ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
(510) 337-9335 (FAX)

REMEDIAL ACTION COMPLETION CERTIFICATION

StID 2949 - 4951 Arroyo Road, Livermore, CA
(12 tanks removed between November 1990 and May 1995)

January 29, 1999

Mr. Gary Geisenhoffer
VA Medical Center, Engineering
4951 Arroyo Road
Livermore, CA 94550

Dear Mr. Geisenhoffer:

This letter confirms the completion of site investigation and remedial action for the underground storage tanks formerly located at the above-described location. Thank you for your cooperation throughout this investigation. Your willingness and promptness in responding to our inquiries concerning the former underground storage tanks are greatly appreciated.

Based on information in the above-referenced file and with the provision that the information provided to this agency was accurate and representative of site conditions, no further action related to the underground tank release is required.

This notice is issued pursuant to a regulation contained in Title 23, Section 2721(e) of the California Code of Regulations.

Please contact our office if you have any questions regarding this matter.

Sincerely,

Mee Ling Tung, Director

cc: Richard Pantages, Chief of Division of Environmental Protection
Chuck Headlee, RWQCB
Dave Deaner, SWRCB
Danielle Stefani, Livermore Fire Dept
files-ec (vamedc7)

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StID 2949

January 29, 1999

Mr. Gary Geisenhoffer
VA Medical Center, Engineering
4951 Arroyo Road
Livermore, CA 94550

Re: Fuel Leak Site Case Closure for VA Medical Center, 4951 Arroyo Rd, Livermore, CA

Dear Mr. Geisenhoffer:

This letter transmits the enclosed underground storage tank (UST) case closure letter in accordance with Chapter 6.75 (Article 4, Section 25299.37[h]). The State Water Resources Control Board adopted this letter on February 20, 1997. As of March 1, 1997, the Alameda County Environmental Protection Division is required to use this case closure letter for all UST leak sites. We are also transmitting to you the enclosed case closure summary. These documents confirm the completion of the investigation and cleanup of the reported release at the subject site. The subject fuel leak case is closed.

SITE INVESTIGATION AND CLEANUP SUMMARY

Please be advised that the following conditions exist at the site:

- up to 6,500ppm TPH as diesel and 0.013ppm benzene exists in soil beneath the site; and,
- a site safety plan must be prepared for construction workers in the event of excavation/trenching is proposed in the vicinity of residual soil contamination.

If you have any questions, please contact me at (510) 567-6762.

eva chu
Hazardous Materials Specialist

enlosures: 1. Case Closure Letter 2. Case Closure Summary

c: Dave Clemens, City of Livermore, Planning Div., 1052 S. Livermore Ave., Livermore, CA 94550
files (vamedc8)

4-1627

CASE CLOSURE SUMMARY
Leaking Underground Fuel Storage Tank Program

I. AGENCY INFORMATION

Date: March 17, 1997

Agency name: **Alameda County-HazMat** Address: **1131 Harbor Bay Pkwy**
City/State/Zip: **Alameda, CA 94502** Phone: **(510) 567-6700**
Responsible staff person: **Eva Chu** Title: **Hazardous Materials Spec.**

II. CASE INFORMATION

Site facility name: **VA Medical Center**
Site facility address: **4951 Arroyo Road, Livermore, CA 94550**
RB LUSTIS Case No: **N/A** Local Case No./LOP Case No.: **2949**
URF filing date: **11/13/90** SWEEPS No: **N/A**

Responsible Parties:	Addresses:	Phone Numbers:
Jim Pitzer VA Medical Center	4951 Arroyo Road Livermore, CA 94550	510/447-2560

Tank No:	Size in gal.:	Contents:	Closed in-place or removed?:	Date:
1	12,000	#5 Fuel Oil	Removed	11/9/90
2	12,000	"	"	"
3	500	Diesel	"	5/19/95
4	2,000	Diesel	"	"
5	2,000	Diesel	Closed in place	6/15/95
6	5,000	"	"	"
7	560	Diesel	Removed	2/24/95
8	750	Gasoline	"	"
9	750	Gasoline	"	"
10	2,000	Diesel	"	"
11	1,000	"	"	3/27/95
12	2,000	"	"	"

III. RELEASE AND SITE CHARACTERIZATION INFORMATION

Cause and type of release: **Leaking UST**
Site characterization complete? **YES**
Date approved by oversight agency: **10/3/95**
Monitoring Wells installed? **Yes** Number: **3**
Proper screened interval? **Yes, ~10' to 20' bgs in well MW-1**
Highest GW depth below ground surface: **~13'** Lowest depth: **18' bgs**
Flow direction: **West/northwest, parallel to Arroyo Del Valle**
Most sensitive current use: **Hospital**
Are drinking water wells affected? **No** Aquifer name: **Amador Subbasin**

Is surface water affected? **No** Nearest affected SW name: **NA**
Off-site beneficial use impacts (addresses/locations): **None**
Report(s) on file? **YES** Where is report(s) filed? **Alameda County**
1131 Harbor Bay Pkwy
Alameda, CA 94502

Treatment and Disposal of Affected Material:

Material	Amount (include units)	Action (Treatment or Disposal w/destination)	Date
Tank &	2 USTs	Disposed by Erickson, in Richmond	11/9/90
	2 USTs	"	5/19/95
	2 USTs	Closed-in-Place	6/15/95
	4 USTs	Disposed by Erickson, in Richmond	2/24/95
	2 USTs	"	3/27/95
Rinsate	1,825 gal.	Disposed by Ramos Environmental, W. Sacto	11/90
Soil	~54 cy	Disposed at BFI L.F. in Livermore	6/15/95
	2550 cy	Disposed at BFI L.F. in Livermore	9-12/91
Groundwater	20,000 gal.	Treated and reused onsite	

Maximum Documented Contaminant Concentrations - - Before and After Cleanup

Contaminant	Soil (ppm)		Water (ppb)	
	Before[1]	After[1]	Before[2]	After[3]
TPH (Diesel)	6,500	6,500	300[4]	ND
Benzene	0.013[5]	0.013	15	ND
Toluene	0.180	0.180	0.8	ND
Ethylbenzene	0.610	0.610	4	ND
Xylenes	0.840	0.840	76	ND
Oil & Grease	22,000	22,000	ND	ND
Heavy Metals				
Other **PNAs**		ND[6]		

NOTE:
1 maximum concentration in soil is beneath the Fire House, north wall of the tank excavation.
2 from initial groundwater sampling event, 11/91
3 most recent analytical results from monitoring wells, 1/93
4 collected from pit bottom, 12/90
5 from Building 64, sample 2000GN, collected at 9.5' bgs.
6 soil collected from boring advanced inside firehouse, at a depth of 15' bgs, in 5/95

Comments (Depth of Remediation, etc):
See Section VII, Additional Comments, etc...

IV. CLOSURE

Does completed corrective action protect existing beneficial uses per the Regional Board Basin Plan? _____
Does completed corrective action protect potential beneficial uses per the Regional Board Basin Plan? _____
Does corrective action protect public health for current land use? **YES**
Site management requirements: **None**

Should corrective action be reviewed if land use changes? **YES**
Monitoring wells Decommissioned: **No, pending site closure**
Number Decommissioned: **0** Number Retained: **3**
List enforcement actions taken: **None**

List enforcement actions rescinded: **NA**

V. LOCAL AGENCY REPRESENTATIVE DATA

Name: **Eva Chu** Title: **Haz Mat Specialist**

Signature: [signature] Date: 4/1/97

Reviewed by

Name: **Scott Seery** Title: **Sr. Haz Mat Specialist**

Signature: [signature] Date: 3/17/97

Name: **Thomas Peacock** Title: **Supervisor**

Signature: [signature] Date: 3-31-97

VI. RWQCB NOTIFICATION

Date Submitted to RB: 4/2/97 RB Response: Approved

RWQCB Staff Name: **Kevin Graves** Title: **AWRCE**

Signature: [signature] Date: 4/21/97

VII. ADDITIONAL COMMENTS, DATA, ETC.

The VA Medical Center property is on ~118 acres in the eastern part of Alameda County. The medical facility and numerous ancillary buildings are on the property, as well as a sewage treatment plant. The property is on a moderate incline, sloping to the east. Most of the present day buildings have been constructed on cut slopes with substantial amounts of fill material used to form level building site. This closure summary covers the 12 USTs closed at the site in 1990 and 1995. (See Figs 1 and 2)

FIRE HOUSE/STATION

In November 1990 two 12,000 gallon USTs which were located adjacent to the onsite fire house/station were removed. The tanks were used to store No. 5 fuel oil. At the time of their removal, it was noted that the tanks were deteriorated, with several through-holes and obvious signs of leakage. Soil samples collected from the tank excavation contained up to 9,000 mg/Kg of TOG, 3,700 mg/Kg TPHd, and detectable TEX. (See Fig 3, Tables 1, 2)

Sixteen exploratory soil borings were drilled at the site in November 1990 to assess the vertical and areal extent of soil contamination prior to overexcavation (see Fig 4). The pit was overexcavated in November and December 1990, removing ~4,000 cy of soil, of which ~2,000 cy was "clean" overburden. It appeared the zone of contamination was mainly at 12' to 20' below ground surface (bgs), and extending at various location to a maximun depth of 25' bgs. Groundwater was encountered in the excavation at ~15' bgs. To facilitate the excavation of contaminated soil below the water table, ~20,000 gallons of groundwater was removed, lowering the water table about 7 feet, and stored in holding tanks.

Contaminated soil was removed to the extent possible. A two-foot thick lens of contaminated soil extending beneath the south wall of the fire house was not removed. Sixteen soil samples were collected from the sidewalls and base of the resultant excavation and analyzed for TPHd, TOG, and BTEX. Only the north sidewall samples contained elevated TPHd (up to 6,500 mg/Kg), TOG (up to 22,000 mg/Kg) and trace levels of TEX (see Fig 5, Table 3). The excavation was backfilled using "clean" overburden and native soil from other areas of the medical facility, then resurfaced with asphalt and/or concrete. The aerated stockpiled soil was subsequently taken to a Class III Landfill (BFI) in Livermore for disposal.

The 20,000 gallons of water removed from the excavation was treated in the holding tanks. Four water samples were collected during the excavation-dewatering activities and analyzed for TPHd and BTEX. Two of the samples (VA Exc and Bottom) were collected directly from the excavation. Low levels of TPHd (up to 300 ppb) and trace to non-detectable levels of BTEX were identified in groundwater within the pit. Two water samples were also collected from within the holding tank. Up to 680 ppb TPHd and below detectable concentrations of BTEX were in the tank (see Table 4). The tank water was subsequently used during backfilling and compaction of the excavation.

Three groundwater monitoring wells (MW-1 through MW-3) were installed near the excavation. Groundwater flow direction has been to the WNW. Groundwater was sampled four consecutive quarters, from November 1991 to January 1993. The last three sampling events did not identify TPHd, BTEX, or TOG in groundwater (see Fig 6, Table 5). The fuel release from the former bunker oil tanks did not appear to significantly impact groundwater quality.

In May 1995 a Geoprobe was advanced in a location 18' into the fire house to a depth of 16' bgs to assess the extent of the contaminated soil lens below the building. Soil samples were collected at depths of 5', 10' and 15' bgs and analyzed for TPHg, TPHd, BTEX, and PNAs. Only the sample from 15' bgs (IFH1-3) contained hydrocarbons above the detection limit (950mg/Kg TPH-d, 0.016 mg/Kg toluene, and 0.026 mg/Kg total xylenes). Benzene, ethyl-benzene and PNAs were not detected (see Fig 7, Table 6).

In March 1995 in-house trenching activities in front of the newly constructed fire house garage identified petroleum hydrocarbon impacted soil (see Fig 8, Table 7). Four soil samples (T-1 through T-4) were collected from the trench. Elevated TPHd was identifed in sample T-1. The trench was overexcavated to 12' by 45' by 7' bgs. Five confirmatory sidewall samples (FH-1 through FH-5) and two bottom samples (FH-5 and FH-6) were collected and analyzed for TPHg, TPHd, BTEX, and metals Cd, Cr, Pb, Ni, and Zn. A maximum of 30 ppm TPHd was detected. TPHg and BTEX were not found above the detection limits. Metal concentrations were less than 10x STLC.

