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

Alameda County
Environmental Protection Division
1131 Harbor Bay Parkway, Room 250
Alameda CA 94502-6577

CC4580

August 23, 1996

STID 2013

REMEDIAL ACTION COMPLETION CERTIFICATION

Mr. Paul Mazza
City and County of San Francisco
Water Department
P.O. Box 730
Millbrae, CA 94030

RE: SAN ANTONIO PUMP STATION, SAN FRANCISCO WATER DEPARTMENT, 5555 CALAVERAS ROAD, SUNOL, ALAMEDA COUNTY

Dear Mr. Mazza:

This letter confirms the completion of site investigation and remedial action for the three (3) underground storage tanks formerly located at the above-described location. Enclosed is the Case Closure Summary for the referenced site for your records.

Based upon the available information, including current land use, 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 storage tank releases is required.

This notice is issued pursuant to a regulation contained in Title 23, California Code of Regulations, Division 3, Chapter 16, Section 2721(e). If changes in land use, structural configuration, or site activities are proposed such that more conservative exposure scenarios should be evaluated, the owner must promptly notify this agency.

Please contact Scott Seery at (510) 567-6783 if you have any questions regarding this matter.

Sincerely,

Mee Ling Tung
Director of Environmental Health Services

enclosure
cc: Gordon Coleman, Acting Chief, Env. Protection Division
Kevin Graves, RWQCB
Lori Casias, SWRCB (w/enclosure)

- SIGNED COPY -

01-1288

CALIFORNIA REGIONAL WATER

DEC 15 1995 KG

QUALITY CONTROL BOARD

CASE CLOSURE SUMMARY
Leaking Underground Fuel Storage Tank Program

I. AGENCY INFORMATION **Date: 12/13/95**

Agency name: **Alameda County-EPD** Address: **1131 Harbor Bay Pkwy #250**
City/State/Zip: **Alameda, CA 94502** Phone: **(510) 567-6700**
Responsible staff person: **Scott Seery** Title: **Sr. Haz. Materials Spec.**

II. CASE INFORMATION

Site facility name: **San Francisco Water Dept., San Antonio Pump Station**
Site facility address: **5555 Calaveras Road, Sunol 94586**
RB LUSTIS Case No: **N/A** Local Case No./LOP Case No.: **2013**
URF filing date: **8-11-92** SWEEPS No: **N/A**

Responsible Parties:	Addresses:	Phone Numbers:
City and County of San Francisco Water Dept. Attn: Paul Mazza	1000 El Camino Real P.O. Box 730 Millbrae, CA 94030	

Tank No:	Size in gal.:	Contents:	Closed in-place or removed?:	Date:
1	10,000 gal.	diesel	removed	11/7/91
2	10,000 "	"	"	"
3	1000 "	waste oil	"	"

95 DEC 29 PM 1:02

III. RELEASE AND SITE CHARACTERIZATION INFORMATION

Cause and type of release: UNK

Site characterization complete? YES

Date approved by oversight agency: 10/13/95

Monitoring Wells installed? YES Number: 3

Proper screened interval? YES

Highest GW depth below ground surface: 14.00' Lowest depth: 15.62'

Flow direction: SW - WSW

Most sensitive current use: recharge basin/watershed for Alameda Crk

Are drinking water wells affected? NO Aquifer name: Sunol Subbasin

Is surface water affected? NO Nearest affected SW name: NA

Off-site beneficial use impacts (addresses/locations): NONE

Leaking Underground Fuel Storage Tank Program

III. RELEASE AND SITE CHARACTERIZATION INFORMATION (Continued)

Report(s) on file? **YES** Where is report 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	(2x10,000; 1x1000 gal.)	disposal - H&H Ship Serv. S.F., CA	11/7/91
Piping	NA		
Free Product	"		
Soil	~1650 yds^3	disposal - BFI landfill Livermore, CA	6/3/92 - 6/8/92
Groundwater	~550 gals	disposal - Allied Oil San Jose, CA	5/2/92
Barrels			

Maximum Documented Contaminant Concentrations - - Before and After Cleanup

Contaminant	Soil (ppm) Before[1]	Soil (ppm) After	Water (ppb) Before	Water (ppb) After
TPH (Gas)	990	NA	ND	ND
TPH (Diesel)	3800	2600	"	"
Benzene	ND	NA	"	"
Toluene	"	"	"	"
Xylene	"	"	"	"
Ethylbenzene	"	"	"	"
Oil & Grease	1600	1700	"	"
Heavy metals	*[SEE Note 2]*		"	NA
Other: **SVOC**	*[SEE Note 3]*		"	*[SEE Note 4]*
HVOC	ND		"	ND

NOTES:

1) "Before" soil results reflect samples collected from initial waste oil UST excavation. "After" soil results are from final samples collected following further excavation of the waste oil UST pit and surrounding area.

2) Target metals appeared to be present at geogenic concentrations.

3) **SVOC present in "before" soil samples:** *methylnaphthalene - 20.0 ppm; phenanthrene - 4.5 ppm.* **SVOC present in "after" soil samples:** *acenapthene - 0.15 ppm; anthracene - 0.09 ppm; bis(2-ethylhexyl)phthalate - 5.9 ppm; di-n-butyl phthalate - 0.07 ppm; fluoranthrene - 0.05 ppm; flucrene - 0.17 ppm; phenanthrene - 0.09 ppm; pyrene - 0.06 ppm.*

4) **SVOC present in "after" water samples:** *4-methylphenol - 28 ppb; phenol - 13 ppb.*

Leaking Underground Fuel Storage Tank Program

Comments (Depth of Remediation, etc.):

During July 1991, three USTs were permanently removed from the site.

DIESEL USTs

Two (2) 10,000 gallon diesel USTs (Tanks A and B), located on the east side of the facility, were encased in concrete up to approximately ⅛ of their diameters. Both tanks were in excellent condition with tar coatings intact. No soil samples were collected from below this tank cluster as: 1) such would have required substantial work to remove the tank encasements from the excavation in order to facilitate sampling; and 2) there were no outward signs of a release.

Approximately 140 yds^3 of backfill material was removed in the UST closure process. This material was reportedly disposed at BFI Vasco Road landfill, Livermore, CA.

WASTE OIL UST

A single 1000 gallon waste oil UST (Tank C), used to store crankcase drainings from the multiple diesel-powered high capacity water pumps, was removed from the west side of the pump house. This tank was "sandwiched" between the pump house foundation and within six feet of a 64" diameter water main.

Although the tank appeared sound, a strong hydrocarbon (HC) odor was reported in material located below this tank. The location of the noted water main and other factors, however, reportedly limited the ability to extend the UST excavation beyond ~10' in depth, where a sample was eventually collected. Initial laboratory results indicated elevated concentrations of diesel- and oil-range HC in sampled soil, as well as parts-per-million (ppm) range SVOCs (*methylnapthalene* and *phenanthrene*).

A soil investigation ensued in which a series of exploratory trenches were excavated and soil borings advanced along the western flank of the pump house, on both east and west sides of the noted water main. Soil samples were collected at one or two discrete depths as each trench was deepened. Conditions encountered during the initial phase of trenching (3) and soil borings (3) resulted in the completion of nine (9) additional trenches and four (4) additional borings in order to track the extent of encountered contamination.

Results of this preliminary work resulted in the eventual excavation of ~1500 yds^3 of impacted material. The final excavation occupied an area approximately rectangular in shape with dimensions of 90 x 25 feet; total depth ranged from ~13 - 21' BG. Excavation was limited by both the 64" and a secondary 78" water mains, and the building footprint.

Leaking Underground Fuel Storage Tank Program

Soil samples collected from the final excavation revealed the presence of elevated concentrations of diesel- and oil-range Hcs, and low ppm-range concentrations of several SVOCs, at depths ranging from 9 to 15' BG. Noteworthy contamination is still present in materials adjacent to and below the building foundation, strongly suggesting that contamination extends some distance beneath the pump house.

Approximately 1500 yds^3 of material was excavated during this investigation and removal process. This material was reportedly disposed at BFI Vasco Road landfill, Livermore, CA.

IV. CLOSURE

Does completed corrective action protect existing beneficial uses per the Regional Board Basin Plan? Undetermined

Does completed corrective action protect potential beneficial uses per the Regional Board Basin Plan? Undetermined

Does corrective action protect public health for current land use? YES
Site management requirements: NA

Should corrective action be reviewed if land use changes? YES

Monitoring wells Decommisioned: NO (pending case closure)

Number Decommisioned: 3 Number Retained: 3 (pending case closure)

List enforcement actions taken: NONE

List enforcement actions rescinded: NONE

V. LOCAL AGENCY REPRESENTATIVE DATA

Name: Scott Seery Title: Sr. Haz Mat Specialist
Signature: Date: 12-13-95

Reviewed by
Name: Amy Leech Title: Haz Mat Specialist
Signature: Date: 12/13/95

Name: Dale Klettke Title: Haz mat Specialist
Signature: Date: 11/27/95

VI. RWQCB NOTIFICATION

Date Submitted to RB: 12-14-95 RB Response: Approved
RWQCB Staff Name: Kevin Graves Title: San. Eng. Assoc. Date: 12/27/95

VII. ADDITIONAL COMMENTS, DATA, ETC.

Following excavation of contaminated material along the western side of the facility, three (3) GW monitoring wells were constructed during June 1992 to determine what impact, if any, the release may have had on underlying GW resources. Wells were placed in anticipation of GW flow towards Alameda Creek, the current channel of which is located ~1000' west of the site.

Boring logs indicate encountered native materials consisted of alluvially-deposited, (apparently) discontinuous units of clay, sandy silt, silty sand and gravel underlain by a basement of well-indurated siltstone bedrock. Well MW-1 was entirely constructed within post-excavation fill materials. GW was initially encountered between ~14.5 and 22' BG, stabilizing between ~14.7 and 15.4' BG.

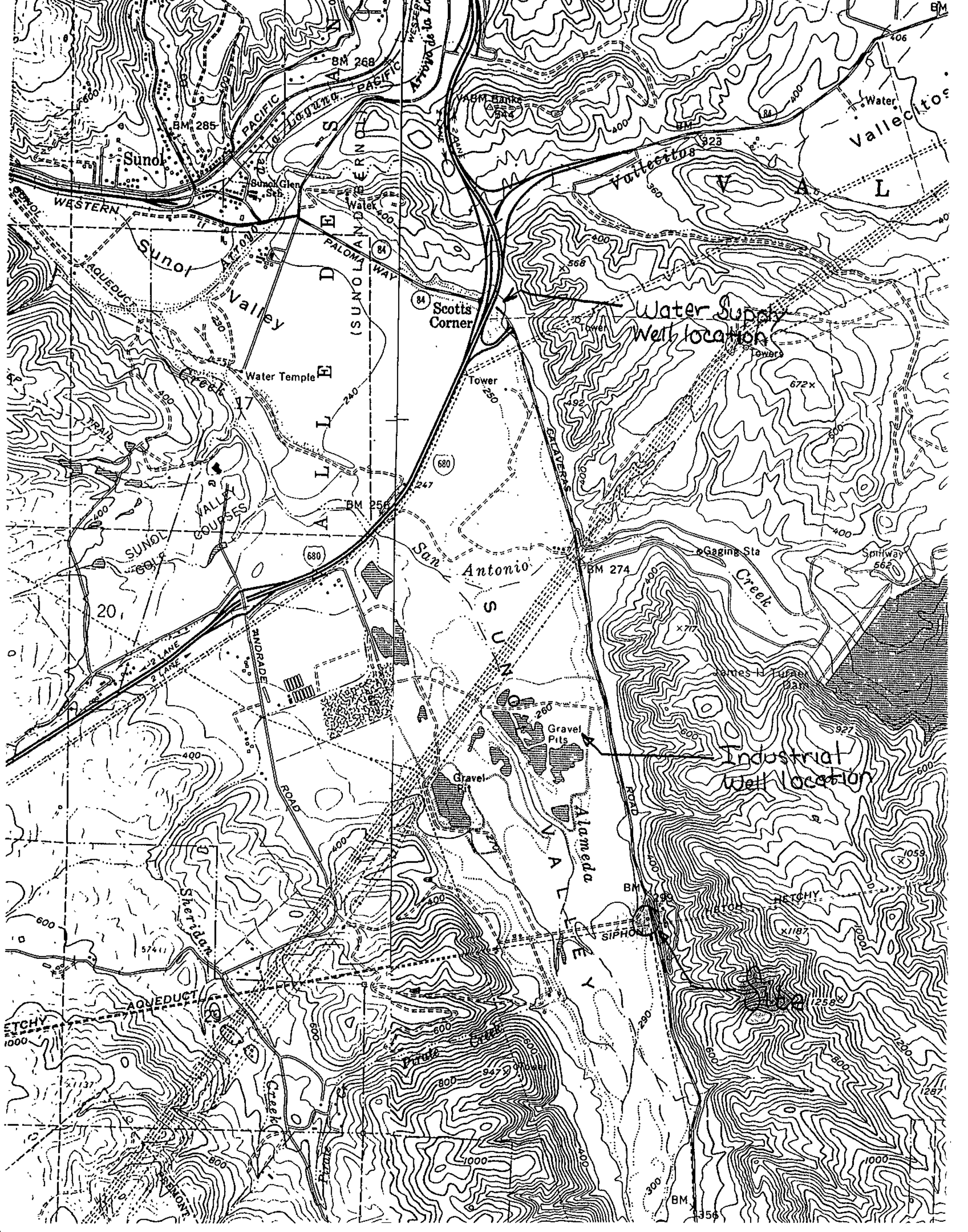
The suite of target compounds sought in both soil and GW samples were consistent with waste oil constituents: TPH-G/-D, BTEX, TOG, SVOC. GW was additionally analyzed for 8240 compounds. Soil from the 20 - 20.5' sampling interval in well borings MW-2 and -3 exhibited TPH-D and TOG range compounds up to 560 ppm. No other target compounds were detected. <u>All</u> GW results were below method detection limits.

