

Impact Environmental Services

**DUAL-PHASE VACUUM EXTRACTION PILOT TEST
REPORT
1409- 1417 12TH STREET
OAKLAND, CALIFORNIA**

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Alameda County
Environmental Health

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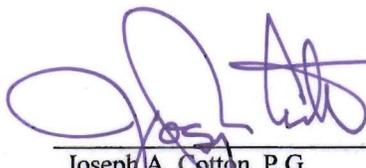
Mrs. Shirley Thompson
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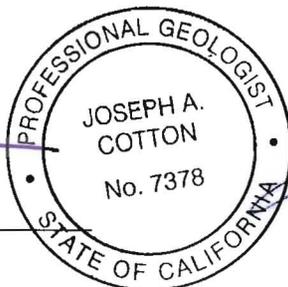
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November 2008

**DUAL-PHASE VACUUM-ENHANCED EXTRACTION PILOT TEST
REPORT
1409-1417 12TH STREET
OAKLAND CALIFORNIA
ACEH File No. RO2933**

On behalf of Mrs. Shirley E. Thompson, Impact Environmental Services (IMPACT) is pleased to submit this report presenting the results of a Dual-Phase Vacuum Enhanced Extraction (DPE) pilot test program conducted from October 13 through 17, 2008 at the Thompson Property, located at 1409-1417 12th Street, Oakland, California (the Site). This report presents site background information, DPE pilot test activities and results, and discussions and conclusions. This report is being prepared in response to a request from the Alameda County Environmental Health (ACEH) for a remediation work plan¹ for the unauthorized release of fuel at the subject property.

SITE CONTACT INFORMATION

The site address and contact information is as follows:

Site Address:
1409-1417 12th Street
Oakland, CA
APN 004-063-06

Contact Information:
Mrs. Shirley Thompson
Edward C. and Shirley E. Thompson Trust
1155 Hopkins Street, Berkeley, CA 94702-1359

¹ Alameda County Environmental Health, "Fuel Leak Case No. RO2933, 1409-1417 12th Street, Oakland, California CA 94607-2003_Request for Work Plan", July 31, 2008.

SITE BACKGROUND

The Subject Property is located in a predominately residential area in the western section of the city of Oakland, Alameda County, California (Figure 1). The subject Property comprises the Alameda County assessor parcel 004-063-06 and is bordered to the north by 12th Street and residential development, to the south by a vacant lot, on the east by Mandela Parkway, and to the west by a residential development (Figure 2). The property is located approximately 1-mile southeast of San Francisco Bay and 1-mile north of Oakland Inner Harbor. The elevation of the site is approximately 17 feet above mean sea level (USGS West Oakland 7.5 Minute Quadrangle). Portions of the site are paved with asphalt and the remainder is covered by grass and soil. Several mounds of soil up to 2 feet high are present in the southeast portion of the subject property.

Historical records indicate that the property was occupied by a service station from circa 1957 to the circa 1969. The subject property was either vacant or occupied by residential dwellings from at least 1902 to circa 1956. Sanborn maps from 1957, 1958, 1961 and 1967 appear to show three underground fuel storage tanks (USTs) located in the southeast corner of the service station. The 1961 Sanborn map appears to show a fourth UST or AST along the west property boundary. According to a previous report, a magnetometer survey performed at the subject property (circa 1999) revealed no magnetic anomalies indicative of buried underground storage tanks. However, communications with the Oakland Fire Department Hazardous Materials Division, confirmed that no records exist of UST removal from the Subject Property².

Geologic and Hydrogeologic Setting

The Subject Property is located in the East Bay Plain of the San Francisco Bay Area. This region is dominated by northwest trending topography enclosed in the Coast Range Province of California. The site is located in the “Merritt Sand Outcrop” groundwater subarea, which has a maximum thickness of 65 feet, and the local gradient is directed toward the west to southwest³. Based on information provided by a previous investigation, soil beneath the property consists

² Verbal Communication, *LeRoy Griffin, Oakland Fire Department Hazardous Materials Division*, May 25, 2006.

³ Hickenbottom and Muir, *Geohydrology and Groundwater Quality Overview of the East Bay Plain Area, Alameda County, California, 205 (J) Report*, 1988.

primarily of silty-sand to at least 20 feet bgs. Groundwater is first encountered between 10.5 and 13.5 below ground surface (bgs) and stabilizes at approximately 11 feet bgs. Groundwater in the vicinity of the subject property is assumed to flow to the west of southwest, towards San Francisco Bay.

Previous Phased Environmental Investigations

In August 1999, East Bay Asian Local Development Corporation (EBALDC) contracted Blymer Engineers of Alameda, California to conduct a subsurface investigation at the subject property⁴. EBALDC was considering purchasing the subject property from Mrs. Thompson for infill development of residential housing units.

The investigation consisted of the installation of five on-site exploratory borings (B1 through B5) and the collection of soil and grab groundwater samples. All soil and grab groundwater samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline (TPHg) by modified EPA Method 8015, and benzene, toluene, ethylbenzene and total xylenes (BTEX) and methyl *tert*-butyl ether (MTBE) by EPA Method 8020. In addition, all of the soil samples and three groundwater samples (GW-3, GW-4, and GW-5) were analyzed for total lead using EPA Methods 6010 and 239.2. Grab groundwater sample GW-5 was also analyzed for Volatile Organic Compounds (VOCs) by EPA Method 8260.

TPHg at concentrations up to 1,500 milligrams per kilogram (mg/kg) and BTEX compounds at concentrations up to 120 mg/kg were detected in soil samples collected from the apparent capillary fringe in borings B-3 and B-5. The highest concentrations were detected just above first-encountered groundwater at a depth of 10.5 to 11.5 feet bgs. Lead was detected in all soil samples (with the exception of sample B1-5) at concentrations indicative of background levels. TPHg at concentrations up to 110,000 micrograms per liter ($\mu\text{g/L}$), benzene up to 5,800 $\mu\text{g/L}$, toluene up to 16,000 $\mu\text{g/L}$, ethylbenzene up to 31,000 $\mu\text{g/L}$, and total xylenes up to 18,000 $\mu\text{g/L}$ were detected in groundwater samples GW-2 and GW-3. The laboratory noted the presence of a "lighter than water immiscible sheen" in groundwater samples GW-3 and GW-5. Lead was not detected in any of the groundwater samples above the method reporting limit of 0.005 milligrams per liter (mg/L). The following VOCs were detected in groundwater sample GW-5: benzene (5,400 $\mu\text{g/L}$), 1,2-dichloroethane (1,2-DCA, 500 $\mu\text{g/L}$), ethylbenzene (3,800 $\mu\text{g/L}$), n-propyl

⁴ Blymer Engineers, Inc., *Subsurface Investigation Vacant Parcel 1409-1417 12th Street, Oakland, California*, August 25, 1999.

benzene (550 µg/L), toluene (18,000 µg/L), 1,2,4-trimethylbenzene (4,900 µg/L), 1,3,5-trimethylbenzene (1,100 µg/L), and total xylenes (23,000 µg/L). The detected concentrations of TPHg and BTEX in groundwater samples from borings B2, B3, and B5 exceed respective San Francisco Bay Regional Water Quality Control Board (RWQCB) environmental screening levels (ESLs)⁵ for commercial and residential land use scenarios. The concentration of 1, 2-DCA detected in groundwater sample GW-5 also exceeds the ESL for that compound.

In July, 2006, IMPACT conducted a Phase I Environmental Site Assessment (Phase I) for the Subject Property⁶. The scope of the Phase I included a reconnaissance of the site and vicinity to assess current land use, review of historical records to establish past land use and to help evaluate the likelihood that past land use resulted in subsurface contamination. Geologic maps and environmental reports were also reviewed to evaluate general geologic and hydrogeologic conditions in the area including the presence of groundwater and regional hydrogeologic features dictating groundwater flow direction. Government agency files were reviewed for information regarding subsurface contamination and use, storage and disposal of hazardous materials at the site and vicinity.

The subject property was not on any government lists. However, the Phase I concluded that the subject property was occupied by a gasoline service station from circa 1957 to circa 1969. Based on review of the Blymer report, previous activities at the site appear to have resulted in hydrocarbon contamination of soils and groundwater at the property.

