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February 1, 2004

Mr. Scott Seery
Alameda County Health Care Services Agency
Environmental Health Services
1131 Harbor Bay Parkway
Alameda, CA 94502

Re: **Investigation Workplan**
Former Chevron Station 9-0329
340 Highland Avenue
Piedmont, California

Alameda County
FEB 06 2004
Environmental Health

Dear Mr. Seery:

As we discussed, Cambria is submitting this investigation workplan for the site referenced above. Our objective is to definitively assess whether hydrocarbons including MTBE are migrating off the site. A summary of previous work and our conclusions and recommendations are presented below. Because a comprehensive discussion of site conditions was presented in our December 2003 *Site Conceptual Model*, only the information pertinent to our upcoming investigation is presented below. Complete site background and conditions will be presented in the report detailing the results of the investigation.

SITE BACKGROUND

The site is a former Chevron service station located at the intersection of Highland Avenue and Highland Way in Piedmont, California (Figure 1). Chevron sold the property and station facilities to Hoffman Investment Company in 1990. The site is currently operated as Texaco-branded station.

The site is on a south facing hillside and is approximately 345 feet above mean sea level (MSL) with a relatively steep topographic gradient (Figure 1). Surrounding land use is commercial, residential and recreational. Piedmont Park is across Highland Avenue immediately down-gradient of the site. The nearest surface water is a small creek located within Piedmont Park.

PREVIOUS ENVIRONMENTAL WORK

1983 On-Site Well Installation: In 1983, Gettler-Ryan installed groundwater monitoring wells C-1 through C-4 (Figure 2). Well C-2 contained ¾-inch of non-aqueous-phase liquid (NAPL) upon installation and development. No soil samples were collected during well installation. There is no groundwater analytical data from the wells prior to 1989. During the first sampling event in 1989,

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elevated hydrocarbon concentrations were detected in wells C-2 and C-4, with the highest concentrations detected in well C-2 (34,000 ug/l total petroleum hydrocarbons as gasoline [TPHg] and 580 ug/l benzene). Well C-1 was apparently never sampled. NAPL has not been encountered in any of the monitoring wells since sampling began in 1989.

1990 On-Site Borings: In November 1990, GeoStrategies drilled soil borings C-A through C-F on the site. Boring C-F was drilled between two USTs into and beneath the tank pit. The highest hydrocarbon concentrations detected were 1,600 mg/kg TPHg at 5.5 feet below grade (fbg) in C-A and 0.16 mg/kg benzene at 6.5 fbg in C-E.

1993 Off-Site Soil Borings: In 1993, Resna drilled shallow off-site borings and temporary wells B-1 through B-4. Groundwater samples could only be collected from borings B-2 and B-4. No hydrocarbons were detected in soil or groundwater. Resna also completed a survey of wells and potential hydrocarbon sources within 1 mile of the site. Forty-five wells were identified, but the locations were not plotted. Resna's well inventory table indicates that 11 were identified as irrigation wells, 17 as domestic, 9 as cathodic protection, 7 as monitoring wells and two of unidentified use. No municipal wells were identified in Resna's survey. Resna also identified Piedmont City Hall as a potential source of diesel subsurface impacts.

1995 Off-Site Well Installation: In May 1995, Canonie Environmental installed groundwater monitoring well MW-6. No petroleum hydrocarbons were detected in soil samples collected from the boring. The following day well MW-6 was flowing artesian and was subsequently destroyed. No water samples were collected.

1996 Off-Site Well Installation: In November 1996, Pacific Environmental Group (PEG) installed groundwater monitoring wells C-5 and C-6 across Highland Avenue. No hydrocarbons were detected in soil or groundwater.

1998 Chromatogram Review: In January 1998, Sierra Environmental Services worked with Superior Analytical Laboratory to review chromatograms for the presence of MTBE. No MTBE was detected in the in samples collected in 1989, 1991 or through the third quarter of 1992. The first indication of MTBE was an estimated 300 ug/l in October 1992.

1998 Well Survey: In May 1998, PEG performed a water well and surface water survey of the site vicinity. PEG identified the City of Piedmont well #4, located 0.11 miles south of the site, and the

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creek in Piedmont Park as the nearest sensitive receptors. City of Piedmont well #4 appears to be used for irrigation at Piedmont Park and its completion depth and screened intervals are unknown.

2000 Utility Trench Investigation: In March 2000, Cambria hand-augered borings U-1 through U-5 adjacent to utilities on and adjacent to the site to assess potential impacts from station operations. Because of drilling safety limitations, the borings were not augered within the utility backfill. The only TPHg detection was 1,900 mg/kg at 1 fbg in boring U-1, located adjacent to the sanitary sewer line at the southern end of the site. No benzene or MTBE were detected in soil. Groundwater from boring U-1 contained 1,000 ug/l TPHg and 39,000 ug/l MTBE. No benzene or fuel oxygenates other than MTBE were detected.

2002 Utility Trench Investigation: In March 2001, Delta Environmental attempted to hand-auger borings U-6 through U-10 within utility trench backfill. Borings U-6, U-8 and U-10 appear to have penetrated trench fill material and soil samples were collected from 5.5 to 6 fbg from these borings. No hydrocarbons were detected in soil. No water accumulated in the borings, therefore Delta concluded that the utility trenches did not appear to be conduits for preferential groundwater migration.

2002 Risk-Based Corrective Action (RBCA) Assessment: In July 2002, Delta submitted a Tier 2 RBCA. Delta concluded that benzene, toluene, ethylbenzene and xylenes (BTEX) concentrations were below site specific target levels (SSTLs) for all pathways for residential site use, with the exception of groundwater ingestion. Two well surveys have identified wells in the area as domestic use. However, a high number of these wells were installed during the drought years of 1976-1977 and are likely used currently for irrigation, or not at all. Municipal water is supplied by East Bay Municipal Utility District (EBMUD) in Piedmont. Additionally, most of the wells identified as being of irrigation/domestic use appear to be located either up-gradient or cross-gradient of the subject site. Because groundwater beneath the site is not a drinking water source, Delta concluded that the SSTL exceedance for the groundwater ingestion pathway did not warrant additional action.

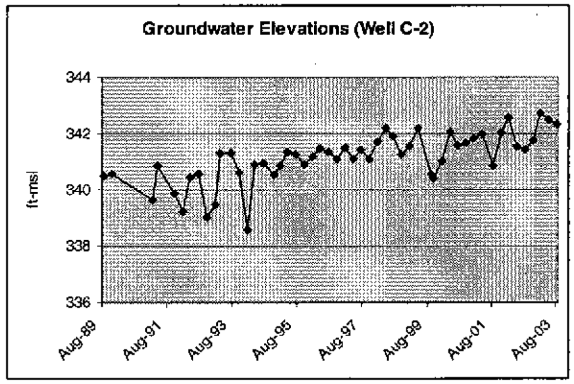
SITE CONDITIONS

Site Geology

The site sits on a hillside that is underlain at shallow depths by siltstone and sandstone bedrock. Native sediments encountered during drilling were silts and sands that appear to be weathered siltstone and sandstone. Cross-sections parallel and perpendicular to the groundwater flow direction are presented in Figure 3. Based on these cross-sections, the bedrock/sediment interface parallels surface topography and results in a thin veneer of weathered material overlying more competent bedrock.

