WORK PLAN FOR SITE ASSESSMENT

For Site Located At
5901 MACARTHUR BLVD.
OAKLAND, CALIFORNIA

Prepared for

Huynh Cheng Family Living Trust
1501 Darius Court
San Leandro, CA 94577

October 9, 2009

Prepared by

oTG

Enviroengineering
Solutions, Inc.

7700 Edgewater Drive, Suite 260
Oakland, CA 94621

OTG EnviroEngineering Solutions, Inc.

October 9, 2009

Mr. Steven Plunkett
Hazardous Materials Specialist
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Reference: ACEH Case No. RO0002959, Geotracker Global ID SLT19761201

Subject: Work Plan for Site Assessment
5901 MacArthur Blvd, Oakland, CA

Dear Mr. Plunkett:

On behalf of the property owner – Huynh Cheng Family Living Trust, OTG EnviroEngineering Solutions, Inc. (OTG) is pleased to submit this work plan for site assessment at 5901 MacArthur Blvd, Oakland, California. Because this project will be funded by the State of California Orphan Site Cleanup Fund (OSCF), which requires all investigation and remediation work be completed by September 30, 2011, your expedited review and approval of the work plan is greatly appreciated.

Certification

"I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge".

Please contact the undersigned at (510) 465-8982 if you have questions or comments.

Sincerely,
OTG EnviroEngineering Solutions, Inc.

Xinggang Tong, PhD, PE
Project Manager

cc: Jeffrey Huynh, 1501 Darius Ct, San Leandro, CA 94577

WORK PLAN FOR SITE ASSESSMENT

For Site Located At
5901 MACARTHUR BLVD.
OAKLAND, CALIFORNIA

Prepared for

Huynh Cheng Family Living Trust
1501 Darius Court
San Leandro, CA 94577

October 9, 2009

Prepared by

oTG
Enviroengineering Solutions, Inc.

7700 Edgewater Drive, Suite 260
Oakland, CA 94621

TABLE OF CONTENTS

FIGURES

TABLES

1. INTRODUCTION

The property owner – Huynh Cheng Family Living Trust (the Owner) applied for grant from the State of California Petroleum Underground Storage Tank (UST) Orphan Site Cleanup Fund (OSCF) and received acceptance and a pre-grant letter (dated September 3, 2009) from the OSCF program manager – State Water Resources Control Board (RWQCB) Division of Financial Assistance. The Scope of Work (SOW) presented in this work plan will be funded by an OSCF site assessment grant.

1.1 Site Location

This currently vacant lot is located in Alameda County at 5901 MacArthur Boulevard (Blvd.) in Oakland, California (Figure 1). It occupies the southwest corner of MacArthur Blvd. and Seminary Avenue intersection and has the size of approximately 0.3 acre. It is located in projected Section 10, T2S, R3W, of the Mount Diablo Baseline and Meridian (MDB&M) at an elevation of approximately 92 feet above mean sea level (msl).

1.2 Site Geology and Hydrogeology

The site is situated at the base of the northwest-southeast trending foothills of the Coast Range. It is located on relatively flat lying sediments that slope southwest at a gradient of approximately 65 feet/mile.

Lion Creek historically ran through the site (Figure 2). A concrete culvert was constructed in the creek bed in the early 1900s and the creek was then filled to create the present parcel. The section of the concrete culvert beneath the site is about 12 feet in width and eight feet in height. The roof of the culvert is approximately nine feet below ground surface (bgs). The culvert was abandoned in place in late 1990s when a new culvert was constructed beneath the Seminary Avenue.

As discussed in details in Section 2 below, environmental investigations were conducted at the site from 1987 to 2007. The 30-foot section tested beneath the site generally consists of stiff dark brown clay that is bisected by a thin sand and gravel layer, first encountered at approximately 15 feet bgs. Fill materials are recognized at some drilling locations down to about 10 feet bgs. The sand and gravel layer is approximately 2 feet thick and forms a shallow water-bearing zone between 9 feet and 17 feet bgs. The shallow zone water flows in a southwest direction. However, the hydrogeology data was collected when the culvert was still carrying the Lion Creek water. The water level beneath the site may have changed after the culvert was abandoned in late 1990s and the creek water has since been rerouted to a new off-site culvert.

2. HISTORY OF ENVIRONMENTAL INVESTIGATION AND REMEDIATION

Wickland Oil Company operated Regal Service Station #404 on the property from unknown time to May 1987 when fueling services ceased operation. All buildings, underground storage tanks (USTs) and associated piping, and pavement were removed by 1997. The site has since been vacant.

