure dissipation data is presented in graphical form in Appendix PPAT.

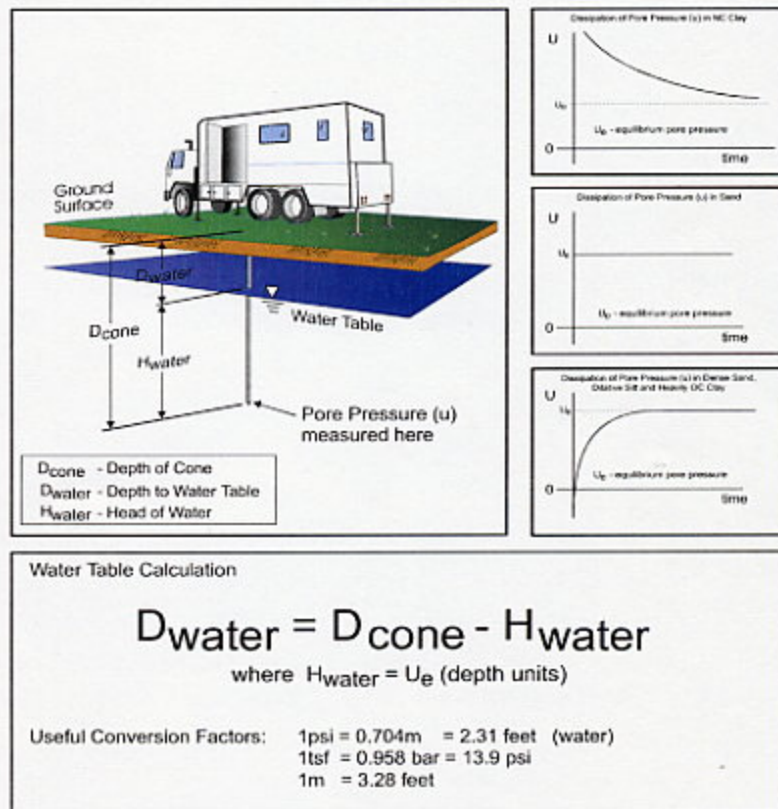


Figure PPDT



## Ultra Violet Induced Fluorescence (UVIFCPTu)

Gregg In Situ, Inc. conducts Ultra Violet Induced Fluorescence (UVIF) Cone Penetration Tests using a UVIF module that is located behind the standard piezocone, *Figure UVIF*. The ultra violet induced fluorescence cone works on the principle that polyaromatic hydrocarbons (PAH's), mixed with soil and groundwater, fluoresce when irradiated by ultra violet light. Therefore, by measuring the UVIF intensity of the soil and groundwater the lateral and vertical extent of polyaromatic hydrocarbon contamination in the ground can be determined.

The UVIF module uses principles of fluorescence spectrometry by irradiating the soil with ultra violet light. The hydrocarbon molecules absorb the UV light energy during radiation and immediately re-emit the light at a longer wavelength. This re-emission is termed fluorescence. The difference between the excitation (250 nm) and emission (275-550 nm) wavelengths is called the Stokes shift. Specific hydrocarbon compounds can be identified by the magnitude of their Stokes shift, refer to *Figure EWL*.

In general, as the number of aromatic rings increase the fluorescent response shifts toward longer wavelengths. Therefore, lighter compounds tend to fluoresce at shorter wavelengths and heavier compounds fluoresce at longer wavelengths.

The UVIF module contains a fiber optic cable that captures the emitted radiation and sends it to an amplifier at the surface so the intensity can be recorded.

The UVIF data is displayed in graphical form along with soil behavior type and other calculated parameters with the corresponding CPT plot.

For a detailed reference on UVIF cone testing, refer to Woeller et. al., 2000.

