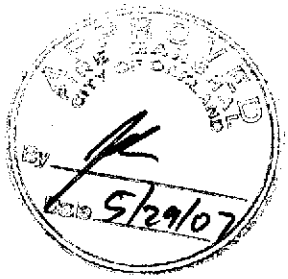
OTG **EnviroEngineering** *Solutions, Inc.*

May 5, 2007



Mr. Jesse Kupers
Hazardous Materials Inspector II
City of Oakland Fire Department -
Fire Prevention Bureau
250 Frank H. Ogawa Plaza, Suite 3341
Oakland, CA 94612 - 2032

Subject: Work Plan for Soil and Groundwater Investigation at
5901 MacArthur Blvd., Oakland, California

Dear Mr. Kupers:

On behalf of the property owner - Mr. Jeffrey Huynh, OTG EnviroEngineering Solutions, Inc. (OTG) is pleased to submit this Work Plan for soil and groundwater investigation at the site located at 5901 MacArthur Blvd, Oakland, California (Figure 1). This Work Plan is prepared in response to your request in a letter to Jeffrey Huynh and Anna Cheng dated July 18, 2006.

BACKGROUND

OTG understands that the site is targeted for either mixed use or commercial only redevelopment, depending on the outcome of the proposed investigation. The site was formerly Regal Service Station #404. All buildings, underground storage tanks (USTs) and associated piping, and pavement have been removed. The site is currently vacant.

According to the *Remedial Action Completion Certification* issued on 29 August 1997 by the Alameda County Health Care Services Agency Environmental Health Services (ACEHS), the following four USTs once existed on the property (Figure 2):

Tank No:	Size (gallons)	Content	Date Removed
1	10,000	Regular gasoline	5/18/87
2	8,000	Unleaded gasoline	5/18/87
3	6,000	Premium gasoline	5/18/87
4	550	waste oil	2/24/93

Six (6) soil samples were collected beneath the gasoline USTs and one soil sample was collected beneath the waste oil tank at the time of their removal. Sample locations are shown on Figure 2. Analytical results are summarized in Table 1. TPH gas was reported up to 310

mg/kg and benzene up to 6.4 mg/kg in the gas tank excavation pit. The soil sample collected within the waste oil tank excavation pit was analyzed for TPH gas, kerosene, diesel by modified EPA Method 8015; BTEX by EPA Method 8020; oil & grease by SM 5520; volatile organic compounds (VOCs) by EPA Method 8240; semi-VOCS (SVOCs) by EPA Method 8270; LUFT five metals by EPA 7000-Series Methods. Except toluene which was reported at 0.012 mg/kg, no other individual VOCs and SVOCs were detected at or above their respective reporting limits. TPH diesel was reported at 17 mg/kg, TPH kerosene at 4 mg/kg, and TPH gas at below reporting limit (<1.0 mg/kg).

Four groundwater monitoring wells once existed on the property. Details are summarized below.

Well ID	Total Depth (feet)	Well Dia (inches)	Screen Levels (feet, bgs)	Water Levels (feet, bgs)	Date of Installation	Date of Destruction
MW-1	25	4	9 – 24	13.2 – 14.5	10/27/93	11/11/97
MW-2	20	4	10 - 20	13.8 – 14.4	10/4/95	11/11/97
MW-3	20	4	10 – 20	13.4 – 14.6	10/4/95	11/11/97
MW-4	20	2	10 - 20	12.1 – 19.0	10/4/95	11/11/97

Soil samples were collected at various depths at the time of well installation and were analyzed for TPH gas, diesel and BTEX. Results are summarized in Table 1. Except the soil sample collected at 10 feet below ground surface (bgs) from MW-4, which had TPH gas at 5,100 mg/kg and TPH diesel at 840 mg/kg, all other soil samples had either no detection or minor detections of TPH gas (<30 mg/kg), TPH diesel (≤100 mg/kg), and benzene (<0.1 mg/kg).

Groundwater samples were collected from the four wells periodically for TPH gas, diesel, and BTEX analysis and results are summarized in Table 2. The last round of groundwater samples were collected on September 4, 1996 (before well closure) and the highest reported TPH gas concentration was 1.1 mg/L from MW-1, the highest TPH diesel was 0.15 mg/L from MW-2, and the highest benzene was 0.051 mg/L from MW-1. The concentration should be even lower by now after more than 10 years of natural attenuation.

