REMEDIAL INVESTIGATION AND REMEDIAL ALTERNATIVE ANALYSIS FOR DFSP NORWALK

DEFENSE FUEL SUPPORT POINT NORWALK
15306 NORWALK BOULEVARD
NORWALK, CALIFORNIA

Prepared for

Defense Logistics Agency Energy
8725 John J. Kingman Road
Fort Belvoir, Virginia 22060-6222

September 27, 2012

Prepared by

PARSONS

100 WEST WALNUT STREET • PASADENA • CALIFORNIA 91124

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Approved by: David A. Brown

David A. Brown
Senior Remedial Engineer

Approved by: Thomas A. Larson

Thomas Larson, PG
Principal Hydrogeologist

Submitted by: Redwan Hassan

Redwan N. Hassan, PG
Senior Project Manager

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
1,2-DCA	1,2-dichloroethane
2D	two dimensional
3D	three dimensional
AFCEE	Air Force Center for Engineering and the Environment
amsl	above mean sea level
AOC	areas of concern
ARARs	applicable or relevant and appropriate requirements
AST	aboveground storage tank
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, xylenes
COPC	chemicals of potential concern
COCs	contaminants of concern
CSM	conceptual site model
DFSP	Defense Fuel Support Point
DIPE	di-isopropyl ether
DLA	Defense Logistics Agency
EDB	ethylene dibromide
EHMP	Environmental Hazards Management Plan
ETBE	ethyl tertiary butyl ether
EVS	Environmental Visualization System
GRAs	general response actions
GWE	groundwater extraction
ICs	institutional controls
JP	jet propellant
KMEP	Kinder Morgan Energy Partners
LNAPL	light, non-aqueous phase liquid
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MNA	monitored natural attenuation
MTBE	methyl tertiary butyl ether
NFA	no further action
POL	petroleum, oil, and lubricant
RAA	remedial alternative analysis
RAB	Restoration Advisory Board
RAOs	remedial action objectives
RI	remedial investigation
RWQCB	Regional Water Quality Control Board
SCG	soil cleanup goals
sf	square feet

LIST OF ACRONYMS AND ABBREVIATIONS

SMP	soil management plan
SVE	soil vapor extraction
TAME	tertiary amyl methyl ether
TBA	tertiary butyl alcohol
TMV	toxicity, mobility, and/or volume
TPH	total petroleum hydrocarbons
TPHjf	total petroleum hydrocarbons as jet fuel
TPHd	total petroleum hydrocarbons as diesel
TPHg	total petroleum hydrocarbons as gasoline
TPS	Thermal Processing Services
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds

SECTION 1

INTRODUCTION

Parsons has prepared this remedial investigation (RI) summary and remedial alternative analysis (RAA) for vadose (unsaturated) soils and groundwater for the Defense Fuel Support Point (DFSP) Norwalk facility located at 15306 Norwalk Boulevard, Norwalk, California (site) on behalf of the Defense Logistics Agency (DLA) Energy. This report will summarize current soil and groundwater conditions compiled from all RIs conducted at the site and RAA has been conducted to provide options for soil and groundwater cleanup.

The site location and vicinity are shown on Figure 1. A soil conceptual site model (CSM) was prepared in response to a letter dated April 10, 2012 from the California Regional Water Quality Control Board (RWQCB) (California RWQCB, 2012a) and submitted to the board on September 4, 2012 (Parsons, 2012a). The purpose of the CSM was to summarize and integrate all information relevant to released fuel products into the environment, and the physical, biological, and chemical processes that determine the transport of these contaminants to environmental receptors.

This report is organized into 5 sections including this introductory section. In addition to this introduction, Section 1 includes a discussion about the regional and site-specific hydrogeologic setting and objectives of this report. Section 2 provides a description of the probable contaminant sources and the nature and extent of contamination at the site. Section 3 discusses the remedial action objectives (RAOs), remedial actions performed to date, and optimization of the current remedial systems. Section 4 presents general response actions (GRAs) and technology screening criteria and summary. Section 5 presents a detailed analysis of remedial alternatives, Section 6 presents a comparative analysis, and Section 7 presents the preferred remedial alternative. Section 8 includes the references.

1.1 SITE DESCRIPTION AND BACKGROUND

The DFSP Norwalk site encompasses approximately 50 acres (Figure 2). The Norwalk facility was constructed in 1923 and was operated by at least four owners, including Tidewater Oil, Jolly Oil Company, Wilshire Oil, and Texaco, until it was acquired by the Air Force in 1951. In 1951, the Air Force added manifolds, gravel sumps, truck fueling racks and aboveground and underground piping to the facility. The gravel sumps were located next to each storage tank and are believed to have been used as discharge points for water drawn from the bottom of the tanks. Facility ownership was transferred from the Air Force to the DLA in 1968.

The site previously contained ten 80,000 and two 55,000-barrel aboveground storage tanks (ASTs) that were used to store and distribute jet propellants 5 and 8 (JP-5 and JP-8). Aviation gasoline and JP-4 were also reportedly stored at the site. The former truck fueling rack area is located in the south-central portion of the site and occupies approximately one acre (Figure 2). In the past, fuel was transferred from the facility via tanker trucks filled at the fueling racks, but by the early 1990s jet fuel was no longer being routinely transferred from the facility via tanker trucks. Subsequently, a 10-inch diameter, government owned multi-product pipeline, carried fuel from DFSP San Pedro to DFSP Norwalk and a 6-inch diameter pipeline carried fuel from DFSP Norwalk to the former El Toro Marine Corp Air Station. Investigations at the site indicate that releases had occurred at several locations at the facility.

The site was shut down in 1999 and the ASTs were removed from service, drained, cleaned, and marine-chemist certified. Within the tank farm, the individual tank lateral pipes were drained, disconnected, and individually cleaned. The main pipe laterals, running form the Powerine Basin to the Air Force and El Toro manifolds, were also drained and individually cleaned. Figure 3 shows the locations of soil borings installed at the site during the numerous investigations and remediation activities conducted during the past 10 years.

In 2004, a 500 gallon underground storage tank (UST) located to the north-west of the truck fueling racks was removed and approved for closure by the Los Angeles Department of Public Works. The UST was used for vapor recovery from the jet fueling process. The UST was installed in 1955 and was last used in 1998.

The ASTs, concrete pads, and connecting pipeline systems were demolished and removed in 2012. Following removal of the tanks and pads, soil confirmation samples were collected from beneath the AST locations in accordance with the work plan (Parsons, 2011a).

An approximate 2-acre area is leased by Kinder Morgan Energy Partner (KMEP) along the southern and eastern property line (Figure 2). Previously, KMEP operated a pump station at the site. The pump station has been decommissioned but three pipelines remain in service.

The DLA has installed remediation systems to treat the hydrocarbon impacted soil and groundwater environmental media. The purposes of these remediation systems are to reduce contaminant concentrations in soil and groundwater to cleanup goals. The ultimate goal is to achieve site closure. The following subsections describe the geological and hydrogeological settings of the site.

1.2 SITE SETTING

The following subsections describe the geological and hydrogeological settings of the site.

1.2.1 Regional Geology

DFSP Norwalk is located between the Montebello Forebay and the Downey Plain in the Central Basin pressure area. Approximately 50 to 60 feet of alluvium (primarily sand, silt, and clay) cover the underlying Lakewood Formation in this area. The Lakewood Formation is composed of marine and continental gravel, sand, silt, and clay deposits. The San Pedro Formation underlies the Lakewood Formation, approximately 300 feet below grade, and consists of marine and continental gravel, sandy silt, silt, and clay deposits (California Department of Water Resources, 1961).

Lithologic logs of borings drilled during previous investigations indicate that sediments beneath the DFSP site consist of clayey silt, sandy silt, silty sand, medium to coarse-grained sand, and deeper coarse-grained sand with granitic cobbles. The top of a clay layer (preliminarily identified as the uppermost sediment layer of the Bellflower aquitard) was encountered at a depth of approximately 55 to 65 feet during previous investigations.

1.2.2 Local Hydrogeology

Figure 4 shows the locations of geologic cross sections. Geologic profiles shown on Figures 5 and 6 indicate areas and depths with more permeable sandy deposits in yellow, whereas the orange and brown colors indicate finer grained and less permeable silty and clayey materials. These figures were generated by importing all of the borehole litho logic data available into the Environmental Visualization System (EVS) modeling software. The stratigraphic correlations are projected based on kriging lithologic data with a horizontal bias.

The potentiometric surface and saturated zone are shown in blue on the cross sections. Groundwater below the site occurs at depths between 23 to 33 feet below the ground surface (bgs). A hydrograph for GMW-57 (the longest water level record available) shows that water level was about 48 feet above mean sea level (amsl) in 2003, quickly rose to about 52.8 feet amsl in early 2005. From 2005 to 2009, the water level has gradually dropped back to about 48 feet amsl, where it has remained about the same since. This would leave about a 5 foot light, non-aqueous phase liquid (LNAPL) smear zone above the current water level, probably at irreducible saturations. Since 2009, there has been about a one foot seasonal fluctuation.

The shallow semi-perched alluvial aquifer, consisting of silts, fine to medium sands, and coarse sands, is approximately 30 to 35 feet thick, and overlies the Bellflower Aquitard at approximately 55 to 65 feet bgs. The Bellflower Aquitard is composed of approximately 70 feet of interbedded silts and clays with minor gravel and sand. The aquitard separates the shallow semi-perched groundwater from the deeper Exposition and Gage aquifers of the Lakewood Formation. Near the site, the Exposition and Gage aquifers are found at 150 and 250 feet bgs, respectively (GTI, 1994). Regional groundwater flow within the Exposition Aquifer is to the southeast. Due to low well yields, local water service companies do not make extensive use of aquifers in the Lakewood Formation. The deeper San Pedro Formation includes the following aquifers, listed from shallowest to deepest: Hollydale, Jefferson, Lynwood, and Silverado.

1.3 OBJECTIVE

The objective of this RI summary and RAA is to integrate all of the soil and groundwater data and interpretations pertaining to the physical, chemical, transport, and receptor characteristics present at the site. Soil cleanup goals (SCGs), shown in Table 1, were approved in a July 12, 2012 letter from the California RWQCB, Los Angeles Region (California RWQCB, 2012b). Based on the site characterization of the nature and extent of contamination, identify and evaluate remedial options to clean the soil to regulatory approved cleanup goals by December 2014. The groundwater cleanup goals have not been established for the site nor the cleanup timeframe.

SECTION 2

SOURCE CHARACTERIZATION

Contaminants and sources are presented in this section along with a summary of the nature and extent of contamination.

2.1 IDENTIFICATION OF POTENTIAL CONTAMINANTS

Historical records and forensic testing of petroleum products recovered from boreholes and monitoring wells at many locations on the site has indicated that soil and groundwater are impacted with hydrocarbons mainly consisting of JP-4, JP-5, JP-8; and gasoline. JP-4 is a 50-50 blend of kerosene and gasoline. JP-5 is similar to JP-4, but has some napthalenes added. JP-8, which is kerosene based, was introduced in 1990 and completely replaced JP-4 in 1996. JP-8 contains less benzene and hexane than JP-4, but it does still contain some benzene, toluene, xylenes and naphthalene, as well as other additives (e.g., diethylene glycol monomethyl ether or ethylene glycol monomethyl ethercontainsl). Gasoline constituents include benzene, toluene, ethylbenzene and total xylenes (BTEX); and methyl tertiary butyl ether (MTBE). In addition, tertiary butyl alcohol (TBA) has been detected in samples collected in the past few years and, along with other fuel oxygenates, was added to the monitoring program at the site by the RWQCB in March 2009. Ethylene dibromide (EDB) and 1,2-dichloroethane (1,2-DCA) were also integral parts of the tetraalkyllead-based antiknock gasoline additives used through the 1980s. EDB and 1,2-DCA were added to gasoline to prevent buildup of lead oxide deposits within internal combustion engines at an average concentration of about 300 milligrams per liter (mg/L) (Falta, 2007). Because of their high aqueous solubility's, this would be expected to produce equilibrium groundwater concentrations of thousands of micrograms per liter (µg/L).

2.2 IDENTIFICATION AND CHARACTERIZATION OF SOURCES

Environmental investigations began in the mid-1980s and full-scale cleanup at the site started in 1995. Figure 2 shows the site infrastructure and facilities. The AST area in the northern portion of the site experienced several leaks and spills from the tanks and connecting pipeline system throughout the operational history of the site, and are described below. Known releases of automotive gasoline and other fuels have also occurred at the KMEP lease area and have been detailed in reports prepared by KMEP. The KMEP 24-inch diameter pipeline running along the southern edge of the site released hydrocarbons near a block valve located approximately 84 feet southwest of the fueling rack area (February 2003). The leak was repaired, and the pipeline returned to operation. KEMP investigated this release and has since installed a soil vapor extraction (SVE) well to remediate the soil in this area. Another 24-inch diameter block valve on this pipeline is located offsite in Holifield Park just outside the southeast corner of the site. In April 1994, a leaking seal on the off-site 24-inch diameter block valve was detected. The valve was repaired and approximately 30 cubic yards of hydrocarbon-impacted soil were excavated from the vicinity of the valve. Remediation activities were implemented in 1994 by KMEP in response to this release.

2.2.1 Oily Waste Material

In 1985, buried oily wastes were encountered in the southwestern portion of the site. The wastes were located approximately 80 feet southeast of the southeastern corner of the laboratory building and extend to about 25 feet southeast of the southeastern corner of the oil-water separator. The areal extent of the buried material is nearly 28,000 square feet and a depth of approximately 10 feet below grade, with a total volume of approximately 5,000 cubic yards. From 1997 through 2003, various investigations were conducted of this area. The RWQCB issued a No Further Action with deed restrictions for the oily waste area on March 28, 2005.

2.2.2 Tank Releases

Numerous tank releases led to the contamination in the north central portion of the facility. Aerial photographs from 1958 and 1959 showed discolored soil near Tank 80004 and in the western portion of Tank 80008; ponded liquid in the southwest corner of the berm surrounding Tank 80002; and two areas of discolored soil in the bermed areas surrounding Tanks 80002 and 80008. A spill was reported at Tank 80002 in the early 1970s due to overflow of which the amount of product lost is unknown. Aerial photographs also indicate the possible presence of a former settling pond in the northeastern portion of the facility.

Direct evidence of jet fuel leaks from the storage tanks is not available. Data suggests subsurface hydrocarbons in the areas of Tanks 80001, 80007, 80008, and 80009 originated from leaks in the bottom of these tanks. Another possible source is a major pipeline junction in the Powerine Basin, but this junction has not been identified as a release point of hydrocarbons. The total volume of fuel in the soil and groundwater underlying the tank farm was calculated during a 2001 Environmental Baseline Survey (IT Corp, 2001) to be approximately 400,000 gallons. To date, 429,000 gallons of hydrocarbons have been removed and destroyed by DLA remediation systems.

An unknown quantity of petroleum product was released to the subsurface in 1968 from the slop tank adjacent to Tank 55003. In 1969, an unknown quantity of JP-4 fuel was released from Tank 55004.

2.2.3 Truck Fueling Racks and Water Tank Area

In 1975 and 1986, abandoned 4- and 12-inch-diameter pipelines (reportedly contained a heavy, viscous, tar-like substance) were discovered near the truck fueling racks and were left in place and backfilled with soil. A former sump located southeast from the water tank was removed in about 1982, at which time observations were reported that underlying soil contained petroleum hydrocarbons. Reportedly, a leaking flange also caused contamination in the south-central section. Surface soil stains were observed by two different environmental contractors in 1984 and again in 1989/1990, suggesting that releases have occurred in the past. Investigations show that soil immediately adjacent to the southwestern portion of the fueling racks has been impacted by site operations.

In 1998, a new release of fuel was observed in the area of the water tank. Impacted soils were excavated and taken off-site for treatment; however, the excavation revealed that underlying soils had been impacted by older releases. Further investigation showed impacted soils surrounded the eastern and southern portions of the water tank.

In 1999, a fuel release from an underground pipeline was discovered in the southern area of the facility west of the water tank and north of truck fueling racks. The terminal operator secured the area, stopped the leak, and removed 80 cubic yards of impacted soil. In addition to the deeper excavation that exposed the leaking pipe, approximately 1 foot of impact soil was removed west and south of the water tank. Confirmation samples were collected from the surrounding area and below the excavated area to assess the impact of the fuel release. Both total petroleum hydrocarbons (TPH) as JP-5 and BTEX compounds were reported in soil samples.

The investigation from 2001 at the truck fueling rack area revealed evidence of past fuel releases. The data suggested that the release occurred at or around the western and central truck fueling islands. An area approximately 80 feet by 260 feet, extending from near the surface to the water table at 28 feet bgs had been impacted by releases at the fueling racks. However, the soil data near the eastern-most truck fueling island did not indicate that significant releases occurred from that facility.

As discussed in Section 1.1, in 2004, a 500 gallon UST was removed and approved for closure by the Los Angeles Department of Public Works. During UST removal and confirmation soil sampling, there were no impacts detected in the surrounding soil based on the laboratory results.

2.2.4 KMEP 24-Inch Diameter Pipeline and Block Valves

KMEP operates a 24-inch diameter pipeline that lies along the southern boundary of the DFSP Norwalk facility and extends off-site to the east, under Holifield Park. Contamination in the south and southeastern sections are reportedly associated with two 24-inch diameter underground fuel block valves associated with this pipeline: one located near the southeast corner of the KMEP lease area to the southwest of the fueling racks and the other is off-site in Holifield Park, just outside the southeast corner of the facility. There have been known releases from these 24-inch diameter block valves.

2.2.5 Commercial Fuel Pumping Station

The greatest extent of contamination in the south-central area is located around the KMEP leased area. Fuel handling operations in the vicinity of the former KMEP's pump station have resulted in the release of a mixture of gasoline, diesel, and jet fuel to the subsurface. Furthermore, fuel additives such as 1,2-DCA, MTBE, and TBA are associated with these fuel releases. The total volume of fuel in the soil and groundwater underlying the pumping station was calculated to be approximately 1 million gallons (IT Corp, 2001). To date, over 466,000 gallons of hydrocarbons have been removed and destroyed by KMEP remediation systems.

2.3 NATURE AND EXTENT OF VADOSE ZONE CONTAMINATION

The primary contaminants of concern (COCs) for this site have been shown to be related to releases of various fuel products. In the 2012 RIs report for soil, separate contaminant plume figures were generated for TPH as gasoline (TPHg) (C4-C13), TPH as jet fuel (TPHjf) (C6-C20), TPH as diesel (TPHd) (C6-C44), each BTEX constituent, MTBE, and

TBA. Table 2 lists the analytical results for each of the COCs from all of the soil sampling events.

Forensic testing of hydrocarbons recovered at the site identified that the carbon range of the weathered product ranged from C9 to C16. Therefore, TPHjf are presented in this report and results for TPHd are presented in the Appendix Figure A-1, but not discussed here because:

- The carbon range for TPHjf and as diesel have significant overlap,
- The distribution of TPHd is nearly identical as TPHjf, and
- There are fewer samples analyzed for TPHd, resulting in lower confidence in the interpretation of lateral extents.

Also, a review of the individual BTEX constituent plumes indicated that benzene is good surrogate that is representative of other volatile organic compounds (VOC) COCs; as it is indicative of the nature and extent of toluene, ethylbenzene, total xylenes, and MTBE.

2.3.1 TPH as Gasoline

All of the soil analytical results for TPHg are shown on Figure 7. The analytical standard for gasoline quantified hydrocarbons in the range of C4 to C13. The lateral extents of concentrations in soil that exceed the minimum clean up goal of 100 milligrams per kilogram (mg/kg) are indicated by yellow and red colors, as shown in the legend. The colored plume extents on the figure are based on all of the soil data available, both current and historic. This two dimensional (2D) figure was created by projecting the highest concentration from any depth up to the surface. Due to the density of soil sampling locations, the yellow text boxes are primarily from the recent investigation following demolition and removal of the ASTs. Supplemental text boxes were added to the figure for "hot spots" that are defined by older, historic sampling events. The vertical distribution of TPH can be discerned by review of data in the yellow text boxes on Figure 7, which show the depths that each sample was collected from at that location and the analytical result for those depths. The highest concentrations occur in the vicinity of the AST 80008 in the northeastern portion of the site, where concentrations range to 32,000 mg/kg (at 25 feet bgs at VEW-26); in the area between the oil/water separator and the slop tank, where concentrations range to 26,000 mg/kg (at 28 feet bgs at UV-5); and in the truck fueling area, where concentrations range to 16,000 mg/kg (at 25 feet bgs at DPT-7).

A three dimensional (3D) model of the TPHg analytical results is shown on Figure 8. The orthogonal view of the 3D model shows that soil contamination below the water tank (just north of the fueling racks) is nearly continuous from the surface to just above the water table – illustrating a migration pathway from the source to the water table. In the tank farm area, the 3D model (Figure 8) shows that there is a small localized thin zone of soil contamination immediately below the center of AST 80009, and then the soil is clean below this until a small zone of contamination is encountered at a depth of 10 feet bgs. Figure 7 and Table 2 provide the detailed results showing that TPH contamination exceeding the cleanup goal was identified in the surface sample (0.5 feet bgs) at DPT locations 41, 42, and 65. At 5 feet bgs, all of these locations had TPHg concentrations less than the cleanup standard, but DPT-65 was again contaminated at 10 feet bgs and DPT-42 was clean until 19 feet bgs.

Figure 8 also clearly illustrates that there is no apparent migration pathway below ASTs 80001, 80006, 80007, 80008, and 55004. Figures 9 and 10 show profile cross-sections A-A' and B-B', respectively, with the extent of TPHg contamination and their associated lithologic types. The profiles show that TPHg contamination exceeding cleanup goals (yellow, orange, and red) occurs only at depth, and is more affiliated with finer grained soil types. There is no residual TPH in the shallow soils, indicating either no migration pathway to the deeper zones, or that previous remedial efforts have been successful at reducing TPHg contamination.

2.3.2 TPH as Jet Fuel

Soil analytical results for TPHjf are shown on Figure 11. The lateral extents of concentrations in soil that exceed the minimum clean up goal of 100 mg/kg are indicated by yellow and red colors, as shown in the legend. The colored plume distribution shown on the Figure 11 is based on all of the soil data available, both current and historic; and was created by projecting the highest concentration from any depth up to the surface. The yellow text boxes are primarily from the soil investigation that followed demolition and removal of the ASTs. Supplemental text boxes were added for "hot spots" that are defined by older, historic sampling events. The vertical distribution of TPHjf can be discerned by review of data in the yellow text boxes on Figure 11.

The lateral extents of the TPHjf plumes are similar to that for TPHg, but each TPHjf plume area is a little broader, probably due to the increased hydrocarbon chain length (C6 to C22) for the TPHjf standard. The TPHjf standard excludes butane (C4) and pentane (C5), but adds several other longer chain hydrocarbons common to weathered gasoline and jet fuel; which is probably more indicative of the volume of soil requiring remediation at this site. There are a few places where the TPHg concentration is higher than the TPHjf concentration, possibly indicating a gasoline source.

A 3D model of the TPHjf analytical results is shown on Figure 12. The highest concentrations occur below AST 80009 where concentrations range to 42,000 mg/kg (DPT-42) at a depth of 19 feet bgs. Other plumes are located in the vicinity AST 80008, where concentrations range to 20,000 mg/L (at 25 feet bgs at DPT-91); near the truck fueling racks in the south-central portion of the site, where concentrations range to 17,000 mg/kg (at 28 feet bgs at VW-14); and in the water tank and slop tank area where concentrations range to 14,000 mg/kg (at 20 feet bgs at DPT-35).

The orthogonal view of the 3D model for TPHjf (Figure 12) indicates that soil contamination is nearly continuous from the shallow soils to just above the water table at the fueling racks, illustrating a continuous migration pathway from the source to the water table. Below AST 80009, the data boxes on Figure 11 show that at DPT locations 41, 42, and 65, TPH contamination exceeding the cleanup goal was identified in the surface sample (0.5 feet bgs), but were less than cleanup goals at 5 feet bgs and deeper. However, DPT-65 was again contaminated at 10 feet bgs and DPT-42 was clean until 19 feet bgs. Only deep contamination was detected below ASTs 80001, 80007, 80008, and 55004 (Figures 11 and 12). The lack of soil contamination at shallower depths, which would indicate a contaminant migration pathway, was not identified below these tanks.

Figures 13 and 14 show profile cross-sections with the lithology indicated in the borehole column and the TPHjf contaminant plumes as interpreted by the EVS kriging program. The profiles show that TPHjf contamination exceeding cleanup goals (orange and red shades) is more affiliated with fine grained soil types (brown and orange shades) below the ASTs and fueling rack areas (except DPT-24 in the fueling rack area). There is no obvious migration pathway to these deeper zones below the ASTs, but there does appear to be more continuous contamination from the surface to the water table in the truck fueling area.

2.3.3 Benzene

Soil analytical results for benzene are shown on Figure 15. The lateral extents of concentrations in soil that exceed the minimum clean up goal of 11 micrograms per kilogram (µg/kg) are indicated by yellow and red colors. The vertical distribution of benzene can be discerned by review of data in the yellow text boxes on Figure 15.

The locations of most of the benzene "hot spots" are similar to that of TPHg and TPHjf, but there are also a few differences. High benzene concentrations are observed at ASTs 80001, 80008, and the area between the slop tank and the oil/water separator. Although benzene is present above cleanup goals in the water tank and fueling rack areas, the concentrations are not as relatively "hot" as compared to TPHg and TPHjf. The highest concentrations of benzene occur below AST 80008 where the maximum concentration was 360,000 µg/kg (VEW-26) at a depth of 25 feet bgs. The relatively decreased intensity of benzene in the fueling rack area indicates that either the fuel released in this area was more like jet fuel, or that remedial efforts in this area have reduced the more volatile constituents.

The orthogonal view of the 3D model for benzene (Figure 16) indicates that soil contamination above cleanup levels (yellow, orange, and red) occurs mostly below 15 feet bgs. Perhaps the SVE systems have been effective at remediating the shallow and more porous zones.

Figures 17 and 18 show profile cross-sections with the lithology indicated in the borehole column and the benzene contaminant plumes indicated between the borehole columns as interpreted by the EVS kriging program. The profiles show that benzene contamination exceeding cleanup goals (orange and red shades) is more affiliated with fine grained soil types (brown and orange shades) below the ASTs and fueling rack areas. There is no obvious migration pathway to these deeper zones below the ASTs, and sporadic contamination in fine grained materials below the truck fueling rack area (Figure 18).

2.3.4 Other VOC Constituents

The analytical results for toluene, ethylbenzene, total xylenes, MTBE, TBA, and 1,2-DCA were evaluated using the EVS software to model the plume extents of these constituents. Due to the high laboratory reporting limits for TBA, the nature and extent of this constituent could not be adequately evaluated. The analytical results for these constituents are reported in Table 2. The model results are shown in Appendix A, Figures A-2 through A-8. These Figures indicate that the vertical and lateral extents of these COCs are similar to the extents of benzene.

2.4 NATURE AND EXTENT OF CONTAMINANTS IN GROUNDWATER

The nature and extent of dissolved phase contaminants is characterized semiannually in Groundwater Monitoring Reports. CH2MHill prepares the groundwater monitoring report, on behalf of KMEP for the first half of the year; and Parsons prepares the groundwater monitoring report, on behalf of the DLA Energy, for the second half of the year. Each report summarizes results of groundwater monitoring activities.

The semiannual groundwater monitoring reports include groundwater gauging and sampling data from selected wells throughout the DFSP Norwalk tank facility and from well located offsite to the east, west, and south, and provide an updated description of the status of the dissolved-phase and liquid-phase hydrocarbon plumes. The principal COCs in groundwater at the site are TPH, BTEX, 1,2-DCA, MTBE, and TBA. The summary of findings from the most recent groundwater monitoring report (CH2MHill, July 30, 2012) is reproduced here for ease of reference. The complete text and figures are available for detailed review.

2.4.1 Summary

Groundwater monitoring of sentry wells and other selected wells was conducted in January 2012. Semiannual monitoring of these and other wells at the site and in the site vicinity was conducted during April 2012. In general, free product and groundwater quality conditions interpreted from these monitoring events are similar to those interpreted for the October 2011 semiannual monitoring event. In addition, KMEP conducts monthly monitoring of six wells in the southeastern area March 2010.

2.4.2 Groundwater Flow Conditions

Groundwater elevations decreased by approximately 1 foot at the site since the October 2011 semiannual monitoring event. During April 2012, the overall sitewide horizontal hydraulic gradient in the upper groundwater zone was 0.00065 ft/ft to the north-northwest. The horizontal hydraulic gradient in the Exposition Aquifer was 0.0004 ft/ft to the east-southeast, similar to the general historical flow direction.

2.4.3 Distribution of Free Product

Free product was observed in the north-central and eastern areas in April 2012. Free product was reported in the north-central area at wells GMW-35, GMW-59, and TF-23, as well as the eastern area at wells GW-15 and GMW-62. Free product has been detected in well GW-15 since April 2008, and in well GMW-62 starting in January 2011.

Free product was observed south of the truck fueling rack area in well GMW-4, but was not detected in well MW-15 north of the fueling racks where it has been detected in the past.

In the KMEP areas, free product also was reported in the south-central area during this semiannual event but in only two wells: GMW-24 and MW-SF-15. Free product was not detected in offsite wells GMW-O-12 and GMW-O-20 to the south where it has been reported during past events. In the southeastern 24-inch diameter block valve area, free product was reported in well GMW-O-15, but not in well GMW-36, where it has been detected in the past. The presence of free product in well GMW-O-15 is consistent with historical data.

At the request of the RWQCB, LNAPL investigations were conducted and summarized in two reports (Parsons, 2011b and 2012b). The investigations showed that the residual LNAPLs are confined to a few thin layers and are not distributed throughout the entire vadose (unsaturated) zone and do not occur below the historical fluctuations in the water table. Hydrocarbon LNAPLs were detected at low concentrations and the vertical extent is limited to a 1 to 2 feet thick smear zone at depths near the perched water table. Based on the 2011 and 2012 LNAPL investigations and summary reports, the occurrence of LNAPLs is limited to the following areas: around and south of the loading racks and extending from the loading racks northward toward AST 55003; southwest of AST 80008 and extends westward toward AST 80007; west of the water tank south of the AST farm area; and at the east side of the site adjacent to Holifield Park. The LNAPL characterization reports concluded that hydrocarbons, tentatively suspected at deeper depths in the saturated zone were not substantiated and the detected LNAPL hydrocarbons at the capillary fringe are interpreted to be at less than residual saturation and are therefore no longer mobile.

2.4.4 Dissolved-Phase Constituents

This section summarized the dissolved-phase constituents for TPH, benzene, 1,2-DCA, MTBE, TBA, and other fuel oxygenates.

2.4.4.1 Total Petroleum Hydrocarbons

The lateral extent of the TPH plume in the north-central, eastern, south-central, and southern offsite areas remains similar to the interpreted plumes for October 2011. As a result of nondetect values reported in offsite wells WCW-7 and WCW-8, the lateral extent of TPH in the northwestern portion of the site decreased as compared to the extent interpreted for October 2011. TPH was not detected in any wells located in the western offsite area or southern offsite area (upgradient) of Cheshire Street.

For the KMEP plume in the southeastern part of the site, the lateral extent of the TPH plume decreased as compared to the interpreted plume for October 2011. The decrease in extent is a result of decreases in TPH to levels below the laboratory reporting limit in wells GMW-SF-9 and GMW-O-19. A decrease in TPH was reported in wells GMW-36, GMW-O-15, and PZ-5 relative to concentrations reported in October 2011. TPH also was not detected in wells GMW-39, GMW-O-16, GMW-O-17, and MW-8.

TPH was not detected in any of the Exposition Aquifer wells during April 2012.

Figure 4 of the Groundwater Monitoring Report shows the nature and extent of TPH in the uppermost groundwater zone in April 2012. The distribution of dissolved-phase TPH is similar to the TPH distribution in the vadose zone, as shown on Figures 7 and 11 of this report.

2.4.4.2 Benzene

Benzene was not detected in offsite wells west of the site or in any of the Exposition Aquifer wells. The lateral extents of dissolved benzene plumes across the site were similar to the October 2011 interpretation, with the exception that the western extent of the north-central plume expanded to the west (due to benzene detections in wells GMW-18, GMW-19 and PZ-3) and the northern extent of the southeastern area plume decreased to the south (due to a nondetect value at well GMW-SF-9). Benzene also was detected in various wells located west of the north-central area plume and near the truck fueling rack area.

2.4.4.3 1,2-Dichloroethane

The lateral extent of 1,2-DCA was similar to the October 2011 interpretation. Concentrations of 1,2-DCA sitewide were below the conservative risk-based cleanup goal for 1,2-DCA (70 µg/L). 1,2-DCA was not detected in any of the Exposition Aquifer wells except well EXP-3 (0.58 µg/L and 0.54 µg/L for SFPP and DLA Energy split samples, respectively). 1,2-DCA was not detected in any of the wells in the north-central, eastern offsite, southern offsite, and southeastern portions of the site.

2.4.4.4 Methyl Tertiary Butyl Ether

Overall, the distribution of dissolved MTBE was similar to that interpreted for the previous semiannual monitoring event. During April 2012, MTBE was detected in the following areas: the northwestern portion of the site and the adjacent western offsite area; the southeastern KMEP area near the 24-inch diameter block valve; the north-central area; the south-central KMEP area; and the southern offsite KMEP area. MTBE was not detected in the truck rack eastern offsite areas. Nine of the 34 wells with MTBE detections contained concentrations above the conservative risk-based cleanup goal for MTBE (40 µg/L). MTBE was not detected in any of the Exposition Aquifer wells, except well EXP-3 (0.48 J µg/L for the DLA Energy split sample). MTBE was not detected above the laboratory reporting limit in the EXP-3 split sample collected on behalf of KMEP.

2.4.4.5 Tertiary Butyl Alcohol

Overall, the lateral extent of TBA across the site was generally similar to the extent interpreted for October 2011. TBA was not detected in any of the eastern or western offsite wells.

The lateral extent of higher-concentration TBA (greater than 1,000 µg/L) is limited to the southeastern KMEP 24-inch diameter block valve area, where the maximum concentration sitewide was reported in well PZ-5. Higher concentration TBA was also reported in KMEP remediation wells GMW-36 and GMW-O-15, where measurable free product has been reported in the past. TBA was not detected in any of the southern offsite wells or the Exposition aquifer wells during the semiannual monitoring event.

2.4.4.6 Other Fuel Oxygenates

Other fuel oxygenates including ethyl tertiary butyl ether (ETBE), di-isopropyl ether (DIPE), and tertiary amyl methyl ether (TAME) were analyzed during the April 2012 semiannual event. DIPE was generally detected in wells located along the KMEP West Side Barrier region and the northwestern portion of the site. Low-level detections of TAME were reported in only two wells during the April 2012 sampling event. ETBE was not detected.

SECTION 3

REMEDIAL ACTIONS PERFORMED TO DATE

The soil and groundwater at the areas of concern (AOC) are impacted with hydrocarbons mainly consisting of JP-5 and JP-8, MTBE, and BTEX. Remediation systems were installed to treat these hydrocarbon impacts in soil and groundwater. The purposes of these remediation systems are to reduce hydrocarbon concentrations to cleanup goals, to prevent offsite migration, and ultimately achieve site closure within a reasonable timeframe.

The impacted areas within the site consist of the AST farm, the truck fueling area, the water tank area, the oily waste area, the eastern boundary and Holifield Park, the KMEP 24-inch diameter block valve area, the KMEP southern boundary of the site, and the northeast boundary of the site.

3.1 REMEDIAL ACTION OBJECTIVES AND CLEANUP GOALS

The remedial cleanup goals and objectives are summarized in this section.

3.1.1 Soil Cleanup Goals

RWQCB approved site-specific SCGs as shown in Table 1. Parsons (2012c) provided the SCG calculations and assumptions for the final approved SCGs. The SCGs were calculated using the procedures proscribed in the Interim Site Assessment & Cleanup Guidebook (RWQCB, 1996), and are site specific goals calculated to be protective of leaching to groundwater pathway. The SCGs are calculated by multiplying an attenuation factor by a water quality standard. The attenuation factor is calculated by using a soil to groundwater leaching model which takes into consideration the physical properties of the site specific soil types, physical properties of the chemicals, the average infiltration rates through the site specific lithology, and the distance to groundwater. SCGs were calculated in five foot intervals and are based on depths to groundwater of 25.5 feet, 21 feet, 16 feet, 11 feet, 6 feet, and 1 foot.

3.1.2 Groundwater Cleanup Goals

Cleanup goals for groundwater constituents have not been established for the site. For the purpose of this RAA, the assumed water quality cleanup goals were the most conservative of the values from the 1) California Drinking Water Maximum Contaminant Levels (MCLs), 2) California drinking water notification levels, and 3) US EPA Tapwater Regional Screening Levels. These presumed groundwater cleanup levels were used because they were used as the basis for developing the SCGs and are thought to be conservative values.

3.2 REMEDIATION SYSTEMS

The remediation systems consist of SVE, groundwater extraction (GWE), biosparging, absorbent sock installations for passive recovery of free product, and total fluids extraction. The following technologies are part of the current remediation system at the site and also listed are the specific locations of each technology to treat subsurface impacts:

- SVE wells for hydrocarbon extraction from vadose zone subsurface impacts from the central tank farm area, northwestern Tank 80001 area, Tank 80006 area, central Tank 80008 area, Tank 55004 area, north-east area, water tank area, and truck fueling area. SVE is currently operating continuously from the horizontal wells that span through the entire AST area and the north-eastern area.
- GWE wells for hydrocarbon extraction from dissolved-phase subsurface impacts from the northwestern area, central tank farm area, and north eastern boundary area. GWE is currently operating continuously from the northwest and north eastern boundary areas.
- Biosparge wells for hydrocarbon removal from dissolved-phase subsurface impacts from areas throughout the tank farm area and eastern boundary area. Biosparging is currently non-operational.
- Quarterly groundwater monitoring throughout the site and impacted off-site areas. The well network and sampling schedule has been approved by the RWQCB and the Restoration Advisory Board (RAB).

3.3 REMEDIAL OPTIMIZATION ACTIVITIES & STRATEGY

Remedial optimization is on-going to ensure the most efficient means and technology used for cleanup at the site. Included as part of remedial optimization, the most recent activities were soil gas and aquifer testing. From September 2008 through November 2008, soil gas testing and monitoring were conducted on vapor monitoring probes located throughout the site to assess the performance of the SVE system. In November 2008, aquifer pump testing and groundwater capture analysis were conducted to support remedial decisions for Holifield Park.

Soil gas monitoring and respiration testing were conducted in order to assess the vadose zone soil chemistry, i.e., chemicals of potential concern (COPC), at its current state and compare to initial site conditions; to estimate the performance of the SVE system; and determine if further vadose zone remediation is warranted. In general, results show lower VOC concentrations across the site, where samples were collected during this effort. This suggests that the SVE system previously designed for the site has helped reduce the quantities of onsite VOCs in the vadose zone where remediation wells were located. However, the results may be due to a combination of factors, including the SVE system, such as natural bio-attenuation, the rise of groundwater levels since initial site conditions, other onsite remedial systems, and/or displacement of plume. In summary, there are areas throughout the site, where the current SVE system has done its job and is no longer needed and there are other areas where continued SVE is recommended and possible expansion of system.

An aquifer pump test and analysis was conducted at extraction well GW-15 (located in the eastern area) and surrounding monitoring wells. A subsequent groundwater capture analysis was conducted to determine the impacted groundwater area. The purpose of the pumping tests was to characterize hydrogeologic parameters in the upper sands, and support remedial decisions regarding migration of COPC towards Holifield Park. The pumping test results were integrated into the capture analysis along with, hydraulic head measurements, and chemical concentration data. Results of the pumping tests suggest groundwater extraction at the site can induce a large enough cone of depression to prevent further migration of COPC towards the property to the east of the site, Holifield Park. Furthermore, if designed properly an extraction system may capture a significant portion of the impacted groundwater under Holifield Park.

The capture zone analysis included defining the target capture area; identifying hydraulic heads and gradients; developing an analytical groundwater model; and modifying the groundwater model to predict effects from GWE west of Holifield Park. Results of the capture analysis resulted in the installation of an additional groundwater extraction well in the eastern site boundary area. The current GWE system in the northeastern boundary area has been successful in preventing impacted groundwater from flowing offsite to the east and has captured a significant portion of impacted groundwater under Holifield Park.

SECTION 4

ESTABLISHING REMEDIAL ALTERNATIVES

Remedial alternatives were developed for the DFSP Norwalk site through assembly of technologies and process options that are effective, implementable, and have reasonable costs to address site contamination and mitigate potential risks. Established technologies that through past successful use are often referred to as presumptive remedies, were identified and screened against GRAs to reduce the number of technologies to be carried forward for further analysis. Retained technologies were assembled to address soil and groundwater contamination, or both, and to form the alternatives, which were screened against specific criteria to allow selection of the preferred alternative. This section provides details of this approach, which led to development and selection of the recommended alternative.

4.1 GENERAL RESPONSE ACTIONS FOR SOIL AND GROUNDWATER

GRAs describe categories of remedial actions that eliminate, reduce or control risks and provide a basis for identifying specific remediation technologies. Based on guidance provided by the California EPA and Los Angeles RWQCB, as well as USEPA feasibility study guidance, this RAA has considered the following hierarchy of GRA alternatives in order of descending preference:

- Reuse or recycling,
- Destruction or detoxification of contaminants through alteration of their molecular structures and/or through neutralization,
- Separation, concentration, or volume reduction,
- Immobilization of hazardous substances through changing the physical state of the contaminant or contaminated media,
- On-site or off-site disposal, isolation, or containment at an engineered facility designed to minimize the future release of hazardous substances, pollutants, or contaminants and in accordance with applicable regulations, and
- Institutional controls (ICs) to restrict access and/or long-term monitoring to assess changes in contaminant distribution over time.

Feasible response actions considered appropriate for addressing the contaminants at the site were reviewed and retained for screening. These actions included destruction/ detoxification of contaminants in soil and groundwater, full and/or partial removal/relocation of soil or soil contamination, monitored natural attenuation (MNA) for addressing groundwater contamination, and implementation of ICs.

4.2 RESPONSE ACTION SCREENING CRITERIA

The potential remedial actions were compared to three primary criteria to determine their suitability for use at this site. These criteria are 1) effectiveness, 2) implementability, and 3) cost.

The above three groups include the following nine criteria (USEPA, 1988):

4.2.1 Effectiveness

The effectiveness of a response action refers to the degree to which the action meets threshold criteria and remedial objectives. The key aspects of the effectiveness criteria include:

- The overall protection of human health and the environment, which is the fundamental reason for implementing any response action.
- The degree to which the response action complies with applicable or relevant and appropriate requirements (ARARs) established for the site.
- The degree to which the response action reduces the toxicity, mobility, and/or volume (TMV) of the hazardous substance or contaminated media.
- The long-term effectiveness of managing the residual risk remaining from untreated contaminated media and the adequacy and reliability of controls used to manage the treated residuals or untreated contaminated media.
- The short-term effects of the response action on human health and the environment during implementation. This would include the impacts to nearby communities, site workers, and the surrounding environment. This would also include the time required until remedial objectives are achieved.

4.2.2 Implementability

The technical and administrative feasibility of implementing any aspect of the response action should also be considered. Technical feasibility includes such factors as the availability of equipment, facilities, and specialists; reliability of the technology; and the compatibility of the technology with current and future site conditions. Administrative feasibility includes factors such as availability of necessary approvals to implement the technology and the degree of community acceptance.

4.2.3 Cost

The cost of each response action is a significant factor in determining the selected remedy. Cost considerations not only include capital costs, but the life-cycle costs as well. Costs that are excessive and disproportionate compared to other remedies are one factor used to eliminate certain response actions.

4.3 RESPONSE ACTION SCREENING

Potential response actions were identified based on the media of concern (surface soil, sub-surface soil, and groundwater), the physio-chemical properties of the contaminants, and review of publicly available information regarding the effectiveness of these remedies at other sites with similar affected media and contaminants. The response actions were screened using the criteria described in Section 4.2 above and the ability of each response action to meet the RAOs established in Section 3.1. The results of the screening are presented below and summarized in Table 3.

4.3.1 No Action

This response action requires that no further activity be performed at the site, including periodic soil and groundwater monitoring. Over time, petroleum, oil, and lubricant (POL) contaminants will naturally attenuate. This alternative will not be effective in removing exposure pathways, preventing migration of site contaminants, and/or minimizing short- and long-term impacts to surrounding communities and the environment. Additionally, this alternative will not be administratively feasible since it is highly unlikely that approvals will be obtained from California EPA, the Los Angeles RWQCB, or members of the community. Based on these reasons, this response action will not be carried forward for further evaluation.

4.3.2 Destruction/Detoxification

The destruction or detoxicification of contaminants can be performed through physical means (application of heat) or chemical means to break down or modify the molecular structure of the site contaminants. Specific technologies considered were based on site contaminants and the impacted media, and included in-situ chemical oxidation. In-situ chemical oxidation is a process by which POL contaminants are degraded into carbon dioxide and water.

Contaminants in upper groundwater, and particularly in the capillary fringe (smear zone), could be destroyed via in-situ chemical oxidation using ozone or peroxide-forming chemicals. Ozone introduced into the groundwater table could theoretically oxidize contaminants in groundwater and the smear zone. The most common method of forming ozone for in-situ oxidation is concentration of oxygen in atmospheric air and transformation of a portion of the oxygen into ozone. This process produces a mixture of approximately 10% ozone and 90% oxygen. The injected ozone quickly decomposes POL contaminants while the oxygen is available to support aerobic biodegradation of POL contaminants. Oxygen is also available to migrate vertically into the smear zone as well as the vadose zone to support aerobic biodegradation in these areas. Ozone is a short-lived compound and produces no secondary by-products other than carbon dioxide and water. A complete aerobic biodegradation also produces only carbon dioxide and water, thus both processes are considered benign. Based on the common usage of ozone to degrade POL contaminants in groundwater and the capillary fringe and the added benefit of oxygen to support aerobic biodegradation in the smear and vadose zones, in-situ chemical oxidation via the introduction of ozone into groundwater is retained for further analysis.

While ozonation for remediation of POL contaminants in groundwater is well understood and relatively straight forward, the use of in-situ oxidation for contaminants in vadose zone soil can be more problematic. The primary drawbacks with in-situ chemical oxidation for contaminants in soil include:

- Requires a WDR permit from RWQCB (general permit),
- may impact solubility of naturally present metals, including hexavalent chromium,
- the need for direct contact between oxidant and contaminant,
- may require longer duration of injection to complete remediation, and
- frequent confirmation sampling to statistically prove SGCs have been met.

Based on these concerns, in-situ chemical oxidation is not retained for further evaluation for soil.

4.3.3 Full or Partial Removal/Relocation of Soil and/or Soil Contamination

4.3.3.1 Bioventing via Soil Vapor Extraction

Bioventing via SVE is a process whereby a vacuum blower connected to vertical or horizontal vadose zone wells is used to induce vacuum in subsurface soils to draw atmospheric air into the soil column thus providing oxygen to indigenous bacteria and increase aerobic biodegradation of POL contaminants. The use of SVE to support bioventing also reduces the potential for unplanned migration of POL-laden soil vapor to migrate beyond the specified treatment area thus creating vapor intrusion issues.

An added short-term benefit of bioventing via SVE is the extraction of POL laden soil vapor for transport to the surface for treatment or venting to the atmosphere. Significant quantities of more volatile POL contaminants can be removed via SVE thus reducing the contaminant mass and decreasing the time necessary to achieve cleanup goals.

Bioventing via SVE is a proven technology for the remediation of POL contaminated soil and is typically the technology of choice for sites such as DFSP Norwalk. SVE has already been implemented at DFSP Norwalk and significant contamination mass removed, but this technology has not been applied to all impacted areas. Expansion of the current system to address all impacted areas would eventually lead to achieving SCGs and significantly affect groundwater contaminant levels through mass removal in the capillary fringe.

The primary drawback associated with bioventing is the time frame needed to achieve cleanup as well as the cost for off-gas treatment when SVE is used to induce air flow into the subsurface. However, as an activated carbon treatment system is currently in place at DFSP Norwalk, and was sized for expansion of the bioventing/SVE system, a portion of the off-gas treatment cost has already been incurred. It is anticipated that in-situ oxidation via ozonation and ICs would also be needed due to residual contaminants in groundwater, as well as in the soil, prior to achieving cleanup goals. Based on its relatively lower cost and ease of implementability, bioventing is retained for further evaluation.

4.3.3.2 Thermally Enhanced Soil Vapor Extraction

Thermally enhanced SVE is similar to standard SVE except that heat is applied to the soil profile to increase POL volatilization and removal. Heat is typically applied using arrays of metal cathodes and carbon anodes with SVE wells place in and around the arrays. Theoretically, the addition of thermal energy to the soil expedites contaminant volatilization and subsequent extraction, resulting in shorter cleanup times. There are a number of drawbacks associated with thermally enhanced SVE including:

- energy consumption is remarkably high and for a large site like DFSP Norwalk, which is in a state with severe seasonal electric power shortages, could become cost prohibitive,
- existing SVE wells constructed of PVC would have to be replaced with stainless steel wells in order to withstand the heat generated by the arrays,
- the arrays have to be placed well above the groundwater table to minimize excessive energy draw and which limits enhanced SVE at the smear zone,
- a potential exists for uncontrolled volatilization of POL contaminants during soil heating, which would require placement of a cap above the treatment area, and
- hot soil vapor may need to be cooled prior to treatment through the existing activated carbon system.

Additionally, in 2004, the Air Force Center for Engineering and the Environment (AFCEE) conducted an evaluation of nearly 40 thermally enhanced SVE projects at U.S. government sites across the country. Based on this evaluation, only one of the 40 sites evaluated clearly benefited from thermal enhancement. This site had a relatively low-volatility contaminant with multiple soil stratifications and thermal enhancement was targeted only at clay layers. At all other sites, it was determined through life-cycle cost analyses that standard SVE would have achieved cleanup for significantly less cost than thermally enhanced SVE. Based on these concerns, thermally enhanced SVE is excluded from further evaluation.

4.3.3.3 Excavation and Off-Site Disposal/Treatment

Excavation and off-site treatment/disposal is the presumptive remedy for treatment of POL impacted soil in California. Soil is commonly removed using excavators, however, air knifing or water fluidization, both followed by vacuum excavation, is commonly employed near buried utilities, building foundations, and other sensitive areas. Removed soil is placed in haul trucks and transported to an off-site treatment facility or landfill.

The primary advantage of excavation and off-site treatment/disposal is the permanence of the remedy and relatively short time-frame needed for implementation. The primary concerns with this response action are the high capital cost requirements and the technical feasibility of transporting the large quantities of soil to the appropriate treatment/disposal facility (logistics). Other concerns include the short-term impacts associated with the implementation of this remedial action, as well as the effects and administrative feasibility associated with moving a portion of the impacted soil to a landfill. Although there are significant concerns, particularly with the elevated costs, this remedial action was retained for further evaluation. It is anticipated that ICs would also need to be implemented due to residual contaminants in groundwater, and possibly in soil, depending on the vertical extent of the excavation. Based on permanence of the technology and short time frame for implementation, excavation and off-site treatment/disposal is retained for further evaluation.

4.3.4 Monitored Natural Attenuation

MNA is a process in which soil and/or groundwater is sampled at specified intervals to monitor and measure the natural attenuation of site contaminants. POL contaminants attenuate by multiple mechanisms including biodegradation, geochemical degradation, transport and dilution, diffusion, and volatilization. Trends in contaminant concentrations are plotted and monitored to determine if contaminant plumes are stable, contracting, or expanding. Early warning and sentry wells are established to monitor unexpected plume expansion and ensure sensitive receptors are not impacted.

