Work Plan for Site Characterization and Remediation Activities to Be Conducted in Conjunction with Proposed Site Development Yerba Buena/East Baybridge Project Site Emeryville and Oakland, California

April 28, 1993
1649.06

Prepared for
Catellus Development Corporation
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LEVINE·FRICKE

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ENGINEERS, HYDROGEOLOGISTS & APPLIED SCIENTISTS

April 28, 1993 LF 1649.06

Ms. Susan Hugo
Alameda County Health Care Services Agency
80 Swan Way, Room 200
Oakland, California 94621

Subject: Work Plan for Site Characterization and Remediation Activities to Be Conducted in Conjunction with Proposed Site Development, Yerba Buena/East Baybridge Project Site, Emeryville and Oakland, California

Dear Ms. Hugo:

We are submitting the enclosed work plan on behalf of Catellus Development Corporation ("Catellus") for your review and approval. We have also sent a copy of this work plan to Mr. Lester Feldman of the Regional Water Quality Control Board (RWQCB) for his review.

The work plan describes site characterization and remediation activities to be conducted in conjunction with site development activities. As we discussed in our meeting on April 14, 1993, grading of Phase I of the proposed site development is currently scheduled for July or August 1993.

The scope of work included in this work plan includes the following:

- abandoning and replacing monitoring wells
- observing and monitoring placement of soils affected with total petroleum hydrocarbons (TPH) as diesel and oil for on-site containment
- further characterizing TPH-affected soil contained on site, by collecting additional soil samples for chemical analysis
- preparing a Soils Management Plan, as requested by the RWQCB in a letter to Ric Notini of Catellus, dated June 24, 1992, which approved the plan for containing petroleum-affected soil at the site

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We will call you in approximately two weeks to discuss the scope of work presented in this work plan. We anticipate that existing monitoring wells east of Hollis Street will be destroyed in July 1993 following quarterly monitoring.

I will be out of the office during the period from April 23, 1993 through May 10, 1993. Please contact Cynthia Barclay, Senior Project Hydrogeologist, during that time, if you have any questions or comments concerning this work plan.

Sincerely,

Cynthia Barclay for

Jenifer J. Beatty
Project Hydrogeologist

Enclosure

cc: Richard Hiett, Regional Water Quality Control Board
Kimberly Brandt, Catellus
Pat Cashman, Catellus

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WORK PLAN FOR SITE CHARACTERIZATION AND REMEDIATION ACTIVITIES TO BE CONDUCTED IN CONJUNCTION WITH PROPOSED SITE DEVELOPMENT YERBA BUENA/EAST BAYBRIDGE PROJECT SITE EMERYVILLE AND OAKLAND, CALIFORNIA

1.0 INTRODUCTION

On behalf of Catellus Development Corporation ("Catellus"), Levine·Fricke has prepared the following work plan to perform additional work at the Yerba Buena/East Baybridge Project site ("the Site"; Figure 1) in conjunction with Phase I of site development. The current layout of the Site is presented in Figure 2. Phase I development activities will occur on the portion of the Site located east of Hollis Street (Areas A and B shown in Figure 2).

The scope of work proposed in this work plan includes the abandonment and replacement of shallow ground-water monitoring wells, final characterization of soils affected with total petroleum hydrocarbons (TPH) contained on site, preparation of the Soils Management Plan to be submitted to the Regional Water Quality Control Board (RWQCB), and continuation of the periodic monitoring plan for Areas A and B of the Site.

2.0 BACKGROUND

The Site consists of approximately 51 undeveloped acres in Emeryville and Oakland, California. The Site is to be developed primarily for commercial use, although a portion of the Site may be developed for residential use by the City of Emeryville.

Since the early 1900s, the Site has been used for a variety of industrial and commercial purposes, including warehouse storage of predominantly dry goods and limited quantities of hazardous materials (e.g., oxides and acids); metal foundries; truck maintenance and repair; auto storage and wrecking; and construction. Several rail transit lines were once located on site, for the transportation of passengers and freight. A detailed discussion of previous site usage is presented in Levine·Fricke's Phase I and Phase II Environmental Investigation (Levine·Fricke 1990a).

2.1 Previous Environmental Investigations

A comprehensive environmental investigation of the Site was initiated in September 1989 by Levine·Fricke on behalf of Catellus, the property owner, and has continued over the past four years. The investigation was conducted in three phases, as described below. With the exception of a few localized areas discussed in Section 2.2, concentrations of chemical compounds detected in soil at the Site during the three phases of environmental investigations were relatively low and would not be expected to adversely affect human health or the environment (Levine·Fricke 1990a), given the current and intended uses of the Site.

A Phase I investigation was conducted between September 1989 and December 1989 and consisted of the following:

- reviewing the Site's history and past usage
- developing a sampling and chemical analysis work plan
- soil sampling and analysis in areas targeted as being of potential environmental concern during the historical review
- soil sampling and analysis in nontargeted areas to characterize the general quality of shallow soil
- collecting "grab" ground-water samples from soil borings and ground-water samples from monitoring wells

Based on the results of these activities, a Phase II investigation was conducted between January 1990 and October 1990 to further assess the lateral and vertical extent of chemically affected soil detected in certain localized areas during Phase I. More specifically, Phase II consisted of the following:

- conducting a soil-gas and shallow ground-water reconnaissance survey in Area A
- collecting and analyzing additional soil samples for lead, zinc, polychlorinated biphenyls (PCBs), and/or volatile organic compounds (VOCs)
- conducting a shallow ground-water quality survey in the vicinity of Phase I monitoring well LF-9 (Levine·Fricke 1990a)

Results from the Phase I and II investigations were presented in Levine·Fricke's October 16, 1990 report (Levine·Fricke 1990a).

Phase I and II soil and ground-water sample analysis results were compared with applicable regulatory guidelines to assist in evaluating areas of potential environmental concern. A conceptual remedial plan (Levine·Fricke 1990b) was developed to address these areas, and submitted to the RWQCB and the Alameda County Health Care Services Agency (ACHA) in November 1990. A third phase of investigation (Phase III) was recommended in the conceptual remedial plan to further assess the extent and volume of chemically affected soil and the lateral and vertical extent of chemically affected ground water. These soil and ground-water data were used in developing the Draft Site Remedial Plan (SRP; Levine·Fricke 1991b).