Initial GW flow was determined to be SW at a gradient of 0.01 $ftft^{-1}$.

Following the initial well installation, sampling and monitoring of June 1992, the wells were additionally sampled 4 times and monitored 11 times between June 1993 and June 1994. Other than the periodic appearance of *chloroform*, and the one-time appearance each of *phenol, bromodichloro-methane,* and *4-methylphenol*, analysis of GW samples did not reveal the presence of target compounds above method detection limits.

A concrete explanation for the presence of the foregoing suite of compounds in sampled GW has not be presented. However, because chloroform and phenol are known compounds used in analytical laboratories, their presence has been suggested as being linked to lab-induced contamination. Because both bromodichloromethane and chloroform are *trihalomethanes (THM)*, common byproducts of drinking water disinfection, a connection between their occurrence in sampled GW and the disinfection of GW conveyed through the water distribution system this facility serves has been alluded to. The occurrence of 4-methylphenol (*p-creosol*), an isomer of creosol derived from coal tar or petroleum, is not as easily explained. It is plausible, however, that, although not present at detectable concentrations in any of the previous soil sampling efforts, it may be a dissolved component of the tar coating applied to the waste oil tank or other below-ground improvements to guard against corrosion.

It has been reported that the *collective* drinking water standard for THMs is 100 ug/l, and that none have been established for phenol or 4-methylphenol. Human and environmental health risks appear minimal.


Water Supply Well location
Industrial Well location
Site
Sunol
Sunol Valley
Scotts Corner
Water Temple
Sunol Glen Sch
PALOMA WAY
(SUNOL AND BERNOL)
VALLE DE SAN
SUNOL VALLEY
Vallecitos
San Antonio Creek
Gaging Sta
Spillway
James H Turner Dam
Gravel Pits
Gravel Pit
Alameda
CALAVERAS ROAD
ANDRADE ROAD
SUNOL VALLEY GOLF COURSES
Sheridan Creek
Pirate Creek
HETCH HETCHY SIPHON
HETCHY AQUEDUCT
WESTERN PACIFIC
Arroyo de la Laguna
BM 268
BM 285
BM 256
BM 274
BM 323
Tower
Towers
Water
680
84

WASTE OIL UST SAMPLE

TABLE 3 - RESULTS OF ANALYSIS OF SOIL SAMPLE S1-10' (results in mg/kg)

TPHg	TPHd	TOG	VOLATILE ORGANICS	SEMI-VOLATILE ORGANICS
*990	3,800	1,600	**ND	methlynapthalene - 20.0 phenanthrene - 4.5

* = Quantity noted by lab to be due to heavier hydrocarbon product, possibly diesel
**ND = Analyte not detected above the stated limits of detection.
Notes:
- For EPA methods 8240 & 8270, only those compounds detected above reporting limits are listed above. See enclosed laboratory reports for the range of compounds included, and their respective detection limits.
- Analysis of sample S1-10' for heavy metals included in Table 4
- Detection limits used - TPH as gasoline = 0.5 mg/kg, TPH as diesel = 100 mg/kg, TOG = 30 mg/kg, see laboratory reports for the detection limits of individual compounds included in EPA methods 8240 & 8270.

TABLE 4 - HEAVY METALS ANALYSIS FOR SOIL SAMPLE S1-10'
(results in mg/kg)

METAL	DETECTION LIMIT	SAMPLE SCC1 A-D
CADMIUM (Cd)	0.25	*ND
TOTAL CHROMIUM (Cr)	0.50	48.3
NICKEL (Ni)	2.0	61.7
LEAD (Pb)	2.0	3.2
ZINC (Zn)	1.0	40.3

*ND = Analyte not detected above the stated limits of detection.

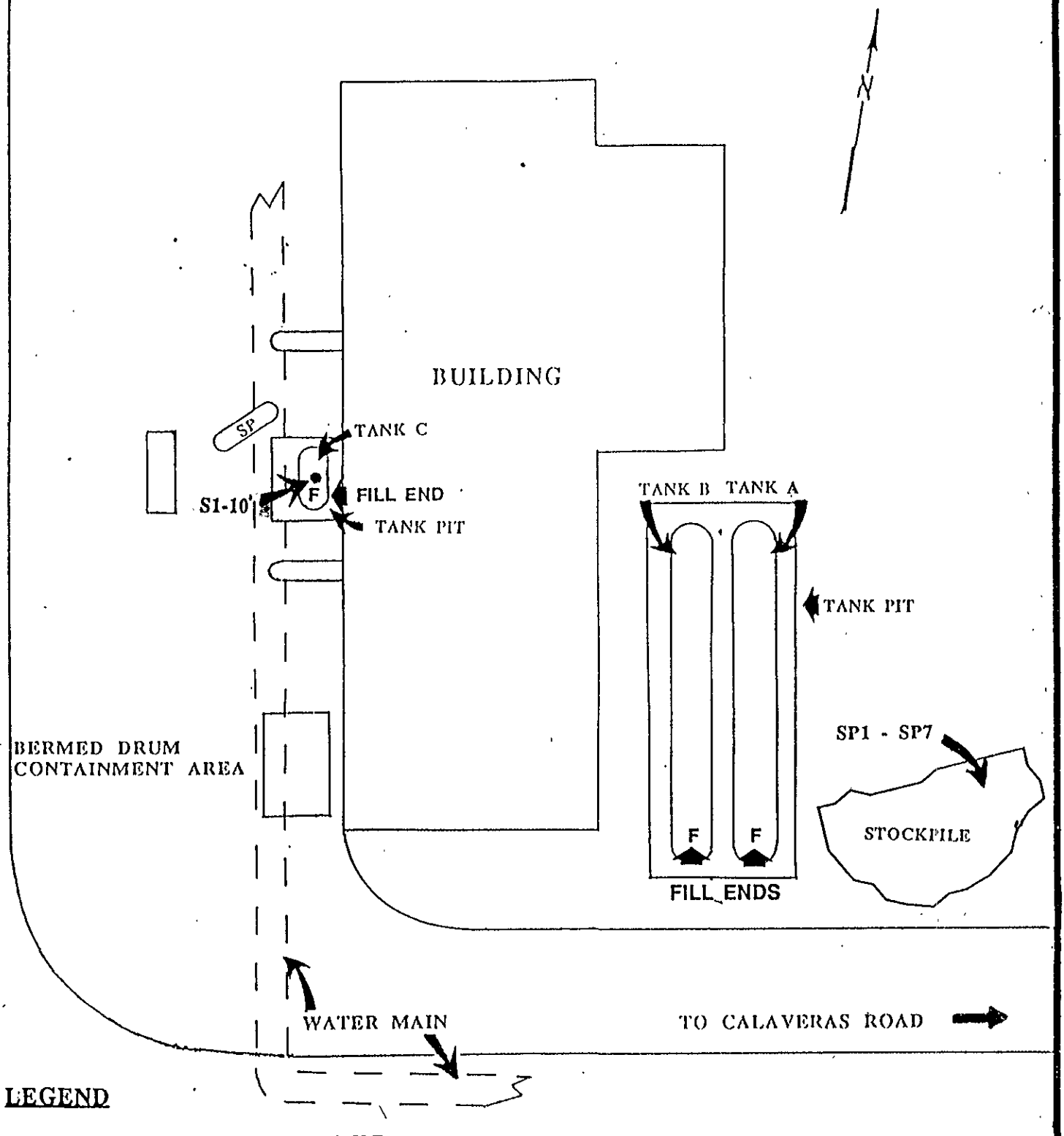
methylnaphthalene - CAS 91-57-6
- combustible

phenanthrene - CAS 85-01-8
- moderately toxic (ing.)
- exp. neoplastigen + carcinogen
- Combustible

TABLE 5 - ANALYTICAL RESULTS FOR SOIL SAMPLES COLLECTED FROM BORINGS AND TRENCHES (mg/kg)

BOREHOLE/ TRENCH #	SAMPLE #	TPHd	TOG
Trench A	TA-10'	*51	–
EB1	EB1-14.5'	*410	–
EB2	EB2-10.5'	**ND	–
EB3	EB3-13.5'	ND	–
EB4	EB4-15-16'	–	ND
EB6	EB6-2'	–	ND
EB6	EB6-5'	–	ND
EB6	EB6-9'	–	ND
EB7	EB7-10'	–	ND

* = Quantity noted by lab to be due to heavier hydrocarbon product, possibly motor oil
**ND = Analyte not detected above the stated limits of detection.
Note: Detection limits used - TPH as diesel = 10 mg/kg, TOG = 50 mg/kg.



LEGEND

SP7' - SOIL SAMPLE FROM STOCKPILE
S1-10' - SOIL SAMPLE FROM TANK PIT
SP - STOCKPILE

SCALE - 1" = 20'

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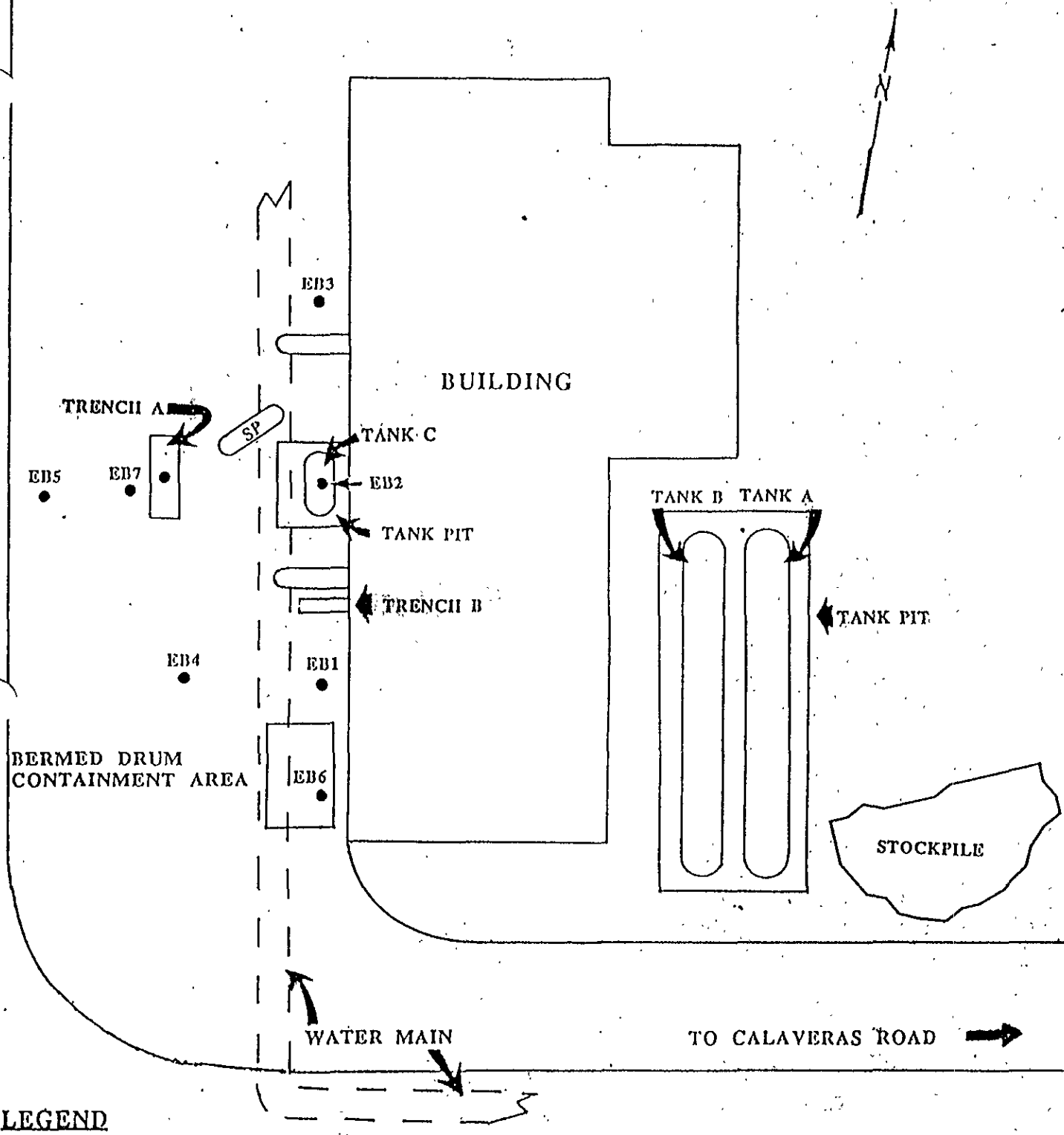
Innovative Solutions for a Better Environment
30028 Industrial Pkwy., S.W.
Suite C
Hayward, CA 94544

