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April 26, 2001

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MAY 01 2001

Mr. Barney M. Chan
Alameda County
Department of Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Subject: Claim No. 7912
Site Address: 3609 International Blvd., Oakland, California

Dear Mr. Chan:

A copy of SOMA's "First Quarter 2001 Groundwater Monitoring Report" for the subject property is enclosed.

Thank you for your time in reviewing our report. If you have any questions or comments, please call me at (925) 244-6600.

Sincerely,

Mansour Sepehr, Ph.D.,P.E.
Principal Hydrogeologist

REGISTERED PROFESSIONAL ENGINEER
MANSOUR SEPEHR
No. C042928
Exp. 3-31-04
CIVIL
STATE OF CALIFORNIA

Enclosure

cc: Mr. Abolghassem Razi w/enclosure
Tony's Express Auto Service

CERTIFICATION

This report has been prepared by SOMA Environmental Engineering, Inc. on behalf of Mr. Abolghassem Razi, the property owner at 3609 International Boulevard, Oakland, California to comply with the Alameda County Department of Environmental Health Services' requirements for the First Quarter 2001 groundwater monitoring event.

Mansour Sepehr, Ph.D., P.E.
Principal Hydrogeologist

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 Introduction

This report has been prepared by SOMA Environmental Engineering, Inc. (SOMA) on behalf of Mr. Abolghassem Razi, the owner of the property. The site, Tony's Express Auto Service, is located at 3609 International Boulevard at the intersection of 36th Avenue in Oakland, California (the "Site"), as shown in Figure 1. The Site is located in an area consisting primarily of commercial and residential uses.

This report summarizes the results of the first quarter 2001 groundwater monitoring event conducted on March 13, 2001 at the Site, including the results of the laboratory analysis of the groundwater samples, which were analyzed for:

- Total petroleum hydrocarbons as gasoline (TPH-g)
- Benzene, toluene, ethylbenzene, total xylenes (collectively referred to as BTEX)
- Methyl tertiary Butyl Ether (MtBE)

These activities were performed in accordance with the general guidelines of the Regional Water Quality Control Board (RWQCB) and the Alameda County Environmental Health Services (ACEHS).

This report also examines the status of the pump and treat system (PATS) and vapor extraction system (VES) installed by SOMA in December 1999 and July 2000, respectively.

1.1 Background

Currently, the Site is used as a gasoline service station. The environmental investigation at the subject property started in 1992, when Mr. Razi, the property owner, retained Soil Tech Engineering, Inc. (STE) of San Jose to conduct a limited subsurface investigation. The purpose of STE's investigation was to determine whether or not the soil near the product lines and underground storage tanks (USTs) had been impacted with petroleum hydrocarbons.

In July 1993, STE removed one single-walled 10,000-gallon gasoline tank and one single-walled 6,000-gallon gasoline tank along with a 550-gallon waste oil tank from the Site. Three double-walled USTs replaced these tanks. Currently, there are one 10,000-gallon double-walled gasoline tank and two 6,000-gallon double-walled gasoline tanks beneath the Site (at the locations shown in Figure 2).

In December 1997, Mr. Razi retained Western Geo-Engineers (WEGE) to conduct additional investigations and perform groundwater monitoring on a quarterly basis. The results of the WEGE groundwater monitoring events indicated elevated levels of petroleum hydrocarbons and methyl tertiary butyl ether (MtBE) in the groundwater. The historical groundwater elevation data, total petroleum hydrocarbons as gasoline (TPH-g), benzene, toluene, ethlybenzene, xylenes, (BTEX) and MtBE concentrations reported by STE and WEGE are included in Tables 2 and 5 of this report.

In April 1999, Mr. Razi retained SOMA to conduct groundwater monitoring, risk based corrective action (RBCA), corrective action plan (CAP) and soil and groundwater remediation at the Site. The results of the RBCA study indicated that the site is a high-risk area, and that, therefore, the soil and groundwater in on-and off-site areas needed to be decontaminated. The results of the CAP study indicated that installation of a French drain with air sparging would be a cost

effective alternative for site remediation.

In late August 1999, SOMA installed a French drain and groundwater treatment system to prevent further migration of chemically impacted groundwater. This treatment system has been in operation since early December 1999.

In July 2000, SOMA installed a vapor extraction system based on the recommendation of the Corrective Action Plan (CAP) document dated July 1, 1999 prepared by SOMA, followed by approval from the Alameda County Department of Environmental Health.

The Site is located at the intersection of 36th Avenue and International Boulevard (formerly known as East 14th Street), Oakland, California. It is currently houses a gasoline service station and mechanic shop. The Site is relatively flat, and the surrounding properties are primarily commercial businesses and residential housing. Figure 2 shows the location of the main building, fuel tank areas, and the on-site and off-site groundwater monitoring wells. The groundwater monitoring wells are currently monitored on a quarterly basis. Past groundwater monitoring events have indicated elevated levels of petroleum hydrocarbons in the groundwater beneath the Site. The source of petroleum hydrocarbons in the groundwater is believed to be the former underground storage tanks (USTs), which were used to store gasoline at the Site. This report includes the results of historical groundwater monitoring events, as well as the results of the first quarter 2001 groundwater monitoring event.

1.2 Site Hydrogeology

Previous investigations have shown that groundwater is encountered at depths ranging from 10 to 11 feet beneath the Site. (Figure 2 shows the location of the on-site and off-site groundwater monitoring wells.) Prior to the operation of the French drain, the groundwater was found to flow from the north to the south with

an average gradient of 0.014 ft/ft. When the groundwater extraction system is in operation, the groundwater flows from all directions toward the French drain. The capture zone of the drain has extended down gradient past well MW-10.

Based on the results of a pumping test conducted by SOMA, the hydraulic conductivity of the saturated sediments ranges from 1.5 to 18.3 feet per day. Assuming that the effective porosity of saturated sediments is 0.35, the groundwater velocity ranges from 22 to 267 feet per year.

2.0 Field Activities

Field activities were performed in accordance with the procedures and guidelines of the California Regional Water Quality Control Board, San Francisco Bay Region.

On March 13, 2001, SOMA's field crew measured the depths to groundwater in the monitoring wells from the top of casings to the nearest 0.01 feet using an electrical sounder. The depth to groundwater and top of casing elevation data at each groundwater monitoring well were used to calculate the groundwater elevation. A total of 11 groundwater monitoring wells and three risers of the French drain were monitored during this event. Table 1 presents the groundwater elevations, and Appendix A presents a detailed summary of the field notes for each groundwater monitoring well.

Prior to collecting the groundwater samples, each well was purged of at least three casing volumes of water, and field measurements of pH and temperature were recorded. A 2-inch diameter submersible pump (model ES-60 DC) was used to purge each well. Groundwater samples were then collected using disposable bailers. Each groundwater sample was transferred into two 40-mL VOA vials and sealed properly to prevent the development of any air bubbles within the headspace area. The vials were placed in an ice chest and delivered to

Delta Environmental Laboratories of Benicia, California for analysis. For field measurements, samples were transferred into 500-mL polyethylene containers.

The groundwater samples that were kept in polyethylene bottles were immediately used for on-site measurements of nitrate-N (NO_3^--N), sulfate (SO_4^{-2}), ferrous iron (Fe^{+2}), pH, turbidity, and electrical conductivity (EC).

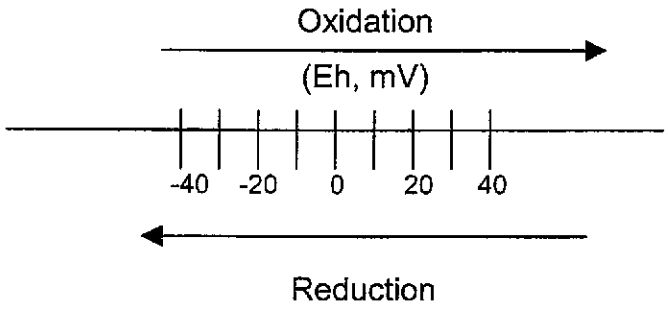
In order to avoid the intrusion of oxygen from ambient air to groundwater samples, the D.O. and temperature measurements were conducted in situ (i.e., down-hole inside each monitoring well).

The D.O. and temperature were measured with a dissolved oxygen meter, YSI Model 50B (YSI Incorporated, Yellow Springs, Ohio 45387 USA); see the field notes in Appendix A for the details of the field measurements. The instrument was calibrated at the Site according to a procedure provided by the manufacturer and prescribed by Taras *et.al.* (1975). Detail of the calibration and measurement procedures can be found in the instrument's handbook. The measurements were corrected for barometric pressure, temperature and salinity using correction factors provided by the user's manual, as described in Appendix A.

Turbidity was measured with a HANNA Instruments (HI) Model 93703 portable turbidity meter. The HI 93703 portable microprocessor-based turbidity meter provides lab-grade accuracy, even in the field. The unit of measure adopted by the ISO Standard is the FTU (Formazine Turbidity Unit), which is identical to the NTU (Nephelometric Turbidity Unit). The instrument was calibrated at two points, 0 FTU and 10 FTU, using the two calibration solutions of primary standard AMCO-AEPA-1 at 0 FTU and 10 FTU that were supplied with the meter. Suspended materials cause the cloudy appearance of water or turbidity. Turbidity is one of the most important parameters used to determine the quality of drinking water. It has been found that there is a strong correlation between the turbidity

level and the Biological Oxygen Demand of the natural water bodies. Turbidity is an indicator and, as such, does not reveal the presence or quantity of specific pollutants in groundwater. It does, however, provide general information on the extent of the suspended solids in groundwater.

A HANNA ORP electrode was used to measure the Oxidation-Reduction Potential of the groundwater samples. Oxidation is a process in which a molecule or ion loses one or several electrons. Reduction is a process by which a molecule or ion gains one or several electrons. The Oxidation Reduction Potential, or Eh, is a measure of the potential for these processes to occur. The unit of Eh, which is commonly referred to as the redox potential, is the Volt or m-Volt. The most important redox reaction in petroleum contaminated groundwater is the oxidation of petroleum hydrocarbons in the presence of bacteria and free molecular oxygen. Because the solubility of O_2 in water is low (9 mg/L at 25 °C and 11 mg/L at 5 °C), and because the rate of O_2 replenishment in subsurface environments is limited, oxidation of only a small amount of petroleum hydrocarbons can result in the consumption of all the dissolved oxygen. When all the dissolved O_2 in groundwater is consumed, oxidation of petroleum hydrocarbons can still occur, but the oxidizing agents (i.e., the constituents that undergo reduction) are NO^-_3, MnO_2, $Fe(OH)_3$, SO_4^{2-} and others (Freeze and Cherry, 1979). As these oxidizing agents are consumed, the groundwater environment becomes more and more reduced. If the process proceeds far enough, the environment may become very strongly reduced, and the petroleum hydrocarbons may undergo anaerobic degradation, possibly resulting in the production of methane gas and carbon dioxide. The concept of oxidation and reduction in terms of changes in oxidation states is illustrated below:



Fe^{+2}, NO^{-}_{3}-N and SO_4^{-2} were measured colorimetrically using the Hach Model DR/850 colorimeter (Hach Company World Headquarters, P.O. Box 389, Loveland, Colorado 80539-0389). The Hach DR/800 Series Colorimeter is a microprocessor-controlled photometer suitable for colorimetric testing in the laboratory or the field. The required reagents for each specific test are provided in AccuVac ampuls.

Fe^{+2} was measured colorimetrically using Method 8146 (1,10-phenanthroline Method). The 1,10-phenathroline indicator in Ferrous Iron Reagent reacts with Fe^{+2} in the sample to form an orange color. The intensity of orange color is proportional to the iron concentration.

SO_4^{-2} was measured colorimetrically using Method 8051 of Sulfa Ver 4 Method. Sulfate ions in the sample react with Sulfa Ver 4 Sulfate Reagent to form insoluble barium sulfate. The amount of turbidity formed is proportional to the sulfate concentration. The Sulfa Ver 4 also contains a stabilizing agent to hold the barium sulfate in suspension.

NO^{-}_{3}-N was measured colorimetrically using Method 8039: the Cadmium Reduction Method. Cadmium metal in the Nitra Ver 5 Nitrate Reagent reduces nitrates present in the sample to nitrite; the nitrite ion reacts in an acidic medium with sulfanilic acid to form an intermediate diazonium salt, which couples with getistic acid to form an amber-colored product. The intensity of the color is proportional to nitrate-N concentration in the sample.

Electrical conductivity and pH were measured with Hydac Model 910 pH meter. The instrument was calibrated for conductance with a standard solution of known concentration (12,000 µS/cm) and for pH with 4, 7 and 10 pH units buffer solutions. All measurements were performed according to the instruction manual provided by the manufacturer.

2.1 Laboratory Analysis

Delta Environmental Laboratories of Benicia analyzed the groundwater samples. The measured constituents included TPH-g, BTEX and MtBE.

TPH-g was measured using EPA Method 5030/GCFID. EPA Method 8020 was used to measure BTEX. MtBE levels in the groundwater were measured using EPA Method 8020 and confirmed using EPA Method 8260. The results of the laboratory analysis are presented in Table 4 and discussed below. As discussed above, the groundwater constituents related to bio-degradation activities (such as dissolved oxygen, redox potential, turbidity, nitrate, ferrous iron, and sulfate) were analyzed in the field by SOMA, and are presented in Table 3.

3.0 Results

Table 1 presents the measured groundwater elevations at different groundwater monitoring wells and the risers of the French drain. At each location, depth to watertable and the elevation of the top of casing were used to calculate the watertable elevation relative to the assumed datum.

Depths to watertable in the monitoring wells and the risers of the French drain ranged from 8.04 to 10.12 feet. The corresponding watertable elevations ranged from 85.80 to 90.37 feet. Figure 3 displays the groundwater elevation contour

map. The contour map does not show the impact of the French drain on the water level elevations of the surrounding monitoring wells because the operators of the service station had turned the system off due to complaints from neighboring residences about the noise level. This was later remedied when SOMA installed a soundproof box around the new compressor, as explained in Section 4.0. Therefore, during the recent monitoring event, the groundwater flow was found to be from the north towards the south. This is consistent with the findings of the previous monitoring events that were conducted prior to the installation of the French drain.

Table 2 displays the historical static water level elevations measured at the monitoring wells and the risers of the French drain. During the recent monitoring event, in comparison with the previous monitoring event, the water level elevations increased by 2.94 in MW-11 and by 7.46 feet in the French drain (center) riser. The increase in watertable elevations in all of the other wells was between these two values, and this rise in water levels is attributable both to the rainy season and the fact that the extraction system was off during this event. Historically, no floating products have been detected in any of the on-or-off site monitoring wells.

The field measurements of some physical and chemical parameters of the groundwater samples are presented in detail in the field notes in Appendix A, and are summarized in Table 3, along with their historical values. Water temperatures ranged from 18.7 ^{0}C to 20.7 ^{0}C. The variation in temperature may reflect the changes in air temperature during sampling, see the field notes in Appendix A. The temperature measurements allowed us to make corrections to the pH and E.C. measurements, using the Manual Temperature Compensation procedure described in the Hydac Model 910 pH meter manual. The dissolved oxygen (D.O.) measurements were also corrected automatically for the recorded temperatures, see Appendix A.

The dissolved oxygen concentrations in the groundwater samples ranged from 0.48 mg/L in MW-8 to 1.01 mg/L in MW-5. The low oxygen content may suggest the presence of an anaerobic biodegradation process in this groundwater system. Figure 4 shows the concentration contour map of D.O. concentrations in the groundwater. The dissolved oxygen measurement was conducted down-hole (in-situ) after purging the wells.

The turbidity of the groundwater samples ranged from 8.42 FTU to 190 FTU. The maximum turbidity was recorded in monitoring well MW-4.

The Redox potential in the groundwater samples ranged from –76.0 mV in well MW-8 to +117.9 mV in Well MW-2. Monitoring wells MW-2, MW-4, MW-5, MW-10, and MW-11 showed oxidized conditions, while the remainder of the wells showed strongly reduced conditions. The low oxygen levels in wells MW-2, MW-4, MW-5, MW-10, and MW-11), in combination with the positive redox potentials, suggest the presence of weak aerobic oxidation of the petroleum hydrocarbons in these wells. However, the other monitoring wells impacted by petroleum show strongly reduced conditions. In these oxygen-depleted environments, anaerobic processes utilizing alternate electron acceptors for oxidation of petroleum hydrocarbons may be responsible for the reduced conditions. Possible alternate electron acceptors include nitrate, iron (III) and sulfate (Lovley *et. al.*, 1994). Under strongly reduced conditions and a lack of other terminal electron acceptors, the occurrence of methanogenesis and production of methane gas is highly possible.

During this monitoring event, nitrate was detected in wells MW-1, MW-2, MW-4, MW-5, MW-6 and MW-8. As discussed earlier, the concentrations of dissolved oxygen in all wells were quite low, and because the replenishment of oxygen in subsurface environments is limited, oxidation of only a small amount of

petroleum hydrocarbons depletes the oxygen. Under this condition, oxidation of petroleum hydrocarbons can still occur, but the oxidizing agents (i.e., constituents that undergo reduction) are NO^-_3, MnO_2, $Fe(OH)_3$, SO_4^{2-} and others (Lovley *et. al.*, 1994). The disappearance of nitrate in many of the wells may suggest that, under the observed anaerobic condition, nitrate may have been used as a source of terminal electron acceptor by microorganisms (Lovley *et. al.*, 1994). Figure 5 shows the contour map of nitrate concentration in the groundwater.

Sulfate concentrations ranged from 0 mg/L in wells MW-3, MW-10, and MW-12 to 80 mg/L in wells MW-1 and MW-2. Sulfate-depleted subsurface contaminated environments may reveal a strong demand by microorganisms for a source of terminal electron acceptor for oxidizing contaminant hydrocarbons (Lovley *et. al.*, 1994). Figure 6 shows the groundwater sulfate concentration contour map, as measured on March 13, 2001.