Although residual soil contamination remains beneath the fire house at ~15 bgs, there should be no risk to human health since the chemicals of concern (benzene and PNAs) are not present (based on ASTM's RBCA Tier 1 Look Up Table). No further action is required in this area.

Tanks by Building 62 and Building 65

A 500 gallon diesel UST located by **Building 62** was removed in May 1995. A soil sample (Bld 62-500-D) was collected below the tank at 12' bgs and analyzed for TPHd and BTEX. None of these analytes were detected in the soil sample. (See Figs 2 and 9, Table 8)

A 2,000 gallon diesel UST located near **Building 65** was also removed. Two soil samples (65-N and 65-E) were collected below the tank and analyzed for TPHd and BTEX. Sample 65-N contained 2,100 ppm TPHd. The pit was excavated to ~12'bgs and two confirmatory soil samples (Bld 65-N-2 and Bld 65-T-1) collected and analyzed for TPHd, TPHg and BTEX. Up to 56 ppm TPHd and trace TPHg, but no BTEX were identified. Excavation removed most of the impacted soil. A groundwater investigation was not required. (See Figs 2 and 10, Table 9)

In-Place Tank Closures by Building 62

Two diesel USTs (1-2,000 gallon and 1-5,000 gallon capacity) were located by **Building 62**. The tanks were located in an area with limited access and numerous electrical lines crossing over the tanks (see Figs 2 and 11). It was decided that the tanks should be closed in-place. In August 1993 three soil borings were advanced to 15' bgs and soil samples were collected from from the bottom of each boring. The soil samples were analyzed for TPHd and BTEX. None of these analytes were detected.

It was not until May 1995, however, that the USTs were taken out of operation. Three additional soil borings (AB-1, HA-1, and HA-2) were advance around the USTs. Soil samples were collected at ~13' bgs (AB-1) and at 9.5' bgs (HA-1 and HA-2) and analyzed for TPHd and BTEX. Up to 290 ppm TPHd was identified in sample HA-2. BTEX was not found above detection limits (see Table 10). The tanks were vacuumed, removing to the extent possible the diesel fuel, and the tanks were filled with ~40 cy of sand grout. No further action was required at this location.

Tanks by Building 64 and Building 6

One 560 gallon diesel UST located by **Building 64**, and three USTs (2-750 gallon and 1-2,000 gallon gasoline tanks) located by **Building 6** were removed on February 24, 1995. Confirmatory soil samples were collected from beneath each UST and analyzed for TPHg or TPHd, BTEX and Total Lead. Only low to non-detectable levels of TPHg/TPHd, BTEX and total lead were identified in the soil samples. No further remedial action was required at these former tank locations. (See Figs 2, 12, 13 and Table 11)

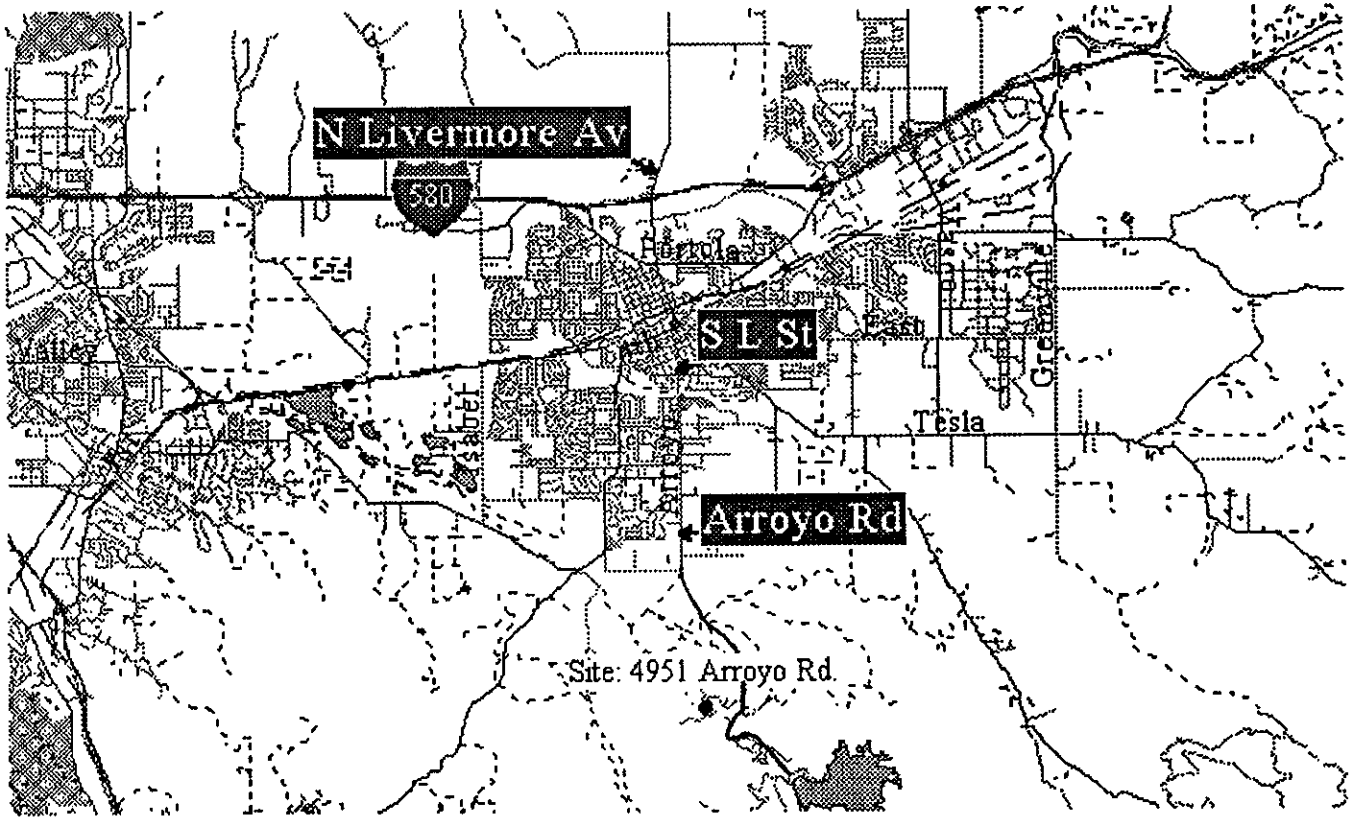
Tanks by Building 88 and Building 90

On March 27, 1995 one 1,000 gallon diesel tank near **Building 88**, and one 2,000 gallon diesel tank near **Building 90** were removed. Two soil samples were collected beneath each tank and were analyzed for TPHd and BTEX. Low or non-detectable levels of TPHd and BTEX were identified in the soil samples. No further action was required at these locations. (See Figs 2, 14, 15, and Table 12)

In summary, case closure is recommended because:

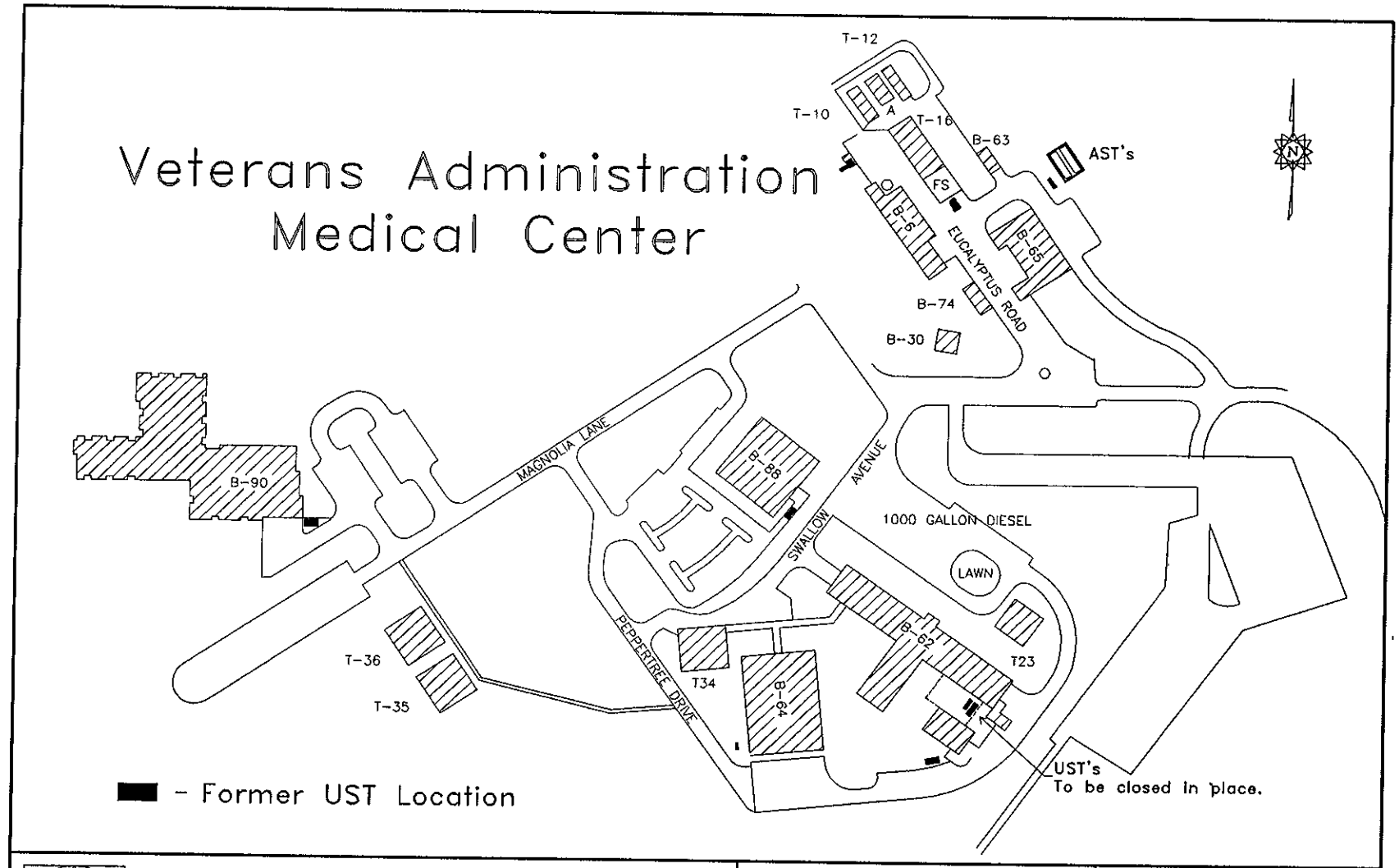
- the leak and ongoing sources have been removed;
- the site has been adequately characterized;
- the dissolved plume is not migrating;
- no water wells, surface water, or other sensitive receptors are likely to be impacted (groundwater plume is limited in extent and should not impact Arroyo Del Valle or the monitoring wells by the sewage treatment plant); and,
- the site presents no significant risk to human health or the environment (residual hydrocarbons beneath the building does not contain benzene or PNAs, therefore, should not pose a risk to human health).

