A R T E S I A N   E N V I R O N M E N T A L

May 3, 1999

Albany Unified School District
c/o Mr. Richard Vila
Vila Construction Company
590 South 33rd Street
Richmond, CA 94804

RE: Preliminary Site Assessment
Albany Unified School District
603 Key Route Boulevard
Albany, California
Artesian Project # 378-002-02
StID 4602

Dear Mr. Vila:

Artesian Environmental Consultants (Artesian) has been retained by Vila Construction Company (Vila) on behalf of the Albany Unified School District (AUSD) to perform a Preliminary Site Assessment (PSA) at 603 Key Route Boulevard (site) in Albany, California (Figures 1 and 2). The AUSD is the current owner of the site. The purpose of the work is to assess soil and groundwater conditions in the vicinity of one former underground storage tank (UST). In October, 1998, Artesian removed one 2,000 gallon heating oil UST and subsequently conducted exploration trenching to determine the extent of soil contamination. Analyzed soil samples collected from the vicinity of the UST excavation indicate that petroleum hydrocarbons were released into the subsurface. In response to the confirmed release of petroleum, the Alameda County Health Services Agency, Department of Environmental Health Services (ACDEH), has required that the extent of petroleum impacted soil and groundwater be assessed.

INTRODUCTION

SCOPE OF WORK

- Obtained soil boring permit from the Alameda County Public Works Agency and notified the ACDEH that borings were planned;
- Prepared Site Safety Plan;
- Notified Underground Services Alert prior to drilling;
- Advanced 7 borings to collect soil and groundwater samples;
- Surveyed top of casing elevations and collected static water level data for use in calculating magnitude and direction of hydraulic gradient;
- Arranged for certified laboratory analysis of samples;
- Reviewed sample results and prepared this report of methods and findings.

SITE LOCATION

The subject site is located in the northern portion of Albany, California at the southeast corner of Key Route Boulevard and Thousand Oaks Boulevard approximately 1 mile east of Interstate Highway 80. The site is surrounded by residential properties and other AUSD property. The site is bounded by AUSD property to the east and south and by residences to the north and west. Figure 1, contained in Attachment A, shows the site location within the City of Albany, as well as surrounding topography.

SITE HISTORY

In the fall of 1998, Vila Construction began site preparation activities for the construction of a new structure at the subject site. AUSD records indicated that one or two USTs had been used at the site to contain heating oil which was used to fuel furnaces in the former building. Vila then conducted exploratory excavations to confirm the presence or absence of the tank(s). Vila located a single UST and confirmed that no tank was present at the second suspected location. Artesian was then contracted to remove the UST and prepare a report of field activities.

On October 14, 1998, Artesian removed one 2,000 gallon heating oil UST and collected soil samples from below the UST for laboratory analysis. Soils below the UST were obviously impacted with petroleum and were excavated from the vicinity of UST until the excavation was approximately 20 feet long by 20 feet wide by 14 feet deep. After over-excavating impacted soils, Artesian began exploration trenching to determine the extent of petroleum impacted soils with the intent of remediating soils by excavation and land disposal. Trenching activities confirmed that the extent of impacted soils exceeds a volume which can be feasibly remediated by excavation and land disposal. Artesian submitted to the ACDEH a Underground Storage Tank Removal/ Soil Remediation Report dated February 5, 1999, which documents UST removal and soil remediation activities. The February 5, 1999 report also contained recommendations that the extent of petroleum impacted soil and groundwater be delineated.

A letter from the ACDEH, dated February 17, 1999 was issued requiring that a PSA be conducted to delineate the extent of petroleum impacted soil and groundwater. This report documents field activities and summarizes results of the PSA.

DETAILED SCOPE OF WORK

PERMITTING

Artesian obtained a soil boring permit from the Alameda County Public Works Agency and notified the ACDEH that soil borings were planned. Underground utilities were located by Underground Service Alert (USA) prior to drilling.

FIELD ACTIVITIES

Soil Sampling

On March 30, 1999, Artesian drilled a total of 7 borings to delineate the extent of petroleum impacted soil and to determine if groundwater at the site has been impacted. Each boring was advanced to depths ranging from 16.5 feet to 21 feet below ground surface (BGS) to collect samples of soil and groundwater using Geoprobe® direct penetration technology (DPT) equipment. Boring locations are shown on Figure 2, contained in Attachment A.

Soil samples were collected continuously with a drive sampler using polyethylene terephthalate glycol (PETG) liners. Soil samples were screened in the field for organic vapors using a PID to assist in the characterization of the vadose zone. The ends of the liners were sealed with Teflon tape and plastic end caps before being hermetically sealed in a plastic sandwich bag and placed in an iced cooler for transportation to the laboratory. Each boring was logged by a geologist under the supervision of a California Registered Geologist using the Unified Soils Classification System (ASTM D248890). The site geologist supervised drilling activities, collected soil and groundwater samples, and documented field activities. Lithologic boring logs are contained in Attachment B.

A soil sample collected from just above the water table or the soil sample displaying the highest PID reading from each boring was submitted for laboratory analysis. Two soil samples were collected for analysis from boring SB-3 to delineate the vertical extent of impacted soils. Because no obvious soil contamination was found, one soil sample from each of the remaining borings was collected for laboratory analysis from just above the water table . Standard operating procedures for collection of soil and groundwater samples are described in Attachment C.

Soil borings SB-1 and SB-3 exhibited some indications of contamination. Boring SB-1 exhibited minor staining with no obvious odor and background PID readings. Soil samples collected from boring SB-3 contained small pore spaces filled with a thick black petroleum substance having a strong, heavy petroleum odor and exhibited PID readings of 78 parts per million (ppm) and 103 ppm at 9 feet and 12 feet BGS, respectively. The lithologic interval in Boring SB-3 which appeared to be impacted was between approximately 8.5 feet and 15.5 feet BGS. To delineate the extent of impacted soil observed in boring SB-3, two additional borings (SB-5 and SB-7) were installed at the presumed down-gradient property line. The need for borings SB-5 and SB-7 was based on indications of contamination observed in boring SB-3 such as obvious staining, odor, and photoionization detector (PID) readings.

Groundwater Sampling

To facilitate collection of groundwater samples, temporary groundwater sampling points were constructed in the resultant boreholes from the soil borings. On March 30, 1999, Artesian constructed each temporary sampling point with ten feet of new factory slotted one-inch polyvinyl chloride (PVC) screen (1-inch diameter riser pipe to the surface) which was lowered down each open borehole to form temporary groundwater sampling points. At the request of the ACDEH, Artesian installed each of the seven groundwater sampling locations with a filter pack (#2/ 12 kiln-dried washed sand) around the screens *up to one foot above the top of each screen. Each groundwater sampling point was* sealed from the filter pack to the ground surface with granulated bentonite which was periodically hyrated with potable water.

On March 30, 1999, Artesian purged sampling points SB-1, SB-2, and SB-3 in preparation for sampling. The remaining sampling points did not produce any water before the end of the work day. Artesian returned to the site on March 31, 1999 and collected groundwater samples from SB-1, SB-2, and SB-3. The same day Artesian also purged the remaining sampling points after they were allowed to recharge over-night. Artesian returned to the site on April 1, 1999 to collect samples from groundwater sampling locations SB-4 through SB-7.

Each groundwater sampling point was purged of 3 wetted casing volumes of water or until purged dry before samples were collected for laboratory analysis. Due to low groundwater recharge rates at many of the sampling points, Artesian allowed each sampling point to recharge over-night before collecting samples.

Groundwater samples were collected with a 0.5 inch disposable bailer and new nylon string. The groundwater samples were decanted from the bailer into labeled bottles supplied by the analytical laboratory. Groundwater samples were then stored in an iced cooler and transported under chain-of-custody control to a California State Certified Laboratory.

Hydraulic Gradient

On March 31, 1999, Artesian surveyed the top of casing elevations for each sampling point in relation to an arbitrary site bench mark. A Spectra Physics laser level was used to survey top of casing elevations to the nearest 0.01 foot. To obtain a preliminary direction of hydraulic gradient, Artesian allowed the water level at each groundwater sampling point to stabilize before measuring static water levels relative to the top of the PVC casing. Static water elevations were then derived from this data and used to calculate hydraulic gradient and direction relative to the arbitrary site bench mark. The static water level data collected March 31, 1999 indicated an unexpected direction of hydraulic gradient (northwest).

To verify that static water levels had been allowed sufficient time to stabilize, Artesian returned to the site on April 15, 1999 and remeasured water levels at each groundwater sampling point. The April 15, 1999 static water elevation data indicate that groundwater flows in a southwesterly direction at a gradient of approximately 0.042 vertical foot per horizontal foot. The difference between the two data sets indicates that very slow groundwater recharge rates for some of the sampling points are responsible for the

April

inaccuracy of the first data set which was collected before all water levels had reached equilibrium. To verify the direction and magnitude of hydraulic gradient, Artesian returned to the site on ~~March~~ 30, 1999 and measured static water levels. The April 30, 1999 water level data indicated that groundwater flows in a southwesterly direction at a gradient of 0.039 vertical foot per horizontal foot, confirming the April 15 data. Table 1, contained in Attachment E, contains top of casing and groundwater elevation data collected on April 15, 1999 and April 30, 1999.

LABORATORY ANALYSES

While purging each sampling point, Artesian collected field measurements of various groundwater quality values to assist in evaluating the potential for natural attenuation of petroleum hydrocarbons. Artesian measured pH, temperature (temp), dissolved oxygen (DO), conductivity, oxidation reduction potential (ORP), and ferrous iron (Fe) while purging each sampling location. Groundwater quality values are presented in Table 2, contained in Attachment E.

A total of 8 soil samples and 7 groundwater samples were submitted to McCampbell Analytical in Pacheco, California for analysis. Soil and groundwater samples were analyzed for Total Petroleum Hydrocarbons as gasoline (TPHg) by EPA Method 8015 and benzene, toluene, ethyl benzene, and total xylenes (BTEX) by EPA Method 8020, TPH as diesel (TPHd) by EPA Method 8015, and Total Oil and Grease (TOG) by EPA Method 418.1 or 413.1. The most impacted soil sample and the most impacted groundwater sample were also analyzed for Polyaromatic Hydrocarbons (PAHs) by EPA Method 625 or modified Method 610. One soil sample was also selected to be analyzed for bulk density, water content, total organic carbon, and porosity to assist in assessing risk of human exposure to residual hydrocarbons in soil.

To assist in determining the potential for natural attenuation/ biodegradation of petroleum hydrocarbons in site groundwater, samples collected from borings SB-1, SB-2, SB-3, SB-4, SB-5, and SB-7 for alkalinity by EPA Method 310.1, carbon dioxide by EPA Method 406A, nitrate by EPA Method 353.1, and sulfate by EPA Method 375.4. All samples were labeled immediately after collection, logged on the chain-of-custody form and placed in an iced cooler for transport to the laboratory. All samples were kept in an iced cooler and transported under proper chain-of-custody control until they arrrived at the laboratory.

ANALYTICAL RESULTS

All samples were shipped to McCampbell Analytical of Pacheco, California or subcontracted to other State Certified laboratories for some analytes. Laboratory analytical reports and chain-of-custody documentation are contained in Attachment D.

Soil

Concentrations of TPHg were below laboratory detection limits in soil samples collected from all borings except SB-3. Soil samples collected from boring SB-3 contained TPHg at concentrations of 20 mg/Kg and 32 mg/Kg, at depths of 9 feet and 13 feet, respectively. Concentrations of BTEX were below laboratory detection limits in borings SB-1, SB-2, SB-3 (9 foot depth), SB-4, SB-5, and SB-7. Toluene was detected only in borings SB-3 (13 foot depth) and SB-6 at respective concentrations of 20 µg/Kg and 10 µg/Kg. Ethylbenzene was detected only in SB-3 (13 foot depth) at a concentration of 37 µg/Kg. Xylenes were detected only in borings SB-3 (13 foot depth) and SB-6 at respective concentrations of 150 µg/Kg and 10 µg/Kg. Benzene and MTBE were not detected in any soil samples collected at the subject site.

TPHd was detected in boring SB-1 at a concentration of 1.3 mg/ Kg. TPHd was also detected in SB-3 at concentrations of 600 mg/Kg (9 foot depth) and 1,600 mg/Kg (13 foot depth). TOG was detected in SB-1 at a concentration of 14 mg/Kg at a depth of 12 feet. TOG was also detected in SB-3 at concentrations of 1,000 mg/Kg (9 foot depth) and 1,700 mg/Kg (13 foot depth). The sample collected from SB-3 at a depth of 13 feet was selected as the most impacted soil sample and analyzed for PAH. All analyzed PAH compounds were below laboratory detection limits. Figure 4, contained in Attachment A is an isoconcentration map of TPHd in soil collected from the vadose zone where the highest concentrations were detected. Laboratory analytical results for soil samples are summarized in Table 3, contained in Attachment E.

Groundwater

Concentrations of TPHg were below laboratory detection limits in groundwater samples collected from borings SB-1 and SB-2. Samples collected from borings SB-4 through SB-7 were inadvertently not analyzed for TPHg. Groundwater collected from boring SB-3 contained TPHg at concentrations of 100 µg/L. Toluene was detected in groundwater samples collected from borings SB-4, SB-5, SB-6, and SB-7 at concentrations ranging from 0.69 µg/L in SB-4 to 1.10 µg/L in SB-5. Ethylbenzene was detected only in borings SB-5 and SB-7 at concentrations of 0.73 µg/L and 67 µg/L, respectively. Xylenes were detected in borings SB-3 through SB-7 at concentrations ranging from 0.74 µg/L in SB-3 to 6.30 µg/L in SB-5. Benzene and MTBE were not detected in any groundwater samples collected at the subject site.

TPHd was detected in groundwater samples collected from borings SB-1, SB-3, SB-4, SB-5, and SB-6 at concentrations ranging from 61 µg/L in SB-1 to 810 µg/L in SB-3. TOG was not detected in any groundwater samples collected. Borings SB-4 and SB-6 did not produce enough water to be analyzed to TOG. The sample collected from SB-3 was selected as the most impacted groundwater sample and analyzed for PAH. All analyzed PAH compounds were below laboratory detection limits.

Alkalinity was detected in all samples analyzed ranging from 290 mg/L in SB-2 to 590 mg/L in SB-3. Nitrate was detected in groundwater collected from borings SB-1, SB-2, SB-5, and SB-7 at concentrations ranging from 9 mg/L in SB-2 to 35 mg/L in SB-7. Nitrate was below laboratory detection limits in SB-3. Sulfate was detected in all samples analyzed at concentrations ranging from 17 mg/L in SB-3 to 143 mg/L in SB-7. Carbon dioxide was detected in all samples analyzed at concentrations ranging from 11 mg/L in SB-1 to 95 mg/L in SB-3. Borings SB-4 and SB-6 did not produce enough water to be analyzed for alkalinity, nitrate, sulfate, and carbon dioxide. Figure 5, contained in Attachment A is an isoconcentration map of TPHd in groundwater. Laboratory analytical results for groundwater samples are summarized in Table 4, contained in Attachment E.

PRELIMINARY NATURAL ATTENUATION EVALUATION

During purging, Artesian measured pH, temp., cond., ORP, DO, and Fe (Table 2). Artesian analyzed groundwater samples from sampling points SB-1 SB-2, SB-3, SB-5, and SB-7 for alkalinity, nitrate, sulfate, and carbon dioxide (Table 4). Based on these data and contaminant concentrations measured in each sampling point, Artesian conducted a preliminary natural attenuation evaluation. DO, nitrate, sulfate, and ferrous iron concentrations were used to evaluate specific biodegradation processes. The processes evaluated include oxygen respiration, nitrate reduction, iron reduction, and sulfate reduction. The remaining parameters were used as indicators of aerobic or anaerobic groundwater conditions and to provide further evidence for activity of specific biodegradation processes. Artesian has preliminarily concluded that intrinsic bioremediation has occurred and is occurring anaerobically in site groundwater.

Groundwater conditions at the site are generally favorable for anaerobic intrinsic bioremediation (biodegradation). On average, pH of site groundwater is approximately neutral (7) and temperature ranges from approximately 14.0° C to approximately 17.3° C. Alkalinity concentrations ranged from 290 mg/L in SB-2 to 590 mg/L in SB-3. Alkalinity in site groundwater appears sufficient to buffer organic acids produced by bacteria when hydrocarbons are metabolized.

DO concentrations range from 6.2 ppm in SB-2 to 9.4 ppm in SB-6. Even though DO concentrations currently exceed the 1 to 2 parts per million (ppm) above which aerobic conditions are typically prevalent, other geochemical indicators (i.e. electron receptor concentrations and ORP) are indicative of an anaerobic groundwater environment. The apparent presence of DO in an anaerobic environment is possibly a result of heterogeneity in an aquifer which may have aerobic and anaerobic zones. The unavoidable mixing of groundwater from these zones during sample collection could explain the DO concentrations. Sampling locations where DO is highest are also those with the slowest recharge rates. DO concentrations may also be explained by the exposure of groundwater to the oxygenated environment of the interior of the PVC screens as groundwater trickled down the screen interiors during recharge.

The ORP of groundwater is conducive to specific biodegradation processes at specific levels of ORP. Under aerobic groundwater conditions (ORP above approximately 750 mv), the prevalent biodegradation process of those evaluated is oxygen respiration. Under slightly reducing conditions, nitrate reduction is the predominant process of biodegradation while iron reduction and sulfate reduction predominate at progressively lower ORP (more reducing conditions). ORP measurements indicate a reducing environment within and outside the plume, however, they show a slight tendency toward more reducing conditions within the plume.

