Applied GeoSystems, Inc. 3315 Almaden Expressway, Suite 34, San Jose, CA 95118 (408) 264-7723

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LETTER REPORT
QUARTERLY GROUND-WATER MONITORING
First Quarter 1991 4/30/91
at
ARCO Station 4494
566 Hegenberger Road
Oakland, California

AGS 69038-4

Applied GeoSystems, Inc. 3315 Almaden Expressway, Suite 34, San Jose, CA 95118 (408) 264-7723

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April 30, 1991
0313ccar
AGS 69038-4

Mr. Chuck Carmel
ARCO Products Company
P.O. Box 5811
San Mateo, California 94402

Subject: First Quarter 1991 Ground-Water Monitoring Report for ARCO Station 4494 at 566 Hegenberger Road, Oakland, California.

Mr. Carmel:

This letter report summarizes the methods and results of the First Quarter 1991 ground-water monitoring performed by Applied GeoSystems (AGS) at the above-referenced site. The station is on the northeastern side of the intersection of Edes Avenue and Hegenberger Road in Oakland, California, as shown on the Site Vicinity Map (Plate 1). ARCO has contracted with AGS to perform quarterly ground-water sampling and analyses to monitor gasoline hydrocarbon concentrations in the ground water beneath the site, and evaluate trends related to fluctuations of these gasoline hydrocarbon concentrations. In addition, ARCO has requested that AGS perform monthly monitoring of ground-water levels in the wells at the site, and evaluate fluctuations in the ground-water gradient over time.

Prior to the present monitoring, Pacific Environmental Group (Pacific), AGS, and others performed limited subsurface environmental investigations related to the former underground waste-oil storage tank and existing gasoline-storage tanks at the site. Pacific performed soil sampling and observation during removal of the waste-oil tank in December 1988. AGS performed a site history and offsite records review in October 1990, and is presently conducting a subsurface environmental investigation at the site. Our work has included the installation of four ground-water monitoring wells (MW-1, MW-2, MW-3, and MW-4) and the drilling of one boring (B-5) near the former waste-oil storage tank in October 1989 and August 1990. The results of these investigations are presented in the reports listed in the references attached to this letter report. The locations of the ground-water monitoring wells and pertinent site features are shown on the Generalized Site Plan (Plate 2).

Ground-Water Sampling and Gradient Evaluation

AGS personnel performed monthly monitoring of depth-to-water (DTW) levels and subjective analyses of water samples from the wells on January 29, February 27, March 7, and March 26, 1991, and performed quarterly ground-water monitoring and sampling on March 7, 1991. Field work consisted of measuring DTW levels in wells MW-1 through MW-4; subjectively analyzing water from these wells for the presence of petroleum hydrocarbon sheen and floating product; purging well MW-2 to remove product sheen and ground water; and purging and sampling ground water from monitoring wells MW-1, MW-3, and MW-4 for laboratory analysis. The ground-water sampling protocol is attached to this report.

The DTW levels, wellhead elevations, and ground-water elevations for this and previous monitoring episodes at the site are summarized in Table 1, Cumulative Ground-Water Monitoring Data. The ground-water gradients interpreted from the January 29, February 27, March 7, and March 26, 1991 monitoring data were approximately 0.009 to 0.012 to the northeast, as shown on the Ground-Water Gradient Maps (Plates 3 through 6, respectively). These interpreted gradients are generally consistent with the previously interpreted ground-water gradients for this site.

Water samples were collected from wells MW-1, MW-3 and MW-4 for subjective analysis (see Table 1) before the monitoring wells were purged and sampled. Subjective analysis of water samples from well MW-2 indicated a product sheen on January 29, February 27, March 7, and March 26, 1991. The product sheen was subsequently removed from well MW-2 by pumping the well dry, and the purge water was removed from the site by Armour Petroleum. No evidence of petroleum product was observed in water samples collected from wells MW-1, MW-3, and MW-4 on January 29, February 27, and March 7, 1991.

Monitoring wells MW-1, MW-3, and MW-4 were purged and sampled on March 7, 1991, in accordance with the attached protocol. Well MW-2 was not sampled due to the presence of product sheen in this well. Well purge data sheets for the parameters monitored and stabilization graphs for each well sampled are also attached (Appendix A).

Laboratory Analysis

Water samples collected from the wells were delivered under Chain of Custody protocol to Applied Analytical Environmental Laboratories in Fremont, California (Hazardous Waste Testing Laboratory No. 1211). The water samples from wells MW-1, MW-3, and MW-4 were analyzed for total petroleum hydrocarbons as gasoline (TPHg), and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using modified Environmental Protection Agency

(EPA) Methods 5030/8015/602. The Chain of Custody Records and Laboratory Analysis Reports are attached (Appendix A). Results of these and previous water analyses are summarized in Table 2, Cumulative Results of Laboratory Analyses of Water Samples.

Results of this quarter's laboratory analyses of water samples from wells MW-1, MW-3 and MW-4 indicated:

- nondetectable levels of TPHg and BTEX in wells MW-1, MW-3, and MW-4.

Conclusions and Recommendations

First ground water in the areas wells MW-1, MW-3, and MW-4 has not been impacted by petroleum hydrocarbons as suggested by reported nondetectable concentrations of TPHg and BTEX during this sampling episode and reported nondetectable concentrations of TPHg, BTEX (with the exception of 0.7 toluene reported during November 1990), TPHd, and TOG during previous monitoring episodes between June 1990 and November 1990. The amount of floating product in well MW-2 has decreased to a sheen since monthly removal was implemented in November 1990.

We recommend continued ground-water monitoring at this site and monthly measurement of ground-water levels to evaluate trends of petroleum hydrocarbons and changes in ground-water gradient and floating product with time. Recommendations for additional work at the site will be included under separate cover.

Schedule

AGS will continue the quarterly ground-water monitoring at this site to evaluate trends in petroleum hydrocarbons and changes in ground-water gradient with time. Routine well maintenance, removal of free product from well MW-2, and quality control will be performed as necessary during these site visits. The next quarterly monitoring episode is scheduled for June 5, 1991.

We recommend that copies of this report be forwarded to:

Mr. Barney Chan
Alameda County Department of
Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

Mr. Lester Feldman
Regional Water Quality Control Board
San Francisco Bay Region
1800 Harrison Street
Oakland, California 94612

If you have any questions or comments, please call us at (408) 264-7723.

