PACIFIC
ENVIRONMENTAL
GROUP, INC.

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4-15-94

April 15, 1994
Project 305-140.1A

Ms. Jennifer Eberle
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

Re: **Work Plan**
Former Service Station
1230 Fourteenth Street at Union Street
Oakland, California

Dear Ms. Eberle:

This letter presents a work plan prepared by Pacific Environmental Group, Inc. (PACIFIC) on behalf of the responsible parties and potentially responsible parties identified in the letter regarding the *Legal Request for Submittal of a Technical Report Resulting from the Alameda County Department of Environmental Health's Pre-Enforcement Review Panel Meeting*, dated February 15, 1994. The letter requested a work plan for: (1) the definition of the lateral and vertical extent of hydrocarbons in soil, (2) soil remediation, and (3) determination of the impact of hydrocarbons to groundwater. This work plan addresses the soil and groundwater assessment issues.

Three proposed soil borings, four monitoring wells, and one soil vapor extraction (SVE) well are shown on Figures 1 and 2. The soil borings and borings for the wells will delineate the lateral and vertical extent of hydrocarbon-affected soils beneath the site. The groundwater monitoring wells will determine if groundwater has been impacted by petroleum hydrocarbons, and determine flow direction and gradient. The SVE well will be utilized during any future potential soil remediation testing.

2025 Gateway Place, Suite 440, San Jose, California 95110 (408) 441-7500 FAX (408) 441-7539

BACKGROUND

Three exploratory borings (SB-1 through SB-3) were drilled in February 1991 by Tank Protect Engineering (TPE). The borings were clustered around the underground storage tank (UST) complex. Boring depth ranged from 16.5 to 20 feet below ground surface (bgs). Fill was encountered consisting primarily of silty sand to a depth of approximately 17 feet. Silty sand was encountered below the fill to the total depth explored of 20 feet. Soil samples were analyzed for the presence of low/medium boiling point hydrocarbons, equivalent to total petroleum hydrocarbons calculated as gasoline (TPH-g). Samples were also analyzed for benzene, toluene, ethylbenzene, xylene isomers (BTEX compounds), and organic lead. TPH-g concentrations ranged from not detected to 1600 parts per million (ppm). Benzene concentrations ranged from not detected to 18 ppm. Organic lead was not detected.

During August 1993, five USTs were removed by TPE. One single-walled steel 550-gallon waste oil tank along with three 7,500-gallon and one 8,000-gallon single-walled steel gasoline tanks were removed. TPH-g concentrations ranged from 1.3 ppm to 18,000 ppm. Benzene concentrations ranged from not detected to 11,000 ppm. The highest concentrations were generally found in the southern portion of the UST complex. A sample collected below the waste oil tank contained 1,200 ppm TPH calculated as diesel (TPH-d) and 7,700 ppm TPH calculated as oil and grease.

11 ppm

SCOPE OF WORK

The scope of work includes: (1) drilling three exploratory soil borings, four groundwater monitoring wells and one SVE well, (2) laboratory analysis of selected soil samples, (3) well development and surveying of the newly installed wells, and (4) technical report preparation and submittal.

to msl.

how? HP?

One exploratory boring (Boring B-1) will be drilled approximately 25 feet south of the former UST complex to further assess the extent of hydrocarbons in soil and groundwater. Each former pump island will be assessed by an exploratory boring (Borings B-2 and B-3). These three borings will aid in delineating the lateral and vertical extent of hydrocarbon-impacted soil. **Additional borings may be drilled to further define lateral or vertical extent depending on field conditions.** The borings will be backfilled with neat cement to ground surface.

to what depth?

we already did 6 dispenser samples, but they were at 4' bgs.

Groundwater is approximated to occur between 15 and 20 feet bgs. **Groundwater flow direction is inferred to be southerly to westerly, however sites nearby report groundwater flow direction to the north or northwest.** Monitoring Wells MW-1

through MW-3 will be installed to assess the groundwater flow direction and the extent of hydrocarbons in groundwater (Figure 2). A dual completion groundwater monitoring/SVE well (Well MW-4) is proposed approximately 10 feet downgradient of the former UST complex. If groundwater is determined by field evidence to flow northerly, then Well MW-4 will be completed as a boring, and the alternative location Boring B-3 will be completed as the downgradient monitoring well. These wells will provide information on the downgradient and lateral extent of hydrocarbons in soil and groundwater. Additionally, SVE Well V-1 will be installed in the former UST tank complex to allow pilot testing to evaluate SVE feasibility which may be proposed in the forthcoming soil remediation work plan. Proposed well locations are shown on Figure 2. Well construction details are shown on Figure 3. The wells will be surveyed to mean sea level by a licensed surveyor after installation.

