BASELINE

COPY

WORK PLAN FOR ENVIRONMENTAL SERVICES

FEBRUARY 1995

670 98TH AVENUE
Oakland, California

For:

City of Oakland
Oakland, California

93343-F0

should also indicate RWQCB

5900 Hollis Street, Suite D • Emeryville, CA 94608 • (510) 420-8686

CITY OF OAKLAND
TRANSMITTAL SLIP

DATE 8 Dec. 95

TO: Eva Chu

FROM: Gary Galindo
Baseline's

SUBJECT: Workplan for Environmental Services

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( ) Review
( ) See Me Re This
( ) Comment/Recommendation
( ) Approval/Signature
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REMARKS:

400-256 (11/67)

BASELINE

ENVIRONMENTAL CONSULTING

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TRANSMITTAL

TO: Mr. Andrew Clark-Clough
City of Oakland
Dept.of Public Works
1333 Broadway, Suite 330
Oakland CA 94612

DATE: 1 February 1995
PROJECT NO.: 93343-F0
Via:
Mail: X
Fed Ex: ____
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SUBJECT: Work Plan for Environmental Services, 670 98th Ave., Oakland CA

ENCLOSED PLEASE FIND:

Copies	Description
5	Reports

__X__ As requested
___ For your use
___ For your signature
___ For your review and comment
___ Returned after loan to us
___ ____

COMMENTS:

cc: Eva Chu, Alameda County Dept. of Environmental Health (w/enclosure)
SFRWQCB (w/enclosure)

TRANSMITTED BY:

Kevin O'Dea, Senior Geologist

5900 Hollis Street, Suite D • Emeryville, CA 94608 • (510) 420-8686 • FAX (510) 420-1707
Emeryville *Petaluma*

BASELINE

ENVIRONMENTAL CONSULTING

1 February 1995
93343-F0

Mr. Andrew Clark-Clough
City of Oakland
Department of Public Works
1333 Broadway, Suite 330
Oakland, CA 94612

Subject: Work Plan for Environmental Services, 670 98th Avenue, Oakland, California

Dear Andrew:

Enclosed please find five copies of the Work Plan for Environmental Services at 670 98th Avenue, Oakland. The work plan proposes an inspection of the site and collection of groundwater samples to assess the current site status. Based on the results of the proposed field work, BASELINE would provide recommendations regarding further investigation and/or remediation at the site. Upon your direction, we are submitting a copy of the Work Plan to Ms. Eva Chu of the Alameda County Department of Environmental Health and to the San Francisco Bay Regional Water Quality Control Board. If you have and questions or comments, please contact us at your convenience.

Sincerely,

Yane Nordhav
Principal
R.G. No. 4009

Kevin O'Dea
Senior Geologist
C.E.G. No. 1702

YN/KOD/dh
Enclosures
cc: Eva Chu, Alameda County Department of Environmental Health
San Francisco Bay Regional Water Quality Control Board

93343fwk.pln-1/25/95

5900 Hollis Street, Suite D • Emeryville, CA 94608 • (510) 420-8686 • FAX (510) 420-1707
Emeryville *Petaluma*

WORK PLAN FOR ENVIRONMENTAL SERVICES

FEBRUARY 1995

670 98TH AVENUE
Oakland, California

For:

City of Oakland
Oakland, California

93343-F0

BASELINE Environmental Consulting
5900 Hollis Street, Suite D • Emeryville, California 94608
(510) 420-8686

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ENVIRONMENTAL SERVICES
670 98th Avenue
Oakland, California

INTRODUCTION

BASELINE Environmental Consulting has been retained by the City of Oakland to evaluate the current status of groundwater quality at 670 98th Avenue, Oakland (Figure 1). In 1989 and 1990, environmental investigations and interim remedial activities were conducted at the site. Since that time, no further work has been performed. The purpose of the proposed work is to assess the current condition of the groundwater monitoring wells and whether there have been any significant changes in groundwater quality since the interim remedial activities were performed. The review of previous investigations and the proposed groundwater sampling will form the basis for future recommendations for continued investigation at or near the project site.

