James P. Kiernan, P.E.
Project Manager

Chevron Environmental Management Company
6001 Bollinger Canyon Road
Room C2102
San Ramon, CA 94583
Tel (925) 842-3220
jkiernan@chevron.com

January 24, 2017

Alameda County Health Care Services Agency
Environmental Health Services
Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

RECEIVED
By Alameda County Environmental Health 8:55 am, Jan 25, 2017

Re: Unocal No. 5781 (351640)
Offsite Investigation Work Plan
3535 Pierson Street, Oakland, California
Fuel Leak Case No.: RO0000253
GeoTracker Global ID #T0600101467

I have read and acknowledge the content, recommendations and/or conclusions contained in the attached document or report submitted on my behalf to ACDEH's FTP server and the SWRCB's GeoTracker website.

The information in this report is accurate to the best of my knowledge. This report was prepared by Arcadis, upon whose assistance and advice I have relied.

Sincerely,

James P. Kiernan, P.E.
Project Manager

Attachment: Offsite Investigation Work Plan by Arcadis

ARCADIS Design & Consultancy for natural and built assets

Chevron Environmental Management Company

OFFSITE INVESTIGATION WORK PLAN

Former Unocal No. 5781 (351640)
3535 Pierson Street
Oakland, California
Fuel Leak Case No. RO0000253

January 24, 2017

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OFFSITE INVESTIGATION WORK PLAN

Former Unocal No. 5781 (351640)
3535 Pierson Street
Oakland, California
Fuel Leak Case No. RO0000253

Prepared for:

Chevron Environmental Management Company

Carl Edwards
Environmental Scientist

Tamera Rogers
Project Manager

Katherine Brandt, P.G. (No. 9132)
Senior Geologist

Prepared by:

Arcadis U.S., Inc.
2999 Oak Road
Suite 300
Walnut Creek
California 94597
Tel 925.274.1100

Our Ref.:

B0035135.1640

Date:

January 24, 2017

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FIGURES

ATTACHMENTS

1 INTRODUCTION

On behalf of Chevron Environmental Management Company's (CEMC's) affiliate, Union Oil Company of California (Union Oil), Arcadis U.S., Inc. (Arcadis) has prepared this *Offsite Investigation Work Plan* (work plan) for former Unocal Station No. 5781 located at 3535 Pierson Street in Oakland, California (the site; Figure 1). This work plan presents a proposed scope of work to address the concerns regarding groundwater delineation to the east of the site identified by the Alameda County Environmental Health (ACEH) following the results of the site assessment conducted in June 2015 (Attachment 1).

1.1 Site Background

The site is an active Shell-branded service station located at the northwestern corner of the intersection of Pierson Street and MacArthur Boulevard in Oakland, California (Figure 1). The current site configuration includes a station building, two 12,000-gallon gasoline underground storage tanks (USTs), and four dispensers on two islands (Figure 2). The station building consists of a market/deli (formerly a vehicle repair shop) and an office area. The site is located in a primarily residential area, and paved with concrete and asphalt, with exception of planter areas along the perimeter.

1.2 Site Geology/Hydrogeology

The site is located on the western flank of the Oakland Hills which are underlain by the Quaternary San Antonio Formation and Holocene alluvium of the Temescal Formation. The San Antonio Formation consists of gravels with a silt and clay matrix. The Temescal Formation consists of alluvial deposits composed of unconsolidated, moderately sorted permeable silt with coarse sand and gravel (California Geological Survey 2002; 2010). Boring logs indicate that the site is underlain by a primarily clay and silt matrix, with interbedded sands and gravels of varying thickness. Offsite borings (SB-13 through SB-15) show more permeable soils (gravel with sand, sandy silt, silt with sand) between 12 and 20 feet below ground surface (bgs).

The most recent groundwater monitoring event was conducted in October 2016. Depth to water ranged from approximately 13 to 17 feet bgs, and the calculated direction of groundwater flow was to the southwest with an estimated gradient of 0.02 foot per foot (Arcadis 2016). Moving clockwise, the historical direction of groundwater flow has varied from northeast to southwest (Figure 3).

1.3 Site Assessment History

A complete summary of site assessments conducted at the site is available in the *Site Conceptual Model* (AECOM 2015b). This section focuses on the most recent site assessment activities, the results of which prompted ACEH's concern regarding further investigation of offsite groundwater.

