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BUILDING HEALTHY, VIBRANT AND SAFE NEIGHBORHOODS

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October 17, 2016

Ms. Karel Detterman, P.G.
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502
karel.detterman@acgov.org

RE: Remedial Action Plan, Properties at 760 22nd Street and 2201 Brush Street, Oakland, California 94612

Dear Ms. Detterman:

Please find attached for your review the following document:

- *Remedial Action Plan, Properties at 760 22nd Street and 2201 Brush Street, Oakland, California 94612* (ACEH Document No. RO#3153_RAP_R_10-10-2016)

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 call me at (510) 287-5353 ext. 339 if you have any questions.

Sincerely;

Everett Cleveland Jr.
Senior Project Manager
East Bay Asian Local Development Corporation
1825 San Pablo Avenue, Suite 200
Oakland, CA 94612

Attachment

REMEDIAL ACTION PLAN

PROPERTIES AT
760 22ND STREET AND 2201 BRUSH STREET
OAKLAND, CALIFORNIA 94612

Prepared for:

Mr. Everett Cleveland
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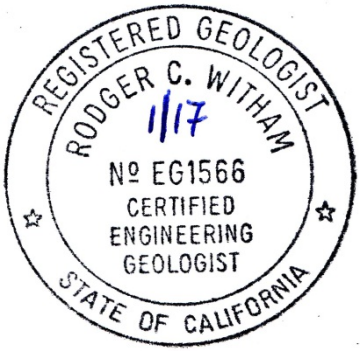
October 10, 2016

REMEDIAL ACTION PLAN
PROPERTIES
AT
760 22ND STREET AND 2201 BRUSH STREET
OAKLAND, CALIFORNIA 94612



Rodger C. Witham, P.G., C.E.G.
Project Manager

Nik Lahiri
Principal

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760 22ND STREET AND 2201 BRUSH STREET
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1.0 INTRODUCTION

East Bay Asian Local Development Corporation (EBALDC) has requested that Essel Environmental Consulting (Essel) prepare this remedial action plan to address risks from petroleum-hydrocarbon impacts to soil, soil vapor, and ground water that have been identified beneath the properties at 760 22nd Street and 2201 Brush Street (site or property) in Oakland, California. The commercial property formerly contained leaking underground storage tanks (LUSTs). The tanks were removed in October 1986 and the predecessor of Alameda County Environmental Health (ACEH) granted closure for the LUST case on December 8, 1997. In October 2014, EBALDC submitted additional subsurface investigation data and requested that the ACEH close the LUST case for a mixed-use (child care and residential) purpose. The ACEH responded in March 2015 indicating that the site did not satisfy the criteria of the State Water Resources Control Board's 2012 Low-Threat Underground Storage Tank Case Closure Policy (low-threat UST closure policy) and that additional investigation of the nature and extent of petroleum hydrocarbons in soil, soil vapor, and ground water beneath the property was necessary.

On behalf of EBALDC, Essel conducted three subsurface investigations at the site and off-site to the west in 2015 (Essel, 2015a) and 2016 (Essel, 2016a; 2016b) to evaluate impacts related to the former USTs, former fueling facilities, former vehicle maintenance operations, and a geophysical anomaly area suspected to have been the location of a previously unidentified UST. A focused human health risk assessment, which addressed all contaminants of potential concern (COPC), was also performed (Essel 2016a) to evaluate vapor intrusion risk in the area of the former USTs. The subsurface investigations have identified two local areas of notable impact to soil and ground water by medium- to heavy-chain petroleum-hydrocarbons and only minor impact by other COPC. The depth of this impact is greater than 10 feet; therefore, exposure to these contaminants is unlikely during development. The focused health risk assessment showed no carcinogenic (less than 10^{-6}) or non-carcinogenic (less than 1) health risks from potential intrusion of contaminant vapors into a future building. The data indicate that the petroleum-hydrocarbon contaminants that are present beneath the site do not pose a threat to human health or the environment.

The purpose of this document is to propose a remedial measure (vapor barrier and sub-slab depressurization) that would mitigate the potential for future health risks related to intrusion of volatile contaminants into indoor air. This section of the remedial action plan presents descriptions of the site and adjacent properties. Section 2.0 presents background information, including the history of site use, a summary of environmental work, and a description of the

planned development. Section 3.0 describes the physical setting of the site including the geology, ground water, and nature and extent of contaminants that will comprise the conceptual site model. Section 4.0 includes discussion of the remedial action objectives and Section 5.0 describes procedures that will be followed to implement the remedial action and properly handle wastes generated during development.

1.1 Site Location and Description

The site consists of two parcels located at the addresses of 760 22nd Street and 2201 Brush Street in Oakland, California and is a short distance to the southwest of the intersection of West Grand Avenue, San Pablo Avenue, and Interstate Highway 980. The adjacent and abutting parcels are on the west side of Brush Street between West Grand Avenue on the north and 22nd Street on the south. Plate 1 shows the location of the site and the features of the regional and local vicinities and Plate 2 shows the configuration of the two parcels and adjacent commercial and residential properties to the west.

At present, the northern and larger parcel at 760 22nd Street is occupied by a metal frame/metal siding shop building, contains two mobile trailers and several parked buses, and is paved with concrete. A below grade pit, historically used for servicing large vehicles (trucks and buses) and referred to as the oil-changing pit, is located in the northern portion of the shop building. This pit is integral with the surrounding concrete floor of the building. The smaller south-adjacent and abutting parcel at 2201 Brush Street is unpaved and also used to park buses. A 7,000-gallon diesel UST and a 2,000-gallon gasoline UST formerly were located at and next to (off-site, beneath the city sidewalk) the northeastern corner of the site, respectively. A small, raised concrete pedestal located at the east-central edge of the property is the location of a former fuel dispenser. During geophysical utility locating work in September 2015, an area of unusually low-density soil and a nearby standpipe indicative of a UST vent pipe were identified at the west-central edge of the site. This area is referred to as the geophysical anomaly area.

Adjacent to the northwestern side of the site is a commercial building presently occupied by City Print & Mail at 777 West Grand Avenue. Adjacent property to the southwest is occupied by a multi-family residential building at 764 22nd Street. Additional residential buildings and a church are located further to the west. Plate 2 shows the current locations of the shop building, oil-changing pit, and fuel dispenser pedestal; the approximate locations of the former USTs; the location of the geophysical anomaly area at the west-central edge of the property; and adjacent off-site properties to the west.

1.2 Planned Development

East Bay Asian Local Development Corporation plans to redevelop the 760 22nd Street/2201 Brush Street parcels with a multistory child-care and residential structure containing 59 residential living units. Preliminary architectural plans show that the building will cover the entire property. The building will include a podium garage with parking at ground level and below ground level. Two, 3-car-high puzzle lifts will be constructed near the center of the property for below ground parking (total of 45 parking spaces). Below grade parking will involve excavation of soil beneath this central portion of the property to an approximate depth of 9 feet below the ground surface. Two elevators and two stairwells are proposed to be located at the northeastern corner of the building, which will overlie the location of the former diesel UST. One elevator and two stairwells are proposed to be located in the southeastern portion of the building in an area straddling the line between the two parcels. Essel understands that elevator shafts may extend to a depth of 7 feet below the ground surface and that the stairwells will not extend below

grade. In addition, concrete footings for the building's foundation may extend to a maximum depth of 4 feet below the current ground surface.

The ground floor of the proposed structure will contain offices, lobbies, an employee break room, conference room, and child-care reception area, which will be located along the northern and eastern sides of the building. The entire second floor is planned as a child day-care center and higher floors will be used for residential living. The elevators will extend to all floors. In addition to the former and current site features, Plate 2 shows the planned ground floor and below ground development.

2.0 BACKGROUND

2.1 Site History

The two parcels have been developed with residential or commercial structures since at least 1902. At the 760 22nd Street parcel, two residential dwellings, two sheds (one at the location of the geophysical anomaly), and a stable were present in 1902 and 1912 and residential use continued into the late 1940s. By 1951, the two homes and associated outbuildings had been removed and this parcel was used as a truck yard. The current shop building was present on the parcel in 1951 along with two storage sheds and these three structures were present through at least 1970. The two storage sheds were later removed. Truck storage and repair activities took place on this parcel likely into the 1990s and possibly until 2003. Information on when the former gasoline and diesel USTs had been installed is not available, but these tanks were removed in 1986 and fueling activities ceased at that time.

A residential dwelling occupied the 2201 Brush Street parcel in 1902 and 1912. Sometime between 1912 and 1925, the single-family residence on this parcel was replaced by a multi-family structure, with two parking garages, and a corner store. Printing, sheet metal, cabinetmaking, and delivery service companies occupied the store. This mixed-use building may have been present on the parcel until sometime in the 1980s, but by 1993 had been removed and no structure has been on this parcel since that time.

The two parcels were unoccupied from mid-2003 until 2007. Since 2007, a charter bus business has been operating at the site, with business operations including storage, cleaning, and some vehicle repair.

2.2 Previous Environmental Work

Previous environmental work has included underground storage tank (UST) removal and a number of subsurface investigations. These activities took place between 1986 and 2016.

2.2.1 Underground Storage Tank Removal

Four USTs, associated with a Bekins Van & Storage (Bekins) warehouse located at 2227 San Pablo Avenue, were removed from the 760 22nd Street location and vicinity in October 1986 (PES Environmental, Inc. [PES], 1997). Two of the tanks included the 7,000-gallon diesel UST that was located on the 760 22nd Street property and the 2,000-gallon gasoline UST that was located beneath the adjacent sidewalk along Brush Street. After tank removal, soil samples were collected beneath both ends of the diesel and gasoline USTs at depths of 12 to 13 feet below the ground surface and submitted for laboratory analysis. Concentrations of 80 to 250 milligrams per

kilogram (mg/kg) total petroleum hydrocarbons as diesel (TPHd) were present in soil beneath the 7,000-gallon diesel UST and 1.8 and 70 mg/kg total petroleum hydrocarbons as gasoline (TPHg) were present in soil beneath the adjacent gasoline UST. In 1997, PES presented the tank removal information to the Alameda County Health Care Services Agency who reviewed the information and issued a closure letter for the Bekins site on December 8, 1997. Plate 2 shows the locations of the former gasoline and diesel USTs and Table 1 presents the results of the laboratory analyses of the soil samples.

2.2.2 PES Environmental, Inc. Subsurface Investigations

PES Environmental, Inc. performed two subsurface environmental investigations and two geophysical surveys at the site.

Subsurface Investigations

PES (2005) performed a subsurface soil and ground-water quality investigation at the 760 22nd Street parcel in September 2005 and additional subsurface soil investigation at this parcel in October 2011 (PES, 2011). In 2005, borings B-1 through B-6 were advanced to depths of 12 to 16 feet below grade at locations near the former USTs and fuel dispenser, inside the shop building, and at the southern and northern ends of the property. Soil samples were collected from borings B-2, B-3, B-4, and B-5 at depths between 5 and 12 feet below the ground surface. Concentrations of 190 mg/kg TPHg and 230 mg/kg TPHd were detected in soil at 8 feet below the ground surface in boring B-4, located near the former fuel dispenser. Concentrations of TPHg and TPHd were less than 25 mg/kg or were not detected in the other soil samples. No benzene, toluene, ethylbenzene, total xylenes (BTEX) or methyl tertiary butyl ether (MTBE) were detected in the soil samples. Ground water was reportedly encountered at depths of 12 to 13 feet below the ground surface and grab ground-water samples were collected from borings B-1, B-2, B-5, and B-6. Total petroleum hydrocarbons as diesel were detected in water samples from the four borings at concentrations of 170 to 3,200 micrograms per liter (µg/L) and TPH as motor oil (TPHmo) was found at concentrations of 190 to 490 µg/L in water samples from three of the four borings. No BTEX or MTBE were detected in ground-water samples, except for a trace 0.61-µg/L MTBE in boring B-1.

In 2011, borings SB1 through SB6 were advanced to depths of 10 to 11 feet below grade at locations from 10 to 15 feet west and south of borings B-2, B-3, and B-4, which were located near the former USTs and dispenser island. PES collected soil samples from the borings at various depths from 2 to 10 feet below the ground surface. No TPHg or BTEX were found in any soil sample and low levels of TPHd (1.2 to 12 mg/kg) were detected in 10 of the 17 soil samples analyzed. Plate 2 shows the locations of borings advanced by PES during the two subsurface investigations. Table 1 presents the results of laboratory analyses of the soil samples and Table 2 presents the results of laboratory analyses of the ground-water samples.

Geophysical Surveys

PES (2011, 2012) conducted two geophysical surveys of the northeastern portion of the 760 22nd Street parcel in October 2011 and April 2012 to evaluate the presence of subsurface features related to the former fuel facilities. The results of these surveys detected various underground utility pipes, but did not find indications of additional USTs. A shallow triangular-shaped metallic anomaly was identified approximately 10 feet west of the former dispenser island.

2.2.3 Essel Environmental Consulting

Essel (2015, 2016a; 2016b) performed subsurface investigations in September/October 2015, February/March 2016, and June 2016 to characterize the nature and extent of petroleum hydrocarbons in soil, soil vapor, and ground water at the site and off-site in relation to the criteria of the low-threat UST closure policy. Twenty-two soil borings (ECB-1 through ECB-22) were advanced to depths of 16 to 20 feet below grade to assess contaminants in soil and ground water in the areas of the two former USTs and fuel dispenser, in the oil changing pit, along the western edge of the property and on the adjacent residential property to the west, and to the northwest and west of the site along West Grand Avenue and 22nd Street, respectively. Seven soil-vapor wells (SV-1 through SV-7) were installed at and in the vicinity of the former locations of the USTs and fuel dispenser to evaluate contaminant levels in soil and soil vapor and three borings were hand-augered in the oil-changing pit to assess potential impact to soil beneath that structure (see Plate 2). The investigations found relatively elevated petroleum hydrocarbon concentrations in local areas at the former UST and fuel dispenser locations and the geophysical anomaly located at the west-central edge of the site.

In soil, the higher concentrations (95 to 16,000 mg/kg) of total petroleum hydrocarbons in the gasoline (TPHg), diesel (TPHd), and motor-oil (TPHmo) ranges were found within a relatively narrow vertical zone (12 to 16 feet below grade) at and below the ground-water surface at the former gasoline UST pit; at depths of 8 to 15 feet below grade beneath the former fuel dispenser; and within the 12- to 16-foot-depth zone (at and below the ground-water surface) at the west-central edge of the site (geophysical anomaly). The results of off-site investigation in June 2016 showed contaminants found in the geophysical anomaly area have not moved more than a few feet off-site to the west. Outside these local areas/depth zones, TPHg, TPHd, and TPHmo were primarily not detected and, except for the area of the geophysical anomaly, the indicator petroleum constituents benzene, toluene, ethylbenzene, and total xylenes (BTEX), methyl tertiary butyl ether (MTBE), naphthalene, and the polynuclear aromatic hydrocarbons (PAHs) were also largely not detected. Furthermore, no detectable contaminants were found underlying the oil-changing pit (see Table 1).

In ground water, high concentrations of TPHg, TPHd, and TPHmo were found in the areas of high soil impact, namely the former UST area, the former fuel dispenser area, and the geophysical anomaly area. Trace to low concentrations of xylenes and tert-butyl alcohol were detected in two water samples and BTEX, MTBE, and naphthalene were not detected in the water samples collected from the 14 borings advanced in September 2015. Relatively low levels of BTEX and naphthalene were found in ground water in the geophysical anomaly area in February 2016. A number of other petroleum-related volatile organic compounds (VOCs), non-chlorinated VOCs, and the chlorinated VOCs *cis*-1,2-dichloroethene and vinyl chloride were sporadically detected at trace to low concentrations. The PAHs acenaphthene, phenanthrene, and 1- and 2-methylnaphthalene were detected in some water samples collected on-site during the two investigations, with the relatively higher concentrations found in the vicinity of the geophysical anomaly. In the four off-site borings (ECB-13, ECB-14, ECB-21, and ECB-22) advanced, low concentrations of TPHd (less than 100 µg/L) were detected in one boring on West Grand Avenue and one boring on 22nd Street. No TPHg, TPHmo, BTEX, MTBE, other VOCs, or PAHs were detected in water samples from the four borings indicating these compounds have not migrated off the property (see Table 2).

In soil vapor, a number of petroleum-related and a few non-petroleum-related VOCs were detected in the areas of the former USTs and fuel dispenser. Total petroleum hydrocarbons-gasoline range, benzene, vinyl chloride, and chloroform were detected at concentrations greater

than default (Tier 1) environmental screening levels for vapor intrusion health risk (see Table 3). A focused human health risk assessment that included all detected VOCs and site specific soil physical data; however, did not find significant cancer or non-cancer risk from vapor intrusion in the former UST area, where belowground elevator shafts for the future building are to be installed, or in the former fuel dispenser area (Essel, 2016a).

Essel also requested available records at the California Department of Water Resources and Alameda County Public Works Agency to identify nearby sensitive receptor water-supply wells. Records available at the two agencies indicate the closest water-supply wells are located more than 2,000 feet to the north of the site. Impacts at the site would not affect these water-supply wells.

Essel concluded that the data showed the site satisfies most of the general (except the presence of secondary source material) and all the media-specific criteria of the low-threat UST closure policy. The depth of the significant contamination, the absence of health-risk indicator petroleum constituents in either soil or ground water, and the absence of nearby sensitive receptor wells indicated little potential for risks to human health or the environment. The focused risk assessment in the area of the former USTs and fuel dispenser did not find significant risk to human health from intrusion of volatile organic compound vapors into a future residential building and investigation at and around the geophysical anomaly did not indicate that a UST was present in the west-central area of the property. The results also showed that the petroleum contaminants in soil and ground water at the western edge of the site (geophysical anomaly area) have not migrated more than a few feet off-site to the west.

3.0 CONCEPTUAL SITE MODEL

A conceptual site model has been developed and refined as a result of the information collected during the various subsurface investigations. Elements of the conceptual site model include the nature and distribution of geologic units, depth to ground water, and the nature and distribution of petroleum-related contaminants in the subsurface. Following is a brief summary of these elements. Appendix A presents the conceptual site model in detail and shows that no data gaps remain with respect to delineation of impact to the subsurface.

3.1 Physiography, Geology, and Ground Water

The site is located near the center of the East Bay Plain, an alluvial plain that bounds the eastern side of San Francisco Bay. The site is at an approximate elevation of 16 feet above mean sea level and surface topography in the local area slopes gently downward toward the northwest.

Unconsolidated sediments encountered during subsurface investigations at the site include near-surface silt or fill underlain by alternating and interbedded units of clay, silt, sand, and occasionally gravel. Fill underlies portions of the site from the base of the concrete to depths ranging from a few inches to approximately 4 feet below the ground surface. At the locations of the former USTs, fill materials extend to depths of 10½ to 12 feet, which were the bottoms of the former gasoline and diesel tanks, respectively. Native materials include a near-surface silt unit, up to 4 feet thick, and underlying relatively thick silty clay were encountered in borings to depths generally of 8 to 10 feet below grade and to 17 feet below grade in the east-central portion of the site (area of former fuel dispenser). Units of silt, more predominant units of clayey sand, silty sand, sand with gravel, and clayey gravel, with subordinate interbeds of clay are present beneath the silty clay (base at 8 to 10 feet below grade) to depths of 17½ to the 20-foot maximum depth

explored. Silty clay was encountered beneath the silt/sand/gravel zone in many but not all borings advanced to 20 feet below the ground surface.

PES (2005) reported depth to first ground water in borings drilled at the site in 2005 to be 12 to 13 feet below the ground surface. Depth to ground water measured in the temporary wells installed in borings advanced during Essel's 2015 and 2016 subsurface investigations varied from 12½ to 20 feet, with the greater depths likely reflecting slow recharge of ground water in borings. Average depth to ground water in September 2015 was approximately 14¼ feet below grade and in February and June 2016, was approximately 13 feet below the ground surface. The inferred direction of ground-water flow is toward the north-northwest or northwest. Free-phase petroleum product not encountered in 22 temporary wells placed during Essel's three investigations (see Table 4 for ground-water data for borings ECB-1 through ECB-22).

3.2 Nature and Distribution of Contaminants in Soil and Ground Water

The analytical laboratory has reported total petroleum hydrocarbons concentrations for compounds with six to 12 carbon atoms per molecule (C_6 to C_{12}) as TPHg; for compounds with 10 to 23 carbon atoms per molecule (C_{10} to C_{23}) as TPHd; and for compounds with 18 to 36 carbon atoms per molecule (C_{18} to C_{36}) as TPHmo. The laboratory data for most samples; however, indicate the more dominant presence of diesel-range or motor-oil-range hydrocarbons relative to gasoline-range hydrocarbons. Essel requested copies of chromatograms for select soil samples where elevated levels of TPH were detected; these included samples S-13-ECB4 in the former gasoline UST tank area, S-8-ECB5 in the fuel dispenser area, and S-12½-ECB15 and S-13½-ECB17 in the geophysical anomaly area. The laboratory provided chromatograms for both the TPHg and TPHd/TPHmo analyses and a brief explanation in a September 14, 2016 electronic mail, as follows:

- S-13-ECB4 – chromatographic pattern is predominantly diesel, with a minor component that extends ("bleeds") into the late gasoline range.
- S-8-ECB5 – chromatographic pattern appears to have a predominant stoddard solvent pattern.
- S-12½-ECB15 and S-13½-ECB17 – chromatographic pattern is predominantly oil range with a lesser stoddard solvent pattern

The laboratory indicated that the TPHg chromatograms for the four samples exhibited patterns of a non-gasoline derived petroleum hydrocarbon. The chromatograms appear to confirm that gasoline petroleum hydrocarbons are not present at the site and that concentrations reported as TPHg are the lighter-end compounds of diesel fuel. A copy of the laboratory's September 14, 2016 electronic mail and the chromatograms are included in Appendix B.

