

June 12, 1997
BEI Job No. 94015

Ms. Amy Leech
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, 2nd Floor
Alameda, CA 94502-6577

pursuant to ACHCS
letter dated
6/6/97

**Subject: Revised Workplan for Additional Site Characterization
and Site Risk Classification
Kawahara Nursery
16550 Ashland Avenue
San Lorenzo, CA**

ST104403

Dear Ms. Leech:

Blymyer Engineers, Inc., on behalf of Kawahara Nursery, is pleased to present this letter workplan to conduct additional site characterization and site risk classification at the above-referenced site.

Background

On December 1, 1992, one steel 5,000-gallon diesel underground storage tank (UST) was removed from the property owned by Kawahara Nursery, located at 16550 Ashland Avenue, San Lorenzo, California (Figure 1), by Tank Protect Engineering of Northern California. The UST was reported to be in good condition with no visible evidence of holes at the time of removal. The excavated soil was stockpiled at the site in two distinct piles and a composite soil sample was collected from each pile. Verification soil samples were collected and analyzed for Total Petroleum Hydrocarbons (TPH) as diesel. The soil sample collected from the southeastern wall of the UST excavation contained 5,000 milligrams per kilogram (mg/kg) TPH as diesel. The composite soil sample collected from the soil excavated from the southeastern portion of the excavation contained 210 mg/kg TPH as diesel.

The results of the UST closure were described in the *Underground Storage Tank Closure Report*, completed by Tank Protect Engineering and forwarded to the Alameda County Health Care Services Agency (ACHCSA) by Mr. Tom Kawahara. In a letter dated January 27, 1993, the ACHCSA requested that a Preliminary Subsurface Investigation be completed at the site to ascertain the extent of soil and groundwater petroleum hydrocarbon contamination.

On June 10, 1993, Blymyer Engineers supervised the installation of three groundwater monitoring wells (MW-1, MW-2, and MW-3) at the site in the locations depicted on Figure 2. Minor concentrations of petroleum hydrocarbons were detected in the soil samples collected during the installation of soil bores. The groundwater sample collected from monitoring well MW-3, installed adjacent to an on-site groundwater well contained 120,000 micrograms per liter ($\mu\text{g/L}$) of TPH as gasoline, 170,000 $\mu\text{g/L}$ of ethylbenzene, and 27,000 $\mu\text{g/L}$ of total xylenes.



Blymyer Engineers also collected four discrete soil samples from the stockpiled soil removed from the southeastern portion of the excavation and composited them into one sample. The results of the analysis of the composite soil sample did not indicate detectable concentrations of TPH as diesel.

In March 1994, Blymyer Engineers conducted a phased groundwater investigation at the site. The initial phases of the investigation included the review of records at the ACHCSA and the San Francisco Bay Regional Water Quality Control Board (SFRWQCB) to determine if any toxic chemical or fuel leaks reported within a ¼-mile radius may have impacted the site; the review of historical aerial photographs; and the review of all available information regarding the construction and pumping rates of the on-site irrigation well to determine the radius of influence of the well on the local groundwater flow.

Depth to groundwater measurements were collected from each of the monitoring wells prior to the disengagement of the irrigation well pump. After the pump had been disengaged for approximately 48 hours, depth to groundwater measurements were again collected from the wells to determine the influence of the pumping system on the shallow water-bearing zone. Following the disengagement of the irrigation well pump, the groundwater elevation decreased less than 0.2 inches in each of the monitoring wells. Blymyer Engineers reactivated the well and collected groundwater samples from each of the three monitoring wells and the irrigation well on March 28, 1994. No detectable concentrations of petroleum hydrocarbons were detected in the groundwater samples collected from the irrigation well or monitoring wells MW-1 and MW-2. The analytical results of the groundwater sample collected from monitoring well MW-3 indicated 23,000 µg/L of TPH as diesel, 94,000 µg/L of TPH as gasoline, 4,800 µg/L of benzene, 6,500 µg/L of toluene, 3,000 µg/L of ethylbenzene, and 15,000 µg/L of total xylenes.

On March 28, 1994, Blymyer Engineers collected one discrete soil sample from the stockpiled soil on the site. The soil sample contained 51 mg/kg of TPH as diesel.

A review of the local regulatory agency records indicated that an Army National Guard facility located approximately 300 feet downgradient of the site has reported an unauthorized release of gasoline into the groundwater. However, the lateral extent of the reported release had not been determined. The construction log of the on-site irrigation well indicated that the well is screened from approximately 45 to 60 feet below grade surface. Based on the depth of the irrigation well screen interval and the very small change in depth to groundwater during pump operation and after pump disengagement, it was determined that the irrigation well pump does not influence the shallow, impacted water-bearing zone.

The soil gas survey completed at the site indicated slightly elevated concentrations of petroleum hydrocarbons in the soil gas samples collected from the northeastern corner of the barn and the north-central portion of the property in the vicinity of the lath house (in the vicinity of the suspected location of the former gasoline UST). Figure 3 depicts the locations and results of the



soil gas sample collection points. Based on this data, monitoring wells MW-4 and MW-5 were installed at the site on October 24, 1994. Soil and groundwater data collected from monitoring wells MW-4 and MW-5 did not indicate detectable concentrations of petroleum hydrocarbons either upgradient (MW-4) or immediately down gradient of the areas of elevated soil gas concentrations. Tables 1, 2, and 3 summarize the soil sample analytical results, groundwater analytical results, and the groundwater elevations, respectively, collected from the site. Figures 5, 6, and 7 depict the groundwater gradient measured during three consecutive quarterly monitoring events conducted at the site on November 22, 1994, March 29, 1995, and June 7, 1995, respectively.

