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MAR 15 2002

TRANSMITTAL

**TO: Mr. David Thompson
c/o Kate Friend, Esq.
Ryan, Andrada & Lifter
300 Lakeside Drive, Suite 1045
Oakland, CA 94612**

DATE: March 13, 2002

Project No. 22002.28

WE ARE TRANSMITTING:

- Per Your Request**
- Herewith**
- Under Separate Cover**

THE FOLLOWING HAS BEEN PREPARED:

One (1) bound original and One (1) un-bound copy of the Groundwater Monitoring and Risk Assessment Workplan for 900 Central Avenue, Alameda, California

One (1) bound copy sent to:

**Ms. Eva Chu, Hazardous Materials Specialist, Alameda County Health Care Services,
Environmental Health Services, Environmental Protection, 1131 Harbor Bay Parkway,
Suite 250, Alameda, California**

TRANSMITTED AS CHECKED BELOW:

- For Approval**
- For Your Use**
- As Requested**
- For Review & Comment**

Signed by: Robert M. Horwath
Robert M. Horwath, RG
Senior Project Manager

E _ M _ F _ P _ T _ A _

Prepared by: Fides Magisa-Laub
Fides Magisa-Laub



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Diligence and Remedial Services

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**GROUNDWATER MONITORING
AND
RISK ASSESSMENT
WORKPLAN**

**900 Central Avenue
Alameda, California**

PREPARED FOR:

Mr. David Thompson
c/o Kate Friend, Esq
Ryan, Andrada & Lifter
300 Lakeside Drive, Suite 1045
Oakland, California 94612

ALLWEST PROJECT No. 22002.28
March 8, 2002

PREPARED BY:

Robert M. Horwath, RG
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REVIEWED BY:

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President



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**GROUNDWATER MONITORING
AND
RISK ASSESSMENT
WORKPLAN**

**900 Central Avenue
Alameda, California**

I. INTRODUCTION

This remedial investigation workplan was prepared in response to Alameda County Health Care Services (ACHCS) letter dated December 3, 2001 to resume quarterly groundwater monitoring and complete a Risk Based Corrective Analysis (RBCA) assessment for the subject property. The purpose of the groundwater monitoring and associated risk assessment is to determine if the petroleum hydrocarbon groundwater plume is stable and not migrating and if it poses an unacceptable risk to human health and the environment. The overall goal is to assess if the site meets closure requirements of the ACHCS and the State of California Water Resource Board.

The release of petroleum hydrocarbons on the property dates to when it was in use as a gas station with underground storage tanks (USTs) between 1931 and 1975. Since the removal of the gasoline station and USTs, a apartment building has been constructed on the property. Target contaminants associated with the former USTs include: total petroleum hydrocarbons in the gasoline, diesel, and motor oil range (TPH-g, TPH-d, TPH-mo); four fuel related volatile compounds: benzene, toluene, ethylbenzene, and xylene (BTEX); and potentially ether oxygenates including methyl-ter-butyl-ether (MTBE).

This plan summarizes the site setting and background including previous investigations conducted at the property and presents the outline of the proposed field monitoring and risk assessment activities.

II. PROJECT BACKGROUND

A. Site Location and Description

The subject property is located in the central-southern portion of the City of Alameda amidst a predominantly residential area. Specifically, the property is at the southeast corner of Central Avenue and Ninth Street. The site improvements consist of a two-story wood-frame apartment building with surrounding landscaped areas. A site location map and a generalized site plan with previous and current features are presented on Figures 1 and 2, respectively.

B. Site Geology and Hydrogeology

Subsurface soils consist chiefly of silty fine sands from ground surface to depths of 15 feet below ground surface (bgs), the maximum depth explored during previous site investigations. The near surface silty sands were generally brown, loose, and moist. Silty sands generally graded to light brown and yellow brown, medium dense, and wet below 10 feet bgs.

Historically, groundwater is generally first encountered within the monitoring wells between 6 and 12 feet bgs. The groundwater table is relatively flat with a general gradient of 0.005 feet/foot and flows towards the southwest as measured during previous monitoring events.

C. Previous Site Investigations

Lowney Associates conducted a soil and groundwater sampling investigation at the site in 1994 to evaluate the potential of subsurface impact due to historical site use. The investigation included the advancement of three borings, the collection of soil and groundwater samples, and the chemical analyses of selected samples. Lowney Associates reported that soil and groundwater samples from a boring located near the northwest corner of the subject property, contained elevated levels of TPH-g and BTEX compounds.

