

A Report Prepared for

Redevelopment Agency of the City of Oakland  
1333 Broadway, 9th Floor  
Oakland, California 94612

PRP  
Std 4036

**REPORT OF GROUNDWATER MONITORING  
JANUARY 1993  
CHINATOWN REDEVELOPMENT PROJECT AREA  
OAKLAND, CALIFORNIA**

HLA Project No. 10874 040

3-31-93

Submitted to:

California Regional Water Quality Control Board  
San Francisco Bay Region  
2101 Webster Street, Suite 500  
Oakland, California 94612

by

Mark T. Egbert  
Mark T. Egbert  
Project Geologist

David F. Leland  
David F. Leland, P.E.  
Associate Engineer

Harding Lawson Associates  
7655 Redwood Boulevard  
P.O. Box 578  
Novato, California 94948  
415/892-0821

March 31, 1993



Transmittal/Memorandum

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**To:** Mr. Donald Dalke  
California Regional Water Quality Control Board  
San Francisco Bay Region  
2101 Webster Street, Suite 500  
Oakland, California 94612

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**From:** David F. Leland *DFL*  
**Date:** March 31, 1993  
**Subject:** January 1993 Report of Groundwater Monitoring  
**Job No.:** 10874 040

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**Remarks:** Please find enclosed a copy of Harding Lawson Associates *Report of Groundwater Monitoring, January 1993, Chinatown Redevelopment Agency Project Area, Oakland, California*, dated March 31, 1993.

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**cc:** Mr. Rich Hiatt, RWQCB  
Ms. Jennifer Eberle, Alameda County DEH  
Peter Chen, Agency

DFL/jb28897-O

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| DISTRIBUTION |  |   |

## 1.0 INTRODUCTION

This report presents the results of the January 1993 biannual groundwater monitoring in the Chinatown Redevelopment Project Area (Project Area) of Oakland, California (Plate 1). Biannual groundwater monitoring was recommended for January and July 1993 in Harding Lawson Associates' report titled *Report of Groundwater Monitoring, June 1992 (HLA, 1992)*.

Groundwater monitoring in January 1993 consisted of sampling four monitoring wells and measuring water levels in 11 wells. Groundwater flow directions and the presence of gasoline constituents in groundwater in the Project Area were evaluated.

## 2.0 BIANNUAL GROUNDWATER MONITORING

Water levels were measured in 11 wells (Table 1) and groundwater samples were collected from Monitoring Wells MW-7, MW-18, MW-19, and MW-23 on January 21, 1993. Water level measurements were recorded to monitor hydraulic conditions in the Project Area and groundwater samples were collected to assess groundwater chemistry in the 4 wells. Six samples were submitted to the laboratory for analysis, including samples from the four monitoring wells, a duplicate from Monitoring Well MW-18, and a field blank.

Standard HLA decontamination protocol for equipment was followed prior to sampling. HLA employees performing field work were trained in safety procedures and used Level D personal protective equipment.

Three well volumes were purged from the wells prior to sampling, collected in 55-gallon drums, and retained onsite. Groundwater samples were collected with a stainless steel bailer and decanted into 40-milliliter sample bottles, which were labeled and stored on ice until delivery under chain of custody to Pace Laboratories, Inc. (PACE), of Novato, California, for chemical analysis. All groundwater samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Test Method 8020; samples from Wells MW-7 and MW-19 also were analyzed for total petroleum hydrocarbons (TPH) as gasoline using EPA Test Method 8015.

### 3.0 RESULTS

#### 3.1 Groundwater Elevations and Potentiometric Contours

Depths to groundwater and calculated water elevations for January 1993 are presented in Table 1; the potentiometric surface interpreted from the water-elevation data is shown on Plate 1. The data indicate groundwater flow is to the west in the western portions of the Project Area and generally west to south in the southern portions of the Project Area. The water level elevation for MW-3, located along Webster Street, was lower than that in adjacent wells, indicating that groundwater is being withdrawn from the shallow aquifer in the area.

Water levels decreased in 7 of the 11 wells between June 25, 1992, and January 21, 1993. At Well MW-3, the water level decreased 2.54 feet; decreases at the remaining wells ranged from 0.02 to 0.48 foot. Water levels increased slightly at Monitoring Wells MW-7, MW-8, MW-18, and MW-20 by 0.20, 0.36, 0.22, and 0.17 foot, respectively.

#### 3.2 Groundwater Analytical Results

Results of chemical analyses of the groundwater samples collected on January 21, 1993, are presented in Table 2 along with historical groundwater chemistry data. Laboratory reports for groundwater samples collected in January are presented in the Appendix.

BTEX compounds were detected in groundwater samples from Monitoring Wells MW-7, MW-18, and MW-19. In general, BTEX concentrations are similar to concentrations measured before dewatering activities at the PRP site began in November 1990. Benzene was detected at Well MW-18 at a concentration higher than in June 1992 but similar to January 1990 results. BTEX compounds were not detected

in the samples from MW-23 or in the field blank. Samples from Monitoring Wells MW-7 and MW-19 had detectable concentrations of TPH as gasoline.

#### 4.0 DISCUSSION AND RECOMMENDATIONS

In general, groundwater flow directions determined are similar to those measured since dewatering activities ceased. The January 1993 measurements continue to show the influence of the buildings constructed in the Project Area on groundwater flow direction as mentioned in earlier reports (e.g., *HLA, 1992*). The January 1993 water-level elevation at Well MW-3 was lower than at adjacent wells; in June 1992 it was higher. Measurements at Well MW-3 and nearby wells suggest that groundwater withdrawals are taking place in this area. (Conversations with East Bay MUD building maintenance engineers revealed that groundwater is seeping into the below-grade parking garage where it collects in sumps and is pumped out.) This may be a possible explanation for the low groundwater elevation measured at Well MW-3.

Laboratory analysis of water samples collected in January 1993 indicates that concentrations of petroleum hydrocarbons and BTEX compounds at MW-19 are only slightly lower than the June 1992 concentrations and are generally similar to pre-dewatering concentrations for those constituents. (In addition, the chemical concentrations at MW-7 are similar to the June 1992 concentrations.)

The biannual monitoring performed in January 1993 completes the first biannual monitoring round. The second biannual groundwater monitoring round is scheduled for July 1993. Results will be presented in a report to the Regional Water Quality Control Board.



5.0 REFERENCES

Harding Lawson Associates, 1989. *A-Aquifer Monitoring Report, Chinatown Redevelopment Project Area, Oakland, California.* January 31.

\_\_\_\_\_, 1991. *Groundwater Monitoring and Dewatering Effluent Treatment System, Operation and Monitoring, April through July 1991, Chinatown Redevelopment Project Area, Oakland, California.* August 16.

\_\_\_\_\_, 1992. *Report of Groundwater Monitoring, June 1992, Chinatown Redevelopment Project Area, Oakland, California.* September 9.

TABLES

Table 1. WATER-LEVEL ELEVATIONS - NOVEMBER 1990 THROUGH JANUARY 1993  
CHINATOWN REDEVELOPMENT PROJECT AREA

| Well No.  | MW-2           |               | MW-3           |               | MW-6           |               | MW-7           |               | MW-8           |               | MW-12          |               |
|-----------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|
|           | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING |
|           | 40.05          | 39.55         | 39.02          | 38.35         | 39.95          | 39.59         | 39.35          | 39.10         | 40.63          | 40.47         | 37.70          | 37.00         |
| DATE      | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     |
| 14-Nov-90 | 25.38          | 14.17         | 23.91          | 14.44         | 25.25          | 14.34         | 24.97          | 14.13         | 26.72          | 13.75         | 23.37          | 13.63         |
| 3-Dec-90  | 26.12          | 13.43         | 24.69          | 13.66         | 25.44          | 14.15         | 27.66          | 11.44         | 27.28          | 13.19         | 25.45          | 11.55         |
| 11-Jan-91 | 28.60          | 10.95         | 28.97          | 9.38          | 27.50          | 12.09         | 29.82          | 9.28          | 29.04          | 11.43         | *              | *             |
| 11-Feb-91 | 32.39          | 7.16          | 32.37          | 5.98          | 29.43          | 10.16         | 32.35          | 6.75          | 30.88          | 9.59          | *              | *             |
| 8-Mar-91  | 33.57          | 5.98          | 32.29          | 6.06          | 30.41          | 9.18          | 32.04          | 7.06          | 31.98          | 8.49          | *              | *             |
| 12-Apr-91 | 32.67          | 6.88          | 31.89          | 6.46          | 30.25          | 9.34          | 31.37          | 7.73          | 32.01          | 8.46          | *              | *             |
| 10-May-91 | 31.90          | 7.65          | 31.29          | 7.06          | 29.94          | 9.65          | 30.94          | 8.16          | 31.66          | 8.81          | *              | *             |
| 6-Jun-91  | 32.56          | 6.99          | 30.94          | 7.41          | 30.27          | 9.32          | 31.06          | 8.04          | 31.94          | 8.53          | *              | *             |
| 19-Sep-91 | 26.94          | 12.61         | 25.28          | 13.07         | 26.58          | 13.01         | 26.96          | 12.14         | 28.65          | 11.82         | *              | *             |
| 20-Dec-91 | 25.94          | 13.61         | 24.23          | 14.12         | 25.74          | 13.85         | 25.83          | 13.27         | 27.47          | 13.00         | *              | *             |
| 27-Mar-92 | 24.05          | 15.50         | 21.94          | 16.41         | 23.92          | 15.67         | 24.01          | 15.09         | 25.64          | 14.83         | *              | *             |
| 25-Jun-92 | 24.20          | 15.35         | 22.37          | 15.98         | 24.07          | 15.52         | 24.37          | 14.73         | 25.84          | 14.63         | *              | *             |
| 21-Jan-93 | 24.58          | 14.97         | 24.91          | 13.44         | 24.32          | 15.27         | 24.17          | 14.93         | 25.48          | 14.99         | *              | *             |

## NOTES:

Elevations are in feet above mean sea level (MSL).

Depth to water measured in feet from top of casing.

- \* Well MW-12 was damaged during excavation and construction activities and can no longer be monitored.

**Table 1. WATER-LEVEL ELEVATIONS - NOVEMBER 1990 THROUGH JANUARY 1993  
CHINATOWN REDEVELOPMENT PROJECT AREA**

| Well No.  | MW-18          |               | MW-19          |               | MW-20          |               | MW-21          |               | MW-22          |               | MW-23          |               |
|-----------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|
|           | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING |
|           | 36.52          | 35.88         | 37.15          | 36.62         | 38.32          | 37.86         | 38.67          | 38.08         | 37.70          | 37.34         | 34.68          | 34.23         |
| DATE      | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     |
| 14-Nov-90 | 24.13          | 11.75         | 21.97          | 14.65         | 24.47          | 13.39         | 27.32          | 10.76         | 22.65          | 14.69         | 21.80          | 12.43         |
| 3-Dec-90  | 24.81          | 11.07         | 22.16          | 14.46         | 26.29          | 11.57         | 27.39          | 10.69         | 22.78          | 14.56         | 22.00          | 12.23         |
| 11-Jan-91 | 25.90          | 9.98          | 25.33          | 11.29         | 28.38          | 9.48          | 28.03          | 10.05         | 24.98          | 12.36         | 22.51          | 11.72         |
| 11-Feb-91 | 26.40          | 9.48          | 26.55          | 10.07         | 29.55          | 8.31          | 28.08          | 10.00         | 26.05          | 11.29         | 22.69          | 11.54         |
| 8-Mar-91  | 26.44          | 9.44          | 26.56          | 10.06         | 29.95          | 7.91          | 28.33          | 9.75          | 26.63          | 10.71         | 22.77          | 11.46         |
| 12-Apr-91 | 26.31          | 9.57          | 25.92          | 10.70         | 29.62          | 8.24          | 28.52          | 9.56          | 26.22          | 11.12         | 22.36          | 11.87         |
| 10-May-91 | 25.48          | 10.40         | 24.90          | 11.72         | 29.01          | 8.85          | 28.34          | 9.74          | 25.84          | 11.50         | 22.14          | 12.09         |
| 6-Jun-91  | 25.61          | 10.27         | 24.75          | 11.87         | 29.06          | 8.80          | 28.21          | 9.87          | 25.69          | 11.65         | 22.17          | 12.06         |
| 19-Sep-91 | 25.23          | 10.65         | 23.12          | 13.50         | 26.46          | 11.40         | 27.81          | 10.27         | 23.73          | 13.61         | 22.35          | 11.88         |
| 20-Dec-91 | 24.81          | 11.07         | 22.37          | 14.25         | 25.56          | 12.30         | 27.33          | 10.75         | 23.11          | 14.23         | 22.46          | 11.77         |
| 27-Mar-92 | 23.70          | 12.18         | 20.42          | 16.20         | 23.95          | 13.91         | 26.82          | 11.26         | 21.62          | 15.72         | 21.05          | 13.18         |
| 25-Jun-92 | 23.97          | 11.91         | 20.94          | 15.68         | 24.27          | 13.59         | 26.68          | 11.40         | 21.59          | 15.75         | 21.13          | 13.10         |
| 21-Jan-93 | 23.75          | 12.13         | 21.42          | 15.20         | 24.10          | 13.76         | 26.70          | 11.38         | 21.83          | 15.51         | 21.16          | 13.07         |

## NOTES:

Elevations are in feet above mean sea level (MSL).  
Depth to water measured in feet from top of casing.