vamedc5



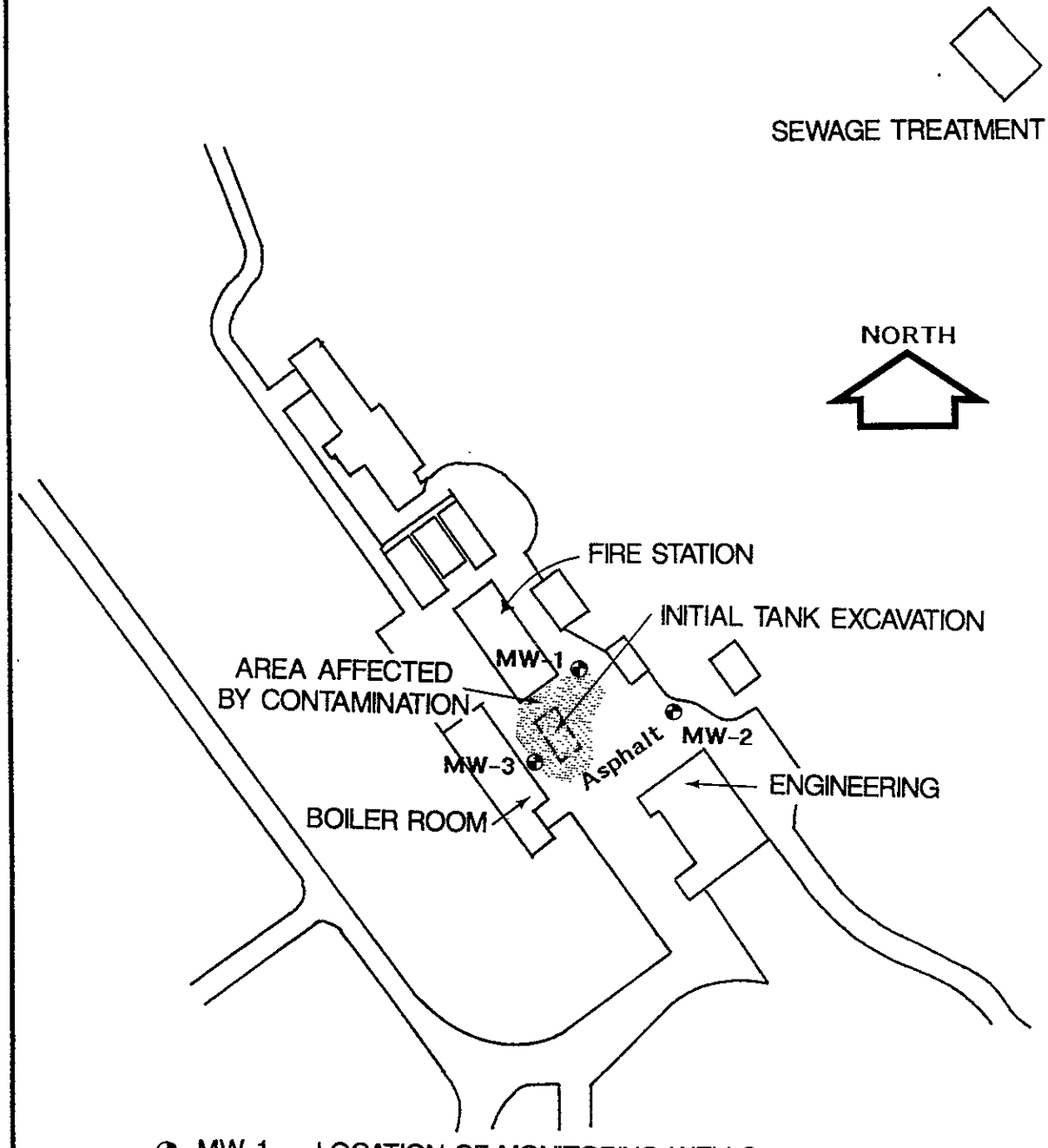
GROWTH
Growth Environmental Services, Inc.

DESCRIPTION: Site Location Map		FIGURE: Figure 1	PROJECT NUMBER: SF009201
		DRAWN BY:	
PROJECT/LOCATION: 4951 Arroyo Rd. Livermore, CA		REVISED: M. Davis	FILE NAME: VA Med. Center
		DRAWING DATE: 6/2/95	PM: G. Rogers


Veterans Administration
Medical Center
T-12
T-10
A
T-16
B-63
AST's
FS
B-6
B-65
EUCALYPTUS ROAD
B-74
B-30
B-90
MAGNOLIA LANE
B-88
SWALLOW AVENUE
1000 GALLON DIESEL
LAWN
T-36
T-35
PEPPERTREE DRIVE
T34
B-64
B-62
T23
UST's
To be closed in place.
- Former UST Location
GROWTH
Growth Environmental Services, Inc.
DESCRIPTION
Site Plan
PROJECT/LOCATION
4951 Arroyo Rd.
Livermore, CA
FIGURE
Figure 2
DRAWN BY
SLK
REVISED
M. Davis
DRAWING DATE
6/2/95
PROJECT NUMBER
SF079508
FILE NAME
VA Med. Center
P.M.
G. Rogers

VA MEDICAL CENTER

SUPPORT BUILDINGS



AUGEAS CORPORATION

FIGURE 3

SITE PLAN OF STUDY AREA

VA MEDICAL CENTER, LIVERMORE, CALIFORNIA

DRAWN BY:	DATE: 1/24/91	PROJECT NO.

FIRE HOUSE USTs

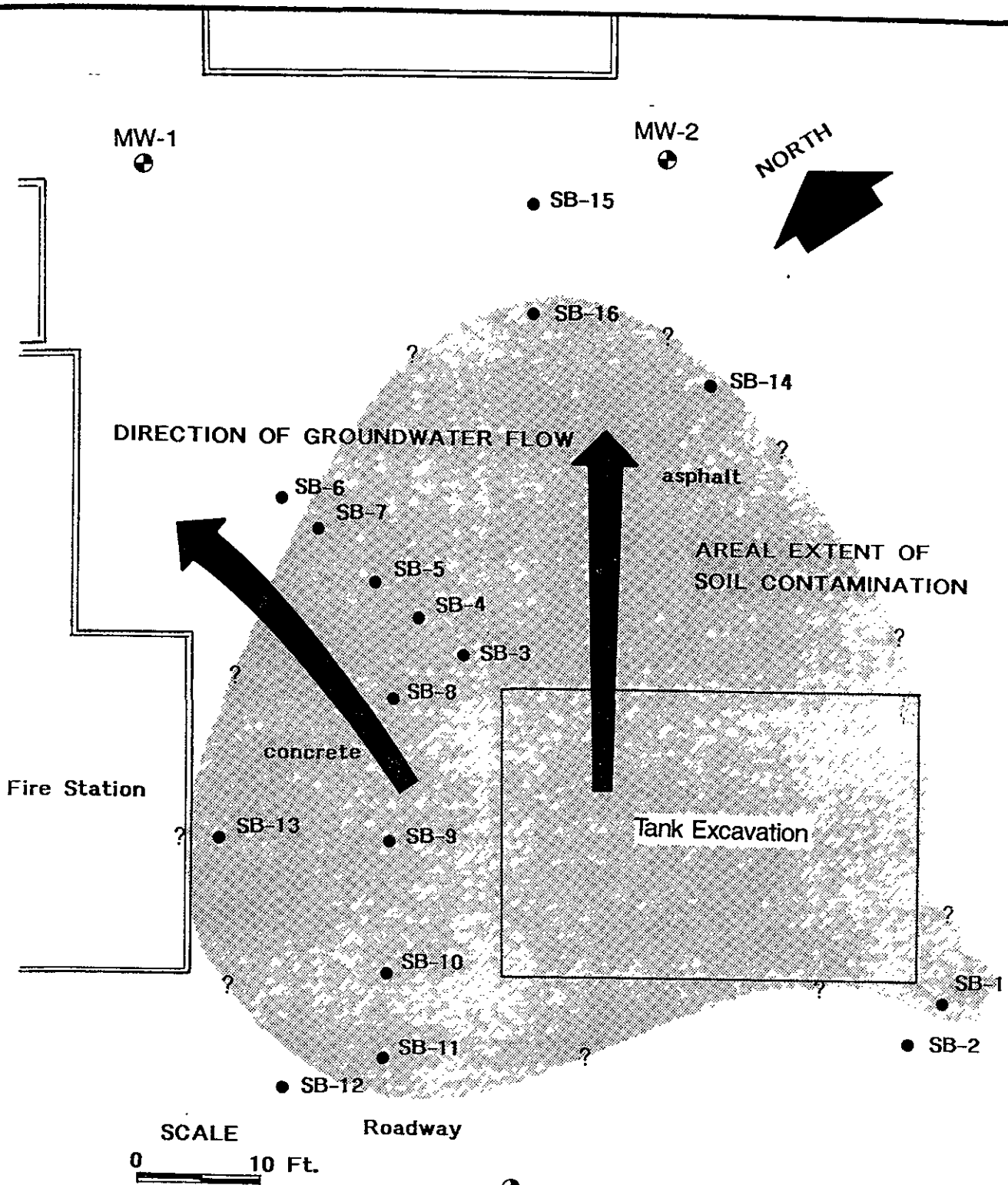
Table 1
Samples Taken During Tank Removal

Sample Identification	TPH as Diesel (mg/kg)	Oil and Grease (Method5520 F) (mg/kg)	Oil and Grease (Method 9071/418.1) (mg/kg)
1–North end, west tank	2,400	3,400	930
2–North end, east tank	2,100	2,400	4,200
3–South end, east tank	3,700	6,300	9,000
4–Middle, east tank	2,200	2,800	4,700
5–Middle, west tank	1,900	2,100	3,200
6–South end, west tank	3,100	4,000	4,700
7–Composite, spoils	1,600	8,200	2,900
Samples 1–6 taken at 15' depth			

FIRE HOUSE USTs

Table 2

Sample identification	Benzene (µg/kg)	Toluene (µu/kg)	Ethyl benzene (µg/kg)	Xylene (µu/kg)
1–North end, west tank	ND	37	180	210
2–North end, east tank	ND	ND	120	200
3–South end, east tank	ND	180	610	840
4–Middle, east tank	ND	35	230	320
5–Middle, west tank	ND	57	190	290
6–South end, west tank	ND	85	370	380
7–Composite spoils	ND	ND	10	48
Samples 1–6 taken at 15' depth				



LEGEND

- ● SOIL BORING
- ◒ MONITORING WELL

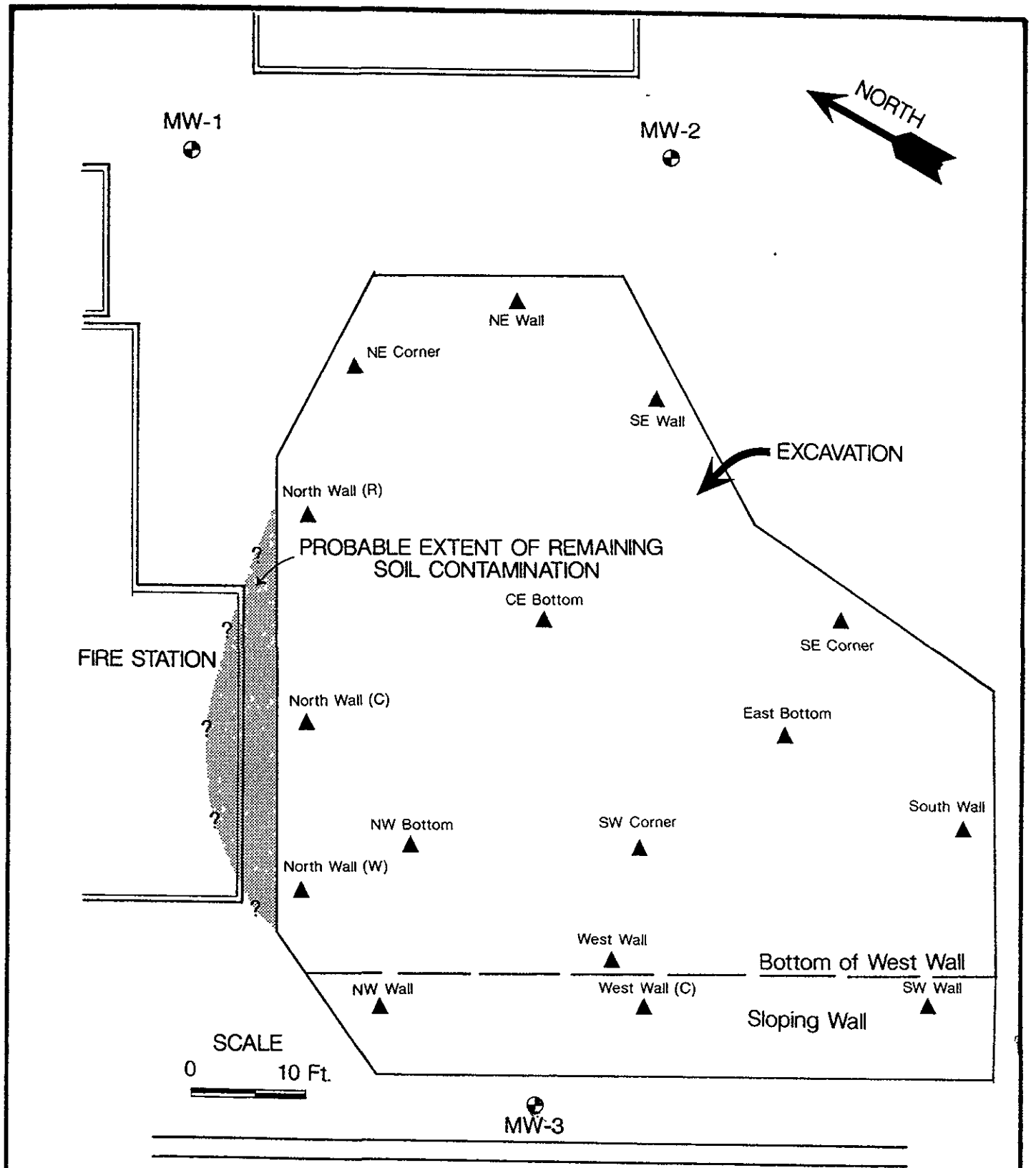
AUGEAS CORPORATION

FIGURE 4

EXPLORATORY BORING LOCATION MAP

VA MEDICAL CENTER, LIVERMORE, CALIFORNIA

DRAWN BY:	DATE: 1/23/91	PROJECT NO.



