R0232

STRATUS ENVIRONMENTAL, INC.

3330 Cameron Park Drive, Ste 550
Cameron Park, California 95682
(530) 676-6004 ~ Fax: (530) 676-6005

January 14, 2004
Project No. 2007-0057-01

Alameda County
JAN 15 2004
Environmental Health

Mr. Don Hwang
Alameda County Health Agency
Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Re: Work Plan for Monitoring Well Replacement at USA Service Station No. 57, Located at 10700 MacArthur Boulevard, Oakland, California

Dear Mr. Hwang:

Stratus Environmental, Inc. (Stratus) has prepared this Work Plan on behalf of USA Gasoline Corporation (USA) for the former USA Service Station No. 57, located at 10700 MacArthur Boulevard, Oakland, California (Figure 1). This Work Plan proposes to remove the existing groundwater monitoring well network to facilitate redevelopment of the site. Replacement monitoring wells will be installed following completion of site redevelopment activities. This Work Plan was prepared in response to a letter from Alameda County Environmental Health Services (ACEHS), dated September 19, 2003.

The property owner plans to redevelop this site and the adjacent shopping center. Plans provided by the developer (Jay-Phares Corporation) indicate that a retail shopping pavilion will be constructed over the former USA site. Based on details provided by the developer, construction will also likely involve lowering the ground surface elevation of the former service station by approximately six feet. The groundwater monitoring well network will be impacted by these construction activities. In addition, construction of the building over the subject site might severely limit access to the area of impact for future remedial actions, if warranted. Locations of the current monitoring well network, proposed redevelopment, and proposed replacement monitoring wells are shown on Figure 2.

Stratus would like to implement remedial measures in the area of groundwater impact prior to abandonment of the monitoring well network. Stratus will discuss interim remediation with ACEHS and, if warranted, will prepare a work plan for any interim remedial activities.

SITE DESCRIPTION

The subject site is currently a vacant lot situated on the eastern corner of the intersection of Foothill Boulevard and 108th Avenue in Oakland, California (Figure 2). The station was closed and the underground storage tanks (USTs) were removed in July 1994. The UST pit and immediate vicinity were over-excavated in September and October 1994.

Two groundwater monitoring wells (S-1 and S-2) were installed in February 1984. One additional groundwater monitoring well (MW-3) and eight soil borings (B-1 through B-8) were installed in March 1995. Five additional groundwater monitoring wells (MW-4 through MW-8) were installed in January 1995. The monitoring well network has been monitored and sampled nineteen times since March 1995.

ACEHS CORRESPONDENCE

In a letter dated September 19, 2003, ACEHS requested information regarding the foundation of the proposed building, further information on injection of oxygen releasing compound (ORC) previously proposed by GHH, logs for wells S-1 and S-2, historical groundwater data, and additional analyses of groundwater samples.

Foundation details for the proposed construction will be forwarded when they have been received from the developer. Information on ORC injection is not provided at this time, as Stratus would like to discuss other interim remedial actions with ACEHS, as mentioned above. The requested boring logs and soil analytical data are included in Appendix A. A rose diagram illustrating historical groundwater flow could not be generated, as four of the ten available groundwater elevation contour maps indicate that flow is radial around wells S-1, S-2, and MW-7. Because radial flow cannot be properly illustrated on a rose diagram and nearly half the maps indicate radial flow, a rose diagram was not created. Available groundwater elevation maps are included in Appendix B. The requested additional analyses were incorporated into the regular monitoring and sampling program beginning with the third quarter 2003.

PROPOSED SCOPE OF WORK

To facilitate proposed construction activities, Stratus will abandon the current monitoring well network (wells S-1, S-2, and MW-3 through MW-8) prior to start of site redevelopment activities, tentatively scheduled to begin in March 2004. Replacement monitoring wells will be installed after site redevelopment and construction activities are completed. The scope of work has been subdivided into tasks 1 through 4. All geologic work will be performed under the supervision of a State of California Registered Geologist or Registered Engineer, and will be conducted in accordance with standards established by the *Tri-Regional Board Guidelines for Hydrocarbon Site Assessment and*

Remediation (RWQCB 1991). Stratus' Field Practices and Procedures are included in Appendix C. All drilling and well installation activities will be performed by a California-licensed well contractor.

Task 1 Monitoring Well Destruction

Prior to destroying the existing monitoring wells, Stratus will update the site-specific health and safety plan, will obtain the required well destruction permits, and will notify Underground Service Alert. All monitoring wells in the existing monitoring well network will be drilled out to the total installed depth explored, using 10-inch diameter hollow-stem augers, to remove all well construction material (casing, grout seal, sandpack, etc.). After each of the wells has been drilled out, the boring will be backfilled with neat cement to ground surface. Drill cuttings will be placed on and covered with plastic sheeting pending removal to an appropriate facility by a licensed contractor.

Task 2 Replacement Well Installation

Following completion of site redevelopment activities, Stratus will install replacement groundwater monitoring wells to monitor plume stability. Proposed locations for the replacement wells are shown Figure 2. Actual locations of the wells will depend on site conditions, such as locations of underground utilities, final locations of aboveground facilities, etc. Prior to initiating the well installation activities, Stratus will obtain the required well installation permits, and will notify Underground Service Alert. Based on the available subsurface data and the anticipated removal of approximately six feet of soil during site redevelopment, we anticipate that groundwater will be encountered at approximately 15 feet below ground surface (bgs) during well installation activities.

Drilling Activities

The drilling contractor will advance the well borings using a truck mounted drilling rig equipped with 8-inch diameter hollow stem augers at the six locations indicated on Figure 2. These borings will be drilled to a depth of approximately 25 feet bgs. These borings will be completed as 2-inch diameter groundwater monitoring wells. The initial 5 feet of each boring will be advanced with a hand auger and/or posthole digger to reduce the possibility of damaging underground utilities.

Each soil boring will be sampled at five foot intervals, at a minimum. Soil samples will be collected using a California-type, split-spoon sampler equipped with three pre-cleaned brass tubes. The ends of the bottom-most, intact tube from each sample interval will be covered with Teflon™ sheets, then sealed with tight-fitting plastic caps. Each sample will then be labeled, placed in a resealable plastic bag, and stored in an ice-chilled cooler. The samples will remain chilled until relinquished to a state-certified analytical laboratory. Strict chain-

of-custody procedures will be followed from the time the samples are collected until the time the samples are relinquished to the laboratory. Soil contained in the remaining brass tubes will be screened for volatile organic compounds using field instrumentation equipped with a photoionization detector (PID).

Stratus will record PID readings, soil types, and other pertinent geologic data on the borehole log. We anticipate that, at a minimum, the soil sample exhibiting the highest PID response and the sample from the capillary fringe zone (just above first-encountered groundwater) will be submitted for chemical analyses. Additional samples may be analyzed at the discretion of the Registered Geologist or Engineer overseeing the project.

Monitoring Well Construction

The monitoring wells will be constructed using 2-inch diameter polyvinyl chloride (PVC) casing, installed to a depth of approximately 25 feet bgs. The wells will be constructed using 15 feet of 0.02-inch diameter factory slotted well screen, installed from approximately 10 to 25 feet bgs (5 feet above and 10 feet below first encountered groundwater). A filter pack of Lonestar® #3 sand will be placed in the annular space around the well from the bottom of the well screen to approximately 1 foot above the top of the well screen (9 to 25 feet bgs). Two feet of bentonite will be placed on top of the filter pack to provide a transition seal for the well. Neat cement will be used to backfill the remaining annular space around the well casing up to surface grade. The actual well construction may be modified in the field based on conditions encountered at the time of the investigation.

Well Development and Sampling

A minimum of 72 hours after installation of the wells has been completed, the newly installed monitoring wells will be developed using a surge block and groundwater pumping. Development will continue, to the extent practical, until the development water runs clean and pH and conductivity measurements stabilize. After well development and stabilization of the water levels, water levels and the quantity of well volumes removed from the well will be recorded.

A minimum of 24 hours after the groundwater monitoring wells have been developed, the wells will be purged and groundwater samples will be collected. The samples will be collected using a disposable bailer, transferred into laboratory-supplied glass vials, and placed in an ice-chilled cooler. The samples will remain chilled until relinquished to a state-certified analytical laboratory. Strict chain-of-custody procedures will be followed from the time the samples are collected until the time they are relinquished to the laboratory. The newly installed groundwater monitoring wells will be placed on a quarterly monitoring program. Additional information regarding sampling and analysis procedures are included in Appendix C.

Well Surveying

The elevation of the top of each well casing will be surveyed to the nearest 0.01 vertical feet under the direction of a California-licensed surveyor. Well casing elevations will be referenced to mean sea level. Latitudes and longitudes of each well will also be established using the Global Positioning System (GPS). Well survey data will be forwarded to the State Water Resources Control Board for inclusion in the GeoTracker database.

Waste Management

All drill cuttings will be placed on and covered with plastic sheeting pending disposal. Wastewater generated will be placed in DOT-approved 55-gallon steel drums and stored on-site pending disposal. A composite sample will be collected from the soil cuttings and will be analyzed for disposal characterization. A licensed contractor will transport the soil and wastewater to an appropriate disposal facility.

Task 3 Laboratory Analysis

Soil and groundwater samples will be forwarded to Alpha Analytical, Inc., a California state-certified laboratory (ELAP #2019), for chemical analyses. Samples will be handled under strict chain-of-custody protocol until released to the laboratory. The soil and groundwater samples will be analyzed for total petroleum hydrocarbons as gasoline (TPHG) using USEPA Method SW8015B/DHS LUFT Manual, and for benzene, toluene, ethylbenzene, and total xylenes (BTEX), methyl tertiary butyl ether (MTBE), ethyl tertiary butyl ether (ETBE), di-isopropyl ether (DIPE), tertiary amyl methyl ether (TAME), tertiary butyl alcohol (TBA), 1,2-dichloroethane (1,2-DCA), and ethylene dibromide (EDB) using USEPA Method SW8260B.

Task 4 Report Preparation

Stratus will prepare a report regarding destruction of the existing monitoring well network. This report will document the well destruction methodology, and will be submitted to ACEHS.