DATE: JAN 1991
DRWN BY: SLS
APPRVD: TMB

FIGURE 3: SAMPLE LOCATIONS NOV. 7, 1991

SAN ANTONIO PUMP STA.
555 CALAVERAS ROAD
SUNOL, CALIFORNIA



LEGEND

EB7 ● - SOIL BORING
SP - STOCKPILE

SCALE - 1" = 20'

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Suite C
Hayward, CA 94544

DATE: FEB 1992

DRWN BY: SLS

APPRVD: TMB

FIGURE 2: SITE DIAGRAM

SAN ANTONIO PUMP STA.
555 CALAVERAS ROAD
SUNOL, CALIFORNIA

TABLE 2 ANALYTICAL RESULTS FOR EXPLORATORY TRENCH AND EXCAVATION SOIL SAMPLES

(results in mg/Kg)

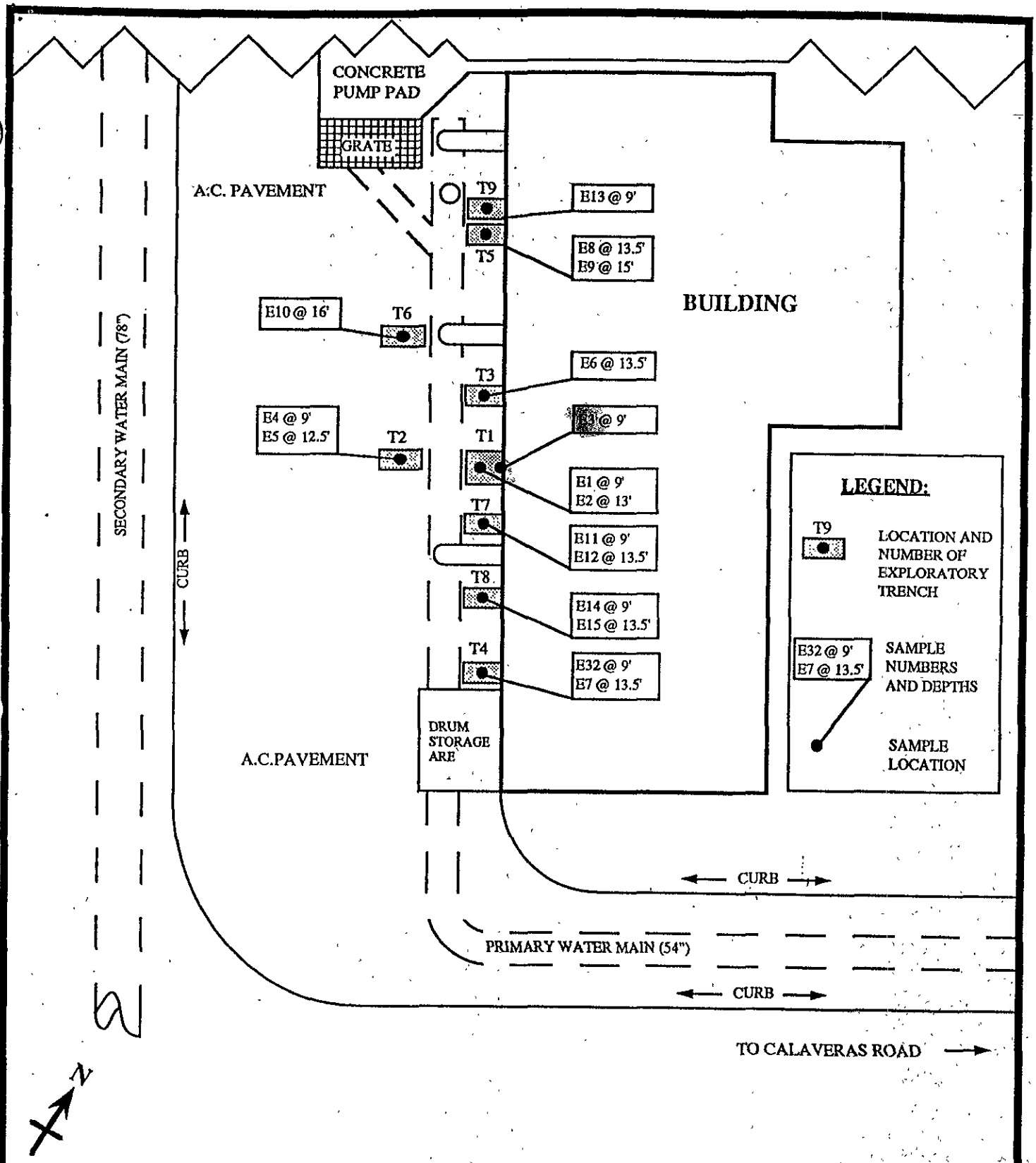
SAMPLE	TPHg	TPHd	TOG	SEMI-VOLATILES	
E2	NA	NA	NA	ND	
E3	NA	2,600[3]	1,700	bis (2-ethylhexyl) phthalate	0.43
E4	NA	NA	NA	napthalene	1.7
				2-methylnapthalene	15
				acenapthene	2.8
				dibenzofuran	1.1
				flourene	2.1
				phenanthrene	4.6
E5	NA	NA	NA	ND	
E6	NA	NA	NA	acenapthene	0.15
				flourene	0.17
				phenanthrene	0.09
				anthracene	0.09
				di-n-butyl phthalate	0.07
				flouranthrene	0.05
				pyrene	0.06
E7	ND	ND	ND	ND	
E9	ND	NA	NA	bis (2-ethylhexyl) phthalate	5.9
E11	NA	NA	NA	ND	
E12	NA	NA	NA	ND	
E13	ND	NA	NA	ND	
E14	NA	NA	NA	ND	
E15	NA	NA	NA	bis (2-ethylhexyl) phthalate	0.35
E16	NA	ND	57	NA	
E17	NA	ND	40	NA	
E18	NA	12	130	NA	
E20	ND	ND	ND	ND	
E21	ND	ND	37	ND	
E22	ND	ND	ND	ND	
E23	ND	ND	30	ND	
E25	ND	ND	57	ND	
E26	ND	ND	43	ND	

Table 1 (cont'd)

SAMPLE	TPHg	TPHd	TOG	SEMI-VOLATILES
E27	ND	ND	80	ND
E29	ND	ND	30	ND
E30	ND	ND	63	ND
E31	ND	ND	63	ND
E32	ND	ND	ND	ND
E33	NA	NA	ND	NA
E34	NA	NA	ND	NA
E35	NA	NA	ND	NA
E37	NA	ND	57	NA
E38	NA	ND	30	NA

1. **Sample not analyzed for this analyte.**
2. **Analyte not detected above laboratory detection limits.**
3. **Detection limit raised to 200-mg/Kg due to interference by elevated levels of impacting constituents.**

Note: See lab reports for detection limits used.



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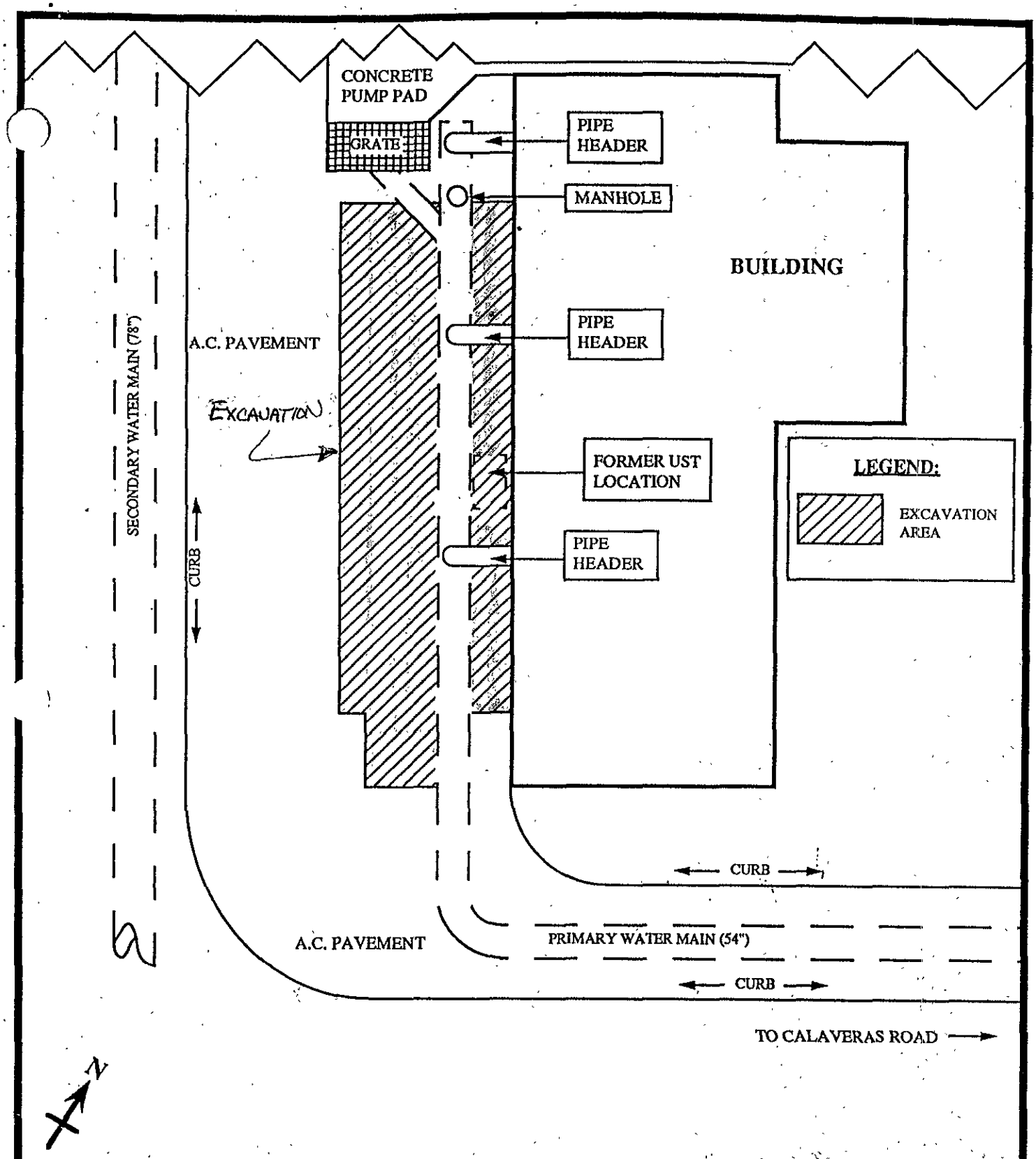
DATE: 11/25/92

