SOIL REMEDIATION AND PRELIMINARY INVESTIGATION AND EVALUATION REPORT

5714 SAN PABLO AVENUE OAKLAND, CALIFORNIA

JULY 1992

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PREPARED FOR:

CHIEF AUTO PARTS, INC.
16069 SHOEMAKER AVENUE
CERRITOS, CALIFORNIA

PREPARED BY:

GHH ENGINEERING, INC.
8084 OLD AUBURN ROAD, SUITE E
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GHH ENGINEERING INC.

RCE #27011 LIC. #537901

July 30, 1992

Ms. Susan L Hugo
Alameda County Department of Environmental Health
Local Oversite Program
80 Swan Way, Room 200
Oakland, California 94841

RE: SOIL REMEDIATION/SITE INVESTIGATION
5714 SAN PABLO AVENUE, OAKLAND, CALIFORNIA

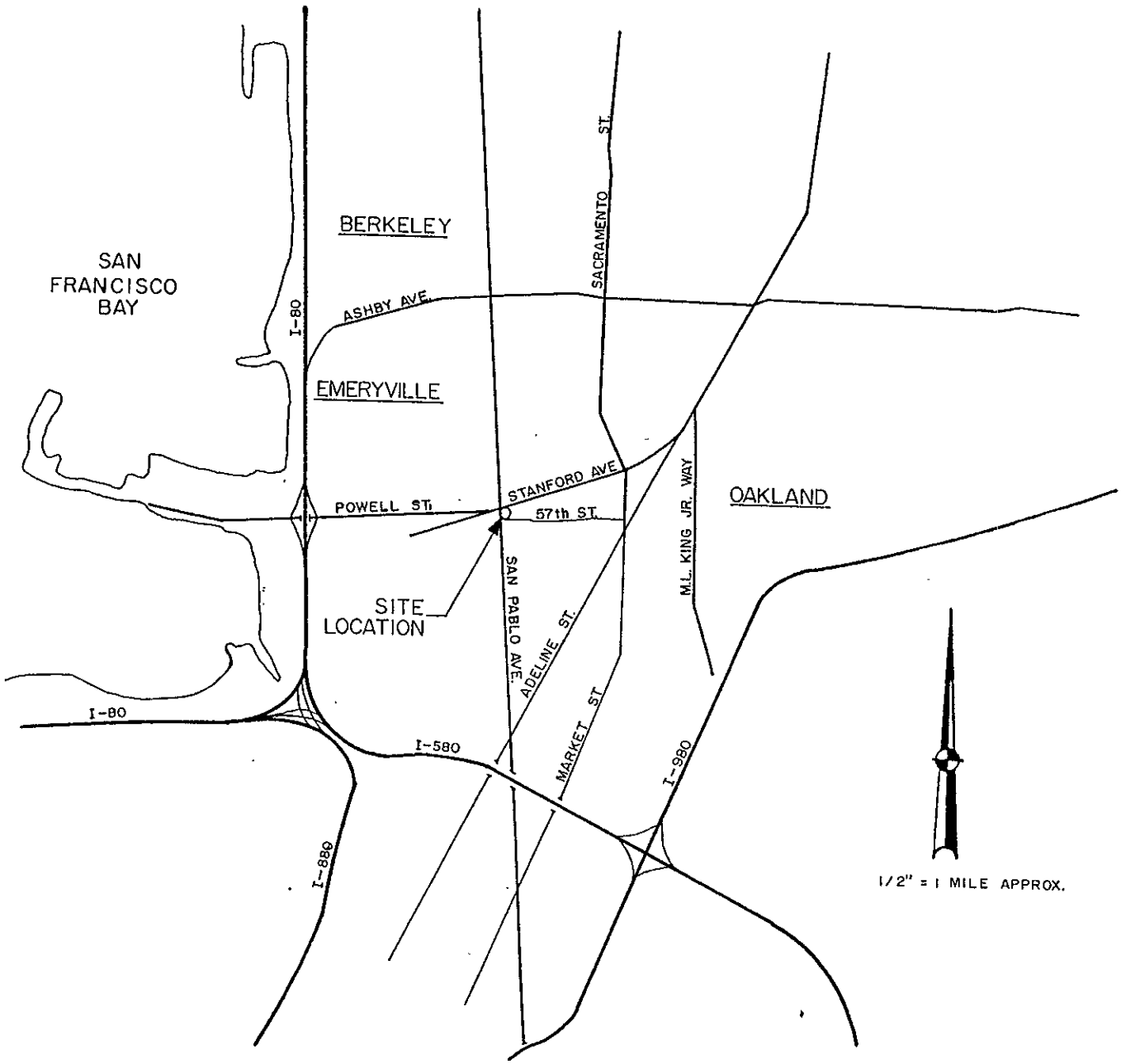
Dear Ms. Hugo:

This report presents the results of the soil remediation and groundwater investigation conducted at the subject site between January and May 1992 by GHH Engineering, Inc. (GHH). The work was completed in accordance with the GHH Soil Remediation/Groundwater Investigation Workplan dated July 19, 1991, which was submitted to your office for review and approval. The site is located at the southeast corner of the San Pablo-Stanford Avenue intersection in Oakland, California. A vicinity map for the subject property is shown on Figure 1.

INTRODUCTION

Previous work completed at the site was summarized in the August 27, 1990, "Report on Soil and Groundwater Investigation, Former Tank Area, 5714 San Pablo Avenue, Oakland, California" prepared by Levine-Fricke, Inc. (L-F). Based on the results presented in the L-F report, it was concluded that gasoline impacted soil was limited to the former tank excavation, and that diesel and motor oil were not present in soil at the site. Groundwater collected by L-F from their single monitoring well (W-1) contained low concentrations of gasoline, benzene, toluene, and xylenes. L-F also identified product piping which had not been removed when the underground storage tanks were excavated in 1985.

FIGURE 1
5714 SAN PABLO AVENUE
VICINITY MAP



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The work completed by GHH as presented in this report consisted of removing the remaining product piping, excavating petroleum hydrocarbon impacted soil from the product piping and the former tank areas, disposing of the impacted soil, completing and sampling three soil borings, and installing and sampling four additional monitoring wells. During completion of this work, GHH encountered additional product piping which was subsequently removed. Verification soil samples from the product piping trenches and tank excavations indicated that diesel and motor oil were present in the soil. Petroleum hydrocarbon impacted soil was found to extend south of the former tanks and the accessible material was excavated for disposal.

