CONFIRMATION SOIL SAMPLING REPORT
FORMER 76 STATION #5379
6280 EAST 2ND STREET
LONG BEACH, CALIFORNIA
LARWQCB NO. 908030052

AUGUST 5, 2010

August 5, 2010

California Regional Water Quality Control Board
Los Angeles Region
320 West 4th Street
Los Angeles, California 90013

Attention: Mr. Dave Bjostad

Re: **REQUEST FOR CLOSURE**
Confirmation Soil Sampling Report
Former 76 Station #5379
6280 East 2nd Street
Long Beach, California
LARWQCB File No. 908030052

Dear Mr. Bjostad:

On behalf of Conoco Phillips, transmitted herewith is a copy of our Confirmation Soil Sampling Report and Request for Site Closure for the above-referenced site.

If you have any questions or comments regarding this report or the project in general, please feel free to contact the undersigned at (213) 996-2200.

Very Truly Yours,

URS

Jennifer S. Nobui, P.G. 8200
Senior Geologist

cc: Holly Quasem, Conoco Phillips
Ms. Amy Lin, Taki Sun
Mr. James A. Leist, Environmental Resolutions, Inc.

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CONFIRMATION SOIL SAMPLING REPORT
FORMER 76 STATION #5379
6280 EAST SECOND STREET
LONG BEACH, CALIFORNIA

1.0 INTRODUCTION

This Confirmation Soil Sampling Report has been prepared for the Former 76 Station #5379 site located at 6280 East Second Street in Long Beach, California (Figure 1). The investigation described herein was performed in general accordance with the *Interim Remedial Action Plan* submitted by URS Corporation (URS), dated October 21, 2009. Confirmation soil sampling was conducted in order to determine the present extent of petroleum hydrocarbons in subsurface soils. This report presents a discussion of the site background, geology and hydrogeology, field procedures, confirmation soil sampling results, current groundwater conditions at the site, conclusions, and recommendations.

2.0 SITE BACKGROUND

The site is located on the southern corner of Second Street and Pacific Coast Highway in Long Beach, California. The site is presently an unpaved vacant lot. The site originally maintained two gasoline and one waste oil underground storage tanks (USTs) and associated dispensers and product lines. A bank and various retail businesses are located in the immediate vicinity of the site. A Mobil service station is located east of the site (Figure 2).

The site has been included in the Los Angeles Regional Water Quality Control Board Expedited Agency Oversight Program (EAOP).

2.1 SITE HISTORY

In June 1985 groundwater monitoring wells MW-1, MW-2, and MW-3 were installed onsite. Liquid-phase hydrocarbons (LPH) were initially detected in October 1985 and interpreted to be crude oil.

In October 1989 the fuel UST system was removed and replaced.

In November 1996 a low-risk site closure request was submitted to the LARWQCB. The LARWQCB required further monitoring at the site.

In July 1998 the USTs, dispensers, and product lines were removed and the station was demolished. A total of 595.5 tons of hydrocarbon-affected soil and 7,300 gallons of hydrocarbon-affected water were removed from the site during demolition activities.

In September 1998 seven groundwater monitoring wells (MW-6 through MW-12) were installed at the site.

In December 1998 and May and June 1999, mobile dual-phase vacuum extraction events were performed at the site. During the events, a total of 29,400 gallons of hydrocarbon-affected groundwater was removed from the subsurface for offsite treatment/disposal.

In November 1999 twenty geoprobe borings were advanced onsite and offsite in order to delineate the extent of LPH.

In May 2000 wells EW-1 through EW-4 were installed to 12 fbg and dual-phase feasibility testing was performed.

In August 2000 Extraction Wells EW-5 through EW-6 were installed to a depth of 12 fbg, adjacent to Monitoring Wells MW-11 and MW-12, respectively.

In October and November 2000, extended dual-phase vacuum extraction was performed for a total of 659 hours.

A Remedial Action Plan dated May 21, 2003, was submitted.

On September 22 through 24, 2003, Biosparge points BP-1 through BP-10 were installed at the site. Biosparge Points BP-1 through BP-3, BP-5, and BP-7 through BP-10 were screened from approximately 17 to 20 fbg in the lower zone. Biosparge Points BP-4 and BP-6 were nested in the upper and lower zones, and screened from approximately 9 to 12

fbg and 17 to 20 fbg, respectively. The wells were constructed using a microperforated sparge point approximately 3-feet long, 3/4-inch diameter, with a ¾" riser.

On September 25, 2003, Soil Borings GP21 through GP23 were advanced west of the site to a maximum depth of 16.5 fbg.

In April 2006 Geoprobe borings GP-24 through GP-29 were advanced onsite to further assess the vertical and lateral extent of hydrocarbon affected soil previously identified during site assessment activities. An assessment report was submitted to the RWQCB in June, 2006.

URS submitted an Interim Remedial Action Plan (IRAP) dated October 21, 2009 to the LARWQCB. The IRAP recommended three 48-hour Dual Phase Extraction (DPE) events be conducted followed by confirmation soil sampling at the site.

Three separate 48-hour DPE events were completed at the site between November 2009 and February 2010. Results of the DPE events were submitted in a Dual-Phase Extraction Events Summary Report dated June 1, 2010 to the LARWQCB. During the remedial events, soil vapors and groundwater were extracted from the subsurface utilizing groundwater monitoring wells BC-1, BC-2, MW-3, MW-11, and MW-12. Vapor-phase TPH-G concentrations decreased from the start of the DPE events in November 2009 to the last DPE event in February 2010. The total hydrocarbon mass removed from the subsurface over the three events was 261 pounds. In addition, a total of 50,559 gallons of hydrocarbon-impacted groundwater were recovered from the subsurface.

A historical set of soil data tables is included in Appendix A. Figure 3 illustrates the extent of historical soil impact at the site.

2.2 GEOLOGY AND HYDROGEOLOGY

The Site lies near the southern boundary of the Los Angeles Basin in the Alamitos Gap Erosional Unconformity at an elevation of approximately 9 feet above mean sea level. The site is located within the Long Beach Plain, which is primarily composed of Recent fine-grained alluvial deposits and Pleistocene marine deposits of clay, silt, sandy silt,

sand and gravel. The Seal Beach Fault is located approximately 1,300 feet north of the site and is part of the active northwest-trending Newport-Inglewood Fault Zone. This fault zone is underlain at depth by a series of northwest/southeast striking subsidiary faults (Randall, 1993).

Alamitos Bay is situated 0.2 miles southwest of the Site. The Cerritos Channel is located 0.4 miles north of the site. The San Gabriel River is located 0.5 miles southeast of the Site. The Site lies in the southern tip of the West Coast Groundwater Basin within the former San Gabriel River Delta Area. The Seal Beach Fault, north of the Site, allows for the lateral migration of groundwater throughout the Recent alluvium; however, the fault forms a substantial barrier to groundwater movement through the aquifers of the Lower Pleistocene San Pedro Formation. Groundwater on the seaward side of the Seal Beach Fault is known to be impacted by saltwater intrusion (CDWR, 1961).

Depth to first groundwater in the Long Beach area is generally less than 50 feet bgs. Depth to groundwater beneath the Site has historically been less than 10 feet bgs.

Industries and municipalities in the area generally no longer utilize the shallow groundwater for beneficial purposes, due in part to poor water quality. In the Long Beach area, regional groundwater flow direction is southwesterly towards San Pedro Bay. At the subject site, groundwater flow is generally directed southeast but is highly variable with local highs and lows possibly related to tidal influence (TRC, 2002).

According to a survey conducted by VET in 1998, nearby groundwater well information obtained from the Los Angeles County Department of Public Works indicated there were five active water wells within a one-mile radius of the Site (VET, 1998). In a subsequent survey (personal communication) conducted in December 1999, TRC Alton Geoscience reported that based on information provided by the City of Long Beach, the Los Angeles County Department of Public Works, and the Orange County Water District, no drinking water wells exist within a one-mile radius of the Site (TRC, 1999).

3.0 PURPOSE AND SCOPE

The purpose for the confirmation soil sampling investigation was to evaluate the present extent of petroleum hydrocarbons in subsurface soils and to compare these results with concentrations detected during previous site assessments. In addition, confirmation soil sampling was also performed to evaluate the effectiveness of remedial activities in mitigating the petroleum hydrocarbon impact to soil and groundwater beneath the site. The confirmation borings were drilled in areas with historically the highest concentrations of petroleum hydrocarbons in soil and the capillary fringe. Current concentrations will also be compared to requirements set forth by the LARWQCB for obtaining case closure. To address these objectives, the following work scope was performed:

- Prepared a site-specific Health & Safety Plan for the field investigation described herein.

