Xtra OIL COMPANY

2307 PACIFIC AVENUE
ALAMEDA, CA 94501
(510) 865-9503 FAX (510) 865-1889

RECEIVED

3:20 pm, Oct 18, 2010

Alameda County
Environmental Health

October 11, 2010

Ms. Barbara Jakub
Alameda County Environmental Health Department
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

SUBJECT: CORRECTIVE ACTION PLAN CERTIFICATION
County Case # RO 191
Xtra Oil Company
1701 Park Street
Alameda, CA

Dear Ms. Jakub:

P&D Environmental, Inc. has prepared the following document:

- Corrective Action Plan dated October 11, 2010 (document 0058.W3).

I declare under penalty of perjury that the contents and conclusions in the document are true and correct to the best of my knowledge.

Should you have any questions, please do not hesitate to contact me at (510) 865-9506.

Sincerely,
Xtra Oil Company

Keith Simas

0058.L36

P&D ENVIRONMENTAL, INC.

55 Santa Clara Ave, Suite 240
Oakland, CA 94610
(510) 658-6916

October 11, 2010
Work Plan 0058.W3

Ms. Barbara Jakub
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

SUBJECT: CORRECTIVE ACTION PLAN
County Case # RO 191
Xtra Oil Company
1701 Park Street
Alameda, CA

Dear Ms. Jakub:

P&D Environmental, Inc. (P&D) is pleased to present this Corrective Action Plan (CAP) for the subject site. This CAP is prepared in response to a written request from the Alameda County Department of Environmental Health (ACDEH) dated August 20, 2008. The CAP addresses the following.

- Background and summary of site characterization data.
- Assessment of impacts.
- Receptor information including likely future land use scenarios, adjacent land use and sensitive receptors, and potential groundwater receptors.
- Proposed cleanup goals and the basis for the cleanup goals.
- Evaluation of remedial alternatives including discussion of feasibility and limitations for each remedial alternative.
- Detailed description of proposed remediation including confirmation sampling and monitoring during implementation.
- Post-remediation monitoring.
- Schedule of implementation and cleanup.

All work will be performed under the direct supervision of a professional geologist. This CAP is prepared in accordance with guidelines set forth in the following documents.

- 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;

- Department of Toxic Substances Control (DTSC) “Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties” dated January, 2005;

- DTSC "Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air" revised February 7, 2005;

- California Code of Regulations, Title 23, Chapter 16, Sections 2725, 2726 and 2727 (effective October 13, 2005);

- San Francisco Bay Regional Water Quality Control Board (SFRWQCB) "San Francisco Bay Basin (Region 2) Water Quality Control Plan" dated January 18, 2007 including July 14, 2010 amendments;

- Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater" dated May 2008;

- San Francisco Bay Regional Water Quality Control Board (SFRWQCB) "Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater" dated May 2008;

- DTSC "Vapor Intrusion Mitigation Advisory" revised May 8, 2009;

- DTSC "Interim Guidance – Evaluating Human Health Risks From Total Petroleum Hydrocarbons (TPH)" dated June 16, 2009;

- DTSC "Advisory - Active Soil Gas Investigations" dated March 3, 2010.

A Site Location Map is attached with this work plan as Figure 1, and a Site Vicinity Map is attached as Figure 2.

BACKGROUND AND SUMMARY OF SITE CHARACTERIZATION DATA

The subject site is presently used as a retail gasoline station. The site is bordered by residential structures to the west and north, and by a mixed commercial/residential structure to the northeast. The site is bounded by Park Street on the east and Buena Vista Avenue on the south. A former Exxon Station now operated by Valero is located approximately 100 feet to the northeast (downgradient) from the subject site at 1725 Park Street.

A detailed summary of site characterization history and data is provided in P&D's Site Conceptual Model Report (SCM) dated October 8, 2010 (document 0058.R10). Historical site characterization activities are summarized as follows.

- In April 1994 the retail station operation was expanded to include a formerly residential property to the northwest. At that time three 10,000-gallon single wall steel gasoline underground storage tanks (USTs) and one 10,000-gallon single wall bare steel diesel UST

were removed from the retail gasoline station portion of the property, and one single wall steel 110-gallon UST which had been used to store heating oil was removed from the former residential property at 2329 Buena Vista Avenue. In addition the fuel dispensers at the retail portion of the property were removed and replaced. Petroleum hydrocarbons were detected in soil and groundwater in the vicinity of the USTs and dispensers at the retail portion of the property. No petroleum hydrocarbons were detected in a soil sample associated with the former heating oil UST. Historical soil sample results associated with removal of the USTs is provided in Table 1 of the SCM.

- In April and May 1994 approximately 1,740 cubic yards of soil appears to have been removed from the site, presumably associated with over-excavation of petroleum-impacted soil in the former UST pit, and possibly with excavation of soil for the new UST pit. There does not appear to be any documentation of any areas where over-excavation of the former UST pit may have occurred and no documentation of collection of post-excavation pit sidewall confirmation sample collection or results
- In November 1994 wells MW-1, MW-2 and MW-3 were installed and in April 1997 well MW-4 was installed by Alisto Engineering Group (Alisto) to evaluate the extent of impacted groundwater that had been detected during UST removal at the retail station portion of the property. A quarterly groundwater monitoring and sampling program for the site was initiated in 1994. Historical soil and groundwater grab sample results associated with the investigation are provided in Tables 1 and 2, respectively, of the SCM. Historical water level and water quality data from the wells are provided Tables 3A, 3B, and 3C of the SCM.
- An October 14, 1999 CAP prepared by Alisto recommended air sparging and soil vapor extraction to remediate the site.
- In April 2000 Alisto installed air sparging wells at the site, and in October 2000 Alisto performed an air sparging and vapor extraction pilot test. The vapor extraction pilot test was performed using horizontal vapor extraction piping that was installed at the site at the time of UST replacement. Based on the results of the pilot test Alisto concluded that air sparging and vapor extraction are feasible remedial technologies at the site. The historical system performance monitoring data, air sample, and water sample results associated with the pilot test are provided in Tables 4A through 4D of the SCM.
- In November 2001 Alisto collected offsite groundwater grab samples and defined the horizontal extent of petroleum hydrocarbons in groundwater across Buena Vista Avenue and Park Street from the subject site. Historical soil and water sample results associated with the investigation are provided in Tables 1 and 2, respectively of the SCM.
- In November 2006 P&D drilled boreholes B3 through B7 using soil conductivity and membrane interface probes to augment information previously obtained by Alisto and to evaluate the vertical extent of impact to groundwater. The historical groundwater sample results are provided in Table 2 of the SCM, and the soil conductivity and membrane interface probe logs are provided in Appendix B of the SCM.

- In October 2007 P&D prepared a Remedial Action Work Plan that proposed to augment and then operate the existing air sparging and vapor extraction system.
- In August 2008 the ACDEH requested a SCM and a CAP.

ASSESSMENT OF IMPACTS

In accordance with CAP preparation requirements, the following elements are addressed for an assessment of impact from the contaminants.

- Physical and chemical characteristics of the contaminants,
- Hydrogeologic characteristics of the site and surrounding area,
- The proximity and quality of nearby surface water or groundwater, and the potential beneficial uses of these waters,
- The potential effects of residual contamination on nearby surface water and groundwater.

Chemicals of Concern

Based on investigations performed at and near the site to date, the chemicals of concern (COCs) associated with the subject site are the petroleum hydrocarbons TPH-G, TPH-D, BTEX, and the associated fuel oxygenates MTBE and TBA. The chemicals addressed in this CAP are as follows.

- Total Petroleum Hydrocarbons as Gasoline (TPH-G),
- Total Petroleum Hydrocarbons as Diesel (TPH-D),
- Benzene,
- Toluene,
- Ethylbenzene,
- Xylenes,
- Tert-Butyl methyl ether (MTBE)
- Tert-Butyl alcohol (TBA)

Physical and Chemical Characteristics

The physical and toxicological characteristics of the COCs are summarized in Appendix A. The benzene, toluene, ethylbenzene and xylene (BTEX) and MTBE values provided in Appendix A were obtained from the DTSC Johnson & Ettinger screening-level model for groundwater contamination VLOOKUP chemical properties lookup table (last updated February 4, 2009 by DTSC/HERD). The TPH-G and TPH-D values were obtained from the DTSC document "Interim Guidance Evaluating Human Health Risks from Total Petroleum Hydrocarbons (TPH)" dated June 16, 2009 where TPH-G is approximated by Table 1 C5-C8 aliphatic compounds and TPH-D is approximated by Table 1 C9-C18 aliphatic compounds. Although molecular weights for TPH-G

and TPH-D are not provided, they are approximated as 105 grams per mole (g/mole) and 230 g/mole, respectively. The TBA values were obtained from the Interstate Technology & Regulatory Council February 2005 Overview of Groundwater Remediation Technologies for MTBE and TBA Table 2-2.

Persistence and Potential For Migration

The petroleum hydrocarbons and fuel oxygenates associated with the subject site decompose most rapidly in aerobic subsurface conditions.

In accordance with SFRWQCB "Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater" May 2008 Table J, chemicals are considered to be "volatile" if the Henry's Law constant as expressed in atm m3/mole is greater than 0.00001 and the molecular weight is less than 200. For comparison with Table 5 Physical-Chemical data, 0.00001 is 1.0E-05. Review of Table 5 shows that based on Henry's Law constants and molecular weights, all of the petroleum hydrocarbons are considered to be volatile, with the exception of TPH-D. Similarly, review of Table 5 shows that based on solubility, all of the petroleum hydrocarbons are considered soluble. Based on the volatility all of the petroleum hydrocarbons can potentially migrate in soil vapor to indoor air, and based on the solubility all of the petroleum hydrocarbons can migrate in groundwater.

Hydrogeologic Characteristics

Geologic cross sections A-A' and B-B' and a discussion of site geology and nearby downgradient geology for 1725 Park Street are provided in P&D's Site Conceptual Model Report dated October 8, 2010 (document 0058.R10). The subsurface geology at both the subject site and the nearby site located at 1725 Park Street is composed predominantly of sandy units, including fine sand, silty sand, clayey sand, and gravelly sand, to depths of at least 40 to 45 feet below the ground surface (bgs). Finer-grained materials consisting of clays and silts are relatively minor, and based on the available information do not appear to be laterally continuous where present. Groundwater levels fluctuate seasonally from approximately 5 feet bgs during the wet season to approximately 9 to 10 feet bgs during the dry season.

Proximity and Beneficial Uses of Surface and Groundwater

Review of Figure 1 (a portion of the US Geological Survey 7.5 Minute Oakland East, California quadrangle dated 1959 (photorevised 1980)) shows surface water bodies in the vicinity of the site as follows.

- Brooklyn Basin Tidal Canal (located approximately 1,500 feet to the northeast of the subject site),
- San Leandro Bay (located approximately 5,000 feet to the southeast and approximately 6,000 feet to the southwest of the subject site),

The tidal canal discharges into the San Leandro Bay located east and south of Alameda. Review of the hydrogeologic characteristics section above shows that Brooklyn Basin Tidal Canal is downgradient from the subject site. The elevation contours in Figure 1, indicate that surface water runoff from the subject site discharges into the tidal canal. There is no creek in the vicinity of the subject site. For this reason, both Brooklyn Basin Tidal Canal and San Leandro Bay are considered for potential impacts to existing or potential beneficial uses of surface water in the vicinity of the subject site.

Review of the January 18, 2007 San Francisco Bay Basin (Region 2) Water Quality Control Plan (the Basin Plan) revised Table 2-1 "Existing and Potential Beneficial Uses of Water Bodies in the San Francisco Bay Region" (amended July 14, 2010) identified San Leandro Bay as part of San Francisco Lower Bay in the table. The proposed existing beneficial uses of the surface water in San Leandro Bay are as follows.

- Industrial Service Supply (IND),
- Ocean, Commercial, and Sport Fishing (COMM),
- Shellfish Harvesting (SHELL),
- Estuary Habitat (EST),
- Fish Migration (MIGR),
- Preservation of Rare and Endangered Species (RARE),
- Fish Spawning (SPWN),
- Wildlife Habitat (WILD),
- Navigation (NAV),
- Water Contract Recreation (REC1), and
- Non-Contact Water Recreation (REC2).

As discussed in the hydrogeologic characteristics section above, groundwater is encountered at depths ranging from approximately 5 to 10 feet bgs at and near the site. Review of Figure 2-10D "Groundwater Basins: East and South Bay" of the Basin Plan identifies the site in Basin 2-9.04, also identified as the Santa Clara Valley Basin, East Bay Plain Sub-basin. Review of the Basin Plan Table 2-2 "Existing and Potential Beneficial Uses in Groundwater in Identified Basins" identified existing beneficial uses of the groundwater at and near the site as follows.

- Municipal and domestic supply (MUN),
- Industrial process supply (PRO),

- Industrial service supply (IND), and
- Agricultural supply (AGR).

A detailed explanation and discussion of each of the beneficial uses for both surface water and groundwater as identified in the Basin Plan July 14, 2010 amendments is provided in Appendix B.

