

ENVIRONMENTAL  
PROTECTION

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Manmohan S. Chopra  
4216 Warbler Loop  
FREMONT, CA 94555  
February 28, 1995

Alameda County Department of Enviroment health  
1131 Harbor Bay Parkway, 2nd Floor  
ALAMEDA, CA 94502-6577

ATTN: Mr Scott Seery

REF: File # STID 4536

SUB: SOIL and GROUNDWATER QUALITY INVESTIGATION WORK PLAN  
former ARCO Station  
1401 Grand Ave. San Leandro, CA

Dear Mr. Seery,

Attached please find a copy of SOIL & GROUNDWATER QUALITY INVESTIGATION WORK PLAN for the above project. The plan is being submitted for your review and approval.

We will be ready to proceed with actual installation of the monitoring wells as soon as we receive your approval. However , if I could be of any assistance, please call me at 510-790-9252 or write me at the above address.

sincerely,



Manmohan S. Chopra

Owner

# P & D ENVIRONMENTAL

4020 Panama Court  
Oakland, CA 94611  
Telephone (510) 658-6916

February 28, 1995  
Workplan 0055.W1

Mr. Scott Seery  
Alameda County Department of Environmental Health  
80 Swan Way, Room 200  
Oakland, CA 94621

SUBJECT: SOIL AND GROUNDWATER QUALITY INVESTIGATION WORK PLAN  
Former ARCO Station  
1401 Grand Ave.  
San Leandro, California

Dear Mr. Seery:

P&D Environmental (P&D) is pleased to present this work plan for groundwater monitoring well installation, in accordance with your request for submittal of a work plan prior to the initiation of field work. P&D proposes to install two offsite groundwater monitoring wells in the trans- and downgradient in an effort to define the extent of petroleum hydrocarbons which have been detected in groundwater at the subject site. A Site Location Map is attached with this work plan as Figure 1, and a Site Vicinity Map showing the proposed offsite groundwater monitoring well locations and groundwater flow direction at the subject site is attached with this work plan as Figure 2.

All work will be performed under the direct supervision of an appropriately registered professional. This workplan is prepared in accordance with guidelines set forth in the document "Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites" dated August 10, 1990 and "Appendix A - Workplan for Initial Subsurface Investigation" dated August 20, 1991.

## BACKGROUND

The site is presently used as an active gasoline station. It is P&D's understanding that on April 24, 1991 Aegis Environmental, Inc. (Aegis) personnel drilled four soil borings, designated as B-1 through B-4, to a vertical depth of approximately 40 feet at the site. The locations of the borings are shown on Figure 2. A total of nine soil samples collected from the boreholes were analyzed for total petroleum hydrocarbons as gasoline (TPH-G); benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8260; and for total lead by EPA Method 7420. TPH-G concentrations ranged from below detection limit to 66 parts per million (ppm). Benzene concentrations ranged from not detected to 0.94 ppm. Total lead concentrations ranged from not detected to 3 ppm. Documentation of the subsurface investigation and results are presented in a report prepared by Aegis titled, "Soil Boring Results Report," dated June 10, 1991.

It is P&D's understanding that on April 14, 1992 Aegis personnel returned to the site to drill three slant borings, designated as B5 through B7, to a total vertical depth of approximately 49 feet at the site. The borings were drilled at an angle of approximately 26 to 28 degrees to collect samples from beneath the underground storage tanks. The locations of the borings are shown on Figure 2. A total of twenty-two soil samples were analyzed for TPH-G using EPA Method 5030; and for BTEX using EPA Method 8240. In addition, one of the samples was analyzed for total lead using EPA Method 7420, and several of the soil samples were analyzed for soluble lead using the California Waste Extraction Test. TPH-G concentrations ranged from not detected to 4,000 ppm. Benzene, concentrations ranged from not detected to 11 ppm. Total lead was not detected, and soluble lead concentrations ranged from not detected to 0.061 ppm. Documentation of the subsurface investigation and results are presented in a report prepared by Aegis titled, "Initial Subsurface Investigation Results Report," dated June 22, 1992.