2.1 Environmental Activities from 1987 through 1997

According to the *Remedial Action Completion Certification* issued on 29 August 1997 by the Alameda County Environmental Health (ACEH), the following four USTs (single-walled steel tanks) once existed on the property (Figure 3):

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

Holes were noted on USTs #2 and #4 upon their removal. Six (6) soil samples were collected beneath the gasoline USTs (one from each end of the three USTs) and one soil sample was collected beneath the waste oil tank at the time of their removal. Sample locations are shown on Figure 3. Analytical results are summarized in Table 1. Gasoline (TPH-g) 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 gasoline (TPH-g), kerosene (TPH-k), and diesel (TPH-d) 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 (Table 1). 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).

No further investigation beyond the initial soil sampling within the gasoline-UST excavation pit was conducted until October 5, 1992 when the local regulatory agency ACEH issued a letter to the property owner (Wickland Properties) requesting a Preliminary Site Assessment. The following four shallow groundwater monitoring wells were installed and then destroyed:

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 (Blakely Environmental Investigation, Inc, January 4, 1997). Results are summarized in Table 1. Except the soil sample collected at 10 feet 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). Results are summarized in Table 1.

Groundwater samples were collected from the four wells periodically by Western Geo-Engineers 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 1,100 ug/L from MW-1, the highest TPH diesel was 150 ug/L from MW-2, and the highest benzene was 51 ug/L from MW-1 (Western Geo-Engineers, September 19, 1996).

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 was reported.

On behalf of Wickland Properties, Blakely Environmental Investigation, Inc. submitted a closure request on January 4, 1997 and again on April 29, 1997. ACEH approved the closure request by issuing a REMEDIAL ACTION COMPLETION CERTIFICATION dated August 29, 1997. When the State adopted the GeoTracker system, this case was assigned a Global ID T0600101300 and the case is listed as closed in the GeoTracker system. The four monitoring wells were destroyed on November 11, 1997.

2.2 Additional Investigation in 2007

After the UST case was closed by ACEH, Wickland Properties (a subsidiary of Wickland Oil Company) sold the vacant lot to Daniel S. and Belia Franko, Sr. on April 7, 2000, who then sold the property to Jeffrey Huynh and Anna Cheng on September 27, 2002. When Jeffrey Huynh and Anna Cheng submitted a development plan to the City of Oakland in July 2006, the City requested a soil and groundwater sampling be conducted to verify the level of petroleum hydrocarbons remaining at the property.

On June 20, 2007, OTG EnviroEngineering Solutions, Inc. (OTG) drilled five boreholes (TB-1 through TB-5, Figure 3) using a Geoprobe 6600, a direct-push rig, and collected continuous cores of soil columns from each borehole. TB-1, TB-4, and TB-5 were drilled to 20 feet bgs, and TB-2 and TB-3 were to 24 feet bgs. Groundwater was first encountered at 15 feet bgs in TB-4, but it was dry at the other four boreholes. TPH-g was reported at 1,620 ug/L in groundwater and up to 2,890 ppm in soil, and TPH-d at 1,000 ug/L in groundwater and up to 440 ppm in soil. Results are summarized in Table 3. After reviewing the June 2007 sampling data, the City of Oakland Fire Department referred the site back to the County (ACEH) and the County opened a new case number for this site (County new case # RO0002959 and a new

Geotracker Global ID SLT19761201). On June 25, 2008, ACEH issued a letter to Mr. Huynh and Ms. Cheng requiring further site characterization. This investigation work plan is prepared in accordance with the ACEH's site investigation request.

3. PROPOSED SITE ASSESSMENT PROGRAM

The site assessment program proposed here is designed to meet both the ACEH's requirement and the expedited schedule imposed by the OSCF fund that all site assessment and remediation work has to be completed by September 30, 2011.

Up to ten (10) groundwater monitoring wells (NW-1 through NW-10) are proposed and their locations are identified on Figure 3. NW-1 and NW-2 are located in the immediate downgredient area of the two former fuel dispenser islands. NW-3 is in the center of the former gasoline-UST location and NW-4 is in the immediate downgredient location and next to TB-4, where TPH-g was reported at 1,620 ug/L in groundwater from the 2007 investigation. NW-5 is located in the immediate downgredient area of the former waste oil UST. NW-6 is a downgredient well and NW-7 is an upgredient well. NW-8 through NW-10 are contingent wells and they will be installed only after results from NW-1 through NW-7 indicate that the plume has migrated further downgredient and requires additional wells for assessment. The exact locations of NW-8 through NW-10 should be adjusted based on the results from NW-1 through NW-7.

To accommodate the potential need of remediation, NW-1 through NW-5 will be 4-inch diameter wells. All other wells will be two inches in diameter. Details of the proposed wells are summarized in Table 4.