Elevated concentrations of TPHg/TPHd and TPHmo were detected in soil and ground water in two areas beneath the site and moderately high concentrations were detected in one area. Notably lower levels of individual constituents were detected in these areas. Investigation in other areas of the site and off-site did not find significant concentrations of contaminants of concern. The distribution of TPHg/TPHd and TPHmo in the three areas is described in the following sections.

3.2.1 Former UST Area

In soil, elevated levels of TPHg/TPHd and TPHmo were detected in three of the 10 borings advanced within and near the location of the former USTs. The highest concentrations (200 to

940 mg/kg) were found in borings ECB-3 and ECB-4, which were advanced at and near the location of the former gasoline UST beneath the sidewalk. Lower concentrations of 21 to 190 mg/kg were detected in soil from the boring for vapor well SV-5, located approximately 10 feet southwest of the diesel UST. The high concentrations, primarily in the diesel range, were detected in the vertical interval of 12 to 16 feet below the ground surface. In most other borings, soil samples did not contain detectable levels of the three ranges of petroleum hydrocarbons. Borings ECB-1, B-SV3, and B-SV4 define the extent of impact to the north, northwest, and west, respectively. The lateral extent of impact to the south is inferred to be a short distance beyond borings ECB-5 and B-3.

In ground water, elevated levels of TPHg/TPHd and TPHmo were detected in borings ECB-2, ECB-3, and ECB-4, with the highest concentrations (maximum 24,000 µg/L) detected also within the diesel range. No petroleum hydrocarbons were detected in the water sample from boring ECB-1 to the north and, based on no detected petroleum hydrocarbons in soil samples collected at the ground-water surface in borings B-SV3 (northwest) and B-SV4 (west), the petroleum plume does not appear to extend to the locations of these borings. Impacted ground water likely does not extend much to the south beyond borings B-SV5 and B-3 because of the dominant clay zone in the southeastern portion of the site.

3.2.2 Former Fuel Dispenser

The vertical and lateral extents of petroleum-hydrocarbon impact to soil and ground water appear to be limited in the area of the former fuel dispenser. Moderate concentrations of TPHg (190 mg/kg) and TPHd (230 mg/kg) were detected in soil at the 8-foot depth in boring B-4 in 2005 and a modestly lower TPHg (stoddard solvent chromatographic pattern) concentration (130 mg/kg) and notably lower TPHd concentration were detected at the 8-foot depth in adjacent boring ECB-5 in 2015. Concentrations of 95 mg/kg TPHg and 3.9 mg/kg TPHd were detected in soil in boring ECB-5 at the ground-water surface (14½ feet below grade). In most other borings near the former fuel dispenser, TPHg and TPHd were not detected or were at concentrations less than 10 mg/kg. The one ground-water sample collected at the dispenser location (boring ECB-5) contained a modestly high 430 µg/L TPHg and 100 µg/L TPHd. None of the soil or ground-water samples collected contained a detectable concentration of TPHmo. The lateral extent of soil impact is inferred to be within a 15- by 15-foot-square area near the dispenser pedestal and the vertical extent of relatively higher concentrations are confined to the depth interval of 8 to 15 feet below the ground surface. The extent of impact to ground water is suspected to be localized around the dispenser island.

3.2.3 Geophysical Anomaly Area

High concentrations of total petroleum hydrocarbons, principally in the motor-oil range, are present in soil directly beneath the geophysical anomaly. Detectable concentrations of the petroleum hydrocarbons are estimated to extend approximately 25 feet north of the anomaly to a point between borings ECB-19 and ECB-9; approximately 20 feet south of the anomaly to a point between borings ECB-17 and ECB-20; and an estimated 20 feet west of the anomaly beyond boring ECB-16 and a short distance beneath the adjacent residential and commercial properties. The absence of detectable petroleum hydrocarbons in soil from boring ECB-18 indicates the impact to soil does not extend more than a few feet to the east of the anomaly. The vertical extent of the elevated levels appears to be restricted to an interval between 12 and 16 feet below the ground surface. Concentrations of total petroleum hydrocarbons in ground water are of similar lateral extent as in soil.

Plates 3 and 4 present the distribution of total petroleum hydrocarbons (as TPHg, TPHd, and TPHmo) in soil at the site and off-site and in the geophysical anomaly area, respectively. Concentrations shown in red on these plates are greater than applicable environmental screening levels (ESLs) presented in Table S-4 (Odor Nuisance Levels - Any Land Use: Deep Soil Exposure [construction workers]) of the California Regional Water Quality Control Board, San Francisco Bay Region's (RWQCB's) ESL tables (2016, Revision 3). The plates illustrate the local extent of TPH at these concentrations in soil beneath the site. Plates 5 and 6 present the distribution of total petroleum hydrocarbons in ground water at the site and off-site, and in the geophysical anomaly area, respectively. Concentrations shown in red are greater than applicable ESLs presented in Table GW-5 (Odor Nuisance Levels, Non-Drinking Water) of the RWQCB's ESL tables and also show the local extent of impact to the ground water. The plates present the data collected during Essel's three subsurface investigations.

3.3 Contaminants in Soil Vapor

Seven soil vapor wells were installed at locations in the former UST excavation (SV-1), next to the former fuel dispenser (SV-2), and in approximate arcs around the former UST locations (SV-3 through SV-5) and former fuel dispenser (SV-6 and SV-7). Relatively higher concentrations of TPH-gasoline range hydrocarbons (64,000 to 400,000 $\mu g/m^3$) were detected within and to the west and south of the former UST location; whereas, low concentrations (450 to 11,000 $\mu g/m^3$) of TPH-gasoline range hydrocarbons were found at and near the former fuel dispenser.

A number of petroleum fuel constituents were detected in soil vapor in wells SV-1 and SV-4, located at and to the west of the former USTs and in well SV-6, located to the northwest of the former fuel dispenser; these constituents were not detected in other vapor wells. The chlorinated solvent vinyl chloride was detected in wells SV-1 and SV-4 near the former USTs and tetrachloroethene was detected in well SV-2 located at the former dispenser. No petroleum or chlorinated solvent compounds were found in soil vapor wells SV-3, located to the north of the former USTs, or in well SV-7, located south of the former fuel dispenser and these two wells appear to delineate the northern and southern extent of contaminants in soil vapor.

Plate 7 presents the distribution of TPH-gasoline range hydrocarbons, benzene, naphthalene, tetrachloroethene, and vinyl chloride in soil vapor using data collected during Essel's investigations. Concentrations shown in red are greater than applicable ESLs in Table SG-1 (Soil Gas Vapor Intrusion: Human Health Risk Levels, Residential) of the RWQCB's ESL tables.

4.0 REMEDIAL ACTION OBJECTIVES

The intent of remedial action objectives is to mitigate potential threats to human health or the environment such that the potential threats are consistent with current and future uses of a site. Mitigation can be achieved by either reducing chemical concentrations or reducing potential exposure to contaminants.

Data generated during Essel's three subsurface investigations (Essel, 2015, 2016a, 2016b) have characterized the nature, magnitude, and extent of existing contaminants related to historical releases at the site. Relatively elevated concentrations of TPHg/TPHd and/or TPHmo are restricted to the areas of the former USTs and the geophysical anomaly. The significant contamination; however, appears to be deep (greater than 10 feet below grade) and substantially contained beneath the site. Little impact appears to be present off the site.

Essel (2014) performed a human health risk assessment using site characterization data at the time and identified potential exposure pathways to construction workers (dermal absorption, ingestion, and inhalation) from soil contaminants; to construction workers (dermal absorption and ingestion) from ground-water contaminants; and to future residents (inhalation) from soil and soil gas contaminants. Proposed excavations for the new development (maximum depth of 9 feet below the ground surface) will not extend to the depths of elevated TPH concentrations in soil or to ground water. The potential pathways for exposure to soil and ground water by construction workers (or future maintenance workers); therefore, are not complete. Furthermore, no sensitive receptor water-supply wells are located in the site vicinity and expected institutional controls will preclude use of ground water beneath the site for any purpose. The potential pathway for exposure to ground water by future on-site residents also will not be complete.

Exposure of future on-site residents to contaminants in soil gas might be a complete pathway. Soil gas sampling and evaluation of results (Essel, 2016a); however, have shown that risk to human health resulting from vapor intrusion in the area of the former USTs and fuel dispenser, where volatile contaminant concentrations in soil gas are likely highest, is insignificant. No other site-specific condition demonstrates increased risk associated with the petroleum hydrocarbons.

The following remedial action objectives are considered appropriate for the site, based on the nature, extent, and potential risk posed by contaminants that are present beneath the property. The following remedial action objectives are proposed, with absolute (numbered items) and functional (bullet items) remedial action objectives listed.

1. Mitigate potential exposure of future site occupants to petroleum-related and other volatile organic compounds in the subsurface as a result of vapor migration into indoor air.
    - Obtain seasonal indoor and outdoor air samples (one pre-occupancy and one post-occupancy) during the late summer/early fall and late winter/early spring to confirm that contaminants of concern are less than applicable indoor air quality screening levels.

2. Prevent exposure (via ingestion, dermal contact) of future site occupants to petroleum-hydrocarbon-impacted ground water at concentrations greater than applicable drinking water standards.
    - Accept institutional controls (i.e., deed restriction) precluding the future use of site ground water.

5.0 REMEDIAL ACTION PLAN

The proposed remedial measure will include installing a vapor barrier/sub-slab depressurization system beneath a portion of the future site building. Elements of this remedial measure are described as follows.

5.1 Pre-Implementation Documents

The following documents will be submitted for ACEH review and approval before field activities commence. These plans may be submitted separately or as one combined document.

5.1.1 Health and Safety Plan

A site-specific health and safety plan will be prepared for the site work to identify and mitigate health risks to workers and the public during the remedial action. The plan will present a summary of the contaminants present at the site and describe the potential physical and chemical hazards associated with the contaminants. Additional elements of the health and safety plan will address measures to protect the public, access and security at the site during the remedial action, general health and safety procedures, and emergency response procedures. All site personnel involved in the remedial action shall read, understand, and follow the procedures described in the health and safety plan before work begins. Health and safety meetings will be conducted at the start of each work day. A copy of the health and safety plan will be available at the site during remediation activities.

5.1.2 Site Management Plan

Petroleum-hydrocarbon impacted soil may be encountered during excavation for the belowground phase of construction and during excavation for future maintenance activities and a site management plan will be prepared to address management of excavated materials. This plan will discuss applicable permits; protocols for excavation oversight; soil management procedures relating to removing, handling, characterizing, and properly disposing of soil (according to applicable laws and regulations); dust control; noise control; and site access and security. Ground water is not expected to be encountered during development; however, provisions for removing, handling, and disposing of ground water will also be addressed in the plan. Contractors involved in soil excavation activities will be provided a copy of the plan and will be required to follow the provisions of the plan.

5.1.3 Remedial Design Implementation Plan (Basis of Design)

As described below, a vapor barrier/sub-slab venting or depressurization system is proposed to be installed beneath a portion of the future site building and details of the installation will be described in a remedial design implementation plan (i.e., basis of design report). This plan will include the following elements.

- Detailed construction plans that include the selected vapor barrier design, products, and specifications. These plans will be incorporated into the full set of construction drawings prepared for the project.
- Construction quality assurance plan that will describe contractor and inspector qualifications and experience; procedures for construction monitoring and documentation including responsibilities and authority; inspections; and the as-built documentation that will be provided after system installation.
- Construction sequencing plan that will include the sequence of measures that will be used to protect the installed vapor mitigation system during construction activities.
- Operation and maintenance plan that will describe measures to be implemented during and after installation of the vapor mitigation system to ensure integrity and long-term effectiveness of the system.

The remedial design implementation plan, with the full set of construction drawings prepared for the project, will be submitted to the ACEH at the time the construction package is submitted to the City of Oakland Planning and Building Department (OPBD). The ACEH will be notified of any planned changes to the vapor mitigation system design or construction drawings required by

OPBD, will be provided copies of the revised construction drawings, and must approve the revisions to the vapor mitigation system. A letter from the vapor mitigation system design engineer will be submitted to ACEH stating that the engineer has reviewed and approves the final construction drawings. Construction activities will not commence until the plan is approved by ACEH.

5.1.4 Permits and Utility Clearance

The following permits/notices may also be required to perform the remedial action.

- City of Oakland Planning and Building Department - excavation and obstruction permits.
- East Bay Municipal Utility District – special discharge permit for ground water (if encountered), if discharge to the sanitary sewer is performed.

Before any excavation begins, the construction contractor will mark the locations of subsurface utilities. Underground Services Alert of Northern California and Nevada will be notified a minimum of 48 hours before the start of construction. A private utility locator may also be used to mark the locations of on-site underground utilities.

5.2 Soil Excavation

A summary of soil excavation work is provided below. Details of the procedures that will be followed will be provided in the soil management plan.

Soil will be excavated for construction of the two belowground garage puzzle lifts, three elevators, and foundation footings. The depths of excavation are anticipated to be 9 feet, 7 feet, and a maximum 4 feet below the ground surface, respectively. During excavation, soil will be field screened for evidence of petroleum impact to distinguish between relatively uncontaminated/clean soil and hydrocarbon-impacted soil. This screening will be performed to make decisions regard segregation of the soil. Monitoring will include visual observation for soil discoloration, checking for noticeable odors, and testing excavated soil using a photoionization detector.

Excavated soil will be placed in stockpiles pending removal or reuse. Stockpiled soil will be placed on a minimum of 10-mil-thick polyethylene sheeting (or equivalent impermeable material) and, when not being actively handled, shall be completely covered and secured with like impermeable sheeting. The contractor will select the on-site locations of soil stockpiles and ensure that stockpiled soil is properly segregated, covered, and moisture controlled. A bermed, impermeable containment structure will be constructed to contain excavated soil with free liquids.

Geotechnical testing indicates that on-site soil beneath the surface “topsoil” is suitable for use as fill (Rollo & Ridley, 2015). If the excavated overburden is desired to be reused on-site, testing of this soil will be performed following the laboratory protocol used during site investigations. Soil that contains contaminants of potential concern (COPC) at concentrations less than the RWQCB’s Tier 1 ESLs will be acceptable for reuse at the site.

The environmental consultant will schedule and direct truck loading activities and coordinate with the accepting landfill facility on transport and disposal of excavated soil. Soil will be transported by a properly licensed waste-transport company. Transport trucks will be lined, as appropriate, and waste soil will be covered during transport. The environmental consultant will

also be responsible for tracking transport and disposal of waste soil by properly completing applicable transport and disposal forms for each load of waste transported off-site. Copies of the transport and disposal documents (bills of lading, weight tickets, etc.) will be included in the soil management completion report.

5.2.1 Dewatering

Ground water is not expected to be present in excavations. If encountered, however, ground water will be pumped into on-site holding tanks for later characterization and disposal.

5.2.2 Soil Sampling

Stockpiled soil will be characterized, as necessary, for off-site disposal or on-site reuse. For off-site disposal, four-point composite soil samples will be collected from the stockpiles and submitted for laboratory analysis. The number of composite samples that will be collected will depend on the total volume of soil excavated, with one composite sample for every 250 cubic yards. The soil stockpiles will be divided into the applicable increment volumes and four samples will be collected from each volume. Samples will be collected in brass or stainless steel sleeves as described above and each set of four samples will be labeled to tie the samples to the applicable volume increment. The samples will be delivered to the analytical laboratory, using chain-of-custody procedures, for compositing and analysis.

For on-site reuse, individual soil samples will be collected from every 20 cubic yards of soil for laboratory testing. Soil with concentrations of TPH less than 100 mg/kg and other COPC less than Tier 1 ESLs will be acceptable for reuse.

5.2.3 Water Sampling

Recovered ground water in the portable storage tank(s) will be sampled and analyzed to characterize the water for disposal purposes. Water sample(s) will be collected by lowering a bailer to the approximate midpoint of the tank to collect the sample. Samples will be transferred to appropriately sized and preserved sample containers, which will be sealed, labeled, and placed on ice pending transport to the analytical laboratory. A chain-of-custody form will be prepared and accompany the water samples to the analytical laboratory.

5.2.4 Laboratory Analyses

Soil samples collected from the stockpiles and water samples collected from the portable storage tank(s) will be analyzed for the constituents required by the applicable disposal facility or sanitary sewer for water, if applicable. The analyses may include TPHg, TPHd, TPHmo, VOCs, and possibly metals. Soil that will be reused on the site will be analyzed for the same laboratory protocol as used during site investigations; that is TPHg, TPHd, TPHmo, and VOCs. A state-certified testing laboratory will perform the analyses.

5.2.5 Import Fill and Backfill of Excavations

Imported material will be tested for a suite of potential contaminants following the guidelines of the California Department of Toxic Substances Control's (2001) information advisory on clean imported fill material. Alternatively, a material specification sheet can be obtained from a quarry for virgin fill. Imported materials will also be subject to the requirements specified by the

owner's geotechnical engineer. As described above, on-site soil that is planned for reuse will be analyzed by the same laboratory protocol used during recent soil and ground-water investigations.

Excavations will be backfilled with the acceptable materials to surface grade. These materials will be placed and compacted as specified by the geotechnical engineer.

5.3 Vapor Mitigation System

5.3.1 Conceptual Design and Installation

A passive sub-slab depressurization and vapor barrier system will be installed beneath the northeastern portion of the proposed building in the area of the elevators, stairwells, and adjacent lobby and conference room as shown on Plate 8. This system, which will be installed during construction of the building foundation and installation of the elevator shafts, is intended to mitigate potential intrusion of residual contaminant vapors remaining in the area of the former USTs.

The passive sub-slab depressurization/venting system will be installed beneath the vapor barrier and may consist of pre-fabricated vent cores or a network of wrapped high-density polyethylene (HDPE) or polyvinyl chloride (PVC) perforated collection piping. The gathering system will be installed directly on the prepared subgrade or within a permeable backfill layer beneath the vapor barrier. This gathering network will be connected to one or more solid pipe vent risers that will be installed either through an interior wall or on the exterior of the building. The vent riser(s) will extend to the roof of the building at locations away from rooftop use areas, windows or other building openings, and air intake systems and will be equipped with a wind-driven turbine fan to create a negative pressure and convey soil vapors to the atmosphere. The vent riser(s) will be equipped with a sample port to allow sampling of extracted vapors and will be clearly marked to indicate that the riser may contain VOC vapors.

The vapor barrier system will consist of:

- A base layer of non-woven polypropylene or HDPE geotextile that is installed between the ground surface and the spray-applied membrane;
- A spray-applied, water-based asphaltic emulsion that is typically of 60 to 80 dry mil thickness; and
- A protection/bond layer of non-woven, needle-punched, polypropylene or HDPE geotextile, which is placed between the spray-applied membrane and the building slab.

The vapor barrier will be installed beneath the concrete building foundation and around the exteriors of the elevator shafts. Alternatively, an interior vapor barrier may be placed within the elevator shafts. Commercially available vapor barrier systems include those manufactured by CETCO® (Liquid Boot®), Land Science Technologies®. (Geo-Seal®), or EPRO Services, Inc. The vapor barrier will be installed and tested (i.e., smoke testing) for integrity following the selected manufacturer's recommended procedures.

Qualified personnel will monitor installation of the vapor barrier and sub-slab depressurization system under the direction of a California-registered Professional Engineer. To remain effective, the venting system and vapor barrier must be intact and operational. If the venting system is damaged or the vapor barrier is punctured or damaged, the damaged components will be repaired by a qualified contractor. Plate 8 shows the approximate location of the gathering system, which

will be placed around the subsurface locations of the elevators shafts. Plate 9 presents a conceptual diagram of the vapor barrier and sub-slab depressurization system. These figures are conceptual and may not represent final element designs.

5.3.2 Operation, Maintenance, and Performance Monitoring

No maintenance of a properly installed vapor barrier should be necessary unless disturbed during future subsurface excavation work. Maintenance of the passive vent system will include periodic inspection, lubrication, and cleaning of turbine fans and replacement of worn or damaged equipment. Periodic sampling of vapors will also be performed. Details of operation and maintenance procedures, equipment specifications, and manuals will be included in the operation and maintenance plan to be prepared before completion of construction.

Performance evaluation will include sampling and analyzing indoor and outdoor air and vent riser vapor and monitoring operational parameters.

Indoor and outdoor air will be sampled twice during the first year, with at least one pre-occupancy sampling event. One event will be performed during the late summer/early fall and the second sampling event will be performed during the late winter/early spring to assess seasonal variations. Two indoor air samples are proposed to be collected during each event, one on the ground floor lobby and one on the second floor in the day-care center at locations next to the elevators. Samples will be collected during a period of 8 hours using laboratory-provided SUMMA™ canisters equipped with integrated flow controllers. The canister intake will be placed within the breathing zone approximately 5 feet above the floor. Samples will be analyzed for total petroleum hydrocarbons-gasoline range using EPA Method TO-3 and VOCs and naphthalene using EPA Method TO-15.

Samples of vent-riser vapor will be collected from sample ports installed in the risers. Quarterly samples are proposed to be collected during the first year. The need for additional longer-term sampling can be evaluated using the results of the first year's sampling. Additional parameters, such as pressure, temperature, and flow rate may be collected to confirm performance of the system.

5.4 Completion Reports and Plans

The following reports and plans will be submitted to ACEH for review and approval.

- A vapor mitigation system report of construction will be submitted following installation of the system and before occupancy of the building. This report will include as-built drawings, copies of permits, construction monitoring and documentation, post-construction indoor air and vent riser sampling results, and other information relevant to the installation of the system.
- A completion report will also be prepared and submitted to document removal and disposal of excavated soil and will include descriptions of the work performed, appropriate maps; and pertinent bills of lading and receipts.
- An operation and maintenance plan will also be prepared for the vapor mitigation system before site construction is completed and will include applicable equipment and materials cut sheets, maintenance and repair manuals, monitoring and sampling protocols, and supplier information.

