



ENVIRONMENTAL STRATEGIES CORPORATION

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July 13, 1992

Eddy So
Water Resources Control Engineer
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 200
Oakland, CA 94612

Ms. Susan Hugo
Hazardous Material Specialist
Alameda County Department of Environmental Health
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, CA 94612

Re: Former Boysen Paint Company
1001 42nd Street, Oakland, California

Dear Eddy So and Ms. Hugo,

On behalf of Grow Group, Inc., enclosed please find two copies of "Workplan for Supplemental Soil and Groundwater Investigation" for the referenced property.

The report outlines additional subsurface investigation in the area of an existing underground tank at the former Boysen Paint Company and is responsive to your October 25, 1991 correspondence to Mr. David B. Russell of Grow Group, Inc.

Following your review, we would like to arrange a meeting to discuss the workplan and our proposed activities. Please don't hesitate to call if you have any questions or need additional information.

Sincerely yours,

A handwritten signature in cursive script that reads "Richard E. Freudenberger".

Richard E. Freudenberger
Senior Vice President

REF:ljw

cc: Henry W. Jones, Grow Group, Inc.

bcc: Gerhard Harnack
David B. Russell, Esquire

enclosure



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**WORKPLAN FOR
SUPPLEMENTAL SOIL AND GROUNDWATER INVESTIGATION
FORMER BOYSEN PAINT UNDERGROUND STORAGE TANK
41ST STREET
EMERYVILLE, CALIFORNIA**

**PREPARED FOR
ALAMEDA COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIALS DIVISION
80 SWAN WAY, ROOM 200
OAKLAND, CALIFORNIA 94621**

AND

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
2101 WEBSTER STREET, SUITE 200
OAKLAND, CALIFORNIA 94612**

PREPARED

BY

ENVIRONMENTAL STRATEGIES CORPORATION

JULY 14, 1992

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Introduction

This workplan has been prepared by Environmental Strategies Corporation (ESC) on behalf of Grow Group, Inc. for submission to Alameda County Department of Environmental Health (DEH) and the California Regional Water Quality Control Board (RWQCB), San Francisco Bay Region. The workplan presents a supplemental soil and groundwater investigation of the area near the former Boysen Paint underground storage tank located on 41st Street, between Adeline and Linden Streets in Emeryville, California. The objective of the investigation is to determine whether or not there was a release from the former Boysen Paint tank and to develop additional information concerning the area-wide groundwater quality, flow direction and other possible sources of contamination. In addition, the investigation will help determine whether to remove the tank or to close the tank in-place. This workplan satisfies the information request for field work, sampling, and analyses contained in the RWQCB's letter of October 25, 1991 to Mr. David B. Russell of Grow Group, Inc.

Survey of Potential Contaminant Sources

In the October 25, 1991 letter, the RWQCB requested that an underground storage tank (UST) at the former Boysen Paint site located on 41st Street be permanently closed. The RWQCB stated that the owner of the UST may select to close the tank in-place or remove it from the site and that the applicable provisions of Chapter 6.5 of Division 20 of the California Health and Safety Code must be complied with. In addition, the above referenced section 2672 (d) states that "the owner of an underground storage tank.....shall demonstrate to the satisfaction of the local agency (Alameda County Department of Environmental Health) that no unauthorized release has occurred...".