Specific details of the site assessment program are outlined below:

- Pre-drilling details include: developing a site health and safety plan; obtaining well construction permits from Alameda County Public Works Agency Water Resources Section; and underground utility clearance (contacting Underground Services Alert [USA], and contracting to an independent utility locator to clear proposed locations).
- The well borings will be drilled with a hollow stem auger rig (8-inch diameter for 2-inch diameter wells and 10-inch auger for 4-inch wells), from which continuous cores of soil columns (using a 5-foot long core barrel) will be collected and logged by an onsite geologist.
- The soil cores will be screened with a PID to evaluate TPH levels.
- The well borings will extend at least 8 feet beyond first encountered groundwater. The goal is to have the screened interval of the well extend both above and below the water table (covering for seasonal water level fluctuations). It is expected that the well borings will have a total depth of 25 feet.

- Soil samples from selected depths of each boring or as selected by the onsite geologist based on field observations will be collected and submitted to a State of California certified environmental analytical laboratory under chain-of-custody protocol for analysis of BTEX, EDB, EDC, five fuel oxygenates, TPH-g, TPH-d & mo, and LUFT five metals (see Table 5 for details).
- The wells will be constructed and finished in typical fashion in accordance with local and state well regulations. The wells will be constructed with flush threaded and factory slotted screen (Schedule 80 PVC for 2-inch diameter wells and Schedule 40 PVC for 4-inch diameter wells). The screen slot size is expected to be 0.02-inch with a Lonestar 2/12 (or equivalent) sand pack. The sand pack will extend one foot above the top of the uppermost screen slots, followed by one foot of hydrated bentonite chips and then neat cement/bentonite grout to land surface. The wells will be completed to grade with lockable wellhead in traffic rated bolted well boxes.
- After a minimum of 72 hours of completion the monitoring wells will be developed with surge blocks and bailers, followed by pumping until the well water clears and water quality parameters of pH, conductivity, temperature and turbidity stabilize.
- All wells will be surveyed with respect to northing and easting location (NAD 1983 datum) and elevation above mean sea level (msl, NAVD 1988 datum). Survey points will be flush mounted traffic box rim and the top of PVC well casing for each well.
- Initial well sampling will be done no earlier than 48-hours after completion of well development. At that time the wells will be sampled and submitted to a state certified environmental laboratory for the analyses summarized in Table 5. The groundwater monitoring events will be preceded with a water level survey to establish depth to water, water surface elevation (flow direction and gradient), and calculation of the wetted well casing volume that will need to be removed (typically 3 to 5 wetted casing volumes) prior to collecting a representative groundwater sample.
- Soil cuttings and decontamination, well development and purge water will be stored in a central on-site location in properly labeled DOT approved 55-gallon drums awaiting final disposal option selection.

4. PREPARATION OF CORRECTIVE ACTION PLAN

A combined report presenting the soil and groundwater investigation results and a Corrective Action Plan (CAP) will be prepared, which will include the following two major elements:

- Results of the soil and groundwater investigation, with summary tables and figures presenting the investigation results and groundwater contours;
- A CAP for soil and groundwater cleanup to satisfy the proposed site development plan.

This task also includes the preparation of a bidding document and assists the property owner to select a contractor to implement the approved CAP in accordance with the OSCF requirement.

REFERENCES

OTG EnviroEngineering Solutions, Inc., *Results of Soil and Groundwater Investigation at 5901 MacArthur Blvd, Oakland, CA,* July 23, 2007.

OTG EnviroEngineering Solutions, Inc., *Work Plan for Soil and Groundwater Investigation at 5901 MacArthur Blvd, Oakland, CA*, May 5, 2007.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Sample ID	Date of Sampling	Depth (ft, bgs)	Location	TPH gas (mg/kg)	TPH kerosi (mg/kg)	TPH diesel (mg/kg)	Oil&grease (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzen (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
Soil Samples Collected from the Bottom of UST Excavation Pits:																		
A1	05/18/87	14' - 17.5'	UST #1	6.2		NA	NA	<0.1	<0.1	NA	<0.1							
A2	05/18/87	14' - 17.5'	UST #1	1.5		NA	NA	<0.1	<0.1	NA	<0.1							
B1	05/18/87	14' - 17.5'	UST #3	310		NA	NA	6.4	1	NA	15							
B2	05/18/87	14' - 17.5'	UST #3	2.3		NA	NA	<0.1	<0.1	NA	<0.1							
C1	05/18/87	14' - 17.5'	UST #2	50		NA	NA	5.9	3.7	NA	7.7							
C2	05/18/87	14' - 17.5'	UST #2	2.4		NA	NA	<0.1	<0.1	NA	<0.1							
WO#1	02/24/93	9.5'	UST #4	<1.0	4	17	<100	<0.005	0.012	<0.005	<0.015	ND	ND	1.2	52	12	170	40
Soil Samples Collected from Well Installations:																		
MW-1-10	10/27/93	10	MW-1	27		NA		0.081	0.055	0.36	0.099							
MW-1-15	10/27/93	15	MW-1	7		NA		0.052	0.019	0.22	0.13							
MW-1-20	10/27/93	20	MW-1	13		NA		0.014	0.033	0.15	0.11							
MW-2-10	10/04/95	10	MW-2	29		2		<0.01	<0.01	<0.01	<0.03							
MW-2-15	10/04/95	15	MW-2	<0.2		<1		<0.005	<0.005	<0.005	<0.005							
MW-3-10	10/04/95	10	MW-3	<0.2		<1		<0.005	<0.005	<0.005	<0.005							
MW-3-15	10/04/95	15	MW-3	<0.2		100		<0.005	<0.005	<0.005	<0.005							
MW-4-10	10/04/95	10	MW-4	5100		840		<1	7.7	33	0.3							
MW-4-15	10/04/95	15	MW-4	<0.2		<1		<0.005	<0.005	<0.005	<0.005							
bgs - below ground surface																		
NA - not analyzed																		
Data source: Blakely Environmental Investigation, Inc. (January 4, 1997), Request for Closure																		

