TEXACO REFINING AND MARKETING INC.
100 CUTTING BOULEVARD
RICHMOND CA 94804

August 1, 1989

Mr. Rafat Shahid
Alameda County Environmental
Health Department
Hazardous Materials Division
80 Swan Way
Room 200
Oakland, CA 94621

Dear Mr. Shahid:

Enclosed please find a copy of our quarterly technical report dated July 25, 1989, for our former Texaco service station located at 2200 East 12th Street in Oakland, California.

Please call me at (415) 236-1770 if you have any questions.

Very truly yours,

R.R. ZIELINSKI
Field Environmental
Supervisor

RRZ:cz

Enclosure

cc: Ms. Leslie Ferguson
San Francisco Bay Regional
Water Quality Control Board
1111 Jackson St., Room 6040
Oakland, CA 94607

RR

Mr. Randolph Stone
Harding Lawson Associates
1355 Willow Way, Suite 109
Concord, CA 94520

8.7.89

A Report Prepared for

Texaco Refining and Marketing, Inc.
100 Cutting Boulevard
Richmond, California 94804

QUARTERLY TECHNICAL REPORT
FIRST QUARTER OF 1989
FORMER TEXACO STATION
2200 EAST 12TH STREET
OAKLAND, CALIFORNIA

HLA Job No. 2251,082.03

7-25-89

by

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July 25, 1989

INTRODUCTION

This quarterly technical report (QTR) presents the results of site investigation activities conducted by Harding Lawson Associates (HLA) at a former Texaco service station site (presently operated by Exxon) at 2200 East 12th Street, Oakland, California. The site location is shown on the Vicinity Map, Plate 1. HLA's work at the site, ongoing since June 1988, is summarized in this report; the recent quarter's work included additional borings and aquifer hydraulic testing, as described below. The information in this QTR is presented in the following subsections:

- Site description
- Hydrogeologic setting
- Summary of previous work
- Work performed during the first quarter of 1989
- Discussion of results.

SITE DESCRIPTION

The site is on the southeast corner of the intersection of East 12th Street and 22nd Avenue (see the Site Plan, Plate 2). The surrounding area consists of commercial/retail businesses, including a Shell service station immediately across 22nd Avenue (Plate 3). The site is bordered on the west by East 12th Street, on the north by 22nd Avenue, and on the east by a building occupied by a mattress manufacturer. Adjacent to the site on the

south is a parcel owned by M.C.B. Industries, which is currently used to store automobiles.

The site of the former Texaco station is relatively flat, with surface drainage toward East 12th Street. Surface elevation at the site is approximately 20 feet above Mean Sea Level. The land surface slopes gently to the southwest toward the Brooklyn Basin Tidal Canal (Plate 1). This area has been extensively developed, and surface water runoff is mainly directed to the municipal storm sewer system.

Structures at the service station include a building, three fuel pump islands, one underground waste oil tank, and three underground fuel storage tanks. At the station, leaded and unleaded gasoline are dispensed and automotive repair services are provided.

HYDROGEOLOGIC SETTING

The East Bay Plain has been divided into seven ground-water subareas, defined by the California Department of Water Resources (DWR) on the basis of areal differences (i.e., faults and geologic conditions). The site lies within the Oakland Upland and Alluvial Plain subarea. Most ground water used in the East Bay Plain is for irrigation or industrial, rather than domestic, purposes. The majority of domestic water is supplied by the East Bay Municipal Utility District (EBMUD). The ground-water reservoir is made up of the Alameda and Temescal Formations, along with the Merritt Sand, with an aggregate thickness of more than

1,100 feet. Regional ground-water flow direction is west-southwest, toward San Francisco Bay.

Subsurface conditions at the site, down to the maximum depth explored of 20 feet, indicate that soils generally consist of unconsolidated, stiff, sandy clay (CL) interbedded with occasional silty sand and gravel lenses. During drilling for our investigation, we initially encountered ground water between 11 and 13 feet below grade. Ground water stabilized in the wells at approximately 6.5 feet below grade.

The tops of well casings were surveyed to a temporary datum located at the western end of the dispenser island nearest the underground storage tanks with an assumed elevation of 100.0 feet (HLA datum, see Plate 2). Well monitoring and survey data are presented in Table 1. The calculated direction of ground-water flow is to the west, with a gradient of 0.004 feet per foot, as shown on the Ground-Water Surface Map, Plate 4.

SUMMARY OF PREVIOUS WORK

Preliminary Subsurface Investigation

In June 1988, HLA conducted a preliminary subsurface investigation at the site. The work included drilling three borings; constructing a monitoring well (2-inch diameter PVC casing) in each boring (MW-9A through MW-9C); developing and sampling water from the wells; and analyzing ground-water samples for dissolved benzene, toluene, ethylbenzene, and xylenes (BTEX). The wells are approximately 18 feet deep with slotted well screen (.02-inch

slot width) between 8 and 18 feet. Results of the chemical analyses are discussed later in this report.