Recently obtained information indicated the former presence of a 1,000-gallon gasoline UST in the vicinity of the lath house to the north of monitoring well MW-3 and upgradient of monitoring well MW-5. According to information provided by the property owner, the UST was removed from the site shortly after Kawahara Nursery occupied the property. This former gasoline UST is a potential source for the gasoline contamination detected at the site. Due to the location of the former gasoline UST and absence of detectable concentrations of diesel in the collected soil and groundwater samples, the ACHCSA has agreed that the removed diesel UST is not a potential source of the contamination detected at the site and therefore, monitoring wells MW-1 and MW-2 can be properly abandoned.

Overview of Proposed Activities

Based on a review of the data collected to date, the site may currently fall in the "low risk groundwater" category as defined by the SFRWQCB. As specified in a letter, dated January 12, 1996, the SFRWQCB defines a low risk groundwater site as one where:

1. the leak has been stopped and ongoing sources, including free petroleum hydrocarbons (FPH), have been removed or remediated
2. the site has been adequately characterized
3. the dissolved hydrocarbon plume is not migrating
4. no water wells, deeper drinking water aquifers, surface water, or other sensitive receptors are likely to be impacted
5. the site presents no significant risk to human health or the environment

If these criteria are met at a site, a management strategy using natural attenuation with subsequent monitoring to confirm that site conditions have remained stable or improved may be implemented.



At the Kawahara Nursery property a limited soils investigation in the vicinity of the reported former gasoline UST is necessary to complete site characterization. Based on available information, the source of the release at the site has been stopped. Following the completion of the site characterization, Blymyer Engineers proposes to evaluate the risk status of the site as set forth by the SFRWQCB, to determine if the site can be classified as a "low risk groundwater site". If low risk classification is appropriate for the site, Blymyer Engineers proposes subsequent quarterly groundwater monitoring to evaluate the effect of natural attenuation on the contaminant concentrations at the site. If the site still meets the low risk criteria following four consecutive quarterly monitoring events, Kawahara Nursery will request site closure.

Scope of Work

The proposed scope of work was designed to accomplish the following goals:

- further site characterization in the vicinity of the former gasoline UST
- confirmation that FPH are not present in the monitoring wells at the site
- determination of the dissolved hydrocarbon concentrations present at the site
- collection and analysis of soil and groundwater samples to evaluate the potential for natural attenuation (aerobic and anaerobic biodegradation)
- evaluation of the risk to human health and the environment

In order to accomplish the above goals, Blymyer Engineers proposes to complete the following detailed scope of work:

- **Prepare a site-specific health and safety plan**

A health and safety plan outlining the potentially hazardous work conditions and contingencies for an emergency will be prepared for the site.

- **Obtain permits**

Permits will be obtained to destroy groundwater monitoring wells MW-1 and MW-2 and install GeoProbe[®] soil bores, from the Zone 7 Water Agency.



- **Overdrill two monitoring wells and grout to surface**

Using a hollow-stem auger drill rig, monitoring wells MW-1 and MW-2 will be overdrilled. Following documented destruction of the wells, the resulting bore holes will be grouted to the surface.

- **Collect groundwater samples from each monitoring well at the site**

One groundwater sample will be collected from monitoring wells MW-3, MW-4, and MW-5, constituting the first quarterly groundwater monitoring event. Prior to sample collection, the monitoring wells will be gauged with an oil-water interface probe to determine the presence of measurable FPH. If FPH are not present in the site wells in measurable quantities, then it can be concluded that the source of the release has been removed, or at least stopped, as required for low risk classification.

- **Groundwater sample analysis for plume extent determination**

The collected groundwater samples will be submitted to American Environmental Network (AEN), a California-certified laboratory located in Pleasant Hill, California, for analysis of Total Petroleum Hydrocarbons (TPH) as gasoline and diesel by modified EPA Method 8015 and benzene, toluene, ethylbenzene, and total xylenes (BTEX) and methyl tertiary butyl ether (MTBE) by EPA Method 8020.

- **Groundwater sample analysis for determination of natural attenuation**

Natural attenuation of dissolved hydrocarbons is a function of several factors including aerobic and anaerobic biodegradation, volatilization, dispersion, and sorption. For the purposes of this study, aerobic and anaerobic degradation are considered potentially significant.

Background electron receptor and metabolic product concentrations will be measured in the groundwater samples collected from monitoring wells MW-3, MW-4, and MW-5. The collected groundwater samples will be field screened for dissolved oxygen (DO), pH, ferrous (Fe), and redox potential (Eh), and laboratory analyzed for total alkalinity by EPA Method 310.1, carbon dioxide (CO₂) by EPA method 406A, nitrate by EPA method 353.1, 300.1 and sulfate by EPA Method 375.4.

The measurement of the background electron receptor concentrations at sampling points both inside and outside of the plume is necessary to assess the potential for passive biodegradation. If biodegradation is occurring, concentrations of metabolic products should be higher within the plume than background levels, and electron receptors within the plume should be relatively depleted.



- **Conduct a geophysical survey**

A geophysical survey of an area approximately 50 feet by 60 feet in the vicinity of the suspected former gasoline UST will be coordinated by Blymyer Engineers. The survey will be performed by a contractor experienced in the location of USTs using magnetometer and ground penetrating radar (GPR) techniques. The GPR technique has the potential advantage of being able to locate a previously filled area, such as a backfilled UST excavation, which could isolate the source of the subsurface petroleum hydrocarbon contamination at the site.