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								
The four wells were destroyed on 11/11/1997.								

Table 3 - Summary of June 20, 2007 Soil and Groundwater Investigation Results
5901 MacArthur Blvd, Oakland, CA

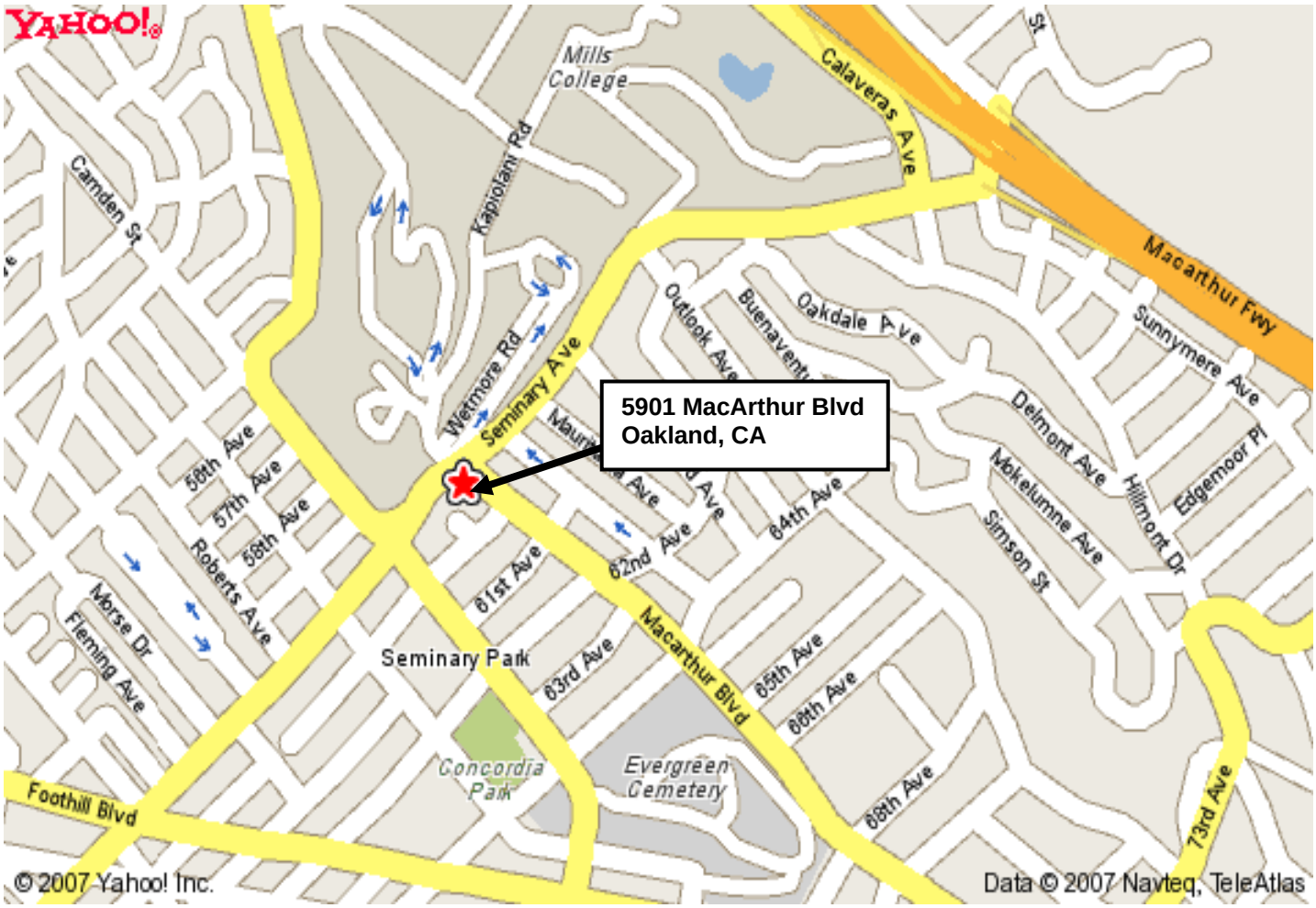
Sample ID	Depth (ft)	medium	unit	TPH gas	TPH diesel	TPH motor oil	Benzene	Toluene	ethylbezene	xylenes	MTBE	Cadmium	Chromium	Lead	Nickel	Zinc
TB-4-W	15	groundwater	ug/L	1,620 (a)	1,000 (b)	ND (246)	2.3	0.97	2.38	0.74	12.3	ND (5)	ND (5)	ND (15)	ND (10)	15
TB-1 (trip blank)				ND (28)	NA	NA	ND (0.34)	ND (0.3)	ND (0.25)	ND (0.74)	ND (0.39)					
TB-1-1	2.0 - 2.5	shallow soil	mg/kg		ND (2.0)	7.5						ND (1.0)	29	25	41	130
TB-1-10	10 - 10.5	deep soil	mg/kg	26.6	2.1	ND (4.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.5)	ND (1.0)	ND (1.0)	78	11	210	76
TB-1-15	15 - 15.5	deep soil	mg/kg	ND (0.1)	ND (2.0)	ND (4.0)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.015)	ND (0.01)	ND (1.0)	27	8.8	38	32
TB-2-1	1.5 -2.0	shallow soil	mg/kg		ND (2.0)	ND (4.0)						ND (1.0)	34	24	37	42
TB-2-10	9.5 - 10	shallow soil	mg/kg	ND (0.1)	ND (2.0)	ND (4.0)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.015)	ND (0.01)	ND (1.0)	50	6.3	130	67
TB-2-15	15 - 15.5	deep soil	mg/kg	23	ND (2.0)	ND (4.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.5)	ND (1.0)					
TB-3-1	1.5 - 2.0	shallow soil	mg/kg		ND (2.0)	73.8						ND (1.0)	29	48	41	97
TB-3-5	5.5 - 6.0	shallow soil	mg/kg	0.22	ND (2.0)	ND (4.0)	ND (0.005)	0.01	0.034	0.13	ND (0.01)	ND (1.0)	150	13	270	88