Potential Effects of Residual Contamination

Figures 3 through 5 are Site Vicinity Maps showing TPH-G, TPH-D and benzene concentrations in shallow groundwater (10 to 14 feet below the ground surface) at the subject site and the adjacent site at 1725 Park Street for samples collected in November and December 2006. Figures 6 through 8 are Site Vicinity Maps showing petroleum hydrocarbon concentrations in groundwater at a depth of approximately 42 feet at and near the subject site for samples collected in November 2006 from locations B3 through B7. Isoconcentration contours in these figures and in associated cross sections A-A' and B-B' (see Figures 9 through 11 and 12 through 14) show the known lateral and vertical extent of petroleum hydrocarbons in groundwater. Further downgradient delineation of the extent of petroleum hydrocarbons will be complicated by the presence of petroleum hydrocarbons in groundwater associated with historical use of the 1725 Park Street property (see wells EMW-1 and EMW-5 on Figures 3, 4 and 5). Review of Figures 9 through 15 show that although the majority of petroleum hydrocarbon mass appears to be present in the vicinity of the water table, the full vertical extent of petroleum hydrocarbons has not yet been defined. Based on the distribution of petroleum hydrocarbons in groundwater, the petroleum hydrocarbons are interpreted to have originated at the former UST pit and to have moved horizontally and vertically in groundwater from the subject site.

A Sensitive Receptor Survey Update Report for the Exxon/Valero site at 1725 Park Street, prepared by Environmental Resolutions, Inc. (ERI) dated May 2, 2002 identified utility vaults and storm drain catch basins adjacent to the 1725 Park Street site. For surface water bodies, a tidal canal was identified approximately 1,000 feet north of the site. Based on a visual reconnaissance of the buildings in the vicinity of the site, several basements were identified within 1,000 feet of the 1725 Park Street site, with the closest basement located approximately 100 feet west of the 1725 Park Street site. No subways or tunnels were identified within 1,000 feet of the 1725 Park Street site. A record search of the California Department of Water Resources for a 2,000-foot radius of the 1725 Park Street site did not reveal records for private or municipal wells.

Based on the known land use in the vicinity of the site and the results of the 2002 Sensitive Receptor Survey, it does not appear that groundwater within or near the groundwater plume associated with the subject site is used for any of the potential beneficial uses identified in the Basin Plan. Domestic water supply in the vicinity of the site is obtained through a municipal provider. No known municipal water supplies are located within the vicinity of the COC groundwater plume. Based on the extent of impacted groundwater, the absence of storm drains in the vicinity of the site (see Figure 6 of the SCM), and the distance to the nearest surface water body, no surface water

bodies are being impacted by the groundwater plume or are likely to be impacted by the groundwater plume.

RECEPTOR INFORMATION

The subject site is zoned for mixed commercial and residential use and is surrounded by residential properties in a residential neighborhood. Based on the distribution of COCs discussed above, the only complete exposure pathway is from soil gas to indoor air. Figure 5 shows that benzene concentrations in groundwater at the property immediately downgradient of the subject site may exceed SFRWQCB May 2008 Table E-1 groundwater screening levels for evaluation of potential vapor intrusion concerns of 540 ug/L. P&D has recommended in the SCM that soil gas samples be collected adjacent to the building at the property immediately downgradient from the subject site. P&D has also recommended collection of a groundwater sample to the north of subject site well MW-4 to augment information regarding the transgradient extent of the petroleum hydrocarbon groundwater plume.

Based on current land use in the vicinity of the subject site, the likely future land use is anticipated to continue to be commercial with limited mixed residential adjacent to Park Street, with continued residential land use where residences are presently located. The subject site is presently used as a commercial property. The current property owner has not identified any intent to change the use of the property. Based on the commercial zoning and the commercial use for the subject site, P&D anticipates that the subject site will continue to be used as a commercial property.

As discussed above, domestic water supply in the vicinity of the site is obtained through a municipal provider. No known municipal water supplies are located within the vicinity of the petroleum hydrocarbon contaminant plume.

PROPOSED CLEANUP GOALS

The SFRWQCB Basin Plan states that the following parameters have water quality objectives that apply to all surface waters within the region.

- Bacteria
- Bioaccumulation
- Biostimulatory
- Color
- Dissolved Oxygen
- Floating Material
- Oil and Grease
- Population and Community Ecology
- pH

- Salinity
- Sediment
- Settleable Material
- Suspended Material
- Sulfide
- Tastes and odors
- Temperature
- Toxicity
- Tubidity
- Un-ionized ammonia
- Objectives for specific chemical constituents
- Constituents of concern for municipal and agricultural water supplies
- Radioactivity

Similarly, parameters with water quality objectives for groundwater are as follows.

- Bacteria
- Organic and inorganic constituents
- Radioactivity
- Taste and odor

Review of the list of parameters for both surface water and groundwater water quality objectives shows that the two applicable parameters are as follows.

- Organic and inorganic constituents
- Taste and odor

The specific limits for each COC for these parameters are summarized in Basin Plan Table 3-5 "Water Quality Objectives for Municipal Supplies" in Appendix C. Review of Table 3.5 in Appendix C identifies water quality objectives for municipal supply (in mg/L) as follows.

- Benzene 0.001
- Toluene 0.15
- Ethylbenzene 0.7
- Xylenes 1.75
- MTBE 0.005
- TBA NONE
- Odor 3.0

The water quality objectives for benzene, toluene, ethylbenzene, xylenes and MTBE correspond to Maximum Contaminant Levels (MCLs) as specified in the California Code of Regulations, and the

water quality objective for odor corresponds to the secondary MCL in the California Code of Regulations.

Because surface water is not impacted and is not likely to be impacted by the groundwater plume, proposed cleanup goals are not provided for surface water. Proposed cleanup goals for groundwater will be Basin Plan water quality objectives for all of the COCs except for TPH-G. TPH-D and TBA. No water quality objectives are provided in the Basin Plan for TPH-G, TPH-D and TBA. The proposed water quality objectives for groundwater for TPH-G, TPH-D and TBA are based on the SFRWQCB May 2008 Table A (Groundwater) Environmental Screening Levels (ESLs) where the TPH (gasolines) ESL is used for TPH-G and the TPH (middle distillates) ESL is used for TPH-D. In addition, if indoor air quality becomes a concern for any of the area where the subject site groundwater plume is located, the proposed cleanup goals for indoor air quality are SFRWQCB May 2008 Table E Indoor Air Screening Levels for residential land use where residential land use is present, and Table E Indoor Air Screening Levels for commercial/industrial land use where commercial land use is present. The proposed cleanup goals are summarized below.

COC	Groundwater (ug/L)	Indoor Air (Residential) (ug/m^3)	Indoor Air (Commercial) (ug/m^3)
TPH-G	100	10	140
TPH-G	100	10	140
Benzene	1	0.084	0.14
Toluene	150	63	88
Ethylbenzene	700	0.98	1.6
Xylenes (total)	1,750	21	29
MTBE	5	9.4	16
TBA	12	None	None
Odor	3.0*	None	None

*Odor is expressed in units of Threshold Odor Number.

At locations where remediation is performed, the remediation will be performed until the calculated indoor air cumulative incremental carcinogenic risk is less than 1.0E-06 and the calculated indoor air cumulative hazard quotient is less than 1 for each of the remediated properties. These risk and hazard objectives are consistent with USEPA and CalEPA guidance for acceptable levels of risk and hazard for residential and commercial land use.

October 11, 2010
Work Plan 0058.W3

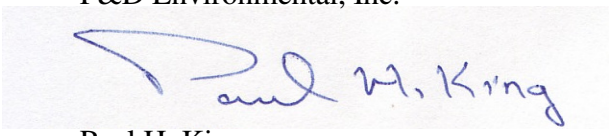
REMEDIAL ALTERNATIVES

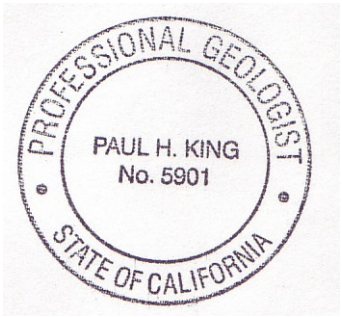
Alisto's October 14, 1999 CAP provided a screening of remedial technologies and recommended that a soil vapor extraction and air sparging feasibility study be performed. In October 2000 Alisto performed an air sparging and vapor extraction pilot test. Based on the results of the pilot test Alisto concluded that air sparging and vapor extraction are feasible remedial technologies at the site. P&D prepared a Remedial Action Work Plan dated October 24, 2007 that proposed to augment and then operate the existing air sparging and vapor extraction system. In addition, P&D proposed to extract and treat groundwater from five groundwater extraction wells. The Remedial Action Work Plan was conditionally approved by the ACDEH in a letter dated August 20, 2008. Responses to comments by the ACDEH regarding the Remedial Action Work Plan were provided to the ACDEH in P&D's October 8, 2010 SCM. For these reasons remedial alternatives and a remedial technology feasibility study will not be further discussed in this CAP.

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

Sincerely,

P&D Environmental, Inc.





Paul H. King
President
California Professional Geologist #5901
Expires: 12/31/11

Attachments:

FIGURES

Figure 1 – Site Location Map
Figure 2 – Site Vicinity Map
Figure 3 – Site Vicinity Map Showing TPH-G in Groundwater at 10 to 14 Feet Below Surface
Figure 4 – Site Vicinity Map Showing TPH-D in Groundwater at 10 to 14 Feet Below Surface
Figure 5 – Site Vicinity Map Showing Benzene in Groundwater at 10 to 14 Feet Below Surface
Figure 6 – Site Vicinity Map Showing TPH-G in Groundwater at 42 Feet Below Surface
Figure 7 – Site Vicinity Map Showing TPH-D in Groundwater at 42 Feet Below Surface
Figure 8 – Site Vicinity Map Showing Benzene in Groundwater at 42 Feet Below Surface
Figure 9 – Geologic Cross Section A-A' Showing TPH-G in Groundwater
Figure 10 – Geologic Cross Section A-A' Showing TPH-D in Groundwater
Figure 11 – Geologic Cross Section A-A' Showing Benzene in Groundwater

Figure 12 – Geologic Cross Section B-B' Showing TPH-G in Groundwater
Figure 13 – Geologic Cross Section B-B' Showing TPH-D in Groundwater
Figure 14 – Geologic Cross Section B-B' Showing Benzene in Groundwater

APPENDICES

Appendix A – Physical-Chemical And Toxicity Parameters For Chemicals of Concern
Appendix B –SFRWQCB Basin Plan (July 14, 2010 Amendments) – Beneficial Uses
Appendix C - SFRWQCB Basin Plan – Water Quality Objectives

PHK
0058.W3

FIGURES

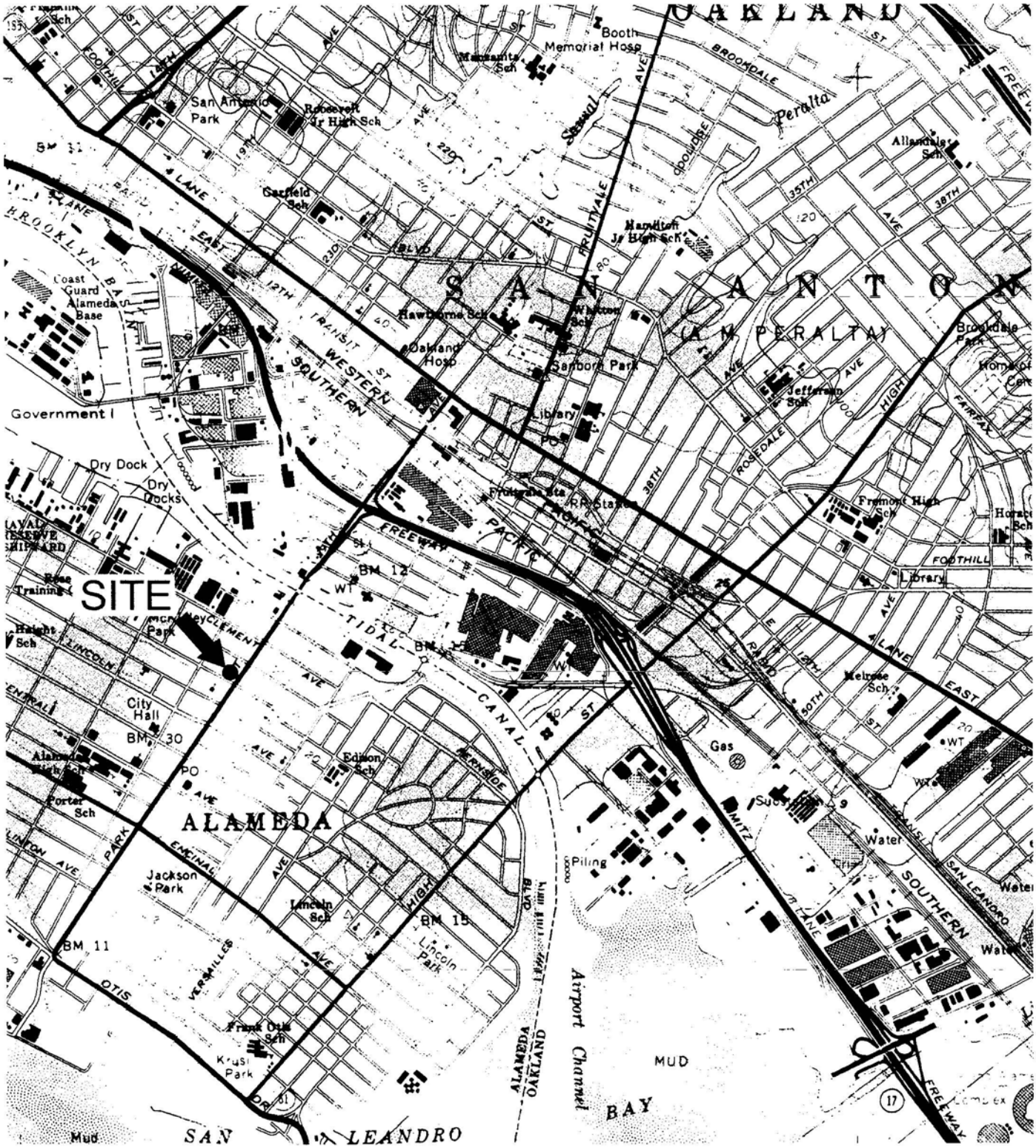


FIGURE 1
Site Location Map
1701 Park Street
Alameda, CA

Base Map From:
USGS Topographic Map, 7.5 minute series, Oakland East, Calif. quadrangle, 1980