Sincerely,
Applied GeoSystems

Ken Mateik
Project Geologist

Joan E. Tiernan
Registered Civil
Engineer 044600

Enclosures: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Ground-Water Gradient Map, January 29, 1991
Plate 4, Ground-Water Gradient Map, February 27, 1991
Plate 5, Ground-Water Gradient Map, March 7, 1991
Plate 6, Ground-Water Gradient Map, March 26, 1991

Table 1, Cumulative Ground-Water Monitoring Data
Table 2, Cumulative Results of Laboratory Analyses of Water Samples

Appendix A: Ground-Water Sampling Protocol
Well Purge Data Sheets
Chain of Custody Record (1 page)
Laboratory Analysis Report (1 page)

cc: H.C. Winsor, ARCO Products Company

REFERENCES

Applied GeoSystems. September 29, 1989. Work Plan for Initial Subsurface Investigation at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. AGS Report 69038-1.

Applied GeoSystems. October 1, 1990. Report on Site History and Limited Environmental Records Review at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. AGS Report 69038-3.

Applied GeoSystems. February 8, 1991. Letter Report on Fourth Quarter 1990 Ground-Water Monitoring at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. AGS Report 69038-4.

Applied GeoSystems. February 13, 1991. Limited Subsurface Environmental Investigation at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. AGS Report 69038-2.

Pacific Environmental Group. May 3, 1989. Arco Station No. 4494, 566 Hegenberger Road, California. Project 330-41.

Applied GeoSystems

CHAIN-OF-CUSTODY RECORD

9138

PROJ. NO. 9038-4 | PROJECT NAME ARCO 4494

P.O. NO. | SAMPLERS (Signature) Mike Baranski

DATE MM/DD/YY	TIME		No. of Containers	TPH gasoline (8015)	BTEX (602/8020)	TPH diesel (8015)					Preserved?	REMARKS	LABORATORY I.D. NUMBER
3/7/91	4:00	W-9-MW1	4	X	X						HCl		
3/7/91	4:15	W-9-MW4	4	X	X						HCl		
3/7/91	4:30	W-9-MW3	4	X	X						HCl		

RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
Mike Baranski	3/7/91 15:40	Tim Mahoney
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED FOR LABORATORY BY (Signature):
	3/7/91 10:40	Audrey Meno

Laboratory: APPLIED Analytical

Turn Around: 2 weeks

SEND RESULTS TO:
Applied GeoSystems
3315 Almaden Expressway
Suite 34
San Jose, California 95118
(408) 264-7723

Proj. Mgr.: Mike Baranski

APPLIED ANALYTICAL

Environmental Laboratories

13844 Alton Pkwy., Suite 140
Irvine, CA 92718
(714) 472-5060

Project Name: ARCO 4494
Project No. : 69038-4

March 26, 1991

Mike Barminsla
Applied GeoSystems
3315 Almaden Expressway #34
San Jose, CA 95118

Dear Mr. Barminsla:

Enclosed please find the analytical results for the samples received by Applied Analytical Environmental Laboratory on 03-20-91.

Applied Analytical maintains a strict Quality Assurance/Quality Control (QA/QC) program designed to meet or exceed EPA requirements. Analytical data presented in this report met QA/QC criteria.

The specific analytical methods used and cited in this report are approved by the State of California's Department of Health Services (DOHS) under certificate number E678.

If you have any questions regarding these analyses, or if we can be of further assistance, please give us a call.

Sincerely,
APPLIED ANALYTICAL

F.A. Jaime
Laboratory Supervisor

APPLIED ANALYTICAL

Environmental Laboratories
13844 Alton Pkwy., Suite 140
Irvine, CA 92718
(714) 472-5060

ANALYSIS REPORT

Attention: Mike Barminsla
Applied GeoSystems
3315 Almaden Expressway
San Jose, CA 95118

Date Sampled: 03-07-91
Date Received: 03-20-91
Date Analyzed: 03-21-91
Date Reported: 03-26-91