Ferrous iron concentration in the groundwater samples ranged from 0.07 mg/L in MW-2 to 3.30 mg/L in wells MW-7 and MW-8. High concentrations of ferrous iron in the groundwater is a good indication of biological activities. Figure 7 shows the groundwater ferrous iron concentration contour, as measured on March 13, 2001. The presence of high ferrous iron concentrations and low concentrations of electron receptors, such as nitrogen, sulfate and dissolved oxygen, is indicative of anaerobic biodegradation beneath the Site. Due to the presence of low levels of dissolved oxygen, as well as nutrients such as nitrates and sulfate, generation of methane gas from the biodegradation of petroleum hydrocarbons seems likely.

The pH measurements ranged from 6.70 to 7.42. Electrical conductivity ranged from 479 µS/cm to 667 µS/cm. The unit of electrical conductivity is Siemens (S) or micro-Siemens (µS) in the SI system. In the past, these units have been known as millimhos and micromhos.

Table 4 displays the results of the laboratory analyses of the groundwater samples. TPH-g was detected in every sample, with concentrations ranging from 69 µg/L in monitoring well MW-1 to 15,697 µg/L in monitoring well MW-8. Figure 8 displays the contour map of TPH-g in the groundwater.

Benzene concentrations ranged from not detectable (i.e., below the detection limit of 0.5 µg/L) in monitoring well MW-1 to 2,250 µg/L in MW-3. Figure 9 displays the contour map of Benzene in the groundwater.

MtBE concentrations were below the detection limit of 5 µg/L in five monitoring wells (MW-2, MW-4, MW-5, MW-6, and MW-11) and reached 2,139 µg/L in MW-8. Due to unexpectedly high concentrations of MtBE encountered in MW-8 on April 11, 2001 a confirmatory sample was collected from MW-8. The results of the re-sampling of MW-8 did not confirm the results of the previous sampling. Therefore, it is believed that the result of the laboratory analysis of the second round (99 µg/L) is a true representation of the MtBE concentrations in MW-8. Figure 10 displays the contour map of MtBE in the groundwater.

Table 5 presents the historical data of groundwater contamination. Generally speaking, many of the analytes increased slightly in concentration in many of the wells since the previous monitoring event, which was conducted on November 2, 2000. However, concentrations remained within normal historical levels (generally, the concentrations reported in the previous event were considerably lower than in most other monitoring events at the site). Benzene concentrations increased slightly in eight of the eleven wells, mostly notably in MW-1 and MW-10, but remained within historically observed limits. MtBE concentrations remained undetectable in 5 of the 11 wells, but increased in five of the wells. TPH-g concentrations increased in nine of the wells this quarter, but remained below historical average values in every well (the TPH-g concentrations had

decreased significantly in the previous quarterly event). This monitoring event also confirmed the findings of the previous monitoring events: petroleum hydrocarbons remain stable or are decreasing in well MW-12, which is located at the BART property south of the Site. It is anticipated that, due to biodegradation activities, the concentration of contaminants in MW-12 will gradually drop to non-detectable levels.

4.0 Groundwater Treatment System Operation

The treatment system began operation on [redacted] permit (as of March 13, 2001).

As required by the discharge permit and the ACEHS, sampling of the groundwater treatment system has been performed on a routine basis. The effluent sampling and maintenance of the system was performed on a weekly basis from the start of the system operation to the end of July 2000. From August 2000 onward, maintenance of the system continued weekly, but sampling was performed on a monthly basis. The result of the first effluent testing was used to acquire a discharge permit from EBMUD.

Table 6 presents the total volume and chemical composition of the effluent treated at the Site. Table 6 shows that all of the effluent samples have maintained compliance with the permit, having concentrations below the laboratory detection limits. Approximately 10,500 gallons of chemically impacted groundwater per week were treated during the first quarter of 2001 by the treatment system. As discussed in the previous monitoring reports, the effluent passing both GAC units is regularly being collected for chemical analysis. The schedule for re-furbishing the GAC units is based on the analytical results of the

effluent samples. The first GAC unit was re-furbished as soon as traces of chemicals broke through the unit. The second GAC unit is serving as a polishing unit and is always kept highly active. This procedure ensures that the effluent discharging to EBMUD has non-detectable levels of contaminants.

As Figure 11 shows, a total of 76 pounds of TPH-g and 4.0 pounds of MtBE have been removed during the operation of the treatment system.

As discussed in SOMA's Semi-Annual Technical Report on February 14, 2001, the groundwater extraction and treatment system required significant repair work this quarter. The system was shut down on February 10, 2001, after it was discovered that the air compressor that powers the vacuum pump was broken. While waiting for the replacement compressor to arrive, SOMA decided to utilize the downtime to refurbish the treatment system. The polishing GAC (GAC 2) was replaced with a new unit with fresh carbon. The spent carbon was removed from the large GAC (GAC 1) and disposed of. After that, the large GAC vessel was steam cleaned, as was the 500-gallon holding tank. Upon completion of the cleaning, the large GAC was refilled with 2000 pounds of fresh carbon. The down-hole pump was fitted with a new regulator, and its filter was replaced as well. Next, the transfer pump was upgraded. In addition, most of the PVC piping for the system was replaced. Finally, the new compressor was installed and the system restarted on March 1, 2001. The system was sampled upon restart, and the laboratory results are included with this report. During the first couple weeks of March, due to residential neighbors complaining about the loudness of the new compressor, the operators of the shops turned the compressor off during some days. On March 29, a soundproof box was installed around the compressor, and the system was then returned to full-time operation.

5.0 Vapor Extraction System Operation

The Vapor Extraction System (VES) consists of 6 vapor extraction wells, a de-moisturizing unit, a blower and three drums of Granulated Active Carbon (GAC) filters. The VES began operation on July 24, 2000. Since then, more than 3,000,000 liters/day of soil gas has been extracted from the vadose zone and treated with the GAC filters before being discharged into the atmosphere. When the system first began to operate, the influent had a concentration of 394 ppmv petroleum hydrocarbons, but this gradually dropped, and after 31 days of operation decreased to 68 ppmv. A [redacted] pounds of petroleum hydrocarbons have been removed from the vadose zone since the system began operation. Based on the requirements of the Bay Area Air Quality Management District (BAAQMD) permit, the frequency of monitoring and GAC unit replacement are scheduled such that the concentration of the hydrocarbons in the exhaust air remains below 10 ppmv. On January 4, 2001, due to an entire month of extremely low influent concentrations (i.e., less than 10 ppm of hydrocarbons), the SVE system was turned off for the duration of the rainy season.

6.0 Conclusions and Recommendations

The findings of the first quarter 2001 groundwater monitoring event are summarized as follows:

1. The groundwater flow direction was found to be from the north towards the south, which is consistent with the findings of the previous monitoring events. When the groundwater extraction system is in operation, the groundwater flow beneath the off-site properties south of the Site is reversed by the effects of the French drain and flows from the south towards the north.

2. In comparison with the previous monitoring event, the water level elevations increased in all of the wells. This rise is attributable to the rainy season and to the fact that the groundwater extraction system was turned off during this monitoring event.

3. Benzene was detected in all but one of the wells, with a peak concentration of 2,250 µg/L in MW-3.

4. MtBE concentrations were below the detection limit of 5 µg/L in five monitoring wells MW-2, MW-4, MW-5, MW-6, and MW-11 (as was the case last quarter). MW-8 showed an unexpectedly high concentration of MtBE. On April 11, 2001 this well was re-sampled. The result of the laboratory analysis did not confirm the presence of high concentration of MtBE at MW-8.

5. TPH-g was detected in every monitoring well, with concentrations ranging up to 15,637 µg/L in monitoring well MW-6. In 9 of the 11 wells, TPH-g concentrations increased since the previous monitoring event. However, that previous event had abnormally low levels of TPH-g, and the current values are all well within the historically observed values.

6. The results of the recent monitoring event confirmed the findings of the previous monitoring events: petroleum hydrocarbons concentrations are stable or decreasing in well MW-12, which is located at the BART property south of the Site.

7. Due to the presence of low levels of dissolved oxygen and nutrients such as nitrates and sulfate, generation of methane gas from the biodegradation of petroleum hydrocarbon in on-site areas seems likely.

8. So far, more than 1,032,000 gallons of groundwater have been treated and discharged to the East Bay Municipal Utility District (EBMUD) under the existing discharge permit.

9. All effluent samples have maintained compliance with the permit, with all contaminant concentrations values below the laboratory detection limit.

10. A total of 76 pounds of TPH-g and 4.0 pounds of MtBE have been removed since the installation of the treatment system.

11. The Vapor Extraction System has removed 187 pounds of petroleum hydrocarbons from the vadose zone beneath the Site since it was installed.

7.0 Report Limitations

This report is the summary of work done by SOMA including observations and descriptions of the Site conditions. It includes the analytical results produced by Delta Environmental Laboratories, as well as summaries of data produced by previous environmental consultants. The number and location of the wells were selected to provide the required information, but may not be completely representative of the entire Site conditions. All conclusions and recommendations are based on the results of the laboratory analysis. Conclusions beyond those specifically stated in this document should not be inferred from this report.

SOMA warrants that the services provided were done in accordance with the generally accepted practices in the environmental engineering and consulting field at the time of this sampling.

8.0 References

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TABLES

Table 1

Groundwater Elevation Data, March 13, 2001

3609 International Boulevard, Oakland, California

Monitoring Well	Depth to Water (ft.)	Top of Casing Elevation (ft.)	Groundwater Elevation (ft.)	Product Thickness (ft.)
MW-1	8.96	97.99	89.03	ND
MW-2	8.55	98.58	90.03	ND
MW-3	9.43	97.78	88.35	ND
MW-4	9.24	97.85	88.61	ND
MW-5	8.67	99.04	90.37	ND
MW-6	9.49	98.77	89.28	ND
MW-7	8.04	97.83	89.79	ND
MW-8	8.75	97.25	88.50	ND
MW-10	8.07	94.54	86.47	ND
MW-11	9.61	95.94	86.33	ND
MW-12	9.04	94.84	85.80	ND
F.D. Center	9.39	97.10	87.71	ND
F.D. East	9.14	97.90	88.76	ND
F.D. West	10.12	96.90	86.78	ND

ND Not Detected

Table 2

Historical Groundwater Elevation Data

3609 International Boulevard, Oakland, California

Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-10	MW-11	MW-12	French Drain
Mar-01	**89.03**	**90.03**	**88.35**	**88.61**	**90.37**	**89.28**	**89.79**	**88.50**	**86.47**	**86.33**	**85.80**	**87.71**
Nov-00	84.79	85.98	84.38	84.80	85.49	85.37	85.88	84.70	83.19	83.39	82.79	80.25
Aug-00	84.63	85.55	84.05	84.5	85.82	84.99	85.2	84.38	83.02	81.07	82.77	81.4
May-00	86.50	87.70	86.10	86.39	88.01	87.07	87.31	86.10	85.09	82.14	84.36	81.50
Feb-00	86.79	88.73	86.83	86.60	89.19	87.82	88.33	86.40	85.29	82.34	84.64	81.70
Nov-99	83.54	84.48	83.08	83.75	84.74	84.02	84.58	83.60	82.04	82.09	81.64	-
Aug.99	84.64	85.08	83.93	84.65	85.49	84.87	85.03	84.50	82.94	83.19	-	-
Jun.99	86.89	87.34	85.98	86.55	87.54	86.87	87.13	86.45	84.59	84.44	-	-
Mar.99	88.08	90.98	89.34	89.39	91.31	90.37	90.83	89.67	87.24	87.13	-	-
Dec.98	86.89	87.64	86.23	86.72	87.84	87.17	87.31	86.50	84.35	84.36	-	-
Sep.98	84.41	85.00	83.10	84.21	85.22	84.67	84.74	84.23	82.61	82.70	-	-
Dec.97	88.69	89.54	-	88.42	89.89	89.47	89.18	88.30	85.76	85.54	-	-
Apr.97	86.85	87.18	86.05	86.62	87.69	87.01	84.88	84.30	84.47	84.47	-	-
Dec.96	86.32	86.91	85.76	86.27	87.56	86.73	86.86	86.12	84.10	83.95	-	-
Apr.96	89.70	90.45	89.02	89.50	90.80	90.01	90.08	89.27	-	-	-	-
Jan.96	87.92	88.65	87.23	87.74	89.01	88.22	88.26	87.46	-	-	-	-
Oct.95	84.70	85.16	84.87	-	85.47	84.83	84.88	84.39	-	-	-	-
Jun.95	88.46	88.99	87.53	-	-	-	-	-	-	-	-	-
Mar.95	89.92	90.90	89.09	-	-	-	-	-	-	-	-	-
Dec.94	88.67	89.98	87.99	-	-	-	-	-	-	-	-	-
Oct.94	82.60	83.22	81.99	-	-	-	-	-	-	-	-	-

Table 3

Groundwater Biodegradation Parameters

3609 International Boulevard, Oakland, California

Well	Date	Nitrate (mg/L)	Sulfate (mg/L)	Ferrous Iron (mg/L)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Turbidity (FTU)
MW-1	**3/13/01**	**4.4**	**80.0**	**0.5**	**0.53**	**-4.70**	**66.0**
	11/2/00	0.0	33.0	1.1	0.56	-39.40	18.00
	8/9/00	0.0	0.0	1.7	0.32	-40.0	219.0
	5/31/00	2.8	0.0	0.57	0.30	-37.0	30
	2/7/00	0.0	1.0	3.3	0.77	-74.0	-
	11/9/99	0.0	26.0	5.1	0.2	-	-
	8/23/99	0.0	8.0	2.67	1.4	-	-
	6/10/99	0	1	3.17	0.14	-	-
	12/30/97	<0.1	<1	3.04	0.5	-	-
MW-2	**3/13/01**	**6.8**	**80.0**	**0.1**	**0.89**	**117.9**	**24.15**
	11/2/00	0.0	7.9	0.7	1.35	111	ND
	8/9/00	5.4	0	0.72	0.76	-74	1000
	5/31/00	2.5	54.0	0.18	0.8	-55.0	30.9
	2/7/00	6.2	55.0	0.15	1.12	-20.0	-
	11/9/99	0.9	55.0	1.0	0.8	-	-
	8/23/99	1.0	60.0	0.62	0.7	-	-
	6/10/99	0.7	40	0.55	0.44	-	-
	6/30/98	<0.1	14	0.5	3.2	-	-
	12/30/97	<0.1	<1	3.35	<0.1	-	-
MW-3	**3/13/01**	**0**	**0**	**2.66**	**0.62**	**-60**	**26.91**
	11/2/00	0	28	4.1	0.83	-94	4,816
	8/9/00	0	0	6.1	0.4	-72	123
	5/31/00	0.00	4.00	7.80	0.45	-117.0	188.0
	2/7/00	0.00	140.00	3.60	0.70	-82.00	-
	11/9/99	0.00	0.00	3.50	0.61	-	-
	8/23/99	0.00	0.00	3.90	0.80	-	-
	6/10/99	0.00	0.00	3.10	0.42	-	-
	6/30/98	0.10	77.00	0.37	2.00	-	-

Table 3

Groundwater Biodegradation Parameters

3609 International Boulevard, Oakland, California

Well	Date	Nitrate (mg/L)	Sulfate (mg/L)	Ferrous Iron (mg/L)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Turbidity (FTU)
MW-4	**3/13/01**	**3.2**	**48**	**0.51**	**0.72**	**9.4**	**190**
	11/2/00	4.5	45	0	0.6	-39	ND
	8/9/00	1	14	0.32	0.46	-50	83
	5/31/00	0.50	40.00	0.25	0.50	-40.0	26.8
	2/7/00	0.00	1.00	1.56	1.30	-31.0	-
	11/9/99	0.50	23.00	0.99	0.12	-	-
	8/23/99	0.50	28.00	0.67	0.15	-	-
	6/10/99	0.40	10.00	0.81	0.15	-	-
	6/30/98	0.90	7.00	0.93	1.30	-	-
	12/30/97	4.50	42.00	0.39	<0.1	-	-
MW-5	**3/13/01**	**1.00**	**45**	**0.33**	**1.01**	**34.2**	**35.36**
	11/2/00	6.5	31	1.02	0.56	49	ND
	8/9/00	0	26	0	1.97	80	490
	5/31/00	0.00	50.00	0.35	0.48	-25.0	27.2
	2/7/00	0.00	47.00	0.64	0.90	18.0	-
	11/9/99	2.00	32.00	0.72	0.27	-	-
	8/23/99	2.40	45.00	1.19	0.75	-	-
	6/10/99	2.50	33.00	0.34	0.25	-	-
	6/30/98	1.60	6.00	0.50	0.60	-	-
	12/30/97	0.30	18.00	0.94	<0.1	-	-
MW-6	**3/13/01**	**1.3**	**79**	**2.63**	**0.75**	**-42.1**	**83**
	11/2/00	0	16	2.65	0.8	-34	618
	8/9/00	2.5	0	4.1	0.65	-33	1000
	5/31/00	0.00	0.00	3.27	0.72	-62.0	111.0
	2/7/00	0.00	0.00	3.02	1.25	-51.0	-
	11/9/99	0.00	0.00	7.00	0.22	-	-
	8/23/99	0.00	9.00	3.30	0.55	-	-
	6/10/99	0.00	23.00	2.52	0.61	-	-
	6/30/98	0.70	4.00	0.40	2.50	-	-
	12/30/97	<0.1	5.00	0.30	<0.1	-	-

