Texaco Refining and Marketing Inc
10 Universal City Plaza
Universal City CA 91608

91 JAN 14 PM 3:06

January 8, 1990 1991

QUARTERLY TECHNICAL REPORT
Former Texaco Service Station
500 Grand Avenue
Oakland, California

Mr. Rafat Shahid
Alameda County Health Department
80 Swan Way, Room 200
Oakland, California 94621

Dear Mr. Shadid:

Enclosed please find the Quarterly Technical Report (Second Quarter 1990) for the Former Texaco Service Station located at 500 Grand Avenue in Oakland, California. The report documents activities conducted at the referenced site for the period of April through June 1990. The activities included water sample collection from all groundwater monitoring wells, drilling two shallow borings near the station building, arranging for replacement of damaged monitoring well traffic boxes and coordination of activities associated with future removal of the waste oil tank.

If you have any questions or comments, please call me at 818/505-2723, or Ron Zielinski at 415/236-1770.

Sincerely yours,
TEXACO ENVIRONMENTAL SERVICES

JEFF GOOLD
Project Technical Lead

JBG/jbg
HLA-LT.1290

Enclosures

cc: Ron Zielinski-TES
Jeanna Hudson-HLA

PR: CB, KGT

A Report Prepared for

Texaco Refining and Marketing Inc.
10 Universal City Plaza
Universal City, California 91608

QUARTERLY TECHNICAL REPORT
SECOND QUARTER OF 1990
FORMER TEXACO STATION NO. 6248800235
500 GRAND AVENUE
OAKLAND, CALIFORNIA

HLA Job No. 2251,114.03
August 30, 1990
1990 Report No. 2

by

Jeanna S. Hudson
Senior Geologist

Randolph Stone
Associate Hydrogeologist

Harding Lawson Associates
1355 Willow Way, Suite 109
Concord, California 94520
415/687-9660

INTRODUCTION

This Quarterly Technical Report (QTR) presents the results of investigation activities by Harding Lawson Associates (HLA) during the second quarter of 1990 at the former site of Texaco service station No. 6248800235, 500 Grand Avenue, Oakland, California (Plate 1). This report also summarizes previous work at the site and describes planned activities for the third quarter of 1990.

SUMMARY OF PREVIOUS WORK

Texaco Refining and Marketing Inc. retained HLA to conduct a sensitive receptor survey at the subject location in May 1988. In June 1988, Texaco Refining and Marketing Inc. requested that HLA proceed with a subsurface investigation to evaluate whether hydrocarbons had affected shallow soil or groundwater. By the end of the first quarter of 1990, HLA had completed the following tasks in the site investigation:

- Conducted a soil-gas survey at 18 locations on or near the site (survey performed by Tracer Research Corporation)
- Drilled and developed four 2-inch-diameter groundwater monitoring wells (MW-8A, MW-8B, MW-8C, and MW-8D) and six 4-inch-diameter monitoring wells (MW-8E, MW-8F and MW-8G MW-8H, MW-8I, and MW-8J). Locations are shown on Plate 2.
- Obtained groundwater samples from each well and analyzed them for benzene, toluene, ethylbenzene, and total xylenes (BTEX), and total petroleum hydrocarbons (TPH) as gasoline and as diesel fuel.

- Drilled and sampled 13 soil borings to identify and delineate the extent of hydrocarbons in the vadose zone (Plate 2)
- Analyzed all soil samples for BTEX and TPH as gasoline
- Analyzed soil samples from B-6, B-7, B-8, B-9, B10, B-11, B-12 and B-8K for TPH as diesel fuel
- Gauged water levels and estimated the direction of groundwater flow
- Performed slug tests in MW-8C and MW-8E to estimate hydraulic conductivity
- Submitted an Environmental Assessment Report to Texaco during the third quarter of 1989
- Pumped and disposed of 5,000 gallons of water from the tank backfill as an interim remedial measure.

The results of the soil-gas survey indicated petroleum hydrocarbons in the soil gas near the underground storage tanks and dispenser islands. Analyses of water samples from the four observation wells showed the presence of dissolved petroleum hydrocarbons in groundwater adjacent to the underground tanks.

Soil samples and drill cuttings indicate that the subsurface materials at the site consist of clay and minor amounts of interbedded clayey sand. Analysis of slug test data obtained from MW-3C and MW-3E indicate unconfined aquifer conditions and a hydraulic conductivity of 0.02 to 0.03 foot/day. Groundwater would be expected to move through the soils relatively slowly.

Local groundwater flow is to the south and southeast, toward Lake Merritt (Plate 3). Water-level data from monitoring wells across the site show that, in most wells, the water table has fluctuated 2.5 to 3.0 feet since early 1988. Water levels in MW-

8A fluctuated as much as 8 feet; those data are suspect and were not used in contouring the phreatic surface.

Samples from 13 soil borings have been chemically analyzed to evaluate the horizontal and vertical extent of petroleum hydrocarbons in the subsurface. The analytical data are summarized in Table 1. A contour map of TPH as gasoline in the vadose zone soil is presented on Plate 4. For this map, the vadose zone was defined by comparing sample depths with static water levels at the time of sampling. Because the water table is very shallow and subject to frequent fluctuations, the vadose zone may be thinner during times of capillary fringe encroachment.

Plate 4 depicts a vadose zone hydrocarbon plume that apparently originates at the underground tanks and extends off-site to MW-8J. Significant concentrations of TPH as gasoline are also found in the area of the dispenser islands. The highest concentration, 2900 parts per million (ppm), was found in a soil sample collected at a depth of 1.5 foot in B-11. This boring is adjacent to and upgradient from the underground tanks. Soils from a depth of 5.5 feet at the MW-8J location contained 2,100 ppm TPH as gasoline. In general, BTEX concentrations in the soil are either below detection limits or very low.

