RO-346

ENVIRONMENTAL ENGINEERING, INC
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March 9, 2004

Ms. Eva Chu
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Subject: Chevron Gasoline Service Station
Site Address: 3519 Castro Valley Boulevard, Castro Valley, CA

Dear Ms. Chu:

As you requested in your letter of January 23, 2004, enclosed for your review is a copy of SOMA's "Workplan for Monitoring Well Installation" at the subject site location.

Thank you for your time in reviewing our report. If you have any questions or comments, please call me at (925) 244-6600.

Sincerely,

Mansour Sepehr, Ph.D.,PE
Principal Hydrogeologist

Enclosure

cc: Mr. Mirazim Shakoori w/enclosure

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WORKPLAN FOR
MONITORING WELL INSTALLATION

CHEVRON GASOLINE SERVICE STATION
3519 Castro Valley Boulevard
Castro Valley, California

March 8, 2004

Project 2760

Prepared for

Mr. Azim Shakoori
3519 Castro Valley Boulevard
Castro Valley, California 94930

Prepared by

SOMA Environmental Engineering, Inc.
2680 Bishop Drive, Suite 203
San Ramon, California 94583

Certification

This report has been prepared by SOMA Environmental Engineering, Inc. on behalf of Mr. Azim Shakoori, the property owner of 3519 Castro Valley Boulevard, Castro Valley, California to comply with the Alameda County Health Care Services' request letter, dated January 23, 2004.

Mansour Sepehr, Ph.D., P.E.
Principal Hydrogeologist

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1.0 Introduction

This workplan has been prepared by SOMA Environmental Engineering, Inc. (SOMA) on behalf of Mr. Azim Shakoori, the property owner. As shown in Figure 1, the subject property is located at 3519 Castro Valley Boulevard, Castro Valley, California (the "Site").

The Site is an active Chevron station located within in a mixed commercial/residential area of Castro Valley, California. The Site is situated on the southeast corner of Castro Valley Boulevard and Redwood Road. The elevation of the subject property is approximately 178 feet above mean sea level, and the topography slopes gently to the south. Recent remedial work at the Site included removing three single-walled fiberglass USTs with volumes of 6,000, 8,000, and 10,000 gallons and a waste oil tank with a volume of 1,000 gallons. Two large USTs were installed in the northwest portion of the Site to replace the smaller tanks.

The previous consultant, URS Corporation, provided relevant project documents with a Site Background and Document Transfer letter, dated July 14, 2003. The following section is based on information provided in that letter.

1.1 Previous Activities

There were no UST-related documents available to SOMA dated before 1984. A former dispenser island reportedly existed on the west side of the Site, however, there was no available information on the date of the dispenser's removal.

Prior to 1989, the Site was a Mobil service station. In 1984, three single-walled fiberglass gasoline USTs with capacities of 6,000, 8,000 and 10,000 gallons were installed in the southeast portion of the Site. In 1988, a 1,000-gallon double-

walled waste oil tank (WOT) was also installed to replace a 380-gallon single-walled steel WOT. In September 1988, Kaprealian Engineering, Inc. (KEI) removed the original 380-gallon WOT and observed holes in this UST. Confirmation soil samples from the bottom of the excavation, at 8.5 feet below ground surface (bgs), contained benzene at 6.8 micrograms per kilogram (ug/Kg or parts per billion) and toluene at 9.5 ug/Kg. Lab analysis detected no total petroleum hydrocarbons (TPH) or total oil and grease (TOG). In March 1989, an Unauthorized Release Report (URR) was submitted to the Alameda County Health Care Services (ACHCS).

In 1989, the subject property was transferred from Mobil to British Petroleum (BP). In March 1994, the subject property was transferred to Mr. Azim Shakoori who operated the Site as a Chevron station. In September 2003, W.A. Craig performed a tank closure and replacement at the Site. SOMA was retained by Mr. Shakoori to oversee the environmental and geotechnical aspects of the tank replacement. During the closure of the former tank pit, which was located in the southeast portion of the Site, free product was encountered at the top of watertable of the former UST pit. The free product was pumped off the watertable surface and temporarily stored before it was removed from the Site as hazardous waste. After removing the free product, groundwater samples were collected and analyzed. The groundwater analytical results indicated the presence of total petroleum hydrocarbons as gasoline (TPH-g) at 1,300 ug/L, benzene at 110 ug/L, and Methyl tertiary Butyl Ether (MtBE) at 14,000 ug/L.

