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**GROUNDWATER MONITORING REPORT  
JULY 1995**

**Lots 1 and 5 (Northwest Area)  
Marina Village  
Alameda, California**

ENVIRONMENTAL  
PROTECTION  
95 JAN -3 AM 10:35

**Prepared for**

**Alameda Marina Village Associates  
1150 Marina Village Parkway  
Alameda, California**

**December 1995  
Project No. 1736.14**

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**Geomatrix Consultants**

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22 December 1995  
Project 1736.14

Ms. Juliet Shin  
Alameda County Health Care Services Agency  
Division of Environmental Health  
1131 Harbor Bay Parkway, Suite 250  
Alameda, California 94502-6577

Subject: Groundwater Monitoring Report  
July 1995  
Lots 1 and 5 (Northwest Area)  
Marina Village Development  
Alameda, California

Dear Ms. Shin:

On behalf of Alameda Marina Village Associates (AMVA), Geomatrix Consultants, Inc. (Geomatrix), is submitting the subject report. Based on the data presented in this report, we are recommending an additional sampling round in the spring of 1996 to confirm the results of this monitoring event. If you have any questions regarding this report, please call either of the undersigned.

Sincerely,

GEOMATRIX CONSULTANTS, INC.

A handwritten signature in cursive script that reads "Yvonne G. Pierce".

Yvonne G. Pierce, R.G.  
Project Geologist

YGP/EAN/mdg  
1736\1736GMR1.LTR

A handwritten signature in cursive script that reads "Elizabeth A. Nixon".

Elizabeth A. Nixon, P.E.  
Senior Engineer

Enclosure

**Geomatrix Consultants, Inc.**  
Engineers, Geologists, and Environmental Scientists



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**Geomatrix Consultants**

## TABLE OF CONTENTS

|                                                         | <u>Page</u> |
|---------------------------------------------------------|-------------|
| 1.0 INTRODUCTION AND OBJECTIVES                         | 1           |
| 2.0 BACKGROUND                                          | 1           |
| 3.0 SEPARATE-PHASE PRODUCT AND WATER-LEVEL MEASUREMENTS | 3           |
| 4.0 WELL REDEVELOPMENT                                  | 4           |
| 5.0 GROUNDWATER SAMPLING                                | 4           |
| 6.0 LABORATORY ANALYTICAL PROGRAM AND RESULTS           | 5           |
| 7.0 CONCLUSIONS AND RECOMMENDATIONS                     | 6           |
| 8.0 REFERENCES                                          | 8           |

### LIST OF TABLES

|         |                                           |
|---------|-------------------------------------------|
| Table 1 | Well Construction Details                 |
| Table 2 | Water-Level Measurements                  |
| Table 3 | Historical Groundwater Analytical Results |

### LIST OF FIGURES

|          |                                                |
|----------|------------------------------------------------|
| Figure 1 | Site Location Map                              |
| Figure 2 | Well Location Map                              |
| Figure 3 | Potentiometric Surface Map, 17 July 1995       |
| Figure 4 | Petroleum Hydrocarbons Detected in Groundwater |

### LIST OF APPENDICES

|            |                                                                  |
|------------|------------------------------------------------------------------|
| Appendix A | Water Level and Monitoring Well Sampling Record Field Sheets     |
| Appendix B | Analytical Laboratory Reports and Chain-of-Custody Documentation |

**GROUNDWATER MONITORING REPORT**  
**Lots 1 and 5 (Northwest Area)**  
Marina Village  
Alameda, California

**1.0 INTRODUCTION AND OBJECTIVES**

This report presents a summary of groundwater monitoring activities conducted by Geomatrix Consultants, Inc. (Geomatrix) on behalf of the Alameda Marina Village Associates (AMVA) at Lots 1 and 5 in Marina Village, also known as the northwest area, in Alameda, California (Figure 1). The work was performed in response to the 6 April 1995 letter from the Alameda County Health Care Services Agency (ACHCSA) to the AMVA requesting additional soil and groundwater investigations at the site. Work was conducted in accordance with the 13 June 1995 work plan prepared by Geomatrix, which was approved by ACHCSA in a 22 June 1995 letter to AMVA.

The objective of this sampling event was to provide current data on: (1) the possible presence of separate-phase hydrocarbons in wells at the site; (2) the distribution of possible dissolved petroleum hydrocarbons in groundwater at the site; and (3) the magnitude and direction of the hydraulic gradient at the site. This data was subsequently used as a basis for recommendations regarding future monitoring and management of the site.

**2.0 BACKGROUND**

The site currently consists of undeveloped areas and paved parking lots. The site is bounded to the east by Oakland Inner Harbor and boat docks, to the west by Marina Village Parkway, to the south by four former shipways that currently are developed as office space, and to the north by an adjacent property owned by Barnhill Construction Company (Figure 2). A sheet pile wall extends from the shipways westward and northward along the boat docks as shown on Figure 2. The historical direction of the hydraulic gradient at the site generally has been toward Oakland Inner Harbor, and may be influenced by the presence of the sheet pile wall.

The extent of petroleum hydrocarbons in soil at the site and surrounding areas was characterized during previous investigations performed by Levine•Fricke (1988, 1989, 1990) and Geomatrix (1992). Based on the results of these investigations, medium- and high-boiling petroleum hydrocarbons (crude oil, waste oil, diesel oil and fuel) were detected in shallow soil at concentrations greater than 500 parts per million (ppm) beneath approximately 2.5 acres of the site. Separate-phase high-boiling petroleum hydrocarbons, characterized as degraded crude oil, were observed in the soil beneath an area of approximately 1.3 acres adjacent to the northwest property boundary. The vertical extent of petroleum hydrocarbons in soil has been limited by the occurrence of estuarine clay sediments, locally referred to as San Francisco Bay Mud. The Bay Mud occurs at shallow depths (ranging from approximately 4 to 15 feet) below the ground surface at the site. The source of petroleum hydrocarbons in soil at the site likely was a combination of shipbuilding activities at and in the vicinity of the site that date back to the first half of this century, and historical off-site sources to the northwest of Marina Village. Priority pollutants and metals have been detected only at relatively low concentrations (i.e., within expected naturally occurring concentrations). Polychlorinated biphenyls (PCBs) and priority pollutant volatile organic compounds (VOCs) have not been detected in the soil at the site, with the exception of relatively low concentrations of toluene (up to 0.7 ppm).

Since 1987, ten shallow groundwater monitoring wells have been installed at and adjacent to Lots 1 and 5 (Figure 2). Well construction details for these wells are summarized in Table 1. Concentrations of medium and high boiling petroleum hydrocarbons historically have been either in the range of several milligrams per liter (mg/l) or have not been detected in groundwater samples from wells located at the site perimeter (wells WC-3, LF-6, LF-7, LF-11, LF-12, LF-13 and GMW-2). Separate-phase product or petroleum sheen have been observed in two of the wells, LF-8 and LF-9, located near the northwest property boundary. A sheen has also been observed in groundwater from well LF-10, which is located approximately upgradient from Lot 5. Very low concentrations of dissolved petroleum hydrocarbon constituents benzene, toluene, ethylbenzene, and xylenes (BTEX) were detected in ground-

water samples from wells LF-7, LF-9, and LF-13 during one sampling round in 1990. BTEX have not been detected during other sampling rounds.

Subsequent placement of a 10,000 cubic yard soil stockpile in 1993 in the vicinity of monitoring well LF-9 renders this well inaccessible for sampling. As discussed with ACHCSA, the need to include this well in future sampling events was evaluated as part of this report.

### **3.0 SEPARATE-PHASE PRODUCT AND WATER-LEVEL MEASUREMENTS**

On 10 July 1995, the top-of-casing elevations of monitoring wells LF-6, LF-7, LF-8, LF-10, LF-11, LF-12, LF-13, WC-3, and GMW-2 were surveyed by Luk, Milani & Associates of Walnut Creek, California to an established City of Alameda datum. Well construction details are presented in Table 1. LF-9 was not surveyed because it was inaccessible. The presence of separate-phase petroleum hydrocarbons was measured to the nearest 0.01 foot on 11 July 1995 using a Flexidip oil-water interface probe. Water levels were measured on 17 July 1995 using a steel tape and an electric well sounder. Measurement equipment was washed with a detergent-water solution and rinsed with deionized water before each measurement was taken. Separate-phase product and water-level measurements are summarized in Table 2; field records for these measurements are included in Appendix A.

Approximately 0.55 feet of separate-phase product previously characterized as degraded crude oil was measured on top of the water column in well LF-8. Separate-phase product was not measured nor seen observed in the other wells tested. Water-level elevations across the site ranged from -1.58 feet at well LF-10 to -3.67 feet at well LF-7. The horizontal hydraulic gradient at the site appears to be to the east toward Oakland and Inner Harbor at a magnitude ranging from approximately 0.021 to 0.0036 foot/foot.

#### 4.0 WELL REDEVELOPMENT

The monitoring wells were redeveloped using a diaphragm pump prior to sampling, except for LF-8, which was not redeveloped due to the presence of separate-phase crude oil. Water was purged from each well until the water quality parameters of temperature, pH, and specific conductance stabilized and the water produced from each well was sufficiently clear. The redeveloped wells were retested for the presence of separate-phase petroleum product a minimum of 24 hours after redevelopment. Separate-phase product was not measured in any of the redeveloped wells.

#### 5.0 GROUNDWATER SAMPLING

Before sample collection, the wells were purged with a diaphragm pump until a minimum of four casing volumes were removed and water quality parameters stabilized. The purge water was collected in 55-gallon drums and stored temporarily on site pending analysis. Groundwater samples were collected using disposable polyethylene bailers from monitoring wells LF-6, LF-7, LF-10, LF-11, LF-12, LF-13, WC-3, and GMW-2 on 12, 13, and 14 July 1995. No sample was collected from well LF-8 due to the presence of separate-phase product in the well. Field records for sampling are included in Appendix A.

Samples to be analyzed for extractable petroleum hydrocarbons were transferred to 1-liter amber bottles, and samples to be analyzed for BTEX were transferred to 40-milliliter volatile organic analysis vials. Additionally, a set of samples was filtered in the field using a 0.45-micron filter to remove suspended particles. This set of samples was retained for potential analysis for extractable petroleum hydrocarbons pending analytical results of the unfiltered samples. Immediately after collection, samples were placed in an ice-chilled cooler and transported under Geomatrix chain-of-custody procedures to American Environmental Network (AEN), of Pleasant Hill, California, a California-certified laboratory.



## 6.0 LABORATORY ANALYTICAL PROGRAM AND RESULTS

The analytical program consisted of analyzing samples from eight wells by modified EPA Method 8015 for total extractable petroleum hydrocarbons as diesel (TPHd) and motor oil (TPHmo). Of the eight wells, two wells (LF-7 and LF-13) additionally were analyzed according to EPA Method 8020 for BTEX. One equipment blank (identified as sample LF-21) and one blind field duplicate from well LF-10 (identified as sample LF-18) were collected and analyzed for TPHd and TPHmo for quality control purposes.

Analytical results of groundwater samples for dissolved extractable TPH may include interference from nondissolved petroleum hydrocarbons and/or soluble biogenic materials. The source of nondissolved petroleum hydrocarbons in water samples can be small amounts of petroleum-affected silt or clay-sized sediment (turbidity) that are collected along with the groundwater and then extracted during analysis. Soluble biogenic materials occur naturally in plants and animals; the levels present in groundwater from these natural sources can often be significant and give false positive results in a modified EPA Method 8015 analysis. Intrinsic bioremedial activity within the area of petroleum-affected soil or groundwater also can provide a source of soluble biogenic material. To remove polar biogenic mass from a sample, a silica gel cleanup procedure can be used in the preparation of the sample extract (this is a standard part of EPA Method 418.1 analysis). Isolation and removal of these two sources of interferences provides a more accurate assessment of the dissolved petroleum constituents in groundwater. To identify and remove potential sources of interferences from the groundwater samples, silica gel cleanup was performed by the laboratory on all samples collected, and selected filtered samples were analyzed to assess possible interference from nondissolved petroleum hydrocarbons associated with particulates in the sample media.

Groundwater analytical results for samples collected to date from the monitoring wells are summarized in Table 3. Analytical results from this latest sampling event are presented on Figure 4. Analytical laboratory reports and chain-of-custody documentation for the samples collected during this sampling event are presented in Appendix B. A comparison of results

from filtered and unfiltered samples was completed on well LF-10. Analytical results for filtered and unfiltered samples were similar, which indicates that suspended material present in the well column does not appear to be influencing the results for dissolved petroleum hydrocarbons. Results for either filtered or unfiltered results for the samples are reported in Table 3. The data are considered representative of dissolved petroleum constituents in groundwater.

No BTEX or TPH<sub>mo</sub> were detected in the groundwater samples. TPH<sub>d</sub> was not detected in samples from any of the wells except LF-10. TPH<sub>d</sub> was detected in the unfiltered sample, unfiltered duplicate sample, and filtered sample from well LF-10 at concentrations of 0.06, 0.06 and 0.07 milligrams per liter (mg/l) respectively. Based on a review of the chromatograms for samples from this well, the TPH<sub>d</sub> reported in the sample may not be dissolved. Although a sheen was not observed in groundwater from this well prior to sampling, a sheen historically has been observed in samples from this well, and it is likely that diesel is present in soil in contact with groundwater in the well bore. Therefore, the reported diesel concentration may not be indicative of dissolved-phase diesel constituents in groundwater.

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on data obtained during this groundwater monitoring event, we conclude the following:

- The hydraulic gradient at the site appears to be to the east towards the Oakland Inner Harbor.
- The monitoring well network along the shoreline is sufficient for monitoring the potential for petroleum hydrocarbons to migrate toward Oakland Inner Harbor.
- Separate-phase crude oil was measured in well LF-8 along the northern property boundary; however, TPH<sub>d</sub> and TPH<sub>mo</sub> were not detected in samples collected from downgradient wells LF-13, LF-7, and LF-12.