The results of analyses for TPH as diesel fuel indicate concentrations ranging from nondetectable to 460 ppm (B-9); most of the soil samples with detectable concentrations contained less than 100 ppm TPH as diesel fuel.

Table 2 presents the results of groundwater analyses obtained since 1988. Groundwater from monitoring wells MW-8E, MW-8H, MW-8I, and MW-8J, and observation wells OB-3 and OB-4 contained benzene in concentrations that exceed the Department of Health Services Drinking Water Action Levels (DWALs). In groundwater samples from wells MW-8A, MW-8B, and MW-8C, BTEX concentrations were either nondetectable or below the DWALs.

A contour map of benzene concentrations in groundwater is presented on Plate 5; Plate 6 is a contour map of concentrations of TPH as gasoline. These maps suggest that hydrocarbons in groundwater may have originated near the underground tanks, as well as near the dispenser islands. Water from monitoring well MW-8E, cross-gradient and down-gradient of the dispenser islands, has the highest concentrations of BTEX, TPH as gasoline, and TPH as diesel fuel.

Groundwater containing TPH as gasoline was detected downgradient from MW-8E in water samples from MW-8H, MW-8I, and MW-8J. Samples from MW-8F and MW-8G contained nondetectable concentrations of BTEX and TPH as gasoline and as diesel fuel. However, approximately 100 ppm "heavy" hydrocarbons, beyond the range of diesel fuel, were detected in groundwater from these downgradient locations during the most recent analysis.

ACCOMPLISHMENTS DURING SECOND QUARTER OF 1990

During the second quarter of 1990, HLA accomplished the following tasks at the 500 Grand Avenue site:

- Purged and sampled four on-site monitoring wells, five off-site monitoring wells, and two observation wells. Water samples were analyzed for BTEX, TPH as gasoline, and TPH as diesel fuel.
- Measured water levels in the monitoring wells on a monthly basis
- Drilled two shallow soil borings (B-13 and B-14, Plate 2) to further investigate the presence of hydrocarbons in the vadose zone near the service building. Soil samples were analyzed for BTEX, TPH as gasoline, and TPH as diesel fuel. One sample was analyzed for additional organic compounds and selected metals.
- Negotiated a subcontractor's agreement to replace traffic boxes over three monitoring wells on Grand Avenue. The wells were paved over by the City of Oakland Public Works (Street Maintenance) Department.
- Began working with representatives of Exxon and Texaco Refining and Marketing Inc., to coordinate excavation of the waste oil tank on site.

Groundwater Sampling

HLA continued to monitor water levels and groundwater quality at the subject location during the second quarter of 1990. Each well was purged while monitoring temperature, conductivity, and pH of the water. The water samples were collected and transported, under chain-of-custody, to ChemWest Analytical Laboratories, Inc., in Sacramento, California. The water samples were analyzed for BTEX, TPH as gasoline, and TPH as diesel fuel.

Soil Sampling

Two shallow soil borings (B-13 and B-14) were drilled adjacent to the service building to further delineate the presence of hydrocarbons in the vadose zone. These borings were drilled with a hand auger to depths of 4.0 feet and 4.5 feet, respectively.

Soil samples were collected in 6-inch-long stainless steel tubes. Two or three samples per boring were collected and logged in accordance with the Unified Soil Classification System. Each sample was screened for volatile organic compounds using a photoionization detector; those selected for chemical analysis were sealed, labeled, and stored in an ice chest. The samples were transported under chain-of-custody to ChemWest Analytical Laboratories, Inc., in Sacramento, California, where they were analyzed for BTEX, TPH as gasoline, and TPH as diesel fuel. One sample from B-13 was also analyzed for halogenated volatile organics, semivolatile organics, oil and grease, and selected metals.

Results of Analyses

Table 2 and Plates 5 and 6 summarize the results of most recent groundwater analyses. Benzene concentrations exceeded the DWAL (1.0 parts per billion [ppb]) in groundwater from MW-8E, MW-8H, MW-8I, MW-8J, and the two observation wells, OB-3 and OB-4. By comparing the most recent set of data with past analytical results (Table 2), it is apparent that BTEX and TPH concentrations are increasing in the groundwater plume. This

effect is especially pronounced in groundwater collected from MW-8E and MW-8I.

Heavier hydrocarbons were detected in groundwater samples from all of the wells except MW-8E. The laboratory describes the compound as an "unknown hydrocarbon mixture beyond the range of diesel fuel #2", possibly a heavier fuel oil or waste oil.

Results of soil tests from B-13 and B-14 are included in Table 1. A dark-colored product was visible at the base of the paved surface when drilling B-14. Soil samples collected at depths of 1.5 feet and 3.5 feet contained nondetectable concentrations of BTEX, less than 10 ppm TPH as gasoline, and less than 100 ppm waste oil. Soil Boring B-13 is located farther from the waste oil tank than B-14, but heavy hydrocarbon concentrations were 1,000 ppm in one sample. Additional analyses indicate that the soil at 2.5 feet of depth contained 5600 ppm oil and grease, 36 ppm of Chromium (Cr) and 41 ppm of Zinc (Zn). These results are summarized in Table 3.

As a contractor employed by Exxon was preparing to install overfill containment devices on the waste oil tank, a layer of free product was discovered floating on water in the excavation pit. Exxon representatives have arranged to have the fluids in the pit pumped out several times, and they are in the process of obtaining permits for removal of the tank.

ANTICIPATED ACTIVITIES FOR THIRD QUARTER, 1990

HLA plans to oversee the replacement of three monitoring well manhole covers located in Grand Avenue. In addition, we will continue to monitor water levels in all wells on a monthly basis, and to sample and analyze groundwater quarterly, for hydrocarbon content.