Site Hydrogeology

Groundwater is generally less than about 5 fbg, and commonly less than 1-2 fbg, with actual depth dependent upon well location. As indicated on the adjacent figure, groundwater in source area well C-2 has increased by about 2 ft over the last 15 years. Similar trends are observed in the other wells.



As previously indicated, well MW-6 was flowing artesian shortly after installation. The materials were logged as dry to damp to 13 fbg. Therefore, we suspect that this well encountered fractures at depth that produced the groundwater resulting in flowing artesian conditions. This also indicates a strong upward hydraulic gradient in the site vicinity.

The horizontal hydraulic gradient at the site is consistently steep, at about 0.05. This is roughly consistent with surface topography as well as the bedrock topography.

Hydrocarbon Distribution in Soil

The two primary compounds of concern in soil at the site are TPHg and benzene, no MTBE has been detected in soil. The highest TPHg and benzene concentrations detected were 1,900 mg/kg (boring U-1) and 0.16 mg/kg (boring C-E), respectively. TPHg and benzene concentrations are highest immediately down-gradient of the tanks and dispensers (Figures 4 and 5). No TPHg or benzene have been detected off-site, indicating that the extent of hydrocarbons in soil is defined and confined to areas onsite.

Hydrocarbon Distribution in Groundwater

The distribution of hydrocarbons in groundwater is generally coincident with the distribution in soil with the highest concentrations of TPHg, benzene and MTBE detected down-gradient of the tanks and dispensers (Figures 6, 7 and 8). Although no MTBE was detected in soil, 39,000 ug/l MTBE was

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detected in a grab sample from native material in boring U-1 and MTBE is detected consistently in well C-2.

NAPL Source and Distribution

Measurable NAPL was detected only once, ¾-inch in well C-2 upon its installation in 1983. Despite the fact that groundwater elevations have been at similar levels since that time, no NAPL has accumulated in C-2, or any other well, since then. This fact, coupled with the fact that TPHg and benzene concentrations are no longer indicative of hydrocarbon saturation concentrations in well C-2, indicates there is no NAPL remaining.

PROPOSED WORKPLAN

Our investigation objective is to assess whether MTBE is migrating off site and, if so, to assess the MTBE mass flux. Because groundwater appears to be migrating in the thin rind of soil above the bedrock, we propose a series of closely spaced shallow borings with temporary wells constructed through the saturated soils to the top of the bedrock. We propose one sampling transect immediately down-gradient of the site and another further down-gradient across Highland Avenue. The close spacing of these borings is to ensure that no MTBE plume stringers exist that cannot reasonably be detected by this investigation. We recommend using a pair of transects so that if MTBE is discovered to be migrating from the site, flux rates past these two transects can be compared to quantify its attenuation between the transects. Specific procedures are presented below.

Proposed Scope of Work

We propose drilling 44 hand-auger borings in the locations shown on Figure 9. We recommend using hand-augered borings because our safety protocols require clearing all borings to at least 8 fbg prior to drilling. Since bedrock is only 5-6 fbg, it is not possible for us to drill using powered drill rigs.

Sampling Protocol: Soil samples will be continuously logged for lithology and screened in the field using visual observations and photoionization detector (PID) volatile vapor measurements. We will analyze samples from the capillary fringe from about 5 select borings across Highland Avenue for MTBE to ensure definition of the extent of MTBE in soil.

Temporary Well Installation: After hand-augering the borings, we will install temporary 2-inch diameter well screens that screen from the bottom of the boring to the top of the potentiometric surface. The wells will be constructed using sand filter pack along the screened section. The wells will be purged using low flow pumps until about 5 boring (not well casing) volumes have been removed. The wells will then be sampled using disposable hand bailers. Following sampling, the well casings will be removed and the borings backfilled with neat Portland cement and finished to match existing grade. Cambria's standard field procedures for borings are presented in Attachment A.

Chemical Analysis: Selected soil samples and water samples from each boring will be analyzed for:

- TPHg using modified EPA Method 8015; and
- Benzene, toluene, ethylbenzene, and xylenes (BTEX) and fuel oxygenates including MTBE by EPA method 8260B.

Site Health and Safety Plan: A Site-Specific Health and Safety Plan will be prepared and will be reviewed by the field staff and contractors prior to beginning field operations at the site. The plan will be kept on site during field activities and signed by each site worker.

Utility Location: Cambria will notify Underground Service Alert of proposed drilling activities to identify utilities in the site vicinity.

Traffic Control: The majority of the borings will be drilled on private property or in the grassy area of the down-gradient park. However, a series of borings will be drilled in streets and City right of way. These borings will require permits and traffic control to be safely drilled.

Soil and Water Disposal/Recycling: Soil and water produced during field activities will be temporarily stored on site. Following review of analytical results, the soil and water will be transported to an appropriate facility for disposal/recycling.

Reporting: Upon completion of field activities and review of the analytical results, Cambria will prepare an investigation report that, at a minimum, will contain:

- Descriptions of the drilling and sampling methods;
- Boring and well logs;
- Tabulated analytical results for soil and groundwater;
- A discussion of hydrocarbon distribution;

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- Analytical reports and chain-of-custody forms;
- Waste disposal methods; and
- Conclusions and recommendations.

Schedule: We would like to perform the investigation during the first quarter of 2004. An investigation report will be submitted approximately 60 days after the fieldwork is completed.

CLOSING

We appreciate this opportunity to work with you on this project. Please call me if you have any questions or comments.

Sincerely
Cambria Environmental Technology, Inc.

N. Scott MacLeod, R.G.
Principal Geologist

REGISTERED GEOLOGIST
N. SCOTT MacLEOD
No. 5747
STATE OF CALIFORNIA

cc: Karen Streich, ChevronTexaco, 6001 Bollinger Canyon Road, San Ramon, CA 94583
Brian House, CH2M HILL, 155 Grand Avenue, Suite 1000, Oakland, CA 94612
Anne Payne, Chevron Products Law, P.O. Box 6004, San Ramon, CA 94583
Ravi Randhawa, 4840 Bernal Ave. Apt A, Pleasanton, CA 94566-1133
Mir Ghafari, 68 Bates Blvd., Orinda, CA 94563
Jeff Orwig, 66 Ambleside Ct., Danville, CA 94526
Fred Manchouri, 1065 Shuey Dr., Moraga, CA 94556
Frank Hoffman, Hoffman Investment Co., 1760 Willow Rd., Hillsborough, CA 94010
Howard Perera, 340 Highland Avenue, Piedmont, CA 94611