TB-3-10	10 - 10.5	deep soil	mg/kg	ND (0.1)	ND (2.0)	ND (4.0)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.015)	ND (0.01)	ND (1.0)	94	7.5	170	82
TB-3-15	15 - 15.5	deep soil	mg/kg	ND (0.1)	ND (2.0)	ND (4.0)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.015)	ND (0.01)					
TB-4-1	1.0 - 1.5	shallow soil	mg/kg		ND (2.0)	ND (4.0)						ND (1.0)	32	14	48	32
TB-4-10	9.5 - 10	shallow soil	mg/kg	ND (0.1)	ND (2.0)	9.97	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.015)	ND (0.01)	ND (1.0)	39	26	53	78
TB-4-15	15 - 15.5	deep soil	mg/kg	2,890 (c)	440	44.6	ND (5)	ND (5)	ND (5)	ND (15)	ND (10)	ND (1.0)	200	12	330	160
TB-5-1	1.0 - 1.5	shallow soil	mg/kg		ND (2.0)	ND (4.0)						ND (1.0)	33	7.2	43	29
TB-5-5	5.0 - 5.5	shallow soil	mg/kg	ND (0.1)	ND (2.0)	ND (4.0)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.015)	ND (0.01)	ND (1.0)	80	17	220	110
TB-5-10	10 - 10.5	deep soil	mg/kg	ND (0.1)	ND (2.0)	ND (4.0)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.015)	ND (0.01)	ND (1.0)	110	6.6	240	68
TB-5-15	15 - 15.5	deep soil	mg/kg	0.143	5.8	ND (4.0)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.015)	ND (0.01)					
Note: a - laboratory reported that the result is elevated due to presence of non-target compounds within the TPH gas quantitative range.																
Note: b - sample chromatogram does not resemble typical diesel pattern. Lighter end and unidentified hydrocarbon peaks within the diesel range quantitated as diesel.																
Note: c - sample chromatogram does not match typical gasoline pattern due to presence of heavier hydrocarbons within the TPH gas range.																

