R0428

CAMBRIA

December 27, 2004

Rosanna Garcia-LaGrille
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: **Site Investigation Work Plan**
Shell-branded Service Station
350 Grand Avenue
Oakland, California
SAP Code 135698
Incident #98995755



Dear Ms. Garcia-LaGrille:

Cambria Environmental Technology, Inc. (Cambria) prepared this work plan on behalf of Equilon Enterprises LLC dba Shell Oil Products US (Shell) to implement the recommendations made in the September 20, 2004 *Site Investigation Report*. The purpose of this investigation is to obtain specific information that will be used to prepare a site conceptual model for the subject site. Although the Alameda County Health Care Services Agency (ACHCSA) did not provide written approval of the recommendations made, since 90 days have passed and there is no ACHCSA-assigned caseworker, Shall has requested that Cambria proceed with this work plan in order to assess whether additional investigation, remediation, monitoring, or closure is warranted at this site.

The work proposed will be performed in accordance with Regional Water Quality Control Board (RWQCB) and Alameda County Public Works Agency (ACPWA) guidelines.

## SITE BACKGROUND

***Site Description:*** The site is an active Shell-branded Service Station, located at the northeast corner of the intersection of Grand Avenue and Perkins Street in Oakland, California (Figure 1). Lakeside Park is located at the southwest corner of this intersection. The area surrounding the site consists of mixed commercial and residential properties. The station layout consists of three gasoline USTs, four fuel dispensers, and a kiosk (Figure 2). Underground utility lines and historical sample locations are depicted on Figure 2, for reference.

**Cambria Environmental Technology, Inc.**

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## PREVIOUS WORK

***1990 Soil Borings:*** On May 11, 1990, GeoStrategies Inc. of Hayward, California (GSI) drilled five exploratory soil borings (S-A through S-E). The highest hydrocarbon concentration in soil was in boring S-A, located at the southwest corner of the property in the vicinity of the gasoline USTs. Constituents detected at a depth of 9.5 feet below grade (fbg) in this area were 2,900 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPHg), 2,400 ppm total petroleum hydrocarbons as diesel (TPHd), and 13 ppm benzene.

***1991 Monitoring Well Installation:*** On January 7, 1991, GSI installed three monitoring wells (S-1, S-2, and S-3) at the site (Figure 2). Groundwater was encountered between 7 and 9 fbg. The highest hydrocarbon concentrations in soil and groundwater were reported in well S-2, located at the southwest corner of the property in the vicinity of the gasoline USTs. The maximum concentrations in soil at S-2 were 440 ppm TPHg, 360 ppm TPHd, and 4.5 ppm benzene in soil at 8.5 fbg. Groundwater from S-2 contained 2,500 parts per billion (ppb) TPHg, 1,200 ppb TPHd, and 550 ppb benzene in groundwater. No TPHg, TPHd, or benzene was detected in the groundwater sample from well S-1.

***1993 Hydropunch Borings:*** On January 27, 1993, GSI installed three hydropunch borings off site (Figure 2). The highest hydrocarbon concentrations were detected in boring HP-1, located crossgradient of the USTs. Maximum concentrations in that boring were 1,500 ppm TPHg, 18 ppm TPHd, and 0.11 ppm benzene in soil at 6.5 fbg and 22,000 ppb TPHg, 14,000 ppb TPHd, and 2,500 ppb benzene in groundwater. TPHg and benzene were not detected in soil or groundwater samples from borings HP-2 and HP-3, located downgradient of the USTs.

***1996 Tank Removal:*** On April 22, 1996, Weiss Associates of Emeryville, California (WA) observed the removal of three 10,000-gallon gasoline USTs and one 10,000-gallon diesel UST and collected soil samples. Up to 4,800 ppm TPHg, 2,800 ppm TPHd, and 22 ppm benzene were detected in samples collected from the UST excavation, product piping trenches, and beneath the product dispensers.

***1998 Potential Receptor Survey:*** In April 1998, Cambria identified wells and surface water bodies within a ½-mile radius of the site. As depicted on Figure 1, three water producing wells are located between 2,640 feet and 3,960 feet crossgradient of the site. Lake Merritt is located approximately 900 feet downgradient of the site. The potential receptor survey results were presented to the ACHCSA in Cambria's May 31, 1998 *MTBE Investigation Report.*

***1998 Conduit Study:*** In September 1998, Cambria performed an investigation to locate underground utilities and local drainage systems near the site in an effort to identify potential preferential pathways for contaminant migration. Cambria contacted Underground Service Alert and used a private utility line locator to identify underground utilities. The City of Oakland was contacted to research locations, depths, and construction information of water, storm drain, and sanitary sewer conduits. The *Watershed Map of the Oakland-Berkeley Area* was reviewed to identify buried creeks, underground culverts, storm drains, and engineered channels in the area. The results of the study are depicted graphically on Figure 2.