In May 2007, IMPACT conducted site characterization study to further evaluate the presence of petroleum hydrocarbons and VOCs in soil, soil-vapor, and groundwater at the subject property. Thirty-six discrete soil samples and nine grab groundwater samples from nine exploratory borings (B-6, B-7, and B-9 through B-15) at the Subject Property. In addition, nine soil-vapor samples were collected from property⁷. Soil and grab groundwater samples were analyzed for TPH as diesel (TPHd) and motor oil (TPHmo) by EPA Method 8015, and TPHg, benzene, toluene, ethylbenzene and total xylenes (BTEX), methyl *tert*-butyl ether (MTBE), and other fuel

⁵ *Screening For Environmental Concerns at Sites with Contaminated Soil and Groundwater*, San Francisco Bay Regional Water Quality Control Board, February 2005.

⁶ Impact Environmental Services, *Phase I Environmental Site Assessment 1409-1417 12th Street Oakland California*, August 25, 2006 (revised December 13, 2006).

⁷ Impact Environmental Services, *Site Characterization Report 1409-1417 12th Street Oakland California*, June 5, 2007.

oxygenates by EPA Method 8260. Soil-vapor samples were analyzed for TPHg (by modified EPA Method TO-3) and VOCs (by EPA Method TO-15).

TPHg was detected in three of the thirty-six soil samples at concentrations ranging from 32 mg/kg and 20,000 mg/kg. Soil samples with TPHg detections were collected from boring B-9 at depths of 10, 12, and 20 feet bgs. Two of these samples (B-9:10' [4,600 mg/kg] and B-9:12' [20,000 mg/kg]) contained concentrations of TPHg that exceed the ESL of 83 mg/kg. TPHd was not detected at or above method detection limits (MDLs) in all other soil samples. TPHmo was only detected in one soil sample (B-10:5'), at a concentration significantly below the residential ESL of 5000 mg/kg. BTEX were only detected in soil samples retrieved from exploratory boring B-9. Benzene was detected at 830 µg/kg in soil sample B-9:20'. The concentration of benzene in this sample is above the residential ESL of 44 µg/kg. Toluene was detected at 210,000 µg/kg and 320 µg/kg in samples B-9:12' and B-9:20', respectively. The concentration of toluene in sample B-9:12' exceeds to residential ESL of 2,900 µg/kg. Ethyl benzene was detected at concentrations of 220,000 µg/kg and 440 µg/kg in samples B-9:12' and B-9:20', respectively. The concentration of ethyl benzene in sample B-9:12' exceeds to residential ESL of 3,300 µg/kg. Total xylenes were detected in soil samples B-9:10' (88,000 µg/kg), B-9:12' (1,300,000 µg/kg), and B-9:20' (1,600 µg/kg). The concentrations of total xylenes in samples B-9:10' and B-9:12' are above the residential ESL of 2,300 µg/kg. Fuel oxygenates were not detected at or above MDLs in soil samples collected from the site. The grab groundwater sample collected from boring B-9 contained 52,000 µg/L TPHg, significantly above the TPHg ESL of 100 µg/L. The grab groundwater sample collected from boring B-7 contained TPHd at 59 µg/L. The grab groundwater sample collected from boring B-6 contained TPHmo at 150 µg/L, which exceeds the ESL of 100 µg/L. BTEX were not detected at or above MDLs in grab groundwater samples collected from the site, with the exception of the following samples. The groundwater sample collected from boring B-9 contained 8,700µg/L of benzene, 2,200 µg/L toluene, 2,000 µg/L mg/kg ethylbenzene, and 7,200 µg/L total xylenes. Fuel oxygenates (including MTBE) were not detected at or above MDLs in grab groundwater samples collected from the site during this investigation, with the following exception. 1, 2-Dichloroethane was detected at 570 µg/L in the grab groundwater sample collected from boring B-9. The concentrations of 1, 2-dichloroethane in this sample exceeds the residential ESL of 0.5 µg/L.

Nine soil-vapor samples (SV-1 through SV-9) were collected from the subject property. The soil-vapor sample collected from SV-6 (near boring B-9) contained concentrations of TPHg,

benzene, and vinyl chloride that exceed residential ESLs for shallow soil gas. TPHg was detected in sample SV-6 at a concentration of 52,000 ug/m³, which is over five times the ESL of 10,000 ug/m³. The soil-vapor sample from SV-6 also contained benzene and vinyl chloride at concentrations of 1,200 ug/m³ and 260 ug/m³, which is significantly above their respective ESLs of 84 ug/m³ and 31 ug/m³, respectively. The remaining soil-vapor samples collected as part of this investigation did not contain constituents of concern above ESLs.

The investigation concluded that soil, soil-vapor, and grab groundwater samples collected from boring B-9 contained gasoline-range hydrocarbons, BTEX, and 1, 2-dichloroethane at concentrations that present a potential risk to human health in a residential land-use scenario. The groundwater sample collected from boring B-6 contained motor-oil range hydrocarbons above residential ESLs.

In March and April 2008, eight groundwater monitoring wells (MW-1 through MW-8), three proposed groundwater extraction/monitoring wells (GW-1, GW-2, and GW-3), and two confirmation exploratory borings were advanced at the locations shown on Figure 2. The results of soil and groundwater samples collected during wells installation and confirmation exploratory borings were compared to the RWQCB ESLs for a residential land-use where groundwater is a source of drinking water. The RWQCB developed ESLs for commercial/industrial and residential land-use scenarios to provide a measure of whether additional investigation, remedial action, or a more detailed risk assessment should be pursued.

Soil samples collected from confirmation exploratory boring B-16 (near well GW-3) and from borings for well MW-8 were found to contain COCs that were above respective ESLs. Soil samples MW-8:6.5', MW-8:16', MW-8:20.5', B-16:8' and B-16:15' all contained concentrations of TPHg above the gasoline ESL of 83 mg/kg. Sample B-16:8' also contained TPHd and BTEX that exceed the respective ESLs for these compounds. Benzene was detected above the ESL in soil samples B-16:8', B-16:15' and MW-8:11'.

Groundwater samples collected from wells MW-8, GW-1, and GW-2 contained TPHg above the gasoline ESL of 100µg/L. The groundwater sample from MW-8 also contained TPHd, benzene, and xylenes above respective ESLs of 100µg/L, 1 µg/L, and 20µg/L. The groundwater sample collected from well GW-1 contained concentrations of benzene, toluene (ESL of 40µg/L), ethylbenzene (ESL of 30µg/L), and total xylenes significantly above residential ESLs. The

groundwater sample collected from well GW-3 contained concentrations of TPHg and benzene above their respective ESLs.

DUAL-PHASE VACUUM ENHANCED EXTRACTION (DPE) PILOT TEST ACTIVITY

Dual-Phase Vacuum Enhanced Extraction (DPE) is a technology that removes liquid (groundwater and free-phase product) and soil vapor simultaneously by applying high vacuum to wells through “stinger” or “straw” pipes inserted into wells. The objectives of the pilot testing are to evaluate whether DPE is a viable method of remediating petroleum hydrocarbons in soil and groundwater at the subject property and to obtain field parameters (zone of vacuum influence, vapor and groundwater extraction rates) for the design of a full scale DPE remediation system, if it is the preferred remediation method.

A trailer-mounted DPE unit was rented from Mako Industries, Ltd of Livermore, California, for the pilot testing. The DPE unit consists of a 25-HP liquid-ring vacuum pump, a moisture knock-out tank, a thermal oxidizer, a propane-operated electrical generator, and accessory pumps and controls. The vacuum pump is capable of achieving up to 29-inch mercury vacuum and 400 intake actual cubic feet per minute (ACFM). The extracted mixture of vapor and liquid first enters the moisture knock-out tank, where vapor is separated from liquid. The liquid is transferred into an on-site storage tank, and the vapor is abated by the thermal oxidizer operated at the temperature between 1400 F and 1650 F. Bay Area Air Quality Management District was notified for the pilot testing operations.

On October 13, 2008, the DPE unit and a propane storage tank were transported to the site. With the assistance of technicians from Mako Industries the DPE unit was setup and tested for proper operation on the same day. Pilot testing commenced on October 14, 2008 on well GW-1 and continued for 30 hours. The test moved to well GW-3 on October 16 and testing continued for 13 hours. Field testing data are presented in Tables 1 and 2.