The Phase III investigation consisted of the following activities:

- collecting and analyzing soil samples for lead, VOCs, and/or TPH as oil (TPHo)
- conducting a shallow ground-water quality reconnaissance survey in Area A
- collecting and analyzing additional ground-water samples from monitoring wells for VOCs, herbicides, and/or total dissolved solids (TDS)

Results of the Phase III investigation were presented in Levine·Fricke's February 6, 1991 report (Levine·Fricke 1991a).

2.2 Previous Remedial Activities for Soil

The SRP, dated February 11, 1991 (Levine·Fricke 1991b), proposed objectives, cleanup goals, the scope of work, and methodologies for remediating localized areas of on-site chemically affected soil and ground water. The SRP was approved by the ACHA in a letter to Mr. Ric Notini of Catellus dated March 5, 1991.

Certain soils identified as containing elevated concentrations of lead, zinc, and/or PCBs in localized areas have been removed from the Site in accordance with the SRP. Larger areas of TPH-affected soils detected at the Site will be

contained on site, in accordance with the containment plan for TPH-affected soils ("the Containment Plan"), dated March 10, 1992 (Levine•Fricke 1992a), and approved by the RWQCB in a letter dated June 24, 1993.

The results of site soil remediation in Phase I Areas A and B, conducted in accordance with the SRP, are summarized below.

2.2.1 Lead-Affected Soils in Area A

Approximately 360 cubic yards (excavated volume) of lead-affected soils were excavated from an area measuring approximately 40 feet by 40 feet near location A-5 in Area A (Figure 2). The final depth of the excavation was approximately 5 feet. Ten soil samples were collected from the final excavation floor and sidewalls and analyzed for lead using EPA Method 7420. Analysis results indicated lead concentrations ranging from 7 parts per million (ppm) to 150 ppm in soil samples collected from the final excavation sidewalls and floor. This concentration range is well below the cleanup goal of 1,000 ppm for lead proposed in the SRP.

2.2.2 PCB-Affected Soils in Area B

Approximately 300 cubic yards (excavated volume) of PCB-affected soils were excavated from an area measuring approximately 30 feet by 85 feet near location B-26 (Figure 2). The northern sidewall of the excavation terminated at the property boundary. The final depth of the excavation was approximately 2.5 feet. Seventeen soil samples were collected from the sidewalls and floor of the final excavation for PCB analysis using EPA Method 8080.

Analytical results of soil samples collected from the western, southern, and eastern sidewalls (i.e., within the property boundary) indicated PCB concentrations of less than 0.2 ppm, which is below the cleanup goal of 1 ppm for PCBs proposed in the SRP. However, elevated concentrations of PCBs (up to 28 ppm) were detected in soil samples collected from the northern sidewall, directly adjacent to the northern property line. Activities conducted at the property located directly north of the PCB excavation apparently have included automobile and equipment repair and maintenance. During an inspection of the Site conducted in September 1989, stained soil and several 55-gallon drums were observed on the adjacent property, near the area of PCB-affected soil removal.

Therefore, it appears activities conducted on that property may have caused the release of PCBs detected near Phase I sampling location B-26, and Catellus should not be responsible for remediating PCB-affected soil on that adjacent property.

2.2.3 TPH-Affected Soils in Area B and Subsequent Ground-Water Investigations

Approximately 25,000 cubic yards of TPH-affected soils were excavated from the former Ransome Construction ("Ransome") property, located in the northwestern portion of Area B (Figure 2). The soils currently are stockpiled in Area B of the Site. The excavated soils contain low concentrations of TPH as diesel (TPHd) and/or TPHo. However, approximately 8,000 cubic yards of the stockpiled soils also contained concentrations of TPH as gasoline (TPHg) and benzene, toluene, ethylbenzene, and xylene (BTEX) above laboratory detection limits. TPHg- and BTEX-affected soils were successfully aerated on site in accordance with the Containment Plan to reduce TPHg and BTEX concentrations to aeration criteria (verbally approved by the ACHA and RWQCB on February 13, 1992) of 10 ppm for TPHg, 1 ppm total for toluene, ethylbenzene, and xylene, and below laboratory detection limits for benzene. Soil remediation activities are described in more detail in the soils remediation activities report submitted to the ACHA, dated December 21, 1992 (Levine•Fricke 1992b). TPH-affected soil currently stockpiled in Area B will be contained beneath proposed parking areas, as discussed in Section 3.0.

To assess the possible effects on shallow ground water from TPH-affected soil identified in and subsequently removed from this area (in accordance with the SRP), a shallow ground-water investigation was conducted at the former Ransome property by Levine•Fricke in May 1992. Six shallow ground-water monitoring wells were installed during this investigation. Analytical results for ground-water samples collected from these wells indicated that shallow ground water has not been significantly affected by TPH concentrations.

To assess potential residual effects on shallow ground water from TPH-affected soils identified in and subsequently removed from this area, the wells at the Ransome property are being monitored for a period of one year (October 1992 through September 1993).

2.2.4 Removal of Underground Storage Tanks at the Former Clipper Site

In November 1990, a gasoline underground storage tank (UST) was removed from the former Clipper Express Warehouse ("Clipper") site (Figure 2) by a contractor working on Clipper's behalf. Levine·Fricke observed the tank removal on behalf of Catellus. Chemical analysis of soil samples collected by Clipper's contractor from the excavation floor and sidewalls indicated low concentrations (less than 18 ppm) of TPHo and TPHd, and nondetectable concentrations of BTEX. In a letter from the ACHA to Clipper, dated January 24, 1991, the ACHA approved backfilling the excavation and did not request further investigation or cleanup.

2.3 Previous Remedial Activities for Shallow Ground Water

Analytical results from ground-water investigations conducted at the Site east of Hollis Street indicate that shallow ground water in Area A has been affected by VOCs (Figure 3). As indicated on Figure 3, a ground-water collection trench was installed during January 1992 to intercept VOC-affected shallow ground water in Area A. However, the apparent shallow ground-water flow direction in the northwestern portion of Area A shifted from west to northwest in August 1991. The timing of the apparent shift in ground-water flow direction corresponded to dewatering activities conducted by the East Bay Municipal Utility District (EBMUD) in conjunction with the installation of a sanitary sewer interceptor pipe and trench beneath Yerba Buena Avenue.

Based on monthly water-level data collected at the Site, ground-water flow direction in the western portion of Area A continues to be toward the northwest. It appears that operation of the existing collection trench may not be sufficient by itself to prevent possible off-site migration of VOC-affected ground water. Therefore, it is proposed that two shallow ground-water extraction wells be installed in the vicinity of existing wells LF-6 and LF-17 to provide greater hydraulic control in Area A. Results of computer modeling indicate that the addition of two shallow ground-water extraction wells operating in conjunction with the collection trench will prevent possible off-site migration of shallow VOC-affected ground water.

