PACIFIC
ENVIRONMENTAL
GROUP, INC.

November 10, 1997
Project 325-055.1A

Mr. Barney Chan
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: **Work Plan for Groundwater Investigation**
Chevron Service Station 9-1851
451 Hegenberger Road at Edgewater Road
Oakland, California

Dear Mr. Chan:

We have forwarded to you the *Work Plan for Groundwater Investigation* (November 7, 1997) to evaluate whether water line trenches are acting as preferential pathways for the migration of MtBE at the site referenced above. The work plan was prepared by Pacific Environmental Group, Inc. (PACIFIC) on behalf of Chevron Products Company (Chevron). Please review and comment. If you have any questions regarding the contents of the work plan, please call.

Sincerely,

Pacific Environmental Group, Inc.

Ross Tinline
Project Geologist
RG 5860

cc: Mr. Phil Briggs, Chevron Products Company
Mr. Ben Shimek, 451 Hegenberger Road, Oakland, California 94621

PACIFIC
ENVIRONMENTAL
GROUP INC.

November 7, 1997
Project 325-055.1A

Mr. Phil Briggs
Chevron Products Company
P.O. Box 5004
San Ramon, California 94583

Re: **Work Plan for Groundwater Investigation**
Chevron Service Station 9-1851
451 Hegenberger Road at Edgewater Road
Oakland, California

Dear Mr. Briggs:

This letter, prepared by Pacific Environmental Group, Inc. (PACIFIC) on behalf of Chevron Products Company (Chevron), presents a work plan to determine the extent of methyl tert-butyl ether (MtBE) confirmed in groundwater at the site referenced above and to evaluate whether water line trenches are acting as preferential pathways for the migration of MtBE. The scope of work will propose off-site groundwater sampling locations along the water line trench and downgradient of the site. The work plan is presented in response to the October 8, 1997 letter from the Alameda County Department of Environmental Health (ACDEH).

This work plan includes a site background, discussion, proposed scope of work, and schedule.

SITE BACKGROUND

Site Description

The site is located at the northwest corner of the intersection of Hegenberger Road and Edgewater Drive in Alameda, California (Figure 1). The site is located approximately 1,700 feet east of San Leandro Creek which flows towards San Francisco Bay. Land use near the site is generally commercial and industrial. The locations of the station building and pump islands and underground storage tank (UST) complexes are shown on Figure 2. The UST complex in the southeast corner of the property includes three 10,000-gallon fuel tanks. The waste oil tank is located immediately west of the station

building. A methanol UST is located north of the station building and is part of a State of California program.

Previous Investigations

In October 1995, Gettler-Ryan completed four groundwater monitoring wells (Wells MW-1 through MW-4) and advanced one soil boring. Quarterly groundwater monitoring has been performed since the wells were installed. Depth to groundwater has ranged from 2.81 to 5.33 feet below ground surface (bgs). Groundwater flow varies from west to southeast at an average gradient of 0.01 foot per foot.

Soils beneath the site vary in composition from clay to sand with gravel to the maximum depth explored of 16.5 feet bgs, and consist of heterogeneous fill on former Bay Mud flats. The lithology encountered during the site investigation has indicated that the western portion of the site is underlain by soils consisting of silty clay or clay to between approximately 3 or 4 feet bgs. Sand with gravel was then encountered to between approximately 6 to 7 feet bgs. Clay and silty clay was then encountered to the total depth explored of 16.5 feet bgs. Lithology on the eastern portion of the site is more variable. Boring SB-1 encountered clay and fat clay to 5 feet bgs. The boring was then terminated at 6 feet bgs after intersecting silty clay with lenses of clayey sand. The boring for Well MW-4 encountered silty clay to approximately 8 feet bgs. A layer of silty sand extended between approximately 8 and 10.5 feet bgs. Clay and silty clays were then encountered to the maximum depth of 16.5 feet bgs. Sand with gravel was not encountered in either Boring SB-1 or Well MW-4. Geologic cross-sections are shown on Figures 2 and 3.