P&D Environmental, Inc.
55 Santa Clara Ave, Ste. 240
Oakland, CA 94610

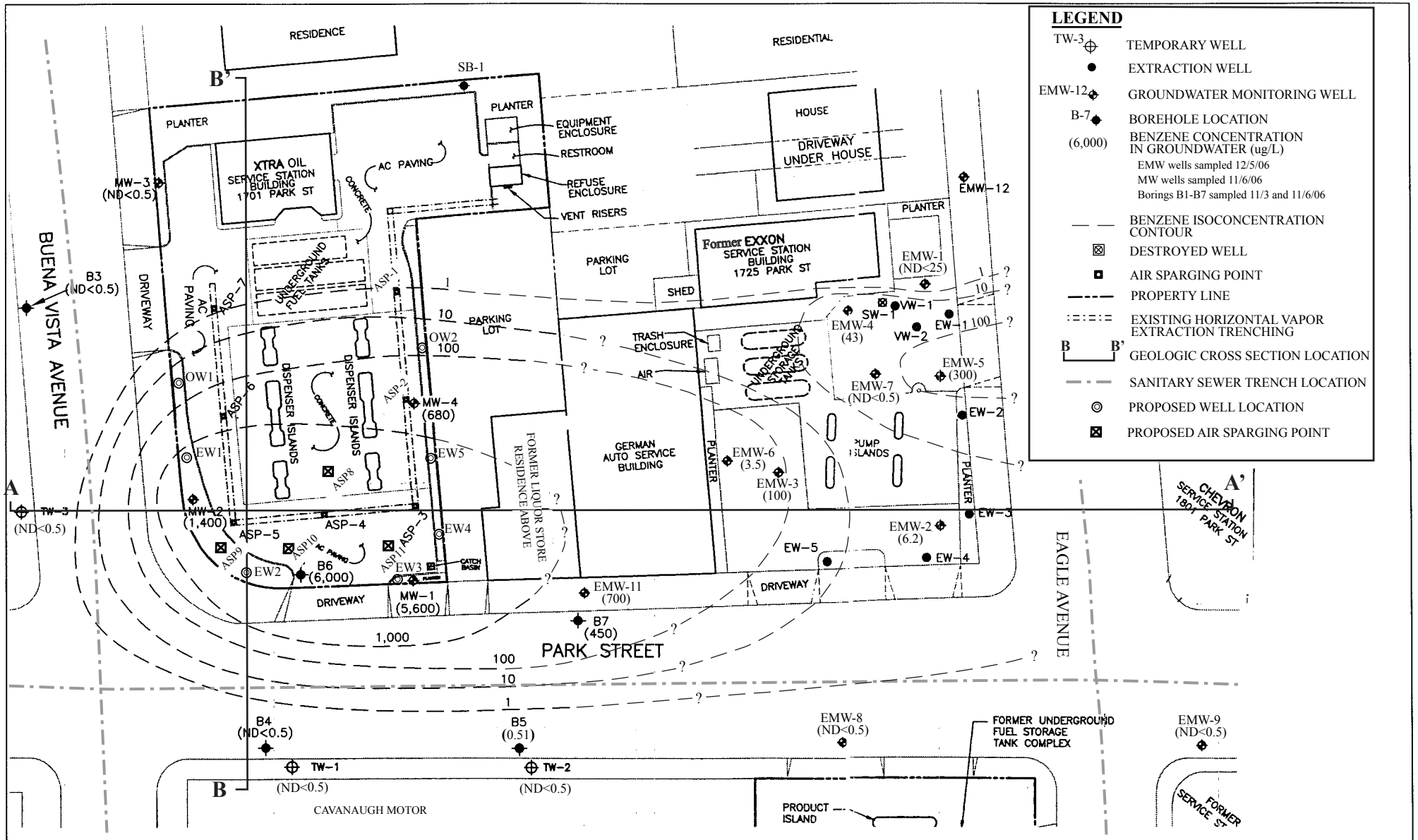


Figure 2
Site Vicinity Map
1701 Park Street
Alameda, CA

N

Base Map From:
Alisto Engineering Group, 9/23/2005
and Environmental Resources, Inc.,
6/15/2004

P&D Environmental, Inc.
55 Santa Clara Ave, Ste. 240
Oakland, CA 94610

0 50 100
Approximate Scale in Feet

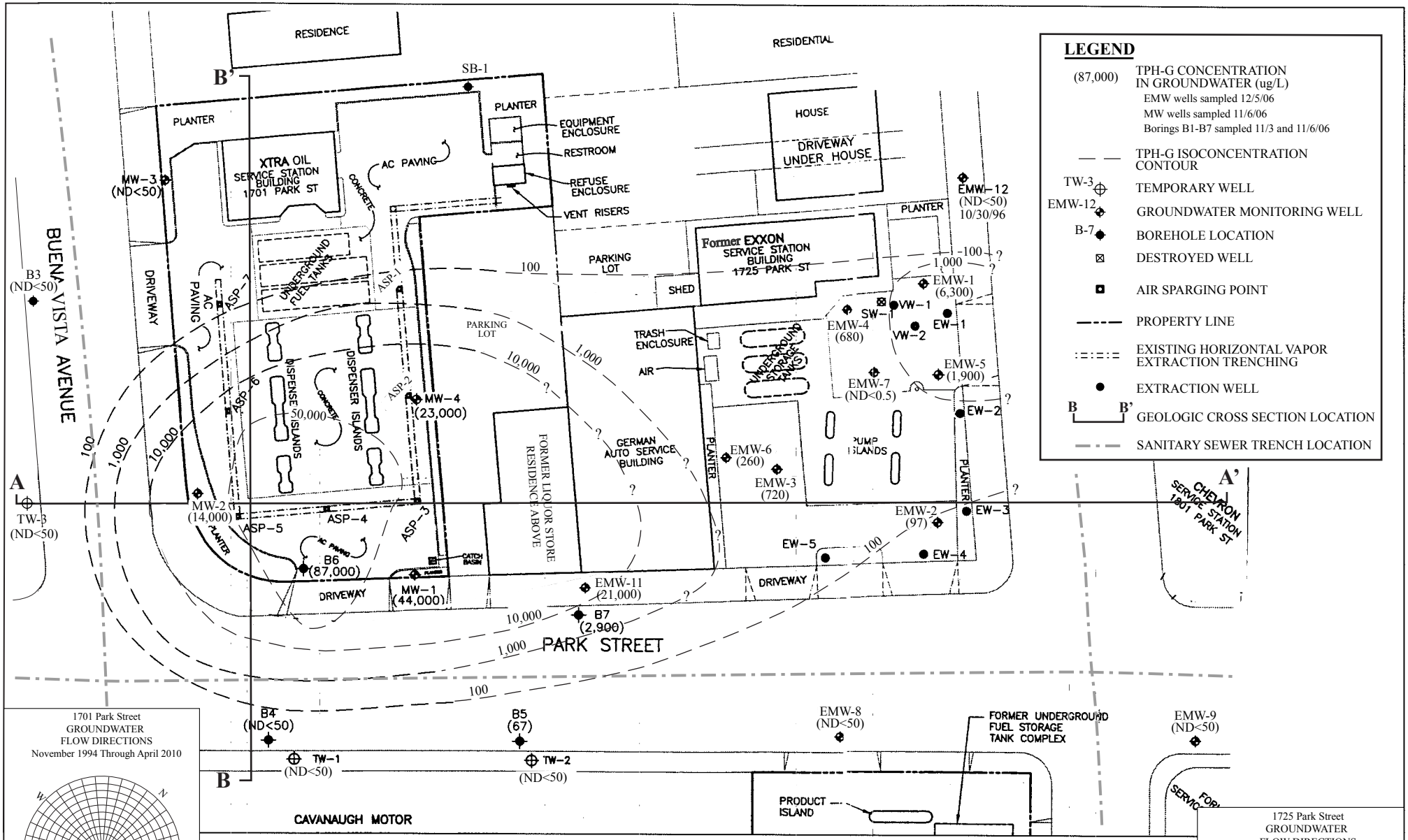


Figure 3
Site Vicinity Map
Showing TPH-G in Groundwater at 10 to 14 Feet Below Ground Surface
1701 Park Street
Alameda, CA

Base Map From:
Alisto Engineering Group, 9/23/2005 and Environmental Resources, Inc. 6/15/2004 and 7/23/2010

P&D Environmental, Inc.
55 Santa Clara Ave, Ste. 240
Oakland, CA 94610

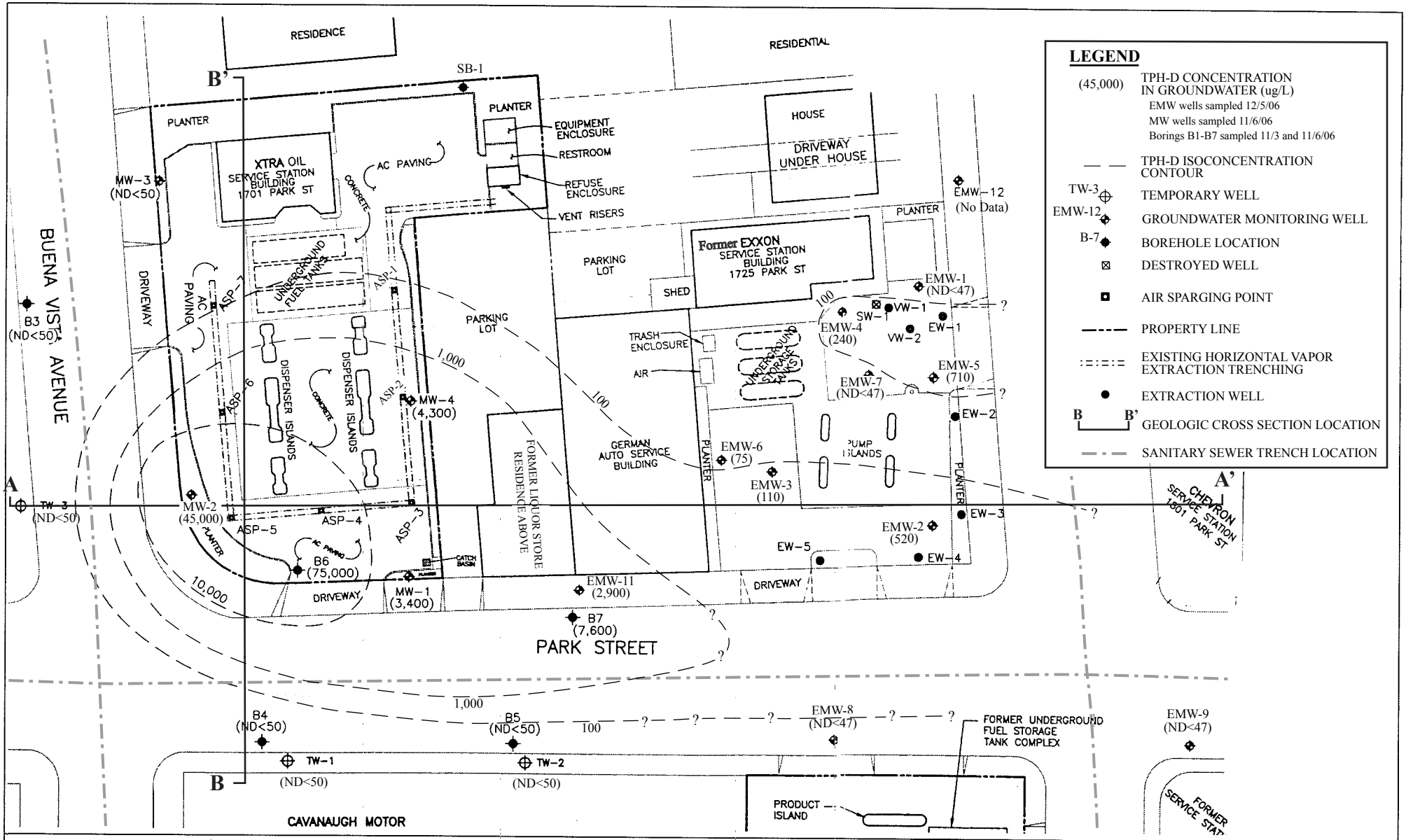


Figure 4
Site Vicinity Map
Showing TPH-D in Groundwater at 10 to 14 Feet Below Ground Surface
1701 Park Street
Alameda, CA

Base Map From:
Alisto Engineering Group, 9/23/2005
and Environmental Resources, Inc.,
6/15/2004

