

APPENDIX N

MONITOR WELL BORING LOGS

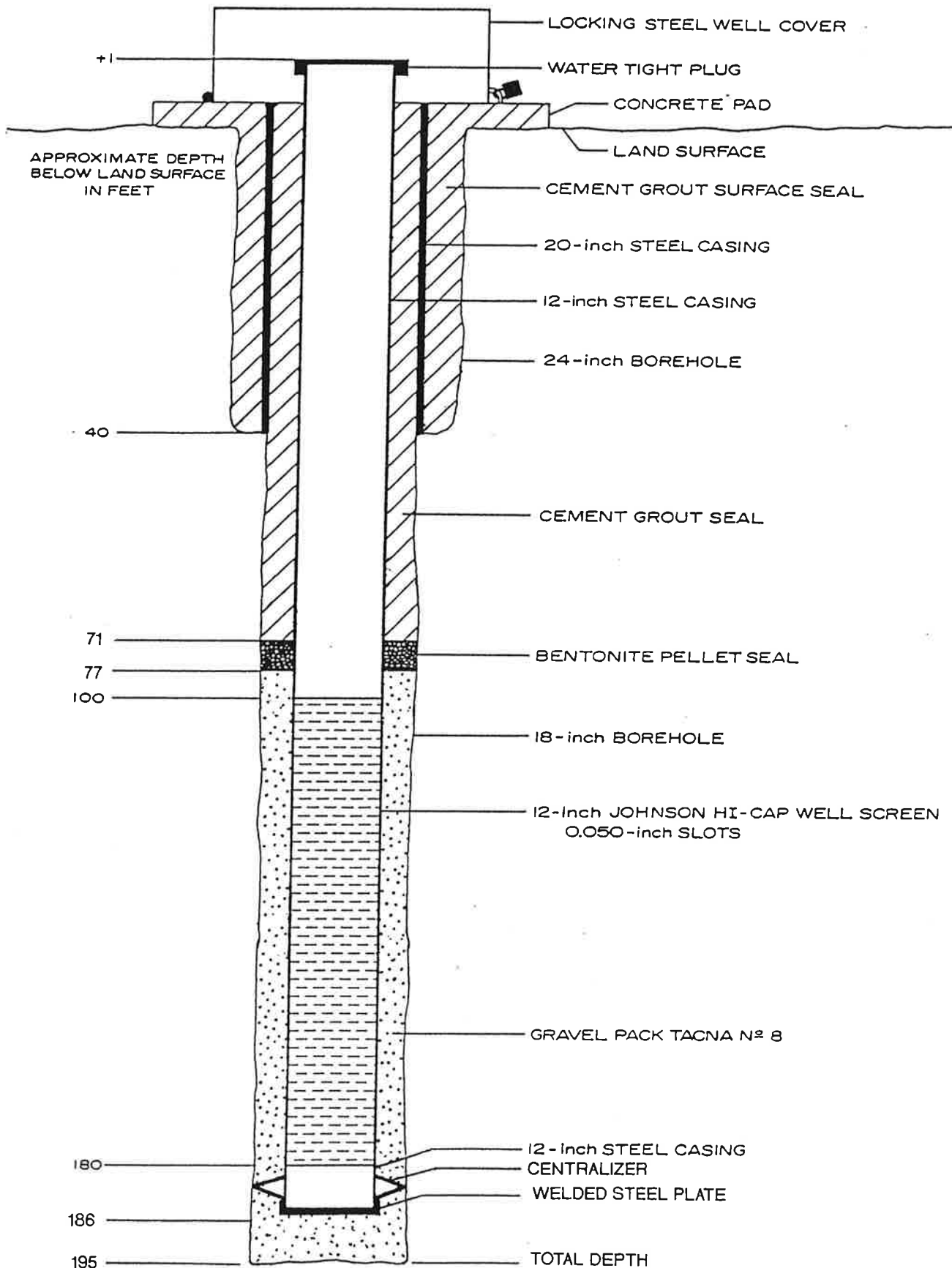
U.S. COAST GUARD
DEC 9 1975
U.S. MARINE DEPT.

Indicate depth at which water was first encountered, and the depth and thickness of water bearing zone. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Date 4 December 1975

CW-1



GROUNDWATER RESOURCES CONSULTING, INC.

TABLE A-1		
LITHOLOGIC LOG OF PILOT EXTRACTION WELL CW-1		
DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 1.5	GRAVELLY SAND WITH COBBLES AND REFUSE	
1.5 - 19	GRAVELLY SAND WITH COBBLES	Medium brown to dark greyish brown, moist, very loose. At 11 feet: increased moisture. At 19 feet: clay layer, moist, soft, cohesive, less than one foot thick.
19 - 21	GRAVELLY SAND WITH COBBLES AND CLAY	Greyish brown, very moist.
21 - 30	GRAVELLY SAND WITH COBBLES	Medium brown, loose.
30 - 40	SANDY GRAVELLY CLAY	Yellowish brown, soft, slightly cohesive.
40 - 42	SANDY GRAVEL AND COBBLES	Light brown, sand is coarse to very coarse, graded gravel.
42 - 66	GRAVELLY SAND	Light brown, sand is predominately coarse to very coarse, contains fine sand and silt as matrix. At 48 feet: cobbly, contains small cobbles, increased gravel content.
66 - 100	SANDY GRAVEL	Brown, gravel is fine to medium size, sand is coarse to very coarse grained, contains fine sand and silt as matrix. At 70 feet: small cobbles. At 72 feet: small cobbles. At 86 feet: gravel coarsens, some small cobbles.

GROUNDWATER RESOURCES CONSULTANTS, INC.

TABLE A-1 (continued) LITHOLOGIC LOG OF PILOT EXTRACTION WELL CW-1		
DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
100 - 195	SANDY GRAVEL/ GRAVELLY SAND	<p>Light brown, graded mixture, variable fine sand and silt as matrix and interbeds, sand is predominately medium to very coarse grained, gravel is predominately fine to medium size.</p> <p>At 108 feet: small cobbles.</p> <p>At 120 feet: cobbles.</p> <p>At 131 feet: cobbles.</p> <p>At 138 feet: increased fines.</p> <p>At 139 feet: coarsens, cobbles.</p> <p>At 159 feet: cobbles.</p> <p>At 172 feet: cobbles.</p> <p>At 180 feet: cobbles.</p> <p>At 186 feet: cobbles.</p> <p>At 194 feet cobbles.</p>
<p>TOTAL DEPTH OF BOREHOLE: 195 FEET WELL COMPLETED: 09/30/94 STATIC WATER LEVEL: 100.5 FEET BELOW LAND SURFACE (10/03/94)</p>		

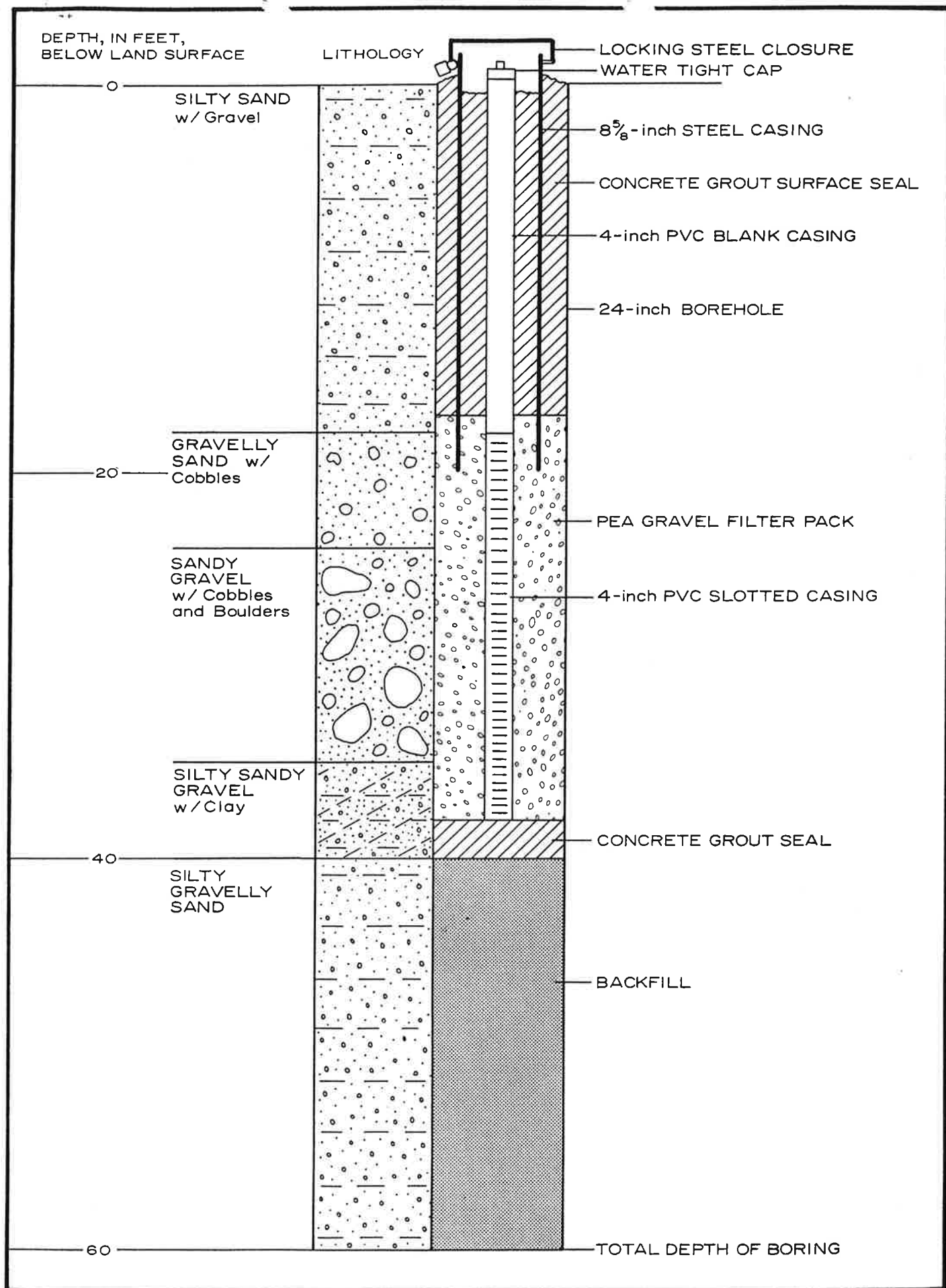


FIGURE 2
SCHEMATIC FOR PERCHED ZONE WELL P-1

FIGURE A-1

TABLE A-1

LITHOLOGIC LOG FOR PERCHED ZONE MONITOR WELL P-1

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 18	SILTY SAND	<p>Brown-grey, with gravel and cobbles, sand is predominately fine to medium grained, non-cohesive slightly moist.</p> <p>At 5 feet, boulders.</p>
18 - 24	GRAVELLY SAND	<p>Light brown, sand is medium to very coarse grained, gravel is fine to coarse, some cobbles up to six-inches in diameter, coarsening downward, slightly moist, loose.</p> <p>At 23 feet, boulders.</p>
24 - 35	SANDY GRAVEL	<p>Light brown, with cobbles, moist, with moisture increasing with depth, loose.</p> <p>Below 27 feet, silty.</p> <p>At 29 feet, contains cobbles and boulders, moist.</p> <p>At 32 feet, very moist.</p>
35 - 40	SILTY SANDY GRAVEL	<p>Light brown, some clay, trace caliche in uppermost part, wet, moisture decreasing with depth.</p>
40 - 60	SILTY GRAVELLY SAND	<p>Light brown-tan, sand is very fine to very coarse grained, very poorly sorted, minor clay, moist, loose, strong organic odor from borehole.</p>
TOTAL DEPTH OF BOREHOLE: 60 FEET		

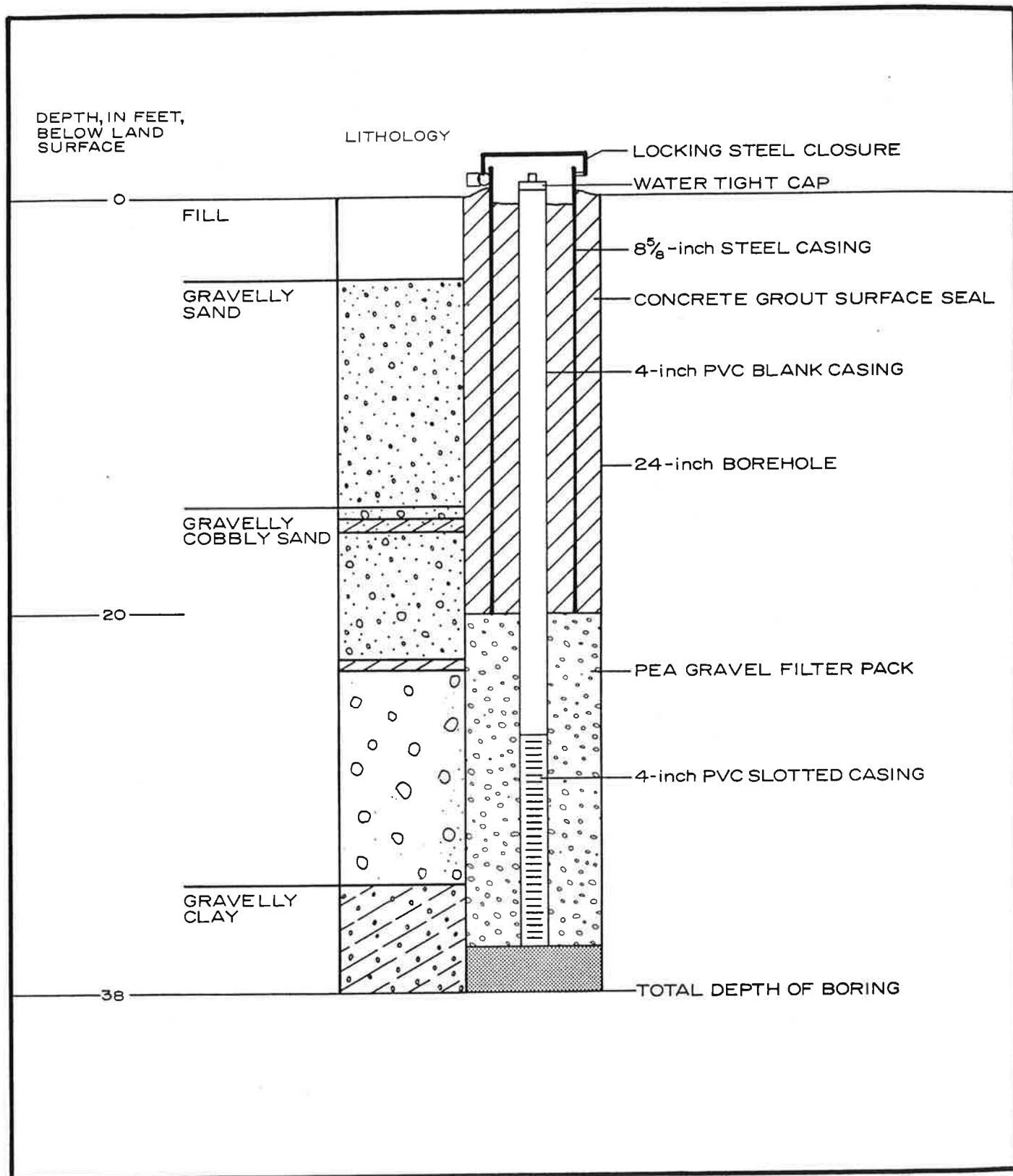


FIGURE 3
SCHEMATIC FOR PERCHED ZONE WELL P-2

TABLE A-2

LITHOLOGIC LOG FOR PERCHED ZONE MONITOR WELL P-2

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 4	FILL	
4 - 15	GRAVELLY SAND	<p>Light brown, very clean, moist, loose, some cobbles estimated up to six-inches in diameter, contains zones of fine-grained, well-sorted sand alternating with sandy gravel.</p> <p>At 7-8 feet, slight odor.</p> <p>At 13 feet, very moist gravelly sand, gravel and cobble content increasing.</p>
15 - 33	GRAVELLY COBBLY SAND	<p>Light brown, loose, moist, highest moisture content at gravelly clay contact, contains cobbles estimated up to one-foot in diameter.</p> <p>At 15.5 feet, sandy clay layer, saturated, soft, very cohesive.</p> <p>At 22 feet, sandy clay layer, saturated, soft, very cohesive.</p> <p>At 24 feet, sandy silt lens, saturated.</p> <p>At 30 feet, boulders estimated up to 18-inches in diameter.</p>
33 - 38	GRAVELLY CLAY	<p>Buff to orange brown, gravel to ½-inch diameter, very moist to saturated, firm, moisture decreasing with depth, no odor.</p>
TOTAL DEPTH OF BOREHOLE: 38 FEET		

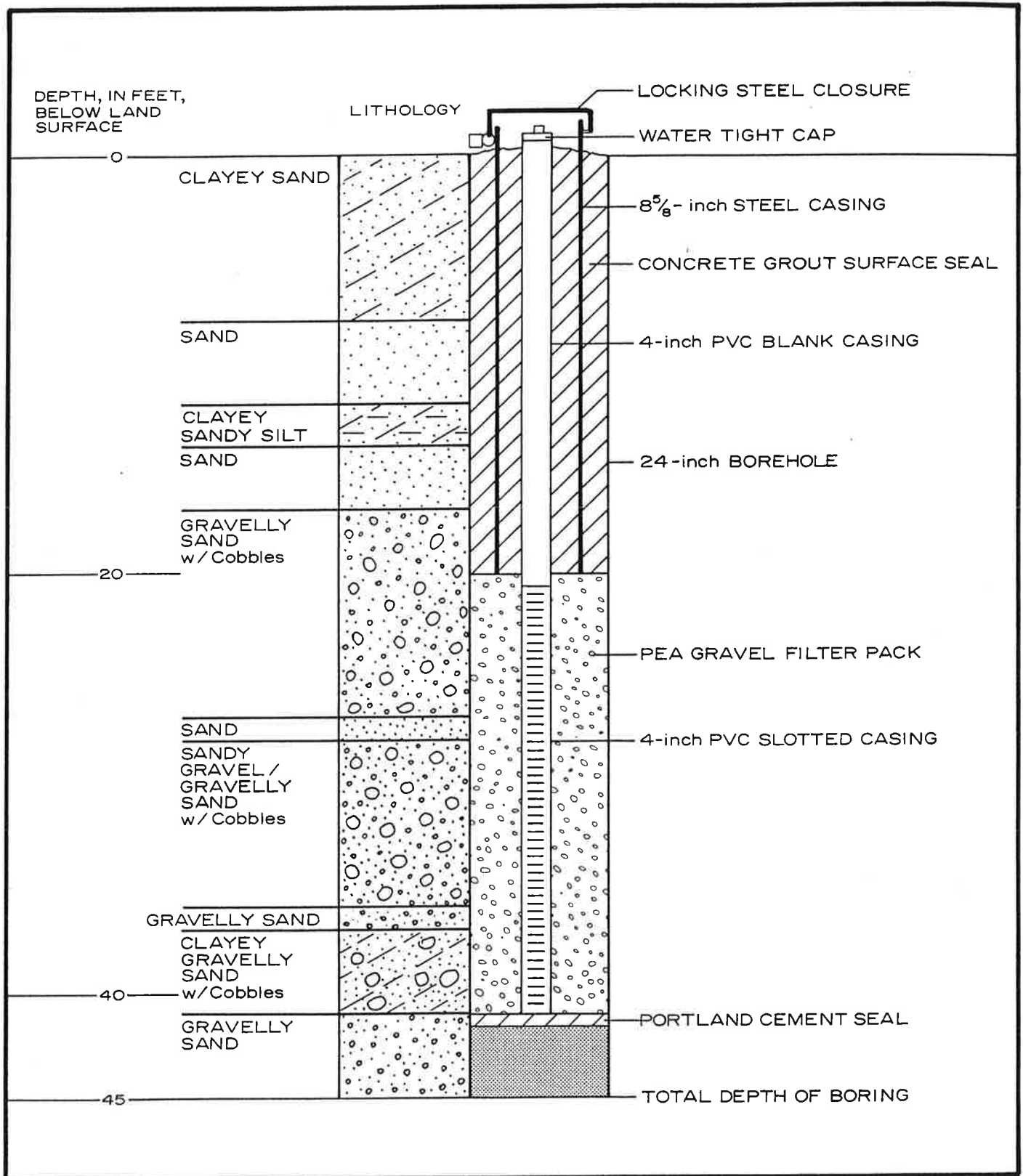


FIGURE 4
SCHEMATIC FOR PERCHED ZONE WELL P-3

TABLE A-3

LITHOLOGIC LOG FOR PERCHED ZONE MONITOR WELL P-3

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 8	CLAYEY SAND	Brown, contains silt, gravel, some cobbles, slightly cohesive, moist.
8 - 12	SAND	Brown, grey-brown, fine to medium grained, very slightly moist.
12 - 14	CLAYEY SANDY SILT	Brown, slightly cohesive, slightly moist, soft.
14 - 17	SAND	Light brown, medium to coarse grained, slightly moist, loose.
17 - 27	GRAVELLY SAND	<p>Brown, poorly sorted, sand is subrounded to subangular, some cobbles estimated up to six-inches in diameter, slightly moist, loose.</p> <p>At 19 feet, slightly cohesive, trace clay and silt.</p> <p>At 25 feet, clay and silt decreasing, cobbles estimated up to ten-inches in diameter, loose.</p>
27 - 28	SAND	Light brown, medium to very coarse grained, clean, some gravel and cobbles estimated up to five-inches in diameter, slightly moist, loose.
28 - 36	SANDY GRAVEL/GRAVELLY SAND	Brown, sand is very coarse grained, gravel is fine to very coarse, predominately fine gravel.
36 - 37	GRAVELLY SAND	Light tan, trace clay, wet, no odor, sand is medium to coarse grained, gravel is fine to medium size.
37 - 41	CLAYEY GRAVELLY SAND	<p>Light brown-tan-white, some cobbles, lightly cemented, calcareous, some thin hard caliche layers, wet at top, moisture decreasing with depth.</p> <p>At 40 feet, slight organic odor over borehole.</p>
41 - 45	GRAVELLY SAND	Light brown, calcareous cement and clay content decreasing, slightly moist.
TOTAL DEPTH OF BOREHOLE: 45 FEET		

**EARL H. WILLIAMS
WELL DRILLING**

701 W. RIVER ROAD
TUCSON, ARIZONA 85704
888-3250

April 26, 1978

Metropolitan Water Company
3910 North Flowing Wells Road
Tucson, Arizona 85705

WILPWOOD

Well Log of New Well on North Shannon Road, south of
Orange Grove Road.

0- 50 ft.	Sand and clay
50-68	Boulders and coarse gravel
68-130	Sand and clay, water at 130 ft.
<u>130</u> -220	Sand and coarse gravel with some clay
220-273	Sand with some gravel
273-280	Sand and gravel with some clay
280-405	Sand and coarse gravel
405-410	Coarse gravel
410-415	Clay with some gravel
415-430	Coarse gravel
430-440	Sticky clay
440-455	Clay and gravel
455-470	Coarse sand and clay
470-475	Fine sand
475-480	Coarse gravel and clay
480-505	Cemented conglomerate
505-529	Sand and silt

*STATIC W' L
AT 125'
4-1A-82
INSTALL SUB
15HP PUMP AT
260'*

The well is cased from the surface to 529 ft. with 16"x.281 wall well casing. The casing is mills knife perforated from 250 ft. to 465 ft. and from 480 ft. to 500 ft. The perforation pattern consists of 8 holes to the round and a round every 12 to 16 inches.

Static water level at the time of completion was 130 ft.

The well was developed for a period of 7 hrs 45 min. with a mud scow, pulling in about 2 ft. of fill.

Sincerely

Earl H. Williams
Earl H. Williams



LABORATORY NUMBER : 3522
 OWNERS NAME : METROPOLITAN SHANNON
 DRILLERS NAME : MC DANIEL

GENERAL INFORMATION : Q X 6 S 1/4 1/4
 WELL LOCATION : (4-13-13) 09.233
 COMPLETION DATE : FEB. 1975
 BENCH MARK : 23.0 FEET ABOVE M.S.L.
 WATER LEVEL HAS AT : 23.0 FEET BELOW L.S.
 CHEMICAL ANALYSIS : COMPLETERS
 LOG AVAILABLE : DRILLERS
 LOG AVAILABLE : MACHINE
 OBSERVED INTERVAL : BETWEEN 70-460 FEET
 INTENDED WATER USES : MUNICIPAL

WELL DEPTH : 470 FEET
 PUMPING TEST : YES
 CASING DIAMETER : 12 INCHES

WELL CUTTINGS LABORATORY ANALYSIS

ANALYSIS DATE : OCT. 1975

NUMBER OF SAMPLES : 47

SAMPLE INTERVAL	WET	COLOR	DRY	PERCENT OF PARTICLES ARE FINES SAND	GRAVELS 2-4MM	MAXIMUM PARTICLE SIZE	HCL REACTION	FEET	COMMENTS
0-10	10. YR4/3	10. YR6/3	10. YR6/3	49	38	7	6	13	STRONG
10-20	10. YR4/3	10. YR6/3	10. YR6/3	24	57	8	11	27	STRONG
20-30	10. YR4/3	10. YR6/3	10. YR6/3	22	48	16	14	18	MODERATE
30-40	10. YR4/3	10. YR6/3	10. YR6/3	16	42	19	23	18	MODERATE
40-50	10. YR4/3	10. YR7/3	10. YR7/3	19	43	14	24	23	WEAK
50-60	10. YR5/4	10. YR7/3	10. YR7/3	19	58	15	8	17	NONE
60-70	10. YR5/4	10. YR7/3	10. YR7/3	27	39	13	21	24	NONE
70-80	10. YR5/4	10. YR7/3	10. YR7/3	30	53	11	5	16	NONE
80-90	10. YR5/4	10. YR7/3	10. YR7/3	22	37	15	26	17	NONE
90-100	10. YR5/4	10. YR7/3	10. YR7/3	21	42	14	23	18	NONE
100-110	10. YR5/4	10. YR7/3	10. YR7/3	23	34	15	23	24	NONE
110-120	10. YR5/4	10. YR7/3	10. YR7/3	36	29	10	25	23	NONE
120-130	10. YR5/4	10. YR7/3	10. YR7/3	30	25	10	35	19	NONE
130-140	10. YR5/4	10. YR7/3	10. YR7/3	24	41	16	19	18	NONE
140-150	10. YR5/2	10. YR7/2	10. YR7/2	21	35	17	27	15	NONE
150-160	10. YR5/2	10. YR7/2	10. YR7/2	15	30	17	38	17	NONE
160-170	10. YR5/2	10. YR7/2	10. YR7/2	19	38	14	29	43	NONE
									NONE

0 TO 10 FEET. THE SAND AND GRAVEL PARTICLES HAVE A STRONG YELLOWISH BROWN WEATHERED STAINING. SAND COLOR IS 10YR7/4 VERY PALE BROWN, AND THE TEXTURE IS MEDIUM TO COARSE GRAINED. THE GRAVEL FRACTION IS GRANITE WITH A FEW QUARTZITE AND MICA SCHIST.

10 TO 50 FEET. SAMPLES STILL HAVE A STRONG DULL YELLOWISH STAINING. SAND IS DARKER AND GRAYER IN COLOR THAN THE TEXTURE IS MEDIUM TO COARSE GRAINED. THE GRAVEL FRACTION IS GRANITE, 15 PERCENT DARKER BROWN AND LIGHTER BROWN QUARTZITE AND LIGHTER BROWN CATALINA GNEISS. 75 PERCENT OF THE GRAVEL FRACTION IS MEDIUM TO COARSE VOLCANIC ROCKS, PURPLISH VOLCANIC ROCKS, COMPLETELY 2-5 PERCENT THERE ARE MANY ROUNDED FRAGMENTS.

50 TO 140 FEET. THE SAMPLES HAVE LOST MOST OF THE YELLOW STAINING AND HAVE A LIGHTER FRESHER APPEARANCE, ESPECIALLY FROM 70 FEET. SAND IS LIGHT GRAY 10YR7/2 IN COLOR. THE TEXTURE IS THE SAME AS ABOVE. THE GRAVEL FRACTION IS 75 PERCENT GRANITE, 15 PERCENT QUARTZITE AND BANDED GRAY AND WHITE CATALINA GNEISS, AND 15 PERCENT LIGHT PURPLISH BANDED AND PINKISH FLOW BANDED AND VESICULAR VOLCANIC ROCKS. FRAGMENT SURFACES ARE SUBROUNDED AND SUBANGULAR WITH A FEW ROUNDED.

140 TO 230 FEET. THERE IS A TOICABE CHANGE TO MUCKY GRAY SAND 10YR7/2 IN COLOR, STILL MEDIUM TO COARSE GRAINED IN TEXTURE. SAMPLES HAVE A DEFINITE DULL GREENISH

[illegible]



Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

[illegible]

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Driller A S "Cotton" Boring
Name
9401 No Vack way
Address
Date May 17 - 78

A. A. McDANIEL WELL AND MACHINE COMPANY, INC.

2838 RUTHRAUFF ROAD
TUCSON, ARIZONA 85705

15 February 1973

~~NO~~Latamori--
South**LOG OF WELL DRILLED FOR:**

Metropolitan Water Company
3910 North Flowing Wells Road
Tucson, Arizona 85705

Location: 6000 Block North Camino Del Terra, Tucson, Arizona.

Formation:

From:	0'	to	35'	Soil
	35'	to	40'	Sand
	40'	to	60'	Clay & gravel
	60'	to	75'	Sand & gravel
	75'	to	100'	Clay & gravel
	100'	to	115'	Sand & gravel
	115'			Water
	115'	to	135'	Sandy clay & gravel
	135'	to	182'	Clay & gravel
	182'	to	187'	Course gravel & water
	187'	to	215'	Clay & gravel
	215'	to	220'	Conglomerate & gravel
	220'	to	260'	Clay & gravel
	260'	to	265'	Conglomerat & gravel
	265'	to	330'	Clay & gravel
	330'	to	340'	Gravel & water
	340'	to	380'	Sandy clay & gravel
	380'	to	430'	Clay
	430'	to	450'	Sandy clay & gravel
	450'	to	460'	Gravel & water
	460'	to	495'	Sandy clay & gravel
	495'	to	507'	Clay & gravel

Casing: 509' of 16" OD x .250" Wall API Grade B Linepipe.

Perforations: 12 Rows of Milled Slots 3/16" x 3" from 88' to 488'.

Static Water Level: 90'.

Driller: George W. Gibson.

A. A. McDaniel Well & Machine Co., Inc.

By

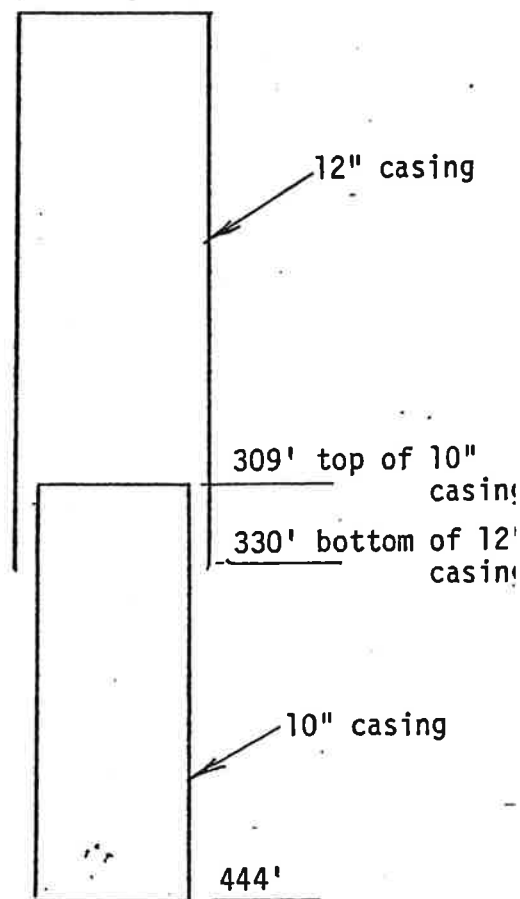
Alvin [Signature]

WELL Z-2

formation log

0 - 50'	Dirt & river sand
50 - 100	Clay & little sand
100 - 150	Heavy clay & very little sand
150 - 315	Hard mountain rock
315 - 375	Coarse sand & gravel
375 - 390	Sand, gravel & clay streaks
390 - 420	Coarse gravel
420 - 428	Clay & gravel
428 - 444	Coarse gravel & sand

construction of well



History of Well:

This well originally drilled to 330' in 1952 by McCray.
It was deepened to 444' in 1975 by M & A Drilling Co.

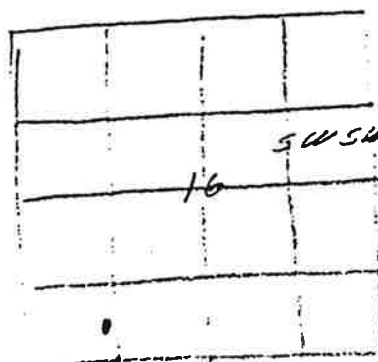
A. A. McDANIEL MACHINE SHOP
 2840 Railroad Rd.
 Mail Address 1203 E. Roger Rd.
 Tucson, Arizona

23

define

ccd.

LOG OF WELL drilled for
 Tucsonita Water Co. #2
 Russell Pagol
 3256 E. Lee Street
 Tucson, Arizona



24 September 1959

T 13 S R 13 E

D-(13-13)16 CCD

FROM

0'	to	26'	Soil
26'	"	55'	Gravel
53'	"	125'	Sandy clay, water @ 100'
125'	"	135'	Clay
135'	"	200'	Muddy gravel & water
200'	"	235'	Clean gravel & water
235'	"	265'	Gravel - clay
265'	"	275'	Clean gravel & water
275'	"	301'	gravel - clay

Casing:

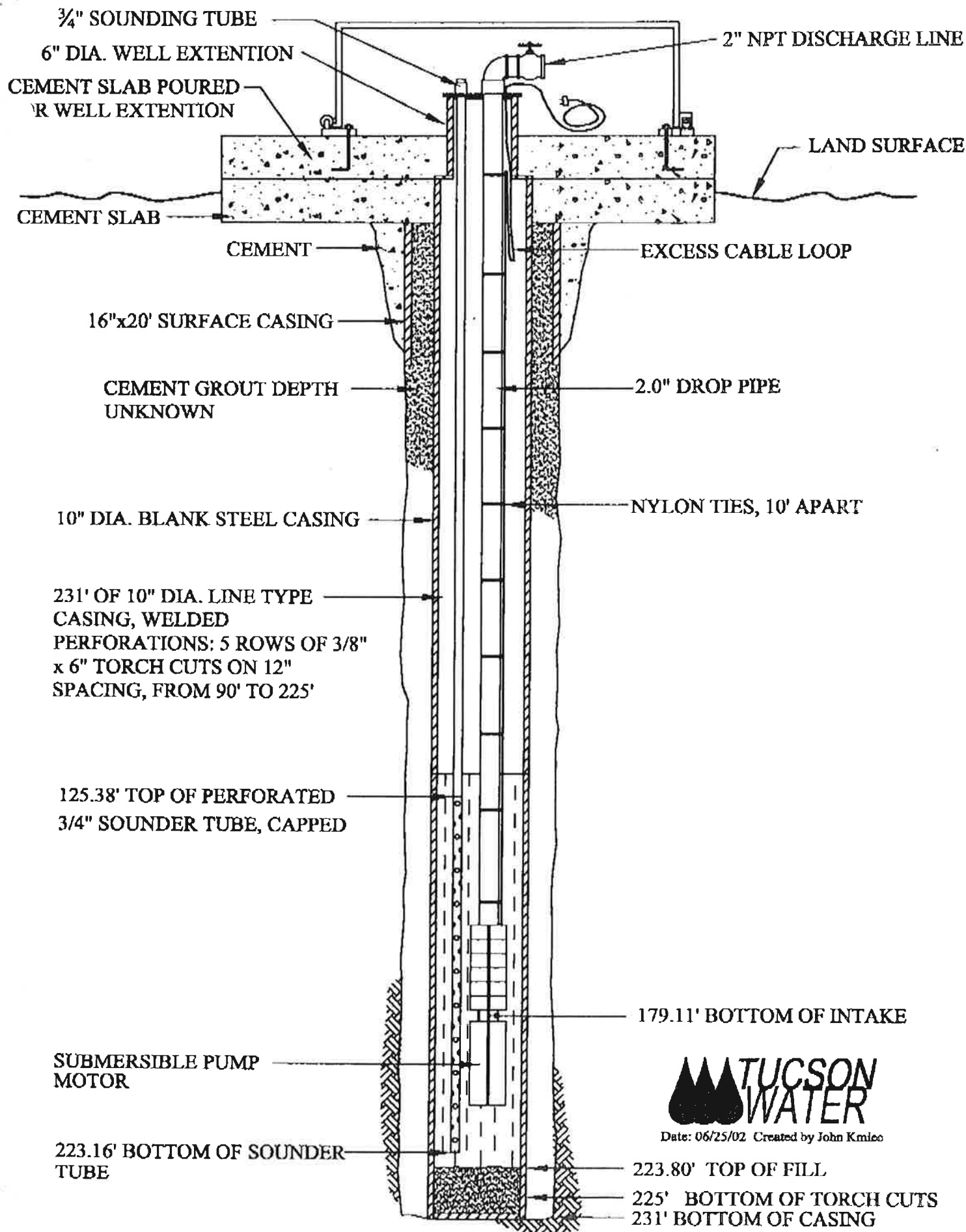
Perforations

Static Water level

302' of 12" ID linepipe. Welded
 : Mills knife, $\frac{1}{8}$ " x $\frac{1}{4}$ " cuts, 5 cuts per
 circle, circles 12" apart from 95' to
 298'
 : 90'

Copy

A. A. McDaniel



Date: 06/25/02 Created by John Kmiec

Z-004A MONITOR WELL CONSTRUCTION

TOTAL P.06

LOG OF WELL

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

[illegible]

I hereby certify that this Well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Driller

James Daniel

1208 East Roger Road Tucson
Address

Date Sept. 5, 1957



DATA ON WELLS AND PUMP IRRIGATION

AGRICULTURAL ENGINEERING DEPARTMENT

UNIVERSITY OF ARIZONA

AGRICULTURAL EXPERIMENT STATION
TUCSON, ARIZONA

NAME: A. Ralph Curtis ADDRESS: Near Jaynes Station

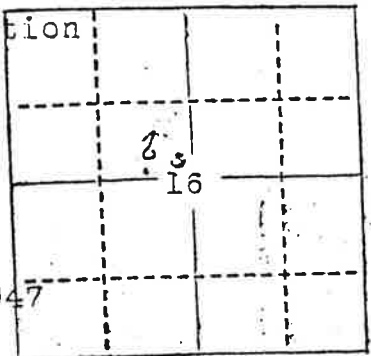
WELL: Location Sec 16, Twp 13S, R 13E

Use, domestic, stock, or irrigation.....acres

Type.....Casing 10" 170'

Perforations ALL perforated

Drilled by L.G. McCray Date: March 20, 1947



LOG

FROM Feet	TO Feet	MATERIAL	FROM Feet	TO Feet	MATERIAL
0		Old hole 18" 135'			
		Starting 10" hole at 135'			
135	180	Hard conglomerate			
180	185	Soft spot			
185	225	Hard conglomerate			
225	230	Soft conglomerate			
230	267	Hard conglomerate			
267	270	Soft conglomerate			
270	300	Hard conglomerate			
416	428	GRAVEL, sd. & clay (NOT cemented)			
428	429	hard cemented gravel			
429	567	Gr., sd. & clay (NOT cemented)			
567	572	Gr. sd. cl. w/ HOT WATER STR. (Temp 110°)			
572	607	" " "			
607	612	" " " (w/ HOT WATER 116°)			

612 - 620 " " " (NOT cemented) WATER LEVEL: Depth from surface when drilled.....feet. Date. March 20. 1947

Present depth to water.....feet. Date.....

Notes on fluctuation of water level.....

PUMP: Make.....Type.....Size.....
Diam. of bowls.....Number of stages.....
Diam. of column.....Diam. discharge.....Diam. suction.....
Rated capacity in G. P. M.....at.....feet head, at.....R. P. M.
Amount of discharge.....G. P. M. measured by means of.....
Drawdown.....feet when pumping.....G. P. M. Total lift.....feet
ENGINE OR MOTOR: Make.....Type.....Size.....H. P.
Drive: direct-connected.....belted....., or geared.....
Fuel consumption or power input.....
Description of installation.....

Page 1 of 2
 Pan set Black Nos.
 Date 4/20/79

Well Cutting Analysis Form

Well Number Z-5 (Deepened)
 Driller City of Tucson
 Method Cable Tool

Depth to in Feet	Sample Size	Munsell Color		Gravel > 4.0 mm		Gravel > 2.0 mm		Sand > .0625mm		Fines < .0625 mm		Mudstone		Acid *	Max. Size	Remarks
		Dry	Wet	Wt.	%	Wt.	%	Wt.	%	Wt.	%	Wt.	%			
340	249	7.5YR 6/4	7.5YR 5/2	103		53		68						W	30	
350	250	6/4	5/4	17		41		111						W	11	
355	232	6/4	5/4	28		40		106						W	17	
360	252	6/4	5/4	104		39		67						W	26	
370	221	6/4	5/4	36		31		105						W	15	
380	270	6/2	5/2	42		77		138						W	15	
390	260	7/2	5/2	56		73		111						W	20	
400	277	7/2	5/2	63		70		122						W	17	
410	231	6/2	5/2	85		61		71						W	32	
420	260	7/2	5/2	90		64		67						W	20	
430	268	6/2	5/2	56		78		119						W	21	
440	284	7/2	5/2	123		70		79						W	21	
450	254	7/2	5/4	59		55		99						W	23	
460	239	7/2	5/4	51		57		88						W	15	
470	245	7/2	5/2	83		71		67						W	34	
480	265	7/2	5/2	150		59		39						W	27	
490	241	7/2	5/4	73		58		66						W	15	
500	237	7/2	5/2	153		33		29						M	22	
510	249	7/2	5/2	132		57		38						M	37	
520	286	7/2	5/2	177		27		48						M	56	
530	283	7/2	5/2	152		48		50						M	26	
540	253	7/2	5/2	75		67		90						M	21	
550	242	7/2	5/4	57		49		74						M	14	
560	255	7/2	5/4	81		40		73						W	24	
570	264	7/2	5/4	68		42		85						W	40	

Well Number Z-5 (Deepened)
Driller City of Tucson
Method Cable Tool

[illegible]

GRAIN SIZE ANALYSIS

age of 1

[illegible]

LITHOLOGIC DESCRIPTION

HOLE No. Z-5 *deepened*DATE 5-2-79 *GA*

Depth From To	Rock and Mineral types present	Degree of Roundness	Sorting
<u>340</u> <u>610</u> <i>T.D.</i>	<u>2</u> % Gneiss, quartz and feldspar	<u> </u> Rounded	<u> </u> Well sorted
Gravel	<u> </u> % Quartzite	<u> </u> Subrounded	<u> </u> Moderately sorted
	<u>95</u> % Volcanics	<u>✓</u> Subangular	<u>✓</u> Poorly sorted
	<u>3</u> % <i>fine gr. Sed.</i>	<u> </u> Angular	
	<u> </u> %		
	<u> </u> %		
	Comments: <u>Trachytes, Dacites & Dacite porphyries</u>		
	<u>Tuffs & tuffaceous</u>		
	<u>probably require to thin for beds</u>		

Depth From To	Rock and Mineral types present	Degree of Roundness	Sorting
<u> </u> <u> </u>	<u> </u> % Gneiss, quartz and feldspar	<u> </u> Rounded	<u> </u> Well sorted
and	<u> </u> % Quartzite	<u> </u> Subrounded	<u> </u> Moderately sorted
	<u> </u> % Volcanics	<u> </u> Subangular	<u> </u> Poorly sorted
	<u> </u> %	<u> </u> Angular	
	<u> </u> %		
	<u> </u> %		
	Comments: <u> </u>		
	<u> </u>		
	<u> </u>		

Depth From To	Rock and Mineral types present	Degree of Roundness	Sorting
<u> </u> <u> </u>	<u> </u> % Gneiss, quartz and feldspar	<u> </u> Rounded	<u> </u> Well sorted
Gravel	<u> </u> % Quartzite	<u> </u> Subrounded	<u> </u> Moderately sorted
	<u> </u> % Volcanics	<u> </u> Subangular	<u> </u> Poorly sorted
	<u> </u> %	<u> </u> Angular	
	<u> </u> %		
	<u> </u> %		
	Comments: <u> </u>		
	<u> </u>		
	<u> </u>		

Depth From To	Rock and Mineral types present	Degree of Roundness	Sorting
<u> </u> <u> </u>	<u> </u> % Gneiss, quartz and feldspar	<u> </u> Rounded	<u> </u> Well sorted
Sand	<u> </u> % Quartzite	<u> </u> Subrounded	<u> </u> Moderately sorted
	<u> </u> % Volcanics	<u> </u> Subangular	<u> </u> Poorly sorted
	<u> </u> %	<u> </u> Angular	
	<u> </u> %		
	<u> </u> %		
	Comments: <u> </u>		
	<u> </u>		
	<u> </u>		

2-6 2-6
February 28, 1962

D(13-13) 17 & 29

Log of Well Drilled for

L. Shannon

Jaynes Station

From	0'	to	23'	Soil
	23'	to	38'	Clay
	38'	to	45'	Gravelly Clay
	45'	to	60'	Boulders
	60'	to	102'	Gravelly Clay, seep at 93'
	102'	to	105'	Clay
	105'	to	114'	Boulders in Clay
	114'	to	126'	Gravel & Water
	126'	to	167'	Muddy Gravel & Water
	167'	to	183'	Gravel & Water
	183'	to	192'	Muddy Gravel & Water
	192'	to	217'	Gravel & Water
	217'	to	219'	Gravelly Clay

Possible Bt

Total Depth--219'

Casing: 220' of 1 1/2" OD linepipe w/welded joints.

Perforations: Mills Knife 1/2" x 4" cuts, 7 cuts per circle, circles 10" apart from 108' to 215'

Stable water level: 83'

A. A. Mc Daniel

LITHOLOGIC DESCRIPTION

HOLE No. Z-6 deepened

DATE _____

Depth From To	Rock and Mineral types present	Degree of Roundness	Sorting
<u>220</u> <u>490</u>	<u>4</u> % Gneiss, quartz and feldspar	<input type="checkbox"/> Rounded <input type="checkbox"/> Subrounded	<input type="checkbox"/> Well sorted <input type="checkbox"/> Moderately sorted
Gravel	<u>41</u> % Quartzite <u>95</u> % Volcanics	<input checked="" type="checkbox"/> Subangular <input type="checkbox"/> Angular	<input checked="" type="checkbox"/> Poorly sorted
	<u> </u> % <u> </u>		
	<u> </u> % <u> </u>		
	<u> </u> % <u> </u>		

Comments: Poorly sorted, sub angular volcanic sandy gravels.
Rhyolites & fine gr. volcanics, little or no calcareous
material. Larger frags, partially coated w/ calc. carbonate.

Depth From To	Rock and Mineral types present	Degree of Roundness	Sorting
<u>220</u> <u>490</u>	<u>4</u> % Gneiss, quartz and feldspar	<input type="checkbox"/> Rounded <input type="checkbox"/> Subrounded	<input type="checkbox"/> Well sorted <input type="checkbox"/> Moderately sorted
<u>9-1</u>	<u>41</u> % Quartzite <u>95</u> % Volcanics	<input checked="" type="checkbox"/> Subangular <input type="checkbox"/> Angular	<input checked="" type="checkbox"/> Poorly sorted
	<u> </u> % <u> </u>		
	<u> </u> % <u> </u>		
	<u> </u> % <u> </u>		

Comments: _____

Depth From To	Rock and Mineral types present	Degree of Roundness	Sorting
<u> </u> <u> </u>	<u> </u> % Gneiss, quartz and feldspar	<input type="checkbox"/> Rounded <input type="checkbox"/> Subrounded	<input type="checkbox"/> Well sorted <input type="checkbox"/> Moderately sorted
Gravel	<u> </u> % Quartzite <u> </u> % Volcanics	<input type="checkbox"/> Subangular <input type="checkbox"/> Angular	<input type="checkbox"/> Poorly sorted
	<u> </u> % <u> </u>		
	<u> </u> % <u> </u>		
	<u> </u> % <u> </u>		

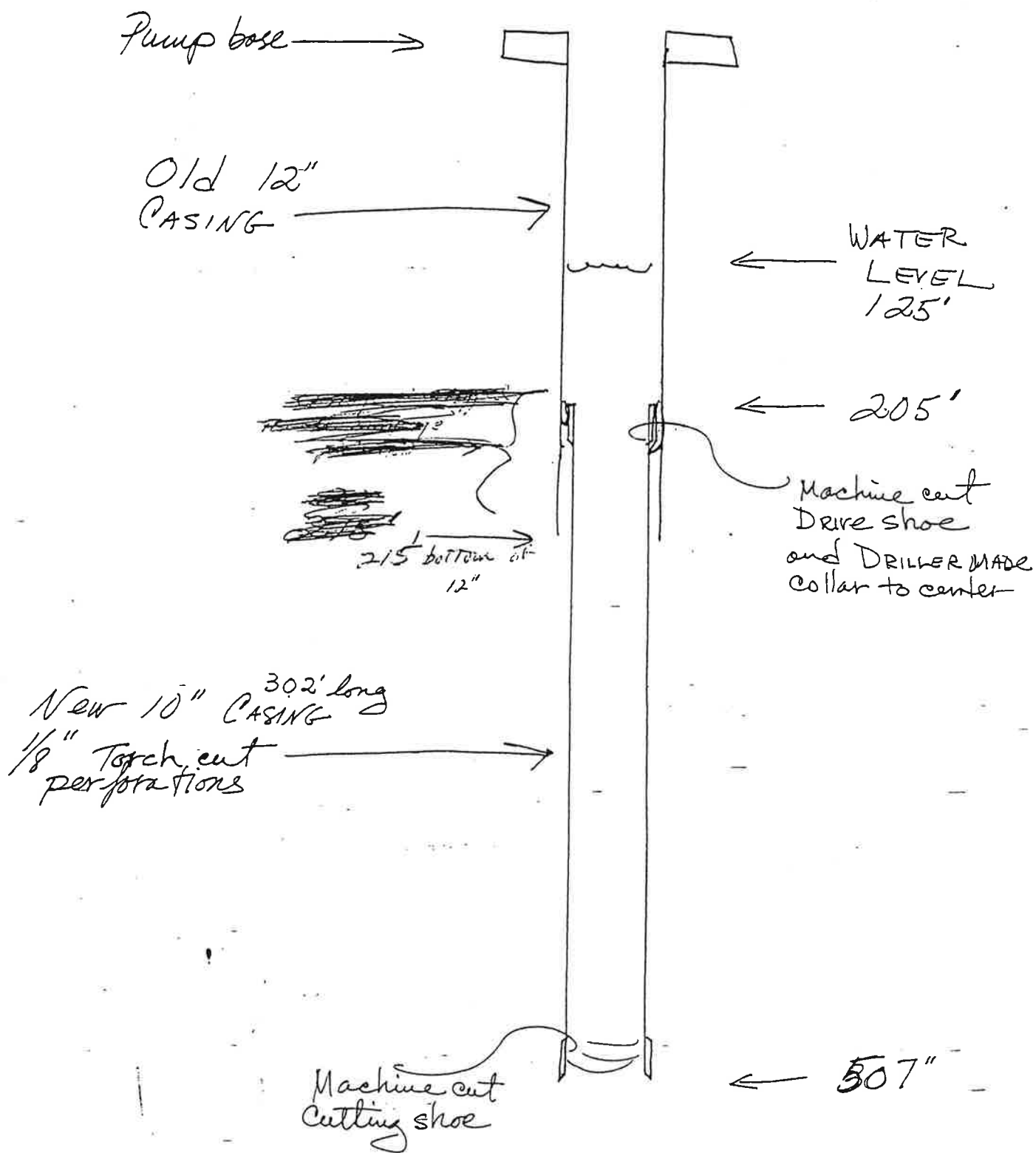
Comments: _____

Depth From To	Rock and Mineral types present	Degree of Roundness	Sorting
<u> </u> <u> </u>	<u> </u> % Gneiss, quartz and feldspar	<input type="checkbox"/> Rounded <input type="checkbox"/> Subrounded	<input type="checkbox"/> Well sorted <input type="checkbox"/> Moderately sorted
Sand	<u> </u> % Quartzite <u> </u> % Volcanics	<input type="checkbox"/> Subangular <input type="checkbox"/> Angular	<input type="checkbox"/> Poorly sorted
	<u> </u> % <u> </u>		
	<u> </u> % <u> </u>		
	<u> </u> % <u> </u>		

Comments: _____

WE - Z-7
NOT-TO-SCALE

12-2-76



WELL Z-7
Cable Tool Deepened, 215 to 500'

215 - 500 Coarse sandy gravels to gravelly sand with minimal clay
Size distribution 8-27% clay, 12-47% sand, 28-68% gravel.
Acid reaction: none to weak.

Gravel: 80-95% Gneiss, most of which is an almost pure
silica; 5-20% dark quartzite. D.R. 50% sub-
angular, 50% subrounded.

Sand: 70% multicolored gneiss grains, almost no pure
quartz, 30% quartzite. D.R. 50% subangular,
50% subrounded.