At the time of the waste oil tank removal on February 24, 1993, approximately 54 cubic yards of contaminated soil was removed and stockpiled on site. The soil was transported to B&J landfill in Vacaville, CA on November 19, 1997 for disposal. No other active soil and/or groundwater remediation has been reported.

PROPOSED INVESTIGATION PROGRAM

Four temporary borings (TB) are proposed. Their locations are shown on Figure 2. TB-1 is located near the former monitoring well MW-4, where relatively high TPH gas (5,100 mg/kg) was reported at the 10'-bgs soil sample. TB-2 is located in the former station building to assess

potential impact from shop activities. TB-3 is located immediately downgradient of the former waste oil tank. TB-4 is located near the former monitoring well MW-1, where groundwater concentration of TPH gas was the highest among the four wells. Specific details of the boring program are outlined below:

- Pre-drilling details include: developing a site health and safety plan; obtaining soil boring permits from Alameda County Public Works Agency Water Resources Section; underground utility clearance (contacting Underground Services Alert [USA], contracting to an independent utility locator to clear proposed locations and hand augering to 5 feet bgs prior to drilling).
- The soil borings will be drilled with a direct-push rig from which continuous cores of the soil column will be obtained and logged by an onsite geologist or a civil engineer.
- The soil borings will extend to 20 feet below ground surface (bgs). Shallow groundwater is expected to be present at about 14 feet bgs. Soil samples will be collected at 0.5 ft bgs, 10 ft bgs, and 15 ft bgs or soil/groundwater interface (three soil samples per borehole) for chemical analyses.
- To collect groundwater samples from each borehole, a temporary well casing (1"-diameter, Schedule 40 PVC) will be inserted into each of the four boreholes, within which grab groundwater samples will be collected using disposable bailers.
- The grab groundwater sample and the soil samples from each borehole will be submitted to a State of California certified environmental analytical laboratory under chain-of-custody protocol. All samples will be analyzed for TPH gas, diesel and motor oil by EPA Method 8015; BTEX and MTBE by EPA Method 8020; and LUFT five metals (cadmium, total chromium, total lead, nickel, and zinc) by EPA Method 6020. Table 3 presents a summary of samples and analyses matrix.
- After the completion of grab groundwater collection, all boreholes will be backfilled with neat cement/bentonite grout from total depth to land surface following the County borehole sealing requirements.
- Soil cuttings and decontamination water will be stored in a central on-site location in properly labeled DOT approved 55-gallon drums awaiting final disposal option selection.

Reporting

A report will be prepared presenting the soil and groundwater investigation results, findings, and recommendations. The text of the report will be supported with summary tables and figures along with hard copies of chemical analyses results.

Please feel free to contact the undersigned at (510) 465-8982 for questions or comments.

Sincerely,
OTG EnviroEngineering Solutions, Inc.

Xinggang Tong, PhD, PE
Project Manager

cc: Mr. Jeffrey Huynh, property owner

Attachment:

Table 1 – Summary of Historic Soil Data
Table 2 – Summary of Historic Groundwater Data
Table 3 – Summary of Proposed Soil and Groundwater Samples and Analyses
Figure 1 – Site Vicinity Map
Figure 2 – Site Plan & Proposed Sampling Locations

References

Letter from Jesse Kupers of City of Oakland to Jeffrey Huynh and Anna Cheng, July 18, 2006.

Email from Jesse Kupers to Tim Low and Leroy Griffin (both City of Oakland), Oct. 19, 2006.

Site Restoration of former Regal Station R404, 5901 MacArthur Blvd, Oakland, CA 94605, by Western Geo-Engineers, January 9, 1998.

Remediation Action Completion Certification, Former Regal Station #404, 5901 MacArthur Blvd., by Alameda County Health Care Services Agency Environmental Health Services, August 29, 1997.

Closure of Remediation at the Former Regal Station #404, 5901 MacArther Blvd., Oakland, CA, by Blakely Environmental Investigations, Inc., June 2, 1997

Request for Closure of Remediation at the Former Regal Station #404, by Blakely Environmental Investigations, Inc., June 2, 1997

Investigations at Former Regal Station #404, located at 5901 MacArthur Blvd, Oakland, CA, letter by Alameda County Health Care Services Agency, April 22, 1997

Investigations at Former Regal Station #404, located at 5901 MacArthur Blvd., Oakland, CA, letter by Alameda County Health Care Services Agency, February 11, 1997

Request for Closure for Wickland Properties, 5901 MacArther Blvd., Oakland, CA, Blakely Environmental Invesitgations, Inc., January 4, 1997.

