RECEIVED

2:18 pm, Dec 05, 2007

Alameda County
Environmental Health

CORRECTIVE ACTION PLAN
FOR CORE AREA OF FUEL IMPACTS

German Autocraft
301 E. 14th Street
San Leandro, California

Global ID No. T0600100639
AC LOP Case # 2783

Prepared For

Mr. Seung Lee
German Autocraft
San Leandro, CA 95070

Prepared By

Groundwater Cleaners Inc.
Cleaning California from the Groundwater up
347 Frederick Street, San Francisco, California 94117
(415) 665-6181

Date: November 28, 2007

Groundwater Cleaners Inc.

Cleaning California from the Groundwater up

347 Frederick Street, San Francisco, California 94117

(415) 665-6181

November 28, 2007

German Autocraft
301 E. 14th Street
San Leandro, CA 94577

Attn: Mr. Seung Lee

Subject: ***Corrective Action Plan***
German Autocraft, AC LOP Case # 2783
Global ID No. T0600100639

Dear Mr. Lee:

GWC is pleased to attach this ***Corrective Action Plan*** (CAP) for your review. The CAP presents a course of action to significantly reduce the persisting high contaminant levels associated with this fuel leak. This remedial action will reduce off-site migration of contaminants and give natural attenuation processes a much better opportunity to improve the overall groundwater quality throughout the plume. Also importantly, the time frame to achieve case closure should be much shorter by implementing this CAP. All associated costs should be reimbursable by the state UST Cleanup Fund. GWC plans to concurrently continue quarterly groundwater sampling in accordance with Alameda County Department of Environmental Health (DEH) requirements while the CAP review and implementation steps progress.

If you have any questions or require further information, please do not hesitate to call us at (415) 665-6181.

Sincerely,

Glenn Reierstad
Project Manager

Cc: Ms. Donna Dragos, DEH
Mr. Steven Plunkett, DEH
Mr. David Charter, USTCF

Perjury Statement

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached proposal or report is true and correct, to the best of my knowledge.

Seung Lee, owner, German Autocraft

TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 ASSESSMENT OF FUEL IMPACTS 2
3.0 APPLICABLE CLEANUP LEVELS 4
4.0 VIABLE REMEDIAL ALTERNATIVES 5
4.1 Monitored Natural Attenuation
4.2 Soil Excavation
4.3 Dual-Phase Soil Vapor and Groundwater Extraction
4.4 Enhanced Aerobic Bioremediation
5.0 RECOMMENDATIONS 7
6.0 MONITORING AND REPORTING 8
7.0 CERTIFICATION 8
8.0 REFERENCES 9

TABLES

Table 1 Summary of Groundwater Elevation Data
Table 2 Summary of Groundwater Sample Analytical Results
Table 3 Suggested Near-Term Cleanup Goals for "Constituents of Concern"
Table 4 Summary of Costs/Benefits for Remedial Alternatives

FIGURES

Figure 1 Location Map
Figure 2 Site Map with Well Locations and Cross-Section Line
Figure 3 Geologic Cross-Section (ESE-WNW orientation)
Figure 4 Contaminant-Affected Area
Figure 5 Site Detail for Possible Excavation
Figure 6 Site Detail for Conceptual HVDPE and Air Sparging Well Array
Figure 7 Site Detail for Conceptual Enhanced Aerobic Bioremediation Well Array

1.0 INTRODUCTION

1.1 Site Location and Description

The site is located at 301 E. 14th Street in San Leandro, CA, in a high-density, mixed-use neighborhood of residential and small commercial buildings. Figure 1 shows the site location. East 14th Street is a busy thoroughfare, running approximately 25 degrees west of north-south. The subject site is approximately 90’ x 120’ in size and has a long history of use as an automobile repair facility, which continues today.

1.2 Case History

Subsurface fuel contamination was discovered in 1990 when the site’s underground storage tanks (USTs) were removed. Other than what was needed to remove the USTs, there does not appear to have been any noteworthy over-excavation of contaminated soils and digging probably did not encounter groundwater. An initial 45-foot deep exploration boring was advanced in December 1990 and completed as a groundwater monitoring well (MW-1). The Alameda County Department of Environmental Health (DEH) took over as lead oversight agency in November 1993 and Mr. Lee was issued a Letter of Commitment from the state’s Underground Storage Tank Cleanup Fund in June 1994.

Additional investigations, including the installation of two more monitoring wells, were performed in 1995. MW-3 apparently had measurable free-product (~1/4”) floating on its groundwater (ACHCS, 1996). Subsequent investigations over the next six years established the network of monitoring wells shown on Figure 2, which encompasses the down-gradient block defined by Garcia Avenue, Lafayette Avenue and West Broadmoor Boulevard. The well labeled as ‘141 Farrelly Drive’ is actually a former residential irrigation supply well that has been adopted for monitoring purposes. Over 10 years of groundwater monitoring has been conducted, but no pro-active remedial measures have been implemented as far as GWC is aware. A June 2001 letter from the DEH sets forth the monitoring schedule (ACHCS, 2001). GWC became the project consultant in September, 2006.

1.3 CAP Objectives

This CAP presents a course of action to significantly reduce the persisting high contaminant levels under the subject site and at least the southern portion of Garcia Avenue. The area of focus is where benzene in groundwater continues to be above 1,000 micrograms per liter (ug/L). This remedial action will reduce off-site migration of contaminants and give natural attenuation processes a much better opportunity to improve the overall groundwater quality. The timeframe to achieve case closure should be much shorter by implementing this CAP.

2.0 ASSESSMENT OF FUEL IMPACTS

2.1 Hydrogeologic Setting

The site is situated within the East Bay Plain Groundwater Basin, about two miles east of San Francisco Bay, west of the Hayward Fault (CRWQCB-SF, 1999). The local ground elevation is approximately 48-50 feet above mean sea level. The subject San Leandro Sub-Area is primarily filled with alluvial fan deposits of mixed grain size (from fine silts/clays to gravels). The area may be underlain by the Yerba Buena Mud that separates shallower groundwater from deeper groundwater zones, but there is a general consensus that many older abandoned wells penetrated this aquitard and locally rendered it leaky. The San Leandro Sub-Area has finer grained alluvium than the Niles Cone basin further to the south and accordingly less groundwater yield. There are a number of wells in the area that are used seasonally by homeowners (or other entities) for irrigation purposes, but very few used for potable supply. EBMUD is the local water supplier, using mainly imported water, or local reservoir water.

A 1996 DEH memo mentions that the site may be close to the buried Edes Channel of the San Leandro Creek, but interpretations by Woodward-Clyde Consultants (WCC) place the channel south of the site, closer to Dutton Avenue. Extensive investigations have been performed for the Caterpillar plume about ½-1 mile southwest of the site and show predominantly clays and silts in the upper 30+ feet of the ground surface (HLA, 1994).

General groundwater flow in the area (in the absence of wells or recharge features) is from east to west, or mimicking the surface topography. As mentioned above, there may be localized vertical groundwater flow via improperly abandoned wells. The nearest surface water body is the San Leandro Creek, which flows eastward about ½-mile south of the site.

2.2 Local Stratigraphy

Figure 3 presents a geologic cross-section oriented with the primary axis of the subject plume and prevailing groundwater flow direction (ESE-WNW). Surface pavements and thin fill material is underlain by over 20 feet of predominantly clayey soil. At a depth beginning about 25 feet below grade there is fairly continuous zone of predominantly sandy soil, which has been found to be between 3 and 13 feet thick. This sandy zone appears to trend thicker and more granular away from the site, with the prior consulting Geologist classifying some of the zone a gravel material at Broadmoor well MW-12. The granular zone is underlain by clay that begins at a depth ranging from 29-38 feet.

2.3 Groundwater Elevation and Gradient

Historical measurements since 1995 show the depth to groundwater varying from about 15 to 28 feet below grade, corresponding to an elevation range of about 22 to 34 feet MSL (see Table 1). Accordingly, the granular zone noted above experiences only occasional periods of unconfined groundwater conditions. The 1990 data and MW-1 log indicate that pre-1995 water levels were probably lower that this range, at least periodically. Such water table variations create a fairly thick 'smear' zone of fuel impacts and increase the difficulty/expense of remedial efforts.

All monitored wells except MW-5 typically contain water and recharge rapidly after purging. There appears to have been marked silting of well MW-5 (over 8 feet) based on logs GWC recently reviewed and sounded bottoms that we've measured. Other older well casings, especially MW-1, may also be silted.

As reflected in the plume axis (see Figure 4), the prevailing groundwater flow direction is northwesterly. A typical gradient is on the order of 0.002 ft/ft, fairly flat.

2.4 Groundwater Analytical Results

Groundwater from monitoring wells close to the former USTs (i.e., MW-1, -2, -3 and -4) consistently has noticeable hydrocarbon odors, but the off-site wells, except MW-9, -10 and -12, are generally odor free. All monitoring wells, except the adopted former supply well at 141 Farrelly, have tested positive for at least traces of petroleum hydrocarbons as gasoline (TPHg) and/or fuel-related volatile organic compounds (BTEX). The relatively newer fuel oxygenate additives, such as MtBE, are not part of this pre-1990 release. The distribution of contamination generally correlates with the prevailing groundwater gradient and the distance from the source. However, in recent monitoring events down-gradient well MW-10 shows impacts as high as Garcia Avenue area wells MW-3 and MW-8. Table 2 summarizes the historical groundwater analytical data and the plume area is shown in Figure 4.

Neither far down-gradient wells MW-1A and MW-12 nor lateral down-gradient wells MW-11 and MW-13 exhibit appreciable worsening in fuel impacts. Correspondingly, it is fairly well documented that the subject plume is not expanding and more likely is in a contracting phase, albeit slow. Wells in the core, on-site impact area have generally experienced very slow declines in fuel concentrations, with benzene concentrations persisting above 1,000 ug/L. Well MW-3 is the exception and has improved fairly dramatically for some reason over the past two years.

2.5 Conceptual Model of Release Spreading

The aggregate of investigative studies and monitoring data supports a fairly straightforward conceptual model for the subject release. There does not appear to any commingled contamination involved and the groundwater flow direction seems to have remained consistent. After vertical seepage on-site contaminating a likely conical-shaped soil mass, the subject fuel reached the sandy zone about 25 feet below grade. The combination of higher permeability and at least occasional groundwater in this zone changed the fuel migration to lateral, with primarily a NNW orientation but with some radial dispersion as the groundwater velocity is not fast. Based on the MW-1 log, it appears that the deepest fuel detections are roughly 35-40 feet below grade. Since groundwater levels have been generally higher since, and the release does not involve compounds denser than water, no further vertical migration is expected to have occurred.

Over the past 10-15 years the sandy zone appears to consistently have contained groundwater, and is often fully filled with water. Since fuel impacts congregate in the upper portion of a saturated zone, this groundwater rise undoubtedly has led to contamination in the lower portion of the overlying (confining) clayey soil throughout the plume area. With an end to the fuel leakage in 1990, the impact has already reached what is expected to be its maximum extent. The plume is now experiencing natural attenuation at its edges at a rate that at least counterbalances further migration/dispersion. In a slow process, the detectable boundary of fuel impacts will shrink back to the core area, which will eventually itself bioremediate. These natural processes can be expedited if the core mass of residual fuel is reduced, as this CAP proposes to do.

