P&D ENVIRONMENTAL, INC.

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Oakland, CA 94610
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March 5, 2007
Work Plan 0014.W10

Mr. Steven Plunkett
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

SUBJECT: GROUNDWATER MONITORING WELL INSTALLATION WORK PLAN (MW5 THROUGH MW13)
Xtra Oil Company
3495 Castro Valley Boulevard
Castro Valley, CA

Dear Mr. Plunkett:

P&D Environmental, Inc. (P&D) is pleased to present this work plan for installation of nine offsite groundwater monitoring wells in the vicinity of the subject site designated as MW5 through MW13. This work plan is submitted in response to a February 6, 2007 letter from the Alameda County Department of Environmental Health (ACDEH). A Site Location Map is attached as Figure 1, and a Site Vicinity Map showing the proposed well locations is attached as Figure 2. Additionally, Site Vicinity Maps showing the proposed well locations and isoconcentration contours in groundwater for Total Petroleum Hydrocarbons as Gasoline (TPH-G), Total Petroleum Hydrocarbons as Diesel (TPH-D) and benzene are attached as Figures 3, 4, and 5, respectively. A Summary of Proposed Well Depths is attached as Table 1. Norbridge School shown on Figure 1 to the south of the subject site has been demolished and replaced with the Castro Valley BART station and associated parking lot.

All work will be performed under the direct supervision of an appropriately registered professional. This work plan 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 and California Code of Regulations Title 23 Sections 2720-2728.

BACKGROUND

The site is currently used as a gasoline station. Four 12,000 gallon underground fuel storage tanks are present at the site. Three of the tanks contain gasoline and the fourth tank contains diesel fuel. A 550 gallon waste oil tank was removed from the site in November, 1988. The fuel tanks were replaced during August, 1992.

Three monitoring wells, designated as MW1, MW2 and MW3 were installed at the site on February 14 and 15, 1990 by Western Geo-Engineers. The subsurface materials encountered in the boreholes consisted primarily of silt and clay. Soil samples collected during drilling of the boreholes for the monitoring wells revealed the presence of TPH-G and TPH-D. TPH-G was encountered in borehole MW1 at depths of 5 and 10 feet below grade (fbg) at concentrations of 40 and 1,400 parts per million (ppm), respectively; in borehole MW2 at depths of 10 and 15 fbg at concentrations of

230 and 95 ppm, respectively; and in borehole MW3 at depths of 5, 10 and 15 fbg at concentrations of 140, 250 and 25 ppm, respectively. In addition, 120 ppm TPH-D was detected in borehole MW3 at a depth of 5 fbg. Soil samples collected at a depth of 20 fbg in borehole MW1 and at a depth of 18 fbg in boreholes in MW2 and MW3 did not show any detectable concentrations of TPH-G or TPH-D. Groundwater was encountered in the boreholes at depths of approximately 15 to 16 fbg.

On February 15, 1990 Western Geo-Engineers drilled three exploratory boreholes at the site designated as SB1, SB2 and SB3. The subsurface materials encountered in the boreholes consisted primarily of silt and clay. It is P&D's understanding that soil samples were collected from the exploratory boreholes at depths of 10 and 12 fbg and evaluated in the field using a photo ionization detector. In borehole SB1, TPH-G was detected at the depths of 10 and 12 fbg at concentrations of 1,700 and 450 ppm, respectively. In boreholes SB2 and SB3, TPH-G was detected at the depths of 10 and 12 fbg in both boreholes at concentrations of 800 ppm and greater than 2,000 ppm, respectively. A groundwater monitoring and sampling program was initiated at the site on February 20, 1990.

It is P&D's understanding that during fuel tank replacement activities in August 1992, soil surrounding the tank pit was removed and disposed of offsite. An extraction well, designated as EW1, was designed and constructed in one corner of the new tank pit by K&B Environmental at the time of installation of the new tanks.

On February 7, 1996 well MW2 was destroyed for the purpose of widening Redwood Road. At the time of road widening, dispenser islands located adjacent to Redwood Road were also destroyed and relocated. The well destruction was overseen by ACC Environmental Consultants of Oakland, California.

On August 15, 1997 P&D personnel oversaw the installation of one groundwater monitoring well, designated as MW4 at the subject site. This work was performed in accordance with P&D's Groundwater Monitoring Well Installation Work Plan dated June 27, 1997 (document 0014.W4). The work plan was approved by ACDEH in a telephone conversation with Mr. Scott Seery on August 14, 1997. During the conversation, Mr. Seery indicated that he would record his approval of the work plan in the county file for the site. Documentation of the well installation is provided in P&D's Monitoring Well Installation Report dated September 30, 1997 (document 0014.R25).

In response to a letter dated November 24, 1997 P&D prepared an Offsite Groundwater Quality Investigation Work Plan dated December 15, 1997 (document 0014.W5) for the installation of two observation wells designated as OW1 and OW2 in the sanitary sewer trench that is located parallel to and beneath Redwood Road and approximately 60 feet east of the site. On June 10, 1998 P&D personnel oversaw installation of the observation wells. The wells were installed to total depths of 7.5 feet below the ground surface. Documentation of observation well installation is provided in P&D's Piezometer Installation Report dated November 3, 2000 (document 0014.R37).

