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Geo Environmental Technology

Groundwater Monitoring Report First Quarter 2005

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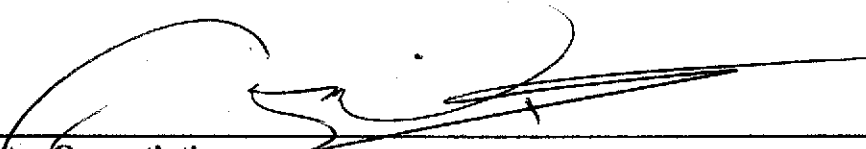
**Livermore Gas and Mini Mart
160 Holmes Street
Livermore, California**

Prepared by

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Environmental Health

**Alameda County
JUL 05 2005**



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April 2005

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Geo Environmental Technology

GROUNDWATER MONITORING REPORT FIRST QUARTER 2005

Livermore Gas and Mini Mart
160 Holmes Street
Livermore, California

1.0 INTRODUCTION

This report documents the results of the 03/02/05 quarterly groundwater monitoring performed at the Livermore Gas and Mini Mart, located at 160 Holmes Street in Livermore, California (site). A Site Vicinity Map is presented as Figure 1 and site details are shown on the Site Plan, Figure 2.

The Livermore Gas and Mini Mart had provided fueling services using three 10,000-gallon gasoline and one 10,000-gallon diesel Underground Storage Tanks (USTs). The USTs, piping and dispensers were removed on 4/5/99 under permit from the Livermore-Pleasanton Fire Department (LPFD). Analysis of soil and groundwater samples collected at the time of the UST removal, indicated that the site has been impacted by a release of petroleum hydrocarbons and MTBE.

On 3/29/05 The Alameda County Environmental Health Services (ACEHS) directed vertical and horizontal investigation and interim remediation for this site. A workplan is being prepared and will be submitted according to the ACEHS timeline.

2.0 PAST WORK ON SITE

On 2/26/99, a soil boring was advanced in the northern section of the property, about 10 feet from the edge of First Street sidewalk, to log the soil profile and determine depth to groundwater. A groundwater grab sample was collected and analyzed for Total Petroleum Hydrocarbons as gasoline (TPHg), benzene, toluene, ethyl-benzene, total xylenes (BTEX) and methyl tertiary butyl ether (MTBE). The sample was found to be impacted by petroleum hydrocarbons (TPHg: 100,000 $\mu\text{g/l}$, Benzene: 6,100 $\mu\text{g/l}$, MTBE: 60,000 $\mu\text{g/L}$). The results were communicated to the Livermore-Pleasanton Fire Department (LPFD) and a UST Unauthorized Release Report was generated.

On 4/5/99, three gasoline and one diesel USTs, associated dispensers and piping were removed, manifested and disposed, under permit by the LPFD. The pit was over-excavated and samples were collected from native soil beneath the USTs; sample analysis indicated the presence of petroleum hydrocarbons in soil. Total Petroleum Hydrocarbons as diesel (TPHd) were detected at low levels (61 mg/kg) in the soil

stockpile, but not beneath the diesel tank; Total Petroleum Hydrocarbons as gasoline (TPHg) concentrations ranged from undetectable to 80 mg/kg in all samples; MTBE concentrations ranged from 24 to 110 mg/kg.

On 5/20/99 soil samples were collected beneath the dispenser islands. TPHg was found beneath the east dispenser island in varying concentrations ranging from 32 to 6,500 mg/kg; TPHd beneath the diesel dispenser was detected at 1300 mg/kg; no MTBE was detected beneath the dispenser islands.

On 7/26/00, three soil borings were drilled onsite to an approximate depth of 30' below ground surface (bgs). Soil samples were collected for analyses. Upon completion of drilling activities, the soil borings were converted to groundwater monitoring wells (MW1, MW2 and MW3) by installing 2-inch diameter, Schedule 40, factory threaded polyvinyl chloride (PVC) slotted pipe (0.010-inch slots). The slotted interval extends from 15 to 30 feet bgs. The wells were sampled on 8/11/00 and analyzed for TPHd, TPHg, BTEX and MTBE. The sample results indicated significant hydrocarbon impact in the groundwater. Directly downgradient well MW1 had concentrations of TPHg and MTBE of 170,000 $\mu\text{g/L}$ and 320,000 $\mu\text{g/L}$, respectively. A "Well Installation Report" was issued by ETIC Engineering on 9/22/00.

On 10/19/00 groundwater samples were collected as part of quarterly monitoring at the site. Samples were analyzed for TPHd, TPHg, BTEX and MTBE. The sample results confirmed the presence of significant hydrocarbon impact in the groundwater. Directly downgradient well MW1 had concentrations of TPHg and MTBE of 170,000 $\mu\text{g/L}$ and 200,000 $\mu\text{g/L}$, respectively. Geo Environmental Technologies (GET) issued a "Quarterly Monitoring Report" on 1/31/01.

On 02/22/01 groundwater samples were collected and analyzed for TPHd, TPHg BTEX and MTBE. The sample results confirmed significant hydrocarbon impact in the groundwater. Directly downgradient well MW1 had concentrations of TPHg and MTBE of 11,000 $\mu\text{g/L}$ and 190,000 $\mu\text{g/L}$, respectively. GET issued a "Quarterly Monitoring Report" on 3/31/01.

On 05/30/01 all three monitoring wells were found to be dry. The monitoring wells also were dry in August 2001.

On 11/14/01 groundwater samples were collected following the installation of an onsite extraction well (EX1) and three off-site monitoring wells (MW4, MW5 and MW6). Monitoring wells MW1, MW2 and MW3 were all dry. Groundwater samples collected from the four newly installed wells were analyzed for TPHd, TPHg, BTEX and MTBE. The sample results confirmed the presence of significant hydrocarbon concentrations offsite and an areal impact to the groundwater. Directly downgradient extraction well EX1 contained concentrations of TPHg and MTBE of 2,000 $\mu\text{g/L}$ and 2,200 $\mu\text{g/L}$, respectively. GET issued a "Quarterly Monitoring Report" on 3/31/02. Well construction details are presented in Table 1.

In 2002, groundwater samples were collected on 5/7, 9/11 and 12/1. These were analyzed for TPHd, TPHg/BTEX and MTBE. Directly downgradient extraction well EX1 contained concentrations of TPHg ranging from 3,000 to 7,700 µg/L; MTBE in well EX1 ranged from 1,200 to 6,200 µg/L. The 9/11 sample from well MW1 contained TPHg at 130,000 µg/L, and MTBE below the detection limit of 5,000 µg/L. In the 12/1/02 monitoring episode, MW1 was dry. Respective quarterly monitoring reports were issued on May 28, and December 13, 2002, and in February 2003.

In 2003, groundwater samples were collected on 3/14, 6/25, 9/16 and 12/22, and analyzed for TPHd, TPHg/BTEX and MTBE. Downgradient well MW1 contained concentrations of TPHg ranging from 37,000 to 180,000 µg/L, and concentrations of MTBE ranging from 150,000 to 210,000 µg/L. Downgradient well EX1 contained concentrations of TPHg ranging from 120 to 260 µg/L, and concentrations of MTBE ranging from 260 to 1,200 µg/L. In the 12/22 sampling episode, groundwater from MW2 was found to contain 240 µg/L of TPHg and 1.200 µg/L of MTBE. Quarterly monitoring reports were issued in April, July and October 2003, and January 2004.

On 8/7/03 Geo Environmental personnel met onsite with Donna Drogos of the ACEHS. Ms. Drogos requested a workplan for additional site investigation using a multiple well-point system to monitor different aquifer levels beneath the site.

On 3/10/04, 6/15/04, 9/17/04 and 12/10/04 groundwater samples were collected and analyzed for TPHd, TPHg/BTEX and MTBE. Downgradient well MW1 continues to contain high concentrations of TPHg. Wells MW1, MW2 and MW5 continue to contain high concentrations of MTBE. GET issued Quarterly monitoring reports in May, July and October 2004 and January 2005.