SCHEMATIC OF EQUIPMENT

HOLE NUMBER Z-16

DATE 10/18/91



COMMENTS

Pump tested at _____ GPM
Sp. Cap. _____ GPM/FT

3/4" TALLY

10/55

①	16.09	P	16.09
②	21.06	P	37.15
③	21.12	P	58.27
④	21.10	P	79.37
⑤	21.12		100.49
⑥	21.09		121.58
⑦	21.07		142.65
⑧	21.11		163.76
⑨	21.11		184.87
⑩	21.08		205.95

(1100) Tag + 2.63

2" Tally

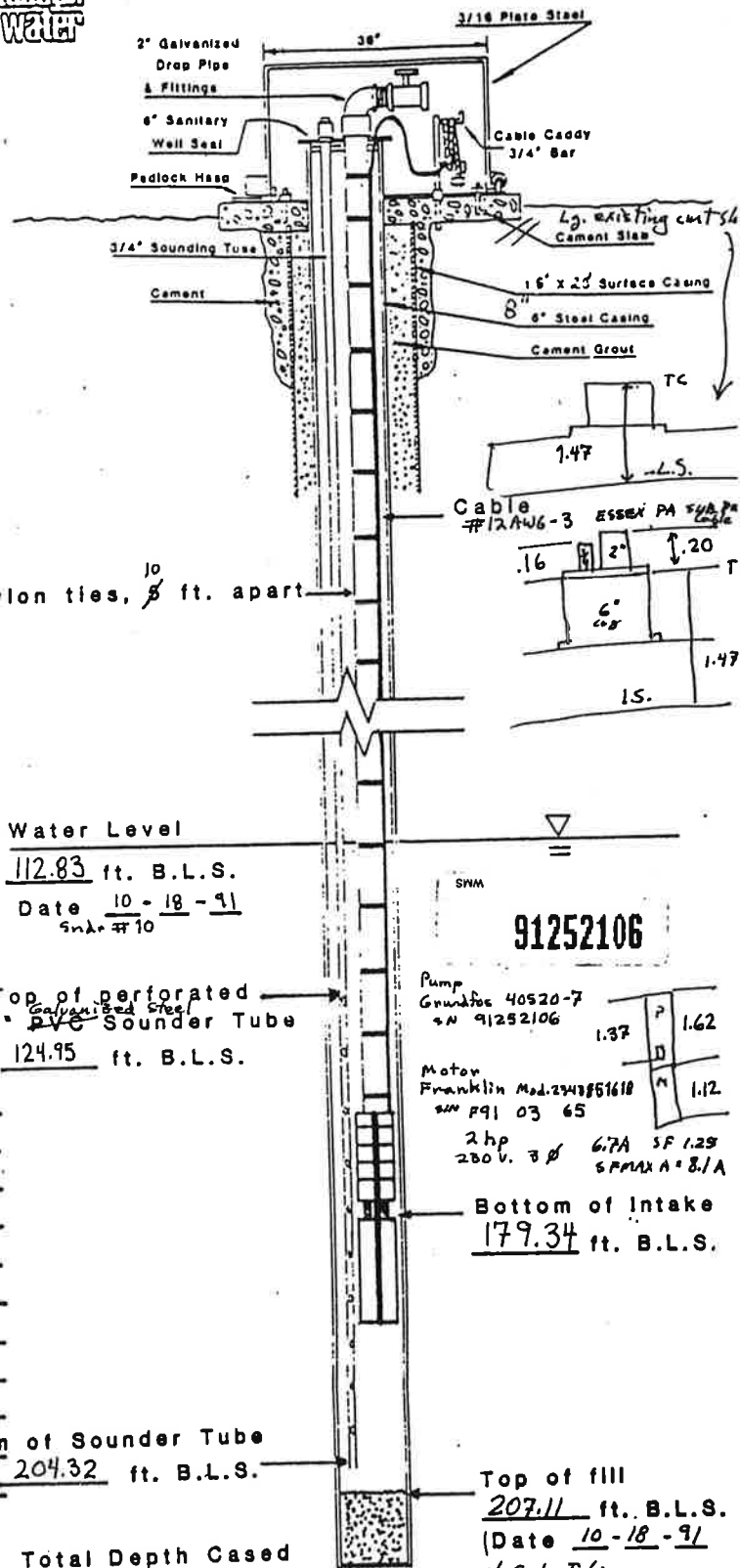
11/07

①	21.14	21.14
②	21.14	42.28
③	21.13	63.41
④	21.13	84.54
⑤	21.11	105.65
⑥	21.14	126.79
⑦	21.11	147.90
⑧	21.14	169.04
⑨	10.60	179.64

11/30

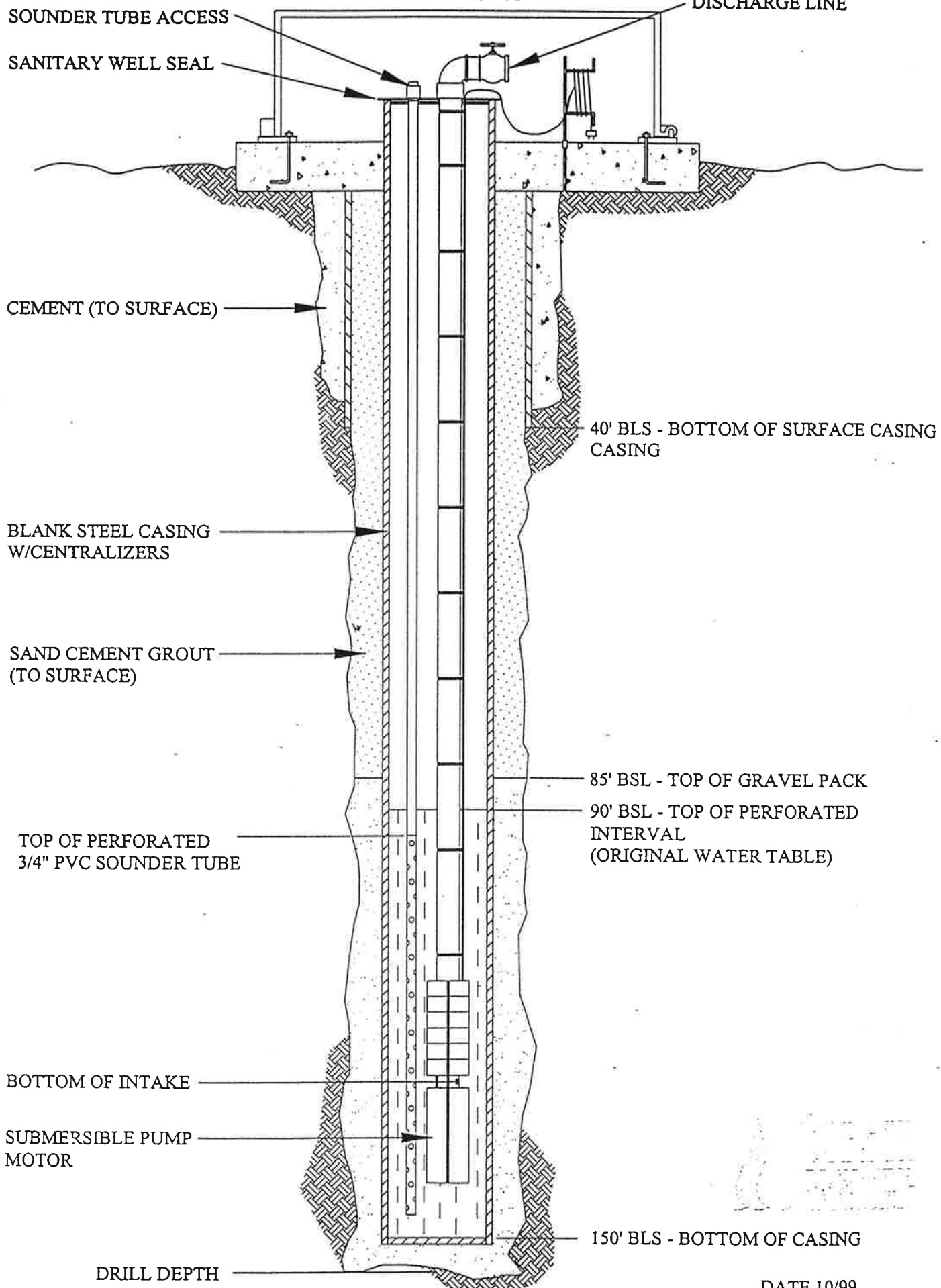
Bottom of Sounder Tube
204.32 ft. B.L.S.

Total Depth Cased
? ft. B.L.S.

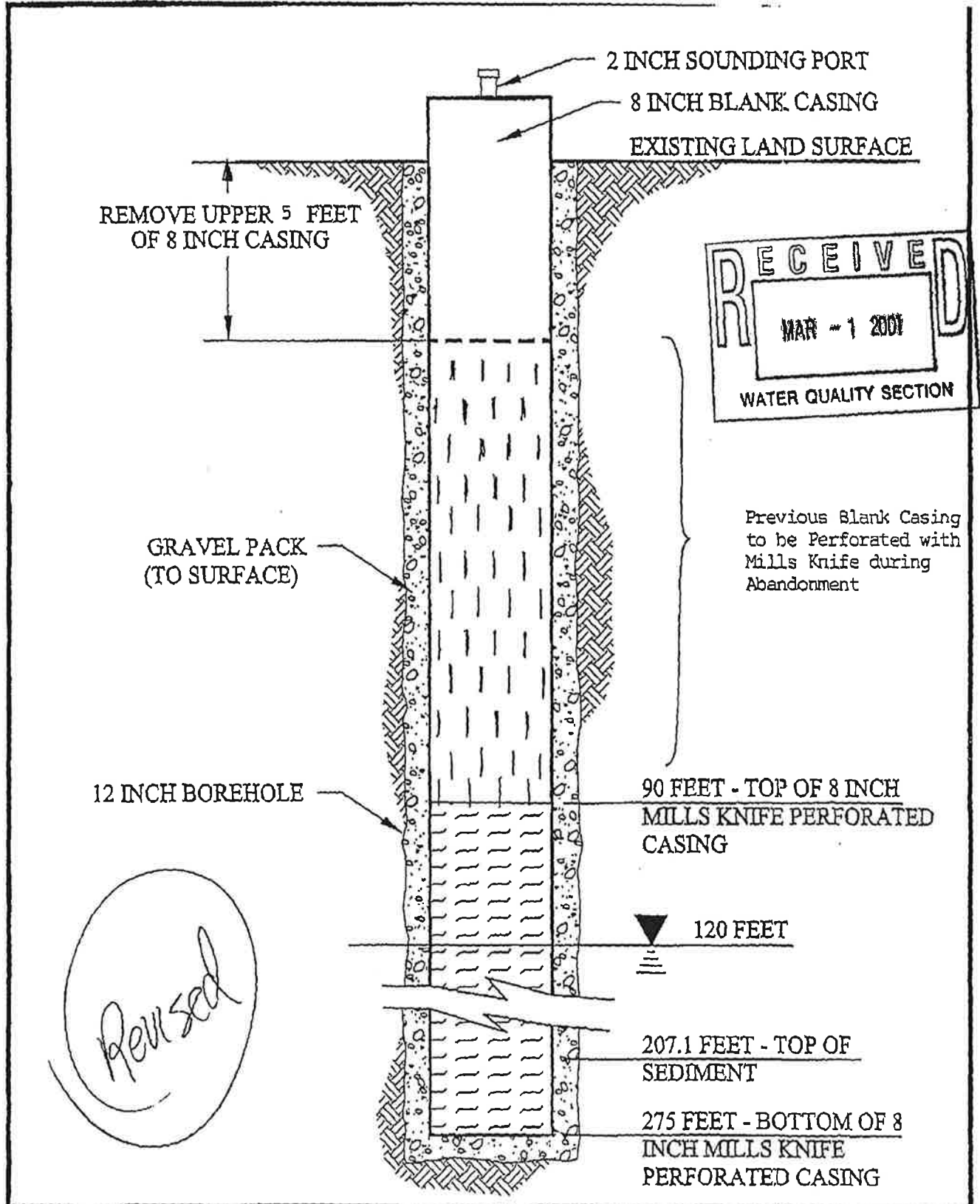


Construction Diagram - Replacement for Well Z-016A

NOT TO SCALE



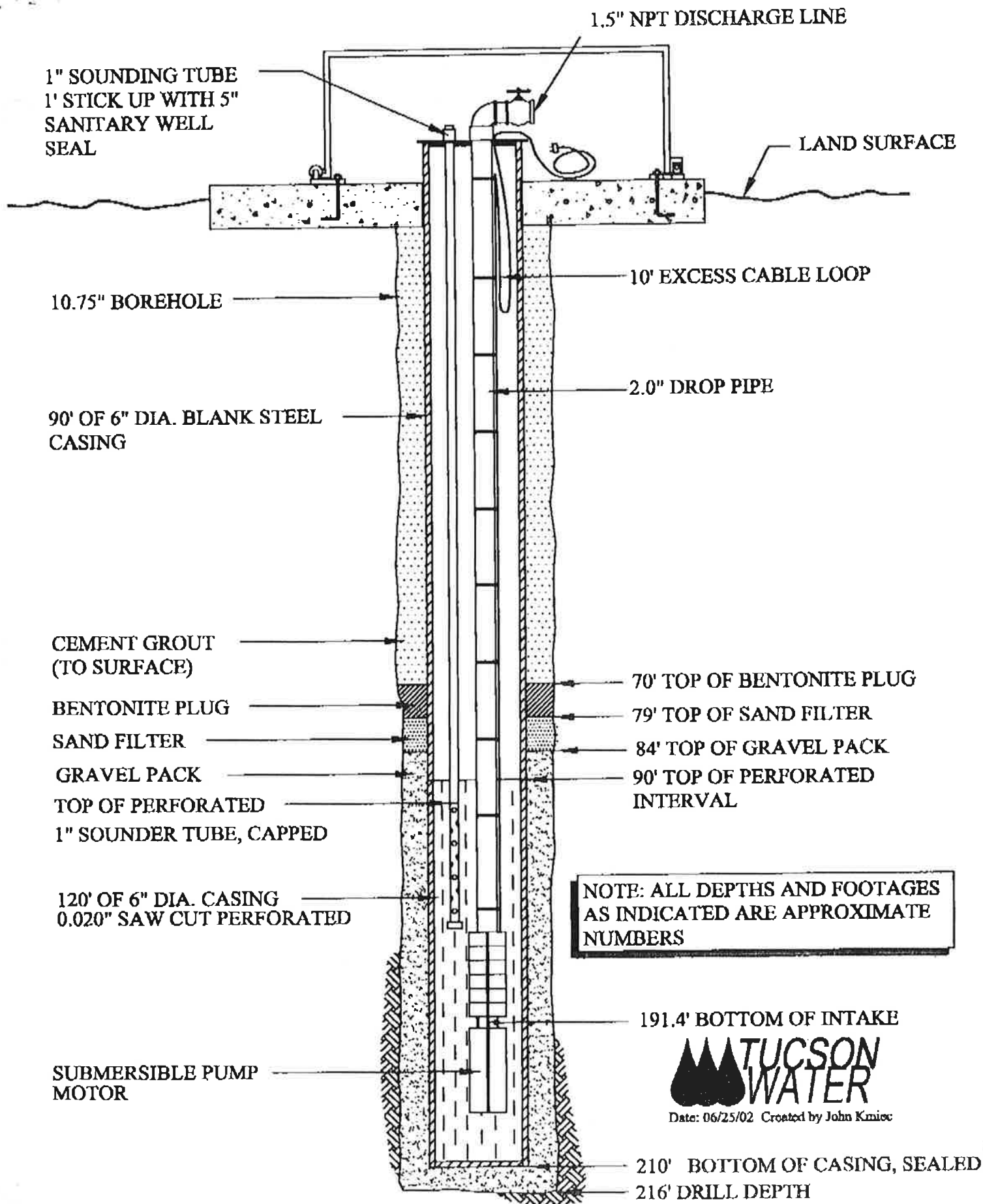
DATE 10/99



WELL ABANDONMENT DETAIL WELL Z-016A

DATE: 2-01

SCALE: NOT TO SCALE



WR-369A MONITOR WELL CONSTRUCTION

WR-369A

LOG OF WELL

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

From (feet)	To (feet)	Description of formation material
0	7	Fine To med sand
7	17	Clayey Fine sand
32.5	32.5	med. Bun. Sandy Gneissic Gravel
32.5	34	yellowish coarsr sand.
34	44	coarsr sand, Gravel
44	215	Basin Fill Bun To Reddish Bun.
		Clayey. Coarsr sand, Volcanic
		Gravel occ. COBBLE.

I hereby certify that this well was drilled by me (or under by supervision), and that each and all statements herein contained are true to the best of my knowledge and belief.

Driller Name: THF DRILLING, INC.

2420 SOUTH 16TH AVENUE

Street

PHOENIX, AZ 85007-4403

City

State

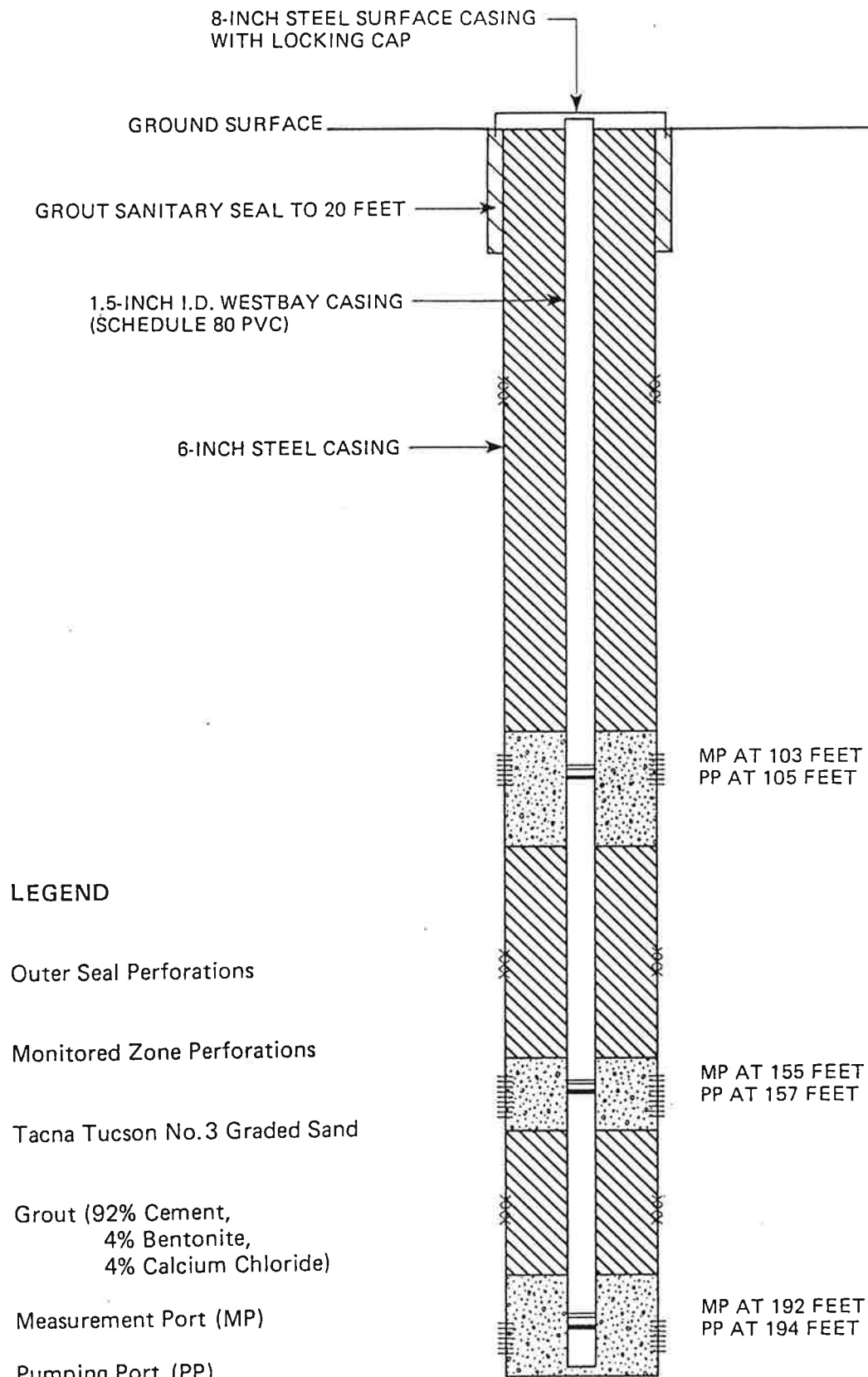
Zip

Phone No.

Signature of Driller

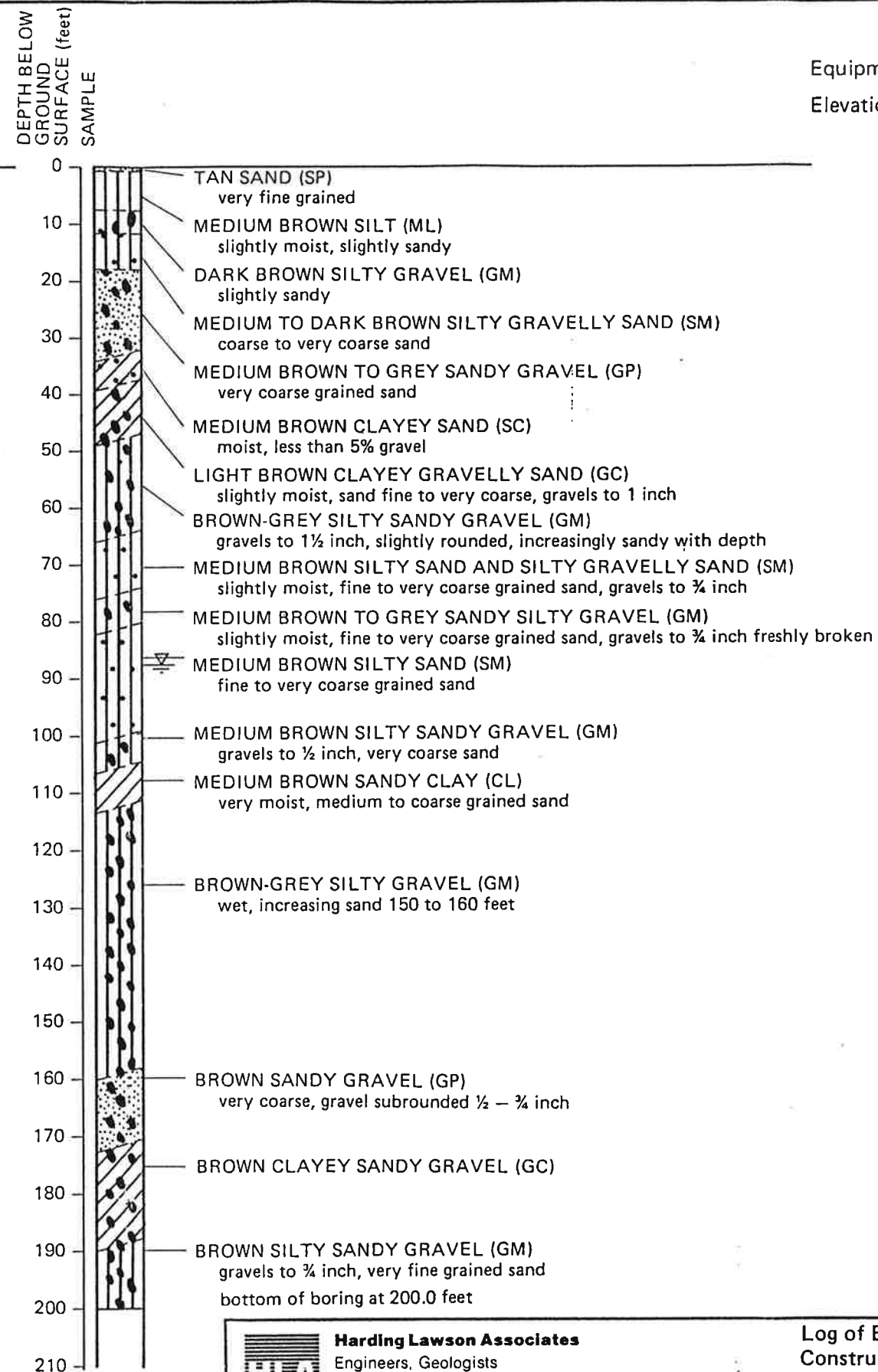
Date

5-1-01

Equipment SCHRAMM ROTADRILLElevation 2230.11 feet Date 9/4/84

LEGEND

- Outer Seal Perforations
- Monitored Zone Perforations
- Tacna Tucson No.3 Graded Sand
- Grout (92% Cement, 4% Bentonite, 4% Calcium Chloride)
- Measurement Port (MP)
- Pumping Port (PP)
- Average Water Level, July 1985 to January 1986



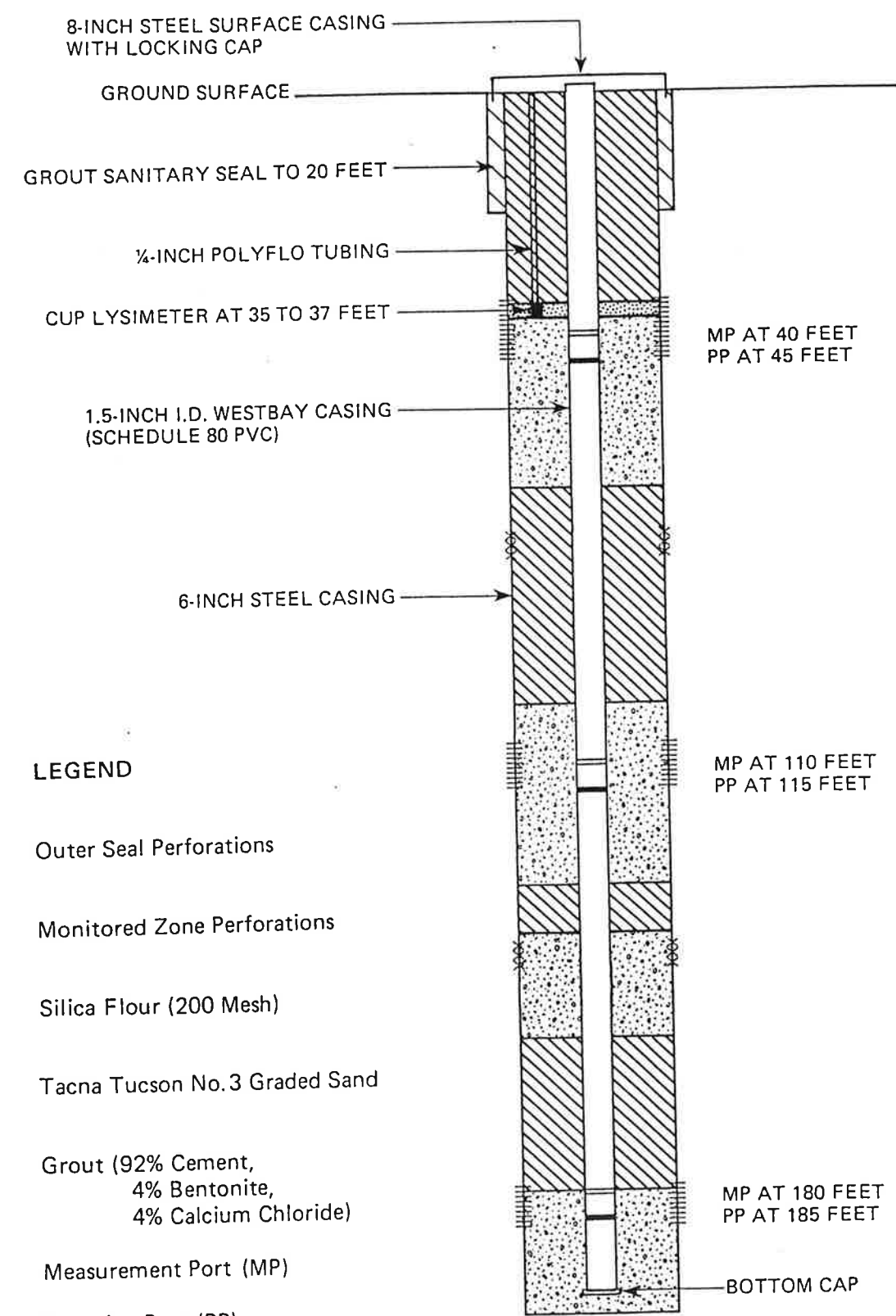
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Log of Boring CDC W1 with
Construction Diagram of Well
El Camino del Cerro Landfill
Pima County, Arizona

PLATE

II-12

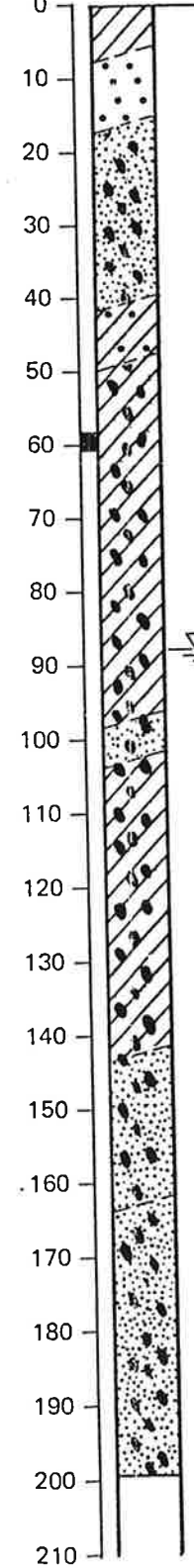
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
ML	17,144,008.02	MR	2/86		



LEGEND

- xxx Outer Seal Perforations
- ||||| Monitored Zone Perforations
- [Stippled Box] Silica Flour (200 Mesh)
- [Dotted Box] Tacna Tucson No. 3 Graded Sand
- [Hatched Box] Grout (92% Cement, 4% Bentonite, 4% Calcium Chloride)
- [Horizontal Line] Measurement Port (MP)
- [Vertical Line] Pumping Port (PP)
- [Inverted Triangle] Average Water Level, July 1985 to January 1986

DEPTH BELOW
GROUND
SURFACE (feet)
SAMPLE



DARK BROWN SANDY SILTY CLAY (CL)
slightly moist, some gravel

BROWN GRAVELLY SAND (SW)
slightly moist, fine to coarse

GREY SANDY GRAVEL (GP)
dry, gravel subangular to 3/4 inch, some fine to coarse sand

BROWN CLAYEY GRAVELLY SAND (SC)
moist, gravel to 2 inch

BROWN SANDY CLAYEY GRAVEL (GC)
slightly moist

GREY GRAVEL (GP)
wet, clean, broken to 3/4 inch, coarse sand or broken to 1/8 inch


BROWN CLAYEY SANDY GRAVEL (GC)
moist, gravel to 1/2 inch, broken, decreasing sand with depth

GREY-GREEN SANDY GRAVEL (GP)
clean

GREY SANDY GRAVEL (GW)
wet, gravel to 2 inch

bottom of boring at 199.0 feet

Equipment SCHRAMM ROTADRILL
Elevation 2232.61 feet Date 10/3/84

 **Harding Lawson Associates**
Engineers, Geologists
& Geophysicists

Log of Boring CDC W2 with
Construction Diagram of Well
El Camino del Cerro Landfill
Pima County, Arizona

DRAWN ML:	JOB NUMBER 17,144,008.02	APPROVED ADR	DATE 2/86	REVISED	DATE
--------------	-----------------------------	-----------------	--------------	---------	------

8-INCH STEEL SURFACE CASING
WITH LOCKING CAP

GROUND SURFACE

GROUT SANITARY SEAL TO 20 FEET

1.5-INCH I.D. WESTBAY CASING
(SCHEDULE 80 PVC)

6-INCH STEEL CASING

LEGEND



Outer Seal Perforations



Monitored Zone Perforations



Tacna Tucson No. 3 Graded Sand



Grout (92% Cement,
4% Bentonite,
4% Calcium Chloride)



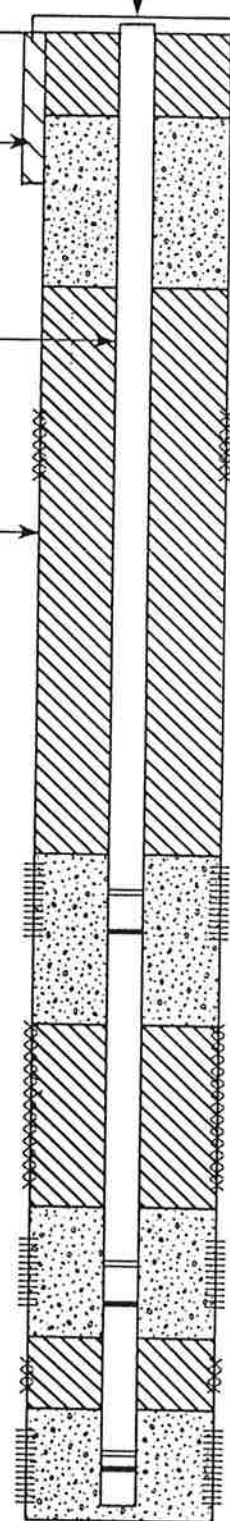
Measurement Port (MP)



Pumping Port (PP)



Average Water Level, July 1985
to January 1986

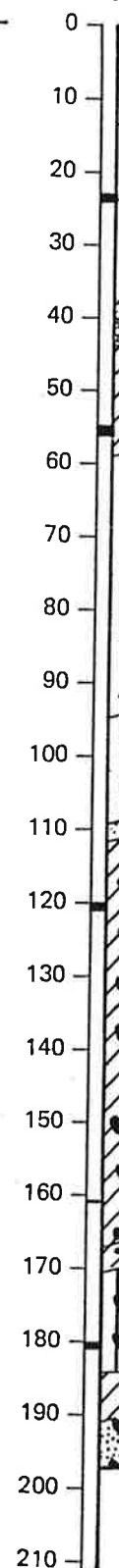


MP AT 115.5 FEET
PP AT 120.5 FEET

MP AT 165.5 FEET
PP AT 170.5 FEET

MP AT 190.5 FEET
PP AT 192.5 FEET

DEPTH BELOW
GROUND
SURFACE (feet)
SAMPLE



DARK BROWN SANDY CLAYEY SILT (ML)
soft, moist, with trace small gravel

GREY-BROWN COARSE SAND (SW)
medium to coarse grained, trace silt

GREY-BROWN GRAVELLY SAND (SW)
very dry, some cobbles

cobbles and boulders at 37.0 feet
water encountered in cobbles and boulders at 39.0 feet

BROWN CLAYEY GRAVEL (GC)
moist, some silt and coarse sand

BROWN SILTY SAND (SM)
slightly moist, coarse, gravel layer 73 feet to 74 feet

BROWN SILTY GRAVEL (GM)
moist

BROWN-GREY GRAVEL (GW)
wet

BROWN-GREY CLAYEY GRAVEL AND CLAYEY SANDY GRAVEL (GC)
wet

CLAYEY SAND (SC)
coarse sand

BROWN SILTY GRAVEL (GM)

BROWN SANDY CLAY (CL)
some coarse sand and gravel

BROWN SANDY GRAVEL (GW)
very wet
bottom of boring at 197 feet

Equipment SCHRAMM ROTADRILL

Elevation 2242.46 feet Date 7/17/84



Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Log of Boring CDC W3 with
Construction Diagram of Well
El Camino del Cerro Landfill
Pima County, Arizona

PLATE

11-13

DRAWN
ML

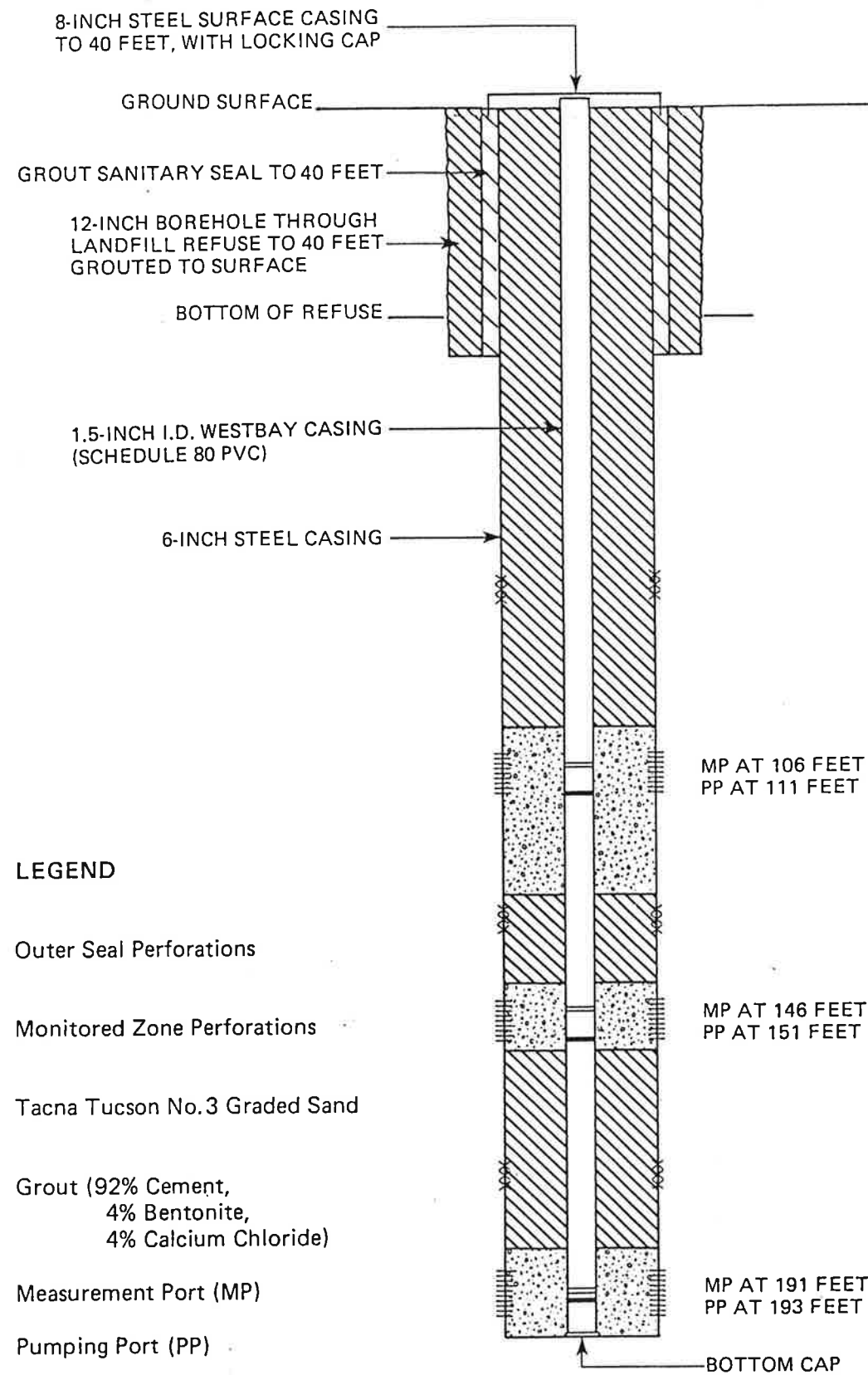
JOB NUMBER
17,144,008.02

APPROVED
ADR

DATE
2/86

REVISED

DATE

Equipment SCHRAMM ROTADRILLElevation 2237.26 feet Date 10/17/84DEPTH BELOW
GROUND
SURFACE (feet)
SAMPLE0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210BROWN SILTY SAND (SM)
slightly moistREFUSE
(paper products, plastic)BROWN CLAYEY GRAVEL (GC)
slightly moistBROWN TO GREY-BROWN GRAVEL (GW)
wet, some sand and clay, gravel angular to 1¼-inch diameter

bottom of boring at 198 feet



Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Log of Boring CDC W4 with
Construction Diagram of Well
El Camino del Cerro Landfill
Pima County, Arizona

PLATE

11-14

DRAWN
MLJOB NUMBER
17,144,008.02APPROVED
ADRDATE
2/86

REVISED

DATE

Equipment Drill Systems Reverse Air
 Elevation Not Surveyed Date 4/14/86

BROWN SILTY GRAVELLY SAND (SP)
 fine to medium sand, gravel 1/2 in. to 3/4 in.
 DARK BROWN SAND (SW) — slightly moist,
 medium- to coarse-grained
 DARK BROWN GRAVELLY SAND (SP)
 slightly moist, medium to coarse sand,
 gravel from 1/2 in. to 2 in., rounded

at 34 ft. color change to brown, cobbles
 to 5 in. diameter

at 38 ft. becomes finer grained

BROWN CLAYEY GRAVEL (GC) — slightly
 moist

GRAY-BROWN SILTY GRAVELLY
 SAND (SP) — slightly moist, fine to
 coarse sand, gravel to 1/2 in.

BROWN SILTY SANDY GRAVEL (GP)
 slightly moist, less sand than
 above, gravel 1/2 in. to 2 in.

water level, April 1986

BROWN SILTY GRAVELLY SAND (SP)
 wet, fine to coarse sand, gravel to 1 in.

BROWN GRAVEL (GP) — subangular to
 1 in., some cobbles, some silt

at 130 ft., color change to gray-green,
 increased sand

at 146 ft., color change to gray, increased
 gravel and silt

at 158 ft., color change to brown, increased
 silt content

bottom of borehole at 158 ft.

Depth (ft)
 Sample

0
 10
 20
 30
 40
 50
 60
 70
 80
 90
 100
 110
 120
 130
 140
 150
 160

GROUT (96% cement,
 4% bentonite)

STAINLESS STEEL CASING
 6-inch diameter

10-INCH BOREHOLE

BENTONITE

MONTEREY NO. 2 SAND

STAINLESS STEEL SCREEN,
 0.010 slot, 6-inch diameter
 (Johnson wire-wrapped)

BOTTOM OF BOREHOLE
 at 158 feet

HLA **Harding Lawson Associates**
 Engineers, Geologists
 & Geophysicists

Log of Boring CDCW5 with Construction
 Diagram of Well
 El Camino del Cerro Landfill
 Pima County, Arizona

PLATE

II-17

CSN

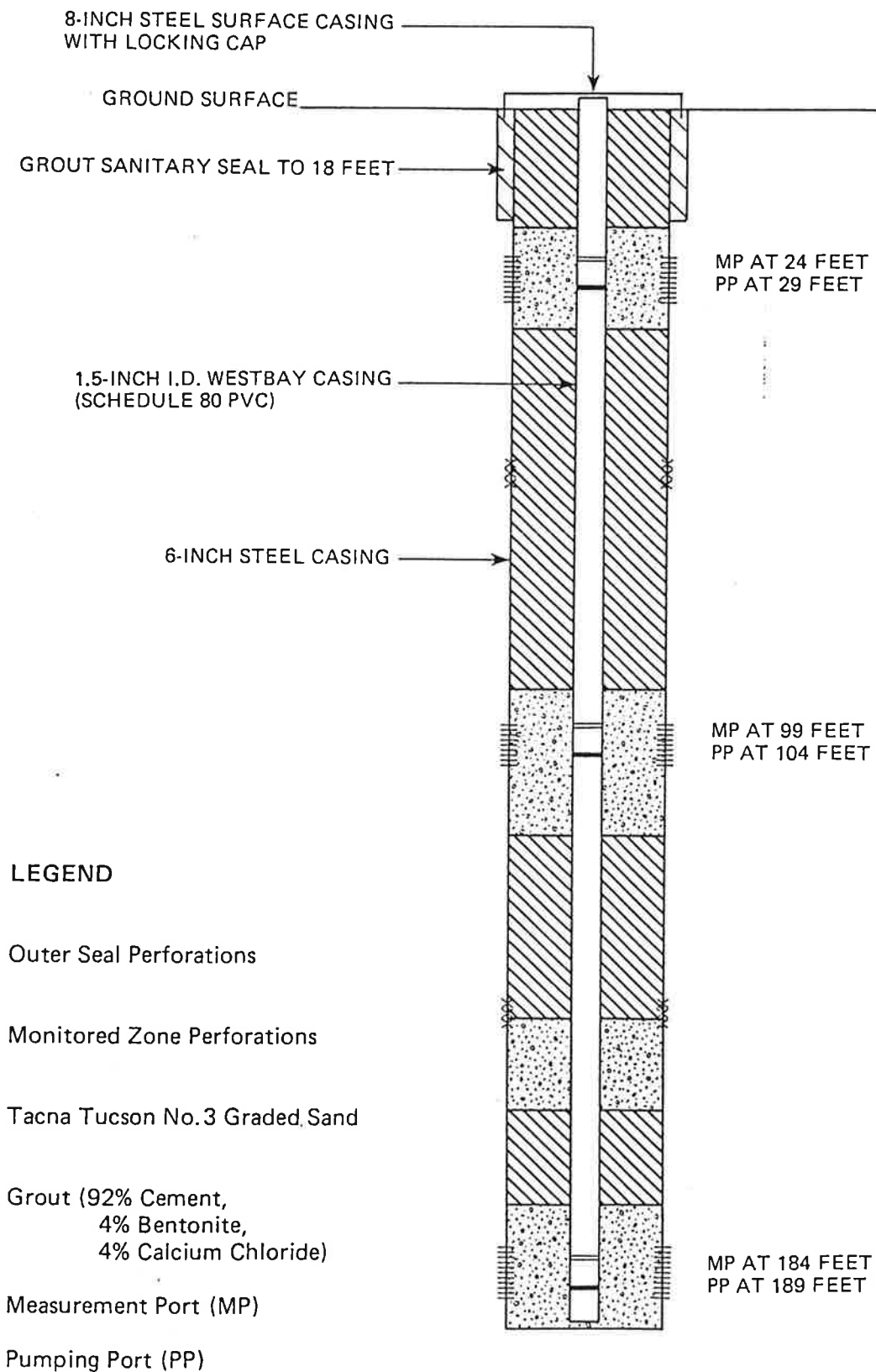
JOB NUMBER
 17,144,008.02

APPROVED
 AMR

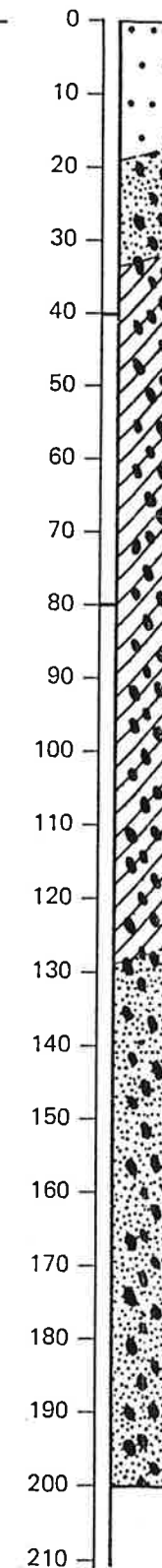
DATE
 6/86

REVISED

DRAWN



DEPTH BELOW
GROUND
SURFACE (feet)
SAMPLE



BROWN SAND (SP)
dry, very fine, some gravel, some silt from 10 to 20 feet

GREY SANDY GRAVEL (GW)
slightly moist
wet cuttings

BROWN SANDY CLAYEY GRAVEL (GC)
very moist, gravel to 1/2-inch diameter

wet cuttings

GREY SANDY GRAVEL (GW)
wet, medium to coarse sand, angular to 2-inch diameter

bottom of boring at 200 feet

Equipment SCHRAMM ROTADRILL
Elevation 2228.13 feet Date 9/12/84



Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Log of Boring CDC W9 with
Construction Diagram of Well
El Camino del Cerro Landfill
Pima County, Arizona

PLATE

11-15

DRAWN
ML

JOB NUMBER
17,144,008.02

APPROVED
ADR

DATE
2/86

REVISED

DATE

TABLE 6D-4

LITHOLOGIC LOG FOR MONITOR WELL CDC-W10

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 6	FILL	Dark brown, gravelly sand and cobbles, some silt and clay dry.
6 - 18	FILL	Dark brown, silty coarse sand, some gravel, poorly sorted, dry, organic odor.
18 - 26	SAND	Light brown, fine to coarse sand, some silt, well sorted.
26 - 39	GRAVELLY SAND	Light brown, gravelly sand, some cobbles and boulders, poorly sorted.
39 - 41	SANDY CLAY	Light brown to white, silty clay, fine to very fine sand, low plasticity.
41 - 52	CLAYEY SILTY SAND	Light brown, fine to coarse sand, poorly sorted, with silty matrix, trace clay, trace cobbles.
52 - 65	GRAVELLY SAND/SANDY GRAVEL	Light grey, fine to coarse sand, gravel to 1-inch, trace cobbles, poorly sorted, trace clay.
65 - 84	SILTY GRAVELLY SAND	Light brown to grey, fine to coarse sand, poorly sorted, trace clay.
84 - 135	SILTY GRAVELLY SAND	Light brown, fine to coarse sand, gravel to ½-inch, poorly sorted, trace sandy clay. At 121-123 feet, cobbles.
135 - 165	SILTY SAND	Light brown to light grey, fine to medium sand, some gravel, in loose silty matrix, poorly sorted.
TOTAL DEPTH OF BOREHOLE: 165 FEET		

TABLE 6D-5

LITHOLOGIC LOG FOR MONITOR WELL CDC-W11

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 8	SANDY GRAVEL	Dark brown, poorly sorted sand, some clay and silt, some cobbles.
8 - 10	CLAYEY SAND	Dark brown, some gravel, cohesive.
10 - 15	CLAYEY SILTY SAND	Dark brown, some gravel.
15 - 20	SILTY SAND	Dark brown, some gravel, cobbles. At 17 feet.
20 - 31	GRAVELLY SAND AND COBBLES	Light brown, medium to very coarse sand, cobbles, some boulders, trace silt and sand, saturated at 27 feet, organic odor.
31 - 37	SANDY GRAVEL AND COBBLES	Brown, fine to coarse gravel, fine to very coarse sand, cobbles to 10-inches, some silt and clay, cobbles decreasing with depth.
37 - 42	CLAYEY SILTY SAND SAND AND GRAVEL	Light brown, sand, gravel to ½-inch.
42 - 80	GRAVELLY SILTY SAND	Light brown, fine to very coarse sand, gravel to ½-inch, clayey silt matrix, trace cobbles.
80 - 103	GRAVELLY SILTY SAND	Dark brown, fine to very coarse sand, some clay; clayey silt matrix, trace cobbles at 89 feet, 93 feet, increasing gravel and cobbles 97-100 feet.
103 - 124	SILTY GRAVELLY SAND	Light brown, fine to coarse sand, gravel to ½-inch trace cobbles, clayey silt matrix. At 116 feet, cobbles.
124 - 130	SILTY SAND AND GRAVEL	Light brown, fine to very coarse sand, gravel to ½-inch, increasing silt in matrix.
130 - 179	SILTY SAND	Light brown, fine to very coarse sand, some fine to medium gravel in silty matrix, some clay. At 140 feet, increasing clayey silt. At 157 and 164 feet, cobbles.
TOTAL DEPTH OF BOREHOLE: 179 FEET		

TABLE 6D-6

LITHOLOGIC LOG FOR MONITOR WELL CDC-W12

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 5	SANDY SILT	Light brown, poorly sorted, some gravel.
5 - 15	CLAYEY SILT	Dark brown, trace of sand.
15 - 20	CLAYEY SANDY GRAVEL	Dark brown, coarse, poorly sorted sand with very cohesive clumps of brown clay.
20 - 35	SILTY SANDY GRAVEL	Dark brown, fine to coarse sand, trace of cobbles at 27 feet below land surface.
35 - 44	BOULDERS/COBBLES	
44 - 95	SANDY SILTY GRAVEL	Dark brown, poorly sorted. At 67 feet, gravel then increasing silt and fine sand.
95 - 100	SILTY CLAYEY SAND	Dark brown, very fine to coarse sand, trace of gravel.
100 - 122	SAND	Dark brown, very fine to coarse sand, trace of silty clay. At 114 feet, cobbles/gravel. At 118 feet, increasing gravel.
122 - 128	GRAVELLY SAND	Dark brown, very fine to coarse sand, fine gravels.
128 - 167	SILTY GRAVELLY SAND	Dark brown, very fine to coarse sand, predominately coarse, some fine gravels and trace of clay, cobbles at 167 feet.
TOTAL DEPTH OF BOREHOLE: 167 FEET		

TABLE 6D-7
(continued)
LITHOLOGIC LOG FOR MONITOR WELL CDC-W13

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 5	FILL	Dark brown, gravelly sand, some silt and clay.
5 - 10	SANDY SILTY CLAY	Dark brown, fine to very fine sands, slight clay content.
10 - 15	SANDY SILTY GRAVEL	Dark brown, very fine to coarse sand, trace of clay.
15 - 18	SILTY CLAY	Light brown, very fine to fine, silty matrix, slightly cohesive clay.
18 - 20	CLAY	Brown, dense, cohesive clay, soft.
20 - 27	GRAVELLY CLAYEY SAND	Brown, fine to coarse sand, gravels to 1-inch, clay is soft and cohesive, some silt.
27 - 47	GRAVELLY SAND WITH COBBLES	Brown, predominately coarse sand, gravel to 1-inch rounded trace cobbles. At 36 feet, cobbles.
47 - 70	GRAVELLY SILTY SAND	Dark brown, very fine to coarse sand, gravels to ½-inch, predominately coarse sand, trace silty clay.
70 - 90	SAND/SILTY SAND	Dark brown, predominately coarse sand, some very fine to fine sand, trace gravel in silty matrix, trace clay.
90 - 125	CLAYEY SILTY SAND	Light brown, predominately coarse sand, fine gravel in silty clay matrix, trace coarse gravel/cobbles. From 98-100 feet, cobbles. At 102 feet, cobbles. At 105 feet, cobbles. At 112 feet, cobbles.

TABLE 6D-7
(continued)
LITHOLOGIC LOG FOR MONITOR WELL CDC-W13

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
125 - 185	SILTY SAND WITH GRAVEL	<p>Dark brown, predominately coarse sand.</p> <p>At 130 feet, cobbles/gravel decreasing fines.</p> <p>At 131 feet, silty matrix.</p> <p>At 137 feet, cobbles.</p> <p>At 153 feet, cobbles.</p> <p>At 173 feet, gravel lens.</p>
TOTAL DEPTH OF BOREHOLE: 185 FEET		

TABLE 6D-8

LITHOLOGIC LOG FOR MONITOR WELL CDC-W14

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 22	SILT	Light brown, fine sand, trace clay. At 9 feet, gravel.
22 - 33	SILT SAND	Light brown, fine to very fine sand.
33 - 60	SANDY GRAVEL AND COBBLES	Light brown, fine to very fine sand.
60 - 110	GRAVELLY SAND	Brown, fine to medium sands.
110 - 169	SILT SANDY GRAVEL	Brown to red brown, fine to medium sand, gravel to ½-inch, trace clay and silt. At 119 feet, cobbles. At 139 feet, large cobbles. At 145 feet, minor sandy clay streaks. At 146 feet, increasing clay streaks, no distinctive bed or lens.
169 - 192	SANDY GRAVEL	Light brown, decrease in clayey sand streaks, some cobbles.
192 - 195	GRAVELLY CLAYEY SAND	Light brown, coarse sand, gravel to ½-inch, loose matrix, trace cobbles.
TOTAL DEPTH OF BOREHOLE: 195 FEET		

TABLE 6D-9

LITHOLOGIC LOG FOR MONITOR WELL CDC-W15D

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 4	SANDY CLAY/CLAYEY SAND	Dark brown, fine to medium sand, firm, slightly cohesive clay, odor present.
4 - 6	SAND	Dark brown, fine to medium, trace of clay, odor present.
6 - 20	SILTY GRAVELLY SAND	Dark brown, very fine to coarse sand, predominately coarse, trace clay (sandy). At 11 feet, boulders. At 16 feet, boulders.
20 - 38	SANDY GRAVEL WITH COBBLES	Dark brown, coarse sand, gravel to 1-inch angular grain shape. At 24 to 38 feet, boulders in matrix.
38 - 65	SILTY GRAVELLY SAND	Fine to coarse sand, predominately coarse, gravel to 1/2-inch, trace cobbles, silty matrix.
65 - 92	SILTY SANDY GRAVEL	Light brown, sand medium to coarse, gravel fine to coarse, clayey silty matrix.
92 - 180	SILTY GRAVELLY SAND	Light brown, sand medium to very coarse gravel, fine to medium. At 114 feet, cobbly. At 128 feet, cobbly. At 130 feet, cobbly. At 132 feet, cobbly. At 147-148 feet, cobbly. At 161 feet, cobbly. At 167 feet, cobbly.
180 - 210	GRAVELLY SAND/SANDY GRAVEL	Some cobbles, minor silty to clayey fines in matrix sand, medium to coarse gravels, fine to medium, increasing white volcanic clasts.

TABLE 6D-9

LITHOLOGIC LOG FOR MONITOR WELL CDC-W15D

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
210 - 275	SANDY GRAVEL	<p>Gravel: fine to medium. Sand: coarse to very coarse, some cobbles.</p> <p>At 225 feet, cobbles (large). At 234 feet, cobbles (large). At 252 feet, cobbles. At 259 feet, cobbles (large). At 266 feet, cobbles.</p>
275 - 280	N/A	Grout from pressure grouting conductor casing.
280 - 338	SILTY SANDY GRAVEL	<p>Very fine to coarse sand, average gravel ½-inch, silty clay matrix, soft clay.</p> <p>At 280 feet, cobbles. At 308 feet, increase in percentage sandy clay interbeds. At 325 feet, cobbles (?). At 330 feet, cobbles. At 335 feet, cobbles.</p>
TOTAL DEPTH OF BOREHOLE: 338 FEET		

TABLE 6D-10
(continued)
LITHOLOGIC LOG FOR MONITOR WELL CDC-W16

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 23	SILT	Light brown, trace fine sand and clay. At 7 feet, gravel lens.
23 - 27	SILTY SAND WITH GRAVEL	Light brown, sand is medium to coarse, gravel fine to coarse.
27 - 51	SANDY GRAVEL AND COBBLES	Light brown, coarse sand, medium to coarse gravel, cobbles to 6-inches. At 35 feet, cobbles increasing in size and amount.
51 - 63	SANDY CLAY/CLAYEY SAND	Red brown, soft, cohesive, fine to coarse sand, some gravel.
63 - 70	SAND	Light brown, fine to coarse sand, light brown silty clay interbeds.
70 - 87	CLAYEY SAND/SILTY SAND	Dark brown to light brown, medium to coarse sand, poorly sorted, some gravel and silt, loose silty matrix, trace fine sand. At 83 feet, increasing clay. At 87 feet, cobble zone.
87 - 93	CLAYEY SAND	Light brown, fine to medium sand. At 92 feet, cobbles and gravel.
93 - 113	SILTY GRAVELLY SAND	Dark brown to grey, fine to coarse sand, poorly sorted, subangular, gravel to ½-inch, silty matrix, trace of clay in thin lens. At 113 feet, decrease in gravel.
113 - 124	SILTY SAND	Brown, predominately coarse sand, trace of clay.

