Aaron Costa
Project Manager
Marketing Business Unit

Chevron Environmental Management Company
6111 Bollinger Canyon Road
San Ramon, CA 94583
Tel (925) 543-2961
Fax (925) 543-2324
acosta@chevron.com

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

Re: Chevron Service Station No. 9-1153
3135 Gibbons Drive (3126 Fernside Blvd)
Alameda, CA

I have reviewed the attached report dated September 30, 2010.

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 to the best of my knowledge.

Sincerely,

Aaron Costa
Project Manager

Attachment: Report

PREFERENTIAL PATHWAY STUDY AND WELL SURVEY REPORT

FORMER CHEVRON SERVICE STATION 9-1153
3135 GIBBONS DRIVE (3126 FERNSIDE BOULEVARD)
ALAMEDA, CALIFORNIA
Fuel Leak Case RO0000341

Prepared For:

Mr. Mark Detterman
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Prepared by:
Conestoga-Rovers & Associates

5900 Hollis Street, Suite A
Emeryville, California
U.S.A. 94608

Office: (510) 420-0700
Fax: (510) 420-9170

web: http://www.CRAworld.com

SEPTEMBER 30, 2010
REF. NO. 311642 (11)
This report is printed on recycled paper

PREFERENTIAL PATHWAY STUDY AND WELL SURVEY REPORT

FORMER CHEVRON SERVICE STATION 9-1153
3135 GIBBONS DRIVE (3126 FERNSIDE BOULEVARD)
ALAMEDA, CALIFORNIA
Fuel Leak Case RO0000341

Ian Hull

PROFESSIONAL GEOLOGIST
NATHAN S. LEE
No.8486
STATE OF CALIFORNIA

Nathan Lee PG 8486

Prepared by:
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1.0 INTRODUCTION

1.1 GENERAL

Conestoga-Rovers & Associates (CRA) is submitting this *Preferential Pathway Study and Well Survey Report* on behalf of Chevron Environmental Management Company (Chevron) for the site referenced above (Figure 1). This report was requested by the Alameda County Environmental Health Services (ACEH) in a letter dated June 24, 2010 (Appendix A). CRA performed a preferential pathway study to indentify potential pathways for offsite migration. CRA also conducted a survey of wells located within a half mile radius of the site utilizing California Department of Water Resources (DWR) well completion records. These results are presented below along with the site background, conclusions and recommendations.

1.2 SITE BACKGROUND

The site is located on a triangular shaped lot at the intersections of Gibbons Drive, Fernside Boulevard and High Street in Alameda, California (Figure 1). The station operated until June 1986. When station operations ceased, two used-oil underground storage tanks (USTs) and three gasoline USTs were removed. A residence was built on the property in 1989 (Figure 2). Surrounding area use is residential and commercial.

A total of eight soil borings, 10 groundwater monitoring wells, one extraction well, four temporary wells, and seven temporary soil vapor probes have been installed at the site. Groundwater monitoring has been conducted at the site since 1986. A summary of previous environmental investigation and remediation is included in Appendix B.

1.3 SITE GEOLOGY

Soil beneath the site consists primarily of clayey and sandy soils to the total depth explored of approximately 23 feet below grade (fbg). Poorly graded sand is typically encountered onsite from 0 to 5 fbg underlain by silty clay or clayey sand from 5 to 12 fbg and poorly graded sand from 12 to 23 fbg.

1.4 SITE HYDROGEOLOGY

The site is approximately 8 feet above mean sea level. Depth to water in onsite wells ranges from approximately 0 to 6.5 fbg. Groundwater beneath the site is designated as an existing or potential drinking water resource.[1] Groundwater flow direction is typically east-southeast toward the Oakland Alameda Estuary. The estuary is the closest surface water and is approximately 550 feet downgradient. Light non-aqueous phase liquids (LNAPL) are detected in well C-1, ranging in thickness during 2010 from 0.04 to 0.25 feet.

2.0 NEARBY WELL SURVEY

2.1 SURVEY METHODOLOGY

CRA complied DWR well completion reports to identify wells within a one half mile of the site and used aerial photography to measure approximate distances from the site to each well. All wells farther than one half mile from the site were not included in the survey. Borings and monitoring wells were also excluded.

2.2 SURVEY FINDINGS

No municipal wells were identified. Local water utilities rely on imported water to meet the region's water needs.[1] Nine extraction wells were identified within the survey area and are included because the current use of these wells is unknown. The closest irrigation and domestic wells are greater than 1,000 feet from the site. Several additional wells, such as test wells and a well with an unknown use were also included in the survey results. Details for wells within the survey are presented in Table 1 and shown on Figure 3.

3.0 PREFERENTIAL PATHWAY ANALYSIS

CRA conducted a preferential pathway study to evaluate potential pathways for hydrocarbon migration from the site. CRA contracted NORCAL Geophysical

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[1] East Bay Plain Groundwater Basin Beneficial Use Evaluation Report, Alameda and Contra Costa Counties, California; California Regional Water Quality Control Board – San Francisco Bay Region Groundwater Committee; June 1999.

Consultants, Inc. of Cotati, California to locate the utilities. NORCAL's September 22, 2010 *Geophysical Survey* report is included in Appendix C. CRA also contacted individual utility companies to assess the location, size and depth of all subsurface utilities in the vicinity. Figure 2 presents the approximate location of all known utilities. Major utilities near the site include electric, natural gas, water, communication, storm drain sewer, and sanitary sewer lines.

3.1 ELECTRIC UTILITIES

Underground electric utilities were located onsite and in the surrounding sidewalks and streets. The electrical utilities included electric service to the onsite residence and street lighting electric lines in the street and sidewalks. On September 16, 2010 a representative of Pacific Gas and Electric (PG&E) stated the company is unable to provide the exact depth of their utility lines. However, PG&E estimated, and NORCAL confirmed with electronic locating equipment, that the electric lines were approximately 1.5 fbg.

3.2 NATURAL GAS UTILITIES

The natural gas lateral connecting to the residence was located by PG&E and NORCAL. Two natural gas mains were also identified: one in the sidewalk of Fernside Boulevard and a second in the southern portion of Gibbons Drive. PG&E could not provide exact depth measurements of their utilities; however, they estimated the lines were located between 1.5 and 2 fbg and NORCAL confirmed these depths.

3.3 WATER UTILITIES

Water line locations were determined by NORCAL, provided by water utility companies and gathered from previous reports. The depths of the water lines onsite were estimated by NORCAL to be no deeper than 3 fbg. The depths of offsite water lines could not be determined. Generally onsite and offsite water lines should be at relatively the same depths.

3.4 COMMUNICATION UTILITIES

NORCAL and the utility companies identified a communication line connecting to the residence from High Street. The communication line intercepts the electrical line in the street and is most likely at the same depth as the electrical line which was confirmed at 1.5 fbg.

3.5 STORM DRAIN UTILITIES

Storm drain utilities were identified in the field by NORCAL and confirmed by utility maps from previous reports. Offsite municipal catch basins and storm drain lines were identified visually in the field. The depths of the storm drain lines range from approximately 4 to 6 fbg.

A concrete-lined sump is located onsite near well C-3. Rainwater from the roof gutters drains into the sump and an electric submersible pump discharges to the curb along Gibbons Drive. The discharge line was located using Ground Penetrating Radar (GPR) and is approximately 1 fbg.

3.6 SANITARY SEWER UTILITIES

Sanity sewer locations onsite were determined by NORCAL using visual methods since GPR could not locate the utility. According to NOCAL, the sanitary sewer lateral onsite is buried deeper than 2 fbg, but probably above 4 fbg. Offsite sanitary sewer locations were provided in previous reports and confirmed by East Bay Municipal Utility District (EBMUD). According to EBMUD, the sanitary sewers are approximately 8 fbg near the site.