3.0 SITE CONTACTS

The following is a listing of site contacts, addresses and phone numbers.

UST Operator: Livermore Gas and Mini Mart
 Attention: Manwel and Samira Shuwayhat
 54 Wolfe Canyon Road
 Kentfield, CA 94904

Local Oversight Agency: ACEHS
 Attention: Robert Schultz P.G.
 1131 Harbor Bay Parkway, Suite 250
 Alameda, CA 94502
 Phone: (510) 567-6700

Environmental engineers: GET
Attention: Costas Orountiotis, or, Nathaniel Allen
343 Soquel Avenue, #33
Santa Cruz, CA 95062
Phone: (831) 423-8780

4.0 METHODS AND PROCEDURES

4.1 Sample Collection and Analysis

Groundwater was sampled on 3/2/05. Depth to groundwater (DTW) was measured in each of the monitoring wells prior to purging and sampling. DTW data is summarized in Table 2. A sample of static groundwater was collected from each well using a clean, clear plastic bailer to visually assess for the presence of floating product or product sheen. No floating product or sheen was found.

To maximize the possibility of sampling fresh, inflowing groundwater, individual wells were purged of four well casing volumes of groundwater prior to sample collection. Purged groundwater was stored onsite in a steel, 55-gallon, DOT 17H drum. After ascertaining that a minimum 80 percent recovery of the initial casing volume had occurred in the well, the monitoring wells were sampled. Field purge data is presented in Appendix A.

Groundwater samples were collected using new, clean, disposable plastic bailers. Water was decanted from the bailer into 1-liter amber glass bottles and 40-ml VOA vials with caps equipped with Teflon-lined septa, in such a manner that neither headspace nor air bubbles were allowed to remain in the containers. Samples were labeled and placed in a pre-cooled container on ice, to minimize potential loss of volatile constituents. Labels contained project name, sample number, date and time of collection.

Sample collection information was entered onto a Chain of Custody (COC) document that accompanied the samples during site time and during transport to McCampbell Analytical Labs, Inc., a State certified laboratory for hazardous materials analysis, for the requisite analyses.

Groundwater samples were analyzed for TPHd, TPHg, BTEX, and MTBE using EPA Methods 8015MOD and 8020.

4.2 Results

Downgradient monitoring well MW1 remains severely impacted. TPHd was detected at 2,800 $\mu\text{g/L}$, TPHg at 58,000 $\mu\text{g/L}$ and MTBE at 230,000 $\mu\text{g/L}$. BTEX constituent concentrations were 4,000, 2,500, 4,500, and 7,800 $\mu\text{g/L}$, respectively.

Cross-gradient well MW2 contained concentration levels of 91 $\mu\text{g/L}$ TPHd, 63 $\mu\text{g/L}$ TPHg, and 1,000 $\mu\text{g/L}$ MTBE; traces of BTEX concentrations also were detected.

Upgradient well MW3 contained no detectable concentrations of TPHd, TPHg, BTEX or MTBE.

Offsite monitoring well MW4 contained no detectable concentrations of TPHd, TPHg, BTEX; MTBE was detected at 14 $\mu\text{g/L}$.

Offsite monitoring well MW5 contained no detectable concentrations of TPHd, TPHg or BTEX; MTBE was detected at 320 $\mu\text{g/L}$.

Offsite monitoring well MW6 contained no detectable concentrations of TPHg, TPHd, MTBE or BTEX.

Extraction well EX1 was not sampled since it is located within 10 feet of well MW1.

Cumulative groundwater analytical results are presented in Table 2. Copies of the Laboratory analysis report and COC documentation for this monitoring event are presented in Appendix B.

4.3 Groundwater Flow and Gradient

DTW measurements taken on 3/2/05 were used to calculate the groundwater flow direction and gradient. Groundwater flow direction was northerly, consistent with general area direction of flow. The gradient was 0.011 ft/ft. This information is presented graphically in Figure 4.

5.0 RECOMMENDATIONS

Based on the results of this groundwater monitoring episode, conversations and directives of the ACEHS the following tasks are recommended:

- Continue quarterly groundwater sampling and depth to water data collection. Next monitoring date within a 15-day window of opportunity, is 6/1/05.

- Initiate work directed by Mr. Schultz in his directive of 3/29/05.

- Forward a copy of this report to: ACEHS
Attention: Robert Schultz P G
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

TABLES

TABLE 1 - Well Construction Details

Livermore Gas and Minimart, 160 Holmes, Livermore, California

Well Number	Date Installed	TOC (feet)	Total Depth (feet bgs)	Borehole Diameter (inches)	Casing Diameter (inches)	Slot (inch)	Interval					DTW 03/02/05 (feet)
							Screen (feet)	Blank Casing (feet)	Sand Pack (feet)	Bentonite Seal (feet)	Cement Grout (feet)	
MW-1	07/26/00	465.03	30	8	2	0.01	30-15	15-0.5	30-13	13-11	11-1.0	16.95
MW-2	07/26/00	464.94	30	8	2	0.01	30-15	15-0.5	30-13	13-11	11-1.0	16.75
MW-3	07/26/00	465.84	30	8	2	0.01	30-15	15-0.5	30-13	13-11	11-1.0	17.33
MW-4	10/30/01	465.15	50	8	2	0.01	50-20	20-0.5	50-18	18-16	16-0.5	17.60
MW-5	10/30/01	464.65	50	8	2	0.01	50-20	20-0.5	50-18	18-16	16-0.5	18.56
MW-6	10/30/01	464.13	50	8	2	0.01	50-20	20-0.5	50-18	18-16	16-0.5	18.04
EX1	10/30/01	465.3	55	10	6	0.01	55-30	30-0.5	55-28	28-26	26-0.5	NM

Notes: bgs Below ground surface
 DTW Depth to water
 TOC Top of Casing Elevation

TABLE 2 - Groundwater Analytical Results

Livermore Gas and Minimart, 160 Holmes, Livermore, California

Well ID.	Date	DTW (feet)	TPHd (µg/L)	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)
MW1	08/11/00	NM	57,000	170,000	6,400	7,600	4,200	9,700	320,000
	10/19/00	21.94	17,000	170,000	8,400	3,200	2,700	10,000	200,000
	02/22/01	22.91	11,000	82,000	5,100	1,000	13,000	8,700	190,000
	05/30/01	Dry	not sampled						
	11/14/01	Dry	not sampled						
	05/07/02	Dry	not sampled						
	09/11/02	26.16	NA	130,000	7,700	1,100	4,500	1,500	<5000
	12/01/02	27.55	NS	NS	NS	NS	NS	NS	NS
	03/14/03	22.63	3,800	180,000	7,100	3,200	4,300	6,000	220,000
	06/25/03	22.1	3,100	71,000	7,500	4,700	4,800	8,900	210,000
	09/16/03	24.91	3,600	37,000	4,600	220	3,600	930	150,000
	12/22/03	21.75	4,000	44,000	6,800	1,500	4,000	3,800	180,000
	03/10/04	17.45	3,100	72,000	6,000	11,000	3,900	10,000	260,000
	06/15/04	22.38	4,300	42,000	5,000	1,800	3,700	6,000	210,000
	09/17/04	25.61	2,900	24,000	2,800	< 33	2,900	500	83,000
	12/10/04	22.18	2,700	31,000	4,600	190	4,400	2,800	200,000
	03/02/05	16.95	2,800	58,000	4,000	2,500	4,500	7,800	230,000
MW2	08/11/00		1,900	4,500	220	52	160	170	3,000
	10/19/00	21.80	1,300	3,400	150	21	100	70	1,900
	02/22/01	22.87	880	7,600	25	< 10	69	25	2,200
	05/30/01	Dry	not sampled						
	11/14/01	Dry	not sampled						
	05/07/02	26.70	86	400	5.4	<0.50	1.9	2.3	230
	09/11/02	25.96	NA	260	1.3	<0.50	0.57	0.77	200
	12/11/02	27.56	120	250	7.9	1.6	13	9.9	180
	03/14/03	22.41	110	830	56	<0.50	<0.50	<1.0	1,200
	06/25/03	21.97	180	260	0.92	2.9	3.1	8.1	2,000
	09/16/03	24.70	260	420	3.6	3.4	5.2	2.4	1,300
	12/22/03	21.58	120	240	0.82	3.1	7.8	3.9	1,400
	03/10/04	17.31	210	280	9.4	4.2	14	11	1,400
	06/15/04	22.18	150	150	2.1	2.4	2.2	1.3	1,500
	09/17/04	25.44	70	61	< 0.50	1.0	< 0.50	< 0.50	730
12/10/04	22.00	110	84	< 0.50	1.2	< 0.50	1.5	1,300	
03/02/05	16.75	91	63	0.55	< 0.50	0.63	0.51	1,000	
MW3	08/11/00		260	59	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	10/19/00	22.45	< 65	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	02/22/01	23.51	100	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	05/30/01	Dry	not sampled						
	11/14/01	Dry	not sampled						
	05/07/02	Dry	not sampled						
	09/11/02	26.61	NA	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	12/11/02	28.18	not sampled						
	03/14/03	23.04	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0