5.5 Institutional Controls

Land use covenants; activity and use limitations; and codes, covenants, and restrictions will be developed in consultation with ACEH. These documents, when recorded, will provide long-term legal and regulatory requirements for the site. To minimize contact with impacted media, the documents will prohibit alteration, disturbance, or removal or any component of the vapor mitigation system. Additional components of the documents may include but not be limited to the following.

- Notification to the OPBD that the vapor mitigation system has been installed at the site and that OPBD shall flag the site such that ACEH is notified when future building permits are to be issued (to avoid potential impact to the vapor mitigation system).

- Prohibition of new construction activities (including utility installation and repair) that could encounter or breach the vapor mitigation system without the express knowledge of ACEH and OPBD.

- Lease documents that include codes, covenants, and restrictions and fact sheets that will serve as the primary communication tool for the site's business occupants.

- The provision to maintain inspection and monitoring records associated with the vapor mitigation system.

- Prohibition of the use of site ground water for domestic, industrial, or irrigation purposes.

- Prohibition against any excavation at the site, unless performed under the provisions of an ACEH-approved site management plan, and any waste materials generated shall be properly characterized and disposed according to applicable laws and regulations.

6.0 SCHEDULE OF ACTIVITIES

A schedule of remedial activities will be dependant on the design/construction schedule developed by EBALDC and this schedule can be better estimated when EBALDC identifies a funding date for the project. Once the funding date is established, a design and construction schedule can be developed and will be submitted to ACEH for review.

7.0 CLOSURE

This remedial action plan has been prepared to provide a general plan to mitigate potential vapor intrusion health risks at the 760 22nd Street/2201 Brush Street property. The plan provides a step-wise approach to meet requirements to successfully implement the remedial action. The ACEH must provide the following documents for the project to proceed.

- Approval of the remedial action plan – On approval of this remedial action plan, ACEH will provide written approval to the OPBD for the planned change of use from commercial to residential land use.
- Approval of the remedial action – On approval of the successful completion of the vapor mitigation system, ACEH will grant "no further action" status for this cleanup program site.

8.0 REFERENCES CITED

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TABLE 1
Concentrations of Organic Compounds in Soil Samples
Properties at 760 22nd Street and 2201 Brush Street, Oakland, California

Location	Date Sampled	Sample Designation	Sample Depth (feet)	Total Petroleum Hydrocarbons			Volatile Organic Compounds											Polynuclear Aromatic Hydrocarbons							PCBs
				Gasoline	Diesel	Motor Oil	B	T	E	X	MTBE	Naphth	n-Butyl	s-Butyl	n-Propyl	1,2,4-TMB	1,3,5-TMB	Fluoran	Fluorene	1-Methyl	2-Methyl	Naphth	Phenan	Pyrene	Total
Underground Storage Tank Removal - 760 22nd Street and Adjacent Sidewalk																									
K Gasoline UST-north en	Oct-86	S-1	12	70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
K Gasoline UST-south en	Oct-86	S-3	12	1.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7K Diesel UST-north end	Oct-86	S-5	12	--	250	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7K Diesel UST-north end	Oct-86	S-8	13	--	220	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7K Diesel UST-south end	Oct-86	S-2	12	--	80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2005 Subsurface Investigation (PES Environmental, Inc.)																									
B-2	9/8/05	B-2-7.5	7½	<1.0	<1.0	<10	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/8/05	B-2-12	12	<1.0	1.5	<10	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B-3	9/8/05	B-3-5.0	5	<1.0	<1.0	<10	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/8/05	B-3-11.5	11½	1.6	23	<10	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B-4	9/8/05	B-4-8.0	8	190	230	<10	<0.025	<0.025	<0.025	<0.025	<0.025	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/8/05	B-4-12	12	6.6	23	<10	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B-5	9/8/05	B-5-5.0	5	<1.0	<1.0	<10	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/8/05	B-5-11.5	11½	<1.0	<1.0	<10	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2011 Subsurface Investigation (PES Environmental, Inc.)																									
SB1	10/20/11	SB1-4.0	4	<1.0	<1.0	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/20/11	SB1-10.0	10	<1.0	<1.0	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB2	10/20/11	SB2-2.0	2	<1.0	1.7	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/20/11	SB2-4.0	4	<1.0	4.3	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/20/11	SB2-8.0	8	<1.0	<1.0	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB3	10/20/11	SB3-2.0	2	<1.0	3.1	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/20/11	SB3-4.0	4	<1.0	<1.0	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/20/11	SB3-8.0	8	<1.0	<1.0	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB4	10/20/11	SB4-2.0	2	<1.0	2.1	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/20/11	SB4-4.0	4	<1.0	1.2	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/20/11	SB4-8.0	8	<1.0	5.0	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB5	10/20/11	SB5-2.0	2	<1.0	1.9	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/20/11	SB5-4.0	4	<1.0	<1.0	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/20/11	SB5-8.0	8	<1.0	<1.0	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB6	10/20/11	SB6-2.0	2	<1.0	12	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/20/11	SB6-4.0	4	<1.0	2.2	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/20/11	SB6-8.0	8	<1.0	9.3	--	<0.0050	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SFBRWQCB Environmental Screening Level (Residential)																									
Odor Nuisance Levels-Any Land Use: Deep Soil				**500**	**1,000**	**5,100**																			
Human Health (construction worker)				**2,800**	**880**	**32,000**	**24**	**4,100**	**480**	**2400**	**3700**	**350**	**NA**	**NA**	**NA**	**NA**	**NA**	**6,700**	**6,700**	**NA**	**670**	**350**	**NA**	**5,000**	**5.6**

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				Gasoline	Diesel	Motor Oil	B	T	E	X	MTBE	Naphth	n-Butyl	s-Butyl	n-Propyl	1,2,4-TMB	1,3,5-TMB	Fluoran	Fluorene	1-Methyl	2-Methyl	Naphth	Phenan	Pyrene	Total
2015 Subsurface Investigation (Essel Environmental Consulting, Inc.)																									
ECB-1	9/24/15	S-12½-ECB1	12½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	9/24/15	S-15-ECB1	15	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	9/24/15	S-19½-ECB1	19½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-2	9/24/15	S-4½-ECB2	4½	<1.0	<1.0	5.4	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--
	9/24/15	S-9-ECB2	9	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--
	9/24/15	S-17-ECB2	17	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	9/24/15	S-19½-ECB2	19½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-3	9/24/15	S-4½-ECB3	4½	<1.0	1.1	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--
	9/24/15	S-9½-ECB3	9½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--
	9/24/15	S-15½-ECB3	15½	200	930	310	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	--	--	--	--	--	--	--	--
	9/24/15	S-18½-ECB3	18½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-4	9/24/15	S-4½-ECB4	4½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	9/24/15	S-9-ECB4	9	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	9/24/15	S-13-ECB4	13	400	940	310	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	--	--	--	--	--	--
	9/24/15	S-17½-ECB4	17½	<1.0	1.3	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-5	9/24/15	S-4-ECB5	4	2.1	1.7	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--
	9/24/15	S-8-ECB5	8	130	12	<5.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--
	9/24/15	S-14½-ECB5	14½	95	3.9	<5.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--	--	--	--
	9/24/15	S-18-ECB5	18	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-6	9/24/15	S-13-ECB6	13	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-7	9/25/15	S-4½-ECB7	4½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--
	9/25/15	S-9½-ECB7	9½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--
ECB-8	9/25/15	S-13-ECB8	13	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-9	9/25/15	S-13-ECB9	13	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-10	9/25/15	S-13-ECB10	13	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	9/25/15	S-14½-ECB10	14½	360	210	1,600	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	--	--	--
ECB-11	9/24/15	S-13-ECB11	13	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-12	9/25/15	S-13-ECB12	13	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-13	9/24/15	S-13-ECB13	13	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-14	9/24/15	S-13-ECB14	13	<1.0	2.5	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	9/24/15	S-18½-ECB14	18½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
SFBRWQCB Environmental Screening Level (Residential)																									
Odor Nuisance Levels-Any Land Use: Deep Soil				**500**	**1,000**	**5,100**																			
Human Health (construction worker)				**2,800**	**880**	**32,000**	**24**	**4,100**	**480**	**2400**	**3700**	**350**	**NA**	**NA**	**NA**	**NA**	**NA**	**6,700**	**6,700**	**NA**	**670**	**350**	**NA**	**5,000**	**5.6**

TABLE 1
Concentrations of Organic Compounds in Soil Samples
Properties at 760 22nd Street and 2201 Brush Street, Oakland, California

Location	Date Sampled	Sample Designation	Sample Depth (feet)	Total Petroleum Hydrocarbons			Volatile Organic Compounds											Polynuclear Aromatic Hydrocarbons							PCBs
				Gasoline	Diesel	Motor Oil	B	T	E	X	MTBE	Naphth	n-Butyl	s-Butyl	n-Propyl	1,2,4-TMB	1,3,5-TMB	Fluoran	Fluorene	1-Methyl	2-Methyl	Naphth	Phenan	Pyrene	Total
2016 Subsurface Investigation (Essel Environmental Consulting, Inc.)																									
Borings at Geophysical Anomaly																									
ECB-15	2/16/16	S-4-ECB15	4	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050
	2/16/16	S-9½-ECB15	9½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050
	2/16/16	S-12½-ECB15	12½	790	2,300	16,000	<1.0	<1.0	<1.0	2.5	<1.0	15	1.9	<1.0	1.6	18	4.5	<0.50	<0.50	2.8	1.3	5.2	0.52	<0.50	--
	2/16/16	S-18-ECB15	18	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-16	2/16/16	S-13-ECB16	13	700	730	5,200	<1.0	<1.0	<1.0	2.6	<1.0	7.6	<1.0	<1.0	<1.0	7.4	1.9	<0.20	<0.20	1.7	3.1	2.7	0.33	0.22	--
	2/16/16	S-16½-ECB16	16½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-17	2/16/16	S-13½-ECB17	13½	1,100	1,200	8,800	<1.0	<1.0	<1.0	1.5	<1.0	4.9	1.6	<0.0050	1.3	13	2.6	--	--	--	--	--	--	--	--
	2/16/16	S-15-ECB17	15	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-18	2/16/16	S-3-ECB18	3	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	2/16/16	S-9½-ECB18	9½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	2/16/16	S-13-ECB18	13	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-19	2/16/16	S-14½-ECB19	14½	44	56	430	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.026	0.067	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--
	2/16/16	S-17-ECB19	17	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-20	2/16/16	S-13-ECB20	13	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
Soil Vapor Well Borings																									
B-SV1	2/15/16	S-4-BSV1	4	42	7.1	<5.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.22	<0.10	0.15	<0.10	<0.10	--	--	--	--	--	--	--	--
	2/15/16	S-13-BSV1	13	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
B-SV2	2/15/16	S-12-BSV2	12	9.5	1.7	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
B-SV3	2/15/16	S-13-BSV3	13	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	2/15/16	S-16-BSV3	16	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
B-SV4	2/15/16	S-13-BSV4	13	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	2/15/16	S-16-BSV4	16	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
B-SV5	2/15/16	S-12-BSV5	12	21	73	31	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.011	0.013	0.0076	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	2/15/16	S-15-BSV5	15	150	190	48	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.059	<0.050	0.079	<0.050	<0.050	0.058	0.068	<0.050	<0.050	<0.050	0.23	0.079	--
B-SV6	2/15/16	S-8½-BSV6	8½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	2/15/16	S-11½-BSV6	11½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
B-SV7	2/15/16	S-5½-BSV7	5½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
		S-10½-BSV7	10½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
Oil Changing Pit - Hand Auger Borings																									
HA-1	2/23/16	S-1-HA1	1 (6)#	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050
	2/23/16	S-3-HA1	3 (8#)	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
HA-2	2/23/16	S-1-HA2	1 (6)#	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050
	2/23/16	S-3½-HA2	3½ (8½)#	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
HA-3	2/23/16	S-1-HA3	1 (6)#	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050
	2/23/16	S-3-HA3	3 (8)#	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
Off-Site Borings																									
ECB-21	6/16/16	S-11½-ECB21	11½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	6/16/16	S-13½-ECB21	13½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--
	6/16/16	S-16½-ECB21	16½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
ECB-22	6/16/16	S-10½-ECB22	10½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--
	6/16/16	S-12½-ECB22	12½	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.060	<0.010	<0.010	<0.010	<0.010	0.052	0.061	--
																		Anthracene	**Benzo(a)A**	**Benzo(a)P**	**Benzo(b)F**	**Benzo(g,h,i)P**	**Benzo(k)F**	**Chrysene**	**Indeno(cd)P**
																		0.014	0.028	0.039	0.060	0.040	0.024	0.044	0.027
																	Human Health (construction worker)	**50,000**	**16**	**1.6**	**16**	**NA**	**150**	**1,500**	**16**
	6/16/16	S-15-ECB22	15	<1.0	<1.0	<5.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--
SFBRWQCB Environmental Screening Level																									
Odor Nuisance Levels-Any Land Use: Deep Soil				**500**	**1,000**	**5,100**																			
Human Health (construction worker)				**2,800**	**880**	**32,000**	**24**	**4,100**	**480**	**2400**	**3700**	**350**	**NA**	**NA**	**NA**	**NA**	**NA**	**6,700**	**6,700**	**NA**	**670**	**350**	**NA**	**5,000**	**5.6**

Analytical results and screening levels are in milligrams per kilogram = parts per million.

Detectable concentrations of TPH that are greater than the applicable odor nuisance-any land use: deep soil exposure screening levels are shaded yellow.

BTEX = benzene, toluene, ethylbenzene, total xylenes; MTBE = methyl tertiary butyl ether; Naphth = naphthalene; n-Butyl = n-Butyl benzene; s-Butyl = sec-Butyl benzene; n-Propyl = n-Propyl benzene; 1,2,4-TMB = 1,2,4-Trimethylbenzene

1,3,5-TMB = 1,3,5-Trimethylbenzene; Fluoran = Fluoranthene; 1-Methyl = 1-Methylnaphthalene; 2-Methyl = 2-Methylnaphthalene; Phenan = Phenanthrene; Cd = Cadmium; Cr = Chromium

Benzo(a)A = Benzo (a) anthracene; Benzo(a)P = Benzo (a) pyrene; Benzo(b)F = Benzo (b) fluoranthene; Benzo(g,h,i)P = Benzo (g,h,i) perylene; Benzo(k)F = Benzo (k) fluoranthene; Indeno(cd)P = Indeno (1,2,3-cd) pyrene

< = less than

-- = not analyzed

NA = screening level not available.

= first number is depth below the bottom of the concrete; the number in parentheses is the depth below the ground surface

SFBRWQCB = San Francisco Bay Regional Water Quality Control Board

Environmental screening levels taken from SFBRWQCB Environmental Screening Levels, February 2016, Revision 3, Tables S-1 (Direct Exposure-construction workers) and S-4 (Odor Nuisance Levels-Any Land Use: Deep Soil).

TABLE 2
Concentrations of Organic Compounds in Ground-Water Samples
Properties at 760 22nd Street and 2201 Brush Street, Oakland, California

	PES Environmental, Inc.				Essel Environmental Consulting									Odor Nuisance ESL Non-Drinking Water	Tier 1 ESL VI
Boring	B-1	B-2	B-5	B-6	ECB-1	ECB-2	ECB-3	ECB-4	ECB-5	ECB-6	ECB-7	ECB-8	ECB-9		
Sample Number	B-1	B-2	B-5	B-6	W-ECB1	W-ECB2	W-ECB3	W-ECB4	W-ECB5	W-ECB6	W-ECB7	W-ECB8	W-ECB9		
Date Sampled	9/8/05	9/8/05	9/8/05	9/8/05	9/25/15	9/25/15	9/24/15	9/24/15	9/25/15	9/25/15	9/25/15	9/25/15	9/25/15		
Analyte															
Petroleum Hydrocarbons															
TPH-gas	<50	<50	<50	<50	<50	330	710	1,200	430	<50	<50	<50	<50	**5,000**	**No Value**
TPH-diesel	360	3,200	530	170	<50	4,900	24,000	3,100	100	<50	<50	<50	<50	**5,000**	**No Value**
TPH-motor oil	190	<100	490	230	<250	1,700	7,300	780	<250	<250	<250	<250	<250	**5,000**	**No Value**
VOCs															
Benzene	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**20,000**	**30**
Toluene	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**400**	**10,000**
Ethylbenzene	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**300**	**370**
Xylenes	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.56	<0.50	<0.50	<0.50	<0.50	**5,300**	**38,000**
Methyl tertiary butyl ether	0.61	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**180**	**15,000**
tert-Butyl alcohol	--	--	--	--	3.9	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**NA**	**No Value**
Naphthalene	--	--	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**210**	**180**
Acetone	--	--	--	--	92	42	18	<10	12	<10	14	25	27	**200,000**	**140,000,000**
Bromomethane	--	--	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.59	<0.50	<0.50	**NA**	**NA**
2-Butanone (MEK)	--	--	--	--	11	6.6	<2.0	<2.0	3.6	<2.0	3.8	4.7	4.9	**84,000**	**22,000,000**
n-Butyl benzene	--	--	--	--	<0.50	<0.50	0.91	1.4	0.92	<0.50	<0.50	<0.50	<0.50	**NA**	**NA**
sec-Butyl benzene	--	--	--	--	<0.50	<0.50	1.4	2.0	1.4	<0.50	<0.50	<0.50	<0.50	**NA**	**NA**
tert-Butyl benzene	--	--	--	--	<0.50	<0.50	<0.50	0.71	<0.50	<0.50	<0.50	<0.50	<0.50	**NA**	**NA**
2-Hexanone	--	--	--	--	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**NA**	**NA**
Isopropylbenzene	--	--	--	--	<0.50	<0.50	<0.50	2.0	1.1	<0.50	<0.50	<0.50	<0.50	**NA**	**NA**
4-Isopropyl toluene	--	--	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**NA**	**NA**
4-Methyl-2-pentanone (MIBK)	--	--	--	--	<0.50	0.78	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**13,000**	**11,000,000**
n-Propyl benzene	--	--	--	--	<0.50	<0.50	0.67	1.8	1.3	<0.50	<0.50	<0.50	<0.50	**NA**	**NA**
1,2,4-Trimethylbenzene	--	--	--	--	<0.50	<0.50	<0.50	<0.50	0.62	<0.50	<0.50	<0.50	<0.50	**NA**	**NA**
1,3,5-Trimethylbenzene	--	--	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**NA**	**NA**
cis -1,2-Dichloroethene	--	--	--	--	<0.50	<0.50	<0.50	1.0	<0.50	<0.50	<0.50	<0.50	<0.50	**NA**	**15,000**
Vinyl chloride	--	--	--	--	<0.50	<0.50	<0.50	0.67	<0.50	<0.50	<0.50	<0.50	<0.50	**34,000**	**2.0**
PAHs															
Acenaphthene	--	--	--	--	--	<0.50	1.9	--	<0.50	--	<0.50	<0.50	--	**200**	**No Value**
1-Methylnaphthalene	--	--	--	--	--	<0.50	<0.50	--	<0.50	--	<0.50	<0.50	--	**NA**	**NA**
2-Methylnaphthalene	--	--	--	--	--	<0.50	<0.50	--	<0.50	--	<0.50	<0.50	--	**100**	**NA**
Naphthalene	--	--	--	--	--	<0.50	<0.50	--	<0.50	--	<0.50	<0.50	--	**210**	**180**
Phenanthrene	--	--	--	--	--	<0.50	3.3	--	<0.50	--	<0.50	<0.50	--	**10,000**	**No Value**
Polychlorinated Biphenyls															
Aroclors (individual)	--	--	--	--	--	--	--	--	--	--	--	--	--	**NA**	**NA**
Total PCBs	--	--	--	--	--	--	--	--	--	--	--	--	--	**NA**	**No Value**

See Notes on Page 2 of 2.