Attachments: A –Standard Investigation Procedures

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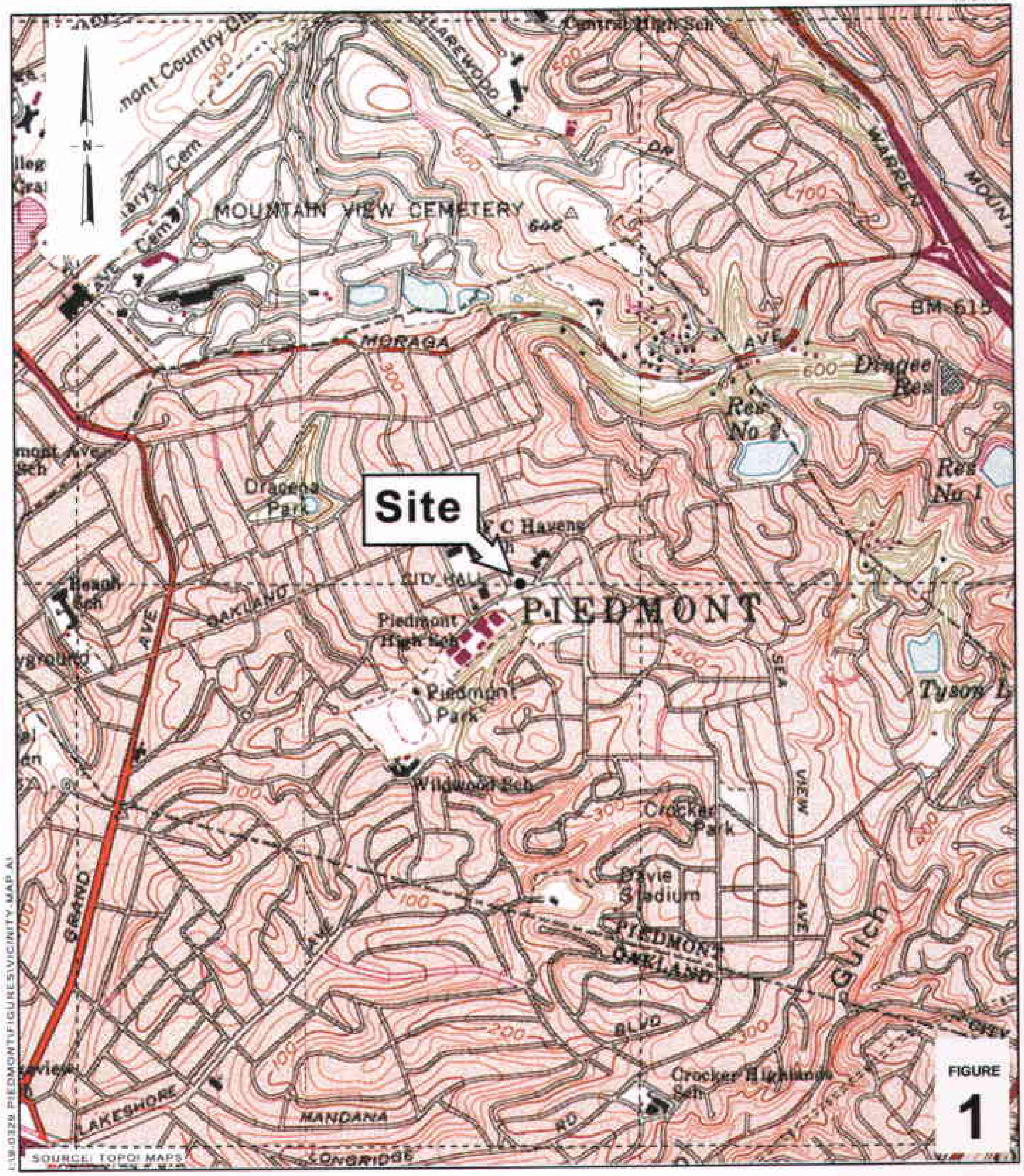