- Located the planned confirmation soil borings in the field and cleared major underground utilities with Underground Service Alert (USA) and a utility clearance survey company (geophysical survey).

- Cleared seven (7) boring locations between 7 and 8 feet bgs using air knife technology.

- Advanced seven (7) confirmation soil borings (CB-1 through CB-7) to 15 feet bgs using a direct-push drill rig.

- Sampled soil at 5-foot intervals.

- Performed laboratory analysis on soil samples for TPH-D using EPA Method 8015M and for TPH-G, benzene, toluene, ethylbenzene, and total xylenes (BTEX), methyl tert butyl ether (MTBE), tert butyl alcohol (TBA), Tert Amyl Methyl Ether (TAME), Diisopropyl Ether (DIPE), Ethyl tert Butyl Ether (ETBE), and ethanol using EPA Method 8260B/5035.

- Conducted equipment decontamination and waste management.

- Prepared this report summarizing URS' investigative methods, findings, and conclusions.

4.0 PROCEDURES

4.1 HEALTH & SAFETY PLAN

In accordance with OSHA regulations 29 CFR 1910.120, a site-specific Health & Safety Plan (HASP) was prepared for the field investigation described herein. Subcontractors and URS personnel were required to review, sign the HASP, and conduct field operations according to the provisions of the HASP. The HASP emphasized safe work practices, identified and described potentially hazardous substances that could be encountered during field activities, specified protective equipment for onsite activities, personnel decontamination procedures, and outlined measures to be implemented in the event of an emergency. The HASP provided site-specific scopes of work and associated job safety analyses for the tasks, and indicated any unique health and safety concerns.

4.2 UTILITY CLEARANCE

Underground Services Alert (USA), a utility location service, was notified 48 hours prior to starting field activities. USA in turn notified representatives of the utility companies who marked the location of underground services entering the property. USA markings were noted prior to drilling to prevent damage to utility lines.

In addition to the service provided by USA, URS utilized a geophysical survey services company on April 19, 2010 to help locate buried pipelines, electrical lines, and other subsurface obstructions within the immediate vicinity of each proposed monitoring well location.

4.3 AIR KNIFE CLEARANCE

Prior to drilling activities, on April 19, 2010, each borehole was cleared between 7 and 8 feet bgs using an air vac truck. Soil cuttings generated during air vac activities were

stored in 55-gallon drums onsite prior to disposal.

4.4 CONFIRMATION SOIL BORINGS AND SAMPLING

Drilling of the confirmation soil borings occurred on April 20, 2010 using a direct-push drill rig. The seven (7) confirmation soil borings (CB-1 through CB-7) were advanced to a depth of 15 feet bgs in areas with historically the highest concentrations of petroleum hydrocarbons in soil and the capillary fringe. Boring locations are shown on Figure 4. This information was needed to confirm that concentrations of petroleum hydrocarbons previously detected in subsurface soils have decreased over time.

During drilling, soil samples were collected at 5 feet, and every 5 feet thereafter to the bottom of the boring (15 feet bgs). Relatively undisturbed soil samples were collected using a geoprobe soil sampler lined with stainless steel sample sleeves. Soil samples were also collected for laboratory analysis using a disposable En Core sampler (EPA Method 5035).

During drilling operations, an organic vapor monitor (PID) was used to monitor for the presence and level of organic vapors in the borings and soil samples. These organic vapor readings were recorded on boring logs prepared by the field geologist during drilling activities. The boring logs recorded the following sampling information: boring number and location; sample identification numbers; date and time; sample depth; lithologic description in accordance with the Unified Soils Classification System (USCS); description of any visible evidence of soil contamination (i.e., odor, staining); and organic vapor monitor readings. Soil sampling activities were conducted by a URS field geologist, working under the technical supervision of a California Professional Geologist. Boring logs from confirmation soil sampling borings are included in Appendix B.

Following completion of soil sampling, boring locations were returned to previous surface conditions. Borings were backfilled with bentonite chips, hydrated with tap water, and completed at the surface to its original condition.

4.5 LABORATORY ANALYSIS

Soil samples collected from the soil borings (21 total) were analyzed for TPH-D by EPA Method 8015M and for TPH-G, BTEX, MTBE, TBA, TAME, DIPE, ETBE, and ethanol by EPA Method 8260B and EPA Method 5035. Chain-of-custody (COC) records were used to document sample collection and shipment to the laboratory for analysis. A COC record accompanied all sample shipments for analyses. The COC records identified the contents of each sample and maintained the custodial integrity of the samples. Laboratory reports and chain-of-custody documentation for confirmation soil samples is included in Appendix C.

4.6 EQUIPMENT DECONTAMINATION

Drilling and sampling equipment were steam cleaned and cleaned with dilute trisodium phosphate solution, double rinsed in clear tap water, and then final rinsed in distilled water prior to its use. The equipment was then air-dried.

4.7 WASTE MANAGEMENT

All soil cuttings and decontamination water generated during this investigation were contained in 55-gallon Department of Transportation approved waste drums and transported from the site to an appropriate COP approved and California licensed disposal facility. Waste drums were labeled and secured so that their contents could be identified and properly managed and disposed of after analytical results were obtained from the laboratory. A copy of the waste manifest is included in Appendix D.

5.0 RESULTS

5.1 FIELD OBSERVATIONS

Soils observed during this investigation generally consisted of silts from the surface to an approximate depth of 8 feet bgs, and clays and very fine-grained silty sands from an approximate depth of 8 to 15 feet bgs, the maximum depth of the investigation. Groundwater was encountered at approximately 10 feet bgs during this investigation.

5.2 SOIL ANALYTICAL RESULTS

Analytical results of the confirmation soil samples are summarized in Table 1. Figure 5 illustrates current TPH-G isoconcentrations in soil at a depth of 5 feet bgs. For comparison, analytical results obtained during previous investigations at the site are also provided in Table 2, Figure 3, and in Appendix A. Appendix E lists Los Angeles Region RWQCB Soil Screening Levels (SSLs). See Cross Section A-A' illustrating soil lithologies and TPH-G concentrations observed during previous investigations and the current confirmation soil boring investigation (Figure 6).

5.2.1 TPH

Concentrations of TPH-D were detected in 7 of the 21 soil samples collected from the seven confirmation soil borings. TPH-D concentrations ranged between 3.8J (J=J Flag; estimated value) mg/kg and 6,600 mg/kg (CB-3 at 5 feet bgs). All but one TPH-D concentration was detected in soil at a depth of 5 feet bgs. Boring CB-1 at a depth of 10 feet bgs had a TPH-D concentration of 30 mg/kg.

Concentrations of TPH-G were detected in 20 of the 21 soil samples collected from the seven confirmation soil borings. TPH-G concentrations ranged between 0.12J mg/kg and 3,600 mg/kg (CB-2 at 5 feet bgs). The second highest TPH-G concentration was 1,900 mg/kg, detected in soil collected from CB-3 at a depth if 5 feet bgs. Higher concentrations of TPH-G were generally detected in soils collected from a depth of 5 feet bgs.

5.2.2 Benzene, MTBE, and Other Oxygenates

Benzene was detected in 16 of the 21 soil samples collected from the seven confirmation soil borings advanced during this investigation. Benzene concentrations ranged between 0.0013J mg/kg and 14 mg/kg (CB-3 at 5 feet bgs). Concentrations of toluene, ethylbenzene, and total xylenes were also detected during this investigation. A maximum toluene concentration of 200 mg/kg was detected from boring CB-3 at a depth of 5 feet bgs. Maximum ethylbenzene and total xylenes concentrations of 170 mg/kg and 800 mg/kg, respectively, were detected from boring CB-2 at a depth of 5 feet bgs.

MTBE concentrations were detected in 14 of 21 soil samples collected from the seven confirmation soil borings during this investigation ranging between 0.0015J mg/kg and 0.45 mg/kg (CB-7 at 15 feet bgs).