Testing procedures were as follows:

- A 2-inch diameter flexible vacuum hose attached to a 2-foot long extraction tube stinger was inserted into the testing well. The wellhead was sealed with a rubber gasket. The stinger was slowly lowered as the groundwater was removed until the tip of the stinger

reached the bottom of the well and then the hose was pulled back about 18 inches and fixed at that position. This allowed the maximum exposure of well screen for soil vapor removal. A vacuum gauge was installed at the wellhead for monitoring applied vacuum to the well.

- Except the extraction testing well, all remaining wells were fitted with magnehelic differential pressure gauges at wellhead to measure vacuum responses in inches of water column.
- Testing parameters were recorded periodically (Tables 1 and 2). They included vacuum readings at the pump, knock-out tank, wellheads of the testing well, and all monitoring/observation wells; flow rate and volatile organic compound concentration (in parts per million by volume [ppmv] with a MiniRae 2000 photoionization detector [PID]) of the extracted soil vapor; and water meter reading for extracted groundwater.
- During the DPE testing of each test well (GW-1 and GW-3), a vapor sample was collected with a pre-vacuumed six-liter SUMMA canister. The two samples were delivered to Torrent Laboratory of Milpitas, CA for analyses of TPH gas by modified Method TO-3 and of BTEX by Method TO-15. Laboratory analytical data are summarized in Table 3.

DPE PILOT TEST RESULTS

The pilot test operational and monitoring data are presented in Tables 1 and 2, and laboratory analytical data of vapors samples are summarized in Table 3. Laboratory analytical reports are included in Appendix A.

Groundwater Removal Rate

With the application of over 20 inches of mercury vacuum to the wellhead, 604 gallons of groundwater was removed from well GW-1 over 30 hours of continuous DPE testing time and 291 gallons of groundwater was removed from well GW-3 over 13 hours of continuous DPE testing time. The average achieved groundwater removal rate was 0.338 gallons per minute (gpm) from GW-1 and 0.373 gpm from GW-3.

Soil Vapor Removal Rate

The soil vapor extraction rate from GW-1 averaged 20.2 standard cubic feet per minute (scfm) over 30 hours of the testing time, and the rate averaged 16.7 scfm from GW-3 over 13 hours of the testing time. These vapor extraction rates are typical in the Bay Area for fine grained shallow soil.

Hydrocarbon removal rate achieved in this pilot test can be calculated as follows:

$$\text{Removal Rate (pounds/day)} = \text{Vapor Extraction Rate (scfm)} \times 1440 \text{ min/day} \times \text{Vapor Concentration (pounds/cubic feet)}$$

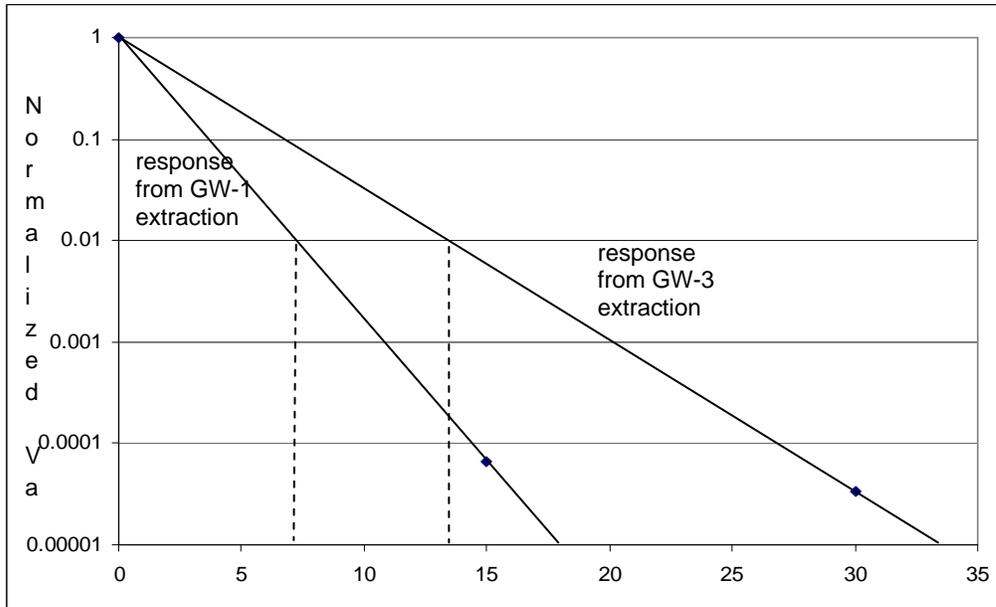
Using the above equation and the laboratory reported soil vapor concentrations (Table 3), the removal rate achieved in this pilot test is calculated and summarized in the following table:

Removal Rate Achieved (pounds/day)	GW-1	GW-3
TPHg	16.9	1.95
Benzene	0.16	0.021
Toluene	0.17	0.060
Ethyl benzene	0.076	0.031
Total xylenes	0.41	0.18

Vacuum Influence

The effective radius of vacuum influence is estimated according to the method proposed by T.E. Buscheck and T.R. Peargin in the article of *A Summary of Nationwide Vapor Extraction System Performance Study* (November 1991). The method involves normalizing the vacuum data by dividing the vacuum observed in monitoring points by the vacuum applied to the extraction wellhead. The log of the normalized vacuum data is then plotted against the distance to the observation wells. For the GW-1 DPE pilot testing, observation well MW-8 recorded a consistent vacuum reading of 0.02” water column, which was used for the evaluation. For the GW-3 DPE pilot testing, observation well GW-1 was the only well that had an observed vacuum

response and was used for the evaluation. The effective radius of influence is typically considered the distance corresponding to 1% (0.01) of the normalized vacuum. As shown on the graph below, the estimated effective radius of vacuum influence ranged from 7 to 13 feet under constant vacuum extraction on wells GW-1 and GW-3.



Petroleum Hydrocarbon Concentrations in Extracted Soil Vapor

The extracted soil vapor was monitored on site with a MiniRae 2000 PID for total petroleum hydrocarbons concentration. Results are included in Tables 1 and 2. Vapor samples were also collected from extraction test wells GW-1 and GW-3 during the DPE pilot testing. Samples were collected using laboratory-cleaned and pre-vacuumed six-liter SUMMA canisters. The two vapor samples were delivered to Torrent Laboratory for TPH gas and BTEX analyses and the results are summarized in Table 3. For extraction well GW-1, the field measurement collected at 2:30 pm on October 15 was 1300 ppmv total volatile petroleum hydrocarbons, while the laboratory-analyzed sample taken right after the field measurement reported a TPH gas concentration of 2600 ppmv. For the extraction well GW-3, the field measurement collected at 2:00 pm on October 16 was 9.2 ppmv, while the laboratory sample reported a TPH gas concentration of 370 ppmv.

One of the likely causes for the differences between field measurements of soil vapor using a PID and the laboratory analytical results was the method used for the field measurement. A small battery operated pump was used to withdraw vapor out of the wellhead to a 2-inch diameter, 1-foot long schedule 40 PVC pipe, which was capped at both ends. A small hole was drilled in the middle of the PVC pipe for the insertion of the MiniRae intake tube. Because the sample pump had to extract vapor sample against the high vacuum at the wellhead, the sampler pump rate was most likely diminished and PID measurements contained dilute air mixed in the sampling tube. In contrast, soil vapor samples analyzed at the laboratory were collected in pre-vacuumed SUMMA canisters, which were directly connected to the pump outlet with air-tight tubing. In general, SUMMA canisters have a very low possibility of leakage during vapor sample collection. Therefore, soil vapor samples analyzed at the laboratory (instead of in the field using a PID) are inherently more accurate and representative of actual subsurface conditions. As a result, laboratory supplied results were used for vapor removal rate calculations presented above.