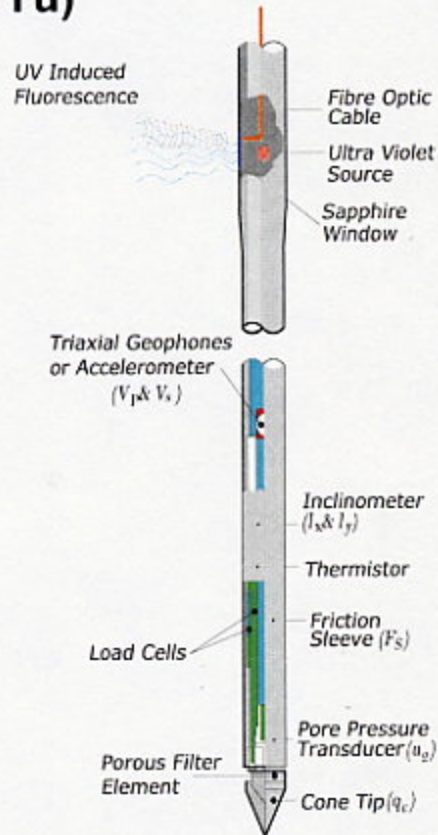


Figure UVIF

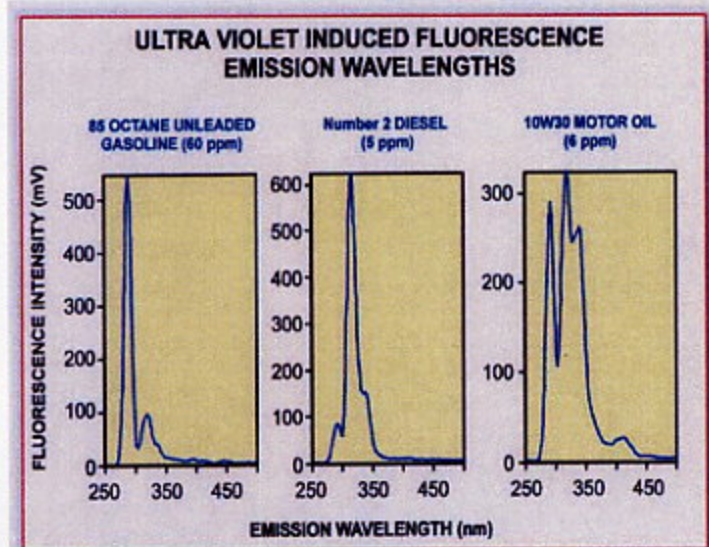


Figure EWL (After Fontana, 1994)