During the waste oil tank removal by Exxon, HLA will be on site to obtain soil samples for chemical analysis. One or two monitoring wells will be installed downgradient of the waste oil tank after it has been removed and the overexcavation of soil is complete.

Work will begin on the Remediation Plan for the site in the late third quarter of 1990.

LIST OF TABLES

LIST OF ILLUSTRATIONS

Table 1. Results of Soil Sample Analyses
(concentrations in mg/kg [ppm])

Boring/ Well Number	Sample Depth (feet)	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH as Gasoline	TPH as Diesel	TPH Other**
B-1	6.5	ND	ND	ND	ND	12	NA	
B-3	4.0	ND	ND	ND	5	520	NA	
B-4	3.5	ND	1	3.5	13	510	NA	
B-5	5.5	ND	ND	ND	ND	<10	NA	
B-5	10.5	ND	ND	ND	ND	ND	NA	
B-5	16.0	ND	ND	ND	ND	ND	NA	
B-6	2.0	ND	0.08	ND	ND	1.0	<100*	<100*
B-6	4.5	ND	0.09	ND	ND	ND	<10	<10
B-7	3.0	ND	6.7	5.1	50	580	<100*	<100*
B-8	2.0	0.05	ND	ND	0.34	3.4	<10	<10
B-9	2.5	0.05	0.32	0.81	6.4	100	460	<100*
B-8K	1.5	ND	ND	ND	ND	2.1		ND
	3.0	ND	0.05	ND	ND	6.6		ND
	5.5	ND	ND	0.08	0.05	84		20
B-10	1.5	0.28	ND	0.20	0.18	8.4		ND
	2.5	0.09	ND	ND	ND	ND		ND
	5.5	ND	ND	ND	ND	ND		ND
	8.5	ND	ND	ND	ND	ND		ND
B-11	1.5	ND	ND	5.4	1.6	2,900		30
	2.5	ND	ND	0.31	0.12	62		11
	5.5	ND	ND	0.06	ND	17		ND
	8.5	ND	ND	ND	ND	ND		ND
B-12	1.0	0.22	0.11	0.18	0.42	13		ND
	2.5	ND	ND	0.19	0.83	49		ND
	4.5	ND	ND	1.27	0.67	1,200		94
	6.0	ND	0.06	ND	ND	ND		ND
B-13	1.5	ND	ND	ND	ND	ND	ND	ND
	2.5	ND	ND	1.7	5.4	130	ND	1,000
	3.5	ND	0.06	0.06	0.30	26	ND	250
B-14	1.5	ND	ND	ND	ND	4.8	ND	85
	3.5	ND	ND	ND	ND	2.3	ND	62
MW-8D	1.3	ND	0.40	ND	0.50	10	NA	
MW-8E	5.5	0.82	6.5	5.5	26	750	NA	
MW-8F	11.0	ND	ND	ND	ND	ND	NA	
MW-8G	6.0	ND	ND	ND	ND	ND	NA	
MW-8H	1.5	ND	0.07	ND	ND	ND		ND
	3.0	ND	0.24	ND	ND	2.6		ND
	5.5	ND	ND	0.30	0.83	550		66
	10.5	ND	ND	ND	ND	ND		ND
MW-8I	1.5	0.10	ND	ND	ND	3.0		ND
	3.5	0.06	ND	ND	0.02	ND		ND
	5.5	ND	ND	2.7	9.2	280		ND
	10.5	ND	ND	ND	ND	ND		ND
MW-8J	1.5	0.18	0.09	0.06	0.05	24		ND
	3.0	0.08	0.14	0.04	ND	13		33
	5.5	ND	ND	25	9.2	2,100		83*
	10.5	ND	0.02	ND	ND	8		ND

ND = Not detected
NA = Not analyzed
* Laboratory increased reporting limits because of matrix interference.
** "Heavy" petroleum hydrocarbons such as waste oil, mineral spirits, jet fuel, or fuel oil.

Table 2. Results of Groundwater Analyses
Concentrations in µg/l (ppb)

Well	Depth (feet)	Date Sampled	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH as Gasoline	TPH as Diesel	TPH Other**
MW-8A	32	06/14/88	<0.5*	1.5	<2	6.6			
		10/28/88	<0.5	<1	<2	<1			
		09/28/89	<0.5	<0.5	<0.5	<3	<50		
		11/29/89	<0.5	1.0	<0.5	<0.5	<50	1,200	<50
		01/24/90	<0.5	<0.5	<0.5	<0.5	<100		2,800
		04/26/90	<0.5	<0.5	<0.5	<0.5	<2,500	<50	890
MW-8B	20	06/14/88	<0.5	<1	<2	<1			
		10/21/88	<0.5	<1	<2	3.1			
		09/28/89	<0.5	<0.5	<0.5	<3	<50		
		11/29/89	<0.5	<0.5	<0.5	<0.5	<50	<50	380
		01/24/90	<0.5	<0.5	<0.5	<0.5	<100		350
		04/26/90	<0.5	<0.5	<0.5	<0.5	<50	<50	110
MW-8C	24.5	06/14/88	5.3	3.5	2.6	13.0			
		10/21/88	<0.5	<1	<2	<1			
		09/28/89	<0.5	<0.5	<0.5	<3.0	<50		
		11/29/89	<0.5	<0.5	<0.5	<0.5	<50	<50	190
		01/24/90	0.9	<0.5	<0.5	<0.5	<100		480
		04/26/90	<0.5	<0.5	<0.5	<0.5	<50	<50	160
MW-8E	20	10/25/88	1,400	510	2.9	420			
		09/28/89	5,600	3,100	<500	<3,000	22,000		
		11/29/89	4,900	2,600	<250	1,490	15,000	6,800	<50
		01/24/90	10,100	3,340	540	1,790	36,000		4,900
		04/26/90	11,000	5,700	840	2,900	48,000	1,400	<50
MW-8F	16.5	04/14/89	<0.5	<1	<2	<1			
		09/28/89	<0.5	<0.5	<0.5	<3	<50		
		11/29/89	<0.5	<0.5	<0.5	<0.5	<50	<50	<50
		01/24/90	<0.5	<0.5	<0.5	<0.5	<100		<300
		04/26/90	<0.5	<0.5	<0.5	<0.5	<50	<50	110
MW-8G	16.5	04/14/89	<0.5	<1	<2	<1			
		09/28/89	<0.5	<0.5	<0.5	<3	<50		
		11/29/89	<0.5	<0.5	<0.5	<0.5	<50	<50	<50
		01/24/90	<0.5	<0.5	<0.5	<0.5	<100		650
		04/26/90	<0.5	<0.5	<0.5	<0.5	<50	<50	120
MW-8H	16.5	01/24/90	14.8	14.8	10.8	38.8	460		<300
		04/26/90	67	19	43	64	830	<50	820
MW-8I	16.5	01/24/90	116	2.9	13	30.5	580		440
		04/26/90	2,400	100	230	350	4,400	<50	1,400