TBA concentrations were detected in ten soil samples and ranged between 0.016J mg/kg and 1.1 mg/kg (CB-3 at 15 feet bgs). TAME, ETBE, DIPE, and Ethanol were not detected in any of the soil samples analyzed.

6.0 DISCUSSION ON SOIL SAMPLING RESULTS

To evaluate the significance of detected petroleum hydrocarbon concentrations, soil chemical data were compared to commonly used soil "action" levels. In doing so, potential direct human health impacts as well as the potential threat to groundwater quality must be considered. Site-specific data are compared to soil action levels to evaluate appropriate response measures for contaminated sites. Analytical results of the confirmation soil samples are summarized in Table 1.

6.1 HUMAN HEALTH RISK CRITERIA

The United States Environmental Protection Agency (US EPA), Region 9, has published Regional Screening Levels (RSLs) for both residential and industrial properties. RSLs are chemical concentrations in soil that correspond to fixed levels of human health risk (i.e., either a one-in-one million cancer risk or a non-carcinogenic hazard quotient of one). RSLs do not consider the threat to groundwater quality or the indoor air vapor intrusion pathway, only potential direct human health effects. The original intended use of RSLs was to provide initial cleanup goals for individual chemicals given specific land-use assumptions. However, the US EPA does not recommend the use of RSLs as cleanup levels "without verifying numbers with a toxicologist or regional risk assessor". Nonetheless, RSLs are commonly used to preliminarily assess detected levels of contamination. Relevant RSLs are summarized below.

Analyte	Residential RSL	Industrial RSL
Benzene	1.1 mg/kg	5.6 mg/kg
Toluene	5,000 mg/kg	46,000 mg/kg
Ethylbenzene	5.7 mg/kg	29 mg/kg
Total Xylenes	600 mg/kg	2,600 mg/kg
MTBE	39 mg/kg	190 mg/kg

Five soil sample results obtained during the current investigation were above the residential RSL for benzene (CB-2, CB-3, CB-5, and CB-6 at 5 feet bgs, and CB-7 at 10 feet bgs). Two soil sample results were above the industrial RSL for benzene (CB-2 and CB-3 at 5 feet bgs). RSLs have not been established for TPH-D, TPH-G, and TBA.

6.2 GROUNDWATER QUALITY PROTECTION

The California Regional Water Quality Control Board, Los Angeles Region (LARWQCB) has published a methodology for determining maximum soil screening levels (MSSLs) for the protection of groundwater quality (Interim Site Assessment & Cleanup Guidebook, RWQCB, Los Angeles and Ventura Counties, Region 4, May 1996, revised January 7, 2005). MSSLs are considered preliminary soil action levels.

The MSSLs are developed as a function of physical and chemical properties of the contaminant, as well as site-specific lithology and depth to groundwater. Based on the site lithology (predominantly silts), depth to groundwater (approximately 10 feet bgs), and the known properties of TPH-G, benzene, and MTBE, the MSSLs for these compounds at this site are summarized in Appendix E and listed below:

Compound	Depth to GW	MSSL
TPH-G	10 ft	100 mg/kg
Benzene	10 ft	0.011 mg/kg
MTBE	10 ft	0.013 mg/kg

Seven TPH-G concentrations detected in soil during this investigation met the calculated MSSLs for TPH-G. Ten benzene concentrations detected during this investigation were

found to be above the listed MSSL. Five MTBE concentrations detected during this investigation in were found to be above the listed MSSL.

6.3 HISTORICAL SOIL DATA COMPARISON

Comparing confirmation soil sample results with soil data collected during previous investigations between 1999 and 2003, it is evident that a significant reduction in petroleum hydrocarbon concentrations has occurred as a result of natural attenuation and onsite remediation. Table 2 provides a comparison between historical concentrations and recent soil data results. Figure 6 illustrates TPH-G concentrations in site soils from earlier investigations and the current confirmation soil boring investigation in a cross sectional view.

Confirmation soil boring CB-1 was located near historical boring GP-12. GP-12 contained a TPH-G concentration of 2,700 mg/kg, a benzene concentration of 7.0 mg/kg, and a MTBE concentration of 6.9 mg/kg from soil collected at a depth of 5 feet bgs. Soil collected from boring CB-1 at a depth of 5 feet bgs had a TPH-G concentration of 0.45 mg/kg, a benzene concentration of 0.0013J mg/kg, and a non-detect MTBE concentration. At a depth of 10 feet bgs, soil collected from boring GP-12 had a TPH-G concentration of 6,600 mg/kg. During this investigation, soil collected at 10 feet bgs from boring CB-1 contained a TPH-G concentration of 0.12J mg/kg. Petroleum hydrocarbon concentrations in soils collected from CB-1 were either non-detect or significantly lower than concentrations detected in soils collected from GP-12.

Confirmation soil boring CB-2 was located near historical boring/extraction well EW-6. EW-6 contained a TPH-G concentration of 3,400 mg/kg, a benzene concentration of 16 mg/kg, and a non-detect MTBE concentration from soil collected at a depth of 5 feet bgs. Soil collected from boring CB-2 at a depth of 5 feet bgs had a TPH-G concentration of 3,600 mg/kg, a benzene concentration of 6.3 mg/kg, and a non-detect MTBE concentration. Benzene concentrations decreased significantly.

Confirmation soil boring CB-3 was located adjacent to historical boring/extraction well EW-5. EW-5 contained a TPH-G concentration of 8,400 mg/kg, a benzene concentration of 14 mg/kg, and a non-detect MTBE concentration at a depth of 5 feet bgs. Soil collected from boring CB-3 at a depth of 5 feet bgs had a TPH-G concentration of 1,900

mg/kg, a benzene concentration of 14 mg/kg, and a non-detect MTBE concentration. In addition, at 10 feet bgs, concentrations of TPH-G and benzene reduced from 5,900 mg/kg and 44 mg/kg, respectively, from boring EW-5 to TPH-G and benzene concentrations of 0.13J mg/kg and non detect, respectively, in soils collected from boring CB-3.

Confirmation soil boring CB-4 was located in the vicinity of historical boring BP-2. BP-2 contained a TPH-G concentration of 31,000 mg/kg, a benzene concentration of 74 mg/kg, and a non-detect MTBE concentration at a depth of 6.5 feet bgs. Soil collected from boring CB-4 at a depth of 5 feet bgs had a TPH-G concentration of 310 mg/kg, a benzene concentration of 0.65 mg/kg, and a MTBE concentration of 0.050J mg/kg.

Confirmation soil boring CB-5 was located in the vicinity of historical boring GP-24. GP-24 contained a TPH-G concentration of 7,000 mg/kg, a benzene concentration of 32 mg/kg, and a MTBE concentration of 0.0032J mg/kg at a depth of 5 feet bgs. Soil collected from boring CB-5 at a depth of 5 feet bgs had a TPH-G concentration of 480 mg/kg, a benzene concentration of 3.8 mg/kg, and a non-detect MTBE concentration.

Confirmation soil boring CB-6 was located in the vicinity of historical boring GP-15. GP-15 contained a TPH-G concentration of 6,800 mg/kg, a benzene concentration of 94 mg/kg, and a MTBE concentration of 55 mg/kg at a depth of 5 feet bgs. Soil collected from boring CB-6 at a depth of 5 feet bgs had a TPH-G concentration of 340 mg/kg, a benzene concentration of 2.0 mg/kg, and a non-detect MTBE concentration. Subsequent TPH-G, benzene, and MTBE concentrations at depths greater than 5 feet bgs were significantly lower in soils collected from boring CB-6 than in historic soils collected from boring GP-15.

Confirmation soil boring CB-7 was located in the vicinity of historical boring BP-8. BP-8 contained a TPH-G concentration of 2,100 mg/kg, a benzene concentration of 1.2 mg/kg, and a non-detect MTBE concentration at a depth of 6.5 feet bgs. Soil collected from boring CB-7 at a depth of 5 feet bgs had a TPH-G concentration of 20 mg/kg, and non-detect benzene and MTBE concentrations. Subsequent TPH-G, benzene, and MTBE concentrations at depths greater than 5 feet bgs were lower in soils collected from boring CB-7 than in historic soils collected from boring BP-8.

Current concentrations of TPH-G, benzene, and MTBE are generally significantly lower than concentrations detected in soils from previous investigations. The majority of the higher concentrations of petroleum hydrocarbons still detected in site soils were found to remain in shallow soils at a depth of 5 feet bgs, particularly in the vicinity of borings CB-2 and CB-3.