Project: 69038-4

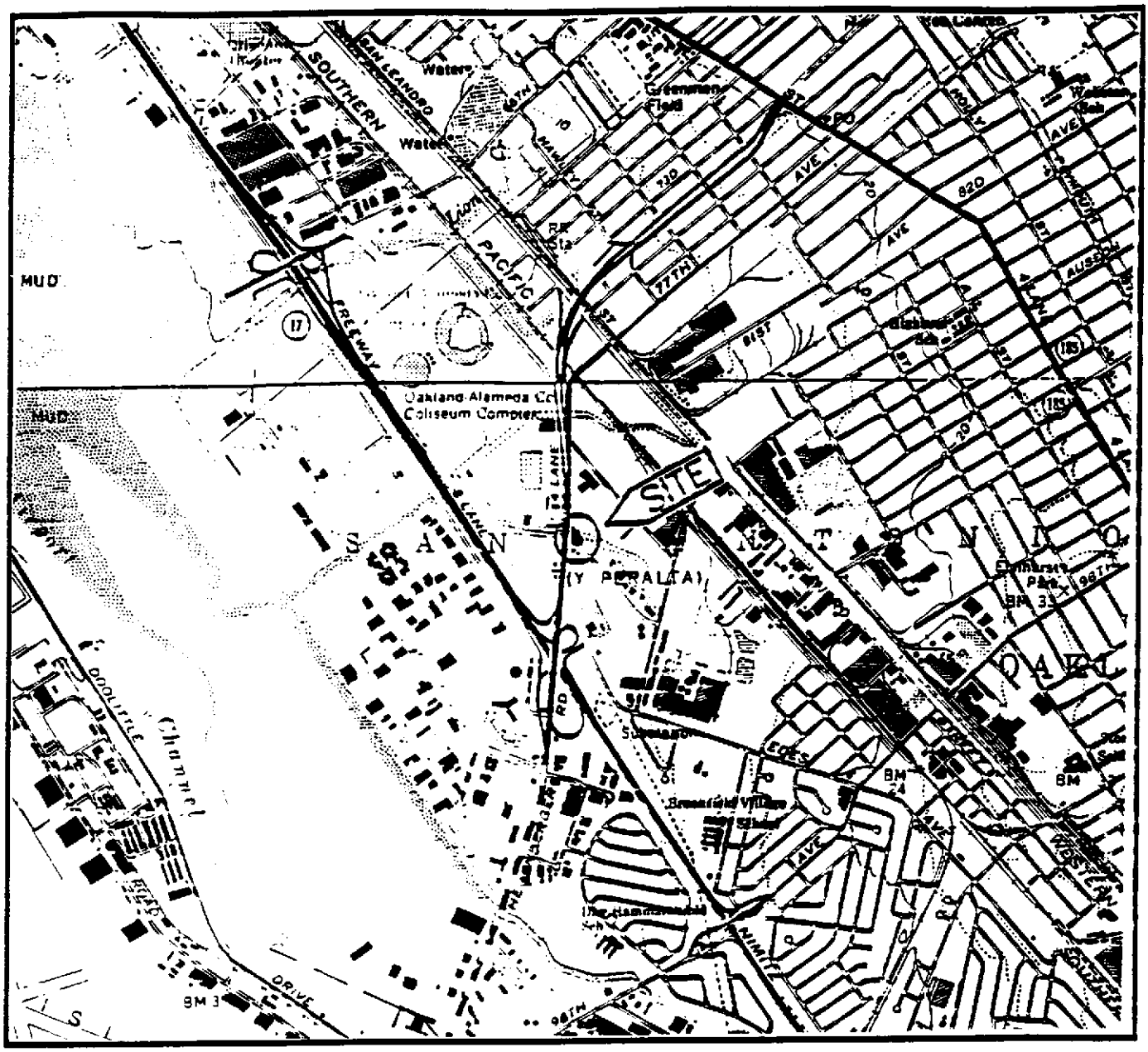
Matrix: Water

Detection limit (ug/L)	Benzene 0.3	Toluene 0.3	Ethyl-benzene 0.3	Total Xylenes 0.5	TPH 50
Sample description					
W-9-MW1 2-103-230*	ND	ND	ND	ND	ND
W-9-MW4 2-103-231*	ND	ND	ND	ND	ND
W-9-MW3 2-103-232*	ND	ND	ND	ND	ND

TPH = total petroleum hydrocarbons as gasoline.
ug/L = Micrograms per liter = ppb = parts per billion.
* = Laboratory identification number.
ND = Analytes not detected above the stated detection limit.

ANALYTICAL PROCEDURES

BTEX-- Benzene, toluene ethylbenzene, and total Xylene isomers are measured in accordance with EPA Method 5030 followed by analysis using EPA Method 8020.
TPH-- Total petroleum hydrocarbons as gasoline are measured in accordance with EPA Method 5030, followed by modified EPA Method 8015.



Source: U.S. Geological Survey
7.5-Minute Quadrangle
Oakland East/San Leandro,
California
Photorevised 1980

N

Approximate Scale

2000 1000 0 2000 4000

feet

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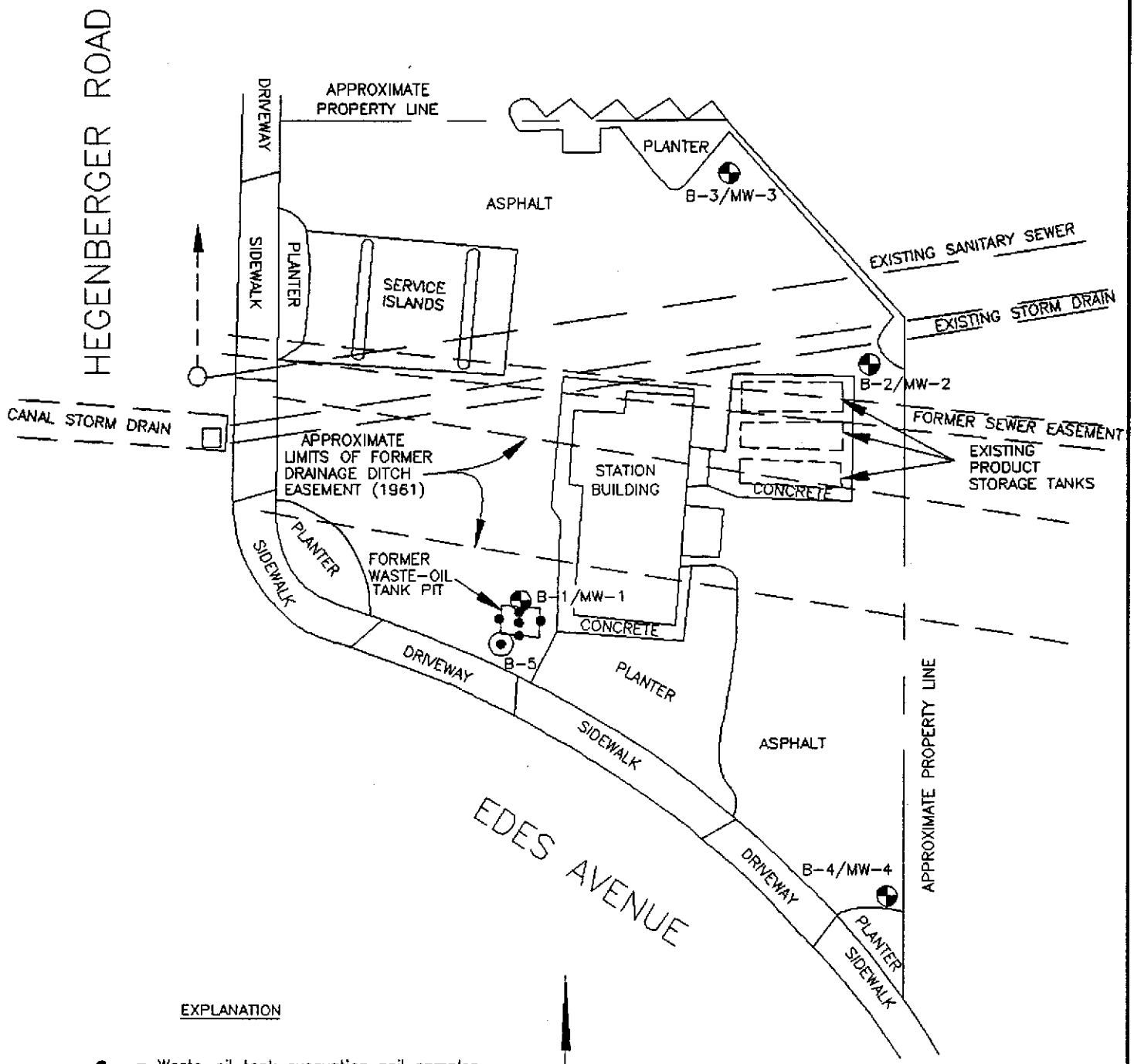
PROJECT 69038-4

SITE VICINITY MAP
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE
1



EXPLANATION

- ● = Waste-oil tank excavation soil samples (Pacific Environmental Group, January 1989)
- B-4/MW-4 ◔ = Monitoring well (Applied GeoSystems, October 1989 and August 1990)
- B-5 ⊙ = Soil boring (Applied GeoSystems, August 1990)

Approximate Scale

40 20 0 40 80

feet

Source: Modified from plans supplied by ARCO Products Co. (dated August 12, 1982) and City of Oakland Dept. of Public Works (dated December 19, 1961).