Concentrations of nitrates and sulfates show a distribution pattern in relation to a low concentration plume of dissolved phase petroleum hydrocarbons. Low nitrate and sulfate concentrations appear to correlate well with sampling locations where contaminant concentrations are higher. This correlation is indicative of nitrate and sulfate transformation into more reduced ions as hydrocarbons are oxidized in biodegradation processes. Biodegradation of contaminants by nitrate reduction appears to be occurring at the site except at sampling location SB-3 where it has become a limiting reagent for this process and sulfate reduction appears to be occurring. Sampling location SB-3 exhibits low concentrations of sulfate which is indicative of a sulfate reduction process acting at this location as would be expected in the absence of nitrate to fuel nitrate reduction and ferric iron to fuel iron reduction.

Concentrations of ferrous iron (the by-product of iron reduction) below 0.5 ppm at each sampling location indicate that iron reduction is not a significant mechanism for natural attenuation at the site. While not analyzed during this study, ferric iron concentrations at the site may be too low to support an iron reduction process, even though ORP appears to be conducive to it.

Carbon dioxide is a byproduct of aerobic respiration, iron reduction, and sulfate reduction. Higher carbon dioxide concentrations correspond well with higher contaminant concentrations, lower concentrations of nitrate and sulfate, and lower ORP. This correlation provides further evidence that biodegradation is occurring at the site.

It appears that site conditions for intrinsic bioremediation are conducive, intrinsic bioremediation has occurred, and should continue to occur anaerobically in the presence of petroleum hydrocarbons. The most likely processes for natural attenuation/ biodegradation at the site are sulfate and nitrate reduction under current site conditions. If ORP or DO at the site change in the future, conditions should support other biodegradation processes.

These are recommendations only.
Get statement that the
RMP will be in
affect, kept onsite
during construct

HUMAN EXPOSURE RISK MANAGEMENT

Risks associated with regulated petroleum constituents in site soils and groundwater are well within acceptable levels if left undisturbed. Concentrations of benzene, MTBE, and polyaromatic hydrocarbons (PAH) are below laboratory detection limits in all soil and groundwater samples collected at the site. Concentrations of toluene, ethylbenzene, and xylenes were well below their respective Maximum Contaminant Levels (MCL's) for drinking water set by the California Department of Health Services as updated April 25,1 1996. Concentrations of toluene, ethylbenzene, and xylenes in all soils analyzed were well below Tier 1 Risk Based Screening Levels (RBSL's) for direct contact and leaching to groundwater. The Tier 1 Lookup Table for Residential Land Use (prepared by The Michigan Department of Natural Resources in accordance with the ASTM Emergency Standard Guide for Rick-Based Corrective Action (RBCA), ES 38-94) which was used in this evaluation is included in Attachment E.

Even though no significant concentrations of regulated petroleum constituents are present in site soils or groundwater, the presence of TPHd and TOG in some site soils warrants that measures be taken in some situations to reduce the risk for human exposure to these residual concentrations of petroleum. These recommended measures as described below are intended to reduce risks of human exposure to acceptable levels during future construction activities and during permanent occupancy of the site.

Risk Management During Construction

If subsurface soil at the site is disturbed (i. e. excavated), proper monitoring of exposed soil and any resulting vapors should be conducted. Proper monitoring is necessary to minimize exposure risk of workers or nearby residents to chemicals which may be contained in site soil. During future earth moving activities at the site, the contractor should monitor the work area and most importantly the breathing zone of the workers for volatile organic vapors. The breathing zone of the workers should be monitored using a photoionization detector (PID) or equivalent instrument to measure the concentration of volatile organic vapors in the air. If PID readings indicate that high concentrations of volatile organic vapors are present in the breathing zone of the workers, workers should be removed from the area until concentrations are below approximately 15 parts per million (ppm) in the breathing zone. If at all possible work should be conducted where PID readings are at zero in the breathing zone. If work must be conducted in areas where PID readings exceed 15 ppm, work may be continued in level C personal protective equipment (standard work uniform with nitrile gloves and an OSHA approved air purifying respirator).

If soils exhibiting strong petroleum odors are encountered during excavation activities, they should be stockpiled between plastic sheeting and samples be collected to determine their suitability for re-use as fill before being re-used.

Every effort should be made to avoid contact of future site workers with site groundwater. If skin contact of workers with groundwater is unavoidable due to the nature of a task to be performed, those personnel should conduct work in a modified personal protection level D (standard work uniform with nitrile gloves, tyvek® or other splash protective suit, and rubber over-boots).

Risk Management for Future Occupants

For any furture construction projects, the above risk management measures should be followed. The new buildings proposed for construction at the site are to be constructed on the eastern portion of the site (see Figure 2). A portion of one of the buildings will be constructed over the former UST location and, therefore, over potentially impacted soils. Site soils are high density, low permeability clay soils which are not anticipated to transmit petroleum vapors from the impacted soils (approximately 9 to 13 feet depth) to the surface and into structures. Because residual concentrations of TPHd and TOG may be present in shallow soils which were used as excavation backfill, a polyethylene vapor barrier should be placed below all building floor slabs as a precaution to prevent potentially present vapors from enterring site structures.

Groundwater at the site is unsuitable for human consumption and may present an increased risk of human exposure to potentially contained petroleum if used for small scale irrigation or other uses. Onsite groundwater may be suitable for some uses in the future, however, onsite groundwater should not be utilized for any purpose without prior assessment of water quality.

CONCLUSIONS / RECOMMENDATIONS

- PAH constituents, benzene and MTBE were not detected in any samples collected at the site;

- Concentrations of PAH constituents, MTBE, benzene, toluene, ethylbenzene, and xylenes were below their respective maximum contaminant levels (MCLs) for drinking water in all groundwater samples collected at the site;

- Concentrations of PAH constituents, MTBE, benzene, toluene, ethylbenzene, and xylenes in all soil samples were below their respective Risk Based Corrective Action (Tier 1 - Residential) Look-up Table screening levels.

- Groundwater appears to flow in a southwesterly direction at a gradient of approximately 0.04 vertical foot per horizontal foot;

- TOG and TPHd are present in site soils in the vicinity of boring SB-3 and the former UST location at concentrations of up to 14,000 mg/Kg and 2,500 mg/Kg, respectively, at depths of approximately 13 feet below ground surface. Significant concentrations of TOG and TPHg were not detected at the down-gradient property line;

- Risks of human exposure to residual concentrations of petroleum at the site may be mitigated by following the proposed risk management measures so that the site does not pose an unacceptable level of risk to site workers or occupants;

- Natural attenuation of petroleum hydrocarbons appears to be occurring in an anaerobic groundwater environment by nitrate reduction and sulfate reduction processes and is anticipated to continue to degrade residual concentrations of petroleum hydrocarbons.

- Because levels of all regulated petroleum constituents are below their MCL's for drinking water and below Tier 1 Residential RBSL's in soils, risk for potential human exposure to residual petroleum can be kept at acceptable levels, and residual petroleum is degrading by natural processes, Artesian recommends that the site be closed

Please call Artesian at (510) 307-9943 if you have any questions.

Sincerely,
Artesian Environmental

JAMES A. JACOBS
NO. 88
STATE OF CALIFORNIA

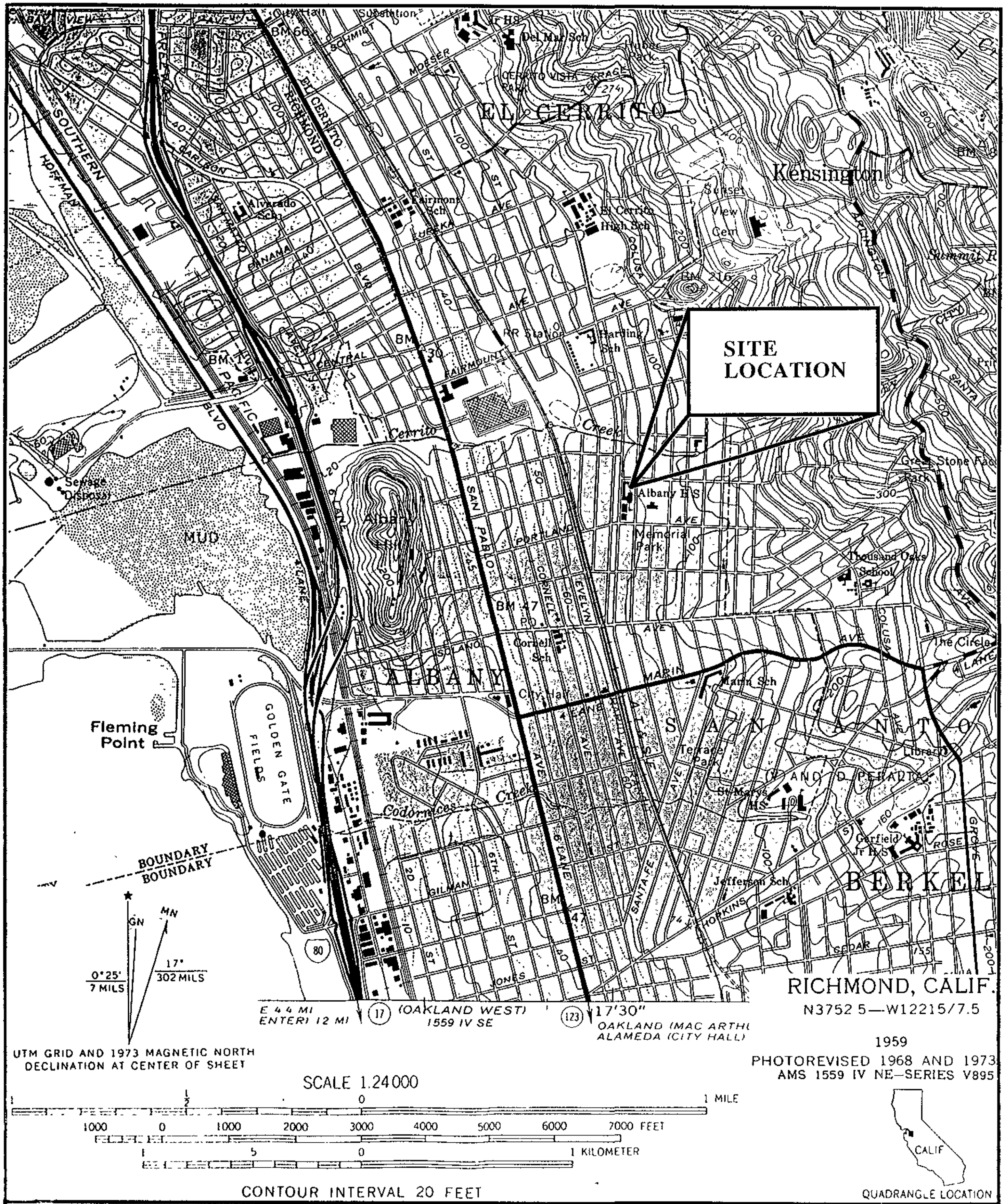
Paul E. Jones
Project Geologist

James A. Jacobs, RG, REA, CHG #88
President / Certified Hydrogeologist

cc: Ms. Eva Chu, ACDEH
Mr. Steven Morse, RWQCB

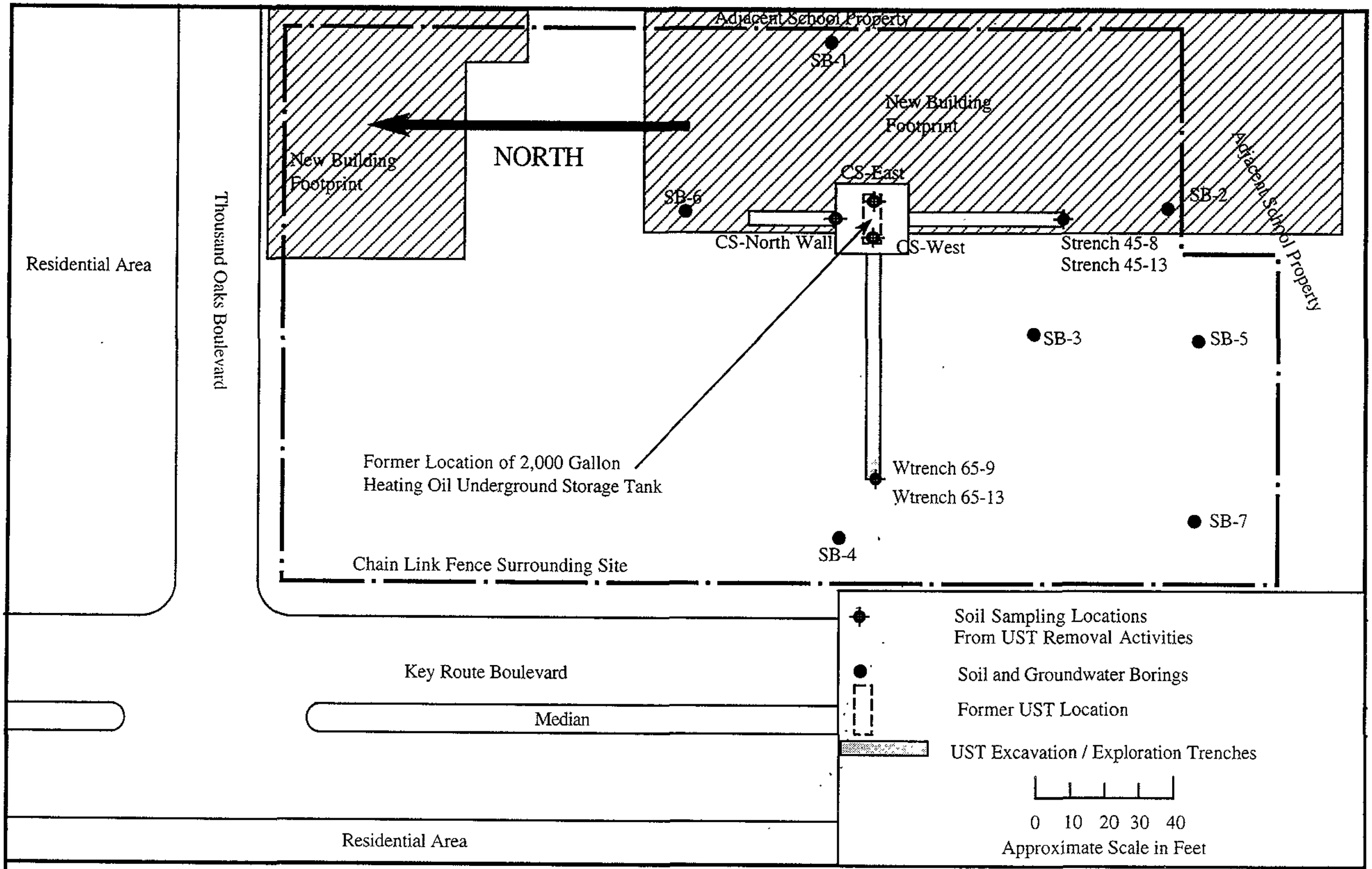
ATTACHMENT A:

FIGURES



ARTESIAN ENVIRONMENTAL 229 Tewksbury Avenue Point Richmond, California 94801 Phone (510) 307-9943 Fax (510) 232-2823	**SITE LOCATION MAP** **Albany Unified School District** 603 Key Route Boulevard Albany, California

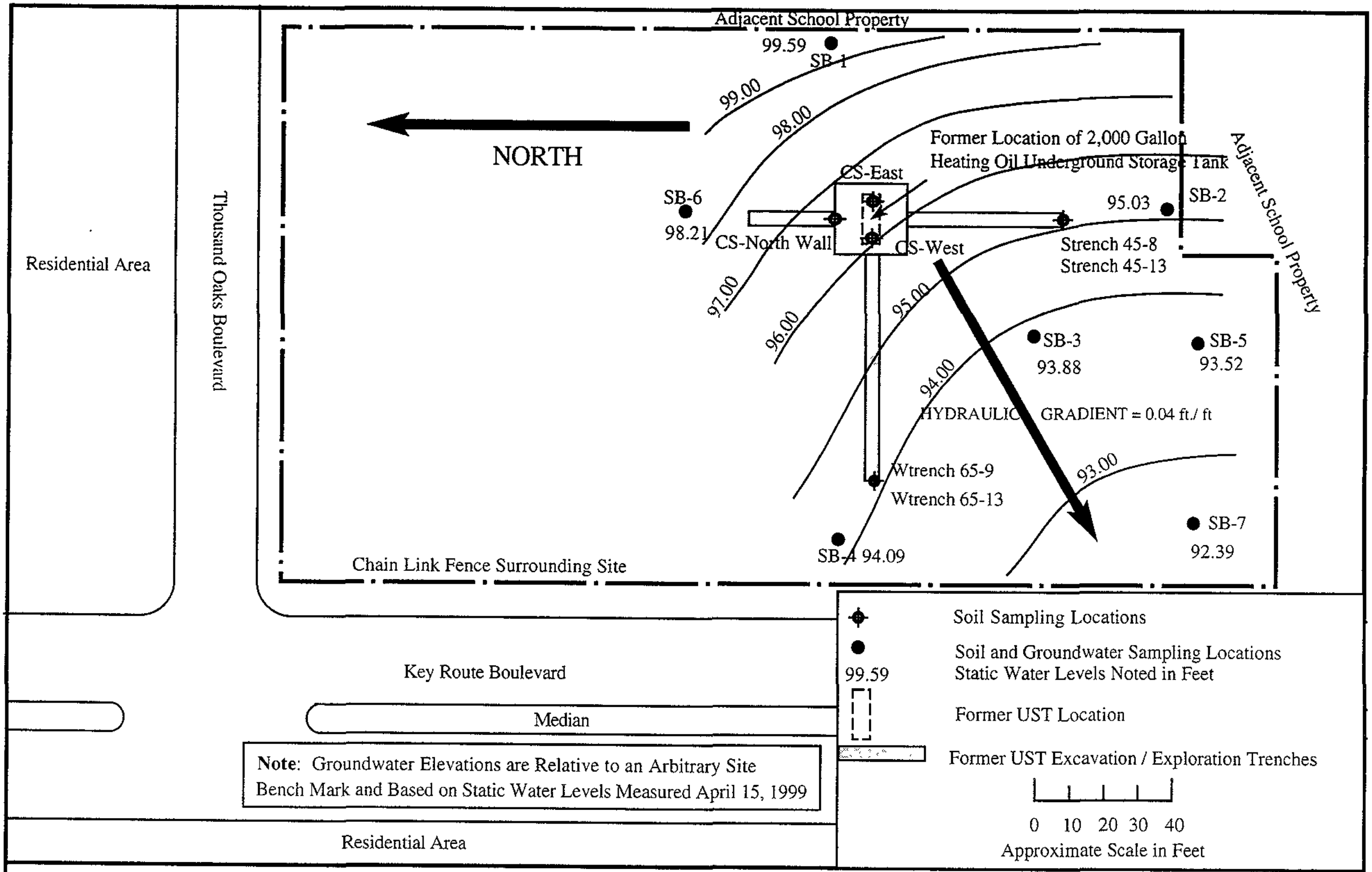
Project No 378-001-01	Date. 1/15/99	Drawn by: P. Jones	Figure 1