The proposed installation of the two shallow extraction wells is described in Section 3.0, Task 4. Ground-water treatment system installation is discussed in Section 3.0, Task 6.

3.0 OBJECTIVES AND PROPOSED SCOPE OF WORK

The objectives of the proposed scope of work for this work plan are as follows:

- abandon selected monitoring wells, so that site grading can take place and so that the wells, which could be damaged during grading, do not act as vertical conduits to ground water beneath the Site
- observe placement of TPH-affected soils for on-site containment in accordance with the Containment Plan (Levine·Fricke 1992a)
- prepare a Soils Management Plan in accordance with a request from the Regional Water Quality Control Board
- install wells to replace those abandoned for site grading purposes and continue the periodic ground-water monitoring program for the Site

This scope of work is organized into the following tasks, presented in their anticipated chronological order:

Task 1: Abandon Ground-Water Monitoring Wells
Task 2: Observe and Monitor Containment of TPH-Affected Soil
Task 3: Collect Shallow Soil Samples for Chemical Analysis Following Placement of TPH-Affected Soil
Task 4: Install 2 Shallow Ground-Water Extraction Wells, 13 Ground-Water Monitoring Wells, and 1 Piezometer
Task 5: Develop and Sample Newly Installed Wells
Task 6: Install the Ground-Water Treatment System
Task 7: Evaluate Data and Prepare Report
Task 8: Prepare Soils Management Plan
Task 9: Conduct Periodic Ground-Water Monitoring

These tasks are described in detail below.

Task 1: Abandon Ground-Water Monitoring Wells

The proposed locations of buildings and extensive Phase I grading activities may compromise the integrity of ground-water monitoring wells at the Site. It is therefore proposed that all existing monitoring wells located in Areas A and B,

as well as selected off-site wells, be properly abandoned before the Site is graded, and then replaced following completion of grading activities. Well will be abandoned in July following third quarter ground-water monitoring activities.

The following existing monitoring wells, as shown in Figure 2, will be properly sealed in accordance with Alameda County Water Conservation District-Zone 7 (ACWD) guidelines:

Areas A and B: LF-1, LF-2, LF-3, LF-4, LF-4D, LF-4Z, LF-5, LF-5D, LF-6, LF-7, LF-8, LF-17, LF-18, LF-19, LF-19D, LF-20, LF-21, and LF-24 through LF-29

Area C: LF-16

off-site well: LF-30

Water Well Destruction Permit Applications will be submitted to the ACWD before the wells are destroyed and sealed. Upon receipt of the permits to abandon the wells, a drilling contractor will be scheduled.

The wells will be abandoned using a hollow-stem auger 10 to 12 inches in diameter (or other appropriate equipment) to drill out well materials (PVC casing, sand pack, bentonite, and cement grout) to the total depth of each well. As drilling proceeds, fragments of well materials will be conveyed to the surface by the rotation of the augers. Remaining well materials will be removed from the boring when the augers are withdrawn. Double-cased wells will be drilled out through the steel or PVC conductor casing.

To complete well destruction, the evacuated boring will be sealed from the bottom of the boring to the ground surface with a cement-bentonite slurry pumped into the well through tremie pipe.

Task 2: Observe and Monitor Containment of TPH-Affected Soil

In accordance with the Containment Plan, TPHo- and TPHd-affected soil currently at the Site will be left in place and capped with a low permeability cover, or will be placed beneath proposed building pads and/or in areas to be covered with asphalt or concrete (parking areas), to reduce possible exposure to the affected soils and mitigate future effects to shallow ground water by reducing surface-water infiltration through the soil.

TPH-affected soil currently stockpiled in Area B of the Site will be placed beneath the parking area proposed for the Site (Figure 4). TPH-affected gravel identified in the western portion of Area A will be excavated to a depth of approximately 5 feet and reworked. Approximately one-half of the gravel fill will then be placed and compacted beneath the foundation of the building proposed for the western portion of Area A. The remaining gravel will be used as engineered fill beneath the building foundations proposed for the eastern portion of Area A.

Levine·Fricke will have a field engineer on site at all times during site grading to observe grading activities and to perform field density tests for geotechnical purposes. The Levine·Fricke engineer will monitor handling and placement of TPHd- and TPHo-affected soil. Additionally, a Levine·Fricke geologist will visit the Site on a daily basis to check that the TPH-affected soils are being handled properly. For more detail on these activities, please refer to the Containment Plan (Levine·Fricke 1992a).

Task 3: Collect Shallow Soil Samples for Chemical Analysis Following Placement of TPH-Affected Soil

Shallow soil samples will be collected for chemical analysis from areas where TPH-affected soil has been placed. These samples will be collected following grading activities (approximately September or October 1993) to assess TPH concentrations in soil contained at the Site.

Soil Sampling Methodology and Field Procedures

Proposed soil sampling locations are presented on Figure 4. As indicated on Figure 4, the proposed parking area was divided into eight sections (approximately 300 feet by 150 feet) and the western and eastern areas (where building foundations are proposed) were divided into six sections each (approximately 125 feet by 165 feet and 100 feet by 165 feet, respectively). One soil sample location per section will be selected randomly in the field by a Levine·Fricke geologist. Two soil samples will be collected for chemical analysis from each location at depths of approximately 1 and 2.5 feet below ground surface (bgs).

Shallow soil borings will be drilled by a licensed drilling subcontractor under the supervision of a Levine·Fricke geologist. Soil samples will be collected for lithologic description by driving a brass-tube-lined split-spoon sampler ahead of the auger into undisturbed soil. The lowest samples

from the split-spoon sampler will be preserved for chemical analysis by placing Teflon-lined plastic caps over the ends of the brass tubes and storing the samples in an ice-chilled cooler for delivery to a state-certified laboratory. Samples will be labeled with borehole identification, depth of sample, the time and date of sample collection, the analysis requested, and the name of the individual who collected the sample. All samples will be delivered to the analytical laboratory under strict chain-of-custody protocols.

Laboratory Analysis

All soil samples will be submitted for analysis for TPHd and total oil and grease (O&G) using modified EPA Method 8015 and Standard Method 5520EF, respectively.