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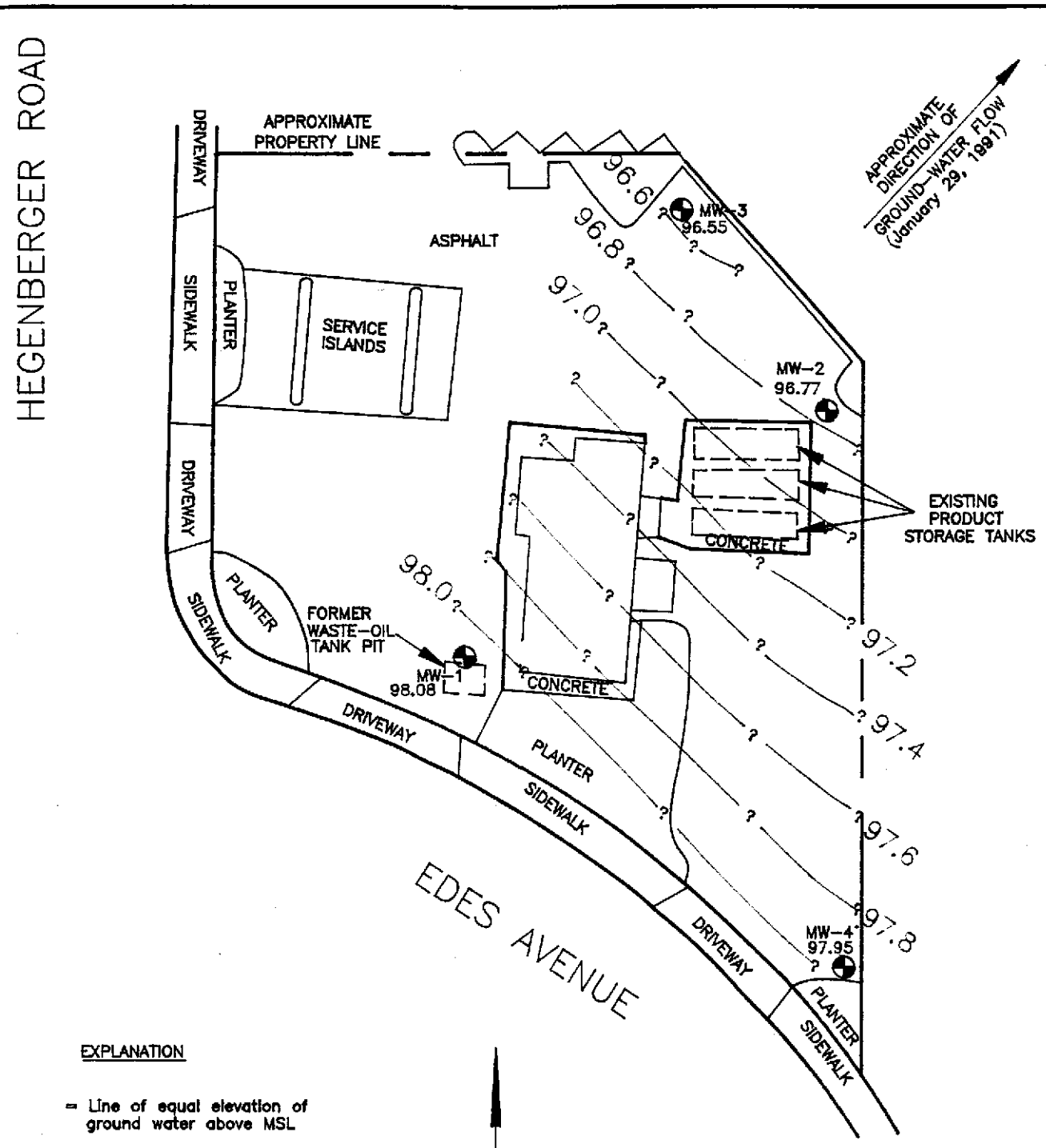
GENERALIZED SITE PLAN
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 2



EXPLANATION

98.0 = Line of equal elevation of ground water above MSL

98.08 = Elevation of ground water in feet January 29, 1991

MW-4 = Monitoring well (Applied GeoSystems, October 1989 and August 1990)

N

Approximate Scale

40 20 0 40 80

feet

Source: Modified from plans supplied by ARCO Products Co. (dated August 12, 1982) and City of Oakland Dept. of Public Works (dated December 19, 1961).

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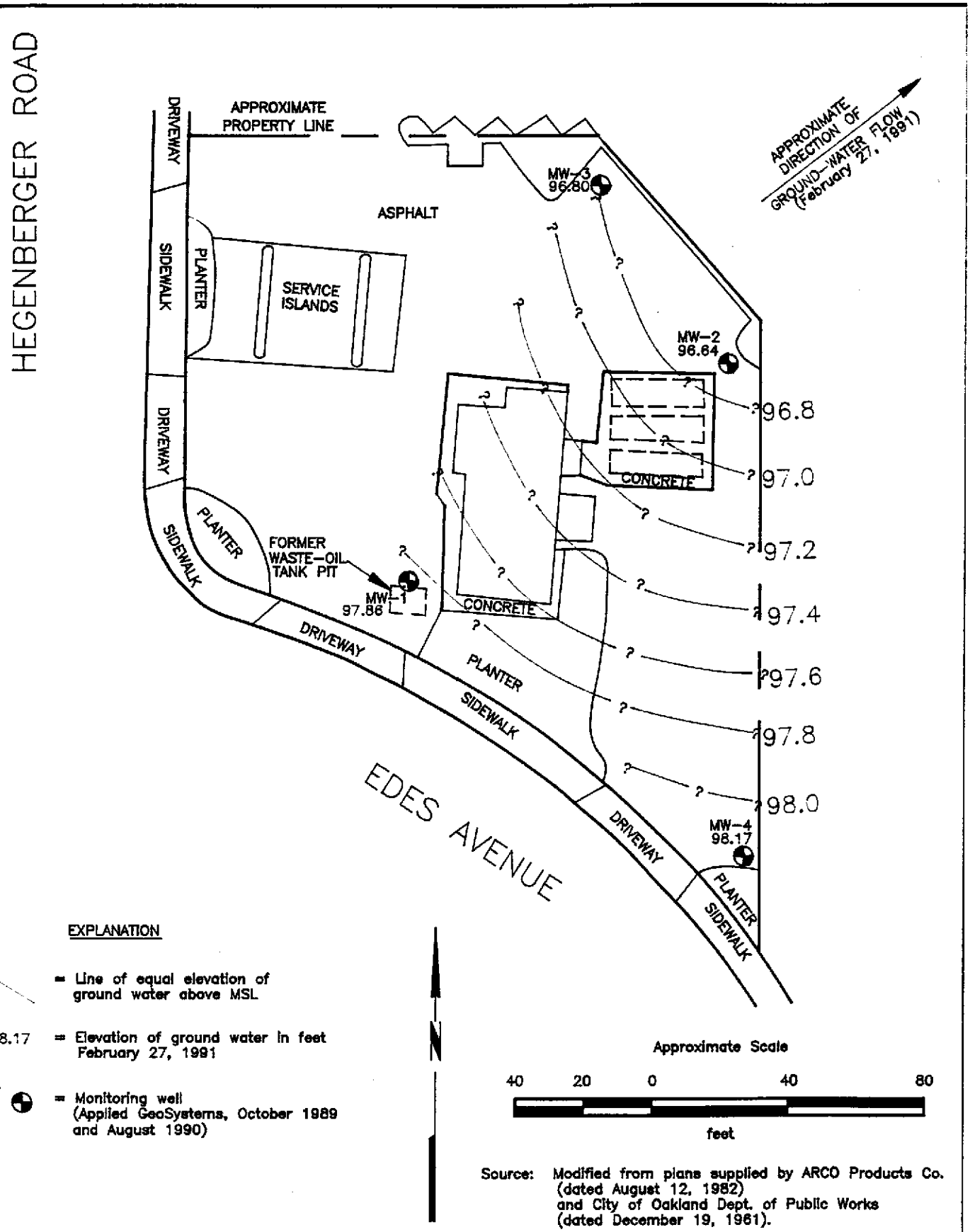
GROUND-WATER GRADIENT MAP
January 29, 1991
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE
3