2.6 Potential Threats to Health and the Environment

Although the core of the fuel impacts lie mostly beneath the subject auto repair property and the adjacent Garcia Avenue, there are small apartment buildings and single family residences within the plume area (see Figure 4). Some of the single-family residences may have basements. Accordingly, residential vapor intrusion is at least a potential threat from the subject impacts.

The subject impacts are in an area that has numerous shallow (<100-foot deep) private wells used for seasonal irrigation (a recognized beneficial use), such as the 141 Farrelly well. EBMUD has provided back-flow prevention devices to owners where such wells have plumbed connections to the main house supply, but there is no certainty that all such situations have been addressed. Also, there may be inadvertent drinking from this type of well water regardless.

With respect to other potential threats, no surface water body lies anywhere near the down-gradient direction of the subject release and the long term monitoring data demonstrates that the impacts are not actively spreading. There are no ecological-type threats from the subsurface impact that we are aware of.

3.0 APPLICABLE CLEANUP LEVELS

Probably the most important consideration for applicable cleanup levels is the timeframe that they are tied to. The requisite and ultimate cleanup levels for this case, as with most in the state that have groundwater impact, are promulgated drinking water standards. Specifically, these are currently as follows – benzene, 1 µg/L; toluene, 150 µg/L;

ethylbenzene, 300 µg/L; and total xylenes, 1,750 µg/L (CCR, 2007). In the absence of other pressing consideration(s), it is generally recognized that fuel leaks will bio-attenuate to below these concentrations in an acceptable timeframe provided the 'source' is adequately removed or remediated.

For the subject case, there is potentially an over-riding consideration of vapor intrusion risk and very little has been done to proactively reduce the core fuel mass since removal of the leaking tanks. Accordingly, GWC is proposing the cleanup levels presented in Table 3 for the near-term corrective action goals.

4.0 VIABLE REMEDIAL ALTERNATIVES

Corrective action is clearly justified in the core impact area for at least two reasons - (1) to shorten the ultimate timeframe of subsurface restoration by reducing contaminant mass, and (2) to eliminate potential health-and-safety concerns represented by vapor intrusion risks from contaminated groundwater into private residences. Potential economic harm is also a concern, as the known presence of subsurface contaminants could negatively affect values for the overlying properties. At this time, until the benefits of the core area remediation are assessed, GWC does not believe any pro-active cleanup action on the less impacted down-gradient area is warranted.

In this evaluation GWC limited our focus to corrective action strategies that are both proven and realistically viable. For example, unless there was significant area-wide lowering of the water table, conventional soil vapor extraction (SVE) is not considered practical for this case, as much of the target soil is clayey and the sandier aquifer zone is often flooded. Even teaming air sparging with SVE does not appear likely to be effective due to the limited granular zone available to collect the augmented vapors. Monitored Natural Attenuation, which essentially is the current 'action', is included in our evaluation as a basis for comparisons.

4.1 Monitored Natural Attenuation

Natural attenuation has kept the plume from further expansion but has failed to eliminate contaminants sufficiently since the underground storage tanks were removed in 1990. No significant decrease in contaminant concentrations has been evident for the last several years of consistent site monitoring. For example, September 2007 benzene levels in groundwater from wells MW-1, MW-2 and MW-4 were comparable to concentrations seen in the mid to late 1990's. Therefore, monitored natural attenuation poses little to no potential for significantly reducing the impact to soil and groundwater in the core area in a reasonable timeframe. Table 4 costs reflect a 50-year monitoring scenario.

4.2 Soil Excavation

Physically removing the contaminated soil and its absorbed, non-draining water would be a quick and effective means of reducing the impact of contaminants to the soil and groundwater in roughly 5,000 square feet of the site area (see Figure 5). If the work coincided with site redevelopment, an even greater area could be accessed. In light of the site's predominantly clayey soils, particularly those between the backfilled UST pit bottom and the sandy material at around 25 feet below grade, GWC considers an excavation approach to be viable, particularly if large diameter augers were used. Auger-excavating minimizes disturbance to adjoining improvements and eliminates the need for shoring. A dual grid of large diameter holes with smaller, pick-up holes can be used to maximize coverage. The holes are backfilled with controlled density fill (CDF) material that sets up similar to a stiff clay.

Although excavating the site would be the quickest approach, and probably the most effective means of remediating the soil above 25 feet, it would be more expensive and cause much more disturbance than other alternatives. Table 4 compares costs and benefits for this option.

4.3 Dual-Phase Soil Vapor and Groundwater Extraction

A common and effective extraction-based approach that is used for flooded aquifers and clayey soils is high-vacuum dual-phase extraction (HVDPE), where the dual-phase refers to soil vapor and groundwater. This technique addresses issues that make standard SVE impractical here. The 'high' vacuum is usually over 20 inches mercury (Hg). As the operational expense is fairly high, HVDPE cost-effectiveness can be enhanced by having a closely-spaced network of wells, and supplementing the subsurface air flow with air sparging (A/S). Systems are usually configured to draw from multiple wells at once. Since the subject site has good capping (with native clays and surface paving/floor slabs) there should be no problems with either short-circuiting or fugitive vapors.

A downwell 'stinger' or drop-pipe is directly connected to the vacuum source. Wellheads are sealed at the surface using couplings and bushings. A slotted, or otherwise perforated stinger is used whenever there is a desire to minimize groundwater mounding and extraction volume. The stinger is positioned such that impacted zones are dewatered for air flow. Vapor-based remediation yields far more fuel mass than groundwater flushing.

Liquids and vapor are separated using a specially designed chamber on the HVDPE system. Vapors are drawn off the separator under vacuum and flow out of the positive side of the blower to some form of treatment unit, typically an oxidizer, then out an exhaust stack. The system must have an air quality board emissions permit. Influent vapor concentration detectors allow the operator to track vapor recovery trends and help optimize stinger settings. A supply of make-up fuel needs to be available for any combustion-based system, either on-site or self-contained with the unit.

Liquids are pumped out of the separator either to a holding tank or directly to a treatment unit. For fixed systems generating an ongoing stream of water, treatment with granular activated carbon (GAC) is common, followed by either sanitary sewer discharge or storm drain discharge with appropriate permit.

The site-specific design parameters, especially the spacing of wells and sparge points, are evaluated by means of pilot testing, typically of 5-day duration. Table 4 compares costs and benefits for this option. Figure 6 presents a conceptual well array for HVDPE.

4.4 Enhanced Aerobic Bioremediation

As with many other technologies, the limitation on enhanced bioremediation is the delivery adequacy of the augmenting agents to the contaminated soils and groundwater. Enhanced aerobic bioremediation (EAB) involves the delivery of air and/or oxygen-releasing chemicals to the contaminated zone. In its simplest form, EAB delivers pressurized air to the subsurface, similar to the delivery of “sparged” air to the HVDPE A/S system. The difference is in the amount of air. With a HVDPE A/S system, the air flow may be up to several hundred cubic feet per minute (cfm). The air is allowed to strip hydrocarbons from the soil and groundwater, and the resulting vapors are collected by the HVDPE system through recovery wells. In an EAB system, only a few cfm of air are introduced per well. The air saturates the surrounding groundwater with dissolved oxygen and indigenous bacteria assimilate the surrounding hydrocarbons. Additional nutrients may be provided to stimulate multiplication of the bacterial population.

EAB therefore requires much less permitting and equipment, smaller wells and less energy input than HVDPE A/S. However, the down side is that EAB realistically requires an even closer well spacing than HVDPE A/S and is much slower. Table 4 compares costs and benefits for this option. Figure 7 shows a conceptual well array for this option.

5.0 RECOMMENDATIONS

Based on the discussions presented herein, HVDPE with air sparging ranks as the preferred corrective action alternate to meet the near-term cleanup goals for groundwater. However, in order to verify that this approach is truly going to remove fuel mass cost effectively, GWC recommends that a 5-day pilot test be performed. The pilot test should extract from wells MW-1, MW-2, MW-3 and MW-4 under both individual and combined flow scenarios. Periphery wells MW-5, MW-6 and MW-8 should be used for vacuum measurements to assess radii of influence. The 4^{th} and 5^{th} day of the pilot test should include A/S using either temporary points or newly installed wells for that purpose. Testing of representative vapor samples at a certified laboratory should be used to calibrate field measurements.

The data acquired from the pilot testing should be evaluated for at least these three parameters – (1) appropriate spacing of extraction wells, plus sparge point spacing assuming boosted vapor concentrations support the inclusion of A/S; (2) the expected rate of mass recovery in both vapor and liquid phases; and (3) a rough projection of how long the system will likely need to operate. Assuming the pilot testing does not unexpectedly show that this technology is impractical, a remedial action plan (RAP) should be prepared that sets forth the details of the site-specific HVDPE approach.

6.0 MONITORING AND REPORTING

During implementation of the core impact area remedial measures, GWC plans to conduct quarterly groundwater quality monitoring on wells MW-1 through MW-4, plus MW-6 and MW-8. Otherwise, the schedule presented in the June 28, 2001 DEH letter will be adhered to. Technical reports describing the remediation progress and monitoring data will be prepared quarterly.

7.0 PROFESSIONAL CERTIFICATION

We declare, under penalty of perjury, that to the best of our knowledge, everything presented in this CAP is true and correct.

REGISTERED PROFESSIONAL ENGINEER
GLEN REIERSTAD
NO. CH5852
11/30/07
CHEMICAL ENGINEER
STATE OF CALIFORNIA

Glenn Reierstad, P.E.
Project Manager, Groundwater Cleaners, Inc.

Eric R. Lautenbach, P.E.
V.P. Engineering

REGISTERED PROFESSIONAL ENGINEER
ERIC R. LAUTENBACH
11/28/07
No. C042437
EXP. 3/31/08
CIVIL
STATE OF CALIFORNIA

8.0 REFERENCES

Alameda County Health Care Services (ACHCS, 1996), Memorandum from Scott Seery to Mike Bakaldin of San Leandro Hazardous Materials Program, German Autocraft Investigation, 3 pages, April 9, 1996.

Alameda County Health Care Services (ACHCS, 2001), Well Sampling and Monitoring Frequencies, German Autocraft, 1 page letter to Mr. Seung Lee, June 28, 2001.

California Code of Regulations (CCR, 2007), Title 22, Division 4, Chapter 15, Article 5.5, Section 64444, Maximum Contaminant Levels – Organic Chemicals, last updated October 11, 2007.

California Regional Water Quality Control Board, San Francisco Bay Region (CRWQCB-SF, 1999), East Bay Plain Groundwater Basin Beneficial Use Evaluation Report, Alameda and Contra Costa Counties, prepared by the CRWQCB-SF Groundwater Committee in coordination with the Alameda County Flood Control and Conservation District, East Bay Municipal Utility District, City of San Leandro, et al, June 1999.

California Regional Water Quality Control Board, San Francisco Bay Region (CRWQCB-SF, 2005), Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, February 2005 (http://www.waterboards.ca.gov/sanfranciscobay/esl.htm).

Harding Lawson Associates (HLA, 1994), Geologic Cross-Section A-A’, Former Caterpillar Facility, San Leandro, Califonia, Project 26953 1.10.6, February, 1994.

