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11:25 am, Jun 20, 2007

Alameda County
Environmental Health

June 14, 2007

Mr. Francis Rush
c/o Rush Property Group, LLC
2200 Adeline Street, Suite 350
Oakland, California 94607

RE: Work Plan - Subsurface Investigation
1549 32nd Street, Oakland, California
ACC Project No. 6875-001.01

Dear Mr. Rush:

ACC Environmental Consultants, Inc., (ACC) presents this Additional Subsurface Investigation Work Plan to perform soil and groundwater investigation at 1549 32nd Street, Oakland, California (Site). To facilitate Alameda County Health Care Services (ACHCSA) review, an electronic copy of this Work Plan will be uploaded to ACHCSA's database and one copy emailed directly to Mr. Barney Chan for review and comment.

If you have any questions concerning this Work Plan, please call me at (510) 638-8400, ext. 109 or email me at ddement@accenv.com.

Sincerely,

David R. DeMent, PG, REA II
Division Manager / Senior Geologist

/krb:drd

Attachments

cc: Mr. Barney Chan, ACHCSA (1 copy)

WORK PLAN
ADDITIONAL SUBSURFACE SOIL AND GROUNDWATERINVESTIGATION

1549 32nd Street
Oakland, California

ACC Project Number: 6875-001.01

Prepared for:

Mr. Francis Rush
c/o Rush Property Group, LLC
2200 Adeline Street, Suite 350
Oakland, California 94607

June 14, 2007

Prepared by: ______________________
Ken Blume
Project Administrator

Reviewed by: ______________________
David R. DeMent, PG, REA II
Division Manager / Senior Geologist

REGISTERED GEOLOGIST DAVID R. DEMENT NO. 5874 STATE OF CALIFORNIA

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WORK PLAN
ADDITIONAL SUBSURFACE SOIL AND
GROUNDWATER INVESTIGATION

1549 32nd Street
Oakland, California

1.0 INTRODUCTION

ACC Environmental Consultants, Inc. (ACC) ACC Environmental Consultants, Inc., (ACC) has prepared this Work Plan to perform a subsurface investigation to address regulatory concerns for 1549 32nd Street, California (Site). The Site formerly operated as a steel foundry that heat-treated metal products, and the Client is pursuing full site closure from the Alameda County Health Care Services Agency (ACHCSA) as the lead regulatory agency.

ACC previously prepared and submitted a *Request for Regulatory Closure Summary* dated August 7, 2006 that summarized previous subsurface investigation and remediation work at the Site, and prepared an *Addendum to Request for Regulatory Closure Summary* dated December 14, 2006 that further elaborated on the issue of volatile organic compounds and perceived data gaps. ACHCSA subsequently responded with a request for additional investigation in a letter dated March 27, 2007.

The goals of the work summarized in this Work Plan are to: 1) collect representative media samples in the subsurface to address concerns summarized in the March 27, 2007 letter; 2) collect representative media samples to address significant data gaps identified during previous investigation; 3) log subsurface soils and first-encountered water-bearing zones to better assess migration potential; and 4) prepare a report of findings for review by ACHCSA.

2.0 BACKGROUND

The approximate 135 feet wide by 300 feet long rectangular property is located at 1549 32nd Street at the southeast corner of the intersection of Hannah and 32nd Streets (Figure 1). According to a January 4, 2001 *Phase I Environmental Site Assessment* Report prepared by Lumina Technologies, the property was developed with the current building in 1946. Oakland Fire Department records indicate the facility operated as Precision Cast, a steel foundry and heat-treating operation, since 1983.

2.1 Previous Site Investigation

In 1988, Property Contamination Control, Inc. (PCC) conducted a soil investigation consisting of four exploratory soil borings. PCC reported relatively minor concentrations of ethanol, methanol, 1,1-dichloroethene (1,1-DCE), and metals in soil. Soil sample locations and depths are unknown.

In March 2002, ERAS Environmental, Inc. (ERAS) advanced four soil borings with a hand auger and reported “elevated” concentrations of total recoverable petroleum hydrocarbons (TRPH) and relatively minor concentrations of benzene, toluene, ethylbenzene and total xylenes (BTEX) in soil at approximately 3.0 feet below ground surface (bgs) in three of the four soil borings. In November 2002, ERAS analyzed a sample of oil from an excavation pit located near the southeast corner of the building and reported the oil resembled mineral oil, foundry quenching oil, or similar material. ERAS soil sample analytical results are summarized in Tables 1.

TABLE 1 – ERAS 2002 SOIL ANALYTICAL RESULTS

Sample ID	TPH-mo (mg/kg)	TPH-g (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	VOCs (mg/kg)
SB-1-2.5	8,300	11	0.053	0.065	0.046	0.17	NA
SB-2-2.5	<50	<1	<0.005	<0.005	<0.005	<0.005	NA
SB-3-3	<50	17	<0.005	<0.005	<0.005	<0.005	NA
SB-4-3	2,100	5.3	<0.005	0.0071	<0.005	0.020	NA

Note: mg/kg = milligrams per kilogram
NA = Not Analyzed

In April 2002, Environmental Restoration Services (Enrest) advanced seven Geoprobe soil borings and reported observing free-floating oil in one soil boring (SB-6). In addition, Enrest determined that a pipe identified by ERAS was actually a waste percolation well. The percolation well was 7 feet deep, the casing was perforated from 5.5 to 7 feet, and drain rock surrounded the well from approximately 5 to 10 feet bgs. On April 26, Enrest demolished the concrete lining of Pit B and excavated soil to 12 feet bgs. Enrest also excavated casting sand backfill from Pit A and Pit C, and identified another suspect percolation well near the southeast corner of the building.

In May 2002, Enrest excavated soil in the vicinity of soil boring SB-6 and in the vicinity of the southeast corner suspect percolation well. Enrest also advanced three soil borings to collect grab groundwater samples north, west, and south of soil boring SB-6, designated as borings SP-1, SP-2, and SP-3. Grab groundwater sample analytical results reported elevated concentrations of motor oil-range petroleum hydrocarbons, relatively minor concentrations of BTEX, 1,2-dichlorobenzene, and naphthalene. Soil and grab groundwater sample analytical results are summarized in Tables 2 and 3.