CONCLUSIONS AND RECOMMENDATIONS

The high vacuum applied to the test wells was sustained throughout the testing period (up to 30 hours for GW-1 and 13 hours for GW-3), indicating minimum intrusion (i.e. short circuiting) in the extraction zone at the test well. Soil vapor extraction rates that were achieved (20.2 scfm from GW-1 and 16.7 scfm from GW-3) are comparable with the rates obtained from other sites in the Bay Area with fine-grained soils. The achieved groundwater removal rates (0.338 gpm from GW-1 and 0.373 gpm from GW-3) are low, which is ideal for maximum soil gas extraction and vaporization of absorbed volatile petroleum hydrocarbons. The combination of these factors confirms that DPE is a viable method of remediating petroleum hydrocarbons from soil and groundwater at the site.

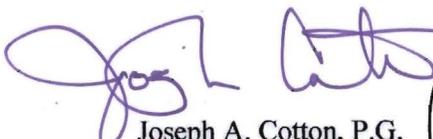
Based on the average effective radius of vacuum influence of 10 feet estimated from the pilot testing data, nine additional DPE wells are proposed and their locations are shown on Figure 3. These nine wells, together with the three existing wells (GW-1 through GW-3) installed for remediation purposes, should provide complete coverage (for hydrocarbon removal) of areas where elevated petroleum hydrocarbons have been detected.

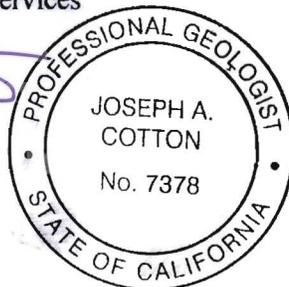
It is recommended that the new DPE wells be four-inches in diameter. This will allow the insertion of a 2-inch stinger into the wells for DPE application. The May 2007 soil and groundwater investigation by IMPACT reported the existence of hydrocarbon soil contamination from approximately 6 feet down to as much as 25 feet below ground surface (bgs) in the proximity of the source area. The vertical screen for the proposed seven shallow DPE wells (DPE-1 through DPE-7) should be constructed from 6 feet to 22 feet bgs. This long screen interval is designed to optimize hydrocarbon removal via soil vapor extraction. Two additional deeper DPE wells (DPE-1B and DPE-2B) are proposed with the vertical screen from 20 feet to 28 feet bgs. The deeper DPE wells should be placed near MW-8, where investigation data suggests hydrocarbon contamination in soil at a possible second water bearing zone. This possible second water bearing zone is currently monitored by well MW-8, which is screened from 20 feet to 27 feet bgs with a conductor casing from surface to 20 feet bgs. April 2008 groundwater data from MW-8 reported a TPHg concentration of 1,049µg/L. For optimal soil vapor and groundwater extraction, it is further recommended that the screen size be 0.02-inch factory standard slots screen and the DPW well screen filter pack consist of Lonestar #3 sand.

The progress and effectiveness of DPE remediation should be evaluated through a combination of soil vapor and groundwater sampling. Soil vapor samples should be collected from individual DPE wells monthly for the first 3 months of operation and analyzed for TPHg and BTEX. Vapor monitoring frequency can be adjusted later based on the results of the initial monthly start-up monitoring DPE monitoring events. Groundwater should be monitored quarterly during the entire period of the DPE remediation. However, the actual monitoring schedule and parameters should also satisfy requirements specified by air and water discharge permits which are required during operation of the DPE system.

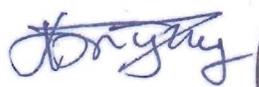
If you have any questions or require additional information, please feel free to contact us.

Sincerely,
Impact Environmental Services


Joseph A. Cotton, P.G.
Principal Geologist



OTG EnviroEngineering Solutions, Inc.


Xinggang Tong, P.E.
Principal Engineer



DISTRIBUTION:

Ms. Shirley E. Thompson, 1155 Hopkins Way, Berkeley, CA

ATTACHMENTS:

Tables:

Table 1 - Results of DPE Pilot Test at Extraction Well GW-1
Table 2 - Results of DPE Pilot Test at Extraction Well GW-3
Table 3 - Laboratory Analytical Data of Extracted Soil Vapor

Figures:

Figure 1 - Site Vicinity Map
Figure 2 - Site Plan and Well Locations Map
Figure 3 - Proposed Locations of DPE Wells

Appendices:

Appendix A - Certified Laboratory Analytical Reports for Soil Vapor Sample (GW-1 and GW-3)

LIMITATIONS

Impact Environmental's actions on this project were performed in accordance with current generally accepted environmental consulting principles and practices. This warranty is in lieu of all others, be it expressed or implied. Environmental conditions may exist at the site that could not be observed. Where the scope of services was limited to observations made during site reconnaissance, interviews, and/or review of readily available reports and literature, our conclusions and recommendations are necessarily based largely on information supplied by others, the accuracy and sufficiency of which may not have been independently reviewed by us. Our professional analyses are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions between such sampling points. Additional data from future work or changing conditions may lead to modifications to our professional opinions and recommendations. Any reliance on this report, or portions thereof, by a third party shall be at such party's sole risk.

Extraction Well: **GW-1**
 Date: 10/14-15/2008

Table 1 -- Dual-Phase Extraction Pilot Test at GW-1
 1409 12th Street, Oakland, CA

Time	Pump	Knock out	Extr well	Watermeter	PID	Vapor	Vapor ext	Vacuum Reading at Monitoring Wellhead (inch H2O)														
								Vacuum	Tank Vac	head vac	reading	reading	flow rate	rate	GW-1	GW-2	GW-3	MW-1	MW-2	MW-3	MW-4	MW-5
	(Hg")	(Hg")	(Hg")	(gallons)	(ppm)	(ft/minute)	(scfm)															
10/14/08																						
8:45	0	0	0	66244	started at 8:50 am																	
10:00	27	24	20	66244	895	365	31.9		0	0	0	0	0	0	0	0	0	0	0	0		
11:00	28.5	25.5	22.5	66307	1180	182	15.9		0	0	0	0	0	0	0	0	0	0	0	0.03		
12:00	28.5	26	22.5	66307	1310	210	18.3		0	0	0	0	0	0	0	0	0	0	0	0.02		
14:00	28.5	22	22.5	66411	1120	230	20.1		0	0	0	0	0	0	0	0	0	0	0	0.02		
16:00	28	26	23	66419	1115	230	20.1		0	0	0	0	0	0	0	0	0	0	0	0.02		
19:00	28	26	22.5	66468	1140	240	21.0		0	0	0	0	0	0	0	0	0	0	0	0.02		
22:00	28	25	22.5	66569	1220	280	24.4		0	0	0	0	0	0	0	0	0	0	0	0.02		
10/15/08																						
9:30	28	24.5	22.5	66752	1420	195	17.0		0.01	0	0	0	0	0	0	0	0	0	0	0.02		
14:30	28	26	23	66848	1300	150	13.1		0.01	0	0	0	0	0	0	0	0	0	0	0.02		
average groundwater extraction rate achieved:					0.3384	gallons per minute (gpm)																
average soil vapor extraction rate achieved:					20.20	standard cubic feet per minute (scfm)																
Notes:																						
scfm (standard cubic feet per minute) = 0.0873 x feet per minute for 4-inch pipe at measurement																						
the tip of the extraction pipe was lowered into the extraction well to 16 feet below top of well casing.																						
The pilot extraction test at GW-1 continued for 29 hours 30 minutes																						