Table 4 - Details of Proposed Monitoring Wells
5901 MacArthur Blvd, Oakland, CA

Well ID	Well Diameter	Total Depth	Screen Interval	Screen Size	Well Material	Borehole Dia.	Sand Packing	Sand Type
	(inches)	(feet)	(feet, bgs)	(inches)		(inches)	Interval (ft, bgs)	(Lonestar or eq)
NW-1	4	25	10 - 25	0.02	Sch 40 PVC	10	9 - 25	#2/12
NW-2	4	25	10 - 25	0.02	Sch 40 PVC	10	9 - 25	#2/12
NW-3	4	25	10 - 25	0.02	Sch 40 PVC	10	9 - 25	#2/12
NW-4	4	25	10 - 25	0.02	Sch 40 PVC	10	9 - 25	#2/12
NW-5	4	25	10 - 25	0.02	Sch 40 PVC	10	9 - 25	#2/12
NW-6	2	25	10 - 25	0.02	Sch 80 PVC	8	9 - 25	#2/12
NW-7	2	25	10 - 25	0.02	Sch 80 PVC	8	9 - 25	#2/12
NW-8	2	25	10 - 25	0.02	Sch 80 PVC	8	9 - 25	#2/12
NW-9	2	25	10 - 25	0.02	Sch 80 PVC	8	9 - 25	#2/12
NW-10	2	25	10 - 25	0.02	Sch 80 PVC	8	9 - 25	#2/12
Note:								
One foot hydrated bentonite chips on top of sand packing and then cement grout to surface,								
complete well with lockable wellhead in a traffic rated bolted well box.								

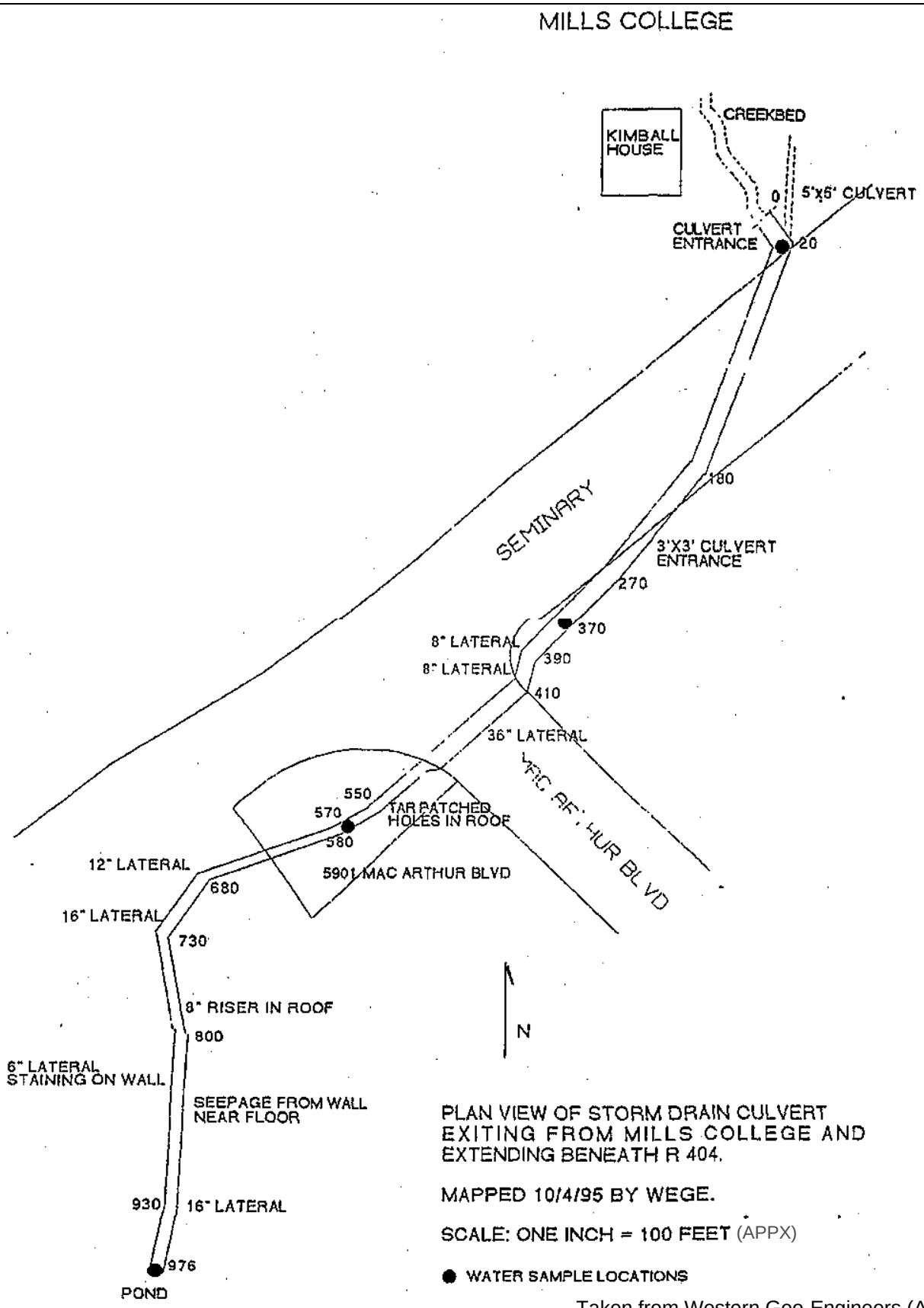
Table 5 - Proposed Soil and Groundwater Samples and Analyses
5901 MacArthur Blvd., Oakland, CA