TABLE 2
Concentrations of Organic Compounds in Ground-Water Samples
Properties at 760 22nd Street and 2201 Brush Street, Oakland, California

	Essel Environmental Consulting													Odor Nuisance ESL Non-Drinking Water	Tier 1 ESL VI
Boring	ECB-10	ECB-11	ECB-12	ECB-13	ECB-14	ECB-15	ECB-16	ECB-17	ECB-18	ECB-19	ECB-20	ECB-21	ECB-22		
Sample Number	W-ECB10	W-ECB11	W-ECB12	W-ECB13	W-ECB14	W-ECB15	W-ECB16	W-ECB17	W-ECB18	W-ECB19	W-ECB20	W-ECB21	W-ECB22		
Date Sampled	9/25/15	9/25/15	9/25/15	9/24/15	9/24/15	2/16/16	2/16/16	2/16/16	2/16/16	2/16/16	2/16/16	6/16/16	6/16/16		
Analyte															
Petroleum Hydrocarbons															
TPH-gas	98	<50	<50	<50	<50	120	850	550	<50	140	<50	<50	--	**5,000**	**No Value**
TPH-diesel	3,100	<50	<50	<50	56	3,400	870	780	<50	310	<100	44	--	**5,000**	**No Value**
TPH-motor oil	17,000	<250	<250	<250	<250	24,000	6,300	4,800	<250	2,000	<500	<75	--	**5,000**	**No Value**
VOCs															
Benzene	<0.50	<0.50	<0.50	<0.50	<0.50	0.54	7.2	<1.2	<0.50	<0.50	<0.50	<0.50	<0.50	**20,000**	**30**
Toluene	<0.50	<0.50	<0.50	<0.50	<0.50	1.3	<5.0	2.4	<0.50	0.58	<0.50	<0.50	<0.50	**400**	**10,000**
Ethylbenzene	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	2.1	<0.50	<0.50	<0.50	<0.50	<0.50	**300**	**370**
Xylenes	<0.50	<0.50	<0.50	<0.50	<0.50	4.6	28	24	<0.50	<0.50	<0.50	<0.50	<0.50	**5,300**	**38,000**
Methyl tertiary butyl ether	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<1.2	<0.50	<0.50	<0.50	<0.50	<0.50	**180**	**15,000**
tert-Butyl alcohol	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<20	<5.0	<2.0	<2.0	3.0	<2.0	<2.0	**NA**	**No Value**
Naphthalene	<0.50	<0.50	<0.50	<0.50	<0.50	6.1	25	31	<0.50	<0.50	<0.50	<0.50	<0.50	**210**	**180**
Acetone	19	<10	<10	11	<10	<10	<100	<25	<10	<10	<10	<10	<10	**200,000**	**140,000,000**
Bromomethane	<0.50	0.67	<0.50	<0.50	<0.50	<0.50	<5.0	<1.2	<0.50	<0.50	<0.50	<0.50	<0.50	**NA**	**NA**
2-Butanone (MEK)	4.8	2.6	2.2	2.8	<2.0	<2.0	<20	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	**84,000**	**22,000,000**
n-Butyl benzene	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	<5.0	6.0	<0.50	0.67	<0.50	<0.50	<0.50	**NA**	**NA**
sec-Butyl benzene	0.67	<0.50	<0.50	<0.50	<0.50	0.63	<5.0	3.1	<0.50	1.3	<0.50	<0.50	<0.50	**NA**	**NA**
tert-Butyl benzene	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<1.2	<0.50	<0.50	<0.50	<0.50	<0.50	**NA**	**NA**
2-Hexanone	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<1.2	<0.50	<0.50	<0.50	<0.50	<0.50	**NA**	**NA**
Isopropylbenzene	<0.50	<0.50	<0.50	<0.50	<0.50	0.95	<5.0	4.4	<0.50	0.83	<0.50	<0.50	<0.50	**NA**	**NA**
4-Isopropyl toluene	<0.50	<0.50	0.99	<0.50	<0.50	1.9	7.1	9.2	<0.50	<0.50	<0.50	<0.50	<0.50	**NA**	**NA**
4-Methyl-2-pentanone (MIBK)	0.99	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<1.2	<0.50	<0.50	<0.50	<0.50	<0.50	**13,000**	**11,000,000**
n-Propyl benzene	<0.50	<0.50	<0.50	<0.50	<0.50	1.3	6.0	7.3	<0.50	0.56	<0.50	<0.50	<0.50	**NA**	**NA**
1,2,4-Trimethylbenzene	<0.50	<0.50	<0.50	<0.50	<0.50	19	78	96	<0.50	0.69	<0.50	<0.50	<0.50	**NA**	**NA**
1,3,5-Trimethylbenzene	<0.50	<0.50	<0.50	<0.50	<0.50	2.2	9.9	16	<0.50	<0.50	<0.50	<0.50	<0.50	**NA**	**NA**
cis -1,2-Dichloroethene	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<1.2	<0.50	<0.50	<0.50	<0.50	<0.50	**NA**	**15,000**
Vinyl chloride	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<1.2	<0.50	<0.50	<0.50	<0.50	<0.50	**34,000**	**2.0**
PAHs															
Acenaphthene	<0.50	--	<0.50	--	--	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<0.50	<0.50	**200**	**No Value**
1-Methylnaphthalene	0.57	--	<0.50	--	--	15	52	15	<5.0	<5.0	<5.0	<0.50	<0.50	**NA**	**NA**
2-Methylnaphthalene	<0.50	--	<0.50	--	--	19	60	<5.0	<5.0	<5.0	<5.0	<0.50	<0.50	**100**	**NA**
Naphthalene	<0.50	--	<0.50	--	--	36	89	38	<5.0	<5.0	<5.0	<0.50	<0.50	**210**	**180**
Phenanthrene	<0.50	--	<0.50	--	--	<5.0	6.1	<5.0	<5.0	<5.0	<5.0	<0.50	<0.50	**10,000**	**No Value**
Polychlorinated Biphenyls															
Aroclors (individual)	--	--	--	--	--	<25	<25	--	--	<25	--	--	--	**NA**	**NA**
Total PCBs	--	--	--	--	--	<25	<25	--	--	<25	--	--	--	**NA**	**No Value**

Results and screening levels are in micrograms per liter = parts per billion.
Detectable concentrations that are greater than an applicable odor nuisance non-drinking water screening levels are shaded yellow.
TPH = total petroleum hydrocarbons
VOCs = volatile organic compounds
PAHs - polynuclear aromatic hydrocarbons
ESL = Environmental Screening Level
ESL VI = Environmental Screening Level for evaluation of the potential for vapor intrusion at residential properties underlain by mixed fine- and coarse-grained sediment.
< = less than
-- = not analyzed
NA = not available
Environmental screening levels for drinking water and vapor intrusion risk are taken from San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels, February 2016, Revision 3, Table GW-5 (Odor Nuisance Non-Drinking Water).

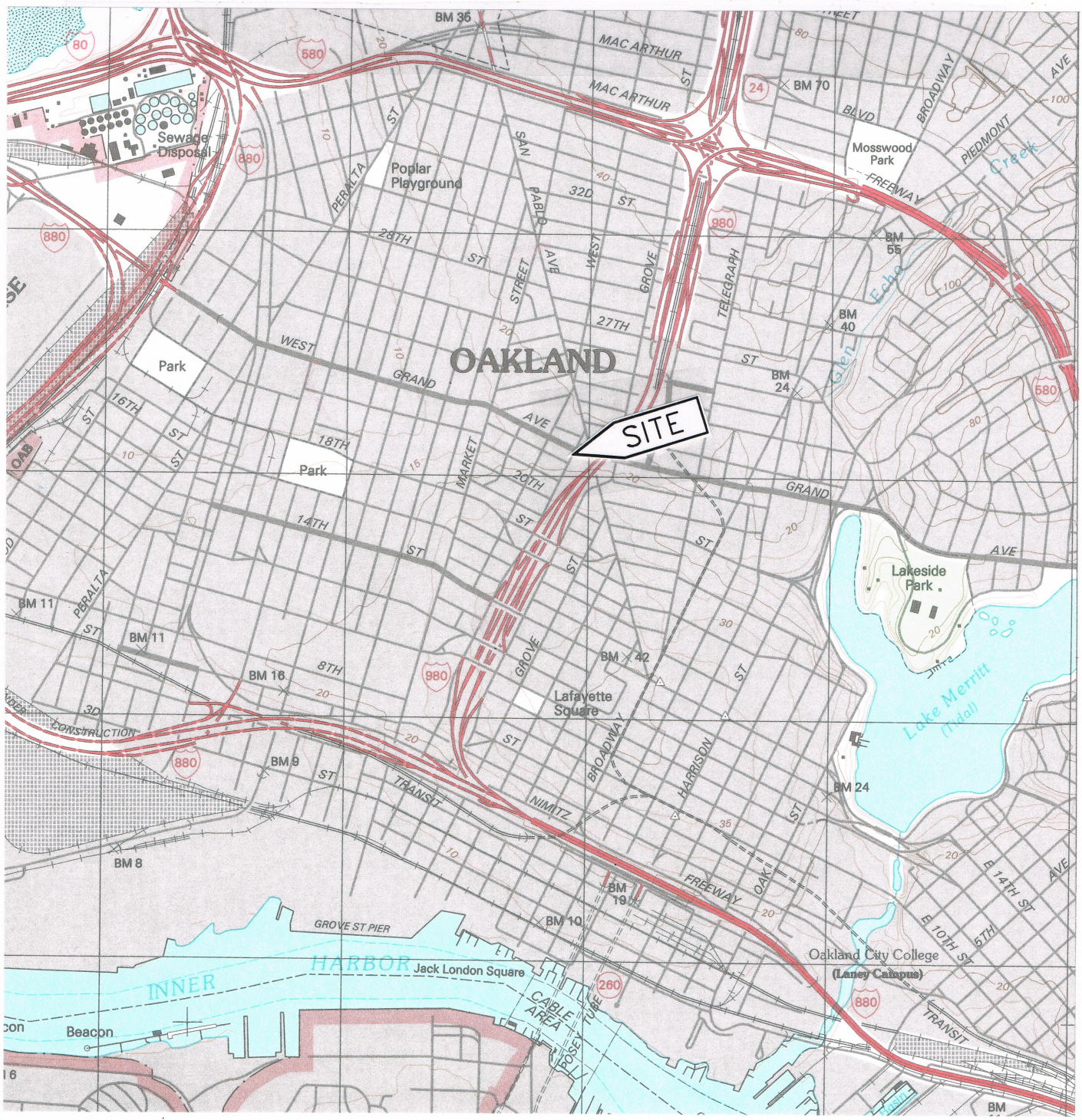
TABLE 3
Concentrations of Volatile Organic Compounds in Soil-Vapor Samples
Properties at 760 22nd Street and 2201 Brush Street, Oakland, California

Soil Probe	SV-1		SV-2		SV-3	SV-4D	SV-5	SV-6	SV-7	SFBRWQCB Screening Levels
Date	10/08/15	02/23/16	10/08/15	03/01/16	02/23/16	03/24/16	02/23/16	03/24/16	02/23/16	
Sample Number	SV-1	SV-1	SV-2	SV-2	SV-3	SV-4D	SV-5	SV-6	SV-7	
Depth of Sample (feet)	9.50	9.50	9.25	9.25	10.75	11.75	9.75	11.75	10.75	Residential
Analyte										
Benzene	28	<27	<3.7	<23	<26	66	<22	43	<8.2	48
Ethylbenzene	39	<36	<5.0	<31	<35	<12	<30	<9.6	<11	560
Toluene	<8.7	<31	<4.3	<27	<30	<11	<26	47	<9.7	160,000
m,p-xylene	130	<36	<5.0	<31	<35	15	<31	23	<11	52,000
o-xylene	68	<36	<5.0	<31	<35	<12	<31	26	<11	52,000
Methyl tertiary butyl ether	110	<30	<4.1	<26	<29	86	<25	<8.0	<9.3	5,400
Naphthalene	<24	<330	<12	<290	<320	<30	<270	<23	<27	41
Heptane	260	<34	<4.7	<29	<33	37	<28	26	<10	--
Hexane	460	<59	<4.0	<50	<57	530	<48	85	<9.1	--
Cumene (isopropylbenzene)	22	NA	<5.6	NA	NA	<14	NA	<11	<13	--
Cyclohexane	240	<29	<4.0	<25	<28	800	<23	28	<8.9	--
4-ethyltoluene	240	<41	<5.6	<35	<40	<14	<33	<11	<13	--
Propylbenzene	83	NA	<5.6	NA	NA	<14	NA	<11	<13	--
1,3-dichlorobenzene		<50		<43	<48	<17	<41	13	<15	--
1,2,4-trimethylbenzene	280	<41	<5.6	<35	<40	<14	<33	15	<13	--
1,3,5-trimethylbenzene	79	<41	<5.6	<35	<40	<14	<33	<11	<13	--
2,2,4-trimethylpentane	1,400	NA	<5.4	NA	NA	5,400	NA	14	<12	--
cis -1,2-dichloroethene	110	<33	<4.6	<28	<32	560	<27	<8.8	<10	4,200
Tetrachloroethene	<16	<56	150	110	<55	<20	<46	<15	<17	240
Trichloroethene	<12	<45	<6.2	<38	<43	<16	<37	<12	<14	340
Vinyl chloride	31	<21	<2.9	<18	<21	46	<17	<5.7	<6.6	4.7
2-propanol (isopropyl alcohol)	<23	<20	<11	<18	<20	<28	<17	840	5,800	--
Carbon disulfide	<29	<26	15	<22	<25	<36	<21	370	56	--
Chloroform	<11	<41	34	130	<39	<14	<33	<11	420	61
Dichlorodifluoromethane (Freon-12)	<11	27J	<5.7	<35	<40	<14	<34	<11	<13	--
Methyl ethyl ketone (2-butanone)		<24		<21	<24	<34	<20	530	<30	2,600,000
TPH as gasoline	64,000	20,000	450	<4,100	<4,100	100,000	400,000	11,000	770	300,000
Oxygen (percent)	1.6	1.3	14	18	1.4	1.9	11	NA	NA	--
Nitrogen (percent)	92	93	81	79	94	93	87	NA	NA	--
Methane (percent)	0.013	0.016	<0.00023	<0.00020	0.019	0.068	0.019	NA	NA	--
Carbon Dioxide (percent)	6.1	5.8	5.2	3.1	4.7	4.7	2.4	NA	NA	--

Results for volatile organic compounds and screening levels are in micrograms per cubic meter.
Results for TPH as gasoline are in micrograms per cubic meter.
Concentrations greater than applicable vapor intrusion human health risk screening levels for residential properties are shaded yellow.
< = less than the laboratory reporting limit shown.
-- = no value available.
NA = not analyzed.
J = estimated concentration that is less than the practical quantitation limit and equal to or greater than the method detection limit.
TPH = total petroleum hydrocarbons
SFBRWQCB = San Francisco Bay Regional Water Quality Control Board
Environmental screening levels for soil gas vapor intrusion risk are taken from San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels, February 2016, Revision 3, Table SG-1 (Human Health Risk Levels - Residential).

TABLE 4
Ground-Water Data
Properties at 760 22nd Street and 2201 Brush Street, Oakland, California

Boring	Date	Depth of Boring (feet below ground surface)	Depth to Water (feet below ground surface)	Free Phase Product (feet)
ECB-1	9/25/15	20	16.2	0.0
ECB-2	9/25/15	20	14.24	0.0
ECB-3	9/24/15	20	14.34	0.0
ECB-4	9/24/15	20	14.3	0.0
ECB-5	9/25/15	20	14.61	0.0
ECB-6	9/25/15	20	14.1	0.0
ECB-7	9/25/15	20.8	20.19	0.0
ECB-8	9/25/15	20	17.26	0.0
ECB-9	9/25/15	20	17.95	0.0
ECB-10	9/25/15	20	14.4	0.0
ECB-11	9/25/15	17	14.29	0.0
ECB-12	9/25/15	20	13.69	0.0
ECB-13	9/24/15	20	19.85	0.0
ECB-14	9/24/15	20	12.41	0.0
ECB-15	2/16/16	20	12.97	0.0
ECB-16	2/16/16	20	12.95	0.0
ECB-17	2/16/16	20	12.96	0.0
ECB-18	2/16/16	20	12.99	0.0
ECB-19	2/16/16	20	13.25	0.0
ECB-20	2/16/16	20	12.8	0.0
ECB-21	6/16/16	20	13.05	0.0
ECB-22	6/16/16	16	12.8	0.0



Scale: 0 2000 feet 4000 feet

Source: USGS 7 1/2–Minute Quadrangle, Oakland West, California 1993

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Site Vicinity Map

760 22nd Street and
2201 Brush Street
Oakland, California

PLATE 1

EXPLANATION

- APPROXIMATE PROPERTY BOUNDARY
- SOIL BORING LOCATION (PES ENVIRONNMENTAL, INC., 2005)
- SOIL BORING LOCATION (PES ENVIRONNMENTAL, INC., 2011)
- SOIL BORING LOCATION (ESSEL, 2015)
- SOIL BORING LOCATION (ESSEL, 2016)
- SOIL VAPOR WELL LOCATION (ESSEL, 2015, 2016)
- HAND AUGER LOCATION (ESSEL, 2016)
- FORMER UNDERGROUND STORAGE TANK
- D DIESEL
- G GASOLINE
- FUTURE BUILDING FOOTPRINT
- LANDSCAPING

NOTES: UNDERGROUND STORAGE TANK LOCATIONS FROM HAGEMAN–SCHANK, INC. (1987)

ECB–7 ADVANCED 30 DEGREES FROM VERTICAL. DASHED LINE SHOWS TRACE OF BORING.

N

Approximate Scale

0 30 60

feet

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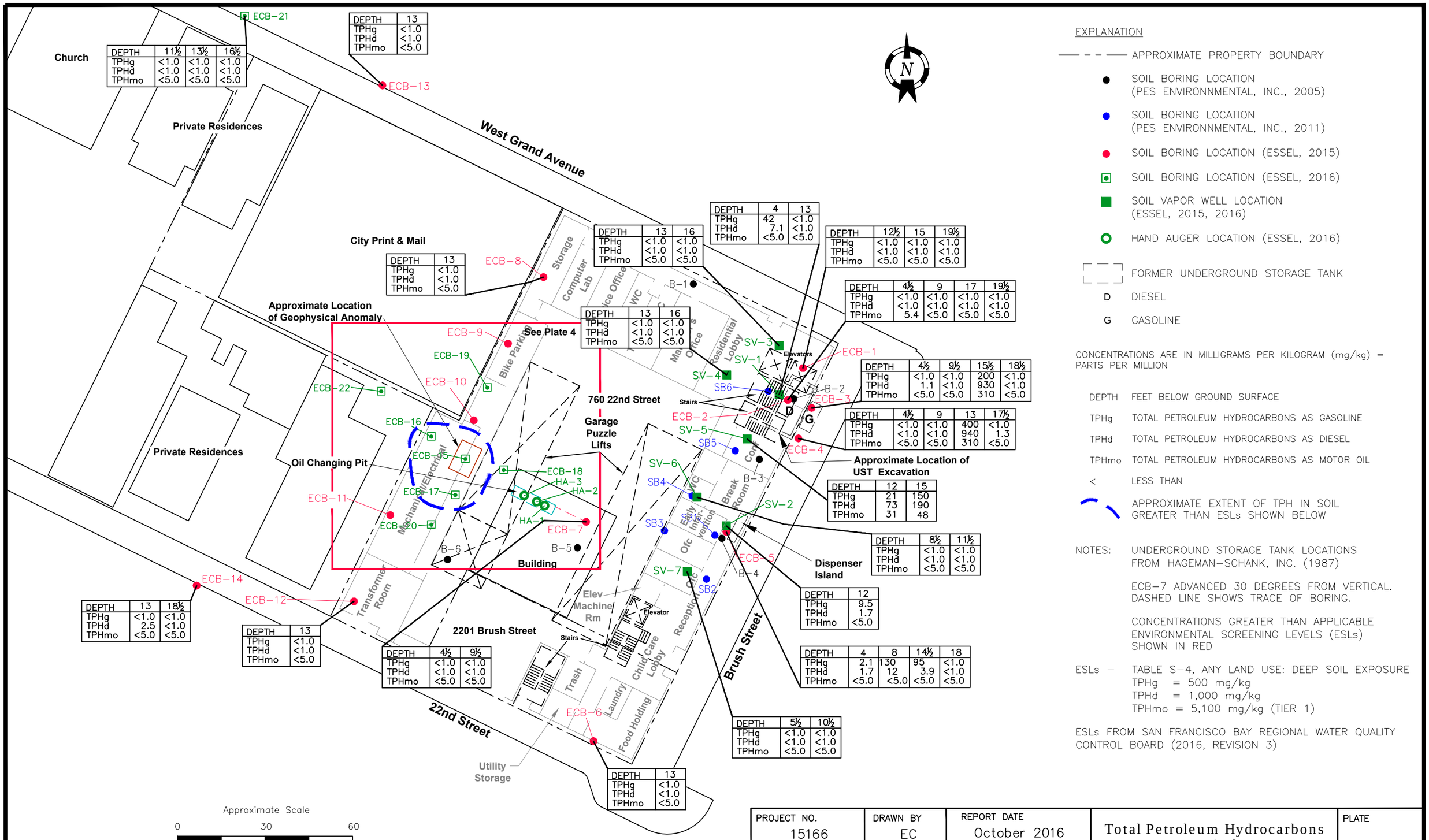
Site Plan and Future Ground Floor

760 22nd Street and
2201 Brush Street
Oakland, California

PLATE 2



DEPTH	11½	13½	16½
TPHg	<1.0	<1.0	<1.0
TPHd	<1.0	<1.0	<1.0
TPHmo	<5.0	<5.0	<5.0

DEPTH	13
TPHg	<1.0
TPHd	<1.0
TPHmo	<5.0

DEPTH	13	16
TPHg	<1.0	<1.0
TPHd	<1.0	<1.0
TPHmo	<5.0	<5.0

DEPTH	4	13
TPHg	42	<1.0
TPHd	7.1	<1.0
TPHmo	<5.0	<5.0

DEPTH	12½	15	19½
TPHg	<1.0	<1.0	<1.0
TPHd	<1.0	<1.0	<1.0
TPHmo	<5.0	<5.0	<5.0

DEPTH	4½	9	17	19½
TPHg	<1.0	<1.0	<1.0	<1.0
TPHd	<1.0	<1.0	<1.0	<1.0
TPHmo	5.4	<5.0	<5.0	<5.0

DEPTH	13	16
TPHg	<1.0	<1.0
TPHd	<1.0	<1.0
TPHmo	<5.0	<5.0

DEPTH	4½	9½	15½	18½
TPHg	<1.0	<1.0	200	<1.0
TPHd	1.1	<1.0	930	<1.0
TPHmo	<5.0	<5.0	310	<5.0

DEPTH	4½	9	13	17½
TPHg	<1.0	<1.0	400	<1.0
TPHd	<1.0	<1.0	940	1.3
TPHmo	<5.0	<5.0	310	<5.0

DEPTH	12	15
TPHg	21	150
TPHd	73	190
TPHmo	31	48

DEPTH	8½	11½
TPHg	<1.0	<1.0
TPHd	<1.0	<1.0
TPHmo	<5.0	<5.0

DEPTH	12
TPHg	9.5
TPHd	1.7
TPHmo	<5.0

DEPTH	4	8	14½	18
TPHg	2.1	130	95	<1.0
TPHd	1.7	12	3.9	<1.0
TPHmo	<5.0	<5.0	<5.0	<5.0

DEPTH	5½	10½
TPHg	<1.0	<1.0
TPHd	<1.0	<1.0
TPHmo	<5.0	<5.0

DEPTH	13	18½
TPHg	<1.0	<1.0
TPHd	2.5	<1.0
TPHmo	<5.0	<5.0

DEPTH	13
TPHg	<1.0
TPHd	<1.0
TPHmo	<5.0

DEPTH	4½	9½
TPHg	<1.0	<1.0
TPHd	<1.0	<1.0
TPHmo	<5.0	<5.0

DEPTH	13
TPHg	<1.0
TPHd	<1.0
TPHmo	<5.0

EXPLANATION

- APPROXIMATE PROPERTY BOUNDARY
- SOIL BORING LOCATION (PES ENVIRONNMENTAL, INC., 2005)
- SOIL BORING LOCATION (PES ENVIRONNMENTAL, INC., 2011)
- SOIL BORING LOCATION (ESSEL, 2015)
- SOIL BORING LOCATION (ESSEL, 2016)
- SOIL VAPOR WELL LOCATION (ESSEL, 2015, 2016)
- HAND AUGER LOCATION (ESSEL, 2016)
- FORMER UNDERGROUND STORAGE TANK
- D DIESEL
- G GASOLINE

CONCENTRATIONS ARE IN MILLIGRAMS PER KILOGRAM (mg/kg) = PARTS PER MILLION

DEPTH	FEET BELOW GROUND SURFACE
TPHg	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
TPHd	TOTAL PETROLEUM HYDROCARBONS AS DIESEL
TPHmo	TOTAL PETROLEUM HYDROCARBONS AS MOTOR OIL
<	LESS THAN

APPROXIMATE EXTENT OF TPH IN SOIL GREATER THAN ESLs SHOWN BELOW

NOTES: UNDERGROUND STORAGE TANK LOCATIONS FROM HAGEMAN-SCHANK, INC. (1987)

ECB-7 ADVANCED 30 DEGREES FROM VERTICAL. DASHED LINE SHOWS TRACE OF BORING.

