

**WORK PLAN  
FOR  
SUPPLEMENTAL SITE INVESTIGATION**

**BP Oil Company Service Station No. 11107  
18501 Hesperian Boulevard  
San Lorenzo, California**

**Project No. 10-060**

**Prepared for:**


**BP Oil Company  
Environmental Resource Management  
16400 Southcenter Parkway, Suite 301  
Tukwila, Washington**

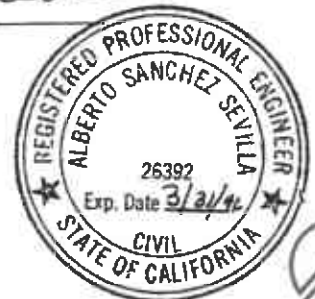
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**June 3, 1993**

  
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**INTRODUCTION**

This work plan presents the proposed scope of work to install additional groundwater monitoring wells at BP Oil Company Service Station No. 11107, located at 18501 Hesperian Boulevard, San Lorenzo, California. A Site Plan is presented as Figure 1.

**PROJECT BACKGROUND**

On October 22, 1992, four soil borings were drilled at the site to depths ranging from 26.5 to 31.5 feet below grade. The borings were converted into groundwater Monitoring Wells MW-1 through MW-4. Laboratory analysis detected total petroleum hydrocarbons as gasoline (TPH-G) up to 51 parts per million (ppm) and benzene up to 0.4 ppm in the soil samples collected at depths of up to 20 feet below grade in the immediate vicinity of the underground fuel storage tanks and dispenser islands. Dissolved-phase TPH-G up to 900 parts per billion (ppb) and benzene up to 150 ppb were detected in the groundwater samples collected from Monitoring Wells MW-3 and MW-4.

**SCOPE OF WORK**

The scope of work includes: (1) drilling three soil borings for installation of three additional groundwater monitoring wells; (2) sampling and analysis of soil and groundwater samples; and (3) preparation of a report presenting the findings and conclusions of the investigative work. All work will be conducted in accordance with applicable regulations and guidelines of the Hazardous Materials Division of the Alameda County Health Care Services Agency, Alameda County Flood Control and Water Conservation District (Zone 7), and the California Regional Water Quality Control Board, San Francisco Bay Region. The scope of work has been divided into the following tasks:

**Task 1: Acquire Permits**

Alisto Engineering Group will procure all necessary drilling and groundwater monitoring well installation permits, encroachment permits and offsite access, schedule the field activities, and locate underground utility lines, prior to commencement of field work.



## Task 2: Drill Exploratory Soil Borings and Install Groundwater Monitoring Wells

To investigate the lateral and vertical extent of soil and groundwater contamination, three exploratory soil borings will be drilled using a truck-mounted CME 75 drilling rig equipped with 8-inch-diameter hollow-stem auger.

Soil samples will be collected from the soil borings at 5-foot intervals and at significant stratigraphic changes beginning at 5 feet below grade and continuing to the total depth of the boring. Soil samples will be collected from a split-spoon sampler lined with stainless steel tubes and logged in the field by a qualified geologist or engineer using the Unified Soils Classification System (USCS). Each sample will also be field screened using a photo-ionization detector or combustible gas indicator to assist in selecting the samples for laboratory analysis. The samples selected for analysis will be sealed airtight with Teflon or aluminum sheeting, plastic caps, and adhesive tape, and placed immediately into a cooler containing blue or dry ice.

The proposed wells will be installed and constructed based on site-specific hydrogeologic conditions and the nature of contamination encountered. The borings will be converted into three 2-inch-diameter groundwater monitoring wells to depths of approximately 10 to 15 feet below the top of the first saturated zone. The wells will be constructed using 2-inch-diameter, Schedule 40, PVC casing, with 0.010-inch perforations, and the associated filter pack. An approximately 1-foot-thick bentonite spacer will be installed above the sand pack, and the remainder of the annulus will be sealed with Portland Type I/II neat cement. The top of each well will be secured with watertight locking caps and utility boxes finished flush with the ground.

## Task 3: Develop, Sample and Survey Groundwater Monitoring Wells

Well development will be performed to: (1) consolidate and stabilize the filter pack; (2) optimize well production; and (3) reduce the turbidity of subsequent groundwater samples. The proposed wells will be developed during drilling before installation of the bentonite spacer and neat cement seal. Additionally, well development will be accomplished by alternately using a surge block and submersible pump or bailer to evacuate the water and sediments. Development will continue to a maximum of 10 saturated well volumes or until the groundwater is relatively free of sediments.

