CAMBRIA

May 23, 1997

Mr. Lynn Worthington
Golden Empire Properties
5942 MacArthur Boulevard, Suite B
Oakland, CA 94605

Re: **Investigation Report**
Former Exxon Service Station
3055 35th Avenue
Oakland, California
Cambria Project No: 13-105

Dear Mr. Worthington:

Cambria Environmental Technology, Inc. (Cambria), on behalf of Golden Empire Properties, conducted a subsurface investigation at the site referenced above. The investigation objective was to further define the extent of petroleum hydrocarbons in ground water and collect data for a Risk-Based Corrective Action (RBCA) Assessment. The RBCA will be submitted shortly. Presented below are the results of our investigation including a brief site summary, our detailed scope of work, investigation results, conclusions and recommendations.

SITE BACKGROUND

Site Location: The site is a former Exxon Service Station located at the northeast corner of 35th Avenue and School Street in Oakland, California (Figure 1). Topography in the area slopes generally westward and ground water flows toward the northwest. The nearest surface water is Peralta Creek, which is about 0.1 miles north (cross gradient) of the site and flows westward.

Adjacent Hydrocarbon Sources: Two active or former gasoline service stations are located within one block of the site. An active British Petroleum (BP) site is on 35th Avenue one block east (upgradient) of the site. A former Texaco station is located across School Street immediately east (upgradient) of the site. Texaco's underground storage tanks were removed about 15 years ago. No soil samples were collected during the tank removal and no investigation has been conducted at the former Texaco site.

Previous Investigations

October 1990 Geotechnical Investigation: In October 1990, Geotechnical Engineering of Fremont, California drilled two soil borings at the site for an engineering analysis.

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ENVIRONMENTAL
TECHNOLOGY, INC.
1144 65TH STREET,
SUITE B
OAKLAND,
CA 94608
PH: (510) 420-0700
FAX: (510) 420-9170

January 1991 Tank Removal: In January 1991, Pacific Excavators removed four gasoline underground storage tanks and one 500-gallon waste oil underground storage tank from the site. The former gasoline tanks appear to have had capacities between 4,000 and 6,000 gallons. According to a September 24, 1992 workplan prepared by Consolidated Technologies of San Jose, California (CT), soil samples were collected during the tank removal, but were not analyzed or reported by Pacific Excavators (CT, 1992).

November 1991 Subsurface Investigation: In November 1991, CT drilled twelve soil borings to depths of up to 35 ft (Figure 2). Total petroleum hydrocarbons as gasoline (TPHg) were detected in soil samples collected from 11 of the 12 soil borings, at up to 2,100 parts per million (ppm). No total petroleum hydrocarbons as diesel (TPHd) or oil and grease (O&G) were detected in boring B-7, which is immediately downgradient of the former waste oil tank.

May 1994 Subsurface Investigation: Between May 5 and 9, 1994, Cambria drilled seven soil borings and installed three monitoring wells at the site. TPHg were detected in soil from six of the seven borings, at concentrations up to 2,900 ppm. TPHg and benzene were detected in ground water at a maximum concentration of 130,000 and 22,000 parts per billion (ppb), respectively.

Quarterly Ground Water Monitoring: A quarterly ground water monitoring program began in May 1994 with all the wells sampled every quarter.

Site Geology and Hydrogeology

Site Hydrogeology: The site is underlain by clayey silts and sands to the maximum explored depth of 30 feet.

Ground Water Depth: The depth to ground water has ranged from approximately 8 to 22 ft.

Ground Water Flow Direction: Ground water flows consistently to the northwest.

INVESTIGATION RESULTS

To further assess the downgradient extent of hydrocarbons, Cambria installed monitoring well MW-4 in the northwest corner of the property (Figure 2). To assess the hydrocarbon distribution in soil and observe changes in lithology, the soil boring was continuously cored. Cambria collected soil samples at 5 ft intervals for chemical analysis and collected additional soil samples at 5 ft intervals to analyze for risk assessment parameters including porosity, moisture content and organic carbon content (f_{oc}). Soil samples were analyzed for TPHg, TPHd, benzene, toluene, ethylbenzene and xylenes (BTEX) and methyl tertiary-butyl ether (MTBE). The monitoring well locations are shown in Figure 2.

The results of Cambria's February 1997 subsurface investigation are summarized below. Tabulated analytic results for soil are presented in Table 1. Results of the quarterly ground water program are presented in Table 2. A monitoring well installation permit from Alameda County Flood Control and Water Conservation District (ACFCWCD) Zone 7 is presented as Attachment A. The boring log and well construction diagram for well MW-4 are presented as Attachment B. The laboratory analytic reports for soil and ground water are presented as Attachment C. Our standard field procedure for monitoring well installation is presented as Attachment D.

Soil Borings

Personnel Present: Staff Hydrogeologist Sam Rangarajan conducted all field work under the supervision of Registered Geologist Scott MacLeod of Cambria.

Permits: ACFCWCD - Zone 7 Monitoring Well Installation Permit # 96840 (Attachment A).

Drilling Company: Gregg Drilling and Testing, Inc. of Martinez, California.

Drilling Dates: We initially attempted to drill on December 6, 1996. However, the ground was saturated and we could not drive the drill rig on to the site. We waited for the site to dry and drilled on February 26, 1997.

Drilling Methods: 8-inch diameter hollow stem auger.

Number of Borings: One (Figure 2).

Boring Depths: 30 ft below ground surface (Attachment B).

Sediment Lithology: Soils at the site from ground surface to 30 ft depth are mostly clayey silts and sands.

Sampling Technique: The boring was sampled and logged continuously using split-barrel samplers lined with clean brass sampling tubes driven into undisturbed sediments at the bottom of the borehole. Soil samples were also collected at every 5 ft for chemical analysis and to analyze for risk assessment parameters.

Sample Screening: A GasTech photo ionization detector (PID) for vapor screening and observations of sheen and odor were used to screen soil samples from each boring.

Laboratory Analyses: Selected soil samples were analyzed for:

- Porosity, bulk density, moisture content, organic carbon content, permeability and air-filled voids;
- TPHg by modified EPA Method 8015;
- TPHd by modified EPA Method 8015;

- BTEX by EPA Method 8020; and,
- MTBE by EPA Method 8020.

Soil Disposal: Soil cuttings were stored on site in Department of Transportation (DOT) approved 55-gallon storage drums. The soil will be remediated on site concurrent with future site remediation.

Well Construction

Well Materials: Monitoring well MW-4 was constructed using two-inch diameter, schedule 40 PVC pipe with a screen size of 0.010" and #2 sand (Attachment B).

Screened Interval: Ground water stabilized in monitoring well MW-4 at 12.7 depth and the well was screened from 10 to 30 ft.

Well Development/ Sampling: Cambria Engineer Adam Sevi developed monitoring well MW-4 on February 28, 1997 using surge block agitation and bailer evacuation including purging at least ten well volumes of water. All the four monitoring wells were sampled on March 20, 1997. Results of the well sampling are presented in Table 2.

Ground Water Analyses: Ground water samples from the wells were analyzed for:

- TPHg by modified EPA Method 8015;
- TPHd by modified EPA Method 8015;
- BTEX by EPA Method 8020; and,
- MTBE by EPA Method 8020.

Ground Water Flow Direction: Ground water flows generally toward the northwest.

Ground Water Depth: Ground water depth gauged on March 20, 1997 ranged from 13 to 16.7 ft (Table 2).

Waste Disposal: Purge water generated during well development and sampling was stored on site in DOT approved 55-gallon storage drums pending disposal.

HYDROCARBON DISTRIBUTION

Soil: The extent of TPHg in soil is shown in Figure 3. As indicated on Figure 3, the highest hydrocarbon concentrations are detected near the former tanks and southern pump island.

Ground Water: As indicated on Figure 4 and 5, TPHg and benzene are detected in on site wells, at a maximum of 56,000 ppb TPHg in well MW-3 and 11,000 ppb benzene in well MW-4 on March 20, 1997. To evaluate potential intrinsic bioremediation mechanisms, we also measured dissolved oxygen (DO) concentrations in the monitoring wells. The elevated DO levels in ground water indicates that bioattenuation of hydrocarbons is possible.

RISK ASSESSMENT PARAMETERS

Soil samples from 5, 10 and 15 ft depth from boring MW-4 were analyzed for porosity, bulk density, moisture content, organic carbon content, and air-filled voids. We also used a sieve analysis to estimate the composition and permeability of subsurface soils beneath the site. These parameters will be used in a health risk assessment that will evaluate the potential risk from petroleum hydrocarbons in soil and ground water to the nearby residential properties. The RBCA establishes target levels which will then be used to prepare a corrective action plan for the site. Laboratory measured values for these parameters are listed in the following table. A copy of the laboratory analytic report for these parameters is presented in Attachment C.

Sample ID	Parameter					
	Porosity (%)	Dry Bulk Density (lbs/ft^3)	Moisture Content (%)	Organic Carbon Content (%)	Air Voids (%)	pH
MW-4-5A	39.7	101.6	24	3.5	1.6	7.51
MW-4-10A	45.6	91.4	16.6	4.1	21.2	8.32
MW-4-15A	44.2	89.9	28.9	3.5	5	7.81

CLOSING

We appreciate this opportunity to provide environmental consulting services to Golden Empire Properties. Please call if you have any questions or comments.

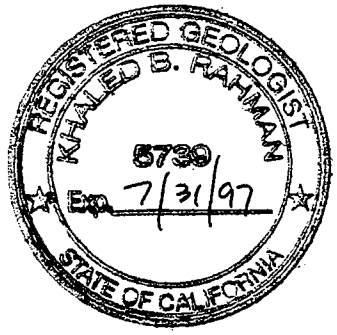
Sincerely,
Cambria Environmental Technology, Inc.