In June 2015, three soil borings (SB-13 through SB-15) were advanced offsite to collect soil and grab groundwater samples at depths ranging from 20 to 24 feet (Figure 3; AECOM 2015a). A 10-foot temporary screen connected to a polyvinyl chloride (PVC) riser was installed to the total boring depth. A grab groundwater sample was only able to be collected from SB-13. Sufficient groundwater did not

accumulate in SB-14 and SB-15 to allow for sample collection. Analytical results for the constituents of potential concern (COPCs) are below and included on Figure 3:

Sample Location	Date	TPH-g (µg/L)	TPH-d (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)
SB-13	6/17/2015	44,000	<2,000	<2.5	<2.5	5.6	<5.0	<2.5

Notes:
BTEX and Oxygenate compounds analyzed by EPA Method 8260B; TPH-d and TPH-g analyzed by EPA Method 8015B.
(µg/L) = micrograms per liter
< = Analyte not detected at or above indicated method detection limit
TPH-g = total petroleum hydrocarbons as gasoline
TPH-d = total petroleum hydrocarbons as diesel
B = benzene
T = toluene
E = ethylbenzene
X = total xylenes
MTBE = methyl tert-butyl ether

The results indicated total petroleum hydrocarbons as gasoline (TPH-g) impacts in groundwater extended offsite to the northeast. The scope of work below will address ACEH's concerns about offsite impacts by advancing soil borings to collect grab groundwater samples at locations further offsite from SB-13 through SB-15.

2 PROPOSED SCOPE OF WORK

2.1 Health and Safety, Permitting, and Utility Clearance

Before field activities are initiated, the site-specific Health and Safety Plan (HASP) will be updated in accordance with state and federal requirements for use during the proposed field activities. Soil boring permits will be obtained from the Alameda County Public Works Agency (ACPWA). Encroachment permits will be obtained as necessary from the City of Oakland.

Arcadis will contact Underground Services Alert (USA) for identifying public underground utilities at the offsite sampling locations. In addition, a private utility locating contractor will identify/confirm any subsurface utilities prior to advancing the proposed borings.

2.2 Grab Groundwater Sampling Activities

Two soil borings (SB-16 and SB-17) will be advanced to groundwater, anticipated to be approximately 20 feet bgs, using direct-push drilling methods. To minimize the potential of damaging underground utilities, the proposed borings will first be cleared to approximately 5 feet bgs using a hand auger. The approximate proposed boring locations are included in Figure 2. Encountered subsurface materials will be logged continuously for stratigraphic characteristics (contacts, color, staining, odors, etc.) using the Unified Soil Classification System (USCS) under the supervision of a California Professional Geologist and field screened for volatile organic compounds (VOCs) with a photo-ionization detector (PID). Soil samples will only be collected for analytical testing if there are obvious signs of COPC impacts based on visual and olfactory observations, as well as VOC readings from the PID.

Following the completion of the soil borings, a grab groundwater sample will attempt to be collected by placing a 1-inch-diameter PVC casing with a 5-foot screened interval of 0.010-inch slotted PVC to the

bottom of each boring. Blank PVC riser pipe will be connected to the PVC screen to facilitate sample collection at the surface. Prior to grab groundwater sample collection, the static water level below the top of the casing and ground surface will be measured using an electronic water level indicator.

Limited groundwater and moisture content has been observed during past grab-groundwater sampling at the site. As a result, the borehole may be required to be left open to allow available groundwater to infiltrate the temporary well screen. Arcadis proposes to leave the borehole open for a maximum of 24 hours if groundwater is not readily present following completion of the boring. Should it be necessary to leave the borehole open, the surface will be protected to prevent rain or other fluids from entering the borehole from the surface.

2.2.1 Proposed Grab Groundwater Sampling

Prior to sampling, one to three casing volumes of groundwater will be purged to remove any sediment-loaded groundwater to the extent feasible. However, purging may not be performed if a limited supply of groundwater is observed in the borehole. If insufficient water is available for purging, Arcadis proposes to decant the samples in the field or have the laboratory filter the sediment prior to analyzing the samples. The groundwater samples will be collected using a disposable polyethylene bailer, stainless steel bailer, peristaltic pump, or similar sampling device. The samples will be sealed, labeled, and placed in an ice-chilled cooler for delivery to a California Department of Public Health-certified analytical laboratory, under proper chain-of-custody procedures. Grab groundwater samples will be analyzed for the following analytes:

- TPH-g (C_6-C_{12}) using United States Environmental Protection Agency (USEPA) Method 8015 Modified (8015M);
- Total petroleum hydrocarbons as diesel (C_{12}-C_{24}) (TPH-d) using USEPA Method 8015M;
- Benzene, toluene, ethylbenzene, total xylenes (collectively BTEX) using USEPA Method 8260B; and
- Fuel additives methyl tert-butyl ether (MTBE), tert-butyl alcohol (TBA), di-isopropyl ether (DIPE), ethyl tert-butyl ether (ETBE), tert-amyl methyl ether (TAME), ethanol, 1,2-dichloroethane (1,2-DCA), and ethylene dibromide (EDB) using USEPA Method 8260B.

2.2.2 Proposed Soil Boring Abandonment

Upon completion of grab groundwater sampling activities, the borings will be abandoned in accordance with ACPWA requirements. The temporary PVC casing will be removed, and the borings will be backfilled with neat cement to approximately 4 inches bgs. The surface will be restored to match the pre-existing conditions.

2.2.3 Equipment Decontamination Procedures

Down-hole drilling and sampling equipment will be steam-cleaned prior to deployment and following the completion of each sampling location. Decontamination of non-dedicated or non-disposable field equipment will be conducted using a Liquinox® solution and deionized water rinse between each boring to prevent cross-contamination.

2.2.4 Investigation-Derived Waste Disposal

Investigation-derived waste (IDW) generated during investigation activities may include soil cuttings, decontamination fluids, purge/rinse water, personal protective equipment (PPE), and other disposable sampling materials. Soil cuttings derived from drilling as well as wastewater from decontamination procedures and purge water from the collection of groundwater samples will be placed in appropriate containers and temporarily stored at the site pending characterization and disposal. PPE, such as nitrile gloves, and disposable supplies, such as paper and plastic, will be treated as municipal waste. Composite soil and aqueous samples of IDW will be collected for waste profiling purposes. A copy of the waste manifest documenting proper off-site transport and disposal of the IDW will be included with the report below.

3 REPORTING AND PROJECT SCHEDULE

Arcadis is prepared to initiate fieldwork upon receipt of all necessary approvals and permits. Based on historical wait times to obtain an encroachment permit from the City of Oakland, Arcadis anticipates up to a 6-month waiting period for the encroachment permit. A report detailing the completion of these proposed activities, along with updates to the site status as it relates to the State Water Resources Control Board's (SWRCB) Low Threat Case Closure Policy, will be submitted to the ACEH following the conclusion of the field investigation and receipt of the analytical results.

4 REFERENCES

AECOM. 2015a. Site Assessment Report, Unocal No. 5781 (351640), 3535 Pierson Street Oakland, California. July 13.