Investigations at Former Regal Station #404, located at 5901 MacArthur Blvd., Oakland, CA, letter by Alameda County Health Care Services Agency, October 22, 1996

Investigations at Former Regal Station #404, located at 5901 MacArthur Blvd., Oakland, CA, letter by Alameda County Health Care Services Agency, September 25, 1996

Quarterly Groundwater Monitoring Report, 2nd Quarter 1996, by Western Geo-Engineers, September 19, 1996

Quarterly Groundwater Monitoring Report, 1st Quarter 1996, by Western Geo-Engineers, August 15, 1996

Investigations at Former Regal Station #404, located at 5901 MacArthur Blvd., Oakland, CA, letter by Alameda County Health Care Services Agency, June 18, 1996

Work Plan for Investigations at Former Regal Station #404, located at 5901 MacArthur Blvd., Oakland, CA, letter by Alameda County Health Care Services Agency, June 26, 1996

Preliminary Investigation and Evaluation Report, Former Regal Station #404, 5901 MacArthur Blvd, Oakland, CA, by Western Geo-Engineers, January 29, 1996

Quarterly Groundwater Monitoring Report, 2nd Quarter 1995, by Western Geo-Engineers, July 17, 1995

Quarterly Groundwater Monitoring Report, 1st Quarter 1995, by Western Geo-Engineers, March 28, 1995

Quarterly Groundwater Monitoring Report, 4th Quarter 1994, by Western Geo-Engineers, February 2, 1995

Investigations at Former Regal Station #404, located at 5901 MacArthur Blvd., Oakland, CA, letter by Alameda County Health Care Services Agency, September 6, 1994

Required Investigations at Former Regal Station #404, located at 5901 MacArthur Blvd., Oakland, CA, letter by Alameda County Health Care Services Agency, July 20, 1994

Quarterly Groundwater Monitoring Report, 3rd Quarter 1994, by Western Geo-Engineers, September 19, 1994

Quarterly Groundwater Monitoring Report, 2nd Quarter 1994, by Western Geo-Engineers, July 15, 1994

Soil Probe Survey (SPS) and sample borings at former Regal Station #404, 5901 MacArthur Blvd, Oakland, CA, Site Code 3534, by Western Geo-Engineers, March 17, 1994

Investigations at Former Regal Station #404, located at 5901 MacArthur Blvd., Oakland, CA, letter by Alameda County Health Care Services Agency, February 28, 1994

Preliminary Site Assessment, Former Regal Station #404, by Western Geo-Engineers, December 2, 1993

Waste Oil Tank Excavation Sample Report for former Regal Station #404, by Western Geo-Engineers, April 7, 1993.

STID 3534, Former Regal Station #404, 5901 MacArthur Blvd., Oakland, by Blakely Environmental Investigations, Inc., time?

Table 1 - Summary of Historic Soil Data
5901 MacArthur Blvd, Oakland, CA

Sample ID	Date of Sampling	Depth (ft, bgs)	TPH gas (mg/kg)	TPH kerosi	TPH diesel (mg/kg)	Oil&grease (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	thylbenzen (mg/kg)	Xylenes (mg/kg)	other VOCs (EPA 6240)	SVOCs (EPA 8270	Cd mg/kg	Cr, total mg/kg	Pb mg/kg	Ni mg/kg	Zn mg/kg
A1	05/18/87	14' - 17.5'	6.2		NA	NA	<0.1	<0.1	NA	<0.1							
A2	05/18/87	14' - 17.5'	1.5		NA	NA	<0.1	<0.1	NA	<0.1							
B1	05/18/87	14' - 17.5'	310		NA	NA	6.4	1	NA	15							
B2	05/18/87	14' - 17.5'	2.3		NA	NA	<0.1	<0.1	NA	<0.1							
C1	05/18/87	14' - 17.5'	50		NA	NA	5.9	3.7	NA	7.7							
C2	05/18/87	14' - 17.5'	2.4		NA	NA	<0.1	<0.1	NA	<0.1							
WO#1	02/24/93	9.5'	<1.0	4	17	<100	<0.005	0.012	<0.005	<0.015	ND	ND	1.2	52	12	170	40
MW-1-10	10/27/93	10	27		NA		0.081	0.055	0.36	0.099							
MW-1-15	10/27/93	15	7		NA		0.052	0.019	0.22	0.13							
MW-1-20	10/27/93	20	13		NA		0.014	0.033	0.15	0.11							
MW-2-10	10/04/95	10	29		2		<0.01	<0.01	<0.01	<0.03							
MW-2-15	10/04/95	15	<0.2		<1		<0.005	<0.005	<0.005	<0.005							
MW-3-10	10/04/95	10	<0.2		<1		<0.005	<0.005	<0.005	<0.005							
MW-3-15	10/04/95	15	<0.2		100		<0.005	<0.005	<0.005	<0.005							
MW-4-10	10/04/95	10	5100		840		<1	7.7	33	0.3							
MW-4-15	10/04/95	15	<0.2		<1		<0.005	<0.005	<0.005	<0.005							

