



November 22, 2000

# 6419

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

ENVIRONMENTAL  
PROTECTION  
00 NOV 27 PM 3: 06

**Subject: Monitoring Well Installation and Sampling Report**  
1450 Fruitvale Avenue  
Oakland, CA  
AEI Project No. 3581

Dear Mr. Chan:

Enclosed is the monitoring well installation and sampling report for the above referenced site.

Please call Peter McIntyre or myself at (925) 283-6000 if you have any questions.

Sincerely,

Orion Alcalay  
Environmental Scientist

November 22, 2000

**MONITORING WELL INSTALLATION  
AND SAMPLING REPORT**

1450 Fruitvale Avenue  
Oakland, California

Project No. 3581

Prepared For

Jay-Phares Corporation  
10700 Foothill Boulevard, Suite 200  
Oakland, California, 94605

Prepared By

**AEI Consultants**  
3210 Old Tunnel Road, Suite B  
Lafayette, CA 94549  
(800) 801-3224

**AEI**

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**AEI**

## 1.0 INTRODUCTION

AEI Consultants (AEI) has prepared this report on behalf of the Jay-Phares Corporation, and documents the groundwater investigation performed at the property located at 1450 Fruitvale Avenue in Oakland, California (Figure 1: Site Location Map). The investigation was performed in response to the requirements of the Alameda County Health Care Services Agency (ACHCSA). The investigation was conducted to investigate groundwater quality in the area of previously removed fuel storage tanks.

## 2.0 SITE DESCRIPTION AND BACKGROUND

The property is located on the eastern corner of Fruitvale Avenue and Farnam Street in a residential and commercial area of the city of Oakland. The property is approximately 11,000 square feet in size and is developed with a three-story building that occupies two-thirds of the parcel. The western corner of the parcel is improved with an asphalt parking lot. The property is currently vacant.

Glenfos, Inc performed an environmental site assessment (ESA) on the property in July 1998. The ESA indicated that the property was developed as a gas station in 1950 by Richfield Oil (currently known as ARCO) and operated until at least 1983. There were four underground storage tanks located in the southwest corner of the current parking lot. The fuel dispenser island was located on the northeast corner of the current parking lot. The gas station was demolished and the existing warehouse was constructed after 1983.

(7/1998)

This ESA included the advancement of eight (8) shallow soil borings to between 15 and 30 feet below ground surface (bgs) and the collection of soil and groundwater samples (refer to Figure 2 for boring locations). Soil sample analysis indicated that Total Petroleum Hydrocarbons (TPH) as gasoline and benzene were present along the former product piping at 190 mg/kg and 0.34 mg/kg, respectively. Groundwater sample analysis revealed impacted groundwater beneath the area of the former dispensers with TPH as gasoline up to 20,000 µg/L and benzene up to 1,000 µg/L. A geophysical survey was also performed on the property as part of the ESA, and based on the results of the survey, Glenfos concluded that, "the USTs may still be present".

On May 27, 1999, AEI was contracted to excavate the locations of the suspected USTs and remove them if necessary. Three excavations were opened on the site. No underground storage tanks or any remaining product piping were encountered during the excavation activities. No significant concentrations of petroleum hydrocarbons were detected in the confirmation soil samples analyzed. The excavations were backfilled with the excavated soil.

Please refer to the *Subsurface Investigation* report issued by AEI on June 11, 1999 for the results of the excavation and sampling activities as wells as an appended copy of the *Glenfos* report.

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On July 21, 1999, AEI reviewed building records at the Oakland Building Department (OBD) for information regarding the former locations of the USTs and product dispensers. According to a site plan of the former gasoline station, four USTs were located on the southern corner of the lot, just outside of the building, oriented perpendicular to Farnam Street. The dispensers were located on the northern corner of the property, beneath the canopy.

At the request of the Alameda County Health Care Services Agency (ACHCSA), AEI performed an additional subsurface investigation at the site in August 1999. This investigation revealed TPH as gasoline present in the soil up to 210 mg/kg, with no significant concentrations of benzene or MTBE. Groundwater samples analyzed during this investigation contained TPH as gasoline at 690 µg/L and benzene at 72 µg/L. Soil sample analytical results indicate that although the release occurred along the product piping or from the dispensers, no significant concentrations of petroleum hydrocarbons have been detected around the former tank hold. Please refer to the Figure 2 and Tables 4 & 5 for previous AEI and Glenfos sampling locations and analytical results.

Based on the results of the August 1999 investigation and the groundwater samples analyzed by Glenfos, the ACHCSA requested the installation of a minimum of three groundwater monitoring wells to confirm the groundwater flow direction beneath the site and assess the stability of the dissolved hydrocarbon plume. A workplan, dated July 17, 2000, was prepared by AEI and the scope of work was agreed upon by the ACHCSA.

### 3.0 GEOLOGY AND HYDROGEOLOGY

The native soil encountered beneath the site during the previous subsurface investigations generally consisted of stiff silty and sandy clay. Gravel was encountered locally in some of the borings. Groundwater was encountered between 10 and 30 feet below ground surface (bgs).

Water level measurements were made during the first groundwater monitoring and sampling episode conducted on October 16, 2000. Static groundwater level ranged between 24.41 and 27.10 feet above Mean Sea Level (MSL). Elevations of the tops of the well casings were surveyed relative to MSL by David Logan (Professional Land Surveyor No. 5003) in November 2000.

The water level measurements were collected in order to calculate the groundwater hydraulic gradient and flow direction. Based on these measurements, groundwater beneath the site flows to the southeast. The hydraulic gradient is 0.116 foot/foot. The water table elevation contours and flow direction are depicted in Figure 4. Water table elevations are summarized in Table 1.

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#### **4.0 PERMITS**

Prior to the start of drilling activities, drilling permit applications for each of the wells were submitted to the Alameda County Public Works Agency. The wells were constructed by Spectrum Exploration, Inc., (License # 512268), a California licensed drilling contractor.

#### **5.0 WELL INSTALLATION & CONSTRUCTION**

On September 25, 2000, three soil borings were advanced and converted to groundwater monitoring wells. Please refer to Figure 3 for locations of the newly constructed wells. These borings were advanced with a hydraulic rotary drill rig running 10.5-inch diameter hollow-stem augers. Cuttings generated during the well installation activities were stored on-site in sealed, labeled 55-gallon drums.

Soil samples were collected at approximately every 5 feet bgs in each boring. The borings were logged using the USCS. Please refer to Appendix B for detailed logs of the borings. Soil samples were sealed within brass liners with teflon tape and plastic caps and stored over ice during transportation to the laboratory.