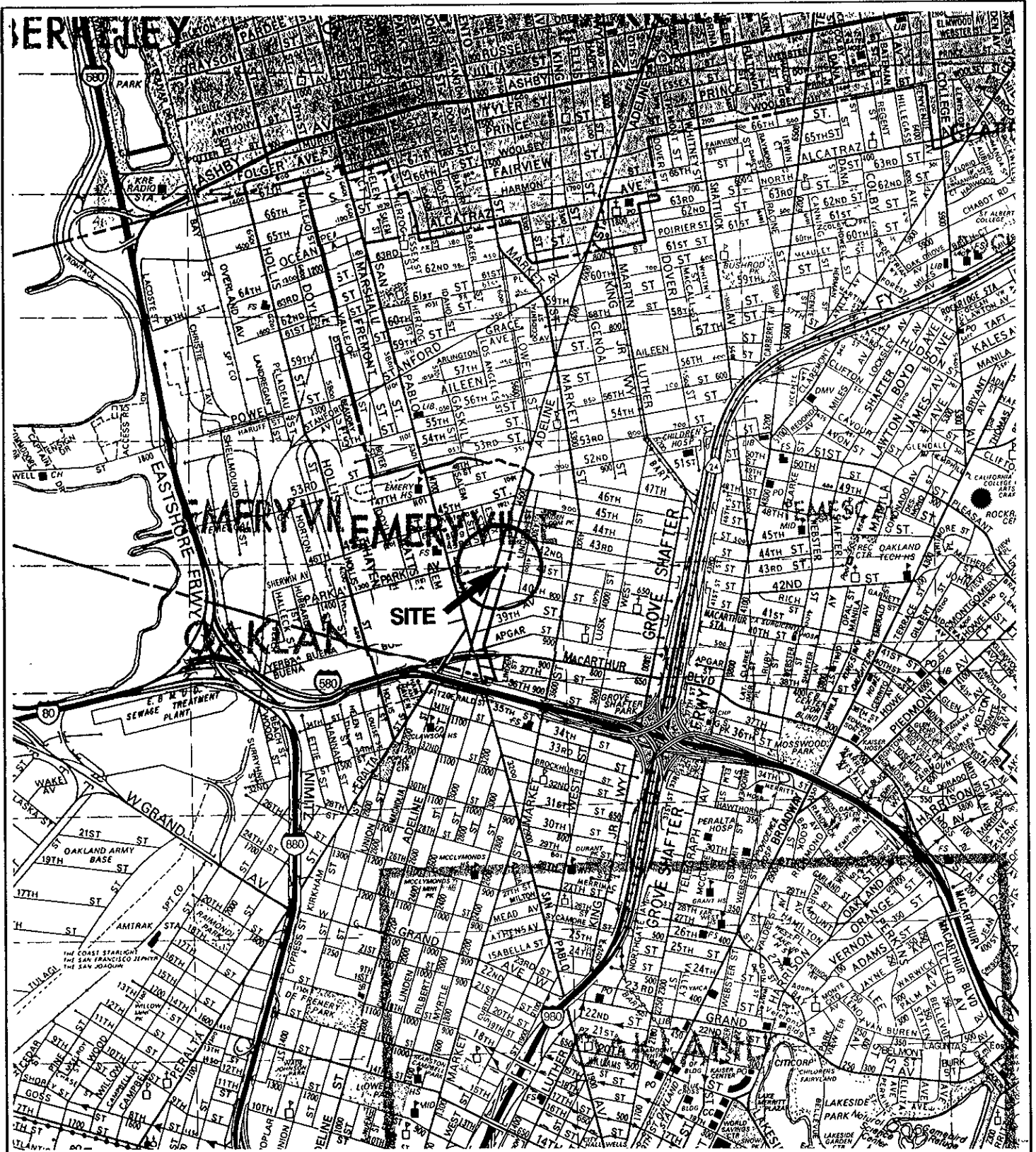
Site Description

The site was formerly owned by Boysen Paint Company, a sister subsidiary to Ameritone Paint Corporation (a wholly owned subsidiary of Grow Group, Inc.). The site is now owned by Edward R. and Elizabeth A. Kozel, operated by Oakland National Engravers, and also contains a furniture restoration shop. There is an underground storage tank that is located on the north side of 41st, approximately 125 feet east of its intersection with Adeline Street, in Emeryville, California (Figure 1). The approximately 5000-gallon tank was installed at an unknown date under the sidewalk between the rear of the brick building occupied by Oakland National Engravers and the northern curb for 41st Street (Figures 2 and 3). Boysen used the tank for storing mineral spirits.

Local Geology and Hydrogeology

San Francisco Bay lies in a low area in the central Coast Range geomorphic province of California. The Coast Range is a region of northwest trending faults, hills, and valleys. The former Boysen Paint tank site is located on the flatlands of east San Francisco Bay, approximately one mile east of the edge of the Bay in Emeryville (Figure 4). The Bay is a drowned valley which is thought to have originally formed by erosion by the ancestral Sacramento River (Jenkins, 1951) and subsequently widened by subsidence and a rise in sea level. Quaternary (Pleistocene to recent) sediments deposited in what is now the Bay, include both shallow marine and continental deposits.

The youngest surficial deposit in the area is known as "Bay Mud" and generally occurs in the low lying areas adjacent to the Bay. Bay Mud is composed of unconsolidated, olive gray, blue gray, or black silty clay. Bay Mud is typically highly plastic and varies from soft to stiff in consistency. Organic remains, such as shells and peat,



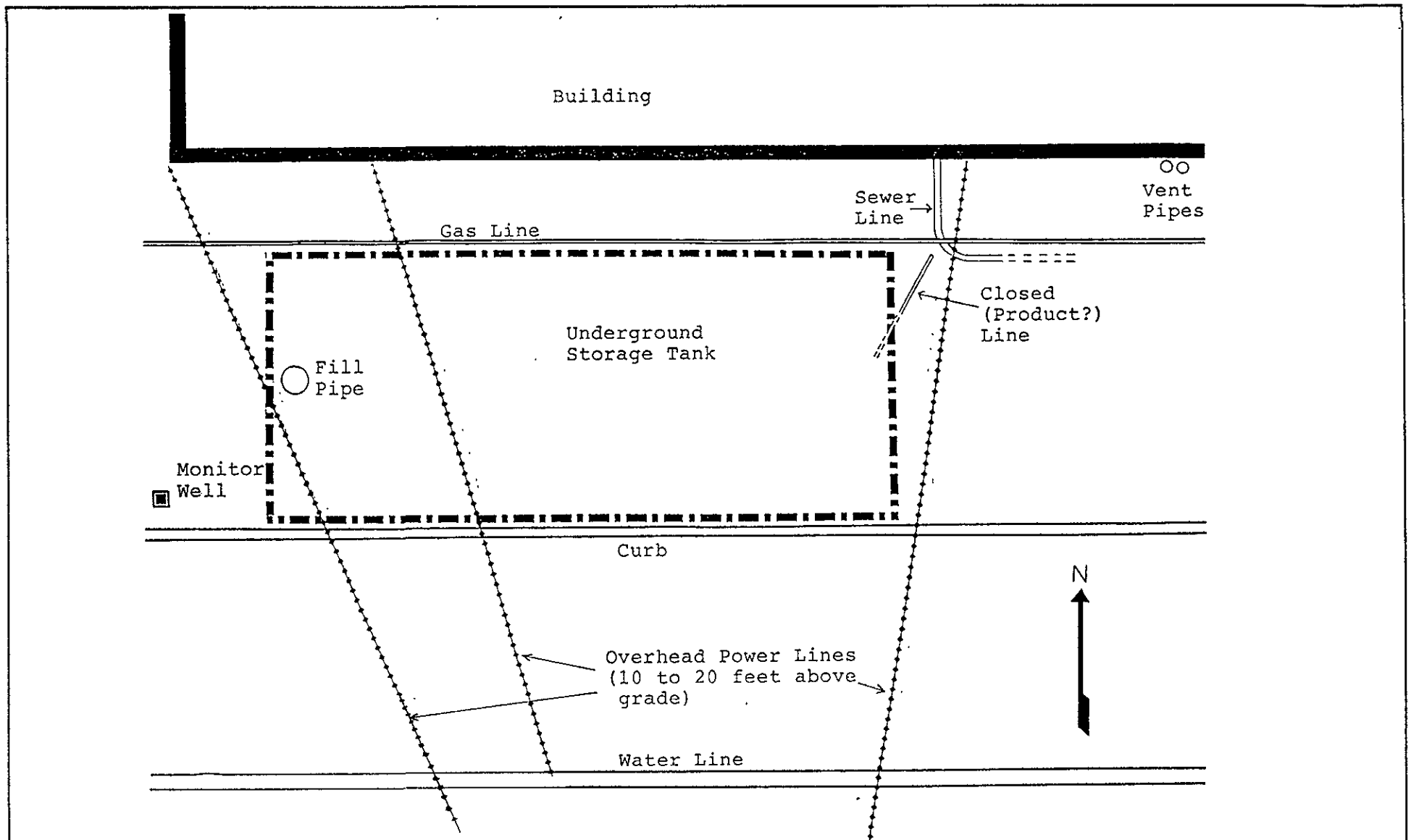
Source: The Thomas Guide, 1988, Alameda and Contra Costa Counties Street & Directory

Scale: 1 inch = 2,200 feet



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Figure 1
 Location Map,
 Former Boysen Paint Company,
 Emeryville, California



Source: UHM Remedial Services Corp., 1991.