ARTESIAN ENVIRONMENTAL CONSULTANTS
229 Tewksbury Avenue
Point Richmond, California 94801
Phone (510) 307-9943 Fax (510) 232-2823

Site Map / Boring Location Map
Albany Unified School District
603 Key Route Boulevard
Albany, California

Project No.: 378-002-02	Date: 03/09/99	Prepared by: P. Jones	Figure 2



ARTESIAN ENVIRONMENTAL CONSULTANTS
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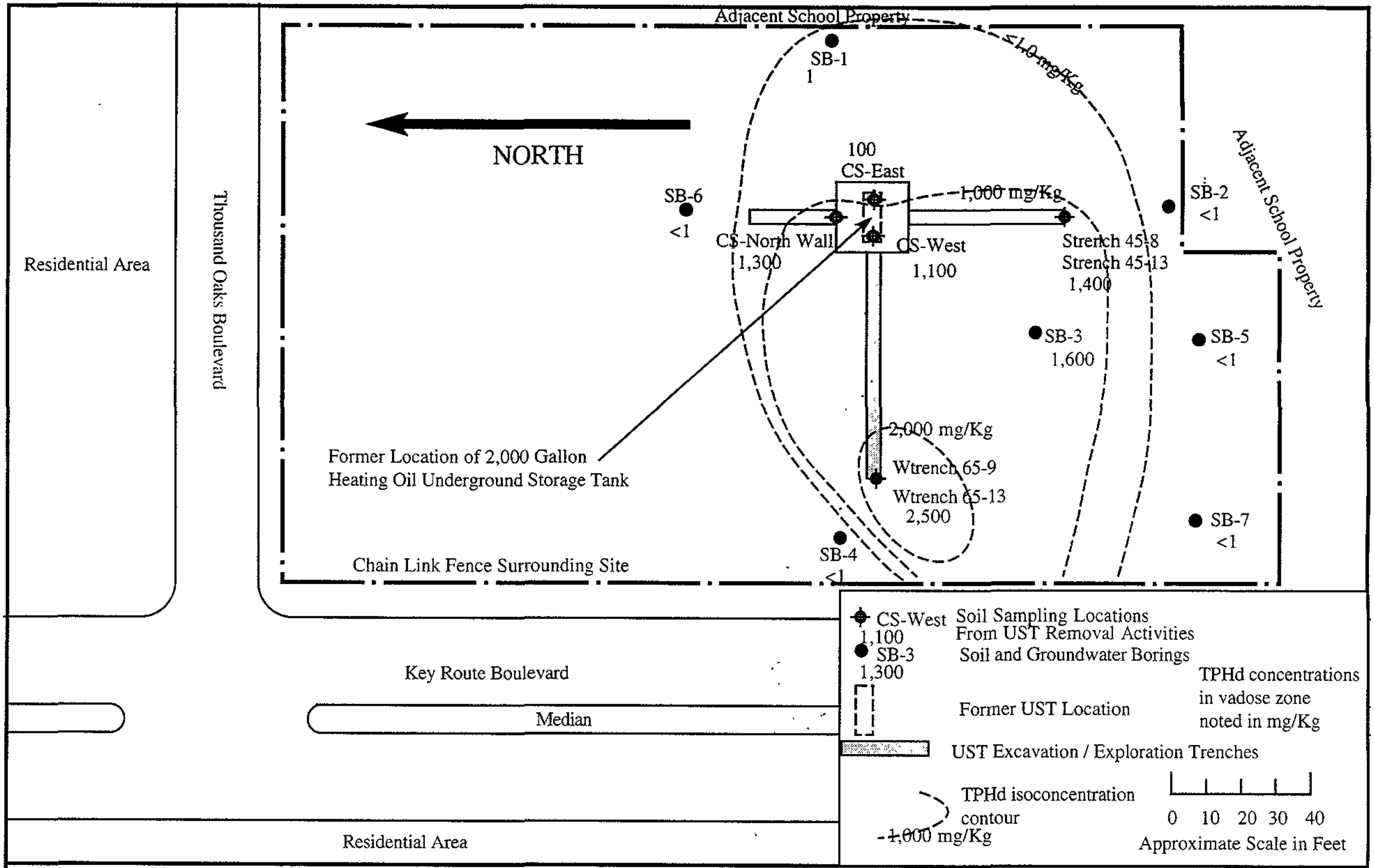
Point Richmond, California 94801
Phone (510) 307-9943 Fax (510) 232-2823

Groundwater Flow Map
Albany Unified School District
603 Key Route Boulevard
Albany, California

Project No.: 378-002-02	Date: 04/23/99	Prepared by: P. Jones	Figure 3



ARTESIAN ENVIRONMENTAL CONSULTANTS
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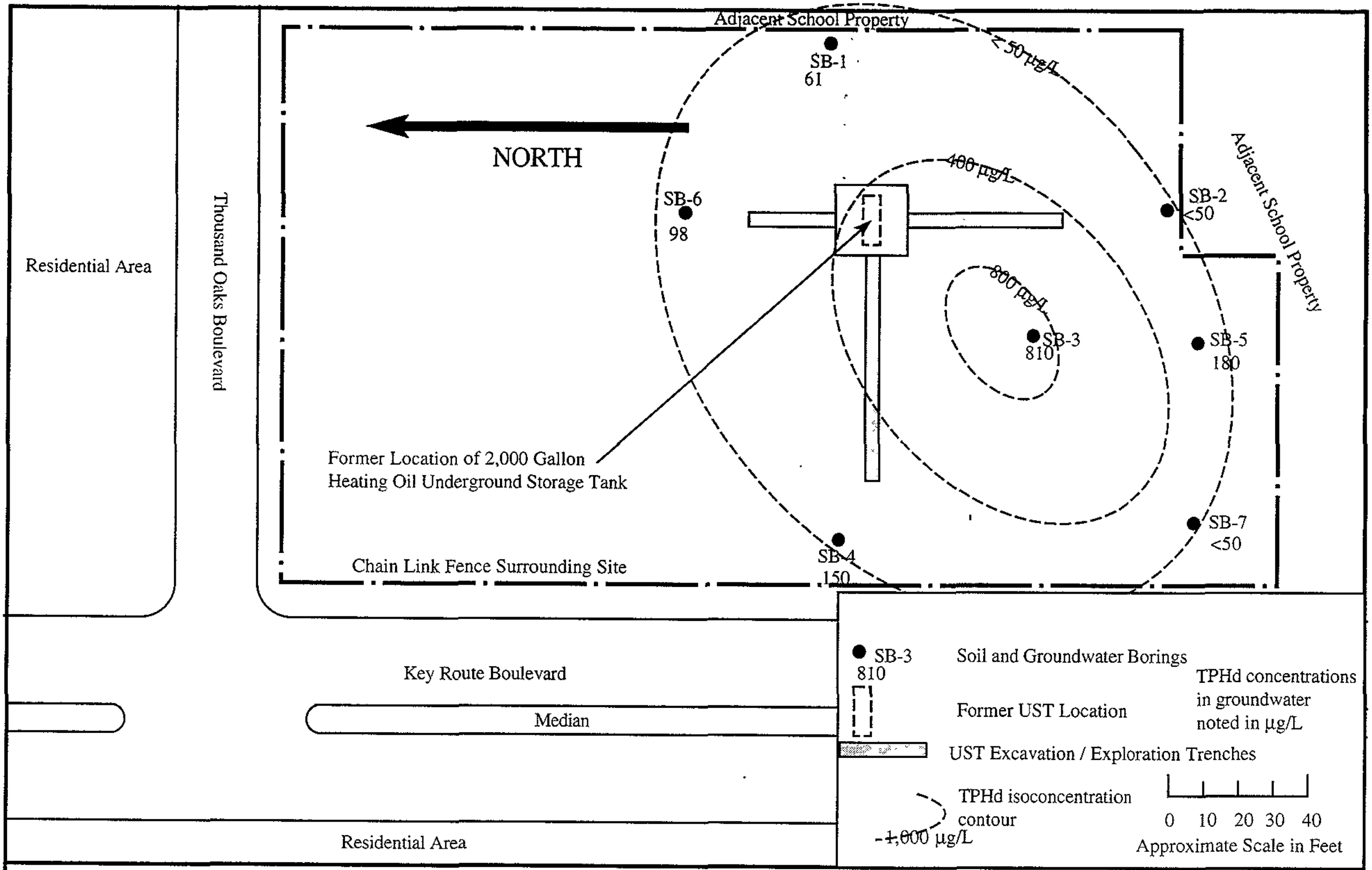
TPHd in Soil Isoconcentration Map
Albany Unified School District
603 Key Route Boulevard
Albany, California

Project No. 378-002-02	Date: 05/02/99	Prepared by: P. Jones	Figure 4



ARTESIAN ENVIRONMENTAL CONSULTANTS
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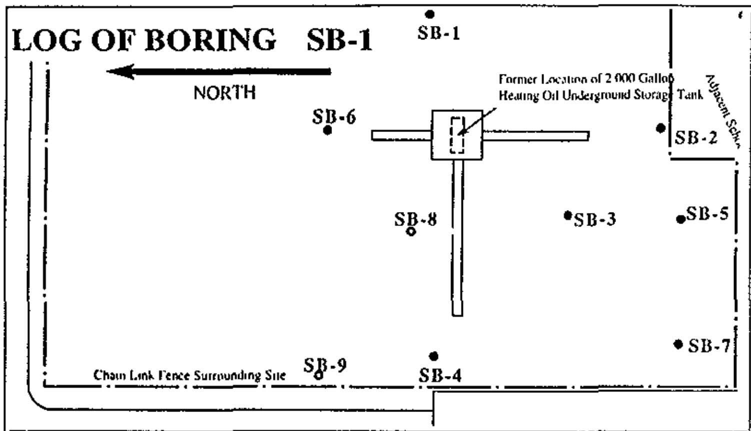
TPHd in Groundwater Isoconcentration Map
Albany Unified School District
603 Key Route Boulevard
Albany, California

Project No.: 378-002-02	Date: 05/02/99	Prepared by: P. Jones	Figure 5

ATTACHMENT B:

LITHOLOGIC BORING LOGS

LOG OF BORING SB-1



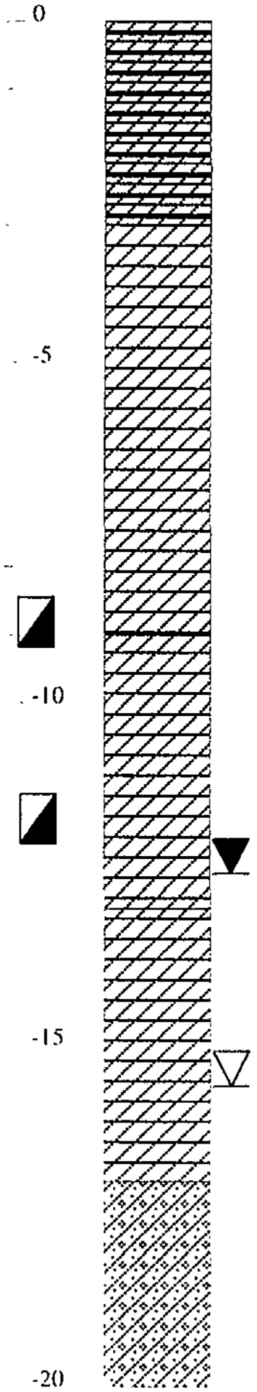
Albany Unified School District

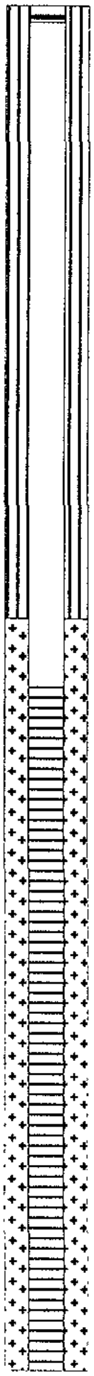
603 Key Route Boulevard
Albany, California

DATES DRILLED:	3/30/99	SAMPLING METH.	4' X 2" Continuous Core
DRILLING CO	Artesian	TOTAL DEPTH	20 feet bgs
DRILL TOOLS	Direct Push	LOGGED BY	P. Jones
DRILLER:	E. Svoboda	DATE DEV.:	NA
PROJECT MANAGER	P. Jones	DRAWN BY	P. Jones
ARTESIAN JOB NO.:	378-002-02	DRAW DATE	4/2/99

ARTESIAN ENVIRONMENTAL CONSULTANTS

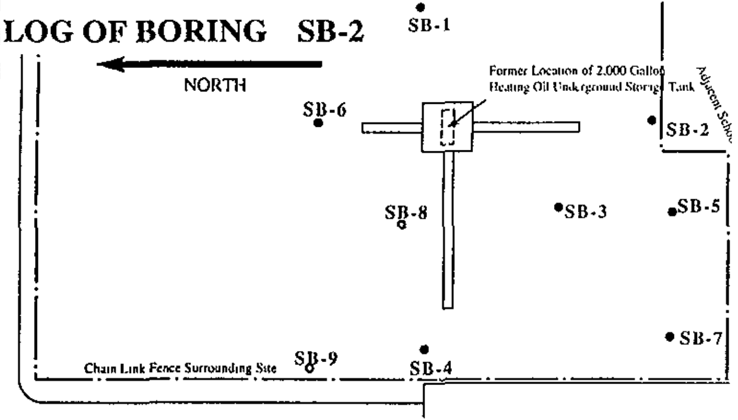
229 Tewksbury Avenue, Point Richmond, California 94801
TEL (510) 307-9943 • FAX (510) 232-2823





DEPTH (feet)	SOIL SYMBOLS/ FIELD TEST DATA	SOIL DESCRIPTION	SAMPLE NO.	BLOWS /6 in.	PID ppm	COMPLETION DIAGRAM	DESCRIPTION
0		OL: Silty CLAY, dark brown, slight plasticity, stiff, moist, with some small gravel					Boring Pressure Grouted with Neat Cement
		CL: CLAY, brown, moderate plasticity, stiff, moist, with some poorly graded coarse to small gravel			0.0		
-5							
					0.0		
		CL: 9 to 17 feet grades with 1-inch and smaller gray-green stained spots, some dark gray-green staining in some small fractures	SB1-9				
-10							
			SB1-12		0.0		
		CL: Grades gravelly CLAY, very stiff, low plasticity					
-15							
		GC: clayey silty sandy GRAVEL, angular to rounded, moist, weathered sedimentary and serpentine bedrock fragments: refusal 20.0 feet in bedrock					
-20							

