CAMBRIA
Environmental Technology, Inc.

Mr. Scott Seery
Alameda County Environmental Health Department
80 Swan Way
Oakland, CA 94621

December 6, 1995

Re: **Investigation Work Plan**
15595 Washington Avenue
San Lorenzo, California

Dear Mr. Seery:

Cambria Environmental Technology, Inc. (Cambria) is submitting this work plan for a subsurface investigation at the site referenced above on behalf of Jessen and Agnes Calleri, and other named responsible parties. Our investigation objective is to define the vertical extent of hydrocarbons in on-site soil and the horizontal extent of hydrocarbons in ground water. Our proposed scope of work for this investigation is described below. Our standard field procedures are presented as Attachment A.

PROPOSED SCOPE OF WORK

The specific tasks implemented for this investigation will include:

1. Preparing a site safety plan and coordinating field activities.
2. Obtaining well and boring permits from Alameda County Water Conservation District (Zone 7).
3. Notifying Underground Service Alert of our drilling activities so they can clear the well location prior to drilling.
4. Drilling six soil borings to about 12 ft depth and two soil borings to 25 ft.
5. Collecting and analyzing up to three soil samples and one grab water sample from each boring for total petroleum hydrocarbons as gasoline (TPHg) and benzene, ethylbenzene, toluene and xylenes (BETX) by EPA Methods 8015/8020.
6. Converting the two 25 ft soil borings to ground water monitoring wells, screened five ft above and ten ft below the static water table.
7. Developing the monitoring wells using surge block agitation and ground water evacuation.
8. Collecting one ground water sample from each of the five on-site wells and analyze the samples for TPHg and BETX by EPA Methods 8015/8020, at least 48 hours after development.

9. Surveying the elevations of the new wells.

10. Gauging all site wells and determining the ground water gradient and flow direction.

11. Preparing a subsurface investigation report.

12. Monitoring the three existing and two new on-site wells quarterly.

Cambria's standard field procedures are included in Attachment A.

SPECIFIC PROCEDURES

The specific tasks to be performed include:

Site Health and Safety Plan: We will prepare a comprehensive site safety plan to protect site workers. The plan will be kept on site at all times and signed by all site workers.

Permits: We will obtain a boring permit from Zone 7 for drilling six exploratory borings and installing two wells.

Underground Utility Location: Cambria will notify Underground Service Alert of our drilling activities so they can clear the offsite well locations prior to drilling.

Soil Borings: We will drill six soil borings to a depth of 12 ft and two soil borings to a depth of 25 ft and will collect soil samples from the borings at five ft intervals, lithologic changes and at the water table. We will log the soil types encountered in each boring. The two wells will be placed downgradient of the pump islands and three 12 ft soil borings (SB-D, SB-E and SB-F) will be placed adjacent to the apparent source area near the pump islands. A 12 ft soil boring (SB-B) will be placed upgradient and the remaining two soil borings (SB-A and SB-C) will be placed to the northeast and southwest of the pump islands to define the lateral extent of hydrocarbons (Figure 1). After sampling, the borings will be backfilled with Portland Type I/II cement. Our standard field procedures are presented in Attachment A.

Well Construction: The two 25 ft soil borings will be converted to monitoring wells MW-4 and MW-5 the wells will be constructed of 2 inch diameter PVC and will be screened 10 ft below and 5 ft above the water table. The wells will be covered with a traffic-rated vault and locking well caps. Depending on the results of field screening of soil and grab water samples collected from SB-E and SB-D, we may also convert one of these borings to an additional monitoring well.

Well Gauging: Before purging the wells we will measure the depth to water in each site well using an electronic depth sounder, as outlined in our Standard Field Procedures (Attachment A). We anticipate that ground water will occur at 10 ft depth.

Soil and Grab Water Sample Analyses: We will analyze selected soil samples from each boring for total petroleum hydrocarbons as gasoline (TPHg) and benzene, ethylbenzene, toluene, and xylenes (BETX) by EPA Methods 8015/8020. One of the soil samples analyzed will be taken immediately above the water table, the others will be from the portion of the boring containing the highest field indications of hydrocarbons. We will also collect and analyze one grab water sample from each boring for TPHg and BETX.

Well Development and Sampling: After we install the wells, we will develop them using consecutive episodes of surge block agitation and well evacuation. Evacuation will continue until at least 10 well-casing volumes have been removed and the well purge water is as clean as practical. At least 48 hours after well development, we will purge and sample the new and existing wells following our standard field procedures (Attachment A). We will analyze the ground water samples from the wells for TPHg and BETX by EPA Methods 8015/8020.

Ground Water Analyses: We will collect and analyze one ground water sample from each of the three original and two new monitoring wells for TPHg and BETX, following our standard field procedures for water sampling (Attachment A). We will record pH, electrical conductivity, and temperature during the well purging and will sample only when these parameters stabilize.

Reporting: After the analytic results are received we will prepare a subsurface investigation report that will contain:

- A summary of the site background and history,
- Descriptions of the drilling, soil sampling, and well installation, development and sampling methods,
- Boring logs and construction diagrams for the wells,
- Tabulated soil and ground water analytic results,
- Analytic reports and chain-of-custody forms,
- Well elevation survey and ground water elevation data,
- Soil and water disposal methods, and
- Hydrogeologic interpretation.

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SCHEDULE

The drilling can begin within two weeks of written approval of this work plan and as soon as the boring and well permits have been received from Zone 7. The investigation report will be submitted about six weeks after finishing the field work.

Please call if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc.