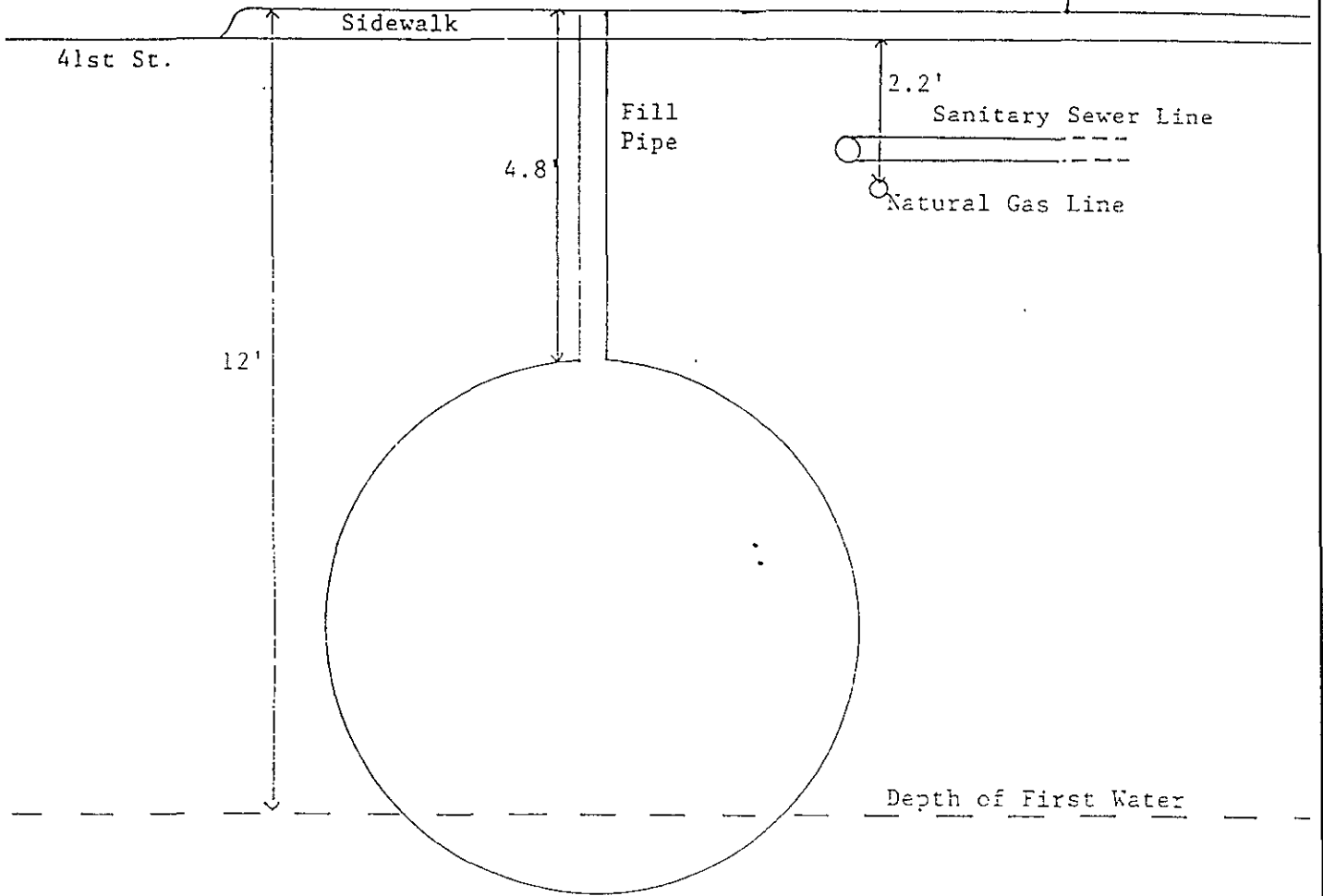
Scale: 1 inch = 4 feet



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Figure 2
 Locations of Underground Storage Tank and
 Proximity to Utility Lines,
 Former Boysen Paint Company,
 Emeryville, California

Building



SCALE

0 1' 2' 3' 4' 5'



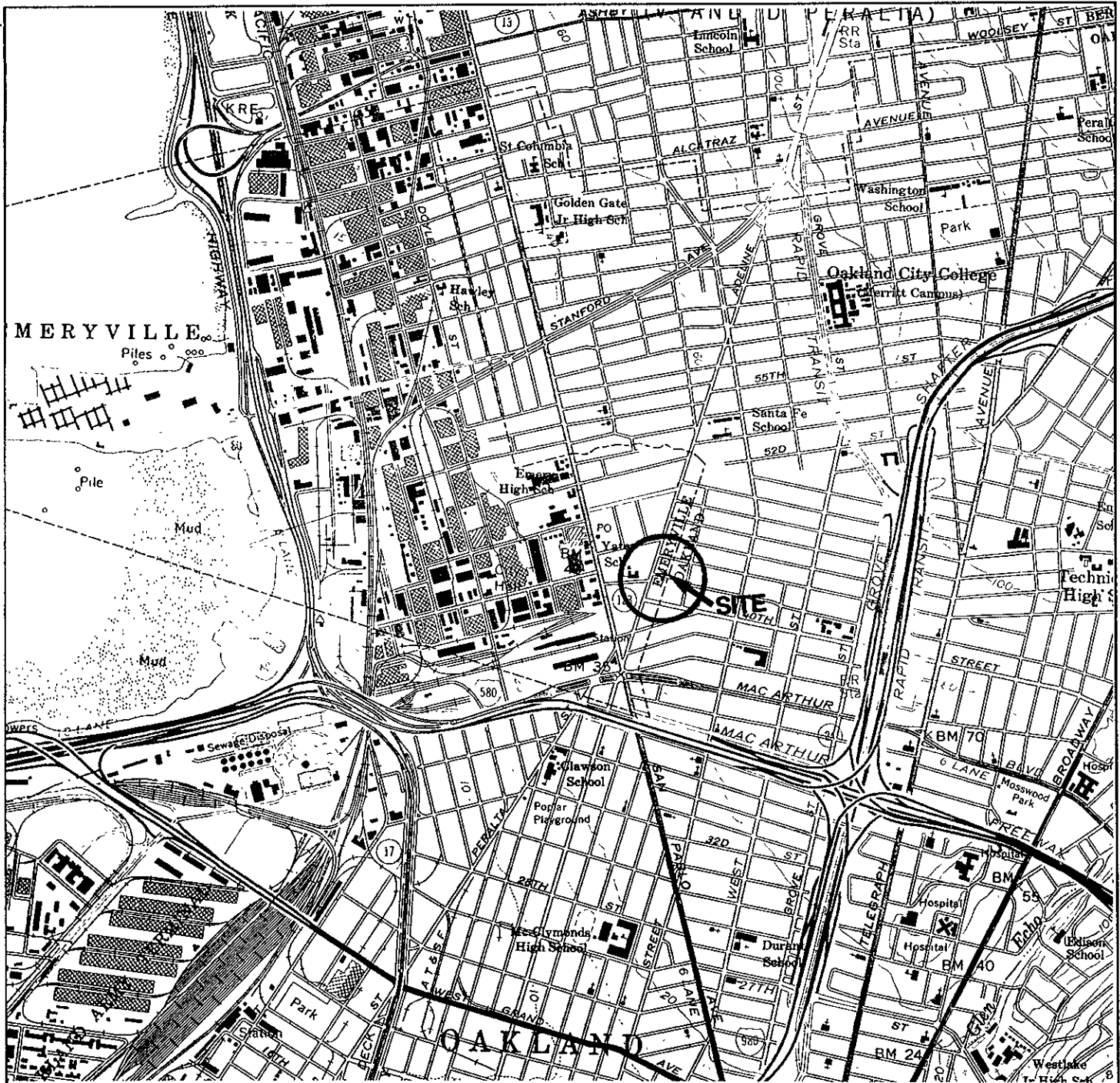
Source: UHM Remedial Services Corp., 1991.