The three soil borings were converted to groundwater monitoring wells (MW-1 through MW-3). The wells were constructed of 10 to 15 feet of 0.020" factory-slotted well screen and flush threaded blank Schedule 40 PVC casing that was installed through the hollow augers. All the wells were constructed with 2" diameter casing. The well screen in each well was fitted with a flush-threaded bottom cap. No. 2/16 Monterey sand was poured through the auger to form a sand pack from the bottom of the well to 2 feet above the slotted well screen. Approximately 1.5 to 2 feet of bentonite pellets were placed above the sand and hydrated with tap water. The remainder of the boring was filled to 0.5 feet below grade with neat cement grout. A flush mounted traffic rated well box was installed over the casing, and an expanding, locking inner cap was placed on the casing top. Refer to the boring logs (Appendix B) for a visual description of well construction.

#### **6.0 WELL DEVELOPMENT AND SAMPLING**

The three newly installed wells were developed no sooner than 24 hours after setting of the grout. The wells were developed by first using a surge block, then a minimum of 10 well volumes of water was removed from each well.

Groundwater samples were collected from the newly installed wells on October 16, 2000. Depth to groundwater was measured at the three newly installed wells prior to sampling activities. Prior to the collection of water samples, approximately six well volumes of water were purged

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from each well. Please refer to Appendix C for Groundwater Well Sampling Field Forms, which include details on the sampling of each well.

The groundwater samples were collected from each well using clean disposable bailers. Water was poured from the bailers into 40 ml VOA vials and capped so that there was no head space or visible air bubbles within the sample containers. The samples were labeled and placed on ice and transported under chain of custody protocol to McCampbell Analytical Laboratories in Pacheco, California.

## 7.0 SAMPLE ANALYTICAL RESULTS

Two soil samples from each boring were selected for analysis. The remaining soil samples were placed on hold at the laboratory. A total of six soil samples were analyzed for Total Petroleum Hydrocarbons as gasoline (TPH-g), methyl tertiary butyl ether (MTBE), and benzene, toluene, ethylbenzene and xylenes (BTEX) by EPA methods 5030, 8015 and 8020.

Gasoline range hydrocarbons were detected up to 360 mg/kg in MW-3 at 16'. Benzene, toluene, ethylbenzene and xylenes were detected up to 0.42 mg/kg, 2.1 mg/kg, 6.5 mg/kg, and 11 mg/kg, respectively in soil sample MW-3 16'. Please refer to Table 2 for detailed results of the soil sample analysis.

Three groundwater samples were analyzed for Total Petroleum Hydrocarbons as gasoline (TPH-g), methyl tertiary butyl ether (MTBE), and benzene, toluene, ethylbenzene and xylenes (BTEX) by EPA methods 5030, 8015 and 8020.

Gasoline range hydrocarbons were detected up to 12,000 ug/L in well MW-3. Slightly elevated concentrations of benzene, toluene, ethylbenzene and xylenes (BTEX) were detected in all the groundwater samples with the highest levels existing in MW-3.

Please refer to Table 3 for detailed results of groundwater analyses. Laboratory results and chain of custody documentation for both soil and groundwater samples are included in Appendix D.

## 8.0 SUMMARY AND RECOMMENDATIONS

AEI advanced a total of three soil borings during this investigation, which were converted to groundwater monitoring wells. Soil and groundwater samples were analyzed to assess the extent of impacted soil beneath the site and to monitor the extent and magnitude of the dissolved hydrocarbon plume beneath the site.

Soil sample analysis indicates that slightly elevated concentrations of gasoline range hydrocarbons remain in the soil, in particular in MW-3. Dissolved hydrocarbons appear to have

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migrated to the south/southeast of the former tanks. Gasoline range hydrocarbons are significant in the groundwater in MW-1 through MW-3.

Continued groundwater monitoring and sample collection and analysis are planned. Groundwater samples from wells MW-1 through MW-3 will continued to be analyzed for Total Petroleum Hydrocarbons as gasoline (TPH-g), methyl tertiary butyl ether (MTBE), and benzene, toluene, ethylbenzene and xylenes (BTEX) by EPA methods 5030, 8015 and 8020. The next episode of sampling is scheduled for January 2001.

## 9.0 REPORT LIMITATIONS AND SIGNATURES

This report presents a summary of work completed by AEI, including observations and descriptions of site conditions. Where appropriate, it includes analytical results for samples taken during the course of the work. The number and location of samples are chosen to provide required information, but it cannot be assumed that they are entirely representative of all areas not sampled. All conclusions and recommendations are based on these analyses, observations, and the governing regulations. Conclusions beyond those stated and reported herein should not be inferred from this document.

These services were performed in accordance with generally accepted practices in the environmental engineering and construction field that existed at the time and location of the work.

Please contact the undersigned or Peter McIntyre for questions regarding the findings outlined in this report.