0 1/8 1/4 1/2 1

SCALE : 1" = 1/4 MILE

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Vicinity Map

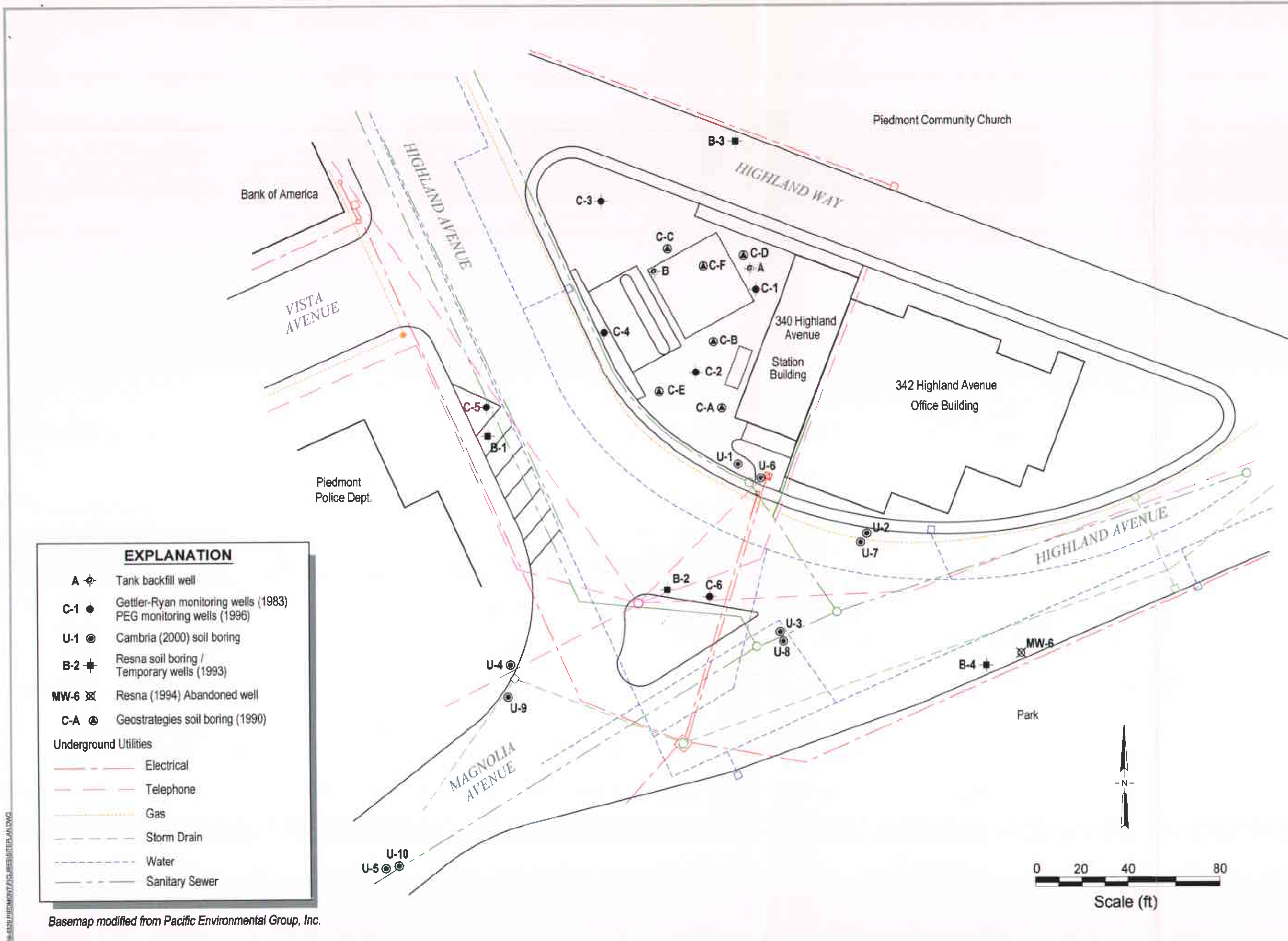

FIGURE
2

Site Plan

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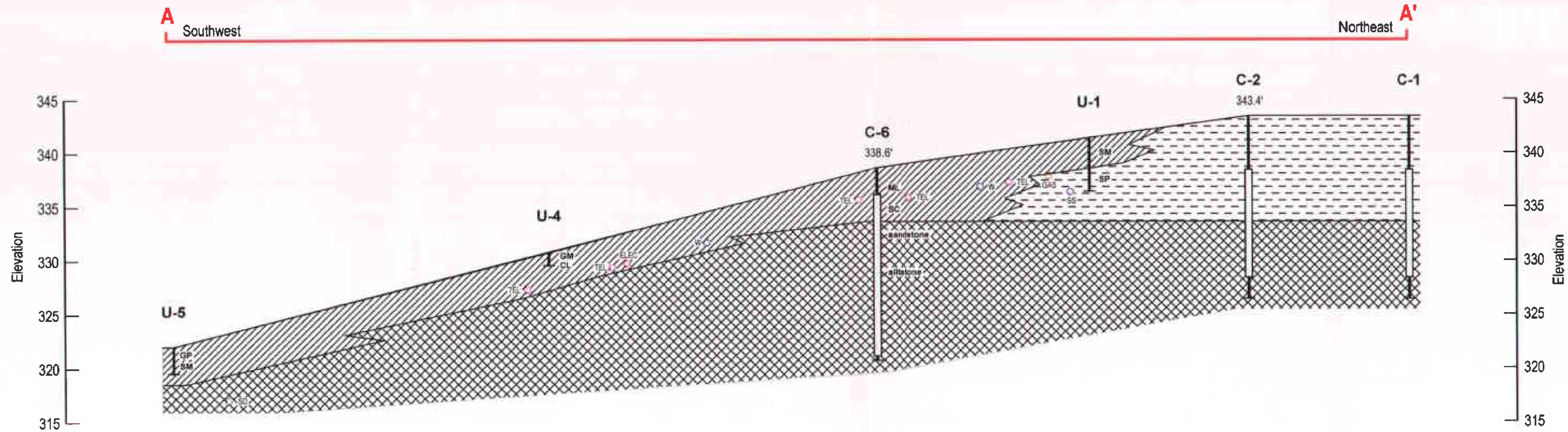

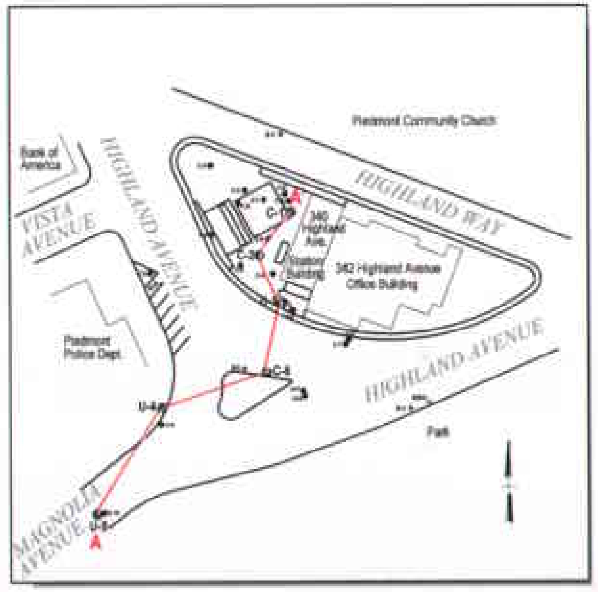

EXPLANATION

= High Permeability Soils
SP
SW
GP

= Low to Moderate Permeability Soils
GM SM
ML SW
SC CL

= Bedrock
Sandstone
Siltstone

Well ID — Well Designation
Elev. — Top of Casing Elevation
Groundwater Monitoring Well
Well Screen Interval
Bottom of boring

Scale (ft)
10
0
30

FIGURE
3a

Geologic Cross Section A-A'

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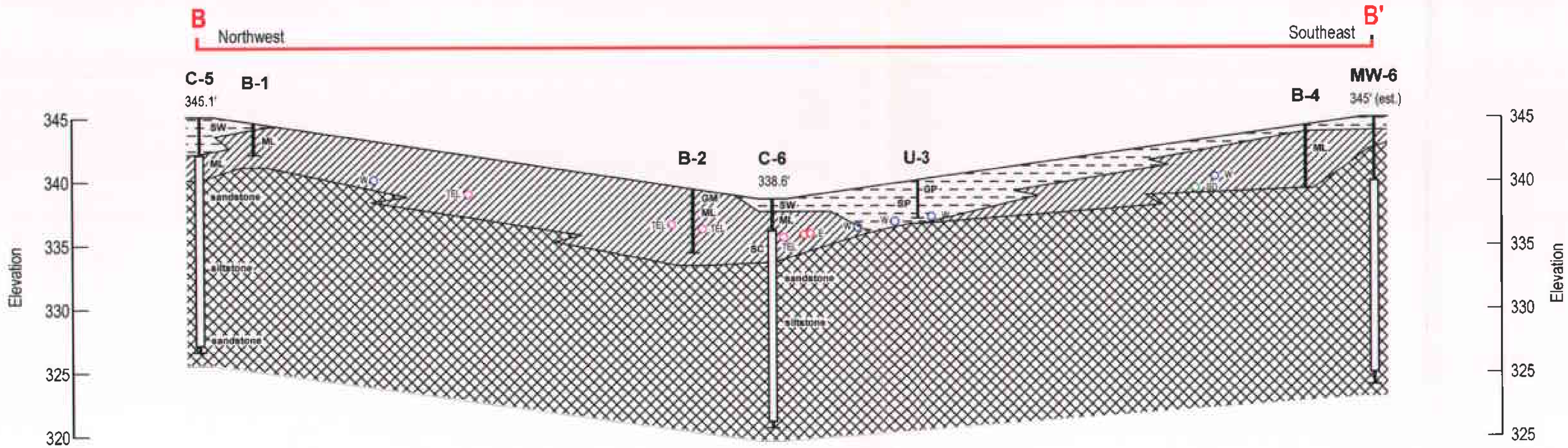

