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GETTLER-RYAN INC.

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TO: Mr. Thomas Bauhs
Chevron Products Company
P.O. Box 6004
San Ramon, CA 95627

DATE: December 4, 2001
PROJ. #: DG90121G.4C01
SUBJECT: Chevron No. 9-0121
3026 Lakeshore Avenue
Oakland, California

FROM:
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On your behalf, a copy of the above referenced workplan is being distributed to the following:

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WORK PLAN FOR ADDITIONAL SUBSURFACE INVESTIGATION

at
Chevron Service Station No. 9-0121
3026 Lakeshore Avenue
Oakland, California

Report No. DG90121G.4C01-1
Delta Project No. DG90-121

Prepared for:

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December 4, 2001

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at
Chevron Service Station No. 9-0121
3026 Lakeshore Avenue
Oakland, California

Report No. DG90121G.4C01-1
Delta Project No. DG90-121

INTRODUCTION

At the request of Chevron Products Company (Chevron), Delta Environmental Consultants, Inc. (Delta) network associate Gettler-Ryan Inc. (GR) has prepared this Work Plan for additional subsurface investigation at the above referenced site (Figure 1). The purpose of this investigation is to delineate the extent of dissolved petroleum hydrocarbons and methyl tert-butyl ether (MtBE) in groundwater southeast of the subject site, determine if buried utility trenches adjacent to the site are acting as preferential pathways for hydrocarbon migration, and evaluate the effectiveness of the plastic barrier located along the southwest site boundary at preventing hydrocarbon migration beneath the adjacent building. To do this GR proposes to install two groundwater monitoring wells southeast of the site, drill three hand-augered soil borings adjacent to surrounding sanitary sewer and storm drain lines, and collect water samples from the basement sump at 3014 Lakeshore Avenue. This work was requested by Alameda County Health Care Services Department of Environmental Health (ACHCS-DEH) in a letter dated October 19, 2001.

The proposed scope of work includes: obtaining the necessary well installation and soil boring permits from the Alameda County Department of Public Works (ACDPW) and encroachment permit from the City of Oakland; updating the site health and safety plan; installing two groundwater monitoring wells; collecting soil samples from the well borings for description and possible analysis; developing and sampling the newly installed groundwater monitoring wells; surveying wellhead elevations and locations; drilling three hand-augered soil borings; collecting grab groundwater samples from the soil borings; collecting a water sample from the basement sump at 3014 Lakeshore Avenue; analyzing selected soil and groundwater samples; and preparing a report which presents the findings of the investigation.

The scope of work described in this report is intended to comply with the State of California Water Resources Control Board's *Leaking Underground Fuel Tanks (LUFT) Manual*, the California Regional Water Quality Control Board (CRWQCB) *Tri-Regional Board Staff Recommendations for Preliminary Investigation and Evaluation of Underground Tank Sites*, and ACHCS-DEH guidelines.

SITE DESCRIPTION

The subject site is an active service station located on the southern corner of the intersection of Lakeshore Avenue and MacArthur Boulevard (Figure 1). Aboveground facilities consist of an island marketer, six dispenser islands located in the central portion of the site, and a storage/restroom building located in the southern corner of the site. Three gasoline underground storage tanks (USTs) and one diesel UST share a common pit near the northern corner of the site. A 7-foot diameter storm drain is located along the southeastern property line. Pertinent site features are shown on Figure 2.

The site is located at the western edge of Piedmont Hills, approximately 800 feet northeast of Lake Merritt and approximately 1.75 miles northeast of the Oakland Inner Harbor. The topography of the site and its northern and western vicinity is relatively flat, however, the surface southeast and east of the site slopes steeply toward the site.

PREVIOUS ENVIRONMENTAL WORK

Chevron began service station operations at the site in the 1950s. In 1967, a 2,000-gallon inventory loss was discovered. The adjacent property owner (presumably at 3014 Lakeshore) complained about gasoline odors in the basement. The steel USTs were replaced with new USTs double wrapped in asphalt. A 32 inch long gash was observed in one of the removed tanks.

In 1980, a tenant in the adjacent building complained of a gasoline odor most likely from the air conditioning system that obtained air from the basement, which created negative pressure in the basement that drew vapor from the subject site. A tank tightness test showed that the USTs at the Chevron site might have had a slight leak. The USTs were replaced with new fiberglass USTs and lines. The removed tanks were found to be tight, but some old product was found in the excavation. An unknown quantity of hydrocarbon impacted soil (reportedly several dozen truckloads) was removed from the site.

