CAMBRIA

ENVIRONMENTAL PROTECTION 98 DEC 10 PM 3:56

December 7, 1998

#515

Mr. Barney Chan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Re: **Well Installation and Supplemental Subsurface Investigation Report**
Former Exxon Service Station
3055 35th Avenue
Oakland, California
Cambria Project #130-0105.108

Dear Mr. Chan:

On behalf of Mr. Lynn Worthington of Golden Empire Properties, Cambria Environmental Technology, Inc. (Cambria) is submitting this Well Installation and Supplemental Subsurface Investigation Report for the site referenced above. The following work was conducted in accordance with the Corrective Action Plan (CAP) dated April 8, 1998, which describes the installation of a ten dual-phase vacuum extraction (DPVE) wells. In response to the May 21, 1998, letter from the Alameda County Health Care Services Agency (ACHCSA), Cambria also prepared a CAP Addendum dated May 29, 1998, which describes additional upgradient plume delineation activities. Presented below are a site summary, remediation well installation summary, supplemental investigation summary, and a discussion of future activities.

SITE SUMMARY

Site Description

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). Currently, the site is an unpaved vacant lot situated within a mixed commercial and residential setting approximately 3 blocks west of the 580 Freeway. The topography in the area slopes generally westward towards the Oakland Inner Harbor and San Francisco Bay. The nearest surface water is Peralta Creek, located approximately 0.1 miles north (crossgradient) of the site.

Adjacent Hydrocarbon Sources: An active British Petroleum (BP) service station is located on 35th Avenue one block east and upgradient of the site. A former Texaco station is located across School Street immediately east and upgradient of the site. Texaco's underground storage tanks (USTs) were

Oakland, CA
Sonoma, CA
Portland, OR
Seattle, WA

Cambria Environmental Technology, Inc.

1144 65th Street
Suite B
Oakland, CA 94608
Tel (510) 420-0700
Fax (510) 420-9170

removed approximately 15 years ago. No soil samples were collected during the tank removal and no subsurface investigation has been conducted at the former Texaco site.

Site Lithology: The site lithology consists primarily of interbedded lenses of clayey gravel and sandy clays to the maximum explored depth of 30 feet. Local base rock backfill is present in the vicinity of the former USTs and pump islands.

Groundwater Depth: During the past 3.5 years of quarterly groundwater monitoring, the depth to groundwater has ranged from approximately 8 to 20 ft below grade surface (bgs).

Groundwater Flow Direction: Groundwater flows primarily towards the northwest, although a southwest groundwater flow direction has been calculated from monitoring data collected during the fourth quarter of previous years.

Site Background

October 1990 Geotechnical Investigation: In October 1990, Geotechnical Engineering Inc. of Fremont, California, drilled two soil borings at the site for a pre-construction engineering analysis. No samples were collected for hydrocarbon analysis.

January 1991 Tank Removal: In January 1991, Pacific Excavators removed two 4,000-gallon USTs, two 6,000-gallon gasoline USTs, and one 500-gallon waste oil UST from the site. According to a September 24, 1992 report 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.

November 1991 Subsurface Investigation: In November 1991, CT drilled twelve soil borings to depths up to 35 ft bgs (Figure 2). Total petroleum hydrocarbons as gasoline (TPHg) concentrations were detected in soil samples collected from 11 of the 12 soil borings up to 2,100 parts per million (ppm). No total petroleum hydrocarbons as diesel (TPHd) or oil and grease (O&G) concentrations 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 onsite monitoring wells (MW-1 through MW-3). TPHg concentrations were detected in six of the seven soil borings at concentrations up to 2,900 ppm. TPHg and benzene concentrations were detected in groundwater at maximum concentrations of 130,000 and 22,000 parts per billion (ppb), respectively.

Groundwater Monitoring: Quarterly groundwater monitoring and sampling has been performed at the site since May 1994.

Remedial Testing: In July 1996, Cambria conducted a series of remedial tests involving soil vapor extraction (SVE), SVE combined with air sparging (AS), and SVE combined with aquifer pumping. Using an internal combustion engine, vacuums up to 150 inches of water were applied to each test well (MW-1 through MW-3) for a period ranging from 20 to 45 minutes. Very low air flow rates of 0.06, 0.36 and 0.40 cubic feet per minute were achieved from test wells MW-1, MW-2, and MW-3, respectively. TPHg soil vapor concentrations collected from each well at the end of the test ranged from less than 250 parts per million by volume (ppmv) in test wells MW-1 and MW-2, and greater than 10,000 ppmv in test well MW-3. No significant increases in air flow or soil vapor concentrations were observed when SVE was combined with AS. **When SVE was combined with aquifer dewatering (0.5 gpm), the air flow rate from MW-2 increased significantly to 15 cfm,** although no corresponding increase in soil vapor concentrations was observed. No vacuum radius of influence or groundwater drawdown influence was observed in any well. The generally low air and groundwater flow rates were indicative of low permeability soils. **Results of the remedial testing** also **indicated that SVE and/or AS with vacuums up to 150 inches of water would not be effective** in removing hydrocarbons from the subsurface soils. **However, dewatering combined** with SVE could enhance remedial efforts.

February 1997 Plume Definition: On February 26, 1997, Cambria installed one additional onsite monitoring well (MW-4) at the site. TPHg were detected in soil at a maximum concentration of 150 ppm at 15 ft bgs. TPHg and benzene concentrations were detected in groundwater at concentrations of 47,000 and 11,000 parts per billion (ppb), respectively.

REMEDIATION WELL INSTALLATION

Cambria installed ten dual-phase extraction wells on site. Remediation wells RW-5 through RW-11 were installed downgradient of the former dispenser islands and USTs (Figure 1). Wells RW-13 and RW-14 were installed upgradient of the former service station features. The procedures for the well installation are summarized below. Boring logs and well construction diagrams are included in Attachment A. Cambria's standard field procedures for remediation wells are included in Attachment B. The drilling and excavation permits are included as Attachment C.

Drilling Dates: August 5 - 6, 1998.