Scale: 1 inch = 2.75 feet

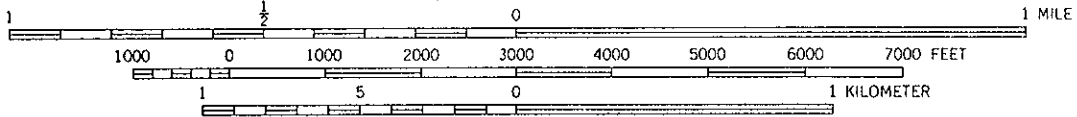


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Figure 3
Cross-Section of Underground Storage Tank and
Proximity to Utility Lines,
Former Boysen Paint Company,
Emeryville, California



SCALE 1:24 000



CONTOUR INTERVAL 20 FEET



QUADRANGLE LOCATION

Source: USGS, 1980, Oakland West, 7.5 Minute Quadrangle, California.



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Figure 4
 Topographic Map of the Emeryville/Oakland Area
 Former Boysen Paint Company,
 Emeryville, California

are not uncommon. Permeability is generally low except where lenses of sand occur. Bay Mud is mainly derived from the sediment load carried by the Sacramento and San Joaquin Rivers and has been deposited in the Bay for almost 10,000 years (Helley et al., 1987) and continues to be deposited today.

In the Oakland area, rocks of the Franciscan Complex form the basement rock in the area and have been reported underlying the Bay Mud at 12th and Clay Streets, approximately 2 miles south of the site (Woodward & Clyde, 1987). The Franciscan Complex is an assemblage of deformed and altered sediments and volcanic rocks which commonly form the basement rock in the San Francisco Bay region.

In May 1990, OHM Remedial Services Corporation (OHM) installed a permanent monitoring well on behalf of Ameritone Paint Corporation at the western end of the former Boysen Paint tank. The permanent well was installed after a temporary well encountered methylene chloride in the groundwater in the area of the tank. According to the lithology of the monitoring well (MW-1), the material at the site consists of stiff silty clay to a depth of approximately 9.5 feet that grades to sandy silt to the final depth of the boring at 22 feet. These silty clays are consistent with Bay Mud, as described earlier. First water was encountered at a depth of approximately 13 feet, then rose and stabilized at 7.76 feet. The groundwater flow direction as determined at the California Linen Rental Company, approximately 200 feet east-southeast of the site, has been reported as flowing in a northwest direction (Miller Environmental Company, 1991).

Summary of Previous Site Investigations

In May 1981, Mr. & Mrs. Edward Kozel purchased the property located at 1001 42nd Street in Oakland, California from the Boysen Paint Company and subsequently Oakland National Engravers began operating on the site. As part of the sale conditions, Boysen Paint removed all tanks known to exist on the property except for a tank that was located in the truck loading area. At the Kozel's request, this tank was left in place. In February, 1987, the tank in the truck loading area was removed by Oakland National Engravers. A monitoring well was also installed by Oakland National Engravers within the excavation. Reportedly, floating organic contamination was observed on the surface of groundwater that entered the excavation during tank removal.

In August 1986, the site owners informed Grow Group, Inc. there existed under the sidewalk on the north side of 41st Street, an underground storage tank reportedly used by the former Boysen Paint Company. In January 1987, Grow Group, Inc. agreed, without admission of liability, to proceed with closure of the subject tank.

In May 1987, OHM conducted a ground penetrating radar (GPR) survey of the site to identify buried structures that may affect proper closure of the tank. The survey identified the limits of the tank and three underground utility lines: a gas line running parallel to the side walk and approximately two feet south of the building; a water pipeline running parallel to the sidewalk approximately seven feet south of the curb; and, an unidentified structure at the eastern end of the tank side (see Figures 2 and 3).

In November 1987, Grow Group, Inc. submitted a plan for the in-place closure of the tank to the Alameda County Department of Environmental Health. This plan was approved by the Department of Environmental Health in December 1987.

On February 9, 1988, OHM installed a temporary groundwater monitoring well adjacent to the former Boysen Paint tank and collected a groundwater sample for chemical analysis. Based on the presence of methylene chloride in the temporary well at 0.72 mg/l and total petroleum hydrocarbons at 610 mg/l, OHM recommended that a permanent groundwater monitoring well be installed on the site, the inspection of associated piping at the east end of the tank, and the removal and disposal of the contents of the tank.

On April 4, 1990, approximately 610 gallons of various materials, including solvents, petroleum hydrocarbons, sludge, and water, were pumped from the tank with a vacuum truck and transported to Solvent Services Inc., in San Jose, California for recycling or disposal at a licensed facility. OHM then removed a portion of the sidewalk to accurately locate the utility lines and structures observed during the 1987 GPR survey. A 2-inch diameter gas line was located 2.75 feet south of and parallel to the building at a depth of 2.2 feet. Other utility lines located during the excavation are shown on Figures 2 and 3. *→ manifest?*

On May 15, 1990, OHM installed a 22 foot deep groundwater monitoring well at the western end of the underground storage tank (see Figure 2). A composite soil sample of cuttings removed from the borehole contained total petroleum hydrocarbons of 250 mg/kg near the former tank. However, part of the soil sample was collected from below the water table and may have been affected by the migration of target constituents in groundwater (OHM, 1991). The soil sample was not analyzed for other constituents. After the well was installed and developed, a groundwater sample was collected and analyzed for total petroleum hydrocarbons (TPH, EPA method 8015) and volatile organic compounds (VOC, EPA method 624). Groundwater contaminants detected in the sample were total petroleum hydrocarbons (57 mg/L), methylene chloride (0.0114 mg/L), and other constituents per EPA method 624 (<0.0025 mg/L; Table 1).