A recovery system consisting of a plastic barrier 14 to 16 feet deep was installed along the southwestern property line, against the basement wall of the adjacent building. Six wells were installed to recover any remaining product beneath the site, however, product and water infiltration problems continued in the adjacent building's basement.

In May 1981, a large pocket of free product was discovered while checking on the remediation system. In July 1981, four additional observation wells were installed. A 24-inch diameter extraction well was installed near the UST pit area, but it appears that the recovery system was not turned on for any significant length of time. A pumping test performed in February 1982, indicated that groundwater depression could not be achieved even at 200 gallons per minute (heavy rains contributed to inflow of groundwater).

In 1984, aboveground station facilities were renovated, but the USTs were not replaced. Two old USTs were discovered beneath the sidewalk and abandoned in place by filling with grout. Approximately 741 cubic yards of soil were removed during station reconstruction activities. It is not clear whether that soil was removed because of hydrocarbon impact. Tenants in the building at 3014

Lakeshore Avenue again complained of a gasoline odor in their building. No odor or sheen was noted in the basement sump during site inspection. In a letter sent to the property owner from Chevron stated that during the two previous years that Chevron had been inspecting the basement of their building for odor or product in the sump, they did not find evidence of any hydrocarbons.

In March 1985, a water sample collected from the basement of the adjacent building (collected in response to an odor complaint) indicated a presence of aromatic compounds typical of gasoline products.

In April 1991, the existing wells at the site were located and sampled, but it was observed that most of the wells were damaged beyond repair, most likely due to site reconstruction activities in 1984. All wells except the 24-inch extraction well were destroyed in July 1991. The extraction well was destroyed in September 1996.

Four 3/4-inch diameter on-site monitoring wells (MW-1 through MW-4) were installed in August 1991, and regular groundwater monitoring and sampling began. Four 2-inch diameter off-site monitoring wells (MW-5 through MW-8) were installed in July 1992.

In September 1996, product lines and dispensers were replaced. Fifteen soil samples were collected from beneath the product lines and dispensers at depths ranging from 2.5 to 3 feet bgs). Soil sample chemical analytical data indicated that shallow soil beneath the site has been impacted by gasoline hydrocarbons.

In April 1999, groundwater monitoring well MW-9 was installed, and the 3/4-inch diameter wells MW-2 through MW-4 were abandoned and replaced with 2-inch diameter wells MW-2A through MW-4A, respectively.

All wells at the site except MW-5 are screened at various depths between 2 to 25 feet bgs. The screen interval in well MW-5 extends from 15 to 35 feet bgs. The top-of-casing of well MW-5 is at a higher elevation than the other wells at the site, and well MW-5 is in an area that appears to be semiconfined. Based on historical groundwater measurements (ranging from 9.74 to 13.75 feet bgs), the screened interval in the well is flooded, therefore, groundwater samples collected from well MW-5 may not detect gasoline hydrocarbons, which tend to concentrate near the groundwater surface.

Groundwater Monitoring and Sampling

Currently all on-site wells are sampled quarterly, and off-site wells are sampled biannually (MW-5 and MW-6) or annually (MW-7 and MW-8) for Total Petroleum Hydrocarbons as gasoline and diesel (TPHg and TPHd), benzene, toluene, ethylbenzene, and xylenes (BTEX), and methyl tert-butyl ether (MtBE). All wells are monitored quarterly. ORC was installed in well MW-1 in 1999 to enhance natural bioremediation. Historical groundwater monitoring and sampling data are in Appendix B, and historical potentiometric maps are in Appendix D.

During the most recent monitoring and sampling event on June 4, 2001, all wells were monitored, and only wells MW-1, MW-2A, MW-3A, MW-4A, and MW-9 were sampled. TPHg were detected in

wells MW-1, MW-4A, and MW-9 at concentrations up to 3,200 ppb. Benzene and MtBE were detected in all wells ranging in concentrations from 2.0 to 310 ppb, and 37 to 7,800 ppb, respectively. TPHd were detected in all wells at concentrations up to 1,200 ppb. Figures 6 through 9 are isoconcentration maps for TPHg, benzene, MtBE, and TPHd, respectively, based on data collected during the March 1, 2001 event when all wells were sampled. Wells MW-5 through MW-8 are sampled semi-annually or annually, and were last sampled on March 1, 2001. At that time, these wells were non-detect for TPHg, TPHd, benzene, and MtBE, except for well MW-8 that had TPHd at a concentration of 51 ppb.