▲ VERIFICATION SAMPLE

AUGEAS CORPORATION

FIGURE 5
VERIFICATION SAMPLE LOCATION MAP

VA MEDICAL CENTER, LIVERMORE, CALIFORNIA

DRAWN BY:	DATE: 1/20/91	PROJECT NO.

Table 3
Analytical Results -- Soil Samples

Constituents

Sample ID	Benzene ug/kg	Toluene ug/kg	Ethylbenzene ug/kg	Xylenes ug/kg	Diesel #2 mg/kg	Oil & Grease mg/kg
SE Corner	ND	ND	ND	ND	ND	ND
NE Corner	ND	ND	ND	4	ND	ND
CE Bottom	ND	ND	ND	ND	ND	ND
NW Bottom	ND	ND	ND	ND	ND	ND
West Wall	ND	ND	ND	ND	ND	ND
SW Corner	ND	ND	ND	ND	ND	ND
North Wall (R)	ND	ND	ND	ND	1,900	2,100
North Wall (C)	ND	ND	280	440	6,500	22,000
North Wall (W)	ND	ND	96	310	930	140
SE Wall	ND	ND	ND	6	ND	ND
NE Wall	ND	ND	ND	4	ND	ND
NW Wall	ND	ND	ND	ND	ND	ND
West Wall (C)	ND	ND	ND	ND	ND	ND
SW Wall	ND	ND	ND	4	ND	ND
South Wall	ND	ND	ND	ND	ND	ND
East Bottom	ND	ND	ND	ND	ND	ND

ND = Not detected.

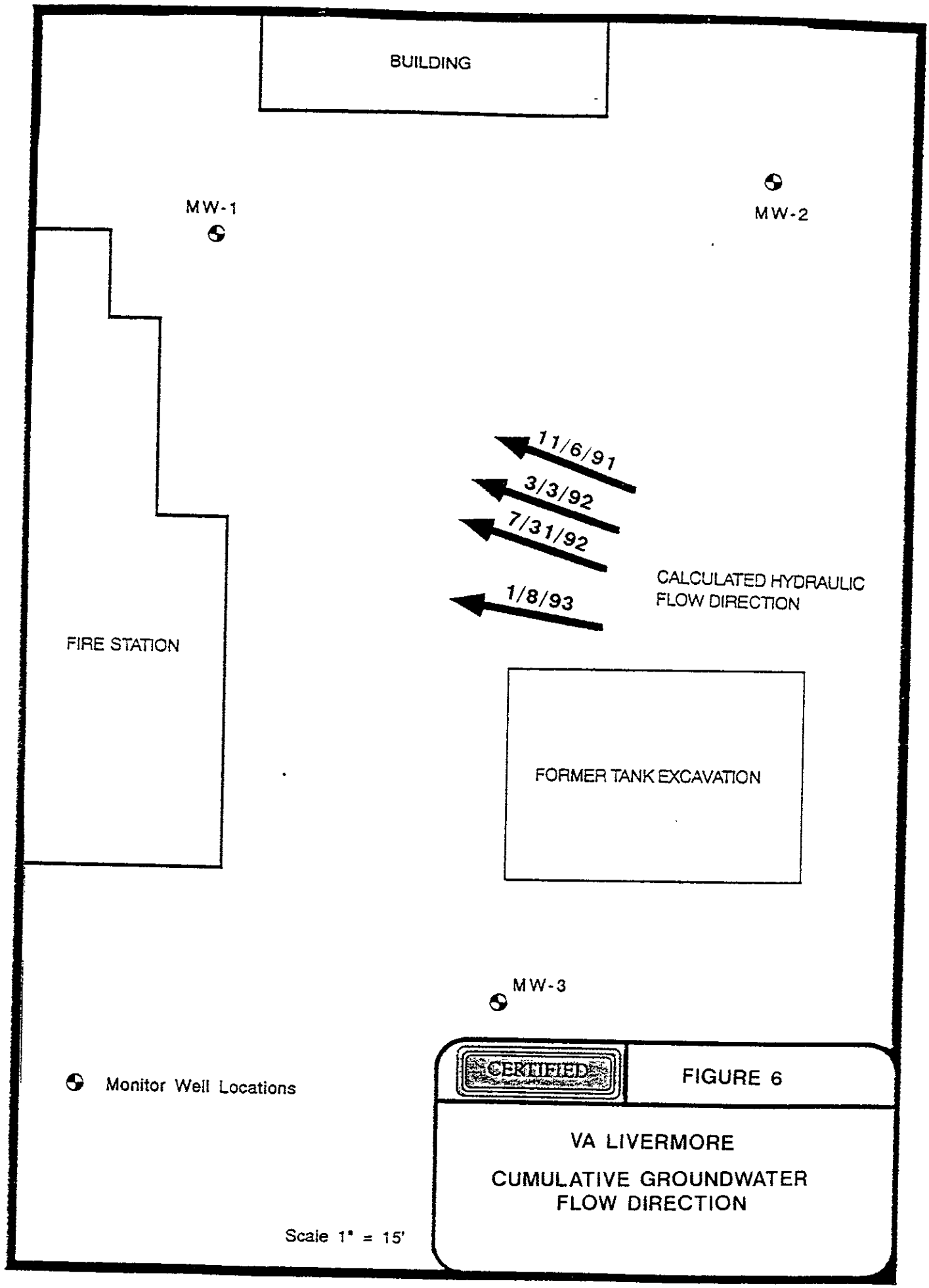

BUILDING
MW-1
MW-2
11/6/91
3/3/92
7/31/92
1/8/93
CALCULATED HYDRAULIC FLOW DIRECTION
FIRE STATION
FORMER TANK EXCAVATION
MW-3
Monitor Well Locations
CERTIFIED
FIGURE 6
VA LIVERMORE
CUMULATIVE GROUNDWATER FLOW DIRECTION
Scale 1" = 15'

TABLE # 4

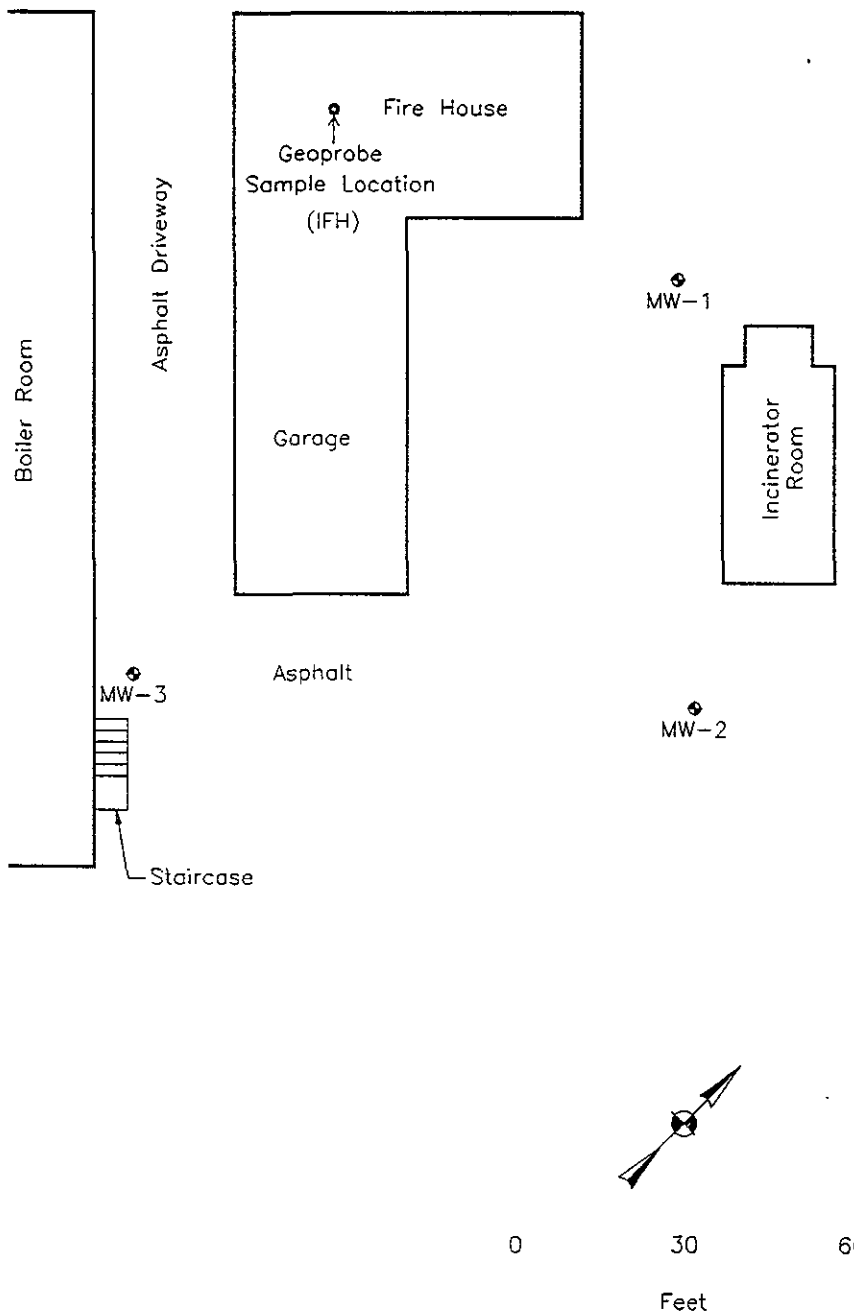
ANALYTICAL RESULTS - WATER SAMPLES

Sample ID	Benzene ug/l	Toluene ug/l	Ethyl-benzene ug/l	Xylene ug/l	TPH-D mg/l
VA Exc.	ND	ND	ND	ND	0.3
Bottom	ND	ND	0.3	ND	0.28
L. Water	ND	ND	ND	ND	0.68
U. Water	ND	ND	ND	ND	0.27

TABLE # 5

QUARTERLY GROUNDWATER MONITORING RESULTS

Well Number	Sample Date	TPH-D ppm	Benzene ppb	Toluene ppb	Ethyl-benzene ppb	Xylene ppb	O+G ppm
MW-1	11/06/91	ND	15	0.8	4	76	-
	03/03/92	ND	ND	ND	ND	ND	-
	07/31/92	ND	ND	ND	ND	ND	ND
	01/08/93	ND	ND	ND	ND	ND	ND
MW-2	11/06/91	ND	ND	ND	ND	ND	-
	03/03/92	ND	ND	ND	ND	ND	-
	07/31/92	ND	ND	ND	ND	ND	ND
	01/08/93	ND	ND	ND	ND	ND	ND
MW-3	11/06/91	ND	ND	ND	ND	ND	-
	03/03/92	ND	ND	ND	ND	ND	-
	07/31/92	ND	ND	ND	ND	ND	ND
	01/08/93	ND	ND	ND	ND	ND	ND



Growth Environmental Services, Inc.	DESCRIPTION: Sample Location	FIGURE: FIGURE #1	PROJECT NUMBER: VA009201
	PROJECT\LOCATION: VA MEDICAL CENTER, 4951 ARROYO ROAD, LIVERMORE, CA. 94550	PROJECT MANAGER: GLR	FILE NAME: 173-631.DWG
		DRAWING DATE: MAR. 29, 1995	DRAWN BY: K. ANDREWS

INTRODUCTION

Soil samples were collected on May 25, 1995 by Growth Environmental Services, Inc. with the use of Geoprobe sampling equipment. One probe was advanced in a location eighteen feet into the Fire House, eight feet southwest of the lunch room door to a depth of sixteen feet below grade. The former fuel oil tank was located beneath the area presently occupied by the fire house garage. An over-excavation of contaminated soil in front of the fire house garage is documented in the Tank Removal report dated August 17, 1995.

