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By loprojectop at 3:58 pm, Mar 31, 2006

March 23, 2006

Rita and Tony Sullins
Don Sul Inc.
187 North L Street
Livermore, CA 94550

Re: Transmittal Letter
Site Location: Arrow Rentals
187 North L Street, Livermore, CA 94550

Dear Mr. Wickham:

On behalf of Rita and Tony Sullins, Don Sul Inc., Geological Technics Inc. (GTI) prepared the Record of Findings, Mass Calculations Report dated March 23, 2006 that was sent to your office via US Mail on March 28, 2006.

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

Respectfully submitted,



Rita Sullins
Property Owner
Don Sul Inc.
187 North L Street
Livermore, CA 94550

Geological Technics Inc.

1101 7th Street
Modesto, CA 95354
209.522.4119
209.522.4227 (fax)
gti@geologicaltechnics.com

RECEIVED

By lopprojectop at 3:59 pm, Mar 31, 2006

March 27, 2006

Mr. Jerry Wickham
Alameda County Health Care Services Agency
Environmental Health Services
1131 Harbor Bay Parkway
Suite 250
Alameda, CA 94502-6577

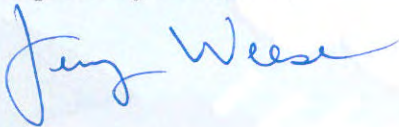
RE: Arrow Rentals, 187 North L Street, Livermore, Case No. RO0000394

Dear Mr. Wickham,
Geological Technics Inc. (GTI) has been contracted by Mr. and Mrs. Sullins to be their environmental consulting company. On behalf of the Sullins, we have reviewed multiple historical reports and documents and would like to respectfully submit the enclosed report of findings dated March 23, 2006.

In this report, we are requesting two things; 1) submit a workplan addendum to clarify uncertainties and recommend some changes, 2) request an extension to allow for the workplan addendum and approval time.

We look forward to your response and building a proactive working relationship with both you and the Sullins. Please feel free to give us a call if you have any questions or need further clarification. Joe Angulo is the project geologist and Ray Kablanow is our Professional Geologist. They can both be reached at 209-522-4119. I am also available for any administrative or project coordination questions.

Respectfully Submitted,



Jenny Weese
Office Manager
Geological Technics Inc.
1101 7th Street
Modesto, CA 95354
jweese@geologicaltechnics.com



Geological Technics Inc.

1101 7th Street
Modesto, California 95354
(209) 522-4119 / Fax # 522-4227

March 23, 2006

Project No.: 1262.2
Project Name: Sullins Property (L St.)

Tony & Rita Sullins
Arrow Rentals Service
187 North L Street
Livermore, CA 94550

RE: Report of Findings
Arrow Rentals, 187 North L Street, Livermore, CA

Dear Mr. and Ms. Sullins:

Gasoline and diesel range petroleum hydrocarbons associated with underground storage tank (UST) systems have been documented in soil and groundwater at the above subject site (see Figures 1 and 2 for vicinity and site maps). The site also experienced an environmental impact when a gasoline delivery was introduced into a subsurface vapor/monitoring well rather than the UST fill pipe ("Pitcock Release"). Geological Technics Inc. (GTI) has reviewed the documents you supplied and will comment on our findings below.

In their December 27, 2005 letter correspondence the Alameda County Environmental Health (ACEH) directed that a Site Conceptual Model (SCM) be developed for the site. This document would serve as a guidance document for establishing the current status of the site investigation and future direction for data gaps or remediation needs. Past site investigations have consisted primarily of soil vapor surveys, soil borings with associated soil samples and groundwater samples from those borings completed as monitoring wells.

GTI does not believe an accurate SCM can be adequately prepared at this time due to the temporal and spatial variations in the historical groundwater and soil data points. The original USTs removal and gasoline discharge occurred prior to 1985 but the first site investigation activities occurred in 1988 or later. Three primary documents were reviewed to glean details regarding the distribution of gasoline in the subsurface and to develop illustrative diagrams:

- 1) Soil and Groundwater Characterization Study, Woodward-Clyde Consultants, June 12, 1991;
- 2) Semiannual Groundwater Monitoring Report, Aquifer Sciences Inc., May 27, 2004.
- 3) Request for Case Closure, Aquifer Sciences Inc, August 8, 2005.

These documents contain the historical soil and groundwater laboratory data in table format. In their 1991 report, Woodward-Clyde Consultants (WWC) included cross sections of contaminant distribution that are included in Appendix A. Their diagrams show a localized core of gasoline soil contamination in the vicinity of W-1, with a second plume in the vicinity of boring B-1A. The two plumes are presented as being from two separate releases by WWC: one from pipeline leak(s) from older USTs systems and one from the Pitcock Release. GTI has the following concerns regarding the WWC interpretation of the plumes:

- 1) In their report's Evaluation of Mitigation Measures, Soil Excavation section (page 17) WWC states "Soil contaminated with gasoline extends to a depth of 43 feet in W-1 and B-1A where the groundwater table is encountered...the soil contamination is assumed to extend laterally from W-1 in a 25 foot radius...It is anticipated that significant contaminated soil (>100 ppm TPH) will be found under the existing tank...extend 35 to 43 feet under tank...extend out about 20 feet"

Discussion: The soil samples from B-1A should have shown the effects of the Pitcock Spill due to the boring's proximity to the vapor well & UST. But the soil samples from 10 to 35 feet below grade surface (bgs) were non-detect for TPH-G (elevated detection limits of 10 mg/kg noted, but text states ND <5 ppm?). WWC stated that water was poured into the vapor well and this could account for a "washing" of the soil. The time and gallonage presented in the report are an assumption and it is unlikely with documented clays and silts in the predominant gravelly soils that no trace would remain at shallow depths. WWC's statement that significant (>100 ppm TPH) soil will be found under the tank contradicts their Figure 5 drawing in which only the 350 mg/kg at 40 feet is noted. It is likely that the soil column in the area of the vapor well contains significantly more TPH-G than the samples from B-1A revealed.

UST schematic included in Appendix A.