TABLE 1
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS (mg/l)
VICINITY OF FORMER BOYSEN PAINT FACILITY
EMERYVILLE, CALIFORNIA

Site	Location	Date	TPH			meth. chloride	benzene	toluene	ethyl- benzene	xylene
			gasoline	diesel	waste oil					
Boysen	MW-1	5/90	57	NA	NA	0.0114	nd	nd	nd	nd
	MW-1(*)	2/88	610	NA	NA	0.72	nd	nd	nd	nd
CA-Lin	MW-1	1/91	99	1.7	3	NA	4.4	7.4	1.8	8.6
		10/90	50	1.1	nd	NA	3.3	4.0	4.2	4.7
		7/90	34	nd	1	NA	2.0	0.67	0.12	1.5
		2/20	73	2.2	3	NA	7.5	5.9	0.68	5.3
		10/89	70	0.61	nd	NA	2.8	2.4	2.3	4.8
	MW-2	89-91	nd	nd	nd	NA	nd	nd	nd	nd
	MW-3	89-91	nd	nd	nd	NA	nd	nd	nd	nd
Dunne	MW-1	3/90	nd	NA	NA	NA	nd	nd	0.004	0.0013
		4/89	1.6	NA	NA	NA	nd	nd	nd	0.0011
		1/89	NA	NA	NA	NA	nd	nd	nd	0.0018
	MW-2	3/90	0.3	NA	NA	NA	nd	nd	0.003	0.0015
		4/89	1.0	NA	NA	NA	nd	nd	nd	0.0015
		1/89	NA	NA	NA	NA	nd	nd	nd	0.012
EBMUD	#3(**)	1/31/91	NA	NA	NA	nd	nd	nd	nd	nd

* Sample collected from temporary monitor well at approximate location of existing monitor well MW-1.

** Sample of groundwater seeping into trench during piping installation.

Survey of Adjacent Properties

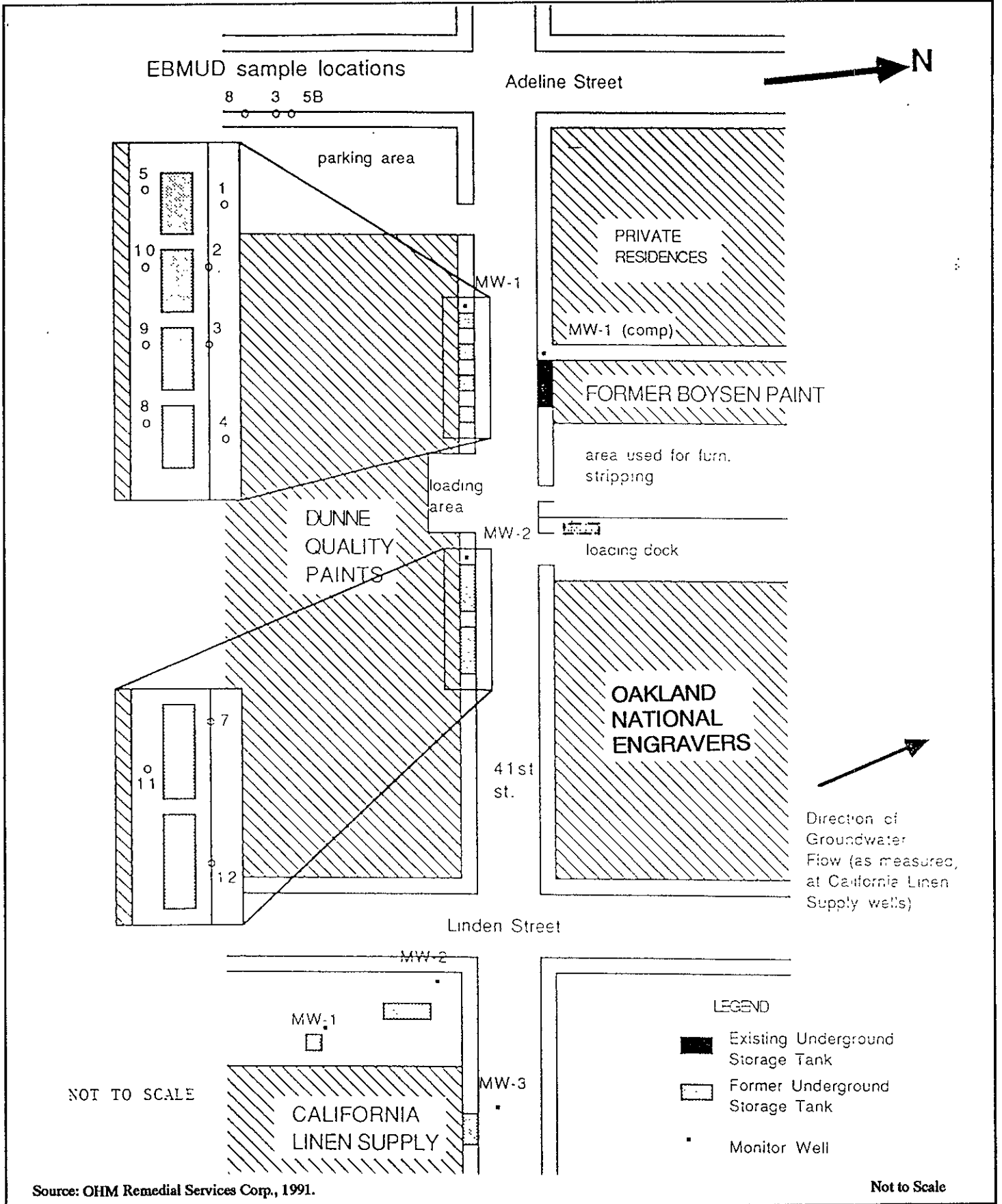
A survey of adjacent facilities was conducted to compile data on potential offsite sources of contamination. Agency lists of contaminated or potentially contaminated sites were examined and files searched.

According to the Alameda County Department of Environmental Health's list of Leaking Underground Storage Tanks dated July 1, 1991, the following sites are under investigation in the vicinity of the site:

Dunne Quality Paints, 1007 41st Street in Oakland, is located south and across the street of the subject site (Figure 5). In February, 1988, Dunne filed an Underground Storage Tank Unauthorized Release (Leak)/Contamination Site Report with RWQCB. In August of 1988, six underground storage tanks were removed. The steel tanks ranged in size from 2000 gallons to 6000 gallons and were apparently used to store paint thinner. Before the tanks were removed, an investigation was performed to characterize the soils contamination adjacent to the tanks. Undisturbed soil samples that were collected from 12 soil borings to depths of 17 feet indicated the presence of TPH as paint thinner at concentrations as high as 27,391 mg/kg.

Three of the four tanks located west of the Dunne loading area were removed intact. A small leak was noted in the westernmost of the four tanks during removal. The two tanks located east of the Dunne loading area were damaged during removal. Grab soil samples were collected from the sidewalls and were analyzed for TPH and benzene, toluene, xylene, and ethyl benzene using EPA Methods 8015 and 8020 at depths of 6.5 to 9 feet below the ground surface. The samples contained TPH concentrations as high as 14,100 mg/kg (see Table 1). This indicates that not all contamination was removed during the removal of the tank. As part of the tank removal, 60 cubic yards of contaminated soil were excavated. The soil was aerated on-site and disposed at a Class II landfill.

