# THIRD QUARTER 2010 GROUNDWATER MONITORING REPORT

## R & H AUTO REPAIR
## 5315 SAN PABLO AVENUE
## OAKLAND, CALIFORNIA

***Prepared for:***

**ALAMEDA COUNTY HEALTH CARE SERVICES**
**1131 HARBOR BAY PARKWAY, SUITE 250**
**ALAMEDA, CA 94502**

**August 2010**

STELLAR
ENVIRONMENTAL SOLUTIONS, INC.
GEOSCIENCE & ENGINEERING CONSULTING

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***Prepared by:***

**STELLAR ENVIRONMENTAL SOLUTIONS, INC.**
**2198 SIXTH STREET**
**BERKELEY, CALIFORNIA 94710**

**August 26, 2010**

Project No. 2010-06

STELLAR
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August 26, 2010

Ms. Barbara Jakub
Alameda County Health Care Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Subject: Third Quarter 2008 Groundwater Monitoring Report
R&H Auto Repair - 5315 San Pablo Avenue, Oakland, California (Alameda County Environmental Health Department Fuel Leak Case No RO0002965)

Dear Ms. Jakub:

Enclosed is the Stellar Environmental Solutions, Inc. report summarizing recent activities conducted at the referenced site. This report presents the findings of the Third Quarter 2010 groundwater monitoring event (the 2nd site groundwater monitoring event since May 2010).

This report was uploaded to both the State Water Board's GeoTracker system (T0619704141) and the Alameda County Environmental Health Department's Electronic Upload ftp system.

We declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

If you have any questions regarding this report, please contact us at (510) 644-3123.

Sincerely,

Steve Bittman, R.E.A.
Senior Geologist

Jasbinder Grewel
Responsible Party

Richard S. Makdisi, R.G., R.E.A.
Principal


cc: Mr. and Mr. Grewel; Mr. Kenneth J. Schmier

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# 1.0 INTRODUCTION

## PROJECT BACKGROUND

On behalf of Jasbinder and Gulbinder Grewel, the responsible party (RP) for the subject site located at 5315 San Pablo Avenue in Oakland, California, Stellar Environmental Solutions, Inc. (Stellar Environmental) has prepared this Third Quarter 2010 Groundwater Monitoring Report.

The subject site is located at the northwest corner of San Pablo Avenue and 53rd Street on the Oakland-Emeryville border (see Figure 1) and was an operating Shell service station from 1958 until the mid 1970s. Since the service station ceased operation, the site has been used only for auto repair; however, the fuel and waste oil USTs remained until 2007.

The site has undergone underground storage tank (UST)-related investigations and remediation since 2007, with the three existing monitoring wells on the site installed in May 2010. The initial groundwater monitoring event for those wells occurred during the second quarter 2010 (May). All known environmental documents for the subject property are listed in Section 9.0, References and Bibliography.

The property is currently owned by Kenneth J. Schmier of Emeryville, California.

## PREVIOUS INVESTIGATIONS AND REGULATORY ACTION

Previous site investigation activities are listed below.

### 2007

Two 7,500-gallon gasoline USTs and one 10,000-gallon diesel UST were removed from the southwest portion of the property in September 2007. A 550-gallon waste oil UST was removed from the northwest corner of the property at the same time.

The managing consultant overseeing the tank removals was AEI Consultants of Walnut Creek, California (AEI). No holes were noted in any of the tanks; however, strong petroleum hydrocarbon odor and soil staining was present in the fuel tank excavations. Maximum petroleum hydrocarbon concentrations detected in the initial soil samples, collected from about 11 feet below ground surface (bgs), were as follows: 230 milligrams per kilogram (mg/kg) of total volatile hydrocarbons as gasoline (TVHg); and 73 mg/kg of total extractable hydrocarbons

as diesel (TEHd). Up to 1,500 mg/kg of TVHg was detected in a soil sample collected at 2 feet bgs beneath the former dispenser area near the south central portion of the site. No detectable petroleum hydrocarbons or volatile organic compounds (VOCs) were detected in the confirmation soil sample collected from beneath the waste oil tank at 8 feet bgs. No groundwater was encountered in any of the excavations.

**2008**

In January 2008, in an effort to remove hydrocarbon-impacted soil, the gasoline and diesel tank pit were enlarged and the dispenser area deepened. Impacted soil was removed to less than 100 mg/kg in all areas, except for an area containing 160 mg/kg of TVHg on the south side of the property near the 53rd Street sidewalk. Due to the close proximity of the sidewalk and other space constraints, the excavation could not be enlarged further. According to AEI reports reviewed by Stellar Environmental, the depth of the final excavation was approximately 12 feet bgs. No groundwater was encountered during AEI's work at the site. In January 2008, the fuel tank and waste oil UST excavations were backfilled with clean imported material consisting of compacted class II fill with a drain rock cover. Approximately 320 tons of contaminated material was removed to the site as non-hazardous waste and hauled to the Keller Canyon landfill.

The Oakland Fire Department officially transferred oversight responsibility to Alameda County Environmental Health (ACEH) on March 5, 2008.

An Underground Storage Tank Unauthorized Release (Leak) Report was received by ACEH on May 6, 2008 (AEI Consultants, 2008a).

On June 26, 2008, ACEH requested an investigation to determine if groundwater beneath the site had been affected by residual hydrocarbons in soil. The work plan developed in response (AEI Consultants, 2008b) called for advancing four soil borings to groundwater in areas best judged to assess the extent of known subsurface residual hydrocarbon contamination.

In a letter dated July 3, 2008, ACEH informed the Grewels that the site was required to be "claimed" to the State Water Resources Control Board GeoTracker database, and that all reports since 2005 are to be uploaded to the database, along with survey data for all permanent monitoring points.

**2009**

The 2008 work plan (AEI Consultants, 2008b) was approved by ACEH in February 2009, with minor modifications.

In a letter dated July 24, 2009, ACEH informed the Grewels that the site had still not been claimed to the State GeoTracker database and warned of penalties if not in compliance by August 10, 2009.

**2010**

The 2008 work plan (AEI Consultants, 2008b) was implemented by Stellar Environmental in March 2010. Based on analytical results of the four onsite soil borings, it appeared that the lack of significant residual hydrocarbon contamination in soil beneath the site in the 12- to 16-foot-bgs zone, in and around the former UST area, suggested no significant remaining hydrocarbon contaminant in the soil to act as a source for continued impact to groundwater.

The laboratory results did indicate groundwater beneath the site had been impacted with gasoline and diesel-range hydrocarbons exceeding ESL criteria typical of an older release. The highest concentrations of TVHg (2,300 micrograms per liter [µg/L]) and TEHd (760 µg/L) in groundwater were found in the sample collected from boring B3, located near the southwest corner of the site and downgradient of the former USTs. This suggested offsite migration of the residual dissolved hydrocarbons to the southwest.

In May 2010, as a response to the March 2010 work, Stellar Environmental supervised the installation of three monitoring wells on site, and the drilling of two borings downgradient of the property along 53rd Street. In addition, a conduit study was conducted to determine the presence of preferential pathways and sensitive receptors. The results of the May 2010 work is summarized below:

- Site lithology is fairly consistent in the areas tested onsite and offsite along 53rd Street, with an unsaturated clay zone located from near the surface to approximately 17 feet bgs. This low-permeability zone is underlain by a higher-permeability, fine sand and silt zone that extends to at least 25 feet bgs, which is the total explored depth. Groundwater was encountered at about 17 feet bgs during drilling and equilibrated (reflecting the overlying clay confining pressure) at about 11 to 12 feet bgs in site monitoring wells.
- The relatively high hydrocarbon concentration in boring B-3 in March 2010 (compared to the non-detection in the monitoring well located about 5 feet away) is attributed to one of more of the following: the grab-groundwater sample having colloidal particles, an isolated (vertically and laterally) pocket of higher concentration, and/or the difference in depths between the grab sample and the well sample.
- The calculated groundwater flow direction beneath the site is toward the southwest at a gradient of approximately 0.01 feet per foot.

- No significant offsite impacts to soil or groundwater currently exist from the former site UST release. The 72 µg/L of TEHd reported for the offsite grab-groundwater sample point is below the ESL, likely reflecting site sourced attenuation with time.
- Based on the depth to groundwater and the maximum 8-foot depth of the located utilities, there does not appear to be any preferential pathways that could intersect the plume. In addition, there are no nearby downgradient water wells that could be impacted, and no demonstrable risk to sensitive receptors from the residual contamination.

## REGULATORY STATUS

The Alameda County Environmental Department of Environmental Health (ACEH) is the lead regulatory agency for the case, acting as a Local Oversight Program (LOP) for the Regional Water Quality Control Board (Water Board). The ACEH Fuel Leak case number is RO0002965. The Water Board GeoTracker global identification number is T0619704141.

The limited Phase II site investigation conducted in March 2010 (Stellar Environmental, 2010) found sufficient evidence of groundwater contamination beneath the site to require permanent onsite groundwater monitoring points, downgradient sampling, and a preferential pathway study. Time constraints associated with site ownership prompted Stellar Environmental to move forward with that work in May 2010, with verbal consent from the ACEH.

