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Alameda County
Environmental Health

Stacie H. Frerichs
Team Lead
Marketing Business Unit

Chevron Environmental Management Company
6001 Bollinger Canyon Road
San Ramon, CA 94583
Tel (925) 842-9655
Fax (925) 842-8370

March 24, 2009
(date)

Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: Chevron Facility #_9-4930_____

Address: 3369 Castro Valley Boulevard, Castro Valley, California_____

I have reviewed the attached report titled *Work Plan for Additional Investigation*_____ and dated March 24, 2009.

I agree with the conclusions and recommendations presented in the referenced report. The information in this report is accurate to the best of my knowledge and all local Agency/Regional Board guidelines have been followed. This report was prepared by Conestoga-Rovers & Associates, upon whose assistance and advice I have relied.

This letter is submitted pursuant to the requirements of California Water Code Section 13267(b)(1) and the regulating implementation entitled Appendix A pertaining thereto.

I declare under penalty of perjury that the foregoing is true and correct.

Sincerely,

SH Frerichs

Stacie H. Frerichs
Project Manager

Enclosure: Report

CONESTOGA-ROVERS
& ASSOCIATES

2000 Opportunity Dr, Suite 110, Roseville, California 95678
Telephone: 916-677-3407, ext. 100 Facsimile: 916-677-3687
www.CRAworld.com

March 24, 2009 Reference No. 611967

Mr. Steven Plunkett
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: Work Plan for Additional Investigation
Former Chevron Service Station 9-4930
3369 Castro Valley Boulevard
Castro Valley, California
LOP Case No. RO0000416

Dear Mr. Plunkett:

Conestoga-Rovers & Associates (CRA) has prepared this *Work Plan for Additional Investigation* on behalf of Chevron Environmental Management Company (Chevron) for the site referenced above. CRA previously submitted a *Case Closure Request*, dated February 8, 2008, in which case closure was recommended for the site based on low-risk conditions. However, in a letter dated January 26, 2009 (Attachment A), Alameda County Environmental Health (ACEH) requested that prior to consideration for case closure, further evaluation of the vertical extent of impacted soil onsite be performed; in particular in the area of previous over-excavation confirmation soil sample OX-25-10' (collected in 1993). In addition, ACEH requested an evaluation of soil vapor quality and potential vapor intrusion issues for site occupants. To evaluate soil vapor quality, CRA proposes the installation and sampling of three shallow soil vapor wells at the site. To further evaluate the vertical extent of impacted soil, CRA proposes the advancement of one of the vapor well borings to a depth of approximately 15 feet below grade (fbg) for the collection of deeper soil samples. The site description and background and the proposed scope of work are presented in the following sections.

SITE DESCRIPTION AND BACKGROUND

The site is a former Chevron gasoline service station located on the southeast corner of the intersection of Castro Valley Boulevard and Wilbeam Avenue in Castro Valley, California (Figure 1). The site appears to have first been occupied by a service station as early as 1957; the original station facilities included four fuel underground storage tanks (USTs) in the northeast portion of the site, a station building in the central portion of the site, a used-oil UST adjacent to the southwest corner of the station building, and two dispenser islands on the northern side of

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the site. Sometime prior to 1992, the station was reconfigured including the removal of the five USTs, the two dispenser islands, and the station building. A new station building/car wash facility (Valley Car Wash) was constructed in the central portion of the site, and three 10,000-gallon, fiberglass, gasoline USTs and two dispenser islands were installed on the western side of the site. Underground wastewater reclamation tanks associated with the car wash were also installed. In 1993, the station was demolished and all aboveground and belowground facilities were removed, and the site subsequently was a vacant lot. By 1996, the existing one-story building had been constructed in the northwest portion of the site and the remainder of the site was a paved parking area. The building is currently occupied by a Chipotle restaurant and 1st United Services Credit Union; former occupants have also included a Boston Market restaurant. The site is located in a mixed commercial and residential area and is bounded by Castro Valley Boulevard to the north, Wilbeam Avenue to the west, an apartment building and associated parking area to the south, and a commercial building (Pet Food Express) and associated parking area to the east. An auto repair facility is located across Wilbeam Avenue to the west of the site. Current and former site facilities are presented on Figure 2.

Environmental investigation has been ongoing at the site since 1992. Four monitoring wells (MW-1 through MW-4) were formerly present onsite; the wells were destroyed in September 2006 with the approval of ACEH, after ACEH staff discussed the site and concurred that site closure was warranted (see previous correspondence included as Attachment B). A summary of the environmental work performed at the site to date is included as Attachment C. The approximate former well and boring locations are presented on Figure 2.

Confirmation soil sample OX-25-10' was collected in the area of the first-generation USTs at an approximate depth of 10 fbg during the tank removal and over-excavation activities performed at the site in 1993. This work was documented in the June 5, 1993 *Tank/Line Removal and Over-Excavation Report* (report) prepared by Touchstone Developments. Total petroleum hydrocarbons as gasoline (TPHg) and benzene were detected in this sample at 5,100 milligrams per kilogram (mg/kg) and 3.9 mg/kg, respectively. The approximate location of sample OX-25-10' is shown on Figure 2. Previous site plans prepared by Touchstone showing the approximate confirmation soil sampling locations are included as Attachment D. Please note that based on former facility site plans provided by Chevron (incorporated onto our Figure 2), the locations of former site features on the Touchstone figures do not appear to be entirely correct. Therefore, we relied on the distances to the nearest property boundaries on the Touchstone figure to plot the location of sample OX-25-10' on Figure 2. As a result, the Touchstone figure shows sample OX-25-10' located to the southwest of the USTs, while our Figure 2 shows the sample to the west of the USTs. As these USTs had been removed prior to Touchstone performing the work, it is our opinion that our Figure 2 more accurately shows the location of sample OX-25-10'.

Please also note that, as mentioned above, sample OX-25-10' was collected at approximately 10 fbg; however, on page 3 of the report it states that the final depth of the excavation ranged from 11 to 15 fbg. Samples located approximately 10 feet (OX-27-11') and 15 feet (OX-35-11') from sample OX-25-10', and collected several days later, were collected at an approximate depth of 11 fbg. Sample OX-27-11' contained only low concentrations of TPHg and benzene, and sample OX-35-11' contained only a low concentration of TPHg; therefore, concentrations appear to have significantly decreased with depth. Additionally, it was noted in the report that the final depth of excavation extended below the static groundwater level (which ranged from approximately 9 to 12 fbg). An approximate 3-foot increase in ground elevation was also noted from the western to the eastern property boundary; this would put the groundwater level at approximately 11 to 12 fbg in this area of the site during the work. The final depth of excavation in this area is not known; however, based on this information it appears that additional soil may have been removed from this area following the collection of sample OX-25-10', and this sample may have not actually represented what remained at the site.

PROPOSED SCOPE OF WORK

To evaluate shallow soil vapor quality, CRA proposes to install and sample three soil vapor wells at the site. To further evaluate vertical soil quality in the area of sample OX-25-10', CRA proposes to extend the adjacent vapor well boring to a depth of approximately 15 fbg for the collection of deeper soil samples. The proposed vapor well locations are shown on Figure 2. The details of the proposed investigation are presented below.

Permits and Access Agreements: CRA will obtain all necessary permits and access agreements for the proposed wells/boring prior to beginning field operations. A minimum of 72 hours written notification will be given to ACEH before initiation of drilling activities.

Site Health and Safety Plan: CRA will prepare a site-specific health and safety plan (HASP) to inform site workers of known hazards and to provide health and safety guidance. The plan will be reviewed and signed by all site workers and visitors and will be kept onsite during field activities.

Underground Utility Location: At least 48 hours prior to the start of drilling activities, CRA will notify Underground Service Alert to clear the proposed boring locations with local public utility companies. A private utility locator will also be retained to additionally clear the boring locations of utility lines prior to drilling.