Table 2. RESULTS OF ORGANIC CHEMICAL ANALYSES OF GROUNDWATER SAMPLES FROM MONITORING WELLS  
CHINATOWN REDEVELOPMENT PROJECT AREA

Purgeable Aromatics (EPA Method 8020)  
Petroleum Hydrocarbons (EPA Method 8015)

| WELL      | DATE        | BENZENE                       | TOLUENE                       | ETHYL<br>BENZENE              | XYLENES,<br>TOTAL             | TPH AS<br>GASOLINE         |
|-----------|-------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|----------------------------|
|           |             | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.25/0.05 ** |
| MW-3      | 10-Mar-88   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 18-Mar-88   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 25-Mar-88   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 1-Apr-88    | 0.7                           | 0.4                           | ND                            | 1.2                           | ND                         |
|           | 15-Apr-88   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 28-Apr-88 @ | ND/ND (0.4)                   | ND/ND (0.4)                   | ND/ND (0.4)                   | ND/ND (0.4)                   | ND/ND                      |
|           | 11-May-88   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 27-May-88   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 16-Jun-88   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 27-Jul-88   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 26-Aug-88   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 30-Sep-88   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 2-Nov-88    | ND (1.0)                      | ND (1.0)                      | ND (1.0)                      | ND (1.0)                      | ND                         |
|           | 2-Dec-88    | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 4-Jan-89    | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 3-Feb-89    | ND                            | 0.0009                        | ND                            | ND                            | ND                         |
|           | 3-Dec-90    | ND                            | 0.0002 †                      | ND                            | ND                            | ND                         |
|           | 8-Mar-91    | ND                            | ND                            | ND                            | ND                            | ND                         |
| 6-Jun-91  | ND          | ND                            | ND                            | ND a                          | NT                            |                            |
| MW-7      | 4-Apr-89    | ND                            | 0.0007                        | 0.0010                        | 0.0012                        | ND                         |
|           | 3-May-89    | ND                            | 0.0012                        | 0.0018                        | 0.0048                        | 0.27                       |
|           | 6-Jun-89    | 0.0010                        | 0.001                         | 0.0022                        | 0.0011                        | 0.40                       |
|           | 7-Jul-89    | 0.0002                        | 0.001                         | 0.00034                       | 0.0059                        | 0.56                       |
|           | 2-Aug-89    | ND                            | 0.0015                        | 0.0054                        | 0.0059                        | 0.70                       |
|           | 7-Sep-89    | ND                            | ND                            | ND                            | 0.0015                        | 0.59                       |
|           | 5-Oct-89    | ND                            | 0.0011                        | 0.0006                        | 0.0013                        | 0.73                       |
|           | 2-Nov-89    | 0.0002                        | 0.0010                        | 0.0055                        | 0.0036                        | 0.63                       |
|           | 6-Dec-89    | 0.0006                        | 0.0087                        | 0.0059                        | 0.0036                        | 0.32                       |
|           | 3-Jan-90    | 0.0007                        | 0.0007                        | 0.0006                        | 0.0013                        | 0.18                       |
|           | 1-Feb-90    | ND                            | 0.0009                        | ND                            | 0.0003                        | ND                         |
|           | 28-Feb-90   | ND                            | 0.0006                        | 0.0004                        | 0.0052                        | 0.09                       |
|           | 11-Apr-90   | ND                            | 0.0007                        | 0.0033                        | 0.0029                        | 0.13                       |
|           | 18-May-90   | ND                            | 0.0008                        | 0.0014                        | 0.0008                        | 0.43                       |
|           | 13-Sep-90   | ND                            | 0.0019                        | ND                            | ND                            | NT                         |
|           | 3-Dec-90    | 0.0002                        | 0.0024                        | 0.0019                        | 0.0012                        | 0.32                       |
|           | 11-Feb-91   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 8-Mar-91    | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 6-Jun-91    | ND                            | ND                            | ND                            | ND a                          | ND                         |
|           | 20-Dec-91   | 0.0002                        | ND                            | 0.0029                        | 0.0078                        | 0.32                       |
|           | 27-Mar-92   | 0.0006                        | ND b                          | 0.0010                        | 0.0020                        | 0.11                       |
| 25-Jun-92 | ND          | 0.0009                        | 0.0017                        | 0.0035                        | 0.14                          |                            |
| 21-Jan-93 | ND          | 0.0010                        | 0.0017                        | 0.0021                        | 0.15                          |                            |
| MW-12     | 15-Feb-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 3-Mar-89    | NT                            | NT                            | NT                            | NT                            | ND                         |
|           | 5-Apr-89    | 0.0014                        | 0.0023                        | ND                            | 0.0054                        | ND                         |
|           | 2-May-89    | 0.026                         | 0.0033                        | ND                            | 0.0063                        | 0.10                       |
|           | 7-Jun-89    | 0.034                         | 0.0037                        | ND                            | 0.012                         | 0.18                       |
|           | 6-Jul-89    | 0.029                         | 0.0025                        | ND                            | 0.0059                        | 0.12                       |
|           | 2-Aug-89    | 0.023                         | 0.002                         | ND                            | 0.005                         | ND                         |
|           | 7-Sep-89 @  | 0.051/0.059                   | 0.0018/0.0022                 | ND/ND                         | 0.0049/0.0058                 | ND/ND                      |
|           | 5-Oct-89 @  | 0.037/0.040                   | 0.0032/0.0031                 | ND/ND                         | 0.0086/0.0094                 | ND/ND                      |
|           | 2-Nov-89    | 0.0056                        | 0.0011                        | ND                            | 0.0019                        | 0.071                      |
|           | 6-Dec-89    | 0.0062                        | 0.0012                        | ND                            | 0.0017                        | 0.06                       |
|           | 3-Jan-90    | 0.0086                        | 0.0010                        | ND                            | 0.0012                        | 0.09                       |
|           | 1-Feb-90 @  | 0.0018/0.0024                 | 0.0010/0.0004                 | ND/ND                         | 0.0005/0.0004                 | ND/ND                      |
|           | 1-Mar-90    | 0.0016                        | 0.0014                        | ND                            | 0.0003                        | ND                         |
|           | 11-Apr-90   | 0.0066                        | 0.0174                        | 0.0015                        | 0.0116                        | 0.147                      |
|           | 18-May-90   | ND                            | 0.0009                        | ND                            | ND                            | ND                         |
|           | 12-Sep-90   | ND                            | ND                            | ND                            | 0.0002                        | NT                         |
| 3-Dec-90  | 0.0006      | 0.0002 †                      | ND                            | 0.0002 †                      | ND                            |                            |

Table 2. RESULTS OF ORGANIC CHEMICAL ANALYSES OF GROUNDWATER SAMPLES FROM MONITORING WELLS  
CHINATOWN REDEVELOPMENT PROJECT AREA

Purgeable Aromatics (EPA Method 8020)  
Petroleum Hydrocarbons (EPA Method 8015)

| WELL     | DATE        | BENZENE                       | TOLUENE                       | ETHYL<br>BENZENE              | XYLENES,<br>TOTAL             | TPH AS<br>GASOLINE         |
|----------|-------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|----------------------------|
|          |             | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.25/0.05 ** |
| MW-18    | 15-Feb-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|          | 3-Mar-89    | NT                            | NT                            | NT                            | NT                            | ND                         |
|          | 5-Apr-89    | ND                            | ND                            | ND                            | ND                            | ND                         |
|          | 2-May-89    | ND                            | ND                            | ND                            | ND                            | ND                         |
|          | 7-Jun-89    | ND                            | ND                            | ND                            | ND                            | ND                         |
|          | 6-Jul-89    | ND                            | ND                            | ND                            | ND                            | ND                         |
|          | 2-Aug-89    | ND                            | ND                            | ND                            | ND                            | ND                         |
|          | 6-Sep-89    | ND                            | ND                            | ND                            | ND                            | ND                         |
|          | 5-Oct-89    | ND                            | ND                            | ND                            | ND                            | ND                         |
|          | 1-Nov-89    | ND                            | ND                            | ND                            | ND                            | ND                         |
|          | 6-Dec-89    | ND                            | 0.0009                        | ND                            | 0.0013                        | ND                         |
|          | 2-Jan-90    | 0.016                         | 0.0080                        | 0.0014                        | 0.0098                        | 0.10                       |
|          | 1-Feb-90    | ND                            | ND                            | ND                            | ND                            | ND                         |
|          | 1-Mar-90    | 0.0003                        | ND                            | ND                            | 0.0002                        | ND                         |
|          | 11-Apr-90   | 0.0004                        | 0.0006                        | 0.0005                        | 0.0003                        | ND                         |
|          | 18-May-90   | ND                            | ND                            | ND                            | ND                            | ND                         |
|          | 13-Sep-90   | 0.0027                        | ND                            | ND                            | ND                            | NT                         |
|          | 4-Dec-90    | 0.0029                        | 0.0002 †                      | ND                            | 0.0003 †                      | ND                         |
|          | 8-Mar-91    | 0.0009                        | 0.0003                        | ND                            | ND                            | ND                         |
|          | 6-Jun-91    | ND                            | ND                            | ND                            | ND a                          | NT                         |
|          | 19-Sep-91   | ND b                          | ND b                          | ND b                          | ND b                          | ND                         |
|          | 20-Dec-91   | 0.0004                        | ND                            | ND b                          | ND b                          | NT                         |
|          | 27-Mar-92   | 0.0016                        | ND b                          | ND b                          | ND b                          | NT                         |
|          | 25-Jun-92   | 0.0008                        | ND b                          | ND b                          | 0.0007                        | NT                         |
|          | 21-Jan-93 @ | 0.011/0.011                   | 0.0004/0.0005                 | ND b                          | 0.0011/0.0007                 | NT                         |
| MW-19    | 15-Dec-89   | 5.0                           | 0.30                          | 0.078                         | 0.61                          | 12                         |
|          | 3-Jan-90    | 3.0                           | 0.46                          | 0.12                          | 1.1                           | 13                         |
|          | 1-Feb-90    | 1.1                           | 0.022                         | LT 0.0040                     | 0.032                         | 1.9                        |
|          | 1-Mar-90    | 4.2                           | 0.92                          | 0.24                          | 0.82                          | 9.2                        |
|          | 11-Apr-90   | 3.8                           | 1.1                           | 0.82                          | 0.34                          | 10                         |
|          | 18-May-90   | 5.6                           | 0.75                          | 0.70                          | 0.78                          | 11                         |
|          | 13-Sep-90   | 1.4                           | 1.2                           | 0.35                          | 1.6                           | NT                         |
|          | 4-Dec-90    | 2.1                           | 1.5                           | 0.42                          | 1.6                           | 12                         |
|          | 11-Feb-91   | 0.45                          | 0.12                          | 0.086                         | 0.21                          | 2.7                        |
|          | 8-Mar-91    | 0.52                          | 0.057                         | 0.020                         | 0.083                         | 1.4                        |
|          | 10-May-91   | 0.32                          | 0.088                         | 0.055                         | 0.160                         | 1.8                        |
|          | 6-Jun-91 @  | 0.38/0.46                     | 0.027/0.038                   | 0.023/0.030                   | 0.092/0.15                    | 3.4/NT                     |
|          | 19-Sep-91   | 0.21                          | 0.023                         | 0.094                         | 0.15                          | 3.5                        |
|          | 20-Dec-91   | 1.0                           | 0.24                          | 0.5                           | 1.2                           | 9.6                        |
|          | 27-Mar-92   | 0.34                          | 0.13                          | 0.12                          | 0.34                          | 3.6                        |
|          | 25-Jun-92   | 1.1                           | 0.38                          | 0.53                          | 1.6                           | 10                         |
|          | 21-Jan-93   | 0.84                          | 0.18                          | 0.43                          | 1.1                           | 8.4                        |
| MW-20    | 15-Dec-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|          | 3-Jan-90    | 0.0004                        | 0.0004                        | ND                            | 0.0008                        | ND                         |
|          | 1-Feb-90    | ND                            | 0.0014                        | ND                            | 0.0005                        | ND                         |
|          | 28-Feb-90   | ND                            | ND                            | ND                            | 0.0005                        | ND                         |
|          | 11-Apr-90   | 0.0028                        | 0.0110                        | 0.0011                        | 0.0066                        | ND                         |
|          | 18-May-90   | ND                            | ND                            | ND                            | ND                            | ND                         |
|          | 12-Sep-90   | ND                            | ND                            | ND                            | ND                            | NT                         |
|          | 3-Dec-90    | ND                            | 0.0002 †                      | ND                            | ND                            | ND                         |
|          | 8-Mar-91    | ND                            | ND                            | ND                            | ND                            | ND                         |
| 6-Jun-91 | ND          | ND                            | ND                            | ND a                          | NT                            |                            |
| MW-21    | 27-Aug-90   | ND                            | ND                            | ND                            | ND                            | NT                         |
|          | 12-Sep-90   | ND                            | ND                            | ND                            | ND                            | NT                         |
|          | 3-Dec-90    | ND                            | 0.0005 †                      | ND                            | 0.0011 †                      | ND                         |
|          | 8-Mar-91    | ND                            | ND                            | ND                            | ND                            | ND                         |
|          | 6-Jun-91    | ND                            | ND                            | ND                            | ND a                          | NT                         |

**Table 2. RESULTS OF ORGANIC CHEMICAL ANALYSES OF GROUNDWATER SAMPLES FROM MONITORING WELLS  
CHINATOWN REDEVELOPMENT PROJECT AREA**

