ENVIRONMENTAL TECHNICAL SERVICES

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A Work Plan for the Installation of Three Groundwater Monitoring Wells

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Alameda County
Environmental Health

Beneath the site at:

2415 and 2431 Mariner Square Drive Alameda, California

Prepared for:

Mariner Square & Associates

September 9, 2011

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Prepared for:

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Prepared by:

Ross Tinline
Registered Geologist License # 5860

September 9, 2011
Date:

Helen Mawhinney
Senior Environmental Specialist

September 9, 2011
Date:

MARINER SQUARE & ASSOCIATES

September 7, 2011

REFERENCE: Address: 2415 & 2431 Mariner Square Drive
Alameda, CA 94501
Case Number: RO0000313
Case Manager: Mr. Mark E. Detterman, PG, CEG

Dear Mr. Detterman:

The attached document is provided for your review and comment. Upon information and belief, I declare, under penalty of perjury, that the information contained in the attached document is true and correct.

Please feel free to contact me directly at (510)521-2727 with any questions or concerns.

Savio D'souza
Mariner Square & Associates
V.P. Operations

09/07/11
Date

Table of Contents

1. Introduction

The following work-plan has been prepared for the installation of three groundwater monitoring wells beneath the Site located at 2415 and 2431 Mariner Square Drive. The purpose of the wells is to replace groundwater monitoring wells removed prior to and during the construction of the Aegis Cardinal Point Senior Center and to determine if known contaminants in groundwater have migrated toward the Oakland Alameda Estuary. The wells will also be used to determine groundwater gradient and flow direction.

2. Groundwater Conditions

The hydraulic gradient for the entire site is typically to the southeast at 0.005 feet per foot (ft/ft). This direction is away from the Oakland-Alameda Estuary. Depth to groundwater for the entire Site ranges from 3.57 to 5.84 feet below ground surface (bgs).

3. Contact Persons

Current Owner:	Mariner Square Group 2415 Mariner Square Drive Alameda, CA 94501
Local Regulatory Agency: (LRA)	Alameda County Env. Health Dept. Environmental Protection Attention: Mr. Mark E. Detterman, PG, CEG 1131 Harbor Bay Parkway, Suite 250 Alameda, CA 94502-6577
Senior Geologist:	Ross Tinline Registered Geologist No. 5860 (650) 218-3766
Senior Environmental Specialist:	Environmental Technical Services Helen Mawhinney Senior Environmental Specialist 1548 Jacob Avenue San Jose, California 95118 (831) 236-9221

4. Site History

4.1. Site Description

The subject site is located at 2415 and 2431 Mariner Square Drive in an area of commercial light manufacturing and military usage.

The site was previously used for bulk fuel storage and distribution as early as 1916. The site was owned by Tidewater/Texaco and then Phillips Petroleum and was used for bulk fuel storage and distribution of refined oils, motor lubricants, and fuel oil for ships until 1972. Since then, the site has been used for office space, a restaurant, boat sales, sail manufacturing, boat motor repair, boat hull repair, and boat hull stripping and painting.

Currently the site is occupied by a senior citizen's assisted living center, offices, a restaurant, and marine industry businesses such as yacht sales, marina docking, and boat storage. The site no longer has bulk storage for oil or fuel.

The site's occupants include:

2415 Mariner Square Drive

The parcel is currently occupied by a dry boat storage warehouse, John Beery Yacht Sales, marina docking, and a concrete paved lot. 1% of the parcel is exposed soil with some landscaping. The abutting properties and land use includes:

- North: Oakland Alameda Estuary
- South: Vacant parcel
- East: Aegis, Cardinal Point Senior Citizen Assisted Living Facility
- West: Vacant Former Military Parcel

2425 Mariner Square Drive

2425 Mariner Square Drive is occupied by an asphalt paved parking lot which provides parking to 2415 and 2431 Mariner Square Drive.