LOG OF BORING SB-2

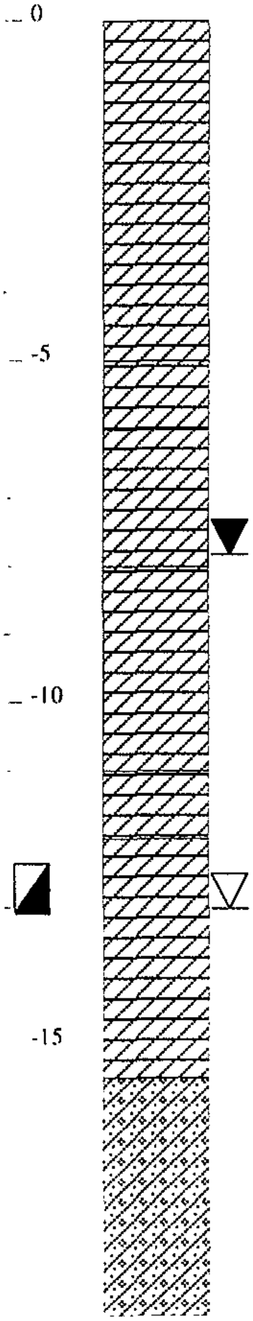


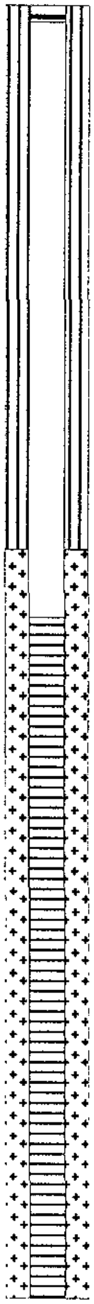
Albany Unified School District

603 Key Route Boulevard
Albany, California

DATES DRILLED	3/30/99	SAMPLING METH	4' X 2 Continous Core
DRILLING CO	Artesian	TOTAL DEPTH	19 feet bgs
DRILL TOOLS	Direct Push	LOGGED BY	P Jones
DRILLER:	E Svoboda	DATE DEV.	NA
PROJECT MANAGER	P. Jones	DRAWN BY	P Jones
ARTESIAN JOB NO	378-002-02	DRAW DATE	4/5/99

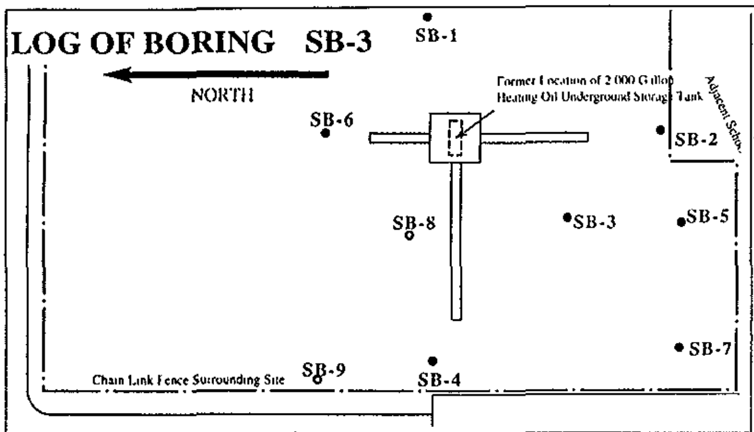
ARTESIAN ENVIRONMENTAL CONSULTANTS
229 Tewksbury Avenue, Point Richmond, California 94801
TEL (510) 307-9943 • FAX (510) 232-2823





DEPTH (feet)	SOIL DESCRIPTION	SAMPLE NO.	BLOWS /6 in.	PID ppm	DESCRIPTION
0	CL: CLAY, dark brown, high plasticity, soft, moist, with some coarse sand, small gravel, and brick fragments			0.0	Boring Pressure Grouted with Neat Cement
-5	CL: Grades stiff				
	CL: 6 feet to 8 feet grades gravelly CLAY, brown, non-plastic				
-10	CL: 8 feet to 11 feet grades silty CLAY, moderate plasticity, with some coarse sand and small gravel			0.0	
	CL: 11 feet to 12 feet grades CLAY				
-15	CL: 12 feet to 15.5 feet grades gravelly and silty - 13 feet to 14 feet grades wet	SB2-13		0.0	
	GC: clayey, gravelly, silty sand, very poorly sorted, angular to rounded, wet - Bottom of Boring 19.0 feet				

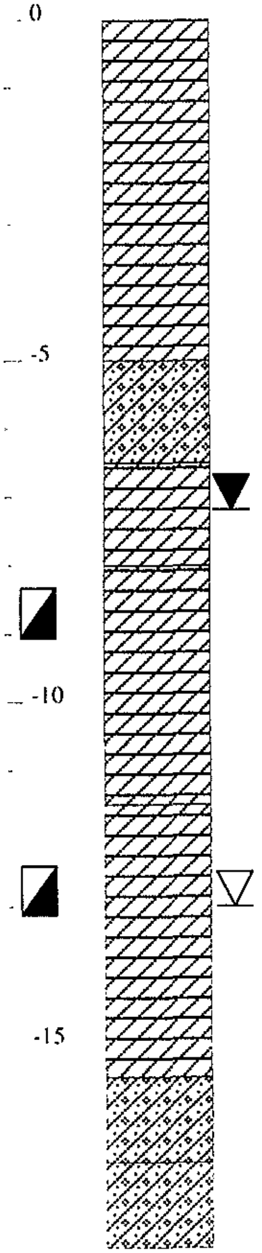
LOG OF BORING SB-3



Albany Unified School District
603 Key Route Boulevard
Albany, California

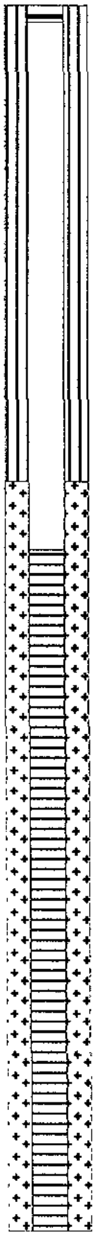
DATES DRILLED:	3/30/99	SAMPLING METH	4' X 2" Continous Core
DRILLING CO:	Artesian	TOTAL DEPTH	18 feet bgs
DRILL TOOLS.	Direct Push	LOGGED BY	P Jones
DRILLER:	E Svoboda	DATE DEV	NA
PROJECT MANAGER	P Jones	DRAWN BY	P Jones
ARTESIAN JOB NO.	378-002-02	DRAW DATE	4/5/99

ARTESIAN ENVIRONMENTAL CONSULTANTS
229 Tewksbury Avenue, Point Richmond, California 94801
TEL (510) 307-9943 • FAX (510) 232-2823

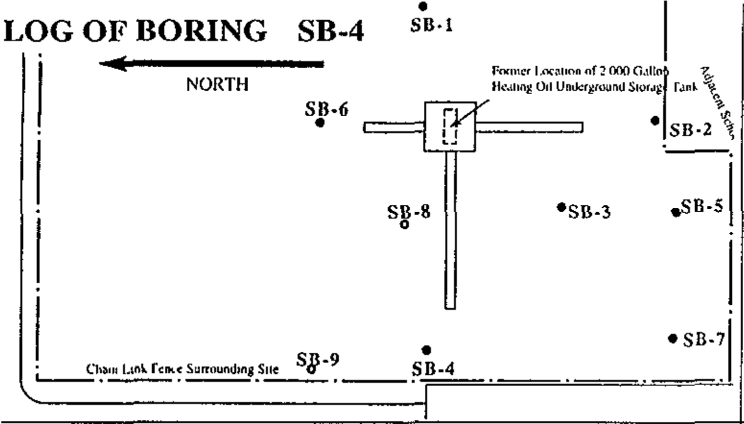


DEPTH (feet)	SOIL DESCRIPTION	SAMPLE NO.	BLOWS /6 in.	PID ppm	DESCRIPTION
0	CL: CLAY, dark brown, high plasticity, stiff, moist, with some coarse sand and small gravel			0.0	Boring Pressure Grouted with Neat Cement
-5	GC: clayey silty sandy GRAVEL, moist, very poorly sorted, angular to rounded				
	CL: gravelly CLAY, dark brown, high plasticity, stiff, moist				
-10	CL: grades greenish brown, with strong petroleum odor and some 1/16-inch pores filled with thick black substance	SB3-9		78	
	CL: 13 feet grades with water in some pore spaces	SB3-13		103	
-15	GC: clayey silty sandy GRAVEL, brown, moist (not wet), staining/ odor grades out 15.5 feet				
	GC: 17.5 feet to 18 feet grades wet, with greenish staining, strong petroleum odor - Refusal 18.0 feet in weathered sandstone				

COMPLETION DIAGRAM



LOG OF BORING SB-4

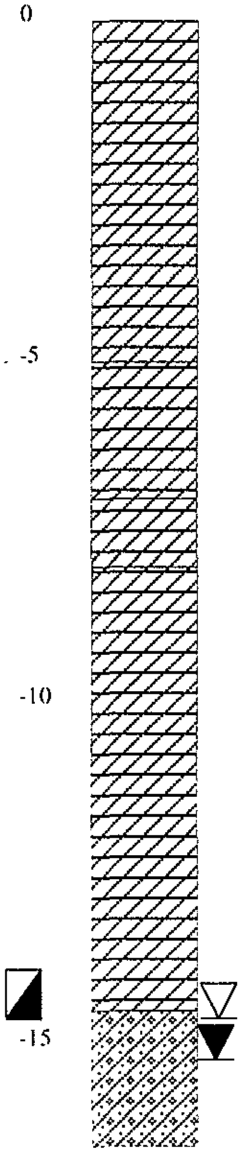


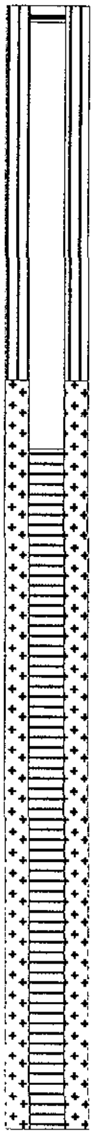
Albany Unified School District

603 Key Route Boulevard
Albany, California

DATES DRILLED:	3/30/99	SAMPLING METH	4' X 2" Continous Core
DRILLING CO.:	Artesian	TOTAL DEPTH	16 5 feet bgs
DRILL TOOLS:	Direct Push	LOGGED BY	P Jones
DRILLER	E Svoboda	DATE DEV	NA
PROJECT MANAGER:	P. Jones	DRAWN BY	P Jones
ARTESIAN JOB NO	378-002-02	DRAW DATE:	4/5/99

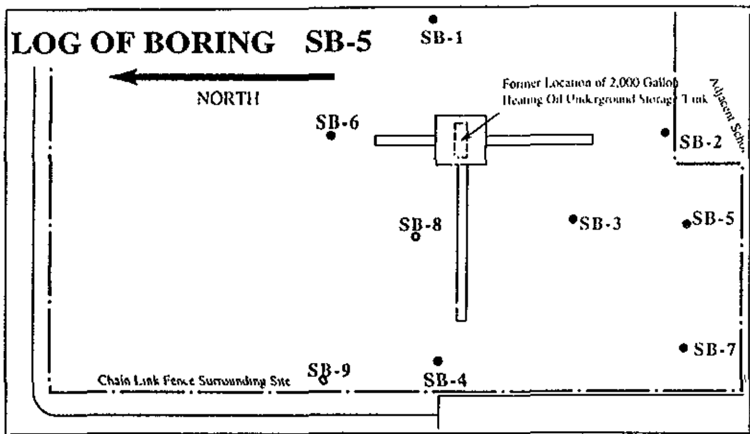
ARTESIAN ENVIRONMENTAL CONSULTANTS
229 Tewksbury Avenue Point Richmond, California 94801
TEL (510) 307-9943 • FAX (510) 232-2823





DEPTH (feet)	SOIL SYMBOLS/ FIELD TEST DATA	SOIL DESCRIPTION	SAMPLE NO.	BLOWS /6 in.	PID ppm	COMPLETION DIAGRAM	DESCRIPTION
0		CL: CLAY, dark brown, high plasticity, stiff, moist, with some coarse sand and small gravel			0.0		Boring Pressure Grouted with Neat Cement
-5		CL: grades brown					
		CL: grades gravelly sandy silty CLAY, non plastic					
		CL: grades CLAY, high plasticity, grayish brown mottled reddish brown, with some coarse sand and small gravel			0.0		
-10					0.0		
			SB4-14.5				
-15		GC: clayey silty sandy GRAVEL, brown, moist with water in small pores below 15 feet, very poorly sorted, angular to rounded sedimentary bedrock fragments - Refusal 16.5 feet in weathered bedrock			0.0		

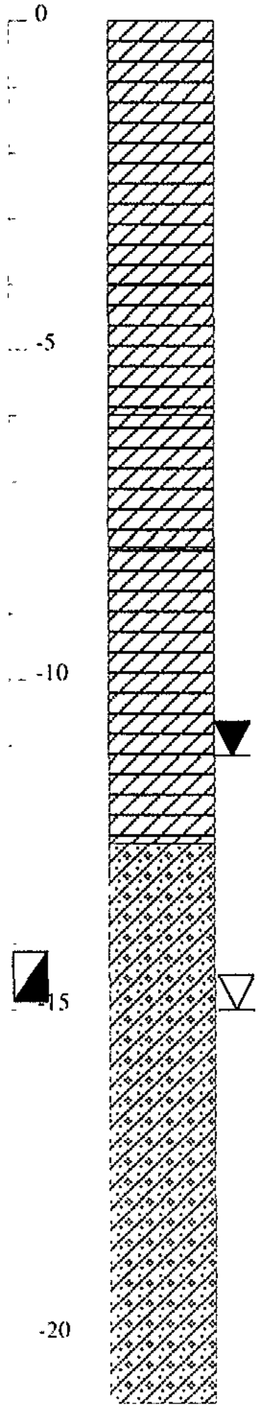
LOG OF BORING SB-5



Albany Unified School District
603 Key Route Boulevard
Albany, California

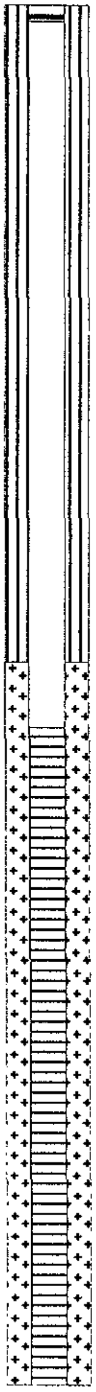
DATES DRILLED:	3/30/99	SAMPLING METH	4' X 2" Continous Core
DRILLING CO	Artesian	TOTAL DEPTH	21 feet bgs
DRILL TOOLS:	Direct Push	LOGGED BY:	P Jones
DRILLER	E. Svoboda	DATE DEV :	NA
PROJECT MANAGER.	P Jones	DRAWN BY	P Jones
ARTESIAN JOB NO.	378-002-02	DRAW DATE:	4/5/99

ARTESIAN ENVIRONMENTAL CONSULTANTS
229 Tewksbury Avenue Point Richmond, California 94801
TEL (510) 307-9943 • FAX (510) 232-2823



DEPTH (feet)	SOIL DESCRIPTION	SAMPLE NO.	BLOWS /6 in.	PID ppm
0	CL: CLAY, dark brown mottled light brown 2 feet to 4 feet, high plasticity, stiff, moist, with some coarse sand and small gravel			
	CL: grades brown			0.0
-5				
	CL: grades gravelly sandy silty CLAY, non plastic			
	CL: grades CLAY, high plasticity, brown slightly mottled reddish brown, with some coarse sand and small gravel			0.0
-10				
				0.0
	GC: clayey silty sandy GRAVEL, brown, moist with water in few pores below 15 feet, very poorly sorted, angular to rounded serpentine and sedimentary bedrock fragments - Refusal 21.0 feet in weathered bedrock			
-15		SB5-15		0.0
				0.0
-20				

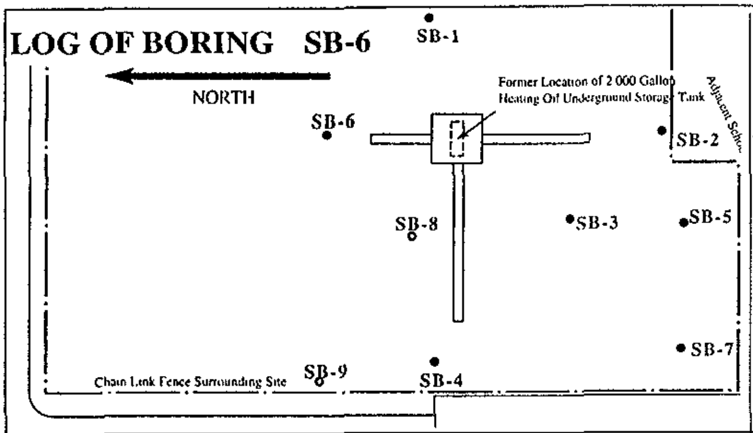
COMPLETION DIAGRAM



DESCRIPTION

Boring Pressure Grouted with Neat Cement

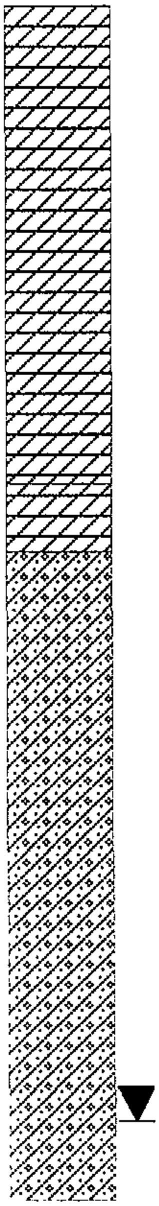
LOG OF BORING SB-6

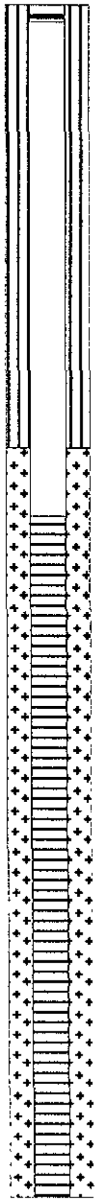


Albany Unified School District
603 Key Route Boulevard
Albany, California

DATES DRILLED:	3/30/99	SAMPLING METH	4' X 2" Continuous Core
DRILLING CO:	Artesian	TOTAL DEPTH	17 5 feet bgs
DRILL TOOLS.	Direct Push	LOGGED BY	P Jones
DRILLER:	E Svoboda	DATE DEV	NA
PROJECT MANAGER	P Jones	DRAWN BY	P Jones
ARTESIAN JOB NO:	378-002-02	DRAW DATE	4/5/99