Tara L Arrowood
Staff Engineer

Joseph P. Theisen, C.E.G.
Principal Hydrogeologist

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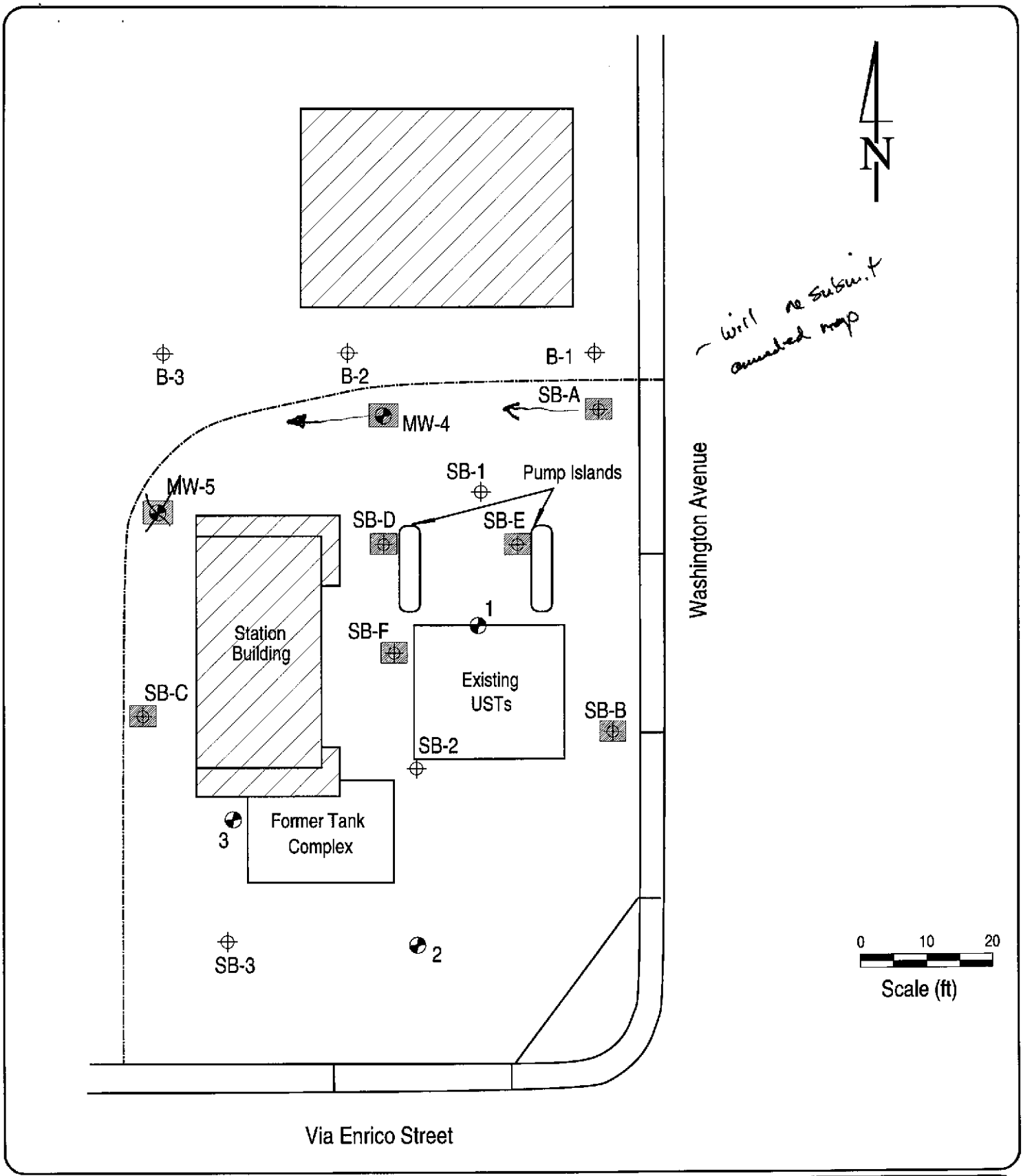
Attachments: A - Standard Field Procedures

cc: J. Rose; Randick and O'Dea
M. Swanson, Attorney at Law



– will re submit amended map

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EXPLANATION
- Existing Ground Water Monitoring Well
- Previously Drilled Soil Boring
- Proposed Soil Boring
- Proposed Monitoring Well

Proposed Boring and Well Locations

15595 Washington Avenue
San Lorenzo, California

FIGURE
1

STANDARD FIELD PROCEDURE FOR MONITORING WELLS

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling ground water monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

SOIL BORING AND SAMPLING

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and to collect samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Registered Geologist (RG) or a Certified Engineering Geologist (CEG).

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or push technologies such as the Geoprobe. Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments at the bottom of the borehole.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Analysis

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. PID measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Water Sampling

Water samples, if they are collected from the boring, are either collected using a driven Hydropunch type sampler or are collected from the open borehole using bailers. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

Ground water monitoring wells are installed to monitor ground water quality and determine the ground water elevation, flow direction and gradient. Well depths and screen lengths are based on ground water depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 ft below and 5 ft above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three ft thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two ft above the well screen. A two ft thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I,II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

Wells are generally developed using a combination of ground water surging and extraction. Surging agitates the ground water and dislodges fine sediments from the sand pack. After about ten minutes of surging, ground water is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of ground water are extracted and the sediment volume in the ground water is negligible. This

process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

Ground Water Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of ground water are purged prior to sampling. Purging continues until ground water pH, conductivity, and temperature have stabilized. Ground water samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.