2431 Mariner Square Drive

2431 Mariner Square Drive is occupied by the Aegis, Cardinal Point Senior Citizen Assisted Living Facility and an asphalt parking lot. Approximately 10% of the parcel is exposed soil and landscaped. The abutting properties and land use includes:

- North: Marina boat docks and a restaurant located in the Oakland Alameda
- South: Vacant parcel
- East: Mariner Square Drive and the former, vacant, Chevys Restaurant
- West: Dry Boat Storage and John Beery Yacht Sales

4.2. Summary of Environmental History

On September 10, 2003 Environmental Resources Management (ERM) submitted a letter to Alameda County Environmental Health Services, Division of Environmental Protection summarizing the Site's available soil and groundwater information regarding the commercial property located at 2415 Mariner Square Drive and the residential property at 2425 Mariner Square Drive. The ERM summary is presented in *italics* below for reference:

Fifty-six discrete soil samples have been collected on the commercial portion of the site from 1992 to present. The historical soil analytical results are presented in Table 1 and are summarized below:

- *A total of 26 samples were analyzed for total petroleum hydrocarbons in the gasoline range TPH-g). TPH-g was detected within seven of the samples at a maximum concentration of 1,100 parts per million (ppm).*
- *A total of 45 samples were analyzed for total petroleum hydrocarbons in the diesel and motor oil range (TPH-d/mo; measured as diesel, motor oil, or total recoverable petroleum hydrocarbons). TPH-d/mo has been detected at concentrations ranging from non-detectable to 24,000 ppm. TPH-d/mo concentrations are shown on Figure 1.*
- *A total of 45 samples (including the greatest TPH-d/mo detection) were analyzed for benzene, toluene, ethyl benzene and xylenes (BTEX compounds). Benzene was not detected in any of the samples. Other BTEX compounds were only detected occasionally, with a maximum detection*

reported at 31 ppm (sum of all compounds). Other volatile organic compounds (VOCs) were reported below detection limits.

- *A total of 14 samples were analyzed for polynuclear aromatic hydrocarbons (PNAs). In general, PNA concentrations were low (less than 20 ppm) or non-detect with two exceptions. Naphthalene and methylnaphthalene were reported at concentrations of 230 and 260 ppm, respectively, in sample PL1-2.*
- *A total of 28 discrete samples were analyzed for lead. Concentrations ranged from non-detect to 5,700 ppm with an average of approximately 284 ppm. Only two of the 28 samples contained concentrations greater than 400 ppm, the preliminary remediation goal developed by U.S. Environmental Protection Agency for residential soils.*

Ground water samples have been collected from six monitoring wells associated with the commercial parcel (MW-2, MW-3 MW-4, MW-6/6A, MW-9, and MW-10— see residential property discussion for MW-5). Sampling was performed between 1992 and 1998, with a limited additional event in 2002. In addition grab ground water samples have been collected from one-time temporary borings at a total of seven locations. Historical ground water results are presented on Table 2 and summarized below.

- *The area of MW-6/MW-9, consisting of MW-6, MW-9 and grab samples collected in the vicinity; typically contain the greatest concentrations of TPH-g and TPH-d/mo (analytical results shown in Figure 2). A thin sheen of separate-phase hydrocarbons has been observed in MW-6.*
- *The maximum concentration of benzene detected in ground water from the commercial parcel was 31 parts per billion (ppb).*
- *MTBE concentrations have ranged from non-detectable to 460 ppb. Vinyl chloride has been detected at a maximum concentration of 9 ppb.*

In a letter dated 23 June 2000, Alameda County Health Care Services Agency (ACHCSA) requested additional monitoring of wells MW-5 (to be relocated to the commercial parcel), MW-6A, MW-9, and MW-10 and removal of soil containing concentrations of lead above 400 ppm or naphthalene above 49 ppm. The requested wells were sampled most recently in January 2002. Results are included in the attached tables. Plans to remove the naphthalene-impacted soil are under development.

Current Site Status Residential Parcel 2425 Mariner Square

Thirty-one soil samples have been collected from the residential portion of the site from 1992 to present. The historical soil analytical results are presented in Table 3 and are summarized below:

- *A total of 26 samples were analyzed for TPH-d/mo, with a maximum concentration detection of 13,000 ppm. TPH-d/mo concentrations are shown on Figure 3.*
- *Higher concentrations of TPH-d/mo (greater than 2,000 ppm) were only detected at depths below 4 feet.*
- *A total of 11 samples (including the greatest TPH-d/mo detection) were analyzed for BTEX compounds. BTEX compounds typically were not detected. The maximum detection was reported at 3.5 ppm. Other VOCs were below detection limits.*
- *Seven samples were analyzed for lead with concentrations ranging from 5.8 to 250 ppm.*

Ground water samples have been collected from five monitoring wells associated with the residential parcel (MW-1, MW-7, and MW-8 within the residential property and MW-5 adjacent to the residential property). The samples were collected between 1992 and 1998, with a limited additional event in 2002. Historical results are presented on Table 4 and Figure 4, and are summarized below.