SOIL SAMPLING AND ANALYTICAL RESULTS

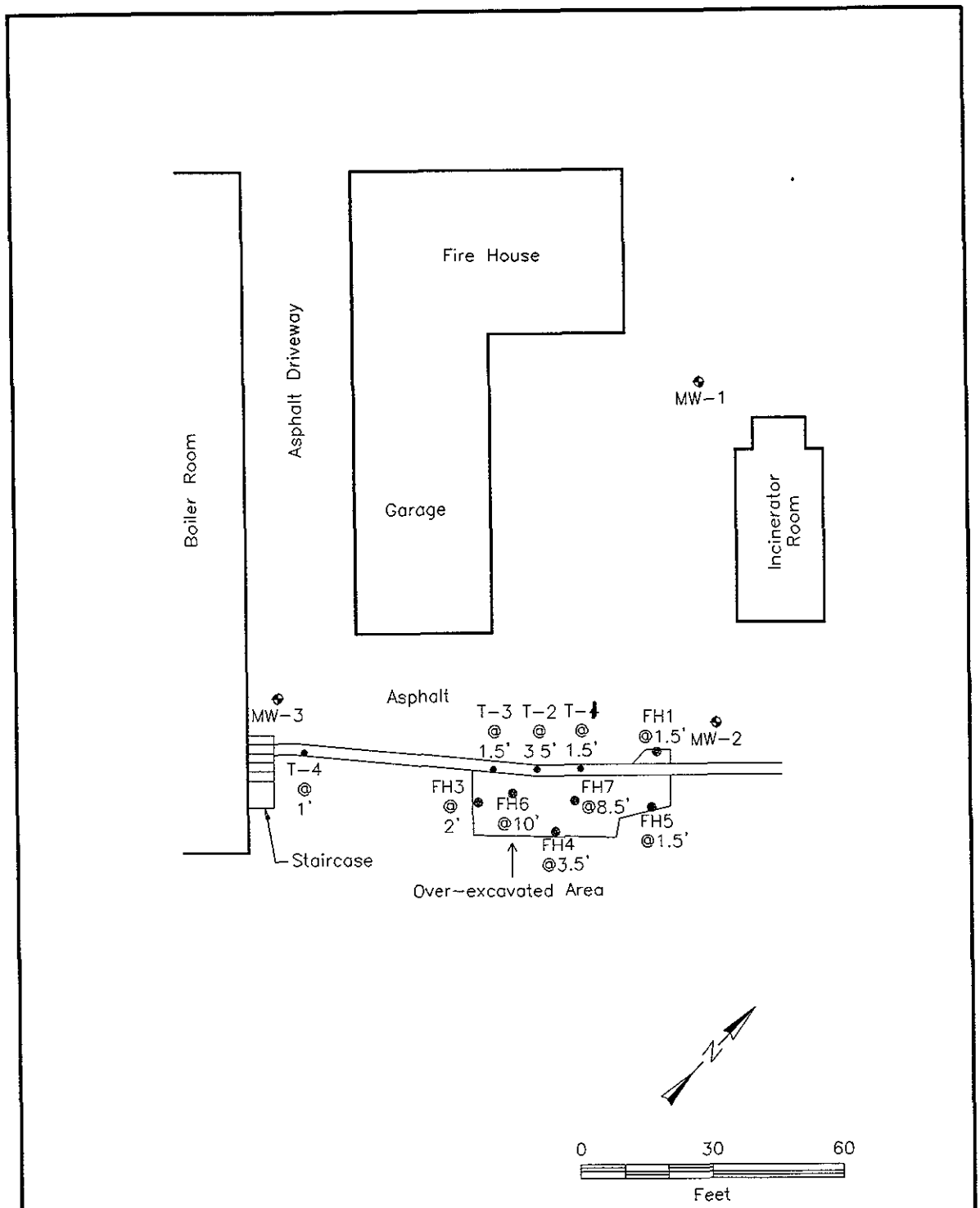
Soil Sampling. One soil probe was advanced using GROWTH's truck mounted Geoprobe sampling equipment. Three soil samples were collected at depths of 5, 10 and 15 feet below grade. The soil samples consisted of medium brown, medium grained sand with silt and occasional angular gravel. The hardness increased at approximately ten feet below grade and sampling refusal was encountered at sixteen feet below grade. No odor or staining was observed in the field until 15 feet below grade. Soon after, sampling refusal was encountered. At the lowest sample interval obtained by GROWTH, stained soil was noted to extend to the base of the sample (16 feet below grade). Soil samples were delivered on ice under GROWTH chain of custody protocol to McCampbell Analytical of Pacheco, California, a state certified laboratory.

Analytical Results. The three soil samples collected on May 25, 1995 inside the fire house were analyzed for Total Petroleum Hydrocarbons as gasoline (TPH-G), as diesel (TPH-D) and benzene, toluene, ethylbenzene and total xylenes (BTEX) by EPA GCFID modified method 8015/8020. None of these analytes were detected in the samples collected from 5 and 10 feet below grade. The third sample was collected in stained soil at the 15 feet below grade surface interval. A summary of the sample results is presented in Table 1.

Table 1
Soil Sample Analytical Results
Sampling Inside the Fire House
May 25, 1995

Sample I.D.	TPH-G	TPH-D	Benzene	Toluene	Ethyl-benzene	Total Xylenes
IFH1-1	ND	ND	ND	ND	ND	ND
IFH1-2	ND	ND	ND	ND	ND	ND
IFH1-3	24	950	ND	0.016	ND	0.026
Detection Limits	1.0 mg/kg	1.0 mg/kg	0.005 mg/kg	0.005 mg/kg	0.005 mg/kg	0.005 mg/kg

ND - Below Detection Limits ** mg/kg = parts per million

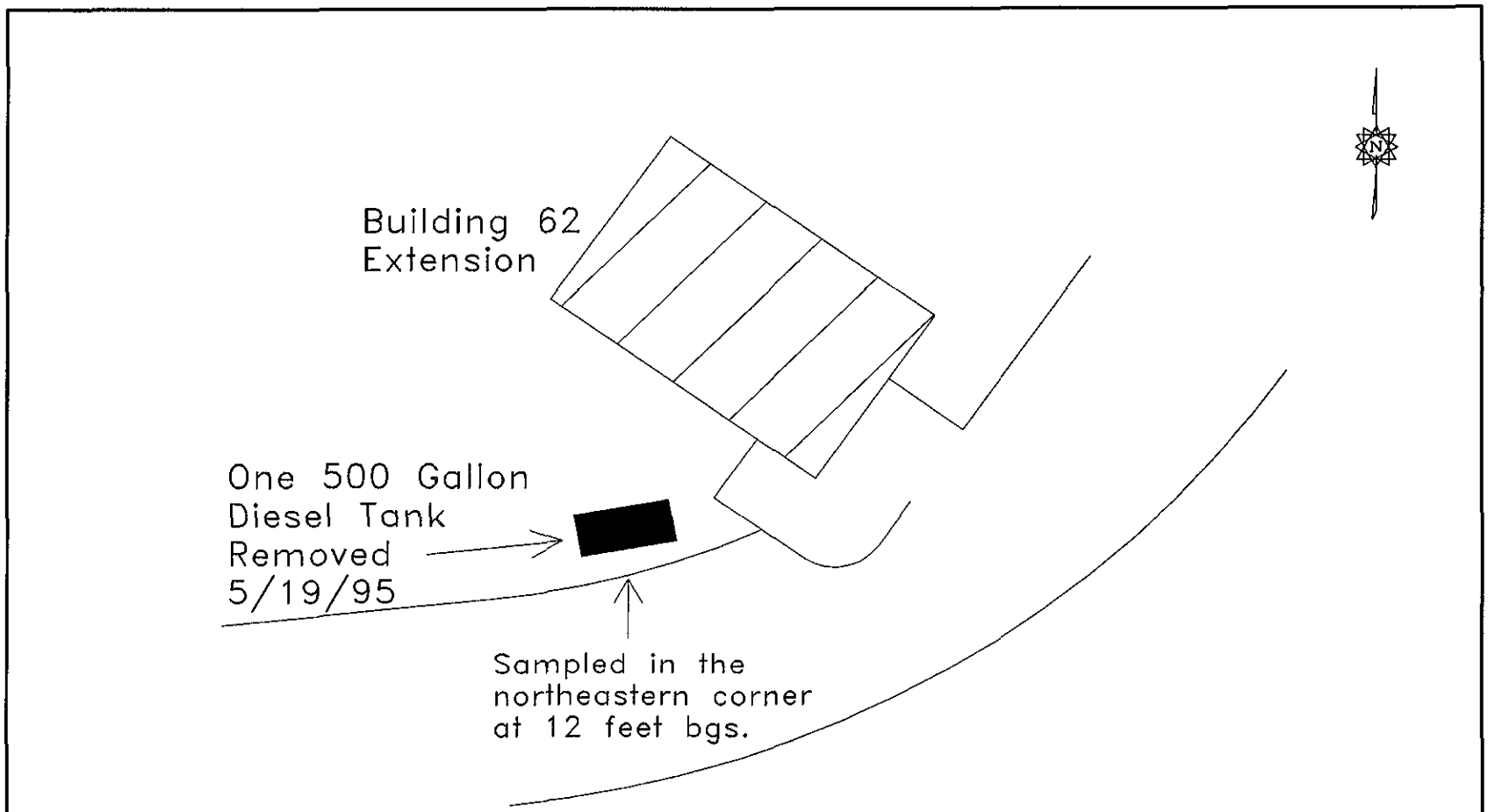


Growth Environmental Services, Inc.	DESCRIPTION: Trench Over-excavation	FIGURE: FIGURE #8	PROJECT NUMBER: SF079508
	PROJECT\LOCATION: VA MEDICAL CENTER, 4951 ARROYO ROAD, LIVERMORE, CA. 94550	PROJECT MANAGER: G. Rogers	FILE NAME: SF079508.dwg
		DRAWING DATE: MAR. 29, 1995	DRAWN BY: K. ANDREWS

Table 7
Fire Station Excavation Soil Samples Analytical Results
Collected on 3/17/95 and3/29/95
Sample Results Reported in mg/Kg (equivalent to ppm)

Sample I.D.	TPH-G	TPH-D	Benzene	Toluene	Ethylbenzene	Xylenes
Stkp 1 (3/17/95)	NA	19	ND	ND	ND	ND
T-1	NA	5700	0.017	0.022	0.21	0.50
T-2	NA	50	ND	ND	ND	0.009
T-3	NA	3.5	ND	ND	ND	ND
T-4	NA	ND	ND	ND	ND	ND
Stkp 1 (3/29/95)	47	980	ND	0.005	0.022	0.078
Stkp 2	9.2	760	ND	ND	ND	ND
FH-1 @ 1.5'	ND	ND	ND	ND	ND	ND
FH-2 @ 3.5'	ND	3.0	ND	ND	ND	ND
FH-3 @ 2'	ND	6.2	ND	ND	ND	ND
FH-4 @ 3.5'	ND	ND	ND	ND	ND	ND
FH-5 @ 1.5'	ND	22	ND	ND	ND	ND
FH-6 @ 10'	ND	9.7	ND	ND	ND	ND
FH-7 @ 8.5'	ND	30	ND	ND	ND	ND
Detection Limits	1.0 mg/Kg	10 mg/Kg	0.005 mg/Kg	0.005 mg/Kg	0.005 mg/Kg	0.005 mg/Kg

NA - Not Analyzed
ND - Below Detection Limits



GROWTH
Growth Environmental Services, Inc.