- **Drill approximately ~~six~~ GeoProbe® soil bores**

Increased to 9 SBs per Amir Gholami

Using a GeoProbe® sampling system, approximately four soil bores will be advanced to approximately 20 feet below grade surface (bgs) in the vicinity of the lath house, or areas of suspected fill material noted during the GPR survey. One soil bore will be advanced downgradient of monitoring well MW-3 and upgradient of the on site residence. One soil bore will be installed in an area previously investigated and determined to be free of detectable petroleum hydrocarbons in order to obtain background soil quality data.

- **Collect soil samples for laboratory analysis**

Three soil samples per soil bore, per Amir Gholami

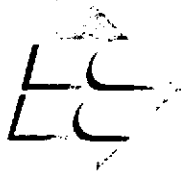
One soil sample and one grab groundwater sample will be collected from each soil bore. Soil samples will be collected from the capillary fringe or from the interval displaying the highest field photoionization detector (PID) reading.

- **Submit the collect soil and grab groundwater samples for laboratory analysis**

The collected soil and grab groundwater samples will be submitted to AEN for analysis of TPH as diesel and TPH as gasoline by modified EPA Method 8015 and BTEX and MTBE by EPA Method 8020.

To evaluate the natural attenuation potential, one soil sample collected from the area of highest petroleum hydrocarbon concentration and one from the background soil bore will also be submitted for laboratory analysis of total kjeldahl nitrogen (TKN) by EPA Method 350.3, total organic carbon (TOC) (the background sample only) by EPA Method 415.1, and pH by EPA Method 9040/150.1. Two representative soil samples, one from the background soil bore, will also be collected from the water-bearing zone for determination of grain size, soil bulk density, moisture content, and soil porosity and analysis of fraction of organic carbon (foc).

*Total 9 Grab GW samples
27 soil samples*



- **Determination of human health and environmental exposure risk**

A Tier 1 risk assessment will be conducted for the site to determine risk-based screening levels (RBSLs) and, if necessary, site-specific target levels (SSTLs) according to the methods outlined in the ASTM E 1739-95, *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites*. Since the main contaminant detected at this site has been gasoline, the risk assessment will be performed for BTEX constituents.

Using California-modified toxicity and exposure levels, a Tier 1 lookup table will be consulted for each of the contaminants detected at the site. Exposure pathways for the Tier 1 assessment will include:

- groundwater volatilization to outdoor air
- groundwater volatilization to indoor air

Based on data collected during previous investigations, the irrigation well present at the site is not hydraulically connected to the shallow impacted water-bearing zone, and therefore, is not anticipated to be a potential groundwater ingestion pathway. A limited sensitive receptor survey conducted by Blymyer Engineers prior to the installation of monitoring wells MW-4 and MW-5, in October 1994, did not indicate any other potential sensitive receptor points within a ¼-mile downgradient of the site.

If plume concentrations exceed the RBSLs determined for either of the two pathways evaluated during the Tier 1 assessment, these pathways will require further evaluation using site-specific information in a Tier 2 assessment.

- **Evaluate collected data and prepare letter report**

The collected geophysical survey and soil and groundwater analytical data will be evaluated to determine the feasibility of utilizing natural attenuation as a remedial alternative at the site. A letter report will be prepared following the monitoring well abandonment, GPR survey, initial soil and groundwater sampling, and risk assessment documenting all work performed, including a detailed summary of analytical and investigative results, a scaled site map and groundwater contour and gradient map, groundwater concentration maps, and a summary of the initial natural attenuation evaluation. The report will document the monitoring well destruction for submittal to the Zone 7 Water Agency.



- **Conduct additional quarterly monitoring events**

In order to comply with plume management requirements, one groundwater sample will be collected from monitoring wells MW-3, MW-4, and MW-5 during two consecutive quarterly sampling events.

- **Analyze groundwater samples**

The groundwater samples collected during the second and third quarterly monitoring events will be field screened for DO, pH, ferrous Fe, and Eh and submitted to AEN for analysis of TPH as gasoline and diesel by modified EPA Method 8015, BTEX and MTBE by EPA Method 8020, nitrate by EPA Method 353.1, CO₂ by EPA method 406A and sulfate by EPA Method 375.4.

- **Prepare groundwater monitoring reports**

A letter report will be prepared following each sampling event which will document all work performed, including a detailed summary of the groundwater analytical data, a scaled site map and groundwater contour and gradient map, groundwater concentration maps, conclusions, and recommendations for future work at the site.

- **Final sampling and site closure request**

The groundwater samples collected during the fourth consecutive quarterly sampling event will be field screened for DO, pH, ferrous Fe, and Eh, and laboratory analyzed for TPH as gasoline and diesel by modified EPA Method 8015, BTEX and MTBE by EPA Method 8020, total alkalinity by EPA Method 310.1, CO₂ by EPA method 406A, nitrate by EPA method 353.1, and sulfate by EPA Method 375.4.

If the results of the proposed soil and groundwater sampling indicate that the site meets the criteria for a low risk site, then Blymyer Engineers will recommend site closure with no further action in accordance with the requirements outlined in the *Tri-Regional Board Staff Recommendations for Closure Requests*, dated March 1, 1994.

- **Drum soil cuttings and well development water**

All generated soil cuttings and decontamination and purge water will be stored on-site in labeled Department of Transportation-approved, 55-gallon drums for later disposal by the owner. Blymyer Engineers estimates that approximately eight 55-gallon drums of water and one 55-gallon drum of soil will be generated during this phase of the investigation.