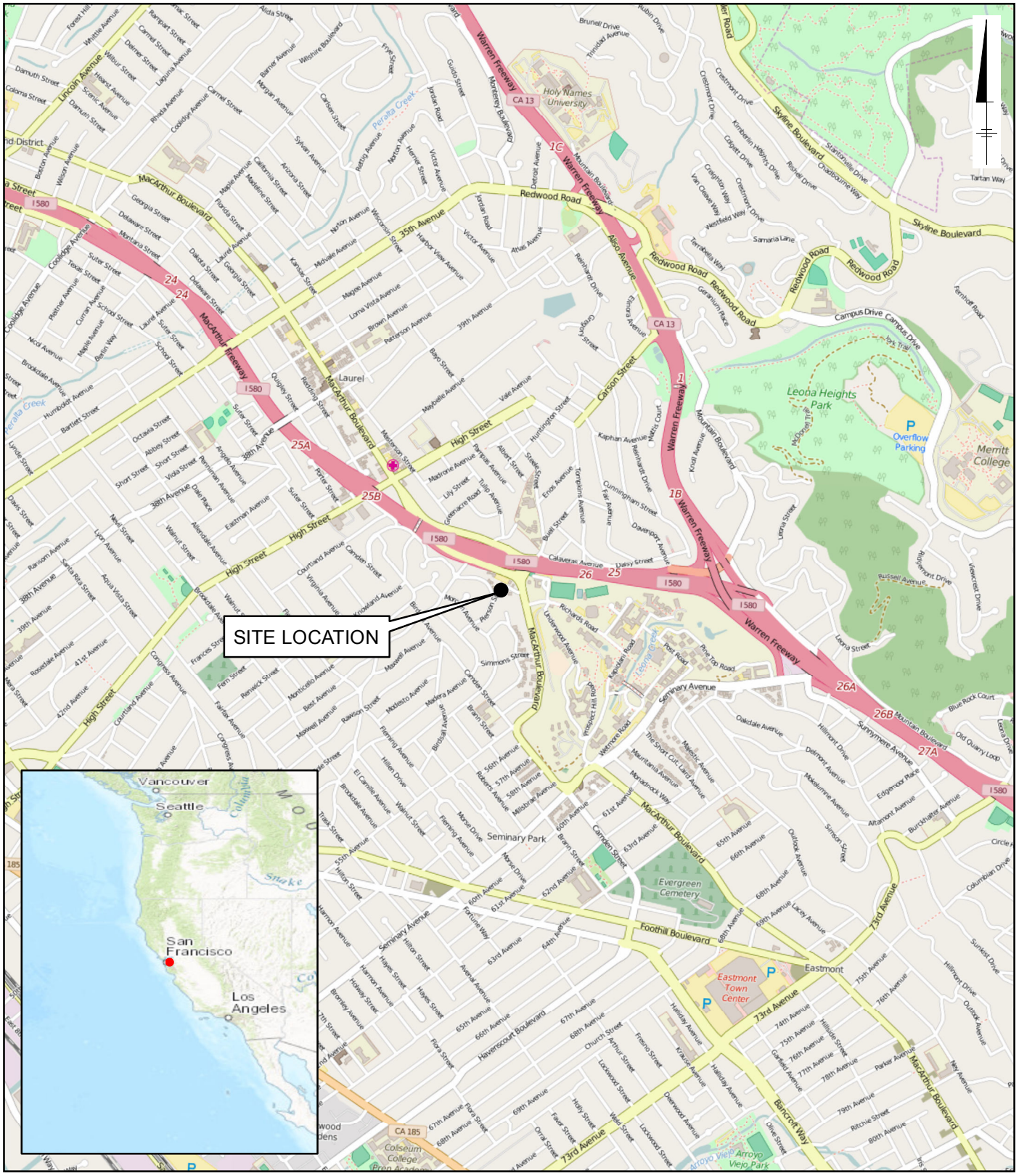
AECOM. 2015b. Site Conceptual Model, Unocal No. 5781 (351640), 3535 Pierson Street Oakland, California. December 16.

Arcadis U.S., Inc. (Arcadis). 2016. Quarterly Status Report, Third Quarter 2016, 3535 Pierson Street, Oakland, CA. October 14.

California Geological Survey. 2002. California Geomorphic Provinces – Note 36.

California Geological Survey. 2010. Geologic Map of California at http://www.quake.ca.gov/gmaps/GMC/stategeologicm ap.html