During the June 4, 2001 event, depth to water ranged from 1.52 to 11.31 feet below top of casing, with groundwater flow in the eastern corner of the site to the southeast, and flow to the southwest near the western corner of the site at gradients from 0.01 to 0.02.

SCOPE OF WORK

To delineate the extent of dissolved petroleum hydrocarbons and MtBE in groundwater southeast of the site, GR proposes to install two groundwater monitoring wells on Excelsior Court at the locations shown on Figure 2. To determine if buried utility trenches adjacent to the site are acting as preferential pathways for hydrocarbon migration, GR proposed to drill three hand-augered soil borings adjacent to sanitary sewer and storm drain lines along the southeast and northwest boundaries of the site at the locations shown on Figure 2. In order to assess the effectiveness of the plastic barrier along the southwest boundary of the site, GR proposes to collect water samples from the basement sump of the building at 3014 Lakeshore Avenue, which is adjacent to the site. GR's Field Methods and Procedures are included in Appendix A.

To implement the proposed scope of work, GR proposes the following seven tasks:

Task 1. Pre-field Activities

GR will update the site safety plan and obtain the necessary monitoring well and soil boring permits from the ACDPW and encroachment permit from the City of Oakland. Underground Service Alert (USA) will be notified at least 48 hours in advance of the scheduled field work. A private utility line locator will be contracted to clear well boring locations and to locate sanitary sewer and storm drain lines for accurate placement of hand-augered soil borings.

Task 2. Well Installation and Soil Borings

GR will install two groundwater monitoring wells at the locations shown on Figure 2. Drilling and well construction will be performed by a California licensed well driller. A GR geologist will monitor the drilling activities and prepare a log of each well boring. The well borings will be drilled with 8-inch diameter hollow-stem augers to approximately 20 feet bgs. Soil samples for description and possible chemical analysis will be obtained from the borings at five-foot intervals, as a minimum. Sample handling procedures are described in Appendix A. Although the actual number of samples submitted for chemical analysis will depend on

site conditions and field screening data, we anticipate a minimum of one soil sample in each well boring will be submitted for chemical analysis as described in Task 6. Soil samples will also be collected of the major soil types encountered in the well borings. These samples will be analyzed for physical parameters for use in future risk-based assessments.

Soil from each sampled interval will be screened in the field for the presence of volatile organic compounds using a photoionization detector (PID). These data will be collected for reconnaissance purposes only, and will not be used as verification of the presence or absence of petroleum hydrocarbons.

The groundwater monitoring wells will be constructed with 2-inch diameter Schedule 40 polyvinyl chloride (PVC) well casing and 0.02-inch machine slotted well screen, as shown on the Proposed Well Construction Detail (Figure 3). The wells will be constructed with 15 feet of screen from approximately 5 to 20 feet bgs. The actual screen interval will depend on the groundwater depth and lithologic conditions encountered during drilling.

GR will advance three hand-augered soil borings to depths up to approximately 13 feet bgs at the locations shown on Figure 2. The borings will be advanced by GR (C57 #220793) at locations adjacent to the sanitary sewer and storm drain lines beneath Lakeshore Avenue, MacArthur Boulevard, and Excelsior Court, as located by a private subsurface utility locating service. The borings will be advanced into the fill around the sanitary sewer and storm drain lines, and a grab groundwater sample will be collected from each boring. The grab groundwater samples will be submitted for chemical analysis as described in Task 6. Upon completion, the borings will be filled to 0.5 feet of ground surface with neat cement, then concrete to ground surface.

Drill cuttings will be stored at the site pending receipt of chemical analytical data. The drill cuttings will be stockpiled on and covered with plastic sheeting pending disposal. Soil samples from the drill cuttings will be collected for disposal characterization as described in Appendix A. Steam cleaning rinsate waste water will be stored on site in properly labeled drums pending disposal.

Task 3. Well Development and Sampling

The newly installed groundwater monitoring wells will be developed after being allowed to stand a minimum of 72 hours following completion. During development, the clarity of the discharged well water and selected groundwater parameters (pH, temperature, and conductivity) will be monitored. When the clarity of the discharge water runs clear and the groundwater parameters have stabilized, groundwater samples will be collected. Groundwater removed from the wells during development and sampling will be transported by Integrated Wastestream Management, Inc. (IWM) to McKittrick for disposal. Groundwater samples will be analyzed as described in Task 6. Development and groundwater sampling procedures are described in Appendix A.

Task 4. Wellhead Survey

Following installation, a California licensed surveyor will survey the elevation of the top of each well casing to MSL. Horizontal coordinates will also be measured.