- TPHd was detected at a concentration of 0.07 mg/l in well LF-10 located upgradient of Lots 1 and 5. This concentration may be due to the presence of nondissolved diesel in the sample. However, TPHd and TPHmo were not detected in samples collected from well WC-3, which is located downgradient of well LF-10.
- Of the two wells analyzed for BTEX, LF-7 and LF-13, no BTEX was detected.
- Data that would be obtained from well LF-9 would not provide additional information regarding site characterization or the potential for migration of petroleum hydrocarbons toward the Oakland Inner Harbor that is not already available.
- Based on the data, groundwater at the perimeter of the areas containing petroleum-affected soil beneath Lots 1 and 5 does not contain dissolved petroleum hydrocarbons or BTEX. The data indicate that the petroleum-affected soil, the separate-phase crude oil measured in well LF-8, and the nondissolved diesel detected in LF-10 are not significant sources of dissolved petroleum hydrocarbons to groundwater. Therefore, the potential for migration of petroleum hydrocarbons toward the Oakland Inner Harbor is very low.

Based on these conclusions, we recommend one additional sampling event to confirm the absence of dissolved TPH and BTEX at the perimeter of the petroleum-affected area. We do not recommend that LF-9 be made accessible for this additional monitoring event. If these results are confirmed, we recommend that a reduced monitoring frequency be considered by the ACHCSA and that a plan be developed to address the future in-place management of petroleum-affected soil at the site.

## 8.0 REFERENCES

- Geomatrix Consultants, Inc., 1992, Soil and Groundwater Quality Investigation, Shipways Project, Marina Village Development, Alameda, California, prepared for Alameda Real Estate Investments, July.
- Levine•Fricke, 1988, Investigations of Northwest Area Marina Village, Alameda, California, 6 October.
- Levine•Fricke, 1989, Continued Soil and Groundwater Investigation of Parcel 5, Implementation of a Groundwater Monitoring Program and Proposed Remedial Measures in the Northwest Study Area, Marina Village, Alameda, California, 26 June.
- Levine•Fricke, 1990, Results of Third Round of Groundwater Sampling, Northwest Area, Marina Village, Alameda, California, 13 April.

**TABLE 1**

**WELL CONSTRUCTION DETAILS**

Northwest Area  
Marina Village  
Alameda, California

| <b>Well Number</b> | <b>Date Constructed</b> | <b>Well Depth (feet below grade)</b> | <b>Screened Interval (feet below grade)</b> | <b>Measuring Point Elevation<sup>1</sup> (feet)</b> |
|--------------------|-------------------------|--------------------------------------|---------------------------------------------|-----------------------------------------------------|
| LF-6               | 3/88                    | 15                                   | 5-15                                        | 3.30                                                |
| LF-7               | 3/88                    | 15                                   | 5-15                                        | 4.56                                                |
| LF-8               | 3/88                    | 15                                   | 5-15                                        | 4.84                                                |
| LF-9               | 3/88                    | 15                                   | 5-15                                        | NA <sup>2</sup>                                     |
| LF-10              | 3/88                    | 15                                   | 5-15                                        | 3.95                                                |
| LF-11              | 3/89                    | 15                                   | 5-15                                        | 5.09                                                |
| LF-12              | 3/89                    | 15                                   | 5-15                                        | 7.19                                                |
| LF-13              | 3/89                    | 13                                   | 3-13                                        | 2.95                                                |
| WC-3               | 1987                    | 14                                   | 7-14                                        | 3.84                                                |
| GMW-2              | 3/16/92                 | 13.5                                 | 3-13                                        | 3.5                                                 |

Note:

- <sup>1</sup> Top of well casings were surveyed on 10 July 1995 by Luk, Milani & Associates of Walnut Creek, California, relative to an established City of Alameda datum.
- <sup>2</sup> Well LF-9 not accessible for surveying.

TABLE 2

WATER-LEVEL MEASUREMENTS

Northwest Area  
Marina Village  
Alameda, California

| Well Number | Date Water Level Measured | Measuring Point (MP) Elevation <sup>1</sup> | Depth to Water Below MP <sup>2</sup> (feet) | Water-Level Elevation <sup>1</sup> | Separate Phase Product Thickness <sup>3</sup> (feet) |
|-------------|---------------------------|---------------------------------------------|---------------------------------------------|------------------------------------|------------------------------------------------------|
| LF-6        | 7/17/95                   | 3.3                                         | 5.66                                        | -2.36                              | 0                                                    |
| LF-7        | 7/17/95                   | 4.56                                        | 8.23                                        | -3.67                              | 0                                                    |
| LF-8        | 7/11/95                   | 4.84                                        | 7.95                                        | NA <sup>4</sup>                    | 0.55                                                 |
| LF-10       | 7/17/95                   | 3.95                                        | 5.53                                        | -1.58                              | 0                                                    |
| LF-11       | 7/17/95                   | 5.09                                        | 7.58                                        | -2.49                              | 0                                                    |
| LF-12       | 7/17/95                   | 7.19                                        | 9.12                                        | -1.93                              | 0                                                    |
| LF-13       | 7/17/95                   | 2.95                                        | 4.78                                        | -1.83                              | 0                                                    |
| WC-3        | 7/17/95                   | 3.84                                        | 6.72                                        | -2.88                              | 0                                                    |
| GMW-2       | 7/17/95                   | 3.5                                         | 6.37                                        | -2.87                              | 0                                                    |

Notes:

- <sup>1</sup> Top of well casings were surveyed on 10 July 1995 by Luk, Milani & Associates of Walnut Creek, California, relative to an established City of Alameda datum.
- <sup>2</sup> Water levels were measured with a steel tape.
- <sup>3</sup> Thickness of separate-phase product measured with a Flexidip oil-water interface probe.
- <sup>4</sup> Water-level elevation not calculated due to the presence of separate-phase product.

TABLE 3

HISTORICAL GROUNDWATER ANALYTICAL RESULTS<sup>1</sup>

Northwest Area  
Marina Village  
Alameda, California

Concentrations in milligrams per liter (mg/l)

| Well Number | Date Sampled | TPHd <sup>2</sup> | TPHmo <sup>3</sup> | Benzene     | Toluene          | Ethylbenzene | Xylenes     | Petroleum Product Thickness (inches) | Characterization |
|-------------|--------------|-------------------|--------------------|-------------|------------------|--------------|-------------|--------------------------------------|------------------|
| LF-6        | 3/29/88      | <0.05             | <0.05              | <0.004      | <0.006           | <0.007       | NA          |                                      |                  |
|             | 3/28/89      | <0.3              | <0.5               | <0.0005     | <0.0005          | <0.0005      | <0.002      |                                      |                  |
|             | 8/3/89       | <0.3              | <0.5               | NA          | NA               | NA           | NA          |                                      |                  |
|             | 1/1/90       | NA                | NA                 | NA          | NA               | NA           | NA          |                                      |                  |
|             | 7/12/95      | <0.05             | <0.2               | NA          | NA               | NA           | NA          |                                      |                  |
| LF-7        | 3/29/88      | <0.05             | <0.05              | <0.004      | <0.006           | <0.007       | NA          |                                      |                  |
|             | 3/28/89      | <0.3              | 1.8                | <0.0005     | <0.0005          | <0.0005      | <0.002      |                                      |                  |
|             | 8/3/89       | <0.3              | <0.5               | NA          | NA               | NA           | NA          |                                      |                  |
|             | 1/31/90      | <0.3              | 3.3                | <0.0005     | 0.003            | 0.001        | 0.007       |                                      |                  |
|             | 7/13/95      | <0.05             | <0.2               | <0.0005     | <0.0005          | <0.0005      | <0.002      |                                      |                  |
| LF-8        | 3/29/88      | 62.0              | NQ                 | <0.004      | <0.006           | <0.007       | NA          | <0.1                                 | Crude oil        |
|             | 3/28/89      | NA                | NA                 | <0.003      | <0.003           | <0.003       | <0.010      | Approx. 2                            |                  |
|             | 8/3/89       | NA                | NA                 | NA          | NA               | NA           | NA          | Approx. 5                            |                  |
|             | 1/31/90      | NA                | NA                 | NA          | NA               | NA           | NA          | Approx. 7                            |                  |
|             | 7/11/95      | NA                | NA                 | NA          | NA               | NA           | NA          | Approx. 6                            |                  |
| LF-9        | 3/29/88      | 54.0              | NQ                 | <0.004      | <0.006           | 0.007        | NA          |                                      |                  |
|             | 3/28/89      | 12.0              | 6.0                | <0.0005     | <0.0005          | <0.0005      | <0.002      |                                      |                  |
|             | 8/3/89       | 79.0              | 67.0               | NA          | NA               | NA           | NA          |                                      |                  |
|             | 1/31/90      | 15.0/12.0         | 17.0/15.0          | 0.003/0.003 | <0.0005/ <0.0005 | 0.007/0.006  | 0.014/0.012 |                                      |                  |

TABLE 3

HISTORICAL GROUNDWATER ANALYTICAL RESULTS<sup>1</sup>

Concentrations in milligrams per liter (mg/l)

| Well Number | Date Sampled       | TPHd <sup>2</sup> | TPHmo <sup>3</sup> | Benzene | Toluene | Ethylbenzene | Xylenes | Petroleum Product Thickness (inches) | Characterization |
|-------------|--------------------|-------------------|--------------------|---------|---------|--------------|---------|--------------------------------------|------------------|
| LF-10       | 3/29/88            | 43.0              | NQ                 | <0.004  | <0.006  | <0.007       | NA      |                                      |                  |
|             | 3/28/89            | <0.2              | 7.8                | <0.0005 | <0.0005 | <0.0005      | <0.002  |                                      |                  |
|             | 8/3/89             | <0.3/ <0.3        | 8.3/7.6            | NA/NA   | NA/NA   | NA/NA        | NA/NA   |                                      |                  |
|             | 1/31/90            | <0.3              | 17.0               | <0.0005 | <0.0005 | <0.0005      | <0.002  |                                      |                  |
|             | 7/14/95            | 0.06/0.06         | <0.2/ <0.2         | NA/NA   | NA/NA   | NA/NA        | NA/NA   |                                      |                  |
|             | 7/14/95 (filtered) | 0.07              | <0.2               | NA      | NA      | NA           | NA      |                                      |                  |
| LF-11       | 3/28/89            | <0.3              | 1.0                | <0.0005 | <0.0005 | <0.0005      | <0.002  |                                      |                  |
|             | 8/3/89             | <0.3              | 0.9                | NA      | NA      | NA           | NA      |                                      |                  |
|             | 1/31/90            | <0.3              | 1.2                | <0.0005 | <0.0005 | <0.0005      | <0.002  |                                      |                  |
|             | 7/12/95            | <0.05             | <0.2               | NA      | NA      | NA           | NA      |                                      |                  |
| LF-12       | 3/28/89            | <0.3              | 1.1                | <0.0005 | <0.0005 | <0.0005      | <0.002  |                                      |                  |
|             | 8/3/89             | <0.3              | 2.0                | NA      | NA      | NA           | NA      |                                      |                  |
|             | 1/31/90            | <0.3              | 1.4                | <0.0005 | <0.0005 | <0.0005      | <0.002  |                                      |                  |
|             | 7/13/95            | <0.05             | <0.2               | NA      | NA      | NA           | NA      |                                      |                  |
| LF-13       | 3/28/89            | <0.3              | 4.4                | <0.0005 | <0.0005 | <0.0005      | <0.002  |                                      |                  |
|             | 8/3/89             | <0.3              | 3.0                | NA      | NA      | NA           | NA      |                                      |                  |
|             | 1/31/90            | <0.3              | 6.1                | 0.004   | 0.001   | <0.0005      | <0.002  |                                      |                  |
|             | 7/14/95            | NR                | NR                 | <0.0005 | <0.0005 | <0.0005      | <0.002  |                                      |                  |
|             | 7/14/95 (filtered) | <0.05             | <0.2               | NA      | NA      | NA           | NA      |                                      |                  |