P&D Environmental, Inc.
55 Santa Clara Ave, Ste. 240
Oakland, CA 94610

0 50 100
Approximate Scale in Feet

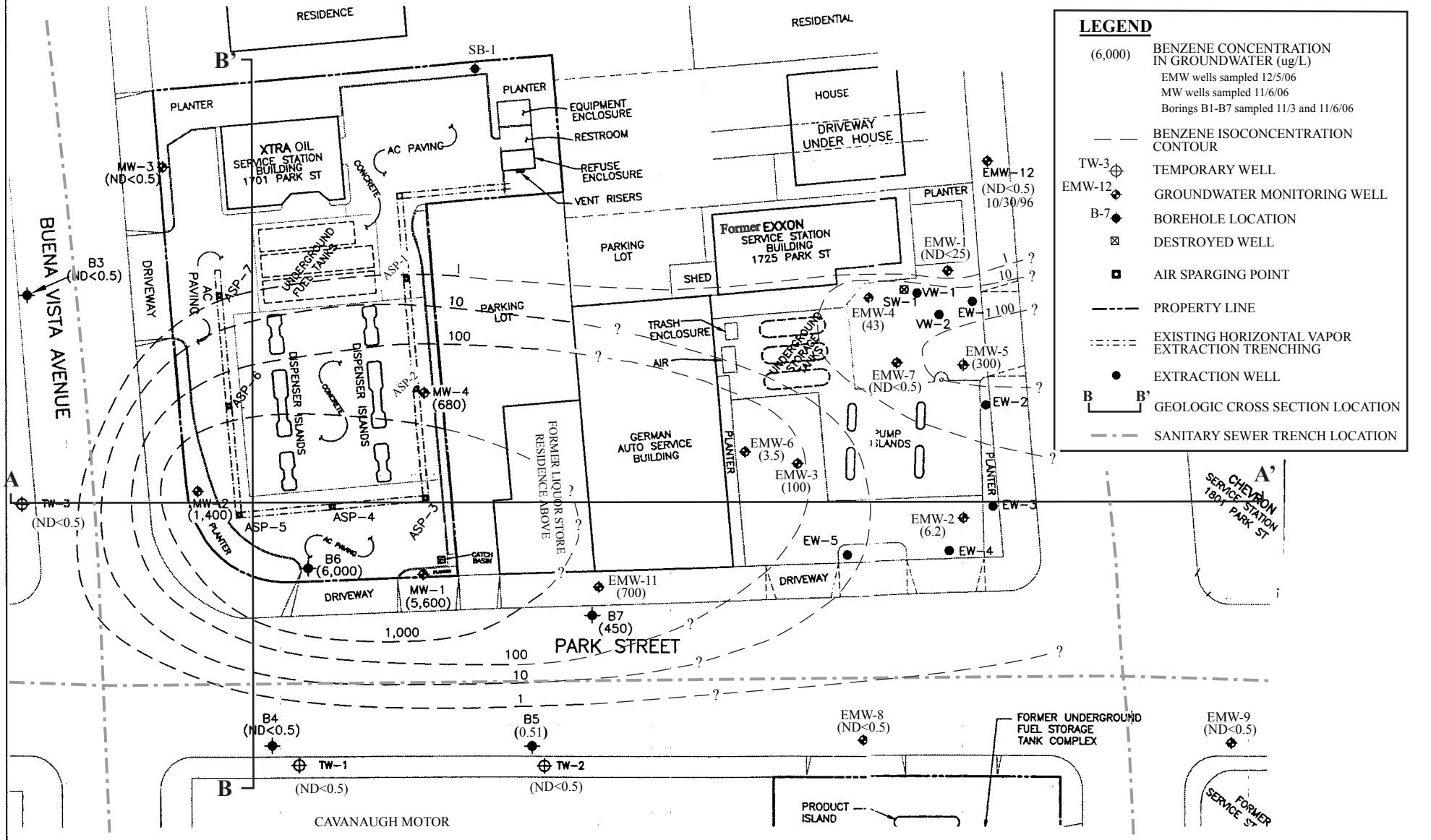


Figure 5
Site Vicinity Map
Showing Benzene in Groundwater at 10 to 14 Feet Below Ground Surface
1701 Park Street
Alameda, CA

N

Base Map From:
Alisto Engineering Group, 9/23/2005
and Environmental Resources, Inc.,
6/15/2004

P&D Environmental, Inc.
55 Santa Clara Ave, Ste. 240
Oakland, CA 94610

0 50 100
Approximate Scale in Feet

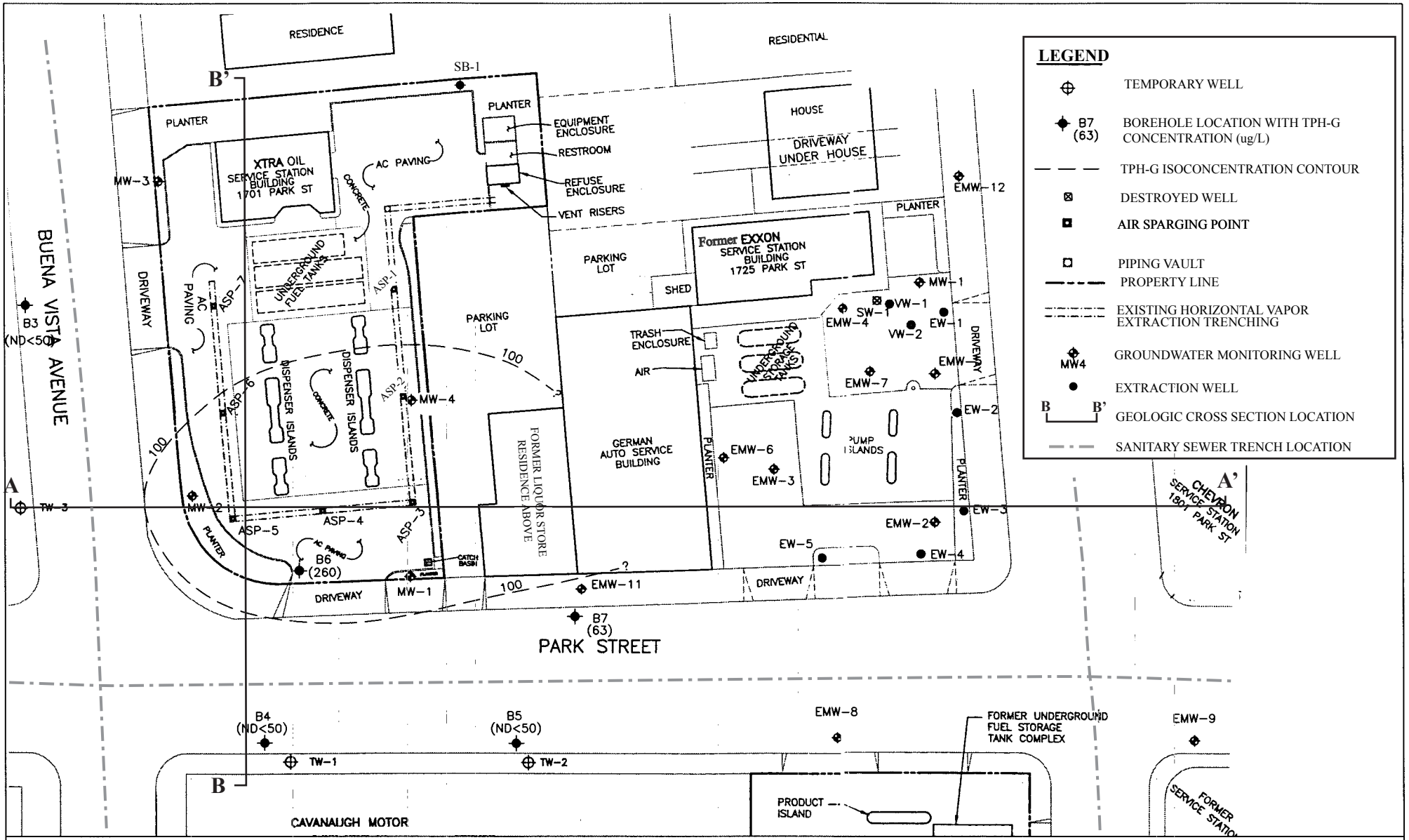


Figure 6
Site Vicinity Map Showing TPH-G in Groundwater At 42 Feet Below Ground Surface
1701 Park Street
Alameda, CA

Base Map From:
Alisto Engineering Group, 9/23/2005
and Environmental Resources, Inc.,
6/15/2004

P&D Environmental, Inc.
55 Santa Clara Ave, Ste. 240
Oakland, CA 94610

0 50 100
Approximate Scale in Feet

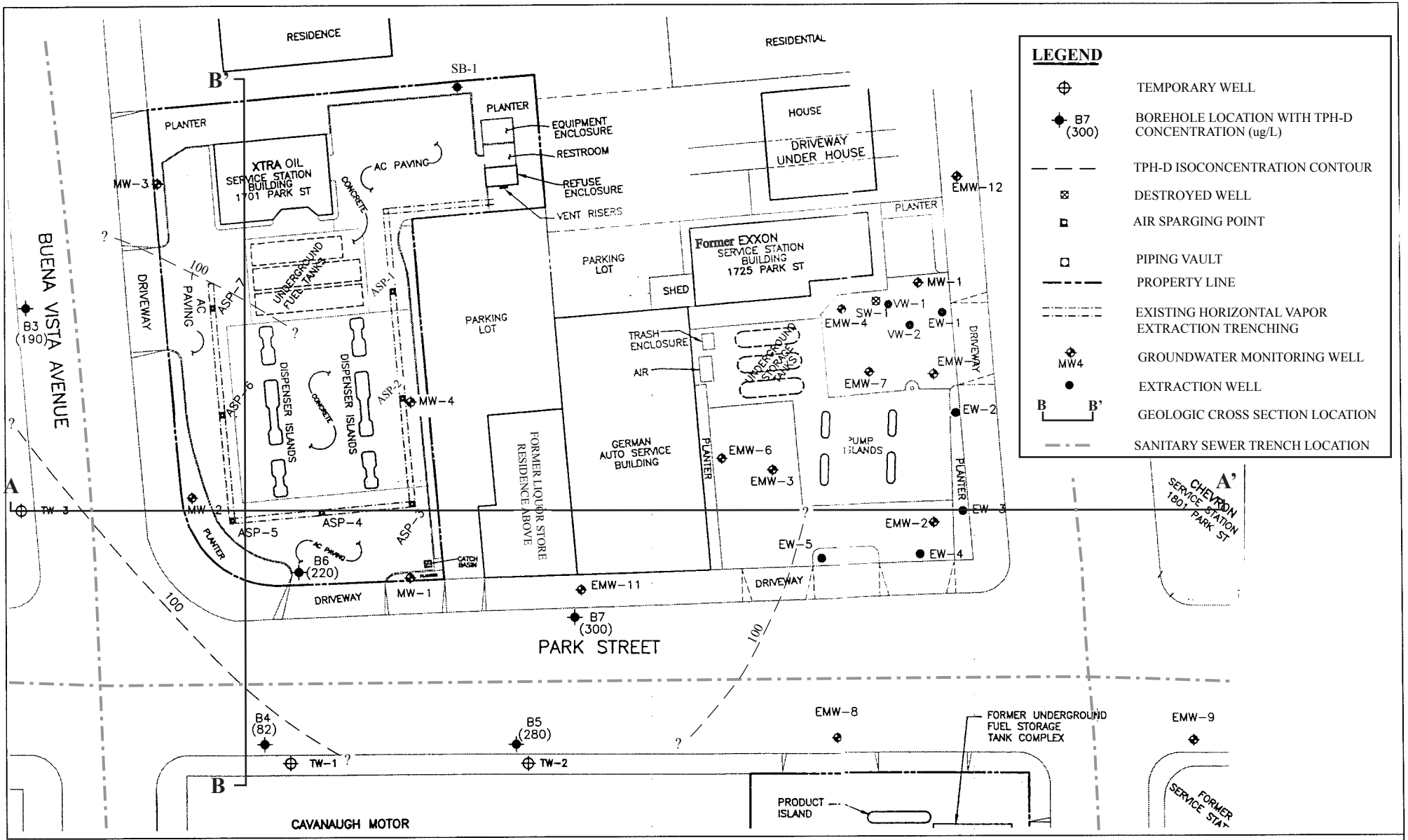


Figure 7
Site Vicinity Map Showing TPH-D in Groundwater At 42 Feet Below Ground Surface
1701 Park Street
Alameda

N

Base Map From:
Alisto Engineering Group, 9/23/2005
and Environmental Resources, Inc.,
6/15/2004