		Sample	Sampling Depth	**Analysis**			
Well ID	Sample ID	Type	(ft, below grade)	TPH-g	TPH-d & mo	VOCs (a)	LUFT 5 metals
				(EPA 8015m)	EPA 8015m)	(EPA 8260)	(EPA 6000)
NW-1	NW-1-5	Soil	5.0 - 5.5	X	X	X	X
	NW-1-10	Soil	10.0 - 10.5	X	X	X	
	NW-1-15	Soil	15.0 - 15.5	X	X	X	X
	NW-1-20	Soil	20.0 - 20.5	X	X	X	
	NW-1-25	Soil	25.0 - 25.5	X	X	X	
	NW-1-W	Groundwater		X	X	X	X
NW-2	NW-2-5	Soil	5.0 - 5.5	X	X	X	X
	NW-2-10	Soil	10.0 - 10.5	X	X	X	
	NW-2-15	Soil	15.0 - 15.5	X	X	X	X
	NW-2-20	Soil	20.0 - 20.5	X	X	X	
	NW-2-25	Soil	25.0 - 25.5	X	X	X	
	NW-2-W	Groundwater		X	X	X	X
NW-3	NW-3-5	Soil	5.0 - 5.5	X	X	X	X
	NW-3-10	Soil	10.0 - 10.5	X	X	X	
	NW-3-15	Soil	15.0 - 15.5	X	X	X	X
	NW-3-20	Soil	20.0 - 20.5	X	X	X	
	NW-3-25	Soil	25.0 - 25.5	X	X	X	
	NW-3-W	Groundwater		X	X	X	X
NW-4	NW-4-5	Soil	5.0 - 5.5	X	X	X	X
	NW-4-10	Soil	10.0 - 10.5	X	X	X	
	NW-4-15	Soil	15.0 - 15.5	X	X	X	X
	NW-4-20	Soil	20.0 - 20.5	X	X	X	
	NW-4-25	Soil	25.0 - 25.5	X	X	X	
	NW-4-W	Groundwater		X	X	X	X
	NW-4-Wd	Groundwater	duplicate	X	X	X	X
NW-5	NW-5-5	Soil	5.0 - 5.5	X	X	X	X
	NW-5-10	Soil	10.0 - 10.5	X	X	X	
	NW-5-15	Soil	15.0 - 15.5	X	X	X	X
	NW-5-20	Soil	20.0 - 20.5	X	X	X	
	NW-5-25	Soil	25.0 - 25.5	X	X	X	
	NW-5-W	Groundwater		X	X	X	X
NW-6	NW-6-5	Soil	5.0 - 5.5	X	X	X	X
	NW-6-15	Soil	15.0 - 15.5	X	X	X	X
	NW-6-25	Soil	25.0 - 25.5	X	X	X	
	NW-6-W	Groundwater		X	X	X	
NW-7	NW-7-5	Soil	5.0 - 5.5	X	X	X	X
	NW-7-15	Soil	15.0 - 15.5	X	X	X	X
	NW-7-25	Soil	25.0 - 25.5	X	X	X	
	NW-7-W	Groundwater		X	X	X	X
NW-8	NW-8-5	Soil	5.0 - 5.5	X	X	X	
	NW-8-15	Soil	15.0 - 15.5	X	X	X	
	NW-8-25	Soil	25.0 - 25.5	X	X	X	
	NW-8-W	Groundwater		X	X	X	
NW-9	NW-9-5	Soil	5.0 - 5.5	X	X	X	
	NW-9-15	Soil	15.0 - 15.5	X	X	X	
	NW-9-25	Soil	25.0 - 25.5	X	X	X	
	NW-9-W	Groundwater		X	X	X	
NW-10	NW-10-5	Soil	5.0 - 5.5	X	X	X	X
	NW-10-15	Soil	15.0 - 15.5	X	X	X	X
	NW-10-25	Soil	25.0 - 25.5	X	X	X	
	NW-10-W	Groundwater		X	X	X	X
Travel blank	TB-1	water		X		X	
Notes:							
(a) - VOCs by EPA 8260 for BTEX, EDB, EDC, MTBE, TAME, TBA, ETBE, and DIPE							