TABLE 3

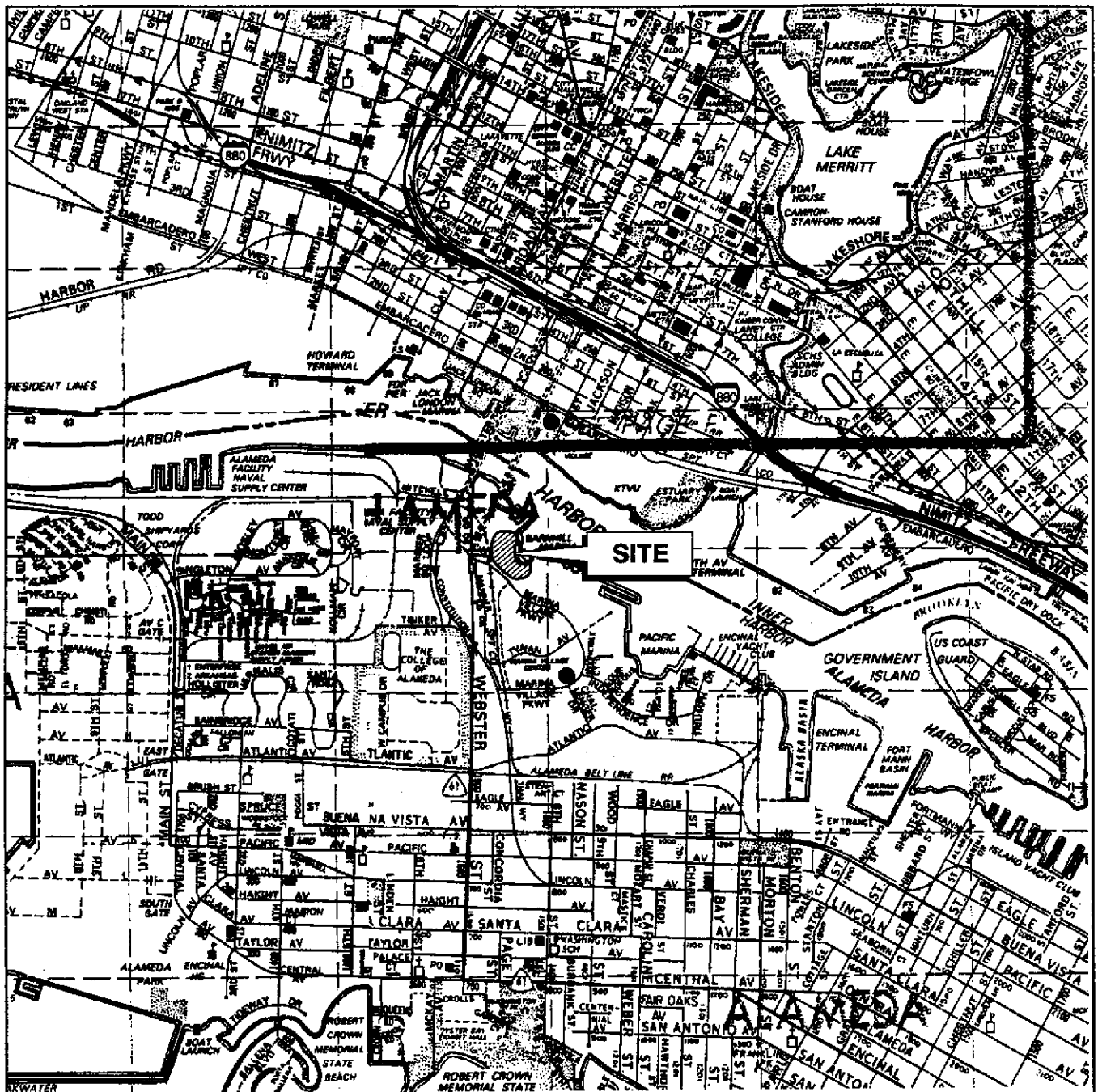
HISTORICAL GROUNDWATER ANALYTICAL RESULTS<sup>1</sup>

Concentrations in milligrams per liter (mg/l)

| Well Number | Date Sampled          | TPHd <sup>2</sup> | TPHmo <sup>3</sup> | Benzene | Toluene | Ethylbenzene | Xylenes | Petroleum Product Thickness (inches) | Characterization |
|-------------|-----------------------|-------------------|--------------------|---------|---------|--------------|---------|--------------------------------------|------------------|
| WC-3        | 3/31/88               | <0.05             | <0.05              | <0.004  | <0.006  | <0.007       | NA      |                                      |                  |
|             | 3/28/89               | <0.3              | 3.2                | <0.0005 | <0.0005 | <0.0005      | <0.002  |                                      |                  |
|             | 8/3/89                | <0.3              | 1.0                | NA      | NA      | NA           | NA      |                                      |                  |
|             | 1/31/90               | <0.3              | 5.7                | <0.0005 | <0.0005 | <0.0005      | <0.002  |                                      |                  |
|             | 7/14/95<br>(filtered) | <0.05             | <0.2               | NA      | NA      | NA           | NA      |                                      |                  |
| GMW-2       | 4/29/92               | 0.2               | 0.4                | NA      | NA      | NA           | NA      |                                      |                  |
|             | 7/12/95               | <0.05             | <0.2               | NA      | NA      | NA           | NA      |                                      |                  |

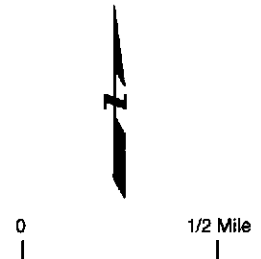
Notes:

- / Indicates duplicate sample.
- <sup>1</sup> Samples analyzed for total petroleum hydrocarbons as diesel and motor oil by EPA Method 8015, and for benzene, toluene, ethylbenzene, and xylenes by EPA Method 602. In 1995, silica gel cleanup was performed prior to 8015 analysis.
- <sup>2</sup> TPHd = total petroleum hydrocarbons as diesel.
- <sup>3</sup> TPHmo = total petroleum hydrocarbons as motor oil.
- NQ Indicates extractable TPH detected in samples was not quantified against motor oil standard.
- NA Indicates not analyzed.
- NR Not reported due to insufficient silica gel cleanup on the sample.



Map Source: The Thomas Guide, Alameda County Street Guide and Directory, 1993

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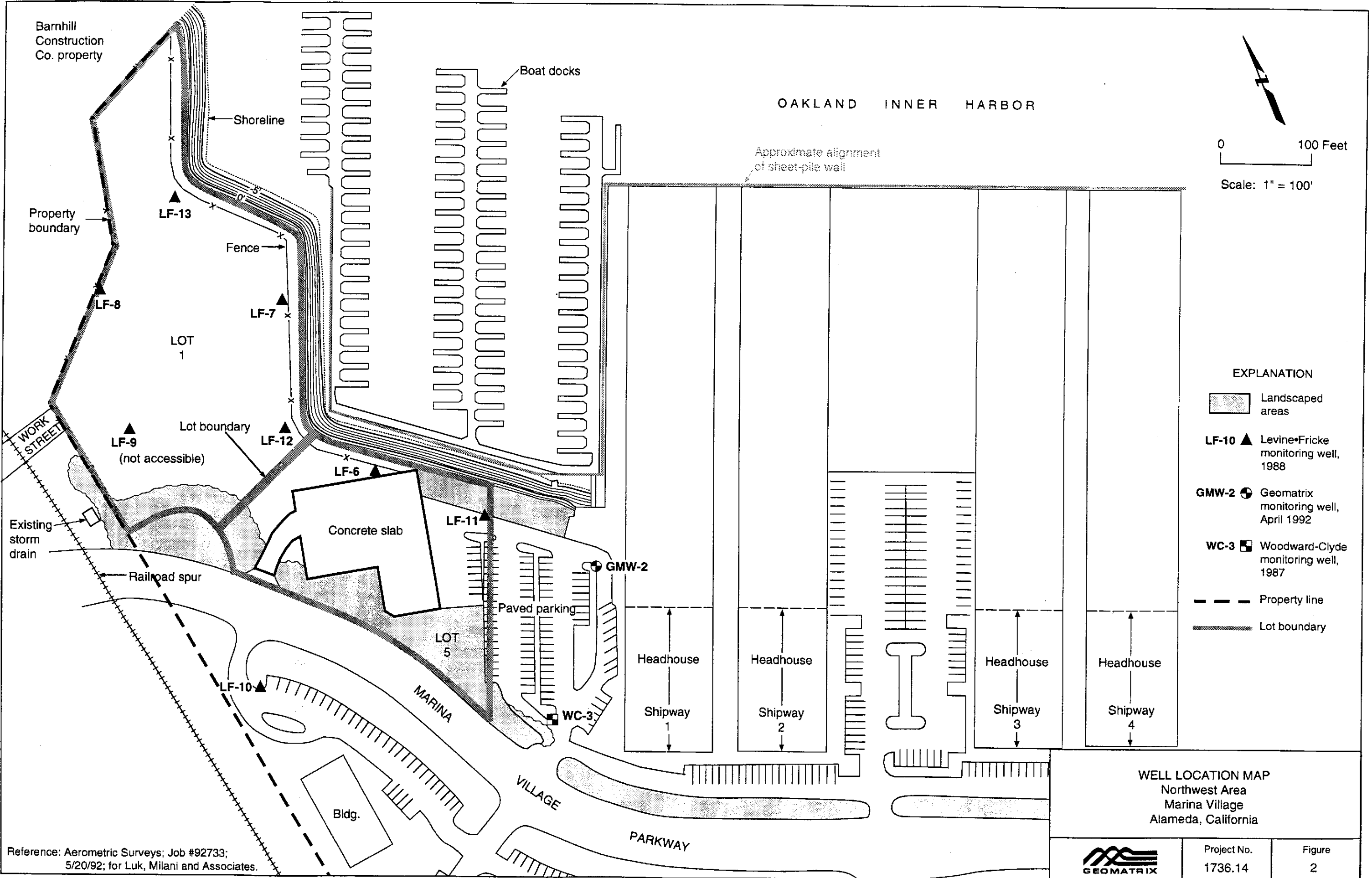
1736.14.002



**SITE LOCATION MAP**  
Marina Village  
Alameda, California

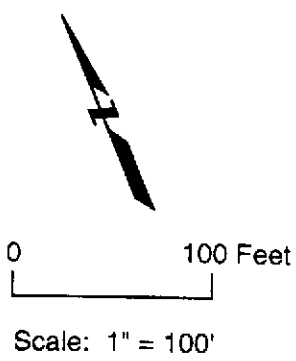
Figure  
1

Project No.  
1736.14









Barnhill  
Construction  
Co. property

OAKLAND INNER HARBOR



EXPLANATION

-  Landscaped areas
- LF-10**  Levine-Fricke monitoring well, 1988
- GMW-2**  Geomatrix monitoring well, April 1992
- WC-3**  Woodward-Clyde monitoring well, 1987
-  Property line
-  Lot boundary

WELL LOCATION MAP  
Northwest Area  
Marina Village  
Alameda, California

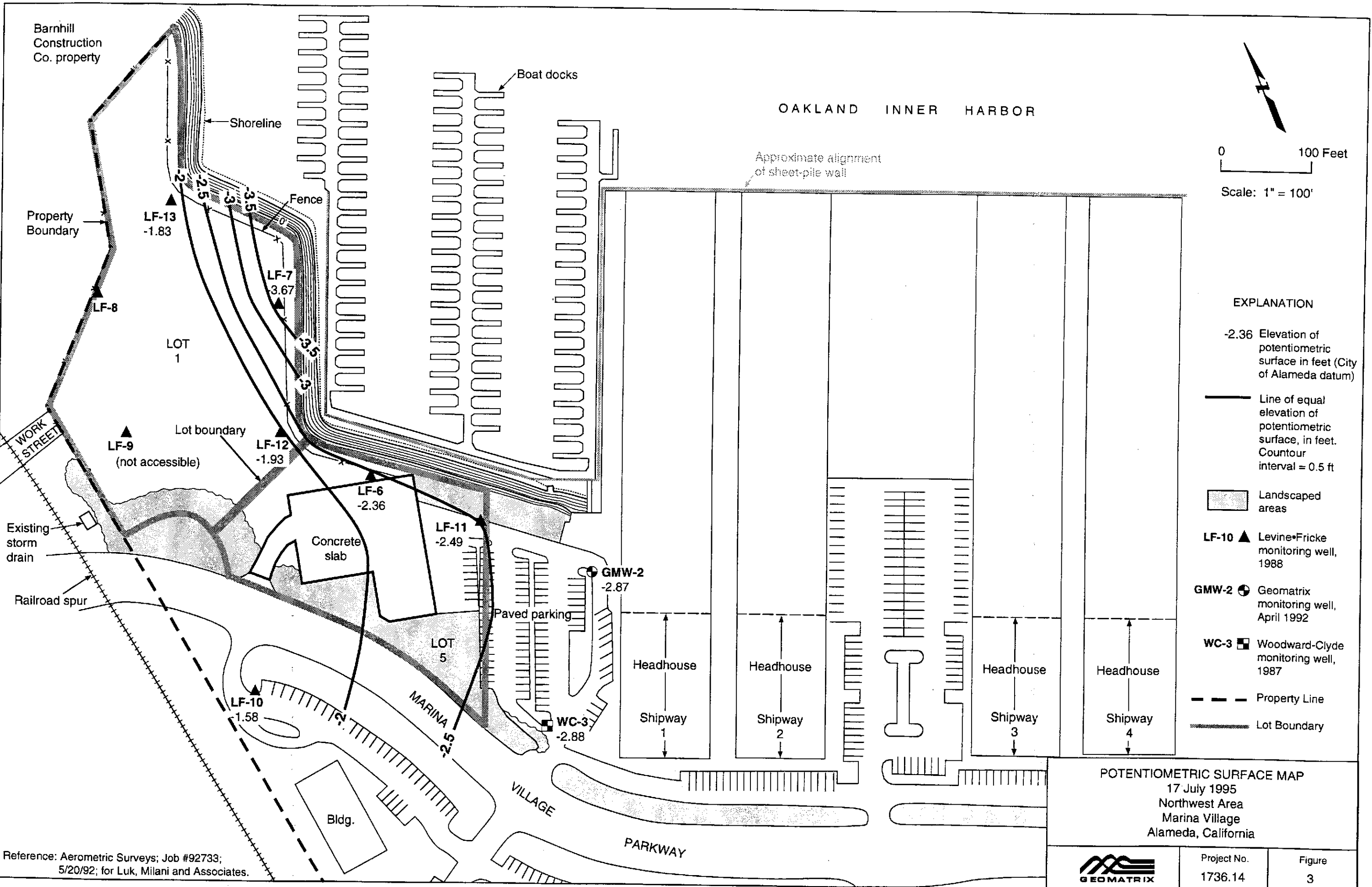


Project No.  
1736.14

Figure  
2

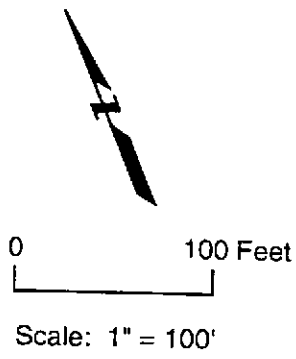
Reference: Aerometric Surveys; Job #92733;  
5/20/92; for Luk, Milani and Associates.