CONCENTRATIONS GREATER THAN APPLICABLE ENVIRONMENTAL SCREENING LEVELS (ESLs) SHOWN IN RED

ESLs – TABLE S-4, ANY LAND USE: DEEP SOIL EXPOSURE
TPHg = 500 mg/kg
TPHd = 1,000 mg/kg
TPHmo = 5,100 mg/kg (TIER 1)

ESLs FROM SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD (2016, REVISION 3)

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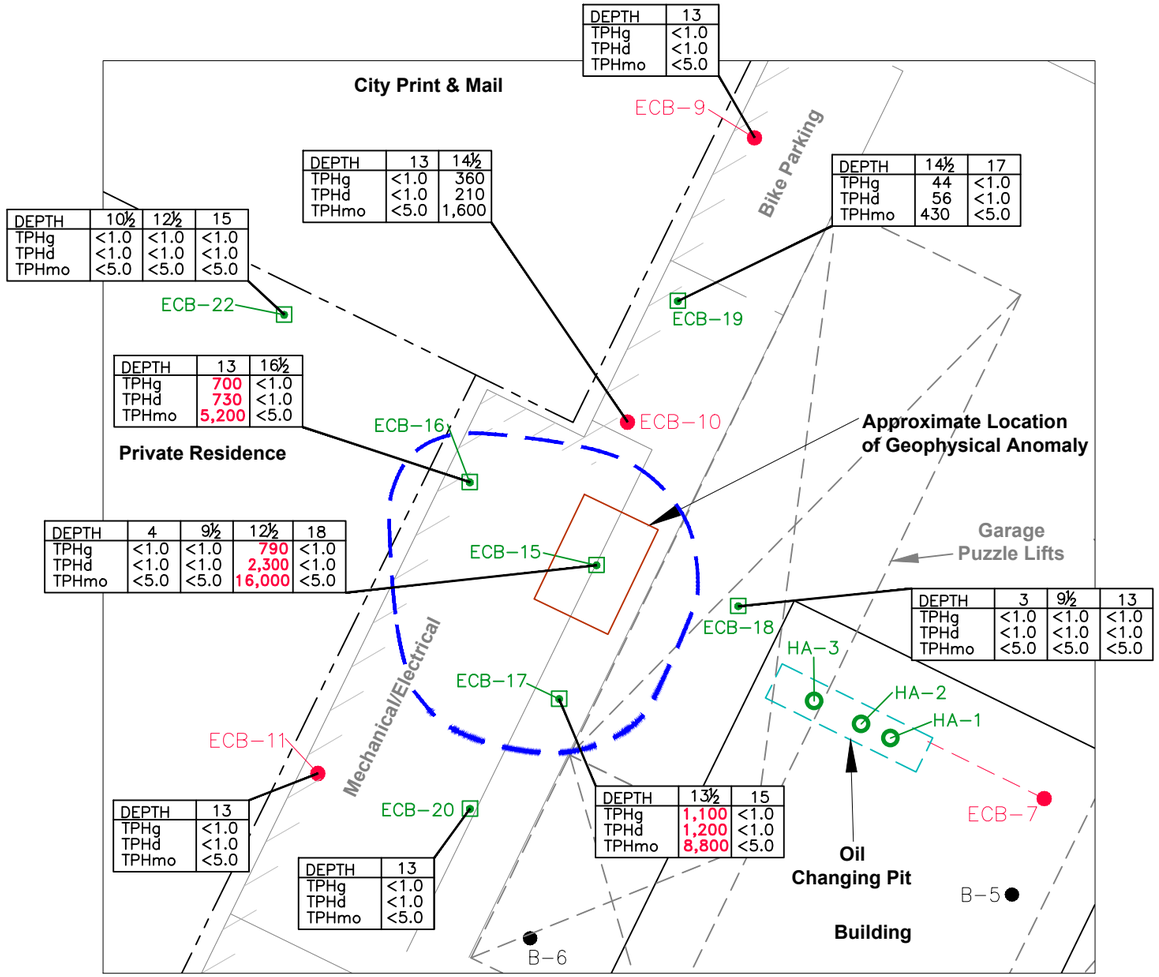
Total Petroleum Hydrocarbons in Soil
760 22nd Street and
2201 Brush Street
Oakland, California

PLATE 3



EXPLANATION

- APPROXIMATE PROPERTY BOUNDARY
- SOIL BORING LOCATION (PES ENVIRONNMENTAL, INC., 2005)
- SOIL BORING LOCATION (ESSEL, 2015)
- SOIL BORING LOCATION (ESSEL, 2016)
- HAND AUGER LOCATION (ESSEL, 2016)

CONCENTRATIONS ARE IN MILLIGRAMS PER KILOGRAM (mg/kg) = PARTS PER MILLION

DEPTH	FEET BELOW GROUND SURFACE
TPHg	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
TPHd	TOTAL PETROLEUM HYDROCARBONS AS DIESEL
TPHmo	TOTAL PETROLEUM HYDROCARBONS AS MOTOR OIL
<	LESS THAN

APPROXIMATE EXTENT OF TPH IN SOIL GREATER THAN ESLs SHOWN BELOW

NOTE: ECB-7 ADVANCED 30 DEGREES FROM VERTICAL. DASHED LINE SHOWS TRACE OF BORING.

CONCENTRATIONS GREATER THAN APPLICABLE ENVIRONMENTAL SCREENING LEVELS (ESLs) SHOWN IN RED

ESLs – TABLE S-4, ANY LAND USE: DEEP SOIL EXPOSURE
TPHg = 500 mg/kg
TPHd = 1,000 mg/kg
TPHmo = 5,100 mg/kg (TIER 1)

ESLs FROM SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD (2016, REVISION 3)

N

Approximate Scale
0 14 28
feet

PROJECT NO.	DRAWN BY	REPORT DATE		PLATE
15166	EC	October 2016	Total Petroleum Hydrocarbons in Soil Geophysical Anomaly Area	4

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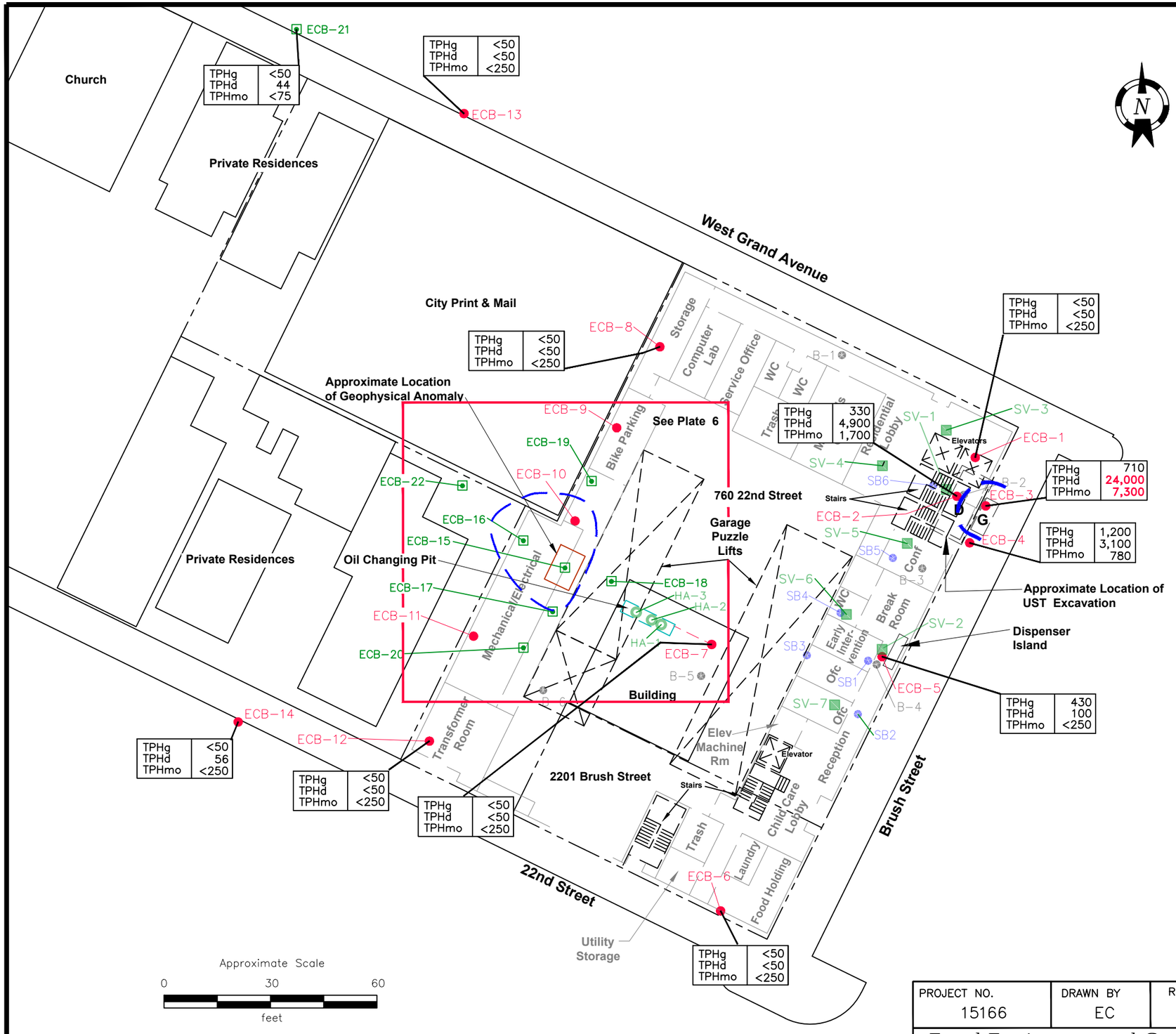
760 22nd Street and
2201 Brush Street
Oakland, California



EXPLANATION

- APPROXIMATE PROPERTY BOUNDARY
- SOIL BORING LOCATION (PES ENVIRONNMENTAL, INC., 2005)
- SOIL BORING LOCATION (PES ENVIRONNMENTAL, INC., 2011)
- SOIL BORING LOCATION (ESSEL, 2015)
- SOIL BORING LOCATION (ESSEL, 2016)
- SOIL VAPOR WELL LOCATION (ESSEL, 2015, 2016)
- HAND AugER LOCATION (ESSEL, 2016)
- FORMER UNDERGROUND STORAGE TANK
- D DIESEL
- G GASOLINE

CONCENTRATIONS ARE IN MICROGRAMS PER LITER (ug/L) = PARTS PER BILLION

- TPHg TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- TPHd TOTAL PETROLEUM HYDROCARBONS AS DIESEL
- TPHmo TOTAL PETROLEUM HYDROCARBONS AS MOTOR OIL
- < LESS THAN
- APPROXIMATE EXTENT OF TPH IN GROUND WATER GREATER THAN ESLs SHOWN BELOW

NOTES: UNDERGROUND STORAGE TANK LOCATIONS FROM HAGEMAN-SCHANK, INC. (1987)

ECB-7 ADVANCED 30 DEGREES FROM VERTICAL. DASHED LINE SHOWS TRACE OF BORING.

CONCENTRATIONS GREATER THAN APPLICABLE ENVIRONMENTAL SCREENING LEVELS (ESLs) SHOWN IN RED

ESLs – TABLE GW-5, ODOR NUISANCE LEVELS – NON DRINKING WATER
TPHg = 5,000 ug/L
TPHd = 5,000 ug/L
TPHmo = 5,000 ug/L

ESLs FROM SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD (2016, REVISION 3)

PROJECT NO.	DRAWN BY	REPORT DATE
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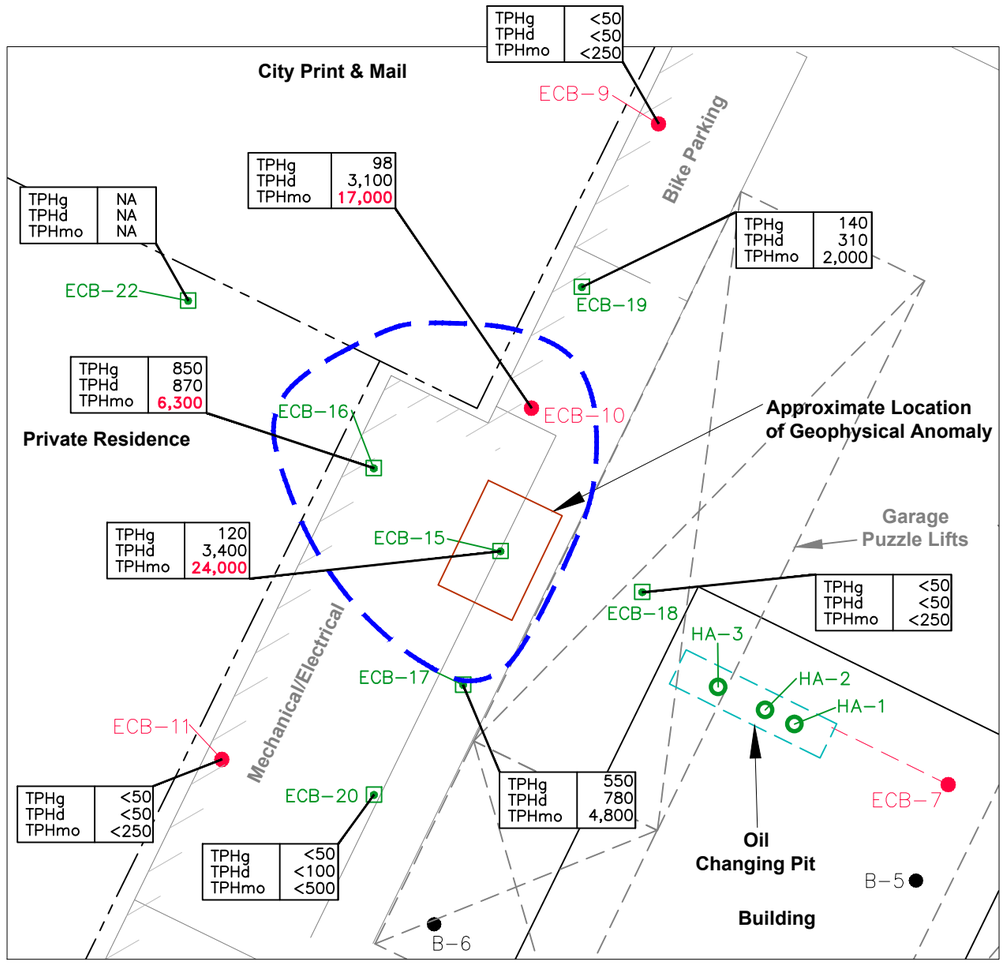
Total Petroleum Hydrocarbons in Ground Water

760 22nd Street and
2201 Brush Street
Oakland, California

PLATE 5



EXPLANATION

APPROXIMATE PROPERTY BOUNDARY

SOIL BORING LOCATION (PES ENVIRONNMENTAL, INC., 2005)

SOIL BORING LOCATION (ESSEL, 2015)

SOIL BORING LOCATION (ESSEL, 2016)

HAND AugER LOCATION (ESSEL, 2016)

CONCENTRATIONS ARE IN MICROGRAMS PER LITER (ug/L) = PARTS PER BILLION

TPHg	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
TPHd	TOTAL PETROLEUM HYDROCARBONS AS DIESEL
TPHmo	TOTAL PETROLEUM HYDROCARBONS AS MOTOR OIL
<	LESS THAN
NA	APPROXIMATE EXTENT OF TPH IN GROUND WATER GREATER THAN ESLs SHOWN BELOW

NOTE: ECB–7 ADVANCED 30 DEGREES FROM VERTICAL. DASHED LINE SHOWS TRACE OF BORING.

CONCENTRATIONS GREATER THAN APPLICABLE ENVIRONMENTAL SCREENING LEVELS (ESLs) SHOWN IN RED

ESLs – TABLE GW–5, ODOR NUISANCE LEVELS – NON DRINKING WATER
TPHg = 5,000 ug/L
TPHd = 5,000 ug/L
TPHmo = 5,000 ug/L

ESLs FROM SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD (2016, REVISION 3)

N

Approximate Scale
0 14 28
feet

PROJECT NO.	DRAWN BY	REPORT DATE
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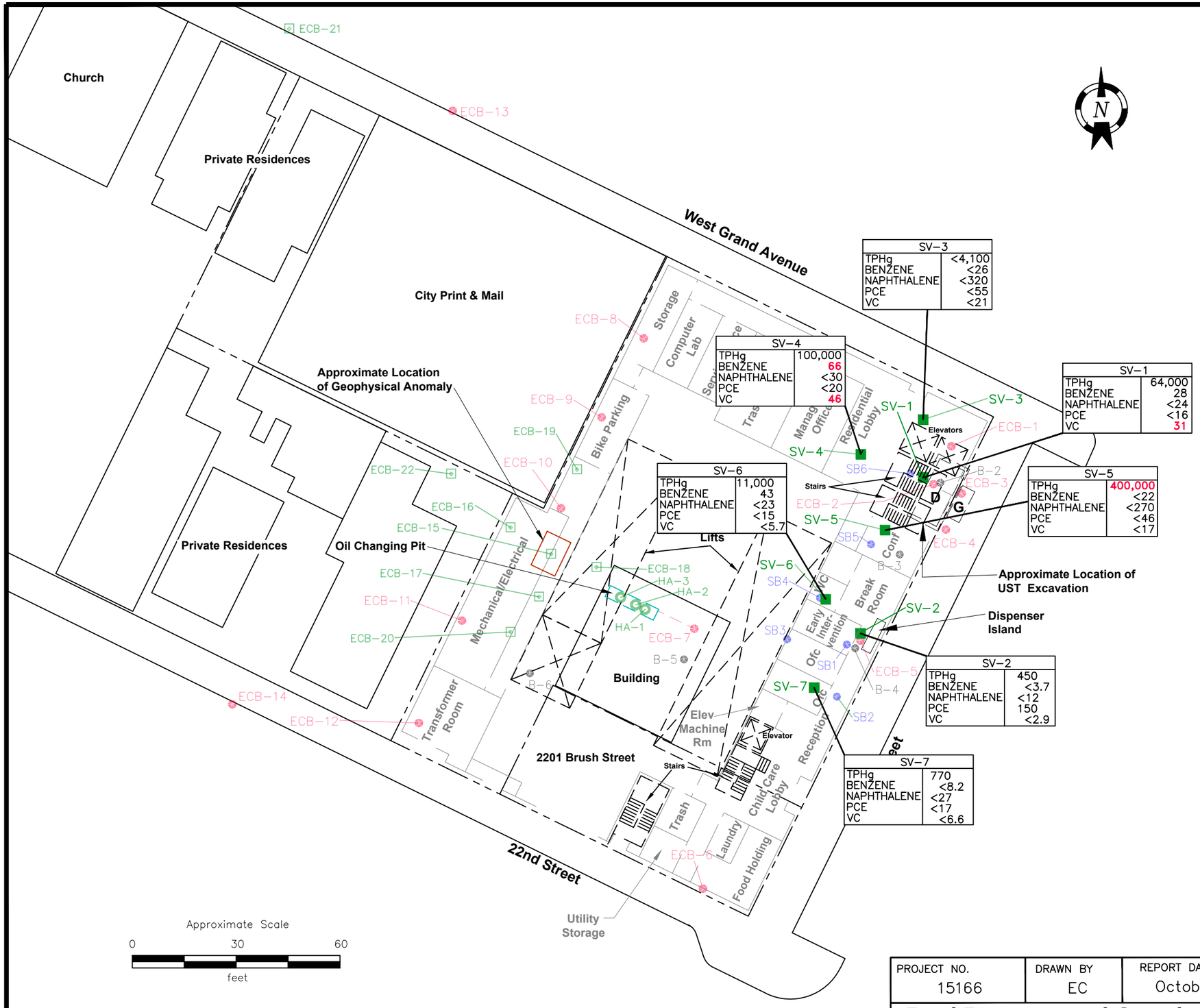
Total Petroleum Hydrocarbons in Ground Water Geophysical Anomaly Area

760 22nd Street and
2201 Brush Street
Oakland, California

PLATE 6



EXPLANATION

- APPROXIMATE PROPERTY BOUNDARY
- SOIL BORING LOCATION (PES ENVIRONNMENTAL, INC., 2005)
- SOIL BORING LOCATION (PES ENVIRONNMENTAL, INC., 2011)
- SOIL BORING LOCATION (ESSEL, 2015)
- SOIL BORING LOCATION (ESSEL, 2016)
- SOIL VAPOR WELL LOCATION (ESSEL, 2015, 2016)
- HAND AugER LOCATION (ESSEL, 2016)
- FORMER UNDERGROUND STORAGE TANK
- D DIESEL
- G GASOLINE

CONCENTRATIONS ARE IN MICROGRAMS PER CUBIC METER (ug/m^3)

- TPHg TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- VOCs VOLATILE ORGANIC COMPOUNDS
- PCE TETRACHLOROETHENE
- VC VINYL CHLORIDE
- < LESS THAN

NOTES: UNDERGROUND STORAGE TANK LOCATIONS FROM HAGEMAN-SCHANK, INC. (1987)

ECB-7 ADVANCED 30 DEGREES FROM VERTICAL. DASHED LINE SHOWS TRACE OF BORING.