DRAWN BY: LMG

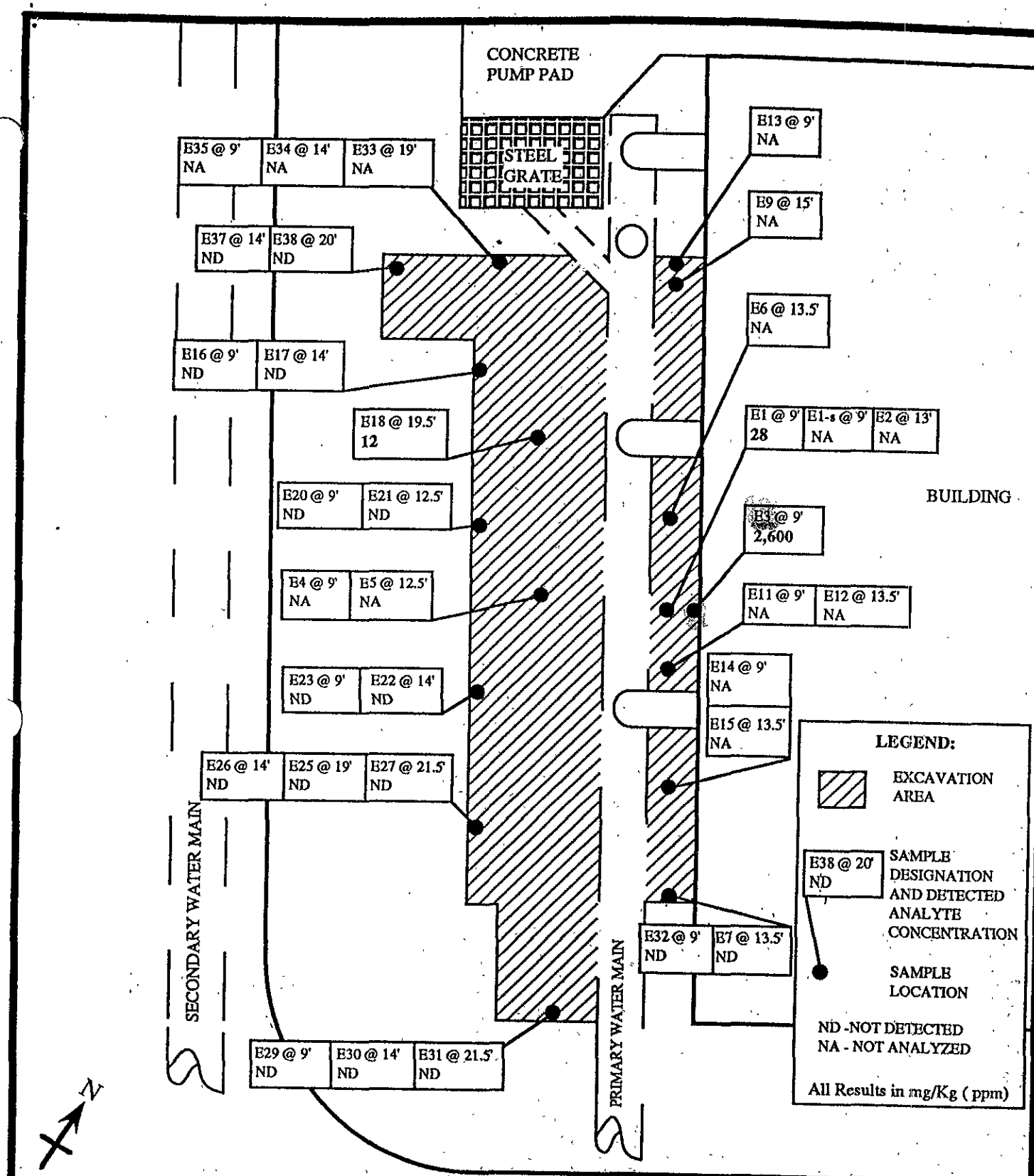
SCALE: 1" = 20'

FIGURE 4: LOCATIONS OF EXPLORATORY TRENCH SAMPLES

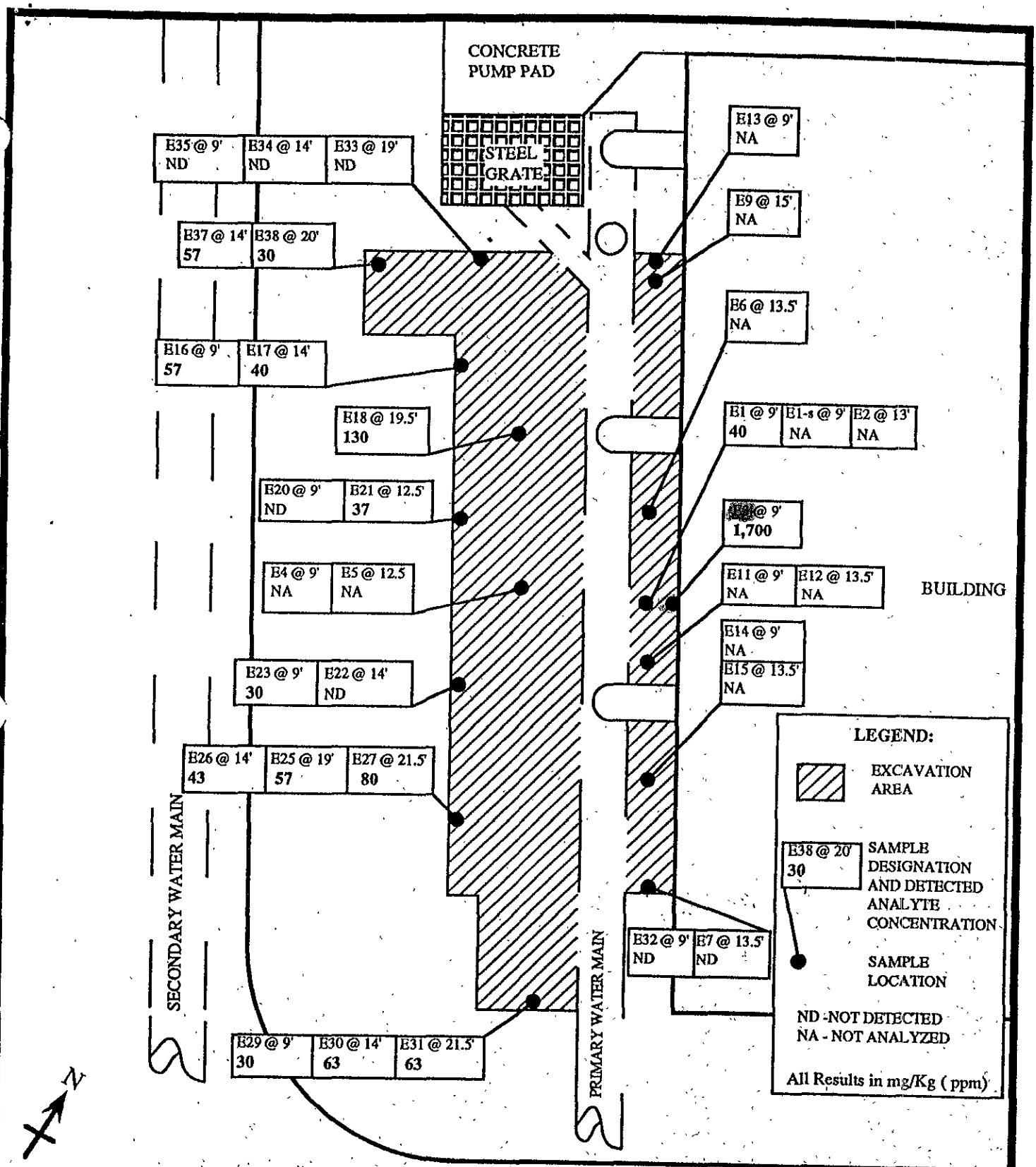
SAN ANTONIO PUMP STATION
5555 CALAVERAS ROAD
SUNOL, CA



ENVIRONMENTAL BIO-SYSTEMS, INC. Innovative Solutions for a Better Environment 30028 Industrial Pkwy. S.W. Suite C Hayward, CA 94544	DATE: 11/25/92 DRAWN BY: LMG SCALE: 1" = 20'	**FIGURE 3: EXCAVATION DIMENSIONS** **SAN ANTONIO PUMP STATION** **5555 CALAVERAS ROAD** **SUNOL, CA**



ENVIRONMENTAL BIO-SYSTEMS, INC. Innovative Solutions for a Better Environment 30028 Industrial Pkwy. S.W. Suite C Hayward, CA 94544	DATE: 11/25/92 DRAWN BY: LMG SCALE: 1" = 15'	**FIGURE 5: CONCENTRATIONS OF TPHd IN SELECTED SOIL SAMPLES** **SAN ANTONIO PUMP STATION** **5555 CALAVERAS ROAD** **SUNOL, CA**



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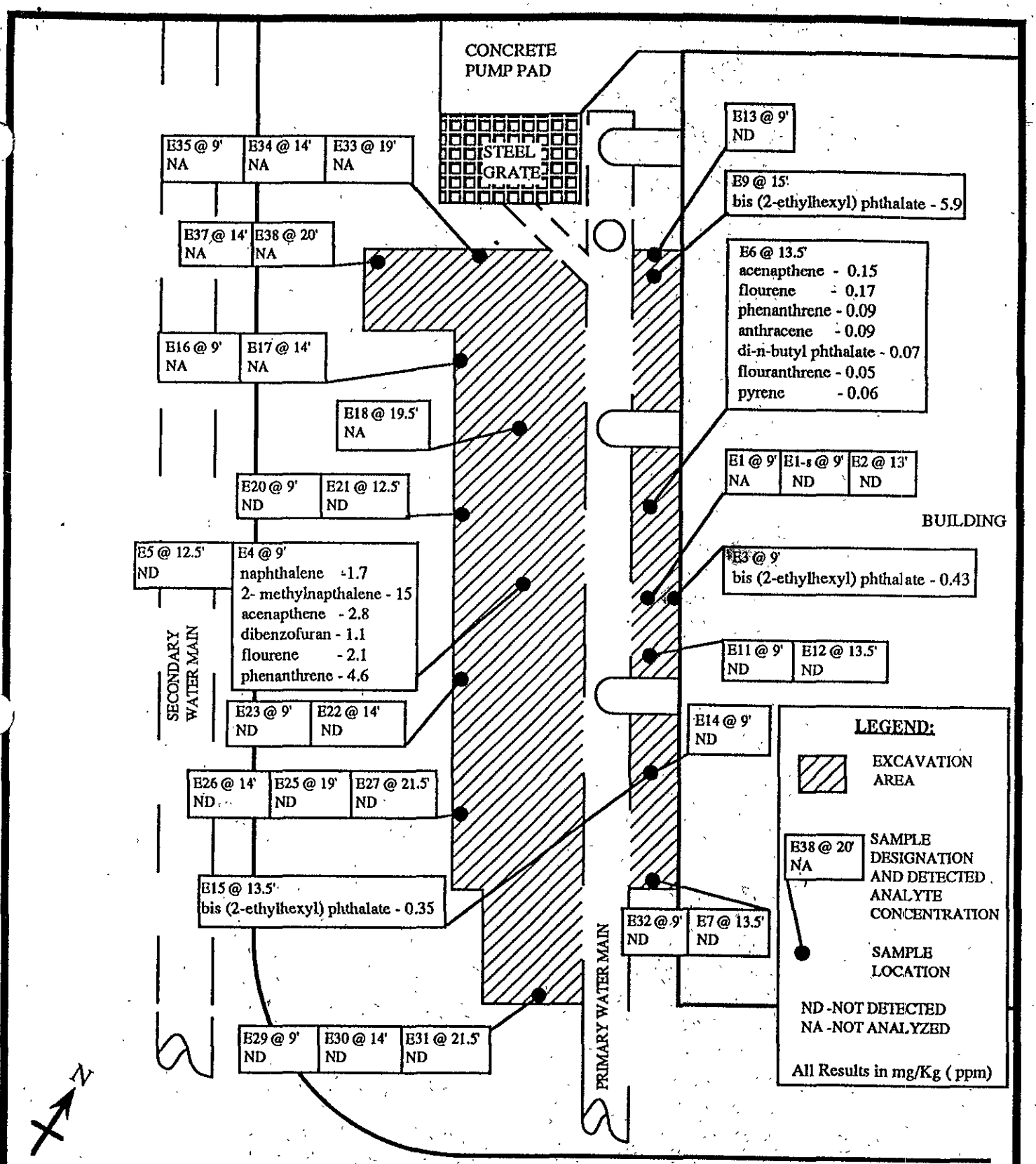
DATE: 11/25/92

DRAWN BY: LMG

SCALE: 1" = 15'

FIGURE 6: CONCENTRATIONS OF TOG IN SELECTED SOIL SAMPLES

SAN ANTONIO PUMP STATION
5555 CALAVERAS ROAD
SUNOL, CA



ENVIRONMENTAL BIO-SYSTEMS, INC. Innovative Solutions for a Better Environment **30028 Industrial Pkwy. S.W.** **Suite C** **Hayward, CA 94544**	DATE: 11/25/92 DRAWN BY: LMG SCALE: 1" = 15'	**FIGURE 7: CONCENTRATIONS OF SVOCs IN SELECTED SOIL SAMPLES** **SAN ANTONIO PUMP STATION** **5555 CALAVERAS ROAD** **SUNOL, CA**