Table 3

Groundwater Biodegradation Parameters

3609 International Boulevard, Oakland, California

Well	Date	Nitrate (mg/L)	Sulfate (mg/L)	Ferrous Iron (mg/L)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Turbidity (FTU)
MW-7	**3/13/01**	**0**	**40**	**3.3**	**0.79**	**-10.4**	**110**
	11/2/00	3.5	30	0.27	0.58	-11.6	ND
	8/9/00	0	17	0.95	0.26	-33	131
	5/31/00	0.00	28.00	0.72	0.30	-52.0	34.9
	2/7/00	0.00	41.00	0.53	0.91	-19.0	-
	11/9/99	0.00	25.00	0.99	0.14	-	-
	8/23/99	0.00	20.00	1.40	0.65	-	-
	6/10/99	0.00	22.00	0.19	0.15	-	-
	6/30/98	0.50	4.00	0.78	1.00	-	-
	12/30/97	0.20	32.00	0.23	1.20	-	-
MW-8	**3/13/01**	**2.1**	**12**	**3.3**	**0.48**	**-76**	**110**
	11/2/00	-	16	73.3	-	-104.9	350
	8/9/00	0	7	3.3	0.5	-91	94
	5/31/00	0.00	0.00	3.30	0.45	-95.0	13.0
	2/7/00	0.00	0.00	3.46	0.65	-90.0	-
	11/9/99	0.00	0.00	8.90	0.38	-	-
	8/23/99	0.00	13.00	8.20	0.20	-	-
	6/10/99	0.00	0.00	4.70	0.10	-	-
	6/30/98	<0.1	3.00	2.82	1.30	-	-
	12/30/97	0.10	<1	3.35	2.50	-	-
MW-10	**3/13/01**	**0**	**0**	**0.23**	**0.65**	**28**	**32.11**
	11/2/00	1.3	13	0.42	0.53	26.7	ND
	8/9/00	0	0	0.4	0.45	19	116
	5/31/00	0.00	0.00	0.29	0.40	17.0	22.4
	2/7/00	0.00	0.00	0.00	0.82	55.0	-
	11/9/99	0.00	12.00	0.37	0.44	-	-
	8/23/99	0.00	9.00	0.52	0.50	-	-
	6/10/99	0.00	0.00	0.25	0.20	-	-
	6/30/98	<0.1	<1	0.38	0.90	-	-
	12/30/97	0.30	<1	2.21	<0.1	-	-

Table 3
Groundwater Biodegradation Parameters
3609 International Boulevard, Oakland, California

Well	Date	Nitrate (mg/L)	Sulfate (mg/L)	Ferrous Iron (mg/L)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Turbidity (FTU)
MW-11	**3/13/01**	**0**	**78**	**0.34**	**0.79**	**114.7**	**111**
	11/2/00	1.5	21	0.44	0.6	17	ND
	8/9/00	1.5	0	0.8	0.48	10	42
	5/31/00	5.20	10.00	0.69	0.50	-15.0	12
	2/7/00	0.00	24.00	0.75	1.10	-14.0	-
	11/9/99	0.00	21.00	0.06	0.22	-	-
	8/23/99	0.00	52.00	0.92	0.60	-	-
	6/10/99	0.00	0.00	0.28	0.19	-	-
	6/30/98	1.20	6.00	0.15	2.20	-	-
	12/30/97	3.50	35.00	0.32	<0.1	-	-
MW-12	**3/13/01**	**0**	**0**	**1.44**	**0.64**	**-5.6**	**8.42**
	11/2/00	0	6	1.93	0.6	12	19
	8/9/00	0	.0	2.84	0.31	-48	56
	5/31/00	0.00	0.00	2.11	0.29	-54.0	7.7
	2/7/00	0.00	0.00	1.53	0.62	-42.0	-
	11/9/99	3.10	9.00	2.21	0.34	-	-

Table 4

Groundwater Analytical Data, March 13, 2001

3609 International Boulevard, Oakland, California

Monitoring Well	DF	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Total Xylenes (µg/L)	MtBE* (µg/L)	TPH-g (µg/L)
MW-1	20	1,005	440	108	2,030	16	14,570
MW-2	1	18	34	1.3	225	ND	932
MW-3	100	2,250	140	ND	1,284	100	14,754
MW-4	1	ND	ND	3.2	8.7	ND	62
MW-5	1	6.1	1.9	6.6	5.9	ND	382
MW-6	5	713	459	238	2,363	ND	15,637
MW-7	1	0.97	ND	0.76	ND	78	82
MW-8	4	81	16	71	270	221	2,360
MW-10	20	969	18	41	72	630	4,935
MW-11	1	8.6	2.1	10	14	ND	273
MW-12	5	13	5.6	5.5	11	214	1,517
DL		0.5	0.5	0.5	1.0	5	50

DF Dilution Factor
DL Minimum laboratory detection limit
ND Not Detected (i.e., below DL)
* MTBE analyzed with EPA Method 8260

Table 5
Historical Groundwater Analytical Data
3609 International Boulevard, Oakland, California

Well	Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Xylenes (µg/L)	MtBE (µg/L)	TPH-g (µg/L)
MW-1	**3/13/01**	**1,005**	**440**	**108**	**2,030**	**16**	**14,570**
	11/2/00	435	52	ND	689	10	7,050
	8/9/00	638	<5	<5	<5	17.1	11,000
	5/31/00	610	350	310	1,400	<5	15,610
	2/7/00	2,280	1,380	8	6,130	47	40,000
	11/9/99	693	15	<5	3,471	50	10,000
	8/23/99	678	463	893	2,938	38	19,750
	6/10/99	1,110	1,460	1,330	5,265	77	25,000
	3/16/99	480	860	850	3,000	190	17,000
	12/16/98	2,500	2,400	2,300	9,500	160	65,000
	12/30/97	2,300	2,100	1,400	5,100	NA	27,000
	4/10/97	NA	NA	NA	NA	NA	NA
	12/9/96	NA	NA	NA	NA	NA	NA
	4/3/96	98	120	63	170	NA	31,000
	1/3/96	71	73	50	120	NA	30,000
	10/2/95	140	130	140	390	NA	59,000
	6/5/95	950	650	570	150	NA	21,000
	3/6/95	190	160	150	490	NA	32,000
	12/2/94	3,800	6,600	2,300	11,000	NA	80,000
	10/5/94	24,000	21,000	2,600	15,000	NA	320,000

Table 5
Historical Groundwater Analytical Data
3609 International Boulevard, Oakland, California

Well	Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Xylenes (µg/L)	MtBE (µg/L)	TPH-g (µg/L)
MW-2	**3/13/01**	**18**	**34**	**1.3**	**225**	**ND**	**932**
	11/2/00	ND	ND	ND	ND	ND	ND
	8/9/00	<5	<5	<5	<5	<5	<50
	5/31/00	130	330	130	570	<5	2,930
	2/7/00	372	639	46	134	8	6,400
	11/9/99	<5	<5	<5	<5	<5	<50
	8/23/99	6	9	4	11	ND	60
	6/10/99	290	428	211	744	ND	3,500
	3/16/99	730	830	610	1,900	55	7,600
	12/16/98	1,400	1,600	880	9,500	<5	26,000
	9/29/98	290	180	160	360	<0.5	29,000
	6/30/98	2,000	2,000	1,300	4,300	NA	25,000
	12/30/97	4,900	4,900	1,600	7,000	NA	35,000
	4/10/97	150	110	37	0	ND	53,000
	12/9/96	11	7	2	14	ND	6,200
	4/3/96	0	92	44	13	NA	27,000
	1/3/96	160	130	93	240	NA	46,000
	10/2/95	160	130	93	240	NA	46,000
	6/5/95	220	330	350	660	NA	8,000
	3/6/95	3	3	3	1	NA	490
	12/2/94	1,700	2,200	1,200	3,600	NA	42,000
MW-3	**3/13/01**	**2,250**	**140**	**ND**	**1,284**	**100**	**14,754**
	11/2/00	6,789	4,816	676	7,258	83	48,000
	8/9/00	8,900	5,636	883	7,356	176	76,000
	5/31/00	15,000	8,900	1,500	7,400	<5	68,000
	2/7/00	6,090	3,360	<5	5,780	276	44,000
	11/9/99	3,218	1,319	<5	6,697	126	26,000
	8/23/99	7,484	8,052	1,744	9,749	141	64,000
	6/10/99	8,245	6,425	1,015	7,173	274	46,000
	3/16/99	4,100	6,400	1,000	6,100	470	45,000
	12/16/98	5,700	3,900	1,200	6,300	410	51,000
	1/3/96	510	410	210	650	NA	150,000
	10/2/95	510	410	210	65	NA	150,000
	6/5/95	20,000	42,000	5,800	36,000	NA	350,000
	3/6/95	20,000	42,000	5,800	36,000	NA	350,000
	12/2/94	19,000	22,000	4,400	28,000	NA	250,000
	10/5/94	190,000	740,000	310,000	130,000	NA	3,000,000

Table 5
Historical Groundwater Analytical Data
3609 International Boulevard, Oakland, California

Well	Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Xylenes (µg/L)	MtBE (µg/L)	TPH-g (µg/L)
MW-4	**3/13/01**	**ND**	**ND**	**3.2**	**8.7**	**ND**	**62**
	11/2/00	5.30	ND	ND	8	ND	ND
	8/9/00	5.08	<5	<5	<5	<5	370
	5/31/00	42	19	16	67	<5	552
	2/7/00	1,200	61	<5	781	<5	7,800
	11/9/99	<5	<5	<5	<5	<5	<50
	8/23/99	497	41	54	145	6	660
	6/10/99	298	44	19	64	13	1,000
	3/16/99	200	35	19	56	11	600
	12/16/98	590	33	28	94	24	1,400
	9/29/98	910	77	68	200	18	6,200
	6/30/98	780	160	54	200	NA	1,700
	12/30/97	410	270	100	1,500	NA	2,300
	4/10/97	ND	ND	ND	ND	ND	ND
	12/9/96	14	6	4	12	ND	4,000
	4/3/96	12	8	5	14	NA	1,900
	1/3/96	230	110	10	29	NA	9,300
	10/2/95	23	11	10	29	NA	9,300
MW-5	**3/13/01**	**6.1**	**1.9**	**6.6**	**5.9**	**ND**	**382**
	11/2/00	ND	ND	ND	ND	ND	ND
	8/9/00	<5	<5	<5	<5	<5	<50
	5/31/00	7.4	24	12	32.4	<5	627.4
	2/7/00	<5	<5	<5	7	<5	70
	11/9/99	<5	<5	<5	<5	<5	<50
	8/23/99	ND	4	ND	4	ND	120
	6/10/99	4	3	6	4	ND	270
	3/16/99	3	1	16	2	10	650
	12/16/98	1	1	ND	2	ND	1,400
	9/29/98	2	1	3	3	<.5	270
	6/30/98	<5	<5	15	<10	NA	400
	12/30/97	82	66	59	160	NA	790
	4/10/97	NA	NA	NA	NA	NA	NA
	12/9/96	NA	NA	NA	NA	NA	NA
	4/3/96	1	1	5	4	NA	780
	1/3/96	1	1	4	5	NA	1,500
	10/2/95	1	1	4	5	NA	1,500

Table 5
Historical Groundwater Analytical Data
3609 International Boulevard, Oakland, California

Well	Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Xylenes (µg/L)	MtBE (µg/L)	TPH-g (µg/L)
MW-6	**3/13/01**	**713**	**459**	**238**	**2,363**	**ND**	**15,637**
	11/2/00	1,387	618	ND	5,250	ND	19,000
	8/9/00	1,306	870	<5	5,162	<5	24,000
	5/31/00	1,700	1,200	17	3,600	<5	21,700
	2/7/00	1,360	521	<5	4,150	6	17,000
	11/9/99	1,084	130	<5	10,940	<5	40,000
	8/23/99	3,806	3,649	1,554	7,996	10	42,000
	6/10/99	2,060	1,650	735	3,170	ND	18,500
	3/16/99	3,900	4,300	1,600	7,000	180	37,000
	1/3/96	350	310	200	610	NA	120,000
	10/2/95	350	310	200	610	NA	120,000
MW-7	**3/13/01**	**0.97**	**ND**	**0.76**	**ND**	**78**	**82**
	11/2/00	ND	ND	ND	ND	9.1	50
	8/9/00	<5	<5	<5	<5	11.7	80
	5/31/00	4.9	22	4.2	21.9	29	494.9
	2/7/00	<5	<5	<5	<5	23	80
	11/9/99	<5	9	<5	<5	12	290
	8/23/99	5	10	ND	ND	ND	570
	6/10/99	3	7	4	3	26	320
	3/16/99	3	1	1	1	62	300
	12/16/98	5	10	5	20	160	990
	9/29/98	1	1	1	2	68	1,800
	6/30/98	4	<5	9	<10	NA	620
	12/30/97	130	98	75	200	NA	1,400
	4/10/97	NA	NA	NA	NA	NA	NA
	12/9/96	NA	NA	NA	NA	NA	NA
	4/3/96	2	3	5	7	NA	1,900
	1/3/96	9	12	17	45	NA	3,300
	10/2/95	10	12	17	NA	3,300	NA

Table 5
Historical Groundwater Analytical Data
3609 International Boulevard, Oakland, California

Well	Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Xylenes (µg/L)	MtBE (µg/L)	TPH-g (µg/L)
MW-8	**3/13/01**	**81**	**16**	**71**	**270**	**221**	**2,360**
	11/2/00	278	350	209	980	21	3,000
	8/9/00	632	5.38	<5	2,686	37.3	22,000
	5/31/00	940	130	1,600	3,960	75	25,940
	2/7/00	1,080	617	<5	4,160	240	44,200
	11/9/99	92	<5	<5	3,414	769	10,500
	8/23/99	5,379	2,438	3,001	6,960	639	58,000
	6/10/99	3,610	1,635	2,175	5,913	988	39,500
	3/16/99	1,800	470	2,000	2,000	820	22,000
	12/16/98	6,300	1,700	2,200	4,400	1,300	61,000
	6/30/98	4,600	2,800	3,500	7,300	NA	54,000
	12/30/97	6,000	1,600	2,100	4,700	NA	28,000
	4/10/97	86	55	50	100	ND	24,000
	12/9/96	88	43	44	80	ND	27,000
	4/3/96	250	170	140	330	NA	58,000
	1/3/96	310	250	180	480	NA	94,000
	10/2/95	310	250	180	480	NA	94,000
MW-10	**3/13/01**	**969**	**18**	**41**	**72**	**630**	**4,935**
	11/2/00	ND	ND	ND	ND	145	ND
	8/9/00	1,055	26	54	53.8	1,283	6,800
	5/31/00	1,500	25	390	107.1	580	4,400
	2/7/00	<5	<5	<5	<5	448	<50
	11/9/99	1,134	20	<5	70	652	2,950
	8/23/99	2,135	97	600	248	1,800	3,250
	6/10/99	1,168	34	264	154	1,195	4,200
	3/16/99	15	28	420	250	2,800	4,100
	12/16/98	3,800	51	790	420	1,800	8,700
	9/29/98	5,400	66	970	620	2,600	9,900
	12/30/97	5,300	76	1,100	780	NA	10,000
	4/10/97	21	9	3	3	ND	1,000

Table 5
Historical Groundwater Analytical Data
3609 International Boulevard, Oakland, California

Well	Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Xylenes (µg/L)	MtBE (µg/L)	TPH-g (µg/L)
MW-11	**3/13/01**	**8.6**	**2.1**	**10**	**14**	**ND**	**273**
	11/2/00	ND	ND	ND	ND	ND	60
	8/9/00	10.5	5.94	<5	7.75	<5	590
	5/31/00	27	13	9.5	29.0	<5	477
	2/7/00	20	15	<5	35	<5	700
	11/9/99	<5	<5	<5	<5	<5	<50
	8/23/99	4	4	ND	6	ND	170
	6/10/99	1,240	35	290	159	1,291	4,600
	3/16/99	30	6	53	84	8	710
	12/16/98	27	4	25	33	>0.5	650
	9/29/98	7	1	4	9	22	170
	6/30/98	45	24	71	100	NA	1,100
	12/30/97	66	97	59	190	NA	710
	4/10/97	ND	ND	ND	ND	ND	ND
MW-12	**3/13/01**	**13**	**5.6**	**5.5**	**11**	**214**	**1,517**
	11/2/00	9.3	19.0	ND	7.40	215	1,010
	8/9/00	15.4	12.4	<5	<5	185	1,730
	5/31/00	230	10	34	12	200	3,930
	2/7/00	351	37	<5	24	513	4,000
	11/9/99	<5	<5	<5	<5	229	80

Table 6

Total Volume of Water Treated and Effluent Chemistry

3609 International Boulevard, Oakland, California

Month	Date	Meter Reading (gallons)	Lab Results For GAC-1 and Effluent* (concentrations in µg/L)					
			MtBE	TPH-g	Benzene	Toluene	Ethyl benzene	Total Xylenes
March	3/13/01	1,032,500	ND	ND	ND	ND	ND	ND
February	2/10/01	975,490	System shut down for maintenance and cleaning.					
January	1/29/01	957,880	ND	ND	ND	ND	ND	ND
	1/29/01	957,880	ND	ND	ND	ND	ND	ND
December	12/5/00	883,000	ND	ND	ND	ND	ND	ND
	12/5/00	883,000	ND	ND	ND	ND	ND	ND
November	11/24/00		ND	ND	ND	ND	ND	ND
	11/24/00		ND	ND	ND	ND	ND	ND
	11/1/00	842,000	ND	ND	ND	ND	ND	ND
	11/1/00	842,000	ND	ND	ND	ND	ND	ND
October	10/1/00	809,000	ND	ND	ND	ND	ND	ND
	10/1/00	809,000	ND	ND	ND	ND	ND	ND
August	8/24/00	778,000	ND	ND	ND	ND	ND	ND
July	7/26/00	726,000	ND	ND	ND	ND	ND	ND
	7/19/00	718,000	ND	ND	ND	ND	ND	ND
	7/13/00	712,000	ND	ND	ND	ND	ND	ND
	7/7/00	706,000	ND	ND	ND	ND	ND	ND
June	06/29/00	700,000	ND	ND	ND	ND	ND	ND
	06/21/00	682,220	ND	ND	ND	ND	ND	ND
	06/16/00	669,720	ND	ND	ND	ND	ND	ND
	06/10/00	651,200	ND	ND	ND	ND	ND	ND
May	05/31/00	629,000	ND	ND	ND	ND	ND	ND
	05/23/00	603,700	ND	ND	ND	ND	ND	ND
	05/18/00	570,000	ND	ND	ND	ND	ND	ND
	05/10/00	530,400	ND	ND	ND	ND	ND	ND

Table 6
Total Volume of Water Treated and Effluent Chemistry
3609 International Boulevard, Oakland, California