- *Hydraulic gradient — typically to the southeast at 0.005 ft/ft. This direction is away from the Oakland-Alameda Estuary.*
- *Depth to ground water — ranges from 3.57 to 5.84 feet bgs.*
- *MW-5, located on the commercial parcel but adjacent to the residential parcel, typically contains the greatest concentrations of dissolved constituents.*
- *TPH-g has ranged from non-detectable to 9,000 ppb.*
- *TPH-d/mo has ranged from non-detectable to 6,600 ppb.*
- *Benzene has ranged from non-detectable to 89 ppb.*
- *MTBE has ranged from non-detectable to 34 ppb. Vinyl chloride has not been detected in any of the residential parcel wells.*
- *Lead was detected at a concentration of 12.8 ppb in MW-5 in 2002, the only sampling event involving lead analysis.*

In a letter dated 2 June 2002, Alameda County Health Care Services Agency (ACHCSA) stated "Based upon the Risk Assessment no remediation is necessary for 2425 Mariner Square Drive." This determination was based upon the February 1999 Risk Assessment and is supported by the following:

- *Hydrocarbons remaining in soil will not likely further impact ground water at the site. Significant concentrations of BTEX compounds or other VOCs have not been detected in soil samples collected from the residential parcel.*
- *Concentrations of VOCs (including BTEX compounds) in ground water do not pose a significant risk to residential use of the parcel. The ground water at the site is not considered drinking water quality. Ground water monitoring and sampling have not shown significant changes in ground water quality.*
- *The risk of exposure to soil and ground water is currently low in the present configuration as well as the proposed residential configuration. The receptor pathways are limited to dermal contact during construction and excavation.*

Recommended Actions — Residential Property 2425 Mariner Square

Consistent with the findings of the risk assessment and conclusions developed by ACHCSA in their 2 June 2002 letter, ERM recommends the following actions to ensure that site development is performed in a manner protective of human health and the environment:

- *Full disclosure of known environmental conditions to contractors planning to perform subsurface work. This will allow the contractors to evaluate the need for training, the modification of work practices, or the use of personal protective equipment to ensure adequate protection of worker health and safety.*
- *Monitoring of excavations deeper than 3 feet bgs to determine if potentially impacted soils are present.*
- *Segregation and stockpiling of impacted material disturbed during development. Currently soils containing TPH-d/mo at concentrations greater than 2,000 ppm are only present at depths greater than 3 feet bgs. The segregation of impacted material upon excavation will help ensure that significantly impacted soils (TPH-d/mo greater than 2,000 ppm) are not introduced into shallow depths via reuse during site grading activities.*

To accomplish this, materials exhibiting field evidence of significant petroleum impact (nuisance odors, discoloration, and free-phase nonaqueous liquids) will be segregated upon excavation and stored in separate stockpiles. Impacted stockpiles will be covered with visqueen. Run-on/run-off controls such as hay bales or silt fencing will be placed around the impacted stockpiles. Impacted stockpiles will then be sampled on a minimum frequency of one 4-part sample per 500 cubic yards. Samples will be analyzed for TPH-d/mo and BTEX compounds. Stockpiles containing TPH-d/mo at concentrations greater than 2,000 ppm or a BTEX compound above its RWQCB risk-based screening level for surface soil (Table A in Application of Risk-based Screening Levels and Decision Making to Site with Impacted Soil and Groundwater, RWQCB, December 2001) will be disposed off-site.

- *Skimming/pumping and off-site disposal of any nonaqueous-phase liquids encountered on the ground water surface during excavation activities.*

5. Scope of Services

The scope of services described below includes the installation and development of three groundwater monitoring wells, soil and groundwater sampling, and laboratory analysis. The purpose of the wells is to replace groundwater monitoring wells removed prior to, and during, the construction of the Aegis Cardinal Point Senior Center and to determine if known contaminants in groundwater have migrated toward the Oakland Alameda Estuary. The wells will also be used to determine groundwater gradient and flow direction. See figure (?) for the proposed locations of the wells.

5.1. Well Installation

Well installation services will be provided by a licensed drilling contractor under the supervision of a California Registered Geologist. Prior to drilling, permits will be obtained from Alameda County.