BACKGROUND

The site was occupied by a Union 76 service station from about 1947 through 1983. An old station building and underground tank that occupied the site were removed in 1966. During that same year, a new station building, two 10,000-gallon underground gasoline tanks, and one 230-gallon waste oil tank were installed at the site. The station building was demolished and the underground storage tanks were removed in 1983.[1]

A Richfield service station was located at 670 98th Avenue, north of the site, from about 1949 to 1963. In 1970, four 1,000-gallon underground storage tanks were removed from that site; the contents and former tank locations are not known.[2]

In 1989, during the widening of 98th Avenue, workers encountered contaminated soil while excavating a water line trench at the project site. Soil samples collected from the trench were found to contain up to 350 mg/kg total petroleum hydrocarbons (TPH).

A preliminary soil investigation was conducted by Subsurface Consultants, Inc. to assess the extent of soil affected by petroleum hydrocarbons at the project site. Soil samples were collected from 14 soil borings (Figure 2). TPH was identified in soil samples collected from all 14 boring locations. The highest concentrations were generally detected in soil samples collected at or immediately below the groundwater table. A summary of analytical results for soil samples collected at the project site is included in Table 1.

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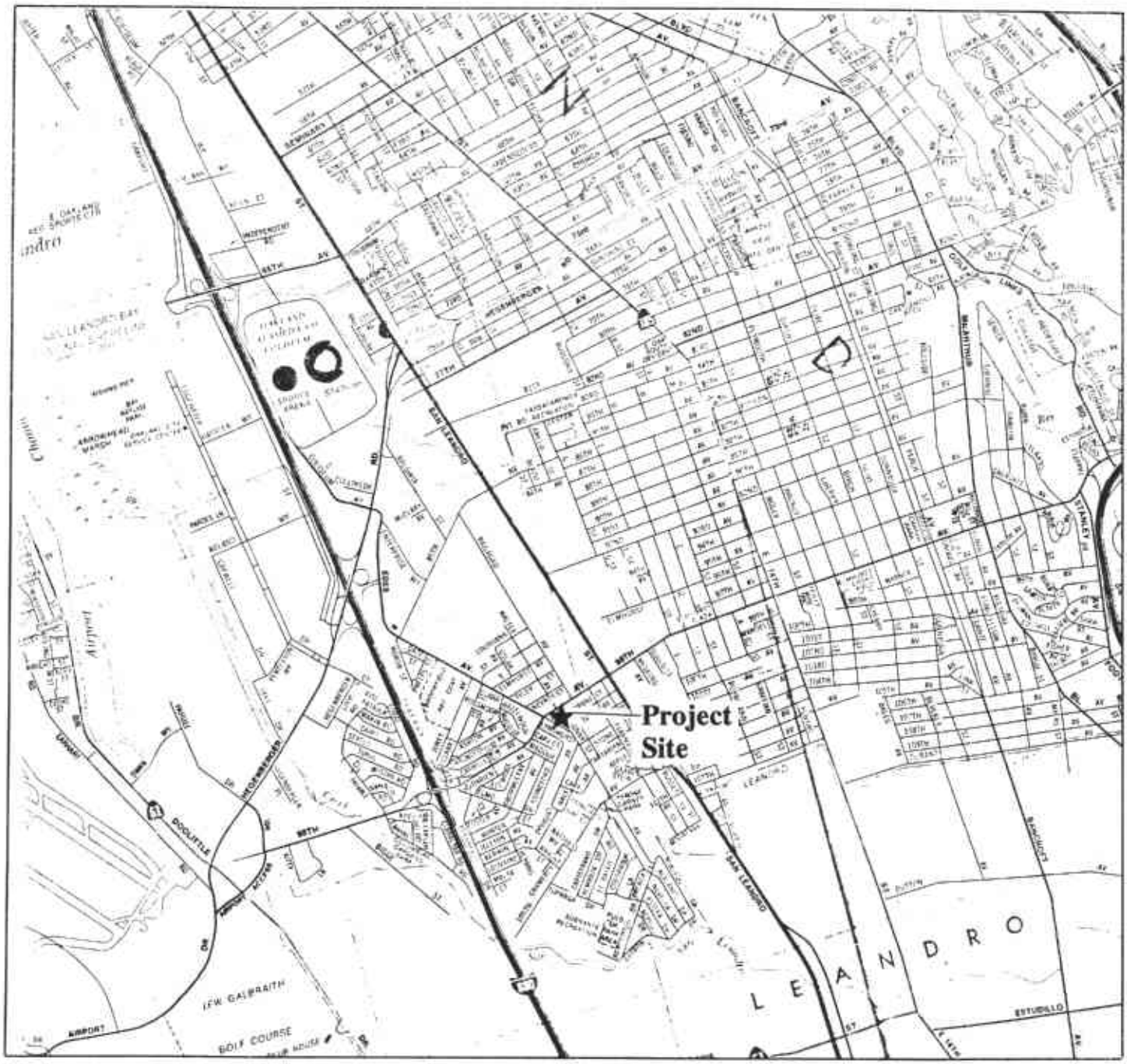
[1]Subsurface Consultants, Inc., 1989, *Preliminary Contaminated Soil Assessment, 98th and Edes Avenues, Oakland, California*, 17 July.