Soil-gas Survey

On September 21, 1988, a soil-gas survey was conducted on site and in streets near the site by Tracer Research Corporation, under HLA's direction and supervision. Soil-gas probes were driven at 13 locations (Plate 5).

The soil-gas testing was conducted using a mobile van equipped with two Varian 3300 gas chromatographs and two Spectra Physics SP4270 computing integrators. A hydraulic mechanism was used to drive and withdraw seven-foot lengths of 3/4-inch-diameter steel tubing with detachable drive points. Soil-gas and/or water samples were obtained through the tubing at depths ranging from two to six feet; these were tested for the following constituents:

- Total hydrocarbons
- Benzene
- Toluene
- Ethylbenzene
- Xylenes

Results of analyses are summarized in Table 2. As indicated in Table 2, the highest total hydrocarbon concentrations were found in soil-gas samples from Probe Locations 1, 2, and 3. Samples from Probes 2 and 10 consisted of ground water. A ground-water sample was also obtained from MW-9A and analyzed in

the mobile van for the same constituents. Because of tight clays encountered at Probe Locations 6 and 7, soil-gas samples could not be obtained. Samples from Probes 4, 5, 8, 9, 10, 11, 12 and MW-9A showed no hydrocarbon levels above analytical detection limits.

Soil Borings

HLA explored subsurface conditions on and off site by drilling and sampling eight soil borings during October and November 1988. Five of the borings were completed as monitoring wells (MW-9D through MW-9H).

The borings were advanced using truck-mounted, 8-inch-(borings), and 12-inch (wells) diameter hollow stem auger drilling equipment and sampled using a 2.5-inch-diameter (I.D.) Sprague and Henwood (S&H) split-barrel sampler, lined with three 6-inch-long brass tubes. Soil samples were collected at three- to five-foot intervals and screened in the field with either a Photovac TIP-I photoionization detector (PID) or a Johnson Gas Detector (Gastech), Model 1314. These devices allow for a field determination of the presence of certain organic vapors.

Water Quality Sampling

On October 19, 1988, MW-9D and MW-9E were developed, sampled, and surveyed by an HLA technician. All other on-site wells were also sampled at this time. On December 6, 1988, off-site wells MW-9F through MW-9H were developed, sampled, and surveyed by an HLA technician.

Ground-water samples were collected from each well with a clean, stainless steel bailer. A representative sample was decanted into laboratory-prepared, 40-milliliter, volatile organic analysis (VOA) vials. The vials were immediately sealed, labeled, and placed in a cooler with blue ice until delivery for chemical testing.

All soil and ground-water samples were delivered to ChemWest Analytical Laboratories, Inc., in Sacramento, California. Soil samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline and for BTEX; water samples were tested for BTEX content. Results are presented in Tables 3 (for soil) and 4 (for water).

WORK PERFORMED DURING THE FIRST QUARTER OF 1989

On-site Soil Borings

To further evaluate concentrations of gasoline hydrocarbons in vadose zone soils, eight additional shallow soil borings (B-4 through B-11), approximately 12 feet deep, were drilled in the northern portion of the site in January and March 1989. On Plate 2, soil borings are designated B-1, B-9-1, B-9-2, and B-4 through B-11. Selected soil samples were preserved and tested for levels of TPH as gasoline and BTEX (see Table 3).

Aquifer Hydraulic Testing

HLA performed hydraulic testing in MW-9B and MW-9E on February 24, 1989. A volume (slug) of water was removed from

each well using a submersible turbine pump. A pressure transducer, placed near the bottom of the wells, was used to measure water level recovery following slug withdrawal. The output of the transducer was interpreted and recorded by a data logger for subsequent analysis.

Estimated hydraulic conductivity for the slightly confined conditions at MW-9B is 0.4 feet per day. At MW-9E, where a gravel layer was encountered, hydraulic conductivity is estimated at 20 feet per day.

DISCUSSION OF RESULTS

Concentrations of petroleum products in soil-gas/water samples were detected at Probe Locations SG-1, WS-2, SG-3, and SG-13 (Plate 5). At SG-1 and SG-3, relatively high concentrations of BTEX and TPH were detected in soil-gas/water samples obtained from depths of 5 and 4 feet, respectively. A ground water sample, obtained from Probe Location WS-2, also contained relatively high concentrations of benzene and TPH.

BTEX and TPH have been detected in the upper four to nine feet of soils in B-1, B-4, B-5, B-8, B-9, B-11 and MW-9E. Detectable concentrations of hydrocarbons found in these locations are relatively low with the exception of the sample from 5.5 feet in MW-9E (1,900 parts per million [ppm] TPH). The area in which detectable concentrations of petroleum products are found in vadose zone soils is closely associated with the pump islands. Spilled fuel products migrating through cold joints

between concrete and asphalt may be the source of the petroleum products in near-surface soils.

The ground-water sample analyses indicate that gasoline handling operations on site have resulted in the BTEX components found in ground water both on and off site. We understand that line and tank testing in 1988 showed that the fuel dispensing system was tight. It is therefore likely that the fuel hydrocarbons encountered result either from surface spillage, overfilling during product delivery, or line or tank leakage that occurred prior to the 1988 testing.