Task 5. Water Sampling

GR will collect a water sample from the basement sump of the building located at 3014 Lakeshore Avenue, which is adjacent to the subject site along the southwest property boundary. The water sample will be analyzed as described in Task 6.

Task 6. Laboratory Analyses

Soil and groundwater samples will be submitted for chemical analysis to Lancaster Laboratories (ELAP #2116). Selected soil and groundwater samples will be analyzed for TPHg and TPHd by EPA Method 8015M, and BTEX and MtBE by EPA Method 8021. The groundwater samples will also be analyzed for tert-butyl alcohol (TBA), MtBE, di-isopropyl ether (DIPE), tert-amyl methyl ether (TAME), and ethyl tert-butyl ether (ETBE) by EPA Method 8260B. The drill cuttings soil sample will be analyzed for TPHg, TPHd, BTEX, and MtBE as specified above, and for total lead by EPA Method 6010A.

Task 6. Report Preparation

Following receipt and analysis of all data, a report will be prepared which summarizes the procedures and findings associated with this investigation. This report will be submitted to Chevron for their use and distribution.

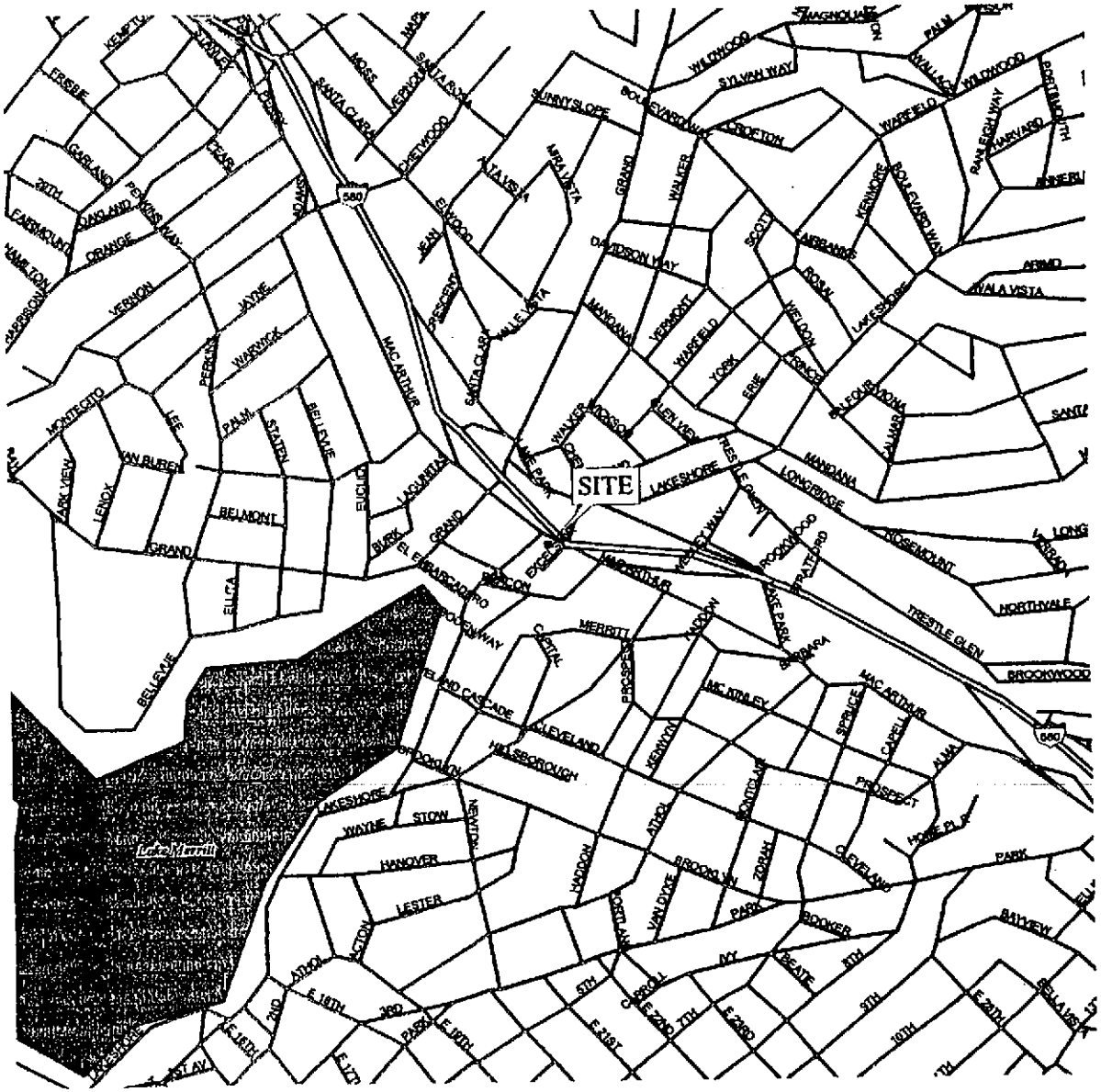
PROJECT STAFF

Mr. David W. Herzog, a Registered Geologist in the State of California (R.G. No. 7211), will provide technical oversight and review of the work. Mr. Greg A. Gurss, Senior Project Manager, will supervise implementation of field and office operations. GR employs a staff of geologists, engineers, and technicians who will assist with the project.

SCHEDULE

Implementation of the proposed scope of work will commence upon receipt of regulatory approval.

FIGURES



Source: Street Atlas USA, Delorme (1995).

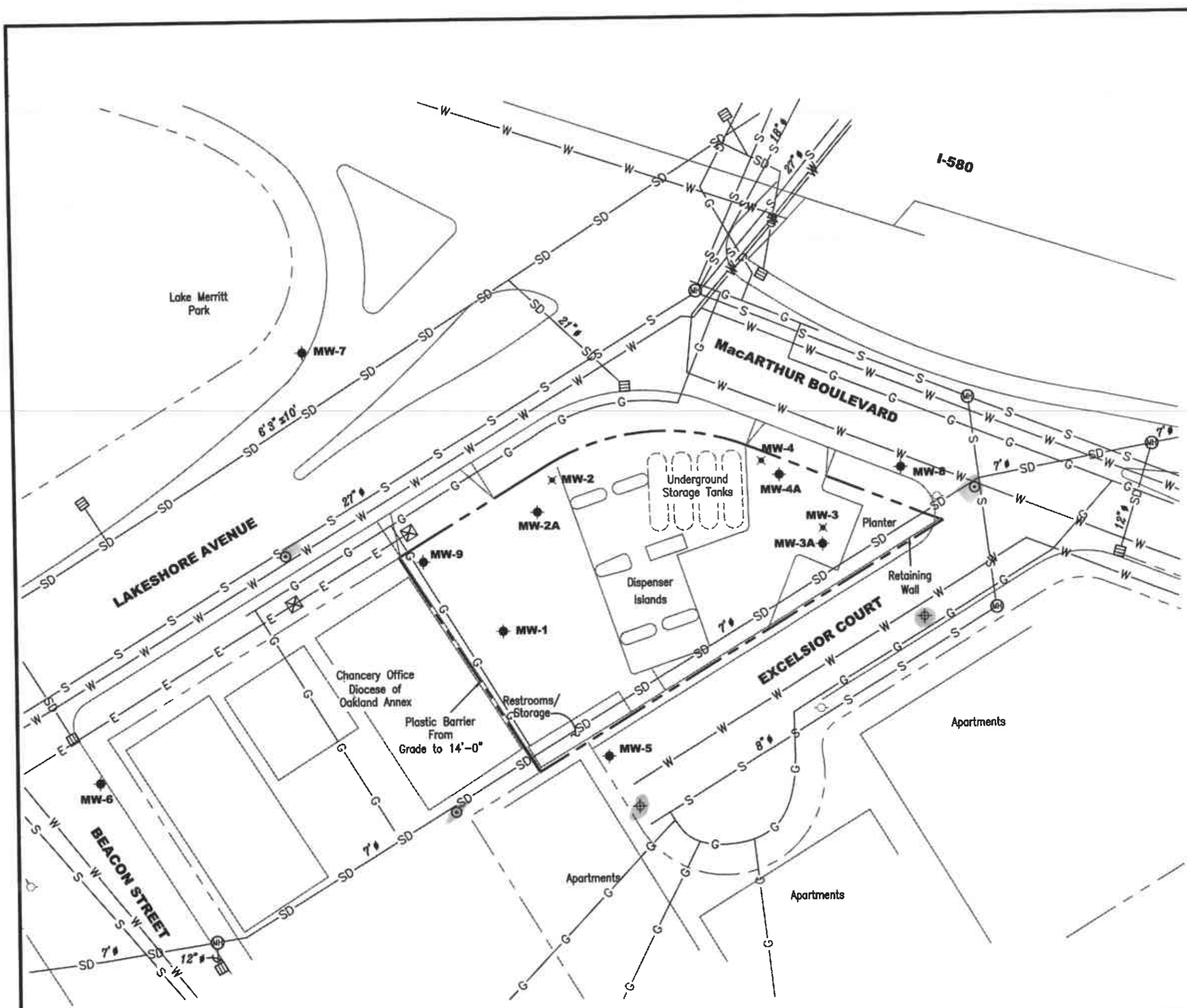
FIGURE 1

Gettler - Ryan Inc.