In 1997, AllWest was retained to review and verify Lowney's 1994 findings. AllWest's 1997 investigation included the review of historical documents related to past site usage, the advancement of eight soil borings via the direct push (Geoprobe) method to collect soil and groundwater samples, the chemical analyses of selected samples for TPH-g and BTEX, and a preliminary risk assessment using the American Society for Testing and Materials (ASTM) Risk Based Corrective Action (RBCA) process.

The 1997 investigation results indicated that no current source areas are located at the subject site, the majority of contaminated groundwater beneath the site is limited to the northwest corner, the extent of the groundwater contamination extends beyond the site boundary, and the former tank site is likely located in the public right-of-way, along the sidewalk of Central Avenue. The preliminary risk assessment indicated that the portion of groundwater contamination plume beneath the subject property is unlikely to cause increased cancer risk to site occupants.

The results of the 1997 AllWest investigation were submitted to ACHCS, the lead regulatory agency for leaking underground storage tank sites in the City of Alameda. In March 1998, the ACHCS issued a letter requesting quarterly groundwater monitoring for a minimum of one year at the subject site. Groundwater samples were required to be analyzed for the presence of TPH-g, BTEX, and MTBE.

In June 1998, AllWest prepared a workplan for the well installation and groundwater monitoring program. The workplan was submitted to and approved by ACHCS in August

1998. In addition to TPH-g, BTEX, and MTBE, ACHCS required that the groundwater samples also be analyzed for TPH-d and TPH-mo.

In November 1998, AllWest installed, developed, and sampled three groundwater monitoring well at the subject site. The analytical results indicated that none of the target analytes were reported above the respective laboratory detection limits in any of the collected groundwater samples except for TPH-g and BTEX in well MW-1, located at the northwest corner of the subject property and near the suspected location of the former USTs. The reported TPH-g concentration was 360 parts per billion (ppb), benzene was 5.8 ppb, toluene was 5.5 ppb, ethylbenzene was 9.2 ppb, and xylene was 40 ppb

In March 1999, AllWest resampled the three wells. None of the target analytes were reported above their respective laboratory detection limits during this sampling event. During the June 1999 sampling event, only TPH-g at 930 ppb, TPH-d at 520 ppb, toluene at 19 ppb, ethylbenzene at 52 ppb, and xylene at 230 ppb, were reported from MW-1. None of the target analytes were reported above their respective laboratory detection limits from MW-2 or MW-3 during the June sampling event. The last sampling event was conducted in September 1999. During this event, xylene was reported from MW-2 at 1.8 ppb. The groundwater sampled from MW-1 from the September event contain TPH-g at 14,000 ppb, TPH-d at 2,100 ppb, benzene at 300 ppb, toluene at 1,900 ppb, ethylbenzene at 890 ppb, and xylene at 5,600 ppb.

III. WORKPLAN OBJECTIVES

The primary objective of this workplan is to resume quarterly groundwater monitoring and prepare a RBCA assessment for the subject property. The overall goal is to assess if the residual petroleum hydrocarbon contamination in the groundwater has stabilized or is decreasing through natural attenuation and meets the ACHCS and the State of California Water Resource Board cleanup criteria to achieve case closure.

The specific workplan objectives are:

- Discuss closure strategy with the ACHCS;
- Sample all three on-site wells, MW-1, MW-2 and MW-3 for four quarters in 2002;
- Complete a conceptual site model (CSM) for the property to identify primary and secondary sources, migration pathways and receptor locations;
- Complete a RBCA assessment to assess if the residual contamination poses as an unacceptable risk to human health or the environment.
- Prepare an initial Groundwater Report after the first round of groundwater monitoring summarizing results, the CSM and RBCA assessment;

- Prepare Letter Reports with updated tables and figures after the second and third rounds of groundwater monitoring; and
- Prepare an Annual Groundwater Report after the fourth round of groundwater monitoring with an updated CSM and RBCA assessment.

IV. FIELD ACTIVITIES

AllWest personnel will be onsite to direct and monitor the sampling process. Prior to actual field sampling activities, AllWest will provide advance notification to the ACHCS to allow agency inspection.