Personnel Present: Cambria geologist, Robert W. Schultz, conducted the field activities under the supervision of Registered Geologist No. 5397 Peter F. McKereghan.

Permits:	Alameda County Public Works Agency Drilling Permit No. 98WR309 and City of Oakland Planning and Building Excavation Permit No. X9800559 (Attachment C).
Drilling Company:	V&W Drilling (V&W) of Rio Vista, California (C-57 License No. 720904).
Drilling Method:	Hollow-stem auger (HSA).
Number of HSA Borings:	Ten (Figure 1).
Boring Depths:	25-30 ft (Attachment A).
Remediation Wells:	Ten wells were constructed.
Well Materials:	Wells RW-5 through RW-14 were constructed using four-inch diameter, 0.010-inch slotted schedule 40 PVC well screen and well casing, and Monterey #2/12 sand.
Soil Sampling:	Soil samples were collected every five ft and near the water table from borings RW-5 through RW-9. Samples were collected near the water table from borings RW-10 through RW-14. Soil samples were logged and classified according to the Unified Soil Classification System (Attachment A).
Depth to Water:	Groundwater was encountered in the borings at depths of 23 to 28 ft below ground surface (bgs).
Screened Interval:	The wells were screened from 4.5 to 5 ft bgs to the total depth of each well (25-30 ft bgs) (Attachment A).
Development Method:	V&W Drilling was performed using a surge block and bailer to develop the recovery wells.
Soil Handling:	Soil cuttings generated during drilling were stockpiled on site, pending profiling and transport to a recycling/disposal site. The stockpile is on top of and covered with plastic sheeting.

SUPPLEMENTAL SUBSURFACE INVESTIGATION

In accordance with the May 29, 1998 CAP Addendum, Cambria advanced two borings upgradient of the site (Figure 1).

Drilling Date:	August 5, 1998.
Personnel Present:	Cambria geologist, Ron Scheele, conducted the field activities under the supervision of Registered Geologist No. 5397 Peter F. McKereghan.
Permits:	Alameda County Public Works Agency Drilling Permit No. 98WR309 and City of Oakland Planning and Building Excavation Permit No. X9800559 (F).
Drilling Company:	V&W Drilling (V&W) of Rio Vista, California (C-57 License No. 720904).
Drilling Method:	Geoprobe® direct-push using 1.5-inch-diameter push rods.
Number of Geoprobe® Borings:	Two (Figure 1).
Boring Depths:	28 to 38 ft bgs.
Depth to Water:	Groundwater was not encountered in either boring.
Soil Handling:	No soil cuttings were generated as part of the additional investigation.

Drilling Summary

The two soil borings were advanced off site along School Street to depths of approximately 28 and 38 ft bgs, respectively (See Figure 1). Temporary 3/4-inch-diameter PVC casing was placed into each boring for up to 5 hours to facilitate the collection of a groundwater sample. Due to the fine grained soil and low soil permeabilities, no groundwater entered the borehole preventing the collection of a groundwater sample. No soil samples were collected during geoprobe® groundwater sampling activities and no hydrocarbon odors were observed. The temporary casing was removed from soil borings were grouted up with cement to allow for vehicular traffic along School Street.

offsite samples not indicated

FUTURE REMEDIAL ACTIVITIES

Dual-Phase Vacuum Extraction System: A dual-phase vacuum extraction system (DPVE) as described in Cambria's April 8, 1998 CAP is currently being designed and a bid package is being prepared. Following successful selection of a contractor from the bidding process and with Fund pre-approval, the DPVE system will be installed at the site.

CLOSING

If you have any questions or comments regarding this report or future site activities, please call Ron Scheele at (510) 420-3336.

Sincerely,
Cambria Environmental Technology, Inc.

Ron Scheele
Project Geologist

Bob Clark-Riddell, PE
Principal Engineer

Figure: 1 - Boring and Well Locations

Attachments: A - Boring Logs and Well Construction Diagrams
B - Standard Field Procedures for Remediation Wells
C - Drilling and Excavation Permits

cc: Mr. Lynn Worthington, Golden Empire Properties, Inc., 5942 MacArthur Boulevard, Suite B, Oakland, California 94605
Mr. David Hallstrom, UST Cleanup Fund, P.O. Box 944212, Sacramento, California 94244-2120