- 2) In Figure 7, Cross Section detail B-B' the soil plume is shown in limited extent laterally from well W-1.

Discussion: W-1 was placed in the down gradient location of the Pitcock release. Significant soil contamination was discovered in this borehole at depths extending from 15 -55 feet bgs. The soil plume is therefore centered on this boring as a piping release location. Borings B-1, B-2 and B-3 were placed in or adjacent to former UST excavations in the central portion of the site. The soil samples from these borings were only taken at a maximum depth of 25 feet bgs and in each case the 25 foot sample contained detectable TPH-G – 220, 1.7 and 1.3 mg/kg, respectively for the three boreholes. It is not known why these boreholes were not advanced deeper or why subsequent investigations did not define the vertical extent of the plume in these locations. It is possible that the USTs were the source of these detections and that significant contamination remains undefined in these areas. If a lithologic factor is responsible for lateral dispersion at 25 feet bgs then the plume could be much greater than depicted by WWC. In any case, the plume shown

on cross section B-B' should have been laterally extended to the base of B-3 but it isn't as depicted.

- 3) In Figure 7, Cross Section detail B-B' the soil plume is shown in limited extent laterally from well W-1.

Discussion: The soil plume in Figure 7 does not extend laterally to the location of boring B-7 that was placed adjacent to the dispenser island at the northwest corner of the parcel. Boring B-H was installed adjacent to the dispenser island in 1992 (and after the WWC 1991 report). Like borings B-1, B-2 and B-3, the soil samples from B-H were non-detect at shallow depths from 4.5 to 21 feet bgs. But the 26, 31, and 36 feet bgs samples contained 160, 1900 and 8000 mg/kg TPH-G, respectively. It is probable that the soil contamination present in these locations is from water table fluctuation smear. GTI notes that in the WWC report it is stated that groundwater has varied from 20 to 40 feet bgs, and in the Aquifer Sciences Inc. May 2004 report, depth to groundwater was approximately 30 feet bgs. This represents a potential smear height of over twenty feet in which hydrocarbons can become entrained in the soil matrix.

- 4) In Figure 4, Cross Section detail A-A', 4" of free product in well W-1. The report text states (page 16) "thickness...4 inches...estimated diameter of floating product of 25 feet...soil porosity of 40%... 200 to 500 gallons of gasoline could be floating on the groundwater at W-1."

Discussion: At the time of the WWC investigation, 1991, four inches of free product was noted in well W-1. In 1988, well W-1 contained 210,000 ug/l TPH-gasoline and 300,000 ug/l TPH-diesel. In 1997 (nine years later), well W-1s (located a few feet from W-1) contained 650,000 ug/l TPH-gasoline and 180,000 ug/l TPH-diesel. WWC's report contains detailed analysis to suggest that the origin of the free product in 1991 was from the Pitcock Release. This assertion aside, the high concentrations of petroleum hydrocarbons present indicate that significantly more contamination is present than the free product attributed to the Pitcock Release. WWC presents a scenario in which the 600 gallon gasoline release could have been flushed by water flushing into the vapor well. With the water transport mechanism, natural attenuation and groundwater movement the plume could have migrated to the W-1 location in the 1985-1991 period. But the magnitude of the TPH-G and TPH-D present in the well in 1988 suggests that free product was already present. The fact that high levels of TPH-G and TPH-D persisted up to 1997 indicates that either significantly more contamination is entrained in soil or the transport/biodegradation rates are much slower than WWC estimates. Another concern with the WWC scenario is that the same water flushing into the vapor well could also caused the plume to migrate vertically beyond the bottom of the screened intervals of the wells. The vertical extent of the plume remains undefined. (It is noted that the diesel contamination did not appear to be an issue and it is not mentioned in the report's "Executive Summary" or "Summary of Conclusions" sections)

- 5) Tracer Research Corporation Report, Appendix A. The report's conclusion section (page 7) states "...depicting a small plume just above the level of significance...the highest concentrations of total hydrocarbons...located near the north corner of the office building."

Discussion: *The contour map included with the soil vapor survey report shows the highest concentration in the northeast portion of the site. As stated in #3 above, TPH-G was present at depth in boring B-H installed adjacent to the former dispenser island. The plume is not shown as extending to this area on the WWC cross section. The vapor survey is another indicator that more contamination is present in this area than what was interpreted by WWC.*

- 6) WWC concludes that 85% of the gasoline impacted soil contamination is from the UST system releases and 15% is from the Pitcock Release. WWC bases this ratio on the estimated volume of impacted soil present in the two plumes illustrated on their cross sections. (It is noted that no calculations for how these numbers were derived are included in the report)

Discussion: *GTI has concerns with this conclusion for the following reasons -*

- *As outlined above, the nature of the contaminant distribution in shallow borings beneath the former USTs and dispenser suggests that additional TPH-G is present at depth outside the plume boundaries depicted by WWC;*
- *The volumetric basis is faulty for the following reason: 2000 cubic yards is estimated as the volume of the UST releases and 350 cubic yards estimated as the Pitcock release for a $[2000/(2000+350) \text{ to } 350/(2000+350) = 85\% \text{ to } 15\% \text{ ratio}]$. However, the concentrations in the UST soil plume are much higher than those in the Pitcock plume as shown in the following table [using 1/2 detection limit for non-detect in B-1A]:*

Depth	TPH-G (mg/kg)	
	W-1	B-1A
15'	1200	
20'	350	
25'	490	
30'	160	<10
35'	370	<10
40'	16000	350
avg:	514	120

- *The 16,000 mg/kg data point is shown as overlapping in both plumes and is therefore not used in the averages for the plumes. If these average concentrations are used in a unitless volume to mass conversion then:*

UST plume	Petcock release
2000 x 514 mg/kg = 1,028,000 mg/kg	350 x 120 mg/kg = 42,000 mg/kg
$1,028,000 \div (1,028,000 + 42,000) =$	$42,000 \div (1,028,000 + 42,000) =$
0.96 or 96%	0.039 or 4%

- *This illustrates that using the concentrations within the soil plumes will result in a calculation which shows that 96% of the mass in the soil plumes is related to the UST release and only 4% can be attributed to the Pitcock release.*