A. Monitoring Well Inspection

The well head and the integrity of the well casing of each of three on-site wells, MW-1, MW-2 and MW-3 will be visually inspected and sounded by lowering a 1-inch diameter, 3-foot long, disposable bailer to the bottom of the well. Any defects will be noted and assessed by a Registered Geologist to determine if the quality of the groundwater samples will be compromised. Any well found to be defective will be repaired or replaced prior to sampling.

B. Monitoring Well Quarterly Sampling

Groundwater will be sampled from all three wells on a quarterly basis for one year. Monitoring events are scheduled for March, June, September and December, 2002.

The wells will be purged prior to sampling. The purpose of well purging is to remove fine grained materials from the well casing and to allow fresh and more representative water to recharge the well. Prior to well purging, an electric water depth sounder will be lowered into the well casing to measure the depth to the water to the nearest 0.01 feet. A clear poly bailer will then be lowered into the well casing and partially submerged. Upon retrieval of the bailer, the surface of the water column retained in the bailer will be carefully examined for any floating product or product sheen.

After all initial measurements are completed and recorded on a groundwater purge log form (Appendix A), the well will be purged by the same disposable bailer. A minimum of 3 well volumes of groundwater will be purged and groundwater characteristics (temperature, pH, and conductivity) monitored at each well volume interval. Purging is considered complete when indicators are stabilized (consecutive readings within 10% of each other) and the purged water is relatively free of sediments. All purged groundwater will be temporarily stored on-site in 55-gallon drums awaiting test results to assess proper disposal method.

Groundwater sampling will be conducted after the water level has recovered to at least 80% of the initial level, recorded prior to purging. The groundwater sample will be

collected by the same disposable bailer. Upon retrieval of the bailer, the retained water will be carefully transferred to appropriate containers furnished by the analytical laboratory. All sample containers will have a Teflon lined septum/cap and be filled such that no head space is present. The sample containers will be labeled and immediately placed on ice to preserve the chemical characteristics of its content.

To prevent cross contamination, all groundwater sampling equipment that contacts the groundwater will be thoroughly decontaminated prior to sampling. A disposable bailer, discarded after each well sampling to avoid cross contamination, will be used to collect groundwater samples.

V. QUALITY ASSURANCE / QUALITY CONTROL PROGRAM

A. Sample Preservation, Storage and Handling

To prevent the loss of constituents of interest, all samples will be preserved by storing in an ice chest cooled to 4°C with crushed ice immediately after their collection and during transportation to the laboratory. The standard chain-of-custody protocols will be followed through all stages of sample handling.

B. Field Quality Control Samples

To detect the occurrence of cross-contamination during sampling events and to reduce the probability of false-positive results, a trip blank will be included with each shipment of samples to the laboratory.

C. Chain-Of-Custody Program

All samples collected for this project will be transported under chain-of-custody protocol. The chain-of-custody program allows for the tracing of possession and handling of individual samples from the time of field collection through laboratory analysis. The document includes the signature of the collector, date and time of collection, sample number, number and type of sample containers including preservatives, parameters requested for analysis, signatures of persons and inclusive dates involved in the chain of possession. Upon delivery to the laboratory the document will also include the name of person receiving the samples, and date and time samples were received. A sample copy of the chain-of-custody form is included in Appendix A.

D. Decontamination Procedures

All groundwater sampling equipment and instruments will be thoroughly cleaned in an Alconox (or other phosphate-free detergent) solution and rinsed with potable water prior to each use. The rinsate water will be contained along with the groundwater as described above. Disposable sampling devices will be employed where applicable to reduce the frequency of re-using the same equipment.

VI. ANALYTICAL METHODS

All samples selected for chemical analyses will be analyzed by a California Department of Health Services (DHS) certified independent analytical laboratory. STL Chromalab of Pleasanton, California will provide the analytical services. However, other qualified laboratories may be utilized dependent on work load and time frame considerations.

The groundwater samples collected during this investigations will be analyzed for the following:

- TPH-g and BTEX by EPA Method 8020
- TPH-mo and TPH-d by EPA Method 8015*
- MTBE and ether oxygenates by EPA Method 8260

*Silica Gel cleanup by EPA Method 3630M will be performed to remove naturally occurring organics from the groundwater samples.

Based on non-detectable concentrations of MTBE and TPH-mo during previous groundwater monitoring events conducted in 1999, MTBE, ether oxygenates and TPH-mo may be deleted from the program if they are not detected during the first quarter 2002 sampling event.

All laboratory analyses will be performed under the one-week turn-around-time schedule.

