

**Work Plan for Installation of Groundwater
Monitoring Wells
Former Glovatorium
Oakland, California**

**6895.00-027
June 14, 2000**

Prepared for
Smiland & Khachigian
601 West Fifth Street, 7th Floor
Los Angeles, California 90071-2004



June 14, 2000

6895.00-027

Mr. Scott Seery, CHMM
Hazardous Materials Specialist
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Subject: Work Plan for Installation of Groundwater Monitoring Wells, Former Glovatorium,
3815 Broadway, Oakland, California

Dear Mr. Seery:

LFR Levine-Fricke (LFR) is submitting the enclosed work plan for the installation of four groundwater monitoring wells, as we discussed and agreed in a meeting at the Regional Water Quality Control Board (RWQCB) on May 10, 2000.

If you have any questions or comments regarding the enclosed work plan, please call either of the undersigned.

Sincerely,

Taylor Bennett for

Julie Sharp, P.E.
Senior Engineer

Charles Pardini for

Charles Pardini, R.G.
Principal Geologist

Enclosure

cc: Stuart Depper, Clean Tech Machinery
Albert M. Cohen, Smiland & Khachigian
Betty Graham, RWQCB
Bruce Page, Bruce W. Page Consultants

CONTENTS

| | |
|---|----|
| 1.0 INTRODUCTION | 1 |
| 2.0 SITE DESCRIPTION AND PREVIOUS INVESTIGATIONS | 1 |
| 2.1 Site Description | 1 |
| 2.2 Summary of Previous Investigations..... | 2 |
| 2.3 Site Geology | 3 |
| 2.4 Groundwater Elevations and Flow Direction..... | 3 |
| 2.5 Groundwater Quality | 3 |
| 3.0 OBJECTIVES, RATIONALE, AND PROPOSED SCOPE OF WORK | 4 |
| 3.1 Objectives | 4 |
| 3.2 Rationale for Proposed Monitoring Well Locations..... | 4 |
| 3.3 Scope of Work | 5 |
| 3.3.1 Task 1: Conduct Preliminary Activities..... | 5 |
| 3.3.2 Task 2: Abandon and Seal Temporary Grab Groundwater Sampling Points GW-6 and GW-8..... | 6 |
| 3.3.3 Task 3: Install Four Groundwater Monitoring Wells | 7 |
| 3.3.4 Task 4: Develop and Sample Monitoring Wells..... | 8 |
| 3.3.5 Task 5: Laboratory Analysis of Samples | 9 |
| 3.4 Schedule | 10 |
| REFERENCE | 11 |

TABLE

- 1 Construction Data for Temporary Sampling Points

FIGURES

- 1 Site Location Map
- 2 Site Plan Showing Proposed Locations of Groundwater Monitoring Wells

1.0 INTRODUCTION

This work plan, prepared by LFR Levine·Fricke (LFR) on behalf of Smiland & Khachigian, proposes the installation of four groundwater monitoring wells in the vicinity of the former Glovatorium, a dry cleaning business located at 3815 Broadway in Oakland, California ("the Site"; Figure 1). This work plan has been prepared in a manner consistent with letters from the Alameda County Health Care Services Agency (ACHCSA) dated March 19, 1999, and January 5, 2000, and discussions on May 10, 2000, between Mr. Scott Seery of ACHCSA, Ms. Betty Graham of the Regional Water Quality Control Board (RWQCB), and representatives of LFR and Bruce W. Page Consulting.

This work is needed to determine the nature and extent of environmental contamination, and thus whether contamination is affecting the neighboring Thompson property. This information is needed to defend against the claim that Mr. Thompson brought against the Glovatorium and the Deppers. This work may also provide data that could help determine when releases occurred, which is also significant to defending against the claims brought by the Johnsons.

The ACHCSA's March 19, 1999 and January 5, 2000 letters requested that a network of groundwater monitoring wells be installed to assess groundwater quality at the Site and to provide data to support a risk-based corrective action (RBCA) evaluation. This evaluation will require analysis for additional bioattenuation parameters, which are discussed briefly in Sections 3.3.4 and 3.3.5 of this plan, and which we propose to discuss in greater detail with ACHCSA and the RWQCB before well installation begins. The proposed locations of the monitoring wells were discussed during the meeting at the RWQCB on May 10, 2000. ?

2.0 SITE DESCRIPTION AND PREVIOUS INVESTIGATIONS

The following sections describe the Site and briefly summarize previous investigations conducted at the Site. The site history, land uses, geology, and previous soil and groundwater investigations were described in detail in the following LFR reports:

- Results of Utility Survey and Work Plan for Soil and Grab Groundwater Investigation, dated May 6, 1999
- Soil and Groundwater Investigation Report, dated March 20, 2000

2.1 Site Description

The Site is located between Manila Avenue and Broadway, near the intersection with 38th Street, in Oakland, California. The ground surface at the Site slopes gently

southwest, with surface elevations ranging from approximately 84 to 78 feet above mean sea level (msl).