3.7 PREFERENTIAL PATHWAY STUDY RESULTS

Depth to groundwater onsite has ranged from approximately 0 to 6.5 fbg (C-1) since monitoring began in 1986. The average depth to groundwater onsite is approximately 3.5 fbg. Groundwater flow direction is primarily to the east-southeast. Utilities identified during this study range in depth from approximately 1 to 8 fbg. Based on the typical groundwater elevation, groundwater flow direction and historical groundwater hydrocarbon concentration data, the utilities on and in the vicinity of the site are not acting as significant pathways for hydrocarbon migration. This includes the storm and

sanitary sewers in High Street based on historical hydrocarbon concentrations in well MW-10.

4.0 CONCLUSIONS

Well Survey

The closest wells of concern are over 1,000 feet from the site. These wells are either up gradient or located in Oakland across the Oakland Alameda Estuary. The wells identified in the survey are not a risk from hydrocarbons originating from the site.

Preferential Pathway Analysis

CRA located electric, natural gas, water, communication, storm drain sewer, and sanitary sewer lines near the site. Although some of these utilities intersect the groundwater table, hydrocarbon concentrations in monitoring wells indicate that utilities are not acting as significant pathways for hydrocarbon migration.

5.0 RECOMMENDATIONS

On August 17, 2010 CRA met with the property owners and determined that the house was built on top of a ventilated crawl space. The vapor intrusion pathway is incomplete due to the crawl space and additional soil vapor assessment is not required.

As requested CRA will evaluate multiple remedial options and submit a Feasibility Study by November 30, 2010.

FIGURES

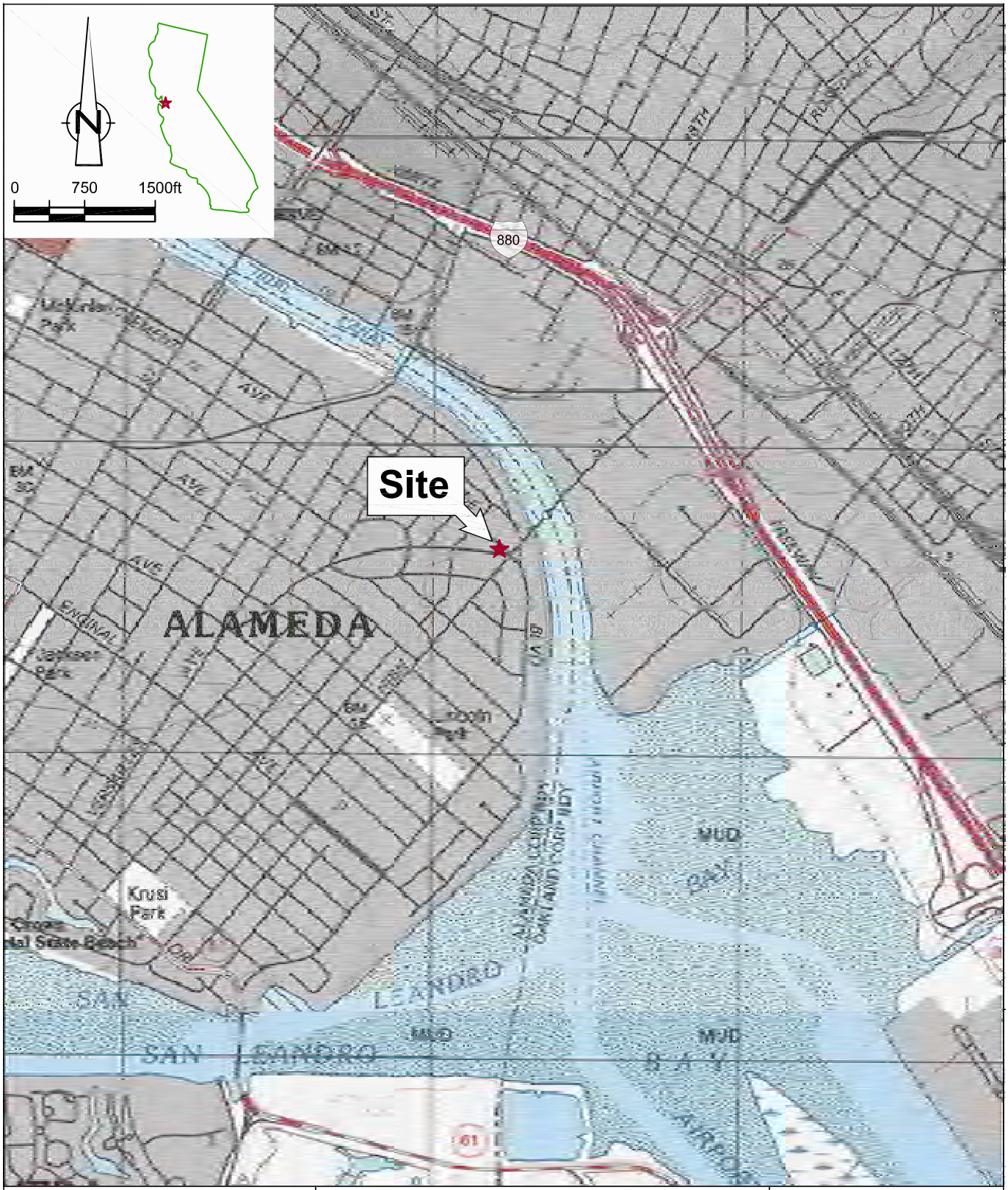
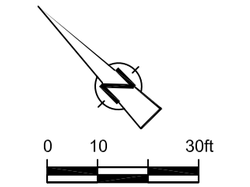
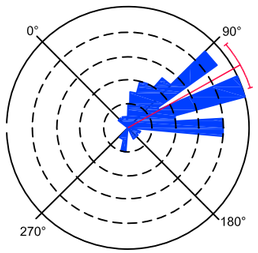