Confirmation soil analytical results for the former tank pit indicated that the most contaminated sidewall of the gasoline UST pit was on the downgradient (south) side. The south sidewall sample contained TPH-g at 17,000 ug/Kg and MtBE at 71 ug/Kg. In the other sidewall samples, the lab reported these constituents of concern at near trace levels or did not detect these compounds above laboratory reporting limits.

1.2 Previous Investigations

Preparation of this workplan involved reviewing investigations for the subject Site and off-site investigations performed for the neighboring Xtra Oil (former Shell) gas station at 3495 Castro Valley Boulevard. Due to the apparently complex hydrogeologic conditions, the ACHCS strongly recommended reviewing the file for this off-site property to assure that the off-site wells for 3519 Castro Valley Boulevard would be constructed to monitor potentially perched groundwater.

Site Investigations

In September and October 1992, Environmental Science & Engineering, Inc. (ESE) drilled five soil boreholes and converted the boreholes into monitoring wells (ESE-1 through ESE-5) that ranged in depth from approximately 23 to 30 feet bgs. The maximum level of soil contamination was detected in monitoring well borehole ESE-5 at a depth of 10.5 feet bgs with 220,000 ug/Kg TPH-g, 1,400 ug/Kg benzene, 8,200 ug/Kg toluene, 3,300 ug/Kg ethylbenzene, and 18,000 ug/Kg xylenes. ESE encountered petroleum hydrocarbon contaminants in all the monitoring wells with maximum levels detected in ESE-1, which is located west of and adjacent to the three USTs. This well contained TPH-g at 2,300 ug/L, benzene at 370 ug/L, toluene at 160 ug/L, ethylbenzene at 17 ug/L, and xylenes at 110 ug/L. A URR for this documented release was submitted to the ACHCS in March 1993.

In December 1994, ACC Environmental Consultants, Inc. (ACC) conducted an investigation along the western edge of the property for the Redwood Boulevard road-widening project. ACC drilled five boreholes to a maximum depth of 10 feet bgs. The maximum level of petroleum hydrocarbon contaminants detected in the road-widening boreholes was 59,000 ug/Kg TPH-g, 5,890 ug/Kg benzene, 220,000 ug/Kg ethylbenzene, and 540,000 ug/Kg xylenes.

In July 1995, Alisto Engineering (AE) installed three additional monitoring wells.

AE installed two of the wells, MW-6 and MW-8, on the Site and the third well, MW-7, on the adjacent property southeast of the Site. In February and March 1996, AE also advanced several hand-auger boreholes in the vicinity of the former western pump island and product lines. The boreholes were hand-augered to a maximum depth of 8.5 feet bgs. AE reported that petroleum hydrocarbon contamination increased with depth and the highest concentration was encountered at the capillary fringe. It was concluded that a dissolved phase plume migrated from an upgradient source. In the following month, April 1996, AE decommissioned well MW-8 on the western margin of the Site to accommodate the road-widening project along Redwood Boulevard.

In December 2003, SOMA conducted an off-site soil and groundwater investigation to delineate the horizontal and vertical extent of the off-site MtBE plume. The investigation confirmed the existence of an off-site petroleum hydrocarbon plume that may have originated from the Site. As shown in Figure 2, trace levels of petroleum hydrocarbons were encountered four of the five boreholes with the notable exception of TWB-5, where TPH-g was detected at a concentration of 32,000 ug/L. In off-site boreholes TWB-1 through TWB-4, first encountered groundwater was noted at 20 to 28 feet bgs, which often is just above or at a saturated silty sand/sandy silt layer - consistent with the on-site well borehole logs prepared by ESE. Due to the presence of at least one distinct water-bearing zone in the on- and off-site areas, SOMA recommended installing off-site groundwater monitoring wells to evaluate and monitor the extent of the groundwater plumes. The results will help verify the groundwater flow direction and determine the stability of the chemical plumes.

