Environmental Services, Inc.

2111 Jennings Street, San Francisco, CA 94124-3224, Phone (415) 822-4555 FAX (415) 822-5290

GROUNDWATER MONITORING
THREE MONTHS ENDING APRIL 30, 1992
ARROYO SCHOOL
15701 LORENZO AVENUE
SAN LORENZO, CALIFORNIA

I concur w/ L&W's recs for the cont'd monitoring due to continued detection of pollution contam.

L&W Project 5186D
April 30, 1992

Prepared for
San Lorenzo Unified School District

George Wilson
Vice President

John Carver
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
JOHN CARVER
C 23772
CIVIL
STATE OF CALIFORNIA

GROUNDWATER MONITORING

Purpose

This report summarizes and presents the results of the quarterly monitoring of three wells at the Arroyo School in San Lorenzo, California. This report, when forwarded to the Alameda County Health Care Services Agency and the Regional Water Quality Control Board (RWQCB), San Francisco Region, will serve as a progress report for the three month period ending April 30, 1992. Those items which have been completed since submission of L&W Environmental Services, Inc.'s last report are highlighted below.

Chronology

The following list summarizes site-related work done to date:

01/03/91 6000 gallon fuel tank removed.
01/16/91 Borings 1 through 6 drilled.
01/25/91 Borings 7 through 11 drilled.
01/28/91 Borings 12 through 13 drilled.
01/31/91 Monitoring wells MW 1 through MW 3 installed.
02/07/91 Monitoring wells MW 1 through MW 3 monitored and sampled.
03/15/91 Monitoring wells MW 1 through MW 3 monitored and sampled.
04/16/91 Monitoring wells MW 1 through MW 3 monitored and sampled.
07/15/91 Monitoring wells MW 1 through MW 3 monitored and sampled.
10/15/91 Monitoring wells MW 1 through MW 3 monitored and sampled.
01/03/92 Monitoring wells MW 1 through MW 3 monitored and sampled.
04/14/92 Monitoring wells MW 1 through MW 3 monitored and sampled.

Site Description

The area investigated is at the Arroyo School located at 15701 Lorenzo Avenue, San Lorenzo, California. The site investigated is an essentially level paved area with only minimal slope to provide surface drainage. Figure 1 in Appendix A is a site plan showing the location of Arroyo School in relation to the nearby streets. The tank which was removed was located between the maintenance boiler room portion of the building and temporary class rooms. This general location is in the approximate middle of the school complex.

Work Performed

The three monitoring wells installed at the site were measured and sampled on April 14, 1992. The depth to water in each well was measured and a preliminary sample was observed for free product or the presence of a hydrocarbon sheen. Each well was then purged of at least four well volumes or until groundwater temperature, pH, and conductivity were measured and found to be approximately stable on three successive readings. Wells were

purged using either an air lift pump or with a teflon bailer. The bailer and all measuring and sampling equipment were decontaminated before use in each well by cleaning in soapy water, a trisodium phosphate (TSP) rinse, and two clear water rinses. Samples were recovered from each well using a disposable bailer.

The wells were monitored for depth to groundwater and the presence of free product on April 14, 1992. The observations made to date are as follows:

SUMMARY OF GROUNDWATER MEASUREMENTS

Well No.	Date Measured	Top of Casing Elevation	Thickness of Free Product (feet)	Depth to Groundwater	Piezometric Surface Elevation (feet)
MW1	02/07/91	100.00	NONE	11.42	88.58
MW2	02/07/91	100.03	NONE	11.27	88.76
MW3	02/07/91	100.17	NONE	11.44	88.73
MW1	03/15/91	100.00	NONE	10.16	89.84
MW2	03/15/91	100.03	NONE	10.16	89.87
MW3	03/15/91	100.17	NONE	10.48	89.69
MW1	04/16/91	100.00	NONE	10.44	89.56
MW2	04/16/91	100.03	NONE	10.50	89.53
MW3	04/16/91	100.17	NONE	10.72	89.45
MW1	07/15/91	100.00	NONE	12.06	87.94
MW2	07/15/91	100.03	NONE	12.04	87.99
MW3	07/15/91	100.17	NONE	12.20	87.97
MW1	10/15/91	100.00	NONE	12.50	87.50
MW2	10/15/91	100.03	NONE	12.48	87.55
MW3	10/15/91	100.17	NONE	12.60	87.57
MW1	01/03/92	100.00	NONE	11.52	88.48
MW2	01/03/92	100.03	NONE	11.53	88.50
MW3	01/03/92	100.17	NONE	11.70	88.47
MW1	04/14/92	100.00	NONE	10.23	89.77
MW2	04/14/92	100.03	NONE	10.24	89.79
MW3	04/14/92	100.17	NONE	10.50	89.67

The groundwater gradient for the measurements taken during each monitoring episode was calculated, plotted and presented in each separate Monitoring Report. Those gradients are summarized below.