Task 4: Install 2 Shallow Ground-Water Extraction Wells, 13 Shallow Ground-Water Monitoring Wells, and 1 Piezometer

Ground-water extraction and monitoring wells will be drilled and installed subsequent to site grading activities to replace monitoring wells abandoned as discussed in Task 1. Proposed locations for monitoring wells to replace existing wells are presented on Figure 5. Two shallow ground-water extraction wells (less than 25 feet deep), 9 shallow monitoring wells, 3 intermediate-depth monitoring wells (less than 45 feet deep), 1 deeper monitoring well (less than 65 feet deep), and one piezometer have been proposed. It is anticipated that well installation will occur in December 1993 or January 1994.

Permitting

Permits will be obtained from the ACWD for the installation of the proposed wells. Underground Service Alert (USA) will be contacted to clear public utilities along Yerba Buena Avenue or Hollis Street that may cross the Site. A utility locating subcontractor will be retained, if necessary, to clear proposed sampling areas of subsurface utilities.

Borehole Drilling and Well Installation

All drilling will be conducted by a licensed drilling subcontractor under the supervision of a California Registered Geologist. Soil samples will be collected every 5 feet from the borings for lithologic description during drilling using procedures discussed in Task 2. Soils will be described using the Unified Soil Classification System.

All drilling and sampling equipment will be steam cleaned or washed with a laboratory-grade detergent and water before use at each drilling or sampling location.

Shallow Monitoring Wells

The proposed shallow monitoring wells will be installed using the hollow-stem auger drilling method. The shallow wells are expected to be approximately 20 to 25 feet deep.

Wells will be constructed of flush-threaded, 2-inch-diameter, polyvinyl chloride (PVC) casing with 10 to 15 feet of factory-made slotted (0.020-inch) well screen. The well screen and solid casing will be placed in the completed borehole through the hollow-stem auger. Appropriately graded sand will be installed in the annular space between the borehole and the well screen as the auger is gradually removed from the borehole to add to the filter pack. The filter pack will extend from the bottom of the borehole to approximately 2 feet above the top of the slotted casing. A 1-foot-thick prehydrated bentonite seal will be placed above the top of the filter pack to prevent the entrance of grout into the filter pack. Cement-bentonite grout will be placed above the bentonite seal to the land surface to seal the remainder of the borehole interval from surface-water infiltration. The grout will be pumped into the borehole from the bentonite seal to land surface through a tremie pipe, and a locking well cover will then be placed over the top of the casing to protect well integrity. The well cover will be set in concrete and finished approximately 0.5 inch above the surrounding grade to restrict the entrance of surface runoff. It is anticipated that the well covers will be temporarily placed to protect the well integrity until the Site is paved. Subsequent to paving, the traffic-rated well covers will be installed to protect the wells following completion of site development.

Ground-Water Extraction Wells

Two shallow ground-water extraction wells will be installed as part of the ground-water remediation system, to provide greater hydraulic control in Area A. The extraction wells will be operated in conjunction with the shallow ground-water collection trench installed along the western property boundary in Area A (Figure 5). The extraction wells will be installed in the vicinity of existing monitoring wells LF-6 and LF-17 using hollow-stem auger drilling methods.

The wells will probably be constructed of flush-threaded, 5-inch-diameter schedule 80 PVC solid casing with an appropriate factory-slotted well screen. Appropriately graded sand will be placed in the annular space between the well screen and the borehole to a depth of approximately 1 to 2 feet over the well screen. When constructed, the well screens will be situated in the well boring so that the static water level will be located approximately 3 to 5 feet below the top of the well screen. The well screen will extend downward, across saturated sediments, to the bottom of the well boring. A 2-foot-long section of solid well casing will be placed at the base of the screen to serve as a sediment trap. A 1.5-by-2.5-foot, rectangular flush-mount metal well cover will installed to protect the integrity of the wells until it is paved. Subsequent to paving, traffic-rated well covers will be installed to protect the wells following completion of site development.

The water extracted from the wells will be piped to the treatment system. A separate work plan describing the treatment system will be submitted for review.

Intermediate-Depth and Deeper Wells

Three intermediate-depth wells (less than 45 feet deep) and one deeper well (less than 65 feet deep) will be installed to replace existing wells LF-4D, LF-5D, and LF-19D. These wells will be installed using hollow-stem auger, mud-rotary, or air-rotary drilling methods.

If the wells are installed using hollow-stem auger or mud-rotary methods, the wells will be double-cased to prevent VOC-affected shallow ground water from migrating to ground water in deeper sediments during well construction. A conductor casing likely will be set in silty clay at a depth of approximately 20 to 25 feet bgs (actual depth will be determined in the field). The annulus between the conductor casing and the borehole will be grouted by pumping a cement-bentonite grout through a tremie pipe from the bottom of the boring to the ground surface. The grout will be allowed to set for at least 24 hours before initiating the second phase of drilling. The second stage of drilling will involve drilling through the conductor casing to the total depth of the well.

If the intermediate-depth wells are installed using air-rotary/casing hammer drilling methods, a steel conductor casing will be advanced into the borehole during drilling to seal the surrounding formation and to prevent possible

downward migration of VOC-affected ground water in the borehole during well installation. After the well is constructed, the steel conductor casing will be removed.

The intermediate-depth and deeper wells will be constructed of a 2-inch-diameter PVC well casing and screen as discussed above for the shallow wells.

Waste Soil Management

Soil generated during drilling activities will be temporarily stored at the property in soil debris bins. It is anticipated that two bins will be required to store the soil. It is anticipated that the soil will be on the property for up to six weeks. Soil samples will be collected from the bins and analyzed to evaluate disposal options.

Task 5: Develop and Sample Newly Installed Wells

It is anticipated that the newly installed wells will be developed and sampled within one week following completion of well installation activities (approximately December 1993 or January 1994).

Water-Level Measurements

The top of the PVC well casings will be surveyed relative to mean sea level by a state-licensed land surveyor. Before the wells are developed, water-level measurements will be collected from all existing and newly installed wells at the Site. Depth to water will be measured using an electric water-level sounding probe to the nearest 0.01 foot, relative to the top of the PVC casing.

Well Development

The proposed monitoring wells will be developed by bailing, jetting, swabbing, and/or pumping to remove sediment from around the well and to enhance hydraulic communication with the surrounding formation. New extraction wells likely will be developed using a truck-mounted hydraulic surge block development tool. Each well will have six to ten well casing volumes of ground water purged from the well to remove finer sediments from the filter pack near the well screen and enhance hydraulic communication with water-yielding sediments in the vicinity of the well. Indicator parameters (pH, temperature, and specific conductivity) will be recorded and

observations will be made about the quantity and clarity of the water withdrawn for each well casing volume removed during this process.