H:\SB-2004\Oakl-002 - Lynn\wellinstall898\installreport.wpd

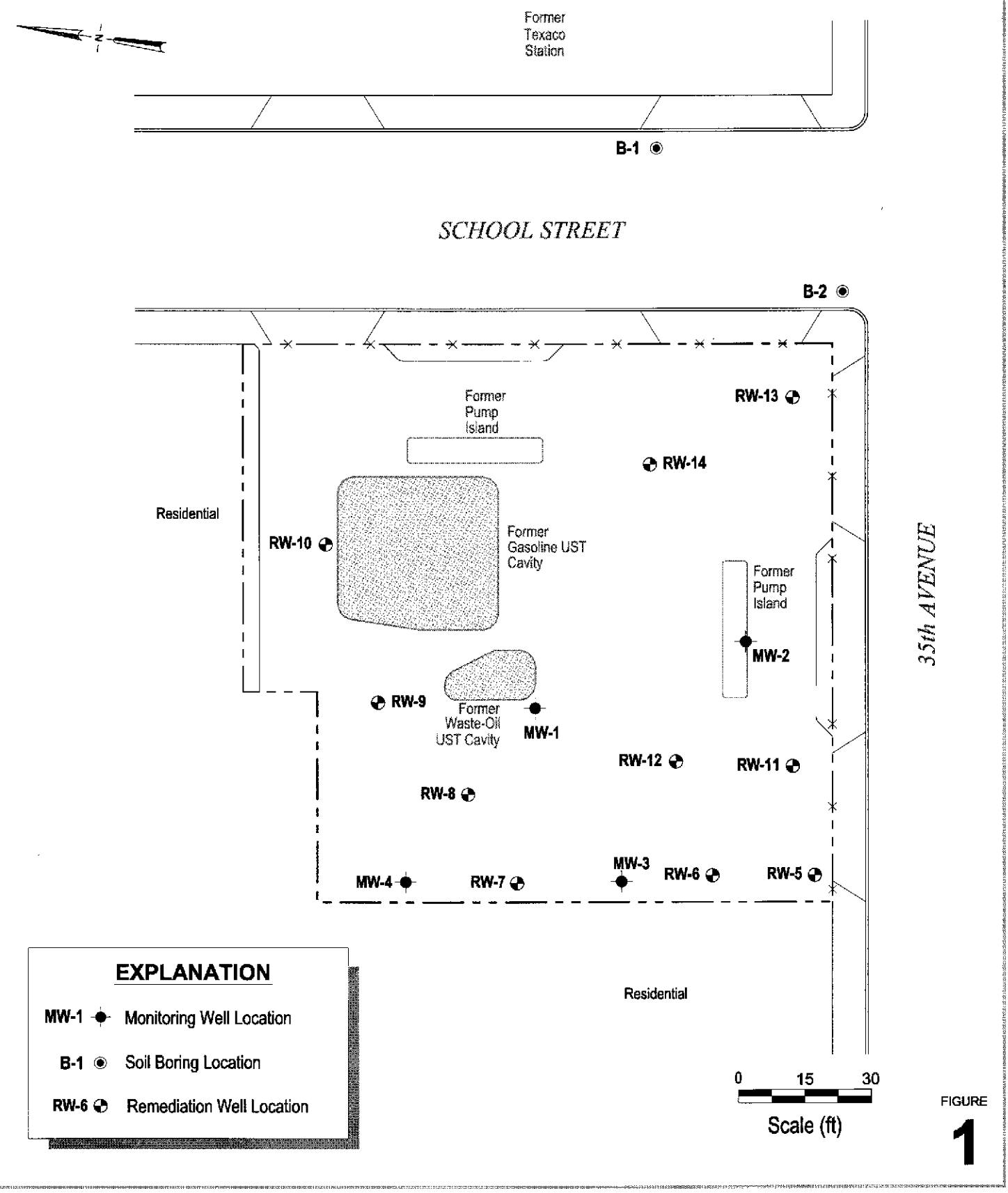


FIGURE
1

H:\SB-2004\OAK-002\FIGURES\WELL-LOC.DWG

Former Exxon Station
3055 35th Avenue
Oakland, California

CAMBRIA

Soil Boring and Well Locations

ATTACHMENT A

Boring Logs and Well Construction Diagrams

BORING LOG

Client: **Lynn Worthington**

Project No: **130-0105** Phase Task **201**

Boring ID **RW-5**

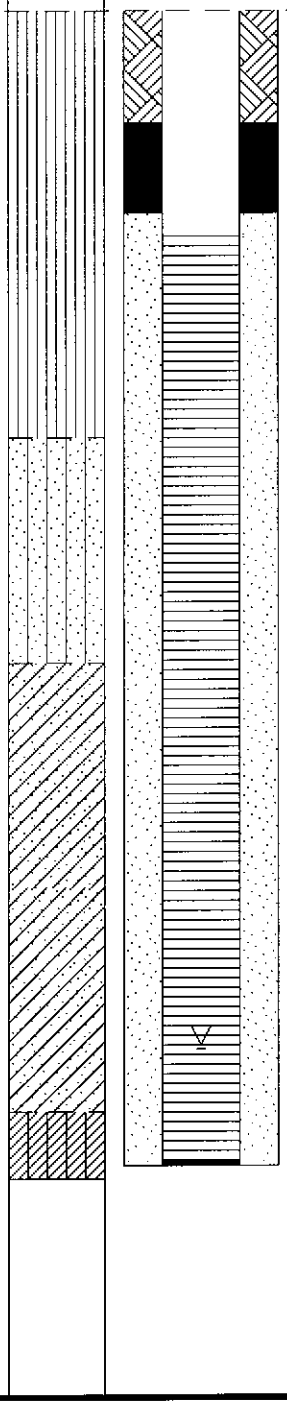
Location **3055 35th Ave., Oakland**

Surface Elev. **ft, 160 - 170 above msl**

Page **1** of **1**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description
0	Ground Surface			
				Gravely SILT; (MLG); brown with green mottling; hard; damp; 15% clay, 50% silt, 20% sand, 15% angular gravel; low plasticity; low estimated permeability.
5	9	⊠	100%	
	21	⊠	100%	
	30	⊠	100%	
10	9	⊠	100%	**Silty SAND**; (SM); brown; dense; damp; 5% clay, 30% silt, 60% sand, 5% gravel; no plasiticity; low estimated permeability.
	18	⊠	100%	
	20	⊠	100%	
15	10	⊠	100%	**Clayey SAND**; (SC); brown with green mottling; medium dense; damp; 25% clay, 25% silt, 50% sand; low plasticity; low estimated permeability.
	11	⊠	100%	
	11	⊠	100%	
20	10	⊠	100%	35% clay, 40 % silt, 25% sand.
	11	⊠	100%	
	17	⊠	100%	
25	8	⊠	100%	**Silty CLAY**; (CL-ML); brown with green mottling; medium dense; wet; 50% clay, 35% silt, <5% sand, 10% gravel; low plasticity; low estimated permeability.
	9	⊠	100%	
	15	⊠	100%	
30				

TPHg (ppm) | Graphic Log | Boring Completion Graphics



Depth (feet)	Additional Comments
0	
5	No chemical odor.
10	Strong hydrocarbon odor.
15	Strong hydrocarbon odor.
20	Strong hydrocarbon odor.
25	Strong hydrocarbon odor. Bottom of well @ 25.7 ft.
30	

Driller **V&W Drilling**

Logged By **R.W. Schultz**

Water-Bearing Zones

Drilling Started **8/5/98**

Drilling Completed **8/5/98**

Grout Type **Portland Type I/II Cement**

Notes: **southwest corner of lot**

BOR BORLOGS.GPJ 9/16/98

Cambria Environmental Technology, Inc.