During the UST removal and soil excavation activities in September 2003, two of the on-site groundwater monitoring wells, namely ESE-3 and ESE-4, were decommissioned by SOMA. SOMA proposed re-installing two on-site monitoring wells near these decommissioned wells for future monitoring as well as

determining plume stability in the groundwater.

Investigations for Xtra Oil Site

At the adjacent Xtra Oil (former Shell) gas station at 3495 Castro Valley Boulevard, periodic southward groundwater flows prompted the ACHCS to require off-site investigations for that property. P&D Environmental performed the investigations and they were documented in four off-site investigation reports dated, April 28, 1994, January 5, 1996, June 28, 2000, and August 23, 2001. The June 2000 report documented the presence of plumes extending from the former Shell station to the southwest and to the southeast across Redwood Road. In hand-augered borehole P24, which is located in a planter box fronting a commercial property located two lots south of the Site and on the east side of Redwood Road, the investigation confirmed the presence of TPH-g at 36,000 ug/L. This concentration compares closely with the TPH-g level of 32,000 ug/L detected in SOMA's off-site borehole TWB-5. It appears that this borehole intercepted the off-site plume extending from the former Shell station. Appendix A presents P&D's map of the TPH-g iso-concentration contours and the individual borehole detections.

In the ten shallow hand-augered boreholes advanced by P&D, first encountered groundwater was noted at approximate depths of 3 to 13 feet bgs with most of the occurrences noted above 10 feet bgs. In most of the 14 boreholes advanced with a direct-push technology (DPT) drilling rig, however, the August 2001 P&D report documented first encountered groundwater between 20 and 22 feet bgs, which, at this depth, is usually associated with a saturated sand/silt layer.

1.3 Quarterly Monitoring

Since 1992, quarterly monitoring has been conducted at the Site. In 1999, the

sampling schedule was modified to include semi-annual sampling of ESE-5 and ESE-7. Prior to SOMA, URS Corporation, Cambria Environmental Technology, Inc., Blaine Technical Services, AE, and ESE conducted these monitoring and sampling events.

Based on joint monitoring events with the adjacent former Shell station to the west, the groundwater flow direction varied from north/northwest to south/southeast and primarily to the northeast. However, at least fourteen quarterly monitoring events between 1990 and 2004 documented that groundwater has also been flowing to the east/southeast and occasionally to the southwest and south/southeast.

Based on monitoring events at the Site, since the cessation of joint monitoring, the groundwater flow direction has usually been to the south and east. For the last four years, MtBE has been detected in off-site well MW-7 at 95 to 4,400 ug/L and most of these detections were above 1,000 ug/L. With consistent on-site groundwater flow to the southeast/south, SOMA concluded that contaminated groundwater has been migrating off-site towards the adjacent commercial property located south of the Site.

2.0 Scope of Work

In a letter dated January 23, 2004, the ACHCS requested a workplan for installing off-site wells. The letter mentioned that the anomalously high contaminant levels in off-site borehole TWB-5 may have originated from 3495 Castro Valley Boulevard. Due to apparently complex hydrogeology with possible perched groundwater, the ACHCS also strongly recommend a thorough file review of site investigation reports for adjacent sites. The letter also suggested that replacement wells for ESE-3 and ESE-4 may not be needed. SOMA personnel conducted a thorough file review on the nearby Xtra Oil (Former Shell)

gas station at 3495 Castro Valley Boulevard – the nearest active gas station within the Site's vicinity. The results of this file review are documented in Section 1.2.

In response to the ACHCS's request letter, dated January 23, 2004, the proposed work has been summarized into the following tasks:

Task 1: Field Preparation: Permit Acquisition, Site Health and Safety Plan, and Utility Clearance
Task 2: Drilling and Installation of Monitoring Wells
Task 3: Laboratory Analysis
Task 4: Development and Surveying of Monitoring Wells
Task 5: Report Preparation

The following is a brief description of the above tasks.