In February 1994, P&D collected nine offsite groundwater grab samples designated as P1 through P9. Results from those samples are presented in P&D's Offsite Groundwater Quality Investigation Report dated April 28, 1994 (document 0014.R8). Between October 1994 and June 1995, P&D collected ten offsite groundwater grab samples designated P10 through P19. Results from these samples are presented in P&D's Offsite Groundwater Quality Investigation Report dated January 5,

1996 (document 0014.R14). Based on the results from these two sets of borings, ACDEH requested further offsite investigation. To address this request, P&D prepared an Offsite Groundwater Quality Investigation Work Plan dated December 15, 1997 (document 0014.W5) which was approved by ACDEH on January 22, 1998. In the course of performing the scope of work in the work plan, some adjustments in sample locations were made to accommodate offsite property access issues. These changes are addressed in P&D's Updated Subsurface Investigation Work Plan dated October 8, 1999 (document 0014.W6). This updated work plan was approved by ACDEH on October 18, 1999.

In response to an ACDEH letter dated November 24, 1997 P&D prepared an Offsite Groundwater Quality Investigation Work Plan dated December 15, 1997 (document 0014.W5) which included evaluation of the sanitary sewer trench in Redwood Road referenced above, and which also addressed groundwater quality to the east and southeast of the subject site. Between June 1998 and May 2000, P&D personnel hand augered 11 boreholes at offsite locations in the vicinity of the subject site designated as P20 through P30. Details of this subsurface investigation are presented in P&D's Offsite Groundwater Quality Investigation Report dated June 28, 2000 (document 0014.R34).

In response to an ACDEH letter dated February 7, 2001 P&D prepared an Offsite Groundwater Quality Investigation Work Plan dated March 9, 2001 (document 0014.W8). The work plan was approved by the Alameda County Department of Environmental Health (ACDEH) in a letter dated April 6, 2001. Between June 19 and 25, 2001, P&D personnel oversaw drilling of 13 boreholes and hand augered one borehole designated as P31 through P44 at offsite locations in the vicinity of the subject site. A total of 15 soil and 14 groundwater grab samples were collected from the boreholes and analyzed. A comprehensive summary of offsite investigation reports documenting groundwater grab sample collection for boreholes P1 through P44 is provided in P&D's Offsite Groundwater Quality Investigation Report (P31-P44) dated August 23, 2001 (document 0014.R41).

P&D submitted an Interim Source Area Remediation Plan (ISARP) dated May 31, 2005, to the ACDEH proposing free product removal from well MW4 and dewatering of the UST pit at the site to evaluate the potential for providing hydraulic control of petroleum hydrocarbon migration in the vicinity of the site (document 0014.W9).

Steven Plunkett of the ACDEH met with Paul King of P&D and Keith Simas of Xtra Oil Company on January 25, 2007 to review site conditions and proposed actions to address subsurface petroleum hydrocarbons. In a letter dated February 6, 2007 Mr. Plunkett requested a work plan for installation of offsite groundwater monitoring wells.

SCOPE OF WORK

P&D proposes to install the nine offsite groundwater monitoring wells to evaluate groundwater quality at offsite plume interior and perimeter locations. The following tasks will be performed:

- Regulatory agency, client, and subcontractor coordination.
- Obtain offsite property access.
- Installation oversight of nine offsite groundwater monitoring wells.

- Surveying of the well heads vertically and horizontally with respect to the existing monitoring wells and extraction well at the subject site.
- Development of the monitoring wells.
- Purging and sampling of all of the monitoring wells.
- Arrange for soil and groundwater sample analysis for Total Petroleum Hydrocarbons as Diesel (TPH-D), Total Petroleum Hydrocarbons as Motor Oil (TPH-MO), Total Petroleum Hydrocarbons as Gasoline (TPH-G), benzene, toluene, ethylbenzene and xylenes (BTEX), and fuel oxygenates and lead scavengers.
- Report preparation documenting installation, surveying, development and sampling of the monitoring wells.

Each of these is discussed below in detail.

Project Coordination, Permitting and Offsite Access

Following ACDEH approval of this work plan, permits will be obtained, access will be requested from offsite property owners, and the driller and laboratory will be scheduled for sample collection. Permits will be obtained from the Alameda County Public Works Agency for encroachment in the public right-of-way and for drilling of the soil borings. The drilling date will be scheduled with the permitting agencies for inspection of drilling procedures in accordance with permit requirements, and notification will be provided to the ACDEH of the scheduled field activities.

Groundwater Monitoring Well Installation Oversight

Nine off-site groundwater monitoring wells, designated as MW5 through MW13, will be installed at the locations shown on Figure 2. Locations MW5 through MW8 are proposed to monitor the interior of the hydrocarbon plume, and locations MW9 through MW13 are proposed to monitor the perimeter of the hydrocarbon plume. The rationale for the location of each of the proposed offsite groundwater monitoring well locations is provided below.