Figure 1

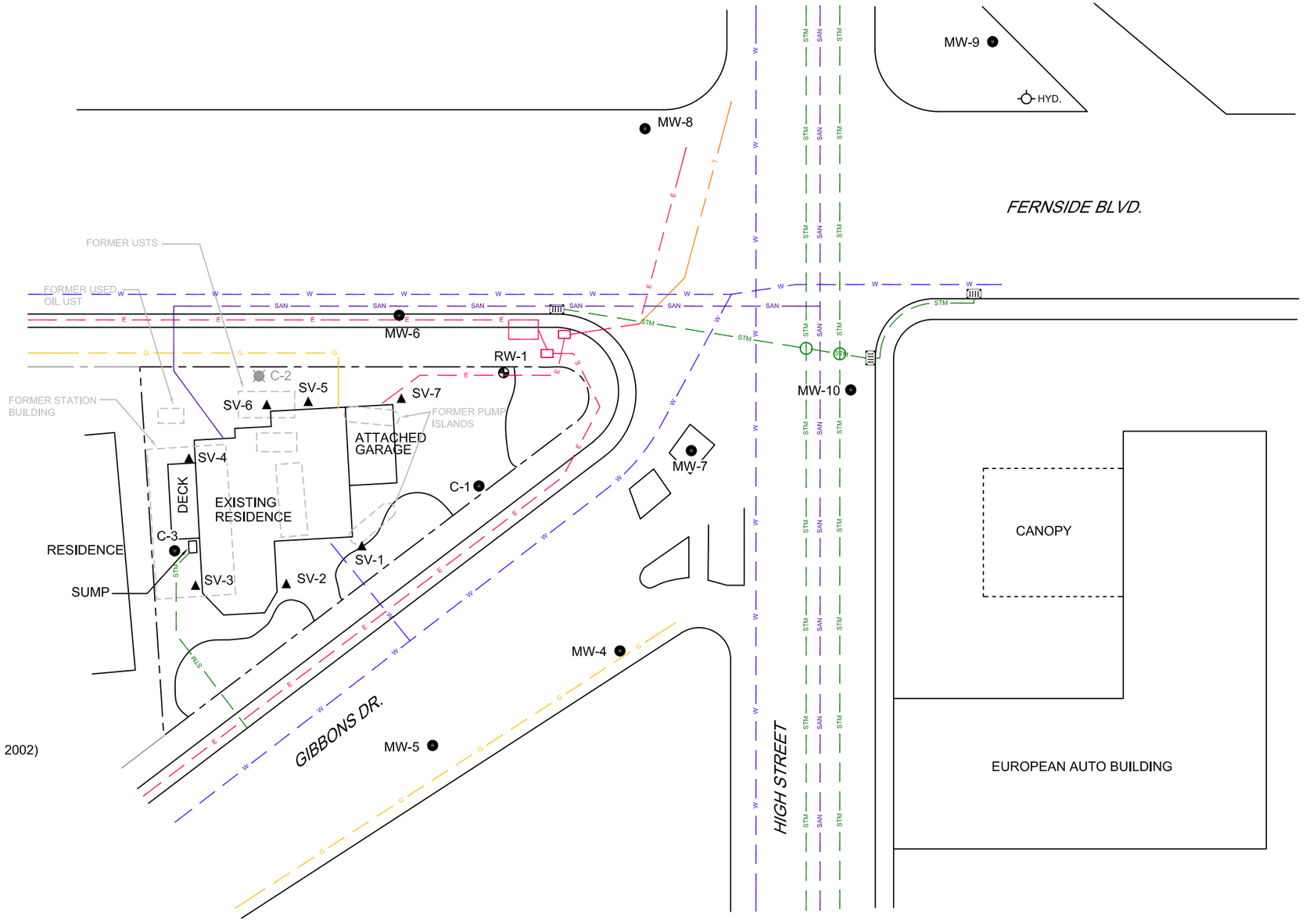
VICINITY MAP
FORMER CHEVRON STTION 9-1153
3135 GIBBONS DRIVE (3126 FERNSIDE BLVD)
Alameda, California

I:\Chevron\3116--\311642 9-1153 Alameda\311642-FIGURES\311642-2010 GN-EM001.DWG





GROUNDWATER FLOW DIRECTION
1986 - 2Q2010



LEGEND

MW-1 ●	MONITORING WELL LOCATION
RW-1 ⊕	EXTRACTION WELL LOCATION
C-2 ✳	DESTROYED WELL LOCATION
SV-1 ▲	SOIL VAPOR SAMPLE LOCATION (G-R, 2002)
E	ELECTRICAL LINE
G	GAS LINE
W	WATER LINE
T	COMMUNICATIONS LINE
STM	STORM DRAIN LINE
SAN	SANITARY SEWER LINE

Figure 2

SITE PLAN with UTILITIES
FORMER CHEVRON SERVICE STATION 9-1153
3135 GIBBONS DRIVE (3126 FERNSIDE BLVD)
Alameda, California

311642-2010 GN-EM002 SEP 22/2010

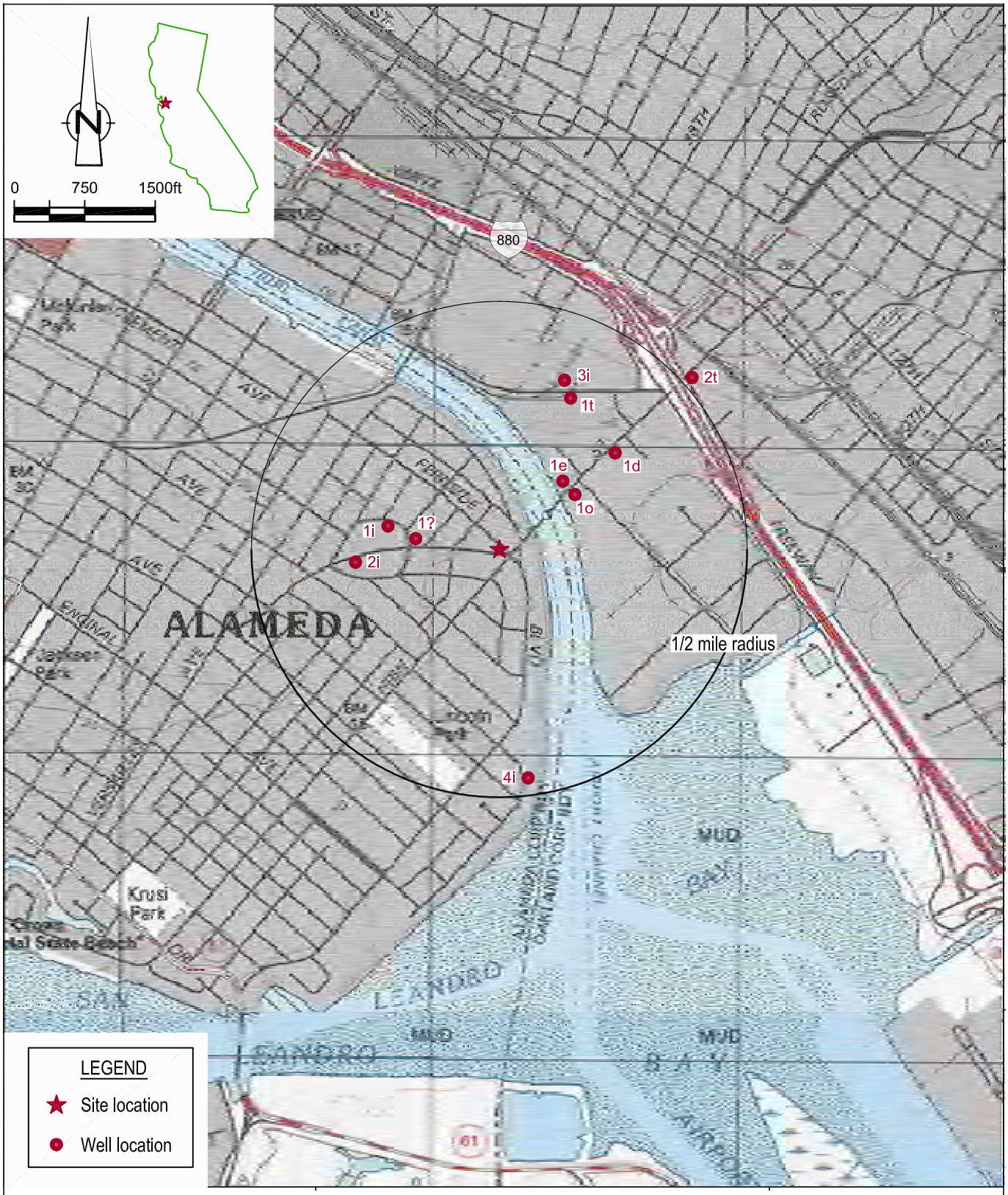


Figure 3

WELL SURVEY MAP
FORMER CHEVRON STTION 9-1153
3135 GIBBONS DRIVE (3126 FERNSIDE BLVD)
Alameda, California