Table 2 (continued)

Well	Depth (feet)	Date Sampled	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH as Gasoline	TPH as Diesel	TPH Other**
MW-8J	16.5	01/24/90	2.7	<0.5	1	2.6	<100		<300
		04/26/90	28	7.7	19	24	160	<50	320
08-3	11.5	11/06/89	420	8	6	64	4,000		
		04/26/90	160	19	5	8.6	1,000	3,200	<50
08-4	10.0	11/06/89	500	11	10	24	4,000		
		04/26/90	360	10	10	18	460	3,900	<50
DWAL			1.0	680	100	1,750			

DWAL = Drinking water action levels, State of California Department of Health Services (April, 1989).

* <0.5 indicates that concentrations are below the reporting limit of 0.5 µg/l.

** "Heavy" petroleum hydrocarbons such as waste oil, mineral spirits, jet fuel, or fuel oil.

Table 3. Summary of Chemical Analyses
Soil Sample B-13 (2.5 feet deep)

Semivolatile Organics; EPA Test Method 8270

- Analyses for 55 semivolatile organic compounds
- Results were below reporting limit on all except:

Naphthalene	900 ppb
2 Methylnapthalene	1400 ppb
Bis (2-ethylhexyl)phthalate	260 ppb

Halogenated Volatile Organics; EPA Methol 8010

- Analyses for 29 compounds
- Results were below reporting limits on all except:

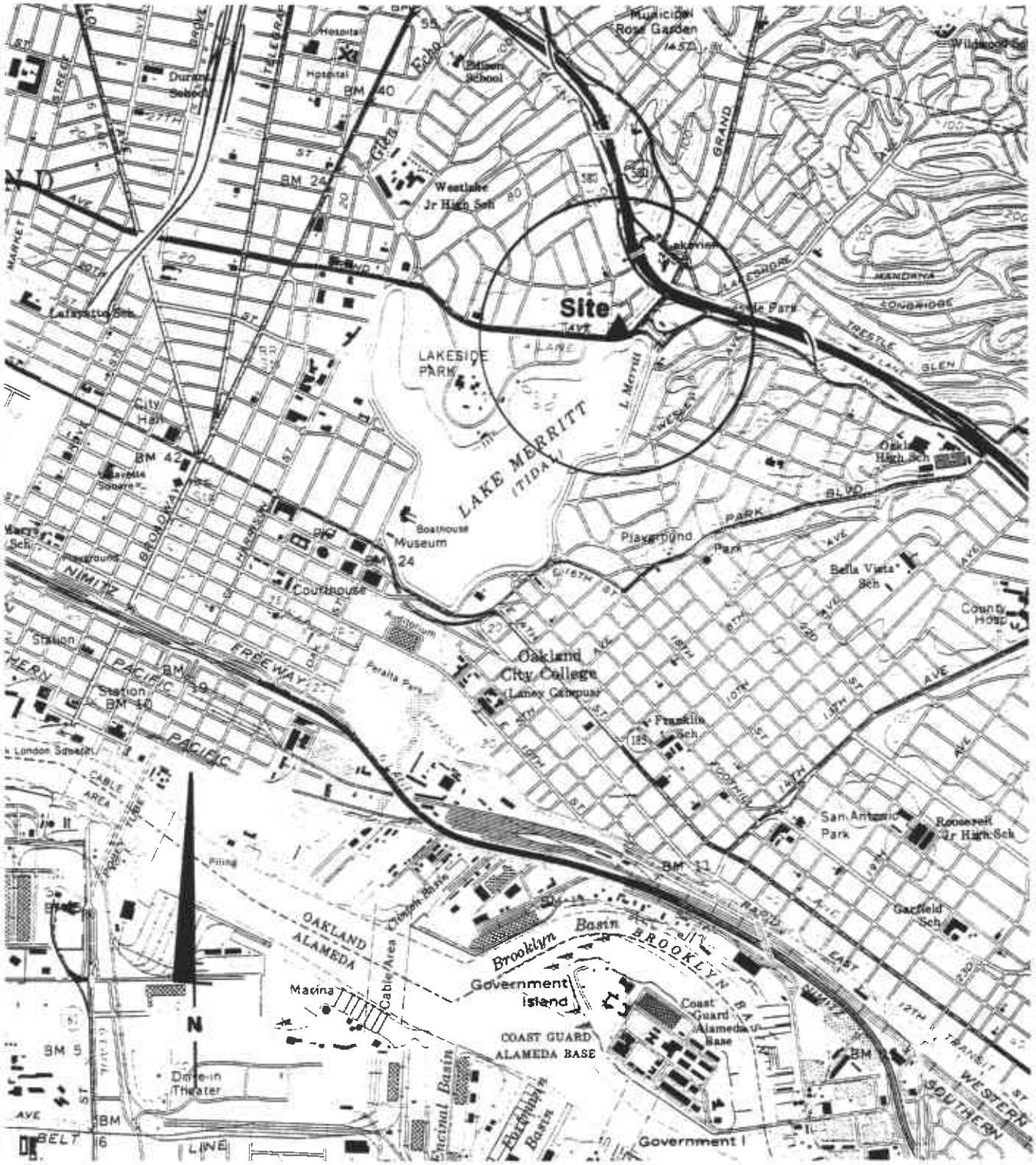
Trichloroethane	0.06 ppm

Total Oil and Grease (IR) 5600 ppm

Cd, Cr, Pb, Zn - EPA Method 503E

Cd - BRL
Cr - 36 ppm
Pb - BRL
Zn - 41 ppm

105649



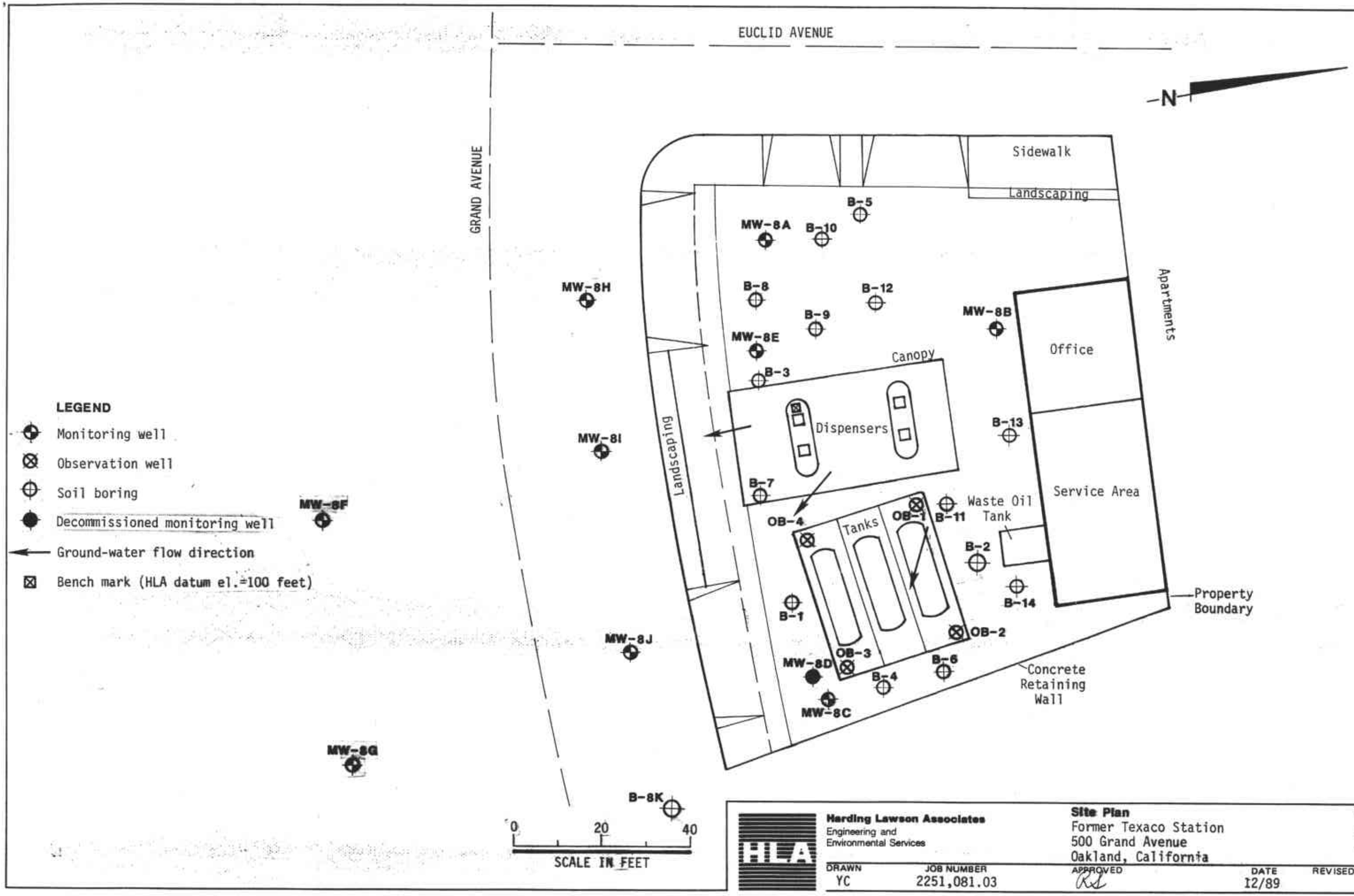
Ref: USGS, 7.5 Minute Topographic Map, Oakland West, California, Photo revised 1980.