Sincerely,



Orion Alcalay  
Environmental Scientist



Joseph P. Derhake  
Senior Project Engineer, Principal



**AEI**





FROM:  
USGS OAKLAND EAST QUADRANGLE  
1959 PHOTOREVISED 1980

**AEI CONSULTANTS**  
3210 OLD TUNNEL RD, SUITE B, LAFAYETTE, CA  
**SITE LOCATION MAP**

1450 FRUITVALE AVENUE  
OAKLAND, CALIFORNIA

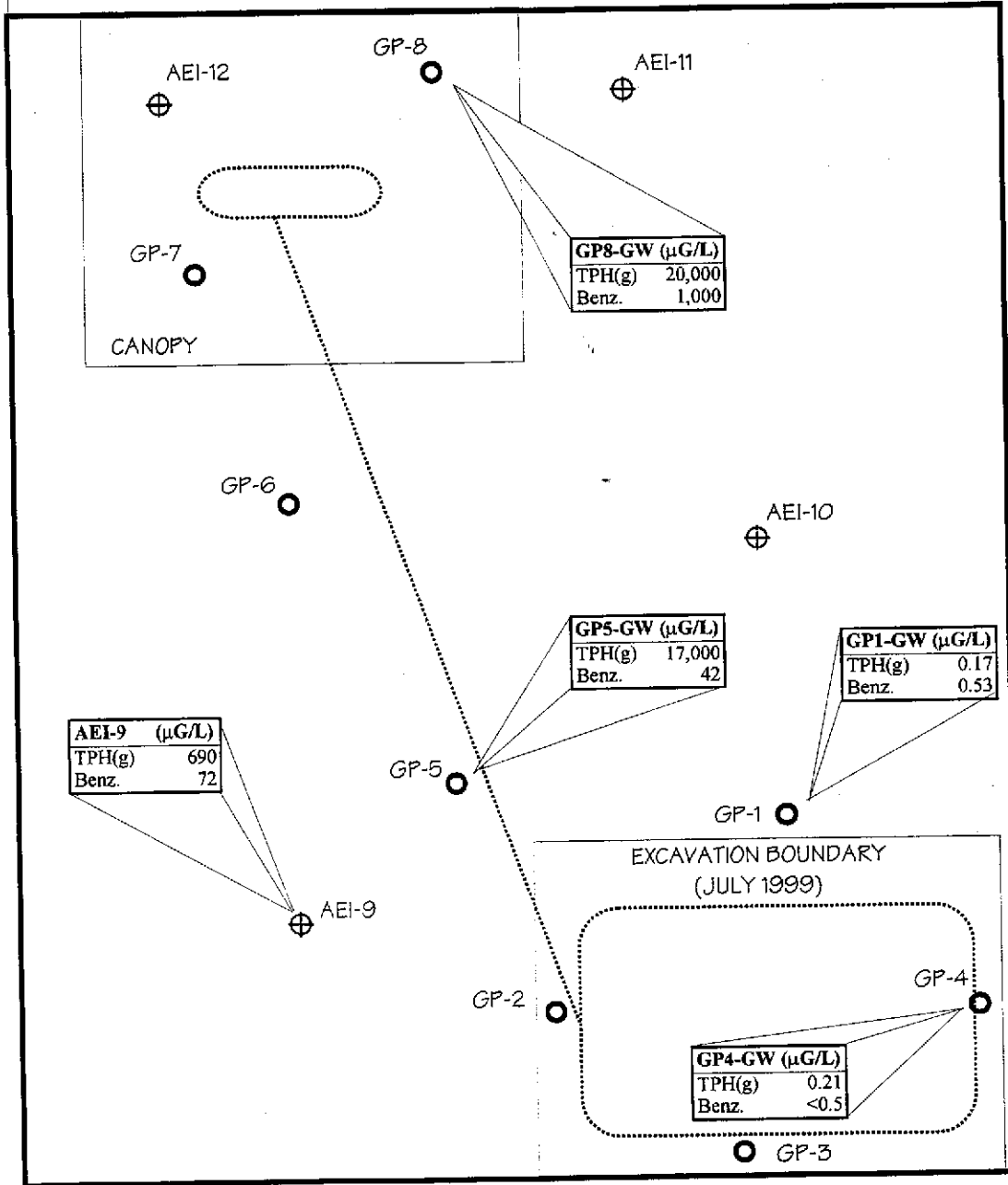
FIGURE 1

FRUITVALE AVENUE

SIDEWALK

BUILDING

BUILDING



SIDEWALK

FARNAM STREET

**KEY**

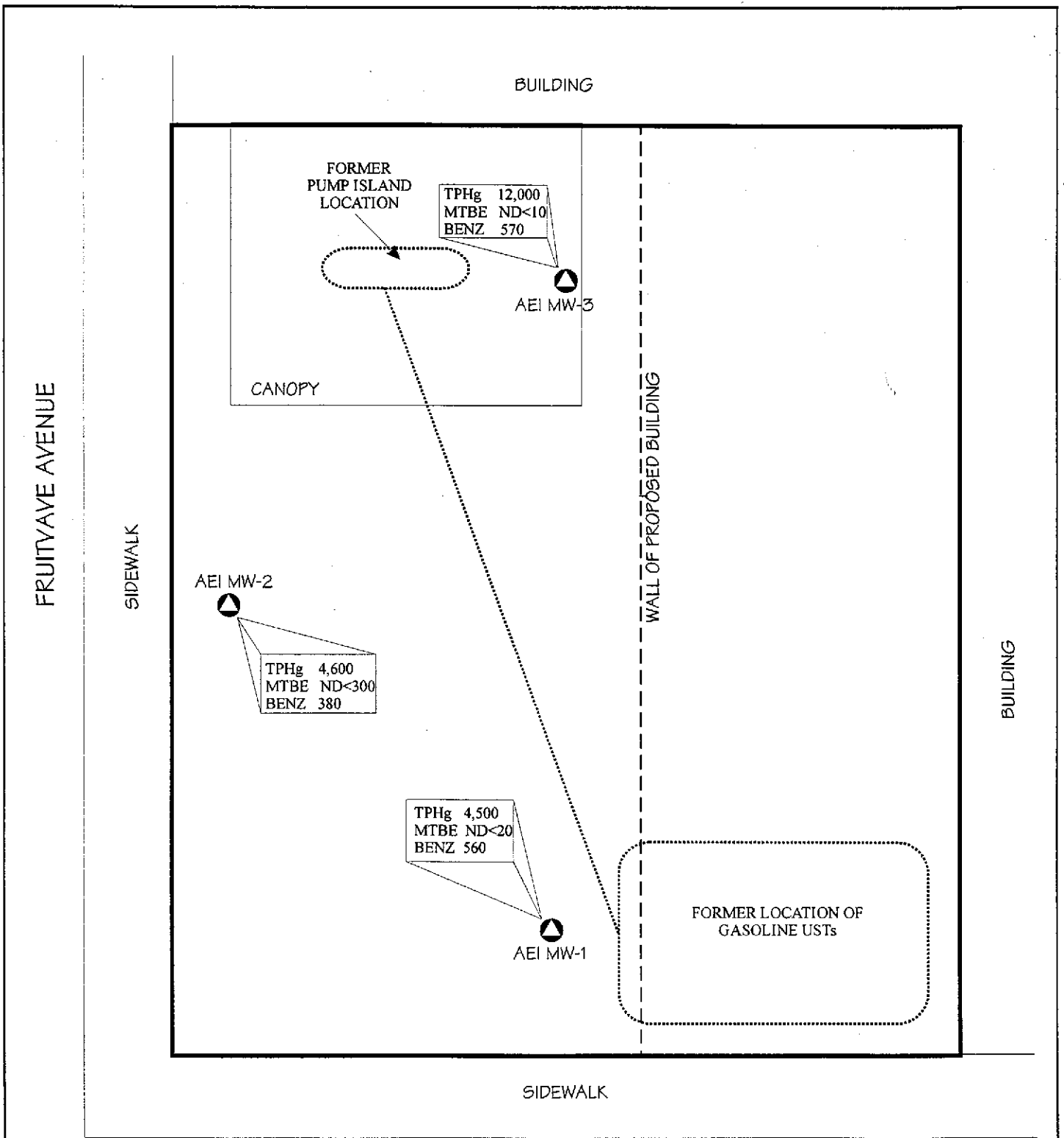
- ⊕ BORING LOCATIONS PERFORMED BY AEI AUGUST 24, 1999
- APPROXIMATE LOCATIONS OF SAMPLING PERFORMED BY GLENFOS; JULY, 1998
- TPH(G) = Total Petroleum Hydrocarbons as gasoline
- Benz. = Benzene

SCALE: 1" = 10'



**AEI CONSULTANTS**  
 3210 OLD TUNNEL RD, SUITE B, LAFAYETTE, CA  
 PREVIOUS SOIL BORING LOCATIONS  
 WITH GROUNDWATER SAMPLE ANALYTICAL

1450 FRUITVALE AVENUE OAKLAND, CALIFORNIA	<b>FIGURE 2</b>
--	-----------------



**KEY**

▲ WELL LOCATIONS INSTALLED BY AEI

TPHg = Total Petroleum Hydrocarbons as gasoline  
 MTBE = Methyl Tertiary Butyl Ether  
 Benz = Benzene