Analytical results of soils have indicated that only minor concentrations of petroleum hydrocarbons are present, and were only detected in one boring (the boring for Well MW-2) located near the waste oil tank. Well MW-2 at 5.5 feet reported the only concentration of total purgeable petroleum hydrocarbons calculated as gasoline (TPPH-g) in soil at 8.4 parts per million (ppm). The sample also reported 2,100 ppm total oil and grease, and 77 ppm total extractable petroleum hydrocarbons calculated as diesel (TEPH-d). Chloroform was reported at 9.2 ppm, but no other halogenated volatile organic compounds were detected. No benzene was detected in any sample analyzed.

Groundwater analytical results also indicate that concentrations of petroleum hydrocarbons are generally limited to Well MW-2. During the June 20, 1997 monitoring event, Well MW-2 reported 62 parts per billion (ppb) TPPH-g and 7.7 ppb benzene. TEPH-d was reported at 1,600 ppb, however the laboratory indicated that the chromatogram pattern indicated an unidentified hydrocarbon. Vinyl chloride and MtBE were detected at 5.2 and 38 ppb, respectively.

All wells have reported detectable concentrations of MtBE in groundwater. The maximum concentration of MtBE, 11,000 ppb, was reported from Well MW-4 on December 17, 1996. Well MW-4 is located immediately south of the UST complex and during the June 20, 1997 sampling event reported 9,300 ppb MtBE. Well MW-3, located adjacent to the methanol UST, reported 1,400 ppb MtBE on June 20, 1997. Well MW-1, located at the southwest corner of the property, has reported up to 940 ppb MtBE, but only 64 ppb MtBE was reported during the most recent monitoring event (June 20, 1997).

In September 1997, PACIFIC conducted a Site Evaluation for Potential MtBE Impacts. The evaluation concluded that it is possible that a commingled MtBE plume may exist from the Chevron and the Unocal sites, and that due to the shallow depth to groundwater (less than 5 feet bgs) and the locations of water line trenches beneath Hegenberger Road and Edgewater Drive, preferential pathways may exist for MtBE migration.

SCOPE OF WORK

The proposed scope of work is designed to determine the extent of MtBE in groundwater and to evaluate whether the water line trenches are acting as preferential pathways for the migration of MtBE.

- **Groundwater Investigation.** PACIFIC proposes that groundwater samples be collected from approximately five locations (Figure 1). Sampling will be performed by advancing a hand driven probe with a retractable screen section to shallow groundwater. A peristaltic pump with nylon tubing will be used to extract the water sample. Field and laboratory procedures are presented as Attachment A.
- **Report.** A report will be prepared, which presents the findings of the above scope of work, and will make recommendations if any further investigation is required.

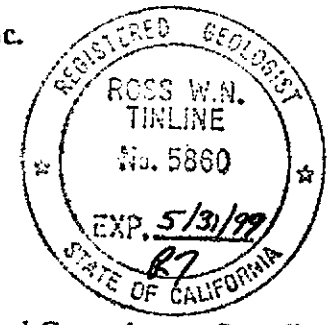
SCHEDULE

Upon approval of the work plan by Chevron and ACDEH, PACIFIC will immediately pursue encroachment permit application with the City of Oakland. Upon receipt of the encroachment permit, PACIFIC will commence with the investigation. The above described report will be submitted to Chevron within 5 weeks after field work completion.

If you have any questions regarding the contents of this letter, please call.

Sincerely,

Pacific Environmental Group, Inc.



Ross Tinline
Project Geologist
RG 5860

Attachments: Figure 1 - Proposed Groundwater Sampling Map
Figure 2 - Geologic Cross-Section A-A'
Figure 3 - Geologic Cross-Section B-B'
Attachment A - Field and Laboratory Procedures

cc: Mr. Barney Chan, Alameda County Department of Environmental Health
Mr. Ben Shimek, 451 Hegenberger Road, Oakland, California 94621