As shown on Plate 6, shallow ground water beneath the site contains detectable quantities of BTEX. BTEX has also been detected in off-site ground water in the downgradient direction. Laterally, the extent of BTEX in the ground water is well defined and appears to be extending in the downgradient direction to utility lines in East 12th Street and 22nd Avenue. The bottom of the storm drain in East 12th Street is approximately 8.5 feet below grade, approximately 2 feet below the water table.

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DISTRIBUTION

3 copies: Texaco Refining and Marketing Inc.
100 Cutting Boulevard
Richmond, California 94804

Attention: Mr. R.R. Zielinski

GLF/RS/ly 031045L/R22

QUALITY CONTROL REVIEWER

Stephen J. Osborne /as

Stephen J. Osborne
Associate Engineer

Table 1. Well Monitoring and Survey Data

Well No.	Top of Casing Elevation* (feet)	Depth to Ground Water** (feet)	Ground-Water Surface Elevation+ (feet)
MW-9A	100.07	7.06	93.01
MW-9B	98.41	6.07	92.34
MW-9C	99.73	6.85	92.88
MW-9D	101.46	8.28	93.18
MW-9E	98.41	5.61	92.80
MW-9F	96.96	5.53	91.43
MW-9G	98.51	5.21	93.30
MW-9H	97.14	8.04	89.10

Notes:

* Elevation relative to HLA temporary benchmark located at the western corner of the dispenser island nearest the underground storage tanks, with an arbitrary elevation of 100.0 feet (see Plate 2).

** Depth to ground water on December 15, 1988.

\+ Ground-water surface elevation = top of casing elevation - depth to water.

Table 2. Analytical Results of Soil-gas Survey
Conducted on September 20, 1988
Concentrations in micrograms per liter (ug/L)

Sample	Depth (ft)	Benzene	Ethyl-benzene	Toluene	Xylenes	Total Petroleum Hydrocarbons
Air	N/A	<0.8	<0.8	<0.7	<0.8	<0.8
SG-01	5.0	320,000	620	1	2,200	700,000
WS-02	5.0	12,000	<80	<73	<80	25,000
SG-03	4.0	32,000	<8	<28,000	800	96,000
SG-04	5.0	<0.8	<0.8	<0.7	<0.8	<0.8
MW-9A	6.0	<76	<80	<73	<80	<76
SG-05	2.0	<0.8	<0.8	<0.7	<0.8	<0.8
SG-06	--	--	--	--	--	--
SG-07	--	--	--	--	--	--
SG-08	5.0	<0.8	<0.8	<0.7	<0.8	<0.8
SG-09	6.0	<0.8	<0.8	<0.7	<0.8	<0.8
WS-10	6.0	<76	<80	<73	<80	<76
SG-11	4.0	<0.8	<0.8	<0.7	<0.8	<0.8
SG-12	5.0	<0.8	<0.8	<0.7	<0.8	<0.8
SG-13	5.0	<0.8	<0.8	<0.7	<0.8	23
Air	N/A	<0.7	<0.8	<0.8	<0.8	<0.7

-- = Not able to obtain sample

N/A = Not applicable

Air = ambient air sample

Table 3. Results of Soil Analyses
Concentrations in milligrams per kilogram (mg/kg)

Sample Number	Depth (ft)	Benzene[1]	Ethyl-Benzene[2]	Toluene[3]	Xylenes[3]	TPH as Gasoline[4]
B-1	4.8	0.30	ND	0.2	ND	ND
B-9-1	5.0	ND	ND	ND	ND	ND
B-9-1	9.0	ND	ND	ND	ND	ND
B-9-1	12.0	ND	ND	ND	ND	ND
B-9-2	5.0	ND	ND	ND	ND	ND
B-9-2	9.0	ND	ND	ND	ND	ND
B-9-2	10.5	ND	ND	ND	ND	ND
B-9-2	13.0	ND	ND	ND	ND	ND
B-4	4.0	1.0	2.3	0.9	5.8	160
B-4	9.0	ND	ND	ND	ND	ND
B-5	4.0	0.33	ND	ND	ND	ND
B-5	9.0	ND	ND	ND	ND	ND
B-6	5.0	ND	ND	ND	ND	ND
B-6	5.5	ND	ND	ND	ND	ND
B-7	4.0	ND	ND	ND	ND	ND
B-7	8.5	ND	ND	ND	ND	ND
B-8	5.5	0.43	ND	ND	ND	ND
B-8	9.0	ND	ND	ND	ND	ND
B-9	4.0	ND	ND	ND	ND	ND
B-9	9.0	ND	0.4	ND	1.1	39
B10-1	5.0	ND	ND	ND	ND	ND
B10-2	10.0	ND	ND	ND	ND	ND
B11-1	5.0	ND	ND	0.1	ND	ND
B11-2	10.0	ND	ND	ND	ND	ND
MW-9D	6.0	ND	ND	ND	ND	ND
MW-9D	10.5	ND	ND	ND	ND	ND
MW-9E	5.5	ND	18	ND	ND	1900
MW-9E	9.0	ND	ND	ND	ND	ND
MW-9G	4.0	ND	ND	0.2	ND	ND

ND = Not detected.