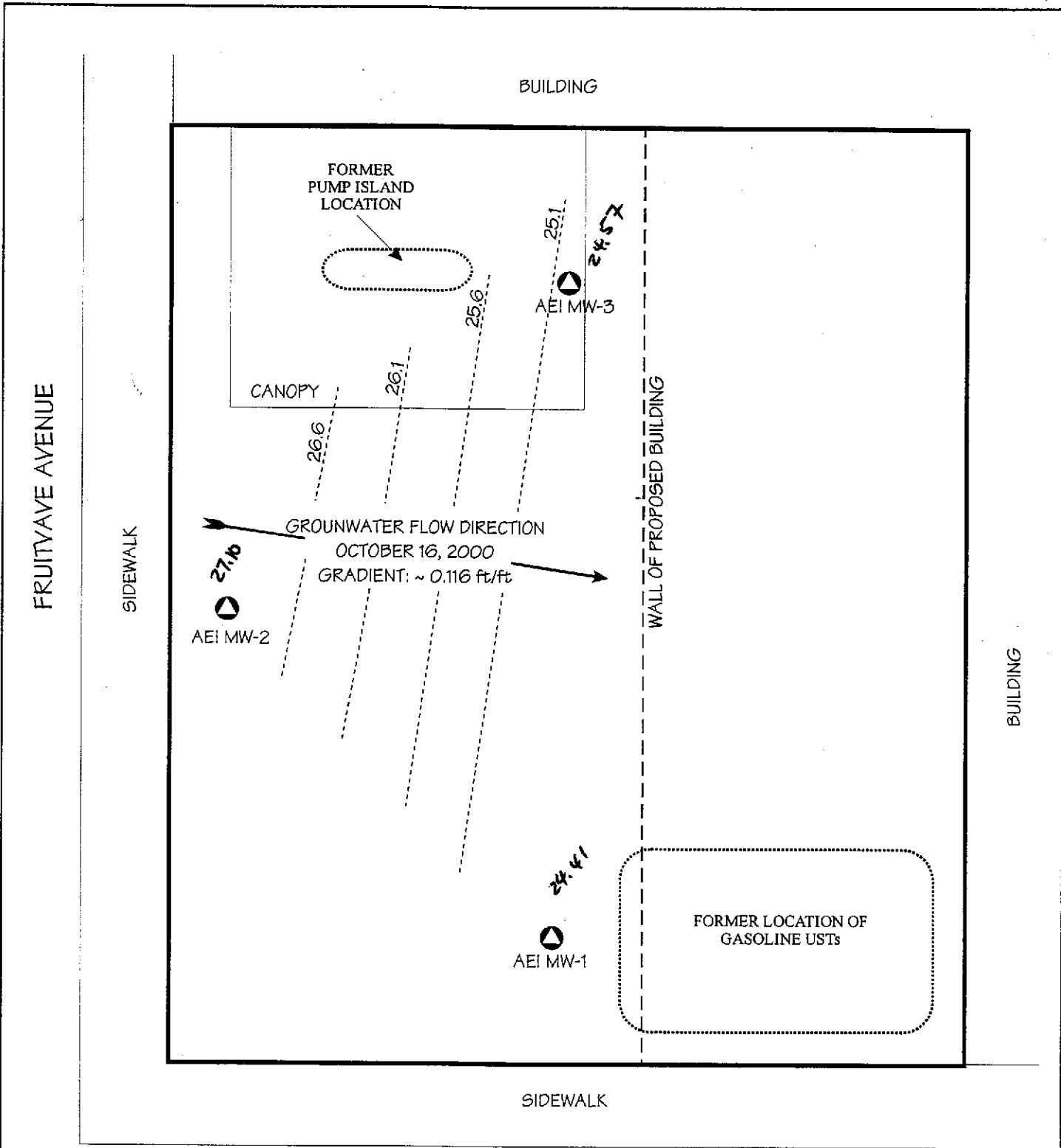
All samples measured in ug/L  
 (micrograms per Liter)

SCALE: 1" = 10'

**AEI CONSULTANTS**  
 3210 OLD TUNNEL RD, SUITE B, LAFAYETTE, CA

WELL LOCATIONS WITH  
 GROUNDWATER SAMPLE ANALYTICAL


1450 FRUITVALE AVENUE OAKLAND, CALIFORNIA	<b>FIGURE 3</b>
--	-----------------



**KEY**

- WELL LOCATIONS INSTALLED BY AEI
- 26.6 GROUNDWATER ELEVATION CONTOUR (FEET) 10/16/00

SCALE: 1" = 10'



FARNAM STREET

**AEI CONSULTANTS**  
 3210 OLD TUNNEL RD, SUITE B, LAFAYETTE, CA

WELL LOCATIONS WITH  
 GROUNDWATER GRADIENT MAP

1450 FRUITVALE AVENUE  
 OAKLAND, CALIFORNIA

**FIGURE 4**

**Table 1**  
**Groundwater Elevations**

Well ID	Date	Well Elevation (ft msl)	Depth to Water (ft)	Groundwater Elevation (ft msl)
MW-1	10/16/00	42.13	17.72	24.41
MW-2	10/16/00	42.08	14.98	27.10
MW-3	10/16/00	42.55	17.98	24.57

Notes:

All well elevations are measured from the top of the casing and not from the ground surface  
ft msl = feet above mean sea level

**Table 2:  
Soil Sample Analytical Results-October 2000**

Sample ID	TPH-g mg/kg	MTBE mg/kg	Benzene mg/kg	Toluene mg/kg	Ethyl- benzene mg/kg	Xylenes mg/kg
MW-1 6.5'	<1.0	<.05	<.005	<.005	<.005	<.005
MW-1 11.5'	15.0 ✓	<.05	<.005	0.31	<.005	0.011
MW-2 6.5'	<1.0	<.05	<.005	<.005	<.005	<.005
MW-2 11'	73.0 ✓	<.05	<.005	0.044	0.0080	0.040
MW-3 6.5'	<1.0	<.05	<.005	<.005	<.005	<.005
<del>MW-3 16'</del>	360.0 ✓	<1.0	0.42	2.1	6.5	11.0
MRL	1.0	0.05	0.005	0.005	0.005	0.005

14g @ 16.5'  
11g @ 6.5'?

MRL = Method Reporting Limit  
 TPH-g = Total Petroleum Hydrocarbons as gasoline  
 MTBE = Methyl tertiary butyl ether  
 mg/kg = milligram per kilogram

**Table 3**  
**Groundwater Sample Analytical Data-October 2000**

Well/Sample ID	Date Collected	Consultant Lab	TPHg µg/L	MTBE µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Xylenes µg/L
MW-1	10/16/00	AEI/MAI	4,500	ND<20	560	14	53	62
MW-2	10/16/00	AEI/MAI	4,600	ND<300	380	3.8	95	33
MW-3	10/16/00	AEI/MAI	12,000	ND<10	570	32	680	1,200
MRL			50.0	5.0	0.5	0.5	0.5	0.5

MRL = Maximum Reporting Limit

µg/L micrograms per liter

AEI AEI Consultants

MAI McCampbell Analytical, Inc.