VII. CONCEPTUAL SITE MODEL

A Conceptual Site Model (CSM) will be developed to evaluate if the residual petroleum hydrocarbons in the soils and groundwater on and down gradient of the subject property poses as an acceptable risk to human health or the environment. Primary and secondary sources, migration pathways and receptor locations will be assessed. Specifically, the CSM will identify conduits such as underground utility lines which may act as preferential pathways for off-site migration, a well survey for domestic or water supply wells within 1,000 feet of the property, and if surface water or creeks are within 1,000 feet of the subject property. A graphic representation of the CSM illustrating sources, pathways and receptors will also be prepared.

VIII. RISK ASSESSMENT

A Risk Based Corrective Analysis (RBCA) assessment will be completed following ASTM E 1739 guidelines. The ASTM specified maximum on-site soil and groundwater concentrations of target contaminants will be used in the risk assessment and be compared to RBSLs developed by the San Francisco Bay RWQCB, *Application of Risk-Based Screening Levels and Decision Making to Sites with Impacted Soil and Groundwater, Interim Final*, December 2001. Under most circumstances, the presence of a chemical at a concentration below the corresponding RWQCB's RBSL can be assumed to not pose a significant threat to human health and the environment. These conservative levels take into account site specific factors such as the current

and future use of the property, the current and potential use of groundwater as a drinking water source, the nature of the impacted soils and the acceptable cancer risk to protect human health.

The risk assessment will serve the purpose of establishing exposure scenarios, identifying receptor subgroups, locating data gaps, and deriving cleanup goals. Should any data gap be identified, a supplemental investigation may be conducted to fill the data gap and to refine the assessment process. The initial cleanup goals derived from the preliminary risk assessment will be evaluated against a set of corrective action alternatives to determine the most cost-effective action.

IX. REPORT PREPARATION

Four written reports are proposed to be prepared as part of this investigative program.

- Prepare an initial Groundwater Report after the March groundwater monitoring event summarizing results, the CSM and RBCA assessment;
- Prepare a Letter Report after the June groundwater monitoring event with updated tables and figures;
- Prepare a Letter Report after the September groundwater monitoring event with updated tables and figures; and
- Prepare an Annual Groundwater Report after the December groundwater monitoring event with an updated CSM and RBCA assessment.

Included in the reports will be groundwater purging logs, chain-of-custody documents, and copies of the analytical laboratory reports. The report will be prepared/reviewed by a California Registered Geologist. Prior to the preparation of the final report, a verbal report summarizing investigation data may be provided.

X. PROJECT STAFF AND SCHEDULE

Mr. Robert M. Horwath, a California Registered Geologist, will provide technical oversight for this project and act as the project manager and regulatory liaison. Additionally, AllWest's staff of engineers, geologists, and technicians will be employed to perform the various tasks of the project.

As previously stated the four quarters of groundwater sampling is scheduled for March, June, September and December 2002. Reports will be prepared no more than 60 days after the completion of the field sampling activities.