GTI used the historical data to produce contaminant distribution diagrams for the site. In Figure 3 the soil plume is shown as an ellipsoid extending from the former USTs in the southwest to the dispenser island in the northeast. The plume was extended beyond the 25' radius centered on W-1 as presented by WWC due to the concerns noted above. Figure 3 also contains the site's cross section and borehole locations (adapted from the above reports, locations are approximate). Figures 4 and 5: Cross Section A-A' & Cross Section B-B' illustrate the soil laboratory data superimposed on the subsurface adjacent to the respective borings (locations approximate, well W-1 construction not known.) GTI has divided the soil profile into 5 zones each with a thickness of five feet and vertically centered on the five foot sampling interval used in the investigation. The mass balance for this total plume was determined by multiplying the volume of soil within each zone by an assumed density of 125 lb/ft³ (from literature for "GM" silty gravel) and then by the average concentration of contamination in each zone. The calculations are presented in Table 1 in Appendix B.

The groundwater plume was plotted in similar fashion for the data obtained from the first sampling event conducted in 1988 from wells W-1, W-2 and W-3. Figure 6 shows the plume centered in the area of W-1 and then attenuating laterally to the locations of W-2 and W-3. For determining the mass of this plume GTI assumed a vertical extent of ten feet for the plume and used CAD software to determine the area within each contour (zone) in Figure 6. The volume of each zone was then multiplied by an assumed porosity of 40% (from WWC) and then by the average concentration of contamination in each contour (zone). The calculations are presented in Table 1 in Appendix B.

GTI's calculations show that there was a total of 32,026 kg or 11,390 gallons of TPH-G in soil and groundwater based on the data utilized for the calculations. This suggests that the 600 gallon Pitcock release is much less than the 15% of the total plume because 600 gallons is only about 5% of the estimated 11,390 total gallons present. The actual value would be even less considering GTI calculations do not include: impacted soils above 17.5 feet bgs around USTs and piping runs, the diesel mass and the vertical extent of the plumes below the water table.

As stated above GTI does not believe a SCM can be adequately prepared at this time. In response to the Aquifer Sciences Inc. (ASI), August 8, 2005 request for site closure the ACEH issued an August 16, 2005 letter response. In their letter the ACEH stated that the

vertical extent of the soil and groundwater contamination is undefined. The ACEH stated that benzene concentrations from April 2004 (3,400 ug/l in W-1) exceeds the California Maximum Contaminant Level (MCL) of 1 ug/l. They also requested additional data including: wells screens shown on cross sections, lead scavenger investigation, vapor well data, etc. ASI developed their December 8, 2005 "Work Plan for Additional Soil and Groundwater investigation and Other Items" for submittal to ACEH. The work plan includes provisions for advancing four additional soil borings at the site to a depth of 75 feet bgs. Based on GTI's analysis of the data the work plan's boring locations will not fully define the extent of the contamination to the northeast and southwest of WWC interpretation of the plumes.

We have two other issues of note regarding the proposed/approved ASI work plan that need to be cleared up:

1. The ACEH August 16, 2005 letter "encouraged" that a SCM be developed for the site (page 3). But in a later sentence the ACEH stated that "The SCM for this project **shall** incorporate...the following" (boldface added by GTI). This suggests that ACEH was mandating the development of a SCM. In their work plan, ASI states that a discussion with ACEH staff will occur after the investigation to determine if an SCM is warranted.
2. The ACEH August 16, 2005 letter directed that a Corrective Action Plan (CAP) be prepared with three alternatives for restoring groundwater to beneficial uses. The ASI work plan states that they do not know if corrective action will be necessary so it will be deferred until after the site investigation is completed.

Conclusions & Recommendations

Based on our review and interpretation of the data supplied by the client, GTI has reached several conclusions. These conclusions are based on the premise that the data we considered, although incomplete, are representative of actual site conditions. We acknowledge that there may be undiscovered conditions, which would upon their consideration, change our interpretation and thus our conclusions.

Conclusions:

- There are two separate sources of gasoline contamination at the site and apparently one source of diesel, although not as well documented.
- Previous investigative efforts did not fully define the lateral and vertical extent of the contamination.
- Because of the lack of contamination definition, the basis on which the contaminant quantity is attributed to the two releases is imperfect.
- The groundwater table has experienced large fluctuations in elevation (at least 20 ft) resulting in a large smear zone of contamination in soil at the site.
- The status of the existing monitoring wells is not certain.
- Beyond purging monitoring wells, it does not appear that any remedial action has taken place to correct the contamination problem.

Our recommendations are based on our knowledge of site conditions, and on the state and limitations of subsurface investigative technology.

Recommendations:

- In order to stay in compliance with regulatory directives an extension for the submittal of reports and completion of approved work plans should be requested from ACEH. We suggest that a 45 day extension be requested.
- A new work plan to supplement the ASI December 8, 2005 “Work Plan for Additional Soil and Groundwater Investigation and Other Items” should be developed. The new work plan should address the uncertainties noted above and include provisions for reporting future field work in a SCM and should include a pilot test for soil vapor extraction/air sparging to address remedial alternatives.
- Based on the preliminary contaminant mass estimate calculations presented above, we recommend that the UST Cleanup Fund Program should be petitioned to re-evaluate the 85%/15% cost assignment to the two gasoline releases.

Thank you for choosing Geological Technics Inc. and do not hesitate to call if you have questions or need clarification.