P&D Environmental, Inc.
55 Santa Clara Ave, Ste. 240
Oakland, CA 94610

0 50 100
Approximate Scale in Feet

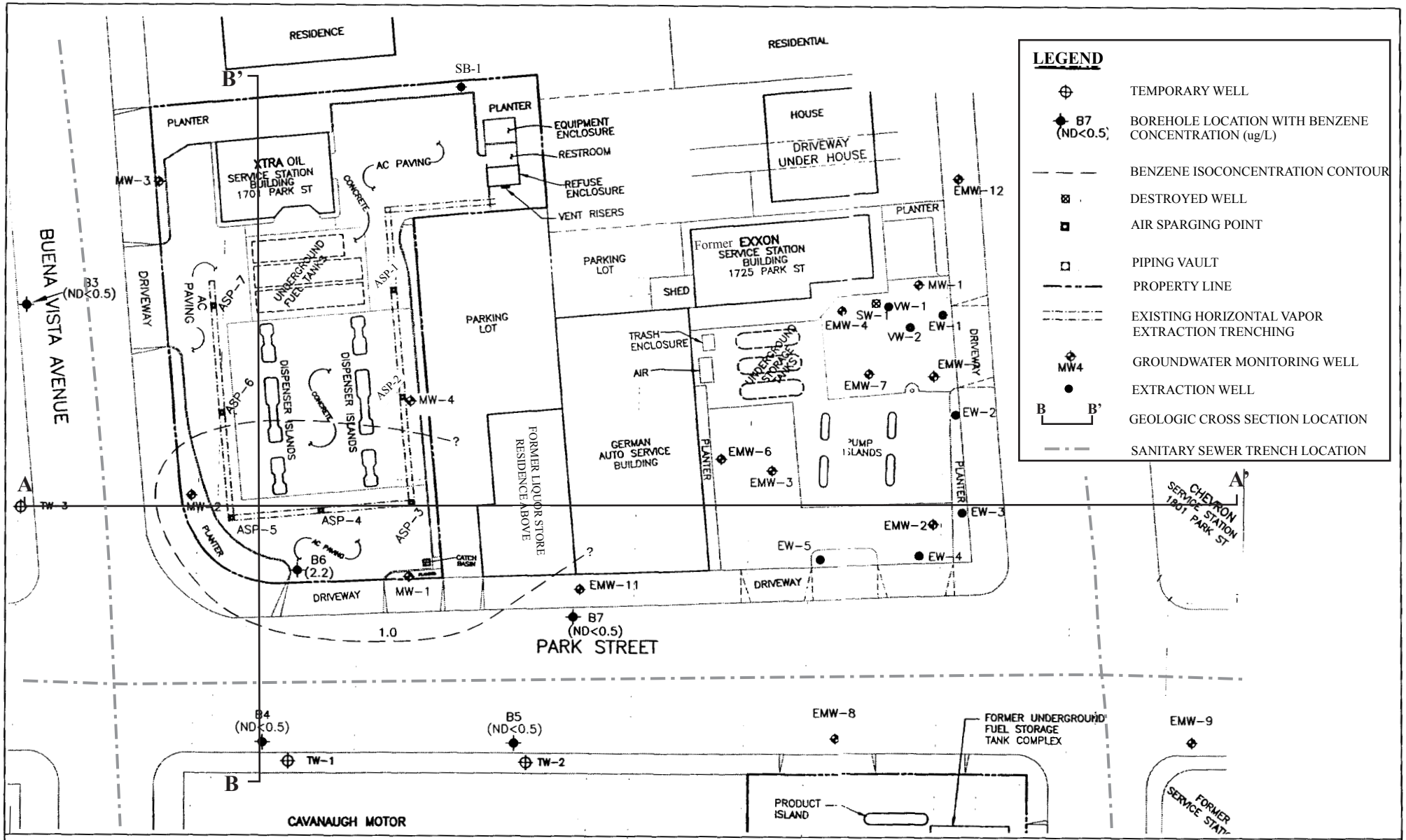


Figure 8
Site Vicinity Map Showing Benzene in Groundwater At 42 Feet Below Ground Surface
1701 Park Street
Alameda

Base Map From:
Alisto Engineering Group, 9/23/2005
and Environmental Resources, Inc.,
6/15/2004

P&D Environmental, Inc.
55 Santa Clara Ave, Ste. 240
Oakland, CA 94610

0 50 100
Approximate Scale in Feet

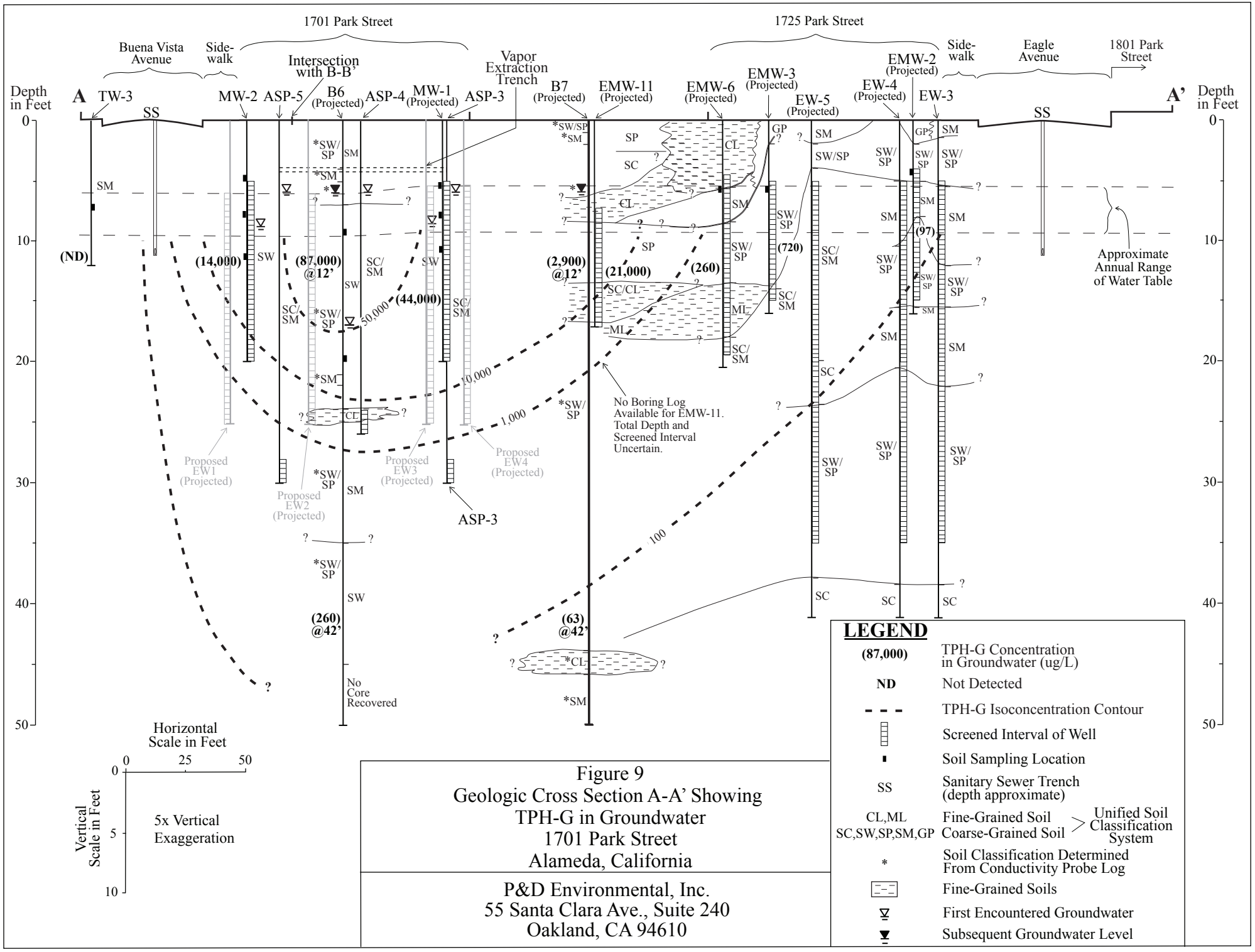


Figure 9
Geologic Cross Section A-A' Showing
TPH-G in Groundwater
1701 Park Street
Alameda, California

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

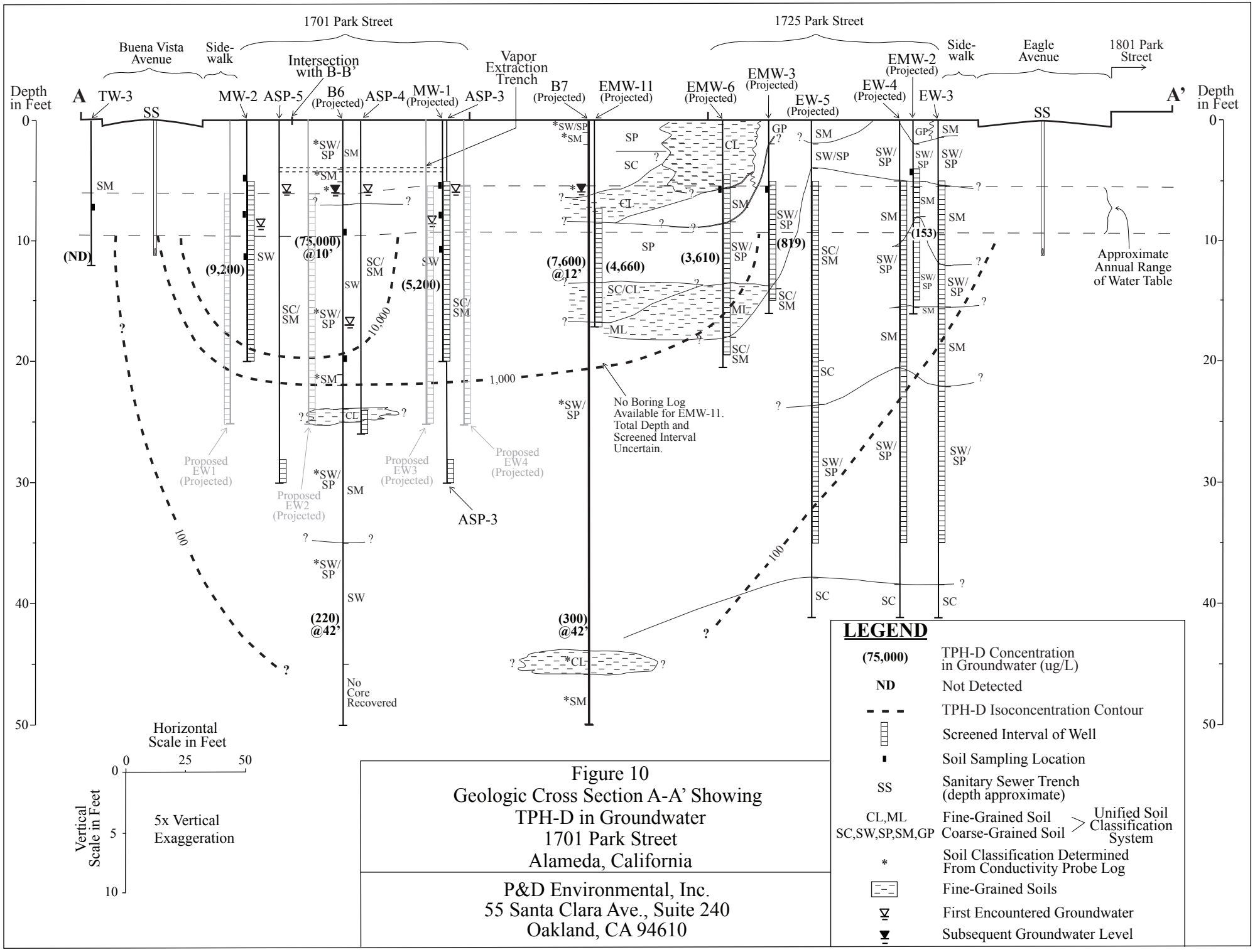


Figure 10
Geologic Cross Section A-A' Showing
TPH-D in Groundwater
1701 Park Street
Alameda, California

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

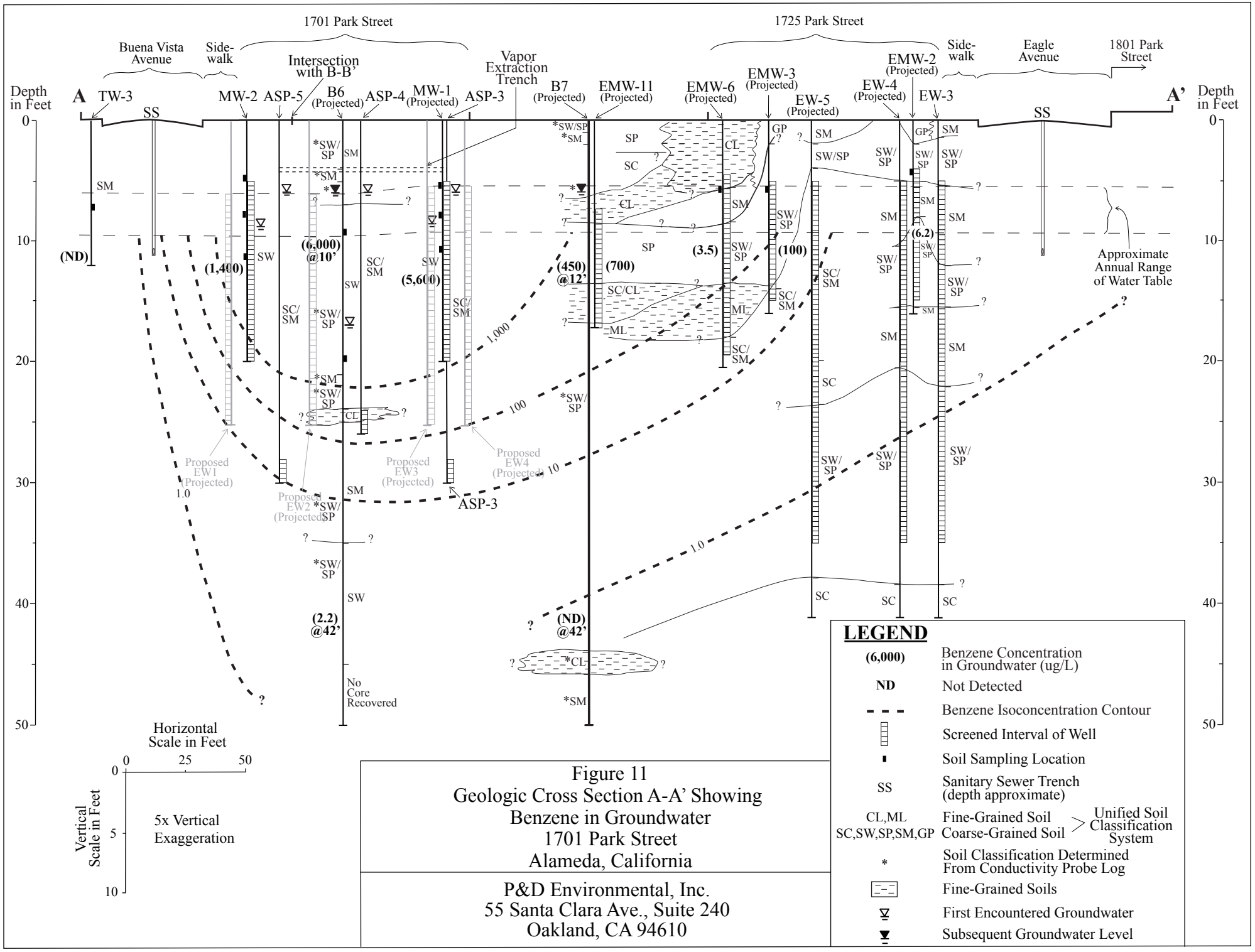


Figure 11
Geologic Cross Section A-A' Showing
Benzene in Groundwater
1701 Park Street
Alameda, California