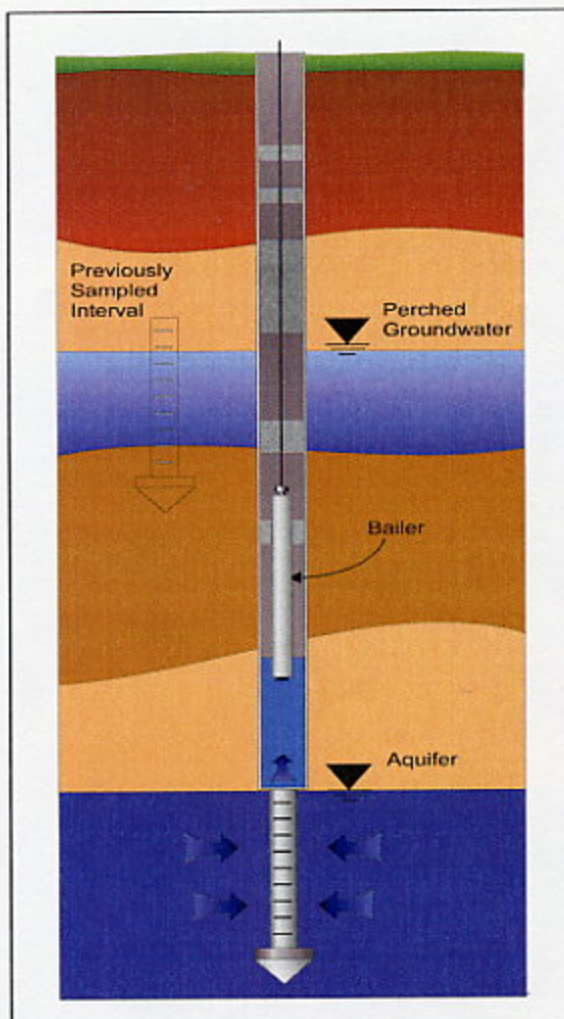


## Groundwater Sampling (GWS)

Gregg In Situ, Inc. conducts groundwater sampling using a Hydropunch<sup>®</sup> type groundwater sampler, *Figure GWS*. The groundwater sampler has a retrievable stainless steel or disposable PVC screen with steel drop off tip. This allows for samples to be taken at multiple depth intervals within the same sounding location. In areas of slower water recharge, provisions may be made to set temporary PVC well screens during sampling to allow the drill rig to advance to the next sample location while the groundwater is allowed to infiltrate.

The groundwater sampler operates by advancing 1 3/4 inch hollow push rods with the filter tip in a closed configuration to the base of the desired sampling interval. Once at the desired sample depth, the push rods are retracted; exposing the encased filter screen and allowing groundwater to infiltrate hydrostatically from the formation into the inlet screen. A small diameter bailer (approximately 1/2 or 3/4 inch) is lowered through the push rods into the screen section for sample collection. The number of downhole trips with the bailer and time necessary to complete the sample collection at each depth interval is a function of sampling protocols, volume requirements, and the yield characteristics and storage capacity of the formation. Upon completion of sample collection, the push rods and sampler, with the exception of the PVC screen and steel drop off tip are retrieved to the ground surface, decontaminated and prepared for the next sampling event.

A summary of the groundwater samples collected, including the sampling date, depth and location identification, is presented in Table 1 and the corresponding CPT plot.



*Figure GWS*

For a detailed reference on direct push groundwater sampling, refer to Zemo et. al., 1992.



## Bibliography

Lunne, T., Robertson, P.K. and Powell, J.J.M., "Cone Penetration Testing in Geotechnical Practice" E & FN Spon. ISBN 0 419 23750, 1997

Robertson, P.K., "Soil Classification using the Cone Penetration Test", Canadian Geotechnical Journal, Vol. 27, 1990 pp. 151-158.

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Campanella, R.G. and I. Weemeees, "Development and Use of An Electrical Resistivity Cone for Groundwater Contamination Studies", Canadian Geotechnical Journal, Vol. 27 No. 5, 1990 pp. 557-567.

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Zemo, D.A., T.A. Delfino, J.D. Gallinatti, V.A. Baker and L.R. Hilpert, "Field Comparison of Analytical Results from Discrete-Depth Groundwater Samplers" BAT EnviroProbe and QED HydroPunch, Sixth national Outdoor Action Conference, Las Vegas, Nevada Proceedings, 1992, pp 299-312.

Copies of ASTM Standards are available through [www.astm.org](http://www.astm.org)

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To: info@envirosoiltech.com  
CC:  
Date: Wed, 27 Sep 2006 13:39:53 -0700 (PDT)  
Subject: **Alameda County Well Permit Approval Notification**

---

Thank you for your Online Request for Wells Permits.  
Your Application Id is: 1159288880387  
Application submitted on: 09/26/2006  
Project Site City/Location: San Lorenzo / 15595 Washington Ave, San Lorenzo CA 94580  
Project Start Date: 11/01/2006 Completion Date: 11/05/2006

Your Permit Application has been approved.  
Permit Number(s) Issued: W2006-0849 to W2006-0853 Valid from 11/01/2006 to 11/05/2006

Attached are 2 PDF files, one serves as your receipt and permit(s), please print for your record.  
The other includes the General Conditions and Instructions you must follow.  
Note: You need to have the free Adobe Reader to open the pdf file.

Conditions of Permit:  
Please follow and comply with conditions and instructions listed in the general conditions document.  
In addition, you must comply with all specific conditions listed in your permit.