S. Rangarajan

Sam Rangarajan, EIT
Hydrogeologist

Khaled Rahman

Khaled B. Rahman. R.G., C.H.G.
Senior Geologist



Attachments:
A - Well Installation Permit
B - Boring Log/Well Construction Detail
C - Soil and Ground Water Analytic Data
D - Standard Field Procedures for Monitoring Well Installation

cc: Mr. Kevin Tinsley, Hazardous Materials Specialist
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, # 250, Alameda, California 94502-6577

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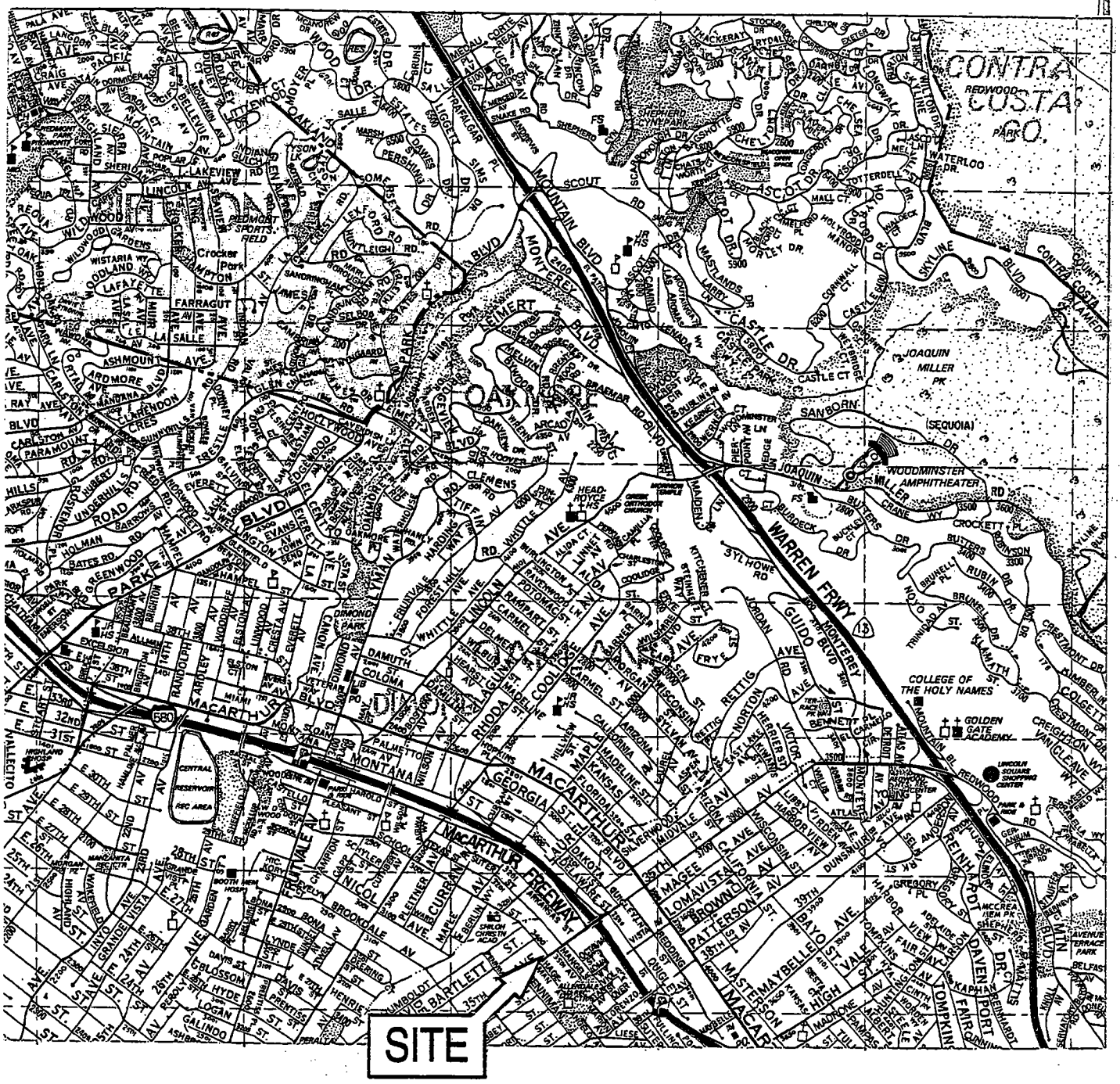

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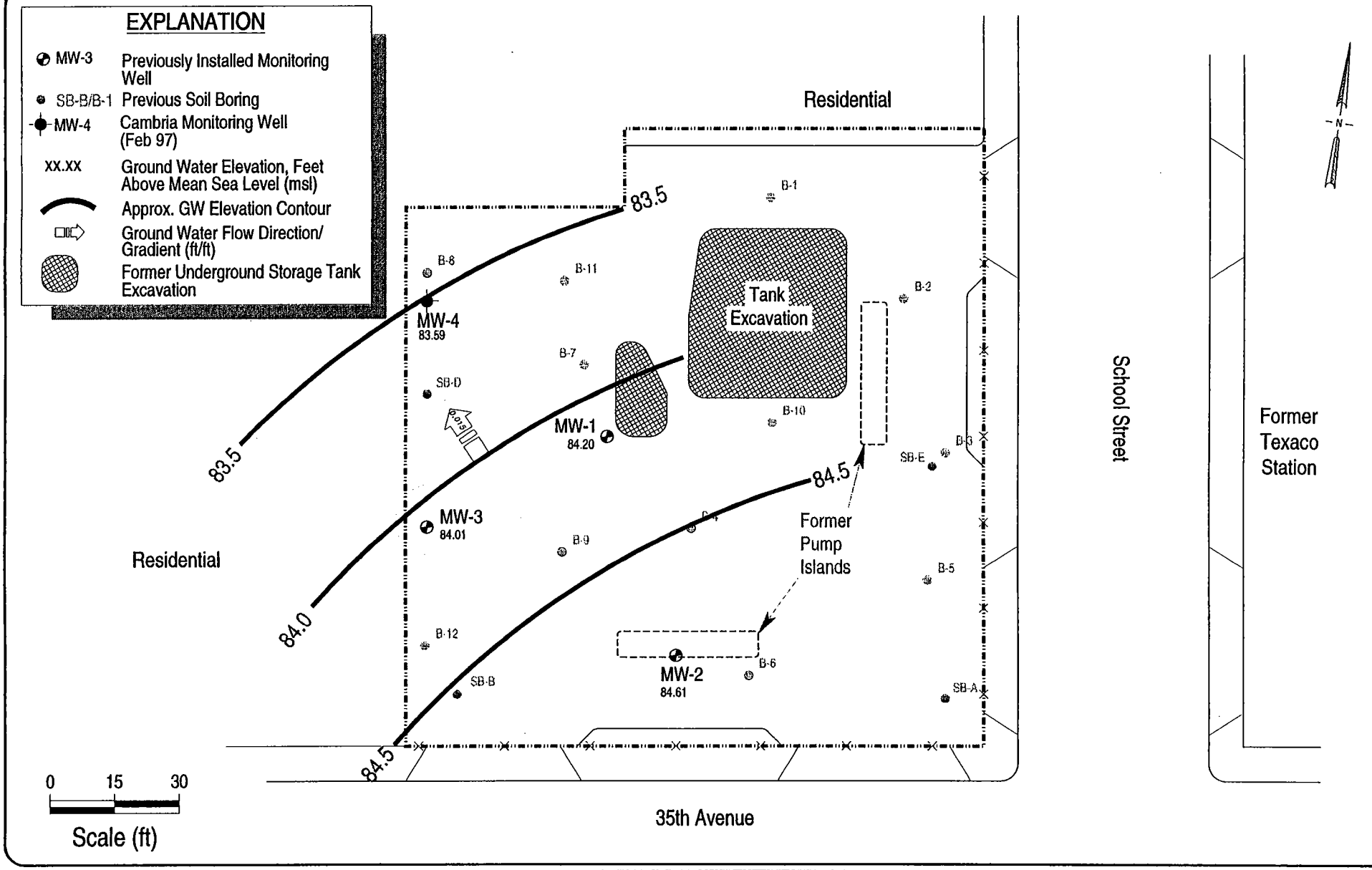
F:\PROJECT\SB-2004\OAK-002\FIGURES\SITE-MAP.DWG

Site Map

FIGURE
1



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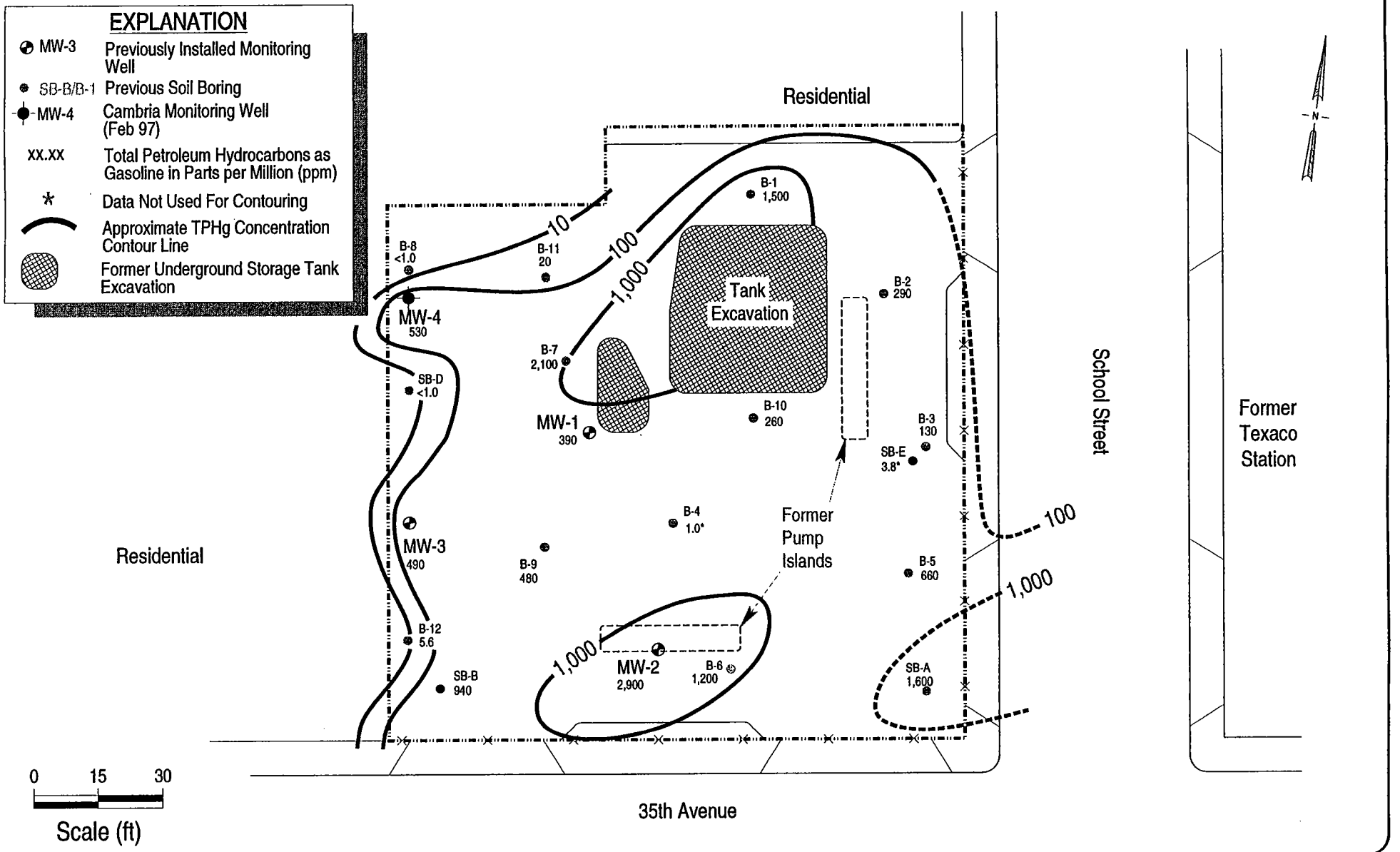
Ground Water Elevation Contours
March 20, 1997