The site is in compliance with State Water Resources Control Board's "GeoTracker" requirements for uploading of technical data and reports. Electronic data format files for the AEI work since 2007 and all Stellar Environmental work, have been successfully uploaded to the Water Board's GeoTracker database and to ACEH's file transfer protocol (ftp) system.

## SCOPE OF REPORT

This report discusses the work conducted between May 15 and August 15, 2010 (i.e., the 2nd groundwater monitoring and sampling event, conducted on August 11, 2010).

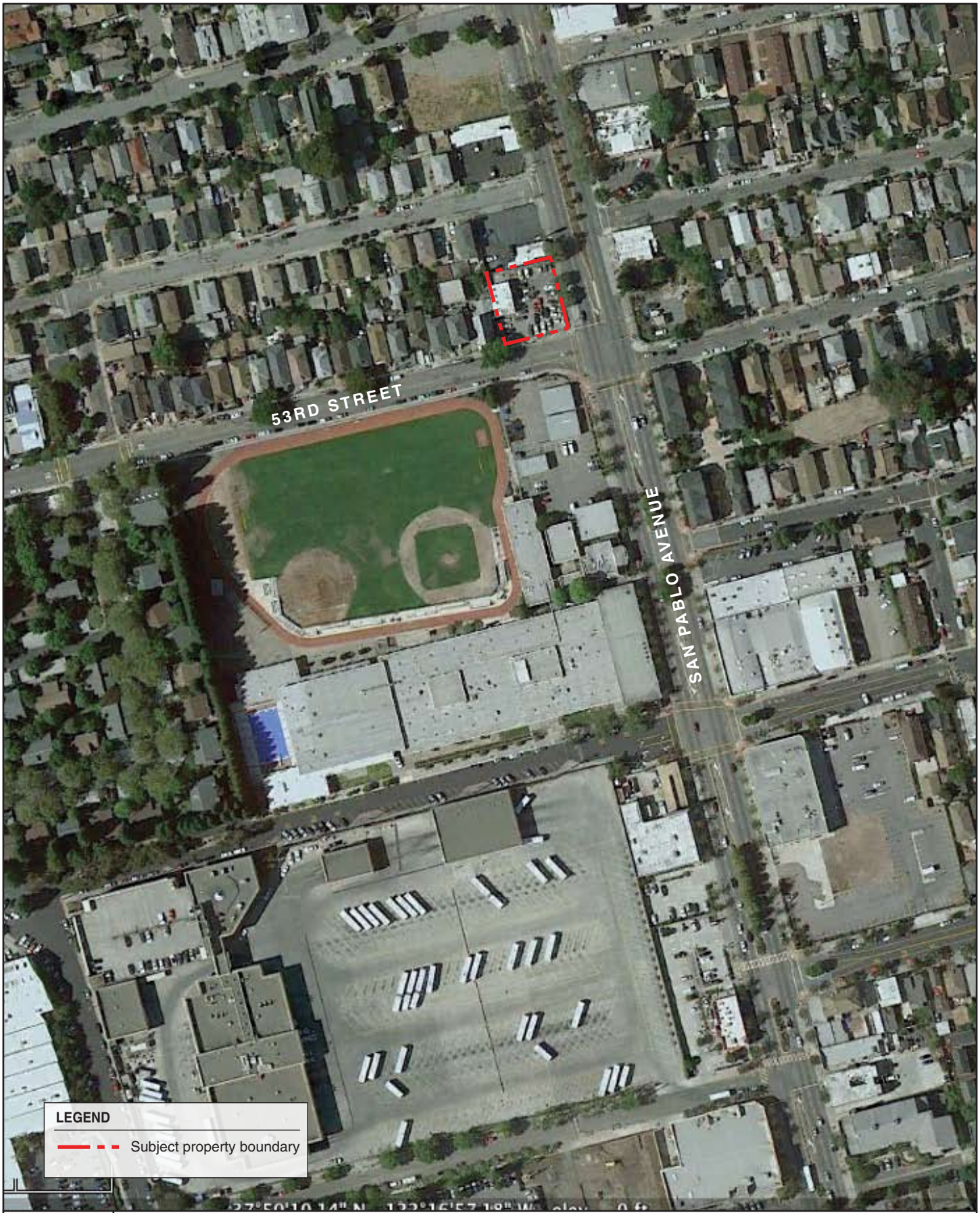
## SITE DESCRIPTION

The site contains a 1,425-square-foot steel-framed building configured for vehicle service in the northwest portion of the property. The remainder of the 10,650-square-foot parcel is essentially flat, partially paved, and enclosed by a locking chain-link fence. The site is currently occupied by R&H Auto Repair, which has been operated by Mr. and Mrs. Grewel since 1986.

Adjacent land use includes: 53rd Street, with the Emeryville Child Development Center and Emery High School beyond (*to the south*); private residences (*to the west*); San Pablo Avenue

and commercial and residential sites (*to the east*); and a restaurant, with 54th Street beyond (*to the north*).

Figure 1 shows the site location. Figure 2 shows the site plan and locations of current groundwater monitoring wells, previous investigative borings and former underground fuel storage tanks (UFSTs).

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# SUBJECT PROPERTY LOCATION

5315 San Pablo Ave.
Oakland, CA

By: MJC

AUGUST 2010

Figure 1

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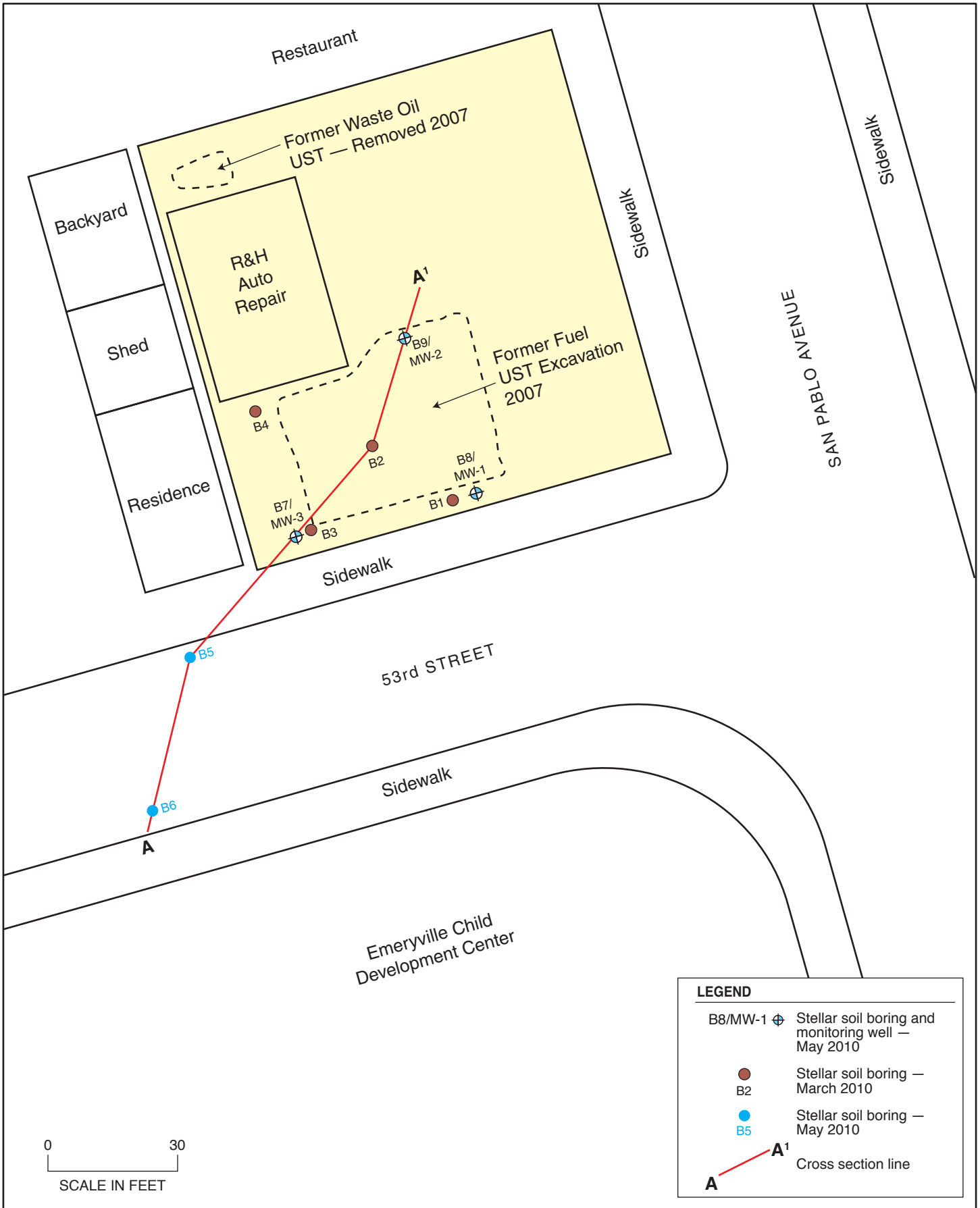


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# SITE PLAN AND BORING/MONITORING WELL LOCATIONS

| 5315 San Pablo Avenue<br>Oakland, CA | By: MJC | AUGUST 2010 |
|---|---|---|
| | Figure 2 | |

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# 2.0 PHYSICAL SETTING

The following evaluation of the site's physical setting—including topography, drainage, and geologic and hydrogeologic conditions—is based on a previous site investigation (AEI Consultants, 2008) and subsurface data collected by Stellar Environmental since March 2010.