In many situations, MNA is accompanied by source area removal to reduce contaminant mass transport, particularly to groundwater. Due to the large area of impact and high contaminant levels in site soil, source removal would be excessive relative to typical MNA applications, and as a result, MNA is not applicable to this media. However, MNA is a standard approach to remediation of groundwater and would likely be combined with any of the retained contaminated soil response actions, particularly in-situ oxidation via ozonation. It is anticipated that ICs would also need to be implemented during MNA implementation due to residual contaminants in groundwater. Based on its proven history, ease of implementation, and relatively low cost, MNA is retained for further evaluation.

4.3.5 Institutional Controls

This response action utilizes ICs to prevent completed exposure pathway between contaminated media and potential receptors. Specific to conditions at the DFSP Norwalk site, this would include prohibitions of certain uses at the site that would allow potential receptors to be exposed to contaminated media. Such prohibitions may include the physical isolation of the property from potential receptors (construction of security measures to eliminate site access), placing administrative controls on the property deed, such as a uniform environmental covenant, and/or preparation and implementation of an Environmental Hazards Management Plan (EHMP). Due to the contaminant concentrations detected and the environmental hazards evaluated, this response action alone would not meet the RAOs. However, use of ICs in conjunction with other response actions is common and therefore this response action was retained for further evaluation.

4.4 RETAINED RESPONSE ACTIONS

After the initial screening, five of the response actions were retained for further evaluation and assembly into remedial alternatives. Table 4 summarizes the retained response actions and their general effectiveness at meeting site RAOs.

SECTION 5

DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

Remedial alternatives were developed based on screening of the response actions described in Section 4. Combinations of remedial actions were considered to address weakness associated with the effectiveness of individual remedial actions. The five remedial alternatives developed for the DFSP Norwalk site are summarized below.

5.1 ALTERNATIVE DESCRIPTIONS

This section provides a detailed description of each alternative.

5.1.1 Alternative 1: Institutional Controls and Monitored Natural Attenuation

ICs would be established to eliminate/minimize the human exposure routes of direct contact to site soil, and ingestion of site soil and groundwater via deed restrictions and site access controls. The inhalation exposure route due to both soil vapor and groundwater off-gassing would remain as a potential. Future land use would be limited to only activities that do not disturb surface or subsurface soil, or involve the extraction of site groundwater. A mitigation plan would have to be in place, in order to address contingencies during building constructions and prior to their occupancy (i.e. passive venting systems, liquid boot, etc.). MNA would be implemented to monitor the progress of groundwater remediation and allow planning for location of additional early warning and sentry wells, if needed.

The cost for this alternative assumes that annual sampling would occur for the first five years at up to 25 groundwater and 10 soil vapor monitoring wells. Sampling could be reduced to biennial for years six to 10. The number of wells sampled could also be reduced during these monitoring periods. Trends in contaminant concentrations would be monitored to establish the stable/ contracting/expanding nature of the groundwater contaminant plume and of the contaminant concentrations in soil, and to estimate the time required to achieve cleanup. It is unlikely that this alternative would be accepted by the regulatory agencies or surrounding community, but eventually, cleanup goals would be met. This Alternative presents a baseline for comparisons of costs to more active remedies presented in Alternatives 2, 3, and 4.

5.1.2 Alternative 2: Institutional Controls, Monitored Natural Attenuation, Excavation of the Top Two Feet of Impacted Soil, In-Situ Chemical Oxidation via Ozonation, and Expansion of the Bioventing/Soil Vapor Extraction System

The ICs and MNA actions described for Alternative 1 would be supplemented by the excavation and off-site treatment/disposal of the top two feet from all impacted areas, implementation of ozonation in groundwater and capillary fringe, and expansion of the current bioventing/SVE system to address all impacted vadose zone soil. This alternative would minimize the human exposure routes of direct contact and ingestion (except for intrusive work by site workers) and would minimize the inhalation exposure route due to soil vapor. ICs would minimize the groundwater ingestion exposure route and further reduce the ingestion and inhalation exposure routes for soil via deed restrictions and site access controls. The potential inhalation exposure route from groundwater off-gassing could still exist.

Excavation of surface soil from all impacted areas would generate approximately 4,680 cubic yards of soil that could be treated via thermal desorption at Thermal Processing Services (TPS) facility in Adelanto, California. Standard excavation techniques would be used for the majority of the site, but water fluidization of soil and vacuum excavation would be used along the KMEP alignment and near any other structurally sensitive areas and near buried utilities. Certified clean backfill would be used to fill the excavation areas to a depth of six inches below grade and certified clean topsoil placed to complete the backfill. The disturbed areas would then be hydroseeded with an athletic field grass mixture. Dust control in the form of a sealant on site roads and water application at excavation areas and at stockpiles would be employed. Perimeter dust monitoring would also be conducted. Additionally, erosion control consisting of silt fences and hay bale berms would be implemented.

An ozonation system consisting of an ozone generator(s) and injection wells would be installed to provide ozone to a point approximately 5 feet below the seasonal low groundwater table. These areas include near tanks 80001, 80007, 80008, 80009 and 55004, and near the water tank and the truck fueling area. Stainless steel well points with diffuser screens would be installed in the areas to be treated. Ozone would be supplied via stainless steel piping and ozone/oxygen/vapor monitoring points installed to monitor the system progress. It is estimated that 676,959 kilograms of ozone would be supplied to the groundwater and capillary fringe and would oxidize an estimated 135,392 kilograms of POL contaminants in these regions. Subsequent sampling would be conducted to determine the mass removal affected by the process. If necessary, additional ozone could be supplied to further increase the removal of POL contaminant mass.

The current bioventing/SVE system would be expanded with the installation of up to 164 new vertical extraction wells (525,000 square feet [sf] and 3,200 sf per well). The new wells would be screened across the most highly contaminated zones and the screen intervals adjusted to account for lower and higher permeability soils. It is anticipated that nearly all wells would extend to the top of groundwater, estimated at 28 feet bgs. The existing vacuum blower was sized for a significant expansion of the current bioventing system, however due the areal extent of the site and distances needed to reach the existing centralized off-gas treatment system, two additional transfer blowers would be needed to meet the needs of an expanded system. Due to excavation of the top two feet of impacted soil across the site, much of the existing vacuum and off-gas conveyance lines would either be removed and replaced, or demolished and replaced.

Up to 30 soil vapor monitoring wells would be installed to monitor both the progress of remediation and for possible vapor intrusion concerns near residences, particularly located south of the site. These wells would be monitored on a weekly to monthly basis using field instrumentation, but would also be sampled on an annual to triennial basis for documentation of vapor concentrations.

5.1.3 Alternative 3: Institutional Controls, Monitored Natural Attenuation, In-Situ Chemical Oxidation via Ozonation, Excavation of the Top 15 Feet of Impacted Soil, and Expansion of the Bioventing/Soil Vapor Extraction System

The ICs, MNA, and in-situ oxidation actions described for Alternative 2 would be supplemented by the excavation and off-site treatment/disposal of the top 15 feet of impacted soil across much of the site and expansion of the current bioventing system to address all impacted vadose zone soil below 15 feet. Soil near tanks 80008, 80009, and 55004, and the water tank and truck fueling stands are the areas recommended for excavation. This is due to the presence of contamination beginning at the ground surface and extending continuously to the top of groundwater at these locations. Because contamination is not encountered in the upper 15 feet of soil at Tank 80001, excavation would not occur here. Instead, ozonation and bioventing would be used to address contaminated vadose zone soil at that location.

This alternative would eliminate the human exposure routes of direct contact with and ingestion of site soil and would further minimize the inhalation exposure route. ICs would minimize the groundwater ingestion exposure route via deed restrictions and site access controls. The potential inhalation exposure route from groundwater off-gassing could still exist.

Excavation of impacted soil to 15 feet below grade would generate approximately 51,000 cubic yards of contaminated material that will require treatment or disposal. It is anticipated that most of the soil could be treated via thermal desorption at TPS facility in Adelanto, California. However, a percentage of the soil may exceed allowable concentration limits at TPS, and thus may require transport to the McKittrick Landfill in McKittrick, California for direct disposal.

Approximately 27,000 cubic yards of clean overburden would have to be removed to access the impacted soil. Clean overburden soil overlies impacted soil at tanks 80008, 80009, 55004, and at the water tank and truck fueling stands. This is particularly evident at Tank 80008. At this location, the areal extent of impacted soil in the 0 to 5 feet depth interval is approximately 5,000 sf. However, the contaminant foot print expands with depth, resulting in an impacted areal extent of approximately 95,000 sf at the 15 to 20 feet depth interval. Additionally, some clean overburden soil will need to be removed to allow excavation with a 1:1 side slope, which is necessary to minimize the potential for side wall cave-in as well as sloughing of clean soil into impacted soil excavation areas. Overburden soil would be stockpiled on site and sampled, in accordance with the On-Site Soil Management Plan (SMP) (Parsons, 2012d) and established soil handling procedures, then used as backfill for the excavations.

Similar to Alternative 2, a combination of standard excavation techniques and water fluidization of soil with vacuum excavation would be used to complete the excavations. However, a trench box would also need to be employed along the KMEP alignment and near structurally sensitive buildings and near buried utilities. Sheet piling along the southern property boundary would also be needed to allow complete removal of impacted soil in this area. Also similar to Alternative 2, certified clean backfill would be used to fill most of the excavation areas, and then disturbed area restored using certified clean topsoil and hydroseeding. Dust control using a sealant on site roads and water application at excavation areas and at stockpiles would also be employed. Perimeter dust monitoring as well as erosion control measures would be implemented.

Also similar to Alternative 2, the current bioventing/SVE system would be expanded with the installation of up to 164 new vertical extraction wells (525,000 sf and 3,200 sf per well). The new wells would be screened only from 15 to 28 feet bgs and preferentially across the most highly contaminated zones. Additional vacuum transfer blowers would be installed to augment the existing vacuum blower. Due to excavation of the top 15 feet of impacted soil, all of the existing vacuum wells, vacuum lines, and off-gas conveyance lines would be demolished and replaced. Up to 30 soil vapor monitoring wells would also be installed to monitor remedial progress and possible vapor intrusion concerns near residences. Monitoring and sampling of these wells would mirror that described for Alternative 2.

5.1.4 Alternative 4: Institutional Controls, Monitored Natural Attenuation, In-Situ Chemical Oxidation via Ozonation, Excavation of the Top 20 Feet of Impacted Soil, and Expansion of the Bioventing/Soil Vapor Extraction System

The ICs, MNA, in-situ chemical oxidation described for Alternative 3 would be supplemented by the excavation and off-site treatment and disposal of the top 20 feet of impacted soil at tanks 80008, 80009, and 55004, and at the water tank and truck fueling area, and expansion of the current bioventing system to address all impacted vadose zone soil below 20 feet. This alternative would eliminate the human exposure routes of direct contact with and ingestion of site soil and would further minimize the inhalation exposure route. ICs would minimize the groundwater ingestion exposure route via deed restrictions and site access controls. The potential inhalation exposure route from groundwater off-gassing could still exist.

Excavation of impacted soil to 20 feet below grade would generate approximately 80,600 cubic yards of contaminated material that will require treatment or disposal. Due the depth that impact is first encountered at Tank 80001, approximately 15 feet, and relatively minor volume of impacted soils at the 15 to 20 feet depth interval, 6,360 cubic yards, soil near this tank would not be excavated as part of this alternative. Bioventing would address contaminated vadose zone soil at this location.

It is anticipated that most of the 80,600 cubic yards of impacted soil could be treated via thermal desorption at TPS facility in Adelanto, California. However, a percentage of the soil may exceed allowable concentration limits at TPS facility in Adelanto, California, and thus require transport to the McKittrick Landfill in McKittrick, California for direct disposal. Approximately 64,600 cubic yards of clean overburden would have to be removed to access the impacted soil. Overburden soil would be stockpiled on site and sampled, in accordance with the SMP and established soil handling procedures, then used as backfill for the excavations.

Similar to Alternative 3, a combination of standard excavation techniques and water fluidization of soil with vacuum excavation, and use of the trench box would be used to complete the excavations. Sheet piling along the southern property boundary would also be needed to allow complete removal of impacted soil to the intended depth of 20 feet. Also similar to Alternative 3, certified clean backfill would be used to fill most of the excavation areas, and then disturbed area restored using certified clean topsoil and hydroseeding. Dust control using a sealant on site roads and water application at excavation areas and at stockpiles would also be employed. Perimeter dust monitoring as well as erosion control measures would be implemented.

Also similar to Alternative 3, the current bioventing/SVE system would be expanded with the installation of up to 164 new vertical extraction wells (525,000 sf and 3200 sf/well). The new wells would be screened only from 20 to 28 feet bgs and preferentially across the most highly contaminated zones. Additional vacuum transfer blowers would be installed to augment the existing vacuum blower. Due to excavation of the top 20 feet of impacted soil, all of the existing vacuum wells, vacuum lines, and off-gas conveyance lines would be demolished and replaced. Up to 30 soil vapor monitoring wells would also be installed to monitor remedial progress and possible vapor intrusion concerns near residences. Monitoring and sampling of these wells would mirror that described for Alternative 3.

5.1.5 Alternative 5: Institutional Controls and Monitored Natural Attenuation for Groundwater, and Excavation of Impacted Soil to the Top of Groundwater

The ICs and MNA actions described for Alternative 1 would be supplemented by the excavation and off-site treatment/disposal of all impacted vadose zone soil at the site. In-situ chemical oxidation would not be implemented as this alternative would completely remove the capillary fringe and thus the majority of contaminant mass that continues to dissolve into site groundwater. This alternative would completely eliminate the human exposure routes of direct contact with and ingestion of site soil, and would nearly eliminate all inhalation concerns, with the possible exception of groundwater off-gassing. ICs would minimize the groundwater ingestion exposure route via deed restrictions and site access controls. The potential inhalation exposure route from groundwater off-gassing could still exist.

Excavation of impacted soil to the top of groundwater would generate approximately 195,000 cubic yards of contaminated material that will require treatment or disposal. Similar to Alternative 3, it is anticipated that most of the soil could be treated via thermal desorption at TPS facility in Adelanto, California. However, a percentage of the soil may exceed allowable concentration limits at TPS facility, and thus require transport to the McKittrick Landfill in McKittrick, California for direct disposal. Approximately 225,000 cubic yards of clean overburden would have to be removed to access the impacted soil. Overburden soil would be stockpiled on site and sampled, in accordance with the SMP and established soil handling procedures, then used as backfill for the excavations.

Similar to Alternatives 2 and 3, a combination of standard excavation techniques and water fluidization of soil with vacuum excavation concurrent with a trench box and sheet piling would be used to complete the excavations. Also similar to Alternatives 2, 3, and 4, certified clean backfill would be used to fill most of the excavation areas, and then disturbed area restored using certified clean topsoil and hydroseeding. Dust control using a sealant on site roads and water application at excavation areas and at stockpiles would also be employed. Perimeter dust monitoring as well as erosion control measures would be implemented.

Although bioventing would no longer be applicable, up to 10 soil vapor monitoring wells would still need to be installed to monitor possible vapor intrusion concerns due to groundwater off-gassing near residences. Monitoring and sampling of these wells would mirror that described for Alternative 2.

5.2 DETAILED ANALYSIS OF EACH ALTERNATIVE

A detailed analysis of each alternative is provided in this section. A summary of the costs for each alternative is provided in Table 5 which includes a breakdown for capital costs, total annual costs, total period costs, and total costs for each alternative. Rough order of magnitude costs were provided for an estimated project life of 10 years. Assumptions and detailed costs breakdowns are provided in Appendix C.

5.2.1 Alternative 1: Institutional Controls and Monitored Natural Attenuation

Under this alternative, no remedial actions to remove contamination in either the soil or groundwater would be implemented. Contaminants would be allowed to degrade naturally and the rate of degradation would be monitored. There would be a long-term potential for contaminants in soil and groundwater to impact human health and the environment, and RAO's for soil contaminants would likely be exceeded for decades. Therefore, this alternative would not meet ARARs.

5.2.2 Alternative 2: Institutional Controls, Monitored Natural Attenuation, Excavation of Top Two Feet of Impacted Soil, In-Situ Chemical Oxidation via Ozonation, and Expansion of the Bioventing/Soil Vapor Extraction System

Under this alternative, ICs would include the recording of land use restrictions with the property deed and/or a uniform environmental covenant, as well as preparation and implementation of an EHMP to manage the contaminated soil and groundwater in-place. These controls would limit access to the site and to future development that minimizes disturbance of site soil and prohibits the use of site groundwater. The top two feet of impacted soil would be removed thus reducing the potential for direct contact with site contaminants in soil. Ozonation in groundwater and the capillary fringe would result in source control/removal and reduce contaminant mass transport to site groundwater. Oxygen from ozonation and bioventing systems would support microbial degradation of soil contaminant levels, and ultimately, RAOs would be met for soil left in place below two feet.

5.2.2.1 Issues to Consider

- Direct exposure to soil contamination would be reduced but not eliminated. Any intrusive work below two feet would potentially encounter site contaminants. This would be particularly applicable to site workers.
- Elevated contaminant levels would exist in site soil below two feet for an extended period of time. Measurement of degradation rates once remedial measures are in place would be used to determine this time frame needed to achieve soil RAOs.
- The amount of soil handling would be limited relative to the more aggressive remedial alternatives.
- Potential risks to human health may be elevated during handling and relocation off-site of impacted soils (i.e., fugitive dust, tracking of soil, runoff, etc.). Perimeter dust monitoring and active dust control would be necessary to reduce the potential for public exposure during remedial construction.
- Construction management would be required to protect site worker and public safety.
- Future use of the property may be impaired by the presence of contamination in groundwater and in soil below two feet in depth.
- A potential exists for contaminated vapor migration away from the remediation zones. This potential would be addressed via the use of SVE to control vapor migration as well as provide oxygen needed for aerobic microbial degradation of POL contaminants.
- It is anticipated that ozonation would occur in cycles over a two year period. This would address potential rebound of measured contaminant levels in the smear zone and lower vadose zone soil.

- Bioventing would be accomplished via SVE during periods of active ozonation and until vapor concentrations begin approaching asymptotic levels. This is expected to occur within the first two to three years of active remediation. The system would then be turned over to air injection bioventing to complete remediation of the vadose zone soils. Air injection bioventing could require as much as three to five years to achieve soil RAOs.
- Sampling of groundwater for MNA analysis would occur annually for the first five years and biennially for the next ten years. If contaminant levels are found to have a continuous downward trend or cleanup levels have been achieved, the monitoring period would be truncated and/or certain wells removed from the sampling program.

5.2.2.2 Practicality of Implementation

Alternative 2 would be somewhat easy to implement since there would be no specialized equipment needed to conduct the remedial action. Disposal/treatment facilities for site soil are available in southern California, specifically TPS facility in Adelanto, California. Discussions with TPS and recent revisions to State of California RWQCB Los Angeles Region Waste Discharge Requirements for Non-Hazardous Petroleum Contaminated Soil Treatment indicate soil with average contamination levels below 5,000 mg/kg jet fuel/gasoline, and 20,000 mg/kg diesel fuel will be accepted at the TPS facility. Additionally, the injection of ozone to degrade POL contaminants in groundwater and the capillary fringe is a commonly applied technology and permitting of this process is anticipated to be straightforward and not excessively time consuming.

One of the primary issues that may arise from this remedial alternative is the short-term impacts. Approximately 4,700 cubic yards of soil would need to be handled and transportation of this soil would be along public highways and secondary roads, including neighborhood streets. The generation of dust and tracking of soil are significant considerations that need to be addressed through close management of the activities. Furthermore, there is the potential for accidental releases to areas used by the general public.

The costs associated with this alternative are high, with initial capital costs of $6,430,000 and total annual operating costs for 10 years of $4,048,000. The total 10-year cost of this alternative is $11,163,000.

It is anticipated that construction of the remedy could be completed within 8 months. Ozone would be injected over approximately two years and the bioventing system operated in the SVE mode for the first two to three years. The system would be switched over to air injection mode after cessation of ozonation and initial SVE operation.

5.2.3 Alternative 3: Institutional Controls, Monitored Natural Attenuation, In-Situ Chemical Oxidation via Ozonation, Excavation of the Top 15 Feet of Impacted Soil, and Expansion of the Bioventing/Soil Vapor Extraction System

Similar to Alternative 2, ICs would be implemented to limit access to the site. These controls would also limit future development so that disturbance of site soil below 15 feet is minimized and use of site groundwater is prohibited. The top 15 feet of impacted soil would be removed thus, with the exception of future excavation deeper than 15 feet, this alternative would eliminate the potential for direct contact with site contaminants in soil. Ozonation would be implemented to reduce groundwater and smear zone contamination, thus reducing contaminant mass transport to site groundwater. Bioventing would be implemented to reduce contaminant levels in soil from a depth of 15 feet to the top of groundwater. Ultimately, RAOs would be met for soil left in place below 15 feet.

5.2.3.1 Issues to Consider

- A potential for direct contact to contaminated soil would continue to exist for site workers engaged in intrusive activities at depths greater than 15 feet.
- Elevated contaminant levels would exist in site soil below 15 feet for an extended period of time. Measurement of degradation rates once remedial measures are in place would be used to determine the time frame needed to achieve soil RAOs.
- A large volume of impacted soil, approximately 51,000 cubic yards, would be excavated and disposed. Additionally, in excess of 51,000 cubic yards of new backfill would have to be transported to the site. It is anticipated that excavation and backfill would take six to nine months.
- Potential risks to human health may be elevated during handling and relocation off-site of impacted soils (i.e., fugitive dust, tracking of soil, runoff, etc.). Perimeter dust monitoring and active dust control would be necessary to reduce the potential for public exposure during remedial construction.
- Construction management would be required to protect site worker and public safety.
- Future use of the property may be impaired by the presence of contamination in groundwater and in soil below 15 feet.
- A potential exists for contaminated vapor migration away from the remediation zones. This potential would be addressed via the use of SVE to control vapor migration as well as provide oxygen needed for aerobic microbial degradation of POL contaminants.
- It is anticipated that ozonation would occur in cycles over a two year period. This would address potential rebound of measured contaminant levels in the smear zone and lower vadose zone soil.
- Bioventing would be accomplished via SVE during periods of active ozonation and until vapor concentrations begin approaching asymptotic levels. This is expected to occur within the first two to three years of active remediation. The

system would then be turned over to air injection bioventing to complete remediation of the vadose zone soils. Air injection bioventing could require as much as five to seven years to achieve soil RAOs.

- Sampling of groundwater for MNA analysis would occur annual for the first five years and biennially for the next ten years. If contaminant levels are found to have a continuous downward trend or cleanup levels have been achieved, the monitoring period would be truncated and/or certain wells removed from the sampling program.

<u>5.2.3.2 Practicality of Implementation</u>

Alternative 3 would be moderately difficult to implement due to the depth of excavation, volume of soil that would be handled, need for sheet piling along the south property boundary, and necessity to protect and support the KMEP pipeline during excavation. However, standard excavation equipment and construction techniques would be used and no specialized equipment is needed to conduct the remedial action. The majority of the excavated and contaminated soil could be treated at the TPS facility in Adelanto, California. Heavily contaminated soil could be transported to the McKittrick Landfill in McKittrick, California for disposal. This facility has received similar material from DFSP Norwalk during past remedial efforts. Additionally, the injection of ozone to degrade POL contaminants in groundwater and the capillary fringe is a commonly applied technology and permitting of this process is anticipated to be straightforward and not excessively time consuming.

One of the primary issues that may arise from this remedial alternative is the short-term impacts. Approximately 51,000 cubic yards of soil would need to be handled and transportation of this soil would be along public highways and secondary roads, including neighborhood streets. The generation of dust and tracking of soil are significant considerations that need to be addressed through close management of the activities. Furthermore, there is the potential for accidental releases to areas used by the general public.

The costs associated with this alternative are high, with initial capital costs of $19,205,000 and total annual operating costs of $3,919,000. The total 10-year cost of this alternative is $23,809,000. As shown in Table 5 and detailed in Appendix C, the cost for only soil excavation to 15 feet is estimated at $12,496,000.

It is anticipated that construction of the remedy could be completed within 12 months This schedule assumes two excavation crews working simultaneously at the site, and that backfilling of excavation areas would occur concurrently with the excavation of subsequent areas. The use of additional excavation crews could reduce the construction period. Ozone would be injected over approximately two years and the bioventing system operated in the SVE mode for the first two to three years. The system would be switched over to air injection mode after cessation of ozonation and initial SVE operation.

5.2.4 Alternative 4: Institutional Controls, Monitored Natural Attenuation, In-Situ Chemical Oxidation via Ozonation, Excavation of the Top 20 Feet of Impacted Soil, and Expansion of the Bioventing/Soil Vapor Extraction System

Similar to Alternatives 2 and 3, ICs would be implemented, but should only be necessary to prohibit the use of site groundwater. The top 20 feet of impacted soil would be removed resulting in nearly complete elimination of the potential for direct contact with soil contamination. Discussions with RWQCB – Los Angeles Region (August 30, 2012), indicated that excavation of soil to a depth of 20 feet could lead to a No Further Action (NFA) designation for vadose zone soil. This would be due to the association of soil below 20 feet would be classified as capillary fringe and would be grouped together with site groundwater. A NFA designation should eliminate the need for ICs for site soil.

Ozonation would be implemented to reduce groundwater and smear zone contamination, thus reducing contaminant mass transport to site groundwater. Bioventing would be implemented to reduce contaminant levels in soil from a depth of 20 feet to the top of groundwater. Ultimately, RAOs would be met for soil left in place below 20 feet.

5.2.4.1 Issues to Consider

- Elevated contaminant levels would exist in site soil below 20 feet for an extended period of time. Measurement of degradation rates that result from ozonation and bioventing would be used to determine the time frame needed to achieve soil RAOs.
- A large volume of impacted soil, approximately 81,000 cubic yards, would be excavated and disposed. Additionally, in excess of 81,000 cubic yards of new backfill would have to be transported to the site. It is anticipated that excavation and backfill would take six to nine months.
- Potential risks to human health may be elevated during handling and relocation off-site of impacted soils (i.e., fugitive dust, tracking of soil, runoff, etc.). Perimeter dust monitoring and active dust control would be necessary to reduce the potential for public exposure during remedial construction.
- Construction management would be required to protect site worker and public safety.
- A potential exists for contaminated vapor migration away from the remediation zones. This potential would be addressed via the use of SVE to control vapor migration as well as provide oxygen needed for aerobic microbial degradation of POL contaminants.
- It is anticipated that ozonation would occur in cycles over a two year period. This would address potential rebound of measured contaminant levels in the smear zone and lower vadose zone soil.
- Bioventing would be accomplished via SVE during periods of active ozonation and until vapor concentrations begin approaching asymptotic levels. This is expected to occur within the first two to three years of active remediation. The

system would then be turned over to air injection bioventing to complete remediation of the vadose zone soils. Air injection bioventing could require as much as five to seven years to achieve soil RAOs.

- Sampling of groundwater for MNA analysis would occur annual for the first five years and biennially for the next ten years. If contaminant levels are found to have a continuous downward trend or cleanup levels have been achieved, the monitoring period would be truncated and/or certain wells removed from the sampling program.

5.2.4.2 Practicality of Implementation

Alternative 4 would be moderately difficult to implement due to the depth of excavation, volume of soil that would be handled, need for sheet piling along the south property boundary, and necessity to protect and support the KMEP pipeline during excavation. However, standard excavation equipment and construction techniques would be used and no specialized equipment is needed to conduct the remedial action. The majority of the excavated and contaminated soil could be treated the TPS facility in Adelanto, California. Heavily contaminated soil could be transported to the McKittrick Landfill in McKittrick, California for disposal. Additionally, the injection of ozone to degrade POL contaminants in groundwater and the capillary fringe is a commonly applied technology and permitting of this process is anticipated to be straightforward and not excessively time consuming.

One of the primary issues that may arise from this remedial alternative is the short-term impacts. Approximately 81,000 cubic yards of soil would need to be handled and transportation of this soil would be along public highways and secondary roads, including neighborhood streets. The generation of dust and tracking of soil are significant considerations that need to be addressed through close management of the activities. Furthermore, there is the potential for accidental releases to areas used by the general public.

The costs associated with this alternative are high, with initial capital costs of $26,911,000 and total annual operating costs of $3,889,000. The total 10-year cost of this alternative is $31,485,000. As shown in Table 5 and detailed in Appendix C, the cost for only soil excavation to 20 feet is estimated at $20,179,000.

It is anticipated that construction of the remedy could be completed within 12 months. This schedule assumes four excavation crews working simultaneously at the site, and that backfilling of excavation areas would occur concurrently with the excavation of subsequent areas. This number of excavation crews is probably the maximum that could safely operate at the site. Ozone would be injected over approximately two years and the bioventing system operated in the SVE mode for the first two to three years. The system would be switched over to air injection mode after cessation of ozonation and initial SVE operation.

5.2.5 Alternative 5: Institutional Controls and Monitored Natural Attenuation for Groundwater, and Excavation of Impacted Soil to the Top of Groundwater

Similar to Alternative 4, ICs would be implemented, but only to prohibit the use of site groundwater. The top 28 to 30 feet of impacted soil would be removed resulting in complete elimination of the potential for direct contact with soil contamination. The removal of all vadose zone soil and the capillary fringe (smear zone) would meet all RAOs for soil, and eliminate future mass transport to site groundwater. This action would lead to a NFA designation for site soil, which would eliminate the need for ICs for site soil.

5.2.5.1 Issues to Consider

- A large volume of impacted soil, approximately 195,000 cubic yards, would be excavated and disposed. Additionally, in excess of 195,000 cubic yards of new backfill would have to be transported to the site. It is anticipated that excavation and backfill would take nine to twelve months.
- Potential risks to human health may be elevated during handling and relocation off-site of impacted soils (i.e., fugitive dust, tracking of soil, runoff, etc.). Perimeter dust monitoring and active dust control would be necessary to reduce the potential for public exposure during remedial construction.
- Construction management would be required to protect site worker and public safety.
- A potential exists for contaminated vapor migration due to off-gassing from contaminated groundwater. This potential would be addressed by monitoring of passive vent wells installed proximal to occupied building and nearby residences, and possibly by the installation of vapor elimination systems if necessary.
- Sampling of groundwater for MNA analysis would occur annual for the first five years and biennially for the next ten years. If contaminant levels are found to have a continuous downward trend or cleanup levels have been achieved, the monitoring period would be truncated and/or certain wells removed from the sampling program.

5.2.5.2 Practicality of Implementation

Alternative 5 would be difficult to implement due to the depth of excavation, volume of soil that would be handled, need for sheet piling along the south property boundary, and necessity to protect and support the KMEP pipeline during excavation. However, long-reach excavation equipment combined with additional soil benching and excavation stabilization techniques would be used to conduct the remedial action. The majority of the excavated and contaminated soil could be treated at TPS facility in Adelanto, California. Heavily contaminated soil could be transported to the McKittrick Landfill in McKittrick, California for disposal.

One of the primary issues that may arise from this remedial alternative is the short-term impacts. Approximately 195,000 cubic yards of soil would need to be handled and transportation of this soil would be along public highways and secondary roads, including neighborhood streets. The generation of dust and tracking of soil are significant considerations that need to be addressed through close management of the activities. Furthermore, there is the potential for accidental releases to areas used by the general public.

The costs associated with this alternative are very high, with initial capital costs of $54,455,000 and total annual operating costs for site monitoring of $382,000. The total 10-year cost of this alternative is $55,126,000.

It is anticipated that construction of the remedy could be completed within 15 months. This schedule assumes four excavation crews working simultaneously at the site, and that backfilling of excavation areas would occur concurrently with the excavation of subsequent areas. This number of excavation crews is probably the maximum that could safely operate at the site.

SECTION 6

COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

The purpose of the comparative analysis is to evaluate the relative performance of each alternative in relation to each specific evaluation criterion by identifying the advantages and disadvantages of each alternative relative to one another.

The following nine criteria (USEPA, 1988) were used for the comparative analysis:

1. Overall protection of human health and the environment.
2. Compliance with ARARs.
3. Long-term effectiveness and permanence.
4. Reduction of MTV through treatment.
5. Short-term effectiveness.
6. Implementability.
7. Cost.
8. State/Support agency acceptance.
9. Community acceptance.

6.1 OVERALL PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT AND COMPLIANCE WITH ARARS

Overall protection of public health and the environment and compliance with ARARS, as measured by whether the remedial objectives could be achieved, are met by Alternatives 2 through 5 with the implementation of ICs coupled with implementation of the referenced remedial technologies. ARARS could eventually be achieved through implementation of Alternative 1, however this alternative is less protective of human health and the environment as it relies solely on ICs to limit access and future use of the site. Therefore, there is an increased potential for direct contact with contaminated surface soil by site workers and trespassers associated with this alternative.

6.2 LONG-TERM EFFECTIVENESS AND PERMANENCE

Alternative 5, which relies primarily on excavation and off-site treatment of contaminated soils provides the best long-term effectiveness and permanence. With lesser depths of excavation and hence lesser volumes of impacted soil removed, the relative long-term effectiveness and permanence decreases because of increasing likelihood that residual contamination will remain in place. Alternatives 2, 3, and 4, which include ozonation to affect contamination in the capillary fringe, have uncertainty regarding their overall effectiveness since this technology has not previously been tested at the site. Treatability testing is recommended prior to implementing ozonation to determine the long-term effectiveness. Because of the lack of any active treatment, Alternative 1, which would likely take decades to reach the cleanup goals, received the lowest score for long-term effectiveness and permanence.

6.3 REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT

Alternatives 3, 4, and 5 are rated equally for their ability to reduce TMV through treatment. Because Alternatives 5 relies more on excavation and offsite treatment, this alternative will reduce TMV more quickly than Alternatives 1 through 4. Alternative 2 received a lower score due to the removal of only impacted surface soil. Alternative 1, which relies only on MNA for treatment of TMV in soil and groundwater, is rated the lowest because of the long time-frame needed to achieve cleanup goals.

6.4 SHORT-TERM EFFECTIVENESS

Alternative 5 provides the greatest short-term effectiveness because of the short time frame of approximately 1.5 years to achieve cleanup goals. Although excavation of contaminated soils to the water table somewhat increases the risk to the surrounding community and onsite workers during implementation due to the high volume of soil that would be excavated and transported off-site, this is balanced by the short time-frame for achieving the remediation goals. Similarly, Alternative 1 provides the lowest level of short-term effectiveness because of the longer time-frame required for remedial objectives to be achieved.

6.5 IMPLEMENTABILITY

Because Alternative 1 involves mainly administrative controls and monitoring this alternative is highly implementable. Alternatives 2, 3, and 4 were ranked as equally implementable due to their use of more standard excavation techniques than Alternative 5. Additionally, materials and vendors for implementing ozonation and expansion of the bioventing system for Alternatives 2, 3, and 4 are readily available. Alternative 5 is readily implementable, however because of the depth of the required excavation it is relatively more difficult to implement than Alternatives 2, 3, and 4.

6.6 COST

The alternatives were evaluated in terms of capital and operations and maintenance cost. For this comparative analysis, the alternatives were scored inversely with cost. Alternative 1 received the highest score because it is the lowest cost alternative, and Alternative 5 received the lowest score because it is the highest cost alternative. The costs are summarized in Table 5 and breakdown and assumptions are provided in Appendix C. The results of the scoring for costs are shown in Table 6.

6.7 COMPARATIVE ANALYSIS SUMMARY

Table 6 shows the numerical results of the comparative analysis scoring evaluation. Alternatives 3, 4, and 5 received the highest and equal scores in this analysis. The evaluation criteria of State and community acceptance are not evaluated in the comparative analysis but are incorporated through the document review and public participation process.

SECTION 7

PREFERRED REMEDIAL ALTERNATIVE

This section presents the preferred remedial alternative and rationale for selection.

7.1 RATIONALE FOR PREFERRED ALTERNATIVE

Based on the comparative analysis of remedial alternatives using the specified screening criteria, Alternatives 3, 4, and 5 all rank equally and higher than the other two alternatives. Because the overall ranking of these alternatives is equal, the lower cost alternative, Alternative 3, was selected to address environmental hazards at the DFSP Norwalk site. The primary actions that are included under Alternative 3 include:

- ICs to limit access to soil below 15 feet and to prohibit the use of site groundwater.
- Ozonation to reduce contaminant mass is upper groundwater, the capillary fringe, and lower vadose zone and which will be an effective means of source removal to significantly reduce contaminant mass transport from these area to site groundwater.
- MNA to monitor the natural decay of contamination levels in site groundwater.
- Excavation and off-site disposal of soil to 15 feet bgs at ASTs 80008, 80009, and 55004, and the water tank and truck fueling rack area.
- Expansion of the current bioventing/SVE system to impact all lower vadose zone soil at the site.
- The capital cost of this alternative is $19,205,000, and the total 10-year cost is $23,809,000.

The primary benefits of Alternative 3 include the following:

- Adequately addresses the environmental hazards identified at the site.
- Provides reliable, long-term protection of human health and the environment by removing approximately 51,000 cubic yards of POL-impacted soil from the site via excavation and off-site disposal, and the removal of up to 135,392 kilograms of POL contamination from the upper groundwater, smear zone, lower vadose zone via ozonation. Complete remediation of the vadose zone will be accomplished via bioventing.

- Implementation of the remedy is well understood and all the technologies have had wide spread and successful use at numerous similar sites across the U.S.

- No specialized equipment will be needed to implement the remedy.

- Bioventing will degrade contaminants in-situ in a cost effective and environmentally friendly manner.

- Although the costs are rated as high, the selected remedy will be as effective, overall, in meeting soil RAOs over time as the more costly remedies.

The primary drawbacks of this alternative include the following:

- Excavated soil and clean backfill will be transported through residential areas using large haul trucks. There is a potential for vehicular and/or pedestrian accidents, spills of impacted soil, and disruption of daily events associated with the increased truck traffic.

- There is a potential for migrant dust issues associated with a large excavation and this potential is compounded due to the close proximity of residences and a public park.

- Because impacted soil will remain in place below 15 feet, soil RAOs will not be achieved in the short-term, and it may require ten years or more for all vadose zone soil to meet RAOs.

- ICs will be required to prohibit the use of site groundwater, and similar controls may be needed to prevent disturbance of impacted soil more than 15 feet bgs. These ICs could affect transfer of the property.

- Regular monitoring of site groundwater will be required to measure and document that contaminant levels are decreasing and will reach acceptable levels in a reasonable length of time.

If DLA can document regulatory concurrence with the concept that removal of soil to 20 feet bgs would effectively lead to NFA status for site soil, implementation of Alternative 4 should be considered. This alternative has similar benefits and drawbacks, and the costs are higher ($26,911,000 in capital costs), but it could eliminate the need for ICs and allow earlier transfer of the property.

7.2 OTHER RECOMMENDATIONS

This section presents other recommendations for consideration for future investigations at the site.

7.2.1 Remedial Design Pilot Studies

Ozonation has proven successful for remediation of POL contamination at numerous sites in California. However, this technology should be tested prior to full-scale implementation. It is recommended that a pilot study be conducted at the site prior to or concurrent with initial phases of remediation. A pilot test would utilize a mobile ozone generator and several temporary well points to inject ozone into site groundwater. Pre- and post-test soil samples would be collected to verify the efficacy of the technology and help determine the optimum radius of influence for full-scale application. The estimated cost for a pilot test is $1 million, and would require approximately two months to complete. Pilot testing would not affect the overall remediation schedule as installation of a full-scale ozonation system would occur after completion of all excavation, backfilling, and site restoration activities.

Although ozonation has been tentatively selected for inclusion in the remedial alternative, due to its combination direct contaminant oxidation and provision of oxygen to enhance aerobic microbial degradation, other potential technologies exist that could reduce contaminant mass in the upper groundwater and capillary fringe. Air sparging could also be tested as a method to enhance aerobic degradation of POL contaminants. The addition of sulfate could be tested as a method to create an anaerobic environment in which POL contamination may be efficiently degraded. All three technologies have potential to significantly reduce contaminant mass in the smear zone and groundwater, and a series pilot tests could verify their effectiveness and lead to selection of the more effective technology.

7.2.2 Remedial Design Data Gap Sampling

The estimated soil volumes and the areal extent of contamination used to determine the costs for the alternatives presented in this analysis were based on the currently available data and EVS modeling. During the alternatives analysis, areas of the site that would benefit from additional characterization were identified. The truck fueling rack area has been adequately characterized and no additional soil investigation from this area is recommended. This area is ready for remedial implementation.

Comparison of boring locations and the plumes generated by the EVS model generally suggests that the EVS model likely over estimates the extent of contamination and therefore the volume of soil exceeding RAOs. Additional characterization of the areas listed in the following subsections would more completely define the extent of contamination and assist in final design of the remedial actions.

<u>7.2.2.1 Tank 80001</u>

RAO exceedances are limited to deeper soil, from 15 to 28 feet bgs. DPT 49, 51, 52 had TEX exceedances in addition to benzene. TBA and MTBE were not detected however the Reporting Limit was elevated several orders of magnitude above the cleanup levels. No MTBE or TBA was “detected” in these borings. Four additional borings in the southeast portion of the Tank 80001 area would help to bound the plume and provide data needed to design the in-situ ozonation and bioventing remediation systems.

7.2.2.2 Tank 80006

Because the exceedances detected in this tank area are from samples collected approximately 8 years ago and the more recently collected soil samples from beneath the former tank are generally below cleanup levels, it is recommended that the areas with previous exceedances be resampled to determine if remediation is necessary. MNA and/or SVE operations in this area may have already reduced concentrations to the cleanup levels. If additional sampling indicates that concentrations are above cleanup levels, tank area 80006 would be a candidate for an expanded bioventing system because contamination appears to be limited to depths greater than 15 feet. Additional soil sampling would also help determine the extent of the bioventing system well network, if needed. With the exception of the area northeast of the tank with 60,000 µg/kg of benzene, the exceedances southwest of the tank are relatively low (220 mg/kg to 1400 mg/kg TPHg). The samples with the highest levels of benzene and TPHg may be below the water table or in the capillary fringe, and therefore amenable to treatment via ozone injection. This area would be more appropriate for bioventing if the contamination is above the water table. An additional three borings are recommended, one in the southwest corner of the tank area, one in the location of ASB-01, and one in the location of Boring BSW-06-02.

7.2.2.3 Tank 80007

Exceedances near Tank 80007 only occurred at depths of 25 feet bgs and deeper. This area appears to only have smear zone soil contamination. There was TPHjf detected in boring DPT-66 at 0.5 feet bgs (340 mg/kg) that did not exceed the 500 mg/kg cleanup level but may indicate that there is additional contamination that has gone undetected.

Two additional soil borings are recommended. One boring north/northeast of DPT-69 to better define the extent of contamination and rule out any additional source areas. One additional boring is recommended in the location of BSW-07-02. This boring had a benzene exceedance in the sample collected in 2004. Additional borings will help to determine if concentrations have been reduced over time with the operation of the horizontal SVE wells. Based on the results of the additional data, active remediation may not be necessary at this area to address soil contamination.

7.2.2.4 Tank 80008

The highest concentrations/exceedances were detected primarily in samples collected from 18 feet and deeper. Samples collected from ground surface to 15 feet bgs were generally non-detect. However there were exceedances of TPHg at 15 feet bgs (3000 mg/kg at boring AST-08-08). Although this tank area appears to be the most highly contaminated of the ASTs, a release point is not well defined. Additional data is necessary to define the extent of contamination and rule out shallow contamination. Much of the data collected to date has been biased toward areas in the footprint of the former tank. Additional data may help determine if additional shallow contamination is present.

TEX exceedances were detected along with benzene exceedances at borings DPT-88, 89, 90, and 91. MTBE exceeded cleanup levels at DPT-88 and -89 at 25 fee bgs (400 µg/kg and 18J, respectively), however the MTBE and TBA Method Detection Limits/Reporting Limits were too elevated in most of the samples to determine if these compounds were present.

The EVS model generated an exceedance plume for the 0 to 15 feet bgs based on exceedances detected from samples collected at 15 feet bgs. The majority of the plume generated is in areas with no soil data. These exceedance areas may be over estimated in the model. Additional step-out borings will define the lateral extent of contamination and therefore the area that will require active remediation.

Additional soil data is recommended south and east of former Tank 80008 to confirm the model results and define the extent of contamination. A minimum of seven additional borings are recommended for further delineating the area requiring remediation.

7.2.2.5 Tank 80009

Samples collected beneath tank 80009 had exceedances for benzene, TPHg, and TPHjf from 0.5 feet bgs to the water table, suggesting that a leak occurred from this tank. Benzene exceedances are most widespread at this tank location.

Samples from DPT-41 and DPT-42 had benzene and TEX exceedances. TEX exceedances occurred where benzene exceeded.

The EVS model has produced a plume in the 0 to 10 feet bgs range that may be much larger than the actual impacted area, possibly because of less TPHjf data than benzene and TPHg data.

Additional borings/samples are recommended to define the extent of contamination on the northeast, east, and southeast sides in order to differentiate the extent of contamination from this tank from releases from areas to the south related to releases from the KMEP portion of the site. These data will determine where remediation is needed. A minimum of four boring is recommended.

7.2.2.6 Tank 80013

Only benzene exceeded cleanup goals in shallow soil. Once sample had a concentration of 16 µg/kg which exceeded the 15 µg/kg cleanup goal for this depth.

No exceedances were detected for MTBE, TEX, or TBA in borings DPT-61, -62, -63, -64.

The EVS model has produced a plume in the 0 to 10 feet bgs range that may be much larger than the actual impacted area based on the benzene exceedance at 0.5 feet bgs from DPT-64.

Natural attenuation will likely reduce benzene concentrations in the shallow soil over time. Additional confirmation samples are recommended. Active remediation may not be necessary.

7.2.2.7 Tank 55003

One sample from DPT-74 had exceedances in this tank area. TPHjf exceeded the 500 mg/kg cleanup level for soils located within 10 feet of ground surface. TPHd also exceeded the 1000 mg/kg cleanup goal. Other analytes were generally all not detected. This tank does not appear to have had a significant release.

No BTEX, TBA, or MTBE exceedances were detected in borings DPT-70, 71, 74, 76, 100, and 87.

The EVS model has produced an exceedance plume southeast of former AST 55003. The plume does not seem to incorporate the TPHjf exceedance of 920 mg/kg from boring DPT-74. The area shown has having exceedances is mainly an area without data and extends from the water tank area, south of Tank 55003.

Additional borings are recommended to better differentiate potential release from AST 55003 and the areas of known releases to the south (water tank area). A minimum of four borings are recommended southeast of the tank. This tank area may only need very small area of surficial soil removed.

7.2.2.8 Tank 55004

Exceedances were detected from 10 to 26 feet bgs on the area southeast of Tank 55004. The samples collected beneath the tank were generally has non-detectable contaminant concentrations suggesting that a release occurred south or east of the tank.

Exceedances at DPT-92, -93, 94, and -95 were limited to TPH. No BTEX, MTBE, or TBA exceedances were detected.

The EVS model has produced an exceedance plume south east of former Tank 55004 that appears justified by the data. Additional data would help refine the extent, especially in deeper soil.

The exceedance plume currently has a two-well SVE system installed (VEW-29 and VEW-30). The collection of additional soil data is recommended to determine the number of additional bioventing wells are needed and to serve as a baseline for the upgraded bioventing system.

Three additional boring in the southwest portion of this tank area will help determine if remediation is needed in this area.