Following completion of drilling and well installation activities, and receipt of associated laboratory reports, Stratus will submit a report to ACEHS documenting installation of the replacement monitoring wells. This report will include logs of the new well borings, tabulated results of any chemical analyses, cross-sections interpreting the encountered subsurface materials, and a contour map of the groundwater elevations measured in the newly installed monitoring wells. This report will also include recommendations for additional environmental work, as warranted.

SCHEDULE

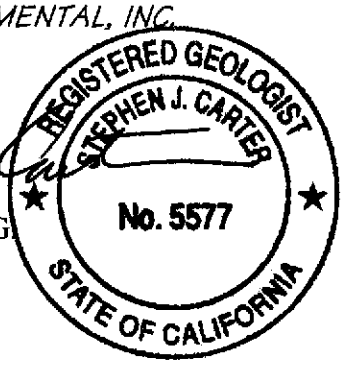
The wells of the existing groundwater monitoring well network will be destroyed at the end of February or beginning of March, 2004. Well destruction activities will be coordinated with the site developer to insure that they have been properly destroyed prior to commencement of any ground disturbance or other demolition activities that might limit access to the wells or cause the wells to become lost. The report for the well destruction activities will be submitted to ACEHS within 30 days of completion of well destruction activities.

The replacement monitoring wells will be installed after the site has been re-graded, ground disturbance activities (utility installation, foundation excavation, landscaping, etc.) have been completed, and site redevelopment activities will not impact the wells. The well installation activities will be coordinated with the site developer. The report documenting installation of the wells will be submitted to ACEHS 60 days after completion of well installation activities.

If you have questions, please call Steve Carter at 530-676-6008.

Sincerely,

STRATUS ENVIRONMENTAL, INC.



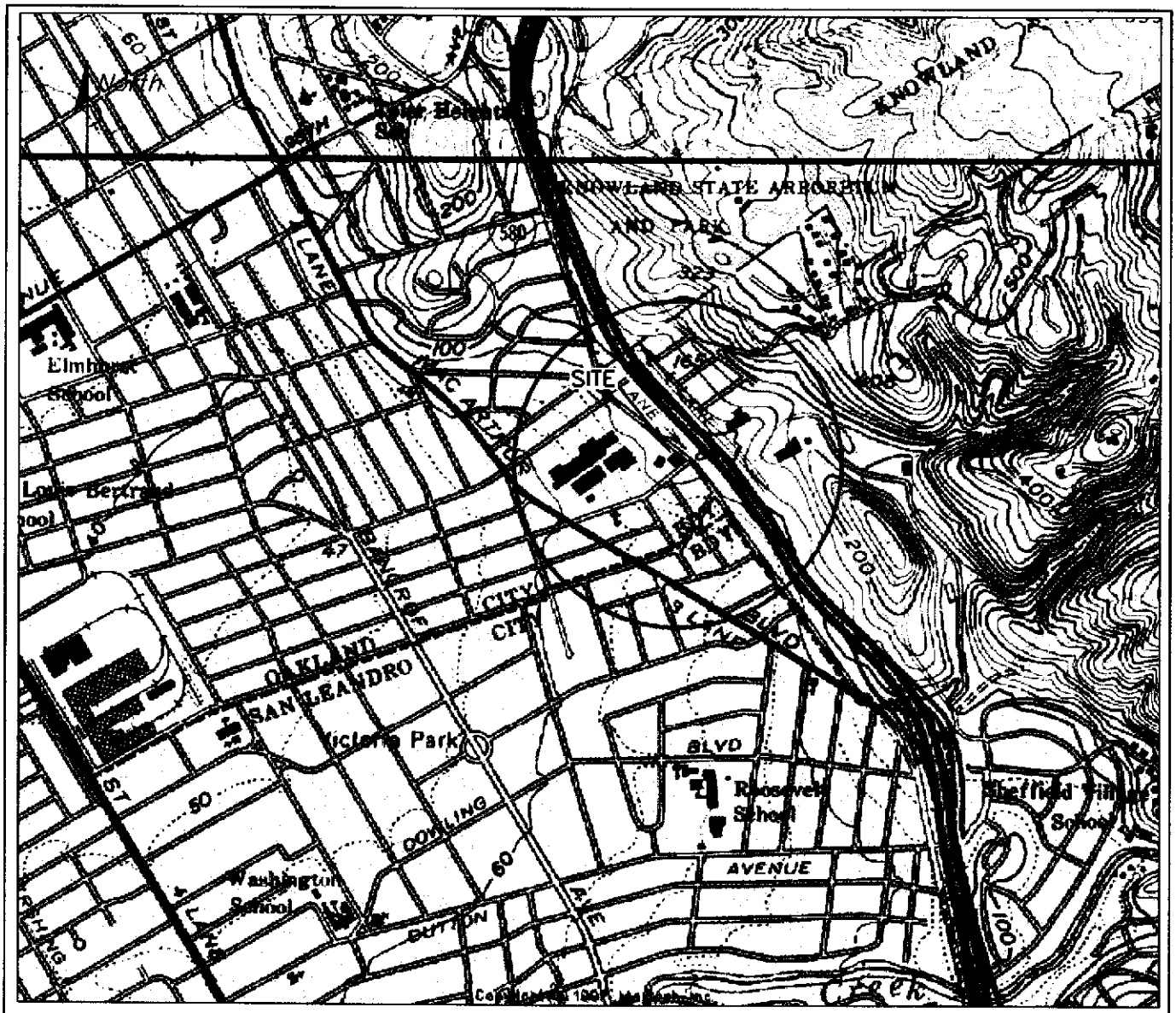
Stephen J. Carter, R.G
Project Manger

Gowri S. Kowtha, P.E.
Senior Engineer

Attachments:

Figure 1	Site Location Map
Figure 2	Site Plan
Appendix A	Boring Logs and Analytical Details (Wells S-1 and S-2)
Appendix B	Historical Groundwater Elevation Contour Maps
Appendix C	Field Practices and Procedures

cc: Mr. Charles Miller, USA Corporation
Mr. Peter McIntyre, AEI Consultants
Mr. Ken Phares, Jay-Phares Corporation



GENERAL NOTES:
BASE MAP FROM U.S.G.S.
OAKLAND, CA
7.5 MINUTE TOPOGRAPHIC
PHOTOREVISED 1980

QUADRANGLE LOCATION

0 2000 FT

SCALE 1:24,000

Jan 14, 2004 JMP USA 57Site Location Map.dwg

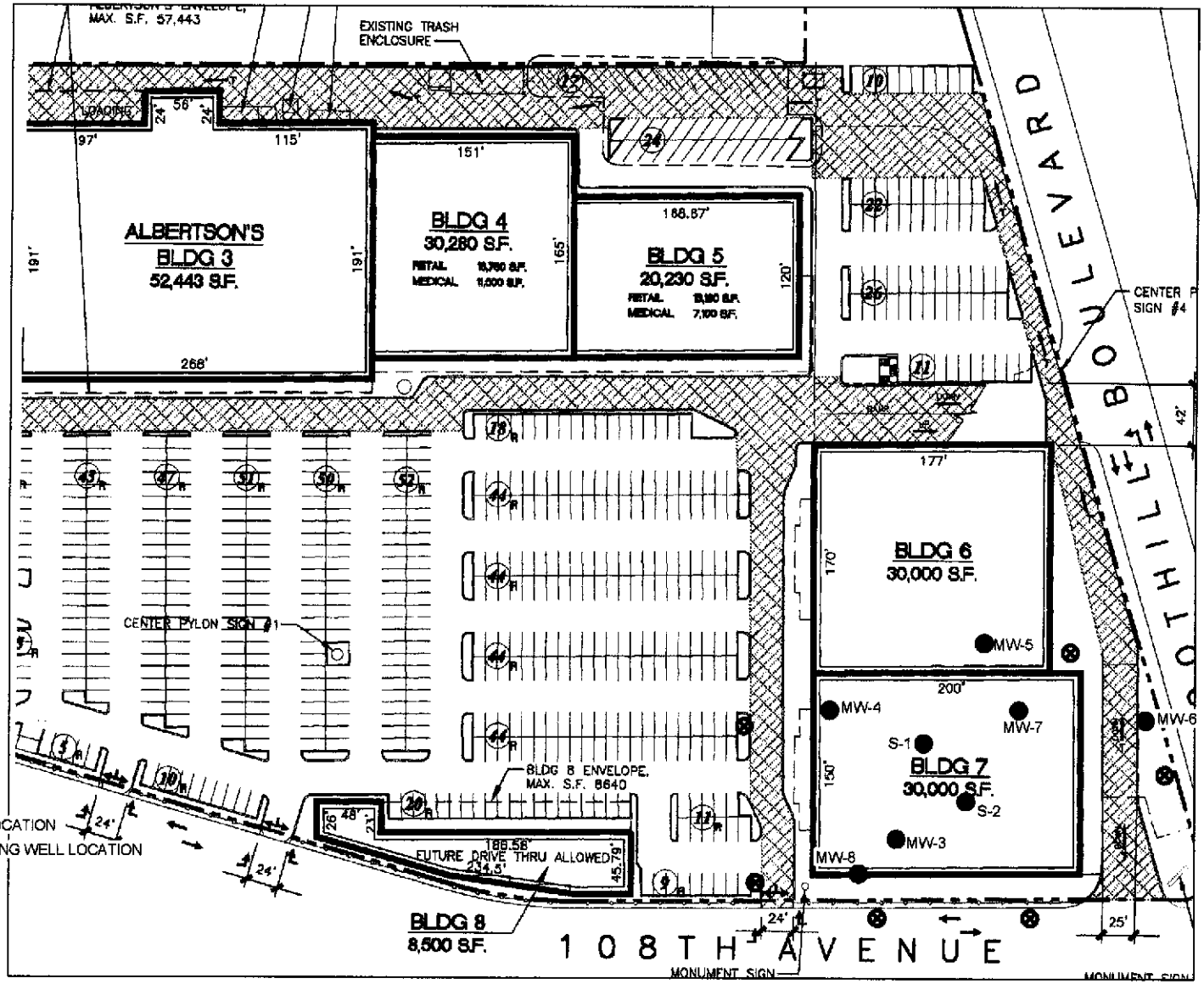
USA57

STRATUS
ENVIRONMENTAL, INC.

USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

SITE LOCATION MAP

FIGURE
1
PROJECT NO.
2007-0057-01



LEGEND:

MW-3 MONITORING WELL LOCATION

PROPOSED MONITORING WELL LOCATION

BASED ON PROPOSED REDEVELOPMENT DRAWINGS SUPPLIED BY JAY-PHARES CORPORATION.

SITEPLAN.dwg Jan 14, 2004 REV JMP USA57

STRATUS ENVIRONMENTAL, INC.

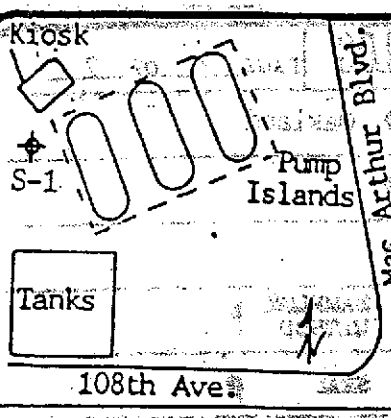
NOT TO SCALE

USA GASOLINE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

SITE PLAN

FIGURE
2

PROJECT NO.
2007-0057-01



SHELL OIL COMPANY — WELL LOG

WELL NUMBER ▶ S-1		LOCATION ▶ Oakland	
DATE ▶ 2/12/87		WEATHER ▶ Cool, rain	
LOGGED BY ▶ DM		DRILLED BY ▶ Bayland: Ed, Curt	
DRILLING METHOD ▶ HSA		SAMPLING METHOD ▶ Cal. Mod.	
GRAVEL PACK ▶ CA		SEAL ▶ Bentonite & concrete	

CASING ▶ TYPE Schedule 40 PVC DIAMETER 3" LENGTH 20' HOLE DIA 8"

SCREEN ▶ TYPE Schedule 40 PVC SLOT .020" DIAMETER 3" LENGTH 20' TOTAL DEPTH 40'

MOISTURE CONTENT	SORTING	POROSITY	PLASTICITY	SAMPLE NO.	H-NU (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						0			Concrete
						1			(CL) olive-brown silty clay
						2			
						3			
Dp			M		ND	4		P	(minor sand; no odor)
						5			(gravelly at 5')
						6			
						7			
						8			
Dp	MS	VD				9		8	(SC) dark yellowish-brown clayey sand; trace fine gravel; no odor
					ND	10		25	
						1		45	
						2			
						3			
						4		15	
Dp	MS	VD			38	5		30	(very silty, slight odor)
						6		50	
						7			
						8			
						9		6	
Dp	MS	VD			102			15	(very fine grained; moderate to strong odor)

WELL COMPLETION: Concrete; Solid; Bentonite; Sand Pack

JOB NO. 100-22.01

LOCATION MAP

See page 1 for details.

SHELL OIL COMPANY -- WELL LOG

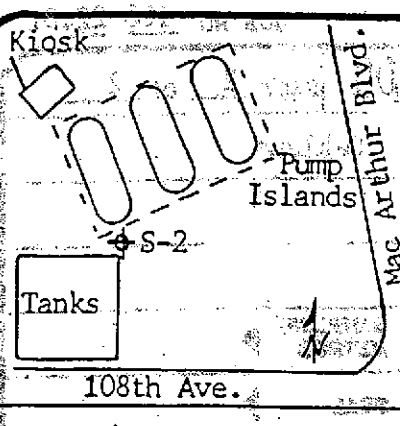
WELL NUMBER ▶ S-1	LOCATION ▶ Oakland
DATE ▶	WEATHER ▶
LOGGED BY ▶	DRILLED BY ▶
DRILLING METHOD ▶	SAMPLING METHOD ▶
ELEVATION ▶	GRAVEL PACK ▶
	SEAL ▶

CASING ▶ TYPE | DIAMETER | LENGTH | HOLE DIA

SCREEN ▶ TYPE | SLOT | DIAMETER | LENGTH | TOTAL DEPTH

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	HNu (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						20		15	(SC) continued
								25	
						1			
						2			(harder drilling)
						3			
Dr-Dp	PS	VD			ND	4		50	yellowish-brown silty sandstone; deeply weathered; fractured; trace clay; no odor
						5			
						6			
						7			
						8			
Dp		Hd			1	9		30	yellowish-brown claystone; no odor
								50	
						30			
						1			
						2			
						3			
						4		30	(very closely fractured; deeply weathered; no odor to very slight odor)
Dp		Hd			ND	5		50	
						6			
						7			
						8			dark grayish-brown silty sandstone; fractured
						9		50	
Wt	PS	VD							Total Depth = 40'

WELL COMPLETION: Sand Pack; Screens



SHELL OIL COMPANY -- WELL LOG

WELL NUMBER	S-2	LOCATION	Oakland
DATE	2/12/87	WEATHER	cool, rainy
LOGGED BY	DM	DRILLED BY	Bayland: Ed, Curt
DRILLING METHOD	HSA	SAMPLING METHOD	Cal. Mod.
GRAVEL PACK	GA	SEAL	bentonite & concrete

CASING ▶ TYPE Schedule 40 PVC DIAMETER 3" LENGTH 20' HOLE DIA 8"

SCREEN ▶ TYPE Schedule 40 PVC SLOT .020" DIAMETER 3" LENGTH 20' TOTAL DEPTH 40'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	H-NU (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						0			concrete
						1			(CL) gray silty clay; no odor
						2			
						3			
						4		P	(SM) dark yellowish-brown silty sand;
Dp	WS				ND	5			very fine-grained; no odor
						6			
						7			
						8			
						9		11	(CL) dark yellowish-brown sandy clay;
Dp		Hd	L		4.4	10		22	very silty; moderate odor
						1		30	
						2			
						3			
						4		P	(CL-ML) dark grayish-brown silty clay to
Dp		VSt	L		127	5			clayey silt; no odor
						6			
						7			
						8			(SC) dark yellowish-brown clayey sand;
Dp	PS					9			some gravel; silty; very fine-grained; no odor

WELL COMPLETION: Concrete; Solid; Bentonite; Sand Pack

JOB NO. 100-22.01

LOCATION MAP

See page 1 for details.

SHELL OIL COMPANY — WELL LOG

WELL NUMBER ▶ S-2 | LOCATION ▶ Oakland

DATE ▶ | WEATHER ▶

LOGGED BY ▶ | DRILLED BY ▶

DRILLING METHOD ▶ | SAMPLING METHOD ▶

ELEVATION ▶ | GRAVEL PACK ▶ | SEAL ▶

CASING ▶ TYPE | DIAMETER | LENGTH | HOLE DIA

SCREEN ▶ TYPE | SLOT | DIAMETER | LENGTH | TOTAL DEPTH

MOISTURE CONTENT	STRUCTURE	DENSITY	PLASTICITY	SAMPLE NO.	U.S.C.S. (ASTM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						20			(SC) continued
						1			
						2			
						3			
Dp	P				152	4		P	dark yellowish brown to dark grayish-brown sandstone; fractured; weathered; no odor
						5			
						6			
						7			
						8			
						9			
Dp	P	VD				30		P	(very closely fractured; very strong odor)
						1	▽		
						2			
						3			
Wt		VD				4		P	(fractured; moderate odor)
						5			
						6			
						7			
						8			
						9			
Wt.		VD						P	(fractured; weathered; no odor) total depth = 40'

WELL COMPLETION

Sand Pack

Screens

INTERNATIONAL TECHNOLOGY CORPORATION

Pacific Environmental Group, Inc.
1601 Civic Center Dr., Suite 107
Santa Clara, CA 95050

February 28, 1987

Attn: Susan Willhite

Following are the results of our analyses on samples of soil and water received February 17, 1987. The project identification is:

Project: 100-22.01, Oakland

The analysis for aromatic hydrocarbons in waters is taken from E.P.A. Method 602, a purge and trap technique. Final detection is by gas chromatography using a photoionization detector (GC/PID) in series with a flame ionization detector. The primary separation column is 5% AT-1200 + 1.75% Bentone 34/ Chromosorb W. Confirmation of positive results is by GC/PID using a Carbopack B/3% SP-1500 column.

The analysis for total hydrocarbons in soils is taken from E.P.A. Methods 3550 and 413.2. The soil is extracted with repeated portions of 1,1,2-trichlorotrifluoroethane using a horn-type sonicator. The resulting extract is dried with sodium sulfate and examined by infrared spectroscopy.

All soils are extracted using "wet" soil; a soil moisture determination is performed on an additional portion of soil. The results given in the following tables are corrected for moisture and are presented on a "dry soil basis".

FR/jd

2 pages following - Tables of Results

Fred Rouse

Fred Rouse

ITAS/Santa Clara to Pacific Environmental Group, Inc.
ATTN: Susan Willhite

February 28, 1987

TABLE OF RESULTS

ND = None Detected

Laboratory Number	Sample Identification		Date Received	Total Hydrocarbons (Parts per Million (dry soil basis))
	Project 100-22.01, Oakland			
S7-02-076-01	A	13.5-15'	2/17/87	16.
S7-02-076-02	B	18.5-20'	2/17/87	4.
S7-02-076-03	C	18.5-20'	2/17/87	ND.
S7-02-076-04	D	9-10.5'	2/17/87	2.
S7-02-076-05	S-1	19-20.5'	2/17/87	42.
S7-02-076-06	S-1	19-20.5'	2/17/87	16.
S7-02-076-07	S-2	24-25.5'	2/17/87	600.
S7-02-076-09	Fill Box		2/17/87	410.
			Detection Limit	2.