1736.14.001



Barnhill  
Construction  
Co. property

OAKLAND INNER HARBOR



EXPLANATION

- 2.36 Elevation of potentiometric surface in feet (City of Alameda datum)
- Line of equal elevation of potentiometric surface, in feet. Contour interval = 0.5 ft
- ▨ Landscaped areas
- ▲ LF-10 Levine-Fricke monitoring well, 1988
- ⊕ GMW-2 Geomatrix monitoring well, April 1992
- WC-3 Woodward-Clyde monitoring well, 1987
- - - Property Line
- Lot Boundary

POTENTIOMETRIC SURFACE MAP  
17 July 1995  
Northwest Area  
Marina Village  
Alameda, California



Project No.  
1736.14

Figure  
3

Reference: Aerometric Surveys; Job #92733;  
5/20/92; for Luk, Milani and Associates.

1736.14.003

Barnhill  
Construction  
Co. property

0 100 Feet

Scale: 1" = 100'

OAKLAND INNER HARBOR

EXPLANATION

Landscaped areas

**LF-10** ▲ Levine-Fricke monitoring well, 1988

**GMW-2** ⊕ Geomatrix monitoring well, April 1992

**WC-3** ⊞ Woodward-Clyde monitoring well, 1987

--- Property line

==== Lot boundary

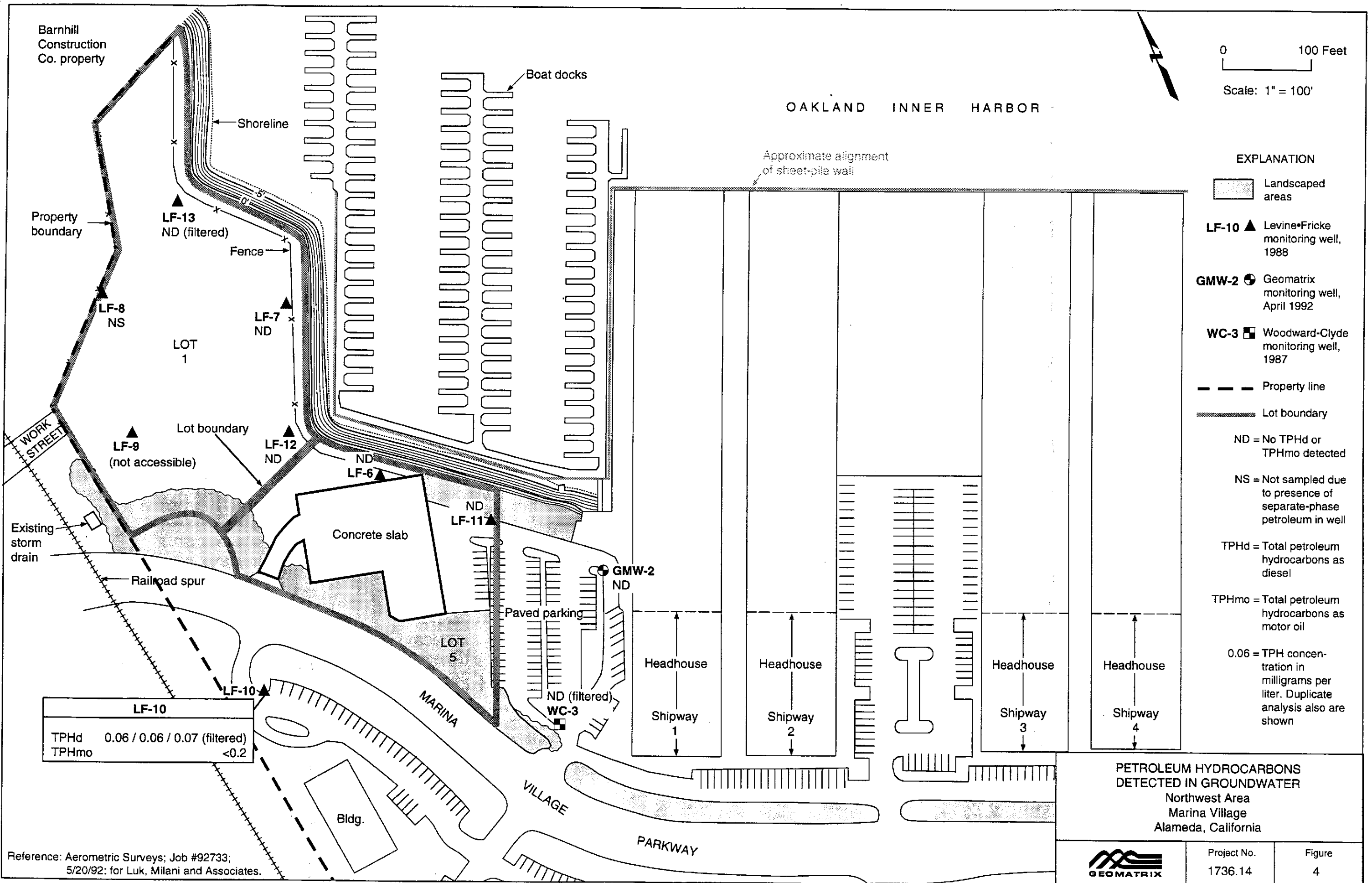
ND = No TPHd or TPHmo detected

NS = Not sampled due to presence of separate-phase petroleum in well

TPHd = Total petroleum hydrocarbons as diesel

TPHmo = Total petroleum hydrocarbons as motor oil

0.06 = TPH concentration in milligrams per liter. Duplicate analysis also are shown



PETROLEUM HYDROCARBONS  
DETECTED IN GROUNDWATER  
Northwest Area  
Marina Village  
Alameda, California



Project No.  
1736.14

Figure  
4

Reference: Aerometric Surveys; Job #92733;  
5/20/92; for Luk, Milani and Associates.

1736.14.004

**APPENDIX A**

**WATER LEVEL AND MONITORING  
WELL SAMPLING RECORD FIELD SHEETS**





# Geometrix Consultants

100 Pine Street, 10th Floor  
San Francisco, California 94111  
(415) 434-9400

## MONITORING WELL SAMPLING RECORD AND WELL DEVELOPMENT DATA

Well ID: LF-6  
 Sample ID.: \_\_\_\_\_ Duplicate ID.: \_\_\_\_\_  
 Sample Depth: \_\_\_\_\_  
 Project No: 1731.14  
 Project Name: MARINA VILLAGE  
 Date: 7/11/95  
 Sampled By: NAT/TFW

Initial Depth to Water: 5.69  
 Depth to Water after Purging: \_\_\_\_\_  
 Total Depth of Well: 15'  
 Well Diameter: 2"  
 1 Casing Volume = 1.6  
 4 Casing Volumes = 6.4  
 Method of Purging: DIAPHRAGM PUMP  
 Method of Sampling: \_\_\_\_\_

| TIME | INTAKE DEPTH | RATE (gpm) | CUM. VOL (gal) | TEMP. (°C) | pH (units) | CONDUCTIVITY (µmhos/cm) | REMARKS (color, turbidity & sediment) |
|------|--------------|------------|----------------|------------|------------|-------------------------|---------------------------------------|
| 1255 | BOTTOM       |            | 10             | 18.5       | 5.2        | 15400                   | BROWN, TURBID                         |
| 1305 | "            |            | 15             | 22.8       | 7.5        | 18800                   | BROWN, TURBID                         |
| 1316 | "            |            | 18             | 19.5       | 7.5        | 19260                   | LIGHT BROWN, GREY.                    |
| 1317 | 14'          |            | 22             | 22.4       | 7.5        | 18500                   | SLIGHTLY CLOUDY - NOT TURBID.         |
| 1325 | "            |            | 26             | 23.1       | 7.6        | 17300                   | SLIGHTLY CLOUDY                       |
| 1330 | "            |            | 30             | 22.5       | 7.6        | 18400                   | SLIGHTLY CLOUDY                       |
| 1346 | "            |            | 35             | 23.3       | 7.6        | 18900                   | SLIGHTLY CLOUDY.                      |
| 1345 |              |            |                |            |            |                         | SURGE FOR 10 MIN.                     |
| 1355 | 12           |            | 40             | 23.1       | 7.7        | 19400                   | VERY CLOUDY w/ SAND.                  |
| 1403 | 14           |            | 45             | 20.6       | 7.6        | 17800                   | VERY CLOUDY w/ LITTLE SAND.           |
| 1415 | 12           |            | 50             | 19.7       | 7.6        | 19000                   | VERY CLOUDY BROWN, "                  |
| 1423 | 14           |            | 53             | 20.0       | 7.7        | 18100                   | CLOUDY - LIGHT BROWN w/               |
| 1432 | 14           |            | 55             | 19.6       | 7.7        | 17400                   | SLIGHTLY CLOUDY.                      |

### PH CALIBRATION (CHOOSE TWO)

Model or Unit No.: #88

|                    |        |        |         |
|--------------------|--------|--------|---------|
| Buffer Solution    | pH 4.0 | pH 7.0 | pH 10.0 |
| Temp. °C           | 30     | 30.5   |         |
| Instrument Reading | 4.0    | 7.0    |         |

### SPECIFIC CONDUCTANCE - CALIBRATION:

Model or Unit No.: #88

|                                 |      |       |
|---------------------------------|------|-------|
| KCL Solution (µmhos/cm at 20°C) | 1409 | 12856 |
| Temp. °C                        |      | 29.5  |
| Instrument Reading              |      | 12800 |

### Notes

SUGGESTED THAT WELL CASING HAS  
 CRACKED BECAUSE OF FILTER PACK SAND  
 FOUND IN SAMPLES + LOCATION OF WELL  
 NEXT TO CONCRETE SLAB WHICH HAS  
 SHIFTED IN THE PAST.











**Geomatrix Consultants**100 Pine Street, 10th Floor  
San Francisco, California 94111  
(415) 434-9400**MONITORING WELL SAMPLING RECORD  
AND WELL DEVELOPMENT DATA**Well ID: LF-11  
Sample ID.: LF-11 Duplicate ID.: \_\_\_\_\_  
Sample Depth: \_\_\_\_\_  
Project No: 1736.14  
Project Name: MARINA VILLAGE  
Date: 7/12/95  
Sampled By: NAT/TFWInitial Depth to Water: 7.53 (1305)  
Depth to Water after Purging: \_\_\_\_\_  
Total Depth of Well: 12.25 (STEEL TAPE)  
Well Diameter: 2"  
1 Casing Volume = .8  
4 Casing Volumes = 3.4  
Method of Purging: DIAPHRAGM  
Method of Sampling: DISPOSABLE BAILEY

| TIME | INTAKE DEPTH | RATE (gpm) | CUM. VOL. (gal) | TEMP. (°C) | pH (units) | CONDUCTIVITY (µmhos/cm) | REMARKS (color, turbidity & sediment)                                                                                       |
|------|--------------|------------|-----------------|------------|------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 1315 |              |            | 2               | 23.4       | 7.2        | 15000                   | CLEAR, NO SEDIMENT.                                                                                                         |
| 1317 |              |            | 3               | 21.6       | 7.6        | 15700                   | " , " ; PURGED DRY.                                                                                                         |
| 1320 |              |            | 4               | 20.9       | 7.3        | 15900                   | CLEAR, NO SEDIMENT.                                                                                                         |
| 1332 |              | Sample     |                 | 19.6       | 7.1        | 16600                   | CLEAR, NO SEDIMENT                                                                                                          |
| 1325 |              |            |                 |            |            |                         | BAILEY RINSED<br>INSIDE AND OUT.<br>FIELD BLANK COLLECTED<br>PRIOR TO WELL SAMPLE.<br>USED OSH WATER. (DI)<br>LABELED LF-21 |

## PH CALIBRATION (CHOOSE TWO)

Model or Unit No.: #8

| Buffer Solution    | pH 4.0 | pH 7.0 | pH 10.0 |
|--------------------|--------|--------|---------|
| Temp. °C           | 29.9   | 30.6   |         |
| Instrument Reading | 4.0    | 7.0    |         |

## SPECIFIC CONDUCTANCE - CALIBRATION:

Model or Unit No.: #8

| KCL Solution (µmhos/cm at 20°C) | 1409 | 12856 |
|---------------------------------|------|-------|
| Temp. °C                        |      | 32.1  |
| Instrument Reading              |      | 12800 |

Notes

Field Blank - LF-21

TPH - diesel by 8015  
TPH - motor oil 8015Silica Gel Cleanup  
on All Samples2 Filtered Liters  
2 Unfiltered Liters.



