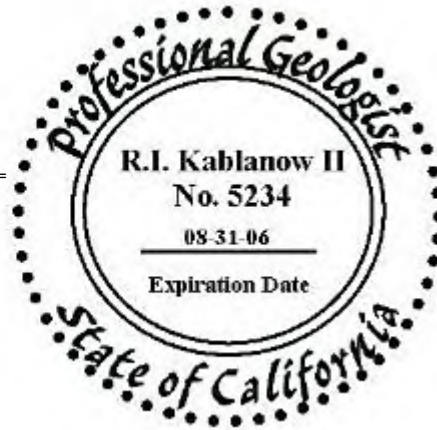
Respectfully Submitted,

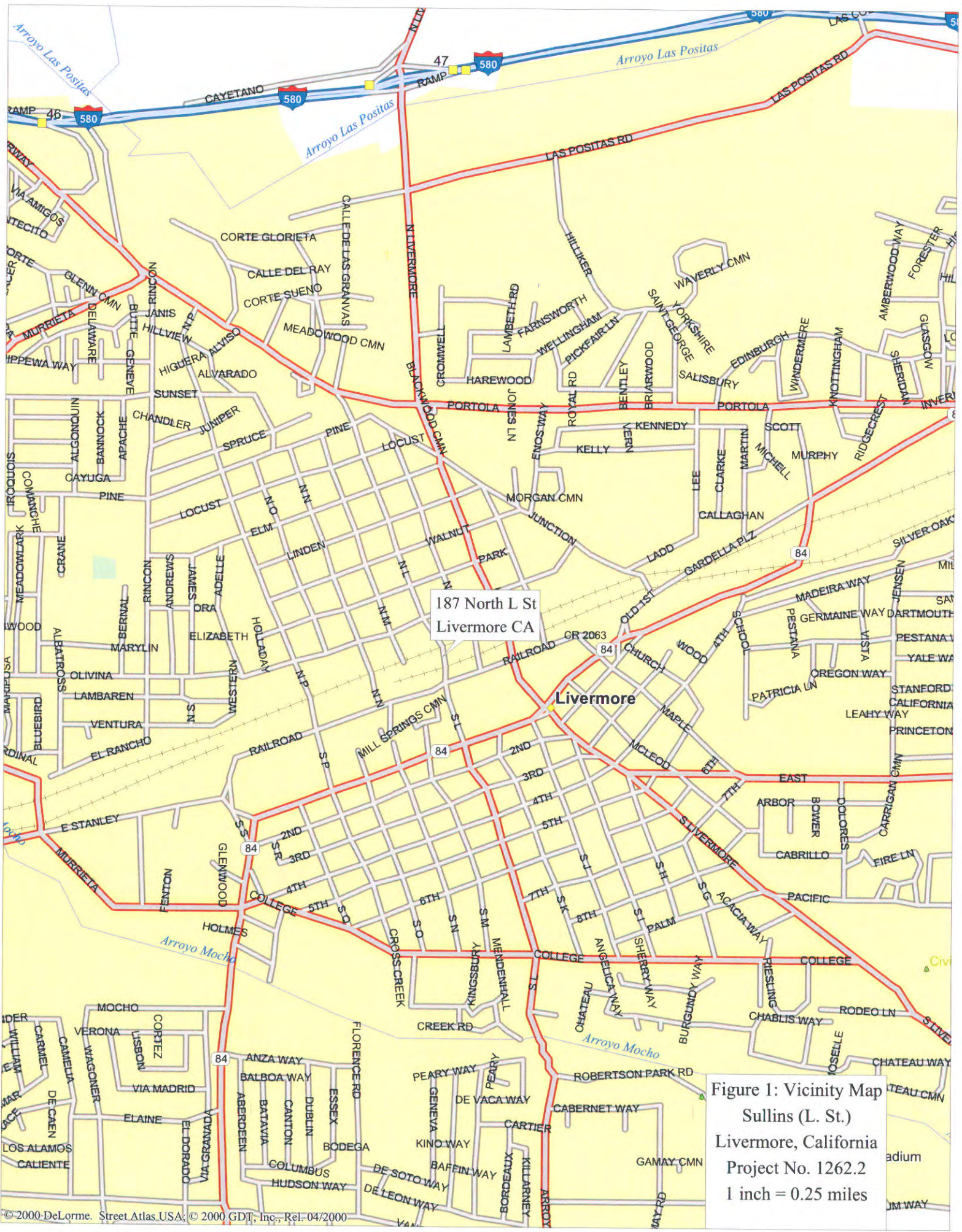
Joe Angulo
Digitally signed by Joe Angulo
DN: CN = Joe Angulo, C = US,
O = Geological Technics, Inc.
Date: 2006.03.31 08:23:49 -
08'00'

Joseph D. Angulo
Project Geologist

**Raynold
Kablanow II**
Digitally signed by Raynold
Kablanow II
DN: CN = Raynold Kablanow II, C =
US, O = Geological Technics, Inc.
Reason: I am approving this
document
Date: 2006.03.31 08:24:06 -08'00'

Raynold Kablanow II, Ph.D.
California Professional Geologist #5234
Certified Hydrogeologist #442





187 North L St
Livermore CA

Figure 1: Vicinity Map
Sullins (L. St.)
Livermore, California
Project No. 1262.2
1 inch = 0.25 miles