TABLE 2 – Enrest 2002 SOIL ANALYTICAL RESULTS

Sample ID	TPH-mo (mg/kg)	TPH-g (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	VOCs (mg/kg)
SS-N	3,300	NA	<0.005	0.065	<0.005	<0.015	(1)
SS-P/A	NA	NA	<0.005	<0.005	<0.005	<0.015	(2)
Source Pt	20,800	NA	<0.005	0.0071	<0.005	<0.015	(3)

Note: NA = Not Analyzed
(1) 0.13 mg/kg 1,2-dichlorobenzene, 0.025 mg/kg naphthalene
(2) 0.14 mg/kg 1,2-dichlorobenzene
(3) Sample contained gasoline constituents

TABLE 3 – Enrest 2002 WATER ANALYTICAL RESULTS

Sample ID	TPH-mo (µg/L)	TPH-g (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (µg/L)	VOCs (µg/L)
SB-1	<500	NA	NA	NA	NA	NA	NA
SB-2	<500	NA	NA	NA	NA	NA	NA
SB-3	<500	NA	NA	NA	NA	NA	NA
SB-4	<500	NA	<1	<1	<1	<2	ND
SB-5	NA	NA	<1	<1	<1	2	(1)
SP-1	77,000	NA	<1	<1	<1	<1	(2)
SP-2	74,000	NA	<1	<1	2	3	(3)
SP-3	FP	NA	87	94	9	82	(4)
Source	NA	NA	<1	<1	1	2	(5)

Note: NA = Not Analyzed
(1) 15 µg/l Chloroform
(2) 3 µg/l Chloroform
(3) 375 µg/l Acetone, 6 µg/l 1,2-dichlorobenzene
(4) 17 µg/l 1,2-dichlorobenzene, 139 µg/l Naphthalene
(5) 2 µg/l 1,2-dichlorobenzene, 2 µg/l Naphthalene

In May 2003, ERAS advanced eleven continuously-cored, Geoprobe soil borings to depths of approximately 16 to 20 feet bgs, collected soil and grab groundwater samples, and converted three of the soil borings to temporary piezometers. Soil samples were analyzed for volatile organic compounds (VOCs), total petroleum hydrocarbons as gasoline (TPH-g), total extractable petroleum hydrocarbons (TEPH, ERAS used TPH), and chromium, copper, and nickel metals. Grab groundwater samples were analyzed for VOCs, TPHg, TPH, and chromium, copper, and nickel metals. The piezometers were surveyed and the calculated groundwater flow direction and gradient were west to northwest at 0.03 foot per foot. Soil sample analysis generally reported minor to elevated TPH concentrations, varying minor VOC concentrations, and varying concentrations of chromium, copper, and nickel metals typical of background, naturally-occurring concentrations. Grab groundwater sample analysis reported relatively low TPH concentrations in soil borings E-6, E-9, and E-10, no VOCs above laboratory reporting limits, and minor to low concentrations of dissolved metals. ERAS soil and grab groundwater sample analytical results are summarized in Tables 4 and 5.

Concurrently, ERAS sampled the contents of six subsurface concrete vaults. Vault contents were described as poorly-graded sand. These soil samples were analyzed for VOCs, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and TPH. Laboratory analysis reported that the sandy contents of the concrete vaults contained TPH concentrations only.

TABLE 4 – ERAS 2003 SOIL ANALYTICAL RESULTS

Sample ID	Depth (Feet)	TPH-g (mg/kg)	TPH-d (mg/kg)	TPH-ho (mg/kg)	Naphthalene (mg/kg)	Toluene (mg/kg)	Xylenes (mg/kg)
PZ-1	3.0-3.5	<0.5	8.1	<13	<0.005	<0.005	<0.005
	11.0-12.0	<0.5	12	<13	<0.005	<0.005	<0.005
PZ-2	1.0-2.0	<0.5	<1	80	<0.005	<0.005	<0.005
	11.5-12.0	<0.5	<1	20	<0.005	<0.005	<0.005
E-5	2.5-3.5	0.310	<100	3,400	0.150	<0.0125	0.023
	11.0-12.0	<0.5	3.8	<13	<0.005	<0.005	<0.005
E-6	4.0-5.0	<0.5	<20	640	<0.005	<0.005	<0.005
	8.5-9.0	<0.5	<20	2,000	<0.005	<0.005	<0.005
E-7	4.0-5.0	0.068	4.8	<13	<0.005	<0.005	<0.005
	11.0-12.0	<0.5	<1	<13	<0.005	<0.005	<0.005
E-8	4.0-5.0	0.05	<25	<312.5	<0.005	<0.005	<0.005
	11.0-12.0	<0.5	9.6	<13	<0.005	<0.005	<0.005
E-9	1.0-2.0	<0.5	<50	1,500	0.023	<0.005	<0.005
	11.0-12.0	<0.5	<1	<13	<0.005	<0.005	<0.005
E-10	3.0-4.0	0.280	<100	3,700	0.084	0.015	0.013
	11.0-12.0	<0.5	<1	26	<0.005	<0.005	<0.005
E-11	4.0-4.5	0.120	<10	220	0.0059	<0.005	<0.005
	10.0-11.0	<0.5	9.0	<13	<0.005	<0.005	<0.005
E-12	2.0-3.0	<0.5	<1	<13	<0.005	<0.005	<0.005
	11.0-12.0	<0.5	<1	<13	<0.005	<0.005	<0.005
E-13	2.0-3.0	<0.5	2.6	<13	<0.005	<0.005	<0.005
	11.0-12.0	<0.5	<1	<13	<0.005	<0.005	<0.005

Notes: *mg/kg = milligrams per kilogram*
** TEPH as kerosene (k), diesel (d), motor oil (mo, and hydraulic oil (ho))*
< = less than the laboratory reporting limit indicated

TABLE 5 – ERAS 2003 WATER ANALYTICAL RESULTS

Sample ID	Date	TPH-d (µg/L)	TPH-ho (µg/L)
PZ-1	04/01/03	<50	<250
PZ-2	04/03/03	<50	<556
E-5	04/02/03	<570	5,300
E-6	04/01/03	130	<338
E-7	04/01/03	<50	<250
E-8	04/01/03	<77	<385
E-9	04/02/03	<58	890
E-10	04/01/03	<63	670
E-11	04/02/03	<118	890
E-12	04/02/03	<50	<250
E-13	04/02/03	<67	<333

Notes: *(µg/L) = micrograms per Liter*

2.2 Verification Site Investigation

In April 2005, Enrest conducted verification site investigation and advanced 15 exploratory soil borings primarily around the perimeter of the building. Soil boring locations are shown on Enrest Figure 2. The purpose was to collect representative verification soil and groundwater samples at the perimeter of the property to evaluate the effectiveness of remedial soil excavation performed in September 2003 to January 2004. Soil samples were generally collected at 4 and 9 feet bgs and grab groundwater samples were collected in each soil boring at approximately 15 and 25 feet bgs (with the exception of 25 feet in soil borings B-2 and B-12). In addition, Enrest collected representative soil samples from imported material to be used to backfill the remedial soil excavations and analyzed the samples for constituents of concern. Imported soil samples are designated with “IMP” in the sample identification.

The Enrest April 2005 verification soil sample analytical results are summarized in Tables 6 through 8 and verification grab groundwater sample analytical results are summarized in Tables 9 and 10.