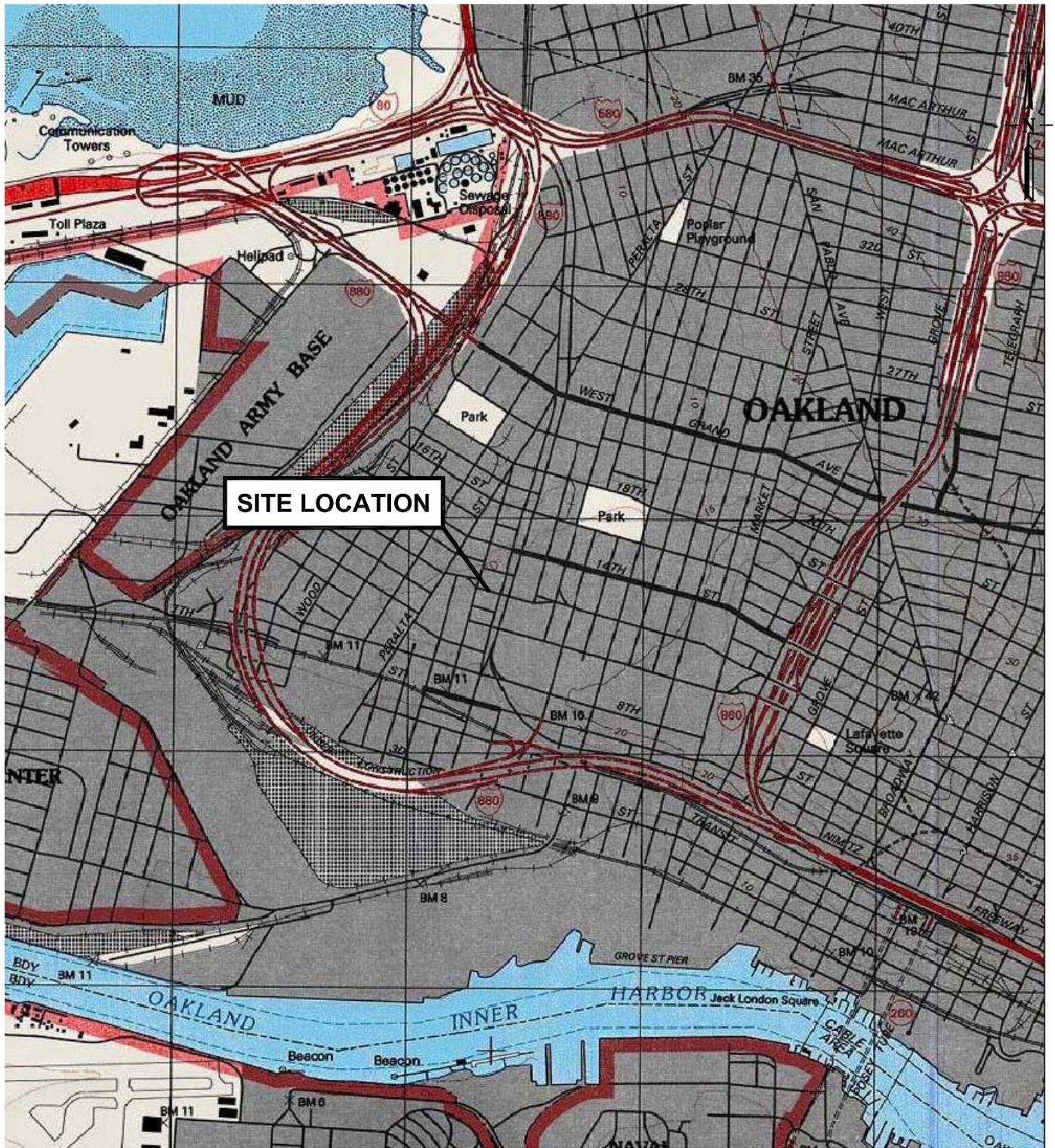
Extraction Well: **GW-3**
 Date: 10/16/2008

Table 2 -- Dual-Phase Extraction Pilot Test at GW-3
 1409 12th Street, Oakland, CA

Time	Pump	Knock out	Extr well	Watermeter	PID	Vapor	Vapor ext	Vacuum Reading at Monitoring Well Head (inch H2O)											
	Vacuum	Tank Vac	head vac	reading	reading	flow rate	rate	GW-1	GW-2	GW-3	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	
	(Hg")	(Hg")	(Hg")	(gallons)	(ppm)	(ft/minute)	(scfm)												
10/16/08																			
9:00	0	0	0	66848	started on 9:00 am														
14:00	27	26	22	66945	1.2	200	17.5	0	0		0	0	0	0	0	0	0	0	
17:00	27	26	21.5	67048	7.2	210	18.3	0.01	0		0	0	0	0	0	0	0	0	
19:00	27	26	22	67084	8.1	215	18.8	0.01	0		0	0	0	0	0	0	0	0	
22:00	27	26	22.5	67139	9	140	12.2	0.01	0		0	0	0	0	0	0	0	0	
average groundwater extraction rate achieved:					0.3731	gallons per minute (gpm)													
average soil vapor extraction rate achieved:					16.70	standard cubic feet per minute (scfm)													
Notes:																			
scfm (standard cubic feet per minute) = 0.0873 x feet per minute for 4-inch pipe at measurement																			
the tip of the extraction pipe was lowered into the extraction well to 18 feet below top of well casing.																			
The pilot extraction test at GW-3 continued for 13 hours.																			

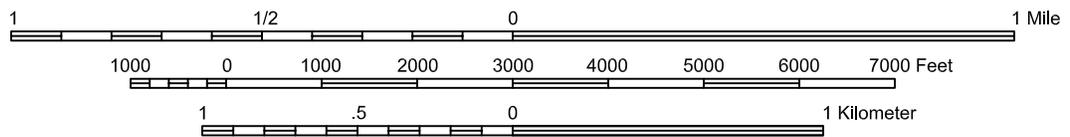
TABLE 3
 Laboratory Analytical Results of Extracted Soil Gas
 1409 12th Street, Oakland, CA

Sample ID	Date	Time	Benzene		Toluene		Ethyl benzene		Total xylenes		TPH gas	
			mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv
GW-1	10/15/2008	14:30	88	28	96	25	42	9.7	228	53	9300	2600
GW-3	10/16/2008	14:00	14	4.4	40	11	21	4.8	123	28	1300	370
Notes:												
Benzene, toluene, ethyl benzene, and xylenes were analyzed by Method TO-15.												
TPH gas was analyzed by modified Method TO-3												



SITE LOCATION

Scale 1:24,000



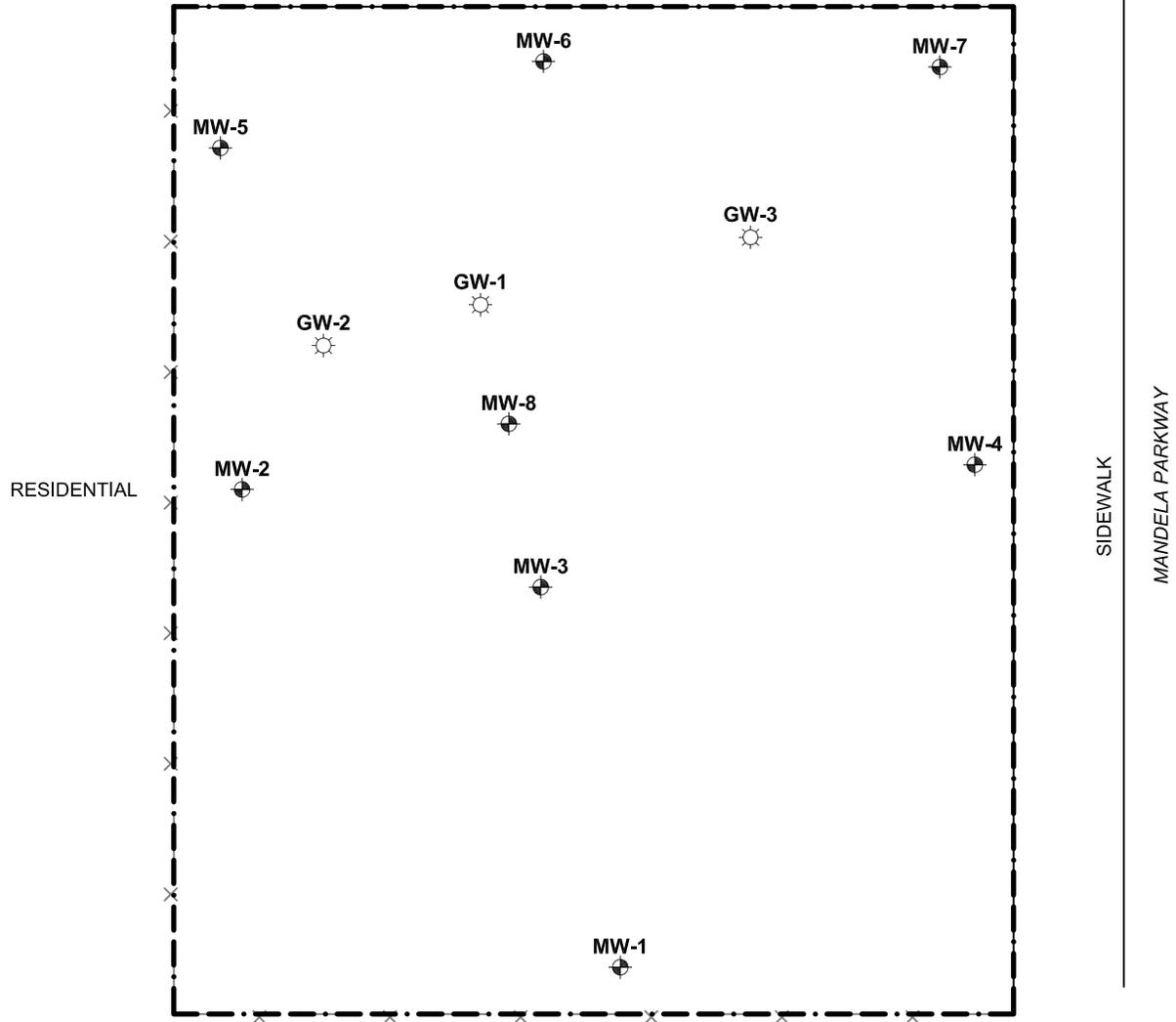
C:\WORK\IES1\409 12th Street\Figure 1.dwg Layout: Fig 2 Sep 22, 2007 - 8:03pm