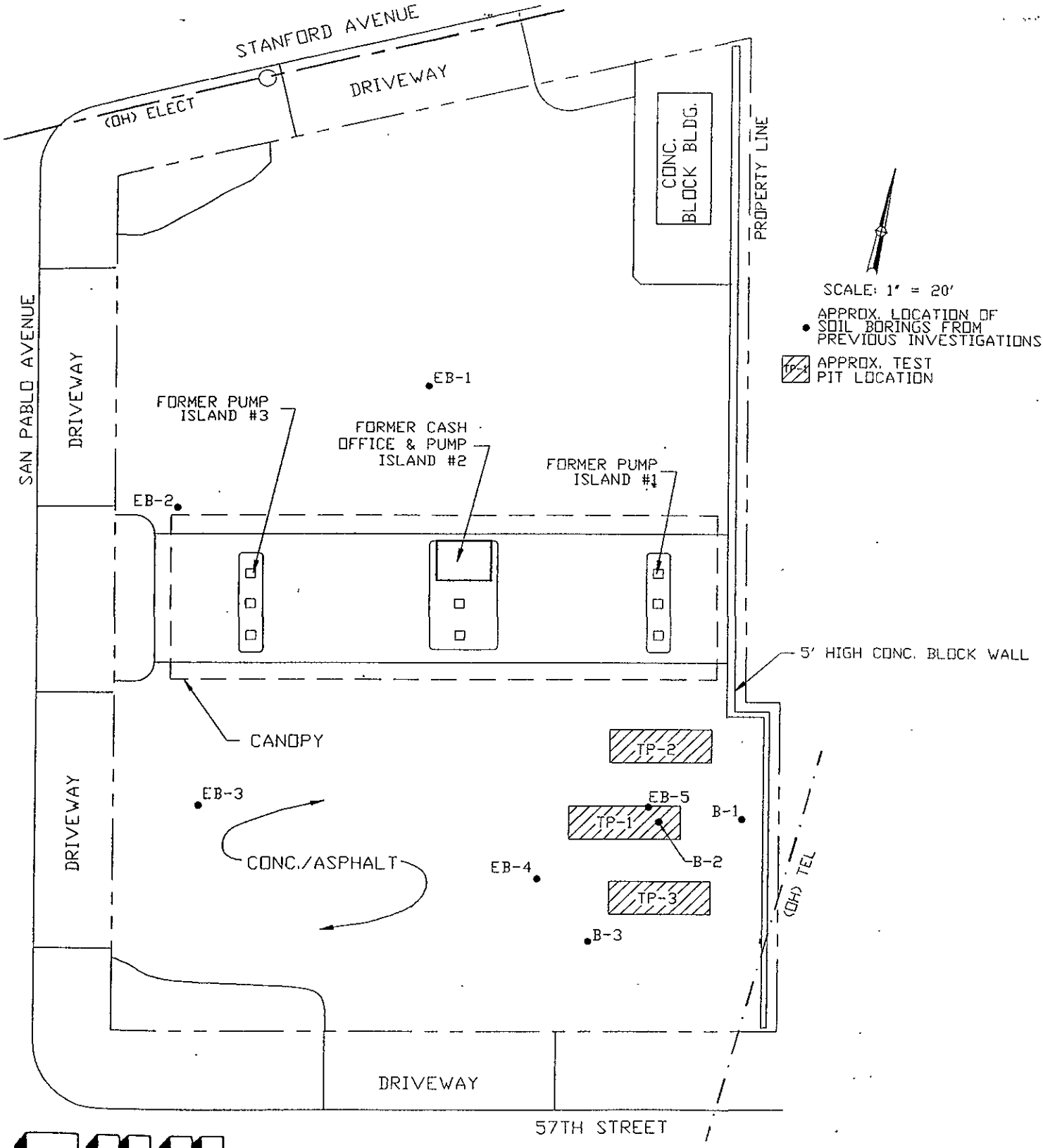
SITE HISTORY

This section provides a brief summary and the results of previous work completed at the site. More detailed discussions of the previous work and the tabulated results are presented in the GHH workplan and the L-F report referenced above.

In 1985, two 8,000-gallon underground tanks, one 10,000-gallon underground tank, and one waste oil tank of unknown size were reported to have been removed from the site by Golden West Builders. It is not known whether verification soil samples were collected at the time of the tank removals. Water was apparently encountered in the tank excavation and a water sample was collected and submitted to IT Analytical Services for "disposal acceptance parameters" for disposal at the Vinehill disposal facility. The water analyses parameters did not include petroleum hydrocarbons.

Kaldveer Associates conducted a soil investigation in February 1989 to evaluate the potential presence of petroleum hydrocarbons in soils resulting from the pre-existing service station. The investigation consisted of five soil borings (EB-1 through EB-5) with samples collected and analyzed for total petroleum hydrocarbons as gasoline and diesel (TPH G & TPH D: Method 8015 modified), benzene, toluene, ethyl benzene, and xylenes (BTEX: Method 8020), and total oil and grease (Method 413.1 [I.R.]). The soil boring locations are shown on Figure 2. Relatively low concentrations of each of the tested constituents were detected in various samples collected from four of the five soil borings. Total oil and grease was detected in most of the soil samples, but the analytical method (Method 413.1 [I.R.]) used for these oil and grease analyses does not discriminate between animal oil, vegetable oil, and petroleum hydrocarbons.

FIGURE 2
5714 SAN PABLO AVENUE
SITE PLAN



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Based on the Kaldveer Associates findings, additional investigative work was recommended to include soil and groundwater. Both issues were addressed when L-F continued the investigation in May and June 1989. The L-F investigation consisted of three exploration trenches in the former tank excavation (TP-1, -2, and -3) , three soil borings (B-1, -2, and -3), and a monitoring well (W-1), as shown on Figure 2.

Soil samples collected from the three L-F trenches contained TPH G and low concentrations of the BTEX constituents. Soil samples collected from the four soil borings completed by L-F did not contain TPH G or TPH D and only one soil sample contained any of the BTEX constituents.

The June 23, 1989, groundwater sample collected from the L-F monitoring well (W-1) installed southeast of the former excavation contained 180 parts per billion (ppb) TPH G; 8 ppb benzene, 1.7 ppb toluene; 1.1 ppb xylenes; and no detectable ethyl benzene or TPH D. Based on the results of these previous investigations, GHH implemented the soil remediation and groundwater investigation presented in this report.

SOIL REMEDIATION

Product Piping Removal

Between January 13 and 23, 1992, GHH excavated and removed two sets of product piping from the vicinity of the former pump islands. Based on the initial information regarding the site, only the south piping system was expected to exist at the site, as shown on Figure 3. However, during the excavating work the second northern piping system was encountered which extended west to east through the center of the pump islands. Three vent lines which ran north-south along the eastern side of the property were also removed. The piping was steamed cleaned and the rinseate water was stored on-site in DOT approved 55 gallon drums.

Six verification soil samples (TS1 through TS6) were collected from the product piping trenches on January 15 and 23, 1992. The verification sample locations are shown on Figure 4. Samples were collected using a drive sampler lined with clean brass tubes. The samples were capped, sealed, iced, and transported to Western Environmental Science and Technology Inc. (WEST) a California certified laboratory for TPH G (EPA Method 8015 modified), TPH D (EPA Method 8015 modified), TPH M (EPA Method 8015 modified), BTEX (EPA Method 8020), and oil and grease (ASTM Method 5520 E,F) analyses. The sample results are summarized in Table 1, and the laboratory reports and chain-of-custody documentation are contained in Appendix A.