FIGURES



0 2,000 4,000 Feet

GRAPHIC SCALE

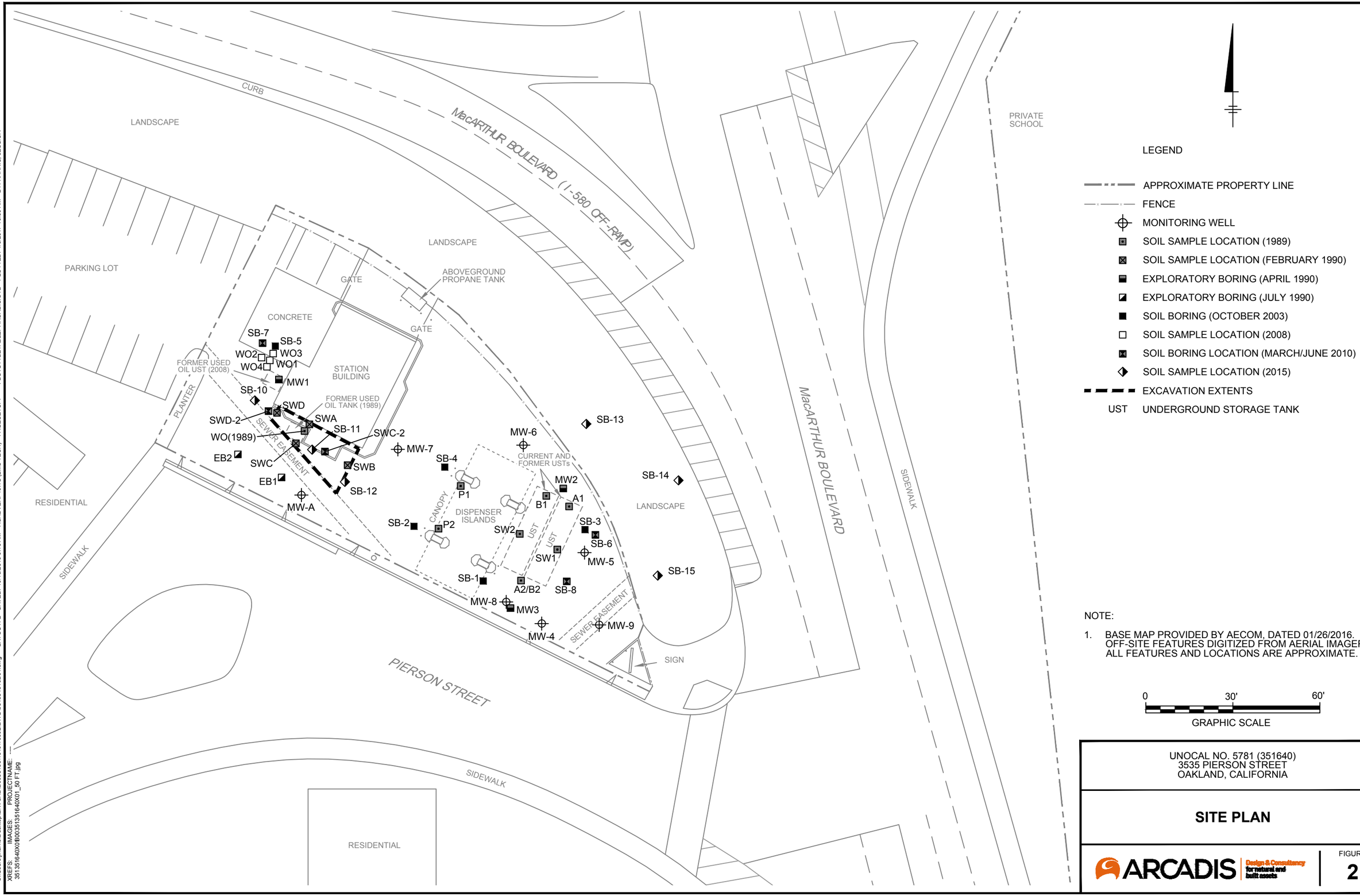
UNOCAL NO. 5781 (351640)
3535 PIERSON STREET
OAKLAND, CALIFORNIA

SITE LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE 1

City:Syr Div/Group:IMDV Created By:A.Schilling Last Saved By: aschilling
Project Unocal
G:\ENVCAD\SYRACUSE\ACTIB0035135\1640\2QTRR\DWG\Fig 1 - Site Location.mxd 7/14/2016 2:53:08 PM



LEGEND

- APPROXIMATE PROPERTY LINE
- FENCE
- MONITORING WELL
- SOIL SAMPLE LOCATION (1989)
- SOIL SAMPLE LOCATION (FEBRUARY 1990)
- EXPLORATORY BORING (APRIL 1990)
- EXPLORATORY BORING (JULY 1990)
- SOIL BORING (OCTOBER 2003)
- SOIL SAMPLE LOCATION (2008)
- SOIL BORING LOCATION (MARCH/JUNE 2010)
- SOIL SAMPLE LOCATION (2015)
- EXCAVATION EXTENTS
- UST UNDERGROUND STORAGE TANK

NOTE:

1. BASE MAP PROVIDED BY AECOM, DATED 01/26/2016. OFF-SITE FEATURES DIGITIZED FROM AERIAL IMAGERY. ALL FEATURES AND LOCATIONS ARE APPROXIMATE.

0 30' 60'