- MW5: To evaluate the downgradient TPH plume interior to the southwest of the subject site in the vicinity of the source area.
- MW6: To evaluate the downgradient TPH plume interior to the southwest of the subject site at allocation approximately one half the distance from the source area to the approximate distal portion of the plume.
- MW7: To evaluate the downgradient TPH plume interior to the southwest of the subject site in the vicinity of the distal portion of the southwestern lobe of the plume (the plume is bifurcated with a southwestern and a southeastern lobe).
- MW8: To evaluate the downgradient TPH plume interior to the southeast of the subject site in the vicinity of the distal portion of the southwestern lobe of the plume (the plume is bifurcated with a southwestern and a southeastern lobe).
- MW9: To evaluate the downgradient TPH plume perimeter to the southwest of the subject site.
- MW10: To evaluate the downgradient TPH plume perimeter to the southwest of the subject site.
- MW11: To evaluate the downgradient TPH plume perimeter to the southwest of the subject site.

- MW12: To evaluate the downgradient TPH plume perimeter to the southwest of the subject site.
- MW13: To evaluate the downgradient TPH plume perimeter to the southeast of the subject site.

A summary of proposed well construction depths for the proposed wells and historic water levels encountered in boreholes located in the vicinity of each of the proposed wells is attached as Table 1. The proposed well construction depths were determined using the historic water levels encountered in boreholes located in the vicinity of each of the proposed wells. Groundwater was historically initially encountered as follows.

- At depths of approximately 22 feet or less near proposed well locations MW5, MW9, and MW10,
- At depths of approximately 15 feet or less near locations MW8, MW11 and MW13, and
- At depths of approximately 10 feet or less at locations MW6, MW7, and MW12.

If groundwater is encountered during drilling for well installation at depths shallower than historically encountered in the vicinity of the 22-foot deep wells (MW5, MW9, and MW10), these wells will be constructed to a depth of four feet below the first encountered groundwater. The total anticipated depth of construction for well MW13 is 13.0 feet. No borehole depth or depth to water information exists for historic drilling locations P4 and P5 when evaluating proposed well location MW5 or for P6 and P9 when evaluating proposed well location MW10.

The number and distribution of proposed downgradient groundwater monitoring wells in conjunction with the onsite groundwater monitoring wells will allow evaluation of groundwater elevations and associated groundwater flow directions for shallow groundwater in the vicinity of the site. In addition, shallow groundwater elevation and flow direction information will be obtained from the gasoline station located at the southeast corner of Redwood Road and Castro Valley Boulevard for comparison with the existing wells at the subject site and the proposed downgradient wells identified in this work plan.

The wells will be installed in ten-inch diameter boreholes drilled using truck-mounted hollow stem augers. 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 California Modified 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. The soil samples will be evaluated with a photoionization detector equipped with a 10.0 eV bulb and calibrated with a 100 ppm isobutylene standard.

Soil samples will be retained in the brass tubes for laboratory analysis in the following manner. The ends of the brass tubes will be successively covered with aluminum foil and plastic endcaps. The brass tubes will then be labeled, 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. One soil sample will be retained from each of the boreholes at the capillary fringe for laboratory analysis.

The boreholes for the monitoring wells in the interior of the hydrocarbon plume, MW5, MW6, MW7, and MW8, will be drilled to total depths of approximately 22.0, 10.0, 10.0, and 15.0 feet below the ground surface, respectively. The boreholes for monitoring wells at the perimeter of the plume, MW9, MW10, MW11, MW12, and MW13, will be drilled to total depths of approximately 22.0, 22.0, 15.0, 10.0, and 10.0 feet below the ground surface, respectively (see Table 1).

The monitoring wells will be constructed using two-inch diameter Schedule 40 PVC pipe. The lowermost 5 feet of each well casing will consist of 0.010-inch width factory slotted pipe. A screw-on cap will be placed on the bottom of each well. The annular space surrounding the screen will be filled with 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 approximately one half foot below the ground surface.

The top of each well will be secured with a locking expandable plug and enclosed in a water-tight, traffic-rated locking vault. The top of the vault will be set slightly above grade to inhibit the collection of water in the vault.

Soil and water generated during drilling will be stored in DOT-approved 55-gallon drums pending appropriate disposal.

Surveying of the Wellhead Elevations and Locations

Following installation of the proposed groundwater monitoring wells, the top of the PVC well pipe for each monitoring well will be surveyed vertically to the nearest 0.01 foot relative to a Mean Sea Level datum and horizontally relative to the site and the existing wells at the site. The surveyed location at the top of each well pipe will be marked to identify the surveyed location for use during future monitoring activities. In addition, the three existing monitoring wells (MW1, MW3 and MW4) and the existing extraction well (EW1) at the subject site and the two observation wells in Redwood Road (OW1 and OW2) will also be surveyed vertically and horizontally and the onsite as described above. All surveying will be performed by a State-licensed surveyor, and in accordance with GeoTracker requirements.

Monitoring Well Development

At least 72 hours after the wells have been constructed, they will be developed by surging and overpumping. 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. Well development will continue until the water removed from the wells is relatively sediment-free. Water removed from the wells during development activities will be stored in DOT-approved 55-gallon drums pending appropriate disposal. Following the settling of sediments in the water, the water may be discharged to the sanitary sewer through the onsite groundwater treatment system.