bgs - below ground surface
NA - not analyzed

Table 2 - Summary of Historic Groundwater Data
5901 MacArthur Blvd, Oakland, CA

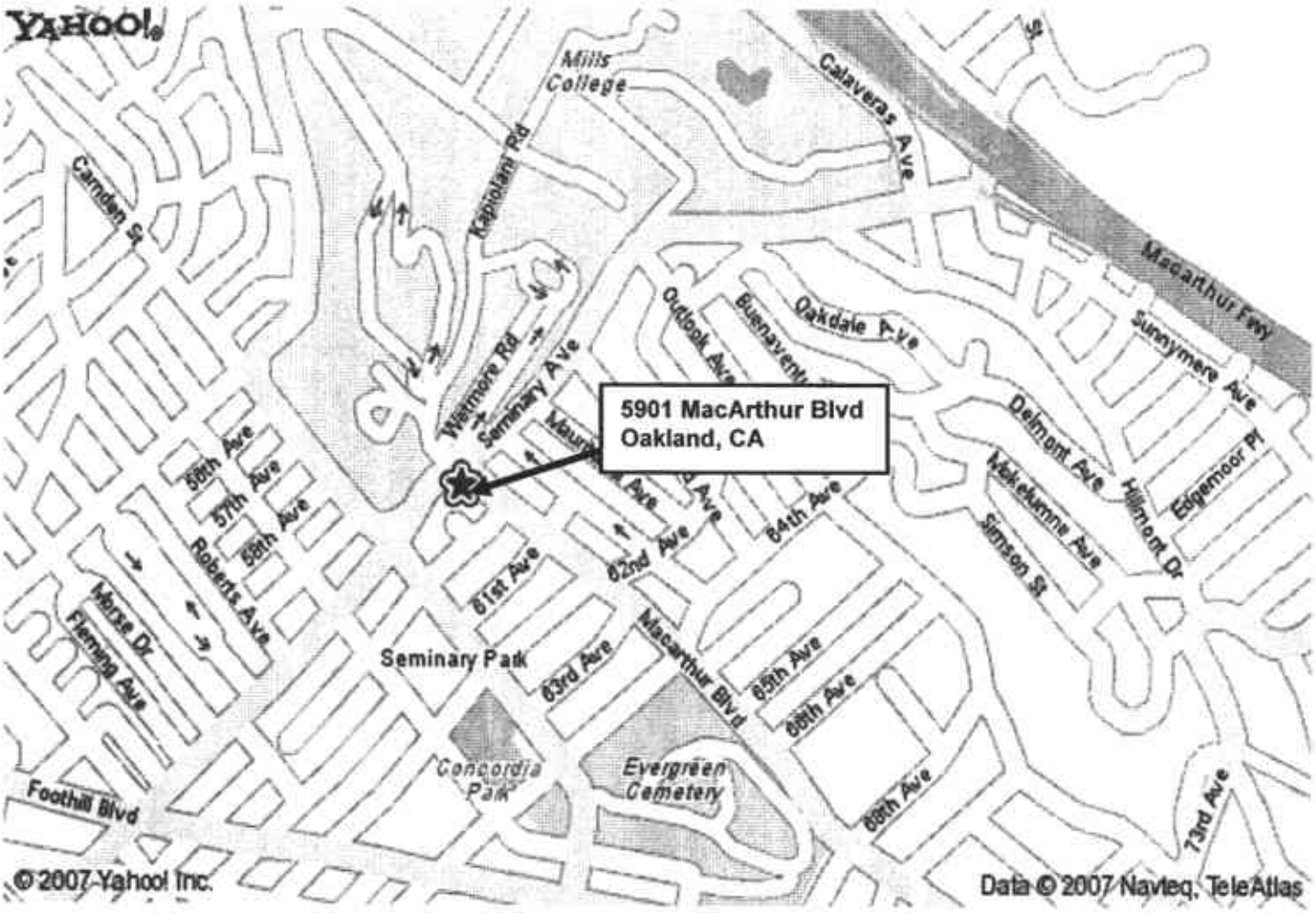
Well ID	Date	Water Level (ft, bgs)	TPH gas (ug/L)	TPH diesel (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzen (ug/L)	Xylenes (ug/L)
MW-1	11/4/93	14.24	1900	610	210	2	0.6	7.8
	3/4/94	13.9	1700	610	220	4.9	2.9	10
	4/30/94	14.07	3200	<50	200	2	60	31
	9/6/94	13.96	3200	940	210	56	55	48
	1/12/95	13.68	500	500	13	<0.5	15	4
	3/13/95	13.2	50	400	8	<0.5	2	<2
	6/15/95	13.92	2000	<50	210	2	83	14
	10/18/95	14.22	1200	<50	110	5	8	6
	12/20/95	13.92	2600	200	320	4	180	55
	3/27/96	13.82	3500	NA	380	6.3	400	280