## TOPOGRAPHY AND DRAINAGE

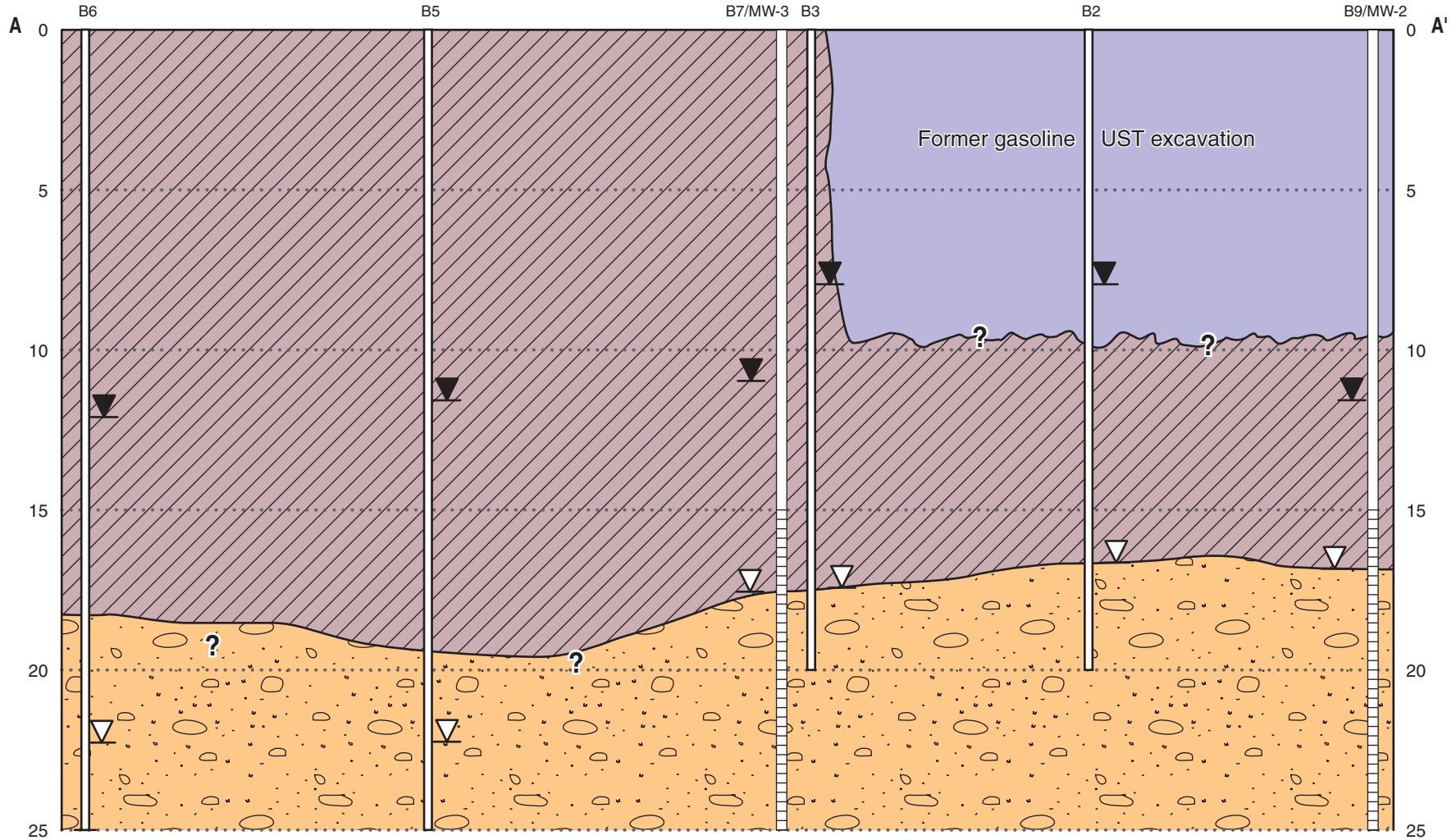
The site is on a gently sloping alluvial fan approximately 0.7 mile east of San Francisco Bay and approximately 2 miles west of the Oakland Hills. The mean elevation of the subject property is approximately 40 feet above mean seal level (amsl), with a slight general topographic gradient in the surrounding area to the west. However, locally, the target property is essentially flat, with a surface that consists of intermittent asphalt, concrete, and bare ground. The former UST excavation area is covered by ¾-inch drain rock.

The nearest surface water body is Temescal Creek, which originates in the Oakland Hills and empties into San Francisco Bay on the west side of Interstate 80 in Emeryville. The creek is nearly entirely culverted underground in the area of the property, but is visible approximately 1,400 feet southeast of the property at Temescal Park near 47$^{th}$ and Adeline Streets. From that point, the creek runs through a pair of buried 60-inch pipes, and passes within 150 feet of the property about 12 feet beneath the Emeryville Child Development Center and Emery High School across 53$^{rd}$ Street. Temescal Creek surfaces again in open culverts near Ohlone Way and Shellmound Street in Emeryville as it nears its mouth at the Bay.

## SHALLOW LITHOLOGY

Shallow lithology at the site has been determined during site subsurface investigations conducted since 2007 (see Section 9.0, References and Bibliography).

Site-specific lithology has been characterized to a depth of 20 feet bgs in onsite borings B1, B2, and B3; to a depth of 22 feet bgs in boring B4; and to 25 feet bgs in onsite and offsite borings B5 through B9. Subsurface lithology can be described as silty clay to gravelly clay fill with fragments of brick to approximately 2.5 feet bgs. The upper fill is underlain by native, low permeability, stiff, expansive, silty clay to about 17 feet bgs. Between 17 feet and 25 feet bgs, interbedded layers of moist to saturated sandy silt, silty sand, and clayey gravel are present. Geologic cross-section A-A' depicting the shallow site lithology is shown on Figure 3.

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# GEOLOGIC CROSS SECTION AREA A-A'