6.4 GROUNDWATER DATA COMPARSION

The most recent groundwater monitoring event was conducted on May 26, 2010. Detected dissolved phase hydrocarbon concentrations are summarized below.

- TPH-G concentrations ranged from 8.2J micrograms per liter (ug/L) (MW-1) to 1,900 ug/L (EW-5).
- Benzene concentrations ranged from 1.8 ug/L (MW-7) to 380 ug/L (EW-5).
- MTBE concentrations ranged from 1.1 ug/L (EW-1) to 1,100 ug/L (MW-11).
- TBA concentrations ranged from 17 ug/L (EW-2) to 5,500 ug/L (MW-6).

Laboratory data collected from March 25, 2010 and May 26, 2010 is also presented below for comparison. Concentrations are in ug/L.

Date	Well	TPH-G	Benzene	MTBE	TBA
Historical High	BC-1	44,000	6,300	18,000	18,000
3/25/10	BC-1	280	8.4	170	5,000
5/26/10	BC-1	1,500	46	390	3,600
Historical High	BC-2	62,600	7,470	10,000	14,000
3/25/10	BC-2	1,600	290	81	nd
5/26/10	BC-2	570	110	59	370
Historical High	EW-1	10,000	1,600	350	520
3/25/10	EW-1	130	nd	nd	59
5/26/10	EW-1	110	nd	1.1	57

Historical High	EW-2	110,000	17,000	1,600	2,000
3/25/10	EW-2	310	45	17	nd
5/26/10	EW-2	35J	nd	27	17
Historical High	EW-4	6,800	230	20	43
3/25/10	EW-4	100	nd	2.8	nd
5/26/10	EW-4	52	nd	3.0	nd
Historical High	EW-5	11,000	1,900	130	380
3/25/10	EW-5	44J	0.25J	2.6	nd
5/26/10	EW-5	1,900	380	20	nd
Historical High	EW-6	8,100	2,100	5,300	6,000
11/25/08	EW-6	30J	nd	21	19
*Well paved over after 11/25/08					
Historical High	MW-1	330	0.55	210	590
3/25/10	MW-1	nd	nd	1.8	nd
5/26/10	MW-1	8.2J	nd	2.1	31
Historical High	MW-3	77,000	7,570	7,100	1,700
3/25/10	MW-3	410	0.75	17	990
5/26/10	MW-3	370	nd	34	1,700
Historical High	MW-7	9,000	1,300	4,000	2,400
3/25/10	MW-7	25J	0.18J	11	320
5/26/10	MW-7	56	1.8	45	420
Historic High	MW-8	770	0.70J	990	590
3/25/10	MW-8	33J	nd	4.7	270
5/26/10	MW-8	12J	nd	7.8	310
Historic High	MW-9	12,000	9,710	800	840
3/25/10	MW-9	25J	nd	27	nd
5/26/10	MW-9	30J	nd	39	49

Historic High	MW-10	3,200	5.3	3,000	5,600
3/25/10	MW-10	25J	nd	36	250
5/26/10	MW-10	36J	nd	55	240
Historic High	MW-11	100,000	4,700	1,600	2,000
3/25/10	MW-11	690	110	650	1,400
5/26/10	MW-11	720	6.4	1,100	1,300
Historic High	MW-12	25,000	2,300	26,300	7,400
3/25/10	MW-12	69	1.9	14	1,500
5/26/10	MW-12	88	2.8	28	1,400

See Appendix F for TRC's June 17, 2010 Groundwater Monitoring Report for historical groundwater data and dates. Petroleum hydrocarbon concentrations in groundwater were either non-detect or lower during the most recent sampling event on May 26, 2010 than historical high concentrations detected during previous sampling events.

7.0 CONCLUSIONS

Based on previous soil and groundwater investigations and the current confirmation soil boring investigation, the following conclusions are drawn:

- The USTs and fuel dispenser islands have been removed from the site. Additionally, approximately 596 tons of impacted petroleum hydrocarbon impacted soils were also removed from the site.

- Petroleum hydrocarbon-impacted soils were predominantly detected in soils located within the northwestern portion of the site adjacent to the former northern dispenser island and its associated piping.

- Most of the current concentrations of petroleum hydrocarbons in soils are lower than concentrations in soils detected during previous soil investigations conducted in 1999 through 2003. These lower concentrations may have occurred as a result

of natural attenuation, bio-sparging, and the recent (November 2009-February 2010) DPE events at the site.

- The most significant higher concentrations of petroleum hydrocarbons were found within the top 5 feet of soil. Soils from approximately the surface to 5 feet bgs are predominantly interbedded silts and clays and silty sands.

- Five soil sample results obtained during the current investigation were above the residential RSL for benzene. Two soil sample results were above the industrial RSL for benzene. RSLs have not been established for TPH-D, TPH-G, and TBA.

- Seven TPH-G concentrations detected in soil during this investigation met the calculated MSSLs for TPH-G. Ten benzene concentrations detected during this investigation were found to be above the listed MSSL. Five MTBE concentrations detected during this investigation in were found to be above the listed MSSL.

- Three 48-hour dual-phase extraction events were performed at the site between November 2009 and February 2010. Approximately 50,559 gallons of impacted groundwater were removed and approximately 261 pounds of TPH were extracted from site soils.

- Petroleum hydrocarbon concentrations in groundwater were either non-detect or lower during the most recent sampling event on May 26, 2010 than historical high concentrations detected during the previous sampling events. Dissolved-phase concentrations of TPH-G, benzene, MTBE, and TBA generally have remained stable or have decreased in comparison to the previous quarterly monitoring data collected within the last few years.

8.0 RECOMMENDATIONS

The removal of the USTs and fuel dispenser islands, the excavation of impacted soils at the site, along with bio-sparging, dual-phase extraction events, and natural attenuation have resulted in petroleum hydrocarbon mass being reduced from the soil and a decline of petroleum hydrocarbon concentrations in groundwater. Soil confirmation sampling has also indicated a decrease in petroleum hydrocarbons in some soil samples since initial subsurface investigations were conducted between 1999 through 2003. In addition, soil confirmation sampling also exhibited higher concentrations of petroleum hydrocarbons remain confined within the upper 5 feet of soil which is primarily composed of silts and clays interbedded with silty sands.

Based on these findings, URS recommends that no further assessment or remediation be completed at this site and requests the LARWQCB review and consider this site for case closure.

9.0 REFERENCES

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TABLES

Table 1
Laboratory Analysis of Confirmation Soil Samples
Former 76 Station #5379
6280 East 2nd Street
Long Beach, California