Purgeable Aromatics (EPA Method 8020)  
Petroleum Hydrocarbons (EPA Method 8015)

| WELL      | DATE       | BENZENE                       | TOLUENE                       | ETHYL<br>BENZENE              | XYLENES,<br>TOTAL             | TPH AS<br>GASOLINE         |
|-----------|------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|----------------------------|
|           |            | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.25/0.05 ** |
| MW-22     | 27-Aug-90  | ND                            | ND                            | ND                            | ND                            | NT                         |
|           | 13-Sep-90  | ND                            | ND                            | ND                            | ND                            | NT                         |
|           | 4-Dec-90   | ND                            | 0.0002 †                      | ND                            | 0.0002 †                      | ND                         |
|           | 8-Mar-91   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 6-Jun-91   | ND                            | ND                            | ND                            | ND a                          | NT                         |
| MW-23     | 27-Aug-90  | ND                            | ND                            | ND                            | ND                            | NT                         |
|           | 13-Sep-90  | ND                            | ND                            | ND                            | ND                            | NT                         |
|           | 4-Dec-90   | ND                            | 0.0002 †                      | ND                            | ND                            | ND                         |
|           | 8-Mar-91   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 6-Jun-91   | ND                            | 0.0004                        | ND                            | ND a                          | NT                         |
|           | 20-Dec-91  | ND                            | ND                            | ND b                          | ND b                          | NT                         |
|           | 27-Mar-92  | 0.0056                        | 0.0064                        | 0.0016                        | 0.0082                        | NT                         |
|           | 25-Jun-92  | ND/ND b                       | ND/ND b                       | ND/ND b                       | ND/ND b                       | NT/NT                      |
| 21-Jan-93 | ND         | ND                            | ND                            | ND                            | NT                            |                            |
| BLANK     | 5-Apr-89   | 0.5                           | ND                            | ND                            | ND                            | ND                         |
|           | 1-May-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 6-Jun-89 @ | ND/ND                         | ND/ND                         | ND/ND                         | ND/ND                         | ND/ND                      |
|           | 1-Aug-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 2-Aug-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 3-Aug-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 6-Sep-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 7-Sep-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 4-Oct-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 2-Nov-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 5-Dec-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 3-Jan-90   | ND                            | 0.0006                        | ND                            | 0.0017                        | ND                         |
|           | 13-Sep-90  | ND                            | ND                            | ND                            | ND                            | NT                         |
|           | 11-Feb-91  | ND                            | ND                            | ND                            | ND                            | NT                         |
|           | 8-Mar-91   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 19-Sep-91  | ND b                          | ND b                          | ND b                          | ND b                          | ND                         |
|           | 20-Dec-91  | ND                            | ND                            | ND b                          | ND b                          | NT                         |
|           | 27-Mar-92  | ND b                          | ND b                          | ND b                          | ND b                          | NT                         |
| 25-Jun-92 | ND b       | ND b                          | ND b                          | ND b                          | NT                            |                            |
| 21-Jan-93 | ND         | ND                            | ND                            | ND                            | NT                            |                            |

## NOTES:

Results reported in milligrams per liter (mg/l); equivalent to parts per million.

Analyses performed by PACE Laboratories, Inc., Novato, California.

Specific limits of detection for compounds detected in June 1992 groundwater samples are presented in the appendix of this report.

LOD: Limit of Detection.

ND: Not detected at or above LOD.

NT: Not tested.

(0.4): Numbers in parentheses are limits of detection.

\*: LOD Changed to 0.0002 on 01-May-89, unless otherwise noted.

\*\* : LOD Changed to 0.05 on 01-May-89, unless otherwise noted.

† : PACE laboratory reported toluene and total xylenes in the method blanks analyzed along with the samples.

@: Two values indicate results of duplicate analyses.

LT: Less than the concentration indicated.

a: Method detection limit is 0.0004 mg/l.

b: Method detection limit is 0.0005 mg/l.

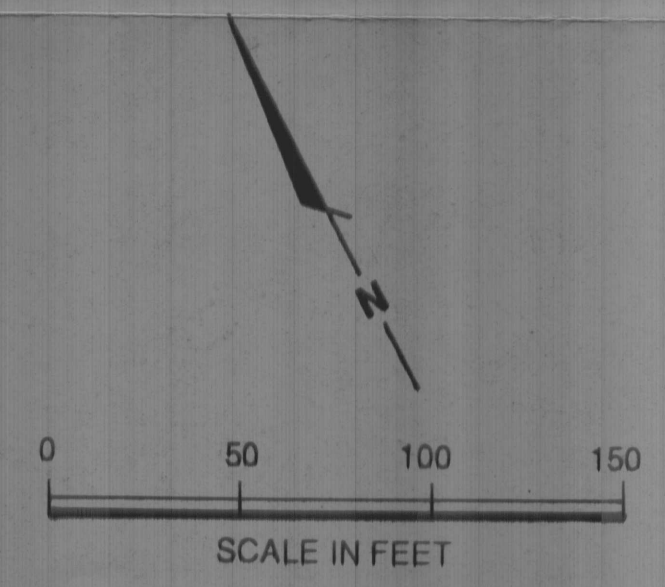
PLATE





**EXPLANATION**

- MW-2 (14.97) Monitoring Well Location and Number (Water-level elevations in feet AMSL) measured January 21, 1993
- BART Subsurface Easement Boundary
- PRP Site Boundary
- EBMUD Site Boundary
- Water-Level Elevation Contour (feet AMSL)
- NM Not Measured



|   |  |          |                                  |
|---|--|----------|----------------------------------|
|   | <b>Harding Lawson Associates</b>       |          | <b>1</b><br><small>PLATE</small> |
|   | Engineering and Environmental Services |          |                                  |
| <b>Plan of Sites and Vicinity and Water-Level Contour Map - January 1993</b><br>Chinatown Redevelopment Project Area<br>Oakland, California |  |          |                                  |
| DRAWN   | JOB NUMBER                             | APPROVED | DATE                             |
| NJB   | 10874 040                              |          | 7/91                             |

**APPENDIX**  
**RESULTS OF LABORATORY ANALYSIS OF**  
**GROUNDWATER SAMPLES FROM MONITORING WELLS**



# REPORT OF LABORATORY ANALYSIS

February 02, 1993

FEB 3 '93 AM 9:18

Mr. David Leland  
Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94945

RE: PACE Project No. 430121.501  
Client Reference: FRP Oakland/10874,039

Dear Mr. Leland:

Enclosed is the report of laboratory analyses for samples received January 21, 1993.

Footnotes are given at the end of the report.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,

  
Carol Reid  
Project Manager

Enclosures



# REPORT OF LABORATORY ANALYSIS

Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94945

February 02, 1993  
PACE Project Number: 430121501

Attn: Mr. David Leland

MW-19

Client Reference: PRP Oakland/10874,039

PACE Sample Number:  
Date Collected:  
Date Received:

70 0279038  
01/21/93  
01/21/93  
93012101

| <u>Parameter</u> | <u>Units</u> | <u>MDL</u> | <u>DATE ANALYZED</u> |
|------------------|--------------|------------|----------------------|
|------------------|--------------|------------|----------------------|

## ORGANIC ANALYSIS

|   |      |     |          |
|---|------|-----|----------|
| <u>PURGEABLE FUELS AND AROMATICS</u>            |      |     |          |
| TOTAL FUEL HYDROCARBONS, (LIGHT):               |      | -   | 01/22/93 |
| Total Purgeable Fuels, as Gasoline              | ug/L | 500 | 8400     |
| <u>PURGEABLE AROMATICS (BTXE BY EPA 8020M):</u> |      |     |          |
| Benzene   | ug/L | 2.0 | 840      |
| Toluene   | ug/L | 2.0 | 180      |
| Ethylbenzene                                    | ug/L | 2.0 | 430      |
| Xylenes, Total                                  | ug/L | 2.0 | 1100     |

Mr. David Leland  
 Page 2

February 02, 1993  
 PACE Project Number: 430121501

Client Reference: PRP Oakland/10874,039

MW-7

PACE Sample Number: 70 0279046  
 Date Collected: 01/21/93  
 Date Received: 01/21/93  
 Client Sample ID: 93012105

| <u>Parameter</u> | <u>Units</u> | <u>MDL</u> | <u>DATE ANALYZED</u> |
|------------------|--------------|------------|----------------------|
|------------------|--------------|------------|----------------------|

ORGANIC ANALYSIS

|  |      |     |          |
|--|------|-----|----------|
| <u>PURGEABLE FUELS AND AROMATICS</u>     |      |     |          |
| TOTAL FUEL HYDROCARBONS, (LIGHT):        |      |     | 01/28/93 |
| Total Purgeable Fuels, as Gasoline       | ug/L | 50  | 150      |
| PURGEABLE AROMATICS (BTXE BY EPA 8020M): |      |     | 01/28/93 |
| Benzene                                  | ug/L | 0.5 | ND       |
| Toluene                                  | ug/L | 0.2 | 1.0      |
| Ethylbenzene                             | ug/L | 0.5 | 1.7      |
| Xylenes, Total                           | ug/L | 0.5 | 2.1      |



# REPORT OF LABORATORY ANALYSIS

Mr. David Leland  
Page 3

February 02, 1993  
PACE Project Number: 430121501

Client Reference: PRP Oakland/10874,039

PACE Sample Number:  
Date Collected:  
Date Received:  
Client Sample ID:  
Parameter

70 0279054  
01/21/93  
01/21/93  
93012102

MW-23

## ORGANIC ANALYSIS

### PURGEABLE AROMATICS (BTXE BY EPA 8020M):

| <u>Parameter</u> | <u>Units</u> | <u>MDL</u> | <u>DATE ANALYZED</u> |
|------------------|--------------|------------|----------------------|
| Benzene          | ug/L         | 0.2        | 01/22/93             |
| Toluene          | ug/L         | 0.2        | 01/22/93             |
| Ethylbenzene     | ug/L         | 0.2        | 01/22/93             |
| Xylenes, Total   | ug/L         | 0.2        | 01/22/93             |

**REPORT OF LABORATORY ANALYSIS**

Mr. David Leland  
 Page 4

February 02, 1993  
 PACE Project Number: 430121501

Client Reference: PRP Oakland/10874,039

MW-18

PACE Sample Number: 70 0279062  
 Date Collected: 01/21/93  
 Date Received: 01/21/93  
 Client Sample ID: 93012103

| <u>Parameter</u> | <u>Units</u> | <u>MDL</u> |  | <u>DATE ANALYZED</u> |
|------------------|--------------|------------|--|----------------------|
|------------------|--------------|------------|--|----------------------|

ORGANIC ANALYSIS

|  |      |     |     |          |
|--|------|-----|-----|----------|
| PURGEABLE AROMATICS (BTXE BY EPA 8020M): |      |     | -   | 01/22/93 |
| Benzene                                  | ug/L | 0.2 | 11  | 01/22/93 |
| Toluene                                  | ug/L | 0.2 | 0.4 | 01/22/93 |
| Ethylbenzene                             | ug/L | 0.2 | ND  | 01/22/93 |
| Xylenes, Total                           | ug/L | 0.2 | 1.1 | 01/22/93 |



# REPORT OF LABORATORY ANALYSIS

Mr. David Leland  
Page 5

February 02, 1993  
PACE Project Number: 430121501

Client Reference: PRP Oakland/10874,039

*Duplicate  
MW-18*

PACE Sample Number:  
Date Collected:  
Date Received:  
Client Sample ID:

70 0279070  
01/21/93  
01/21/93  
93012104

| <u>Parameter</u> | <u>Units</u> | <u>MDL</u> | <u>DATE ANALYZED</u> |
|------------------|--------------|------------|----------------------|
|------------------|--------------|------------|----------------------|

### ORGANIC ANALYSIS

PURGEABLE AROMATICS (BTXE BY EPA 8020M):

|                |      |     |     |          |
|----------------|------|-----|-----|----------|
| Benzene        | ug/L | 0.2 | 11  | 01/22/93 |
| Toluene        | ug/L | 0.2 | 0.5 | 01/22/93 |
| Ethylbenzene   | ug/L | 0.5 | ND  | 01/22/93 |
| Xylenes, Total | ug/L | 0.2 | 0.7 | 01/22/93 |





# REPORT OF LABORATORY ANALYSIS

Mr. David Leland  
Page 6

February 02, 1993  
PACE Project Number: 430121501

Client Reference: PRP Oakland/10874,039

*Field*  
*Blank*

PACE Sample Number: 70 0279089  
Date Collected: 01/21/93  
Date Received: 01/21/93  
Client Sample ID: 93012106

| <u>Parameter</u> | <u>Units</u> | <u>MDL</u> | <u>DATE ANALYZED</u> |
|------------------|--------------|------------|----------------------|
|------------------|--------------|------------|----------------------|

### ORGANIC ANALYSIS

|  |      |     |    |
|--|------|-----|----|
| PURGEABLE AROMATICS (BTXE BY EPA 8020M): |      |     |    |
| Benzene                                  | ug/L | 0.2 | ND |
| Toluene                                  | ug/L | 0.2 | ND |
| Ethylbenzene                             | ug/L | 0.2 | ND |
| Xylenes, Total                           | ug/L | 0.2 | ND |

These data have been reviewed and are approved for release.