[2]Subsurface Consultants, Inc., 1990, *Soil and Groundwater Contamination Assessment, Phase 2, 98th and Edes Avenues, Oakland, California*, 10 April.

REGIONAL LOCATION

Figure 1



670 98th Avenue
Oakland, California

0 0.5 Miles

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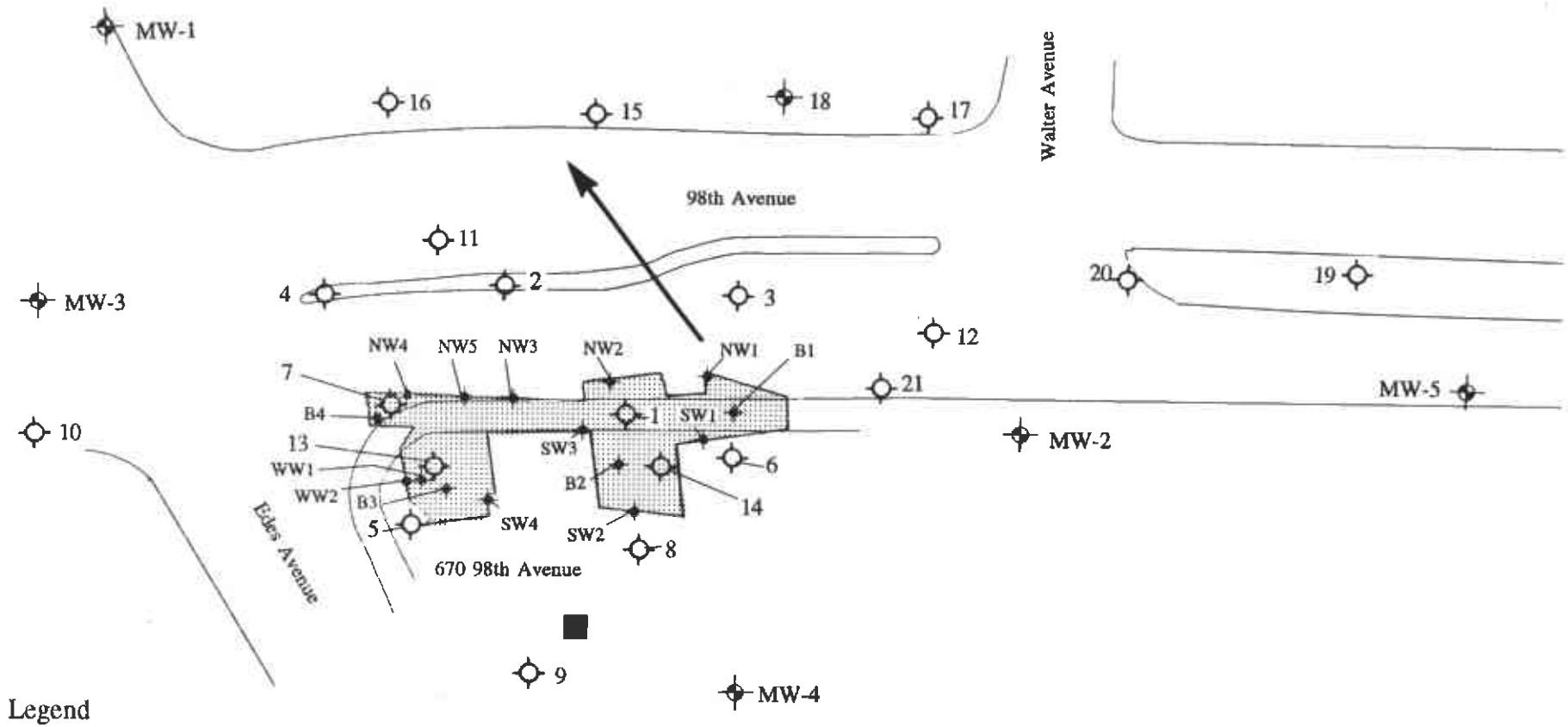
SITE PLAN