FIGURE 4
5714 SAN PABLO AVENUE
VERIFICATION SAMPLE
LOCATION MAP

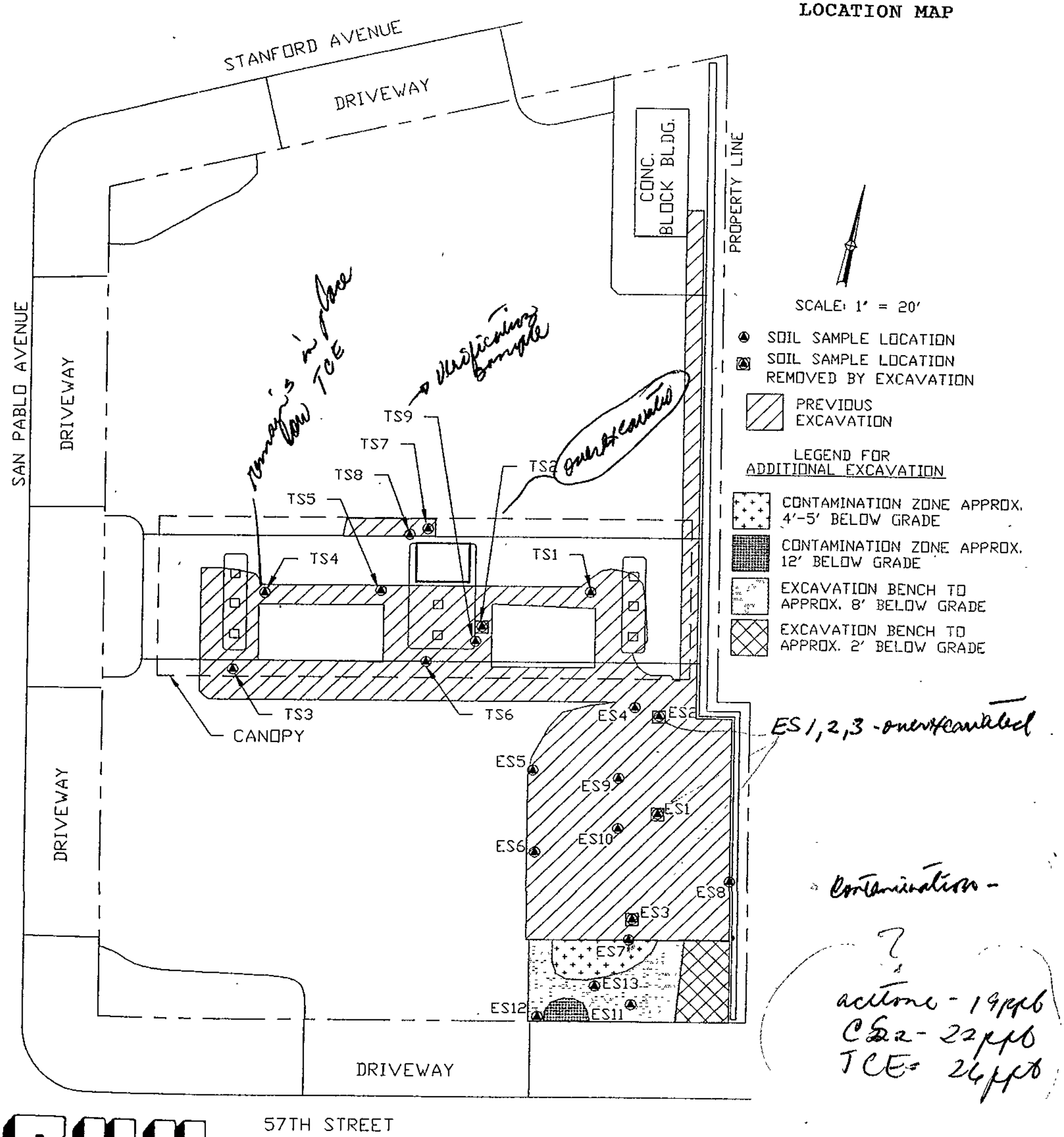

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TABLE 1

VERIFICATION SAMPLE DATA
5714 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

TOTAL PETROLEUM HYDROCARBONS

Soil Sample	Depth (feet)	Date	Benzene (ppm)	Toluene (ppm)	Ethyl Benzene (ppm)	Xylenes (ppm)	TPH G (ppm)	TPH D (ppm)	TPH M (ppm)	Oil & Grease (ppm)
TS1	2.5	01-15-92	.029	.12	.029	.16	1.0	<10	67	NA
TS2	2	01-15-92	52	330	100	570	5300	<10	100	NA
TS3	1	01-15-92	<.005	<.005	<.005	<.005	.52	<10	21	NA
TS4	2	01-23-92	<.005	<.005	<.005	<.005	<.5	<10	29	<50
TS5	3	01-23-92	<.005	<.005	<.005	<.005	<.5	<10	<10	<50
TS6	3	01-23-92	<.005	<.005	<.005	<.005	<.5	<10	<10	<50
TS7	2	02-07-92	2.6	31	21	110	400	<50*	140	NA
TS8	5	02-07-92	.011	.076	.029	.16	.61	<10	<10	<50
TS9	5	02-07-92	<.005	<.005	<.005	<.005	<.5	<10	<10	<50
ES1	5	01-15-92	<.005	<.005	<.005	<.005	17	<10	170	NA
ES2	10	01-15-92	<.05*	<.05*	<.05*	<.05*	76	<10	510	NA
ES3	6	01-15-92	<.005	<.005	<.005	<.005	13	<10	320	NA
ES4	4	01-23-92	<.005	<.005	<.005	<.005	1.6	<10	<10	<50
ES5	4	01-23-92	<.005	<.005	<.005	<.005	<.5	<10	<10	<50
ES6	4	01-23-92	<.005	<.005	<.005	<.005	<.5	<10	<10	<50
ES7	4	01-23-92	<.05*	<.05*	<.05*	<.05*	<20**	1700*	<10	1100
ES8	4	01-23-92	<.005	<.005	<.005	<.005	<.5	<10	<10	<50
ES9	12	01-23-92	<.005	<.005	<.005	<.005	<.5	<10	<10	<50
ES10	12	01-23-92	<.005	<.005	<.005	<.005	<.5	<10	<10	<50
ES11	4	02-07-92	<.005	<.005	<.005	<.005	<.5	<10	<10	<50
ES12	12	05-19-92	<.050*	<.050*	<.050*	<.050*	73	1400	<10	330
ES13	10	05-20-92	<.005	<.005	<.005	<.005	<.50	1100	<10	200

TPH G Total petroleum hydrocarbon as gasoline
TPH D Total petroleum hydrocarbon as diesel
TPH M Total petroleum hydrocarbon as motor oil
ppm Parts per million
NA Not analyzed
* Increased reporting limit due to interference from other petroleum hydrocarbons
** Increased reporting limit due to interference from diesel
TS7 Mortar and brick sample from buried foundation
< Less than reporting limits

Sample TS2 collected approximately 2 feet below grade near the center pump island was the only piping trench sample to contain significant petroleum hydrocarbon concentrations. The sample contained 5,300 part per million (ppm) TPH G, 100 ppm TPH M and various concentrations of the BTEX constituents. Low concentrations of these same constituents were also detected in TS1 with TPH G at 1.0 ppm and TPH M at 67 ppm. Samples TS3 and TS4 contained even lower concentrations of TPH G and TPH M, and no detectable BTEX. Samples TS5 and TS6 were non-detectable for all petroleum hydrocarbons.