TPHg total petroleum hydrocarbons as gasoline

MTBE methyl tertiary butyl ether

ND not detected

**Table 4:  
Previous Soil Sample Analytical Results**

Sample ID	Consultant	Sample Date	TPH-g mg/kg	MTBE mg/kg	Benzene mg/kg	Toluene mg/kg	Ethyl Benzene mg/kg	Xylenes mg/kg	Total Lead mg/kg
GP-1 10'	Glenfos	7/9/98	10	-	<0.005	0.022	0.015	<0.01	-
GP-2 10'	Glenfos	7/9/98	1.5	-	0.017	<0.005	<0.005	<0.01	-
GP-2 15'	Glenfos	7/9/98	27	-	0.017	0.056	0.052	0.51	-
GP-2 30'	Glenfos	7/9/98	2.5	-	<0.005	<0.005	<0.005	<0.01	-
GP-3 10'	Glenfos	7/9/98	95	-	0.59	0.42	1.1	1.5	7.3
GP-3 15'	Glenfos	7/9/98	2.5	-	0.055	0.018	0.055	0.26	-
GP-3 20'	Glenfos	7/9/98	1.6	-	0.02	<0.005	0.02	0.032	-
GP-3 25'	Glenfos	7/9/98	<1	-	<0.005	<0.005	<0.005	<0.01	-
GP-4 10'	Glenfos	7/9/98	2.5	-	0.017	<0.005	0.003	0.021	4.1
GP-5 10'	Glenfos	7/9/98	6.5	-	<0.005	0.022	0.018	0.041	-
GP-5 15'	Glenfos	7/9/98	19	-	0.077	0.016	0.43	0.49	-
GP-5 20'	Glenfos	7/9/98	<1	-	<0.005	<0.005	<0.005	<0.01	-
GP-6 5'	Glenfos	7/9/98	<1	-	<0.005	<0.005	<0.005	<0.01	-
GP-6 10'	Glenfos	7/9/98	7.7	-	0.008	0.015	0.012	0.047	6.2
GP-6 15'	Glenfos	7/9/98	190	-	0.34	0.53	2.3	4.7	-
GP-6 20'	Glenfos	7/9/98	28	-	0.083	0.081	0.052	0.19	-
GP-7 10'	Glenfos	7/9/98	86	-	<0.005	0.088	0.09	0.5	-
GP-7 15'	Glenfos	7/9/98	2.7	-	0.008	0.012	<0.005	0.031	-
GP-8 10'	Glenfos	7/9/98	24	-	0.022	0.061	0.071	0.45	-
GP-8 15'	Glenfos	7/9/98	5.8	-	0.021	0.014	0.022	0.06	-
GP-8 20'	Glenfos	8/23/99	<1	-	<0.005	<0.005	<0.005	<0.01	-
AEI-9 10'	AEI	8/23/99	<1	<0.05	<0.005	<0.005	<0.005	<0.005	-
AEI-9 20'	AEI	8/23/99	<1	<0.05	<0.005	<0.005	<0.005	<0.005	-
AEI-10 10'	AEI	8/23/99	77	<0.05	<0.005	<0.005	0.078	<0.005	-
AEI-10 15'	AEI	8/23/99	69	0.071	0.1	0.21	0.23	<0.005	-
AEI-11 10'	AEI	8/23/99	<1	<0.05	<0.005	<0.005	<0.005	<0.005	-
AEI-11 15'	AEI	8/23/99	210	<0.40	<0.020	1.1	1.2	2.4	-
AEI-12 10'	AEI	8/23/99	24	<0.05	<0.005	0.12	<0.005	<0.005	-
AEI-12 15'	AEI	8/23/99	120	<0.40	<0.020	<0.020	1.6	1.6	-
MDL			1.0	0.05	0.005	0.005	0.005	0.005	

MDL = Method Detection Limit

mg/kg = milligrams per kilogram (ppm)

- Sample not analyzed for this chemical

TPH-g = Total petroleum hydrocarbons as gasoline



**Table 5:  
Previous Groundwater Sample Analytical Results**

Sample ID	Consultant	Sample Date	TPH-g µg/L	MTBE µg/L	Benzene µg/L	Toluene µg/L	Ethyl- Benzene µg/L	Xylenes µg/L	Lead µg/L
GP 1	Glenfos	7/9/98	170	-	0.53	<0.5	1.2	2.0	-
GP 4	Glenfos	7/9/98	210	-	<0.5	<0.5	0.58	<1	11
GP 5	Glenfos	7/9/98	17,000	-	42	24	820	110	-
GP 8	Glenfos	7/9/98	20,000	<10	1,000	19	420	290	9.5
AEI-9W	AEI	8/23/99	690	3.8	72	0.79	29	24	-
MDL			50	5.0	0.5	0.5		1.5	2.5

MDL = Method Detection Limit

ND = Not detected above the Method Detection Limit (unless otherwise noted)

µg/L = micrograms per liter (ppb)

mg/L = milligrams per liter (ppm)

- Sample not analyzed for this chemical

TPH-g = Total petroleum hydrocarbons as gasoline

**APPENDIX A**  
**PERMIT DOCUMENTATION**



**ALAMEDA COUNTY PUBLIC WORKS AGENCY**

**WATER RESOURCES SECTION**  
 399 ELMHURST ST. MAYWARD CA. 94544-1395  
 PHONE (510) 670-4854 MARLON MAGALLANES/FRANK CODD (510) 670-5783  
 FAX (510) 670-1939

**DRILLING PERMIT APPLICATION**

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT 1450 FRUITVALE AVE  
OAKLAND CA  
X STREET & FARNUM

PERMIT NUMBER W00-589  
 WELL NUMBER \_\_\_\_\_  
 APN \_\_\_\_\_

**PERMIT CONDITIONS**  
 Circled Permit Requirements Apply

CLIENT  
 Name JAY PHARES CORP.  
 Address 10700 FORTMILL BLVD Phone 510-562-9500  
 City OAKLAND Zip 94605

- 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 Well Completion Report.
  3. Permit is void if project not begun within 90 days of approval date.

APPLICANT  
 Name AEI CONSULTANTS  
 Address 3210 OLD TUNNEL RD Phone 283-6000  
 City LA FAYETTE Zip 94549

- 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.

**TYPE OF PROJECT**

Well Construction	<input type="checkbox"/>	Geotechnical Investigation	<input type="checkbox"/>
Cathodic Protection	<input type="checkbox"/>	General	<input type="checkbox"/>
Water Supply	<input type="checkbox"/>	Contamination	<input type="checkbox"/>
Monitoring	<input checked="" type="checkbox"/>	Well Destruction	<input type="checkbox"/>

- 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.