Woodward-Clyde Consultants (WCC), Generalized Topographic Map of the San Leandro Alluvial Cone Showing Former Channels of San Leandro Creek, San Leandro Plume Project 92C0805F, undated.

Tables

Groundwater Cleaners, Inc.
Cleaning California from the Groundwater up
347 Frederick Street, San Francisco, California 94117
(415) 665-6181

Table 1
Cumulative Summary of Groundwater Elevations
German Autocraft, 301 E. 14th Street, San Leandro, California

Well Number	Date Recorded	Depth to Groundwater (feet)	TOC Elevation (feet)	Groundwater Elevation (feet)
MW-1	12/21/90	30.25	49.40	19.15
	2/10/95	---	49.40	29.59
	7/7/95	---	49.40	26.63
	8/10/95	---	49.40	25.58
	9/11/95	---	49.40	24.68
	10/2/95	---	49.40	24.12
	11/7/95	---	49.40	23.36
	12/8/95	---	49.40	22.77
	1/12/96	---	49.40	24.35
	2/12/96	---	49.40	29.04
	3/12/96	---	49.40	31.75
	4/13/96	---	49.40	29.43
	5/14/96	---	49.40	27.89
	6/20/96	---	49.40	27.19
	7/26/96	---	49.40	25.95
	8/19/96	---	49.40	25.16
	9/17/96	---	49.40	24.44
	10/21/96	---	49.40	23.63
	11/27/96	---	49.40	24.28
	12/27/96	---	49.40	28.23
	1/28/97	---	49.40	33.02
	4/25/97	---	49.40	27.14
	7/17/97	---	49.40	24.55
	10/21/97	---	49.40	22.85
	3/10/98	---	49.40	34.35
	6/6/98	---	49.40	30.69
	9/30/98	---	49.40	25.95
	12/30/98	---	49.40	25.13
	3/13/99	---	49.40	29.98
	9/29/99	---	49.40	24.39
	12/29/99	---	49.40	23.75
	3/18/00	---	49.40	31.92
	7/18/00	---	49.40	26.21
	9/26/00	---	49.40	25.01
	12/28/00	---	49.40	24.63
	3/30/01	---	49.40	27.47
	10/5/01	---	49.40	23.82
	3/28/02	---	49.40	28.66

	3/31/03	---	49.40	26.68
	6/19/03	---	49.40	26.23
	9/30/03	---	49.40	24.05
	2/10/04	---	49.40	26.96
	6/30/04	---	49.40	24.73
	9/14/04	---	49.40	21.51
	3/29/06	18.84	49.40	30.56
	6/24/06	20.57	49.40	28.83
	9/30/06	23.53	49.40	25.87
	12/11/06	22.78	49.40	26.29
	03/16/07	nm	49.40	nm
	06/10/7	24.36	49.40	25.04
	09/14/07	25.92	49.40	23.48

Well Number	Date Recorded	Depth to Groundwater (feet)	TOC Elevation (feet)	Groundwater Elevation (feet)
MW-2	2/10/95	---	50.02	29.62
	7/7/95	---	50.02	26.47
	8/10/95	---	50.02	25.40
	9/11/95	---	50.02	24.49
	10/2/95	---	50.02	23.94
	11/7/95	---	50.02	23.13
	12/8/95	---	50.02	22.55
	1/12/96	---	50.02	24.20
	2/12/96	---	50.02	29.03
	3/12/96	---	50.02	31.60
	4/13/96	---	50.02	29.25
	5/14/96	---	50.02	27.68
	6/20/96	---	50.02	26.97
	7/26/96	---	50.02	25.74
	8/19/96	---	50.02	24.97
	9/17/96	---	50.02	24.22
	10/21/96	---	50.02	23.43
	11/27/96	---	50.02	24.09
	12/27/96	---	50.02	28.03
	1/28/97	---	50.02	32.71
	4/25/97	---	50.02	26.88
	7/17/97	---	50.02	24.31
	10/21/97	---	50.02	22.69
	3/10/98	---	50.02	34.20
	6/6/98	---	50.02	30.41
	9/30/98	---	50.02	25.68
	12/30/98	---	50.02	24.93
	3/13/99	---	50.02	29.80

	9/29/99	---	50.02	24.12
	12/29/99	---	50.02	23.52
	3/18/00	---	50.02	31.87
	7/18/00	---	50.02	26.01
	9/26/00	---	50.02	24.69
	12/28/00	---	50.02	24.39
	3/30/01	---	50.02	27.31
	10/5/01	---	50.02	23.64
	3/28/02	---	50.02	28.43
	9/30/02	---	50.02	24.18
	3/31/03	---	50.02	26.39
	6/19/03	---	50.02	26.04
	9/30/03	---	50.02	23.83
	2/10/04	---	50.02	26.75
	6/30/04	---	50.02	24.57
	9/14/04	---	50.02	23.32
	3/29/06	19.61	50.02	30.41
	6/24/06	21.41	50.02	28.61
	9/30/06	24.37	50.02	25.65
	12/11/06	23.92	50.02	26.10
	03/16/07	22.78	50.02	27.24
	06/10/07	25.12	50.02	24.90
	09/14/07	26.63	50.02	23.39

Well Number	Date Recorded	Depth to Groundwater (feet)	TOC Elevation (feet)	Groundwater Elevation (feet)
MW-3	2/10/95	---	49.32	29.57
	7/7/95	---	49.32	26.50
	8/10/95	---	49.32	25.44
	9/11/95	---	49.32	24.54
	10/2/95	---	49.32	24.00
	11/7/95	---	49.32	23.21
	12/8/95	---	49.32	22.62
	1/12/96	---	49.32	24.25
	2/12/96	---	49.32	29.00
	3/12/96	---	49.32	31.67
	4/13/96	---	49.32	29.26
	5/14/96	---	49.32	27.71
	6/20/96	---	49.32	27.00
	7/26/96	---	49.32	25.67
	8/19/96	---	49.32	25.01
	9/17/96	---	49.32	24.27
	10/21/96	---	49.32	23.48

	11/27/96	---	49.32	24.13
	12/27/96	---	49.32	28.11
	1/28/97	---	49.32	32.78
	4/25/97	---	49.32	26.94
	7/17/97	---	49.32	24.37
	10/21/97	---	49.32	22.73
	3/10/98	---	49.32	34.13
	6/6/98	---	49.32	30.47
	9/30/98	---	49.32	25.75
	12/30/98	---	49.32	24.99
	3/13/99	---	49.32	29.83
	9/29/99	---	49.32	24.20
	12/29/99	---	49.32	23.60
	3/18/00	---	49.32	31.82
	7/18/00	---	49.32	26.04
	9/26/00	---	49.32	24.80
	12/28/00	---	49.32	24.45
	3/30/01	---	49.32	27.39
	10/5/01	---	49.32	23.70
	3/28/02	---	49.32	28.49
	9/30/02	---	49.32	24.12
	3/31/03	---	49.32	26.50
	6/19/03	---	49.32	26.03
	9/30/03	---	49.32	23.82
	2/10/04	---	49.32	26.79
	6/30/04	---	49.32	24.59
	9/14/04	---	49.32	21.39
	3/29/06	18.87	49.32	30.45
	6/24/06	22.65	49.32	26.67
	9/30/06	24.49	49.32	24.83
	12/11/06	23.03	49.32	26.29
	03/16/07	21.97	49.32	27.35
	06/10/07	24.28	49.32	25.04
	09/14/07	25.75	49.32	23.57

Well Number	**Date Recorded**	**Depth to Groundwater (feet)**	**TOC Elevation (feet)**	**Groundwater Elevation (feet)**
MW-4	12/30/98	---	49.61	25.05
	3/13/99	---	49.61	29.89
	9/29/99	---	49.61	24.27
	12/29/99	---	49.61	23.64
	3/18/00	---	49.61	31.85
	12/28/00	---	49.61	24.52

	3/30/01	---	49.61	27.40
	10/5/01	---	49.61	23.77
	3/28/02	---	49.61	28.58
	9/30/02	---	49.61	24.32
	3/31/03	---	49.61	26.59
	6/19/03	---	49.61	26.16
	9/30/03	---	49.61	23.96
	9/14/04	---	49.61	21.45
	3/29/06	19.87	49.61	29.74
	6/24/06	22.86	49.61	26.75
	9/30/06	23.94	49.61	25.67
	12/11/06	23.36	49.61	26.25
	03/16/07	22.26	49.61	27.35
	06/10/07	24.60	49.61	25.01
	09/14/07	26.11	49.61	23.50

Well Number	**Date Recorded**	**Depth to Groundwater (feet)**	**TOC Elevation (feet)**	**Groundwater Elevation (feet)**
MW-5	12/30/98	---	unknown	25.06
	3/13/99	---		29.93
	9/29/99	---		24.26
	3/18/00	---		23.64
	3/28/02	---		31.94
	09/14/07	Dry		

Well Number	**Date Recorded**	**Depth to Groundwater (feet)**	**TOC Elevation (feet)**	**Groundwater Elevation (feet)**
MW-6	12/30/98	---	unknown	25.14
	3/13/99	---		29.97
	9/29/99	---		24.38
	12/29/99	---		23.75
	3/18/00	---		31.86
	7/18/00	---		26.22
	9/26/00	---		24.95
	12/28/00	---		24.61
	3/30/01	---		27.41
	10/5/01	---		23.82
	3/28/02	---		28.65
	9/30/02	---		24.41
	9/30/06	22.33		
MW-6	09/14/07	24.58	nm	nc

Well Number	Date Recorded	Depth to Groundwater (feet)	TOC Elevation (feet)	Groundwater Elevation (feet)
MW-8	12/30/98	---	unknown	25.14
	3/13/99	---		
	9/29/99	---		
	12/29/99	---		
	3/18/00	---		
	7/18/00	---		
	9/26/00	---		
	12/28/00	---		
	3/30/01	---		
	10/5/01	---		
	3/28/02	---		
	9/30/06	24.07		
	09/14/07	26.12	nm	nc

Well Number	Date Recorded	Depth to Groundwater (feet)	TOC Elevation (feet)	Groundwater Elevation (feet)
MW-9	12/30/98	---	48.77	24.79
	3/13/99	---	48.77	29.58
	9/29/99	---	48.77	24.05
	12/29/99	---	48.77	23.45
	3/18/00	---	48.77	31.46
	7/18/00	---	48.77	25.83
	9/26/00	---	48.77	24.61
	12/28/00	---	48.77	24.29
	3/30/01	---	48.77	27.12
	10/5/01	---	48.77	23.54
	3/28/02	---	48.77	28.32
	9/30/02	---	48.77	24.11
	3/31/03	---	48.77	26.33
	6/19/03	---	48.77	25.90
	9/30/03	---	48.77	23.77
	2/10/04	---	48.77	26.64
	6/30/04	---	48.77	24.22
	9/14/04	---	48.77	23.08
	3/29/06	16.74	48.77	32.03
	6/24/06	22.43	48.77	26.34
	9/30/06	23.40	48.77	25.37
	12/11/06	22.78	48.77	25.99
	03/16/07	21.76	48.77	27.01