# Geomatrix Consultants

100 Pine Street, 10th Floor  
San Francisco, California 94111  
(415) 434-9400

## MONITORING WELL SAMPLING RECORD AND WELL DEVELOPMENT DATA

Well ID: WC-3  
 Sample ID: WC-3 <sup>FILTER</sup> Duplicate ID: WC-35  
 Sample Depth: \_\_\_\_\_  
 Project No: 1736.14  
 Project Name: MARWA VILLAGE  
 Date: 7/14/95  
 Sampled By: NAT

Initial Depth to Water: 6.90  
 Depth to Water after Purging: \_\_\_\_\_  
 Total Depth of Well: 14.5'  
 Well Diameter: 2"  
 1 Casing Volume = 1.2  
 4 Casing Volumes = 4.8  
 Method of Purging: DIAPHRAGM PUMP  
 Method of Sampling: DISPOSABLE BAILEY

| TIME | INTAKE DEPTH | RATE (gpm) | CUM. VOL. (gal) | TEMP. (°C) | pH (units) | CONDUCTIVITY (µmhos/cm) | REMARKS (color, turbidity & sediment) |
|------|--------------|------------|-----------------|------------|------------|-------------------------|---------------------------------------|
| 1155 | 14'          |            | 1.5             | 27.3       | 7.4        | 13600                   | CLEAR                                 |
| 1200 | 14'          |            | 2.5             | 23.8       | 7.5        | 16200                   | CLEAR                                 |
| 1205 | 14'          |            | 4.0             | 23.3       | 7.3        | 15700                   | CLEAR                                 |
| 1207 | 14'          |            | 5.0             | 23.4       | 7.1        | 15300                   | CLEAR                                 |
| 1215 | 14'          | SAMPLE     |                 | 25.0       | 7.2        | 11000                   | CLEAR.                                |
| 1230 |              | SAMPLE     |                 | 24.9       | 6.7        | 15300                   | CLEAR                                 |
|      |              |            |                 |            |            |                         |                                       |
|      |              |            |                 |            |            |                         |                                       |
|      |              |            |                 |            |            |                         |                                       |
|      |              |            |                 |            |            |                         |                                       |
|      |              |            |                 |            |            |                         |                                       |
|      |              |            |                 |            |            |                         |                                       |
|      |              |            |                 |            |            |                         |                                       |
|      |              |            |                 |            |            |                         |                                       |
|      |              |            |                 |            |            |                         |                                       |

|                                     |        |        |         |                       |  |
|-------------------------------------|--------|--------|---------|-----------------------|--|
| Ph CALIBRATION (CHOOSE TWO)         |        |        |         | Model or Unit No.: #8 |  |
| Buffer Solution                     | pH 4.0 | pH 7.0 | pH 10.0 |                       |  |
| Temp. °C                            | 25.1   | 26.9   |         |                       |  |
| Instrument Reading                  | 4.0    | 7.0    |         |                       |  |
| SPECIFIC CONDUCTANCE - CALIBRATION: |        |        |         | Model or Unit No.: #8 |  |
| KCL Solution (µmhos/cm at 20°C)     | 1409   | 12856  |         |                       |  |
| Temp. °C                            |        | 26.2   |         |                       |  |
| Instrument Reading                  |        | 12500  |         |                       |  |

Notes \_\_\_\_\_

TPH - checked by SOIS 2 FILTERED 1 LITER  
 TPH - Meter oil by SOIS 2 UNFILTERED 1 LITER

Silica Fil Cleanup.





**Geomatrix Consultants**  
 100 Pine Street, 10th Floor  
 San Francisco, California 94111  
 (415) 434-9400

**MONITORING WELL SAMPLING RECORD  
 AND WELL DEVELOPMENT DATA**

Well ID: LF-10 (F) Initial Depth to Water: 5.39  
 Sample ID: LF-10 Duplicate ID: LF-21 (F) Depth to Water after Purging: \_\_\_\_\_  
 Sample Depth: \_\_\_\_\_ Total Depth of Well: 14.5  
 Project No: 1736.101 Well Diameter: 2"  
 Project Name: MARINA VILLAGE 1 Casing Volume = 1.5  
 Date: 7/14/95 4 Casing Volumes = 6.0  
 Sampled By: NAT Method of Purging: DISPEABLE BAILEY  
 Method of Sampling: DIAPHRAGM PUMP

| TIME | INTAKE DEPTH | RATE (gpm) | CUM. VOL (gal) | TEMP. (°C) | pH (units) | CONDUCTIVITY (µmhos/cm) | REMARKS (color, turbidity & sediment) |
|------|--------------|------------|----------------|------------|------------|-------------------------|---------------------------------------|
| 1315 |              |            | 2              | 25.9       | 6.9        | 12800                   | CLEAR                                 |
| 1317 |              |            | 3              | 23.9       | 6.8        | 14900                   | CLEAR                                 |
| 1320 |              |            | 4              | 22.9       | 6.8        | 15300                   | CLEAR                                 |
| 1323 |              |            | 5              | 22.6       | 6.9        | 15200                   | CLEAR                                 |
| 1325 |              |            | 6              | 22.8       | 6.8        | 15900                   | CLEAR                                 |
| 1330 | SAMPLE       |            |                | 24.9       | 6.7        | 15200                   | CLEAR                                 |

**PH CALIBRATION (CHOOSE TWO)**

|                    |        |        |         |
|--------------------|--------|--------|---------|
| Buffer Solution    | pH 4.0 | pH 7.0 | pH 10.0 |
| Temp. °C           | 25.1   | 26.9   |         |
| Instrument Reading | 4.0    | 7.0    |         |

Model or Unit No.: #8

**SPECIFIC CONDUCTANCE - CALIBRATION:**

|                                 |      |       |
|---------------------------------|------|-------|
| KCL Solution (µmhos/cm at 20°C) | 1409 | 12856 |
| Temp. °C                        |      | 26.2  |
| Instrument Reading              |      | 18500 |

Model or Unit No.: #8

Notes

TPI - dust by 8015 2 FILTERED 1 LITER  
 TPI - water oil by 8015 2 UNFILTERED 1 LITER

Site G Cleanup





**APPENDIX B**

**ANALYTICAL LABORATORY REPORTS  
AND CHAIN-OF-CUSTODY DOCUMENTATION**

# American Environmental Network

## Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

GEOMATRIX CONSULTANTS  
100 PINE ST., SUITE 1000  
SAN FRANCISCO, CA 94111

ATTN: YVONNE PIERCE  
CLIENT PROJ. ID: 1736.14

C.O.C. NUMBER: 5489

REPORT DATE: 09/14/95

DATE(S) SAMPLED: 07/12/95

DATE RECEIVED: 07/12/95

AEN WORK ORDER: 9507121

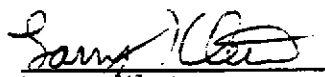
### PROJECT SUMMARY:

On July 12, 1995, this laboratory received 7 water sample(s).

Client requested 4 sample(s) be analyzed for organic parameters; three samples were placed on hold. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.

  
Larry Klein  
Laboratory Director

Revision of report dated 08/04/95

GEOMATRIX CONSULTANTS

SAMPLE ID: LF-6  
 AEN LAB NO: 9507121-01  
 AEN WORK ORDER: 9507121  
 CLIENT PROJ. ID: 1736.14

DATE SAMPLED: 07/12/95  
 DATE RECEIVED: 07/12/95  
 REPORT DATE: 09/14/95

| ANALYTE             | METHOD/<br>CAS# | RESULT | REPORTING<br>LIMIT | UNITS        | DATE<br>ANALYZED |
|---------------------|-----------------|--------|--------------------|--------------|------------------|
| #Extraction for TPH | EPA 3510        | -      |                    | Extrn Date   | 07/20/95         |
| #Silica gel Cleanup | EPA 3630        | -      |                    | Cleanup Date | 07/21/95         |
| TPH as Diesel       | GC-FID          | ND     | 0.05 mg/L          |              | 07/22/95         |
| TPH as Oil          | GC-FID          | ND     | 0.2 mg/L           |              | 07/22/95         |

ND = Not detected at or above the reporting limit  
 \* = Value at or above reporting limit

## GEOMATRIX CONSULTANTS

SAMPLE ID: GMW-2  
AEN LAB NO: 9507121.03  
AEN WORK ORDER: 9507121  
CLIENT PROJ. ID: 1736.14

DATE SAMPLED: 07/12/95  
DATE RECEIVED: 07/12/95  
REPORT DATE: 09/14/95

| ANALYTE             | METHOD/<br>CAS# | RESULT | REPORTING<br>LIMIT | UNITS        | DATE<br>ANALYZED |
|---------------------|-----------------|--------|--------------------|--------------|------------------|
| #Extraction for TPH | EPA 3510        | -      |                    | Extrn Date   | 07/20/95         |
| #Silica gel Cleanup | EPA 3630        | -      |                    | Cleanup Date | 07/21/95         |
| TPH as Diesel       | GC-FID          | ND     | 0.05               | mg/L         | 08/29/95         |
| TPH as Oil          | GC-FID          | ND     | 0.2                | mg/L         | 08/29/95         |

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

GEOMATRIX CONSULTANTS

SAMPLE ID: LF-11  
 AEN LAB NO: 9507121-05  
 AEN WORK ORDER: 9507121  
 CLIENT PROJ. ID: 1736.14

DATE SAMPLED: 07/12/95  
 DATE RECEIVED: 07/12/95  
 REPORT DATE: 09/14/95

| ANALYTE             | METHOD/<br>CAS# | RESULT | REPORTING<br>LIMIT | UNITS        | DATE<br>ANALYZED |
|---------------------|-----------------|--------|--------------------|--------------|------------------|
| #Extraction for TPH | EPA 3510        | -      |                    | Extrn Date   | 07/20/95         |
| #Silica gel Cleanup | EPA 3630        | -      |                    | Cleanup Date | 07/21/95         |
| TPH as Diesel       | GC-FID          | ND     | 0.05               | mg/L         | 08/25/95         |
| TPH as Oil          | GC-FID          | ND     | 0.2                | mg/L         | 08/25/95         |

ND = Not detected at or above the reporting limit  
 \* = Value at or above reporting limit

## GEOMATRIX CONSULTANTS

SAMPLE ID: LF-21  
AEN LAB NO: 9507121-07  
AEN WORK ORDER: 9507121  
CLIENT PROJ. ID: 1736.14

Equipment Blank

DATE SAMPLED: 07/12/95  
DATE RECEIVED: 07/12/95  
REPORT DATE: 09/14/95

| ANALYTE             | METHOD/<br>CAS# | RESULT | REPORTING<br>LIMIT | UNITS        | DATE<br>ANALYZED |
|---------------------|-----------------|--------|--------------------|--------------|------------------|
| #Extraction for TPH | EPA 3510        | -      |                    | Extrn Date   | 07/20/95         |
| #Silica gel Cleanup | EPA 3630        | -      |                    | Cleanup Date | 07/21/95         |
| TPH as Diesel       | GC-FID          | ND     | 0.05               | mg/L         | 07/22/95         |
| TPH as Oil          | GC-FID          | ND     | 0.2                | mg/L         | 07/22/95         |

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

AEN (CALIFORNIA)  
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9507121

CLIENT PROJECT ID: 1736.14

Quality Control Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 3510 GCFID

AEN JOB NO: 9507121  
AEN LAB NO: 0720-BLANK  
DATE EXTRACTED: 07/20/95  
DATE ANALYZED: 07/22/95  
INSTRUMENT: C  
MATRIX: WATER

Method Blank

---

|        | Result<br>(mg/L) | Reporting<br>Limit<br>(mg/L) |
|--------|------------------|------------------------------|
| Diesel | ND               | 0.05                         |
| Oil    | ND               | 0.2                          |

---



## QUALITY CONTROL DATA

METHOD: EPA 3510 GCFID

AEN JOB NO: 9507121  
 INSTRUMENT: C  
 MATRIX: WATER

## Surrogate Standard Recovery Summary

| Date Analyzed | Client Id. | Lab Id. | Percent Recovery |
|---------------|------------|---------|------------------|
|               |            |         | n-Pentacosane    |
| 07/22/95      | LF-6       | 01      | 94               |
| 07/25/95      | GMW-2      | 03      | 101              |
| 07/25/95      | LF-11      | 05      | 101              |
| 07/22/95      | LF-21      | 07      | 106              |
| QC Limits:    |            |         | 59-118           |

DATE EXTRACTED: 07/17/95  
 DATE ANALYZED: 07/17/95  
 SAMPLE SPIKED: DI WATER  
 INSTRUMENT: C

## Method Spike Recovery Summary

| Analyte | Spike Conc. (mg/L) | Sample Result (mg/L) | LCS Result (mg/L) | LCSD Result (mg/L) | Average Percent Recovery | RPD | QC Limits        |     |
|---------|--------------------|----------------------|-------------------|--------------------|--------------------------|-----|------------------|-----|
|         |                    |                      |                   |                    |                          |     | Percent Recovery | RPD |
| Diesel  | 1.82               | ND                   | 1.62              | 1.60               | 89                       | 1   | 65-103           | 12  |

\*\*\* END OF REPORT \*\*\*

9507121

**Chain-of-Custody Record**      NO **5489**      Date: **7/12/95**      Page **1** of **1**

Project No.: **1736.14**  
 Samplers (Signatures): *Nathaniel A Taylor*

| Date    | Time | Sample Number | ANALYSES        |                 |                 |                 |                 |               |             |                 |  |  |  |  |  | Cooled | Soil (S) or water (W) | Acidified | Number of containers |   |   |   |
|---------|------|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------|-------------|-----------------|--|--|--|--|--|--------|-----------------------|-----------|----------------------|---|---|---|
|         |      |               | EPA Method 8010 | EPA Method 8020 | EPA Method 8240 | EPA Method 8270 | TPH as gasoline | TPH as diesel | TPH as BTEX | TPH - Motor Oil |  |  |  |  |  |        |                       |           |                      |   |   |   |
| 7/12/95 | 1025 | LF-6 } O1NB   |                 |                 |                 |                 |                 |               |             |                 |  |  |  |  |  |        |                       |           | X                    | X | X | 1 |
|         | 1035 | LF-6          |                 |                 |                 |                 |                 |               |             |                 |  |  |  |  |  |        |                       |           | X                    | X | X | 1 |
|         | 1045 | LF-6 FUA      |                 |                 |                 |                 |                 |               |             |                 |  |  |  |  |  |        |                       |           | X                    | X | X | 1 |
|         | 1235 | Gmw-2 } O4NB  |                 |                 |                 |                 |                 |               |             |                 |  |  |  |  |  |        |                       |           | X                    | X | X | 1 |
|         | 1235 | Gmw-2         |                 |                 |                 |                 |                 |               |             |                 |  |  |  |  |  |        |                       |           | X                    | X | X | 1 |
|         | 1235 | Gmw-2 F       |                 |                 |                 |                 |                 |               |             |                 |  |  |  |  |  |        |                       |           | X                    | X | X | 1 |
|         | 1235 | Gmw-2 F       |                 |                 |                 |                 |                 |               |             |                 |  |  |  |  |  |        |                       |           | X                    | X | X | 1 |
|         | 1345 | LF-11 } OSAB  |                 |                 |                 |                 |                 |               |             |                 |  |  |  |  |  |        |                       |           | X                    | X | X | 1 |
|         | 1345 | LF-11         |                 |                 |                 |                 |                 |               |             |                 |  |  |  |  |  |        |                       |           | X                    | X | X | 1 |
|         | 1340 | LF-11F } O6NB |                 |                 |                 |                 |                 |               |             |                 |  |  |  |  |  |        |                       |           | X                    | X | X | 1 |
|         | 1340 | LF-11F        |                 |                 |                 |                 |                 |               |             |                 |  |  |  |  |  |        |                       |           | X                    | X | X | 1 |
| ✓       | 1325 | LF-21 O7NB    |                 |                 |                 |                 |                 |               |             |                 |  |  |  |  |  |        |                       |           | X                    | X | X | 2 |

REMARKS

Additional comments

Silica Gel Cleanup  
 On All Analyses.