Impact Environmental Services
 39120 Aronaut Way, Suite 223
 Fremont, CA 94538

Figure 1
 1409 to 1417 12TH STREET
 OAKLAND, CALIFORNIA
SITE LOCATION MAP

12TH STREET

SIDEWALK



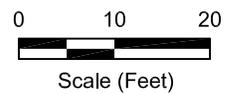
RESIDENTIAL

SIDEWALK

MANDELA PARKWAY

EXPLANATION:

- Approximate Property Boundary
- MW-8  Monitoring Well Location
- GW-3  Existing DPE Well Location



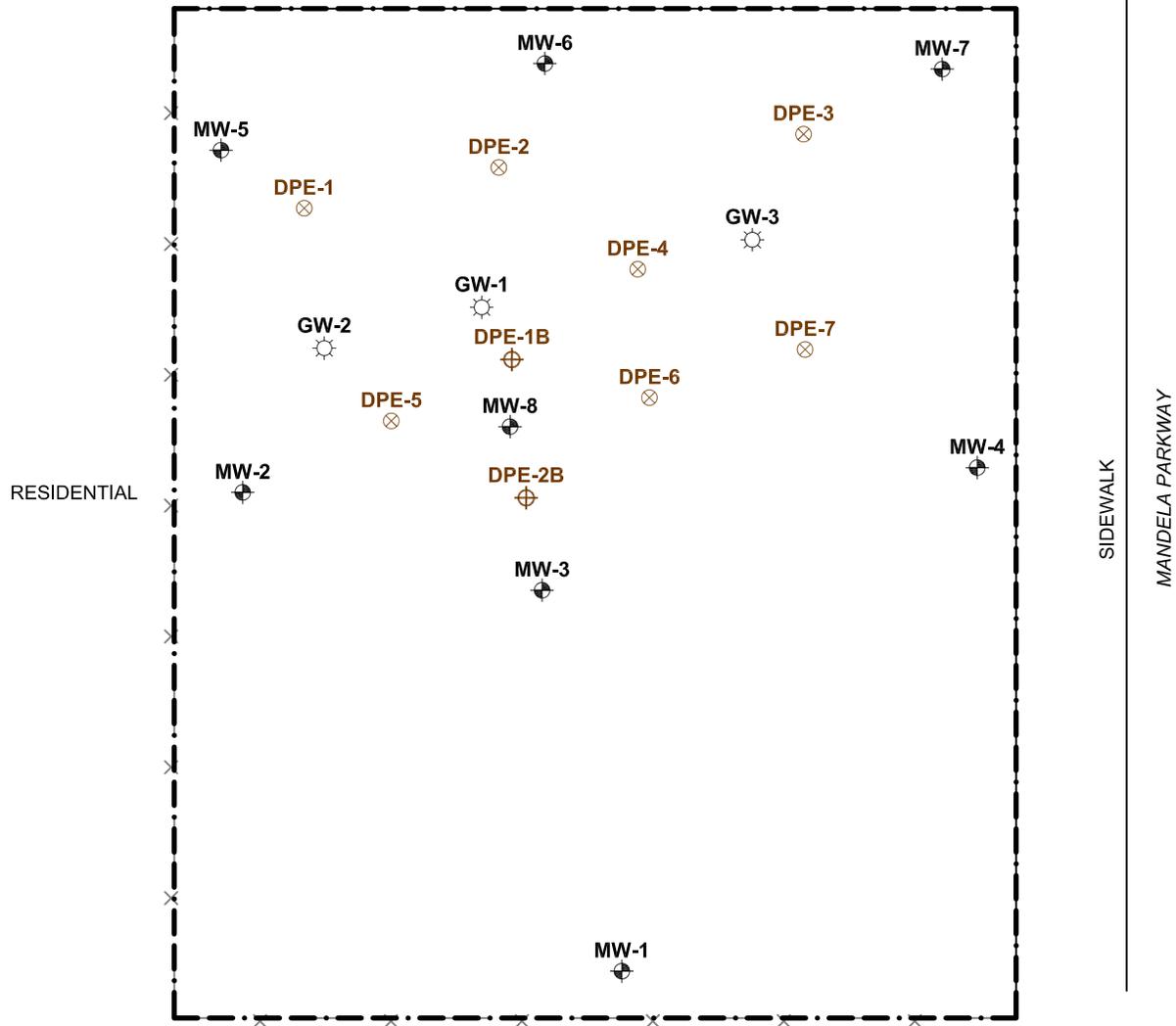
C:\Work\EnviroCAD\IES\1409-1417 12th Street\DPE Pilot Test Report\Figure 2-3.dwg Layout: Fig 2 Nov 03, 2008 - 10:32pm

Impact Environmental Services
 39120 Aronaut Way, Suite 223
 Fremont, CA 94538

Figure 2
 1409 to 1417 12TH STREET
 OAKLAND, CALIFORNIA
SITE PLAN

12TH STREET

SIDEWALK



EXPLANATION:

- Approximate Property Boundary
- Monitoring Well Location
- Existing DPE Well Location
- Proposed Shallow DPE Well Location
- Proposed Deep DPE Well Location



C:\Work\EnviroCAD\IES\1409-1417 12th Street\DPE Pilot Test Report\Figure 2-3.dwg Layout: Fig 3 Nov 03, 2008 - 10:32pm

Impact Environmental Services
 39120 Aronaut Way, Suite 223
 Fremont, CA 94538

Figure 3
 1409 to 1417 12TH STREET
 OAKLAND, CALIFORNIA
REVISED PROPOSED DPE WELL LOCATIONS

APPENDIX A

Certified Laboratory Analytical Report for Soil Vapor Samples



October 24, 2008

Mr. Joseph Cotton
Impact Environmental Services
39120 Aragonat Way, Suite 223
Fremont, CA 94538
TEL: 510-703-5420
FAX 510-713-7790

RE:

Order No.: 0810115

Dear Mr. Joseph Cotton:

Torrent Laboratory, Inc. received 2 samples on 10/16/2008 for the analyses presented in the following report.

All data for associated QC met EPA or laboratory specification(s) except where noted in the case narrative.

Reported data is applicable for only the samples received as part of the order number referenced above.

Torrent Laboratory, Inc, is certified by the State of California, ELAP #1991. If you have any questions regarding these tests results, please feel free to contact the Project Management Team at (408)263-5258;ext: 204.

Sincerely,


Laboratory Director

10/24/08
Date

Patti Sandrock
QA Officer 



TORRENT LABORATORY, INC.