Ms. Amy Leech
June 12, 1997
Page 9

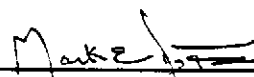
All work will be completed in accordance with Blymyer Engineers's *Standard Operating Procedures* previously submitted to the ACHCSA.

Please call Laurie Buckman at (510) 521-3773 with any questions or comments regarding this project.

Sincerely,

Blymyer Engineers, Inc.

By: 
Laurie A. Buckman
Project Geologist

And: 
Mark Detterman, CEG #17889
Senior Geologist



Enclosures:

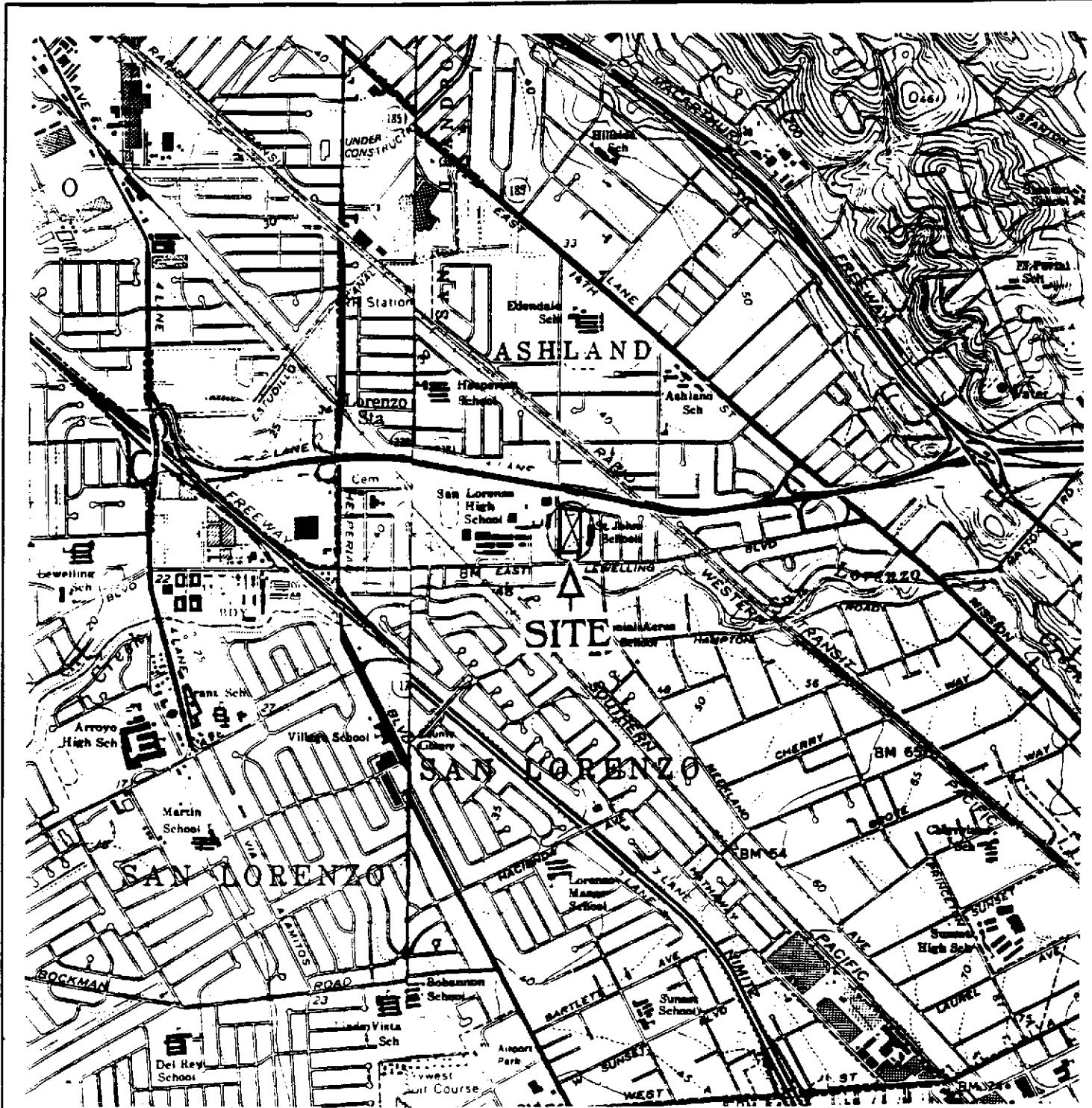
Tables:

Table 1: Summary of Soil Sample Analytical Results
Table 2: Summary of Groundwater Sample Analytical Results
Table 3: Summary of Groundwater Elevation Measurements

Figures:

Figure 1: Site Location Map
Figure 2: Site Plan
Figure 3: Soil Gas Survey Concentration Map
Figure 4: Groundwater Gradient November 22, 1994
Figure 5: Groundwater Gradient March 29, 1995
Figure 6: Groundwater Gradient June 7, 1995

cc: Ms. Jean Kawahara, Kawahara Nursery, Inc.



SOURCE: UNITED STATES GEOGRAPHICAL SURVEY 7.5' QUAD. "SAN LEANDRO CA" PHOTOREVISED 1980.



BLMYER
ENGINEERS, INC.



0 1000 2000
SCALE IN FEET



SITE LOCATION MAP
KAWAHARA NURSERY
16550 ASHLAND AVE.
SAN LORENZO, CA

FIGURE

1

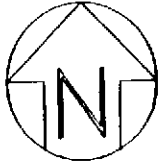
BEI JOB NO.