Table 1
Compounds Detected in Groundwater

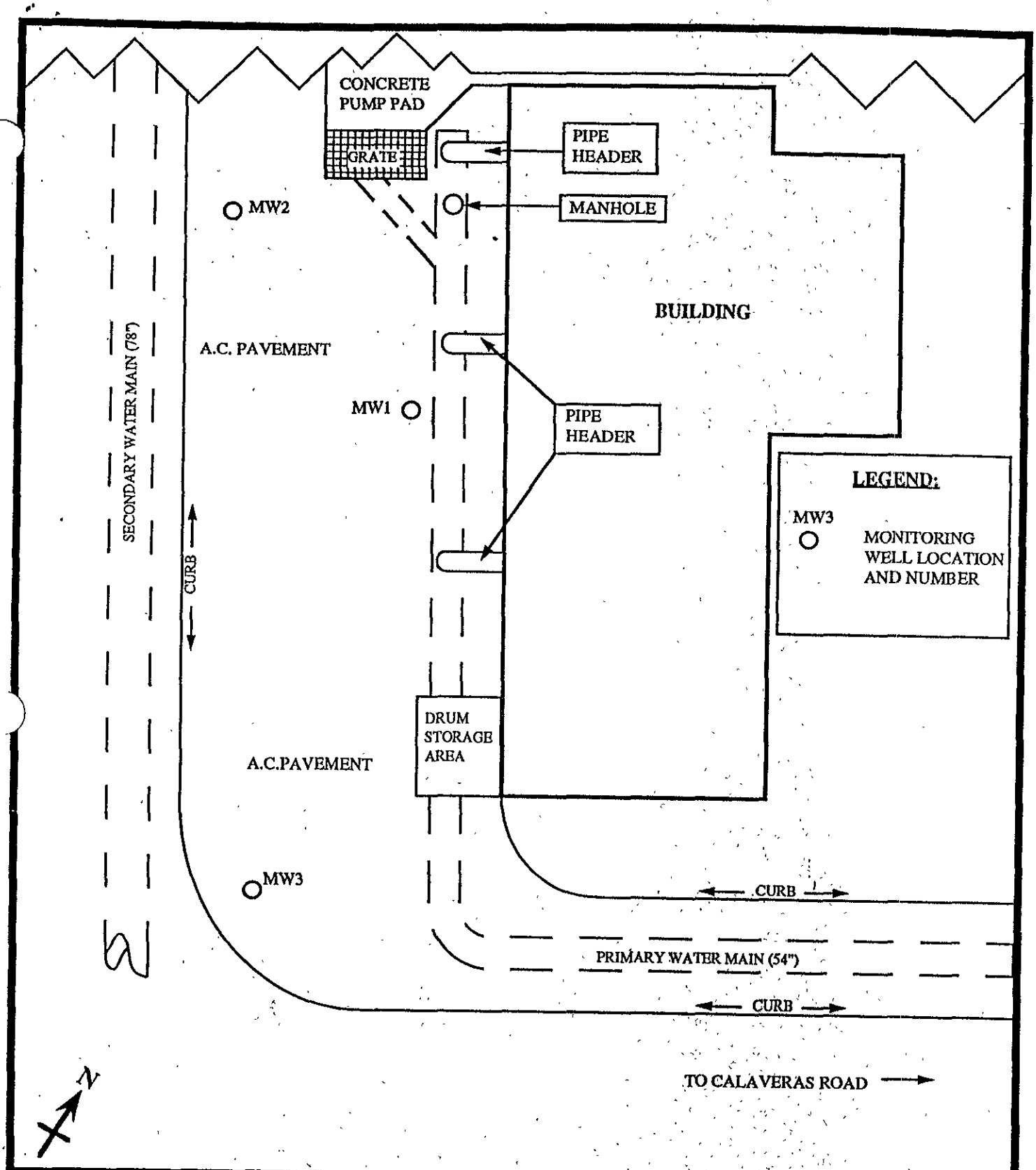
Quarter	Compound	MW1	MW2	MW3
First	Chloroform	--	3.7 µg/l	0.9 µg/l
Second	Chloroform	10 µg/l	2.2 µg/l	0.9 µg/l
	Bromodichloro-methane	0.57 µg/l	--	--
Third	---			
Fourth	Phenol	13 µg/l	--	--
	4-Methylphenol	28 µg/l	--	--

Groundwater Depth and Elevation Data

	MW-1 Well Elevation: 289.50 Total Well Depth: 15.90		MW-2 Well Elevation: 288.98 Total Well Depth: 21.20		MW-3 Well Elevation: 289.24 Total Well Depth: 21.22	
	Depth	Elevation	Depth	Elevation	Depth	Elevation
June 1992	14.95	274.55	14.74	274.24	15.43	274.31
June 1993	14.28	275.22	14.62	274.36	15.30	274.44
September 1993	14.82	274.68	15.18	273.80	15.50	274.24
October 1993	15.08	274.42	14.84	274.14	15.62	273.62
November 1993	no access	--	14.86	274.12	15.57	273.67
December 1993	14.04	275.10	14.70	274.28	15.43	273.81
January 1994	14.57	274.93	14.86	274.12	15.58	273.66
February 1994	14.55	274.95	14.80	274.18	14.45	274.79
March 1994	14.17	275.33	14.65	274.33	15.36	273.88
April 1994	14.61	274.89	14.75	274.14	15.50	273.74
May 1994	14.00	275.50	14.63	274.35	15.35	273.89
June 1994	14.61	274.89	14.78	274.20	15.46	273.78

?

This is a May 1994 report!



ENVIRONMENTAL BIO-SYSTEMS, INC.
Innovative Solutions for a Better Environment

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Hayward, CA 94544

DATE: 11/25/92

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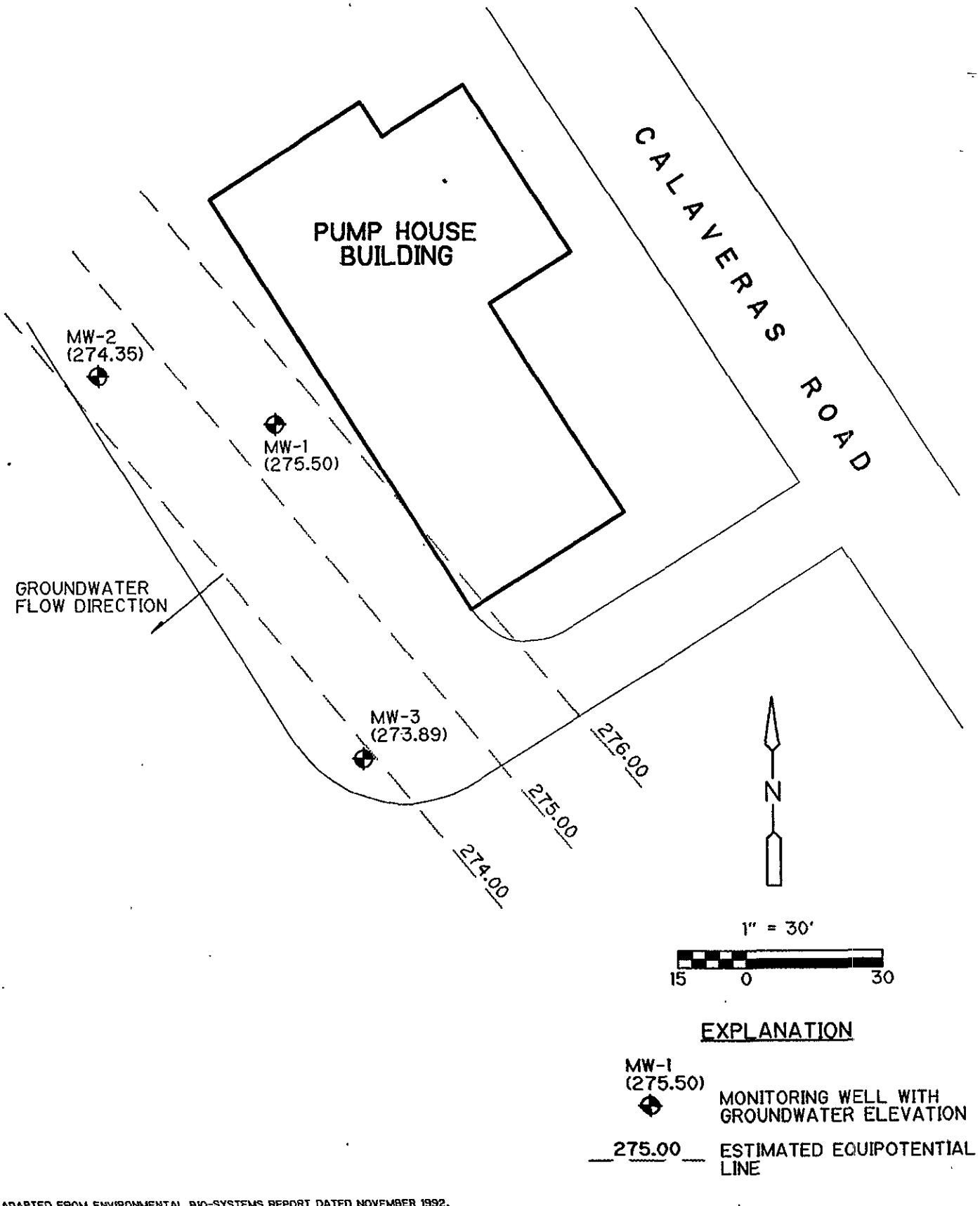
SCALE: 1" = 20'

FIGURE 8: LOCATIONS OF MONITORING WELLS AND SOIL BORINGS

SAN ANTONIO PUMP STATION
5555 CALAVERAS ROAD
SUNOL, CA



ADAPTED FROM ENVIRONMENTAL BIO-SYSTEMS REPORT DATED NOVEMBER 1992.

SAN ANTONIO PUMP STATION

GROUNDWATER MONITORING WELL LOCATION & GROUNDWATER FLOW MAP 4th QUARTER SAMPLING

CDM
environmental engineers, scientists, planners, & management consultants

Figure No. 1

CDM/CADD ST6 06/29/94 0:34:01 PLAN002B X:\ACAD\5800-110\

APPENDIX A

LOGS OF BORINGS

SOIL BORING LOG

BORING DESIGNATION: EB1
DATE OF DRILLING: 11-21-91
CASING TYPE:
LOGGED BY: AMM H. ANAM
REGISTRATION:

MONITORING WELL INSTALLED:
WELL DIAMETER:
SLOT SIZE:
SIGNATURE:
EXPIRATION:

DEPTH (FEET)	SAMPLE NO.		BLOW CNT.	P.I.D.	GRAPHIC LOG	SOIL TYPE	WELL CONST.	DESCRIPTION AND REMARKS
-1-								Gravelly Sand with some Silt, light gray, loose, damp, no hydrocarbon odor
-2-								
-3-								
-4-								
-5-								
-6-								
-7-								
-8-								
-9-								
-10-								Coarse Sandy Gravel with traces of Clay, light gray to gray, damp, no hydrocarbon odor
-11-								
-12-	1							
-13-							Siltstone	
-14-								Clayey Silt, gray, massive, very compact, damp, no hydrocarbon odor
-15-	2							
-16-								BOTTOM OF BORING AT 15'
-17-								
-18-								
-19-								
-20-								

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DATE DRAWN: JAN 1992
JOB NO: 004-189-02
DRAWN BY: SLS
APP'D BY: TMB

SITE:
SAN ANTONIO PUMP STA.
555 CALAVERAS ROAD
SUNOL, CALIFORNIA

SOIL BORING LOG

BORING DESIGNATION: EB2
DATE OF DRILLING: 11-21-91
CASING TYPE:
LOGGED BY: AMM H. ANAM
REGISTRATION:

MONITORING WELL INSTALLED:
WELL DIAMETER:
SLOT SIZE:
SIGNATURE:
EXPIRATION:

DEPTH (FEET)	SAMPLE NO.	BLOW CNT.	P.I.D.	GRAPHIC LOG	SOIL TYPE	WELL CONST.	DESCRIPTION AND REMARKS
-1-							
-2-							
-3-							
-4-							
-5-							
-6-							
-7-							
-8-							
-9-							
-10-							
-11-	1						Gravelly Sand with some Silt, light gray, loose, damp, no hydrocarbon odor
-12-							
-13-							
-14-							
-15-	*						Coarse Sandy Gravel with Clay bindings, light gray to gray, damp, no hydrocarbon odor
-16-							
-17-	2		??	no sample recovery			
-18-							
-19-							
-20-	3						Clayey Silt, gray, massive and compact, damp, no hydrocarbon odor