*Darrell Cain*  
Darrell C. Cain  
Regional Director



# REPORT OF LABORATORY ANALYSIS

Mr. David Leland  
Page 7

FOOTNOTES  
for pages 1 through 6

February 02, 1993  
PACE Project Number: 430121501

Client Reference: PRP Oakland/10874,039

MDL Method Detection Limit  
ND Not detected at or above the MDL.

11 Digital Drive  
Novato, CA 94949  
TEL: 415-883-6100  
FAX: 415-883-2673

Offices Serving: Minneapolis, Minnesota  
Tampa, Florida  
Iowa City, Iowa  
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Kansas City, Missouri  
Los Angeles, California

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Asheville, North Carolina  
New York, New York  
Pittsburgh, Pennsylvania  
Denver, Colorado

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# REPORT OF LABORATORY ANALYSIS

Mr. David Leland  
Page 8

QUALITY CONTROL DATA

February 02, 1993  
PACE Project Number: 430121501

Client Reference: PRP Oakland/10874,039

**PURGEABLE FUELS AND AROMATICS**

Batch: 70 18221

Samples: 70 0279038, 70 0279054, 70 0279062, 70 0279070, 70 0279089

**METHOD BLANK:**

| Parameter                                | Units | MDL | Method Blank |
|--|-------|-----|--------------|
| TOTAL FUEL HYDROCARBONS, (LIGHT):        |       |     | -            |
| Purgeable Fuels, as Gasoline (EPA 8015M) | ug/L  | 50  | ND           |
| PURGEABLE AROMATICS (BTXE BY EPA 8020M)  |       |     | -            |
| Benzene                                  | ug/L  | 0.5 | ND           |
| Toluene                                  | ug/L  | 0.5 | ND           |
| Ethylbenzene                             | ug/L  | 0.5 | ND           |
| Xylenes, Total                           | ug/L  | 0.5 | ND           |

**LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:**

| Parameter                                | Units | MDL | Reference Value | Recv | Dup1 Recv | RPD |
|--|-------|-----|-----------------|------|-----------|-----|
| Purgeable Fuels, as Gasoline (EPA 8015M) | ug/L  | 50  | 1000            | 96%  | 99%       | 3%  |
| Benzene                                  | ug/L  | 0.5 | 40.0            | 99%  | 98%       | 1%  |
| Toluene                                  | ug/L  | 0.5 | 40.0            | 98%  | 96%       | 2%  |
| Ethylbenzene                             | ug/L  | 0.5 | 40.0            | 101% | 98%       | 3%  |
| Xylenes, Total                           | ug/L  | 0.5 | 120             | 103% | 100%      | 2%  |



# REPORT OF LABORATORY ANALYSIS

Mr. David Leland  
Page 9

## QUALITY CONTROL DATA

February 02, 1993  
PACE Project Number: 430121501

Client Reference: PRP Oakland/10874,039

PURGEABLE FUELS AND AROMATICS  
Batch: 70 18327  
Samples: 70 0279046

### METHOD BLANK:

| Parameter                                | Units | MDL | Method Blank |
|--|-------|-----|--------------|
| TOTAL FUEL HYDROCARBONS, (LIGHT):        |       |     | -            |
| Purgeable Fuels, as Gasoline (EPA 8015M) | ug/L  | 50  | ND           |
| PURGEABLE AROMATICS (BTXE BY EPA 8020M)  |       |     | -            |
| Benzene                                  | ug/L  | 0.5 | ND           |
| Toluene                                  | ug/L  | 0.5 | ND           |
| Ethylbenzene                             | ug/L  | 0.5 | ND           |
| Xylenes, Total                           | ug/L  | 0.5 | ND           |

### LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

| Parameter                                | Units | MDL | Reference Value | Recv | Dupl Recv | RPD |
|--|-------|-----|-----------------|------|-----------|-----|
| Purgeable Fuels, as Gasoline (EPA 8015M) | ug/L  | 50  | 1000            | 96%  | 99%       | 3%  |
| Benzene                                  | ug/L  | 0.5 | 40.0            | 99%  | 98%       | 1%  |
| Toluene                                  | ug/L  | 0.5 | 40.0            | 98%  | 97%       | 1%  |
| Ethylbenzene                             | ug/L  | 0.5 | 40.0            | 100% | 99%       | 1%  |
| Xylenes, Total                           | ug/L  | 0.5 | 120             | 103% | 101%      | 1%  |

Mr. David Leland  
Page 10

FOOTNOTES  
for pages 8 through 9

February 02, 1993  
PACE Project Number: 430121501

Client Reference: PRP Oakland/10874,039

MDL Method Detection Limit  
ND Not detected at or above the MDL.  
RPD Relative Percent Difference



Harding Lawson Associates  
 7655 Redwood Boulevard  
 P.O. Box 578  
 Novato, California 94948  
 415/892-0621  
 Teletcopy: General: 415/892-0831  
 Accounting: 415/898-1052

# CHAIN OF CUSTODY FORM

Lab: Pace

Samplers: SJK DME

Job Number: 10874,039

Name/Location: PRP Oakland

Project Manager: David Leland

Recorder: Steve Kozlay  
 (Signature Required)

| SOURCE CODE | MATRIX |          |      |     | #CONTAINERS & PRESERV. |                                |                  | SAMPLE NUMBER OR LAB NUMBER |    |    | DATE |    |    |    | STATION DESCRIPTION/NOTES |         |
|-------------|--------|----------|------|-----|------------------------|--------------------------------|------------------|-----------------------------|----|----|------|----|----|----|---------------------------|---------|
|             | Water  | Sediment | Soil | Oil | Unpres.                | H <sub>2</sub> SO <sub>4</sub> | HNO <sub>3</sub> | HCL                         | Yr | Wk | Seq  | Yr | Mo | Dy |                           | Time    |
|             |        |          |      |     |                        |                                |                  |                             |    |    |      |    |    |    |                           |         |
| 20          | X      |          |      |     |                        |                                | 3                | 93                          | 01 | 21 | 01   | 93 | 01 | 21 | 0550                      | MW-19   |
| 20          | X      |          |      |     |                        |                                | 3                | 93                          | 01 | 21 | 02   | 93 | 01 | 21 | 0620                      | MW-23   |
| 20          | X      |          |      |     |                        |                                | 3                | 93                          | 01 | 21 | 08   | 93 | 01 | 21 | 0705                      | MW-18   |
| 20          | X      |          |      |     |                        |                                | 3                | 93                          | 01 | 21 | 04   | 93 | 01 | 21 | 0720                      | Dup     |
| 20          | X      |          |      |     |                        |                                | 3                | 93                          | 01 | 21 | 05   | 93 | 01 | 21 | 0750                      | MW-7    |
| 20          | X      |          |      |     |                        |                                | 3                | 93                          | 01 | 21 | 06   | 93 | 01 | 21 | 0800                      | F-blank |

| ANALYSIS REQUESTED |              |              |              |            |              |    |     |  |  |
|--------------------|--------------|--------------|--------------|------------|--------------|----|-----|--|--|
| EPA 601/8010       | EPA 602/8020 | EPA 624/8240 | EPA 625/8270 | ICP METALS | EPA 605/8100 | PH | GAS |  |  |
| X                  | X            |              |              |            | X            |    |     |  |  |
| X                  | X            |              |              |            |              |    |     |  |  |
| X                  | X            |              |              |            |              |    |     |  |  |
| X                  | X            |              |              |            |              |    |     |  |  |
| X                  |              |              |              |            | X            |    |     |  |  |
| X                  |              |              |              |            |              |    |     |  |  |

| LAB NUMBER |    |     | DEPTH IN FEET | COL MTD CD | QA CODE | MISCELLANEOUS |
|------------|----|-----|---------------|------------|---------|---------------|
| Yr         | Wk | Seq |               |            |         |               |
|            |    |     |               |            |         | Standard TAT  |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |

| CHAIN OF CUSTODY RECORD                      |                          |                                  |                    |
|--|--------------------------|----------------------------------|--------------------|
| RELINQUISHED BY: (Signature)                 | RECEIVED BY: (Signature) | DATE/TIME                        |                    |
| RELINQUISHED BY: (Signature)                 | RECEIVED BY: (Signature) | DATE/TIME                        |                    |
| RELINQUISHED BY: (Signature)                 | RECEIVED BY: (Signature) | DATE/TIME                        |                    |
| RELINQUISHED BY: (Signature)                 | RECEIVED BY: (Signature) | DATE/TIME                        |                    |
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JANUARY 1993  
CHINATOWN REDEVELOPMENT PROJECT AREA  
OAKLAND, CALIFORNIA  
March 31, 1993**

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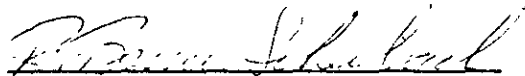
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QUALITY CONTROL REVIEWER



R. Bruce Scheibach  
Registered Geologist - 5062



A Report Prepared for

Redevelopment Agency of the City of Oakland  
1333 Broadway, 9th Floor  
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**REPORT OF GROUNDWATER MONITORING  
JUNE 1993  
CHINATOWN REDEVELOPMENT PROJECT AREA  
OAKLAND, CALIFORNIA**

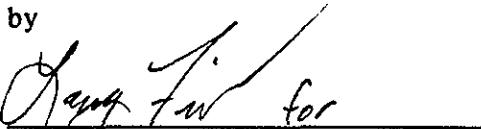
HLA Project No. 10874 040

8-9-93


Submitted to:

California Regional Water Quality Control Board  
San Francisco Bay Region  
2101 Webster Street, Suite 500  
Oakland, California 94612

by



Mark T. Egbert  
Project Geologist



David F. Leland, P.E.  
Associate Engineer

Harding Lawson Associates  
7655 Redwood Boulevard  
P.O. Box 578  
Novato, California 94948  
415/892-0821

August 9, 1993



Transmittal/Memorandum

98 AUG 16 PM 12:45

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**To:** Mr. Donald Dalke  
California Regional Water Quality Control Board  
San Francisco Bay Region  
2101 Webster Street, Suite 500  
Oakland, California 94612

---

**From:** David Leland DL  
**Date:** August 13, 1993  
**Subject:** Report of Groundwater Monitoring, June 1993  
**Job No.:** 10874 040

---

**Remarks:** Please find enclosed a copy of HLA's *Report of Groundwater Monitoring, June 1993, Chinatown Redevelopment Project Area, Oakland, California*, dated August 9, 1993. This report documents results of scheduled semiannual groundwater monitoring in the Project Area.

---

**cc:** Mr. Peter Chen, Redevelopment Agency  
Ms. Jennifer Eberle, ACDEH  
Mr. Rich Hiatt, RWQCB

jb30496-O

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| DISTRIBUTION  |   |   |

## 1.0 INTRODUCTION

This report presents the results of the June 1993 biannual groundwater monitoring in the Chinatown Redevelopment Project Area (Project Area) of Oakland, California (Plate 1). Groundwater monitoring in June 1993 included of sampling six monitoring wells and measuring water levels in 11 wells. Groundwater flow directions and the presence of gasoline constituents in groundwater in the Project Area were evaluated.

Biannual groundwater monitoring was recommended for January and July 1993 in Harding Lawson Associates' report titled *Report of Groundwater Monitoring, June 1992* (HLA, 1992) to provide data during a wet season and dry season. The dry season sampling, proposed for July 1993, was completed in late June, to coordinate sampling of two wells in the southwest part of the Project Area with the scheduled sampling of four Project Area wells. The two additional wells, Wells MW-20 and MW-21, were sampled to determine if gasoline constituents were present in groundwater in the southwest part of the Project Area.

## 2.0 BIENNIAL GROUNDWATER MONITORING

For the biennial groundwater monitoring conducted on June 24, 1993, water levels were measured in 11 wells (Table 1) and groundwater samples were collected from Monitoring Wells MW-7, MW-18, MW-19, MW-20, MW-21 and MW-23. Wells MW-20 and MW-21 were not originally planned for sampling but were included at the request of the Redevelopment Agency of the City of Oakland. Water level measurements were recorded to monitor hydraulic conditions in the Project Area and groundwater samples were collected to assess groundwater chemistry. Eight samples were submitted to the laboratory for analysis, including samples from the six monitoring wells, a duplicate from Monitoring Well MW-21, and a field blank.

Standard HLA decontamination protocol for equipment was followed prior to sampling. HLA employees performing field work were trained in safety procedures and used Level D personal protective equipment.

Three well volumes were purged from the wells prior to sampling, collected in 55-gallon drums, and retained onsite. Groundwater samples were collected with a stainless steel bailer and decanted into 40-milliliter sample bottles, which were labeled and stored on ice until delivery under chain of custody to Pace Laboratories, Inc. (PACE), of Novato, California, for chemical analysis. All groundwater samples and the field blank were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Test Method 8020; samples from Wells MW-7, MW-19, MW-20, and MW-21 also were analyzed for total petroleum hydrocarbons (TPH) as gasoline using EPA Test Method 8015. The duplicate from Well MW-21 was not analyzed for TPH as gasoline.

### 3.0 RESULTS

#### 3.1 Groundwater Elevations and Potentiometric Contours

Depth to groundwater and calculated water elevations for June 1993 are presented in Table 1; the potentiometric surface interpreted from the water-elevation data is shown on Plate 1. The data indicate groundwater flow is generally west to south in the western and southern portions of the Project Area.

Water levels increased from January to June in all 11 monitoring wells to the highest levels historically measured. The increases ranged from a minimum of 0.23 feet at Well MW-18 to a maximum of 3.16 feet at Well MW-3.