SECTION 8

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TABLES

TABLE 1
SOIL CLEANUP GOALS
DFSP NORWALK SITE, NORWALK CALIFORNIA

	(feet below ground surface)					
Depth Below Ground Surface	**0.5**	**5**	**10**	**15**	**20**	**25**
Depth to Groundwater	**25.5**	**21**	**16**	**11**	**6**	**1**
Constituent	**Soil Cleanup Goal (mg/kg)**					
TPH as Gasoline (C4-C12)	500	500	100	100	100	100
TPH as JP-5 (C8-C17)	500	500	100	100	100	100
TPH as Diesel (C5-C25)	1,000	1,000	100	100	100	100
Benzene	0.015	0.013	0.012	0.013	0.011	0.012
Toluene	0.614	0.440	0.391	0.423	0.356	0.367
Ethylbenzene	2.07	1.44	1.19	1.33	1.07	1.10
Xylenes	5.55	3.77	3.09	3.47	2.76	2.84
1,1,2,2-Tetrachloroethane	0.0023	0.0020	0.0015	0.0012	0.0006	0.0002
1,1,2-Trichloroethane	0.0032	0.0029	0.0023	0.0020	0.0012	0.0008
1,2,3-Trichlorobenzene	0.0740	0.0634	0.0467	0.0356	0.0162	0.0034
1,2,3-Trichloropropane	8.74E-07	7.66E-07	5.87E-07	4.79E-07	2.56E-07	1.23E-07
1,2,4-Trimethylbenzene	2.10	1.80	1.34	1.03	0.478	0.120
1,2-Dibromo-3-chloropropane	2.50E-04	2.19E-04	1.68E-04	1.37E-04	7.31E-05	3.52E-05
1,2-Dibromoethane	3.05E-06	2.78E-06	2.27E-06	2.04E-06	1.30E-06	9.60E-07
1,2-Dichloroethane	1.06E-04	1.04E-04	9.37E-05	9.60E-05	7.29E-05	6.92E-05
1,3,5-Trimethylbenzene	2.06	1.77	1.31	1.01	0.470	0.118
2-Butanone	0.557	0.607	0.617	0.713	0.612	0.661
2-Chlorotoluene	0.558	0.481	0.358	0.278	0.132	0.039
2-Hexanone	0.0073	0.0072	0.0065	0.0066	0.0050	0.0047
4-Chlorotoluene	0.547	0.472	0.351	0.273	0.130	0.038
Acetone	0.994	1.17	1.28	1.57	1.42	1.60
Bromomethane	0.0015	0.0014	0.0013	0.0013	0.0010	0.0010
Carbon disulfide	0.049	0.046	0.039	0.038	0.026	0.023
Chlorobenzene	0.119	0.104	0.079	0.063	0.032	0.013
Chloroethane (Ethyl Chloride)	2.23	2.47	2.55	2.98	2.59	2.83
Chloroform	7.38E-05	6.82E-05	5.67E-05	5.25E-05	3.48E-05	2.75E-05
Dichlorodifluoromethane	0.984	0.868	0.672	0.559	0.309	0.167
Diisopropyl Ether (DIPE)	0.449	0.424	0.364	0.350	0.246	0.212
Isopropylbenzene	5.56	4.78	3.53	2.71	1.26	0.303
Methylene Chloride	7.78E-04	7.99E-04	7.61E-04	8.27E-04	6.69E-04	6.82E-04
Methyl-t-Butyl Ether (MTBE)	9.07E-04	9.10E-04	8.43E-04	8.89E-04	6.97E-04	6.86E-04
Naphthalene	0.270	0.231	0.170	0.130	0.059	0.012
n-Butylbenzene	3.97	3.40	2.50	1.91	0.867	0.179
n-Propylbenzene	2.18	1.87	1.39	1.06	0.489	0.114
p-Isopropyltoluene	2.82	2.42	1.79	1.37	0.636	0.154
sec-Butylbenzene	2.59	2.22	1.64	1.26	0.576	0.129
Styrene	0.463	0.399	0.296	0.229	0.108	0.030
Tert-Butyl Alcohol (TBA)	0.0010	0.0012	0.0013	0.0016	0.0014	0.0016
tert-Butylbenzene	2.07	1.78	1.32	1.01	0.465	0.110
Trichloroethene	0.0070	0.0061	0.0047	0.0038	0.0020	0.0009

mg/kg = milligram per kilogram
NA = not applicable

TABLE 2
ANALYTICAL RESULTS FOR CONTAMINANTS OF CONCERN IN SOIL
DFSP NORWALK SITE, NORWALK CALIFORNIA

Sample Location	Sample Date	Sample Depth	TPHg [1] (C4-C13) (mg/kg)	TPHjf [2] (C6-C22) (mg/kg)	TPHd [3] (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE [4] (µg/kg)	TBA [5] (µg/kg)	1,2-DCA [6] (µg/kg)
SOIL CLEANUP GOALS (by depth)		**0.5**	**500**	**500**	**1000**	**15**	**614**	**2070**	**5550**	**2.36**	**1** [7]	**0.106**
		5	**500**	**500**	**1000**	**13**	**440**	**1440**	**3770**	**2.37**	**1.2**	**0.104**
		10	**100**	**100**	**100**	**12**	**391**	**1190**	**3090**	**2.19**	**1.3**	**0.0937**
		15	**100**	**100**	**100**	**13**	**423**	**1330**	**3470**	**2.31**	**1.6**	**0.096**
		20	**100**	**100**	**100**	**11**	**356**	**1070**	**2760**	**1.81**	**1.4**	**0.0729**
		25	**100**	**100**	**100**	**12**	**367**	**1100**	**2840**	**1.78**	**1.6**	**0.0692**
ASB-01	07/14/04	6	< 0.5 [8]	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-01	07/14/04	18	**120**	--	--	< 50	< 50	**77**	**360**	< 250	--	--
ASB-01	07/14/04	27	**1400**	--	--	< 2500	< 2500	< 2500	**12000**	< 13000	--	--
ASB-02	07/14/04	6	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-02	07/14/04	18	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-02	07/14/04	27	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-03	07/12/04	6	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-03	07/12/04	17	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-03	07/12/04	27	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-04	07/12/04	6	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-04	07/12/04	17	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-04	07/12/04	27	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-05	07/13/04	6	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-05	07/13/04	17	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-05	07/13/04	27	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-06	07/13/04	6	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-06	07/15/04	6	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-06	07/13/04	17	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-06	07/15/04	18	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-06	07/13/04	27	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-06	07/15/04	27	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-07	07/15/04	6	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-07	07/15/04	18	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-07	07/15/04	27	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-09	07/12/04	6	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-09	07/12/04	17	**100**	--	--	< 50	< 50	**270**	**200**	< 250	--	--
ASB-09	07/12/04	27	**0.84**	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-10	07/09/04	6	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-10	07/09/04	17	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-10	07/09/04	28.5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-11	07/16/04	8	**350**	--	--	< 130	< 130	**150**	< 130	< 630	--	--
ASB-11	07/16/04	18	**7.4**	--	--	< 5	< 5	< 5	< 5	< 25	--	--
ASB-11	07/16/04	27	**3.6**	--	--	< 5	**8.2**	< 5	**5.2**	< 25	--	--
AST-01-02	07/08/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-01-02	07/08/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-01-02	07/08/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-01-03	07/08/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-01-03	07/08/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-01-03	07/08/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-01-04	07/08/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-01-04	07/08/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-01-04	07/08/04	25	**4600**	--	--	**8400**	**68000**	**36000**	**310000**	< 2500	--	--
AST-01-05	07/08/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-01-05	07/08/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-01-05	07/08/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-01-06	07/08/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-01-06	07/08/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-01-06	07/08/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-01-07	07/08/04	5	< 0.5	--	--	< 5	< 5	< 5	**8.1**	< 25	--	--
AST-01-07	07/08/04	15	< 0.5	--	--	**7.7**	**48**	< 5	< 5	< 25	--	--
AST-01-07	07/08/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-08-05	07/14/04	5	< 0.5	--	--	< 5	< 5	< 5	**5.7**	< 25	--	--
AST-08-05	07/14/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-08-05	07/14/04	25	**13000**	--	--	**91000**	**310000**	**93000**	**550000**	**16000**	--	--

TABLE 2
ANALYTICAL RESULTS FOR CONTAMINANTS OF CONCERN IN SOIL
DFSP NORWALK SITE, NORWALK CALIFORNIA

Sample Location	Sample Date	Sample Depth	TPHg [/1] (C4-C13) (mg/kg)	TPHjf [/2] (C6-C22) (mg/kg)	TPHd [/3] (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE [/4] (µg/kg)	TBA [/5] (µg/kg)	1,2-DCA [/6] (µg/kg)
AST-08-06	07/14/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-08-06	07/14/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-08-06	07/14/04	25	**12000**	--	--	**130000**	**420000**	**120000**	**570000**	**19000**	--	--
AST-08-07	07/14/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-08-07	07/14/04	15	< 0.5	--	--	< 5	< 5	< 5	**6.8**	< 25	--	--
AST-08-07	07/14/04	25	**9700**	--	--	**60000**	**270000**	**92000**	**480000**	< 13000	--	--
AST-08-08	07/14/04	5	< 0.5	--	--	< 5	< 5	< 5	**11**	< 25	--	--
AST-08-08	07/14/04	15	**3000**	--	--	**6400**	**75000**	**29000**	**150000**	< 6300	--	--
AST-08-08	07/14/04	25	**30000**	--	--	**320000**	**970000**	**260000**	**1300000**	**47000**	--	--
AST-08-09	07/14/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-08-09	07/14/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-08-09	07/14/04	25	**17000**	--	--	**170000**	**530000**	**160000**	**780000**	**34000**	--	--
AST-09-02	07/09/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-09-02	07/09/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-09-02	07/09/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-09-03	07/09/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-09-03	07/09/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-09-03	07/09/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-09-04	07/09/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-09-04	07/09/04	15	< 0.5	--	--	< 5	< 5	< 5	**6.9**	< 25	--	--
AST-09-04	07/09/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-09-05	07/09/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-09-05	07/09/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-09-05	07/09/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-09-06	07/09/04	5	< 0.5	--	--	< 5	< 5	< 5	**13**	< 25	--	--
AST-09-06	07/09/04	15	**2**	--	--	< 5	< 5	< 5	**65**	< 25	--	--
AST-09-06	07/09/04	25	< 0.5	--	--	< 5	< 5	< 5	**10**	< 25	--	--
AST-09-07	07/09/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-09-07	07/09/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
AST-09-07	07/09/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
B100	12/19/06	5	< 0.21	< 5.0	--	< 0.86	< 0.86	< 0.86	< 2.56	< 1.7	< 17	< 0.86
B100	12/19/06	15	< 0.27	< 5.0	--	< 1.2	< 1.2	< 1.2	< 3.6	< 2.4	< 24	< 1.2
B101	12/19/06	5	< 0.22	< 5.0	--	< 0.87	< 0.87	< 0.87	< 2.57	< 1.7	< 17	< 0.87
B101	12/19/06	15	< 0.24	< 5.0	--	< 0.98	< 0.98	< 0.98	< 2.98	< 2.0	< 20	< 0.98
B108	06/25/07	5	< 0.24	< 5.0	--	**1.7**	**1.6**	< 0.95	< 2.85	< 1.9	< 19	< 0.95
B108	06/25/07	10	< 0.26	< 5.0	--	**2.2**	**1.6**	< 0.87	< 2.57	< 1.7	< 17	< 0.87
B109	06/25/07	5	**0.64**	< 5.0	--	**3.5**	**1.6**	< 0.96	< 2.86	< 1.9	< 19	< 0.96
B109	06/25/07	10	**0.28**	< 5.0	--	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
B109	06/25/07	20	< 0.22	< 5.0	--	**2.1**	**1.8**	< 1.0	< 3.1	< 2.1	< 21	< 1.0
B109	06/25/07	25	< 0.27	< 5.0	--	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
B11	08/16/06	5	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B11	08/16/06	10	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B11	08/16/06	25	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B110	06/25/07	5	< 0.26	< 5.0	--	< 1.4	< 1.4	< 1.4	< 4.2	< 2.8	< 28	< 1.4
B111	06/25/07	5	< 0.30	< 5.0	--	< 1.1	< 1.1	< 1.1	< 3.2	< 2.1	< 21	< 1.1
B111	06/25/07	10	< 0.29	< 5.0	--	< 1.2	< 1.2	< 1.2	< 3.5	< 2.3	< 23	< 1.2
B112	06/26/07	5	< 0.25	< 5.0	--	**1.3**	**0.98**	< 0.96	< 2.86	< 1.9	< 19	< 0.96
B112	06/26/07	10	< 0.25	< 5.0	--	< 0.89	< 0.89	< 0.89	< 2.69	< 1.8	< 18	< 0.89
B113	06/26/07	5	< 0.26	< 5.0	--	< 1.0	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
B113	06/26/07	10	< 0.22	< 5.0	--	**2.4**	**1.9**	< 0.90	< 2.7	< 1.8	< 18	< 0.90
B113	06/26/07	15	< 0.25	< 5.0	--	< 0.95	< 0.95	< 0.95	< 2.85	< 1.9	< 19	< 0.95
B114	06/26/07	5	< 0.26	< 5.0	--	< 0.92	< 0.92	< 0.92	< 2.72	< 1.8	< 18	< 0.92
B114	06/26/07	10	< 0.23	< 5.0	--	< 0.92	< 0.92	< 0.92	< 2.72	< 1.8	< 18	< 0.92
B115	06/26/07	5	< 0.32	< 5.0	--	< 1.4	< 1.4	< 1.4	< 4.2	< 2.8	< 28	< 1.4
B115	06/26/07	10	< 0.30	< 5.0	--	**1.1**	< 0.87	< 0.87	< 2.57	< 1.7	< 17	< 0.87
B116	06/29/07	5	< 0.23	< 5.0	--	**2**	**0.99**	< 0.90	< 2.7	< 1.8	< 18	< 0.90
B116	06/29/07	10	< 0.28	< 5.0	--	< 1.0	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
B116	06/29/07	15	< 0.28	< 5.0	--	< 1.1	< 1.1	< 1.1	< 3.2	< 2.1	< 21	< 1.1
B117	06/27/07	5	< 0.33	< 5.0	--	< 1.2	< 1.2	< 1.2	< 3.6	< 2.4	< 24	< 1.2
B117	06/27/07	10	< 0.26	< 5.0	--	**2.3**	**2**	< 0.96	< 2.86	< 1.9	< 19	< 0.96
B118	06/27/07	10	< 0.29	< 5.0	--	**1.9**	**2.2**	< 0.96	< 2.86	< 1.9	< 19	< 0.96

TABLE 2
ANALYTICAL RESULTS FOR CONTAMINANTS OF CONCERN IN SOIL
DFSP NORWALK SITE, NORWALK CALIFORNIA

Sample Location	Sample Date	Sample Depth	TPHg [1] (C4-C13) (mg/kg)	TPHjf [2] (C6-C22) (mg/kg)	TPHd [3] (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE [4] (µg/kg)	TBA [5] (µg/kg)	1,2-DCA [6] (µg/kg)
B119	06/27/07	5	< 0.30	< 5.0	--	< 1.2	< 1.2	< 1.2	< 3.6	< 2.4	< 24	< 1.2
B119	06/27/07	10	< 0.22	< 5.0	--	**1.6**	**1.4**	< 0.86	< 2.56	< 1.7	< 17	< 0.86
B12	08/15/06	5	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	< 5.0
B12	08/15/06	10	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	< 5.0
B12	08/15/06	25	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	< 5.0
B120	06/27/07	5	< 0.31	< 5.0	--	< 1.4	< 1.4	< 1.4	< 4.1	< 2.7	< 27	< 1.4
B120	06/27/07	10	< 0.21	< 5.0	--	**0.89**	< 0.83	< 0.83	< 2.53	< 1.7	< 17	< 0.83
B120	06/27/07	15	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B120	06/27/07	20	< 0.27	< 5.0	--	< 0.96	< 0.96	< 0.96	< 2.86	< 1.9	< 19	< 0.96
B120	06/27/07	25	< 0.22	< 5.0	--	< 0.85	**0.87**	< 0.85	< 2.55	< 1.7	< 17	< 0.85
B121	06/29/07	5	< 0.30	< 5.0	--	< 1.2	< 1.2	< 1.2	< 3.6	< 2.4	< 24	< 1.2
B121	06/29/07	10	< 0.26	< 5.0	--	**1.4**	**1.3**	< 1.0	< 3.1	< 2.1	< 21	< 1.0
B122	06/29/07	10	< 0.22	< 5.0	--	< 0.96	< 0.96	< 0.96	< 2.86	< 1.9	< 19	< 0.96
B122	06/29/07	15	< 0.25	< 5.0	--	< 0.99	< 0.99	< 0.99	< 2.99	< 2.0	< 20	< 0.99
B126	09/24/08	45	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B13	08/15/06	5	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	< 5.0
B13	08/15/06	10	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	< 5.0
B13	08/15/06	25	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	< 5.0
B14	08/16/06	5	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B14	08/16/06	10	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B14	08/16/06	25	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B15	08/16/06	5	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B15	08/16/06	10	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B15	08/16/06	25	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B16	08/16/06	5	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B16	08/16/06	10	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B16	08/16/06	25	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B17	08/17/06	5	--	< 5	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B17	08/17/06	10	--	< 5	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B17	08/17/06	25	--	< 5	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B-17	09/15/05	10	--	< 25	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B-17	09/15/05	20	--	< 25	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B18	08/17/06	5	--	< 5	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B18	08/17/06	10	--	< 5	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B18	08/17/06	25	--	< 5	--	< 5	< 5	**5.6**	< 10	< 5	< 50	< 5
B-18	09/15/05	10	--	< 25	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B-18	09/15/05	20	--	< 25	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B19	08/17/06	5	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B19	08/17/06	10	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B19	08/17/06	25	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B20	08/17/06	5	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B20	08/17/06	10	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B20	08/17/06	25	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
B21	08/15/06	5	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	< 5.0
B21	08/15/06	10	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	< 5.0
B21	08/15/06	25	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	< 5.0
B22	08/15/06	5	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	< 5.0
B22	08/15/06	10	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	< 5.0
B22	08/15/06	25	--	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	< 5.0
B-23	09/15/05	10	--	< 25	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B-23	09/15/05	20	--	**73**	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B24	12/19/06	5	< 0.27	< 5.0	--	< 0.89	< 0.89	< 0.89	< 2.69	< 1.8	< 18	< 0.89
B24	12/19/06	25	< 0.26	< 5.0	--	< 0.99	< 0.99	< 0.99	< 2.99	< 2.0	< 20	< 0.99
B-24	09/15/05	10	--	**34**	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B-24	09/15/05	20	--	< 25	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B24 EAST	06/27/07	25	< 0.24	< 5.0	--	< 1.0	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
B24 NORTH	06/27/07	25	< 0.27	< 5.0	--	< 1.0	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
B24 SOUTH	06/27/07	5	< 0.24	< 5.0	--	< 1.0	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
B24 SOUTH	06/27/07	15	< 0.27	< 5.0	--	**3.1**	< 1.0	< 1.0	**2.7**	**17**	< 21	< 1.0
B24 SOUTH	06/27/07	25	**230**	**150**	--	**7200**	**18000**	**3100**	**20900**	**29000**	< 1800	< 0.86
B-25	09/15/05	10	--	< 25	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5

TABLE 2
ANALYTICAL RESULTS FOR CONTAMINANTS OF CONCERN IN SOIL
DFSP NORWALK SITE, NORWALK CALIFORNIA

Sample Location	Sample Date	Sample Depth	TPHg /1 (C4-C13) (mg/kg)	TPHjf /2 (C6-C22) (mg/kg)	TPHd /3 (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE /4 (µg/kg)	TBA /5 (µg/kg)	1,2-DCA /6 (µg/kg)
B-25	09/15/05	20	--	< 25	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B26	12/19/06	15	< 0.21	< 5.0	--	< 0.94	< 0.94	< 0.94	< 2.84	< 1.9	< 19	< 0.94
B26	12/19/06	25	< 0.22	< 5.0	--	< 0.88	< 0.88	< 0.88	< 2.68	< 1.8	< 18	< 0.88
B-26	09/15/05	10	--	< 25	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B-26	09/15/05	20	--	< 25	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B27	12/15/06	25	< 0.23	< 5.0	--	**1.3**	**1.3**	< 0.86	< 2.56	< 1.7	< 17	< 0.86
B-27	09/15/05	10	--	**6200**	--	< 5	< 5	**3600**	**1405.7**	< 5	< 50	< 5
B-27	09/15/05	20	--	< 25	--	< 5	< 5	**11**	**10**	< 5	< 50	< 5
B28	12/18/06	25	< 0.20	< 5.0	--	< 0.85	< 0.85	< 0.85	< 2.55	< 1.7	< 17	< 0.85
B-28	09/15/05	10	--	**3000**	--	< 5	**17**	**12000**	**77000**	< 5	< 50	< 5
B-28	09/15/05	20	--	**1700**	--	**59**	**35**	**4400**	**19028**	< 5	< 50	< 5
B29	12/18/06	25	< 0.22	< 5.0	--	**2**	**2**	< 0.87	< 2.57	< 1.7	< 17	< 0.87
B-29	09/15/05	10	--	< 25	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B-29	09/15/05	20	--	< 25	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B-30	09/15/05	10	--	< 25	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B-30	09/15/05	20	--	< 25	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
B31	12/18/06	25	< 0.23	< 5.0	--	**1.1**	< 0.94	< 0.94	< 2.84	< 1.9	< 19	< 0.94
B-31	09/20/05	10	--	**7200**	--	< 50	**140**	**300**	**1100**	--	--	--
B-31	09/20/05	20	--	< 5	--	< 5	< 5	< 5	**18**	--	--	--
B-32	09/20/05	10	--	< 5	--	< 5	< 5	< 5	< 5	--	--	--
B-32	09/20/05	20	--	< 5	--	< 5	< 5	< 5	< 5	--	--	--
B33	12/14/06	15	< 0.27	< 5.0	--	< 1.0	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
B-33	09/20/05	10	--	< 5	--	< 5	< 5	< 5	< 5	--	--	--
B-33	09/20/05	20	--	< 5	--	< 5	< 5	< 5	< 5	--	--	--
B-34	09/20/05	10	--	< 5	--	< 5	< 5	< 5	< 5	--	--	--
B-34	09/20/05	20	--	**610**	--	< 50	< 50	< 50	**87**	--	--	--
B-35	09/20/05	10	**4900**	--	--	--	--	--	--	--	--	--
B-36	09/20/05	20	**800**	--	--	--	--	--	--	--	--	--
B-37	09/20/05	15	**3200**	--	--	--	--	--	--	--	--	--
B38	12/15/06	15	< 0.25	< 5.0	--	< 0.89	< 0.89	< 0.89	< 2.69	< 1.8	< 18	< 0.89
B-39	09/20/05	30	**13000**	--	--	--	--	--	--	--	--	--
B-40	09/20/05	30	**2.5**	--	--	--	--	--	--	--	--	--
B43	12/18/06	5	< 0.27	< 5.0	--	< 1.2	< 1.2	< 1.2	< 3.7	< 2.5	< 25	< 1.2
B44	12/18/06	15	< 0.30	< 5.0	--	< 1.2	< 1.2	< 1.2	< 3.7	< 2.5	< 25	< 1.2
B46	12/15/06	15	< 0.25	< 5.0	--	< 1.2	< 1.2	< 1.2	< 3.5	< 2.3	< 23	< 1.2
B50	12/14/06	5	< 0.31	< 5.0	--	< 1.0	**1.3**	< 1.0	< 3.1	< 2.1	< 21	< 1.0
B50	12/14/06	10	< 0.26	< 5.0	--	< 0.96	< 0.96	< 0.96	< 2.86	< 1.9	< 19	< 0.96
B50	12/14/06	25	< 0.23	**7.9**	--	**1**	**0.89**	< 0.89	< 2.69	< 1.8	< 18	< 0.89
B50 NORTH	06/27/07	15	< 0.29	< 5.0	--	< 1.6	< 1.6	< 1.6	< 4.9	< 3.3	< 33	< 1.6
B50 NORTH	06/27/07	25	< 0.32	< 5.0	--	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
B51	12/15/06	5	< 0.32	< 5.0	--	< 1.3	< 1.3	< 1.3	< 3.9	< 2.6	< 26	< 1.3
B51	12/15/06	20	< 0.22	< 5.0	--	< 0.81	< 0.81	< 0.81	< 2.41	< 1.6	< 16	< 0.81
B54	12/19/06	20	< 0.21	< 5.0	--	**0.87**	< 0.86	< 0.86	< 2.56	< 1.7	< 17	< 0.86
B54	12/19/06	25	< 0.22	< 5.0	--	**1.1**	**1.2**	< 0.87	< 2.57	< 1.7	< 17	< 0.87
B56	12/14/06	5	< 0.32	< 5.0	--	< 1.2	< 1.2	< 1.2	< 3.5	< 2.3	< 23	< 1.2
B57	12/19/06	5	< 0.28	< 5.0	--	< 1.3	< 1.3	< 1.3	< 3.8	< 2.5	< 25	< 1.3
B58	12/18/06	10	< 0.26	< 5.0	--	< 1.0	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
B58	12/18/06	15	< 0.24	< 5.0	--	< 1.0	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
B58	12/18/06	25	< 0.29	< 5.0	--	< 1.2	< 1.2	< 1.2	< 3.5	< 2.3	< 23	< 1.2
B59	12/18/06	10	< 0.24	< 5.0	--	**3**	**3**	< 0.86	< 2.56	< 1.7	< 17	< 0.86
B59	12/18/06	15	< 0.25	< 5.0	--	**0.98**	**1.1**	< 0.92	< 2.72	< 1.8	< 18	< 0.92
B59	12/18/06	20	< 0.21	< 5.0	--	< 0.88	< 0.88	< 0.88	< 2.68	< 1.8	< 18	< 0.88
B59	12/18/06	25	< 0.22	< 5.0	--	< 0.95	< 0.95	< 0.95	< 2.85	< 1.9	< 19	< 0.95
B60	12/19/06	15	< 0.22	< 5.0	--	< 0.94	< 0.94	< 0.94	< 2.84	< 1.9	< 19	< 0.94
B60	12/19/06	20	< 0.23	< 5.0	--	< 0.90	< 0.90	< 0.90	< 2.7	< 1.8	< 18	< 0.90
B87	12/18/06	5	< 0.26	< 5.0	--	< 1.0	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
BSP-1	04/18/07	30	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
BSP-1	04/18/07	30	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
BSP-2	04/18/07	30	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
BSP-3	04/17/07	30	**1.6**	< 5.0	--	**85**	**90**	**14**	**101**	< 5.0	--	--
BSP-4	04/17/07	30	**220**	**130**	--	**1300**	**5200**	**1800**	**10600**	< 120	--	--

TABLE 2
ANALYTICAL RESULTS FOR CONTAMINANTS OF CONCERN IN SOIL
DFSP NORWALK SITE, NORWALK CALIFORNIA

Sample Location	Sample Date	Sample Depth	TPHg /1 (C4-C13) (mg/kg)	TPHjf /2 (C6-C22) (mg/kg)	TPHd /3 (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE /4 (µg/kg)	TBA /5 (µg/kg)	1,2-DCA /6 (µg/kg)
BSP-5	04/17/07	30	**1500**	**1100**	--	**1600**	**15000**	**11000**	**65000**	< 250	--	--
BSP-6	04/18/07	30	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
BSP-7	04/19/07	30	**1000**	< 5.0	--	**66**	**74**	**10**	**59**	< 5.0	--	--
BSP-8	04/19/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
BSP-8	04/19/07	30	**7300**	**1800**	--	**5500**	**54000**	**17000**	**135000**	< 120	--	--
BSP-8	04/19/07	40	**2.4**	< 5.0	--	**12**	**13**	**69**	**61**	< 5.0	--	--
BSP-9	04/19/07	30	**1600**	**1200**	--	**4300**	**44000**	**23000**	**145000**	< 620	--	--
BSW-02-01	08/03/04	25	**150**	--	--	**250**	**420**	**520**	**4200**	< 250	--	--
BSW-02-02	08/04/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
BSW-06-01	08/06/04	25	**1.2**	--	--	**32**	**16**	**15**	**130**	< 25	--	--
BSW-06-02	08/06/04	25	**11000**	--	--	**60000**	**120000**	**79000**	**530000**	< 13000	--	--
BSW-06-03	08/06/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
BSW-06-04	08/05/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
BSW-07-01	08/05/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
BSW-07-01	08/05/04	30	**3400**	--	--	< 500	< 500	< 500	**11000**	< 2500	--	--
BSW-07-02	08/04/04	25	< 0.5	--	--	**34**	< 5	**9.3**	< 5	< 25	--	--
BSW-07-03	08/05/04	25	**2.1**	--	--	**83**	< 5	**42**	**240**	< 25	--	--
BSW-07-03	08/05/04	30	**6900**	--	--	**29000**	< 1300	**51000**	**280000**	< 6300	--	--
BSW-07-04	08/05/04	25	< 0.5	--	--	< 5	< 5	< 5	**14**	< 25	--	--
DPT-1	09/03/09	10	< 0.30	< 5.0	--	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-1	09/03/09	20	< 0.30	< 5.0	--	< 1.2	< 1.2	< 1.2	< 3.5	< 2.3	< 23	< 1.2
DPT-1	09/03/09	25	< 0.28	< 5.0	--	< 1.4	< 1.4	< 1.4	< 4.3	< 2.9	< 29	< 1.4
DPT-10	09/04/09	15	**240**	**490**	--	< 1.1	**4.2**	**9.1**	**15**	< 2.2	< 22	< 1.1
DPT-10	09/04/09	20	**2800**	**3200**	--	< 420	< 420	**11000**	**13000**	< 830	< 8300	< 420
DPT-10	09/04/09	25	**830**	**990**	--	< 110	< 110	**940**	< 340	< 230	< 2300	< 110
DPT-100	11/16/11	0.5	< 0.26	**28**	**160**	**1.2**	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-100	11/16/11	5	< 0.25	< 5.0	< 5.0	**0.39 J**	< 0.93	< 0.93	< 2.83	< 1.9	< 19	< 0.93
DPT-100	11/16/11	10	< 0.28	< 5.0	< 5.0	**0.18 J**	< 1.2	< 1.2	< 3.6	< 2.4	< 24	< 1.2
DPT-100	11/16/11	16	< 0.31	< 5.0	< 5.0	**0.18 J**	< 1.1	< 1.1	< 3.4	< 2.3	< 23	< 1.1
DPT-100	11/16/11	26	**3.3**	**50**	**48**	**2.6**	**5.8**	**110**	**1040**	< 1.7	< 17	< 0.87
DPT-101	11/16/11	0.5	< 0.28	**64**	**750**	**0.48 J**	< 1.2	< 1.2	< 3.5	< 2.3	< 23	< 1.2
DPT-101	11/16/11	5	< 0.21	< 5.0	< 5.0	**1.5**	**0.96**	**0.15 J**	**0.31 J**	< 1.9	< 19	< 0.95
DPT-101	11/16/11	10	< 0.25	< 5.0	< 5.0	< 1.0	< 1.0	**0.16 J**	**0.56 J**	< 2.1	< 21	< 1.0
DPT-101	11/16/11	10	< 0.29	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	**0.4 J**	< 2.3	< 23	< 1.1
DPT-101	11/16/11	16	< 0.30	< 5.0	< 5.0	**0.28 J**	< 1.1	< 1.1	**0.54 J**	< 2.3	< 23	< 1.1
DPT-101	11/16/11	21.5	< 0.22	< 5.0	< 5.0	**0.52 J**	< 0.90	< 0.90	< 2.7	< 1.8	< 18	< 0.90
DPT-101	11/16/11	24	< 0.22	< 5.0	< 5.0	**0.31 J**	< 0.84	< 0.84	< 2.54	< 1.7	< 17	< 0.84
DPT-102	11/16/11	0.5	< 0.27	< 5.0	**5.2**	**0.67 J**	< 1.4	< 1.4	< 4.1	< 2.7	< 27	< 1.4
DPT-102	11/16/11	5	< 0.32	< 5.0	< 5.0	**0.99 J**	**0.95 J**	**0.28 J**	**0.64 J**	< 2.3	< 23	< 1.2
DPT-102	11/16/11	10	< 0.25	< 5.0	< 5.0	**0.19 J**	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-102	11/16/11	10	< 0.26	< 5.0	< 5.0	**0.14 J**	< 1.1	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-102	11/16/11	17	< 0.22	< 5.0	< 5.0	**1.2**	**0.55 J**	< 0.86	< 2.56	< 1.7	< 17	< 0.86
DPT-102	11/16/11	17	< 0.22	< 5.0	< 5.0	**1.6**	**0.66 J**	< 0.85	< 2.55	< 1.7	< 17	< 0.85
DPT-102	11/16/11	20	< 0.28	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-102	11/16/11	25	**1.7**	< 5.0	< 5.0	**9.2**	**0.51 J**	**3.8**	**9.5**	< 1.5	< 15	< 0.77
DPT-11	09/04/09	15	< 0.28	< 5.0	--	< 0.78	**1.2**	< 0.78	< 2.38	< 1.6	< 16	< 0.78
DPT-11	09/04/09	20	**1900**	**1800**	--	< 86	< 86	**2700**	**320**	< 170	< 1700	< 86
DPT-11	09/04/09	25	**1.2**	< 5.0	--	**1.2**	**1.2**	< 0.86	< 2.56	< 1.7	< 17	< 0.86
DPT-12	09/04/09	10	**540**	**1600**	--	< 97	< 97	< 97	< 287	< 190	< 1900	< 97
DPT-12	09/04/09	15	**3500**	**5600**	--	< 96	< 96	< 96	< 286	< 190	< 1900	< 96
DPT-12	09/04/09	20	**130**	**87**	--	**1.9**	**2.7**	**75**	**5.53**	< 1.6	< 16	< 0.78
DPT-12	09/04/09	25	**0.57**	< 5.0	--	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-13	09/10/09	5	< 0.27	< 5.0	--	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-13	09/10/09	10	< 0.21	< 5.0	--	**1.9**	**0.92**	< 0.85	< 2.55	< 1.7	< 17	< 0.85
DPT-14	09/10/09	5	< 0.24	< 5.0	--	< 0.98	< 0.98	< 0.98	< 2.98	< 2.0	< 20	< 0.98
DPT-14	09/10/09	10	< 0.23	< 5.0	--	< 0.92	< 0.92	< 0.92	< 2.72	< 1.8	< 18	< 0.92
DPT-15	09/10/09	5	< 0.28	< 5.0	--	< 1.2	< 1.2	< 1.2	< 3.5	< 2.3	< 23	< 1.2
DPT-15	09/10/09	10	< 0.28	< 5.0	--	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-16	09/10/09	5	< 0.24	< 5.0	--	< 0.99	< 0.99	< 0.99	< 2.99	< 2.0	< 20	< 0.99
DPT-16	09/10/09	10	< 0.23	< 5.0	--	**1.4**	< 0.98	< 0.98	< 2.98	< 2.0	< 20	< 0.98
DPT-17	09/10/09	5	**14000**	**11000**	--	< 1000	< 1000	< 1000	< 3000	< 2000	< 20000	< 1000

TABLE 2
ANALYTICAL RESULTS FOR CONTAMINANTS OF CONCERN IN SOIL
DFSP NORWALK SITE, NORWALK CALIFORNIA

Sample Location	Sample Date	Sample Depth	TPHg /1 (C4-C13) (mg/kg)	TPHjf /2 (C6-C22) (mg/kg)	TPHd /3 (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE /4 (µg/kg)	TBA /5 (µg/kg)	1,2-DCA /6 (µg/kg)
DPT-17	09/10/09	10	**5000**	**6800**	--	< 97	< 97	< 97	< 287	< 190	< 1900	< 97
DPT-17	09/10/09	15	**7200**	**10000**	--	< 1100	< 1100	< 1100	< 3300	< 2200	< 22000	< 1100
DPT-17	09/10/09	20	**0.86**	**7**	--	**3.1**	**1**	**1.3**	**3.4**	< 1.9	< 19	< 0.93
DPT-17	09/10/09	25	**370**	**200**	--	< 95	< 95	< 95	< 285	< 190	< 1900	< 95
DPT-18	09/10/09	15	**0.63**	< 5.0	--	< 1.0	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-18	09/10/09	20	**160**	**23**	--	< 86	< 86	< 86	< 256	< 170	< 1700	< 86
DPT-19	09/10/09	10	**830**	**910**	--	< 86	**320**	< 86	**568**	< 170	< 1700	< 86
DPT-19	09/10/09	15	**0.72**	< 5.0	--	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-19	09/10/09	20	**0.45**	< 5.0	--	**1.2**	**0.84**	< 0.81	< 2.41	< 1.6	< 16	< 0.81
DPT-2	09/03/09	15	< 0.21	< 5.0	--	< 0.96	< 0.96	< 0.96	< 2.86	< 1.9	< 19	< 0.96
DPT-2	09/03/09	20	< 0.28	< 5.0	--	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-2	09/03/09	25	< 0.27	< 5.0	--	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-20	06/09/10	25	**1.6**	< 5	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
DPT-21	06/09/10	10	< 0.5	**12**	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
DPT-21	06/09/10	15	**6.9**	**8.4**	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
DPT-21	06/09/10	20	**5.1**	**11**	--	< 5	< 5	**0.4 J**	< 10	< 5	< 50	< 5
DPT-21	06/09/10	25	< 0.5	< 5	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
DPT-22	06/09/10	20	< 0.5	< 5	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
DPT-22	06/09/10	25	**970**	**1700**	--	**36 J**	< 500	**530**	**163 J**	< 500	< 5000	< 500
DPT-23	06/09/10	10	**1200**	**2100**	--	< 500	< 500	**1200**	**993 J**	< 500	< 5000	< 500
DPT-23	06/09/10	15	**4**	< 5	--	< 5	< 5	**0.74 J**	**0.5 J**	< 5	< 50	< 5
DPT-23	06/09/10	20	< 0.5	< 5	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
DPT-23	06/09/10	25	**3.1**	**6**	--	< 5	< 5	**0.6 J**	**0.84 J**	< 5	< 50	< 5
DPT-24	06/09/10	10	< 0.5	< 5	--	< 5	< 5	< 5	< 10	< 5	< 50	< 5
DPT-24	06/09/10	15	**2700**	**5200**	--	< 1000	< 1000	**2800**	**2830 J**	< 1000	< 10000	< 1000
DPT-24	06/09/10	20	**780**	**1300**	--	< 500	< 500	**680**	**235 J**	< 500	< 5000	< 500
DPT-24	06/09/10	25	**70**	**74**	--	< 5	< 5	**13**	**4.7 J**	< 5	< 50	< 5
DPT-25	06/09/10	10	**2600**	**150**	--	< 500	< 500	**2300**	**1033 J**	< 500	< 5000	< 500
DPT-25	06/09/10	15	**2700**	**3800**	--	< 1000	< 1000	**7400**	**10650 J**	< 1000	< 10000	< 1000
DPT-25	06/09/10	20	**680**	**720**	--	< 500	< 500	**1000**	**227 J**	< 500	< 5000	< 500
DPT-25	06/09/10	25	**190**	**520**	--	< 500	< 500	**560**	**460 J**	< 500	< 5000	< 500
DPT-27	06/10/10	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
DPT-28	06/10/10	25	**17**	**53**	--	< 500	< 500	**140 J**	< 1000	< 500	< 5000	< 500
DPT-29	06/10/10	20	**1600**	**580**	--	< 500	< 500	**1400**	**524 J**	< 500	< 5000	< 500
DPT-29	06/10/10	25	**770**	**520**	--	< 500	< 500	**480 J**	**78 J**	< 500	< 5000	< 500
DPT-3	09/03/09	15	< 0.23	< 5.0	--	< 0.93	< 0.93	< 0.93	< 2.83	< 1.9	< 19	< 0.93
DPT-3	09/03/09	20	< 0.20	< 5.0	--	< 0.78	**1**	< 0.78	< 2.38	< 1.6	< 16	< 0.78
DPT-3	09/03/09	25	< 0.27	< 5.0	--	< 1.2	< 1.2	< 1.2	< 3.5	< 2.3	< 23	< 1.2
DPT-30	06/10/10	15	**840**	**1300**	--	< 500	< 500	**280 J**	< 1000	< 500	< 5000	< 500
DPT-30	06/10/10	20	**770**	**2900**	--	< 500	< 500	**320 J**	< 1000	< 500	< 5000	< 500
DPT-30	06/10/10	25	**1700**	**8**	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
DPT-31	06/14/10	12	< 0.50	**5.2**	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
DPT-33	06/10/10	25	**1700**	**2200**	--	< 500	< 500	< 500	< 1000	< 500	< 5000	< 500
DPT-34	06/14/10	20	**0.65**	< 5.0	--	< 5.0	< 5.0	**0.19 J**	**0.44 J**	< 5.0	< 50	< 5.0
DPT-34	06/14/10	25	**8400**	**12000**	--	< 500	< 500	**230 J**	< 1000	< 500	< 5000	< 500
DPT-35	06/10/10	15	**0.57**	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
DPT-35	06/10/10	20	**6.4**	**14000**	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
DPT-35	06/10/10	25	**1400**	**2000**	--	< 500	< 500	**20 J**	**59 J**	< 500	< 5000	< 500
DPT-36	06/11/10	20	**1.1**	**8.8**	--	< 5.0	< 5.0	< 5.0	**0.26 J**	< 5.0	< 50	< 5.0
DPT-36	06/11/10	25	**0.9**	**14**	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
DPT-37	06/11/10	15	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
DPT-37	06/11/10	20	**520**	**440**	--	< 500	< 500	< 500	< 1000	< 500	< 5000	< 500
DPT-37	06/11/10	25	**1**	< 5.0	--	**0.31 J**	< 5.0	**0.72 J**	**0.81 J**	< 5.0	< 50	< 5.0
DPT-38	06/11/10	15	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
DPT-38	06/11/10	20	**0.53**	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
DPT-38	06/11/10	25	**13000**	**11000**	--	**45 J**	**320 J**	**1600**	**10700**	< 1000	< 10000	< 1000
DPT-39	06/11/10	20	**1.7**	**11**	--	< 5.0	< 5.0	**0.24 J**	**1.72 J**	< 5.0	< 50	< 5.0
DPT-4	09/03/09	5	**480**	**3100**	--	< 91	< 91	< 91	< 271	< 180	< 1800	< 91
DPT-4	09/03/09	10	< 0.26	**15**	--	< 1.0	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-4	09/03/09	15	< 0.27	< 5.0	--	< 1.1	< 1.1	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-4	09/03/09	20	**850**	**640**	--	< 82	**86**	**480**	**270**	< 160	< 1600	< 82

TABLE 2
ANALYTICAL RESULTS FOR CONTAMINANTS OF CONCERN IN SOIL
DFSP NORWALK SITE, NORWALK CALIFORNIA

Sample Location	Sample Date	Sample Depth	TPHg [/1] (C4-C13) (mg/kg)	TPHjf [/2] (C6-C22) (mg/kg)	TPHd [/3] (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE [/4] (µg/kg)	TBA [/5] (µg/kg)	1,2-DCA [/6] (µg/kg)
DPT-4	09/03/09	25	**11000**	**6100**	--	**390**	**3300**	**15000**	**51000**	< 180	< 1800	< 90
DPT-40	06/11/10	20	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
DPT-40	06/11/10	25	**0.67**	< 5.0	--	< 5.0	< 5.0	**0.39 J**	< 10	< 5.0	< 50	< 5.0
DPT-41	10/31/11	0.5	**2400**	**5300**	**8700**	**370**	**1200**	**5400**	**18810**	< 96	< 960	< 48
DPT-41	10/31/11	5	**2.2**	< 5.0	< 5.0	**15**	**77**	**21**	**198**	< 3.5	**27 J**	< 1.8
DPT-41	10/31/11	12	**1.8**	< 5.0	< 5.0	**26**	**120**	**34**	**247**	< 1.9	**7 J**	< 0.94
DPT-41	10/31/11	15	**7.5**	< 5.0	< 5.0	**86**	**820**	**260**	**2300**	< 100	< 1000	< 50
DPT-41	10/31/11	20	< 0.26	< 5.0	< 5.0	**1 J**	**5.8**	**1.9**	**14.5**	< 2.1	< 21	< 1.0
41_2010	06/11/10	25	< 0.50	< 5.0	--	< 5.0	< 5.0	**0.33 J**	< 10	< 5.0	< 50	< 5.0
DPT-42	10/31/11	0.5	**2300**	**3400**	**7600**	**3900**	**34000**	**23000**	**110000**	< 580	< 5800	< 290
DPT-42	10/31/11	5	**910**	< 5.0	< 5.0	**340**	**5900**	**5400**	**33700**	< 84	< 840	< 42
DPT-42	10/31/11	10	**2.8**	< 5.0	< 5.0	**120**	**1300**	**1000**	**7000**	< 87	< 870	< 44
DPT-42	10/31/11	16	**23**	< 5.0	< 5.0	**70**	**280**	**180**	**1280**	< 110	< 1100	< 53
DPT-42	10/31/11	19	**49**	**42000**	**40000**	**990**	**3600**	**1800**	**11800**	< 92	< 920	< 46
DPT-42	10/31/11	24	< 0.13	< 5.0	< 5.0	**0.47 J**	**0.89 J**	**0.6 J**	**4**	< 2.0	< 20	< 1.0
DPT-43	10/31/11	0.5	< 0.26	< 5.0	**74**	**5.4**	**1.5**	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-43	10/31/11	5	< 0.25	< 5.0	< 5.0	**1.8**	**1.4**	**0.27 J**	**0.62 J**	< 2.0	< 20	< 1.0
DPT-43	10/31/11	10	< 0.23	< 5.0	< 5.0	**32**	**12**	**0.81 J**	**2.51 J**	< 1.8	< 18	< 0.91
DPT-43	10/31/11	15	< 0.27	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-43	10/31/11	20	< 0.21	< 5.0	< 5.0	**0.53 J**	< 0.77	< 0.77	< 2.27	< 1.5	< 15	< 0.77
DPT-43	10/31/11	25	< 0.26	< 5.0	< 5.0	**0.47 J**	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-44	10/31/11	0.5	< 0.25	< 5.0	**18**	**6**	**1.7**	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-44	10/31/11	5	< 0.24	< 5.0	< 5.0	**1.2**	**0.88 J**	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-44	10/31/11	10	< 0.21	< 5.0	< 5.0	**2.7**	**1.2**	< 0.90	< 2.7	< 1.8	< 18	< 0.90
DPT-44	10/31/11	15	< 0.25	< 5.0	< 5.0	**0.8 J**	**0.82 J**	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-44	10/31/11	20	< 0.25	< 5.0	< 5.0	**0.18 J**	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-44	10/31/11	25	< 0.22	< 5.0	**240**	**0.57 J**	< 0.80	< 0.80	< 2.4	< 1.6	< 16	< 0.80
DPT-45	11/01/11	0.5	< 0.20	< 5.0	< 5.0	**6.2**	**2.5**	**0.21 J**	**0.6 J**	< 1.7	< 17	< 0.87
DPT-45	11/01/11	5	< 0.24	< 5.0	< 5.0	**0.94 J**	**0.85 J**	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-45	11/01/11	10	< 0.20	< 5.0	**6.3**	**0.96**	**0.53 J**	< 0.86	< 2.56	< 1.7	< 17	< 0.86
DPT-45	11/01/11	10	< 0.21	< 5.0	< 5.0	**0.59**	**0.26 J**	< 0.44	< 1.32	< 0.88	< 8.8	< 0.44
DPT-45	11/01/11	15	< 0.27	< 5.0	< 5.0	< 1.1	**0.63 J**	**0.31 J**	**0.73 J**	< 2.2	< 22	< 1.1
DPT-45	11/01/11	20	< 0.25	< 5.0	< 5.0	**0.29 J**	< 0.98	< 0.98	< 2.98	< 2.0	< 20	< 0.98
DPT-45	11/01/11	25	< 0.20	**12**	**580**	**0.48 J**	< 0.76	< 0.76	< 2.26	< 1.5	< 15	< 0.76
DPT-46	11/01/11	0.5	< 0.24	< 5.0	**340**	**2.5**	**0.78 J**	< 0.93	< 2.83	< 1.9	< 19	< 0.93
DPT-46	11/01/11	5	< 0.20	< 5.0	< 5.0	**2.1**	**1.4**	**0.14 J**	< 2.54	< 1.7	< 17	< 0.84
DPT-46	11/01/11	10	< 0.23	< 5.0	< 5.0	**0.74 J**	**0.55 J**	< 0.91	**0.34 J**	< 1.8	< 18	< 0.91
DPT-46	11/01/11	10	< 0.24	< 5.0	**260**	**2**	**1.4**	**0.19 J**	**0.34 J**	< 1.8	< 18	< 0.92
DPT-46	11/01/11	15	< 0.24	< 5.0	< 5.0	**0.67 J**	**0.62 J**	< 0.92	< 2.72	< 1.8	< 18	< 0.92
DPT-46	11/01/11	20	< 0.20	< 5.0	< 5.0	**1.4**	**0.92 J**	< 0.96	< 2.86	< 1.9	< 19	< 0.96
DPT-46	11/01/11	28	< 0.24	< 5.0	< 5.0	**0.18 J**	< 0.98	< 0.98	< 2.98	< 2.0	< 20	< 0.98
DPT-46	11/01/11	33	< 0.27	**17**	**380**	**0.91**	**0.93**	**0.18 J**	**0.34 J**	< 1.7	< 17	< 0.84
DPT-47	11/01/11	0.5	< 0.24	< 5.0	< 5.0	**5.6**	**2.4**	**0.19 J**	**0.4 J**	< 1.9	< 19	< 0.96
DPT-47	11/01/11	5	< 0.20	< 5.0	< 5.0	**2**	**1.2**	**0.17 J**	**0.27 J**	< 1.6	< 16	< 0.81
DPT-47	11/01/11	10	< 0.21	< 5.0	< 5.0	**1.1**	**0.85**	**0.13 J**	**0.21 J**	< 1.5	< 15	< 0.76
DPT-47	11/01/11	15	< 0.26	< 5.0	< 5.0	**0.24 J**	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-47	11/01/11	20	< 0.20	< 5.0	< 5.0	**0.97**	**1.2**	**0.18 J**	**0.27 J**	< 1.7	< 17	< 0.84
DPT-47	11/01/11	24	< 0.22	< 5.0	< 5.0	**0.28 J**	< 0.85	< 0.85	< 2.55	< 1.7	< 17	< 0.85
DPT-48	11/01/11	0.5	< 0.26	< 5.0	**13**	**8.2**	**2.8**	**0.17 J**	**0.54 J**	< 2.1	< 21	< 1.0
DPT-48	11/01/11	5	< 0.24	< 5.0	< 5.0	**1.2**	**0.91 J**	**0.15 J**	< 2.84	< 1.9	< 19	< 0.94
DPT-48	11/01/11	10	< 0.22	< 5.0	< 5.0	**3.2**	**3.4**	**0.63 J**	**0.93 J**	< 1.7	< 17	< 0.84
DPT-48	11/01/11	15.5	< 0.24	< 5.0	< 5.0	**0.19 J**	< 0.98	< 0.98	< 2.98	< 2.0	< 20	< 0.98
DPT-48	11/01/11	20	< 0.19	< 5.0	< 5.0	**0.21 J**	< 0.93	< 0.93	< 2.83	< 1.9	< 19	< 0.93
DPT-48	11/01/11	23.5	< 0.20	< 5.0	< 5.0	**1.9**	**1.3**	**0.18 J**	**0.31 J**	< 1.6	< 16	< 0.78
DPT-49	11/01/11	0.5	< 0.24	< 5.0	**59**	**6.3**	**3.2**	**0.22 J**	**0.53 J**	< 1.8	< 18	< 0.89
DPT-49	11/01/11	5	< 0.26	< 5.0	< 5.0	**1.2**	**1.2**	**0.15 J**	**0.39 J**	< 1.9	**9.4 J**	< 0.96
DPT-49	11/01/11	10	**5.3**	**13**	**13**	**21**	**180**	**9.7**	**93**	< 1.6	**420**	< 0.78
DPT-49	11/01/11	15	**6.6**	**9**	**8.6**	**35**	**1400**	**18**	**143**	< 2.0	**210**	< 1.0
DPT-49	11/01/11	15	< 5.8	< 5.0	< 5.0	**42**	**560**	**24**	**176**	< 2.0	**200**	< 1.0
DPT-49	11/01/11	18	**1500**	**520**	**490**	**300**	**8000**	**1200**	**6700**	< 160	< 1600	< 82
DPT-49	11/01/11	20	< 18	**14**	**14**	**240**	**4200**	**100**	**1480**	< 1.5	**22**	< 0.76