Purging and Sampling of the Monitoring Wells

At least 48 hours after the wells have been developed, they will be monitored for depth to water and the presence of free product and sheen using methods described above. Each well will then be purged of a minimum of three casing volumes of water, or until the well is 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 well purged dry, a groundwater sample will be collected from the monitoring well using a Teflon bailer. All well purging and sampling equipment 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 glass Volatile Organic Analysis (VOA) vials and 1-liter amber glass bottles which will be sealed with Teflon-lined screw caps. The VOA vials will be overturned and tapped to assure that no air bubbles are 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. Water removed from the wells during purging activities will be stored in DOT-approved 55-gallon drums pending appropriate disposal.

Soil and Groundwater Sample Analysis

The soil and groundwater samples will be analyzed at McCampbell Analytical, Inc. of Pittsburg, California. McCampbell is a state-accredited hazardous waste testing laboratory. The samples will be analyzed for TPH-D and TPH-MO using EPA Method 3550 for the soil samples and using EPA Method 3510 for the water samples in conjunction with Modified EPA 8015; TPH-G using EPA Method 5030 in conjunction with Modified EPA Method 8015; and for BTEX, fuel oxygenates and lead scavengers using EPA Method 8260B.

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 and installation, surveying, 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 reports and chain of custody documentation; a tabulated summary of the laboratory analytical results; a discussion of the local geology and hydrogeology; isoconcentration contour maps for petroleum hydrocarbons in groundwater; geologic cross sections; a site map showing the location of the former UST pit and dispensers and all onsite buildings; a discussion of the laboratory results; recommendations based upon the laboratory analytical results; and the signature and stamp of an appropriately registered professional.

DISTRIBUTION

A copy of this report will be uploaded to the ACDEH website, in accordance with ACDEH requirements. In addition, a copy of this report will be uploaded to the GeoTracker database.

SCHEDULE

The following schedule addresses elements identified in this work plan.

Activity	Calendar Days
Work plan submittal to ACDEH	Day 0
Work plan approval by ACDEH	Day 7
Request Offsite Access	Day 14
Obtain Offsite Access	Day 28
Permit application submittal to ACPWA	Day 50
Permit application approval by ACPWA	Day 57
Set drill date with driller	Day 61
Well installation	Day 82
Well development	Day 88
Well sample collection and surveying	Day 94
Receipt of soil and groundwater sample results	Day 103
Submittal of draft report to client for review	Day 133
Submittal of final well installation report to ACDEH	Day 148

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

Sincerely,

P&D Environmental, Inc.

David M. Gibbs
Geosciences Department Manager
Professional Geologist #7804
Expires: 2/28/09

Attachments: Table 1
Site Location Map - Figure 1
Site Vicinity Map Showing Proposed Well Locations - Figure 2
Site Vicinity Map Showing TPH-G Isoconcentration Contours - Figure 3
Site Vicinity Map Showing TPH-D Isoconcentration Contours - Figure 4
Site Vicinity Map Showing Benzene Isoconcentration Contours - Figure 5

cc: Mr. Keith Simas, Xtra Oil Company

DMG/sjc
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TABLES

Table 1. Proposed Well Depths

Proposed Well	Nearby Drilling Location	Boring Total Depth (feet)	Depth to First Water (feet)	Static Depth to Water (feet)	Alt. Nearby Drilling Location	Boring Total Depth (feet)	Depth to First Water (feet)	Static Depth to Water (feet)	Recommended Total Well Depth (feet)
MW5	P34	21.0	21.0	8.1	P40	18.0	18.0	5.8	22.0
MW6	P37	15.0	7.0	7.0	P21	9.0	3.0	NR	10.0
MW7	P10	8.0	6.0	3.9	P12	6.5	4.8	4.0	10.0
MW8	P24	10.5	9.5	NR	P25	14.5	12.0	NR	15.0
MW9	P32	24.0	22.5	4.0	P35	12.0	12.0	6.8	22.0
MW10	P36	30.0	29.5	10.1	P33	20.0	19.5	7.6	22.0
MW11	P41	20.0	19.8	10.3	P37	15.0	7.0	7.0	22.0
MW12	P10	8.0	6.0	3.9	P12	6.5	4.8	4.0	10.0
MW13	P25	14.5	12.0	NR	P26	10.0	8.0	NR	13.0

Abbreviations and Notes:

NR = Not Recorded

FIGURES

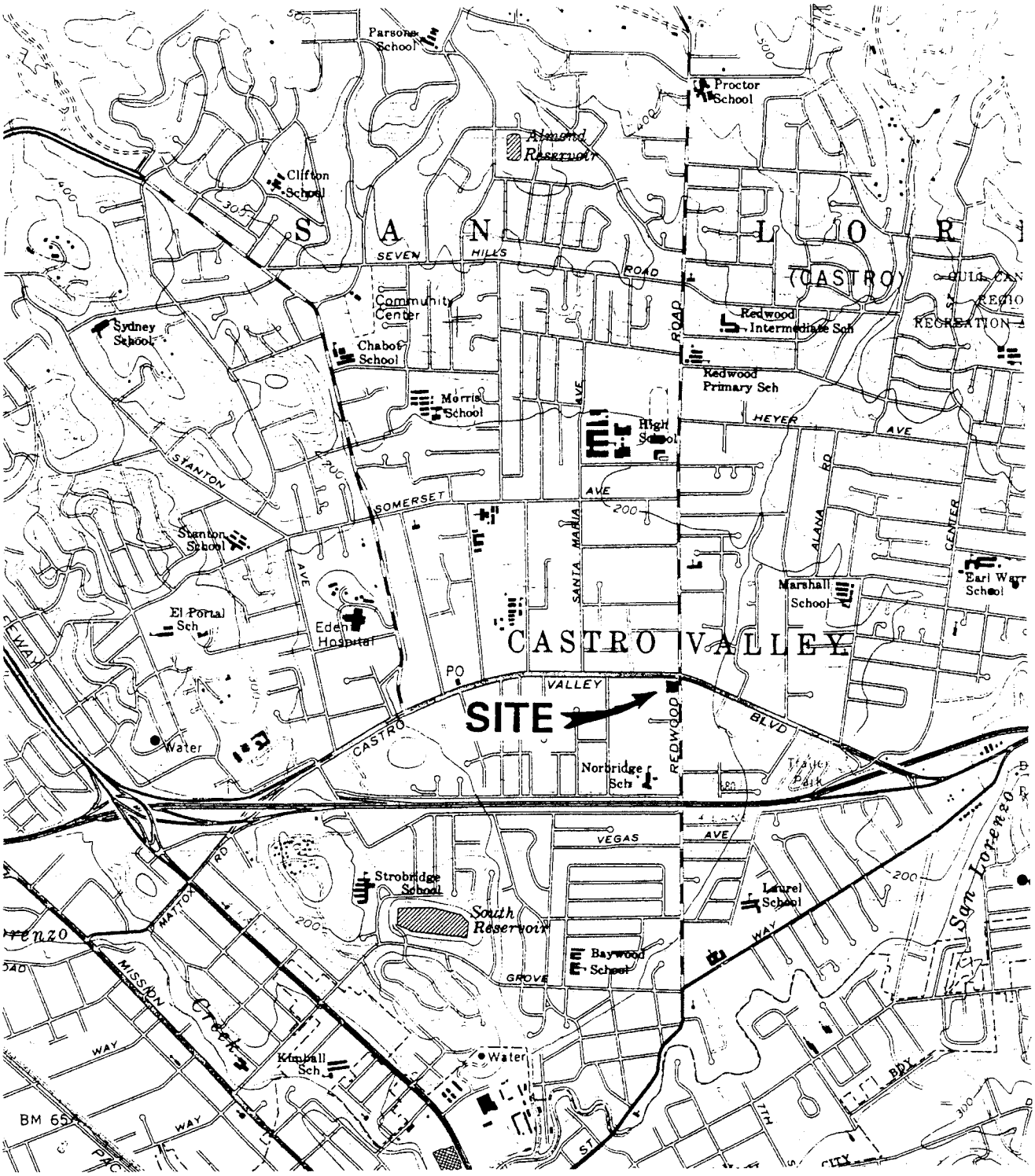

Figure 1
Site Location Map
Xtra Oil Company
3495 Castro Valley Boulevard
Castro Valley, California

N

Base Map From:
U.S. Geological Survey
Hayward, California
7.5 Minute Quadrangle
Photorevised 1980