FIGURE
2

05/08/97



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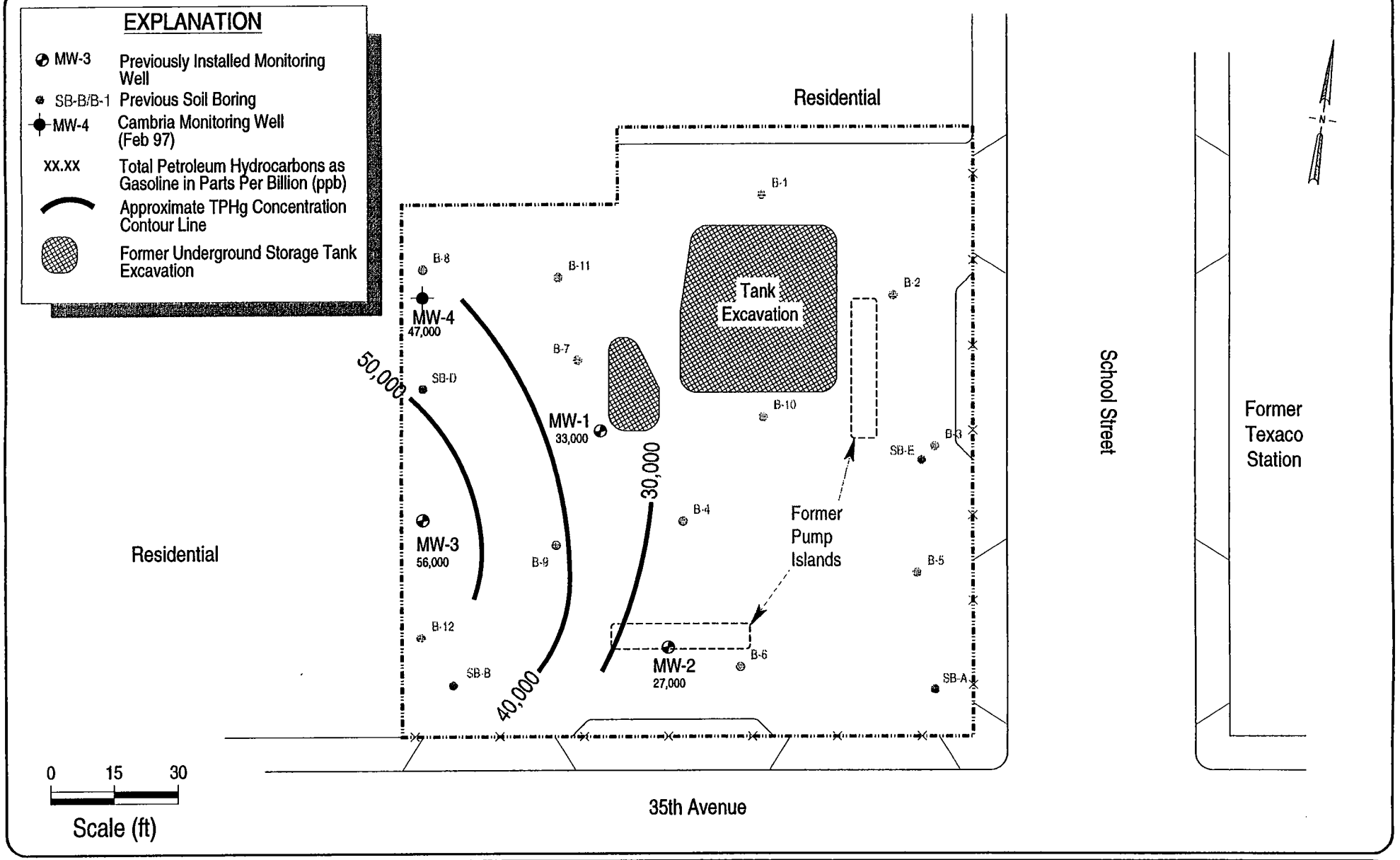
MaximumTPHg Concentrations (ppm) in Soil at 15 ft Depth
March 20, 1997

FIGURE
3

05/08/97



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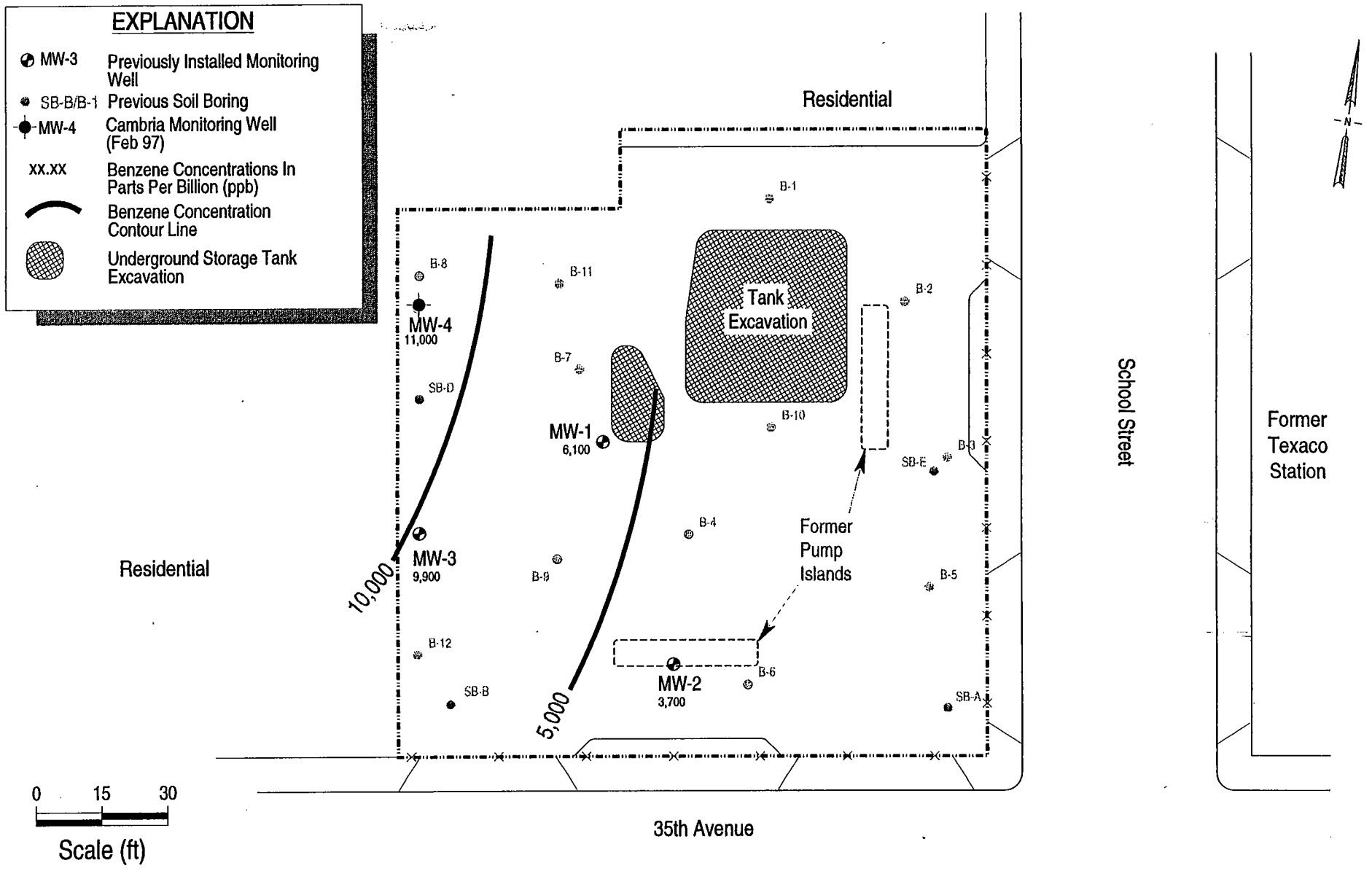
TPHg Concentrations In Ground Water (ppb)
March 20, 1997

FIGURE
4

05/08/97



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Benzene Concentrations In Ground Water (ppb)
March 20, 1997

FIGURE
5

05/08/97

Table 1. Soil Analytic Data - Former Exxon Service Station - 3055 35th Avenue, Oakland, California

Sample ID	Depth (ft)	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Notes
					(Concentrations in ppm)					
MW-4-10	10	2/26/97	64	62	0.24	1.1	0.7	2.6	<0.2	a, b
MW-4-15	15	2/26/97	530	150	5.1	18	8.4	39	5.4	a, b

Abbreviations:

ft = feet

TPHg = Total petroleum hydrocarbons as gasoline by modified EPA Method 8015

TPHd = Total petroleum hydrocarbons as diesel by modified EPA Method 8015

Benzene , ethylbenzene, toluene, and xylenes by EPA Method 8020

MTBE = Methyl Tertiary-Butyl Ether by EPA Method 8020

ppm = parts per million equivalent to milligrams per kilogram

Notes:

(a) Unmodified or weakly modified gasoline is significant (TPHg)

(b) Gasoline range compounds are significant (TPHd)

Table 2. Ground Water Elevation and Analytic Data - Former Exxon Service Station, 3055 35th Avenue, Oakland, California

Well ID	Date	GW	LPH	GW	TPHg	TPHd	TPHmo	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	DO
(quarters sampled)		Depth (ft)	(ft)	Elev. (ft)	(concentrations in parts per billion)								(mg/l)
MW-1	5/25/94	16.79	Sheen	84.06	120,000	25,000	<50,000	22,000	17,000	2,800	16,000	---	---
(all)	7/19/94	20.77	---	80.08	---	---	---	---	---	---	---	---	---
TOC = 100.85	8/18/94	21.04	Sheen	79.81	925,000	---	---	16,500	6,200	1,000	9,400	---	---
	11/11/94	15.80	---	85.05	57,000	---	---	14,000	4,400	1,400	6,400	---	---
	2/27/95	15.53	---	85.32	45,000	---	---	2,900	2,500	760	4,100	---	---
	5/23/95	15.29	---	85.56	22,000	---	---	9,900	990	790	2,000	---	---
	8/22/95	20.90	---	79.95	23,000	---	---	6,900	340	1,200	1,900	---	---
	11/29/95	22.19	---	78.66	37,000	---	---	9,900	530	1,600	2,900	---	---
	2/21/96	11.69	---	89.16	33,000	4,300	---	10,000	480	1,000	1,800	3,300	---
	5/21/96	14.62	---	86.23	36,000	8,500	---	8,500	1,400	1,300	2,800	1,900	---
	8/22/96	22.30	---	78.55	41,000	6,200	---	8,600	1,300	1,500	2,900	<200	8.0
	11/27/96	17.24	Sheen	83.61	38,000	6,100	---	9,600	950	1,600	3,100	<400	5.6
	3/20/97	**16.65**	**---**	**84.20**	**33,000**	**10,000**	**---**	**6,100**	**560**	**970**	**2,200**	**<400**	**8.5**
MW-2	5/25/94	15.65	---	84.35	61,000	6,900	<5,000	9,900	7,400	960	4,600	---	---
(all)	7/19/94	19.81	---	80.19	---	---	---	---	---	---	---	---	---
TOC = 100.00	8/18/94	20.37	---	79.63	88,000	---	---	10,750	10,500	1,850	9,600	---	---
	11/11/94	15.52	---	84.48	54,000	---	---	5,900	6,700	1,300	7,500	---	---
	2/27/95	14.46	Sheen	85.54	44,000	---	---	5,100	5,300	930	6,400	---	---
	5/23/95	14.17	---	85.83	33,000	---	---	8,200	5,600	900	6,600	---	---
	8/22/95	19.80	---	80.20	38,000	---	---	6,400	5,000	1,100	5,600	---	---
	11/29/95	21.05	---	78.95	46,000	---	---	7,100	5,300	1,300	6,000	---	---
	2/21/96	10.53	---	89.47	59,000	---	---	8,000	6,000	1,800	8,900	4,500	---
	5/21/96	13.47	---	86.53	51,000	3,400	---	8,200	5,200	1,300	6,600	2,400	---
	8/22/96	19.12	---	80.88	37,000	5,700	---	5,100	3,500	960	4,500	<200	3.0
	11/27/96	16.61	Sheen	83.39	54,000	10,000	---	9,800	7,000	1,800	7,900	<2,000	3.1
	3/20/97	**15.39**	**---**	**84.61**	**27,000**	**6,100**	**---**	**3,700**	**2,300**	**580**	**2,800**	**<400**	**8.1**

Table 2. Ground Water Elevation and Analytic Data - Former Exxon Service Station, 3055 35th Avenue, Oakland, California

Well ID	Date	GW	LPH	GW	TPHg	TPHd	TPHmo	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	DO
(quarters sampled)		Depth (ft)	(ft)	Elev. (ft)	(concentrations in parts per billion)								(mg/l)
MW-3	5/25/94	13.93	Sheen	82.94	56,000	14,000	<50,000	14,000	14,000	1,300	11,000	---	---
(all)	7/19/94	17.04	---	79.83	---	---	---	---	---	---	---	---	---
TOC = 96.87	8/18/94	17.75	---	79.12	116,000	---	---	28,300	26,000	2,400	15,000	---	---
	11/11/94	17.80	---	79.07	89,000	---	---	1,600	1,900	1,900	14,000	---	---
	2/27/95	11.86	Sheen	85.01	250,000	---	---	22,000	26,000	7,800	21,000	---	---
	5/23/95	11.60	Sheen	85.27	310,000	---	---	18,000	17,000	4,500	2,800	---	---
	8/22/95	17.10	---	79.77	74,000	---	---	14,000	13,000	1,900	11,000	---	---
	11/29/95	16.34	---	80.53	220,000	---	---	25,000	25,000	3,500	19,000	---	---
	2/21/96	7.92	---	88.95	60,000	---	---	10,000	7,800	1,500	8,800	3,400	---
	5/21/96	10.86	Sheen	86.01	69,000	13,000	---	17,000	9,400	1,700	9,400	2,600	---
	8/22/96	16.50	---	80.37	94,000	16,000	---	17,000	15,000	2,100	12,000	330	2.0
	11/27/96	13.47	Sheen	83.40	82,000	24,000	---	14,000	13,000	2,400	13,000	<1,000	2.4
	3/20/97	**12.86**	**---**	**84.01**	**56,000**	**11,000**	**---**	**9,900**	**6,900**	**1,300**	**8,000**	**3,500**	**9.0**
MW-4	**3/20/97**	**13.75**	**---**	**83.59**	**47,000**	**3,100**	**---**	**11,000**	**4,500**	**1,100**	**5,200**	**3,400**	**8.4**
TOC = 97.34													

Abbreviations:

TOC = Top of casing elevation with respect to an onsite benchmark
GW = Ground water
LPH = Liquid-phase hydrocarbons
TPHg = Total petroleum hydrocarbons as gasoline by modified EPA Method 8015
TPHd = Total petroleum hydrocarbons as diesel by modified EPA Method 8015
TPHmo = Total petroleum hydrocarbons as motor oil by modified EPA Method 8015
Benzene, Ethylbenzene, Toluene, and Xylenes by EPA Method 8020
MTBE = Methyl Tertiary-Butyl Ether by EPA Method 8020
DO = Dissolved oxygen
parts per billion equivalent to micrograms per liter
mg/l = milligrams per liter equivalent to parts per million

Notes:

TOC Elevation of MW-4 surveyed relative to an arbitrary site datum by David Hop Licensed Surveyor on April 19, 1997

Attachment A

Well Installation Permit

ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588 VOICE (510) 484-2600
FAX (510) 462-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 3055 35th Avenue
Oakland, CA

FOR OFFICE USE

PERMIT NUMBER 96840
LOCATION NUMBER

CLIENT
Name Golden Empire Properties - Lynn Worthington
Address 5547 Mt. Arthur Blvd Voice (510) 567-8600
City Oakland, CA Zip 94605

APPLICANT
Name Cambria Environmental
Chuck Headlee Fax (510) 420-9170
Address 1144 65th St., Suite B Voice (510) 420-0700
City Oakland Zip 94608

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	___
Monitoring	✓	Well Destruction	___

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger ✓
Cable ___ Other ___

DRILLER'S LICENSE NO. C57 484288

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 2" in. Depth 30 ft.
Surface Seal Depth 5 ft. Number 1 MW-4

GEOTECHNICAL PROJECTS
Number of Borings ___ Maximum
Hole Diameter ___ in. Depth ___ ft.

ESTIMATED STARTING DATE Dec 6, 1996
ESTIMATED COMPLETION DATE Dec 6, 1996

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Chuck Headlee Date November 25, 1996

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well Projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 2 Dec 96
Wyman Hong

91992

Attachment B

Boring Log/Well Construction Diagram

DRILLING LOG

Client: **Lynn Worthington**

Project No: **13-105** Phase Task**150**

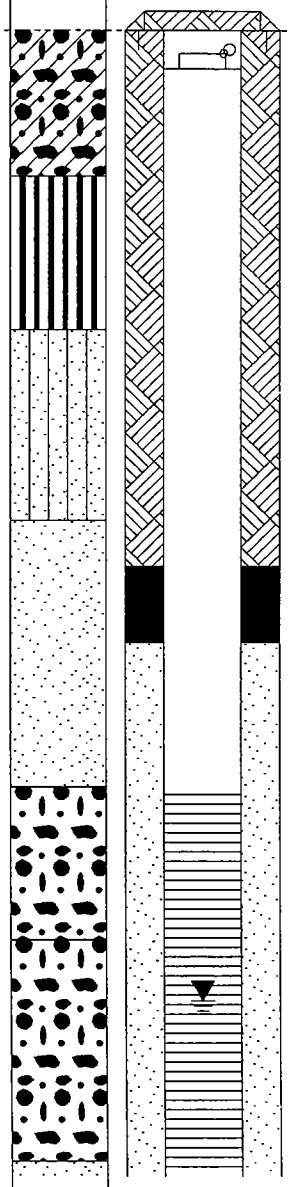
Well ID **MW-4** Boring ID **MW-4**

Location **3055 35th Ave, Oakland**

Surface Elev. **NA ft,**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description
0	Ground Surface			
				Clayey Silty GRAVEL; (GC); light brown; damp; 20% clay, 30% silt, 50% 0.25"- to 0.5"-diameter gravel; low to medium plasticity; low to moderate estimated permeability.
				Clayey SILT; (MH); light to dark brown; damp; 40% clay, 60% silt; medium to high plasticity; low to moderate estimated permeability.
5				**Silty SAND**; (SM); light brown with black mottling; 5% clay, 40% silt, 50% fine to medium sand, 5% gravel.
				Gravelly Silty SAND; (SP); brown; damp; 30% silt, 50% sand, 20% 0.5"-diameter gravel; no plasticity; medium to high estimated permeability.
				20% silt, 50% sand, 30% 0.25"- to 0.5"-diameter gravel, increasing gravel content
10				**Sandy GRAVEL**; (GP); light brown; damp; 5% clay, 10% silt, 30% sand, 55% 1"-diameter gravel; no plasticity; moderate to high estimated permeability.
				Silty Sandy GRAVEL; (GP); brown-green; damp; 5% clay, 15% silt, 15% sand, 65% gravel, increasing clay content; low plasticity; moderate estimated permeability.
				10% clay, 20% silt, 30% sand, 40% gravel; low to medium plasticity
15				Continued Next Page

TPHg (ppm): 64.0



Well Construction Details: T.O.C. Elev.