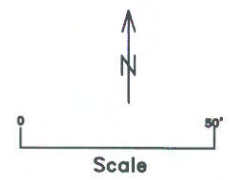


Fig 2: Site Map

Arrow Rentals
187 North L Street
Livermore, CA

Legend

- ⊕ Monitoring Well
- Soil Boring



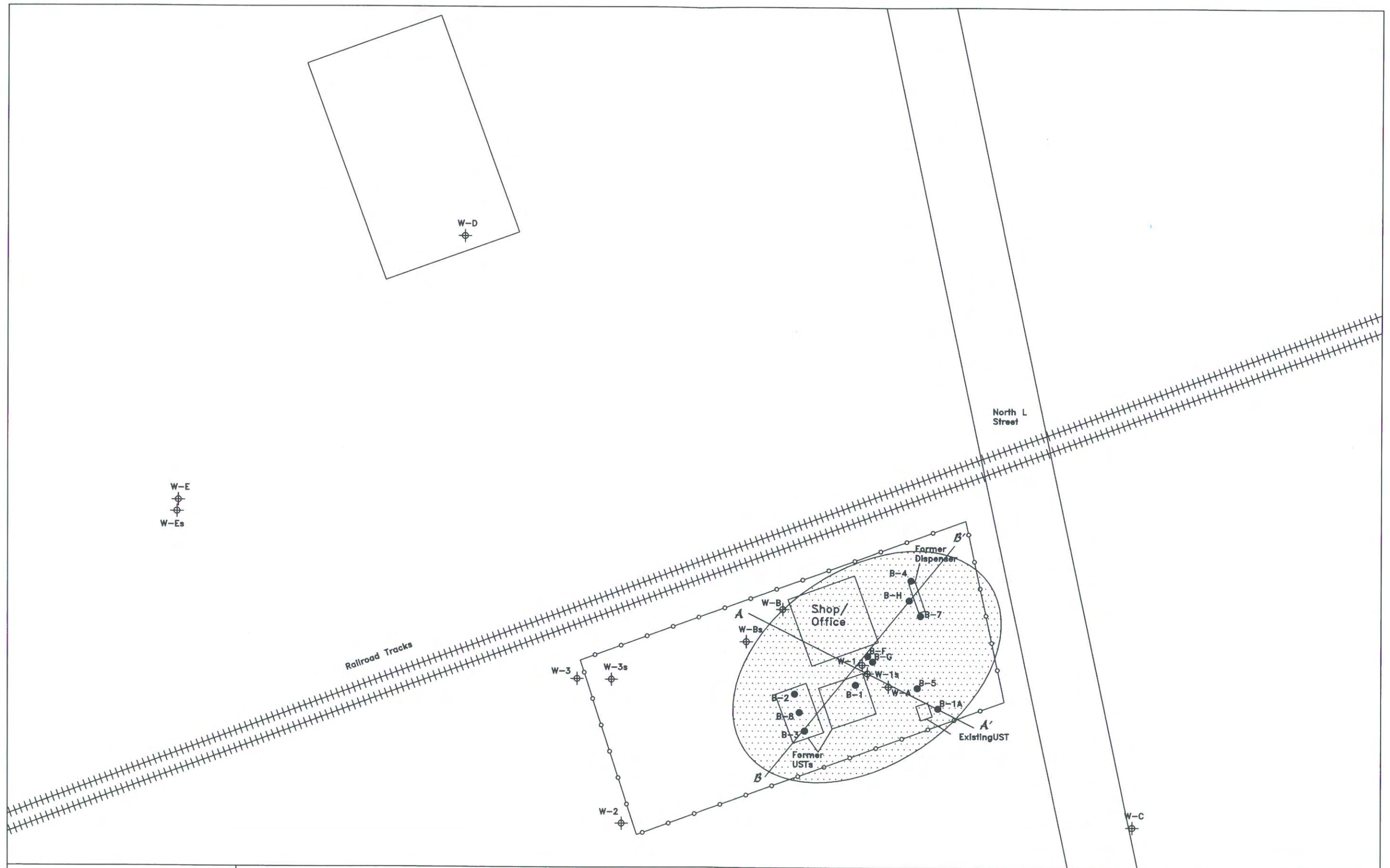


Fig 3: Soil Gasoline Plume

Arrow Rentals
187 North L Street
Livermore, CA

Legend



Soil Plume

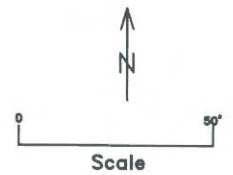
A - A' Cross Section Location



Monitoring Well



Soil Boring



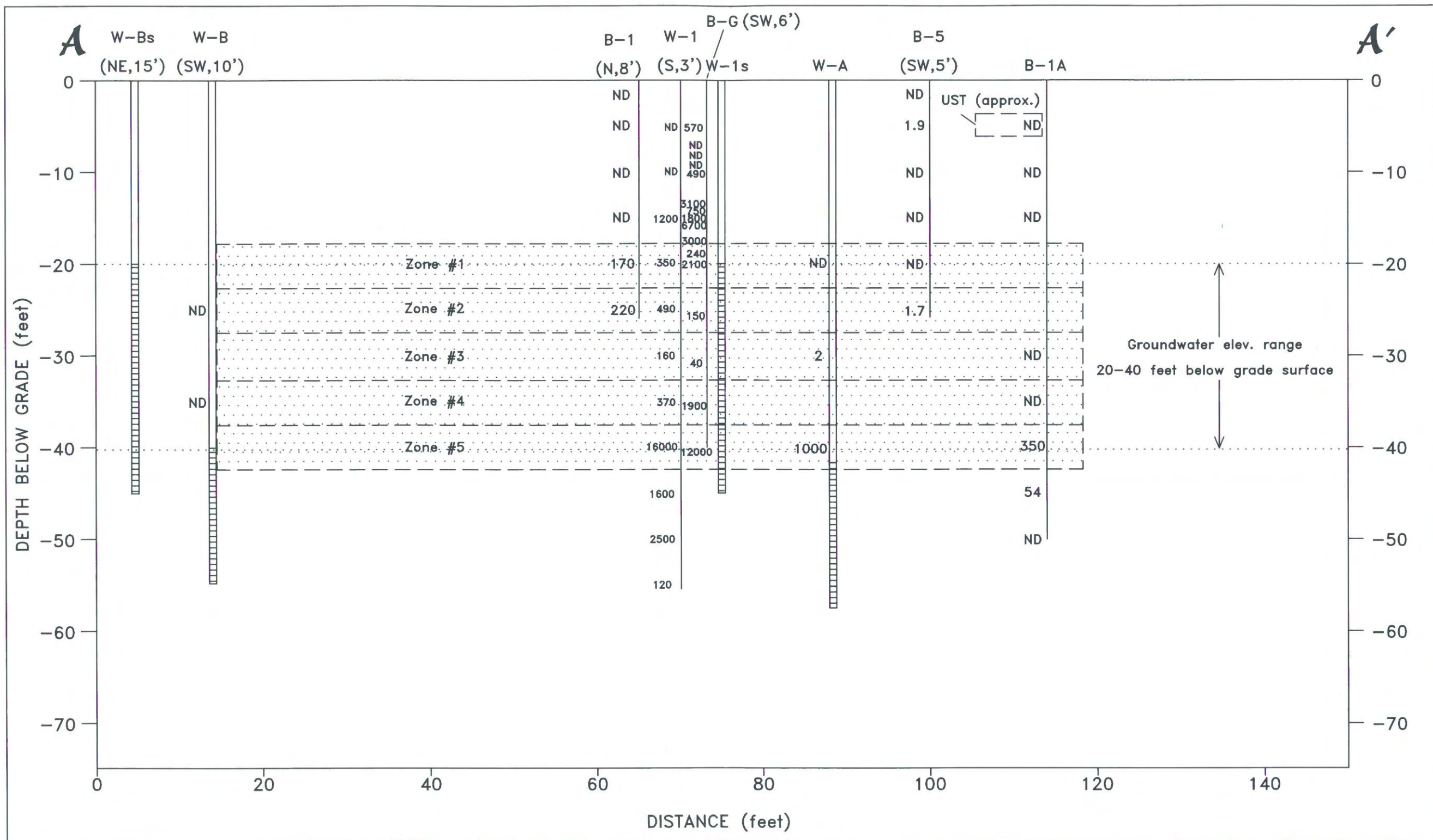


Figure 4
 Cross Section A - A'
 With Soil TPH-Gasoline
 Arrow Rentals
 187 N L Street
 Livermore, CA
 Project No.: 1262.2

LEGEND

Scale as Indicated.

2300 = Soil TPH-G Concentration (mg/kg)