Reporting

After receipt of analytical data from the laboratory, the information collected during this investigation will be evaluated and assembled into a well installation report. The report will include boring logs, well locations, soil analytical data, survey data, certified analytical reports, and chain-of-custody documentation.

WELL INSTALLATION PROCEDURES

Exploratory Boring Procedures

The borings for the monitoring wells will be drilled using 8- or 10-inch diameter hollow-stem auger drilling equipment. The borings will by logged by a PACIFIC geologist using the Unified Soil Classification System and standard geologic techniques. Soil samples for logging and chemical analysis will be collected at minimum 5-foot depth intervals by advancing a California-modified split-spoon sampler with brass liners into undisturbed soil beyond the tip of the auger. The sampler is driven a maximum of 18 inches using a 140-pound hammer with a 30-inch drop. Soil samples will be analyzed in the field for volatile organic compounds using a photo-ionization detector (PID). Results of the PID tests will be used to assist in selection of samples for laboratory analysis. All samples collected from the boring for Well MW-4 will be submitted for analysis. Up to three samples per boring may be submitted for analyses as described below. Soil samples for chemical analysis will be retained in brass liners, capped with Teflon and plastic end caps, and sealed in zip-lock plastic bags. These samples will be placed in a cooler on dry ice for transport to the laboratory accompanied by chain-

of-custody documentation. The temperature of the cooler will be recorded upon delivery to the laboratory.

All down-hole drilling equipment will be steam-cleaned prior to drilling and between boring locations. All residual soils obtained from drilling operations will be stockpiled on site and covered with plastic sheeting until laboratory analyses are completed and the results evaluated. Arrangements will then be made for disposal to an appropriate landfill based on the detected gasoline concentrations.

Monitoring Well Installation

The borings will be converted to groundwater monitoring wells by the installation of 3- or 4-inch diameter Schedule 40 PVC casing and 0.020-inch factory-slotted screen. Screen will be placed through the saturated zone and extend no more than 15 feet below first-encountered groundwater. Graded sand pack (RMC 2 x 12) will be placed in the annular space across the screened interval, and will extend approximately 2 feet above the screen. A 1-foot bentonite seal will be placed above the sand pack. A neat cement seal will be placed from the bentonite to ground surface. A locking cap and protective vault box will be installed on top of each well. A proposed groundwater monitoring well construction detail is shown on Figure 3. Following well installation, the wells will be developed through surging and pumping repeatedly until water removed from the wells is relatively free of sediments. The monitoring wells will be surveyed for location and elevation relative to mean sea level.

Laboratory Procedures

Selected soil samples from the soil borings will be analyzed in the laboratory for the presence of TPH-g, TPH-d, and BTEX compounds by EPA Methods 8015, 8020, 5030 and 3510. The samples will be examined using the purge and trap technique, with final detection by gas chromatography using a flame-ionization detector as well as a PID. Selected soil samples from the boring for groundwater monitoring near the former waste oil tank will be analyzed for oil and grease by SM 5520 E and F.

All analyses will be performed by a California State-certified laboratory. PACIFIC estimates that up to three soil samples from each boring will be submitted for analysis.