1 Detection limit 0.05 mg/kg except as noted in parentheses.

2 Detection limit 0.2 mg/kg except as noted in parentheses.

3 Detection limit 0.1 mg/kg except as noted in parentheses.

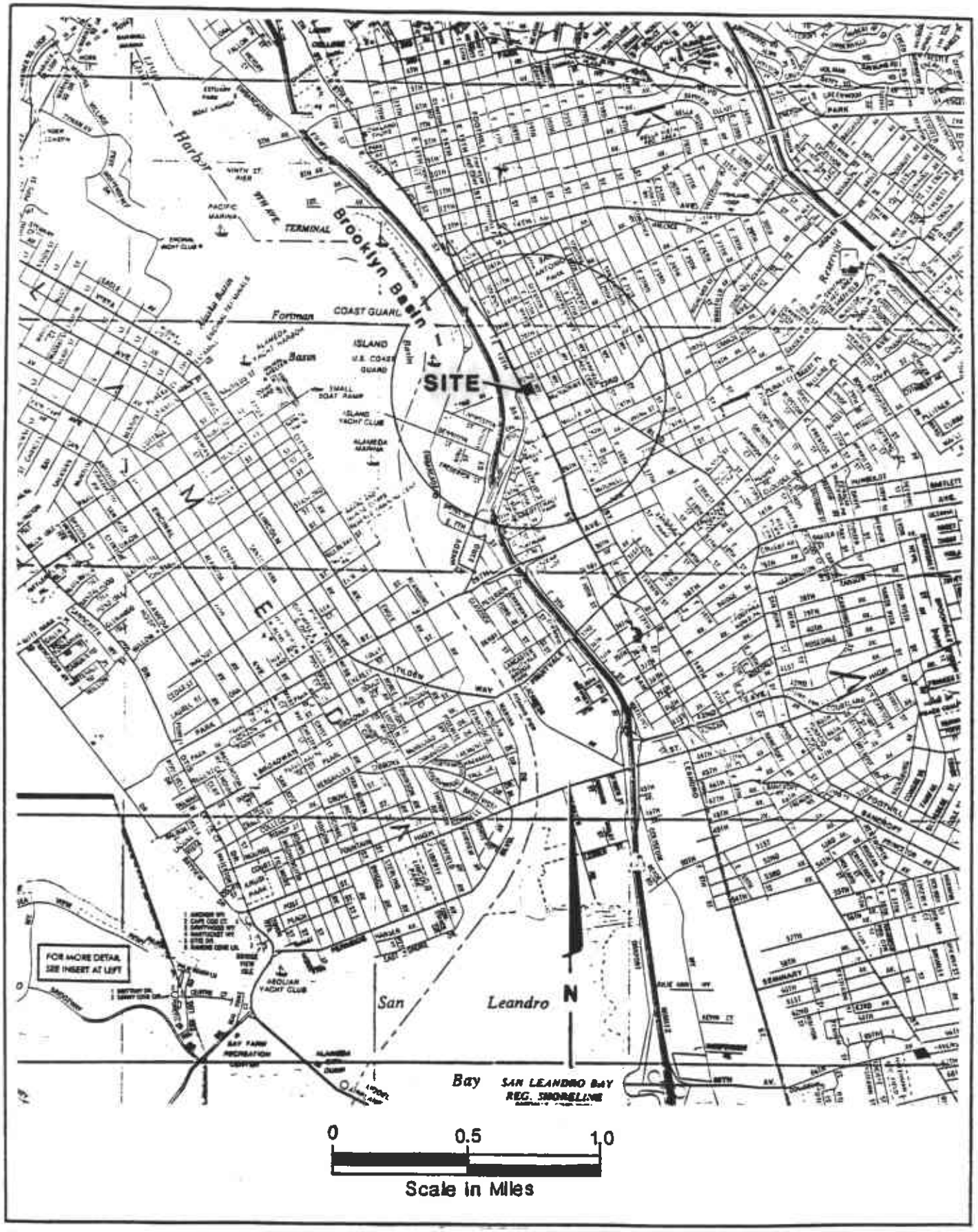
4 Detection limit 10 mg/kg except as noted in parentheses.