If you need further assistance regarding your permit, please visit our website at: <http://www.acgov.org/pwa/wells/>  
or contact us at wells@acpwa.org , and include your application id number.

Thank you,  
Public Works Agency-Water Resources

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## Alameda County Public Works Agency - Water Resources Well Permit

permit application. Boreholes shall not be converted to monitoring wells, without a permit application process.

---

Borehole(s) for Investigation-Contamination Study - 3 Boreholes

Driller: Greggh Drilling & Testing Inc. - Lic #: 656407 - Method: other

**Work Total: \$200.00**

### Specifications

Permit Number	Issued Dt	Expire Dt	# Boreholes	Hole Diam	Max Depth
W2006-0853	09/27/2006	01/30/2007	3	2.00 in.	50.00 ft

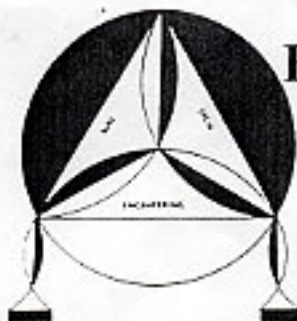
### Specific Work Permit Conditions

1. Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings. All cuttings remaining or unused shall be containerized and hauled off site.
  2. Boreholes shall not be left open for a period of more than 24 hours. All boreholes left open more than 24 hours will need approval from Alameda County Public Works Agency, Water Resources Section. All boreholes shall be backfilled according to permit destruction requirements and all concrete material and asphalt material shall be to Caltrans Spec or County/City Codes. No borehole(s) shall be left in a manner to act as a conduit at any time.
  3. Permittee shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend and save the Alameda County Public Works Agency, its officers, agents, and employees free and harmless from any and all expense, cost, liability in connection with or resulting from the exercise of this Permit including, but not limited to, property damage, personal injury and wrongful death.
  4. Copy of approved drilling permit must be on site at all times. Failure to present or show proof of the approved permit application on site shall result in a fine of \$500.00.
  5. Permit is valid only for the purpose specified herein. No changes in construction procedures, as described on this permit application. Boreholes shall not be converted to monitoring wells, without a permit application process.
-

**A P P E N D I X "I"**

**FIELD NOTES**

**ENVIRO SOIL TECH CONSULTANTS**



# ENVIRO SOIL TECH CONSULTANTS

Environmental & Geotechnical Consultants

131 TULLY ROAD, SAN JOSE, CALIFORNIA 95111

Tel: (408) 297-1500

Fax: (408) 292-2116

FILE NO.: 12-99-702-51

WELL NO.: mw-1

DATE: 12-14-06

SAMPLER: Richard Manly

DEPTH TO WELL: \_\_\_\_\_

1 WELL VOLUME: 1.1

DEPTH TO WATER: 8 FT, 18

5 WELL VOLUME: 5.5

HEIGHT OF WATER COLUMN: \_\_\_\_\_

ACTUAL PURGED VOLUME: 9

CASING DIAMETER: ✓ 2" \_\_\_\_\_ 4"

## CALCULATIONS:

2" - x 0.1632 6.82

4" - 0.653 \_\_\_\_\_

PURGE METHOD: \_\_\_\_\_ BAILER ✓ DISPLACEMENT PUMP \_\_\_\_\_ OTHER

SAMPLE METHOD: ✓ BAILER \_\_\_\_\_ OTHER

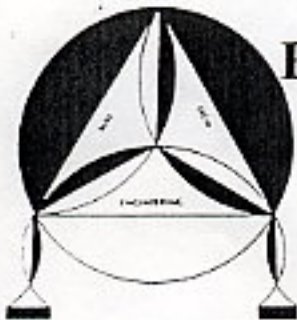
SHEEN: ✓ NO \_\_\_\_\_ YES, DESCRIBE: \_\_\_\_\_