Ground-Water Sampling and Laboratory Analysis

Ground-water samples will be collected following well development using a clean Teflon bailer. Samples for VOC or TPH analysis will be placed into laboratory-supplied, 40-milliliter glass vials and 1-liter amber bottles, respectively. The glass vials will be filled to capacity, capped, and checked for trapped air bubbles. If an air bubble is observed, the vial will be emptied and refilled with additional water from the well. One field blank and one duplicate sample will also be collected. Immediately after sample collection, samples will be placed into a chilled cooler for transportation to the state-certified laboratory. Strict chain-of-custody protocols will be followed in all phases of sample handling.

Ground-water samples for all but three wells (MW-1, MW-2, and MW-4) will be submitted to a state-certified laboratory for analysis of purgeable halocarbons using EPA Method 8010. Ground-water samples collected from ground-water monitoring wells MW-1 through MW-9 and EW-1 also will be analyzed for one or more of the following compounds: TPHg, BTEX, TPHd, and O&G using modified EPA Methods 8015/8020, EPA Method 3510, and Standard Method 5520EF (see Task 9).

Waste Ground-Water Management

Ground water generated from well development and sampling will be temporarily stored on site until it can be transferred to the on-site treatment system for treatment.

Task 6: Install the Ground-Water Treatment System

To reduce the potential for off-site migration of VOC-affected ground water, a ground-water collection trench (installed in January 1992) and one to two shallow ground-water extraction wells (discussed in Task 4) will be used to extract shallow ground water in Area A. VOC-affected ground water will be treated on site using an activated carbon filtration system. Based on the evaluation of results from a hydraulic test conducted on the trench, the activated carbon filtration system was recommended as the most appropriate remedial technology based on a cost/benefit analysis that considered design, construction, and operational costs.

An NPDES permit will be obtained for discharge of treated water from the treatment system into the storm sewer. A separate work plan discussing the treatment system design and installation will be submitted to the ACHA and the RWQCB for review in May 1993. It is anticipated that the treatment system will be installed in August or September 1993 in conjunction with construction of the proposed building in the western portion of Area A.

Task 7: Evaluate Data and Prepare Report

Following completion of field work, a report will be prepared for submittal to the ACHA. The report will summarize the methods, procedures, and results associated with proposed Tasks 1 through 5. The report will contain a description of the sampling location, field procedures, lithologic well logs, laboratory methods, and laboratory results. The report will also present an evaluation of the ground-water extraction and treatment system for shallow VOC-affected ground water. Water-level measurements from surrounding wells and the piezometer to be located northeast of proposed extraction well EW-1 will provide data to estimate the hydraulic capture from the ground-water extraction trench and wells.

Task 8: Prepare Soils Management Plan

In its letter to Levine·Fricke dated June 24, 1992, the RWQCB approved the Containment Plan, but requested that the Containment Plan be amended to include specific guidance language providing for the maintenance of the proposed encapsulations to protect water quality, and for conducting any future excavation or grading activities at the Site. In addition, the RWQCB requested that the document be referred to as the Soils Management Plan (SMP).

Levine·Fricke will prepare and submit the SMP to the ACHA and RWQCB following completion of site development. The SMP will include a figure or figures indicating areas where TPH-affected soil has been encapsulated. The SMP will also present analytical results of soil samples collected from these areas before encapsulation as described in Task 3.

Task 9: Conduct Periodic Ground-Water Monitoring

A sampling and analysis plan for quarterly monitoring in Area A and the south-central portion of Area B was developed to monitor the effectiveness of the shallow ground-water extraction trench and to monitor the presence of VOCs in ground water in Area A and the south-central portion of Area B

(Levine•Fricke 1991c). The quarterly monitoring program was implemented at the Site in January 1992, in accordance with the draft site remedial plan (Levine•Fricke 1991b).

Following installation of replacement wells (see Figure 5 for locations), the ground-water monitoring program will be continued at the Site beginning with the first round of sampling and analysis. The monitoring program will include the collection of quarterly water-level measurements from all wells located at the Site before sampling. Ground-water samples will be collected from selected wells at the Site on a periodic basis as described below.

Quarterly Monitoring

All monitoring wells, with the exception of wells MW-1, MW-2, and MW-4, will be monitored quarterly for VOCs using EPA Method 8010 for a minimum of one year. Following one year of quarterly monitoring, data for the Site will be reevaluated to assess whether a semiannual monitoring program may be appropriate for selected wells.

Well MW-1 will be monitored quarterly for the presence of TPHg, TPHd, BTEX, and O&G to assess whether shallow ground water has been affected by TPH-affected soil that was identified in and subsequently removed from this area.

Semiannual Monitoring

In accordance with the Containment Plan, the monitoring program will be modified following placement of TPH-affected soil beneath the proposed parking area to confirm that these soils are not affecting shallow ground water. Monitoring wells MW-3, MW-5 through MW-7, and EW-2 will be monitored semiannually for the presence of TPHd and O&G using modified EPA Method 8015 and Standard Method 5520EF, respectively. Well MW-2 will be monitored semiannually for TPHg and BTEX using modified EPA Methods 8015/8020 to assess possible on-site migration of these compounds from an off-site source.

Water-Level Measurements

Before sampling, water-level measurements will be collected from all on- and off-site wells in Areas A, B, and C of the Site. Water-level measurements will be collected in accordance with procedures discussed in Task 5. These data will be presented on tables and figures included in the periodic reports, discussed below.

Ground-Water Sampling Procedures

Approximately three to five well casing volumes of water will be removed from each well before a water sample is collected. If a well cannot sustain a yield (i.e., pumps dry), it will be allowed to recover to 80 percent of the original, static water level. A ground-water sample will then be collected after the well has recovered to 80 percent of the original water level or within two hours of pumping the well dry.

The wells will be purged using a submersible or centrifugal pump. Specific conductance, pH, and temperature will be measured during this purging process to aid in evaluating overall ground-water quality. These parameters will be recorded in the field on water-quality sampling forms. Samples will be collected after these parameters have stabilized to within 15 percent of previous measurements.

Samples will be collected using a clean Teflon bailer in accordance with procedures discussed in Task 5. Samples will be placed in an ice-chilled cooler immediately after collection for transportation to a state-certified laboratory for appropriate chemical analysis.