It is P&D's understanding that between September 15 and 18, 1992 Aegis personnel returned to the site to install five groundwater monitoring wells, designated as MW1 through MW5. The wells were drilled to total depths of between 50 and 55 feet, and were constructed using four-inch diameter PVC pipe. Wells MW1 and MW2 were constructed with perforated casing between the depths of approximately 15 and 55 feet. Wells MW3, MW4 and MW5 were constructed with perforated casing between the depths of approximately 35 and 55 feet. Groundwater was reported to have been first encountered at a depth of 42 feet. The locations of the wells are shown in Figure 2.

A total of thirty-one soil samples were analyzed for TPH-G using EPA Method 5030/8015; and for BTEX using EPA Method 8020. In addition, three soil samples containing TPH-G were analyzed for total metals concentrations of cadmium, chromium, lead, and zinc using EPA Method 6010 and 7421. One soil sample was collected from each borehole from below the air-water interface and analyzed for petrophysical properties, including saturated permeability and grain size distribution.

TPH-G concentrations ranged from not detected to 39 ppm. Benzene concentrations ranged from not detected to 0.27 ppm. The total metals concentrations were all less than 10 times their respective STLC values. The subsurface materials encountered in the borings indicate that soil types vary across the site, but generally consist of silty clay, silt, clayey silt and sandy silt from the surface to a depth of between 30 and 35 feet. Below the depth of 30 to 35 feet, layers of sand and sandy silt were reported to be present.

It is P&D's understanding that on September 29, 1992 Aegis personnel collected groundwater samples from wells MW1, MW2, MW4 and MW5 at the site. A sample was not collected from well MW-3 due to the reported presence of 0.02 feet of floating hydrocarbons. The measured depth to water ranged from approximately 41.5 to 44.5 feet. The samples were analyzed for TPH-G using EPA Method 5030/8015; and for BTEX using EPA Method 8020. TPH-G concentrations ranged from 0.06 to 20 ppm, and benzene concentrations ranged from 0.16 to 10 ppm. Based upon the water level measurements in the wells, the groundwater flow direction was reported to be to the northwest. The water level measurements are summarized in Table 1. The analytical results are summarized in Table 2.

It is P&D's understanding that on October 7, 1992 Aegis personnel performed rising head slug tests wells MW1, MW2, and MW4 to estimate the saturated hydraulic conductivity at the site. In addition, two short-term soil vapor extraction tests were performed on wells MW1 and MW2. Wells MW-3, MW-4, and MW-5 were used as vacuum influence monitoring points. Documentation of the monitoring well groundwater sample collection, slug test and vapor extraction tests are presented in a report prepared by Aegis titled, "Problem Assessment Report," dated December 16, 1992.

On February 18, 1994 P&D personnel monitored the five groundwater monitoring wells at the site for depth to water and the presence of free product or sheen. The depth to water was measured using an electric water level indicator, and the presence of free product and sheen was evaluated using a transparent bailer. The measured depth to water in the wells ranged from approximately 39.8 to 42.9 feet. No evidence of free product or sheen was detected in any of the wells. Based on the measured depth to water in the wells, the groundwater flow direction was calculated to be to the north with a gradient of 0.054. The measured depth to water in the wells is presented in Table 1.

The wells at the site have been subsequently monitored and sampled by P&D personnel in July and October, 1994 and February, 1995. Groundwater flow has been consistently found to be to the north. The measured depth to water in the wells is presented in Table 1. The analytical results are summarized in Table 2.

### SCOPE OF WORK

P&D proposes to perform the following tasks.

- o Regulatory agency coordination.
- o Installation of two groundwater monitoring wells.
- o Surveying of the wellhead elevations for the two proposed monitoring wells relative to the existing wells at the subject site.
- o Development of the two proposed monitoring wells.
- o Purging and sampling of the two proposed monitoring wells.
- o Soil and groundwater sample analysis of soil samples collected from the monitoring well boreholes and groundwater samples collected from the two proposed groundwater monitoring wells for Total Petroleum Hydrocarbons as Gasoline (TPH-G); and Benzene, Toluene, Ethylbenzene and Xylenes (BTEX).
- o Report preparation.