***1998 Geoprobe Well Installation:*** On April 16, 1998, Cambria installed two ¾-inch diameter pre-packed wells (S-4 and S-5) within the Grand Avenue right-of-way, downgradient of the site. No TPHg, benzene, toluene, ethylbenzene, or xylenes (BTEX), or methyl tertiary butyl ether (MTBE) was detected in soil or groundwater from wells (S-4 and S-5).

***1999 Geoprobe Boring Installation:*** In March 1999, Cambria installed three Geoprobe borings to evaluate whether utility conduit trenches serve as preferential pathways for the migration of impacted groundwater. Two borings (HP-4 and HP-5) were advanced within the sanitary sewer conduit trench along the north sidewalk on Grand Ave, and the third boring (HP-6) was advanced within Perkins Street. The maximum TPHg concentration detected in soil was 408 ppm in soil sample HP-4-10. The maximum MTBE concentration reported (by EPA Method 8020) in soil was 2.52 ppm in soil sample HP-4-10. Grab groundwater samples collected from HP-4 contained 100,000 ppb TPHg, 83,000 ppb TPHd, and 2,000 ppb MTBE (by EPA Method 8020). Grab groundwater samples from HP-5, near the diesel UST complex, contained 160 ppb TPHg. TPHg, BTEX, and MTBE were below detection limits in grab groundwater samples from HP-5 and HP-6.

***2001 Dual-Phase Vapor Extraction (DVE) Pilot Test:*** In June 2001, Cambria conducted an 8-hour DVE pilot test on groundwater monitoring well S-2. DVE is the process of applying high vacuum through an airtight well seal to simultaneously extract soil vapors from the vadose zone and enhance groundwater extraction from the saturated zone. Approximately 50 gallons of groundwater were extracted during the 8-hour test. This data is consistent with the low permeability soil (sandy silt and silt) encountered at this site. Estimated mass removal through groundwater extraction of TPHg, benzene, and MTBE was 0.008, 0.0004, and 0.009 pounds, respectively. Estimated mass removal through vapor extraction of TPHg, benzene, and MTBE was 2.44, 0.002, and 0.005 pounds, respectively. Based on this data, DVE from monitoring well S-2 does not appear to effectively recover hydrocarbons and MTBE from the subsurface.

***Groundwater Monitoring:*** Groundwater monitoring has been conducted at the site since well installation in 1991. Historical onsite maximum concentrations of constituents have been found in well S-2 with up to 120,000 ppb TPHg, 36,000 ppb TPHd, 10,000 ppb benzene, and 30,200 ppb MTBE, by EPA Method 8260. The current onsite maximum concentrations of constituents are also reported in well S-2 with 16,000 ppb TPHg, 7,000 ppb TPHd, 650 ppb benzene, and 10,000 ppb MTBE, by EPA Method 8260. The majority of the TPHd found in well S-2 can be attributed to the heavier portion of weathered gasoline that falls in the TPHd range. Although still elevated, the concentrations in well S-2, and other site wells, are declining. Offsite wells S-4 and S-5 delineate the downgradient extent of the plumes.

***July 2002 - Tank Backfill Wells:*** On July 10, 2002, two UST backfill wells were installed (T-1 and T-2). The installation activities were documented in Cambria's *Tank Backfill Well Installation Report and Investigation Work Plan Addendum* dated September 26, 2002.

***2002 Groundwater Remediation:*** Cambria initiated mobile groundwater extraction (GWE) from the tank backfill wells using a vacuum truck at the site in October 2002 and continued until January 2004. The cumulative estimated volume of water removed from the site through GWE is 54,679 gallons. This volume of water corresponds to the removal of approximately 2.56 pounds of MTBE.

***2003 Interim Remediation:*** In an attempt to reduce the elevated concentrations of contaminants localized at well S-2, Cambria conducted DVE from groundwater monitoring well S-2 between September 16 and September 18, 2003. Approximately 35 gallons of groundwater were extracted during approximately 50 hours of DVE from S-2. Estimated mass removal through groundwater extraction is considered negligible. Cambria also conducted soil vapor extraction (SVE) from tank backfill well T-1 on September 18 in an effort to maximize mass removal and gain additional information about the site. Estimated mass removal from the site through vapor extraction of TPHg, benzene, and MTBE was 0.152 pounds, 0.0009 pounds, and 0.0042 pounds, respectively.