Drilling: The vapor well boring adjacent to OX-25-10' will first be advanced to approximately 8 fbg using a 3-inch diameter hand auger in accordance with Chevron and CRA safety protocols; below 8 fbg, the boring will be advanced to the total depth of approximately 15 fbg using a truck-mounted drill rig equipped with direct-push technology. The remaining two vapor well borings will be advanced to a total depth of approximately 6 fbg using a 3-inch diameter hand auger in accordance with Chevron and CRA safety protocols. The final locations and depths of the borings will be based on field conditions.

Soil Sampling and Laboratory Analysis: Soil samples will be continuously collected the entire length of each boring for logging and observation purposes. The soil encountered in the borings will be logged in accordance with the modified Unified Soil Classification System (USCS). Soil samples from each boring will be screened in the field for volatile organic vapors using a photo-ionization detector (PID). Samples which return PID readings of 100 parts per million by volume (ppmv) or greater, or those in which evidence of contamination is observed, may be retained for laboratory analysis. We do not anticipate the analysis of any soil samples collected from depths shallower than 8 fbg from any of the borings. If no evidence of contamination is observed in the deeper boring, soil samples will be collected at approximate depths of 10, 12.5, and 15 fbg for analysis. Soil samples retained for laboratory analysis will be collected in acetate, brass, or stainless steel liners, capped using Teflon tape and plastic end caps, labeled, placed in an ice-chilled cooler, and transported under chain of custody to Lancaster Laboratories, Inc. (Lancaster) in Lancaster, Pennsylvania, for analysis. The samples will be analyzed for the following constituents:

- TPHg by EPA Method 8015M; and
- Benzene, toluene, ethylbenzene, and xylenes (BTEX) and methyl tertiary butyl ether (MTBE) by EPA Method 8260B.

CRA's standard field procedures for hand auger and direct-push borings are included as Attachment E.

Soil Vapor Well Installation: The base of each vapor probe will be installed at approximately 5.5 fbg. The deeper boring will be backfilled with bentonite chips to approximately 6 fbg prior to vapor well construction. The soil vapor wells will be constructed in general accordance with CRA's Standard Field Procedures (Attachment E). One-quarter inch diameter Nylaflow® tubing will be fitted with a 6-inch-long section of 0.010-inch slotted, Schedule 40 PVC screen. The tubing and screen will be placed into each open borehole with the bottom of the screen at approximately 5.5 fbg. Washed No. 2/16 silica sand will be placed from 5 to 6 fbg to create a filter pack around the screen. A 3-inch layer of dry granular bentonite will be placed on top of the sand pack followed by hydrated bentonite powder (gel) to a few inches below the surface.

The tubing exiting the bentonite will be capped, and well boxes with traffic-rated well vaults will be installed. A schematic diagram of the soil vapor well construction is presented on Figure A of Attachment E.

Soil Vapor Sampling and Laboratory Analysis: Soil vapor samples will be collected from the vapor wells in 1-liter SUMMA™ canisters for laboratory analysis. The samples will be collected in general accordance with the Department of Toxic Substances Control (DTSC) *Advisory-Active Soil Gas Investigations* guidance document dated January 28, 2003. A generalized schematic of the soil vapor sampling apparatus is presented on Figure B of Attachment E. CRA's Standard Field Procedures for Soil Vapor Probe Installation and Sampling are included in Attachment E. The samples will be collected no sooner than 72 hours after well installation to allow adequate equilibration time.

A field duplicate sample will also be collected. In accordance with the DTSC guidance, leak testing will be performed during sampling. Helium will be used as a leak check compound to evaluate if significant ambient air is entering the SUMMA™ canisters during sampling. Field application of helium will be accomplished through the use of a containment structure (i.e. a clear, large volume Rubbermaid® or Tupperware® storage container) placed inverted over the entire well and sampling apparatus.

The soil vapor samples will be kept at ambient temperature and submitted under chain-of-custody to Air Toxics Air Toxics Ltd. in Folsom, California, for analysis. The soil vapor samples will be analyzed for the following constituents:

- TPHg by EPA Method TO-3;
- BTEX and MTBE by EPA Method TO-15; and,
- Helium (leak check compound), oxygen (O_2), carbon dioxide (CO_2), and methane (CH_4) by ASTM D-1946.

Soil and Water Disposal: Soil cuttings and decontamination rinsate generated during field activities will be temporarily stored onsite in 55-gallon steel drums and sampled for disposal purposes. Once profiled, the drums will be transported to a Chevron-approved facility for disposal.

Reporting: After receipt of the analytical results, CRA will prepare an investigation report that includes the following:

- A description of field activities;
- A figure illustrating the vapor well locations;

- Boring logs and vapor well construction diagrams;
- Tabulated soil and soil vapor analytical results;
- Analytical reports and chain-of-custody forms; and
- Our conclusions and recommendations.

SCHEDULE AND CLOSING

CRA will perform this investigation upon receiving written approval from ACEH, or 60 days following submittal of this work plan. We will submit our investigation report approximately six weeks after completion of field activities.

We appreciate your assistance on this project and look forward to your reply. Please contact Mr. James Kiernan at (916) 751-4102 if you have any questions or comments regarding this work plan.