#### 3.2 Groundwater Analytical Results

Results of chemical analyses of the groundwater samples collected on June 24, 1993, are presented in Table 2 along with historical groundwater chemistry data. Laboratory reports for groundwater samples collected in June are presented in the Appendix.

BTEX compounds were detected in groundwater samples from Monitoring Wells MW-19 and MW-23. In general, concentrations of BTEX and TPH as gasoline at Well MW-19 are lower than concentrations measured before dewatering activities at the PRP site began in November 1990. Concentrations at MW-19 have declined each monitoring round since June 1992. At Well MW-23, total xylenes were detected at 0.0012 milligrams per liter (mg/l), which is slightly above the method detection limit of 0.0005 mg/l. Total xylenes had not been detected since March 1992. BTEX compounds detected in January 1993 at Wells MW-7 and MW-18 were not detected in June 1993. BTEX compounds were not detected in any other groundwater samples or in the field blank.

#### 4.0 DISCUSSION AND RECOMMENDATIONS

In general, groundwater flow directions for June 1993 were similar to those measured since dewatering activities ceased. The measurements continue to show the influence of the buildings constructed in the Project Area on groundwater flow direction, as mentioned in earlier reports (e.g., *HLA, 1992*).

Current water levels are the highest for the period of record in the Project Area, apparently reflecting both the cessation of construction dewatering activities in the area and the end of drought conditions in the region. Water level increases between January and June at Wells MW-2, MW-6, MW-19, and MW-22, located east and north of the site, were very similar, varying from 1.12 to 1.16 feet. The similarity of these water level increases may be due to the locations of these wells upgradient of and, therefore, in an area hydraulically unaffected by the below-grade structures in the Project Area. The June 1993 water-level elevation at Well MW-3 appears to be consistent with nearby wells; in January 1993 it appeared to be anomalously lower.

Laboratory analyses of water samples collected in June 1993 indicate that concentrations of TPH as gasoline and BTEX compounds at MW-19 have declined since June 1992 and are lower than pre-dewatering concentrations for these constituents. In addition, analytes were not detected at Well MW-7, and only xylene was detected at a low concentration at Well MW-23. TPH as gasoline and BTEX compounds were not detected in any other samples. Chemical concentrations have decreased to the lowest levels since March 1992 at MW-19, and the lowest levels since June 1991 at Well MW-7. This overall improvement in water quality in the Project Area appears to reflect a combination of source removals completed in the last several years and increased groundwater levels resulting from increased post-drought precipitation.

The biannual monitoring performed in June 1993 completes the scheduled monitoring for this site. Because of the overall improvement in water quality and the trend of decline in measured concentrations, no additional monitoring is recommended in the Project Area at this time.



**5.0 REFERENCES**

Harding Lawson Associates, 1992. *Report of Groundwater Monitoring, June 1992, Chinatown Redevelopment Project Area, Oakland, California.* September 9.

TABLES

Table 1. WATER-LEVEL ELEVATIONS - NOVEMBER 1990 THROUGH JUNE 1993  
CHINATOWN REDEVELOPMENT PROJECT AREA

| Well No.  | MW-18          |               | MW-19          |               | MW-20          |               | MW-21          |               | MW-22          |               | MW-23          |               |
|-----------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|
|           | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING |
|           | 36.52          | 35.88         | 37.15          | 36.62         | 38.32          | 37.86         | 38.67          | 38.08         | 37.70          | 37.34         | 34.68          | 34.23         |
| DATE      | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     |
| 14-Nov-90 | 24.13          | 11.75         | 21.97          | 14.65         | 24.47          | 13.39         | 27.32          | 10.76         | 22.65          | 14.69         | 21.80          | 12.43         |
| 3-Dec-90  | 24.81          | 11.07         | 22.16          | 14.46         | 26.29          | 11.57         | 27.39          | 10.69         | 22.78          | 14.56         | 22.00          | 12.23         |
| 11-Jan-91 | 25.90          | 9.98          | 25.33          | 11.29         | 28.38          | 9.48          | 28.03          | 10.05         | 24.98          | 12.36         | 22.51          | 11.72         |
| 11-Feb-91 | 26.40          | 9.48          | 26.55          | 10.07         | 29.55          | 8.31          | 28.08          | 10.00         | 26.05          | 11.29         | 22.69          | 11.54         |
| 8-Mar-91  | 26.44          | 9.44          | 26.56          | 10.06         | 29.95          | 7.91          | 28.33          | 9.75          | 26.63          | 10.71         | 22.77          | 11.46         |
| 12-Apr-91 | 26.31          | 9.57          | 25.92          | 10.70         | 29.62          | 8.24          | 28.52          | 9.56          | 26.22          | 11.12         | 22.36          | 11.87         |
| 10-May-91 | 25.48          | 10.40         | 24.90          | 11.72         | 29.01          | 8.85          | 28.34          | 9.74          | 25.84          | 11.50         | 22.14          | 12.09         |
| 6-Jun-91  | 25.61          | 10.27         | 24.75          | 11.87         | 29.06          | 8.80          | 28.21          | 9.87          | 25.69          | 11.65         | 22.17          | 12.06         |
| 19-Sep-91 | 25.23          | 10.65         | 23.12          | 13.50         | 26.46          | 11.40         | 27.81          | 10.27         | 23.73          | 13.61         | 22.35          | 11.88         |
| 20-Dec-91 | 24.81          | 11.07         | 22.37          | 14.25         | 25.56          | 12.30         | 27.33          | 10.75         | 23.11          | 14.23         | 22.46          | 11.77         |
| 27-Mar-92 | 23.70          | 12.18         | 20.42          | 16.20         | 23.95          | 13.91         | 26.82          | 11.26         | 21.62          | 15.72         | 21.05          | 13.18         |
| 25-Jun-92 | 23.97          | 11.91         | 20.94          | 15.68         | 24.27          | 13.59         | 26.68          | 11.40         | 21.59          | 15.75         | 21.13          | 13.10         |
| 21-Jan-93 | 23.75          | 12.13         | 21.42          | 15.20         | 24.10          | 13.76         | 26.70          | 11.38         | 21.83          | 15.51         | 21.16          | 13.07         |
| 24-Jun-93 | 23.52          | 12.36         | 20.30          | 16.32         | 23.65          | 14.21         | 26.17          | 11.91         | 20.67          | 16.67         | 20.31          | 13.92         |

## NOTES:

Elevations are in feet above mean sea level (MSL).  
Depth to water measured in feet from top of casing.

Table 1. WATER-LEVEL ELEVATIONS - NOVEMBER 1990 THROUGH JUNE 1993  
CHINATOWN REDEVELOPMENT PROJECT AREA

| Well No.  | MW-2           |               | MW-3           |               | MW-6           |               | MW-7           |               | MW-8           |               | MW-12          |               |
|-----------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|
|           | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING | GROUND SURFACE | TOP OF CASING |
|           | 40.05          | 39.55         | 39.02          | 38.35         | 39.95          | 39.59         | 39.35          | 39.10         | 40.63          | 40.47         | 37.70          | 37.00         |
| DATE      | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     | Depth to Water | Elevation     |
| 14-Nov-90 | 25.38          | 14.17         | 23.91          | 14.44         | 25.25          | 14.34         | 24.97          | 14.13         | 26.72          | 13.75         | 23.37          | 13.63         |
| 3-Dec-90  | 26.12          | 13.43         | 24.69          | 13.66         | 25.44          | 14.15         | 27.66          | 11.44         | 27.28          | 13.19         | 25.45          | 11.55         |
| 11-Jan-91 | 28.60          | 10.95         | 28.97          | 9.38          | 27.50          | 12.09         | 29.82          | 9.28          | 29.04          | 11.43         | *              | *             |
| 11-Feb-91 | 32.39          | 7.16          | 32.37          | 5.98          | 29.43          | 10.16         | 32.35          | 6.75          | 30.88          | 9.59          | *              | *             |
| 8-Mar-91  | 33.57          | 5.98          | 32.29          | 6.06          | 30.41          | 9.18          | 32.04          | 7.06          | 31.98          | 8.49          | *              | *             |
| 12-Apr-91 | 32.67          | 6.88          | 31.89          | 6.46          | 30.25          | 9.34          | 31.37          | 7.73          | 32.01          | 8.46          | *              | *             |
| 10-May-91 | 31.90          | 7.65          | 31.29          | 7.06          | 29.94          | 9.65          | 30.94          | 8.16          | 31.66          | 8.81          | *              | *             |
| 6-Jun-91  | 32.56          | 6.99          | 30.94          | 7.41          | 30.27          | 9.32          | 31.06          | 8.04          | 31.94          | 8.53          | *              | *             |
| 19-Sep-91 | 26.94          | 12.61         | 25.28          | 13.07         | 26.58          | 13.01         | 26.96          | 12.14         | 28.65          | 11.82         | *              | *             |
| 20-Dec-91 | 25.94          | 13.61         | 24.23          | 14.12         | 25.74          | 13.85         | 25.83          | 13.27         | 27.47          | 13.00         | *              | *             |
| 27-Mar-92 | 24.05          | 15.50         | 21.94          | 16.41         | 23.92          | 15.67         | 24.01          | 15.09         | 25.64          | 14.83         | *              | *             |
| 25-Jun-92 | 24.20          | 15.35         | 22.37          | 15.98         | 24.07          | 15.52         | 24.37          | 14.73         | 25.84          | 14.63         | *              | *             |
| 21-Jan-93 | 24.58          | 14.97         | 24.91          | 13.44         | 24.32          | 15.27         | 24.17          | 14.93         | 25.48          | 14.99         | *              | *             |
| 24-Jun-93 | 23.42          | 16.13         | 21.75          | 16.60         | 23.20          | 16.39         | 23.62          | 15.48         | 24.83          | 15.64         | *              | *             |

## NOTES:

Elevations are in feet above mean sea level (MSL).

Depth to water measured in feet from top of casing.

- \* Well MW-12 was damaged during excavation and construction activities and can no longer be monitored.

Table 2. RESULTS OF ORGANIC CHEMICAL ANALYSES OF GROUNDWATER SAMPLES FROM MONITORING WELLS  
CHINATOWN REDEVELOPMENT PROJECT AREA

Purgeable Aromatics (EPA Method 8020)  
Petroleum Hydrocarbons (EPA Method 8015)