I:\Chevron\3116--\311642 9-1153 Alameda\311642-FIGURES\311642-2010 GN-EM003.DWG

TABLE

TABLE 1

WELL SURVEY RESULTS
FORMER CHEVRON SERVICE STATION #9-1153
3135 GIBBONS DRIVE (3126 FERNSIDE BLVD.), ALAMEDA, CALIFORNIA

Well ID	*Well Address*	*City*	*Well Use*	*Distance From Site* (ft)*	*Total Depth (fbg)*
1?	3001 Gibbons Dr	Alameda	?	850	49
1e	401 High St	Oakland	EXT	950	31
1e	401 High St	Oakland	EXT	950	31
1e	401 High St	Oakland	EXT	950	29
1e	401 High St	Oakland	EXT	950	31
1e	401 High St	Oakland	EXT	950	29
1e	401 High St	Oakland	EXT	950	29
1e	401 High St	Oakland	EXT	950	31
1e	401 High St	Oakland	EXT	950	30
1e	401 High St	Oakland	EXT	950	33
1o	301 - 411 High St	Oakland	OTH	970	32
1i	2978 Northwood Dr	Alameda	IRR	1,180	55
2i	2936 Gibbons Dr	Alameda	IRR	1,490	40
1d	500 High St	Oakland	DOM	2,000	127
3i	3801 E 8th St	Oakland	IRR	2,350	180
1t	3801 E 8th St	Oakland	TES	2,350	23
4i	1522 E Shore Dr	Alameda	IRR	2,420	17
2t	720 High St	Oakland	TES	2,700	17

TABLE 1

WELL SURVEY RESULTS
FORMER CHEVRON SERVICE STATION #9-1153
3135 GIBBONS DRIVE (3126 FERNSIDE BLVD.), ALAMEDA, CALIFORNIA

Well ID	*Well Address*	*City*	*Well Use*	*Distance From Site* (ft)*	*Total Depth (fbg)*

Notes/Abbreviations:
Well survey radius is 2,500 feet from the site. Results tabulated from a survey of Department of Water Resources Well Completion Reports conducted on July 20, 2010.
Ft = Feet.
Fbg = Feet below grade.
Well use/desginations include: domestic (DOM), irrigation (IRR), test (TES), extraction/vapor (EXT), no information found or given (?), and other (OTH).
* = Distances from site are approximate and measured using aerial photography.
-- = Not available/not applicable.
Note: Only MUN, DOM, IRR, EXT, TES, ABN, OTH and ? Wells included. Other types are not sensitive receptors.

APPENDIX A

JUNE 24, 2010 ALAMEDA COUTNY ENVIRONMENTAL HEALTH SERVICES LETTER

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

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

June 24, 2010

Mr. Aaron Costa
Chevron Corporation
6111 Bollinger Canyon Road, Rm 3660
San Ramon, CA
(sent via electronic mail to acosta@chevron.com)

Mr. Mark Hom and Anna Cheng
3135 Gibbons Drive
Alameda, CA, 94501-1749

JL and Jane Bolton
3135 Gibbons Drive
Alameda, CA 94501-1749

Subject: Approval of Vapor Survey With Modifications and Request for Feasibility Study; Fuel Leak Case No. RO0000341; (Global ID # T0600100330); Chevron #9-1153, (3126 Fernside Blvd), 3135 Gibbons Drive, Alameda, CA 94501

Ladies and Gentlemen:

Alameda County Environmental Health Department (ACEH) staff has reviewed the case file, and the most recently submitted reports prepared by Conestoga-Rovers & Associates (CRA) for this site, *Work Plan for Remediation and Vapor Survey*, dated January 14, 2010; *Fourth Quarter 2009 Groundwater Monitoring Report,* dated April 30, 2010; and *First Quarter 2010 Groundwater Monitoring Report,* dated May 5, 2010. Thank you for submitting the reports, and thank you for forwarding extraction trench construction design documents in the work plan. As you are aware, this is a residential property. During the October 2008 sampling event approximately 0.4 feet of free phase (FP) petroleum hydrocarbon was detected in onsite monitoring well C-1. Between September 2008 and December 2008 free-phase was again present in this well at increased thicknesses in comparison to previous monthly measurements. The recently submitted reports document a reduction in FP thickness in well C-1 since approximately February 2009.

Based on Alameda County Environmental Health (ACEH) staff review of the work plan we request additional information prior to initiation of the proposed scope of work for the surfactant pilot test; however, are in general agreement with the sub-slab soil vapor scope of work. We request that you address the following technical comments regarding the proposed surfactant work, perform the proposed soil vapor work, and send us the technical reports requested below. Please provide 72-hour advance written notification to this office (e-mail preferred to: mark.detterman@acgov.org) prior to the start of field activities.

TECHNICAL COMMENTS

1. **Surfactant Injection and Extraction**. The work plan proposes to conduct a pilot test in well C-1 using the surfactant Gold Crew Release© in an effort to decrease the surface tension between the FP and water, allowing desorption of residual FP from saturated soil. The surfactant is also reported to be biodegradable and of food-grade quality. Due to the shallow depth of groundwater, the work is planned to occur near the end of the dry season during the annual low groundwater level, (i.e. early fall). The approach is intriguing; however, ACEH has a number of concerns that require a better understanding prior to initiation of the pilot test. Please address the following comments and submit the requested items:

a. **Preferential Pathway Evaluation -** ACEH is concerned that the flow of groundwater (and potentially injected fluids), may not be adequately understood in the vicinity of the site. This can be more critical at the site due to downgradient close proximity of the Oakland – Alameda Estuary; a straight-line distance of under approximately 400 feet by utility conduits. Underground utilities downgradient and in the site vicinity appear to range between approximately 1.5 to 3.6 feet below grade surface, and depths to groundwater have been generally within that range. In conjunction with these observations are notes contained on old bore logs (e.g. C-1 and B-1) that appear to indicate significant hydrocarbon impacts in these depth ranges. Should the injection of surfactant successfully liberate adsorbed free-phase, unintended flow along preferential pathways may occur. As a consequence, please conduct a preferential pathway survey including a conduit and well survey. Utility laterals emanating from vicinity parcels, onsite utility corridors, storm drop inlets, and buried PG&E lines are to be included. Please evaluate the potential for fluid flow along all potential conduits; please note several gradient maps suggest flow towards to a drop box on the far side of High Street from the site. Available sources of information include the May 15, 1996 *Evaluation of Potential Migration Pathway via Buried Utilities* which did not evaluate laterals, onsite corridors, or PG&E lines at the site and vicinity and the June 26, 1996 *Geophysical Investigation for Buried Underground Storage Tanks*; copies can be found on the ACEH website.

   As a part of the preferential pathway study please include the results of a well survey. A *Well Completion Report Release Agreement* form was submitted to, and approved by, ACEH in January 2009, but results have not been forwarded.

b. **Justification of Pilot Test Appropriateness -** Please also note that ACEH is not convinced that the proposed interim remediation pilot test could not be described as a spot treatment of one or more wells, and not of the site, due to the depth of impacted soil as described in older bore logs including those noted above, and previously observed flow patterns at the site. Considering the site is close to the estuary and is a residential property the use of surfactant appears to be inappropriate remedial technology, and that other options would be more appropriate; in particular when coupled with wells currently spaced a minimum of 50 feet apart and intervening underground utility lines. Significant unintended flow of liberated product can occur prior to recognition or could be missed completely with the existing well network. As a consequence, a denser monitoring well network would be required.

   Please evaluate interim use of skimmers or socks in well C-1 as temporary measures to increase the capture of free product at the site between site visits; they do not appear to be utilized currently.