P&D Environmental, Inc.
55 Santa Clara Avenue, Suite 240
Oakland, CA 94610

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SCALE IN FEET

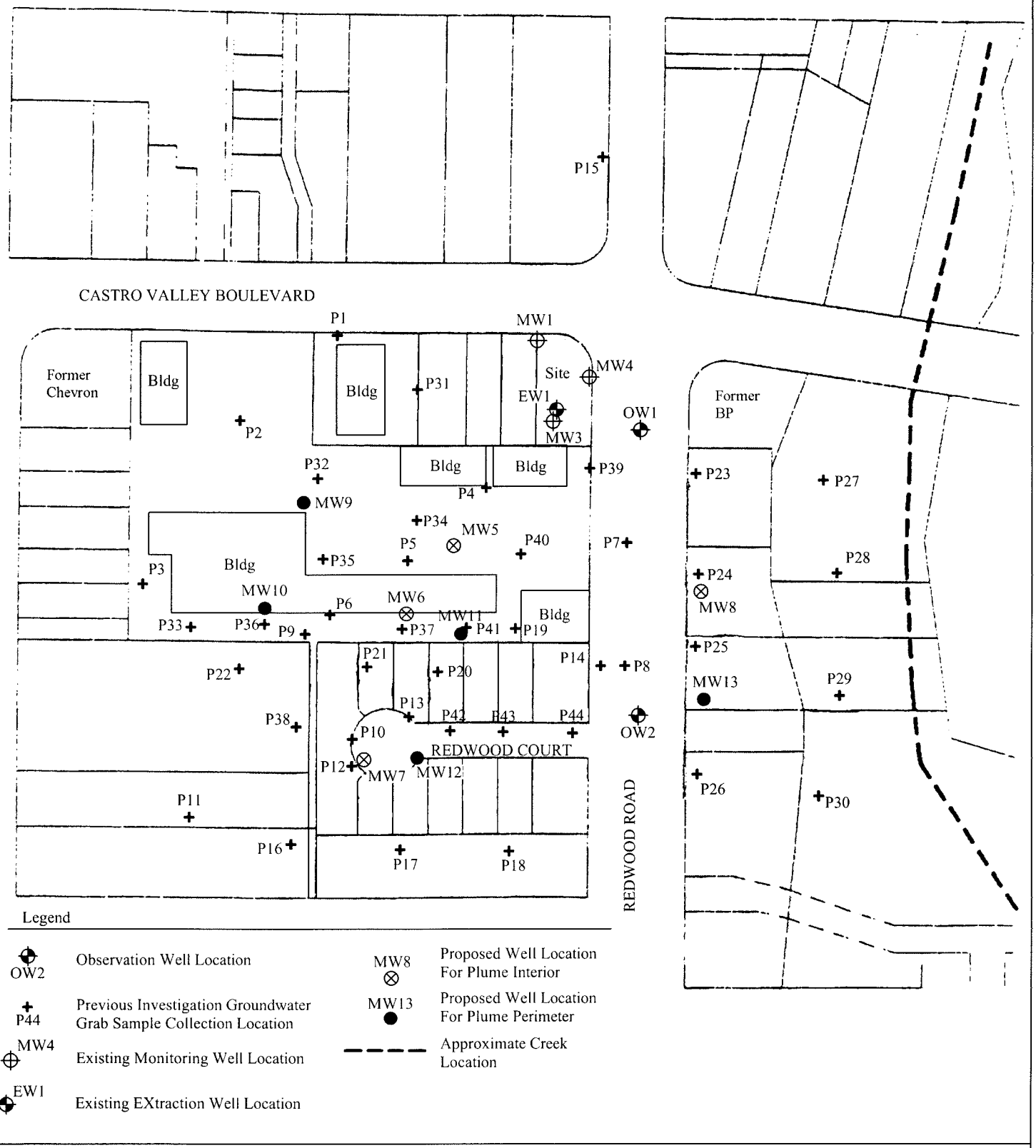

Figure 2
Site Vicinity Map Showing Proposed Well Locations
Xtra Oil Company
3495 Castro Valley Boulevard
Castro Valley, California

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Base Map From:
Castro Valley Sanitation District

P&D Environmental, Inc.
55 Santa Clara Avenue, Suite 240
Oakland, CA 94610

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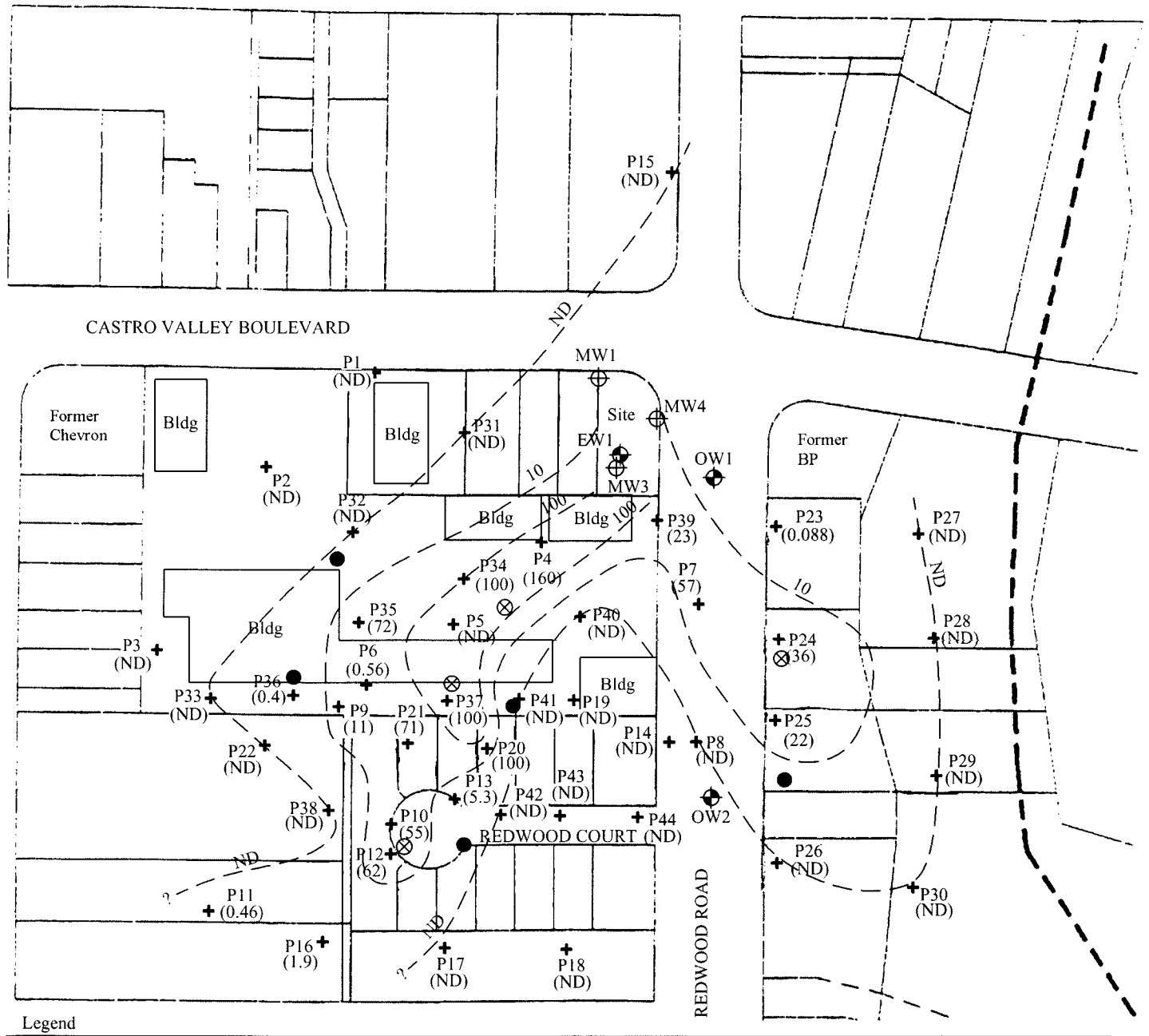