TABLE 6 – Enrest 2005 SOIL ANALYTICAL RESULTS – Petroleum Hydrocarbons

Sample ID	Depth (Feet)	TPH-g (mg/kg)	TPH-d (mg/kg)	TPH-k (mg/kg)	TPH-mo (mg/kg)	TPH-ho (mg/kg)	TEPH (mg/kg)
B-1	4	<0.5	---	---	---	---	<50
B-1	9	<0.5	---	---	---	---	120
B-2	4	<0.5	---	---	---	---	---
B-2	9	<0.5	---	---	---	---	---
B-4	4	---	---	---	---	---	<50
B-4	9	<0.5	---	---	---	---	<50
B-5	4	<0.5	---	---	---	---	<50
B-5	9	<0.5	---	---	---	---	<50
B-7	4	<0.5	---	---	---	---	<50
B-7	9	3.44	---	---	---	---	70
B-8	4	<0.5	---	---	---	---	<50
B-8	9	<0.5	---	---	---	---	<50
B-10	4	---	---	---	---	---	<50
B-10	9	---	---	---	---	---	60
B-11	4	1.01	---	---	---	---	---
B-11	9	<0.5	---	---	---	---	---
B-14	4	<0.5	---	---	---	---	<50
B-14	9	<0.5	---	---	---	---	<50
B-18	4	<0.5	---	---	---	---	<50
B-18	9	<0.5	---	---	---	---	<50
Imported Soil Analysis							
IMP-1	8	<0.5	<1	<1	<10	19	---
IMP-2	4	<0.5	<1	<1	25	<10	---
IMP-2	8	<0.5	<1	<1	<10	13	---
IMP-3	4	<0.5	<1	<1	25	<10	---
IMP-3	8	<0.5	<1	<1	24	24	---
IMP-4	3	<0.5	11	<1	14	29	---
IMP-4	6	<0.5	<1	<1	20	<10	---
IMP-5	4	0.682	<1	<1	65	<10	---

Notes: *mg/kg = milligrams per kilogram*
** TEPH as kerosene (k), diesel (d), motor oil (mo), and hydraulic oil (ho)*
< = less than the laboratory reporting limit indicated

TABLE 7 – Enrest 2005 SOIL ANALYTICAL RESULTS – Volatile Halocarbons

Sample ID	Depth (Feet)	VHCs (mg/kg)
B-1	4	ND
B-1	9	0.005 1,3,5-Trimethylbenzene 0.014 Naphthalene
B-2	4	ND
B-4	9	ND
B-5	4	ND
B-5	9	ND
B-10	4	ND
B-10	9	ND
Imported Soil Analysis		
IMP-2	8	ND
IMP-4	3	ND

Notes: ND = no constituents detected above laboratory reporting limits
VHC = volatile halocarbons (VOCs)

TABLE 8 – IMPORTED SOIL ANALYTICAL RESULTS – Metals

Sample ID	Depth (Feet)	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Nickel (mg/kg)	Zinc (mg/kg)
IMP-2	4	2.4	39.4	50.6	20.4	36.9
IMP-2	8	ND	44.8	12.8	30.2	40.0
IMP-3	8	1.2	39.0	27.0	23.4	39.1
IMP-4	3	ND	38.6	51.2	33.7	76.6
IMP-4	6	0.8	31.9	18.6	24.0	36.9
IMP-5	4	4.4	35.2	84.8	20.5	52.0

Notes: ND = no constituents detected above laboratory reporting limits

TABLE 9 – GRAB WATER ANALYTICAL RESULTS – Petroleum Hydrocarbons

Sample ID	Depth	TPHg (µg/L)	TEPH (µg/L)
B-1	15	<50	<10,000
B-1	25	<50	<10,000
B-2	16	---	<10,000
B-2	25	<50	<10,000
B-3	25	<50	<10,000
B-4	16	<50	<10,000
B-4	25	853*	<10,000
B-5	25	<50	<10,000
B-6	16	<50	<10,000
B-6	25	<50	<10,000
B-7	16	<50	<20,000
B-7	25	<50	<19,000
B-8	16	<50	<10,000
B-8	25	62	<17,000
B-9	16	<50	<10,000
B-9	25	<50	<10,000
B-10	16	<50	<10,000
B-10	25	<50	<10,000
B-11	16	<50	<10,000
B-11	25	<50	<10,000
B-12	16	<50	---
B-13	16	<50	<10,000
B-13	25	<50	<10,000
B-14	16	<50	---
B-14	25	<50	<10,000
B-18	16	1,640**	<10,000
B-18	25	285**	<10,000

Notes: * = Chromatogram does not match pattern
** = *Result due to single peak*

TABLE 10 – GRAB WATER ANALYTICAL RESULTS – Metals

Sample ID	Copper (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Lead (µg/L)	Nickel (µg/L)	Zinc (µg/L)
B-1	1.4	---	2.0	---	1.5	---
B-4	6.53	---	0.89	---	8.65	---
B-5	3.00	---	1.69	---	33.9	---
B-14	112	---	51.3	---	212	---

Enrest also collected two representative soil gas samples for chemical analysis. Sample B-1SV was collected at the north end of the Site adjacent to the “north” excavation and sample B-5SV was collected at the south end of the Site adjacent to the “south” excavation. Soil gas sample locations are shown on Enrest Figure 2. Soil gas sample analytical results generally reported various minor VOC constituent concentrations just above their respective laboratory reporting limits.

None of the reported VOC concentrations reported in the two soil gas samples indicate that a significant source of residual VOCs or TPH with VOC components exist in the subsurface.

2.3 Remedial Soil Removal

In April 2002, Enrest demolished the concrete lining of Pit B and excavated soil to 12 feet bgs. An oil sheen was noted on groundwater that entered the excavation pit. Enrest also excavated sand backfill from Pit A and Pit C. The volume of removed soil is unknown. In or before May 2002, Enrest excavated soil in the vicinity of soil boring SB-6 and around the second 4-inch diameter pipe identified as a waste percolation well.

In September 2003 to January 2004, ERAS oversaw remedial soil excavation designed to remove soil containing TPH-ho above 500 mg/kg. The limits of soil excavation are shown on ERAS Figure 2. Soil was removed in three locations: 1) inside the northeast corner of the building (designated “north”); 2) inside the southeast portion of the building to the building perimeter (designated “middle”); and 3) outside the building on the south side (designated “south”). Approximately 845 cubic yards of soil were removed from the “north” excavation, approximately 1,950 cubic yards of soil were removed from the “middle” excavation, and approximately 407 cubic yards of soil were removed from the “south” excavation, for a total of approximately 3,202 cubic yards (4,800 tons). Following remedial soil excavation, confirmation sidewall and excavation bottom soil samples were collected and analyzed for TPH-ho and select confirmation soil samples were collected and analyzed for VOCs. Confirmation sidewall and excavation bottom soil sample analytical results are summarized in Table 11.

Excavated soil was properly profiled and disposed at Forward Landfill, Manteca, California, under profile No. 3786.

2.4 Confirmation Sampling

North Excavation

Detectable TPH-ho concentrations were reported in two of four sidewall samples ranging from 130 to 160 mg/kg, and no detectable TPH-ho was reported in the two excavation bottom samples. Naphthalene was reported in two of two analyzed soil samples at 0.093 and 0.099 mg/kg and 1,2-Dichlorbenezene was reported in two of two analyzed soil samples at 0.022 and 0.032 mg/kg.