A 54-inch-inside-diameter masonry storm drain culvert passes under the property, from Manila Avenue on the west to 38th Street on the south (Figure 2). A 10-inch-diameter, cast iron sanitary sewer lateral extends from a manhole inside the building approximately 110 feet west to a connection with the sanitary sewer main that runs north-south down the middle of Manila Avenue.

Six underground storage tanks (USTs) are located at the Site. Two USTs are located under the sidewalk on 38th Street and four USTs are located inside the building (Figure 2). The volumes of the USTs have been variously reported as ranging from 800 up to 5,000 gallons. They reportedly contained Stoddard Solvent, fuel oil, and possibly waste oil. The six USTs were closed in-place by backfilling with cement-sand slurry or pea gravel in August 1997.

In addition, there are three USTs owned by Earl Thompson, Sr. under the sidewalk on 38th Street (Figure 2).

2.2 Summary of Previous Investigations

Geosolv, LLC ("GeoSolv") performed a soil and grab groundwater investigation on August 18 through 22, 1997. The investigation consisted of advancing 14 soil borings to depths of between 10 and 24 feet below ground surface (bgs) using the direct-push drilling method. Seven of the soil borings (B-2, B-3, B-7, B-8, B-9, B-10, and B-13; Figure 2) were converted to temporary grab groundwater sampling points, from which grab groundwater samples were collected.

Geosolv performed an additional soil and grab groundwater investigation from September 9 through 15, 1998. The investigation consisted of advancing 12 direct-push soil borings to depths of 19 to 25 feet bgs. All 12 of the soil borings were converted to temporary grab groundwater sampling points (E-15 through E-26; Figure 2), from which grab groundwater samples were collected. All of the temporary piezometers were abandoned and sealed upon completing the investigation.

LFR performed the following soil and grab groundwater investigations:

- On July 15 and 16, 1999, LFR drilled 10 soil borings (GW-1 through GW-8, GW-5A, and GW-6A; Figure 2) using the direct-push method. LFR collected soil samples for laboratory analysis and lithologic description, and installed nine temporary groundwater sampling points in the borings.
- In July and August 1999, LFR collected grab groundwater samples from seven of the nine temporary groundwater sampling points (GW-2, GW-3, GW-4, GW-5, GW-6A, GW-7, and GW-8). Sampling point GW-1 has remained dry since it was installed and has not been sampled. Sampling point GW-6 was not measured or sampled because the adjacent sampling point, GW-6A, was sampled instead.

Temporary grab groundwater sampling point GW-7 was abandoned and sealed with cement grout after a grab groundwater sample was collected on July 15, 1999, in accordance with the approved work plan (LFR 1999).

- Since January 2000, LFR has performed quarterly groundwater monitoring at the Site. Groundwater monitoring includes measuring groundwater levels and collecting groundwater samples from the temporary sampling points installed by LFR and GeoSolv, and from well MW-11, which is located north of the Site and is owned by TOSCO Marketing Company ("TOSCO"). In April 2000, TOSCO granted LFR permission to measure groundwater levels in two additional wells, MW-8 and MW-9.

Construction data for the temporary groundwater sampling points installed by GeoSolv and LFR are presented in Table 1. Construction data for the wells owned by TOSCO are not available.

2.3 Site Geology

Sediments encountered in soil borings at the Site are typical of those encountered in an alluvial fan depositional environment. The sediments are predominantly fine-grained, consisting of clay, silty clay, sandy clay, gravelly clay, and clayey silt. Discontinuous layers of coarse-grained sediments (clayey sand, silty sand, and clayey gravel) generally also contain relatively high percentages of silt and clay, which tend to reduce their permeability.

During investigations conducted by GeoSolv and LFR, a relatively coarse-grained layer of silty sand, clayey sand, and clayey gravel was encountered in soil borings GW-2, GW-3, GW-7, GW-8, E-23, E-25, and E-26 at depths between approximately 4.5 and 14 feet bgs (at elevations ranging from approximately 66 to 74 feet msl). A discontinuous layer of silty to clayey sand was encountered at depths from 17 to 21 feet bgs (60 to 64 feet msl) in borings GW-7, GW-8, and E-23.

2.4 Groundwater Elevations and Flow Direction

Groundwater was generally encountered in borings drilled under LFR's supervision at depths of approximately 7 to 13 feet bgs (68 to 70 feet msl).

Groundwater elevations measured by LFR on April 27, 2000, ranged from 68.16 feet msl in downgradient temporary sampling point GW-3 to 79.15 feet msl in monitoring well MW-8. Based on the April 27, 2000 measurements, the calculated horizontal hydraulic gradient was approximately 0.020 foot per foot (ft/ft). The measurements indicated that shallow groundwater was flowing toward the southwest on this date.