   Please justify the evaluation of this potential interim remedial alternative in lieu of other options such as the pilot testing of vapor extraction, dual-phase extraction, or other potentially appropriate remedial options as a part of a Feasibility Study (FS). The FS, prepared in accordance with Title 23, California Code of Regulations, Section 2725, must include a concise background of soil and groundwater investigations performed in connection with this case and an assessment of the residual impacts of the chemicals of concern (COCs) for the site and the surrounding area where the unauthorized release has migrated or may migrate. The FS should also include, but not limited to, a detailed description of site lithology, including soil permeability, and most importantly, contamination cleanup levels and cleanup goals, in accordance with the San Francisco Regional Water Quality Control Board (SFRWQCB) Basin Plan and appropriate environmental screening levels (ESL) guidance for all COCs and for the appropriate groundwater designation. Please note

that soil cleanup levels should ultimately (within a reasonable timeframe) achieve water quality control objectives (cleanup goals) for groundwater in accordance with the SFRWQCB Basin Plan. Please propose appropriate cleanup levels and cleanup goals and the timeframe to reach these levels and goals in accordance with 23 CCF Section 2725, 2726, and 2727 in the FS/CAP for active remediation and final cleanup goals. These can be applicable and justified ESLs or calculated site-specific risk-based cleanup goals and water quality objectives.

The FS/CAP must evaluate at least three viable alternatives for remedying or mitigating the actual or potential adverse affects of the unauthorized release(s) besides the 'no action' and 'monitored natural attenuation' remedial alternatives. Each alternative shall be evaluated for cost-effectiveness and the Responsible Party must propose the most cost-effective corrective action and shortest timeframe to reach water quality objectives (cleanup goals).

2. **Installation of Vapor Points.** Due to the shallowness of groundwater at the site the installation of "permanent" single depth sub-slab vapor probes, at both indoor and outdoor locations, was proposed in the work plan. Indoor and outdoor background air sampling is also proposed after completion of a Building Survey Form to help identify sources of contaminants derived from consumer products. The number of probes, probe locations, and location of ambient indoor and outdoor air sampling were proposed to be identified after incorporation of utility corridors, the residential site plan, and other site features, and then submitted for ACEH concurrence prior to work initiation. The approach described in the work plan generally appears reasonable. Please incorporate sub-slab sampling protocols contained in Appendix G of the DTSC *Interim Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor* Air, dated December 15, 2004, revised February 7, 2005. For all consumer products identified during the building survey please include a list of active or known inactive ingredients in the resulting report.

TECHNICAL REPORT REQUEST

Please submit technical reports to Alameda County Environmental Health (Attention: Mr. Mark Detterman), according to the following schedule:

- **July 30, 2010** - Preferential Pathway Survey and proposed vapor points
- **August 20, 2010** – Feasibility Study
- **September 20, 2010** – Vapor Survey Report
- **30 days after approval of Feasibility Study** – Pilot Test Work Plan
- **60 days after approval of Pilot Test Work Plan** – Interim Corrective Action 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.

Should you have any questions, do not hesitate to call me at (510) 567-6876.

Sincerely,

Digitally signed by Mark E. Detterman
DN: cn=Mark E. Detterman, c=US
Date: 2010.06.24 10:58:21 -07'00'

Mark E. Detterman, PG, CEG
Hazardous Materials Specialist

cc: Nathan Lee, Conestoga-Rovers & Assoc., 5900 Hollis Street, Suite A, Emeryville, CA 94608 (sent via electronic mail to NLee@craworld.com)

Donna Drogos (sent via electronic mail to donna.drogos@acgov.org),
Mark Detterman (sent via electronic mail to mark.detterman@acgov.org),
File

Attachment 1

Responsible Party(ies) Legal Requirements / Obligations

REPORT REQUESTS

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 Cleanup Oversight Program FTP site are provided on the attached "Electronic Report Upload Instructions." 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. 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.

Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC)	**ISSUE DATE:** July 5, 2005
	REVISION DATE: March 27, 2009
	PREVIOUS REVISIONS: December 16, 2005, October 31, 2005
SECTION: Miscellaneous Administrative Topics & Procedures	**SUBJECT:** Electronic Report Upload (ftp) Instructions

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.

REQUIREMENTS

- Entire report including cover letter must be submitted to the ftp site as **a single portable document format (PDF) with no password protection**. (Please do not submit reports as attachments to electronic mail.)
- It is **preferable** that reports be converted to PDF format from their original format, (e.g., Microsoft Word) rather than scanned.
- Signature pages and perjury statements **must** be included and have either original or electronic signature.
- **Do not password protect the document**. Once indexed and inserted into the correct electronic case file, the document will be secured in compliance with the County's current security standards and a password. **Documents with password protection will not be accepted**.
- Each page in the PDF document should be rotated in the direction that will make it easiest to read on a computer monitor.
- Reports must be named and saved using the following naming convention:
  RO#_Report Name_Year-Month-Date (e.g., RO#5555_WorkPlan_2005-06-14)

Additional Recommendations

- A separate copy of the tables in the document should be submitted by e-mail to your Caseworker in **Excel** format. These are for use by assigned Caseworker only.

Submission Instructions

1) Obtain User Name and Password:
   a) Contact the Alameda County Environmental Health Department to obtain a User Name and Password to upload files to the ftp site.
      i) Send an e-mail to dehloptoxic@acgov.org
         Or
      ii) Send a fax on company letterhead to (510) 337-9335, to the attention of My Le Huynh.
   b) In the subject line of your request, be sure to include **"ftp PASSWORD REQUEST"** and in the body of your request, include the **Contact Information, Site Addresses**, and the **Case Numbers (RO# available in Geotracker) you will be posting for**.

2) Upload Files to the ftp Site
   a) Using Internet Explorer (IE4+), go to ftp://alcoftp1.acgov.org
      (i) Note: Netscape and Firefox browsers will not open the FTP site.
   b) Click on File, then on Login As.
   c) Enter your User Name and Password. (Note: Both are Case Sensitive.)
   d) Open "My Computer" on your computer and navigate to the file(s) you wish to upload to the ftp site.
   e) With both "My Computer" and the ftp site open in separate windows, drag and drop the file(s) from "My Computer" to the ftp window.

3) Send E-mail Notifications to the Environmental Cleanup Oversight Programs
   a) Send email to dehloptoxic@acgov.org notify us that you have placed a report on our ftp site.
   b) Copy your Caseworker on the e-mail. Your Caseworker's e-mail address is the entire first name then a period and entire last name @acgov.org. (e.g., firstname.lastname@acgov.org)
   c) The subject line of the e-mail must start with the RO# followed by **Report Upload**. (e.g., Subject: RO1234 Report Upload) If site is a new case without an RO# use the street address instead.
   d) If your document meets the above requirements and you follow the submission instructions, you will receive a notification by email indicating that your document was successfully uploaded to the ftp site.

APPENDIX B

PREVIOUS ENVIRONMENTAL INVESTIGATION AND REMEDIATION

PREVIOUS ENVIRONMENTAL INVESTIGATION AND REMEDIATION

1986 UST Removal and Excavation

The underground storage tanks (USTs) were removed and an unreported volume of soil was excavated from the former UST pit and product line trenches. Excavated soil was aerated onsite and used as backfill. Additional information is available in Blaine Tech Services, Inc.'s June 19, 1986 *Field Sampling* report and Weiss Associates' (Weiss) December 20, 1994 *Comprehensive Site Evaluation and Proposed Future Action Plan*.

1986 Well Installation

Wells C-1 through C-3 were installed onsite. Additional information is available in Emcon Associates' September 18, 1986 *Well Installation Memorandum*.

1987 Area Well Survey

In August 1987, Pacific Environmental Group, Inc. (PEG) conducted a well survey and indentified wells within approximately 0.5 mile of the site. The majority of these wells were used for groundwater monitoring or cathodic protection and some were used for irrigation. None of the wells were listed as municipal drinking water supply wells. Additional information is available in PEG's August 12, 1987 *Well Survey Report*.