Middle Excavation

Detectable TPH-ho concentrations were reported in five of seven sidewall samples ranging from 32 to 3,400 mg/kg, and detectable TPH-ho was reported in six of seven excavation bottom samples ranging from 61 to 1,900 mg/kg. Methylene Chloride was reported in one of two analyzed soil samples at 0.130 mg/kg, 0.670 mg/kg 1,2-Dichlorobenezene was reported in one of two analyzed soil samples, and 0.082 mg/kg 1,4-Dichlorbenezene was reported in one of two analyzed soil samples. The middle excavation was physically limited by the east building perimeter wall, and additional soil excavation was not possible. Enrest soil borings B-9 and B-10 were advanced approximately 10 feet east of ERAS soil samples SWJ-7’ and SWB-7’, respectively. Enrest did not analyze soil samples from soil boring B-9 but did not report any odor or soil discoloration in its B-9 soil boring log. Enrest soil boring B-10 reported nondetect TPH at 4 feet bgs and 60 mg/kg TPH at 9 feet bgs.

South Excavation

Detectable TPH-ho concentrations were reported in three of six sidewall samples ranging from 15 to 830 mg/kg, and detectable TPH-ho was reported in two of two excavation bottom samples at 24 and 26 mg/kg. No VOCs were reported in the two analyzed soil samples.

Final sidewall and excavation bottom confirmation soil sample TPH-ho analytical results are summarized in Table 11.

TABLE 11– ERAS CONFIRMATION SOIL ANALYTICAL RESULTS

Excavation	Sample ID	Depth (Feet)	Sidewall / Bottom Sample	TPH-ho (mg/kg)	VOCs (mg/kg)
North	NSW3-7’	7	Sidewall	160	
	SE-2-7’	7	Sidewall	<13	
	SS-1-7’	7	Sidewall	130	
	SW4-7’	7	Sidewall	<13	
	WB2-9’	9	Bottom	<13	
	SC-5-8’	8	Bottom	<13	
Middle	SW-E-7A	7	Sidewall	<13	
	SWC@4’	4	Sidewall		ND
	SW-D-7A	7	Sidewall	66	
	SWA-1@4’	4	Sidewall		0.022[(1)], 0.099[(3)]
	SWJ-7’	7	Sidewall	3,400	
	SWB@4’	4	Sidewall		0.032[(1)], 0.093[(3)]
	SWH@4’	4	Sidewall		0.670[(1)], 0.082[(2)],0.130[(4)]
	SWB-7’	7	Sidewall	1,300	
	YY-7’	7	Sidewall	32	
	XX-7’	7	Sidewall	300	
	SW-F-7A	7	Sidewall	<13	
	B7	9.5	Bottom	<13	
	B6	9.5	Bottom	98	
	B5	9	Bottom	1,900	
	BH2-9’	9	Bottom	61	
	BH3-9’	9	Bottom	470	
	BH4-10’	10	Bottom	160	
	BH1-9’	9	Bottom	440	
South	OT2-7’	7	Sidewall	830	ND
	OT1-7’	7	Sidewall	440	ND
	OT6-7’	7	Sidewall	<13	
	OT5-7’	7	Sidewall	<13	
	OT4-7’	7	Sidewall	15	
	OT3-7’	7	Sidewall	<13	
	OTB1-10’	10	Bottom	24	
	OTB2-10’	10	Bottom	26	

Notes: *mg/kg = milligrams per kilogram*
(1) = 1,2-DCB, (2) = 1,4-DCB, (3) = Naphthalene, (4) = Methylene Chloride

2.5 Subsurface Conditions

According to ERAS, soils at the Site consisted primarily of silt (ML) to 15 to 19 feet bgs. At 15 to 19 feet, sand and gravel stringers were encountered in a number of soil borings. According to Enrest, soils at the Site primarily consisted of medium plasticity silty clays (CL) and low plasticity sandy silts (ML) to 16 feet bgs.

During remedial soil excavation activities, native soils encountered beneath the vaults consisted of brown silty clays to approximately 10 feet bgs. Sand lenses were noted from 9 to 11 feet bgs and groundwater was generally encountered at 10 feet bgs. Some soils exhibited a characteristic blue-green color and mild to strong petroleum hydrocarbon odor. These field indications of TPH impact were used to help determine the limits of remedial soil excavation.

Groundwater was generally observed at approximately 10 to 15 feet bgs and at 20 to 25 feet bgs.

2.5.1 Evidence of Petroleum Hydrocarbon Impact in Groundwater

As summarized in Tables 5 and 9, TPH impacts in groundwater are generally low to nondetect. Groundwater sample analytical results do not indicate any significant source of TPH impact to groundwater and identified TPH impacts in groundwater are generally from motor oil-range or mineral oil-based petroleum hydrocarbons.

2.5.2 Evidence of VOC Impact in Groundwater

As summarized in Tables 3 and 9, VOC impacts in groundwater are generally low to nondetect. Chlorinated solvents were not used at the facility but minor concentrations of chlorinated solvents have been reported in water samples. The most likely conclusion is that minor amounts of various chlorinated solvents were in quenching oils or other petroleum hydrocarbons used at the facility. The TPHg reported in the water sample in soil boring B-18 was most likely a solvent or specific chemical, but it should be noted that similar impacts were not reported in adjacent soil borings B-5, 8, or 11.

The source of suspect VOC impact in groundwater at soil boring B-18 is unknown.

2.5.3 Evidence of Petroleum Hydrocarbon Impact in Soil

Petroleum hydrocarbon impacts in soil at the Site are minimal with the exception of the eastern boundary of the middle excavation. Along this sidewall, excavation was limited by the property boundary. As summarized in Table 11, sidewall and bottom soil samples generally indicate that the majority of TPH-impacted soil was successfully removed. Remaining TPH impacts, primarily motor oil-range and/or mineral oil-based petroleum hydrocarbons, are found between 7 to 9 feet bgs in silty/clayey soils.

2.5.4 Evidence of VOC Impact in Soil

As summarized in Tables 2, 7, and 11, VOC impacts in soil at the Site are minimal and generally insignificant. Significant VOC impacts in soil are not indicated by site history, soil sample analytical results, and groundwater sample analytical results.

3.0 SCOPE OF WORK

ACC reviewed its August 7, 2006 *Request for Regulatory Closure Summary*, its December 14, 2006 *Addendum to Request for Regulatory Closure Summary*, and the technical comments summarized in the March 27, 2007 ACHCSA letter. ACC believes that any additional subsurface investigation work should be performed in a logical, progressive fashion based on previously obtained data and the significance of the perceived "data gap." Using "direct push" sampling technology, ACC can cost-effectively obtain the necessary representative media samples, determine current residual concentrations of constituents of concern, and confirm previous subsurface investigation.

3.1 Project Scoping

Technical Comment 1 – Fill Material Characterization

RESPONSE: ERAS reported that soil backfill material came from a residential source in Berkeley, California. While the exact source of the soil is unknown, bulk soil (approximately 3,200 cubic yards) generated in a residential setting can be confidently assumed to have been generated at depth and suitable for use as backfill. Environmental Restoration Services reported that they advanced soil borings in five random locations within the backfilled excavations and analyzed representative soil samples for constituents of concern as TPH, VOCs, and 5 LUFT metals (Tables 6, 7, and 8). Backfill material sample analytical results demonstrated typical TPH and metal concentrations for this geographic region and suggest that the soil was suitable for reuse. Soil boring locations within the excavations were not illustrated on the Site Plan but since the five soil borings were reported as "random" locations, and the report stamped by a Professional Engineer, ACC believes the sample analytical results are representative of the soil used as backfill material. Since a reported 3,202 cubic yards of soil were excavated and disposed offsite, it is safe to assume that approximately 3,202 cubic yards of soil were needed to backfill.