2.5 Groundwater Quality

Previous investigations conducted by LFR indicate that shallow groundwater below the Site has been affected with Stoddard solvent (TPHs; up to 20 milligrams per liter [mg/l]), and chlorinated solvents, including tetrachloroethene (PCE; up to 1.2 mg/l), trichloroethene (TCE; up to 2.4 mg/l) cis-1,2-dichloroethene (cis-1,2-DCE; up to 14 mg/l), and vinyl chloride (up to 0.0046 mg/l). The presence of the PCE breakdown products TCE, cis-1,2-DCE, and vinyl chloride in grab groundwater samples provides evidence that natural bioattenuation of PCE is occurring at the Site.

Light, non-aqueous phase liquid (LNAPL) consisting of Stoddard solvent was detected in several of the temporary grab groundwater sampling points installed inside the building by GeoSolv.

3.0 OBJECTIVES, RATIONALE, AND PROPOSED SCOPE OF WORK

This work plan proposes the installation of four groundwater monitoring wells. The objectives, rationale, and scope of work for this investigation are presented in the following sections.

3.1 Objectives

The groundwater monitoring wells will be used to help further assess groundwater flow direction and to assess the lateral extent of affected groundwater in the site vicinity. Data gathered from these investigations will also be used to conduct an RBCA evaluation. The information will also be of assistance in defending against the claims brought against the Glovatorium and the Deppers in pending litigation.

3.2 Rationale for Proposed Monitoring Well Locations

The proposed locations of groundwater monitoring wells are shown on Figure 2. The rationale for selecting these proposed well locations is discussed below.

- Monitoring well LFR-1 will be installed to replace grab groundwater sampling point GW-8 in Manila Avenue, to further assess groundwater quality at this location. This proposed well will provide a monitoring point to assess the lateral extent of TPHs and VOCs in groundwater at the Site. Well LFR-1 will also provide a groundwater level measurement point in this area.
- Monitoring well LFR-2 will be installed at a location downgradient from the storm drain on property located at 340 38th Street, which is owned by Mr. Greg Bloom, to assess groundwater quality at this location. The proposed location of this monitoring well is intended to provide representative monitoring data for groundwater that could potentially migrate under houses that are located near the corner of Manila Avenue and 38th Street. These data will be used to evaluate

potential risks to residents from potentially migrating chemicals in groundwater at the Site. Well LFR-2 will also provide a groundwater level measurement point in this area.

- Monitoring well LFR-3 will be installed at a location downgradient from grab groundwater sampling point GW-3, near the southwest corner of the intersection of 38th Street and Manila Avenue, to assess groundwater quality at this location. The proposed location of this monitoring well is intended to establish the downgradient extent of TPHss and VOCs in groundwater in the site vicinity. No preliminary groundwater quality data currently exist for this location, which is approximately 100 feet downgradient from existing grab groundwater sampling point GW-3. Well LFR-3 will also provide a groundwater level measurement point in this area.
- Monitoring well LFR-4 will be installed near the former location of grab groundwater sampling point GW-7 on 38th Street, to further assess groundwater quality downgradient from the USTs located under the sidewalk nearby. This proposed well will provide a monitoring point to assess the lateral extent of TPHss and VOCs in groundwater at the Site. Well LFR-4 will also provide a groundwater level measurement point in this area.

The proposed well locations are intended to provide an adequate distribution of monitoring points for measuring groundwater levels. Groundwater level measurements from the proposed wells will be used in conjunction with those from selected existing monitoring wells and temporary grab groundwater sampling points to assess groundwater flow patterns at the Site.

Groundwater monitoring will be performed using the proposed monitoring wells and selected existing monitoring wells and temporary grab groundwater sampling points. These data will be used to assess the extent to which natural bioattenuation of chemicals in groundwater is occurring.

3.3 Scope of Work

The scope of work consists of the following tasks:

- Task 1: Conduct Preliminary Activities
- Task 2: Abandon and Seal Temporary Grab Groundwater Sampling Points GW-6 and GW-8
- Task 3: Install Four Groundwater Monitoring Wells
- Task 4: Develop and Sample Monitoring Wells
- Task 5: Laboratory Analysis of Samples

These activities are described in more detail below.

3.3.1 Task 1: Conduct Preliminary Activities

Several preliminary activities must be conducted before field work begins. These activities include obtaining required permits, gaining access approval, distributing the Site Health and Safety Plan (HSP), and locating underground utilities. Permits to install the groundwater monitoring wells will be obtained from the Alameda County Department of Public Works. In addition, street excavation permits and encroachment permits for the wells will be obtained from the City of Oakland (these permits must be obtained by the Site owner).