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

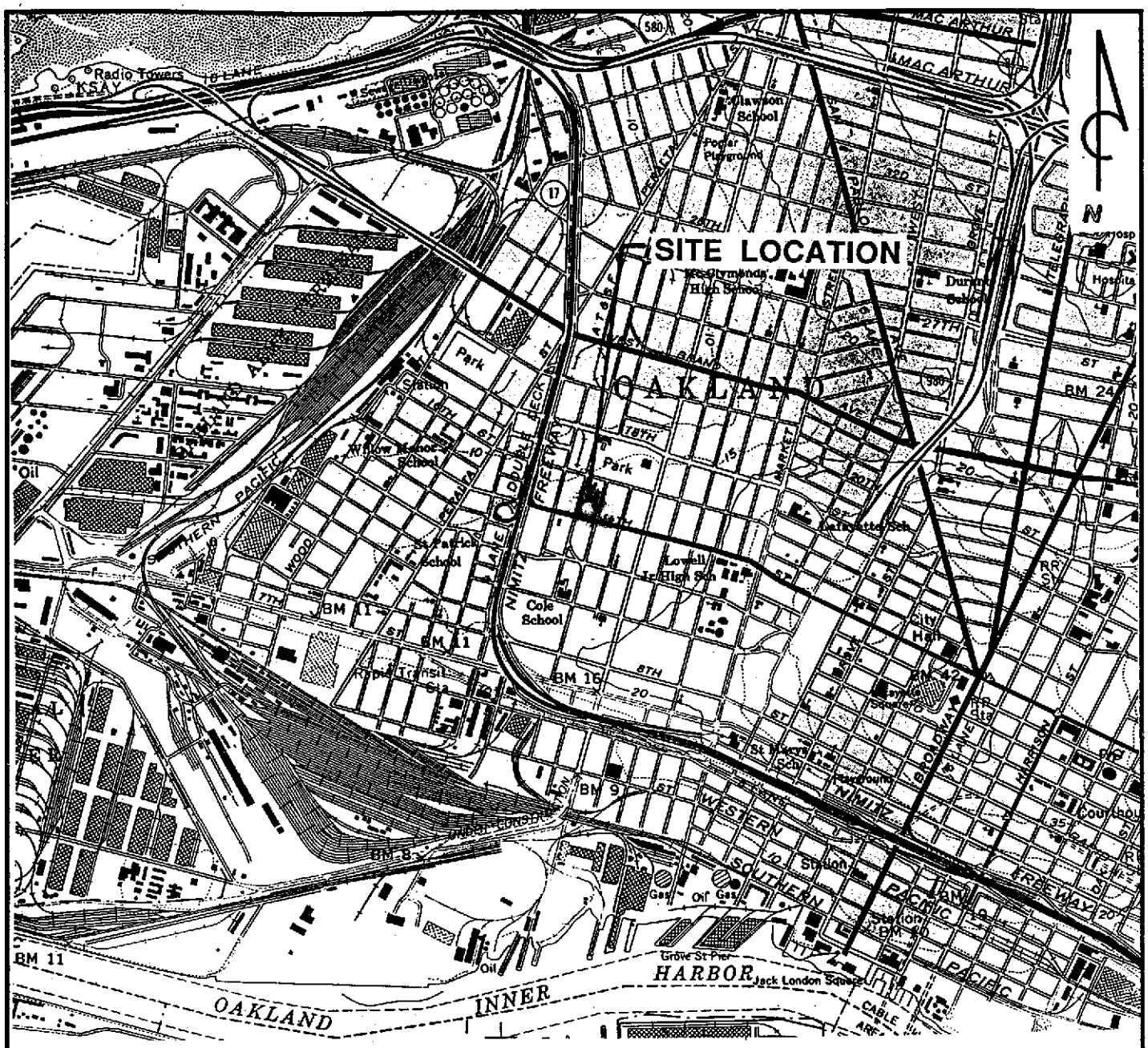
Sincerely,

Pacific Environmental Group, Inc.

Michael Hurd
Senior Geologist
RG 5319

Attachments: Figure 1 - Site Location Map
Figure 2 - Proposed Well Location Map
Figure 3 - Well Detail

cc: Mr. Lynn Walker, Shell Oil Company
Mr. Rich Hiett, Regional Water Quality Control Board
Mr. Andrew Saberi, Sabek Inc.
Mr. Som Gupta and Mr. Pawan Garg
Mr. Michael Johnson, Larson and Burnham