CONCENTRATIONS GREATER THAN APPLICABLE ENVIRONMENTAL SCREENING LEVELS (ESLs) SHOWN IN RED

ESLs – TABLE SG-1, SOIL VAPOR INTRUSION: HUMAN HEALTH RISK LEVELS, RESIDENTIAL

- TPHg = 300,000 ug/m^3
- BENZENE = 48 ug/m^3
- NAPHTHALENE = 41 ug/m^3
- PCE = 240 ug/m^3
- VC = 4.7 ug/m^3

ESLs FROM SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD (2016, REVISION 3)

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TPHg and Select VOCs in Soil Vapor

760 22nd Street and
2201 Brush Street
Oakland, California

PLATE 7

EXPLANATION

- APPROXIMATE PROPERTY BOUNDARY
- SOIL BORING LOCATION (PES ENVIRONNMENTAL, INC., 2005)
- SOIL BORING LOCATION (PES ENVIRONNMENTAL, INC., 2011)
- SOIL BORING LOCATION (ESSEL, 2015)
- SOIL BORING LOCATION (ESSEL, 2016)
- SOIL VAPOR WELL LOCATION (ESSEL, 2015, 2016)
- HAND AUGER LOCATION (ESSEL, 2016)
- FORMER UNDERGROUND STORAGE TANK
- D DIESEL
- G GASOLINE
- FUTURE BUILDING FOOTPRINT
- LANDSCAPING
- AREA OF PROPOSED VAPOR BARRIER
- PROPOSED SUB–SLAB DEPRESSURIZATION SYSTEM
- PROPOSED RISER LOCATION

NOTES: UNDERGROUND STORAGE TANK LOCATIONS FROM HAGEMAN–SCHANK, INC. (1987)

ECB–7 ADVANCED 30 DEGREES FROM VERTICAL. DASHED LINE SHOWS TRACE OF BORING.

N

Approximate Scale

0 30 60

feet

PROJECT NO.	DRAWN BY	REPORT DATE
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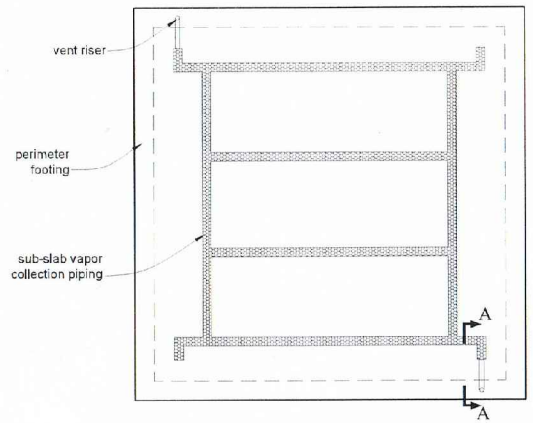
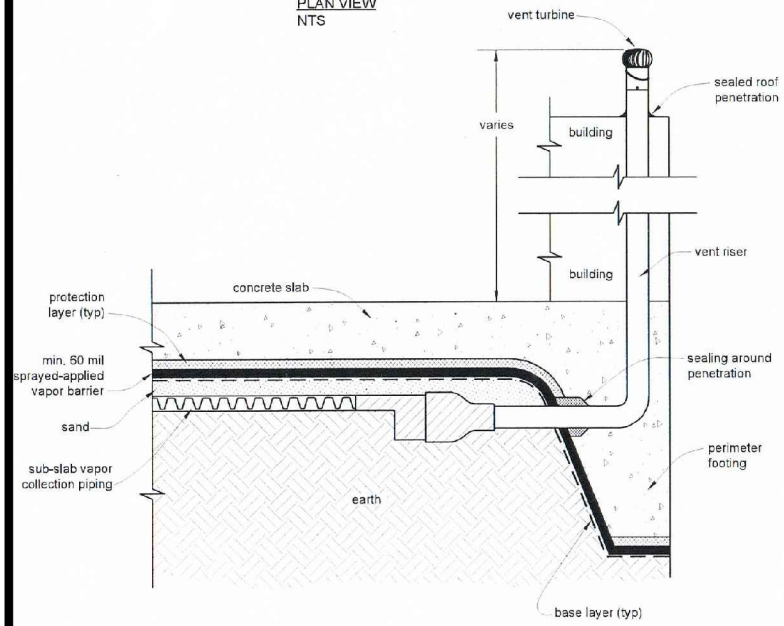
Proposed Barrier and Sub-Slab Depressurization System
760 22nd Street and
2201 Brush Street
Oakland, California

PLATE 8

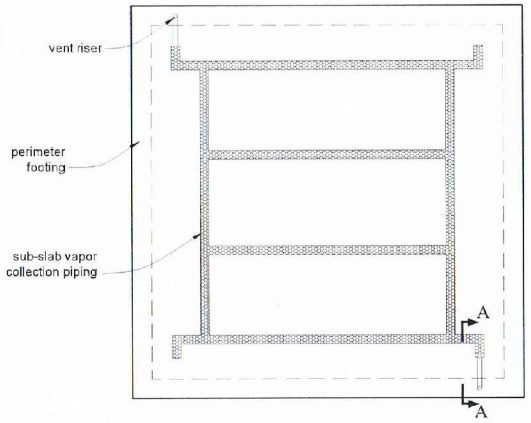


PLAN VIEW
NTS

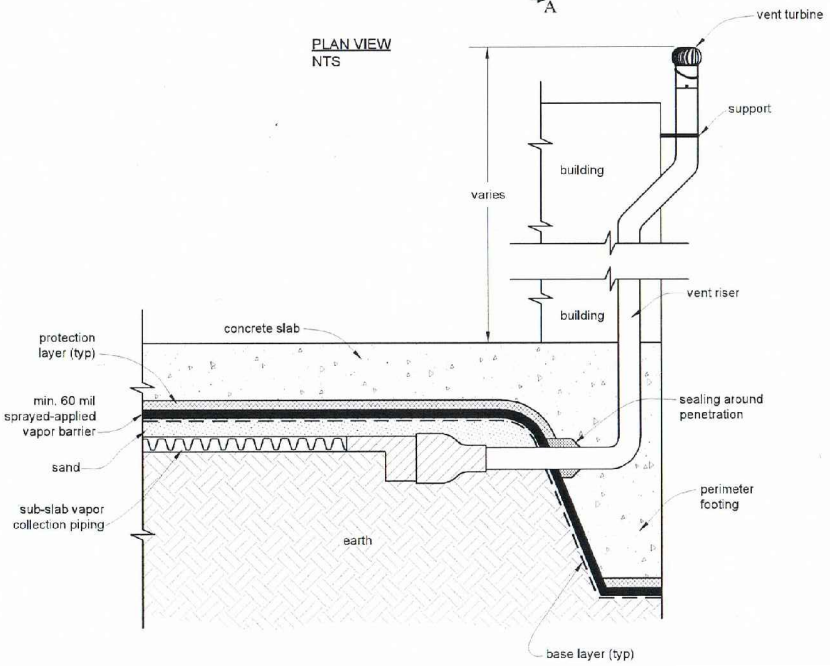


SECTION A-A'
NTS

VERTICAL VENT OPTION



PLAN VIEW
NTS



SECTION A-A'
NTS

ANGLED VENT OPTION

Abbreviations:
NTS = not to scale
SSD = sub-slab depressurization system

NOT TO SCALE

PROJECT NO.	DRAWN BY	REPORT DATE		PLATE
15166	EC	October 2016	Conceptual Vapor Barrier and SSD Components 760 22nd Street and 2201 Brush Street Oakland, California	9

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APPENDIX A

CONCEPTUAL SITE MODEL

Table 5

Conceptual Site Model

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
Geology and Hydrogeology	Regional	The site is located near the center of a topographic feature known as the East Bay Plain, an elongate northwest to southeast trending alluvial plain that bounds the eastern side of San Francisco Bay. The East Bay Plain consists of a series of alluvial fans and dune sands that were deposited on a westward sloping bedrock surface. This bedrock is presumed to consist of rocks of the Jurassic- to Cretaceous-age Franciscan complex. The alluvial fan and dune sand deposits that overlie the Franciscan complex rocks are Pleistocene to Holocene in age and, from oldest to youngest, include the Santa Clara, Alameda, and Temescal Formations. The early Pleistocene-age Santa Clara Formation contains semi-consolidated units of conglomerate, sandstone, siltstone, and claystone. The Alameda Formation, of Pleistocene to Holocene age, comprises lower unnamed units and several upper members that include the Yerba Buena mud (black, organic-rich clay); a sequence of alluvial fan and eolian deposits (sand, gravel, silt) referred to as the San Antonio/Merritt/Posey member, and the Young Bay mud (black, organic-rich clay). The Temescal Formation is late Pleistocene to early Holocene in age and is an alluvial fan deposit consisting of silt and clay. The total thickness of these Pleistocene to Holocene sediments in the general area is reported to range from 450 to 500 feet (see Radbruch, 1957; California Regional Water Quality Control Board, San Francisco Bay Region [RWQCB], 1999; Graymer, 2000). The RWQCB considers regional shallow ground-water-bearing units to be those that are above the Yerba Buena mud (i.e., San Antonio, Merritt, and Posey members of the Alameda Formation; Temescal Formation) and deeper regional ground water to be below the Yerba Buena mud (i.e., lower unnamed units of the Alameda Formation; Santa Clara Formation). The direction of ground-water flow in the area of the Site varies, but is generally westward to northwestward, consistent with the surface topographic slope.	None.	NA

Table 5

Conceptual Site Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
Geology and Hydrogeology	Site	The site is at an approximate elevation of 16 feet above mean sea level and surface topography in the local area slopes gently downward toward the northwest. Graymer (2000) and Radbruch (1957), respectively, show the site is located at or near the surface contact between the Merritt sand member of the Alameda Formation and the Temescal Formation. The Merritt sand is a fine-grained, very well sorted, Aeolian sand that is silty and clayey in areas and contains lenses of sandy clay and clay. The Temescal Formation is an alluvial fan deposit and consists of interfingering lenses of sandy gravel, clayey gravel, gravelly sand, and clayey sand that grade upward at shallower depths to sandy clay and silty clay. The Merritt sand and Temescal Formation are late Pleistocene to Holocene in age. Unconsolidated sediments encountered during Essel's three subsurface investigations (2015; 2016a; 2016b) include near-surface silt or fill underlain by alternating and interbedded units of clay, silt, sand, and occasionally gravel to the maximum depth explored of 20.8 feet below the ground surface. Coarse-grained sand and gravel clasts contained within the silty clay are consistent with the Temescal Formation as described by Radbruch (1957) and the very fine- to fine-grained sand (well sorted, poorly graded), silty sand, and clayey sand appears consistent with Radbruch's description of the Merritt sand. Units encountered in borings at the site are described as follows: • Fill - brownish-black to dusky yellowish-brown clay, silt, silty fine-grained sand, and fine- to coarse-grained sand observed in some borings from the base of the concrete to depths ranging from a few inches to approximately 4 feet below the ground surface. • Fill - at the locations of the former underground storage tanks (USTs), bluish-gray-discolored silty clay and silt underlain by layers of fine-grained sand and fine- to coarse-grained sand	None.	NA

Table 5

Conceptual Site Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		with gravel that showed no discoloration, were encountered to 13 feet below the ground surface in borings ECB-2 and B-SV1 (diesel UST location), and 10½ feet below the ground surface in boring ECB-3 (gasoline UST location). Bluish-gray-discolored silty clay directly underlies the sand backfill in the three borings indicating the bottoms of the former diesel and gasoline USTs were at approximate depths of 12 and 10½ feet below grade, respectively. • Silt and silty clay - outside the former UST excavation, a near-surface silt unit, up to 4 feet thick, and underlying relatively thick silty clay were encountered in borings to depths generally of 8 to 10 feet below grade. This silt/clay unit appears to be laterally extensive beneath much of the site in the 1- to 10-foot-depth interval; however, was observed to extend as deep as 17 feet below grade in east-central boring ECB-5, advanced next to the former fuel dispenser. The silt/clay unit is inferred to be of similar thickness to the south of the fuel dispenser area (southeastern portion of the site); however, interbeds of silt and sand are present between 10 and 17 feet below grade at the southeastern corner of the property in boring ECB-6. • Silt/sand/gravel - units of silt, more predominant units of clayey sand, silty sand, sand (some units containing gravel), and occasional units of clayey gravel, with subordinate interbeds of clay, are present beneath the silty clay (base at 8 to 10 feet below grade) to depths ranging from 17½ to at least 20 feet below the ground surface. The silt/sand/gravel zone also appears to be laterally continuous beneath the site, but is thinner (2 to 3 feet thick) beneath the eastern portion of the property and becomes notably thicker (more than 10 feet) along the western side of the site and off-site beneath the adjacent residential property (boring ECB-22).		

Table 5

Conceptual Site Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		• Silty clay - encountered beneath the silt/sand/gravel zone in many but not all borings advanced to 20 feet below the ground surface. This unit appears to be laterally continuous beneath much of the site, except along the western edge. The sediments were observed to be various shades of yellowish-brown (pale to dark) with varying degrees of reddish-brown and yellowish-orange oxidation staining. A zone of medium bluish-gray discolored sediments (with associated petroleum odor) was observed between 5 and 17 feet below grade in borings (ECB-1 through ECB-5) advanced near the former USTs and fuel dispenser. Bluish-gray discolored soil was observed in borings ECB-9, ECB-10, and ECB-15 through ECB-19 in the west-central geophysical anomaly area from as shallow as 3 feet to as deep as 17 feet below the ground surface. At both these locations, the discoloration occurs above and below the ground-water surface. Gray, discolored appearing soil was observed in off-site western boring ECB-14 (22nd Street) at depths of 17½ to 18½ feet below grade (below the ground-water surface). PES (2005) reported depth to first ground water in borings drilled at the site in 2005 to be 12 to 13 feet below the ground surface. Depth to ground water was measured in the temporary wells installed in borings ECB-1 through ECB-22 during Essel's 2015 and 2016 subsurface investigations. In September 2015, the ground-water surface ranged from 12.41 feet below grade in off-site western boring ECB-14 to 20.19 feet below the ground surface in slant boring ECB-7, located in the central portion of the site. Depth to water in most temporary wells averaged approximately 14¼ feet below grade in September 2015. The greater depths to first ground water measured in some borings likely do not represent static water levels. In February 2016, depth to ground water varied from 12.8 to 13.25 feet below the ground surface in temporary wells placed in borings ECB-15 through ECB-20 (west-central portion of the site). In June 2016, ground water was measured at approximately 13 feet below grade in off-site borings ECB-21 and ECB-22, located along		

Table 5

Conceptual Site Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		West Grand Avenue and on the west-adjacent residential property, respectively. Based on the orientation of TPHg, TPHd, TPHmo, and naphthalene plumes in the geophysical anomaly area, the direction of ground-water flow beneath the site is inferred to be between north-northwest and northwest.		
Surface Water Bodies		Lake Merritt is located approximately 3,900 feet east-southeast and Oakland Inner Harbor is located approximately 6,700 feet south of the site.	None.	NA
Nearby Wells		The State Water Resources Control Board's GeoTracker GAMA website provides the locations of ground-water-monitoring and ground-water-supply wells. The GAMA website shows that no ground-water-supply wells are located within ¼-mile (1,320 feet) of the site. Three groups of environmental monitoring wells, related to leaking underground storage tank properties, are located at distances of 600 feet south-southwest, 900 feet west-northwest, and 1,350 feet south of the site. Well records provided by the Alameda County Public Works Agency show the nearest water-supply wells are more than 2,000 feet north of the site. Records provided by the California Department of Water Resources do not indicate any water-supply wells are located within 2,000 feet of the Site.	None.	NA
Release Sources		The release sources include: • One 7,000-gallon diesel underground storage tank (UST) formerly located in the northeastern corner of the site; • One 2,000-gallon gasoline UST formerly located off-site beneath the sidewalk adjacent to the diesel UST; • A fuel dispenser island located in the east-central portion of the site; and	None.	NA

Table 5

Conceptual Site Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		• A presumed UST, possibly used for waste oil, formerly located near the west-central edge of the site. The gasoline and diesel USTs were removed in October 1986. No description of the conditions of the tanks or observations of the tank excavation is available. The volume of the release is not known. No record exists with regard to the possible UST at the west-central edge of the site, but borings advanced in the area did not encounter a UST.		
Light Non-aqueous Phase Liquid (LNAPL)		An electronic oil-water interface probe was used to check the presence of LNAPL in on-site and off-site borings ECB-1 through ECB-22. No LNAPL was detected in any boring using the interface probe and no LNAPL was observed during grab ground-water sampling (through temporary wells) of the 22 borings.	None.	NA
Source Removal Activities		Primary sources: The two USTs were removed in October 1986. Secondary sources: No free-phase petroleum product was found on the ground water in borings ECB-1 through ECB-22. Secondary source soil with elevated concentrations of TPHg, TPHd, and TPHmo is present in the 12- to 16-foot-depth interval (at and below the ground-water surface) in the areas of the former USTs and the geophysical anomaly. The vertical and lateral extent of this impacted soil has been delineated and is restricted to the vicinity of the former UST excavation and within an approximately 35 by 55 foot area around boring ECB-15 at the geophysical anomaly. Moderate concentrations of petroleum hydrocarbons are present in the depth interval of 8 to 15 feet below the ground surface in an estimated 15- by 15-foot square area near the former fuel dispenser. Based on depth to this impacted soil (greater than 10 feet below grade), the local impact to ground water, and the lack of health-risk indicator constituents (benzene, naphthalene, polynuclear aromatic hydrocarbons [PAHs]), secondary source soil at the former USTs, fuel dispenser, and geophysical anomaly areas is not considered to be of risk to human health or the environment.	None	NA

Table 5

Conceptual Site Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
Contaminants of Potential Concern		Historical records indicate diesel and gasoline USTs were present at and adjacent to the site and that the present-day shop building was used for vehicle oil changes. Previous analyses (PES, 2005, 2011) of soil and ground-water samples were restricted to total petroleum hydrocarbons (TPH); benzene, toluene, ethylbenzene, total xylenes (BTEX); and methyl tertiary butyl ether (MTBE). Soil and ground-water samples from borings ECB-1 through ECB-22, soil samples from borings advanced for soil vapor wells SV-1 through SV-7, and soil samples from hand auger borings HA-1 through HA-3 were analyzed for the full range of petroleum hydrocarbons and VOCs. Selected soil and ground-water samples were also analyzed for PAHs (see Essel, 2015, 2016a, 2016b). In soil, relatively elevated concentrations of TPHg, TPHd, and TPHmo were found in nine of 95 soil samples. Laboratory chromatograms show that the TPH is diesel and motor oil and not gasoline. Trace to low concentrations of xylenes, naphthalene, five other petroleum-related volatile organic compounds (VOCs), and five PAHs were sporadically detected in soil samples from borings in the geophysical anomaly. Low concentrations of the carcinogenic PAHs were detected in one soil sample from off-site boring B-22. Of the compounds detected, concentrations of TPHg, TPHd, TPHmo, xylenes, naphthalene, 2-methylnaphthalene, and benzo (a) pyrene are greater than Tier 1 environmental screening levels (ESLs) of the San Francisco Bay Regional Water Quality Control Board. However, no concentration of the indicator petroleum constituents (benzene, ethylbenzene, naphthalene, carcinogenic PAHs) is greater than the direct contact or outdoor air criteria of the State Water Resources Control Board's Low-Threat UST Closure Policy. In ground water, concentrations of TPHg, TPHd, and TPHmo greater than current applicable Tier 1 ESLs were found in 13 of 26 ground-water samples collected from borings advanced in 2005, 2015, and 2016. The higher concentrations were detected primarily in borings where elevated levels of TPH were found in soil. The	None.	NA

Table 5

Conceptual Site Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		aromatic hydrocarbons BTEX were detected in five ground-water samples, the fuel oxygenate MTBE was detected in one sample, naphthalene was detected in three samples, the chlorinated hydrocarbons *cis*-1,2-dichloroethene and vinyl chloride were found in one sample; and the butyl benzenes, isopropylbenzene, n-propyl benzene, and the trimethylbenzenes were variously detected in seven water samples. Non-chlorinated hydrocarbon solvents acetone, methyl ethyl ketone (MEK), 2-hexanone, methyl isobutyl ketone (MIBK), and 4-isopropyl toluene; and the insecticide bromomethane were also detected in several ground-water samples. In addition to the total petroleum hydrocarbons, benzene, xylenes, naphthalene, 2-methylnaphthalene, phenanthrene, and vinyl chloride, were at a concentration greater than applicable screening levels or maximum contaminant levels for drinking water; however, these exceedances were in only four water samples that were associated with elevated TPH levels. In soil vapor, TPH-gasoline range, BTEX, MTBE, other fuel constituents and vinyl chloride were detected in soil-vapor samples from wells SV-1 and SV-4, located within and to the west of the former UST excavation. Benzene and vinyl chloride were found at levels greater than applicable vapor intrusion ESLs. In soil vapor wells SV-2, SV-3, SV-5, SV-6, and SV-7, petroleum hydrocarbon constituents were either not detected or were detected at low levels below applicable vapor intrusion ESLs. Chloroform was detected in wells SV-2 and SV-7 at concentrations greater than the applicable ESL. The chlorinated solvent tetrachloroethene was found during two sampling events in well SV-2 (below the vapor intrusion ESL), but was not detected in nearby vapor wells SV-6 or SV-7. Sampling of soil vapor wells SV-1 through SV-7 in February and March 2016 did not suggest a significant on-site source area or areas for the chlorinated solvents vinyl chloride or tetrachloroethene.		