TABLE 2 - Groundwater Analytical Results

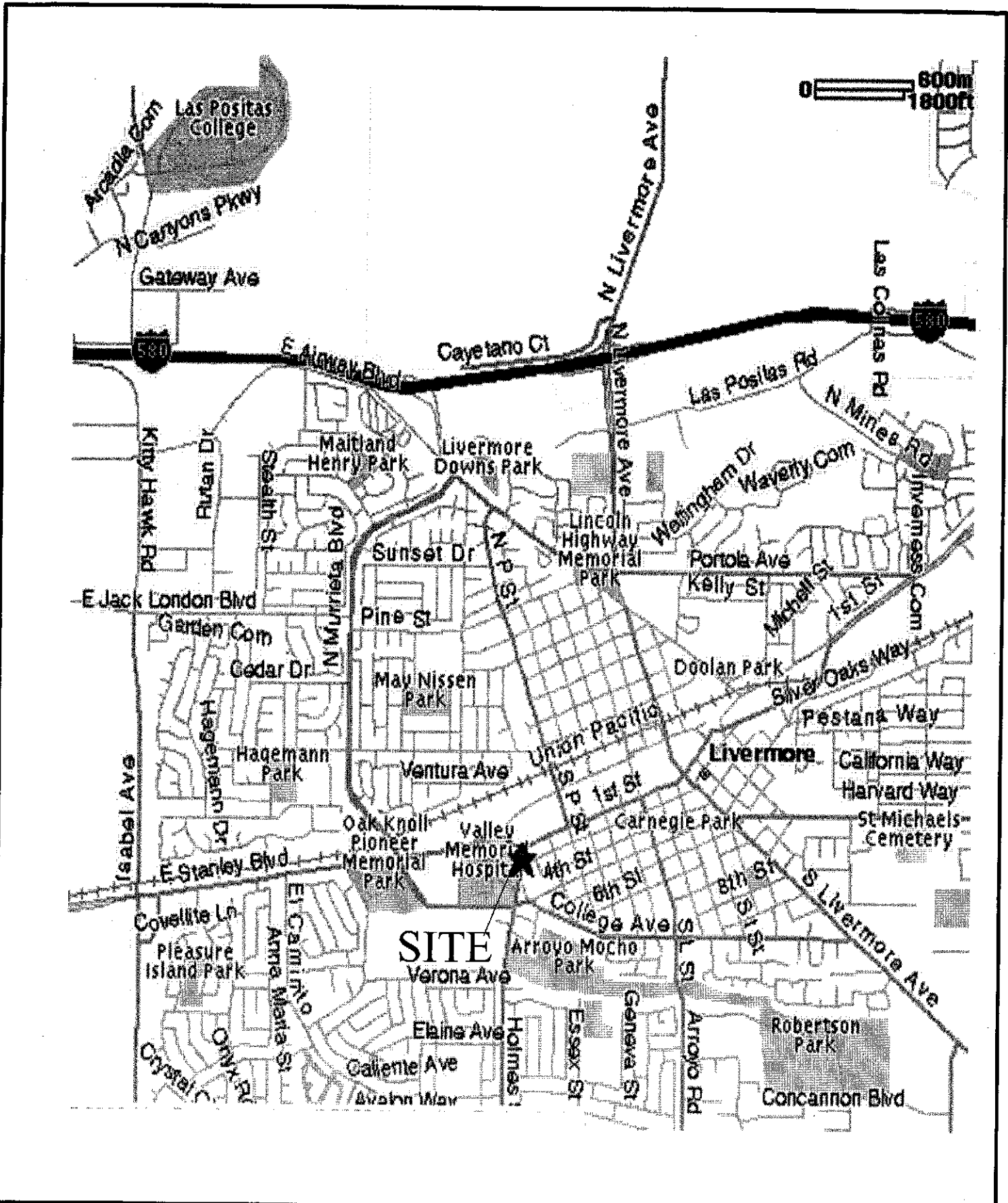
Livermore Gas and Minimart, 160 Holmes, Livermore, California

Well ID.	Date	DTW (feet)	TPHd (µg/L)	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)
MW3 cont.	06/25/03	22.59	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	09/16/03	25.33	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	12/22/03	22.37	69	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	03/10/04	17.88	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	06/15/04	22.82	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	09/17/04	26.09	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	12/10/04	22.65	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	7.6
	03/05/05	17.33	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
MW4	11/14/01	33.84	90	510	4	< 0.50	< 0.50	< 0.50	14
	05/07/02	26.75	< 50	150	3.5	0.5	< 0.50	< 0.50	48
	09/11/02	26.66	NA	< 50	< 0.50	< 0.50	< 0.50	< 0.50	15
	12/11/02	28.39	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	24
	03/14/03	23.14	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
	06/25/03	22.72	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
	09/16/03	25.39	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	12/22/03	22.42	69	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	03/04/04	18.20	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	37
	06/15/04	22.95	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	7.4
	09/17/04	26.12	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	12/10/04	22.73	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
03/02/05	17.60	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	14	
MW5	11/14/01	34.94	< 66	< 50	< 0.50	< 0.50	< 0.50	< 0.50	8.2
	05/07/02	27.90	< 50	140	< 0.50	< 0.50	< 0.50	< 0.50	110
	09/11/02	27.99	NA	< 50	< 0.50	< 0.50	< 0.50	< 0.50	6.3
	12/11/02	29.50	< 50	73	< 0.50	< 0.50	< 0.50	< 0.50	160
	03/14/03	24.26	< 50	110	< 0.50	< 0.50	< 0.50	< 0.50	170
	06/25/03	24.01	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	89
	09/16/03	26.83	< 50	630	< 0.50	3.5	< 0.50	2.63	1,500
	12/22/03	23.68	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	630
	03/10/04	19.22	< 50	57	< 0.50	< 0.50	< 0.50	< 0.50	1,100
	06/15/04	24.20	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	750
	09/17/04	27.68	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	780
	12/10/04	23.93	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	120
03/02/05	18.56	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	320	
MW6	11/14/01	33.88	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	05/07/02	27.01	< 67	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	09/11/02	27.03	NA	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	12/11/02	28.77	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
	03/14/03	23.46	< 50	< 50	< 0.50	< 0.50	< 0.50	< 1.0	< 1.0
	06/25/03	23.08	< 50	< 50	< 0.50	< 0.50	< 0.50	< 1.0	< 1.0
	09/16/03	25.77	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0
	12/22/03	22.59	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0