All Filtered Samples  
 on hold. Please  
 provide results  
 verbally within 1  
 week.

LF-6F } HOLD  
 Gmw-2F } FILTERED  
 LF-11F } SAMPLES.

Turnaround time: **TWO WEEKS.**      Results to: **WONNE PERCE**      Total No. of containers: **13**

Relinquished by: **NAT**  
 Signature: *Nathaniel A Taylor*  
 Printed name: **NATHANIEL TAYLOR**  
 Company: **Geomatrix**

Date: **7/12/95**  
 Relinquished by: *Wendy E. ...*  
 Signature: *Wendy E. ...*  
 Printed name:  
 Company:

Date: **7/12**  
 Relinquished by:  
 Signature:  
 Printed name:  
 Company:

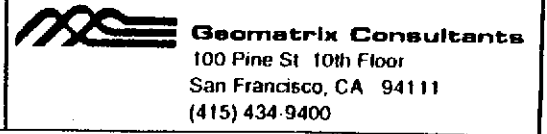
Date:      Method of shipment: **Pick-Up**

Received by:  
 Signature: *Jan L. Pruitt*  
 Printed name:  
 Company: **NEIV**

Time: **16:55**  
 Received by: *Jan L. Pruitt*  
 Signature: *Jan L. Pruitt*  
 Printed name:  
 Company:

Time: **18:10**  
 Received by:  
 Signature:  
 Printed name:  
 Company:

Laboratory comments and Log No:



# American Environmental Network

## Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

GEOMATRIX CONSULTANTS  
100 PINE ST., SUITE 1000  
SAN FRANCISCO, CA 94111

ATTN: YVONNE PIERCE  
CLIENT PROJ. ID: 1736.14

C.O.C. NUMBER: 6333

REPORT DATE: 09/14/95

DATE(S) SAMPLED: 07/13/95

DATE RECEIVED: 07/14/95

AEN WORK ORDER: 9507160


### PROJECT SUMMARY:

On July 14, 1995, this laboratory received 4 water sample(s).

Client requested 2 sample(s) be analyzed for organic parameters; two samples were placed on hold. On July 25, 1995, client requested one sample be taken off hold to be analyzed for organic parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.

  
Larry Klein  
Laboratory Director

Revision of report dated 08/10/95

GEOMATRIX CONSULTANTS

SAMPLE ID: LF-7  
 AEN LAB NO: 9507160-01  
 AEN WORK ORDER: 9507160  
 CLIENT PROJ. ID: 1736.14

DATE SAMPLED: 07/13/95  
 DATE RECEIVED: 07/14/95  
 REPORT DATE: 09/14/95

| ANALYTE             | METHOD/<br>CAS# | RESULT | REPORTING<br>LIMIT | UNITS        | DATE<br>ANALYZED |
|---------------------|-----------------|--------|--------------------|--------------|------------------|
| EPA 8020 for BTEX   | EPA 8020        |        |                    |              |                  |
| Benzene             | 71-43-2         | ND     | 0.5                | ug/L         | 07/17/95         |
| Toluene             | 108-88-3        | ND     | 0.5                | ug/L         | 07/17/95         |
| Ethylbenzene        | 100-41-4        | ND     | 0.5                | ug/L         | 07/17/95         |
| Xylenes, Total      | 1330-20-7       | ND     | 2                  | ug/L         | 07/17/95         |
| #Extraction for TPH | EPA 3510        | -      |                    | Extrn Date   | 07/24/95         |
| #Silica gel Cleanup | EPA 3630        | -      |                    | Cleanup Date | 07/24/95         |
| TPH as Diesel       | GC-FID          | ND     | 0.05               | mg/L         | 08/25/95         |
| TPH as Oil          | GC-FID          | ND     | 0.2                | mg/L         | 08/25/95         |

ND = Not detected at or above the reporting limit  
 \* = Value at or above reporting limit

GEOMATRIX CONSULTANTS

SAMPLE ID: LF-12  
AEN LAB NO: 9507160-03  
AEN WORK ORDER: 9507160  
CLIENT PROJ. ID: 1736.14

DATE SAMPLED: 07/13/95  
DATE RECEIVED: 07/14/95  
REPORT DATE: 09/14/95

---

| ANALYTE             | METHOD/<br>CAS# | RESULT | REPORTING<br>LIMIT | UNITS        | DATE<br>ANALYZED |
|---------------------|-----------------|--------|--------------------|--------------|------------------|
| #Extraction for TPH | EPA 3510        | -      |                    | Extrn Date   | 07/24/95         |
| #Silica gel Cleanup | EPA 3630        | -      |                    | Cleanup Date | 07/24/95         |
| TPH as Diesel       | GC-FID          | ND     | 0.05 mg/L          |              | 08/29/95         |
| TPH as Oil          | GC-FID          | ND     | 0.2 mg/L           |              | 08/29/95         |

---

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

GEOMATRIX CONSULTANTS

SAMPLE ID: LF-12F  
AEN LAB NO: 9507160-04  
AEN WORK ORDER: 9507160  
CLIENT PROJ. ID: 1736.14

DATE SAMPLED: 07/13/95  
DATE RECEIVED: 07/14/95  
REPORT DATE: 09/14/95

---

| ANALYTE             | METHOD/<br>CAS# | RESULT | REPORTING<br>LIMIT | UNITS        | DATE<br>ANALYZED |
|---------------------|-----------------|--------|--------------------|--------------|------------------|
| #Extraction for TPH | EPA 3510        | -      |                    | Extrn Date   | 07/27/95         |
| #Silica gel Cleanup | EPA 3630        | -      |                    | Cleanup Date | 08/02/95         |
| TPH as Diesel       | GC-FID          | 0.09 * | 0.05               | mg/L         | 08/03/95         |
| TPH as Oil          | GC-FID          | ND     | 0.2                | mg/L         | 08/03/95         |

---

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

AEN (CALIFORNIA)  
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9507160

CLIENT PROJECT ID: 1736.14

Quality Control Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 3510 GCFID

AEN JOB NO: 9507160  
AEN LAB NO: 0724-BLANK  
DATE EXTRACTED: 07/24/95  
DATE ANALYZED: 07/26/95  
INSTRUMENT: C  
MATRIX: WATER

Method Blank

---

|        | Result<br>(mg/L) | Reporting<br>Limit<br>(mg/L) |
|--------|------------------|------------------------------|
| Diesel | ND               | 0.05                         |
| Oil    | ND               | 0.2                          |

---

AEN LAB NO: 0727-BLANK  
DATE EXTRACTED: 07/27/95  
DATE ANALYZED: 08/03/95  
INSTRUMENT: C

Method Blank

---

|        | Result<br>(mg/L) | Reporting<br>Limit<br>(mg/L) |
|--------|------------------|------------------------------|
| Diesel | ND               | 0.05                         |
| Oil    | ND               | 0.2                          |

---



QUALITY CONTROL DATA  
METHOD: EPA 3510 GCFID

AEN JOB NO: 9507160  
INSTRUMENT: C  
MATRIX: WATER

Surrogate Standard Recovery Summary

| Date Analyzed | Client Id. | Lab Id. | Percent Recovery<br>n-Pentacosane |
|---------------|------------|---------|-----------------------------------|
| 07/26/95      | LF-7       | 01      | 97                                |
| 07/26/95      | LF-12      | 03      | 95                                |
| 08/03/95      | LF-12F     | 04      | 108                               |
| QC Limits:    |            |         | 59-118                            |

DATE EXTRACTED: 07/21/95  
DATE ANALYZED: 07/21/95  
SAMPLE SPIKED: DI WATER  
INSTRUMENT: C

Method Spike Recovery Summary

| Analyte | Spike Conc.<br>(mg/L) | Sample Result<br>(mg/L) | LCS Result<br>(mg/L) | LCSD Result<br>(mg/L) | Average Percent Recovery | RPD | QC Limits        |     |
|---------|-----------------------|-------------------------|----------------------|-----------------------|--------------------------|-----|------------------|-----|
|         |                       |                         |                      |                       |                          |     | Percent Recovery | RPD |
| Diesel  | 1.82                  | ND                      | 1.55                 | 1.53                  | 85                       | 1   | 65-103           | 12  |

DATE EXTRACTED: 07/27/95  
DATE ANALYZED: 07/27/95  
SAMPLE SPIKED: DI WATER  
INSTRUMENT: C

Method Spike Recovery Summary

| Analyte | Spike Conc.<br>(mg/L) | Sample Result<br>(mg/L) | LCS Result<br>(mg/L) | LCSD Result<br>(mg/L) | Average Percent Recovery | RPD | QC Limits        |     |
|---------|-----------------------|-------------------------|----------------------|-----------------------|--------------------------|-----|------------------|-----|
|         |                       |                         |                      |                       |                          |     | Percent Recovery | RPD |
| Diesel  | 1.82                  | ND                      | 1.66                 | 1.75                  | 94                       | 5   | 65-103           | 12  |

QUALITY CONTROL DATA

METHOD: EPA 8020

AEN JOB NO: 9507160  
AEN LAB NO: 0717-BLANK  
DATE ANALYZED: 07/17/95  
INSTRUMENT: H  
MATRIX: WATER

Method Blank

|                | CAS #     | Result<br>(ug/L) | Reporting<br>Limit<br>(ug/L) |
|----------------|-----------|------------------|------------------------------|
| Benzene        | 71-43-2   | ND               | 0.5                          |
| Toluene        | 108-88-3  | ND               | 0.5                          |
| Ethylbenzene   | 100-41-4  | ND               | 0.5                          |
| Xylenes, Total | 1330-20-7 | ND               | 2                            |

## QUALITY CONTROL DATA

METHOD: EPA 8020

AEN JOB NO: 9507160  
 INSTRUMENT: H  
 MATRIX: WATER

## Surrogate Standard Recovery Summary

| Date Analyzed | Client Id. | Lab Id. | Percent Recovery<br>Fluorobenzene |
|---------------|------------|---------|-----------------------------------|
| 07/17/95      | LF-7       | 01      | 98                                |
| QC Limits:    |            |         | 92-109                            |


DATE ANALYZED: 07/17/95  
 SAMPLE SPIKED: LCS  
 INSTRUMENT: H

## Laboratory Control Sample Recovery

| Analyte | Spike Added<br>(ug/L) | LCS<br>Result<br>(ug/L) | LCSD<br>Result<br>(ug/L) | Average<br>Percent<br>Recovery | QC Limits           |
|---------|-----------------------|-------------------------|--------------------------|--------------------------------|---------------------|
|         |                       |                         |                          |                                | Percent<br>Recovery |
| Benzene | 36.1                  | 36.1                    | 38.6                     | 104                            | 60-120              |
| Toluene | 99.3                  | 109.0                   | 114.0                    | 112                            | 60-120              |