| WELL      | DATE            | BENZENE                       | TOLUENE                       | ETHYL<br>BENZENE              | XYLENES,<br>TOTAL             | TPH AS<br>GASOLINE         |
|-----------|-----------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|----------------------------|
|           |                 | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.25/0.05 ** |
| MW-3      | 10-Mar-88       | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 18-Mar-88       | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 25-Mar-88       | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 1-Apr-88        | 0.7                           | 0.4                           | ND                            | 1.2                           | ND                         |
|           | 15-Apr-88       | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 28-Apr-88 @     | ND/ND (0.4)                   | ND/ND (0.4)                   | ND/ND (0.4)                   | ND/ND (0.4)                   | ND/ND                      |
|           | 11-May-88       | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 27-May-88       | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 18-Jun-88       | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 27-Jul-88       | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 26-Aug-88       | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 30-Sep-88       | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 2-Nov-88        | ND (1.0)                      | ND (1.0)                      | ND (1.0)                      | ND (1.0)                      | ND                         |
|           | 2-Dec-88        | ND                            | ND                            | ND                            | ND                            | ND                         |
| 4-Jan-89  | ND              | ND                            | ND                            | ND                            | ND                            |                            |
| 3-Feb-89  | ND              | 0.0009                        | ND                            | ND                            | ND                            |                            |
| 3-Dec-90  | ND              | 0.0002 †                      | ND                            | ND                            | ND                            |                            |
| 8-Mar-91  | ND              | ND                            | ND                            | ND                            | ND                            |                            |
| 6-Jun-91  | ND              | ND                            | ND                            | ND a                          | NT                            |                            |
| MW-7      | 4-Apr-89        | ND                            | 0.0007                        | 0.0010                        | 0.0012                        | ND                         |
|           | 3-May-89        | ND                            | 0.0012                        | 0.0018                        | 0.0048                        | 0.27                       |
|           | 6-Jun-89        | 0.0010                        | 0.001                         | 0.0022                        | 0.0011                        | 0.40                       |
|           | 7-Jul-89        | 0.0002                        | 0.001                         | 0.00034                       | 0.0059                        | 0.56                       |
|           | 2-Aug-89        | ND                            | 0.0015                        | 0.0054                        | 0.0059                        | 0.70                       |
|           | 7-Sep-89        | ND                            | ND                            | ND                            | 0.0015                        | 0.59                       |
|           | 5-Oct-89        | ND                            | 0.0011                        | 0.0006                        | 0.0013                        | 0.73                       |
|           | 2-Nov-89        | 0.0002                        | 0.0010                        | 0.0055                        | 0.0036                        | 0.63                       |
|           | 8-Dec-89        | 0.0006                        | 0.0087                        | 0.0059                        | 0.0038                        | 0.32                       |
|           | 3-Jan-90        | 0.0007                        | 0.0007                        | 0.0006                        | 0.0013                        | 0.18                       |
|           | 1-Feb-90        | ND                            | 0.0009                        | ND                            | 0.0003                        | ND                         |
|           | 28-Feb-90       | ND                            | 0.0006                        | 0.0004                        | 0.0052                        | 0.09                       |
|           | 11-Apr-90       | ND                            | 0.0007                        | 0.0033                        | 0.0029                        | 0.13                       |
|           | 18-May-90       | ND                            | 0.0008                        | 0.0014                        | 0.0008                        | 0.43                       |
|           | 13-Sep-90       | ND                            | 0.0019                        | ND                            | ND                            | NT                         |
|           | 3-Dec-90        | 0.0002                        | 0.0024                        | 0.0019                        | 0.0012                        | 0.32                       |
|           | 11-Feb-91       | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 8-Mar-91        | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 6-Jun-91        | ND                            | ND                            | ND                            | ND a                          | ND                         |
|           | 20-Dec-91       | 0.0002                        | ND                            | 0.0029                        | 0.0078                        | 0.32                       |
| 27-Mar-92 | 0.0006 = 16 ppb | ND b                          | 0.0010                        | 0.0020                        | 0.11                          |                            |
| 25-Jun-92 | ND              | 0.0009                        | 0.0017                        | 0.0035                        | 0.14                          |                            |
| 21-Jan-93 | ND              | 0.0010                        | 0.0017                        | 0.0021                        | 0.15 = 150 ppb                |                            |
| 24-Jun-93 | ND              | ND                            | ND                            | ND                            | ND                            |                            |
| MW-12     | 15-Feb-89       | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 3-Mar-89        | NT                            | NT                            | NT                            | NT                            | ND                         |
|           | 5-Apr-89        | 0.0014                        | 0.0023                        | ND                            | 0.0054                        | ND                         |
|           | 2-May-89        | 0.026                         | 0.0033                        | ND                            | 0.0063                        | 0.10                       |
|           | 7-Jun-89        | 0.034                         | 0.0037                        | ND                            | 0.012                         | 0.18                       |
|           | 6-Jul-89        | 0.029                         | 0.0025                        | ND                            | 0.0059                        | 0.12                       |
|           | 2-Aug-89        | 0.023                         | 0.002                         | ND                            | 0.005                         | ND                         |
|           | 7-Sep-89 @      | 0.051/0.059                   | 0.0018/0.0022                 | ND/ND                         | 0.0049/0.0058                 | ND/ND                      |
|           | 5-Oct-89 @      | 0.037/0.040                   | 0.0032/0.0031                 | ND/ND                         | 0.0086/0.0094                 | ND/ND                      |
|           | 2-Nov-89        | 0.0056                        | 0.0011                        | ND                            | 0.0019                        | 0.071                      |
|           | 6-Dec-89        | 0.0062                        | 0.0012                        | ND                            | 0.0017                        | 0.06                       |
|           | 3-Jan-90        | 0.0086                        | 0.0010                        | ND                            | 0.0012                        | 0.09                       |
|           | 1-Feb-90 @      | 0.0018/0.0024                 | 0.0010/0.0004                 | ND/ND                         | 0.0005/0.0004                 | ND/ND                      |
|           | 1-Mar-90        | 0.0016                        | 0.0014                        | ND                            | 0.0003                        | ND                         |
| 11-Apr-90 | 0.0066          | 0.0174                        | 0.0015                        | 0.0116                        | 0.147                         |                            |
| 18-May-90 | ND              | 0.0009                        | ND                            | ND                            | ND                            |                            |
| 12-Sep-90 | ND              | ND                            | ND                            | 0.0002                        | NT                            |                            |
| 3-Dec-90  | 0.0006          | 0.0002 †                      | ND                            | 0.0002 †                      | ND                            |                            |

→ 110 ppb  
→ 140 ppb  
= 150 ppb

Table 2. RESULTS OF ORGANIC CHEMICAL ANALYSES OF GROUNDWATER SAMPLES FROM MONITORING WELLS  
CHINATOWN REDEVELOPMENT PROJECT AREA

Purgeable Aromatics (EPA Method 8020)  
Petroleum Hydrocarbons (EPA Method 8015)

| WELL                 | DATE                 | BENZENE                       | TOLUENE                       | ETHYL<br>BENZENE              | XYLENES,<br>TOTAL             | TPH AS<br>GASOLINE         |
|----------------------|----------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|----------------------------|
|                      |                      | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.25/0.05 ** |
| MW-18                | 15-Feb-89            | ND                            | ND                            | ND                            | ND                            | ND                         |
|                      | 3-Mar-89             | NT                            | NT                            | NT                            | NT                            | ND                         |
|                      | 5-Apr-89             | ND                            | ND                            | ND                            | ND                            | ND                         |
|                      | 2-May-89             | ND                            | ND                            | ND                            | ND                            | ND                         |
|                      | 7-Jun-89             | ND                            | ND                            | ND                            | ND                            | ND                         |
|                      | 8-Jul-89             | ND                            | ND                            | ND                            | ND                            | ND                         |
|                      | 2-Aug-89             | ND                            | ND                            | ND                            | ND                            | ND                         |
|                      | 6-Sep-89             | ND                            | ND                            | ND                            | ND                            | ND                         |
|                      | 5-Oct-89             | ND                            | ND                            | ND                            | ND                            | ND                         |
|                      | 1-Nov-89             | ND                            | ND                            | ND                            | ND                            | ND                         |
|                      | 6-Dec-89             | ND                            | 0.0009                        | ND                            | 0.0013                        | ND                         |
|                      | 2-Jan-90             | 0.016                         | 0.0080                        | 0.0014                        | 0.0098                        | 0.10                       |
|                      | 1-Feb-90             | ND                            | ND                            | ND                            | ND                            | ND                         |
|                      | 1-Mar-90             | 0.0003                        | ND                            | ND                            | 0.0002                        | ND                         |
|                      | 11-Apr-90            | 0.0004                        | 0.0006                        | 0.0005                        | 0.0003                        | ND                         |
|                      | 18-May-90            | ND                            | ND                            | ND                            | ND                            | ND                         |
|                      | 13-Sep-90            | 0.0027                        | ND                            | ND                            | ND                            | NT                         |
|                      | 4-Dec-90             | 0.0029                        | 0.0002 †                      | ND                            | 0.0003 †                      | ND                         |
|                      | 8-Mar-91             | 0.0009                        | 0.0003                        | ND                            | ND                            | ND                         |
|                      | 6-Jun-91             | ND                            | ND                            | ND                            | ND a                          | NT                         |
|                      | 19-Sep-91            | ND b                          | ND b                          | ND b                          | ND b                          | ND                         |
|                      | 20-Dec-91            | 0.0004                        | ND                            | ND b                          | ND b                          | NT                         |
|                      | 27-Mar-92            | 0.0016                        | ND b                          | ND b                          | ND b                          | NT                         |
|                      | 25-Jun-92            | 0.0008                        | ND b                          | ND b                          | 0.0007                        | NT                         |
| 21-Jan-93            | 0.011/0.011          | 0.0004/0.0005                 | ND b                          | 0.0011/0.0007                 | NT                            |                            |
| <del>24 JUN 93</del> | ND                   | ND                            | ND                            | ND                            | NT                            |                            |
| MW-19                | 15-Dec-89            | 5.0                           | 0.30                          | 0.078                         | 0.61                          | 12                         |
|                      | 3-Jan-90             | 3.0                           | 0.46                          | 0.12                          | 1.1                           | 13                         |
|                      | 1-Feb-90             | 1.1                           | 0.022                         | LT 0.0040                     | 0.032                         | 1.9                        |
|                      | 1-Mar-90             | 4.2                           | 0.92                          | 0.24                          | 0.82                          | 9.2                        |
|                      | 11-Apr-90            | 3.8                           | 1.1                           | 0.82                          | 0.34                          | 10                         |
|                      | 18-May-90            | 5.6                           | 0.75                          | 0.70                          | 0.78                          | 11                         |
|                      | 13-Sep-90            | 1.4                           | 1.2                           | 0.35                          | 1.6                           | NT                         |
|                      | 4-Dec-90             | 2.1                           | 1.5                           | 0.42                          | 1.6                           | 12                         |
|                      | 11-Feb-91            | 0.45                          | 0.12                          | 0.086                         | 0.21                          | 2.7                        |
|                      | 8-Mar-91             | 0.52                          | 0.057                         | 0.020                         | 0.083                         | 1.4                        |
|                      | 10-May-91            | 0.32                          | 0.088                         | 0.055                         | 0.160                         | 1.8                        |
|                      | 6-Jun-91             | 0.38/0.46                     | 0.027/0.038                   | 0.023/0.030                   | 0.092/0.15                    | 3.4/NT                     |
|                      | 19-Sep-91            | 0.21                          | 0.023                         | 0.094                         | 0.15                          | 3.5                        |
|                      | 20-Dec-91            | 1.0                           | 0.24                          | 0.5                           | 1.2                           | 9.6                        |
|                      | 27-Mar-92            | 0.34                          | 0.13                          | 0.12                          | 0.34                          | 3.6                        |
|                      | 25-Jun-92            | 1.1                           | 0.38                          | 0.53                          | 1.6                           | 10                         |
|                      | 21-Jan-93            | 0.84                          | 0.18                          | 0.43                          | 1.1                           | 8.4                        |
|                      | <del>24 JUN 93</del> | <del>0.85</del>               | 0.09                          | 0.22                          | 0.65                          | <del>8.5</del>             |
|                      | MW-20                | 15-Dec-89                     | ND                            | ND                            | ND                            | ND                         |
| 3-Jan-90             |                      | 0.0004                        | 0.0004                        | ND                            | 0.0008                        | ND                         |
| 1-Feb-90             |                      | ND                            | 0.0014                        | ND                            | 0.0005                        | ND                         |
| 28-Feb-90            |                      | ND                            | ND                            | ND                            | 0.0005                        | ND                         |
| 11-Apr-90            |                      | 0.0028                        | 0.0110                        | 0.0011                        | 0.0066                        | ND                         |
| 18-May-90            |                      | ND                            | ND                            | ND                            | ND                            | ND                         |
| 12-Sep-90            |                      | ND                            | ND                            | ND                            | ND                            | NT                         |
| 3-Dec-90             |                      | ND                            | 0.0002 †                      | ND                            | ND                            | ND                         |
| 8-Mar-91             |                      | ND                            | ND                            | ND                            | ND                            | ND                         |
| 6-Jun-91             |                      | ND                            | ND                            | ND                            | ND a                          | NT                         |
| <del>24 JUN 93</del> |                      | ND                            | ND                            | ND                            | ND                            | NT                         |
| MW-21                | 27-Aug-90            | ND                            | ND                            | ND                            | ND                            | NT                         |
|                      | 12-Sep-90            | ND                            | ND                            | ND                            | ND                            | NT                         |
|                      | 3-Dec-90             | ND                            | 0.0005 †                      | ND                            | 0.0011 †                      | ND                         |
|                      | 8-Mar-91             | ND                            | ND                            | ND                            | ND                            | ND                         |
|                      | 6-Jun-91             | ND                            | ND                            | ND                            | ND a                          | NT                         |
|                      | <del>24 JUN 93</del> | ND/ND                         | ND/ND                         | ND/ND                         | ND/ND                         | ND/NT                      |

Table 2. RESULTS OF ORGANIC CHEMICAL ANALYSES OF GROUNDWATER SAMPLES FROM MONITORING WELLS  
CHINATOWN REDEVELOPMENT PROJECT AREAPurgeable Aromatics (EPA Method 8020)  
Petroleum Hydrocarbons (EPA Method 8015)

| WELL      | DATE       | BENZENE                       | TOLUENE                       | ETHYL<br>BENZENE              | XYLENES,<br>TOTAL             | TPH AS<br>GASOLINE         |
|-----------|------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|----------------------------|
|           |            | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.0005/0.0002 * | LOD (mg/l)<br>0.25/0.05 ** |
| MW-22     | 27-Aug-90  | ND                            | ND                            | ND                            | ND                            | NT                         |
|           | 13-Sep-90  | ND                            | ND                            | ND                            | ND                            | NT                         |
|           | 4-Dec-90   | ND                            | 0.0002 †                      | ND                            | 0.0002 †                      | ND                         |
|           | 8-Mar-91   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 8-Jun-91   | ND                            | ND                            | ND                            | ND a                          | NT                         |
| MW-23     | 27-Aug-90  | ND                            | ND                            | ND                            | ND                            | NT                         |
|           | 13-Sep-90  | ND                            | ND                            | ND                            | ND                            | NT                         |
|           | 4-Dec-90   | ND                            | 0.0002 †                      | ND                            | ND                            | ND                         |
|           | 8-Mar-91   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 6-Jun-91   | ND                            | 0.0004                        | ND                            | ND a                          | NT                         |
|           | 20-Dec-91  | ND                            | ND                            | ND b                          | ND b                          | NT                         |
|           | 27-Mar-92  | 0.0056                        | 0.0064                        | 0.0016                        | 0.0082                        | NT                         |
|           | 25-Jun-92  | ND/ND b                       | ND/ND b                       | ND/ND b                       | ND/ND b                       | NT/NT                      |
|           | 21-Jan-93  | ND                            | ND                            | ND                            | ND                            | NT                         |
|           | 24-Jun-93  | ND                            | ND                            | ND                            | 0.0012                        | NT                         |
| BLANK     | 5-Apr-89   | 0.5                           | ND                            | ND                            | ND                            | ND                         |
|           | 1-May-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 6-Jun-89 @ | ND/ND                         | ND/ND                         | ND/ND                         | ND/ND                         | ND/ND                      |
|           | 1-Aug-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 2-Aug-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 3-Aug-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 6-Sep-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 7-Sep-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 4-Oct-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 2-Nov-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 5-Dec-89   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 3-Jan-90   | ND                            | 0.0006                        | ND                            | 0.0017                        | ND                         |
|           | 13-Sep-90  | ND                            | ND                            | ND                            | ND                            | NT                         |
|           | 11-Feb-91  | ND                            | ND                            | ND                            | ND                            | NT                         |
|           | 8-Mar-91   | ND                            | ND                            | ND                            | ND                            | ND                         |
|           | 19-Sep-91  | ND b                          | ND b                          | ND b                          | ND b                          | ND                         |
|           | 20-Dec-91  | ND                            | ND                            | ND b                          | ND b                          | NT                         |
|           | 27-Mar-92  | ND b                          | ND b                          | ND b                          | ND b                          | NT                         |
|           | 25-Jun-92  | ND b                          | ND b                          | ND b                          | ND b                          | NT                         |
|           | 21-Jan-93  | ND                            | ND                            | ND                            | ND                            | NT                         |
| 24-Jun-93 | ND         | ND                            | ND                            | ND                            | NT                            |                            |

## NOTES:

Results reported in milligrams per liter (mg/l); equivalent to parts per million.