1989 House Construction and Destruction of Monitoring Well C-2

According to Weiss' December 20, 1994 *Comprehensive Site Evaluation and Proposed Future Action Plan*, a majority of the soil beneath the planned residence footprint was removed for construction in early 1989. Groundwater monitoring well C-2 was apparently destroyed during construction prior to May 1989. Additional information is available in Weiss' December 20, 1994 *Comprehensive Site Evaluation and Proposed Future Action Plan*.

1987 and 1989 Soil Vapor Survey

Soil vapor surveys were conducted to quantify vapor intrusion to indoor air risks for onsite residents. Based on vapor concentrations from samples collected from the southeastern portion of the site, a vapor barrier was recommended for any structures. Additional information is available in EA Engineering's August 19, 1987 *Risk Assessment* and June 9, 1989 *Soil vapor Contaminant Assessment Report of Investigation*.

1989 Subsurface Investigation

In July 1989, EA collected soil samples from between 0.5 and 9.5 feet below grade (fbg) in five shallow onsite borings and three shallow offsite borings (SB1 through SB8). The highest concentrations of total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene and xylenes (BTEX) were found in the areas east of the UST complex and pump

islands. Additional information is available in Weiss' December 20, 1994 *Comprehensive Site Evaluation and Proposed Future Action Plan*.

1991 Groundwater Treatment

A groundwater pump and treat system was installed and operated by EA from 1991 to 1994. The system extracted groundwater from a recovery trench and extraction well RW-1. Additional information is available in Weiss' December 20, 1994 *Comprehensive Site Evaluation and Proposed Future Action Plan*.

1992 Well Installations

Offsite wells MW-4 through MW-6 were installed to further delineate the lateral extent of dissolved hydrocarbons. Additional information is available in Groundwater Technology Inc.'s (GTI) July 16, 1992 *Environmental Assessment Report*.

1993 Offsite Groundwater Sampling

Weiss collected groundwater samples from three temporary offsite borings crossgradient and downgradient of the groundwater extraction trench. Additional information is available in Weiss' December 20, 1994 *Comprehensive Site Evaluation and Proposed Future Action Plan*..

1993 Monitoring Well Installation

On November 11, 1993 GTI installed groundwater monitoring well MW-7 and temporary monitoring well TMW-1 to further characterize the distribution of hydrocarbons in soil and groundwater upgradient and downgradient of the site. Additional information is available in GTI's January 31, 1994 *Additional Environmental Assessment Report*.

1994 Site Evaluation and Proposed Further Action

At Chevron's request, Weiss prepared a site evaluation to summarize all investigative and remedial actions performed to date and to outline a recommended future action plan. Additional information is available in WA's December 20, 1994 *Site Evaluation and Proposed Further Action Plan*.

1995 Well Installations

Wells MW-8 through MW-10 were installed to further delineate the downgradient extent of hydrocarbons in groundwater. Groundwater samples were not collected during this investigation, but were collected during subsequent groundwater sampling events. Additional information is available in GTI's October 31, 1995 *Additional Site Assessment Report*.

1996 Evaluation for Potential Migration Pathway via Buried Utility Pipelines

Fluor Daniel GTI (FD-GTI) compiled utility location and depth information to analyze the potential for offsite migration of dissolved hydrocarbons. The report concluded that several

utilities penetrated groundwater, but that these utilities were not acting as preferential pathways. The report states that the buried utilities were installed in materials similar to native soil at the site and that monitoring well data near the utilities showed no elevated hydrocarbon concentrations. Additional information is available in FD-GTI's May 15, 1996 *Evaluation for Potential Migration Pathway via Buried Utility Pipelines*.

1996 Geophysical Investigation for Buried Underground Storage Tanks

FD-GTI performed a geophysical survey of approximately 70 feet of sidewalk along Gibbons Boulevard and near monitoring well C-1. Both ground penetrating radar and vertical magnetic gradiometer were used. No buried underground storage tanks were identified within the survey areas. Additional information is available in FD-GTI's July 8, 1996 *Geophysical Investigation for Buried Underground Storage Tanks*.

1997 Shallow Soil Investigation

Shallow soil samples S-1 through S-15 were collected along the north, west, and east property boundaries to assess lead concentrations in onsite soil. Additional information is available in Gettler-Ryan's (G-R) October 22, 1997 *Soil Sampling Report*.

1997 ORC and Peroxide Injection

Oxygen releasing compound (ORC) and hydrogen peroxide were placed in the three onsite wells to treat light non-aqueous phase liquids. Additional information is available in ChevronTexaco Energy Research and Technology Company's (Chevron ETC) May 2003 *Risk-Based Corrective Action Evaluation of Vapor Intrusion to Indoor Air from Soil Vapor*,

1998 Bio-Parameter Evaluation

Three samples collected during the third quarter 1998 groundwater monitoring event were analyzed for bio-parameter data to evaluate biodegradation processes. The report concluded that not enough parameters indicated biodegradation was occurring. However, the report states that the recently added ORC and hydrogen peroxide would potentially increase bioremediation. Additional information is available in Chevron's September 29, 1998 *Bio-Remediation Evaluation Letter*.

1999 Hydrogen Peroxide Injection

In July 1999, Cambria Environmental Technology (Cambria) injected a hydrogen peroxide solution into well C-1 to oxidize residual hydrocarbons. Groundwater was first bailed from the well and then hydrogen peroxide solutions were injected. Additional information is available in Cambria's July 12, 1999 *Hydrogen Peroxide Injection* report.

2001 to 2002 Groundwater Extraction Events

Five groundwater extraction events were conducted. These events were discontinued because of inconvenience to the resident. Additional Information available in Chevron ETC's May 2003 *Risk-Based Corrective Action Evaluation of Vapor Intrusion to Indoor Air from Soil Vapor*.

2002-2003 Vapor Intrusion Study and Risk-Based Correction Action Evaluation of Vapor Intrusion to Indoor Air from Soil Vapor

Seven borings (SV-1 through SV-7) were hand-augered along the edges of the current building. Soil-vapor samples were collected from temporary probes installed in undisturbed soil adjacent to each boring. These data were used to evaluate potential indoor air risks to onsite residents. Risks were assessed for potential residential exposure and were compared to the United States Environmental Protection Agency's established target risk levels for adults and children. The report concludes that vapor intrusion risks from soil vapor intrusion to indoor air were well below the established guidelines. Additional information is available in Chevron ETC's May 2003 *Risk-Based Corrective Action Evaluation of Vapor Intrusion to Indoor Air from Soil Vapor*.

APPENDIX C

SEPTEMBER 22, 2010 NORCAL UTILITY INVESTIGATION REPORT

NORCAL GEOPHYSICAL CONSULTANTS, INC.

September 22, 2010

Mr. Ian Hull
Conestoga-Rovers & Associates
5900 Hollis Street, Suite A
Emeryville, CA 94608

Subject: Utility Investigation
Chevron 9-1153, 3135 Gibbons Dr, Alameda, California
NORCAL Job No. 10-462.69

Dear Mr. Hull:

This report presents the findings of a utility investigation performed by NORCAL Geophysical Consultants, Inc. at the former Chevron property in Alameda, CA. The field survey was conducted on September 16, 2010 by NORCAL California Professional Geophysicist Donald J. Kirker. Site information and logistics were provided by Ian Hull and Nathan Lee of Conestoga-Rovers & Associates (CRA).

1.0 PURPOSE AND SITE DESCRIPTION

Site information, provided by CRA, indicates that a Chevron station occupied the subject property prior to the construction of the present house. Subsurface work associated with the former Chevron station has been ongoing by CRA. Since documentation showing the routing of present underground utilities is not available, the purpose of the utility investigation is to locate all detectable utilities associated with the house within the designated survey boundary.