XI. LIMITATIONS

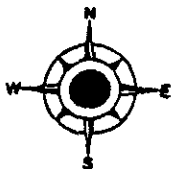
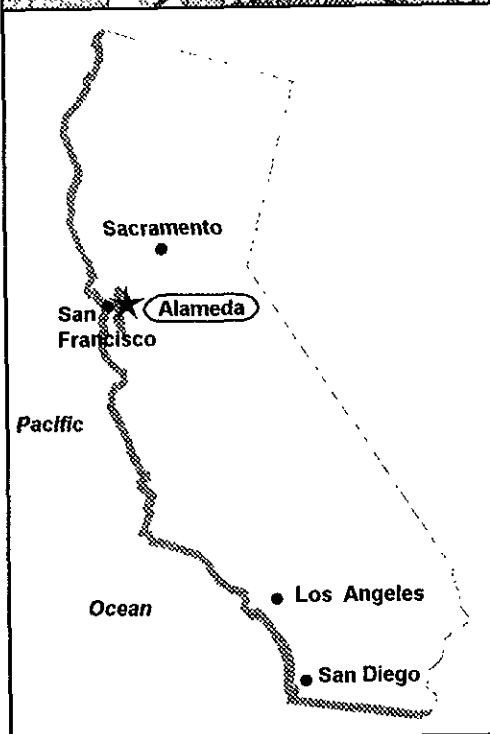
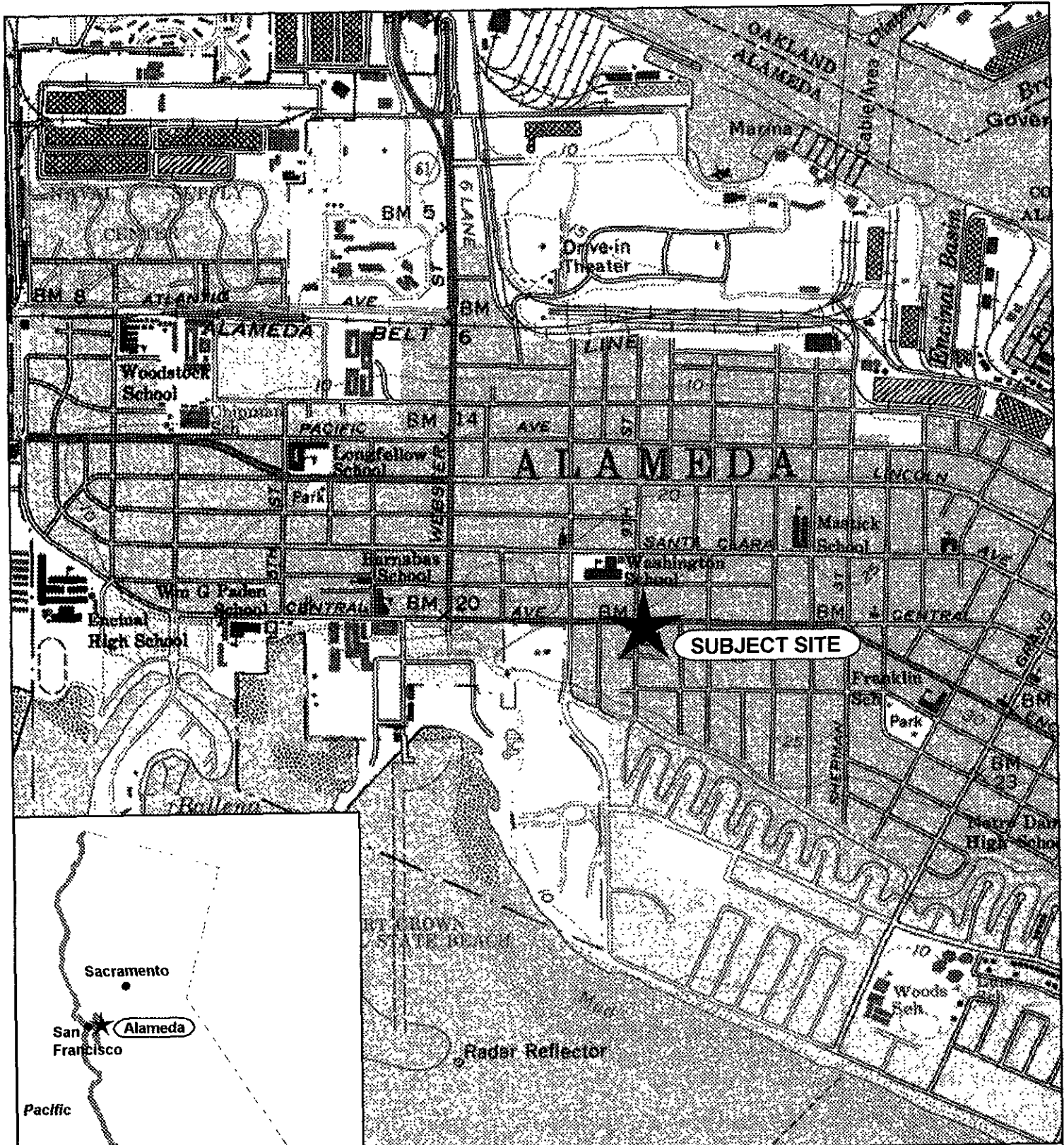
AllWest has prepared this remedial investigation and corrective action plan for the exclusive use of Mr. David Thompson, c/o Kate Friend, Esq. of Ryan, Andrada & Lifter (Client) for this particular project and in accordance with generally accepted practices at the time of the work and with our written proposal dated January 11, 2002. No other warranties, either expressed or implied are made as to the professional advice offered. This plan is not a specification for the proposed work and should not be used to bid out any of the proposed work found within. Reliance on this plan by any party other than the Client is at the user's sole risk.