BORING LOG

Client: **Lynn Worthington**

Project No: **130-0105** Phase Task **201**

Boring ID **RW-6**

Location **3055 35th Ave., Oakland**

Surface Elev. **ft, 160 - 170 above msl**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description
0	Ground Surface			
				Silty GRAVEL; (GM); orange-brown; very dense; dry; 5% clay, 20% silt, 30% sand, 45% gravel; angular gravel to >2" diameter; low plasticity; low estimated permeability.
5	10	X	100%	
	50	X	100%	
10	12	X	100%	
	21	X	100%	
	38	X	100%	
15	8	X	100%	**Sandy Silt**; (MLS); brown; stiff; dry; 30% clay, 50% silt, 20% sand; moderate plasticity; nlow estimated permeability.
	10	X	100%	
	12	X	100%	
20	12	X	100%	**Clayey GRAVEL**; (GC); brown with green mottling; hard; damp; 20% clay, 20% silt, 30% sand, 30% gravel; low plasticity; low estimated permeability.
	24	X	100%	
	37	X	100%	
25	17	X	100%	15% clay, 10% silt, 15% sand, 60% gravel; wet.
	20	X	100%	
	31	X	100%	
30				

TPHg (ppm) | Graphic Log | Boring Completion Graphics

Depth (feet)	Additional Comments
0	
5	No chemical odor.
10	Strong hydrocarbon odor.
15	No chemical odor.
20	Moderate to strong hydrocarbon odor.
25	No chemical odor. Bottom of well @ 25.5 ft.
30	

Driller **V&W Drilling**

Logged By **R.W. Schultz**

Water-Bearing Zones

Drilling Started **8/5/98**

Drilling Completed **8/5/98**

Grout Type **Portland Type I/II Cement**

Notes: **western border of site**

BOR BORLOGS.GPJ 9/16/98

Cambria Environmental Technology, Inc.

BORING LOG

Client: **Lynn Worthington**

Project No: **130-0105** Phase Task **201**

Boring ID **RW-7**

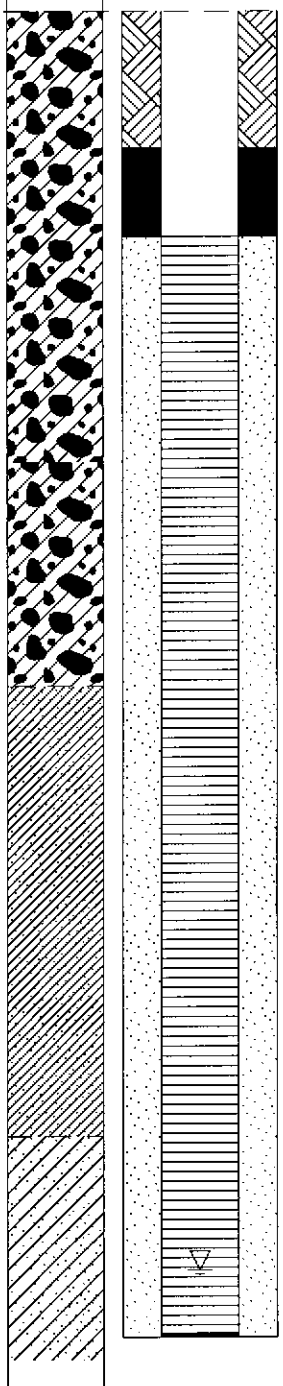
Location **3055 35th Ave., Oakland**

Surface Elev. **ft, 160 - 170 above msl**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description
0	Ground Surface			
				Clayey GRAVEL; orange-brown; dense; dry; 15% clay, 20% silt, 25% sand, 40% gravel; low plasticity; low estimated permeability.
5	14	⊠	100%	
	30	⊠	100%	
	31	⊠	100%	
10	15	⊠	100%	Brown with green mottling; damp.
	28	⊠	100%	
	30	⊠	100%	
15	14	⊠	100%	**Sandy CLAY**; (CLS); brown with green mottling; hard; damp; 40% clay, 20% silt, 25% sand, 15% gravel; low plasticity; low estimated permeability.
	15	⊠	100%	
	20	⊠	100%	
20	11	⊠	100%	
	18	⊠	100%	
	20	⊠	100%	
25	8	⊠	100%	**Clayey SAND;** (SC); brown with grey mottling; medium dense; damp; 30% clay, 10% silt, 50% coarse sand, 10% gravel; low plasticity; low estimated permeability.
	9	⊠	100%	
	11	⊠	100%	
30				

Continued Next Page

TPHg (ppm) | Graphic Log | Boring Completion Graphics



Depth (feet)	Additional Comments
0	
5	No chemical odor.
10	No chemical odor.
15	Moderate hydrocarbon odor.
20	Moderate hydrocarbon odor.
25	No chemical odor.
30	

Driller **V&W Drilling**

Logged By **R.W. Schultz**

Water-Bearing Zones

Drilling Started **8/5/98**

Drilling Completed **8/5/98**

Grout Type **Portland Type I/II Cement**

Notes: **western border of site**

Cambria Environmental Technology, Inc.

BORING LOG

Client: **Lynn Worthington**

Project No: **130-0105** Phase Task **201**

Boring ID **RW-7**

Location **3055 35th Ave., Oakland**

Surface Elev. **ft, 160 - 170 above msl**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description	TPHg (ppm)	Graphic Log	Boring Completion Graphics	Depth (feet)	Additional Comments
				Continued from previous page					
30								30	
	10		100%	Fine to medium sand.					Bottom of well @ 29.5 ft.
	14		100%						No chemical odor.
	15		100%						
35								35	
40								40	
45								45	
50								50	
55								55	
60								60	