Source: Modified from plans supplied by ARCO Products Co. (dated August 12, 1982) and City of Oakland Dept. of Public Works (dated December 19, 1961).

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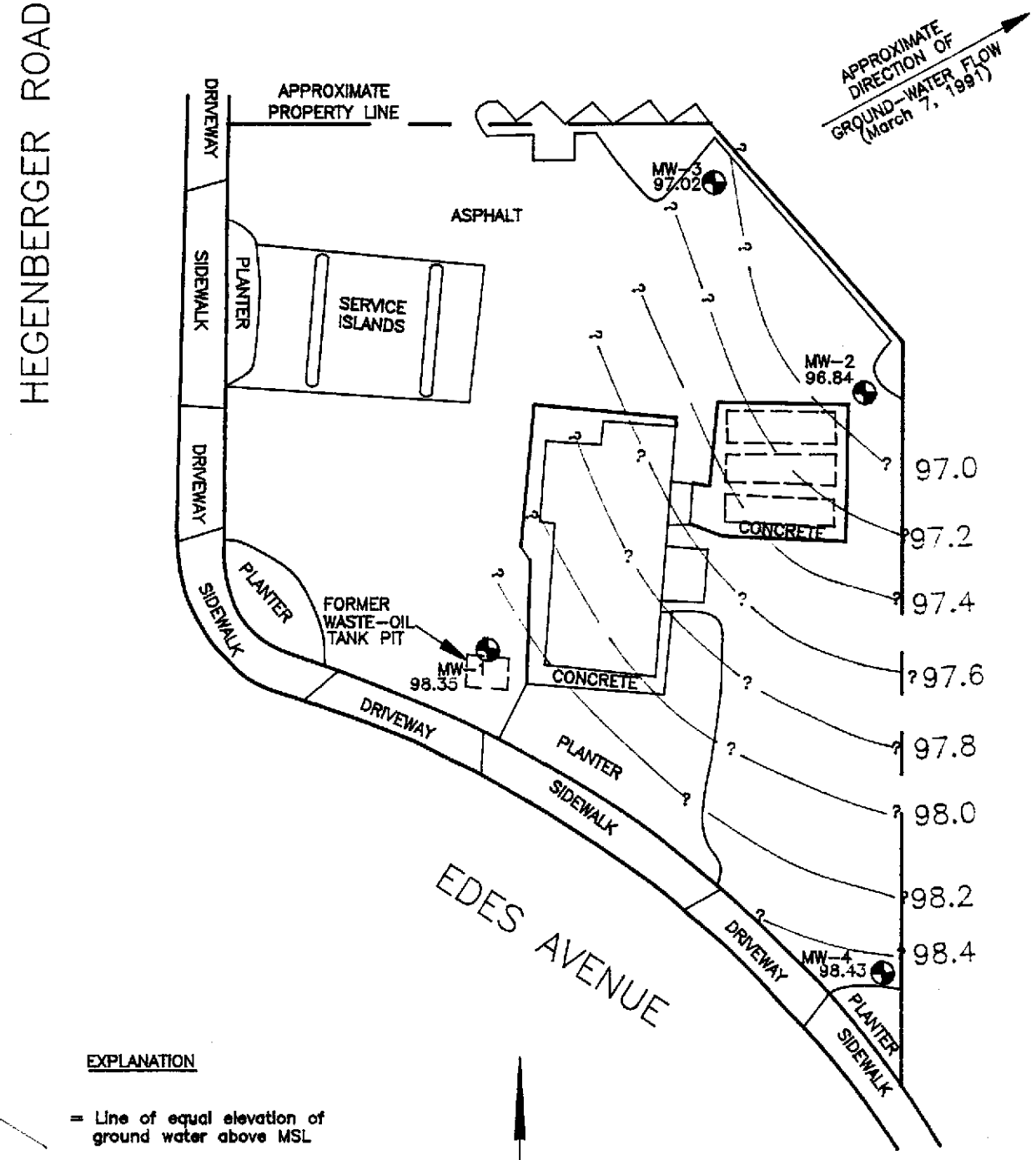
GROUND-WATER GRADIENT MAP
February 27, 1991
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 4



EXPLANATION

98.4 = Line of equal elevation of ground water above MSL

98.43 = Elevation of ground water in feet March 7, 1991

MW-4 = Monitoring well (Applied GeoSystems, October 1989 and August 1990)

N

Approximate Scale

40 20 0 40 80

feet

Source: Modified from plans supplied by ARCO Products Co. (dated August 12, 1982) and City of Oakland Dept. of Public Works (dated December 19, 1961).