LFR obtained permission from the owner of the property at 340 38th Street to install a temporary grab groundwater sampling point and up to two groundwater monitoring wells on his property in July 1999. LFR will request the property owner's approval of the proposed location of monitoring well LFR-2 and will cooperate with him to establish a drilling schedule to reduce potential impacts to his property or tenants before drilling begins.

LFR prepared an HSP dated June 24, 1999 that provides health and safety precautions and procedures to be used during drilling, well installation, and sampling activities at the Site. A copy of the HSP will be distributed to on-site LFR field personnel. Field activities will be monitored to ensure that appropriate health and safety procedures are followed. Subcontractors are responsible for providing an HSP for their own employees, but will be required, at a minimum, to use the equipment and follow the procedures described in LFR's HSP.

The proposed drilling locations will be cleared for underground utilities by a subcontracted utility locator using geophysical methods. Underground Services Alert (USA) will also be notified of drilling activities. USA will contact public and private entities that may have utilities in the drilling area.

3.3.2 Task 2: Abandon and Seal Temporary Grab Groundwater Sampling Points GW-6 and GW-8

Temporary grab groundwater sampling points GW-6 and GW-8 will be abandoned and sealed using the hollow-stem auger method, which involves drilling out the casing and annular materials (polyvinyl chloride [PVC] casing, sand pack, bentonite, and cement grout). A drilling rod string, if one is available that fits inside the 1-inch diameter PVC casing, will be placed inside the casing. The drilling rod fits inside the hollow-stem augers and acts as a guide to keep the augers from drifting off the casing during drilling. Hollow-stem augers (4 or 6 inches in diameter) will be used to drill out the PVC casing and annular materials. As the drilling proceeds, fragments of well casing and annular materials will be conveyed to the surface by the rotation of the auger. Drilling will terminate when the bottom of the boring is encountered. The depth of the bottom of the boring will be determined in the field by a geologist using well completion logs and the physical evidence observed while the PVC casing and annular

materials are drilled out. Remaining well materials and soil will be removed from the borings when the augers are removed.

After the casing and annular materials have been drilled out, a cement slurry with 5 percent bentonite powder will be pumped into the boring through a tremie pipe placed at the bottom of the boring, and the boring will be filled to approximately 4 to 6 inches bgs. After the cement-bentonite slurry settles, the boring will again be topped up with cement grout to within 4 to 6 inches bgs and allowed to set for at least 24 hours. The boring will then be patched with hot asphalt to match existing surface conditions. The grouting activities will be conducted under the supervision of a City of Oakland and an Alameda County inspector, if required.

The materials generated during temporary grab sampling point abandonment activities will be temporarily stored at the Site in Department of Transportation- (DOT-) approved 55-gallon drums. Disposal options will be evaluated after groundwater monitoring well installation activities have been completed.

3.3.3 Task 3: Install Four Groundwater Monitoring Wells

Four groundwater monitoring wells will be installed at the approximate locations discussed in Section 3.2 and shown in Figure 2. Well LFR-2 will be installed in a parking area behind a house at 340 38th Street. The remaining wells will be installed in nearby public streets, within 3 feet of the curb. The actual well locations will be determined based on conditions observed in the field, such as the locations of underground utilities.

Groundwater monitoring wells will be installed and developed in accordance with the State of California Well Standards. The borings for the wells will be drilled with a hollow-stem auger drill rig equipped with 8-inch augers. Soil samples for lithologic description will be collected from the borings using a continuous-core sampler. Soils will be monitored using a handheld portable photoionization detector (PID) by placing a portion of the soil sample into a glass jar, then placing the jar lid on. The jar lid will have a hole approximately the diameter of the PID probe. The PID probe will be inserted into the jar through the hole, and the PID measurement will be recorded. Soils will be tested in this way at approximate intervals of 5 feet, and where hydrocarbon odors are observed. If PID measurements above background are observed, a soil sample from that interval will be collected and analyzed as discussed in Section 3.3.5. Soil samples retained for chemical analysis will be placed in clean brass tubes; capped with Teflon sheeting and plastic caps; labeled with the soil boring identification, the time and date of sample collection, the analysis requested, and the name of the sampler; and placed in a cooler chilled with ice for transport to the analytical laboratory under standard chain-of-custody protocol. Soil lithology will be recorded by an LFR geologist using the Unified Soil Classification System. The lithologic and well construction logs will be prepared under the direct supervision of a California Registered Geologist.

After the auger has been advanced to the desired depth (anticipated to be approximately 20 feet bgs), the groundwater monitoring well will be constructed using flush-threaded, 2-inch-diameter PVC casing. The well screens will be 0.010-inch, factory-slotted PVC casing. The length of the well screen will be based on the thickness of the water-yielding sediments observed, and will not exceed 10 feet. Blank PVC casing will be installed from the top of the screened interval to the ground surface. All drilling equipment will be cleaned with high-pressure hot water (i.e., steam cleaned) before use.