Periodic Reporting

Reports will be prepared and submitted quarterly to the ACHA and the RWQCB. These reports will include a summary of work completed since the previous quarterly report and work projected to be completed during the next quarter. These reports will also include the following:

- a discussion of water-quality and ground-water elevation data collected at the Site during the quarterly period
- a site plan showing locations of all wells
- ground-water elevation maps and ground-water quality maps for data collected during the quarterly period
- tables presenting well construction and ground-water elevation data, and chemical analysis results
- tables summarizing historical ground-water quality data for the Site

As stated previously, hydrogeologic data for the Site will be reevaluated following a year of monitoring, to review trends in the water-quality data and to assess whether a semiannual monitoring program may be appropriate for selected wells.

Quarterly Monitoring Schedule

It is anticipated that periodic monitoring for newly installed replacement wells will commence in the first quarter of 1994. Quarterly reports will be submitted to the ACHA 30 days after the last day of the quarter (i.e., on April 30, July 31, October 31, and January 31).

SCHEDULE

We estimate that permit applications for well destruction can be submitted to the ACWD within two weeks following receipt of approval of this work plan from the ACHA and RWQCB. It is anticipated that existing monitoring wells in Areas A and B will be abandoned during July 1993 following quarterly monitoring activities. The schedule for the remaining tasks will be dependent on the schedule for site development. An approximate schedule for Tasks 1 through 6 of this work plan is presented in Figure 6.

REFERENCES

Alameda County Health Care Services Agency (ACHA). Correspondence to Mr. Ric Notini of Catellus Development Corporation. Subject: Site Remedial Plan. March 5.

Levine·Fricke, Inc. 1990a. Phase I and II environmental investigation, Yerba Buena Project Site, Emeryville, California. October 26.

———. 1990b. Conceptual remedial plan, Yerba Buena Project Site, Emeryville, California. November 8.

———. 1991a. Phase III environmental investigation, Yerba Buena Project Site, Emeryville, California. February 6.

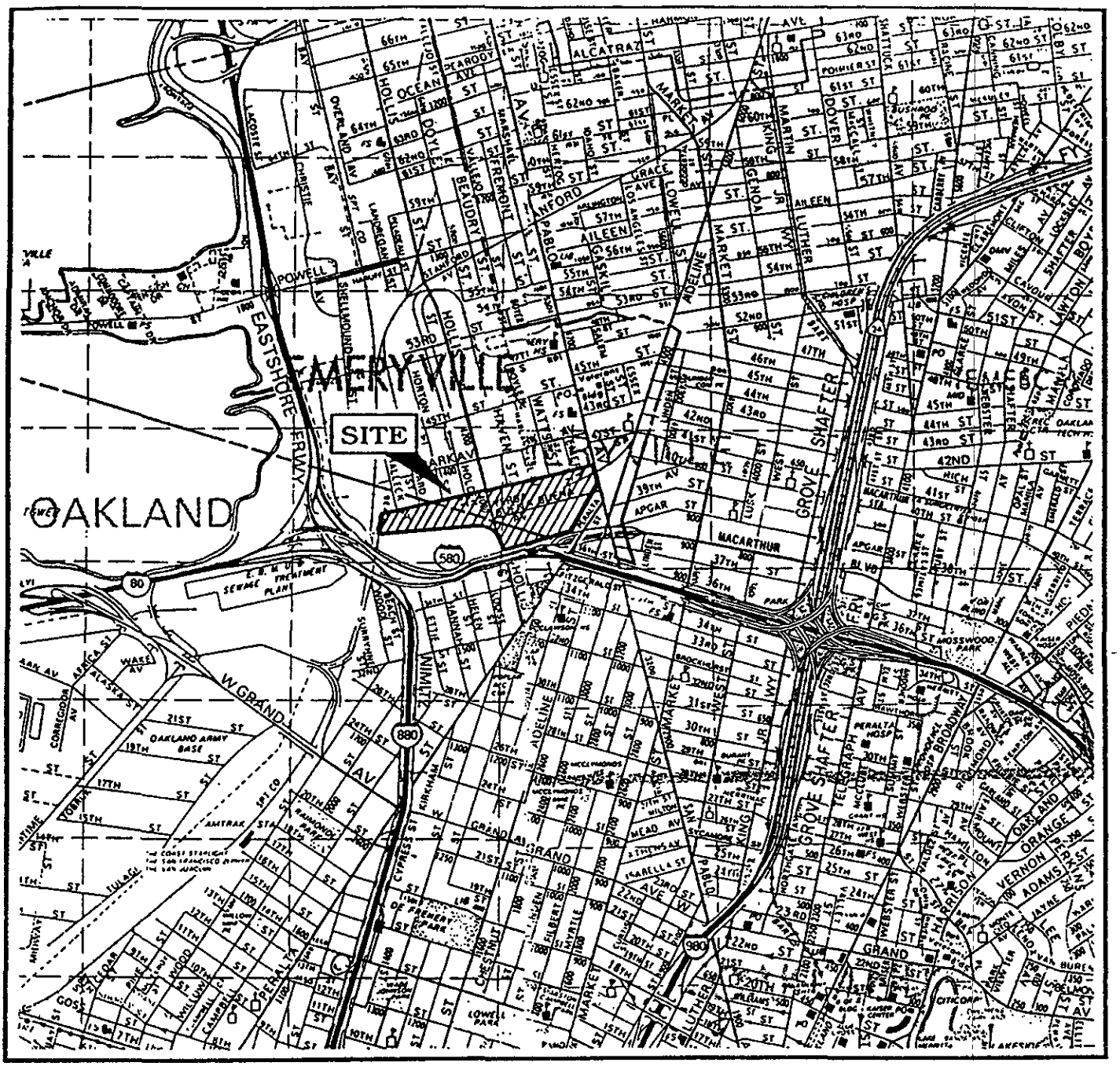
———. 1991b. Draft Site remedial plan, Yerba Buena Project Site, Emeryville and Oakland, California. February 11.

———. 1991c. Report on soil remediation activities, Yerba Buena Project Site, Emeryville and Oakland, California. November 13.

———. 1991d. Sampling and analysis plan for quarterly ground-water monitoring in Area A and the south-central portion of Area B of the Yerba Buena Project Site, Emeryville and Oakland, California. December 6.

———. 1992a. Containment plan for petroleum hydrocarbon-affected soils, Yerba Buena Project Site, Emeryville and Oakland, California. March 10.

———. 1992b. Soil remediation activities report, Former Ransome Property, Yerba Buena Project Site, Emeryville, California. December 21.