Sincerely,

CONESTOGA-ROVERS & ASSOCIATES

gjc 3/24/09

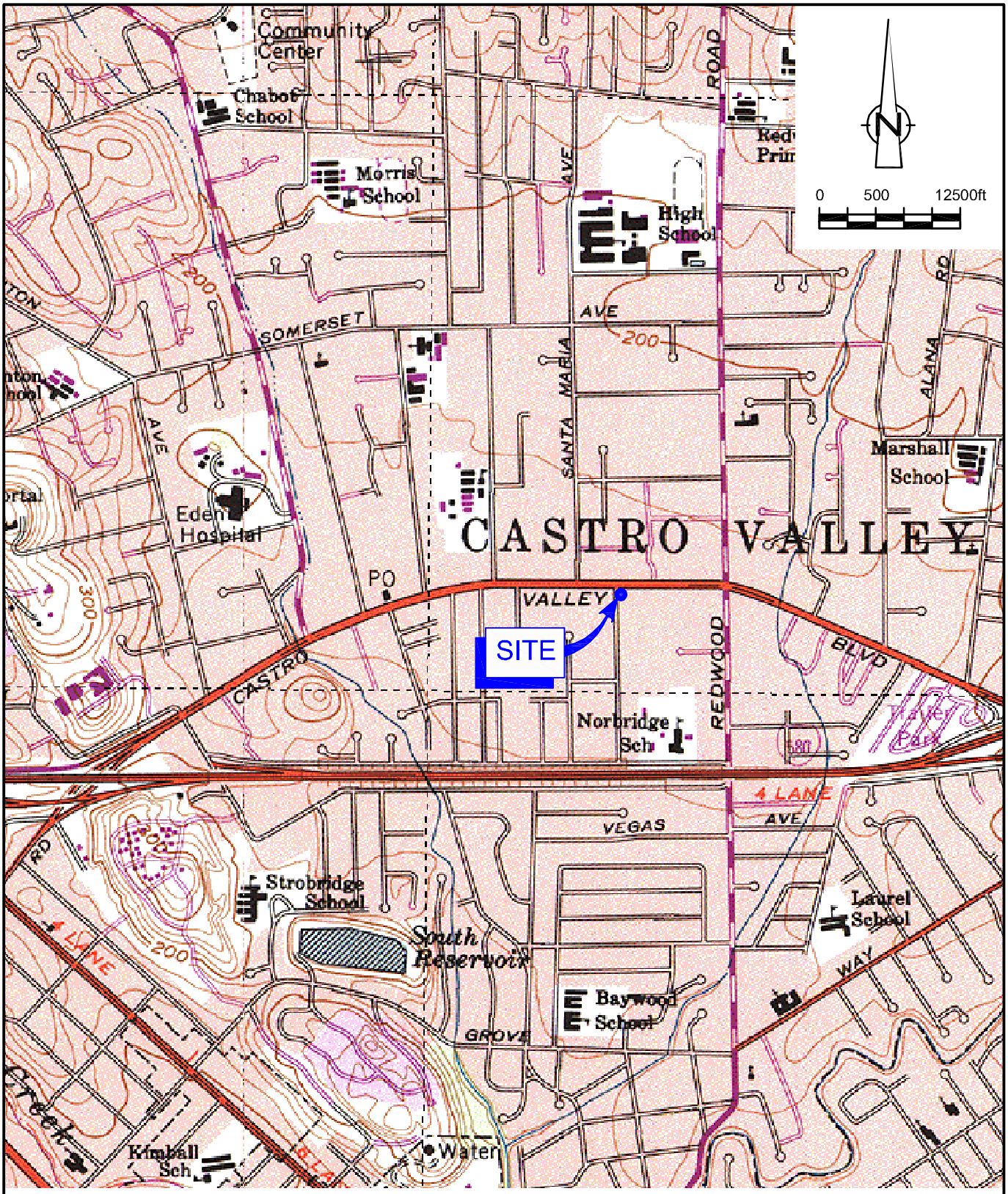
James P. Kiernan, PE #C68498

JPK/kw/1
Encl.

Figure 1	Vicinity Map
Figure 2	Site Plan
Attachment A	ACEH Letter Dated January 26, 2009
Attachment B	Previous ACEH Correspondence
Attachment C	Summary of Previous Environmental Work
Attachment D	Previous Site Plans
Attachment E	Standard Field Procedures

cc: Mr. Rob Speer, Chevron Environmental Management Company
Ms. Anna Counelis and Tula Gallanes

FIGURES



SOURCE: TOPO! MAPS.

figure 1

VICINITY MAP
CHEVRON SERVICE STATION 9-4930
3369 CASTRO VALLEY BOULEVARD
Castro Valley, California

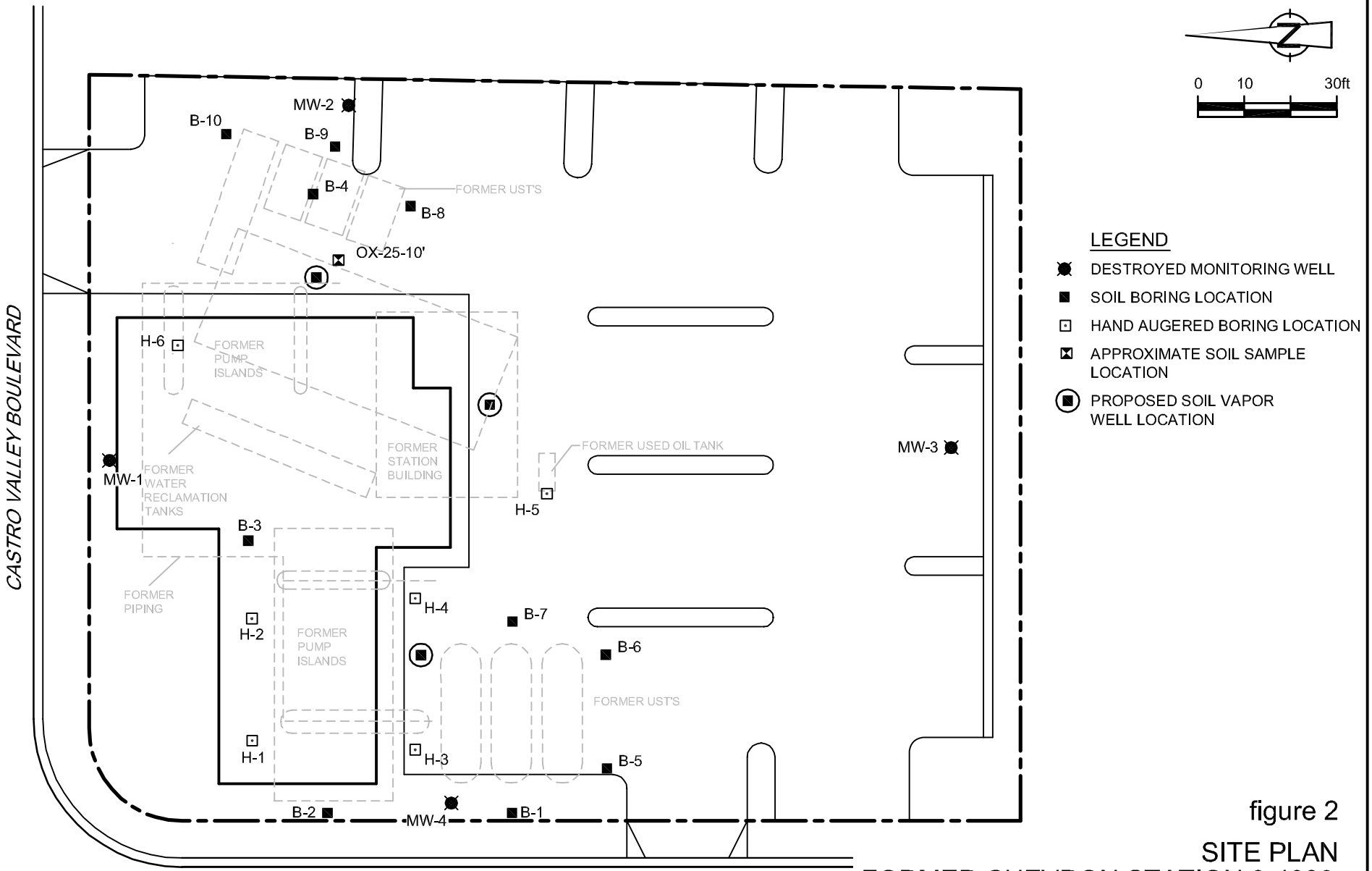


figure 2

SITE PLAN
FORMER CHEVRON STATION 9-4930
3369 CASTRO VALLEY BOULEVARD
Castro Valley, California

BASEMAP MODIFIED FROM DRAWING PROVIDED BY TOUCHSTONE DEVELOPMENTS, RESNA AND GETTLER-RYAN INC.

611967-299(PRES002)GN-WA002 MAR 20/2009

ATTACHMENT A

ACEH LETTER DATED JANUARY 26, 2009

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

CRA
FEB 05 2009
Received SK 6119k7

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

January 26, 2009

Stacie Hartung-Frerichs
Chevron Environmental Management Company
6001 Bollinger Canyon Road, K-2200
San Ramon, CA 94583

Subject: Fuel Leak Case No. RO0000416 and GeoTracker Global ID T0600100137, Chevron #9-4930 / Valley Car Wash, 3369 Castro Valley Boulevard, Castro Valley, CA 94546

Dear Ms. Hartung-Frerichs:

Alameda County Environmental Health (ACEH) staff has reviewed the case file for the above-referenced site including the recently submitted document entitled, "Subsurface Investigation Report and Closure Request," dated December 3, 2007, which was prepared by Conestoga-Rovers & Associates (CRA) for the subject site. According to CRA, two (CPT-1 and CPT-2) of the proposed three borings were advanced to delineate the petroleum hydrocarbon contaminant plume off-site. Total petroleum hydrocarbons (TPH) as gasoline (g) and methyl tertiary butyl ether (MTBE) were detected at maximum concentrations of 140 µg/L and 17 µg/L, respectively in "grab" groundwater samples collected from CPT-2. Based on the analytical results from the off-site borings and historical groundwater monitoring data collected from site monitoring wells, CRA has requested case closure for the subject site.