QUADRANGLE LOCATION

REFERENCES:
USGS 7.5 MIN. TOPOGRAPHIC MAP
TITLED: OAKLAND WEST, CALIFORNIA
DATED: 1959 REVISED: 1980

SCALE IN FEET

2000 0 2000

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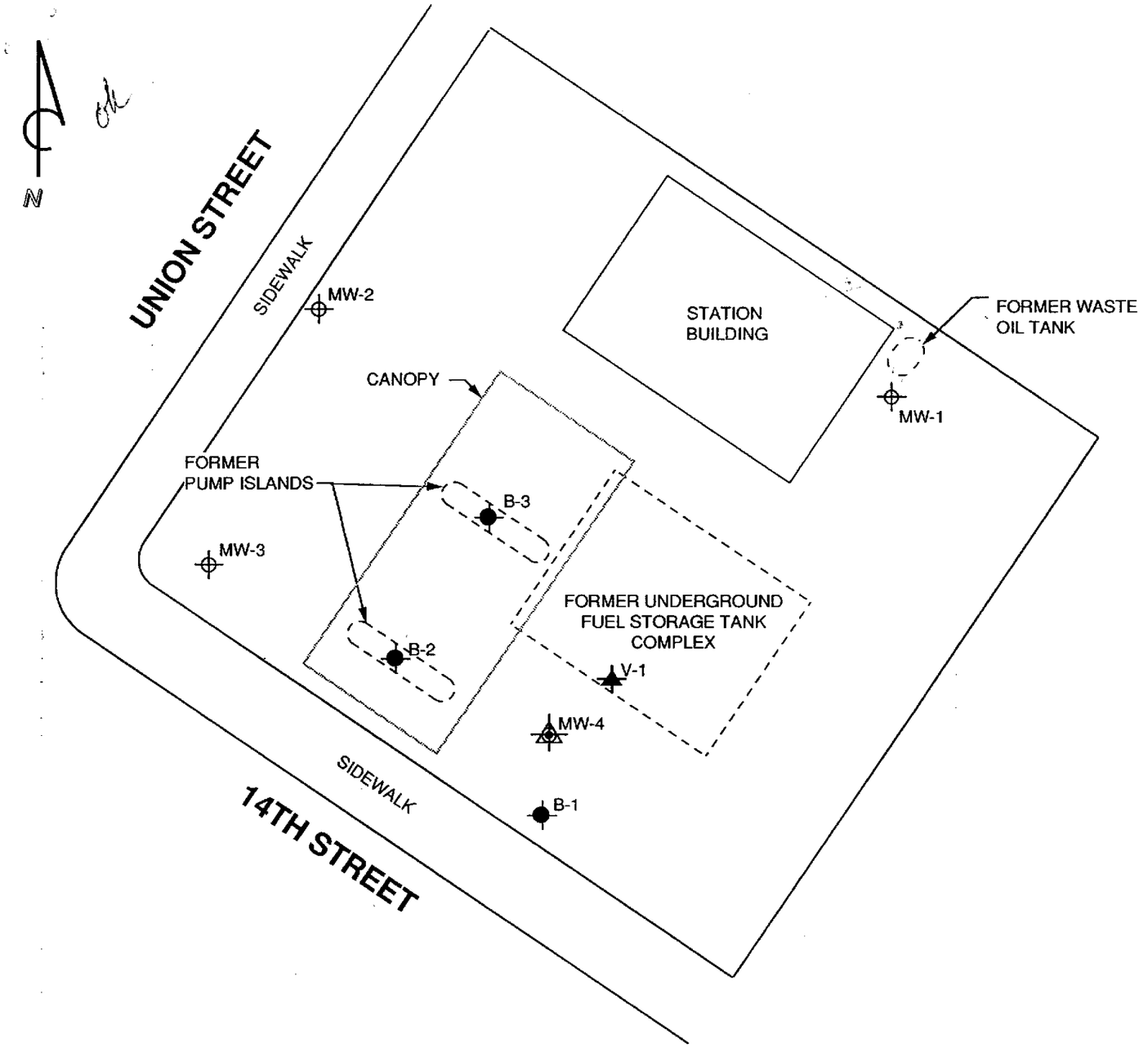
FORMER SERVICE STATION
1230 14th Street at Union Street
Oakland, California

SITE LOCATION MAP

FIGURE: 1

PROJECT: 305-140-1A



LEGEND

- MW-2 — PROPOSED GROUNDWATER MONITORING WELL AND DESIGNATION
- B-1 — PROPOSED SOIL BORING LOCATION AND DESIGNATION
- V-1 — PROPOSED SOIL VAPOR EXTRACTION WELL LOCATION AND DESIGNATION
- MW-4 — PROPOSED DUAL GROUNDWATER MONITORING/ SOIL VAPOR EXTRACTION WELL LOCATION AND DESIGNATION