The area around the center pump island was further excavated to approximately 5 feet below grade to remove the petroleum hydrocarbon impacted soil as detected in TS2. Verification soil sample TS9, collected approximately 5 feet below grade near the location of the initial sample TS2, was non-detectable for all petroleum hydrocarbons indicating that the material had been effectively removed.

North of the center fuel island a buried brick foundation was encountered during the piping removal. The area had a strong petroleum hydrocarbon odor and samples were collected from the brick and mortar (TS7) and underlying soil (TS8). The brick and mortar sample (TS7) contained 400 ppm TPH G, 140 ppm TPH M, and various concentrations of the BTEX constituents, as shown in Table 1. The sample collected from the underlying soil (TS8) approximately 5 feet below grade contained TPH G at 0.61 ppm and very low concentrations of the BTEX constituents. TPH M was not detected in the 5 feet below grade sample.

Piping trench samples TS4, through TS9 were also analyzed for volatile organics (EPA Method 8240) and the metals cadmium, chromium, lead, zinc and nickel (Total Threshold Limit Concentration [TTLC]). The TTLC metals results are summarized in Table 2, and the laboratory reports are contained in Appendix A. Cadmium was not detected in any of the samples. Chromium concentrations in the three samples ranged from 83 ppm to 180 ppm; lead ranged from non-detectable to 170 ppm; zinc ranged from 57 ppm to 480 ppm; and nickel ranged from 24 ppm to 33 ppm. All the of the detectable metals concentrations were well below the TTLC concentrations as defined by the Department of Health Services (DHS). Piping trench samples TS4 and TS6 contained 7.5 ppb trichloroethane (TCE) and 71 ppb acetone, respectively.

Former Tank Excavation Soil Removal

The petroleum hydrocarbon impacted soil was exhumed from the former tank excavation during the January 1992 work. The initial excavation was roughly 30 feet by 30 feet and was completed to a depth of approximately 12 feet along the western portion and to approximately 8 feet along the eastern portion. Groundwater was encountered at approximately 5.5 feet below grade during excavating. To allow access to the impacted soil, groundwater was pumped from the excavation and stored in a 4,000 gallon holding tank pending proper disposal.

TABLE 2

VERIFICATION SAMPLE DATA
5714 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

METALS
TOTAL THRESHOLD LIMIT CONCENTRATION (TTLC)

Soil Sample	Cadmium (ppm)	Chromium (ppm)	Lead (ppm)	Zinc (ppm)	Nickel (ppm)
TS1	NA	NA	NA	NA	NA
TS2	NA	NA	NA	NA	NA
TS3	NA	NA	NA	NA	NA
TS4	<0.5	180	110*	480	33
TS5	<0.5	83	<5.0	57	26
TS6	<0.5	87	9.9	280	24
TS7	NA	NA	NA	NA	NA
TS8	<0.05	80	17	120	32
TS9	<0.05	71	<5.0	91	26
ES1	NA	NA	NA	NA	NA
ES2	NA	NA	NA	NA	NA
ES3	NA	NA	NA	NA	NA
ES4	<0.5	60	<5.0	51	27
ES5	<0.5	39	<5.0	120	18
ES6	<0.5	78	<5.0	93	27
ES7	<0.5	63	5.1	68	28
ES8	<0.5	40	<5.0	70	23
ES9	<0.5	58	<5.0	90	34
ES10	<0.5	60	<5.0	82	31
ES11	<0.5	89	5.3	77	21
ES12	<0.5	58	<5.0	64	24
ES13	<0.5	58	7.1	71	38
TTLC	100	2500	1000	5000	2000

NA Not Analyzed
ppm Parts per million
RL Reporting limit
* Result of average of 5 replicates (45, 37, 160, 160, 170)
< Less than reporting limits
TTLC California EPA Department of Health Services Total Threshold Limit Concentrations

Ten initial verification soil samples (ES1 through ES10) were collected from the excavation on January 15 and 23, 1992 at the locations shown on Figure 4. The samples were collected using a drive sampler lined with clean brass tubes. The samples were capped, sealed, iced and transported to WEST for TPH G, TPH D, TPH M, BTEX, and oil and grease analyses. The results are summarized in Table 1, and the laboratory reports and chain-of-custody documentation are contained in Appendix A.

BTEX constituents were not detected in any of the verification soil samples. Soil samples ES1, ES2, and ES3 collected on January 15, 1992, contained TPH G and TPH M with the highest concentrations at 76 ppm and 510 ppm, respectively. The locations of these three samples were further excavated once the water table had been lowered with groundwater pumping. Of the other initial 10 excavation samples, only ES7 collected from the south sidewall of the excavation approximately 4 feet below grade contained significant petroleum hydrocarbon concentrations. Sample ES7 contained 1,700 ppm TPH D and 1,100 ppm oil and grease, but did not contain TPH G, TPH M or BTEX constituents.

On February 7, 1992, a test hole was excavated south of the excavation and soil sample ES11 was collected approximately 4 feet below grade to delineate the southern extent of petroleum hydrocarbon impacted soil. ES11 was non-detectable for all petroleum hydrocarbons. On May 18 and 19, 1992, the initial excavation was backfilled and compacted and the area to the south was excavated to a depth of approximately 12 feet below grade.

The extent of the southern excavation is shown on Figure 4. Verification soil sample ES12 was collected approximately 12 feet below grade at the southern extent of the excavation adjacent to the sidewalk and contained 1,100 ppm TPH D and 200 ppm oil and grease. Sample ES13 was collected approximately 10 feet below grade from the borehole for monitoring well MW-4 at the center of the southern excavation and contained 73 ppm TPH G, 1,400 ppm TPH D, and 330 ppm oil and grease. TPH M and the BTEX constituents were not detected in either of the samples.

TPH D and oil and grease was detected in three samples (ES7, ES12, and ES13), but these same three samples did not contain TPH M. Therefore, the oil and grease detected in these samples is likely do to heavier fraction of the old diesel fuel and not motor oil as would be expected.

Excavation verification samples ES4 through ES13 were also analyzed for volatile organics (EPA Method 8240) and the metals cadmium, chromium, lead, zinc, and nickel (TTLC). Cadmium was not detect in any of the samples and lead was only detected in ES7 (5.1 ppm), ES11 (5.3 ppm), and ES13 (7.1 ppm). Chromium, zinc, and nickel were detected in all 10 excavation samples. Chromium concentrations ranged from 39 ppm to 89 ppm; zinc ranged from 51 ppm to 120 ppm; and nickel ranged from 18 to 38 ppm.

All the of the detectable metals concentrations were well below the TTLC concentrations as defined by DHS. Excavation samples ES4, ES6, and ES7 contained acetone at 19 ppb, carbon disulfide at 22 ppb, and TCE at 26 ppb.