***2004 – Offsite Investigation:*** In correspondence dated March 29, 2002 and July 9, 2002, the ACHCSA requested sampling of groundwater near utility lines and also downgradient of the UST complex. Cambria proposed the installation of four borings (HP-7 through HP-10) in the *Tank Backfill Well Installation Report and Investigation Work Plan Addendum* dated September 26, 2002. In Cambria's *Groundwater Monitoring Report – Fourth Quarter 2003,* dated January 26, 2004, Cambria notified the ACHCSA of Shell's intent to implement the work plan addendum, although no written approval had been received.

In April 2004, HP-7 through HP-10 were installed. Maximum TPHg detected in soil samples was 4,300 ppm. Maximum MTBE detected in soil was 0.045 ppm. No benzene was detected in the soil samples. TPHg was reported in water samples from all four borings, at concentrations ranging from 57 ppb in HP-8 to 89,000 ppb in HP-9. In samples from HP-8 and HP-10, the laboratory noted that the material reported as TPHg did not resemble their gasoline standard. Benzene was detected at boring HP-9 only, at a concentration of 480 ppb. MTBE was reported in water from HP-7, HP-8, and HP-9 at concentrations of 89, 6.2, and 730 ppb, respectively. The water sample from HP-10 did not contain MTBE at, or above, the detection limit of 0.50 ppb.

Given these results, Cambria concluded that the petroleum impacted groundwater is limited in its lateral extent to a relatively short distance from the source area. The borings installed near the subsurface utilities do not suggest that preferential contaminant migration is occurring via the water, electrical or sanitary sewer lines. The groundwater near the two storm drain lines located in Perkins Street, across from boring HP-3 has not yet been assessed.

Based on historical shallow soil data near the on-site commercial building (kiosk), soil gas samples would be needed to assess the potential threat to onsite commercial workers. However, during construction of the onsite building, it is often standard practice to install a layer of plastic as a moisture barrier. If present, the moisture barrier (plastic) would also act as a vapor barrier, prohibiting direct migration of vapors from soil through any cracks in the foundation and into the building. Further, given that the commercial business is a gasoline service station, there are likely concentrations of petroleum constituents in ambient air that are migrating into the kiosk, making soil-gas migration relatively insignificant.

## TECHNICAL RATIONALE FOR PROPOSED SCOPE OF WORK

- To assess the presence of petroleum constituents near the storm drains in Perkins Street, south of Grand Avenue, two borings (CPT-1 and CPT-2) are proposed as shown on Figure 3.

- To assess the vertical delineation of soil impact near the dispenser islands, four borings (B-1 through B-4) are proposed.

- To assess the vertical delineation of groundwater impact in the vicinity of well S-2, one deep boring (CPT-3) is proposed.

- To determine whether soil vapor sampling is warranted near the kiosk, research investigating the construction methods used when the kiosk was built and information regarding background concentrations of petroleum constituents in air at an operating service station is proposed.

- To assess whether groundwater in the vicinity of the site is suitable for drinking water, analysis of groundwater from the monitoring wells for total dissolved solids is proposed.

## WORK TASKS

***Permits:*** Appropriate permits for drilling and encroachment will be obtained from ACHCSA and the City of Oakland.

***Site Safety Plan:*** Cambria will prepare a Site Safety Plan for field work, including a traffic control plan.

***Utility Clearance:*** Cambria will mark proposed drilling locations and the locations will be cleared through Underground Service Alert prior to drilling. Additionally, at each proposed boring location a private utility line locating service will be used to further identify any subsurface utilities or obstructions. The top five to ten feet at each boring will be cleared with an air knife to at least 3-inches larger than the drilling equipment, to ensure protection of workers, and also that utilities are not damaged with the drilling equipment.

***Site Investigation:*** Seven exploratory soil borings (CPT-1 through CPT-3 and B-1 through B-4) are proposed at the locations shown on Figure 3. CPT-1 and CPT-2 will be drilled adjacent to the storm drain lines in Perkins Street, south of Grand Avenue. These borings will extend to first groundwater for collection of a groundwater sample. Borings B-1 through B-4 are proposed around the dispensers where soil impact had previously been identified. These borings will extend to 10 feet below grade to assess the vertical extent of shallow impact beneath the dispensers. Boring CPT-3 is located near well S-2 and is proposed to be extended to 60 fbg to log lithology and to obtain depth discrete groundwater samples from deeper intervals for vertical assessment. Groundwater sampling depths will be determined based on the soil types encountered. Cambria will target coarse-grained (sandy) zones for groundwater sampling. If no coarse-grained zones are encountered, Cambria will attempt to collect groundwater samples at 10-foot intervals.