	09/14/07	25.50	48.77	23.27

Well Number	Date Recorded	Depth to Groundwater (feet)	TOC Elevation (feet)	Groundwater Elevation (feet)
MW-10	12/30/98	---	49.93	24.78
	3/13/99	---	49.93	29.31
	9/29/99	---	49.93	23.80
	12/29/99	---	49.93	23.23
	3/18/00	---	49.93	31.26
	7/18/00	---	49.93	25.55
	9/26/00	---	49.93	24.34
	12/28/00	---	49.93	24.03
	3/30/01	---	49.93	26.79
	10/5/01	---	49.93	23.33
	3/28/02	---	49.93	28.06
	9/30/02	---	49.93	23.88
	3/31/03	---	49.93	26.06
	6/19/03	---	49.93	25.65
	9/30/03	---	49.93	23.56
	2/10/04	---	49.93	26.39
	6/30/04	---	49.93	24.22
	9/14/04	---	49.93	23.08
	3/29/06	20.18	49.93	29.75
	6/24/06	23.87	49.93	26.06
	9/30/06	24.80	49.93	25.13
	03/16/07	23.09	49.93	26.84
	09/14/07	26.87	49.93	23.06

Well Number	Date Recorded	Depth to Groundwater (feet)	TOC Elevation (feet)	Groundwater Elevation (feet)
MW-11	12/30/98	---	unknown	24.78
	3/13/99	---		29.56
	9/29/99	---		24.03
	12/29/99	---		23.43
	3/18/00	---		31.38
	7/18/00	---		25.81
	9/26/00	---		24.58
	12/28/00	---		24.26
	3/30/01	---		27.03
	10/5/01	---		23.52
	3/28/02	---		28.31
	9/30/02	---		24.09
	9/30/06	22.58		

	09/14/07	24.72	nm	nc

Well Number	Date Recorded	Depth to Groundwater (feet)	TOC Elevation (feet)	Groundwater Elevation (feet)
MW-12	12/30/98	---	unknown	24.78
	3/13/99	---	---	29.56
	9/29/99	---	---	24.03
	12/29/99	---	---	23.43
	3/18/00	---	---	31.38
	7/18/00	---	---	25.81
	9/26/00	---	---	24.58
	12/28/00	---	---	24.26
	3/30/01	---	---	27.03
	10/5/01	---	---	23.52
	3/28/02	---	--	28.31
	9/30/02	---	---	24.09
	9/30/06	22.58	---	----
	12/11/06	23.88	---	---
	03/16/07	21.77	---	---
	06/10/07	24.06	---	---
	09/14/07	Not available		

Well Number	Date Recorded	Depth to Groundwater (feet)	TOC Elevation (feet)	Groundwater Elevation (feet)
MW-13	12/30/98	---	unknown	24.78
	3/13/99	---	---	29.56
	9/29/99	---	---	24.03
	12/29/99	---	---	23.43
	3/18/00	---	---	31.38
	7/18/00	---	---	25.81
	9/26/00	---	---	24.58
	12/28/00	---	---	24.26
	3/30/01	---	---	27.03
	10/5/01	---	---	23.52
	3/28/02	---	---	28.31
	9/30/02	---	---	24.09
	9/30/06	22.58	---	---
	12/11/06	25.33	---	---
	03/16/07	23.00	---	---
	06/10/07	25.50	---	---
	09/14/07	26.85	nm	nc

Well Number	Date Recorded	Depth to Groundwater (feet)	TOC Elevation (feet)	Groundwater Elevation (feet)
MW-14	12/30/98	---	unknown	24.78
	3/13/99	---	---	29.56
	9/29/99	---	----	24.03
	12/29/99	---	---	23.43
	3/18/00	---	---	31.38
	7/18/00	---	---	25.81
	9/26/00	---	---	24.58
	12/28/00	---	---	24.26
	3/30/01	---	---	27.03
	10/5/01	---	---	23.52
	3/28/02	---	--	28.31
	9/30/02	---	---	24.09
	9/30/06	22.58	---	---
	12/11/06	24.90	---	---
	03/16/07	22.67	---	---
	06/10/07	25.11	---	---
	09/14/07	26.56	nm	nc

Well Number	Date Recorded	Depth to Groundwater (feet)	TOC Elevation (feet)	Groundwater Elevation (feet)
MW-1A	12/30/98	---	unknown	24.64
	3/13/99			29.39
	9/29/99			23.89
	12/29/99			23.29
	3/18/00			31.25
	7/18/00			25.64
	9/26/00			24.48
	12/28/00			24.13
	3/30/01			27.02
	10/5/01			23.38
	3/28/02			28.14
	9/30/02			23.96
	9/30/06	23.03	nm	nc
	09/14/07	25.13	nm	nc

Well Number	Date Recorded	Depth to Groundwater (feet)	TOC Elevation (feet)	Groundwater Elevation (feet)
141 Farrelly	03/18/00	17.90	48.76	30.86
	09/26/00	24.66	48.76	24.10
	03/30/01	22.25	48.76	26.51
	09/30/02	25.34	48.76	23.42
	12/21/02	20.07	48.76	28.69
	06/19/03	23.55	48.76	25.21
	09/14/04	26.12	48.76	22.64
	03/16/07	22.28	48.76	26.48
	09/14/07	25.98	48.76	22.78

Table 2
Cumulative Summary of Groundwater Analytical Data

Well Number	Date Sampled	TPHg (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-Benzene (µg/l)	Total Xylenes (µg/l)
MW-1	12/31/90	51,000	2,200	1,200	<0.5	760
	1/6/95	110,000	13,000	15,000	4,800	13,000
	1/6/95	580,000	29,000	41,000	17,000	43,000
	7/6/95	49,000	8,000	17,000	1,900	9,700
	10/2/95	120,000	16,000	36,000	3,300	17,000
	10/2/95	160,000	20,000	47,000	5,000	23,000
	1/12/96	1,100,000	11,000	18,000	15,000	51,000
	1/12/96	98,000	2,100	4,600	2,500	10,000
	4/13/96	53,000	1,300	2,900	2,100	10,000
	4/13/96	58,000	820	3,600	2,800	12,000
	7/26/96	91,000	2,600	7,200	2,900	14,000
	7/26/96	67,000	2,300	5,500	2,500	11,000
	10/21/96	210,000	4,800	17,000	2,300	15,000
	10/21/96	210,000	5,400	18,000	2,600	11,000
	1/28/97	120,000	5,600	15,000	2,100	11,000
	1/28/97	130,000	5,500	15,000	2,300	12,000
	4/25/97	180,000	6,900	20,000	2,600	13,000
	4/25/97	170,000	6,500	20,000	2,500	13,000
	7/17/97	220,000	8,300	41,000	2,700	16,000
	10/21/97	240,000	9,400	33,000	3,300	22,000
	3/10/98	120,000	11,000	46,000	3,700	21,000
	6/6/98	110,000	7,600	32,000	4,800	23,000
	9/30/98	140,000	5,800	29,000	3,500	18,000
	12/30/98	78,000	5,200	24,000	3,200	19,000
	3/23/99	250,000	8,000	43,000	5,200	27,000
	9/29/99	140,000	6,100	35,000	5,400	27,000
	3/18/00	120,000	5,100	33,000	4,600	24,000
	3/20/01	100,000	3,600	41,000	4,700	25,000
	3/28/02	100,000	2,800	24,000	5,400	28,900
	3/31/03	100,000	2,200	19,000	4,900	21,000
	3/31/04	100,000	2,100	21,000	6,200	36,000
	9/14/04	160,000	1,800	16,000	5,500	30,000
	3/29/06	69,000	1,400	16,000	4,900	28,000
	09/30/06	120,000	1,400	13,000	5,200	29,000
	09/14/07	92,000	1,000	9,400	4,300	23,000

Well Number	Date Sampled	TPHg (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-Benzene (µg/l)	Total Xylenes (µg/l)
MW-2	1/6/95	980,000	9,400	5,600	19,000	42,000
	7/6/95	71,000	5,300	1,800	6,100	9,000
	10/2/95	40,000	2,900	200	2,800	3,600
	1/12/96	260,000	2,600	2,200	6,300	7,800
	4/13/96	30,000	1,900	370	2,300	2,400
	7/26/96	180,000	1,400	640	2,100	5,000
	10/21/96	62,000	2,100	<0.5	2,100	2,700
	1/28/97	46,000	1,500	94	1,800	2,000
	4/25/97	23,000	790	26	820	730
	7/17/97	95,000	2,200	<0.5	3,100	4,300
	10/21/97	31,000	2,000	<0.5	2,100	1,900
	3/10/98	19,000	730	44	820	1,000
	6/6/98	16,000	670	1,100	510	1,200
	9/30/98	24,000	600	77	680	580
	12/30/98	9,300	510	96	450	480
	3/23/99	5,700	580	9.4	400	280
	9/29/99	17,000	880	240	830	1,000
	12/29/99	11,000	800	11	860	780
	3/18/00	11,000	790	14	520	450
	7/18/00	10,000	560	27	630	530
	9/26/00	6,800	450	7.4	290	200
	12/28/00	12,000	540	30	420	330
	3/20/01	3,500	230	<10	<10	<10
	3/28/02	7,000	570	16	170	71
	3/31/03	5,000	620	<12.5	71	<25
	3/31/04	8,200	500	<12.5	65	<25
	9/14/04	9,000	560	<13	57	<25
	3/29/06	5,200	1,400	<20	52	<20
	9/30/06	4,800	900	64	22	110
	09/14/07	11,000	2,200	53	72	150

Well Number	Date Sampled	TPHg (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-Benzene (µg/l)	Total Xylenes (µg/l)
MW-3	1/6/95	740,000	11,000	2,300	8,300	28,000
	7/6/95	86,000	12,000	8,600	4,900	19,000
	10/2/95	100,000	15,000	11,000	6,000	20,000
	1/12/96	84,000	6,500	4,100	3,200	12,000
	4/13/96	48,000	7,600	3,600	2,800	9,400

	7/26/96	62,000	6,400	3,100	3,000	11,000
	10/21/96	110,000	5,400	2,400	2,500	9,800
	1/28/97	130,000	5,500	15,000	2,300	12,000
	4/25/97	180,000	6,900	20,000	2,600	13,000
	7/17/97	69,000	5,100	1,100	1,800	8,600
	10/21/97	58,000	4,300	1,300	2,100	8,000
	3/10/98	25,000	3,000	1,300	1,100	3,700
	6/6/98	52,000	4,400	1,900	2,300	6,900
	9/30/98	42,000	4,300	1,400	1,800	6,600
	12/30/98	34,000	4,200	770	2,300	9,000
	3/23/99	44,000	3,500	1,000	1,700	5,200
	9/29/99	39,000	6,000	840	2,400	8,100
	12/29/99	39,000	4,600	790	2,400	8,100
	3/18/00	21,000	3,100	550	1,400	4,100
	7/18/00	30,000	5,000	950	2,000	5,700
	9/26/00	36,000	5,300	640	2,400	9,900
	12/28/00	33,000	4,700	450	2,100	6,400
	3/20/01	21,000	2,000	260	570	3,000
	3/31/03	25,000	3,200	280	1,600	4,200
	3/31/04	11,000	1,000	940	550	1,900
	9/14/04	42,000	3,600	190	2,200	4,800
	3/29/06	7,200	180	17	460	680
	9/30/06	7,100	130	94	500	820
	09/14/07	6,700	16	44	200	400