In March 1993, three 10,000-gallon underground storage tanks (USTs) were removed from the site. Approximately 7,500 cubic yards of soil was disposed of off-site to Redwood Landfill, Inc. in Novato, California. The excavation was backfilled with 800 cubic yards of segregated "clean" stockpiled soil with the remainder of the excavation backfilled with 2-inch drain rock and aggregate base rock. Over-excavation confirmation soil samples detected a maximum TPH-g and benzene concentration of 5,100 mg/kg and 3.9 mg/kg, respectively in soil sample OX-25-10', collected at 10 feet bgs, immediately southwest of the former USTs. These concentrations are significantly above the Regional Water Quality Control Board's (RWQCB) Environmental Screening Levels (ESLs) for TPH-g and benzene of 83 mg/kg and 0.044 mg/kg, respectively, indicating that the site poses a potential risk to human health and the environment. ACEH is aware that a RBCA evaluation was conducted for the site with 0.6 mg/kg as an upper 95% confidence limit concentration for benzene. However, ACEH is concerned that porous material was used to backfill the excavation increasing the potential for contaminant volatilization to indoor air, especially since the SSTL is above the ESL, which recommends collection of subsurface or sub-slab vapor samples to evaluate such risk. Therefore, ACEH cannot consider case closure for the subject site at this time. This decision to deny closure is subject to appeal to the State Water Resources Control Board (SWRCB), pursuant to Section 25299.39.2(b) of the Health and Safety Code (Thompson-Richter Underground Storage Tank Reform Act - Senate Bill 562). Please contact the SWRCB Underground Storage Tank Program at (916) 341-5851 for information regarding the appeal process.

ACEH request that you address the following technical comments and send us the technical work plan and reports requested below.

TECHNICAL COMMENTS

1. **Contaminant Source Area Characterization** – As mentioned above, TPH-g and benzene were detected at concentrations of 5,100 mg/kg and 3.9 mg/kg, respectively in soil sample OX-25-10', collected at 10 feet bgs, immediately southwest of the former USTs. Although the lateral extent of soil contamination appears delineated by the confirmation sidewall soil samples, the vertical extent of the soil contamination appears uncharacterized at this time. Please propose a scope of work to address the above-mentioned concerns and submit a work plan, due by the date specified below.

2. **Potential Contaminant Volatilization to Indoor Air** – Significantly elevated concentration of TPH-g (5,100 mg/kg) and benzene (3.9 mg/kg) remain in place at the subject site. These concentrations are significantly above the RWQCB's ESL for TPH-g and benzene of 83 mg/kg and 0.044 mg/kg, respectively, indicating that the site poses a potential risk to human health and the environment. Furthermore, porous materials (i.e. 2-inch drain rock and aggregate base rock) were used to backfill the majority of the excavation. Please propose a scope of work to address the above-mentioned concerns and submit a work plan, due by the date specified below. Also include figures that illustrate previous sampling locations and site features (i.e. location of both generations of USTs, piping runs, station building, etc.) in relation to current site structures.

Once all data gaps have been addressed, the case closure evaluation for the site can proceed forward.

TECHNICAL REPORT REQUEST

Please submit technical reports to ACEH (Attention: Steven Plunkett), according to the following schedule:

- **March 27, 2009** – Soil and Water Investigation Work Plan

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of reports in electronic form. The electronic copy replaces paper copies and is expected to be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental

requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) GeoTracker website. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for all groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitoring wells, and other data to the GeoTracker database over the Internet. Beginning July 1, 2005, these same reporting requirements were added to Spills, Leaks, Investigations, and Cleanup (SLIC) sites. Beginning July 1, 2005, electronic submittal of a complete copy of all reports for all sites is required in GeoTracker (in PDF format). Please visit the SWRCB website for more information on these requirements (http://www.swrcb.ca.gov/ust/electronic_submittal/report_rqmts.shtml.

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to $10,000 per day for each day of violation.

If you have any questions, please call me at (510) 777-2478 or send me an electronic mail message at paresh.khatri@acgov.org.

Sincerely,

Paresh C. Khatri
Hazardous Materials Specialist

Steven Plunkett
Hazardous Materials Specialist

Donna L. Drogos, PE
Supervising Hazardous Materials Specialist

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

cc: Brian P. Carey, Conestoga-Rovers & Associates, 2000 Opportunity Drive, Suite 110, Roseville, CA 95678
Donna Drogos, ACEH
Steven Plunkett, ACEH
File

ATTACHMENT B

PREVIOUS ACEH CORRESPONDENCE

Giorgi, Sara

From: Chan, Barney, Env. Health [barney.chan@acgov.org]
Sent: Thursday, April 14, 2005 5:11 PM
To: Giorgi, Sara
Cc: beppler@cambria-env.com
Subject: RE: Former Chevron #9-4930, 3369 Castro Valley Blvd, RO416

Sara: I wanted to let you know that our staff discussed the site and concurred that closure is warranted. They also concurred that cumulative tables and figures indicating the location and concentration of residuals is necessary to complete the closure. Perhaps the site map would include the location of residual data points with the points bolded where ESLs are exceeded. Hope to get a draft from you soon.

Barney

From: Giorgi, Sara [mailto:sgiorgi@cambria-env.com]
Sent: Tuesday, April 12, 2005 6:36 AM
To: Chan, Barney, Env. Health
Cc: 'Eppler, Bruce'
Subject: RE: Former Chevron #9-4930, 3369 Castro Valley Blvd, RO416

Barney,
Attached is a slightly revised Table. Bold concentrations indicate unconfirmed remaining concentrations.

Sara

Sara Giorgi
Senior Staff Geologist
Cambria Environmental Technology, Inc.
4111 Citrus Ave., Suite 12
Rocklin, CA 95677
(916) 630-1855 x103
(916) 630-1856 Fax
(916) 919-0211 #41 Cell

> -----Original Message-----
> **From:** Chan, Barney, Env. Health [mailto:barney.chan@acgov.org]
> **Sent:** Monday, April 11, 2005 4:09 PM
> **To:** Giorgi, Sara
> **Subject:** RE: Former Chevron #9-4930, 3369 Castro Valley Blvd, RO416
>
> Thanks for the table. What would be helpful, besides a comprehensive map, is noting somehow (bold, color, italic) those concentrations which may still exist and those which have been excavated or resampled.
>
> Barney
>
> ---
>
> **From:** Giorgi, Sara [mailto:sgiorgi@cambria-env.com]
> **Sent:** Monday, April 11, 2005 3:06 PM
> **To:** Chan, Barney, Env. Health; 'Eppler, Bruce'
> **Cc:** 'Herzog, David'
> **Subject:** RE: Former Chevron #9-4930, 3369 Castro Valley Blvd, RO416

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

RECEIVED
JAN 17 2006
By CS/DH

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

January 11, 2006

Mr. Dana Thurman
ChevronTexaco
6001 Bollinger Canyon Rd., K2236
P.O. Box 6012
San Ramon, CA 94583-2324

Dear Mr. Thurman:

Subject: Fuel Leak Case RO0000416, Chevron #9-4930, 3369 Castro Valley Blvd., Castro Valley, CA 94546

Alameda County Environmental Health has received and reviewed the December 7, 2005 *Subsurface Investigation Workplan* submitted by Cambria Environmental. This work plan responds to the County's July 29, 2005 letter requesting further off-site delineation of the hydrocarbon plume from the subject site. Three off-site borings are proposed from which three groundwater samples will be collected, at first encountered groundwater and at 15' intervals to 35' bgs. The grab groundwater samples will be analyzed for TPHg, BTEX, MTBE, the other oxygenates, TBA, DIPE, TAME, ETBE and the lead scavengers, EDB and EDC. In addition, monitoring wells MW-1 through MW-4 will be properly decommissioned under permit. This work plan is approved. We note that typically, well decommissioning is performed after site closure has been concurred by the Water Board, however, we believe that no further on-site investigation will be required and these wells indicate a stable on-site plume.

TECHNICAL REPORT REQUEST

Please submit the following technical report to our office according to the following schedule.