TABLE 2 - Groundwater Analytical Results										
Livermore Gas and Minimart, 160 Holmes, Livermore, California										
Well ID.	Date	DTW (feet)	TPHd (µg/L)	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	
MW6 cont.	03/10/04	18.65	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0	
	06/15/04	23.31	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0	
	09/17/04	26.56	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0	
	12/10/04	23.09	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0	
	03/02/05	18.04	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 5.0	
EX1	11/14/01	33.41	2,000	13,000	180	1,000	330	3,200	2,200	
	05/07/02	27.58	560	7,700	320	< 25	66	150	6,200	
	09/11/02	NM	NA	2,800	32	< 13	14	< 13	2,500	
	12/11/02	27.98	100	3,000	81	< 0.50	44	< 1	4,800	
	03/14/03	23.02	50	750	< 0.50	< 0.50	7.7	13	1,200	
	06/25/03	22.41	<50	120	3.2	3.7	4.2	7.6	260	
	09/16/03	24.65	< 50	170	0.51	1.5	< 0.50	0.94	1,600	
	03/10/04	17.99	not sampled							
	06/15/04	22.48	not sampled							
09/17/04	25.91	not sampled								

Notes:
 DTW: Depth to Groundwater
 NM: Not Measured
 NA: Not Analyzed
 TPHg: Total Petroleum Hydrocarbons as gasoline
 TPHd: Total Petroleum Hydrocarbons as diesel
 MTBE: Methyl tertiary Butyl Ether
 µg/L: Micrograms per liter

FIGURES

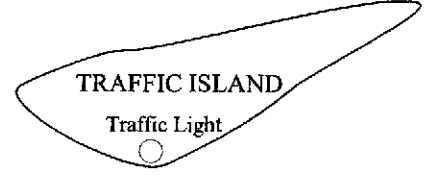
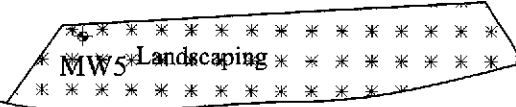
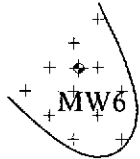


Site Vicinity Map
 Livermore Gas and Mini Mart
 160 Holmes Street
 Livermore, California

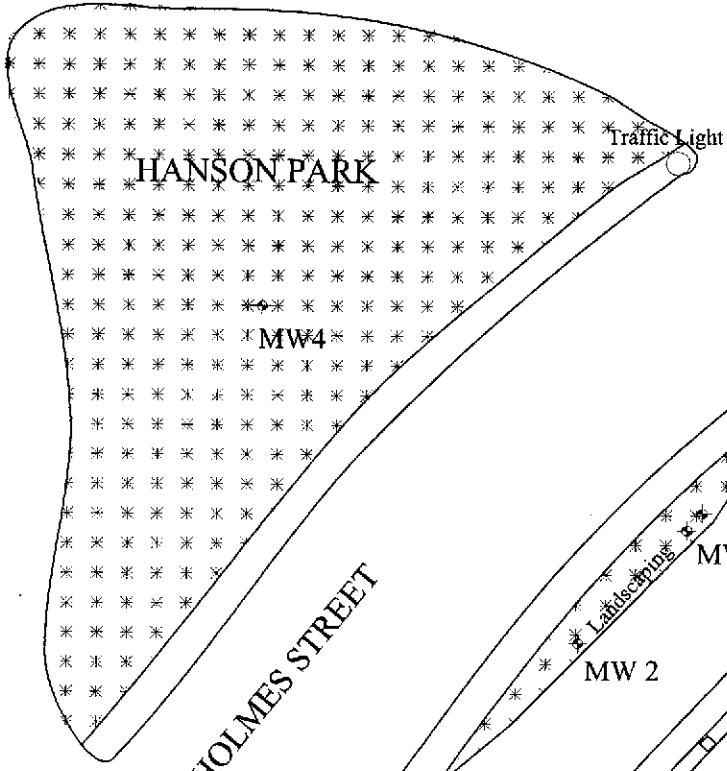
Figure No.
 1
 Project
 MANWEL



Noah's Bagels



South St



Traffic Light

LIVERMORE INN

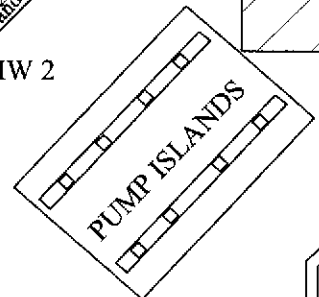
HOLMES STREET



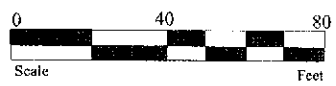
Landscaping

EX1
MW 1

MW 2



SECOND STREET

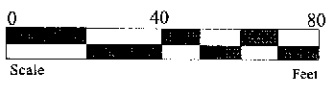
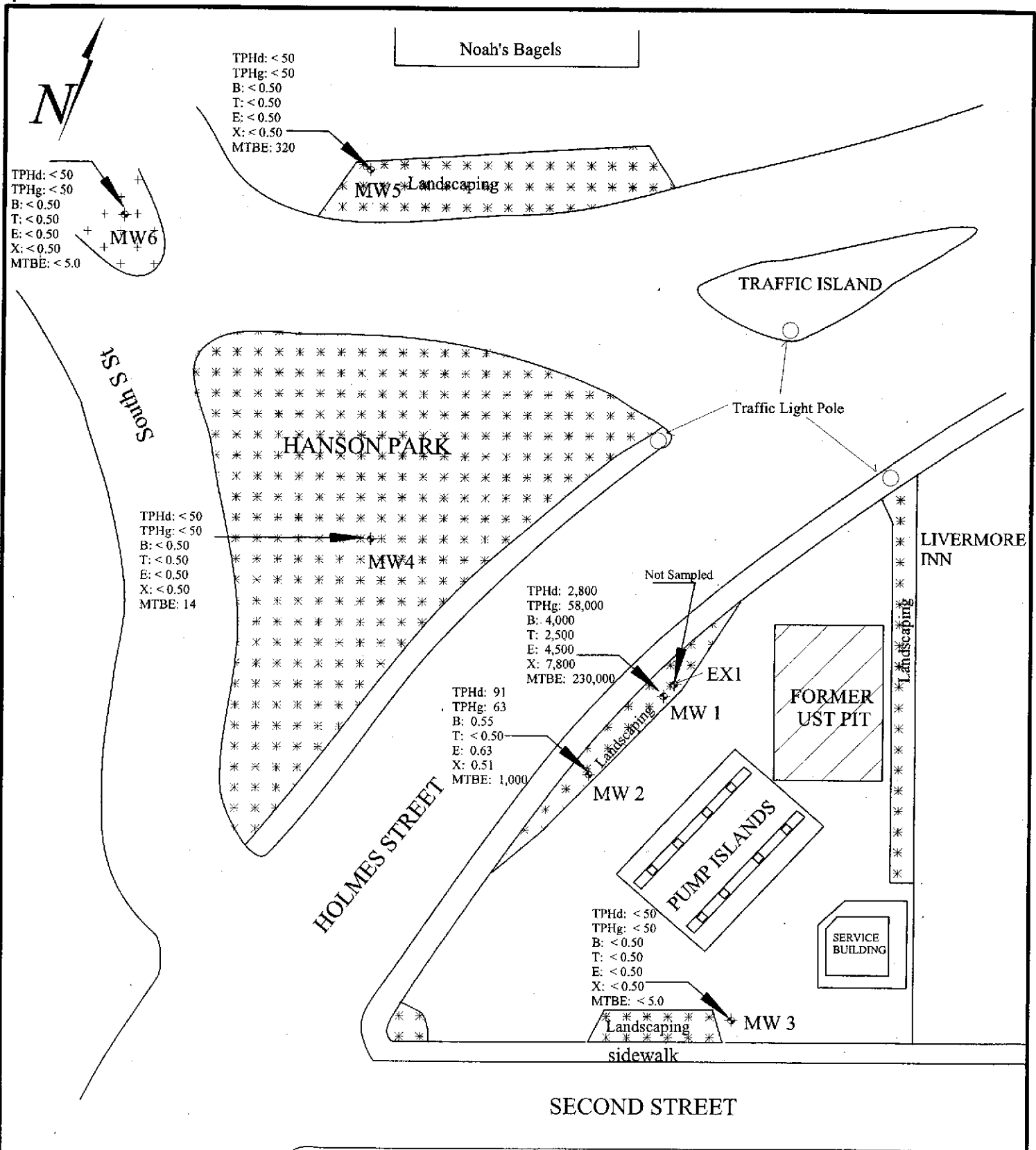