BORING LOG

Client: **Lynn Worthington**

Project No: **130-0105** Phase Task **201**

Boring ID **RW-8**

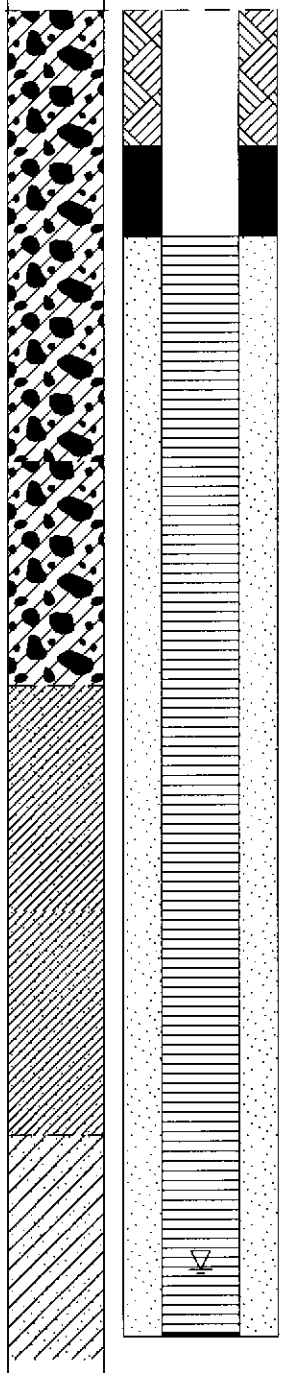
Location **3055 35th Ave., Oakland**

Surface Elev. **ft, 160 - 170 above msl**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description
0	Ground Surface			
				Clayey GRAVEL; orange-brown; very dense; dry; 15% clay, 20% silt, 25% sand, 40% gravel; low plasticity; low estimated permeability.
5	30	⧓	100%	
	50	⧓	100%	
10	8	⧓	100%	Brown with green mottling; damp.
	19	⧓	100%	
	24	⧓	100%	
15	11	⧓	100%	**Sandy CLAY**; (CLS); brown with green mottling; very stiff; damp; 40% clay, 20% silt, 25% sand, 15% gravel; coarse sand; low plasticity; low estimated permeability.
	15	⧓	100%	
	15	⧓	100%	
20	12	⧓	100%	Hard.
	19	⧓	100%	
	20	⧓	100%	
25	7	⧓	100%	**CLAY**; (CL); brown; stiff; damp; 80% clay, 10% silt, 10% fine sand; low plasticity; low estimated permeability.
	9	⧓	100%	
	10	⧓	100%	
30				

Continued Next Page

TPHg (ppm) | Graphic Log | Boring Completion Graphics



Depth (feet)	Additional Comments
0	
5	No chemical odor.
10	Strong hydrocarbon odor.
15	Strong hydrocarbon odor.
20	Strong hydrocarbon odor.
25	Strong hydrocarbon odor.
30	

Driller **V&W Drilling**

Logged By **R.W. Schultz**

Water-Bearing Zones

Drilling Started **8/5/98**

Drilling Completed **8/5/98**

Grout Type **Portland Type I/II Cement**

Notes: **northwest quadrant of site**

Cambria Environmental Technology, Inc.

BORING LOG

Client: **Lynn Worthington**

Project No: **130-0105** Phase Task **201**

Boring ID **RW-8**

Location **3055 35th Ave., Oakland**

Surface Elev. **ft, 160 - 170 above msl**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description
				Continued from previous page
30				
	7	■	100%	70% clay, 15% silt, 15% sand.
	9	■	100%	
	15	■	100%	
35				
40				
45				
50				
55				
60				

TPHg (ppm)	Graphic Log	Boring Completion Graphics	Depth (feet)	Additional Comments
			30	
				Bottom of well @ 29.5 ft. Slight hydrocarbon odor.
			35	
			40	
			45	
			50	
			55	
			60	

BOR BORLOGS.GPJ 9/16/98

Cambria Environmental Technology, Inc.

BORING LOG

Client: **Lynn Worthington**

Project No: **130-0105** Phase Task **201**

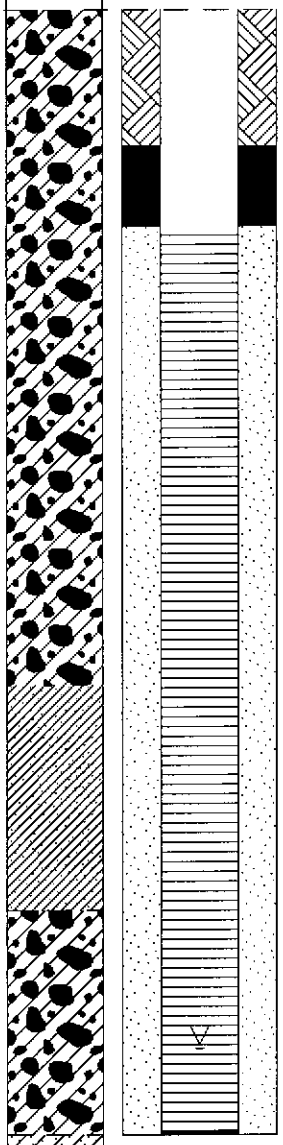
Boring ID **RW-9**

Location **3055 35th Ave., Oakland**

Surface Elev. **ft, 160 - 170 above msl**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description
0	Ground Surface			
				Clayey GRAVEL; brown with green mottling; very dense; dry; 15% clay, 15% silt, 30% sand, 40% angular gravel; low plasticity; low estimated permeability.
5	25	X	100%	
	28	X	100%	
	30	X	100%	
10	24	X	100%	
	29	X	100%	
	36	X	100%	
15	19	X	100%	**Sandy CLAY**; brown with green mottling; hard; damp; 40% clay, 20% silt, 25% sand, 15% gravel; low plasticity; low estimated permeability.
	30	X	100%	
	36	X	100%	
20	25	X	100%	**Clayey GRAVEL**; (GC); brown with green mottling; very dense; damp; 15% clay, 15% silt, 30% sand, 40% gravel; low plasticity; low estimated permeability.
	36	X	100%	
	40	X	100%	
25	13	X	100%	**Clayey SAND**; (SC); brown with green mottling; dense; wet; 30% clay, 10% silt, 50% sand, 10% gravel; low plasticity; low estimated permeability.
	19	X	100%	
	25	X	100%	
30				

TPHg (ppm) | Graphic Log | Boring Completion Graphics



Depth (feet)	Additional Comments
0	
5	No odor.
10	Strong hydrocarbon odor.
15	Strong hydrocarbon odor.
20	Strong hydrocarbon odor.
25	Slight hydrocarbon odor. Bottom of well and boring @ 25.0 ft.
30	

Driller **V&W Drilling**

Logged By **R.W. Schultz**

Water-Bearing Zones

Drilling Started **8/6/98**

Drilling Completed **8/6/98**

Grout Type **Portland Type I/II Cement**

Notes: **northwest quadrant of site**

BOR BORLOGS.GPJ 9/16/98

Cambria Environmental Technology, Inc.