After the well casing has been placed inside the auger, the well annulus materials (sand, bentonite, and grout) will be added. The auger will be slowly retrieved from the borehole as the well annulus materials are added. The well annulus opposite the screened interval will be backfilled with clean Number 2/12 Monterey sand to a height of approximately 2 feet above the top of the well screen. A minimum of 2 feet of ¼-inch bentonite pellets will be placed above the sand pack to isolate the screened interval from material above and prevent the transfer of grout into the sand pack. The bentonite pellets will be hydrated. A cement-bentonite grout will then be placed above the bentonite seal to the ground surface, to seal the remainder of the borehole from possible infiltration by surface water. The Alameda County Department of Public Works and City of Oakland will be notified before the wells are sealed so that a field inspector can witness this activity. A locking well cap will be placed over the top of each casing to protect the integrity of the well and each well will be fitted with a flush-mounted, traffic-rated well box. After well construction activities are completed, the horizontal coordinates of the new wells will be determined and the tops of the PVC well casings will be surveyed to the nearest 0.01 foot by a licensed surveyor.

Soil cuttings generated during the installation of the wells will be temporarily stored on site in DOT-approved 55-gallon drums. Disposal options will be evaluated after groundwater monitoring well installation activities have been completed.

3.3.4 Task 4: Develop and Sample Monitoring Wells

Before the wells are developed, the depth to water in each monitoring well will be measured (to the nearest 0.01 foot) using an electronic water-level meter.

The wells will be developed a minimum of 24 hours after installation by bailing, jetting, swabbing, and/or pumping to remove sediment left in the well during construction and to enhance the hydraulic communication between the well and surrounding sediment. Observations of the pH, temperature, specific conductance, quantity, and clarity of water withdrawn will be recorded after each well volume has been purged during development. The wells will be developed until approximately 3 to 10 well casing volumes are removed or until relatively sediment-free water is produced. All development equipment that is placed in the well will be steam cleaned before each use.

Because well development could affect the measurement of natural bioattenuation parameters, the wells will not be sampled for at least one week after well development is completed, so that they may be allowed to equilibrate with the surrounding aquifer. After this minimum one-week period, the wells will be sampled for TPHss; VOCs; benzene, toluene, ethylbenzene, and total xylenes (BTEX); and methyl tertiary-butyl ether (MTBE); and for additional parameters (which may include, and are not necessarily limited to oxidation-reduction potential, dissolved oxygen, hydrogen, ferrous iron, nitrate, and sulfate) that will provide data to allow evaluation of the possible occurrence of natural bioattenuation of PCE in groundwater. Section 3.3.5 describes the proposed laboratory analysis.

proposed:
ORP
DO
H₂⁺
Fe
nitrate
sul fate

Sampling for TPHss, VOCs, BTEX, and MTBE will be conducted as follows. A Teflon bailer fitted with a new nylon rope will be lowered below the groundwater surface in the casing to retrieve a groundwater sample. The grab groundwater sample will be slowly poured into laboratory-supplied, 40-milliliter (ml) volatile organic analysis (VOA) vials with Teflon septa. The VOA vials will be capped; labeled with the groundwater monitoring well identification number, the time and date of sample collection, the analysis requested, and the name of the sampler; and placed in a cooler chilled with ice for transport to the analytical laboratory under standard chain-of-custody protocol.

add:
pH
CO₂
temp
ure/flow
#

Sampling for natural bioattenuation parameters may require special downhole sampling equipment, such as a flow-through cell. The depths of well screen intervals relative to the groundwater table, and the presence of product or sheen within the well, will need to be evaluated before such sampling is conducted. We propose to discuss the collection of the natural bioattenuation data with representatives of ACHCSA and the RWQCB to establish a sampling and analysis plan.

After sampling, the depth to water in each monitoring well will be measured (to the nearest 0.01 foot) using an electronic water-level meter.

A duplicate grab groundwater sample will also be collected from one of the monitoring wells for quality control (QC) purposes. As a QC check for possible equipment contamination, a field (bailer rinsate) blank will be prepared before collecting one of the groundwater samples, using laboratory-supplied deionized, organic-free water. A laboratory-prepared trip (travel) blank will also be placed in the cooler used to transport grab groundwater samples to the laboratory, as a QC check for possible contamination of samples during transport.

Water generated during development and sampling activities will be temporarily stored at the Site in DOT-approved 55-gallon drums pending receipt of the analytical results of the groundwater samples. Disposal options for the water will then be evaluated.

3.3.5 Task 5: Laboratory Analysis of Samples

The samples will be submitted to Curtis & Tompkins (C&T), of Berkeley, California, a state-certified laboratory, for analysis.