The conclusions and recommendations contained in this plan are made based on data from available records, observed conditions existing at the site, laboratory test results of the submitted samples, and interpretation of a limited data set. It must be recognized that changes can occur in subsurface conditions due to site use or other reasons. Furthermore, the distribution of chemical concentrations in the subsurface can vary spatially and over time. AllWest makes no warranties or guarantees as to the accuracy or completeness of information obtained from or provided by others.

The estimated implementation costs for the proposed corrective action is based on costs of completed remedial projects in the Bay Area and proposals obtained from contractors in the Bay Area within the past three years. However, the final costs will dependent upon the actual extent of contamination and the corrective action implemented. Other factors that will influence the costs are the means, methods, sequence, and operations of construction and related safety program; the cost and extent of labor, equipment, and materials; cost estimators' and contractors' techniques for determining the price and market conditions; and other factors that cost estimators and contractors consider and over which AllWest has no control.

XII. REFERENCES

- Alameda County Health Care Services, Letter to Mr. David Thompson, RE. QMR for 900 Central Avenue, Alameda, California, December 3, 2001.
- Alameda County Health Care Services, Letter to Mr. David Thompson, Former Property Owner, RE. 900 Central Avenue, Alameda, California, February 22, 1999.
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- Alameda County Health Care Services, Letter to Mr. David Thompson, Former Property Owner, RE. 900 Central Avenue, Alameda, California, March 9, 1998.
-
- AllWest, Quarterly Groundwater Monitoring Report, Third Quarter, 1999, 900 Central Avenue, Alameda, California, October 14, 1999 (#98115.23).
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- AllWest, Groundwater Monitoring Well Installation and Sampling Report, 900 Central Avenue, Alameda, California, February 2, 1999 (#98115.23).
- AllWest, Workplan for Groundwater Monitoring Well Installation and Sampling, 900 Central Avenue, Alameda, California, June 29, 1998 (#98115.23)
- AllWest, Site Specific Health and Safety Plan, Groundwater Monitoring Well Installation and Sampling, 900 Central Avenue, Alameda, California, June 29, 1998 (#98115.23)
- AllWest, Subsurface Investigation Report, 900 Central Avenue, Alameda, California, February 2, 1999 (#97217.23).
- Lowney Associates, Subsurface Investigation Report, 900 Central Avenue, Alameda, California, 1994.
- San Francisco Bay Regional Water Quality Control Board, Application of Risk-Based Screening Levels and Decision Making to Sites with Impacted Soil and Groundwater, Interim Final, December 2001.



NOT TO SCALE

PROJECT NO.
22002.28

SITE LOCATION MAP
FIGURE 1
900 CENTRAL AVENUE
ALAMEDA, CALIFORNIA
SOURCE: USGS TOPO
PREPARED BY: J.K.M. TINGIN
DATE: 03/08/02