DESCRIPTION: Former UST Locations		FIGURE: Figure 9	PROJECT NUMBER: SF079508
		DRAWN BY:	
PROJECT/LOCATION: Building 62		REVISED: M. Davis	FILE NAME: VA Med. Center
		DRAWING DATE: 6/2/95	P.M.: G. Rogers

Table 8
Analytical Results from Soil Samples Collected 5/19/95
Near Buildings 62 and 65 (mg/Kg equivalent to ppm)

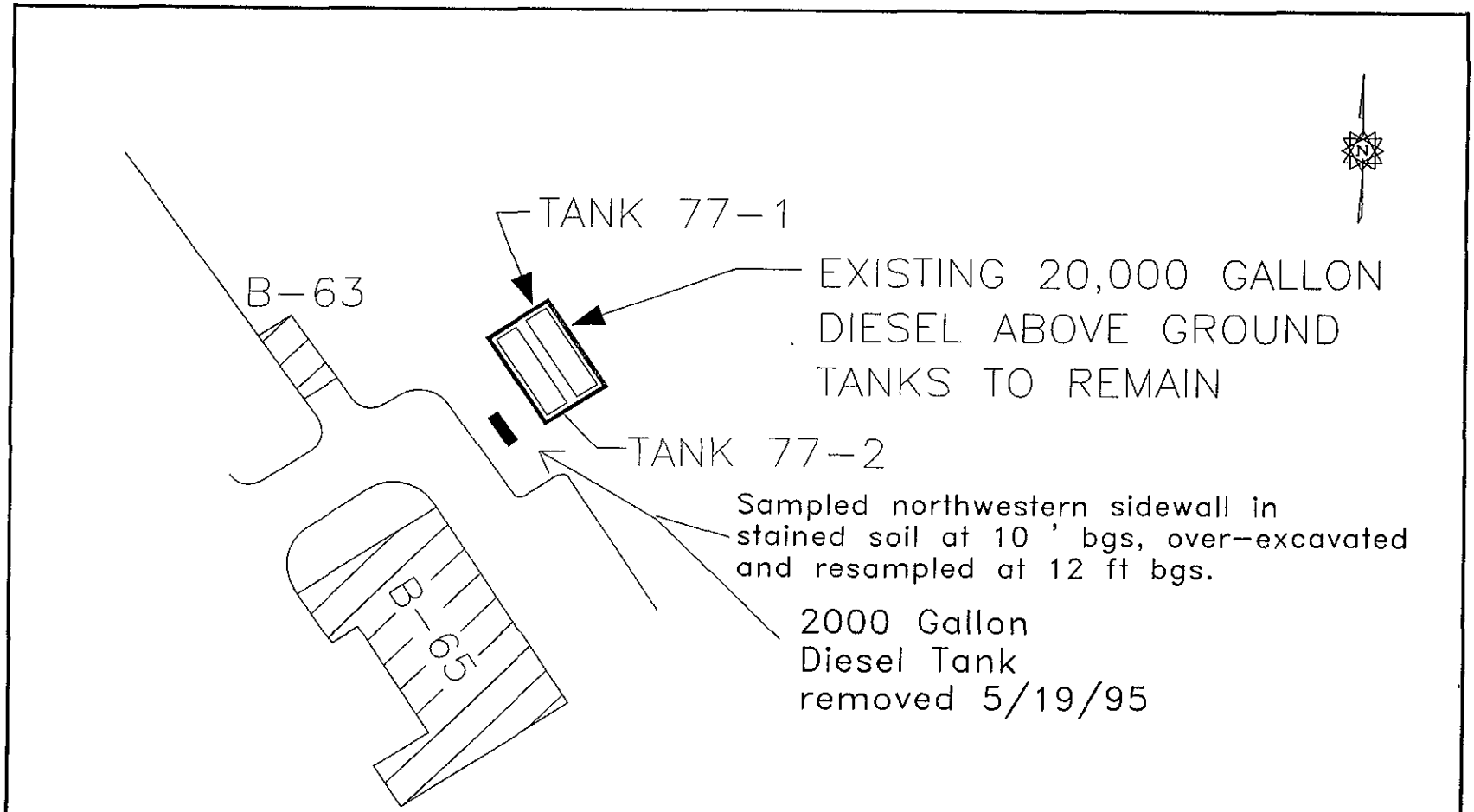
Sample I.D.	TPH-D	Benzene	Toluene	Ethyl-benzene	Xylenes
Bld.-62-500-D	ND	ND	ND	ND	ND
Bld.-62-500-D Stkp	210	ND	ND	ND	ND
Bld.-65-N	2100	ND	ND	ND	ND
Bld.-65-E	21	ND	ND	ND	ND
Bld.-65-Stkp 1	73	ND	ND	ND	ND
Bld.-65-Stkp 1A	8.2	ND	ND	ND	ND
Bld. -65-Stkp2	200	ND	ND	ND	ND
Detection Limits	1.0 (mg/Kg)	0.005 (mg/Kg)	0.005 (mg/Kg)	0.005 (mg/Kg)	0.005 (mg/Kg)

ND - Below Detection Limits

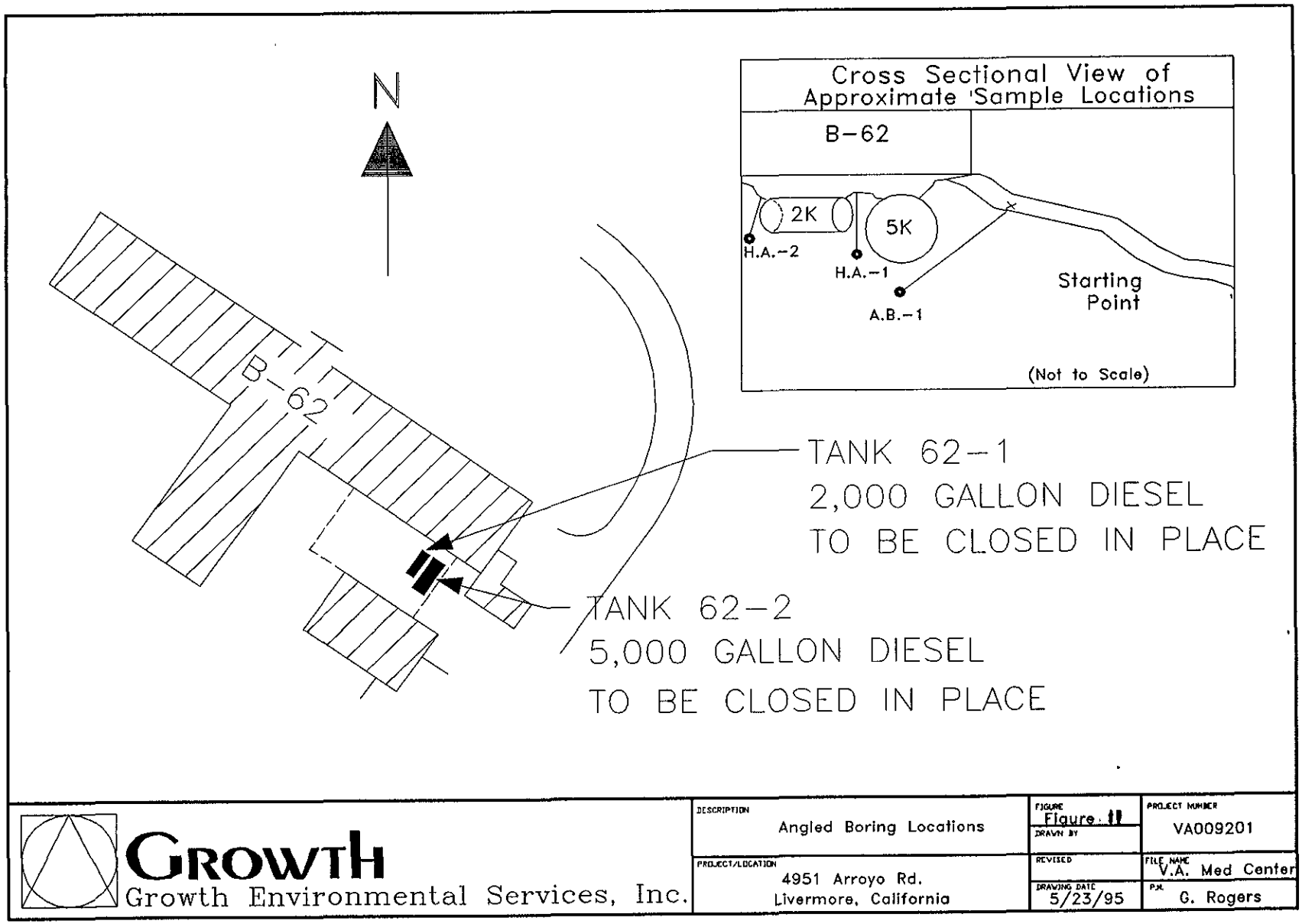
Table 9
Analytical Results from Soil Samples Collected 5/25/95
Near Building 65 (mg/Kg equivalent to ppm)

Sample I.D.	TPH-G	TPH-D	Benzene	Toluene	Ethyl-benzene	Xylenes
Bld.65-N-2	1.6	56	ND	ND	ND	ND
Bld.65-T-1	ND	11	ND	ND	ND	ND
Bld.65-Stkp1B	6.1	64	ND	ND	ND	ND
Detection Limits	1.0 (mg/Kg)	1.0 (mg/Kg)	0.005 (mg/Kg)	0.005 (mg/Kg)	0.005 (mg/Kg)	0.005 (mg/Kg)

ND - Below Detection Limits



GROWTH Growth Environmental Services, Inc.	DESCRIPTION: Former UST Locations	FIGURE: Figure #10 DRAWN BY:	PROJECT NUMBER: SF09508
	PROJECT/LOCATION: Building 65	REVISED: M. Davis DRAWING DATE: 6/2/95	FILE NAME: VA Med. Center P.M.: G. Rogers



Growth Environmental Services, Inc.	DESCRIPTION: Angled Boring Locations	FIGURE: Figure 11	PROJECT NUMBER: VA009201
	PROJECT/LOCATION: 4951 Arroyo Rd. Livermore, California	DRAWN BY / REVISED	FILE NAME: V.A. Med Center
		DRAWING DATE: 5/23/95	P.M.: G. Rogers

Table 6 10
Building 62, In Place Tank Closures
Sampled May 25 and 26, 1995
Analytical Results Reported in mg/kg (equivalent to ppm)

Sample I.D.	TPH-D	Benzene	Toluene	Ethylbenzene	Xylenes
A.B.-1	ND	ND	ND	ND	ND
H.A.-1	1.5	ND	ND	ND	ND
H.A.-2	290	ND	ND	ND	ND
Detection Limits	1.0 mg/kg	0.005 mg/kg	0.005 mg/kg	0.005 mg/kg	0.005 mg/kg