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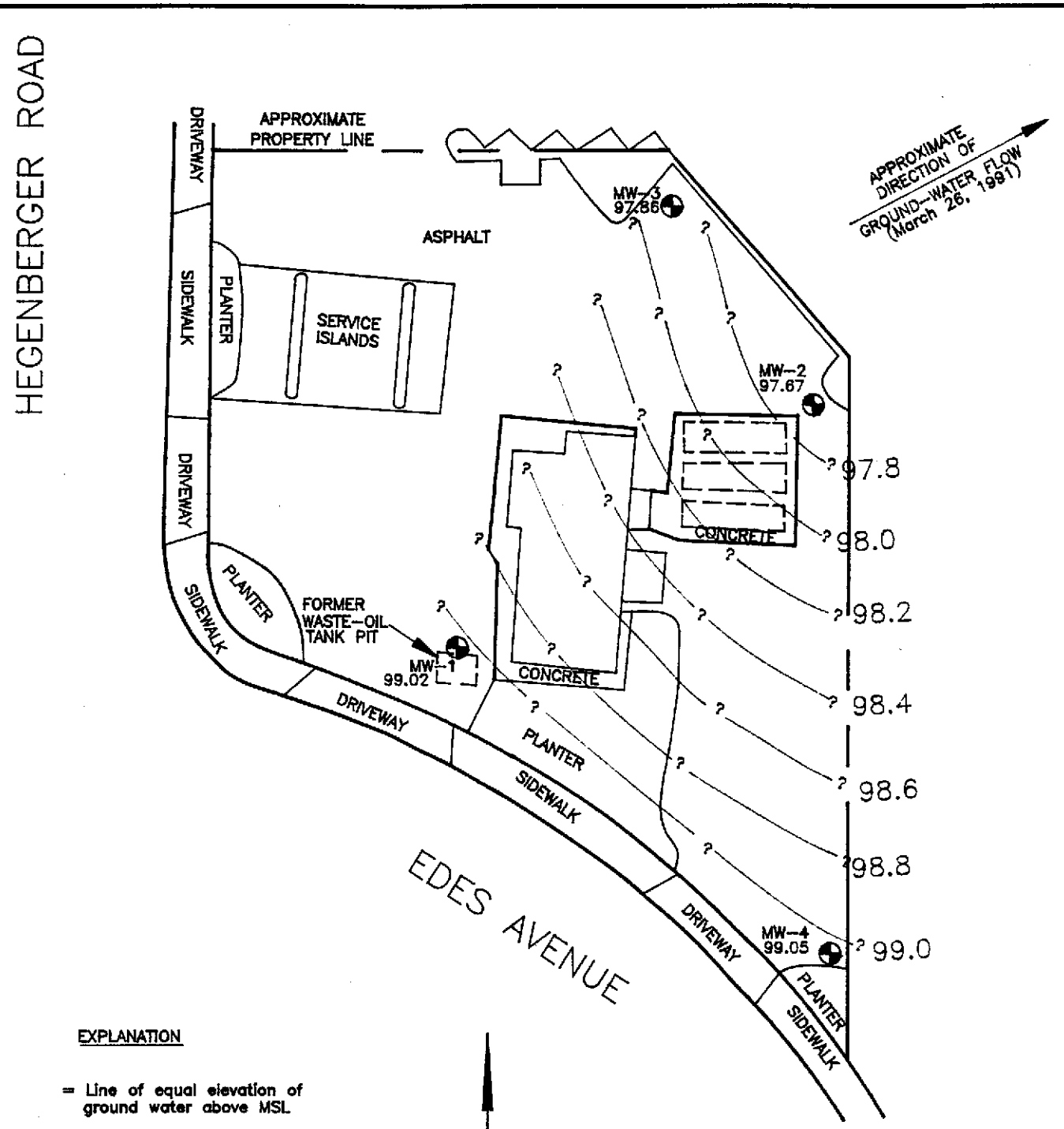
PROJECT 69038-4

GROUND-WATER GRADIENT MAP
March 7, 1991
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE
5



EXPLANATION

99.0 = Line of equal elevation of ground water above MSL

99.05 = Elevation of ground water in feet March 26, 1991

MW-4 = Monitoring well (Applied GeoSystems, October 1989 and August 1990)

N

Approximate Scale

40 20 0 40 80

feet

Source: Modified from plans supplied by ARCO Products Co. (dated August 12, 1982) and City of Oakland Dept. of Public Works (dated December 19, 1961).

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GROUND-WATER GRADIENT MAP
March 26, 1991
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE
6

TABLE 1
CUMULATIVE GROUND-WATER MONITORING DATA
ARCO Station 4494
Oakland, California
(Page 1 of 2)

Well Date	Elevation of Wellhead	Depth to Water	Water Elevation	Product Evidence
MW-1				
06/06/90	105.31	6.65	98.66	None
08/16/90		7.00	98.31	None
08/21/90		7.05	98.26	None
09/07/90		7.24	98.07	None
11/20/90		7.46	97.85	None
11/29/90		7.40	97.91	None
12/19/90		6.99	98.32	None
01/29/91		7.23	98.08	None
02/27/91		7.45	97.86	None
03/07/91		6.96	98.35	None
03/26/91		6.02	99.29	None
MW-2				
06/06/90	105.78	9.00*	96.78*	11" of Black Product
08/16/90		NM	--.--	2" of Black Product
08/21/90		NM	--.--	2" of Black Product
09/07/90		9.17*	96.61*	2" of Black Product
11/20/90		9.20*	96.58*	Heavy Sheen
11/29/90		9.92*	95.86*	Heavy Sheen
12/19/90		8.95	96.83	Obvious Odor
01/29/91		9.01	96.77	Sheen
02/27/91		9.14	96.64	Sheen
03/07/91		8.94	96.84	Sheen
03/26/91		8.11	97.67	Sheen

See notes on page 2 of 2.

TABLE 1
CUMULATIVE GROUND-WATER MONITORING DATA
ARCO Station 4494
Oakland, California
(Page 2 of 2)

Well Date	Elevation of Wellhead	Depth to Water	Water Elevation	Product Evidence
MW-3				
08/16/90	105.51	8.87	96.64	None
08/21/90		8.85	96.66	None
09/07/90		8.98	96.53	None
11/20/90		9.10	96.41	None
11/29/90		9.05	96.46	None
12/19/90		8.67	96.84	None
01/29/91		8.96	96.55	None
02/27/91		8.71	96.80	None
03/07/91		8.49	97.02	None
03/26/91		7.65	97.86	None
MW-4				
08/16/90	106.61	8.16	98.45	None
08/21/90		8.22	98.39	None
09/07/90		8.39	98.22	None
11/20/90		8.57	98.04	None
11/29/90		8.53	98.08	None
12/19/90		8.13	98.48	None
01/29/91		8.66	97.95	None
02/27/91		8.44	98.17	None
03/07/91		8.18	98.43	None
03/26/91		7.56	99.05	None

Depth measurements in feet. * = Floating Product present in well. NM = Not measured.
Elevations in feet above mean sea level (plus one hundred feet to avoid negative ground-water elevations).