Groundwater samples will be analyzed for TPHs using modified EPA method 8015, for VOCs using EPA method 8010, and BTEX and MTBE using EPA method 8020. The natural bioattenuation parameters discussed in Section 3.3.4 will also be analyzed in accordance with proposed discussions with ACHCSA and the RWQCB. Some of these analyses may be conducted using field test kits. Groundwater samples will be analyzed on a normal turnaround basis.

If soil samples are collected for chemical analysis, they will be analyzed for TPHs using modified EPA method 8015, for VOCs using EPA method 8010, and for BTEX using EPA Method 8020 on a normal turnaround basis.

3.4 Schedule

The proposed monitoring wells can be installed approximately three weeks after approval of this work plan is received from the ACHCSA and after drilling and excavation permits are obtained from the Alameda County Department of Public Works and the City of Oakland. This schedule is contingent on subcontractor availability and assumes that no other unforeseen conditions arise that cause unavoidable delays. The drilling and groundwater monitoring well installation is expected to take two days to complete. Well development will be conducted approximately one day after installation and should take about one day to complete. Groundwater sampling will be conducted approximately one week after well development. Laboratory analysis of samples is expected to be completed within two weeks after sampling.

The newly installed groundwater monitoring wells will be incorporated into the quarterly groundwater-monitoring program. The schedule for quarterly groundwater monitoring may have to be adjusted to allow concurrent sampling of the newly installed groundwater monitoring wells. The analytical results and lithologic and well construction logs will be included in the subsequent quarterly groundwater monitoring report.

REFERENCE

LFR Levine-Fricke. 1999. Results of Utility Survey and Work Plan for Soil and Grab Groundwater Investigation. May 6.

Table 1
Construction Data for Temporary Sampling Points
Former Glovatorium
3815 Broadway, Oakland, California

| Location | Date Installed | Ground Surface Elevation (ft msl) | Top of Casing Elevation (ft msl) | Total Depth (ft) | Screened Interval Depth (ft bgs) | Screened Interval Elevation (ft msl) | Notes |
|----------|----------------|-----------------------------------|----------------------------------|------------------|----------------------------------|--------------------------------------|-------|
|----------|----------------|-----------------------------------|----------------------------------|------------------|----------------------------------|--------------------------------------|-------|

Temporary sampling points installed by GeoSolv, LLC:

| | | | | | | | |
|------|-----------|-------|-------|------|-------------|--------------|-----|
| B-2 | 19-Aug-97 | 82.20 | 82.09 | 21 | 5 to 21 | 77.2 to 61.2 | |
| B-3 | 19-Aug-97 | 82.60 | 82.57 | 18 | 5 to 18 | 77.6 to 64.6 | (1) |
| B-7 | 20-Aug-97 | 77.33 | 76.96 | 17.5 | 5 to 17.5 | 72.3 to 59.8 | |
| B-8 | 20-Aug-97 | 82.06 | 81.82 | 24 | 9 to 24 | 73.1 to 58.1 | |
| B-9 | 21-Aug-97 | 77.57 | 77.37 | 19.5 | 4.5 to 19.5 | 73.1 to 58.1 | |
| B-10 | 21-Aug-97 | 81.65 | 81.50 | 19 | 4 to 19 | 77.7 to 62.7 | |
| B-13 | 22-Aug-97 | 85.12 | 84.58 | 20 | 5 to 20 | 80.1 to 65.1 | |

Temporary sampling points installed by LFR:

| | | | | | | | |
|-------|-----------|-------|-------|------|-------------|--------------|--|
| GW-1 | 16-Jul-99 | 80.24 | 79.94 | 8 | 3 to 8 | 77.2 to 72.2 | |
| GW-2 | 16-Jul-99 | 79.44 | 79.14 | 20 | 10 to 20 | 69.4 to 59.4 | |
| GW-3 | 15-Jul-99 | 78.48 | 77.92 | 20 | 10 to 20 | 68.5 to 58.5 | |
| GW-4 | 16-Jul-99 | 82.55 | 82.37 | 12 | 7 to 12 | 75.6 to 70.6 | |
| GW-5 | 15-Jul-99 | 81.31 | 81.01 | 13 | 8 to 13 | 73.3 to 68.3 | |
| GW-6 | 15-Jul-99 | 81.91 | 81.65 | 13.5 | 7.5 to 13.5 | 74.4 to 68.4 | |
| GW-6A | 16-Jul-99 | 81.93 | 81.61 | 15 | 5 to 15 | 76.9 to 66.9 | |
| GW-7 | 15-Jul-99 | 81.3 | NS | 20 | 10 to 20 | 71.3 to 61.3 | |
| GW-8 | 16-Jul-99 | 80.28 | 80.10 | 20 | 10 to 20 | 70.3 to 60.3 | |