All wells will be sampled a minimum of 72 hours after well development and installation of the neat cement seal of the proposed well. Before sampling, water level measurements at each well will be recorded, and the presence of free product or sheen will be observed. The wells will then be purged of groundwater to allow groundwater representative of the aquifer to enter the wells. Purging will be accomplished using a bailer or pump so as not to agitate the groundwater or expose it to air. Purging will continue until a minimum of 3 and a maximum of 10 saturated well casing volumes have been evacuated and the indicator parameters of pH, temperature, and specific conductivity, have stabilized.



Stabilization of the indicator parameters will be determined when they vary no more than the following values:

- pH - 0.2 units
- Temperature - 0.5 degrees Celsius
- Specific conductivity - 10 percent

The samples will be placed in an iced cooler and transported to a state-certified laboratory for analysis. All purged water from sampling and development, as well as decontamination rinsate will be stored onsite in Department of Transportation (DOT) approved 55-gallon drums for transport and disposal.

To calculate the hydraulic gradient and groundwater flow direction of the shallow aquifer, each well will be surveyed from the top of the casings to within 0.01 foot accuracy in reference to an established benchmark or a common datum.

#### Task 4: Analyze Soil and Groundwater Samples

Soil and groundwater samples will be transported to a state-certified laboratory and analyzed on a standard two week turnaround time for total petroleum hydrocarbons as gasoline (TPH-G), benzene, toluene, ethylbenzene, and total xylenes (BTEX) using Environmental Protection Agency (EPA) Methods 5030/8015/8020. Additionally, water samples collected from the monitoring well near the waste oil tank will be analyzed for the following:

- Total oil and grease (TOG) using EPA Method 5520 DF
- Total petroleum hydrocarbons as diesel (TPH-D) using EPA Methods 5030/8015 (modified)
- Halogenated volatile organic compounds (HVOCs) using EPA Method 8010

#### Task 5: Analyze Data and Laboratory Results

Upon completion of sample analysis, a detailed evaluation of results and available information will be conducted to assess the extent and nature of petroleum hydrocarbons in the soil and groundwater. This will include the following:

- Interpretation of geologic and hydrogeologic characteristics of the water-bearing formation and the nature of subsurface contamination.
- Preparation of groundwater potentiometric surface maps, hydrocarbon concentration maps, and hydrogeologic cross sections.
- Assessment of the extent of hydrocarbons in the soil and/or groundwater.



Task 6: Prepare Report

A report presenting the results, findings, conclusions, and recommendations of the supplemental investigation will be prepared for submittal to BP Oil for subsequent submittal to the regulatory agencies.

**SITE SAFETY PLAN**

All field procedures and activities related to the conduct of the site investigation work will be conducted in accordance with the site specific safety plan. The site safety plan will be developed in accordance with the applicable requirements of the California Environmental Protection Agency (Cal-EPA) and the federal and state Occupational Safety and Health Administration (OSHA and Cal-OSHA).

**IMPLEMENTATION SCHEDULE**

The proposed supplemental site investigation will be completed and a report submitted within 75 days after receipt of written approval of the proposed work plan from the appropriate regulatory agencies.

The estimated schedule for completion of the tasks is as follows:

<u>Task/Activity</u>	<u>Days After Work Plan Approval</u>
- Acquire permits	15
- Soil borings/well installation	25
- Well development/sampling	30
- Sample analysis	45
- Data analysis	60
- Report preparation	75

This schedule may be subject to revision depending on timely receipt of information required to complete the site investigation. Any changes to the schedule will be communicated in advance to the appropriate agencies and parties involved.





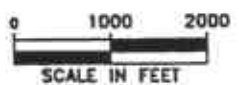
SOURCE:  
 USGS MAP, HAYWARD & SAN LEANDRO QUADRANGLES,  
 CALIFORNIA, 7.5 MINUTE SERIES, 1959. PHOTOREVISED 1980.