94015

DATE

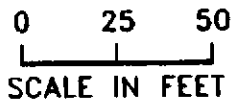
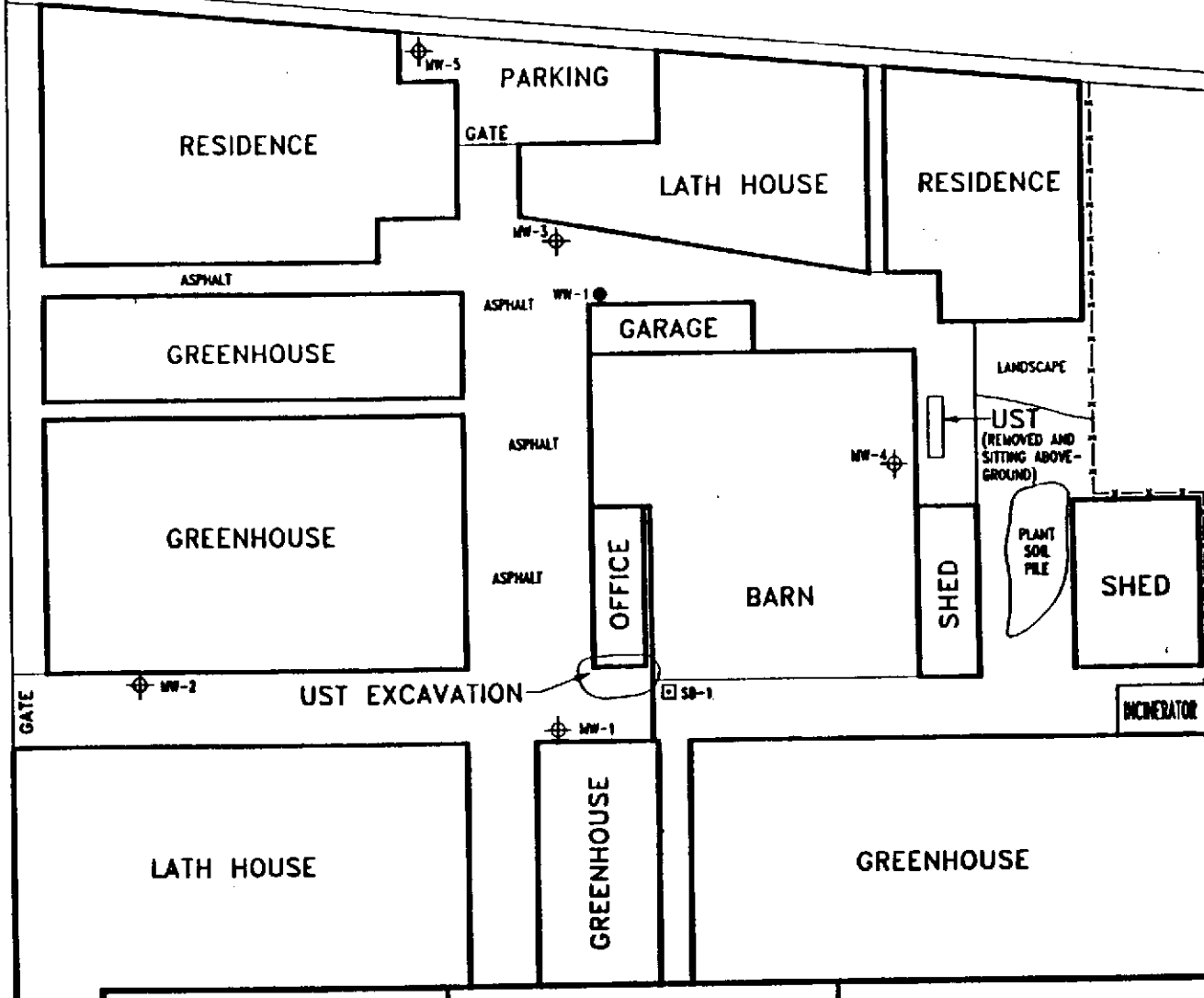
4/18/94

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ASHLAND AVENUE

ANO ST.



BLYMYER
ENGINEERS, INC.

BEI JOB NO. 94015	DATE 11/15/94
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LEGEND