Date	Direction of Gradient	Slope of Gradient
02/07/91	24° west of north	0.59 feet per 100 feet
03/15/91	46° east of north	0.18 feet per 100 feet
04/16/91	82° east of north	0.16 feet per 100 feet
07/15/91	10° west of north	0.17 feet per 100 feet
10/15/91	40° west of north	0.14 feet per 100 feet
01/03/92	32° west of north	0.29 feet per 100 feet
04/14/92	**69° east of north**	**0.25 feet per 100 feet**

The water samples were stored in appropriate containers, labeled and transported in ice chests under Chain-Of-Custody protocol to a California State Certified Laboratory for analysis. Chain-Of-Custody forms are included in Appendix B. Each sample was tested for Total Petroleum Hydrocarbons as Diesel (TPH-D); Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX); and Total Oil and Grease (TOG). The following table summarizes the laboratory analyses results to date.

RESULTS OF GROUNDWATER ANALYSES

Well Sample	Date	TPH-D (ppm)	BTEX (ppb)	TOG (ppm)
MW1	2/07/91	0.3 300	ND/ND/ND/ND	ND
MW2	2/07/91	ND	ND/ND/ND/ND	ND
MW3	2/07/91	0.3	ND/ND/ND/ND	ND
MW1	3/15/91	ND	ND/ND/ND/ND	ND
MW2	3/15/91	ND	ND/ND/ND/ND	ND
MW3	3/15/91	0.055 55	ND/ND/ND/ND	ND
MW1	4/16/91	0.20 200	ND/ND/ND/ND	ND
MW2	4/16/91	ND	ND/ND/ND/ND	ND
MW3	4/16/91	ND	ND/ND/ND/ND	ND
MW1	7/15/91	ND	ND/0.3/ND/ND	ND
MW2	7/15/91	ND	ND/ND/ND/ND	ND
MW3	7/15/91	ND	ND/ND/ND/ND	ND
MW1	10/15/91	0.080	ND/ND/ND/ND	ND
MW2	10/15/91	ND	ND/ND/ND/ND	ND
MW3	10/15/91	ND	ND/ND/ND/ND	ND

Well Sample	Date	TPH-D (ppm)	BTEX (ppb)	TOG (ppm)
MW1	01/03/92	0.14 140	ND/ND/ND/ND	ND
MW2	01/03/92	ND	ND/ND/ND/ND	ND
MW3	01/03/92	0.065 65	ND/ND/ND/ND	ND
MW1	**04/14/92**	**ND**	**ND/23/ND/ND**	**ND**
MW2	**04/14/92**	**ND**	**ND/0.7/ND/ND**	**ND**
MW3	**04/14/92**	**ND**	**ND/ND/ND/ND**	**ND**

Notes: (ppm) parts per million.
(ppb) parts per billion.
ND Not detected at or above limit of detection.

Analytical Certificates
Original certificates from a California State Certified Laboratory for the most recent groundwater analyses are attached in Appendix B. Copies of the Chain-Of-Custody are also included in Appendix B.

Discussion
The groundwater flow direction as indicated by measurements taken on February 7, 1991 was to the northwest. Measurements taken during March and April 1991 indicated that the groundwater flow direction had moved to the northeast. Measurements taken during July and October 1991 and January 1992 indicate that the groundwater flow direction had moved back to the northwest. The April 1992 elevation readings indicate that the gradient shifted back to the northwest. Refer to Figure 2 of Appendix A, which shows the well locations and the calculated groundwater gradient.

Concentrations of TPH-D and TOG were non-detectable in water samples from all wells and was the second time that no TPH-D was detected. TOG has been non-detectable since the well installation in February, 1991. The samples from MW1 and MW2 showed detectable levels of Toluene of 23 and 0.7 ppb respectively. Toluene was detect once before in MW1 during the July 1991 monitoring episode.

Proposed Future Work
We recommend that the monitoring of the three groundwater wells be continued on a quarterly schedule. Each water sample should be analyzed for TPH-D, BTEX, and TOG. The next scheduled episode should occur in July, 1992.