- 30 days after completion of off-site investigation- Off-site investigation report

This report is being requested pursuant to California Health and Safety Code Section 25296.10. Title 23, CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from petroleum UST system, and require your compliance with this request.

ELECTRONIC SUBMITTAL OF REPORTS

Effective **January 31, 2006**, the Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of all reports in electronic form to the county's ftp site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program ftp site are provided on the attached "Electronic Report Upload (ftp) Instructions." Please do not submit reports as attachments to electronic mail.

Submission of reports to the Alameda County ftp site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) Geotracker website. Submission of reports to the Geotracker website does not fulfill the requirement to submit documents to the Alameda County ftp site. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for groundwater

ATTACHMENT C

SUMMARY OF PREVIOUS ENVIRONMENTAL WORK

SUMMARY OF PREVIOUS ENVIRONMENTAL WORK

November 1992 Subsurface Investigation and Area Well Survey: In November 1992, Resna Industries, Inc. (Resna) advanced 10 borings (B-1 through B-10) to depths of 11 or 15 feet below grade (fbg) and six hand-augered borings (H-1 through H-6) at the site to evaluate soil and groundwater quality. Groundwater was encountered in the borings at depths of 11 to 12 fbg. One or two soil samples were collected at various depths from each boring and analyzed for total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene, and xylenes (BTEX). Low concentrations of TPHg (up to 96 milligrams per kilogram [mg/kg]) were detected in soil samples collected from borings B-1, B-3, and B-8; low concentrations of toluene, ethylbenzene, and xylenes (up to 3.5 mg/kg) were also detected. An elevated concentration of TPHg (2,500 mg/kg) was detected in the soil sample collected at 11.25 fbg from boring B-4 located in the former location of the first-generation underground storage tanks (USTs); toluene, ethylbenzene, and xylenes (up to 130 mg/kg) were also detected. Benzene was not detected in any of the soil samples. The soil samples collected at 5.5 and 10.5 fbg from boring H-5, located adjacent to a former used-oil UST, were additionally analyzed for TPH as diesel (TPHd) and total oil and grease (TOG); the sample collected at 10.5 fbg was also analyzed for halogenated volatile organic compounds (HVOCs). TOG was detected at 57 mg/kg in the sample collected at 5.5 fbg; TPHd was not detected in either of the samples, and HVOCs were not detected in the 10.5 fbg sample. Groundwater samples were also collected from borings B-1 through B-4 and analyzed for TPHg and BTEX. Elevated concentrations of TPHg (ranging from 2,700 [B-1] to 23,000 micrograms per liter [µg/L] [B-3]) and benzene (ranging from 23 [B-2] to 800 µg/L [B-3]) were detected in the four groundwater samples.

Resna also conducted a well survey that identified 58 wells within a ½-mile radius of the site. The closest identified domestic water supply well was located approximately 1,500 feet west of the site. Two known leaking USTs were also identified between the site and the domestic well. No municipal water wells were identified within the search radius. Details of this investigation were presented in Resna's December 16, 1992 *Report-Subsurface Environmental Investigation*.

February to May 1993 Station Demolition: In February 1993, the service station building and car wash facility were demolished. In March 1993, three 10,000-gallon, fiberglass, gasoline USTs, associated piping, and the car wash waste water reclaim tanks (WWRTs) were removed. Eight soil samples were collected at depths of 6 to 9 fbg from the sidewalls of the UST excavation and analyzed for TPHg and BTEX. TPHg (up to 620 mg/kg) was only detected in three of the samples; low concentrations of BTEX (up to 53 mg/kg) were detected in four of the samples. A groundwater sample collected from the UST excavation contained TPHg and benzene at 3,900 µg/L and 180 µg/L, respectively. Thirteen soil samples were collected at

depths of 2.5 to 6 fbg beneath the product piping; TPHg (up to 720 mg/kg) and BTEX (up to 49 mg/kg) were detected in several of the samples. Four soil samples were also collected at depths of 9 or 12 fbg from the WWRT excavation and analyzed for TPHg, TPHd, BTEX, TOG, HVOCs, and metals. TPHg (up to 230 mg/kg) and BTEX (up to 4.5 mg/kg) were detected in two of the samples; benzene, TOG, TPHd, and HVOCs were not detected in any of the samples, and the detected metals concentrations were consistent with background levels. Several rounds of over-excavation of impacted soil and confirmation soil sampling were performed from March to May 1993. The majority of the site was excavated to depths ranging from 11 to 15 fbg. Approximately 7,500 cubic yards of soil were excavated and disposed at Redwood Landfill in Novato, California. The final confirmation soil samples collected from the over-excavation indicated that no significant hydrocarbon mass remained in soil. Approximately 800 cubic yards of excavated soil that did not contain any contamination was used as backfill; and approximately 500 cubic yards of soil was transported offsite and used as fill material. The remainder of the excavation was backfilled with drain rock and aggregate baserock. Details of the station demolition and subsequent over-excavation activities were presented in Touchstone's *Tank/Line Removal and Over-excavation Report* dated June 5, 1993.

October 1993 Subsurface Investigation: In October 1993, Resna installed monitoring wells MW-1 through MW-4 (borings B-11 through B-14) to a maximum depth of 21.5 fbg. One or two soil samples were collected at various depths from each boring and analyzed for TPHg and BTEX. TPHg was only detected in the soil samples collected at 8 fbg from the boring for well MW-2 (100 mg/kg) and at 6 fbg from the boring for well MW-4 (530 mg/kg); low concentrations of toluene, ethylbenzene, and xylenes (up to 18 mg/kg) were also detected. The initial groundwater samples collected from wells MW-1 through MW-4 contained TPHg at 1,000 µg/L, 5,600 µg/L, 110 µg/L, and 640 µg/L, respectively. Benzene was only detected in the groundwater samples collected from wells MW-1 (11 µg/L), MW-2 (140 µg/L), and MW-4 (6.7 µg/L). Details of this investigation were presented in Resna's December 13, 1993 *Report-Additional Subsurface Environmental Investigation*.

February 1994 Well Sampling: In February 1994, wells MW-1 through MW-4 were re-sampled. TPHg and benzene were detected in wells MW-1, MW-2, and MW-4 at maximum concentrations of 820 µg/L and 41 µg/L, respectively. Tetrachloroethene (PCE) was detected in all the wells at a maximum concentration of 400 µg/L; trichloroethene (TCE) was detected in wells MW-1, MW-3, and MW-4 at a maximum concentration of 51 µg/L; and 1,2-Dichloroethene (1,2-DCE) was detected in wells MW-1 (0.8 µg/L) and MW-4 (13 µg/L).

January 1996 Subsurface Investigation: In January 1996, Pacific Environmental Group, Inc. (PEG) advanced four offsite borings (GP-1 through GP-4) to further evaluate the extent of

impacted groundwater. Boring GP-1 was located in Castro Valley Boulevard and borings GP-2 through GP-4 were located in Wilbeam Avenue. A total of six soil samples were collected at depths of 5, 10, and 15 fbg from borings GP-3 and GP-4 and analyzed for TPHg and BTEX, which were not detected. Grab-groundwater samples were also collected from borings GP-1 and GP-2 and analyzed for TPHg and BTEX. The groundwater sample collected from boring GP-2 contained TPHg at 1,600 µg/L and benzene at 9.6 µg/L. TPHg and BTEX were not detected in the groundwater sample collected from boring GP-1. Details of this investigation were presented in PEG's April 18, 1996 *Soil and Groundwater Investigation* report.

July 1996 Risk-Based Corrective Action (RBCA) Tier 2 Analysis: In July 1996, Chevron Research and Technology Company (CRTC) performed a Tier 2 RBCA evaluation for the site. The results of the evaluation indicated that the estimated risks for potential future onsite workers and residents were within the acceptable range of 1×10^{-6} to 1×10^{-4}, and the representative concentrations for the chemicals of concern were all less than the estimated site-specific target levels (SSTLs), with the exception of benzene in subsurface soil potentially exposed to future onsite residents in indoor air.