After the tanks were removed, two monitoring wells were installed in the excavations on the Dunne site (Figure 5). The bottoms of the monitoring wells were set approximately four feet below the tank bottom elevation. Pea gravel was placed in the excavations and compacted to sub-grade. The wells were sealed with concrete slurry and fitted with a locking well cap and box. The wells were installed so that the groundwater could be sampled after the tank excavation holes were closed. Results of groundwater samples collected from the wells in August 1988, January and April 1989, and March 1990 indicated the presence of TPH (0.3 to 1.6 mg/L), xylene (0.0013 to 0.012 mg/L), and ethylbenzene (0.003 to 0.004 mg/L; Table 2).



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Figure 5
Locations of Present and Former Underground Storage Tanks, Former Boysen Paint Company, Emeryville, California

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS (mg/kg)
VICINITY OF FORMER BOYSEN PAINT FACILITY
EMERYVILLE, CALIFORNIA

Site	Location	Depth	Date	TPH light (C8-C15)	TPH heavy (diesel)	waste oil	benzene	toluene	ethyl- benzene	xylene	
Boysen	comp	0-15'	5/90	250	NA	NA	NA	NA	NA	NA	
CA-Lin	MW-1	4'	10/89	140	36	41	5.3	2.2	2.9	16	
	MW-2	4'	10/89	nd	nd	190	nd	nd	nd	nd	
Dunne	1	3'	1/88	<20	NA	NA	NA	NA	NA	NA	
		8'	1/88	<20	NA	NA	NA	NA	NA	NA	
		10'	1/88	41	NA	NA	NA	NA	NA	NA	
	2	9'	1/88	10,080	NA	NA	NA	NA	NA	NA	
		3	3'	1/88	<20	NA	NA	NA	NA	NA	NA
			10'	1/88	226	NA	NA	NA	NA	NA	NA
	4	14'	1/88	<20	NA	NA	NA	NA	NA	NA	
		6'	1/88	150	NA	NA	NA	NA	NA	NA	
		10'	1/88	638	NA	NA	NA	NA	NA	NA	
	5	6'	1/88	<20	NA	NA	NA	NA	NA	NA	
		10'	1/88	586	NA	NA	NA	NA	NA	NA	
	6	6'	1/88	986	NA	NA	NA	NA	NA	NA	
10'		1/88	102	NA	NA	NA	NA	NA	NA		
7	6'	1/88	27,362	NA	NA	NA	NA	NA	NA		
	10'	1/88	8,362	NA	NA	NA	NA	NA	NA		
8	6'	1/88	27,391	NA	NA	NA	NA	NA	NA		
	10'	1/88	13,845	NA	NA	NA	NA	NA	NA		
9	6'	1/88	3,472	NA	NA	NA	NA	NA	NA		
	10'	1/88	1,193	NA	NA	NA	NA	NA	NA		
10	6'	1/88	5,549	NA	NA	NA	NA	NA	NA		
	10'	1/88	6,491	NA	NA	NA	NA	NA	NA		
11	6'	1/88	503	NA	NA	NA	NA	NA	NA		
	10'	1/88	120	NA	NA	NA	NA	NA	NA		
12	6'	1/88	15,140	NA	NA	NA	NA	NA	NA		
	10'	1/88	284	NA	NA	NA	NA	NA	NA		
EBMUD	5B	13.5'	1/91	NA	NA	NA	nd	nd	nd	nd	
	8	5.75'	1/91	2,000	NA	NA	nd	nd	nd	nd	

In February 1991, East Bay Metropolitan Utility District (EBMUD) encountered contaminated soil during construction of the Adeline Street Interceptor. The utility trench crossed 41st Street along the eastern edge of Adeline Street (see Figure 5). Grab soil and groundwater samples were collected and selected samples were analyzed using EPA Methods 8240, 8270, and 624. One soil sample (no. 8, see Figure 5) contained TPH at a concentration of 2,000 mg/kg (see Table 1). Further examination of laboratory results determined that the TPH detected was consistent with Stoddard Solvent. Groundwater collected at a depth of 15 feet had no contaminants above minimum detection levels (see Table 2). Soil and groundwater samples collected during this investigation were not analyzed for methylene chloride. EBMUD removed the contaminated soil from this area and disposed the material at a local landfill. EBMUD reviewed Agency files and identified Dunne, California Linen, and Oakland National Engravers as potential sources of the EBMUD-identified contamination. On April 2, 1991, EBMUD submitted a letter to Dunne requesting that Dunne remove the contaminated soil from the local landfill and properly dispose of the material. EBMUD indicated in this letter that it had informed California Linen and Oakland National Engravers of the contamination, but that Dunne was the closest potential source to the Adeline Interceptor and that the composition of contaminants were similar to those identified at the Dunne site. On April 6, 1991, Dunne entered into an agreement with EBMUD to dispose of the contaminated soil, while denying any liability.

Based on Dunne's location with respect to the subject site and the groundwater flow direction in the immediate area, evidence that a contaminant source may remain in subsurface soils at Dunne, and groundwater contamination found in monitoring wells at the Dunne site, past releases from the Dunne site may be affecting soil or groundwater at the subject site (see Figure 5).

California Linen Rental Company, 989 41st Street in Oakland, is located southeast (up gradient) of the site. The RWQCB list indicates that California Linen Rental Company (California Linen) had three underground storage tanks removed in February 1989. The tanks consisted of a 10,000 gallon gasoline tank, a 2,500 gallon #5 fuel oil tank, and a 550 gallon unleaded gasoline fuel tank (see Figure 5).

Upon removal of the tanks, soil and groundwater were collected from the excavation for chemical analysis using EPA methods 418.1 and 8015. The water sample contained concentrations of oil and grease at 14 mg/L and TPH as diesel at 0.520 mg/L. In February 1989, California Linen filed an Underground Storage Tank Unauthorized Release (Leak)/Contamination Site Report for the site.

In September, 1989, three monitoring wells were installed on the site, one adjacent to each former storage tank (see Figure 5). Soil samples collected from wells MW-1 and MW-2 contained TPH (36 to 140 mg/kg), waste oil (41 to 190 mg/kg), benzene (5.3 mg/kg), toluene (2.2 mg/kg), xylene (16 mg/kg), and ethylbenzene (2.9 mg/kg; see Table 2). Groundwater samples collected from MW-1 contained concentrations of TPH (gasoline, 34 to 99 mg/L; diesel, non-detectable (ND) to 2.2 mg/L; waste oil, ND to 3 mg/L), benzene (2.0 to 7.5 mg/L), toluene (0.67 to 7.4 mg/L), ethylbenzene (0.12 to 4.2 mg/L), and xylene (1.5 to 8.6 mg/L; Table 1). Groundwater samples collected from MW-2 and MW-3 had no contaminants above the minimum detection limit. Soil and groundwater samples collected for the California Linen investigation were not analyzed for methylene chloride. Measurement of groundwater levels in the California Linen monitoring wells indicate an apparent northerly flow direction.