 ND = Soil TPH-G non-detect

(N,5') = Boring projection onto section (direction, distance)

 Soil Plume

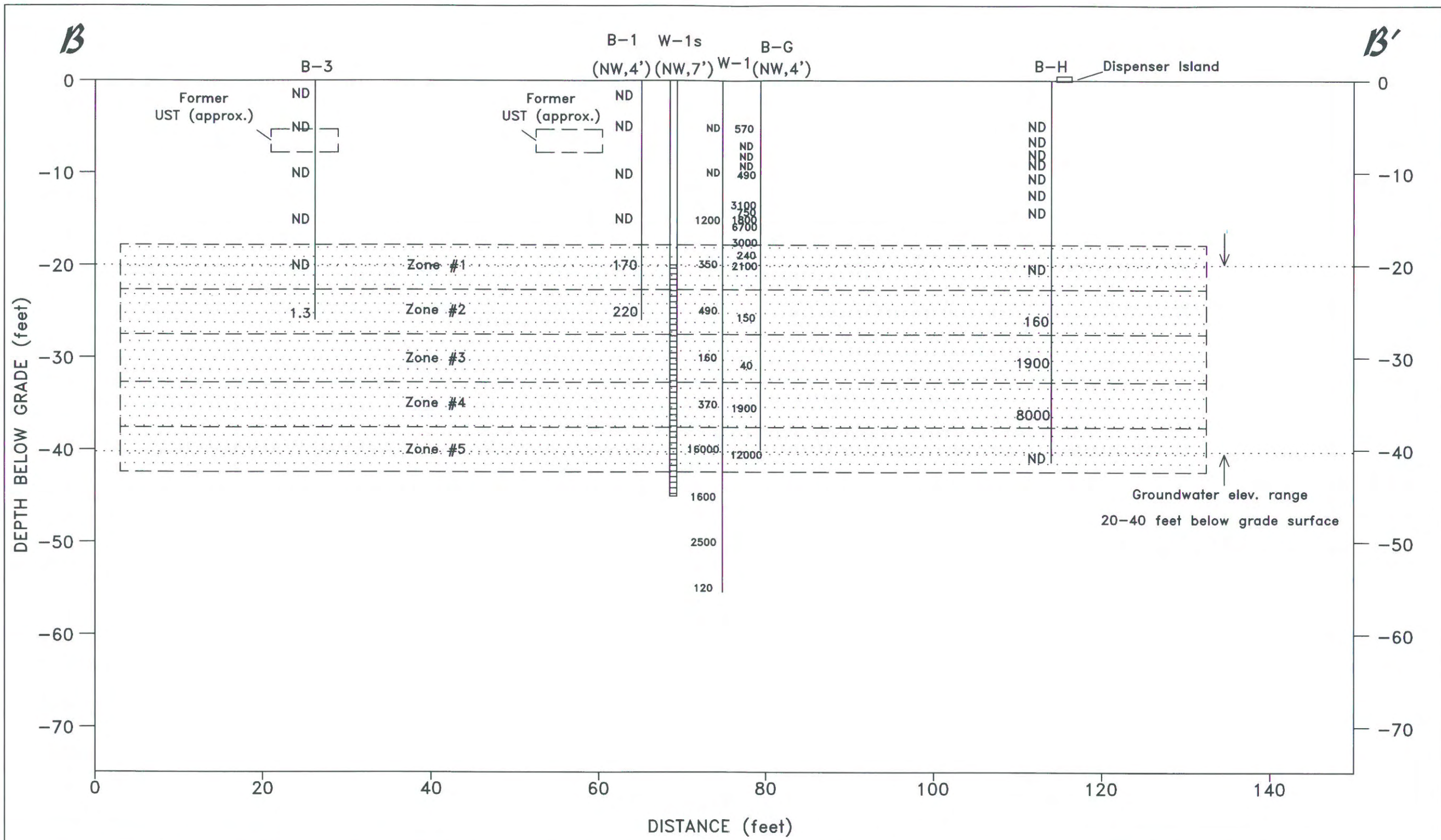


Figure 5
Cross Section B - B'
With Soil TPH-gasoline
Arrow Rentals
187 N L Street
Livermore, CA
Project No.: 1262.2

LEGEND

Scale as Indicated.

2300 = Soil TPH-G Concentration (mg/kg)
ND = Soil TPH-G non-detect

(N,5') = Boring projection onto section (direction, distance)

Soil Plume



Fig 6: Shallow Well
1988 Gasoline
Concentrations

Arrow Rentals
187 North L Street
Livermore, CA

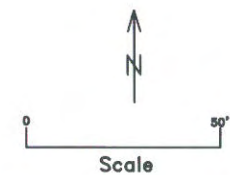
Geological Technics Inc.