2.1 Field Preparation: Permit Acquisition, Site Health and Safety Plan, and Utility Clearance

Prior to installing groundwater monitoring wells, SOMA will obtain the necessary permits from the Alameda County Public Works Agency (ACPWA) before fieldwork begins. Prior to commencing field activities, SOMA will also prepare a site-specific health and safety plan (HASP). The HASP is designed to address safety provisions during field activities. The plan provides procedures to protect the field crew from physical and chemical hazards resulting from drilling, well installation, and groundwater monitoring and sampling. The HASP establishes personnel responsibilities, general safe work practices, field procedures, personal protective equipment standards, decontamination procedures, and emergency action plans. To protect the field crew from underground utility hazards, SOMA will call Underground Service Alert (USA) and interface with the utility companies to clear the proposed drilling locations.

2.2 Drilling and Installation of Monitoring Wells

As shown in Figure 2, SOMA proposes installing one on-site and three off-site groundwater monitoring wells. In the letter of workplan request dated January 23, 2004, the ACHCS mentioned a well screen from 10 to 15 feet bgs based on observations of apparently perched groundwater entering excavations between these depths. However, ESE logs for the nearest existing and former wells indicate the presence of damp soils overlying a saturated silty sand layer at 18 to 26 feet bgs (ESE-1) and 23 to 28 feet bgs (ESE-2). First groundwater was encountered near the top of the saturated zones. In continuously sampled DPT boreholes adjacent to and near the Site, SOMA and P&D observed a similar lithologic sequence and range of first encountered groundwater.

In accordance with the intent of the ACHCS's letter of workplan request, dated January 23, 2004, shallow monitoring well boreholes will be drilled in the on-site and off-site areas shown in Figure 3. The on- and off-site wells will be drilled with a hollow-stem auger drilling rig. To determine if an active perched water-bearing zone exists, shallow boreholes will be drilled to approximately 15 feet bgs and will remain open for at least several hours. During this waiting period, augers will be left in the borehole to temporarily case the upper 10 feet of the hole. If groundwater enters the shallow boreholes, a well will be constructed and screened from approximately 10 to 15 feet bgs. If very little or no groundwater enters the shallow borehole, the borehole will be deepened to approximately 25 to 30 feet bgs and screened over the observed water-bearing zone.

To verify the complete borehole lithology and identify the vertical interval of the water-bearing zones, the monitoring well boreholes will be continuously sampled with an unlined sampler. Observing a continuous sequence of sediment cores, SOMA's field geologist will continuously log the boreholes. Based on field observations of the first encountered groundwater and associated water-bearing zones, the wells will be screened to discretely span only the water-bearing zones

and not extend beyond the upper and lower boundaries of the water-bearing units.

The monitoring wells will be cased with new 2-inch diameter threaded schedule 40 PVC pipe, fitted with a factory-slotted screen perforated with 0.01-inch wide slots. A PVC cap will be fastened to the bottom of the casing without glue or other potentially cross-contaminating materials. After setting the casing inside the borehole, kiln-dried 2/12 sand will be poured into the annular space to fill from the bottom of the borehole to at least one-foot above the perforated interval. A one-foot thick bentonite plug will be placed above this filter material to prevent grout from infiltrating down into the filter material. Approximately one to two gallons of distilled water will be added to hydrate the bentonite pellets. The wells will be sealed from the top of the bentonite seal to one-foot below surface grade with neat cement containing about 5% bentonite. To protect the well from vandalism and surface water contamination, a well box will be installed into a concrete foundation emplaced around the wellhead.

2.3 Laboratory Analysis

In the quarterly monitoring event following the proposed installation, groundwater samples will be collected from the wells along with the existing on-site monitoring wells. A state-certified laboratory will analyze the groundwater samples for total petroleum hydrocarbons as diesel (TPH-d), TPH-g, benzene, toluene, ethylbenzene, and total xylenes (BTEX), and MtBE using EPA Methods 8020 and 8015 Modified followed by 8260B for confirming the presence of MtBE. The lab will also analyze the samples for gasoline oxygenates and lead scavengers using EPA Method 8260.