On April 15, 1991, Alameda County Health Care Services Agency suggested that California Linen remove and treat or dispose of groundwater from MW-1 before closure. No further information is available concerning any ongoing remedial activities at the site.

Supplemental Site Investigation

Environmental Strategies Corporation (ESC) has reviewed available data on the adjacent sites as summarized in the preceding sections and has identified several data gaps that need to be addressed before design and implementation of tank closure at the former Boysen site can take place. ESC has developed the following investigation plans to characterize any soil contamination and to further delineate the groundwater contamination in the immediate area of the former Boysen Paint tank. These plans address the following major issues and possible source areas:

- determine the effects of releases, if any, from the Boysen tank on soils in the tank's immediate vicinity.
- determine the possible effects on soil and groundwater from any releases from the former Dunne underground storage tanks across 41st Street, south of the Boysen tank, and California Linen, east-southeast of the site.

Soil Investigation - Former Boysen Tank

In November 1987, a work plan for the in-place closure of the former Boysen Paint tank was submitted to the Alameda County Department of Environmental Health. This plan was approved by the Department of Environmental Health in December 1987.

In 1988, a temporary groundwater monitoring well revealed the presence of TPH and methylene chloride in the well. In April 1990, approximately 610 gallons of tank materials (i.e., solvents/petroleum hydrocarbons, sludge, and water) were pumped from the tank. In May 1990, soil and groundwater samples collected during the installation of a permanent monitoring well indicated the continuing presence of TPH and methylene chloride near the tank.

Soil and groundwater studies performed by others indicate that there are potential offsite sources of contamination in the vicinity of the site.

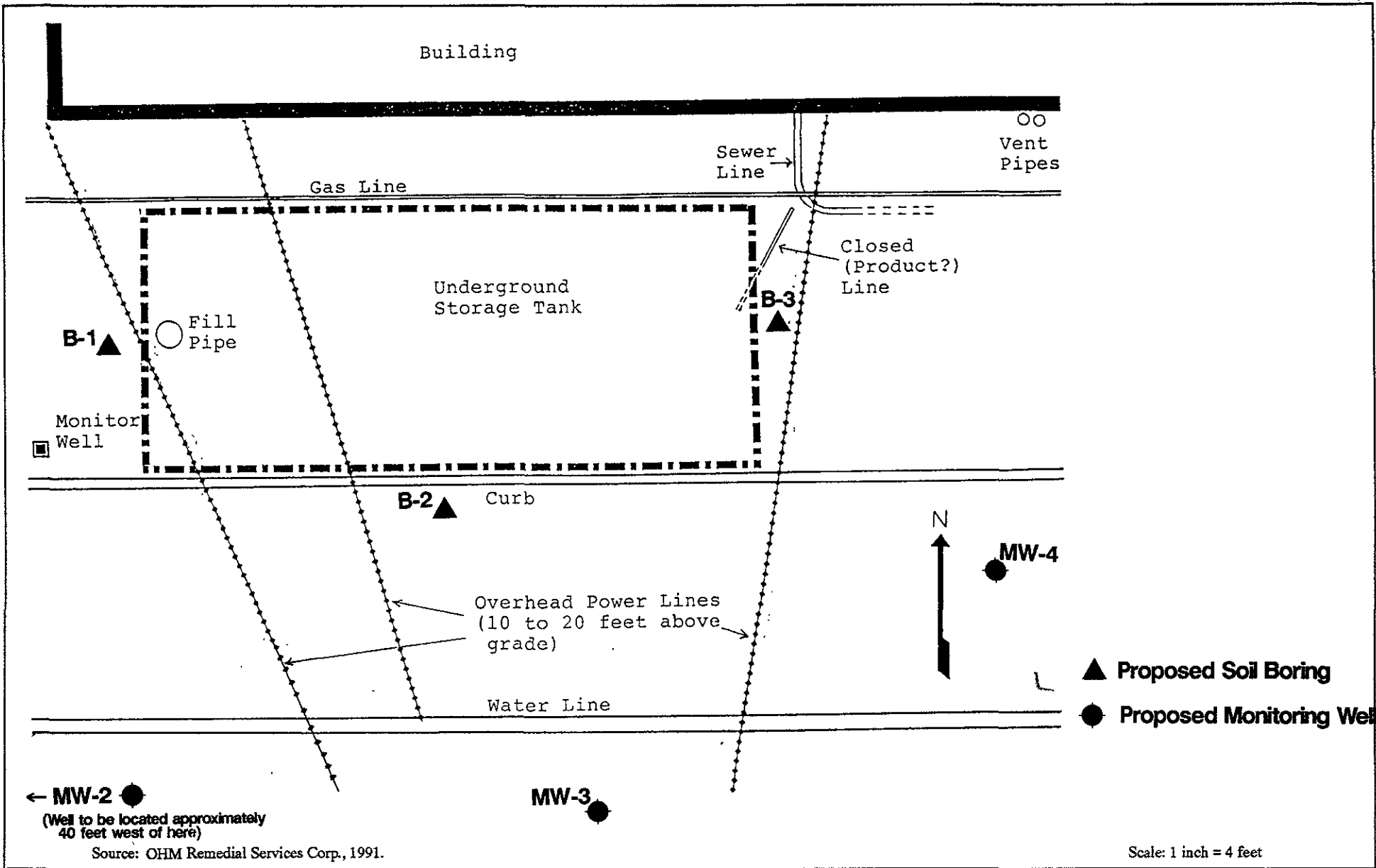
These findings indicate that contamination sources for TPH and VOCs are not well delineated and require further investigation near and in the vicinity of the tank near the former Boysen Plant.

ESC proposes the following investigation plan to provide further delineation of the existing soil and groundwater conditions in the area and to determine whether closure of the tank should be performed in-place or by removal.

- Three borings, B-1, B-2, and B-3 (Figure 6) will be drilled to the groundwater table with soil sampling on the western, southern, and eastern edges of the tank (Figure 6). The purpose of the borings will be to determine if soil contamination exists adjacent to the former Boysen tank. Soil samples will be collected continuously for geologic characterization and every five feet for chemical analysis using EPA methods 8240 and 8015.
- At least three borings, MW-2, MW-3, and MW-4, will be drilled approximately 15 to 20 feet south and southeast of the tank with soil sampling to the groundwater table (Figure 6). Groundwater monitoring wells will be installed in these borings and groundwater samples will be collected and analyzed. Groundwater samples will also be collected from the existing well on Oakland National Engravers property and the two wells on the Dunne property. The purpose of the borings will be to establish soil and groundwater contaminant levels in the area and determine if upgradient source(s) may be impacting the area of the former Boysen Paint tank. Soil samples will be collected every five feet for geologic characterization and chemical analysis using EPA methods 8240 and 8015.