TABLE 2
ANALYTICAL RESULTS FOR CONTAMINANTS OF CONCERN IN SOIL
DFSP NORWALK SITE, NORWALK CALIFORNIA

Sample Location	Sample Date	Sample Depth	TPHg /1 (C4-C13) (mg/kg)	TPHjf /2 (C6-C22) (mg/kg)	TPHd /3 (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE /4 (µg/kg)	TBA /5 (µg/kg)	1,2-DCA /6 (µg/kg)
DPT-49	11/01/11	27.5	**0.49**	< 5.0	< 5.0	**49**	**86**	**46**	**261**	< 1.8	**7.3 J**	< 0.89
DPT-5	09/03/09	10	< 0.23	< 5.0	--	< 1.0	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-5	09/03/09	15	< 0.27	< 5.0	--	< 1.1	**2.2**	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-5	09/03/09	20	**2000**	**2800**	--	< 80	< 80	**1700**	**520**	< 160	< 1600	< 80
DPT-50	11/02/11	0.5	< 0.24	< 5.0	< 5.0	**7.1**	**3.2**	**0.33 J**	**0.5 J**	< 2.2	< 22	< 1.1
DPT-50	11/02/11	5	< 0.22	< 5.0	< 5.0	**1.5**	**0.7 J**	< 0.83	< 2.53	< 1.7	< 17	< 0.83
DPT-50	11/02/11	10	< 0.24	< 5.0	< 5.0	**0.89 J**	**0.75 J**	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-50	11/02/11	16	< 0.22	< 5.0	< 5.0	**1.2**	**1.1**	**0.2 J**	**0.53 J**	< 1.9	< 19	< 0.96
DPT-50	11/02/11	20	**1.3**	< 5.0	< 5.0	**1.4**	**1.1**	**27**	**36**	< 1.9	**63**	**0.33 J**
DPT-50	11/02/11	25	**1**	**14**	**170**	**1.4**	**0.59 J**	**12**	**35.6 J**	< 1.7	**12 J**	< 0.84
DPT-51	11/02/11	0.5	< 0.24	**7.4**	**100**	**6.9**	**2.7**	**0.31 J**	**0.94 J**	< 2.2	< 22	< 1.1
DPT-51	11/02/11	5	< 0.23	< 5.0	**17**	**1.1**	**0.93 J**	**0.16 J**	**0.33 J**	< 1.9	< 19	< 0.94
DPT-51	11/02/11	10	< 0.22	< 5.0	**9.1**	**2.3**	**1.2**	**0.13 J**	**0.21 J**	< 1.5	< 15	< 0.76
DPT-51	11/02/11	14	< 0.25	< 5.0	< 5.0	**0.61 J**	**0.55 J**	< 0.97	< 2.87	< 1.9	< 19	< 0.97
DPT-51	11/02/11	20	**5800**	**1600**	**1500**	**1200**	**46000**	**44000**	**406000**	< 500	< 5000	< 250
DPT-51	11/02/11	20	**6000**	**4300**	**4100**	**920**	**26000**	**23000**	**188000**	< 970	< 9700	< 480
DPT-52	11/02/11	0.5	< 0.25	< 5.0	< 5.0	**8.9**	**5.1**	**0.51 J**	**1.6 J**	< 2.2	< 22	< 1.1
DPT-52	11/02/11	5	< 0.22	< 5.0	< 5.0	**2**	**1.7**	**0.57 J**	**4.4**	< 1.7	< 17	< 0.84
DPT-52	11/02/11	12	**0.44**	< 5.0	< 5.0	**4.4**	**2.7**	**3.3**	**16.1**	< 1.9	**12 J**	< 0.94
DPT-52	11/02/11	15.5	**1.1**	< 5.0	< 5.0	**2.5**	**0.79 J**	**3.6**	**6.6**	< 2.2	**100**	< 1.1
DPT-52	11/02/11	20	**2.6**	< 5.0	< 5.0	**16**	**670**	**31**	**182**	< 1.9	**18 J**	**1.4**
DPT-52	11/02/11	24	**0.45**	< 5.0	< 5.0	**2.3**	**3.2**	**4.7**	**15.96 J**	< 1.9	**14 J**	**1**
DPT-53	11/02/11	0.5	< 0.26	< 5.0	**36**	**3.5**	**1.8**	< 1.0	**0.5 J**	< 2.1	< 21	< 1.0
DPT-53	11/02/11	6	< 0.26	< 5.0	< 5.0	**1.3**	**1.5**	**0.28 J**	**0.8 J**	< 2.0	< 20	< 0.99
DPT-53	11/02/11	6	< 0.27	< 5.0	< 5.0	**2**	**1.9**	**0.35 J**	**0.8 J**	< 2.5	< 25	< 1.3
DPT-53	11/02/11	12	< 0.24	< 5.0	< 5.0	**0.94 J**	**0.65 J**	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-53	11/02/11	16	< 0.22	< 5.0	< 5.0	**0.65 J**	**0.54 J**	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-53	11/02/11	20	< 0.27	< 5.0	< 5.0	**0.43 J**	< 1.1	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-54	11/02/11	0.5	< 0.27	< 5.0	< 5.0	**6**	**3**	**0.18 J**	**0.53 J**	< 2.1	< 21	< 1.0
DPT-54	11/02/11	6	< 0.28	< 5.0	< 5.0	**0.61 J**	**0.58 J**	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-54	11/02/11	12	< 0.21	< 5.0	< 5.0	**1.9**	**1**	< 0.87	< 2.57	< 1.7	< 17	< 0.87
DPT-54	11/02/11	16	< 0.23	< 5.0	< 5.0	**0.65 J**	**0.61 J**	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-54	11/02/11	20	< 0.26	< 5.0	< 5.0	< 1.0	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-55	11/03/11	0.5	< 0.25	< 5.0	**70**	**1.7**	**0.86 J**	< 0.98	< 2.98	< 2.0	< 20	< 0.98
DPT-55	11/03/11	5	< 0.29	< 5.0	< 5.0	**1 J**	**0.97 J**	**0.17 J**	**0.28 J**	< 2.1	< 21	< 1.0
DPT-55	11/03/11	11.5	< 0.22	< 5.0	< 5.0	**1**	**0.71 J**	< 0.84	< 2.54	< 1.7	< 17	< 0.84
DPT-55	11/03/11	15	< 0.28	< 5.0	< 5.0	**0.17 J**	< 0.97	< 0.97	< 2.87	< 1.9	< 19	< 0.97
DPT-55	11/03/11	20	< 0.29	< 5.0	< 5.0	< 1.0	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-55	11/03/11	24	< 0.21	< 5.0	< 5.0	**0.75 J**	**0.96**	**0.18 J**	**0.25 J**	< 1.6	< 16	< 0.81
DPT-56	11/03/11	0.5	< 0.26	< 5.0	**200**	**3**	**1.5**	< 0.97	**0.31 J**	< 1.9	< 19	< 0.97
DPT-56	11/03/11	5	< 0.32	< 5.0	< 5.0	**1.1**	**1.1**	**0.22 J**	**0.28 J**	< 2.1	< 21	< 1.0
DPT-56	11/03/11	11.5	< 0.21	< 5.0	< 5.0	**0.72 J**	**0.61 J**	< 0.91	< 2.71	< 1.8	< 18	< 0.91
DPT-56	11/03/11	15	< 0.27	< 5.0	< 5.0	< 0.91	< 0.91	< 0.91	< 2.71	< 1.8	< 18	< 0.91
DPT-56	11/03/11	20	< 0.26	< 5.0	< 5.0	**0.45 J**	**0.79 J**	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-57	11/03/11	0.5	< 0.21	< 5.0	**20**	**8.8**	**3.2**	**0.2 J**	**0.45 J**	< 2.0	< 20	< 1.0
DPT-57	11/03/11	5	< 0.22	< 5.0	< 5.0	**2.2**	**1.7**	**0.26 J**	**0.41 J**	< 1.8	< 18	< 0.91
DPT-57	11/03/11	11	< 0.22	< 5.0	< 5.0	**4.2**	**5**	**0.9**	**2.16 J**	< 1.8	< 18	< 0.88
DPT-57	11/03/11	15	< 0.26	< 5.0	< 5.0	**0.21 J**	< 0.89	< 0.89	< 2.69	< 1.8	< 18	< 0.89
DPT-57	11/03/11	19.5	**65**	< 5.0	< 5.0	**14 J**	< 44	**21 J**	**75 J**	< 89	< 890	< 44
DPT-57	11/03/11	19.5	**460**	**9.5**	**9**	**37 J**	< 44	**32 J**	**75 J**	< 87	< 870	< 44
DPT-57	11/03/11	23	**8.2**	< 5.0	< 5.0	**23**	**1.3**	**21**	**120.72 J**	**23**	**15 J**	< 1.0
DPT-58	11/03/11	0.5	< 0.25	< 5.0	< 5.0	**8.7**	**3.8**	**0.26 J**	**0.62 J**	< 1.8	< 18	< 0.89
DPT-58	11/03/11	5	< 0.27	< 5.0	< 5.0	**2.2**	**1.6**	**0.24 J**	**0.38 J**	< 2.2	< 22	< 1.1
DPT-58	11/03/11	10.5	< 0.20	< 5.0	< 5.0	**1**	**0.72 J**	< 0.88	< 2.68	< 1.8	< 18	< 0.88
DPT-58	11/03/11	15	< 0.25	< 5.0	< 5.0	**0.31 J**	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-58	11/03/11	20	< 0.21	< 5.0	< 5.0	**2.2**	**2.6**	**0.5 J**	**0.77 J**	< 1.6	< 16	< 0.81
DPT-58	11/03/11	24	**0.34**	< 5.0	< 5.0	**0.33 J**	< 0.93	< 0.93	**0.33 J**	**0.68 J**	< 19	< 0.93
DPT-59	11/03/11	0.5	< 0.27	< 5.0	< 5.0	**5.9**	**2.5**	**0.19 J**	**0.39 J**	< 2.1	< 21	< 1.1
DPT-59	11/03/11	5	< 0.19	< 5.0	< 5.0	**1.4**	**1.2**	**0.19 J**	**0.26 J**	< 1.6	< 16	< 0.79
DPT-59	11/03/11	10	< 0.25	< 5.0	< 5.0	**0.14 J**	< 1.1	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-59	11/03/11	15	< 0.26	< 5.0	< 5.0	**0.23 J**	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1

TABLE 2
ANALYTICAL RESULTS FOR CONTAMINANTS OF CONCERN IN SOIL
DFSP NORWALK SITE, NORWALK CALIFORNIA

Sample Location	Sample Date	Sample Depth	TPHg /1 (C4-C13) (mg/kg)	TPHjf /2 (C6-C22) (mg/kg)	TPHd /3 (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE /4 (µg/kg)	TBA /5 (µg/kg)	1,2-DCA /6 (µg/kg)
DPT-59	11/03/11	20	< 0.31	< 5.0	< 5.0	**0.31 J**	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-59	11/03/11	24	**0.79**	< 5.0	< 5.0	**0.97 J**	< 1.0	**1 J**	**9.1**	**0.76 J**	< 21	< 1.0
DPT-59	11/03/11	28	**4.6**	< 5.0	< 5.0	**4.4**	< 0.83	**6.9**	**41**	**1.2 J**	< 17	< 0.83
DPT-6	09/04/09	15	< 0.28	< 5.0	--	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-6	09/04/09	20	**3100**	**8600**	--	< 100	< 100	**8800**	**5080**	< 210	< 2100	< 100
DPT-6	09/04/09	25	**1.3**	< 5.0	--	< 87	< 87	< 87	< 257	< 170	< 1700	< 87
DPT-60	11/03/11	0.5	< 0.25	< 5.0	**27**	**6.5**	**2.5**	**0.18 J**	**0.39 J**	< 2.2	< 22	< 1.1
DPT-60	11/03/11	5	< 0.32	< 5.0	< 5.0	**1.2**	**1.2**	**0.22 J**	**0.37 J**	< 2.1	< 21	< 1.0
DPT-60	11/03/11	5	< 0.26	< 5.0	< 5.0	**1.1**	**1.1**	**0.18 J**	**0.31 J**	< 2.0	< 20	< 0.99
DPT-60	11/03/11	11.5	< 0.23	< 5.0	< 5.0	**4.4**	**5**	**0.81 J**	**2.01 J**	< 2.0	< 20	< 1.0
DPT-60	11/03/11	15	< 0.28	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-60	11/03/11	19	**220**	**6.4**	**6**	< 45	< 45	**23 J**	**43 J**	< 90	< 900	< 45
DPT-60	11/03/11	19	**2.1**	**180**	**170**	< 43	< 43	**28 J**	**43 J**	< 86	< 860	< 43
DPT-61	11/07/11	0.5	< 0.23	< 5.0	**31**	**6.6**	**1.3**	**0.25 J**	**0.62 J**	< 1.8	< 18	< 0.90
DPT-61	11/07/11	5	< 0.20	< 5.0	< 5.0	**0.91**	**0.96**	**0.17 J**	**0.29 J**	< 1.6	< 16	< 0.80
DPT-61	11/07/11	10.5	< 0.24	< 5.0	< 5.0	< 0.94	< 0.94	< 0.94	< 2.84	< 1.9	< 19	< 0.94
DPT-61	11/07/11	15	< 0.26	< 5.0	< 5.0	**13**	**3.8**	**0.22 J**	**0.46 J**	< 2.2	< 22	< 1.1
DPT-61	11/07/11	20	< 0.20	< 5.0	< 5.0	**3.2**	**3.9**	**0.75 J**	**1 J**	< 1.6	< 16	< 0.79
DPT-61	11/07/11	23.5	< 0.26	< 5.0	< 5.0	**10**	**11**	**1.9**	**3.9 J**	< 3.2	< 32	< 1.6
DPT-62	11/07/11	0.5	< 0.25	< 5.0	**12**	**0.24 J**	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-62	11/07/11	6	< 0.27	< 5.0	< 5.0	**0.31 J**	< 1.1	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-62	11/07/11	10	< 0.23	< 5.0	< 5.0	**2.8**	**2.9**	**0.5 J**	**0.7 J**	< 1.8	< 18	< 0.90
DPT-62	11/07/11	15	< 0.12	< 5.0	< 5.0	**0.33 J**	< 0.98	< 0.98	< 2.98	< 2.0	< 20	< 0.98
DPT-62	11/07/11	20	< 0.21	< 5.0	< 5.0	**1.2**	**1.2**	**0.22 J**	**0.33 J**	< 1.6	< 16	< 0.79
DPT-62	11/07/11	20	< 0.20	< 5.0	< 5.0	**1.3**	**1.2**	**0.23 J**	**0.33 J**	< 1.6	< 16	< 0.80
DPT-62	11/07/11	24	< 0.22	< 5.0	< 5.0	**0.34 J**	< 0.84	< 0.84	< 2.54	< 1.7	< 17	< 0.84
DPT-63	11/07/11	0.5	< 0.28	< 5.0	< 5.0	**13**	**3.8**	**0.25 J**	**0.42 J**	< 1.7	< 17	< 0.86
DPT-63	11/07/11	6	< 0.25	< 5.0	< 5.0	**1.1**	**0.81 J**	**0.16 J**	< 2.98	< 2.0	< 20	< 0.98
DPT-63	11/07/11	11	< 0.22	< 5.0	< 5.0	**5.3**	**6**	**2**	**3.08**	< 1.7	< 17	< 0.85
DPT-63	11/07/11	15	< 0.23	< 5.0	< 5.0	**0.14 J**	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-63	11/07/11	19.5	< 0.21	< 5.0	< 5.0	**1.7**	**0.79 J**	< 0.80	< 2.4	< 1.6	< 16	< 0.80
DPT-63	11/07/11	24	< 0.26	< 5.0	< 5.0	< 1.0	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-64	11/07/11	0.5	< 0.26	< 5.0	< 5.0	**16**	**5.3**	**0.55 J**	**1.3 J**	< 2.8	< 28	< 1.4
DPT-64	11/07/11	0.5	< 0.23	< 5.0	< 5.0	**12**	**3.8**	**0.37 J**	**0.8 J**	< 1.8	< 18	< 0.89
DPT-64	11/07/11	6	< 0.22	< 5.0	< 5.0	**1.4**	**1.1**	**0.63 J**	**2.78 J**	< 1.7	< 17	< 0.85
DPT-64	11/07/11	11	< 0.20	< 5.0	< 5.0	**5.4**	**5.5**	**0.67 J**	**1 J**	< 1.8	< 18	< 0.90
DPT-64	11/07/11	16	< 0.28	< 5.0	< 5.0	**0.27 J**	< 1.0	< 1.0	**0.65 J**	< 2.0	< 20	< 1.0
DPT-64	11/07/11	20	< 0.18	< 5.0	< 5.0	**0.84**	**0.76 J**	< 0.83	< 2.53	< 1.7	< 17	< 0.83
DPT-64	11/07/11	24	< 0.30	< 5.0	< 5.0	**0.33 J**	< 1.2	< 1.2	< 3.6	< 2.4	< 24	< 1.2
DPT-65	11/07/11	0.5	< 0.27	**160**	**2600**	**1.3**	**1.5**	**0.8 J**	**3.38 J**	< 2.3	< 23	< 1.1
DPT-65	11/07/11	5	< 0.27	< 5.0	**23**	**1.2**	**0.99 J**	< 1.1	**0.39 J**	< 2.2	< 22	< 1.1
DPT-65	11/07/11	10	**8300**	**9400**	**8700**	**600 J**	< 2100	**40000**	**240000**	< 4200	< 42000	< 2100
DPT-66	11/07/11	0.5	< 0.27	**340**	**5900**	**0.69 J**	< 1.1	< 1.1	**0.47 J**	< 2.2	< 22	< 1.1
DPT-66	11/07/11	6	< 0.26	< 5.0	< 5.0	**0.97 J**	**0.77 J**	**0.3 J**	**1.4 J**	< 2.1	< 21	< 1.0
DPT-66	11/07/11	12	< 0.24	< 5.0	< 5.0	**8.2**	**3.7**	**0.37 J**	**0.91 J**	< 2.1	< 21	< 1.1
DPT-66	11/07/11	15	< 0.24	< 5.0	< 5.0	**0.35 J**	< 0.99	< 0.99	< 2.99	< 2.0	< 20	< 0.99
DPT-66	11/07/11	20	< 0.28	< 5.0	< 5.0	**0.27 J**	< 1.1	< 1.1	**0.59 J**	< 2.3	< 23	< 1.1
DPT-66	11/07/11	26.5	< 0.23	< 5.0	< 5.0	**0.92 J**	**0.8 J**	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-67	11/08/11	0.5	< 0.26	< 5.0	< 5.0	**0.15 J**	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-67	11/08/11	5	< 0.24	< 5.0	< 5.0	**0.72 J**	**0.65 J**	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-67	11/08/11	12	< 0.24	< 5.0	< 5.0	**0.49 J**	< 0.93	< 0.93	< 2.83	< 1.9	< 19	< 0.93
DPT-67	11/08/11	16	< 0.27	< 5.0	< 5.0	< 1.2	< 1.2	< 1.2	< 3.5	< 2.3	< 23	< 1.2
DPT-67	11/08/11	20	< 0.28	< 5.0	< 5.0	**0.15 J**	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-67	11/08/11	27.5	< 0.22	< 5.0	< 5.0	**9.1**	**5.9**	**0.88 J**	**0.96 J**	< 2.7	< 27	< 1.3
DPT-67	11/08/11	27.5	< 0.24	< 5.0	< 5.0	**1.7**	**1.5**	**0.22 J**	**0.34 J**	< 1.9	< 19	< 0.95
DPT-68	11/08/11	0.5	< 0.24	< 5.0	< 5.0	**0.66 J**	< 0.99	< 0.99	< 2.99	< 2.0	< 20	< 0.99
DPT-68	11/08/11	5	< 0.22	< 5.0	< 5.0	**2.8**	**2.2**	**0.34 J**	**0.46 J**	< 1.8	< 18	< 0.91
DPT-68	11/08/11	11.5	< 0.22	< 5.0	< 5.0	**14**	**5.3**	**0.35 J**	**0.64 J**	< 1.6	< 16	< 0.80
DPT-68	11/08/11	16	< 0.26	< 5.0	< 5.0	**0.31 J**	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-68	11/08/11	16	< 0.25	< 5.0	< 5.0	**0.39 J**	< 0.94	< 0.94	< 2.84	< 1.9	< 19	< 0.94
DPT-68	11/08/11	20	< 0.26	< 5.0	< 5.0	< 1.0	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0

TABLE 2
ANALYTICAL RESULTS FOR CONTAMINANTS OF CONCERN IN SOIL
DFSP NORWALK SITE, NORWALK CALIFORNIA

Sample Location	Sample Date	Sample Depth	TPHg [/1] (C4-C13) (mg/kg)	TPHjf [/2] (C6-C22) (mg/kg)	TPHd [/3] (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE [/4] (µg/kg)	TBA [/5] (µg/kg)	1,2-DCA [/6] (µg/kg)
DPT-68	11/08/11	28	< 0.18	< 5.0	< 5.0	**240**	**1.3**	**4.4**	**19.2**	**3.4**	< 17	< 0.84
DPT-69	11/08/11	0.5	< 0.28	**6.8**	**260**	**0.28 J**	< 1.1	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-69	11/08/11	5.5	< 0.29	< 5.0	< 5.0	**0.15 J**	< 1.1	< 1.1	< 3.4	< 2.3	< 23	< 1.1
DPT-69	11/08/11	10	< 0.30	< 5.0	< 5.0	**3.1**	**1.7**	**0.21 J**	**0.31 J**	< 1.8	< 18	< 0.88
DPT-69	11/08/11	15	< 0.24	< 5.0	< 5.0	**0.24 J**	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-69	11/08/11	20	< 0.27	< 5.0	< 5.0	**0.15 J**	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-69	11/08/11	20	< 0.26	< 5.0	< 5.0	**0.16 J**	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-69	11/08/11	28	**1.8**	**6600**	**6300**	**2**	**1.3**	**0.31 J**	**1.4 J**	< 1.7	< 17	< 0.86
DPT-7	09/04/09	15	**26**	**15**	--	< 1.3	**2.4**	< 1.3	< 3.9	< 2.6	< 26	< 1.3
DPT-7	09/04/09	20	**4400**	**2000**	--	< 440	< 440	**6600**	**4590**	< 880	< 8800	< 440
DPT-7	09/04/09	25	**16000**	**11000**	--	< 1100	< 1100	**21000**	**24200**	< 2200	< 22000	< 1100
DPT-70	11/08/11	0.5	< 0.22	< 5.0	< 5.0	**3.1**	**1.5**	**0.18 J**	**0.3 J**	< 1.9	< 19	< 0.94
DPT-70	11/08/11	6.5	< 0.21	< 5.0	< 5.0	**2.2**	**1.4**	**0.2 J**	**0.72 J**	< 1.9	< 19	< 0.95
DPT-70	11/08/11	6.5	< 0.22	< 5.0	< 5.0	**3.7**	**2.6**	**0.41 J**	**0.72 J**	< 1.8	< 18	< 0.89
DPT-70	11/08/11	11	< 0.21	< 5.0	< 5.0	**0.55 J**	< 0.92	< 0.92	< 2.72	< 1.8	< 18	< 0.92
DPT-70	11/08/11	15.5	< 0.27	< 5.0	< 5.0	**0.2 J**	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-70	11/08/11	19	< 0.19	< 5.0	< 5.0	**2.1**	**0.82**	**0.12 J**	**0.25 J**	< 1.5	< 15	< 0.76
DPT-70	11/08/11	26	< 0.28	< 5.0	< 5.0	< 1.0	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-71	11/08/11	0.5	< 0.23	< 5.0	< 5.0	**3.1**	**1.2**	< 0.97	< 2.87	< 1.9	< 19	< 0.97
DPT-71	11/08/11	6	< 0.27	< 5.0	< 5.0	**2.1**	**1.4**	**0.18 J**	**0.26 J**	< 1.8	< 18	< 0.89
DPT-71	11/08/11	10	< 0.25	< 5.0	< 5.0	**0.65 J**	**0.58 J**	< 0.93	**0.3 J**	< 1.9	< 19	< 0.93
DPT-71	11/08/11	15	< 0.28	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-71	11/08/11	20	< 0.20	< 5.0	< 5.0	**4.6**	**1.7**	**0.11 J**	**0.28 J**	< 1.3	< 13	< 0.65
DPT-71	11/08/11	26.5	< 0.23	< 5.0	< 5.0	**0.23 J**	< 0.94	< 0.94	< 2.86	< 1.9	< 19	< 0.94
DPT-71	11/08/11	26.5	< 0.24	< 5.0	< 5.0	**0.19 J**	< 0.96	< 0.96	< 2.86	< 1.9	< 19	< 0.96
DPT-72	11/09/11	16	< 0.22	**38**	**1300**	**1.8**	**1.1**	**0.27 J**	**0.43 J**	< 1.7	< 17	< 0.84
DPT-72	11/09/11	20	< 0.21	< 5.0	**48**	**1.6**	**0.81 J**	< 0.84	**0.23 J**	< 1.7	< 17	< 0.84
DPT-72	11/09/11	23	< 0.21	< 5.0	< 5.0	**2.5**	**1.2**	**0.28 J**	**0.35 J**	< 1.8	< 18	< 0.90
DPT-73	11/09/11	15	< 0.21	**7.9**	**170**	**1.5**	**1.1**	**0.18 J**	**0.46 J**	< 1.6	< 16	< 0.82
DPT-73	11/09/11	22	< 0.22	< 5.0	< 5.0	**2.2**	**0.57 J**	**9.1**	**1.5 J**	**3.4**	**14 J**	< 0.82
DPT-74	11/09/11	0	< 0.28	**920**	**14000**	**0.81 J**	**0.51 J**	< 0.93	**0.4 J**	< 1.9	< 19	< 0.93
DPT-74	11/09/11	0.5	< 0.22	< 5.0	**39**	**5**	**2.2**	**0.22 J**	**0.51 J**	< 2.0	< 20	< 1.0
DPT-74	11/09/11	6	< 0.28	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	< 3.4	< 2.3	< 23	< 1.1
DPT-74	11/09/11	11	< 0.22	< 5.0	< 5.0	**1.4**	**0.7 J**	< 0.91	< 2.71	< 1.8	< 18	< 0.91
DPT-74	11/09/11	16	< 0.27	< 5.0	< 5.0	< 1.0	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-74	11/09/11	20	< 0.20	< 5.0	< 5.0	**3.8**	**1.5**	**0.13 J**	**0.27 J**	< 1.6	< 16	< 0.82
DPT-74	11/09/11	20	< 0.19	< 5.0	< 5.0	**3.2**	**1.2**	< 0.79	**0.23 J**	< 1.6	< 16	< 0.79
DPT-74	11/09/11	27	< 0.26	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-75	11/09/11	0.5	< 0.26	**25**	**330**	**2**	**0.88 J**	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-75	11/09/11	7	< 0.22	< 5.0	< 5.0	**1.9**	**1.2**	**0.17 J**	**0.29 J**	< 1.8	< 18	< 0.91
DPT-75	11/09/11	11	< 0.22	< 5.0	< 5.0	**2.8**	**2.5**	**0.46 J**	**0.72 J**	< 1.7	< 17	< 0.86
DPT-75	11/09/11	15	< 0.26	< 5.0	< 5.0	< 1.0	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-75	11/09/11	18.5	< 0.26	< 5.0	< 5.0	**0.37 J**	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-75	11/09/11	23	< 0.27	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-75	11/09/11	27	< 0.22	< 5.0	**24**	**0.64 J**	**0.45 J**	< 0.86	< 2.56	< 1.7	< 17	< 0.86
DPT-75	11/09/11	27	< 0.20	< 5.0	**23**	**0.59 J**	< 0.82	< 0.82	< 2.42	< 1.6	< 16	< 0.82
DPT-75	11/09/11	31	< 0.26	< 5.0	< 5.0	< 0.99	< 0.99	< 0.99	< 2.99	< 2.0	< 20	< 0.99
DPT-76	11/09/11	0.5	< 0.26	< 5.0	**6.3**	**3.2**	**1.6**	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-76	11/09/11	7	< 0.23	< 5.0	< 5.0	**1.6**	**0.98**	**0.13 J**	< 2.55	< 1.7	< 17	< 0.85
DPT-76	11/09/11	11	< 0.22	< 5.0	< 5.0	**0.96**	**0.52 J**	< 0.85	< 2.55	< 1.7	< 17	< 0.85
DPT-76	11/09/11	15	< 0.28	< 5.0	< 5.0	< 1.2	< 1.2	< 1.2	< 3.5	< 2.3	< 23	< 1.2
DPT-76	11/09/11	19.5	< 0.20	< 5.0	< 5.0	**1.6**	**0.51 J**	< 0.83	< 2.53	< 1.7	< 17	< 0.83
DPT-76	11/09/11	23.5	< 0.26	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	< 3.4	< 2.3	< 23	< 1.1
DPT-76	11/09/11	26.5	< 0.28	< 5.0	< 5.0	**0.33 J**	< 1.3	< 1.3	< 3.8	< 2.5	< 25	< 1.3
DPT-76	11/09/11	26.5	< 0.26	< 5.0	< 5.0	**0.27 J**	< 0.89	< 0.89	< 2.69	< 1.8	< 18	< 0.89
DPT-77	11/10/11	0.5	< 0.26	< 5.0	**75**	**1.6**	**1.2**	**0.17 J**	< 3	< 2.0	< 20	< 1.0
DPT-77	11/10/11	5.5	< 0.28	< 5.0	< 5.0	< 1.2	< 1.2	< 1.2	< 3.6	< 2.4	< 24	< 1.2
DPT-77	11/10/11	11	< 0.19	< 5.0	< 5.0	**1.1**	**0.65 J**	< 0.79	< 2.39	< 1.6	< 16	< 0.79
DPT-77	11/10/11	15	< 0.18	< 5.0	< 5.0	**1**	**0.79 J**	< 0.88	< 2.68	< 1.8	< 18	< 0.88
DPT-77	11/10/11	20	< 0.22	< 5.0	< 5.0	**0.74 J**	**0.7 J**	< 0.84	< 2.54	< 1.7	< 17	< 0.84
DPT-77	11/10/11	26.5	< 0.21	< 5.0	< 5.0	**0.31 J**	< 0.79	< 0.79	< 2.39	< 1.6	< 16	< 0.79

TABLE 2
ANALYTICAL RESULTS FOR CONTAMINANTS OF CONCERN IN SOIL
DFSP NORWALK SITE, NORWALK CALIFORNIA

Sample Location	Sample Date	Sample Depth	TPHg /1 (C4-C13) (mg/kg)	TPHjf /2 (C6-C22) (mg/kg)	TPHd /3 (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE /4 (µg/kg)	TBA /5 (µg/kg)	1,2-DCA /6 (µg/kg)
DPT-78	11/10/11	0.5	< 0.25	< 5.0	**140**	**0.22 J**	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-78	11/10/11	5.5	< 0.29	< 5.0	< 5.0	**0.22 J**	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-78	11/10/11	11	< 0.21	< 5.0	< 5.0	**0.64 J**	**0.48 J**	< 0.91	< 2.71	< 1.8	< 18	< 0.91
DPT-78	11/10/11	15	< 0.22	< 5.0	< 5.0	**0.92**	**0.6 J**	< 0.76	< 2.26	< 1.5	< 15	< 0.76
DPT-78	11/10/11	20	< 0.19	< 5.0	< 5.0	**0.47 J**	< 0.99	< 0.99	**0.23 J**	< 2.0	< 20	< 0.99
DPT-78	11/10/11	20	< 0.17	< 5.0	< 5.0	**1.1**	**0.86**	**0.15 J**	**0.23 J**	< 1.5	< 15	< 0.74
DPT-78	11/10/11	27	< 0.22	< 5.0	< 5.0	**0.97**	**0.65 J**	< 0.78	< 2.38	< 1.6	< 16	< 0.78
DPT-79	11/10/11	0.5	< 0.28	< 5.0	**28**	**1.3**	**1 J**	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-79	11/10/11	6	< 0.30	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	< 3.4	< 2.3	< 23	< 1.1
DPT-79	11/10/11	11.5	< 0.20	< 5.0	< 5.0	**1.9**	**0.92**	< 0.78	< 2.38	< 1.6	< 16	< 0.78
DPT-79	11/10/11	16	< 0.25	< 5.0	< 5.0	**0.86 J**	**0.69 J**	< 0.94	< 2.84	< 1.9	**7.3 J**	< 0.94
DPT-79	11/10/11	20	< 0.19	< 5.0	< 5.0	**0.61 J**	< 0.80	< 0.80	< 2.4	< 1.6	< 16	< 0.80
DPT-79	11/10/11	26	< 0.20	< 5.0	< 5.0	**1.7**	**1.1**	**0.18 J**	< 3.1	< 2.1	< 21	< 1.0
DPT-8	09/04/09	10	**770**	**2700**	--	< 110	< 110	**240**	< 330	< 220	< 2200	< 110
DPT-8	09/04/09	15	**870**	**2000**	--	< 110	< 110	**110**	< 330	< 220	< 2200	< 110
DPT-8	09/04/09	20	**5.5**	**1000**	--	**1.5**	**5.1**	**0.99**	< 2.85	< 1.9	< 19	< 0.95
DPT-8	09/04/09	25	**0.46**	< 5.0	--	**1.1**	**2.7**	< 0.78	< 2.38	< 1.6	< 16	< 0.78
DPT-80	11/10/11	0.5	< 0.29	< 5.0	**54**	**1.3**	**0.95 J**	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-80	11/10/11	6	< 0.28	< 5.0	< 5.0	**0.18 J**	< 1.0	< 1.0	< 3.6	< 2.0	< 20	< 1.0
DPT-80	11/10/11	6	< 0.26	< 5.0	< 5.0	< 1.2	< 1.2	< 1.2	< 3.6	< 2.4	< 24	< 1.2
DPT-80	11/10/11	11	< 0.20	< 5.0	< 5.0	**0.61 J**	**0.57 J**	< 0.84	< 2.54	< 1.7	< 17	< 0.84
DPT-80	11/10/11	15	< 0.21	< 5.0	< 5.0	**0.48 J**	**0.48 J**	< 0.85	< 2.55	< 1.7	< 17	< 0.85
DPT-80	11/10/11	20	< 0.23	< 5.0	< 5.0	**0.47 J**	**0.44 J**	< 0.83	< 2.53	< 1.7	< 17	< 0.83
DPT-80	11/10/11	24	< 0.20	< 5.0	< 5.0	**1.1**	**1.1**	**0.19 J**	**0.26 J**	< 1.5	< 15	< 0.74
DPT-81	11/10/11	0.5	< 0.21	< 5.0	**15**	**1.4**	**0.48 J**	< 0.85	< 2.55	< 1.7	< 17	< 0.85
DPT-81	11/10/11	6	**810**	**3200**	**10000**	**14 J**	< 46	**170**	< 139	< 93	< 930	< 46
DPT-81	11/10/11	10.5	**360**	**200**	**240**	< 41	< 41	**14 J**	< 124	< 83	< 830	< 41
DPT-81	11/10/11	15	**0.59**	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-81	11/10/11	18	**480**	**1500**	**1600**	< 56	< 56	< 56	< 166	< 110	< 1100	< 56
DPT-81	11/10/11	20	**690**	**170**	**180**	< 79	< 79	**64 J**	**141 J**	< 160	< 1600	< 79
DPT-81	11/10/11	24	**1500**	**870**	**910**	**25 J**	< 52	**52 J**	< 152	< 100	< 1000	< 52
DPT-82	11/10/11	0.5	< 0.26	**370**	**2200**	**1.8**	**0.76 J**	< 0.98	< 2.98	< 2.0	< 20	< 0.98
DPT-82	11/10/11	6	**470**	**1800**	**6100**	**0.83 J**	< 0.95	**1.1**	**1.6**	< 1.9	< 19	< 0.95
DPT-82	11/10/11	11	**33**	< 5.0	< 5.0	**2.3**	**1.1**	< 0.93	< 2.83	< 1.9	< 19	< 0.93
DPT-82	11/10/11	16	**0.97**	< 5.0	< 5.0	**3.8**	**0.52 J**	**0.51 J**	< 2.39	< 1.6	< 16	< 0.79
DPT-82	11/10/11	20	**1100**	**1800**	**1900**	**14 J**	< 60	**320**	< 180	< 120	< 1200	< 60
DPT-82	11/10/11	20	**4500**	**120**	**130**	**21 J**	< 56	**360**	< 166	< 110	< 1100	< 56
DPT-82	11/10/11	23	**2200**	**2700**	**2800**	**19 J**	< 54	**370**	< 164	< 110	< 1100	< 54
DPT-83	11/11/11	0.5	**0.39**	**1300**	**3700**	**0.9**	**0.47 J**	< 0.85	< 2.55	< 1.7	< 17	< 0.85
DPT-83	11/11/11	6	**420**	**3200**	**10000**	**8.3 J**	< 46	**19 J**	**16 J**	< 92	< 920	< 46
DPT-83	11/11/11	11	**0.25**	< 5.0	< 5.0	**0.96**	**0.56 J**	< 0.87	< 2.57	< 1.7	< 17	< 0.87
DPT-83	11/11/11	15	**0.33**	< 5.0	< 5.0	< 1.2	< 1.2	< 1.2	< 3.5	< 2.3	< 23	< 1.2
DPT-83	11/11/11	18	**1.3**	**13**	**12**	**1.6**	**0.79 J**	**0.14 J**	**1.02 J**	< 1.7	< 17	< 0.83
DPT-84	11/11/11	0.5	< 0.30	< 5.0	**82**	**5.8**	**2.4**	**0.34 J**	**0.99 J**	< 2.2	< 22	< 1.1
DPT-84	11/11/11	5	< 0.25	**9.5**	**11**	**0.6 J**	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-84	11/11/11	10	**2200**	**3400**	**3200**	< 58	< 58	**12 J**	**28 J**	< 120	< 1200	< 58
DPT-84	11/11/11	16	**1300**	**3000**	**2800**	< 54	< 54	**25 J**	< 164	< 110	< 1100	< 54
DPT-84	11/11/11	20	**2100**	**5100**	**4900**	< 72	< 72	**91**	< 212	< 140	< 1400	< 72
DPT-84	11/11/11	23	**2100**	**4300**	**4100**	< 55	< 55	**72**	< 165	< 110	< 1100	< 55
DPT-85	11/11/11	0.5	< 0.30	**630**	**9900**	**2.4**	**0.97 J**	< 1.0	**0.34 J**	< 2.1	< 21	< 1.0
DPT-85	11/11/11	5.5	< 0.27	**12**	**51**	**0.95 J**	**0.67 J**	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-85	11/11/11	10.5	**560**	**1300**	**1300**	< 52	< 52	**78**	< 152	< 100	< 1000	< 52
DPT-85	11/11/11	15	**1600**	**3700**	**3500**	< 52	< 52	**89**	< 152	< 100	< 1000	< 52
DPT-85	11/11/11	20	**1**	< 5.0	< 5.0	**1**	**0.55 J**	**0.84**	**0.42 J**	< 1.6	< 16	< 0.80
DPT-85	11/11/11	24	**7200**	**3500**	**3300**	< 180	< 180	**1200**	**690**	< 370	< 3700	< 180
DPT-86	11/11/11	0.5	< 0.26	< 5.0	**47**	**6.6**	**3.2**	**0.43 J**	**0.92 J**	< 2.2	< 22	< 1.1
DPT-86	11/11/11	6	**2900**	**9300**	**10000**	< 47	< 47	**220**	< 142	< 95	< 950	< 47
DPT-86	11/11/11	6	**3400**	**11000**	**13000**	< 46	< 46	**160**	< 138	< 92	< 920	< 46
DPT-86	11/11/11	10	**860**	**3000**	**3100**	**0.2 J**	< 0.98	**0.47 J**	< 2.98	< 2.0	< 20	< 0.98
DPT-86	11/11/11	16	**950**	**2900**	**2800**	< 53	< 53	< 53	**17 J**	< 110	< 1100	< 53
DPT-86	11/11/11	20	**340**	**120**	**120**	< 41	< 41	< 41	< 122	< 81	< 810	< 41

TABLE 2
ANALYTICAL RESULTS FOR CONTAMINANTS OF CONCERN IN SOIL
DFSP NORWALK SITE, NORWALK CALIFORNIA

Sample Location	Sample Date	Sample Depth	TPHg /1 (C4-C13) (mg/kg)	TPHjf /2 (C6-C22) (mg/kg)	TPHd /3 (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE /4 (µg/kg)	TBA /5 (µg/kg)	1,2-DCA /6 (µg/kg)
DPT-86	11/11/11	24	**1100**	**1300**	**1300**	< 54	< 54	**35 J**	< 164	< 110	< 1100	< 54
DPT-87	11/11/11	0.5	< 0.26	**13**	**810**	**3.2**	**1.2**	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-87	11/11/11	6	< 0.20	< 5.0	< 5.0	**0.37 J**	< 0.78	**0.13 J**	**0.32 J**	< 1.6	< 16	< 0.78
DPT-87	11/11/11	10.5	< 0.24	< 5.0	< 5.0	**0.22 J**	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-87	11/11/11	15	< 0.28	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-87	11/11/11	20	< 0.28	< 5.0	< 5.0	**0.14 J**	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-87	11/11/11	24	< 0.23	< 5.0	< 5.0	**0.37 J**	< 0.91	< 0.91	< 2.71	< 1.8	< 18	< 0.91
DPT-87	11/11/11	24	< 0.24	< 5.0	< 5.0	**0.35 J**	< 0.90	< 0.90	< 2.7	< 1.8	< 18	< 0.90
DPT-88	11/14/11	0.5	< 0.25	**11**	**240**	**1.6**	**1.3**	**0.29 J**	**0.63 J**	< 2.1	< 21	< 1.0
DPT-88	11/14/11	5	< 0.20	< 5.0	< 5.0	**3.1**	**2**	**0.3 J**	**0.51 J**	< 2.6	< 26	< 1.3
DPT-88	11/14/11	10	< 0.19	< 5.0	< 5.0	**0.64 J**	**0.85**	**0.2 J**	**0.4 J**	< 1.5	< 15	< 0.75
DPT-88	11/14/11	15	< 0.23	< 5.0	< 5.0	**2**	**1.3**	**0.24 J**	**0.6 J**	**1.4 J**	**5.5 J**	< 0.82
DPT-88	11/14/11	19	**2800**	**1900**	**1900**	**17000**	**85000**	**42000**	**184000**	< 1700	< 17000	< 860
DPT-88	11/14/11	23	**1400**	**7300**	**7600**	**19000**	**50000**	**31000**	**139000**	< 150	< 1500	< 77
DPT-88	11/14/11	26	**140**	**2200**	**2400**	**22000**	**100000**	**30000**	**3750**	< 170	< 1700	< 85
DPT-88	11/14/11	26	**570**	**370**	**350**	**2500**	**4800**	**790**	**3750**	**400**	< 810	< 40
DPT-89	11/14/11	0.5	< 0.28	< 5.0	**11**	**0.95 J**	**1**	**0.21 J**	**0.44 J**	< 2.0	< 20	< 1.0
DPT-89	11/14/11	5	< 0.27	< 5.0	< 5.0	**1.2**	**4.5**	**0.8 J**	**3.25 J**	< 1.8	< 18	< 0.91
DPT-89	11/14/11	10	< 0.18	< 5.0	< 5.0	**3.8**	**3.8**	**0.37 J**	**0.96 J**	< 1.7	< 17	< 0.84
DPT-89	11/14/11	14	< 0.22	< 5.0	< 5.0	**0.34 J**	< 0.95	< 0.95	< 2.85	< 1.9	< 19	< 0.95
DPT-89	11/14/11	18	**2500**	**1900**	**2000**	**780**	< 360	**15000**	**72000**	< 730	< 7300	< 360
DPT-89	11/14/11	25	**29**	< 5.0	< 5.0	**1700**	**2100**	**410**	**2450**	**18 J**	< 750	< 38
DPT-9	09/04/09	10	**1.2**	< 5.0	--	**2**	**3.2**	**1.1**	< 2.41	< 1.6	< 16	< 0.81
DPT-9	09/04/09	15	**8.2**	**39**	--	< 1.1	**5.6**	**1.6**	< 3.3	< 2.2	< 22	< 1.1
DPT-9	09/04/09	20	**850**	**1200**	--	< 100	< 100	**270**	< 310	< 210	< 2100	< 100
DPT-9	09/04/09	25	**9800**	**4300**	--	< 2000	< 2000	**20000**	**5800**	< 4100	< 41000	< 2000
DPT-90	11/14/11	0.5	< 0.32	< 5.0	< 5.0	**0.47 J**	< 1.1	< 1.1	< 3.4	< 2.3	< 23	< 1.1
DPT-90	11/14/11	5	< 0.29	< 5.0	< 5.0	**1.3**	**4.1**	**0.67 J**	**3.49 J**	< 2.2	< 22	< 1.1
DPT-90	11/14/11	5	< 0.30	< 5.0	< 5.0	**0.82 J**	**2.2**	**0.39 J**	**1.4 J**	< 2.2	< 22	< 1.1
DPT-90	11/14/11	8.5	< 0.20	< 5.0	< 5.0	**2.2**	**1.1**	**0.17 J**	**0.38 J**	< 1.7	< 17	< 0.84
DPT-90	11/14/11	14	**0.27**	< 5.0	< 5.0	**1.7**	**1.2**	**0.21 J**	**0.45 J**	< 1.7	< 17	< 0.84
DPT-90	11/14/11	20	**860**	**240**	**250**	**6300**	**39000**	**7000**	**48000**	< 81	< 810	< 40
DPT-90	11/14/11	26	**1800**	**150**	**180**	**1800**	**13000**	**3800**	**17300**	< 88	< 880	< 44
DPT-91	11/14/11	0.5	< 0.25	< 5.0	< 5.0	**1.2**	**1.5**	**0.3 J**	**0.56 J**	< 2.0	< 20	< 0.99
DPT-91	11/14/11	5	< 0.22	< 5.0	< 5.0	**6.3**	**6.6**	**1.4**	**2.37 J**	< 1.8	< 18	< 0.88
DPT-91	11/14/11	10	< 0.19	< 5.0	< 5.0	**1.3**	**1.3**	**0.29 J**	**0.44 J**	< 1.6	< 16	< 0.80
DPT-91	11/14/11	16	< 0.25	< 5.0	< 5.0	**0.4 J**	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-91	11/14/11	18	**1700**	**320**	**300**	**3800**	**12000**	**14000**	**80000**	< 860	< 8600	< 430
DPT-91	11/14/11	25	**5000**	**20000**	**18000**	**140000**	**660000**	**190000**	**1020000**	< 4300	< 43000	< 2100
DPT-92	11/14/11	0.5	< 0.25	**57**	**1100**	**0.47 J**	< 1.0	< 1.0	< 3	< 2.0	< 20	< 1.0
DPT-92	11/14/11	5	< 0.28	< 5.0	< 5.0	**0.58 J**	**0.75 J**	< 1.2	< 3.6	< 2.4	< 24	< 1.2
DPT-92	11/14/11	10	**0.54**	< 5.0	< 5.0	**3.8**	**7.2**	**1.9**	**9.8**	< 1.9	< 19	< 0.97
DPT-92	11/14/11	15	< 0.28	< 5.0	< 5.0	**0.21 J**	**0.97 J**	**0.41 J**	**2.48 J**	< 2.2	< 22	< 1.1
DPT-92	11/14/11	20	**0.73**	< 5.0	< 5.0	**1.6**	**1.4**	**0.69 J**	**0.62 J**	< 1.6	< 16	< 0.80
DPT-92	11/14/11	25.5	**0.54**	< 5.0	< 5.0	**1.2**	**0.66 J**	**0.2 J**	**0.44 J**	< 1.5	< 15	< 0.73
DPT-92	11/14/11	25.5	**0.6**	< 5.0	< 5.0	**1.3**	**1.1**	**0.29 J**	**0.44 J**	< 1.9	< 19	< 0.95
DPT-93	11/14/11	0.5	< 0.24	< 5.0	< 5.0	**0.69 J**	**0.51 J**	< 0.96	**0.27 J**	< 1.9	< 19	< 0.96
DPT-93	11/14/11	5	< 0.27	< 5.0	< 5.0	**0.22 J**	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-93	11/14/11	10	< 0.21	< 5.0	< 5.0	**1.5**	**0.95**	**0.13 J**	**0.25 J**	< 1.3	< 13	< 0.67
DPT-93	11/14/11	14.5	< 0.20	< 5.0	< 5.0	**0.66 J**	< 0.80	< 0.80	< 2.4	< 1.6	< 16	< 0.80
DPT-93	11/14/11	22	**2.5 J**	< 5.0	< 5.0	**0.57 J**	< 0.86	**0.17 J**	**0.54 J**	< 1.7	< 17	< 0.86
DPT-93	11/14/11	25	**13**	**340**	**320**	**0.72 J**	**0.51 J**	**1**	< 2.27	< 1.5	< 15	< 0.77
DPT-94	11/15/11	0.5	< 0.27	< 5.0	**14**	**0.26 J**	< 1.1	< 1.1	**0.34 J**	< 2.2	< 22	< 1.1
DPT-94	11/15/11	5	< 0.30	< 5.0	**18**	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-94	11/15/11	10	**380**	**3300**	**5200**	< 41	< 41	**150**	**150**	< 81	< 810	< 41
DPT-94	11/15/11	14.5	**1.7**	< 5.0	**6.9**	< 1.0	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-94	11/15/11	20	**1.5**	< 5.0	< 5.0	**1.5**	**0.66 J**	**73**	**66**	< 1.8	< 18	< 0.88
DPT-94	11/15/11	25	**500**	**480**	**480**	< 56	< 56	**450**	< 166	< 110	< 1100	< 56
DPT-94	11/15/11	25	**490**	**260**	**250**	**8.9 J**	< 52	**1000**	< 152	< 100	< 1000	< 52
DPT-95	11/15/11	0.5	< 0.25	< 5.0	**47**	**0.25 J**	< 0.97	< 0.97	< 2.87	< 1.9	< 19	< 0.97
DPT-95	11/15/11	5	< 0.28	< 5.0	< 5.0	< 1.0	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0

TABLE 2
ANALYTICAL RESULTS FOR CONTAMINANTS OF CONCERN IN SOIL
DFSP NORWALK SITE, NORWALK CALIFORNIA

Sample Location	Sample Date	Sample Depth	TPHg [/1] (C4-C13) (mg/kg)	TPHjf [/2] (C6-C22) (mg/kg)	TPHd [/3] (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE [/4] (µg/kg)	TBA [/5] (µg/kg)	1,2-DCA [/6] (µg/kg)
DPT-95	11/15/11	10	< 0.20	< 5.0	< 5.0	**0.73 J**	**0.76**	**0.13 J**	< 2.26	< 1.5	< 15	< 0.76
DPT-95	11/15/11	14.5	< 0.26	< 5.0	< 5.0	< 1.0	< 1.0	< 1.0	< 3.1	< 2.1	< 21	< 1.0
DPT-95	11/15/11	20	**0.21**	< 5.0	< 5.0	**1.3**	**1.1**	**0.28 J**	**0.38 J**	< 1.7	< 17	< 0.84
DPT-95	11/15/11	25	< 0.20	< 5.0	< 5.0	**1.1**	**0.82 J**	**0.14 J**	**0.27 J**	< 1.8	< 18	< 0.88
DPT-95	11/15/11	25	< 0.22	< 5.0	< 5.0	**1.7**	**1**	**0.17 J**	**0.27 J**	< 1.8	< 18	< 0.90
DPT-96	11/15/11	0.5	< 0.24	**32**	**420**	**7.8**	**9.5**	**1.7**	**4**	< 1.8	< 18	< 0.91
DPT-96	11/15/11	5	< 0.28	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	< 3.4	< 2.3	< 23	< 1.1
DPT-96	11/15/11	10	< 0.19	< 5.0	< 5.0	**0.66 J**	**0.59 J**	< 0.89	< 2.69	< 1.8	< 18	< 0.89
DPT-96	11/15/11	16	< 0.20	< 5.0	< 5.0	**0.95**	**0.46 J**	< 0.86	< 2.56	< 1.7	< 17	< 0.86
DPT-96	11/15/11	20	< 0.21	< 5.0	< 5.0	**0.39 J**	< 0.83	< 0.83	< 2.53	< 1.7	< 17	< 0.83
DPT-96	11/15/11	25.5	< 0.20	< 5.0	< 5.0	**1.3**	**1.1**	**0.17 J**	**0.25 J**	< 1.7	< 17	< 0.86
DPT-96	11/15/11	25.5	< 0.24	< 5.0	< 5.0	**1.4**	**1.1**	**0.16 J**	**0.23 J**	< 1.6	< 16	< 0.80
DPT-97	11/15/11	0.5	< 0.24	< 5.0	**37**	**8.4**	**12**	**2.5**	**5.5**	< 2.0	< 20	< 1.0
DPT-97	11/15/11	0.5	< 0.26	**7.4**	**120**	**6.7**	**7.1**	**1.4**	**3.02 J**	< 1.9	< 19	< 0.96
DPT-97	11/15/11	5	< 0.28	< 5.0	**13**	**0.48 J**	< 1.1	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-97	11/15/11	10	< 0.22	< 5.0	< 5.0	**1**	**0.86 J**	**0.13 J**	< 2.56	< 1.7	< 17	< 0.86
DPT-97	11/15/11	16	< 0.19	< 5.0	< 5.0	**0.79**	< 0.78	< 0.78	< 2.38	< 1.6	< 16	< 0.78
DPT-97	11/15/11	20	< 0.20	< 5.0	< 5.0	**0.85**	**0.73 J**	**0.13 J**	< 2.27	< 1.5	< 15	< 0.77
DPT-98	11/15/11	0.5	< 0.22	< 5.0	**13**	**6.9**	**6.5**	**0.97 J**	**2.18 J**	< 2.0	< 20	< 1.0
DPT-98	11/15/11	0.5	< 0.26	< 5.0	**17**	**5.7**	**5.4**	**0.8 J**	**1.2 J**	< 2.0	< 20	< 0.99
DPT-98	11/15/11	5	< 0.27	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	< 3.3	< 2.2	< 22	< 1.1
DPT-98	11/15/11	10	< 0.22	< 5.0	< 5.0	**0.25 J**	< 0.97	< 0.97	< 2.87	< 1.9	< 19	< 0.97
DPT-98	11/15/11	16	< 0.27	< 5.0	< 5.0	< 1.1	< 1.1	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-98	11/15/11	20	< 0.23	< 5.0	< 5.0	**0.57 J**	**0.66 J**	< 0.88	< 2.68	< 1.8	< 18	< 0.88
DPT-99	11/15/11	0.5	< 0.26	< 5.0	< 5.0	**4.1**	**4**	**0.55 J**	**1.1 J**	< 1.9	< 19	< 0.96
DPT-99	11/15/11	0.5	< 0.29	< 5.0	< 5.0	**3.7**	**3.9**	**0.63 J**	**1.1 J**	< 2.1	< 21	< 1.1
DPT-99	11/15/11	5	< 0.26	< 5.0	< 5.0	**0.19 J**	< 1.2	< 1.2	< 3.6	< 2.4	< 24	< 1.2
DPT-99	11/15/11	10	< 0.24	< 5.0	< 5.0	**0.79 J**	**0.65 J**	< 0.87	< 2.57	< 1.7	< 17	< 0.87
DPT-99	11/15/11	16	< 0.21	< 5.0	< 5.0	**1.4**	**1.2**	**0.2 J**	**0.3 J**	< 1.7	< 17	< 0.84
DPT-99	11/15/11	20	< 0.22	< 5.0	< 5.0	**0.58 J**	**0.64 J**	< 0.91	< 3.2	< 1.8	< 18	< 0.91
DPT-99	11/15/11	20	< 0.24	< 5.0	< 5.0	**0.42 J**	< 1.1	< 1.1	< 3.2	< 2.1	< 21	< 1.1
DPT-99	11/15/11	24	< 0.20	< 5.0	< 5.0	**0.89**	**0.66 J**	< 0.83	< 2.53	< 1.7	< 17	< 0.83
GMW-60	04/13/04	10	--	**1100**	--	< 5	< 5	< 5	< 10	< 5	--	< 5
GMW-60	04/13/04	25	--	< 5	--	< 5	< 5	< 5	< 10	< 5	--	< 5
GMW-60	04/13/04	30	--	**340**	--	**430**	**1700**	**1100**	**6700**	< 130	--	< 130
GMW-60	04/13/04	35	--	< 5	--	< 5	< 5	< 5	< 10	< 5	--	< 5
GMW-61	04/13/04	10	--	< 5	--	< 5	< 5	< 5	< 10	< 5	--	< 5
GMW-61	04/13/04	15	--	< 5	--	< 5	< 5	< 5	< 10	< 5	--	< 5
GMW-61	04/13/04	30	--	< 5	--	**78**	**180**	**14**	**86**	< 5	--	< 5
GMW-61	04/13/04	35	--	< 5	--	**56**	< 5	**18**	**85**	< 5	--	< 5
GMW-63	09/29/08	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
GMW-63	09/29/08	30	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
GMW-64	09/29/08	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
GMW-64	09/29/08	30	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
GMW-66	09/08/09	5	**0.35**	< 5.0	--	< 1.1	**1.9**	< 1.1	< 3.2	< 2.1	< 21	< 1.1
GMW-66	09/08/09	10	< 0.22	< 5.0	--	**0.94**	**1**	< 0.87	< 2.57	< 1.7	< 17	< 0.87
GW-16	07/06/09	30	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
GW-16	07/06/09	35	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
GW-16	07/06/09	40	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
GW-16	07/06/09	45	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
GW-16	07/06/09	50	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 50	< 5.0
SB-200	07/06/04	6	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-200	07/06/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-200	07/06/04	26	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-201	07/06/04	6	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-201	07/06/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-201	07/06/04	26	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-203	07/06/04	6	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-203	07/06/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-203	07/06/04	26	**250**	--	--	< 50	**170**	< 50	**560**	< 250	--	--
SB-204	07/06/04	6	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--