ACC proposes to advance one continuously-cored soil boring (EB 1) within the former middle excavation, log the soil boring to a minimum depth of 12 feet bgs, and collect one 2-point composite soil sample from 4 to 8 feet bgs for analysis of TEPH and 5 LUFT metals. The primary goal of the soil boring is to directly observe the soil type used to backfill the excavations and collect one representative soil sample to compare analytical results with those reported by Environmental Restoration Services.

Technical Comment 2 – Off-Site Characterization

RESPONSE: As reported by ERAS, impacted soil exists in the vicinity of soil samples SWJ-7’ and SWB-7’ at the approximate middle of the property at the eastern border. Environmental Restoration Services advanced soil boring B-10 approximately 10 feet directly east of ERAS soil sample SWB-7’ and collected soil samples at 4 and 9 feet bgs and grab groundwater samples at 16 and 25 feet bgs. Soil boring B-10 should be considered an ideal “step out” soil boring from an excavation sidewall soil sample reporting elevated concentrations of TPH. TEPH was reported in soil boring B-10 in soil at 9 feet bgs at 60 mg/kg. The TEPH reporting limit in the soil boring B-10 grab groundwater samples was high; however, the lack of TPHg-range petroleum hydrocarbons (an expected degradation product of degraded motor oil-range petroleum hydrocarbons) in the grab groundwater samples, and the lack of odor or field indications of petroleum hydrocarbon impact in the log of soil boring B-10, suggest that no significant petroleum hydrocarbon impacts exist in soil much beyond the extent of remedial soil excavation. Soil samples were not analyzed in soil borings B-9 and B-12, advanced approximately 10 and 33 feet east of ERAS soil sample SWJ-7’ but grab groundwater samples collected in the borings were nondetect (less than 50 µg/L TPHg-range petroleum hydrocarbons, an expected degradation product of motor oil-range petroleum hydrocarbons.

ACC proposes to advance one continuously-cored soil boring (EB 2) in the immediate vicinity of soil boring B-9 and one soil boring in the immediate vicinity of soil sample SWJ-7’ (EB 3), log the soil borings to a minimum depth of 12 feet bgs, and collect one to two soil samples in each soil boring for analysis of TEPH and VOCs. The primary goal of soil borings EB 2 and EB 3 is to directly observe the soil type, characterize soil for suspect constituents of concern and compare soil and groundwater analytical results with those reported by ERAS and Environmental Restoration Services. Proposed soil boring locations are shown on Figure 2.

Technical Comment 3 – Characterization of 2885 Hannah Street

RESPONSE: ACC interviewed Mr. Don Torkington, owner and operator of Precision Cast from approximately 1983 to 2002. Mr. Torkington stated that Precision Cast did not use “solvents” other than petroleum hydrocarbon-based materials such as kerosene, and the southern portion of the Site, actually 2668 Hannah Street, was only used for parking, raw material storage, containers, and miscellaneous equipment. The January 4, 2001 Phase I Environmental Site Assessment prepared for the Site included both 1549 32nd Street and 2668 Hannah Street and did not report any significant recognized environmental concerns on 2668 Hannah Street. This information was likely the basis for so little recommended investigation at 2668 Hannah over the years.

ERAS advanced soil borings E-12 and E-13 in the southwest and southeast corners of the property at 2668 Hannah Street respectively, and did not report any constituents of concern in soil or groundwater. A grab groundwater sample in soil boring B-18 reported 1,640 µg/L gasoline-range petroleum hydrocarbons that were flagged as being a single peak on the chromatogram. No significant concentrations of TPH were reported in grab groundwater samples collected in soil borings B-5, B-8, and B-11.

ACC proposes to advance one continuously-cored soil borings (EB 4) in the immediate vicinity of soil boring B-18 and one soil boring (EB 5) in the approximate center of the property at 2668 Hannah

Street, log and screen the soil borings for volatile constituents to a minimum depth of 12 feet bgs with a PID, and collect one soil sample and one grab groundwater sample in each soil boring for analysis of TEPH and VOCs. The primary goal of these two soil borings is to directly observe the soil type, characterize soil for suspect constituents of concern and further confirm analytical results reported by ERAS and Environmental Restoration Services.

Technical Comment 4 – Soil Vapor Sampling

RESPONSE: There is no data that indicates that VOCs are constituents of concern at the Site and warrant soil gas characterization. With only a few relatively minor exceptions, reported VOC concentrations in soil and grab groundwater samples have been low and generally one to three orders of magnitude below applicable Environmental Screening Levels (ESLs) as summarized in the RWQCB document *Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater, Interim Final – 2005, Table B.*

According to RWQCB Table E-1a, *Groundwater Screening Levels For Evaluation of Potential Vapor Intrusion Concerns*, residual VOC concentrations groundwater are generally three to five orders of magnitude below their applicable ESL.

Investigation findings that support dropping VOCs as constituents of concern include: 1) low residual concentrations of reported VOCs in soil and groundwater; 2) the lack of reportable VOC concentrations in vault content samples (suspect "source" areas); 3) site history and interviews with the former facility operator that indicate VOCs were not specifically used at Precision Cast; 4) fine-grain soils with relatively low permeability that hinder or prevent vertical VOC migration in soil gas; 5) two analyzed soil gas samples collected in native soil in the vicinity of two of the remedial soil excavations reported only low residual VOC concentrations well below their applicable ESLs; and 6) the general consensus that more soil versus less soil was eventually removed during remedial activities. Soil gas sampling is not warranted.

Technical Comment 5 – Data Tables

RESPONSE: Summary data tables were included with the August 7, 2006 *Request for Regulatory Closure Summary* and December 14, 2006 *Addendum to Request for Regulatory Closure Summary*. These tables, including revised Table 11, have also been included in the background section of this Work Plan. ACC generated Figure 2 to illustrate previous soil and grab groundwater sample locations and soil samples analytical results which exceeded applicable ESLs.

Technical Comment 6 – Risk Assessment

RESPONSE: A Tier 1 Risk Evaluation will be provided in the technical report of findings summarizing the scope of work proposed in this Work Plan.

3.2 Conceptual Site Model

Based on known Site conditions and extensive subsurface investigation, the conceptual site model (CSM) is relatively simple. For purposes of this proposed investigation, the CSM is designed to provide a three-dimensional picture or representation of site conditions, assist in organizing "first impressions", summarize known subsurface data, and help focus on the recently obtained data filling perceived data gaps and support future decision making.

3.2.1 Subsurface Conditions

According to ERAS, soils at the Site consisted primarily of silt (ML) to 15 to 19 feet bgs. At 15 to 19 feet, sand and gravel stringers were encountered in a number of soil borings. According to Enrest, soils at the Site primarily consisted of medium plasticity silty clays (CL) and low plasticity sandy silts (ML) to 16 feet bgs.