Figure 3
Site Vicinity Map Showing TPH-G Isoconcentration Contours
Xtra Oil Company
3495 Castro Valley Boulevard
Castro Valley, California

N

Base Map From:
Castro Valley Sanitation District

P&D Environmental, Inc.
55 Santa Clara Avenue, Suite 240
Oakland, CA 94610

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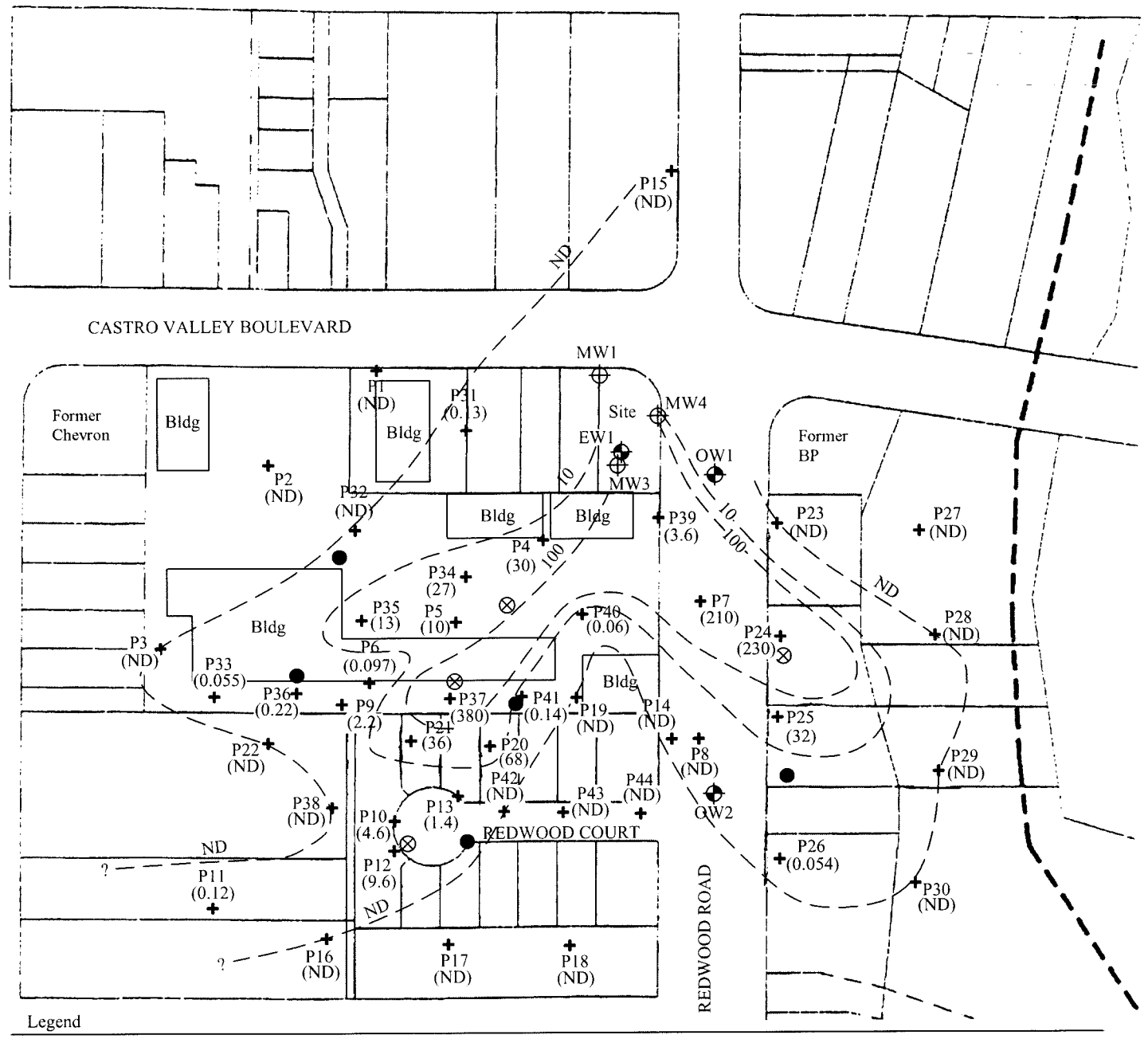

Legend

OW2	Observation Well Location	MW8	Proposed Well Location For Plume Interior	(30)	TPH-D Concentration in Groundwater (mg/L)
P44	Previous Investigation Groundwater Grab Sample Collection Location	MW13	Proposed Well Location For Plume Perimeter	100	TPH-D Groundwater Isoconcentration Contour (mg/L)
MW4	Existing Monitoring Well Location		Approximate Creek Location		
EW1	Existing EXtraction Well Location				