GRAPHIC SCALE

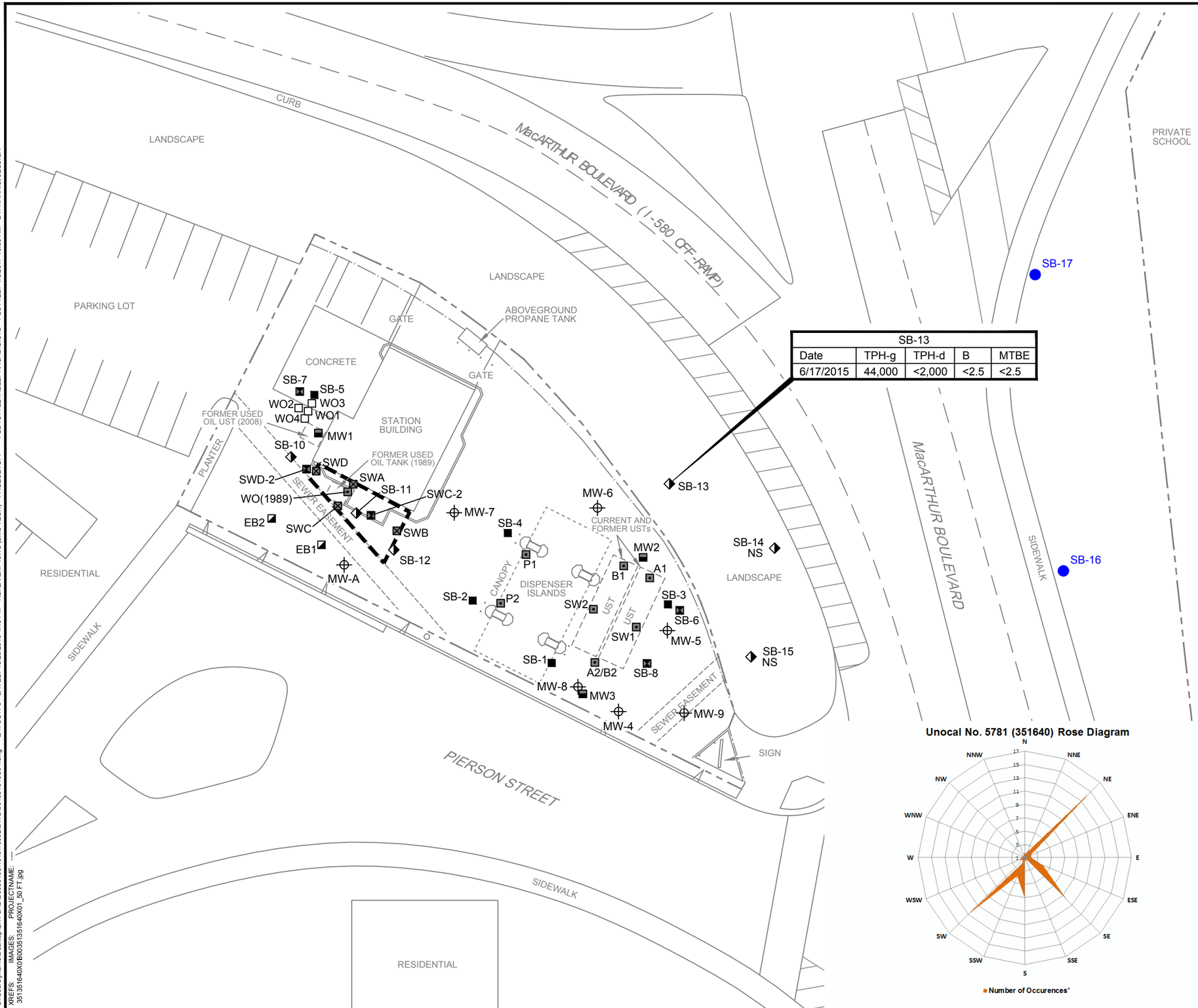
UNOCAL NO. 5781 (351640)
3535 PIERSON STREET
OAKLAND, CALIFORNIA

SITE PLAN

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2

CITY: SAN RAFAEL, CA DIV/GROUP: ENVCAD DB: J. HARRIS
C:\Users\jharris\Desktop\ENVCAD\B0035135\1640\16002\DWG\351351640B01.dwg LAYOUT: 2 SAVED: 10/13/2016 9:16 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 1/6/2017 10:50 AM BY: HARRIS, JESSICA
XREFS: IMAGES: PROJECTNAME: ----
351351640XOB0035135164 0X01_50 FT.jpg



SB-13				
Date	TPH-g	TPH-d	B	MTBE
6/17/2015	44,000	<2,000	<2.5	<2.5

LEGEND

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- EXPLORATORY BORING (JULY 1990)
- SOIL BORING (OCTOBER 2003)
- SOIL SAMPLE LOCATION (2008)
- SOIL BORING LOCATION (MARCH/JUNE 2010)
- SOIL SAMPLE LOCATION (2015)
- PROPOSED GRAB GROUNDWATER SAMPLING LOCATION
- EXCAVATION EXTENTS