During remedial soil excavation activities, native soils encountered beneath the vaults consisted of brown silty clays to approximately 10 feet bgs. Sand lenses were noted from 9 to 11 feet bgs and groundwater was generally encountered at 10 feet bgs. Some soils exhibited a characteristic blue-green color and mild to strong petroleum hydrocarbon odor. These field indications of TPH impact were used to help determine the limits of remedial soil excavation.

Groundwater was generally observed at approximately 10 to 15 feet bgs and at 20 to 25 feet bgs.

3.2.2 Risk Evaluation

ACC proposes to evaluate potential human health risk by preparing a Tier 1 Risk Evaluation using RWQCB ESLs or California Human Health Screening Levels (CHHSLs) and a comparison to high and average concentrations of constituents of concern. Based on previously obtained data and the amount of soil remediation performed at the Site, this comparison should be adequate to assess the health risk associated with residual soil and groundwater impacts.

Obtaining additional data near soil boring B-18 to evaluate suspect human health risk is a major goal of this investigation.

3.2.3 Data Gaps

ACC believes the following items represent data gaps that could be addressed through additional subsurface investigation and media sampling: 1) the lack of additional TEPH and VOC groundwater data in the vicinity of soil boring B-18; 2) the lack of groundwater TEPH data with an appropriate laboratory reporting limit in the vicinity of soil boring B-9; and 3) the lack of TEPH data in step-out soil samples adjacent to soil sample SWJ-7'. Legal access may be necessary in order to advance a step-out soil boring adjacent to soil boring SWJ-7'.

3.3 Rationale for Sampling Strategy

The primary goals of this investigation are to confirm suspect TEPH and/or VOC impacts in soil or groundwater at select locations to address the data gaps summarized in Section 3.2.3. ACC proposes to collect soil samples at five locations and grab groundwater samples at four locations. Proposed sample media and depths are summarized in Table 12. Proposed soil boring locations are shown on

Figure 2. The proposed soil sample locations have been specifically selected for proximity to previously obtained elevated analytical results or in areas representing data gaps. A soil boring permit will be obtained from Alameda County Public Works prior to field work.

All encountered or cored soil will be screened for volatile constituents and selected representative soil samples will be prepared for analysis. Soil screening will be done with a calibrated ppbRAE photoionization detector (PID). The ppbRAE PID measures volatile constituents in air in the ppb range and is highly effective at screening soil for volatile constituents (if encountered). Soil borings EB1 through EB5 constitute one full day of limited access Geoprobe® work with the contingency of potentially advancing one to two additional soil borings based on observations and field indications of impact. All Geoprobe® sample locations will be continuously cored to a minimum depth of 12 feet bgs to visually log and screen every foot of encountered soil, identify potential saturated sand stringers, and better estimate migration potential in the subsurface.

Proposed soil and grab groundwater sample analyses are summarized in Table 12. Proposed soil boring locations are illustrated on ACC Figure 2. Minor deviations to these proposed sampling locations and/or depths may be required based on conditions encountered in the field. All samples will be immediately capped, labeled, placed in resealable plastic bags in a pre-chilled insulated container, and prepared for transport and analysis using standard chain of custody protocol.

TABLE 12 – PROPOSED ANALYSES

Soil Boring	Depth	Matrix	Constituent Analysis	Comment
EB1	3.5-4.0 7.5-8.0	Soil Soil	TEPH 5 LUFT Metals	Representative Soil
EB2	7.5-8.0 12.0-16.0	Soil Groundwater	VOCs, TEPH VOCs, TEPH	VOCs if odor or elevated PID First-encountered groundwater
EB3	7.5-8.0 12.0-16.0	Soil Groundwater	VOCs, TEPH VOCs, TEPH	VOCs if odor or elevated PID First-encountered groundwater
EB4	7.5-8.0 12.0-16.0	Soil Groundwater	VOCs, TEPH VOCs, TEPH	VOCs if odor or elevated PID First-encountered groundwater
EB5	7.5-8.0 12.0-16.0	Soil Groundwater	VOCs, TEPH VOCs, TEPH	VOCs if odor or elevated PID First-encountered groundwater

3.4 Sampling Methods

Soil Sampling

Soil samples collected with a limited access track-driven Geoprobe® rig and will be collected in Geoprobe® stainless steel macro cores equipped with Geoprobe®-supplied, 2.0 inch by 48.0 inch disposable clear acetate liners. Select depth intervals will be cut from the 4-foot-long acetate liners and logged, checked with the ppbRAE PID, or prepared for analysis. Soil intervals saved for analysis will be immediately covered with polyethylene sheeting and tight-fitting plastic caps, labeled, placed in resealable plastic bags, and placed in a pre-chilled insulated container. Soil samples collected for analysis will be sealed and cooled as soon as feasible to minimize potential volatilization. All samples will be in a locked vehicle or in direct observation at all times.

At each sample location, representative soil samples will be screened for volatile constituents using the ppbRAE PID approximately every 1.0 to 2.0 feet. Soil screening with the PID will be performed by placing approximately 1.0 inch of sample core in a resealable bag, sealing it, crushing the soil sample to the extent feasible, and inserting the PID inlet hose into the headspace of the bag after approximately 5 minutes have elapsed. Soil screening for volatiles will be performed at consistently as possible to minimize the variation due to methodology. Soil samples will be collected for analysis when characteristic odor and elevated PID readings are observed, or at select representative depths in each soil boring approximately every 4.0 to 8.0 feet.

Grab Groundwater Sampling

Grab groundwater samples will either be collected directly through the drilling rods with a pre-cleaned stainless steel bailer or with the use of a HydroPunch™ sampling probe equipped with a temporary stainless-steel screen. The pre-cleaned HydroPunch™ tool will be hydraulically driven to the respective depth of interest plus one foot, retracted one foot to remove the disposable driving tip, and the 4-foot long screen will be exposed to the formation as the external probe component is raised 4.0 feet. Undisturbed water samples will then be collected using disposable polyethylene tubing equipped with a disposable check valve or slowly bailed with a new polyethylene bailer inserted into the HydroPunch™ tool. Grab groundwater samples collected for analysis will be carefully decanted into laboratory-supplied amber liter bottles or 40-milliliter sample vials without headspace, and immediately sealed and cooled as soon as feasible to minimize potential volatilization.

Grab groundwater samples will be stored in a pre-chilled, insulated container pending ACC transport to STL San Francisco, a state-certified analytical laboratory. Every effort will be made to minimize disturbance of the groundwater samples prior to placement in the sample containers and maintaining the samples at the four degrees Celsius prior to analysis.

Standard turnaround time for analytical results is 5 working days. Following drilling and sample collection, each soil boring will be abandoned with neat cement to just below the surface (3 to 6 inches). The soil boring will then be completed with concrete to grade and colored to match the surrounding surface material.

Sample Containers and Preservation

Soil samples collected with the Geoprobe® rig will be collected in new Geoprobe®-supplied, 2.0 inch by 48.0 inch disposable clear acetate liners. Grab groundwater samples will be collected in laboratory-supplied new amber liter bottles or 40 milliliter glass vials.

Samples will be labeled with pre-printed laboratory-supplied labels, placed in new resealable plastic bags, and immediately placed in a pre-chilled, insulated container maintained at four degrees Celsius pending transport to the analytical laboratory. Each sample cooler will be chilled with ice and no blue ice containers will be used.