## 5315 San Pablo Ave. Oakland, CA

**Figure 3**

by: MJC | AUGUST 2010

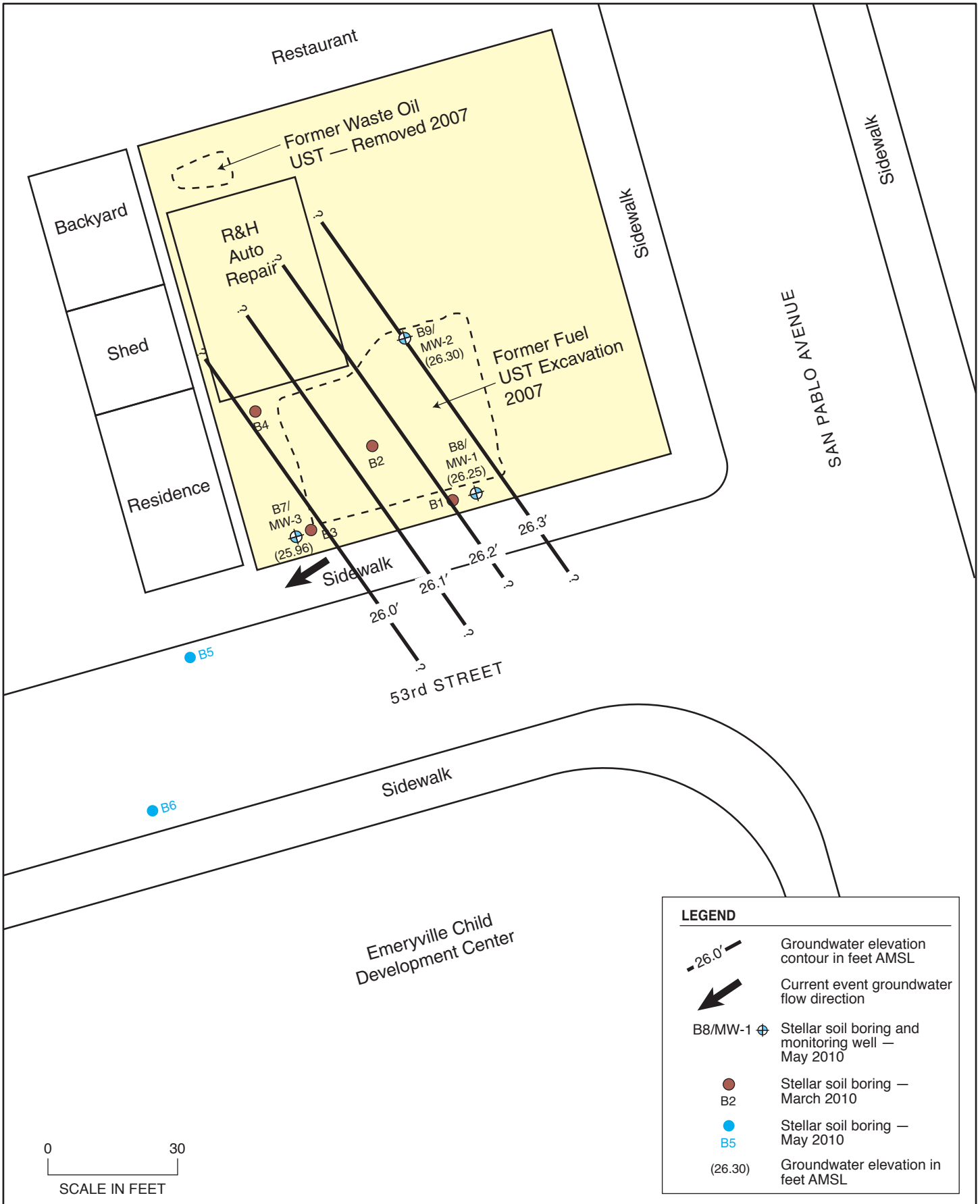
2010-06-18

## GROUNDWATER HYDROLOGY

According to AEI Consultants (2008a), groundwater was not observed in excavations as deep as 12 feet bgs during either the September 2007 initial UST removals or the January 2008 over-excavation work. Initial saturated soil samples were observed at the base of the upper clay layer at about 17 feet bgs during the Stellar Environmental March 2010 soil borings (B1 through B4) and the May 2010 monitoring well installation and offsite boring tests (B5 through B9). The lithology from 17 feet bgs to the total explored depth of 25 feet bgs is typical of a low-yielding, fine-grained water-bearing zone. Equilibrated water levels in the soil borings and wells ranged between approximately 6 and 11 feet bgs.

Regional groundwater flow in the area of the property is approximately to the southwest, toward San Francisco Bay. The initial groundwater monitoring event conducted by Stellar Environmental on May 13, 2010, which used wells MW-1 through MW-3 as data points, demonstrated a southwesterly groundwater flow direction with a relatively hydraulic gradient of approximately 0.01 feet/foot. The groundwater flow direction and gradient for the current monitoring event is consistent with the initial event.

Figure 4 is a groundwater potentiometric surface map for the current groundwater monitoring event that occurred on August 11, 2010 (activities discussed in Section 3.0).




# GROUNDWATER ELEVATION MAP, AUGUST 11, 2010

| 5315 San Pablo Avenue<br>Oakland, CA | By: MJC | AUGUST 2010 |
|---|---|---|
| | Figure 4 | |

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# 3.0 THIRD QUARTER 2010 GROUNDWATER MONITORING AND SAMPLING

This section presents the groundwater sampling and analytical methods for the current event (Third Quarter 2010), conducted on August 11, 2010. Table 1 summarizes monitoring well construction and groundwater monitoring data. Groundwater analytical results are presented and discussed in Section 4.0. Groundwater sampling was conducted in accordance with State of California guidelines for sampling dissolved analytes in groundwater associated with leaking USTs (State Water Resources Control Board, 1989).

Specific activities for this event included:

- Measuring static water levels before purging the wells.
- Collecting "post-purge" groundwater samples from the three onsite wells for laboratory analyses for contaminants of concern.

Groundwater monitoring well water level measurements, sampling, and field analyses were conducted by SES personnel. The locations of all site monitoring wells are shown on Figure 2. Well construction information and water level data are summarized in Table 1. Appendix A contains the groundwater monitoring field records for the current event.

**Table 1**
**Groundwater Monitoring Well Construction and Groundwater Elevation Data**
**5315 San Pablo Avenue, Oakland, California**

| Well | Well Depth (feet bgs) | Well Screened Interval | | Groundwater Level Depth [(a)] September 19, 2008 | Groundwater Elevation [(b)] September 19, 2008 |
|---|---|---|---|---|---|
| | | Depth (feet) | Elevation (feet) | | |
| MW-1 | 25 | 15 to 25 | 14 to 24 | 12.69 | 26.25 |
| MW-2 | 25 | 15 to 25 | 14 to 24 | 12.88 | 26.30 |
| MW-3 | 25 | 15 to 25 | 13 to 23 | 12.27 | 25.96 |

Notes:

[(a)] Pre-purge measurement, feet below top of well casing.
[(b)] Pre-purge measurement, feet above mean sea level

As the first monitoring task, static water levels were measured in the site wells using an electric water level indicator. Each well was then purged of five wetted casing volumes. After purging, the water level in each well was allowed to recover to at least 80% of the pre-purge

measurement. The groundwater elevations and flow direction are consistent with previous measurements. Figure 4 shows the groundwater elevation map with the direction of flow indicated.

Groundwater samples were collected from each well using a peristaltic pump equipped with new polyethylene tubing. Samples were contained in appropriate containers (40-ml VOA vials with hydrochloric acid preservative and 1-liter amber glass jars), labeled, and placed in coolers with "blue ice." All groundwater samples were managed under chain-of-custody procedures from the time of sample collection until samples were received in the laboratory.

Approximately 7.5 gallons of wastewater (purge water and equipment decontamination rinseate) was containerized in a labeled, 55-gallon steel drum and temporarily stored onsite. This non-hazardous monitoring well purge water will continue to be accumulated onsite until it is cost-effective to coordinate its disposal, at which time it will be profiled and disposed of at a permitted wastewater treatment facility.

# 4.0 REGULATORY CONSIDERATIONS, ANALYTICAL RESULTS, AND FINDINGS

This section presents analytical results of the most recent monitoring event, preceded by a summary of relevant regulatory considerations.

## REGULATORY CONSIDERATIONS

### Environmental Screening Levels

The concentrations reported in soil and groundwater samples must be compared to regulatory limits and guidance to evaluate the extent of any potential impact on the property and the environment.

The Water Board has established ESLs for evaluating the likelihood of environmental impact. ESLs are conservative screening-level criteria for soil and groundwater, designed to be generally protective of both drinking water resources and aquatic environments; they incorporate both environmental and human health risk considerations. ESLs are not cleanup criteria (i.e., health-based numerical values or disposal-based values). Rather, they are used as a preliminary guide in determining whether additional remediation and/or investigation may be warranted. Exceedance of ESLs suggests that additional investigation and/or remediation is warranted.

Different ESLs are published for commercial/industrial vs. residential land use, for sites where groundwater is a likely vs. unlikely drinking water resource, and the type of receiving water body. The Water Board's "proposed groundwater management zones and designated areas map" in the *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report* (Water Board, 1999) shows the property area in a location where groundwater is unlikely to be used for drinking water.

The appropriate ESLs for the subject site are based on the following:

- Residential land use (a school is located downgradient of the property) and commercial/industrial use (for the subject property itself). Note that, for groundwater contaminants, all ESLs for the site contaminants are the same for both residential and commercial/industrial land use.
- Groundwater is not likely to be used as a potential drinking water resource based on both the property zoning status (commercial/industrial) and the designation of this area of

Oakland as "Zone B – Unlikely to be used as a Drinking Water Resource (Water Board, 1999). Thus, while the Basin Plan considers all groundwater with potential for drinking water, the appropriate ESLs for the subject site are groundwater is not a likely drinking water resource.

- The receiving body for groundwater discharge is an estuary (San Francisco Bay).

The State of California has also promulgated drinking water standards (Maximum Contaminant Levels [MCLs]) for some of the site contaminants. Drinking water standards may also be utilized by regulatory agencies to evaluate the potential risk associated with groundwater contamination. For the site contaminants, MCLs are generally the same as the ESLs (except that there is no MCL for gasoline).

Once ESLs or drinking water standards are exceeded, the need for and/or type of additional investigative and corrective actions is generally driven by the potential risk associated with the contamination. Minimum regulatory site closure criteria generally applied to fuel leak cases where groundwater is impacted include:

- The contaminant source has been removed, including reasonably accessible contaminated soils that pose a long-term impact to groundwater.

  *This criterion has been met, with all soil sample results below their respective ESL in areas near the former waste oil and fuel USTs most likely to show high residual contamination.*

- The extent of residual contamination has been fully characterized to obtain sufficient lithologic and hydrogeologic understanding (generally referred to as a Site Conceptual Model).

  *This criterion has been met with respect to the onsite residual contamination.*

- Groundwater wells have been installed and are monitored periodically to evaluate groundwater contaminant concentrations and hydrochemical trends.

  *This criterion has been partially met with the installation of the three monitoring wells and baseline monitoring onsite. Continued monitoring over at least the next two calendar quarters will likely be required to monitor hydrochemical trends and confirm groundwater flow direction.*

- The stability of the contaminant plume has been evaluated to determine whether it is moving or increasing in concentration.

  *This criterion has not been met but is currently being evaluated. Information regarding stability of the contaminant levels can only be established over time (see above).*

- A determination has been made as to whether the residual contamination poses an unacceptable risk to sensitive receptors.

This criterion has been met. No fuel hydrocarbons exist offsite in concentrations that exceed ESLs, and the sensitive receptor/offsite conduit survey conducted as part of the current phase of work do not indicate the likelihood of such receptors.