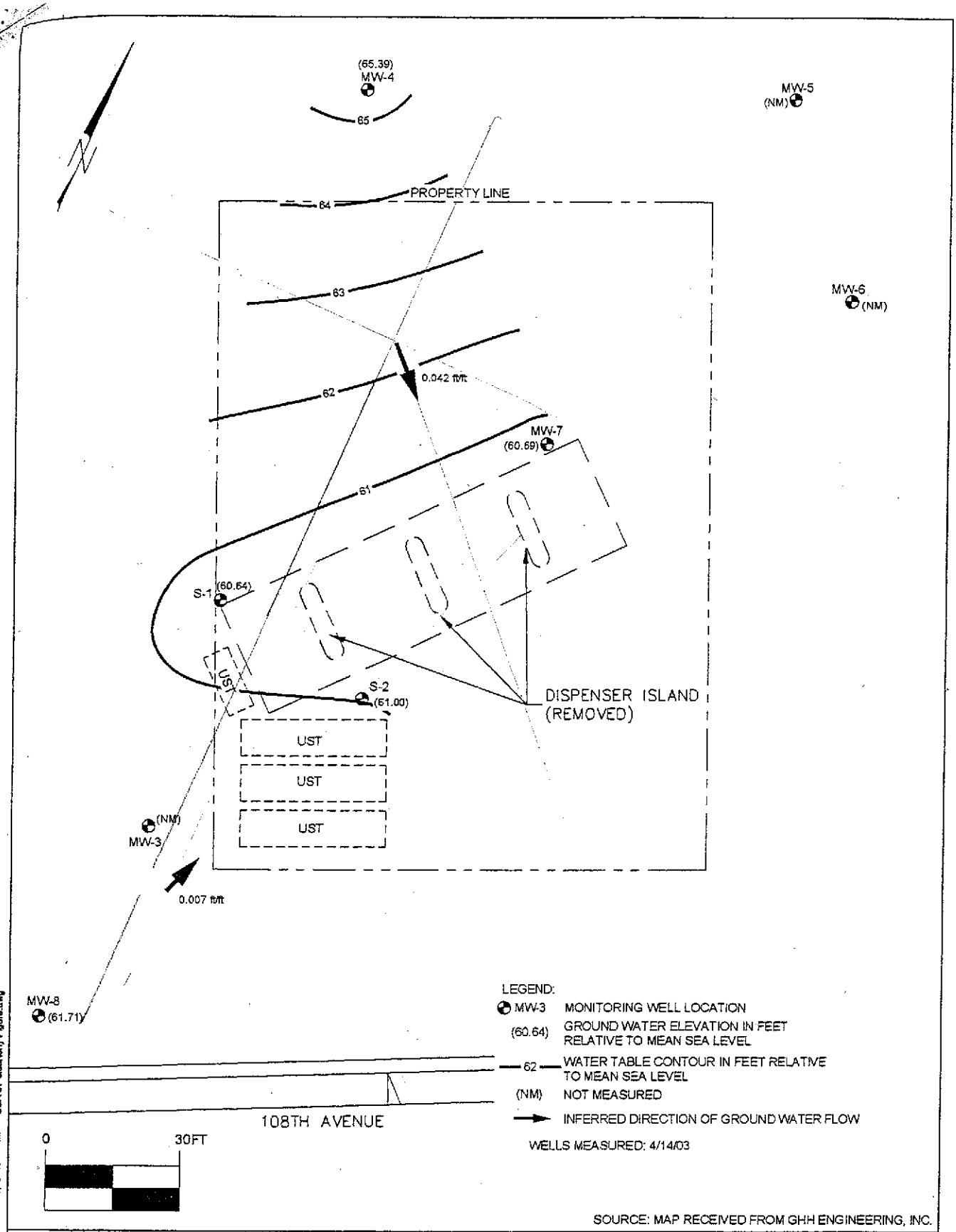
ITAS/Santa Clara to Pacific Environmental Group, Inc.
ATTN: Susan Willhite

February 28, 1987

TABLE OF RESULTS

ND = None Detected

Laboratory Number	Sample Identification	Date Received	Method 602 Surrogate Recovery (%)	Micrograms per Liter			
				Benzene	Toluene	Ethyl Benzene	Xylene Isomers
	Project 100-22.01, Oakland						
S7-02-069-01	S-1	2/17/87	92.	630.	4.4	3.5	37.
S7-02-069-02	S-2	2/17/87	112.	3400.	3800.	1300.	11000.
S7-02-069-04	22-FB	2/17/87	101.	ND	ND	ND	ND
S7-02-069-05	22-CB	2/17/87	76.	ND	2.3	0.9	5.2
S7-02-069-06	22-DP	2/17/87	85.	630.	3.2	3.2	36.
S7-02-076-08	S-1 Split Spoon Rinsate	2/17/87	97.	ND	ND	ND	ND
		Detection Limit		0.5	0.5	0.5	1.5



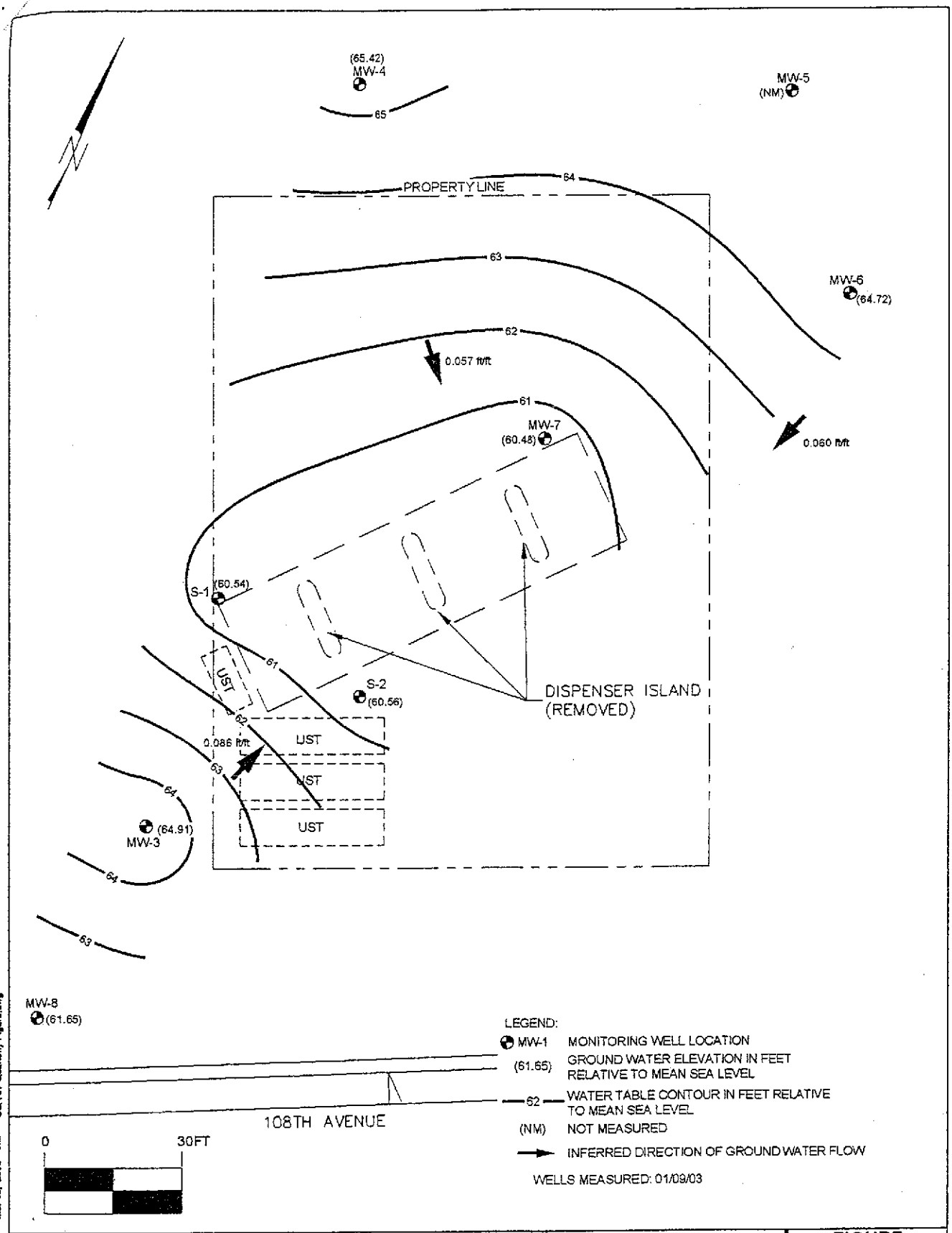
SOURCE: MAP RECEIVED FROM GHH ENGINEERING, INC.

STRATUS ENVIRONMENTAL, INC.

USA GASOLINE STATION #57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION CONTOUR MAP
2nd QUARTER 2003