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DATE DRAWN: JAN 1992
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DRAWN BY: SLS
APP'D BY: TMB

SITE:
SAN ANTONIO PUMP STA.
555 CALAVERAS ROAD
SUNOL, CALIFORNIA

SOIL BORING LOG

BORING DESIGNATION: EB2
DATE OF DRILLING: 11-21-91
CASING TYPE:
LOGGED BY: AMM H. ANAM
REGISTRATION:

MONITORING WELL INSTALLED:
WELL DIAMETER:
SLOT SIZE:
SIGNATURE:
EXPIRATION:

DEPTH (FEET)	SAMPLE NO.		BLOW CNT.	P.I.D.	GRAPHIC LOG	SOIL TYPE	WELL CONST.	DESCRIPTION AND REMARKS
-21-								
-22-								
-23-	4							Clayey Silt, gray, massive and compact, damp, no hydrocarbon odor
-24-								BOTTOM OF BORING AT 23-1/2'
-25-								
-26-								
-27-								
-28-								
-29-								
-30-								
-31-								
-32-								
-33-								
-34-								
-35-								
-36-								
-37-								
-38-								
-39-								
-40-								

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JOB NO: 004-189-02
DRAWN BY: SLS
APP'D BY: TMB

SITE:
SAN ANTONIO PUMP STA.
555 CALAVERAS ROAD
SUNOL, CALIFORNIA

SOIL BORING LOG

BORING DESIGNATION: EB3 — MONITORING WELL INSTALLED: _____

DATE OF DRILLING: 11-21-91 — WELL DIAMETER: _____

CASING TYPE: _____ — SLOT SIZE: _____

LOGGED BY: AMM H. ANAM — SIGNATURE: _____

REGISTRATION: _____ — EXPIRATION: _____

DEPTH (FEET)	SAMPLE NO.	BLOW CNT.	P.I.D.	GRAPHIC LOG	SOIL TYPE	WELL CONST.	DESCRIPTION AND REMARKS
-1-							Asphalt
-2-							
-3-							
-4-							
-5-							
-6-							
-7-							
-8-							
-9-							
-10-							
-11-							Gravelly Silt with Clay, gray to bluish gray, damp, no hydrocarbon odor
-12-							
-13-	1						
-14-							Clayey Silt with Gravel, bluish gray to pale greenish gray, damp, no hydrocarbon odor
-15-							
-16-	2						
-17-							Silt stone?
-18-							Clayey Silt, gray, massive and compact, damp, no hydrocarbon odor
-19-							
-20-	3						

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JOB NO: 004-189-02
DRAWN BY: SLS
APP'D BY: TMB

SITE:
SAN ANTONIO PUMP STA.
555 CALAVERAS ROAD
SUNOL, CALIFORNIA

SOIL BORING LOG

BORING DESIGNATION: EB3
DATE OF DRILLING: 11-21-91
CASING TYPE:
LOGGED BY: AMM H. ANAM
REGISTRATION:

MONITORING WELL INSTALLED:
WELL DIAMETER:
SLOT SIZE:
SIGNATURE:
EXPIRATION:

DEPTH (FEET)	SAMPLE NO.		BLOW CNT.	P.I.D.	GRAPHIC LOG	SOIL TYPE	WELL CONST.	DESCRIPTION AND REMARKS
-21-								
-22-								
-23-								
-24-								Clayey Silt, gray, massive and compact, damp, no hydrocarbon odor
-25-	4							
-26-								BOTTOM OF BORING AT 25'
-27-								
-28-								
-29-								
-30-								
-31-								
-32-								
-33-								
-34-								
-35-								
-36-								
-37-								
-38-								
-39-								
-40-								

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JOB NO: 004-189-02
DRAWN BY: SLS
APP'D BY: TMB

SITE:
SAN ANTONIO PUMP STA.
555 CALAVERAS ROAD
SUNOL, CALIFORNIA

SOIL BORING LOG

BORING DESIGNATION: EB4
DATE OF DRILLING: 12-18-91
CASING TYPE:
LOGGED BY: AMM H. ANAM
REGISTRATION:

MONITORING WELL INSTALLED:
WELL DIAMETER:
SLOT SIZE:
SIGNATURE:
EXPIRATION:

DEPTH (FEET)	SAMPLE NO.	BLOW CNT.	P.I.D.	GRAPHIC LOG	SOIL TYPE	WELL CONST.	DESCRIPTION AND REMARKS
-1-							Asphalt
-2-							Clayey Gravel with Sand, Gray, moist, no hydrocarbon odor
-3-							
-4-							
-5-							Sandy Clay, brown, moist, slightly plastic, no hydrocarbon odor
-6-							
-7-							
-8-							
-9-							Silty Sand with Clay, occasional presence of gravel, brownish yellow, damp, no odor
-10-							
-11-	1						
-12-							Gravelly Sand with Clay bindings, occasional presence of boulders, brown to pale reddish brown, damp, no odor
-13-							
-14-							
-15-							
-16-	▽						
-17-							Groundwater at 16-1/2-feet
-18-							
-19-							BOTTOM OF BORING AT 18'
-20-							

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DATE DRAWN: JAN 1992
JOB NO: 004-189-02
DRAWN BY: SLS
APP'D BY: TMB

SITE:
SAN ANTONIO PUMP STA.
555 CALAVERAS ROAD
SUNOL, CALIFORNIA

SOIL BORING LOG

BORING DESIGNATION: EB5 | MONITORING WELL INSTALLED: _____

DATE OF DRILLING: 12-18-91 | WELL DIAMETER: _____

CASING TYPE: _____ | SLOT SIZE: _____

LOGGED BY: AMM H. ANAM | SIGNATURE: _____

REGISTRATION: _____ | EXPIRATION: _____

DEPTH (FEET)	SAMPLE NO.	BLOW CNT.	P.I.D.	GRAPHIC LOG	SOIL TYPE	WELL CONST.	DESCRIPTION AND REMARKS
							Asphalt
-1-							Clayey Gravel with Sand, Gray to brown, moist, no hydrocarbon odor
-2-							
-3-							Sandy Clay with some gravel, brown to dark brown, moist, slightly plastic, no hydrocarbon odor
-4-							
-5-							
-6-							
-7-							
-8-							
-9-							
-10-							Silty Sand with Clay, light yellowish brown, moist, no odor
-11-	1	■					
-12-							
-13-							
-14-							
-15-							
-16-							Gravel with traces of Sand and Clay, dry to wet, no odor
-17-							
-18-							
-19-	▽						
-20-							Groundwater at 19-1/2-feet
							BOTTOM OF BORING AT 20'

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SITE:
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SUNOL, CALIFORNIA

SOIL BORING LOG

BORING DESIGNATION: EB6 | MONITORING WELL INSTALLED: _____

DATE OF DRILLING: 12-18-91 | WELL DIAMETER: _____

CASING TYPE: _____ | SLOT SIZE: _____

LOGGED BY: AMM H. ANAM | SIGNATURE: _____

REGISTRATION: _____ | EXPIRATION: _____

DEPTH (FEET)	SAMPLE NO.	BLOW CNT.	P.I.D.	GRAPHIC LOG	SOIL TYPE	WELL CONST.	DESCRIPTION AND REMARKS
							Concrete
-1-							
-2-	1						
-3-							Sandy Gravel - Gravelly Sand, yellowish gray to brownish gray, color changes to greenish gray at 7', damp, faint hydrocarbon odor noticed at 5'
-4-							
-5-	2						
-6-							
-7-	3						
-8-							
-9-	4						
-10-							
-11-							BOTTOM OF BORING AT 11'
-12-							
-13-							
-14-							
-15-							
-16-							
-17-							
-18-							
-19-							
-20-							

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DATE DRAWN: JAN 1992

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SITE:

SAN ANTONIO PUMP STA.
555 CALAVERAS ROAD
SUNOL, CALIFORNIA

SOIL BORING LOG

BORING DESIGNATION: EB7
DATE OF DRILLING: 12-18-91
CASING TYPE:
LOGGED BY: AMM H. ANAM
REGISTRATION:

MONITORING WELL INSTALLED:
WELL DIAMETER:
SLOT SIZE:
SIGNATURE:
EXPIRATION:

DEPTH (FEET)	SAMPLE NO.	BLOW CNT.	P.I.D.	GRAPHIC LOG	SOIL TYPE	WELL CONST.	DESCRIPTION AND REMARKS
-1-							Asphalt
-2-							Clayey Silt, dark brown, moist, no hydrocarbon odor
-3-							
-4-							
-5-							
-6-							
-7-							
-8-							
-9-							
-10-	1						Gravelly Sand with clay bindings, gets more gravelly with depth, damp, no hydrocarbon odor
-11-							
-12-							
-13-							Gravel with traces of Sand and Clay damp, no odor
-14-							
-15-							
-16-							BOTTOM OF BORING AT 15'
-17-							
-18-							
-19-							
-20-							

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DATE DRAWN: JAN 1992
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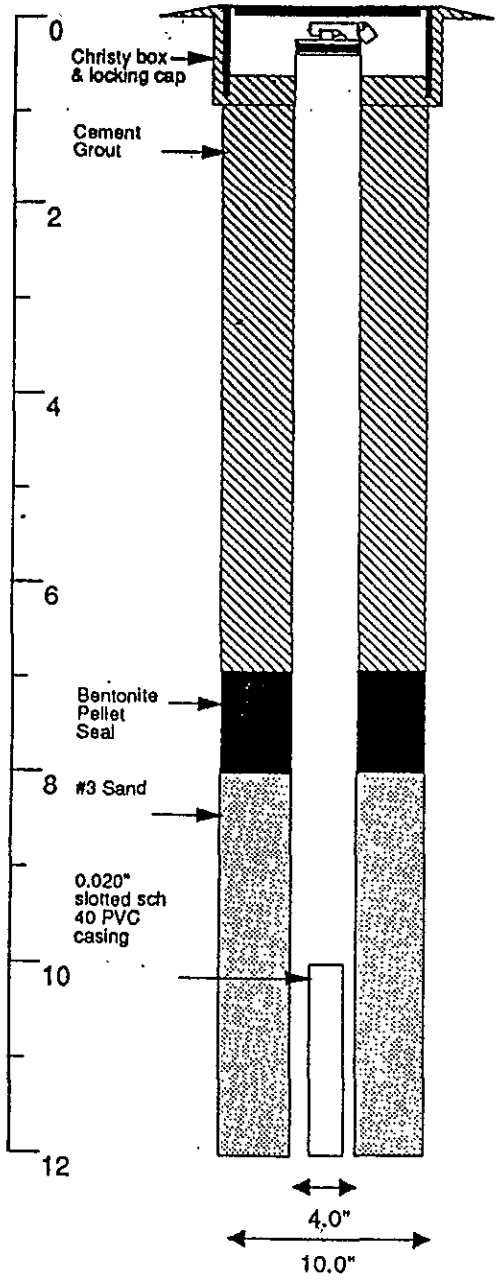
SITE:
SAN ANTONIO PUMP STA.
555 CALAVERAS ROAD
SUNOL, CALIFORNIA

APPENDIX E

SOIL BORING LOGS AND

MONITORING WELL CONSTRUCTION DETAILS



PID Blow (ppmv) Counts	GRAPHIC LOG	DESCRIPTION
0		Eight inches of asphalt and backfill.
		Backfill, base rock, compacted to 95%.
2		
4		
6		
8		
10		
12		

Continues

Logged by:	Dave Sadoff	Drilling Company:	Exploration Geoservices, Inc.	Well Head Completion:	Christy box & locking cap
Inspector:	Scott Seery	Drilling Method:	Hollow Stem Auger	Type of Sampler:	California Split Spoon
Dates Drilled:	6/1/92	Lead Agency:	Alameda County	TD (Total Depth):	16.0 ft.