May 2001 Confirmation Groundwater Sampling: In May 2001, Gettler-Ryan Inc. (GR) performed a confirmation groundwater sampling event at the site to confirm the historical monitoring data that indicated the dissolved petroleum hydrocarbon plume was limited, adequately defined, stable, and concentrations had shown a general decreasing trend over time. Groundwater samples were collected from wells MW-1 through MW-4 and analyzed for TPHg, BTEX, fuel oxygenates, 1,2-Dichloroethane (1,2-DCA), ethylene dibromide (EDB), methanol, and ethanol. TPHg was detected in wells MW-1 through MW-3 at a maximum concentration of 230 µg/L (MW-3). Benzene was detected in wells MW-1 (1.5 µg/L), MW-2 (3 µg/L), and MW-4 (0.63 µg/L). MTBE was detected in wells MW-1 (2.1 µg/L), MW-2 (26 µg/L), and MW-3 (2.4 µg/L). Toluene, ethylbenzene, xylenes, the remaining fuel oxygenates, 1,2-DCA, EDB, methanol, and ethanol were not detected in any of the wells.

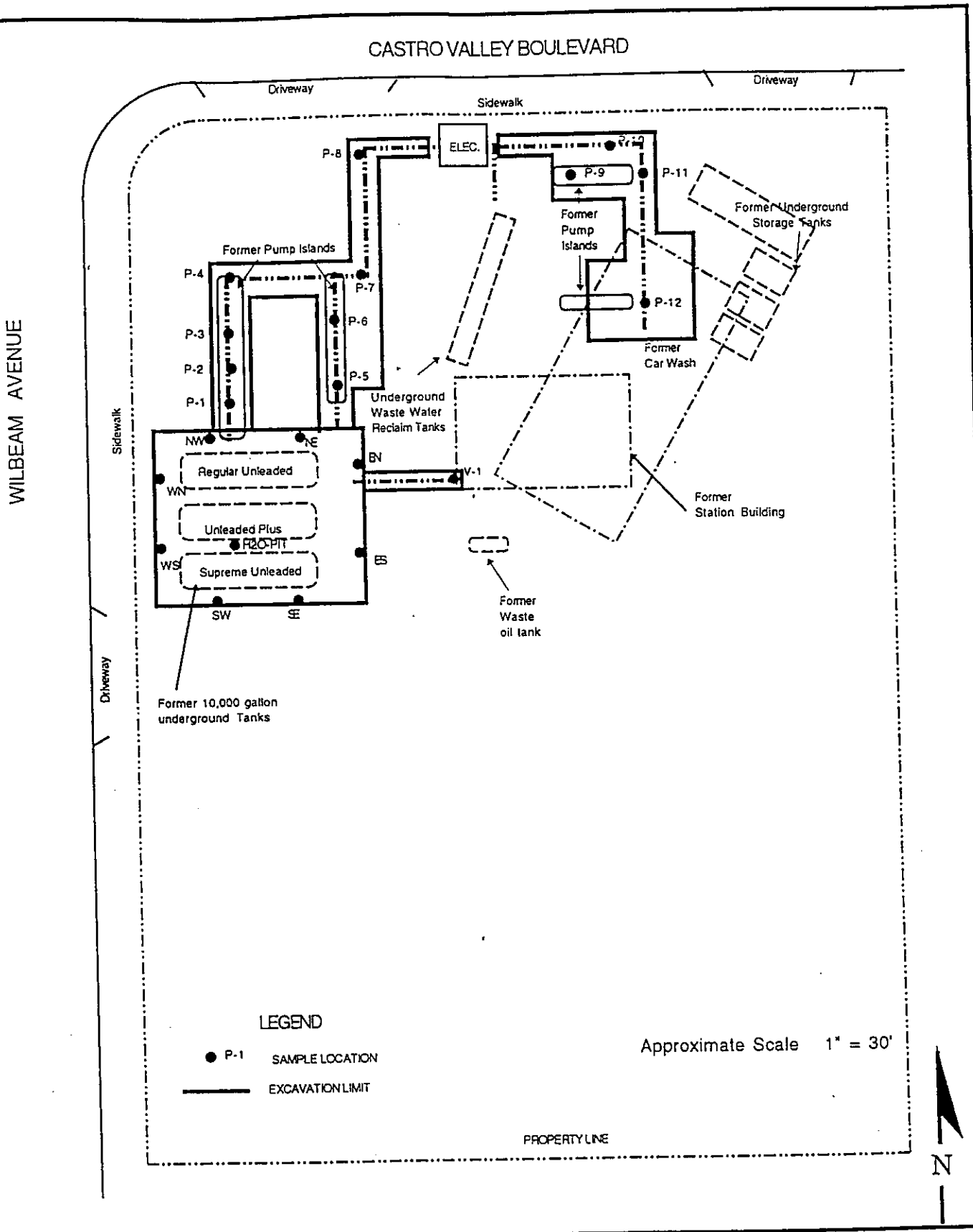
September 2006 Well Destruction: In September 2006, Cambria Environmental Technology, Inc. (Cambria; now CRA) destroyed wells MW-1 through MW-4.

September 2007 Subsurface Investigation: In September 2007, CRA drilled two cone penetrometer test (CPT) borings (CPT-1 and CPT-2) offsite to evaluate the downgradient (southwest) extent of impacted groundwater. The borings were drilled to approximately 35 fbg. Groundwater samples were collected at depths of 15 fbg and 32 fbg from boring CPT-1 and at depths of 15 fbg, 21 fbg, and 34 fbg from boring CPT-2 and analyzed for TPHg, BTEX, fuel oxygenates, 1,2-DCA, and EDB. No soil samples were collected for laboratory analysis. TPHg

was only detected in the samples collected at 21 fbg and 34 fbg from boring CPT-2 (130 µg/L and 140 µg/L, respectively). Methyl tertiary butyl ether (MTBE) was detected in the samples collected at 32 fbg from boring CPT-1 (6 µg/L), and at 15, 21, and 34 fbg from boring CPT-2 (2 µg/L, 17 µg/L, and 17 µg/L, respectively). BTEX, other fuel oxygenates, 1,2-DCA, and EDB were not detected in any of the samples. Based on the analytical results, the downgradient extent of impacted groundwater appeared to have been adequately defined.