	6/11/96	13.83	1200	<20	120	1.5	7.7	2
	9/4/96	14.1	1100	<50	51	1.4	5.2	3
MW-2	10/18/95	14.36	500	650	59	1	28	13
	12/20/95	13.87	300	200	5	0.8	0.9	<2
	3/27/96	13.76	<50	NA	<0.5	<0.5	<0.5	<2
	6/11/96	13.9	<50	130	<0.5	<0.5	<0.5	<2
	9/4/96	14.24	240	150	0.7	0.7	9.7	3
MW-3	10/18/95	14.57	100	300	<0.5	<0.5	<0.5	<2
	12/20/95	13.85	<50	<50	<0.5	<0.5	<0.5	<2
	3/27/96	13.38	<50	NA	<0.5	<0.5	<0.5	<2
	6/11/96	14.1	<50	<50	<0.5	<0.5	<0.5	<2
	9/4/96	14.44	<50	<50	<0.5	<0.5	<0.5	<2
MW-4	12/2/95	19.02	2100	2200	20	0.9	5.8	8.4
	12/20/95	12.14	2000	300	17	1	4	7
	3/27/96	12.15	430	NA	0.6	<0.5	0.8	<2
	6/11/96	12.7	370	200	1.9	<0.5	1	<2
	9/4/96	14.16	290	<50	1.1	<0.5	1.4	<2