## GROUNDWATER SAMPLE ANALYTICAL METHODS

Groundwater samples were analyzed in accordance with the methods proposed in the SES technical workplan. Analytical methods included:

- Total volatile hydrocarbons – gasoline range (TVHg) BTEX, MTBE, ethyl tertiary-butyl ether (ETBE), diisopropyl ether (DIPE), tertiary-amyl methyl ether (TAME), and tertiary-butyl alcohol (TBA) by EPA Method 8260.
- Total extractable hydrocarbons – diesel range (TEHd), by EPA Method 8015C.

## GROUNDWATER SAMPLE RESULTS

Tables 2 and 3 summarize the analytical results of the current monitoring event. Appendix B contains the certified analytical laboratory report and chain-of-custody record. Figure 5 depicts contaminant concentration in groundwater.

Groundwater samples collected from wells MW-1, MW-2, and MW-3 did not contain detectable concentrations of TVHg or TEHd. Wells MW-1 and MW-3 did not contain detectable concentrations of BTEX or fuel oxygenates. The groundwater sample from MW-2 contained 2.1 µg/L of DIPE, but did not contain detectable concentrations of BTEX.

Lack of detectable concentrations of TVHg, TEHd, BTEX and fuel oxygenates in all wells for the Third Quarter 2010 compare closely to the initial sampling event in May 2010 with the only detection being DIPE in well MW-2 at 2.1µg/L for the current event compared to 1.6 µg/L for the initial event.

## QUALITY CONTROL SAMPLE ANALYTICAL RESULTS

Laboratory QC samples (e.g., method blanks, matrix spikes, surrogate spikes) were analyzed by the laboratory in accordance with requirements of each analytical method. All laboratory QC sample results and sample holding times were within the acceptance limits of the methods (Appendix B).

## Table 2
## Groundwater Sample Analytical Results – August 11, 2010
## Hydrocarbons, BTEX, and MTBE

| Well | TVHg | TEHd | Benzene | Toluene | Ethyl-benzene | Total Xylenes | MTBE |
|---|---|---|---|---|---|---|---|
| MW-1 | < 50 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| MW-2 | < 50 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| MW-3 | < 50 | <50 | <0.5 | *<0.5* | <0.5 | <0.5 | <0.5 |
| ESLs | 100 / 210 | 100 / 210 | 1.0 / 46 | 150 / 650 | 40 / 130 | 20 / 100 | 5.0 / 1,800 |

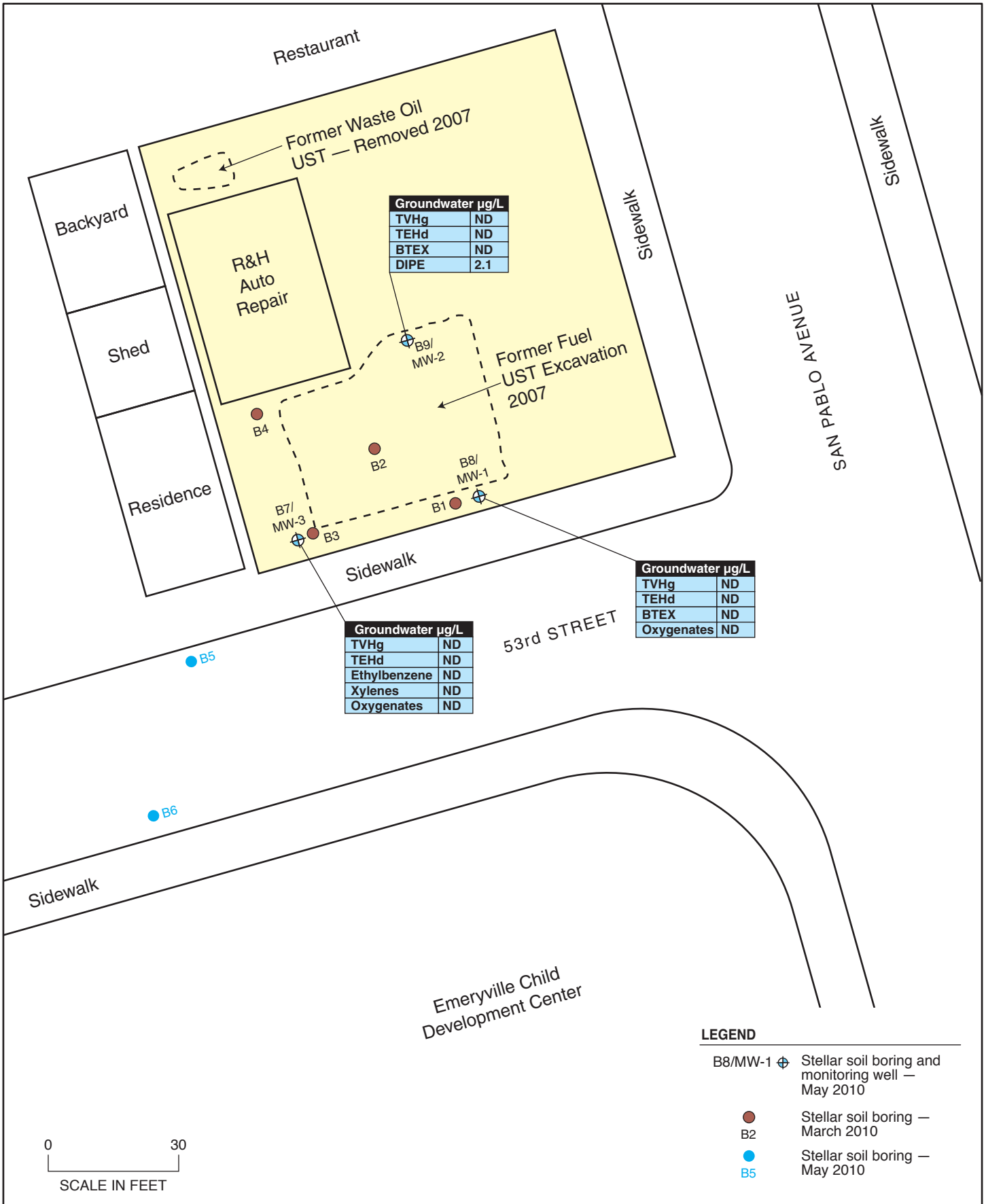
Notes:

ESLs = Water Board Environmental Screening Levels for commercial/industrial sites where groundwater *is/is not* a potential drinking water resource
MTBE = methyl *tertiary*-butyl ether; TEHd = total extractable hydrocarbons - diesel range; TVHg = total volatile hydrocarbons - gasoline range
All concentrations are expressed in micrograms per liter (µg/L), equivalent to parts per billion (ppb).

## Table 3
## Groundwater Sample Analytical Results – August 11, 2010
## Fuel Oxygenates

| Well | EDBE | DIPE | TAME | TBA |
|---|---|---|---|---|
| MW-1 | <0.5 | *<0.5* | <0.5 | < 2 |
| MW-2 | <0.5 | 2.1 | <0.5 | <2 |
| MW-3 | <0.5 | <0.5 | <0.5 | <2 |
| ESLs | 0.5 / 690 | NLP | NLP | 12 / 18,000 |

Notes:
ESLs = Water Board Environmental Screening Levels for commercial/industrial sites where groundwater *is/is not* considered a drinking water resource.
EDBE = ethyl tertiary-butyl ether; DIPE = diisopropyl ether; TAME = tertiary-amyl methyl ether; TBA = *tertiary*-butyl alcohol
NA = not analyzed for this contaminant; NS = not sampled; NLP = no level published.
All concentrations are expressed in micrograms per liter (µg/L), equivalent to parts per billion (ppb).




# CONTAMINANTS OF CONCERN IN MONITORING WELLS AND OFFSITE BORINGS

| | | |
|---|---|---|
| 5315 San Pablo Avenue<br>Oakland, CA | By: MJC | AUGUST 2010 |
| | Figure 5 | |

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# 5.0 SUMMARY, CONCLUSIONS, AND PROPOSED ACTIONS

## SUMMARY AND CONCLUSIONS

- The site has undergone site investigations and remediation since 2007 (SES has been involved since March 2010) to address soil and groundwater contamination associated with the former onsite UFSTs.
- The contaminant source has been removed, including reasonably accessible contaminated soils that pose a long-term impact to groundwater.
- A total of two groundwater monitoring/sampling events have been conducted in the three site wells between May 2010 and the current 3rd Quarter event.
- Regional groundwater flow in the area of the property is approximately to the southwest, toward San Francisco Bay. The initial groundwater monitoring event conducted by Stellar Environmental on May 13, 2010, which used wells MW-1 through MW-3 as data points, demonstrated a southwesterly groundwater flow direction with a hydraulic gradient of approximately 0.01 feet/foot. The groundwater flow direction and gradient for the current monitoring event is consistent with the initial event.
- Lack of detectable concentrations of TVHg, TEHd, BTEX and fuel oxygenates in all wells for the Third Quarter 2010 compare closely to the initial sampling event in May 2010 with the only detection being DIPE in well MW-2 at 2.1µg/L for the current event compared to 1.6 µg/L for the initial event.
- Based on the depth to groundwater and the maximum 8-foot depth of the located utilities determined during the March 2010 conduit survey, there does not appear to be any preferential pathways, downgradient wells or other sensitive receptors that could intersect site-sourced groundwater.
- No significant offsite impacts to soil or groundwater currently exist from the former site UST release. The 72 µg/L of TEHd reported in the May 2010 offsite grab-groundwater sample point across 53rd Street is below the ESL, likely reflecting site sourced contaminants attenuated with time.
- The site is not currently receiving reimbursements from the California Tank Fund.