UST	UNDERGROUND STORAGE TANK
TPH-g	TOTAL PETROLEUM HYDROCARBONS - GASOLINE
TPH-d	TOTAL PETROLEUM HYDROCARBONS - DIESEL
B	BENZENE
MTBE	METHYL TERTIARY BUTYL ETHER
<	LESS THAN LABORATORY REPORTING LIMIT
NS	NOT SAMPLED

GROUNDWATER ANALYTICAL RESULTS ARE IN MICROGRAMS PER LITER (µg/L)

NOTE:

1. BASE MAP PROVIDED BY AECOM, DATED 01/26/2016. OFF-SITE FEATURES DIGITIZED FROM AERIAL IMAGERY. ALL FEATURES AND LOCATIONS ARE APPROXIMATE.

Unocal No. 5781 (351640) Rose Diagram

0 30' 60'

GRAPHIC SCALE

UNOCAL NO. 5781 (351640)
3535 PIERSON STREET
OAKLAND, CALIFORNIA

SITE PLAN SHOWING GRAB GROUNDWATER ANALYTICAL RESULTS AND PROPOSED SAMPLING LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 3

CITY: SAN RAFAEL, CA DIV/GROUP: ENVCAD DB: J. HARRIS
C:\Users\jlharris\Desktop\ENVCAD\B0035135\516401\6002\DWG\351351640C01.dwg LAYOUT: 3 SAVED: 10/20/2016 4:19 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 1/6/2017 10:50 AM BY: HARRIS, JESSICA
XREFS: IMAGES: PROJECTNAME: ---
351351640X01B0035135164016402X01_50 FT.jpg

ATTACHMENT A

ACEH Correspondence

Nowell, Keith, Env. Health

From: Nowell, Keith, Env. Health
Sent: Friday, December 11, 2015 2:24 PM
To: 'Arceneaux, Nicole Marie'
Cc: 'Roper, Chad'; Roe, Dilan, Env. Health
Subject: Status of Groundwater Investigation, fuel leak case No. RO253 and GeoTracker Global ID T0600101467, Unocal #5781, 3535 Pierson Street, Oakland

Dear Ms. Arceneaux,

Alameda County Environmental Health (ACEH) staff has reviewed the case file including the recently submitted document entitled *Third Quarter 2015 Groundwater Monitoring Report* (GWMR), dated October 14, 2015 and prepared by AECOM for the subject site. The *Future Activities* section of the GWMR states AECOM will submit quarterly groundwater monitoring and sampling reports. Additionally, the site conceptual model (SCM) will be updated with the results to identify any remaining data gaps.

Following submittal of the AECOM document entitled *Site Assessment Report* (SAR), dated July 13, 2015, ACEH met with you to discuss the findings of the SAR. At the August 13, 2015 meeting, ACEH discussed with you a strategy to move the case toward closure. The GWMR does not address the strategy discussed. Therefore, ACEH is requesting an update of the status of the groundwater delineation investigation discussed at the August 13 meeting. Please respond via email (Attn.: Keith Nowell) by December 18, 2015.

Regards,
Keith Nowell

Keith Nowell PG, CHG
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda , CA 94502-6540
phone: 510 / 567 - 6764
fax: 510 / 337 - 9335
email: keith.nowell@acgov.org

PDF copies of case files can be reviewed/downloaded at:

http://www.acgov.org/aceh/lop/ust.htm

Arcadis U.S., Inc.

2999 Oak Road

Suite 300

Walnut Creek, California 94597

Tel 925 724 1100

www.arcadis.com

STATE WATER RESOURCES CONTROL BOARD

GEOTRACKER ESI

UPLOADING A GEO_REPORT FILE

SUCCESS

Your GEO_REPORT file has been successfully submitted!

Submittal Type:	**GEO_REPORT**
Report Title:	**OFFSITE INVESTIGATION WORK PLAN**
Report Type:	**Site Investigation Workplan**
Report Date:	**1/24/2017**
Facility Global ID:	**T0600101467**
Facility Name:	**UNOCAL #5781**
File Name:	**351640 Offsite Investigation WP FIN 01242017-signed.pdf**
Organization Name:	**ARCADIS**
Username:	**ARCADIS76**
IP Address:	**8.39.233.203**
Submittal Date/Time:	**1/24/2017 3:52:26 PM**
Confirmation Number:	**9415659308**