FIGURE
2
PROJECT NO.
2007-0057-01

Jul 21, 2003 JNP USA 57 Quarterly Figure.dwg
USA57\Quarterly Figures

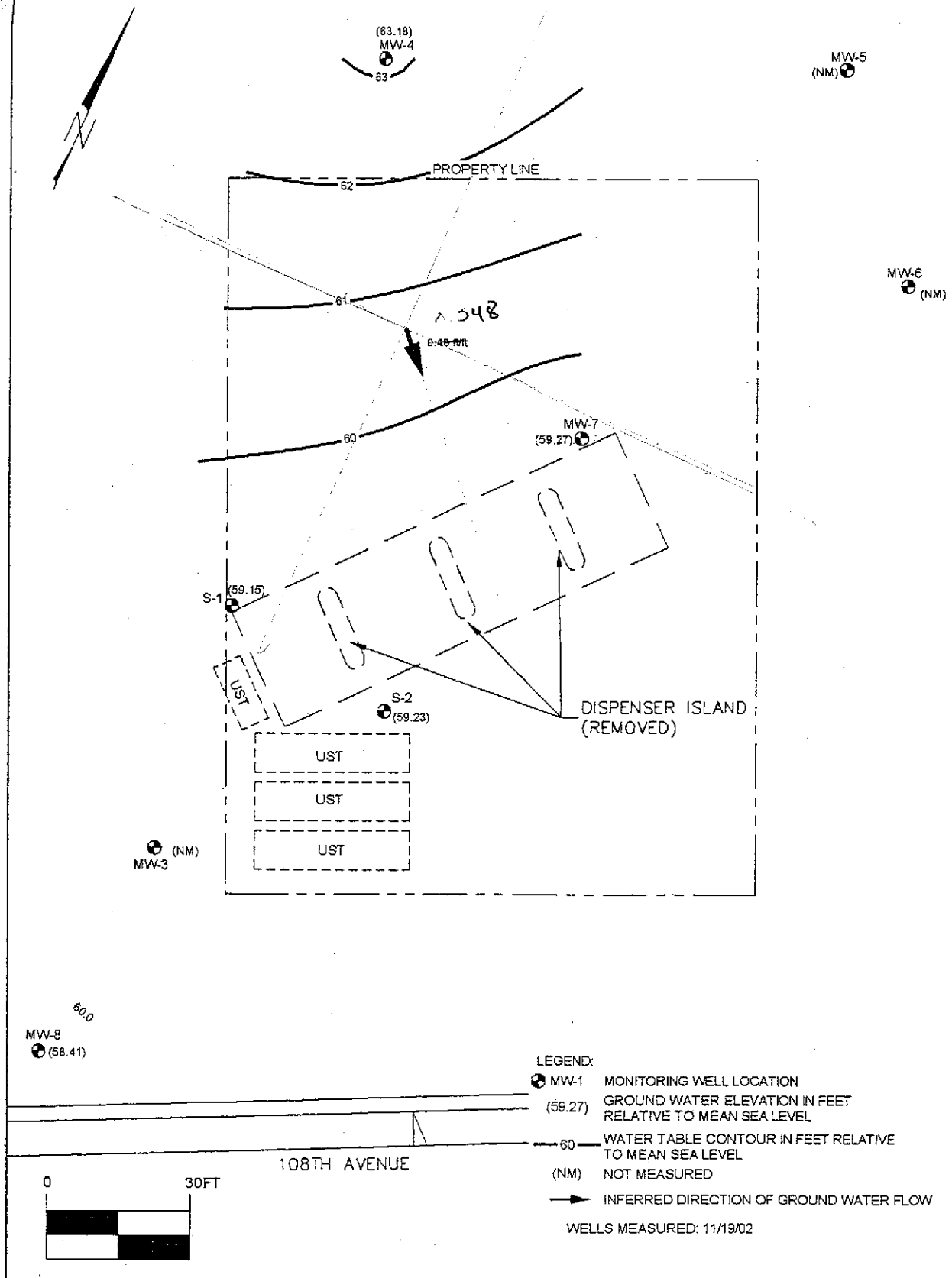


USA57/Quarterly Figures Mar 13, 2003 JMP USA 57 Quarterly Figure.dwg

STRATUS ENVIRONMENTAL, INC.

USA GASOLINE STATION #57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION CONTOUR MAP
1st QUARTER 2003

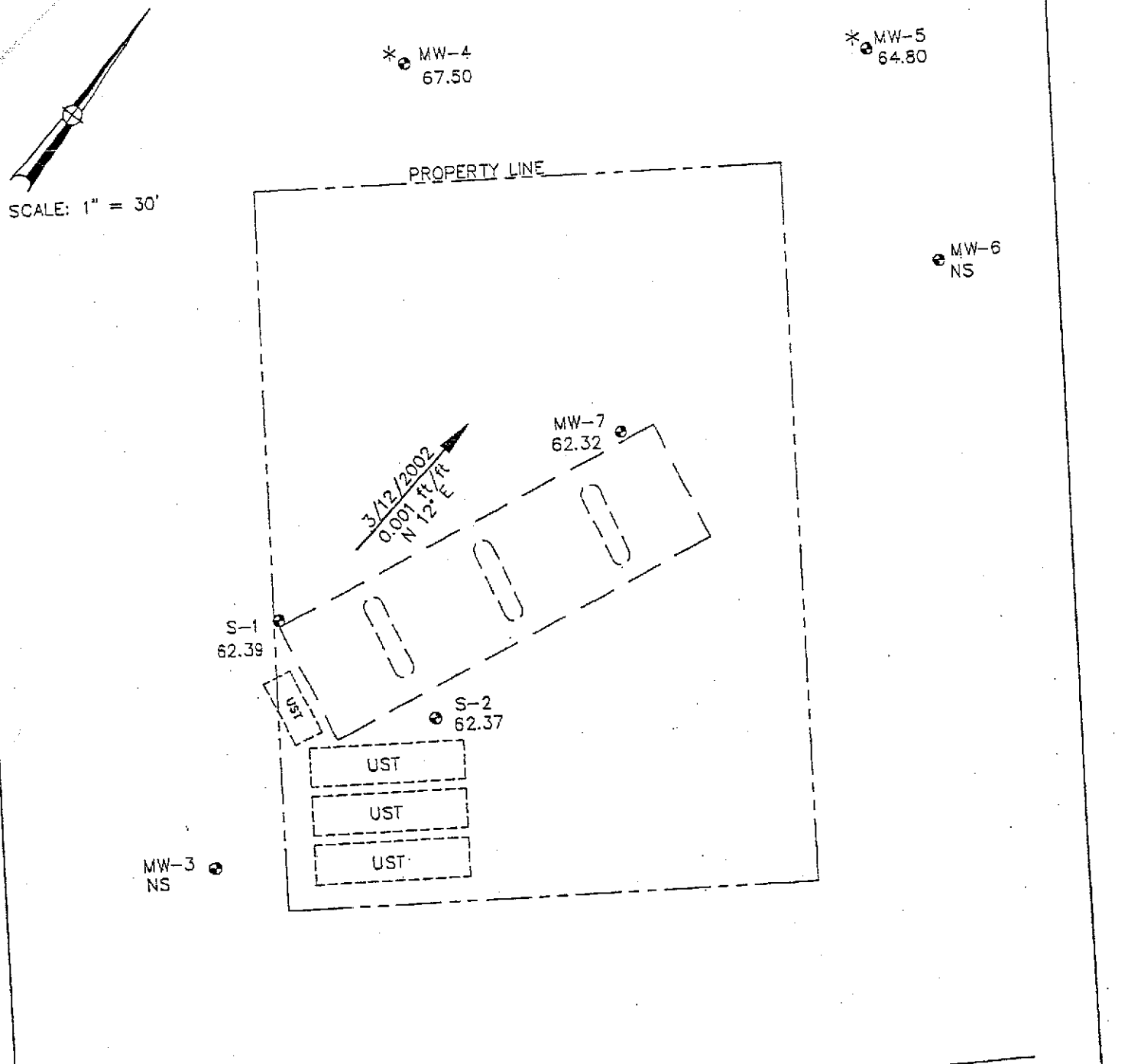
FIGURE
2
PROJECT NO.
2007-0057-01



STRATUS ENVIRONMENTAL, INC.

USA GASOLINE STATION #57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION CONTOUR MAP
4th QUARTER 2002

FIGURE
2
PROJECT NO.
2007-0057-01



LEGEND

● MONITORING WELL LOCATION

GROUNDWATER LEGEND

79.10 GROUNDWATER ELEVATION

FLOW DIRECTION (MARCH 12, 2002)

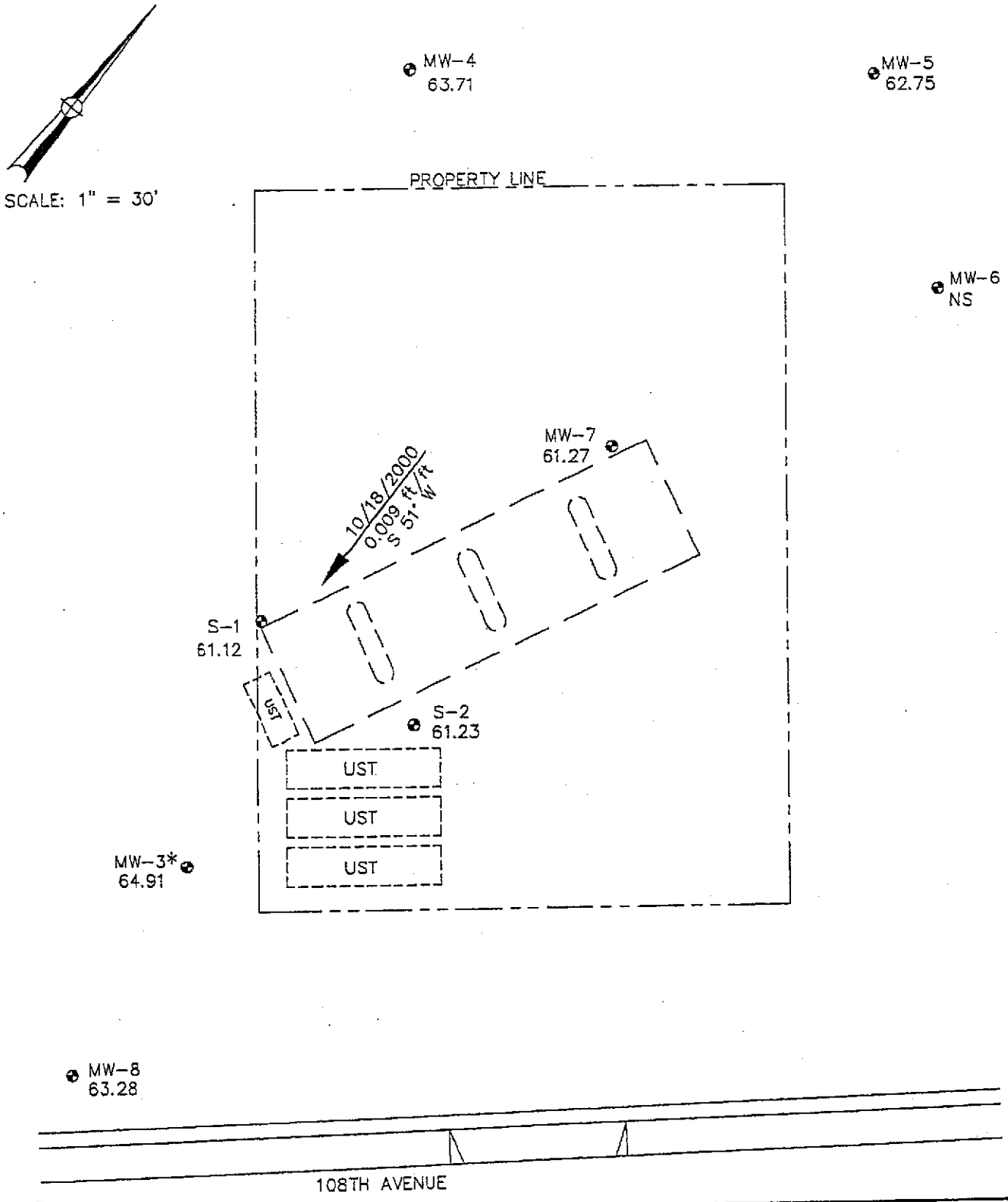
NS NOT SURVEYED

* NOT USED IN GRADIENT CALCULATION

USA GASOLINE STATION #57
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION MAP