Table 4. Results of Ground-Water Analyses
Concentrations in micrograms per liter (ug/L)

Well Number	Date Sampled	EPA TEST METHOD 602 Benzene	Ethylbenzene	Toluene	Xylenes
MW-9A	10/24/88	ND	ND	ND	ND
MW-9B	10/24/88	84	3.1	ND	3.2
MW-9C	10/28/88	ND	ND	ND	ND
MW-9D	10/24/88	ND	ND	ND	ND
MW-9E	10/24/88	1.3	ND	ND	ND
MW-9F	12/06/88	ND	ND	ND	ND
MW-9G	12/06/88	0.8	ND	ND	ND
MW-9H	12/06/88	ND	ND	ND	ND
Detection limits		0.5	2.0	1.0	1.0

ND = Not detected

105648



Harding Lawson Associates
Engineers and Geoscientists

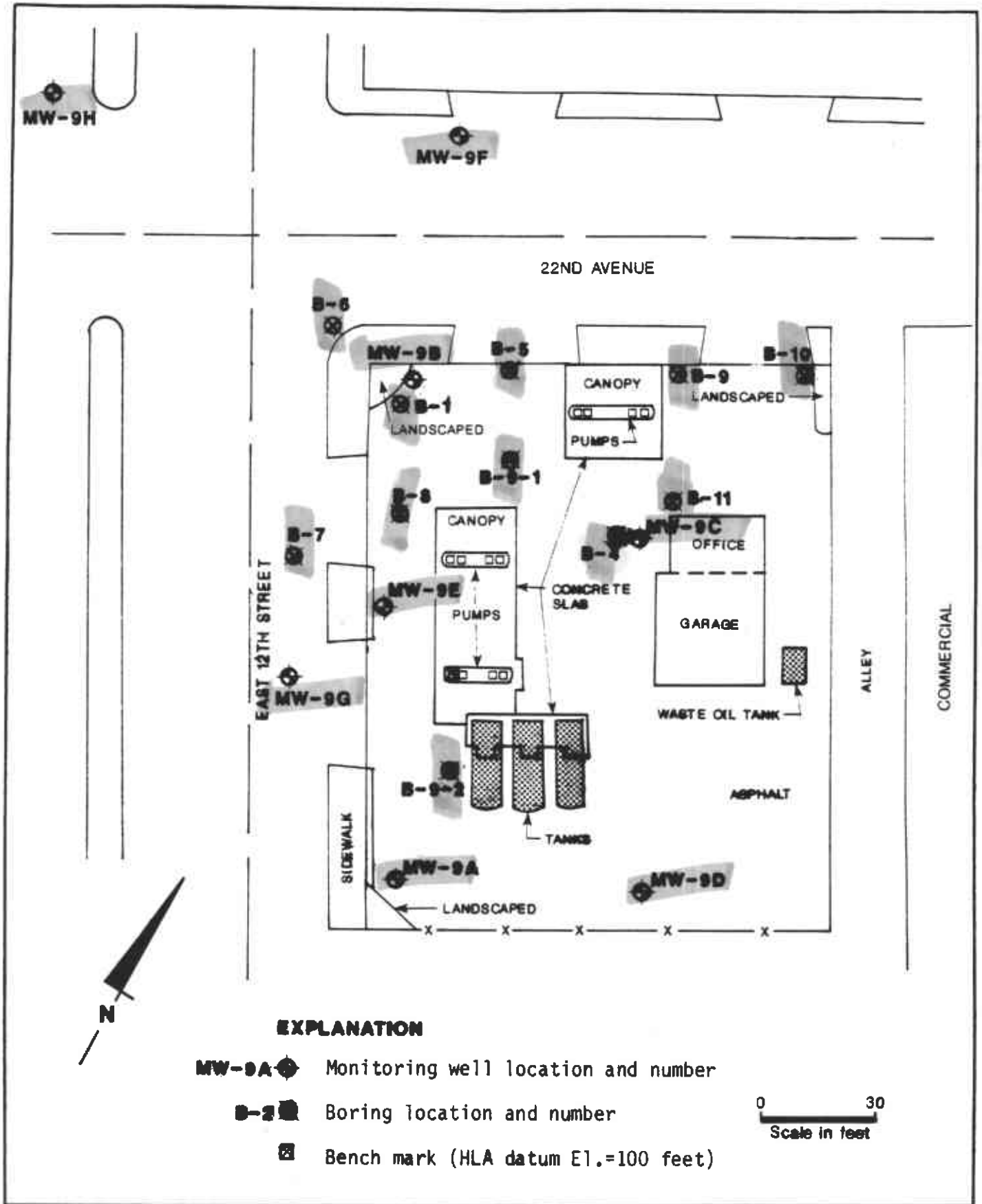
Vicinity Map

Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	2251,082.03		6/89		

wells ① MW9A-C June 1988
② 13 SG Rods
wells ③ MW9D-H



HLA
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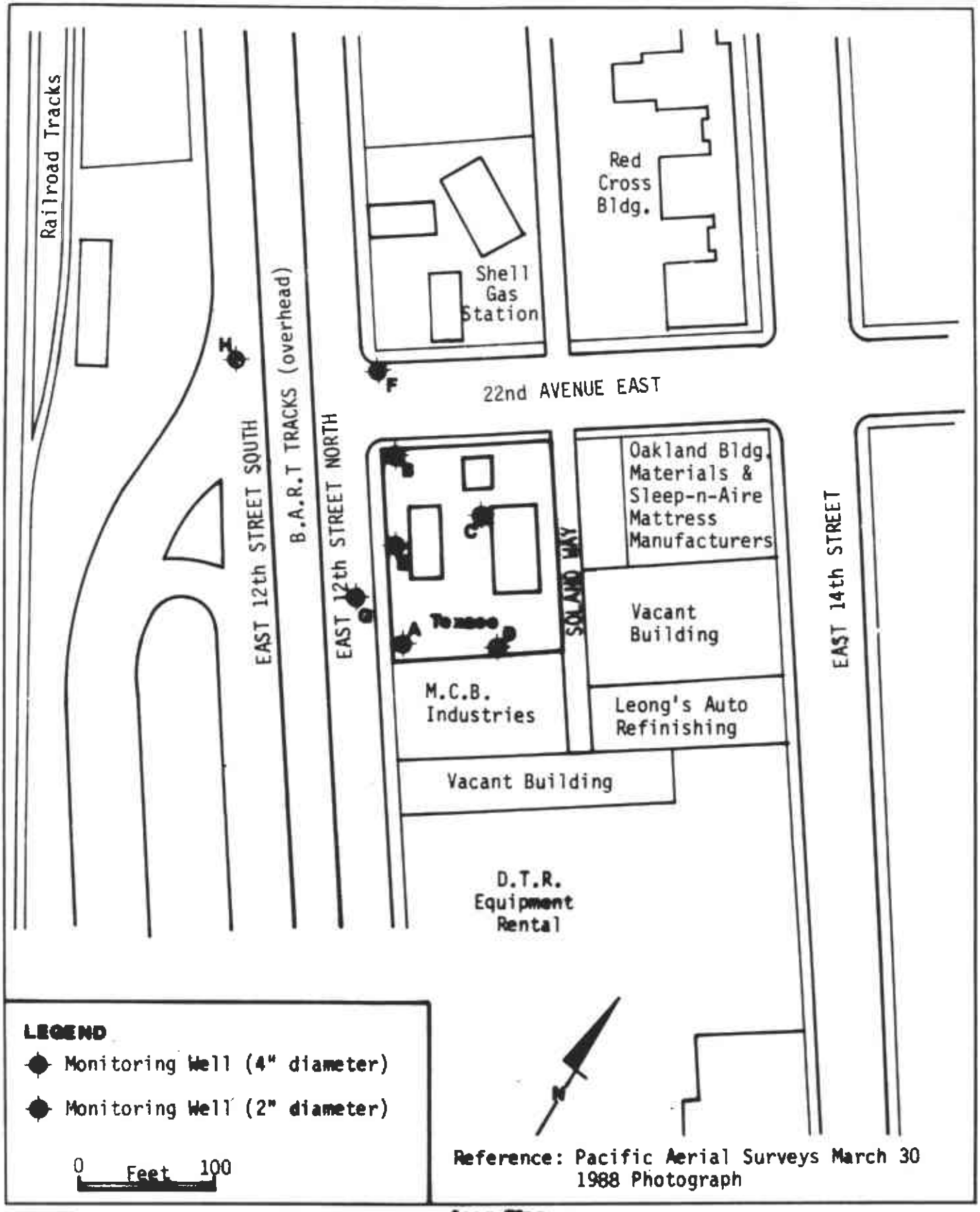
Site Plan
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE
2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,082.03	G	6/89		



Reference: Pacific Aerial Surveys March 30 1988 Photograph

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Area Plan
Texaco Station #9
2200 East 12th Street
Oakland, California