\*\*\* END OF REPORT \*\*\*

7504160  
 7507159 DSH 7/14/95

| Chain-of-Custody Record                                                                                                                                                                    |      |               | 6933                            |                 |                 |                                |                           |               |                           |             |                             |                              | Date: 7/14/95 |  | Page 1 of 1                                                                            |   |   |                              |  |  |   |                                                                                                                                                            |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------|---------------------------------|-----------------|-----------------|--------------------------------|---------------------------|---------------|---------------------------|-------------|-----------------------------|------------------------------|---------------|--|----------------------------------------------------------------------------------------|---|---|------------------------------|--|--|---|------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Project No.: 173614                                                                                                                                                                        |      |               | ANALYSES                        |                 |                 |                                |                           |               |                           |             |                             |                              | REMARKS       |  |                                                                                        |   |   |                              |  |  |   |                                                                                                                                                            |  |
| Samplers (Signatures):<br>Nathaniel A. Taylor                                                                                                                                              |      |               | EPA Method 8010                 | EPA Method 8020 | EPA Method 8240 | EPA Method 8270                | TPH as gasoline           | TPH as diesel | TPH as BTEX               | TPH - Water |                             |                              |               |  |                                                                                        |   |   |                              |  |  |   | Additional comments                                                                                                                                        |  |
| Date                                                                                                                                                                                       | Time | Sample Number |                                 |                 |                 |                                |                           |               |                           |             |                             |                              |               |  |                                                                                        |   |   |                              |  |  |   |                                                                                                                                                            |  |
| 7/13                                                                                                                                                                                       | 1555 | LF-7          |                                 |                 |                 |                                |                           | X             |                           |             |                             |                              |               |  |                                                                                        | X | W | X                            |  |  | 3 | SILICA GEL<br>CLEAN UP PORTION 1/4<br>ALL ANALYSES.<br>PLEASE HOLD<br>LF-7F<br>LF-12F<br>1/4 of 12 samples<br>all held as indicated<br>by Y. Pierce. N/A T |  |
| 7/13                                                                                                                                                                                       | 1605 | LF-7          |                                 |                 |                 |                                | X                         | X             |                           |             |                             |                              |               |  |                                                                                        | X | W | X                            |  |  | 2 |                                                                                                                                                            |  |
| 7/13                                                                                                                                                                                       | 1620 | LF-7F         |                                 |                 |                 |                                | X                         | X             |                           |             |                             |                              |               |  |                                                                                        | X | W | X                            |  |  | 2 |                                                                                                                                                            |  |
| 7/13                                                                                                                                                                                       | 1430 | LF-12         |                                 |                 |                 |                                | X                         | X             |                           |             |                             |                              |               |  |                                                                                        | X | W | X                            |  |  | 2 |                                                                                                                                                            |  |
| 7/13                                                                                                                                                                                       | 1420 | LF-12F        |                                 |                 |                 |                                | (X)                       | (X)           |                           |             |                             |                              |               |  |                                                                                        | X | W | X                            |  |  | 2 |                                                                                                                                                            |  |
|                                                                                                                                                                                            |      |               | Turnaround time: STAMPID.       |                 |                 |                                | Results to: YVONNE PIERCE |               |                           |             | Total No. of containers: 11 |                              |               |  |                                                                                        |   |   |                              |  |  |   |                                                                                                                                                            |  |
| Relinquished by: [Signature]                                                                                                                                                               |      |               | Date: 7/14                      |                 |                 | Relinquished by: [Signature]   |                           |               | Date: 7/14                |             |                             | Relinquished by: [Signature] |               |  | Date: [Signature]                                                                      |   |   | Method of shipment: Pick-up. |  |  |   |                                                                                                                                                            |  |
| Signature: Nathaniel A. Taylor                                                                                                                                                             |      |               | Signature: [Signature]          |                 |                 | Signature: [Signature]         |                           |               | Signature: [Signature]    |             |                             | Signature: [Signature]       |               |  | Laboratory comments and Log No.: Be R. Results due 7/25/95 by noon to Geomatrix R Byas |   |   |                              |  |  |   |                                                                                                                                                            |  |
| Printed name: NATHANIEL A. TAYLOR                                                                                                                                                          |      |               | Printed name: [Signature]       |                 |                 | Printed name: [Signature]      |                           |               | Printed name: [Signature] |             |                             | Printed name: [Signature]    |               |  |                                                                                        |   |   |                              |  |  |   |                                                                                                                                                            |  |
| Company: OMX                                                                                                                                                                               |      |               | Company: [Signature]            |                 |                 | Company: [Signature]           |                           |               | Company: [Signature]      |             |                             | Company: [Signature]         |               |  |                                                                                        |   |   |                              |  |  |   |                                                                                                                                                            |  |
| Received by: [Signature]                                                                                                                                                                   |      |               | Time: 16:00                     |                 |                 | Received by: Denise Harrington |                           |               | Time: 8:00                |             |                             | Received by: [Signature]     |               |  | Time: [Signature]                                                                      |   |   |                              |  |  |   |                                                                                                                                                            |  |
| Signature: [Signature]                                                                                                                                                                     |      |               | Signature: DENISE HARRINGTON    |                 |                 | Signature: [Signature]         |                           |               | Signature: [Signature]    |             |                             | Signature: [Signature]       |               |  |                                                                                        |   |   |                              |  |  |   |                                                                                                                                                            |  |
| Printed name: [Signature]                                                                                                                                                                  |      |               | Printed name: DENISE HARRINGTON |                 |                 | Printed name: [Signature]      |                           |               | Printed name: [Signature] |             |                             | Printed name: [Signature]    |               |  |                                                                                        |   |   |                              |  |  |   |                                                                                                                                                            |  |
| Company: [Signature]                                                                                                                                                                       |      |               | Company: [Signature]            |                 |                 | Company: [Signature]           |                           |               | Company: [Signature]      |             |                             | Company: [Signature]         |               |  |                                                                                        |   |   |                              |  |  |   |                                                                                                                                                            |  |
|  <b>Geomatrix Consultants</b><br>100 Pine St. 10th Floor<br>San Francisco, CA 94111<br>(415) 434-9400 |      |               |                                 |                 |                 |                                |                           |               |                           |             |                             |                              |               |  |                                                                                        |   |   |                              |  |  |   |                                                                                                                                                            |  |

NONCONFORMANCE REPORT

Please record today's DATE: 7/15/95

Circle your DEPT: CS EX GC IN MS QA SC Other \_\_\_\_\_

Please provide ALL the following information:

AEN Proj. # 9507160 Company Geometrix  
Sample ID see below Project 1736.14  
Analysis see below Contact Yvonne Pierce

Indicate the REASON for this Nonconformance Report

- Documents incomplete
- Missing sample
- Sample mislabeled
- Improper preservation
- Sample warm
- Wrong container
- Sample damaged
- Leaking sample
- Headspace in VOA
- Insufficient sample
- QC recovery out
- Positive blank
- Holding time expired
- Other (explain): \_\_\_\_\_

Describe the SITUATION leading to this Nonconformance

① Verify silica gel cleanup on extractables only  
② Please document original COC

Is it necessary to inform the Client? (Y/N) If so, in the space below write the full name of person contacted:

Yvonne Pierce was notified (verbally/by fax) on  
Date/time 7/15/95 by DSH from AEN.

Describe the CORRECTIVE ACTIONS taken and when.

| Sample on HOLD:                                                                         | Processed AS IS:                        | Sample RERUN: | RESAMPLED: |
|-----------------------------------------------------------------------------------------|-----------------------------------------|---------------|------------|
| DATE: <u>1/1/1995</u>                                                                   | <u>Yvonne Pierce called 805 7-17-95</u> |               |            |
| <u>Yes - silica gel cleanup on extractables only - original COC documented. R. Byas</u> |                                         |               |            |
| Continued on Corrective Action Form.                                                    |                                         |               |            |

Please DATE: 7/15/95 and SIGN here: Denise Harrington

The Date: 7-17-95 when the Dept. Manager Robin Byas signed.

The Date: \_\_\_\_\_ when the QA Manager \_\_\_\_\_ signed.

Indicate where the NCR is to be routed: CS GM IN OR QA SC

# American Environmental Network

## Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

GEOMATRIX CONSULTANTS  
100 PINE ST., SUITE 1000  
SAN FRANCISCO, CA 94111

ATTN: YVONNE PIERCE  
CLIENT PROJ. ID: 1736.14

C.O.C. NUMBER: 6335

REPORT DATE: 09/15/95

DATE(S) SAMPLED: 07/14/95

DATE RECEIVED: 07/14/95

AEN WORK ORDER: 9507159

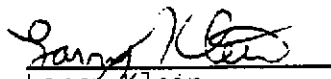
### PROJECT SUMMARY:

On July 14, 1995, this laboratory received 8 water sample(s).

Client requested 3 sample(s) be analyzed for organic parameters; five samples were placed on hold. On July 25, 1995, client requested four samples be taken off hold to be analyzed for organic parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.

  
Larry Klein  
Laboratory Director

GEOMATRIX CONSULTANTS

SAMPLE ID: LF-13  
 AEN LAB NO: 9507159-01  
 AEN WORK ORDER: 9507159  
 CLIENT PROJ. ID: 1736.14

DATE SAMPLED: 07/14/95  
 DATE RECEIVED: 07/14/95  
 REPORT DATE: 09/15/95

| ANALYTE             | METHOD/<br>CAS# | RESULT | REPORTING<br>LIMIT | UNITS        | DATE<br>ANALYZED |
|---------------------|-----------------|--------|--------------------|--------------|------------------|
| EPA 8020 for BTEX   | EPA 8020        |        |                    |              |                  |
| Benzene             | 71-43-2         | ND     | 0.5                | ug/L         | 07/17/95         |
| Toluene             | 108-88-3        | ND     | 0.5                | ug/L         | 07/17/95         |
| Ethylbenzene        | 100-41-4        | ND     | 0.5                | ug/L         | 07/17/95         |
| Xylenes, Total      | 1330-20-7       | ND     | 2                  | ug/L         | 07/17/95         |
| #Extraction for TPH | EPA 3510        | -      |                    | Extrn Date   | 07/21/95         |
| #Silica gel Cleanup | EPA 3630        | -      |                    | Cleanup Date | 08/04/95         |
| TPH as Diesel       | GC-FID          | 0.05 * | 0.05               | mg/L         | 08/05/95         |
| TPH as Oil          | GC-FID          | ND     | 0.2                | mg/L         | 08/05/95         |

ND = Not detected at or above the reporting limit  
 \* = Value at or above reporting limit

## GEOMATRIX CONSULTANTS

SAMPLE ID: LF-13F  
AEN LAB NO: 9507159-02  
AEN WORK ORDER: 9507159  
CLIENT PROJ. ID: 1736.14

DATE SAMPLED: 07/14/95  
DATE RECEIVED: 07/14/95  
REPORT DATE: 09/15/95

---

| ANALYTE             | METHOD/<br>CAS# | RESULT | REPORTING<br>LIMIT | UNITS        | DATE<br>ANALYZED |
|---------------------|-----------------|--------|--------------------|--------------|------------------|
| #Extraction for TPH | EPA 3510        | -      |                    | Extrn Date   | 07/27/95         |
| #Silica gel Cleanup | EPA 3630        | -      |                    | Cleanup Date | 08/03/95         |
| TPH as Diesel       | GC-FID          | ND     | 0.05 mg/L          |              | 09/02/95         |
| TPH as Oil          | GC-FID          | ND     | 0.2 mg/L           |              | 09/02/95         |

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit



## GEOMATRIX CONSULTANTS

SAMPLE ID: WC-3  
AEN LAB NO: 9507159-03  
AEN WORK ORDER: 9507159  
CLIENT PROJ. ID: 1736.14

DATE SAMPLED: 07/14/95  
DATE RECEIVED: 07/14/95  
REPORT DATE: 09/15/95

| ANALYTE             | METHOD/<br>CAS# | RESULT | REPORTING<br>LIMIT | UNITS        | DATE<br>ANALYZED |
|---------------------|-----------------|--------|--------------------|--------------|------------------|
| #Extraction for TPH | EPA 3510        | -      |                    | Extrn Date   | 07/21/95         |
| #Silica gel Cleanup | EPA 3630        | -      |                    | Cleanup Date | 08/04/95         |
| TPH as Diesel       | GC-FID          | 0.1 *  | 0.05               | mg/L         | 08/05/95         |
| TPH as Oil          | GC-FID          | ND     | 0.2                | mg/L         | 08/05/95         |

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

GEOMATRIX CONSULTANTS

SAMPLE ID: WC-3F  
AEN LAB NO: 9507159-04  
AEN WORK ORDER: 9507159  
CLIENT PROJ. ID: 1736.14

DATE SAMPLED: 07/14/95  
DATE RECEIVED: 07/14/95  
REPORT DATE: 09/15/95

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| ANALYTE             | METHOD/<br>CAS# | RESULT | REPORTING<br>LIMIT | UNITS        | DATE<br>ANALYZED |
|---------------------|-----------------|--------|--------------------|--------------|------------------|
| #Extraction for TPH | EPA 3510        | -      |                    | Extrn Date   | 07/27/95         |
| #Silica gel Cleanup | EPA 3630        | -      |                    | Cleanup Date | 08/03/95         |
| TPH as Diesel       | GC-FID          | ND     | 0.05 mg/L          |              | 09/02/95         |
| TPH as Oil          | GC-FID          | ND     | 0.2 mg/L           |              | 09/02/95         |

---

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

GEOMATRIX CONSULTANTS

SAMPLE ID: LF-10  
 AEN LAB NO: 9507159-05  
 AEN WORK ORDER: 9507159  
 CLIENT PROJ. ID: 1736.14

DATE SAMPLED: 07/14/95  
 DATE RECEIVED: 07/14/95  
 REPORT DATE: 09/15/95

| ANALYTE             | METHOD/<br>CAS# | RESULT | REPORTING<br>LIMIT | UNITS        | DATE<br>ANALYZED |
|---------------------|-----------------|--------|--------------------|--------------|------------------|
| #Extraction for TPH | EPA 3510        | -      |                    | Extrn Date   | 07/21/95         |
| #Silica gel Cleanup | EPA 3630        | -      |                    | Cleanup Date | 08/04/95         |
| TPH as Diesel       | GC-FID          | 0.06 * | 0.05               | mg/L         | 08/29/95         |
| TPH as Oil          | GC-FID          | ND     | 0.2                | mg/L         | 08/29/95         |

ND = Not detected at or above the reporting limit  
 \* = Value at or above reporting limit

## GEOMATRIX CONSULTANTS

SAMPLE ID: LF-10F  
AEN LAB NO: 9507159-06  
AEN WORK ORDER: 9507159  
CLIENT PROJ. ID: 1736.14

DATE SAMPLED: 07/14/95  
DATE RECEIVED: 07/14/95  
REPORT DATE: 09/15/95

| ANALYTE             | METHOD/<br>CAS# | RESULT | REPORTING<br>LIMIT | UNITS        | DATE<br>ANALYZED |
|---------------------|-----------------|--------|--------------------|--------------|------------------|
| #Extraction for TPH | EPA 3510        | -      |                    | Extrn Date   | 07/21/95         |
| #Silica gel Cleanup | EPA 3630        | -      |                    | Cleanup Date | 08/04/95         |
| TPH as Diesel       | GC-FID          | 0.07 * | 0.05 mg/L          |              | 08/04/95         |
| TPH as Oil          | GC-FID          | ND     | 0.2 mg/L           |              | 08/04/95         |

ND = Not detected at or above the reporting limit  
\* = Value at or above reporting limit