GHH ENGINEERING, INC.
11960 Heritage Oak Place
Auburn, CA 95603
(530) 996-3100

INITIAL	C.O.
DATE	4/9/2002
JOB #	5090
FIG. #	4



LEGEND

● MONITORING WELL LOCATION

GROUNDWATER LEGEND

79.10 GROUNDWATER ELEVATION

FLOW DIRECTION
(OCTOBER 18, 2000)

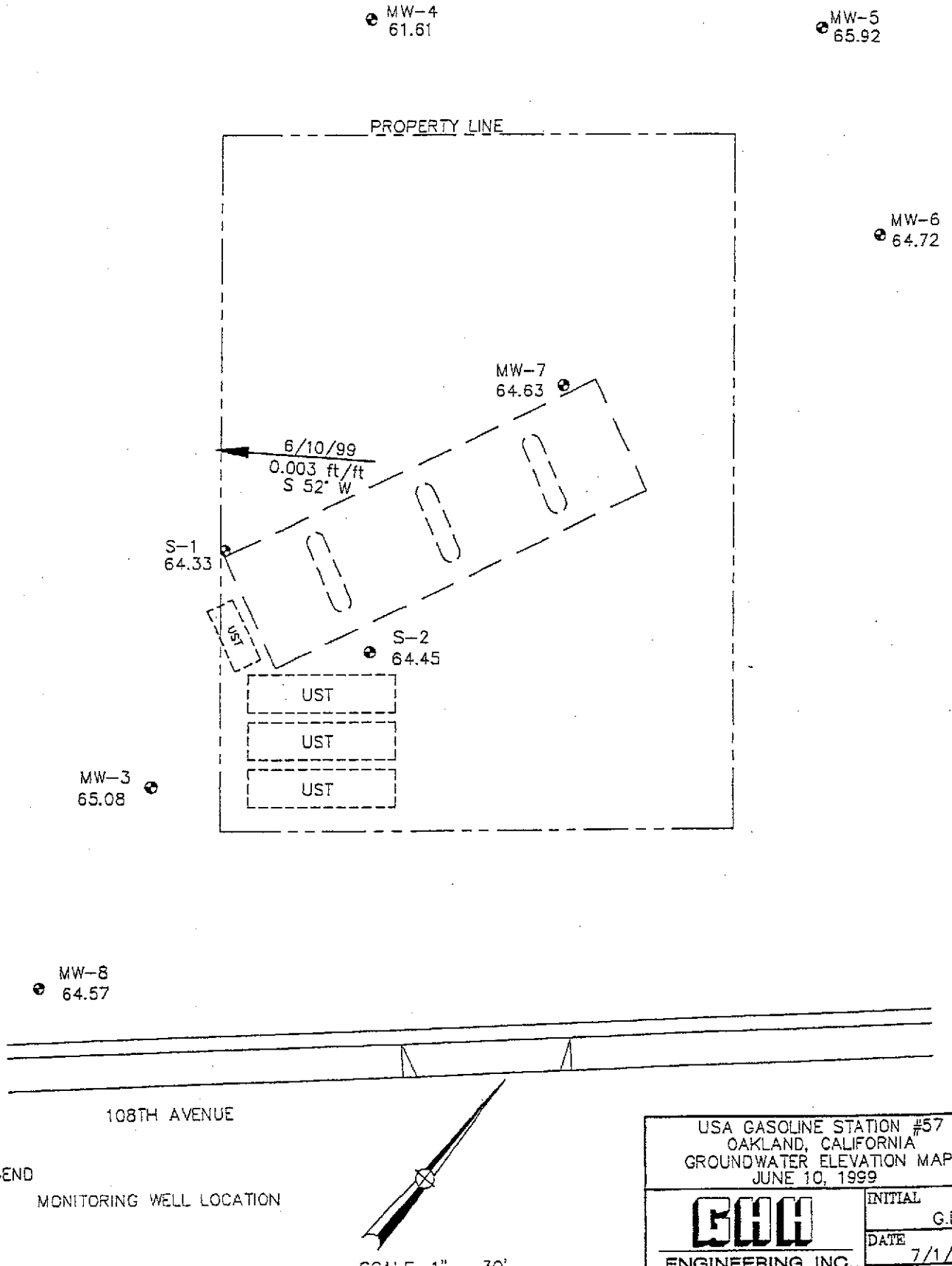
NS NOT SURVEYED

* NOT USED IN GRADIENT CALCULATION

USA GASOLINE STATION #57
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION MAP

GHH
ENGINEERING, INC.
11960 Heritage Oak Place
Auburn, CA 95603
(530) 996-3100

INITIAL	C.O.
DATE	1/19/2001
JOB #	5090
FIG. #	4

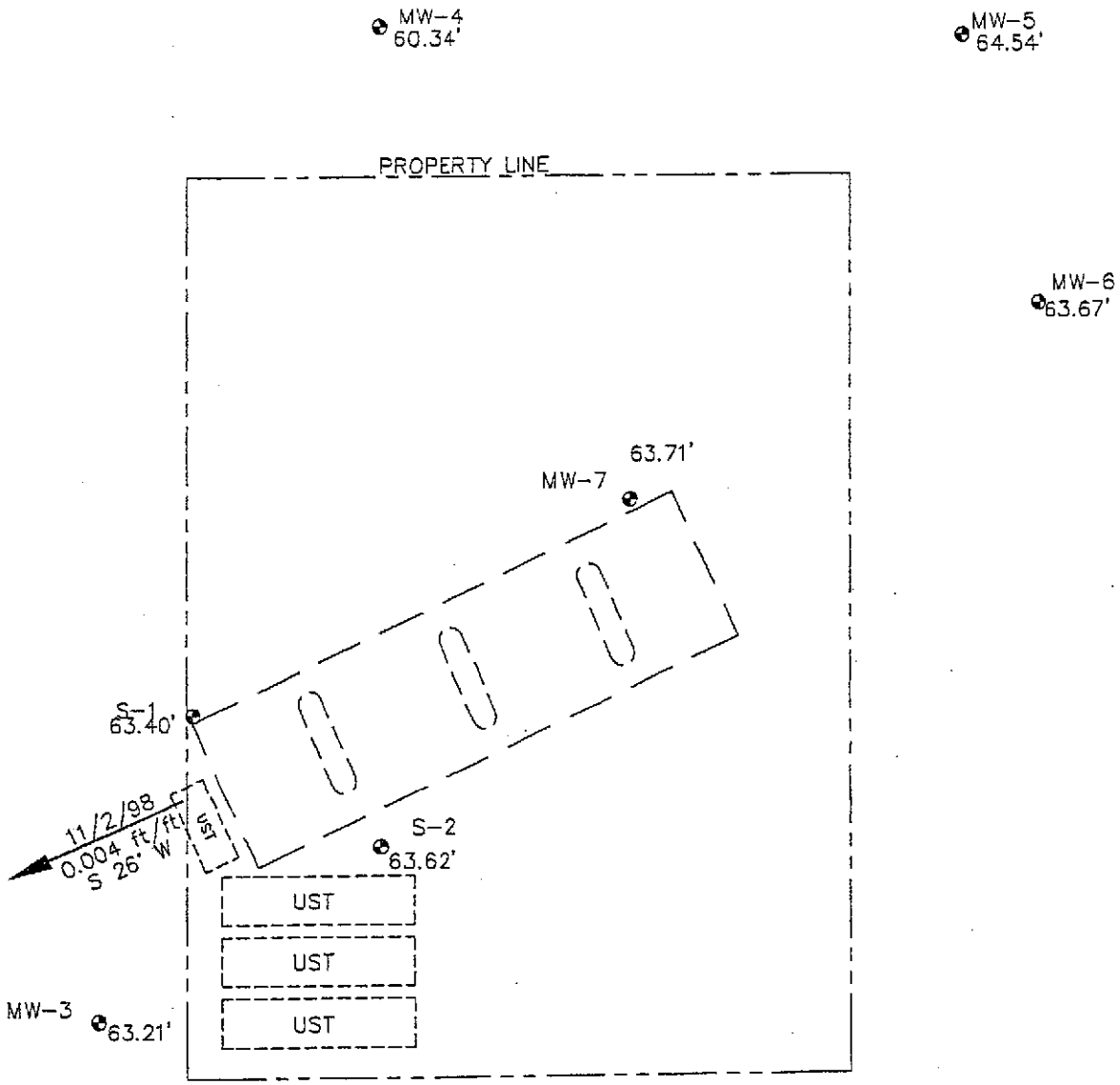


* NOT USED IN GRADIENT CALCULATION

USA GASOLINE STATION #57
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION MAP
JUNE 10, 1999

GHH
ENGINEERING, INC.
8084 Old Auburn Rd.
Citrus Heights, CA 95610
(916) 723-7645