Each of these is discussed below in detail.

#### Regulatory Agency Coordination

Following approval of this workplan, the offsite property owners will be contacted and permission requested for site access. Following receipt of permission for site access, a permit application will be submitted to the Zone 7 Water Agency office for the installation of the groundwater monitoring wells.

After the permit has been approved by the Zone 7 Water Agency, Underground Service Alert will be notified for underground utility location and a drilling date will be scheduled with an appropriately licensed drilling contractor. The drilling date will be set for the earliest possible date available, and the Alameda County Department of Environmental Health will be notified of the drilling date by telephone as soon as it has been set. Prior to the beginning of field work, a health and safety plan will be prepared.

#### Installation of Two Offsite Groundwater Monitoring Wells

The groundwater monitoring wells, designated as MW6 and MW7, will be installed at the proposed locations shown on Figure 2. The location for MW6 is in the trans-gradient direction relative to the subject site and the location of MW7 is in the downgradient direction relative to the subject site, based upon the groundwater flow direction calculated from the monitoring wells at the subject site. The anticipated depth to groundwater is 40 feet at the proposed drilling locations.

The boreholes for the proposed groundwater monitoring wells will be drilled using a ten-inch diameter truck-mounted hollow stem auger drilling rig. The hollow stem augers will be steam cleaned prior to use in each borehole. Soil samples will be collected from the boreholes into brass tubes at a maximum of five foot intervals, at changes in lithology and at any areas of obvious contamination using a Modified California split-spoon sampler lined with brass tubes. Blow counts will be recorded every six inches. The soil samples will be logged in the field in accordance with standard geologic field techniques and the Unified Soil Classification System. In addition, the samples will be evaluated with a Photovac Model 580B Photoionization Detector (PID) equipped with a 10.3 eV bulb.

Soil samples collected from above the water table in the boreholes at depths of 10, 20, 30 and 40 feet will be retained in the brass tubes for laboratory analytical purposes. The ends of the brass tubes for these samples will be successively sealed with aluminum foil and plastic endcaps. The brass tubes will then be labeled, placed into a ziplock baggie, and stored in a cooler with ice pending delivery to a State-accredited hazardous waste testing laboratory. Chain of custody procedures will be observed for all sample handling.

The boreholes for the monitoring well will be advanced to a depth of approximately ten feet below first encountered groundwater. Based upon historical depth to water measurements at the subject site, it is anticipated that groundwater will be encountered at a depth of approximately 40 feet. The monitoring wells will be constructed using two-inch diameter Schedule 40 PVC pipe. The lowermost 15 feet of the pipe will be 0.010-inch width factory slotted. A screw-on cap or slip-cap will be placed on the bottom of the well. The annular space surrounding the screen will be filled with a Lonestar 2/16 sack sand to a height of one foot above the top of the screen. A one-foot thick layer of bentonite pellets will be placed above the sand and hydrated. The remaining annular space will be filled with a neat cement grout (sanitary seal) to one foot below the ground surface.

The top of the well pipes will be secured with a locking expandable plug and enclosed in a water-tight, traffic-rated locking vault. The top of the vaults will be set slightly above grade to inhibit the collection of water in the vaults. Soil generated during drilling will be stored in DOT-approved 55-gallon drums or on visqueen and covered with a sheet of visqueen pending appropriate disposal. Water generated during steam cleaning of the augers will be stored in DOT-approved 55-gallon drums pending appropriate disposal.

#### Surveying of the Wellhead Elevations for the Monitoring Wells

The top of the PVC pipe for the two proposed groundwater monitoring wells will be surveyed vertically to the nearest 0.01 foot relative to the existing onsite monitoring wells by a State-licensed surveyor. The top of the well pipes will be marked at the location that the well pipes are surveyed.

#### Development of the Monitoring Wells

At least 48 hours after the wells have been constructed, the wells will be developed by surging and bailing. Prior to development, the wells will be monitored for depth to water and the presence of free product or sheen. The depth to water will be measured using an electric water level indicator and will be measured to the nearest 0.01 feet from a location marked at the top of the monitoring well. The presence of free product and sheen will be evaluated using a transparent bailer. Water removed from the well during development activities will be stored in DOT-approved 55-gallon drums pending appropriate disposal.