TABLE 6D-10
(continued)
LITHOLOGIC LOG FOR MONITOR WELL CDC-W16

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
124 - 194	SILTY GRAVELLY SAND	<p>Brown, fine to coarse sand, gravel to ½-inch, silty clay matrix.</p> <p>At 157 feet, increasing clay.</p> <p>At 161 feet, decreasing clay.</p> <p>At 166 feet, gravel 3-6 inches.</p> <p>From 172-174 feet, cobbles.</p>
TOTAL DEPTH OF BOREHOLE: 194 FEET		

CDC-W17

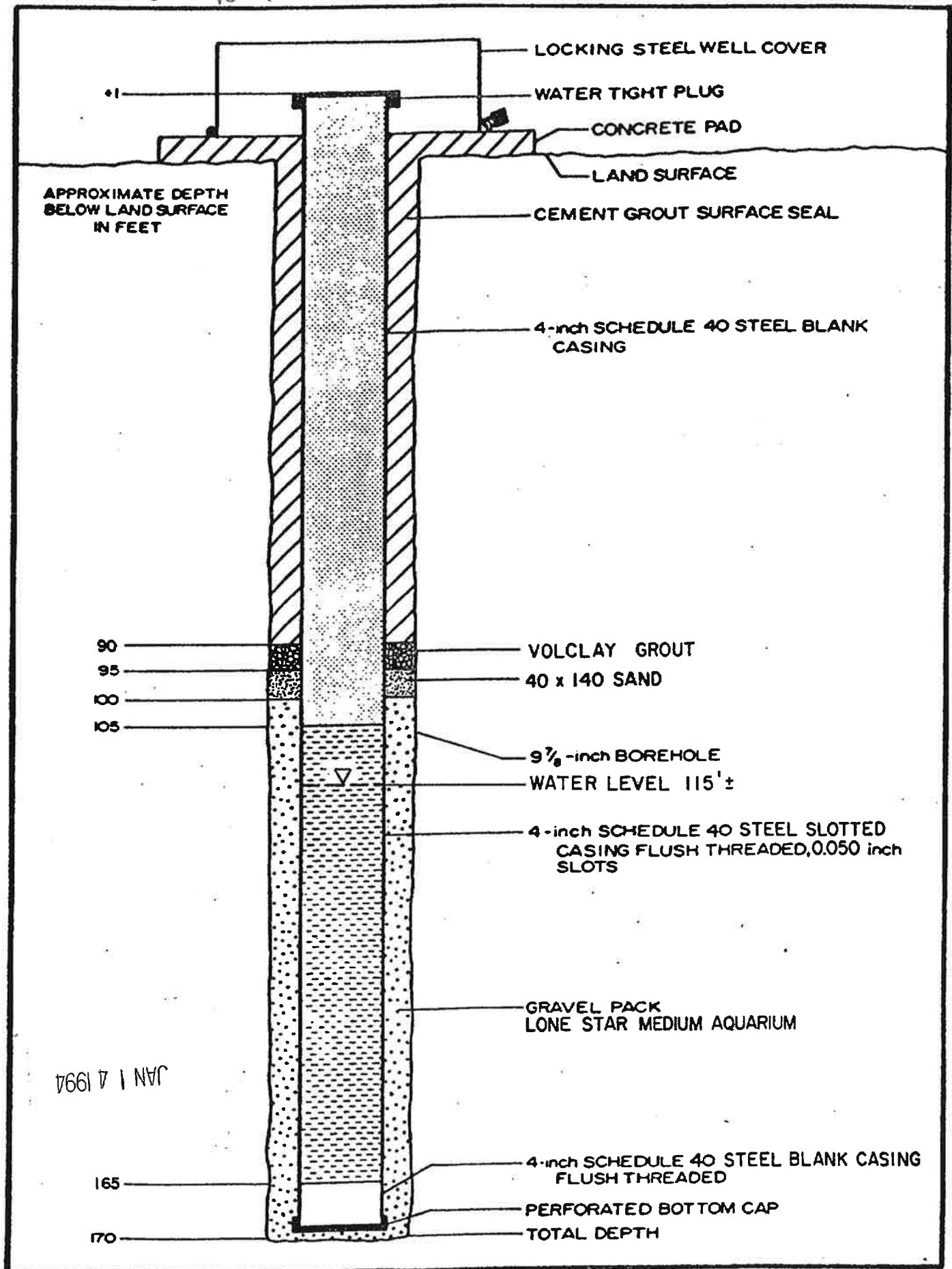


FIGURE 2
SCHEMATIC CONSTRUCTION DIAGRAM
FOR SHALLOW MONITOR WELLS

TABLE 6D-11
(continued)
LITHOLOGIC LOG FOR MONITOR WELL CDC-W17

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 9	SILTY SAND/SANDY SILT	Dark brown, moist, sand is predominantly very fine to fine grained, contains some weak caliche cementation as veinlets.
9 - 11	SILTY SAND	Brown, very slightly moist, sand is medium to coarse grained, contains some gravel and small cobbles.
11 - 25	SANDY SILT/SAND	Light brown, very slightly moist, compact, sand is very fine to fine grained.
25 - 34	SAND	Light brown, dry, loose, sand is fine to very coarse grained, contains minor fine and medium size gravel. Below 31 feet: contains some clasts up to 3-inches in size.
34 - 38	GRAVELLY SAND	Greyish brown, dry, sand is fine to very coarse grained, gravel is predominately fine, some coarse gravel and cobbles to 6-inches in size.
38 - 43	GRAVEL AND COBBLES	Greyish brown, dry, fine to coarse gravel and cobbles up to about 8-inches in size, contains some sand and silt in matrix. At 40 feet: boulder.
43 - 53	GRAVELLY SAND w/SILT	Light greyish brown, dry to slightly moist, compact, interbedded/graded mixture, sand is fine to very coarse grained, gravel is fine to coarse size. At 44 feet: some weak caliche cementation. At 48 feet: some caliche cementation.
53 - 61	SILTY GRAVELLY SAND w/COBBLES	Light greyish brown, dry to slightly moist, compact, graded mixture, sand is fine to very coarse grained, gravel is fine to coarse sized, contains variable cobbles estimated up to 8-inches in size, grades to sandy gravel in part.
61 - 68	SILTY GRAVELLY SAND	Light brown, slightly moist, sand is fine to very coarse, gravel is fine to medium size.
68 - 69.5	SILTY SAND	Light brown, slightly moist, compact, sand is very fine to medium grained.
69.5 - 71	SILTY GRAVELLY SAND	Light brown, slightly moist, sand is fine to coarse grained, gravel is fine, silt is in matrix or as thin interbeds.
71 - 73	SILTY SAND	Light brown, slightly moist, dense, sand is very fine to medium grained.

TABLE 6D-11
(continued)
LITHOLOGIC LOG FOR MONITOR WELL CDC-W17

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
73 - 81	SILTY SAND w/GRAVEL	Light greyish brown, slightly moist, sand is very fine to medium grained, gravel is fine overall, contains some coarse gravel and trace small cobbles to about 5-inches in size.
81 - 85	SILTY SAND	Light brown, slightly moist, sand is very fine to medium grained, minor fine gravel.
85 - 89	SILTY GRAVELLY SAND	Light brown, slightly moist, sand is fine to coarse grained, some very coarse sand, gravel is fine.
89 - 91	SANDY GRAVEL	Light greyish brown, slightly moist, gravel is fine to coarse, sand is coarse, contains some fine sand and silt in matrix.
91 - 102	SILTY GRAVELLY SAND	<p>Light brown, slightly moist, sand is very fine to coarse grained, gravel is fine to coarse size, graded/interbedded mixture.</p> <p>At 93 feet: boulder, some caliche cementation.</p> <p>Below 96 feet: moist.</p> <p>Below 97 feet: decreased fines, moist to very moist, some cobbles to 6-inches in size.</p>
102 - 172	SANDY GRAVEL w/ COBBLES	<p>Light brown, very moist to wet, gravel is fine to coarse, sand is medium to very coarse, grades to gravelly sand in part, contains variable cobbles and some boulder size clasts.</p> <p>At 112 feet: silty sand interbed.</p> <p>At 113 feet: slight solvent-like odor.</p>
<p align="center">TOTAL DEPTH OF BOREHOLE: 172 FEET WELL COMPLETED: 02/11/94 STATIC WATER LEVEL: 104 FEET BELOW TOP OF WELL CASING (02/17/94)</p>		

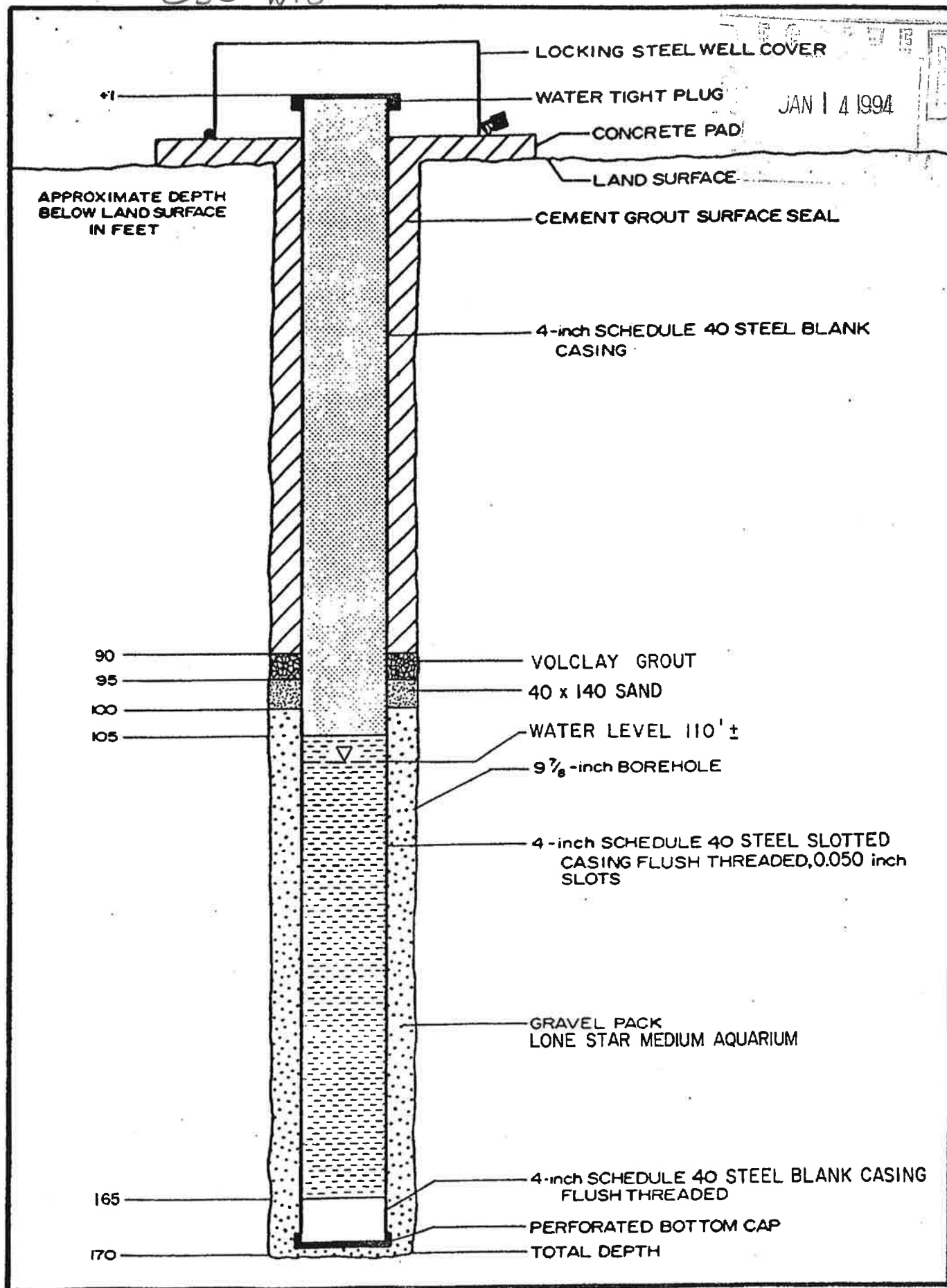


FIGURE 2
SCHEMATIC CONSTRUCTION DIAGRAM
FOR SHALLOW MONITOR WELLS

TABLE 6D-12
(continued)
LITHOLOGIC LOG FOR MONITOR WELL CDC-W18

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 10	FILL	Concrete, bricks and construction debris with silty sand, gravel, and cobbles to depth of approximately 8-12 feet.
10 - 18	SANDY GRAVEL/ GRAVELLY SAND AND COBBLES	Light brown, slightly moist, sand is fine to very coarse, gravel is fine to coarse.
18 - 23	SAND	Light brown, moist, compact to loose, sand is medium to very coarse grained.
23 - 35	GRAVELLY SAND W/COBBLES AND BOULDERS	Light greyish brown, slightly moist, sand is fine to very coarse grained, gravel is fine to coarse size, graded mixture, variable content of cobbles, trace boulder size clasts, contains some silt.
35 - 54	SANDY GRAVEL w/COBBLES	Light brown, moist to very moist, gravel is predominately fine to medium size, sand is fine to very coarse, contains some silt as matrix or interbeds.
54 - 56	SILTY SAND	Light brown, slightly moist to moist, sand is fine to coarse grained, contains minor gravel.
56 - 80	SILTY GRAVELLY SAND	Light brown, slightly moist to dry, sand is fine to coarse grained, gravel is predominately fine, contains some coarse gravel and cobble size clasts. From 67 to 72 feet: contains some light brown to yellow brown silt and clayey silt interbeds.
80 - 100	GRAVELLY SILTY SAND	Light brown, slightly moist to moist, sand is fine to coarse grained, gravel is predominately fine.
100 - 126	GRAVELLY SAND/ SANDY GRAVEL	Light brown, very moist to wet, sand is fine to very coarse, gravel is fine to coarse, contains minor small cobbles, variable graded mixture.
126 - 151	SILTY SANDY GRAVEL	Light brown, wet, gravel is fine to coarse, sand is predominately medium to very coarse, some fine to very fine sand and silt, minor cobble size clasts. At 144 feet: increased fines as matrix or interbeds.
151 - 169	SANDY GRAVEL	Light brown, wet, gravel is fine to coarse, sand is predominately coarse to very coarse grained, contains some cobbles and trace boulder size clasts.

TABLE 6D-12
(continued)
LITHOLOGIC LOG FOR MONITOR WELL CDC-W18

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
169 - 172	GRAVEL AND COBBLES	Light brown, wet, gravel is fine to coarse, contains minor sand.
<p style="text-align: center;">TOTAL DEPTH OF BOREHOLE: 172 FEET WELL COMPLETED: 02/15/94 STATIC WATER LEVEL: 100 FEET BELOW TOP OF WELL CASING (02/17/94)</p>		

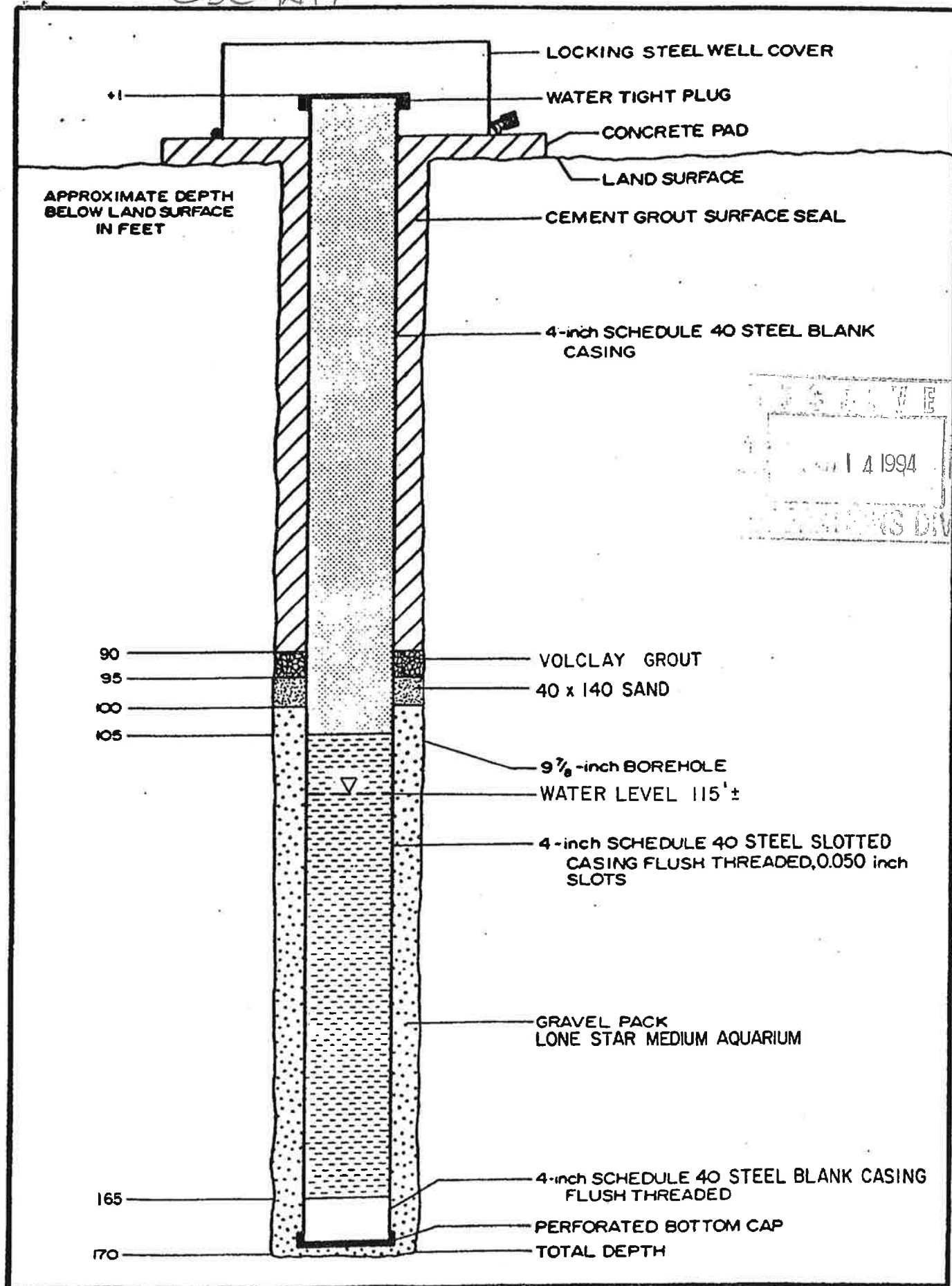


FIGURE 2
SCHEMATIC CONSTRUCTION DIAGRAM
FOR SHALLOW MONITOR WELLS

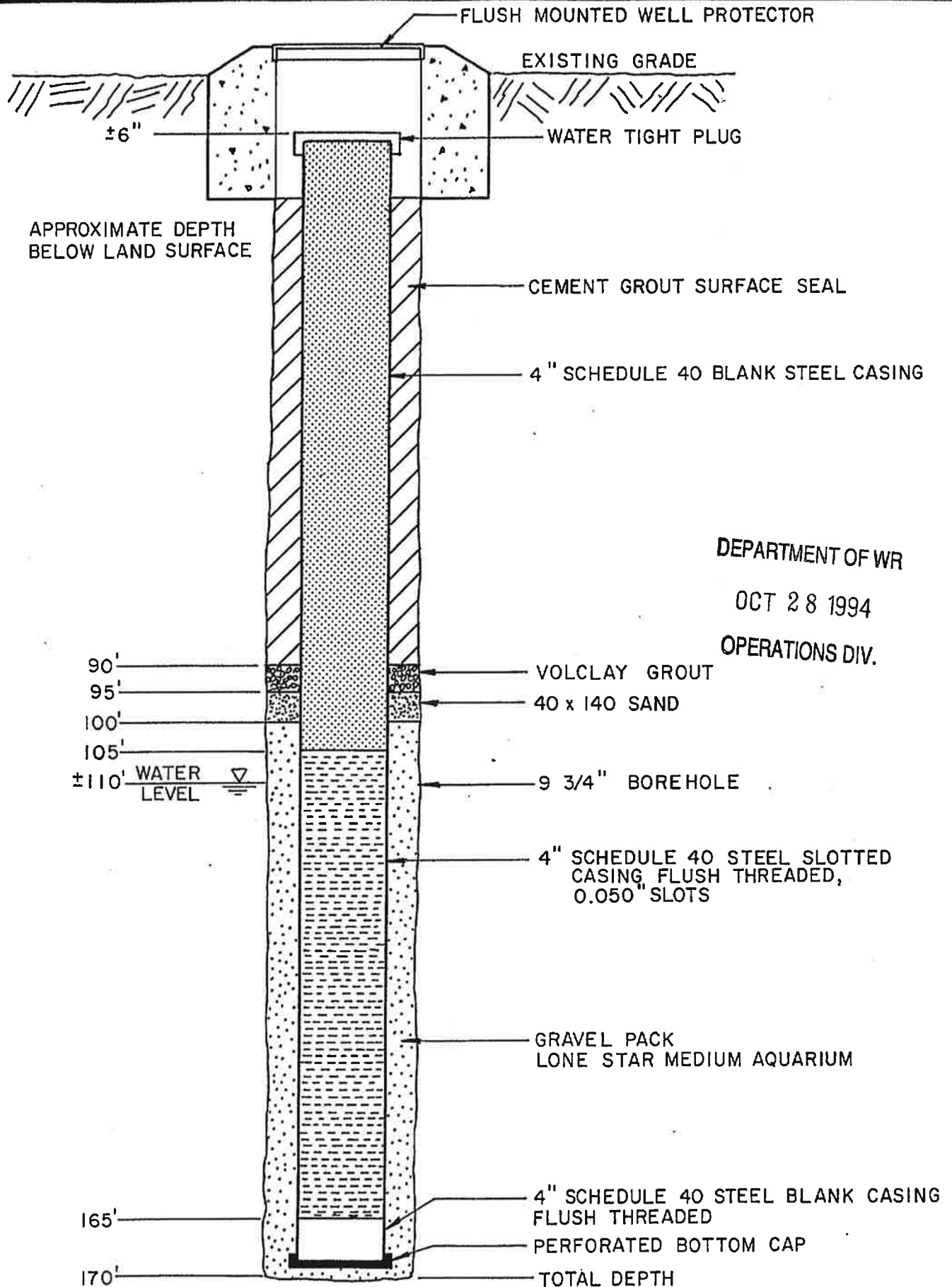
TABLE 6D-13
(continued)
LITHOLOGIC LOG FOR MONITOR WELL CDC-W19

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 1	CLAYEY SANDY SILT	Light brown, dry, sand is very fine to fine grained.
1 - 33	SANDY GRAVEL w/COBBLES	Greyish brown, moist, gravel is medium to coarse grained, gravel is fine to coarse sized, cobbles are up to 6-inches or more in size. At 22 feet: boulder.
33 - 61	GRAVELLY SAND	Light brown, sand is medium to very coarse grained, gravel is fine to medium size, contains some gravel and trace boulders. At 50 feet: cobble zone. At 57 feet: cobble zone, boulder.
61 - 98	SANDY GRAVEL	Light brown, gravel is predominately fine size, sand is predominately very coarse grained, contains fine to medium sand and silt as matrix. At 62 feet: coarse gravel and cobbles. At 68 feet: small cobbles. At 73 feet: cobbles At 86 feet: cobbles At 88 feet: cobbles Below 91 feet: increased medium to coarse size gravel
98 - 103	SAND	Light brown, sand is fine to very coarse grained, contains some fine to medium gravel and contains some silt as matrix.
103 - 126	GRAVELLY SAND	Light brown, sand is fine to very coarse grained, gravel predominately fine. At 113 feet: cobbles
126 - 157	SANDY GRAVEL	Light brown, gravel is fine to coarse size, predominately fine gravel overall, sand is predominately coarse.
157 - 175	GRAVELLY SAND	Light brown, sand is medium to very coarse, gravel is predominately fine.

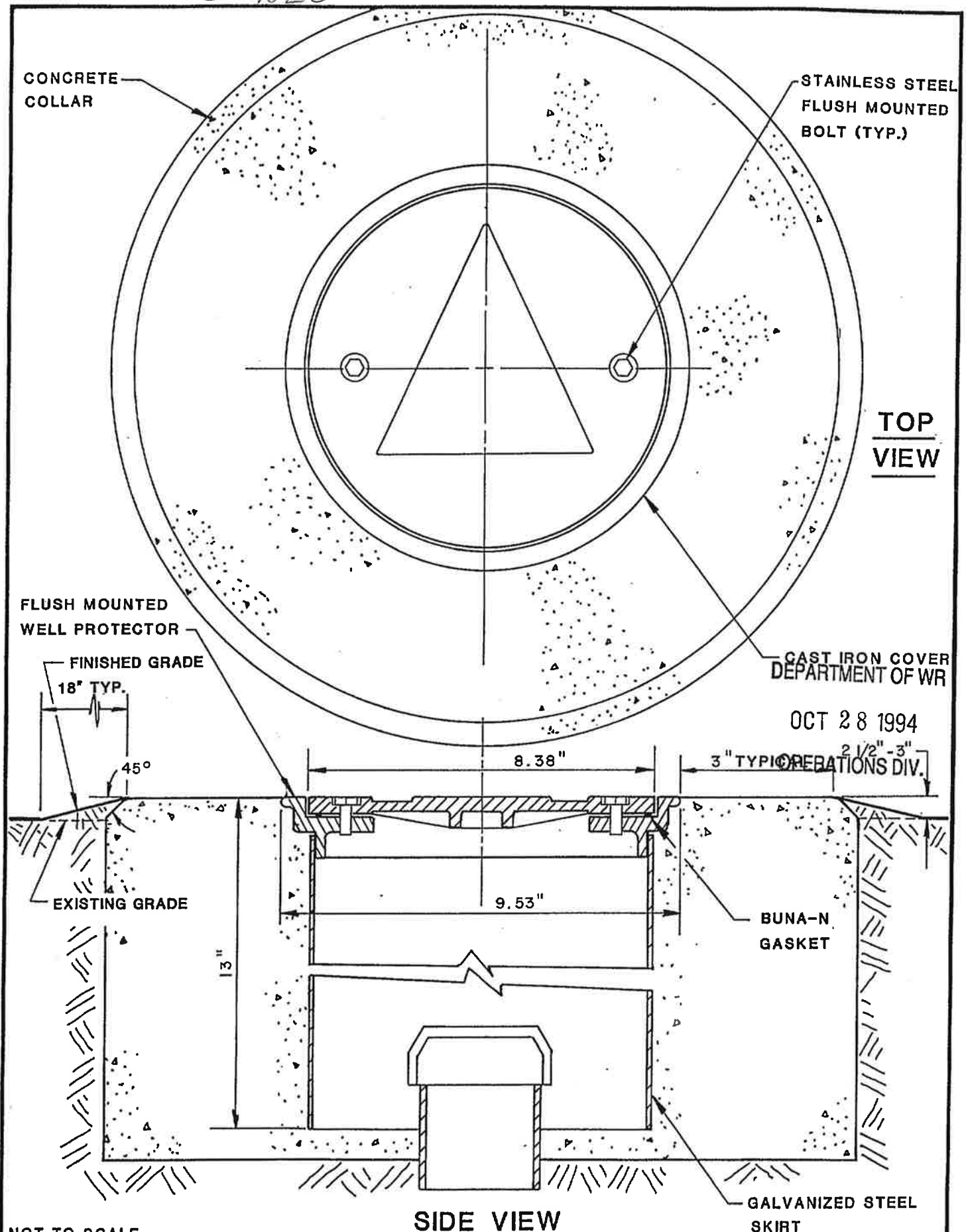
TABLE 6D-13
(continued)
LITHOLOGIC LOG FOR MONITOR WELL CDC-W19

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
175 - 178	SANDY GRAVEL	Light brown, gravel is predominately fine, sand is coarse.
<p style="text-align: center;">TOTAL DEPTH OF BOREHOLE: 178 FEET WELL COMPLETED: 02/25/94 STATIC WATER LEVEL: 93 FEET BELOW TOP OF WELL CASING (03/11/94)</p>		

CDC-W20



CDC-W20



SIDE VIEW

NOT TO SCALE

**MALCOLM
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**EL CAMINO DEL CERRO LANDFILL
FLUSH MOUNTED WELL COMPLETION**

MALCOLM PIRNIE, INC.

FIGURE 3

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TABLE A-14

LITHOLOGIC LOG OF MONITOR WELL CDC-W20

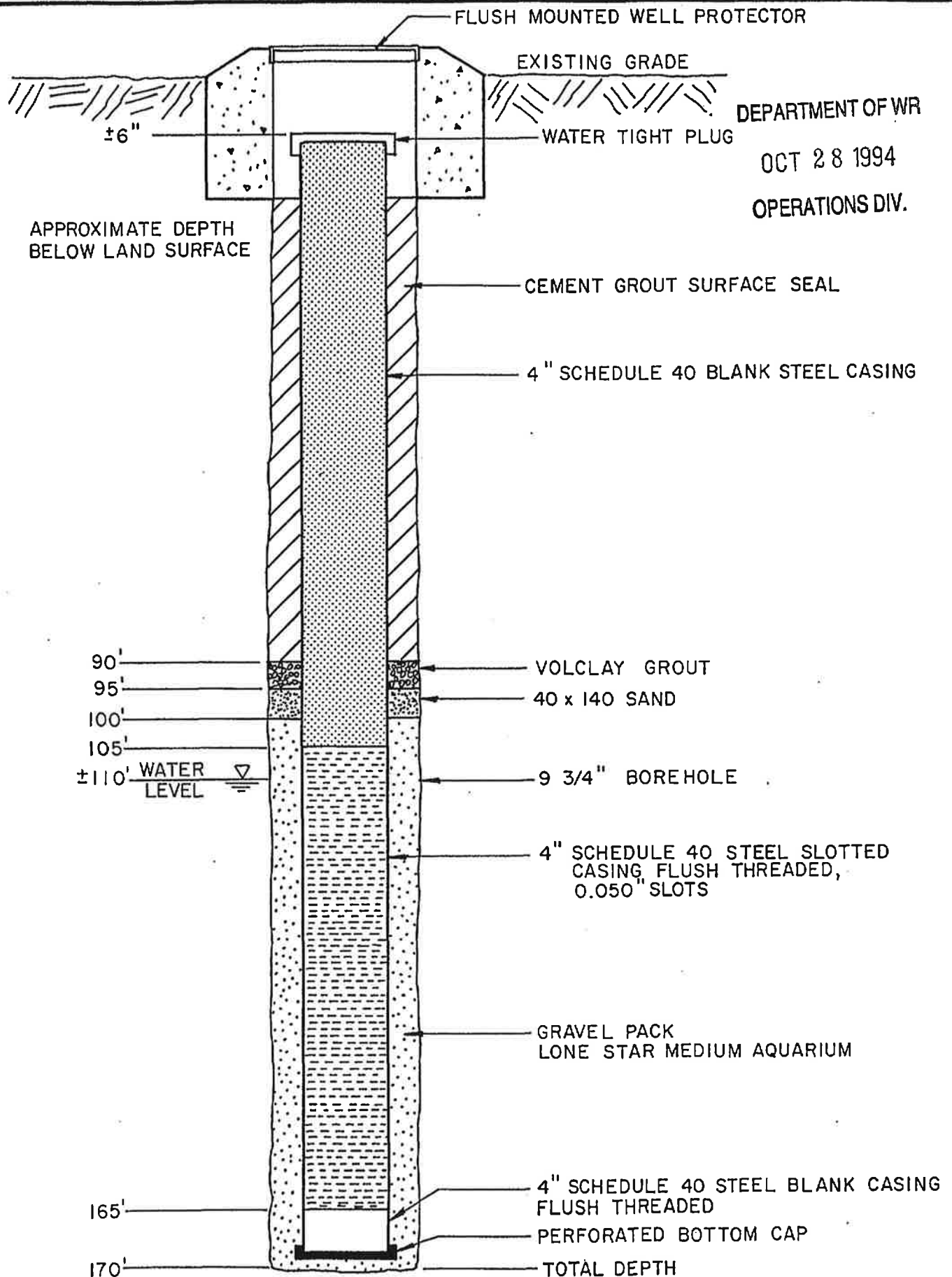
DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 12	SANDY SILT	Light brown, slightly moist, sand is very fine to medium grained, calcareous, some weak caliche cementation.
12 - 14	SAND	Light brown, dry, sand is medium to very coarse grained, contains some silt.
14 - 25	SILTY SANDY CLAY	Brown, dry, hard, sand is fine to medium grained, contains some weak caliche cementation and veinlets, sand content increases with depth, grades to clayey sand at 18 feet, contains some gravel size clasts.
25 - 27	SAND	Light brown, dry, loose, non-calcareous, sand is medium to very coarse grained.
27 - 38	GRAVELLY SAND	Light brown, sand is medium to very coarse grained, gravel is up to 1-inch in size, contains some coarse gravel and cobbles. At 35 feet: coarsens, contains large cobbles and boulders.
38 - 40	SILTY SAND	Brown, moist, sand is fine to very coarse grained, contains some fine gravel.
40 - 78	SAND/GRAVELLY SAND WITH SILT AND CLAY	Brown, moist, sand is very fine to very coarse, gravel is fine overall, contains variable silt and clay as matrix fill, contains some cobbles and boulders, interbedded and graded mixture. At 45 feet: cobbles. At 47 feet: very moist silty clay as matrix or thin interlayers. At 51 feet: cobble and boulders. Below 56 feet: moist to very moist clay and silt as matrix. At 70 feet: cobbles and boulders.
78 - 83	SILTY SAND	Light brown, moist, sand is fine to very coarse grained, contains some fine gravel.

Continued on back

TABLE A-14
(continued)
LITHOLOGIC LOG OF MONITOR WELL CDC-W20

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
83 - 128	GRAVELLY SILTY SAND WITH COBBLES	Brown to light brown, moist, graded mixture, sand is very fine to very coarse, gravel is predominately fine to medium size. Below about 113 feet: very moist to wet.
128 - 167	SANDY GRAVEL/ GRAVELLY SAND	Brown, wet, sand is medium to very coarse, gravel is predominately fine to medium, contains some coarse gravel and cobbles, contains some silt and clay. Below 152 feet: contains increased fines as matrix.
<p style="text-align: center;">TOTAL DEPTH OF BOREHOLE: 167 FEET WELL COMPLETED: 11/15/94 STATIC WATER LEVEL: 109.2 FEET BELOW LAND SURFACE (11/15/94)</p>		

CDC-W21



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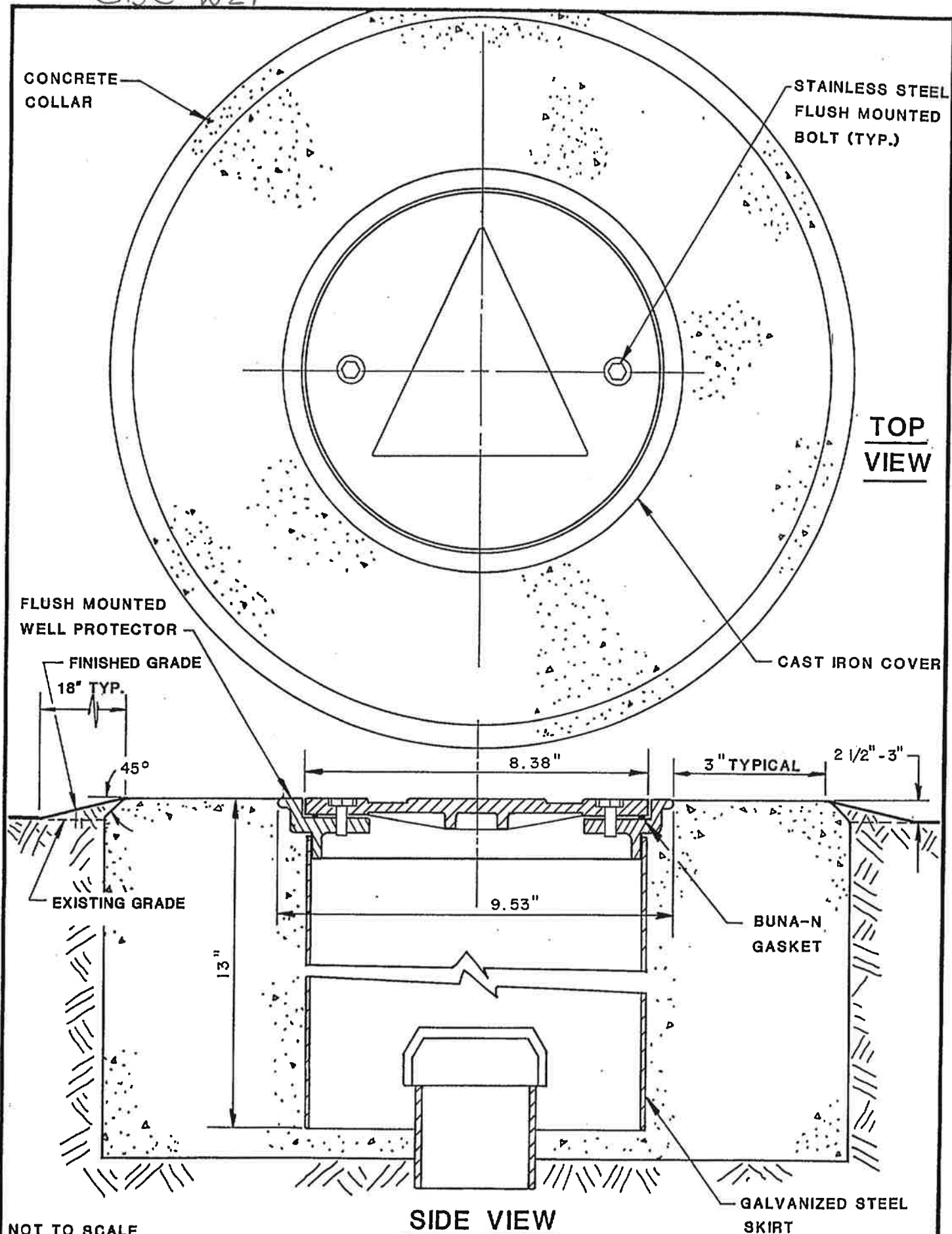
LESP 3
EL CAMINO DEL CERRO LANDFILL
SCHEMATIC CONSTRUCTION DIAGRAM
FOR SHALLOW MONITOR WELLS

MALCOLM PIRNIE, INC.

FIGURE 2

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CDC-W21



NOT TO SCALE

SIDE VIEW

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FLUSH MOUNTED WELL COMPLETION**

MALCOLM PIRNIE, INC.

FIGURE 3

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TABLE A-15

LITHOLOGIC LOG OF MONITOR WELL CDC-W21

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 12	SILTY SAND	Dark brown, sand is fine to very coarse grained, calcareous. From 0 to 5 feet: very moist. Below 5 feet: light brown, dry.
12 - 17	CLAYEY SILT	Dark brown, moist, soft, low plasticity.
17 - 23	SILTY SAND	Brown, moist, sand is very fine to fine grained.
23 - 44	SAND/GRAVELLY SAND	Light brown, moist, sand is medium to very coarse grained, gravel is fine to coarse, contains some cobbles, interbedded/graded mixture. At 33 feet: increased gravel content, cobbles. At 41 feet: cobbles and boulders.
44 - 50	SILTY GRAVELLY SAND	Brown, moist, sand is medium to very coarse grained, variable silt, clay and fine sand content as matrix.
50 - 137	SILTY GRAVELLY SAND TO SANDY GRAVEL AND COBBLES	Brown, moist, variable interbedded/graded mixture, sand is fine to very coarse grained, gravel is fine to coarse, variable matrix fines. From 55 feet to 70 feet: very moist. At 70 feet: moist to slightly moist. At 75 feet: increased gravel and cobbles. At 96 feet: cobbles. At about 110 feet: very moist. Below about 115 feet: wet.
137 - 143	GRAVEL	Light brown, fine to medium size overall, contains some cobbles, sand and matrix fines.

TABLE A-15
(continued)
LITHOLOGIC LOG OF MONITOR WELL CDC-W21

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
143 - 167	GRAVELLY SAND/ SANDY GRAVEL	<p>Brown, sand is medium to very coarse grained, gravel is fine to medium size, contains some cobbles and fines.</p> <p>From 150 to 154 feet: finer grained, contains increased fines as matrix.</p> <p>Below 165 feet: graded coarse sand to cobbles.</p>
<p style="text-align: center;">TOTAL DEPTH OF BOREHOLE: 167 FEET WELL COMPLETED: 11/17/94 STATIC WATER LEVEL: 106.5 FEET BELOW LAND SURFACE (11/17/94)</p>		

TABLE A-16

LITHOLOGIC LOG OF MONITOR WELL CDC-W22

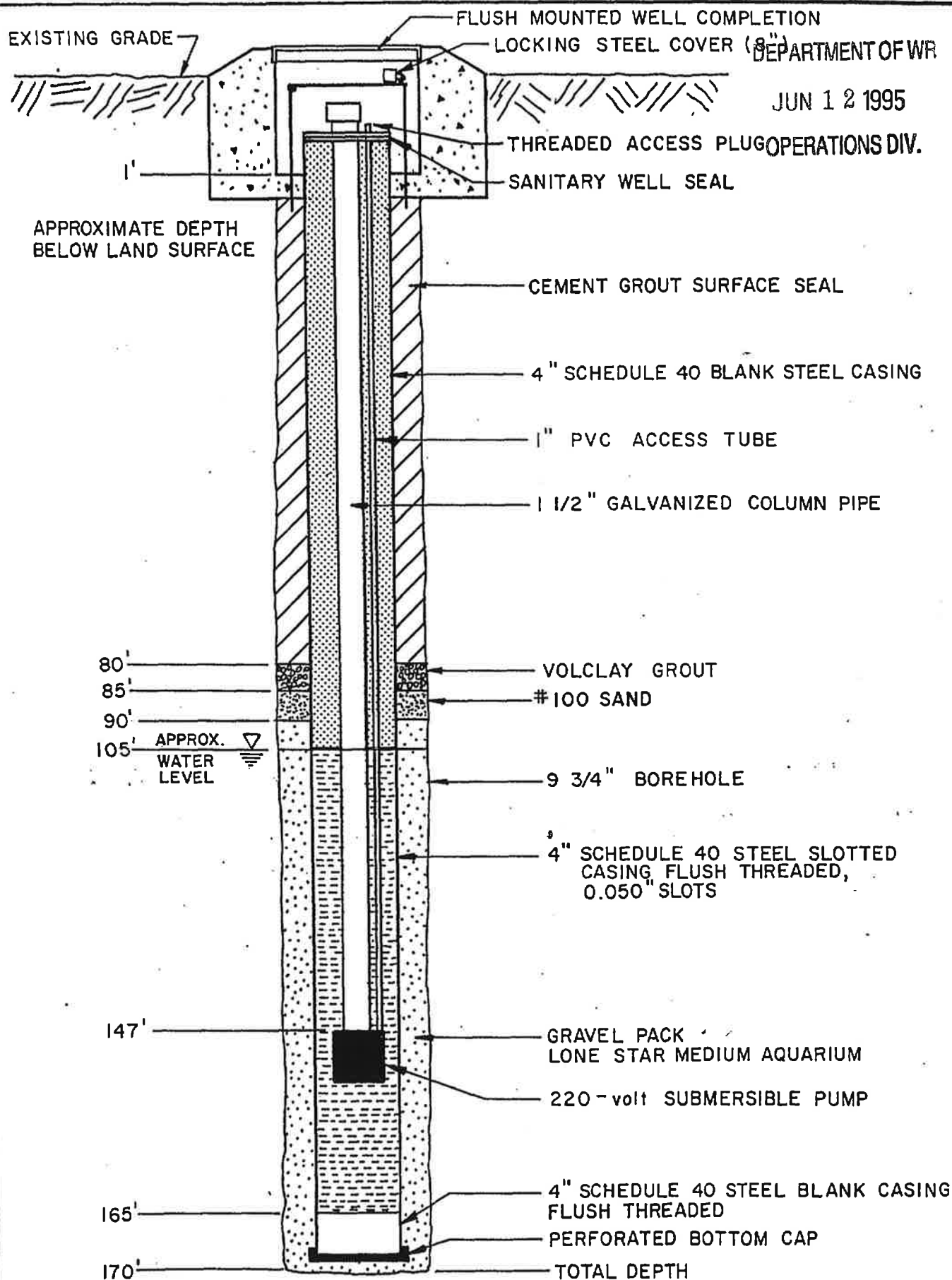
DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 11	SILTY SAND	Light brown, slightly moist, sand is very fine to fine grained, some medium and coarse grained sand, calcareous.
11 - 15	SAND	Light brown, very slightly moist, sand is very fine to medium grained, calcareous.
15 - 16	CLAYEY SILT	Brown, moist, compact, calcareous.
16 - 20	SILT	Light brown, dry, contains some very fine to fine grained sand, contains some brown clayey silt, calcareous. At 18 feet: some weak caliche cementation.
20 - 24	SILTY SAND	Light brown, slightly moist, sand is very fine to fine grained, calcareous.
24 - 36	SILTY SAND	Light brown, slightly moist, sand is fine to medium grained contains some coarse to very coarse grained sand and fine gravel. At 32 feet: increased silt and decrease in sand grain size to very fine and fine.
36 - 37	GRAVELLY SILTY SAND	Light brown, slightly moist, gravel is fine, sand is fine to coarse grained.
37 - 43	SANDY GRAVEL WITH COBBLES	Light brown, dry, sand is medium to very coarse grained, gravel is fine to very coarse, loose. At 40 feet: Boulder.
43 - 70	GRAVELLY SAND/SANDY GRAVEL AND COBBLES	Light brown, moist, sand is medium to very coarse, gravel is fine to coarse, contains some silt. Below 58 feet: some moist to very moist clayey silt as matrix fill or interbeds.

Continued on back

TABLE A-16
(continued)
LITHOLOGIC LOG OF MONITOR WELL CDC-W22

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
70 - 138	SILTY SANDY GRAVEL TO GRAVELLY SANDY SILT	<p>Brown, moist, variable graded and interbedded mixture, medium to very coarse sand and fine to medium gravel overall, with silt and clayey silt as matrix fill, contains some cobbles and boulders.</p> <p>At 83 feet: cobbles and boulders.</p> <p>At 106 feet: cobbles.</p> <p>Below about 115 feet: very moist to wet.</p> <p>At 125 feet: cobbles.</p> <p>At 134 feet: cobbles.</p>
138 - 167	SILTY GRAVELLY SAND TO SANDY CLAYEY SILT	<p>Brown, wet, sand is fine to very coarse grained, gravel is fine overall, contains silt and clayey silt as matrix, graded and interbedded mixture, contains some small cobbles.</p> <p>From 161 to 165 feet: decreased matrix fines, predominately coarse to very coarse sand and fine gravel, contains some coarse gravel and cobbles.</p>
<p style="text-align: center;">TOTAL DEPTH OF BOREHOLE: 167 FEET WELL COMPLETED: 11/16/94 STATIC WATER LEVEL: 111.4 FEET BELOW LAND SURFACE (11/16/94)</p>		

CDC-W23



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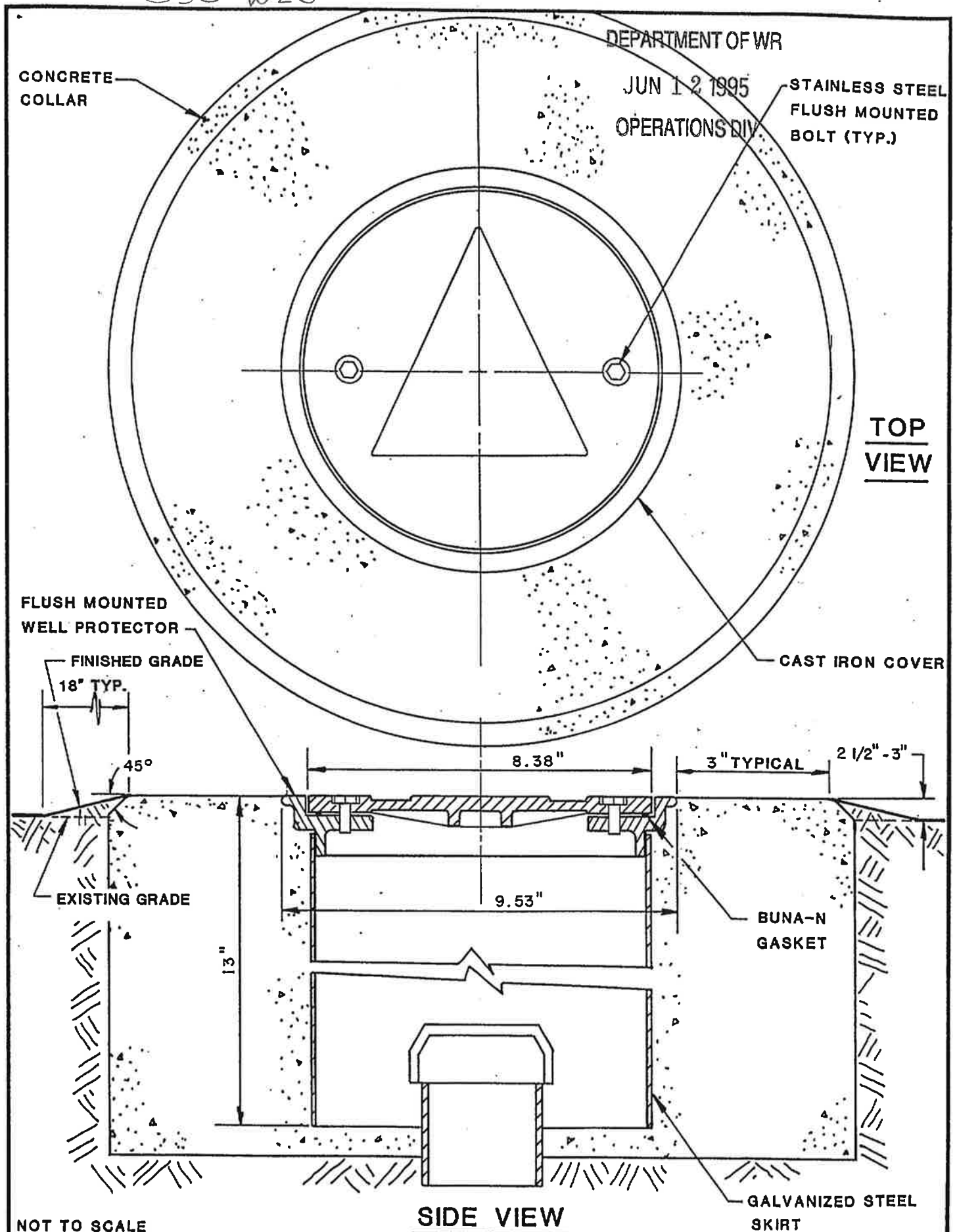
LESP 3
EL CAMINO DEL CERRO LANDFILL
SCHEMATIC CONSTRUCTION DIAGRAM FOR
SHALLOW MONITOR WELL

MALCOLM PIRNIE, INC.

FIGURE 2

159381

CDC-W23



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**EL CAMINO DEL CERRO LANDFILL
FLUSH MOUNTED WELL COMPLETION**

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FIGURE 3

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TABLE A-17

**Landfill Environmental Studies Program - Phase 3
El Camino del Cerro Study Area
Remedial Investigation Report**

Lithologic Log of Monitor Well CDC-W23

Depth Interval (feet)	Description of Material	
0-19	Silty Sand	<p>Light brown, dry , compact to loose, sand is very fine to fine grained.</p> <p>Below 11 feet: slightly moist, sand is coarser, very fine to medium grained, contains some clayey silt.</p>
19-23	Clayey Silt	Medium brown, slightly moist, compact to dense.
23-27	Sand	Light brown, slightly moist, loose, sand is fine to very coarse grained.
27-39	Gravelly Sand	Light brown, slightly moist, sand is fine to very coarse grained, contains some cobbles up to 4-inches in size, contains some silt, graded mixture.
39-50	Gravelly Sand to Sandy Gravel with Cobbles	<p>Light brown, dry to slightly moist, sand is medium to very coarse grained, gravel is graded, cobbles are up to 6-inches or more in size.</p> <p>At about 45 feet: contains some clay and silt as matrix, moist, sand is coarse grained and gravel is fine</p>
50-60	Gravelly Sand to Sand	<p>Light brown, moist, sand is fine to coarse grained, gravel is fine to medium, contains some cobbles to 6-inches or more in size.</p> <p>At 60 feet: increase in matrix fines, moist to very moist.</p>
60-80	Silty Gravelly Sand and Cobbles	<p>Light brown, moist, sand is predominantly coarse to very coarse grained, gravel is fine to medium size, cobbles to more than 5-inches, contains variable sand, silt and clay as matrix.</p> <p>At 69 feet: boulder</p> <p>At 76 feet: boulder</p> <p>At 79 feet: increase in matrix fines.</p>
80-93	Gravelly Sand	Light brown, moist, sand is medium to very coarse grained, gravel is fine overall, contains some very fine to fine sand, silt and trace clay as matrix.

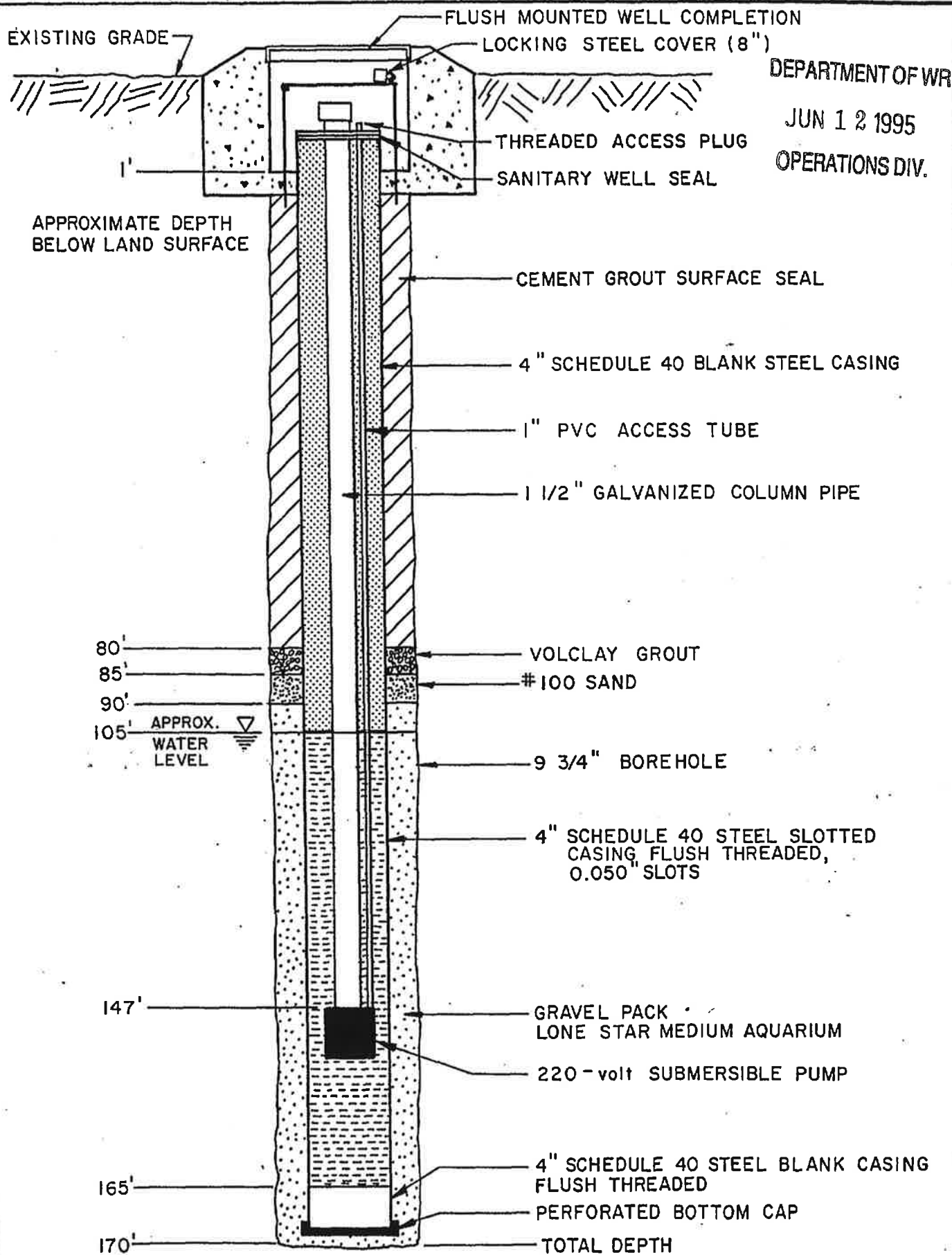
TABLE A-17 (Continued)

**Landfill Environmental Studies Program - Phase 3
El Camino del Cerro Study Area
Remedial Investigation Report**

Lithologic Log of Monitor Well CDC-W23

Depth Interval (feet)	Description of Material	
93-120	Silty Gravelly Sand	Light brown, moist, interbedded and graded mixture, sand is fine to very coarse grained, gravel is predominantly fine, contains silt and trace clay in At 105 feet: contains increased light brown sandy silt as matrix or interbeds. Below about 110 feet: wet.
120-125	Gravelly Sand	Light brown, sand is medium to very coarse grained, gravel is fine, contains some very fine to fine grained
125-130	Silty Sand with Gravelly Sand	Light brown to grey, compact, sand is very fine to fine grained, interbedded or grading to medium to very coarse sand and fine gravel with minor cobble size
130-139	Gravelly Sand to Sand	Light brown to grey, sand is coarse to very coarse grained, gravel is fine to medium size, contains some gravel size clasts up to 2-inches, contains some silt and very fine sand as matrix.
139-140	Gravel	Light brown, fine to medium size overall, contains some cobbles up to 5-inches in size.
140-172	Gravel to Silty Gravelly Sand	Light brown, compact to dense, gravel is predominantly fine, sand is fine to coarse grained, interbedded/graded mixture.
Total Depth of Borehole: 172 feet		
Well Completed: 07/18/95		
Static Water Level: 109.7 Feet Below Top of Casing (07/20/95)		

CDC-W24



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LESP 3
EL CAMINO DEL CERRO LANDFILL
SCHEMATIC CONSTRUCTION DIAGRAM FOR
SHALLOW MONITOR WELL

MALCOLM PIRNIE, INC.

FIGURE 2

CDC-W24

DEPARTMENT OF WR

JUN 12 1995

OPERATIONS DIV

STAINLESS STEEL
FLUSH MOUNTED
BOLT (TYP.)

CONCRETE
COLLAR

TOP
VIEW

FLUSH MOUNTED
WELL PROTECTOR

FINISHED GRADE

18° TYP.

45°

EXISTING GRADE

CAST IRON COVER

8.38"

3" TYPICAL

2 1/2" - 3"

9.53"

BUNA-N
GASKET

13"

GALVANIZED STEEL
SKIRT

SIDE VIEW

NOT TO SCALE

LESP 3

EL CAMINO DEL CERRO LANDFILL

FLUSH MOUNTED WELL COMPLETION

MALCOLM PIRNIE, INC.