ATTACHMENT D

PREVIOUS SITE PLANS



Touchstone Developments
Environmental Management

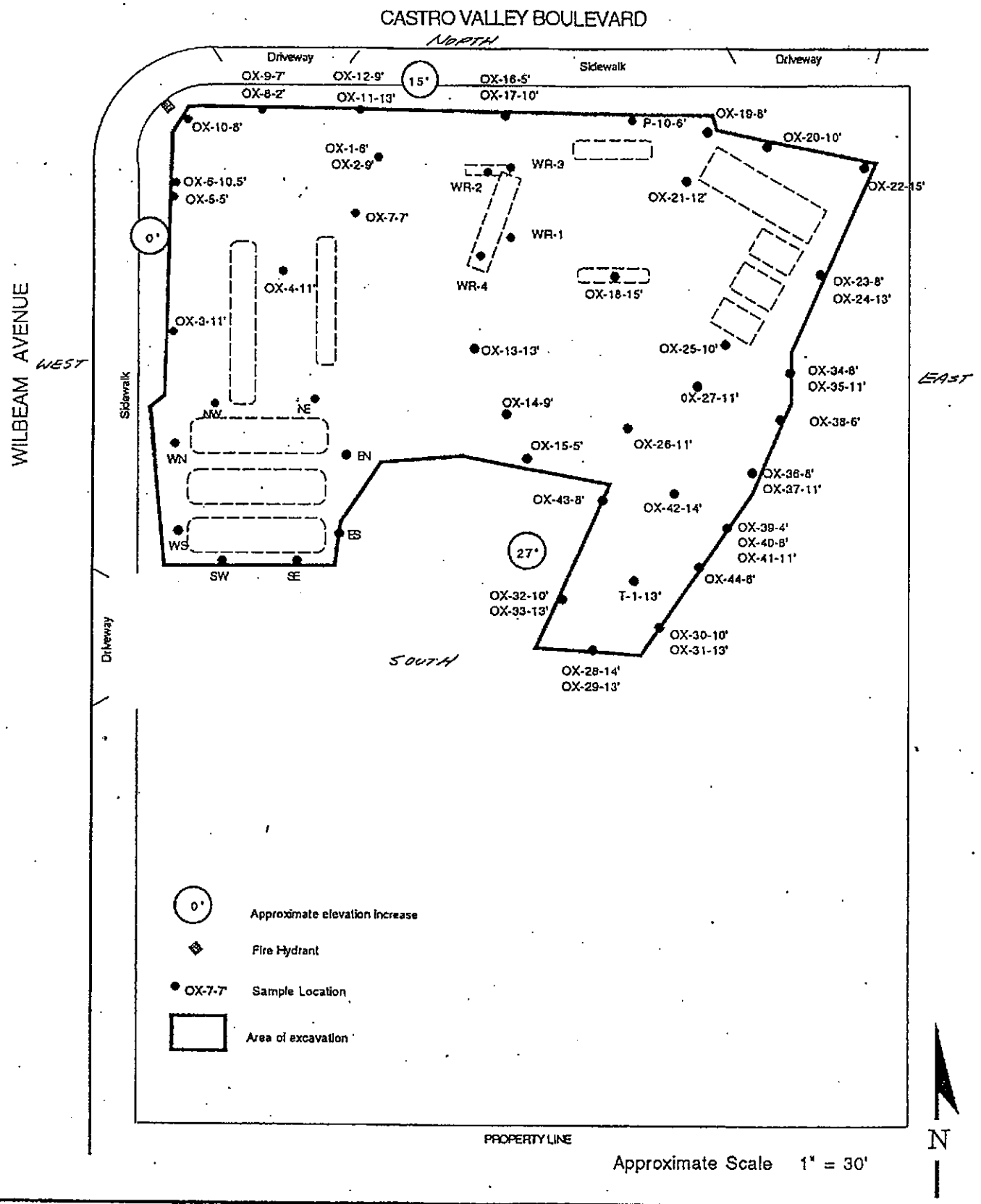
UGST & Pipeline Sample Location Map

Chevron Service Station No. 9-4930
3369 Castro Valley Boulevard
Castro Valley, California

Figure 2

03-11-93 | mjt

Project # 4930-1



Touchstone Developments
Environmental Management

Over-excavation Sample Location Map

Chevron Service Station No. 9-4930
3369 Castro Valley Boulevard
Castro Valley, California

Figure 3

05-10-93 | mjl

Project # 4930-2

ATTACHMENT E

STANDARD FIELD PROCEDURES

Conestoga-Rovers & Associates

STANDARD FIELD PROCEDURES FOR HAND-AUGER SOIL BORINGS

This document describes Conestoga-Rovers & Associates 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 Professional Geologist (PG) 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.

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 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 4°C, 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

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.

Conestoga-Rovers & Associates

STANDARD FIELD PROCEDURES FOR SOIL VAPOR PROBE INSTALLATION AND SAMPLING

VAPOR POINT METHODS

This document describes Conestoga-Rovers & Associates' standard field methods for soil vapor sampling. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil vapor samples are collected and analyzed to assess whether vapor-phase subsurface contaminants pose a threat to human health or the environment.

Shallow Soil Vapor Point Installation

The shallow soil vapor point method for soil vapor sampling utilizes a hand auger or drill rig to advance a boring for the installation of a soil vapor sampling point. Once the boring is hand augered to the final depth, a probe, connected with Swagelok fittings to nylon or Teflon tubing of ¼-inch outer-diameter, is placed within 12-inches of number 2/16 filter sand (Figure A). A 12-inch layer of dry granular bentonite is placed on top of the filter pack. Pre-hydrated granular bentonite is then poured to fill the borehole. The tube is coiled and placed within a wellbox finished flush to the surface. Soil vapor samples will be collected no sooner than 48 hours after installation of the soil vapor points to allow adequate time for representative soil vapors to accumulate. Soil vapor sample collection will not be scheduled until after a minimum of three consecutive precipitation-free days and irrigation onsite has ceased. Figure B shows the soil vapor sampling apparatus. A measured volume of air will be purged from the tubing using a different Summa purge canister. Immediately after purging, soil vapor samples will be collected using the appropriate size Summa canister with attached flow regulator and sediment filter. The soil vapor points will be preserved until they are no longer needed for risk evaluation purposes. At that time, they will be destroyed by extracting the tubing, hand augering to remove the sand and bentonite, and backfilling the boring with neat cement. The boring will be patched with asphalt or concrete, as appropriate.

Sampling of Soil Vapor Points

Samples will be collected using a SUMMA™ canister connected to sampling tubing at each vapor point. Prior to collecting soil vapor samples, the initial vacuum of the canisters is measured and recorded on the chain-of-custody. The vacuum of the SUMMA™ canister is used to draw the soil vapor through the flow controller until a negative pressure of approximately 5-inches of Hg is observed on the vacuum gauge and recorded on

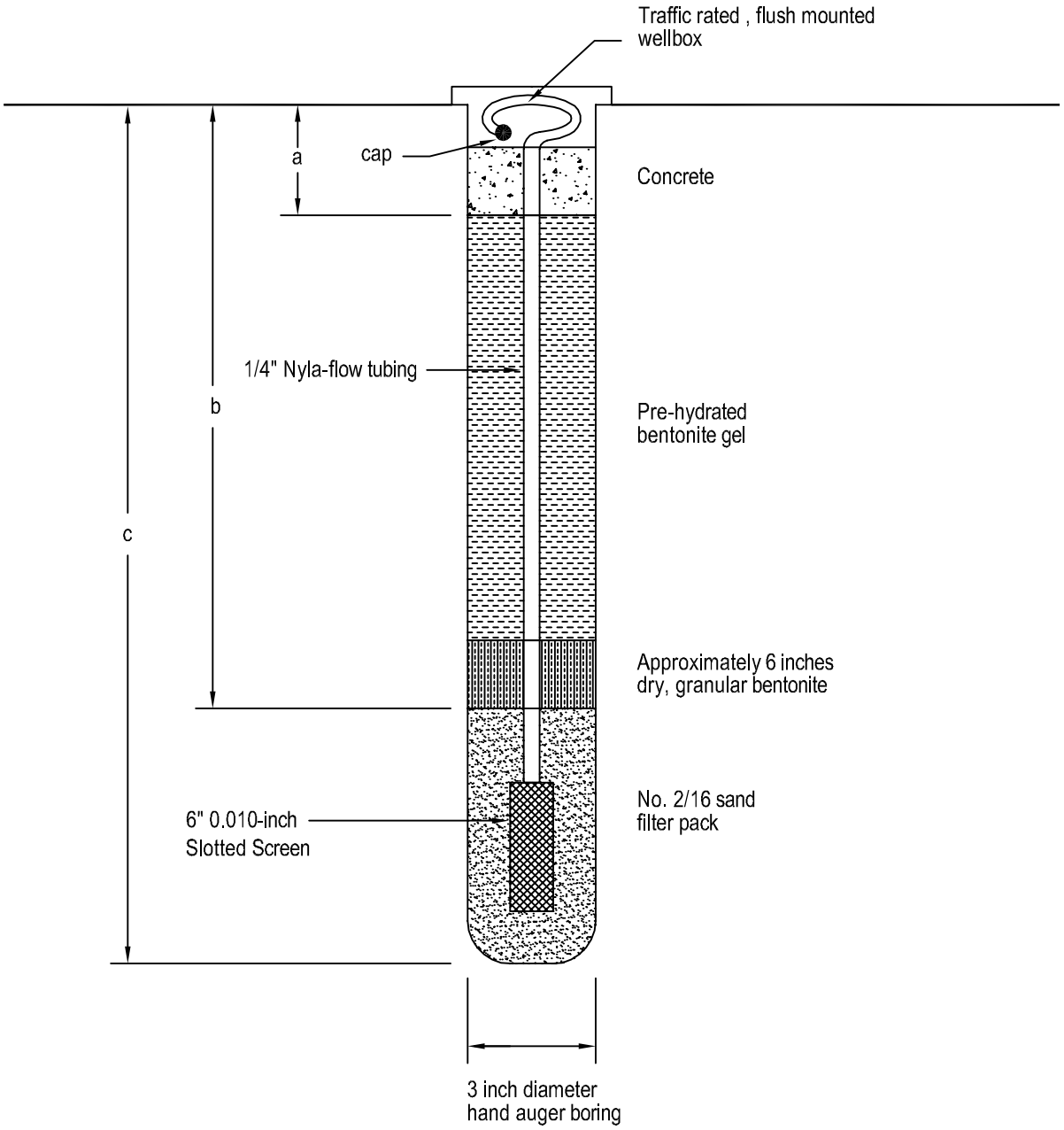
the chain-of-custody. The flow controllers should be set to 100-200 ml/minute. Field duplicates should be collected for every day of sampling and/or for every 10 samples collected.