LEGEND: + Groundwater Monitoring Well

**Geo
Environmental
Technologies**

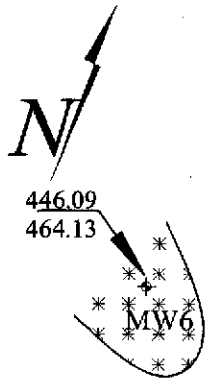
Site Plan
03/02/05
Livermore Gas and Minimart
160 Homes Street, Livermore, CA

Figure No.
2
Project
Manwel



LEGEND:

- ◆ Groundwater Monitoring Well
- TPHd: Total petroleum hydrocarbons as diesel
- TPHg: Total petroleum hydrocarbons as gasoline
- B: Benzene
- T: Toluene
- E: Ethyl-Benzene
- X: Xylenes
- MTBE: Methyl tertiary butyl ether



Noah's Bagels

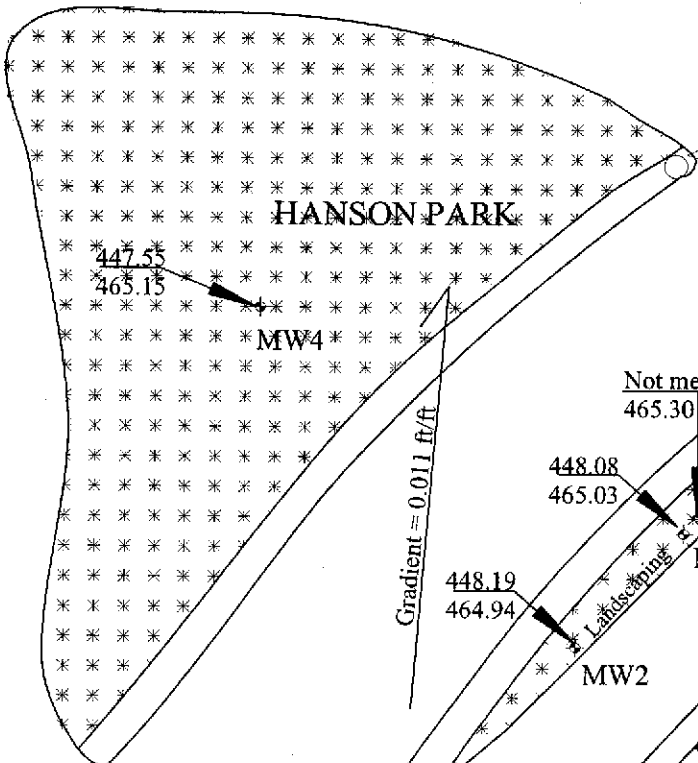
446.09
464.65

MW5 Landscaping

Gradient range:
low = 0.008 ft/ft (9/11/02)
high = 0.031 ft/ft (9/17/04)

The mean gradient from 2001 to the present is 0.0129 ft/ft in a northerly direction.

15 S 1100 S



HANSON PARK

HOLMES STREET

TRAFFIC ISLAND

Traffic Light Pole

LIVERMORE INN

Not measured
465.30

448.08
465.03

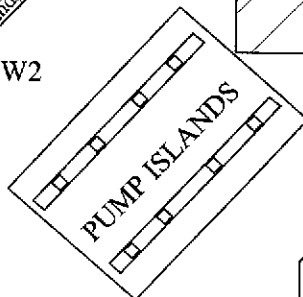
EX1

FORMER UST PIT

448.19
464.94

MW1

MW2



SERVICE BUILDING

Landscaping

MW3

Sidewalk

SECOND STREET

448.51
465.84



LEGEND:

- Groundwater Monitoring Well
- Groundwater Elevation
- Well Casing Elevation (MSL)

**Geo
Environmental
Technologies**

Groundwater Direction and Gradient
03/02/05
Livermore Gas and Minimart
160 Homes Street, Livermore, CA

Figure No.
4
Project
Manwel

APPENDIX A

Project	Manwel	Sampler: DIMITRI KELLY	
Site Location:	Livermore		
Well ID: <u>MW1</u>	Well Diameter(in): <u>2</u>	(1) Initial Depth of water (ft): <u>16.95</u>	(2) Total Depth (ft): <u>30</u>
Free Product (Y/N) <u>(N)</u>	Product Thickness(in):		
Measurements Referenced to: <u>TOC</u> Grade Other:			

Calculations

$$\text{Length of water column} = \frac{30}{2} \text{ ft} - \frac{17}{1} \text{ ft} = \frac{13}{3} \text{ ft}$$

$$80\% \text{ of the water level} = \frac{17}{1} \text{ ft} + \frac{13}{3} \text{ ft} \times 0.2 = 19.6 \text{ ft}$$

$$\text{Estimated purge volume (EPV)} = \frac{13}{3} \text{ ft} \times \frac{.16}{\text{VCF}} \times \frac{2}{1 \text{ casing vol}} \times 3 = \frac{6}{\text{purge volume}} \text{ Gal}$$

Volume conversion factor(VCF)

$$\text{VCF} = 0.052 \text{ gal} / (\text{in}^2 \times \text{ft}) \times \pi \times (\text{d}^2 / 4)$$

where p=3.14 and d=well dia(in)

Well Dia	VCF
<u>2"</u>	<u>0.16</u>
3"	0.37
4"	0.65
5"	1.02
6"	1.47

Purging Equipment:

- _____ Bailer
 Disposable bailer
 Electric Submersible Pump
 Extraction Pump
 Other

Sampling Equipment:

- _____ Bailer
 Disposable Bailer
 Extraction Port
 Other

Did well dewater? if yes, _____ gal

Sample ID: MW1

Sampling time:

Sampling date: 3/2/05

Notes:

Project	Manwel	Sampler: DIMITRI KELLY	
Site Location:	Livermore		
Well ID: MW2	Well Diameter(in): 2	(1) Initial Depth of water (ft): 16.75	(2) Total Depth (ft): 30
Free Product (Y/N) (N)	Product Thickness(in):		
Measurements Referenced to: TOC Grade Other:			

Calculations

$$\text{Length of water column} = \frac{30}{2} \text{ ft} - \frac{17}{1} \text{ ft} = \frac{13}{3} \text{ ft}$$

$$80\% \text{ of the water level} = \frac{17}{1} \text{ ft} + \left(\frac{13}{3} \text{ ft} \times 0.2 \right) = \frac{196}{3} \text{ ft}$$

$$\text{Estimated purge volume (EPV)} = \frac{13}{3} \text{ ft} \times \frac{.16}{\text{VCF}} \times \frac{2}{1} \times \frac{6}{\text{purge volume}} \text{ Gal}$$

Volume conversion factor(VCF)

$$\text{VCF} = 0.052 \text{ gal} / (\text{in}^2 \times \text{ft}) \times \pi (d^2 / 4)$$

where p=3.14 and d=well dia(in)

Well Dia VCF

2" 0.16

3" 0.37

4" 0.65

5" 1.02

6" 1.47

Purging Equipment:

- _____ Bailer
- Disposable bailer
- Electric Submersible Pump
- Extraction Pump
- Other

Sampling Equipment:

- _____ Bailer
- Disposable Bailer
- Extraction Port
- Other

Did well dewater? if yes, _____ gal

Sample ID: MW2

Sampling time:

Sampling date: 3/2/05

Notes:

Project	Manwel	Sampler: DIMITRI KELLY
Site Location:	Livermore	
Well ID: <u>MW3</u>	Well Diameter(in): <u>2</u>	(1) Initial Depth of water (ft): <u>17.33</u> (2) Total Depth (ft): <u>30</u>
Free Product (Y/N) <input checked="" type="checkbox"/>	Product Thickness(in):	
Measurements Referenced to: <u>TOC</u> Grade Other:		

Calculations

Length of water column = $\frac{30}{2}$ ft - $\frac{17}{1}$ ft = $\frac{13}{3}$ ft

80% of the water level = $\frac{17}{1}$ ft + $(\frac{13}{3} \text{ ft} \times 0.2) = 19.6$ ft

Estimated purge volume (EPV) = $\frac{13}{3}$ ft x $\frac{.16}{\text{VCF}}$ x $\frac{2}{1}$ casing vol x 3 = $\frac{6}{\text{purge volume}}$ Gal

Volume conversion factor (VCF)	
VCF = 0.052 gal / (in ² x ft) x P (d ² / 4)	
where p = 3.14 and d = well dia (in)	
Well Dia	VCF
2"	0.16
3"	0.37
4"	0.65
5"	1.02
6"	1.47

Purging Equipment:

- _____ Bailer
- Disposable bailer
- Electric Submersible Pump
- Extraction Pump
- Other

Sampling Equipment:

- _____ Bailer
- Disposable Bailer
- Extraction Port
- Other

Did well dewater? if yes, _____ gal		
Sample ID: <u>MW3</u>	Sampling time:	Sampling date: 3/2/05

Notes:

Project	Manwel	Sampler: DIMITRI KELLY	
Site Location:	Livermore		
Well ID: <u>mw4</u>	Well Diameter(in): <u>2</u>	(1) Initial Depth of water (ft): <u>17.6</u>	(2) Total Depth (ft): <u>50</u>
Free Product (Y/N) <u>(N)</u>	Product Thickness(in):		
Measurements Referenced to: TOC Grade Other:			

Calculations

$$\text{Length of water column} = \frac{50}{2} \text{ ft} - \frac{18}{1} \text{ ft} = \frac{32}{3} \text{ ft}$$

$$80\% \text{ of the water level} = \frac{18}{1} \text{ ft} + \frac{32}{3} \text{ ft} \times 0.2 = 24.4 \text{ ft}$$

$$\text{Estimated purge volume (EPV)} = \frac{32}{3} \text{ ft} \times \frac{.16}{\text{VCF}} \times \frac{5}{1 \text{ casing vol}} \times 3 = 15 \text{ Gal}$$

Volume conversion factor(VCF)

$$\text{VCF} = 0.052 \text{ gal} / (\text{in}^2 \times \text{ft}) \times \pi (d^2 / 4)$$

where p=3.14 and d=well dia(in)

Well Dia VCF

2" 0.16

3" 0.37

4" 0.65

5" 1.02

6" 1.47

Purging Equipment:

- () _____ Bailer
 () Disposable bailer
 (X) Electric Submersible Pump
 () Extraction Pump
 () Other

Sampling Equipment:

- () _____ Bailer
 (X) Disposable Bailer
 () Extraction Port
 () Other

Did well dewater? if yes, _____ gal

Sample ID: mw4

Sampling time:

Sampling date: 3/2/05

Notes:

Project	Marwel	Sampler: DIMITRI KELLY	
Site Location:	Livermore		
Well ID: <u>mw5</u>	Well Diameter(in): <u>2</u>	(1) Initial Depth of water (ft): <u>18.56</u>	(2) Total Depth (ft): <u>50</u>
Free Product (Y/N) <u>(N)</u>	Product Thickness(in):		
Measurements Referenced to: <u>(TOC)</u> Grade Other:			

Calculations

$$\text{Length of water column} = \frac{50}{2} \text{ ft} - \frac{18}{1} \text{ ft} = \frac{32}{3} \text{ ft}$$

$$80\% \text{ of the water level} = \frac{18}{1} \text{ ft} + \frac{32}{3} \text{ ft} \times 0.2 = \frac{24.4}{1} \text{ ft}$$

$$\text{Estimated purge volume (EPV)} = \frac{32}{3} \text{ ft} \times \frac{.16}{\text{VCF}} \times \frac{5}{1 \text{ casing vol}} \times 3 = \frac{15}{\text{purge volume}} \text{ Gal}$$

Volume conversion factor (VCF)

$$\text{VCF} = 0.052 \text{ gal} / (\text{in}^2 \times \text{ft}) \times \pi \times (d^2 / 4)$$

where p=3.14 and d=well dia(in)

Well Dia VCF

2" 0.16

3" 0.37

4" 0.65

5" 1.02

6" 1.47

Purging Equipment:

- Bailer
- Disposable bailer
- Electric Submersible Pump
- Extraction Pump
- Other

Sampling Equipment:

- Bailer
- Disposable Bailer
- Extraction Port
- Other

Did well dewater? if yes, _____ gal

Sample ID: mw5

Sampling time:

Sampling date: 3/2/05

Notes:

Project	Manwel	Sampler: DIMITRI KELLY	
Site Location:	Livermore		
Well ID: <u>mw6</u>	Well Diameter(in): <u>2</u>	(1) Initial Depth of water (ft): <u>18.04</u>	(2) Total Depth (ft): <u>50</u>
Free Product (Y/N) <u>(N)</u>	Product Thickness(in):		
Measurements Referenced to: <u>(TO)</u> Grade Other:			

Calculations

$$\text{Length of water column} = \frac{50}{2} \text{ ft} - \frac{18}{1} \text{ ft} = \frac{32}{3} \text{ ft}$$

$$80\% \text{ of the water level} = \frac{18}{1} \text{ ft} + \frac{32}{3} \text{ ft} \times 0.2 = \frac{24.4}{1} \text{ ft}$$

$$\text{Estimated purge volume (EPV)} = \frac{32}{3} \text{ ft} \times \frac{.16}{\text{VCF}} \times \frac{5}{1} \text{ casing vol} \times 3 = \frac{15}{1} \text{ Gal}$$

Volume conversion factor(VCF)	
VCF=0.052gal/(in ² x ft)xP(d ² /4)	
where p=3.14 and d=well dia(in)	
Well Dia	VCF
2"	0.16
3"	0.37
4"	0.65
5"	1.02
6"	1.47

Purging Equipment:

- Bailer
- Disposable bailer
- Electric Submersible Pump
- Extraction Pump
- Other

Sampling Equipment:

- Bailer
- Disposable Bailer
- Extraction Port
- Other

Did well dewater? if yes, _____ gal	Sample ID: <u>mw6</u>	Sampling time:	Sampling date: 3/2/05
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Notes:

APPENDIX B



McC Campbell Analytical, Inc.

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

Geo Environmental Technologies 343 Soquel Avenue #33 Santa Cruz, CA 95062	Client Project ID: Livemore; Manuel	Date Sampled: 03/02/05
		Date Received: 03/03/05
	Client Contact: Costas Orountiotis	Date Reported: 03/10/05
	Client P.O.:	Date Completed: 03/10/05

WorkOrder: 0503072

March 10, 2005

Dear Costas:

Enclosed are:

- 1). the results of 6 analyzed samples from your **Livemore; Manuel project**,
- 2). a QC report for the above samples
- 3). a copy of the chain of custody, and
- 4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions please contact me. McC Campbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Angela Rydelius, Lab Manager



McC Campbell Analytical, Inc.