Static water level @ 12.7 ft.

Driller **Gregg Drilling**	Development Yield **NA**	Bentonite Seal **7' to 8'**
Logged By **SR**	Well Casing **2"** Dia. **0** to **10'**	Sand Pack **8' to 30'**
Drilling Started **2/26/97**	Casing Type **Schedule 40 PVC**	Sand Pack Type **#2/16 Sand**
Drilling Completed **2/26/97**	Well Screen **2"** Dia.**10'** to **30'**	Static Water Level **12.70** ft Depth
Construction Completed **2/26/97**	Screen Type **Schedule 40 PVC**	Date **2/26/97**
Development Completed **3/20/97**	Slot Size **0.010"**	Notes: **In north-west corner of site.**
Water Bearing Zones **NA**	Drilling Mud **NA**	
	Grout Type **Portland Type I/II**	

Cambria Environmental Technology, Inc.

DRILLING LOG

Client: **Lynn Worthington**

Project No: **13-105** Phase Task**150**

Well ID **MW-4** Boring ID **MW-4**

Location **3055 35th Ave, Oakland**

Surface Elev. **NA ft,**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description	TPHg (ppm)	Graphic Log	Well Construction Graphics	Depth (feet)	Well Construction Details
				Continued from previous page					
15								15	
		X		**Silty SAND**; (SP); brown-green; damp; 5% clay, 30% silt, 60% sand, 5% gravel; low plasticity; moderate estimated permeability.	530.0				
				Silty Sandy GRAVEL; (GP); brown-green; damp; 5% clay, 20% silt, 35% sand, 40% 1"-round gravel, increasing gravel content; low plasticity; moderate to high estimated permeability.					
				Silty Gravelly SAND; (SP); brown-green; moist; 10% clay, 20% silt, 40% sand, 30% gravel; low plasticity; moderate to high estimated permeability.					
20				**Clayey Silty Gravelly SAND**; (SP); moist; 15% clay, 15% silt, 50% sand, 20% medium gravel; low to medium plasticity; moderate estimated permeability.				20	
		X							
				Sandy Clayey SILT; (MH); wet; 25% clay, 50% silt, 25% sand; medium to high plasticity; low to moderate estimated permeabilty.					Water first encountered @ 23 ft.
25				25% clay, 60% silt, 15% fine to medium sand				25	
30								30	Bottom of boring @ 30 ft.
35								35	

WELL 20105 5/27/97

Cambria Environmental Technology, Inc.

ORIGINAL
File with DWR

Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 447533

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

Owner's Well No. MW-4
Date Work Began 02/26/97, Ended 2/26/97
Local Permit Agency Alameda County Flood Control and Water Cons. District
Permit No. 96540 Permit Date 12/2/96

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DEPTH TO FIRST WATER ___ (Ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
		See attached Well Log

TOTAL DEPTH OF BORING 30 (Feet)
TOTAL DEPTH OF COMPLETED WELL 30 (Feet)

WELL OWNER

Name LYNN WORTHINGTON
Mailing Address GOLDEN EMPIRE PROPERTIES
5942 MACARTHUR, STE B, OAKLAND, CA 94605
CITY STATE ZIP

WELL LOCATION

Address 3055 35th AVENUE
City OAKLAND, CA
County ALAMEDA
APN Book ___ Page ___ Parcel ___
or Township ___ Range ___ Section ___
or Latitude ___ DEG. MIN. SEC. NORTH Longitude ___ DEG. MIN. SEC. WEST

LOCATION SKETCH

NORTH
WEST
EAST
SOUTH

See Attached Site Location Map

Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc.
PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

✓ NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

PLANNED USE(S) (✓)

✓ MONITORING
WATER SUPPLY
___ Domestic
___ Public
___ Irrigation
___ Industrial
___ "TEST WELL"
___ CATHODIC PROTECTION
___ OTHER (Specify)

DRILLING METHOD HOLLOW STEM AUGER FLUID ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL 12.7 (Ft.) & DATE MEASURED 2/28/97
ESTIMATED YIELD* ___ (GPM) & TEST TYPE ___
TEST LENGTH ___ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
* *May not be representative of a well's long-term yield.*

CASING(S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL/GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	10	8	✓				SCH 40 PVC	2		
10	30			✓			SCH 40 PVC	2		0.010"

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	7	✓			
7	8		✓		
8	30				#2 SAND

ATTACHMENTS (✓)

✓ Geologic Log
✓ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME SAM RANGARAJAN CAMBRIA ENV. TECH. INC
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

1144 65th ST, STE C, OAKLAND CA 94608
ADDRESS CITY STATE ZIP

Signed S. Rangarajan
WELL DRILLER/AUTHORIZED REPRESENTATIVE

5/22/97
DATE SIGNED

C-57 LICENSE NUMBER

DWR 188 REV. 7-90

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Attachment C

Soil and Ground Water Analytic Data

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

03/07/97

Dear Sam:

Enclosed are:

1). the results of **2** samples from your # **13-105; Lynn Worthington** project,

2). a QC report for the above samples

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

4). a bill for analytical services.

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

Yours truly,

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

Cambria Environmental Technology	Client Project ID: # 13-105; Lynn Worthington	Date Sampled: 02/26/97
1144 65th Street, Suite C		Date Received: 02/28/97
Oakland, CA 94608	Client Contact: Sam Rangarajan	Date Extracted: 02/28-03/03/97
	Client P.O:	Date Analyzed: 02/28-03/03/97

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

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

Lab ID	Client ID	Matrix	TPH(g)+	MTBE	Benzene	Toluene	Ethylben-zene	Xylenes	% Rec. Surrogate
73967	MW-4-10	S	64,a	ND< 0.2	0.24	1.1	0.70	2.6	98
73969	MW-4-15	S	530,a	5.4	5.1	18	8.4	39	97
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	5.0	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

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

cluttered chromatogram; sample peak coelutes with surrogate peak

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

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

Cambria Environmental Technology 1144 65th Street, Suite C Oakland, CA 94608	Client Project ID: # 13-105; Lynn Worthington	Date Sampled: 02/26/97
		Date Received: 02/28/97
	Client Contact: Sam Rangarajan	Date Extracted: 02/28/97
	Client P.O:	Date Analyzed: 02/28/97

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

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

Lab ID	Client ID	Matrix	TPH(d)+	% Recovery Surrogate
73967	MW-4-10	S	62,d	108
73969	MW-4-15	S	150,d	106
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	
		S	1.0 mg/kg	

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

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

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

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

Cambria Environmental Technology 1144 65th Street, Suite C Oakland, CA 94608	Client Project ID: # 13-105; Lynn Worthington	Date Sampled: 02/26/97
		Date Received: 02/28/97
	Client Contact: Sam Rangarajan	Date Extracted: 03/04/97
	Client P.O:	Date Analyzed: 03/04/97

			pH
Analytical methods			EPA 150.1, 9040, 9045
Lab ID	Client ID	Matrix	pH
73966	MW-4-5A	S	7.51
73968	MW-4-10A	S	8.32
73970	MW-4-15A	S	7.81
Reporting Limit or Method Accuracy unless otherwise stated; ND		W	± 0.05
means not detected above the reporting limit; N/A means not applicable		S	± 0.1
Reporting Units		W,S	- $\log(a_H^+)$ at 25°C

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 02/28/97 Matrix: Soil

Analyte	Concentration (mg/kg) Sample (#68840)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.000	1.977	1.974	2.03	97	97	0.2
Benzene	0.000	0.198	0.204	0.2	99	102	3.0
Toluene	0.000	0.204	0.210	0.2	102	105	2.9
Ethylbenzene	0.000	0.196	0.204	0.2	98	102	4.0
Xylenes	0.000	0.584	0.604	0.6	97	101	3.4
TPH (diesel)	0	317	315	300	106	105	0.7
TRPH (oil and grease)	0.0	18.9	17.6	20.8	91	85	7.1

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

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

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 03/03/97 Matrix: Soil

Analyte	Concentration (mg/kg) Sample (#68848)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.000	1.818	1.831	2.03	90	90	0.7
Benzene	0.000	0.194	0.192	0.2	97	96	1.0
Toluene	0.000	0.188	0.196	0.2	94	98	4.2
Ethylbenzene	0.000	0.194	0.194	0.2	97	97	0.0
Xylenes	0.000	0.574	0.574	0.6	96	96	0.0
TPH (diesel)	0	325	318	300	108	106	2.0
TRPH (oil and grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