2.4 Development and Surveying of Monitoring Wells

SOMA will develop the monitoring wells by bailing sediment-rich groundwater until groundwater has clarified enough to pump and surge the wells. The

pumping and surging will continue until the purged groundwater clarifies substantially and groundwater quality parameters have stabilized.

After installing the monitoring wells, a licensed surveyor will horizontally and vertically survey all of the existing and newly installed wells.

2.5 Report Preparation

A technical report will be prepared to document the installation of groundwater monitoring wells and utility trench sampling. The technical report will include tables, figures, appendices, and a detailed description of the investigative procedures.

3.0 References

Mobil Oil Corp., August 29, 1984, "Monitoring Plan: Alameda County"

Kaprealian Engineering, Inc., October 17, 1988, "Soil Sampling Report, 3519 Castro Valley Blvd., Castro Valley, California".

Unauthorized Release Report, March 1989

Environmental Science & Engineering Inc., October 30, 1992, "Workplan for Preliminary Site Assessment, 3519 Castro Valley Blvd., Castro Valley, California".

Environmental Science & Engineering Inc., November 23, 1992, "Preliminary Site Assessment Report, 3519 Castro Valley Blvd., Castro Valley, California".

Unauthorized Release Report, March 1993

Alisto Engineering Group, June 3, 1994, "Workplan for Supplemental Site Investigation, 3519 Castro Valley Blvd., Castro Valley, California".

ACC Environmental Consultants, December 1994, "Summary Results Redwood Road Expansion, 3519 Castro Valley Blvd., Castro Valley, California".

Alisto Engineering Group, February 24, 1995, "Expanded Site Plan, 3519 Castro Valley Blvd., Castro Valley, California".

Alisto Engineering Group, May 1, 1996, "Groundwater Monitoring Well Destruction Report, 3519 Castro Valley Blvd., Castro Valley, California".

Unauthorized release report, May 2, 2000

URS Corp., April 4, 2003 "First Quarter Monitoring Report, 3519 Castro Valley Blvd., Castro Valley, California".

URS Corp., July 18, 2003, "Second Quarter Monitoring Report, 3519 Castro Valley Blvd., Castro Valley, California".

SOMA Environmental Engineering, Inc., October 14, 2003. "Third Quarter 2003 Groundwater Monitoring Report, Castro Valley Gasoline Service Station, 3519 Castro Valley Blvd., Castro Valley, California".

SOMA Environmental Engineering, Inc., November 13, 2003. "'Tank Closure and

Replacement Report, Castro Valley Gasoline Service Station, 3519 Castro Valley Blvd., Castro Valley, California".

SOMA Environmental Engineering, Inc., December 29, 2003. "Off-Site Soil and Groundwater Investigation, Castro Valley Gasoline Service Station, 3519 Castro Valley Blvd., Castro Valley, California".

Figures

Figure 1: Site vicinity map.

SOMA
ENVIRONMENTAL ENGINEERING, INC.