## PROPOSED ACTIONS

The Responsible Party proposes to implement the following actions to address regulatory concerns:

- Conduct two additional quarters of groundwater monitoring of the existing wells to monitor hydrologic conditions and groundwater flow direction, and to confirm hydrochemical trends.
- Required Electronic Data Format uploads should continued to be made to the GeoTracker database, and electronic copies of technical reports should be uploaded to ACEH's ftp system.
- Provide this report to the ACEH and discuss strategies to move the site toward regulatory closure.
- Consider placing asphalt or pavement over the former UST excavation area. This area is currently surfaced with drain rock, which provides no protection against automotive-based hydrocarbon spills that commonly occur at auto repair shops. Such spills can be easily transported to the subsurface by rainwater infiltration through an unsealed surface.
- Apply to the State Tank Fund to determine eligibility for reimbursements.

# 7.0 REFERENCES AND BIBLIOGRAPHY

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State Water Resources Control Board, 1989. Leaking Underground Fuel Tank Field Manual. October

Stellar Environmental Solutions, Inc., 2010. Limited Phase II Site Investigation Report, 5315 San Pablo Avenue, Oakland, California. March 28.

Stellar Environmental Solutions, Inc., 2010. Well Installation Report and Preferential Pathway Study, 5315 San Pablo Avenue, Oakland, California. June 15.

# 8.0 LIMITATIONS

This report has been prepared for the use of the R&H Auto Repair property owners, members, property manager, and tenants, and all of their authorized representatives. The information presented in this report is based on a review of site-specific documents provided by the property owner and its agents (e.g., historical environmental assessments and monitoring) and communication with the regulatory agencies. This report has been prepared in accordance with generally accepted methodologies and standards of practice of the area. The personnel performing this assessment are qualified to perform such investigations and have accurately reported the information available, but cannot attest to the validity of that information. No warranty, expressed or implied, is made as to the findings included in the report.

The findings of this report are valid as of the date of this report. Subject property conditions may change with the passage of time, natural processes, or human intervention, which can invalidate the findings and conclusions presented in this report. As such, this report should be updated as needed with monitoring reports, inspection reports, contact information, and monitoring schedules.

# APPENDIX A

## Current Event Groundwater Monitoring Field Records

STELLAR
ENVIRONMENTAL SOLUTIONS, INC.
2198 SIXTH STREET, SUITE 201-BERKELEY, CA 94710
TEL: (510)644-3123 · FAX: (510)644-3859
GEOSCIENCE & ENGINEERING CONSULTING

# WELL MONITORING DATA SHEET

| | |
|---|---|
| Project #: 2010-6 | Client: Grewel |
| Sampler: S Bittman | Start Date: Aug 11 2010 |
| Well I.D.: MW-1 | Well Diameter: (circle one) 2 3 4 6 (1) |
| Total Well Depth: Before 25' After 25' | Depth to Water: Before 12.09 After 17.20 |
| Depth to Free Product: 0 | Thickness of Free Product (feet): 0 |
| Measurements referenced to: (PVC) Grade | Other: |

| Well Diameter | VCF | Well Diameter | VCF |
|---|---|---|---|
| 1" | 0.04 | 6" | 1.47 |
| 2" | 0.16 | 8" | 2.61 |
| 3" | 0.37 | 10" | 4.08 |
| 4" | 0.65 | 12" | 5.87 |
| 5" | 1.02 | 16" | 10.43 |

0.49 gal (1 Case Volume) x 5 (Specified Volumes) = 2.46 gallons

Purging: Bailer; Disposable Bailer; Middleburg; Electric Submersible; Extraction Pump; Other Peristaltic Pump

Sampling: Bailer; Disposable Bailer; Extraction Port; Other Peristaltic Pump

| TIME | TEMP. (F) | pH | COND. | TURBIDITY: | VOLUME REMOVED: | OBSERVATIONS: |
|---|---|---|---|---|---|---|
| 1135 | | | | Cloudy | Start | |
| 1155 | | | | Clear | 2.5 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Did Well Dewater? NO If yes, gals. Gallons Actually Evacuated: 2.5

Sampling Time: 12:00 Sampling Date: 8/11/2010

Sample I.D.: MW-1 Laboratory: McCampbell

Analyzed for: (TPH-G) (BTEX) (TPH-D) OTHER: OXY

Duplicate I.D.: 0 Cleaning Blank I.D.: 0

Analyzed for: TPH-G BTEX TPH-D OTHER:

STELLAR
ENVIRONMENTAL SOLUTIONS, INC.
2198 SIXTH STREET, SUITE 201-BERKELEY, CA 94710
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GEOSCIENCE & ENGINEERING CONSULTING

# WELL MONITORING DATA SHEET

Project #: 2010-6 Client: Grewel

Sampler: S Bittman Start Date: Aug 11 2010

Well I.D.: MW-2 Well Diameter: (circle one) 2 3 4 6 (1)

Total Well Depth: Before 25' After 25' Depth to Water: Before 12.88 After 16.83

Depth to Free Product: 0 Thickness of Free Product (feet): 0

Measurements referenced to: (PVC) Grade Other:

| Well Diameter | VCF | Well Diameter | VCF |
|---|---|---|---|
| 1" | 0.04 | 6" | 1.47 |
| 2" | 0.16 | 8" | 2.61 |
| 3" | 0.37 | 10" | 4.08 |
| 4" | 0.65 | 12" | 5.87 |
| 5" | 1.02 | 16" | 10.43 |

0.48 (1 Case Volume) x 5 (Specified Volumes) = 2.4 gallons

Purging: Bailer
Disposable Bailer
Middleburg
Electric Submersible
Extraction Pump
Other Peristaltic pump

Sampling: Bailer
Disposable Bailer
Extraction Port
Other peristaltic pump

| TIME | TEMP. (F) | pH | COND. | TURBIDITY: | VOLUME REMOVED: | OBSERVATIONS: |
|---|---|---|---|---|---|---|
| 1005 | | | | Clear | Start | |
| 1030 | | | | Clear | 2.5 gal | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Did Well Dewater? ~~No~~ If yes, gals. 2.5 Gallons Actually Evacuated: 2.5

Sampling Time: 1125 Sampling Date: Aug 11 2010

Sample I.D.: MW-2 Laboratory: McCampbell

Analyzed for: (TPH-G) (BTEX) (TPH-D) OTHER: OXY
(Circle)

Duplicate I.D.: 0 Cleaning Blank I.D.: 0

Analyzed for: TPH-G BTEX TPH-D OTHER:
(Circle)

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ENVIRONMENTAL SOLUTIONS, INC.
2198 SIXTH STREET, SUITE 201 · BERKELEY, CA 94710
TEL: (510)644-3123 · FAX: (510)644-3859
GEOSCIENCE & ENGINEERING CONSULTING

# WELL MONITORING DATA SHEET

| | |
|---|---|
| Project #: 2010-06 | Client: Grewal |
| Sampler: S Bittman | Start Date: Aug 11 2010 |
| Well I.D.: MW-3 | Well Diameter: (circle one) 2 3 4 6 (12) |
| Total Well Depth: Before 25' After 25' | Depth to Water: Before 12.27 After 15.38 |
| Depth to Free Product: 0 | Thickness of Free Product (feet): 0 |
| Measurements referenced to: (PVC) Grade | Other: |

| Well Diameter | VCF | Well Diameter | VCF |
|---|---|---|---|
| 1" | 0.04 | 6" | 1.47 |
| 2" | 0.16 | 8" | 2.61 |
| 3" | 0.37 | 10" | 4.08 |
| 4" | 0.65 | 12" | 5.87 |
| 5" | 1.02 | 16" | 10.43 |

0.51 gal (1 Case Volume) x 5 (Specified Volumes) = 2.55 gallons

Purging: Bailer
Disposable Bailer
Middleburg
Electric Submersible
Extraction Pump
Other Peristaltic pump

Sampling: Bailer
Disposable Bailer
Extraction Port
Other Peristaltic pump

| TIME | TEMP. (F) | pH | COND. | TURBIDITY: | VOLUME REMOVED: | OBSERVATIONS: |
|---|---|---|---|---|---|---|
| 1045 | | | | Clear | Start | |
| 1110 | | | | Clear | 2.5 | |
| | | | | | | |
| | | | | | | |
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| | | | | | | |

Did Well Dewater? NO If yes, gals. Gallons Actually Evacuated: 2.5

Sampling Time: 1115 Sampling Date: 8/11/10

Sample I.D.: MW-3 Laboratory: Mc Campbell

Analyzed for: (TPH-G) (BTEX) (TPH-D) OTHER: OXY (Circle)

Duplicate I.D.: 0 Cleaning Blank I.D.: 0

Analyzed for: TPH-G BTEX TPH-D OTHER: (Circle)

# APPENDIX B

## Current Event Analytical Laboratory Report and Chain-of-Custody Record

**McCampbell Analytical, Inc.**
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

| | | |
|---|---|---|
| Stellar Environmental Solutions | Client Project ID: #2010-06; R&H Auto | Date Sampled: 08/11/10 |
| 2198 Sixth St. #201 | | Date Received: 08/11/10 |
| | Client Contact: Steve Bittman | Date Reported: 08/18/10 |
| Berkeley, CA 94710 | Client P.O.: | Date Completed: 08/18/10 |

**WorkOrder: 1008331**

August 18, 2010

Dear Steve:

Enclosed within are:

1) The results of the **3** analyzed samples from your project: **#2010-06; R&H Auto,**
2) A QC report for the above samples,
3) A copy of the chain of custody, and
4) An invoice 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 or concerns, please feel free to give me a call. Thank you for choosing

McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius
Laboratory Manager
McCampbell Analytical, Inc.