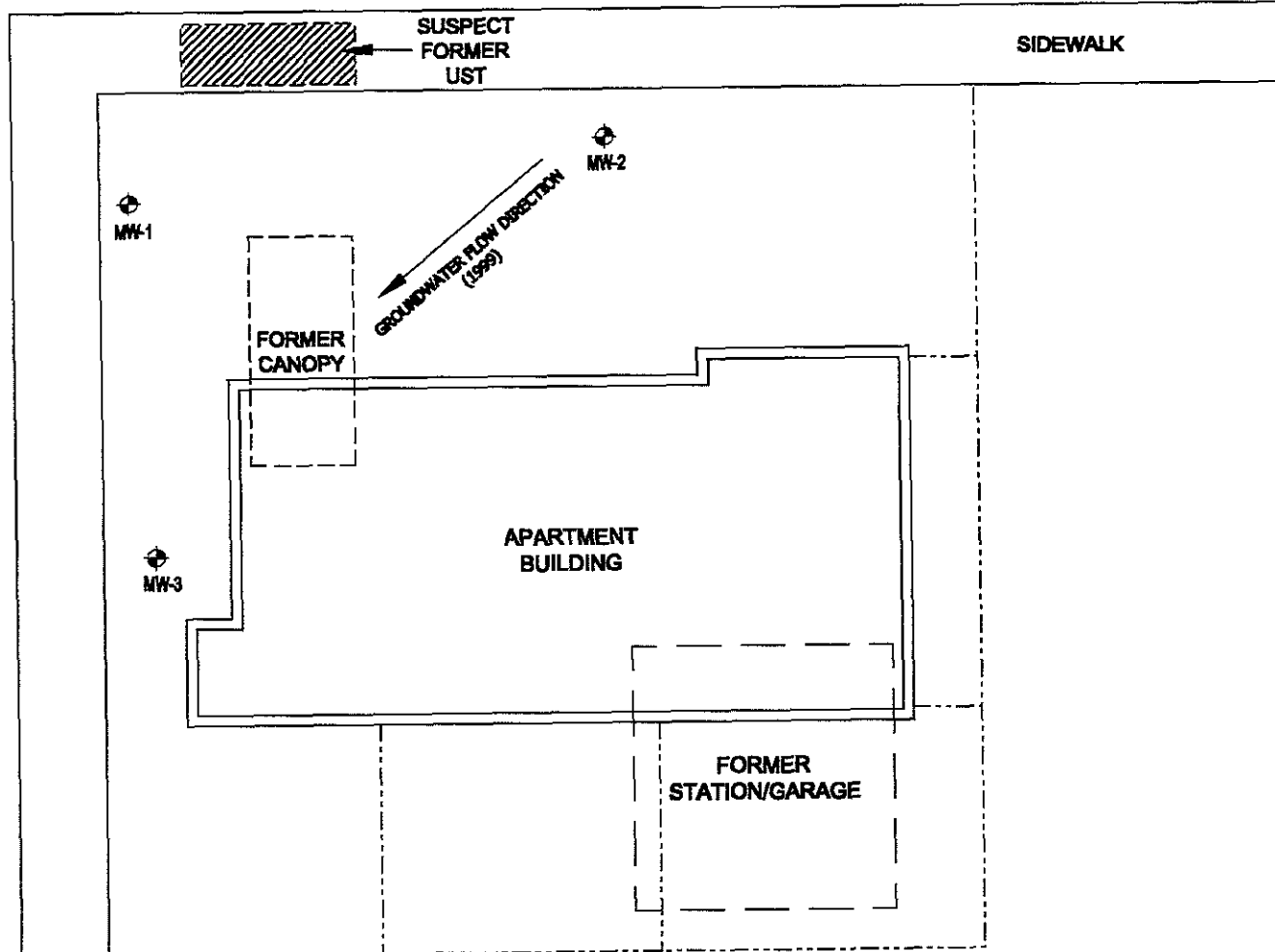
CENTRAL AVENUE







APPROXIMATE SCALE
0 5 10 15'

NINTH STREET

SIDEWALK



LEGEND

-  - SUSPECT LOCATION OF FORMER UNDERGROUND TANKS
-  - APPROXIMATE LOCATION OF FORMER STRUCTURE
-  MW-1 - GROUNDWATER MONITORING WELL
-  - FENCE LINES



AllWest

PROJECT NO.
22002.28

SITE PLAN WITH MONITORING WELLS

FIGURE 2

900 CENTRAL AVENUE

ALAMEDA, CALIFORNIA

SOURCE: ALLWEST

DRAWN BY: J.K.M. TINGIN

DATE: 03/08/02

APPENDIX A

EXAMPLE
GROUNDWATER PURGE LOG FORM

and

CHAIN-OF-CUSTODY FORM

Groundwater Monitoring Well Sampling Field Log

Project No.: 22002.28 Project Name: Central Monitor
 Well No.: MW- Well Location: 900 Central Ave., Alameda
 Well Depth: _____ (ft.) Casing Diameter: 2 (in.)
 Depth to Water: _____ (ft.) Date: /2002 Time: _____
 Water Column in Well: _____ (ft.) x 1.7 Well Volume: _____ (gal.) x 3 = _____
 Odor? _____ Free Product? _____ Thickness: _____
 Purging Method: Hand Pump _____ Submersible Pump _____ Bailer X Other _____

Time	pH	Conduc. (μ S)	Temp. (°F)	Water Level	Volume Removed	Remark

Purging Start Time: _____ Purging Stop Time: _____
 Total Volume Purged: _____ (gal.) Well Dewater? _____
 Sampling Method: Teflon Bailer: _____ Disposable Bailer X Sampling Pump _____

Sample Analysis: TPHg, d, mo/BTEX/MTBE/Oxygenates Sample No.: MW-

Remark: _____

Sampler: _____ Date/Time: _____