3/16/06

11/88 TPH-G Data
615 = TPH-G ug/L
Contour Interval = 20000 ug/L
ND = Non-detect (<50 ug/L)

Legend

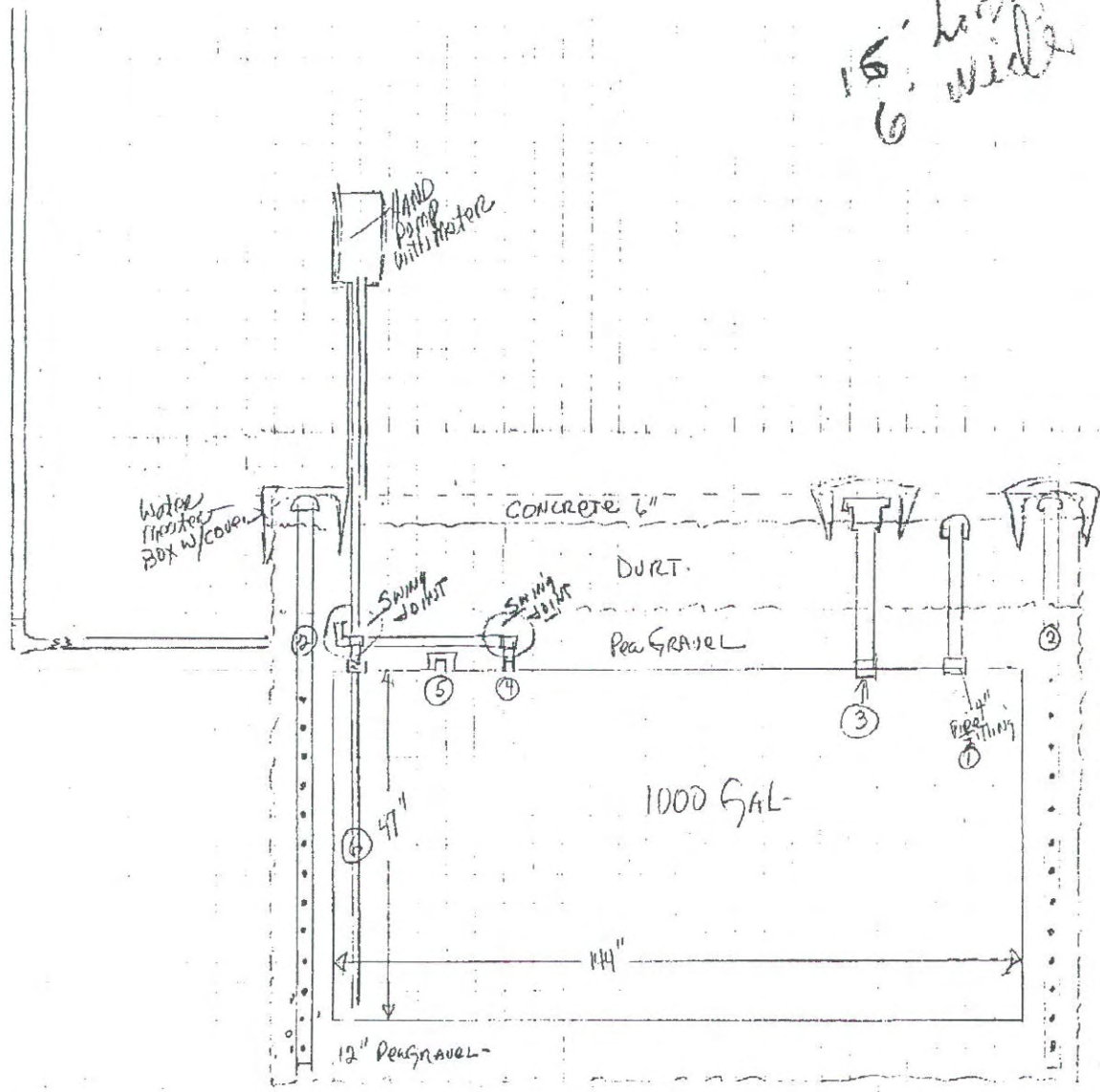
- ⊕ Monitoring Well
- Soil Boring



Appendix A

Woodward-Clyde Data

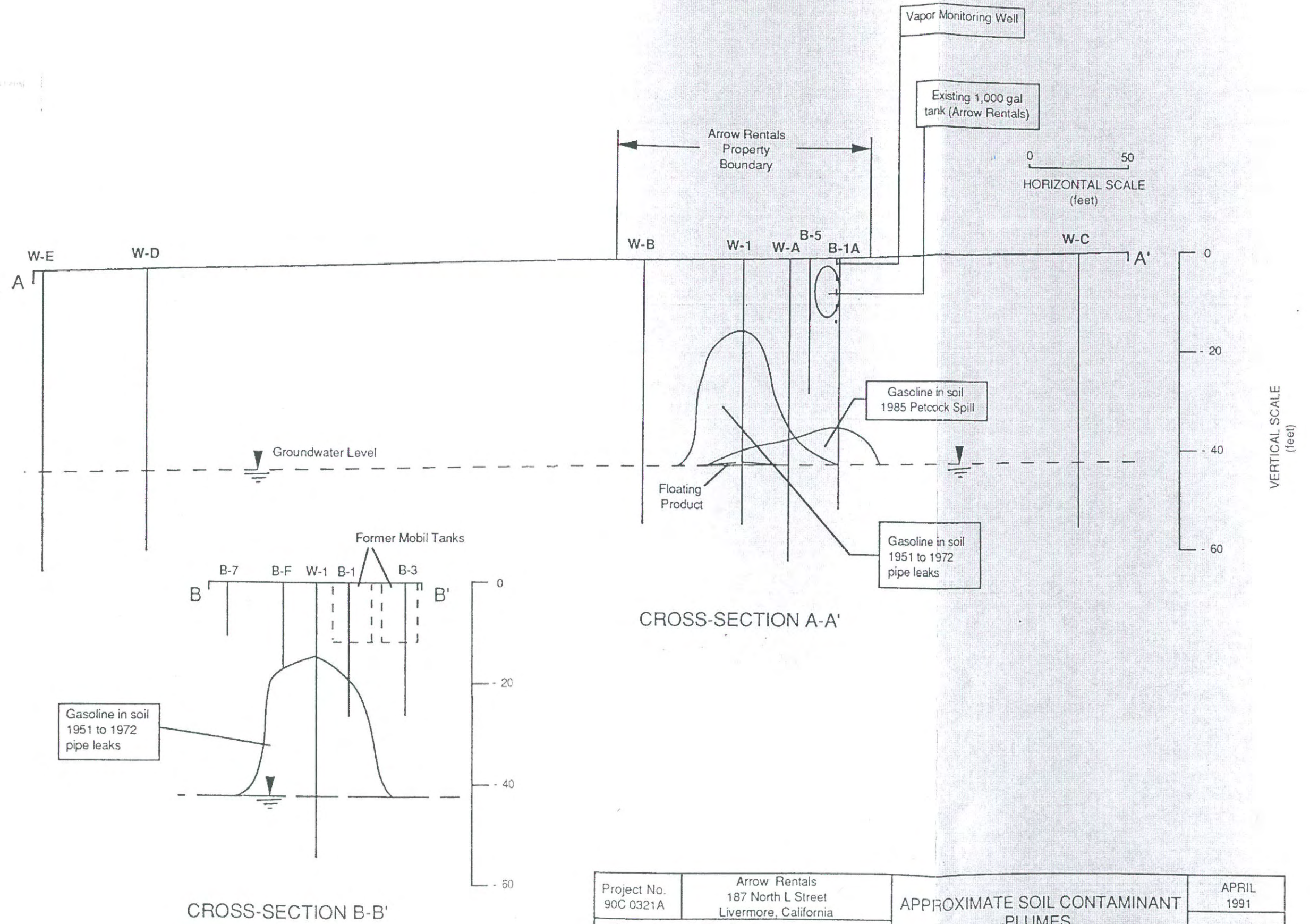
15' long
 6' wide



- ① 4" Pipe Fitting with wick Bushing to 3" Pipe with Pipe & Cap - IN CASE VAPOR RECOVERY EVER NECESSARY
- ② P.V.C. Pipe with NECESSARY HOLES; FOR MONITOR TUBES -
- ③ 4" FILL PIPE WITH SNAP ON CAP
- ④ VENT PIPE 1/2" with SWING JOINT AT TRAIL OVER TO VENT BOX WITH SWING JOINT -
- ⑤ Plug
- ⑥ Pick up Pipe to 4" P.V.C. Double TAP SECTION 1" Pipe up to the Pump with 3" COVER CONCRETE TO PUMP -

APPROVED

DATE OF ISSUE: _____



Project No. 90C 0321A	Arrow Rentals 187 North L Street Livermore, California	APPROXIMATE SOIL CONTAMINANT PLUMES	APRIL 1991
Woodward-Clyde Consultants			FIGURE 7

Appendix B

Contaminant Mass Estimate Calculations

Table 1: Contaminant Mass Estimate Calculations (TPH-G)

Arrow Rentals
 187 North L Street
 Livermore CA
 Project No. 1262.2

zone	matrix type	depth - ft	thickness	area * (ft.)	volume ft3	density** lbs/ft3	conv. lbs/kg	avg. cont. load mg/kg	conv. mg/kg	cont. kg
#1	soil	17.5-22.5	5	12422	62110	125	0.4536	587	0.000001	2067
#2	soil	22.5-27.5	5	12422	62110	125	0.4536	128	0.000001	451
#3	soil	27.5-32.5	5	12422	62110	125	0.4536	421	0.000001	1483
#4	soil	32.5-37.5	5	12422	62110	125	0.4536	2,055	0.000001	7237
#5	soil	37.5-42.5	5	12422	62110	125	0.4536	5,870	0.000001	20672
total									kg =	31910
									lb =	70361
									gal =	11348