FIGURE 3

**MALCOLM
PIRNIE**

59381

TABLE A-18

**Landfill Environmental Studies Program - Phase 3
El Camino del Cerro Study Area
Remedial Investigation Report**

Lithologic Log of Monitor Well CDC-W24

Depth Interval (feet)	Description of Material	
0-20	Silty Sand/Sandy Silt	<p>Light brown to grayish brown, dry sand is very fine to fine grained, loose to compact.</p> <p>At 12 feet: very compact to dense.</p> <p>At 15 feet: contains thin clayey silt interbeds, medium brown, dense, moist</p>
20-29	Silty Sand	<p>Light brown, moist, sand is predominately fine to medium grained, contains minor clay.</p> <p>From 23 to 25 feet: coarsens, contains coarse and fine gravel.</p>
29-32	Silt	Medium brown, moist, soft, contains some clay.
32-34	Clayey Silt	Brown, moist, soft, medium plasticity.
34-38	Sand	Light brown to orangeish brown, medium to very coarse grained, contains some gravel and cobbles.
38-45	Gravel and Cobbles	Light brown to light grayish brown, dry clasts range up to greater than 6-inches in size, contains some probable boulder size clasts.
45-50	Sandy Gravel	Light brown, moist to very moist, gravel is fine, sand is very coarse, contains some cobbles up to 4-inches in
50-63	Gravelly Sand to Sandy Gravel	<p>Light brown, dry to slightly moist, sand is medium to very coarse grained, gravel is graded, cobbles are up to 6-inches or more in size.</p> <p>At 55 feet: increased silt and very fine to fine sand as matrix or thin interbeds.</p> <p>At 56 feet: increased cobbles.</p> <p>At 58 feet: some clayey silt, medium brown, moist to very moist.</p>

TABLE A-18 (Continued)

**Landfill Environmental Studies Program - Phase 3
El Camino del Cerro Study Area
Remedial Investigation Report**

Lithologic Log of Monitor Well CDC-W24

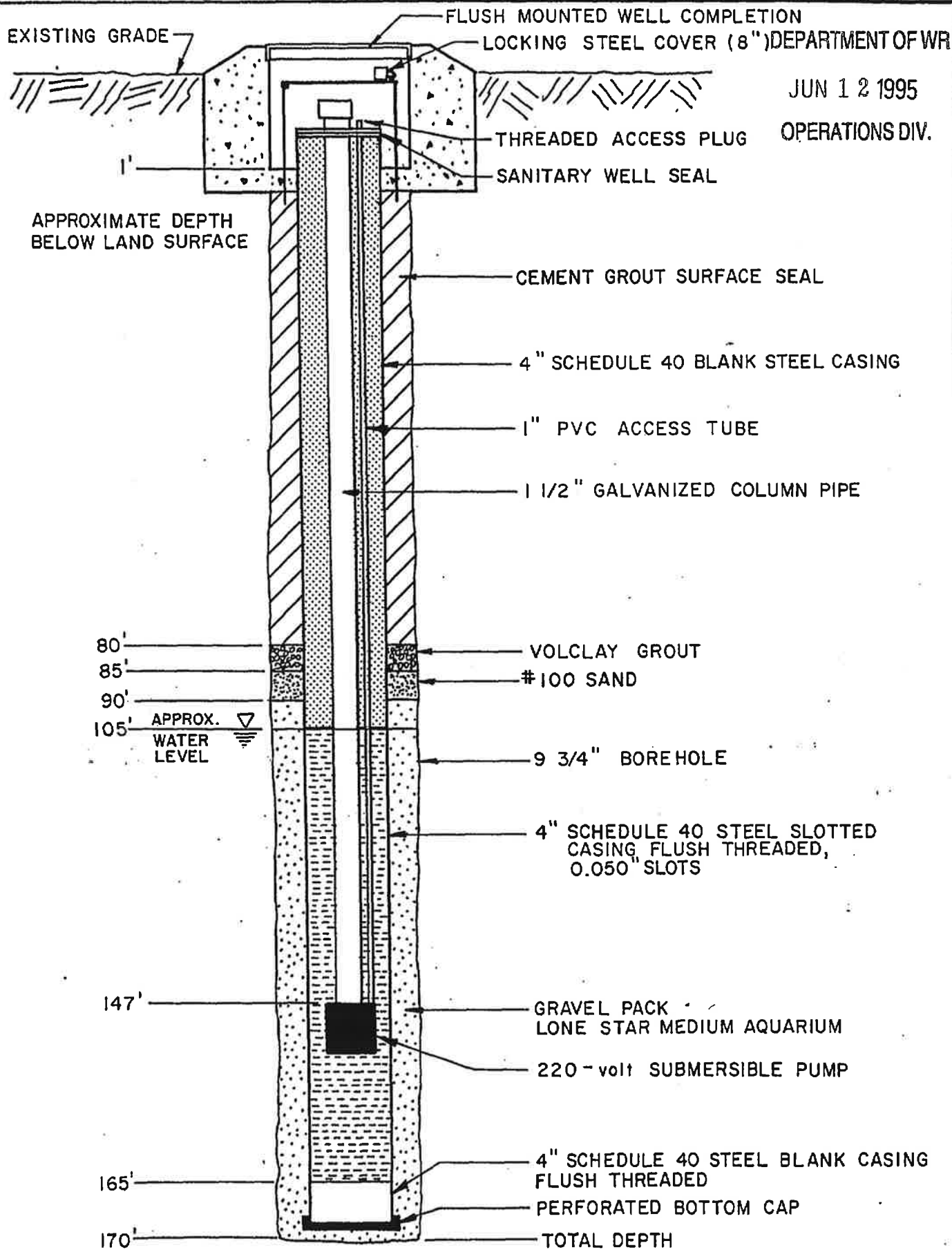
Depth Interval (feet)	Description of Material	
63-67	Silty Gravelly Sand with Cobbles	Brown, moist, sand is medium to coarse grained, gravel is fine to medium, contains some very fine to fine sand and coarse gravel, cobbles are up to 6-inches in size or
67-103	Gravelly Sand	Brown, moist, sand is predominantly very coarse, gravel is fine overall, contains some cobbles estimated up to 8-inches in size, contains variable very fine sand and silt as matrix.
103-110	Silty Sandy Gravel to Silty Gravelly Sand	Brown, moist, sand is medium to coarse grained, some cobbles up to 4-inches in size, fine to very fine sand, silt and clay as matrix or interbeds, variable and graded mixture.
110-129	Sandy Gravel/Gravelly Sand	Light brown, sand is very coarse, gravel is fine, some fines as matrix, some cobbles up to 4-inches in size. From 118 to 120 feet: increased fine sands and silt as matrix or interbeds.
129-172	Sandy Gravel to Silty Sand	Brown, wet, sand is very fine to very coarse, gravel is coarse, variable interbedded and graded mixture. At 136 feet: predominately very coarse sand and fine gravel. At 165 feet: cobbles, hard. At 169 feet: fine to coarse gravel.

Total Depth of Borehole: 172 feet

Well Completed: 07/17/95

Static Water Level: 104.6 Feet Below Top of Casing (07/19/95)

CDC-W25



JUN 12 1995
OPERATIONS DIV.

**MALCOLM
PIRNIE**

LESP 3
EL CAMINO DEL CERRO LANDFILL
SCHEMATIC CONSTRUCTION DIAGRAM FOR
SHALLOW MONITOR WELL

MALCOLM PIRNIE, INC.

FIGURE 2

159381

CDC-W25

DEPARTMENT OF WR

JUN 12 1995

OPERATIONS DIV.

CONCRETE
COLLAR

STAINLESS STEEL
FLUSH MOUNTED
BOLT (TYP.)

TOP
VIEW

FLUSH MOUNTED
WELL PROTECTOR

FINISHED GRADE

18" TYP.

45°

EXISTING GRADE

CAST IRON COVER

8.38"

3" TYPICAL

2 1/2" - 3"

9.53"

BUNA-N
GASKET

GALVANIZED STEEL
SKIRT

SIDE VIEW

NOT TO SCALE

LESP 3

MALCOLM PIRNIE, INC.

**MALCOLM
PIRNIE**

EL CAMINO DEL CERRO LANDFILL
FLUSH MOUNTED WELL COMPLETION

FIGURE 3

59381

TABLE A-19

**Landfill Environmental Studies Program - Phase 3
El Camino del Cerro Study Area
Remedial Investigation Report**

Lithologic Log of Monitor Well CDC-W25

Depth Interval (feet)	Description of Material	
0-0.25	Asphalt	
0.25-17	Sandy Silt	Brown, moist, compact to loose, sand is very fine to fine grained, contains some weak cementation, contains some clay. At 7 feet: color change to light brown, dry.
17-29	Silty Sand	Light brown, dry to slightly moist, loose, sand is very fine to fine grained, some weak cement as small nodules and veinlets, grades to sandy silt in part.
29-40	Sand to Gravelly Sand	Light brown, dry to slightly moist, sand is medium to very coarse grained, gravel is medium to coarse, contains some cobbles. Below 38 feet: contains some fines as matrix.
40-55	Sandy Gravel with Cobbles	Brown, slightly moist, gravel is coarse, contains cobbles estimated to 8-inches or more in size.
55-60	Gravelly Sand with Cobbles	Light brown, moist to slightly moist, sand is coarse to very coarse grained, gravel is fine.
60-70	Silty Gravelly Sand	Light brown, moist, sand is coarse grained, gravel is fine, very fine sand and silt as matrix, variable-graded
70-76	Gravelly Sand	Light brown, moist, sand is coarse grained, gravel is fine, contains some cobbles and matrix fines.
76-80	Silty Gravelly	Light brown, moist, graded-interbedded mixture.
80-87	Sandy Gravel	Light brown, moist, sand is very coarse, gravel is fine, some matrix fines and clasts up to cobble size. At 85 feet: very moist to wet.
87-91	Silty Sand to Sandy Silt	Brown, moist to very moist, sand is very fine to coarse grained, contains some gravel and some clay, graded to thinly interbedded.
91-98	Sand	Light brown, moist, loose, sand is fine to medium grained overall, contains some silt and very fine and coarse grained sand.

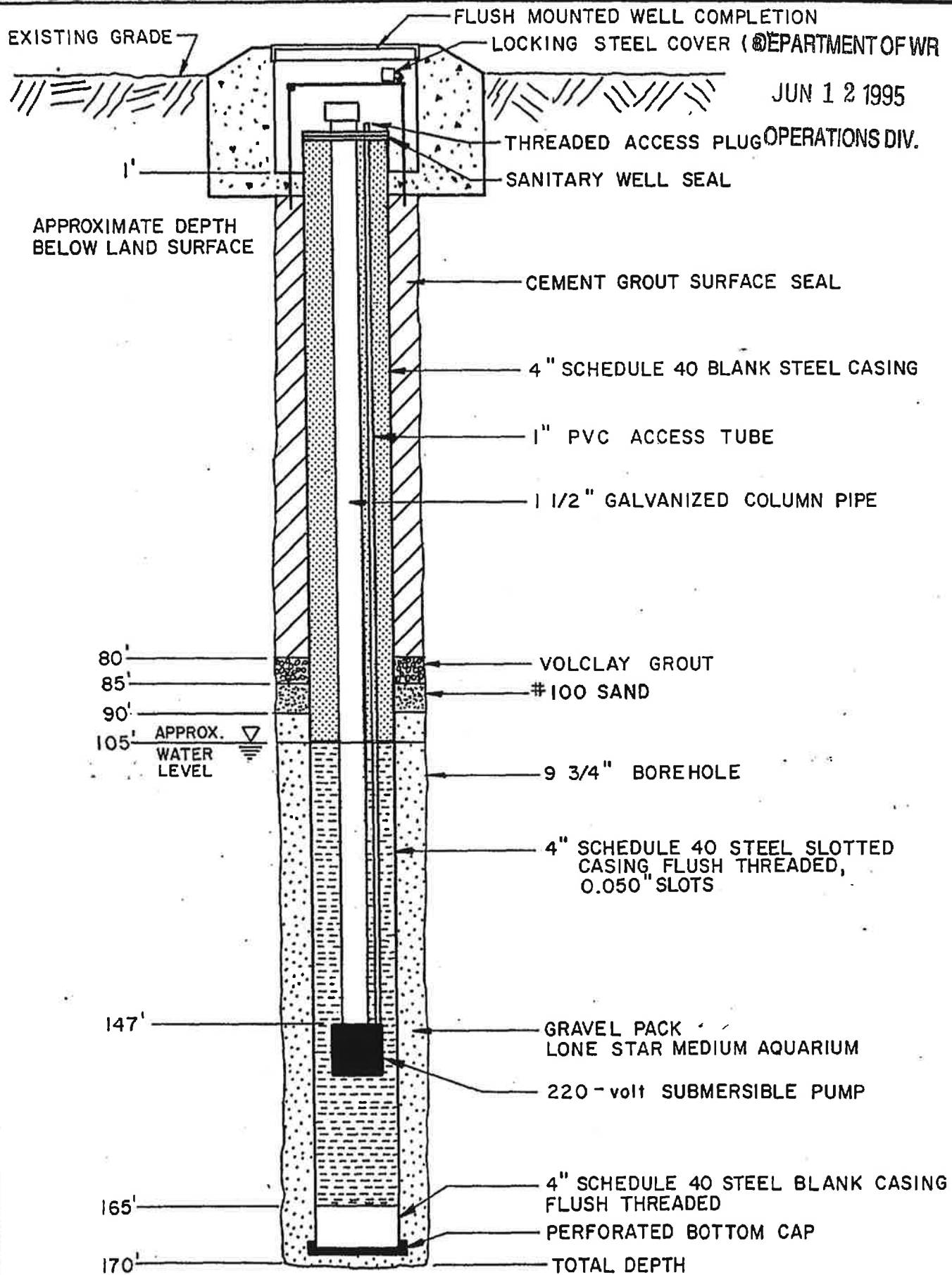
TABLE A-19 (Continued)

**Landfill Environmental Studies Program - Phase 3
El Camino del Cerro Study Area
Remedial Investigation Report**

Lithologic Log of Monitor Well CDC-W25

Depth Interval (feet)	Description of Material	
98-102	Gravelly Sand	Brown, moist to very moist, gravel is up to 2-inches in size, sand is coarse to very coarse grained.
102-110	Silty Gravelly Sand	Brown, moist, sand is very fine to very coarse grained, gravel is graded, contains silt and fine sands as matrix or interbeds, contains some cobbles.
110-115	Gravelly Sand	Brown, very moist to moist, sand is medium to very coarse grained, gravel is fine, contains some coarse gravel, small cobbles and silt.
115-130	Silty Gravelly Sand	Brown, very moist to moist, sand is very fine to very coarse, gravel is fine to medium, variable silt content as matrix or thin interbeds, variable mixture.
130-135	Sandy Gravel with Silt	Brown, wet, sand is very coarse grained, gravel is fine, silt as variable content in matrix or interbeds.
135-140	Silty Sand	Brown, sand is fine to coarse, contains some gravel and cobbles.
140-145	Silty Sandy	Brown, gravel is graded.
145-160	Silty Gravelly Sand to Gravelly Sandy Silt	Brown, variable graded or interbedded mixture, sand is very fine to very coarse, gravel is fine to coarse.
160-170	Silty Sand to Sandy Silt	Brown, compact to dense, sand is very fine to very coarse grained, contains some gravel to 1/2-inch is size.
Total Depth of Borehole: 170 feet		
Well Completed: 07/20/95		
Static Water Level: 111.6 Feet Below Top of Casing (07/21/95)		

CDC-W26



**MALCOLM
PIRNIE**

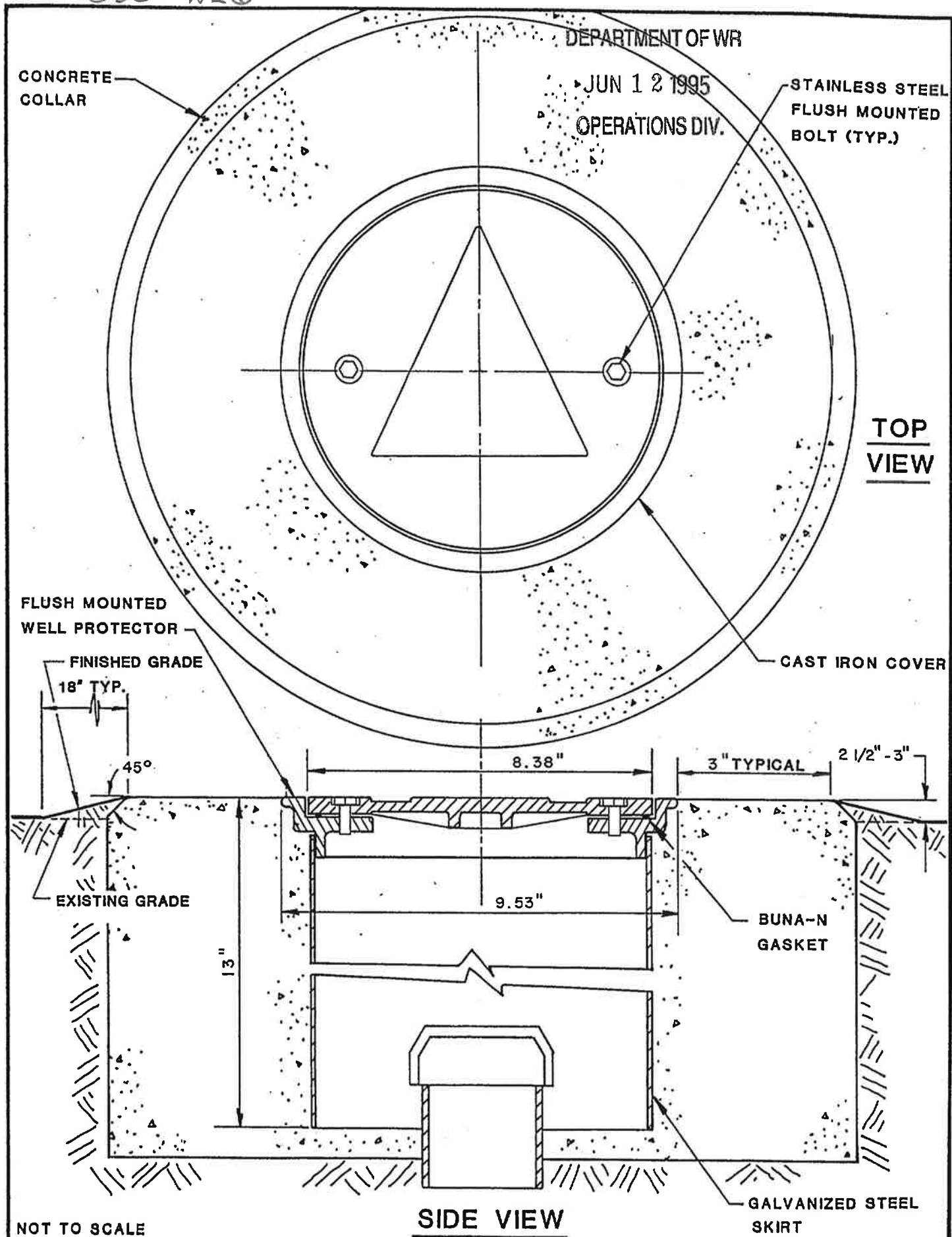
LESP 3
EL CAMINO DEL CERRO LANDFILL
SCHEMATIC CONSTRUCTION DIAGRAM FOR
SHALLOW MONITOR WELL

MALCOLM PIRNIE, INC.

FIGURE 2

159381

CDC - W26



LESP 3

EL CAMINO DEL CERRO LANDFILL
FLUSH MOUNTED WELL COMPLETION

MALCOLM PIRNIE, INC.

FIGURE 3

MALCOLM
PIRNIE

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TABLE A-20

**Landfill Environmental Studies Program - Phase 3
El Camino del Cerro Study Area
Remedial Investigation Report**

Lithologic Log of Monitor Well CDC-W26

Depth Interval (feet)	Description of Material	
1-8	Sandy Silt	Brown to light brown, dry, compact, sand is very fine to very coarse grained, contains some gravel.
8-19	Silt	Brown, dry to moist, compact to dense, clayey in part, contains some very fine to fine sand. At 15 feet: some weak cementation.
19-37	Sand	Light brown, very slightly moist, sand is very fine grained, grades to sandy silt in part. At 30 feet: thin clayey silt interbed, moist. At 32 feet: some weak cementation.
37-43	Gravelly Sand	Light brown, slightly moist, sand is medium to very coarse grained, gravel is fine overall, contains some cobbles to 4-inches in size.
43-53	Sandy Gravel and Cobbles	Brown, slightly moist, gravel is graded, sand is coarse to very coarse grained, cobbles are up to 8-inches or more in size.
53-55	Sand	Light brown, very moist, very coarse grained.
55-57	Silty Sand to Clayey Silt	Light brown, moist to very moist, interbedded or graded.
57-69	Sandy Gravel with Cobbles	Light brown, moist, sand is medium to very coarse grained, graded.
69-71	Gravelly Sand with Cobbles	Light brown, dry to slightly moist, sand is medium to very coarse grained, gravel is graded.
71-81	Silty Gravelly Sand	Brown to reddish brown, moist, sand is fine to very coarse grained, contains very fine sand, silt and some clay as matrix or interbeds.
81-85	Silty Sandy	Light brown, very moist, gravel is fine, sand is very
85-90	Silt to Clayey Silt	Light brown to light reddish brown, very moist, contains very coarse sand and fine gravel.
90-99	Sandy Gravel with Cobbles to Silty Gravelly Sand	Light brown, moist, predominantly very coarse grained sand and fine gravel, interbedded and graded mixture with variable fines.

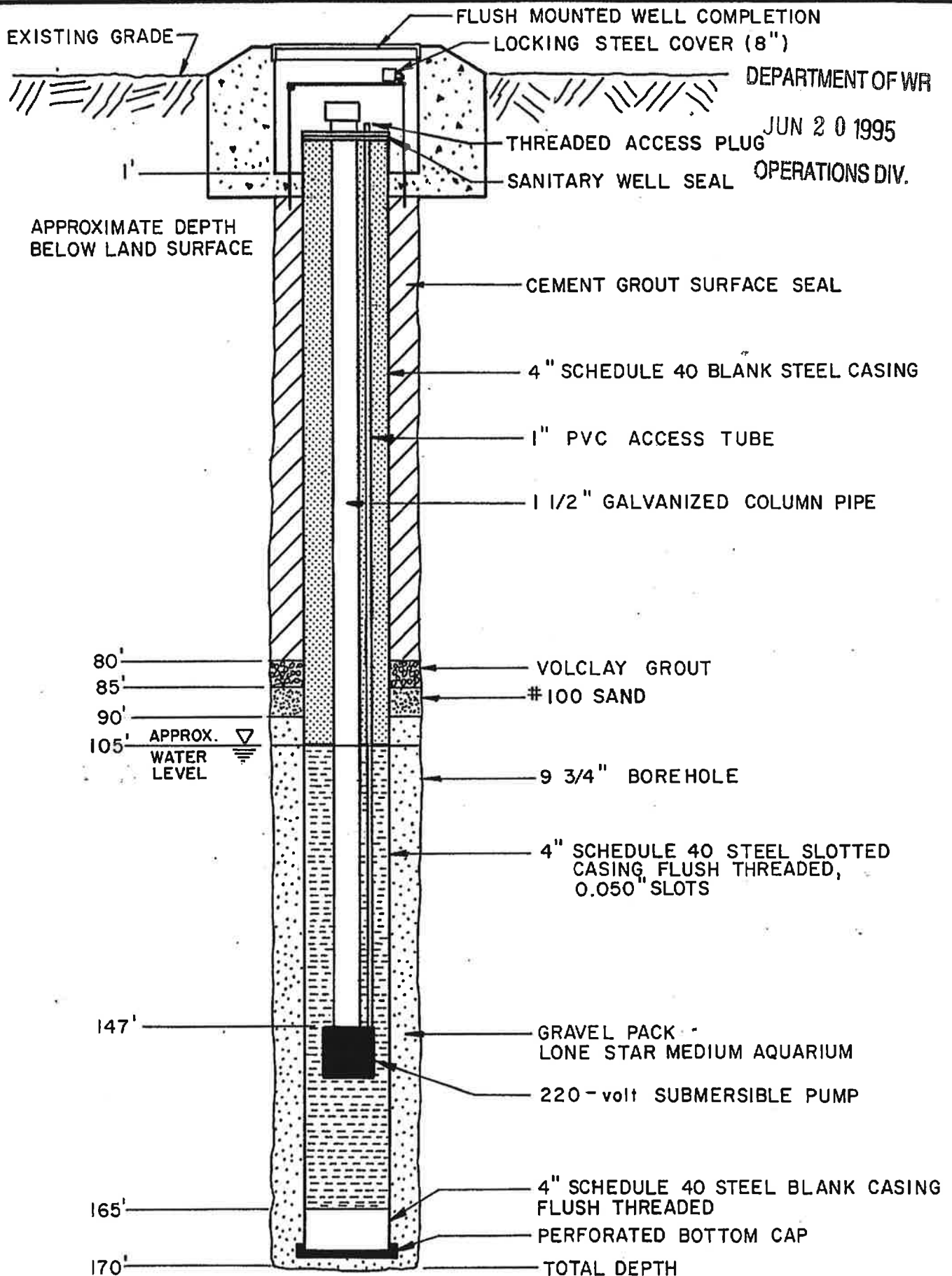
TABLE A-20 (Continued)

**Landfill Environmental Studies Program - Phase 3
El Camino del Cerro Study Area
Remedial Investigation Report**

Lithologic Log of Monitor Well CDC-W26

Depth Interval (feet)	Description of Material	
99-130	Silty Gravelly Sand to Gravelly Silty Sand	Brown, moist, compact, sand is medium to coarse grained, gravel is predominantly fine, some coarse gravel and cobbles. Below about 115 feet: wet.
130-150	Gravel to Sandy Silty Gravel	Brown, compact to dense, gravel is predominately fine, contains variable content of silt and very fine sand as matrix, interbedded mixture.
150-170	Sandy Silty Gravel and Silt	Brown, compact to dense, graded and interbedded mixture, contains minor cobbles, matrix of silt and very fine to fine grained sand.
Total Depth of Borehole: 170 feet		
Well Completed: 07/21/95		
Static Water Level: 112.8 Feet Below Top of Casing (07/22/95)		

CDC-W27



LESP 3

EL CAMINO DEL CERRO LANDFILL

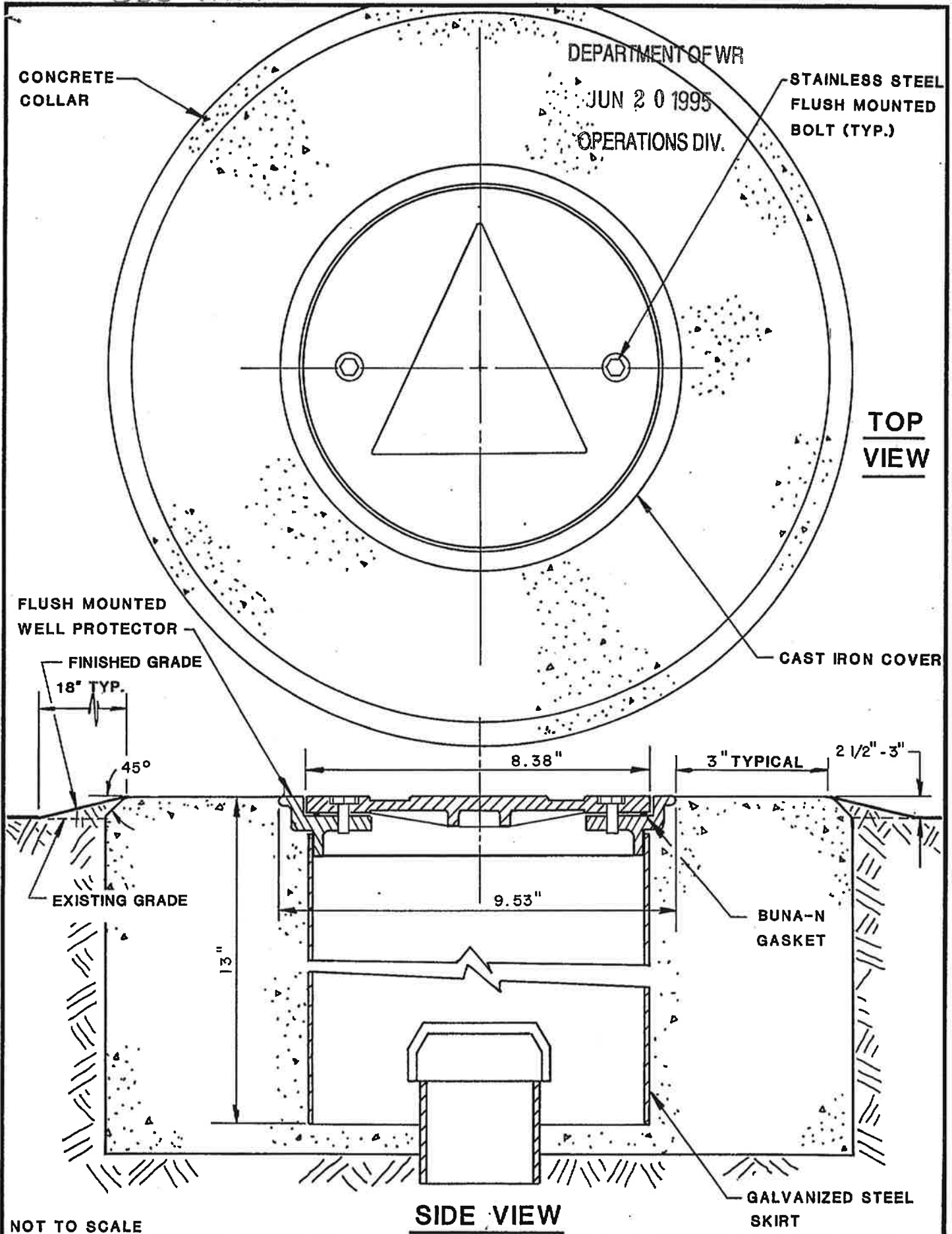
SCHEMATIC CONSTRUCTION DIAGRAM FOR
SHALLOW MONITOR WELL

MALCOLM PIRNIE, INC.

FIGURE 2

159381

**MALCOLM
PIRNIE**



**MALCOLM
PIRNIE**

LESP 3
EL CAMINO DEL CERRO LANDFILL
FLUSH MOUNTED WELL COMPLETION

MALCOLM PIRNIE, INC.

FIGURE 3

TABLE A-21

**Landfill Environmental Studies Program - Phase 3
El Camino del Cerro Study Area
Remedial Investigation Report**

Lithologic Log of Monitor Well CDC-W27

Depth Interval (feet)	Description of Material	
0-10	Sandy Silt	Light brown, dry, compact, sand is very fine to fine
10-28	Silty Sand to Sandy Silt	Light brown, dry to slightly moist, compact, sand is very fine to medium grained. Below 20 feet: contains some sandy silty clay, brown, slightly moist, firm.
28-31	Sand	Light brown, dry, loose, sand is medium to very coarse grained, contains some fine gravel.
31-55	Gravelly Sand to Sandy Gravel and Cobbles	Light brown, slightly moist to moist, sand is medium to very coarse grained, gravel is fine overall. Below 35 feet: contains coarse gravel clasts and cobbles up to 6-inches or more in size. Below 50 feet: very moist.
55-60	Sand	Light brown, moist to slightly moist, compact, sand is predominantly very coarse grained, contains some gravel to cobble size clasts and fine grained sand.
60-67	Sand to Gravelly Sand	Lightly brown, slightly moist, graded from medium grained sand to fine gravel overall, matrix of very fine to fine grained sand and silt in part, some cobble to
67-83	Gravelly Sand with Cobbles to Gravelly Silty Sand	Brown, moist to very moist, variable-graded and interbedded mixture.
83-85	Gravelly Sand to Gravelly Sandy Silt	Brown, moist, very graded or interbedded mixture.
85-130	Silty Gravelly Sand to Sandy Gravel	Brown, moist, compact to dense, sand is medium to very coarse grained, gravel is predominantly fine, graded or interbedded mixture. Below about 110 feet: wet. Below 125 feet: increased fines content, contains some clay. At 129 feet: coarse gravel bed.

Continued on back

TABLE A-21 (Continued)

**Landfill Environmental Studies Program - Phase 3
El Camino del Cerro Study Area
Remedial Investigation Report**

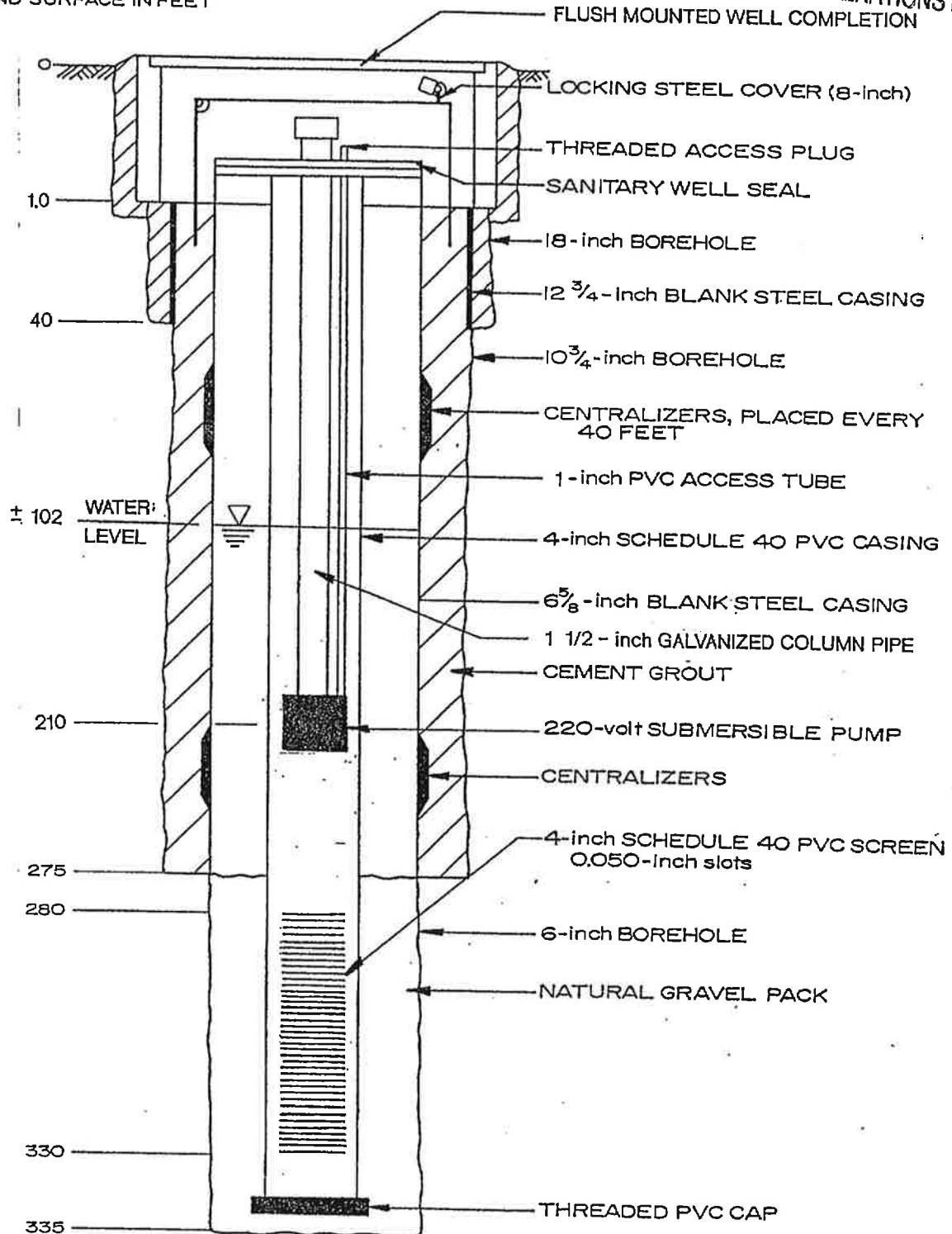
Lithologic Log of Monitor Well CDC-W27

130-160	Sandy Gravel to Gravelly Sandy Silt	Brown, compact, sand is very fine to very coarse grained, gravel is fine to coarse, graded and At 148 feet: coarse gravel bed.
Total Depth of Borehole: 170 feet		
Well Completed: 07/29/95		
Static Water Level: 109.7 Feet Below Top of Casing (07/31/95)		

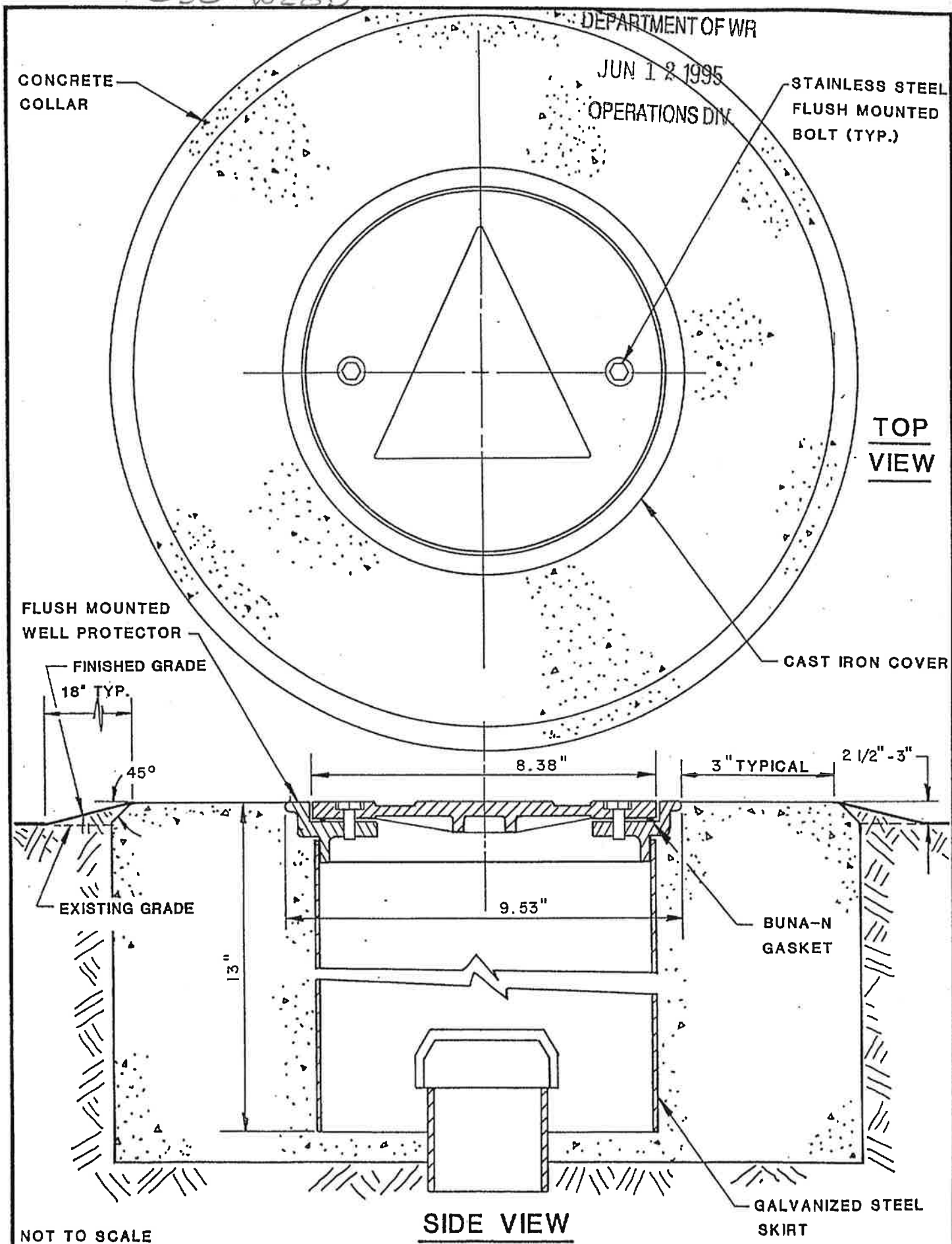
JUN 12 1995

OPERATIONS DIV.

DEPTH BELOW
LAND SURFACE IN FEET



CDC -W28D



**MALCOLM
PIRNIE**

LESP 3
EL CAMINO DEL CERRO LANDFILL
FLUSH MOUNTED WELL COMPLETION

MALCOLM PIRNIE, INC.
FIGURE 3

159381

TABLE A-22

**Landfill Environmental Studies Program - Phase 3
El Camino del Cerro Study Area
Remedial Investigation Report**

Lithologic Log of Monitor Well CDC-W28D

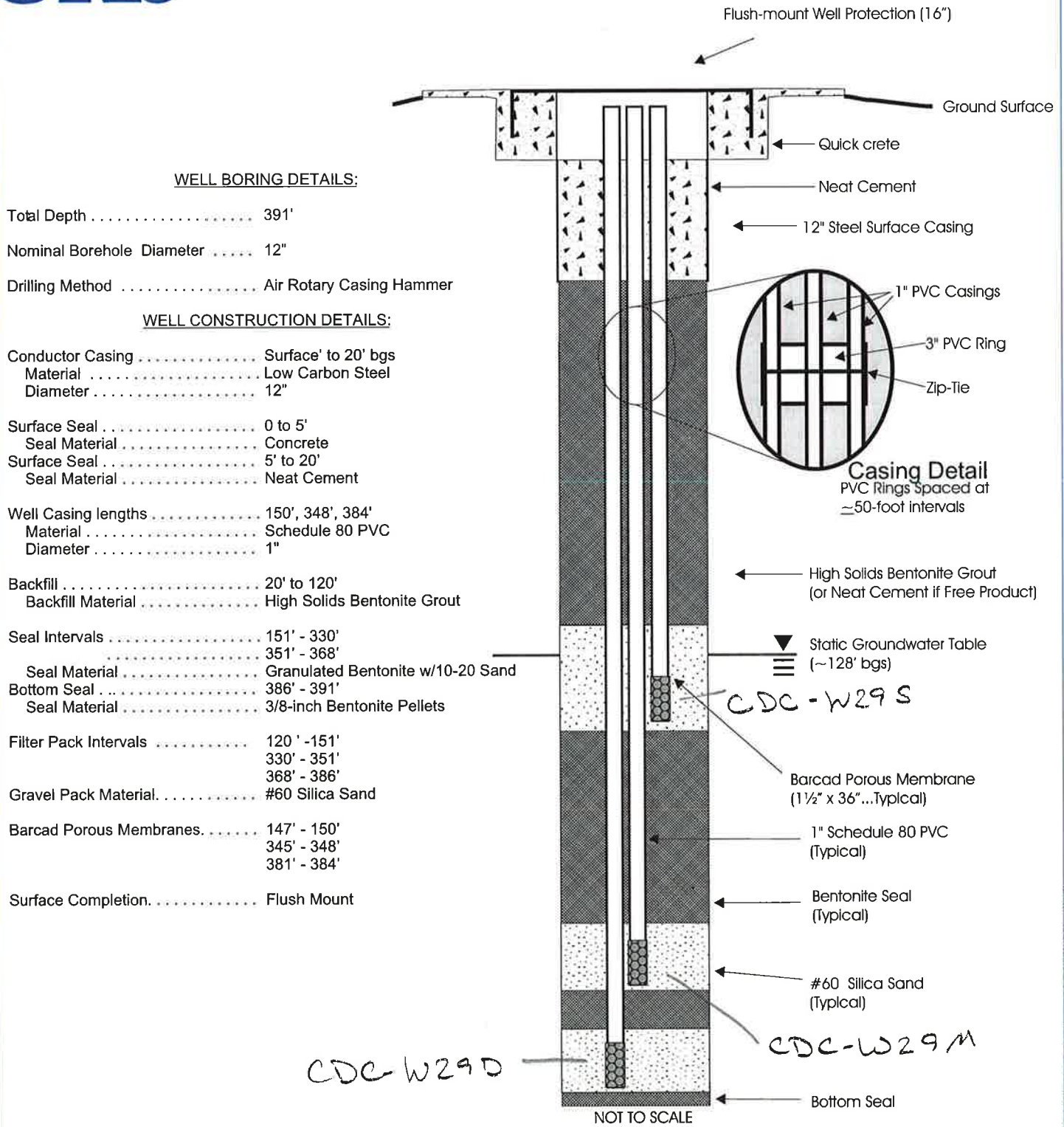
Depth Interval (feet)	Description of Material	
0-5	Gravelly Silty Sandy Clay	Dark brown, fine to medium sand, angular and poorly sorted, approximate composition; 45% clay, 25% gravel, and 25% gravel with cobbles and rock
5-10	Gravelly Sandy Silty Clay	Dark brown, slightly moist, fine to medium sand, angular and poorly sorted, approximate composition; 55% clay, 20% sand, and 20% gravel with cobbles and rock fragments.
10-15	Gravelly Silty Sandy Clay	Medium brown, fine to medium sand, angular and poorly sorted, approximate composition; 45% clay, 35% sand, 20% gravel with cobbles and rock fragments.
15-25	Sandy Silty Clay	Dark brown, fine to medium sand, angular and poorly sorted, approximate composition; 70% clay, 20% sand, and 10% silt.
25-30	Gravelly Sandy Clay	Dark brown, fine to medium sand, sub-angular and poorly sorted, approximate composition; 60% clay, 30% sand, and 10% gravel with cobbles.
30-40	Clayey Sandy Gravel	Brownish gray, fine to very coarse sand, sub-angular and poorly sorted, approximate composition; 60% gravel with cobbles and rock fragments, 20% sand, and
40-70	Silty Sandy Gravel	Brownish gray, fine to very coarse sand, sub-angular and poorly sorted, approximate composition; 70% gravel with cobbles and large rock fragments, 30% sand, some silt. Rock fragments consisted of dolomite, pink granite, rhyolite, gneiss, and quartzite.
70-85	Silty Sandy Gravel with Cobbles and Rock Fragments	Brownish gray, fine to very coarse sand, sub-angular and poorly sorted, approximate composition; 60% gravel with cobbles and rock fragments, 30% sand, 10% silt and a little clay.
85-100	Silty Clayey Sandy Gravel	Brownish gray, fine to very coarse sand, sub-angular to rounded and poorly sorted, approximate composition; 45% gravel with cobbles and rock fragments, 30% sand, and 15% clay.

TABLE A-22 (Continued)

**Landfill Environmental Studies Program - Phase 3
El Camino del Cerro Study Area
Remedial Investigation Report**

Lithologic Log of Monitor Well CDC-W28D

Depth Interval (feet)	Description of Material	
100-150	Silty Clayey Sandy gravel	Brownish gray, fine to very coarse sand, angular to rounded and poorly sorted, approximate composition; 50% gravel with cobbles and rock fragments, 35% sand, 15% silt and clay. At 105 feet: water table was encountered.
150-205	Silty Clayey Sandy Gravel	Dark gray, fine to very coarse sand, angular to rounded and poorly sorted, clay balls, approximate composition; 60% gravel with cobbles and rock fragments, 30% sand, and 10% silt and clay.
205-220	Silty Clayey Sand and Gravel	Brownish gray, fine to very coarse sand, angular to rounded and poorly sorted, some clay balls, approximate composition; 40% sand, 40% gravel with cobbles and rock fragments, 20% silt and clay.
220-300	Silty Clayey Sandy Gravel	Brownish gray, fine to very coarse sand, angular to rounded and poorly sorted, approximate composition; 45% gravel with cobbles and rock fragments, 35% sand, and 20% silt and clay.
300-310	Silty Clayey Gravelly Sand	Brownish gray, fine to very coarse sand, angular to rounded and poorly sorted, approximate composition; 40% sand, 35% gravel with cobbles, and 25% clay.
310-315	Silty Clayey Sandy Gravel	Brownish gray, fine to very coarse sand, angular to rounded and poorly sorted, approximate composition; 40% gravel with cobbles and rock fragments, 40% sand, and 20% silt and clay.
315-340	Silty Clayey Gravelly Sand	Brown, medium to very coarse sand, angular to rounded and poorly sorted, approximate composition; 50% sand, 30% gravel with cobbles and rock fragments, and 20% silt and clay.
Total Depth of Borehole: 340 feet		
Well Completed: 10/06/95		
Static Water Level: 111.6 Feet Below Top of Casing (10/09/95/95)		



CDC-W29D MONITOR WELL SCHEMATIC
Remedial Investigation/Feasibility Study
El Camino del Cerro WQARF Site
Tucson, Arizona

Figure 3



DRILLING LOG FOR: Soil Boring #1**Date Hole Started:** 4/01/02**ADWR No:****Date Hole Completed:** 4/10/02**Site Location:** E.C.Winter**Rig Type:** Rotosonic**Drilling Contractor:** Prosonic**Drilling Method:** Rotosonic**Depth of Borehole:** 375'**URS**

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	SC			Fill - CLAYEY SAND little gravel, angular to subangular sand and gravel, light brown, Nil HCl, low to med PI, slightly moist	1.5 2.3 4.6 0.2 0.1 0.1 0.1 0.3 0.2 1.5 10.6 10.5 19.4 10.9 14.9 10.3 12.7 6.4	

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 1 of 19

DRILLING LOG FOR: Soil Boring #1

Date Hole Started: 4/01/02

ADWR No:

Date Hole Completed: 4/10/02

Site Location: E.C. Winter

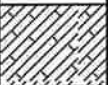
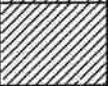


Rig Type: Rotosonic

Drilling Contractor: Prosonic

Drilling Method: Rotosonic

Depth of Borehole: 375'

URS

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
21	SC			Fill - CLAYEY SAND little gravel, angular to subangular sand and gravel. light brown, Nil HCl, low to med PI, moist	13.0	
22	CL			CLAY little sand, brown mottled tan, weak HCL, med PI, slightly moist	2.7	
23	SP			SAND little gravel, subangular to subrounded sand and gravel, brown, Nil HCl, Nil PI, slightly moist	20.7	
24					3.4	
25					3.5	
26					19.6	
27					10.3	
28					8.4	
29					7.3	
30					6.9	
31					4.2	
32					2.6	
33					6.4	
34					2.4	
35				3" thick CLAY layer, brown, moist	6.9	
36				3" thick GRAVELY CLAY layer, brown, med PI, moist	4.2	
37					4.6	
38					too hot	
39	GP			GRAVEL few cobbles, few sand, subangular to subrounded sand and gravel, Nil HCl, Nil PI, dry		
40						

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 2 of 19

DRILLING LOG FOR: Soil Boring #1

Date Hole Started: 4/01/02

ADWR No:

Date Hole Completed: 4/10/02

Site Location: E.C. Winter

Rig Type: Rotosonic

Drilling Contractor: Prosonic

Drilling Method: Rotosonic

Depth of Borehole: 375'



Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
41	GP			GRAVEL few cobbles, few sand, subangular to subrounded sand and gravel, Nil HCl, Nil PI, dry	too hot	
42						
43						
44						
45						
46						
47	GC			CLAYEY GRAVEL some sand, subrounded sand and gravel, brown, Nil HCl, med PI, moist	8.7	
48					9.4	
49					6.7	
50					20.6	
51					14.3	
52	SC			CLAYEY SAND few gravel, brown, Nil HCl, med PI, slightly moist	6.5	
53					8.9	
54					9.9	
55					9.3	
56					9.6	
57					8.6	
58					9.5	
59					9.4	
60				cobble layer	7.5	

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 3 of 19

DRILLING LOG FOR: Soil Boring #1**Date Hole Started:** 4/01/02**ADWR No:****Date Hole Completed:** 4/10/02**Site Location:** E.C.Winter**Rig Type:** Rotosonic**Drilling Contractor:** Prosonic**Drilling Method:** Rotosonic**Depth of Borehole:** 375'

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
61	SC			CLAYEY SAND few gravel, brown, Nil HCl, med PI, slightly moist	6.2	
62				cobble layer	9.1	
63					3.9	
64					4.0	
65					3.6	
66					2.9	
67					6.2	
68					8.5	
69					4.2	
70					6.3	
71					5.7	
72					4.5	
73					2.4	
74					8.0	
75				gravel layer	6.8	
76					6.3	
77					3.6	
78					2.7	
79					3.5	
80					7.2	

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 4 of 19

DRILLING LOG FOR: Soil Boring #1

Date Hole Started: 4/01/02

ADWR No:

Date Hole Completed: 4/10/02

Site Location: E.C.Winter

Rig Type: Rotosonic

Drilling Contractor: Prosonic

Drilling Method: Rotosonic

Depth of Borehole: 375'



Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
81	SC	A vertical rectangular box filled with a diagonal hatching pattern, representing the USCS symbol for Silty Clay (SC).		CLAYEY SAND few gravel, brown, Nil HCl, med PI, slightly moist	9.1	
82					2.4	
83				interbedded low to med PI clays	4.8	
84					4.5	
85					4.7	
86					5.3	
87					4.5	
88					4.8	
89				SILTY SAND layer	5.5	
90					5.3	
91					6.8	
92					2.3	
93					4.3	
94					5.6	
95					5.5	
96					6.2	
97					3.4	
98					1.2	
99					6.2	
100					2.2	

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 5 of 19

DRILLING LOG FOR: Soil Boring #1**Date Hole Started:** 4/01/02**ADWR No:****Date Hole Completed:** 4/10/02**Site Location:** E.C.Winter**Rig Type:** Rotosonic**Drilling Contractor:** Prosonic**Drilling Method:** Rotosonic**Depth of Borehole:** 375'

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
101	SC			CLAYEY SAND few gravel, brown, Nil HCl, med PI, slightly moist	1.4	
102					1.3	
103					2.0	
104					1.7	
105					4.3	
106					4.3	
107					7.2	
108					2.2	
109					4.2	
110					1.2	
111					2.5	
112					4.4	
113					2.8	
114					1.4	
115					2.3	
116					6.1	
117					2.6	
118					2.5	
119					2.4	
120					1.6	

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 6 of 19

DRILLING LOG FOR: Soil Boring #1**Date Hole Started:** 4/01/02**ADWR No:****Date Hole Completed:** 4/10/02**Site Location:** E.C.Winter**Rig Type:** Rotosonic**Drilling Contractor:** Prosonic**Drilling Method:** Rotosonic**Depth of Borehole:** 375'

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
121	SC			CLAYEY SAND few gravel, brown, Nil HCl, med PI, slightly moist	6.2	
122					3.6	
123					4.8	
124					7.1	
125					1.4	
126					4.1	IV
127					1.6	IV
128				2" gravel layer	5.9	
129					5.2	IV
130					4.1	B
131					3.6	
132					3.5	
133					2.7	
134				larger gravels are subrounded	5.3	
135					3.5	
136					1.6	
137					2.8	
138					1.5	
139					3.8	
140					3.8	

Geologist's Name: D. Carlson







Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 7 of 19

DRILLING LOG FOR: Soil Boring #1**Date Hole Started:** 4/01/02**ADWR No:****Date Hole Completed:** 4/10/02**Site Location:** E.C. Winter**Rig Type:** Rotosonic**Drilling Contractor:** Prosonic**Drilling Method:** Rotosonic**Depth of Borehole:** 375'**URS**

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
141	SC			CLAYEY SAND few gravel, brown, Nil HCl, med PI, slightly moist	3.5	
142	SP			GRAVELY SAND few silt, angular to subrounded sand and gravel, brown, Nil HCl, Nil PI, wet	2.1	
143					0.3	
144	SC			CLAYEY SAND few gravel, brown, Nil HCl, low PI, wet	0.3	
145	GP			SANDY GRAVEL some clay, angular to subangular sand and gravel, brown, Nil HCl, low PI, wet	0.2	
146	SC			CLAYEY SAND few gravel, brown, Nil HCl, low PI, very moist	3.6	
147	SP			SAND some gravel few clay, angular to subrounded sand and gravel, brown, Nil HCl, low PI, wet	1.3	
148					1.2	
149					3.2	
150					3.6	
151					2.9	
152					0.3	
153					2.0	
154				2-3" med to coarse SAND layer	2.0	
155					2.6	
156				2-3" med to coarse SAND layer	0.5	
157					0.5	
158					0.4	
159					3.8	
160					5.2	

Geologist's Name: D. Carlson


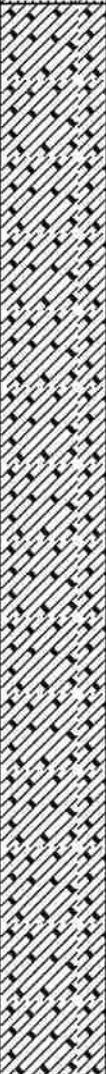
Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 8 of 19

DRILLING LOG FOR: Soil Boring #1**Date Hole Started:** 4/01/02**ADWR No:****Date Hole Completed:** 4/10/02**Site Location:** E.C.Winter**Rig Type:** Rotosonic**Drilling Contractor:** Prosonic**Drilling Method:** Rotosonic**Depth of Borehole:** 375'

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
161	SP			SAND some gravel few clay, angular to subrounded sand and gravel, brown, Nil HCl, low PI, wet	3.4	
162	GC			CLAYEY GRAVEL little sand, subrounded sand and gravel, brown, Nil HCl, med PI, very moist	3.4	
163					3.1	
164				6" GRAVELY SAND layer	3.0	
165					4.5	
166					4.3	
167					4.8	
168				8" CLAYEY SAND layer	4.3	
169				6" GRAVELY SAND layer	1.2	
170					1.3	
171					5.6	
172					1.0	
173					3.0	
174					1.3	
175					5.2	
176					4.2	
177					1.3	
178					0.2	
179					0.3	
180					1.2	