**PROPOSED WATER SUPPLY WELL USE**

New Domestic	<input type="checkbox"/>	Replacement Domestic	<input type="checkbox"/>
Municipal	<input type="checkbox"/>	Irrigation	<input type="checkbox"/>
Industrial	<input type="checkbox"/>	Other <u>Monitoring</u>	<input checked="" type="checkbox"/>

- D. GEOTECHNICAL**  
 Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings.

**DRILLING METHOD:**

Mud Rotary	<input type="checkbox"/>	Air Rotary	<input type="checkbox"/>	Auger	<input checked="" type="checkbox"/>
Cable	<input type="checkbox"/>	Other	<input type="checkbox"/>	<u>HOLLOW-STEM</u>	

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

DRILLER'S LICENSE NO. 512268  
Spectrum Exploration, INC. 4-30-01

- F. WELL DESTRUCTION**  
 Send a map of work site. A separate permit is required for wells deeper than 45 feet.

**WELL PROJECT'S**

Drill Hole Diameter	<u>10.5</u> in.	Maximum Depth	<u>35</u> ft.
Casing Diameter	<u>8</u> in.	Number	<u>AEI-MW1</u>
Surface Seal Depth	<u>10</u> ft.		

- G. SPECIAL CONDITIONS**

**GEOTECHNICAL PROJECTS**

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

ESTIMATED STARTING DATE Mon 9/25/00  
 ESTIMATED COMPLETION DATE Mon 9/25/00

APPROVED [Signature] DATE 9-19-00

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 72-68.

APPLICANT'S SIGNATURE [Signature] DATE 9/18/00

PLEASE PRINT NAME NICK WALCZAK Rev. 4-4-00  
AEI CONSULTANTS



# ALAMEDA COUNTY PUBLIC WORKS AGENCY

**WATER RESOURCES SECTION**  
399 ELMHURST ST. HAYWARD CA. 94544-1395  
PHONE (510) 670-8554 MARLON MAGALLANES/FRANK CODD (510) 670-5783

## DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT 1450 FRUITVALE AVE  
OAKLAND CA  
X STREET & FARMWAY

PERMIT NUMBER WCO-590  
WELL NUMBER \_\_\_\_\_  
APN \_\_\_\_\_

CLIENT  
Name JAY PHARES CORP.  
Address 18700 Foothill Blvd Phone 510-562-9500  
City Oakland Zip 94605

APPLICANT  
Name AEI CONSULTANTS  
Address 3210 Old Tunnel Rd Phone 925-283-6121  
City Lafayette Zip 94549

### 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 Monitoring

### DRILLING METHOD:

Mud Rotary  Air Rotary  Auger   
Cable  Other  HOLLOW-STEM

DRILLER'S LICENSE NO. 512268  
Spectrum Exploration, EXP 4-30-01

### WELL PROJECTS

Drill Hole Diameter 10.5 in. Maximum \_\_\_\_\_  
Casing Diameter 8 in. Depth 35 ft.  
Surface Seal Depth 10 ft. Number AEI-MWZ

### GEOTECHNICAL PROJECTS

Number of Borings \_\_\_\_\_ Maximum \_\_\_\_\_  
Hole Diameter \_\_\_\_\_ in. Depth \_\_\_\_\_ ft.

ESTIMATED STARTING DATE Mon 9/25/00  
ESTIMATED COMPLETION DATE Mon 9/25/00

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

APPLICANT'S SIGNATURE Nick Walchuk DATE 9/18/00

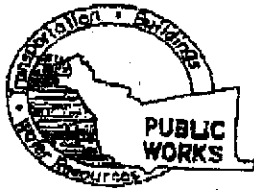
PLEASE PRINT NAME NICK WALCHUK Rev. 4-4-00  
AEI CONSULTANTS

### 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- Well Completion Report.
  - 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 by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings.
- E. CATHODIC**  
Fill hole above anode zone with concrete placed by tremie.
- F. WELL DESTRUCTION**  
Send a map of work site. A separate permit is required for wells deeper than 45 feet.
- G. SPECIAL CONDITIONS**

APPROVED [Signature] DATE 9-19-00



# ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION  
399 ELMHURST ST. HAYWARD CA. 94544-1393  
PHONE (510) 470-6554 MARLON MAGALLANES/FRANK COBB (510) 670-5783  
FAX (510) 470-1939

## DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT 1450 FRUITVINE AVE  
OAKLAND CA  
X STREET X BARNUM

PERMIT NUMBER W00-591  
WELL NUMBER \_\_\_\_\_  
APN \_\_\_\_\_

CLIENT  
Name JAY PHARES CORP.  
Address 10700 FORTMILL BLVD Phone 510-562-9500  
City OAKLAND Zip 94605

APPLICANT  
Name AEI CONSULTANTS  
Address 3210 OLD TUNNEL RD Phone 925-253-6121  
City LAFAYETTE Zip 94549

### 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 Monitoring

### DRILLING METHOD:

Mud Rotary  Air Rotary  Auger   
Cable  Other  HOLLOW STEM

### DRILLER'S LICENSE NO.

512268  
Spectrum Exploration, exp. 4-30-01

### WELL PROJECTS

Drill Hole Diameter 10.5 in. Maximum Depth 35 ft.  
Casing Diameter 2 in. Number AEI-MW3  
Surface Seal Depth 10 ft.

### GEOTECHNICAL PROJECTS

Number of Borings \_\_\_\_\_ Maximum Depth \_\_\_\_\_ ft.  
Hole Diameter \_\_\_\_\_ in.

ESTIMATED STARTING DATE Mon 9/25/00  
ESTIMATED COMPLETION DATE Mon 9/25/00

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

APPLICANT'S SIGNATURE Nick Walchuk DATE 9/18/00

PLEASE PRINT NAME NICK WALCHUK Rev. 4-4-00  
AEI CONSULTANTS

### 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-Well Completion Report.
  - 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 by tremie with cement grout or cement grout/sand mixture. Upper two-thirds feet replaced in kind or with compacted cuttings.
- E. CATHODIC**  
Fill hole above anode zone with concrete placed by tremie.
- F. WELL DESTRUCTION**  
Send a map of work site. A separate permit is required for wells deeper than 45 feet.
- G. SPECIAL CONDITIONS**

APPROVED [Signature] DATE 9-19-00

**APPENDIX B**  
**SOIL BORING LOGS**

Project No: 3581

Sheet: 1 of 1

Project Name: Jay Phares Corp.