BORING LOG

Client: **Lynn Worthington**

Project No: **130-0105** Phase Task **201**

Boring ID **RW-10**

Location **3055 35th Ave., Oakland**

Surface Elev. **ft, 160 - 170 above msl**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description
0	Ground Surface			
				Clayey GRAVEL; (GC); brown; very dense; dry; 15% clay, 15% silt, 30% sand, 40% angular gravel; low plasticity; low estimated permeability.
10				**Sandy CLAY**; (CLS); brown; very stiff; damp; 40% clay, 20% silt, 25% sand, 15% gravel; low plasticity; low estimated permeability.
15				Brown with green mottling.
25	9		100%	Some gravel, poorly sorted sands.
	12		100%	
	24		100%	
30				

TPHg (ppm) | Graphic Log | Boring Completion Graphics

Depth (feet)	Additional Comments
0	
5	No chemical odor.
10	Strong hydrocarbon odor.
25	No chemical odor. Bottom of well @ 25.0 ft.
30	

Driller **V&W Drilling**

Logged By **R.W. Schultz**

Water-Bearing Zones

Drilling Started **8/6/98**

Drilling Completed **8/6/98**

Grout Type **Portland Type I/II Cement**

Notes: **northeast quadrant of site**

BOR BORLOGS.GPJ 9/16/98

Cambria Environmental Technology, Inc.

BORING LOG

Client: **Lynn Worthington**

Project No: **130-0105** Phase Task **201**

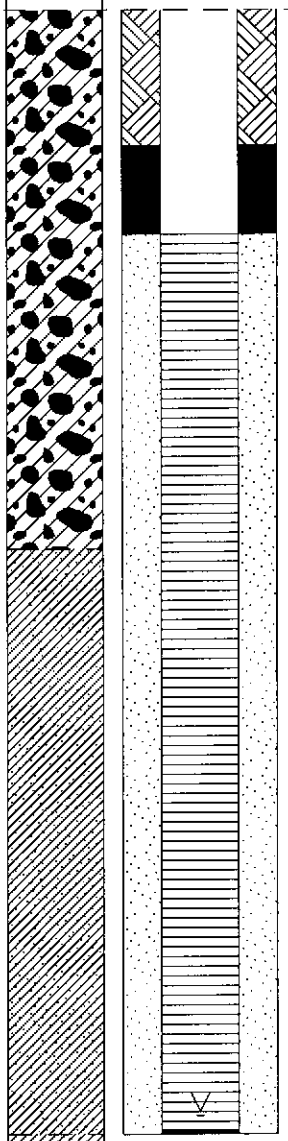
Boring ID **RW-11**

Location **3055 35th Ave., Oakland**

Surface Elev. **ft, 160 - 170 above msl**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description
0	Ground Surface			
				Clayey GRAVEL; brown with green mottling; very dense; dry; 15% clay, 15% silt, 30% sand, 40% angular gravel; low plasticity; low estimated permeability.
5				
10				
				Sandy CLAY; (CLS); brown with green mottling; hard; damp; 40% clay, 25% silt, 20% sand, 15% gravel; low plasticity; low estimated permeability.
15				
20				
25	12		100%	**Clayey SAND:** (SC); brown; very dense; wet; 30% clay, 10% silt, 50% sand, 10% gravel; low plasticity; low estimated permeability.
	37		100%	
	42		100%	
30				

TPHg (ppm) | Graphic Log | Boring Completion Graphics



Depth (feet)	Additional Comments
0	
5	No chemical odor.
10	Strong hydrocarbon odor.
15	
20	
25	Strong hydrocarbon odor. Bottom of well @ 25.0 ft.
30	

Driller **V&W Drilling**

Logged By **R.W. Schultz**

Water-Bearing Zones

Drilling Started **8/6/98**

Drilling Completed **8/6/98**

Grout Type **Portland Type I/II Cement**

Notes: **southwest quadrant of site**

Cambria Environmental Technology, Inc.

BORING LOG

Client: **Lynn Worthington**

Project No: **130-0105** Phase Task **201**

Boring ID **RW-12**

Location **3055 35th Ave., Oakland**

Surface Elev. **ft, 160 - 170 above msl**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description
0	Ground Surface			
				Clayey GRAVEL; (GC); brown; dense; dry; 15% clay, 15% silt, 30% sand, 40% gravel; low plasticity; low estimate permeability.
5				
10				Damp; 15% clay; 25% silt; 30% sand; 40% gravel.
15				**Sandy CLAY**; (CLS); brown; very stiff; damp; 40% clay, 25% silt, 20% sand, 15% gravel; low plasticity; low estimated permeability.
20				
25	10		100%	**Clayey SAND**; (SC); brown; dense; wet; 30% clay; 10% silt; 50% sand; 10% gravel; low plasticity; low estimated permeability.
	12		100%	
	30		100%	
30				

TPHg (ppm) | Graphic Log | Boring Completion Graphics

Depth (feet)	Additional Comments
0	
5	No chemical odor.
10	Strong hydrocarbon odor.
15	
20	
25	Slight hydrocarbon odor.
	Bottom of well @ 27.0 ft.
30	

Driller **V&W Drilling**

Logged By **R.W. Schultz**

Water-Bearing Zones

Drilling Started **8/6/98**

Drilling Completed **8/6/98**

Grout Type **Portland Type I/II Cement**

Notes: **southwest quadrant of site**

BOR BORLOGS.GPJ 9/16/98

Cambria Environmental Technology, Inc.