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

Geo Environmental Technologies 343 Soquel Avenue #33 Santa Cruz, CA 95062	Client Project ID: Livemore; Manuel	Date Sampled: 03/02/05
		Date Received: 03/03/05
	Client Contact: Costas Orountiotis	Date Extracted: 03/04/05-03/09/05
	Client P.O.:	Date Analyzed: 03/04/05-03/09/05

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE*

Extraction method: SW5030B

Analytical methods: SW8021B/8015Cm

Work Order: 0503072


Lab ID	Client ID	Matrix	TPH(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS
001A	MW1	W	58,000,a,h,i	230,000	4000	2500	4500	7800	200	91
002A	MW2	W	63,a,i	1000	0.55	ND	0.63	0.51	1	96
003A	MW3	W	ND,i	ND	ND	ND	ND	ND	1	92
004A	MW4	W	ND	14	ND	ND	ND	ND	1	98
005A	MW5	W	ND	320	ND	ND	ND	ND	1	93
006A	MW6	W	ND	ND	ND	ND	ND	ND	1	97

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	50	5.0	0.5	0.5	0.5	0.5	1	µg/L
	S	NA	NA	NA	NA	NA	NA	1	mg/Kg

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

cluttered chromatogram; sample peak coelutes with surrogate peak.

+The following descriptions of the TPH chromatogram are cursory in nature and McC Campbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (stoddard solvent / mineral spirit?); f) one to a few isolated non-target peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; j) reporting limit raised due to high MTBE content; k) TPH pattern that does not appear to be derived from gasoline (aviation gas). m) no recognizable pattern; n) TPH(g) range non-target isolated peaks subtracted out of the TPH(g) concentration at the client's request.

 Angela Rydelius, Lab Manager



McC Campbell Analytical, Inc.

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

Geo Environmental Technologies 343 Soquel Avenue #33 Santa Cruz, CA 95062	Client Project ID: Livemore; Manuel	Date Sampled: 03/02/05
		Date Received: 03/03/05
	Client Contact: Costas Orountiotis	Date Extracted: 03/03/05
	Client P.O.:	Date Analyzed: 03/04/05-03/07/05

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

Extraction method: SW3510C

Analytical methods: SW8015C

Work Order: 0503072


Lab ID	Client ID	Matrix	TPH(d)	DF	% SS
0503072-001B	MW1	W	2800,d,h,i	2	92
0503072-002B	MW2	W	91,b,i	1	107
0503072-003B	MW3	W	ND,i	1	101
0503072-004B	MW4	W	ND	1	108
0503072-005B	MW5	W	ND	1	111
0503072-006B	MW6	W	ND	1	109

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 µg/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.

+The following descriptions of the TPH chromatogram are cursory in nature and McC Campbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) aged diesel? is significant; d) gasoline range compounds are significant; e) unknown medium boiling point pattern that does not appear to be derived from diesel; f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; k) kerosene/kerosene range/jet fuel range; l) bunker oil; m) fuel oil; n) stoddard solvent/mineral spirit.

 Angela Rydelius, Lab Manager



QC SUMMARY REPORT FOR SW8021B/8015Cm

W.O. Sample Matrix: Water

QC Matrix: Water

WorkOrder: 0503072

EPA Method: SW8021B/8015Cm		Extraction: SW5030B			BatchID: 15229			Spiked Sample ID: 0503064-001A		
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	LCS / LCSD
TPH(btex) [£]	ND	60	106	103	3.16	92.8	102	9.91	70 - 130	70 - 130
MTBE	ND	10	99.5	99.1	0.417	90.2	98.3	8.57	70 - 130	70 - 130
Benzene	ND	10	114	105	7.34	103	108	4.26	70 - 130	70 - 130
Toluene	ND	10	110	101	8.73	108	107	0.429	70 - 130	70 - 130
Ethylbenzene	ND	10	115	107	7.27	107	113	5.43	70 - 130	70 - 130
Xylenes	ND	30	107	96	10.5	110	100	9.52	70 - 130	70 - 130
%SS:	109	10	111	111	0	102	109	5.96	70 - 130	70 - 130

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

Sample ID	Batch ID	Date Sampled	Date Analyzed	Sample ID	Batch ID	Date Sampled	Date Analyzed
0503072-001A	15229	3/02/05	3/08/05 5:05 AM	0503072-002A	15229	3/02/05	3/09/05 8:08 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 / 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.

£ TPH(btex) = sum of BTEX areas from the FID.

cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not applicable or 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.



QC SUMMARY REPORT FOR SW8021B/8015Cm

W.O. Sample Matrix: Water

QC Matrix: Water

WorkOrder: 0503072

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	LCS / LCSD
TPH(btex) [£]	ND	60	99.5	102	2.41	102	102	0	70 - 130	70 - 130
MTBE	ND	10	112	106	5.22	104	110	6.48	70 - 130	70 - 130
Benzene	ND	10	119	116	2.35	104	112	7.24	70 - 130	70 - 130
Toluene	ND	10	115	114	0.608	104	110	5.55	70 - 130	70 - 130
Ethylbenzene	ND	10	117	117	0	108	113	4.61	70 - 130	70 - 130
Xylenes	ND	30	100	107	6.45	96.3	100	3.74	70 - 130	70 - 130
%SS:	111	10	117	114	3.02	105	110	4.91	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

Sample ID	Batch ID	Date Sampled	Date Analyzed	Sample ID	Batch ID	Date Sampled	Date Analyzed
0503072-003A	15236	3/02/05	3/07/05 12:12 PM	0503072-004A	15236	3/02/05	3/07/05 12:47 PM
0503072-005A	15236	3/02/05	3/07/05 1:22 PM	0503072-006A	15236	3/02/05	3/08/05 1:29 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 / 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.

£ TPH(btex) = sum of BTEX areas from the FID.

cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not applicable or 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.



QC SUMMARY REPORT FOR SW8015C

W.O. Sample Matrix: Water

QC Matrix: Water

WorkOrder: 0503072

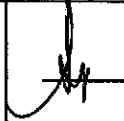
EPA Method: SW8015C		Extraction: SW3510C			BatchID: 15221			Spiked Sample ID: N/A		
Analyte	Sample	Spiked	MS*	MSD*	MS-MSD*	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
TPH(d)	N/A	1000	N/A	N/A	N/A	111	114	2.48	N/A	70 - 130
%SS:	N/A	2500	N/A	N/A	N/A	112	113	1.52	N/A	70 - 130

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

Sample ID	Batch ID	Date Sampled	Date Analyzed	Sample ID	Batch ID	Date Sampled	Date Analyzed
0503072-001B	15221	3/02/05	3/07/05 4:36 PM	0503072-002B	15221	3/02/05	3/04/05 7:24 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 / 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 Certification No. 1644


QA/QC Officer



QC SUMMARY REPORT FOR SW8015C

W.O. Sample Matrix: Water

QC Matrix: Water

WorkOrder: 0503072

EPA Method: SW8015C		Extraction: SW3510C			BatchID: 15237			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	LCS / LCSD
TPH(d)	N/A	1000	N/A	N/A	N/A	116	118	1.21	N/A	70 - 130
%SS:	N/A	2500	N/A	N/A	N/A	112	114	1.19	N/A	70 - 130

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

BATCH 15237 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0503072-003B	3/02/05	3/03/05 4:28 PM	3/07/05 3:24 PM	0503072-004B	3/02/05	3/03/05 4:28 PM	3/04/05 2:42 PM
0503072-005B	3/02/05	3/03/05 4:28 PM	3/04/05 5:12 PM	0503072-006B	3/02/05	3/03/05 4:28 PM	3/04/05 4:06 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 / 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.

McC Campbell Analytical, Inc.