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

MOISTURE AND DENSITY DETERMINATIONS

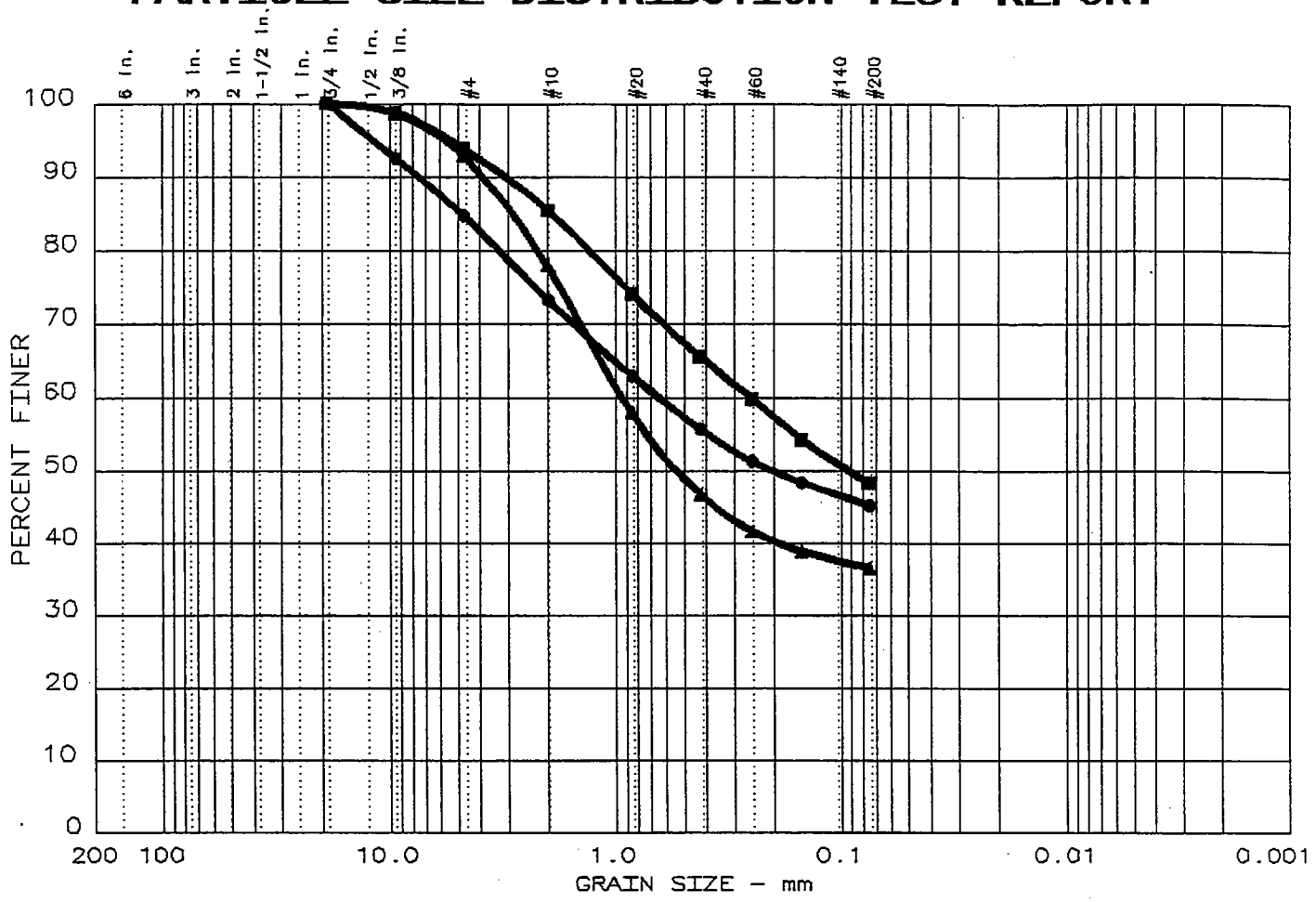
CLIENT McCampbell Analytical
LOCATION Oakland
JOB NO. 13-105
Lynn Worthington

*	Porosity, n.	39.7 %	45.6 %	44.2 %	
*	Air Voids, Va	1.6 %	21.2 %	5.0 %	
	Organic Cont. ASTM D2974(C)	3.5 %	4.1 %	3.5 %	
SAMPLE & SOIL TYPE	BORING	MW-4-5A	MW-4-10A	MW-4-15A	
	SAMPLE NO.	73966	73968	73970	
	SAMPLE DEPTH				
	DATE SAMPLED BY	2-26-97	2-26-97	2-26-97	
	DATE TESTED BY 3-4-97 MA.	Soft, moderate	Dense, olive	Soft, brown	
	SOIL TYPE	brown clayey coarse SAND	grey clayey coarse SAND	clayey coarse SAND	
	LABORATORY IDENTIFICATION USCS	SC	SC	SC	
(Bulk) DENSITY	NO. OF RINGS	3.7	4.3	4.0	
	WT. OF WET SOIL & RINGS	509.2	513.5	518.0	
	WT. OF RINGS	150.9	161.4	162.0	
	WT. OF WET SOIL	358.3	352.1	356.0	
	WET DENSITY (LBS./CU.FT.)	126.0	106.6	115.8	
	DRY DENSITY (LBS./CU.FT.)	101.6	91.4	89.9	
MOISTURE CONTENT	DISH NO.	39	22	1	
	WT. OF WET SOIL & DISH	121.7	87.7	118.4	
	WT. OF DRY SOIL & DISH	104.3	79.9	99.2	
	NET LOSS OF MOISTURE	17.4	7.8	19.2	
	WT. OF DISH	31.7	32.8	32.8	
	WT. OF DRY SOIL	72.6	47.1	66.4	
	MOISTURE CONTENT (% DRY WT.)	24.0	16.6	28.9	

→ Strong gaseous odour.

* Calculated values on assumed specific gravity of 2.70

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	0.0	15.3	39.5	45.2		SC		
▲	0.0	7.2	56.3	36.5		SC		
■	0.0	6.2	45.5	48.3		SC		

SIEVE inches size	PERCENT FINER ●	▲	■
0.75	100.0	100.0	100.0
0.375	92.5	98.6	98.7
GRAIN SIZE			
D_{60}	0.65	0.93	0.25
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ●	▲	■
4	84.7	92.8	93.8
10	73.2	77.9	85.4
20	62.9	58.0	74.1
40	55.7	46.7	65.5
60	51.2	41.6	59.8
100	48.4	38.8	54.3
200	45.2	36.5	48.3

Sample information:

● MW-4-5A 73966
Moderate brown clayey COARSE SAND.

▲ MW-4-10A 73968
Olive grey clayey COARSE SAND.

■ MW-4-15A 73970
Brown clayey COARSE SAND.

Remarks:

Soil Mechanics Lab

Project No.: 13-105
Project: Lynn Worthington

Date: 3-4-97 Data Sheet No. ——

GRAIN SIZE DISTRIBUTION TEST DATA Test No.: 4

Date: 3-4-97
Project No.: 13-105
Project: Lynn Worthington

Sample Data

Location of Sample: MW-4-5A 73966
Sample Description 1: Moderate brown clayey
Sample Description 2: COARSE SAND.
USCS Class: SC Liquid limit: Plasticity index:

Notes

Remarks:

Data Sheet No.:

Mechanical Analysis Data

Initial
Dry sample and tare= 195.00
Tare = 0.00
Dry sample weight = 195.00
Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer
0.75 inches	0.00	100.0
0.375 inches	14.70	92.5
# 4	29.80	84.7
# 10	52.20	73.2
# 20	72.30	62.9
# 40	86.40	55.7
# 60	95.10	51.2
# 100	100.70	48.4
# 200	106.80	45.2

Fractional Components

Gravel/Sand based on #4 sieve
Sand/Fines based on #200 sieve
% + 3 in. = 0.0 % GRAVEL = 15.3 % SAND = 39.5
% FINES = 45.2

D85= 4.84 D60= 0.646 D50= 0.204

GRAIN SIZE DISTRIBUTION TEST DATA Test No.: 5

Date: 3-4-97
Project No.: 13-105
Project: Lynn Worthington

Sample Data

Location of Sample: MW-4-10A 73968
Sample Description 1: Olive grey clayey
Sample Description 2: COARSE SAND.
USCS Class: SC Liquid limit: Plasticity index:

Notes

Remarks:

Data Sheet No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	255.40
Tare =	0.00
Dry sample weight =	255.40

Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer
0.75 inches	0.00	100.0
0.375 inches	3.50	98.6
# 4	18.40	92.8
# 10	56.50	77.9
# 20	107.20	58.0
# 40	136.10	46.7
# 60	149.20	41.6
# 100	156.20	38.8
# 200	162.10	36.5

Fractional Components

Gravel/Sand based on #4 sieve
Sand/Fines based on #200 sieve
% + 3 in. = 0.0 % GRAVEL = 7.2 % SAND = 56.3
% FINES = 36.5

D85= 2.85 D60= 0.932 D50= 0.536

GRAIN SIZE DISTRIBUTION TEST DATA Test No.: 1

Date: 3-5-97
Project No.: 13-105
Project: Lynn Worthington

Sample Data

Location of Sample: MW-4-15A 73970
Sample Description 1: Brown clayey COARSE
Sample Description 2: SAND.
USCS Class: SC Liquid limit: Plasticity index:

Notes

Remarks:

Data Sheet No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	280.80
Tare =	0.00
Dry sample weight =	280.80

Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer
0.75 inches	0.00	100.0
0.375 inches	3.60	98.7
# 4	17.30	93.8
# 10	41.00	85.4
# 20	72.80	74.1
# 40	96.90	65.5
# 60	112.80	59.8
# 100	128.40	54.3
# 200	145.20	48.3

Fractional Components

Gravel/Sand based on #4 sieve
Sand/Fines based on #200 sieve
% + 3 in. = 0.0 % GRAVEL = 6.2 % SAND = 45.5
% FINES = 48.3

D85= 1.93 D60= 0.251 D50= 0.092

McCAMPBELL ANALYTICAL

110 2nd AVENUE, # D7
PACHECO, CA 94553

(510) 798-1620 FAX (510) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME: ☐ RUSH ☐ 24 HOUR ☐ 48 HOUR ☒ 5 DAY ☐ ROUTI[NE]

REPORT TO: Ed HAmilton BILL TO: McCampbell
PROJECT NUMBER: 13-105 PROJECT NAME: Lynn Worthington
PROJECT LOCATION: OAKland

ANALYSIS REQUEST: EPA 601/8010; EPA 602/8020; EPA 608/8080; EPA 608/8080 – PCBs Only; EPA 624/8240/8260; EPA 625/8270; CAM – 17 Metals; EPA – Priority Pollutant Metals; LUFT Metals; LEAD (7240/7421/239.2/6010); ORGANIC LEAD; RCI

OTHER: Porosity; Bulk Density; Moisture Content; Fraction Organic Carbon; Permeability* And; Air Filled Voids

351

SAMPLE ID	LOCATION	DATE	TIME	# CONTAINERS	TYPE CONTAINERS	MATRIX	METHOD PRESERVED	Porosity	Bulk Density	Moisture Content	Fraction Organic Carbon	Permeability*	Air Filled Voids	COMMENTS
MW-4-5A		2/26/97		1	BT	SOIL (X)	ICE (X)	X	X	X	X	*	X	73966
MW-4-10A		"		1	BT	SOIL (X)	ICE (X)	X	X	X	X	X	X	73968
MW-4-15A		"		1	BT	SOIL (X)	ICE (X)	X	X	X	X	X	X	73970

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:
[signature]	3/4/97		[signature]
[signature]	3/10/97	1110	[signature]
			RECEIVED BY LABORATORY:

REMARKS: * Grainsize analysis was performed and permeability cancelled as per your request.