BORING LOG

Client: **Lynn Worthington**

Project No: **130-0105** Phase Task **201**

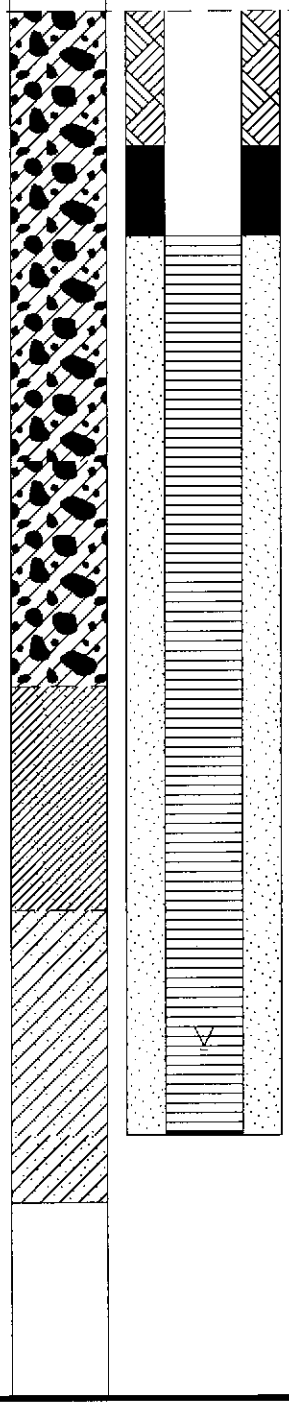
Boring ID **RW-13**

Location **3055 35th Ave., Oakland**

Surface Elev. **ft, 160 - 170 above msl**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description
0	Ground Surface			
				Clayey GRAVEL; (GC); brown; dense; dry; 15% clay, 15% silt, 30% sand, 40% gravel; low plasticity; low estimate permeability.
5				
10				Damp.
15				
				Sandy CLAY; (CLS); brown; hard; damp; 40% clay, 25% silt, 20% sand, 15% gravel; low plasticity; low estimated permeability.
20				
				Clayey SAND; (SC); brown with green mottling; very dense; damp; 30% clay; 10% silt; 50% sand; 10% gravel; low plasticity; low estimated permeability.
25	15		100%	Wet.
	32		100%	
	30		100%	
30				

TPHg (ppm) | Graphic Log | Boring Completion Graphics



Depth (feet)	Additional Comments
0	
5	No chemical odor.
10	
15	Strong hydrocarbon odor.
20	
25	Strong hydrocarbon odor. Bottom of well @ 25.0 ft.
30	

Driller **V&W Drilling**

Logged By **R.W. Schultz**

Water-Bearing Zones

Drilling Started **8/6/98**

Drilling Completed **8/6/98**

Grout Type **Portland Type I/II Cement**

Notes: **southeast corner of site**

Cambria Environmental Technology, Inc.

BORING LOG

Client: **Lynn Worthington**

Project No: **130-0105** Phase Task **201**

Boring ID **RW-14**

Location **3055 35th Ave., Oakland**

Surface Elev. **ft, 160 - 170 above msl**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description
0	Ground Surface			
				Clayey GRAVEL; (GC); brown; dense; dry; 15% clay, 15% silt, 30% sand, 40% gravel; low plasticity; low estimate permeability.
5				
10				Damp.
15				**Sandy CLAY**; (CLS); brown; very stiff; damp; 40% clay, 25% silt, 20% sand, 15% gravel; low plasticity; low estimated permeability.
20				
25	6		100%	**Clayey SAND**; (SC); brown; medium dense; wet; 30% clay; 10% silt; 50% sand; 10% gravel; low plasticity; low estimated permeability.
	12		100%	
	20		100%	
30				

TPHg (ppm) | Graphic Log | Boring Completion Graphics

Depth (feet)	Additional Comments
0	
5	No chemical odor.
10	Strong hydrocarbon odor.
15	
20	
25	Slight hydrocarbon odor. Bottom of well @ 25.0 ft.
30	

Driller **V&W Drilling**

Logged By **R.W. Schultz**

Water-Bearing Zones

Drilling Started **8/6/98**

Drilling Completed **8/6/98**

Grout Type **Portland Type I/II Cement**

Notes: **southeast quadrant of site**

Cambria Environmental Technology, Inc.

ATTACHMENT B

Standard Field Procedures for Remediation Wells

CAMBRIA

STANDARD FIELD PROCEDURES FOR REMEDIATION WELLS

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

SOIL BORING AND SAMPLING

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.

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.

REMEDIATION WELL INSTALLATION

Well Construction

Remediation wells are installed for soil vapor extraction (SVE), ground water extraction (GWE), oxygenation, air sparging (AS) and for vapor monitoring (VM). Well depths and screen lengths will vary depending upon several factors including the intended use of the well, ground water depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines.

Well casing and screen are typically one to four inch diameter 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 typically connected remediation piping set in traffic-rated vaults finished flush with the ground surface. Typical well screen intervals for each type of well are as follows:

SVE Wells: SVE wells are screened in the vadose zone targeting horizons with the highest hydrocarbon concentrations. SVE wells are also occasionally screened as concurrent soil vapor and ground water extraction wells with screen interval above and below the water table.

GWE Wells: Ground water extraction wells are typically screened ten to fifteen ft below the first water-bearing zone encountered. The well screen may or may not be screened above the water table depending upon whether the water bearing zone is unconfined or confined.

Oxygenation Wells: Oxygenation wells are installed above or below the water table to supply oxygen and enhance naturally occurring hydrocarbon biodegradation. Oxygenation wells installed in the vadose zone typically have well screens that are two to ten feet long and target horizons with the highest hydrocarbon concentrations. Oxygenation wells installed below the water table typically have a two foot screen interval set ten to fifteen ft below the water table.

AS Wells: Air sparging wells are installed below the water table and typically have a two foot screen interval set ten to fifteen ft below the water table.

VM Wells: Vapor monitoring wells are installed in the vadose zone to check for hydrocarbon vapor migration during air injection. The wells are typically constructed with short screens to target horizons through which hydrocarbon vapor migration could occur. These wells can also be constructed in borings drilled using push technologies such as the Geoprobe by using non-collapsible Teflon tubing set in small sand packed regions overlain by grout.