Figure 2



Legend

MW-5 — Groundwater Monitoring Well

2 — Soil Boring

Former Waste Oil Tank Location

SW-1 — Excavation Sidewall or Base Soil Sample Location

Groundwater Flow Direction, March 1990

Areas of Previous Excavation

Approximate

0 50 Feet

670 98th Avenue
Oakland, California

Source: Subsurface Consultants, Inc., 1990.

93343-FO 1/26/95

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TABLE 1

SUMMARY OF ANALYTICAL RESULTS, SOIL
PETROLEUM AND AROMATIC HYDROCARBONS
670 98th Avenue, Oakland, California

(mg/kg)

Sample ID	Date	Depth (feet)	TPH as Gasoline	TPH as Diesel	Total Oil & Grease	Benzene	Toluene	Ethyl-benzene	Xylenes
Soil Borings									
1	5/25/89	7[1,2]	<10	<10	60	--	--	--	--
		10	1,100	--	--	8.1	2.6	31	120
		13.5	<10	--	--	0.025	0.015	0.052	0.23
2	5/25/89	5	280	--	--	3.1	17	12	72
		9	1,100	--	--	16	31	39	130
		11	13,000	--	--	--	--	--	--
3	5/25/89	4	20	--	--	0.39	0.90	0.33	1.7
		7	<10	--	--	--	--	--	--
		10	260	--	--	1.7	6.2	3.1	26
4	5/25/89	3	14	--	--	0.83	1.1	0.71	3.6
		9	150	--	--	4.7	5.9	6.8	49
5	5/25/89	7	130	--	--	4.7	17	13	58
		10	930	--	--	11	32	20	90
		12	2,600	--	--	--	--	--	--
6	5/25/89	6	<10	--	--	<0.005	<0.005	<0.005	<0.015
		9	45	--	<50	1.1	1.2	2.2	16
7	5/26/89	3[1]	45	--	--	3.7	6.0	2.6	14
		9[1]	200	--	--	5.2	8.3	2.9	16
8	5/26/89	7	<10	--	--	<0.010	0.018	<0.010	<0.020
		9	120	--	--	1.5	0.27	4.7	--
9	5/26/89	8	<10	--	--	0.017	<0.010	<0.010	<0.020
		11	--	--	--	--	--	--	--
10	5/26/89	2	<10	--	--	<0.010	0.048	0.012	0.047
		8	<10	--	--	<0.010	0.12	<0.010	<0.020
11	5/26/89	3	16	--	--	0.94	1.9	0.48	2.5
		8	150	--	--	3.3	6.3	3.4	15
12	5/26/89	4	<10	--	--	<0.010	0.046	<0.010	<0.020
		8	440	<10	--	--	--	--	--
		10	310	--	--	1.5	2.2	2.9	13