A Cambria geologist will supervise the drilling, and encountered soils will be continuously logged using electronic CPT technology at CPT-1 through CPT-3. Since B-1 through B-4 are located near operating fueling equipment, the borings will be extended using a combination of air knife and hand auger to the proposed total depth of 10 fbg. Soils will be logged from the cuttings that are available. Soil samples will be retained at five-foot intervals in brass or stainless steel sample tubes and will be covered on both ends with Teflon sheets and plastic end caps. Groundwater samples from the CPT borings will be collected with CPT groundwater sampling equipment and transferred into vials containing hydrochloric acid preservative with no head space. Soil and groundwater samples will be labeled, entered onto a chain-of-custody record, and placed into a cooler with ice for transport to a State of California certified laboratory for analyses.

The scope of work described in this work plan will be performed under the supervision of a registered geologist or engineer.

***Chemical Analyses:*** Select soil and groundwater samples will be analyzed for TPHg, BTEX, and MTBE by EPA Method 8260B. Further, during the next scheduled groundwater monitoring event, the monitoring wells will be analyzed for Total Dissolved Solids by EPA Method 160.1.

***Research Activities:*** Cambria will request information from Shell concerning the construction details for the kiosk foundation at this site in an attempt to identify whether a vapor barrier exists beneath the kiosk. Cambria will also query existing sources regarding background concentrations of petroleum constituents in air at operating service stations. This information will be used to evaluate whether site specific soil gas or ambient air sampling should be recommended.

***Report Preparation:*** Following the receipt of analytical results from the laboratory, and completion of the research activities, Cambria will prepare a written report which will include field procedures, laboratory results, boring logs, a site conceptual model, a risk assessment, and recommendations for further investigation, monitoring, remediation, or closure.

## SCHEDULE

Cambria will implement the proposed scope of work upon receipt of approval from the ACHCSA, or within 90 days following the submittal of this document, if no correspondence is received.

## CLOSING

If you have any questions regarding the contents of this document, please call Ana Friel at (707) 442-2700.