6747 Sierra Ct., Suite J
Dublin, CA 94568
(925) 551-7555

VICINITY MAP
Chevron Service Station No. 9-0121
3026 Lakeshore Avenue
Oakland, California

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
346462		05/99	



EXPLANATION

- Groundwater monitoring well
- Destroyed well
- Proposed groundwater monitoring well
- Proposed soil boring
- Storm drain
- PG&E vault
- Power pole
- Manhole
- 8"ø Pipe diameter

UNDERGROUND UTILITIES

- S — Sanitary sewer
- SD — Storm drain
- W — Water
- G — Natural gas
- E — Electric

N

0 40

Scale in Feet

Source: Figure modified from drawing provided by RRM engineering contracting firm and utility maps provided by EBMUD and City of Oakland Public Works.

FIGURE 2

SITE PLAN/UTILITY MAP
Chevron Service Station No. 9-0121
3026 Lakeshore Avenue
Oakland, California

REVISED DATE

GETTLER-RYAN INC.
6747 Sierra Ct., Suite J
Dublin, CA 94568
(925) 551-7555

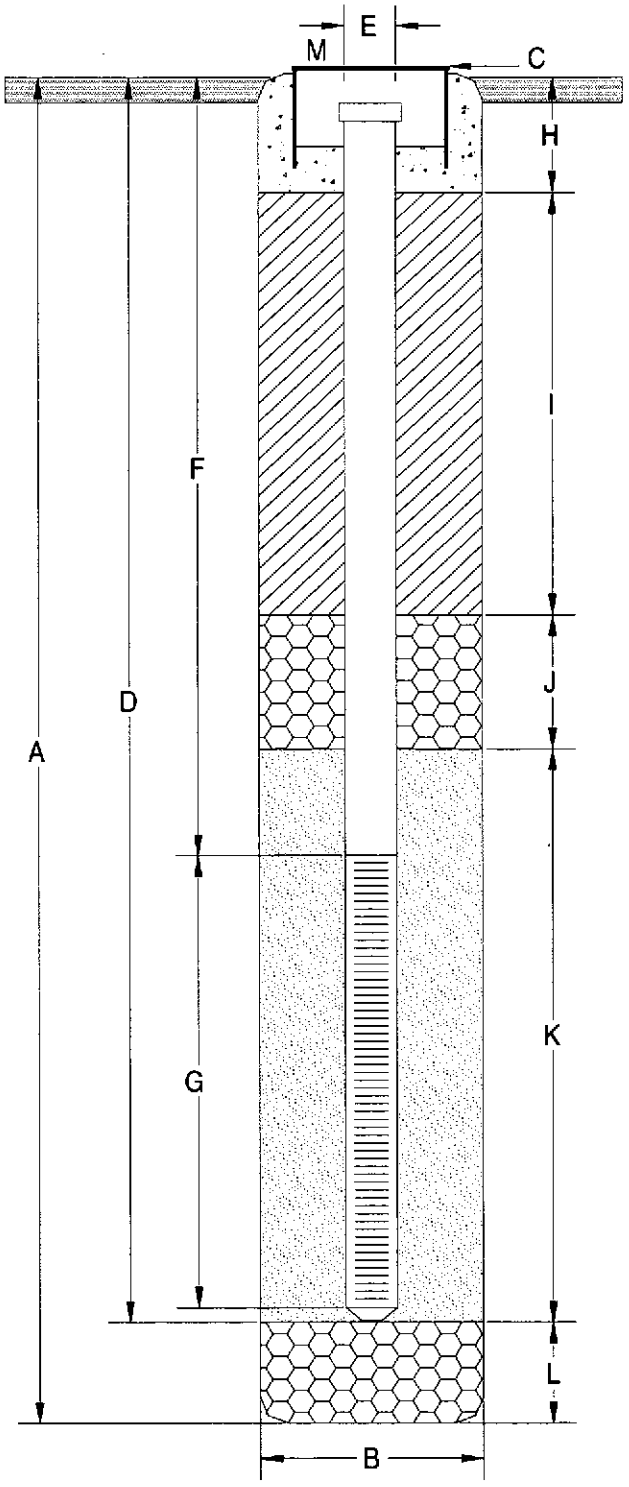
PROJECT NUMBER
DG90121C.4C01

REVIEWED BY

DATE
11/01

FILE NAME: P:\ENVRO\CHEVRON\9-0121\W01-9-0121.DWG | Layout Tab: Work Plan 11-01

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 20 ft.