Sample Packaging and Shipment

All samples will be handled according to ACC sampling protocols. Soil samples will be covered at each open end with new polyethylene (Teflon®) sheeting, fitted with tight-fitting plastic caps, labeled, placed in resealable plastic bags, placed in a pre-chilled, insulated container pending transport to ACC's Oakland office. ACC will properly refrigerate the samples until they are picked up by the analytical laboratory courier. Standard chain of custody documentation will be maintained at all times. Soil gas samples will be couriered to either STL Los Angeles or Air Toxics in Folsom, California.

Sample Documentation

ACC will utilize a unique sample numbering system to identify sample locations and depths. Each sample will be designated with the following: 1) Unique boring number – "B1"; 2) matrix type – "S for soil and SG for soil gas – "B1-S"; and 3) maximum depth – "B1-S-7.5". A sample designated B1-S-7.5 is therefore a soil sample collected at soil boring location B1 at 7.0-7.5 feet bgs. Each respective sample designation will be placed at the top of the sample label and on each line of the chain of custody form.

Soil samples will be logged and fully described on pre-printed ACC log forms. These log forms are designed to facilitate preparing boring logs for the final report of findings and prompt the ACC field geologist to obtain and document specific types of information.

ACC proposes that no duplicate or trip blank quality assurance/quality control (QA/QC) samples be analyzed.

Analytical Methods and Detection Limits

All samples will be analyzed by STL San Francisco in Pleasanton, California. STL San Francisco is state certified, certified with the Army Corps of Engineers, and certified with the United States Navy. ACC has used STL San Francisco almost exclusively for 14 years and receives superior service.

Select samples will be analyzed for VOCs (8010 list) by EPA Method 8260, and TPHg/BTEX by EPA Method 8260.

Laboratory reporting limits are set by the laboratory. Reporting limits may be increased due to interference effects and required laboratory dilution.

VOCs in soil	200 µg/kg or 0.20 mg/kg, some analytes higher
VOCs in groundwater	0.5 µg/Liter (µg/L), some analytes higher
TEPH in soil	1.0 mg/kg or 0.50 mg/kg, some analytes higher
TEPH in groundwater	50 µg/L, some analytes higher

Decontamination

All sampling equipment will be either new disposable equipment or pre-cleaned, stainless steel sampling equipment. Decontamination of the Geoprobe® sampling probes, hand auger, and slide-hammer sampler will be performed between sample locations by washing the equipment with a tap water and Alconox cleaning solution, rinsing the equipment with clean tap water, and a final rinse with deionized water.

New clean nitrile surgical gloves will be worn at each new sample location and at each new depth at each sample location. Gloves will be replaced before the collection and/or handling of every sample.

Waste Management

Soil removed from the soil borings will be containerized in a 55-gallon steel drum, labeled, sampled, and profiled for appropriate disposal at an accepting, permitted landfill.

Backfilling Soil Borings

The soil borings will be backfilled with cement slurry consisting of approximately six gallons of water mixed with 94 pounds of Portland cement. The cement slurry will be prepared with an electric mixing rod to minimize cement lumps in the slurry mix. The surface of the soil boring will be covered with approximately 4 inches of concrete and colored to match the existing surface.

3.5 Data Evaluation

Data obtained during this investigation is confirmatory in nature. Therefore, analytical results will be initially compared to applicable Regional Water Quality Control Board ESLs or California EPA CHHSLs to estimate human health risk. If residual VOCs in the subsurface warrant more thorough risk evaluation, a full risk assessment will be recommended.

3.6 Quality Assurance and Quality Control Measures

Samples will be collected in an accurate and consistent manner to eliminate variability associated with sample collection. Samples will be immediately sealed and placed in resealable plastic bags to eliminate potential contamination during transportation. Due to extensive previous site investigation and soil sampling, ACC proposes a minimum of QA/QC duplicate soil samples.

STL San Francisco employs extensive internal QA/QC procedures consistent with the respective laboratory method. To minimize laboratory variability, ACC will specifically request that any samples submitted for analysis be analyzed within a respective calibrated sample run. Based on sample handling procedures and adequate decontamination procedures, no travel blanks or equipment blanks will be analyzed.