# Chain of Custody Record

1008331

Lab job no. _____
Date _____
Page 1 of 1

Laboratory: McCampbell Analytical
Address: 1534 Willow Pass Rd, Pittsburg, CA 94565, 877-252-9262
Project Owner: _____
Site Address: 5315 San Pablo Ave, Oakland CA
Project Name: R&H Auto
Project Number: 2010-06

Method of Shipment: Courrier
Shipment No. _____
Airbill No. _____
Cooler No. _____
Project Manager: Steve Bittman
Telephone No.: 510-644-3123
Fax No. _____
Samplers: (Signature) Steve Bittman

8260

| Field Sample Number | Location/ Depth | Date | Time | Sample Type | Type/Size of Container | Preservation: Cooler | Preservation: Chemical | Filtered | No. of Containers | TPHg BTEX Oxys 8260 | TPHd TEPH | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-1 | | 8/11/10 | | W | 40 ml VOA | Y | HCL | | 3 | X | | |
| MW-1 | | | | W | Amber Liter | Y | 0 | | 1 | | X | |
| MW-2 | | | | W | 40 ml VOA | Y | HCL | | 3 | X | | |
| MW-2 | | | | W | Amber Liter | Y | 0 | | 1 | | X | |
| MW-3 | | | | W | 40 ml VOA | Y | HCL | | 3 | X | | |
| MW-3 | | 8/11/10 | | W | Amber Liter | Y | 0 | | 1 | | X | |

ICE/t° yes 2.8 °C
GOOD CONDITION ✓
HEAD SPACE ABSENT ✓
DECHLORINATED IN LAB ✓
APPROPRIATE CONTAINERS ✓
PRESERVED IN LAB ✓
PRESERVATION: VOAS | O&G | METALS | OTHER

| Relinquished by: | Date | Received by: | Date | Relinquished by: | Date | Received by: | Date |
|---|---|---|---|---|---|---|---|
| Signature: S. Bittman | 1490 | Signature: | 8/11/10 | Signature: | 8/11/10 | Signature: | |
| Printed: Steve Bittman | Time: 8/11/10 | Printed: Rob Wright | Time: 1440 | Printed: | Time: | Printed: Samantha Arevalo | Time: |
| Company: SES | | Company: MAI | | Company: MAI | 8/11/10 | Company: MAI | |

Turnaround Time: 5 day
Comments: EDF Required
email Results to:
Sbittman@stellar-environmental.com

| Relinquished by: | Date | Received by: | Date |
|---|---|---|---|
| Signature: | | Signature: | |
| Printed: | Time: | Printed: | Time: |
| Company: | | Company: | |

**McCampbell Analytical, Inc.**
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

# CHAIN-OF-CUSTODY RECORD



**WorkOrder: 1008331** **ClientCode: SESB**

☐ WaterTrax ☐ WriteOn ☑ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

**Report to:**
Steve Bittman
Stellar Environmental Solutions
2198 Sixth St. #201
Berkeley, CA 94710
(510) 612-8751 FAX (510) 644-3859

Email: sbittman@stellar-environmental.com,inter
cc:
PO:
ProjectNo: #2010-06; R&H Auto

**Bill to:**
Accounts Payable
Stellar Enviormental Solutions
2198 Sixth St. #201
Berkeley, CA 94710

**Requested TAT:** 5 days

***Date Received:*** **08/11/2010**
***Date Printed:*** **08/13/2010**

| Lab ID | Client ID | Matrix | Collection Date | Hold | Requested Tests (See legend below) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1008331-001 | MW-1 | Water | 8/11/2010 | ☐ | A | A | B | | | | | | | | | |
| 1008331-002 | MW-2 | Water | 8/11/2010 | ☐ | A | | B | | | | | | | | | |
| 1008331-003 | MW-3 | Water | 8/11/2010 | ☐ | A | | B | | | | | | | | | |

**Test Legend:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | GAS8260_W | 2 | PREDF REPORT | 3 | TPH(D)_W | 4 | | 5 | |
| 6 | | 7 | | 8 | | 9 | | 10 | |
| 11 | | 12 | | | | | | | |

The following SampIDs: 001A, 002A, 003A contain testgroup.

**Prepared by: Samantha Arbuckle**

**Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

# Sample Receipt Checklist

Client Name: **Stellar Environmental Solutions**
Date and Time Received: **8/11/2010 6:56:58 PM**

Project Name: **#2010-06; R&H Auto**
Checklist completed and reviewed by: Samantha Arbuckle

WorkOrder N°: **1008331** Matrix Water
Carrier: Rob Pringle (MAI Courier)

## Chain of Custody (COC) Information

| | | |
|---|---|---|
| Chain of custody present? | Yes ☑ | No ☐ |
| Chain of custody signed when relinquished and received? | Yes ☑ | No ☐ |
| Chain of custody agrees with sample labels? | Yes ☑ | No ☐ |
| Sample IDs noted by Client on COC? | Yes ☑ | No ☐ |
| Date and Time of collection noted by Client on COC? | Yes ☑ | No ☐ |
| Sampler's name noted on COC? | Yes ☑ | No ☐ |

## Sample Receipt Information

| | | | |
|---|---|---|---|
| Custody seals intact on shipping container/cooler? | Yes ☐ | No ☐ | NA ☑ |
| Shipping container/cooler in good condition? | Yes ☑ | No ☐ | |
| Samples in proper containers/bottles? | Yes ☑ | No ☐ | |
| Sample containers intact? | Yes ☑ | No ☐ | |
| Sufficient sample volume for indicated test? | Yes ☑ | No ☐ | |

## Sample Preservation and Hold Time (HT) Information

| | | | |
|---|---|---|---|
| All samples received within holding time? | Yes ☑ | No ☐ | |
| Container/Temp Blank temperature | Cooler Temp: 2.8°C | | NA ☐ |
| Water - VOA vials have zero headspace / no bubbles? | Yes ☑ | No ☐ | No VOA vials submitted ☐ |
| Sample labels checked for correct preservation? | Yes ☑ | No ☐ | |
| Metal - pH acceptable upon receipt (pH<2)? | Yes ☐ | No ☐ | NA ☑ |
| Samples Received on Ice? | Yes ☑ | No ☐ | |

(Ice Type: WET ICE )

** NOTE: If the "No" box is checked, see comments below.*

---

Client contacted: Date contacted: Contacted by:

Comments:

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Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

| | | |
|---|---|---|
| Stellar Environmental Solutions | Client Project ID: #2010-06; R&H Auto | Date Sampled: 08/11/10 |
| | | Date Received: 08/11/10 |
| 2198 Sixth St. #201 | Client Contact: Steve Bittman | Date Extracted: 08/12/10 |
| Berkeley, CA 94710 | Client P.O.: | Date Analyzed 08/12/10 |

**TPH(g) by Purge & Trap and GC/MS***

Extraction method SW5030B Analytical methods SW8260B Work Order: 1008331

| Lab ID | Client ID | Matrix | TPH(g) | DF | % SS | Comments |
|---|---|---|---|---|---|---|
| 001A | MW-1 | W | ND | 1 | 100 | |
| 002A | MW-2 | W | ND | 1 | 100 | |
| 003A | MW-3 | W | ND | 1 | 100 | |
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|---|---|---|---|
| Reporting Limit for DF =1; ND means not detected at or above the reporting limit | W | 50 | µg/L |
| | S | NA | NA |

* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

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

# surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.

%SS = Percent Recovery of Surrogate Standard
DF = Dilution Factor

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

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Telephone: 877-252-9262 Fax: 925-252-9269

| | | |
|---|---|---|
| Stellar Environmental Solutions | Client Project ID: #2010-06; R&H Auto | Date Sampled: 08/11/10 |
| | | Date Received: 08/11/10 |
| 2198 Sixth St. #201 | Client Contact: Steve Bittman | Date Extracted: 08/12/10-08/13/10 |
| Berkeley, CA 94710 | Client P.O.: | Date Analyzed: 08/12/10-08/13/10 |