Well	Depth (feet bgs)	TPH-D (mg/kg)	TPH-G (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total Xylenes (mg/kg)	MTBE (mg/kg)	TAME (mg/kg)	TBA (mg/kg)	DIPE (mg/kg)	ETBE (mg/kg)	Ethanol (mg/kg)
CB-1	5	nd (<10)	**0.45**	**0.0013J**	nd (<0.0044)	nd (<0.0044)	nd (<0.0088)	nd (<0.0044)	nd (<0.0044)	nd (<0.044)	nd (<0.0044)	nd (<0.0044)	nd (<0.88)
	10	**30**	**0.12J**	**0.0020J**	**0.0019J**	nd (<0.0044)	nd (<0.0088)	**0.0015J**	nd (<0.0044)	**0.016J**	nd (<0.0044)	nd (<0.0044)	nd (<0.88)
	15	nd (<10)	nd (<0.18)	nd (<0.0044)	nd (<0.0044)	nd (<0.0044)	nd (<0.0088)	**0.0034J**	nd (<0.0044)	**0.21**	nd (<0.0044)	nd (<0.0044)	nd (<0.88)
CB-2	5	**670**	**3,600**	**6.3**	**170**	**170**	**800**	nd (<5.0)	nd (<5.0)	nd (<50)	nd (<5.0)	nd (<5.0)	nd (<1000)
	10	nd (<10)	**0.42**	**0.0018J**	nd (<0.0046)	nd (<0.0046)	nd (<0.0092)	**0.0049**	nd (<0.0046)	**0.064**	nd (<0.0046)	nd (<0.0046)	nd (<0.92)
	15	nd (<10)	**0.13J**	nd (<0.0053)	nd (<0.0053)	nd (<0.0053)	nd (<0.011)	**0.0091**	nd (<0.0053)	**0.052J**	nd (<0.0053)	nd (<0.0053)	nd (<1.1)
CB-3	5	**6,600**	**1,900**	**14**	**200**	**69**	**350**	nd (<2.2)	nd (<2.2)	nd (<22)	nd (<2.2)	nd (<2.2)	nd (<430)
	10	nd (<10)	**0.13J**	nd (<0.0055)	nd (<0.0055)	nd (<0.0055)	nd (<0.011)	**0.0019J**	nd (<0.0055)	nd (<0.055)	nd (<0.0055)	nd (<0.0055)	nd (<1.1)
	15	nd (<10)	**1.3**	**0.013**	**0.11**	**0.039**	**0.21**	**0.12**	nd (<0.0048)	**1.1**	nd (<0.0048)	nd (<0.0048)	nd (<0.95)
CB-4	5	**180**	**310**	**0.65**	**3.8**	**9.6**	**39**	**0.050J**	nd (<0.44)	**1.6J**	nd (<0.44)	nd (<0.44)	nd (<88)
	10	nd (<10)	**29**	**0.014**	**0.17**	**0.30**	**1.2**	**0.0034J**	nd (<0.0048)	nd (<0.048)	nd (<0.0048)	nd (<0.0048)	nd (<0.96)
	15	nd (<10)	**0.34**	**0.0020J**	**0.0072**	**0.0079**	**0.035**	**0.024**	nd (<0.0053)	**0.19**	nd (<0.0053)	nd (<0.0053)	nd (<1.1)
CB-5	5	**1,600**	**480**	**3.8**	**20**	**11**	**51**	nd (<0.45)	nd (<0.45)	nd (<4.5)	nd (<0.45)	nd (<0.45)	nd (<91)
	10	nd (<10)	**0.53**	**0.029**	**0.0023J**	**0.062**	**0.018**	**0.029**	nd (<0.0055)	**0.32**	nd (<0.0055)	nd (<0.0055)	nd (<1.1)
	15	nd (<10)	**0.14J**	nd (<0.0049)	nd (<0.0049)	nd (<0.0049)	nd (<0.0098)	**0.071**	nd (<0.0049)	**0.37**	nd (<0.0049)	nd (<0.0049)	nd (<0.98)
CB-6	5	**510**	**340**	**2.0**	**6.8**	**8.5**	**35**	nd (<0.20)	nd (<0.20)	nd (<2.0)	nd (<0.20)	nd (<0.20)	nd (<41)
	10	nd (<10)	**0.95**	**0.0024J**	**0.0056**	**0.0044J**	**0.018**	**0.0018J**	nd (<0.0047)	nd (<0.047)	nd (<0.0047)	nd (<0.0047)	nd (<0.93)
	15	nd (<10)	**0.12J**	**0.0025J**	**0.0033J**	nd (<0.0049)	nd (<0.0097)	**0.0077**	nd (<0.0049)	**0.046J**	nd (<0.0049)	nd (<0.0049)	nd (<0.97)
CB-7	5	**3.8J**	**20**	nd (<0.23)	nd (<0.23)	**0.8**	nd (<0.46)	nd (<0.23)	nd (<0.23)	nd (<2.3)	nd (<0.23)	nd (<0.23)	nd (<46)
	10	nd (<10)	**750**	**1.8J**	**11**	**25**	**67**	nd (<2.8)	nd (<2.8)	nd (<28)	nd (<2.8)	nd (<2.8)	nd (<570)
	15	nd (<10)	**110**	**0.35**	**0.50**	**2.0**	**3.2**	**0.45**	nd (<0.26)	nd (<2.6)	nd (<0.26)	nd (<0.26)	nd (<52)

Notes: nd = not detected
bgs = below ground surface
mg/kg = millgrams per kilogram
J = J Flag (estimated value)

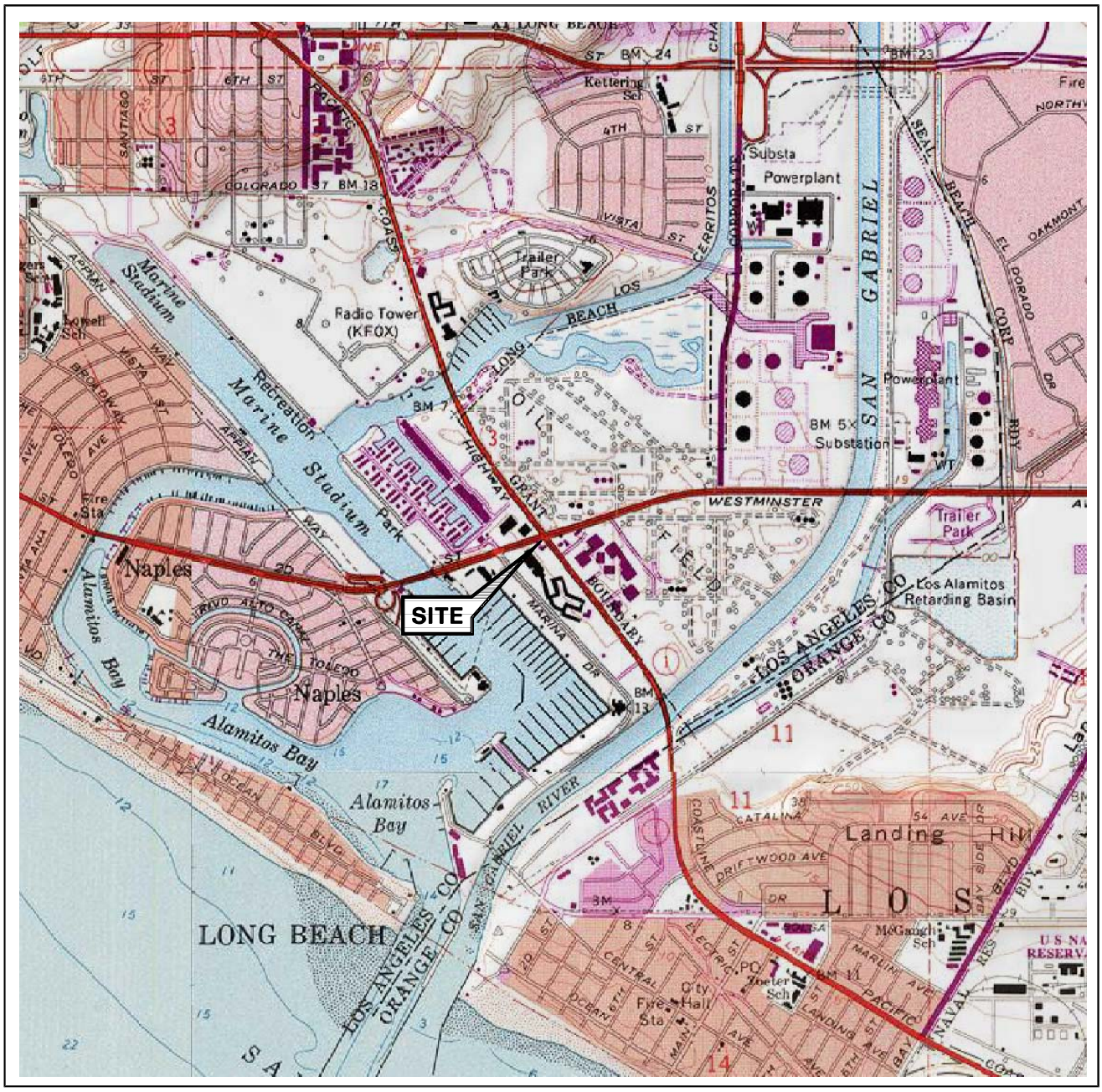
TPH-G = Total Petroleum Hydrocarbons as Gasoline
MTBE = Methyl tert-butyl ether
TAME = tert-Amyl Methyl ether
TBA = tert-Butyl alcohol
DIPE = Diisopropyl ether
ETBE = Ethyl tert-butyl ether

Table 2
Historical Soil Data vs. Confirmation Soil Boring Data
Former 76 Station 5379
6280 East 2nd Street
Long Beach, California