Well Development

Ground water extraction 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.

ATTACHMENT C

Drilling and Excavation Permits

ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
951 TURNER COURT, SUITE 300, HAYWARD, CA 94545-2651
PHONE (510) 670-5575 ANDREAS GODFREY FAX (510) 670-5262
(510) 670-5248 ALVIN KAN

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 2055 35th Ave.
Oakland, CA

California Coordinates Source _____ ft. Accuracy ± ___ ft.
CCN _____ ft. CCE _____ ft.
APN _____

CLIENT
Name Lynn Worthington
Address 5942 MacArthur Blvd. Room Ste B
City Oakland, CA Zip 94605

APPLICANT
Name Bob Schultz Cambria Environmental Technology Inc.
Fax 510 420 9170
Address 1144 65th St. Ste B Phone 510 420 3341
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

New Domestic	☐	Replacement Domestic	☐
Municipal	☐	Irrigation	☐
Industrial	☐	Other _____	☐

DRILLING METHOD:

Mud Rotary	☐	Air Rotary	☐	Auger	☒
Cable	☐	Other	☐		

DRILLER'S LICENSE NO. _____

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 4 in. Depth 25 ft.
Surface Seal Depth 5 ft. Number 10

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

ESTIMATED STARTING DATE August 5, 1998
ESTIMATED COMPLETION DATE August 7, 1998

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

APPLICANT'S SIGNATURE Bob Schultz DATE 7/27/98
Cambria Env Tech.

FOR OFFICE USE

PERMIT NUMBER 98WR309
WELL NUMBER _____
APN _____

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
(2.) Submit to ACPWA 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 SUPPLY WELLS
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.

(C.) GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

D. 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.

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

F. WELL DESTRUCTION
See attached.

G. SPECIAL CONDITIONS

APPROVED _____ DATE 7/30/98

City of Oakland — Office of Planning and Building

EXCAVATION PERMIT

TO EXCAVATE IN STREETS OR OTHER SPECIFIED WORK

CIVIL ENGINEERING

PERMIT NUMBER X 9800559	SITE ADDRESS/LOCATION 3055 35th Ave.
APPROX. START DATE August 5 / APPROX. END DATE Aug. 7, '98	24-HOUR EMERGENCY PHONE NUMBER (Permit not valid without 24-Hour number) 510
CONTRACTOR'S LICENSE # AND CLASS	CITY BUSINESS TAX #

ATTENTION:

1) State law requires that the contractor/owner call *Underground Service Alert (USA)* two working days before excavating. This permit is not valid unless applicant has secured an inquiry identification number issued by USA. The USA telephone number is 1 (800) 642-2444. UNDERGROUND SERVICE ALERT (USA) #: ____________

2) **48 hours prior to starting work, YOU MUST CALL (510) 238-3651 TO SCHEDULE AN INSPECTION.**

OWNER/BUILDER

I hereby affirm that I am exempt from the Contractor's License Law for the following reason (Sec. 7031.5 Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he is licensed pursuant to the provisions of the Contractor's License law Chapter 9 (commencing with Sec. 7000) of Division 3 of the Business and Professions Code, or that he is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than $500):

☐ I, as an owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business Professions Code: The Contractor's License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or through his own employees, provided that such improvements are not intended or offered for sale. If however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he did not build or improve for the purpose of sale).

☐ I, as owner of the property, am exempt from the sale requirements of the above due to: (1) I am improving my principal place of residence or appurtenances thereto, (2) the work will be performed prior to sale, (3) I have resided in the residence for the 12 months prior to completion of the work, and (4) I have not claimed exemption on this subdivision on more than two structures more than once during any three-year period. (Sec. 7044 Business and Professions Code).

☐ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project, (Sec. 7044, Business and Professions Code: The Contractor's License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractor's License law).

☐ I am exempt under Sec. ____________, B&PC for this reason ____________

WORKER'S COMPENSATION

○ I hereby affirm that I have a certificate of consent to self-insure, or a certificate of Worker's Compensation Insurance, or a certified copy thereof (Sec. 3700, Labor Code).

Policy # ____________ Company Name ____________

○ I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the Worker's Compensation Laws of California (not required for work valued at one hundred dollars ($100) or less).

NOTICE TO APPLICANT: If, after making this Certificate of Exemption, you should become subject to the Worker's Compensation provisions of the Labor Code, you must forthwith comply with such provisions or this permit shall be deemed revoked. This permit is issued pursuant to all provisions of Title 12 Chapter 12.12 of the Oakland Municipal Code. It is granted upon the express condition that the permittee shall be responsible for all claims and liabilities arising out of work performed under the permit or arising out of permittee's failure to perform the obligations with respect to street maintenance. The permittee shall, and by acceptance of the permit agrees to defend, indemnify, save and hold harmless the City, its officers and employees, from and against any and all suits, claims, or actions brought by any person for or on account of any bodily injuries, disease or illness or damage to persons and/or property sustained or arising in the construction of the work performed under the permit or in consequence of permittee's failure to perform the obligations with respect to street maintenance. This permit is void 90 days from the date of issuance unless an extension is granted by the Director of the Office of Planning and Building.

I hereby affirm that I am licensed under provisions of Chapter 9 of Division 3 of the Business and Professions Code and my license is in full force and effect (if contractor), that I have read this permit and agree to its requirements, and that the above information is true and correct under penalty of law.

[signature] CAMBRIA ENV. TECH. — Date 7/27/98

Signature of Permittee ☒ Agent for ☐ Contractor ☐ Owner

DATE STREET LAST RESURFACED	SPECIAL PAVING DETAIL REQUIRED? ☐ YES ☒ NO	HOLIDAY RESTRICTION (NOV 1 - JAN 1) ☐ YES ☒ NO	LIMITED OPERATION AREA (7AM-9AM & 4PM-6PM) ☒ YES ☐ NO
ISSUED BY [signature]		DATE ISSUED 7/27/98	

72904