483 Sinclair Frontage Road • Milpitas, CA • Phone: (408) 263-5258 • Fax: (408) 263-8293

Visit us at www.torrentlab.com email: analysis@torrentlab.com

Report prepared for: Mr. Joseph Cotton
Impact Environmental Services

Date Received: 10/16/2008
Date Reported: 10/24/2008

Client Sample ID: GW-1
Sample Location: 1409 12th St.Oakland,CA
Sample Matrix: AIR
Date/Time Sampled 10/15/2008 2:30:00 PM

Lab Sample ID: 0810115-001
Date Prepared:

Parameters	Analysis Method	Date Analyzed	RL	Dilution Factor	MRL	Result	Units	Analytical Batch
Benzene	TO-15	10/16/2008	1.6	1000	1600	88000	µg/m ³	R17662
Ethyl Benzene	TO-15	10/16/2008	2.17	1000	2200	42000	µg/m ³	R17662
m,p-Xylene	TO-15	10/16/2008	2.05	1000	2000	170000	µg/m ³	R17662
o-xylene	TO-15	10/16/2008	2.7	1000	2700	58000	µg/m ³	R17662
Toluene	TO-15	10/16/2008	1.89	1000	1900	96000	µg/m ³	R17662
Surr: 4-Bromofluorobenzene	TO-15	10/16/2008	0	1000	65-135	89.9	%REC	R17662
Gasoline	TO-3(MOD)	10/17/2008	352	2000	700000	9300000x	µg/m ³	G17662

Note: x - Sample chromatogram does not resemble gasoline standard pattern. Although TPH as Gasoline constituents are present, TPH value includes a significant portion of non-gasoline hydrocarbons within range of C5-C12 quantified as Gasoline that biases the quantitation (light end hydrocarbons and possible aged gasoline).

Client Sample ID: GW-3
Sample Location: 1409 12th St.Oakland,CA
Sample Matrix: AIR
Date/Time Sampled 10/16/2008 2:00:00 PM

Lab Sample ID: 0810115-002
Date Prepared:

Parameters	Analysis Method	Date Analyzed	RL	Dilution Factor	MRL	Result	Units	Analytical Batch
Benzene	TO-15	10/20/2008	1.6	400	640	14000	µg/m ³	R17681
Ethyl Benzene	TO-15	10/20/2008	2.17	400	870	21000	µg/m ³	R17681
m,p-Xylene	TO-15	10/20/2008	2.05	400	820	89000	µg/m ³	R17681
o-xylene	TO-15	10/20/2008	2.7	400	1100	34000	µg/m ³	R17681
Toluene	TO-15	10/20/2008	1.89	400	760	40000	µg/m ³	R17681
Surr: 4-Bromofluorobenzene	TO-15	10/20/2008	0	400	65-135	95.6	%REC	R17681
Gasoline	TO-3(MOD)	10/21/2008	352	800	280000	1300000x	µg/m ³	G17681

Note: x - Sample chromatogram does not resemble gasoline standard pattern (possibly aged gasoline).

Definitions, legends and Notes

Note	Description
ug/kg	Microgram per kilogram (ppb, part per billion).
ug/L	Microgram per liter (ppb, part per billion).
mg/kg	Milligram per kilogram (ppm, part per million).
mg/L	Milligram per liter (ppm, part per million).
LCS/LCSD	Laboratory control sample/laboratory control sample duplicate.
MDL	Method detection limit.
MRL	Modified reporting limit. When sample is subject to dilution, reporting limit times dilution factor yields MRL.
MS/MSD	Matrix spike/matrix spike duplicate.
N/A	Not applicable.
ND	Not detected at or above detection limit.
NR	Not reported.
QC	Quality Control.
RL	Reporting limit.
% RPD	Percent relative difference.
a	pH was measured immediately upon the receipt of the sample, but it was still done outside the holding time.
sub	Analyzed by subcontracting laboratory, Lab Certificate #

CLIENT: Impact Environmental Services

Work Order: 0810115

Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: G17662

Sample ID MB-G17662	SampType: MBLK	TestCode: TO-3Gas (MO	Units: ppbv	Prep Date: 10/15/2008	RunNo: 17662						
Client ID: ZZZZZ	Batch ID: G17662	TestNo: TO-3(MOD)	Analysis Date: 10/15/2008	SeqNo: 253161							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	ND	100									
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Sample ID LCS-G17662	SampType: LCS	TestCode: TO-3Gas (MO	Units: ppbv	Prep Date: 10/15/2008	RunNo: 17662						
Client ID: ZZZZZ	Batch ID: G17662	TestNo: TO-3(MOD)	Analysis Date: 10/15/2008	SeqNo: 253162							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	495.1	100	500	0	99.0	50	150				
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Sample ID LCSD-G17662	SampType: LCSD	TestCode: TO-3Gas (MO	Units: ppbv	Prep Date: 10/16/2008	RunNo: 17662						
Client ID: ZZZZZ	Batch ID: G17662	TestNo: TO-3(MOD)	Analysis Date: 10/16/2008	SeqNo: 253163							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	485.5	100	500	0	97.1	50	150	495.1	1.96	30	
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Qualifiers:	E Value above quantitation range	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	ND Not Detected at the Reporting Limit	R RPD outside accepted recovery limits	S Spike Recovery outside accepted recovery limits

CLIENT: Impact Environmental Services
Work Order: 0810115
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: G17681

Sample ID MB-G17681	SampType: MBLK	TestCode: TO-3Gas (MO	Units: ppbv	Prep Date: 10/20/2008	RunNo: 17681						
Client ID: ZZZZZ	Batch ID: G17681	TestNo: TO-3(MOD)		Analysis Date: 10/21/2008	SeqNo: 253443						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	ND	100									
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Sample ID LCS-G17681	SampType: LCS	TestCode: TO-3Gas (MO	Units: ppbv	Prep Date: 10/20/2008	RunNo: 17681						
Client ID: ZZZZZ	Batch ID: G17681	TestNo: TO-3(MOD)		Analysis Date: 10/21/2008	SeqNo: 253444						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	483.0	100	500	0	96.6	50	150				
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Sample ID LCSD-G17681	SampType: LCSD	TestCode: TO-3Gas (MO	Units: ppbv	Prep Date: 10/20/2008	RunNo: 17681						
Client ID: ZZZZZ	Batch ID: G17681	TestNo: TO-3(MOD)		Analysis Date: 10/21/2008	SeqNo: 253445						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	483.6	100	500	0	96.7	50	150	483	0.122	30	
----------	-------	-----	-----	---	------	----	-----	-----	-------	----	--

Qualifiers:	E Value above quantitation range	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	ND Not Detected at the Reporting Limit	R RPD outside accepted recovery limits	S Spike Recovery outside accepted recovery limits

CLIENT: Impact Environmental Services
Work Order: 0810115
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: R17662

Sample ID MB-R17662	SampType: MBLK	TestCode: TO-15	Units: ppbv	Prep Date: 10/15/2008	RunNo: 17662						
Client ID: ZZZZZ	Batch ID: R17662	TestNo: TO-15		Analysis Date: 10/15/2008	SeqNo: 253173						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Benzene	ND	0.50									
Ethyl Benzene	ND	0.50									
m,p-Xylene	ND	0.50									
o-xylene	ND	0.50									
Toluene	ND	0.50									
Surr: 4-Bromofluorobenzene	19.24	0	20	0	96.2	65	135				

Sample ID MB1-R17662	SampType: MBLK	TestCode: TO-15	Units: ppbv	Prep Date: 10/16/2008	RunNo: 17662						
Client ID: ZZZZZ	Batch ID: R17662	TestNo: TO-15		Analysis Date: 10/16/2008	SeqNo: 253381						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Benzene	ND	0.50									
Ethyl Benzene	ND	0.50									
m,p-Xylene	ND	0.50									
o-xylene	ND	0.50									
Toluene	ND	0.50									
Surr: 4-Bromofluorobenzene	17.21	0	20	0	86.0	65	135				

Sample ID MB2-R17662	SampType: MBLK	TestCode: TO-15	Units: ppbv	Prep Date: 10/17/2008	RunNo: 17662						
Client ID: ZZZZZ	Batch ID: R17662	TestNo: TO-15		Analysis Date: 10/17/2008	SeqNo: 253610						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Benzene	ND	0.50									
Ethyl Benzene	ND	0.50									
m,p-Xylene	ND	0.50									
o-xylene	ND	0.50									
Toluene	ND	0.50									
Surr: 4-Bromofluorobenzene	18.34	0	20	0	91.7	65	135				

Qualifiers: E Value above quantitation range H Holding times for preparation or analysis exceeded J Analyte detected below quantitation limits
 ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

CLIENT: Impact Environmental Services
Work Order: 0810115
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: R17662