The utility investigation, as specified by CRA, was conducted over the perimeter sidewalk and on accessible portions of the property located outside of the residential structure. Noticeable features include a small catch basin (sump) on the west side of the house, and valve boxes and utility vaults throughout the property. The valve boxes and utility vaults indicate that electric, water, telephone, sanitary sewer, and roof drains, are associated with the house. The surface trace of an electric line associated with street lighting was marked by others on the sidewalk.

2.0 METHODOLOGY

We used the electromagnetic line locating/metal detection (EMLL) and ground penetrating radar (GPR) methods. The EMLL method was used in the electromagnetic conduction, ambient and metal detection (MD) modes. The conduction mode is used to locate metal utilities that are accessible from the surface in at least one location. This is typically done by applying a current to a line by directly connecting the transmitter to the exposed utility through a vault or a hose bib. The

ambient procedure is used to locate utilities that exhibit currents already flowing on the line (passive signals). The most common passive signals are generated by live electric lines, water lines acting as electrical grounds, and metal pipes re-radiated radio signals. The metal detection mode is used to locate metal utilities that are not accessible at the surface. This is done by holding the transmitter-receiver unit above the ground and continuously scanning over the surface. Metallic utilities will produce a response indicating when the unit is directly over the metal object.

The GPR method was used to confirm the location of the utilities detected with the EMLL, and to locate possible non-metallic utilities. Since GPR depth of detection is based on site specific soil conditions, not all subsurface features are detectable. Descriptions of the EMLL and GPR methods are provided in Appendix A.

3.0 LIMITATIONS

3.1 ELECTROMAGNETIC LINE LOCATING

The detection of underground utilities is dependent upon the composition and construction of the line of interest, as well as depth. Utilities detectable with standard line location techniques include any continuously connected metal pipes, cables/wires or utilities with tracer wires. Unless carrying a passive current these utilities must be exposed at the surface or accessible in utility vaults. These generally include water, electric, natural gas, telephone, and other conduits related to facility operations. Utilities that may not be detectable using standard electromagnetic line location techniques may include certain abandoned utilities, utilities not exposed at the ground surface, or those made of non-electrically conductive materials such as PVC, fiberglass, vitrified clay, and metal pipes with insulating joints. Also, pipes generally deeper than about five to seven feet may not be detected.

3.2 GROUND PENETRATING RADAR

The ability to detect subsurface targets is dependent on site specific conditions. These conditions include depth of burial, the size or diameter of the target, the condition of the specific target in question, the type of backfill material associated with the target, and the surface conditions over the target. Under ideal conditions, the GPR can generally detect objects buried to approximately six feet. However, as the clay content in the subsurface increases, the GPR depth of detection decreases. Therefore, it is possible that on-site soil conditions and target features may limit the depth of detection to the upper two to four feet below ground surface.

4.0 FIELD INVESTIGATIONS

We investigated the subject property for detectable utilities associated with the present house. The findings of the utility survey were marked on the ground with lumber crayon, as designated by CRA.

A brief description of our field procedures are presented below:

A. Site Reconnaissance: We visually inspected the property to locate visible utility vaults, valves, clean-outs, meters, and hose bibs.

B. EMLL Direct Connect and Induction Survey: We traced the natural gas line using the EMLL direct connect and induction methods, as described above.

C. EMLL Ambient Survey: We used the EMLL ambient procedure to investigate the survey area for non-accessible utilities emitting a passive signal, as described above. These included electric, communication, and water.

D. EMLL Metal Detection (MD) Survey: We used the MD systems to investigate for metal utilities that were not accessible at the surface. Since the specific type of utility (i.e. water, gas, etc.) cannot be determined by this method, they are referred to as undifferentiated utilities.

E. GPR Survey: We obtained GPR data over accessible portions of the property, and examined the GPR records for hyperbolic reflection patterns characteristic of underground utilities.

F. Field Documentation: Upon completion of the field survey, we drafted the locations of our findings on a base map provided by CRA. Field measurements along various walls and between the house and property lines indicated that the base map was not accurate. Therefore, the site diagram on Plate 1 should be considered approximate.

5.0 RESULTS

The results of the utility investigation are presented on the Geophysical Survey Map, Plate 1. This map shows the limits of the designated survey area, structures or above ground cultural features that are in close proximity, and the locations of the detected utility alignments.

The results of the EMLL and MD surveys defined the location of water, natural gas, electric, and telecommunications utilities. The water line trends southeast from the house to Gibbons Drive. The natural gas line trends north from the house to the Fernside Blvd sidewalk, then west along the sidewalk. The electric and telecommunications lines trend northeast from the house to the intersection of Fernside Blvd and Gibbons Dr. The GPR survey defined the location of the drain line associated with the sump. As shown on Plate 1, this line trends south from the sump along the west property line then angles towards Gibbons Dr. The outfall is evident in the side of the curb. It should be noted that the sanitary sewer line could not be detected by the GPR because it is buried deeper than the detection capabilities of the equipment. Therefore, the location of the line as shown on Plate 1 is only speculated and based on the position of cleanouts and nearby man-way covers.

6.0 STANDARD CARE AND WARRANTY

The scope of NORCAL's services for this project consisted of using geophysical methods to explore the area of investigation for underground utilities. The accuracy of our findings is subject to specific site conditions and limitations inherent to the techniques used. We performed our services in a manner consistent with the level of skill ordinarily exercised by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, expressed or implied, is made by NORCAL.

We appreciate having the opportunity to provide our geophysical services to Conestoga-Rovers & Associates. If you have any questions, or require additional geophysical services, please do not hesitate to call.

Respectfully,

NORCAL Geophysical Consultants, Inc.

Donald J. Kirker

Donald J. Kirker
Professional Geophysicist, PGp-997

DJK/tt

Enclosure: Plate 1
Appendix A: GEOPHYSICAL METHODOLOGY

Appendix A

GEOPHYSICAL METHODOLOGY

Appendix A

ELECTROMAGNETIC LINE LOCATION/METAL DETECTION (EMLL/MD)

METHODOLOGY

Electromagnetic line location techniques (EMLL) are used to locate the magnetic field resulting from an electric current flowing on a line. These magnetic fields can arise from currents already on the line (passive) or currents applied to a line with a transmitter (active). The most common passive signals are generated by live electric lines and re-radiated radio signals. Active signals can be introduced by connecting the transmitter to the line at accessible locations or by induction.

The detection of underground utilities is affected by the composition and construction of the line in question. Utilities detectable with standard line location techniques include any continuously connected metal pipes, cables/wires or utilities with tracer wires. Unless the utilities carry a passive current, they must be exposed at the surface or in accessible utility vaults. These generally include water, electric, natural gas, telephone, and other conduits related to facility operations. Utilities that are not detectable using standard electromagnetic line location techniques include those made of non-electrically conductive materials such as PVC, fiberglass, vitrified clay, and pipes with insulated connections.

Buried objects can also be detected, without direct contact, by using the metal detection technique (MD). This is used to detect buried near surface metal objects such as rebar, manhole covers, USTs, and various metallic debris. The MD transmitter-receiver unit is held above the ground and continuously scanned over the surface. The unit utilizes two orthogonal coils that are separated by a specified distance. One of the coils transmits an electromagnetic signal (primary magnetic field) which in turn produces a secondary magnetic field about the subsurface metal object. Since the receiver coil is orthogonal to the transmitter coil, it is unaffected by the primary field. Therefore, the secondary magnetic fields produced by buried metal object will generate an audible response from the unit. The peak of this response indicates when the unit is directly over the metal object.