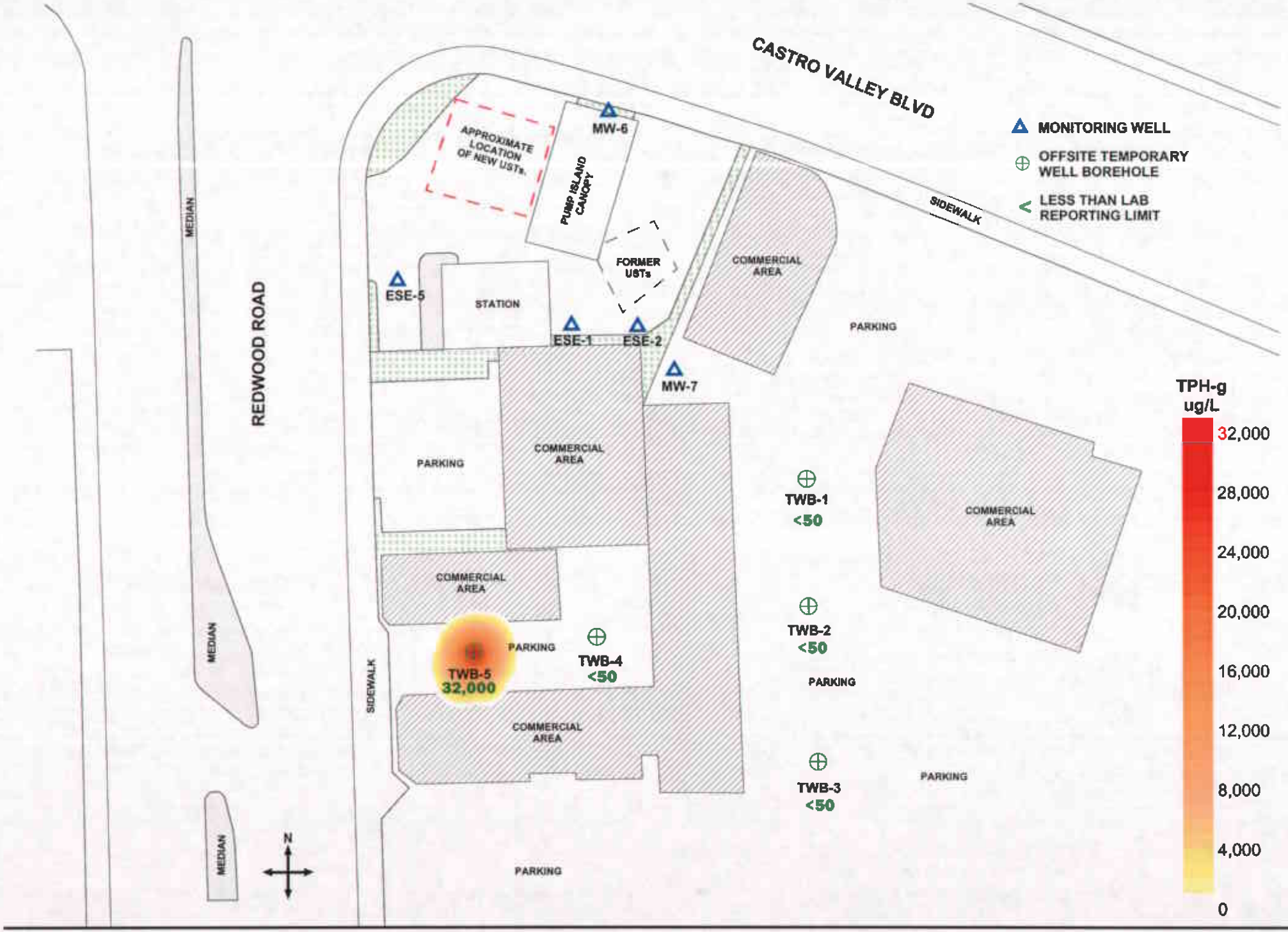


Figure 2: Contour map showing TPH-g concentrations in the groundwater.
December 2, 2003.

SOMA ENVIRONMENTAL ENGINEERING, INC.