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

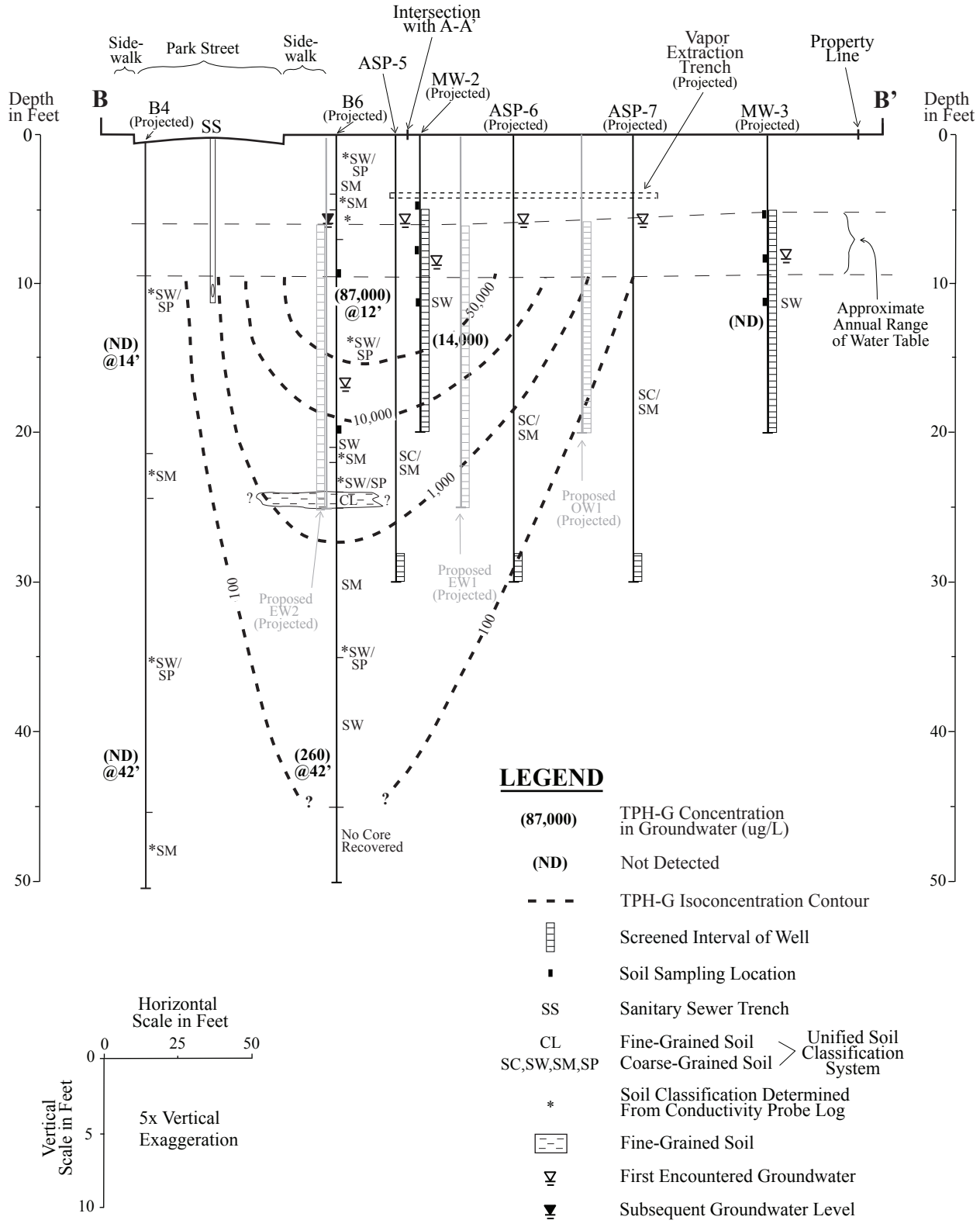


Figure 12
Geologic Cross Section B-B' Showing
TPH-G in Groundwater
1701 Park Street
Alameda, California

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

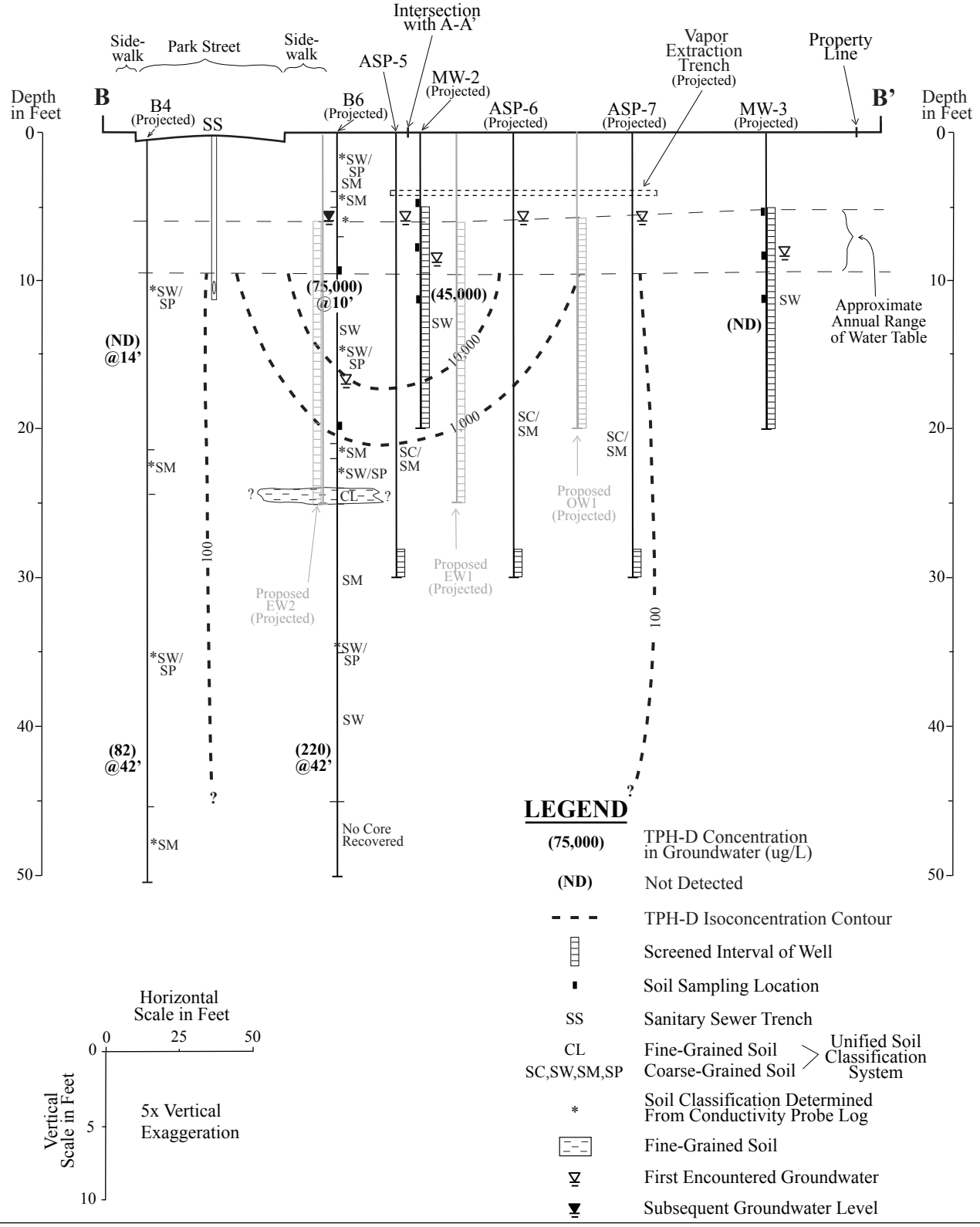


Figure 13
Geologic Cross Section B-B' Showing
TPH-D in Groundwater
1701 Park Street
Alameda, California

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

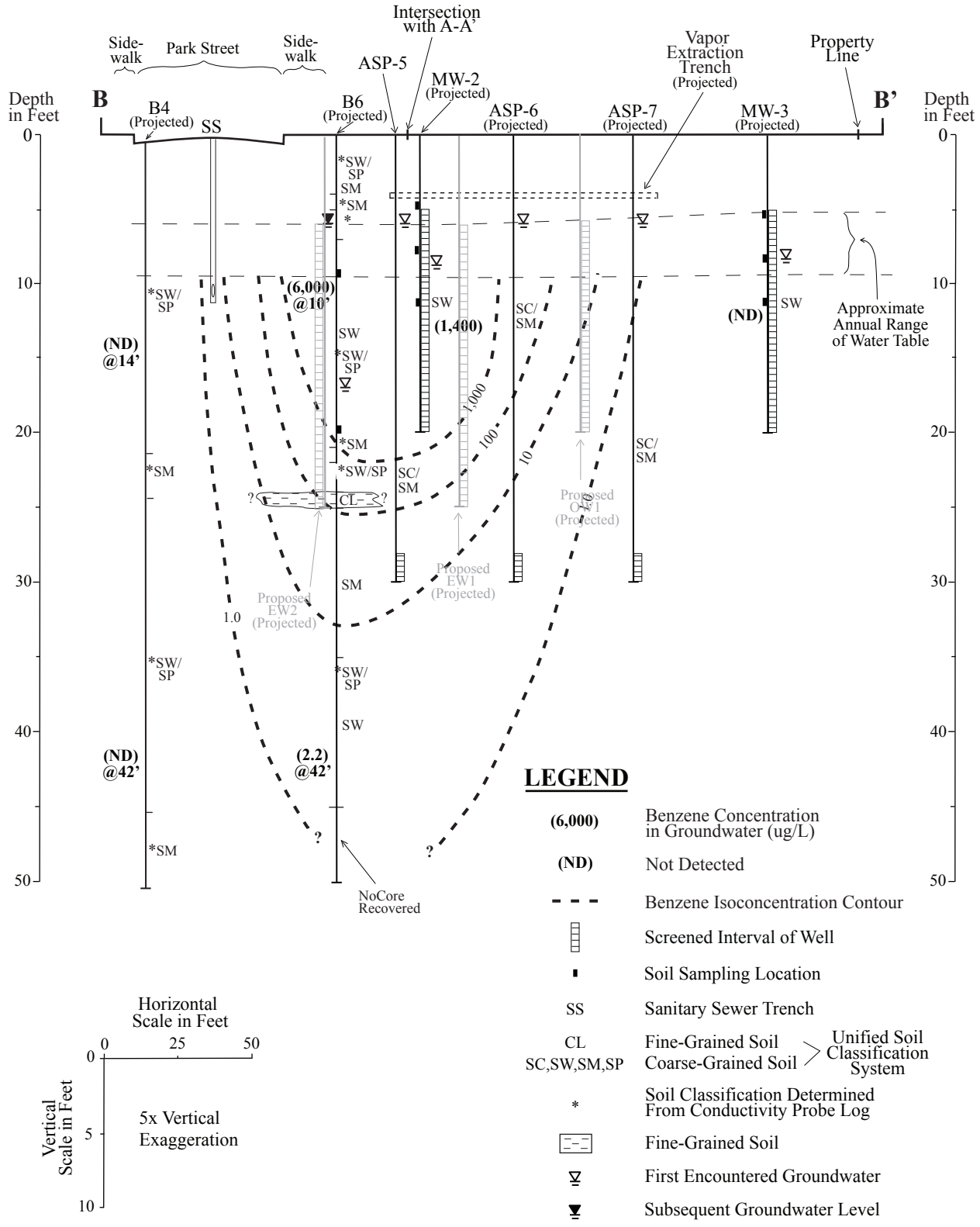


Figure 14
Geologic Cross Section B-B' Showing
Benzene in Groundwater
1701 Park Street
Alameda, California