Harding Lawson Associates
Engineers and Geoscientists

Regional Map
Former Texaco Service Station
500 Grand Avenue
Oakland, California

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,081.03		5/89		

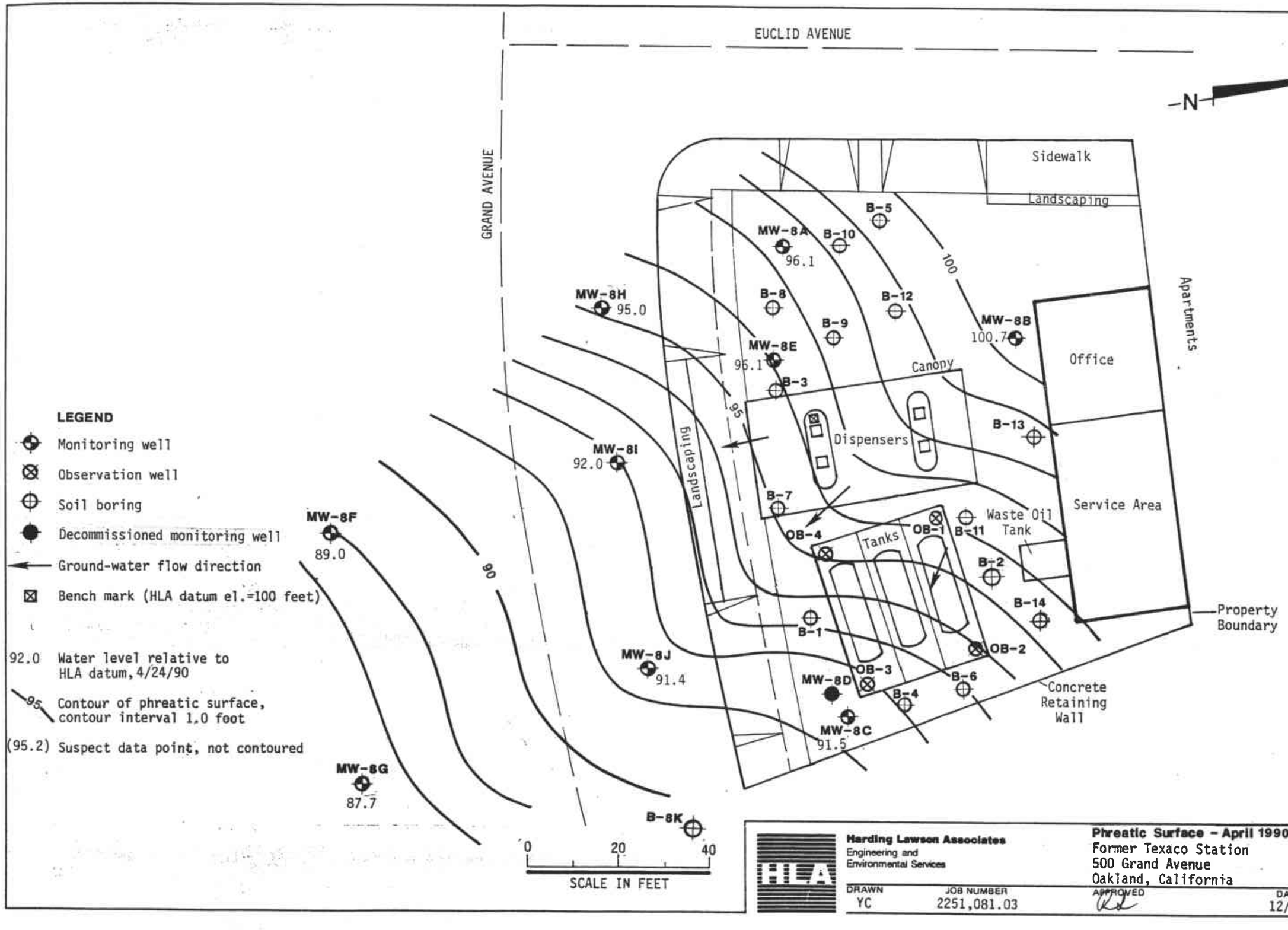


Harding Lawson Associates
Engineering and Environmental Services

Site Plan
Former Texaco Station
500 Grand Avenue
Oakland, California

PLATE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
YC	2251,081.03	RS	12/89	



LEGEND

- Monitoring well
- Observation well
- Soil boring
- Decommissioned monitoring well
- Ground-water flow direction
- Bench mark (HLA datum el.=100 feet)

92.0 Water level relative to HLA datum, 4/24/90

95 Contour of phreatic surface, contour interval 1.0 foot

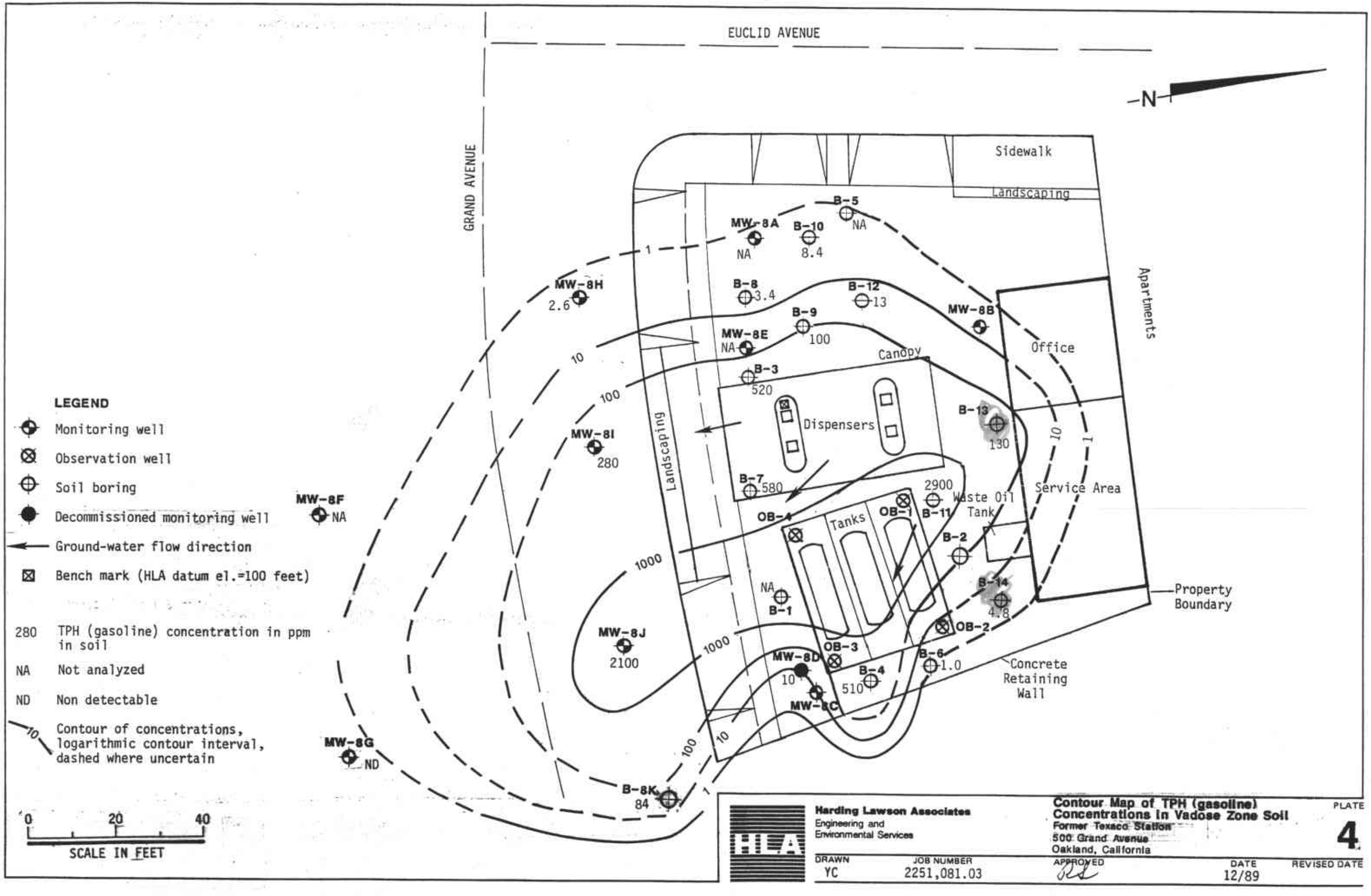
(95.2) Suspect data point, not contoured