Analyses performed by PACE Laboratories, Inc., Novato, California.

Specific limits of detection for compounds detected in June 1992 groundwater samples are presented in the appendix of this report.

LOD: Limit of Detection.

ND: Not detected at or above LOD.

NT: Not tested.

(0.4): Numbers in parentheses are limits of detection.

\*: LOD Changed to 0.0002 on 01-May-89, unless otherwise noted.

\*\* : LOD Changed to 0.05 on 01-May-89, unless otherwise noted.

† : PACE laboratory reported toluene and total xylenes in the method blanks analyzed along with the samples.

@: Two values indicate results of duplicate analyses.

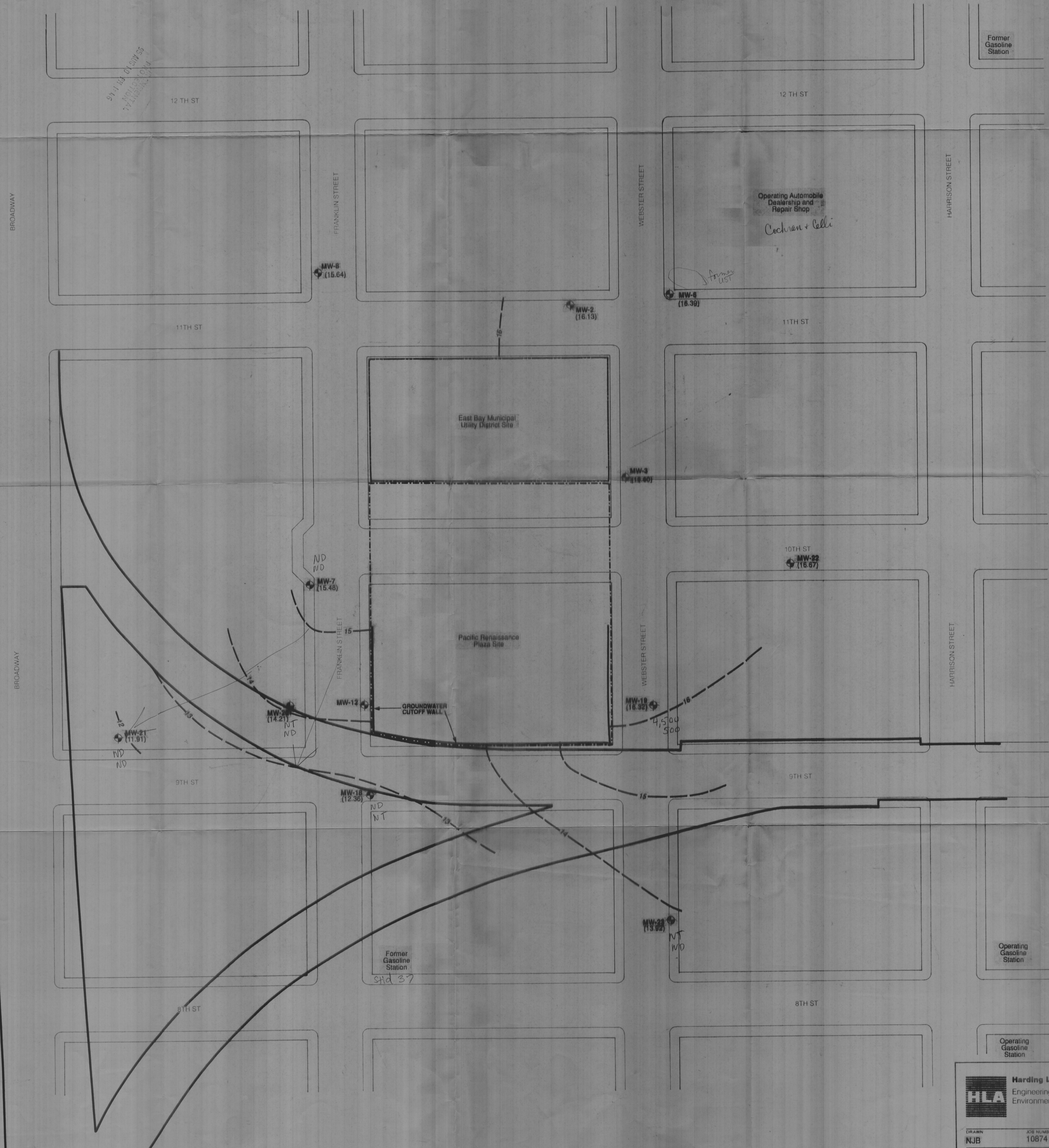
LT: Less than the concentration indicated.

a: Method detection limit is 0.0004 mg/l.

b: Method detection limit is 0.0005 mg/l.

PLATE





9711 HA 01.07W 35  
7/1/1993  
17/1/1993

Operating Automobile  
Dealership and  
Repair Shop  
*Cochran + Belli*

East Bay Municipal  
Utility District Site

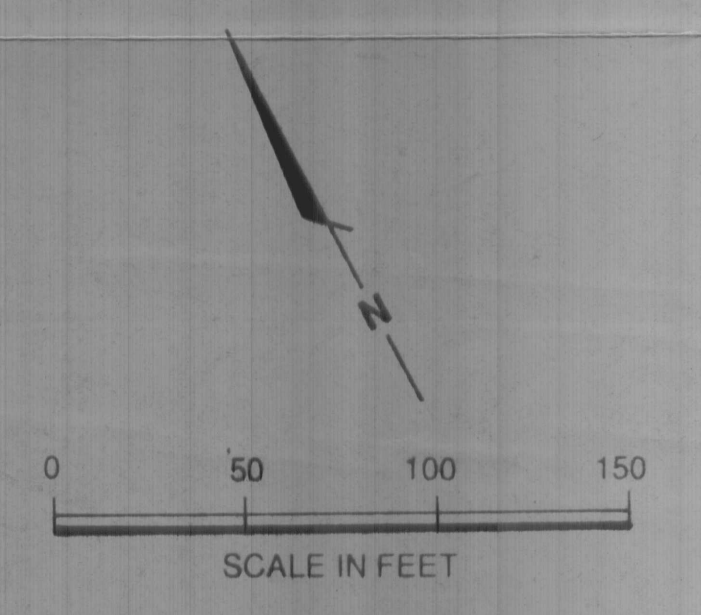
Pacific Renaissance  
Plaza Site

GROUNDWATER  
CUTOFF WALL

**EXPLANATION**

- MW-2 (16.13) Monitoring Well Location and Number (Water-level elevations in feet AMSL) measured June 24, 1993
- BART Subsurface Easement Boundary
- - - PRP Site Boundary
- - - EBMUD Site Boundary
- - - 13 Water-Level Elevation Contour (feet AMSL)
- NM Not Measured

TPHg (ppb) 6-24-93  
benz (ppb)



**HLA** Harding Lawson Associates  
Engineering and Environmental Services

**Plan of Sites and Vicinity and Water-Level Contour Map - June 1993**  
Chinatown Redevelopment Project Area  
Oakland, California

DRAWN: NJB    JOB NUMBER: 10874 040    APPROVED:    DATE: 7/91    REVISED DATE: 7/93

PLATE **1**

**APPENDIX**  
**RESULTS OF LABORATORY ANALYSIS OF**  
**GROUNDWATER SAMPLES FROM MONITORING WELLS**



## REPORT OF LABORATORY ANALYSIS

JUL 14 '93 AM 9:37

July 12, 1993

Mr. Marc Egbert  
Harding Lawson Associates  
200 Rush Landing  
Novato, CA 94948

RE: PACE Project No. 430624.507  
Client Reference: 10874 039/PRP-Oakland

Dear Mr. Egbert:

Enclosed is the report of laboratory analyses for samples received June 24, 1993.

Footnotes are given at the end of the report.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,

Carol Reid  
Project Manager

Enclosures



# REPORT OF LABORATORY ANALYSIS

Harding Lawson Associates  
200 Rush Landing  
Novato, CA 94948

July 12, 1993  
PACE Project Number: 430624507

Attn: Mr. Marc Egbert

Client Reference: 10874 039/PRP-Oakland

MW-19

PACE Sample Number:  
Date Collected:  
Date Received:

70 0102430  
06/24/93  
06/24/93  
93062401

| <u>Parameter</u>                         | <u>Units</u> | <u>MDL</u> | <u>DATE ANALYZED</u> |
|--|--------------|------------|----------------------|
| <u>ORGANIC ANALYSIS</u>                  |              |            |                      |
| PURGEABLE FUELS AND AROMATICS            |              |            |                      |
| TOTAL FUEL HYDROCARBONS, (LIGHT):        |              |            | -                    |
| Purgeable Fuels, as Gasoline (EPA 8015M) | ug/L         | 250        | 4500                 |
| PURGEABLE AROMATICS (BTXE BY EPA 8020M): |              |            | -                    |
| Benzene                                  | ug/L         | 2.5        | 500                  |
| Toluene                                  | ug/L         | 2.5        | 90                   |
| Ethylbenzene                             | ug/L         | 2.5        | 220                  |
| Xylenes, Total                           | ug/L         | 2.5        | 650                  |

**REPORT OF LABORATORY ANALYSIS**

Mr. Marc Egbert  
 Page 2

July 12, 1993  
 PACE Project Number: 430624507

Client Reference: 10874 039/PRP-Oakland

PACE Sample Number:  
 Date Collected:  
 Date Received:  
 Client Sample ID:  
Parameter

70 0102448  
 06/24/93  
 06/24/93  
 93062402

*MW-23*

Units                      MDL                      DATE ANALYZED

ORGANIC ANALYSIS

PURGEABLE AROMATIC COMPOUNDS, EPA 8020

|                |      |     |     |          |
|----------------|------|-----|-----|----------|
| Benzene        | ug/L | 0.5 | ND  | 07/06/93 |
| Toluene        | ug/L | 0.5 | ND  | 07/06/93 |
| Ethylbenzene   | ug/L | 0.5 | ND  | 07/06/93 |
| Xylenes, Total | ug/L | 0.5 | 1.2 | 07/06/93 |

**REPORT OF LABORATORY ANALYSIS**

Mr. Marc Egbert  
 Page 3

July 12, 1993  
 PACE Project Number: 430624507

Client Reference: 10874 039/PRP-Oakland

PACE Sample Number:  
 Date Collected:  
 Date Received:  
 Client Sample ID:

70 0102456  
 06/24/93  
 06/24/93  
 93062403

MW-18

| <u>Parameter</u> | <u>Units</u> | <u>MDL</u> | <u>DATE ANALYZED</u> |
|------------------|--------------|------------|----------------------|
|------------------|--------------|------------|----------------------|

ORGANIC ANALYSIS

PURGEABLE AROMATIC COMPOUNDS, EPA 8020

|                |      |     |    |          |
|----------------|------|-----|----|----------|
| Benzene        | ug/L | 0.5 | ND | 07/06/93 |
| Toluene        | ug/L | 0.5 | ND | 07/06/93 |
| Ethylbenzene   | ug/L | 0.5 | ND | 07/06/93 |
| Xylenes, Total | ug/L | 0.5 | ND | 07/06/93 |

**REPORT OF LABORATORY ANALYSIS**

Mr. Marc Egbert  
 Page 4

July 12, 1993  
 PACE Project Number: 430624507

Client Reference: 10874 039/PRP-Oakland

PACE Sample Number:  
 Date Collected:  
 Date Received:  
 Client Sample ID:  
 Parameter

70 0102464 *MW-7*  
 06/24/93  
 06/24/93  
 93062404

Units      MDL      DATE ANALYZED

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):

|  |      |     |    |          |
|--|------|-----|----|----------|
| Purgeable Fuels, as Gasoline (EPA 8015M) | ug/L | 50  | -  | 07/02/93 |
| PURGEABLE AROMATICS (BTXE BY EPA 8020M): |      |     |    |          |
| Benzene                                  | ug/L | 0.5 | ND | 07/02/93 |
| Toluene                                  | ug/L | 0.5 | ND | 07/02/93 |
| Ethylbenzene                             | ug/L | 0.5 | ND | 07/02/93 |
| Xylenes, Total                           | ug/L | 0.5 | ND | 07/02/93 |