INITIAL	G.E.B.
DATE	7/1/99
JOB #	5090
FIG. #	3 A

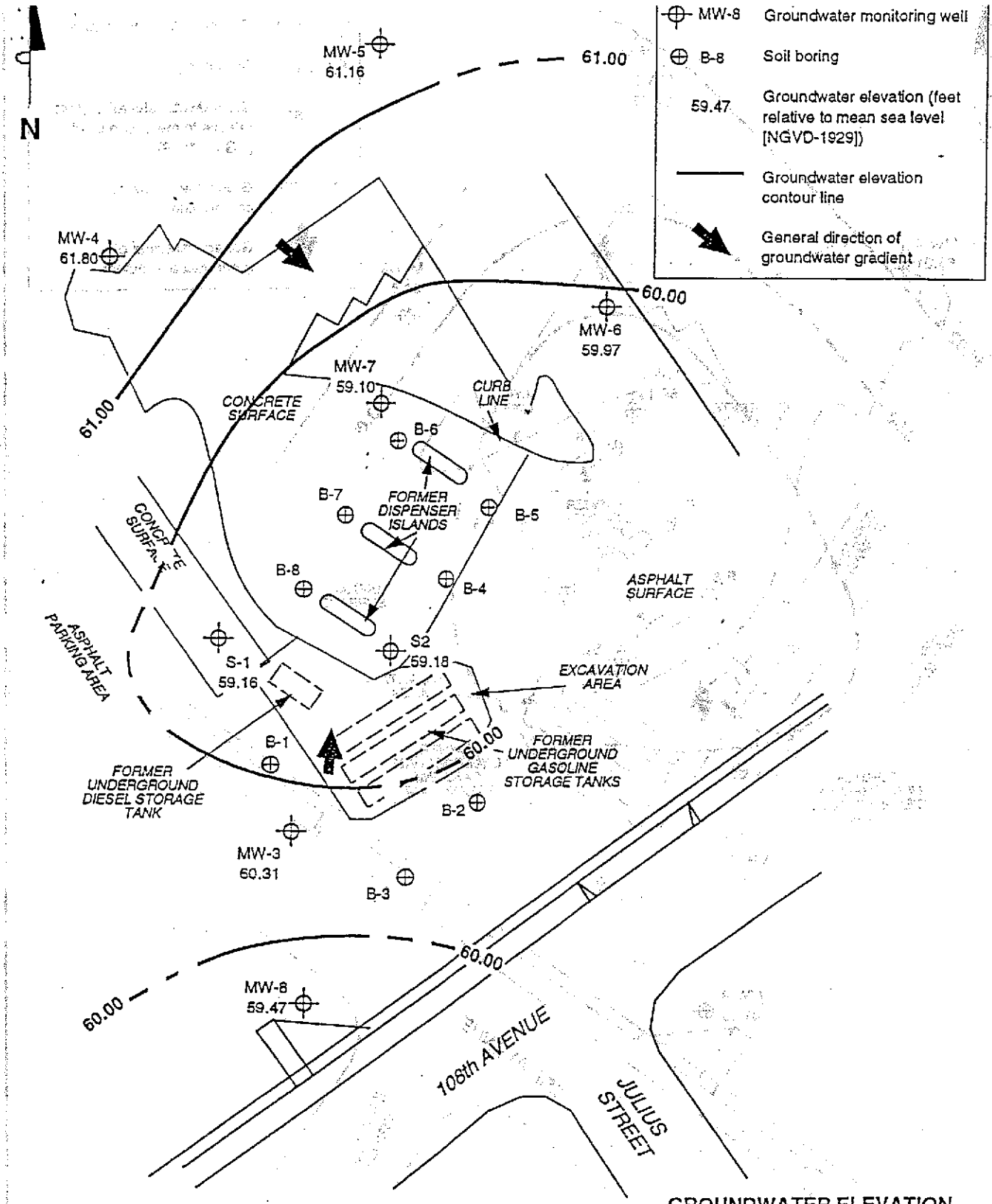


* NOT USED IN GRADIENT CALCULATION

USA GASOLINE STATION #57
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION MAP
NOVEMBER 2, 1998

GAH
ENGINEERING, INC.
8084 Old Auburn Rd.
Citrus Heights, CA 95610
(916) 723-7645

INITIAL	G.E.B.
DATE	7/1/99
JOB #	5090
FIG. #	3



NOTES:
Contour lines are interpretive based on fluid level measurements collected January 4, 1996.
Contour interval = 1.0 foot.

GROUNDWATER ELEVATION CONTOUR MAP
January 4, 1996

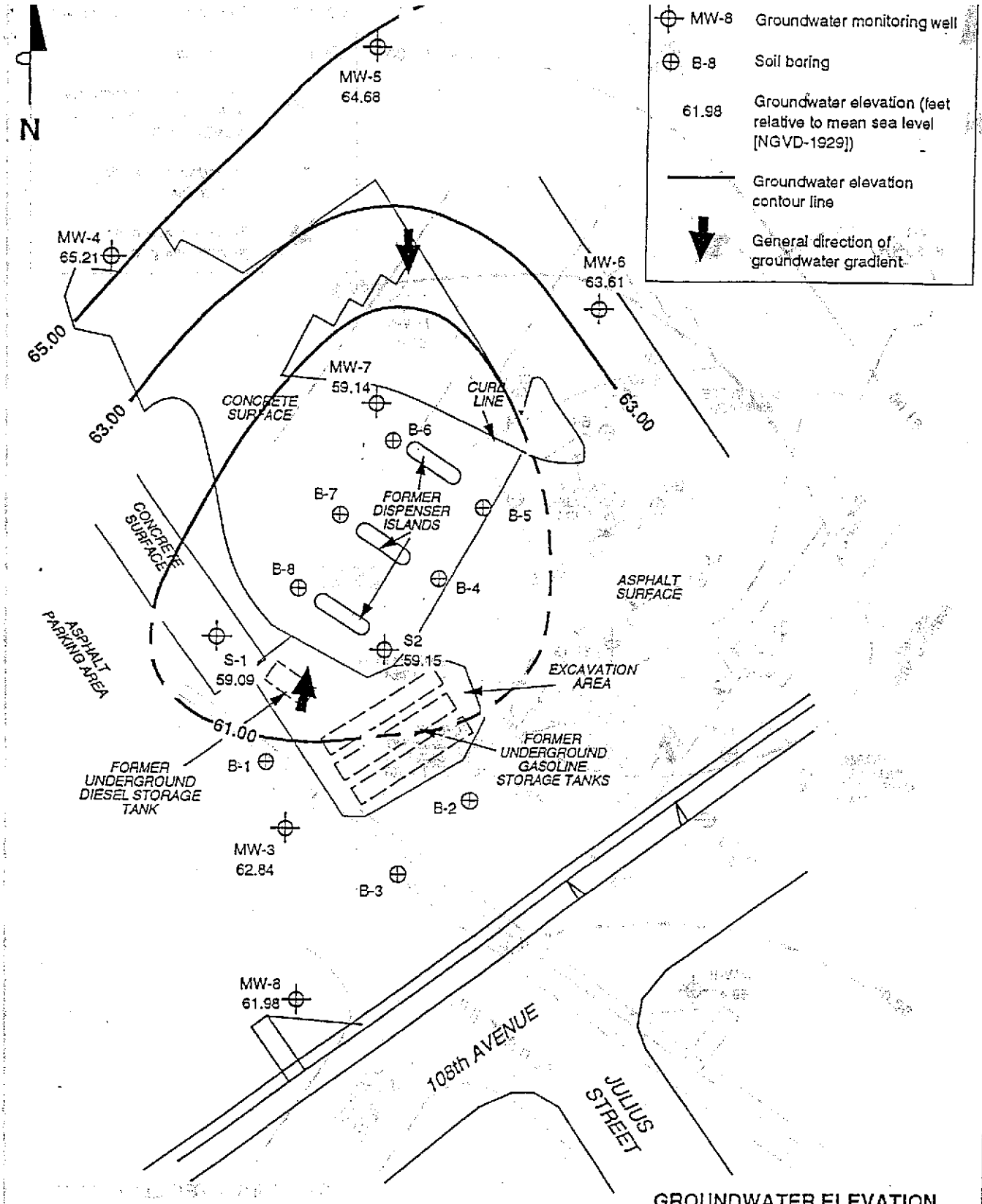
USA Gas # 57
10700 MacArthur Boulevard
Oakland, California

ALTON GEOSCIENCE
Livermore, California

Source: Ron Archer, Civil Engineer, Inc.

FIGURE 8

41-0034/Site 12/95 12/15/95



NOTES:
Contour lines are interpretive based on fluid level measurements collected December 6, 1995.
Contour interval = 2.0 feet.

SCALE (feet)
0 20 40

GROUNDWATER ELEVATION CONTOUR MAP
December 6, 1995

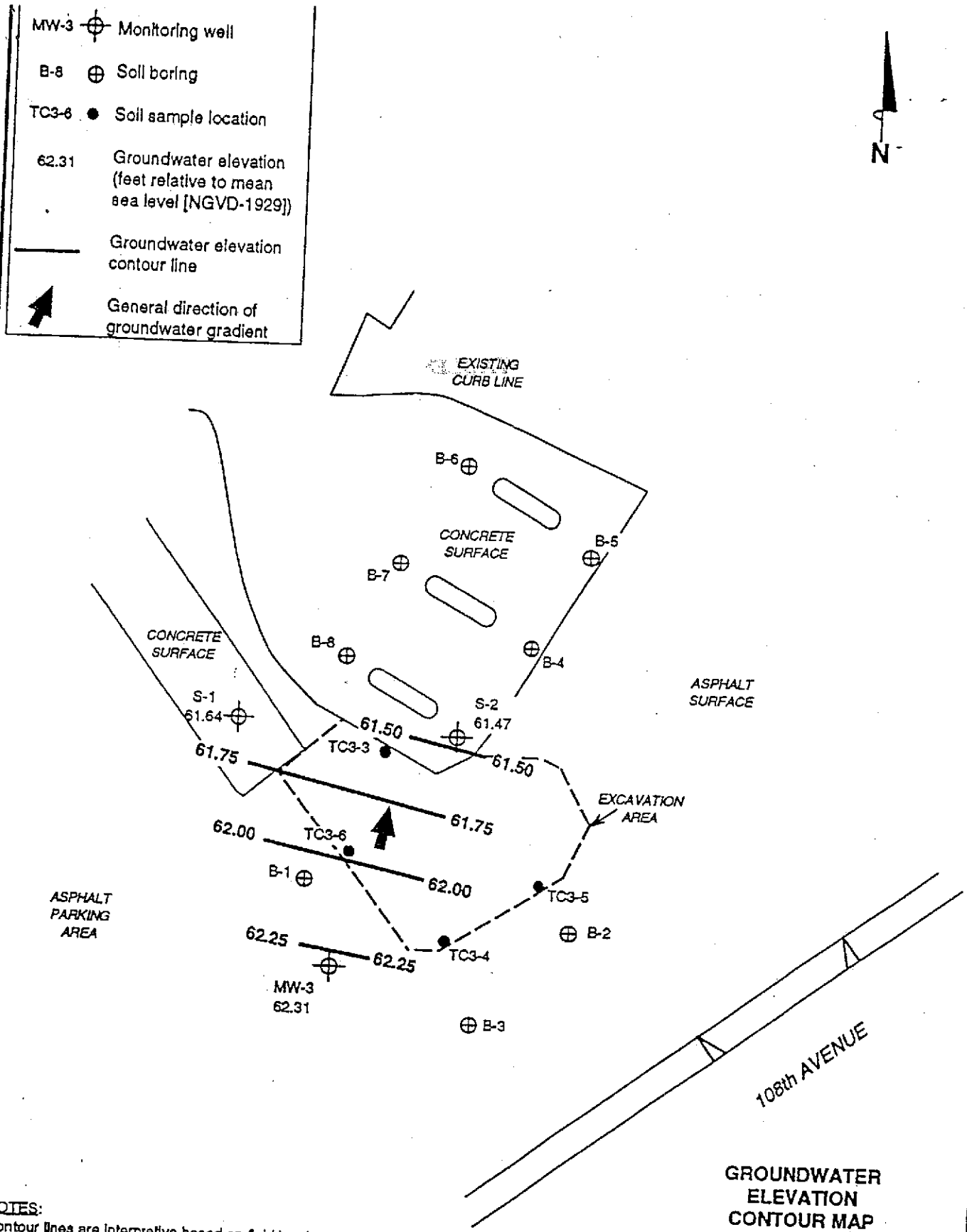
USA Gas # 57
10700 MacArthur Boulevard
Oakland, California