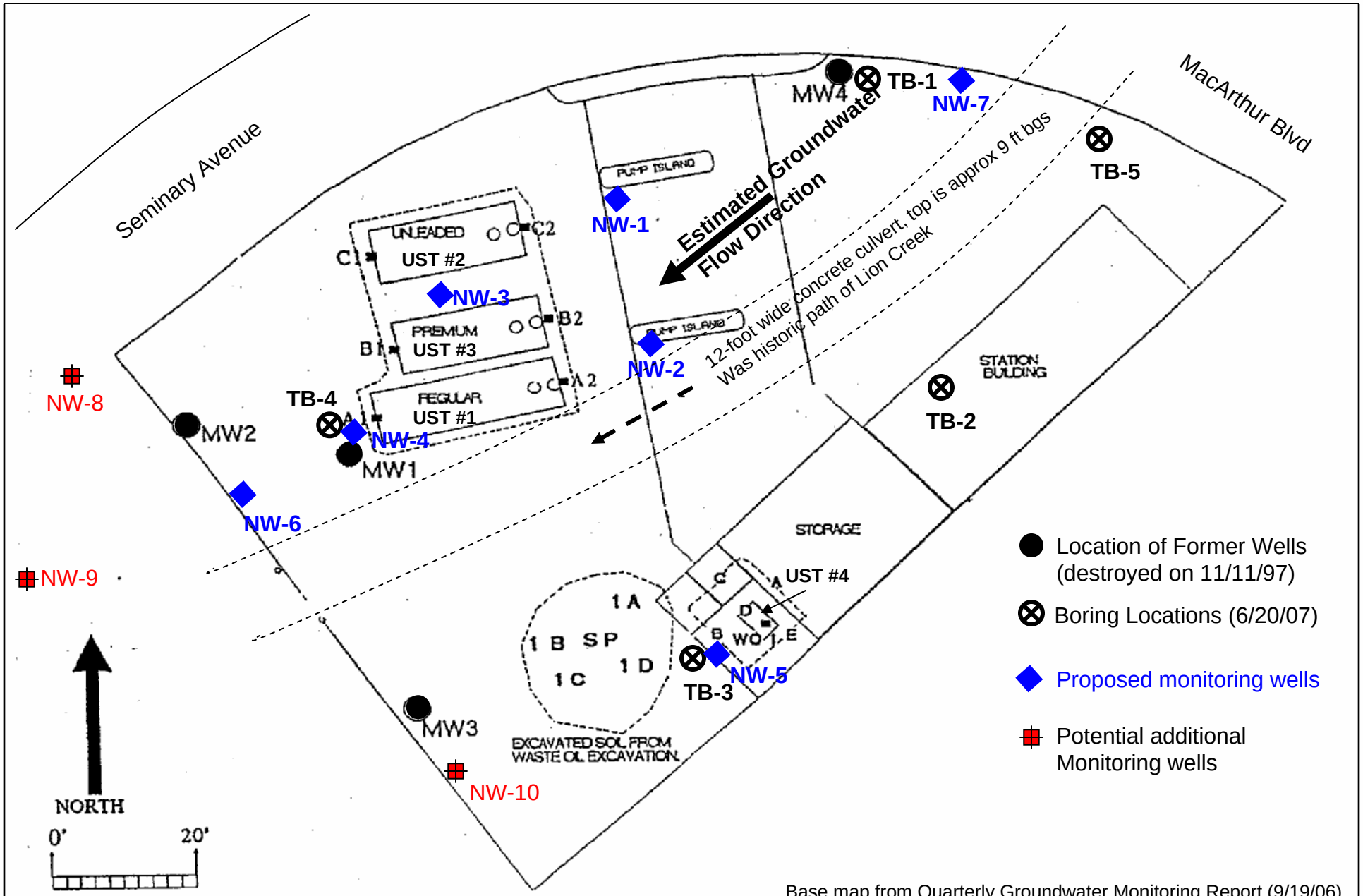
N

PROJECT NO. 09HCT01.1000	5901 MacArthur Blvd Oakland, CA	SITE VICINITY MAP	FIGURE 1
OTG EnviroEngineering Solutions Inc.			



Taken from Western Geo-Engineers (April 10, 1995)

PROJECT NO. 06HCT01.1000	**5901 MacArthur Blvd Oakland, CA**	**STORM DRAIN CULVERT (abandoned in late 1990s)**	**FIGURE 2**
OTG EnviroEngineering Solutions Inc.			



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

September 24, 2009

PROJECT NO. 06HCT01.1000	5901 MacArthur Blvd Oakland, CA	SITE PLAN & PROPOSED MONITORING WELL LOCATIONS	FIGURE 3
OTG EnviroEngineering Solutions Inc.			