Month	Date	Meter Reading (gallons)	Lab Results For GAC-1 and Effluent* (concentrations in µg/L)					
			MtBE	TPH-g	Benzene	Toluene	Ethyl benzene	Total Xylenes
April	04/30/00	488,300	ND	ND	ND	ND	ND	ND
	04/18/00	485,300	ND	ND	ND	ND	ND	0.51
	04/10/00	440,200	ND	ND	ND	ND	ND	ND
	04/04/00	390,100	ND	ND	ND	ND	ND	ND
March	03/24/00	388,000	ND	ND	ND	ND	ND	ND
	03/17/00	357,100	ND	ND	ND	ND	ND	ND
	03/10/00	329,000	ND	ND	ND	ND	ND	ND
	03/03/00	300,000						
February	02/25/00	274,000	ND	ND	ND	ND	ND	ND
	02/18/00	233,000	ND	ND	ND	ND	ND	ND
	02/11/00	190,000	ND	ND	ND	ND	ND	ND
	02/04/00	160,800	ND	ND	ND	ND	ND	ND
January	01/28/00	130,600	ND	ND	ND	ND	ND	ND
	01/21/00	103,435	ND	ND	ND	ND	ND	ND
	01/14/00	83,500	185	ND	ND	ND	ND	ND
December	12/23/99	51,680	1486	NA	ND	ND	ND	ND
	12/23/99	51,680	ND	NA	ND	ND	ND	ND
	12/16/99	30,450	963	NA	ND	ND	ND	ND
	12/16/99	30,450	ND	NA	ND	ND	ND	ND
	12/09/99	9,000	230	ND	ND	ND	ND	ND
Pumping began on December 6, 1999								

* Effluent is equivalent to GAC-2

Table 7

Total Mass of Petroleum Hydrocarbons Removed by Vapor Extraction System

3609 International Boulevard, Oakland, California

Date	Time	PID (ppmv)		Flow Rate	Time Elapsed	Air Flow	Mass Removed [1]
		Influent	Effluent	(cfm)	(Hours)	(Liters)	(pounds)
7/24/00	5:00	394.0	0.0	85	0	0	0.00
7/25/00	5:15	38.0	2.0	95	24	3,914,096	1.01
7/26/00	5:05	207.0	1.0	80	48	3,228,121	4.52
7/27/00	9:00	160.0	5.0	92	64	2,500,944	2.71
7/28/00	4:30	141.0	7.0	87	96	4,656,139	4.44
7/29/00	1:30	225.0	8.0	85	117	3,032,734	4.62
7/30/00	9:00	226.0	12.0	85	136	2,816,110	4.31
7/31/00	3:00	141.0	5.0	85	166	4,332,478	4.13
8/1/00	5:00	135.0	4.0	80	192	3,533,942	3.23
8/2/00	4:00	80.0	4.0	80	215	3,126,180	1.69
8/3/00	5:00	60.0	5.0	85	240	3,610,398	1.47
8/4/00	3:00	57.0	4.0	85	262	3,177,150	1.23
8/5/00	2:00	97.0	8.0	87	285	3,399,721	2.23
8/6/00	12:00	114.0	8.0	80	307	2,990,259	2.31
8/7/00	12:00	93.0	9.0	85	331	3,465,982	2.18
8/8/00	4:30	152.0	10.0	85	360	4,115,854	4.23
8/10/00	10:00	173.0	1.0	85	377	2,527,279	2.96
8/11/00	7:00	78.0	4.0	70	410	3,924,715	2.07
8/12/00	9:00	100.0	6.0	70	424	1,665,031	1.13
8/13/00	5:00	107.0	9.0	70	456	3,805,784	2.75
8/14/00	12:30	122.0	5.0	70	476	2,319,150	1.91
8/15/00	6:00	103.0	12.0	70	505	3,508,457	2.44
8/16/00	12:30	112.0	0.0	70	524	2,200,219	1.67
8/18/00	9:00	90.0	0.0	75	568	5,670,449	3.45
8/21/00	12:00	74.0	5.0	80	643	10,194,065	5.10
8/24/00	12:00	68.0	13.0	80	712	9,378,540	4.31
8/27/00	12:30	68.5	2.0	80	785	9,854,263	4.57
8/31/00	1:30	52.0	6.0	80	882	13,184,324	4.64
9/4/00	12:30	54.0	5.0	80	977	12,912,482	4.72
9/7/00	12:00	55.0	3.0	80	1,048	9,718,342	3.62
9/11/00	4:30[2]	141.0	0.0	80	1,149	13,660,047	13.03
9/14/00	9:30	56.0	5.0	80	1,214	8,834,856	3.35
9/18/00	2:00	46.0	9.5	80	1,314	13,660,047	4.25
9/18/00	4:30[3]	34.0	0.0	80	1,317	339,802	0.08
9/21/00	4:30	43.0	1.0	80	1,389	9,786,302	2.85
9/25/00	5:30	55.0	6.0	80	1,486	13,184,324	4.91
9/28/00	9:00	47.5	7.5	80	1,550	8,766,896	2.82
10/1/00	1:00	38.5	6.0	80	1,626	10,329,986	2.69
10/5/00	3:00[4]	28.5	3.0	80	1,724	13,320,245	2.57
10/5/00	5:00	36.0	0.0	80	1,726	271,842	0.07
10/8/00	3:00	28.5	3.0	80	1,796	9,514,460	1.83
10/14/00	3:00	24.5	2.5	80	1,940	19,572,604	3.24
10/17/00	2:00	36.5	3.5	80	2,011	9,650,381	2.38
10/20/00	8:30	18.5	3.5	80	2,078	9,038,737	1.13
10/25/00	2:00	38.0	3.7	80	2,203	17,058,068	4.39
10/29/00	10:00	35.0	4.0	80	2,295	12,504,719	2.96

Table 7

Total Mass of Petroleum Hydrocarbons Removed by Vapor Extraction System

3609 International Boulevard, Oakland, California

Date	Time	PID (ppmv)		Flow Rate (cfm)	Time Elapsed (Hours)	Air Flow (Liters)	Mass Removed [1] (pounds)
		Influent	Effluent				
11/2/00	4:00	30.5	4.0	80	2,397	13,863,928	2.86
11/7/00	4:00	30.0	6.0	80	2,517	16,310,504	3.31
11/19/00	12:00	92.7	5.5	80	2,801	38,601,525	24.20
11/24/00	13:30	25.0	6.5	80	2,923	16,514,385	2.79
11/29/00	15:00	14.5	3.5	80	3,044	16,514,385	1.62
12/4/00	16:30	10.7	1.0	80	3,190	19,776,486	1.43
12/13/00	15:30	24.0	3.0	80	3,405	29,222,986	4.74
12/28/00	14:30	10.0	6.0	85	3,764	51,845,314	3.51
1/4/2001[5]	14:00	8.7	3.7	85	3,907	20,723,684	1.22
Total Mass of Petroleum Hydrocarbons Removed =							**187.86**
Average Daily Removal Rate (pounds / day)=							***1.15***

[1] The representative molecular weight of hydrocarbons was assumed to be 78 gram/mole and used the measured temperature of Vapor (36 °C) in converting ppm-v to ppm on mass basis.

[2] System accidentally shut down from main box, readings taken 30 minutes after startup.

[3] GAC Replaced

[4] GAC-1 removed, new GAC installed at effluent end

[5] SVE System turned off for rainy season due to low influent concentrations

FIGURES

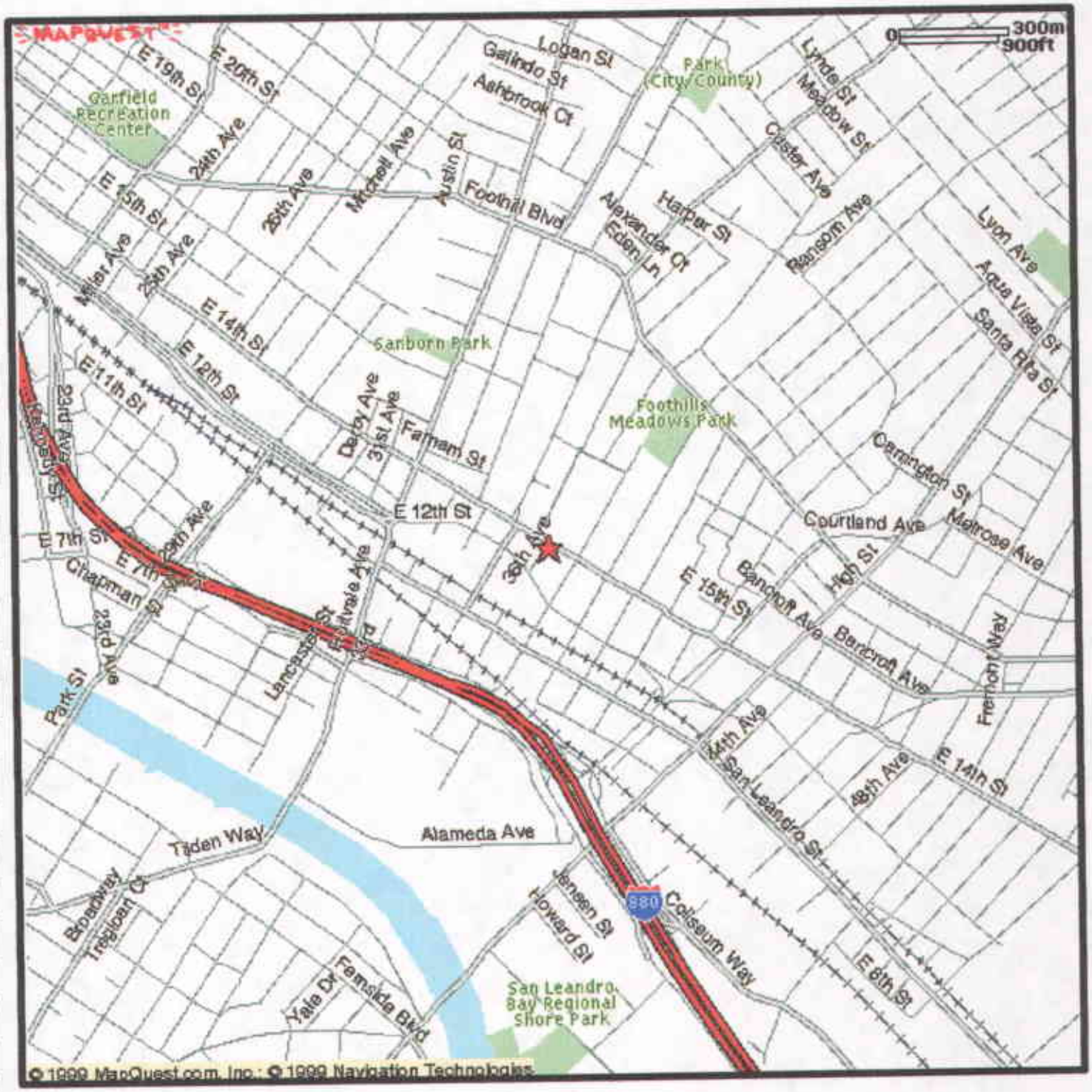


Figure 1: Site Location Map

ENVIRONMENTAL ENGINEERING, INC.