- ⊕ MONITORING WELL
- WATER WELL
- UST UNDERGROUND STORAGE TANK
- SOIL BORE

SITE PLAN
KAWAHARA NURSERY
SAN LORENZO, CA

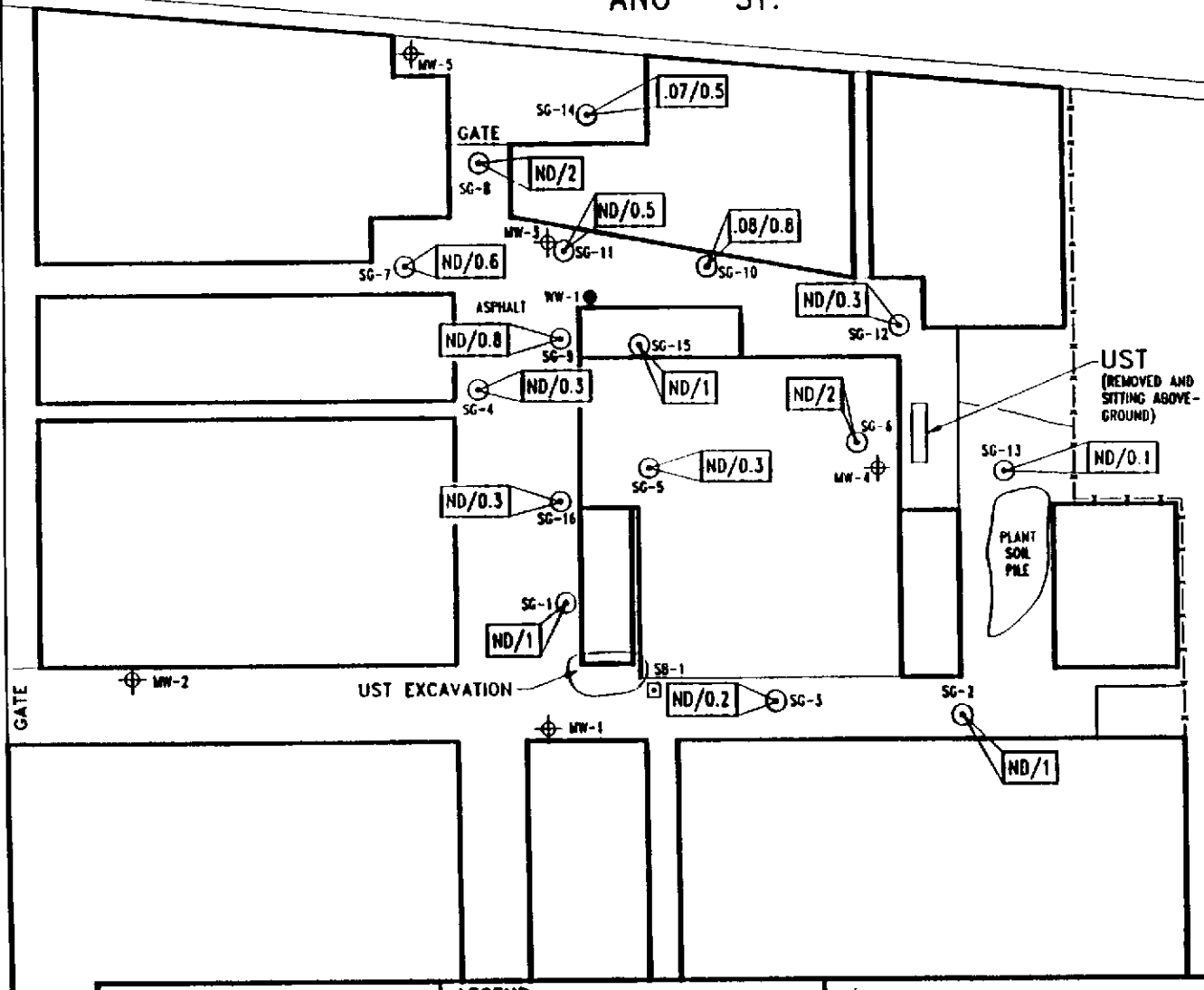
FIGURE
2

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ASHLAND AVENUE

ANO ST.



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SCALE IN FEET

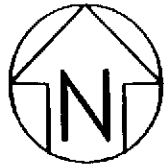
BLYMYER ENGINEERS, INC.
 BEI JOB NO. 94015
 DATE 11/15/94

LEGEND
 ⊕ MONITORING WELL
 ⊙ SOIL GAS SURVEY POINTS
 ● WATER WELL
 ■ UST
 □ UST EXCAVATION
 [ND/2] BENZENE/TVHC CONCENTRATIONS IN ug/L
 TVHC TOTAL VOLATILE HYDROCARBONS
 □ SOIL BORE