**Oxygenates, MBTEX & Lead Scavengers by GC/MS***

Extraction Method: SW5030B Analytical Method: SW8260B Work Order: 1008331

| Lab ID | 1008331-001A | 1008331-002A | 1008331-003A | | Reporting Limit for DF =1 | |
|---|---|---|---|---|---|---|
| Client ID | MW-1 | MW-2 | MW-3 | | | |
| Matrix | W | W | W | | | |
| DF | 1 | 1 | 1 | | S | W |
| **Compound** | **Concentration** | | | | ug/kg | µg/L |
| tert-Amyl methyl ether (TAME) | ND | ND | ND | | NA | 0.5 |
| Benzene | ND | ND | ND | | NA | 0.5 |
| t-Butyl alcohol (TBA) | ND | ND | ND | | NA | 2.0 |
| 1,2-Dibromoethane (EDB) | ND | ND | ND | | NA | 0.5 |
| 1,2-Dichloroethane (1,2-DCA) | ND | ND | ND | | NA | 0.5 |
| Diisopropyl ether (DIPE) | ND | 2.1 | ND | | NA | 0.5 |
| Ethylbenzene | ND | ND | ND | | NA | 0.5 |
| Ethyl tert-butyl ether (ETBE) | ND | ND | ND | | NA | 0.5 |
| Methyl-t-butyl ether (MTBE) | ND | ND | ND | | NA | 0.5 |
| Toluene | ND | ND | ND | | NA | 0.5 |
| Xylenes | ND | ND | ND | | NA | 0.5 |
| **Surrogate Recoveries (%)** | | | | | | |
| %SS1: | 108 | 114 | 110 | | | |
| %SS2: | 94 | 92 | 95 | | | |
| **Comments** | | | | | | |

* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

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

# surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.

%SS = Percent Recovery of Surrogate Standard
DF = Dilution Factor

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Telephone: 877-252-9262 Fax: 925-252-9269

| | | |
|---|---|---|
| Stellar Environmental Solutions | Client Project ID: #2010-06; R&H Auto | Date Sampled: 08/11/10 |
| | | Date Received: 08/11/10 |
| 2198 Sixth St. #201 | Client Contact: Steve Bittman | Date Extracted: 08/11/10 |
| Berkeley, CA 94710 | Client P.O.: | Date Analyzed 08/15/10-08/17/10 |

**Total Extractable Petroleum Hydrocarbons***

Extraction method SW3510C Analytical methods: SW8015B Work Order: 1008331

| Lab ID | Client ID | Matrix | TPH-Diesel (C10-C23) | DF | % SS | Comments |
|---|---|---|---|---|---|---|
| 1008331-001B | MW-1 | W | ND | 1 | 81 | |
| 1008331-002B | MW-2 | W | ND | 1 | 101 | |
| 1008331-003B | MW-3 | W | ND | 1 | 81 | |
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|---|---|---|---|
| Reporting Limit for DF =1; ND means not detected at or above the reporting limit | W | 50 | µg/L |
| | S | NA | NA |

* water samples are reported in ug/L, wipe samples in µg/wipe, soil/solid/sludge samples in mg/kg, product/oil/non-aqueous liquid samples in mg/L, and all DISTLC / STLC / SPLP / TCLP extracts are reported in µg/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.

%SS = Percent Recovery of Surrogate Standard
DF = Dilution Factor

+The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation:

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

**McCampbell Analytical, Inc.**
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# QC SUMMARY REPORT FOR SW8260B

W.O. Sample Matrix: Water QC Matrix: Water BatchID: 52488 WorkOrder 1008331

**EPA Method SW8260B** **Extraction SW5030B** **Spiked Sample ID: 1008394-001A**

| Analyte | Sample | Spiked | MS | MSD | MS-MSD | LCS | LCSD | LCS-LCSD | Acceptance Criteria (%) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | µg/L | µg/L | % Rec. | % Rec. | % RPD | % Rec. | % Rec. | % RPD | MS / MSD | RPD | LCS/LCSD | RPD |
| tert-Amyl methyl ether (TAME) | ND | 10 | 82.4 | 87.1 | 5.58 | 89.8 | 90.5 | 0.859 | 70 - 130 | 30 | 70 - 130 | 30 |
| Benzene | ND | 10 | 103 | 104 | 1.27 | 101 | 102 | 1.21 | 70 - 130 | 30 | 70 - 130 | 30 |
| t-Butyl alcohol (TBA) | ND | 50 | 72.7 | 79.2 | 8.58 | 74.2 | 77 | 3.76 | 70 - 130 | 30 | 70 - 130 | 30 |
| Chlorobenzene | ND | 10 | 99.2 | 100 | 0.714 | 98.3 | 99.8 | 1.54 | 70 - 130 | 30 | 70 - 130 | 30 |
| 1,2-Dibromoethane (EDB) | ND | 10 | 83 | 87.8 | 5.62 | 92.8 | 97.3 | 4.67 | 70 - 130 | 30 | 70 - 130 | 30 |
| 1,2-Dichloroethane (1,2-DCA) | ND | 10 | 95.1 | 99.1 | 4.09 | 94.3 | 98 | 3.80 | 70 - 130 | 30 | 70 - 130 | 30 |
| 1,1-Dichloroethene | ND | 10 | 97.3 | 98.4 | 1.08 | 125 | 130 | 3.43 | 70 - 130 | 30 | 70 - 130 | 30 |
| Diisopropyl ether (DIPE) | ND | 10 | 110 | 114 | 3.23 | 104 | 108 | 3.43 | 70 - 130 | 30 | 70 - 130 | 30 |
| Ethyl tert-butyl ether (ETBE) | ND | 10 | 96.3 | 99.6 | 3.35 | 100 | 103 | 2.87 | 70 - 130 | 30 | 70 - 130 | 30 |
| Methyl-t-butyl ether (MTBE) | ND | 10 | 91.3 | 96.3 | 5.30 | 108 | 111 | 3.23 | 70 - 130 | 30 | 70 - 130 | 30 |
| Toluene | ND | 10 | 99.7 | 99 | 0.646 | 92.4 | 94.4 | 2.17 | 70 - 130 | 30 | 70 - 130 | 30 |
| Trichloroethene | ND | 10 | 103 | 103 | 0 | 111 | 112 | 1.17 | 70 - 130 | 30 | 70 - 130 | 30 |
| %SS1: | 116 | 25 | 104 | 106 | 2.04 | 106 | 107 | 1.39 | 70 - 130 | 30 | 70 - 130 | 30 |
| %SS2: | 94 | 25 | 106 | 106 | 0 | 93 | 93 | 0 | 70 - 130 | 30 | 70 - 130 | 30 |
| %SS3: | 82 | 2.5 | 82 | 80 | 2.07 | 80 | 83 | 3.79 | 70 - 130 | 30 | 70 - 130 | 30 |

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 52488 SUMMARY

| Lab ID | Date Sampled | Date Extracted | Date Analyzed | Lab ID | Date Sampled | Date Extracted | Date Analyzed |
|---|---|---|---|---|---|---|---|
| 1008331-001A | 08/11/10 | 08/12/10 | 08/12/10 9:03 PM | 1008331-002A | 08/11/10 | 08/12/10 | 08/12/10 9:49 PM |
| 1008331-003A | 08/11/10 | 08/12/10 | 08/12/10 10:31 PM | | | | |

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS – MSD) / (MS + MSD) * 2.

MS and / or MSD spike recoveries may not be near 100% or the RPDs near 0% if: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) if that specific sample matrix interferes with spike recovery. The LCS and LCSD are spikes into a clean, known, similar matrix and they and the surrogate standards reflect the overall validity of their extraction batch. Our control limits are 70-130% recovery and a 30% RPD for the LCS-LCSD and for the Surrogate Standards.

DHS ELAP Certification 1644

QA/QC Officer

**McCampbell Analytical, Inc.**
"When Quality Counts"

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# QC SUMMARY REPORT FOR SW8015B

W.O. Sample Matrix: Water QC Matrix: Water BatchID: 52437 WorkOrder 1008331

**EPA Method SW8015B** **Extraction SW3510C** **Spiked Sample ID: N/A**

| Analyte | Sample | Spiked | MS | MSD | MS-MSD | LCS | LCSD | LCS-LCSD | Acceptance Criteria (%) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | µg/L | µg/L | % Rec. | % Rec. | % RPD | % Rec. | % Rec. | % RPD | MS / MSD | RPD | LCS/LCSD | RPD |
| TPH-Diesel (C10-C23) | N/A | 1000 | N/A | N/A | N/A | 94.5 | 96.6 | 2.15 | N/A | N/A | 70 - 130 | 30 |
| %SS: | N/A | 625 | N/A | N/A | N/A | 85 | 85 | 0 | N/A | N/A | 70 - 130 | 30 |

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 52437 SUMMARY

| Lab ID | Date Sampled | Date Extracted | Date Analyzed | Lab ID | Date Sampled | Date Extracted | Date Analyzed |
|---|---|---|---|---|---|---|---|
| 1008331-001B | 08/11/10 | 08/11/10 | 08/15/10 8:26 AM | 1008331-002B | 08/11/10 | 08/11/10 | 08/17/10 9:05 PM |
| 1008331-003B | 08/11/10 | 08/11/10 | 08/15/10 4:00 AM | | | | |

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS ELAP Certification 1644

QA/QC Officer