**Log of Borehole: MW-1**

Client: Ken Phares

Location: 1450 Fruitvale Avenue

Depth ft m	Soil Symbol	Subsurface Description	Sample Data				Well Data	Remarks
			Sample Label	Type	Blow Counts/	Recovery		
0		Ground Surface						
1		<b>CLAY</b>						
2								
3								
4								
5								
6								
7		dark silty clay	MW-1	SS				PID= 3 ppm, no odor
8								
9								
10								
11								
12		sandy clay w/coarse gravel	MW-1	SS				PID= 193 ppm, grey green staining, strong odor
13								
14								
15								
16								
17								
18								
19								
20								
21								
22		<b>SAND</b>	MW-1	SS				PID= 29 ppm, wet grey
23		sandy gravel						
24								
25								
26								
27								
28								
29								
30								
31		End of Borehole						
32								

Drill Date 09/25/00

Reviewed by: PM

AEI Consultants  
3210 Old Tunnel Road, Suite B  
Lafayette, CA 94549  
(925) 283-6000

Drill Method: HS

Logged by: NW

Total Depth: 30'

Depth to Water: ~15'

Project No: 3581


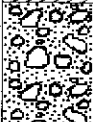
Sheet: 1 of 1

Project Name: Jay Phares Corp.

**Log of Borehole: MW-2**

Client: Ken Phares

Location: 1450 Fruitvale Avenue

Depth ft m	Soil Symbol	Subsurface Description	Sample Data				Well Data	Remarks
			Sample Label	Type	Blow Counts/	Recovery		
0		Ground Surface						
1		<b>CLAY</b> dark silty clay						
2								
3								
4								
5								
6								
7		sandy clay, coarse gravel	MW-2	SS			PID= 0 ppm, no odor	
8								
9								
10								
11		<b>SAND</b> gravelly sand	MW-2	SS			PID= 368 ppm, strong odor green staining, tree roots present	
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22			MW-2	SS			PID= 10 ppm, wet noticeable odor, green staining	
23								
24								
25								
26								
27								
28								
29								
30								
31		End of Borehole						
32								

Drill Date 09/25/00

Reviewed by: PM

AEI Consultants  
3210 Old Tunnel Road, Suite B  
Lafayette, CA 94549  
(925) 283-6000

Drill Method: HS

Logged by: NW

Total Depth: 30'

Depth to Water: ~15'



Project No: 3581

Sheet: 1 of 1

Project Name: Jay Phares Corp.

**Log of Borehole: MW-3**

Client: Ken Phares

Location: 1450 Fruitvale Avenue

Depth ft m	Soil Symbol	Subsurface Description	Sample Data				Well Data	Remarks
			Sample Label	Type	Blow Counts/	Recovery		
0		Ground Surface						
1		<b>CLAY</b> brown silty clay w/ organic matter to 5'						
2								
3								
4								
5								
6								
7		stiff silty clay	MW-3	SS			PID= 20 ppm, dark green staining, strong odor	
8								
9								
10								
11								
12		stiff silty clay	MW-3	SS			PID= 220 ppm, green staining strong odor	
13		silty gravelly clay intermixed w/coarse gravel						
14								
15								
16								
17		stiff silty clay	MW-3	SS			PID= 522 ppm, light grey green staining, strong odor	
18								
19								
20								
21								
22		gravelly sandy clay / light brown clayey sand	MW-3	SS			PID= 19 ppm, light odor	
23								
24								
25								
26								
27		gravelly sandy silt, light brown	MW-3	SS			no odor or staining	
28								
29								
30								
31		End of Borehole						
32								

Drill Date 09/25/00

Reviewed by: PM

AEI Consultants  
3210 Old Tunnel Road, Suite B  
Lafayette, CA 94549  
(925) 283-6000

Drill Method: HS

Logged by: NW

Total Depth: 30'

Depth to Water: ~15'

**ATTACHMENT C**

**WELL FIELD SAMPLING FORMS**

**AEI CONSULTANTS - GROUNDWATER MONITORING WELL FIELD  
SAMPLING FORM**

**Monitoring Well Number: MW-1**

Project Name: Jay Phares	Date of Sampling: 10/16/00
Job Number: 3581	Name of Sampler: DR
Project Address: 1450 Fruitvale Avenue	

**MONITORING WELL DATA**

Well Casing Diameter (2"/4"/6")	2"
Seal at Grade -- Type and Condition	Cement, good
Well Cap & Lock -- OK/Replace	OK
Elevation of Top of Casing	42.13
Depth of Well	28.00
Depth to Water	17.72
Water Elevation	24.41
<b>Three Well Volumes (gallons)*</b>	
2" casing: (TD - DTW)(0.16)(3)	4.93
4" casing: (TD - DTW)(0.65)(3)	
6" casing: (TD - DTW)(1.44)(3)	
Actual Volume Purged (gallons)	6
Appearance of Purge Water	Clear

**GROUNDWATER SAMPLES**

Number of Samples/Container Size	2 VOAs
----------------------------------	--------

Time	Vol Remvd (gal)	Temp (deg F)	pH	Cond (mS)	Comments
9:35	1	74.3	6.60	1128	2 samples
9:37	3	72.4	6.82	1080	
9:39	5	71.3	6.82	1073	

COMMENTS (i.e., sample odor, well recharge time & percent, etc.)

TD - Total Depth of Well  
DTW - Depth To Water

**AEI CONSULTANTS - GROUNDWATER MONITORING WELL FIELD  
SAMPLING FORM**

**Monitoring Well Number: MW-2**

Project Name: Jay Phares	Date of Sampling: 10/16/00
Job Number: 3581	Name of Sampler: DR
Project Address: 1450 Fruitvale Avenue	

**MONITORING WELL DATA**

Well Casing Diameter (2"/4"/6")	2"
Seal at Grade -- Type and Condition	Cement, good
Well Cap & Lock -- OK/Replace	OK
Elevation of Top of Casing	42.08
Depth of Well	28.00
Depth to Water	14.98
Water Elevation	27.10
<b>Three Well Volumes (gallons)*</b>	
2" casing: (TD - DTW)(0.16)(3)	6.25
4" casing: (TD - DTW)(0.65)(3)	
6" casing: (TD - DTW)(1.44)(3)	
Actual Volume Purged (gallons)	7
Appearance of Purge Water	Clear

**GROUNDWATER SAMPLES**

Number of Samples/Container Size		2 VOAs			
Time	Vol Remvd (gal)	Temp (deg F)	PH	Cond (mS)	Comments
9:46	1	78.2	6.98	1231	
9:50	3	75.4	6.79	1239	
9:53	5	75.2	6.94	1221	

COMMENTS (i.e., sample odor, well recharge time & percent, etc.)