Field Methods

Borings will be drilled using a truck or trailer-mounted solid or hollow-stem auger rig fitted with 6 or 8.25 inch outside diameter (O.D.) augers. Augers, samplers, and drilling tools will be steam-cleaned before drilling each boring. Samples will be obtained using either a 3 inch inside diameter (I.D.), five-foot-long continuous sampler or closely spaced split-spoon sampler drives. When drive samplers are used, a 140-pound hammer falling 30 inches will be used to drive the sampler, and blow counts will be recorded for every six inches of penetration to help evaluate the consistency of the materials. All efforts will be made to maximize the recovery of sampled intervals. Soil cores will be logged in the field by an ESC geologist using the Unified Soil Classification System, under the supervision of a California Registered Geologist or Professional Engineer.



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Figure 6
 Locations of Proposed Soil Borings and
 Monitoring Wells,
 Former Boysen Paint Company,
 Emeryville, California

Samples for chemical analyses will be taken at 5-foot intervals, generally beginning at the ground surface. At depths where laboratory samples are desired, the split-spoon will be fitted with brass sleeves. The sleeves will be removed from the two-foot-long sampler, and the selected interval sleeve will be prepared by covering the open ends with aluminum foil or Teflon material, capped, taped, labeled, and placed on ice.

These samples will be screened in the field for VOCs using a photoionization detector (PID). Each sample will be labeled and placed in an ice chest for shipment to a California-certified laboratory. Duplicate and field blank samples will be collected in accordance with EPA quality assurance and quality control protocols. Chain-of-custody documentation will be recorded for each sample and shipped with the sample container. Samples will be shipped to the laboratory at the end of each day of field work. Laboratory analyses will be performed on selected soil samples for VOCs using EPA Method 8240. All cuttings will be drummed, labeled, and properly disposed of based on laboratory analyses.

Three boreholes, MW-2, MW-3, and MW-4, will be advanced into the saturated zone for the installation of a 2-inch-diameter monitoring well with filter pack. Monitoring well screen length and placement will be determined upon evaluating the lithology and groundwater depth during drilling and reviewing logs from the soil borings and from existing monitoring wells. All monitoring wells will be constructed and borings will be abandoned in conformance with the Alameda County Water District Groundwater Protection Program (1988).

The monitoring well locations will be selected to establish a network with the existing monitoring well to resolve questions concerning groundwater flow direction, as discussed later. Geologic cross-sections will be developed using the boring information as well as previous monitoring well logs.

The installation of the borings to determine possible offsite sources of soil and groundwater contamination will be supplemented with information from the investigation of subsurface conduits as potential migration pathways for contamination.

Groundwater Site Assessment Plan

Results of previous groundwater sampling through May 1990 are included in Table 2 and the existing monitoring well, adjacent to the underground tank, is shown on Figure 3. From review of the data, MW-1 nearest to the underground tank near the former Boysen Plant is the most contaminated well (up to 610 mg/L TPH and 0.72 mg/L methylene chloride in the February 1988 sampling).

Based on the most recent groundwater elevation data from nearby sites, it would appear that the groundwater flow direction is generally northwesterly. If this is true, contamination found in MW-1 may be from an offsite source(s).

In order to further evaluate groundwater flow direction and address the extent and source of the existing groundwater contamination, three borings, MW-2, MW-3, and MW-4, will be completed as monitoring wells (as described earlier) in order to obtain water level measurements. Groundwater collected from these monitoring wells and from the Oakland National Engravers well and the Dunne wells will be analyzed for TPH and VOCs to help determine the source of groundwater contamination in the area.

The existing and new monitoring well network will be surveyed and referenced to a bench mark in order to provide an established datum. This is necessary so that groundwater elevation data from existing and future wells (if necessary) can be compared.

Analytical Methodology

A California-certified laboratory will be retained to analyze all soil and groundwater samples. All sample containers will be provided by the laboratory.

Soil samples collected from selected depths will be analyzed for total petroleum hydrocarbons using EPA Method 8015 and volatile organic compounds using EPA Method 8240 as referenced in the EPA Test Methods for Evaluating Hazardous Wastes (SW-846). Groundwater samples obtained from the monitoring wells will be analyzed for TPH using EPA Method 8015 and VOCs using EPA Method 624. Detection limits for all analyses will meet the EPA practical quantitation limits.

Quality Assurance and Quality Control

ESC's Quality Assurance Officer (QAO) will be responsible for establishing data quality requirements and detection limits for the analyses. Before field work begins, ESC will submit a Data Collection Quality Assurance and Management Plan and a Health and Safety Plan to the RWQCB. The QAO is responsible for ensuring that quality assurance goals are met during the investigation. He serves as the overall quality control coordinator for sampling and analysis. The QAO will work closely with the contract analytical laboratory to facilitate the planned sampling and analytical activities. The QAO's overall responsibilities include, but are not limited to sampling quality

control, laboratory quality control, data processing quality control, data quality review, performance auditing, systems auditing, and overall quality assurance. The QAO will specify the protocol for duplicate samples, equipment blanks, and field blanks. A QA/QC report will be included in the field investigation report.

Proposed Schedule

The following schedule and dates are based on a 60-day review and approval of this submittal by the RWQCB.

- **Week of September 15, 1992** - Soil boring/monitoring well installation on and off site. Submission of the Health and Safety Plan and the Data Collection Quality Assurance and Management Plan.
- **Week of September 15, 1992** - Topographic survey of well/piezometer network. Water level measurements will be taken monthly for a minimum six-month period beginning with August 1992 through February 1993..
- **November 1992** - A Preliminary Report on the investigation results will be submitted to the Alameda DEH and RWQCB in early November 1992. This Report will include hydrogeologic cross-sections with soil and groundwater contaminant results and groundwater elevation isopleth maps. The results and interpretations, together with outstanding issues, will be further discussed with the Alameda DEH and RWQCB. Agreement will be sought on the direction of future work, and specifically on the criteria and specifications for the closure of the tank. ESC will prepare an appropriate workplan for the closure of the tank either in-place or by removal.

ESC recommends that the plan be discussed in a meeting with DEH and RWQCB. Appropriate permits will have to be acquired for all work within the public right-of-way. The results of the investigation will help determine whether closure in-place or tank removal is appropriate.