(Continued)

Table 1: Summary of Analytical Results, Soil - Petroleum and Aromatic Hydrocarbons *(Continued)*

Sample ID	Date	Depth (feet)	TPH as Gasoline	TPH as Diesel	Total Oil & Grease	Benzene	Toluene	Ethyl-benzene	Xylenes
13	5/26/89	8[1,2]	9,600	67	<50	23	270	190	1,000
		11[1]	25,000	--	--	--	--	--	--
		13	28	--	--	--	--	--	--
14	5/26/89	12.5[1]	730	--	--	--	--	--	--
15	2/9/90	6	ND	--	--	ND	0.003	0.004	0.006
		9.5	0.737	16	--	0.75	8.32	9.25	49.0
		10.5	56.6	1,540	--	39.1	260	96.2	519
16	2/9/90	4	ND	--	--	ND	0.079	ND	0.005
		7	0.641	62	--	0.4	2.13	1.43	8.06
		11.5	10.2	5,650	--	13.1	81.9	25.3	146
17	2/9/90	8	ND	--	--	ND	0.007	ND	ND
		10	ND	ND	--	ND	0.037	0.108	0.444
		11.5	ND	--	--	ND	0.007	0.038	0.135
19	2/9/90	10	ND	--	--	ND	0.007	ND	ND
20	2/9/90	9	ND	--	--	ND	0.007	0.003	0.011
21	2/9/90	7.5	ND	--	--	ND	0.005	0.007	0.016
		9.5	ND	16	ND	ND	0.072	0.280	0.970
		11.5	754	20	--	ND	0.860	0.73	2.73
		13	ND	--	--	ND	0.017	0.024	0.07
Monitoring Wells									
MW-1	2/7/90	8	ND	--	--	0.329	0.007	0.070	0.130
		10.5	ND	732	--	1.690	12.8	9.47	48.3
		12	ND	--	--	0.072	0.004	0.006	0.002
MW-2	2/7/90	6	ND	--	--	ND	ND	ND	ND
		9[2]	ND	293	278	ND	0.355	0.81	3.98
		12	ND	--	--	ND	ND	0.74	3.74
MW-3	2/8/90	6	ND	--	--	ND	ND	ND	ND
		9	14.4	352	840	ND	ND	1.99	10.2
MW-4	2/8/90	4.5	ND	--	--	ND	ND	ND	ND
		10.5	ND	ND	ND	ND	ND	ND	ND
		13.5	ND	--	--	ND	ND	ND	ND
MW-5	2/9/90	9	ND	ND	--	ND	ND	ND	ND
		11	ND	--	--	ND	0.003	ND	ND

(Continued)

Table 1: Summary of Analytical Results, Soil - Petroleum and Aromatic Hydrocarbons *(Continued)*

Sample ID	Date	Depth (feet)	TPH as Gasoline	TPH as Diesel	Total Oil & Grease	Benzene	Toluene	Ethyl-benzene	Xylenes
18	2/9/90	8	ND	--	--	ND	0.008	0.003	0.012
		9.5	0.766	138	ND	0.333	1.39	2.63	11.5
		11.5	0.703	--	--	0.122	0.236	0.552	1.53
Excavation Sidewall Samples[3]									
SW-1	10/90	9	ND	--	--	--	--	--	--
SW-2	10/90	12	81	--	--	--	--	--	--
SW-3	10/90	10	430	--	--	--	--	--	--
SW-4	10/90	9	210	--	--	--	--	--	--
NW-1	10/90	9	ND	--	--	--	--	--	--
NW-2	10/90	10	260	--	--	--	--	--	--
NW-3	10/90	9	420	--	--	--	--	--	--
NW-4	10/90	9	50	--	--	--	--	--	--
NW-5	10/90	9	83	--	--	--	--	--	--
WW-1[1]	10/90	9	2,000	--	--	--	--	--	--
WW-2	10/90	9	140	--	--	--	--	--	--
Excavation Base Samples[3]									
B-1	10/90	10	790	--	--	--	--	--	--
B-2	10/90	13.5	1,700	--	--	--	--	--	--
B-3	10/90	10	1,400	--	--	--	--	--	--
B-4	10/90	10.5	2,100	--	--	--	--	--	--