Historical Boring	Date	Depth (feet bgs)	TPH-G (mg/kg)	Benzene (mg/kg)	MTBE (mg/kg)	Confirmation Boring	Date	Depth (feet bgs)	TPH-G (mg/kg)	Benzene (mg/kg)	MTBE (mg/kg)
GP-12	11/8/99	5	**2,700**	**7.0**	**6.9**	**CB-1**	4/20/10	5	**0.45**	**0.0013J**	nd
		7.5	**6,600**	**39**	**21**			10	**0.12J**	**0.0020J**	**0.0015J**
		11	**150**	**5.6**	**3.9**			15	nd	nd	**0.0034J**
		15	**170**	**3.0**	**2.2**						
EW-6	8/28/00	5	**3,400**	**16**	nd	**CB-2**	4/20/10	5	**3,600**	**6.3**	nd
		10	**0.68**	**0.052**	**1.2**			10	**0.42**	**0.0018J**	**0.0049**
		12	**17**	**0.90**	**1.8**			15	**0.13J**	nd	**0.0091**
EW-5	8/28/00	5	**8,400**	**14**	nd	**CB-3**	4/20/10	5	**1,900**	**14**	nd
		10	**5,900**	**44**	nd			10	**0.13J**	nd	**0.0019J**
		12	**0.66**	**0.087**	nd			15	**1.3**	**0.013**	**0.12**
BP-2	9/22/03	6.5	**31,000**	**74.0000**	nd	**CB-4**	4/20/10	5	**310**	**0.65**	**0.050J**
		11	**1.2**	**0.0082**	**0.007**			10	**29**	**0.014**	**0.0034J**
		15.5	nd	nd	nd			15	**0.34**	**0.0020J**	**0.024**
		20	nd	**0.028**	**0.24**						
GP-24	4/6/06	5	**7,000**	**32**	**0.0032J**	**CB-5**	4/20/10	5	**480**	**3.8**	nd
		10	nd	**0.0011J**	nd			10	**0.53**	**0.029**	**0.029**
		15	nd	nd	**0.0013J**			15	**0.14J**	nd	**0.071**
GP-15	11/8/99	5	**6,800**	**94**	**55**	**CB-6**	4/20/10	5	**340**	**2.0**	nd
		9	**2,500**	**2.1**	**1.3**			10	**0.95**	**0.0024J**	**0.0018J**
		11	**780**	**14**	**13**			15	**0.12J**	**0.0025J**	**0.0077**
		15	**48**	**0.90**	**0.68**						
BP-8	9/22/03	6.5	**2,100**	**1.2**	nd	**CB-7**	4/20/10	5	**20**	nd	nd
		11.5	**1,600**	**6.2**	**4.7**			10	**750**	**1.8J**	nd
		16.5	**15**	**0.64**	**6.41**			15	**110**	**0.35**	**0.45**
		21.5	**3.9**	nd	**0.83**						

Notes:
mg/kg = milligrams per kilogram
nd = not detected
-- = not analyzed
J = J Flag; estimated value

FIGURES



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N

SOURCE:

United States Geological Survey
7.5 Minute Topographic Map:
Los Alamitos & Long Beach
Quadrangles

URS

915 WILSHIRE BLVD, SUITE 700
LOS ANGELES, CA 90017
TEL: (213) 996-2200
FAX: (213) 996-2290

SITE LOCATION MAP

Former 76 Station 5379
6280 East Second Street
Long Beach, California

FIGURE 1

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LOS ANGELES, CA 90017
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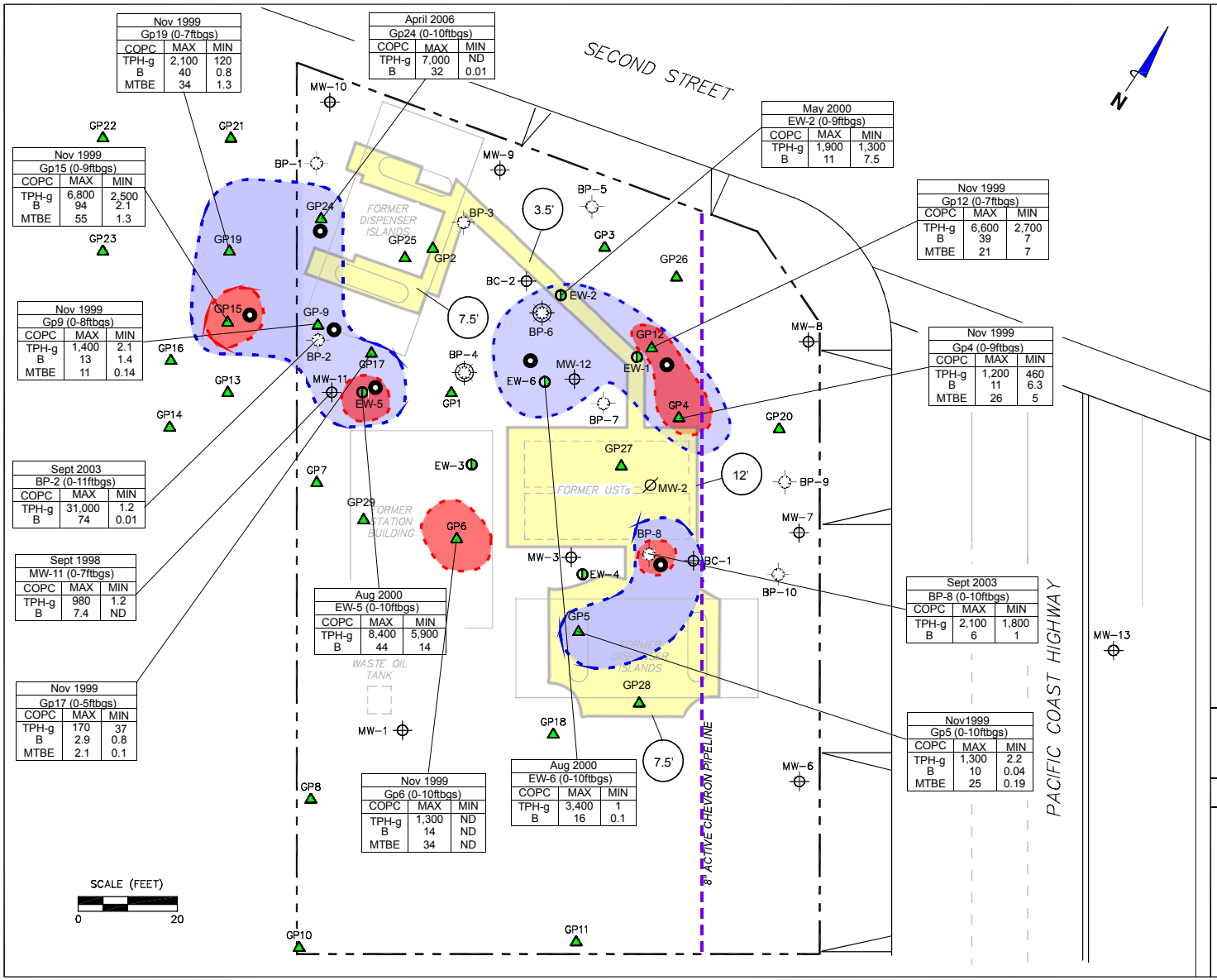
CONOCOPHILLIPS