The well borings will be drilled to a depth of approximately fifteen feet bgs using eight-inch hollow stem auger drilling equipment. Soil samples will be collected from undisturbed soil using a California modified 18-inch split spoon sampler, driven with a 140-pound hammer dropped from a height of 30-inches. The sampler will contain clean brass sampling sleeves. During the placement of these borings blow counts, PID readings, well construction details, depth to water, and characteristics such as color, moisture, and density will be recorded. The probes will be logged by a California licensed registered geologist using the Unified Soil Classification System. Soil boring logs of collected data will be presented in the final report.

Soil will be field monitored for odor, discoloration, and hydrocarbon vapor using a Photoionization detector (PID).

Soil samples will be collected within the soil/vadose capillary fringe, at changing lithologies, or where indications of contamination are present.

Immediately upon retrieval, the split spoon sampler will be opened, each end of the tube covered with a clean Teflon sheet and tightly fitting plastic caps, labeled with the site project number, date, and time of collection, depth interval, company and sampler ID. Pertinent data will be entered on to the chain of custody (COC) document. The sample will then be placed in a clean cooler with ice, pending transport to an analytical laboratory.

5.2. Groundwater Elevation

Subsequent to the completion of each well and the stabilization of groundwater, groundwater elevation will be surveyed with respect to mean sea level (msl).

5.3. Groundwater Monitoring Well Purging and Development

Prior to well development depth to water will be measured from the top of casing and recorded to calculate groundwater gradient and flow direction.

Groundwater monitoring wells will be purged and developed to clean and stabilize the sand, gravel, and aquifer materials around the slots/perforations. Well development will continue until the wells are free of sand, silt, and turbidity to the maximum extent feasible. Purging and development will be accomplished using a surge block, stainless steel bailer and groundwater monitoring pump. Temperature, pH, and conductivity will be measured and observed to stabilize prior to sample collection. Approximately five (5) well casing volumes of standing water will be removed from each well. Data collected during the development and sampling will be documented in the final report.

Development water will be placed in a DOT 17, 55-gallon drum for disposal, labeled, and contained pending receipt of laboratory results of groundwater samples.

5.4. Groundwater Monitoring Well's Sample Collection

A groundwater sample will be collected within each groundwater monitoring well using a clean, dedicated disposable plastic bailer. Collected water will be decanted into two (2) one-liter amber, two 200-ml amber, and two (2) 40-ml volatile organics vials (VOAs), to a positive meniscus to eliminate headspace.

The groundwater samples will be labeled with the date, time, sampler's name, project name, and well number. The samples will placed in sealed bags on ice within a cooler and transported under chain of custody to Accutest Analytical Labs, Inc.

5.5. Soil and Groundwater Analyses

Selected soil samples and all groundwater samples will be analyzed for Total Petroleum Hydrocarbons as Diesel (TPHd, using EPA Modified 8015), Total Petroleum Hydrocarbons as Gasoline (TPHg), Benzene, Toluene, Ethylbenzene, Total Xylenes (BTEX) Methyl Tert-Butyl Ether (MTBE), Total Petroleum Hydrocarbons as motor oil (TPHmo, using EPA Modified 8015), Polynuclear Aromatics (PNAs, using EPA Method 8310), and lead (using EPA Method 200.8).

5.6. Health and Safety Plan

A site specific Health and Safety Plan will be prepared to guide the field crew in safely handling potentially hazardous materials, to discuss potential site and work hazards, and to identify the nearest health care facilities. These issues will be discussed in a tailgate safety meeting prior to the initiation of work.

5.7. Summary Technical Report

A Summary Technical Report will be prepared when all data has been generated. The report will describe the exploration methodologies; present a soil profile log for each soil boring, a description of sampling methodology; and present supporting COC's and laboratory analytical data. It will also present information relative groundwater flow direction and gradient.

ENVIRONMENTAL TECHNICAL SERVICES
FIGURES

ETS Figure A. Site Location Map

ETS Figure B. Proposed Monitoring Wells Location Map

Environmental Technical Services

Site
2415 & 2431
MARINER SQUARE DRIVE
ALAMEDA, CALIFORNIA

ETS Figure A.