Sincerely,
**Cambria Environmental Technology, Inc.**

for

Ana Friel, RG
Senior Project Geologist
RG 6452

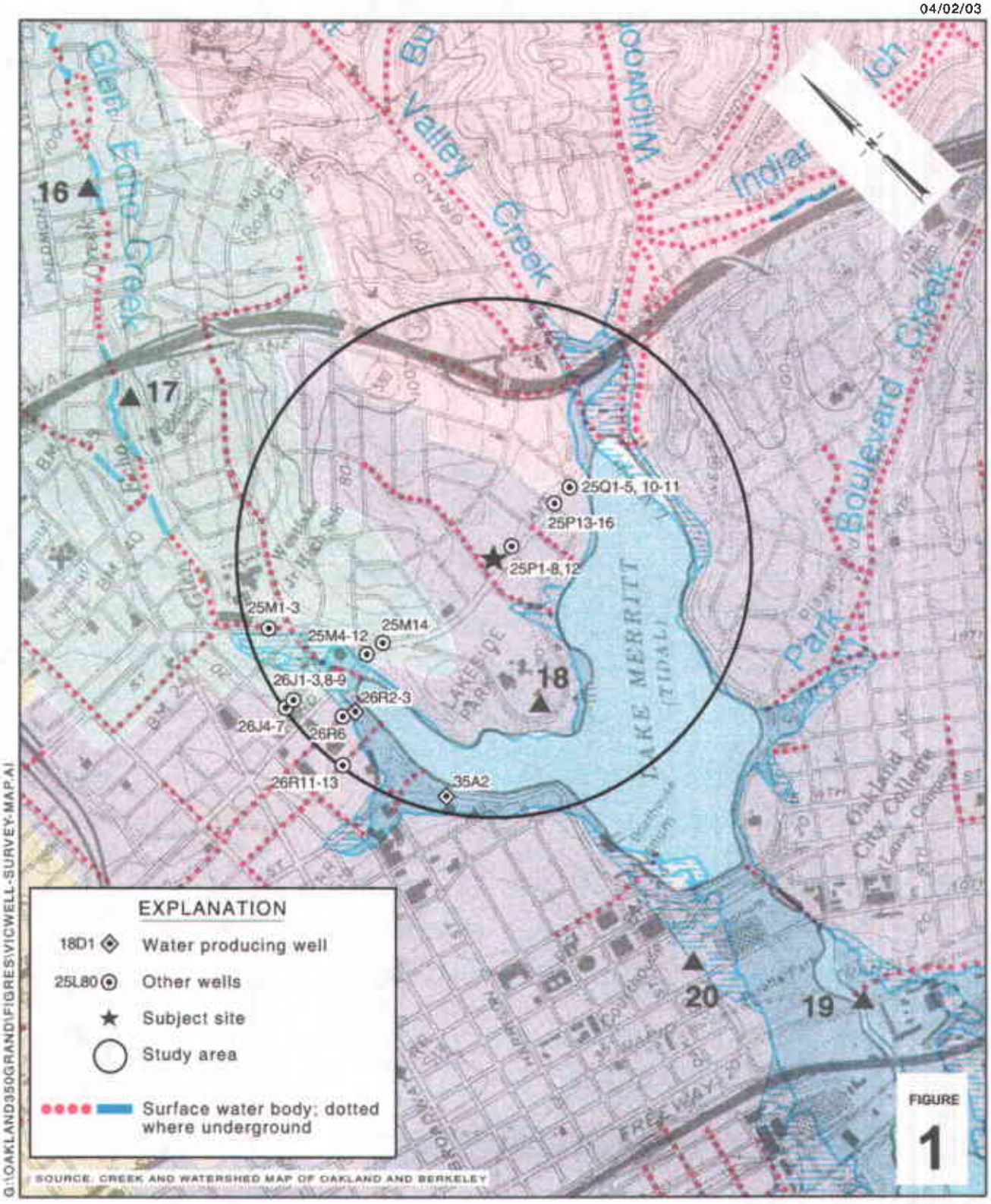
REGISTERED GEOLOGIST
JOSEPH W. NEELY
No. 6927
STATE OF CALIFORNIA

Attachments:

Figure 1. Vicinity/Area Well Survey Map
Figure 2. Site Plan/Historical Sample and Conduit Location Map
Figure 3. Proposed Sample Location Map

cc: Karen Petryna, Shell
Gursharnjeet Cheema, 1060 St. Raphael Drive, Bay Point, CA 94565

04/02/03

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**Vicinity/Area Well Survey Map**

21-Dec-04

# Site Plan/Historical Sample and Conduit Location Map

## EXPLANATION

- Groundwater monitoring well
- Soil boring location
- Tank backfill well location
- Soil sample location
- Hydropunch sample location
- E — Electric utility line
- W — Water main utility line
- G — Gas utility line
- SS — Sanitary sewer utility line
- SD — Storm drain utility line
- PB — Pacific Bell utility line
- Manhole

Apartments
Planter
Trash Enclosure
Dispensers
Planter
Canopy
Kiosk
Planter
Commercial Building
Commercial Building
Commercial Building
Commercial Building
Former Diesel UST
UST
HP-10
HP-1
HP-6
HP-7
HP-9
HP-4
HP-5
HP-2
SD 30"φ
SD 18"φ
SS 8"φ
W 6"φ
SS 8"φ
E
PB
SS 10"φ

**GRAND AVENUE**

W 36"φ
E
SS 8"φ
Planter
Planter
Planter
Lakeside Park
PERKINS STREET
HP-3
SD
SD 33"φ
W 16"φ
Apartments
Ta-Ke Sushi
Apartments

Scale (ft)
0 25 50 100

FIGURE
**2**

**Shell-branded Service Station**
350 Grand Avenue
Oakland, California

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21-Dec-04

# Proposed Sample Location Map

## EXPLANATION

- Proposed boring location
- Groundwater monitoring well
- Soil boring location
- Tank backfill well location
- E — Electric utility line
- W — Water main utility line
- G — Gas utility line
- SS — Sanitary sewer utility line
- SD — Storm drain utility line
- PB — Pacific Bell utility line
- Manhole

Apartments

Commercial Building

Planter

Trash Enclosure

Dispensers (typ)

Canopy

Kiosk

Planter

Commercial Building

Commercial Building

Commercial Building

HP-10

HP-1

HP-6

HP-9

HP-2

HP-4

HP-8

HP-7

HP-5

S-3

B-2

B-3

B-1

B-4

T-1

CPT-3

S-2

T-2

UST

Former Diesel UST

S-1

SD 30"ø

SD 18"ø

SS 8"ø

W 8"ø

SS 8"ø

E

PB

G

SS 10"ø

**GRAND AVENUE**

W 36"ø

G

E

SS 8"ø

S-5

S-4

Planter

Planter

Planter

CPT-2

CPT-1

Lakeside Park

*PERKINS STREET*

HP-3

Apartments

Ta-Ke Sushi

Apartments

SD

SD 25"ø

W 18"ø

N

Scale (ft)

0 25 50 100

FIGURE

**3**

**Shell-branded Service Station**

350 Grand Avenue

Oakland, California

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