FIGURE 2

SITE PLAN

Former 76 Station 5379
6280 East Second Street
Long Beach, California



Nov 1999		
Gp19 (0-7ftbgs)		
COPC	MAX	MIN
TPH-g	2,100	120
B	40	0.8
MTBE	34	1.3

April 2006		
Gp24 (0-10ftbgs)		
COPC	MAX	MIN
TPH-g	7,000	ND
B	32	0.01

May 2000		
EW-2 (0-9ftbgs)		
COPC	MAX	MIN
TPH-g	1,900	1,300
B	11	7.5

Nov 1999		
Gp15 (0-9ftbgs)		
COPC	MAX	MIN
TPH-g	6,800	2,500
B	94	2.1
MTBE	55	1.3

Nov 1999		
Gp12 (0-7ftbgs)		
COPC	MAX	MIN
TPH-g	6,600	2,700
B	39	7
MTBE	21	7

Nov 1999		
Gp9 (0-8ftbgs)		
COPC	MAX	MIN
TPH-g	1,400	2.1
B	13	1.4
MTBE	11	0.14

Nov 1999		
Gp4 (0-9ftbgs)		
COPC	MAX	MIN
TPH-g	1,200	460
B	11	6.3
MTBE	26	5

Sept 2003		
BP-2 (0-11ftbgs)		
COPC	MAX	MIN
TPH-g	31,000	1.2
B	74	0.01

Sept 1998		
MW-11 (0-7ftbgs)		
COPC	MAX	MIN
TPH-g	980	1.2
B	7.4	ND

Sept 2003		
BP-8 (0-10ftbgs)		
COPC	MAX	MIN
TPH-g	2,100	1,800
B	6	1

Aug 2000		
EW-5 (0-10ftbgs)		
COPC	MAX	MIN
TPH-g	8,400	5,900
B	44	14

Nov 1999		
Gp17 (0-5ftbgs)		
COPC	MAX	MIN
TPH-g	170	37
B	2.9	0.8
MTBE	2.1	0.1

Nov1999		
Gp5 (0-10ftbgs)		
COPC	MAX	MIN
TPH-g	1,300	2.2
B	10	0.04
MTBE	25	0.19

Nov 1999		
Gp6 (0-10ftbgs)		
COPC	MAX	MIN
TPH-g	1,300	ND
B	14	ND
MTBE	34	ND

Aug 2000		
EW-6 (0-10ftbgs)		
COPC	MAX	MIN
TPH-g	3,400	1
B	16	0.1

LEGEND

- MW-13 — Monitoring Well
- EW-6 — Extraction Well
- GP23 — Geoprobe Boring Location
- BP-6 — Nested Upper Zone and Lower Zone Sparge Point
- BP-10 — Lower Zone Sparge Point
- MW-2 — Abandoned Well
- Previous Excavation During UST Removal (VET,1998)
- 3.5' — Depth of Excavation (in feet) During UST Removal (VET,1998)
- Estimated Extent of Impacted Soil Above Action Levels at 5 feet bgs (TRC, 2006)
- Estimated Extent of Impacted Soil Above Action Levels at 10 feet bgs (TRC, 2006)
- Proposed Confirmation Soil Boring Location

Concentrations are shown in units of milligrams per kilogram (mg/kg)

COPC	Chemical o fPotential Concern
TPH-g	Total Petroleum Hydrocarbons as gasoline
B	Benzene
MTBE	Methyltert-butylether
bgs	below ground surface

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FIGURE 3

PETROLEUM HYDROCARBON CONCENTRATIONS IN SOIL ABOVE ACTION LEVELS AND AERIAL EXTENT OF IMPACTED SOIL FROM HISTORICAL INVESTIGATION NOVEMBER 1999 THRU APRIL 2006

Former 76 Station 5379
6280 East Second Street
Long Beach, California

LEGEND

MW-13	Monitoring Well
EW-6	Extraction Well
GP23	Geoprobe Boring Location
BP-6	Nested Upper Zone and Lower Zone Sparge Point
BP-10	Lower Zone Sparge Point
MW-2	Abandoned Well
	Previous Excavation During UST Removal (VET,1998)
3.5'	Depth of Excavation (in feet) During UST Removal (VET,1998)
CB-1	Confirmation Boring

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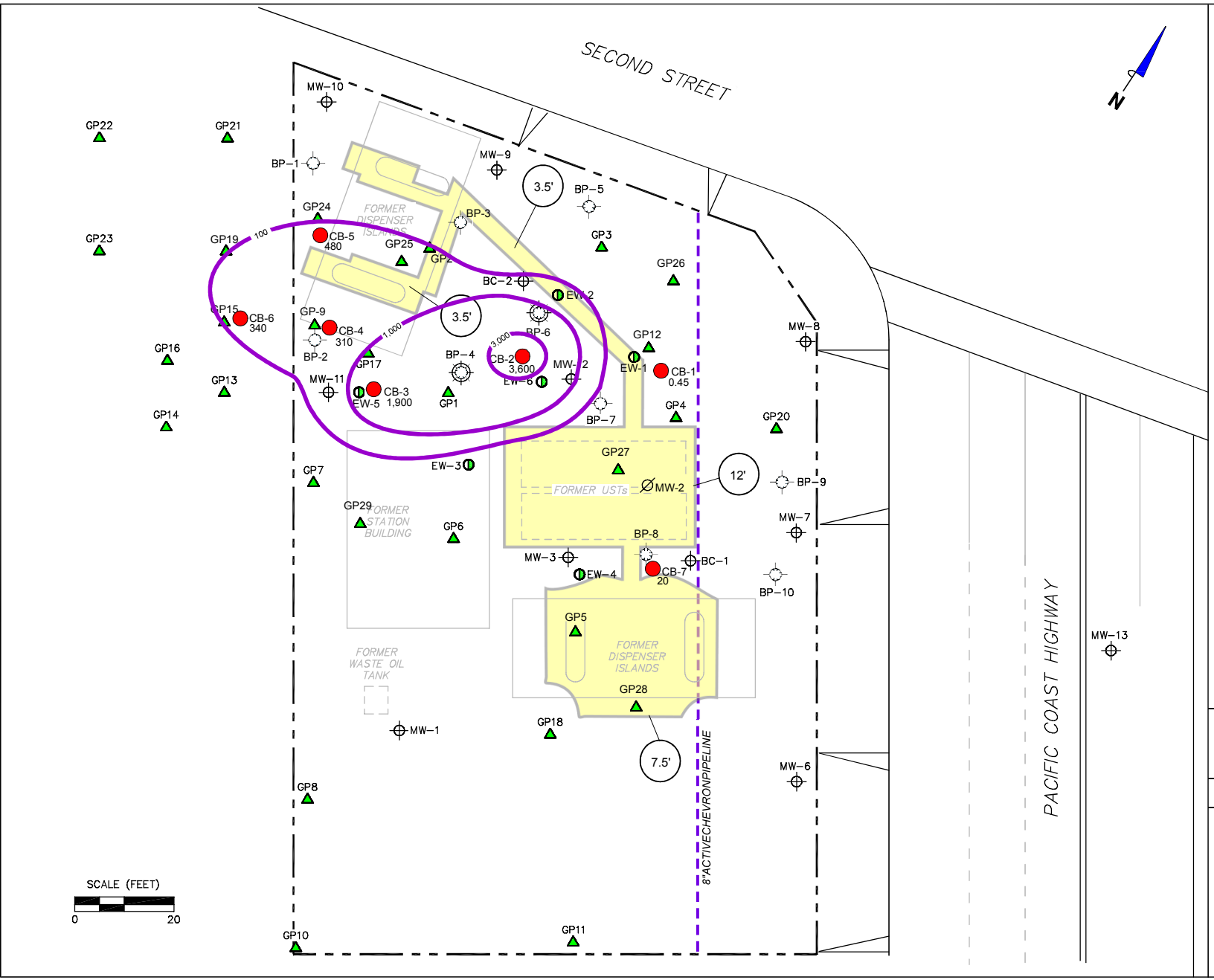
CONOCOPHILLIPS

FIGURE 4

SITE PLAN WITH WELL AND BORING LOCATIONS AND PREVIOUS EXCAVATION AREA

Former 76 Station 5379
6280 East Second Street
Long Beach, California



LEGEND

MW-13	Monitoring Well
EW-6	Extraction Well
GP23	Geoprobe Boring Location
BP-6	Nested Upper Zone and Lower Zone Sparge Point
BP-10	Lower Zone Sparge Point
MW-2	Abandoned Well
	Previous Excavation During UST Removal (VET,1998)
3.5'	Depth of Excavation (in feet) During UST Removal (VET,1998)
CB-1	Confirmation Boring