Waste Disposal

Soil

Approximately 558 cubic yards of petroleum hydrocarbon impacted soil was excavated from the product piping and initial tank excavation. The material was stockpiled on the northern portion of the property as shown on Figure 5. The stockpile was divided into 14 sections for characterization sampling with four soil samples collected from each section. The four samples from each section were composited at the laboratory to form one sample for laboratory analyses. The composite samples were analyzed for TPH G, TPH D, TPH M, BTEX, oil and grease, volatile organics and metals. The laboratory results are summarized in Table 3, and the laboratory reports and chain-of-custody documentation are contained Appendix A.

BTEX constituent concentrations were non-detectable to very low in the composite samples. TPH G concentrations ranged from non-detectable to 110 ppm with an average concentration of 18.5 ppm. TPH D was detected in only 2 of the 14 samples (140 ppm and 350 ppm). TPH M concentrations ranged from 51 ppm to 170 ppm with an average concentration of 120 ppm. No volatile organics were detected.

The results of the characterization samples and a waste characterization profile were submitted to Brown-Ferris, Industries (BFI) for approval, and the material was accepted for disposal at the BFI facility in Livermore, California. The 558 cubic yards (cy) of material was hauled to the Livermore facility on February 10 and 11, 1992, under non-hazardous manifest. Copies of the non-hazardous manifests are contained in Appendix B.

An additional 72 cy of material was excavated from the southern excavation on May 18 and 19, 1992, and it was also transported to the BFI facility in Livermore. The non-hazardous manifests for this material are also included in Appendix B.

Groundwater

The groundwater extracted from the excavation stored in the 4,000 gallon tank was discharged to the Oakland city storm drain on May 15, 1992, after obtaining a one time exemption NPDES permit from the San Francisco Bay Regional Water Quality Control Board. A copy of the Regional Board Exemption is contained in Appendix C.

FIGURE 5
714 SAN PABLO AVENUE
STOCKPILE & CHARACTERIZATION
SAMPLE LOCATION MAP

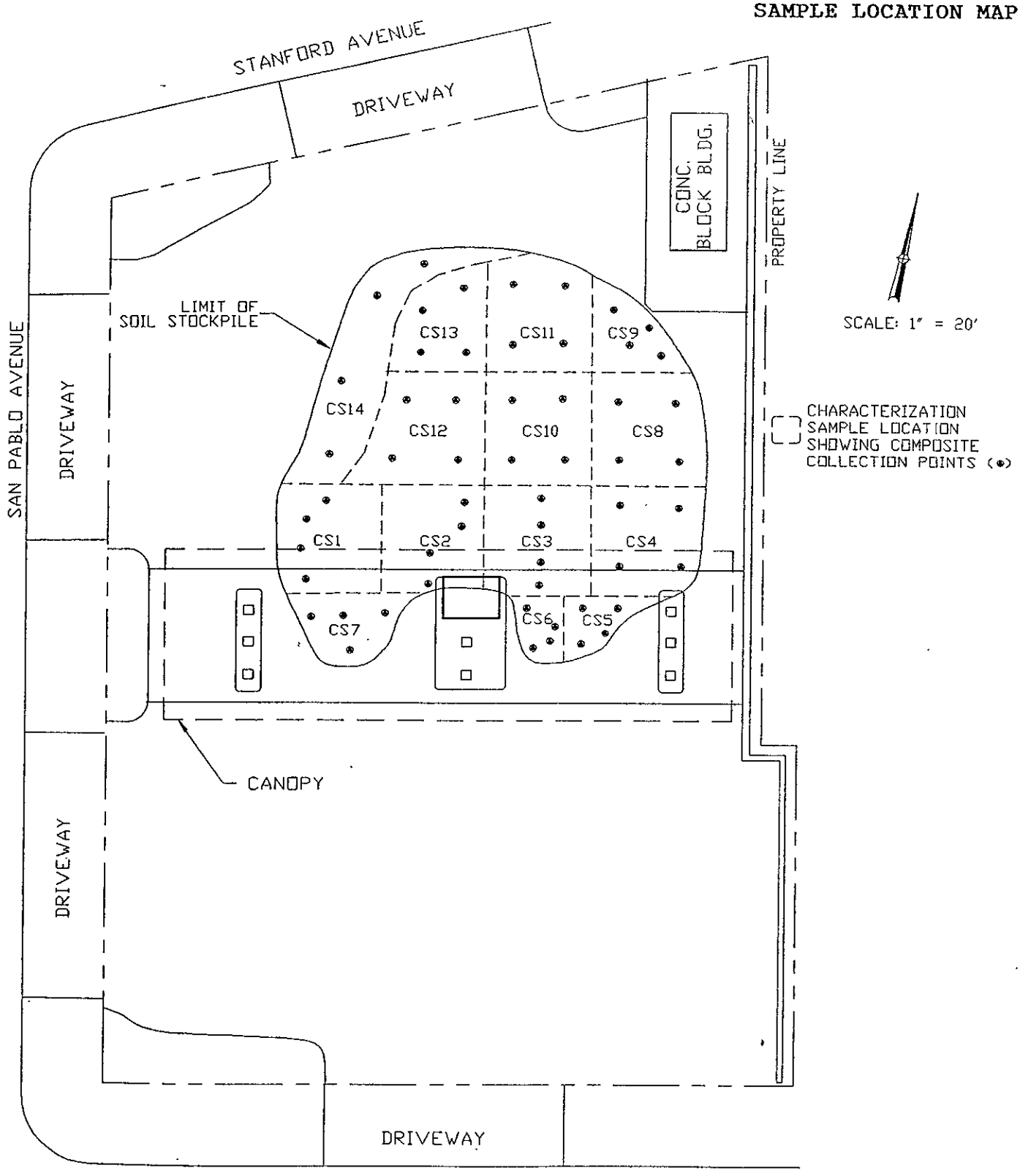

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TABLE 3

STOCKPILE CHARACTERIZATION SAMPLE DATA
5714 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

TOTAL PETROLEUM HYDROCARBONS

Soil Sample	Date	Benzene (ppm)	Toluene (ppm)	Ethyl Benzene (ppm)	Xylenes (ppm)	TPH G (ppm)	TPH D (ppm)	TPH M (ppm)	Oil & Grease (ppm)	Lead (ppm)
CS1	01-22-92	<.005	<.005	<.005	<.005	1.4	<10	130	210	0.67
CS2	01-22-92	<.005	<.005	<.005	<.005	.85	140	51	NA	NA
CS3	01-22-92	.0060	.081	.019	.13	4.6	<10	160	160	2.1
CS4	01-22-92	<.005	<.005	<.005	.0081	7.8	<20*	110	NA	NA
CS5	01-22-92	<.005	<.005	<.005	<.005	<.5	350	130	NA	NA
CS6	01-22-92	<.005	<.005	<.005	<.005	.91	<10	86	180	0.53
CS7	01-22-92	<.005	<.005	<.005	<.005	<.5	<10	69	NA	NA
CS8	01-22-92	<.005	<.005	<.005	.0083	5.0	<20*	140	260	NA
CS9	01-23-92	<.05*	<.05*	<.2*	<.2*	49	<20*	100	NA	NA
CS10	01-23-92	<.05*	<.05*	<.05*	.26	12	<20*	150	130	1.2
CS11	01-23-92	0.12	<.1*	<.1*	<.1*	38	<20*	170	NA	NA
CS12	01-23-92	<.05*	<.05*	<.05*	<.05*	17	<20*	140	120	0.97
CS13	01-23-92	<0.5*	<.05*	<.2*	<.2*	110	<20*	140	NA	NA
CS14	01-23-92	<.005	<.005	.0073	<.005	11	<20*	110	80	NA

TPH G Total petroleum hydrocarbon as gasoline
TPH D Total petroleum hydrocarbon as diesel
ppm Parts per million
* Increased reporting limit due to interference from other petroleum hydrocarbons
< Less than reporting limit
NA Not analyzed

Rinseate

The nine 55 gallon drums which contained the rinseate water generated during stream cleaning the product piping were disposed of by Erickson, Inc. a licensed hazardous waste hauler. A copy of the hazardous waste manifest is included in Appendix D.