110 Second Avenue South, #D7
 Pacheco, CA 94553-5560
 (925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0503072

ClientID: GET

Report to:

Costas Orountiotis
 Geo Environmental Technologies
 343 Soquel Avenue #33
 Santa Cruz, CA 95062

TEL: (831) 423-8780
 FAX: (831) 423-8827
 ProjectNo: Livemore; Manuel
 PO:

Bill to:

Accounts Payable
 Geo Environmental Technologies
 343 Soquel Avenue #33
 Santa Cruz, CA 95062

Requested TAT:

5 days

Date Received: 03/03/2005

Date Printed: 03/03/2005

Sample ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests (See legend below)														
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0503072-001	MW1	Water	3/2/05	<input type="checkbox"/>	A	A	B												
0503072-002	MW2	Water	3/2/05	<input type="checkbox"/>	A		B												
0503072-003	MW3	Water	3/2/05	<input type="checkbox"/>	A		B												
0503072-004	MW4	Water	3/2/05	<input type="checkbox"/>	A		B												
0503072-005	MW5	Water	3/2/05	<input type="checkbox"/>	A		B												
0503072-006	MW6	Water	3/2/05	<input type="checkbox"/>	A		B												

Test Legend:

1	G-MBTX_W	2	PREF REPORT	3	TPH(D)_W	4		5	
6		7		8		9		10	
11		12		13		14		15	

Prepared by: Melissa Valles

Comments:

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

get

0503072

McCAMPBELL ANALYTICAL INC.

110 2ND AVENUE SOUTH, #117
 PACHECO, CA 94553-5560
 Telephone: (925) 798-1620 Fax: (925) 798-1622
 Email: main@mccampbell.com

CHAIN OF CUSTODY RECORD

TURN AROUND TIME RUSH 24 HR 48 HR 72 HR 5 DAY
EDF Required? Yes No

Report To: Costas Orountotis **Bill To:** GET
Company: Geo Environmental Technologies
343 Soquel Ave. #33
Santa Cruz, CA 95062 **E-Mail:**
Tele: (831) 423-8780 **Fax:** (831) 423-8827
Project #: L... **Project Name:** Man...
Project Location:
Sampler Signature:

Analysis Request **Other** **Comments**

SAMPLE ID (Field Point Name)	LOCATION	SAMPLING		# Containers	Type Containers	MATRIX					METHOD PRESERVED						
		Date	Time			Water	Soil	Air	Sludge	Other	Ice	HCl	HNO ₃	Other			
+1 MW1	Manuel	3/2/05		3	VECTAM	X	X	X	X	X							
+1 MW2						X	X	X	X	X							
+1 MW3						X	X	X	X	X							
+ MW4						X	X	X	X	X							
+ MW5						X	X	X	X	X							
+ MW6						X	X	X	X	X							

STEX & TPH as Gas (602/8020 + 8015)/MTBE	TPH as Diesel (8015)	Total Petroleum Oil & Grease (5520 E&F/B&F)	Total Petroleum Hydrocarbons (418.1)	EPA 601/8010	BTEX ONLY (EPA 602/8020)	EPA 608/8080	EPA 608-8080 PCB'S ONLY	EPA 624/8240/8260	EPA 625/8270	PAH's / PCB's by EPA 625 / 8270 / 8310	CAM-17 Metals	LUFT 5 Metals	Lead (7240/7421/239.2/6010)	RCI	pH	TSS	Specific Conductivity
--	----------------------	---	--------------------------------------	--------------	--------------------------	--------------	-------------------------	-------------------	--------------	--	---------------	---------------	-----------------------------	-----	----	-----	-----------------------

Relinquished By: *[Signature]* **Date:** 3/2/05 **Time:** 1:57 **Received By:** *[Signature]*
Relinquished By: *[Signature]* **Date:** 3/3/05 **Time:** 3:35 **Received By:** *[Signature]*
Relinquished By: *[Signature]* **Date:** **Time:** **Received By:**

ICE/Iⁿ **GOOD CONDITION**
HEAD SPACE ABSENT
PRESERVATION APPROPRIATE
CONTAINERS
 VOAS O&G METALS OTHER

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Confirmation Number: 9846907019
Date/Time of Submittal: 3/21/2005 10:46:54 AM
Facility Global ID: T0600102287
Facility Name: LIVERMORE GAS AND MINI MART
Submittal Title: 1st QM 2005
Submittal Type: GW Monitoring Report

Click [here](#) to view the detections report for this upload.

LIVERMORE GAS AND MINI MART 160 HOLMES ST LIVERMORE, CA 94550	<u>Regional Board - Case #: 01-2482</u> SAN FRANCISCO BAY RWQCB (REGION 2) - (BG) <u>Local Agency (lead agency) - Case #: 4130</u> ALAMEDA COUNTY LOP - (AG)
--	---

<u>CONF #</u>	<u>TITLE</u>	<u>QUARTER</u>
9846907019	1st QM 2005	Q1 2005
<u>SUBMITTED BY</u>	<u>SUBMIT DATE</u>	<u>STATUS</u>
Costas Orountiotis	3/21/2005	PENDING REVIEW

SAMPLE DETECTIONS REPORT

# FIELD POINTS SAMPLED	6
# FIELD POINTS WITH DETECTIONS	4
# FIELD POINTS WITH WATER SAMPLE DETECTIONS ABOVE MCL	3
SAMPLE MATRIX TYPES	WATER

METHOD QA/QC REPORT

METHODS USED	SW8015B,SW8021F
TESTED FOR REQUIRED ANALYTES?	N

MISSING PARAMETERS NOT TESTED:

- SW8015B REQUIRES ETBE TO BE TESTED
- SW8015B REQUIRES TAME TO BE TESTED
- SW8015B REQUIRES DIPE TO BE TESTED
- SW8015B REQUIRES TBA TO BE TESTED
- SW8015B REQUIRES DCA12 TO BE TESTED
- SW8015B REQUIRES EDB TO BE TESTED
- SW8021F REQUIRES ETBE TO BE TESTED
- SW8021F REQUIRES TAME TO BE TESTED
- SW8021F REQUIRES DIPE TO BE TESTED
- SW8021F REQUIRES TBA TO BE TESTED
- SW8021F REQUIRES DCA12 TO BE TESTED
- SW8021F REQUIRES EDB TO BE TESTED

LAB NOTE DATA QUALIFIERS	N
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QA/QC FOR 8021/8260 SERIES SAMPLES

TECHNICAL HOLDING TIME VIOLATIONS	0
METHOD HOLDING TIME VIOLATIONS	0
LAB BLANK DETECTIONS ABOVE REPORTING DETECTION LIMIT	0
LAB BLANK DETECTIONS	0
DO ALL BATCHES WITH THE 8021/8260 SERIES INCLUDE THE FOLLOWING?	
- LAB METHOD BLANK	Y
- MATRIX SPIKE	N
- MATRIX SPIKE DUPLICATE	N
- BLANK SPIKE	Y
- SURROGATE SPIKE - NON-STANDARD SURROGATE USED	Y

WATER SAMPLES FOR 8021/8260 SERIES

MATRIX SPIKE / MATRIX SPIKE DUPLICATE(S) % RECOVERY BETWEEN 65-135%	Y
MATRIX SPIKE / MATRIX SPIKE DUPLICATE(S) RPD LESS THAN 30%	Y
SURROGATE SPIKES % RECOVERY BETWEEN 85-115%	N
BLANK SPIKE / BLANK SPIKE DUPLICATES % RECOVERY BETWEEN 70-130%	Y

SOIL SAMPLES FOR 8021/8260 SERIES

MATRIX SPIKE / MATRIX SPIKE DUPLICATE(S) % RECOVERY BETWEEN 65-135%	n/a
MATRIX SPIKE / MATRIX SPIKE DUPLICATE(S) RPD LESS THAN 30%	n/a
SURROGATE SPIKES % RECOVERY BETWEEN 70-125%	n/a
BLANK SPIKE / BLANK SPIKE DUPLICATES % RECOVERY BETWEEN 70-130%	n/a

FIELD QC SAMPLES

<u>SAMPLE</u>	<u>COLLECTED</u>	<u>DETECTIONS > REPD</u>
QCTB SAMPLES	N	0
QCEB SAMPLES	N	0
QCAB SAMPLES	N	0

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<u>Submittal Date/Time:</u>	3/21/2005 3:00:18 PM
<u>Confirmation Number:</u>	8865903556

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