8166 AC168

McCAMPBELL ANALYTICAL

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

CHAIN OF CUSTODY RECORD

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

REPORT TO: SAM RANGA-RAJAN BILL TO: CAMBRIA

COMPANY: CAMBRIA ENVIRONMENTAL TECHNOLOGY, INC.
1144 65th st., ste C
Oakland, CA 94608

TELE: (510) 420-9184 FAX #: (510) 420-9170

PROJECT NUMBER: 13-108 PROJECT NAME: LYNN WORTHINGTON

PROJECT LOCATION: 3055 35th St. Oakland, CA SAMPLER SIGNATURE: S. Rangarajan

	SAMPLE ID	LOCATION	SAMPLING DATE	SAMPLING TIME	# CONTAINERS	TYPE CONTAINERS	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	METHOD PRESERVED: HCl	HNO3	OTHER	BTEX & TPH as Gasoline	TPH as Diesel	Total Petroleum Oil & Grease	Total Petroleum Hydrocarbons	EPA 601/8010	EPA 602/8020	EPA 608/8080	EPA 608/8080 - PCBs Only	EPA 624/8240/8260	EPA 625/8270	CAM - 17 Metals	EPA - Priority Pollutant Metals	LEAD	ORGANIC LEAD	RCI	OTHER	
	MW-4-5		2/26/97		1	Brass		X						Ice																[redacted]	Hold
SOIL PARAMETERS	MW-4-5A		"		1	"		X						"																	Hold
	MW-4-10		"		1	"		X						"	X	X															
SOIL PARAMETERS	MW-4-10A		"		1	"		X						"																	Hold
	MW-4-15		"		1	"		X						"	X	X															
SOIL PARAMETERS	MW-4-15A		"		1	"		X						"																	Hold
	MW-4-20		"		1	"		X						"																	Hold
	MW-4-20A		"		1	"		X						"																	"
	MW-4-25		"		1	"		X						"																	"
	MW-4-25A		"		1	"		X						"																	"
	MW-4-30		"		1	"		X						"																	"
	MW-4		"		4	Glass	X					X																			"

[redacted]

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:
S. Rangarajan	2/28/97	10:10	J. Delaman 673
J. Delaman	2/28	11:05	Heidi Price
RELINQUISHED BY:	DATE	TIME	RECEIVED BY LABORATORY:

REMARKS:

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

	VOAS	O&G	METALS	OTHER
PRESERVATIVE	✓			

APPROPRIATE CONTAINERS ✓

[redacted]

P.02

LEGEND

Analytical Services

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Adam Sevi
Cambria Env. Technology
1144 65th Street
Suite C
Oakland, CA 94608

Date: 04/04/1997
LEGEND Client Acct. No: 98900
LEGEND Job No: 97.00596
Received: 03/22/1997

Client Reference Information

13-105-106/Worthington

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety. Please refer to the enclosed "Key to Result Flags" for definition of terms. Should you have questions regarding procedures or results, please feel free to call me at (707) 541-2313.

Submitted by:

Jennifer L. Roseberry
Quality Assurance Officer

Enclosure(s)

Client Name: Cambria Env. Technology
Client Acct: 98900
LEGEND Job No: 97.00596

Date: 04/04/1997
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Ref: 13-105-106/Worthington

SAMPLE DESCRIPTION: MW-1
Date Taken: 03/20/1997
Time Taken:
LEGEND Sample No: 273847

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Liquid)								
5030/M8015	--						03/25/1997	3816
DILUTION FACTOR*	200						03/25/1997	3816
as Gasoline	33		10	mg/L	5030		03/25/1997	3816
8020 (GC,Liquid)	--						03/25/1997	3816
Benzene	6,100		100	ug/L	8020		03/25/1997	3816
Toluene	560		100	ug/L	8020		03/25/1997	3816
Ethylbenzene	970		100	ug/L	8020		03/25/1997	3816
Xylenes (Total)	2,200		100	ug/L	8020		03/25/1997	3816
MTBE	ND		400	ug/L	8020		03/25/1997	3816
SURROGATE RESULTS	--						03/25/1997	3816
Bromofluorobenzene (SURR)	99			% Rec.	5030		03/25/1997	3816
M8015 (EXT., Liquid)						03/26/1997		
DILUTION FACTOR*	20						04/01/1997	1313
as Diesel	10		1	mg/L	3510		04/01/1997	1313
SURROGATE RESULTS	--						04/01/1997	1313
Ortho-terphenyl (SURR)	132			% Rec.	3510		04/01/1997	1313

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SAMPLE DESCRIPTION: MW-2
Date Taken: 03/20/1997
Time Taken:
LEGEND Sample No: 273848

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Liquid)								
5030/M8015	--						03/25/1997	3816
DILUTION FACTOR*	200						03/25/1997	3816
as Gasoline	27		10	mg/L	5030		03/25/1997	3816
8020 (GC,Liquid)	--						03/25/1997	3816
Benzene	3,700		100	ug/L	8020		03/25/1997	3816
Toluene	2,300		100	ug/L	8020		03/25/1997	3816
Ethylbenzene	580		100	ug/L	8020		03/25/1997	3816
Xylenes (Total)	2,800		100	ug/L	8020		03/25/1997	3816
MTBE	ND		400	ug/L	8020		03/25/1997	3816
SURROGATE RESULTS	--						03/25/1997	3816
Bromofluorobenzene (SURR)	97			% Rec.	5030		03/25/1997	3816
M8015 (EXT., Liquid)						03/26/1997		
DILUTION FACTOR*	10						04/01/1997	1313
as Diesel	6.1	DL	0.50	mg/L	3510		04/01/1997	1313
SURROGATE RESULTS	--						04/01/1997	1313
Ortho-terphenyl (SURR)	105			% Rec.	3510		04/01/1997	1313

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SAMPLE DESCRIPTION: MW-3
Date Taken: 03/20/1997
Time Taken:
LEGEND Sample No: 273849

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Liquid)								
5030/M8015	--						03/24/1997	3817
DILUTION FACTOR*	1.000						03/24/1997	3817
as Gasoline	56		50	mg/L	5030		03/24/1997	3817
8020 (GC,Liquid)	--						03/24/1997	3817
Benzene	9,900		500	ug/L	8020		03/24/1997	3817
Toluene	6,900		500	ug/L	8020		03/24/1997	3817
Ethylbenzene	1,300		500	ug/L	8020		03/24/1997	3817
Xylenes (Total)	8,000		500	ug/L	8020		03/24/1997	3817
MTBE	3,500		2000	ug/L	8020		03/24/1997	3817
SURROGATE RESULTS	--						03/24/1997	3817
Bromofluorobenzene (SURR)	102			% Rec.	5030		03/24/1997	3817
M8015 (EXT., Liquid)						03/26/1997		
DILUTION FACTOR*	10						04/01/1997	1313
as Diesel	11	DL	0.50	mg/L	3510		04/01/1997	1313
SURROGATE RESULTS	--						04/01/1997	1313
Ortho-terphenyl (SURR)	110			% Rec.	3510		04/01/1997	1313

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Client Acct: 98900
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SAMPLE DESCRIPTION: MW-4
Date Taken: 03/20/1997
Time Taken:
LEGEND Sample No: 273850

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Liquid)								
5030/M8015	--						03/24/1997	3817
DILUTION FACTOR*	100						03/24/1997	3817
as Gasoline	47		5.0	mg/L	5030		03/24/1997	3817
8020 (GC,Liquid)	--						03/24/1997	3817
Benzene	11,000	FI	500	ug/L	8020		03/25/1997	3818
Toluene	4,500	FI	500	ug/L	8020		03/25/1997	3818
Ethylbenzene	1,100		50	ug/L	8020		03/24/1997	3817
Xylenes (Total)	5,200		50	ug/L	8020		03/24/1997	3817
MTBE	3,400		2000	ug/L	8020		03/24/1997	3817
SURROGATE RESULTS	--						03/24/1997	3817
Bromofluorobenzene (SURR)	98			% Rec.	5030		03/24/1997	3817
M8015 (EXT., Liquid)						03/26/1997		
DILUTION FACTOR*	2						04/01/1997	1313
as Diesel	3.1		0.1	mg/L	3510		04/01/1997	1313
SURROGATE RESULTS	--						04/01/1997	1313
Ortho-terphenyl (SURR)	106			% Rec.	3510		04/01/1997	1313

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CONTINUING CALIBRATION VERIFICATION STANDARD REPORT

Parameter	CCV Standard % Recovery	CCV Standard Amount Found	CCV Standard Amount Expected	Flags	Units	Date Analyzed	Analyst Initials	Run Batch Number
TPH (Gas/BTXE,Liquid) as Gasoline	105.2	0.526	0.50		mg/L	03/24/1997	aal	3816
Benzene	93.6	18.72	20.0		ug/L	03/24/1997	aal	3816
Toluene	88.3	17.66	20.0		ug/L	03/24/1997	aal	3816
Ethylbenzene	92.3	18.46	20.0		ug/L	03/24/1997	aal	3816
Xylenes (Total)	91.1	54.65	60.0		ug/L	03/24/1997	aal	3816
Bromofluorobenzene (SURR)	96.0	96	100		% Rec.	03/24/1997	aal	3816
TPH (Gas/BTXE,Liquid) as Gasoline	94.2	0.471	0.50		mg/L	03/24/1997	aal	3817
Benzene	93.5	18.69	20.0		ug/L	03/24/1997	aal	3817
Toluene	92.6	18.51	20.0		ug/L	03/24/1997	aal	3817
Ethylbenzene	93.6	18.71	20.0		ug/L	03/24/1997	aal	3817
Xylenes (Total)	92.1	55.24	60.0		ug/L	03/24/1997	aal	3817
Bromofluorobenzene (SURR)	96.0	96	100		% Rec.	03/24/1997	aal	3817
TPH (Gas/BTXE,Liquid) as Gasoline	102.4	0.512	0.50		mg/L	03/25/1997	aal	3818
Benzene	93.1	18.62	20.0		ug/L	03/25/1997	aal	3818
Toluene	88.2	17.64	20.0		ug/L	03/25/1997	aal	3818
Ethylbenzene	91.4	18.28	20.0		ug/L	03/25/1997	aal	3818
Xylenes (Total)	90.8	54.49	60.0		ug/L	03/25/1997	aal	3818
Bromofluorobenzene (SURR)	97.0	97	100		% Rec.	03/25/1997	aal	3818
M8015 (EXT., Liquid) as Diesel	92.2	922	1000		mg/L	03/27/1997	aal	1313
Ortho-terphenyl (SURR)	98.0	98	100		% Rec.	03/27/1997	aal	1313
M8015 (EXT., Liquid) as Diesel	99.1	991	1000		mg/L	03/28/1997	vah	1313
Ortho-terphenyl (SURR)	102.0	102	100		% Rec.	03/28/1997	vah	1313
M8015 (EXT., Liquid) as Diesel	99.3	993	1000		mg/L	03/28/1997	vah	1313
Ortho-terphenyl (SURR)	104.0	104	100		% Rec.	03/28/1997	vah	1313
M8015 (EXT., Liquid) as Diesel	92.8	928	1000		mg/L	04/01/1997	gec	1313
Ortho-terphenyl (SURR)	98.0	98	100		% Rec.	04/01/1997	gec	1313