**REPORT OF LABORATORY ANALYSIS**

Mr. Marc Egbert  
 Page 5

July 12, 1993  
 PACE Project Number: 430624507

Client Reference: 10874 039/PRP-Oakland

PACE Sample Number:  
 Date Collected:  
 Date Received:  
 Client Sample ID:  
 Parameter

70 0102472  
 06/24/93  
 06/24/93  
 93062405

*Field Blank*

Units      MDL      DATE ANALYZED

ORGANIC ANALYSIS

PURGEABLE AROMATIC COMPOUNDS, EPA 8020

| Parameter      | Units | MDL | Result | DATE ANALYZED |
|----------------|-------|-----|--------|---------------|
| Benzene        | ug/L  | 0.5 | ND     | 07/06/93      |
| Toluene        | ug/L  | 0.5 | ND     | 07/06/93      |
| Ethylbenzene   | ug/L  | 0.5 | ND     | 07/06/93      |
| Xylenes, Total | ug/L  | 0.5 | ND     | 07/06/93      |



**REPORT OF LABORATORY ANALYSIS**

Mr. Marc Egbert  
 Page 6

July 12, 1993  
 PACE Project Number: 430624507

Client Reference: 10874 039/PRP-Oakland

*MW-20*

PACE Sample Number: 70 0102480  
 Date Collected: 06/24/93  
 Date Received: 06/24/93  
 Client Sample ID: 93062406

| <u>Parameter</u> | <u>Units</u> | <u>MDL</u> | <u>DATE ANALYZED</u> |
|------------------|--------------|------------|----------------------|
|------------------|--------------|------------|----------------------|

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

|  |      |     |    |          |
|--|------|-----|----|----------|
| TOTAL FUEL HYDROCARBONS, (LIGHT):        |      |     | -  | 07/02/93 |
| Purgeable Fuels, as Gasoline (EPA 8015M) | ug/L | 50  | ND | 07/02/93 |
| PURGEABLE AROMATICS (BTXE BY EPA 8020M): |      |     | -  | 07/02/93 |
| Benzene                                  | ug/L | 0.5 | ND | 07/02/93 |
| Toluene                                  | ug/L | 0.5 | ND | 07/02/93 |
| Ethylbenzene                             | ug/L | 0.5 | ND | 07/02/93 |
| Xylenes, Total                           | ug/L | 0.5 | ND | 07/02/93 |

**REPORT OF LABORATORY ANALYSIS**

Mr. Marc Egbert  
 Page 7

July 12, 1993  
 PACE Project Number: 430624507

Client Reference: 10874 039/PRP-Oakland

MW-21

PACE Sample Number: 70 0102499  
 Date Collected: 06/24/93  
 Date Received: 06/24/93  
 Client Sample ID: 93062407

| <u>Parameter</u> | <u>Units</u> | <u>MDL</u> | <u>DATE ANALYZED</u> |
|------------------|--------------|------------|----------------------|
|------------------|--------------|------------|----------------------|

ORGANIC ANALYSIS

|  |      |     |          |
|--|------|-----|----------|
| <u>PURGEABLE FUELS AND AROMATICS</u>     |      |     |          |
| TOTAL FUEL HYDROCARBONS, (LIGHT):        |      |     |          |
| Purgeable Fuels, as Gasoline (EPA 8015M) | ug/L | 50  | 07/06/93 |
| PURGEABLE AROMATICS (BTXE BY EPA 8020M): |      |     |          |
| Benzene                                  | ug/L | 0.5 | 07/06/93 |
| Toluene                                  | ug/L | 0.5 | 07/06/93 |
| Ethylbenzene                             | ug/L | 0.5 | 07/06/93 |
| Xylenes, Total                           | ug/L | 0.5 | 07/06/93 |

**REPORT OF LABORATORY ANALYSIS**

Mr. Marc Egbert  
Page 8

July 12, 1993  
PACE Project Number: 430624507

Client Reference: 10874 039/PRP-Oakland

*MW-2)*

PACE Sample Number:  
Date Collected:  
Date Received:  
Client Sample ID:  
Parameter

70 0102502  
06/24/93  
06/24/93  
93062408

*Duplicate*

Units                      MDL                      DATE ANALYZED

ORGANIC ANALYSIS

PURGEABLE AROMATIC COMPOUNDS, EPA 8020

|                |      |     |    |          |
|----------------|------|-----|----|----------|
| Benzene        | ug/L | 0.5 | ND | 07/06/93 |
| Toluene        | ug/L | 0.5 | ND | 07/06/93 |
| Ethylbenzene   | ug/L | 0.5 | ND | 07/06/93 |
| Xylenes, Total | ug/L | 0.5 | ND | 07/06/93 |

These data have been reviewed and are approved for release.

*Darrell C. Cain*  
Darrell C. Cain  
Regional Director



# REPORT OF LABORATORY ANALYSIS

Mr. Marc Egbert  
Page 9

FOOTNOTES  
for pages 1 through 8

July 12, 1993  
PACE Project Number: 430624507

Client Reference: 10874 039/PRP-Oakland

MDL Method Detection Limit  
ND Not detected at or above the MDL.

**REPORT OF LABORATORY ANALYSIS**

Mr. Marc Egbert  
 Page 10

QUALITY CONTROL DATA

July 12, 1993  
 PACE Project Number: 430624507

Client Reference: 10874 039/PRP-Oakland

**PURGEABLE FUELS AND AROMATICS**

Batch: 70 22534

Samples: 70 0102430, 70 0102464, 70 0102480, 70 0102499

**METHOD BLANK:**

| Parameter                                      | Units | MDL | Method Blank |
|--|-------|-----|--------------|
| <b>TOTAL FUEL HYDROCARBONS, (LIGHT):</b>       |       |     |              |
| Purgeable Fuels, as Gasoline (EPA 8015M)       | ug/L  | 50  | ND           |
| <b>PURGEABLE AROMATICS (BTXE BY EPA 8020M)</b> |       |     |              |
| Benzene  | ug/L  | 0.5 | ND           |
| Toluene  | ug/L  | 0.5 | ND           |
| Ethylbenzene                                   | ug/L  | 0.5 | ND           |
| Xylenes, Total                                 | ug/L  | 0.5 | ND           |

**LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:**

| Parameter                                | Units | MDL | Reference Value | Recv | Dupl Recv | RPD |
|--|-------|-----|-----------------|------|-----------|-----|
| Purgeable Fuels, as Gasoline (EPA 8015M) | ug/L  | 50  | 1000            | 94%  | 82%       | 13% |
| Benzene                                  | ug/L  | 0.5 | 100             | 91%  | 89%       | 2%  |
| Toluene                                  | ug/L  | 0.5 | 100             | 93%  | 91%       | 2%  |
| Ethylbenzene                             | ug/L  | 0.5 | 100             | 93%  | 94%       | 1%  |
| Xylenes, Total                           | ug/L  | 0.5 | 300             | 97%  | 98%       | 1%  |

Mr. Marc Egbert  
 Page 11

QUALITY CONTROL DATA

July 12, 1993  
 PACE Project Number: 430624507

Client Reference: 10874 039/PRP-Oakland

PURGEABLE FUELS AND AROMATICS

Batch: 70 22639

Samples: 70 0102448, 70 0102456, 70 0102472, 70 0102502

METHOD BLANK:

| Parameter                                      | Units | MDL | Method Blank |
|--|-------|-----|--------------|
| <b>TOTAL FUEL HYDROCARBONS, (LIGHT):</b>       |       |     |              |
| Purgeable Fuels, as Gasoline (EPA 8015M)       | ug/L  | 50. | ND           |
| <b>PURGEABLE AROMATICS (BTXE BY EPA 8020M)</b> |       |     |              |
| Benzene  | ug/L  | 0.5 | ND           |
| Toluene  | ug/L  | 0.5 | ND           |
| Ethylbenzene                                   | ug/L  | 0.5 | ND           |
| Xylenes, Total                                 | ug/L  | 0.5 | ND           |

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

| Parameter                                | Units | MDL | Reference Value | Recv | Dupl Recv | RPD |
|--|-------|-----|-----------------|------|-----------|-----|
| Purgeable Fuels, as Gasoline (EPA 8015M) | ug/L  | 50  | 1000            | 96%  | 93%       | 3%  |
| Benzene                                  | ug/L  | 0.5 | 40.0            | 93%  | 90%       | 3%  |
| Toluene                                  | ug/L  | 0.5 | 40.0            | 90%  | 88%       | 2%  |
| Ethylbenzene                             | ug/L  | 0.5 | 40.0            | 93%  | 90%       | 3%  |
| Xylenes, Total                           | ug/L  | 0.5 | 120             | 92%  | 87%       | 5%  |

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FOOTNOTES  
for pages 10 through 11

July 12, 1993  
PACE Project Number: 430624507

Client Reference: 10874 039/PRP-Oakland

MDL Method Detection Limit  
ND Not detected at or above the MDL.  
RPD Relative Percent Difference



**Herding Lawson Associates**  
 200 Rush Landing Road  
 P.O. Box 6107  
 Novato, California 94948  
 415/892-0821  
 Telecopy: 415/892-1588

# CHAIN OF CUSTODY FORM

430624.507

Lab: PAGE

Job Number: 10824 039  
 Name/Location: PKP - OAKLAND  
 Project Manager: MARK EUBERT

Samplers: RICK ERDMAN

DOUG LUND

Recorder: Rich Erdman  
 (Signature Required)

| SOURCE CODE | MATRIX |          |      |     |  | #CONTAINERS & PRESERV. |                                |                  |     | SAMPLE NUMBER OR LAB NUMBER |      |     | DATE |    |      |      |
|-------------|--------|----------|------|-----|--|------------------------|--------------------------------|------------------|-----|-----------------------------|------|-----|------|----|------|------|
|             | Water  | Sediment | Soil | Oil |  | Unpres.                | H <sub>2</sub> SO <sub>4</sub> | HNO <sub>3</sub> | HCL | Yr                          | Wk   | Seq | Yr   | Mo | Dy   | Time |
|             |        |          |      |     |  |                        |                                |                  |     |                             |      |     |      |    |      |      |
| 23          | X      |          |      |     |  |                        |                                | 3                | 93  | 06                          | 2401 | 93  | 06   | 24 | 0550 |      |
| 23          | X      |          |      |     |  |                        |                                | 3                | 93  | 06                          | 2402 | 93  | 06   | 24 | 0615 |      |
| 23          | X      |          |      |     |  |                        |                                | 3                | 93  | 06                          | 2403 | 93  | 06   | 24 | 0650 |      |
| 23          | X      |          |      |     |  |                        |                                | 3                | 93  | 06                          | 2404 | 93  | 06   | 24 | 0710 |      |
| 23          | X      |          |      |     |  |                        |                                | 3                | 93  | 06                          | 2405 | 93  | 06   | 24 | 0325 |      |
| 23          | X      |          |      |     |  |                        |                                | 3                | 93  | 06                          | 2406 | 93  | 06   | 24 | 0805 |      |
| 23          | X      |          |      |     |  |                        |                                | 3                | 93  | 06                          | 2407 | 93  | 06   | 24 | 0900 |      |
| 23          | X      |          |      |     |  |                        |                                | 3                | 93  | 06                          | 2408 | 93  | 06   | 24 | 0930 |      |

| STATION DESCRIPTION/NOTES |
|---------------------------|
| 10243.0                   |
| 44.8                      |
| 45.6                      |
| 46.4                      |
| 47.2                      |
| 48.0                      |
| 49.9                      |
| 50.2                      |

| ANALYSIS REQUESTED |                     |              |              |            |                          |  |  |  |  |
|--------------------|---------------------|--------------|--------------|------------|--------------------------|--|--|--|--|
| EPA 601/8010       | EPA 602/8020 (BTEX) | EPA 624/8240 | EPA 625/8270 | ICP METALS | EPA 8015M/TPH - Gasoline |  |  |  |  |
| X                  |                     |              |              |            | X                        |  |  |  |  |
| X                  |                     |              |              |            |                          |  |  |  |  |
| X                  |                     |              |              |            |                          |  |  |  |  |
| X                  |                     |              |              |            | X                        |  |  |  |  |
| X                  |                     |              |              |            |                          |  |  |  |  |
| X                  |                     |              |              |            | X                        |  |  |  |  |
| X                  |                     |              |              |            |                          |  |  |  |  |

| LAB NUMBER |    |     | DEPTH IN FEET | COL MTD CD | QA CODE | MISCELLANEOUS |
|------------|----|-----|---------------|------------|---------|---------------|
| Yr         | Wk | Seq |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |
|            |    |     |               |            |         |               |

| CHAIN OF CUSTODY RECORD                            |                          |   |
|--|--------------------------|---|
| RELINQUISHED BY: (Signature)<br><i>Rich Erdman</i> | RECEIVED BY: (Signature) | DATE/TIME   |
| RELINQUISHED BY: (Signature)                       | RECEIVED BY: (Signature) | DATE/TIME   |
| RELINQUISHED BY: (Signature)                       | RECEIVED BY: (Signature) | DATE/TIME   |
| RELINQUISHED BY: (Signature)                       | RECEIVED BY: (Signature) | DATE/TIME   |
| DISPATCHED BY: (Signature)                         | DATE/TIME                | RECEIVED BY: (Signature) OR LAB BY: (Signature)<br><i>Mark Eubert</i> |
| METHOD OF SHIPMENT<br><i>Hand delivered</i>        |                          |   |

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QUALITY CONTROL REVIEWER



R. Bruce Scheibach  
Registered Geologist - 5062