FIGURE 1

SITE VICINITY MAP

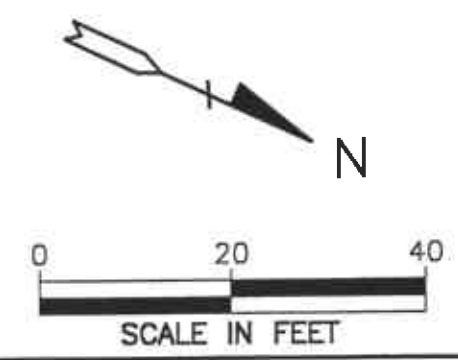
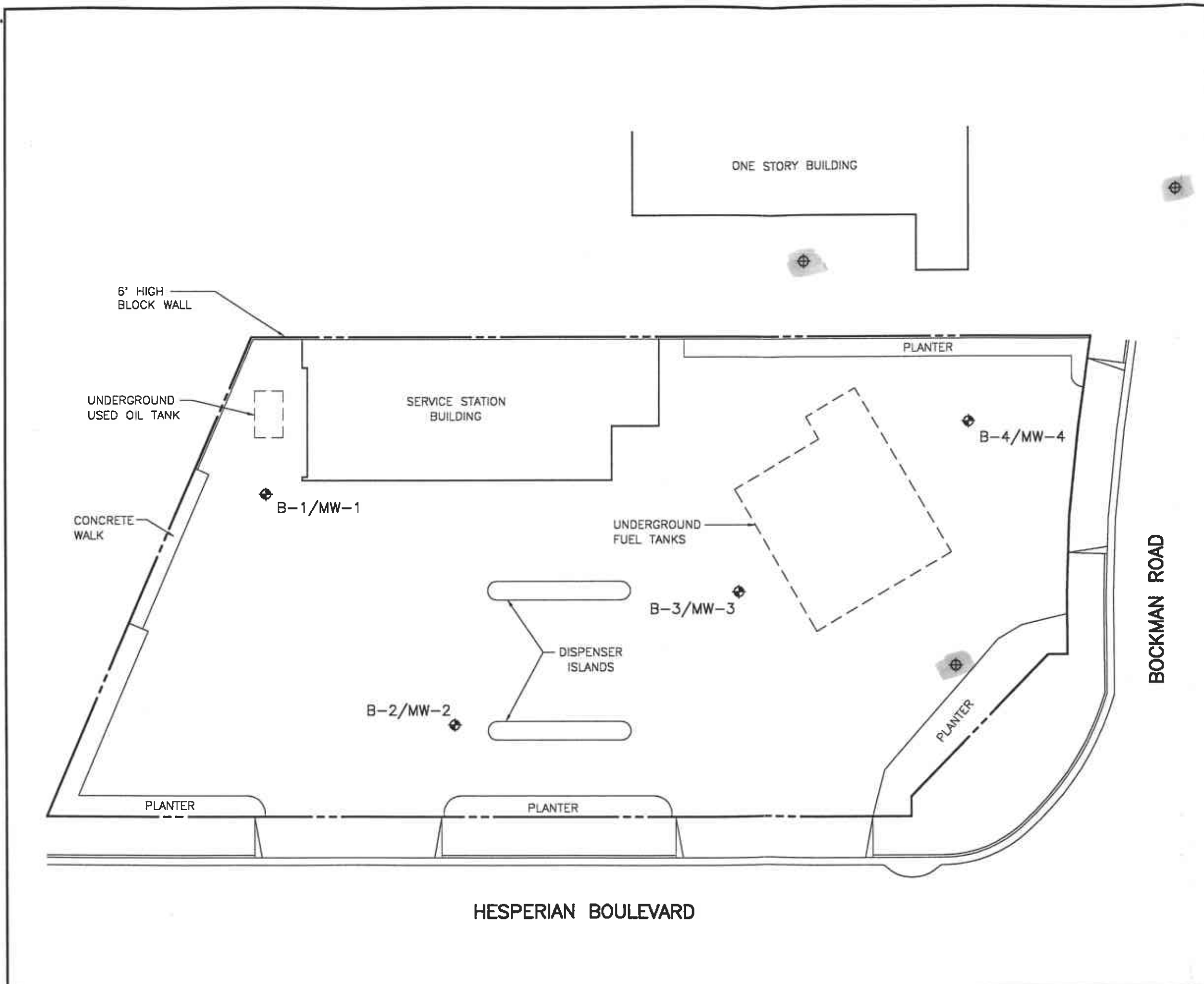
BP OIL SERVICE STATION NO. 11107  
 185601 HESPERIAN BOULEVARD  
 SAN LORENZO, CALIFORNIA



ALISTO PROJECT NO. 10-060

**ALISTO ENGINEERING GROUP**  
 CONCORD, CALIFORNIA

1-11 MAP 10-2-21 Date: 11/09/00



- LEGEND**
- ⊕ GROUNDWATER MONITORING WELL
  - ⊕ PROPOSED GROUNDWATER MONITORING WELL

**FIGURE 2**  
**PROPOSED MONITORING WELL LOCATIONS**  
 BP OIL SERVICE STATION NO. 11107  
 18501 HESPERIAN BOULEVARD  
 SAN LORENZO, CALIFORNIA  
 PROJECT NO. 10-060-02

100600-0200 8-11-03 001 14-20