SOIL INVESTIGATION

On May 20 and 21, 1992, seven boreholes were drilled and sampled: three soil borings (SB-1, SB-2, and SB-3) and four monitoring wells (MW-2, MW-3, MW-4, and MW-5). The borehole locations are shown on Figure 6. The soil borings were completed to 6 to 10 feet below grade and each of the monitoring wells were completed to 19 feet below grade. The soil boring and monitoring well logs are contained in Appendix D. Soil boring SB-3 was a slant boring angled approximately 20 degrees toward the south beneath the former service station canopy.

Soil sampling was conducted in accordance with the sampling protocol contained in the July 19, 1991 Workplan. One sample from each borehole was submitted to WEST for TPH G, TPH D, TPH M, and BTEX analyses. The results are summarized in Table 4, and the laboratory reports and chain-of-custody documentation are contained in Appendix A.

No petroleum hydrocarbons were detected in the soil boring samples with the exception of the MW-4 sample which was previously discussed and referred to as ES13. This sample contained 1,100 ppm TPH D and 200 ppm oil and grease.

GROUNDWATER INVESTIGATION

The four monitoring wells (MW-2, MW-3, MW-4, and MW-5) were installed on May 20 and 21, 1992. The wells were constructed and sampled in accordance with the protocol contained in the July 19, 1992, workplan. All four wells were completed to approximately 19 feet below grade with screened intervals extending from approximately 5 to 19 feet below grade. The well construction details are shown on the monitoring well logs contained in Appendix D.

On May 27, 1992, the wells were developed, purged, and sampled. The existing monitoring well (W-1) installed by L-F was not sampled because the screened interval extends from approximately 10 feet below grade to 19 feet below grade and therefore, did not bridge the water table, which was 6.35 feet below grade in W-1 on the sample date.

FIGURE 6
5714 SAN PABLO AVENUE
SOIL BORING/MONITORING WELL LOCATION MAP

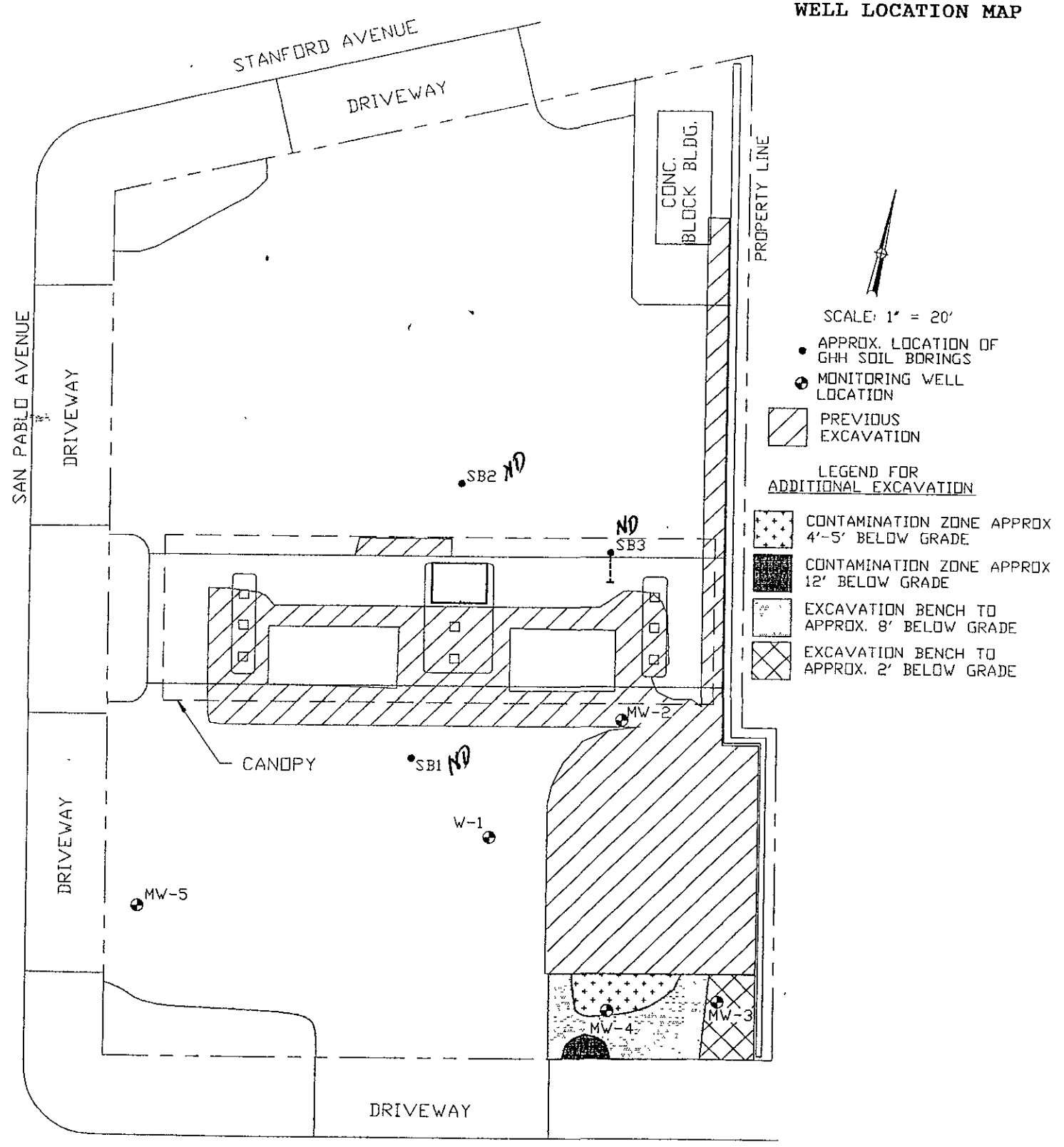

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TABLE 4

BOREHOLE SAMPLE DATA
5714 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

Sample ID	Depth (feet)	Date	Benzene (ppm)	Toluene (ppm)	Ethyl Benzene (ppm)	Xylenes (ppm)	TPH G (ppm)	TPH D (ppm)	TPH M (ppm)	Oil & Grease (ppm)
MW-2	10	05-20-92	<.0050	<.0050	<.0050	<.0050	<.50	<10	<10	NA
MW-3	5	05-20-92	<.0050	<.0050	<.0050	<.0050	<.50	<10	<10	NA
MW-5	5	05-20-92	<.0050	<.0050	<.0050	<.0050	<.50	<10	<10	NA
MW-ES13	10	05-20-92	<.0050	<.0050	<.0050	<.0050	<.50	1100	<10	200
SB-1	5	05-21-92	<.005	<.005	<.005	<.005	<.50	<10	<10	NA
SB-2	5	05-21-92	<.005	<.005	<.005	<.005	<50	<10	<10	NA
SB-3	5	05-21-92	<.005	<.005	<.005	<.005	<.50	<10	<10	NA