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 9 of 19

DRILLING LOG FOR: Soil Boring #1

Date Hole Started: 4/01/02

ADWR No:

Date Hole Completed: 4/10/02

Site Location: E.C.Winter

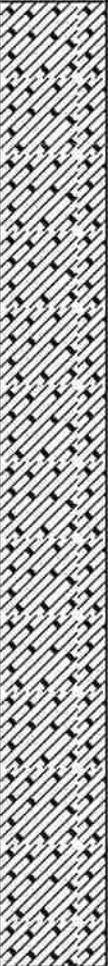

Rig Type: Rotosonic

Drilling Contractor: Prosonic

Drilling Method: Rotosonic

Depth of Borehole: 375'

URS

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
181	GC			CLAYEY GRAVEL little sand, subrounded sand and gravel, brown, Nil HCl, med PI, very moist	1.2	
182					3.6	
183					5.0	
184					0.2	
185					0.3	
186				6" SILTY SAND layer	0.1	
187					0.1	
188				2" coarse grain SAND layer	0.4	
189					1.3	
190					5.9	
191					2.4	
192					5.3	
193				14" SP-SM layer	2.2	
194					7.6	
195				4" SILTY SAND layer	1.4	
196				4" SANDY CLAY layer	4.0	
197					3.6	
198	SC			CLAYEY SAND little gravel, angular to subangular sand and gravel, brown, Nil HCl, low PI, very moist	4.3	
199					3.3	
200					3.1	

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 10 of 19

DRILLING LOG FOR: Soil Boring #1

Date Hole Started: 4/01/02

ADWR No:

Date Hole Completed: 4/10/02

Site Location: E.C.Winter




Rig Type: Rotosonic

Drilling Contractor: Prosonic

Drilling Method: Rotosonic

Depth of Borehole: 375'

URS

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
201	SC			CLAYEY SAND little gravel, angular to subangular sand and gravel, brown, Nil HCl, low PI, very moist	6.3	
202					3.0	
203					1.2	
204					3.4	
205					1.2	
206					6.3	
207	SM-GM			Interbedded - SILTY GRAVEL and SILTY SAND, brown, weak HCl, low PI, slightly moist	5.7	
208					0.3	
209				4" SAND few gravel layer	3.1	
210					2.6	
211					2.8	
212					0.0	
213					1.1	
214					0.9	
215				10" SAND trace gravel layer	3.7	
216					1.7	
217					1.6	
218					0.5	
219	SC			CLAYEY SAND some gravel, subrounded sand and gravel, brown, Nil HCl, low PI, very moist	1.4	
220					2.2	

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 11 of 19

DRILLING LOG FOR: Soil Boring #1

Date Hole Started: 4/01/02

ADWR No:

Date Hole Completed: 4/10/02

Site Location: E.C.Winter

Rig Type: Rotosonic

Drilling Contractor: Prosonic

Drilling Method: Rotosonic

Depth of Borehole: 375'



Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
221	SC			CLAYEY SAND some gravel, subrounded sand and gravel, brown, Nil HCl, low PI, very moist	11.0	
222					12.4	
223					1.4	
224					4.3	
225					9.8	
226					9.6	
227					18.6	
228					1.0	
229					7.5	
230					0.3	
231					7.0	
232					19.5	
233					45.8	
234				4" SAND trace gravel and silt layer	7.6	
235				2" SAND trace gravel and silt layer	5.7	
236				4" SAND trace gravel and silt layer	4.1	
237					7.8	
238					1.4	
239					2.1	
240					20.8	

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 12 of 19

DRILLING LOG FOR: Soil Boring #1

Date Hole Started: 4/01/02

ADWR No:

Date Hole Completed: 4/10/02

Site Location: E.C.Winter



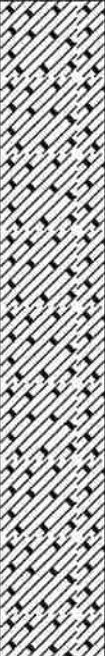
Rig Type: Rotosonic

Drilling Contractor: Prosonic

Drilling Method: Rotosonic

Depth of Borehole: 375'

URS

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
241	SC			CLAYEY SAND some gravel, subrounded sand and gravel, brown, Nil HCl, low PI, very moist	0.3	
242				3" SANDY CLAY layer	5.2	
243				4" SANDY GRAVELY CLAY layer	5.2	
244				2" SANDY CLAY layer	3.8	
245	SM			SILTY SAND little gravel, angular to subangular sand and gravel, Nil HCl, moist	10.7	
246					2.1	
247					1.6	
248					19.0	
249	GC			CLAYEY GRAVEL some sand, angular sand and subangular to subrounded gravel, brown, Nil HCl, med PI, very moist	5.4	
250					1.2	
251					10.3	
252				2" CLAYEY SAND layer	5.7	
253					7.0	
254					7.5	
255					2.7	
256					6.3	
257					1.6	
258					1.7	
259					1.6	
260				2" SANDY CLAY layer	3.7	

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 13 of 19

DRILLING LOG FOR: Soil Boring #1

Date Hole Started: 4/01/02

ADWR No:

Date Hole Completed: 4/10/02

Site Location: E.C.Winter

Rig Type: Rotosonic

Drilling Contractor: Prosonic

Drilling Method: Rotosonic

Depth of Borehole: 375'



Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
261	GC			CLAYEY SAND few gravel, angular to subrounded sand and gravel, brown, Nil HCl, med PI, slightly moist	3.2	
262	SC				14.7	
263					5.3	
264				5" SP few gravel layer	3.4	
265					8.4	
266				4" SAND few silt and gravel layer	10.1	
267					14.1	
268					3.7	
269					6.1	
270					1.2	
271					1.7	
272					13.4	
273					21.7	
274				3" SAND layer	9.3	
275					12.3	
276					1.9	
277					12.8	
278					53.0	
279					31.6	
280					11.8	

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by
photoionization detector (PID) calibrated each morning with 100
parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 14 of 19

DRILLING LOG FOR: Soil Boring #1**Date Hole Started:** 4/01/02**ADWR No:****Date Hole Completed:** 4/10/02**Site Location:** E.C. Winter**Rig Type:** Rotosonic**Drilling Contractor:** Prosonic**Drilling Method:** Rotosonic**Depth of Borehole:** 375'

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
281	SC			CLAYEY SAND few gravel, angular to subrounded sand and gravel, brown, Nil HCl, med PI, slightly moist	3.6	
282				6" SANDY CLAY layer	6.7	
283					12.2	
284					6.9	
285				6" SILTY SAND layer	4.8	
286					6.0	
287	SM			SILTY SAND few gravel, angular to subangular sand and gravel, brown, Nil HCl, Nil PI, slightly moist	6.4	
288					3.4	
289					1.7	
290					6.2	
291					19.4	
292	SC			CLAYEY SAND few gravel, angular to subangular sand and gravel, weak HCl, med PI, very moist	7.8	
293					6.3	
294				4" SILTY SAND some gravel layer	0.5	
295				2" SILTY SAND little gravel layer	0.6	
296					21.7	
297				3" SILTY SAND layer	24.1	
298					0.7	
299					10.6	
300					17.9	

Geologist's Name: D. Carlson




Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 15 of 19

DRILLING LOG FOR: Soil Boring #1**Date Hole Started:** 4/01/02**ADWR No:****Date Hole Completed:** 4/10/02**Site Location:** E.C.Winter**Rig Type:** Rotosonic**Drilling Contractor:** Prosonic**Drilling Method:** Rotosonic**Depth of Borehole:** 375'**URS**

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
301	SC			CLAYEY SAND few gravel, angular to subangular sand and gravel, weak HCl, med PI, very moist	2.4	
302					5.8	
303					6.5	
304					9.6	
305				9" SILTY SAND few gravel layer	9.8	
306					12.3	
307					16.7	
308					43.2	
309					33.9	
310	CL			SANDY CLAY few gravel, brown, weak HCl, med PI, dry	28.3	
311					96.5	
312	SC			CLAYEY SAND little gravel, angular to subangular sand and gravel, brown, weak HCl, low to med PI, slightly moist	39.0	
313					278.6	
314					13.7	
315					9.9	
316				1" SILTY SAND layer	25.4	
317					15.6	
318				3" SANDY CLAY layer	15.2	
319					32.3	
320					32.0	

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 16 of 19

DRILLING LOG FOR: Soil Boring #1**Date Hole Started:** 4/01/02**ADWR No:****Date Hole Completed:** 4/10/02**Site Location:** E.C.Winter**Rig Type:** Rotosonic**Drilling Contractor:** Prosonic**Drilling Method:** Rotosonic**Depth of Borehole:** 375'**URS**

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
321	SC			CLAYEY SAND little gravel, angular to subangular sand and gravel, brown, weak HCl, low to med PI, slightly moist	35.1	
322					63.2	
323					57.1	
324					237	
325					204	
326					251	
327				8" CLAYEY SAND little gravel layer	235	
328					6.0	
329					44	
330					1.2	
331					2.3	
332					4.5	
333					3.9	
334					18.1	
335				3" SILTY SAND layer	2.8	
336					6.1	
337					5.2	
338					29.2	
339					43.3	
340					17.3	

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 17 of 19

DRILLING LOG FOR: Soil Boring #1

Date Hole Started: 4/01/02

ADWR No:

Date Hole Completed: 4/10/02

Site Location: E.C.Winter


Rig Type: Rotosonic

Drilling Contractor: Prosonic

Drilling Method: Rotosonic

Depth of Borehole: 375'

URS

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
341	SC			CLAYEY SAND little gravel, angular to subangular sand and gravel, brown, weak HCl, low to med PI, slightly moist	1.5	
342					25.8	
343				2" SANDY CLAY few gravel layer	91.5	
344					42.3	
345					210	
346				5" SANDY CLAY few gravel layer	51.6	
347					4.5	
348					3.2	
349					3.5	
350					12.8	
351					15.9	
352					2.5	
353					3.7	
354					13.6	
355					10.5	
356					56.2	
357					75.2	
358					75.2	
359					403.2	
360					17.4	

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 18 of 19

DRILLING LOG FOR: Soil Boring #1**Date Hole Started:** 4/01/02**ADWR No:****Date Hole Completed:** 4/10/02**Site Location:** E.C. Winter**Rig Type:** Rotosonic**Drilling Contractor:** Prosonic**Drilling Method:** Rotosonic**Depth of Borehole:** 375'

Depth	Soil Class	USCS Symbol	Blows/6"	Narrative Lithologic Description	VOC Conc. (ppm)	Sample ID/Time
361	SC			CLAYEY SAND little gravel, angular to subangular sand and gravel, brown, weak HCl, low to med PI, slightly moist 4" SILTY SAND layer	18.6	
362					27.8	
363					41.1	
364					14.1	
365					13.1	
366					2.8	
367					4.3	
368					6.1	
369					8.9	
370					4.3	
371	GC			CLAYEY GRAVEL some sand, angular to subangular sand and gravel, brown, weak HCl, med PI, slightly moist	2.9	
372					4.5	
373					4.2	
374					12.4	
375					16.1	
376				END OF BORING		
377						
378						
379						
380						

Geologist's Name: D. Carlson

Client: ADEQ

Volatile Organic Compounds (VOCs) concentration determined by photoionization detector (PID) calibrated each morning with 100 parts per million (ppm) isobutylene

Project: E.C. Winter

Sheet: 19 of 19

W30S

WELL BORING DETAILS:

Total Depth	40-feet bgs
Drilling Method	Resonant Sonic
Nominal Borehole Diameter	10"
Depth Interval	0' - 176'
Nominal Borehole Diameter	8"
Depth Interval	176' - 404'
Seal at Reduction	Bentonite Grout

WELL CONSTRUCTION DETAILS:

Shallow Well Casing Length	120'
Material	Schedule 40 PVC
Diameter	3"
Screened Interval	120' - 170'
Perforations	0.040", Slotted
Deep Regional Well Casing Length	370'
Material	Schedule 40 PVC
Diameter	3"
Screened Interval	370' - 400'
Perforations	0.040", Slotted
Surface Seal Interval	0 - 2'
Seal Material	Concrete
1st Upper Seal Interval	3' - 20'
Seal Material	Cement Grout
2nd Upper Seal Interval	20' - 108'
Seal Material	Bentonite Grout
3rd Upper Seal Interval	108' - 112'
Seal Material	Bentonite Chips
Upper Transition Interval	112' - 115'
Transition Material	#30 Sand
Upper Gravel Pack Interval	115' - 170'
Gravel Pack Material	#8-12 Sand
Middle Transition Interval	170' - 172'
Transition Material	#30 Sand
1st Lower Seal Interval	172' - 198'
Seal Material	Bentonite Chips
2nd Lower Seal Interval	198' - 340'
Seal Material	Bentonite Pellets
3rd Lower Seal Interval	340' - 361'
Seal Material	Bentonite Grout
Lower Transition Interval	361' - 364'
Transition Material	#30 Sand
Lower Gravel Pack Interval	364' - 400'
Gravel Pack Material	#8-12 Sand
Bottom Transition Interval	400' - 402'
Transition Material	#30 Sand
Bottom Seal Interval	402' - 404'
Seal Material	Bentonite Chips
Surface Completion	Flush Mount Surface Vault

WELL EQUIPPING:

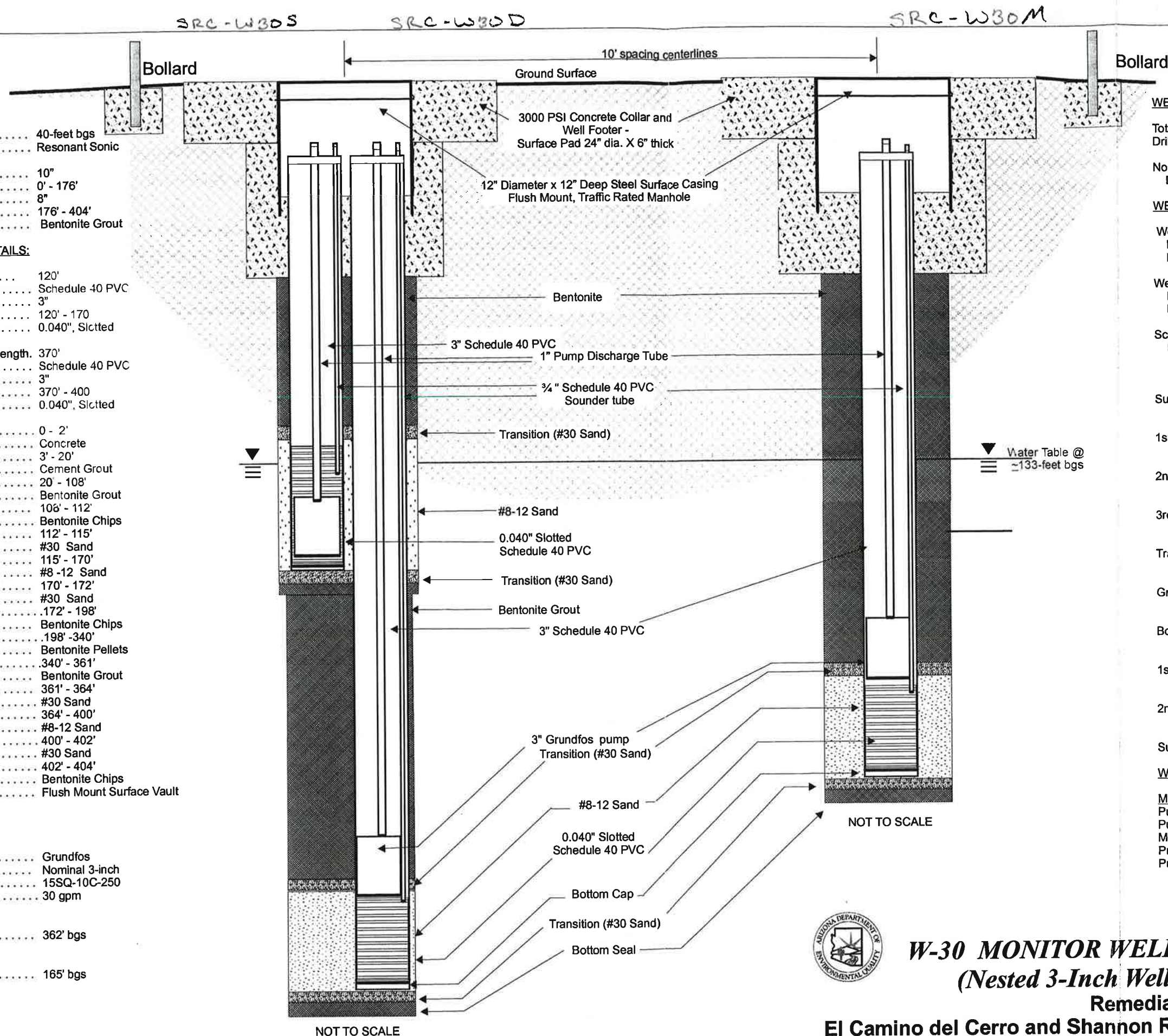
Both Wells	
Pump Make	Grundfos
Pump Size	Nominal 3-inch
Model	15SQ-10C-250
Pump capacity	30 gpm

Deep Regional Well

Pump Intake	362' bgs
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Water Table Well

Pump Intake	165' bgs
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WELL BORING DETAILS:

Total Depth	260-feet bgs
Drilling Method	Resonant Sonic
Nominal Borehole Diameter	8"
Depth Interval	0' - 260'

WELL CONSTRUCTION DETAILS:

Well Casing Length	0 - 20'
Material	Steel
Diameter	3"
Well Casing Length	20 - 205'
Material	Schedule 40 PVC
Diameter	3"

Screened Interval	205' - 235'
Material	Schedule 40 PVC
Diameter	3"
Perforations	0.040", Slotted

Surface Seal Interval	0 - 5'
Seal Material	Concrete

1st Upper Seal Interval	5' - 20'
Seal Material	Cement Grout

2nd Upper Seal Interval	20' - 196'
Seal Material	Bentonite Grout

3rd Upper Seal Interval	196' - 198'
Seal Material	Bentonite Chips

Transition Interval	198' - 200'
Transition Material	#30 Sand

Gravel Pack Interval	200' - 235'
Gravel Pack Material	#8-12 Sand

Bottom Transition Interval	235' - 237'
Transition Material	#30 Sand

1st Bottom Seal Interval	237' - 248'
Seal Material	Bentonite Chips

2nd Bottom Seal Interval	248' - 260'
Seal Material	Bentonite Pellets

Surface Completion	Flush Mount Surface Vault
--------------------	---------------------------

WELL EQUIPPING:

Medium Regional Well	
Pump Make	Grundfos
Pump Size	Nominal 3-inch
Model	15SQ-10C-250
Pump capacity	30 gpm
Pump Intake	200' bgs



W-30 MONITOR WELLS AS-BUILT SCHEMATIC (Nested 3-Inch Wells + 3-Inch Companion Well)

Remedial Investigation/Feasibility Study

El Camino del Cerro and Shannon Road- Rillito Creek WQARF Sites

URS



333 E Wetmore, Suite 611
Tucson, AZ 85705
520-887-1800
520-887-8438 (Fax)

SHEET 1 of 7

BORING LOG: W-30 (middle)

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 03/14/2003 02:30 PM
FINISH DATE/TIME: 03/20/2003 12:05 PM

LATITUDE (NAVD27): 32.183
LONGITUDE (NAVD 27): 111.015

TOP OF GROUND ELEVATION: 2233.66 A.S.L.
TOP OF CASING ELEVATION: 2233.66 A.S.L.
SCREENED INTERVAL: 2028.66' - 1998.66'

COMMENTS: Lithology elevations calculated from top of casing (ground surface elevations not available)

RIG TYPE: Sonic
DRILLING METHOD: RotoSonic
SAMPLING METHOD: Continuous Coring

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
5	2230		0.5	CL-ML		SILTY CLAY, few cobble, brown, slightly moist, low plasticity.	
10	2225		1.4	SM		SILTY SAND, brown, slightly moist, null to low plasticity.	
15	2220		0.4	CL		SANDY CLAY, with silt, brown, slightly moist, low to medium plasticity.	
20	2215			SC		CLAYEY SAND, with silt, brown, slightly moist, low plasticity, dense.	
				SM		SILTY SAND, brown, slightly moist, null plasticity.	
25	2210			NONE		Silty Gravel layer of 6 inches.	
				NONE		Poorly Graded Sand layer of 4 inches.	
30	2205			SW		GRAVELLY SAND, trace silt, light brown, slightly moist, null plasticity.	
				SC		CLAYEY SAND, with silt, brown, slightly moist, medium plasticity.	
35	2200					SANDY GRAVEL, trace silt, light brown to brown,	



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CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

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START DATE/TIME: 03/14/2003 02:30 PM
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DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
						slightly moist, null plasticity.	
	2195					37.8'	
40			8.1	NONE GP		Gravel layer	
	2190					44.0'	
45						CLAYEY SAND, with gravel, dark brown, very moist to wet, low plasticity. Cobbel layer at 50' and 55'.	
	2185						
50			17.1			Cobble layer	
						3 inch layer of CL with fine sand, gravel and cobble.	
	2180					54.0'	
55						SILTY SAND, brown, slightly moist.	
	2175			SC			
60						Trace of cobble	
	2170						
65							
	2165			SM			
70			10.1 13.4				
	2160						
75						6 inch layer of clayey sand layer.	



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SHEET 3 of 7

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CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

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START DATE/TIME: 03/14/2003 02:30 PM
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DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80	2155		3.1			8 inch layer of silty sand.	
85	2150			SC		CLAYEY SAND, brown, moist. 4 inch layer of clay. 8 inch of sandy clay layer	
90	2145					Interbedded clayey gravel and clayey sand.	
95	2140			GC		Blackish-greenish color. CLAYEY GRAVEL, brown, moist.	
100	2135		17.1			Interbedded silty gravel. CLAYEY SAND, brown, moist, low to medium plasticity.	
105	2130		18.6			Interbedded clayey gravel.	
110	2125					Interbedded silty gravel.	
115	2120			SC		Interbedded silty sand.	Bentonite Grout



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CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

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DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			7.8				
	2115						
120			7.9			Interbedded silty sand.	
	2110						
125			4.1				
	2105						
130							
	2100			GC		131.0' CLAYEY GRAVEL, brown, slightly moist, low plasticity.	
135						134.0' CLAYEY SAND, brown, moist, low to medium plasticity.	
	2095			SC		Interbedded silty gravel. Interbedded clayey gravel.	
140						140.0' SILTY SAND with gravel, brown, moist.	
	2090			SM			
145			5.0			143.0' CLAYEY GRAVEL, brown, moist.	
	2085		2.0			Interbedded silty gravel.	
150			10.0				
	2080			GC			
155							



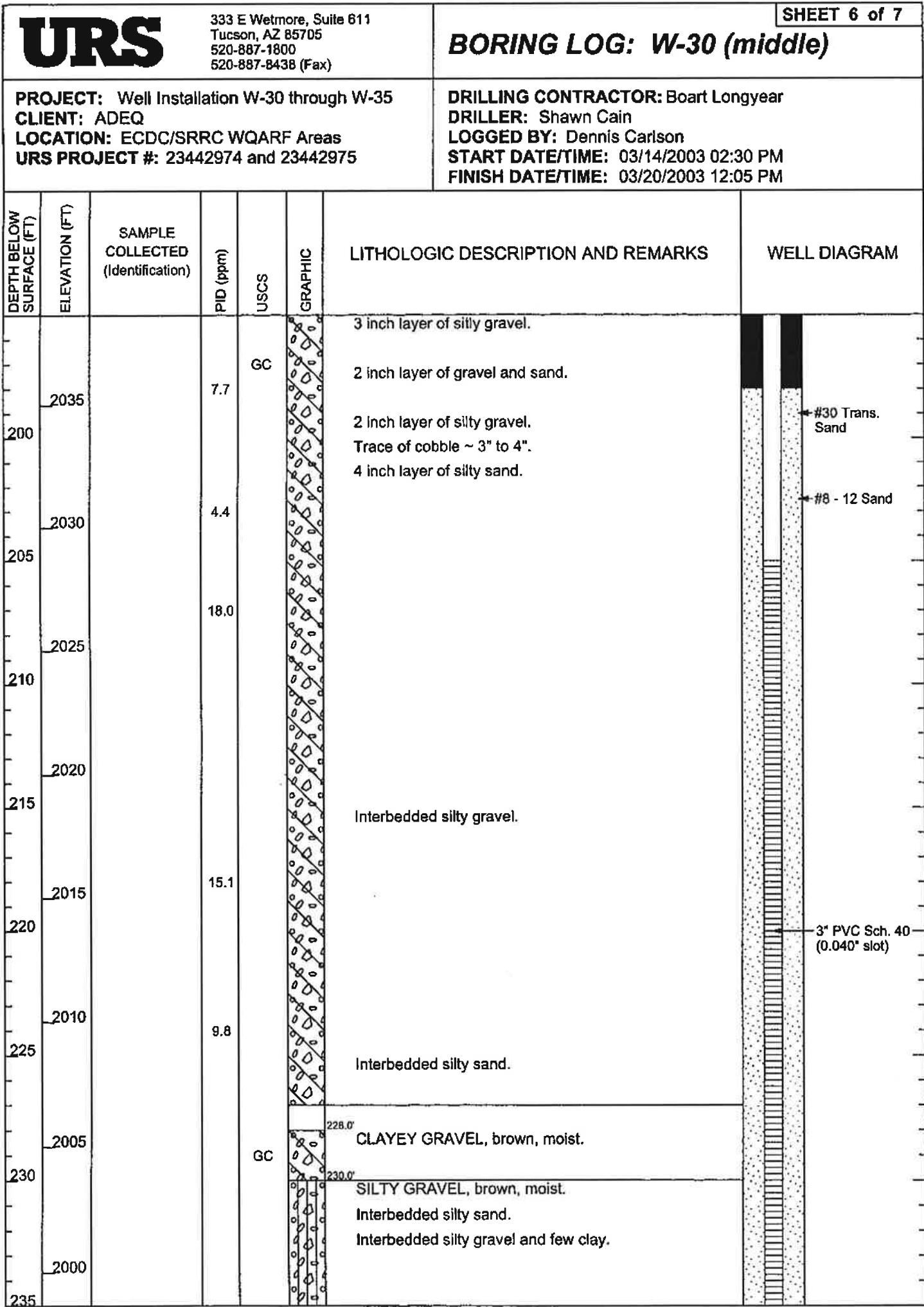
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BORING LOG: W-30 (middle)

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
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DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160	2075		5.5			Thin clayey sand.	
						Interbedded silty sand.	
						Interbedded silty sand and clayey gravel.	
			4.8			162.0' SILTY GRAVEL, brown, moist.	
165	2070			GP		167.0' CLAYEY GRAVEL, brown, very moist.	
			16.0			Very dense.	
						Interbedded silty sand.	
			13.0				
175	2060						
			13.9				
180	2055						
			8.1				
			7.9				
185	2050						
190	2045						
			2.1				
195	2040						





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CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

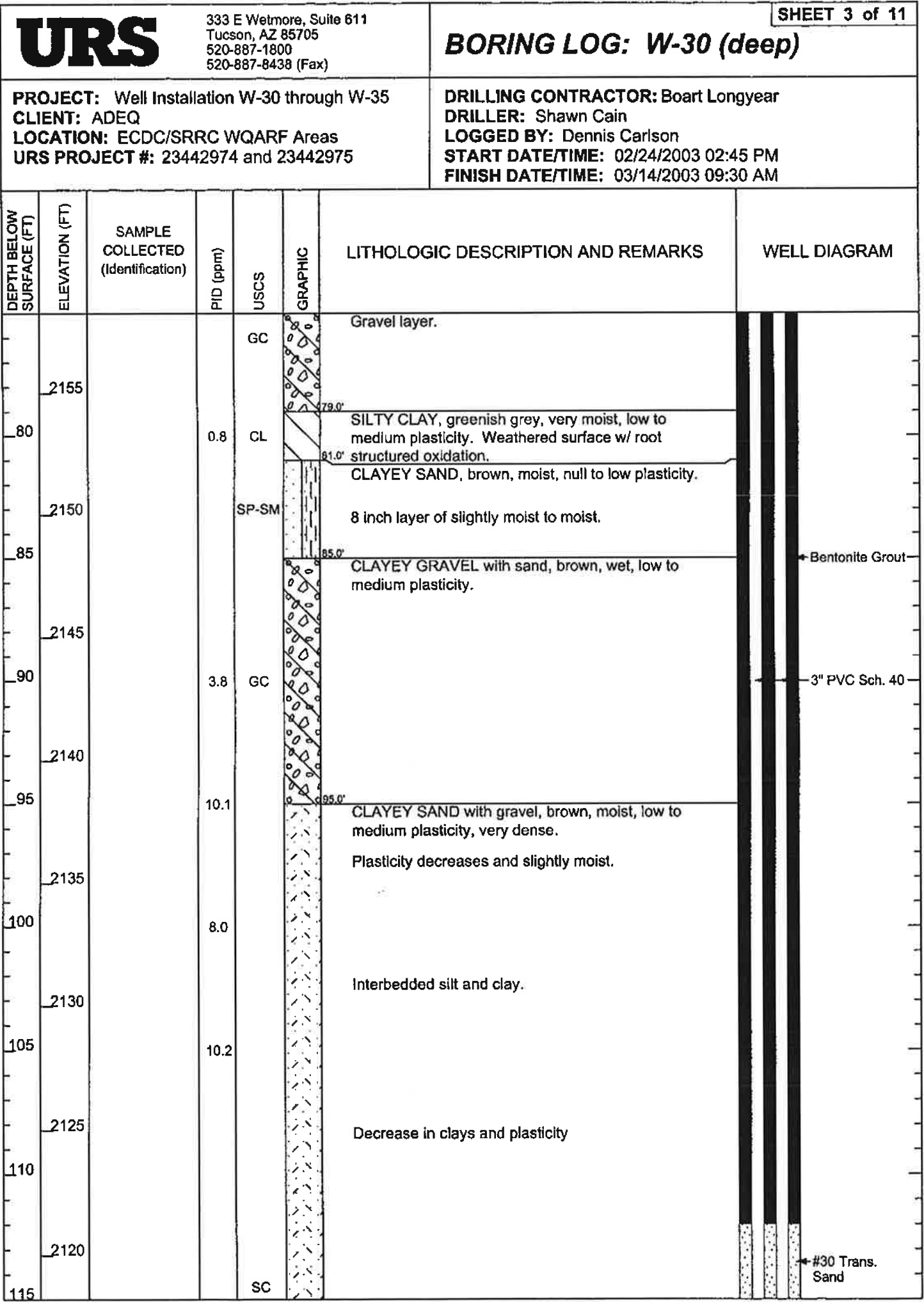
DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 03/14/2003 02:30 PM
FINISH DATE/TIME: 03/20/2003 12:05 PM

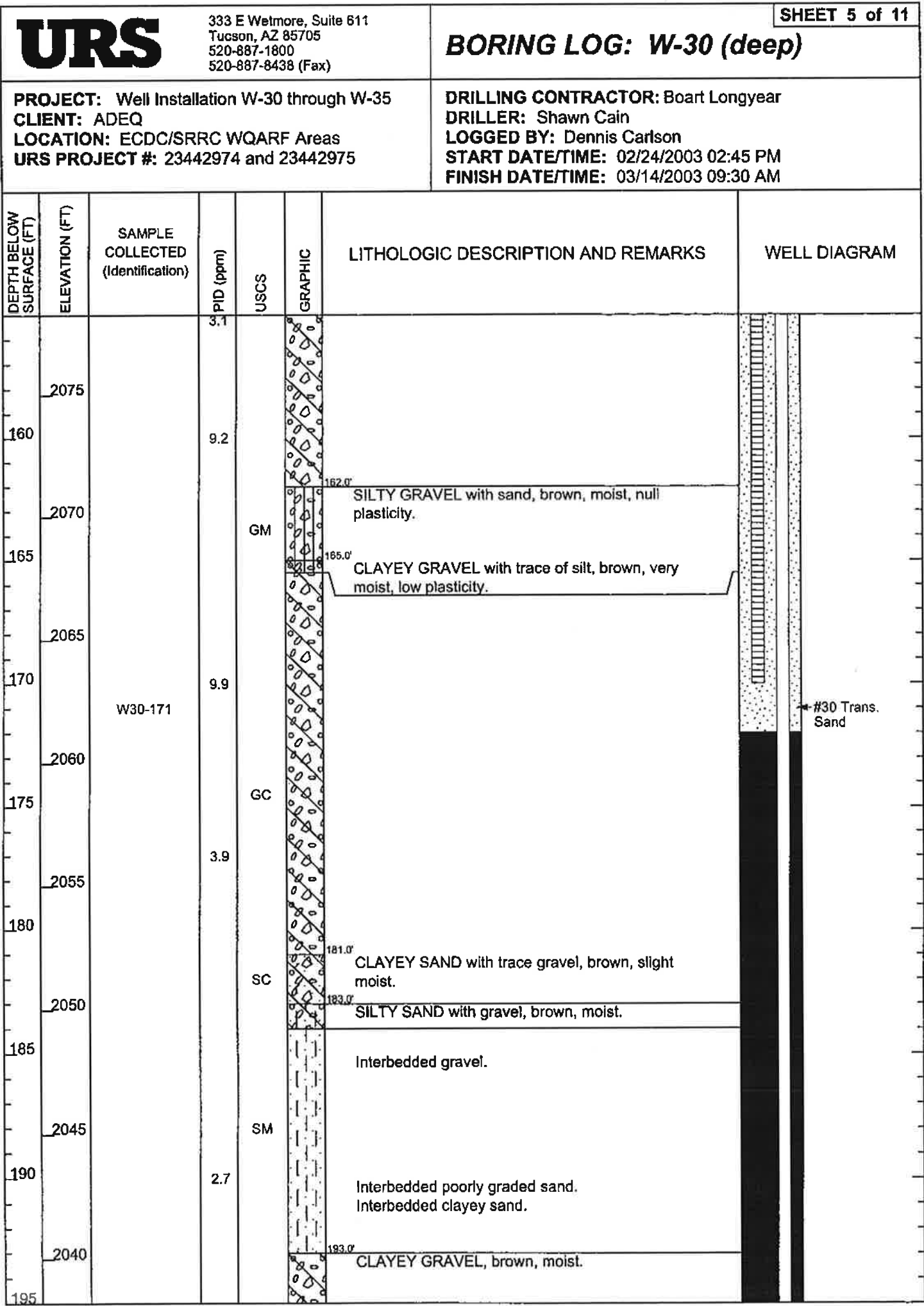
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
240	1995		8.1				<div></div> <div>#30 Trans. Sand</div>
245	1990		13.6	GM			
250	1985					Interbedded silty gravel and few clayey sand.	<div></div> <div>Bentonite</div>
255	1980		6.7				
260	1975						
265	1970						
270	1965						
275	1960						

<div> <div>URS</div> <div> 333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax) </div> </div>		<div> <div>SHEET 1 of 11</div> <div>BORING LOG: W-30 (deep)</div> </div>
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRRC WQARF Areas URS PROJECT #: 23442974 and 23442975		DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dennis Carlson START DATE/TIME: 02/24/2003 02:45 PM FINISH DATE/TIME: 03/14/2003 09:30 AM
LATITUDE (NAVD27): 32.183 LONGITUDE (NAVD 27): 111.015		TOP OF GROUND ELEVATION: 2233.24 A.S.L. TOP OF CASING ELEVATION: 2233.24 A.S.L. SCREENED INTERVAL: 2113.46' -2063.46' and 1863.24' - 1833.24'
COMMENTS: Lithology elevations calculated from top of casing (ground surface elevations not available)		RIG TYPE: Sonic DRILLING METHOD: RotoSonic SAMPLING METHOD: Continuous Coring

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
5	2230		0.5	CL-ML		SILTY CLAY, few sands, brown, slightly moist, low plasticity.	<div>Concrete</div> <div>Cement Grout</div> <div>3" PVC Sch. 40</div> <div>Bentonite Grout</div>
10	2225		1.4	SM		SILTY SAND, brown, slightly moist, null to low plasticity.	
15	2220		0.4	CL		SANDY CLAY, with silt, brown, slightly moist, low to medium plasticity.	
20	2215		2.2	SM		CLAYEY SAND, with silt, brown, slightly moist, low plasticity, dense.	
25	2210		1.9	NONE		SILTY SAND, brown, slightly moist, null plasticity.	
30	2205		5.4	SW		Silty Gravel layer of 6 inches.	
35	2200			SC		Poorly Graded Sand layer of 4 inches.	
						GRAVELLY SAND, trace silt, light brown, slightly moist, null plasticity.	
						CLAYEY SAND, with silt, brown, slightly moist, medium plasticity.	
						SANDY GRAVEL, trace silt, light brown to brown,	

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PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dennis Carlson START DATE/TIME: 02/24/2003 02:45 PM FINISH DATE/TIME: 03/14/2003 09:30 AM				
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM	
			5.1			slightly moist, null plasticity.		
	2195			NONE GP		37.5' Gravel layer		
40			8.1					
	2190							
45			13.5			44.0' CLAYEY SAND, with gravel, dark brown, very moist to wet, low plasticity. Cobble layer at 50' and 55'.		
	2185							
50			17.1			Cobble layer	Bentonite Grout	
	2180					3 inch layer of CL with fine sand, gravel and cobble.		
55			9.9			Cobble layer.	3" PVC Sch. 40	
	2175			SC				
60			4.9			Decrease in gravel, increase in clay, slightly moist to moist.		
	2170							
65			1.6			64.0' Interbedded cobble. 3 inch layer of sandy silty clay.		
	2165							
70			17.6			6 inch layer of silty sand. Interbedded with increase in silt.		
	2160					73.0' CLAYEY GRAVEL, with sand and cobble, brown, moist, medium plasticity.		
75								







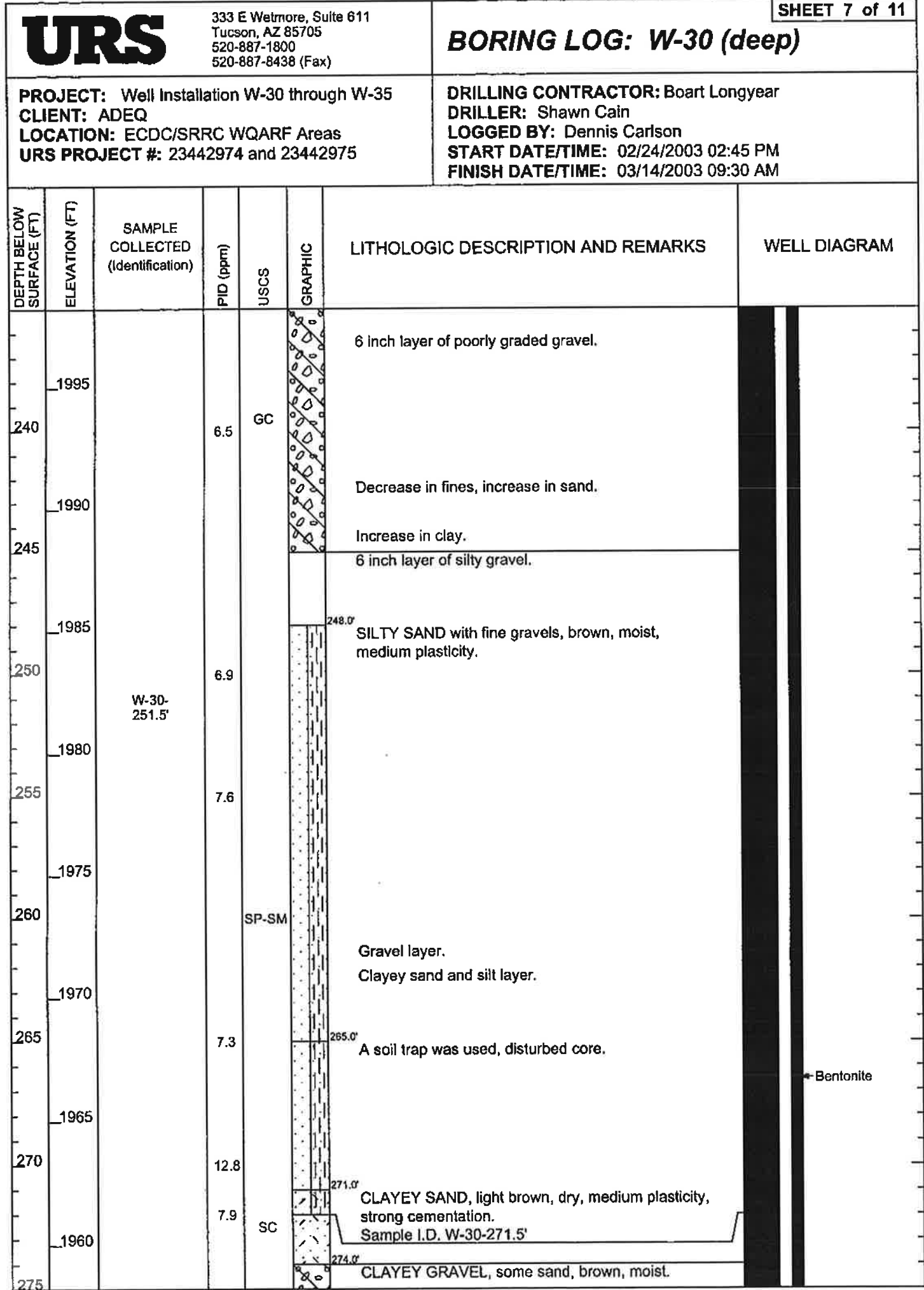
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BORING LOG: W-30 (deep)

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DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
2035				GC		2 inch layer of poorly graded sand	
200			1.2			199.0' SILTY SAND with gravel, brown, moist.	
2030						4 inch layer of clayey gravel.	
205				SP			
2025			8.1				
210						211.0' SILTY GRAVEL with sand, trace clay, brown, moist, null plasticity. Sample I.D. W-30-211.5'	
2020		W30-211.5	12.1	GM			
215						Poorly graded sand with silt.	
2015							
220							
2010							
225						224.0' Poorly graded sand with silt.	
2005							
230						Increase in silt and clay, low plasticity Decrease in fines, null plasticity.	
						231.0' POORLY GRADED GRAVEL, brown, moist, null plasticity. Sample I.D. W-30-231.5'	
2000			11.8	GP			
235						234.0' CLAYEY GRAVEL, brown, moist.	



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SHEET 8 of 11

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CLIENT: ADEQ
LOCATION: ECDC/SRRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

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START DATE/TIME: 02/24/2003 02:45 PM
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DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM	
280	1955	W-30-301'	10.0	GC		Increase in gravel.		
						Decrease in clay.		
						Some interbedded clay, decrease in gravel.		
285	1950		10.7	GC		2 inch layer of interbedded silty gravel and silty sand. Nodules of weak cementation, 1/4" to 1/2".		
						2 inch layer of gravel.		
290	1945		11.6			SP		
					Slightly moist and very dense.			
295	1940				SANDY GRAVEL, trace silt, brown, wet. Interbedded silty sand, silty gravel and clayey sand.			
300	1935			GC		CLAYEY GRAVEL, brown, slight moist.		
305	1930	7.3	GM				Very dense.	
				SILTY GRAVEL with sand, trace clay, brown, moist to wet. Cobble layer.				
				Interbedded clean sand, 3 to 8 inches thick. Interbedded clayey gravel.				
310	1925		SC		Interbedded clean sand, 3 to 8 inches thick.			
					CLAYEY SAND, brown, moist to wet, low plasticity.			
315	1920				CLAYEY GRAVEL with sand, brown, moist,			



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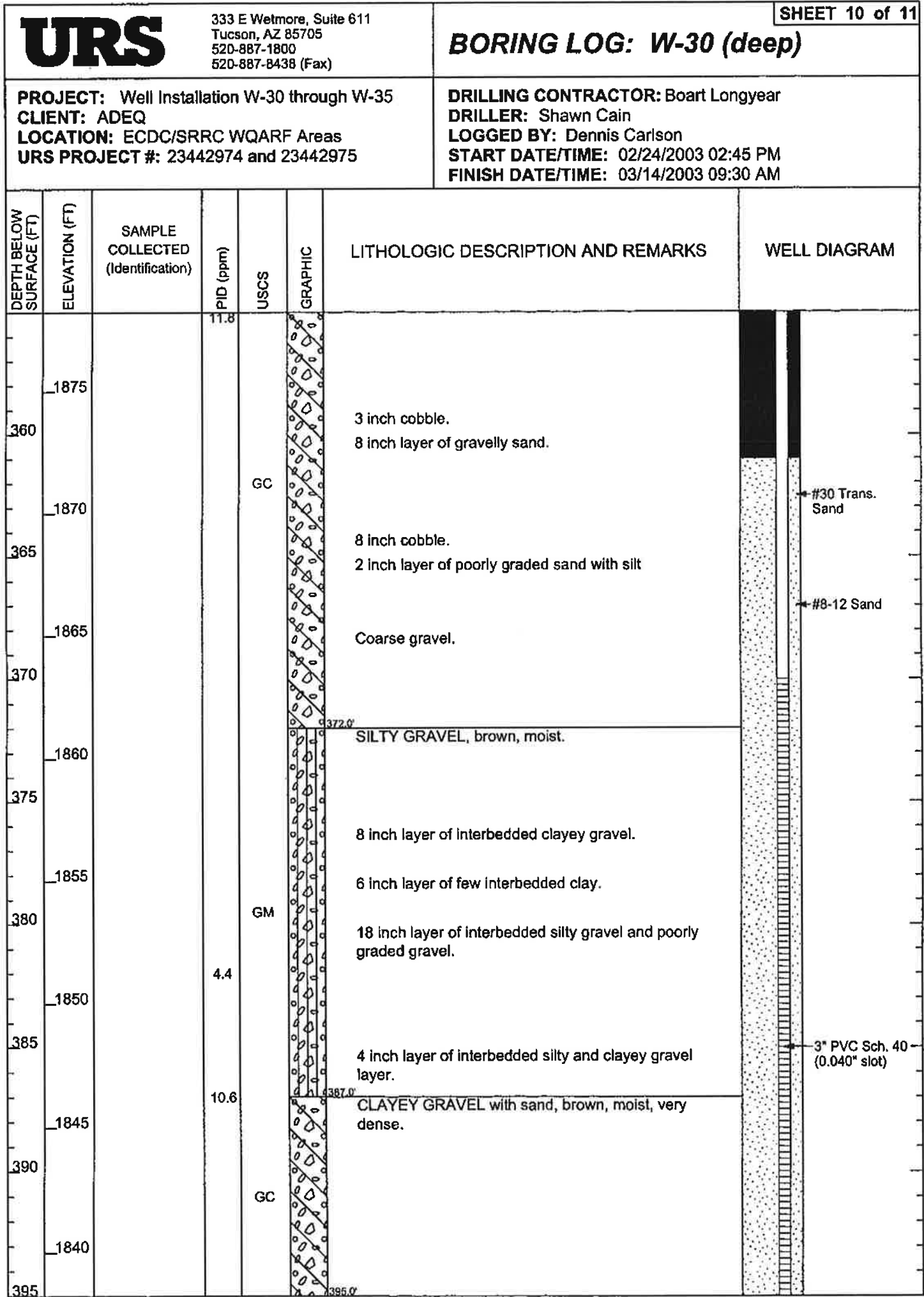
SHEET 9 of 11

BORING LOG: W-30 (deep)

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
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DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			11.5			medium plasticity, very dense.	
	1915		13.0				
320				GC			
	1910						
325						325.0' SILTY GRAVEL with sand, brown, wet.	
	1905			GM		4 inch layer of interbedded clayey gravel with sand.	
						328.0' CLAYEY GRAVEL, brown, moist.	
330				GC		2 inch layer of sand and fine to coarse mostly medium. 1/2 inch cementation.	
	1900					331.0' SILTY GRAVEL with sand, brown, moist.	
				GM		2 inch layer of gravel with clay.	
335			6.8			334.0' CLAYEY GRAVEL with sand, brown, moist, medium plasticity.	
	1895			GC			
						339.0' 3 inch layer of silty sand.	
340				GM		SILTY GRAVEL, brown, moist, medium plasticity.	
	1890					340.5' CLAYEY GRAVEL with sand, brown, moist, medium plasticity and very dense. Increase in clay.	
				GC			
345							
	1885					347.0' SILTY GRAVEL, brown, moist, medium plasticity.	
						2 inch layer of interbedded clay.	
350		W-30-351'		GM			
						352.0' 2 inch layer of poorly-graded sand.	
	1880					CLAYEY GRAVEL with sand, brown, moist.	
355						3 inch cobble.	





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DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			5.1				
	1835						
400		401*	8.9	SP		POORLY GRADED SAND, brown, moist, medium plasticity. Layer of cobble. 6 inch layer of interbedded clayey sand. 8 inch layer of interbedded clayey sand.	
	1830						
405			0.3	SC		CLAYEY SAND with gravel, brown, moist, low to medium plasticity.	
	1825						
410							
	1820						
415							
	1815						
420							
	1810						
425							
	1805						
430							
	1800						
435							

404-FOOT WELL BORING DETAILS:	
Total Depth	404-feet bgs
Drilling Method	Resonant Sonic
Nominal Borehole Diameter	10"
Depth Interval	0' - 200'
Nominal Borehole Diameter	8"
Depth Interval	200' - 404'
Seal at Reduction	Bentonite Grout

400-FOOT ("DEEP") WELL CONSTRUCTION DETAILS:	
Steel Protective Casing	0-20'
Well Casing Length	20'-370'
Material	Schedule 80 PVC
Diameter	4"
Screened Interval	370' - 400'
Perforations	0.040", Slotted
Surface Seal Interval	0 - 2'
Seal Material	Concrete
1st Upper Seal Interval	2' - 358'
Seal Material	Bentonite Grout
2nd Upper Seal Interval	358' - 363'
Seal Material	Bentonite Chips
Transition Interval	363' - 365'
Transition Material	#30 Sand
Gravel Pack Interval	365' - 400'
Gravel Pack Material	#8-12 Sand
Bottom Transition Interval	400' - 402'
Transition Material	#30 Sand
Bottom Seal Interval	402' - 404'
Seal Material	Bentonite Chips
Surface Completion	Flush Mount

WELL EQUIPPING

"DEEP and MIDDLE" Wells	
Pump Make	Grundfos
Pump Size	Nominal 3-inch
Model	15SQ10C-250
Pump capacity	30 gpm
Pump Intake - "DEEP"	360'bgs
Sounding Tube - "DEEP"	250'bgs
Pump Intake - "MIDDLE"	200'bgs
Sounding Tube - "MIDDLE"	190'bgs

"SHALLOW" Well	
Water Table Well	
Pump Make	Grundfos
Pump Size	Nominal 3-inch
Model	30SQ10C-130
Pump capacity	30 gpm
Pump Intake - "SHALLOW"	175'bgs
Sounding Tube - "SHALLOW"	170'bgs

184-FOOT WELL BORING DETAILS:	
Total Depth	184-feet bgs
Drilling Method	ARCH
Nominal Borehole Diameter	10"
Depth Interval	0' - 184'

180 FOOT ("SHALLOW") WELL CONSTRUCTION DETAILS:

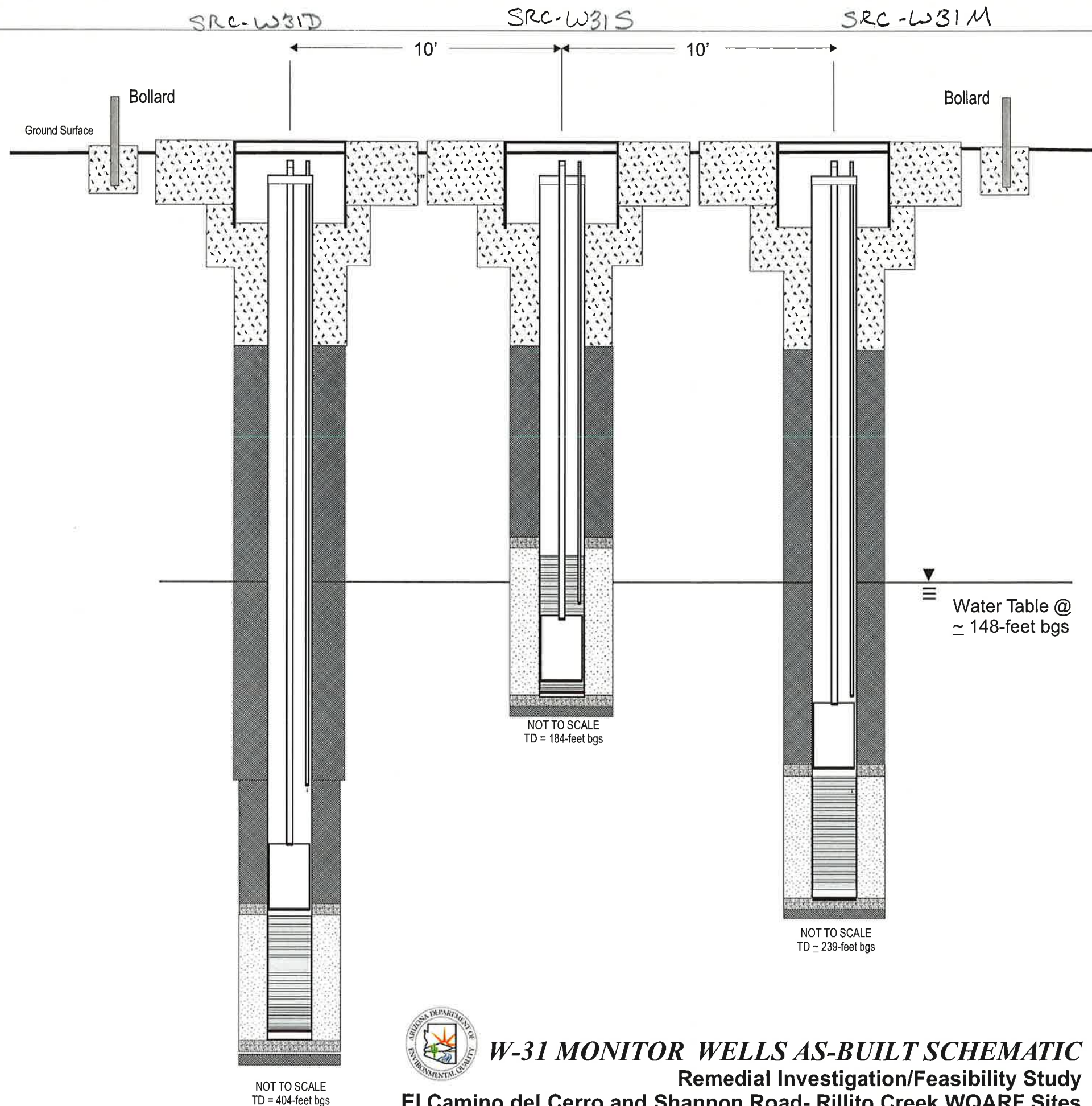
Well Casing Length	120'
Material	Schedule 80 PVC
Diameter	4"
Screened Interval	130' - 180'
Perforations	0.040", Slotted
Surface Seal Interval	0 - 2'
Seal Material	Concrete
1st Upper Seal Interval	2' - 30'
Seal Material	Cement Grout
2nd Upper Seal Interval	30' - 115'
Seal Material	Bentonite Grout
3rd Upper Seal Interval	115' - 123'
Seal Material	Bentonite Chips
Transition Interval	123' - 125'
Transition Material	#30 Sand
Gravel Pack Interval	125' - 180'
Gravel Pack Material	#8-12 Sand
Bottom Transition Interval	181' - 182'
Transition Material	#30 Sand
Bottom Seal Interval	182' - 184'
Seal Material	Bentonite Chips
Surface Completion	Flush Mount

239-FOOT WELL BORING DETAILS:

Total Depth	239 feet bgs
Drilling Method	ARCH
Nominal Borehole Diameter	10"
Depth Interval	0' - 239'

235 FOOT ("MIDDLE") WELL CONSTRUCTION

DETAILS:	
Well Casing Length	205'
Material	Schedule 80 PVC
Diameter	4"
Screened Interval	205' - 235'
Perforations	0.040", Slotted
Surface Seal Interval	0 - 2'
Seal Material	Concrete
1st Upper Seal Interval	2' - 20'
Seal Material	Cement Grout
2nd Upper Seal Interval	20' - 189'
Seal Material	Bentonite Grout
3rd Upper Seal Interval	189' - 195'
Seal Material	Bentonite Chips
Transition Interval	195' - 199'
Transition Material	#30 Sand
Gravel Pack Interval	199' - 235'
Gravel Pack Material	#8-12 Sand
Bottom Transition Interval	235' - 237'
Transition Material	#30 Sand
Bottom Seal Interval	237' - 239'
Seal Material	Bentonite Chips









W-31 MONITOR WELLS AS-BUILT SCHEMATIC

Remedial Investigation/Feasibility Study

El Camino del Cerro and Shannon Road- Rillito Creek WQARF Sites

<div>URS<div>333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)</div></div>		SHEET 1 of 5					
<div>PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975</div>		<div>DRILLING CONTRACTOR: WDC DRILLER: Loren Rudolph LOGGED BY: Armando Jimenez START DATE/TIME: 06/03/2003 07:00 AM FINISH DATE/TIME: 06/03/2003 02:00 PM</div>					
<div>LATITUDE (NAVD27): 32.1853 LONGITUDE (NAVD 27): 111.0142</div>		<div>TOP OF GROUND ELEVATION: 2235.47 A.S.L. TOP OF CASING ELEVATION: 2235.47 A.S.L. SCREENED INTERVAL: 2105.47' - 2055.47'</div>					
<div>COMMENTS: Lithology elevations calculated from top of casing (ground surface elevations not available)</div>		<div>RIG TYPE: Tresser 70W DRILLING METHOD: Arch Method SAMPLING METHOD:</div>					
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
5	2235			CL		SANDY CLAY with silt, brown, dry, medium PI, soft density, weak cementation.	
10	2230			CL			
15	2225			SM		11.0' SILTY SAND, brown, dry, null PI.	
20	2220			CL		13.5' SANDY CLAY, light brown, dry, medium PI.	3" PVC Sch. 40
25	2215			SM		16.5' SILTY SAND with few gravel, tan, null cementation.	Cement Grout
30	2210			SC		21.5' CLAYEY SAND with trace of gravel and silt, brown, slightly moist, low PI.	
35	2205			SM		25.0' SILTY SAND with trace gravel, light brown, slightly moist.	