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Sample Location	Sample Date	Sample Depth	TPHg [/1] (C4-C13) (mg/kg)	TPHjf [/2] (C6-C22) (mg/kg)	TPHd [/3] (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE [/4] (µg/kg)	TBA [/5] (µg/kg)	1,2-DCA [/6] (µg/kg)
SB-204	07/06/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-204	07/06/04	26	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-205	07/07/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-205	07/07/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-205	07/07/04	25	**1200**	--	--	**2100**	**3700**	**2100**	**30000**	< 1300	--	--
SB-206	07/07/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-206	07/07/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-206	07/07/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-207	07/06/04	6	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-207	07/06/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-207	07/06/04	26	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-208	07/07/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-208	07/07/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-208	07/07/04	26	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-209	07/07/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-209	07/07/04	15	**0.52**	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-209	07/07/04	25	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-210	07/07/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-210	07/07/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-210	07/07/04	25	**28**	--	--	**44**	**68**	**260**	**1100**	< 25	--	--
SB-211	07/08/04	5	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-211	07/08/04	15	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-211	07/08/04	25	**90**	--	--	< 50	< 50	**140**	**390**	< 250	--	--
SB-A3	07/20/04	10	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-A4	07/20/04	10	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-A5	07/20/04	10	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-AB4	07/20/04	10	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-BA4	07/20/04	10	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
SB-BA4	07/20/04	27	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
TFSB-1	03/24/04	10	--	< 5	--	< 5	< 5	< 5	< 10	< 5	--	< 5
TFSB-1	03/24/04	20	--	**29**	--	< 630	< 630	**18000**	**10960**	< 630	--	< 630
TFSB-1	03/24/04	30	--	< 5	--	**8.6**	< 5	< 5	**7.4**	< 5	--	< 5
TFSB-2	03/24/04	10	--	**3300**	--	< 250	< 250	**2600**	**1190**	< 250	--	< 250
TFSB-2	03/24/04	20	--	**8600**	--	< 630	< 630	**22000**	**32300**	< 630	--	< 630
TFSB-2	03/24/04	30	--	< 5	--	< 130	< 130	**170**	**910**	< 130	--	< 130
TFSB-3	03/24/04	10	--	**580**	--	< 130	< 130	**930**	**950**	< 130	--	< 130
TFSB-3	03/24/04	20	--	**2400**	--	< 630	< 630	**12000**	**37500**	< 630	--	< 630
TFSB-3	03/24/04	30	--	**4500**	--	**1500**	< 1300	**21000**	**112000**	< 1300	--	< 1300
TFSB-4	04/13/04	10	--	**5400**	--	< 630	< 630	< 630	< 1260	< 630	--	< 630
TFSB-4	04/13/04	15	--	**1600**	--	< 630	< 630	**1500**	< 1260	< 630	--	< 630
TFSB-4	04/13/04	20	--	**660**	--	< 250	< 250	**1300**	**800**	< 250	--	< 250
TFSB-5	04/13/04	10	--	**3900**	--	< 630	< 630	**6200**	< 1260	< 630	--	< 630
TFSB-5	04/13/04	15	--	**860**	--	< 250	< 250	**1200**	< 500	< 250	--	< 250
TFSB-5	04/13/04	20	--	**200**	--	< 130	< 130	**260**	**210**	< 130	--	< 130
UV-1	06/17/11	74	**9800**	**11000**	--	**280 J**	< 5000	**290 J**	**3560 J**	< 5000	< 50000	--
UV-10	10/27/10	32	**32**	**3300**	--	**2000**	**74 J**	**190**	**750**	< 170	< 1700	< 87
UV-12	10/27/10	30	**21**	**630**	--	**1500**	**480**	**470**	**2880**	< 180	< 1800	< 92
UV-2	10/27/10	30	**370**	**510**	--	**100**	**1000**	**1900**	**10100**	< 170	< 1700	< 85
UV-2	06/17/11	80	< 0.50	< 5.0	--	**8.7**	< 5.0	< 5.0	**7**	**1.7 J**	< 50	--
UV-3	06/16/11	70	**2400**	**3800**	--	< 2000	< 2000	< 2000	**140 J**	< 2000	< 20000	--
UV-4	06/15/11	68	**1600**	**2800**	--	< 500	< 500	**43 J**	< 1000	< 500	< 5000	--
UV-5	10/27/10	28	**26000**	**2200**	--	**110000**	**660000**	**340000**	**1760000**	< 1800	< 18000	< 920
UVB-2	12/08/11	11	**200**	**460**	**510**	< 59	< 59	**18 J**	**68 J**	< 120	< 1200	< 59
UVB-2	12/08/11	30	**0.38**	< 5.0	< 5.0	**2.5**	**2.2**	**0.33 J**	**0.6 J**	< 1.7	< 17	< 0.87
UVB-2	12/08/11	43	< 0.22	< 5.0	< 5.0	**0.23 J**	< 0.92	< 0.92	< 2.72	< 1.8	< 18	< 0.92
UVB-2	12/08/11	65	< 0.21	< 5.0	< 5.0	**0.19 J**	< 0.76	< 0.76	< 2.26	< 1.5	< 15	< 0.76
UVB-2	12/08/11	72	**0.34**	< 5.0	< 5.0	**140**	**130**	**23**	**33**	< 1.7	< 17	< 0.85
UVB-2	12/08/11	76	< 0.19	< 5.0	< 5.0	< 0.77	< 0.77	< 0.77	< 2.27	< 1.5	< 15	< 0.77
UVB-9	12/08/11	24	**0.76**	< 5.0	< 5.0	**1.4**	**1.1 J**	**0.55 J**	**1.3 J**	< 2.6	< 26	< 1.3
UVB-9	12/08/11	28	**150**	**7**	**7.3**	**91**	**1000**	**510**	**3140**	< 97	< 970	< 48
UVB-9	12/08/11	61	< 0.20	< 5.0	< 5.0	**0.5 J**	**0.81 J**	**0.21 J**	**0.67 J**	**0.34 J**	< 20	< 0.99

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DFSP NORWALK SITE, NORWALK CALIFORNIA

Sample Location	Sample Date	Sample Depth	TPHg [1] (C4-C13) (mg/kg)	TPHjf [2] (C6-C22) (mg/kg)	TPHd [3] (C6-C44) (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Xylenes (total) (µg/kg)	MTBE [4] (µg/kg)	TBA [5] (µg/kg)	1,2-DCA [6] (µg/kg)
UVB-9	12/08/11	68	< 0.19	< 5.0	< 5.0	**0.38 J**	< 0.78	< 0.78	< 2.38	< 1.6	**8 J**	< 0.78
UVB-9	12/08/11	72	< 0.20	< 5.0	< 5.0	**0.29 J**	< 0.82	< 0.82	< 2.42	< 1.6	< 16	< 0.82
VEW-1	04/11/07	1	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VEW-20	08/02/04	20	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
VEW-21	08/02/04	20	< 0.5	--	--	< 5	< 5	< 5	< 5	< 25	--	--
VEW-22	08/02/04	10	< 0.5	--	--	< 5	< 5	< 5	**9.7**	< 25	--	--
VEW-23	08/03/04	25	**2400**	--	--	**5900**	**55000**	**19000**	**150000**	< 1300	--	--
VEW-24	08/02/04	25	**14000**	--	--	**36000**	**88000**	**73000**	**520000**	< 25000	--	--
VEW-25	08/02/04	15	**2800**	--	--	**8600**	**36000**	**17000**	**99000**	< 13000	--	--
VEW-26	08/04/04	25	**32000**	--	--	**360000**	**1100000**	**280000**	**1400000**	< 63000	--	--
VEW-27	08/04/04	25	**4500**	--	--	**28000**	**99000**	**38000**	**230000**	< 3100	--	--
VEW-28	08/03/04	15	**590**	--	--	< 130	< 130	**1200**	**840**	< 630	--	--
VEW-29	08/03/04	20	**8500**	--	--	**21000**	**5800**	**87000**	**120000**	< 6300	--	--
VEW-30	08/03/04	10	**1700**	--	--	**7100**	< 500	**15000**	**55000**	< 2500	--	--
VEW-31	08/03/04	15	**2500**	--	--	< 630	< 630	**3400**	**16000**	< 3100	--	--
VEW-32	04/11/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VEW-33	04/11/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VEW-34	04/11/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VEW-35	04/10/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VEW-36	04/10/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VEW-37	04/10/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VMP-01	03/23/04	10	--	< 5	--	< 5	< 5	< 5	< 10	< 5	--	< 5
VMP-01	03/23/04	20	--	< 5	--	< 5	< 5	< 5	< 10	< 5	--	< 5
VMP-01	03/23/04	30	--	< 5	--	**190**	**85**	**79**	**200**	**17**	--	**9.7**
VMP-02	03/23/04	10	--	**1800**	--	< 5	< 5	< 5	**21.4**	< 5	--	< 5
VMP-02	03/23/04	20	--	**4700**	--	< 130	< 130	**14000**	**29100**	< 130	--	< 130
VMP-02	03/23/04	28	--	< 5	--	**41**	**34**	< 5	**22.4**	< 5	--	**8.4**
VMP-03	03/23/04	10	--	**2500**	--	< 130	< 130	**460**	**1110**	< 130	--	< 130
VMP-03	03/23/04	20	--	**600**	--	**130**	**130**	**7900**	**17600**	< 130	--	< 130
VMP-03	03/23/04	28	--	**3300**	--	**800**	**1400**	**22000**	**105000**	< 630	--	< 630
VMP-20	04/12/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VMP-21	04/12/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VMP-22	04/12/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VMP-23	04/11/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VMP-24	04/12/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VMP-25	04/13/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VMP-26	04/12/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VMP-27	04/13/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VMP-28	04/13/07	25	< 0.50	< 5.0	--	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
VW-10	03/23/04	20	--	**3500**	--	< 130	< 130	**7300**	**8860**	< 130	--	< 130
VW-10	03/23/04	30.5	--	< 5	--	< 5	< 5	**14**	**51**	< 5	--	< 5
VW-11	03/23/04	20	--	**6300**	--	< 630	< 630	**9700**	**8300**	< 630	--	< 630
VW-11	03/23/04	25	--	< 5	--	< 5	< 5	**9.8**	**18.3**	< 5	--	< 5
VW-12	03/23/04	20	--	**1800**	--	< 130	< 130	< 130	**490**	< 130	--	< 130
VW-12	03/23/04	30	--	< 5	--	**470**	**40**	**100**	**550**	< 5	--	**70**
VW-13	03/23/04	20	--	< 5	--	< 5	< 5	< 5	< 10	< 5	--	< 5
VW-13	03/23/04	28	--	< 5	--	**340**	**88**	**96**	**230**	< 5	--	**24**
VW-14	03/23/04	20	--	**43**	--	< 5	< 5	< 5	< 10	< 5	--	< 5
VW-14	03/23/04	28	--	**17000**	--	**61000**	**250000**	**250000**	**1320000**	< 13000	--	< 13000

[1] TPHg = total petroleum hydrocarbons as gasoline.
[2] TPHjf = total petroleum hydrocarbons as jet fuel.
[3] TPHd = total petroleum hydrocarbons as diesel.
[4] MTBE = methyl tertiary butyl ether.
[5] TBA = tertiary butyl alcohol.
[6] 1,2-DCA = 1,2-diclhoroethane.
[7] The blue shaded cells identify the minimum values (most stringent) used for the model statistical analyses (Kriging) and comparison.
[8] The less than symbol (<) indictes that the concentration is less than the shown laboratory reporting limit.
BOLD is for detection.
RED is for exceedance.

TABLE 3
TECHNOLOGY SCREENING FOR SOIL AND GROUNDWATER
DFSP NORWALK SITE, NORWALK CALIFORNIA

General Response Action	Primary Remedial Technology	Process Options	Description	Screening Comments
No Further Action	None	None	No additional action is completed at the site.	Used as a baseline for evaluation of action alternatives. Will not meet the threshold criteria of meeting the cleanup goals. Do not retain for further consideration.
Risk and Hazard Management	Access control	Fencing, security, etc.	Signs, fencing, and/or other non-engineered physical barriers designed to reduce or eliminate human exposure to contaminants of concern (COCs) in the environment.	Site access control is currently in place. Does not meet the objective of property transfer and redevelopment.
	Administrative exposure controls	Notifications and management	Intrusive work within site boundary (e.g., constructing/repairing sewer lines) that could lead to contaminant exposure requires proper advance notification and management of environmental hazards during implementation which may include use of protective equipment.	Necessary component of any remedy that does not meet residential cleanup standards. **Retain for further consideration.**
	Monitoring	Vadose zone monitoring	Matrix-specific monitoring in support of general response action. Verify continuing necessity for and effectiveness of ongoing risk and hazard management actions.	**Retain for further consideration.**
In Situ Treatment	Biological	Phytoremediation	Use of plants to extract, degrade, contain, or immobilize contaminants.	Contamination is too deep and widespread for phytoremediation to be considered. Would not meet timeframe desired for soil remediation. Do not retain for further consideration.
		Monitored natural attenuation	Includes the dilution, dispersion, chemical, and biological degradation, sorption/precipitation, and/or radioactive decay of contaminants. The effect of these natural processes are monitored over time to document progress toward achieving remediation goals.	May require long timeframe to achieve ROAs in groundwater. **Retain for further evaluation.**
		Bioventing	Involves supplying oxygen to contaminated, oxygen depleted soils, to facilitate aerobic microbial biodegradation.	Typically applicable to POL contaminants in vadose zone soil. However, use is limited when rapid site cleanup is needed. Heavier hydrocarbons (diesel range) will be slower to degrade than lighter hydrocarbons (gasoline range). **Retain for further consideration.**
		Biosparging	Injection of air into the saturated zone provides oxygen in order to promote aerobic bioremediation. Similar to air sparging however typically injection pressure is lower.	Because of the large source mass, including LNAPL, use of dissolved oxygen would not likely address the smear zone soils. Do not retain for further evaluation.
		Sulfate addition	Anaerobic processes such as sulfate reduction are generally the primarily biodegradation pathway for TPH/BTEX in groundwater. Injection of sulfate into the saturated zone enhances the anaerobic bioremediation of dissolved phase petroleum compounds.	Because of the large source mass, including LNAPL, use of sulfate would not likely address the smear zone soils. Do not retain for further evaluation.
	Chemical/Physical	Soil Vapor Extraction	Contaminated soil vapors are removed from the vadose zone by applying a vacuum to extraction wells and/or trenches. Extracted soil vapor is treated *ex situ* and then discharged to the atmosphere.	Technology is currently used and effective at the site. **Retain for further consideration**

TABLE 3
TECHNOLOGY SCREENING FOR SOIL AND GROUNDWATER
DFSP NORWALK SITE, NORWALK CALIFORNIA

General Response Action	Primary Remedial Technology	Process Options	Description	Screening Comments
		Solidification/ Stabilization	Use of chemical and/or physical processes to treat radioactive, hazardous, and mixed wastes. Solidification encapsulates the waste to form a solid material. Stabilization reduces the hazard potential of a waste by converting the contaminants in to less soluble, mobile or toxic forms.	Not a conventional approach for petroleum impacted sites. Do not retain for further evaluation.
		Chemical Oxidation	Chemical conversion of organic contaminants to non-hazardous or less toxic compounds. Common oxidizing agents include potassium or sodium permanganate, Fenton's catalyzed hydrogen peroxide, hydrogen peroxide, ozone, and sodium persulfate. Can be applied to the vadose zone with in situ mixing technologies or to the saturated zone for groundwater treatment.	Heterogeneous soils make delivery of oxidant problematic. In situ mixing may overcome problems with heterogeneous soils. Sparging with ozone gas may be applicable to POL contaminants in upper groundwater and smear zone. Pilot testing needed to verify efficacy. **Retain for further consideration.**
		Soil Flushing	Involves flooding a zone of contamination with an appropriate solution of surfactants to mobilize contaminants from the soil. Water or liquid solution is injected or infiltrated into the area of contamination. After passing through the contamination zone, the fluid is collected and brought to the surface for disposal, recirculation, or on-site treatment and reinjection.	Site heterogeneity and low permeability silt and clay lenses would prevent ideal contact between the solution and the contamination. Ensuring capture of the liquids would be problematic. Do not retain for further evaluation.
		Electrokinetic Separation	Electrokinetics separation uses electrochemical and electrokinetic processes to desorb and then remove metals and/or polar organics from low permeability soils.	Not applicable to petroleum impacted sites. Do not retain for further evaluation.
		Air Sparging	Air is injected into saturated zone to remove contaminants through volatilization. Soil vapor is collected for *ex situ* treatment using a soil vapor extraction system.	Site heterogeneity and low permeability silt and clay lenses would prevent ideal contact between the air and the contamination. Do not retain for further evaluation.
	Thermal Treatment	Electrical Resistive Heating	Involves passing electrical current through moisture in the soil between an array of electrodes. As the current flows through the moisture in soil pores, the resistance of the soil produces heat. Contaminants are volatilized and steam-stripped and recovered using SVE.	A study conducted by AFCEE of 40 thermally enhanced SVE sites concluded that only one site clearly benefited from thermal enhancement. At all other sites, it was determined through life-cycle cost analyses that standard SVE would have achieved cleanup for significantly less cost than thermally enhanced SVE. There also are concerns regarding the availability of sufficient power to run a large-scale system. Do not retain for further evaluation.
		Conductive Heating	Heat is supplied to the soil through steel wells or with a blanket that covers the ground surface. As the polluted area is heated, the contaminants are destroyed or evaporated. Steel wells are used when the polluted soil is deep. The blanket is used where the polluted soil is shallow. Typically, a carrier gas or vacuum system transports the volatilized water and organics to a treatment system.	

TABLE 3
TECHNOLOGY SCREENING FOR SOIL AND GROUNDWATER
DFSP NORWALK SITE, NORWALK CALIFORNIA

General Response Action	Primary Remedial Technology	Process Options	Description	Screening Comments
		Radio-Frequency Heating	Process that uses electromagnetic energy to heat soil and enhance soil vapor extraction. The technique heats a discrete volume of soil using rows of vertical electrodes embedded in soil or other media. Heated soil volumes are bounded by two rows of ground electrodes with energy applied to a third row midway between the ground rows. The three rows act as a buried triplate capacitor. When energy is applied to the electrode array, heating begins at the top center and proceeds vertically downward and laterally outward through the soil volume. The technique can heat soils to over 300ºC.	
		Steam Injection and Extraction	Involves injection of steam, through injection wells, and the recovery, using recovery wells, of mobilized contaminants in vapor.	Challenging to use with shallow contamination. Heterogeneity tends to channel the steam to the more permeable layers and by-pass less permeable soils. Would require groundwater extraction and treatment. Do not retain for further evaluation.
		Vitrification	Uses an electric current to melt soil or other earthen materials at extremely high temperatures (1,600 to 2,000 degrees Celsius [°C]) and thereby immobilize most inorganics and destroy organic pollutants by pyrolysis.	Generally applied at sites with metals or radionuclides. Do not retain for further evaluation.
Removal	Soil Removal	Excavation	Affected soils are removed from the site and disposed at an approved disposal facility or treated on site. Excavation requires backfilling with clean soil.	Able to meet the desired time-frame for the remediation. **Retain for further consideration.**
	LNAPL Removal	Multi-phase Extraction (Bioslurping)	Primarily used to remove LNAPL by applying a high vacuum to an extraction well. Contaminated groundwater and soil vapor also are simultaneously extracted for *ex situ* treatment/disposal.	**Retain for further consideration** for areas with LNAPL.
Containment	Groundwater Controls	Extraction	The use of recovery wells or trenches to remove contaminated groundwater in order to control contaminant migration.	Groundwater extraction is currently being used at the site as a gradient control. Does not advance the site toward meeting the cleanup goals. Do not retain for further consideration.
		Permeable Barriers	These barriers allow the passage of water while causing the degradation or removal of contaminants. Examples of reactive agents include iron filings and bark mulch. In addition, the barrier could be constructed as a sparge trench removing contaminants through volatilization.	Use of a horizontal air sparging trench or well could be used to prevent off-site plume migration. Controlling off-site migration of the plume is not the primary cleanup objective, therefore do not retain for further consideration.
	Physical Barriers	Vertical	These subsurface barriers consist of vertically excavated trenches filled with slurry or driven barriers such as sheet piling or high-density polyethylene (HDPE) panels. Vertical barriers prevent the migration of groundwater beyond the barriers perimeter.	For the same rationale as the permeable barrier option, do not retain for further consideration.
		Horizontal	These surface barriers consist of horizontal caps constructed of asphalt, concrete, geocomposites, etc. to minimize infiltration of precipitation to the contaminated groundwater and reduce potential exposure.	Not compatible with the desire to transfer and redevelop the site. Does not advance the site toward meeting the cleanup goals. Do not retain for further consideration.

TABLE 4
EFFECTIVENESS OF RETAINED RESPONSE ACTIONS

DFSP NORWALK SITE, NORWALK CALIFORNIA

	Remedial Action Objectives				
Response Action	**Reduce Contaminant Concentrations**	**Remove Exposure Pathways**	**Prevent Contaminant Migration**	**Minimize Adverse Impacts**	**Meet Established Cleanup Goals**
In-situ Oxidation via Ozonation	+	+	+/-	+	+
Bioventing	+	+/-	+/-	+	+
Excavation and Off-Site Disposal / Treatment	+	+	+	+	+
Monitored Natural Attenuation	+/-	+/-	+/-	+/-	+
Institutional Controls	-	+/-	-	+/-	-

Notes:
+ Response action achieves RAOs
+/-Response action partially achieves RAOs
- Response action does not achieve RAOs

TABLE 5
REMEDIAL ALTERNATIVES COST SUMMARY

DFSP NORWALK SITE, NORWALK CALIFORNIA

Alternative	Description	Capital Cost ($)	Total Operation and Maintenance Cost ($)	Total Periodic Cost ($)	Total Cost ($)
1	Institutional Controls and Monitored Natural Attenuation	$131,000	$402,000	$309,000	$842,000
2	Institutional Controls, Ozonation and Monitored Natural Attenuation, Expanded SVE-Bioventing	$6,430,000	$4,048,000	$685,000	$11,163,000
3	Institutional Controls, Ozonation and Monitored Natual Attenuation, Soil Excavation to 15 Feet, Expanded SVE-Bioventing	$19,205,000 [/a]	$3,919,000	$685,000	$23,809,000
4	Institutional Control, Ozonation and Monitored Natural Attenuation, Soil Excavation to 20 Feet, Expanded SVE-Bioventing	$26,911,000 [/b]	$3,889,000	$685,000	$31,485,000
5	Institutional Controls, Monitored Natural Attenuation, Excavate To Top of Groundwater	$54,455,000	$382,000	$289,000	$55,126,000

Footnotes:

[/a] Costs for only soil excavation to 15 feet is estimated at $12,496,000 (which includes 20% labor for construction oversight and management and 25% implementation contingency.

[/b] Costs for only soil excavation to 20 feet is estimated at $20,179,000 (which includes 20% labor for construction oversight and management and 25% implementation contingency.

General Notes:

1. Costs are based on a 10 year project life. Excavation is assumed to take approx 3 to 6 months for Alternative 2, 6 to 9 months for Alternatives 3 and 4, and 9 to 12 months for Alternative 5. Mass reduction via ozonation and BV/SVE is expected to be completed in the first two to three years following excavation. Monitoring will be conducted from years 3 to 10.
2. No present value costs have been calculated. Electrical costs for system operation have been included. A 25% contigency has been included for design and construction for the excavation and BV/SVE implementation.

TABLE 6
COMPARATIVE ANALYSIS OF ALTERNATIVES

DFSP NORWALK SITE, NORWALK CALIFORNIA

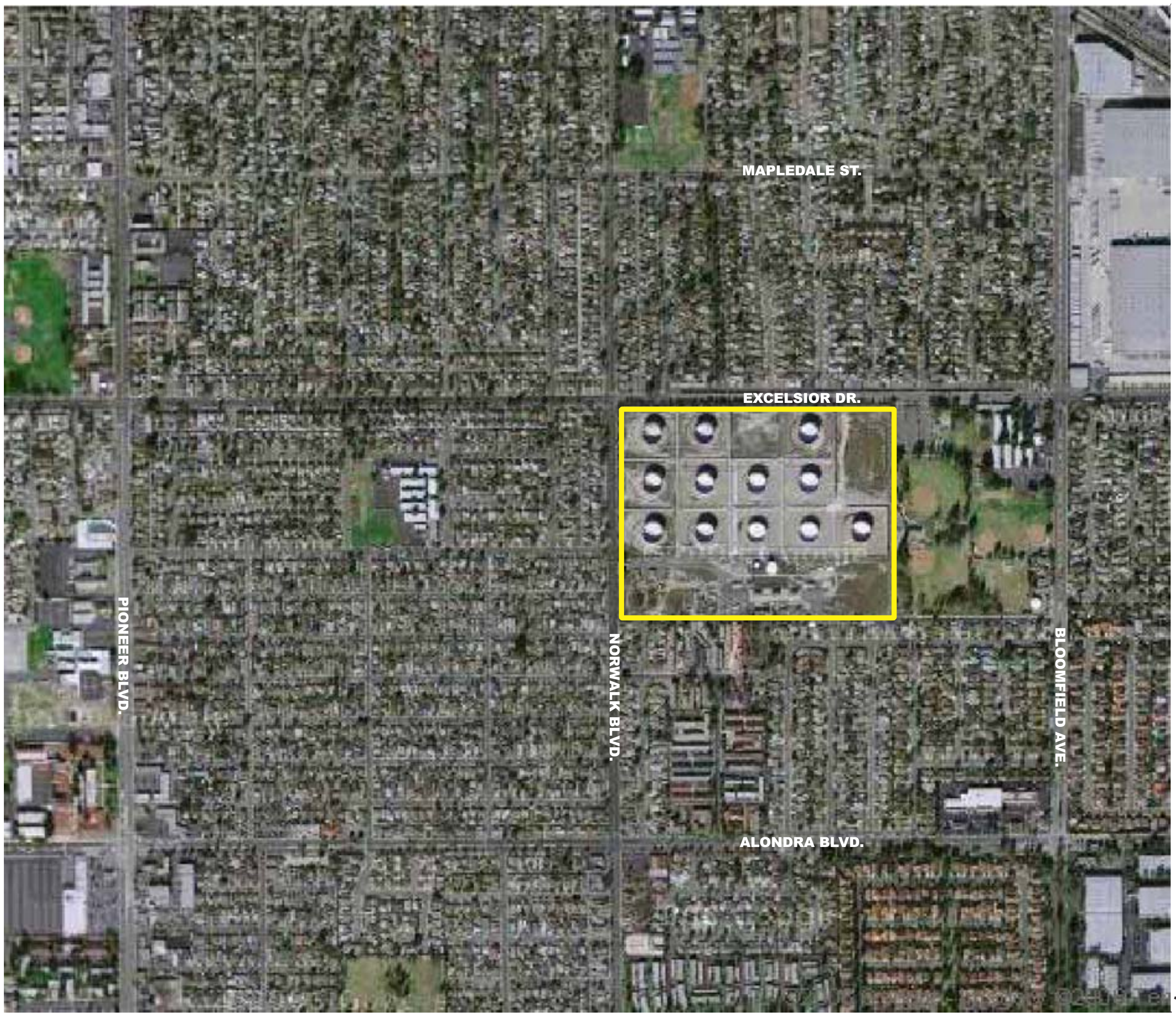
Alternative	Description	Threshold Criteria		Balancing Criteria					Total Score
		Overall Protection of Human Health & the Environment	**Compliance with ARARs**	**Long-Term Effectiveness and Permanence**	**Reduction of Toxicity, Mobility, or Volume (TMV) Through Treatment**	**Short-Term Effectiveness**	**Implement -ability**	**Cost**	
1	ICs and MNA	No	✓	1	1	1	3	3	**9**
2	Institutional Controls / Ozonation and Monitored Natural Attenuation / Excavation of the Top Two Feet of Impacted Soil / Expanded SVE-Bioventing	✓	✓	1	2	2	2	3	**10**
3	Institutional Controls / Ozonation and Monitored Natural Attenuation / Soil Excavation to 15 Feet / Expanded SVE-Bioventing	✓	✓	2	3	2	2	2	**11**
4	Institutional Controls / Ozonation and Monitored Natural Attenuation / Soil Excavation to 20 Feet / Expanded SVE-Bioventing	✓	✓	2	3	2	2	2	**11**
5	Institutional Controls / Monitored Natural Attenuation / Excavate To Top of Groundwater	✓	✓	3	3	3	1	1	**11**

Notes:

Scores for the Balancing Criteria are based on following: 1 (low), 2 (moderate), 3 (high) rating. Total Possible Score = 15

Modifying Criteria such as regulatory and community acceptance are evaluated through public meetings and document reviews.

FIGURES



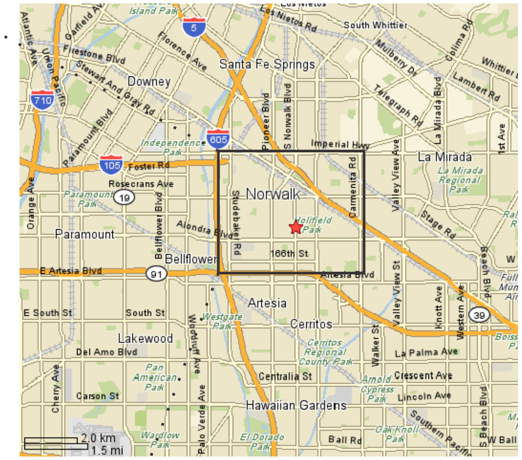


FIGURE 1

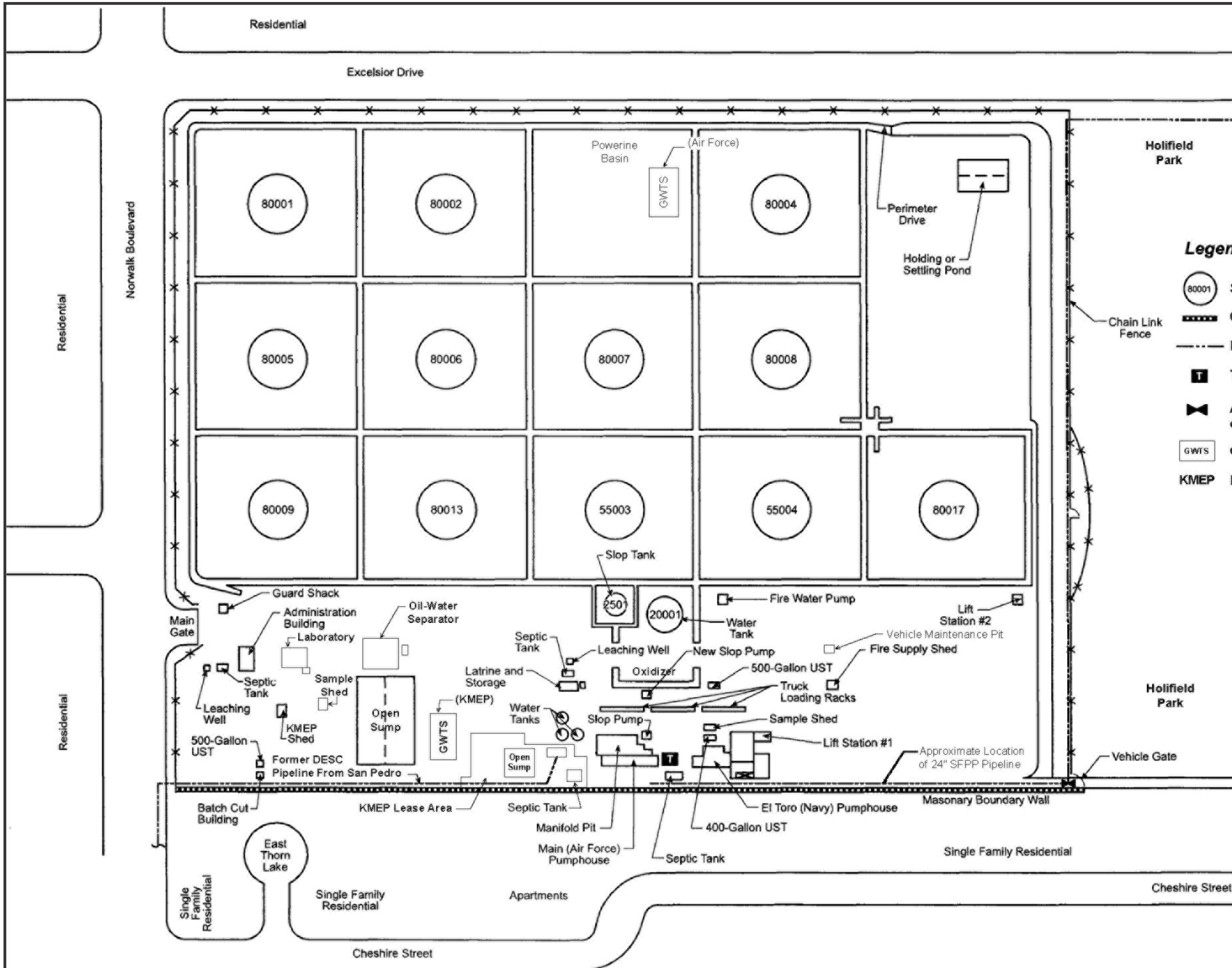
SITE
LOCATION MAP

DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA

PARSONS

Pasadena, California

draw\748575 Site Location Map.cdr ma 08/20/2012



Note: Figure obtained from Environmental Baseline Survey Report prepared by IT group (October2001)

FIGURE 2

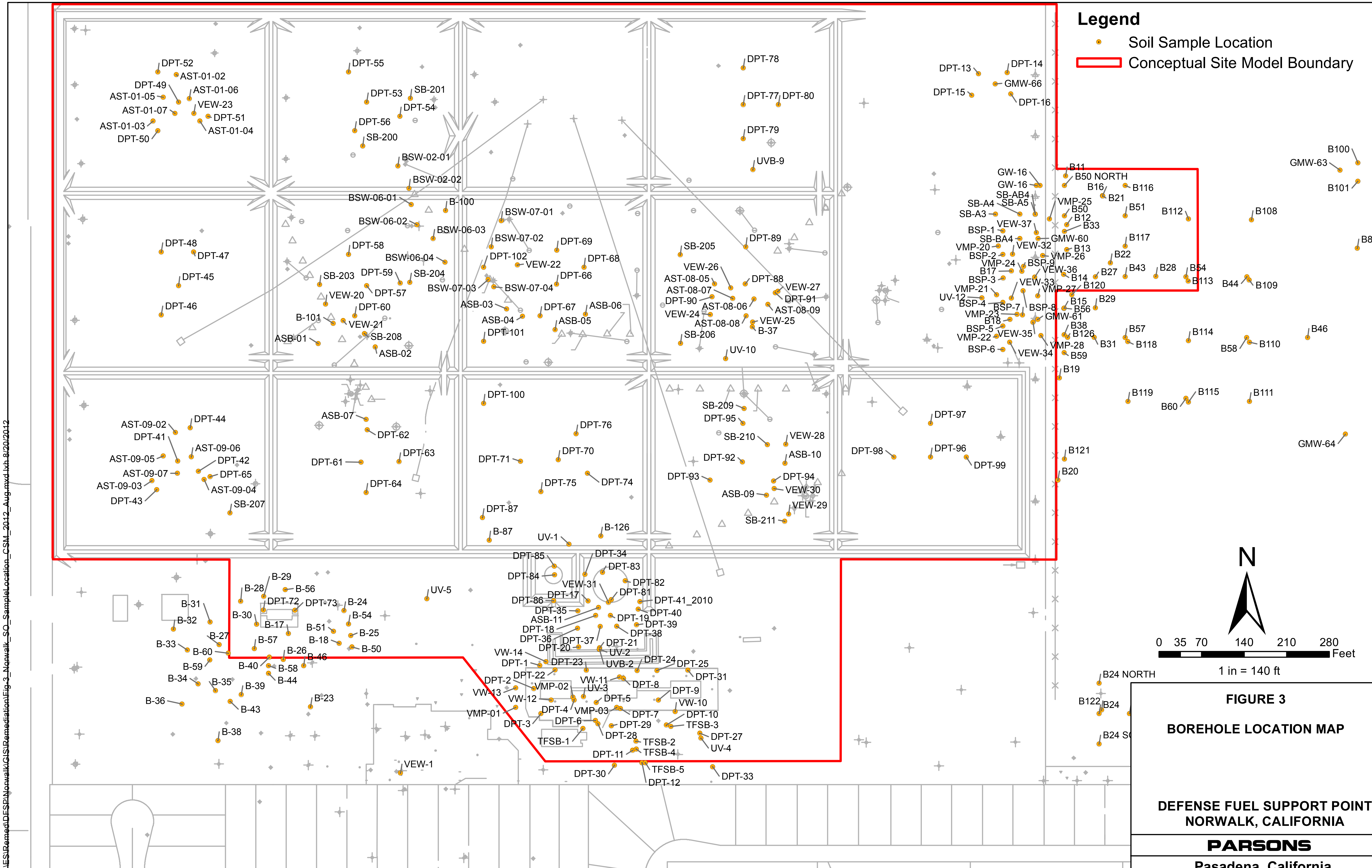
SITE MAP AND HISTORICAL SITE FACILITIES

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California

draw\748575 Historical Site Facilities.cdr ma 08/20/2012


Legend
Soil Sample Location
Conceptual Site Model Boundary
N
0 35 70 140 210 280
Feet
1 in = 140 ft
FIGURE 3
BOREHOLE LOCATION MAP
DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA
PARSONS
Pasadena, California
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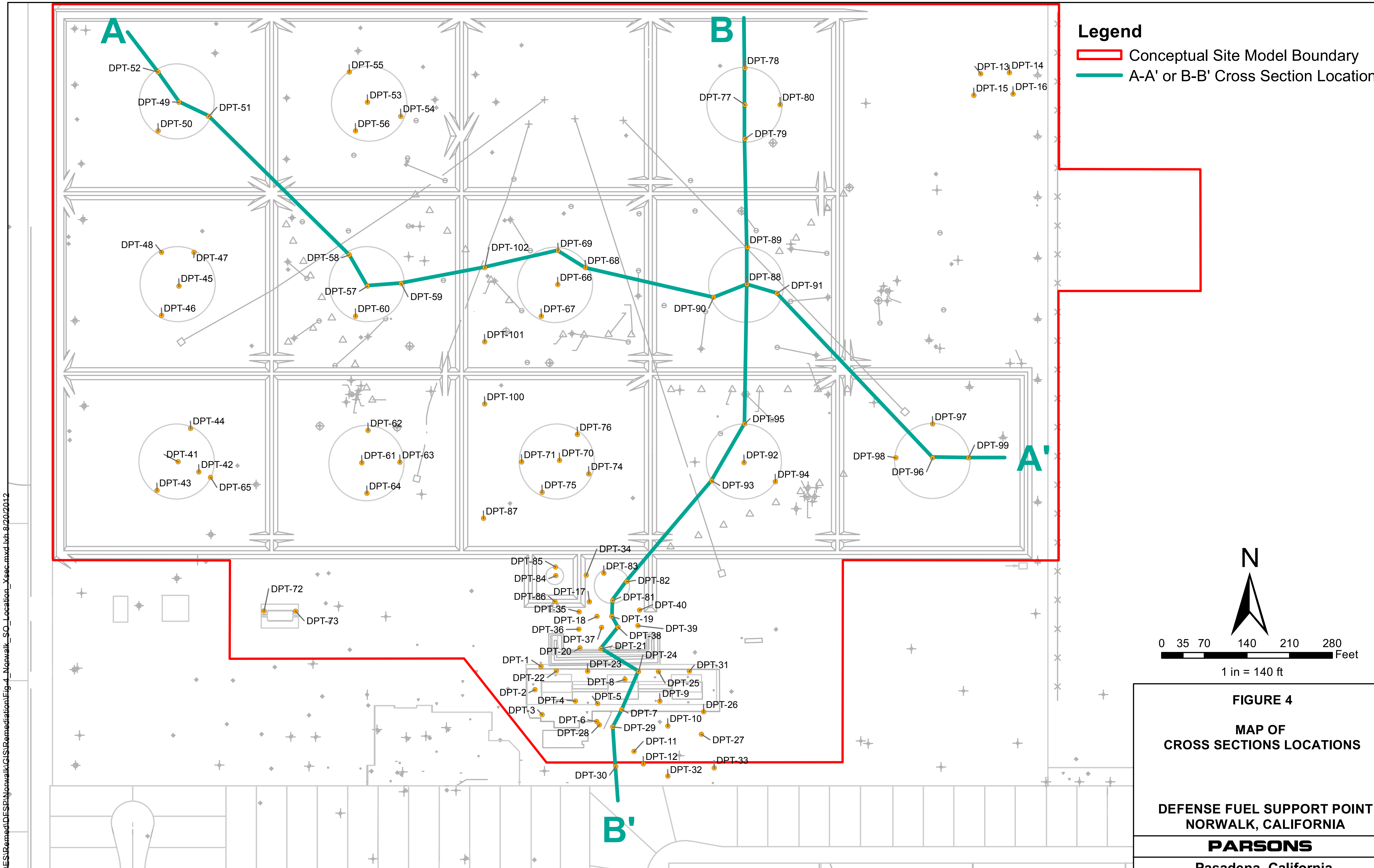

FIGURE 4

MAP OF CROSS SECTIONS LOCATIONS

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California

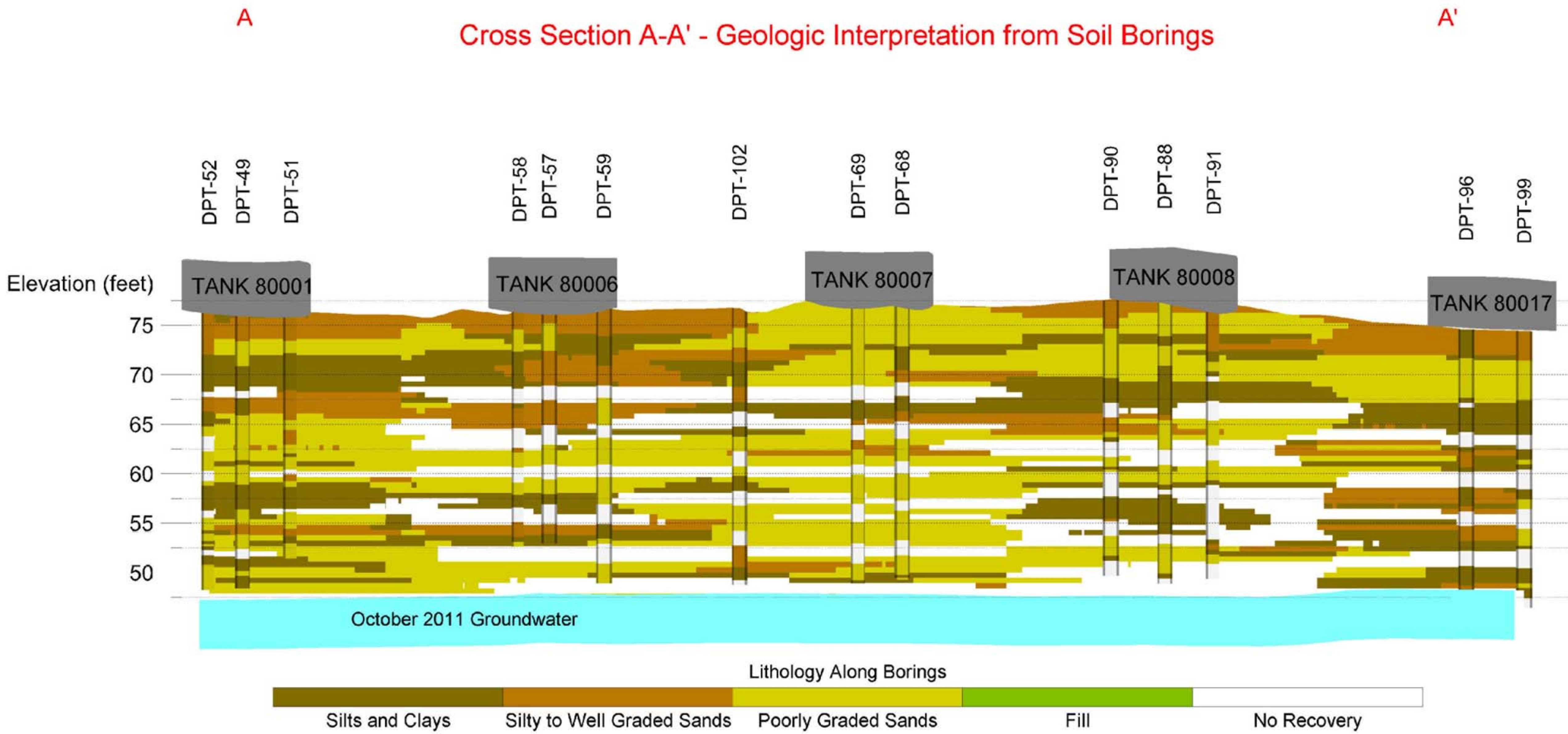

FIGURE 5

GEOLOGIC
CROSS SECTION A-A'

DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA

PARSONS

Pasadena, California

draw\748575 Cross Section A-A'.cdr ma 08/20/2012

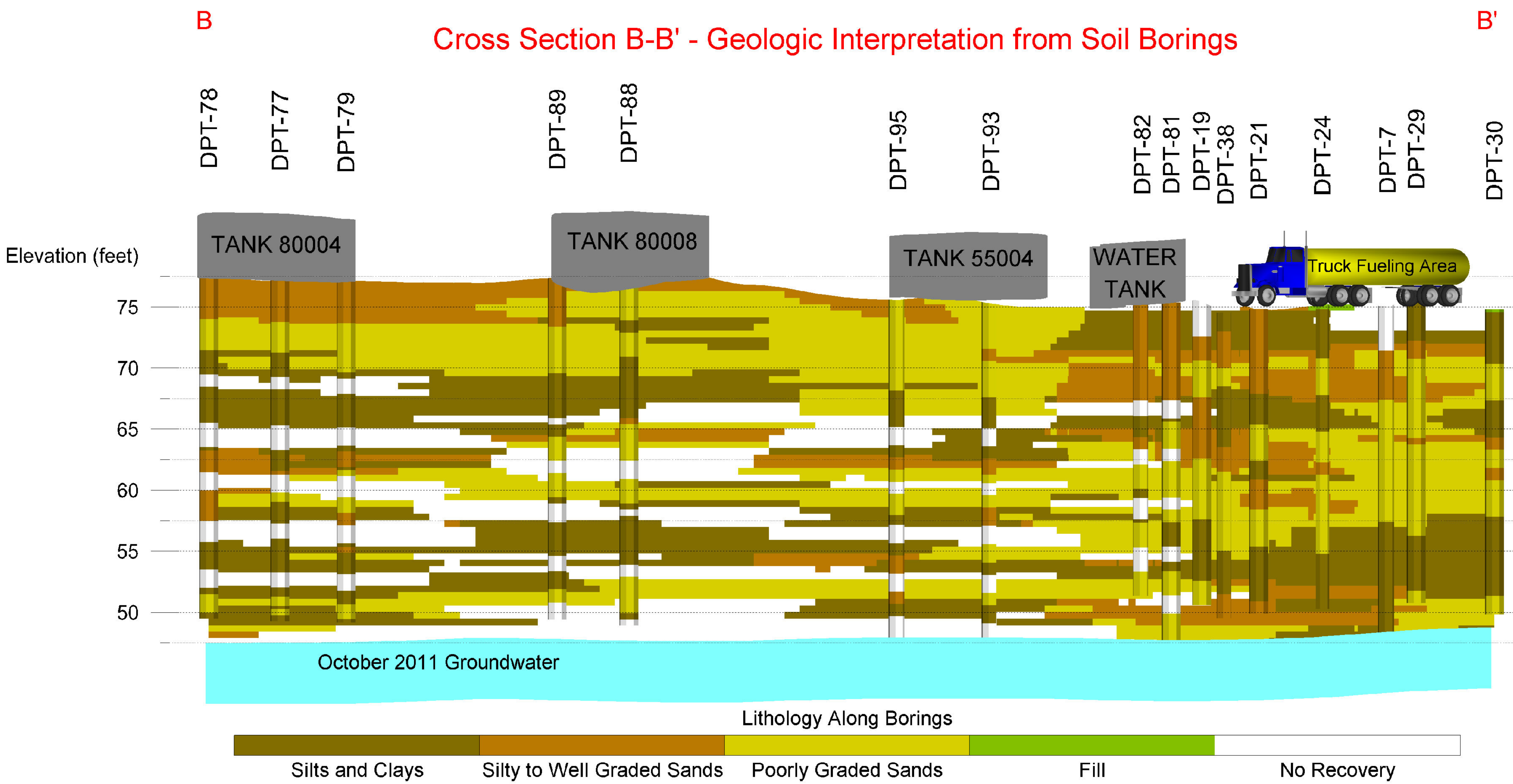

FIGURE 6

GEOLOGIC CROSS SECTION B-B'

DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA

PARSONS

Pasadena, California

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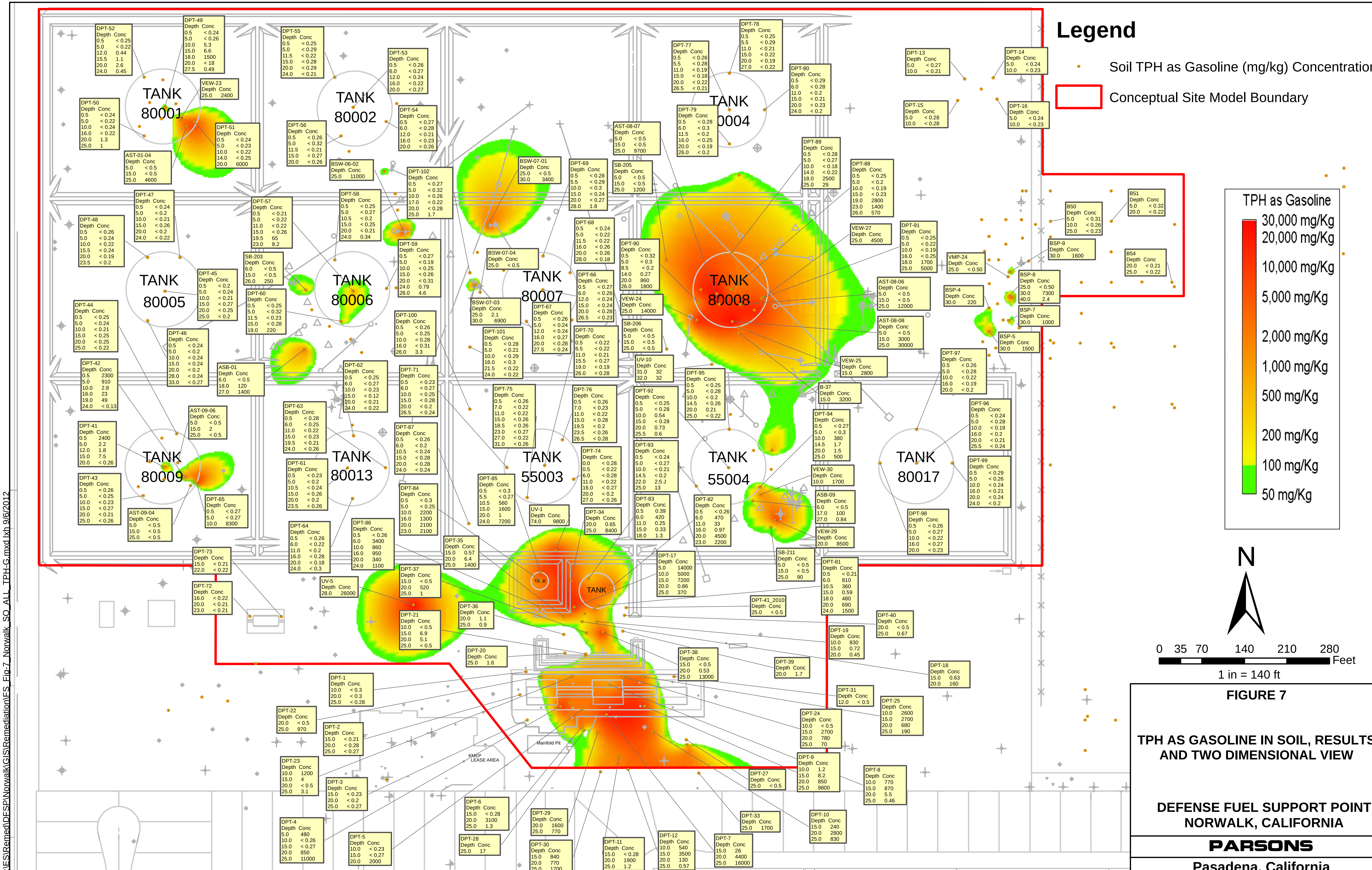


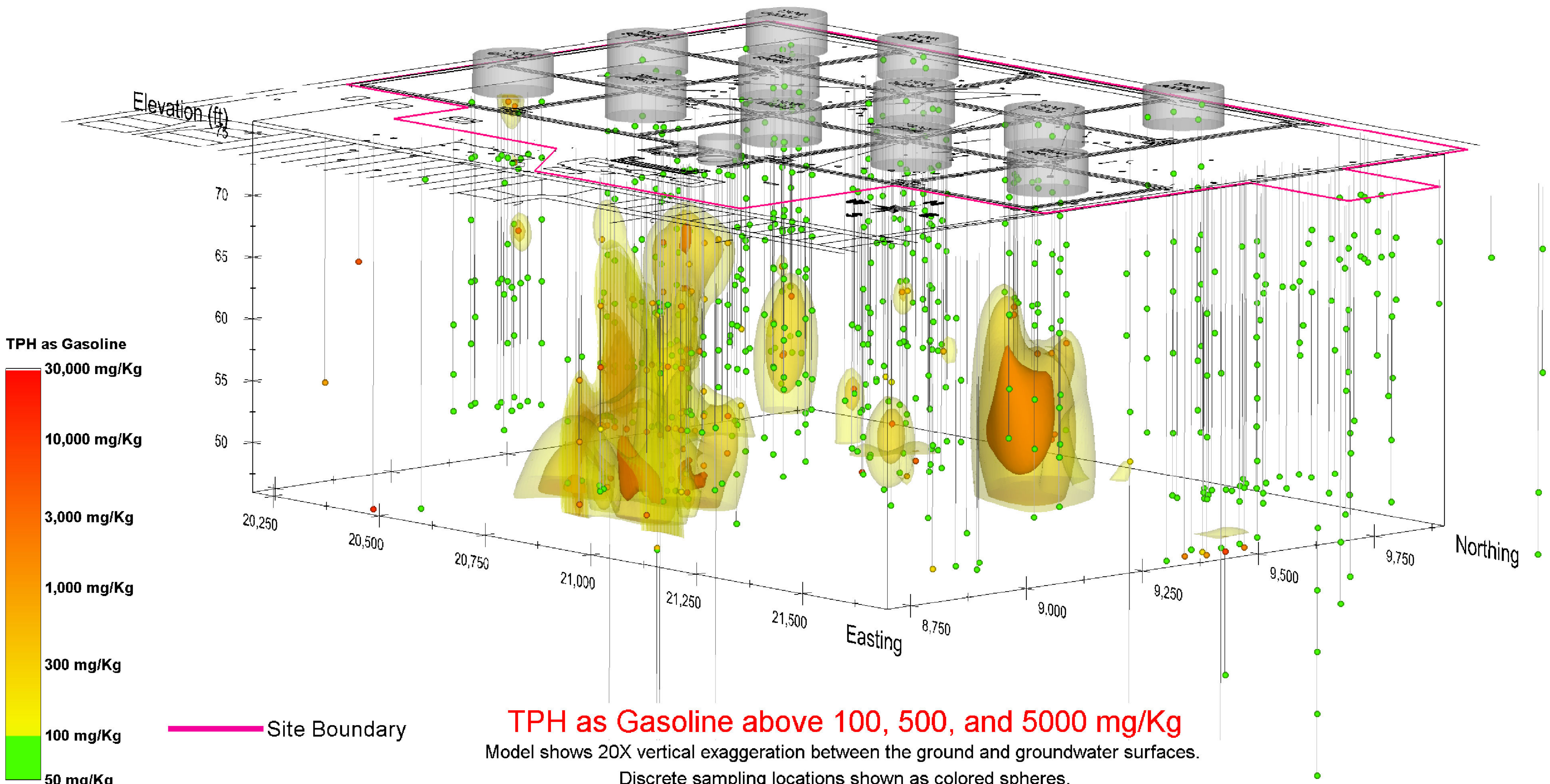
FIGURE 7

TPH AS GASOLINE IN SOIL, RESULTS AND TWO DIMENSIONAL VIEW

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California



TPH as Gasoline above 100, 500, and 5000 mg/Kg

Model shows 20X vertical exaggeration between the ground and groundwater surfaces.