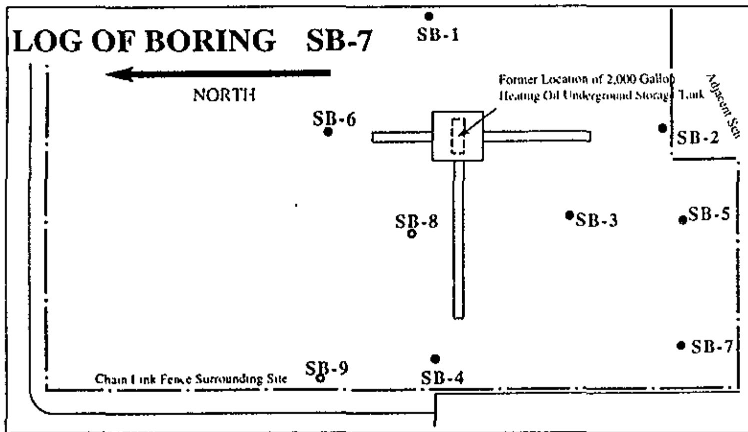
ARTESIAN ENVIRONMENTAL CONSULTANTS
229 Tewksbury Avenue, Point Richmond, California 94801
TEL (510) 307-9943 • FAX (510) 232-2823





DEPTH (feet)	SOIL SYMBOLS/ FIELD TEST DATA	SOIL DESCRIPTION	SAMPLE NO.	BLOWS /6 in.	PID ppm	COMPLETION DIAGRAM	DESCRIPTION
0		CL: CLAY, dark brown, high plasticity, stiff, moist, with some coarse sand and small gravel					Boring Pressure Grouted with Neat Cement
					0.0		
-5							
		CL: grades brown					
		GC: clayey silty sandy GRAVEL, brown, moist , very poorly sorted, angular to rounded serpentine and sedimentary bedrock fragments - Refusal 17.5 feet in weathered bedrock			0.0		
-10							
					0.0		
◩			SB6-13				
-15							
	▼						

LOG OF BORING SB-7

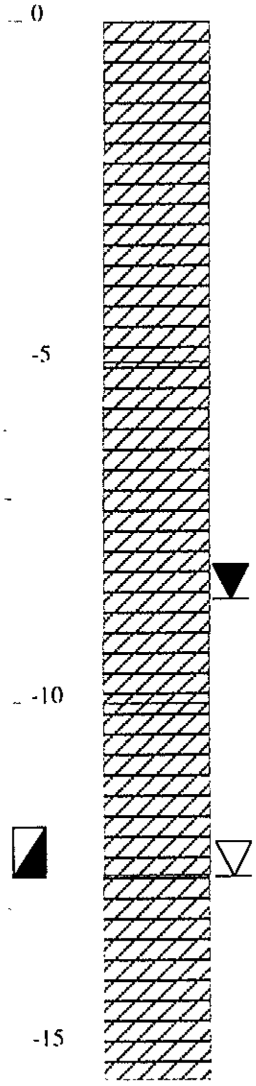


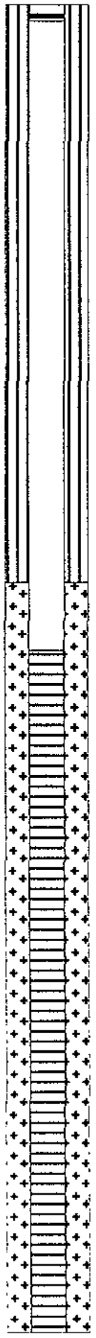
Albany Unified School District

603 Key Route Boulevard
Albany, California

DATES DRILLED	3/30/99	SAMPLING METH	4' X 2" Continous Core
DRILLING CO.	Artesian	TOTAL DEPTH	19 5 feet bgs
DRILL TOOLS:	Direct Push	LOGGED BY	P Jones
DRILLER	E Svoboda	DATE DEV.	NA
PROJECT MANAGER	P Jones	DRAWN BY	P Jones
ARTESIAN JOB NO	378-002-02	DRAW DATE	4/5/99

ARTESIAN ENVIRONMENTAL CONSULTANTS
229 Tewksbury Avenue, Point Richmond, California 94801
TEL (510) 307-9943 • FAX (510) 232-2823





DEPTH (feet)	SOIL DESCRIPTION	SAMPLE NO.	BLOWS /6 in.	PID ppm	DESCRIPTION
0	CL: CLAY, dark brown, high plasticity, stiff, moist, with some coarse sand and small gravel				Boring Pressure Grouted with Neat Cement
				0.0	
-5	CL: grades brown				
				0.0	
-10	CL: grades gravelly sandy silty CLAY, non plastic				
		SB7-12		0.0	
	CL: grades with water in few pores below 12.5 feet, very poorly sorted, angular to rounded serpentine and sedimentary bedrock fragments - No Recovery 15.5 feet to 19.5 feet - Refusal 19.5 feet				
-15					
				0.0	

ATTACHMENT C:

STANDARD OPERATING PROCEDURES

Artesian Environmental Consultants

Standard Operating Procedures:

Installing PVC Monitoring Well-Points With DPT Equipment

Small-diameter (not exceeding 1.5-inch outside diameter (OD)) PVC well screen and casing can be installed in borings using a Geoprobe® direct penetration technology (DPT) drill rig. The casing can be installed either as temporary well screens for collection of grab graoundwater samples, or as permanent groundwater monitoring well-points or air sparging points. The simplest and quickest method is to simply place the PVC well screen and casing in the open boring following continuous coring with DPT equipment. If the well-point is to be permanent, a sand filter pack, bentonite and grout seal would be addedthrough the boring annulus. The subsurface formation must be stable enough for the boring to remain open for this method to be practical, which is usually the case only in clayey formations.

For unstable formations where a cased-hole system is desired, two additional optional methods of installing the well casing with DPT equipment can be used:The monitoring well-point casing will consist of 1-inch outside diameter (OD) by 0.84-inch inside-diameter (ID) Schedule 40 PVC with a screened interval to intersect the shallow saturated zone as determined by hydrogeologic conditions in the field.

1) The Geoprobe® well method uses an outer drive casing with an expendable plastic end seal and PVC point. The drive casing is driven into the pre-cored borehole with the Geoprobe® DPT rig. Since the OD of the drive casing is slightly smaller than the OD of the continuous core sampler, disturbance and compaction of the formation around the annulus is minimized. The PVC well casing and screen are placed in the drive casing, the sand pack is installed to 1 foot above the top of the screen, and a 1-foot thick hydrated 1/4-inch bentonite pellet seal and 3% bentonite/cement grout seal are then added above the sand pack to the surface.

2) A second method uses the GeoInsight, Inc. PowerPunch™ system, which consists of a 1-inch outside diameter (OD) by 0.84-inch inside-diameter (ID) Schedule 40 PVC well screen and casing driven by an expendible stainless steel drive cone and PowerPunch™ body. While the PowerPunch™ system can be driven into soft formations without pre-drilling, it is desirable that the borehole be continuously cored prior to the well-point installation to minimize disturbance and compaction of the formation around the annulus. The PowerPunch™ assembly is driven into the borehole to the desired depth using the Geoprobe® DPT rig, then the drive rod and PowerPunch™ body are retracted to expose the desired length of well screen. The PowerPunch™ body remains in place in the borehole to form a seal between the well casing and the borehole annulus. A 1-foot thick hydrated bentonite pellet seal and 3% bentonite/cement grout seal are then added above the PowerPunch™ body to the surface. Since it is not possible to add a filter pack to the screened interval with this method, a 0.010-inch slot size will be used for the well screen. The natural formation will collapse around the well screen when the drive rod and PowerPunch™ body are retracted.

Artesian Environmental Consultants

Standard Operating Procedures

MONITORING WELL SAMPLING

Prior to groundwater sampling, initial water level and floating liquid hydrocarbon measurements are recorded for each well. Each well is sounded for depth to ascertain if silting has occurred and to verify the actual depth below ground surface. These measurements are used to calculate the volume for each well. At this time, all non-dedicated pumping and sampling supplies are washed with an Alconox solution, rinsed with clean water, and final rinsed with either distilled or deionized water to prevent any cross contamination from other sampling events.

Each well is purged by evacuating a minimum of three well-casing volumes of groundwater from the well. The well water may be evacuated either by bailing, or pumping. Any of the following may be used for bailing: a dedicated pvc bailer, sterile disposable polyethylene bailer, or a stainless steel bailer. For pumping the groundwater out of the well, a downhole impeller type pump (dedicated or removable with PVC tubing), a downhole dedicated bladder pump, or a surface peristaltic pump is used.

After three to four well volumes are pumped, each well is permitted to recharge to at least 80% of original capacity or for two hours; whichever occurs first. The water is then measured to verify whether the well has stabilized. Stabilization is determined by measuring the parameters of pH; temperature; and electrical conductivity. Stabilized measurements indicate that formation water has entered the well. When two subsequent measurements of these three parameters are within 10% of each other, the well is considered stabilized and is ready to be sampled.

The samples are collected using a new polyethylene bailer with a bottom siphon and nylon cord. The bailers are disposable, and therefore, never reused. The groundwater sample is visually inspected for the presence of free product in the sampling bailer. Agitation is minimized during sample retrieval to prevent aeration during the transfer from the well to the laboratory prepared sample containers. Duplicate water samples are collected from the well and siphoned into three, 40 ml, VOA, septum top vials, with additional 950 ml samples collected in an amber glass bottles or polyethylene bottles depending on the analyses to be performed. The VOA vials are filled completely, leaving no headspace, and are sealed with Teflon-lined lids. All samples are labeled, chilled to 4° C in an ice chest, and sent to a California State Certified hazardous materials testing laboratory under chain-of-custody documentation .

All groundwater samples are collected in accordance with California Regional Water Quality Control Board (RWQCB) procedures described in the *Leaking Underground Fuel Tank (LUFT) Field Manual*, the *Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites*, and local regulatory guidelines.

Standard Environmental Protection Agency (EPA), San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), and Department of Health Services (DHS) methodologies for sampling and analyses are routinely utilized.

Chain of Custody documentation accompanies all samples to the laboratory. A copy of the Chain of Custody documentation is attached to the Certificate of Analysis.

Monitor well purge water is properly stored and labeled on site in DOT 17-H containers pending off site disposal.

ARTESIAN ENVIRONMENTAL

Standard Operating Procedures

Direct Push Technology - Soil Sampling

Direct push technology, also called drive point sampling and soil probing, uses portable and limited access hydraulic or pneumatic probing methods to sample soils. Artesian uses hardened stainless steel soil sampling tools. The tools are designed for discrete or continuous coring.

Piston Probe-Drive Sampler

The 2-foot to 4-foot long Probe-Drive piston sampler remains completely sealed with disposable, rubber o-rings, while it is pushed or driven to the desired sampling depth. After the sampler has been driven to the target depth, a piston stop-pin at the trailing end of the sampler is removed using steel extension rods inserted down the inside diameter of the hollow probe rods. The piston tip retracts into the sample tube as it is displaced approximately 2 feet by the soil while the sample is being collected. Soil samples are usually collected in a 2 foot long inert PETG liners (clear plastic). The liners can be cut easily with a knife. Brass, stainless steel or Teflon liners are also available to suit various sampling requirements.

Continuous Coring Tools

Artesian uses continuous coring tools ranging from 0.5 inches to 2.0 inches in diameter. The soil sampling tools range from 1.0 feet to 4.0 feet in length. The continuous coring tool contains an inner liner composed of PETG (clear plastic), brass, stainless steel or Teflon.

Drive Points

Solid, hardened steel drive points are designed to pre-probe holes or be used where difficult drilling is encountered due to hard pan soils, penetrating frost or asphalt layers. After the hard zone has been penetrated, the drive point is removed and replaced with a coring tool.

Sample Preparation

The sampler is extracted from the borehole to the surface using the Direct Push Technology (DPT) rig, a truck mounted crane, or a portable probe extractor. The sample liner containing the soil sample is removed from the sampler. The soil sample is generally logged for hydrogeologic and lithologic characteristics by a geologist or engineer under the direction and supervision of a state-registered geologist or state-registered engineer using the Unified Soil Classification System (USCS). Soil samples may be screened using an organic vapor analyzer (OVA) or a photoionization detector (PID).

After the soil samples have been logged, the portions of the soil sample selected for analysis are immediately capped on both open ends with Teflon tape, trimmed and capped with plastic caps. The samples are then labeled and placed in individual see-through zip-lock plastic bags. The samples are stored in an ice chest with crushed ice. A thermometer is kept in the ice chest to ensure that the proper temperature is maintained. The samples are then delivered under chain-of-custody to a state-certified hazardous materials testing laboratory. The above mentioned procedures minimize the potential for cross-contamination and volatilization of volatile organic compounds (VOC) prior to chemical analysis.

Decontamination

All sampling equipment is cleaned either with a hot water pressure washer or with a phosphate-free detergent wash and two de-ionized water rinses between samples and between borings to prevent cross-contamination. The sampler is then refitted with a new soil liner and re-inserted into the borehole. The sampler is driven to the next target zone. This procedure is repeated until the total depth of the borehole is reached. Since all materials generated using direct push technology are actual samples, soil disposal in not required.

ATTACHMENT D:

LABORATORY ANALYTICAL REPORTS

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #378-002-02; Vila/AUSDH	Date Sampled: 04/01/99 Date Received: 04/01/99
	Client Contact Paul Jones	Date Extracted: 04/04-04/05/99
	Client P.O:	Date Analyzed: 04/04-04/05/99

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)$^{+}$	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	% Recovery Surrogate
08452	SB-5	W	---	ND	ND	1.1	0.73	6.3	103
08453	SB-4	W	---	ND	ND	0.69	ND	1.2	101
08454	SB-7	W	---	ND	ND	0.95	067	5.6	102
08455	SB-6	W	---	ND	ND	1.0	ND	2.2	105
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	5.0	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

$^{\#}$ cluttered chromatogram; sample peak coelutes with surrogate peak

$^{+}$The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?, e) TPH pattern that does not appear to be derived from gasoline (?), f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment, j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.	110 2nd Avenue South, #D7, Pacheco, CA 94553-5560 Telephone : 925-798-1620 Fax : 925-798-1622 http://www.mccampbell.com E-mail: main@mccampbell.com

Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #378-002-02; Vila/AUSDH	Date Sampled: 04/01/99
		Date Received: 04/01/99
	Client Contact Paul Jones	Date Extracted: 04/01/99
	Client P.O:	Date Analyzed: 04/02-04/07/99

Diesel Range (C10-C23) Extractable Hydrocarbons as Diesel *

EPA methods modified 8015, and 3550 or 3510; California RWQCB (SF Bay Region) method GCFID(3550) or GCFID(3510)

Lab ID	Client ID	Matrix	TPH(d)+	% Recovery Surrogate
08452	SB-5	W	180,b	99
08453	SB-4	W	150,b	94
08454	SB-7	W	ND	93
08455	SB-6	W	98,b	94

Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	W	50 ug/L	
	S	1.0 mg/kg	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP / STLC / SPLP extracts in ug/L

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

+The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern, c) aged diesel? is significant); d) gasoline range compounds are significant; e) medium boiling point pattern that does not match diesel (?), f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #378-002-02; Vila/AUSDH	Date Sampled: 04/01/99 Date Received: 04/01/99
	Client Contact Paul Jones	Date Extracted: 04/01/99
	Client P.O:	Date Analyzed: 04/01/99

Petroleum Oil & Grease (with Silica Gel Clean-up) *

EPA methods 413.1, 9070 or 9071; Standard Methods 5520 D/E&F or 503 D&E for solids and 5520 B&F or 503 A&E for liquids

Lab ID	Client ID	Matrix	Oil & Grease*
08452	SB-5	W	ND
08454	SB-7	W	ND

Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	W	5 mg/L
	S	50 mg/kg

* water samples are reported in mg/L, wipe samples in mg/wipe, soil and sludge samples in mg/kg, and all TCLP / STLC / SPLP extracts in mg/L

h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5vol. % sediment.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 925-798-1620 Fax: 925-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 04/01/99 Matrix: WATER

Analyte	Concentration (ug/L)			Amount Spiked	% Recovery		RPD
	Sample (#05350)	MS	MSD		MS	MSD	
TPH (gas)	0.0	89.3	103.9	100.0	89.3	103.9	15.1
Benzene	0.0	10.3	10.0	10.0	103.0	100.0	3.0
Toluene	0.0	10.4	10.1	10.0	104.0	101.0	2.9
Ethyl Benzene	0.0	10.6	10.4	10.0	106.0	104.0	1.9
Xylenes	0.0	31.5	30.9	30.0	105.0	103.0	1.9
TPH(diesel)	0.0	8064	7773	7500	108	104	3.7
TRPH (oil & grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

QC REPORT FOR HYDROCARBON ANALYSES

Date: 04/04/99-04/05/99 Matrix: WATER

Analyte	Concentration (ug/L) Sample (#08563)			Amount Spiked	% Recovery MS		RPD
		MS	MSD			MSD	
TPH (gas)	0.0	108.4	107.1	100.0	108.4	107.1	1.2
Benzene	0.0	10.2	10.4	10.0	102.0	104.0	1.9
Toluene	0.0	10.5	10.5	10.0	105.0	105.0	0.0
Ethyl Benzene	0.0	10.6	10.8	10.0	106.0	108.0	1.9
Xylenes	0.0	31.9	32.1	30.0	106.3	107.0	0.6
TPH(diesel)	0.0	7523	7415	7500	100	99	1.4
TRPH (oil & grease)	0	27700	25500	23700	117	108	8.3

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

QC REPORT FOR HYDROCARBON ANALYSES

Date: 04/07/99-04/08/99 Matrix: WATER

Analyte	Concentration (ug/L)			Amount Spiked	% Recovery		RPD
	Sample (#08563)	MS	MSD		MS	MSD	
TPH (gas)	0.0	104.5	102.9	100.0	104.5	102.9	1.6
Benzene	0.0	9.2	9.0	10.0	92.0	90.0	2.2
Toluene	0.0	9.4	9.4	10.0	94.0	94.0	0.0
Ethyl Benzene	0.0	9.3	9.2	10.0	93.0	92.0	1.1
Xylenes	0.0	27.9	27.6	30.0	93.0	92.0	1.1
TPH(diesel)	0.0	7636	8165	7500	102	109	6.7
TRPH (oil & grease)	0	22464	22584	23700	95	95	0.5

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

GeoAnalytical Laboratories, Inc.