ODOR: ✓ NO \_\_\_\_\_ YES, DESCRIBE: \_\_\_\_\_

## FIELD MEASUREMENTS

TIME	VOLUME	pH	TEMP.	E.C.
_____	<u>3 GAL</u>	<u>7.32</u>	<u>21.0</u>	<u>651</u>
_____	<u>6 GAL</u>	<u>7.18</u>	<u>21.2</u>	<u>653</u>
_____	<u>9 GAL</u>	<u>7.22</u>	<u>21.1</u>	<u>648</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

8 FT, 42



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131 TULLY ROAD, SAN JOSE, CALIFORNIA 95111

Tel: (408) 297-1500

Fax: (408) 292-2116

FILE NO.: 12-99-702-91

WELL NO.: MU-2

DATE: 12-14-06

SAMPLER: Richard Manly

DEPTH TO WELL: \_\_\_\_\_

1 WELL VOLUME: 1.3

DEPTH TO WATER: 7<sup>ft</sup> .10

5 WELL VOLUME: 6.5

HEIGHT OF WATER COLUMN: \_\_\_\_\_

ACTUAL PURGED VOLUME: 9

CASING DIAMETER: ✓ 2" \_\_\_\_\_ 4"

## CALCULATIONS:

2" - x 0.1632 7.9

4" - 0.653 \_\_\_\_\_

PURGE METHOD: \_\_\_\_\_ BAILER ✓ DISPLACEMENT PUMP \_\_\_\_\_ OTHER

SAMPLE METHOD: ✓ BAILER \_\_\_\_\_ OTHER

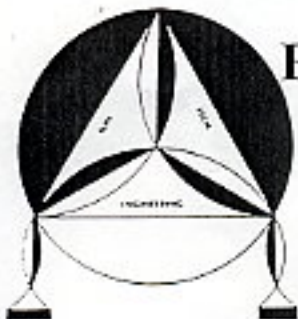
SHEEN: ✓ NO \_\_\_\_\_ YES, DESCRIBE: \_\_\_\_\_

ODOR: ✓ NO \_\_\_\_\_ YES, DESCRIBE: \_\_\_\_\_

## FIELD MEASUREMENTS

TIME	VOLUME	pH	TEMP.	E.C.
_____	<u>3 g AC</u>	<u>7.40</u>	<u>22.0</u>	<u>603</u>
_____	<u>6 g AC</u>	<u>7.16</u>	<u>22.5</u>	<u>610</u>
_____	<u>9 g AC</u>	<u>7.26</u>	<u>22.4</u>	<u>612</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

7<sup>ft</sup> .38



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131 TULLY ROAD, SAN JOSE, CALIFORNIA 95111

Tel: (408) 297-1500

Fax: (408) 292-2116

FILE NO.: 12-99-702-51

WELL NO.: MW-3

DATE: 12-14-06

SAMPLER: Retinal Manly

DEPTH TO WELL: \_\_\_\_\_

1 WELL VOLUME: 1.3

DEPTH TO WATER: 7<sup>ft</sup> .88

5 WELL VOLUME: 6.5

HEIGHT OF WATER COLUMN: \_\_\_\_\_

ACTUAL PURGED VOLUME: 9

CASING DIAMETER: ✓ 2" \_\_\_\_\_

\_\_\_\_\_ 4"

## CALCULATIONS:

2" - x 0.1632 8.12

4" - 0.653 \_\_\_\_\_

PURGE METHOD: \_\_\_\_\_ BAILER ✓ DISPLACEMENT PUMP \_\_\_\_\_ OTHER

SAMPLE METHOD: ✓ BAILER \_\_\_\_\_ OTHER

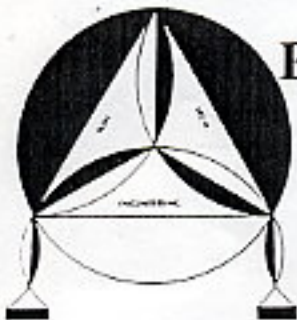
SHEEN: ✓ NO \_\_\_\_\_ YES, DESCRIBE: \_\_\_\_\_