MAP SOURCE:
Alameda & Contra Costa Counties,
Thomas Bros. map, 1990 Edition

Figure 1 : SITE LOCATION MAP
YERBA BUENA PROJECT SITE

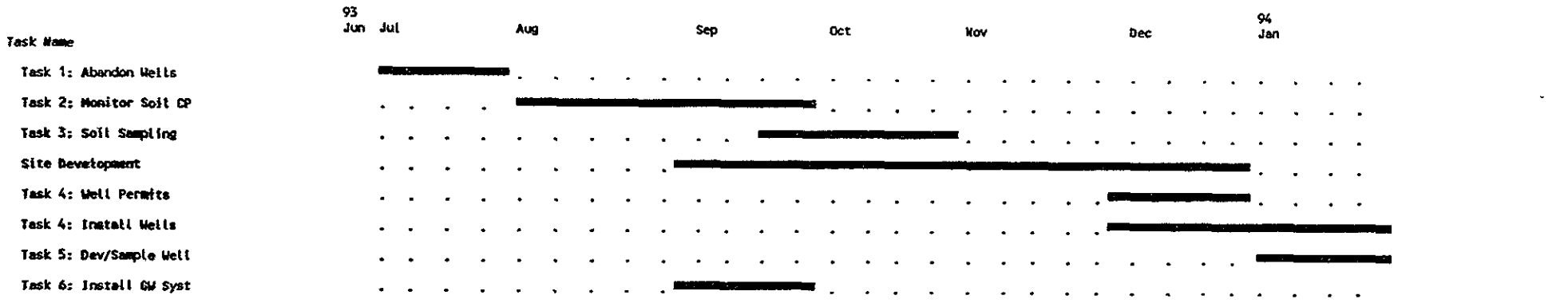
Project No. 1649

LEVINE • FRICKE
CONSULTING ENGINEERS AND HYDROGEOLOGISTS

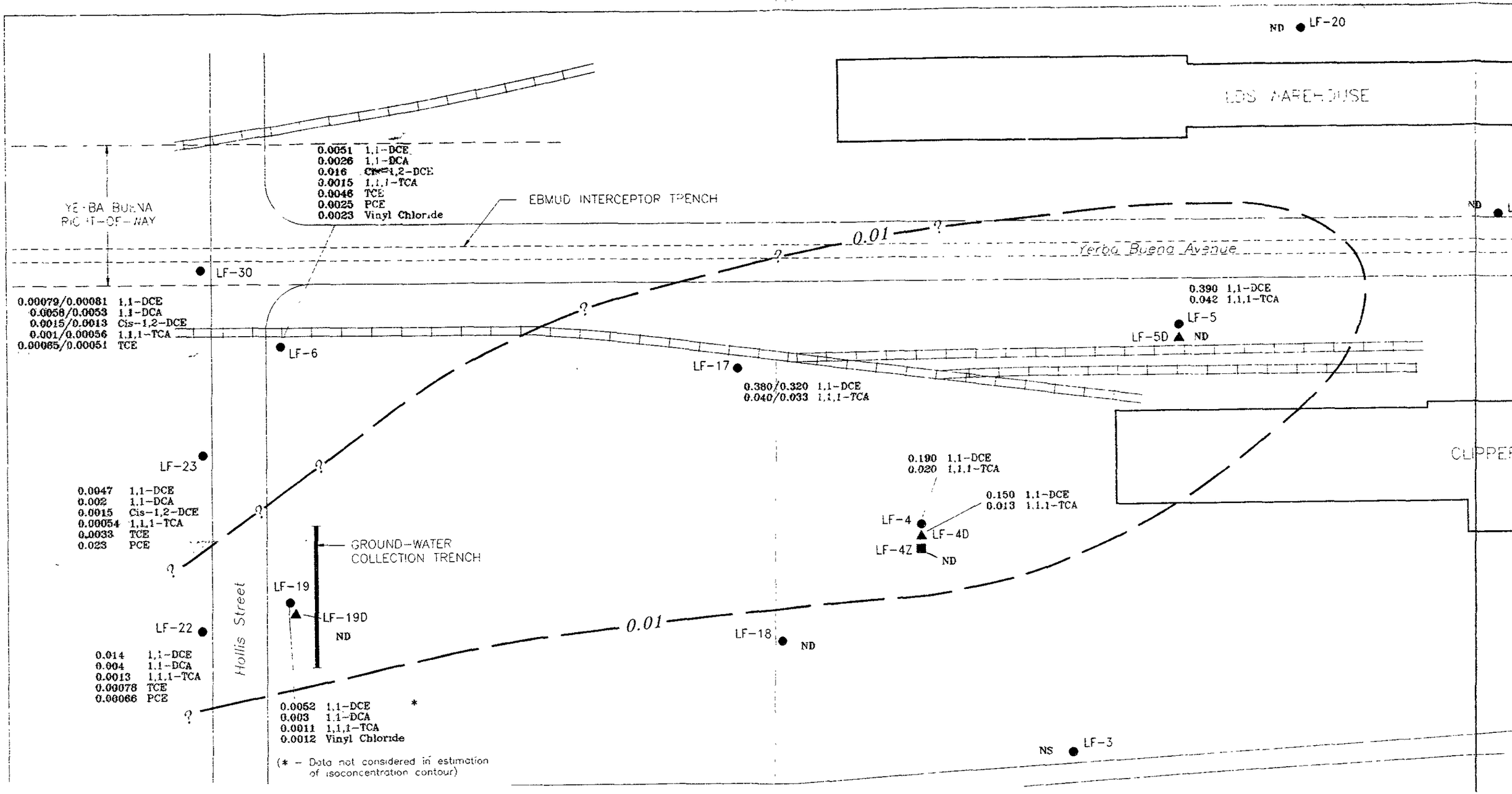
1649ALS•SFEB91•rvz

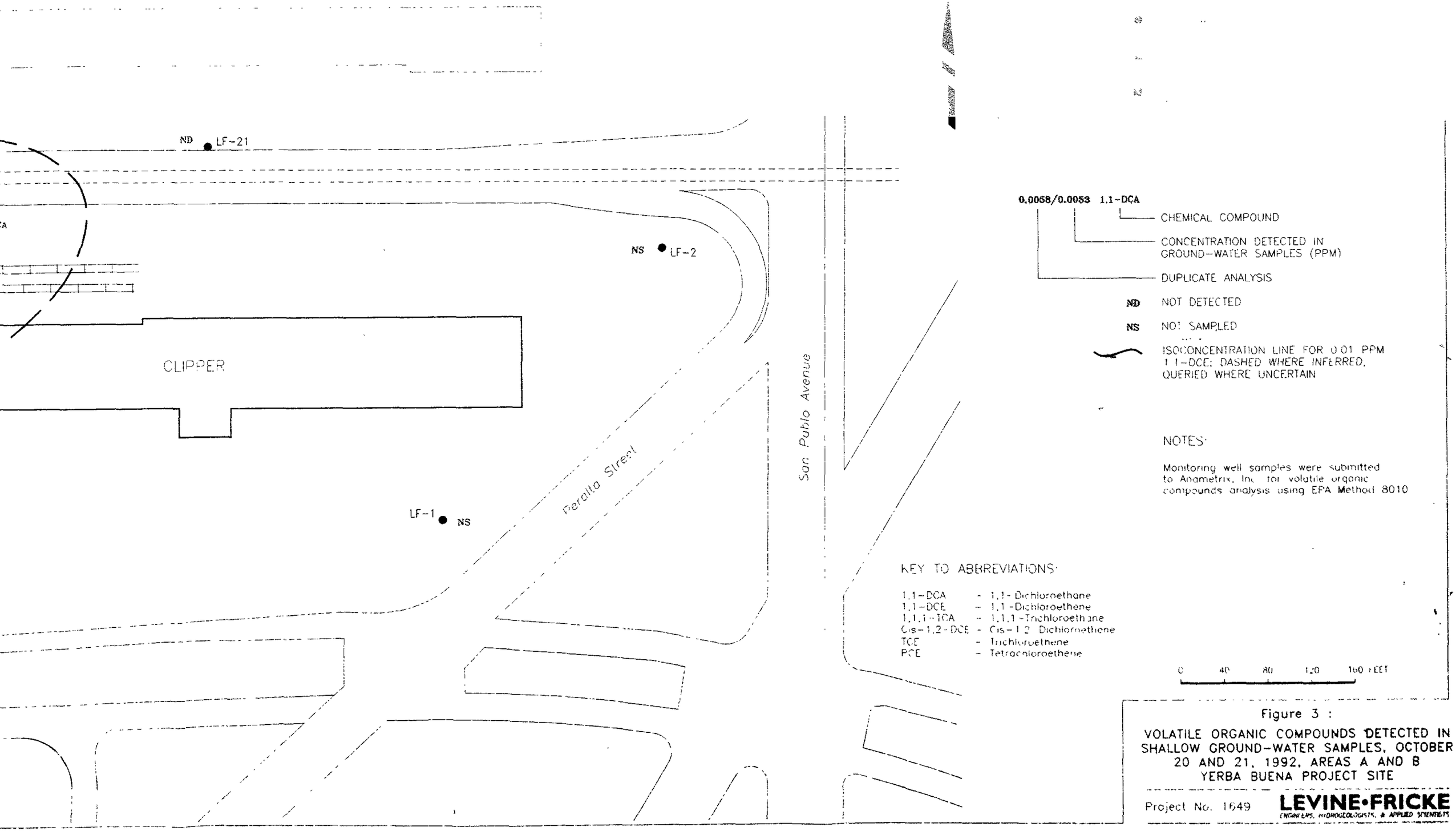
FIGURE 6. APPROXIMATE SCHEDULE
Responsible : LEVINE.FRICKE, INC.
As-of Date : 28-Apr-93 Schedule File : 164906

This schedule is subject to change per the Develop. Schedule



TIME LINE Gantt Chart Report, Strip 1


ND LF-20
LOS MAREHOUSE
YERBA BUENA RIGHT-OF-WAY
0.0051 1,1-DCE
0.0026 1,1-DCA
0.016 Cis-1,2-DCE
0.0015 1,1,1-TCA
0.0046 TCE
0.0025 PCE
0.0023 Vinyl Chloride
EBMUD INTERCEPTOR TRENCH
0.01
Yerba Buena Avenue
LF-30
0.00079/0.00081 1,1-DCE
0.0058/0.0053 1,1-DCA
0.0015/0.0013 Cis-1,2-DCE
0.001/0.00056 1,1,1-TCA
0.00065/0.00051 TCE
LF-6
LF-17
0.380/0.320 1,1-DCE
0.040/0.033 1,1,1-TCA
0.390 1,1-DCE
0.042 1,1,1-TCA
LF-5
LF-5D ND
CLIPPER
0.190 1,1-DCE
0.020 1,1,1-TCA
0.150 1,1-DCE
0.013 1,1,1-TCA
LF-4
LF-4D
LF-4Z ND
LF-23
0.0047 1,1-DCE
0.002 1,1-DCA
0.0015 Cis-1,2-DCE
0.00054 1,1,1-TCA