Report Submittal
Copies of this report have been submitted to:

Hazardous Materials Division
Department of Environmental Health
Alameda County Health Care Services Agency
80 Swan Way Rm 200
Oakland, CA 94621
Attn: Pamela J Evans

California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, CA 94162

APPENDIX A

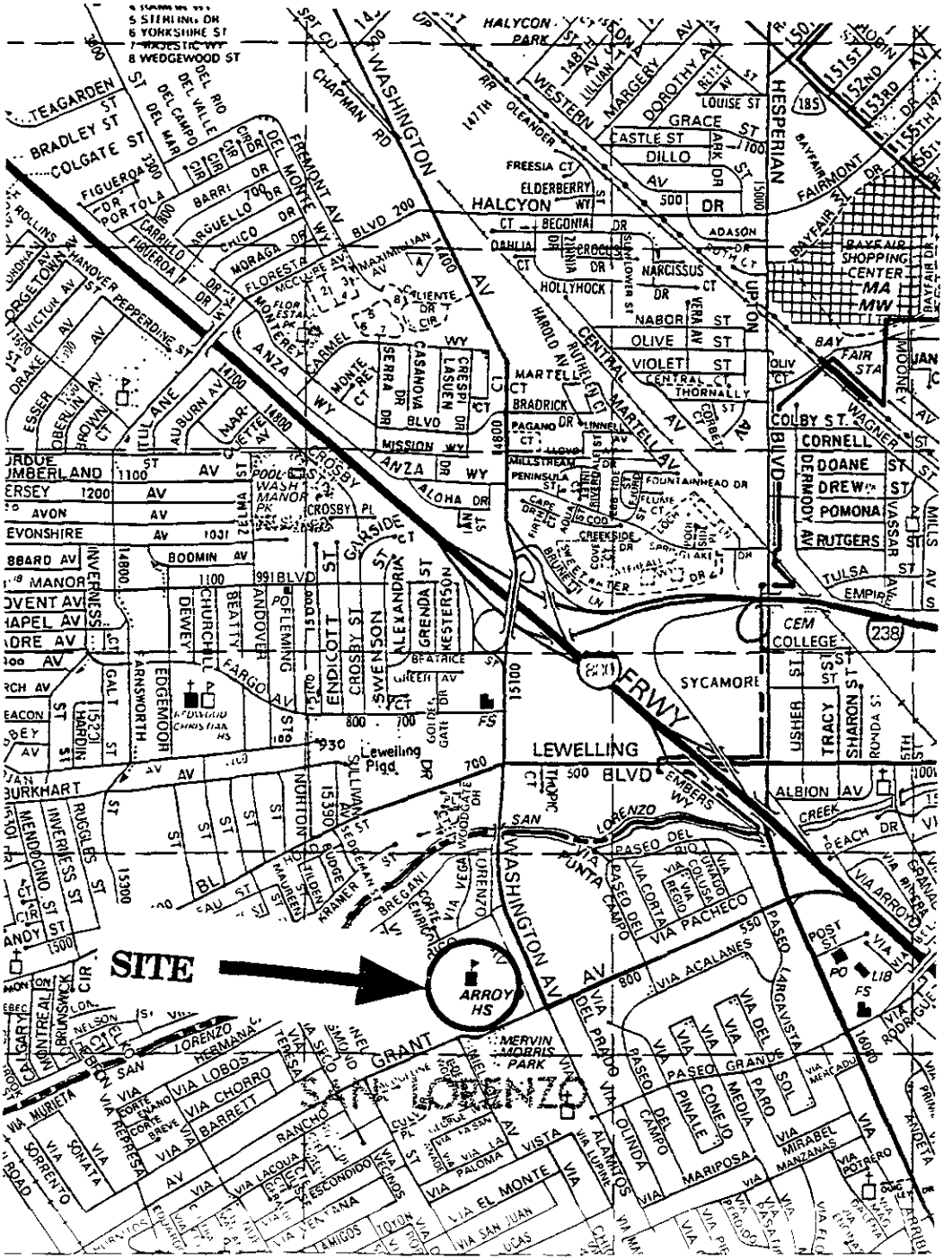
Figures 1 through 2

GROUNDWATER MONITORING

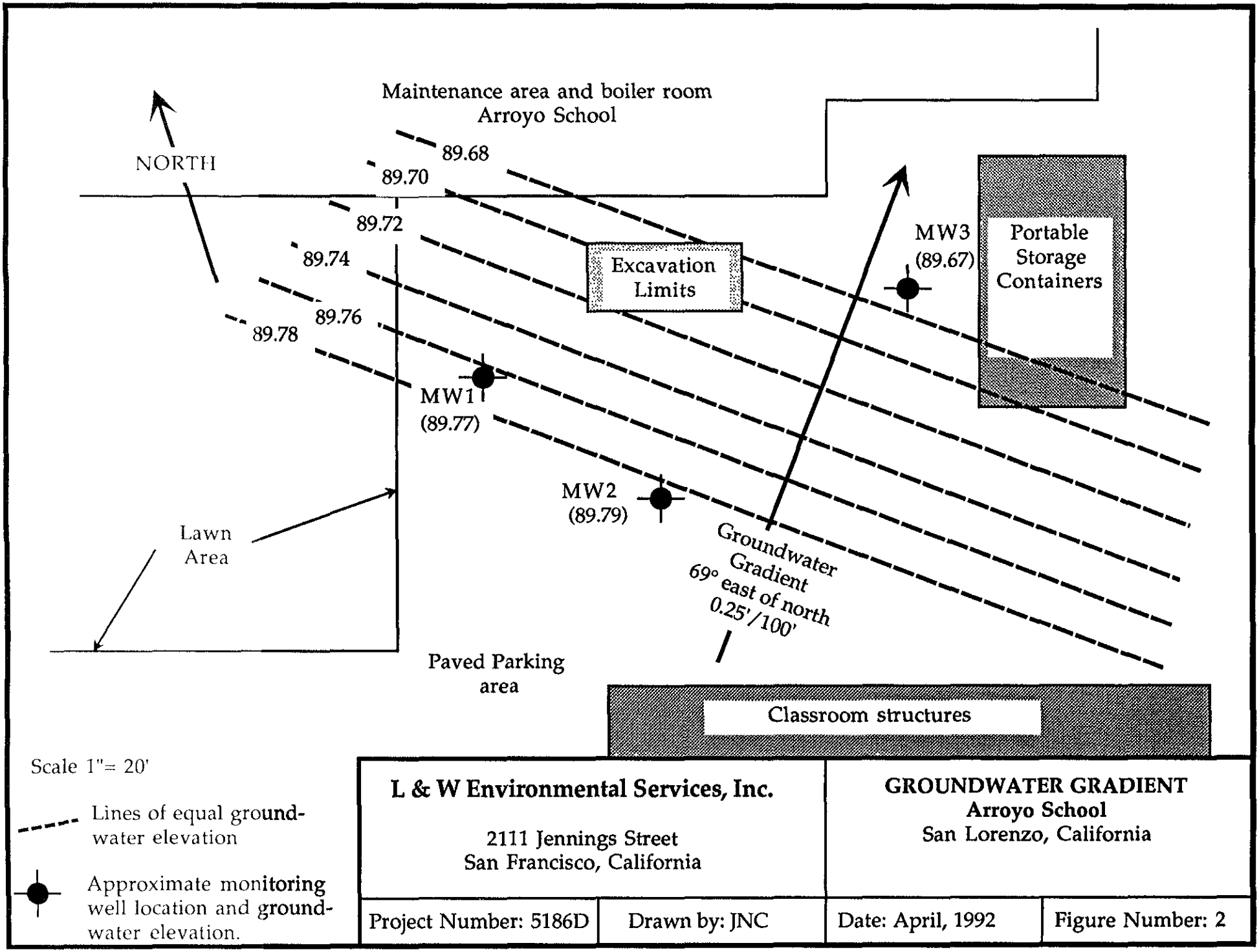
ARROYO HIGH SCHOOL
15701 LORENZO AVENUE
SAN LORENZO, CALIFORNIA

L&W Project 5186D
April 30, 1992

NORTH



L & W Environmental Services, Inc. 2111 Jennings Street San Francisco, California		Site Plan Arroyo High School San Lorenzo, California	
Project Number: 5186D	Drawn by: JNC	Date: April, 1992	Figure Number: 1


Maintenance area and boiler room
Arroyo School
NORTH
89.68
89.70
89.72
89.74
89.76
89.78
Excavation Limits
MW3
(89.67)
Portable Storage Containers
MW1
(89.77)
MW2
(89.79)
Lawn Area
Groundwater Gradient
69° east of north
0.25'/100'
Paved Parking area
Classroom structures
Scale 1"= 20'
Lines of equal groundwater elevation
Approximate monitoring well location and groundwater elevation.
L & W Environmental Services, Inc.
2111 Jennings Street
San Francisco, California
GROUNDWATER GRADIENT
Arroyo School
San Lorenzo, California
Project Number: 5186D
Drawn by: JNC
Date: April, 1992
Figure Number: 2

APPENDIX B

Laboratory Certificates and Chain of Custody Forms

GROUNDWATER MONITORING

ARROYO HIGH SCHOOL
15701 LORENZO AVENUE
SAN LORENZO, CALIFORNIA

L&W Project 5186D
April 30, 1992

CHAIN OF CUSTODY

SAMPLERS: (Signature) Edward Lorenz

PROJECT NAME: (Print) LORENZO USD (ARROYO) JOB NUMBER: 5186D

DESCRIPTION: QUARTERLY GROUND WATER MONITORING

ADDRESS: 15701 LORENZO AVE.