Well Number	**Date Sampled**	**TPHg (µg/l)**	**Benzene (µg/l)**	**Toluene (µg/l)**	**Ethyl-Benzene (µg/l)**	**Total Xylenes (µg/l)**
MW-4	12/30/98	12,000	1,200	1,100	290	1,400
	3/23/99	89,000	5,900	8,700	2,000	9,200
	9/29/99	48,000	5,300	6,800	1,700	7,700
	3/18/00	44,000	4,500	7,500	2,200	11,000
	3/20/01	10,000	700	620	<10	1,900
	3/28/02	30,000	3,700	3,100	1,100	4,100
	3/31/03	25,000	2,000	2,100	820	2,900
	3/31/04	24,000	2,500	200	1,400	2,800
	9/14/04	14,000	760	550	430	1,600
	3/29/06	17,000	2,000	1,200	910	2,400
	9/30/06	4,000	440	120	240	360
	9/14/07	10,000	1,300	96	440	560

Well	**Date**	**TPHg**	**Benzene**	**Toluene**	**Ethyl-**	**Total**

Number	Sampled	(µg/l)	(µg/l)	(µg/l)	Benzene (µg/l)	Xylenes (µg/l)
MW-5	12/30/98	170	1.1	<0.5	<0.5	4.8
	3/22/99	470	3.8	0.51	2.0	<0.5
	9/29/99	1,200	13	4.2	2.7	4.2
	3/18/00	660	5.5	0.62	1.6	1.7
	3/29/06	190	<0.5	<0.5	<0.5	<0.5
	9/30/06	Dry	---	---	---	---
	9/14/07	Dry	---	---	---	---

Well Number	Date Sampled	TPHg (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-Benzene (µg/l)	Total Xylenes (µg/l)
MW-6	12/30/98	400	1.0	<0.5	<0.5	4.8
	3/22/99	390	<0.5	<0.5	<0.5	<0.5
	9/30/99	330	1.8	1.4	1.5	<0.5
	3/18/00	200	1.3	<0.5	<0.5	<0.5
	9/26/00	240	1.5	<0.5	<0.5	<0.5
	3/20/01	160	<0.5	<0.5	<0.5	<0.5
	3/28/02	88	.89	<0.5	<0.5	<0.5
	3/29/06	NS	NS	NS	NS	NS
	9/30/06	280	5.5	24	14	69
	9/14/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5

Well Number	Date Sampled	TPHg (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-Benzene (µg/l)	Total Xylenes (µg/l)
MW-8	12/30/98	2,200	70	0.94	26	15
	3/23/99	2,300	34	1.1	15	13
	9/30/99	8,800	140	<50	53	<50
	12/29/99	1,900	64	1.0	22	23
	3/18/00	1,400	36	<0.5	12	9.3
	7/18/00	3,000	67	9.8	38	38
	9/26/00	1,200	24	3.0	24	15
	12/28/00	1,200	47	3.7	17	18
	3/20/01	1,300	7.8	<2.5	<2.5	14
	10/5/01	1,800	28	<2.5	20	23
	3/28/02	1,100	12	1.7	11	10.8
	9/30/02	1,400	15	24	32	22
	9/30/06	760	4.9	31	13	64
	03/16/07	370	<0.5	8.1	0.52	0.94

	09/14/07	1,300	1.3	20	3.0	1.6

Well Number	Date Sampled	TPHg (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-Benzene (µg/l)	Total Xylenes (µg/l)
MW-9	12/30/98	25,000	23	<10	180	620
	3/23/99	27,000	35	<20	600	920
	9/30/99	42,000	140	130	1,000	1,700
	12/29/99	1,100,000	1,200	1,300	4,300	8,700
	3/18/00	17,000	89	46	10	600
	7/18/00	12,000	39	8.2	540	760
	9/26/00	11,000	19	<5	470	610
	12/28/00	22,000	100	<100	610	770
	3/20/01	8,200	40	<10	14	210
	10/5/01	77,000	<100	110	780	850
	3/28/02	11,000	34	6.1	220	180
	9/30/02	34,000	<125	140	240	370
	3/31/03	6,200	<12.5	<12.5	130	87
	9/30/03	9,700	52	<25	160	87
	9/14/04	9,500	48	<25	93	<50
	3/29/06	6,200	<0.5	<0.5	57	11
	9/30/06	2,200	3.7	31	37	40
	3/16/07	3,200	2.2	37	18	2.9
	9/14/07	2,600	1.4	28	13	3.2

Well Number	Date Sampled	TPHg (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-Benzene (µg/l)	Total Xylenes (µg/l)
MW-10	12/30/98	6,900	130	19	140	210
	3/23/99	6,600	150	33	240	170
	9/30/99	9,300	60	38	280	150
	12/29/99	5,800	87	10	420	180
	3/18/00	3,800	180	11	220	120
	7/18/00	9,100	120	33	210	130
	9/26/00	4,500	22	8.8	1.3	18
	12/28/00	3,900	55	13	98	38
	3/20/01	4,500	48	6.0	<5	23
	10/5/01	5,200	70	28	41	30
	3/28/02	7,400	45	20	210	66
	9/30/02	670	54	5.9	76	23
	3/31/03	5,700	31	38	67	27
	9/30/03	7,400	61	<50	<50	<100

	9/14/04	9,100	47	<25	51	<50
	3/29/06	6,800	140	18	270	160
	9/30/06	5,700	61	30	78	120
	3/16/07	10,000	71	15	46	25
	9/14/07	5,800	55	18	22	15

Well Number	**Date Sampled**	**TPHg (µg/l)**	**Benzene (µg/l)**	**Toluene (µg/l)**	**Ethyl-Benzene (µg/l)**	**Total Xylenes (µg/l)**
MW-11	12/30/98	80	<0.5	<0.5	0.93	1.6
	3/23/99	<50	<0.5	<0.5	<0.5	<0.5
	9/30/99	94	<0.5	<0.5	<0.5	<0.5
	3/18/00	<50	<0.5	<0.5	<0.5	<0.5
	9/26/00	<50	<0.5	<0.5	<0.5	<0.5
	3/20/01	<50	<0.5	<0.5	<0.5	<0.5
	3/28/02	<50	<0.5	<0.5	<0.5	<1.5
	9/30/06	160	1.8	12	7.6	40
	9/14/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5

Well Number	**Date Sampled**	**TPHg (µg/l)**	**Benzene (µg/l)**	**Toluene (µg/l)**	**Ethyl-Benzene (µg/l)**	**Total Xylenes (µg/l)**
MW-12	3/20/01	4,100	28	6.2	<5	16
	6/29/01	4,200	26	25	19	29
	12/21/01	5,300	9.7	<2.5	41	14
	3/28/02	4,900	20	<2.5	69	23
	6/28/02	2,600	29	<12.5	30	<25
	9/30/02	700	16	4.9	19	9.8
	09/30/06	2,100	6.2	15	16	38
	12/11/06	5,500	13	24	16	23
	3/16/07	4,900	11	24	16	8.5
	6/10/07	2,600	<2.5	<2.5	13	9.5
	9/14/07	not	available			

Well Number	**Date Sampled**	**TPHg (µg/l)**	**Benzene (µg/l)**	**Toluene (µg/l)**	**Ethyl-Benzene (µg/l)**	**Total Xylenes (µg/l)**
MW-13	3/20/01	<50	<0.5	<0.5	<0.5	<0.5
	6/29/01	<50	<0.5	<0.5	<0.5	<0.5

	10/5/01	<50	<0.5	<0.5	<0.5	<0.5
	12/21/01	<50	<0.5	<0.5	<0.5	<0.5
	3/28/02	<50	<0.5	<0.5	<0.5	<1.5
	6/28/02	<50	<0.5	<0.5	<0.5	<1.0
	9/30/02	<50	<0.5	<0.5	<0.5	<1.0
	12/21/02	<50	<0.5	<0.5	<0.5	<1.0
	09/30/06	170	2.1	13	8.1	43
	12/11/06	110	4.6	6.5	4.6	17
	3/16/07	<50	<0.5	<0.5	<0.5	<0.5
	6/10/07	54	0.80	0.84	1.3	5.4
	9/14/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5

Well Number	**Date Sampled**	**TPHg (µg/l)**	**Benzene (µg/l)**	**Toluene (µg/l)**	**Ethyl-Benzene (µg/l)**	**Total Xylenes (µg/l)**
MW-14	3/20/01	200	<0.5	<0.5	<0.5	<0.5
	6/29/01	660	<0.5	<0.5	<0.5	4.6
	10/5/01	770	1.7	1.5	0.91	8.3
	12/21/01	1,500	3.1	13	1.9	22
	3/28/02	390	1.7	<0.5	<0.5	0.74
	6/28/02	120	<0.5	<0.5	<0.5	<1
	9/30/02	210	<0.5	1.7	<0.5	1.1
	12/21/02	53	<0.5	<0.5	<0.5	<1.0
	09/30/06	210	2.5	15	9.1	48
	12/11/06	190	6.7	9.9	5.4	19
	3/16/07	<50	<0.5	1.1	<0.5	<0.5
	6/10/07	73	1.1	1.3	1.8	7.2
	9/14/07	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5

Well Number	**Date Sampled**	**TPHg (µg/l)**	**Benzene (µg/l)**	**Toluene (µg/l)**	**Ethyl-Benzene (µg/l)**	**Total Xylenes (µg/l)**
MW-1A	5/30/97	12,000	18	8.7	90	540
	12/30/98	51	<0.5	<0.5	<0.5	<0.5
	3/23/99	1,800	4.0	<0.5	3.0	7.5
	3/23/99	2,200	10	0.52	3.1	7.1
	9/30/99	13,000	63	26	30	72
	3/8/00	6,100	36	<5	9.7	45
	9/26/00	11,000	14	<5	65	150
	3/20/01	4,800	30	6.0	<5	7.0
	10/5/01	15,000	76	41	36	140
	3/28/02	9,300	35	<12.5	17	32

	9/30/02	23,000	<50	63	77	230
	9/30/06	2,500	4.1	25	22	49
	3/16/07	1,800	1.8	17	6.4	4.4
	9/14/07	1,500	1.1	15	2.8	1.8

Well Number	**Date Sampled**	**TPHg (µg/l)**	**Benzene (µg/l)**	**Toluene (µg/l)**	**Ethyl-Benzene (µg/l)**	**Total Xylenes (µg/l)**
141 Farrelly	4/6/96	<50	<0.5	<0.5	<0.5	<0.5
	10/2/99	<50	<0.5	<0.5	<0.5	<0.5
	3/18/00	<50	<0.5	<0.5	<0.5	<0.5
	7/13/00	<50	<0.5	<0.5	<0.5	<0.5
	9/26/00	<50	<0.5	<0.5	<0.5	<0.5
	12/29/00	<50	<0.5	<0.5	<0.5	<0.5
	12/21/01	<50	<0.5	<0.5	<0.5	<0.5
	9/30/02	<50	<0.5	<0.5	<0.5	<1.0
	12/21/02	<50	<0.5	<0.5	<0.5	<1.0
	6/19/03	<50	<0.5	<0.5	<0.5	<1.0
	9/14/04	<50	<0.5	<0.5	<0.5	<1.0
	3/16/07	<50	<0.5	<0.5	<0.5	<0.5
	9/14/07	<50	<0.5	<0.5	<0.5	<0.5

Table 3
Suggested Corrective Action Goals for Constituents of Concern

CONSTITUENT	GROUNDWATER (ug/L)	Ref. CRWQCB-SF, 2005
TPH as Gasoline	5,000	Table I-2
Benzene	1,900	Table E-1a*
Toluene	380,000	Table E-1a
Ethylbenzene	170,000	Table E-1a
Xylenes	160,000	Table E-1a

* - Low/moderate permeability soil between groundwater and point of vapor intrusion; reduces to 540 ug/L if ‘high’ permeability separation is assumed.