bgs - below ground surface

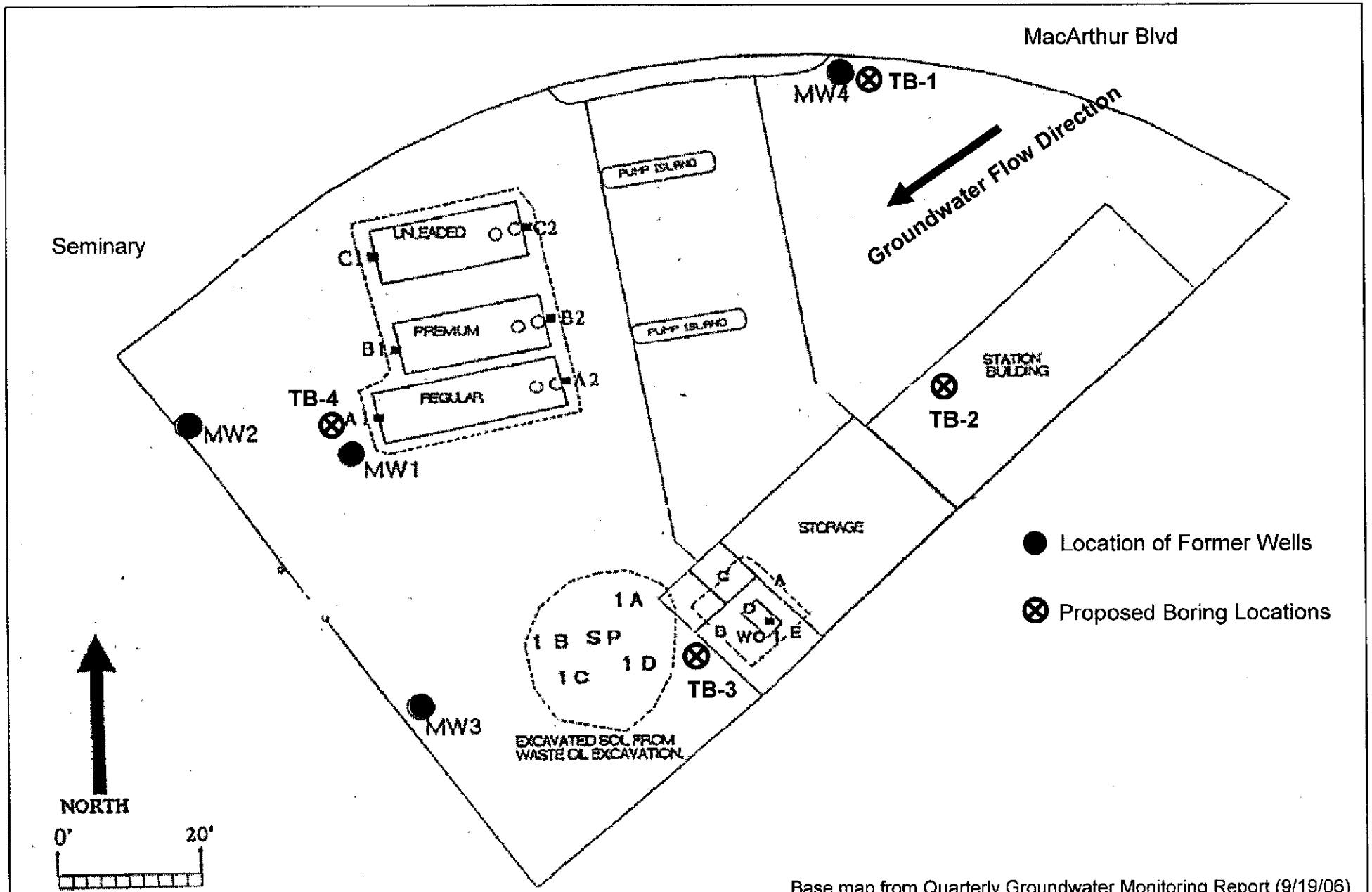
NA - not analyzed

Table 3 - Summary of Proposd Soil and Groundwater Samples and Analyses
5901 MacArthur Blvd, Oakland, CA

			Depth	Analysis				
Boring ID	Sample ID	Sample Type	below grade (feet)	LUFT 5 metals (EPA 6000)	TPHd & mo (EPA 8015)	TPHgas (EPA 8015)	BTEX (EPA 8020)	MTBE (EPA 8020)
TB-1	TB-1-1	Soil	0.5 - 1.0	x	x			
	TB-1-10	Soil	10.0 - 10.5	x	x	x	x	x
	TB-1-15	Soil	15.0 - 15.5	x	x	x	x	x
	TB-1-W	groundwater		x	x	x	x	x
TB-2	TB-2-1	Soil	0.5 - 1.0	x	x			
	TB-2-10	Soil	10.0 - 10.5	x	x	x	x	x
	TB-2-15	Soil	15.0 - 15.5	x	x	x	x	x
	TB-2-W	groundwater		x	x	x	x	x
TB-3	TB-3-1	Soil	0.5 - 1.0	x	x			
	TB-3-10	Soil	10.0 - 10.5	x	x	x	x	x
	TB-3-15	Soil	15.0 - 15.5	x	x	x	x	x
	TB-3-W	groundwater		x	x	x	x	x
TB-4	TB-4-1	Soil	0.5 - 1.0	x	x			
	TB-4-10	Soil	10.0 - 10.5	x	x	x	x	x
	TB-4-15	Soil	15.0 - 15.5	x	x	x	x	x
	TB-4-W	groundwater		x	x	x	x	x



PROJECT NO. 06BPC01.2000	5901 MacArthur Blvd Oakland, CA	VICINITY MAP	FIGURE 1
OTG EnviroEngineering Solutions Inc.			



Base map from Quarterly Groundwater Monitoring Report (9/19/06)
By Western Geo-Engineers

May 8, 2007

PROJECT NO. 06BPC01.2000	5901 MacArthur Blvd Oakland, CA	SITE PLAN & PROPOSED SAMPLING LOCATIONS	FIGURE 2
OTG EnviroEngineering Solutions Inc.			