Table 5

Conceptual Site Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		The results of analyses of soil, ground water, and soil vapor samples indicate that the contaminants of potential concern are total petroleum hydrocarbons (TPH). Laboratory chromatograms for selected soil samples show that the TPH consists of diesel and motor-oil range compounds.		
Petroleum Hydrocarbons in Soil		The results of subsurface investigations performed by PES in 2005 and 2011 found relatively localized concentrations of TPHg and TPHd in soil above the ground-water surface at levels greater than applicable environmental screening levels (ESLs). Essel's 2015 and 2016 investigations were performed to further delineate the extent of petroleum contaminants, particularly at and below the ground-water surface. TPHg: Detectable levels of TPHg were found in the two soil samples collected from the gasoline UST pit in 1986 and in three of 25 soil samples collected from borings advanced in 2005 and 2011. Soil collected at a depth of 8 feet below the ground surface in boring B-4, advanced next to the former fuel dispenser, was the only sample containing TPHg at a concentration (190 mg/kg) greater than the current applicable Tier 1 ESL. During the 2015 and 2016 subsurface investigations, elevated levels of TPHg were detected at and just below the ground-water surface (depth interval of 13 to 16 feet below grade) in borings advanced at and very near the location of the former gasoline UST and at the west-central edge of the site (geophysical anomaly area). Concentrations of 130 and 95 milligrams per kilogram (mg/kg) TPHg were detected at 8 and 14½ feet below grade in boring ECB-5, located next to the former fuel dispenser and earlier boring B-4. Low concentrations (2.1 to 44 mg/kg) of TPHg were detected in soil from five borings advanced in the former UST, former fuel dispenser, and geophysical anomaly areas. No TPHg was detected in 56 soil samples collected from borings advanced within and outside the three areas of impact or in the four borings advanced off-site. TPHd: Concentrations of 250 and 220 mg/kg TPHd were found in	None. Extent of contaminants in soil has been delineated.	NA

Table 5

Conceptual Site Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		1986 at the northern end of the on-site 7,000-gallon diesel UST at respective depths of 12 and 13 feet below the ground surface and 80 mg/kg TPHd was detected at 12 feet below grade beneath the southern end of the former UST. A concentration of 230 mg/kg TPHd, associated with the elevated TPHg, was also detected in the soil sample collected at the 8-foot depth in boring B-4, advanced next to the former fuel dispenser. This concentration dropped to 23 mg/kg at the 12-foot depth in boring B-4. In 2015 and 2016, elevated concentrations of TPHd (190 to 1,200 mg/kg) were found in borings ECB-3, ECB-4, ECB-10, ECB-15, ECB-16, and ECB-17 within the depth interval of 13 to 16 feet below the ground surface. These borings were advanced in the former UST area and the geophysical anomaly area. Either no TPHd was detected or low concentrations were found in other soil samples tested. TPHmo: TPHmo was not detected in soil samples during previous investigations, including two samples collected from boring B-5, advanced in the former oil changing building. In 2015 and 2016 elevated concentrations of 310 to 16,000 mg/kg TPHmo were detected within the 13- to 16-foot-depth interval in borings advanced in the former UST and geophysical anomaly areas. No TPHmo was detected in the two samples collected at 4½ and 9½ feet below grade from slant boring ECB-7, advanced beneath the vehicle maintenance trench and none was detected in other soil samples tested. The vertical and lateral extents of the three TPH ranges in soil have been defined in the former UST, former fuel dispenser, and geophysical anomaly areas as follows. • Former USTs - an area approximately 35 feet by 30 feet is impacted around the former locations of the USTs, with elevated concentrations occurring between 12 and 16 feet below grade and the maximum depth of impact at approximately 17½ feet below the ground surface. • Former Fuel Dispenser – an estimated 15- by 15-square-		

Table 5

Conceptual Site Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		foot area is impacted at the location of the existing concrete dispenser pedestal. Concentrations of TPH were detected at depths of 4 to 14½ feet below grade and no TPH was detected at 18 feet below grade. Relatively elevated concentrations are at 8 and 14½ feet below the ground surface. • Geophysical Anomaly Area – an estimated area approximately 55 feet by 35 feet encompassing borings ECB-10, ECB-15 through ECB-17, and ECB-19 is impacted with TPH. The TPH impact may extend approximately 10 feet west of the site beneath adjacent properties. Elevated concentrations of TPH and the maximum depth of impact are restricted to within the depth interval of approximately 12 to 16 feet below the ground surface. <u>Individual Constituents</u>: No BTEX, MTBE, naphthalene, other VOCs, or PAHs were detected in soil samples collected during the 2005, 2011, and 2015 investigations. In 2016, xylenes, naphthalene, and a few other petroleum-related VOCs and PAHs were detected in soil in the geophysical anomaly area, with detected concentrations primarily found in samples containing elevated TPH concentrations. Except for anomalous detections of the carcinogenic PAHs at the 12½-foot depth in off-site boring ECB-22, the lateral and vertical extent of individual constituents is essentially contained within the area of TPH impact in the geophysical anomaly area.		

Table 5

Conceptual Site Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
Petroleum Hydrocarbons in Ground Water		PES sampled ground water from borings B-1, B-2, B-5, and B-6 in 2005 and concentrations of TPHd and TPHmo were greater than current applicable Tier 1 ESLs. No TPHg or BTEX was detected in water samples and trace MTBE (0.61 ug/L) was found in one grab ground-water sample. Both TPHd and TPHmo were present across the site and, possibly may have migrated off-site to the northwest. In 2015 and 2016, elevated levels of TPHg, TPHd, and TPHmo were detected in water samples collected from borings ECB-2 through ECB-5 (former USTs and fuel dispenser) and borings ECB-10, ECB-15 through ECB-17, and ECB-19 (geophysical anomaly area). No TPHg, TPHd, or TPHmo was found in water samples from central boring ECB-7, perimeter borings ECB-1, ECB-6, ECB-8, ECB-9, ECB-11, and ECB-12, or off-site boring ECB-13. Low concentrations of TPHd were detected in off-site borings ECB-14 and ECB-21, but these detections do not appear to be related to site releases, based on crossgradient location and distance from the site. The results suggest the elevated levels detected in the areas of the former USTs and fuel dispenser have not migrated to the western edge of the site. Elevated TPHg, TPHd, and TPHmo in ground water in the geophysical anomaly area are present a short distance (likely less than 50 feet) off-site to the northwest. Sporadic trace to low concentrations of petroleum fuel constituents and PAHs and minor concentrations of non-chlorinated solvents and chlorinated solvents were detected in water samples collected from on-site borings. None of these individual compounds were detected in water samples collected from the four off-site borings.	None. Extent of contaminants in ground water has been delineated.	NA
Vapor Intrusion to Indoor Air		Detectable concentrations of TPH gasoline range, benzene, ethylbenzene, xylenes, MTBE and other petroleum fuel constituents were found in several soil vapor wells located near the former USTs	None. No vapor intrusion health risk appears to be	NA

Table 5

Conceptual Site Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		and fuel dispenser. Naphthalene was not detected in any soil vapor sample. Except for TPH gasoline range, benzene, vinyl chloride, and chloroform, none of the detected concentrations was greater than applicable Tier 1 ESLs for potential vapor intrusion risk. A focused human health risk assessment shows vapor intrusion health risk in the former UST and fuel dispenser areas is not present.	present.	
Direct Contact and Outdoor Air		Soil samples collected within the 0- to 5-foot and 5- to 10-foot depth intervals have been analyzed for benzene. Benzene was not detected in soil samples collected within the two depth intervals. During the 2015 and 2016 investigations, soil samples collected within the above-described depth intervals in the former UST, fuel dispenser, geophysical anomaly area, and oil-changing pit were analyzed for benzene, naphthalene, and PAHs. Laboratory analytical results show no detectable concentrations of benzene, naphthalene, or any PAH analyte.	None.	NA
Risk Evaluation		The Source Group, Inc. performed a focused human health risk assessment for the former UST and fuel dispenser area to assess vapor intrusion risk from vinyl chloride and other VOCs found in soil vapor. The assessment did not find significant health risk from the contaminants present in soil vapor in this area.	None.	NA

Table 6
Data Gaps Summary and Proposed Investigation

Item	Data Gap Item #	Proposed Investigation	Rationale	Analyses
	None.	None.	None.	None.

APPENDIX B

LABORATORY CHROMATOGRAMS

Witham, Rodger C

From: Rodger Witham <rodger@esseltek.com>
Sent: Monday, September 26, 2016 7:43 AM
To: Witham, Rodger C
Subject: Fwd: TPH chromatograms; project #15166

---------- Forwarded message ----------
From: **Rodger Witham** <rodger@esseltek.com>
Date: Wed, Sep 14, 2016 at 3:34 PM
Subject: TPH chromatograms; project #15166

On Wed, Sep 14, 2016 at 2:39 PM, Angela Rydelius <angela@mccampbell.com> wrote:

Hi Rodger,

Per our phone conversation yesterday, the following TPH-gas and TPH-d,mo chromatograms have been reviewed:

1509A61-014 (S-13-ECB4)
1509A61-017 (S-8-ECB5)
1602626-003 (S-12 ½ -ECB15)
1602626-007 (S-13 ½-ECB17)

Both samples on 1602626 appear to have a predominate oil range component with a lesser stoddard solvent pattern present.

Sample 1509A61-014 appears to have a predominate diesel pattern which bleeds into the late gasoline range.

Sample 1509A61-017 appears to have a predominate stoddard solvent pattern.

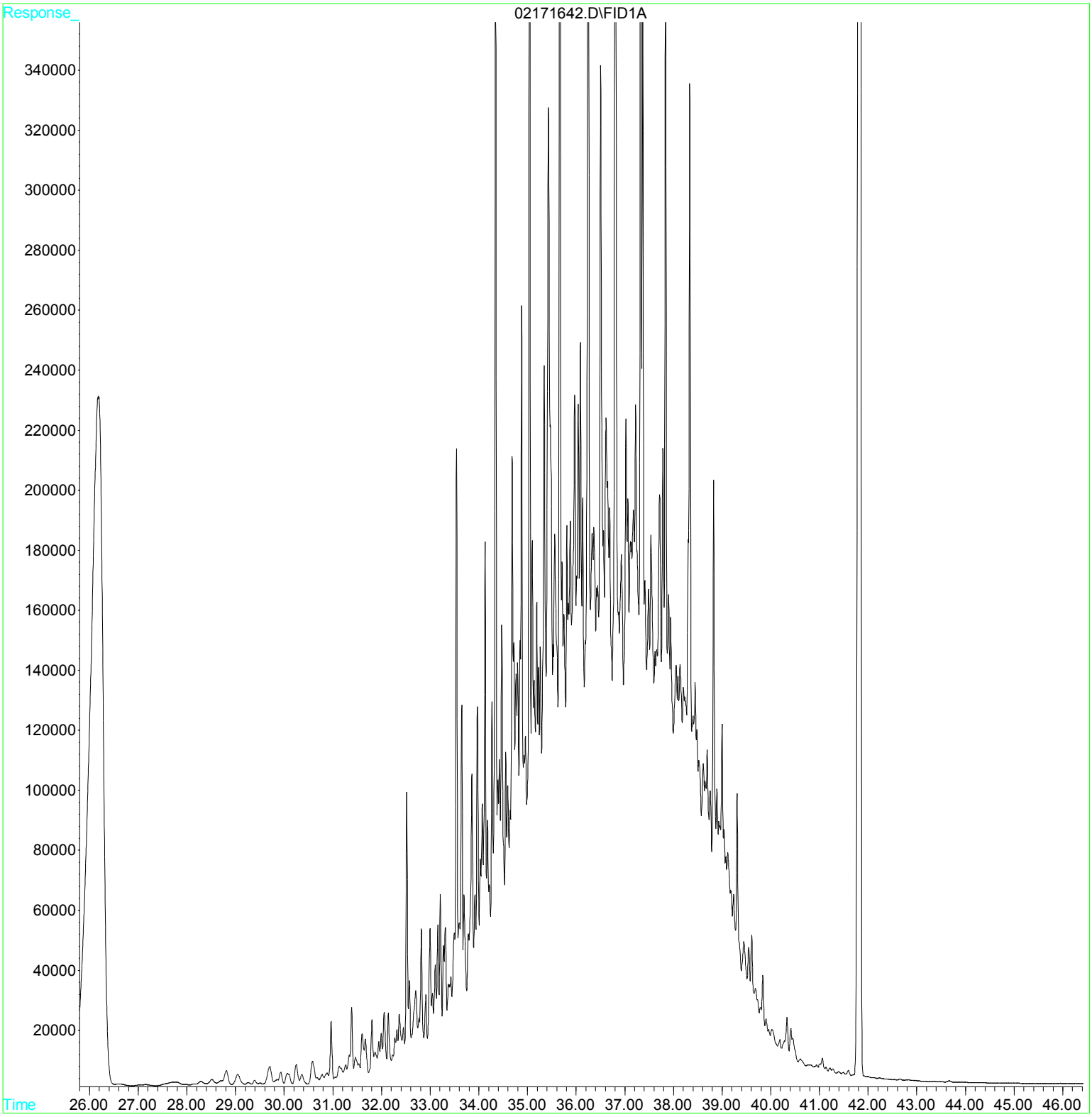
All four samples' TPH-gas patterns exhibit a non-gasoline derived TPH pattern. Attached are the TPH-gas and TPH-d,mo chromatograms for review. Please let me know if you have any further questions or concerns.

Regards,

Angela Rydelius
Laboratory Manager
McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565
P: 925-252-9262 ext. 214
F: 925-252-9270
www.mccampbell.com

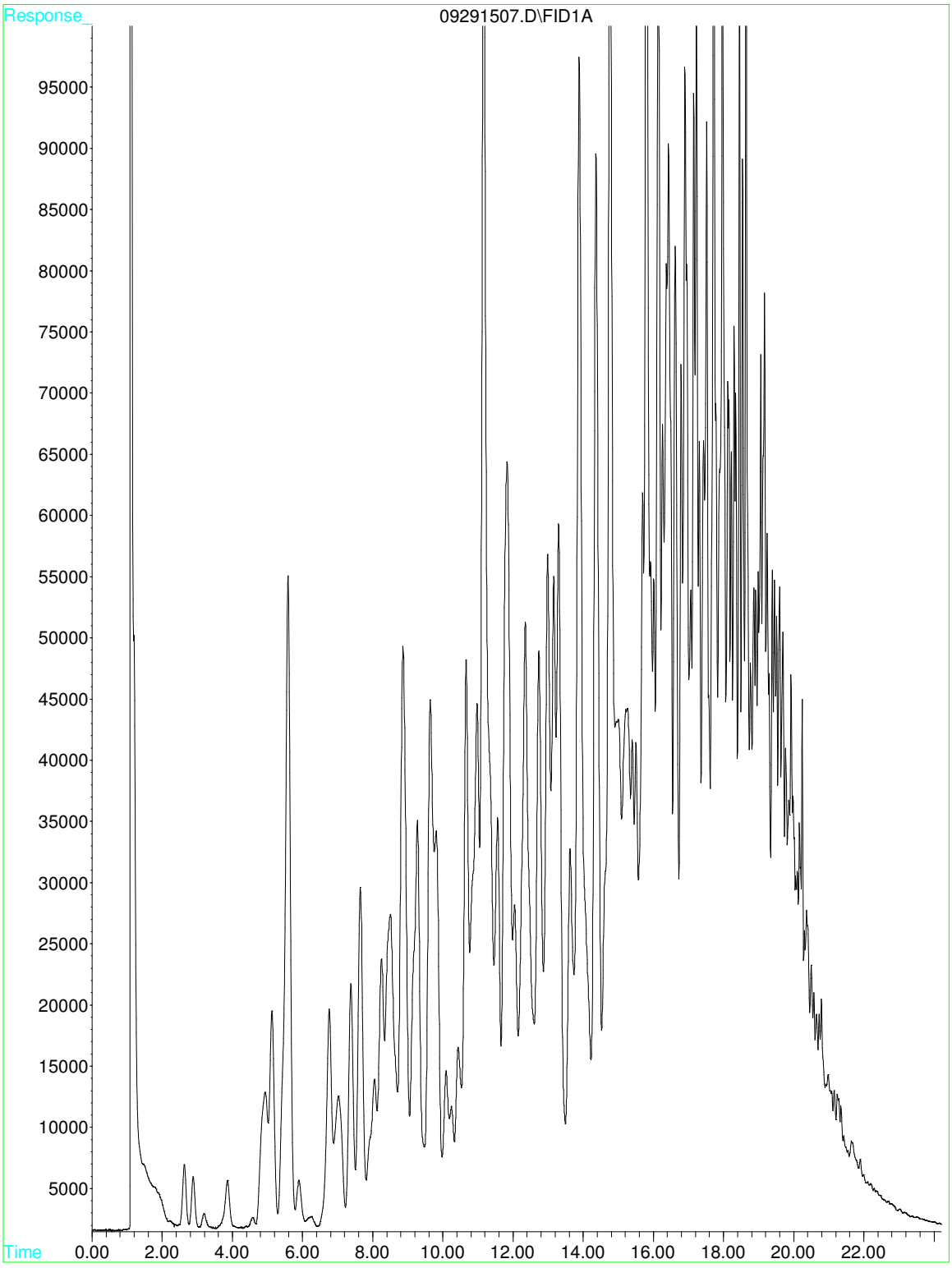
File : D:\HPCHEM\GC2\DATAA\02171642.D
Operator : Toshiko
Acquired : 18 Feb 2016 7:01 pm using AcqMethod GC2ALVI8.M
Instrument : GC-2
Sample Name: CCV 2-2
Misc Info :
Vial Number: 21

TPH-DIESEL STANDARD CHROMATOGRAM



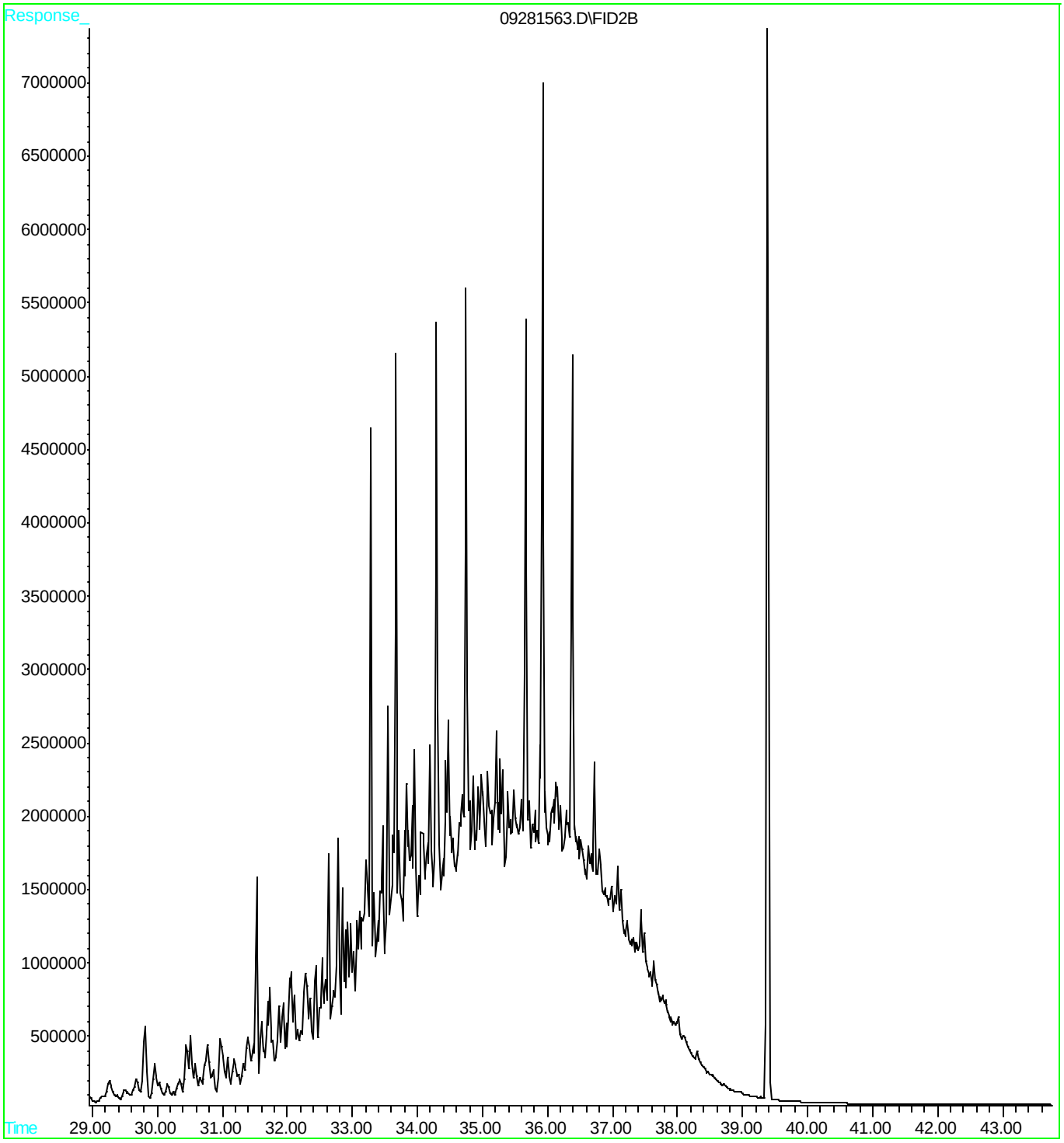
File : D:\HPCHEM\GC19\DATA\09291507.D
Operator : IRINA
Acquired : 29 Sep 2015 2:56 pm using AcqMethod GC19P2.M
Instrument : GC-19
Sample Name: 1509A61-014A S rr
Misc Info : G-MBTEX_S
Vial Number: 7