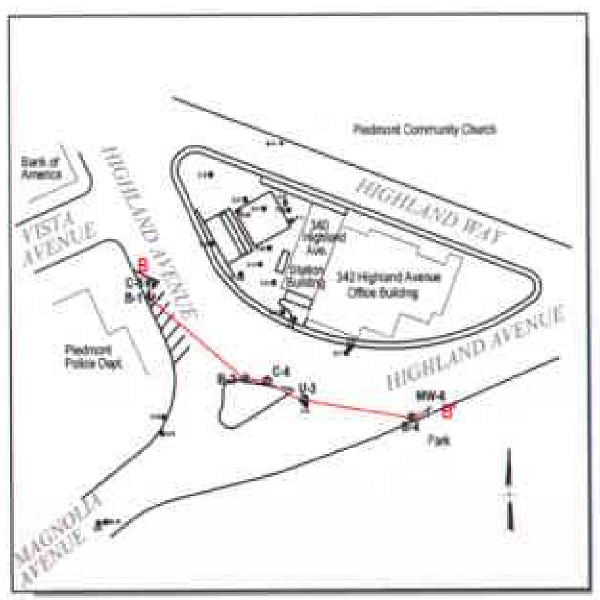

EXPLANATION

= High Permeability Soils
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Sandstone
Siltstone

Well ID — Well Designation
Elev. —— Top of Casing Elevation

Groundwater Monitoring Well

Well Screen Interval

Bottom of boring

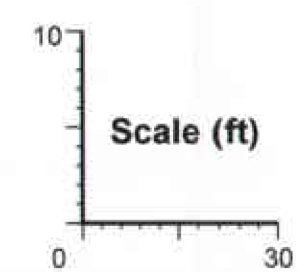

FIGURE
3b

Geologic Cross Section B-B'

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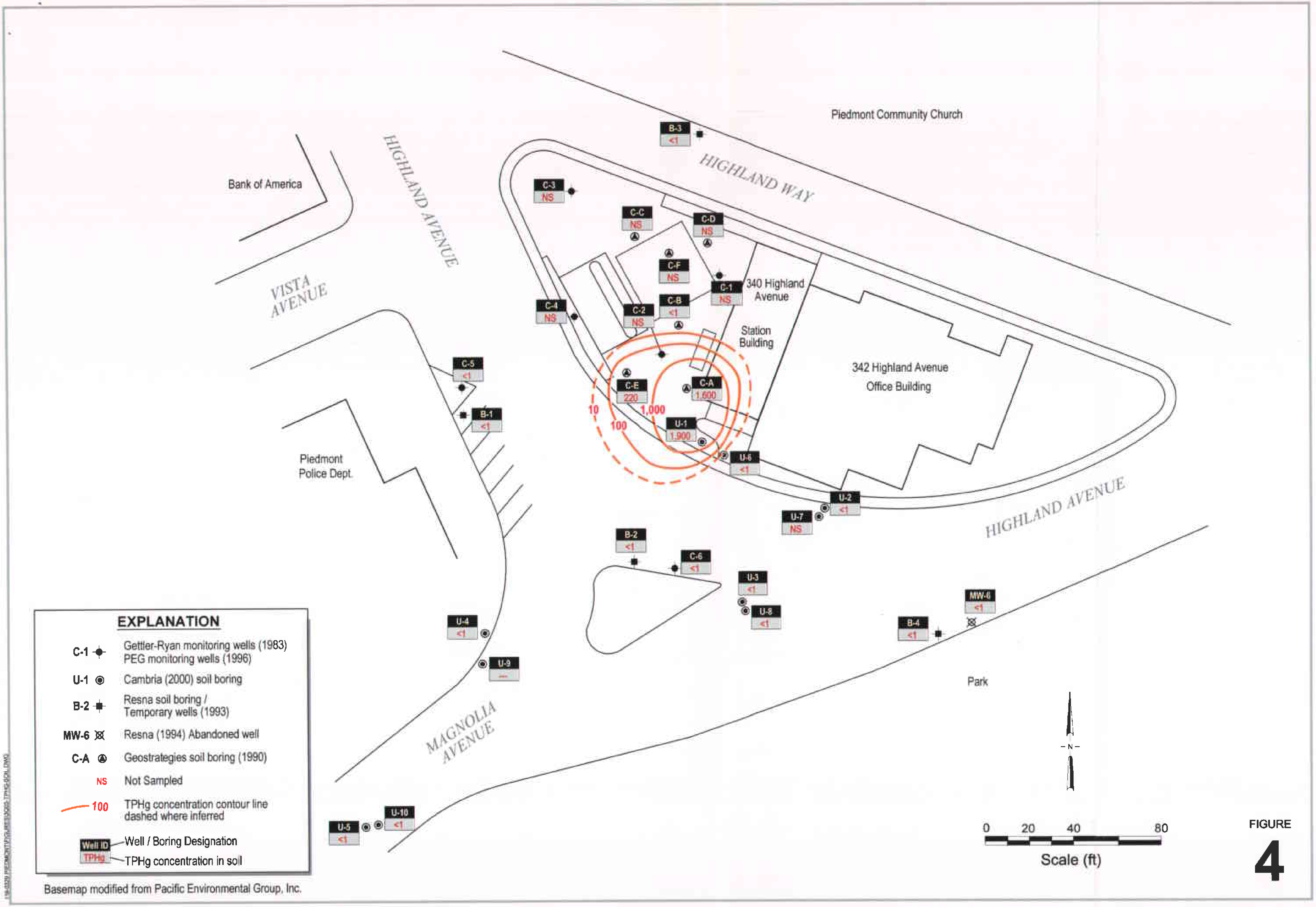

FIGURE 4

TPHg Concentrations in Soil

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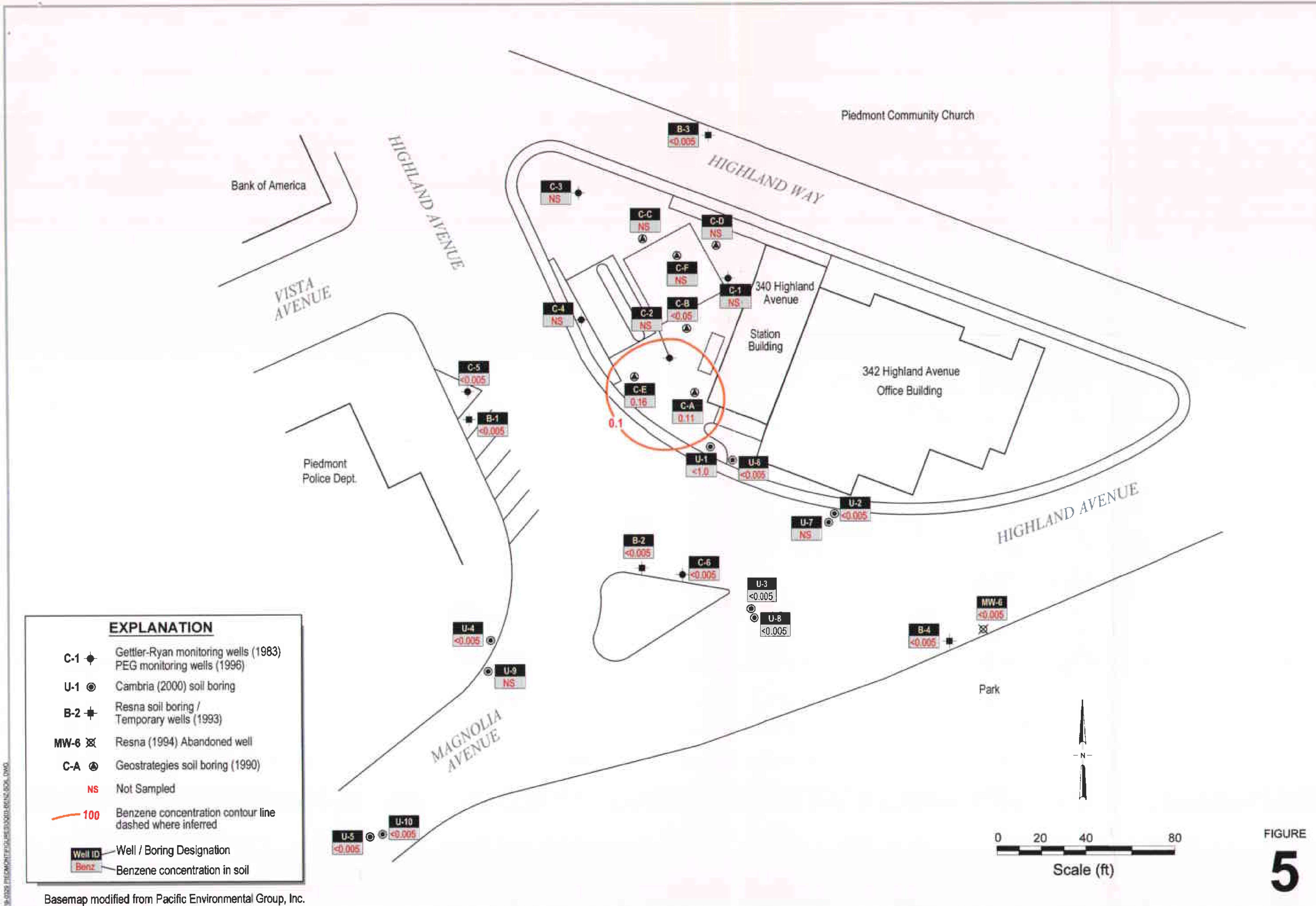