Table 4
SUMMARY OF COMPARISONS FOR REMEDIAL ALTERNATIVES
German Autocraft Fuel Leak Core Area Remediation
301 East 14th Street, San Leandro, California

COMPONENT	**ALTERNATIVE A** MONITORED NATURAL ATTENUATION	**ALTERNATIVE B** EXCAVATE PLUS OFF-SITE DISPOSAL	**ALTERNATIVE C** DUAL-PHASE VAPOR & GROUNDWATER EXTRACTION	**ALTERNATIVE D** ENHANCED AEROBIC BIOREMEDIATION
Implementation Cost	$5,000-$10,000	$850,000-$900,000	$155,000-$175,000	$95,000-$110,000
Operating + Mon. Cost	$750,000-$800,000	$15,000	$290,000-$350,000	$195,000-$250,000
Total Estimated Costs	$755,000-$810,000	$865,000-$915,000	$445,000-$525,000	$290,000-$360,000
Timeline (from date of final regulatory/USTCF approval)	Immediate implementation; residual petroleum impacts will persist in ground for decades, cost figures assume 50 years	One month to prepare for ground breaking followed by a few weeks for the excavating, offhauling & CDF backfilling	1-3 months to acquire permits and complete installation; 18 month operational period assumed for cost estimate	1-2 months to complete installation; 4 year operational period assumed for cost estimate
Site Use Impacts Or Constraints	No site disruptions; quarterly well sampling as most; health risk levels may preclude a residential type of future land use	Significant disruption to site business, would need to be shutdown; significant truck & equipment traffic on Garcia Ave; some noise	Need small area for equipment; need to install several wells & buried piping; system generates constant noise	Need small area for equipment; need to install many well pts & buried piping; compressor generates noise
Benefits	Lowest initial cost; least disruptive	Very quick process fully accepted by regulatory agencies; thoroughness is readily verifiable; effective for clayey soils	Can remediate petroleum under site improvements & immediately adjacent zones; odors controlled; proven mass removal	Very little disruption once installed; relatively low cost; easy to adapt to more aggressive approach if needed
Effectiveness Concerns and Overall Risks	Contaminants likely to continue to be slow to degrade, especially in core area;	Inaccessible contamination under bldg and/or Garcia Ave continues to cause elevated groundwater impacts; fugitive emissions	Subsurface vapor circulation problems; clayey soil lessens effectiveness; may need to run longer than anticipated	Inadequate distribution of air; too much residual fuel mass to activate aerobic degraders; vapor short-circuiting; may need to run longer than anticipated
Summary	Will not achieve acceptable reductions in reasonable timeframe	Too disruptive to active site and most costly of three pro-active alternatives	Most cost-effective approach for mass reduction at developed site	Fairly inexpensive but lowest success confidence of 3 pro-active options

Figures

Groundwater Cleaners, Inc.
Cleaning California from the Groundwater up
347 Frederick Street, San Francisco, California 94117
(415) 665-6181

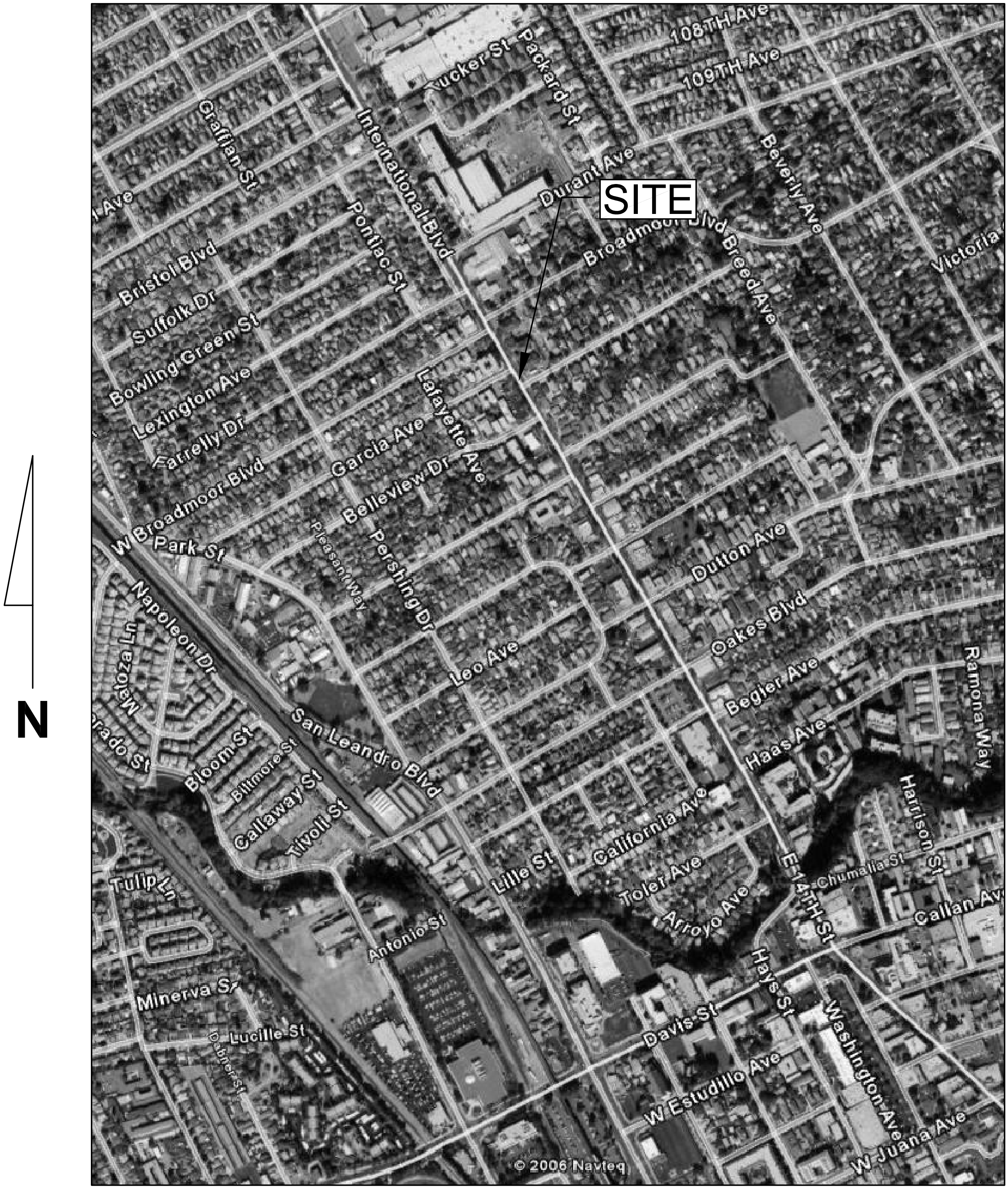
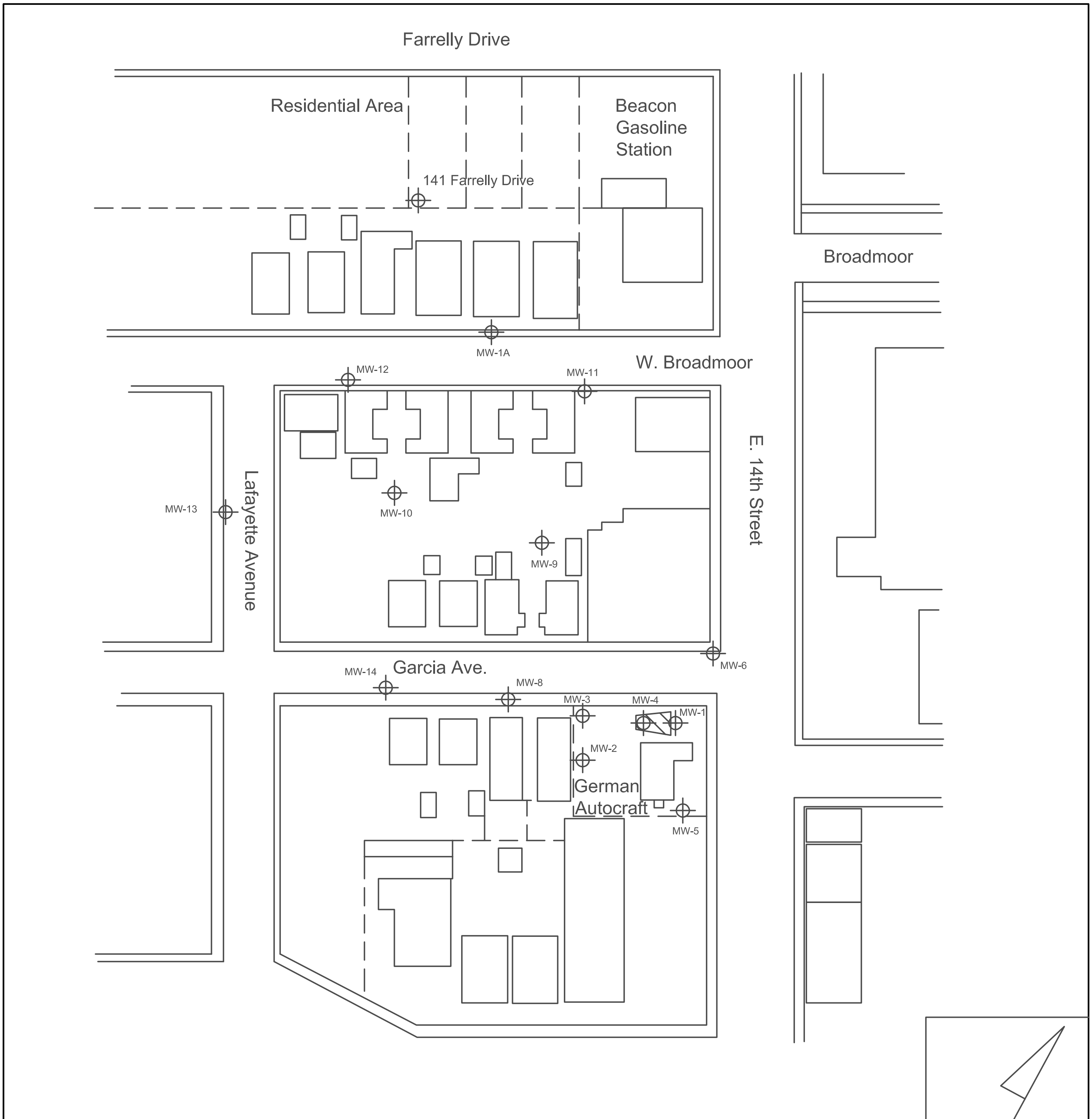


Image from Google ©2006

Groundwater GWC Cleaners Inc. *Cleaning California from the Groundwater Up* 347 Frederick Street, San Francisco, California, 94117 (415) 665-6181	German Autocraft 301 East 14th Street San Leandro, California	Figure 1 Rev. B
	Site Area Map	10.01.06



EXPLANATION:

0' 60' 120'

Scale: 1"=120'

Streets/Buildings

Groundwater Monitoring Well

Former Tank Pit Areas

Buildings

N

Groundwater GWC Cleaners Inc.