PLATE 3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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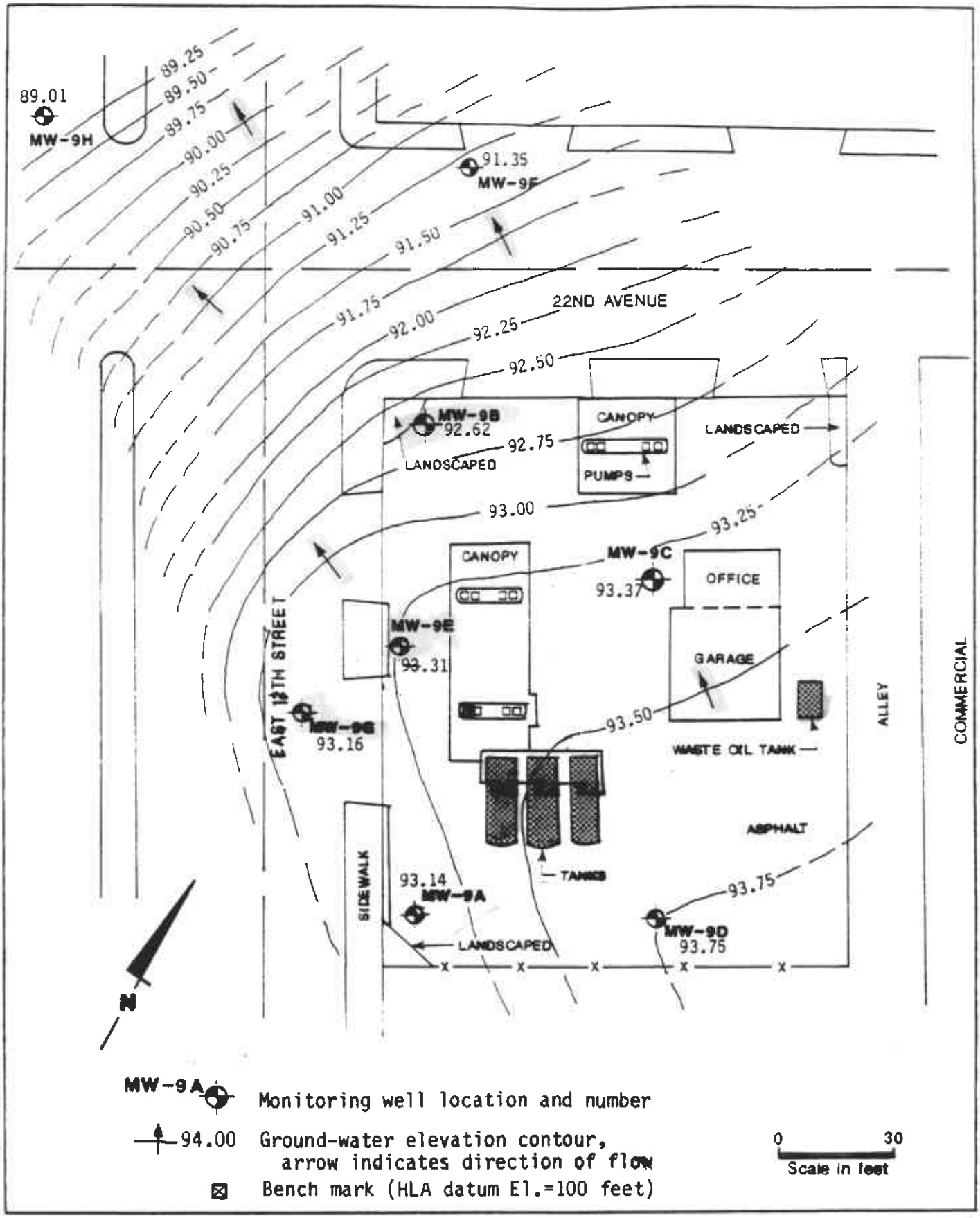

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Ground-Water Surface Map
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE **4**

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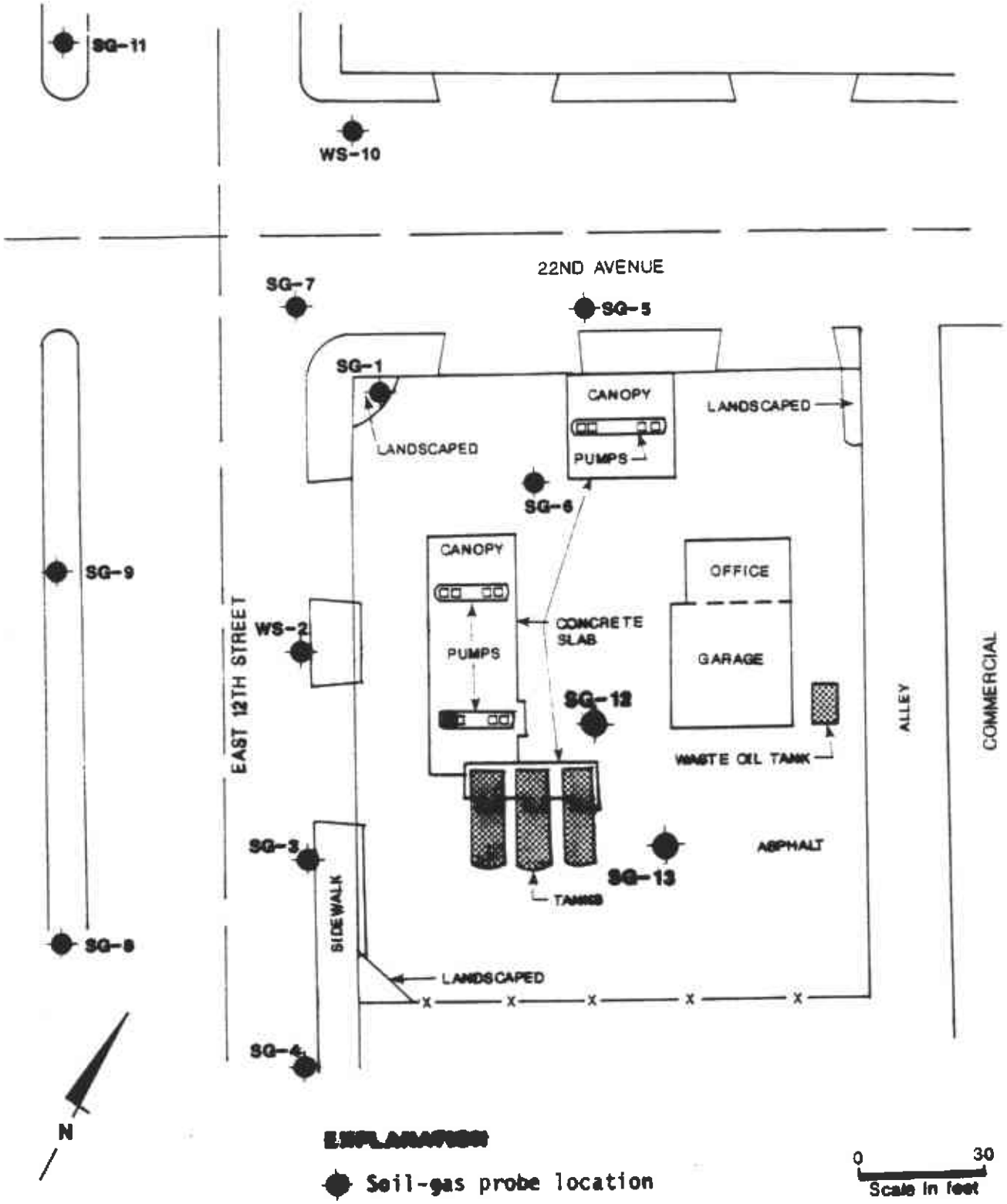