Notes: -- = Constituent not analyzed or data not available.
<x.x = Constituent not detected at stated reporting limit.
ND = Constituent not detected, reporting limit unknown.
xx = Bolded numbers indicate compounds identified above the level of detection
1989 and 1990 soil samples collected by Subsurface Consultants, Inc.
Monitoring well and soil boring locations are shown on Figure 2.

1 Soil excavated from sample location.
2 Sample also analyzed for purgeable halocarbons (Method 8010); no compounds detected.
3 Collection date of excavation sidewall samples not reported.

In 1990, Subsurface Consultants, Inc., conducted a soil and groundwater investigation to further evaluate subsurface conditions and groundwater quality at the site. Eleven soil borings were drilled, and six of the borings were completed as monitoring wells (MW-1 through MW-5, and 18). The consultants concluded that the former tank locations were the primary source of contamination at the site. Groundwater samples were found to contain TPH, benzene, toluene, xylenes and ethylbenzene (BTXE), and halogenated hydrocarbons. Determination of the groundwater flow direction and distribution of detected contaminants in groundwater indicated that a plume of affected groundwater extended southwestward from the site. The highest concentrations of petroleum hydrocarbons were detected in the groundwater sample from Well 18 (Figure 2). Halogenated hydrocarbons were detected in monitoring wells located upgradient of the former tank locations, suggesting that they might originate from an off-site source.[3] The analytical results of groundwater samples collected at the site are summarized in Tables 2A and 2B.

Subsurface Consultants, Inc. performed quarterly groundwater monitoring during the second and third quarterly periods of 1990. The concentration of contaminants detected in groundwater samples from each well varied, significantly in some cases, during the three quarterly groundwater monitoring events. In general, elevated concentrations of petroleum hydrocarbons were detected in groundwater samples collected from MW-1 and Well 18, but none were detected in samples from MW-4 and MW-5. Halogenated halocarbons were detected in water samples from all wells. The highest concentrations of most of the eight compounds detected were identified in samples from MW-2 and MW-3. The highest concentrations of tetrachloroethene (PCE) were detected in samples from MW-4 (Table 2B).

Based on the results of investigations conducted at the site the consultant proposed a remedial action plan that would include biotreatment of soil and groundwater. In the interim, contaminated soil was excavated from the trench for construction of the water line along the roadway. The trench was also proposed to be used as a groundwater extraction trench. Contaminated soil was excavated within five feet of the centerline of the trench and extended to the groundwater level, approximately ten feet below ground surface. Soil was also excavated from the former on-site gasoline tank locations. The excavation backfill at the former gasoline tank locations was removed until native soil was encountered, 10 to 13 feet below ground surface. The excavated soil was treated by aeration and transported off-site for disposal. About 1,200 cubic yards of materials were removed from the site. Soil samples were collected from the sidewalls and base of the excavation. The analytical results indicated that residual concentrations of TPH ranging from 50 to 2,100 mg/kg remained in the soil on-site.[4]

HYDROGEOLOGY

The site is located in the East Bay Plain and is underlain by fluvial and alluvial fan deposits. The fluvial deposits consist primarily of fine-grained sands, silts, and clays. The alluvial deposits are comprised of a heterogeneous mixture of clay, silt, sand, and gravel. According to soil and well borings drilled at the site, the subsurface materials encountered at the site consist primarily of silty

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[3]Subsurface Consultants, Inc., 1990, op. cit.

[4]Subsurface Consultants, Inc., 1990, *Progress Report, Contaminated Soil Removal Utility Trench Alignment, 98th and Edes Avenues, Oakland, California,* 13 December.