Cleaning California from the Groundwater Up

347 Frederick Street, San Francisco, California, 94117

(415) 665-6181

German Autocraft
301 East 14th Street
San Leandro, California

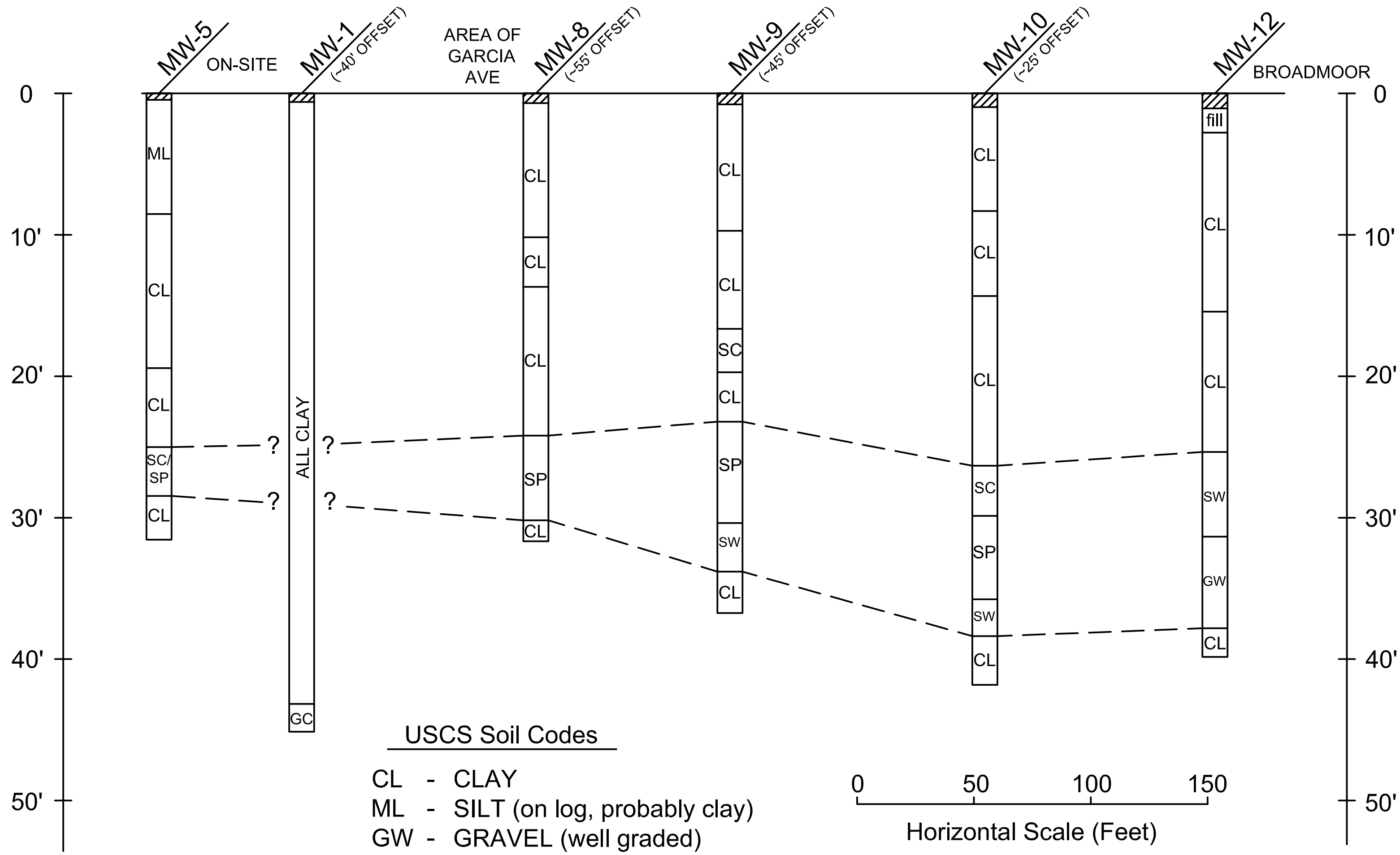
Generalized Site Map

Figure 2

Rev. B

09.27.06

Geologic Cross-Section

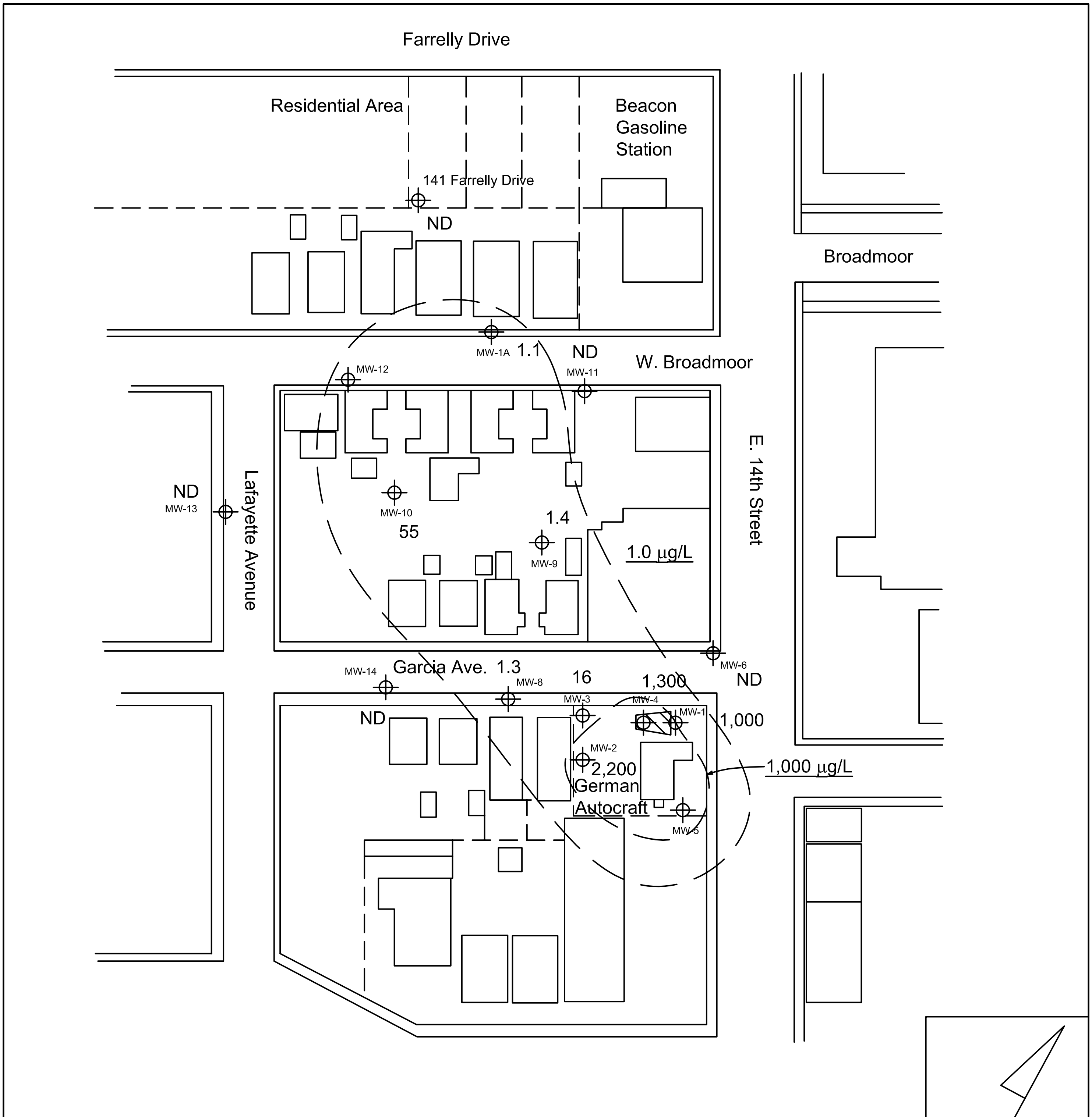


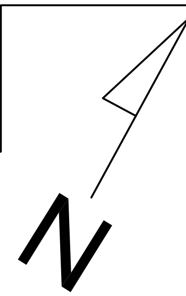
USCS Soil Codes

CL - CLAY
ML - SILT (on log, probably clay)
GW - GRAVEL (well graded)
SC - CLAYEY SAND
GC - CLAYEY GRAVEL
SP - SAND (poorly graded)
SW - SAND (well graded)

0 50 100 150
Horizontal Scale (Feet)

Groundwater Cleaners Inc. *Cleaning California from the Groundwater Up* 347 Frederick Street, San Francisco, California, 94117 (415) 665-6181	German Autocraft 301 East 14th Street San Leandro, California	Figure 3 Rev. B
	Fuel Leak	12.01.07





EXPLANATION:

55	micrograms per literbenzene in groundwater
—	Streets/Buildings
⌖	Groundwater Monitoring Well
▨	Former Tank Pit Areas
□	Buildings

0' 60' 120'

Scale: 1"=120'

Notes:
MW-5 Dry.
MW-12 Not accessible.

Groundwater GWC Cleaners Inc.
Cleaning California from the Groundwater Up
347 Frederick Street, San Francisco, California, 94117
(415) 665-6181