GEOMATRIX CONSULTANTS

SAMPLE ID: LF-18  
 AEN LAB NO: 9507159.07  
 AEN WORK ORDER: 9507159  
 CLIENT PROJ. ID: 1736.14

Duplicate of LF-10

DATE SAMPLED: 07/14/95  
 DATE RECEIVED: 07/14/95  
 REPORT DATE: 09/15/95

| ANALYTE             | METHOD/<br>CAS# | RESULT | REPORTING<br>LIMIT | UNITS        | DATE<br>ANALYZED |
|---------------------|-----------------|--------|--------------------|--------------|------------------|
| #Extraction for TPH | EPA 3510        | -      |                    | Extrn Date   | 07/21/95         |
| #Silica gel Cleanup | EPA 3630        | -      |                    | Cleanup Date | 08/04/95         |
| TPH as Diesel       | GC-FID          | 0.06 * | 0.05               | mg/L         | 08/05/95         |
| TPH as Oil          | GC-FID          | ND     | 0.2                | mg/L         | 08/05/95         |

ND = Not detected at or above the reporting limit  
 \* = Value at or above reporting limit

AEN (CALIFORNIA)  
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9507159

CLIENT PROJECT ID: 1736.14

Quality Control Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

## QUALITY CONTROL DATA

METHOD: EPA 3510 GCFID

AEN JOB NO: 9507159  
AEN LAB NO: 0721-BLANK  
DATE EXTRACTED: 07/21/95  
DATE ANALYZED: 07/22/95  
INSTRUMENT: C  
MATRIX: WATER

## Method Blank

---

|        | Result<br>(mg/L) | Reporting<br>Limit<br>(mg/L) |
|--------|------------------|------------------------------|
| Diesel | ND               | 0.05                         |
| Oil    | ND               | 0.2                          |

---

AEN LAB NO: 0727-BLANK  
DATE EXTRACTED: 07/27/95  
DATE ANALYZED: 08/03/95  
INSTRUMENT: C

## Method Blank

---

|        | Result<br>(mg/L) | Reporting<br>Limit<br>(mg/L) |
|--------|------------------|------------------------------|
| Diesel | ND               | 0.05                         |
| Oil    | ND               | 0.2                          |

---

QUALITY CONTROL DATA  
METHOD: EPA 3510 GCFID

AEN JOB NO: 9507159  
INSTRUMENT: C  
MATRIX: WATER

Surrogate Standard Recovery Summary

| Date Analyzed | Client Id. | Lab Id. | Percent Recovery<br>n-Pentacosane |
|---------------|------------|---------|-----------------------------------|
| 08/05/95      | LF-13      | 01      | 61                                |
| 09/02/95      | LF-13F     | 02      | 66                                |
| 08/05/95      | WC-3       | 03      | 103                               |
| 09/02/95      | WC-3F      | 04      | 118                               |
| 08/29/95      | LF-10      | 05      | 81                                |
| 08/04/95      | LF-10F     | 06      | 95                                |
| 08/05/95      | LF-18      | 07      | 96                                |
| QC Limits:    |            |         | 59-118                            |

DATE EXTRACTED: 07/21/95  
DATE ANALYZED: 07/21/95  
SAMPLE SPIKED: DI WATER  
INSTRUMENT: C

Method Spike Recovery Summary

| Analyte | Spike Conc.<br>(mg/L) | LCS Result<br>(mg/L) | LCSD Result<br>(mg/L) | Average Percent Recovery | RPD | QC Limits        |     |
|---------|-----------------------|----------------------|-----------------------|--------------------------|-----|------------------|-----|
|         |                       |                      |                       |                          |     | Percent Recovery | RPD |
| Diesel  | 1.82                  | 1.55                 | 1.53                  | 85                       | 1   | 65-103           | 12  |

DATE EXTRACTED: 07/27/95  
DATE ANALYZED: 07/27/95  
SAMPLE SPIKED: DI WATER  
INSTRUMENT: C

Method Spike Recovery Summary

| Analyte | Spike Conc.<br>(mg/L) | LCS Result<br>(mg/L) | LCSD Result<br>(mg/L) | Average Percent Recovery | RPD | QC Limits        |     |
|---------|-----------------------|----------------------|-----------------------|--------------------------|-----|------------------|-----|
|         |                       |                      |                       |                          |     | Percent Recovery | RPD |
| Diesel  | 1.82                  | 1.66                 | 1.75                  | 94                       | 5   | 65-103           | 12  |



## QUALITY CONTROL DATA

METHOD: EPA 8020

AEN JOB NO: 9507159  
AEN LAB NO: 0717-BLANK  
DATE ANALYZED: 07/17/95  
INSTRUMENT: H  
MATRIX: WATER

## Method Blank

|                | CAS #     | Result<br>(ug/L) | Reporting<br>Limit<br>(ug/L) |
|----------------|-----------|------------------|------------------------------|
| Benzene        | 71-43-2   | ND               | 0.5                          |
| Toluene        | 108-88-3  | ND               | 0.5                          |
| Ethylbenzene   | 100-41-4  | ND               | 0.5                          |
| Xylenes, Total | 1330-20-7 | ND               | 2                            |

QUALITY CONTROL DATA

METHOD: EPA 8020

AEN JOB NO: 9507159  
 INSTRUMENT: H  
 MATRIX: WATER

Surrogate Standard Recovery Summary

| Date Analyzed | Client Id. | Lab Id. | Percent Recovery |  |
|---------------|------------|---------|------------------|--|
|               |            |         | Fluorobenzene    |  |
| 07/17/95      | LF-13      | 01      | 99               |  |
| QC Limits:    |            |         | 92-109           |  |

DATE ANALYZED: 07/17/95  
 SAMPLE SPIKED: LCS  
 INSTRUMENT: H

Laboratory Control Sample Recovery

| Analyte | Spike Added (ug/L) | LCS Result (ug/L) | LCSD Result (ug/L) | Average Percent Recovery | QC Limits        |
|---------|--------------------|-------------------|--------------------|--------------------------|------------------|
|         |                    |                   |                    |                          | Percent Recovery |
| Benzene | 36.1               | 36.1              | 38.6               | 104                      | 60-120           |
| Toluene | 99.3               | 109.0             | 114.0              | 112                      | 60-120           |

\*\*\* END OF REPORT \*\*\*

R-150C

9507159

| Chain-of-Custody Record                       |      |               | No. 6335         |                             | Date: 7/14/95   |                 | Page 1 of 1     |                  |                          |               |                                                                                           |                                                              |  |  |  |  |  |  |  |                     |
|-----------------------------------------------|------|---------------|------------------|-----------------------------|-----------------|-----------------|-----------------|------------------|--------------------------|---------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------|--|--|--|--|--|--|--|---------------------|
| Project No.: 1736 101                         |      |               | ANALYSES         |                             |                 |                 |                 |                  | REMARKS                  |               |                                                                                           |                                                              |  |  |  |  |  |  |  |                     |
| Samplers (Signatures):<br>Nathaniel A. Taylor |      |               | EPA Method 8010  | EPA Method 8020             | EPA Method 8240 | EPA Method 8270 | TPH as gasoline | TPH as diesel    | TPH as BTEX              | TPH-Matrix C1 |                                                                                           |                                                              |  |  |  |  |  |  |  | Additional comments |
| Date                                          | Time | Sample Number |                  |                             |                 |                 |                 |                  |                          |               |                                                                                           |                                                              |  |  |  |  |  |  |  |                     |
| B                                             | 7/14 | 1110          | LF-13            |                             |                 |                 |                 |                  |                          |               |                                                                                           |                                                              |  |  |  |  |  |  |  |                     |
| B                                             | 7/14 | 1100          | LF-13F           |                             |                 |                 |                 | X                | X                        |               |                                                                                           |                                                              |  |  |  |  |  |  |  | SILICA GEL          |
| DE                                            | 7/14 | 1050          | LF-13            |                             |                 |                 |                 | X                | X                        |               |                                                                                           |                                                              |  |  |  |  |  |  |  | CLEAN UP ALL        |
| AB                                            | 7/14 | 1245          | WC-3             |                             |                 |                 |                 |                  |                          |               |                                                                                           |                                                              |  |  |  |  |  |  |  | Extractables        |
| B                                             | 7/14 | 1236          | WC-3F            |                             |                 |                 |                 | X                | X                        |               |                                                                                           |                                                              |  |  |  |  |  |  |  | ANALYSES RD 7/25/95 |
| AB                                            | 7/14 | 1340          | LF-10            |                             |                 |                 |                 | X                | X                        |               |                                                                                           |                                                              |  |  |  |  |  |  |  | PLEASE HOLD         |
| B                                             | 7/14 | 1325          | LF-10F AD        |                             |                 |                 |                 | X                | X                        |               |                                                                                           |                                                              |  |  |  |  |  |  |  | LF-18F              |
| B                                             | 7/14 | 1445          | LF-21 18 RD      |                             |                 |                 |                 | X                | X                        |               |                                                                                           |                                                              |  |  |  |  |  |  |  | TO                  |
| AB                                            | 7/14 | 1435          | LF-21 18         |                             |                 |                 |                 | X                | X                        |               |                                                                                           |                                                              |  |  |  |  |  |  |  | WC-13F              |
|                                               |      |               |                  |                             |                 |                 |                 |                  |                          |               |                                                                                           |                                                              |  |  |  |  |  |  |  | LF-10 F             |
|                                               |      |               |                  |                             |                 |                 |                 |                  |                          |               |                                                                                           |                                                              |  |  |  |  |  |  |  | LF-21 F             |
|                                               |      |               | Turnaround time: | STANDARD                    |                 | Results to:     | YVONNE PIERCE   |                  | Total No. of containers: | 19            |                                                                                           | 7/25/95 (3) Samples off hold as indicated per V. PIERCE NTAT |  |  |  |  |  |  |  |                     |
| Relinquished by:                              |      |               | Date:            | Relinquished by:            |                 |                 | Date:           | Relinquished by: |                          |               | Date:                                                                                     | Method of shipment:                                          |  |  |  |  |  |  |  |                     |
| Signature: Nathaniel A. Taylor                |      |               | 7/14/95          | Signature: Robert W. Mann   |                 |                 | 7-14-95         | Signature:       |                          |               | Pickup.                                                                                   |                                                              |  |  |  |  |  |  |  |                     |
| Printed name: NATHANIEL A. TAYLOR             |      |               |                  | Printed name: AEN           |                 |                 |                 | Printed name:    |                          |               | Laboratory comments and Log No:                                                           |                                                              |  |  |  |  |  |  |  |                     |
| Company: GMY                                  |      |               |                  | Company:                    |                 |                 |                 | Company:         |                          |               | Corrected sample id's per N. Taylor. Results required by noon to Geomatrix 7/25/95 R Byas |                                                              |  |  |  |  |  |  |  |                     |
| Received by:                                  |      |               | Time:            | Received by:                |                 |                 | Time:           | Received by:     |                          |               | Time:                                                                                     |                                                              |  |  |  |  |  |  |  |                     |
| Signature: Robert W. Mann                     |      |               | 1640             | Signature: Deuse Harrington |                 |                 | 18:00           | Signature:       |                          |               |                                                                                           |                                                              |  |  |  |  |  |  |  |                     |
| Printed name: AEN                             |      |               |                  | Printed name: D. HARRINGTON |                 |                 |                 | Printed name:    |                          |               |                                                                                           |                                                              |  |  |  |  |  |  |  |                     |
| Company:                                      |      |               |                  | Company: AEN                |                 |                 |                 | Company:         |                          |               |                                                                                           |                                                              |  |  |  |  |  |  |  |                     |

**Geomatrix Consultants**  
 100 Pine St, 10th Floor  
 San Francisco, CA 94111  
 (415) 434-9400

NONCONFORMANCE REPORT

COPY

Please record today's DATE: 7/15/95

Circle your DEPT: CS EX GC IN MS QA SC Other \_\_\_\_\_

Please provide ALL the following information:

AEN Proj. # 9507159 Company Geometrix  
Sample ID see below Project 1736.14  
Analysis see below Contact Yvonne Pierce

Indicate the REASON for this Nonconformance Report

- Documents incomplete
- Improper preservation
- Sample damaged
- Insufficient sample
- Holding time expired
- Missing sample
- Sample warm
- Leaking sample
- QC recovery out
- Other (explain): \_\_\_\_\_
- Sample mislabeled
- Wrong container
- Headspace in VOA
- Positive blank

Describe the SITUATION leading to this Nonconformance correct?

- ① Verify samples on hold - no WC-13F rec'd (WC-3F rec'd)
- ② Verify silica gel cleanup on extractables only - not BTEX TRUE
- ③ Please note verifications on original COC.

Is it necessary to inform the Client? (Y/N) If so, in the space below write the full name of person contacted:

Yvonne Pierce was notified (verbally/by fax) on  
Date/time 7/15/95 by DST from AEN.

Describe the CORRECTIVE ACTIONS taken and when.

| Sample on HOLD:                               | Processed AS IS:                        | Sample RERUN: | RESAMPLED: |
|-----------------------------------------------|-----------------------------------------|---------------|------------|
| DATE: <u>1/1/1995</u>                         | <u>Yvonne Pierce called 805 7-17-95</u> |               |            |
| <u>all samples with an "F" on the</u>         |                                         |               |            |
| <u>end are on hold. Silica gel cleanup on</u> |                                         |               |            |
| <u>EXTRACTABLES ONLY <u>RByas</u></u>         |                                         |               |            |

Continued on Corrective Action Form.

Please DATE: 7/15/95 and SIGN here: Debbie Harrington

The Date: 7-17-95 when the Dept. Manager Robin Byas signed.

The Date: Jul 18 1995 when the QA Manager [Signature] signed.

Indicate where the NCR is to be routed: CS GM IN OR QA SC