TABLE 2A

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER
PETROLEUM AND AROMATIC HYDROCARBONS
670 98th Avenue, Oakland, California

(mg/L)

Sample ID	Date	TPH as Gasoline	TPH as Diesel	Total Oil & Grease	Benzene	Toluene	Ethyl-benzene	Xylenes
MW-1	2/12/90	**0.0551**	**0.100**	ND	**0.0608**	**0.0119**	ND	**0.0199**
	6/30/90	**0.95/<0.05**	<0.5	--	<0.0005	<0.0005	<0.0005	<0.0005
	10/4/90	**2,940**	<0.2	--	**7.78**	**26.7**	**20**	**20.3**
MW-2	2/13/90	**0.0351**	**0.100**	ND	ND	ND	**0.0013**	**0.004**
	6/30/90	**<0.5/<0.05**	<0.5	--	<0.0005	<0.0005	<0.0005	<0.0005
	10/4/90	**0.0528**	<0.2	--	<0.0005	<0.0005	<0.0005	<0.0005
MW-3	2/13/90	ND	**0.100**	ND	ND	ND	ND	**0.0029**
	6/30/90	**2.6/0.85**	<0.5	--	<0.0005	<0.0005	<0.0005	**0.044**
	10/4/90	**0.0429**	<0.2	--	<0.0005	<0.0005	<0.0005	**0.0085**
MW-4	2/13/90	ND	ND	ND	ND	ND	ND	ND
	6/30/90	**<0.5/<0.05**	<0.5	--	<0.0005	<0.0005	<0.0005	<0.0005
	10/4/90	<0.020	<0.2	--	<0.0005	<0.0005	<0.0005	<0.0005
MW-5	2/13/90	ND	ND	ND	ND	ND	ND	ND
	6/30/90	**<0.5/<0.05**	<0.5	--	<0.0005	<0.0005	<0.0005	<0.0005
	10/4/90	<0.020	<0.2	--	<0.0005	<0.0005	<0.0005	<0.0005
18	2/14/90	**134**	**17**	**120**	**3.73**	**8.92**	**5.43**	**22**
	6/30/90	**26/20**	**2.4**	--	**0.66**	**0.47**	**0.18**	**2.0**
	10/4/90	**4.9**	<0.2	--	**0.082**	**0.04**	**0.19**	**0.635**

Notes: -- = Constituent not analyzed or data not available.
<x.x = Constituent not detected at stated reporting limit.
ND = Constituent not detected; reporting limit unknown.
xx/xx = Duplicate sample.
xx = Bolded numbers indicate compounds identified above the level of detection.
1990 groundwater samples collected by Subsurface Consultants.
Monitoring well locations are shown on Figure 2.

TABLE 2B
SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER
PURGEABLE HALOCARBONS
670 98th Avenue, Oakland, California

(mg/L)