Site Location Map

Environmental
Technical
Services

Site
2415 & 2431
MARINER SQUARE DRIVE
ALAMEDA, CALIFORNIA

ETS Figure B.
Proposed
Monitoring Well
Location Map

ENVIRONMENTAL RESOURCES MANAGEMENT
HISTORICAL FIGURES

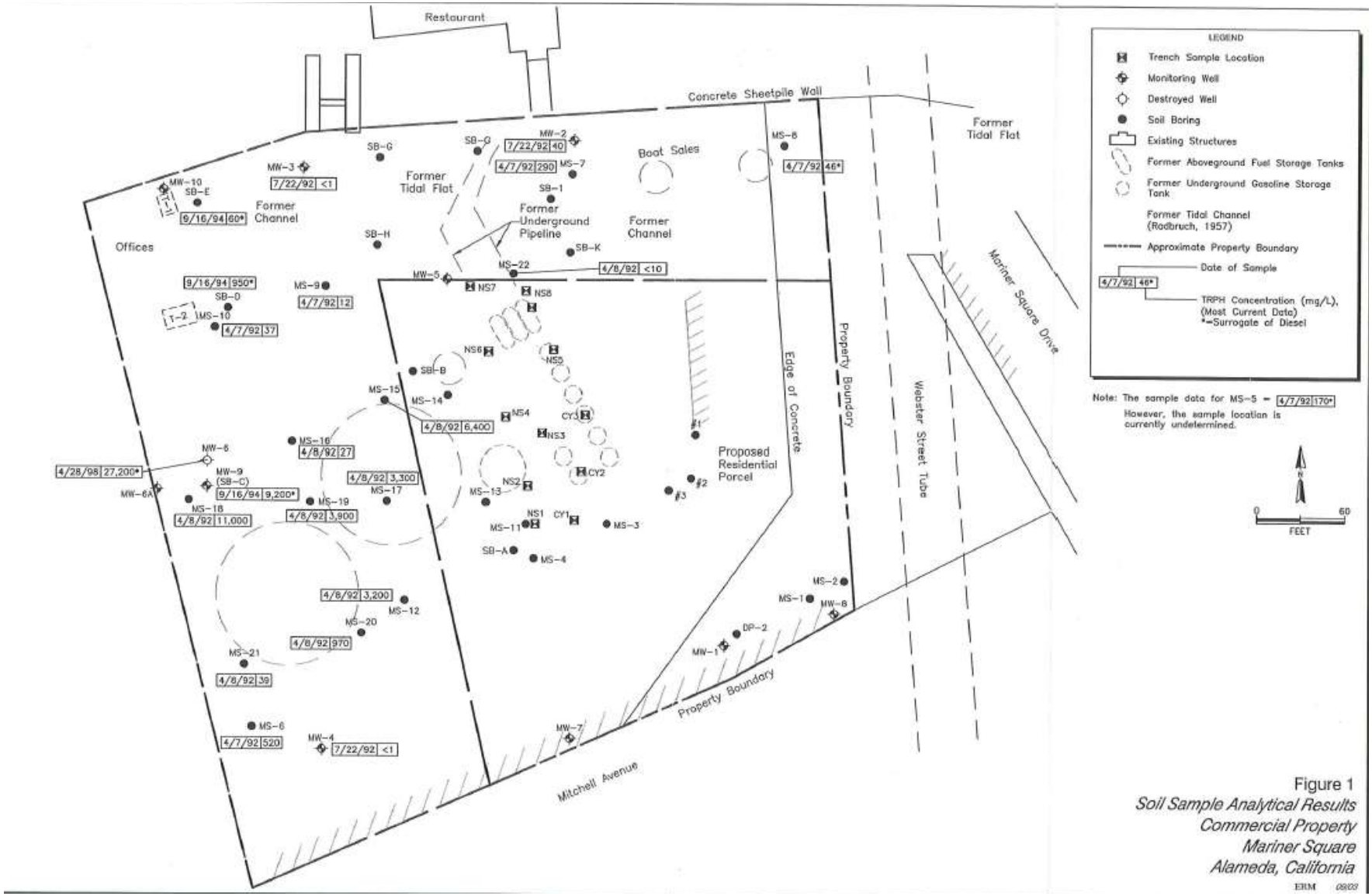
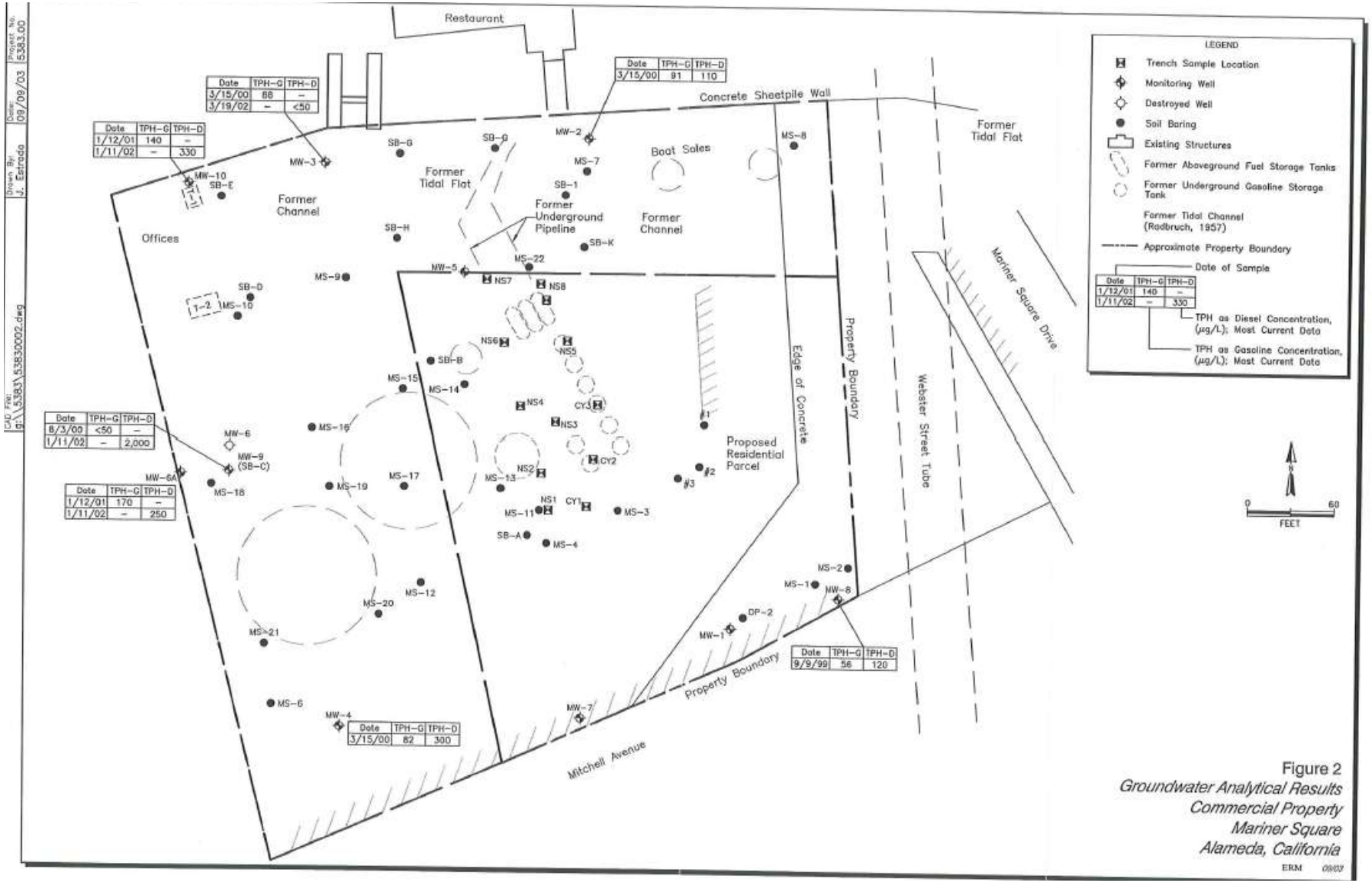


Figure 1
Soil Sample Analytical Results
Commercial Property
Mariner Square
Alameda, California

ERM 08/23/



Date	TPH-G	TPH-D
3/15/00	88	–
3/19/02	–	<50

Date	TPH-G	TPH-D
3/15/00	91	110

Date	TPH-G	TPH-D
1/12/01	140	–
1/11/02	–	330

Date	TPH-G	TPH-D
8/3/00	<50	–
1/11/02	–	2,000

Date	TPH-G	TPH-D
1/12/01	170	–
1/11/02	–	250

Date	TPH-G	TPH-D
3/15/00	82	300

Date	TPH-G	TPH-D
9/9/99	56	120

Figure 2
Groundwater Analytical Results
Commercial Property
Mariner Square
Alameda, California

ERM 0803

Figure 3
Soil Sample Analytical Results
Residential Property
Mariner Square
Alameda, California

Figure 4
Groundwater Analytical Results
Residential Property
Mariner Square
Alameda, California