SOIL GAS SURVEY CONCENTRATION MAP
 KAWAHARA NURSERY
 SAN LORENZO, CA

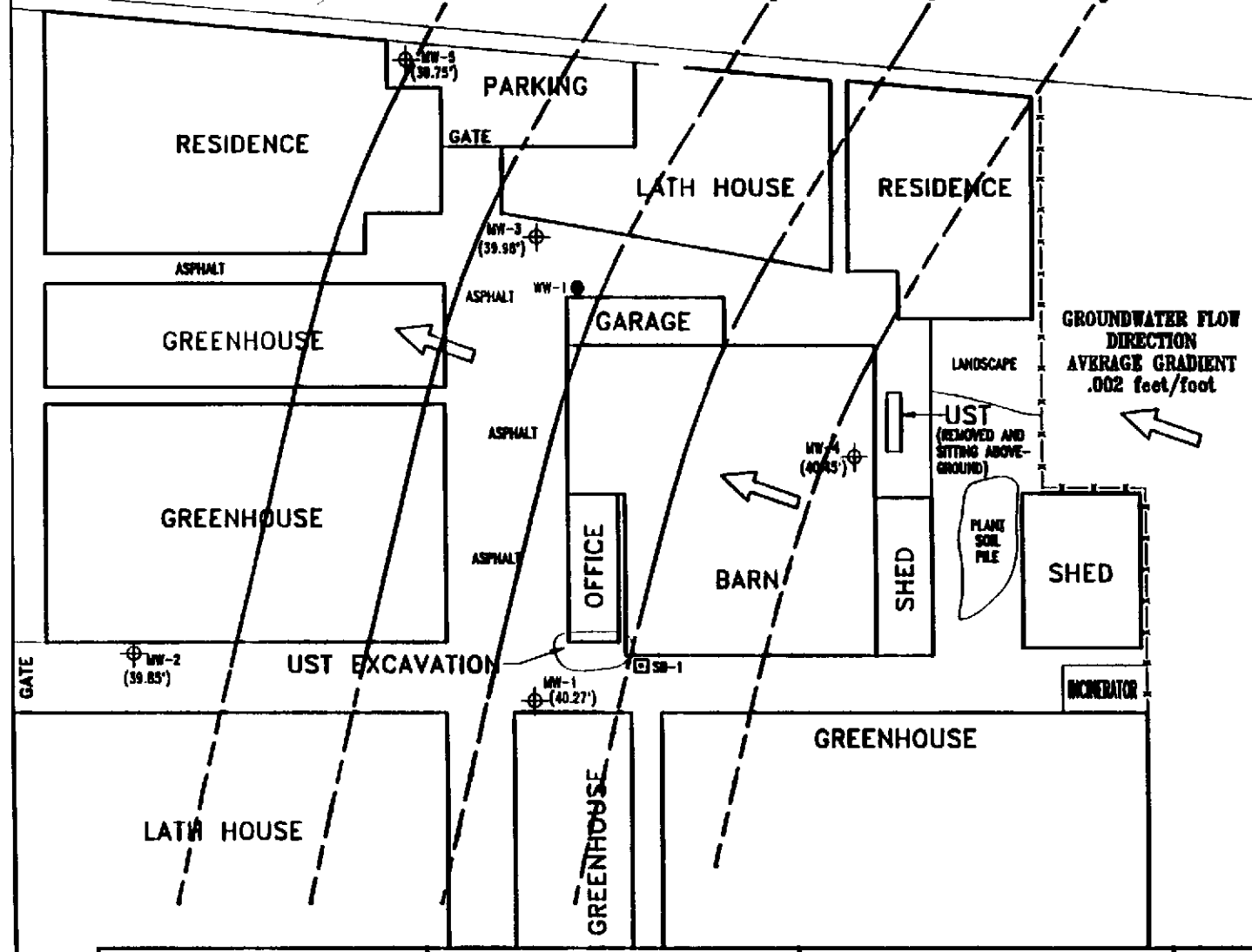
FIGURE
3

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ASHLAND AVENUE

ANO ST. 87.70° 87.80° 87.90° 88.00° 88.10°



0 25 50
SCALE IN FEET

BLYMYER ENGINEERS, INC.

BEI JOB NO. 94015	DATE 12/15/94
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LEGEND

- ⊕ MONITORING WELL
- WATER WELL
- ▣ UST UNDERGROUND STORAGE TANK
- SOIL BORE
- GROUNDWATER ELEVATION
- - - GROUNDWATER CONTOUR

GROUNDWATER GRADIENT
NOVEMBER 22, 1994
KAWAHARA NURSERY
SAN LORENZO, CA

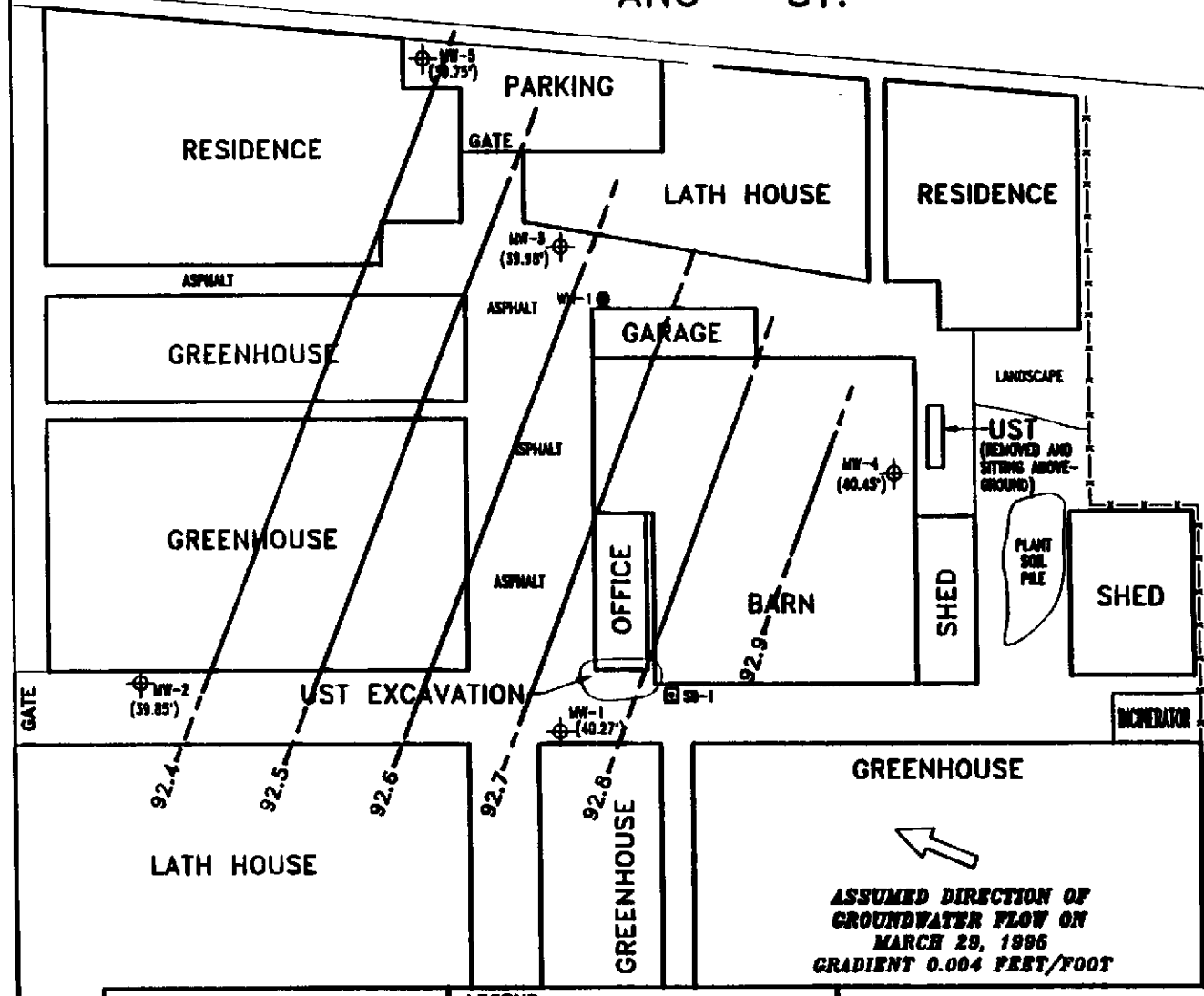
FIGURE
4

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ASHLAND AVENUE

ANO ST.