TPH G Total petroleum hydrocarbon as gasoline
TPH D Total petroleum hydrocarbon as diesel
TPH M Total petroleum hydrocarbon as motor oil
ppm Parts per million
* Product is not typical gasoline
< Less than reporting limits
NA Not analyzed

The groundwater samples were transported under chain-of-custody to WEST for TPH G (Method 8015), TPH D (Method 8015), TPH M (Method 8015), and BTEX (Method 602) analyses. The groundwater sample from MW-4 was also analyzed for volatile organics (Method 8240) and oil and grease (Method 5520 E,F). The results are summarized in Table 5, and the laboratory reports and chain-of-custody documentation are contained in Appendix E.

TPH M was detected in the groundwater samples collected from MW-3 and MW-4 installed south of the former tank excavation. The water samples contained TPH M at 130 parts per billion (ppb) and 120 ppb, respectively. In addition to motor oil, the sample from MW-4 contained low concentrations of toluene (0.84 ppb), xylenes (0.67 ppb), vinyl chloride (3.3 ppb), dichloromethene (0.63 ppb), and dichloroethene (2.1 ppb). No petroleum hydrocarbons were detected in MW-2 or MW-5, and none of the samples contained benzene, ethyl benzene, TPH G, TPH D, or oil and grease.

SITE CONDITIONS

Geology

The geology encountered during drilling at the site is shown on the soil boring and monitoring wells logs contained in Appendix D. Soil at the site is very fine grained material consisting chiefly of clay and sandy silty clay.

Groundwater Levels

The top of casing elevation for the four new wells were surveyed on May 27, 1992, to obtain top of casing (TOC) elevations relative to monitoring well W-1. The water level measurements are shown on Table 6. The depth to groundwater on May 27, 1992, was generally 5 to 7 feet below grade. However, the depth to groundwater in MW-3 was approximately 10 feet below grade and this well had a very slow recharge during development and sampling.

Based on the relative groundwater elevations in the wells, groundwater flow appears to be toward the southwest. However, each of the water level measurements in the four new wells were made prior to well development. Additional groundwater level measurements are needed to establish a more reliable groundwater flow direction.

TABLE 5

GROUNDWATER SAMPLE DATA
5714 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

Sample ID	Date	Benzene (ppb)	Toluene (ppb)	Ethyl Benzene (ppb)	Xylenes (ppb)	TPH G (ppb)	TPH D (ppb)	TPH M (ppb)	Oil & Grease (ppb)
MW-2	05-27-92	<.50	<.50	<.50	<.50	<50	<50	<50	NS
MW-3	05-27-92	<.50	<.50	<.50	<.50	<50	<50	130 ✓	NS
MW-4	05-27-92	<.50	.84	<.50	.67	<50	<50	120 ✓	<1000
MW-5	05-27-92	<.50	<.50	<.50	<.50	<50	<50	<50	NS
SAL		1.0	40.0	30.0	20.0	NA	10.0	NA	NA

TPH G Total petroleum hydrocarbon as gasoline
TPH D Total petroleum hydrocarbon as diesel
TPH M Total petroleum hydrocarbon as motor oil
ppm Parts per million
* Product is not typical gasoline
< Less than reporting limits
NS Not sampled
SAL State action level
NA Not available

TABLE 6

GROUNDWATER ELEVATION DATA
5214 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

MONITORING WELL	DATE	TOC TO GROUNDWATER (feet)	ASSUMED ELEVATION (feet)	GROUNDWATER ELEVATION (feet)
W-1	01/13/92 05/27/92	5.52 6.35	100.00	94.48 93.65
MW-2	05/27/92	5.04	100.14	95.10
MW-3	05/27/92	10.13	99.72	89.59
MW-4	05/27/92	7.66	99.72	92.06
MW-5	05/27/92	6.51	98.80	92.29

TOC Top of casing

CONCLUSIONS

Soil

Approximately 630 cy of petroleum hydrocarbon impacted soil was excavated and disposed of at the BFI facility in Livermore, California. The soil remediation measures appear to have mitigated the majority of the petroleum hydrocarbon impacted soil at the site. Based on the results of excavation verification soil sample ES12 located south of the former tanks adjacent to the sidewalk, petroleum hydrocarbons, specifically diesel and gasoline, appear to extend beneath the sidewalk on the north side of 57th Street.

The gasoline odor and brick and mortar samples collected from the north side of the center fuel island indicate that additional gasoline and motor oil impacted material may extend north from the center piping trench. The brick foundation encountered at this location may also act as a conduit for petroleum hydrocarbon migration at this location of the site.

The volatile organic compounds encountered in the soil were randomly located, low in concentration, and with the exception of Tetrachloroethane (TCE), appear to be within regulatory limits. One of the two samples that contained TCE, excavation sample ES-7, was removed, and TCE was not detected in the follow-up verification samples ES-12 and ES-13. The trench sample TS-4 remains in-place and contains TCE in low concentrations.

Groundwater

Groundwater samples collected from the two of the four monitoring wells (MW-3 and MW-4) contained motor oil ranged hydrocarbons at 130 ppb and 120 ppb. Very low concentrations of toluene and xylenes were detected in groundwater from MW-4. Benzene, ethyl benzene, xylenes, TPH G, and TPH D were not detected in any of the groundwater samples from the four wells. Groundwater flow appears to be toward the southwest, but additional water level measurements are needed to confirm the groundwater flow direction.

The volatile organic compounds detected in the groundwater were not the same compounds detected in the soil, and the concentrations were low. The volatile organic compounds detected in this investigation are erratic in location, inconsistent in the compounds detected, and appear to be unrelated to the petroleum hydrocarbon occurrences

RECOMMENDATIONS

Soil

Due to shallow depth to groundwater (approximately 5 feet below grade) it is recommended that the brick foundation north of the center pump island and trench sample TS-4 be excavated and any petroleum impacted soil encountered be removed for proper disposal. Due to the inaccessibility of the diesel and gasoline impacted soil beneath the sidewalk of 57th Street, it is recommended that no further action be taken at the southern portion of the site.

Groundwater

Due to the detection of low concentrations of motor oil and volatile organics in the groundwater at the site, it is recommended that groundwater be monitored quarterly for a period of one year to evaluate possible changes in concentration. Since no BTEX constituents, gasoline, or diesel were detected, groundwater remediation is not recommended at this time. Groundwater levels should be monitored at the site to establish a reliable groundwater flow direction and the assess possible seasonal variations in flow.