B Diameter of Boring 8 in.
Drilling Method hollow-stem auger

C Top of Casing Elevation ft.
☐ Referenced to Mean Sea Level
☐ Referenced to Project-Datum

D Casing Length 20 ft.
Material Schedule 40 PVC

E Casing Diameter 2-inch in.

F Depth to Top Perforations 5 ft.

G Perforated Length 15 ft.
Perforated Interval from 5 to 20 ft.
Perforation Size 0.02 in.

H Surface Seal from 0 to 1.5 ft.
Seal Material concrete

I Backfill from 1.5 to 3 ft.
Backfill Material neat cement

J Seal from 3 to 4 ft.
Seal Material bentonite

K Gravel Pack from 4 to 20 ft.
Pack Material Lonestar #3 Sand

L Bottom Seal none ft.
Seal Material

M flush mounted water resistant well box, locking well cap and lock.

Note:

GETTLER-RYAN, INC.
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Dublin, CA 94568

Proposed Well Construction Detail
Chevron Service Station #9-0121
3026 Lakeshore Avenue
Oakland, California

FIGURE
3

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
DG90121G				

APPENDIX A

GETTLER-RYAN INC.

FIELD METHODS AND PROCEDURES
WELL INSTALLATION

Site Safety Plan

Field work performed by Gettler-Ryan Inc. (GR) is conducted in accordance with GR's Health and Safety Plan and the Site Safety Plan. GR personnel and subcontractors who perform work at the site are briefed on the contents of these plans prior to initiating site work. The GR geologist or engineer at the site when the work is performed acts as the Site Safety Officer. GR utilizes a photoionization detector (PID) to monitor ambient conditions as part of the Health and Safety Plan.

Collection of Soil Samples

Soil borings are drilled by a California-licensed well driller. A GR geologist is present to observe the drilling, collect soil samples for description, physical testing, and chemical analysis, and prepare a log of the exploratory soil boring. Soil samples are collected from the soil boring with a split-barrel sampling device fitted with 2-inch-diameter, clean brass tube or stainless steel liners. The sampling device is driven approximately 18 inches with a 140-pound hammer falling 30 inches. The number of blows required to advance the sampler each successive 6 inches is recorded on the boring log. The encountered soils are described using the Unified Soil Classification System (ASTM 2488-84) and the Munsell Soil Color Chart.

After removal from the sampling device, soil samples for chemical analysis are covered on both ends with teflon sheeting or aluminum foil, capped, labeled, and place in a cooler with blue ice for preservation. A chain-of-custody form is initiated in the field and accompanies the selected soil samples to the analytical laboratory. Samples are selected for chemical analysis based in part on:

a. depth relative to underground storage tanks and existing ground surface
b. depth relative to known or suspected groundwater
c. depth relative to areas of known hydrocarbon impact at the site
d. presence or absence of contaminant migration pathways
e. presence or absence of discoloration or staining
f. presence or absence of obvious gasoline hydrocarbon odors
g. presence or absence of organic vapors detected by headspace analysis

Field Screening of Soil Samples

A PID is used to perform head-space analysis in the field for the presence of organic vapors from the soil sample. This test procedure involves removing some soil from one of the sample tubes not retained for chemical analysis and immediately covering the end of the tube with a plastic cap. The PID probe is inserted into the headspace inside the tube through a hole in the plastic cap. Head-space screening results are recorded on the boring log. Head-space screening procedures are performed and results recorded as

reconnaissance data. GR does not consider field screening techniques to be verification of the presence or absence of hydrocarbons.

Construction of Monitoring Wells

Monitoring wells are constructed in the exploratory soil borings with Schedule 40 polyvinyl chloride (PVC) casing. All joints are thread-joined; no glues, cements, or solvents are used in well construction. The screened interval is constructed of machine-slotted PVC well screen, which generally extends from the total well depth to a point above the groundwater. An appropriately sized sorted sand is placed in the annular space adjacent to the entire screened interval. A bentonite transition seal is placed in the annular space above the sand, and the remaining annular space is sealed with neat cement or cement grout.

Wellheads are protected with water-resistant traffic-rated vault boxes placed flush with the ground surface. The top of the well casing is sealed with a locking waterproof cap. A lock is placed on the well cap to prevent vandalism and unintentional introduction of materials into the well.