ALTON GEOSCIENCE
Livermore, California

Source: Ron Archer, Civil Engineer, Inc.

FIGURE 7

41-0034/Site 12/95 12/15/95



NOTES:
Contour lines are interpretive based on fluid level measurements collected March 3, 1995. Contour interval = 0.25 foot.

ALTON GEOSCIENCE
Livermore, California

SCALE (feet)
0 15 30

GROUNDWATER ELEVATION CONTOUR MAP
March 3, 1995

Former USA Gas #57
10700 MacArthur Boulevard
Oakland, California

FIGURE 7

41-0034/New Plan 04/11/95

APPENDIX C

FIELD PRACTICES AND PROCEDURES

General procedures used by Stratus in site assessments for drilling exploratory borings, collecting samples, and installing monitoring wells are described herein. These general procedures are used to provide consistent and reproducible results; however, some procedure may be modified based on site conditions. A California state-registered geologist supervises the following procedures.

PRE-FIELD WORK ACTIVITIES

Health and Safety Plan

Field work performed by Stratus at the site is conducted according to guidelines established in a Site Health and Safety Plan (SHSP). The SHSP is a document which describes the hazards that may be encountered in the field and specifies protective equipment, work procedures, and emergency information. A copy of the SHSP is at the site and available for reference by appropriate parties during work at the site.

Locating Underground Utilities

Prior to commencement of any work that is to be below surface grade, the location of the excavation, boring, etc., is marked with white paint as required by law. An underground locating service such as Underground Service Alert (USA) is contacted. The locating company contacts the owners of the various utilities in the vicinity of the site to mark the locations of their underground utilities. Any invasive work is preceded by hand augering to a minimum depth of five feet below surface grade to avoid contact with underground utilities.

FIELD METHODS AND PROCEDURES

Exploratory Soil Borings

Soil borings will be drilled using a truck-mounted, hollow stem auger drill rig. Soil samples for logging will be obtained from auger-return materials and by advancing a modified California split-spoon sampler equipped with brass or stainless steel liners into undisturbed soil beyond the tip of the auger. Soils will be logged by a geologist according to the Unified Soil Classification System and standard geological techniques. Drill cuttings well be screened using a portable photoionization detector (PID) or a flame ionization detector (FID). Exploratory soil borings not used for monitoring well installation will be backfilled to the surface with a bentonite-cement slurry pumped into the boring through a tremie pipe.

Soil sampling equipment will be cleaned with a detergent water solution, rinsed with clean water, and equipped with clean liners between sampling intervals. Augers and

samplers will be steam cleaned between each boring to reduce the possibility of cross contamination. Steam cleaning effluent will be contained in 55-gallon drums and temporarily stored on site. The disposal of the effluent will be the responsibility of the client.

Drill cuttings generated during the drilling procedure will be stockpiled on site. Stockpiled drill cuttings will be placed on and covered with plastic sheeting. The stockpiled soil is typically characterized by collecting and analyzing composite samples from the stockpile. Stratus Environmental will recommend an appropriate method for disposition of the cuttings based on the analytical results. The client will be responsible for disposal of the drill cuttings.

Soil Sample Collection

During drilling, soil samples will be collected in cleaned brass, two by six inch tubes. The tubes will be set in an 18-inch-long split-barrel sampler. The sampler will be conveyed to bottom of the borehole attached to a wire-line hammer device on the drill rig. When possible, the split-barrel sampler will be driven its entire length, either hydraulically or by repeated pounding a 140-pound hammer using a 30-inch drop. The number of drops (blows) used to drive the sampler will be recorded on the boring log. The sampler will be extracted from the borehole, and the tubes containing the soil samples will be removed. Upon removal, the ends of the lowermost tube will be sealed with Teflon sheets and plastic caps. Soil samples for chemical analysis will be labeled, placed on ice, and delivered to a state-certified analytical laboratory, along with the appropriate chain-of-custody documentation.

Soil Classification

As the samples are obtained in the field, they will be classified by the field geologist in accordance with the Unified Soil Classification System. Representative portions of the samples will be retained for further examination and for verification of the field classification. Logs of the borings indicating the depth and identification of the various strata and pertinent information regarding the method of maintaining and advancing the borehole will be prepared

Soil Sample Screening

Soil samples selected for chemical analysis will be determined from a head-space analysis using a PID or an FID. The soil will be placed in a Ziploc® bag, sealed, and allowed to reach ambient temperature, at which time the PID probe will be inserted into the Ziploc® bag. The total volatile hydrocarbons present are detected by the PID and reported in parts per million by volume (ppmv). The PID will be calibrated to an isobutylene standard.

Generally two soil samples from each soil boring will be submitted for chemical analysis unless otherwise specified in the scope of work. Soil samples selected for analysis

typically represent the highest PID reading recorded for each soil boring and the sample just above first-encountered groundwater.

Stockpiled Drill Cuttings and Soil Sampling

Soil generated during drilling operations will be stockpiled on-site. The stockpile will be set on and covered by plastic sheeting in a manner to prevent rain water from coming in contact with the soil. Prior to collecting soil samples, Stratus personnel will calculate the approximate volume of soil in the stockpile. The stockpile will then divided into sections, if warranted, containing the predetermined volume sampling interval. Soil samples will be collected at 0.5 to 2 feet below the surface of the stockpile. Four soil samples will be collected from the stockpile and composited into one sample by the laboratory prior to analysis. The soil samples will be collected in cleaned brass, two by six inch tubes using a hand driven sampling device. To reduce the potential for cross-contanlination between samples, the sampler will be cleaned between each sampling event. Upon recovery, the sample container will be sealed at each end with Teflon sheeting and plastic caps to minimize the potential of volatilization and cross-contanlination prior to chemical analysis. The soil sample will be labeled, placed on ice, and delivered to a state-certified analytical laboratory, along with the appropriate chain-of-custody documentation.

Direct Push Technology, Water Sampling

A well known example of direct push technology for water sampling is the Hydropunch®. For the purpose of this field method the term hydropunch will be used instead of direct push technology for water sampling.

The hydropunch is typically used with a drill rig. A boring is drilled with hollow stem-augers to just above the sampling zone. In some soil conditions the drill rig can push directly from the surface to the sampling interval. The hydropunch is conveyed to the bottom of the boring using drill rods. Once on bottom the hydropunch is driven a maximum of five feet. The tool is then opened by lifting up the drill rod no more than four feet. Once the tool is opened, water enters and a sample can be collected with a bailer or tubing utilizing a peristaltic pump. Soil particles larger than silt are prevented from entering the tool by a screen within the tool. The water sample is collected, labeled, and handled according to the Quality Assurance Plan.

Monitoring Well Installation

Monitoring wells will be completed by installing 2- to 6-inch-diameter Schedule 40 polyvinyl chloride (PVC) casing. The borehole diameter for a monitoring well will be a minimum of four inches larger than the outside diameter of the casing. The 2-inch-diameter flush-threaded casing is generally used for wells dedicated for groundwater monitoring purposes.

A monitoring well is typically cased with threaded, factory-perforated and blank Schedule 40 PVC. The perforated interval consists of slotted casing, generally with 0.01 or 0.02 inch-wide by 1.5-inch-long slots, with 42 slots per foot. The screened sections of casing are factory machine slotted and will be installed approximately 5 feet above and

10 feet below first-encountered water level. The screened interval will allow for seasonal fluctuation in water level and for monitoring floating product. A threaded or slip PVC cap is secured to the bottom of the casing. The slip cap can be secured with stainless steel screws or friction; no solvents or cements are used. Centering devices may be fastened to the casing to ensure even distribution of filter material and grout within the borehole annulus. The well casing is thoroughly washed and/or steam cleaned, or may be purchased as pre-cleaned, prior to completion.

A filter pack of graded sand will be placed in the annular space between the PVC casing and the borehole wall. Sand will be added to the borehole through the hollow stem of the augers to provide a uniform filter pack around the casing and to stabilize the borehole. The sand pack will be placed to a maximum of 2 feet above the screens, followed by a minimum 1-foot seal consisting of bentonite pellets.

Cement grout containing 5 percent bentonite or concrete will be placed above the bentonite seal to the ground surface. A concrete traffic-rated vault box will be installed over the monitoring well(s). A watertight locking cap will be installed over the top of the well casing. Reference elevations for each monitoring well will be surveyed when more than two wells will be located on site. Monitoring well elevations will be surveyed by a California licensed surveyor to the nearest 0.01-foot relative to mean sea level (MSL). Horizontal coordinates of the wells will be measured at the same time.

Exploratory boring logs and well construction details will be prepared for the final written report.