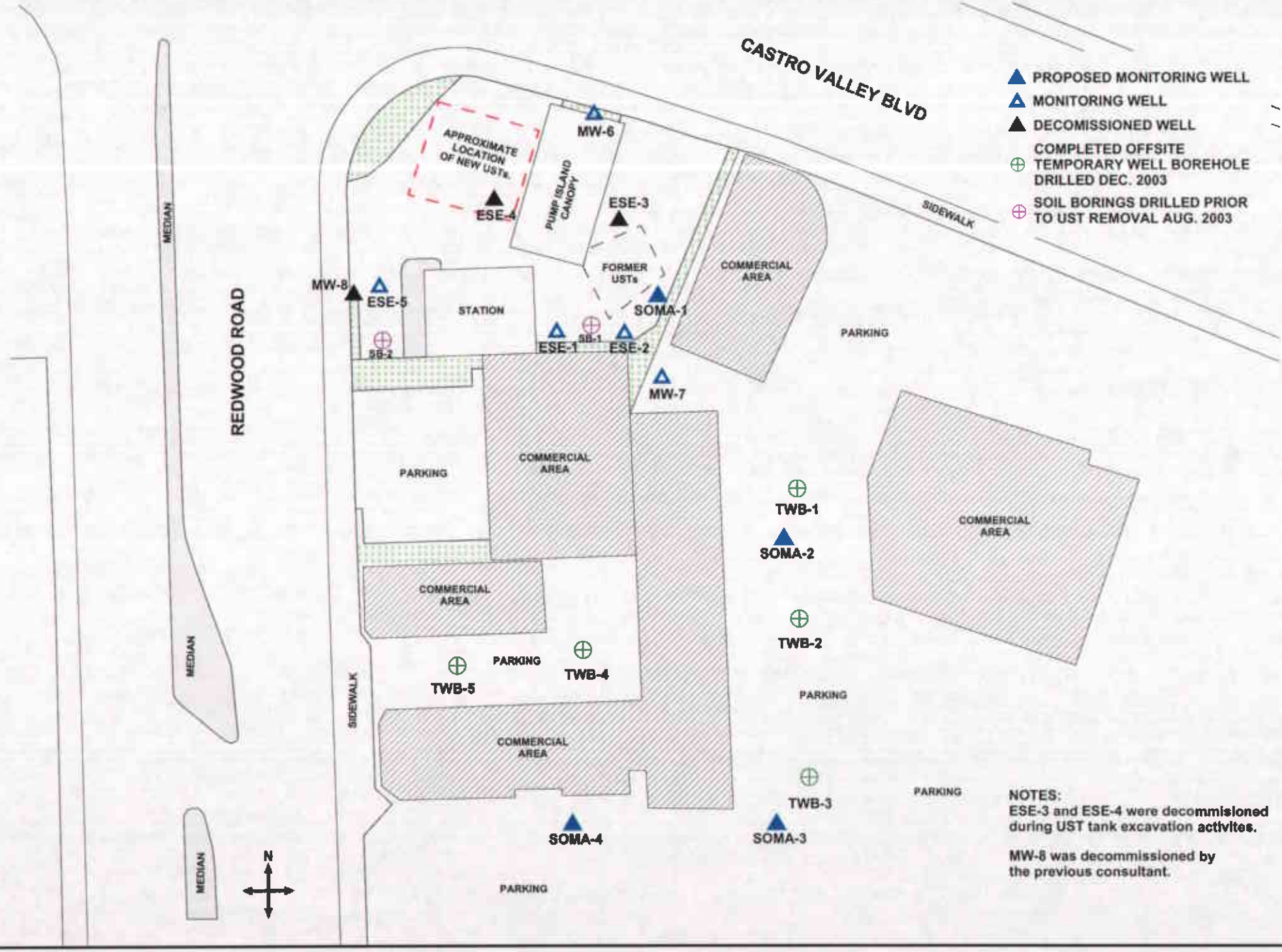


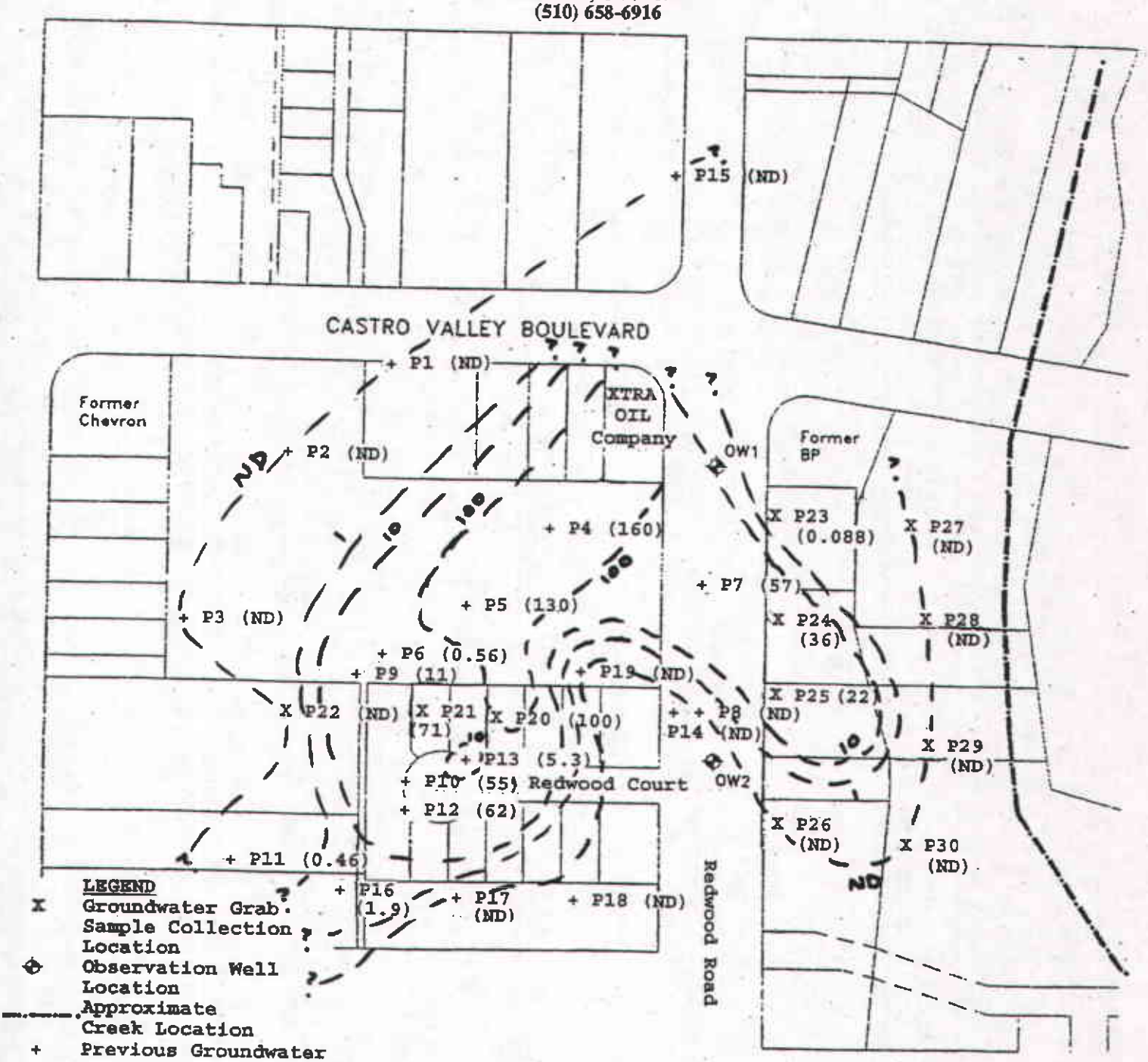
Figure 3: Site map showing locations of existing monitoring wells, decomissioned wells, offsite temporary well boreholes, and proposed monitoring wells.

SOMA ENVIRONMENTAL ENGINEERING, INC.

Appendix A

Site Vicinity Map Showing TPH-g Iso-concentration Contours from P&D's Off-Site Investigation

P & D Environmental
A Division of Paul H. King, Inc.
4020 Panama Court
Oakland, CA 94611
(510) 658-6916



LEGEND

- X — Groundwater Grab Sample Collection Location
- ⊕ — Observation Well Location
- Approximate Creek Location
- \+ — Previous Groundwater Quality Investigation Sample Collection Location
- (5) — TPH-Gasoline Concentration in Groundwater in ppm
- TPH-Gasoline Groundwater Isoconcentration Contour

Base Map From:
Castro Valley Sanitation District
Undated

0 100 200
SCALE IN FEET

North

Figure 3
SITE VICINITY MAP SHOWING TPH-GASOLINE ISO-CONCENTRATION CONTOURS
XTRA OIL Company
3495 Castro Valley Blvd.
Castro Valley, CA