SOIL SAMPLE S-13-ECB4



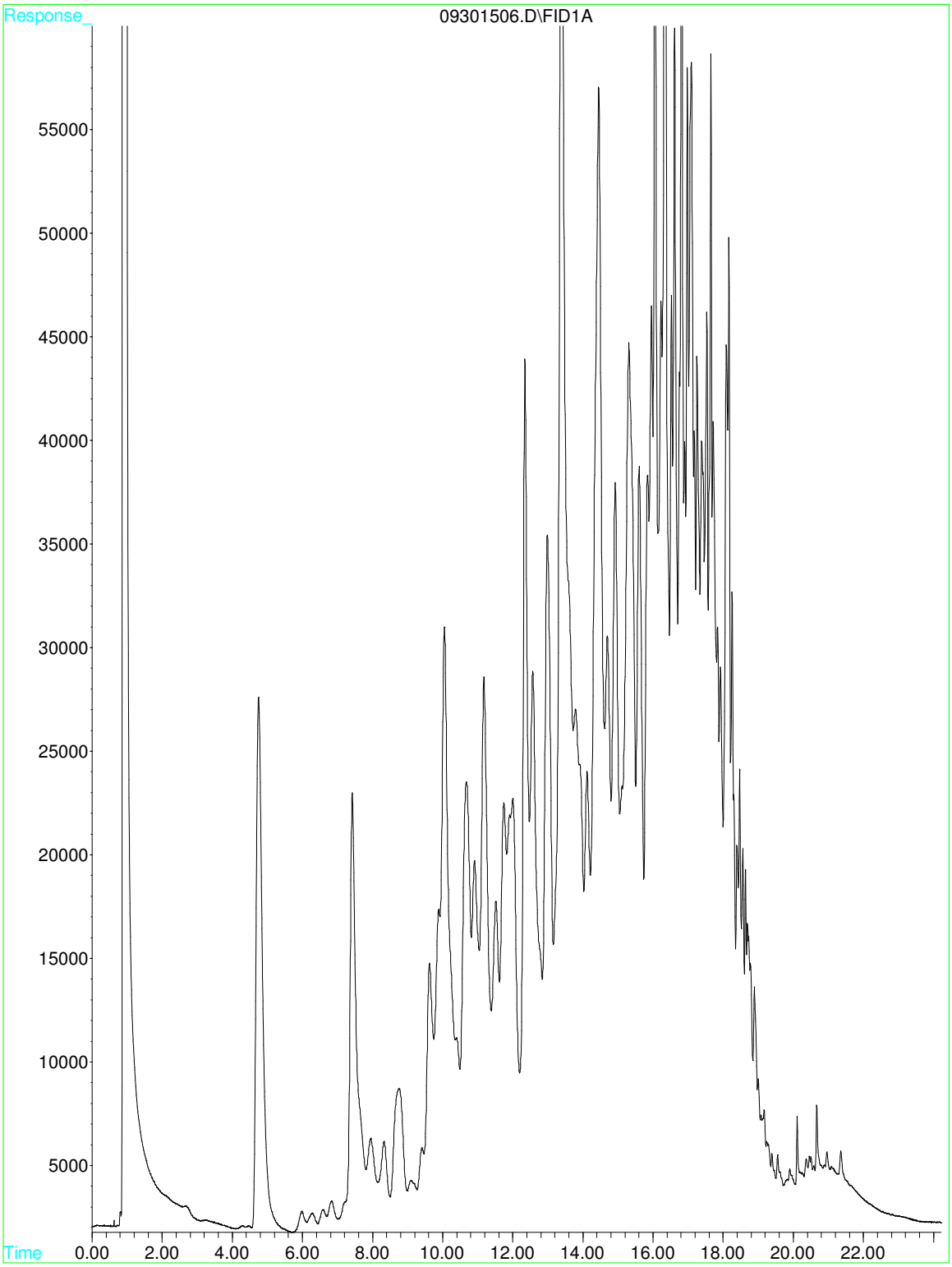
File : D:\HPCHEM\GC11\DATAB\09281563.D
Operator : Toshiko
Acquired : 1 Oct 2015 11:43 am using AcqMethod GC11AD.M
Instrument : GC-11
Sample Name: 1509A61-014A S RR
Misc Info : TPHSG
Vial Number: 82

SOIL SAMPLE S-13-ECB4



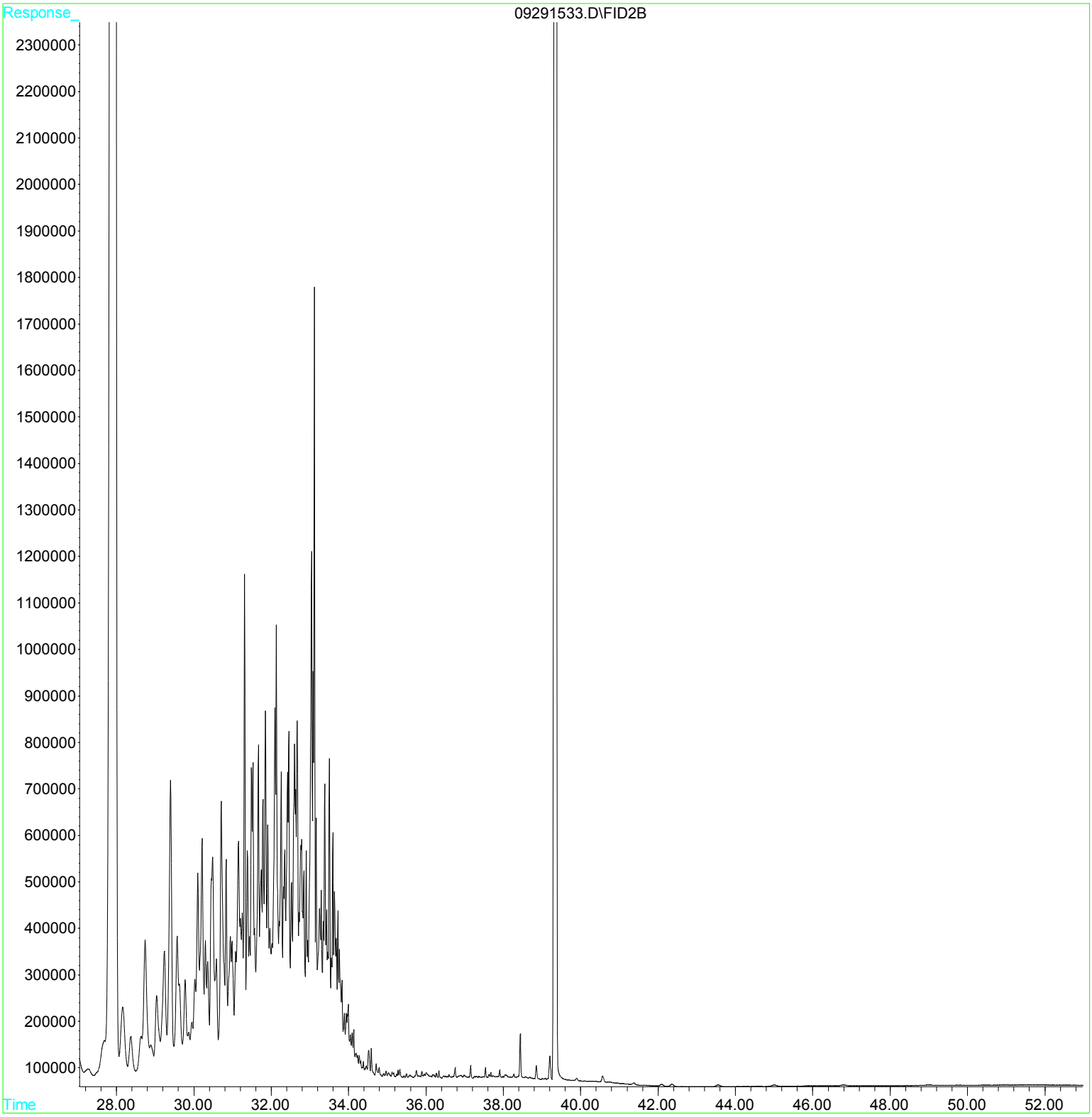
File : D:\HPCHEM\GC7\DATA\09301506.D
Operator : IRINA
Acquired : 30 Sep 2015 1:41 pm using AcqMethod GC7U3.M
Instrument : GC-7
Sample Name: 1509A61-017A S rr
Misc Info : G-MBTEX_S
Vial Number: 6

SOIL SAMPLE S-8-ECB5



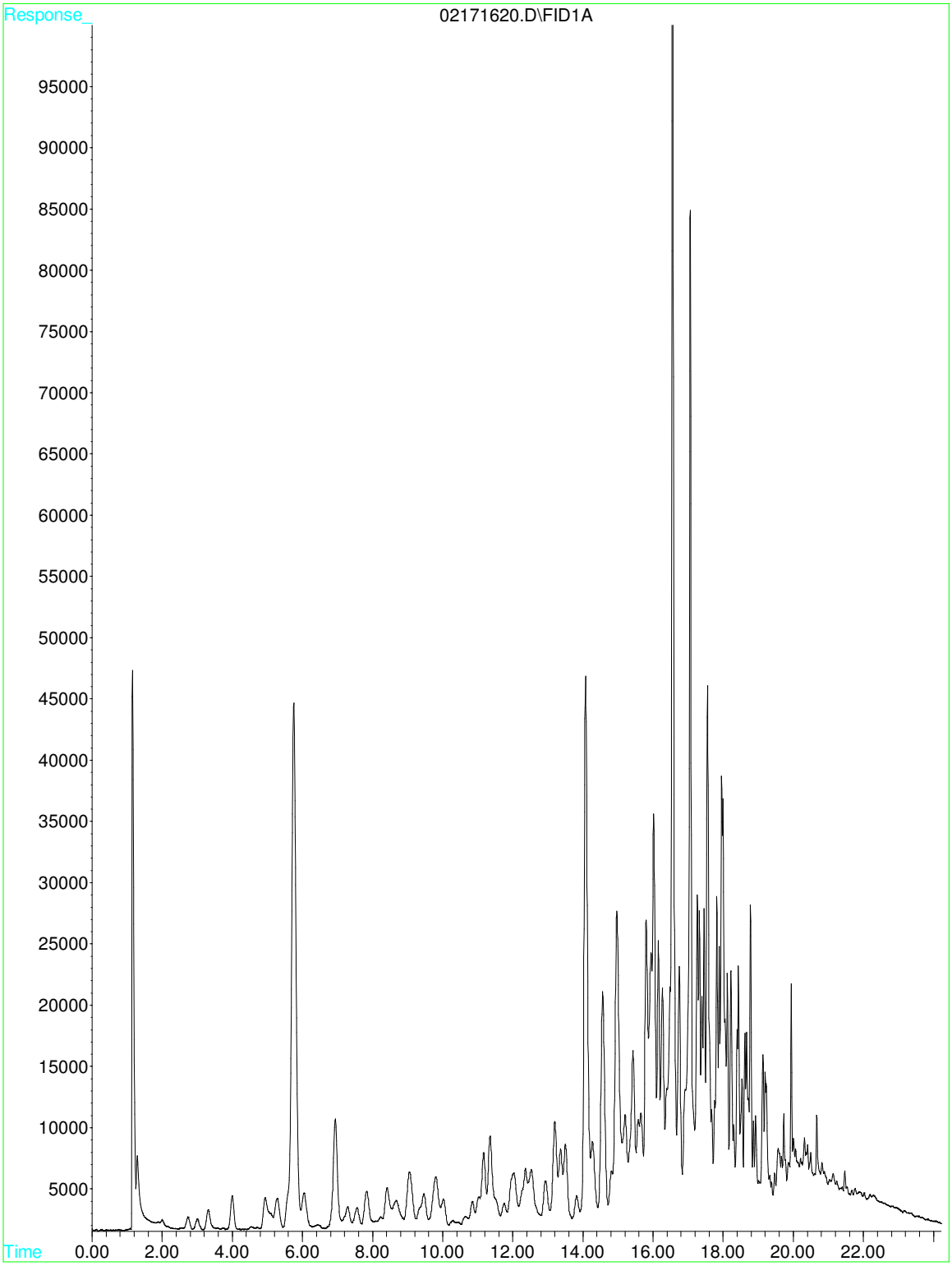
File : D:\HPCHEM\GC9\DATAB\09291533.D
Operator : Toshiko
Acquired : 30 Sep 2015 10:21 am using AcqMethod GC9AD.M
Instrument : GC-9
Sample Name: 1509A61-017A S
Misc Info : TPHSG
Vial Number: 67

SOIL SAMPLE S-8-ECB5



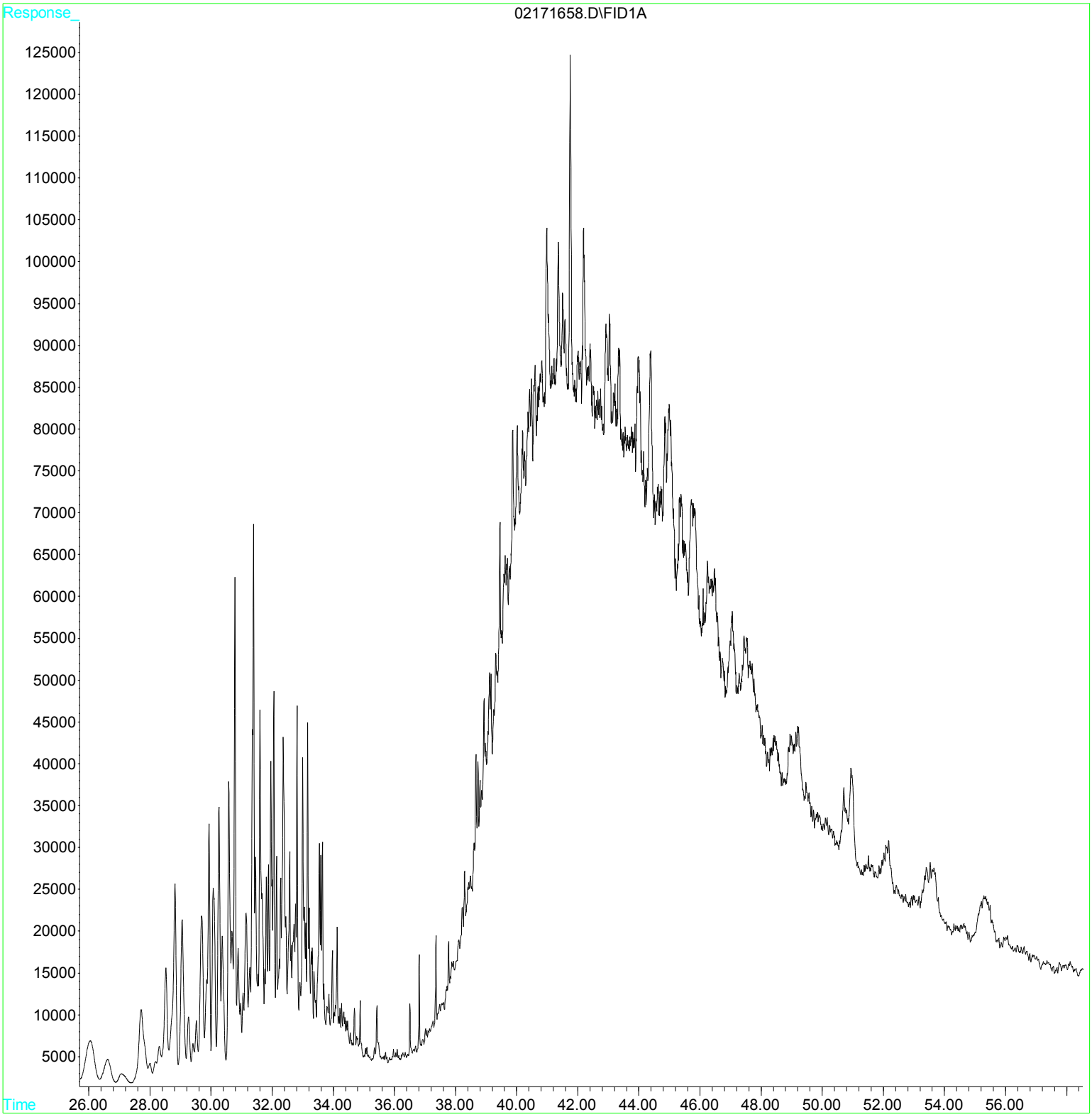
File : D:\HPCHEM\GC19\DATA\02171620.D
Operator : IRINA
Acquired : 18 Feb 2016 12:43 am using AcqMethod GC19P2.M
Instrument : GC-19
Sample Name: 1602626-003A S
Misc Info : G-MBTEX_S
Vial Number: 20

SOIL SAMPLE S-12 1/2-ECB15



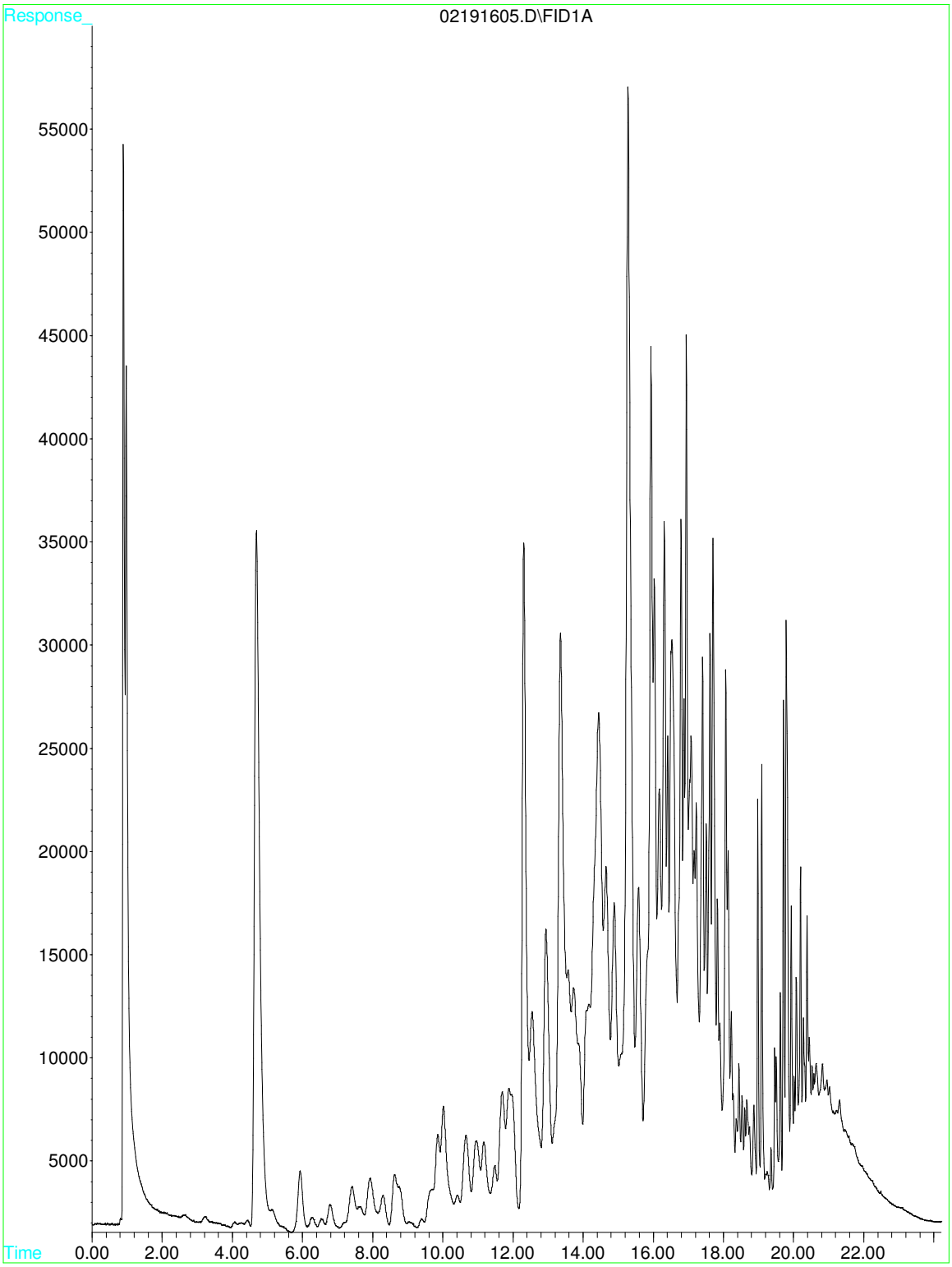
File : D:\HPCHEM\GC2\DATAA\02171658.D
Operator : Toshiko
Acquired : 19 Feb 2016 5:10 am using AcqMethod GC2ALVI8.M
Instrument : GC-2
Sample Name: 1602626-003A S
Misc Info : TPHSG
Vial Number: 29

SOIL SAMPLE S-12 1/2-ECB15



File : D:\HPCHEM\GC7\DATA\02191605.D
Operator : IRINA
Acquired : 19 Feb 2016 11:53 am using AcqMethod GC7U3.M
Instrument : GC-7
Sample Name: 1602626-007A S
Misc Info : G-MBTEX_S
Vial Number: 5

SOIL SAMPLE S-13 1/2-ECB17



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Operator : Toshiko
Acquired : 19 Feb 2016 8:59 am using AcqMethod GC2ALVI8.M
Instrument : GC-2
Sample Name: 1602626-007A S
Misc Info : TPHSG
Vial Number: 32

SOIL SAMPLE S-13 1/2-ECB17