#### Purging and Sampling of the Monitoring Wells

At least 24 hours after the wells have been developed, the wells will be monitored for depth to water and the presence of free product and sheen using methods described above. The wells will then be purged of a minimum of three casing volumes, or until the wells are purged dry. During purging operations, the field parameters of pH, electrical conductivity and temperature will be monitored. Once the field parameters have been observed to stabilize and a minimum of three casing volumes has been purged or the wells purged dry, groundwater samples will be collected from the monitoring wells using a Teflon bailer. The bailer will be cleaned using an Alconox solution and clean water rinse prior to use.

The samples will be transferred from the bailer to 40-milliliter Volatile Organic Analysis bottles (VOAs). The VOAs will be overturned and tapped to assure that air bubbles are not present. The sample bottles will then be labeled and placed into a cooler with ice pending delivery to the State-certified hazardous waste testing laboratory. Chain of custody procedures will be observed for all sample handling.

At the time that the proposed monitoring wells are monitored for depth to water, the monitoring wells located at the subject site will also be monitored for depth to water for groundwater flow direction determination purposes.

Soil and Groundwater Sample Analysis

The soil samples collected from the monitoring well boreholes and the groundwater samples collected from the two proposed groundwater monitoring wells will be analyzed for TPH-G using EPA Method 5030 in conjunction with Modified EPA Method 8015 and for BTEX using EPA Method 8020 on a normal turn around basis.

Report Preparation

Upon receipt of the laboratory analytical results, a report will be prepared. The report will contain documentation of field activities associated with the collection of the soil samples from the boreholes for the groundwater monitoring wells and installation, development and sampling of the groundwater monitoring wells; boring logs; well construction diagrams; a copy of the well head survey data; copies of the laboratory analytical results and chain of custody documentation; a tabulated summary of the laboratory analytical results; a discussion of the local geology and hydrogeology; a discussion of the results and recommendations based upon the laboratory analytical results; and the signature and stamp of an appropriately registered professional.

SCHEDULE

The following schedule addresses elements identified in this workplan.

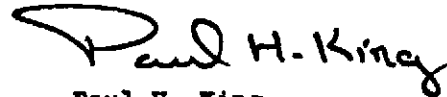
<u>Activity</u>	<u>Calendar Days</u>
Workplan submittal.....	Day 0
Workplan approval.....	Day 7
Request permission for offsite access.....	Day 10
Receive permission for offsite access.....	Day 20
Permit application submittals.....	Day 22
Permit application approvals.....	Day 27
Set drill date with driller.....	Day 29
Well installation.....	Day 39
Well development.....	Day 43
Well sample collection and surveying.....	Day 45
Receipt of soil and groundwater sample results.....	Day 50
Submittal of draft report to Mr. Chopra for review.....	Day 65
Submittal of final report to ACDEH.....	Day 80

February 28, 1995  
Workplan 0055.W1

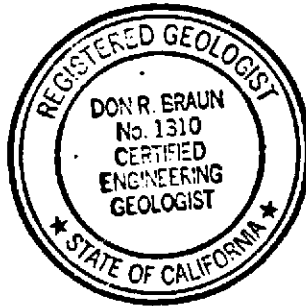
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Should you have any questions, please do not hesitate to contact us at  
(510) 658-6916.