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[redacted]
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE 5

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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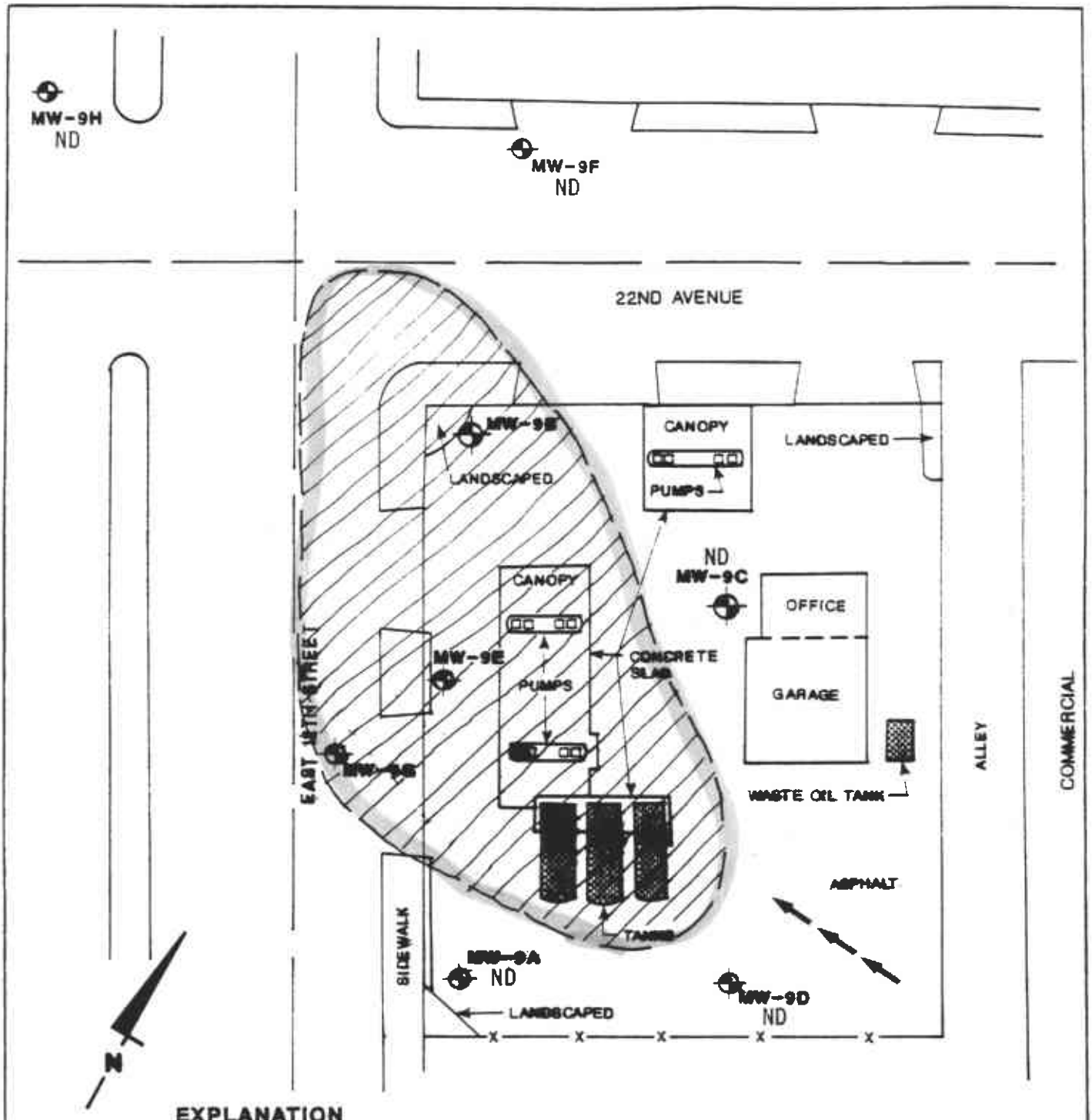

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Hydrocarbons in Ground-Water Map
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE
6

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,082.03	G	6/89		