1405 Kansas Avenue Modesto, CA 95351 Phone (209) 572-0900 Fax (209) 572-0916

CERTIFICATE OF ANALYSIS

Report # K092-03

Date: 4/08/99

McCampbell Analytical
110 2nd Avenue #D7
Pacheco CA 94553-5560

Project: 14558 ART-E

PO#

Date Rec'd:	4/02/99
Date Started:	4/02/99
Date Completed:	4/07/99
Date Sampled:	4/01/99
Time:	09:45 am
Sampler:	

Sample ID	Lab ID	MDL	Method	Analyte	Results	Units
SB-5	K31659	10	310.1	Total Alkalinity	330	mg/L
		1.0	300	Nitrate (NO3)	9	mg/L
		1.0	300	Sulfate	86	mg/L
		1.0	$4500CO_2C$	Carbon Dioxide	31	mg/L
SB-7	K31660	10	310.1	Total Alkalinity	350	mg/L
		1.0	300	Nitrate (NO3)	35	mg/L
		1.0	300	Sulfate	143	mg/L
		1.0	$4500CO_2C$	Carbon Dioxide	44	mg/L

Ramiro Salgado
Chemist

Certification # 1157

Donna Keller
Laboratory Director

GeoAnalytical Laboratories, Inc.

1405 Kansas Avenue Modesto, CA 95351 Phone (209) 572-0900 Fax (209) 572-0916

Report# K092-03

QC REPORT

McCampbell Analytical
110 2nd Avenue #D7
Pacheco CA 94553-5560

Dates Analyzed 4/2/99

Analyte	**Batch #**	**Method**	**Original Sample**	**Duplicate Sample**	**RPD**	**Blank**
Carbon Dioxide	I00457	4500 C	95	92	3.2	ND

Ramiro Salgado
Chemist

Certification # 1157

Donna Keller
Donna Keller
Laboratory Director

GeoAnalytical Laboratories, Inc.

1405 Kansas Avenue Modesto, CA 95351 Phone (209) 572-0900 Fax (209) 572-0916

Report# K092-03

QC REPORT

McCampbell Analytical
110 2nd Avenue #D7
Pacheco CA 94553-5560

Dates Analyzed 4/7/99

Analyte	**Batch #**	**Method**	**MS % Recovery**	**MSD % Recovery**	**RPD**	**Blank**
Total Alkalinity	I00498	310.1	100	100	0.0	ND
Chloride	I00460	300	78	80	2.5	ND
Nitrite			90	92	2.2	ND
Nitrate			90	87	3.4	ND
Sulfate			100	96	4.1	ND

Donna Keller

Ramiro Salgado
Chemist

Certification # 1157

Donna Keller
Laboratory Director

Geo

K092-03

McCAMPBELL ANALYTICAL INC.
110 2nd AVENUE SOUTH, #D7
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CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HOUR ☐ 48 HOUR ☒ 5 DAY ☐ ROUTINE

Report To: Ed Hamilton Bill To: MAI
Project #: 14558 Project Name: ART-E
Project Location:

SAMPLE ID	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	MATRIX Soil	MATRIX Air	MATRIX Sludge	MATRIX Other	METHOD PRESERVED Ice	METHOD PRESERVED HCl	METHOD PRESERVED HNO_3	METHOD PRESERVED Other	EPA 601/8010	EPA 602/8020	EPA 608/808	EPA 608/8080-PCB's only	EPA 624/8240/8260	EPA 625/8270	CAM – 17 Metals	EPA – Priority Pollutant Metals	LUFT Metals	LEAD (7240/7421/239.2/6010)	ORGANIC LEAD	RCI	Alkalinity	Nitrate	Sulfate	CO_2				COMMENTS
SB-5		4/1	09:45			X															K31659						X	X	X	X				08452
SB-7		4/1	10:15			X															K31660						X	X	X	X				08454

Relinquished By: Vida V (MAI) Date: 4/1 Time: Received By: AERO

Relinquished By: Date: Time: Received By:

Relinquished By: Date: Time: Received By:

Remarks:

14558 ZA4

McCAMPBELL ANALYTICAL INC.

110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553
Telephone: (925) 798-1620 Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HOUR ☐ 48 HOUR ☒ 5 DAY

Report To: Bill To: Artesian
Company: Artesian Environmental
229 Tewksbury Avenue
Point Richmond, CA 94801
Tele: (510) 307-9943 Fax: (510) 232-2823
Project #: 378-002-02 Project Name: Villa/AUSDH
Project Location: 603 Key Route Blvd, Albany
Sampler Signature:

SAMPLE ID	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	MATRIX Soil	MATRIX Air	MATRIX Sludge	MATRIX Other	METHOD PRESERVED Ice	METHOD PRESERVED HCl	METHOD PRESERVED HNO_3	METHOD PRESERVED Other	BTEX & TPH as Gas (602/8020 + 8015)/ MTBE	TPH as Diesel (8015)	Total Petroleum Oil & Grease (5520 E&F/B&F)	Total Petroleum Hydrocarbons (418.1)	EPA 601 / 8010	BTEX ONLY (EPA 602 / 8020)	EPA 608 / 8080	EPA 608 / 8080 PCB's ONLY	EPA 624 / 8240 / 8260	EPA 625 / 8270	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals	LUFT 5 Metals	Lead (7240/7421/239.2/6010)	RCI	Other: Alkalinity, Nitrate, Sulfate	Other: CO_2	Other	Other	Comments
✓ SB-5		4/1/99	0945	5	voa/1L	X					X	X			X	X	X													X	X			08452
✓ SB-4		4/1/99	1010	3	"	X					X	X			X	X																		08453
✓ SB-7		4/1/99	1015	5	"	X					X	X			X	X	X													X	X			08454
✓ SB-6		4/1/99	1045	3	"	X					X	X			X	X																		08455

Relinquished By:	Date:	Time:	Received By:
	4/1/99	1408	David J. Moro
David Moro	4/1/99	14:45	Dina A Butler

Remarks:

ICE/t° ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT ✓

	VOAS	O&G	METALS	OTHER
PRESERVATION	✓			

APPROPRIATE CONTAINERS ✓

lev

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Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #378-002-02; Vila/ AUSDH	Date Sampled: 03/30/99
		Date Received: 03/31/99
	Client Contact Paul Jones	Date Extracted: 03/31/99
	Client P.O:	Date Analyzed: 03/31-04/02/99

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)[+]	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	% Recovery Surrogate
08274	SB1-12	S	ND	---	ND	ND	ND	ND	102
08275	SB2-13	S	ND	---	ND	ND	ND	ND	100
08276	SB3-13	S	32,g	---	ND	0.020	0.037	0.15	107
08277	SB3-9	S	20,g	---	ND	ND	ND	ND	95
08278	SB4-14.5	S	ND	---	ND	ND	ND	ND	97
08279	SB5-15	S	ND	---	ND	ND	ND	ND	99
08280	SB6-13	S	ND	---	ND	0.010	ND	0.010	103
08281	SB7-12	S	ND	---	ND	ND	ND	ND	98
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	5.0	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

[#] cluttered chromatogram; sample peak coelutes with surrogate peak

[+] The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant, d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

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Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #378-002-02; Vila/ AUSDH	Date Sampled: 03/30/99
		Date Received: 03/31/99
	Client Contact Paul Jones	Date Extracted: 03/31/99
	Client P.O:	Date Analyzed: 03/31-04/02/99

Diesel Range (C10-C23) Extractable Hydrocarbons as Diesel *

EPA methods modified 8015, and 3550 or 3510; California RWQCB (SF Bay Region) method GCFID(3550) or GCFID(3510)

Lab ID	Client ID	Matrix	TPH(d)$^+$	% Recovery Surrogate
08274	SB1-12	S	1.3,b,g	99
08275	SB2-13	S	ND	99
08276	SB3-13	S	1600,a,g	102
08277	SB3-9	S	600,a,g	102
08278	SB4-14.5	S	ND	102
08279	SB5-15	S	ND	98
08280	SB6-13	S	ND	102
08281	SB7-12	S	ND	98
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	W	50 ug/L	
	S	1.0 mg/kg	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP / STLC / SPLP extracts in ug/L

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

+The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) aged diesel? is significant); d) gasoline range compounds are significant; e) medium boiling point pattern that does not match diesel (?); f) one to a few isolated peaks present; g) oil range compounds are significant, h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol % sediment.

DHS Certification No. 1644

Edward Hamilton, Lab Director

Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #378-002-02; Vila/ AUSDH	Date Sampled: 03/30/99 Date Received: 03/31/99
	Client Contact Paul Jones	Date Extracted: 03/31/99
	Client P.O:	Date Analyzed: 03/31/99

Total Recoverable Petroleum Hydrocarbons as Oil & Grease (with Silica Gel Clean-up) by Scanning IR Spectrometry*

EPA method 418.1 or 9073; Standard Methods 5520 C&F

Lab ID	Client ID	Matrix	TRPH[+]	% Recovery Surrogate
08274	SB1-12	S	14	94
08275	SB2-13	S	ND	87
08276	SB3-13	S	1700	---[#]
08277	SB3-9	S	1000	---[#]
08278	SB4-14.5	S	ND	89
08279	SB5-15	S	ND	91
08280	SB6-13	S	ND	89
08281	SB7-12	S	ND	86
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	W	1.0 mg/L	
	S	10 mg/kg	

* water samples are reported in mg/L , wipe samples in mg/wipe and soils and sludges in mg/kg

[#] surrogate diluted out of range or not applicable to this sample

[+] At the client's request or the laboratory's discretion, one or more positive samples may be run by direct injection chromatography with FID detection. The following comments pertain to these GC results: a) gasoline-range compounds (C6-C12) are present; b) diesel range compounds (C10-C23) are present; c) oil-range compounds (>C18) are present; d) other patterned solvent (?), e) isolated peaks; f) GC compounds are absent or insignificant relative to TRPH inferring that complex biologically derived molecules are the source of IR absorption; h) a lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment

DHS Certification No. 1644

Edward Hamilton, Lab Director

Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #378-002-02; Vila/ AUSDH	Date Sampled: 03/30/99 Date Received: 03/31/99
	Client Contact Paul Jones	Date Extracted: 04/01/99
	Client P.O:	Date Analyzed: 04/05/99

Polynuclear Aromatic Hydrocarbons (PAH / PNA) by GC-MS

EPA methods 625 (modified 610) and 3510 or 8270 (modified 8100) and 3550

Lab ID	08276					Reporting Limit	
Client ID	SB3-13					S	W, STLC TCLP
Matrix	S						
Compound	Concentration*					mg/kg	ug/L
Acenaphthene	ND<1					0.33	10
Acenaphthylne	ND<1					0.33	10
Anthracene	ND<1					0.33	10
Benzo(a)anthracene	ND<1					0.33	10
Benzo(b)fluoranthene	ND<1					0.33	10
Benzo(k)fluoranthene	ND<1					0.33	10
Benzo(g,h,i)perylene	ND<1					0.33	10
Benzo(a)pyrene	ND<1					0.33	10
Chrysene	ND<1					0.33	10
Dibenzo(a,h)anthracene	ND<1					0.33	10
Fluoranthene	ND<1					0.33	10
Fluorene	ND<1					0.33	10
Indeno(1,2,3-cd)pyrene	ND<1					0.33	10
Naphthalene	ND<1					0.33	10
Phenanthrene	ND<1					0.33	10
Pyrene	ND<1					0.33	10
% Recovery Surrogate 1	109						
% Recovery Surrogate 2	90						
Comments	j						

* water and vapor samples are reported in ug/L, soil and sludge samples in mg/kg, wipes in ug/wipe and all TCLP / STLC / SPLP extracts in ug/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis

\# surrogate diluted out of range or surrogate coelutes with another peak

(h) a lighter than water immiscible sheen is present; (i) liquid sample that contains >~5 vol % sediment; (j) sample diluted due to high organic content.

DHS Certification No. 1644

Edward Hamilton, Lab Director

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http://www.mccampbell.com E-mail: main@mccampbell.com

Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #378-002-02; Vila/ AUSDH	Date Sampled: 03/30/99 Date Received: 03/31/99
	Client Contact Paul Jones	Date Extracted: 03/31/99
	Client P.O:	Date Analyzed: 04/01-04/07/99

Analytical methods			Moisture	Bulk Density	Porosity
			ASTM E3173	#	&
Lab ID	Client ID	Matrix	Weight %	Grams / cc	Vol % Porosity
08275	SB2-13	S	18	1.9	40
Reporting Limit or Method Accuracy unless otherwise stated; ND means not detected above the reporting limit		S	± 2%	± 0.1g/cc	± 2%

calculated

& calculated volume percentage assuming that the specific gravity of soil is 2.65 grams/cc.

DHS Certification No. 1644

Edward Hamilton, Lab Director

QC REPORT FOR HYDROCARBON ANALYSES

Date: 03/31/99 Matrix: SOIL

Analyte	Concentration (mg/kg)				% Recovery		
	Sample (#01932)	MS	MSD	Amount Spiked	MS	MSD	RPD
TPH (gas)	0.000	2.179	2.026	2.03	107	100	7.3
Benzene	0.000	0.192	0.202	0.2	96	101	5.1
Toluene	0.000	0.198	0.202	0.2	99	101	2.0
Ethylbenzene	0.000	0.196	0.196	0.2	98	98	0.0
Xylenes	0.000	0.584	0.576	0.6	97	96	1.4
TPH(diesel)	0	304	305	300	101	102	0.3
TRPH (oil and grease)	0.0	24.5	24.6	20.8	118	118	0.4

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
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QC REPORT FOR SVOCs (EPA 8270/625/525)

Date: 04/05/99-04/06/99 Matrix: SOIL

Analyte	Concentration (ug/Kg,m Sample (#01929)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
Phenol	0	60	59	100	60	59	3.4
2-Chlorophenol	0	73	71	100	73	71	2.8
1, 4-Dichlorobenzene	0	76	75	100	76	75	1.3
N-nitroso-di-n-propyl	0	68	67	100	68	67	1.5
1, 2, 4-Trichlorobenz	0	82	83	100	82	83	1.2
4-Chloro-3-methylphen	0	70	69	100	70	69	1.4
4-Nitrophenol	0	72	70	100	72	70	2.8
Acenaphthene	0	71	70	100	71	70	1.4
2, 4- Dinitrotoluene	0	68	67	100	68	67	1.5
Pentachlorophenol	0	50	50	100	50	50	0.0
Pyrene	0	81	80	100	81	80	1.2

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

alpha
Alpha Analytical Laboratories Inc. • 860 Waugh Lane, H-1, Ukiah, California 95482
(707) 468-0401

CHEMICAL EXAMINATION REPORT

McCampbell Analytical, Inc.
110 2nd Avenue South #D7
Pacheco, CA 94553-5560
Attn: Ed Hamilton

Date Printed	Page
4/09/99	1

atch Number	Receipt Date	Client	Client P.O.	Send Via
9-0402-011	04/02/99 10:09	MCCLAB		Mail

	METHOD	EXTRACTED	TEST DATE	RESULT	UNITS	PQL	DILUTION
atch 99-0402-011 consisted of 1 Sample and 1 Test							
ample 1 SB2-13 A.E. Project #14535							
Sample Type: Soil Sampled by:			Sampled: 3/30/99				
Total Organic Carbon	415.1		4/09/99	1090	mg/kg	5	

PQL - Practical Quantitation Limit ND - None Detected
- Indicates Detection Limit altered due to Sample Dilution

NOTES:

Bruce L. Gove
Laboratory Director

Date Printed: 4/09/99

41.8 1-

ICED/COLD: YES
AIR SPACE/BUBBLES: YES
PRESERVED: NO

AAI

McCAMPBELL ANALYTICAL INC.
110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553-5560
Telephone: (925) 798-1620 Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HOUR ☐ 48 HOUR ☒ 5 DAY ☐ ROUTINE

Report To: Ed Hamilton Bill To: MAI
Project #: 14535 Project Name: A.E.
Project Location:

SAMPLE ID	LOCATION	SAMPLING		# Containers	Type Containers	MATRIX					METHOD PRESERVED				ANALYSIS REQUEST												OTHER							COMMENTS
		Date	Time			Water	Soil	Air	Sludge	Other	Ice	HCl	HNO$_3$	Other	EPA 601/8010	EPA 602/8020	EPA 608/808	EPA 608/8080-PCB's only	EPA 624/8240/8260	EPA 625/8270	CAM – 17 Metals	EPA – Priority Pollutant Metals	LUFT Metals	LEAD (7240/7421/239.2/6010)	ORGANIC LEAD	RCI	TOC						
SB2-13		3/30		1	VOA		X				X																X							08275

99-0402-11-1

Relinquished By:	Date:	Time:	Received By:	Remarks:
Dena A Butler	4/1/99		Locke Smith 4/2/99@10:09	
Relinquished By:	Date:	Time:	Received By:	
Relinquished By:	Date:	Time:	Received By:	

14535ZA2

McCAMPBELL ANALYTICAL
110 2nd AVENUE, # D7
PACHECO, CA 94553
(510) 798-1620 FAX (510) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME: ☐ RUSH ☐ 24 HOUR ☐ 48 HOUR ☒ 5 DAY

REPORT TO: Paul Jones BILL TO:
COMPANY: Artesian Environmental
229 Tewksbury Avenue
Point Richmond, CA 94801
TELE: (510) 307-9943 FAX #: (510) 232-2823
PROJECT NUMBER: 378-002-02 PROJECT NAME: Vila / AUSDH
PROJECT LOCATION: 603 Key Route Blvd, Albany
SAMPLER SIGNATURE:

SAMPLE ID	LOCATION	SAMPLING DATE	SAMPLING TIME	# CONTAINERS	TYPE CONTAINERS	MATRIX WATER	MATRIX SOIL	MATRIX AIR	MATRIX SLUDGE	MATRIX OTHER	METHOD PRESERVED HCL	METHOD PRESERVED HNO_3	METHOD PRESERVED OTHER	BTEX & TPH as Gasoline (602/8020 & 8015)	THP as Diesel (8015)	Total Petroleum Oil & Grease (5520 E&F/5520 B&F) 418.1	Total Petroleum Hydrocarbons (418.1)	EPA 601/8010	EPA 602/8020	EPA 608/8080	EPA 608/8080 - PCBs Only	EPA 624/8240/8260	EPA 625/8270 PAHS	CAM - 17 Metals	EPA - Priority Pollutant Metals	LEAD (7240/7421/239.2/6010)	ORGANIC LEAD	RCI	OTHER: Total Organic Carbon	OTHER: Bulk Density, Porosity	OTHER: Water Content	OTHER	COMMENTS
SB1-9		3/30/99	0840	1	tube		X																										08273 H
SB1-12		3/30/99	0840	1	Tube		X							X	X	X																	08274
SB2-13		3/30/99	1023	1	"		X							X	X	X													X	X	X		08275
SB3-13		3/30/99	1110	1	"		X							X	X	X							X										08276
SB3-9		3/30/99	1100	1	"		X							X	X	X																	08277
SB4-14.5		3/30/99	1200	1	"		X							X	X	X																	08278
SB5-15		3/30/99	1248	1	"		X							X	X	X																	08279
SB6-13		3/30/99	1520	1	"		X							X	X	X													X	X	X		08280
SB7-12		3/30/99	1617	1	"		X							X	X	X																	08281

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:
	3/31/99	9:09	H Marlin 303
H Marlin 303	3/31/99	2:04	Gina A. Butler 3/31/99
			RECEIVED BY LABORATORY:

REMARKS: Please Hold the following for possible future analysis: SB1-9.

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #348-002-02; Vila/AUSDH	Date Sampled: 03/31/99
		Date Received: 04/01/99
	Client Contact Paul Jones	Date Extracted: 04/01/99
	Client P.O:	Date Analyzed: 04/01/99

04/08/99

Dear Paul:

Enclosed are:

1). the results of **3** samples from your **#348-002-02; Vila/AUSDH** project,

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Edward Hamilton, Lab Director

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Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #348-002-02; Vila/AUSDH	Date Sampled: 03/31/99 Date Received: 04/01/99
	Client Contact Paul Jones	Date Extracted: 04/03-04/05/99
	Client P.O:	Date Analyzed: 04/03-04/05/99

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)[+]	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	% Recovery Surrogate
08384	SB-1	W	ND	ND	ND	ND	ND	ND	104
08385	SB-2	W	ND	ND	ND	ND	ND	ND	105
08386	SB-3	W	100,g	ND	ND	ND	ND	0.74	102
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	5.0	0.5	0 5	0.5	0.5	
		S	1.0 mg/kg	0 05	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

[#] cluttered chromatogram; sample peak coelutes with surrogate peak

[+] The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant, biologically altered gasoline?, e) TPH pattern that does not appear to be derived from gasoline (?), f) one to a few isolated peaks present, g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment; j) no recognizable pattern

DHS Certification No. 1644

Edward Hamilton, Lab Director

Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #348-002-02; Vila/AUSDH	Date Sampled: 03/31/99 Date Received: 04/01/99
	Client Contact Paul Jones	Date Extracted: 04/01/99
	Client P.O:	Date Analyzed: 04/01/99

Petroleum Oil & Grease (with Silica Gel Clean-up) *

EPA methods 413.1, 9070 or 9071; Standard Methods 5520 D/E&F or 503 D&E for solids and 5520 B&F or 503 A&E for liquids

Lab ID	Client ID	Matrix	Oil & Grease*
08384	SB-1	W	ND
08385	SB-2	W	ND
08386	SB-3	W	ND
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	5 mg/L
		S	50 mg/kg

* water samples are reported in mg/L, wipe samples in mg/wipe, soil and sludge samples in mg/kg, and all TCLP / STLC / SPLP extracts in mg/L

h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5vol. % sediment

DHS Certification No. 1644

Edward Hamilton, Lab Director

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Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #348-002-02; Vila/AUSDH	Date Sampled: 03/31/99 Date Received: 04/01/99
	Client Contact Paul Jones	Date Extracted: 04/02/99
	Client P.O:	Date Analyzed: 04/07/99

Polynuclear Aromatic Hydrocarbons (PAH / PNA) by GC-MS

EPA methods 625 (modified 610) and 3510 or 8270 (modified 8100) and 3550

Lab ID	08386					Reporting Limit	
Client ID	SB-3					S	W, STLC TCLP
Matrix	W						
Compound	Concentration*					mg/kg	ug/L
Acenaphthene	ND					0.33	10
Acenaphthylne	ND					0.33	10
Anthracene	ND					0.33	10
Benzo(a)anthracene	ND					0.33	10
Benzo(b)fluoranthene	ND					0.33	10
Benzo(k)fluoranthene	ND					0.33	10
Benzo(g,h,i)perylene	ND					0.33	10
Benzo(a)pyrene	ND					0.33	10
Chrysene	ND					0.33	10
Dibenzo(a,h)anthracene	ND					0.33	10
Fluoranthene	ND					0.33	10
Fluorene	ND					0.33	10
Indeno(1,2,3-cd)pyrene	ND					0.33	10
Naphthalene	ND					0.33	10
Phenanthrene	ND					0.33	10
Pyrene	ND					0.33	10
% Recovery Surrogate 1	111						
% Recovery Surrogate 2	97						
Comments							

* water and vapor samples are reported in ug/L, soil and sludge samples in mg/kg, wipes in ug/wipe and all TCLP / STLC / SPLP extracts in ug/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis

\# surrogate diluted out of range or surrogate coelutes with another peak

(h) a lighter than water immiscible sheen is present, (i) liquid sample that contains >~5 vol. % sediment, (j) sample diluted due to high organic content.

DHS Certification No. 1644

Edward Hamilton, Lab Director

QC REPORT FOR HYDROCARBON ANALYSES

Date: 04/01/99 Matrix: WATER

Analyte	Concentration (ug/L) Sample (#05350)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.0	89.3	103.9	100.0	89.3	103.9	15.1
Benzene	0.0	10.3	10.0	10.0	103.0	100.0	3.0
Toluene	0.0	10.4	10.1	10.0	104.0	101.0	2.9
Ethyl Benzene	0.0	10.6	10.4	10.0	106.0	104.0	1.9
Xylenes	0.0	31.5	30.9	30.0	105.0	103.0	1.9
TPH(diesel)	0.0	8064	7773	7500	108	104	3.7
TRPH (oil & grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
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QC REPORT FOR HYDROCARBON ANALYSES

Date: 04/04/99-04/05/99 Matrix: WATER

Analyte	Concentration (ug/L)			Amount Spiked	% Recovery		RPD
	Sample (#08563)	MS	MSD		MS	MSD	
TPH (gas)	0.0	108.4	107.1	100.0	108.4	107.1	1.2
Benzene	0.0	10.2	10.4	10.0	102.0	104.0	1.9
Toluene	0.0	10.5	10.5	10.0	105.0	105.0	0.0
Ethyl Benzene	0.0	10.6	10.8	10.0	106.0	108.0	1.9
Xylenes	0.0	31.9	32.1	30.0	106.3	107.0	0.6
TPH(diesel)	0.0	7523	7415	7500	100	99	1.4
TRPH (oil & grease)	0	27700	25500	23700	117	108	8.3

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

QC REPORT FOR SVOCs (EPA 8270/625/525)

Date: 04/06/99-04/07/99 Matrix: WATER

Analyte	Concentration (ug/Kg,m			Amount Spiked	% Recovery		
	Sample (#03568)	MS	MSD		MS	MSD	RPD
Phenol	0	49	43	100	49	43	26.1
2-Chlorophenol	0	42	42	100	42	42	0.0
1, 4-Dichlorobenzene	0	46	47	100	46	47	2.2
N-nitroso-di-n-propyl	0	52	47	100	52	47	10.1
1, 2, 4-Trichlorobenz	0	45	46	100	45	46	2.2
4-Chloro-3-methylphen	0	44	44	100	44	44	0.0
4-Nitrophenol	0	53	43	100	53	43	20.8
Acenaphthene	0	44	45	100	44	45	2.2
2, 4- Dinitrotoluene	0	40	40	100	40	40	0.0
Pentachlorophenol	0	47	42	100	47	42	11.2
Pyrene	0	51	50	100	51	50	2.0

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

GeoAnalytical Laboratories, Inc.

1405 Kansas Avenue Modesto, CA 95351 Phone (209) 572-0900 Fax (209) 572-0916

CERTIFICATE OF ANALYSIS

Report # K092-02

Date: 4/08/99

McCampbell Analytical
110 2nd Avenue #D7
Pacheco CA 94553-5560

Project: 14548 A-378-002-02

PO#

Date Rec'd: 4/02/99
Date Started: 4/02/99
Date Completed: 4/07/99

Date Sampled: 3/31/99
Time:
Sampler:

Sample ID	Lab ID	MDL	Method	Analyte	Results	Units
SB-1	K31656	10	310.1	Total Alkalinity	350	mg/L
		1.0	300	Nitrate (NO3)	24	mg/L
		1.0	300	Sulfate	130	mg/L
		1.0	4500CO$_2$C	Carbon Dioxide	11	mg/L
SB-2	K31657	10	310.1	Total Alkalinity	290	mg/L
		1.0	300	Nitrate (NO3)	9	mg/L
		1.0	300	Sulfate	69	mg/L
		1.0	4500CO$_2$C	Carbon Dioxide	33	mg/L
SB-3	K31658	10	310.1	Total Alkalinity	590	mg/L
		1.0	300	Nitrate (NO3)	ND	mg/L
		1.0	300	Sulfate	17	mg/L
		1.0	4500CO$_2$C	Carbon Dioxide	95	mg/L

Ramiro Salgado
Chemist

Certification # 1157

Donna Keller
Laboratory Director

GeoAnalytical Laboratories, Inc.
1405 Kansas Avenue Modesto, CA 95351 Phone (209) 572-0900 Fax (209) 572-0916

Report# K092-02

QC REPORT

McCampbell Analytical
110 2nd Avenue #D7
Pacheco CA 94553-5560

Dates Analyzed 4/7/99

Analyte	Batch #	Method	MS % Recovery	MSD % Recovery	RPD	Blank
Total Alkalinity	I00498	310.1	100	100	0.0	ND
Chloride	I00460	300	78	80	2.5	ND
Nitrite			90	92	2.2	ND
Nitrate			90	87	3.4	ND
Sulfate			100	96	4.1	ND

Ramiro Salgado
Chemist

Certification # 1157

Donna Keller
Laboratory Director

GeoAnalytical Laboratories, Inc.

1405 Kansas Avenue Modesto, CA 95351 Phone (209) 572-0900 Fax (209) 572-0916

Report# K092-02

QC REPORT

McCampbell Analytical
110 2nd Avenue #D7
Pacheco CA 94553-5560

Dates Analyzed 4/2/99

Analyte	Batch #	Method	Original Sample	Duplicate Sample	RPD	Blank
Carbon Dioxide	I00457	4500 C	95	92	3.2	ND

Ramiro Salgado
Chemist

Certification # 1157

Donna Keller
Donna Keller
Laboratory Director

6co

K092-02

McCAMPBELL ANALYTICAL INC.
110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553-5560
Telephone: (925) 798-1620 Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HOUR ☐ 48 HOUR ☒ 5 DAY ☐ ROUTINE

Report To: Ed Hamilton Bill To: MAI
Project #: 14548 Project Name: A-378-002-02
Project Location:

		SAMPLING				MATRIX					METHOD PRESERVED				ANALYSIS REQUEST												OTHER							
SAMPLE ID	LOCATION	Date	Time	# Containers	Type Containers	Water	Soil	Air	Sludge	Other	Ice	HCl	HNO_3	Other	EPA 601/8010	EPA 602/8020	EPA 608/808	EPA 608/8080-PCB's only	EPA 624/8240/8260	EPA 625/8270	CAM – 17 Metals	EPA – Priority Pollutant Metals	LUFT Metals	LEAD (7240/7421/239.2/6010)	ORGANIC LEAD	RCI		ALKALinity	Nitrate	Sulfate	CO_2			COMMENTS
SB-1		3/31/99		1	Ltr	X					X										K31656							X	X	X	X			08384
SB-2				1		X					X										K31657							X	X	X	X			08385
SB-3		↓		1	↓	X					X										K31658							X	X	X	X			08386

Relinquished By:	Date: 4/1/99	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

Remarks:

14548 ZA3

McCAMPBELL ANALYTICAL INC.

110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553
Telephone: (925) 798-1620 Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HOUR ☐ 48 HOUR ☒ 5 DAY

Report To:
Bill To: Artesian

Company: Artesian Environmental
229 Tewksbury Avenue
Point Richmond, CA 94801

Tele: (510) 307-9943
Fax: (510) 232-2823

Project #: 378-002-02
Project Name: Vila / AUSDH

Project Location: 603 Key Route Blvd., Albany

Sampler Signature:

SAMPLE ID	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	MATRIX Soil	MATRIX Air	MATRIX Sludge	MATRIX Other	METHOD PRESERVED Ice	METHOD PRESERVED HCl	METHOD PRESERVED HNO_3	METHOD PRESERVED Other
SB-1		3/31/99	1124	5	Liter	X					X	X		
SB-2		3/31/99	1140	5	"	X					X	X		
SB-3		3/31/99	1205	6	"	X					X	X		

SAMPLE ID	BTEX & TPH as Gas (602/8020 + 8015)/ MTBE	TPH as Diesel (8015)	Total Petroleum Oil & Grease (5520 E&F/B&F)	Total Petroleum Hydrocarbons (418.1)	EPA 601 / 8010	BTEX ONLY (EPA 602 / 8020)	EPA 608 / 8080	EPA 608 / 8080 PCB's ONLY	EPA 624 / 8240 / 8260	EPA 625 / 8270	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals	LUFT 5 Metals	Lead (7240/7421/239.2/6010)	RCI	Other: Alkalinity, Nitrate, Sulfate, CO2	Other	Other	Comments
SB-1	X	X	X													X			
SB-2	X	X	X													X			
SB-3	X	X	X								X					X			

08384
08385
08386

Relinquished By:	Date:	Time:	Received By:
	4/1/99	9:45	H Marlin 303
H Marlin 303	4/1/99	11:17	Heidi Rivera

Remarks:

ICE/t° ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT ✓

	VOAS	O&G	METALS	OTHER
PRESERVATION	✓			

APPROPRIATE CONTAINERS ✓

ATTACHMENT E:

TABLES

TABLE 1: GROUNDWATER ELEVATION DATA

Albany Unified School District
603 Key Route Boulevard
Albany, California

Boring Number	Date Measured	TOC Elevation	Depth to Water (ft)	Static Water Elev. (ASB)
SB-1	4-15-99	104.92	5.33	99.59
	4-30-99		7.37	97.55
SB-2	4-15-99	102.04	7.01	95.03
	4-30-99		8.99	93.05
SB-3	4-15-99	100.35	6.47	93.88
	4-30-99		7.86	92.49
SB-4	4-15-99	100.69	6.60	94.09
	4-30-99		7.82	92.87
SB-5	4-15-99	99.92	6.40	93.52
	4-30-99		8.14	91.78
SB-6	4-15-99	104.62	6.41	98.21
	4-30-99		7.89	96.72
SB-7	4-15-99	99.51	7.12	92.39
	4-30-99		8.72	90.79