Sincerely,  
P&D Environmental



Paul H. King  
Hydrogeologist



Don R. Braun  
Certified Engineering Geologist  
Registration No. : 1310  
Expiration Date: 6/30/96

Attachments: Tables 1 & 2  
Site Location Map - Figure 1  
Site Vicinity Map - Figure 2

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TABLE 1  
 WELL MONITORING DATA

Well No.	Date Monitored	Top of Casing Elev. (ft.)	Depth to Water (ft.)	Water Table Elev. (ft.)
MW1	2/01/95	87.96	38.46	49.50
	10/12/94		42.01	45.95
	7/05/94		41.36	46.60
	2/18/94		41.02	46.94
	9/29/92		42.77	45.19
MW2	2/01/95	86.60	37.27	49.33
	10/12/94		40.77	45.83
	7/05/94		40.13	46.47
	2/18/94		39.81	46.79
	9/29/92		41.55	45.05
MW3	2/01/95	87.50	40.13	47.37
	10/12/94		43.92	43.58
	7/05/94		43.32	44.18
	2/18/94		43.09	44.41
	9/29/92		44.60	42.90*
MW4	2/01/95	86.20	36.96	49.24
	10/12/94		40.48	45.72
	7/05/94		39.69	46.51
	2/18/94		39.36	46.84
	9/29/92		44.29	41.91
MW5	2/01/95	89.06	39.94	49.12
	10/12/94		43.81	45.25
	7/05/94		43.08	45.98
	2/18/94		42.88	46.18
	9/29/92		44.53	44.53

NOTES:

The top of casing elevation is identified by Aegis Environmental, Inc. as being relative to either mean sea level or an arbitrary benchmark.

\* Indicates groundwater elevation corrected for the presence of free product.



TABLE 2  
 SUMMARY OF LABORATORY ANALYTICAL RESULTS

Well No.	TPH-G	Benzene	Toluene	Ethyl-benzene	Total Xylenes
Samples Collected On October 12, 1994					
MW1	4.6	1.8	0.0099	0.23	0.030
MW2	45	7.0	5.1	1.2	6.1
MW3	11	4.2	0.031	0.33	0.29
MW4	1.4	0.39	0.055	0.049	0.18
MW5	ND	ND	ND	ND	ND
Samples Collected On October 12, 1994					
MW1	2.5	0.82	0.0039	0.10	0.020
MW2	24	4.4	2.8	0.73	3.5
MW3	1.7	0.39	0.00090	0.018	0.0057
MW4	0.68	0.14	0.0087	0.014	0.052
MW5	ND	ND	ND	ND	ND
Samples Collected On July 5, 1994					
MW1	3.0	1.3	0.0038	0.035	0.0025
MW2	46.0	9.1	7.0	1.4	7.3
MW3	3.6	1.6	0.0083	0.076	0.047
MW4	2.6	0.47	0.045	0.084	0.25
MW5	ND	ND	ND	ND	0.0010

NOTES:

TPH-G = Total Petroleum Hydrocarbons as Gasoline.

ND = Not Detected.

NA = Not Analyzed. A sample was not collected because of the presence of free product.

Results in parts per million (ppm), unless otherwise indicated.

TABLE 2  
(Continued)  
SUMMARY OF LABORATORY ANALYTICAL RESULTS

Well No.	TPH-G	Benzene	Toluene	Ethyl-benzene	Total Xylenes
Samples Collected On September 29, 1992					
MW1	3.1	0.16	ND	ND	0.0060
MW2	20	4.6	3.8	0.26	3.3
MW3	NA	NA	NA	NA	NA
MW4	0.63	0.17	0.06	0.0073	0.65
MW5	0.06	10	0.0071	ND	0.0069

NOTES:

TPH-G = Total Petroleum Hydrocarbons as Gasoline.