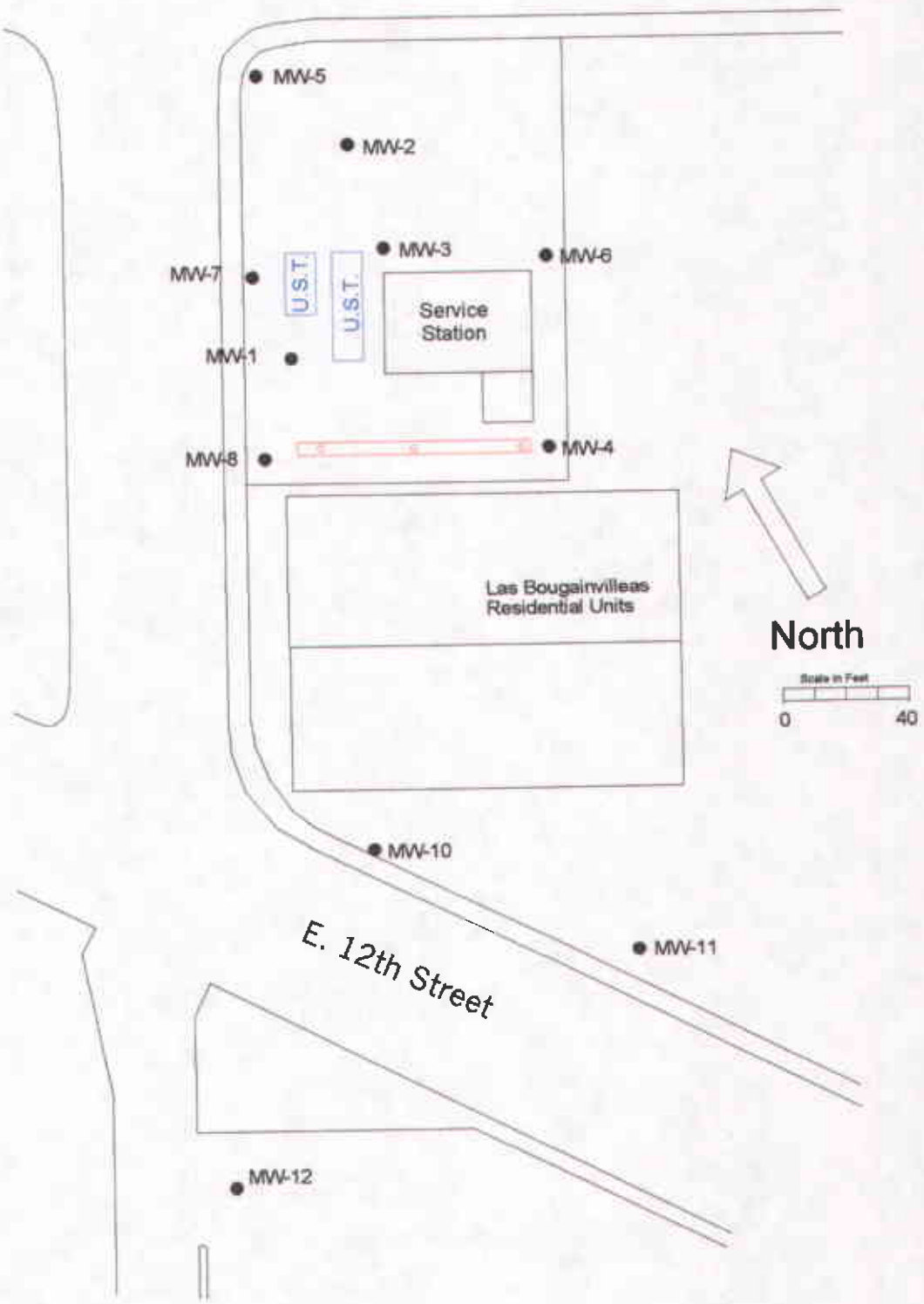


Figure 2: Location of Groundwater Monitoring Wells

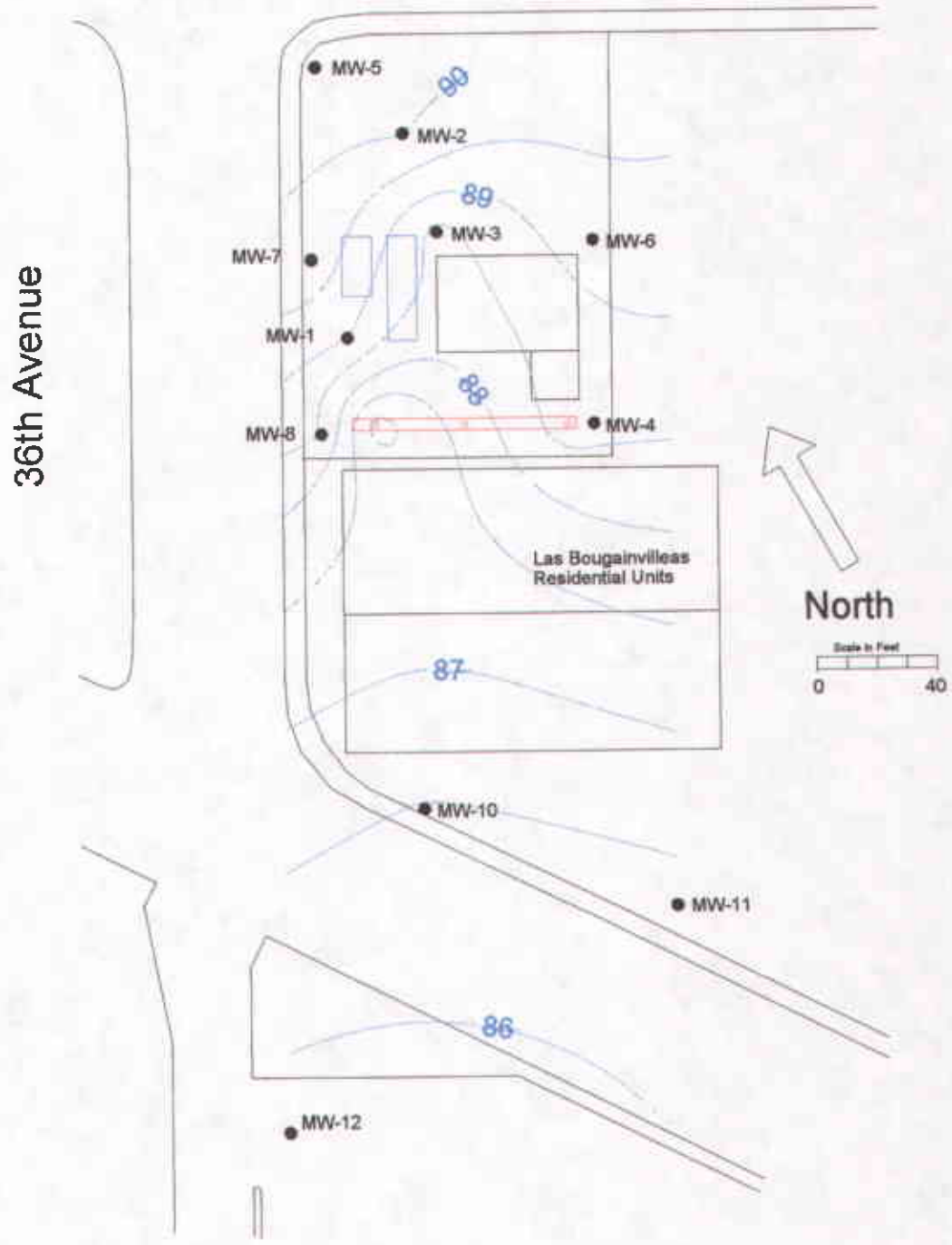


Figure 3: Groundwater Elevation Contour Map, March 13, 2001

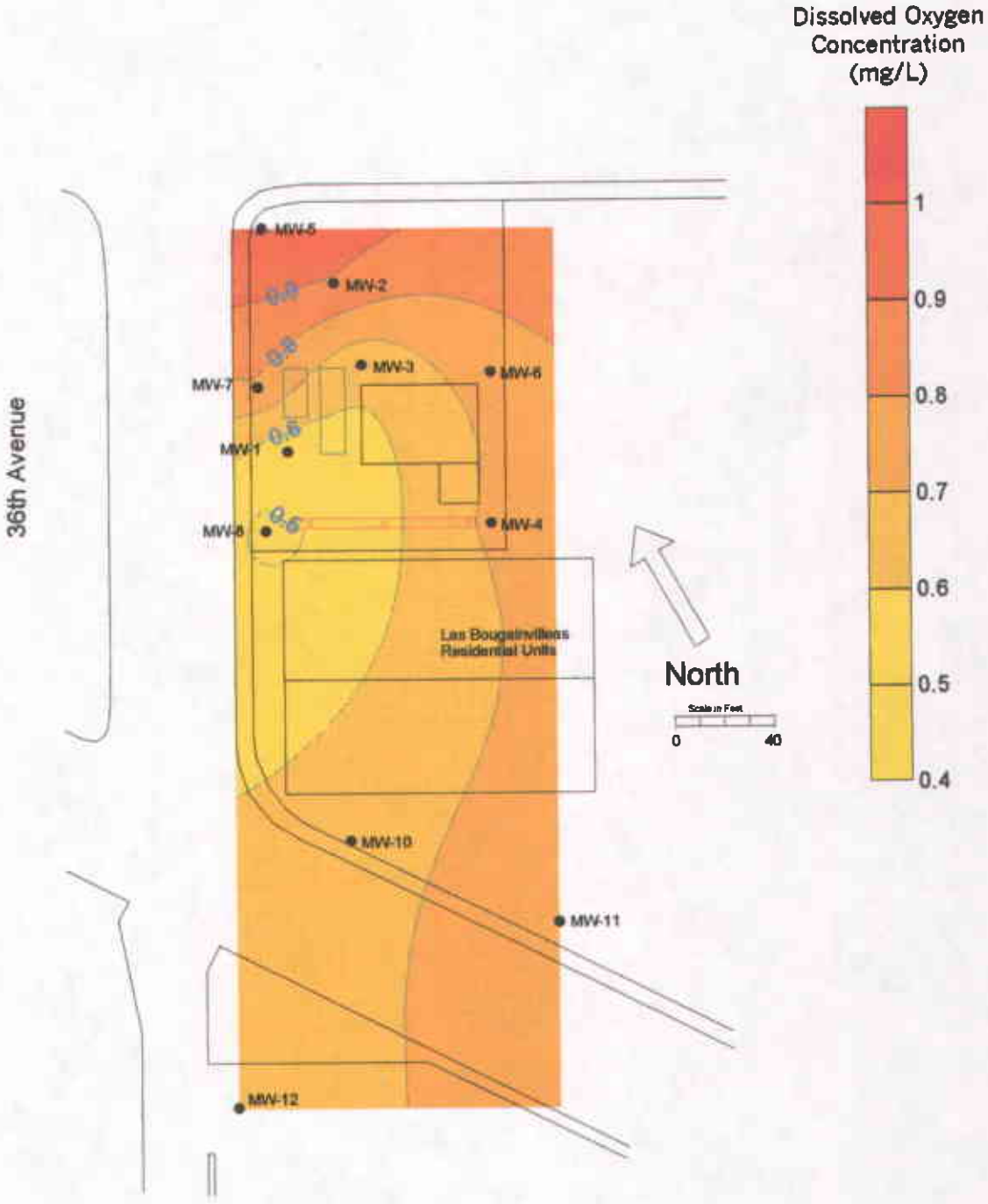


Figure 4: Dissolved Oxygen Concentration in Groundwater, March 13, 2001

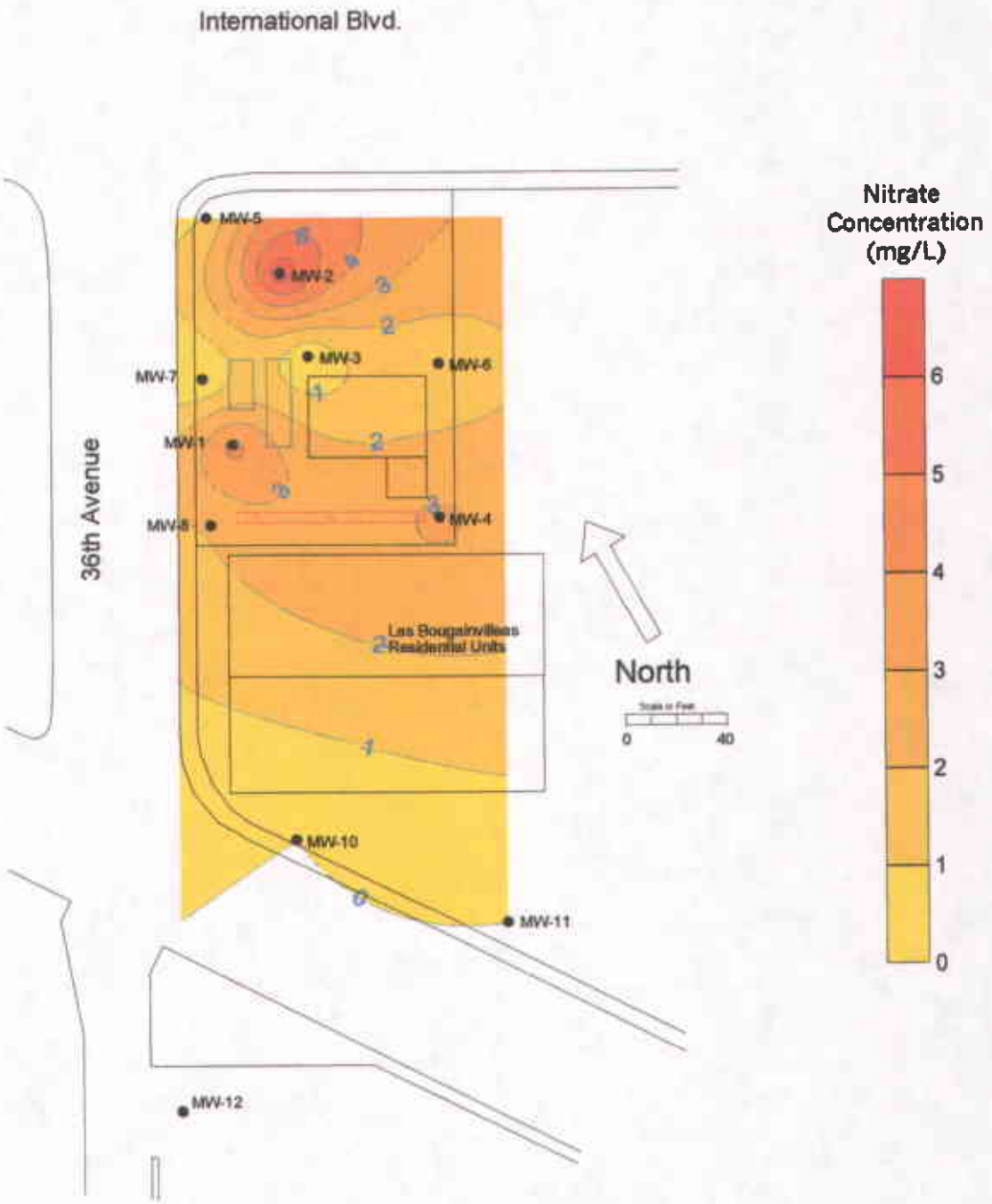


Figure 5: Nitrate Concentration Contour Map in Groundwater, March 13, 2001

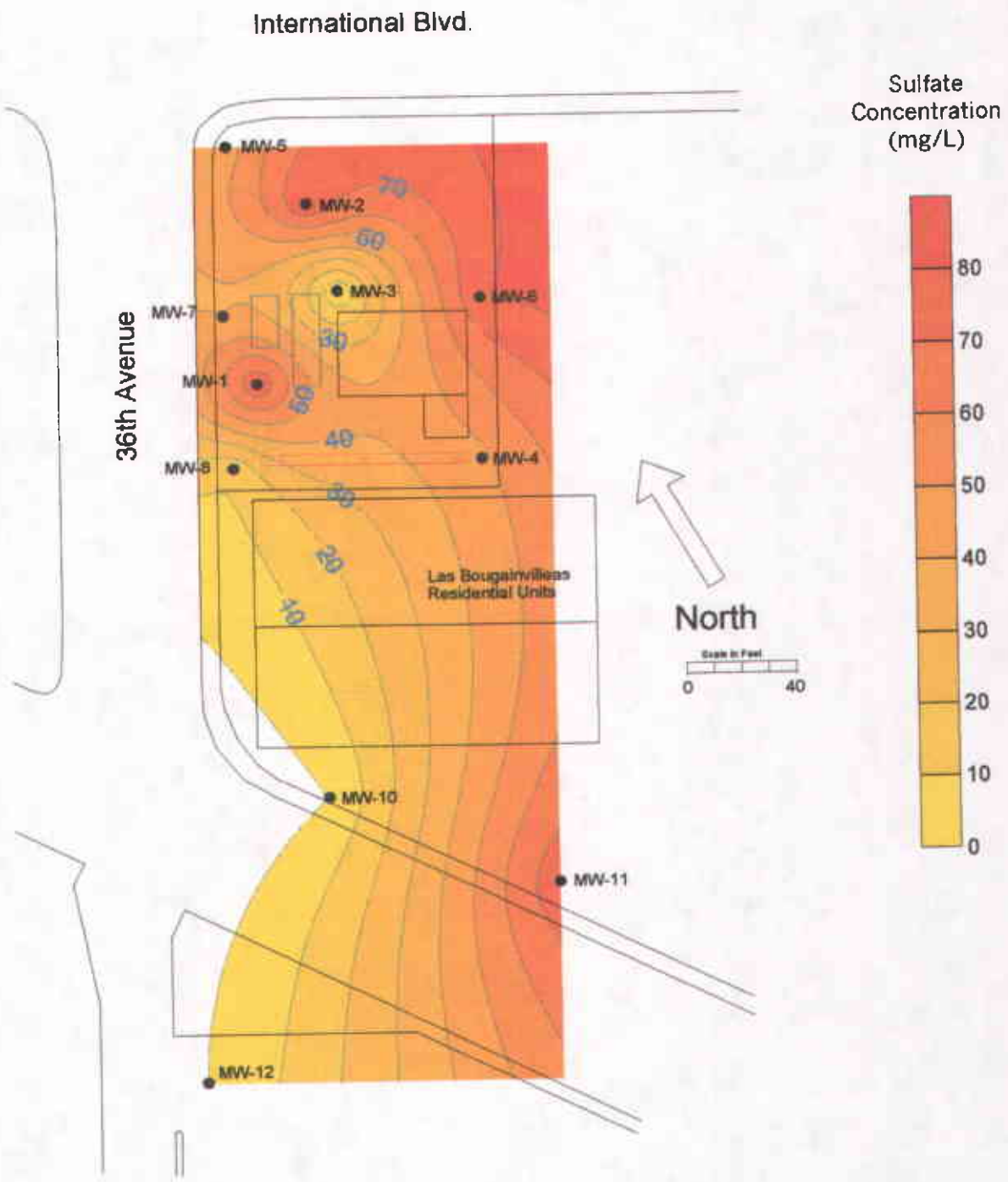


Figure 6: Sulfate Concentration Contour Map in Groundwater, March 13, 2001

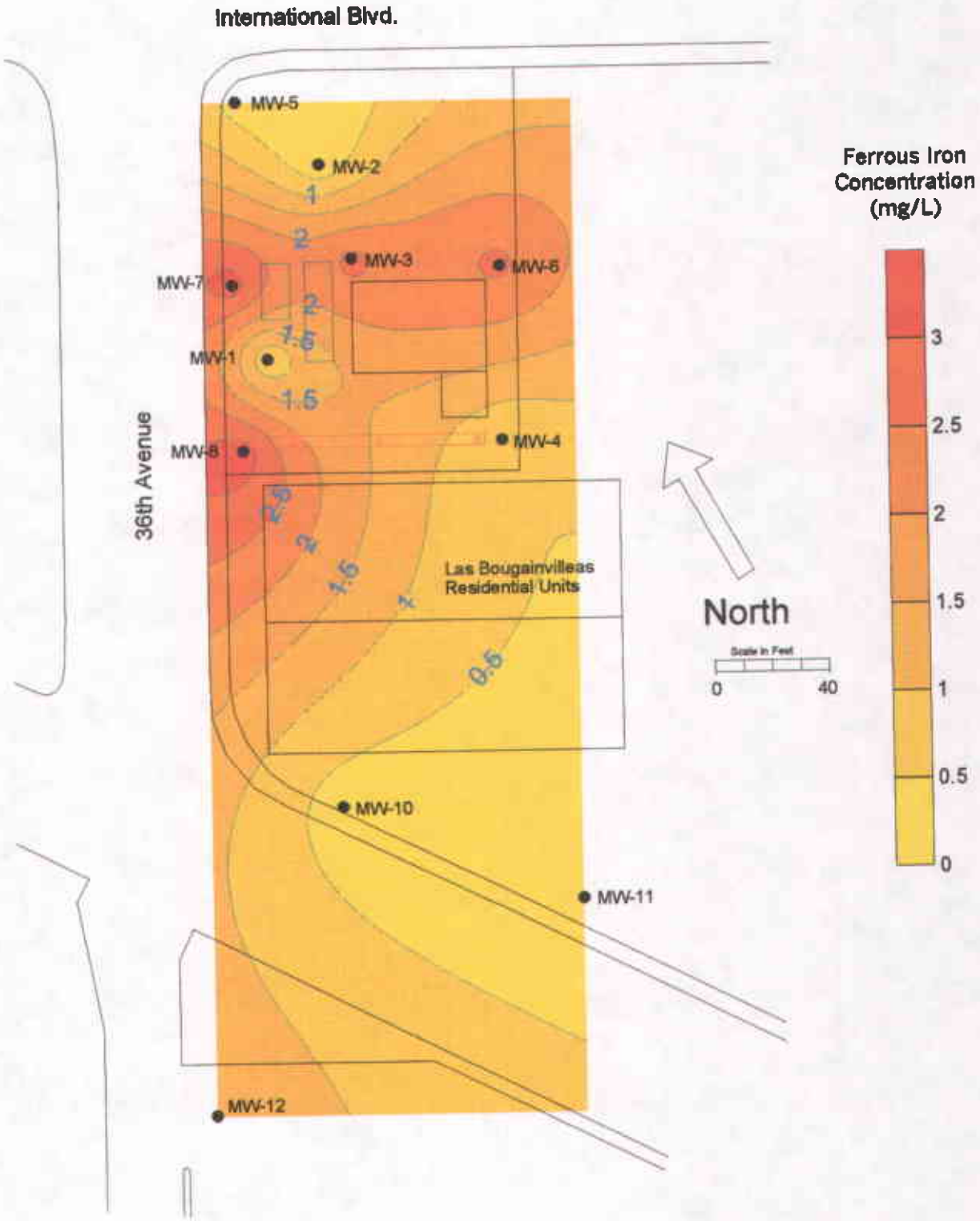


Figure 7: Ferrous Iron Concentration Contour Map in Groundwater, March 13, 2001

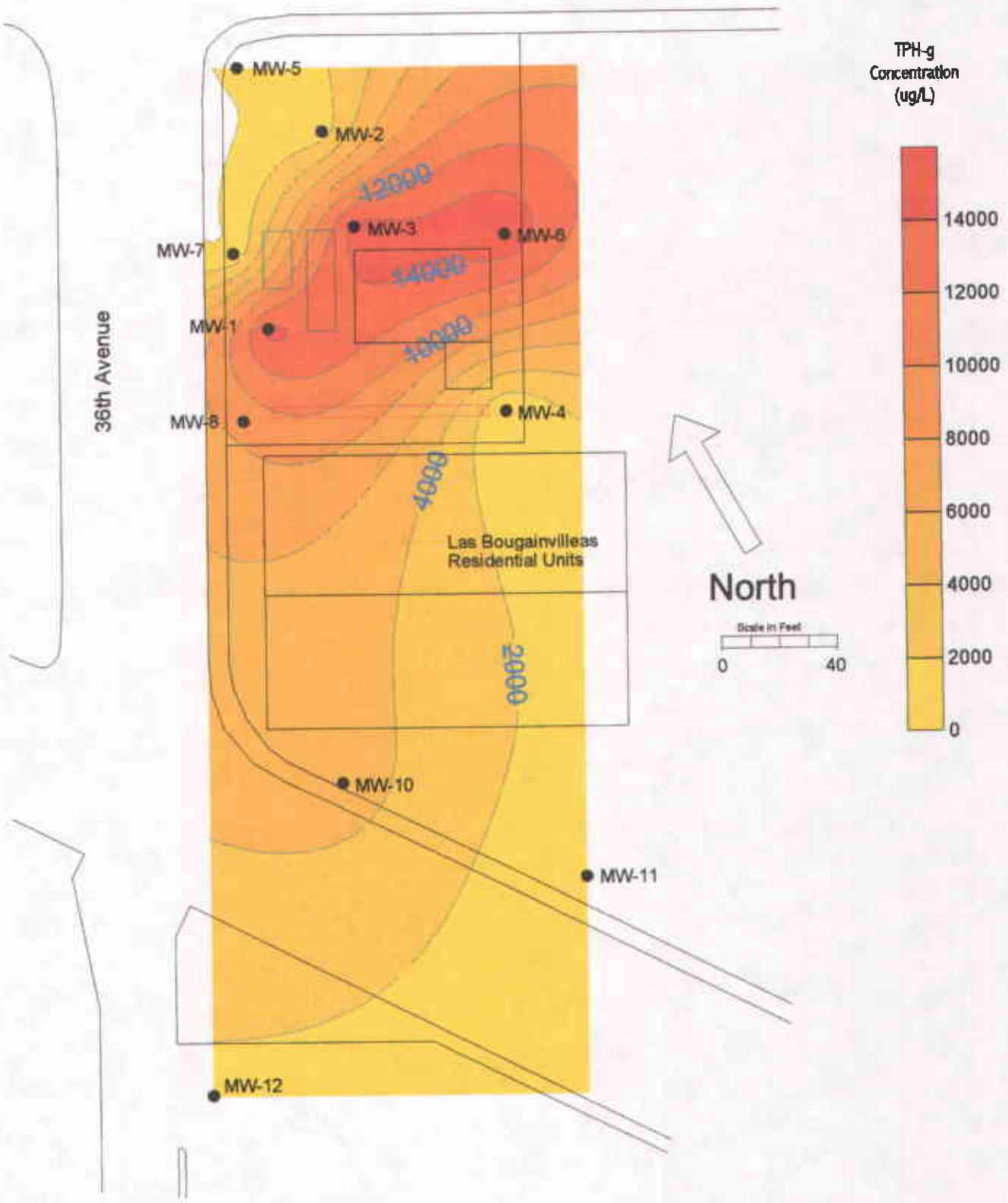


Figure 8: TPH-g Concentration Contour Map in Groundwater, March 13, 2001

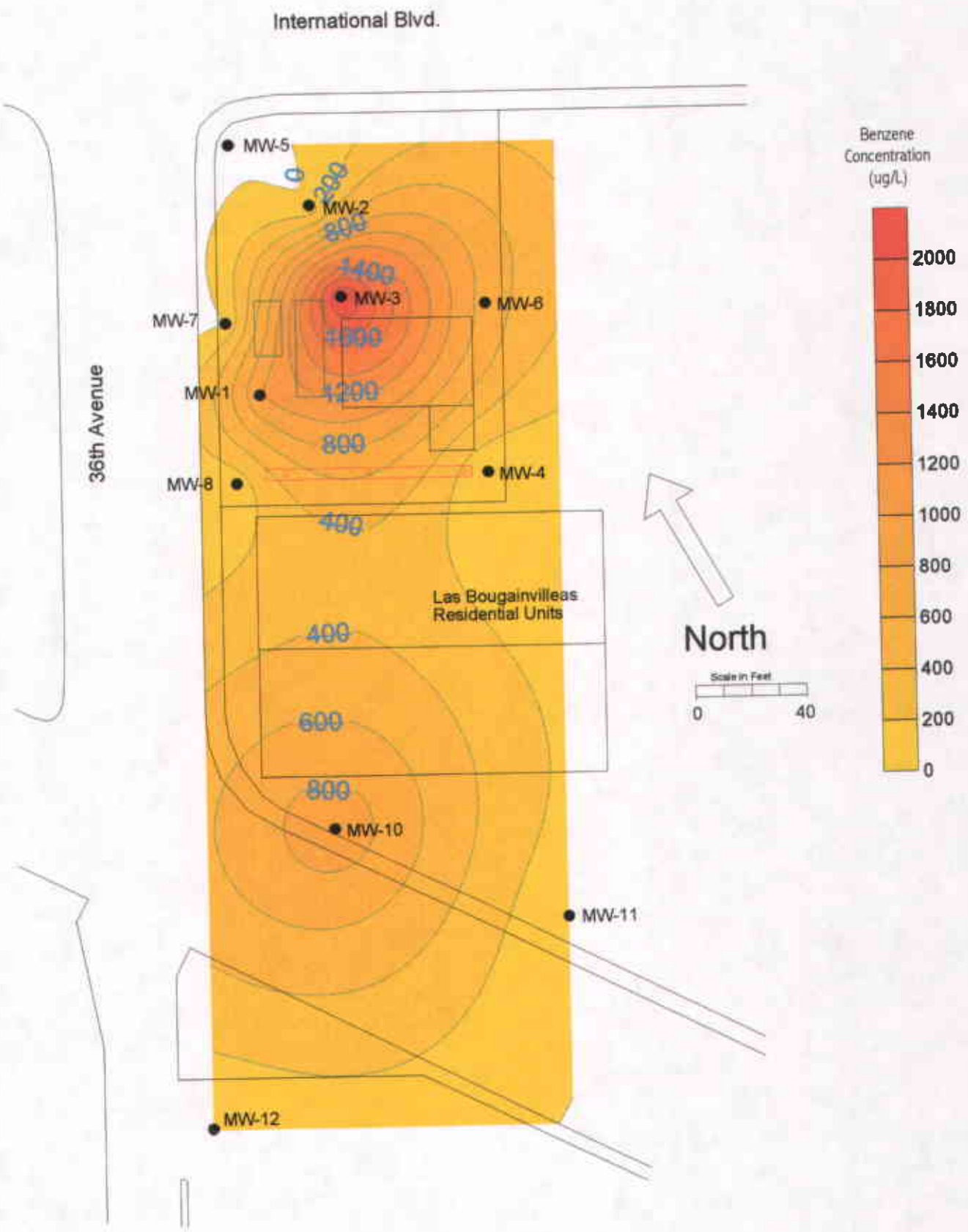


Figure 9: Benzene Concentration Contour Map in Groundwater, March 13, 2001

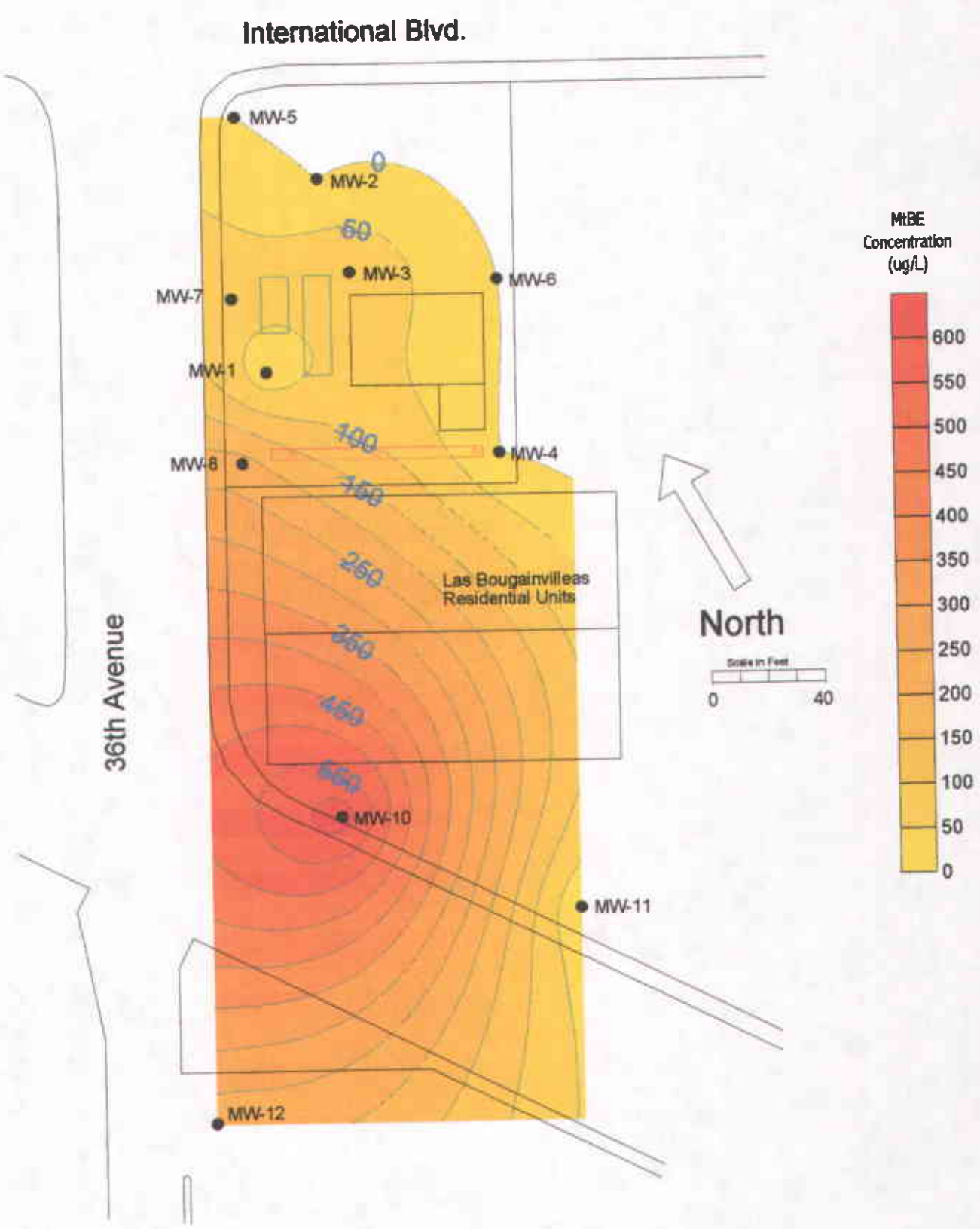
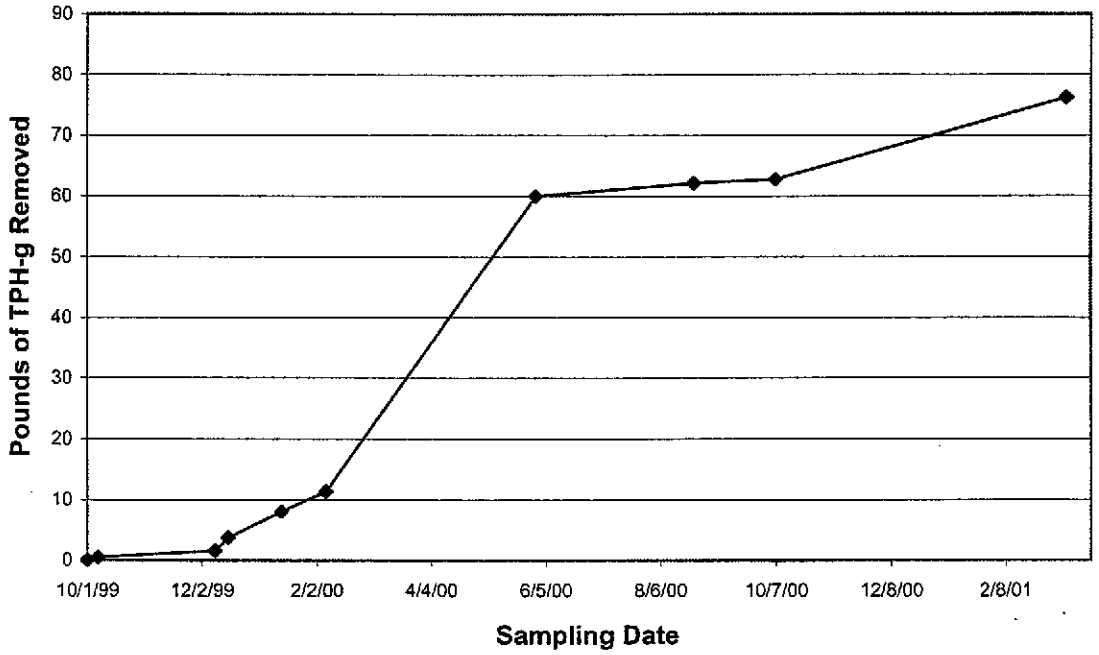


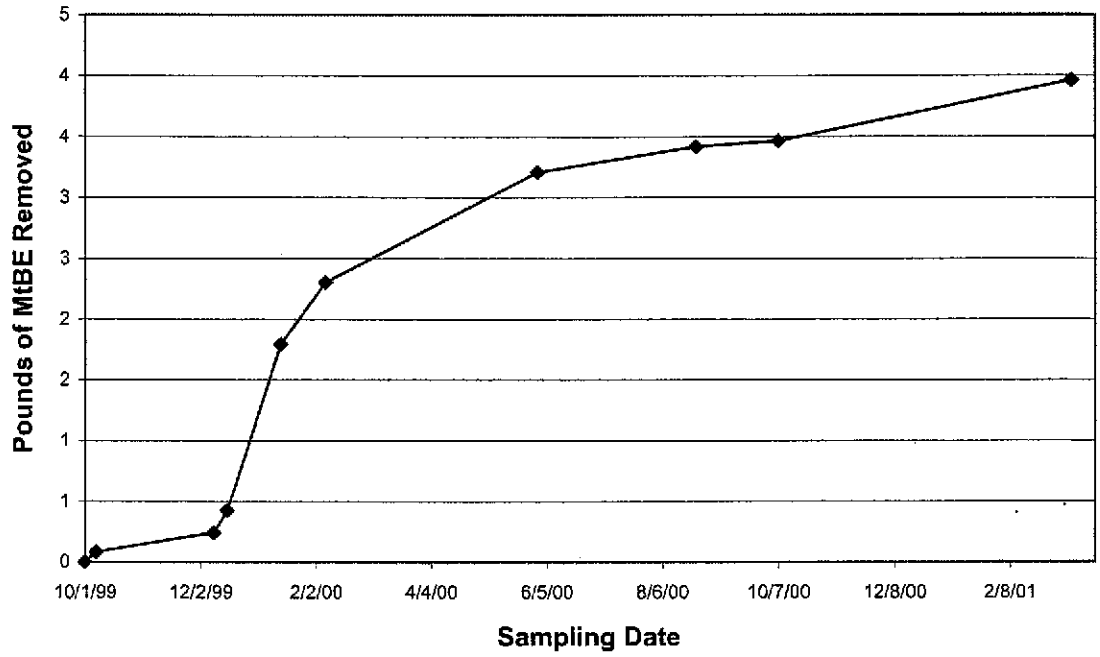
Figure 10: MtBE Concentration Contour Map in Groundwater, March 13, 2001

Figure 11

Cumulative Weight of TPH-g and MtBE Extracted from Groundwater Since Installation of the Treatment System

3609 International Boulevard, Oakland, California





APPENDIX A

FIELD NOTES, LABORATORY REPORTS, CHAIN OF CUSTODY FORMS, D.O. CORRECTION TABLES

ENVIRONMENTAL ENGINEERING, INC

Well No.:	1	Project No.:	2331
Casing Diameter:	2 inch	Address:	3609 International Blvd.
Depth of Well:	29.7 feet		Oakland, CA
Elevation of the Casing:	97.99 feet	Date:	March 13, 2001
Depth to Water Table:	8.96 feet	Sampler:	Naser Pakrou
Elevation of Water Table:	89.03 feet		Patrick Sullivan
Height of Water:	20.74 feet		
Purged Volume:	____ gallons		

Purging Method:	Bailer ☐	Pump ☑	
Sampling Method:	Bailer ☑	Bailer ☐	
Sheen:	Yes ☐	No ☒	Describe
Odor:	Yes ☑	No ☐	Describe Slight Petroleum odor

Field Measurements:

Time	Temp (°C)	pH	EC (µS/cm)	No.3--N (mg/L)	SO_4^{+2} (mg/L)	Fe^{+2} (mg/L)	D.O. (mg/L)	Redox (mV)	Turbidity (FTU)
12:30	20.3	6.86	667	4.4	80	0.5	0.53	-4.70	66