TABLE 2: GROUNDWATER QUALITY VALUES

Albany Unified School District
603 Key Route Boulevard
Albany, California

Sample Location	Date Sampled	pH	Temperature °C	DO ppm	Conductivity mS	ORP mv	Fe ppm
SB-1	3-30-99	7.56	17.3	8.7	1,640	-33.9	<0.5
SB-2	3-30-99	8.62	14.10	6.20	1,460	249.60	<0.5
SB-3	3-30-99	7.42	14.10	7.60	1,790	-25.60	<0.5
SB-4	3-31-99	7.26	14.00	8.90	2,040	-15.40	<0.5
SB-5	3-31-99	7.11	14.70	8.00	1,560	-6.30	<0.5
SB-6	3-31-99	7.23	16.60	9.40	NA	-13.10	<0.5
SB-7	3-31-99	6.97	14.60	7.60	1,150	15.70	<0.5

NOTES:

DO	Dissolved Oxygen	mS	Millisiemen (1mS = 1mmho)
ORP	Oxidation Reduction Potential	mv	Millivolts
Fe	Ferrous Iron	ppm	parts per million
ASB	relative to Arbitrary Site Bench mark set at 100.00 ft	NA	Not Analyzed
		TOC	Top of well Casing

TABLE 3: **SOIL SAMPLE RESULTS**
Albany Unified School District
603 Key Route Boulevard
Albany, California

Sample Location	Sample Date	TOG mg/Kg	TPH-d mg/Kg	TPH-g mg/Kg	Benzene µg/Kg	Toluene µg/Kg	Ethylbenzene µg/Kg	Xylenes µg/Kg	MTBE µg/Kg
SB1-12	3-30-99	14	1	ND	ND	ND	ND	ND	ND
SB2-13	3-30-99	ND	ND	ND	ND	ND	ND	ND	ND
SB3-9	3-30-99	1,000	600	20	ND	ND	ND	ND	ND
SB3-13	3-30-99	1,700	1,600	32	ND	20	37	150	ND
SB4-14.5	3-30-99	ND	ND	ND	ND	ND	ND	ND	ND
SB5-15	3-30-99	ND	ND	ND	ND	ND	ND	ND	ND
SB6-13	3-30-99	ND	ND	ND	ND	10	ND	10	ND
SB7-12	3-30-99	ND	ND	ND	ND	ND	ND	ND	ND
CS-East	10-14-98	460	100	11	ND	ND	ND	57	ND
CS-West	10-14-98	2,400	1,100	74	ND	31	ND	330	ND
CS-North Wall	10-14-98	760	1,300	NA	ND	36	ND	380	NA
WTrench 65-13	10-16-98	14,000	2,500	NA	ND	67	ND	790	NA
WTrench 65-9	10-19-98	450	280	NA	ND	ND	8	28	NA
STrench 45-8	10-19-98	460	350	NA	ND	ND	ND	13	NA
STrench 45-13	10-19-98	1,100	1,400	NA	ND	21	ND	230	NA

	Sample Location	Sample Date	PAH mg/Kg	Moisture Wt. %	Density g/ cc	Porosity Vol. %
	SB1-12	3-30-99	NA	NA	NA	NA
SB3	SB~~2~~-13	3-30-99	All ND	18	1.9	40
SB2	SB~~3~~-13	3-30-99	NA	NA	NA	NA
	SB4-14.5	3-30-99	NA	NA	NA	NA
	SB5-15	3-30-99	NA	NA	NA	NA
	SB6-13	3-30-99	NA	NA	NA	NA
	SB7-12	3-30-99	NA	NA	NA	NA
	CS-East	10-14-98	All ND	NA	NA	NA

NOTES:

TPH-g	Total Petroleum Hydrocarbons as gasoline	MTBE	Methyl Tertiary Butyl Ether
		mg/Kg	milligrams per Kilogram (ppm)
TPH-d	Total Petroleum Hydrocarbons as diesel	µg/Kg	micrograms per Kilogram (ppb)
		ND	Not Detected (above method reporting limit)
TOG	Total Oil and Grease	NA	Not Analyzed
PAH	Polyaromatic Hydrocarbons		

TABLE 4: GROUNDWATER SAMPLE RESULTS

Albany Unified School District
603 Key Route Boulevard
Albany, California

Sample Location	Sample Date	TOG mg/L	TPH-d µg/L	TPH-g µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Xylenes µg/L	MTBE µg/L
SB-1	3-31-99	ND	61	ND	ND	ND	ND	ND	ND
SB-2	3-31-99	ND	ND	ND	ND	ND	ND	ND	ND
SB-3	3-31-99	ND	810	100	ND	ND	ND	0.74	ND
SB-4	4-1-99	NA*	150	NA	ND	0.69	ND	1.20	ND
SB-5	4-1-99	ND	180	NA	ND	1.10	0.73	6.30	ND
SB-6	4-1-99	NA*	98	NA	ND	1.00	ND	2.20	ND
SB-7	4-1-99	ND	ND	NA	ND	0.95	67.00	5.60	ND

Sample Location	Sample Date	Alk mg/L	Nitrate mg/L	Sulfate mg/L	CO2 mg/L
SB-1	3-31-99	350	24	130	11
SB-2	3-31-99	290	9	69	33
SB-3	3-31-99	590	ND	17	95
SB-4	4-1-99	NA	NA	NA	NA
SB-5	4-1-99	330	9	86	31
SB-6	4-1-99	NA	NA	NA	NA
SB-7	4-1-99	350	35	143	44

NOTES:

Alk	Total Alkalinity	mg/L	milligrams per liter (ppm)
CO2	Carbon Dioxide	µg/L	micrograms per liter (ppb)
TPH-g	Total Petroleum Hydrocarbons as gasoline	ND	Not Detected (above method reporting limit)
TPH-d	Total Petroleum Hydrocarbons as diesel	NA	Not Analyzed
MTBE	Methyl Tertiary Butyl Ether		Location did not Produce a Sufficient Quantity of Water for this Analysis

DNR UNDERGROUND STORAGE TANK DIVISION

SUBJECT: Tier 1 Lookup Tables for Risk-Based Corrective Action at Leaking Underground Storage Tank Sites	DATE: 07/10/95	Operational Memorandum No. 4 Page No. 1 of 1

Section 21304a of Part 213, Leaking Underground Storage Tanks (LUSTs), of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, requires corrective action at LUST sites to be conducted in accordance with the American Society for Testing and Materials Emergency Standard Guide for Risk-Based Corrective Action (RBCA), ES 38-94 The Department of Natural Resources is also required to establish cleanup criteria using the RBCA process and utilizing reasonable and relevant exposure assumptions and pathways.

The purpose of this operational memorandum is to establish the exposure assumptions and pathways that are used to develop the risk-based screening levels (RBSLs) that are published in the Tier 1 Lookup Tables (Tier 1 Tables) pursuant to the RBCA process.

The exposure assumptions and pathways printed in Attachment 1 are conservative assumptions applied to LUST sites based on use - residential, commercial or industrial. Based on these assumptions and pathways, the RBSLs found in the Tier 1 Tables [residential, commercial (III & IV) or industrial] printed in Attachment 2, represent conservative corrective action goals (cleanup criteria) according to use of the site. Commercial IV values for direct contact - soil may be applied where a person at the site is outside for 1.5 hours or less per day. Commercial III values for direct contact - soil should be applied where a person at the site is outside for more than 1.5 hours per day.

The values (RBSLs) in the Tier 1 Tables may not necessarily represent the cleanup criteria for any given site. These RBSLs should be used to determine if further corrective action is required, based on the assumptions and pathways found in Attachment 1, or if cleanup criteria for a particular site (site specific target levels) may be determined under a Tier 2 evaluation using different assumptions, pathways, and points of compliance based on site specific conditions. If the values listed in the Tier 1 Tables are not immediately met, an analysis should be performed to determine if it is more cost effective to perform a Tier 2 evaluation based on site specific conditions or conduct remediation at the site to achieve the Tier 1 values.

It is recommended that persons conducting corrective action at LUST sites receive training in the ASTM RBCA process to ensure proper use of the information contained in this operational memorandum. For further information on the ASTM RBCA process, please refer to the ASTM ES 38-94 Standard.

For chemicals of concern not listed in the Tier 1 Tables, the values listed in Environmental Response Division Operational Memorandums Nos. 8 and 14 may be used until the Tier 1 Tables are revised to include the additional chemicals of concern.

Periodic review and revisions to this operational memorandum are the responsibility of the Chief of the Program Support Section.

Authorization Arthur R Nash	Date 7-10-95

Attachments

Operational Memorandum No. 4
Attachment 2

TIER 1 LOOKUP TABLE FOR RESIDENTIAL LAND USE

DNR, USTD June 30, 1995

Chemical	GROUNDWATER (µg/l or ppb) Health-based Criteria	GROUNDWATER (µg/l or ppb) Aesthetic Criteria (A)	GROUNDWATER (µg/l or ppb) Groundwater Surface Water Interface (GSI)	SOIL (µg/kg or ppb) Direct Contact	SOIL (µg/kg or ppb) Leaching to Groundwater
Volatiles					
Benzene	5.0 (N)	NA	53	88,000	100
Toluene	1,000 (N)	790	110	24,000,000	16,000
Ethylbenzene	700 (N)	74	31	11,000,000	4,700
Xylenes	10,000 (N)	280	59	200,000,000	74,000
MTBE	240	NA	380	3,600,000	4,800
Polynuclear Aromatics (PNAs)					
Acenaphthene	1,300	NA	3.8	76,000,000	120,000
Acenaphthylene	26	NA	(D)	1,500,000	1,400
Anthracene	7,300	NA	110,000	420,000,000	150,000
Benzo(a)anthracene (K)	1.2	NA	0.31	14,000	14,000 (M)
Benzo(a)pyrene (K)	0.20 (N)	NA	0.31	1,400	3,700 (O)
Benzo(b)fluoranthene (K)	1.2	NA	0.31	14,000	14,000 (M)
Benzo(g,h,i)perylene	26	NA	(D)	1,500,000	1,500,000 (M)
Benzo(k)fluoranthene (K)	12	NA	0.31	140,000	140,000 (M)
Chrysene (K)	120	NA	0.31	1,400,000	1,400,000 (M)
Dibenzo(a,h)anthracene (K)	0.12	NA	0.31	1,400	4,200 (O)
Fluoranthene	880	NA	370	51,000,000	68,000
Fluorene	880	NA	14,000	51,000,000	89,000
Indeno (1,2,3-cd)pyrene (K)	1.2	NA	0.31	14,000	14,000 (M)
Naphthalene	260	NA	29	15,000,000	5,500
Phenanthrene	26	NA	(D)	1,500,000	7,400
Pyrene	550	NA	11,000	32,000,000	56,000

FOOTNOTES

(A) Aesthetic values should be considered when drinking water is or may be impacted

(B) Background, as defined in Rule 701 (c), may be substituted if higher than the cleanup criteria.

(C) Criterion exceeds 100% in soil, hence it is reduced to 100%.

(D) Chemical has either not been evaluated or an inadequate data base precludes the development of a GSI value. Contact an ERD toxicologist for assisstance

(E) GSI value is pH, temperature, or water hardness dependent Contact an ERD toxicologist for details.

(F) Chemical may be present in several isomer forms Isomer specific concentrations must be combined for comparison to criteria. Contact an ERD toxicologist for further explanation

Basis for the GSI value is the National Toxics Rule (NTR). The NTR value was either more restrictive than the Rule 57 value or a Rule 57 value was not available.

(G) Criterion developed using the U.S. EPA integrated Uptake Biokinetic Model for children No risk assessment method(s) is currently available to evaluate lead toxicity in adults Higher level may b acceptable if soil concentration is less than 400 ppm and groundwater migrating off-site will not impact adjacent properties Contact an ERD toxicologist for further explanation.

(H) Criterion developed using the U.S. EPA integrated Uptake Biokinetic Model for children. No risk assessment method(s) is currently available to evaluate lead toxicity in adults

(I) Valence specific chromium data (Cr III and Cr VI) must be compared to the same valence-specific cleanup criteria If analytical data are provided for "total" chromium only, then values for chromium VI must be applied as the cleanup criteria. Chromium III cleanup criteria can only be used at sites where groundwater is prevented from being used as a public water supply, currently or in the future

(J) Consistent with EPA's Soil Screening Guidance, RBSL not calculated. The preliminary screening level for direct contact was used to represent all soil pathways

(K) Criteria for carcinogenic PNAs were developed using "relative potential potencies" (RPPs) to benzo(a)pyrene

(L) A preliminary remediation goal of 1,000 ppb has been set for PCBs based on Toxic Substances Control Act, Subpart G - PCB Spill Cleanup Policy Standards

(M) This chemical, due to its physiocochemical properties, is not expected to leach through soils to groundwater under most conditions.

(N) State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976 used as the default

(O) This criterion may only be used if a direct contact hazard has been eliminated.

NA = Not available

TIER 1 LOOKUP TABLE FOR COMMERCIAL LAND USE

DNR, USTD June 30, 1995

	GROUNDWATER (µg/l or ppb)			SOIL (µg/kg or ppb)		
				Direct Contact		
Chemical	**Health-based Criteria**	**Aesthetic Criteria (A)**	**Groundwater Surface Water Interface (GSI)**	**Commercial III**	**Commercial IV**	**Leaching to Groundwater (P)**
Volatiles						
Benzene	5.0 (N)	NA	53	1,200,000	2,400,000	100
Toluene	1,000 (N)	790	110	230,000,000	460,000,000	16,000
Ethylbenzene	700 (N)	74	31	100,000,000	200,000,000	4,700
Xylenes	10,000 (N)	280	59	1,000,000,000 (C)	1,000,000,000 (C)	74,000
MTBE	690	NA	380	34,000,000	68,000,000	13,800
Polynuclear Aromatics (PNAs)						
Acenaphthene	3,800	NA	3.8	1,000,000,000 (C)	1,000,000,000 (C)	120,000
Acenaphthylene	75	NA	(D)	23,000,000	54,000,000	1,400
Anthracene	21,000	NA	110,000	1,000,000,000 (C)	1,000,000,000 (C)	150,000
Benzo(a)anthracene (K)	4.8	NA	0.31	290,000	680,000	14,000 (M)
Benzo(a)pyrene (K)	0.20 (N)	NA	0.31	29,000	68,000	3,700 (O)
Benzo(b)fluoranthene (K)	4.8	NA	0.31	290,000	680,000	14,000 (M)
Benzo(g,h,i)perylene	75	NA	(D)	23,000,000	54,000,000	1,500,000 (M)
Benzo(k)fluoranthene (K)	48	NA	0.31	2,900,000	6,800,000	140,000 (M)
Chrysene (K)	480	NA	0.31	29,000,000	68,000,000	1,400,000 (M)
Dibenzo(a,h)anthracene (K)	0.48	NA	0.31	29,000	68,000	4,200 (O)
Fluoranthene	2,500	NA	370	760,000,000	1,000,000,000 (C)	68,000
Fluorene	2,500	NA	14,000	760,000,000	1,000,000,000 (C)	89,000
Indeno (1,2,3-cd)pyrene (K)	4.8	NA	0.31	290,000	680,000	14,000 (M)
Naphthalene	750	NA	29	230,000,000	540,000,000	5,500
Phenanthrene	75	NA	(D)	23,000,000	54,000,000	7,400
Pyrene	1,600	NA	11,000	470,000,000	1,000,000,000 (C)	56,000

TIER 1 LOOKUP TABLE FOR INDUSTRIAL LAND USE

DNR, USTD June 30, 1995

Chemical	GROUNDWATER (µg/l or ppb)			SOIL (µg/kg or ppb)	
	Health-based Criteria	Aesthetic Criteria (A)	Groundwater Surface Water Interface (GSI)	Direct Contact	Leaching to Groundwater (P)
Volatiles					
Benzene	5.0 (N)	NA	53	850,000	100
Toluene	1,000 (N)	790	110	160,000,000	16,000
Ethylbenzene	700 (N)	74	31	72,000,000	4,700
Xylenes	10,000 (N)	280	59	1,000,000,000 (C)	74,000
MTBE	690	NA	380	25,000,000	13,800
Polynuclear Aromatics (PNAs)					
Acenaphthene	3,800	NA	3.8	810,000,000	120,000
Acenaphthylene	75	NA	(D)	16,000,000	1,400
Anthracene	21,000	NA	110,000	1,000,000,000 (C)	150,000
Benzo(a)anthracene (K)	4.8	NA	0.31	210,000	14,000 (M)
Benzo(a)pyrene (K)	0.20 (N)	NA	0.31	21,000	3,700 (O)
Benzo(b)fluoranthene (K)	4.8	NA	0.31	210,000	14,000 (M)
Benzo(g,h,i)perylene	75	NA	(D)	16,000,000	1,500,000 (M)
Benzo(k)fluoranthene (K)	48	NA	0.31	2,100,000	140,000 (M)
Chrysene (K)	480	NA	0.31	21,000,000	1,400,000 (M)
Dibenzo(a,h)anthracene (K)	0.48	NA	0.31	21,000	4,200 (O)
Fluoranthene	2,500	NA	370	540,000,000	68,000
Fluorene	2,500	NA	14,000	540,000,000	89,000
Indeno (1,2,3-cd)pyrene (K)	4.8	NA	0.31	210,000	14,000 (M)
Naphthalene	750	NA	29	160,000,000	5,500
Phenanthrene	75	NA	(D)	16,000,000	7,400
Pyrene	1,600	NA	11,000	340,000,000	56,000