<div>URS</div>		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		SHEET 2 of 5			
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				DRILLING CONTRACTOR: WDC DRILLER: Loren Rudolph LOGGED BY: Armando Jimenez START DATE/TIME: 06/03/2003 07:00 AM FINISH DATE/TIME: 06/03/2003 02:00 PM			
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2200						
40	2195			GM		36.0' SILTY GRAVEL with sand and few cobble, brown, slightly moist.	
45	2190						
50	2185						
55	2180			GC		51.0' CLAYEY GRAVEL with some sand, reddish orange to tan, moist, low cementation, medium PI. Gravel and sand are decomposed granite, weathered clay.	
				GM		55.0' SANDY GRAVEL with little silt, few clay, orange to gray, moist, low PI.	
60	2175			CL		60.0' SANDY CLAY with few gravel, dark brown, moist, strong cementation, medium to high PI.	
				SW		61.0' Well-graded SAND, tan, slightly moist, null PI.	
						62.0' Poorly-graded SANDY GRAVEL with few silt, tan, slightly moist.	
65	2170			GP			
70	2165						
75						72.0' SANDY GRAVEL with little silt few clay, brown, slightly moist.	← Bentonite Grout

















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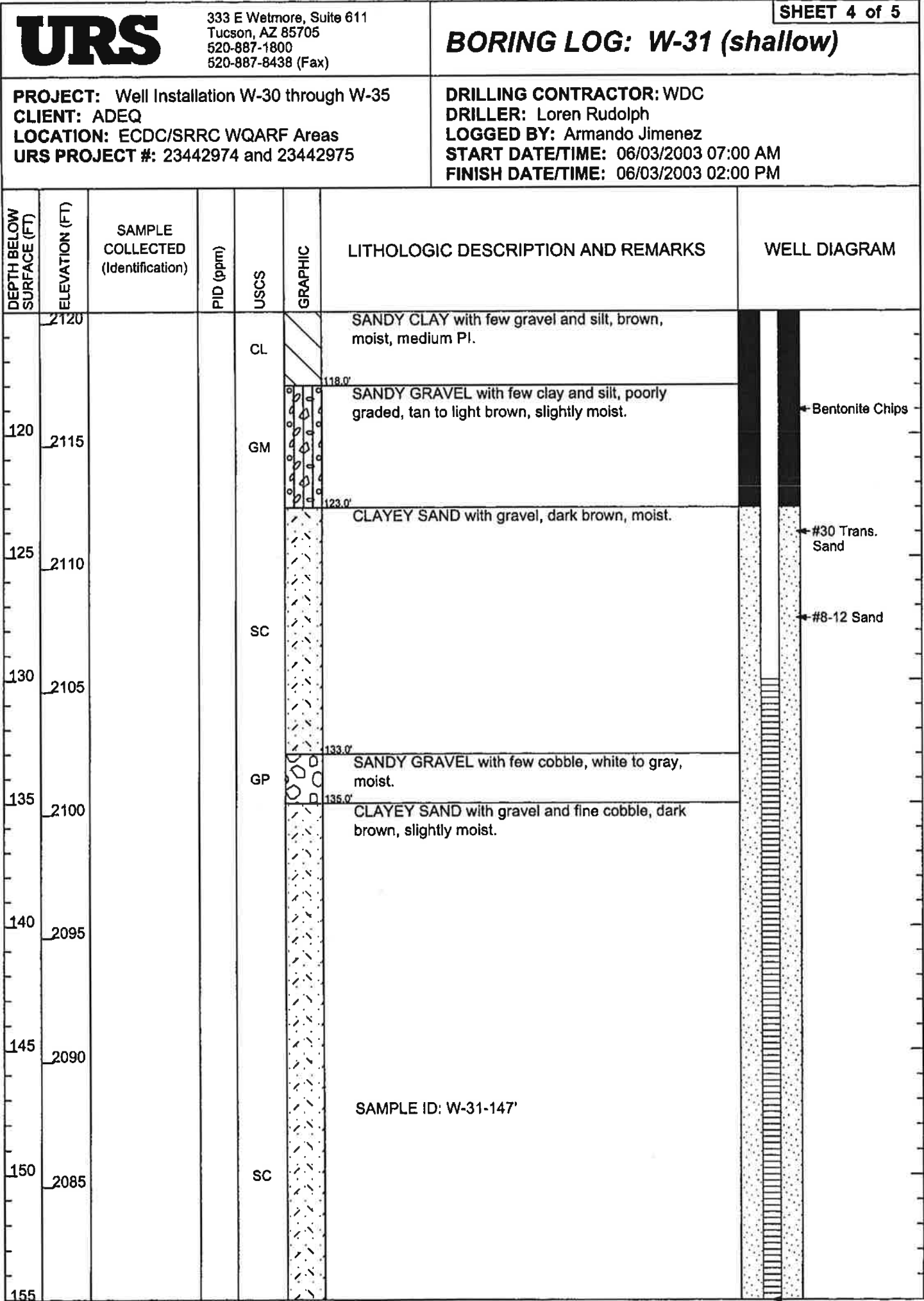
SHEET 3 of 5

BORING LOG: W-31 (shallow)


PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

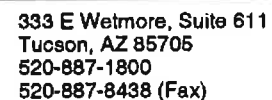
DRILLING CONTRACTOR: WDC
DRILLER: Loren Rudolph
LOGGED BY: Armando Jimenez
START DATE/TIME: 06/03/2003 07:00 AM
FINISH DATE/TIME: 06/03/2003 02:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2160			GM			
80	2155			SM		78.0' SILTY SAND with gravel, poorly graded, tan to light brown, moist.	
						81.0' CLAYEY SAND with little gravel, few silt, dark brown, moist.	
85	2150			SC			
						87.0' SANDY CLAY with little gravel, few silt, dark brown, moist.	
90	2145			CL		90.0' GRAVELLY SAND with few silt, few clay, tan, moist, low PI, weak cementation.	
				SP		93.0' CLAYEY SAND with little gravel, brown, moist, weak cementation.	
95	2140			SC			
						97.0' CLAY with few silt and sand, dark brown, moist, medium to high PI, strong cementation.	
100	2135			CH		100.5' GRAVELLY SAND with few silt and clay, tan to light brown, slightly moist.	
				SP			
105	2130					108.0' CLAYEY SAND with few gravel and little silt, brown, slightly moist, medium PI.	
110	2125			SC			
115						115.0'	



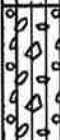


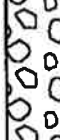
URS 333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		SHEET 5 of 5					
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDG/SRRG WQARF Areas URS PROJECT #: 23442974 and 23442975		BORING LOG: W-31 (shallow) DRILLING CONTRACTOR: WDC DRILLER: Loren Rudolph LOGGED BY: Armando Jimenez START DATE/TIME: 06/03/2003 07:00 AM FINISH DATE/TIME: 06/03/2003 02:00 PM					
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160	2080						3" PVC Sch. 40, Slotted 0.040"
165	2075						
170	2070					CLAYEY GRAVEL with little sand, dark brown, moist, low to medium PI.	
175	2065						
180	2060						
185	2055						#30 Trans. Sand
190	2050						Bentonite Seal
195	2045						

<div>URS</div> <div>333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)</div>		<div>SHEET 1 of 7</div> <div>BORING LOG: W-31 (middle)</div>					
<div>PROJECT: Well Installation W-30 through W-35</div> <div>CLIENT: ADEQ</div> <div>LOCATION: ECDC/SRRRC WQARF Areas</div> <div>URS PROJECT #: 23442974 and 23442975</div>		<div>DRILLING CONTRACTOR: WDC</div> <div>DRILLER: Loren Rudolph</div> <div>LOGGED BY: Armando Jimenez</div> <div>START DATE/TIME: 06/04/2003 12:30 PM</div> <div>FINISH DATE/TIME: 06/04/2003 05:00 PM</div>					
<div>LATITUDE (NAVD27): 32.1853</div> <div>LONGITUDE (NAVD 27): 111.0142</div>		<div>TOP OF GROUND ELEVATION: 2235.57 A.S.L.</div> <div>TOP OF CASING ELEVATION: 2235.57 A.S.L.</div> <div>SCREENED INTERVAL: 2030.57' - 2000.57'</div>					
<div>COMMENTS: Lithology elevations calculated from top of casing (ground surface elevations not available)</div>		<div>RIG TYPE: Tresser 70W</div> <div>DRILLING METHOD: Arch Method</div> <div>SAMPLING METHOD:</div>					
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2235					SANDY CLAY with silt, brown, dry, medium PI, soft density, weak cementation.	 <div>Concrete</div> <div>Cement Grout</div> <div>3" PVC Sch. 40</div>
5	2230			CL			
10	2225			SM		11.0' SILTY SAND, brown, dry, null PI.	
15	2220			CL		13.5' SANDY CLAY, light brown, dry, medium PI.	
20	2215			SM		16.5' SILTY SAND with few gravel, tan, null cementation.	
25	2210			SC		21.5' CLAYEY SAND with trace of gravel and silt, brown, slightly moist, low PI.	
30	2205			SM		25.0' SILTY SAND with trace gravel, light brown, slightly moist.	
35							










PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

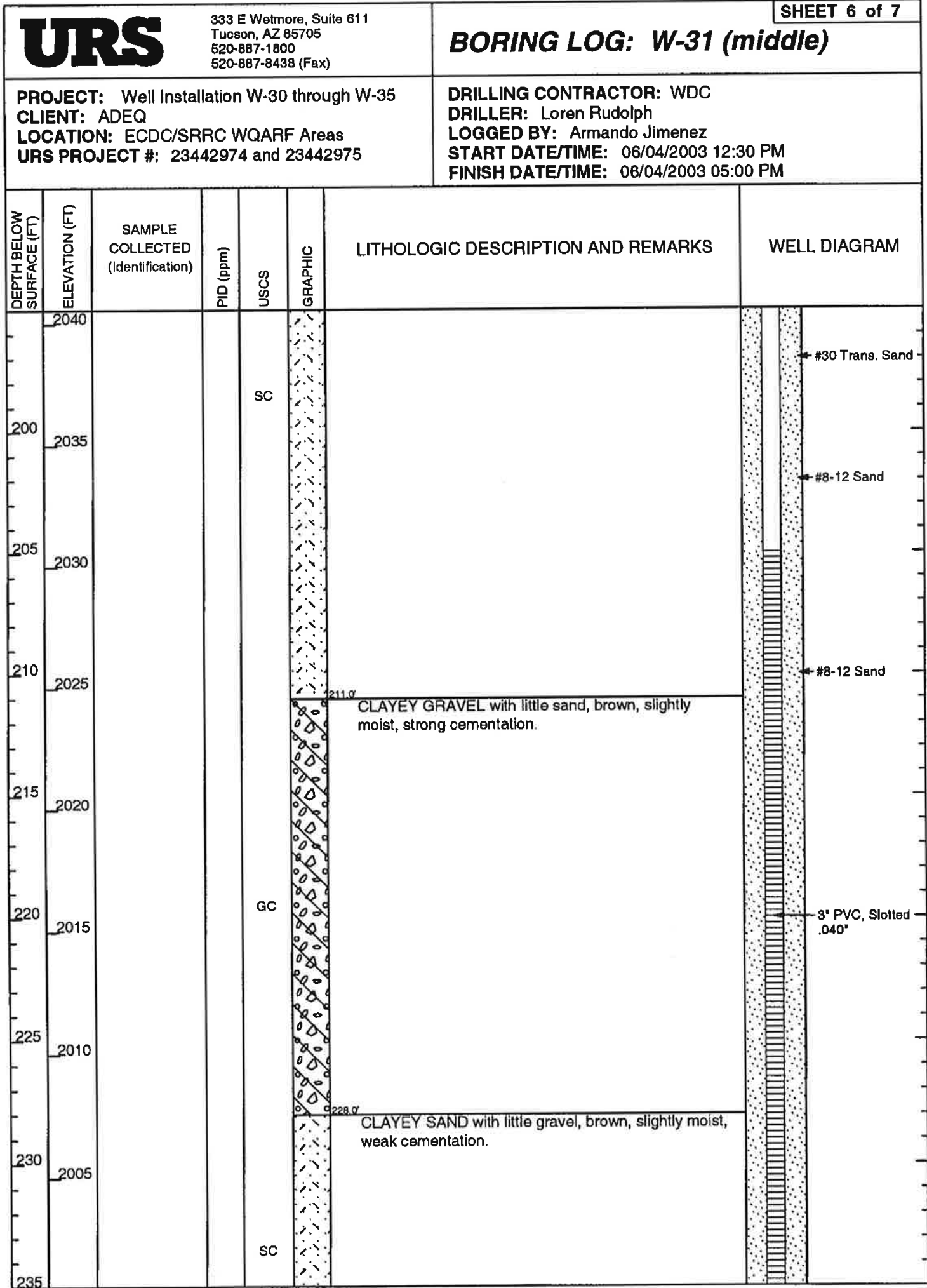
DRILLING CONTRACTOR: WDC
DRILLER: Loren Rudolph
LOGGED BY: Armando Jimenez
START DATE/TIME: 06/04/2003 12:30 PM
FINISH DATE/TIME: 06/04/2003 05:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
0	2200						
40	2195			GM		38.0' SILTY GRAVEL with sand and few cobble, brown, slightly moist.	
45	2190						
50	2185						
55	2180			GC		51.0' CLAYEY GRAVEL with some sand, reddish orange to tan, moist, low cementation, medium PI. Gravel and sand are decomposed granite, weathered clays.	
60	2175			GM		55.0' SANDY GRAVEL with little silt, few clays, orange to gray, moist, low PI.	
65	2170						
70	2165			GP		60.0' SANDY CLAY with few gravel, dark brown, moist, strong cementation, medium to high PI. 61.0' Well-graded SAND, tan, slightly moist, null PI. 62.0' Poorly-graded SANDY GRAVEL with few silt, tan, slightly moist.	
75							
						72.0' SANDY GRAVEL with little silt few clays, brown, slightly moist.	

URS		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		BORING LOG: W-31 (middle)			SHEET 3 of 7		
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRRC WQARF Areas URS PROJECT #: 23442974 and 23442975					DRILLING CONTRACTOR: WDC DRILLER: Loren Rudolph LOGGED BY: Armando Jimenez START DATE/TIME: 06/04/2003 12:30 PM FINISH DATE/TIME: 06/04/2003 05:00 PM				
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM		
	2160			GM					
						78.0'			
80	2155			SM		SILTY SAND with gravel, poorly graded, tan to lgith brown, moist.			
						81.0'			
				SC		CLAYEY SAND with little gravel, few silt, dark brown, moist.			
85	2150					87.0'			
				CL		SANDY CLAY with little gravel, few silt, dark brown, moist.			
90	2145					90.0'			
				SP		GRAVELLY SAND with few silt, few clay, tan, moist, low PI, weak cementation.			
						93.0'			
				SC		CLAYEY SAND with little gravel, brown, moist, weak cementation.			
95	2140					97.0'			
				CH		CLAY with few silt and sand, dark brown, moist, medium to high PI, strong cementation.			
100	2135					100.5'			
				SP		GRAVELLY SAND with few silt and clay, tan to light brown, slightly moist.			
105	2130					108.0'			
							← Bentonite Grout		
				SC		CLAYEY SAND with few gravel and little silt, brown, slightly moist, medium PI.			
110	2125					115.0'			
115									

		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		SHEET 4 of 7			
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				DRILLING CONTRACTOR: WDC DRILLER: Loren Rudolph LOGGED BY: Armando Jimenez START DATE/TIME: 06/04/2003 12:30 PM FINISH DATE/TIME: 06/04/2003 05:00 PM			
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2120			CL		SANDY CLAY with few gravel and silt, brown, moist, medium PI.	
120	2115			GM		118.0' SANDY GRAVEL with few clay and silt, poorly graded, tan to light brown, slightly moist.	
125	2110			SC		123.0' CLAYEY SAND with gravel, dark brown, moist.	
130	2105						
135	2100			GP		133.0' SANDY GRAVEL with few cobble, white to gray, moist.	
						135.0' CLAYEY SAND with gravel and fine cobble, dark brown, slightly moist.	
140	2095						
145	2090						
150	2085			SC			
155							

URS		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		SHEET 5 of 7			
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				BORING LOG: W-31 (middle)			
DRILLING CONTRACTOR: WDC DRILLER: Loren Rudolph LOGGED BY: Armando Jimenez START DATE/TIME: 06/04/2003 12:30 PM FINISH DATE/TIME: 06/04/2003 05:00 PM							
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160	2080						
	2075						
165	2070						
	2065						
170	2060			GC		CLAYEY GRAVEL with little sand, dark brown, moist, low to medium Pl.	
	2055						
180	2050						
	2045					CLAYEY SAND with little gravel, dark brown, moist, weak cementation.	
185							
190							
195							



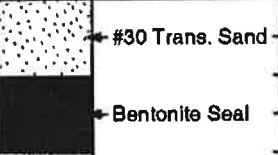


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BORING LOG: W-31 (middle)

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRR WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: WDC
DRILLER: Loren Rudolph
LOGGED BY: Armando Jimenez
START DATE/TIME: 06/04/2003 12:30 PM
FINISH DATE/TIME: 06/04/2003 05:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2000						
240	1995						
245	1990						
250	1985						
255	1980						
260	1975						
265	1970						
270	1965						
275							

<div>URS</div>		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		SHEET 1 of 11			
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975		DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dana Strength START DATE/TIME: 04/17/2003 12:30 PM FINISH DATE/TIME: 05/31/2003 01:05 PM					
LATITUDE (NAVD27): 32.1853 LONGITUDE (NAVD 27): 111.0142		TOP OF GROUND ELEVATION: 2235.45 A.S.L. TOP OF CASING ELEVATION: 2235.45 A.S.L. SCREENED INTERVAL: 1865.45' - 1835.45'					
COMMENTS: Lithology elevations calculated from top of casing (ground surface elevations not available)		RIG TYPE: Sonic DRILLING METHOD: RotoSonic SAMPLING METHOD: Continuous Coring					
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2235		0.9			SANDY CLAY with silt, brown, dry, medium PI, soft density, weak cementation.	Concrete
5	2230			CL		Thin veins of medium cementation, medium stiffness.	Cement Grout
10	2225					11.0'	3" PVC Sch. 40
				SM		SILTY SAND, brown, dry, null PI.	
						13.5'	
				CL		SANDY CLAY, light brown, dry, medium PI.	
15	2220					16.5'	
				SM		SILTY SAND with few gravel, tan, null cementation.	
						3-inch layer of gravel, interbedded with very coarse sand.	
20	2215					Fine cobble.	
				SC		21.5'	
						CLAYEY SAND with trace of gravel and silt, brown, slightly moist, low PI.	
25	2210		3.4			25.0'	
						SILTY SAND with trace gravel, light brown, slightly moist.	Bentonite Grout
						3-inch layer of interbedded cobble and gravel.	
30	2205			SM		18-inch layer of sandy clay, dark gray color.	
						Increase in gravel.	
						3-inch layer of clay with few sand, medium PI.	
35							



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SHEET 2 of 11

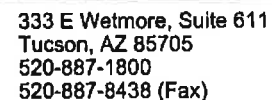
BORING LOG: W-31 (deep)

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dana Strength
START DATE/TIME: 04/17/2003 12:30 PM
FINISH DATE/TIME: 05/31/2003 01:05 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
2200			4.0			12-inch layer of interbedded sandy clay.	
40	2195			GM		36.0' SILTY GRAVEL with sand and few cobble, brown, slightly moist. Decrease in silt, gravels and increase in sand.	
45	2190					8-inch layer of poorly graded sand, moist.	
50	2185					6 to 10-inch layer of interbedded clayey gravel, silty gravel, sandy clay and clayey sand. Low to medium PI. Decrease in gravel and cobble.	
55	2180		8.5	GC		51.0' CLAYEY GRAVEL with some sand, reddish orange to tan, moist, low cementation, medium PI. Gravel and sand are decomposed granite, weathered clays.	
60	2175			GM		55.0' SANDY GRAVEL with little silt, few clays, orange to gray, moist, low PI.	
65	2170			CL		60.0' SANDY CLAY with few gravel, dark brown, moist, strong cementation, medium to high PI.	
70	2165			SW		61.0' Well-graded SAND, tan, slightly moist, null PI.	
						62.0' Poorly-graded SANDY GRAVEL with few silt, tan, slightly moist.	
				GP		6 to 9-inch layer of interbedded sandy gravel and gravelly sand, few silt, poorly sorted.	
						68.0' Few cobble, dry to slightly moist.	
75						72.0' SANDY GRAVEL with little silt few clays, brown, slightly moist.	


URS		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		BORING LOG: W-31 (deep)		SHEET 3 of 11	
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dana Strength START DATE/TIME: 04/17/2003 12:30 PM FINISH DATE/TIME: 05/31/2003 01:05 PM			
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2160			GM			
					78.0'		
80	2155			SM		SILTY SAND with gravel, poorly graded, tan to light brown, moist.	
					81.0'		
				SC		CLAYEY SAND with little gravel, few silt, dark brown, moist.	
85	2150				87.0'		
				CL		SANDY CLAY with little gravel, few silt, dark brown, moist. Increase in gravel size, 2-inches.	
90	2145		11.6		90.0'	Some cobble.	
				SP		GRAVELLY SAND with few silt, few clay, tan, moist, low PI, weak cementation.	
					93.0'		
95	2140			SC		CLAYEY SAND with little gravel, brown, moist, weak cementation.	
					97.0'		
				CH		CLAY with few silt and sand, dark brown, moist, medium to high PI, strong cementation.	
100	2135				100.5'		
				SP		GRAVELLY SAND with few silt and clay, tan to light brown, slightly moist. 8 to 10-inch layer of interbedded gravelly sand and sandy gravel.	
105	2130				108.0'		
110	2125			SC		CLAYEY SAND with few gravel and little silt, brown, slightly moist, medium PI. 6-inch layer of coarser gravel.	
115					115.0'		




PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dana Strength
START DATE/TIME: 04/17/2003 12:30 PM
FINISH DATE/TIME: 05/31/2003 01:05 PM

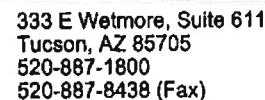
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
2120				CL		SANDY CLAY with few gravel and silt, brown, moist, medium PI.	
120	2115		4.2	GM		118.0' SANDY GRAVEL with few clay and silt, poorly graded, tan to light brown, slightly moist. 4-inch layer of clay, black. Decrease in gravel size.	
125	2110			SC		123.0' CLAYEY SAND with gravel, dark brown, moist.	
130	2105					133.0' SANDY GRAVEL with few cobble, white to gray, moist.	
135	2100		5.5	GP		135.0' CLAYEY SAND with gravel and fine cobble, dark brown, slightly moist. Material becomes dry.	
140	2095					8 to 12-inch layer of interbedded clayey sand and sandy clay.	
145	2090						
150	2085		4.4	SC		Moist and low PI.	
155							

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PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				BORING LOG: W-31 (deep) DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dana Strength START DATE/TIME: 04/17/2003 12:30 PM FINISH DATE/TIME: 05/31/2003 01:05 PM			
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160	2080						
165	2075						
170	2070						
175	2065		17.1			CLAYEY GRAVEL with little sand, dark brown, moist, low to medium PI.	
180	2060			GC		SAMPLE ID: W-31-171.5 Reddish iron staining.	
185	2055					6 to 12-inch layer of increasing sand and increasing clay.	
190	2050					CLAYEY SAND with little gravel, dark brown, moist, weak cementation.	
195	2045						

		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		SHEET 6 of 11			
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				BORING LOG: W-31 (deep) DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dana Strength START DATE/TIME: 04/17/2003 12:30 PM FINISH DATE/TIME: 05/31/2003 01:05 PM			
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
200	2040		3.9	SC			
205	2035					Increase in gravel size.	
210	2030					Increase in gravel proportion and a decrease in sand proportion.	
215	2025		4.6			CLAYEY GRAVEL with little sand, brown, slightly moist, strong cementation. SAMPLE ID: W-31-211.5	
220	2020			GC		2 to 6-inch layer of Interbedded clayey gravel and clayey sand.	
225	2015					Increase in in gravel size.	
230	2010					CLAYEY SAND with little gravel, brown, slightly moist, weak cementation.	
235	2005		4.3	SC		SAMPLE ID: W-31-232'	

URS		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		BORING LOG: W-31 (deep)			
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dana Strength START DATE/TIME: 04/17/2003 12:30 PM FINISH DATE/TIME: 05/31/2003 01:05 PM			
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2000						
240	1995					239.0' SILTY GRAVEL, brown, slightly moist. 1 to 2-inch layer of poorly graded sand.	
245	1990			GM		4-inch layer of clayey sand, wet. 9-inch layer of clayey gravel, moist. 8-inch layer of clayey gravel, wet.	
250	1985		11.3			250.0' 6-inch layer of poorly graded gravel. CLAYEY GRAVEL with sand, brown, moist, medium PI. SAMPLE ID: W-31-251	
255	1980						
260	1975			GC		6-inch layer of clayey sand with little gravel, moist, medium to high.	
265	1970						
270	1965		0.5			8-inch layer of coarser gravels. Increase in silt clay. SAMPLE ID: W-31-271.5	
275						274.0' 8-inch layer sandy gravel with little clay. GRAVELLY SAND with little clay and poorly sand,	

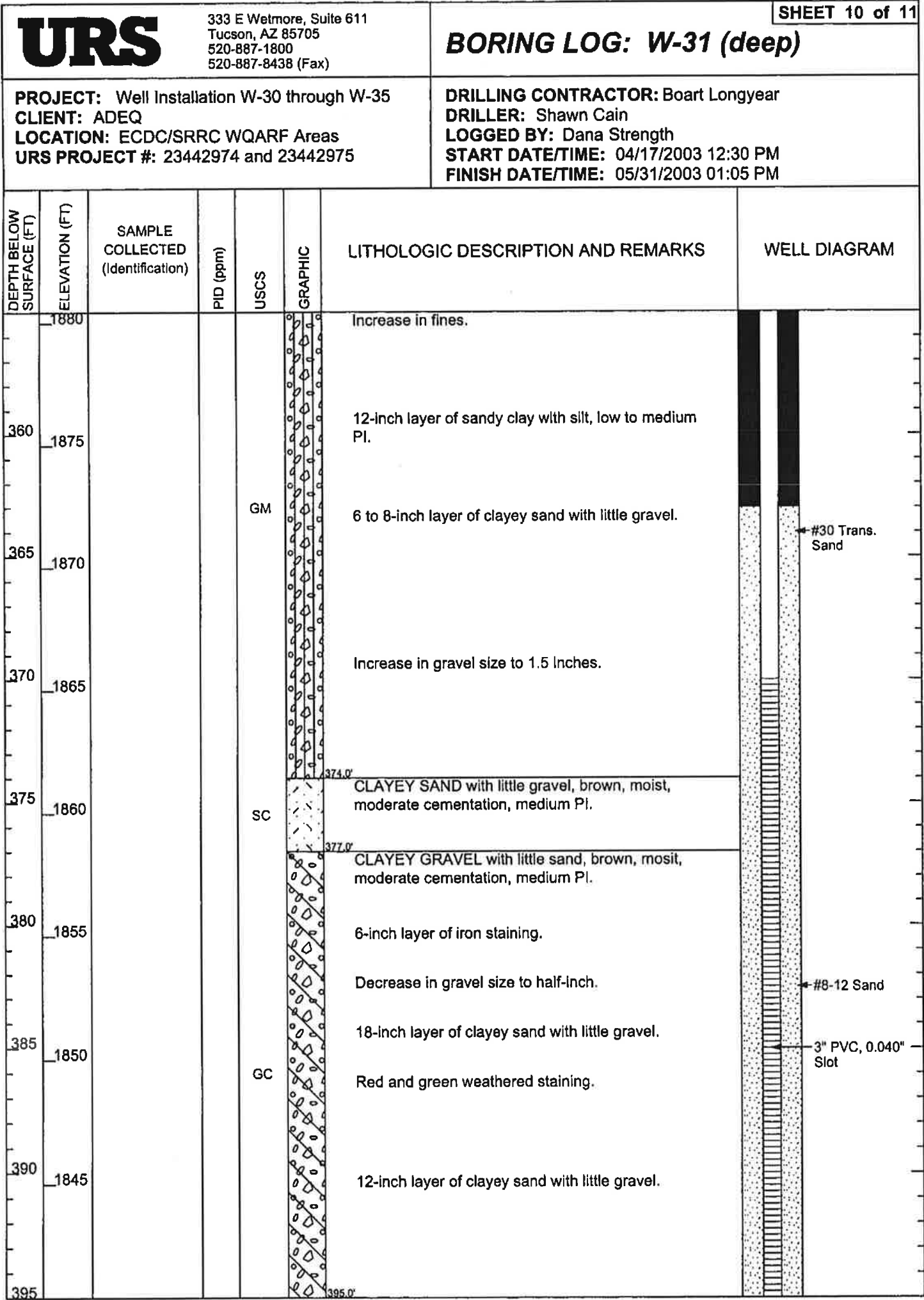
<div>URS</div> <div>333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)</div>		<div>SHEET 8 of 11</div> <div>BORING LOG: W-31 (deep)</div>					
<div>PROJECT: Well Installation W-30 through W-35</div> <div>CLIENT: ADEQ</div> <div>LOCATION: ECDC/SRRC WQARF Areas</div> <div>URS PROJECT #: 23442974 and 23442975</div>		<div>DRILLING CONTRACTOR: Boart Longyear</div> <div>DRILLER: Shawn Cain</div> <div>LOGGED BY: Dana Strength</div> <div>START DATE/TIME: 04/17/2003 12:30 PM</div> <div>FINISH DATE/TIME: 05/31/2003 01:05 PM</div>					
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	1960			SP		brown, moist, low PI, low cementation.	
						276.0'	
						SANDY GRAVEL with little clays, brown, moist, low to medium PI.	
						6 to 12-inch layer of interbedded gravelly sand and sandy gravel.	
280	1955			GP			
285	1950						
						287.0'	
						CLAYEY SAND with little gravel, brown to dark gray, moist, medium plasticity.	
				SC			
290	1945					Cobble of 3.5-inches in diameter are present.	
						291.0'	
						GRAVELLY SAND with little clay, brown, moist, weak cementation, low PI.	
				GM		CLAYEY GRAVEL with little sand, some cobble, brown, moist, moderate cementation.	
						292.0'	
						18-inch layer of clayey sand with little gravel.	
						4-inch layer of poorly sorted.	
295	1940						
300	1935		0.2	GC		16-inch layer of poorly graded gravel, dark brown, moist, low PI, weak cementation.	
						SAMPLE ID: W-31-301.5	
						18-inch layer of poorly graded gravel.	
305	1930						
310	1925		2.2			310.0'	
						SANDY GRAVEL with little clays, dark brown, moist.	
						6 to 12-inch layer few cobble, 4-inch in diameter.	
				GM			
315							



PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
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START DATE/TIME: 04/17/2003 12:30 PM
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DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
1920							
320	1915					CLAYEY GRAVEL with little sand, dark brown, moist, weak to medium cementation.	
325	1910					Iron staining. Decrease in gravel content. Increase in gravel content.	
330	1905					12-inch layer of sandy gravel with clay.	
335	1900			GC		18-inch layer of clayey gravel.	
340	1895		2.0			18-inch layer of sandy gravel with little clay.	
345	1890					Decrease in gravel size.	
350	1885					12-inch layer of clayey sand with few gravel, medium PI.	
355			2.8			SAMPLE ID: W-31-351.5 SANDY GRAVEL with little clay, dark brown, moist, weak cementation, low PI.	





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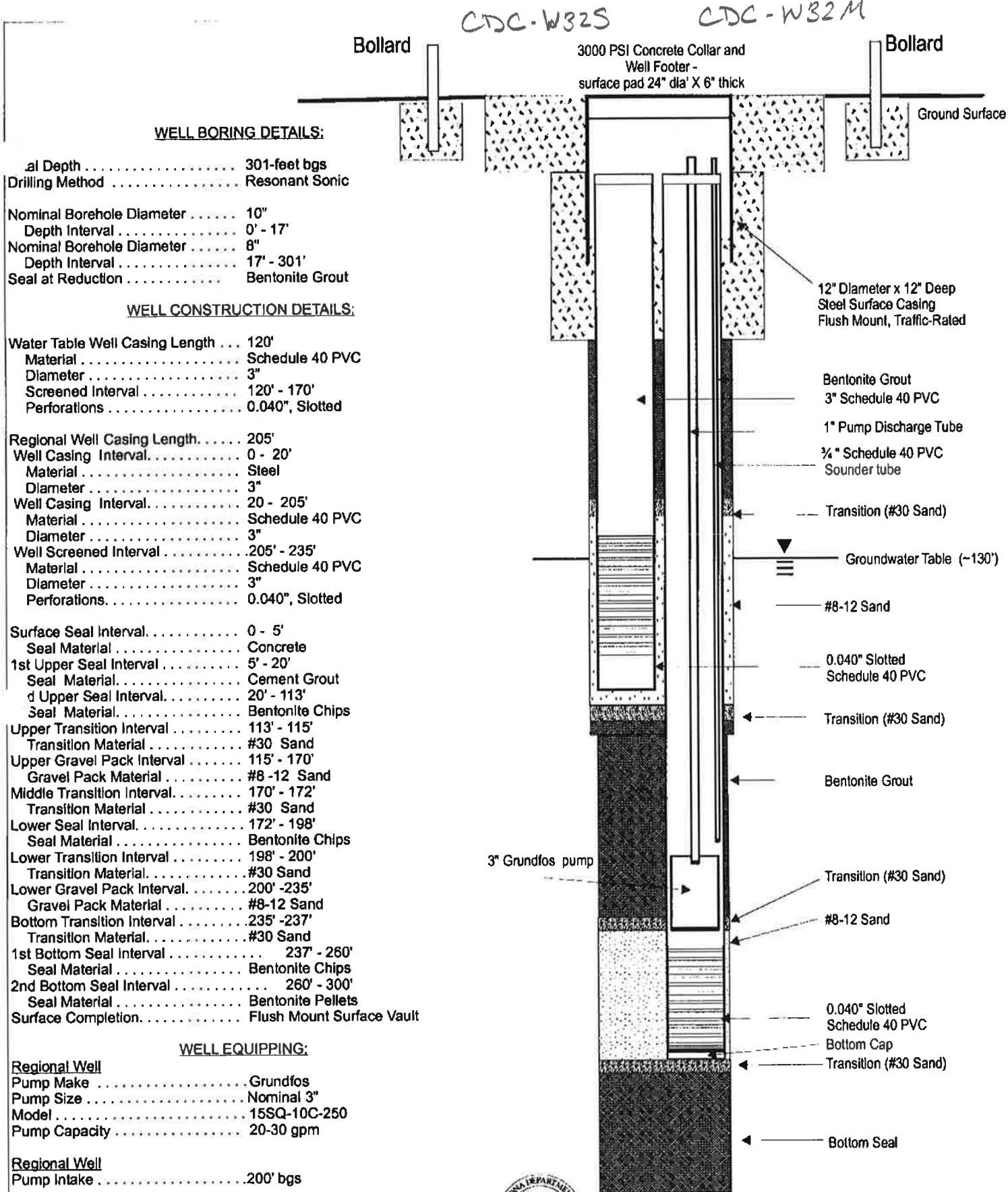
SHEET 11 of 11

BORING LOG: W-31 (deep)

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
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START DATE/TIME: 04/17/2003 12:30 PM
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DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
400	1840		1.2	SC		CLAYEY SAND with few gravel, brown, moist, weak cementation, low PI. Increase in gravel percentage and in size. A 4 to 5-inch cobble found. SAMPLE ID: W-31-401.5	 #30 Trans. Sand Bentonite Seal
405	1835						
410	1830						
415	1825						
420	1820						
425	1815						
430	1810						
435	1805						



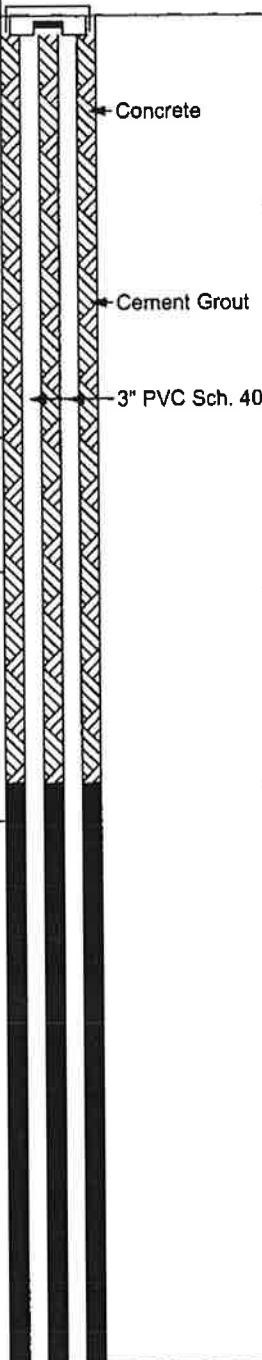
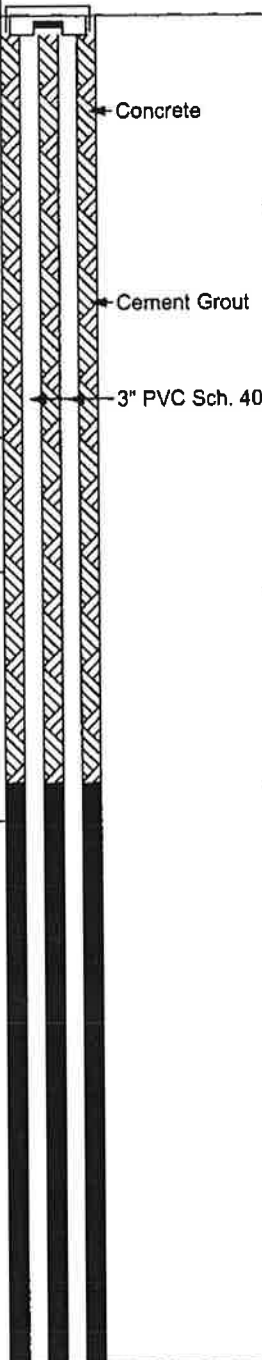
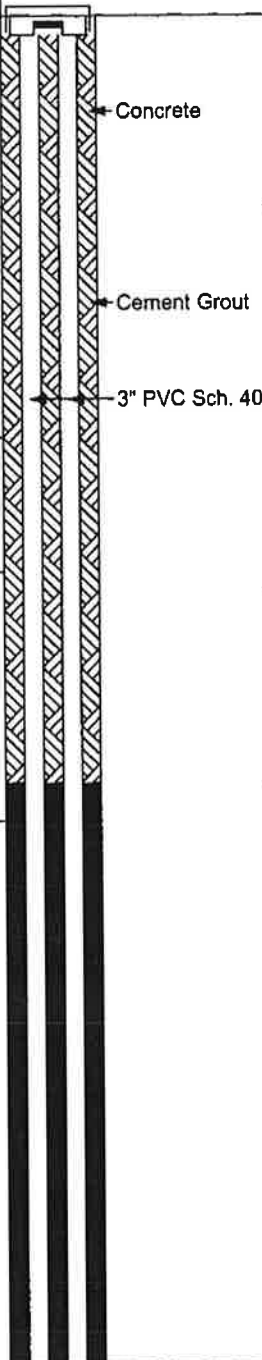
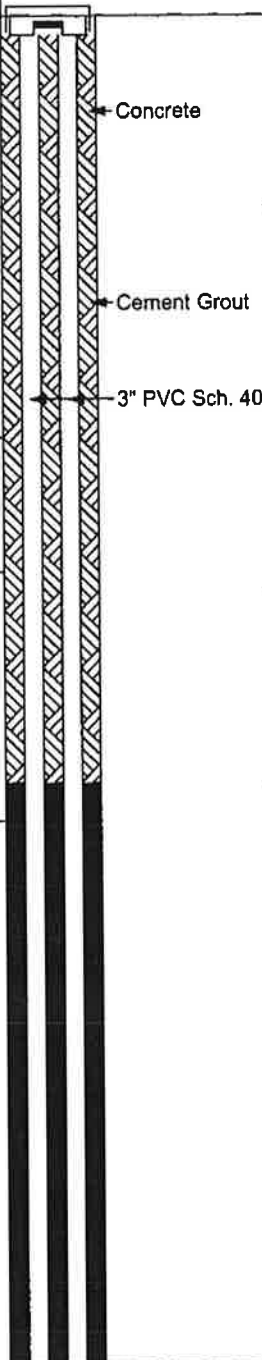
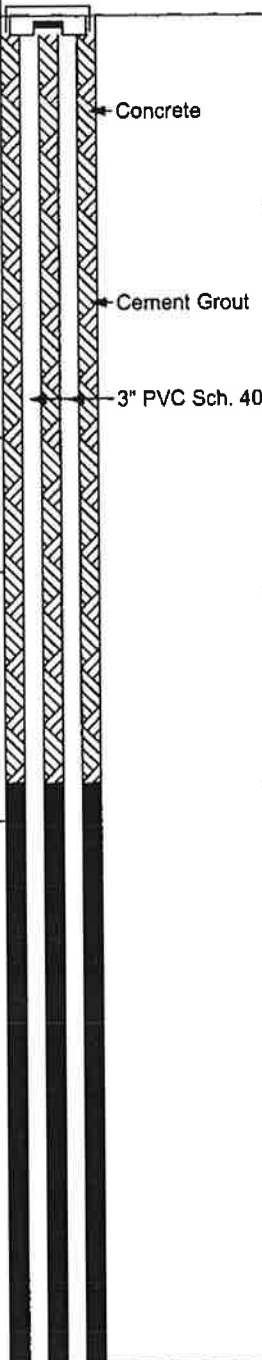
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W-32 MONITOR WELLS AS-BUILT SCHEMATIC

Shannon Road - Rillito Creek & El Camino Del Cerro WQARF Sites

URS

<div>URS</div> <div>333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)</div>		SHEET 1 of 8		BORING LOG: W-32			
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975		DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Armando Jimenez START DATE/TIME: 03/21/2003 01:00 PM FINISH DATE/TIME:					
LATITUDE (NAVD27): 32.1815 LONGITUDE (NAVD 27): 111.0204		TOP OF GROUND ELEVATION: 2234 A.S.L. TOP OF CASING ELEVATION: 2234 A.S.L. SCREENED INTERVAL: 2114.84' - 2064.84' ; 2029.82' - 1,999.82'					
COMMENTS: Lithology elevations calculated from top of casing (ground surface elevations not available)		RIG TYPE: Sonic DRILLING METHOD: RotoSonic SAMPLING METHOD: Continuous Coring					
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
				CL		SILTY CLAY with sand, brown, dry to slightly moist, low plasticity.	
5	2230		0.8				
			1.5	SC-SM		SANDY CLAY, brown, dry to slightly moist, medium plasticity, 15% fine sand. Decrease in sand, medium stiff to stiff. 35% fine sand and 20% silt. Transition to clayey sand.	
10	2225						
			2.9	SP		POORLY-GRADED SAND, trace to few silt, brown, slightly moist, 30% fine sand and 5% to 10% silt. 3 inch layer of interbedded clayey sand. Fine grain sand transitions to silt.	
15	2220						
			14.1	SC		CLAYEY SAND with silt, brown to dark brown, slightly moist. Interbedded poorly graded sand, silty sand, clayey sand and silt from 15' to 20'.	
20	2215						
			5.4			POORLY-GRADED SAND with silt, brown, slightly moist. Interbedded clean sand, silty sand, and clayey sand from 23' to 28'.	
25	2210						
			2.0	SP-SM		Gravel layer Interbedded poorly graded sand and silty sand, 20% silt, 15% gravel and 15% fine to coarse sand. Interbedded large gravel. Gravel and cobble layer.	
30	2205	30'					
							
	2200						
35							



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SHEET 2 of 8

BORING LOG: W-32

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Armando Jimenez
START DATE/TIME: 03/21/2003 01:00 PM
FINISH DATE/TIME:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			1.3	SM		5 inch size cobble noted. SITLY SAND with gravel, brown, slightly moist, 25% silt, 15% gravel and fine to coarse but mostly medium sand.	
40	2195			GM		SILTY GRAVEL with sand, trace of cobble, brown, slightly moist, 15% sand and gravel, 10% silt and clay.	
			18.6	SP		8 inch layer clayey sand gravel. SAND with gravel, trace cobble, light brown, slightly moist, 30% gravel, 5% silt and medium to coarse but mostly medium sand.	
45	2190			GC		CLAYEY GRAVEL with cobble and few sand, brown to dark brown, slightly moist, low plasticity, 40% gravel, 35% cobble, 15% sand, and 10% clay.	
50	2185		3.3	CL		SANDY CLAY with silt, trace gravel, greenish, yellowish, gray, brown, moist, low to medium plasticity, 20% sand 15% silt, 5% gravel.	
				SC		CLAYEY SAND, few gravel, brown, slightly moist, low plasticity and dense.	
55	2180			GC		CLAYEY GRAVEL, light brown, slightly moist.	
60	2175		8.1	GC			
			10.1	SP		SAND, few silt, light brown, slightly moist to moist.	
65	2170					CLAYEY SAND with gravel, trace cobble, brown, moist, low plasticity, dense to very dense, 25% gravel, 20% clay, fine to coarse mostly coarse sand.	
			9.5			Thin interbedded clayey gravel layer Trace of cobble.	Bentonite Chlps
70	2165					Trace of cobble.	
			8.4			Interbedded 10 inch layer of silty sand with gravel.	
75	2160						



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SHEET 3 of 8

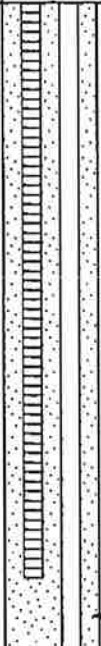

BORING LOG: W-32

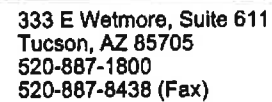
PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Armando Jimenez
START DATE/TIME: 03/21/2003 01:00 PM
FINISH DATE/TIME:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80	2155	90'	4.3	SC		6 inch layer of silty sand. Interbedded clayey gravel with sand layer. Interbedded silty sand with gravel.	
85	2150		5.7			Interbedded 8 inch layer of silty sand with gravel. Interbedded silty sand with a trace of gravel (2"). 8 inch layer of silty sand. 3 inch layer of silty sand.	
90	2145		11.7				
95	2140		23.5				
95	2140		6.4	GM		93.0' SILTY GRAVEL with sand, brown, slightly moist, 35% fine to coarse sand, 20% silt and clay.	
100	2135		24.0			97.0' CLAYEY SAND with gravel, brown, slightly moist. Interbedded clayey gravel.	
105	2130		22.3	SC		Interbedded 8 inch layer of silty gravel.	
110	2125		12.2			105.0' SILTY GRAVEL with sand, brown, slightly moist, null plasticity. Interbedded clayey gravel.	
115	2120		35.1			Interbedded clayey gravel.	
115	2120			GM		Increase in gravel size. Interbedded 2 inch layer between clayey gravel and	

<div>URS</div>		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		BORING LOG: W-32		SHEET 4 of 8	
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Armando Jimenez START DATE/TIME: 03/21/2003 01:00 PM FINISH DATE/TIME:			
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
120	2115	120'	6.1			silty gravel.	<div>#8-12 Sand</div>
125	2110					CLAYEY GRAVEL with sand, brown, slightly moist, low plasticity, 25% clay.	
130	2105	W-32-139'	12.3	10.4		Interbedded silty gravel. Interbedded clayey sand with gravel.	<div>3" PVC Sch.40 Slotted 0.040"</div>
135	2100					4 inch layer of silty sand. 6 inch layer of silty gravel layer.	
140	2095					4 inch layer silty gravel layer, 35% sand and 20% silt.	
145	2090					10 inch layer silty sand layer. Silty sand layer. 7 inch layer of silty sand and clean sand with few gravel. Increase in plasticity. Silty gravel and clean sand with few gravel.	
150	2085					8 inch layer of silty sand with coarse gravel layer.	
155	2080		7.4	3.1		SILTY GRAVEL with sand, dark brown, wet, 30% to 40% fine to coarse sand, 10% to 20% silt and fine gravel. Few interbedded silty sand and poorly-graded sand.	

<div>URS</div>		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		BORING LOG: W-32			
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Armando Jimenez START DATE/TIME: 03/21/2003 01:00 PM FINISH DATE/TIME:			
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2075					6 inch layer of interbedded silty sand with gravel.	
160			5.7			4 inch layer of clayey gravel.	
			8.1			Trace of coarse gravel and cobble.	
2070						2 inch layer of gravel layer.	
165						8 inch layer silty sand layer with trace gravel.	
						8 inch layer of interbedded clay layer.	
2065						4 inch layer of interbedded sand, and silty sand.	
170			2.8				
2060							
175							
			5.4			10 inch layer of interbedded silty sand.	
2055			12.2			6 inch layer of clayey gravel with sand, low plasticity, trace to 15% silt, trace gravel, fine to coarse mostly coarse sand.	
180						3 inch layer of clayey gravel with sand.	
						5 inch layer of clean sand, trace of gravel and silt.	
2050						Coarse gravel.	
185						Silty gravelly sand.	
2045				GM			
190			4.8				
2040							
195							



PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
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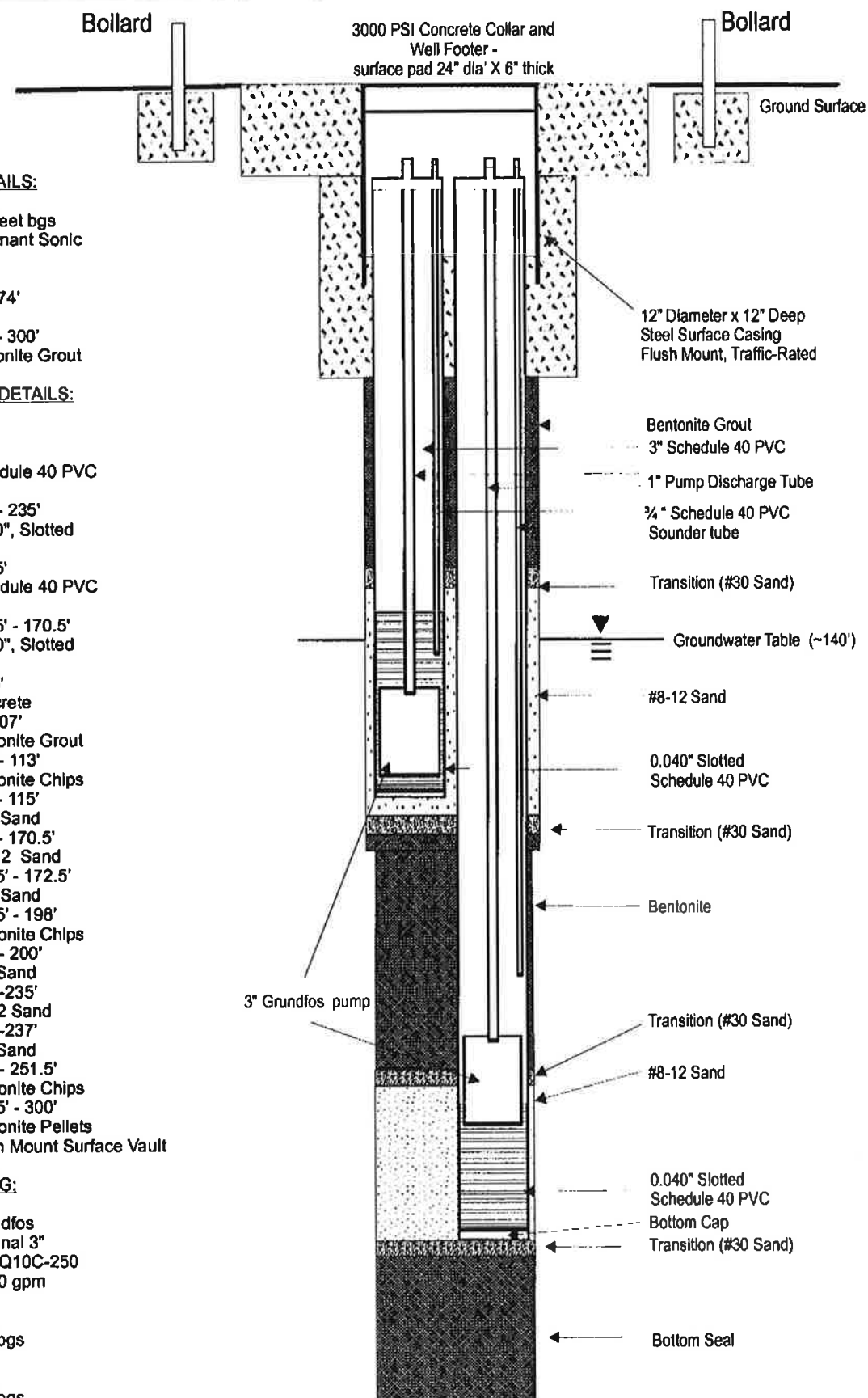
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM			
200	2035	W-32-211.5'	7.5			6 inch layer of silty sand and trace gravel.				
						4 inch layer of clayey gravel with sand.				
	2030		10 inch layer of silty sand with few gravel.							
205			Coarse gravel.							
			6 inch layer of clayey gravel.							
	2025		6 inch layer of clayey gravel.							
210			4 inch layer of silty sand with gravel.							
			2 to 3 inch layer of silty, clean sand with few gravel.							
	2020		2 to 3 inch layer of silty, clean sand with few gravel.							
215			W-32-231.5'			6.2				Interbedded clayey gravel.
		2 to 3 inch layer of silty, clean sand with few gravel.								
		Interbedded clayey gravel.								
	2015	2 to 3 inch layer of silty, clean sand with few gravel.								
220		Interbedded clayey gravel.								
		Trace cobble.								
		2 to 3 inch layer of silty, clean sand with few gravel.								
	2010	2 to 3 inch layer of silty, clean sand with few gravel.								
225		2.1		GC		CLAYEY GRAVEL with sand, brown, moist, low plasticity, dense.				
						SILTY GRAVEL, wet, brown.				
	2005		Cobble noted.							
230			4 inch layer of clayey gravel.							
						6 inch layer of silty sand.				
	2000					3 inch layer of clayey gravel.				
235										

URS		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		BORING LOG: W-32		SHEET 7 of 8	
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Armando Jimenez START DATE/TIME: 03/21/2003 01:00 PM FINISH DATE/TIME:			
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
				GM		Interbedded with clayey gravel and silty gravel.	<div>#30 Trans. Sand</div> <div>Bentonite Chips</div>
240	1995		5.3				
						241.0'	
						SILTY GRAVEL with sand, brown, wet. 2 to 3 inch layer of silty sand with gravel.	
245	1990		5.3				
						2 to 3 inch layer of silty sand with gravel.	<div>Bentonite Chips</div>
250	1985			GM			
		W-32-251.5'				Interbedded silty sand with gravel.	
255	1980		5.3				
						Clayey gravel layer.	
						258.0'	<div>Bentonite Chips</div>
260	1975		27.6				
						CLAYEY GRAVEL, brown, moist to wet, low plasticity, dense. 4 inch layer poorly-graded sand and silty sand.	
265	1970		27.0	GC			
						2 to 6 inch layers of clayey gravel, silty gravel and silty sand.	
270	1965		10.8				<div>Bentonite Chips</div>
			10.2				
			96.8				
275	1960		25.2				
						272.5'	
						SILTY GRAVEL with sand, brown, wet, 30% gravel and clay, fine to coarse mostly coarse sand.	