Prior to sample collection, stagnant air in the sampling apparatus should be removed by purging approximately 3 purge volumes. The purge volume is defined as the amount of air within the probe and tubing.

In accordance with the DTSC Advisory-Active Soil Gas Investigations guidance document, dated January 28, 2003, leak testing needs to be performed during sampling. Helium is recommended, although shaving cream is acceptable.

Vapor Sample Storage, Handling, and Transport

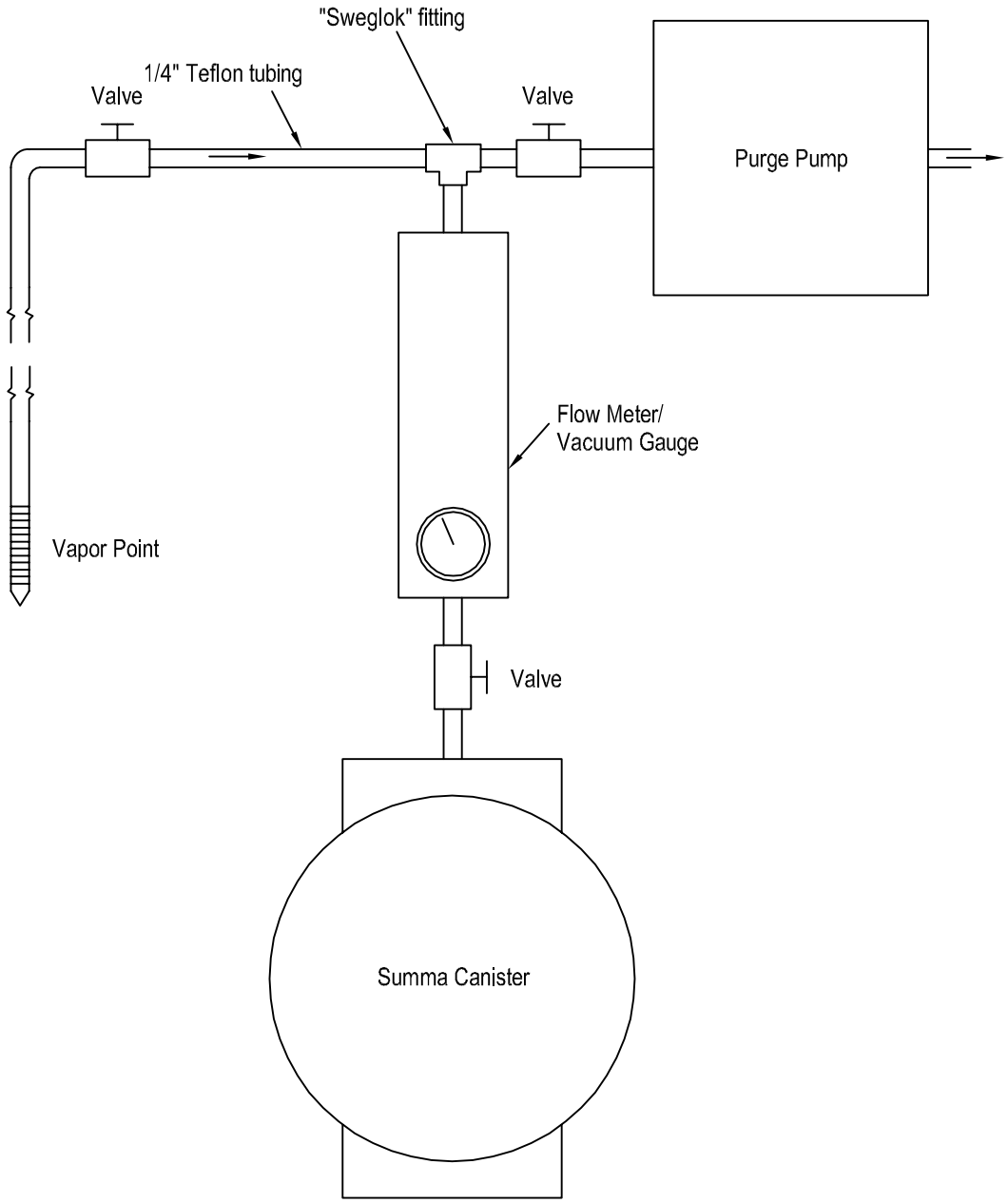
Samples are stored and transported under chain-of-custody to a state-certified analytic laboratory. Samples should never be cooled due to the possibility of condensation within the canister.



Schematic Not to Scale

figure A

SOIL VAPOR POINT



Schematic Not to Scale

figure B

SOIL VAPOR SAMPLING APPARATUS DIAGRAM

Conestoga-Rovers & Associates

STANDARD FIELD PROCEDURES FOR SOIL BORING AND MONITORING WELL INSTALLATION

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling groundwater monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

SOIL BORINGS

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and to collect samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Professional Geologist (PG).

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or direct-push technologies such as the Geoprobe®. Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. 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 at the bottom of the borehole.

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 Analysis

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^{o} C 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 volatile vapor analyzer measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. Volatile vapor analyzer measurements are used along with the field observations, odors, stratigraphy and groundwater 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 groundwater 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 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may 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.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

Groundwater monitoring wells are installed to monitor groundwater quality and determine the groundwater elevation, flow direction and gradient. Well depths and screen lengths are based on groundwater depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 feet below and 5 feet above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three feet thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two feet above the well screen. A two feet thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I, II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

Wells are generally developed using a combination of groundwater surging and extraction. Surging agitates the groundwater and dislodges fine sediments from the sand pack. After about ten minutes of surging, groundwater is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of groundwater are extracted and the sediment volume in the groundwater is negligible. This process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

Groundwater Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of groundwater are purged prior to sampling. Purging continues until groundwater pH, conductivity, and temperature have stabilized. Groundwater samples are collected using bailers or pumps and 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 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

Waste Handling and Disposal

Soil cuttings from drilling activities are usually stockpiled onsite and covered by plastic sheeting. At least three individual soil samples are collected from the stockpiles and composited at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples in addition to any analytes required by the receiving disposal facility. Soil cuttings are transported by licensed waste haulers and disposed in secure, licensed facilities based on the composite analytic results.

Groundwater removed during development and sampling is typically 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. Upon receipt of analytic results, 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.