ND - Below Detection Limits
mg/L = parts per million

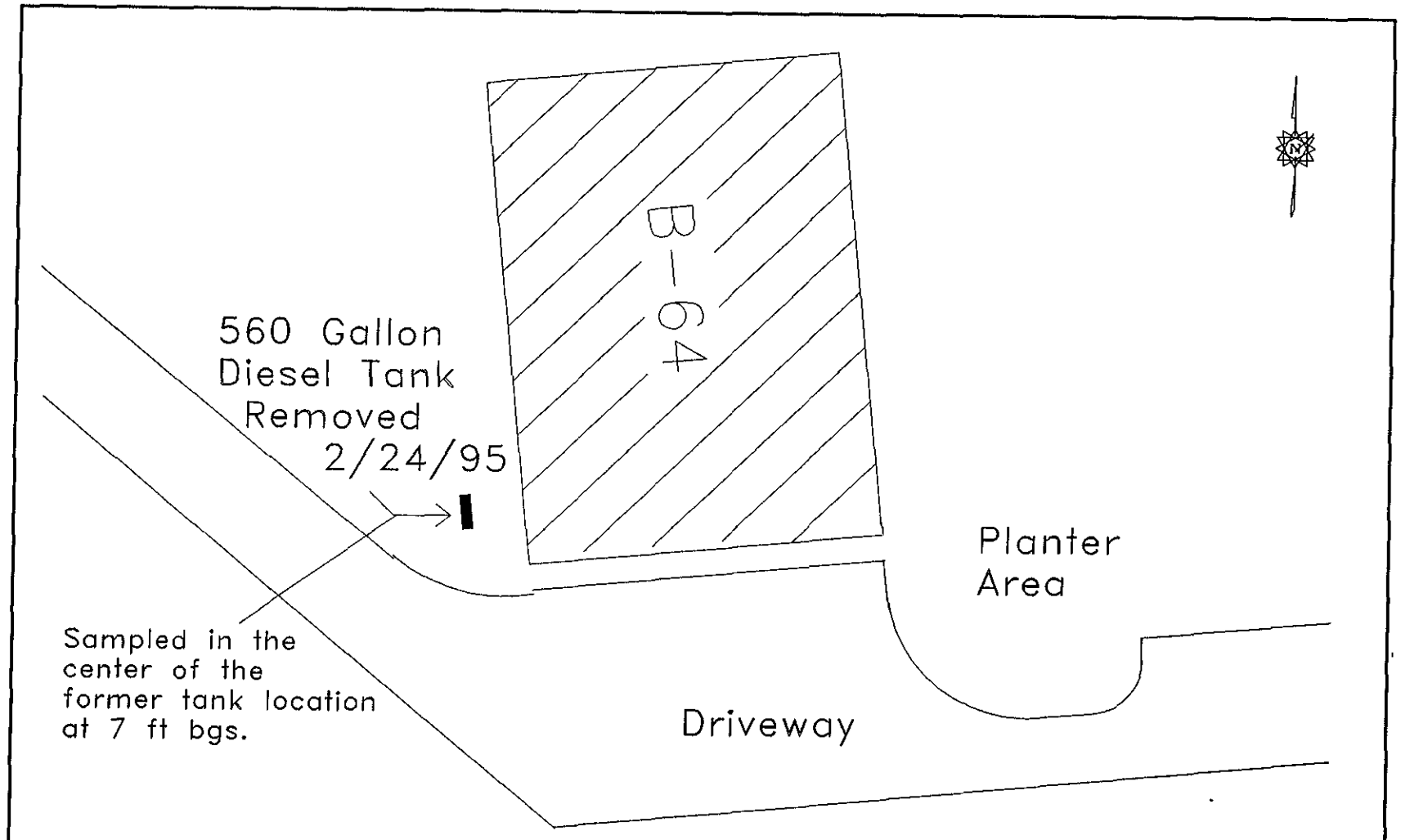
TANK CLOSURE

The tanks were vacuumed and their contents were submitted to a waste recycler. All venting pipe was disconnected and the tanks were pumped with 40 cubic yards of 4 sack sand grout by RCI to ensure that no storage space was left for rain water or other substances (Pictures documenting the grouting are provided in Appendix D). The exposed area of the tanks was covered with the displaced surface soil to grade.

CONCLUSIONS/RECOMMENDATIONS

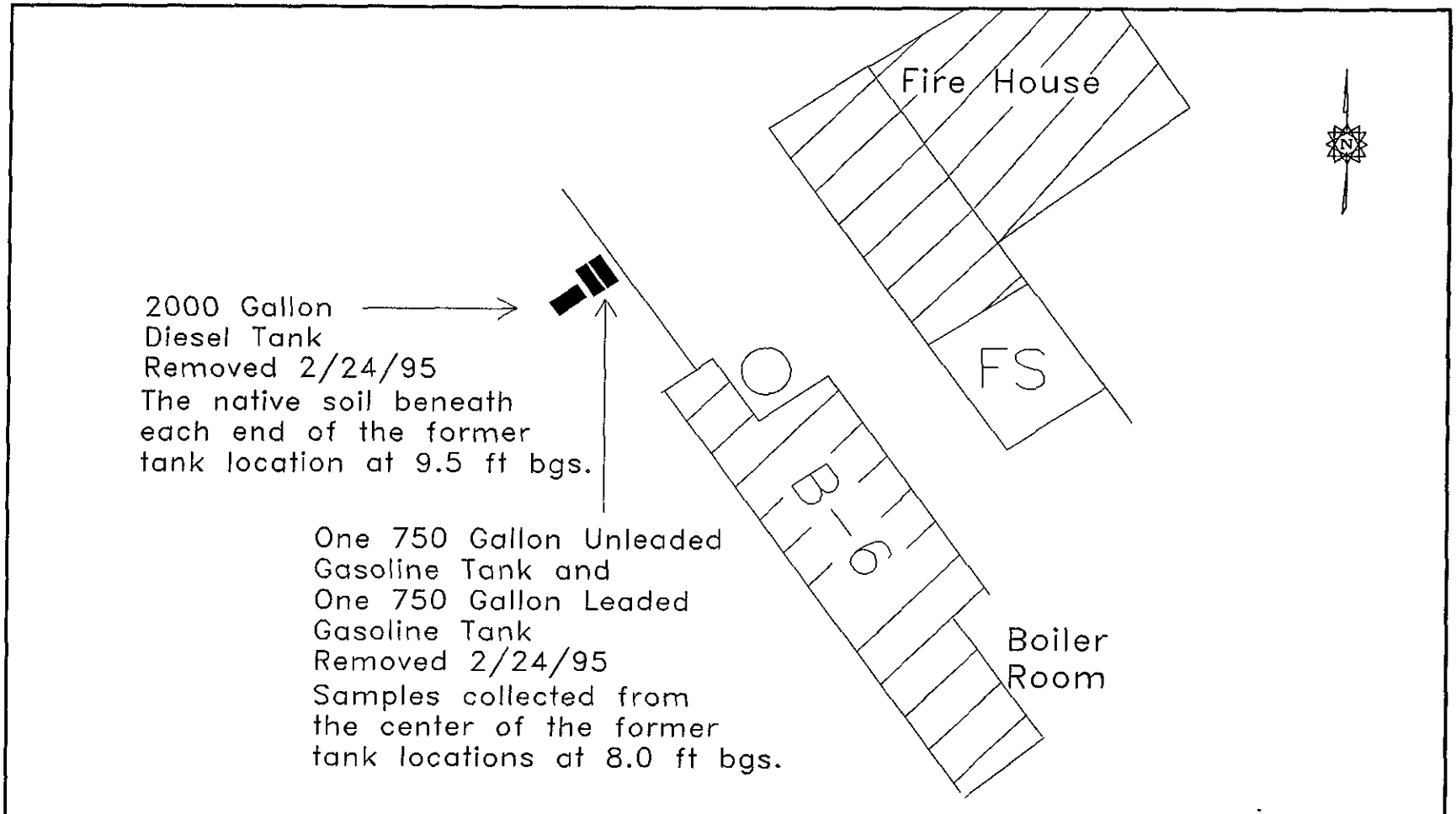
All tank removal and associated over-excavation activities that occurred at the VA Medical center removed the majority of the petroleum hydrocarbon contamination present. The low levels that remain, or were returned as backfill, are within acceptable ranges as indicated by Eva Chu of the Alameda County Department of Environmental Health. GROWTH recommends case closure on the eight tanks that were removed at the Veterans Administration Medical Center, 4951 Arroyo Road, Livermore, California.

During the sampling activities on May 25 and May 26, 1995, at the Building 62 UST's (designated to be closed in place), twoof the three soil samples collected contained detectable levels of petroleum hydrocarbons. No BTEX constituents, however, were found in any of the three samples collected on May 25 and 26, 1995. The levels and amounts of diesel present are within an acceptable range for closure in place, as communicated by Eva Chu of the Alameda County of Environmental Health. Therefore, GROWTH recommends no additional work be performed and case closure be granted for the two tanks closed in place in the vicinity of the Building 62 at the Veterans Administration Medical Center.



GROWTH
Growth Environmental Services, Inc.

DESCRIPTION: Former UST Locations	FIGURE: Figure # 12		PROJECT NUMBER: SF079508
PROJECT/LOCATION: Building 64	DRAWN BY:	REVISED: M. Davis	FILE NAME: VA Med. Center
		DRAWING DATE: 6/2/95	P.M.: G. Rogers



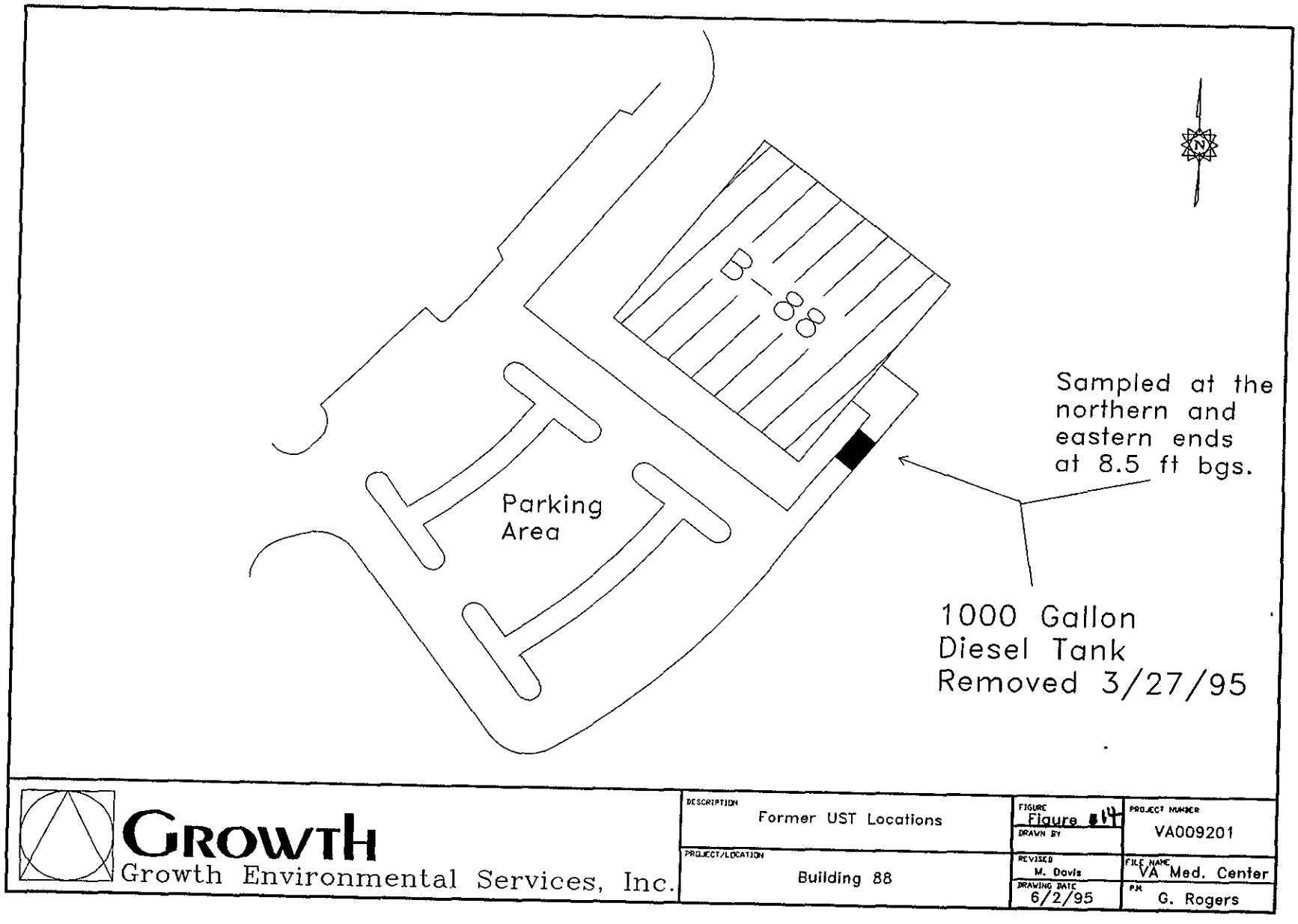
GROWTH Growth Environmental Services, Inc.	DESCRIPTION: Former UST Locations	FIGURE: Figure 13	PROJECT NUMBER: SF079508
	PROJECT/LOCATION: Building 6	DRAWN BY / REVISED	FILE NAME: VA Med. Ctr.
		DRAWING DATE: 6/2/95	PM: G. Rogers