zone	matrix type	depth - ft	thickness	area * (ft.)	volume ft3	vol of H2O*** ft3	vol H2O liters	cont. load**** mg/L	cont. load kg/L	cont. kg
#1	water	40-50	10	13	130	52	1456	210	0.00021	0.31
#2	water	40-50	10	318	3050	1220	34160	190	0.00019	6.49
#3	water	40-50	10	960	6420	2568	71904	170	0.00017	12.22
#4	water	40-50	10	2011	10510	4204	117712	150	0.00015	17.66
#5	water	40-50	10	3556	15450	6180	173040	130	0.00013	22.50
#6	water	40-50	10	5724	21680	8672	242816	110	0.00011	26.71
#7	water	40-50	10	8712	29880	11952	334656	90	0.00009	30.12
#8	water	40-50	10	12854	41420	16568	463904	70	0.00007	32.47
#9	water	40-50	10	18770	59160	23664	662592	50	0.00005	33.13
#10	water	40-50	10	28016	92460	36984	1035552	30	0.00003	31.07
#11	water	40-50	10	40344	123280	49312	1380736	10	0.00001	13.81
total									kg =	116
									lb =	256
									gal =	41
total soil & GW									kg =	32026
									lb =	70616
									gal =	11390

Notes:

* = Area calculated by CAD software.

** = 125 lb/cu ft "GM" silty gravel (Hydrology, Watson & Burnett, 1995)

*** Vol. H2O = volume of zone x porosity (assume 40% porosity from Woodward-Clyde 1991)

****average zone concentration

Boring	SOIL TPH-G mg/kg)				
	Zone #1	Zone #2	Zone #3	Zone #4	Zone #5
depth (feet bgs)→	17.5-22.5	22.5-27.5	27.5-32.5	32.5-37.5	37.5-42.5
B-1A	5		5	5	350
B-1	170	220			
B-2		1.7			
B-3	1	1.3			
B-5	1	1.7			
B-G	3000	150	40	1900	12000
(B-G)	240				
(B-G)	2100				
B-H	0.5	160	1900	8000	0.5
W-A	0.5		2		1000
W-B		0.5		0.5	
W-1	350	490	160	370	16000
AVG CONC.→	587	128	421	2055	5870

boldface = detect

non-detect = assume one half the detection limit or 1 mg/kg if not given

blank = interval not analyzed