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

APPENDIX A

Physical-Chemical and Toxicity Characteristics for Chemicals of Concern

Table 1
Physical-Chemical and Toxicity Characteristics for Chemicals of Concern

CAS No.	Chemical	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Enthalpy of vaporization at the normal boiling point, $DH_{v,b}$ (cal/mol)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Molecular weight, MW (g/mol)	URF extrapolated (X)	RfC extrapolated (X)	Original EPA Values: Unit risk factor, URF $(mg/m^3)^{-1}$	Original EPA Values: Reference conc., RfC (mg/m^3)	Original EPA Values: URF extrapolated (X)	Original EPA Values: RfC extrapolated (X)
None*	TPH-G*	3.98E+03	1.00E-01	1.00E-05	5.40E+00	5.00E+01	8.00E-01	25	369.00	508.00	7,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
None*	TPH-D*	2.51E+05	1.00E-01	1.00E-05	3.40E-02	1.20E+02	1.90E+00	25	473.00	568.90	7,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	2.9E-05	3.0E-02	7.81E+01			7.8E-06	0.0E+00		
108883	Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.62E-03	25	383.78	591.79	7,930	0.0E+00	3.0E-01	9.21E+01			0.0E+00	4.0E-01		
100414	Ethylbenzene	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.22E-01	7.86E-03	25	409.34	617.20	8,501	2.5E-06	1.0E+00	1.06E+02			0.0E+00	1.0E+00		
108383	m-Xylene	4.07E+02	7.00E-02	7.80E-06	1.61E+02	3.00E-01	7.32E-03	25	412.27	617.05	8,523	0.0E+00	1.0E-01	1.06E+02		?	0.0E+00	1.0E-01		
95476	o-Xylene	3.63E+02	8.70E-02	1.00E-05	1.78E+02	2.12E-01	5.18E-03	25	417.60	630.30	8,661	0.0E+00	1.0E-01	1.06E+02			0.0E+00	1.0E-01		
106423	p-Xylene	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.13E-01	7.64E-03	25	411.52	616.20	8,525	0.0E+00	1.0E-01	1.06E+02		?	0.0E+00	1.0E-01		
1634044	MTBE	7.26E+00	1.02E-01	1.05E-05	5.10E+04	2.56E-02	6.23E-04	25	328.3	497.1	6677.66	2.60E-07	3.00E+00	8.82E+01			0.00E+00	3.00E+00		
75-65-0	TBA**	1.57	NA	NA	INFINITE	5.93E-04	NA	NA	355.2	NA	NA	NA	NA	74.12	NA	NA	NA	NA	NA	NA

NOTES:
TPH-G = Total Petroleum Hydrocarbons as Gasoline.
TPH-D = Total Petroleum Hydrocarbons as Diesel.
NA = Not Available.
CalEPA Toxicity criteria (last updated 2/4/09 DTSC/HERD) obtained from DTSC Johnson & Ettinger Screening-Level Model for Groundwater Contamination VLOOKUP Chemical Properties Lookup Table
* = Data obtained from the California Department of Toxic Substances Control (DTSC) document *Interim Guidance Evaluating Human Health Risks from Total Petroleum Hydrocarbons (TPH)*, dated June 16, 2009, where TPH-G is approximated by C5-C8 aliphatic compounds and TPH-D is approximated by C9-C18 aliphatic compounds.
** = Data obtained from the Interstate Technology & Regulatory Council (ITRC) document *Overview of Groundwater Remediation Technologies for MTBE and TBA*, dated February 2005.

APPENDIX B

SFRWQCB Basin Plan Beneficial Uses

- Existing Beneficial Uses Dated January 18, 2007
- Proposed Beneficial Uses for Adoption on July 14, 2010

Amend the language of Chapter 2 as follows. Underline indicates new text, strikethrough indicates deleted text. Section 2.2.2, entitled Groundwater, and Tables 2-2 and 2-3 are not shown because there are no changes. Replace Figures 2-3 through 2-9 with revised Figures 2-3 through 2-9b.

CHAPTER 2: BENEFICIAL USES

State policy for water quality control in California is directed toward achieving the highest water quality consistent with maximum benefit to the people of the state. Aquatic ecosystems and underground aquifers provide many different benefits to the people of the state. The beneficial uses described in detail in this chapter define the resources, services, and qualities of these aquatic systems that are the ultimate goals of protecting and achieving high water quality. The ~~Regional~~ Water Board is charged with protecting all these uses from pollution and nuisance that may occur as a result of waste discharges in the region. Beneficial uses of waters of the State ~~surface waters, groundwaters, marshes, and mudflats wetlands~~ presented here serve as a basis for establishing water quality objectives and discharge prohibitions to attain these goals.

Beneficial use designations for any given water body do not rule out the possibility that other beneficial uses exist or have the potential to exist. Existing beneficial uses that have not been formally designated in this Basin Plan are protected whether or not they are identified. While the tables in this Chapter list a large, representative portion of the water bodies in our region, it is not practical to list each and every water body.

2.1 DEFINITIONS OF BENEFICIAL USES

The following definitions (in italic) for beneficial uses are applicable throughout the entire state. A brief description of the most important water quality requirements for each beneficial use follows each definition (in alphabetical order by abbreviation).

2.1.1 AGRICULTURAL SUPPLY (AGR)

Uses of water for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.

The criteria discussed under municipal and domestic water supply (MUN) also effectively protect farmstead uses. To establish water quality criteria for livestock water supply, the ~~Regional~~ Water Board must consider the relationship of water to the total diet, including water freely drunk, moisture content of feed, and interactions between irrigation water quality and feed quality. The University of California Cooperative Extension has developed threshold and limiting concentrations for livestock and irrigation water. Continued irrigation often leads to one or more of four types of hazards related to water quality and the nature of soils and crops. These hazards are (1) soluble salt accumulations, (2) chemical changes in the soil, (3) toxicity to crops, and (4) potential disease transmission to humans through reclaimed water use. Irrigation water classification systems, arable soil classification systems, and public health criteria related to reuse of wastewater have been developed with consideration given to these hazards.

2.1.2 AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE (ASBS)

Areas designated by the State Water Board.

These include marine life refuges, ecological reserves, and designated areas where the preservation and enhancement of natural resources requires special protection. In these areas, alteration of natural water quality is undesirable. The areas that have been designated as ASBS in this Region are Bird Rock, Point Reyes Headland Reserve and Extension, Double Point, Duxbury Reef Reserve and Extension, Farallon Islands, and James V. Fitzgerald Marine Reserve, depicted in Figure 2-1. The ~~2001~~ California Ocean Plan ~~(see Chapter 5)~~ prohibits waste discharges into, and requires wastes to be discharged at a sufficient distance from, these areas to assure maintenance of natural water quality conditions. These areas have been designated as a subset of State Water Quality Protection Areas as per the Public Resources Code.

2.1.3 COLD FRESHWATER HABITAT (COLD)

Uses of water that support cold water ecosystems, including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Cold freshwater habitats generally support trout and may support ~~the~~ anadromous salmon and steelhead fisheries as well. Cold water habitats are commonly well-oxygenated. Life within these waters is relatively intolerant to environmental stresses. Often, soft waters feed cold water habitats. These waters render fish more susceptible to toxic metals, such as copper, because of their lower buffering capacity.

2.1.4 ~~OCEAN,~~ COMMERCIAL AND SPORT FISHING (COMM)

Uses of water for commercial or recreational collection of fish, shellfish, or other organisms ~~in oceans, bays, and estuaries~~, including, but not limited to, uses involving organisms intended for human consumption or bait purposes.

To maintain ~~ocean~~ fishing, the aquatic life habitats where fish reproduce and seek their food must be protected. Habitat protection is under descriptions of other beneficial uses.

2.1.5 ESTUARINE HABITAT (EST)

Uses of water that support estuarine ecosystems, including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds), and the propagation, sustenance, and migration of estuarine organisms.

Estuarine habitat provides an essential and unique habitat that serves to acclimate anadromous fishes (e.g., salmon, striped bass) migrating into fresh or marine water conditions. The protection of estuarine habitat is contingent upon (1) the maintenance of adequate Delta outflow to provide mixing and salinity control; and (2) provisions to protect wildlife habitat associated with marshlands and the Bay periphery (i.e., prevention of fill activities). Estuarine habitat is generally associated with moderate seasonal fluctuations in dissolved oxygen, pH, and temperature and with a wide range in turbidity.

2.1.6 FRESHWATER REPLENISHMENT (FRESH)

Uses of water for natural or artificial maintenance of surface water quantity or quality.

Fresh water inputs are important for maintaining salinity balance, flow, and/or water quantity for such surface water bodies as marshes, wetlands, and lakes.

2.1.7 GROUNDWATER RECHARGE (GWR)

Uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting saltwater intrusion into freshwater aquifers.

The requirements for groundwater recharge operations generally reflect the future use to be made of the water stored underground. In some cases, recharge operations may be conducted to prevent seawater intrusion. In these cases, the quality of recharged waters may not directly affect quality at the wellfield being protected. Recharge operations are often limited by excessive suspended sediment or turbidity that can clog the surface of recharge pits, basins, or wells.

Under the state Antidegradation Policy, the quality of some of the waters of the state is higher than established by adopted policies. It is the intent of this policy to maintain that existing higher water quality to the maximum extent possible.

Requirements for groundwater recharge, therefore, shall impose the Best Available Technology (BAT) or Best Management Practices (BMPs) for control of the discharge as necessary to assure the highest quality consistent with maximum benefit to the people of the state. Additionally, it must be recognized that groundwater recharge occurs naturally in many areas from streams and reservoirs. This recharge may have little impact on the quality of groundwaters under normal circumstances, but it may act to transport pollutants from the recharging water body to the groundwater. Therefore, groundwater recharge must be considered when requirements are established.

2.1.8 INDUSTRIAL SERVICE SUPPLY (IND)

Uses of water for industrial activities that do not depend primarily on water quality, including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.

Most industrial service supplies have essentially no water quality limitations except for gross constraints, such as freedom from unusual debris.

2.1.9 MARINE HABITAT (MAR)

Uses of water that support marine ecosystems, including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).

In many cases, the protection of marine habitat will be accomplished by measures that protect wildlife habitat generally, but more stringent criteria may be necessary for waterfowl marshes and other habitats, such as those for shellfish and marine fishes. Some marine habitats, such as important intertidal zones and kelp beds, may require special protection.

2.1.10 FISH MIGRATION (MIGR)

Uses of water that support habitats necessary for migration, acclimatization between fresh water and salt water, and protection of aquatic organisms that are temporary inhabitants of waters within the region.

The water quality provisions acceptable to cold water fish generally protect anadromous fish as well. However, particular attention must be paid to maintaining zones of passage. Any barrier to migration or free movement of migratory fish is harmful. Natural tidal movement in estuaries and unimpeded river flows are necessary to sustain migratory fish and their offspring. A water quality barrier, whether thermal, physical, or chemical, can destroy the integrity of the migration route and lead to the rapid decline of dependent fisheries.

Water quality may vary through a zone of passage as a result of natural or human- induced activities. Fresh water entering estuaries may float on the surface of the denser salt water or hug one shore as a result of density differences related to water temperature, salinity, or suspended matter.

2.1.11 MUNICIPAL AND DOMESTIC SUPPLY (MUN)

Uses of water for community, military, or individual water supply systems, including, but not limited to, drinking water supply.

The principal issues involving municipal water supply quality are (1) protection of public health; (2) aesthetic acceptability of the water; and (3) the economic impacts associated with treatment- or quality-related damages.

The health aspects broadly relate to: direct disease transmission, such as the possibility of contracting typhoid fever or cholera from contaminated water; toxic effects, such as links between nitrate and methemoglobinemia (blue babies); and increased susceptibility to disease, such as links between halogenated organic compounds and cancer.

Aesthetic acceptance varies widely depending on the nature of the supply source to which people have become accustomed. However, the parameters of general concern are excessive hardness, unpleasant odor or taste, turbidity, and color. In each case, treatment can improve acceptability although its cost may not be economically justified when alternative water supply sources of suitable quality are available.

Published water quality objectives give limits for known health-related constituents and most properties affecting public acceptance. These objectives for drinking water include the U.S. Environmental Protection Agency Drinking Water Standards and the California State Department of Health Services criteria.

2.1.12 NAVIGATION (NAV)

Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.

Navigation is a designated use where water is used for shipping, travel, or other transportation by private, military, or commercial vessels.

2.1.13 INDUSTRIAL PROCESS SUPPLY (PROC)

Uses of water for industrial activities that depend primarily on water quality.

Water quality requirements differ widely for the many industrial processes in use today. So many specific industrial processes exist with differing water quality requirements that no meaningful criteria can be

established generally for quality of raw water supplies. Fortunately, this is not a serious shortcoming, since current water treatment technology can create desired product waters tailored for specific uses.

2.1.14 PRESERVATION OF RARE AND ENDANGERED SPECIES (RARE)

Uses of waters that support habitats necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened, or endangered.

The water quality criteria to be achieved that would encourage development and protection of rare and endangered species should be the same as those for protection of fish and wildlife habitats generally. However, where rare or endangered species exist, special control requirements may be necessary to assure attainment and maintenance of particular quality criteria, which may vary slightly with the environmental needs of each particular species. Criteria for species using areas of special biological significance should likewise be derived from the general criteria for the habitat types involved, with special management diligence given where required.

2.1.15 WATER CONTACT RECREATION (REC1)

Uses of water for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, and uses of natural hot springs.

Water contact implies a risk of waterborne disease transmission and involves human health; accordingly, criteria required to protect this use are more stringent than those for more casual water-oriented recreation.

Excessive algal growth has reduced the value of shoreline recreation areas in some cases, particularly for swimming. Where algal growths exist in nuisance proportions, particularly bluegreen algae, all recreational water uses, including fishing, tend to suffer.

One criterion to protect the aesthetic quality of waters used for recreation from excessive algal growth is based on chlorophyll a.

Public access to drinking water reservoirs is limited or prohibited by reservoir owner/operators for purposes of protecting drinking water quality and public health. In some cases, access to reservoir tributaries is also prohibited. For these water bodies, REC-1 is designated as E*, for the purpose of protecting water quality. No right to public access is intended by this designation.

2.1.16 NONCONTACT WATER RECREATION (REC2)

Uses of water for recreational activities involving proximity to water, but not normally involving contact with water where water ingestion is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

Water quality considerations relevant to noncontact water recreation, such as hiking, camping, or boating, and those activities related to tide pool or other nature studies require protection of habitats and

aesthetic features. In some cases, preservation of a natural wilderness condition is justified, particularly when nature study is a major dedicated use.