Harding Lawson Associates
Engineering and Environmental Services

Phreatic Surface - April 1990
Former Texaco Station
500 Grand Avenue
Oakland, California

PLATE **3**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
YC	2251,081.03		12/89	



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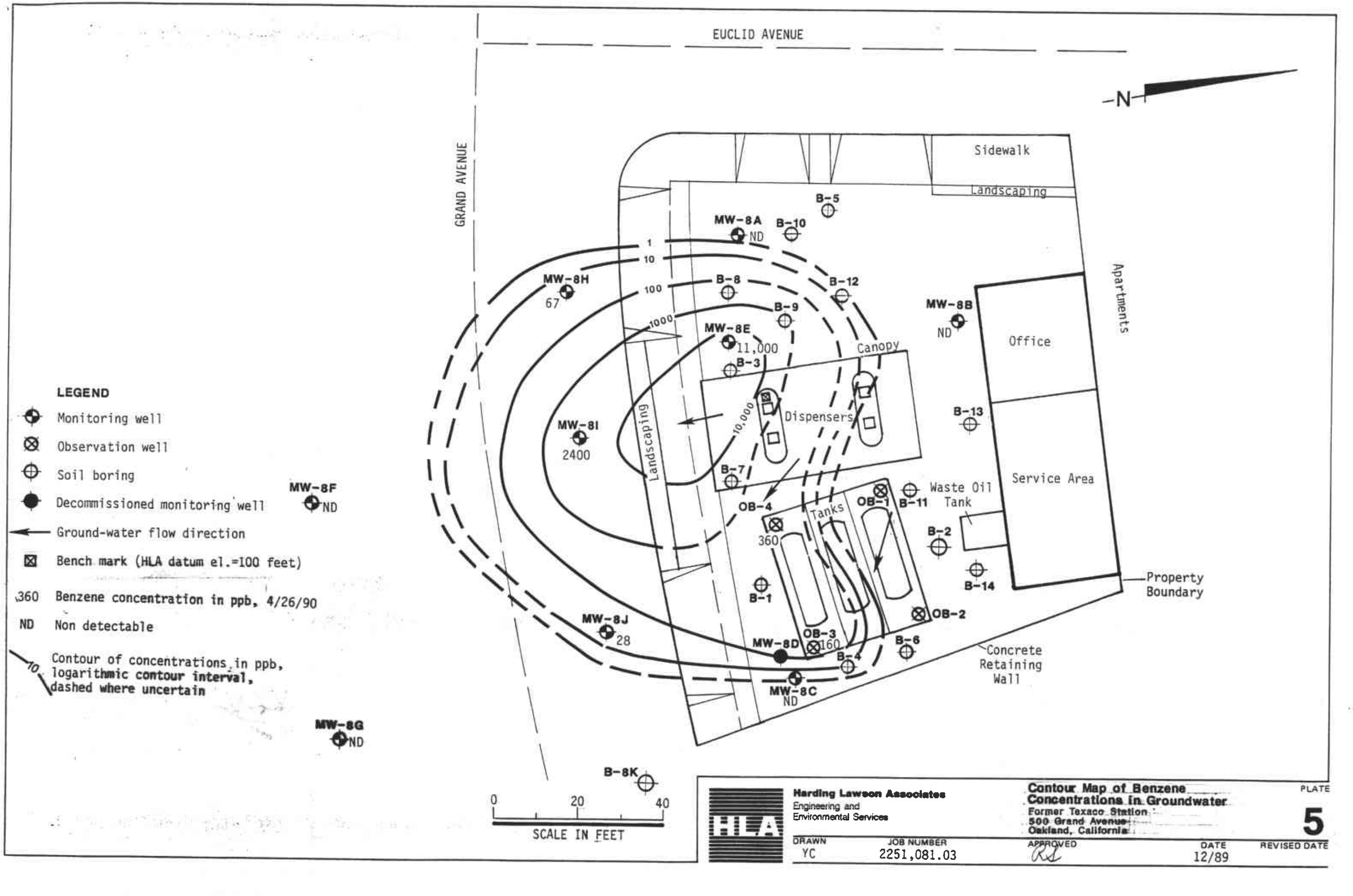
Contour Map of TPH (gasoline) Concentrations in Vadose Zone Soil
Former Texaco Station
500 Grand Avenue
Oakland, California