Sample ID	Date	1,1 Dichloro-ethene	1,1 Dichloro-ethane	Total 1,2 dichloro-ethene	1,1,1 Trichloro-ethane	Trichloro-ethene	Dichloro-methane	Tetrachloro-ethene	Chloroform
MW-1	2/12/90	ND	ND	ND	**0.0051**	**0.0118**	**0.009**	**0.0024**	ND
	6/30/90	<0.001	**0.0041**	<0.001	**0.008**	**0.013**	<0.001	**0.0028**	<0.001
	10/4/90	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
MW-2	2/13/90	**0.0071**	**0.0049**	ND	**0.0116**	**0.0251**	**0.0079**	**0.0085**	ND
	6/30/90	**0.0031**	**0.0051**	**0.0048**	**0.015**	**0.035**	<0.001	**0.016**	<0.001
	10/4/90	<0.0005	**0.0024**	<0.0005	**0.0063**	**0.0187**	<0.0005	**0.0068**	<0.0005
MW-3	2/13/90	**0.0057**	ND	ND	**0.0171**	**0.0217**	**0.0692**	**0.0016**	ND
	6/30/90	**0.0013**	**0.0021**	**0.0035**	**0.021**	**0.026**	<0.001	**0.0062**	<0.001
	10/4/90	<0.0005	<0.0005	<0.0005	**0.011**	**0.0245**	<0.0005	**0.0051**	<0.0005
MW-4	2/13/90	ND	ND	ND	**0.0018**	**0.0024**	**0.0153**	**0.0674**	ND
	6/30/90	<0.001	<0.001	<0.001	**0.0027**	**0.003**	<0.001	**0.26**	<0.001
	10/4/90	<0.0005	<0.0005	<0.0005	**0.0011**	**0.0028**	<0.0005	**0.0955**	**0.0007**
MW-5	2/13/90	ND	ND	ND	**0.0013**	**0.001**	ND	**0.0014**	ND
	6/30/90	<0.001	<0.001	<0.001	**0.0013**	<0.001	<0.001	**0.0021**	<0.001
	10/4/90	<0.0005	<0.0005	<0.0005	**0.0005**	<0.0005	<0.0005	**0.0007**	<0.0005
18	2/14/90	ND	ND	ND	ND	ND	ND	ND	ND
	6/30/90	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	10/4/90	<0.005	<0.005	<0.0005	**0.009**	**0.091**	<0.005	**0.006**	<0.0005

Notes: -- = Constituent not analyzed or data not available.
<x.x = Constituent not detected at stated reporting limit.
ND = Constituent not detected; reporting limit unknown.
xx = Bolded numbers indicate compounds identified above the level of detection.
1990 groundwater samples collected by Subsurface Consultants.
Monitoring well locations are shown on Figure 2.

and sandy clays to depths of approximately 12 to 15 feet below ground surface. This is underlain by a gravelly sand. Clay, sandy clay, and clayey sand layers were observed to a depth of approximately 24 feet below ground surface in most of the borings.

The direction of groundwater flow at the site was calculated to be toward the west in March 1990. The depth to groundwater measured in the monitoring wells at the site in 1990 ranged from about eight to ten feet below ground surface.

PROPOSED FIELD INSPECTION/GROUNDWATER SAMPLING

BASELINE proposes to inspect the six groundwater monitoring wells installed at the site and assess whether any damage occurred to the wells during the 98th Avenue road widening project. Groundwater samples would be collected from accessible wells. Water levels and the presence of floating product would be checked in each well using a dual-interface probe. Approximately three to five well volumes of water would be pumped from each of the wells at a low rate using a double-diaphragm pneumatic pump and clean, disposable polyethylene tubing until field measurements of pH, temperature, and conductivity had stabilized.

After the water levels had sufficiently recovered, groundwater samples would be collected from each well using individual disposable PVC bailers, and decanted into appropriate sample containers provided by the analytical laboratory. The groundwater samples would be labeled, placed in a cooler containing ice, and transported to a California-certified analytical laboratory for TPH as gasoline (Method 5030/8015M), TPH as diesel (Method 3550/8015M), BTXE (Method 8020), purgeable halocarbons (Method 8010), and total lead (Method 7421) analyses. A blank water sample would be prepared with distilled water provided by the analytical laboratory and submitted with the groundwater samples to the laboratory for quality control purposes for TPH as gasoline, BTXE, and purgeable halocarbons analyses.

All field work would be performed under the supervision of California-registered geologist and in accordance with State and local guidelines and regulations, BASELINE's Site Safety Plan prepared for the site, and accepted industry practices.

Decontamination

The dual-interface probe would be cleaned prior to use and between each well using a trisodium phosphate (TSP) and water solution and rinsed with deionized water. Only new, disposable bailers and tubing would be introduced into each well. Purge water generated during sampling activities would be placed in labeled, sealed drums, temporarily stored on-site pending receipt of analytical results.

SUMMARY REPORT

A summary report would be prepared following receipt of analytical results. The report would document field activities, present analytical results, and provide conclusions and recommendations for additional investigation and/or remediation at the site.