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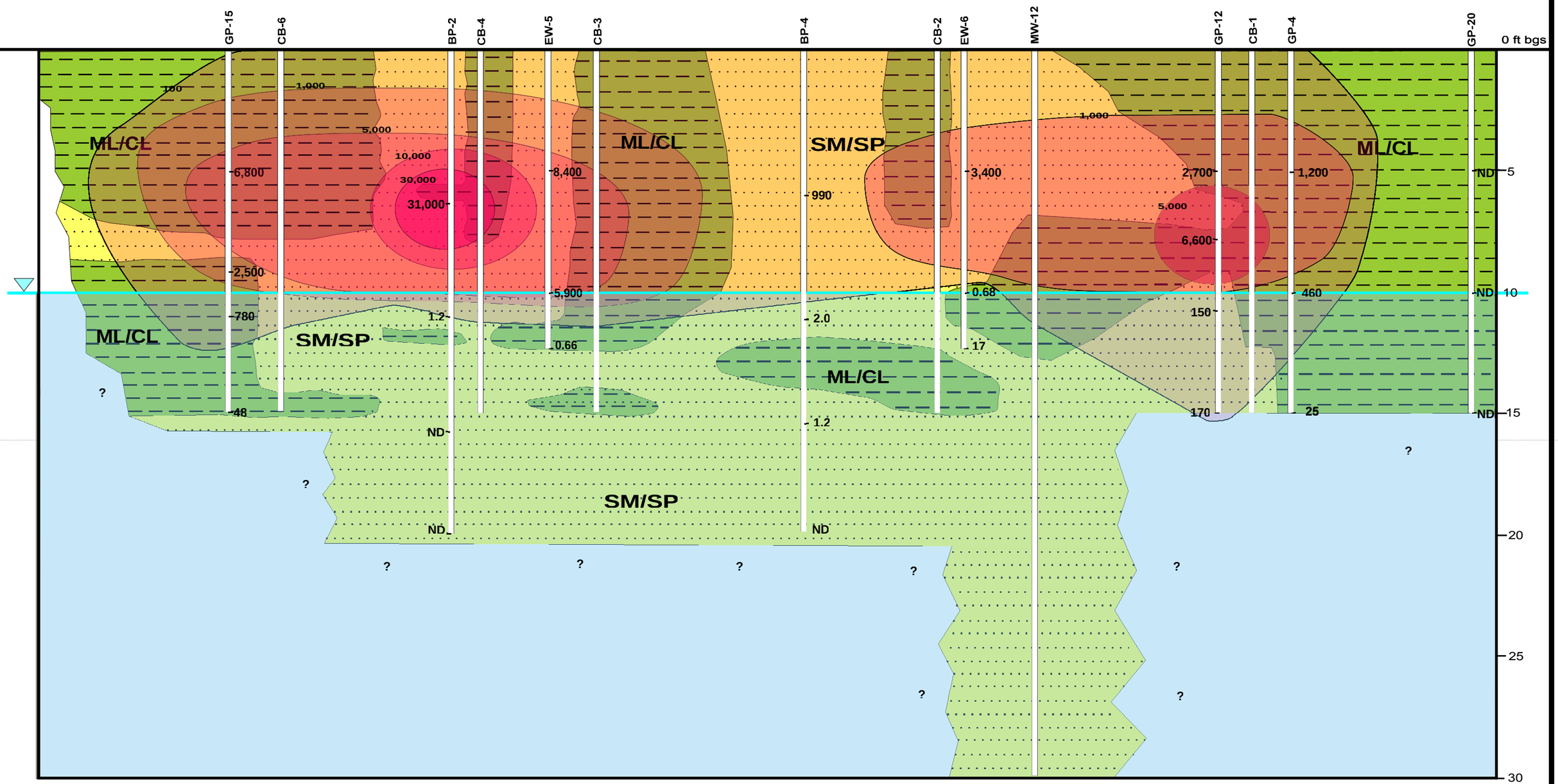
FAX: (213) 996-2290

CONOCOPHILLIPS

FIGURE 5

ISOCONCENTRATION MAP OF
TPH-G IN SOIL (mg/kg) AT 5 FEET BGS

Former 76 Station 5379
6280 East Second Street
Long Beach, California



CROSS SECTION - Historical concentrations in soil of TPH-G in mg/kg

CONOCO PHILLIPS
FORMER 76 STATION 5379
6280 EAST SECOND STREET
LONG BEACH, CALIFORNIA

0 — 20
APPROXIMATE HORIZONTAL SCALE IN FEET

LEGEND:

- -SAND/Silty SAND
- -SILT/CLAY
- -Water

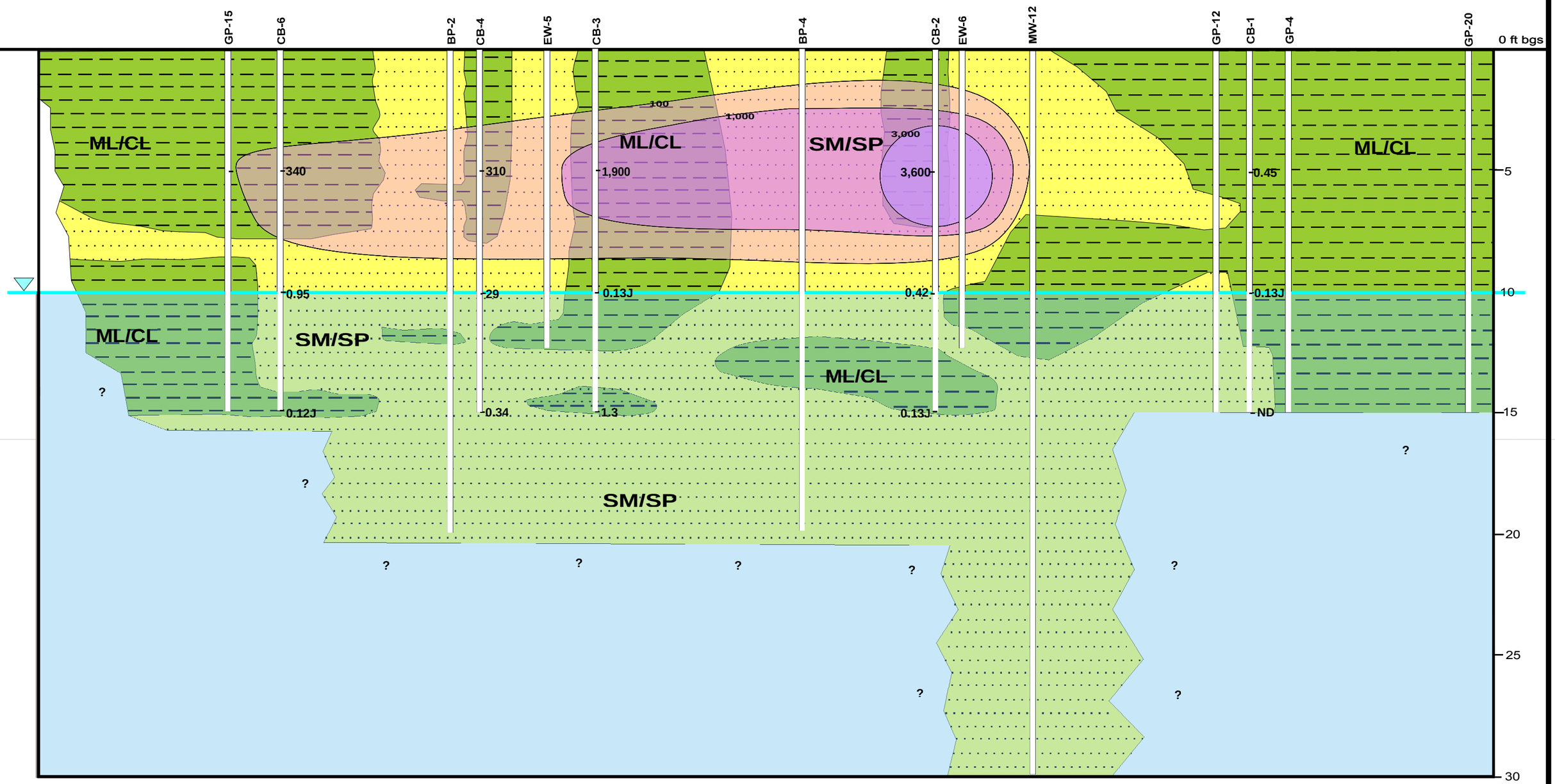
ft bgs = feet below ground surface
ND = not detected

10 100 -Historical TPH-g in mg/kg (November 1999 through September 2003 Investigations)

NW SW NE SE

Figure 6A

URS



CROSS SECTION - Current concentrations in soil of TPH-G in mg/kg

CONOCO PHILLIPS
FORMER 76 STATION 5379
6280 EAST SECOND STREET
LONG BEACH, CALIFORNIA

0 — 20
APPROXIMATE HORIZONTAL SCALE IN FEET

LEGEND:

- -SAND/Silty SAND
- -SILT/CLAY
- -Water
- 10 / 100 -TPH-g in mg/kg (2010 Investigation)

ft bgs = feet below ground surface
ND = not detected

NW SW NE SE

Figure 6B

URS