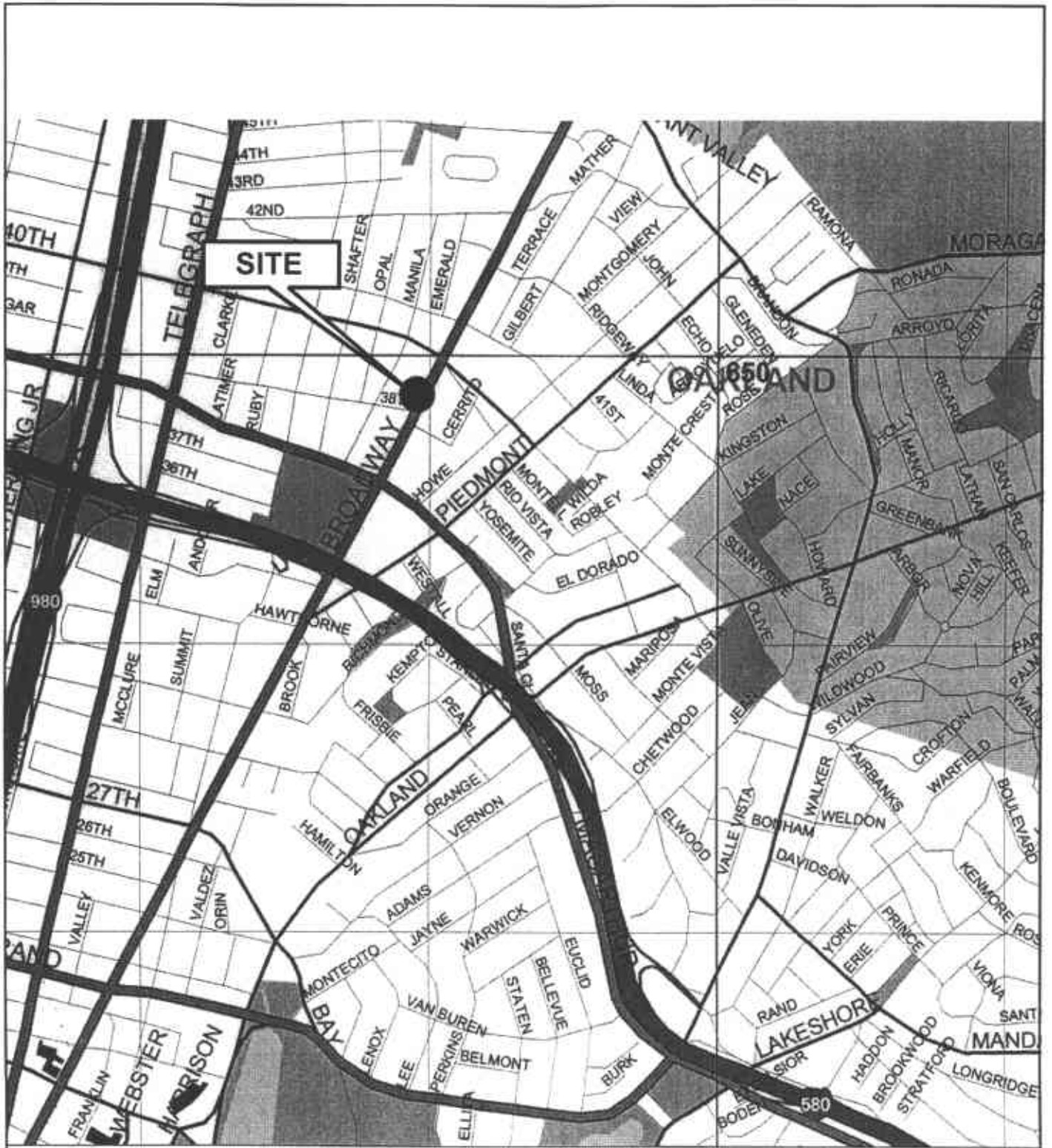
Notes:

(1) Top of casing surveyed on south side on January 21, 2000 because the casing was broken.

ft msl = feet above mean sea level

ft bgs = feet below ground surface

NS = Not surveyed. Temporary sampling point GW-7 was not surveyed because the casing was removed and the boring was backfilled with cement grout after a grab groundwater sample was collected on July 15, 1999, in accordance with LFR's work plan dated May 6, 1999. Surface elevation estimated to be 81.3 feet msl.