LEGEND

- MW-4 ◉ GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION (CHEVRON)
- MW-3 ◒ GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION (UNOCAL)
- SB-1 ● SOIL BORING LOCATION AND DESIGNATION
- GW-1 ✦ GROUNDWATER GEOPROBE SAMPLING LOCATION AND DESIGNATION
- WATER LINE
- SD STORM DRAIN LINE
- SS SANITARY SEWER LINE
- ○ MANHOLE
- 5.4 / 0.0 DEPTH BELOW GROUND SURFACE (FEET) / ELEVATION (FEET, MSL)
- A A' LINE OF GEOLOGIC CROSS-SECTION

N

HEGENBERGER ROAD

EDGEWATER DRIVE

CHEVRON SERVICE STATION

UNOCAL SERVICE STATION

UNION BANK

PLANTER

48" SD

24" SD

30" SD

21" SD

15" SS

30" SS

42" SS

10" SS

SD

SS

MW-1 MW-2 MW-3 MW-4 MW-6 MW-9 MW-10

GW-1 GW-2 GW-3 GW-4 GW-5

SB-1

11.1 / -4.82

6.48 / -1.08

7.56 / -2.16

7.46 / -1.2

7.22 / -0.96

5.4 / 0.0

-2.89 -2.55 -3.00 -6.9 -0.14 -4.1 -4.43 -0.37 -0.72 -0.45 -0.98 2.62 1.19 0.49 2.29 -0.45 0.2 2.02 2.0 3.0

Depth below G. Surface

SCALE

0 100 200 FEET

Reference: 325/055/Utility.vsd

PACIFIC ENVIRONMENTAL GROUP, INC.

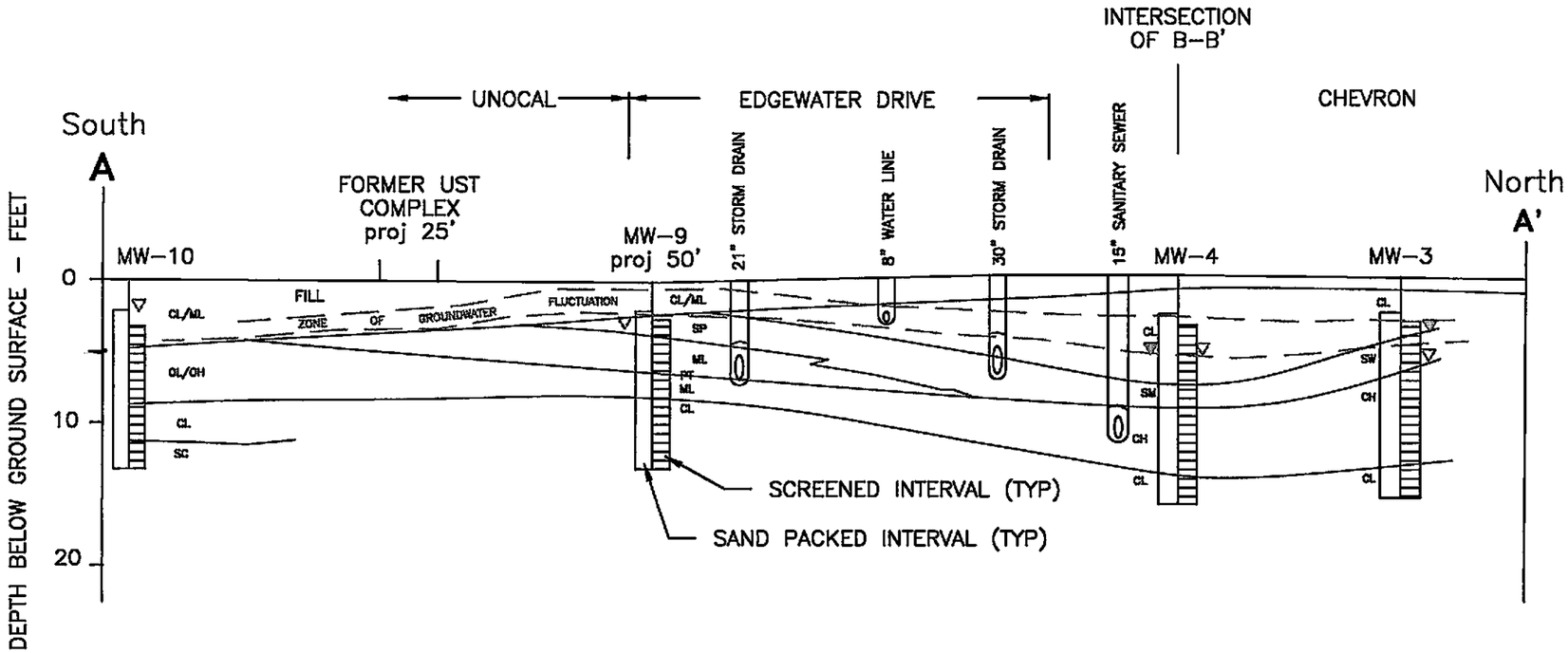
TITLE:

PROPOSED GROUND-WATER SAMPLING MAP

PREPARED FOR:

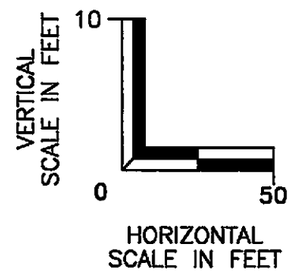
CHEVRON SERVICE STATION 9-1851
451 Hegenberger Road at Edgewater Drive
Oakland, California

DATE: 7-22-97 | PROJECT: 325-055.1B | FIGURE: 1



LEGEND

ML, CL, OL, CH, OH, Pt	PRIMARILY FINE GRAINED DEPOSITS
SW, SP, SC	PRIMARILY COARSE GRAINED DEPOSITS
MW–10	GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
▽	FIRST ENCOUNTERED WATER LEVEL
▼	STATIC WATER LEVEL, 6–20–97
proj	PROJECTED ONTO LINE OF SECTION IN FEET



Reference: 325/055/XSecAA.dwg

PACIFIC ENVIRONMENTAL GROUP, INC.

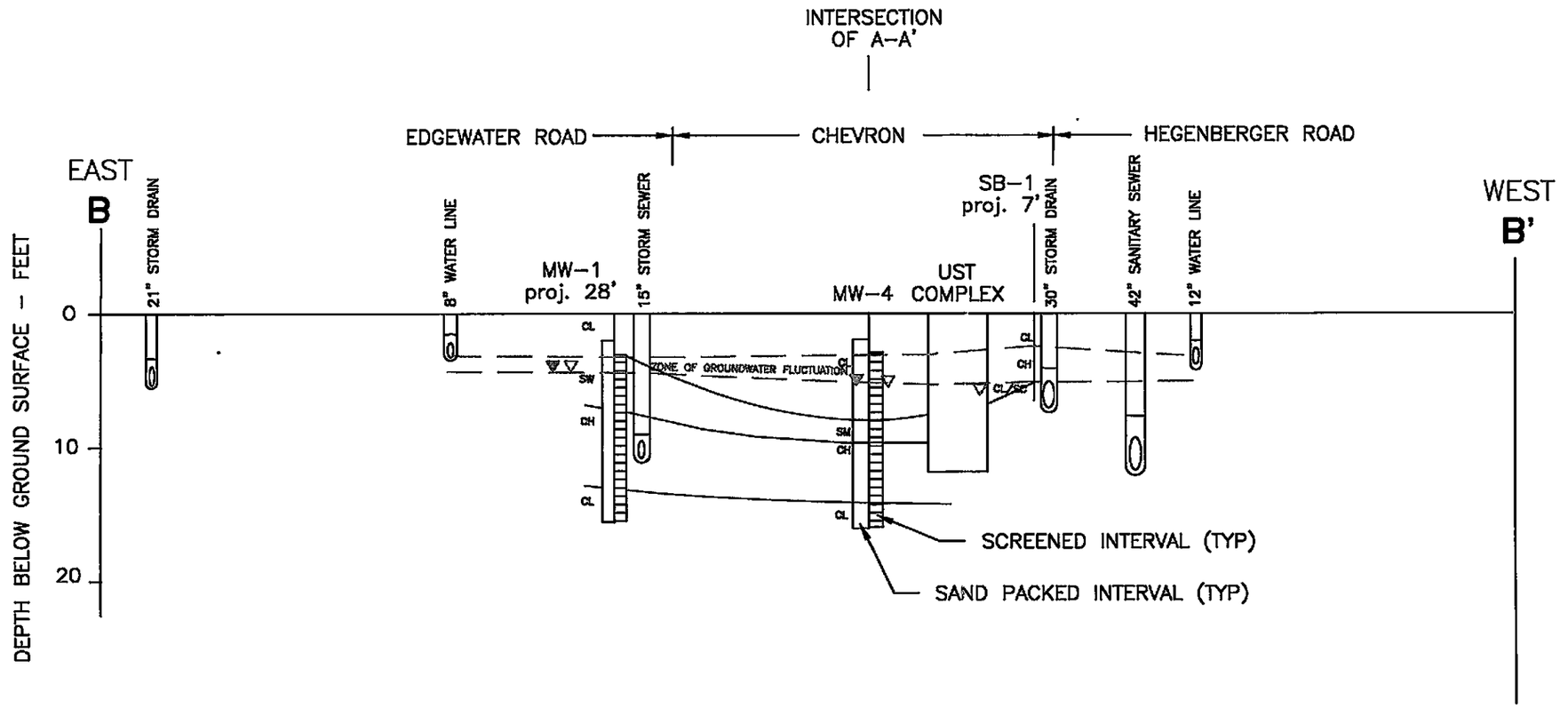
TITLE:

GEOLOGIC CROSS-SECTION A-A'

PREPARED FOR:

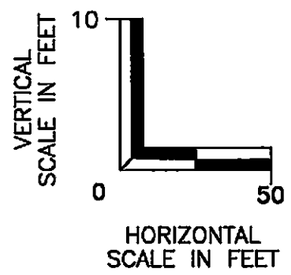
CHEVRON SERVICE STATION 9-1851
451 Hegenberger Road at Edgewater Drive
Oakland, California

DATE: 9–3–97	PROJECT: 325–055.1B	FIGURE: 2



LEGEND

CL, CH, ML	PRIMARILY FINE GRAINED DEPOSITS
SW, SM, SC	PRIMARILY COARSE GRAINED DEPOSITS
MW–1	GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
SB–1	SOIL BORING LOCATION AND DESIGNATION
▽	FIRST ENCOUNTERED WATER LEVEL
▼	STATIC WATER LEVEL, 6–20–97
proj	PROJECTED ONTO LINE OF SECTION IN FEET



PACIFIC ENVIRONMENTAL GROUP, INC.

TITLE:

GEOLOGIC CROSS-SECTION B-B'

PREPARED FOR:

CHEVRON SERVICE STATION 9-1851
451 Hegenberger Road at Edgewater Drive
Oakland, California

DATE: 9–3–97 | PROJECT: 325–055.1B | FIGURE: 3

Reference: 325/055/XSec8B.dwg

ATTACHMENT A

FIELD AND LABORATORY PROCEDURES

ATTACHMENT A
FIELD AND LABORATORY PROCEDURES

Groundwater Sampling

The AMS Retract-A-Tip Gas Vapor Probe System along with a peristaltic pump will be utilized to collect shallow groundwater samples. The 1-inch diameter probe will be driven to just below first encountered water, and pulled up a few inches to open the Retract-A-Tip. "Grab" groundwater samples will then be collected via a peristaltic pump and plastic tubing.

These samples will be placed in a cooler with ice for transport to the laboratory under chain-of-custody protocol. The temperature of the cooler will be recorded upon delivery to the laboratory.

Laboratory Procedures

The analytical methods for determining the presence of total purgeable petroleum hydrocarbons calculated as gasoline, benzene, toluene, ethylbenzene, xylenes, and methyl tert-butyl ether will be taken from EPA Methods 5030 and 8015/8020. The above analytical methods utilize the purge-and-trap technique, with final detection by gas chromatography using a flame-ionization detector and a PID. All analyses will be performed by a California State-certified laboratory.