EXPLANATION

- Water level in completed well
- Water level during drilling
- Location of drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample

Contacts:
- Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational

- est K — Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR — No recovery

Boring Log and Well Completion Details
MW-1 (Boring 1)

San Antonio Pump Station
5555 Calaveras Road
Sunol, California

MONITOR WELL
1

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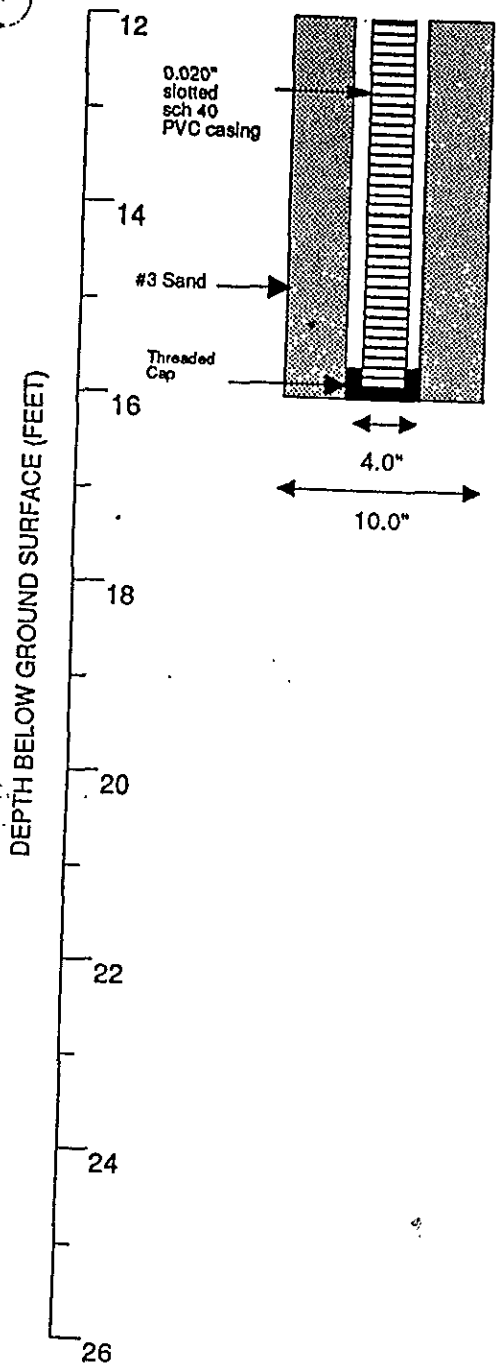
004-189-02



PID Blow (ppmv) Counts	GRAPHIC LOG	DESCRIPTION
		Backfill to 14'.
		Hard Drilling at 14'. First water at 14'7". MW-1; 14.5-15.0.
50		Extremely hard packed from 15'5"; Gray, very well indurated siltstone with abundant quartz and lithic fragments, weathered serpentine? Refusal at 16'.

Final Page

EXPLANATION

- Water level in completed well
- Water level during drilling
- Location of drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Contacts: Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K — Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR — No recovery

Boring Log and Well Completion Details
MW-1 (Boring 1)

San Antonio Pump Station
5555 Calaveras Road
Sunol, California

MONITOR WELL
1

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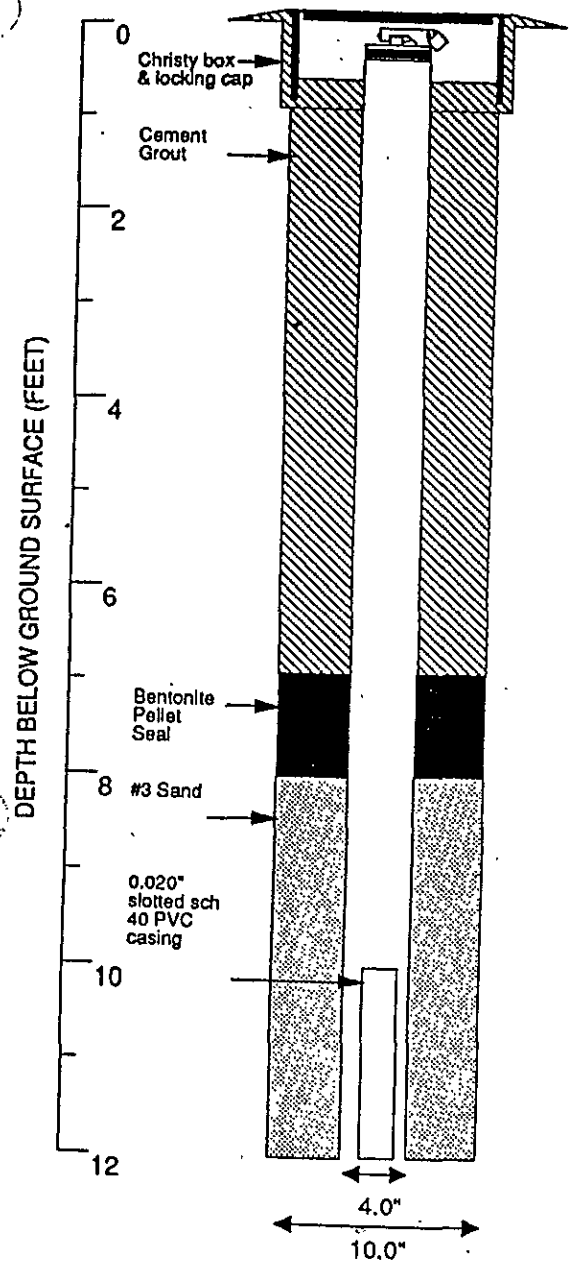
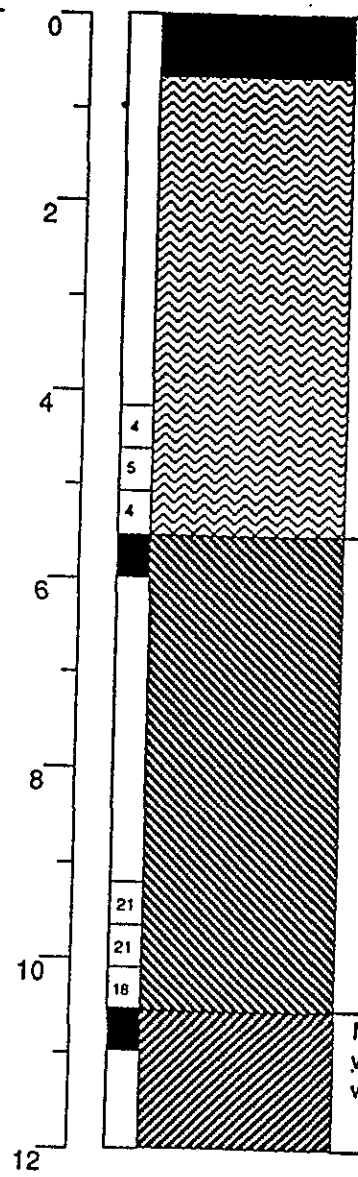
004-189-02





DESCRIPTION

Eight inches of asphalt and backfill. No odor.

Clayey silt, black (organic?).

MW-2; 5.5-6.0; Poorly consolidated fine grained sand, light brown, gravels and cobbles (?), 65% recovery.

MW-2; 10.5-11.0. Fine/medium grained sand with gravels, light brown, poorly consolidated, with iron oxide staining, 65% recovery.

Continues

Logged by:	Dave Sadoff	Drilling Company:	Exploration Geoservices, Inc.	Well Head Completion:	Christy box & locking cap
Inspector:	Scott Seery	Drilling Method:	Hollow Stem Auger	Type of Sampler:	California Split Spoon
Dates Drilled:	6/1/92	Lead Agency:	Alameda County	TD (Total Depth):	22.0 ft.

EXPLANATION

- Water level in completed well
- Water level during drilling
- Location of drill sample
- Location of sample sealed for chemical analysis
- ieve sample
- Grab sample
- ——— Contacts: Solid where certain
- ····· Dotted where approximate
- – – – Dashed where uncertain
- ////// Hachured where gradational
- est K Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR No recovery

Boring Log and Well Completion Details
MW-2 (Boring 2)

San Antonio Pump Station
5555 Calaveras Road
Sunol, California

MONITOR WELL
2

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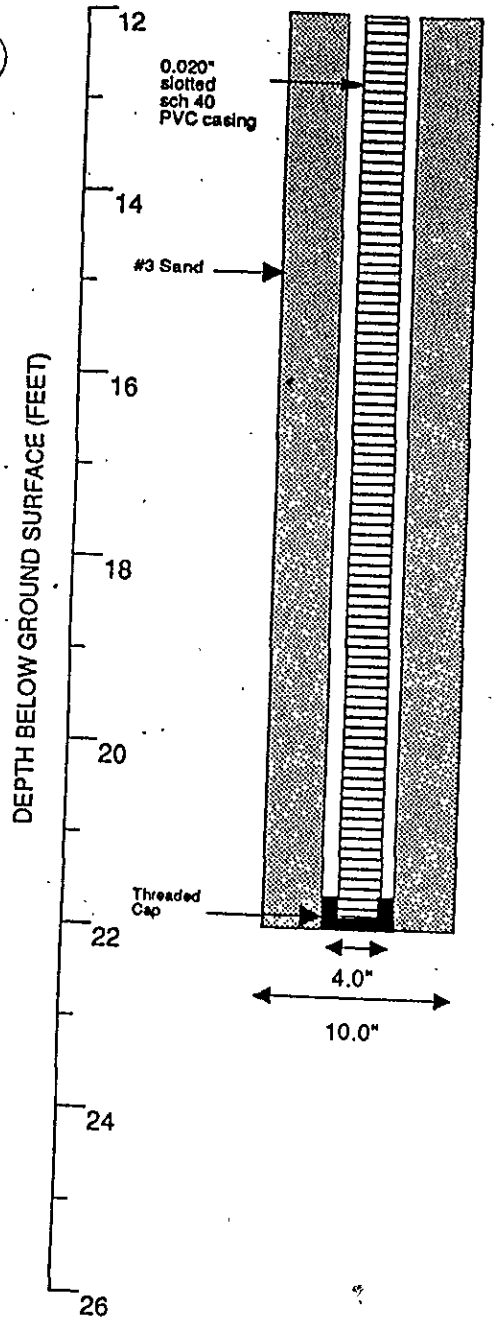

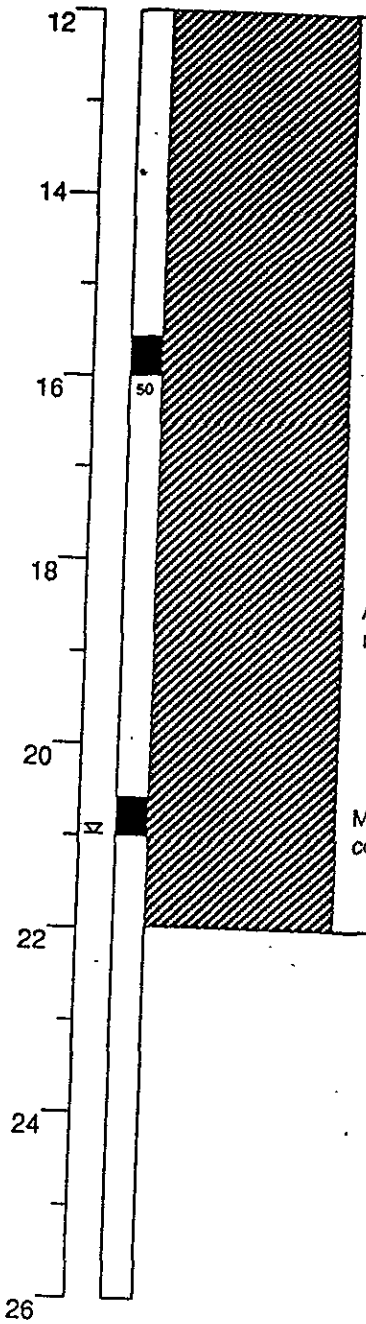

DESCRIPTION

Gravel, minor sand,difficult drilling.

MW-2; 15.5-16.0. Gravel, cobbles (?) in fine/medium grained sand.

At 16.5' light brown/tan silty, fine grained sand, abundant gravel.

At 18.5' light gray, sandy silt, rare oxide staining.

MW-2; 20.5'-21.0'. Gravels/cobbles (?) composed of serpentine (?).