TD - Total Depth of Well  
DTW - Depth To Water

**AEI CONSULTANTS - GROUNDWATER MONITORING WELL FIELD  
SAMPLING FORM**

**Monitoring Well Number: MW-3**

Project Name: Jay Phares	Date of Sampling: 10/16/00
Job Number: 3581	Name of Sampler: DR
Project Address: 1450 Fruitvale Avenue	

**MONITORING WELL DATA**

Well Casing Diameter (2"/4"/6")	2"
Seal at Grade -- Type and Condition	Cement, good
Well Cap & Lock -- OK/Replace	OK
Elevation of Top of Casing	42.55
Depth of Well	28.00
Depth to Water	17.98
Water Elevation	24.57
<b>Three Well Volumes (gallons)*</b>	
2" casing: (TD - DTW)(0.16)(3)	4.8
4" casing: (TD - DTW)(0.65)(3)	
6" casing: (TD - DTW)(1.44)(3)	
Actual Volume Purged (gallons)	6
Appearance of Purge Water	Clear

**GROUNDWATER SAMPLES**

Number of Samples/Container Size	2 VOAs
----------------------------------	--------

Time	Vol Remvd (gal)	Temp (deg F)	PH	Cond (mS)	Comments
10:05	1	74.8	6.98	1280	
10:09	3	75.1	6.98	1218	
10:13	5	73.1	6.74	1210	

COMMENTS (i.e., sample odor, well recharge time & percent, etc.)

TD - Total Depth of Well  
DTW - Depth To Water

**APPENDIX D**

**LABORATORY ANALYSES WITH  
CHAIN OF CUSTODY DOCUMENTATION**



**McCAMPBELL ANALYTICAL INC.**

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560  
 Telephone : 925-798-1620 Fax : 925-798-1622  
<http://www.mccampbell.com> E-mail: main@mccampbell.com

All Environmental, Inc. 3210 Old Tunnel Road, Suite B Lafayette, CA 94549-4157	Client Project ID: #3581; Jay Phares	Date Sampled: 09/25/00
		Date Received: 09/26/00
	Client Contact: Nick Walchuk	Date Extracted: 09/26-09/29/00
	Client P.O.:	Date Analyzed: 09/26-09/29/00

**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) <sup>+</sup>	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	% Recovery Surrogate
48638	AEI-MW1 6.5'	S	ND	ND	ND	ND	ND	ND	104
48639	AEI-MW1 11.5'	S	15,j	ND	ND	0.31	ND	0.011	98
48641	AEI-MW2 6.5'	S	ND	ND	ND	ND	ND	ND	104
48642	AEI-MW2 11'	S	73,g,j	ND	ND	0.044	0.0080	0.040	85
48644	AEI-MW3 6.5'	S	ND	ND	ND	ND	ND	ND	101
48646	AEI-MW3 16'	S	360,a	ND<1	0.42	2.1	6.5	11	--- <sup>#</sup>
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, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/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.

Edward Hamilton, Lab Director



McCAMPBELL ANALYTICAL INC.

110 2nd Ave. South, #D7, Pacheco, CA 94553-5560  
 Telephone : 925-798-1620 Fax : 925-798-1622  
<http://www.mccampbell.com> E-mail: main@mccampbell.com

## QC REPORT

Date: 09/26/00 Matrix: Soil

Extraction: N/A

Compound	Concentration: mg/kg				%Recovery		RPD
	Sample	MS	MSD	Amount Spiked	MS	MSD	

SampleID: 38430

Instrument: GC-7

Surrogate1	0.000	99.0	98.0	100.00	99	98	1.0
Xylenes	0.000	310.0	308.0	300.00	103	103	0.6
Ethyl Benzene	0.000	99.0	100.0	100.00	99	100	1.0
Toluene	0.000	101.0	99.0	100.00	101	99	2.0
Benzene	0.000	99.0	98.0	100.00	99	98	1.0
MTBE	0.000	114.0	104.0	100.00	114	104	9.2
GAS	0.000	1043.2	1029.9	1000.00	104	103	1.3

SampleID: 92600

Instrument: MB-1

Oil & Grease	0.000	19.4	19.6	20.00	97	98	1.0
--------------	-------	------	------	-------	----	----	-----

SampleID: 39269

Instrument: GC-2 A

Surrogate1	0.000	98.0	98.0	100.00	98	98	0.0
TPH (diesel)	0.000	281.0	276.0	300.00	94	92	1.8

SampleID: 39269

Instrument: IR-1

TRPH	0.000	22.3	21.0	20.80	107	101	6.0
------	-------	------	------	-------	-----	-----	-----

$$\% \text{ Recovery} = \frac{(MS - \text{Sample})}{\text{Amount Spiked}} \cdot 100$$

$$\text{RPD} = \frac{(MS - MSD)}{(MS + MSD)} \cdot 2 \cdot 100$$

RPD means Relative Percent Deviation







McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560  
Telephone : 925-798-1620 Fax : 925-798-1622  
<http://www.mccampbell.com> E-mail: [main@mccampbell.com](mailto:main@mccampbell.com)

All Environmental, Inc. 3210 Old Tunnel Road, Suite B Lafayette, CA 94549-4157	Client Project ID: #3581; Jay Phares-Corp	Date Sampled: 10/16/00
	Client Contact: Peter McIntyre	Date Received: 10/17/00
	Client P.O:	Date Extracted: 10/17-10/20/00
		Date Analyzed: 10/17-10/20/00

**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) <sup>+</sup>	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	% Recovery Surrogate
50608	MW-1	W	4500,a	ND<20	560	14	53	62	109
50609	MW-2	W	4600,a	ND<300	380	3.8	95	33	---
50610	MW-3	W	12,000,a	ND<10	570	32	680	1200	111
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, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

<sup>+</sup> cluttered chromatogram; sample peak coelutes with surrogate peak

<sup>+</sup>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.



### QC REPORT

Date: 10/17/00 Matrix: Water

Extraction: N/A

Compound	Concentration: ug/L				%Recovery		RPD
	Sample	MS	MSD	Amount Spiked	MS	MSD	

SampleID: 101600

Instrument: GC-12

Surrogate1	0.000	97.0	95.0	100.00	97	95	2.1
Xylenes	0.000	311.0	315.0	300.00	104	105	1.3
Ethyl Benzene	0.000	105.0	105.0	100.00	105	105	0.0
Toluene	0.000	102.0	102.0	100.00	102	102	0.0
Benzene	0.000	104.0	104.0	100.00	104	104	0.0
MTBE	0.000	100.0	97.0	100.00	100	97	3.0
GAS	0.000	940.2	812.0	1000.00	94	81	14.6

SampleID: 101700

Instrument: MB-1

Oil & Grease	0.000	19.6	19.4	20.00	98	97	1.0
--------------	-------	------	------	-------	----	----	-----

SampleID: 101700

Instrument: GC-11 B

Surrogate1	0.000	119.0	120.0	100.00	119	120	0.8
TPH (diesel)	0.000	315.0	327.0	300.00	105	109	3.7

$$\% \text{ Recovery} = \frac{(MS - \text{Sample})}{\text{Amount Spiked}} \cdot 100$$

$$RPD = \frac{(MS - MSD)}{(MS + MSD)} \cdot 100$$

RPD means Relative Percent Deviation