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES
ARCO Station 4494
566 Hegenberger Road
Oakland, California
(Page 1 of 2)

Well Date	TPHg	TPHd	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TOG
MW-1							
06/19/90	ND	ND	ND	ND	ND	ND	ND
08/16/90	ND	NA	ND	ND	ND	ND	NA
09/07/90	NA	NA	NA	NA	NA	NA	ND
11/29/90	ND	NA	ND	0.7	ND	ND	NA
03/07/91	ND	NA	ND	ND	ND	ND	NA
MW-3							
08/16/90	ND	ND	ND	ND	ND	ND	NA
09/07/90	NA	NA	NA	NA	NA	NA	NA
11/29/90	ND	NA	ND	ND	ND	ND	NA
03/07/91	ND	NA	ND	ND	ND	ND	NA
MW-4							
08/16/90	ND	ND	ND	ND	ND	ND	NA
09/07/90	NA	NA	NA	NA	NA	NA	NA
11/29/90	ND	NA	ND	ND	ND	ND	NA
03/07/91	ND	NA	ND	ND	ND	ND	NA

Results in micrograms per liter (ug/l), or parts per billion (ppb).

TPHg: Total petroleum hydrocarbons as gasoline by EPA Methods 5030 and 8015.

TPHd: Total petroleum hydrocarbons as diesel by EPA Methods 3550 and 8015.

BTEX: Benzene, toluene, ethylbenzene, and total xylene isomers by EPA Method 5030 and 8020.

TOG: Total oil and grease by EPA Standard Method 503E.

NA: Not Analyzed.

ND: Below the detection limit; see laboratory data sheets for detection limits.

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSIS OF WATER SAMPLES
ARCO Station 4494
566 Hegenberger Road
Oakland, California
(Page 2 of 2)

Well Date	BNA's	VOC's	Total Cadmium	Chromium	Lead	Zinc
MW-1						
06/19/90	ND	ND	0.024	ND	0.10	0.049
08/16/90	NA	NA	NA	NA	NA	NA
11/29/90	NA	NA	NA	NA	NA	NA
03/07/91	NA	NA	NA	NA	NA	NA
MW-3						
08/16/90	ND	ND	ND	0.06	0.07	0.07
11/29/90	NA	NA	NA	NA	NA	NA
03/07/91	NA	NA	NA	NA	NA	NA
MW-4						
08/16/90	ND	ND	ND	ND	ND	0.03
03/07/91	NA	NA	NA	NA	NA	NA
11/29/90	NA	NA	NA	NA	NA	NA
03/07/91	NA	NA	NA	NA	NA	NA
DWALs/MCLs	----	---	0.010	0.05	0.05	NE

Results in milligrams per liter (mg/l), or parts per million (ppm).
NA: Not Analyzed.
ND: Below the detection limit; see laboratory data sheets for detection limits.

DWALs: Drinking Water Action Levels (California Department of Health Services, Office of Drinking Water, October 1990).
MCLs: Maximum Contaminant Levels (California Department of Health Services, Office of Drinking Water, October 1990).
NE: No established DWAL or MCL.

APPENDIX A

Ground-Water Sampling Protocol

GROUND-WATER SAMPLING PROTOCOL

The static water level in each well that contained water was measured with a Solinst® water-level indicator; this instrument is accurate to the nearest 0.01 foot. These ground-water depths were subtracted from wellhead elevations measured in 1989 by Ron Archer, Civil Engineer, Inc., of Pleasanton, California, a licensed land surveyor, to calculate the differences in ground-water elevations.

Water samples collected for subjective evaluation were collected by gently lowering approximately half the length of a clean Teflon® bailer past the air-water interface (if possible) and collecting a sample from near the surface of the water in the well. The samples were checked for measurable floating hydrocarbon product and product sheen.

The static water level in each well that was suspected to contain floating product was measured with an ORS® interface probe; this instrument is accurate to the nearest 0.01 foot. The probe contains two different sensor units, one for detecting the liquid/air interface, and one for distinguishing between water and hydrocarbon. The thickness of the floating product and the ground-water depths were recorded. The recorded thickness of the floating product was then multiplied by 0.80 to obtain an approximate value for the displacement of water by the floating product. This approximate displacement value is then subtracted from the measured depth to water to obtain a calculated depth to water. These calculated ground-water depths were subtracted from wellhead elevations measured by Ron Archer, Civil Engineer, Inc., of Pleasanton, California, a licensed land surveyor, to calculate the differences in ground-water elevations.

Before water samples were collected from the ground-water monitoring wells, the wells were purged until stabilization of the temperature, pH, and conductivity was obtained. Approximately 1 well casing volume of water was purged before these characteristics stabilized. The quantity of water purged from the wells was calculated as follows:

1 well casing volume = $\pi r^2 h(7.48)$ where:

r = radius of the well casing in feet.
h = column of water in the well in feet (well depth - depth to water).
7.48 = conversion constant from cubic feet to gallons

$$\frac{\text{gallons of water purged}}{\text{gallons in 1 well casing volume}} = \text{well casing volumes removed.}$$

After purging, each well was allowed to recharge to at least approximately 80% of the initial water level. Water samples were then collected with an Environmental Protection Agency (EPA) approved Teflon® bailer which had been cleaned with Alconox® and deionized water. The water samples were carefully poured into 40-milliliter glass vials, which were filled so as to produce a positive meniscus. Each sample container was preserved with hydrochloric acid, sealed with a cap containing a Teflon® septum, and subsequently examined for air bubbles to avoid headspace which would allow volatilization to occur. The samples were promptly transported in iced storage in a thermally-insulated ice chest, accompanied by a Chain of Custody Record, to a California-certified laboratory.