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SCALE
0 20 40 FEET

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PROPOSED WELL LOCATION MAP

FIGURE: 2
PROJECT: 305-140.1A

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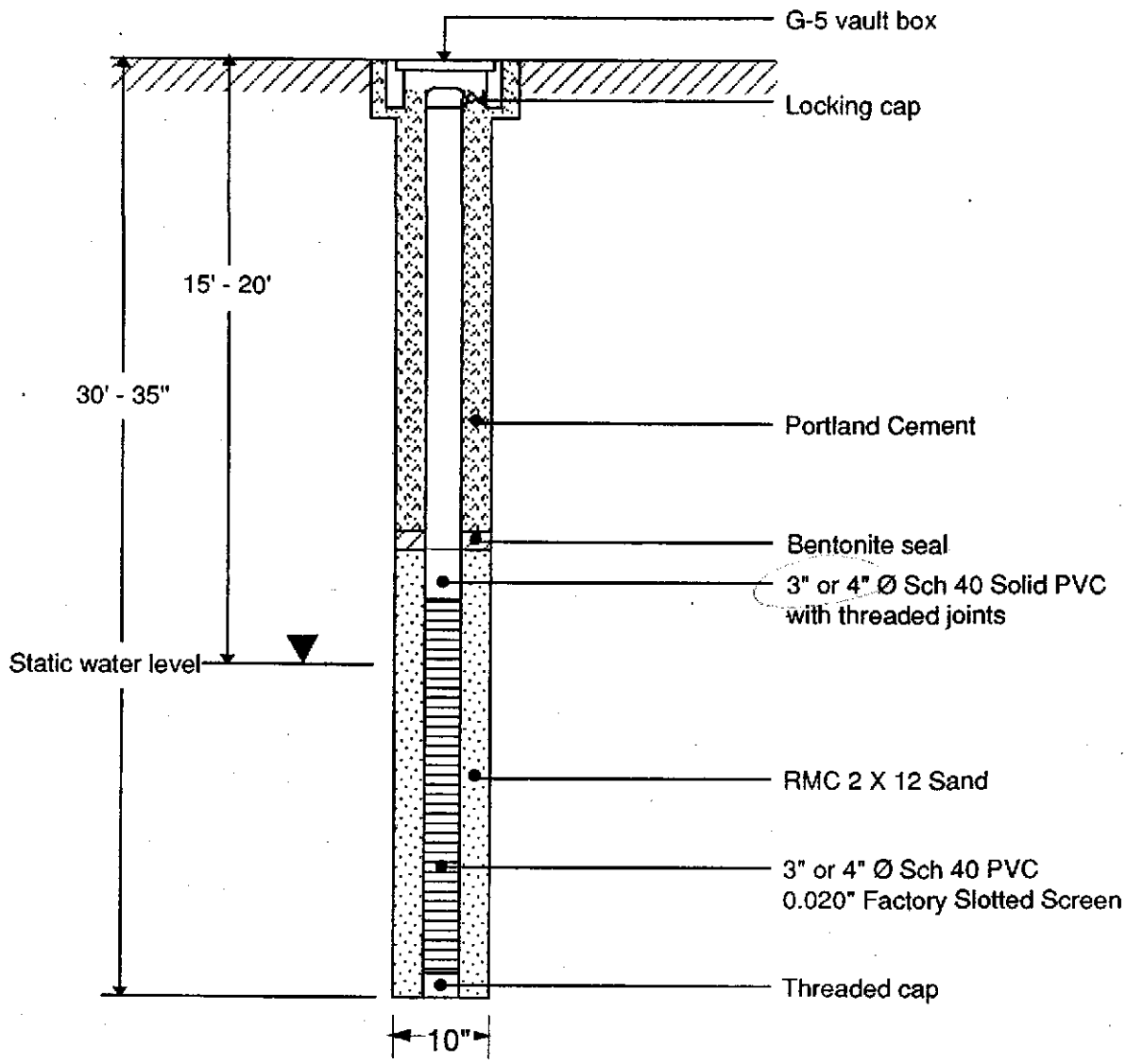

Not to Scale

PACIFIC ENVIRONMENTAL GROUP, INC.

FORMER SERVICE STATION
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Oakland, California

WELL DETAIL

FIGURE:
3
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