Discrete sampling locations shown as colored spheres.

COC impacts to soil clipped vertically at the groundwater surface and horizontally at the site boundary.

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_Fig-8_Norwalk_SO_3D_TPH-g.mxd lxh 9/6/2012

FIGURE 8

TPH AS GASOLINE IN SOIL THREE DIMENSIONAL VIEW

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California

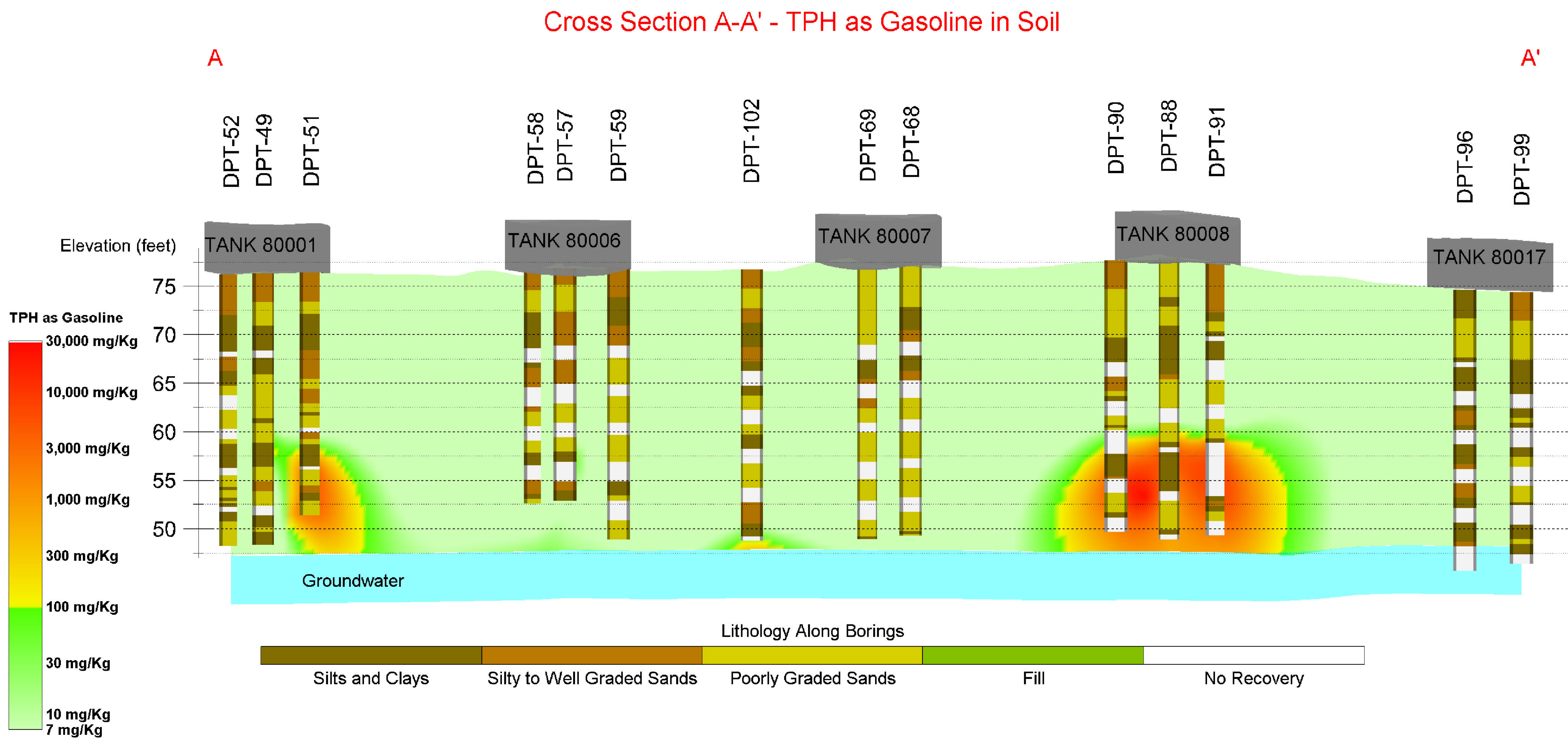


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FIGURE 9

LITHOLOGIC CROSS SECTION A-A' WITH TPH AS GASOLINE PLUMES

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California

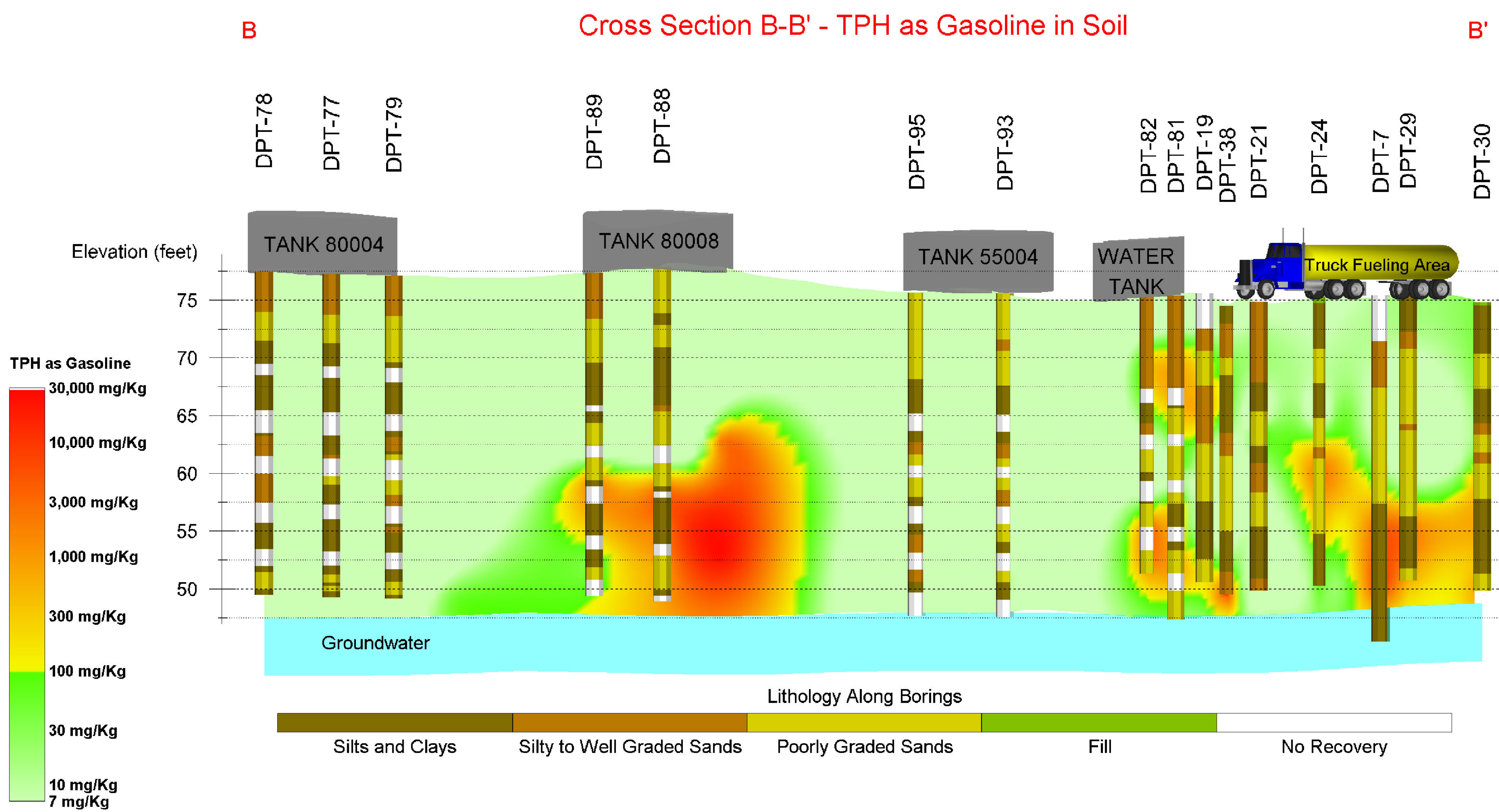

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FIGURE 10

LITHOLOGIC CROSS SECTION B-B' WITH TPH AS GASOLINE PLUMES

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California

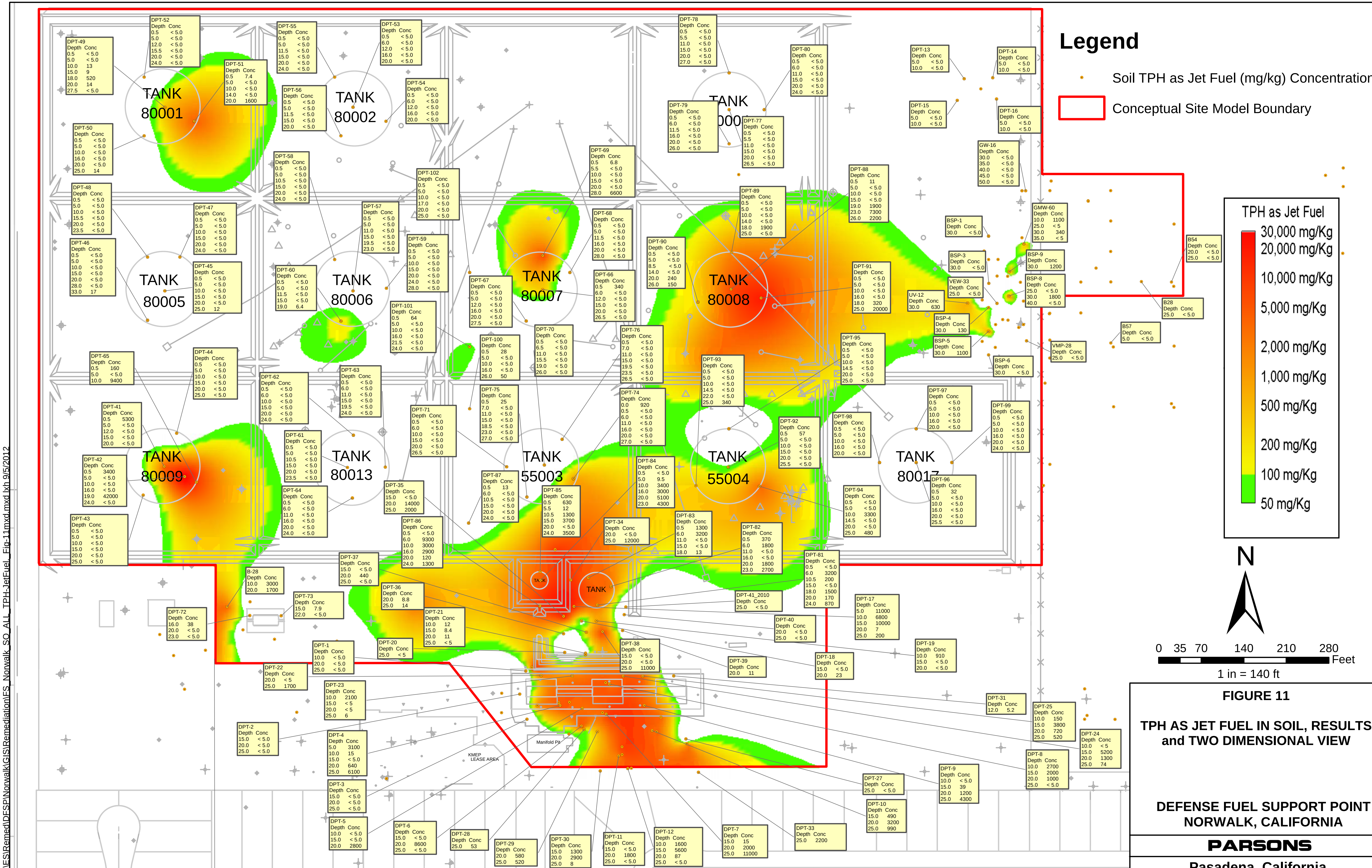


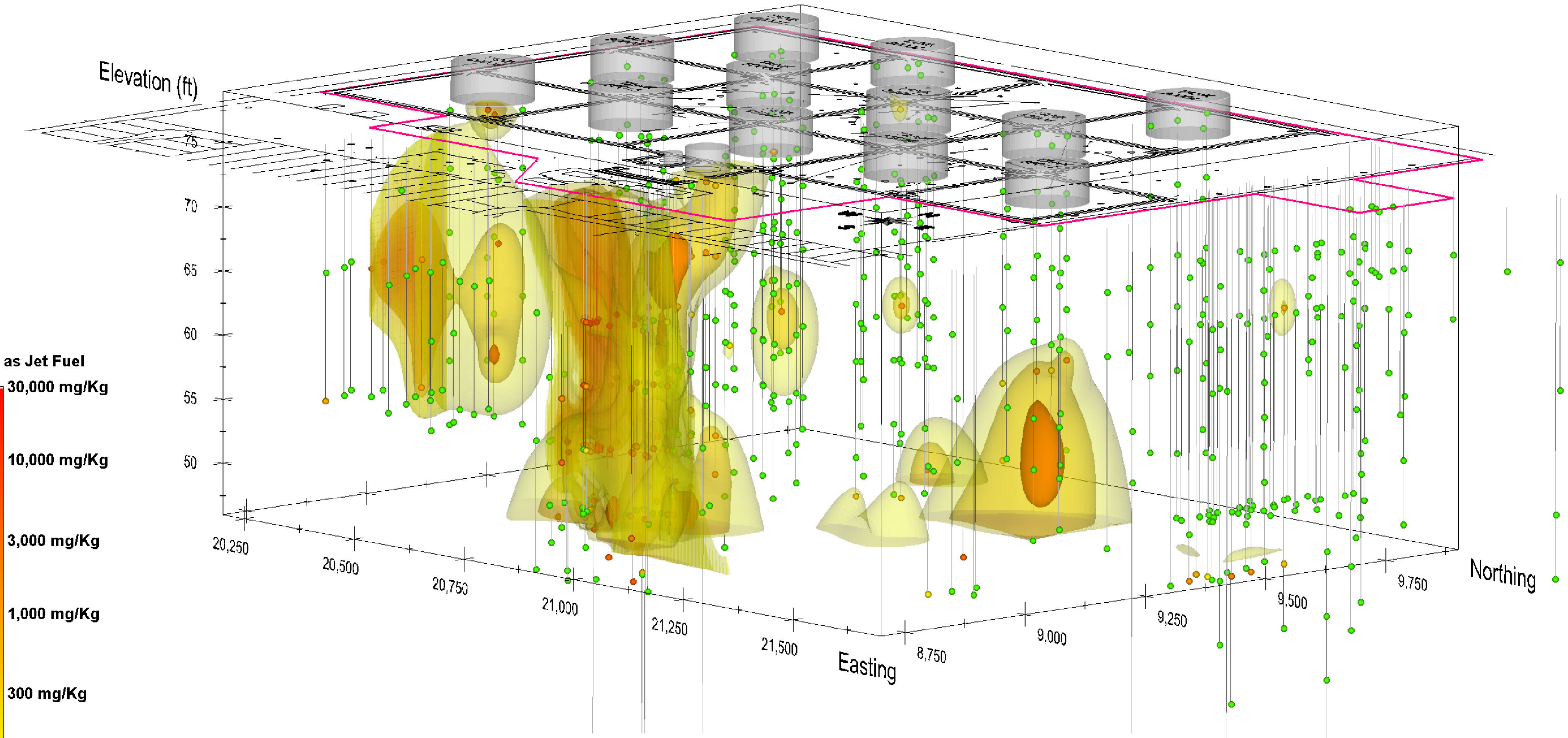
FIGURE 11

TPH AS JET FUEL IN SOIL, RESULTS and TWO DIMENSIONAL VIEW

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California



TPH as Jet Fuel
30,000 mg/Kg
10,000 mg/Kg
3,000 mg/Kg
1,000 mg/Kg
300 mg/Kg
100 mg/Kg
50 mg/Kg

Site Boundary

TPH as Jet Fuel above 100, 500, and 5000 mg/Kg

Model shows 20X vertical exaggeration between the ground and groundwater surfaces.

Discrete sampling locations shown as colored spheres.

COC impacts to soil clipped vertically at the groundwater surface and horizontally at the site boundary.

FIGURE 12

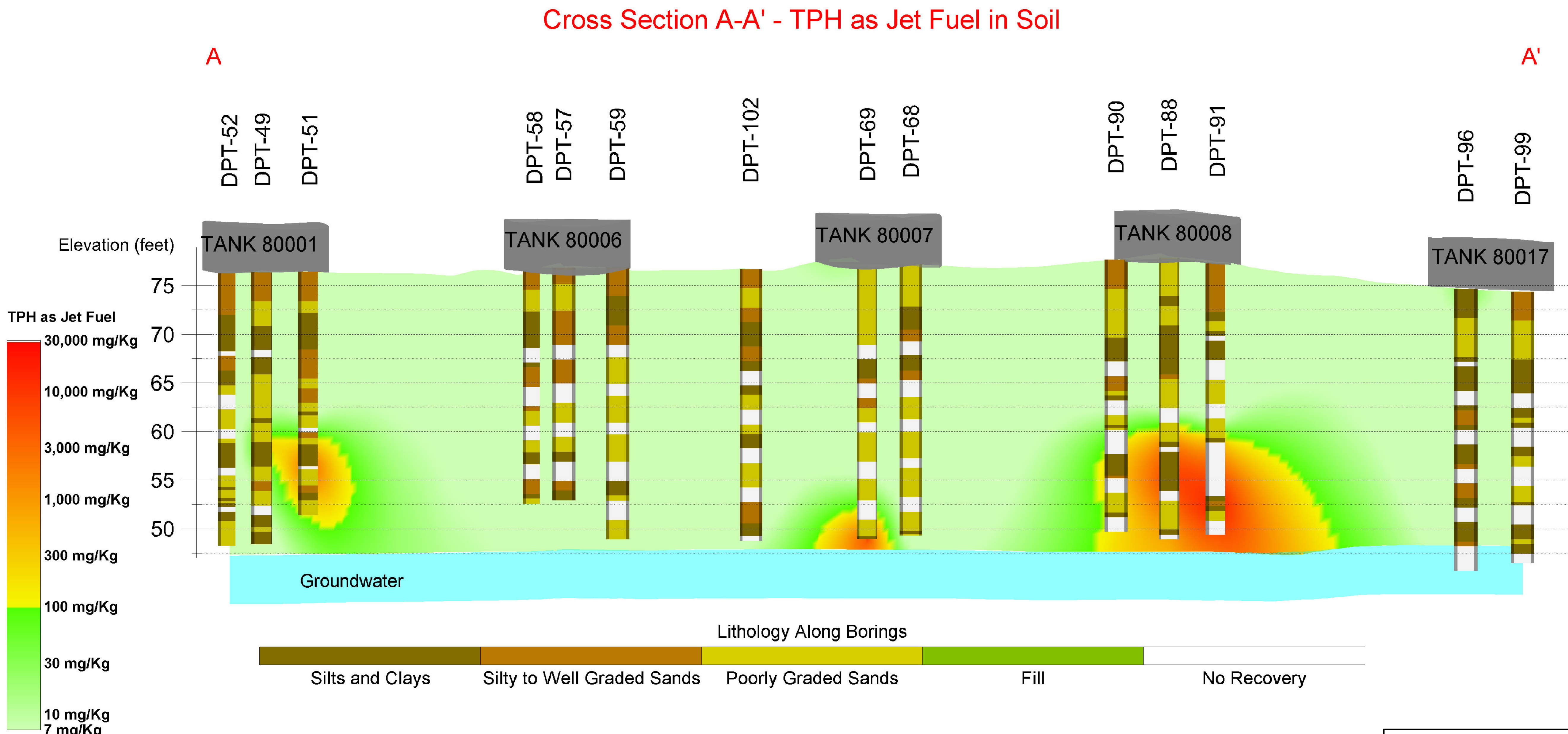
TPH AS JET FUEL IN SOIL
THREE DIMENSIONAL VIEW

DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA

PARSONS

Pasadena, California

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_Fig-12_Norwalk_SO_3D_TPH-jf.mxd lxh 9/5/2012



S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_Fig-13_Norwalk_SO_A-A'_TPH-jf.mxd lxh 9/6/2012

FIGURE 13

LITHOLOGIC CROSS SECTION A-A' WITH TPH AS JET FUEL PLUMES

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California

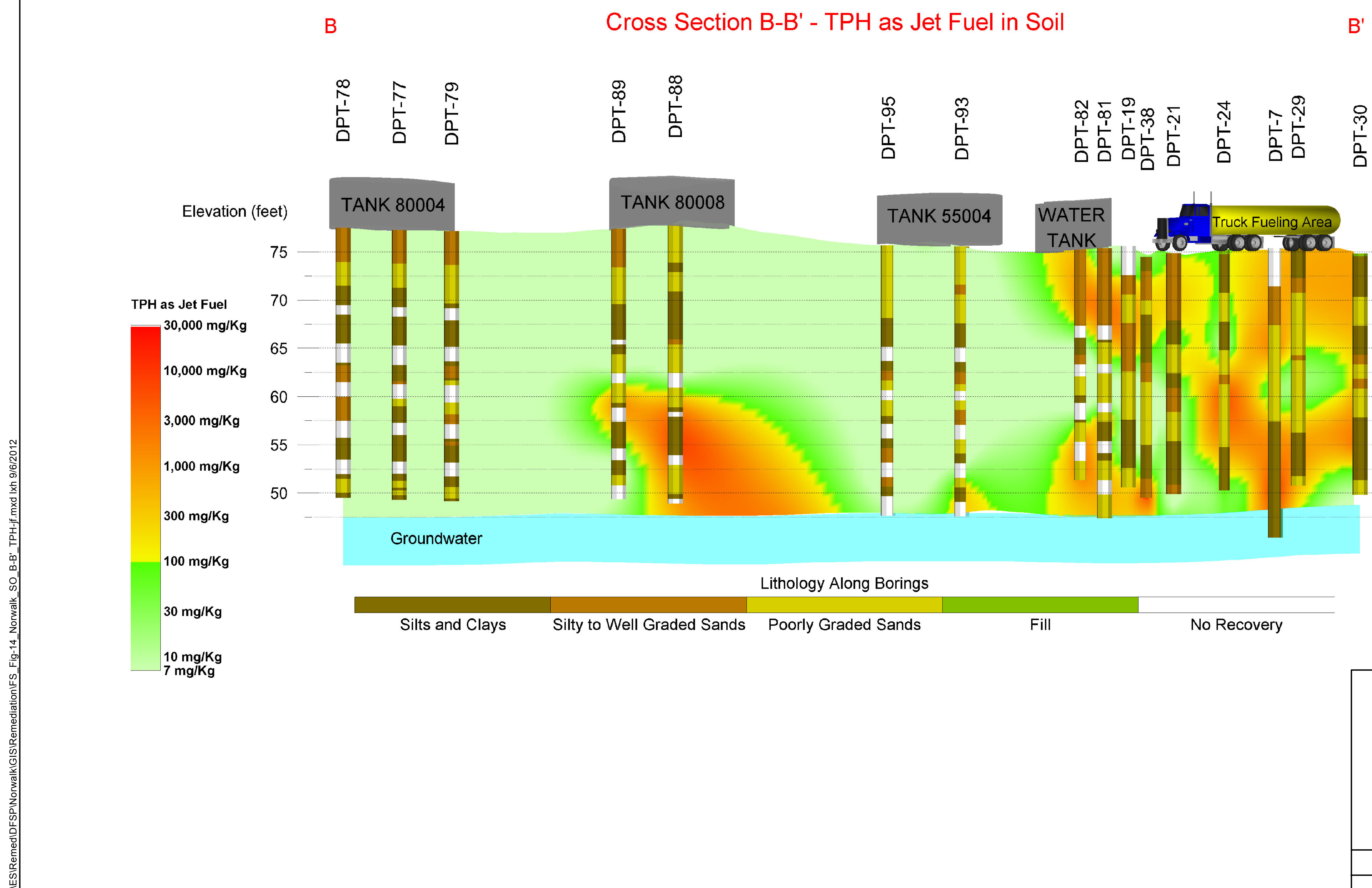


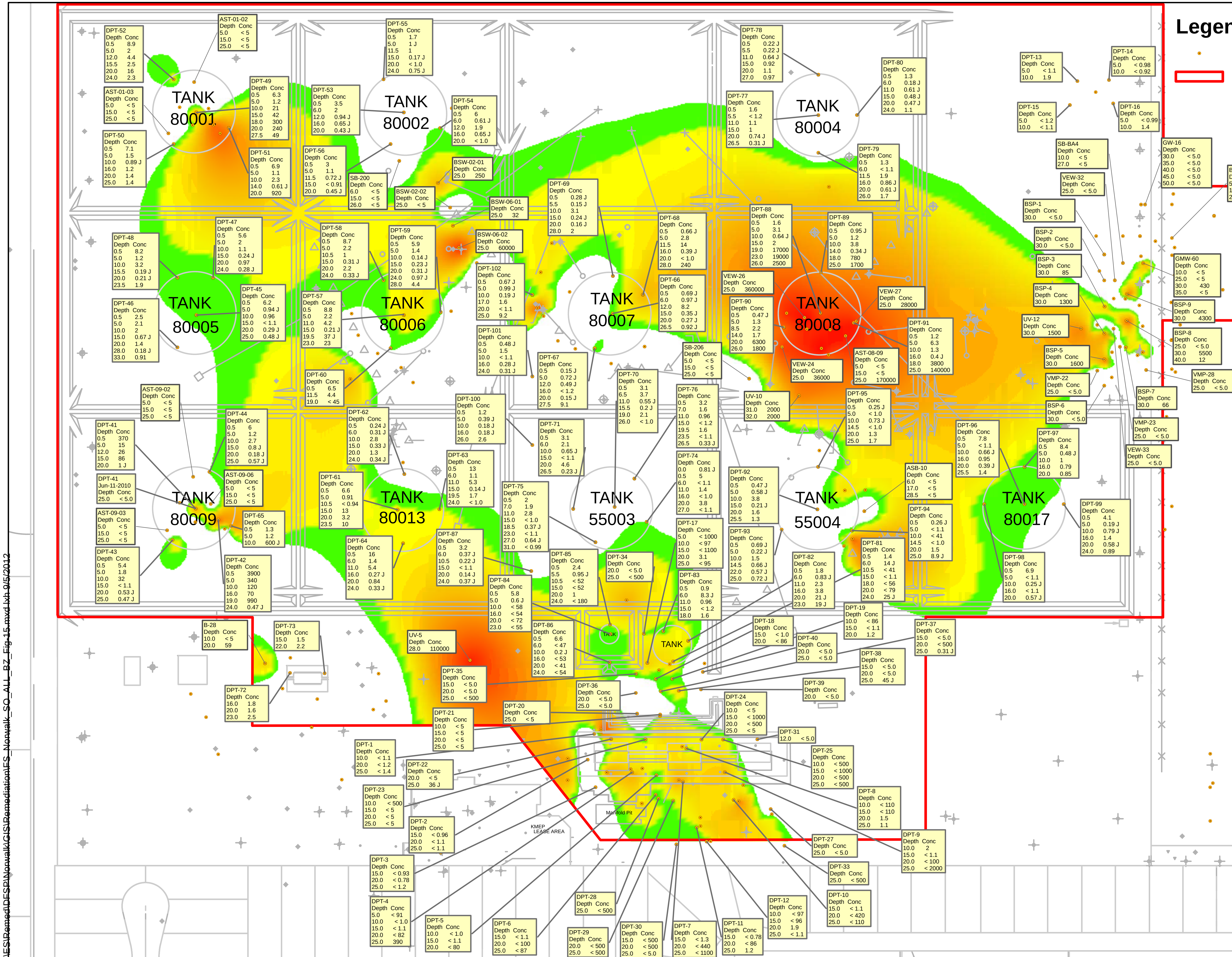
FIGURE 14

LITHOLOGIC CROSS SECTION B-B'
WITH TPH AS JET FUEL PLUMES

DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA

PARSONS

Pasadena, California



Legend

Soil Benzene (ug/kg) Concentration

Conceptual Site Model Boundary

Benzene
300,000 ug/Kg
100,000 ug/Kg
30,000 ug/Kg
10,000 ug/Kg
3,000 ug/Kg
1,000 ug/Kg
300 ug/Kg
100 ug/Kg
30 ug/Kg
10 ug/Kg
5 ug/Kg

N

0 35 70 140 210 280 Feet

1 in = 140 ft

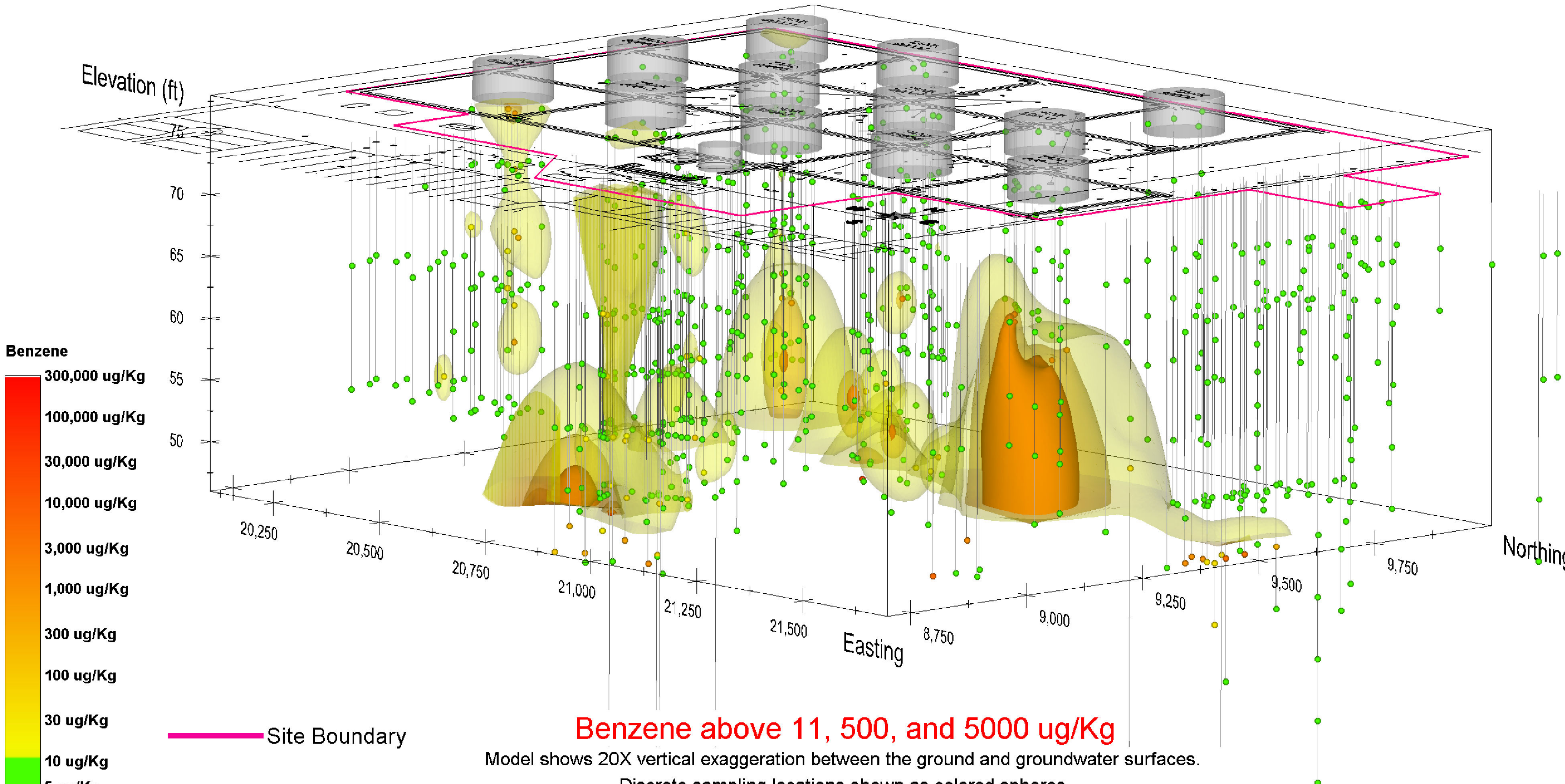
FIGURE 15

BENZENE IN SOIL, RESULTS and TWO DIMENSIONAL VIEW

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California



Benzene above 11, 500, and 5000 ug/Kg

Model shows 20X vertical exaggeration between the ground and groundwater surfaces.

Discrete sampling locations shown as colored spheres.

COC impacts to soil clipped vertically at the groundwater surface and horizontally at the site boundary.

FIGURE 16

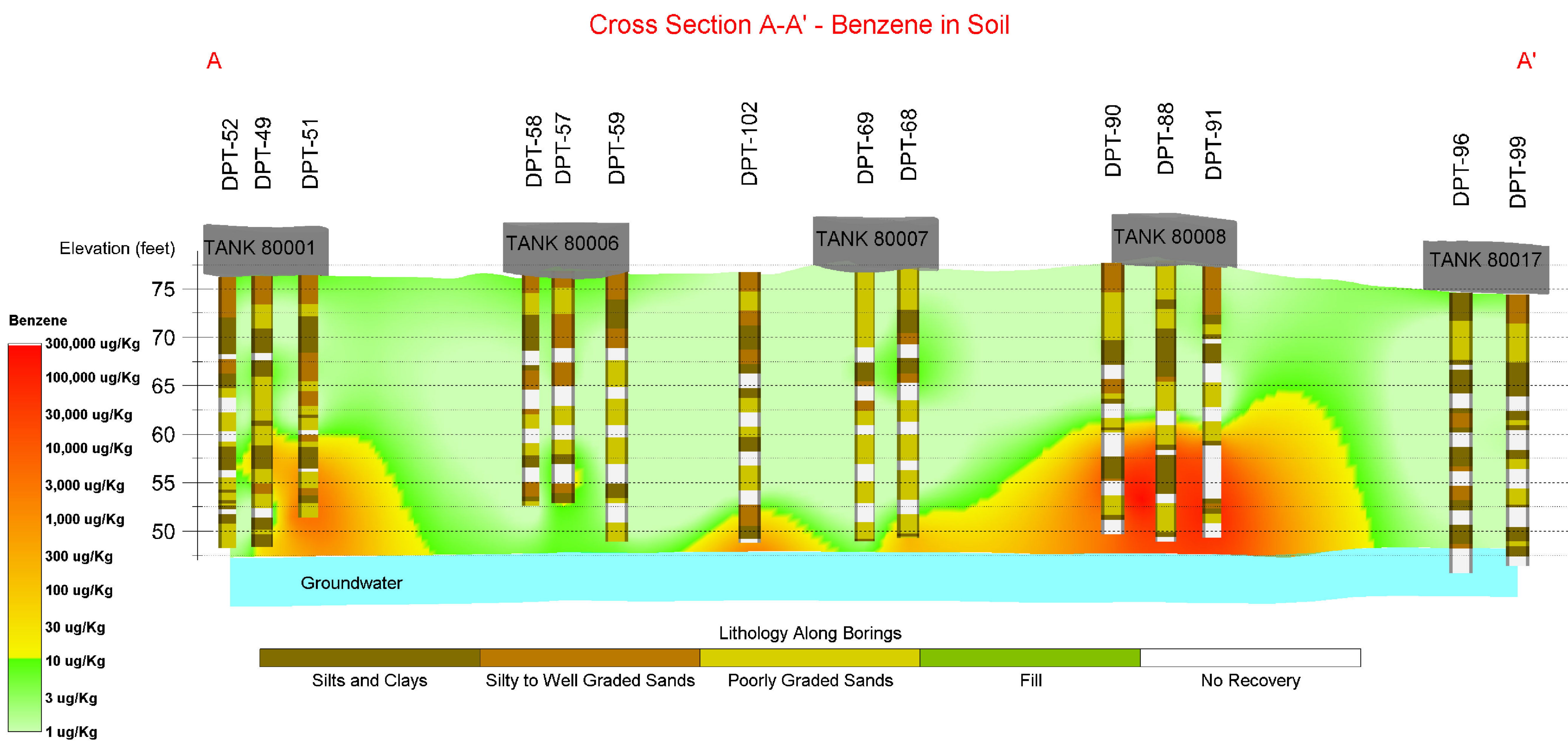
BENZENE IN SOIL
THREE DIMENSIONAL VIEW

DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA

PARSONS

Pasadena, California

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_Fig-16_Norwalk_SO_3D_BZ.mxd lxh 9/6/2012



S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_Fig-17_Norwalk_SO_A-A'_BZ.mxd lxh 9/6/2012

FIGURE 17

LITHOLOGIC CROSS SECTION A-A' WITH BENZENE PLUMES

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California

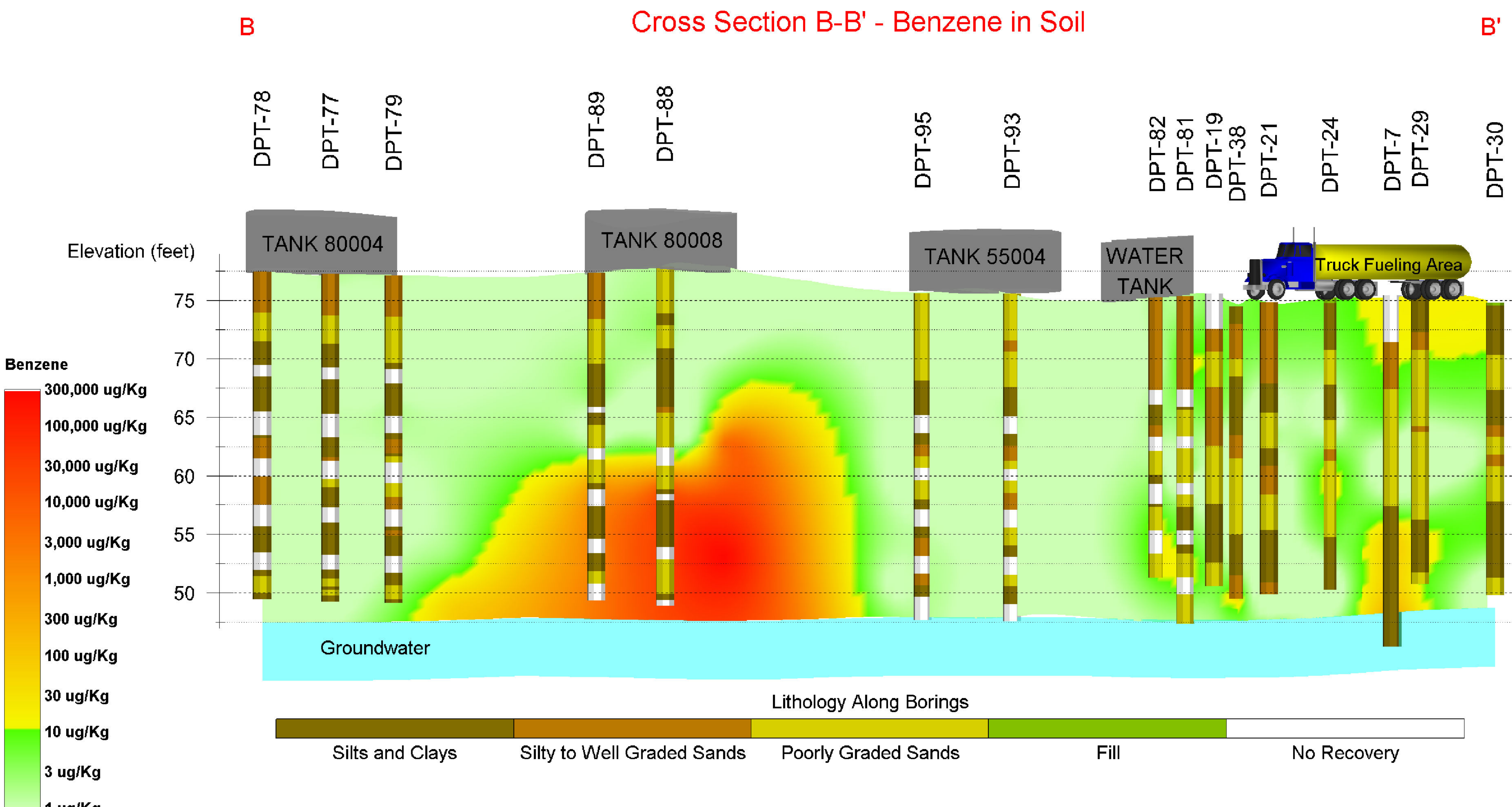


FIGURE 18

LITHOLOGIC CROSS SECTION B-B' WITH BENZENE PLUMES

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

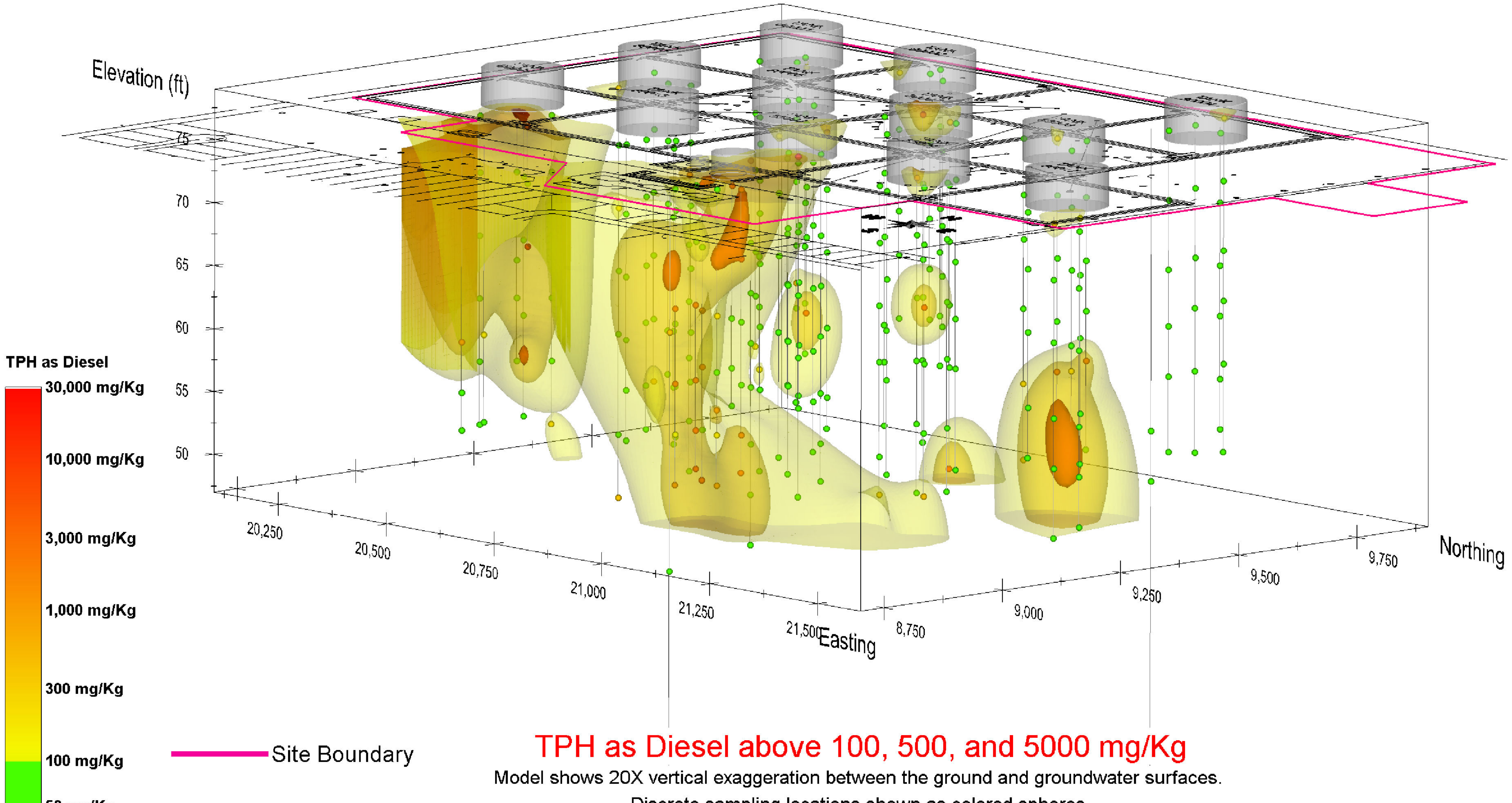
PARSONS

Pasadena, California

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_Fig-18_Norwalk_SO_B-B'_BZ.mxd lxh 9/6/2012

APPENDIX A

CONTAMINANTS OF CONCERN PLUME DISTRIBUTION



TPH as Diesel above 100, 500, and 5000 mg/Kg

Model shows 20X vertical exaggeration between the ground and groundwater surfaces.