Figure 4
Site Vicinity Map Showing TPH-D Isoconcentration Contours
Xtra Oil Company
3495 Castro Valley Boulevard
Castro Valley, California

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Base Map From:
Castro Valley Sanitation District

P&D Environmental, Inc.
55 Santa Clara Avenue, Suite 240
Oakland, CA 94610

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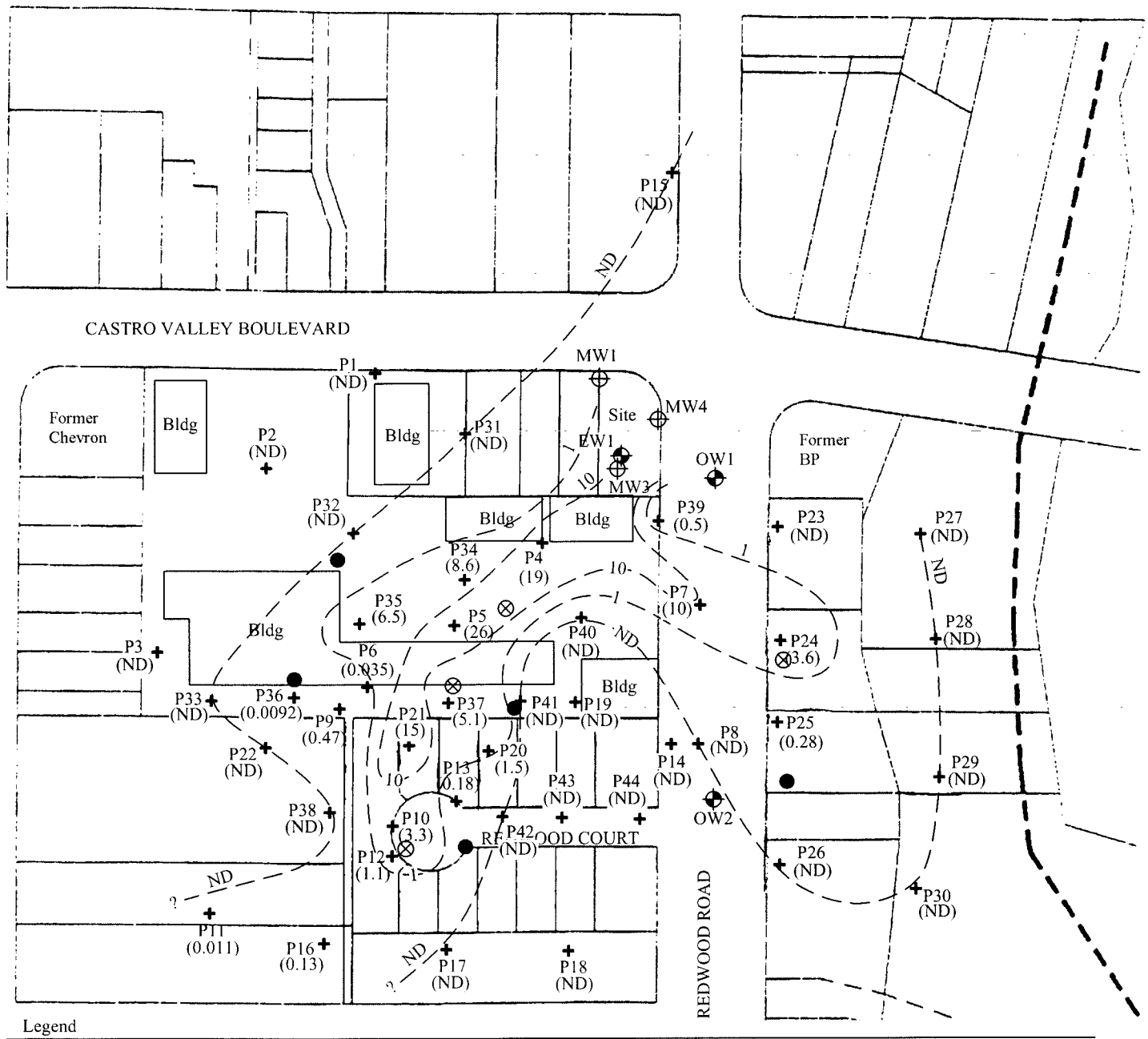

Legend

OW2	Observation Well Location	MW8	Proposed Well Location For Plume Interior	(160)	Benzene Concentration in Groundwater (mg/L)
P44	Previous Investigation Groundwater Grab Sample Collection Location	MW13	Proposed Well Location For Plume Perimeter	100	Benzene Groundwater Isoconcentration Contour (mg/L)
MW4	Existing Monitoring Well Location		Approximate Creek Location		
EW1	Existing EXtraction Well Location				

Figure 5
Site Vicinity Map Showing Benzene Isoconcentration Contours
Xtra Oil Company
3495 Castro Valley Boulevard
Castro Valley, California

N

Base Map From:
Castro Valley Sanitation District

P&D Environmental, Inc.
55 Santa Clara Avenue, Suite 240
Oakland, CA 94610

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SCALE IN FEET