0 25 50
SCALE IN FEET



BEL JOB NO. 94015
DATE 4/10/95

LEGEND
 ⊕ MONITORING WELL
 ● WATER WELL
 UST UNDERGROUND STORAGE TANK
 □ SOIL BORE
 (12.31) GROUNDWATER ELEVATION
 — GROUNDWATER CONTOUR

GROUNDWATER GRADIENT
 MARCH 29, 1995
 KAWAHARA NURSERY
 SAN LORENZO, CA

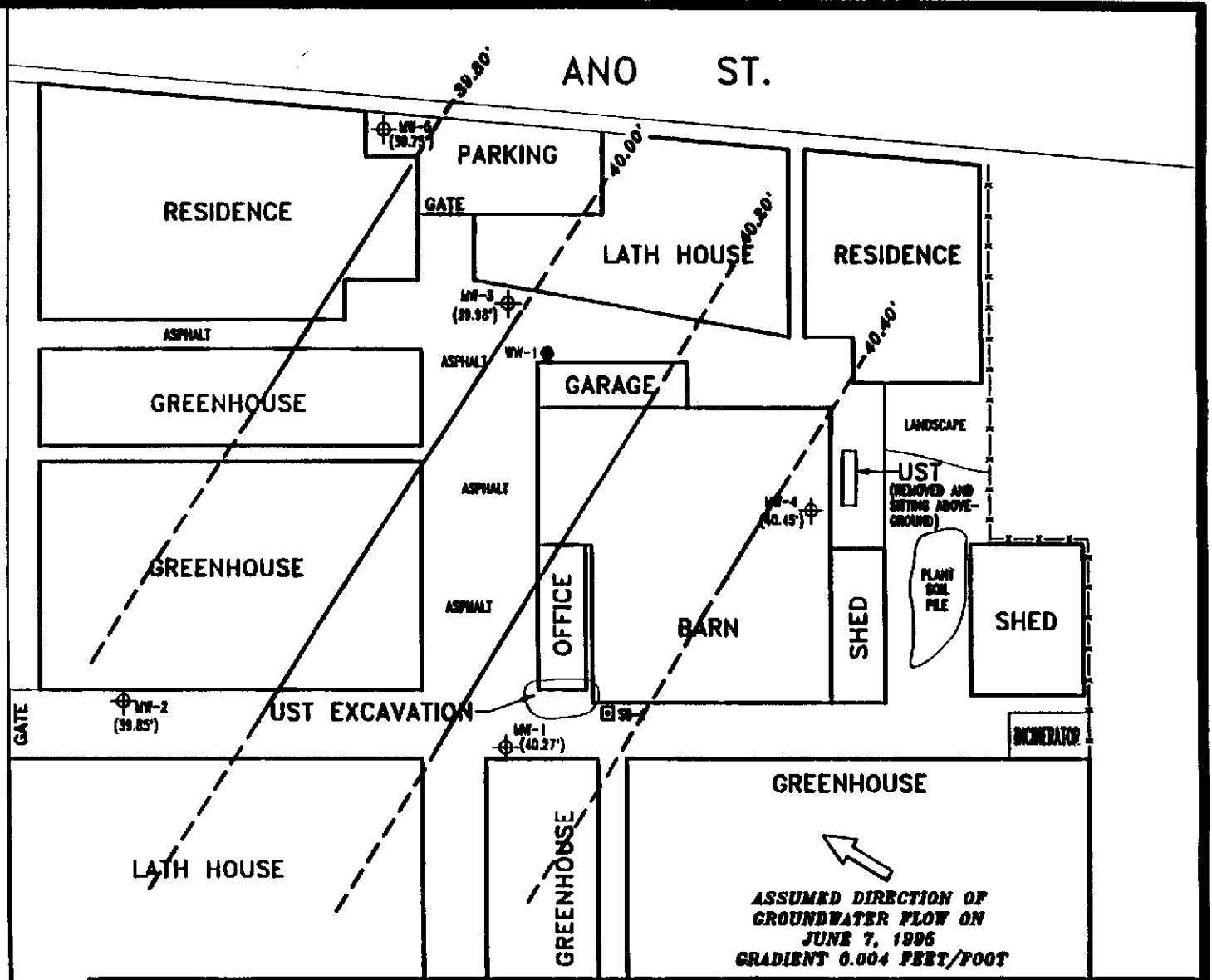
FIGURE
 5

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ASHLAND AVENUE

ANO ST.



0 25 50
SCALE IN FEET



BEI JOB NO.
94015

DATE
6/20/95

LEGEND

- ⊕ MONITORING WELL
- WATER WELL
- UST UNDERGROUND STORAGE TANK
- SOIL BORE
- (39.91) GROUNDWATER ELEVATION
- GROUNDWATER CONTOUR

GROUNDWATER GRADIENT
JUNE 7, 1995
KAWAHARA NURSERY
SAN LORENZO, CA

FIGURE
6