<div>URS<div>333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)</div></div>		SHEET 8 of 8					
<div>PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDG/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975</div>		<div>DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Armando Jimenez START DATE/TIME: 03/21/2003 01:00 PM FINISH DATE/TIME:</div>					
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
280	1955	W-32-301'	5.5	GM		7 inch layer of fine to coarse sand.	<div>Betonite Pellet Pellets</div>
						2 inch layer of clayey sand.	
				3 inch layer of clayey coarse gravel.			
285	1950			2 inch medium grain size.			
				8 inch layer of sand.			
		8.1	GC		CLAYEY GRAVEL, brown, moist, low plasticity, 25% to 30% clay, fine to coarse sand and fine to coarse mostly fine gravel.		
					4 inch layer of silty gravel, wet.		
290	1945				Interbedded clayey gravel and silty gravel.		
					Interbedded clayey gravel and silty gravel.		
295	1940				Interbedded clayey gravel and silty gravel.		
		W-32-301'	8.1	GC		2 inch layer of silty sand.	
300	1935						
		W-32-301'	8.1	GC			
305	1930						
		W-32-301'	8.1	GC			
310	1925						
		W-32-301'	8.1	GC			
315	1920						

CDC-W33 S

CDC-W33 M

**WELL BORING DETAILS:**

Total Depth 300-feet bgs
 Drilling Method Resonant Sonic
 Nominal Borehole Diameter 10"
 Depth Interval 0' - 174'
 Nominal Borehole Diameter 8"
 Depth Interval 174' - 300'
 Seal at Reduction Bentonite Grout

WELL CONSTRUCTION DETAILS:

Regional Well Casing Length 205'
 Material Schedule 40 PVC
 Diameter 3"
 Screened Interval 205' - 235'
 Perforations 0.040", Slotted

Water Table Well Casing Length 120.5'
 Material Schedule 40 PVC
 Diameter 3"
 Screened Interval 120.5' - 170.5'
 Perforations 0.040", Slotted

Surface Seal Interval 0 - 5'
 Seal Material Concrete
 1st Upper Seal Interval 5' - 107'
 Seal Material Bentonite Grout
 2nd Upper Seal Interval 107' - 113'
 Seal Material Bentonite Chips
 Upper Transition Interval 113' - 115'
 Transition Material #30 Sand
 Upper Gravel Pack Interval 115' - 170.5'
 Gravel Pack Material #8 -12 Sand
 Middle Transition Interval 170.5' - 172.5'
 Transition Material #30 Sand
 Lower Seal Interval 172.5' - 198'
 Seal Material Bentonite Chips
 Lower Transition Interval 198' - 200'
 Transition Material #30 Sand
 Lower Gravel Pack Interval 200' - 235'
 Gravel Pack Material #8-12 Sand
 Bottom Transition Interval 235' - 237'
 Transition Material #30 Sand
 Bottom Seal Interval 237' - 251.5'
 Seal Material Bentonite Chips
 Backfill Interval 251.5' - 300'
 Seal Material Bentonite Pellets
 Surface Completion Flush Mount Surface Vault

WELL EQUIPPING:

Both Wells
 Pump Make Grundfos
 Pump Size Nominal 3"
 Model 15 SQ10C-250
 Pump Capacity 20-30 gpm

Regional Well
 Pump Intake 203' bgs

Water Table Well
 Pump Intake 163' bgs

P:\E\CD-C\SRRC\RI-FS\Monitor Wells\Drilling\2003\Installation Report\Figures\W-33 As-Built.cdr 10-03


















**W-33 MONITOR WELLS AS-BUILT SCHEMATIC**

Remedial Investigation/Feasibility Study




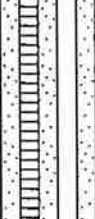
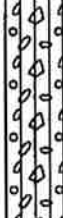
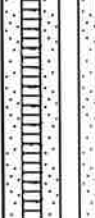

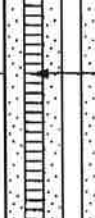
Shannon Road - Rillito Creek & El Camino Del Cerro WQARF Sites

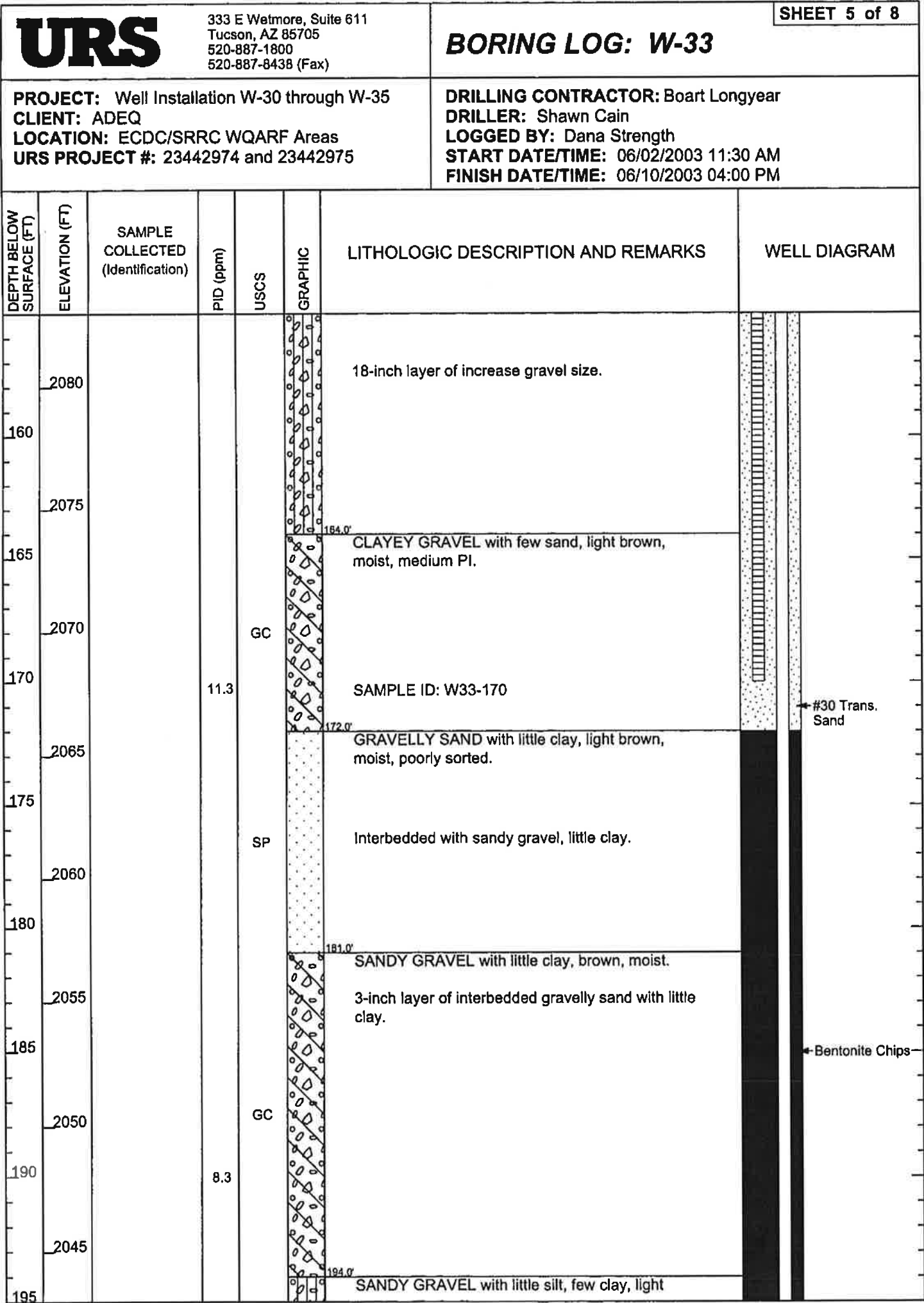
URS

<div>URS</div> <div>333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)</div>		<div>BORING LOG: W-33</div>		<div>SHEET 1 of 8</div>																																																																																																														
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<div>LATITUDE (NAVD27): 32.1822</div> <div>LONGITUDE (NAVD 27): 111.0158</div>		<div>TOP OF GROUND ELEVATION: 2238 A.S.L.</div> <div>TOP OF CASING ELEVATION: 2238 A.S.L.</div> <div>SCREENED INTERVAL: 2117.82' - 2067.82' ; 2033.34' - 2003.34'</div>																																																																																																																
<div>COMMENTS: Lithology elevations calculated from top of casing (ground surface elevations not available)</div>		<div>RIG TYPE: Sonic</div> <div>DRILLING METHOD: RotoSonic</div> <div>SAMPLING METHOD: Continuous Coring</div>																																																																																																																
<table><tr><th>DEPTH BELOW SURFACE (FT)</th><th>ELEVATION (FT)</th><th>SAMPLE COLLECTED (Identification)</th><th>PID (ppm)</th><th>USCS</th><th>GRAPHIC</th><th>LITHOLOGIC DESCRIPTION AND REMARKS</th><th>WELL DIAGRAM</th></tr><tr><td></td><td>2235</td><td></td><td></td><td>SW</td><td></td><td>SAND with few gravels and fines, tan to light brown, dry, weak cementation.</td><td rowspan="10"></td></tr><tr><td>5</td><td></td><td></td><td>1.9</td><td></td><td></td><td></td></tr><tr><td></td><td>2230</td><td></td><td></td><td>CL</td><td></td><td>SILTY CLAY with few sand, light brown, dry, weak to medium cementation, high plasticity.</td></tr><tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td>Increase in fine sand, dark brown.</td></tr><tr><td></td><td>2225</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>15</td><td></td><td></td><td></td><td>SC</td><td></td><td>CLAYEY SAND with few gravel, light brown, dry, weak to medium cementation, medium plasticity.</td></tr><tr><td></td><td>2220</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>20</td><td></td><td></td><td>3.4</td><td>CL</td><td></td><td>SILTY CLAY with little sand, light brown, dry, weak to medium cementation, high PI, soft.</td></tr><tr><td></td><td>2215</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>25</td><td></td><td></td><td></td><td>SC</td><td></td><td>CLAYEY SAND, light brown, dry, weak to medium cementation, medium plasticity, dense.</td></tr><tr><td></td><td>2210</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>30</td><td></td><td></td><td></td><td>SM</td><td></td><td>SILTY SAND with few clay, tan, dry, weak cementation, low PI, dense.</td></tr><tr><td></td><td>2205</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>35</td><td></td><td></td><td></td><td>SW</td><td></td><td>SAND with little clay, tan, dry. Coarse sand.</td><td></td></tr></table>							DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM		2235			SW		SAND with few gravels and fines, tan to light brown, dry, weak cementation.		5			1.9					2230			CL		SILTY CLAY with few sand, light brown, dry, weak to medium cementation, high plasticity.	10						Increase in fine sand, dark brown.		2225						15				SC		CLAYEY SAND with few gravel, light brown, dry, weak to medium cementation, medium plasticity.		2220						20			3.4	CL		SILTY CLAY with little sand, light brown, dry, weak to medium cementation, high PI, soft.		2215						25				SC		CLAYEY SAND, light brown, dry, weak to medium cementation, medium plasticity, dense.		2210						30				SM		SILTY SAND with few clay, tan, dry, weak cementation, low PI, dense.		2205						35				SW		SAND with little clay, tan, dry. Coarse sand.	
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URS		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		BORING LOG: W-33		SHEET 2 of 8	
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dana Strength START DATE/TIME: 06/02/2003 11:30 AM FINISH DATE/TIME: 06/10/2003 04:00 PM			
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2200			GM		36.0' SANDY GRAVEL with little clay, tan to light gray. 6-inch layer of coarse gravel.	
40						6-inch layer of coarse gravel.	
	2195			SP		41.0' GRAVELLY SAND with few clay, tan, dry, null PI. 6-inch layer of cobble upto 4 inches in diameter.	
45						46.0' SANDY GRAVEL with little cobble and clay, light brown, dry to slightly moist. 6 to 12-inch layer of cobble found, upto 4-inch in diameter.	
	2190		7.2				
50							
	2185					Molted clayey sand with gravel. 9-inch layer of silty sand with clay.	
55							
	2180					Increase in gravel, decomposed granite.	
60			11.9				
	2175					9-inch layer of interbedded clay. 6-inch layer of gravelly sandy clay, decomposed granite. 3-inch layer of gravelly clay sand.	
65							
	2170					6-inch layer of gravelly sand with silt and clay.	
70							
	2165					Interbedded clay and gravel.	
75							

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PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRRC WQARF Areas URS PROJECT #: 23442974 and 23442975			DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dana Strength START DATE/TIME: 06/02/2003 11:30 AM FINISH DATE/TIME: 06/10/2003 04:00 PM				
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80	2160		12.4	GM		12-inch layer of sandy gravel, cobble with silt and clay.	
	2155					9-inch layer of gravelly sand with silt and clay.	
85	2150					9-inch layer of clayey sand with gravel and silt.	
90	2145					6-inch layer of silt to clayey sand with gravel.	
95	2140					8-inch layer of clayey sand with silt and gravel, slightly moist to dry.	
100	2135					6-inch layer of silty sand with clay and gravel.	
105	2130					Becomes silty sand with clay and gravel.	
110	2125					3-inch layer of clayey sand with silt and gravel.	
115							

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PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dana Strength START DATE/TIME: 06/02/2003 11:30 AM FINISH DATE/TIME: 06/10/2003 04:00 PM				
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM	
120	2120		11.9			Becomes silty sand with gravel, clay and trace of cobble.		
						6-inch layer of sandy gravel with silt and trace of clay and cobble.		
125	2115					Interbedded clayey sand and gravel.		
130	2110		3.3			8-inch layer of silty sand with gravel and clay.		
						Decrease in gravel size.		
135	2105							
140	2100		4.3			6-inch layer of interbedded clayey sand and gravel. SAMPLE ID: W33-139		
						GRAVELLY SAND with little clay, brown, moist, moderate cementation, medium PI.		
145	2095			GC				
150	2090					SILTY GRAVEL with little clay and silt, brown, moist, moderate cementation, medium PI.		
						Red and yellow sedimentary clasts.		
155	2085		6.8					





PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dana Strength
START DATE/TIME: 06/02/2003 11:30 AM
FINISH DATE/TIME: 06/10/2003 04:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
						brown, moist, weak cementation, low PI.	
200	2040					3 to 6-inch layer of gravelly sand with little silt and few clay.	#30 Trans. Sand
205	2035					Large cobble, 3-inch diameter.	#8-12 Sand
210	2030					Increase of clay.	
215	2025		7.8			6-inch layer of silty sand with little gravel, poorly sorted and graded. SAMPLE ID: W33-211.5	
220	2020			GM		6 to 12-inch layer of interbedded clayey sand with little gravel.	
225	2015					6 to 12-inch layer of silty sand with few gravel.	
230	2010					Increase in gravel, silty sand with little gravel.	3" PVC Sch. 40 Slotted 0.040"
235	2005		1.3			SAMPLE ID: W33-231.5	



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Tucson, AZ 85705
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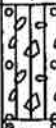


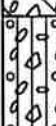
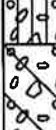



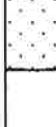
SHEET 7 of 8

BORING LOG: W-33

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dana Strength
START DATE/TIME: 06/02/2003 11:30 AM
FINISH DATE/TIME: 06/10/2003 04:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2000						#30 Trans. Sand
240						239.0' SANDY GRAVEL with little silt, few clay, gray to dark brown, moist, weak cementation, low PI.	
1995							
245				GM		18-inch layer of gravelly sand with little silt and clay.	Bentonite Chips
1990						6 to 16-inch layer of sandy gravel with little silt and clay.	
250			2.7			251.0' CLAYEY GRAVEL with little sand and few silt, dark brown to gray, moist, medium PI. SAMPLE ID: W33-251.5	
1985				GC		12-inch layer of gravelly sand with little sand and clay.	
255						255.0' CLAYEY GRAVEL with little sand and few silt, dark brown to gray, moist, medium PI.	
1980				GC			
260						260.0' SANDY GRAVEL with few silt and few clay, dark brown, moist, null PI.	
1975							
265						18-inch layer of interbedded clayey gravel with little sand.	
1970						18-inch layer of sandy gravel with few silt and few clay.	
270				GM			
			1.4			9-inch layer of sandy gravel with some clay and silt, brown, moist, moderate cementation, medium PI. SAMPLE ID: W33-271.5	
1965							
275							

<div>URS</div>		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		BORING LOG: W-33		SHEET 8 of 8	
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dana Strength START DATE/TIME: 06/02/2003 11:30 AM FINISH DATE/TIME: 06/10/2003 04:00 PM			
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	1960					18-inch layer of interbedded sandy gravel with few silt and few clay, low PI. CLAYEY GRAVEL with some silt and clay, brown, moist, weak cementation, medium PI.	
280				GC			
	1955					SANDY GRAVEL with few silt and clay, brown, moist, low PI.	
285				GM			
	1950					CLAYEY GRAVEL with little sand, brown, moist, moderate cementation, medium PI.	
290			14.0	GC			
	1945					GRAVELLY SAND with silt and clay, gray to light brown, slightly moist, weak cementation, low PI.	
295				SP			
	1940						
300			5.4				
	1935					W33-301.5	
305							
	1930						
310							
	1925						
315							

W34 S

WELL BORING DETAILS:

Total Depth	404-feet bgs
Drilling Method	Resonant Sonic
Nominal Borehole Diameter	10"
Depth Interval	0' - 200'
Nominal Borehole Diameter	8"
Depth Interval	200' - 404'
Seal at Reduction	Bentonite Grout

WELL CONSTRUCTION DETAILS:

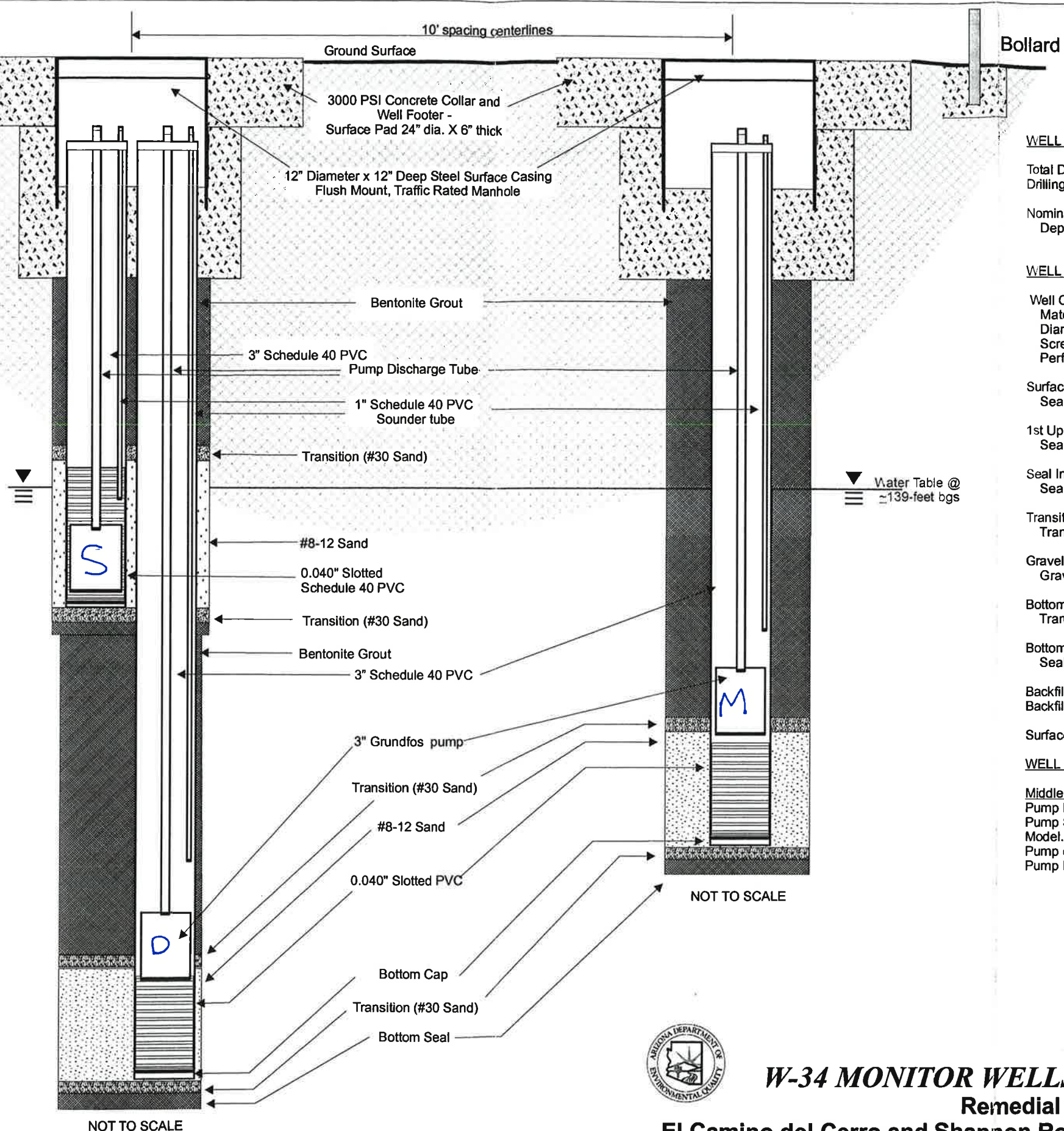
Deep Regional Well Casing Length	370'
Material	Schedule 40 PVC
Diameter	3"
Screened Interval	370' - 400'
Perforations	0.040", Slotted
Water Table Well Casing Length	125'
Material	Schedule 40 PVC
Diameter	3"
Screened Interval	125' - 175'
Perforations	0.040", Slotted
Surface Seal Interval	0 - 2'
Seal Material	Concrete
1st Upper Seal Interval	2' - 25'
Seal Material	Cement Grout
2nd Upper Seal Interval	25' - 118'
Seal Material	Bentonite Grout
Upper Transition Interval	118' - 123'
Transition Material	#30 Sand
Upper Gravel Pack Interval	123' - 175'
Gravel Pack Material	#8-12 Sand
Middle Transition Interval	175' - 177'
Transition Material	#30 Sand
Lower Seal Interval	177' - 363'
Seal Material	Bentonite Grout
Lower Transition Interval	363' - 365'
Transition Material	#30 Sand
Lower Gravel Pack Interval	365' - 400'
Gravel Pack Material	#8-12 Sand
Bottom Transition Interval	400' - 402'
Transition Material	#30 Sand
Bottom Seal Interval	402' - 404'
Seal Material	Bentonite Chips
Surface Completion	Flush Mount Surface Vault

WELL EQUIPPING:

Both Shallow and Deep Wells	
Pump Make	Grundfos
Pump Size	Nominal 3-inch
Model	15SQ10C-250
Pump capacity	30 gpm

Deep Regional Well	
Pump Intake	366' bgs

Water Table Well	
Pump Intake	171' bgs



WELL BORING DETAILS:

Total Depth	246-feet bgs
Drilling Method	ARCH
Nominal Borehole Diameter	10"
Depth Interval	0' - 246'

WELL CONSTRUCTION DETAILS:

Well Casing Length	200'
Material	Schedule 80 PVC
Diameter	3"
Screened Interval	205' - 235'
Perforations	0.040", Slotted
Surface Seal Interval	0 - 2'
Seal Material	Concrete
1st Upper Seal Interval	2' - 20'
Seal Material	Cement Grout
Seal Interval	2' - 198'
Seal Material	Bentonite Grout
Transition Interval	198' - 200'
Transition Material	#30 Sand
Gravel Pack Interval	200' - 235'
Gravel Pack Material	#8-12 Sand
Bottom Transition Interval	235' - 237'
Transition Material	#30 Sand
Bottom Seal Interval	237' - 239'
Seal Material	Bentonite Chips
Backfill	239' - 246'
Backfill Material	Soil Cuttings
Surface Completion	Flush Mount Surface Vault

WELL EQUIPPING:

Middle Regional Well	
Pump Make	Grundfos
Pump Size	Nominal 3-inch
Model	15SQ10C-250
Pump capacity	20 gpm
Pump Intake	191' bgs



W-34 MONITOR WELLS AS-BUILT SCHEMATIC
Remedial Investigation/Feasibility Study
El Camino del Cerro and Shannon Road- Rillito Creek WQARF Sites





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BORING LOG: W-34 (middle)

PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975	DRILLING CONTRACTOR: WDC DRILLER: Vern Christensen LOGGED BY: Mike Greene START DATE/TIME: 06/20/2003 10:00 AM FINISH DATE/TIME: 06/21/2003 05:45 PM
LATITUDE (NAVD27): 32.1805 LONGITUDE (NAVD 27): 111.0203	TOP OF GROUND ELEVATION: 2239.02 A.S.L. TOP OF CASING ELEVATION: 2239.02 A.S.L. SCREENED INTERVAL: 2039.02' - 2009.02'
COMMENTS: Lithology elevations calculated from top of casing (ground surface elevations not available)	RIG TYPE: Speedstar 50K DRILLING METHOD: SAMPLING METHOD:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
5	2235					SILTY SAND with sand, interbedded, tan to light brown, dry.	Concrete
10	2230			SP-SM			Cement Grout
15	2225						3"PVC Sch. 40
20	2220			CL		18.0' CLAY, brown, slightly moist, medium PI.	
25	2215			SM		21.5' SILTY SAND, dark brown, slightly moist.	
30	2210					28.0' SAND with trace of silt, brown, slightly moist.	
35	2205			SP			

		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)			SHEET 2 of 7		
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975					BORING LOG: W-34 (middle)		
DRILLING CONTRACTOR: WDC DRILLER: Vern Christensen LOGGED BY: Mike Greene START DATE/TIME: 06/20/2003 10:00 AM FINISH DATE/TIME: 06/21/2003 05:45 PM							
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2200					36.0'	
40						SANDY GRAVEL with sand, light brown, moist, null PI.	
	2195						
45							
	2190					46.0'	
50						CLAYEY GRAVEL with sand, light brown, slightly moist, low PI.	
	2185						
55							
	2180						
60							
	2175						
65							
	2170						
70							
	2165						
75							

		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)			SHEET 3 of 7		
BORING LOG: W-34 (middle)							
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975					DRILLING CONTRACTOR: WDC DRILLER: Vern Christensen LOGGED BY: Mike Greene START DATE/TIME: 06/20/2003 10:00 AM FINISH DATE/TIME: 06/21/2003 05:45 PM		
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80	2160						
85	2155			GC			
90	2150						
95	2145						
100	2140						
105	2135						
110	2130						Bentonite Grout
115	2125						



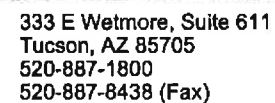
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BORING LOG: W-34 (middle)

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: WDC
DRILLER: Vern Christensen
LOGGED BY: Mike Greene
START DATE/TIME: 06/20/2003 10:00 AM
FINISH DATE/TIME: 06/21/2003 05:45 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
120	2120						
125	2115					123.0' SILTY GRAVEL with sand, brown, slightly moist, dense.	
130	2110						
135	2105						
140	2100			GM			
145	2095						
150	2090						
155	2085						



BORING LOG: W-34 (middle)

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: WDC
DRILLER: Vern Christensen
LOGGED BY: Mike Greene
START DATE/TIME: 06/20/2003 10:00 AM
FINISH DATE/TIME: 06/21/2003 05:45 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160	2080						
				SM		159.0' SILTY SAND, brown, wet, null PI.	
165	2075						
170	2070						
				GC		172.0' CLAYEY GRAVEL with sand, brown, wet, low to medium PI, dense.	
175	2065						
180	2060					178.0' SILTY GRAVEL with sand, dark brown, wet, null PI.	
185	2055						
190	2050			GP-GM			
195	2045						

<div>URS</div>		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		SHEET 6 of 7		BORING LOG: W-34 (middle)	
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				DRILLING CONTRACTOR: WDC DRILLER: Vern Christensen LOGGED BY: Mike Greene START DATE/TIME: 06/20/2003 10:00 AM FINISH DATE/TIME: 06/21/2003 05:45 PM			
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
200	2040						<div><div>#30 Trans. Sand</div><div>#8-12 Sand</div></div>
205	2035						
210	2030			GC	<div><div>206.0'</div><div>CLAYEY GRAVEL with sand, brown, moist, medium PI.</div></div>		
215	2025				<div><div>211.0'</div><div>SITLY GRAVEL with sand, dark brown, wet.</div></div>		
220	2020			GM			<div>3" PVC Sch. 40 Slotted 0.040"</div>
225	2015						
230	2010				<div><div>230.0'</div><div>CLAYEY GRAVEL with sand, brown, moist, very dense, medium PI.</div></div>		
235	2005			GC			





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BORING LOG: W-34 (middle)

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: WDC
DRILLER: Vern Christensen
LOGGED BY: Mike Greene
START DATE/TIME: 06/20/2003 10:00 AM
FINISH DATE/TIME: 06/21/2003 05:45 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
240	2000						
245	1995						
250	1990						
255	1985						
260	1980						
265	1975						
270	1970						
275	1965						



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BORING LOG: W-34 (deep)

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 05/02/2003 02:15 PM
FINISH DATE/TIME: 06/09/2003 02:15 PM

LATITUDE (NAVD27): 32.1805
LONGITUDE (NAVD 27): 111.0203

TOP OF GROUND ELEVATION: 2239 A.S.L.
TOP OF CASING ELEVATION: 2239 A.S.L.
SCREENED INTERVAL: 2113.79' - 2063.79' ; 1868.73' - 1838.73'

COMMENTS: Lithology elevations calculated from top of casing (ground surface elevations not available)

RIG TYPE: Sonic
DRILLING METHOD: RotoSonic
SAMPLING METHOD: Continuous Coring

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
5	2235		0.4	SP-SM		SILTY SAND with sand, interbedded, tan to light brown, dry.	Concrete
10	2230						Cement Grout
15	2225		2.6			Becomes coarse sand.	3"PVC Sch. 40
20	2220		5.5	CL		CLAY, brown, slightly moist, medium Pl. 2-inch layer of interbedded clayey sand.	
25	2215			SM		SILTY SAND, dark brown, slightly moist.	
30	2210					6-inch layer of clayey sand. SAND with trace of silt, brown, slightly moist.	
35	2205			SP		5-inch cobble, increase in gravel. 6-inch layer of gravel layer. 4-inch layer of silty sand with gravel.	






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BORING LOG: W-34 (deep)

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 05/02/2003 02:15 PM
FINISH DATE/TIME: 06/09/2003 02:15 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
40	2200					36.0' 2-inch layer of clayey sand, moist, medium PI.	
45	2195		14.5	GP-GM		SANDY GRAVEL with sand, light brown, moist, null PI.	
						Increase in cobble.	
						8-inch cobble.	
						6-inch cobble.	
50	2190		9.4			48.0' CLAYEY GRAVEL with sand, light brown, slightly moist, low PI.	
						Interbedded clayey gravel and silty gravel.	
55	2185		22.4				
						Increase in gravel with few sand.	
60	2180					Multi-color gravel.	
						1 to 2-inch layer of cobble, moist.	
65	2175						
70	2170		4.9			Interbedded clayey sand and clayey gravel.	
						Becomes slightly moist.	
75	2165						Bentonite Grout

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PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				BORING LOG: W-34 (deep) DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dennis Carlson START DATE/TIME: 05/02/2003 02:15 PM FINISH DATE/TIME: 06/09/2003 02:15 PM			
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80	2160					10-inch layer of silty gravel.	
85	2155			GC		48-inches of interbedded clayey sand, silty sand, silty gravel, clayey gravel. 5-inch cobble.	
90	2150					Becomes moist. Becomes slightly moist. 24-inches of silty gravel and clayey gravel.	
95	2145						
100	2140		10.1				
105	2135				104.0'	24-inches of interbedded silty sand and silty gravel.	
110	2130		40.8			9-inch layer of clayey sand with few gravel. 4-8-inch layer of clayey gravel, sand, poorly graded gravel.	
115	2125						



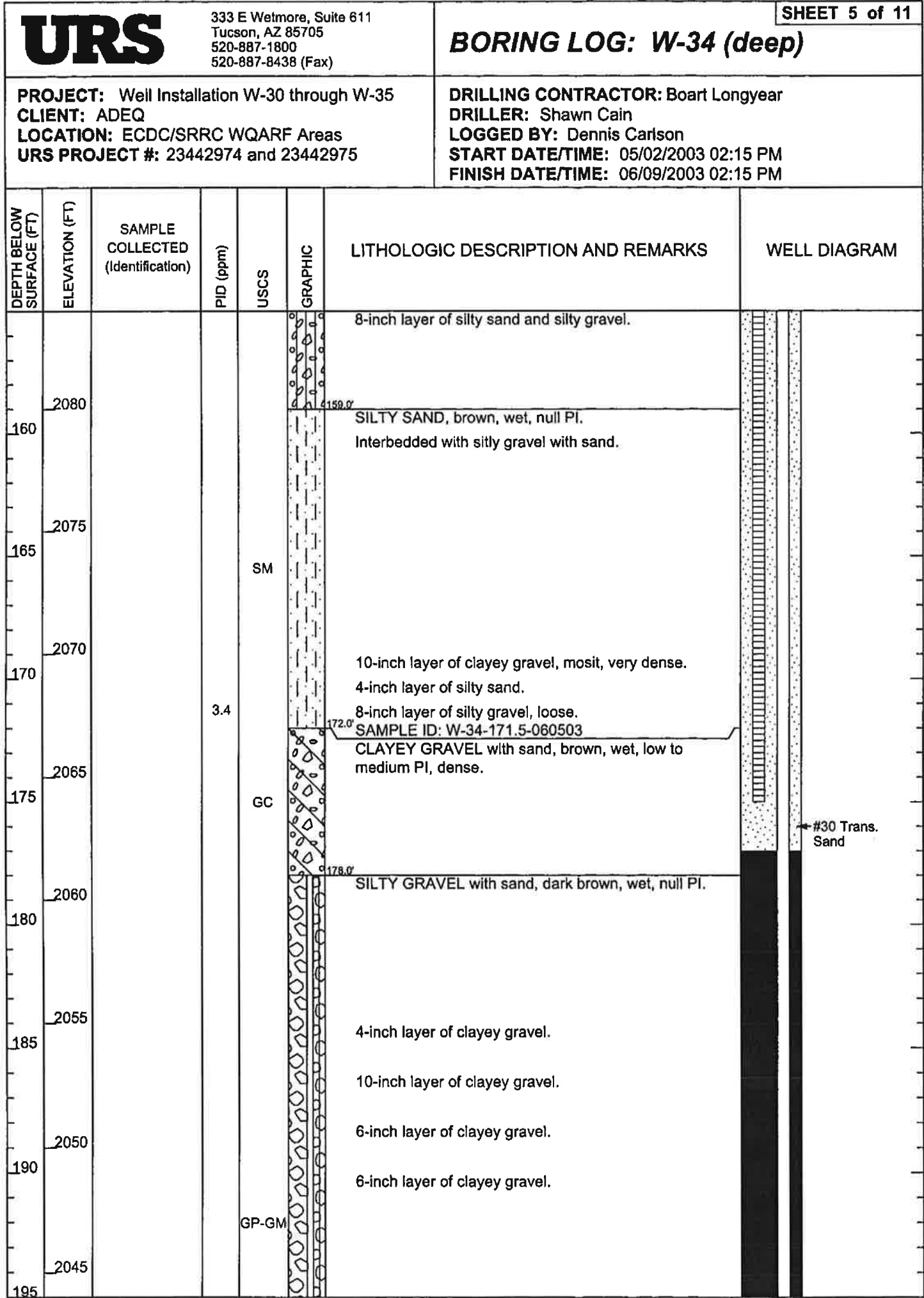
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BORING LOG: W-34 (deep)

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 05/02/2003 02:15 PM
FINISH DATE/TIME: 06/09/2003 02:15 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			48.8				
120	2120						
123.0'							
125	2115					SILTY GRAVEL with sand, brown, slightly moist, dense. 4-inch layer of silty sand with trace gravel.	#30 Trans. Sand #8-12 Sand
130	2110					6-inch layer of clayey gravel.	
135	2105					6-inch layer of clayey gravel.	
140	2100		5.1	GM		2 to 6-inch layer of sand, clayey gravel, silty sand. SAMPLE ID: W-34-142-060403	
145	2095		0.3				
150	2090						
155	2085					10-inch layer of silty sand and silty gravel.	3"PVC Sch. 40 Slotted 0.040"



<div>URS</div>		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		SHEET 6 of 11			
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				BORING LOG: W-34 (deep)			
DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dennis Carlson START DATE/TIME: 05/02/2003 02:15 PM FINISH DATE/TIME: 06/09/2003 02:15 PM							
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			4.9				
	2040					10-inch layer of clayey gravel.	
200						8-inch layer of clayey gravel.	
						3-inch layer of silty sand.	
	2035					12-inch layer of clayey gravel.	
205							
						206.0'	
						CLAYEY GRAVEL with sand, brown, moist, medium PI.	
	2030			GC			
210			3.8			211.0'	
						SITLY GRAVEL with sand, dark brown, wet. SAMPLE ID: W-34-211.5-060503	
	2025						
215							
	2020					3-inch layer of silty sand.	
220				GM			
	2015					224.0'	
225						2 to 6 inch layer of interbedded clayey gravel, silty sand, silty gravel.	
	2010					230.0'	
230						CLAYEY GRAVEL with sand, brown, moist, very dense, medium PI. SAMPLE ID: W-34-231.5-060603	
	2005						
235			6.7	GC			



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BORING LOG: W-34 (deep)

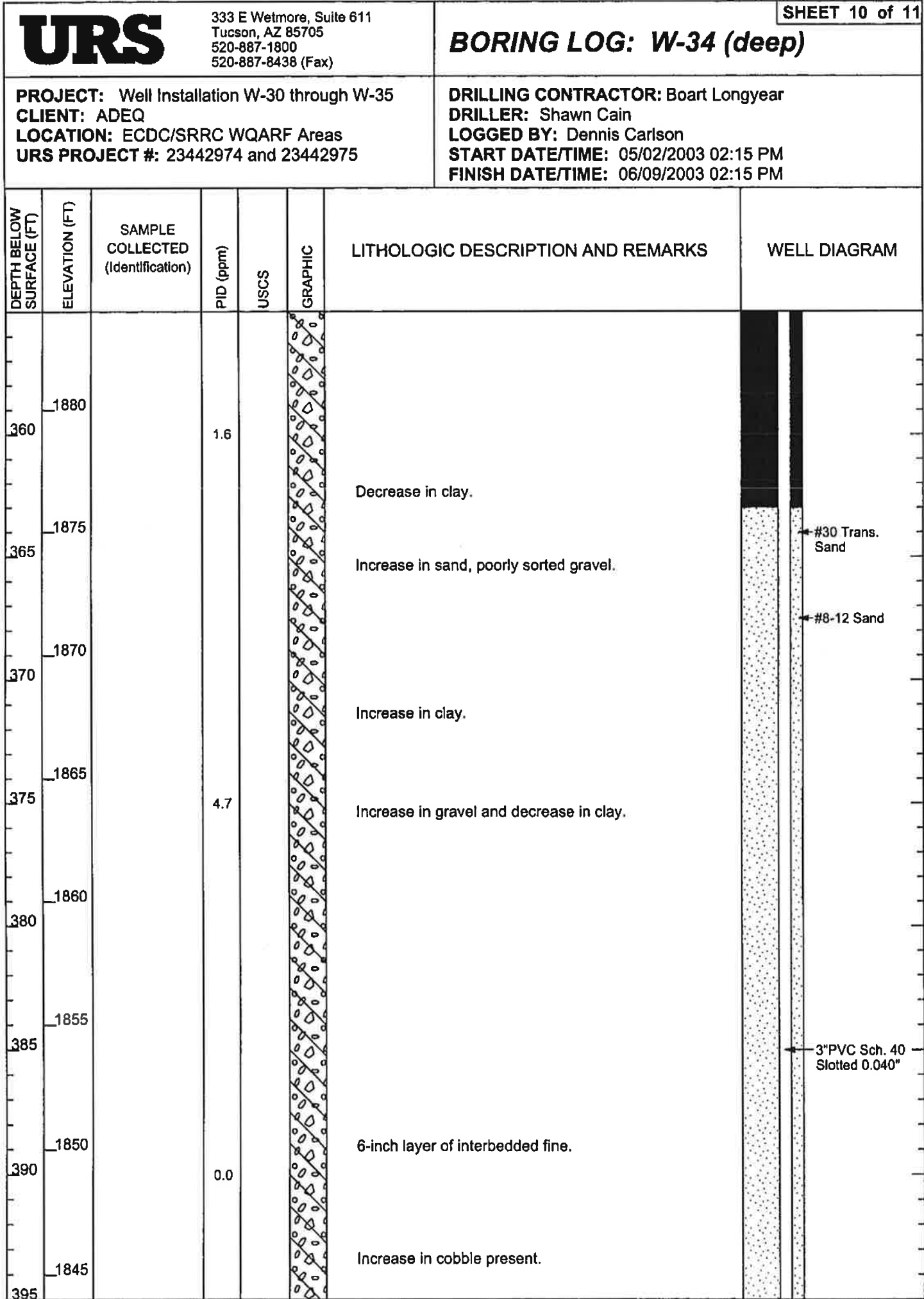
PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975



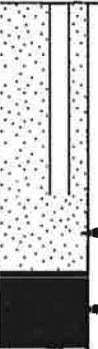


DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 05/02/2003 02:15 PM
FINISH DATE/TIME: 06/09/2003 02:15 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
240	2000						
						239.0'	
						SILTY GRAVEL with sand, brown, moist.	
245	1995			GM		Becomes blackish brown.	
						248.0'	
250	1990		1.7			CLAYEY GRAVEL with sand, brown, moist to wet, very dense, medium PI.	
255	1985						
						2 to 4-inch layer of silty sand.	
260	1980					2 to 4-inch layer of silty sand.	
				GC		6-inch layer of clayey gravel.	
265	1975						
						4 to 10-inch layer of interbedded clayey gravel and silty gravel.	
270	1970						
							Bentonite Grout
275	1965					275.0'	

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BORING LOG: W-34 (deep)							
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRR WQARF Areas URS PROJECT #: 23442974 and 23442975		DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dennis Carlson START DATE/TIME: 05/02/2003 02:15 PM FINISH DATE/TIME: 06/09/2003 02:15 PM					
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			29.1	GM		SILTY GRAVEL with sand, brown, wet, null PI.	
						277.0	
						CLAYEY GRAVEL with sand, brown, moist, dense, low to medium PI.	
	1960						
280							
						8-inch layer of silty sand.	
	1955						
285							
	1950						
290							
	1945						
295							
	1940						
300			4.0				
	1935					2-inch layer of interbedded sand, moist.	
305							
	1930						
310						Wide range of particle sizes.	
	1925						
315							

URS		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)			SHEET 9 of 11		
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRRC WQARF Areas URS PROJECT #: 23442974 and 23442975					BORING LOG: W-34 (deep) DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dennis Carlson START DATE/TIME: 05/02/2003 02:15 PM FINISH DATE/TIME: 06/09/2003 02:15 PM		
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
320	1920		1.9			2-inch layer of sand.	
325	1915					2-inch layer of sand. 2-inch layer of sand.	
330	1910						
335	1905						
340	1900			GC			
345	1895					3-inch layer of sand, dry.	
350	1890						
355	1885					2-inch layer of increasing gravel.	



		333 E Wetmore, Suite 611 Tucson, AZ 85705 520-887-1800 520-887-8438 (Fax)		SHEET 11 of 11			
PROJECT: Well Installation W-30 through W-35 CLIENT: ADEQ LOCATION: ECDC/SRRRC WQARF Areas URS PROJECT #: 23442974 and 23442975				BORING LOG: W-34 (deep) DRILLING CONTRACTOR: Boart Longyear DRILLER: Shawn Cain LOGGED BY: Dennis Carlson START DATE/TIME: 05/02/2003 02:15 PM FINISH DATE/TIME: 06/09/2003 02:15 PM			
DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
400	1840		0.0			SAMPLE ID: W-34-401.5-060903	
405	1835						 #30 Trans. Sand
410	1830						 Bentonite Chips
415	1825						
420	1820						
425	1815						
430	1810						
435	1805						

WELL BORING DETAILS:

Total Depth	301.5-feet bgs
Drilling Method	Resonant Sonic
Nominal Borehole Diameter	10"
Depth Interval	0' - 174'
Nominal Borehole Diameter	8"
Depth Interval	174' - 301.5'
Seal at Reduction	Bentonite Grout

WELL CONSTRUCTION DETAILS:

Regional Well Casing Length	205'
Material	Schedule 40 PVC
Diameter	3"
Screened Interval	210' - 240'
Perforations	0.040", Slotted
Water Table Well Casing Length	120.5'
Material	Schedule 40 PVC
Diameter	3"
Screened Interval	120.5' - 170.5'
Perforations	0.040", Slotted
Surface Seal Interval	0 - 20'
Seal Material	Concrete
1st Upper Seal Interval	20' - 113'
Seal Material	Bentonite Grout
2nd Upper Seal Interval	113' - 114.6'
Seal Material	Bentonite Chips
Upper Transition Interval	114.6' - 115.4'
Transition Material	#30 Sand
Upper Gravel Pack Interval	115.4' - 170.7'
Gravel Pack Material	#8-12 Sand
Middle Transition Interval	170.7' - 172.6'
Transition Material	#30 Sand
Lower Seal Interval	172.6' - 203.3'
Seal Material	Bentonite Chips
Lower Transition Interval	203.3' - 205.1'
Transition Material	#30 Sand
Lower Gravel Pack Interval	205.1' - 239'
Gravel Pack Material	#8-12 Sand
Bottom Transition Interval	239' - 241.8'
Transition Material	#30 Sand
Bottom Seal Interval	241.8' - 251.7'
Seal Material	Bentonite Chips
Backfill Interval	251.7' - 301.5'
Seal Material	Bentonite Pellets
Surface Completion	Flush Mount Surface Vault

WELL EQUIPPING:

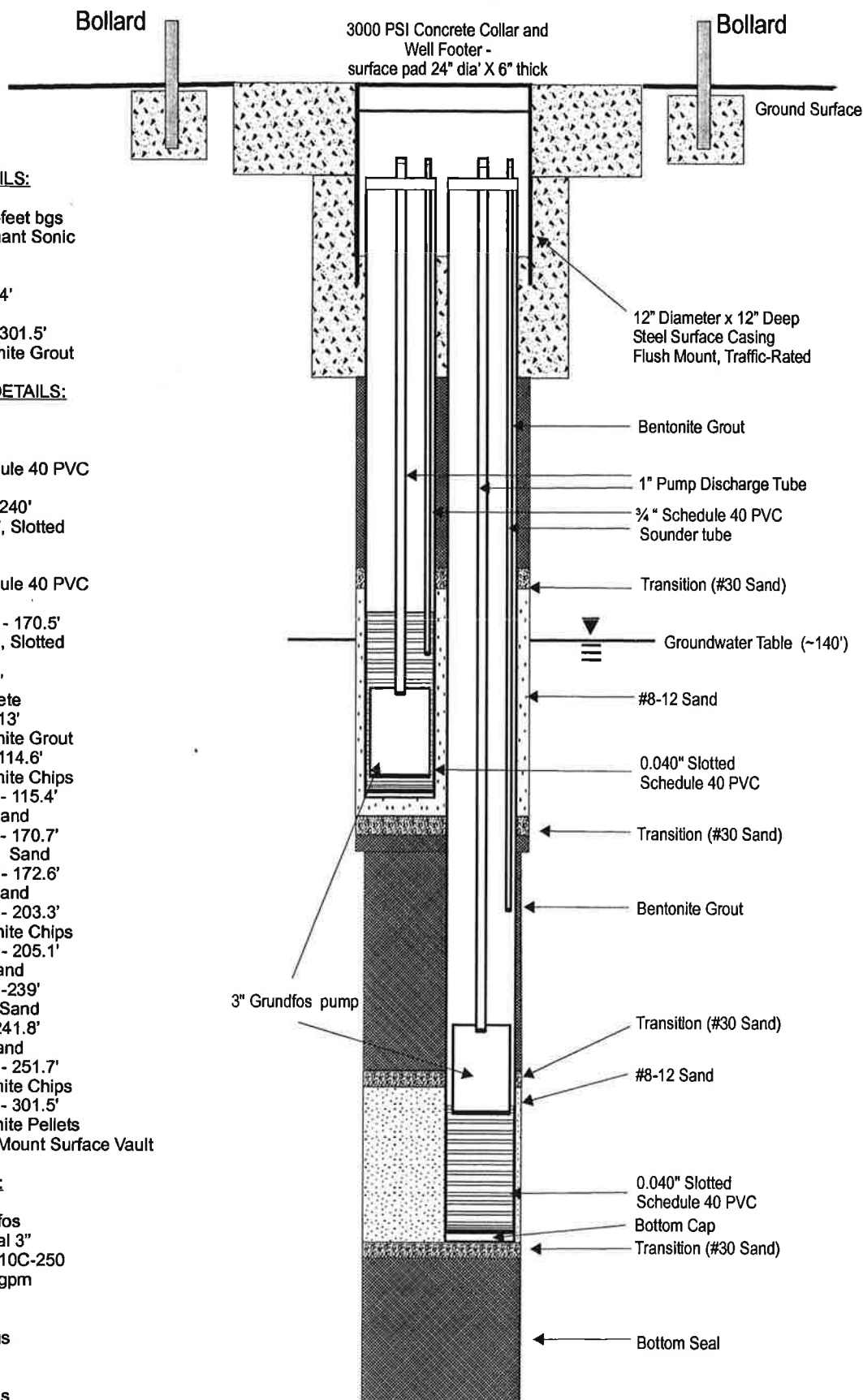
Both Wells	
Pump Make	Grundfos
Pump Size	Nominal 3"
Model	15 SQ10C-250
Pump Capacity	20-30 gpm

Regional Well

Pump Intake	203' bgs
-------------	----------

Water Table Well

Pump Intake	163' bgs
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W-35 MONITOR WELLS AS-BUILT SCHEMATIC

Remedial Investigation Feasibility Study

Shannon Road - Rillito Creek & El Camino Del Cerro WQARF Sites





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SHEET 1 of 8

BORING LOG: W-35

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 05/20/2003 05:05 PM
FINISH DATE/TIME:

LATITUDE (NAVD27): 32.1845
LONGITUDE (NAVD 27): 111.0152

TOP OF GROUND ELEVATION: 2227.7 A.S.L.
TOP OF CASING ELEVATION: 2227.7 A.S.L.
SCREENED INTERVAL: 2022.70' - 1992.70'

COMMENTS: Lithology elevations calculated from top of casing (ground surface elevations not available)

RIG TYPE: Sonic
DRILLING METHOD: RotoSonic
SAMPLING METHOD: Continuous Coring

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2225		1.1	SP		Fill	
5						SAND with trace of silt and gravel, tan, dry.	
	2220			SM		SILTY SAND with trace of gravel, brown, slightly moist.	
10						Trace of clay.	
	2215			CL		CLAY with few sand and silt, brown slightly moist, medium PI, weak cementation.	
15						Increase in silt.	
	2210					Decrease in silt and sand, medium to high PI.	
20						SILTY SAND with trace of gravel, brown, slightly moist, dense.	
	2205			SM			
25			0.2			6-inch layer of clayey sand, medium PI.	
	2200					SANDY GRAVEL with trace silt, brown, moist.	
30						5-inch in diameter cobble.	
	2195					8-inch layer of clayey sand, slightly moist, medium PI.	
35				GP-GM		Increase in cobble.	



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SHEET 2 of 8

BORING LOG: W-35

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 05/20/2003 05:05 PM
FINISH DATE/TIME:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
40	2190		0.8			18-inch layer of interbedded sand and sandy gravel.	
						Trace of clay.	
	2185					CLAYEY GRAVEL with sand, brown, slightly moist, low PI, dense.	
45							
	2180					Interbedded layer of clayey gravel and silty gravel.	
50							
	2175						
55			1.6			6-inch layer of clay with silt, wet.	
	2170			GC		2-inch layer of sand.	
60						2 to 6-inch layer of interbedded clay, silty sand.	
	2165					2-inch layer of gravel.	
65							
	2160						
70			2.4			Increase in gravel.	
	2155						
75							





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SHEET 3 of 8

BORING LOG: W-35

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 05/20/2003 05:05 PM
FINISH DATE/TIME:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80	2150			GC		78.0' CLAYEY GRAVEL with sand, trace of cobble, light brown, moist to wet, medium PI.	
						3-inch layer of clay with sand, wet.	
85	2145						
				CL		85.5' SANDY CLAY, brown, moist, stiff.	
90	2140		1.0			87.5' CLAYEY GRAVEL with sand, trace of cobble, light brown, moist to wet, medium PI. Interbedded clayey sand and clayey gravel.	
						Interbedded clayey sand and clayey gravel.	
95	2135						
100	2130						
105	2125		2.1				
						Interbedded clayey sand and clayey gravel.	
						Interbedded clayey sand and clayey gravel.	
110	2120						
						Decrease in PI and fines.	
	2115						
115							

• Bentonite Chips



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SHEET 4 of 8

BORING LOG: W-35

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 05/20/2003 05:05 PM
FINISH DATE/TIME:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
120	2110		6.3				
125	2105			GC		6-inch layer of clayey sand, no gravel.	
130	2100					6-inch layer of clayey sand, no gravel.	
135	2095		4.6			4-inch layer of silty gravel.	
140	2090					2-inch layer of silty gravel.	
145	2085						
150	2080		1.1			6-inch layer of clayey sand with gravel.	
						3-inch layer of silty gravel.	
155	2075					18-inch layer of interbedded silty gravel and silty sand.	
						3-inch layer of cobble.	
						4-inch layer of silty sand.	

← #30 Trans. Sand

← #8-12 Sand

3" PVC Sch. 40
Slotted 0.040"



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SHEET 5 of 8

BORING LOG: W-35

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 05/20/2003 05:05 PM
FINISH DATE/TIME:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PI (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160	2070		4.9			8-inch layer of silty gravel.	
165	2065					7-inch layer of silty sand, wet.	
165						165.0' SILTY GRAVEL with sand, brown, wet to moist, null PI.	
170	2060			GM		4-inch layer of clayey gravel.	
175	2055		1.6			172.0' SAMPLE ID: W-35-171.5-052703 CLAYEY GRAVEL with sand, brown, moist, medium PI, dense to very dense. Interbedded silty gravel.	
180	2050					Interbedded silty gravel.	
185	2045					8-inch layer of clayey gravel.	
190	2040			GC		3-inch layer of silty gravel with sand.	
195	2035						#30 Trans. Sand Bentonite Chips



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SHEET 7 of 8

BORING LOG: W-35

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 05/20/2003 05:05 PM
FINISH DATE/TIME:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
1990						Interbedded clayey gravel and silty gravel.	
240						Interbedded sand.	#30 Trans. Sand
1985							
245							
1980						CLAYEY SAND with gravel, brown, moist, medium PI.	Bentonite Chips
250						Trace of cobble.	
1975				SC		Thin cementation layer, dry.	
255							
1970						SILTY SAND with gravel, brown, wet.	
260							
1965							
265							
1960							
270							
1955			2.1			SAMPLE ID: W-35-271.5-053003	
275							





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SHEET 8 of 8

BORING LOG: W-35

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 05/20/2003 05:05 PM
FINISH DATE/TIME:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
1950				SM			
280							
1945						1 to 2-inch layer of hard cementation.	
285							
1940						4 to 6-inch layer of silty gravel.	
290							
1935							
295						10-inch layer of clayey gravel.	
1930						6-inch layer of clayey sand, slightly moist to moist.	
300							
1925			5.6			SAMPLE ID: W-35-301.5-053103	
305							
1920							
310							
1915							
315							

BORING LOG: W-37 (middle)

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

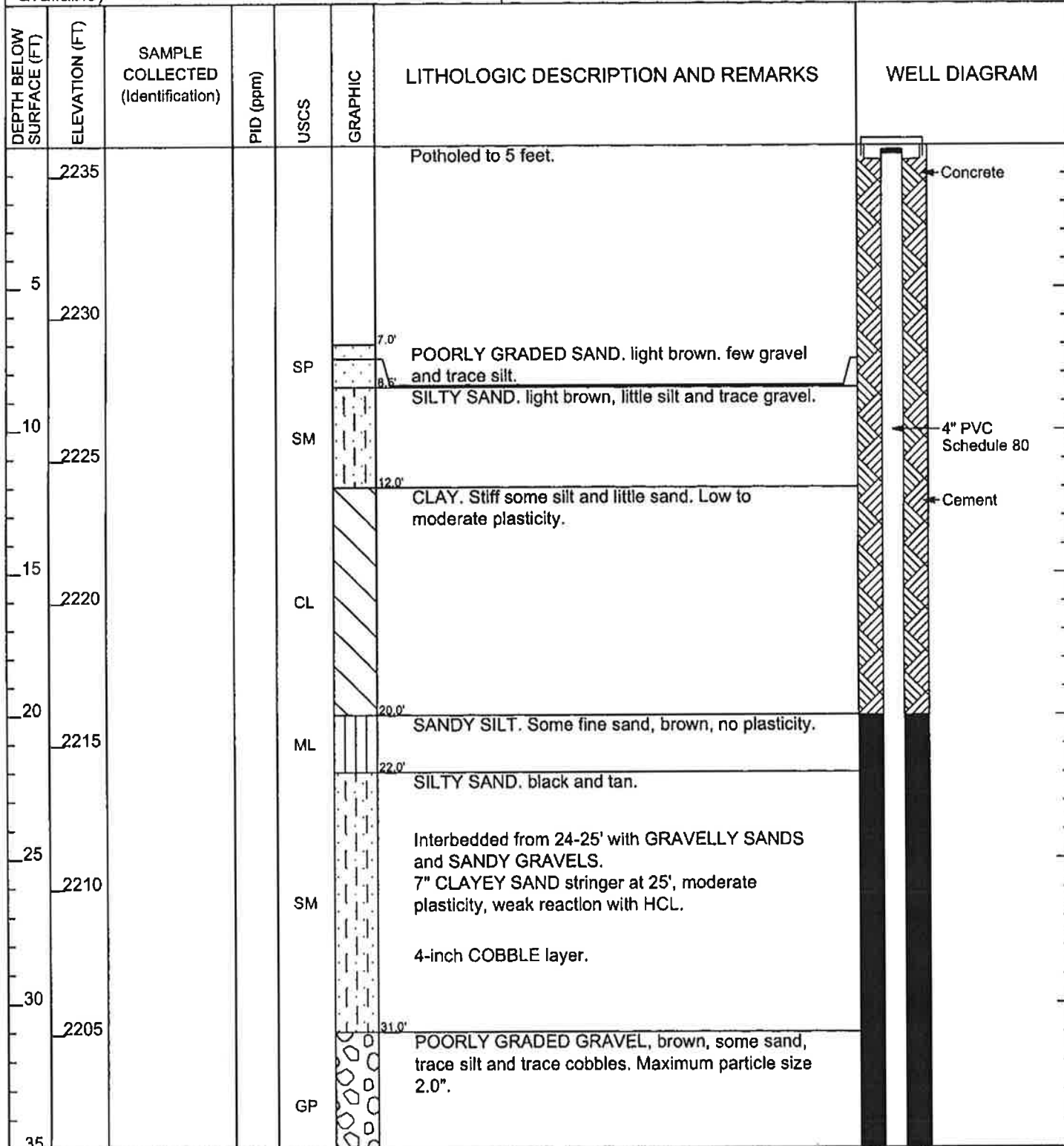
DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 06/05/2004 03:04 PM
FINISH DATE/TIME: 06/11/2004 02:15 PM

LATITUDE (NAVD27): 32.1838
LONGITUDE (NAVD 27): -111.0148

TOP OF GROUND ELEVATION: 2236.06 A.S.L.
TOP OF CASING ELEVATION: 2236.06 A.S.L.
SCREENED INTERVAL: 1984.06' - 1954.06'

COMMENTS: Lithology elevations calculated from top of casing (ground surface elevations not available)

RIG TYPE: Sonic
DRILLING METHOD: RotoSonic
SAMPLING METHOD: Continuous Coring









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SHEET 2 of 8

BORING LOG: W-37

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 06/05/2004 03:04 PM
FINISH DATE/TIME: 06/11/2004 02:15 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2200						
40	2195			GM		36.0' SILTY GRAVEL, some sand, dry, weak reaction with HCL. 8-inch CLAYEY SAND/CLAYEY GRAVEL unit, moderate plasticity.	
45	2190					42.0' CLAYEY GRAVEL WITH SAND, brown, some sand, little silt. Wet and moist interbedded. Decomposed granite material in matrix.	
50	2185					COBBLE layer at 48 feet.	
55	2180			GC			
60	2175						
65	2170					Increase in gravels and sand. Weak to moderate plasticity.	
70	2165						
75						71.0' CLAYEY SAND WITH GRAVEL, brown, moist to wet. Interbedded with CLAYEY GRAVEL WITH SAND, moderate plasticity. Rock cobble wedges in shoe bit.	