FIGURE 5

Benzene Concentrations in Soil

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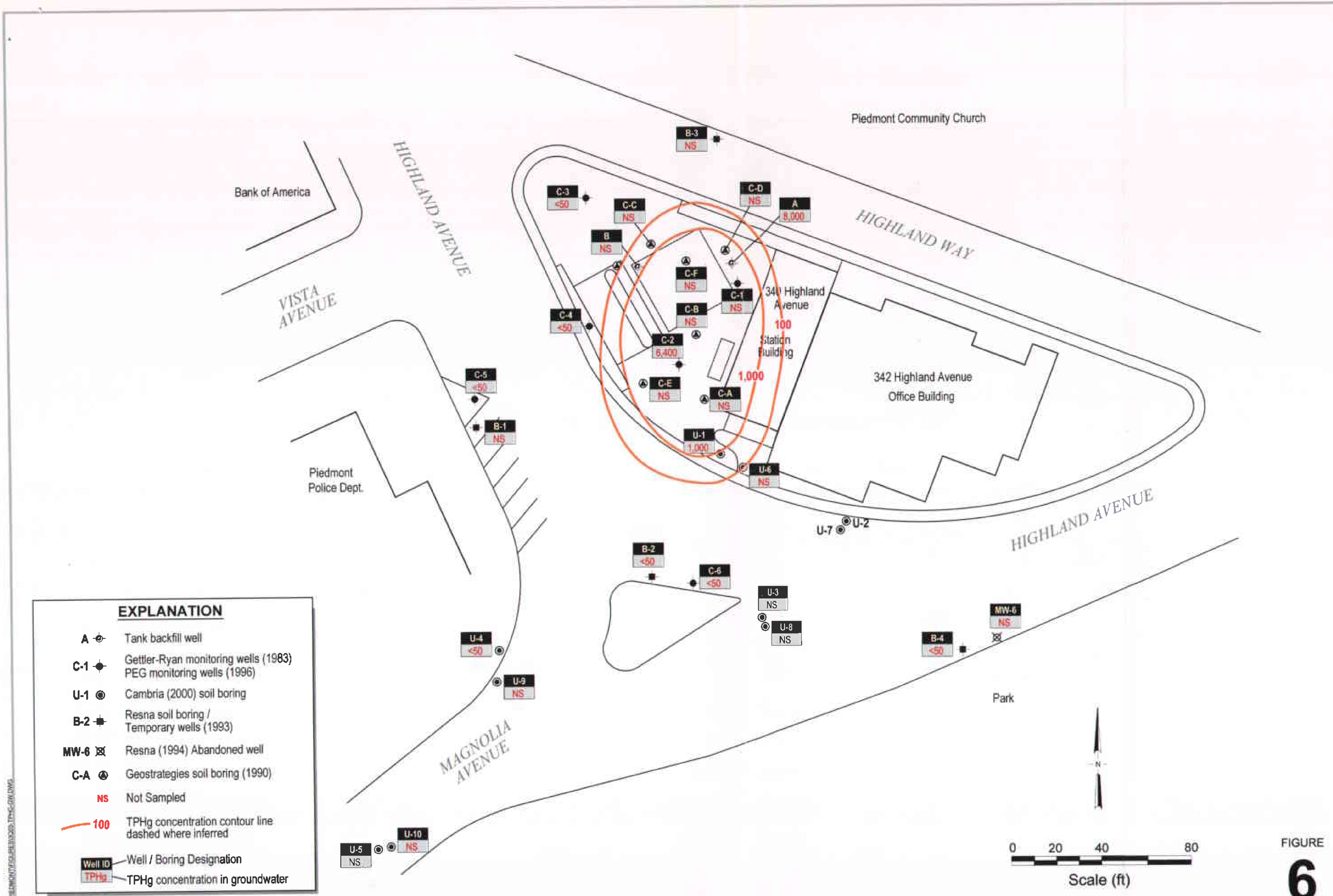

Basemap modified from Pacific Environmental Group, Inc.