PLATE **4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
YC	2251,081.03		12/89	



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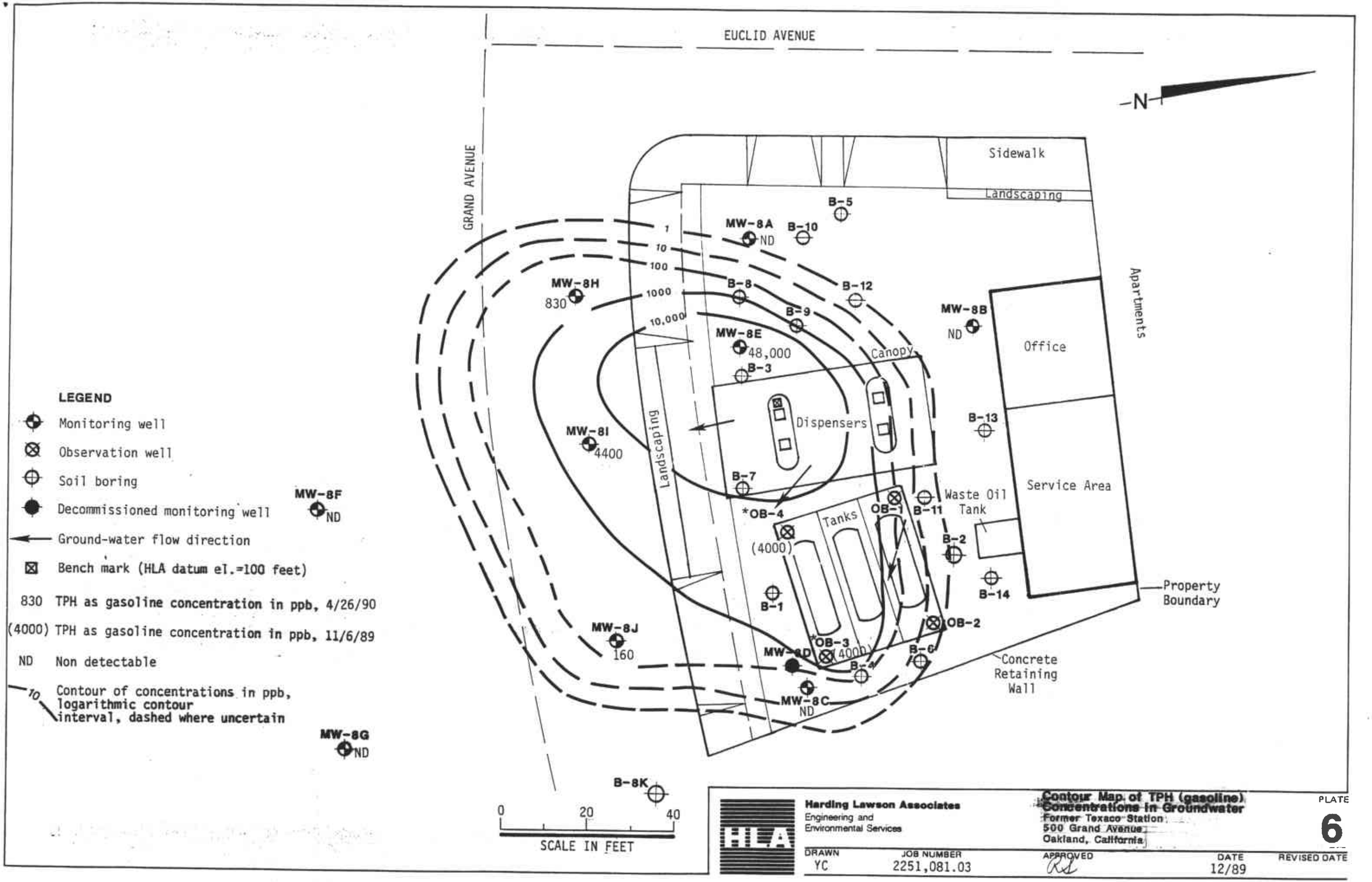
Contour Map of Benzene Concentrations in Groundwater
Former Texaco Station
500 Grand Avenue
Oakland, California

PLATE **5**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
YC	2251,081.03	RS	12/89	



LEGEND

- Monitoring well
- Observation well
- Soil boring
- Decommissioned monitoring well
- Ground-water flow direction
- Bench mark (HLA datum el.=100 feet)
- 830 TPH as gasoline concentration in ppb, 4/26/90
- (4000) TPH as gasoline concentration in ppb, 11/6/89
- ND Non detectable
- 10 Contour of concentrations in ppb, logarithmic contour interval, dashed where uncertain

Harding Lawson Associates
Engineering and Environmental Services

Contour Map of TPH (gasoline) Concentrations in Groundwater
Former Texaco Station
500 Grand Avenue
Oakland, California

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
YC	2251,081.03	RL	12/89	

PLATE 6

DISTRIBUTION

3 copies: Texaco Refining and Marketing Inc.
10 Universal City Plaza
Universal City, California 91608
Attention: Mr. R. W. Conlon

1 copy: Texaco Refining and Marketing Inc.
100 Cutting Boulevard
Richmond, California 94804
Attention: Mr. R. R. Zielinski

JSH/RS/ere 031682M/R40

QUALITY CONTROL REVIEWER

Stephen J. Osborne
Principal Engineer