The instrumentation we used for the EMLL and MD survey consists of a Radio Detection RD-400 and a Fisher TW-6 inductive pipe and cable locator.

DATA ANALYSIS

The EMLL/MD instrumentation indicates the presence of buried metal by emitting an audible tone; there are no recorded data to analyze. Therefore, the locations of buried objects detected with these methods are marked on the ground surface during the survey.

LIMITATION

The detection of underground utilities is dependent upon the composition and construction of the line of interest, as well as depth. Utilities detectable with standard line location techniques include any continuously connected metal pipes, cables/wires or utilities with tracer wires. Unless carrying a passive current these utilities must be exposed at the surface or accessible in utility vaults. These generally include water, electric, natural gas, telephone, and other conduits related to facility

operations. Utilities that may not be detectable using standard electromagnetic line location techniques include certain abandoned utilities, utilities not exposed at the ground surface, or those made of non-electrically conductive materials such as PVC, fiberglass, vitrified clay, and metal pipes with insulating joints. Pipes generally deeper than about five to seven feet may not be detected.

GROUND PENETRATING RADAR (GPR)

METHODOLOGY

Ground penetrating radar is a method that provides a continuous, high resolution cross-section depicting variations in the electrical properties of the shallow subsurface. The method is particularly sensitive to variations in electrical conductivity and electrical permittivity (the ability of a material to hold a charge when an electrical field is applied).

The GPR system operates by radiating electromagnetic pulses into the ground from a transducer (antenna) as it is moved along a traverse. Since most earth materials are transparent to electromagnetic energy, the signal spreads downward into the subsurface. However, when the signal encounters a variation in electrical permittivity, a portion of the electromagnetic energy is reflected back to the surface. When the signal encounters a metal object, all of the incident energy is reflected. The reflected signals are received by the same transducer and are printed in cross-section form on a graphical recorder. Changes in subsurface reflection character on the GPR records can provide information regarding the location of USTs, sumps, buried debris, underground utilities, and variations in the shallow stratigraphy.

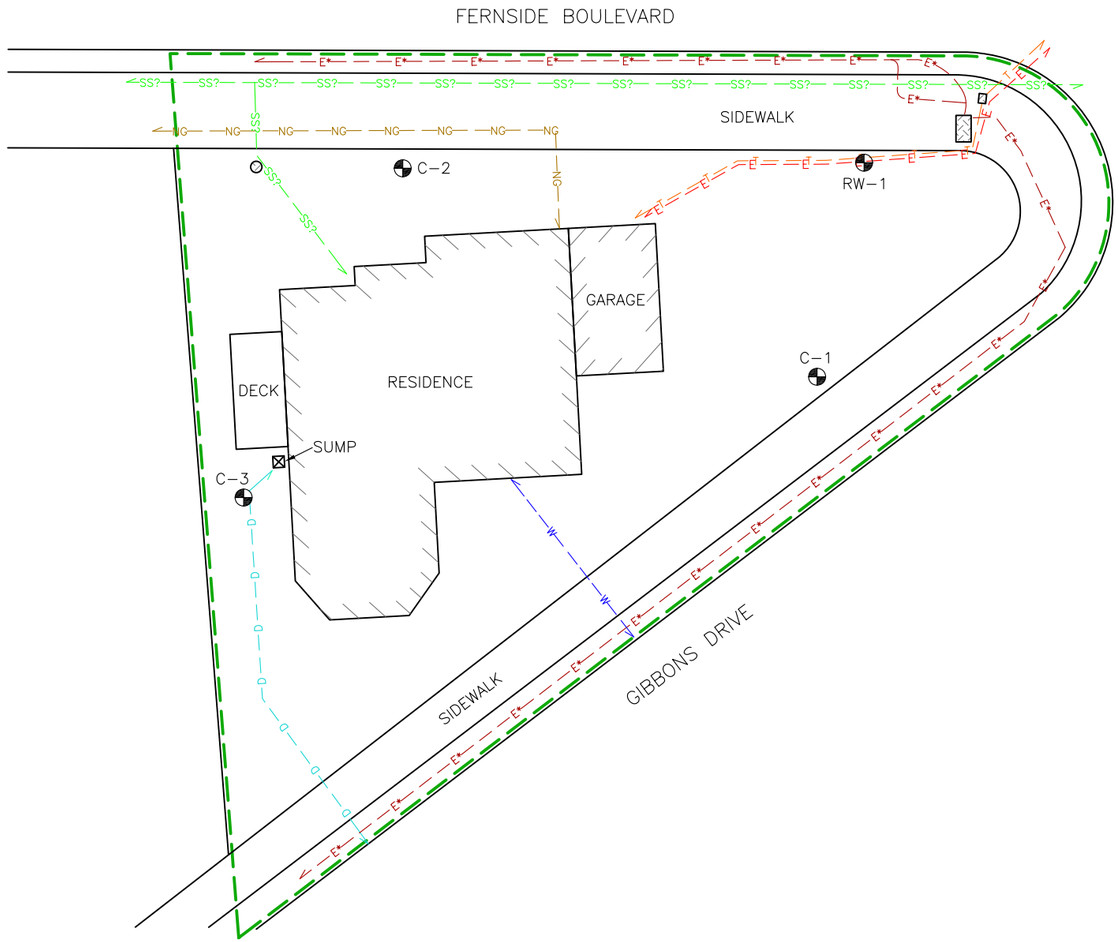
The GPR system used was a Geophysical Survey Systems, Inc. SIR-3000 Subsurface Interface Radar Systems equipped with a 270 megahertz (MHz) transducer, respectively. This transducer is used to provide high resolution at shallow depths.

DATA ANALYSIS

GPR records are examined to identify reflection patterns characteristic of USTs, utilities, septic tanks, and other buried debris. Typically, USTs are manifested by broad localized hyperbolic (upside-down "U" shape) reflection patterns that vary in intensity. The intensity of a reflection pattern is usually dependent upon the condition of the respective UST, its burial depth, and the type of fill over the UST. Utilities and other buried debris are typically manifested by narrow localized hyperbolic reflections that also vary in intensity.

LIMITATIONS

The ability to detect subsurface targets is dependent on site specific conditions. These conditions include depth of burial, the size or diameter of the target, the condition of the specific target in question, the type of backfill material associated with the target, and the surface conditions over the target. Under ideal conditions, the GPR can generally detect objects buried to approximately six feet. However, as the clay content in the subsurface increases, the GPR depth of detection decreases. Therefore, it is possible that on-site soil conditions and target features may limit the depth of detection to the upper one to two feet below ground surface.



APPROXIMATE SCALE

0 10 20 40

(1 inch ≅ 20 feet)

LEGEND

	LIMITS OF GEOPHYSICAL SURVEY
D	DRAIN LINE
E	ELECTRIC LINE
E*	ELECTRIC STREET LIGHT UTILITY LINE (AS MARKED BY OTHERS)
NG	NATURAL GAS LINE
SS?	SUSPECTED SANITARY SEWER LINE
T	TELECOMMUNICATIONS LINE
W	WATER LINE
	BORING/MONITORING WELL
	UTILITY VAULT

NOTE: BASE MAP PROVIDED BY CRA. FIELD MEASUREMENTS CONFIRMED THAT BASE MAP IS NOT ACCURATE. THEREFORE, THE LOCATIONS OF THE DETECTED UTILITIES ARE APPROXIMATE.

NORCAL

GEOPHYSICAL SURVEY MAP
3135 GIBBONS DRIVE

LOCATION: ALAMEDA, CALIFORNIA

CLIENT: CRA

JOB #: 10–462.69

NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: SEP. 2010

DRAWN BY: G.RANDALL

APPROVED BY: DJK

PLATE 1