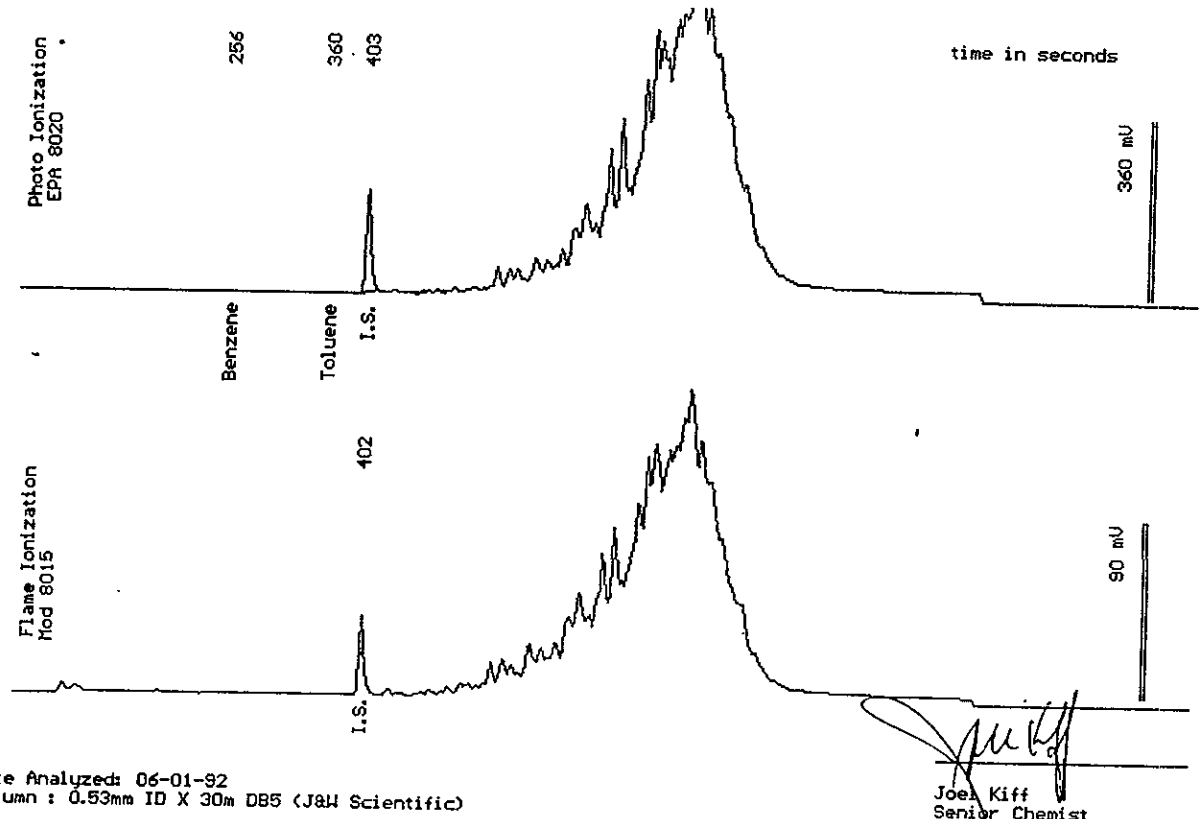
Sample Log 4441
4441-1

Sample: ES12

From : Project # 001088(San Pablo)
Sampled : 05/19/92
Dilution : 1:10 QC Batch : 6045E
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.050)	<.050
Toluene	(.050)	<.050
Ethylbenzene	(.050)	<.050
Total Xylenes	(.050)	<.050
TPH as Gasoline	(5.0)	73 *

* Product is not typical gasoline.



Date Analyzed: 06-01-92
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

Joel Kiff
Senior Chemist

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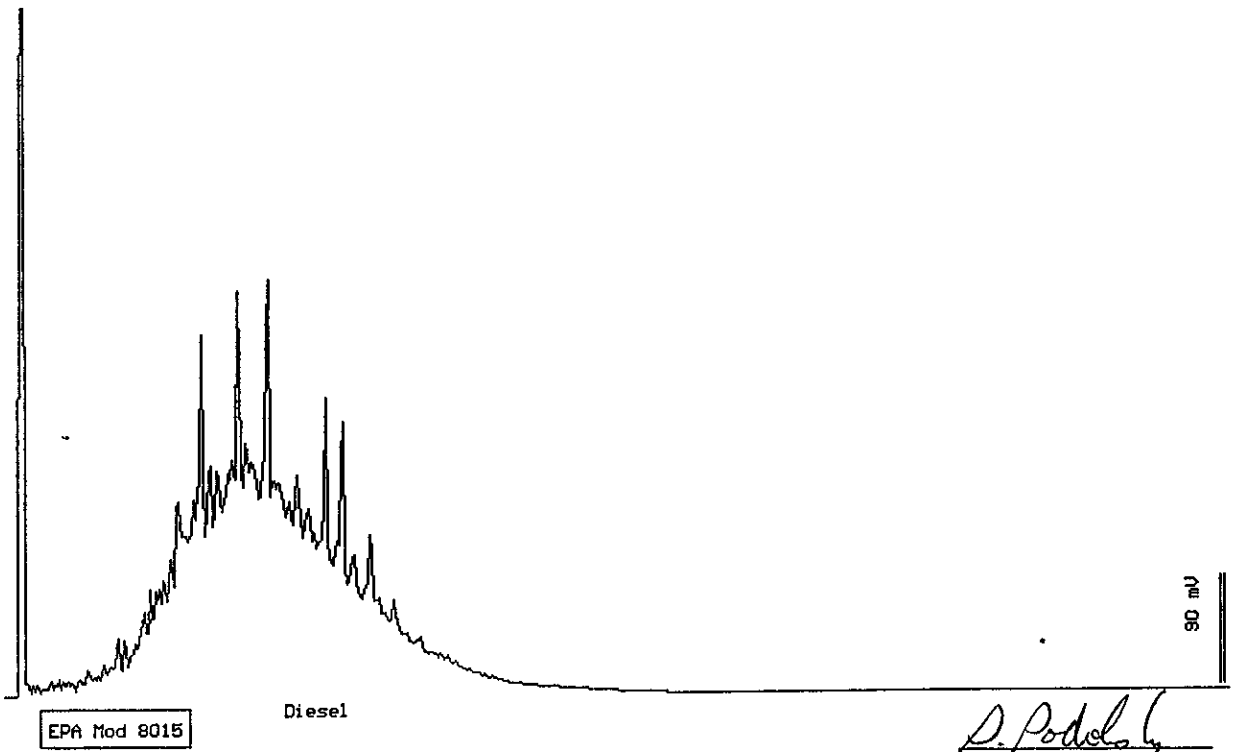
Sample Log 4441
4441-4

Sample: ES13

From : Project # 001088(San Pablo)
Sampled : 05/20/92
Extracted: 05/28/92
Dilution : 1:1 QC Batch : 8029a
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
TPH as Diesel	(10)	1100
TPH as Motor Oil	(10)	<10



EPA Mod 8015

Date: 05-29-92 Time: 03:05:14
Column : 0.53mm ID X 15m DB1 (J&W Scientific)

D. Podolsky

Stewart Podolsky
Senior Chemist

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