ENVIRONMENTAL ENGINEERING, INC

Well No.:	2	Project No.:	2331
Casing Diameter:	4 inch	Address:	3609 International Blvd.
Depth of Well:	30.00 feet		Oakland, CA
Elevation of the Casing:	98.58 feet	Date:	March 13, 2001
Depth to Water Table:	8.55 feet	Sampler:	Naser Pakrou
Elevation of Water Table:	90.03 feet		Patrick Sullivan
Height of Water:	21.45 feet		
Purged Volume:	_____ gallons		

Purging Method:	Bailer ☐	Pump ☑
Sampling Method:	Bailer ☑	Bailer ☐

Sheen:	Yes ☐	No ☑	Describe
Odor:	Yes ☐	No ☑	Describe

Field Measurements:

Time	Temp (°C)	pH	EC (µS/cm)	No.3--N (mg/L)	SO_4^{+2} (mg/L)	Fe^{+2} (mg/L)	D.O. (mg/L)	Redox (mV)	Turbidity (FTU)
10:45	20.2	6.44	558	6-8	80	0.1	0.89	117.9	[redacted] 24.5

ENVIRONMENTAL ENGINEERING, INC

Well No.:	3	Project No.:	2331
Casing Diameter:	4 inch	Address:	3609 International Blvd.
Depth of Well:	29.75 feet		Oakland, CA
Elevation of the Casing:	97.78 feet	Date:	March 13, 2001
Depth to Water Table:	9.43 feet	Sampler:	Naser Pakrou
Elevation of Water Table:	88.35 feet		Patrick Sullivan
Height of Water:	20.32 feet		
Purged Volume:	_____ gallons		

Purging Method:	Bailer ☐	Pump ☑
Sampling Method:	Bailer ☑	Bailer ☐

Sheen:	Yes ☐	No ☒	Describe
Odor:	Yes ☑	No ☐	Describe strong petroleum odor

Field Measurements:

Time	Temp (°C)	pH	EC (µS/cm)	No.3--N (mg/L)	SO_4^{+2} (mg/L)	Fe^{+2} (mg/L)	D.O. (mg/L)	Redox (mV)	Turbidity (FTU)
11:30	19.3	6.90	664	Ø	Ø	2.66	0.62	-60	[illegible]

26.91

ENVIRONMENTAL ENGINEERING, INC

Well No.:	4	Project No.:	2331
Casing Diameter:	2 inch	Address:	3609 International Blvd.
Depth of Well:	24.34 feet		Oakland, CA
Elevation of the Casing:	97.85 feet	Date:	March 13, 2001
Depth to Water Table:	9.24 feet	Sampler:	Naser Pakrou
Elevation of Water Table:	88.61 feet		Patrick Sullivan
Height of Water:	15.10 feet		
Purged Volume:	_____ gallons		

Purging Method:	Bailer ☐	Pump ☑	
Sampling Method:	Bailer ☑	Bailer ☐	
Sheen:	Yes ☐	No ☑	Describe
Odor:	Yes ☐	No ☑	Describe

Field Measurements:

Time	Temp (°C)	pH	EC (µS/cm)	No.3--N (mg/L)	SO_4^{+2} (mg/L)	Fe^{+2} (mg/L)	D.O. (mg/L)	Redox (mV)	Turbidity (FTU)
12:10	20.0	6.84	479	3.2	48	0.51	0.72	9.4	190