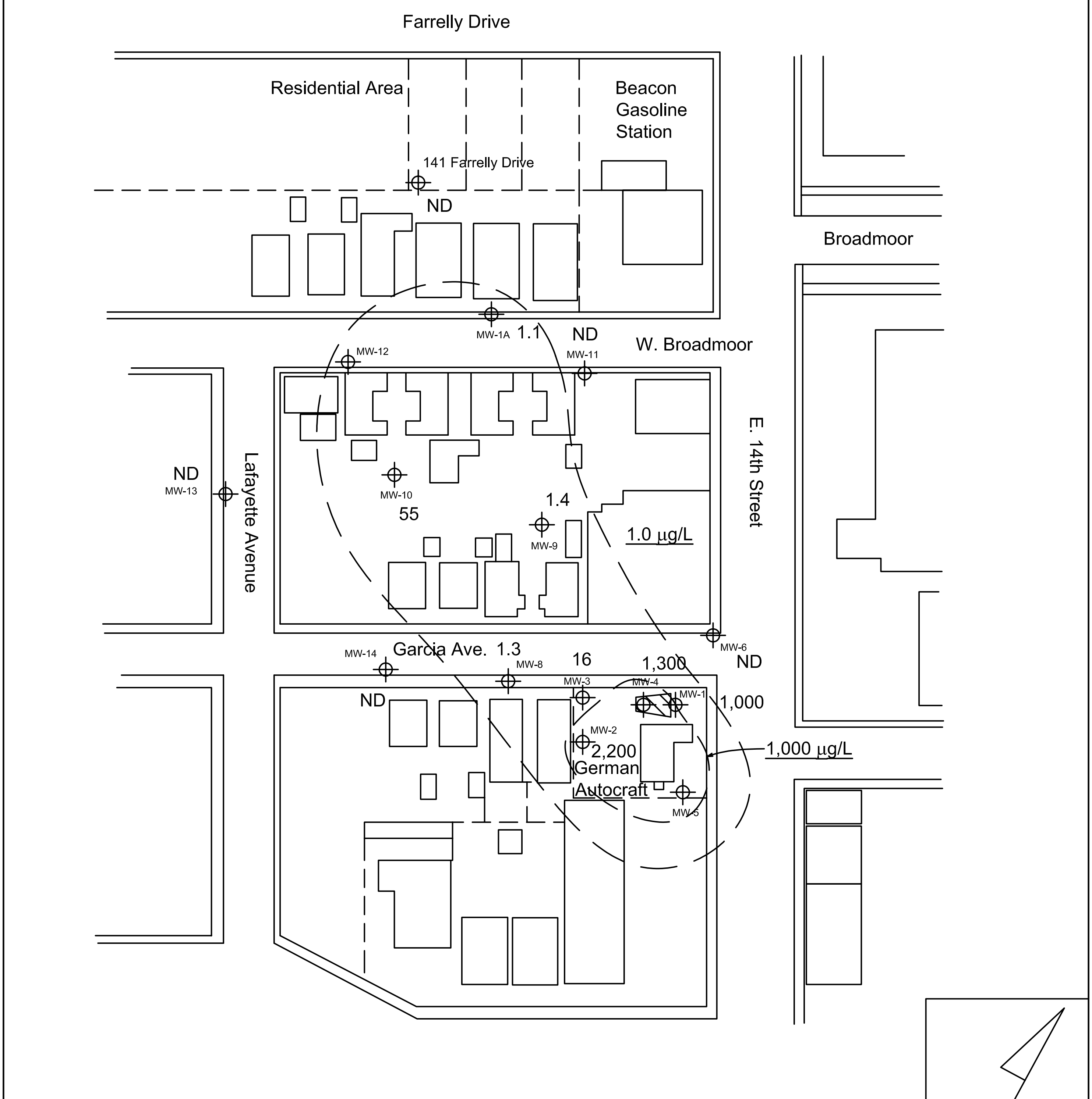
German Autocraft
301 East 14th Street
San Leandro, California

Contaminant-Affected Area

Figure 4

Rev. B

09.14.07



EXPLANATION:

0' 60' 120'

Scale: 1"=120'

Streets/Buildings

Groundwater Monitoring Well

Former Tank Pit Areas

Buildings

Notes:
MW-5 Dry.
MW-12 Not accessible.

Groundwater Cleaners Inc.

Cleaning California from the Groundwater Up

347 Frederick Street, San Francisco, California, 94117

(415) 665-6181

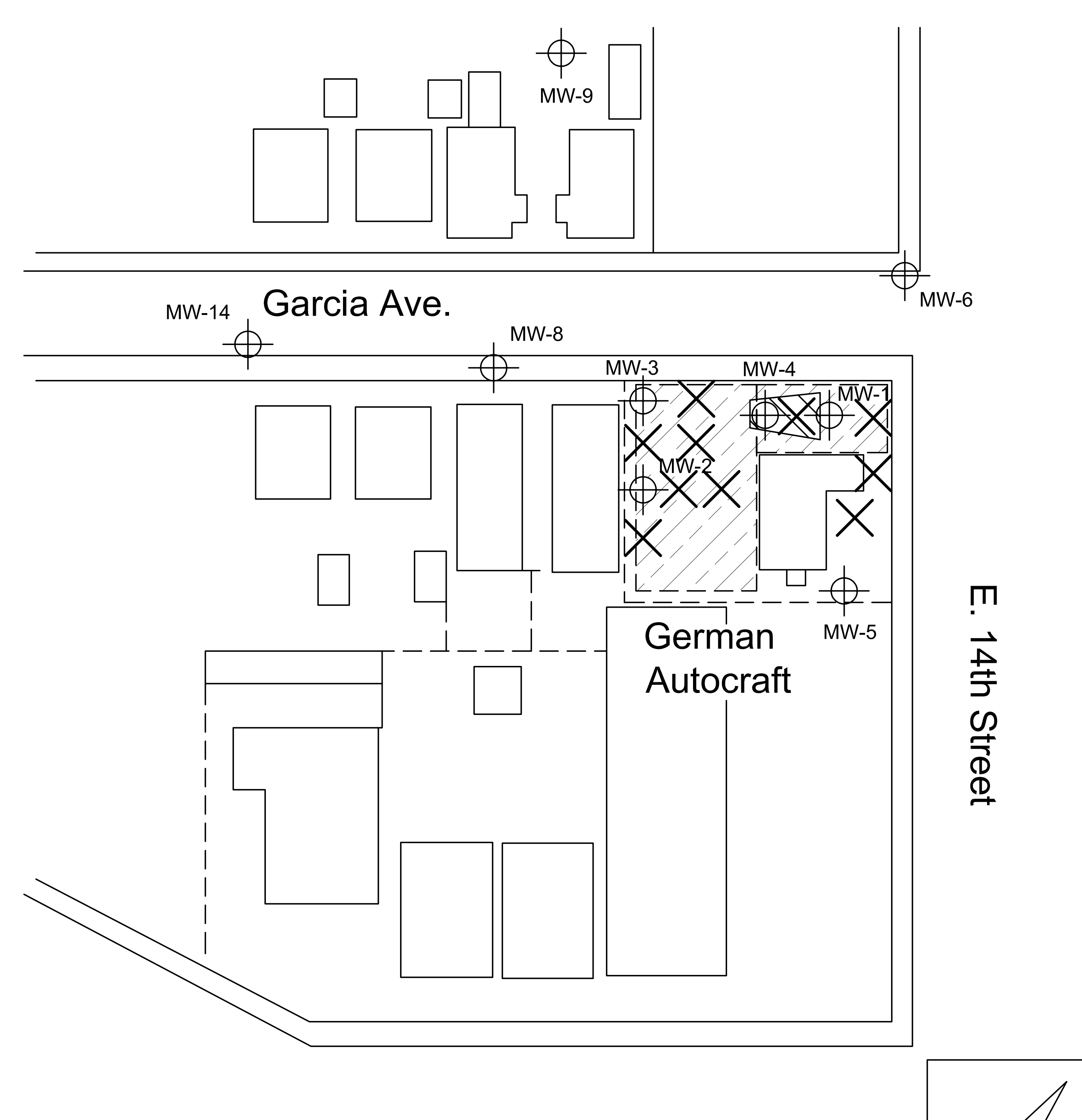
German Autocraft
301 East 14th Street
San Leandro, California

Benzene in Groundwater (µg/L)

Figure 5

Rev. A

09.14.07



EXPLANATION:

0' 30' 60'

Scale: 1"=60'

Streets/Buildings

Groundwater Monitoring Well

Former Tank Pit Areas

Buildings

Area for Excavation

New Extraction / Sparge Wells

N

Groundwater Cleaners Inc.

Cleaning California from the Groundwater Up

347 Frederick Street, San Francisco, California, 94117

(415) 665-6181

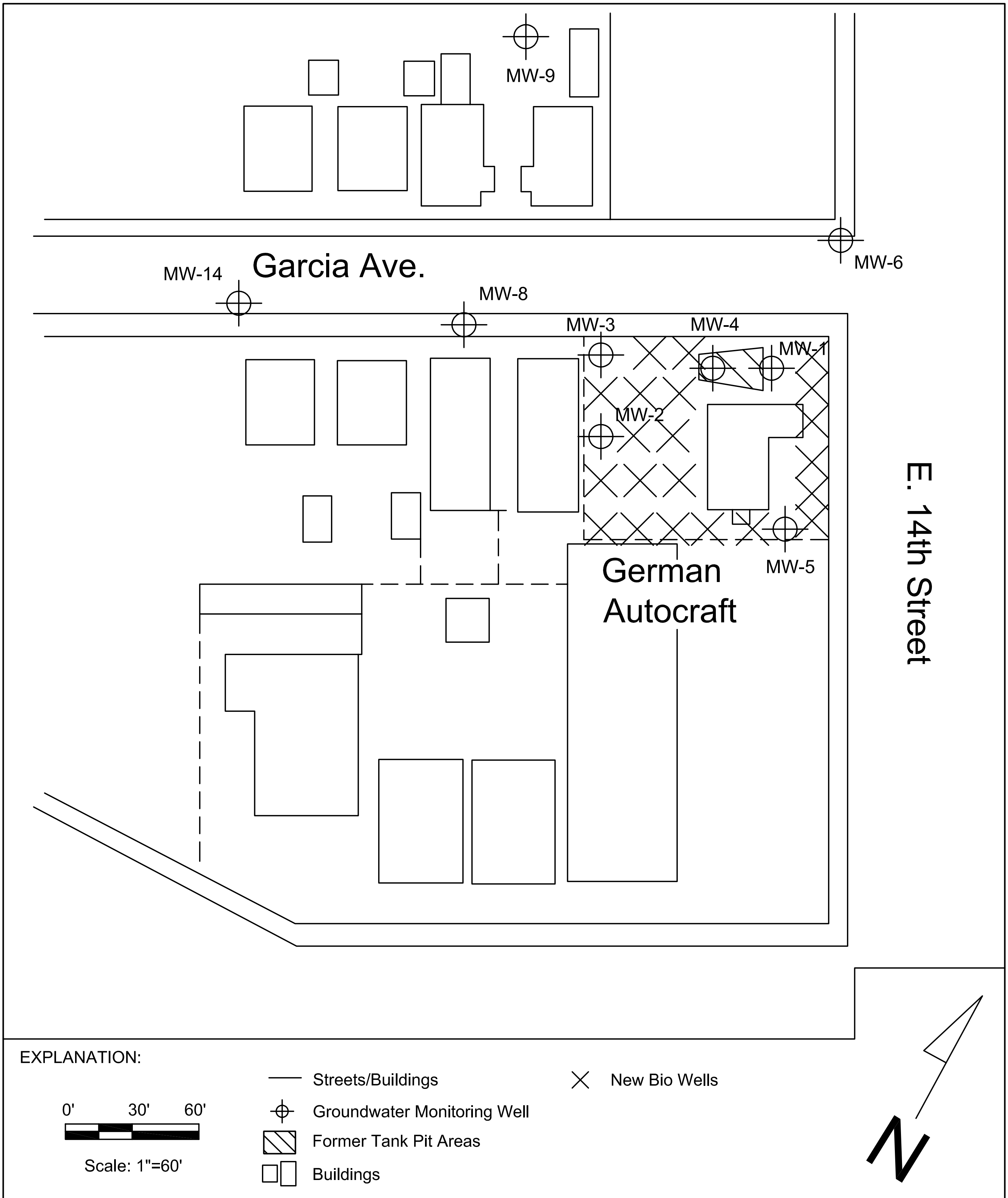
German Autocraft
301 East 14th Street
San Leandro, California

Site Detail for Conceptual HVDPE and Air Sparging Well Array

Figure 6

Rev. A

09.12.07



Groundwater Cleaners Inc.
Cleaning California from the Groundwater Up
347 Frederick Street, San Francisco, California, 94117
(415) 665-6181

German Autocraft
301 East 14th Street
San Leandro, California

Site Detail for Conceptual Aerobic Bioremediation Well Array

Figure 7
Rev. A
12.01.07