FIGURE 6

TPHg Concentrations in Groundwater

August 18, 2003

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Piedmont, California

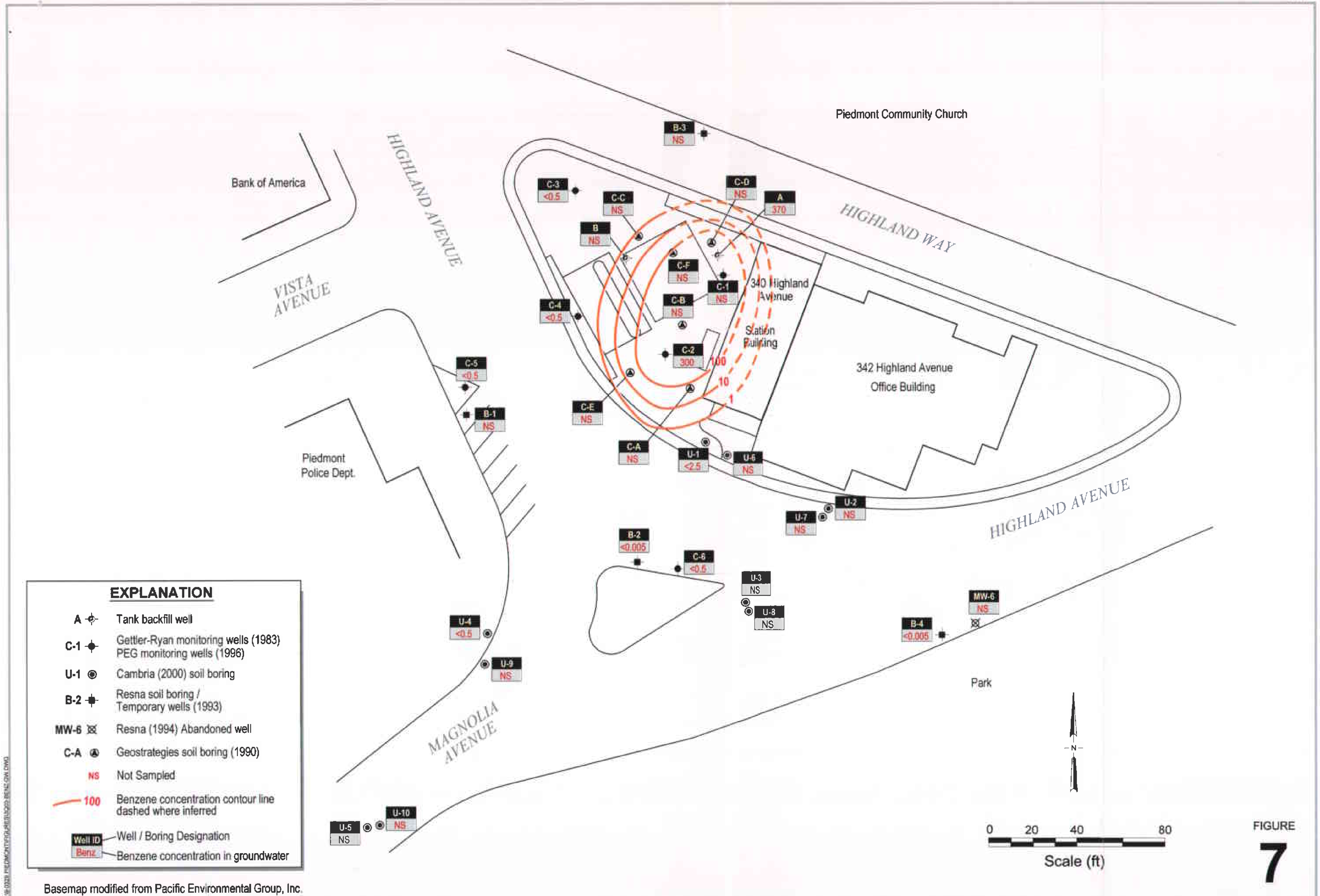

FIGURE 7

Benzene Concentrations in Groundwater

August 18, 2003

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Piedmont, California

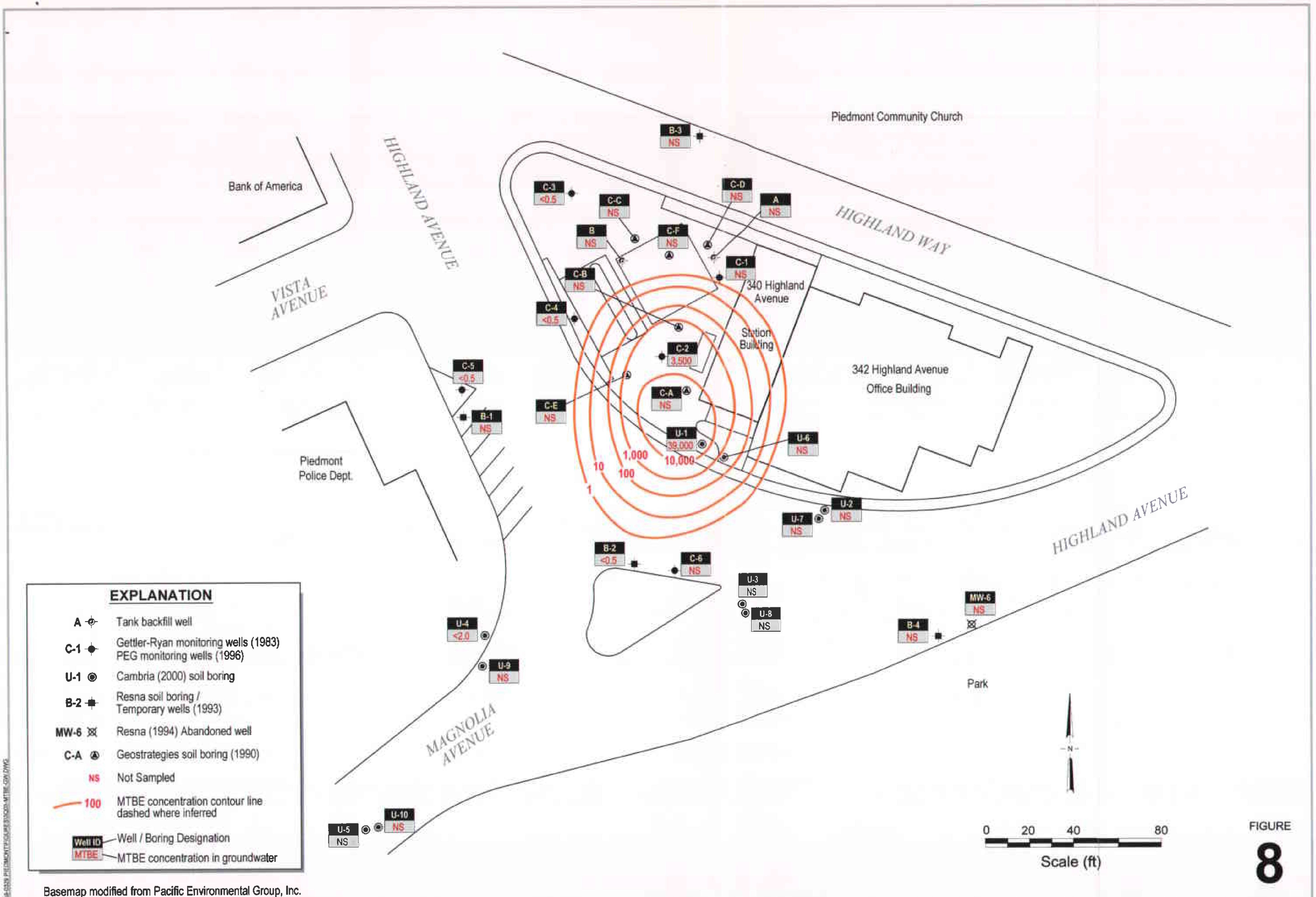

FIGURE 8

Former Chevron Station 9-0329

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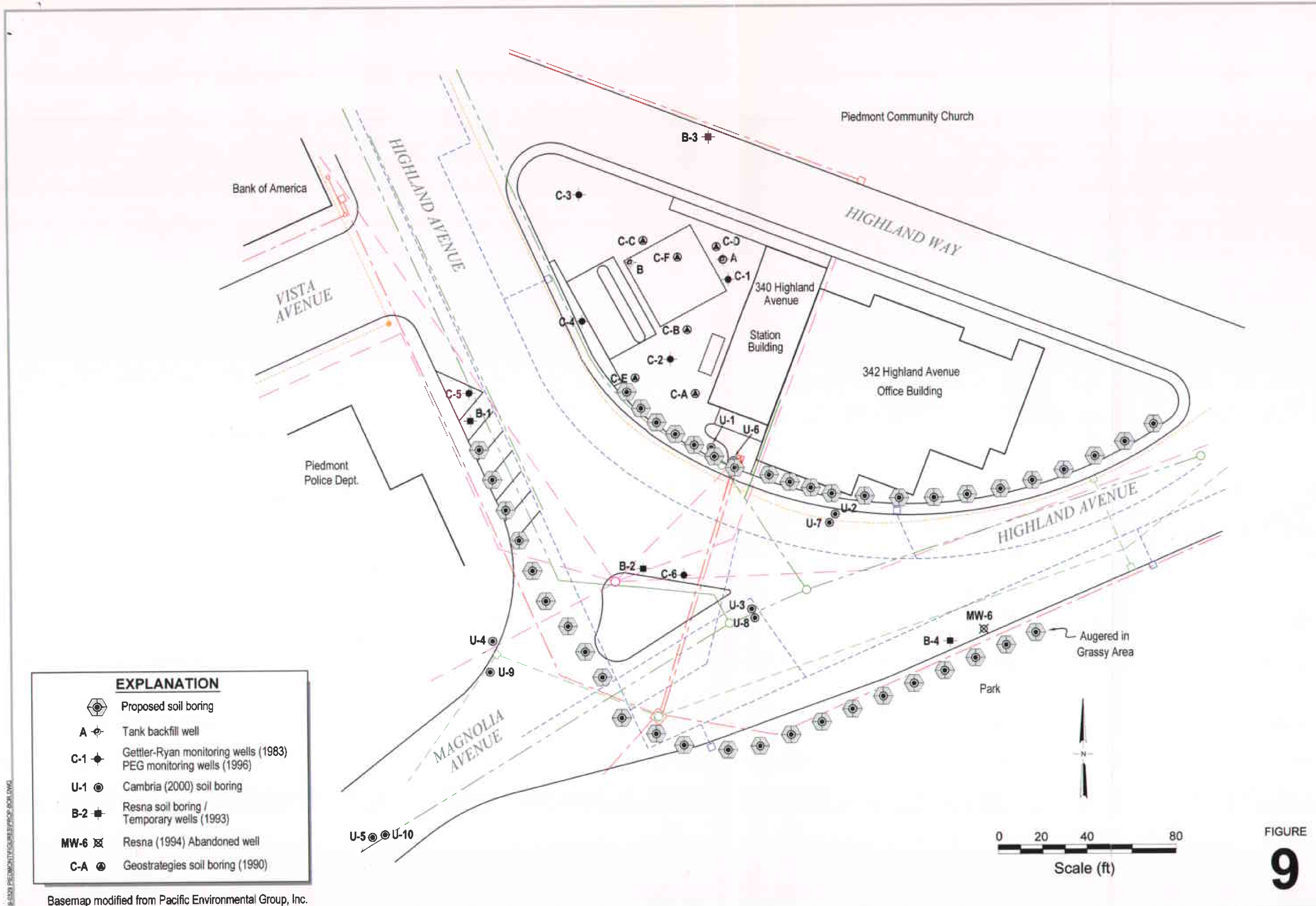
MTBE Concentrations in Groundwater

August 18, 2003



FIGURE

9

Proposed Soil Boring Locations

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Former Chevron Station 9-0329

340 Highland Avenue

Piedmont, California

ATTACHMENT A

STANDARD FIELD PROCEDURES FOR HAND-AUGER SOIL BORINGS

This document describes Cambria Environmental Technology's standard field methods for drilling and sampling soil borings using a hand-auger. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor odor or staining, estimate ground water depth and quality and to submit samples for chemical analysis.

Soil Classification/Logging

All soil samples are classified according to the Unified Soil Classification System by a trained geologist or engineer working under the supervision of a California Registered Geologist (RG) or a Certified Engineering Geologist (CEG). The following soil properties are noted for each soil sample:

- Principal and secondary grain size category (i.e. sand, silt, clay or gravel)
- Approximate percentage of each grain size category,
- Color,
- Approximate water or product saturation percentage,
- Observed odor and/or discoloration,
- Other significant observations (i.e. cementation, presence of marker horizons, mineralogy), and
- Estimated permeability.

Soil Boring and Sampling

Hand-auger borings are typically drilled using a hand-held bucket auger to remove soil to the desired sampling depth. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments beyond the bottom of the augered hole. The vertical location of each soil sample is determined using a tape measure. All sample depths use the ground surface immediately adjacent to the boring as a datum. The horizontal location of each boring is measured in the field from an onsite permanent reference using a measuring wheel or tape measure.

Augering and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Storage, Handling and Transport

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

ATTACHMENT A

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- Approximate percentage of each grain size category,
- Color,
- Approximate water or product saturation percentage,
- Observed odor and/or discoloration,
- Other significant observations (i.e. cementation, presence of marker horizons, mineralogy), and
- Estimated permeability.

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or hydraulic push technologies. Prior to drilling, the first 8 ft of the boring are cleared using an air or water knife and vacuum extraction. This minimizes the potential for impacting utilities.