ENVIRONMENTAL ENGINEERING, INC

Well No.:	5	Project No.:	2331
Casing Diameter:	2 inch	Address:	3609 International Blvd.
Depth of Well:	26.08 feet		Oakland, CA
Elevation of the Casing:	99.04 feet	Date:	March 13, 2001
Depth to Water Table:	8.67 feet	Sampler:	Naser Pakrou
Elevation of Water Table:	90.37 feet		Patrick Sullivan
Height of Water:	17.41 feet		
Purged Volume:	_____ gallons		

Purging Method:	Bailer ☐	Pump ☑	
Sampling Method:	Bailer ☑	Bailer ☐	
Sheen:	Yes ☐	No ☑	Describe
Odor:	Yes ☐	No ☑	Describe

Field Measurements:

Time	Temp (°C)	pH	EC (µS/cm)	No.3--N (mg/L)	SO_4^{+2} (mg/L)	Fe^{+2} (mg/L)	D.O. (mg/L)	Redox (mV)	Turbidity (FTU)
10:35	20.4	7.4	600	1.00	45	0.33	1.01	34.2	[illegible]

35.36

ENVIRONMENTAL ENGINEERING, INC

Well No.:	6	Project No.:	2331
Casing Diameter:	6 inch	Address:	3609 International Blvd.
Depth of Well:	24.45 feet		Oakland, CA
Elevation of the Casing:	98.77 feet	Date:	March 13, 2001
Depth to Water Table:	9.49 feet	Sampler:	Naser Pakrou
Elevation of Water Table:	89.28 feet		Patrick Sullivan
Height of Water:	14.96 feet		
Purged Volume:	_____ gallons		

Purging Method:	Bailer ☐	Pump ☑	
Sampling Method:	Bailer ☑	Bailer ☐	
Sheen:	Yes ☐	No ☑	Describe
Odor:	Yes ☑	No ☐	Describe slight Petroleum odor

Field Measurements:

Time	Temp (°C)	pH	EC (µS/cm)	No.3--N (mg/L)	SO_4^{+2} (mg/L)	Fe^{+2} (mg/L)	D.O. (mg/L)	Redox (mV)	Turbidity (FTU)
12:00	19.4	6.82	550	1-3	79	2-63	0.75	-421	[redacted]

83

ENVIRONMENTAL ENGINEERING, INC

Well No.:	7	Project No.:	2331
Casing Diameter:	2 inch	Address:	3609 International Blvd.
Depth of Well:	24.60 feet		Oakland, CA
Elevation of the Casing:	97.83 feet	Date:	March 13, 2001
Depth to Water Table:	8.04 feet	Sampler:	Naser Pakrou
Elevation of Water Table:	89.79 feet		Patrick Sullivan
Height of Water:	16.56 feet		
Purged Volume:	_____ gallons		

Purging Method:	Bailer ☐	Pump ☑	
Sampling Method:	Bailer ☑	Bailer ☐	
Sheen:	Yes ☐	No ☑	Describe
Odor:	Yes ☐	No ☑	Describe

Field Measurements:

Time	Temp (°C)	pH	EC (µS/cm)	No.3–N (mg/L)	SO_4^{+2} (mg/L)	Fe^{+2} (mg/L)	D.O. (mg/L)	Redox (mV)	Turbidity (FTU)
1:30	20.3	7.07	560	Ø	40	3.3	0.79	-10.4	110

ENVIRONMENTAL ENGINEERING, INC

Well No.:	8	Project No.:	2331
Casing Diameter:	2 inch	Address:	3609 International Blvd.
Depth of Well:	26.34 feet		Oakland, CA
Elevation of the Casing:	97.25 feet	Date:	March 13, 2001
Depth to Water Table:	8.75 feet	Sampler:	Naser Pakrou
Elevation of Water Table:	88.50 feet		Patrick Sullivan
Height of Water:	17.59 feet		
Purged Volume:	_____ gallons		

Purging Method:	Bailer ☐	Pump ☑
Sampling Method:	Bailer ☑	Bailer ☐

Sheen:	Yes ☐	No ☑	Describe
Odor:	Yes ☑	No ☐	Describe Slight Petroleum odor

Field Measurements:

Time	Temp (°C)	pH	EC (µS/cm)	No.3--N (mg/L)	SO_4^{+2} (mg/L)	Fe^{+2} (mg/L)	D.O. (mg/L)	Redox (mV)	Turbidity (FTU)
1:00	19.1	6.87	592	2.1	12	3.3	0.48	-76	[illegible]

110

ENVIRONMENTAL ENGINEERING, INC

Well No.:	10	Project No.:	2331
Casing Diameter:	2 inch	Address:	3609 International Blvd.
Depth of Well:	24.35 feet		Oakland, CA
Elevation of the Casing:	94.54 feet	Date:	March 13, 2001
Depth to Water Table:	8.07 feet	Sampler:	Naser Pakrou
Elevation of Water Table:	86.47 feet		Patrick Sullivan
Height of Water:	16.28 feet		
Purged Volume:	_____ gallons		

Purging Method:	Bailer ☐	Pump ☑
Sampling Method:	Bailer ☑	Bailer ☐

Sheen:	Yes ☐	No ☑	Describe
Odor:	Yes ☑	No ☐	Describe slight Petroleum odor

Field Measurements:

Time	Temp (°C)	pH	EC (µS/cm)	No.3--N (mg/L)	SO_4^{+2} (mg/L)	Fe^{+2} (mg/L)	D.O. (mg/L)	Redox (mV)	Turbidity (FTU)
3:30	19.8	6.70	575	Ø	Ø	0.23	0.65	28	32.11

ENVIRONMENTAL ENGINEERING, INC

Well No.:	11	Project No.:	2331
Casing Diameter:	2 inch	Address:	3609 International Blvd.
Depth of Well:	24.30 feet		Oakland, CA
Elevation of the Casing:	95.94 feet	Date:	March 13, 2001
Depth to Water Table:	9.61 feet	Sampler:	Naser Pakrou
Elevation of Water Table:	86.33 feet		Patrick Sullivan
Height of Water:	14.69 feet		
Purged Volume:	_____ gallons		

Purging Method:	Bailer ☐	Pump ☑
Sampling Method:	Bailer ☑	Bailer ☐

Sheen:	Yes ☐	No ☑	Describe
Odor:	Yes ☐	No ☑	Describe

Field Measurements:

Time	Temp (°C)	pH	EC (µS/cm)	No.3--N (mg/L)	SO_4^{+2} (mg/L)	Fe^{+2} (mg/L)	D.O. (mg/L)	Redox (mV)	Turbidity (FTU)
2:10	19.3	6.98	649	Ø	78	0.34	0.79	114.7	111

ENVIRONMENTAL ENGINEERING, INC

Well No.:	12	Project No.:	2331
Casing Diameter:	4 inch	Address:	3609 International Blvd.
Depth of Well:	30.00 feet		Oakland, CA
Elevation of the Casing:	94.84 feet	Date:	March 13, 2001
Depth to Water Table:	9.04 feet	Sampler:	Naser Pakrou
Elevation of Water Table:	85.80 feet		Patrick Sullivan
Height of Water:	20.96 feet		
Purged Volume:	_____ gallons		

Purging Method:	Bailer ☐	Pump ☑
Sampling Method:	Bailer ☑	Bailer ☐

Sheen:	Yes ☐	No ☑	Describe
Odor:	Yes ☐	No ☑	Describe

Field Measurements:

Time	Temp (°C)	pH	EC (µS/cm)	No.3--N (mg/L)	SO_4^{+2} (mg/L)	Fe^{+2} (mg/L)	D.O. (mg/L)	Redox (mV)	Turbidity (FTU)
2:40	19.1	7.0	640	Ø	Ø	1.44	0.64	-5.6	8.42

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SOMA
2680 Bishop Drive, Suite 203
San Ramon, CA 94583

Client Project ID:
Project # 2331
3609 INT Blvd
Oakland, CA

Ref.: R5858400
Method: 5030 GCFID/ 8020/8260
Sampled: 3/13/01
Received: 3/14/01
Matrix: Water
Analyzed: 3/16-20/01
Reported: 3/20/01
Units: ug/L
Analyst: DS

Attention: Naser Pakrou

Laboratory Results for TPH + BTEX & MTBE Analysis.

Analyte	EPA Method	Detection Limit ug/L	Results Sample ID MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
BTEX									
Benzene	**8020**	0.5	1,005	18	2,250	ND	6.1	713	0.97
Toluene	**8020**	0.5	440	34	140	ND	1.9	459	ND
Ethylbenzene	**8020**	0.5	108	1.3	ND	3.2	6.6	238	0.76
total-Xylene	**8020**	1.0	2,030	225	1,284	8.7	5.9	2,363	ND
MTBE	**8260**	5	16*	ND	100*	ND	ND	ND*	78*
TPH-g	**5030/GCFID**	50	14,570	932	14,754	62	382	15,637	82
D.F.			20	1	100	1	1	5	1

ND:Not Detected(<MDL)
MTBE was confirmed by GC/MS ,EPA 8260

Delta Environmental Laboratories,

Hossein Khosh Khoo, Ph.D.

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ENVIRONMENTAL LABORATORIES, Ltd

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San Ramon, CA 94583

Client Project ID:
Project # 2331
3609 INT Blvd
Oakland, CA

Ref.:	R5858401
Method:	5030 GCFID/ 8020/8260
Sampled:	3/13/01
Received:	3/14/01
Matrix:	Water
Analyzed:	3/16-20/01
Reported:	3/20/01
Units:	ug/L
Analyst:	DS

Attention: Naser Pakrou

Laboratory Results for TPH + BTEX & MTBEAnalysis

Analyte	EPA Method	Detection Limit ug/L	Results Sample ID			
			MW-8	MW-10	MW-11	MW-12
BTEX						
Benzene	8020	0.5	312	969	8.6	13
Toluene	8020	0.5	77	18	2.1	5.6
Ethylbenzene	8020	0.5	243	41	10	5.5
Total-Xylene	8020	1.0	1,063	72	14	11
MTBE	8260	5	3139*	630*	ND	214*
TPH-g	5030/GC	50	8,600	4,935	273	1,517
D.F.			20	20	1	5

ND:Not Detected(<MDL)
MTBE was confirmed by GC/MS ,EPA 8260

Delta Environmental Laboratories,

Hossein Khosh Khoo, Ph.D.

Quality Control Report

SOMA
2680 Bishop Drive, Suite 203
San Ramon, CA 94583

Client Project ID:
Project #2331
3609 International Blvd.
Oakland, CA

QC Batch #:5857R

Ref.:	Q5858400
Method:	5030 GCFID/ 8020 / 8260
Sampled:	3/13/01
Received:	3/14/01
Matrix:	Water
Analyzed:	3/16-20/01
Analyst:	DS
Reported:	3/20/01
Units:	ug/L

Quality Control Report for TPH ,BTEX & MTBE

Analyte	Detection Limit ug/L	Sample Result ug/L	Spike Added ug/L	% MS Recovery	% MSD Recovery	Relative % Difference RPD	Method
Benzene	0.5	ND	20	86	86	0.0	8020
Toulene	0.5	ND	20	93	90	3.3	8020
Ethylbenzene	0.5	ND	20	96	96	0.0	8020
T-Xylene	1.0	ND	40	96	96	0.0	8020
MTBE	5.0	ND	20	97	96	1.0	8260
TPH-Gas,GC/FID	50	ND	400	112	109	2.7	5030

Delta Environmental Laboratories

H.Khosh Khoo, PhD.,
Laboratory Director/President

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SOMA
2680 Bishop Drive, Suite 203
San Ramon, CA 94583

Client Project ID:
Project # 2331
3609 INT Blvd
Oakland, CA
Tony's Auto express

Ref.: R5925400
Method: 5030 GCFID/ 8020/8260
Sampled: 4/11/2001
Received: 4/11/2001
Matrix: Water
Analyzed: 4/12/2001
Reported: 4/19/2001
Units: ug/L
Analyst: DS

Attention: Naser Pakrou

Laboratory Results for TPH + BTEX & MTBE Analysis

Analyte	EPA Method	Detection Limit ug/L	Results Sample ID MW-8
BTEX			
Benzene	8020	0.5	81
Toluene	8020	0.5	16
Ethylbenzene	8020	0.5	71
total-Xylene	8020	1.0	270
MTBE	8260	5	221
TPH-g	5030/GCFID	50	2,360
D.F.			4

ND:Not Detected(<MDL)

Delta Environmental Laboratories,

Hossein Khosh Khoo, Ph.D.

Delta Environmental Laboratories

Chain of Custody (COC) Form

685 Stone Road #11 & 12
Benicia, Ca. 94510
(707) 747-6081, 800-7476082 FAX (707) 747-8082

Results to: Naser Pakrou
Client Name SOMA ENV. Eng.
Address
City
Telephone 925 2446600 Fax: 925 2446601
SAMPLER (signature)
Turnaround Time Standard

Project Name 3609 International Blvd. CA. Oakland
LAB ID Tony's Autoexpress
Ref # Proj. 2331

5925

Special Instructions::

Analysis Requested

#	Sample ID	Date	Time	Matrix	No. of containers	pH	Temperature	TPH g, BTEX, MTBE	Comments
1	MW-8	4/11	11:30	H2O				✓	Hcl preservitive cont
									Confirm MTBE peaks
									with 8260

Relinquished by: Date 4/11
Received By: 3:10PM Date 4/11/01
Relinquished by: Date

1) Have all samples received been stored on ice? Yes
2) Did any VCA samples received have any head space? NO
3) Were samples in appropriate containers and packaged properly? Yes
4) Were samples received in good condition? Yes

04/19/01 THU 15:05 FAX 17077476082 D-E-L-T-A 008

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SOMA
2680 Bishop Drive, Suite 203
San Ramon, CA 94583

Client Project ID:
Project # 2333
3609 INT. Blvd
Oakland, CA

Ref.: R5859100

Method: 8260B
Sampled: 3/13/01
Received: 3/14/01
Matrix: Water
Analyzed: 3/16/01
Reported: 3/20/01

Attention: Naser Pakrou

Purgeable Hydrocarbons
EPA 8260B

Analyte	Detection Limit (ug/L)	Results Sample ID PSP#1	Results Sample ID Influent*
Benzene	0.5	ND	701
Bromobenzene	0.5	ND	ND
Bromochloromethane	0.5	ND	ND
Bromodichloromethane	0.5	ND	ND
Bromoform	0.5	ND	ND
Bromomethane	0.5	ND	ND
n-Butylbenzene	0.5	ND	ND
sec-Butylbenzene	0.5	ND	ND
tert-Butylbenzene	0.5	ND	ND
Carbon Tetrachloride	0.5	ND	ND
Chlorobenzene	0.5	ND	ND
Chloroethane	0.5	ND	ND
Chloroform	0.5	ND	ND
Chloromethane	0.5	ND	ND
2-Chlorotoluene	0.5	ND	ND
4-Chlorotoluene	0.5	ND	ND
Dibromochloromethane	0.5	ND	ND
1,2-Dibromo-3-chloropropane	0.5	ND	ND
1,2-Dibromoethane	0.5	ND	ND
Dibromomethane	0.5	ND	ND
1,2-Dichlorobenzene	0.5	ND	ND
1,3-Dichlorobenzene	0.5	ND	ND
1,4-Dichlorobenzene	0.5	ND	ND
dichlorodifluoromethane	0.5	ND	ND
1,1-Dichloroethane	0.5	ND	ND
1,2,-Dichloroethane	0.5	ND	ND
1,1-Dichloroethene	0.5	ND	ND
cis-1,2-Dichloloethene	0.5	ND	ND
trans-1,2-Dichloroethene	0.5	ND	ND
1,2-Dichloropropane	0.5	ND	ND
1,3-Dichloropropane	0.5	ND	ND

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SOMA
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Client Project ID:
Project # 2333
3609 INT. Blvd
Oakland, CA

Ref.: R5859100

Method: 8260B
Sampled: 3/13/01
Received: 3/14/01
Matrix: Water
Analyzed: 3/16/01
Reported: 3/20/01

Attention: Naser Pakrou

Purgeable Hydrocarbons
EPA 8260B

Analyte	Detection Limit (ug/L)	Results Sample ID PSP#1	Results Sample ID Influent*
2,2-Dichloropropane	0.5	ND	ND
1,1-Dichloropropene	0.5	ND	ND
Ethylbenzene	0.5	ND	ND
Hexachlorobutadiene	0.5	ND	ND
Isopropylbenzene	0.5	ND	ND
p-Isopropyltoluene	0.5	ND	ND
Methylene Chloride	0.5	ND	ND
Naphthalene	0.5	ND	ND
n-Propylbenzene	0.5	ND	ND
Styrene	0.5	ND	ND
1,1,1,2-Tetrachloroethane	0.5	ND	ND
1,1,2,2-Tetrachloroethane	0.5	ND	ND
Tetrachloroethene	0.5	ND	33
Toluene	0.5	ND	81
1,2,3-Trichlorobenzene	0.5	ND	ND
1,2,4-Trichlorobenzene	0.5	ND	ND
1,1,1-Trichloroethane	0.5	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND
Trichloroethene	0.5	ND	ND
Trichlorofluoromethane	0.5	ND	ND
1,2,3-Trichloropropane	0.5	ND	ND
1,2,4-Trimethylbenzene	0.5	ND	23
1,3,5-Trimethylbenzene	0.5	ND	85
Vinyl Chloride	0.5	ND	ND
Xylenes, Total	1.0	ND	795
cis-1,3-Dichloropropene	0.5	ND	ND
trans-1,3-Dichlopropene	0.5	ND	ND

ND: Not Detected
* Sample has been diluted 20 times, therefore detection limits must be multiplied by the same factor.
DELTA Environmental Laboratories
California Certification #1857

H.Khosh Khoo, PhD.,
Laboratory Director/President

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Quality Control Report

SOMA
2680 Bishop Drive
San Ramon, CA 94583

Client Project ID:
proj 2333
3609 INT Blv.
Oakland,CA

Sample Spiked:Blank

Ref.:	Q5859400
Method:	5030 GCFID/ 8020/8260B
Sampled:	3/13/01
Received:	3/14/01
Matrix:	Water
Analyzed:	3/17-20/01
Analyst:	DS
Reported:	3/20/00
Units:	ug/L

Quality Control Report for TPH-G & MTBE

Analyte	Detection Limit ug/L	Sample Result ug/L	Spike Added ug/L	% MS Recovery	% MSD Recovery	Relative % Difference RPD	Method
MTBE	5	ND	20	100	103	3.0	8260B
TPH-Gas,GC/FID	50	ND	400	93	91	2.2	5030

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H.Khosh Khoo, PhD.,
Laboratory Director/President

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ENVIRONMENTAL LABORATORIES, Ltd

Quality Control Report

Client project ID:
Project # 2333
3609 INT Blvd
Oakland, CA

SOMA
2680 Bishop Drive, Suite 203
San Ramon, CA 94583

Ref. Q5859100
Matrix: Water
Unit: ug/L
Reported: 3/20/01

Attention: Naser Pakrou

Surrogate Standard Recovery Summary
Method : EPA8260B

Date Analyzed	Lab Id	Percent Recovery Pentafluoro-benzene	Toluene d8	p-Bromofluoro-Benzene
3/16/01	Blank	108	98	99
3/16/01	Blank	109	98	99
QC limit:		70-121	81-117	74-121

Date Analyzed:3/16/01
Sample Spiked:Blank

Matrix Spike Recovery

Analyte	Spike Added ug/L	Matrix Spike %Recovery	Matrix Spike Dup % Recovery	Relative % Difference RPD
1,1-Dichloroethene	20	119	117	1.7
Trichloroethene	20	102	100	2.0
Benzene	20	102	100	2.0
Toluene	20	96	97	1.0
Chlorobenzene	20	99	99	0.0

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Laboratory Director/President

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SOMA
2680 Bishop Drive, Suite 203
San Ramon, CA 94583

Client project ID:
Proj 2333
3609 INT Blv.
Oakland,CA

Ref.: R5859400
Method: 5030 GCFID/ 8020/8260B
Sampled: 3/13/01
Received: 3/14/01
Matrix: Water
Analyzed: 3/17-20/01
Reported: 3/20/01
Units: ug/L
Analyst: DS

Attention: Naser Pakrou

Laboratory Results for TPH-G & MTBE Analysis

Analyte	EPA Method	Detection Limit ug/L	Results Sample ID	
			PSP#1	Influent
MTBE	8260B	5.0	ND	267
TPH-g	5030/GCFID	50	ND	7250

ND:Not Detected(<MDL)

Delta Environmental Laboratories,

Hossein Khosh Khoo, Ph.D.