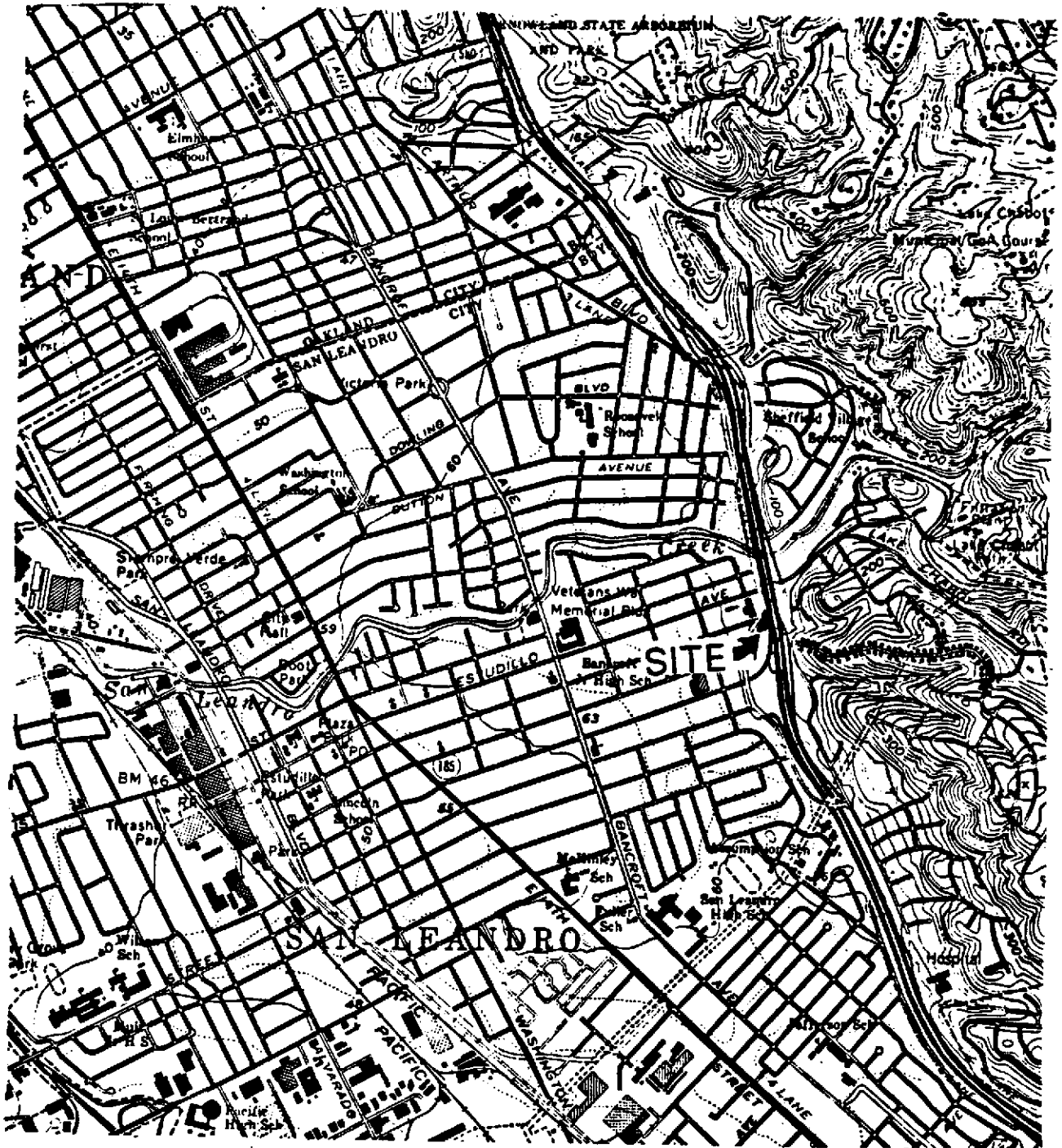
ND = Not Detected.

NA = Not Analyzed. A sample was not collected because of the presence of free product.

Results in parts per million (ppm), unless otherwise indicated.

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4020 Panama Court  
Oakland, CA 94611  
Telephone (510) 658-6916



Base Map from:  
U.S. Geological Survey  
San Leandro, Calif.  
7.5 Minute Quadrangle  
Photorevised 1980