One criterion to protect the aesthetic quality of waters used for recreation from excessive algal growth is based on chlorophyll a.

2.1.17 SHELLFISH HARVESTING (SHELL)

Uses of water that support habitats suitable for the collection of crustaceans and filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial, or sport purposes.

Shellfish harvesting areas require protection and management to preserve the resource and protect public health. The potential for disease transmission and direct poisoning of humans is of considerable concern in shellfish regulation. The bacteriological criteria for the open ocean, bays, and estuarine waters where shellfish cultivation and harvesting occur should conform with the standards described in the National Shellfish Sanitation Program, Manual of Operation.

Toxic metals can accumulate in shellfish. Mercury and cadmium are two metals known to have caused extremely disabling effects in humans who consumed shellfish that concentrated these elements from industrial waste discharges. Other elements, radioactive isotopes, and certain toxins produced by particular plankton species also concentrate in shellfish tissue. Documented cases of paralytic shellfish poisoning are not uncommon in California.

2.1.18 FISH SPAWNING (SPWN)

Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

Dissolved oxygen levels in spawning areas should ideally approach saturation levels. Free movement of water is essential to maintain well-oxygenated conditions around eggs deposited in sediments. Water temperature, size distribution and organic content of sediments, water depth, and current velocity are also important determinants of spawning area adequacy.

2.1.19 WARM FRESHWATER HABITAT (WARM)

Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

The warm freshwater habitats supporting bass, bluegill, perch, and other ~~pan~~fish are generally lakes and reservoirs, although some minor streams will serve this purpose where stream flow is sufficient to sustain the fishery. The habitat is also important to a variety of nonfish species, such as frogs, crayfish, and insects, which provide food for fish and small mammals. This habitat is less sensitive to environmental changes, but more diverse than the cold freshwater habitat, and natural fluctuations in temperature, dissolved oxygen, pH, and turbidity are usually greater.

2.1.20 WILDLIFE HABITAT (WILD)

Uses of waters that support wildlife habitats, including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.

The two most important types of wildlife habitat are riparian and wetland habitats. These habitats can be threatened by development, erosion, and sedimentation, as well as by poor water quality.

The water quality requirements of wildlife pertain to the water directly ingested, the aquatic habitat itself, and the effect of water quality on the production of food materials. Waterfowl habitat is particularly sensitive to changes in water quality. Dissolved oxygen, pH, alkalinity, salinity, turbidity, settleable matter, oil, toxicants, and specific disease organisms are water quality characteristics particularly important to waterfowl habitat. Dissolved oxygen is needed in waterfowl habitats to suppress development of botulism organisms; botulism has killed millions of waterfowl. It is particularly important to maintain adequate circulation and aerobic conditions in shallow fringe areas of ponds or reservoirs where botulism has caused problems.

2.2 ~~PRESENT~~ EXISTING AND POTENTIAL BENEFICIAL USES

2.2.1 SURFACE WATERS

Surface waters in the Region consist of non-tidal wetlands, rivers, streams, and lakes (collectively described as inland surface waters), estuarine wetlands known as baylands, estuarine waters, and coastal waters. In this Region, estuarine waters consist of the Bay system including intertidal, tidal, and subtidal habitats from the Golden Gate to the Region's boundary near Pittsburg and the lower portions of streams that are affected by tidal hydrology, such as the Napa and Petaluma rivers in the north and Coyote and San Francisquito creeks in the south.

Inland surface waters support or could support most of the beneficial uses described above. The specific beneficial uses for inland streams include municipal and domestic supply (MUN), agricultural supply (AGR), commercial and sport fishing (COMM), freshwater replenishment (FRESH), industrial process supply (PRO), groundwater recharge (GWR), preservation of rare and endangered species (RARE), water contact recreation (REC1), noncontact water recreation (REC2), wildlife habitat (WILD), cold freshwater habitat (COLD), warm freshwater habitat (WARM), fish migration (MIGR), and fish spawning (SPWN).

The San Francisco Bay Estuary supports estuarine habitat (EST), industrial service supply (IND), and navigation (NAV) in addition to ~~all of the uses supported by streams~~COMM, RARE, REC1, REC2, WILD, MIGR, and SPWN.

Coastal waters' beneficial uses include water contact recreation (REC1); noncontact water recreation (REC2); industrial service supply (IND); navigation (NAV); marine habitat (MAR); shellfish harvesting (SHELL); ocean, commercial and sport fishing (COMM); wildlife habitat (WILD), fish migration (MIGR), fish spawning (SPWN), and preservation of rare and endangered species (RARE). In addition, the California coastline within the Region is endowed with exceptional scenic beauty.

The beneficial uses of any specifically identified waterbody generally apply to all its tributaries. In some cases a beneficial use may not be applicable to the entire body of water, such as navigation in Richardson Bay or shellfish harvesting in the Pacific Ocean. In these cases, the Water Board's judgment regarding water quality control measures necessary to protect beneficial uses will be applied.

Beneficial uses of streams that have intermittent flows, as is typical of many streams in the region, must be protected throughout the year and are designated as "existing."

Beneficial uses of each significant water body have been identified and are organized according to the seven major Hhydrologic ~~units~~Planning Areas within the Region (Figure 2-2). ~~Table 2-1 contains the beneficial uses for water bodies that have been designated in the Region.~~ The maps locating each water body (Figures 2-3 through 2-9b) were produced using a geographical information system (GIS) at the Water Board. The maps use the hydrologic basin information compiled by the California Interagency Watershed map, with supplemental information from the Oakland Museum of California Creek and Watershed Map series, the Contra Costa County Watershed Atlas, and the San Francisco Estuary Institute EcoAtlas. More detailed representations of each location can be created using this GIS version.

Table 2-1 contains the beneficial uses for many surface water bodies in the Region, organized geographically by the Region's seven Hydrologic Planning Areas. Within each Hydrologic Planning Area, water bodies are listed geographically, with tributaries indented below their receiving water body. In cases where a water body shares the same name with another water body (e.g., Redwood Creek), the location of the water body (county and/or other identifier) is given in parentheses. An alternative name for a water body, where known, is also shown in parentheses. In Table 2-1, beneficial uses are indicated as follows:

E – indicates the beneficial use exists in the water body.

E* – indicates public access to the water body is limited or prohibited for purposes of protecting drinking water quality and public health. REC-1 is designated as E* for the purpose of protecting water quality. No right to public access is intended by this designation.

P – indicates the water body could potentially support the beneficial use.

2.2.3 WETLANDS

Table 2-3 shows how beneficial uses are associated with different wetland types. Table 2-4 lists and specifies beneficial uses for 34 significant wetland areas within the Region; generalized locations of these wetlands are shown in Figure 2-11. It should be noted that most of the wetlands listed in Table 2-4 are saltwater marshes, and that the list is not comprehensive.

FIGURES

Figure 2-1: Areas of Special Biological Significance

Figure 2-2: Hydrologic Planning Areas

~~Figure 2-3: Marin Coastal Basin~~

Legend for Figures 2-3 through 2-9b

Figures 2-3 through 2-3b: Marin Coastal Basin

Figures 2-4 through 2-4b: San Mateo Coastal Basin

Figure 2-5: Central Basin

Figures 2-6 through 2-6b: South Bay Basin

Figures 2-7 through 2-7b: Santa Clara Basin

Figures 2-8 through 2-8b: San Pablo Basin

Figures 2-9 through 2-9b: Suisun Basin

TABLES

Table 2-1: Existing and Potential Beneficial Uses of Water Bodies in the San Francisco Bay Region

Table 2-2: Existing and Potential Beneficial Uses of Groundwater in Identified Basins

Table 2-3: Examples of Existing and Potential Beneficial Uses of Selected Wetlands

Table 2-4: ~~Examples of~~ Beneficial Uses of Wetland Areas

APPENDIX C

SFRWQCB Basin Plan Water Quality Objectives

Table 3-5: Water Quality Objectives for Municipal Supply

Parameter	Objective (in MG/L)
Physical:	
Color (units)[a]	15.0
Odor (number)[a]	3.0
Turbidity (NTU)[a]	5.0
pH[b]	6.5 - 8.0
TDS[c]	500.0
EC (mmhos/cm)[c]	900
Corrosivity	non-corrosive
Inorganic Parameters:	
Aluminum[d]	1.0[d] / 0.2[a]
Antimony[d]	0.006
Arsenic[d]	0.05
Asbestos[d]	7 MFL[e]
Barium[d]	1.0
Beryllium[d]	0.004
Chloride[c]	250.0
Cadmium[d]	0.005
Chromium[d]	0.05
Copper[a]	1.0
Cyanide[d]	0.15
Fluoride[f]	0.6 - 1.7[g]
Iron[a]	0.3
Lead[b]	0.05
Manganese[a]	0.05
Mercury[d]	0.002
Nickel[d]	0.1
Nitrate (as NO_3)[d]	45.0
Nitrate + Nitrite (as N)[d]	10.0
Nitrite (as N)[d]	1.0
Selenium[d]	0.05
Silver[b]	0.1
Sulfate[c]	250.0
Thallium[d]	0.002
Zinc[a]	5.0
Organic Parameters:	
MBAS (Foaming agents)[a]	0.5
Oil and grease[b]	none
Phenols[b]	0.001
Trihalomethanes[b]	0.1
Chlorinated Hydrocarbons:	
Endrin[h]	0.002
Lindane[h]	0.0002
Methoxychlor[h]	0.03
Toxaphene[h]	0.003
2,3,7,8-TCDD (Dioxin)[h]	3×10^{-8}
2,4-D[h]	0.07
2,4,4-TP Silvex[h]	0.05

Parameter	Objective (in MG/L)
Synthetic Organic Chemicals:	
Alachor[h]	0.002
Atrazine[h]	0.001
Bentazon[h]	0.018
Benzo(a)pyrene[h]	0.0002
Dalapon[h]	0.2
Dinoseb[h]	0.007
Diquat[h]	0.02
Endothall[h]	0.1
Ethylene dibromide[h]	0.00005
Glyphosate[h]	0.7
Heptachlor[h]	0.00001
Heptachlor epoxide[h]	0.00001
Hexachlorecyclopentadiene[h]	0.001
Molinate[h]	0.02
Oxarnyl[h]	0.05
Pentachlorophenol[h]	0.001
Picloram[h]	0.5
Polychlorinated Biphenyls[h]	0.0005
Simazine[h]	0.004
Thiobencarb[h]	0.07 / 0.001
Volatile Organic Chemicals:	
Benzene[h]	0.001
Carbon Tetrachloride[h]	0.005
1,2-Dibromo-3-chloropropane[h]	0.0002
1,2-Dichlorobenzene[h]	0.6
1,4-Dichlorobenzene[h]	0.005
1,1-Dichloroethane[h]	0.005
1,2-Dichloroethane[h]	0.0005
cis-1,2-Dichloroethlyene[h]	0.006
trans-1,2-Dichloroethylene[h]	0.01
1,1-Dichloroethylene[h]	0.006
Dichloromethane[h]	0.005
1,2-Dichloropropane[h]	0.005
1,3-Dichloropropene[h]	0.0005
Ethylbenzene[h]	0.7
Methyl-tert-butyl ether[h]	0.13 / 0.005
Monochlorobenzene[h]	0.07
Styrene[h]	0.1
1,1,2,2-Tetrachloroethane[h]	0.001
Tetrachloroethylene[h]	0.005
1,2,4-Trichlorobenzene[h]	0.005
1,1,1-Trichloroethane	0.200
1,1,2-Trichloroethane[h]	0.005
Trichloroethylene[h]	0.005
Trichlorofluoromethane	0.15

Parameter	Objective (in MG/L)
Volatile Organic Chemicals (cont'd):	
1,1,2-Trichloro-1,2,2-trifluoromethane[h]	1.2
Toluene[h]	0.15
Vinyl Chloride[h]	0.0005
Xylenes (single or sum of isomers)[h]	1.750
Radioactivity:	
Combined Radium-226 and Radium-228[i]	5
Gross Alpha Particle Activity[i]	15i
Tritium[i]	20,000
Strontium-90[i]	8
Gross Beta Particle Activity[i]	50
Uranium[i]	20

NOTES:

a. Secondary Maximum Contaminant Levels as specified in Table 64449-A of Section 64449, Title 22 of the California Code of Regulations, as June 3, 2005.

b. Table III-2, 1986 Basin Plan

c. Secondary Maximum Contaminant Levels as specified in Table 64449-B of Section 64449, Title 22 of the California Code of Regulations, as of June 3, 2005. (Levels indicated are "recommended" levels. Table 64449-B contains a complete list of upper and short-term ranges.)

d. Maximum Contaminant Levels as specified in Table 64431-A (Inorganic Chemicals) of Section 64431, Title 22 of the California Code of Regulations, as of June 3, 2005.

e. MFL = million fibers per liter; MCL for fibers exceeding 10 um in length.

f. Flouride objectives depend on temperature.

g. A complete list of optimum and limiting concentrations is specified in Table 64433.2-A of Section 64433.2, Title 22 of the California Code of Regulations, as of June 3, 2005.

h. Maximum Contaminant Levels as specified in Table 64444-A (Organic Chemicals) of Section 64444, Title 22 of the California Code of Regulations, as of June 3, 2005.

i. Maximum Contaminant Levels as specified in Table 4 (Radioactivity) of Section 64443, Title 22 of the California Code of Regulations, as of June 3, 2005.

j. Included Radium-226 but excludes Radon and Uranium.

MG/L Milligrams per liter
pCi/L pico Curries per liter