Delta Environmental Laboratories

Chain of Custody (COC) Form

685 Stone Road #11 & 12
Benicia, Ca, 94510
(707) 747-6081, 800-7476082 FAX (707) 747-8082

Results to: Naser Partov
Client Name SOMA Env. Eng
Address
City
Telephone 9252446600 Fax: 9252446601
SAMPLER (signature)
Turnaround Time Standard

Project Name
Proj 2333
3609 Int Blv.
LAB ID Oakland CA
Ref # Groundwater
Extraction System

5859

Analysis Requested

Special Instructions::

#	Sample ID	Date	Time	Matrix	No. of containers	pH	Temperature	TPHg + 8260B (MTBE)	Comments
1	Effluent (PSP #1)	3/13	3:0	H2O	3			✓	
2	Influent	3/13	3:0	H2O	3			✓	

Relinquished by:	Date 3/14/01	1)	Have all samples received been stored on ice? Y
Received By:	Date 3,14,01	2)	Did any VOA samples received have any head space? N
Relinquished by:	Date	3)	Were samples in appropriate containers and packaged properly? Y
Received By:	Date	4)	Were samples received in good condition? Y

WED 11:30 FAX 1/01/14/DUD4
03/27/01

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ENVIRONMENTAL LABORATORIES, Ltd

SOMA
2680 Bishop Drive, Suite 203
San Ramon, CA 94583

Client Project ID:
Proj 2333
Tony's Auto Express
3609 International Blvd.

Ref.: R5711400
Method 5030 GCFID/ 8020/8260
Sampled: 1/29/01
Received: 1/29/01
Matrix: Water
Analyzed: 2/6-7/01
Reported: 2/8/01
Units: ug/L
Analyst: DS

Attention: Frank Cioffi

Laboratory Results for TPH-G & MTBE Analysis

Analyte	EPA Method	Detection Limit ug/L	Results Sample ID		
			Effluent	Influent	GAC-1
MTBE	8260	5.0	ND	413	ND
TPH-G	5030/GCFID	50	ND	7056	ND

ND:Not Detected(<MDL)

Delta Environmental Laboratories

Hossein Khosh Khoo, Ph.D.

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DELTA ENVIRONMENTAL LABORATORIES, Ltd

Client:
SOMA
2680 Bishop Drive, Suite 203
San Ramon, CA 94583

Client Project ID:
Proj 2333
Tony's Auto Express
3609 International Blvd.

Attention: Frank Cioffi

Ref.	R5711100
Method:	8260
Sampled:	1/29/01
Received:	1/29/01
Matrix	Water
Analyzed:	2/6-7/01
Reported:	2/8/01
Analyst:	DS
Unit	ug/L

Purgeable Hydrocarbons
EPA 8260
VOC

Analyte	Detection Limit ug/L	Results Sample ID		
		Effluent	Influent*	GAC-1
Benzene	0.5	ND	481	ND
Bromobenzene	0.5	ND	ND	ND
Bromochloromethane	0.5	ND	ND	ND
Bromodichloromethane	0.5	ND	ND	ND
Bromoform	0.5	ND	ND	ND
Bromomethane	0.5	ND	ND	ND
n-Butylbenzene	0.5	ND	ND	ND
sec-Butylbenzene	0.5	ND	ND	ND
tert-Butylbenzene	0.5	ND	ND	ND
Carbon Tetrachloride	0.5	ND	ND	ND
Chlorobenzene	0.5	ND	ND	ND
Chloroethane	0.5	ND	ND	ND
Chloroform	0.5	ND	ND	ND
Chloromethane	0.5	ND	ND	ND
2-Chlorotoluene	0.5	ND	ND	ND
4-Chlorotoluene	0.5	ND	ND	ND
Dibromochloromethane	0.5	ND	ND	ND
1,2-Dibromo-3-chloropropane	0.5	ND	ND	ND
1,2-Dibromoethane	0.5	ND	ND	ND
Dibromomethane	0.5	ND	ND	ND
1,2-Dichlorobenzene	0.5	ND	ND	ND
1,3-Dichlorobenzene	0.5	ND	ND	ND
1,4-Dichlorobenzene	0.5	ND	ND	ND
dichlorodifluoromethane	0.5	ND	ND	ND
1,1-Dichloroethane	0.5	ND	ND	ND
1,2,-Dichloroethane	0.5	ND	ND	ND
1,1-Dichloroethene	0.5	ND	ND	ND
cis-1,2-Dichloloethene	0.5	ND	ND	ND
trans-1,2-Dichloroethene	0.5	ND	ND	ND
1,2-Dichloropropane	0.5	ND	ND	ND
1,3-Dichloropropane	0.5	ND	ND	ND

Client:
SOMA
2680 Bishop Drive, Suite 203
San Ramon, CA 94583

Client Project ID:
Proj 2333
Tony's Auto Express
3609 International Blvd.

Attention: Frank Cioffi

Ref.	R5711100
Method:	8260
Sampled:	1/29/01
Received:	1/29/01
Matrix	Water
Analyzed:	2/6-7/01
Reported:	2/8/01
Analyst:	DS
Unit	ug/L

Purgeable Hydrocarbons
EPA 8260
VOC

Analyte	Detection Limit ug/L	Results Sample ID		
		Effluent	Influent*	GAC-1
2,2-Dichloropropane	0.5	ND	ND	ND
1,1-Dichloropropene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Hexachlorobutadiene	0.5	ND	ND	ND
Isopropylbenzene	0.5	ND	ND	ND
p-Isopropyltoluene	0.5	ND	ND	ND
Methylene Chloride	0.5	ND	ND	ND
Naphthalene	0.5	ND	70	ND
n-Propylbenzene	0.5	ND	ND	ND
Styrene	0.5	ND	ND	ND
1,1,1,2-Tetrachloroethane	0.5	ND	ND	ND
1,1,2,2-Tetrachloroethane	0.5	ND	ND	ND
Tetrachloroethene	0.5	ND	ND	ND
Toluene	0.5	ND	68	ND
1,2,3-Trichlorobenzene	0.5	ND	ND	ND
1,2,4-Trichlorobenzene	0.5	ND	ND	ND
1,1,1-Trichloroethane	0.5	ND	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND	ND
Trichloroethene	0.5	ND	ND	ND
Trichlorofluoromethane	0.5	ND	ND	ND
1,2,3-Trichloropropane	0.5	ND	ND	ND
1,2,4-Trimethylbenzene	0.5	ND	385	ND
1,3,5-Trimethylbenzene	0.5	ND	112	ND
Vinyl Chloride	0.5	ND	ND	ND
Xylenes, Total	0.5	ND	1297	ND
cis-1,3-Dichloropropene	0.5	ND	ND	ND
trans-1,3-Dichlopropene	0.5	ND	ND	ND

ND: Not Detected

* Sample was diluted 10 times, so the detection limits must be multiplied by the same factor.

DELTA Environmental Laboratories
California Certification #1857
H.Khosh Khoo, PhD.,
Laboratory Director/President

Quality Control Report

Client Project ID:
Proj 2333
Tony's Auto Express
3609 International Blvd.

Client:
SOMA
2680 Bishop Drive, Suite 203
San Ramon, CA 94583

Ref. Q5711100
Matrix: Water
Unit: ug/L
Reported 2/8/01

Attention: Frank Cioffi

Surrogate Standard Recovery Summary
Method : EPA8260

Date Analyzed	Lab Id.	Percent Recovery Pentafluoro-benzene	Toluene d8	p-Bromofluoro-Benzene
2/6/01	Blank	89	104	104
2/6/01	Blank	93	101	105
QC limit:		70-121	81-117	74-121

Date Analyzed:2/6/01
Sample Spiked:Blank

Matrix Spike Recovery

Analyte	Spike Added ug/L	Matrix Spike %Recovery	Matrix Spike Dup % Recovery	Relative % Difference RPD
1,1-Dichloroethene	20	109	118	7.9
Trichloroethene	20	104	101	2.9
Benzene	20	107	101	5.8
Toluene	20	105	99	5.9
Chlorobenzene	20	97	97	0.0
MTBE	20	112	110	1.8

H.Khosh Khoo, PhD.,
Laboratory Director/President

Quality Control Report

SOMA
2680 Bishop Drive, Suite 203
San Ramon, CA 94583

Client Project ID:
Proj 2333
Tony's Auto Express
3609 International Blvd.

Sample Spiked:Blank

Attention: Frank Cioffi

Ref.:	Q 5711400
Method	5030 GCFID/ 8020/8015M
Sampled:	1/29/01
Received:	1/29/01
Matrix:	Water
Analyzed:	2/6/01
Analyst	DS
Reported:	2/8/01
Units:	ug/L

Quality Control Report for TPH-G Analysis

Analyte	Detection Limit ug/L	Sample Result ug/L	Spike Added ug/L	% MS Recovery	% MSD Recovery	Relative % Difference RPD	Method
MTBE	5	ND	20	112	110	1.8	8260
TPH-Gas,GC/FID	50	ND	400	96	110	13.6	5030

Delta Environmental Laboratories

H.Khosh Khoo, PhD.,
Laboratory Director/President

Delta Environmental Laboratories

Chain of Custody (COC) Form

685 Stone Road #11 & 12
Benicia, Ca, 94510
(707) 747-6081, 800-747-6082 FAX (707) 747-6082

Project Name 2333
Tony's Auto Express
3609 International Blvd., Oakland

LAB ID

Ref #

5711

Results to:	Frank Cioffi
Client Name	SOMA Environmental
Address	2680 Bishop Dr., Suite 203
City	San Ramon, CA
Telephone	925-244-6600 Fax: 925-244-6600
SAMPLER (signature)	Frank Cioffi
Turnaround Time	standard

Special Instructions::

#	Sample ID	Date	Time	Matrix	No. of containers	pH	Temperature	TPH-gas	8260 B-including MTBE	Comments
	Effluent	1/29/01	2:17	H_2O	2			✓	✓	* ~~1664~~ Use E.P.A. Method
	Influent	1/29/01	2:20	H_2O	2			✓	✓	8260 B for all samples
	GAC-1	1/29/01	2:33	H_2O	2			✓	✓	

Relinquished by:	Frank Cioffi	Date	1/29/01
Received By:	[illegible]	Date	1/29/01
Relinquished by:		Date	
Received By:		Date	

For Lab Use Only:

1) Have all samples received been stored on ice? YES
2) Did any VOA samples received have any head space? NO
3) Were samples in appropriate containers and packaged properly? YES
4) Were samples receicved in good condition? YES

02/08/01 THU 19:15 FAX 17077476082 D-E-L-T-A
01/05/01 FRI 15:55 FAX 17077476082 D-E-L-T-A
004

OXYGEN SOLUBILITY AND CALIBRATION VALUE TABLES

TABLE A — Solubility of Oxygen in mg/L in Water Exposed to Air at 760 mm Hg Pressure

Temp °C	Chlorinity: 0 Salinity: 0	5.0 9.0	10.0 18.1	15.0 27.1	20.0 36.1	25.0 45.2
0.0	14.62	13.73	12.89	12.10	11.36	10.66
1.0	14.22	13.36	12.55	11.78	11.07	10.39
2.0	13.83	13.00	12.22	11.48	10.79	10.14
3.0	13.46	12.66	11.91	11.20	10.53	9.90
4.0	13.11	12.34	11.61	10.92	10.27	9.66
5.0	12.77	12.02	11.32	10.66	10.03	9.44
6.0	12.45	11.73	11.05	10.40	9.80	9.23
7.0	12.14	11.44	10.78	10.16	9.58	9.02
8.0	11.84	11.17	10.53	9.93	9.36	8.83
9.0	11.56	10.91	10.29	9.71	9.16	8.64
10.0	11.29	10.66	10.06	9.49	8.96	8.45
11.0	11.03	10.42	9.84	9.29	8.77	8.28
12.0	10.78	10.18	9.62	9.09	8.59	8.11
13.0	10.54	9.96	9.42	8.90	8.41	7.95
14.0	10.31	9.75	9.22	8.72	8.24	7.79
15.0	10.08	9.54	9.03	8.54	8.08	7.64
16.0	9.87	9.34	8.84	8.37	7.92	7.50
17.0	9.67	9.15	8.67	8.21	7.77	7.36
18.0	9.47	8.97	8.50	8.05	7.62	7.22
19.0	9.28	8.79	8.33	7.90	7.48	7.09
20.0	9.09	8.62	8.17	7.75	7.35	6.96
21.0	8.92	8.46	8.02	7.61	7.21	6.84
22.0	8.74	8.30	7.87	7.47	7.09	6.72
23.0	8.58	8.14	7.73	7.34	6.96	6.61
24.0	8.42	7.99	7.59	7.21	6.84	6.50
25.0	8.26	7.85	7.46	7.08	6.73	6.39
26.0	8.11	7.71	7.33	6.96	6.62	6.29
27.0	7.97	7.58	7.20	6.85	6.51	6.18
28.0	7.83	7.44	7.08	6.73	6.40	6.09
29.0	7.69	7.32	6.96	6.62	6.30	5.99
30.0	7.56	7.19	6.85	6.51	6.20	5.90
31.0	7.43	7.07	6.73	6.41	6.10	5.81
32.0	7.31	6.96	6.62	6.31	6.01	5.72
33.0	7.18	6.84	6.52	6.21	5.91	5.63
34.0	7.07	6.73	6.42	6.11	5.82	5.55
35.0	6.95	6.62	6.31	6.02	5.73	5.46
36.0	6.84	6.52	6.22	5.93	5.65	5.38
37.0	6.73	6.42	6.12	5.84	5.56	5.31
38.0	6.62	6.32	6.03	5.75	5.48	5.23
39.0	6.52	6.22	5.93	5.66	5.40	5.15
40.0	6.41	6.12	5.84	5.58	5.32	5.08
41.0	6.31	6.03	5.75	5.49	5.24	5.01
42.0	6.21	5.93	5.67	5.41	5.17	4.93
43.0	6.12	5.84	5.58	5.33	5.09	4.86
44.0	6.02	5.75	5.50	5.25	5.02	4.79
45.0	5.93	5.67	5.41	5.17	4.94	4.72

TABLE B — Calibration Values for Various Atmospheric Pressures and Altitudes

PRESSURE		ALTITUDE			CORRECTION
in. Hg	mm Hg	kPa	Feet	m	FACTOR (%)
30.23	768	102.3	-276	-84	101
29.92	760	101.3	0	0	100
29.61	752	100.3	278	85	99
29.33	745	99.3	558	170	98
29.02	737	98.3	841	256	97
28.74	730	97.3	1126	343	96
28.43	722	96.3	1413	431	95
28.11	714	95.2	1703	519	94
27.83	707	94.2	1995	608	93
27.52	699	93.2	2290	698	92
27.24	692	92.2	2587	789	91
26.93	684	91.2	2887	880	90
26.61	676	90.2	3190	972	89
26.34	669	89.2	3496	1066	88
26.02	661	88.2	3804	1160	87
25.75	654	87.1	4115	1254	86
25.43	646	86.1	4430	1350	85
25.12	638	85.1	4747	1447	84
24.84	631	84.1	5067	1544	83
24.53	623	83.1	5391	1643	82
24.25	616	82.1	5717	1743	81
23.94	608	81.1	6047	1843	80
23.62	600	80.0	6381	1945	79
23.35	593	79.0	6717	2047	78
23.03	585	78.0	7058	2151	77
22.76	578	77.0	7401	2256	76
22.44	570	76.0	7749	2362	75
22.13	562	75.0	8100	2469	74
21.85	555	74.0	8455	2577	73
21.54	547	73.0	8815	2687	72
21.26	540	71.9	9178	2797	71
20.94	532	70.9	9545	2909	70
20.63	524	69.9	9917	3023	69
20.35	517	68.9	10293	3137	68
20.04	509	67.9	10673	3253	67
19.76	502	66.9	11058	3371	66