Source: The Thomas Guide Digital Edition
1999 Bay Area

3815 BROADWAY, OAKLAND, CALIFORNIA

Site Location Map

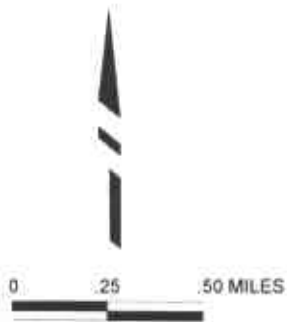
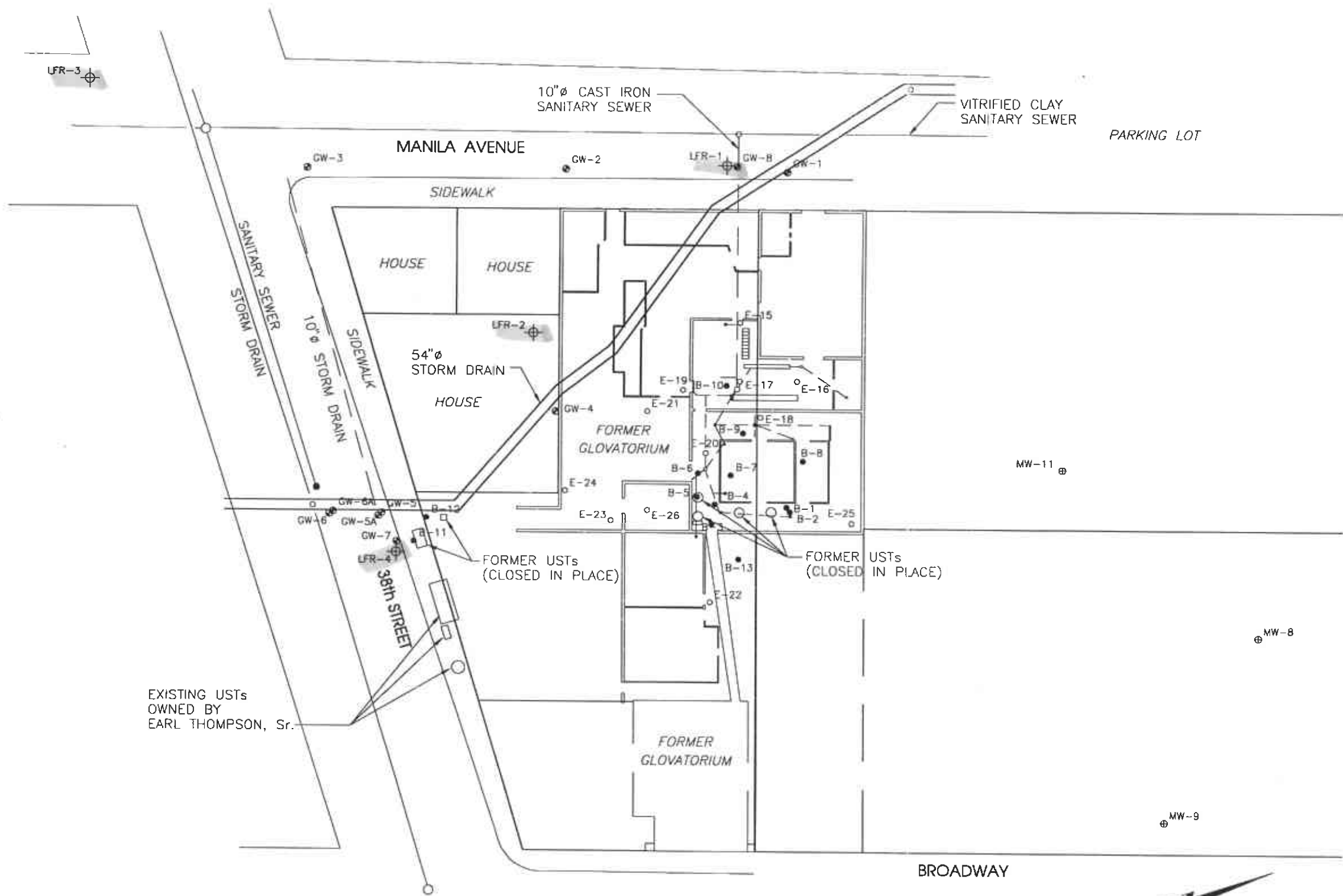


Figure 1



- EXPLANATION
- LFR-1 ⊕ Proposed location of groundwater monitoring well
 - B-10 ● Temporary groundwater sampling point and/or soil boring location by GeoSolv, August 19-22, 1997
 - E-18 ○ Temporary groundwater sampling point and/or soil boring location by GeoSolv, September 9-15, 1998
 - GW-5 ⊙ Temporary groundwater sampling point and/or grab groundwater sampling location by LFR, July 15-16, 1999
 - MW-11 ⊕ Groundwater monitoring well owned by TOSCO
 - USTs ⊕ Underground Storage Tanks

Site Plan Showing
Proposed Locations of Groundwater
Monitoring Wells

Former Glovatorium, Oakland, California