WELL PURGE DATA SHEET

Project Name: ARCO 4494 Job No. 69038.04

Date: March 7, 1991 Page 1 of 1

Well No. MW-1 Time Started 11:15

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromoh)
11:15	Begin purging MW-1			
11:20	5	66.6	7.92	16.22
11:25	10	66.9	7.86	16.01
11:30	15	65.8	7.89	15.55
11:35	20	65.4	7.81	14.92
11:40	25	65.1	7.95	15.04
11:45	30	64.5	7.94	15.03
11:50	35	64.3	7.86	14.99
11:55	40	64.3	7.99	14.37
12:00	45	64.2	8.03	14.11
12:05	50	63.8	7.98	13.89
12:10	55	63.7	8.03	13.74
	Stop purging MW-1			

Notes:

Depth to Bottom (feet)	:	23.35
Depth to Water - initial (feet)	:	6.96
Depth to Water - final (feet)	:	7.02
% recovery	:	99.6%
Time Sampled	:	16:00
Gallons per Well Casing Volume	:	10.70
Gallons Purged	:	55.0
Well Casing Volumes Purged	:	5.14
Approximate Pumping Rate (gpm)	:	1.0

WELL PURGE DATA SHEET

Project Name: ARCO 4494 Job No. 69038.04

Date: March 7, 1991 Page 1 of 1

Well No. MW-3 Time Started 12:40

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromoh)
12:40	Begin purging MW-3			
12:45	5	69.1	8.17	7.02
12:50	10	68.7	8.35	9.13
13:00	15	68.4	8.42	10.24
13:05	20	67.7	8.22	10.44
13:15	25	67.2	8.15	10.56
13:25	30	66.3	7.86	10.72
13:30	35	66.5	7.37	11.20
13:40	40	65.9	7.59	10.85
13:50	45	65.6	7.33	10.73
13:55	50	64.5	7.36	10.67
14:00	55	64.9	7.44	10.64
	Stop purging MW-3			

Notes:

Depth to Bottom (feet) :	18.10
Depth to Water - initial (feet) :	8.49
Depth to Water - final (feet) :	9.61
% recovery :	88.3%
Time Sampled :	16:15
Gallons per Well Casing Volume :	6.27
Gallons Purged :	55.0
Well Casing Volumes Purged :	8.77
Approximate Pumping Rate (gpm) :	0.69

WELL PURGE DATA SHEET

Project Name: ARCO 4494 Job No. 69038.04

Date: March 7, 1991 Page 1 of 1

Well No. MW-4 Time Started 14:10

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromoh)
14:10	Begin purging MW-4			
14:15	5	67.3	7.83	9.22
14:20	10	67.2	7.77	9.35
14:25	15	66.5	7.92	9.47
14:30	20	66.3	7.79	9.46
14:35	25	66.2	7.86	9.44
14:40	30	66.2	7.88	9.45
14:45	35	65.3	7.92	9.44
14:50	40	66.8	7.87	9.51
14:55	45	66.4	7.83	9.48
15:00	50	65.6	7.84	9.37
15:05	55	66.2	7.84	9.43
	Stop purging MW-4			

Notes:

Depth to Bottom (feet)	:	18.21
Depth to Water - initial (feet)	:	8.18
Depth to Water - final (feet)	:	10.03
% recovery	:	81.6%
Time Sampled	:	16:30
Gallons per Well Casing Volume	:	6.55
Gallons Purged	:	55.0
Well Casing Volumes Purged	:	8.40
Approximate Pumping Rate (gpm)	:	1.0

CHAIN-OF-CUSTODY RECORD

9138

Applied GeoSystems

PROJ. NO.	PROJECT NAME
09038-4	ARCO 4494
P.O. NO.	SAMPLERS (Signature)
	Mike Baranski

DATE (MM/DD/YY)	TIME		No. of Containers	TPHgasoline (8015)	BTEX (602/8020)	TPHdiesel (8015)						Preserved?	REMARKS	LABORATORY I.D. NUMBER
				ANALYSIS										
3/7/91	4:00	W-9-MW1	4	X	X								HCl	
3/7/91	4:15	W-9-MW4	4	X	X								HCl	
3/7/91	4:30	W-9-MW3	4	X	X								HCl	

RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
Mike Baranski	3/7/91 1540	Jim Mordonald
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED FOR LABORATORY BY (Signature):
	3/7/91 10:40	Anthony Nieto

Laboratory: APPLIED Analytical

SEND RESULTS TO:
Applied GeoSystems
3315 Almaden Expressway
Suite 34
San Jose, California 95118
(408) 264-7723

Turn Around: 2 weeks

Proj. Mgr.: MIKE BARANSKI

APPLIED ANALYTICAL

Environmental Laboratories

13844 Alton Pkwy., Suite 140
Irvine, CA 92718
(714) 472-5060

Project Name: ARCO 4494
Project No. : 69038-4

March 26, 1991

Mike Barminsla
Applied GeoSystems
3315 Almaden Expressway #34
San Jose, CA 95118

Dear Mr. Barminsla:

Enclosed please find the analytical results for the samples received by Applied Analytical Environmental Laboratory on 03-20-91.

Applied Analytical maintains a strict Quality Assurance/Quality Control (QA/QC) program designed to meet or exceed EPA requirements. Analytical data presented in this report met QA/QC criteria.

The specific analytical methods used and cited in this report are approved by the State of California's Department of Health Services (DOHS) under certificate number E678.

If you have any questions regarding these analyses, or if we can be of further assistance, please give us a call.

Sincerely,
APPLIED ANALYTICAL

F.A. Jaime
Laboratory Supervisor

APPLIED ANALYTICAL

Environmental Laboratories
13844 Alton Pkwy.,-Suite 140
Irvine, CA 92718
(714) 472-5060

ANALYSIS REPORT

Attention: Mike Barminsla
Applied GeoSystems
3315 Almaden Expressway
San Jose, CA 95118

Date Sampled: 03-07-91
Date Received: 03-20-91
Date Analyzed: 03-21-91
Date Reported: 03-26-91

Project: 69038-4

Matrix: Water

Detection limit (ug/L)	Benzene 0.3	Toluene 0.3	Ethyl-benzene 0.3	Total Xylenes 0.5	TPH 50
Sample description					
W-9-MW1 2-103-230*	ND	ND	ND	ND	ND
W-9-MW4 2-103-231*	ND	ND	ND	ND	ND
W-9-MW3 2-103-232*	ND	ND	ND	ND	ND

TPH = total petroleum hydrocarbons as gasoline.
ug/L = Micrograms per liter = ppb = parts per billion.
* = Laboratory identification number.
ND = Analytes not detected above the stated detection limit.

ANALYTICAL PROCEDURES

BTEX-- Benzene, toluene ethylbenzene, and total Xylene isomers are measured in accordance with EPA Method 5030 followed by analysis using EPA Method 8020.
TPH-- Total petroleum hydrocarbons as gasoline are measured in accordance with EPA Method 5030, followed by modified EPA Method 8015.