Measurement of Water Levels

The top of the newly installed well casing is surveyed by a California-licensed Land Surveyor to mean sea level (MSL). Depth-to-groundwater in the well is measured from the top of the well casing with an electronic water-level indicator. Depth-to-groundwater is measured to the nearest 0.01-foot, and referenced to MSL.

Well Development and Sampling

The purpose of well development is to improve hydraulic communication between the well and the surrounding aquifer. Prior to development, each well is monitored for the presence of floating product and the depth-to-water is recorded. Wells are then developed by alternately surging the well with a vented surge block, then purging the well with a pump or bailer to remove accumulated sediments and draw groundwater into the well. Development continues until the groundwater parameters (temperature, pH, and conductivity) have stabilized.

Storing and Sampling of Drill Cuttings

Drill cuttings are stockpiled on and covered with plastic sheeting and samples are collected and analyzed for disposal classification on the basis of one composite sample per 100 cubic yards of soil. Stockpile samples are composed of four discrete soil samples, each collected from an arbitrary location on the stockpile. The four discrete samples are then composited in the laboratory prior to analysis.

Each discrete stockpile sample is collected by removing the upper 3 to 6 inches of soil, and them driving the stainless steel or brass sample tube into the stockpiled material with a hand, mallet, or drive sampler. The sample tubes are then covered on both ends with Teflon sheeting or aluminum foil, capped, labeled, and placed in a cooler with blue ice for preservation. A chain-of-custody form is initiated in the field and accompanies the selected soil samples to the analytical laboratory. Stockpiled soils are covered with plastic sheeting after completion of sampling.

GETTLER-RYAN INC.

FIELD METHODS AND PROCEDURES
HAND-AUGERED BORINGS

Site Safety Plan

Field work performed by Gettler-Ryan Inc. (GR) is conducted in accordance with GR's Health and Safety Plan and the Site Safety Plan. GR personnel and subcontractors who perform work at the site are briefed on the contents of these plans prior to initiating site work. The GR geologist or engineer at the site when the work is performed acts as the Site Safety Officer. GR utilizes a photoionization detector (PID) to monitor ambient conditions as part of the Health and Safety Plan.

Collection of Soil Samples

Hand-augered soil borings are drilled by a California-licensed well driller. A GR geologist is present to observe the drilling, collect soil samples for description and chemical analysis, and prepare a log the exploratory soil boring. Soil samples are collected from the boring with a hand-driven sampling device fitted with a 2-inch diameter, clean brass tube or stainless steel liner. After removal from the sampling device, soil samples are covered on both ends with Teflon sheeting, capped, labeled, and place in a cooler with blue ice for preservation. A chain-of-custody form is initiated in the field and accompanies the selected soil samples to the analytical laboratory.

Field Screening of Soil Samples

A PID is used to perform head-space analysis in the field for the presence of organic vapors from the soil sample. This test procedure involves placing a small amount of the soil to be screened in a sealed plastic bag. The bag is warmed in the sun to allow organic compounds in the soil sample to volatilize. The PID probe is inserted through the wall of the bag and into the headspace inside, and the meter reading is recorded in the field notes. Head-space screening is performed and results recorded as reconnaissance data only. GR does not consider field screening techniques to be verification of the presence or absence of hydrocarbons.

Grab Groundwater Sampling

Grab samples of groundwater are collected from the boring using a bailer. The groundwater sample is decanted into laboratory-supplied containers appropriate for the anticipated analyses. Sample bottles are then labeled and placed in chilled storage for transport to the analytical laboratory. A chain-of-custody form is initiated in the field and accompanies the groundwater samples to the analytical laboratory.

Storing and Sampling of Soil Stockpiles

Excavated material is stockpiled on and covered with plastic sheeting. Stockpile samples are collected and analyzed for disposal classification on the basis of one composite sample per 100 cubic yards of soil. Stockpile samples are composed of four discrete soil samples, each collected from an arbitrary location on the stockpile. The four discrete samples are then composited in the laboratory prior to analysis.

Each discrete stockpile sample is collected by removing the upper 12 to 18 inches of soil, and then driving the stainless steel or brass sample tube into the stockpiled material with a mallet or drive sampler. The sample tubes are then covered on both ends with Teflon sheeting, capped, labeled, and placed in a cooler with blue ice for preservation. A chain-of-custody form is initiated in the field and accompanies the selected soil samples to the analytical laboratory. Stockpiled soils are covered with plastic sheeting after completion of sampling.