Final Page

EXPLANATION

- Water level in completed well
- Water level during drilling
- Location of drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Contacts: Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K — Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR — No recovery

Boring Log and Well Completion Details
MW-2 (Boring 2)

San Antonio Pump Station
5555 Calaveras Road
Sunol, California

MONITOR WELL 2

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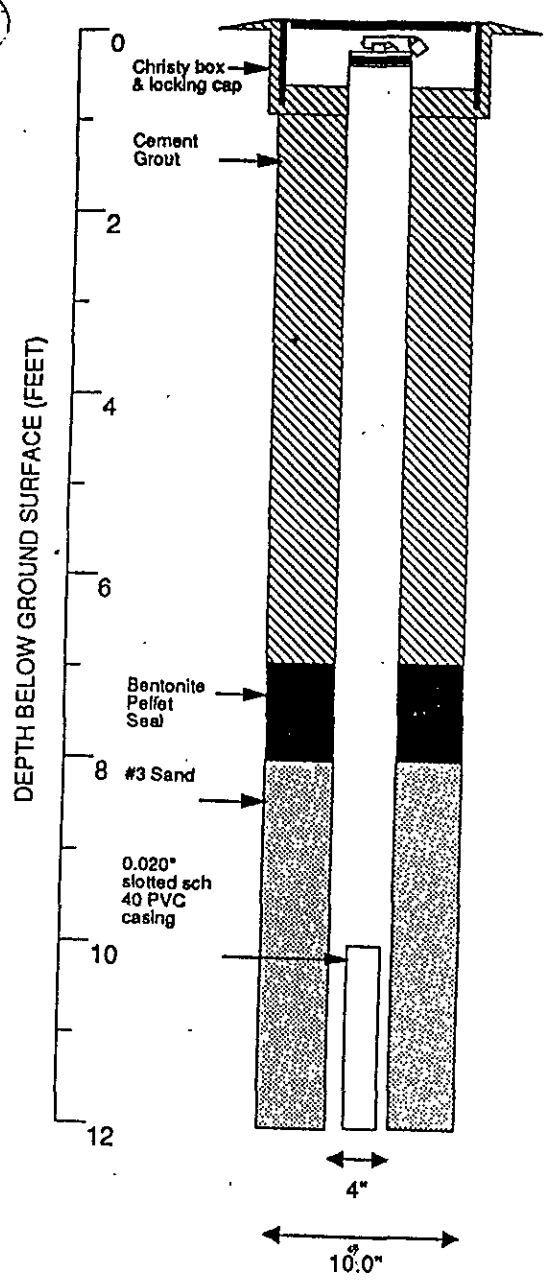

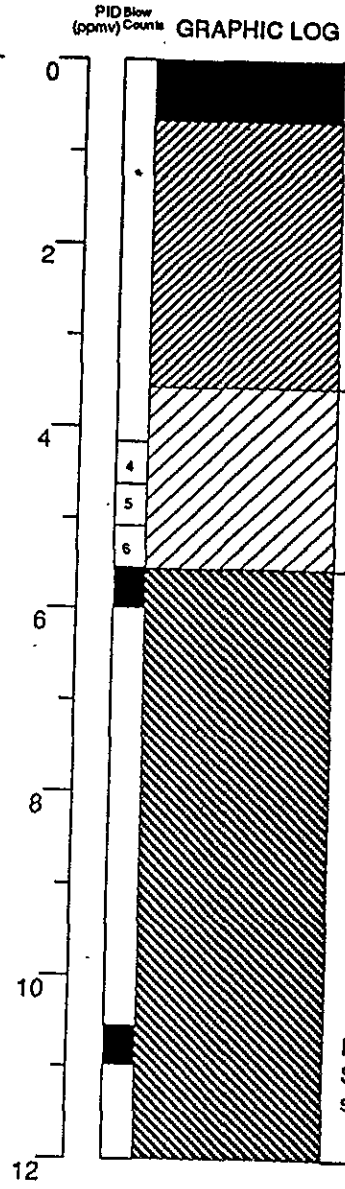

DESCRIPTION

Eight inches of asphalt and backfill. No odor.

Gravels/cobbles (?) to 3.5'..

Clay.

MW-3; 5.5-6.0. Sandy silt, organic rich (roots), dark brown, no gravel, 70% recovery.

MW-3; 10.5-11.0.
Silty sand, fine grained, brown, rare gravels, some iron oxide staining, poorly consolidated.

Continues

Logged by:	Dave Sadoff	Drilling Company:	Exploration Geoservices, Inc.	Well Head Completion:	Christy box & locking cap
Inspector:	Scott Seery	Drilling Method:	Hollow Stem Auger	Type of Sampler:	California Split Spoon
Dates Drilled:	6/1/92	Lead Agency:	Alameda County	TD (Total Depth):	42.0 ft.

EXPLANATION

- Water level in completed well
- Water level during drilling
- Location of drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Contacts: Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR: No recovery

Boring Log and Well Completion Details
MW-3 (Boring 3)

San Antonio Pump Station
5555 Calaveras Road
Sunol, California

MONITOR WELL
3

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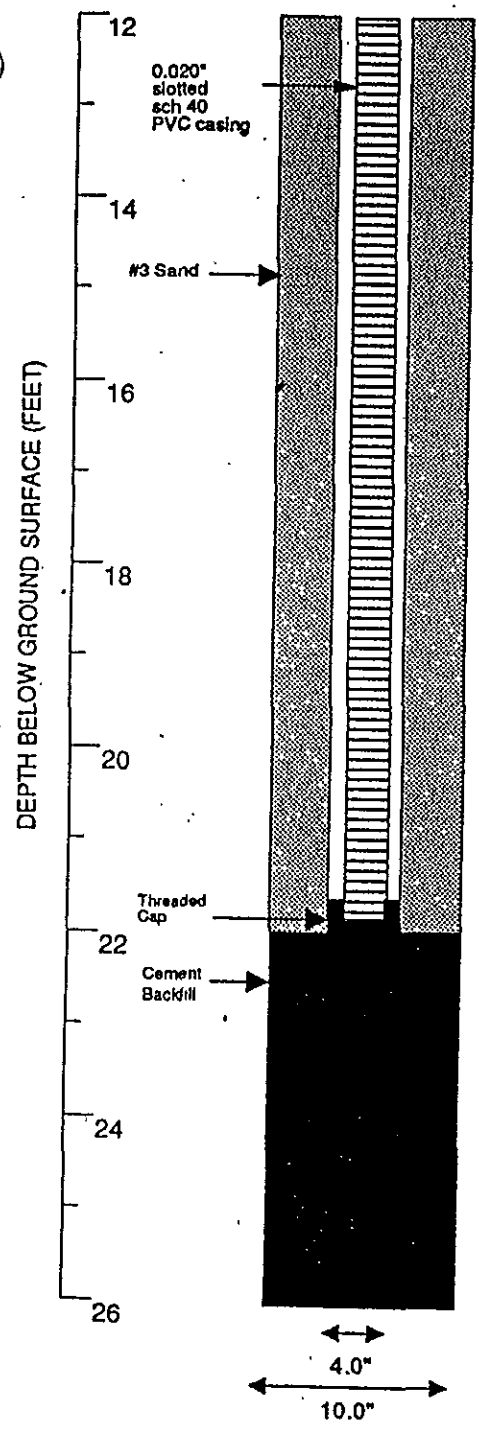
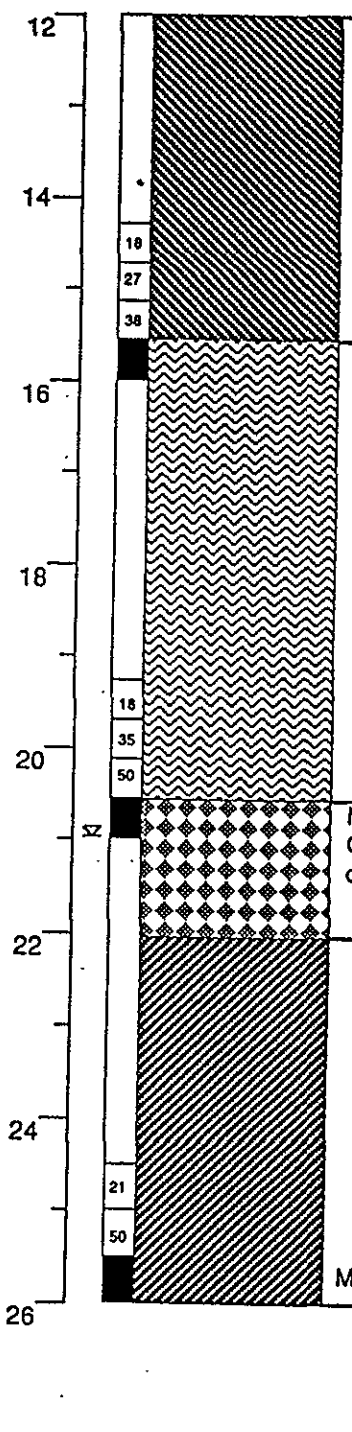
004-189-02





DESCRIPTION

Cobbles (?) at 13.5'-harder drilling.

MW-3; 15.5-16.0. Subrounded gravels in silty sand. Difficult drilling at 16'.

MW-3; 20.5-21.0.
Gravels and cobbles (?), (to 6" diameter), composed of subangular serpentine (?).

Gray silty mudstone with abundant gravels, poorly indurated.

MW-3; 25.5-26.0.

Continues

EXPLANATION

- Water level in completed well
- Water level during drilling
- Location of drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Contacts: Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K — Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR — No recovery

Boring Log and Well Completion Details
MW-3 (Boring 3)

San Antonio Pump Station
5555 Calaveras Road
Sunol, California

MONITOR WELL
3

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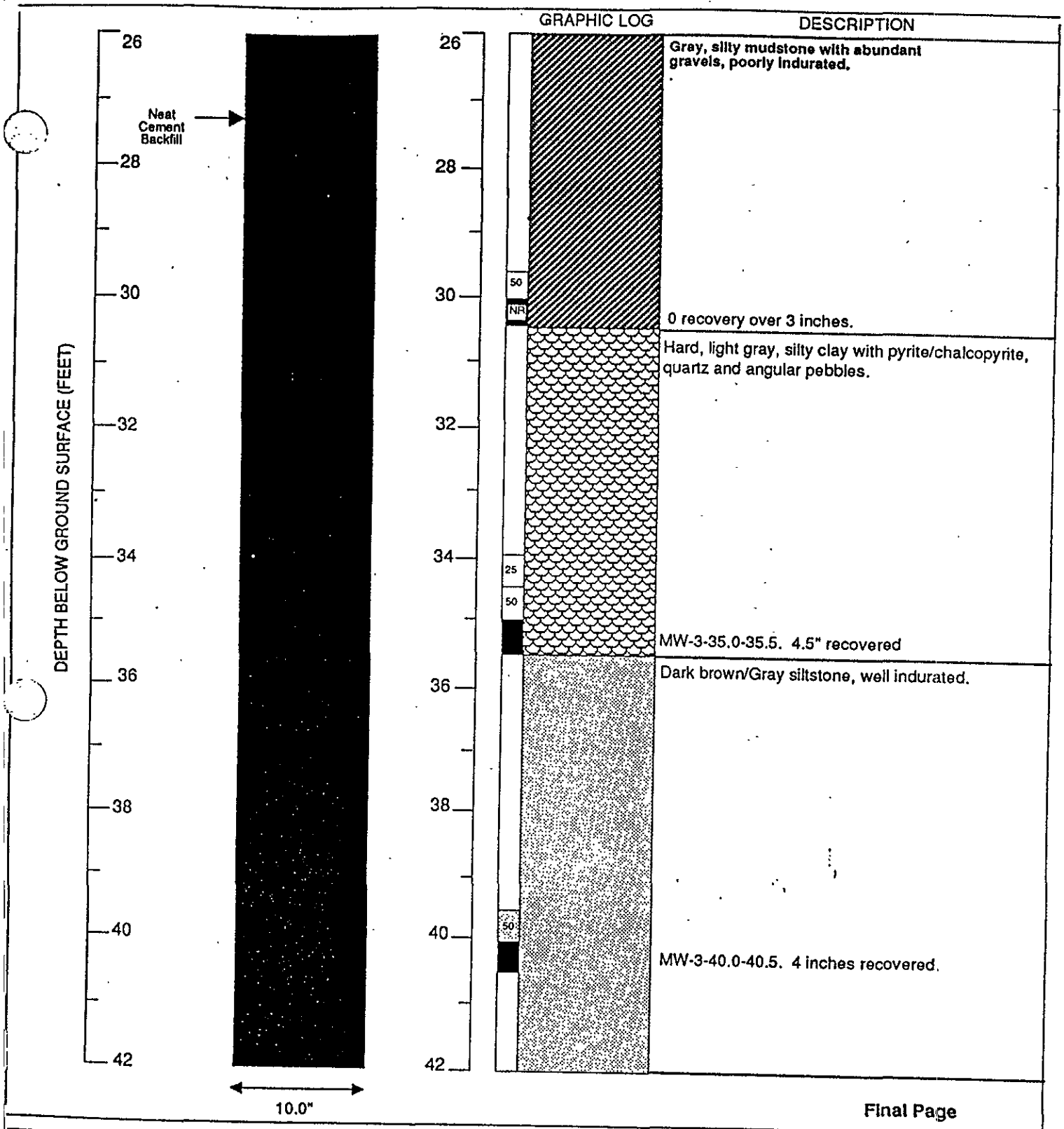

Final Page

EXPLANATION

- Water level in completed well
- Water level during drilling
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Contacts: Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K — Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR — No recovery

Boring Log and Well Completion Details
MW-3 (Boring 3)

San Antonio Pump Station
5555 Calaveras Road
Sunol, California

MONITOR WELL
3

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