Discrete sampling locations shown as colored spheres.

COC impacts to soil clipped vertically at the groundwater surface and horizontally at the site boundary.

FIGURE A-1

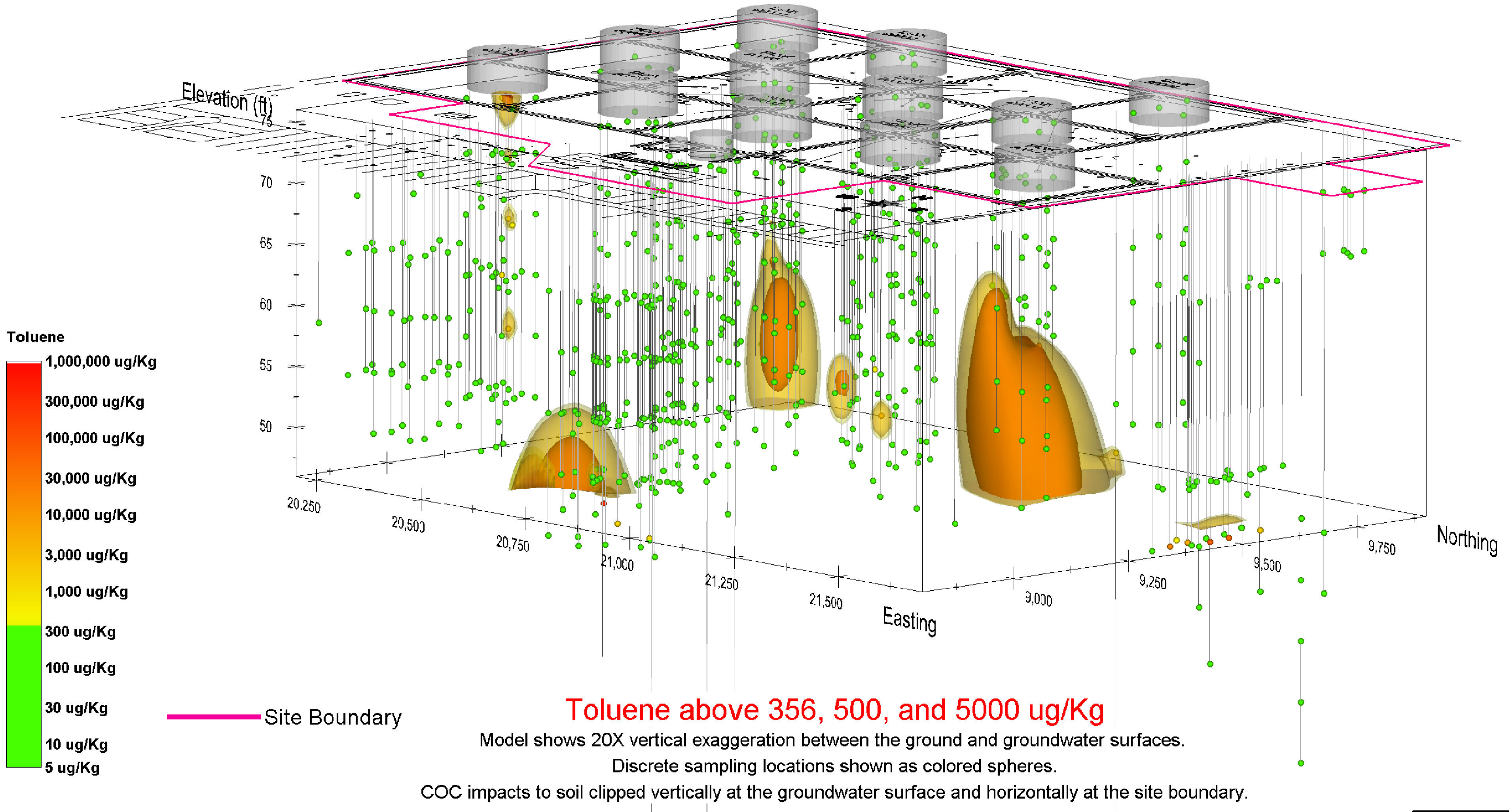
TPH AS DIESEL IN SOIL
THREE DIMENSIONAL VIEW

DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA

PARSONS

Pasadena, California

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigA-1_Norwalk_SO_3D_TPH-d.mxd lxh 9/6/2012



Toluene above 356, 500, and 5000 ug/Kg

Model shows 20X vertical exaggeration between the ground and groundwater surfaces.

Discrete sampling locations shown as colored spheres.

COC impacts to soil clipped vertically at the groundwater surface and horizontally at the site boundary.

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigA-2_Norwalk_SO_3D_Toluene.mxd lxh 9/6/2012

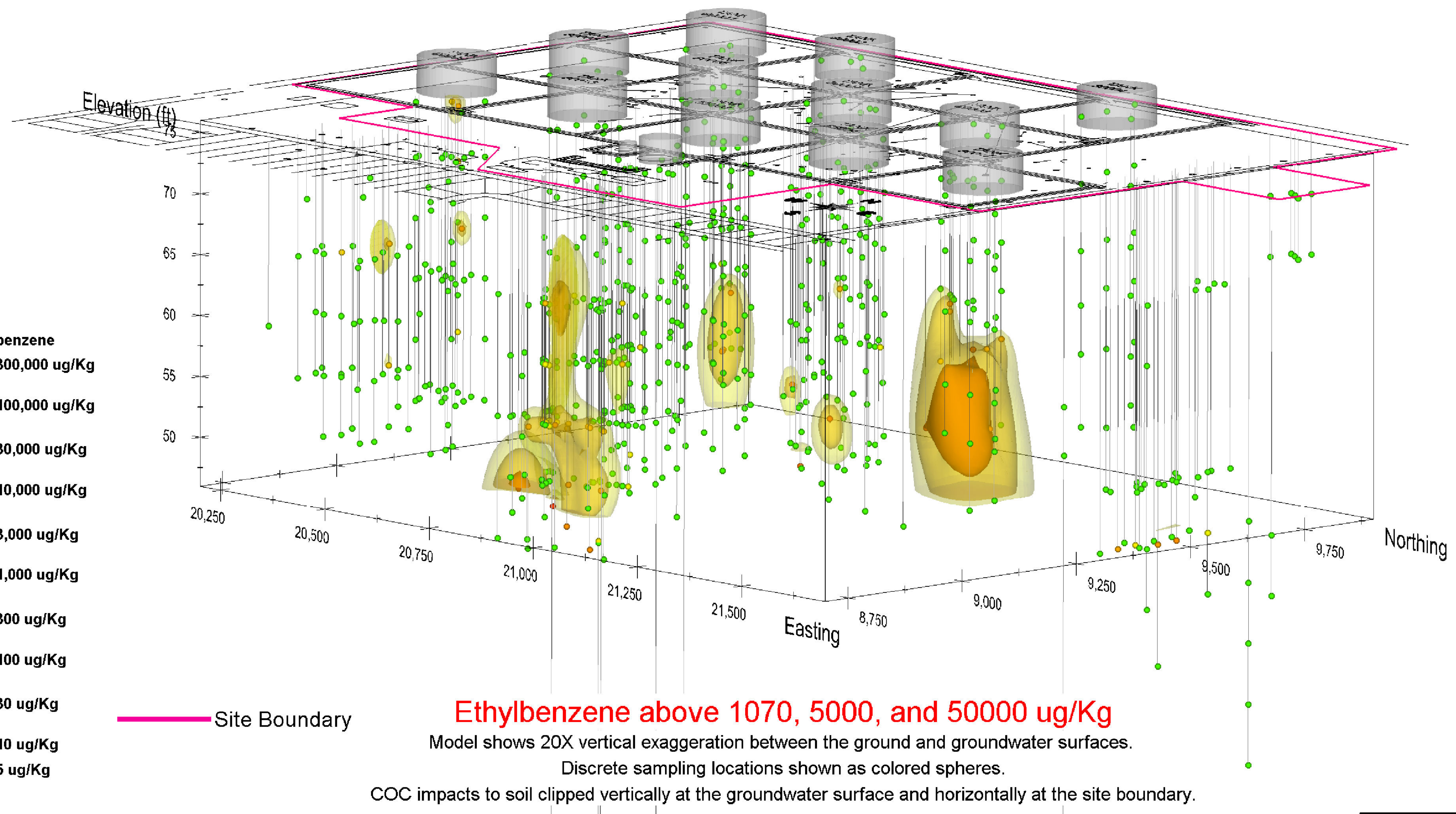
FIGURE A-2

TOLUENE IN SOIL
THREE DIMENSIONAL VIEW

DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA

PARSONS

Pasadena, California



Ethylbenzene

300,000 ug/Kg
100,000 ug/Kg
30,000 ug/Kg
10,000 ug/Kg
3,000 ug/Kg
1,000 ug/Kg
300 ug/Kg
100 ug/Kg
30 ug/Kg
10 ug/Kg
5 ug/Kg

Site Boundary

Ethylbenzene above 1070, 5000, and 50000 ug/Kg

Model shows 20X vertical exaggeration between the ground and groundwater surfaces.
Discrete sampling locations shown as colored spheres.
COC impacts to soil clipped vertically at the groundwater surface and horizontally at the site boundary.

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigA-3_Norwalk_SO_3D_EBZ.mxd lxh 9/6/2012

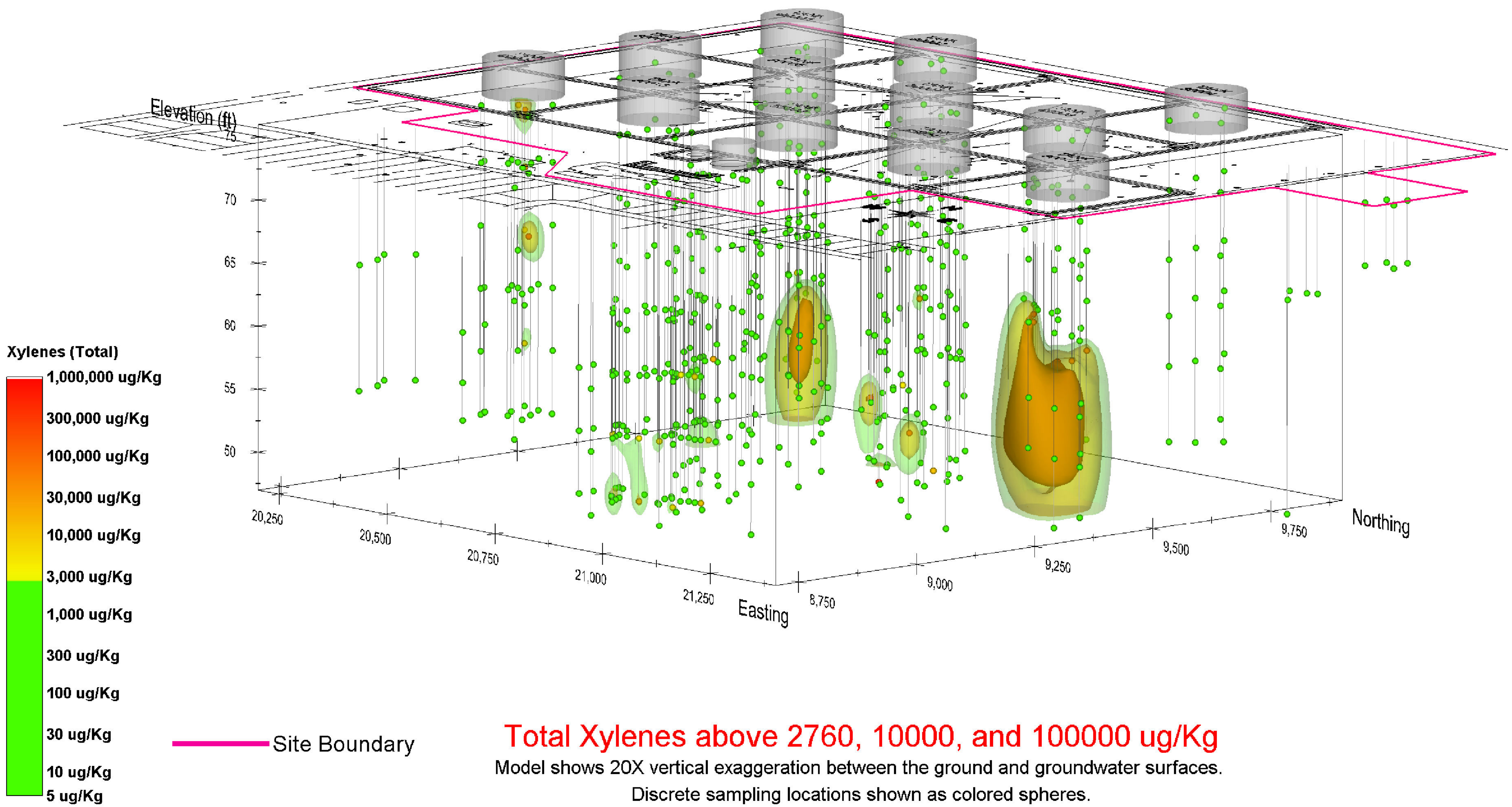
FIGURE A-3

ETHYLBENZENE IN SOIL
THREE DIMENSIONAL VIEW

DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA

PARSONS

Pasadena, California



Total Xylenes above 2760, 10000, and 100000 ug/Kg

Model shows 20X vertical exaggeration between the ground and groundwater surfaces.

Discrete sampling locations shown as colored spheres.

COC impacts to soil clipped vertically at the groundwater surface and horizontally at the site boundary.

FIGURE A-4

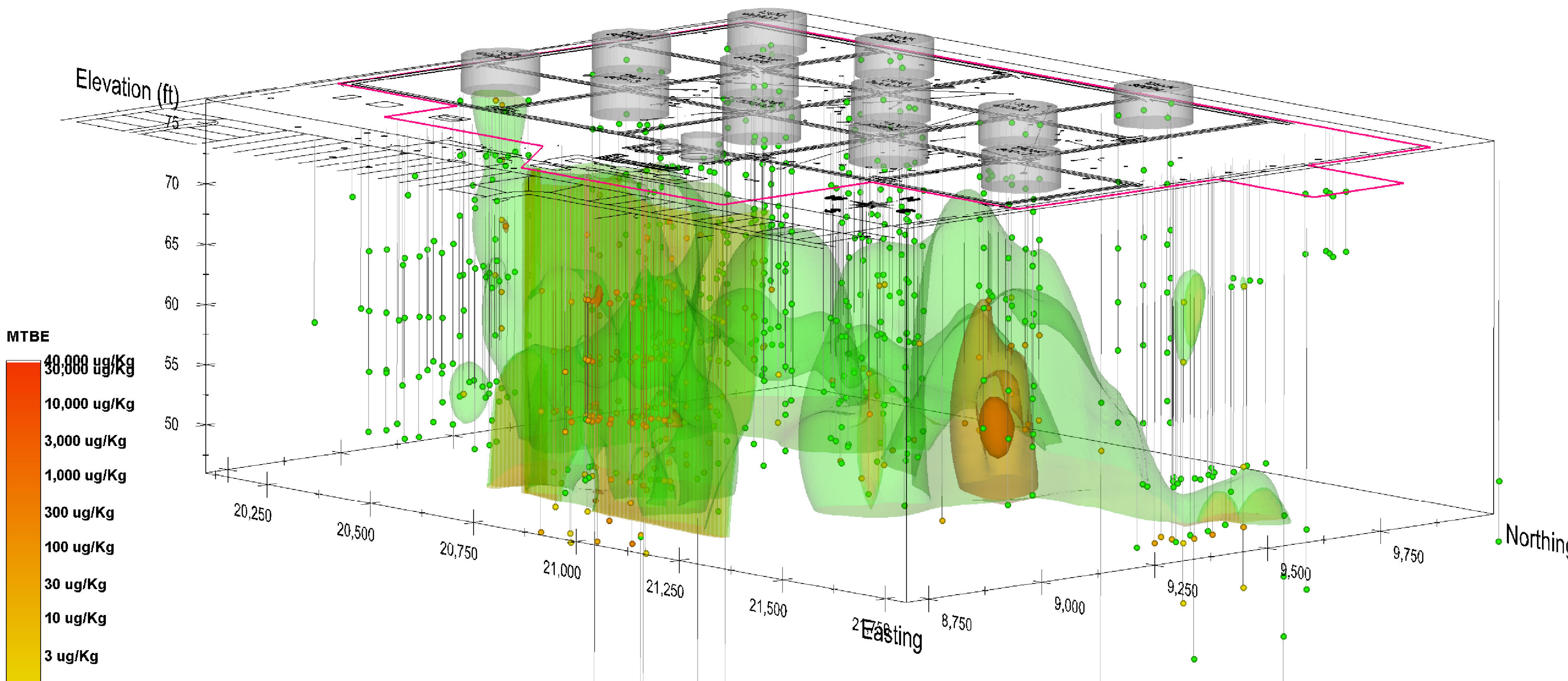
TOTAL XYLENES IN SOIL
THREE DIMENSIONAL VIEW

DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA

PARSONS

Pasadena, California

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigA-4_Norwalk_SO_3D_TXYL.mxd lxh 9/6/2012



MTBE above 0.697, 100, and 10000 ug/Kg

Model shows 20X vertical exaggeration between the ground and groundwater surfaces.

Discrete sampling locations shown as colored spheres.

COC impacts to soil clipped vertically at the groundwater surface and horizontally at the site boundary.

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigA-5_Norwalk_SO_3D_MTBE.mxd lxh 9/6/2012

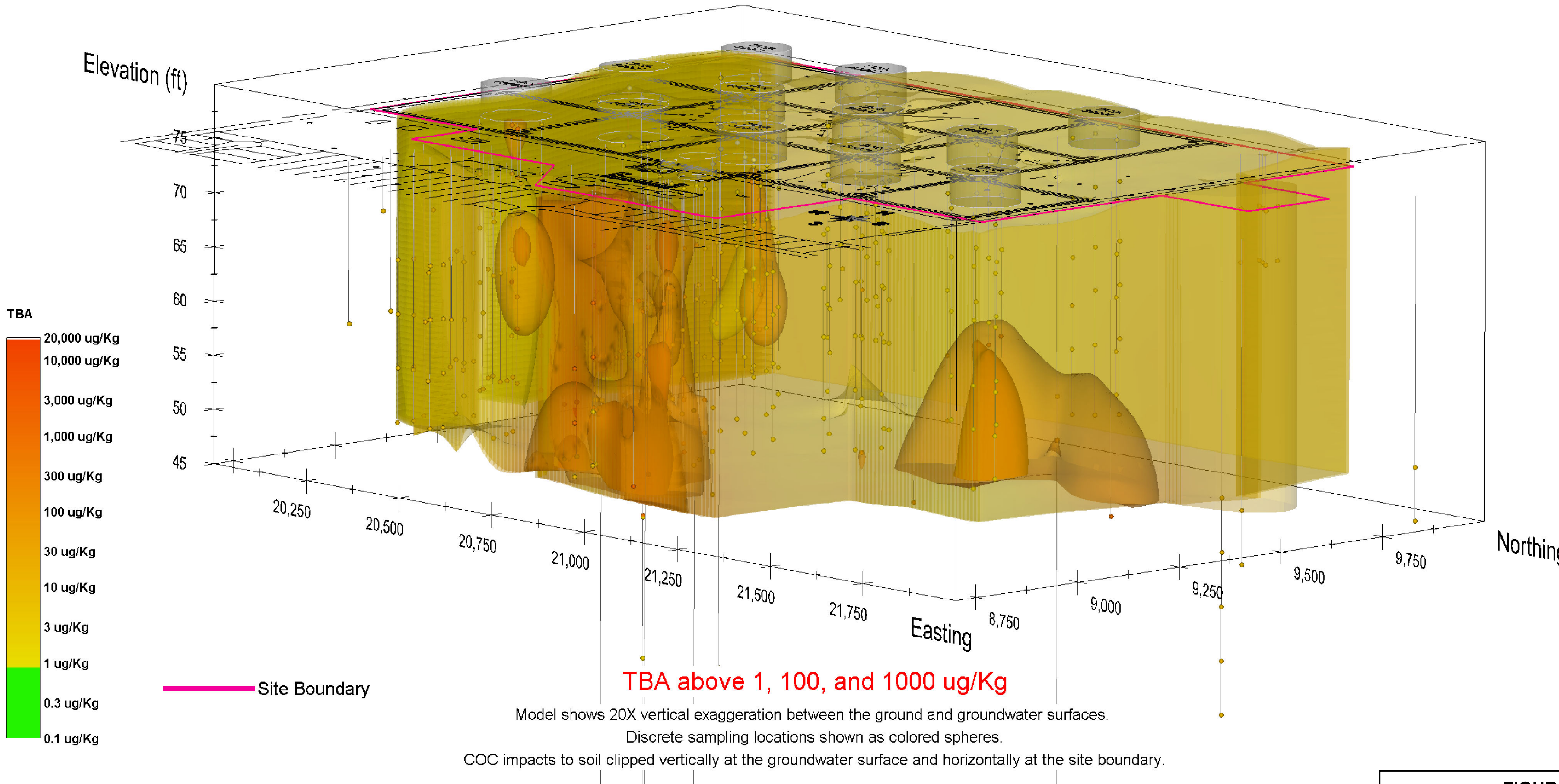
FIGURE A-5

MTBE IN SOIL
THREE DIMENSIONAL VIEW

DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA

PARSONS

Pasadena, California



TBA above 1, 100, and 1000 ug/Kg

Model shows 20X vertical exaggeration between the ground and groundwater surfaces.
Discrete sampling locations shown as colored spheres.
COC impacts to soil clipped vertically at the groundwater surface and horizontally at the site boundary.

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigA-6_Norwalk_SO_3D_TBA.mxd lxh 9/6/2012

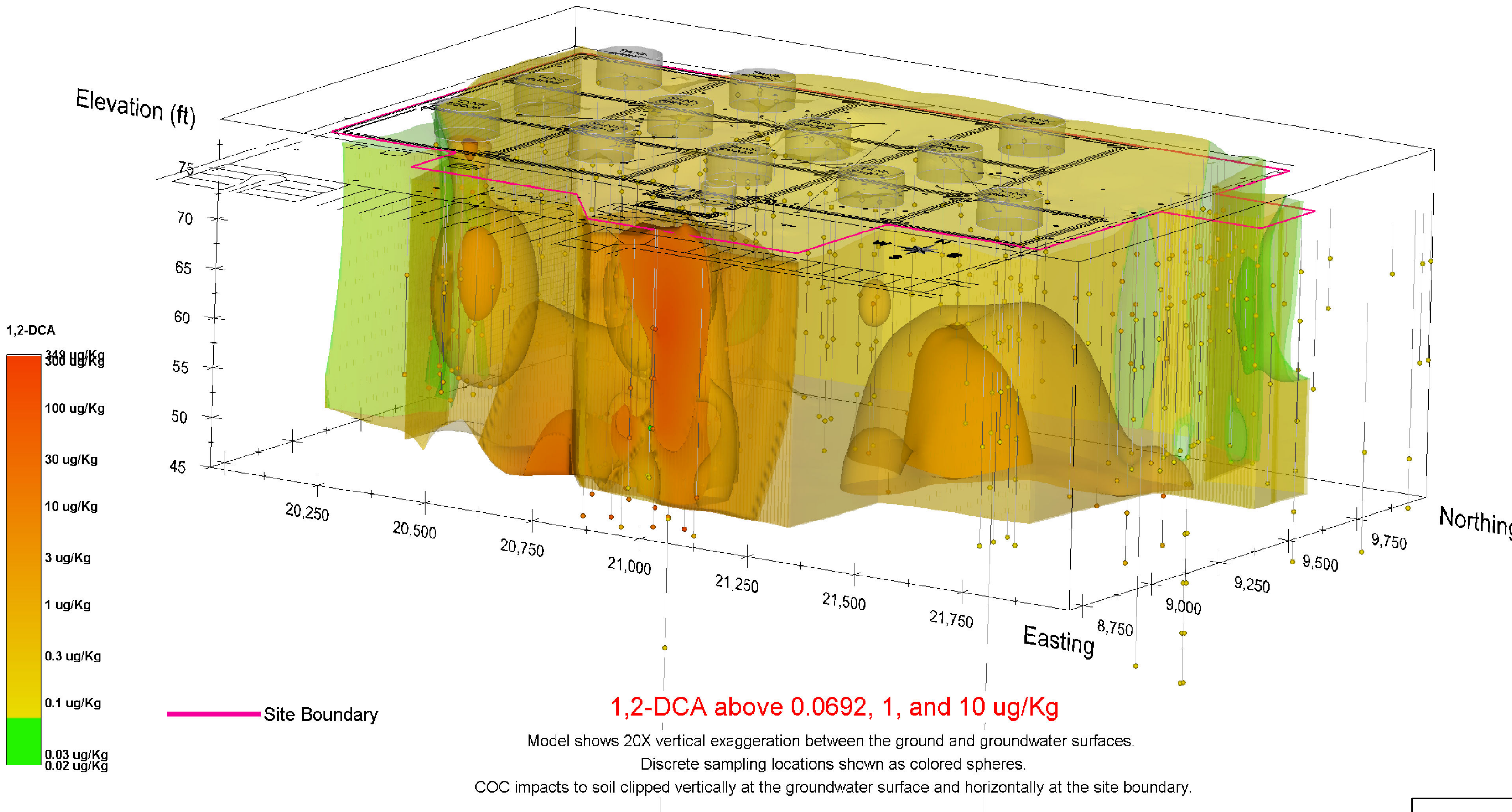
FIGURE A-6

TBA IN SOIL
THREE DIMENSIONAL VIEW

DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA

PARSONS

Pasadena, California



1,2-DCA above 0.0692, 1, and 10 ug/Kg

Model shows 20X vertical exaggeration between the ground and groundwater surfaces.
Discrete sampling locations shown as colored spheres.
COC impacts to soil clipped vertically at the groundwater surface and horizontally at the site boundary.

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigA-7_Norwalk_SO_3D_12DCA.mxd lxh 9/6/2012

FIGURE A-7

**1,2-DICHLOROETHANE IN SOIL
THREE DIMENSIONAL VIEW**

**DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA**

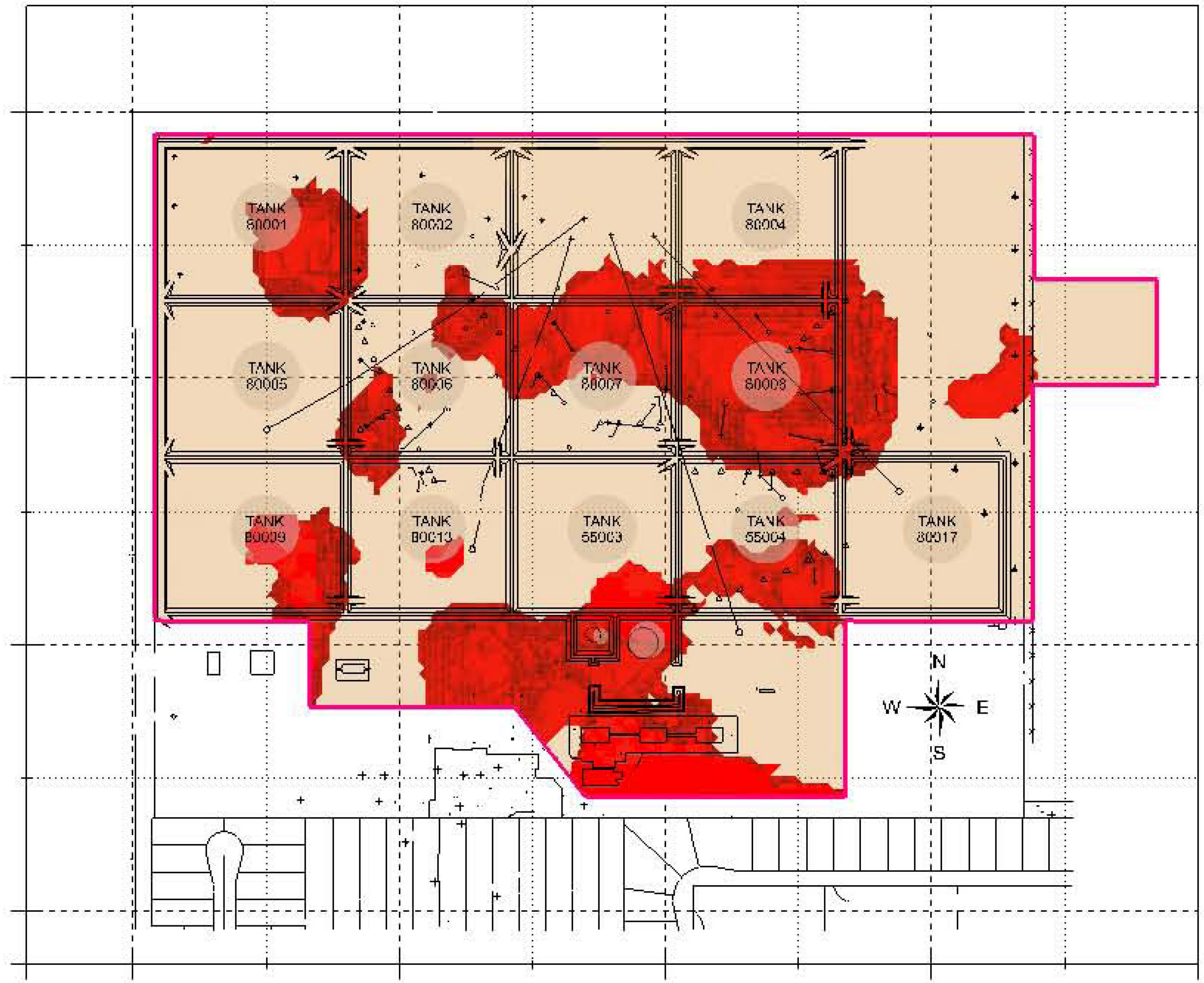
PARSONS

Pasadena, California

APPENDIX B

VADOSE ZONE IMPACTED SOIL VOLUME BY DEPTH

DESC Norwalk - Norwalk, CA
Vadose Zone Soil Investigation



Soil volume of unioned plumes (TPH-g and TPH-jet fuel > 100 mg/kg and bezene > 11 ug/kg) = 177,167 CYs

COC impacts to soil clipped vertically at groundwater surface and horizontally at site boundary
Model shows 10X vertical exaggeration between ground and groundwater surfaces

Site Boundary

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigB-1_Norwalk_SO_AboveGoal.mxd lxh 9/19/2012

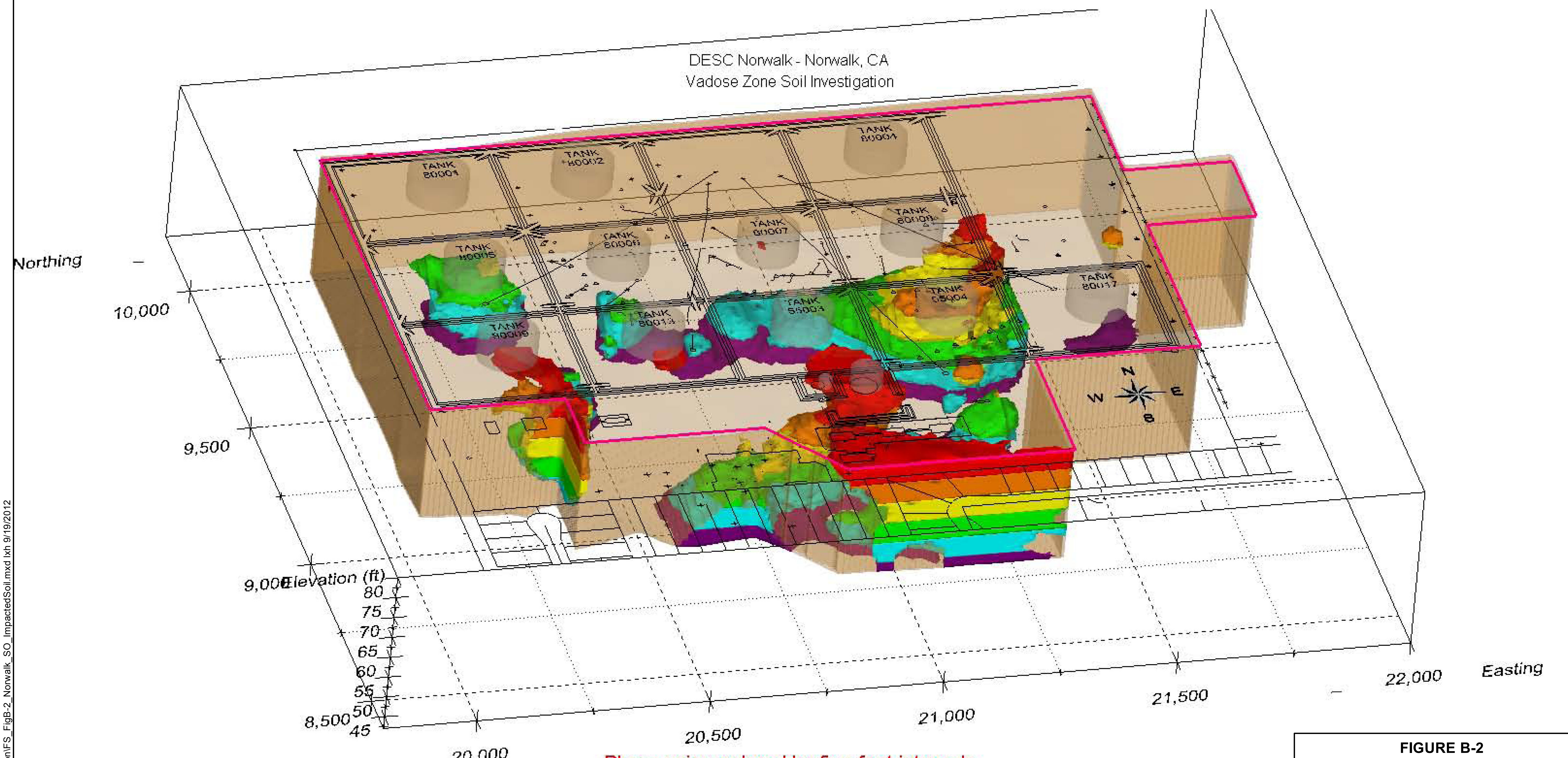
FIGURE B-1

SOIL VOLUME OF TPH AS JET FUEL, TPH AS GASOLINE, AND BENZENE ABOVE CLEANUP GOALS

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California



Plume union colored by five foot intervals

COC impacts to soil clipped vertically at groundwater surface and horizontally at site boundary
Model shows 10X vertical exaggeration between ground and groundwater surfaces

Site Boundary

FIGURE B-2

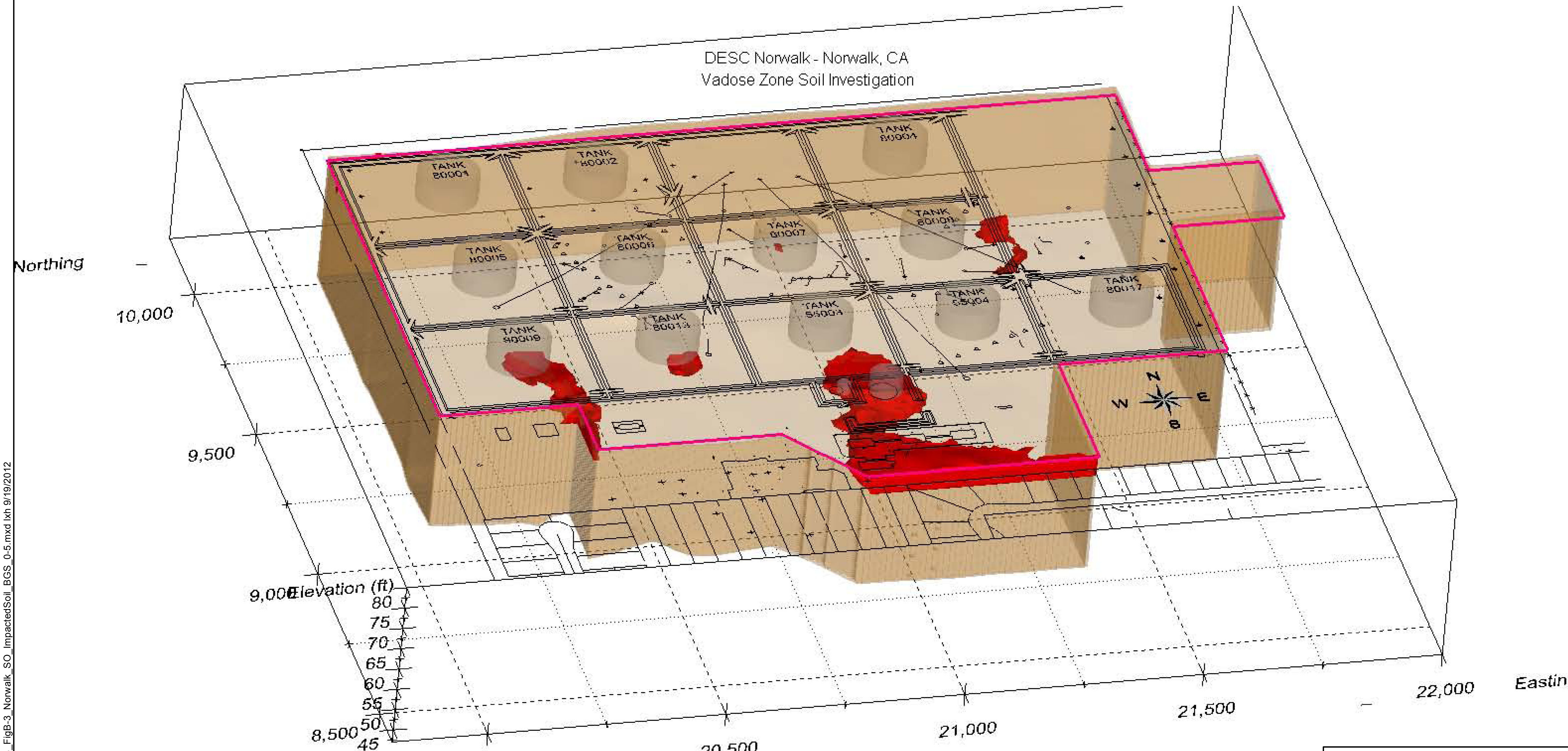
OVERALL IMPACTED SOIL S HOWING 5-FOOT DEPTH INTERVALS

DEFENSE FUEL SUPPORT POINT
NORWALK, CALIFORNIA

PARSONS

Pasadena, California

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigB-2_Norwalk_SO_ImpactedSoil.mxd lxh 9/19/2012



6.6% of unioned plume 0-5 feet BGS

COC impacts to soil clipped vertically at groundwater surface and horizontally at site boundary
Model shows 10X vertical exaggeration between ground and groundwater surfaces

Site Boundary

FIGURE B-3

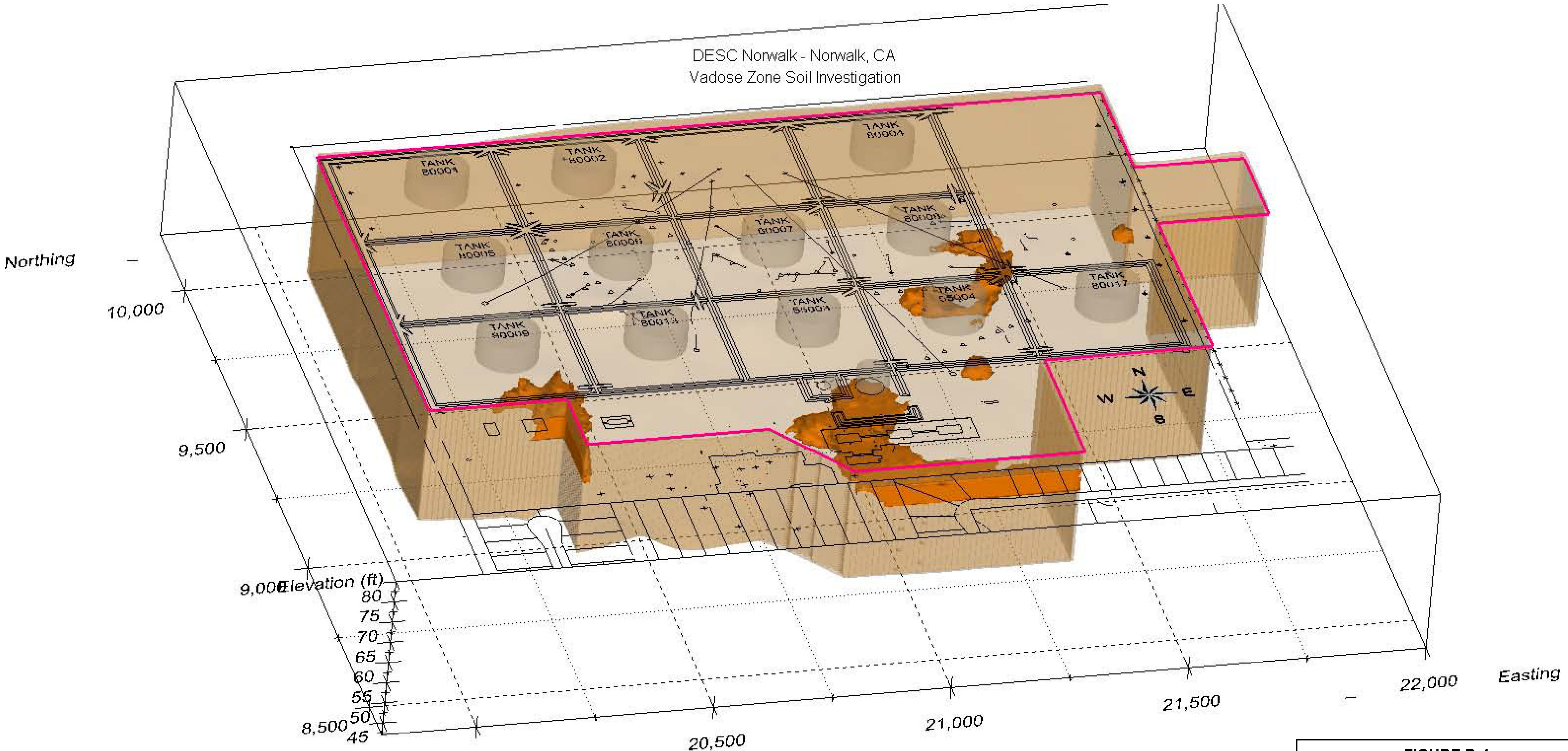
IMPACTED SOIL FROM 0 TO 5 FEET BELOW GROUND SURFACE

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigB-3_Norwalk_SO_ImpactedSoil_BGS_0-5.mxd lxh 9/19/2012



8.7% of unioned plume 5-10 feet BGS

COC impacts to soil clipped vertically at groundwater surface and horizontally at site boundary
Model shows 10X vertical exaggeration between ground and groundwater surfaces

Site Boundary

FIGURE B-4

IMPACTED SOIL FROM 5 TO 10 FEET BELOW GROUND SURFACE

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigB-4_Norwalk_SO_ImpactedSoil_BGS_5-10.mxd lxh 9/19/2012

10.8% of unioned plume 10-15 feet BGS

COC impacts to soil clipped vertically at groundwater surface and horizontally at site boundary
Model shows 10X vertical exaggeration between ground and groundwater surfaces

Site Boundary

FIGURE B-5

IMPACTED SOIL FROM 10 TO 15 FEET BELOW GROUND SURFACE

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigB-5_Norwalk_SO_ImpactedSoil_BGS_10-15.mxd lxh 9/19/2012

19.0% of unioned plume 15-20 feet BGS

COC impacts to soil clipped vertically at groundwater surface and horizontally at site boundary
Model shows 10X vertical exaggeration between ground and groundwater surfaces

Site Boundary

FIGURE B-6

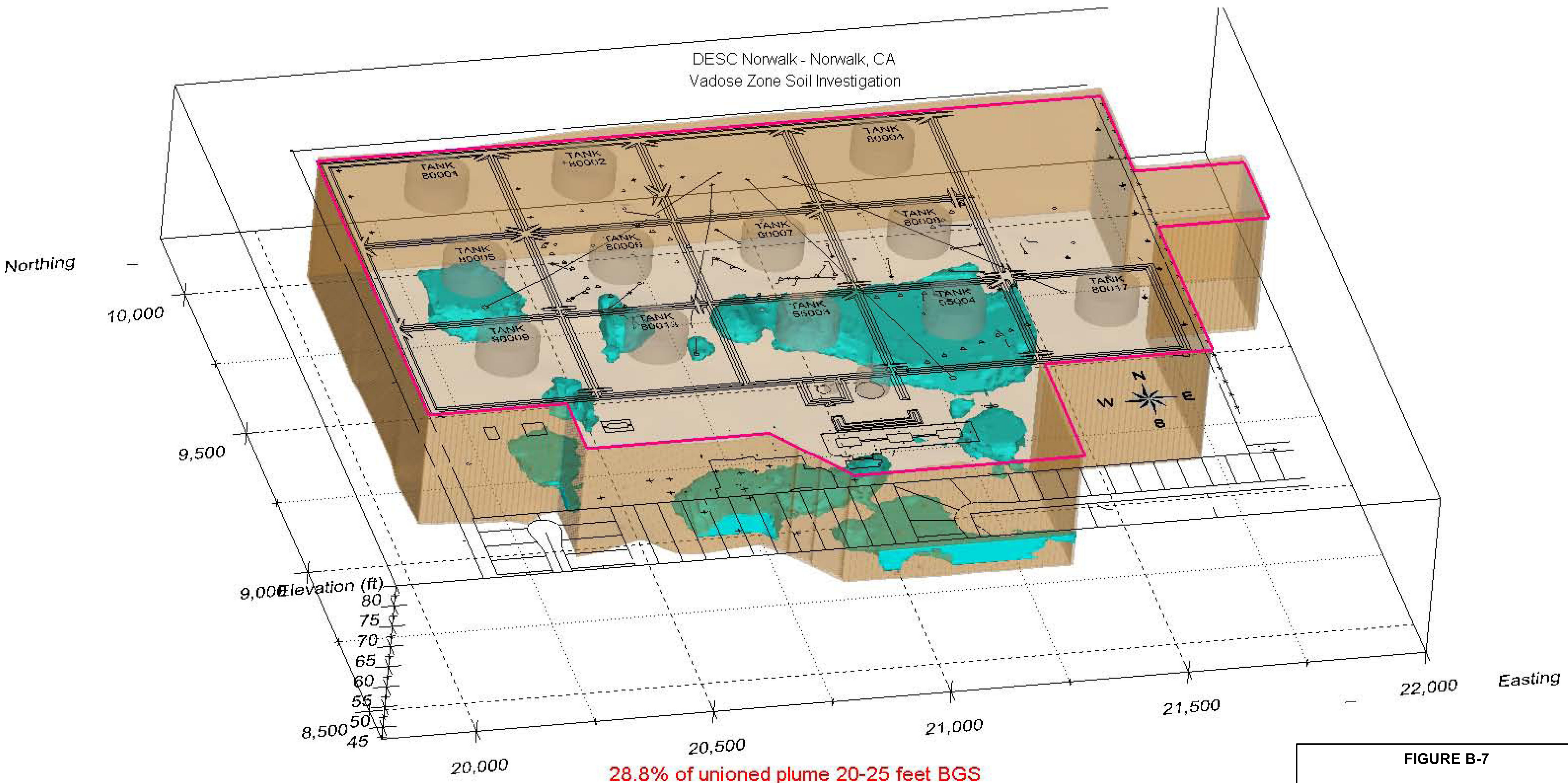
IMPACTED SOIL FROM 15 TO 20 FEET BELOW GROUND SURFACE

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigB-6_Norwalk_SO_ImpactedSoil_BGS_15-20.mxd lxh 9/19/2012



28.8% of unioned plume 20-25 feet BGS

COC impacts to soil clipped vertically at groundwater surface and horizontally at site boundary
Model shows 10X vertical exaggeration between ground and groundwater surfaces

Site Boundary

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigB-7_Norwalk_SO_ImpactedSoil_BGS_20-25.mxd lxh 9/19/2012

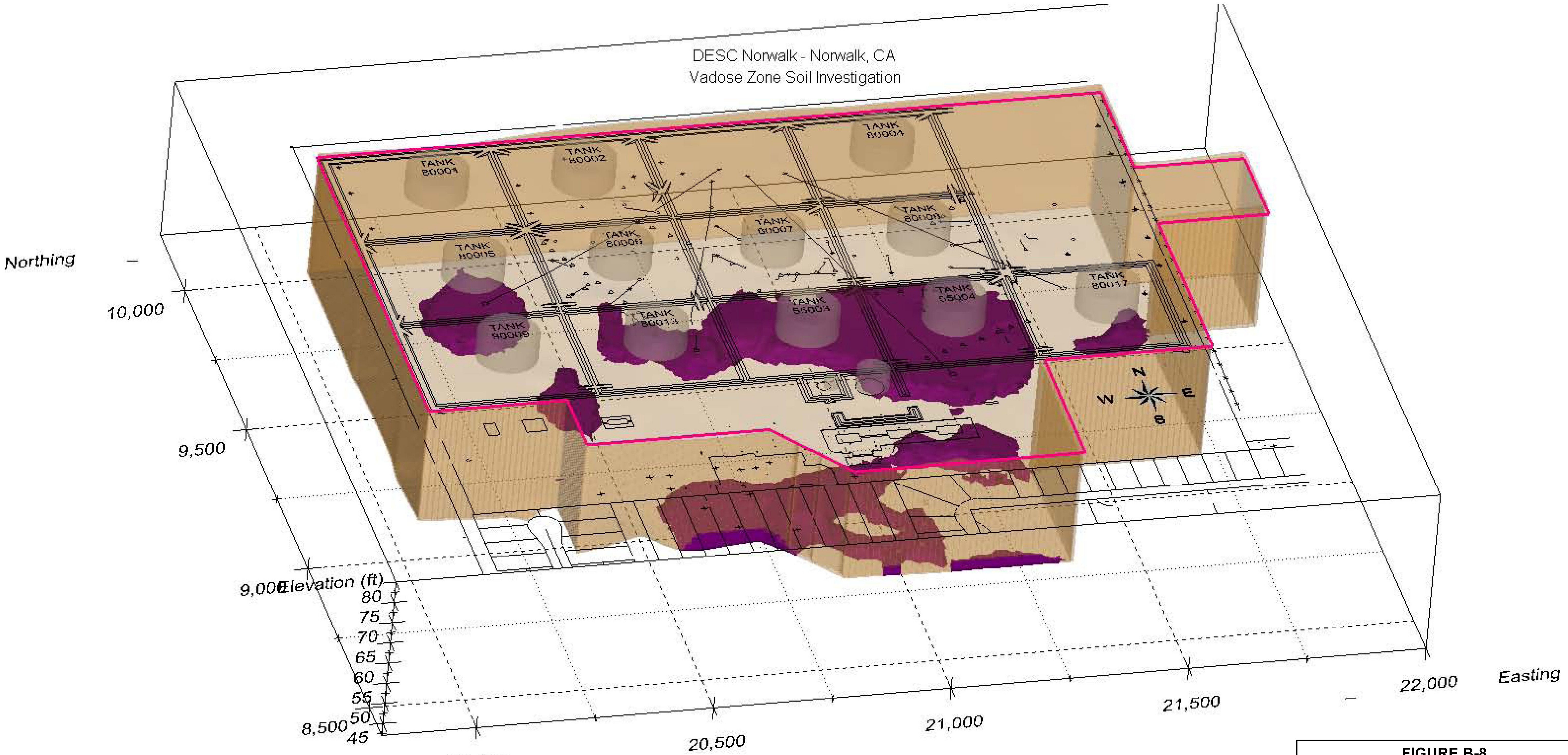
FIGURE B-7

IMPACTED SOIL FROM 20 TO 25 FEET BELOW GROUND SURFACE

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California



25.6% of unioned plume between 25 feet BGS and the groundwater surface

COC impacts to soil clipped vertically at groundwater surface and horizontally at site boundary
Model shows 10X vertical exaggeration between ground and groundwater surfaces

Site Boundary

FIGURE B-8

IMPACTED SOIL FROM 25 FEET BELOW GROUND SURFACE TO THE GROUNDWATER SURFACE

DEFENSE FUEL SUPPORT POINT NORWALK, CALIFORNIA

PARSONS

Pasadena, California

S:\ES\Remed\DFSP\Norwalk\GIS\Remediation\FS_FigB-8_Norwalk_SO_ImpactedSoil_BGS_25-GW.mxd lxh 9/19/2012

APPENDIX C

ALTERNATIVES COSTS BREAKDOWN

TABLE 5
REMEDIAL ALTERNATIVES COST SUMMARY

DFSP NORWALK SITE, NORWALK CALIFORNIA

Alternative	Description	Capital Cost ($)	Total Operation and Maintenance Cost ($)	Total Periodic Cost ($)	Total Cost ($)
1	Institutional Controls and Monitored Natural Attenuation	$131,000	$402,000	$309,000	$842,000
2	Institutional Controls, Ozonation and Monitored Natural Attenuation, Expanded SVE-Bioventing	$6,430,000	$4,048,000	$685,000	$11,163,000
3	Institutional Controls, Ozonation and Monitored Natual Attenuation, Soil Excavation to 15 Feet, Expanded SVE-Bioventing	$19,205,000 [/a]	$3,919,000	$685,000	$23,809,000
4	Institutional Control, Ozonation and Monitored Natural Attenuation, Soil Excavation to 20 Feet, Expanded SVE-Bioventing	$26,911,000 [/b]	$3,889,000	$685,000	$31,485,000
5	Institutional Controls, Monitored Natural Attenuation, Excavate To Top of Groundwater	$54,455,000	$382,000	$289,000	$55,126,000

Footnotes:

[/a] Costs for only soil excavation to 15 feet is estimated at $12,496,000 (which includes 20% labor for construction oversight and management and 25% implementation contingency.