CROSS REFERENCE NUMBER	DATE	TIME	SOIL	WATER		SAMPLE LOCATION	TOTAL PETROLEUM HYDROCARBONS Diesel	BTEX	VOC - EPA 8240	TOTAL OIL AND GREASE	TETRAETHYL LEAD	EPA - 8270	METALS			REMARKS
5186D-mw1	4-14-92	1100		X		10.24 FT INTO MW1	X	X		X						3 Lit 2 VOA
5186D-mw2	4-14-92	1115		X		10.28 FT INTO MW2	X	X		X						3 Lit 2 VOA
5186D-mw3	4-14-92	1130		X		10.52 FT INTO MW3	X	X		X						3 Lit 2 VOA

RELINQUISHED BY: (Signature) Edward Lorenz

DATE 4-14-92 TIME 12:30 PM

RECEIVED BY: (Signature) Surinder Sahni

DATE 4-14-92 TIME 12:30 PM

RELINQUISHED BY: (Signature)

DATE TIME

RECEIVED BY: (Signature)

DATE TIME

RELINQUISHED BY: (Signature)

DATE TIME

RECEIVED BY: (Signature)

DATE TIME

RELINQUISHED BY: (Signature)

DATE TIME

RECEIVED BY: (Signature)

DATE TIME

L&W ENVIRONMENTAL SERVICES, INC.

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (510) 222-3002 FAX (510) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. E 750

Received: 04/14/92
Extraction: 04/20/92
Reported: 04/27/92
Job #: 73414

Attn: George Wilson
L & W Environmental Services, Inc.
2111 Jennings Street
San Francisco, CA 94124

Project: San Lorenzo Unified School District
Arroyo, 15701 Lorenzo Avenue
Matrix: Water

Total Petroleum Hydrocarbon Analysis
DHS Extraction Method (LUFT)
mg/L

Lab ID	Client ID	Diesel	MDL
73414-1	5186D-MW1	ND<0.05	0.05
73414-2	5186D-MW2	ND<0.05	0.05
73414-3	5186D-MW3	ND<0.05	0.05

QA/QC: Spike Recovery for Diesel: 84%

MDL: Method Detection Limit. Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/td

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (510) 222-3002 FAX (510) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. E 750

Received: 04/14/92
Reported: 04/27/92
Job #: 73414

Attn: George Wilson
L & W Environmental Services, Inc.
2111 Jennings Street
San Francisco, CA 94124

Project: San Lorenzo Unified School District
Arroyo, 15701 Lorenzo Avenue
Matrix: Water

Aromatic Volatile Hydrocarbon Analysis
EPA Method 602
µg/L

Lab ID	Client ID	Benzene	MDL	Toluene	MDL
73414-1	5186D-MW1	ND<0.3	0.3	23	0.3
73414-2	5186D-MW2	ND<0.3	0.3	0.7	0.3
73414-3	5186D-MW3	ND<0.3	0.3	ND<0.3	0.3

Lab ID	Client ID	Ethyl-benzene	MDL	Xylenes	MDL
73414-1	5186D-MW1	ND<0.3	0.3	ND<0.6	0.6
73414-2	5186D-MW2	ND<0.3	0.3	ND<0.6	0.6
73414-3	5186D-MW3	ND<0.3	0.3	ND<0.6	0.6

QA/QC: Spike Recovery for Benzene: 98%
Spike Recovery for Toluene: 110%
Spike Recovery for Xylene: 105%

MDL: Method Detection Limit. Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/td

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (510) 222-3002 FAX (510) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. E 750

Received: 04/14/92
Reported: 04/27/92
Job #: 73414

Attn: George Wilson
L & W Environmental Services, Inc.
2111 Jennings Street
San Francisco, CA 94124

Project: San Lorenzo Unified School District
Arroyo, 15701 Lorenzo Avenue
Matrix: Water

Total Oil and Grease
EPA Method 5520B
mg/L

Lab ID	Client ID	Oil and Grease	MDL
73414-1	5186D-MW1	ND<5	5
73414-2	5186D-MW2	ND<5	5
73414-3	5186D-MW3	ND<5	5

QA/QC: Spike Recovery: 88%

MDL: Method Detection Limit. Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/td