ODOR: ✓ NO \_\_\_\_\_ YES, DESCRIBE: \_\_\_\_\_

## FIELD MEASUREMENTS

TIME	VOLUME	pH	TEMP.	E.C.
	<u>3 gals</u>	<u>7.10</u>	<u>20.7</u>	<u>679</u>
	<u>6 gals</u>	<u>7.03</u>	<u>21.0</u>	<u>720</u>
	<u>9 gals</u>	<u>7.19</u>	<u>21.0</u>	<u>728</u>

8A .54



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131 TULLY ROAD, SAN JOSE, CALIFORNIA 95111

Tel: (408) 297-1500

Fax: (408) 292-2116

FILE NO.: 12-99-702-51

WELL NO.: MW-4

DATE: 12-14-06

SAMPLER: Richard Mendez

DEPTH TO WELL: \_\_\_\_\_

1 WELL VOLUME: 1.7

DEPTH TO WATER: 8<sup>ft</sup> .76

5 WELL VOLUME: 8.5

HEIGHT OF WATER COLUMN: \_\_\_\_\_

ACTUAL PURGED VOLUME: 9

CASING DIAMETER:  2"

4"

## CALCULATIONS:

2" - x 0.1632 10.24

4" - 0.653 \_\_\_\_\_

PURGE METHOD:  BAILER  DISPLACEMENT PUMP  OTHER

SAMPLE METHOD:  BAILER  OTHER

SHEEN:  NO  YES, DESCRIBE: \_\_\_\_\_

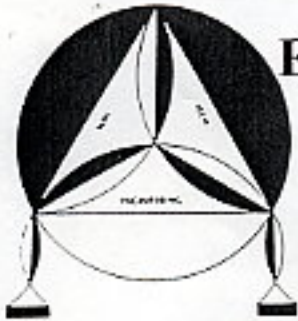
ODOR:  NO  YES, DESCRIBE: \_\_\_\_\_

## FIELD MEASUREMENTS

<u>TIME</u>	<u>VOLUME</u>	<u>pH</u>	<u>TEMP.</u>	<u>E.C.</u>
_____	<u>3 gals</u>	<u>7.39</u>	<u>20.7</u>	<u>774</u>
_____	<u>6 gals</u>	<u>7.23</u>	<u>20.9</u>	<u>787</u>
_____	<u>9 gals</u>	<u>7.26</u>	<u>21.0</u>	<u>790</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

8<sup>ft</sup> .96





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Tel: (408) 297-1500

Fax: (408) 292-2116

FILE NO.: 12-99-702-51

DATE: 12-14-06

DEPTH TO WELL: \_\_\_\_\_

DEPTH TO WATER: 9<sup>ft</sup> .26

HEIGHT OF WATER COLUMN: \_\_\_\_\_

WELL NO.: MU-5

SAMPLER: Direct Manly

1 WELL VOLUME: 1.6

5 WELL VOLUME: 8

ACTUAL PURGED VOLUME: 9

CASING DIAMETER: ✓ 2"

\_\_\_\_\_ 4"

## CALCULATIONS:

2" - x 0.1632

9.74

4" - 0.653

PURGE METHOD: \_\_\_\_\_ BAILER ✓ DISPLACEMENT PUMP \_\_\_\_\_ OTHER

SAMPLE METHOD: ✓ BAILER \_\_\_\_\_ OTHER

SHEEN: \_\_\_\_\_ NO ✓ YES, DESCRIBE: RAINBOW

ODOR: ✓ NO \_\_\_\_\_ YES, DESCRIBE: \_\_\_\_\_

## FIELD MEASUREMENTS

TIME	VOLUME	pH	TEMP.	E.C.
_____	<u>3 GAL</u>	<u>7.18</u>	<u>19.5</u>	<u>690</u>
_____	<u>6 GAL</u>	<u>7.13</u>	<u>19.8</u>	<u>759</u>
_____	<u>9 GAL</u>	<u>7.10</u>	<u>19.6</u>	<u>780</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

9<sup>ft</sup> .98