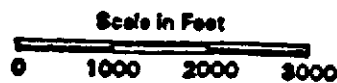
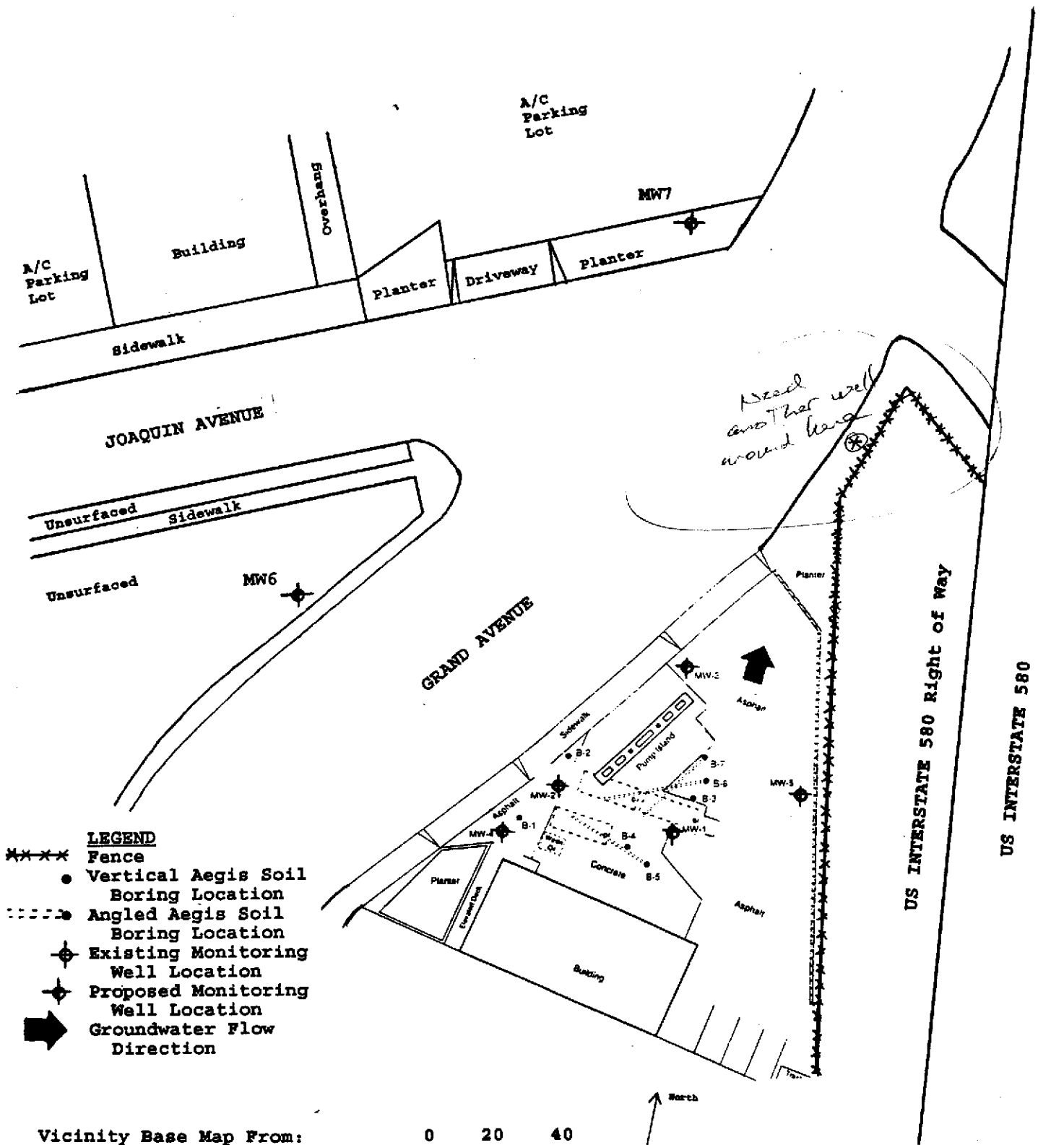


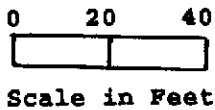
Figure 1  
SITE LOCATION MAP  
Former ARCO Service Station  
1401 Grand Avenue  
San Leandro, CA

# P & D ENVIRONMENTAL

4020 Panama Court  
 Oakland, CA 94611  
 Telephone (510) 658-6916



Vicinity Base Map From:  
 P&D Environmental  
 February, 1995  
 Site Base Map From:  
 Aegis Environmental, Inc.  
 Problem Assessment Report  
 dated December 16, 1992



**Figure 2**  
 SITE VICINITY MAP  
 Former ARCO Service Station  
 1401 Grand Avenue  
 San Leandro, California