At least one and one half ft of the soil column is collected for every five ft of drilled depth. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments beyond the bottom of the borehole. The vertical location of each soil sample is determined by measuring the distance from the middle of the soil sample tube to the end of the drive rod used to advance the split barrel sampler. All sample depths use the ground surface immediately adjacent to the boring as a datum. The horizontal location of each boring is measured in the field from an onsite permanent reference using a measuring wheel or tape measure.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Storage, Handling and Transport

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4oC on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. PID measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Water Sampling

Water samples, if they are collected from the boring, are either collected using a driven Hydropunch type sampler or are collected from the open borehole using bailers. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4oC, and transported under chain-of-custody to the laboratory.

Duplicates and Blanks

Blind duplicate water samples are collected usually collected only for monitoring well sampling programs, at a rate of one blind sample for every 10 wells sampled. Laboratory-supplied trip blanks accompany samples collected for all sampling programs to check for cross-contamination caused by sample handling and transport. These trip blanks are analyzed if the internal laboratory QA/QC blanks contain the suspected field contaminants. An equipment blank may also be analyzed if non-dedicated sampling equipment is used.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

Waste Handling and Disposal

Soil cuttings from drilling activities are usually stockpiled onsite on top of and covered by plastic sheeting. At least four individual soil samples are collected from the stockpiles for later compositing at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples. Soil cuttings are transported by licensed waste haulers and disposed in secure, licensed facilities based on the composite analytic results.

Ground water removed during sampling and/or rinsate generated during decontamination procedures are stored onsite in sealed 55 gallon drums. Each drum is labeled with the drum number, date of generation, suspected contents, generator identification and consultant contact. Disposal of the water is based on the analytic results for the well samples. The water is either pumped out using a vacuum truck for transport to a licensed waste treatment/disposal facility or the individual drums are picked up and transported to the waste facility where the drum contents are removed and appropriately disposed.

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