0.0033 TCE
0.023 PCE
GROUND-WATER COLLECTION TRENCH
LF-19
LF-19D ND
Hollis Street
LF-22
0.014 1,1-DCE
0.004 1,1-DCA
0.0013 1,1,1-TCA
0.00078 TCE
0.00066 PCE
0.01
LF-18 ND
0.0052 1,1-DCE *
0.003 1,1-DCA
0.0011 1,1,1-TCA
0.0012 Vinyl Chloride
(* - Data not considered in estimation of isoconcentration contour)
NS LF-3



0.0058/0.0053 1,1-DCA
- CHEMICAL COMPOUND
- CONCENTRATION DETECTED IN GROUND-WATER SAMPLES (PPM)
- DUPLICATE ANALYSIS

ND NOT DETECTED

NS NOT SAMPLED

ISOCONCENTRATION LINE FOR 0.01 PPM 1,1-DCE; DASHED WHERE INFERRED, QUERIED WHERE UNCERTAIN

NOTES:

Monitoring well samples were submitted to Anametrix, Inc. for volatile organic compounds analysis using EPA Method 8010

KEY TO ABBREVIATIONS:

1,1-DCA	- 1,1-Dichloroethane
1,1-DCE	- 1,1-Dichloroethene
1,1,1-TCA	- 1,1,1-Trichloroethane
Cis-1,2-DCE	- Cis-1,2-Dichloroethene
TCE	- Trichloroethene
PCE	- Tetrachloroethene

0 40 80 120 160 FEET

Figure 3 :

VOLATILE ORGANIC COMPOUNDS DETECTED IN SHALLOW GROUND-WATER SAMPLES, OCTOBER 20 AND 21, 1992, AREAS A AND B YERBA BUENA PROJECT SITE

Project No. 1649 LEVINE•FRICKE
ENGINEERS, HYDROGEOLOGISTS, & APPLIED SCIENTISTS