Sample ID LCS-R17662	SampType: LCS	TestCode: TO-15	Units: ppbv	Prep Date: 10/15/2008	RunNo: 17662						
Client ID: ZZZZZ	Batch ID: R17662	TestNo: TO-15		Analysis Date: 10/15/2008	SeqNo: 253174						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	20.03	0.50	20	0	100	65	135				
Ethyl Benzene	20.34	0.50	20	0	102	65	135				
m,p-Xylene	39.60	0.50	40	0	99.0	65	135				
o-xylene	19.32	0.50	20	0	96.6	65	135				
Toluene	19.12	0.50	20	0	95.6	65	135				
Surr: 4-Bromofluorobenzene	21.09	0	20	0	105	65	135				

Sample ID LCSD-R17662	SampType: LCSD	TestCode: TO-15	Units: ppbv	Prep Date: 10/15/2008	RunNo: 17662						
Client ID: ZZZZZ	Batch ID: R17662	TestNo: TO-15		Analysis Date: 10/15/2008	SeqNo: 253175						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	20.45	0.50	20	0	102	65	135	20.03	2.08	30	
Ethyl Benzene	19.99	0.50	20	0	100	65	135	20.34	1.74	30	
m,p-Xylene	40.18	0.50	40	0	100	65	135	39.6	1.45	30	
o-xylene	19.10	0.50	20	0	95.5	65	135	19.32	1.15	30	
Toluene	18.35	0.50	20	0	91.8	65	135	19.12	4.11	30	
Surr: 4-Bromofluorobenzene	20.81	0	20	0	104	65	135	0	0	30	

Qualifiers: E Value above quantitation range H Holding times for preparation or analysis exceeded J Analyte detected below quantitation limits
 ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

CLIENT: Impact Environmental Services
Work Order: 0810115
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: R17681

Sample ID MB-R17681	SampType: MBLK	TestCode: TO-15	Units: ppbv	Prep Date: 10/20/2008	RunNo: 17681						
Client ID: ZZZZZ	Batch ID: R17681	TestNo: TO-15		Analysis Date: 10/20/2008	SeqNo: 253447						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Benzene	ND	0.50									
Ethyl Benzene	ND	0.50									
m,p-Xylene	ND	0.50									
o-xylene	ND	0.50									
Toluene	ND	0.50									
Surr: 4-Bromofluorobenzene	17.72	0	20	0	88.6	65	135				

Sample ID MB	SampType: MBLK	TestCode: TO-15	Units: ppbv	Prep Date: 10/22/2008	RunNo: 17681						
Client ID: ZZZZZ	Batch ID: R17681	TestNo: TO-15		Analysis Date: 10/22/2008	SeqNo: 253808						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Benzene	ND	0.50									
Ethyl Benzene	ND	0.50									
m,p-Xylene	ND	0.50									
o-xylene	ND	0.50									
Toluene	ND	0.50									
Surr: 4-Bromofluorobenzene	17.25	0	20	0	86.2	65	135				

Sample ID MB	SampType: MBLK	TestCode: TO-15	Units: ppbv	Prep Date: 10/23/2008	RunNo: 17681						
Client ID: ZZZZZ	Batch ID: R17681	TestNo: TO-15		Analysis Date: 10/23/2008	SeqNo: 253828						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Benzene	ND	0.50									
Ethyl Benzene	ND	0.50									
m,p-Xylene	ND	0.50									
o-xylene	ND	0.50									
Toluene	ND	0.50									
Surr: 4-Bromofluorobenzene	18.04	0	20	0	90.2	65	135				

Qualifiers: E Value above quantitation range H Holding times for preparation or analysis exceeded J Analyte detected below quantitation limits
 ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

CLIENT: Impact Environmental Services
Work Order: 0810115
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: R17681

Sample ID LCS-R17681	SampType: LCS	TestCode: TO-15	Units: ppbv	Prep Date: 10/20/2008	RunNo: 17681						
Client ID: ZZZZZ	Batch ID: R17681	TestNo: TO-15		Analysis Date: 10/20/2008	SeqNo: 253470						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	25.19	0.50	20	0	126	65	135				
Ethyl Benzene	20.59	0.50	20	0	103	65	135				
m,p-Xylene	40.78	0.50	40	0	102	65	135				
o-xylene	19.54	0.50	20	0	97.7	65	135				
Toluene	20.25	0.50	20	0	101	65	135				
Surr: 4-Bromofluorobenzene	19.41	0	20	0	97.0	65	135				

Sample ID LCSD-R17681	SampType: LCSD	TestCode: TO-15	Units: ppbv	Prep Date: 10/20/2008	RunNo: 17681						
Client ID: ZZZZZ	Batch ID: R17681	TestNo: TO-15		Analysis Date: 10/20/2008	SeqNo: 253471						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	25.29	0.50	20	0	126	65	135	25.19	0.396	30	
Ethyl Benzene	20.06	0.50	20	0	100	65	135	20.59	2.61	30	
m,p-Xylene	39.82	0.50	40	0	99.6	65	135	40.78	2.38	30	
o-xylene	18.84	0.50	20	0	94.2	65	135	19.54	3.65	30	
Toluene	19.79	0.50	20	0	99.0	65	135	20.25	2.30	30	
Surr: 4-Bromofluorobenzene	18.22	0	20	0	91.1	65	135	0	0	30	

Qualifiers: E Value above quantitation range H Holding times for preparation or analysis exceeded J Analyte detected below quantitation limits
 ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits



483 Sinclair Frontage Road
 Milpitas, CA 95035
 Phone: 408.263.5258
 FAX: 408.263.8293
 www.torrentlab.com

CHAIN OF CUSTODY

LAB WORK ORDER NO

0810115

NOTE: SHADED AREAS ARE FOR TORRENT LAB USE ONLY.

Company Name: <i>Impact Environmental Services</i>			Location of Sampling: <i>1409 12th St, Oakland, CA</i>		
Address: <i>39120 Aragonat Way, Suite 223</i>			Purpose: <i>Soil Vapor monitoring</i>		
City: <i>Fremont</i>	State: <i>CA</i>	Zip Code: <i>94538</i>	Special Instructions / Comments:		
Telephone: <i>510-703-5420</i> FAX:					
REPORT TO: <i>Joseph Cotton</i>			SAMPLER: <i>X Tong</i>	P.O. #:	EMAIL:

TURNAROUND TIME:

- 10 Work Days 3 Work Days Noon - Nxt Day
 7 Work Days 2 Work Days 2 - 8 Hours
 5 Work Days 1 Work Day Other

SAMPLE TYPE:

- Storm Water Air
 Waste Water Other
 Ground Water
 Soil

REPORT FORMAT:

- QC Level IV
 EDF
 Excel / EDD

ANALYSIS REQUESTED

LAB ID	CLIENT'S SAMPLE I.D.	DATE / TIME SAMPLED	MATRIX	# OF CONT	CONT TYPE	TPH/gas/BTEX	Summa Canister ID	Initial Vacuum (-Hg")	Final Vacuum (-Hg")	REMARKS
001A	GW-1	10/15/08 2:30pm	air	1	G-2 Summa	X	863	30"	2"	
002A	GW-3	10/16/08 2:00pm	air	1	u	X	901	30"	2"	

1	Relinquished By: <i>X Tong</i>	Print: <i>Xingyan Tang</i>	Date: <i>10/16/08</i>	Time: <i>2:30pm</i>	Received By: <i>C. Moore</i>	Print: <i>C Moore</i>	Date: <i>10/16</i>	Time: <i>14:30</i>
2	Relinquished By: <i>C. Moore</i>	Print: <i>C Moore</i>	Date: <i>10/16</i>	Time: <i>15:19</i>	Received By: <i>To. S. Shodasara</i>	Print: <i>NAVIA</i>	Date: <i>10/16/08</i>	Time: <i>15:19</i>

Were Samples Received in Good Condition? Yes NO Samples on Ice? Yes NO Method of Shipment *flispeed* Sample seals intact? Yes NO N/A

NOTE: Samples are discarded by the laboratory 30 days from date of receipt unless other arrangements are made. Page *1* of *1*

Log In By: _____ Date: _____ Log In Reviewed By: _____ Date: _____

TORRENT LAB