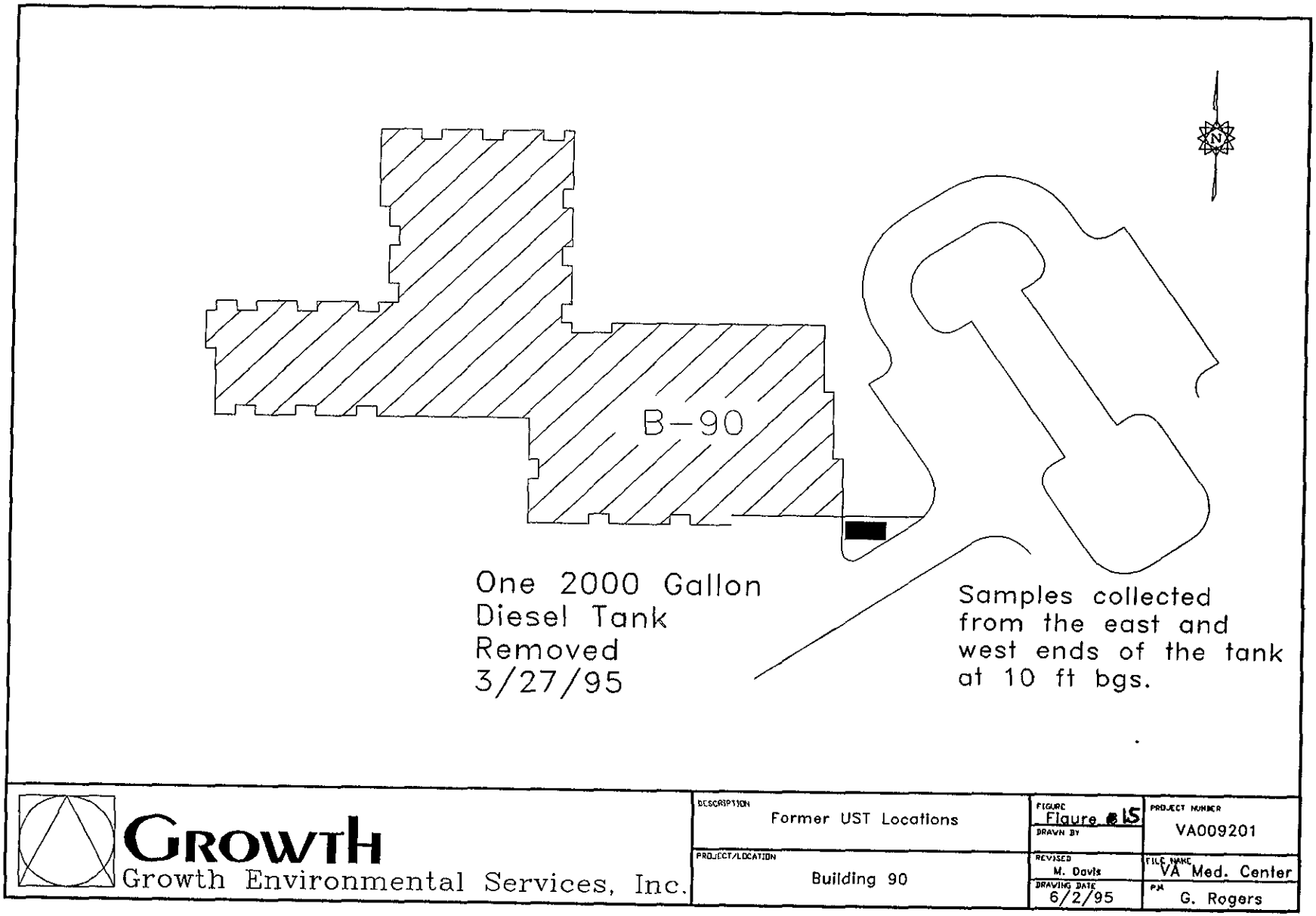
Table 1

Analytical Results from Soil Samples Collected 2/24/95
Near Buildings 6 and 64
Sample Results Reported in mg/kg (equivalent to ppm)

Sample I.D.	TPH-G	TPH-D	Benzene	Toluene	Ethylbenzene	Xylenes
560-D @7'	NA	ND	ND	ND	ND	ND
560-D Stkp	NA	9.9	ND	ND	ND	ND
750-G N@8'	ND	NA	ND	ND	ND	ND
750-G S@8'	1.7	NA	ND	0.005	0.005	0.042
2000-G N@9.5'	4.4	NA	0.013	0.081	0.040	0.29
2000-G S@9.5'	ND	NA	ND	ND	ND	ND
750-G Stkp 1	ND	NA	ND	ND	ND	ND
750-G Stkp 2	4.6	NA	ND	0.013	ND	0.062
2000-G Stkp 1	ND	NA	ND	ND	ND	ND
2000-G Stkp 2	ND	NA	ND	ND	ND	ND
Detection Limits	1.0 (mg/Kg)	10 (mg/Kg)	0.005 (mg/Kg)	0.005 (mg/Kg)	0.005 (mg/Kg)	0.005 (mg/Kg)

NA - Not Analyzed
ND - Below detection limits


B
88
Parking
Area
Sampled at the
northern and
eastern ends
at 8.5 ft bgs.
1000 Gallon
Diesel Tank
Removed 3/27/95
GROWTH
Growth Environmental Services, Inc.
DESCRIPTION
Former UST Locations
FIGURE
Figure #4
DRAWN BY
PROJECT NUMBER
VA009201
PROJECT/LOCATION
Building 88
REVISED
M. Davis
FILE NAME
VA Med. Center
DRAWING DATE
6/2/95
PM
G. Rogers



GROWTH Growth Environmental Services, Inc.	DESCRIPTION: Former UST Locations	FIGURE: Figure # 15 DRAWN BY:	PROJECT NUMBER: VA009201
	PROJECT/LOCATION: Building 90	REVISED: M. Davis DRAWING DATE: 6/2/95	FILE NAME: VA Med. Center PM: G. Rogers

Table2
Analytical Results from Soil Samples Collected 3/27/95
Near Buildings 88 and 90
Sample Results Reported in mg/Kg (equivalent to ppm)

Sample I.D.	TPH-D	Benzene	Toluene	Ethylbenzene	Xylenes
Bld. 88-N	ND	ND	ND	ND	ND
Bld. 88-S	ND	ND	ND	ND	ND
Bld. 90-W	3.2	ND	ND	ND	ND
Bld. 90-E	ND	ND	ND	ND	ND
Bld. 88 Stkp.	52	ND	ND	ND	ND
Bld. 90 Stkp1	11	ND	ND	ND	ND
Bld. 90 Stkp2	26	ND	ND	ND	ND
Detection Limits	1.0 mg/Kg	0.005 mg/Kg	0.005 mg/Kg	0.005 mg/Kg	0.005 mg/Kg

ND - Below Detection Limits

TRENCHING AND OVER-EXCAVATION NEAR THE FIRE STATION

Two 12,000 gallon underground storage tanks (see Figure 7) were excavated and removed from the VA Medical Center Fire Station, located at 4951 Arroyo Road, Livermore, California (Figure 1) in November 1990. The tanks stored No. 5 fuel oil and had not been used since 1965. During tank removal conducted by Augeas Corporation, contamination of subsurface soils and groundwater beneath the site was identified.

In November and December 1990, approximately 4,000 cubic yards of soil were excavated and stockpiled on site. Soil samples collected during excavation revealed levels of contamination at 9,000 ppm Oil and Grease (O+G) and 3,700 ppm of Total Petroleum Hydrocarbons as Diesel (TPH-D) in the excavated soil.

In 1991, Augeas Corporation reported that soil sample analytical results indicated that fuel oil contamination existed only on the northwestern wall extending under the fire house garage. During in-house trenching activities in front of the fire house at the VA Medical Center, operators encountered what appeared to be petroleum hydrocarbon contamination in the soil. On March 17, 1995 a GROWTH geologist collected four soil samples at locations marked T-1 through T-4 on Figure 7. Diesel contamination was detected in the samples up to a level of 5700 ppm, and over-excavation activities were initiated on March 29, 1995. The soil removed extended the middle of the original trench to approximately 12 feet by 45 feet to an average depth of 7 feet

Project: VA Hospital Job No. ________ BORING MW-1 Sheet 1 of 1

Date Started 11/24 Completed 11/24 Surface Elevation ________

Total Depth 25' Location Livermore

Logged By KAW Drilled By Enejco

Remarks ________

ELEV. FEET	DEPTH FEET	SAMPLE TYPE	NUMBER	BLOWS PER FT	DEPTH RANGE	RECVRY	GRAPHIC LOG	SAMPLE DESCRIPTION	EQUIPMENT INSTALLED
								Silty sand (SM) minor gravel, clasts subrounded to 1" max. diameter, Moderate brown (5YR 3/4)	CON
								Silty sand (SM) no gravel, moderate yellowish brown (10YR 5/4)	
5		SS	1	12/25/28	5-6½	100%			
								interbedded thin clay of very stiff clay (CL) 10YR 5/4	BEN SE
10		SS	2	15/18/25	10-11½	100%			# SAN
								Gravel (GC) with minor clay, clasts subrounded to well rounded derived from stream bed. Clay very stiff, 10YR 5/4 and minor silt	
					initial ▽				SC
15		SS	3	100/6"	15-16	33%		Gravelly sand (SG) with minor clay, gravel clast well rounded, sand to coarse gravel, moist to saturated conditions at 15'	
								Clay (CL) moderate brown (5YR 3/4) stiff, moist, gradually changing color to bluish gray 5B 5/1	
20		SS	4	41/50/5"	21-22½				
									SOLI
25								Terminate hole @ 25'	2"

Project VA Hospital Job No. ______ BORING MW-2 Sheet 1 of 1

Date Started 11/29 Completed 11/29 Surface Elevation ______

Total Depth 20' Location Livermore

Logged By KM Drilled By Enviro

Remarks

ELEV. FEET	DEPTH FEET	SAMPLE TYPE	SAMPLE NUMBER	BLOWS PER FT	DEPTH RANGE	RECVRY	GRAPHIC LOG	SAMPLE DESCRIPTION	EQUIPMENT INSTALLED
								asphalt, medium	
								Silty clay (CL); Moderate yellow dark brown 10 YR 3/4, moist, no odor. Minor large cobbles in upper 2' of soil column.	grout
5		SS	1	13/25	5-6	100%			bentonite seal
									#3 sand
									0.02 slot
10		SS	2	25/36/57	10-11	80%		Gravel (GC) w/ minor clay, moderate yellow brown clay, gravel dense subrounded to well rounded. No odor	
							initial ▽		
15		SS	3	50/5"	15-15½	30%			
								to clayey silt (ML) Dense clay (CL) dense, fine marine sediment, bedrock bluish gray 5B 5/1	
20		SP	4	23/38/56/5"				7 minute hole at 20' sample from 20-21½	
25									

Project VA Hospital Job No. ______ BORING MW-3 Sheet 1 of 1

Date Started 11/29 Completed 11/30 Surface Elevation ______

Total Depth 25' Location Livermore

Logged By [illegible] Drilled By Enviro

Remarks ______

ELEV. FEET	DEPTH FEET	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE BLOWS PER FT	SAMPLE DEPTH RANGE	SAMPLE RECVRY	GRAPHIC LOG	SAMPLE DESCRIPTION	EQUIPMENT INSTALLED
								Concrete/asphalt Silty Clay (CL) moderate yellowish brown 10YR 5/4 no odor, clean	2' of grout 2' of bent. seal 5' of blank casing
5		SS	1	15/25/30	5-5.5				21' of sand
10		SS	2	27/36	10-11			Gravel and clay (GC) clasts subrounded alluvial origin, clay (CL) moderate yellowish brown, no odor. Gravel consists of meta. rock fragments, mostly greenstone	15' of 0.02" screen
15		SS	3	38/36/50 5"	15-16				
20		SP	4	85/	20-20.5			Gravel and sand w/ minor clay (GS) brown [illegible] - w/in fluctuating water table sand is med to coarse grain, gravel clast subrounded to subang. meta rock fragments mostly greenstone	
25		SP	5	85/6"	25-25.5			Terminate boring at 25'	5' of blank casing

Project VA Hospital Job No. ______ BORING SB-13 Sheet ____ of ____

te Started 11/26 Completed 11/26 Surface Elevation ______

Total Depth 20' Location Livermore

Logged By KRM Drilled By Enerco

Remarks Drilled hole adjacent to firestation (approx 2' away from structure)

ELEV. FEET	DEPTH FEET	SAMPLE TYPE	SAMPLE NUMBER	BLOWS PER FT	DEPTH RANGE	RECVRY	GRAPHIC LOG	SAMPLE DESCRIPTION	EQUIPMENT INSTALLED
								Concrete sidewalk w/ reinforcement silty sand	
5									
10									
								Clayey Gravel zone	
15								contamination at 15'	
								Shale bedrock at 18'	
20									