[/b] Costs for only soil excavation to 20 feet is estimated at $20,179,000 (which includes 20% labor for construction oversight and management and 25% implementation contingency.

General Notes:

1. Costs are based on a 10 year project life. Excavation is assumed to take approx 3 to 6 months for Alternative 2, 6 to 9 months for Alternatives 3 and 4, and 9 to 12 months for Alternative 5. Mass reduction via ozonation and BV/SVE is expected to be completed in the first two to three years following excavation. Monitoring will be conducted from years 3 to 10.
2. No present value costs have been calculated. Electrical costs for system operation have been included. A 25% contigency has been included for design and construction for the excavation and BV/SVE implementation.

TABLE C1
ALTERNATIVE 1
Institutional Controls / Monitored Natural Attenuation

DFSP NORWALK SITE, NORWALK CALIFORNIA

Item	Units		Unit Cost	Extended
Capital				
Implementation of Land Use Controls (Attachment 1A)	1	LS	$ 40,000	$ 40,000
Long Term Monitoring Program to Monitor Groundwater Plume and Vapor Intrusion on South Side of Property.				
Installation of GW Points (Attachment 1B)	15	each	$ 2,400	$ 36,000
Installation of Vapor Points (Attachment 1C)	10	each	$ 1,800	$ 18,000
Construction Oversight	20%			$ 10,800
			Sub-Total =	$ 104,800
Contingency (design + construction)	25%			$ 26,200
			Capital Total =	$ 131,000
Annual Operation and Maintenance				
Land Use Controls	1	each	$ 3,200	$ 3,200
Contingency (design + construction)	25%			$ 800
			Annual Total =	$ 4,000
Years 0 to 5				
GW Monitoring (Attachment 1D)	25	point	$ 1,100	$ 27,500
Vapor Monitoring (Attachment 1E)	10	point	$ 600	$ 6,000
Reporting (Attachment 1F)	1	each	$ 24,400	$ 24,400
Contingency (design + construction)	25%			$ 14,500
			Annual Total (Years 0 to 5) =	$ 72,400
Periodic				
5-Year Review (Attachment 1G)	1	each	$ 41,500	$ 41,500
Contingency (design + construction)	25%			$ 10,400
			Periodic Total =	$ 51,900
Well Abandonment (Year 5)	10	each	$ 1,600	$ 16,000
Contingency (design + construction)	25%			$ 4,000
			Periodic Total =	$ 20,000
Years 6 to 10 (Every Other Year)				
GW Monitoring (Attachment 1D)	15	point	$ 1,100	$ 16,500
Vapor Monitoring (Attachment 1E)	5	point	$ 600	$ 3,000
Reporting (Attachment 1F)	1	each	$ 24,400	$ 24,400
Contingency (design + construction)	25%			$ 11,000
			Periodic Total =	$ 54,900
Well Abandonment (Year 10)	10	each	$ 1,600	$ 16,000
Contingency (design + construction)	25%			$ 4,000
			Periodic Total =	$ 20,000

TABLE C2
ALTERNATIVE 1 COSTS BY YEAR
Institutional Controls / Monitored Natural Attenuation

DFSP NORWALK SITE, NORWALK CALIFORNIA

Year	Capital Cost ($)	Annual O&M Costs ($)	Periodic Costs ($)	Total Cost ($)
0	$131,000	$0	$0	$131,000
1	$0	$76,400	$0	$76,400
2	$0	$76,400	$0	$76,400
3	$0	$76,400	$0	$76,400
4	$0	$76,400	$0	$76,400
5	$0	$76,400	$71,900	$148,300
6	$0	$4,000	$54,900	$58,900
7	$0	$4,000	$0	$4,000
8	$0	$4,000	$54,900	$58,900
9	$0	$4,000	$0	$4,000
10	$0	$4,000	$126,800	$130,800
Total	$131,000	$402,000	$308,500	$841,500

TABLE C3
ALTERNATIVE 1
ATTACHMENTS

DFSP NORWALK SITE, NORWALK CALIFORNIA

Attachment 1A - Implementation of Land Use Controls						
Subtask Description, Labor	**Quant.**	**Unit**		**Unit Cost**		**Cost**
Incorporate Restrictions into General Plan	1	LS	$	10,000.00	$	10,000.00
Delineate Area onto Master Planning Maps	1	LS	$	10,000.00	$	10,000.00
Update GIS Database with LUCs	1	LS	$	10,000.00	$	10,000.00
Communicate Land Use Restrictions	1	LS	$	10,000.00	$	10,000.00
				Total:	**$**	**40,000.00**

Attachment 1B - Installation of Groundwater Point						
Construction	**Quant.**	**Unit**		**Unit Cost**		**Cost**
GW Well Installation (2")	35	ft	$	15.00	$	525.00
Well Vault	1	each	$	125.00	$	125.00
IDW Drums	1	drum	$	115.00	$	115.00
Soil Disposal (HC Contaminated)	1	drum	$	275.00	$	275.00
Well Development	0.5	each	$	400.00	$	200.00
Water Disposal	0.5	drum	$	65.00	$	32.50
				Location Markup (0%):	$	-
Labor						
Geologist, Mid	12	hr	$	90.00	$	1,080.00
				Total:	**$**	**2,352.50**

Attachment 1C - Installation of Vapor Monitoring Point						`
Construction	**Quant.**	**Unit**		**Unit Cost**		**Cost**
Vapor Well Installation (1")	28	ft	$	12.00	$	336.00
Well Vault	1	each	$	115.00	$	115.00
IDW Drums	0.25	drums	$	115.00	$	28.75
Soil Disposal (HC Contaminated)	0.25	drum	$	275.00	$	68.75
				Location Markup (0%):	$	-
Labor						
Geologist, Mid	14	hr	$	90.00	$	1,260.00
				Total:	**$**	**1,808.50**

TABLE C3
ALTERNATIVE 1
ATTACHMENTS

DFSP NORWALK SITE, NORWALK CALIFORNIA

Attachment 1D - Groundwater Monitoring, Sample Collection and Analysis							
Equipment	**Quant.**	**Unit**		**Unit Cost**			**Cost**
Groundwater Micropurge	1	well	$	200.00		$	200.00
VOC Analysis (SW8260B)	1	sample	$	123.00		$	123.00
VOC Analysis (QA/QC)	0.2	sample	$	123.00		$	24.60
TPH-gasoline Analysis	1	sample	$	63.00		$	63.00
TPH-gasoline Analysis (QA/QC)	0.2	sample	$	63.00		$	12.60
TPH-Jet Fuel Analysis	1	sample	$	63.00		$	63.00
TPH-Jet Fuel Analysis (QA/QC)	0.2	sample	$	63.00		$	12.60
MNA parameters	1	sample	$	110.00		$	110.00
PPE	0.05	lump sum	$	340.00		$	17.00
Hach Equipment	1	lump sum	$	30.00		$	30.00
Sample Shipping	1.2	sample	$	8.00		$	9.60
					Location Markup (0%):	$	-
Labor							
Env. Engineer, Mid	2.5	hr	$	100.00		$	250.00
Engineering Tech., Senior	2.5	hr	$	75.00		$	187.50
					Total:	**$**	**1,102.90**

Attachment 1E - Vapor Monitoring, Sample Collection and Analysis							
Equipment Installation	**Quant.**	**Unit**		**Unit Cost**			**Cost**
VOC Analysis (TO-15)	1	sample	$	170.00		$	170.00
VOC Analysis (QA/QC)	0.2	sample	$	170.00		$	34.00
Tedlar Bag	1	each	$	12.00		$	12.00
Teflon Tubing	2	ft	$	3.40		$	6.80
Multi Gas Meter	0.2	day	$	80.00		$	16.00
Sample Pump	0.2	day	$	70.00		$	14.00
PPE	0.1	lump sum	$	340.00		$	34.00
Sample Shipping	1.2	sample	$	10.00		$	12.00
					Location Markup (0%):	$	-
Labor							
Env. Engineer, Mid	1.5	hr	$	100.00		$	150.00
Engineering Tech., Senior	1.5	hr	$	75.00		$	112.50
					Total:	**$**	**561.30**

TABLE C3
ALTERNATIVE 1
ATTACHMENTS

DFSP NORWALK SITE, NORWALK CALIFORNIA

Attachment 1F - Reporting

Labor	Quant.	Unit	Unit Cost		Cost
Findings Report	2	ea	$ 3,000.00		$ 6,000.00
Project Manager, Senior	18	hr	$ 150.00		$ 2,700.00
Env. Engineer, Senior	50	hr	$ 130.00		$ 6,500.00
Env. Engineer, Mid	40	hr	$ 100.00		$ 4,000.00
Geologist, Mid	100	hr	$ 90.00		$ 9,000.00
Chemist, Senior	18	hr	$ 120.00		$ 2,160.00
				Total:	**$ 24,360.00**

Attachment 1G - 5 Year Review

Labor	Quant.	Unit	Unit Cost		Cost
Project Manager, Senior	50	hr	$ 150.00		$ 7,500.00
Env. Engineer, Senior	150	hr	$ 130.00		$ 19,500.00
Env. Engineer, Mid	80	hr	$ 100.00		$ 8,000.00
Geologist, Mid	30	hr	$ 90.00		$ 2,700.00
Chemist, Senior	32	hr	$ 120.00		$ 3,840.00
				Total:	**$ 41,540.00**

Attachment 1H - Confirmation Soil Sample Collection and Analysis

Equipment	Quant.	Unit	Unit Cost		Cost
Equipment Shipping		day	$ 50.00		$ -
VOC Analysis (SW8260B)	1	sample	$ 123.00		$ 123.00
VOC Analysis (QA/QC)	0.2	sample	$ 170.00		$ 34.00
TPH-gasoline Analysis	1	sample	$ 63.00		$ 63.00
TPH-gasoline Analysis (QA/QC)	0.2	sample	$ 63.00		$ 12.60
TPH-Jet Fuel Analysis	1	sample	$ 63.00		$ 63.00
TPH-Jet Fuel Analysis (QA/QC)	0.2	sample	$ 63.00		$ 12.60
PPE		lump sum	$ 340.00		$ -
				Location Markup (0%):	$ -
Labor					
Env. Engineer, Mid		hr	$ 100.00		$ -
Engineering Tech., Senior		hr	$ 75.00		$ -
				Total:	**$ 308.20**

TABLE C4
ALTERNATIVE 2
Institutional Controls / Ozonation and Monitored Natural Attenuation / Expanded SVE-Bioventing

DFSP NORWALK SITE, NORWALK CALIFORNIA

Item	Units		Unit Cost		Extended	
Capital						
Implementation of Land Use Controls (Attachment 1A)	1	LS	$	40,000	$	40,000
Long Term Monitoring Program to Monitor Groundwater Plume and Vapor Intrusion on South Side of Property.						
Installation of GW Points (Attachment 1B)	15	each	$	2,400	$	36,000
Installation of Vapor Points (Attachment 1C)	30	each	$	1,800	$	54,000
Installation of Remedial System						
Limited Surface Soil Removal and Backfill	1	LS	$	664,800	$	664,800
Installation of Treatment Unit (Attachment 2D)	1	each	$	156,000	$	156,000
Installation of SVE Wells (Attachment 2C)	1	total	$	993,350	$	993,350
Ozone system	1	LS		$3,200,000	$	3,200,000
				Sub-Total =	$	5,144,150
Contingency (design + construction)	25%				$	1,286,000
				Capital Total =	$	6,430,151
Annual Operation and Maintenance						
Land Use Controls	1	each	$	3,200	$	3,200
Contingency (design + construction)	25%				$	800
				Annual Total =	$	4,000
SVE/BV System Operation (3 Yrs)						
Estimated O&M (Attachment 2E)	1	LS	$	84,600	$	84,600
Electricity (100 hp continuous for 3 years)	606,000	kW-hr	$	0.15	$	90,900
GAC Change-Out	1	LS	$	48,000	$	48,000
Maintenance / Repairs (Parts)	1	LS	$	160,000	$	160,000
Subcontracts	1	total	$	250,000	$	250,000
System Monitoring	1	LS	$	78,000	$	78,000
Reporting (Attachment 2A)	10	each	$	24,080	$	240,800
Contingency (design + construction)	25%				$	238,100
				Annual Total (years 1 to 3)=	$	1,190,400
Years 0 to 5						
GW Monitoring (Attachment 1D)	25	point	$	1,100	$	27,500
Vapor Monitoring (Attachment 1E)	30	point	$	600	$	18,000
Reporting (Attachment 1F)	1	each	$	24,400	$	24,400
Contingency (design + construction)	25%				$	17,500
				Annual Total (years 0 to 5)=	$	87,400

TABLE C4
ALTERNATIVE 2
Institutional Controls / Ozonation and Monitored Natural Attenuation / Expanded SVE-Bioventing

DFSP NORWALK SITE, NORWALK CALIFORNIA

Item	Units		Unit Cost		Extended	
Periodic						
5-Year Review (Attachment 1G)	1	each	$	41,500	$	41,500
Contingency (design + construction)	25%	each			$	10,400
			Periodic Total =		$	51,900
System Abandonment (Year 10)	1	LS	$	250,000	$	250,000
Contingency (design + construction)	25%				$	62,500
			Periodic Total =		$	312,500
Well Abandonment (Year 5)	20	each	$	1,600	$	32,000
Contingency (design + construction)	25%				$	8,000
			Periodic Total =		$	40,000
Years 6 to 10 (Every Other Year)						
GW Monitoring (Attachment 1D)	15	point	$	1,100	$	16,500
Vapor Monitoring (Attachment 1E)	20	point	$	600	$	12,000
Reporting (Attachment 1F)	1	each	$	24,400.00	$	24,400
Contingency (design + construction)	25%				$	13,200
			Periodic Total=		$	66,100
Well Abandonment (Year 10)	15	each	$	1,600	$	24,000
Contingency (design + construction)	25%				$	6,000
			Periodic Total =		$	30,000

TABLE C5
ALTERNATIVE 2 COSTS BY YEAR
Institutional Controls / Ozonation and Monitored Natural Attenuation / Expanded SVE-Bioventing
DFSP NORWALK SITE, NORWALK CALIFORNIA

Year	Capital Cost ($)	Annual O&M Costs ($)	Periodic Costs ($)	Total Cost ($)
0	$6,430,151	$0	$0	$6,430,151
1	$0	$ 1,281,800	$0	$1,281,800
2	$0	$1,281,800	$0	$1,281,800
3	$0	$1,281,800	$0	$1,281,800
4	$0	$ 91,400	$0	$91,400
5	$0	$ 91,400	$91,900	$183,300
6	$0	$4,000	$66,100	$70,100
7	$0	$4,000	$0	$4,000
8	$0	$4,000	$66,100	$70,100
9	$0	$4,000	$0	$4,000
10	$0	$4,000	$460,500	$464,500
Total	$6,430,200	$4,048,200	$684,600	$11,163,000

TABLE C6
ALTERNATIVE 2
ATTACHMENTS

DFSP NORWALK SITE, NORWALK CALIFORNIA

Attachment 2A - Annual Reporting						
Labor	**Quant.**	**Unit**		**Unit Cost**		**Cost**
Findings Report	2	ea	$	3,000.00	$	6,000.00
Engineering Tech., Senior	24	hr	$	75.00	$	1,800.00
Env. Engineer, Mid	80	hr	$	100.00	$	8,000.00
Env. Engineer, Senior	36	hr	$	130.00	$	4,680.00
Project Manager, Senior	24	hr	$	150.00	$	3,600.00
				Total:	**$**	**24,080.00**

Attachment 2B - Remove Top 2 Feet Soil, Backfill, Place Topsoil, and Hydroseed						
Construction	**Quant.**	**Unit**		**Unit Cost**		**Cost**
Excavate Surface Soil (2 ft)	4680	CY	$	12.43	$	58,172.40
Transport Soil to Thermal Desorber	4680	CY	$	25.00	$	117,000.00
Treat Soil at Thermal Desorber	4680	CY	$	35.00	$	163,800.00
Transport Backfill to Site	4212	CY	$	25.00	$	105,300.00
Backfill and Compact Soil	4212	CY	$	20.00	$	84,240.00
Transport Topsoil to Site	1404	CY	$	25.00	$	35,100.00
Place Topsoil	1404	CY	$	32.10	$	45,068.40
Hydroseed Disturbed Area	63	MSF	$	52.52	$	3,319.26
Dust Control	1	LS	$	52,800.00	$	52,800.00
				Location Markup (0%):	$	-
				Total:	**$**	**664,800.06**

Attachment 2C - Vertical SVE Wells						
Construction	**Quant.**	**Unit**		**Unit Cost**		**Cost**
Vertical SVE Wells (to 30 Ft)	4592	ft	$	15.00	$	68,880.00
Valve Pits	17	each	$	2,500.00	$	42,500.00
IDW Drums	218	drum	$	115.00	$	25,070.00
Soil Disposal	218	drum	$	275.00	$	59,950.00
Subgrade piping installation placed in trenches	3000	ft	$	190.00	$	570,000.00
Fittings and Piping	17	total	$	3,750.00	$	63,750.00
Labor						
Engineering Tech, Mid	0	hr	$	60.00	$	-
Engineering Tech, Sr	800	hr	$	75.00	$	60,000.00
Geologist, Mid	800	hr	$	90.00	$	72,000.00
Environmental Eng, Sr	240	hr	$	130.00	$	31,200.00
				Total:	**$**	**993,350.00**

TABLE C6
ALTERNATIVE 2
ATTACHMENTS

DFSP NORWALK SITE, NORWALK CALIFORNIA

Attachment 2D - Installation of SVE Unit with GAC to Treat Off-Gas				
Equipment Installation	**Quant.**	**Unit**	**Unit Cost**	**Cost**
Transfer blower (w/Knock-out Tanl	2	each	$ 10,000.00	$ 20,000.00
Fittings and Piping	1	each	$ 32,800.00	$ 32,800.00
Secure Structure to House System	2	each	$ 5,000.00	$ 10,000.00
Provide Electrical Connection	2	each	$ 3,000.00	$ 6,000.00
Subcontracted Installer	1	LS	$ 20,000.00	$ 20,000.00
Labor				
Engineering Tech, Mid	320	hr	$ 60.00	$ 19,200.00
Engineering Tech, Sr	200	hr	$ 75.00	$ 15,000.00
Environmental Eng, Mid	200	hr	$ 100.00	$ 20,000.00
Environmental Eng, Sr	100	hr	$ 130.00	$ 13,000.00
			Total:	**$ 156,000.00**

Attachment 2E - O&M Labor				
Labor	**Quant.**	**Unit**	**Unit Cost**	**Cost**
Engineering Tech, Mid	520	hr	$ 60.00	$ 31,200.00
Environmental Eng, Mid	300	hr	$ 100.00	$ 30,000.00
Environmental Eng, Sr	180	hr	$ 130.00	$ 23,400.00
			Total:	**$ 84,600.00**

TABLE C7
ALTERNATIVE 3
Institutional Controls / Ozonation and Monitored Natual Attenuation / Soil Excavation to 15 Feet / Expanded SVE-Bioventing

DFSP NORWALK SITE, NORWALK CALIFORNIA

Item	Units		Unit Cost	Extended
Capital				
Implementation of Land Use Controls (Attachment 1A)	1	LS	$ 40,000	$ 40,000
Long Term Monitoring Program to Monitor Groundwater Plume and Vapor Intrusion on South Side of Property.				
Installation of GW Points (Attachment 1B)	15	each	$ 2,400	$ 36,000
Installation of Vapor Points (Attachment 1C)	30	each	$ 1,800	$ 54,000
Remedial System				
Excavation of Soils and SVE System (Attachments 3B, 3C, and 3E)	1	LS	$ 9,479,919	$ 9,479,919
Ozone system	1	LS	$3,200,000	$ 3,200,000
Construction Oversight	20%			$ 2,553,984
			Sub-Total =	$ 15,363,903
Contingency (design + construction)	25%			$ 3,841,000
			Capital Total =	$ 19,204,903
Annual Operation and Maintenance				
Land Use Controls	1	each	$ 3,200	$ 3,200
Contingency (design + construction)	25%			$ 800
			Annual Total =	$ 4,000
SVE/BV System Operation (3 Yrs)				
Estimated O&M (Attachment 3E)	1	LS	$ 84,600	$ 84,600
Electricity (75 hp continuous for 3 years)	457,000	kW-hr	$ 0.15	$ 68,550
GAC Change-Out	1	LS	$ 36,000	$ 36,000
Maintenance / Repairs (Parts)	1	LS	$ 160,000	$ 160,000
Subcontracts	1	total	$ 250,000	$ 250,000
System Monitoring	1	LS	$ 78,000	$ 78,000
Reporting (Attachment 3A)	10	each	$ 24,080	$ 240,800
Contingency (design + construction)	25%			$ 229,500
			Annual Total (years 0 to 3)=	$ 1,147,450
Years 0 to 5				
GW Monitoring (Attachment 1D)	25	point	$ 1,100	$ 27,500
Vapor Monitoring (Attachment 1E)	30	point	$ 600	$ 18,000
Reporting (Attachment 1F)	1	each	$ 24,400	$ 24,400
Contingency (design + construction)	25%			$ 17,500
			Annual Total (years 0 to 5)=	$ 87,400

TABLE C7
ALTERNATIVE 3
Institutional Controls / Ozonation and Monitored Natual Attenuation / Soil Excavation to 15 Feet / Expanded SVE-Bioventing

DFSP NORWALK SITE, NORWALK CALIFORNIA

Item	Units		Unit Cost		Extended	
Periodic						
5-Year Review (Attachment 1G)	1	each	$	41,500	$	41,500
Contingency (design + construction)	25%	each			$	10,400
			Periodic Total =		$	51,900
System Abandonment (Year 10)	1	LS	$	250,000	$	250,000
Contingency (design + construction)	25%				$	62,500
			Periodic Total =		$	312,500
Well Abandonment (Year 5)	20	each	$	1,600	$	32,000
Contingency (design + construction)	25%				$	8,000
			Periodic Total =		$	40,000
Years 6 to 10 (Every Other Year)						
GW Monitoring (Attachment 1D)	15	point	$	1,100	$	16,500
Vapor Monitoring (Attachment 1E)	20	point	$	600	$	12,000
Reporting (Attachment 1F)	1	each	$	24,400.00	$	24,400
Contingency (design + construction)	25%				$	13,200
			Periodic Total=		$	66,100
Well Abandonment (Year 10)	15	each	$	1,600	$	24,000
Contingency (design + construction)	25%				$	6,000
			Periodic Total =		$	30,000

TABLE C8
ALTERNATIVE 3 COSTS BY YEAR
Institutional Controls / Ozonation and Monitored Natual Attenuation / Soil Excavation to 15 Feet / Expanded SVE-Bioventing

DFSP NORWALK SITE, NORWALK CALIFORNIA

Year	Capital Cost ($)	Annual O&M Costs ($)	Periodic Costs ($)	Total Cost ($)
0	$19,204,903	$0	$0	$19,204,903
1	$0	$ 1,238,850	$0	$1,238,850
2	$0	$1,238,850	$0	$1,238,850
3	$0	$1,238,850	$0	$1,238,850
4	$0	$ 91,400	$0	$91,400
5	$0	$ 91,400	$91,900	$183,300
6	$0	$4,000	$66,100	$70,100
7	$0	$4,000	$0	$4,000
8	$0	$4,000	$66,100	$70,100
9	$0	$4,000	$0	$4,000
10	$0	$4,000	$460,500	$464,500
Total	$19,205,000	$3,919,400	$684,600	$23,808,900

TABLE C9
ALTERNATIVE 3
ATTACHMENTS

DFSP NORWALK SITE, NORWALK CALIFORNIA

Attachment 3A - Reporting

Labor	Quant.	Unit		Unit Cost		Cost
Findings Report	2	ea	$	3,000.00	$	6,000.00
Engineering Tech., Senior	24	hr	$	75.00	$	1,800.00
Env. Engineer, Mid	80	hr	$	100.00	$	8,000.00
Env. Engineer, Senior	36	hr	$	130.00	$	4,680.00
Project Manager, Senior	24	hr	$	150.00	$	3,600.00
				Total:	**$**	**24,080.00**

Attachment 3B - Excavation of Soils Above Cleanup Goals to Depth of 15 Feet (assumes 2 crews for excavation)

Construction	Measure Quantity	Measure Unit	Conversion Factor	Cost Unit	Cost Quantity		Unit Cost		Cost
Mobilization	1	EA	1.0	EA	1	$	75,000.00	$	75,000
Mobile Truck Scale	1	EA	1.0	EA	1	$	33,400.00	$	33,400
Trechbox Rental	3	Month	1.0	Month	3	$	1,587.60	$	4,763
Trenchbox Place and Move	180	Hour	1.0	Hour	180	$	114.31	$	20,576
Sheet Piling for 15-foot Excavation	13750	SF	1.0	SF	13750	$	22.18	$	304,975
Sheet Piling for 20-foot Excavation		SF	1.0	SF	0	$	26.11	$	-
Sheet Piling for 25-foot Excavation	0	SF	1.0	SF	0	$	26.90	$	-
Sheet Pile Wales	13.2	Ton	1.0	Ton	13	$	517.88	$	6,836
Sheet Pile Tie Backs	2.875	Ton	1.0	Ton	3	$	2,347.40	$	6,749
Excavate Overburden Soil	27000	CY	1.0	CY	27000	$	12.43	$	335,610
Haul Overburden Soil to Stockpile	27000	CY	1.2	CY	32400	$	2.02	$	65,448
Excavate Soils for Disposal / Treatment (Excavator)	50853	CY	1.0	CY	50853	$	12.43	$	632,103
Vacuum Excavate Soil	460	CY	0.070	17 CY/Day	32	$	3,185.44	$	102,571
Confirmation Sampling (Attachment 2H)	378	EA	1.0	EA	378	$	308.20	$	116,500
Transport Soil to Landfill	5085	CY	0.090	Truckload per Day	5085	$	25.00	$	127,125
Tipping Fee at Landfill	5085	CY	1.600	Ton	8136	$	62.00	$	504,432
Transport to Thermal Desorber	45768	CY	0.0300	Three Truckloads per Day	45768	$	25.00	$	1,144,200
Treat / Dispose Soil	45768	CY	1.8	Ton	45768	$	35.00	$	1,601,880
Haul Overburden Soil to Excavation	32400	CY	1.0	CY	32400	$	2.02	$	65,448
Backfill and Compact Overburden Soil	32400	CY	1.0	CY	32400	$	3.41	$	110,484
Transport New Backfill to Site	57508	CY	0.0250	Three Truckloads per Day	57508	$	25.00	$	1,437,700
Backfill and Compact Clean Fill	57508	CY	1.0	CY	57508	$	20.00	$	1,150,160
Transport Topsoil to Site	2930	CY	0.0250	Three Truckloads per Day	2930	$	25.00	$	73,250
Place Topsoil	2930	CY	1.0	CY	2930	$	20.00	$	58,600
Hydroseed Excavation Area	158	MSF	1.0	SY	158	$	52.52	$	8,298

TABLE C9
ALTERNATIVE 3
ATTACHMENTS

DFSP NORWALK SITE, NORWALK CALIFORNIA

Dust Control - Sealant on Site Roads	3555	SY/Week	23.0	SY/Week	81765	$	0.99	$	80,947
Dust Contol - Water Excavation Areas and Soil Stockpiles	120	Day	1.0	Day	113	$	1,933.97	$	218,539
Perimeter Dust Monitoring	150	Day	1.0	Day	150	$	200.00	$	30,000
Erosion Control (Silt Fence)	3000	LF	1.0	LF	3000	$	0.82	$	2,460
Erosion Control (Hay Bales - Staked)	1200	LF	1.0	LF	1200	$	10.43	$	12,516
							Total:	**$**	**8,330,569**

Attachment 3C - Vertical SVE Wells

Construction	**Quant.**	**Unit**		**Unit Cost**		**Cost**
Vertical SVE Wells (to 30 Ft)	4592	ft	$	15.00	$	68,880.00
Valve Pits	17	each	$	2,500.00	$	42,500.00
IDW Drums	218	drum	$	115.00	$	25,070.00
Soil Disposal	218	drum	$	275.00	$	59,950.00
Subgrade piping installation placed in trenches	3000	ft	$	190.00	$	570,000.00
Fittings and Piping	17	total	$	3,750.00	$	63,750.00
Labor						
Engineering Tech, Mid	0	hr	$	60.00	$	-
Engineering Tech, Sr	800	hr	$	75.00	$	60,000.00
Geologist, Mid	800	hr	$	90.00	$	72,000.00
Environmental Eng, Sr	240	hr	$	130.00	$	31,200.00
				Total:	**$**	**993,350.00**

Attachment 3D - Installation of SVE Unit with GAC to Treat Off-Gas

Equipment Installation	**Quant.**	**Unit**		**Unit Cost**		**Cost**
Transfer blower (w/Knock-out Tanl	2	each	$	10,000.00	$	20,000.00
Fittings and Piping	1	each	$	32,800.00	$	32,800.00
Secure Structure to House System	2	each	$	5,000.00	$	10,000.00
Provide Electrical Connection	2	each	$	3,000.00	$	6,000.00
Subcontracted Installer	1	LS	$	20,000.00	$	20,000.00
Labor						
Engineering Tech, Mid	320	hr	$	60.00	$	19,200.00
Engineering Tech, Sr	200	hr	$	75.00	$	15,000.00
Environmental Eng, Mid	200	hr	$	100.00	$	20,000.00
Environmental Eng, Sr	100	hr	$	130.00	$	13,000.00
				Total:	**$**	**156,000.00**

Attachment 3E - O&M Labor

Labor	**Quant.**	**Unit**		**Unit Cost**		**Cost**
Engineering Tech, Mid	520	hr	$	60.00	$	31,200.00
Environmental Eng, Mid	300	hr	$	100.00	$	30,000.00
Environmental Eng, Sr	180	hr	$	130.00	$	23,400.00
				Total:	**$**	**84,600.00**
				TOTAL FOR SVE SYSTEM	**$**	**1,149,350.00**

TOTAL FOR EXCAVATION AND SVE/BV $ 9,479,919

TABLE C10
ALTERNATIVE 4
Institutional Controls / Ozonation and Monitored Natural Attenuation / Soil Excavation to 20 Feet / Expanded SVE-Bioventing

DFSP NORWALK SITE, NORWALK CALIFORNIA

Item	Units		Unit Cost	Extended
Capital				
Implementation of Land Use Controls (Attachment 1A)	1	LS	$ 40,000	$ 40,000
Long Term Monitoring Program to Monitor Groundwater Plume and Vapor Intrusion on South Side of Property.				
Installation of GW Points (Attachment 1B)	15	each	$ 2,400	$ 36,000
Installation of Vapor Points (Attachment 1C)	30	each	$ 1,800	$ 54,000
Remedial System				
Excavation of Soils and SVE System (Attachments 4B, 4C, and 4D)	1	LS	$ 14,617,375	$ 14,617,375
Ozone system	1	LS	$3,200,000	$ 3,200,000
Construction Oversight	20%			$ 3,581,475
			Sub-Total =	$ 21,528,850
Contingency (design + construction)	25%			$ 5,382,200
			Capital Total =	$ 26,911,051
Annual Operation and Maintenance				
Land Use Controls	1	each	$ 3,200	$ 3,200
Contingency (design + construction)	25%			$ 800
			Annual Total =	$ 4,000
SVE/BV System Operation (3 Yrs)				
Estimated O&M (Attachment 4E)	1	LS	$ 84,600	$ 84,600
Electricity (75 hp continuous for 3 years)	457,000	kW-hr	$ 0.15	$ 68,550
GAC Change-Out	1	LS	$ 28,000	$ 28,000
Maintenance / Repairs (Parts)	1	LS	$ 160,000	$ 160,000
Subcontracts	1	total	$ 250,000	$ 250,000
System Monitoring	1	LS	$ 78,000	$ 78,000
Reporting (Attachment 4A)	10	each	$ 24,080	$ 240,800
Contingency (design + construction)	25%			$ 227,500
			Annual Total (years 0 to 3)=	$ 1,137,450
Years 0 to 5				
GW Monitoring (Attachment 1D)	25	point	$ 1,100	$ 27,500
Vapor Monitoring (Attachment 1E)	30	point	$ 600	$ 18,000
Reporting (Attachment 1F)	1	each	$ 24,400	$ 24,400
Contingency (design + construction)	25%			$ 17,500
			Annual Total (years 0 to 5)=	$ 87,400

TABLE C10
ALTERNATIVE 4
Institutional Controls / Ozonation and Monitored Natural Attenuation / Soil Excavation to 20 Feet / Expanded SVE-Bioventing

DFSP NORWALK SITE, NORWALK CALIFORNIA

Item	Units		Unit Cost		Extended	
Periodic						
5-Year Review (Attachment 1G)	1	each	$	41,500	$	41,500
Contingency (design + construction)	25%	each			$	10,400
			Periodic Total =		$	51,900
System Abandonment (Year 10)	1	LS	$	250,000	$	250,000
Contingency (design + construction)	25%				$	62,500
			Periodic Total =		$	312,500
Well Abandonment (Year 5)	20	each	$	1,600	$	32,000
Contingency (design + construction)	25%				$	8,000
			Periodic Total =		$	40,000
Years 6 to 10 (Every Other Year)						
GW Monitoring (Attachment 1D)	15	point	$	1,100	$	16,500
Vapor Monitoring (Attachment 1E)	20	point	$	600	$	12,000
Reporting (Attachment 1F)	1	each	$	24,400.00	$	24,400
Contingency (design + construction)	25%				$	13,200
			Periodic Total=		$	66,100
Well Abandonment (Year 10)	15	each	$	1,600	$	24,000
Contingency (design + construction)	25%				$	6,000
			Periodic Total =		$	30,000

TABLE C11
ALTERNATIVE 4 COSTS BY YEAR
Institutional Controls / Ozonation and Monitored Natural Attenuation / Soil Excavation to 20 Feet / Expanded SVE-Bioventing

DFSP NORWALK SITE, NORWALK CALIFORNIA

Year	Capital Cost ($)	Annual O&M Costs ($)	Periodic Costs ($)	Total Cost ($)
0	$26,911,051	$0	$0	$26,911,051
1	$0	$1,228,850	$0	$1,228,850
2	$0	$1,228,850	$0	$1,228,850
3	$0	$1,228,850	$0	$1,228,850
4	$0	$ 91,400	$0	$91,400
5	$0	$ 91,400	$91,900	$183,300
6	$0	$4,000	$66,100	$70,100
7	$0	$4,000	$0	$4,000
8	$0	$4,000	$66,100	$70,100
9	$0	$4,000	$0	$4,000
10	$0	$4,000	$460,500	$464,500
Total	$26,911,100	$3,889,400	$684,600	$31,485,100

TABLE C12
ALTERNATIVE 4
ATTACHMENTS

DFSP NORWALK SITE, NORWALK CALIFORNIA

Attachment 4A - Reporting

Labor	Quant.	Unit		Unit Cost		Cost
Findings Report	2	ea	$	3,000.00	$	6,000.00
Engineering Tech., Senior	24	hr	$	75.00	$	1,800.00
Env. Engineer, Mid	80	hr	$	100.00	$	8,000.00
Env. Engineer, Senior	36	hr	$	130.00	$	4,680.00
Project Manager, Senior	24	hr	$	150.00	$	3,600.00
				Total:	**$**	**24,080.00**

Attachment 4B - Excavation of Soils Above Cleanup Goals to Depth of 20 Feet (assumes 4 crews for excavation)

Construction	Measure Quantity	Measure Unit	Conversion Factor	Cost Unit	Cost Quantity		Unit Cost		Cost
Mobilization	1	EA	1.0	EA	1	$	75,000.00	$	75,000
Mobile Truck Scale	1	EA	1.0	EA	1	$	33,400.00	$	33,400
Trechbox Rental	3	Month	1.0	Month	3	$	1,587.60	$	4,763
Trenchbox Place and Move	180	Hour	1.0	Hour	180	$	114.31	$	20,576
Sheet Piling for 15-foot Excavation	1125	SF	1.0	SF	1125	$	22.18	$	24,953
Sheet Piling for 20-foot Excavation	22750	SF	1.0	SF	22750	$	26.11	$	594,003
Sheet Piling for 25-foot Excavation	0	SF	1.0	SF	0	$	26.90	$	-
Sheet Pile Wales	32.28	Ton	1.0	Ton	32	$	517.88	$	16,717
Sheet Pile Tie Backs	3.75	Ton	1.0	Ton	4	$	2,347.40	$	8,803
Excavate Overburden Soil	64600	CY	1.0	CY	64600	$	12.43	$	802,978
Haul Overburden Soil to Stockpile	64600	CY	1.2	CY	77520	$	2.02	$	156,590
Excavate Soils for Disposal / Treatment (Excavator)	80600	CY	1.0	CY	80600	$	12.43	$	1,001,858
Vacuum Excavate Soil	460	CY	0.070	17 CY/Day	32	$	3,185.44	$	102,571
Confirmation Sampling (Attachment 2H)	530	EA	1.0	EA	530	$	308.20	$	163,346
Transport Soil to Landfill	8060	CY	0.090	Truckload per Day	8060	$	25.00	$	201,500
Tipping Fee at Landfill	8060	CY	1.600	Ton	12896	$	62.00	$	799,552
Transport to Thermal Desorber	72540	CY	0.0300	Three Truckloads per Day	72540	$	25.00	$	1,813,500
Treat / Dispose Soil	72540	CY	1.8	Ton	72540	$	35.00	$	2,538,900
Haul Overburden Soil to Excavation	77520	CY	1.0	CY	77520	$	2.02	$	156,590
Backfill and Compact Overburden Soil	77520	CY	1.0	CY	77520	$	3.41	$	264,343
Transport New Backfill to Site	92016	CY	0.0250	Three Truckloads per Day	92016	$	25.00	$	2,300,400
Backfill and Compact Clean Fill	92016	CY	1.0	CY	92016	$	20.00	$	1,840,320
Transport Topsoil to Site	3920	CY	0.0250	Three Truckloads per Day	3920	$	20.00	$	78,400
Place Topsoil	3920	CY	1.0	CY	3920	$	20.00	$	78,400
Hydroseed Excavation Area	212	MSF	1.0	SY	212	$	52.52	$	11,134
Dust Control - Sealant on Site Roads	5333	SY/Week	19.0	SY/Week	101327	$	0.99	$	100,314
Dust Contol - Water Excavation Areas and Soil Stockpiles	93	Day	1.0	Day	113	$	1,933.97	$	218,539
Perimeter Dust Monitoring	150	Day	1.0	Day	150	$	200.00	$	30,000

TABLE C12
ALTERNATIVE 4
ATTACHMENTS

DFSP NORWALK SITE, NORWALK CALIFORNIA

Erosion Control (Silt Fence)	3000	LF	1.0	LF	3000	$	0.82	$	2,460
Erosion Control (Hay Bales - Staked)	1200	LF	1.0	LF	1200	$	10.43	$	12,516
							Total:	**$**	**13,452,425**

Attachment 4C - Vertical SVE Wells

Construction	**Quant.**	**Unit**		**Unit Cost**			**Cost**
Vertical SVE Wells (to 30 Ft)	4592	ft	$	15.00		$	68,880.00
Valve Pits	17	each	$	2,500.00		$	42,500.00
IDW Drums	218	drum	$	115.00		$	25,070.00
Soil Disposal	218	drum	$	275.00		$	59,950.00
Subgrade piping installation placed in trenches	3000	ft	$	190.00		$	570,000.00
Fittings and Piping	17	total	$	3,750.00		$	63,750.00
Labor							
Engineering Tech, Mid	0	hr	$	60.00		$	-
Engineering Tech, Sr	800	hr	$	75.00		$	60,000.00
Geologist, Mid	800	hr	$	90.00		$	72,000.00
Environmental Eng, Sr	240	hr	$	130.00		$	31,200.00
					Total:	**$**	**993,350.00**

Attachment 4D - Installation of SVE Unit with GAC to Treat Off-Gas

Equipment Installation	**Quant.**	**Unit**		**Unit Cost**			**Cost**
Transfer Blower (w/Knock-out Tan	2	each	$	10,000.00		$	20,000.00
Fittings and Piping	1	each	$	32,800.00		$	32,800.00
Secure Structure to House System	2	each	$	5,000.00		$	10,000.00
Provide Electrical Connection	2	each	$	3,000.00		$	6,000.00
Subcontracted Installer	1	LS	$	20,000.00		$	20,000.00
Labor							
Engineering Tech, Mid	320	hr	$	60.00		$	19,200.00
Engineering Tech, Sr	320	hr	$	75.00		$	24,000.00
Environmental Eng, Mid	240	hr	$	100.00		$	24,000.00
Environmental Eng, Sr	120	hr	$	130.00		$	15,600.00
					Total:	**$**	**171,600.00**

Attachment 4E - O&M Labor - 10 Years

Labor	**Quant.**	**Unit**		**Unit Cost**			**Cost**
Engineering Tech, Mid	520	hr	$	60.00		$	31,200.00
Environmental Eng, Mid	300	hr	$	100.00		$	30,000.00
Environmental Eng, Sr	180	hr	$	130.00		$	23,400.00
					Total:	**$**	**84,600.00**
					TOTAL FOR SVE SYSTEM	**$**	**1,164,950.00**

TOTAL FOR EXCAVATION AND SVE $ 14,617,375

TABLE C13
ALTERNATIVE 5

Institutional Controls / Monitored Natural Attenuation / Excavate To Top of Groundwater

DFSP NORWALK SITE, NORWALK CALIFORNIA

Item	Units		Unit Cost	Extended
Capital				
Implementation of Land Use Controls (Attachment 1A)	0.5	LS	$ 40,000	$ 20,000
Long Term Monitoring Program to Monitor Groundwater Plume and Vapor Intrusion on South Side of Property.				
Installation of GW Points (Attachment 1B)	15	each	$ 2,400	$ 36,000
Installation of Vapor Points (Attachment 1C)	10	each	$ 1,800	$ 18,000
Remedial System				
Excavation of Soils (Attachment 5B)	1	LS	$ 33,032,829	$ 33,032,829
Ozone system	1	LS	$3,200,000	$ 3,200,000
Construction Oversight	20%			$ 7,257,366
			Sub-Total =	$ 43,564,195
Contingency (design + construction)	25%			$ 10,891,000
			Capital Total =	$ 54,455,195
Annual Operation and Maintenance				
Land Use Controls	0.5	each	$ 3,200	$ 1,600
Contingency (design + construction)	25%			$ 400
			Annual Total =	$ 2,000
Years 0 to 5				
GW Monitoring (Attachment 1D)	25	point	$ 1,100	$ 27,500
Vapor Monitoring (Attachment 1E)	10	point	$ 600	$ 6,000
Reporting (Attachment 1F)	1	each	$ 24,400	$ 24,400
Contingency (design + construction)	25%			$ 14,500
			Annual Total (years 0 to 5)=	$ 72,400
Periodic				
5-Year Review (Attachment 1G)	1	each	$ 41,500	$ 41,500
Contingency (design + construction)	25%	each		$ 10,400
			Periodic Total =	$ 51,900
Well Abandonment (Year 5)	10	each	$ 1,600	$ 16,000
Contingency (design + construction)	25%			$ 4,000
			Periodic Total =	$ 20,000
Years 6 to 10 (Every Other Year)				
GW Monitoring (Attachment 1D)	15	point	$ 1,100	$ 16,500
Vapor Monitoring (Attachment 1E)	5	point	$ 600	$ 3,000
Reporting (Attachment 1F)	1	each	$ 24,400.00	$ 24,400
Contingency (design + construction)	25%			$ 11,000
			Periodic Total=	$ 54,900

TABLE C13
ALTERNATIVE 5

Institutional Controls / Monitored Natural Attenuation / Excavate To Top of Groundwater

DFSP NORWALK SITE, NORWALK CALIFORNIA

Item	Units		Unit Cost		Extended	
Well Abandonment (Year 10)	10	each	$	1,600	$	16,000
Contingency (design + construction)	25%				$	4,000
				Periodic Total =	$	20,000
Years 16 to 30 (Every Third Year)						
GW Monitoring (Attachment 1D)	10	point	$	1,100	$	11,000
Vapor Monitoring (Attachment 1E)	5	point	$	600	$	3,000
Reporting (Attachment 1F)	1	each	$	24,400	$	24,400
Contingency (design + construction)	25%				$	9,600
				Periodic Total=	$	48,000
Well Abandonment (Year 30)	15	each	$	1,600	$	24,000
Contingency (design + construction)	25%				$	6,000
				Periodic Total =	$	30,000

TABLE C14
ALTERNATIVE 5 COSTS BY YEAR
Institutional Controls / Monitored Natural Attenuation / Excavate To Top of Groundwater

DFSP NORWALK SITE, NORWALK CALIFORNIA

Year	Capital Cost ($)	Annual O&M Costs ($)	Periodic Costs ($)	Total Cost ($)
0	$54,455,195	$0	$0	$54,455,195
1	$0	$74,400	$0	$74,400
2	$0	$74,400	$0	$74,400
3	$0	$74,400	$0	$74,400
4	$0	$74,400	$0	$74,400
5	$0	$74,400	$71,900	$146,300
6	$0	$2,000	$54,900	$56,900
7	$0	$2,000	$0	$2,000
8	$0	$2,000	$54,900	$56,900
9	$0	$2,000	$0	$2,000
10	$0	$2,000	$106,800	$108,800
Total	$54,455,200	$382,000	$288,500	$55,125,700

TABLE C15
ALTERNATIVE 5
ATTACHMENTS

DFSP NORWALK SITE, NORWALK CALIFORNIA

Attachment 5A - Reporting

Labor	Quant.	Unit		Unit Cost		Cost
Findings Report	2	ea	$	3,000.00	$	6,000.00
Engineering Tech., Senior	40	hr	$	75.00	$	3,000.00
Env. Engineer, Mid	120	hr	$	100.00	$	12,000.00
Env. Engineer, Senior	80	hr	$	130.00	$	10,400.00
Project Manager, Senior	24	hr	$	150.00	$	3,600.00
				Total:	**$**	**35,000.00**

Attachment 5B - Excavation of Soils Above Cleanup Goals to Top of Groundwater (assumes 4 crews for excavation)

Construction	Measure Quantity	Measure Unit	Conversion Factor	Cost Unit	Cost Quantity		Unit Cost		Cost
Mobilization	1	EA	1.0	EA	1	$	75,000.00	$	75,000
Mobile Truck Scale	1	EA	1.0	EA	1	$	33,400.00	$	33,400
Trechbox Rental	3	Month	1.0	Month	3	$	1,587.60	$	4,763
Trenchbox Place and Move	180	Hour	1.0	Hour	180	$	114.31	$	20,576
Sheet Piling for 15-foot Excavation	1125	SF	1.0	SF	1125	$	22.18	$	24,953
Sheet Piling for 20-foot Excavation	4025	SF	1.0	SF	4025	$	26.11	$	105,093
Sheet Piling for 25-foot Excavation	48400	SF	1.0	SF	48400	$	26.90	$	1,301,960
Sheet Pile Wales	36	Ton	1.0	Ton	36	$	517.88	$	18,644
Sheet Pile Tie Backs	7.5	Ton	1.0	Ton	8	$	2,347.40	$	17,606
Excavate Overburden Soil	224801	CY	1.0	CY	224801	$	12.43	$	2,794,276
Haul Overburden Soil to Stockpile	224801	CY	1.2	CY	269761	$	2.02	$	544,918
Excavate Soils for Disposal / Treatment (Excavator)	194884	CY	1.0	CY	194884	$	12.43	$	2,422,408
Vacuum Excavate Soil	460	CY	0.070	17 CY/Day	32	$	3,185.44	$	102,571
Confirmation Sampling (Attachment 2H)	1010	EA	1.0	EA	1010	$	308.20	$	311,282
Transport Soil to Landfill	29223	CY	0.090	Truckload per Day	29223	$	25.00	$	730,575
Tipping Fee at Landfill	29223	CY	1.600	Ton	29223	$	62.00	$	1,811,826
Transport to Thermal Desorber	165651	CY	0.0300	Three Truckloads per Day	165651	$	25.00	$	4,141,275
Treat / Dispose Soil	165651	CY	1.8	Ton	165651	$	35.00	$	5,797,785
Haul Overburden Soil to Excavation	269761	CY	1.0	CY	269761	$	2.02	$	544,917
Backfill and Compact Overburden Soil	269761	CY	1.0	CY	269761	$	3.41	$	919,885
Transport New Backfill to Site	218819	CY	0.0250	Three Truckloads per Day	218819	$	25.00	$	5,470,475
Backfill and Compact Clean Fill	218819	CY	1.0	CY	218819	$	20.00	$	4,376,380

TABLE C15
ALTERNATIVE 5
ATTACHMENTS

DFSP NORWALK SITE, NORWALK CALIFORNIA

Transport Topsoil to Site	12535	CY	0.0250	Three Truckloads per Day	12535	$	25.00	$	313,375
Place Topsoil	12535	CY	1.0	CY	12535	$	20.00	$	250,700
Hydroseed Excavation Area	676	MSF	1.0	MSF	676	$	52.52	$	35,504
Dust Control - Sealant on Site Roads	7111	SY/Week	48.0	SY/Week	341328	$	0.99	$	337,915
Dust Contol - Water Excavation Areas and Soil Stockpiles	226	Day	1.0	Day	226	$	1,933.97	$	437,077
Perimeter Dust Monitoring	301	Day	1.0	Day	301	$	200.00	$	60,200
Erosion Control (Silt Fence)	3000	LF	1.0	LF	3000	$	0.82	$	2,460
Erosion Control (Hay Bales - Staked)	2400	LF	1.0	LF	2400	$	10.43	$	25,032
							Total:	**$**	**33,032,829**