Client Name: Cambria Env. Technology
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METHOD BLANK REPORT

Parameter	Method Blank Amount Found	Reporting Limit	Flags	Units	Date Analyzed	Analyst Initials	Run Batch Number
TPH (Gas/BTXE,Liquid)							
as Gasoline	ND	0.050		mg/L	03/24/1997	aal	3816
Benzene	ND	0.50		ug/L	03/24/1997	aal	3816
Toluene	ND	0.50		ug/L	03/24/1997	aal	3816
Ethylbenzene	ND	0.50		ug/L	03/24/1997	aal	3816
Xylenes (Total)	ND	0.50		ug/L	03/24/1997	aal	3816
MTBE	ND	2.0		ug/L	03/24/1997	aal	3816
Bromofluorobenzene (SURR)	101			% Rec.	03/24/1997	aal	3816
TPH (Gas/BTXE,Liquid)							
as Gasoline	ND	0.050		mg/L	03/24/1997	aal	3817
Benzene	ND	0.50		ug/L	03/24/1997	aal	3817
Toluene	ND	0.50		ug/L	03/24/1997	aal	3817
Ethylbenzene	ND	0.50		ug/L	03/24/1997	aal	3817
Xylenes (Total)	ND	0.50		ug/L	03/24/1997	aal	3817
MTBE	ND	2.0		ug/L	03/24/1997	aal	3817
Bromofluorobenzene (SURR)	102			% Rec.	03/24/1997	aal	3817
TPH (Gas/BTXE,Liquid)							
as Gasoline	ND	0.050		mg/L	03/25/1997	aal	3818
Benzene	ND	0.50		ug/L	03/25/1997	aal	3818
Toluene	ND	0.50		ug/L	03/25/1997	aal	3818
Ethylbenzene	ND	0.50		ug/L	03/25/1997	aal	3818
Xylenes (Total)	ND	0.50		ug/L	03/25/1997	aal	3818
MTBE	ND	2.0		ug/L	03/25/1997	aal	3818
Bromofluorobenzene (SURR)	100			% Rec.	03/25/1997	aal	3818
M8015 (EXT., Liquid)							
as Diesel	ND	0.050		mg/L	03/27/1997	aal	1313
Ortho-terphenyl (SURR)	96			% Rec.	03/27/1997	aal	1313

4097

CHAIN OF CUSTODY RECORD

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

COMPANY: CAMBRIA ENVIRONMENTAL
1144 65TH ST. SUITE B
OAKLAND, CA 94608

REPORT TO: ADAM SEVI
BILL TO: 13-105-106
PHONE NO.: 510-420-0700
FAX NO.: 510-420-9170
PROJECT NO.: 13-105-106
PROJECT NAME: WORTHINGTON
PROJECT LOCATION: 3055 35TH ST & OAKLAND, CA

SAMPLE ID	LOCATION	SAMPLING DATE	SAMPLING TIME	# CONTAINERS	TYPE CONTAINERS	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	METHOD PRESERVED: HCL	HNO_3	ICE	OTHER
MW-1		3/20		3	VOA	X					X			
MW-1		"		1	1L	X								
MW-2				3	VOA	X					X			
MW-2				1	1L	X								
MW-3				3	VOA	X					X			
MW-3				1	1L	X								
MW-4				3	VOA	X					X			
MW-4				1	1L	X								

ANALYSIS REQUEST

BTEX & TPH as Gasoline (602/8020 & 8015)	TPH as Diesel (8015)	Total Petroleum Oil & Grease (5520 E&F/5520 B&F)	Total Petroleum Hydrocarbons (418.1)	EPA 601/8010	BTEX & MTBE	EPA 608/8080	EPA 608/8080 – PCBs Only	EPA 624/8240/8260	EPA 625/8270	CAM – 17 Metals	EPA – Priority Pollutant Metals	LUFT Metals	LEAD (7240/7421/239.2/6010)	ORGANIC LEAD	RCI
X															
	X														
X															
	X														
X															
	X														
X															
	X														

OTHER

COMMENTS

CUSTODY SEALED
Date 3-21-97 Time 1820 Initials SH
SEAL INTACT?
Yes ✓ No Initials

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:
Adam Sevi	3/21/97	11:00	Florence Ropp
RELINQUISHED BY: Florence Ropp	3-21-97	1800	RECEIVED BY: 0930 032297
RELINQUISHED BY:	DATE	TIME	RECEIVED BY LABORATORY:

REMARKS: Cooler Temp 1.5°C

KEY TO RESULT FLAGS

*	: RPD between sample duplicates exceeds 30%.
*M	: RPD between sample duplicates or MS/MSD exceeds 20%.
+	: Correlation coefficient for the Method of Standard Additions is less than 0.995.
<	: Sample result is less than reported value.
B-I	: Value is between Method Detection Limit and Reporting Limit.
B-0	: Analyte found in blank and sample.
C	: The result confirmed by secondary column or GC/MS analysis.
CNA	: Cr+6 not analyzed; Total Chromium concentration below Cr+6 regulatory level.
COMP	: Sample composited by equal volume prior to analysis.
CV	: Parameter cannot be analyzed for in a preserved sample.
CWT	: Due to the sample matrix, constant weight could not be achieved.
D-	: The result has an atypical pattern for Diesel analysis.
D1	: The result for Diesel is an unknown hydrocarbon which consists of a single peak.
DB	: ND for hydrocarbons, non-discrete baseline rise detected.
DH	: The result appears to be a heavier hydrocarbon than Diesel.
DL	: The result appears to be a lighter hydrocarbon than Diesel.
DR	: Elevated Reporting Limit due to Matrix.
DS	: Surrogate diluted out of range.
DX	: The result for Diesel is an unknown hydrocarbon which consists of several peaks.
FA	: Compound quantitated at a 2X dilution factor.
FB	: Compound quantitated at a 5X dilution factor.
FC	: Compound quantitated at a 10X dilution factor.
FD	: Compound quantitated at a 20X dilution factor.
FE	: Compound quantitated at a 50X dilution factor.
FF	: Compound quantitated at a 100X dilution factor.
FG	: Compound quantitated at a 200X dilution factor.
FH	: Compound quantitated at a 500X dilution factor.
FI	: Compound quantitated at a 1000X dilution factor.
FJ	: Compound quantitated at a greater than 1000x dilution factor.
FK	: Compound quantitated at a 25X dilution factor.
FL	: Compound quantitated at a 250X dilution factor.
G-	: The result has an atypical pattern for Gasoline.
G1	: The result for Gasoline is an unknown hydrocarbon which consists of a single peak.
GH	: The result appears to be a heavier hydrocarbon than Gasoline.
GL	: The result appears to be a lighter hydrocarbon than Gasoline.
GX	: The result for Gasoline is an unknown hydrocarbon which consists of several peaks.
HT	: Analysis performed outside of the method specified holding time.
HTC	: Confirmation analyzed outside of the method specified holding time.
HTP	: Prep procedure performed outside of the method specified holding time.
HTR	: Received after holding time expired, analyzed ASAP after receipt.
HX	: Peaks detected within the quantitation range do not match standard used.
J	: Value is estimated.
MI	: Matrix Interference Suspected.
MSA	: Value determined by Method of Standard Additions.
MSA*	: Value obtained by Method of Standard Additions; Correlation coefficient is <0.995.
NI1	: Sample spikes outside of QC limits; matrix interference suspected.
NI2	: Sample concentration is greater than 4X the spiked value; the spiked value is considered insignificant.
NI3	: Matrix Spike values exceed established QC limits, post digestion spike is in control.
NI4	: MS/MSD outside of control limits, serial dilution within control.
P	: There is >40% difference between primary and confirmation analysis.
P7	: pH of sample > 2; sample analyzed past 7 days.
RSC	: Refer to subcontract laboratory report for QC data.
S2	: Matrix interference confirmed by repeat analysis.
SCN	: Thiocyanate not analyzed separately; total value is below the Reporting Limit for Free Cyanide.
TND	: Conc. of the total analyte ND; therefore this analyte is ND also.
UMDL	: Undetected at the Method Detection Limit.
UTD	: Unable to perform requested analysis.

CAMBRIA

Attachment D

Standard Field Procedures for Monitoring Well Installation

STANDARD FIELD PROCEDURES FOR MONITORING WELLS

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling ground water monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

SOIL BORINGS

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and to collect samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Registered Geologist (RG) or a Certified Engineering Geologist (CEG).

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or push technologies such as the Geoprobe. Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments at the bottom of the borehole.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Analysis

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. PID measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Water Sampling

Water samples, if they are collected from the boring, are either collected using a driven Hydropunch type sampler or are collected from the open borehole using bailers. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

Ground water monitoring wells are installed to monitor ground water quality and determine the ground water elevation, flow direction and gradient. Well depths and screen lengths are based on ground water depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 ft below and 5 ft above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three ft thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two ft above the well screen. A two ft thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I,II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

Wells are generally developed using a combination of ground water surging and extraction. Surging agitates the ground water and dislodges fine sediments from the sand pack. After about ten minutes of surging, ground water is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of ground water are extracted and the sediment volume in the ground water is negligible. This process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs

after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

Ground Water Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of ground water are purged prior to sampling. Purging continues until ground water pH, conductivity, and temperature have stabilized. Ground water samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

G:\TEMPLATE\SOPS\WELLS-GW.WPD