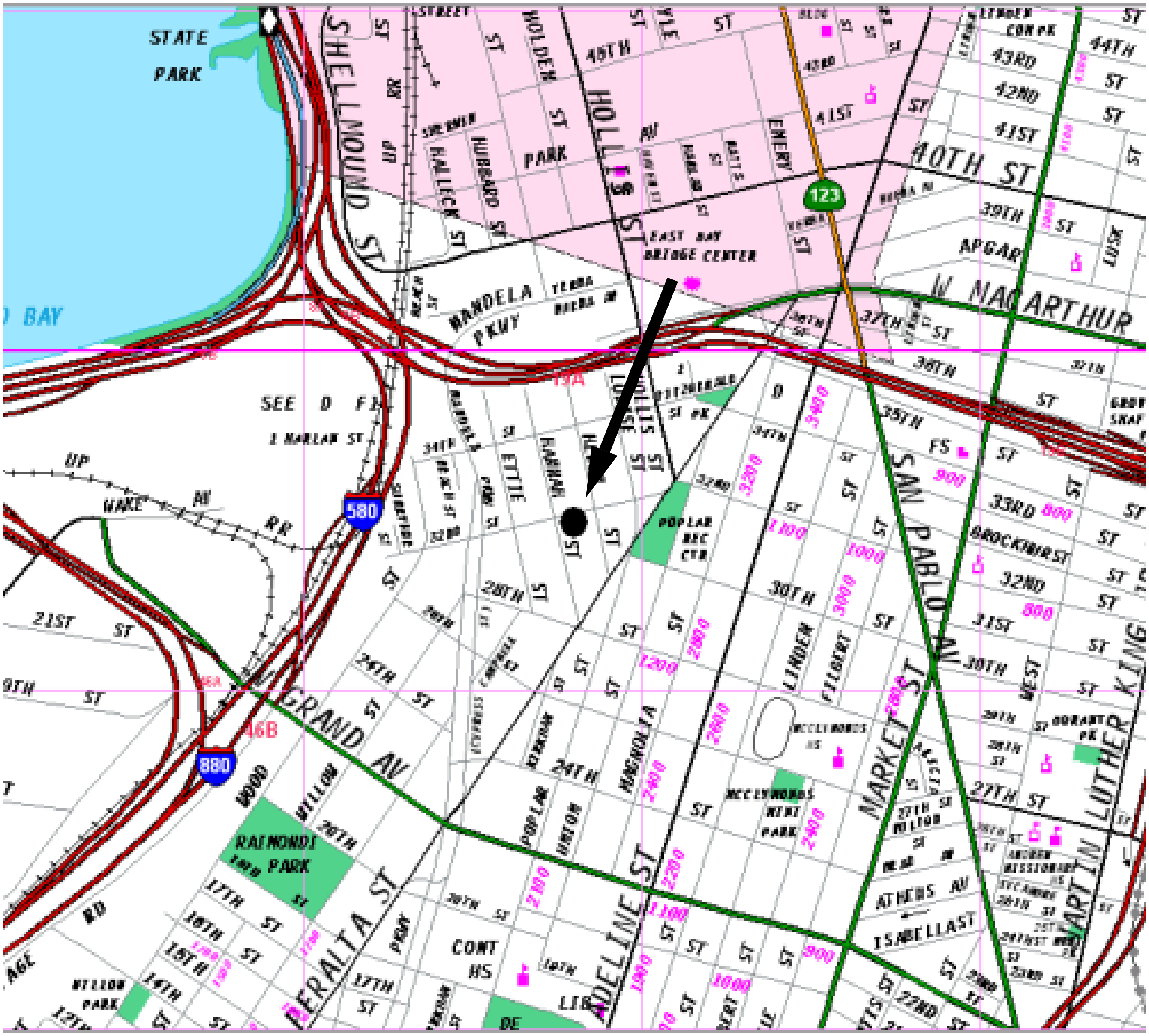
4.0 HEALTH AND SAFETY PLAN

A site-specific Site Safety Plan (SSP) which encompasses the proposed work at the Site and complies with the requirements of 29 CFR Part 1910.120 will be prepared and present during field activities. All personnel involved with sample collection will be 40 hour trained according to requirements of 29 CFR Part 1910.120, will review and sign the SSP, and are presently in medical surveillance programs administered by their employer. All supervisory personnel involved with sample collection will be 8 hour supervisory trained according to requirements of 29 CFR Part 1910.120, and all field personnel have 24 hours of supervised field training.

5.0 REPORT PREPARATION

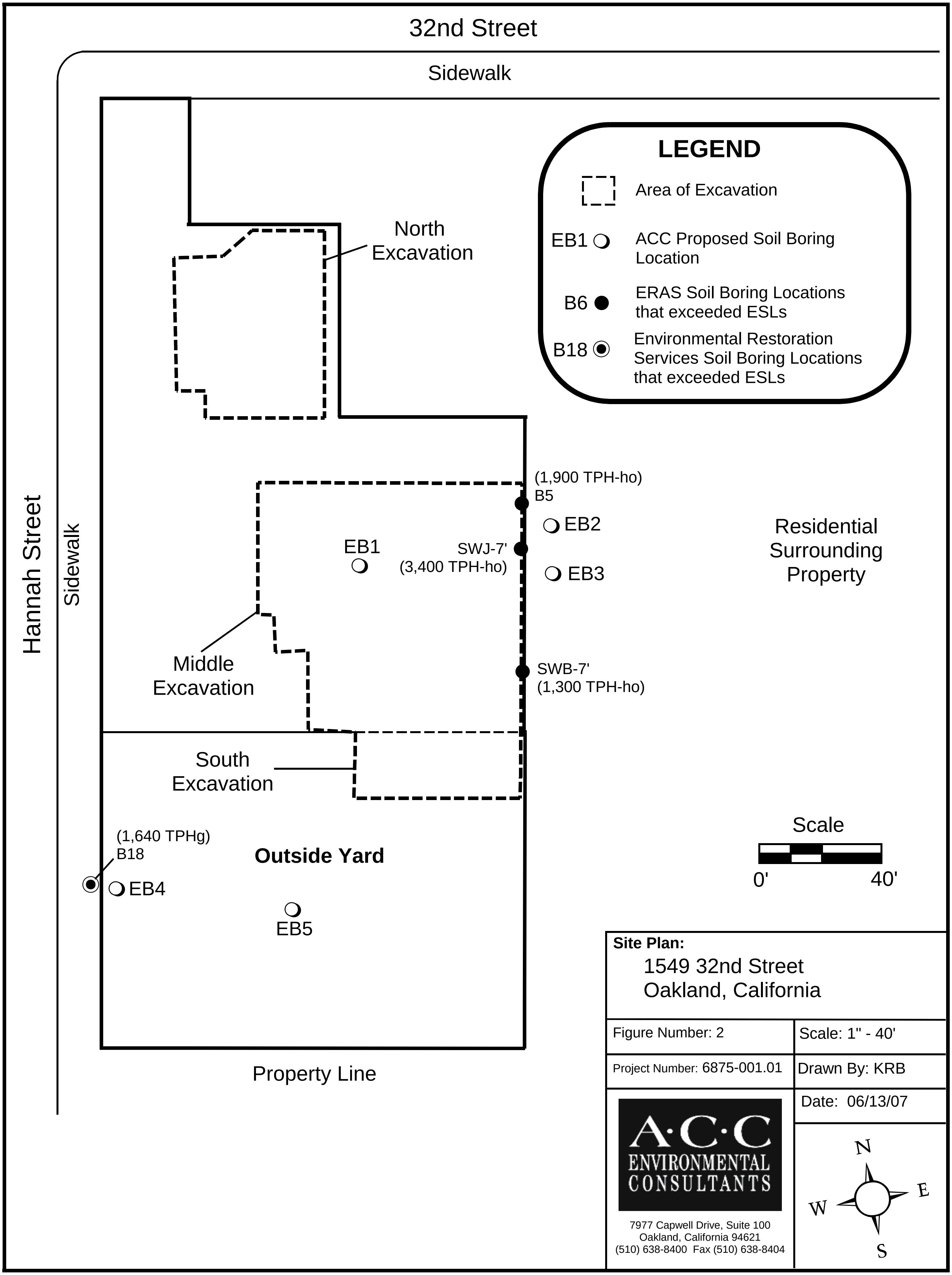
A technical report discussing field work, observations and findings, analytical results, conclusions, and recommendations will be prepared for submission to ACHCSA. The technical report of findings will generally follow applicable report criteria specified in the *Preliminary Endangerment Assessment Guidance Manual* prepared by the California EPA DTSC, January 1994.

The technical report will present a Conceptual Site Model, findings and conclusions of the initial subsurface investigation, and discuss identified data gaps and their significance.



Source: The Thomas Guide, Bay Area Metro 2004

Title: ***Location Map 1549 32nd Street Oakland, California***	
Figure Number: 1	Scale: None
Project Number: 6875-001.01	Drawn By: KRB
A·C·C ENVIRONMENTAL CONSULTANTS 7977 Capwell Drive, Suite 100 Oakland, California 94621 (510) 638-8400 Fax: (510) 638-8404	Date: 06/13/07 N W E S


32nd Street
Sidewalk
Hannah Street
Sidewalk
LEGEND
Area of Excavation
EB1 ACC Proposed Soil Boring Location
B6 ERAS Soil Boring Locations that exceeded ESLs
B18 Environmental Restoration Services Soil Boring Locations that exceeded ESLs
North Excavation
(1,900 TPH-ho)
B5
EB2
EB1
SWJ-7'
(3,400 TPH-ho)
EB3
Residential Surrounding Property
Middle Excavation
SWB-7'
(1,300 TPH-ho)
South Excavation
(1,640 TPHg)
B18
Outside Yard
EB4
EB5
Scale
0'
40'
Property Line
Site Plan:
1549 32nd Street
Oakland, California
Figure Number: 2
Scale: 1" - 40'
Project Number: 6875-001.01
Drawn By: KRB
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