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SHEET 3 of 8

BORING LOG: W-37

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 06/05/2004 03:04 PM
FINISH DATE/TIME: 06/11/2004 02:15 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80	2160						
85	2155						
90	2150			SC/GC		6-inch SILTY CLAY lenses, trace fine sand.	
95	2145					GRAVELLY CLAY.	
100	2140					8-inch POORLY SORTED SAND/SILTY SAND.	
105	2135					1-inch SANDY CLAY.	
110	2130			GM		COBBLES at 99'.	
						2-inch CLAY layer.	
						104.0' SILTY GRAVEL WITH SAND.	
						105.0' CLAYEY GRAVEL interbedded with SILTY GRAVEL, light brown and beige.	
				GC		COBBLE layer at 110'.	
						INTERBEDDED SILTY SANDS WITH TRACE CLAY, moderate plasticity.	
						114.0' POORLY GRADED SAND INTERBEDDED WITH	
115	2125						



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SHEET 4 of 8

BORING LOG: W-37

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 06/05/2004 03:04 PM
FINISH DATE/TIME: 06/11/2004 02:15 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2120			SP		POORLY SORTED GRAVEL, brown and tan.	
120	2115					118.0' COBBLES present. CLAYEY GRAVEL, brown and black with some white, low to moderate plasticity. 8-inch POORLY GRADED SAND/SILTY SAND, brown and beige. 6-inch SILTY SAND/CLAYEY GRAVEL.	
125	2110			GC		Becomes brown, increase in clay, increase in plasticity.	
130	2105						
135	2100						
140	2095			GP-GM		139.0' GRAVEL WITH SILT AND SAND, brown.	
145	2090					142.0' CLAYEY GRAVEL interbedded with SILTY GRAVEL, brown, low plasticity.	
150	2085			GC		Interbedded CLAYEY GRAVEL AND SILTY GRAVEL layers.	
155							

← Bentonite



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SHEET 5 of 8

BORING LOG: W-37

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 06/05/2004 03:04 PM
FINISH DATE/TIME: 06/11/2004 02:15 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160	2080						
160	2075					160.0' POORLY GRADED GRAVEL WITH SAND, trace silt, brown, wet.	
165	2070			GP		5-inch CLAYEY GRAVEL. 4-Inch CLAYEY GRAVEL. 8-inch CLAYEY GRAVEL.	
170	2065						
175	2060			GC		172.5' CLAYEY GRAVEL, brown, low plasticity. Maximum particle size 2.5 inches.	
180	2055			GP		178.0' POORLY GRADED SAND, trace silt, brown and black, wet.	
185	2050			GC		182.0' POORLY GRADED SAND. CLAYEY GRAVEL interbedded with SILTY GRAVEL, brown, low plasticity.	
190	2045			GP-GC		184.0' Interbedded CLAYEY GRAVEL and SILTY GRAVEL, approximately 3 to 8-inches thick.	
195						190.0' POORLY GRADED GRAVEL WITH SAND, trace to little silts, brown, wet. Interbedded with CLAYEY GRAVELS.	



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SHEET 6 of 8

BORING LOG: W-37

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 06/05/2004 03:04 PM
FINISH DATE/TIME: 06/11/2004 02:15 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
200	2040						
	2035			GC		6-inch POORLY GRADED SAND. CLAYEY GRAVEL.	
205				GC		CLAYEY GRAVEL.	
	2030			GC		CLAYEY GRAVEL.	
				GC		CLAYEY GRAVEL.	
210	2025						
				GC		6-inch CLAYEY GRAVEL, low plasticity.	
215	2020			GP			
				GC		6-inch CLAYEY GRAVEL, low plasticity.	
220	2015						
225	2010						
230	2005			GM		Interbedded SILTY GRAVELS with some CLAYEY GRAVELS.	
				GC		6-inch CLAYEY GRAVEL.	
235							



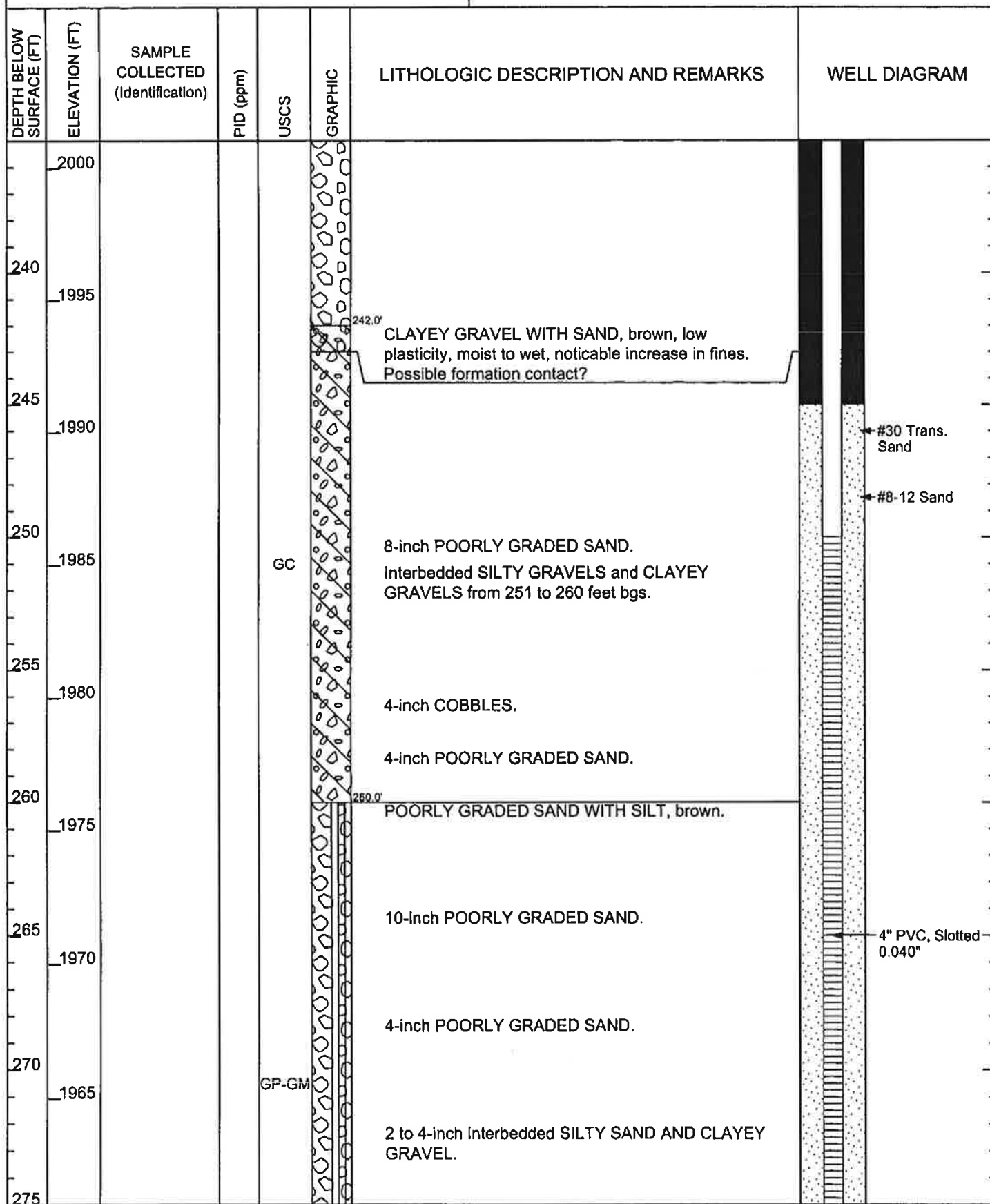
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SHEET 7 of 8

BORING LOG: W-37

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 06/05/2004 03:04 PM
FINISH DATE/TIME: 06/11/2004 02:15 PM





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SHEET 8 of 8

BORING LOG: W-37

PROJECT: Well Installation W-30 through W-35
CLIENT: ADEQ
LOCATION: ECDC/SRRC WQARF Areas
URS PROJECT #: 23442974 and 23442975

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 06/05/2004 03:04 PM
FINISH DATE/TIME: 06/11/2004 02:15 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
1960							
280							
1955							
281.0'						CLAYEY GRAVEL WITH SAND, brown, slightly moist.	← #8-12 Sand
285							← #30 Trans. Sand
1950							
290							
1945				GC		Becomes interbedded with 1-inch layers of SILTY GRAVEL AND CLAYEY GRAVEL.	
295							← Bentonite Chips
1940						Cobbles at 295'. Increase in clays, moderate plasticity, strong HCL reaction.	
300							
1935						End of Boring.	
305							
1930							
310							
1925							
315							

Bollard

3000 PSI Concrete Collar and
Well Footer -
surface pad 24" dia' X 6" thick

Bollard

Ground Surface

WELL BORING DETAILS:

Total Depth 300-feet bgs
Drilling Method Casing Hammer
Nominal Borehole Diameter 10 1/4"

WELL CONSTRUCTION DETAILS:

Middle Well Casing Length ~205'
Material Schedule 40 PVC
Diameter 3"
Screened Interval ~205' - 235'
Perforations 0.040", Slotted

Water Table Well Casing Length ~130'
Material Schedule 40 PVC
Diameter 3"
Screened Interval 130' - 180'
Perforations 0.040", Slotted

Surface Completion 0 - 5'
Material Concrete
Casing Protection 5' - 20'
Material Neat Cement Grout
1st Upper Seal Interval 20' - 117'
Seal Material Bentonite Grout
2nd Upper Seal Interval 117' - 123'
Seal Material Bentonite Chips
Upper Transition Interval 123' - 125'
Transition Material #30 Sand
Upper Gravel Pack Interval 125' - 180'
Gravel Pack Material #8-12 Sand
Middle Transition Interval 180' - 182'
Transition Material #30 Sand
Lower Seal Interval 182' - 198'
Seal Material Bentonite Pellets
Lower Transition Interval 198' - 200'
Transition Material #30 Sand
Lower Gravel Pack Interval 200' - 235'
Gravel Pack Material #8-12 Sand
Bottom Transition Interval 235' - 240'
Transition Material #30 Sand
Bottom Seal Interval 240' - 245'
Seal Material Bentonite Chips
Backfill Interval 245' - 300'
Seal Material Bentonite Pellets
Surface Completion Flush Mount Surface Vault

WELL EQUIPPING:

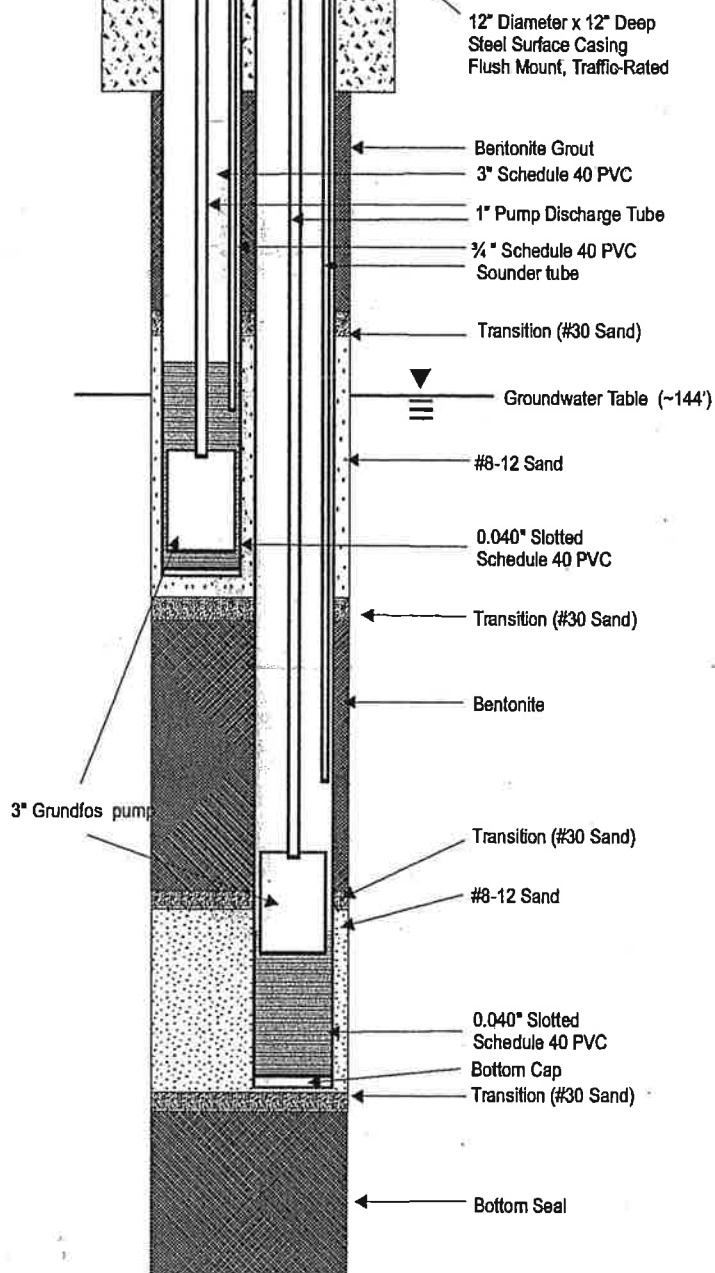
Both Wells
Pump Make Grundfos
Pump Size Nominal 3"
Model 15 SQ10C-250
Pump Capacity 20-30 gpm

Middle Interval Well

Pump Intake 203' bgs

Shallow Interval Well

Pump Intake 173' bgs



W-38 MONITOR WELLS As-Built Schematic

Remedial Investigation/Feasibility Study
Shannon Road / El Camino Del Cerro WQARF Site



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SHEET 1 of 8

BORING LOG: MW-38

PROJECT: MW-38
CLIENT: ADEQ
LOCATION: Parcel 101-17-0320
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Layne Christensen
DRILLER: Perry Hormann
LOGGED BY: AAJ
START DATE/TIME: 03/15/2005 02:45 PM
FINISH DATE/TIME:

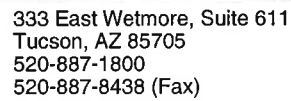
LATITUDE (NAVD27):
LONGITUDE (NAVD 27):

TOP OF GROUND ELEVATION: A.S.L.
TOP OF CASING ELEVATION: A.S.L.
SCREENED INTERVAL:

COMMENTS:








RIG TYPE: Becker AP-1000
DRILLING METHOD: Casing Hammer
SAMPLING METHOD: Auto Hammer

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
0				CL	1.0'	SILTY CLAY with sand, brown, dry, low plasticity, strong HCL.	Concrete
5			0				Cement
10							3" PVC Sch. 40
12.0'						Decrease in sand.	
15				CL			
20.0'						Low to medium plasticity.	
25							
29.5'						Increase in silt, rebounding effect.	
30			0.1				
33.0'						SILTY SAND, dark brown, slightly moist, null HCL, null plasticity.	
35							

**BORING LOG: MW-38**

PROJECT: MW-38
CLIENT: ADEQ
LOCATION: Parcel 101-17-0320
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Layne Christensen
DRILLER: Perry Hormann
LOGGED BY: AAJ
START DATE/TIME: 03/15/2005 02:45 PM
FINISH DATE/TIME:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80				GC		CLAYEY GRAVEL with little sand, dark brown to brown, slightly moist, null HCl, null plasticity.	
85				SC		CLAYEY SAND, dark brown, dry, null HCL, null plasticity.	
90			0	GC		CLAYEY GRAVEL with little sand, dark brown to brown, slightly moist, null HCl, null plasticity.	
95						CLAYEY SAND with trace gravels, light brown, dry, null HCL, null plasticity.	
100						Increase in silt.	
105				SC			
110							
115							



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SHEET 4 of 8

BORING LOG: MW-38

PROJECT: MW-38
CLIENT: ADEQ
LOCATION: Parcel 101-17-0320
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Layne Christensen
DRILLER: Perry Hormann
LOGGED BY: AAJ
START DATE/TIME: 03/15/2005 02:45 PM
FINISH DATE/TIME:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
120			0	SC	116.0'	Increase in coarse sand.	
					117.0'	SILTY SAND, light brown, dry, null HCL, null plasticity.	
125				SM	126.0'	Trace of gravels, 1" to 2" sub angular.	
130					129.0'	Increase in silt and decrease in clay.	
135					134.0'	Increase in gravel.	
					135.0'	SILTY GRAVEL with little sand, light brown, dry, null HCL, null plasticity.	
140							
145				GM			
150					151.0'	Soil is moist to wet.	
155					155.0'		

WELL DIAGRAM labels: Bentonite Pellets, #30 Sand, #8-12 Sand

**BORING LOG: MW-38**

PROJECT: MW-38
CLIENT: ADEQ
LOCATION: Parcel 101-17-0320
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Layne Christensen
DRILLER: Perry Hormann
LOGGED BY: AAJ
START DATE/TIME: 03/15/2005 02:45 PM
FINISH DATE/TIME:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
						CLAYEY GRAVEL with little sand, dark brown to brown, moist, null HCL, null plasticity.	3" PVC Sch. 40 Slotted 0.040
160				GC		Interbedded silts and clays. Sand and gravels being dominant.	
165		MW-38-165	0			SILTY GRAVEL with little sand, brown, wet, null HCL, null plasticity.	
170						Increase in sand, fine to medium grain size.	
175				GM		Decrease in silt and increase in clay. Soil not as moist.	
180							#30 Sand
185						Increase in gravel size, 2" to 3".	
190		MW-38-190	0	SM		SILTY SAND with little gravel, brown, wet, null HCL, null plasticity.	Bentonite Pellets
195							



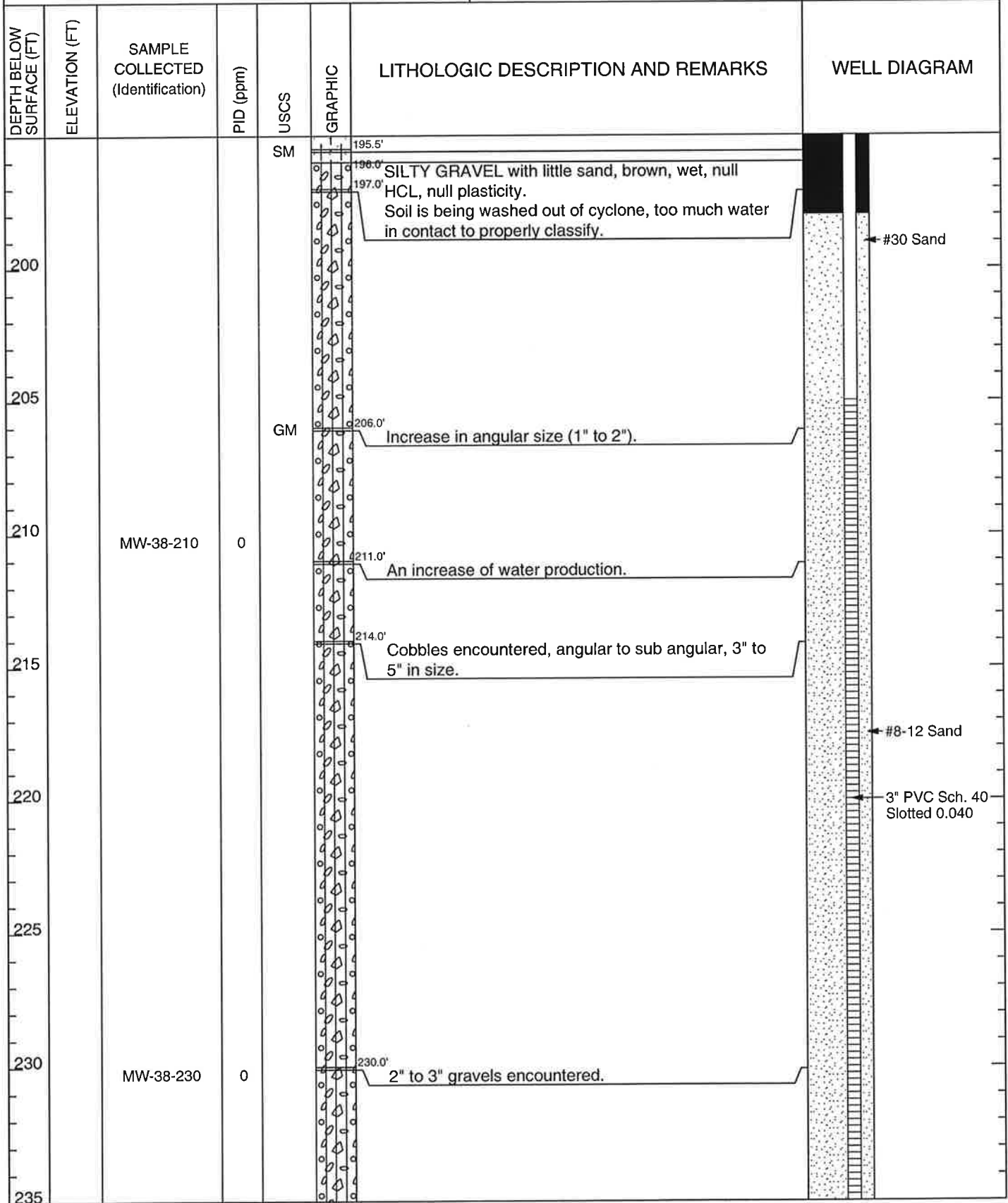
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SHEET 6 of 8

BORING LOG: MW-38

PROJECT: MW-38
CLIENT: ADEQ
LOCATION: Parcel 101-17-0320
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Layne Christensen
DRILLER: Perry Hormann
LOGGED BY: AAJ
START DATE/TIME: 03/15/2005 02:45 PM
FINISH DATE/TIME:














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SHEET 7 of 8

BORING LOG: MW-38

PROJECT: MW-38
CLIENT: ADEQ
LOCATION: Parcel 101-17-0320
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Layne Christensen
DRILLER: Perry Hormann
LOGGED BY: AAJ
START DATE/TIME: 03/15/2005 02:45 PM
FINISH DATE/TIME:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
240				GM		236.0'	
245				GM			
250		MW-38-250	0				
255							
260							
265							
270		MW-38-270	0				
275							



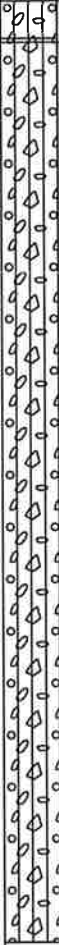
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SHEET 8 of 8

BORING LOG: MW-38

PROJECT: MW-38
CLIENT: ADEQ
LOCATION: Parcel 101-17-0320
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Layne Christensen
DRILLER: Perry Hormann
LOGGED BY: AAJ
START DATE/TIME: 03/15/2005 02:45 PM
FINISH DATE/TIME:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	P/D (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
280				GM			
285							
290							
295							
300		MW-38-300	0				
305							
310							
315							

WELL BORING DETAILS:

Total Depth 409-feet bgs
Drilling Method Air Rotary Casing Hammer
Nominal Borehole Diameter . . . 12"

WELL CONSTRUCTION DETAILS:

Surface Completion 0 - 5'
Material Concrete
Casing Protection 5' - 20'
Material Neat Cement Grout
Casing
Material Schedule 40 Blank PVC
Diameter 3"
Well Casing Length
Shallow Well ~130'
Middle Well ~254'
Deep Well ~370'
Material 0.040", Slotted Schedule 40 PVC
Diameter 3"
Screen Length
Shallow Well 50'
Middle Well 30'
Deep Well 30'
Screened Interval
Shallow Well 129.5-179.5'
Middle Well 253.5-283.5'
Deep Well 369.5- 399.5'
Threaded End Cap Length 6"

Shallow Well

1st Upper Seal Interval 20' - 117.5'
Seal Material Bentonite Grout
2nd Seal Interval 117.5' - 122'
Seal Material Bentonite Chips
Upper Transition Interval 122' - 124'
Transition Material #30 Sand
Gravel Pack Interval 124' - 181.5'
Gravel Pack Material #8-12 Sand
Bottom Transition Interval 181.5' - 183'
Transition Material #30 Sand
Bottom Seal Interval 183' - 245'
Seal Material Bentonite Pellets

Middle Well

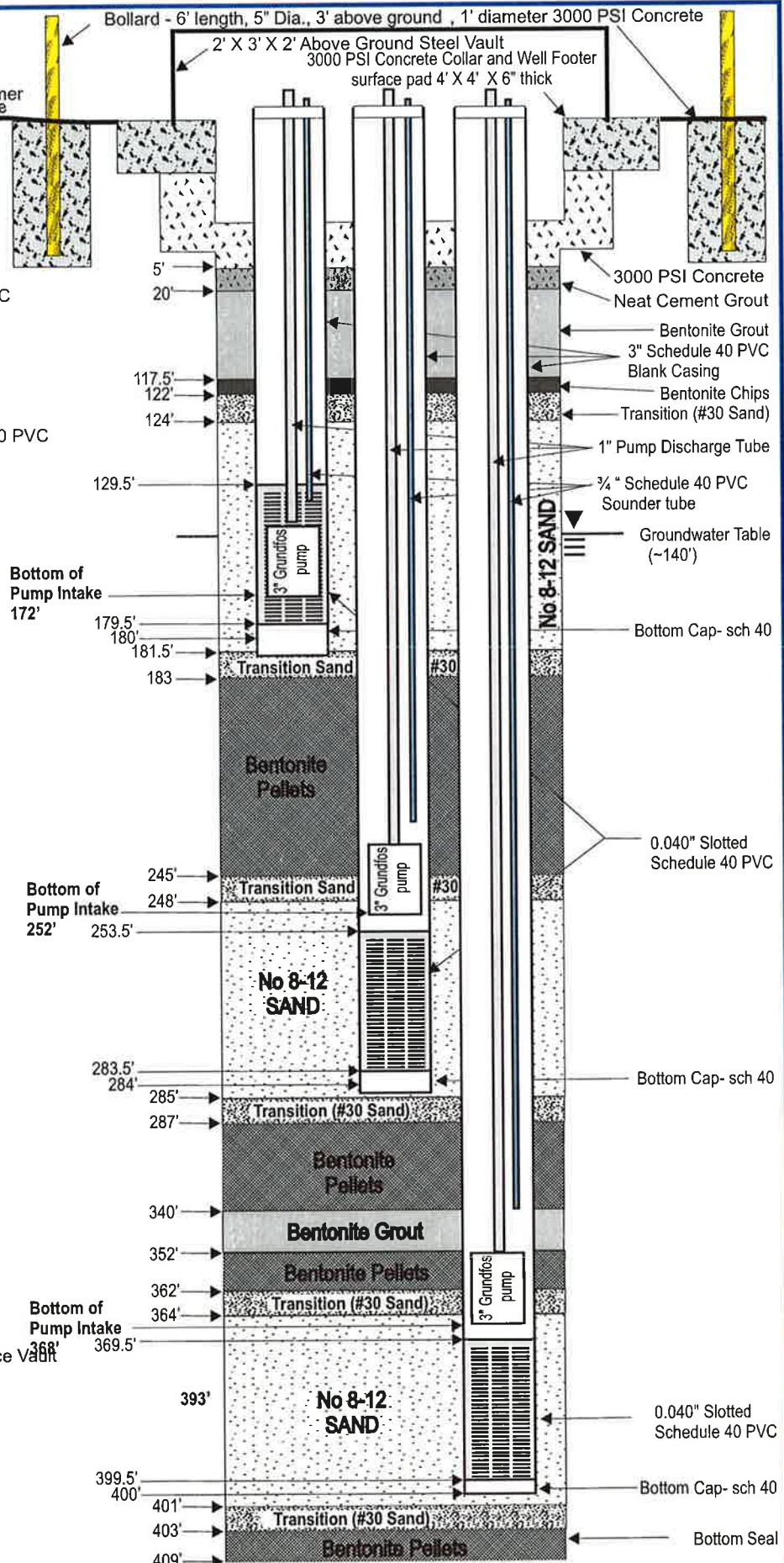
Upper Transition Interval 245' - 248'
Transition Material #30 Sand
Gravel Pack Interval 248' - 285'
Gravel Pack Material #8-12 Sand
Bottom Transition Interval 285' - 287'
Transition Material #30 Sand
Bottom Seal Interval 287' - 362'
Seal Material Bentonite Pellets & Bentonite Grout

Deep Well

Upper Transition Interval 362' - 364'
Transition Material #30 Sand
Gravel Pack Interval 364' - 401'
Gravel Pack Material #8-12 Sand
Bottom Transition Interval 401' - 403'
Transition Material #30 Sand
Bottom Seal Interval 403' - 409'
Seal Material Bentonite Pellets
Surface Completion Flush Mount Surface Vault
In a 3'X3'X6" 3000 psi concrete pad

WELL EQUIPPING:

Pump Make Grundfos
Pump Size Nominal 3"
Model 15 SQ10C-250
Pump Capacity 15-20 gpm
Pump Intake
Shallow Well . . . 172' bgs
Middle Well . . . 252' bgs
Deep Well . . . 368' bgs



W-39 As-Built SCHEMATIC

Remedial Investigation/Feasibility Study

Shannon Road - Rillito Creek & El Camino Del Cerro WQARF Sites



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SHEET 1 of 11

BORING LOG: MW-39

PROJECT: MW-39
CLIENT: ADEQ
LOCATION: Parcel 999-99-9993
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 04/18/2005 10:21 AM
FINISH DATE/TIME: 04/26/2005 06:50 PM

LATITUDE (NAVD27):
LONGITUDE (NAVD 27):

TOP OF GROUND ELEVATION: A.S.L.
TOP OF CASING ELEVATION: A.S.L.
SCREENED INTERVAL: 130-180, 254-284, 370-400

COMMENTS:

RIG TYPE:
DRILLING METHOD: Air Rotary Casing Hammer
SAMPLING METHOD: Auto Hammer

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
5				SM		SANDY SILT, light brown, low-null plasticity, moderate HCl, Dry, null Cementation.	
8.0'				GW		GRAVELLY SAND, with few fines, brown, null plasticity, moderate HCl, dry, null cementation.	
15.0'				SP-SM		SILTY SAND with trace gravel, light brown, null plasticity, null HCl, dry, null cementation.	
25.0'				SP-SC		POORLY GRADED SAND with few gravel and silt, brown, null plasticity, null HCl, null cementation. (moisture unknown-driller adding water)	
31.0'						SANDY GRAVEL with trace fines, angular - subround, brown, null plasticity, null HCl, null cementation. (moisture unknown-driller adding water)	
35							



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SHEET 2 of 11

BORING LOG: MW-39

PROJECT: MW-39
CLIENT: ADEQ
LOCATION: Parcel 999-99-9993
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 04/18/2005 10:21 AM
FINISH DATE/TIME: 04/26/2005 06:50 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
40				GP			
45						45.0' CLAYEY SAND, with gravel, angular, brown, low-moderate plasticity, null HCL, null cementation. (moisture unknown-driller adding water)	
50				SC			
55							
60							
65						65.0' GRAVELLY SAND with clay, angular - subround, brown, low plasticity, null HCL, null cementation. (moisture unknown-driller adding water)	3" PVC Sch. 40
70				SP			Bentonite Grout
75						75.0'	



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SHEET 3 of 11

BORING LOG: MW-39

PROJECT: MW-39
CLIENT: ADEQ
LOCATION: Parcel 999-99-9993
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 04/18/2005 10:21 AM
FINISH DATE/TIME: 04/26/2005 06:50 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80			0.0	GC		CLAYEY GRAVEL, with sand, subangular - subround, brown, moderate plasticity, null HCl, null cementation. (moisture unknown-driller adding water)	
85				GC			
90				GC			
93.0'				GC		CLAYEY GRAVEL, with sand and trace silts, subangular - subround, brown, low - moderate plasticity, null HCl, moist, null cementation.	
95				GC			
100			1.2	GC			
105				GP		SANDY GRAVEL, with clay, angular, brown, low plasticity, null HCl, moist, null cementation.	
106.0'				GP			
110				GP			
115				GP			
115.0'				GP			



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SHEET 4 of 11

BORING LOG: MW-39

PROJECT: MW-39
CLIENT: ADEQ
LOCATION: Parcel 999-99-9993
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 04/18/2005 10:21 AM
FINISH DATE/TIME: 04/26/2005 06:50 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
120			0.0	SP		GRAVELLY SAND, with clay, subangular - subround, brown, null - low plasticity, null HCl, moist, null cementation.	
125						125.0'	
130				GP		SANDY GRAVEL with few clay, subangular - subround, brown, null - low plasticity, null HCl, moist, null cementation.	
135						136.0'	
140			0.2	GP		SANDY GRAVEL with clay, subangular - subround, brown, low plasticity, null HCl, null cementation. (moisture unknown-driller adding water)	
145						146.0'	
150				GP		POORLY GRADED GRAVEL, with little sand and trace fines, angular - subround, brown, null plasticity, null HCl, null cementation. (moisture unknown-driller adding water)	
155							



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SHEET 5 of 11

BORING LOG: MW-39

PROJECT: MW-39
CLIENT: ADEQ
LOCATION: Parcel 999-99-9993
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 04/18/2005 10:21 AM
FINISH DATE/TIME: 04/26/2005 06:50 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160		SRECD-C-MW39-160	0 0.1	GC		157.0' CLAYEY GRAVEL, with trace sand and silt, angular - subround, brown, low plasticity, null HCl, wet, null cementation.	<p>3" PVC Sch. 40 Slotted 0.040</p> <p>#30 Sand</p> <p>3" PVC Sch. 40</p>
165						165.0' CLAYEY GRAVEL, with few clay and sand, angular - subround, brown, null plasticity, null HCl, wet, null cementation.	
170		SRECD-C-MW39-170		GC			
175						176.0' WELL GRADED SAND with gravel and few fines, angular - subround, brown, null plasticity, null HCl, wet, null cementation.	
180				SW			
185						185.0' POORLY GRADED SAND with gravel and few fines, angular - subround, brown, null plasticity, null HCl, wet, null cementation.	
190		SRECD-C-MW39-190	0.1	SP			
195						195.0'	



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SHEET 6 of 11

BORING LOG: MW-39

PROJECT: MW-39
CLIENT: ADEQ
LOCATION: Parcel 999-99-9993
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 04/18/2005 10:21 AM
FINISH DATE/TIME: 04/26/2005 06:50 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
200				SW		WELL GRADED SAND with gravel and few fines, angular - subround, brown, null plasticity, null HCl, wet, null cementation.	
205						205.0' SANDY GRAVEL with few fines, subangular - subround, brown, null plasticity, null HCl, wet, null cementation.	
210		SREDCD-MW39-210 0.1		GP		215.0' POORLY GRADED SAND with gravels and little fines, subangular - subround, brown, null plasticity, null HCl, wet, null cementation.	
215							
220							
225							
230		SREDCD-MW39-230 0.1		SP			
235							



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SHEET 7 of 11

BORING LOG: MW-39

PROJECT: MW-39
CLIENT: ADEQ
LOCATION: Parcel 999-99-9993
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 04/18/2005 10:21 AM
FINISH DATE/TIME: 04/26/2005 06:50 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
240							
245						245.0'	
						POORLY GRADED SAND, with gravel, angular - subround, brown - gray brown, null plasticity, strong HCl, wet, null Cementation.	#30 Sand
250		SRECD-C-MW39-250		SP			
255						255.0'	
						POORLY GRADED SAND, with gravel, angular - subround, brown - gray brown, null plasticity, weak HCl, wet, null Cementation.	
260			0.3	SP			
265						265.0'	
						POORLY GRADED GRAVEL with sand, angular - subround, brown, null plasticity, strong HCl, wet, null cementation.	#8-12 Sand
270		SRECD-C-MW39-270		GP			3" PVC Sch. 40 Slotted 0.040
275						275.0'	



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SHEET 8 of 11

BORING LOG: MW-39

PROJECT: MW-39
CLIENT: ADEQ
LOCATION: Parcel 999-99-9993
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 04/18/2005 10:21 AM
FINISH DATE/TIME: 04/26/2005 06:50 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
280				SP		POORLY GRADED SAND with gravel and little silt, fine - coarse sand and coarse gravel, angular - subround, brown, null plasticity, moderate HCl, wet, null cementation.	
285						285.0'	
290			0.2	GP		SANDY GRAVEL with clay, fine sand and fine - predominantly coarse gravel, angular - subround, brown, null plasticity, strong HCl, wet, null - weak cementation.	← #30 Sand
295						295.0'	
300				GP		POORLY GRADED GRAVEL with few clay and little sand, angular - subround, brown with colorful gravel, null plasticity, strong HCl, wet, null - weak cementation.	
305						305.0'	
310		SREDCD-MW39-310		GP		POORLY GRADED GRAVEL with sand and few clay/silt, angular - subround, brown with colorful gravel, null plasticity, moderate HCl, wet, null - weak cementation.	
315						315.0'	



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SHEET 9 of 11

BORING LOG: MW-39

PROJECT: MW-39
CLIENT: ADEQ
LOCATION: Parcel 999-99-9993
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 04/18/2005 10:21 AM
FINISH DATE/TIME: 04/26/2005 06:50 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
320						POORLY GRADED SAND with gravel and few fines, angular - subround, brown, null plasticity, moderate HCl, wet, null - weak cementation.	
325				SP			Bentonite Pellets
330		SREDCD-MW39-330					
335						POORLY GRADED GRAVEL with sand and few fines, angular - subround, brown with colorful gravel, null plasticity, strong HCl, wet, null - weak cementation.	
340			0.2				
345				GP			
350							
355							



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SHEET 10 of 11

BORING LOG: MW-39

PROJECT: MW-39
CLIENT: ADEQ
LOCATION: Parcel 999-99-9993
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 04/18/2005 10:21 AM
FINISH DATE/TIME: 04/26/2005 06:50 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
360		SREDCD-MW39-360		SP		POORLY GRADED SAND with gravel, angular - subround, brown, null plasticity, strong HCl, wet, null - weak cementation.	
365						365.0'	
370						POORLY GRADED GRAVEL with sand and few fines, angular - subround, brown, null plasticity, strong HCl, wet, null - weak cementation.	
375				GP			
380							
385						385.0'	
390				SP		POORLY GRADED SAND with gravel and little silt, angular - subround, brown, null plasticity, strong HCl, wet, null - weak cementation.	
395						395.0'	



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SHEET 11 of 11

BORING LOG: MW-39

PROJECT: MW-39
CLIENT: ADEQ
LOCATION: Parcel 999-99-9993
URS PROJECT #: 23444228.4000

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 04/18/2005 10:21 AM
FINISH DATE/TIME: 04/26/2005 06:50 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
400		SRECDG-MW39-400 0.1		GP		POORLY GRADED GRAVEL with some sand and little fines, angular - subround, brown with colorful gravel, null plasticity, strong HCl, wet, null cementation.	
405							
410							
415							
420							
425							
430							
435							

WELL BORING DETAILS:

Total Depth 405-feet bgs
Drilling Method Air Rotary Casing Hammer
Nominal Borehole Diameter 12"

WELL CONSTRUCTION DETAILS:

Surface Completion 0 - 5'
Material Concrete
Casing Protection 5' - 20'
Material Neat Cement Grout

Casing

Material Schedule 40 Blank PVC
Diameter 3"
Well Casing Length
Shallow Well ~130'
Middle Well ~205'
Deep Well ~370'

Material 0.040", Slotted Schedule 40 PVC
Diameter 3"
Screen Length
Shallow Well 50'
Middle Well 30'
Deep Well 30'
Screened Interval
Shallow Well 129.5-179.5'
Middle Well 204.5-234.5'
Deep Well 369.5- 399.5'
Threaded End Cap Length 6"

Shallow Well

1st Upper Seal Interval 20' - 116'
Seal Material Bentonite Grout
2nd Seal Interval 116' - 122'
Seal Material Bentonite Chips
Upper Transition Interval 122' - 124'
Transition Material #30 Sand
Gravel Pack Interval 124' - 181'
Gravel Pack Material #8-12 Sand
Bottom Transition Interval 181' - 183'
Transition Material #30 Sand
Bottom Seal Interval 183' - 197'
Seal Material Bentonite Pellets

Middle Well

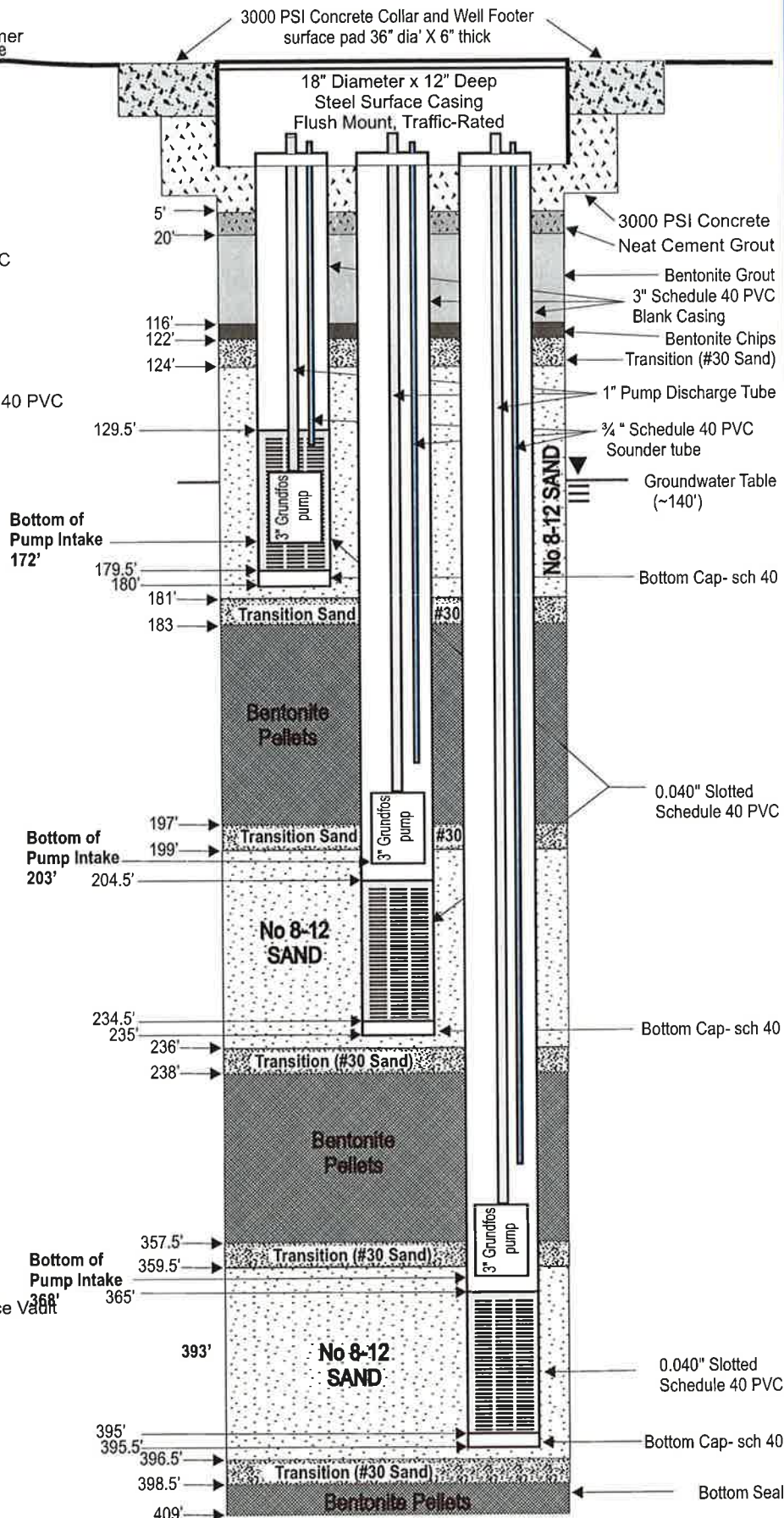
Upper Transition Interval 197' - 199'
Transition Material #30 Sand
Gravel Pack Interval 199' - 236'
Gravel Pack Material #8-12 Sand
Bottom Transition Interval 236' - 238'
Transition Material #30 Sand
Bottom Seal Interval 238' - 357.5'
Seal Material Bentonite Pellets

Deep Well

Upper Transition Interval 357.5' - 359.5'
Transition Material #30 Sand
Gravel Pack Interval 359.5' - 396.5'
Gravel Pack Material #8-12 Sand
Bottom Transition Interval 396.5' - 398.5'
Transition Material #30 Sand
Bottom Seal Interval 398.5' - 409'
Seal Material Bentonite Pellets
Surface Completion Flush Mount Surface Vault
In a 3'X3'X6" 3000 psi concrete pad

WELL EQUIPPING:

Pump Make Grundfos
Pump Size Nominal 3"
Model 15 SQ10C-250
Pump Capacity 15-20 gpm
Pump Intake
Shallow Well 172' bgs
Middle Well 203' bgs
Deep Well 363.5' bgs



W-40 AsBuilt SCHEMATIC

Remedial Investigation/Feasibility Study

Shannon Road - Rillito Creek & El Camino Del Cerro WQARF Sites



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SHEET 1 of 11

BORING LOG: MW-40

PROJECT: MW-40
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 23444555

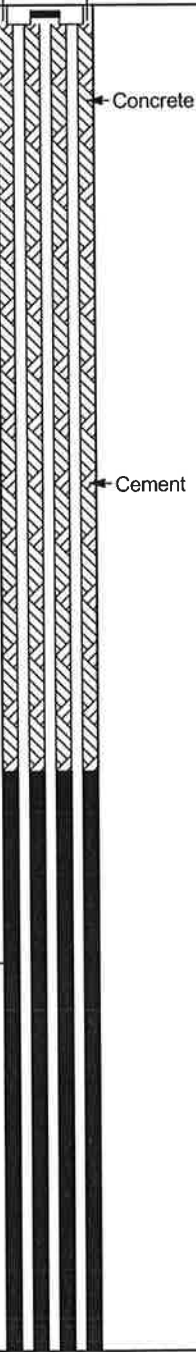
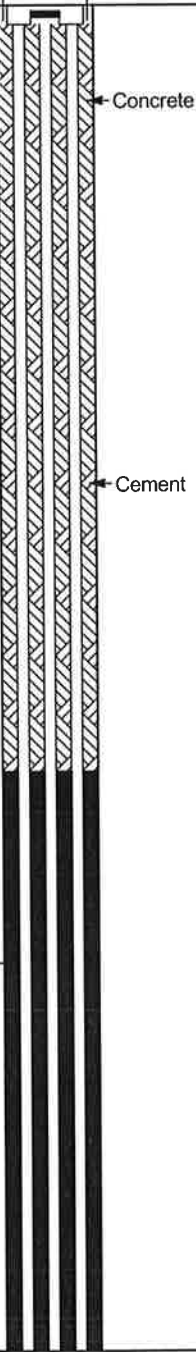
DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 05/12/2006 01:17 PM
FINISH DATE/TIME: 05/23/2006 12:00 PM

LATITUDE (NAVD27):
LONGITUDE (NAVD 27):

TOP OF GROUND ELEVATION: A.S.L.
TOP OF CASING ELEVATION: A.S.L.
SCREENED INTERVAL: 129.5-179.5, 204.5-234.5, 365-395

COMMENTS:

RIG TYPE:
DRILLING METHOD: Air Rotary Casing Hammer
SAMPLING METHOD: Auto Hammer

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
5						CLAYEY SILT, light brown, strong HCl, med plasticity, null cementation, dry.	
10							
15				ML			
20			0.2				
25						CLAYEY SILT, light brown, strong HCl, med-low plasticity, null Cementation, Moisture unknown (driller adding water).	
30				ML			
35							



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SHEET 2 of 11

BORING LOG: MW-40

PROJECT: MW-40
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 23444555

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 05/12/2006 01:17 PM
FINISH DATE/TIME: 05/23/2006 12:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
40			0.0	GP		SANDY SILTY GRAVEL, with few clay, light brown, sub-angular to round, strong HCl, low-med plasticity, null cementation, Moisture unknown (driller adding water).	
45				GP		SANDY SILTY GRAVEL, with few clay, light brown, sub-angular to sub-round, no HCl, null plasticity, null cementation, Moisture unknown (driller adding water).	
50				GP			
55				SP		POORLY GRADED SAND with gravel and clay, light brown, angular to sub-round, null HCl, low plasticity, null cementation, Moisture unknown (driller adding water).	
60				GP		SANDY GRAVEL, with clay, brown, angular to sub-round, no HCl, null plasticity, null cementation, Moisture unknown (driller adding water).	
65				GP			
70				GP			
75				GP			



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SHEET 3 of 11

BORING LOG: MW-40

PROJECT: MW-40
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 23444555

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 05/12/2006 01:17 PM
FINISH DATE/TIME: 05/23/2006 12:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80						GRAVELLY SAND with clay, brown, sub-angular to sub-round, null HCl, moderate plasticity, null cementation, Moisture unknown (driller adding water).	
85				SP			
90							
95							
						95.0'	
						SILTY SAND with gravel and trace clays, brown, sub-angular to sub-round, null HCl, low plasticity, null cementation, Moisture unknown (driller adding water).	
100				SP			
105							
						105.0'	
						CLAYEY SAND with gravel, brown, sub-angular to sub-round, null HCl, low-mod plasticity, null cementation, Moisture unknown (driller adding water).	
110				SC			
			0.1				
115						115.0'	



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SHEET 4 of 11

BORING LOG: MW-40

PROJECT: MW-40
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 23444555

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 05/12/2006 01:17 PM
FINISH DATE/TIME: 05/23/2006 12:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
120				SC		CLAYEY SAND with gravel, brown, sub-angular to round, null HCl, null plasticity, null cementation, Moisture unknown (driller adding water).	
125						125.0' CLAYEY GRAVEL, with sand and trace silt, brown, sub-angular to round, no HCl, low plasticity, null cementation, moist.	
130				GP			
135						135.0' WELL GRADED SAND with gravel, brown, angular to sub-round, null HCl, null plasticity, null cementation, moist.	
140				SW			
145						145.0' SANDY GRAVEL, with few clay, brown, sub-angular to sub-round, no HCl, null plasticity, null cementation, moist.	
150			0.0	GP			
155						155.0'	



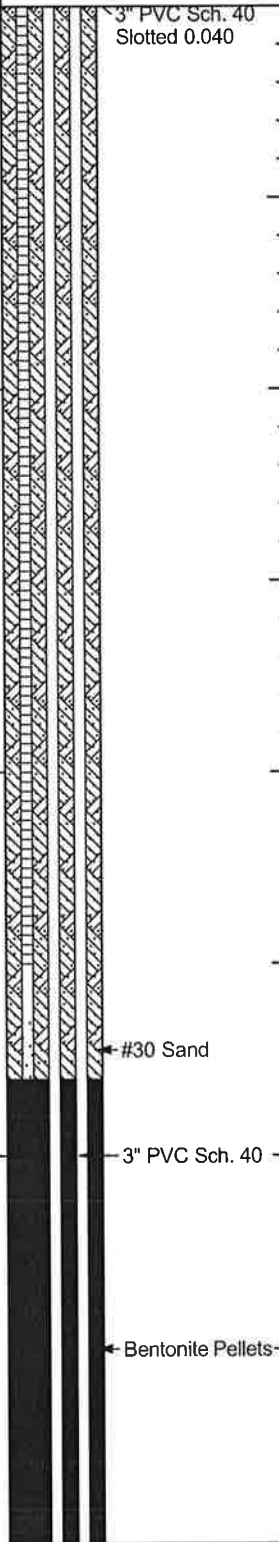
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SHEET 5 of 11

BORING LOG: MW-40

PROJECT: MW-40
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 23444555

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 05/12/2006 01:17 PM
FINISH DATE/TIME: 05/23/2006 12:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160		SREDCD-MW40-160		SP		GRAVELLY SAND with clay, brown, sub-angular to round, null HCl, null plasticity, null cementation, wet.	
165						165.0' SANDY GRAVEL, with clay, brown, angular to sub-round, no HCl, null plasticity, null cementation, wet.	
170		SREDCD-MW40-170 0.0		GP			
175						175.0' CLAYEY SAND with gravel, brown, angular to sub-angular, null HCl, null plasticity, low cementation, wet.	
180				SC			
185						185.0' GRAVELLY SAND with few fines, brown, angular to sub-round, null HCl, null plasticity, low cementation, wet.	
190		SREDCD-MW40-190 0.0		SP			
195						195.0'	



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SHEET 6 of 11

BORING LOG: MW-40

PROJECT: MW-40
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 23444555

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 05/12/2006 01:17 PM
FINISH DATE/TIME: 05/23/2006 12:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
200				GP		SANDY GRAVEL, with trace fines, brown, sub-angular to sub-round, no HCl, null plasticity, null cementation, wet.	
205						GRAVELLY SAND with few fines, brown, angular to sub-round, null HCl, null plasticity, null cementation, wet.	
210		SRECD-C-MW40-210 0.0		SP			
215						SANDY GRAVEL, with trace fines, brown, angular to sub-round, no HCl, null plasticity, null cementation, wet.	
220							
225							
230		SRECD-C-MW40-230		GP			
235							



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SHEET 7 of 11

BORING LOG: MW-40

PROJECT: MW-40
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 23444555

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 05/12/2006 01:17 PM
FINISH DATE/TIME: 05/23/2006 12:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
240			0.0				
245						245.0'	
250		SRECD-C-MW40-250	0.0	SW		WELL GRADED SAND with gravel, brown, sub-angular to sub-round, no HCl, null plasticity, null cementation, wet.	← #30 Sand
255						255.0'	
260				GP		SANDY GRAVEL, with silt, brown, angular to sub-round, no HCl, null plasticity, null cementation, wet.	
265						265.0'	
270		SRECD-C-MW40-270		SW		WELL GRADED SAND with gravel, brown, sub-angular to sub-round, no HCl, null plasticity, null cementation, wet.	
275						275.0'	



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SHEET 8 of 11

BORING LOG: MW-40

PROJECT: MW-40
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 23444555

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 05/12/2006 01:17 PM
FINISH DATE/TIME: 05/23/2006 12:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
280				GP		Poorly Graded Gravel, with silt, clay and little sand, brown, sub-angular to sub-round, no HCl, null plasticity, null cementation, wet.	
285				GP		285.0' SANDY GRAVEL, with little silt, brown, sub-angular to sub-round, strong HCl, null plasticity, null cementation, wet.	
290				GP		295.0' WELL GRADED SAND with few fines, brown, sub-angular to sub-round, strong HCl, null plasticity, null cementation, wet.	
295				SW		305.0' WELL GRADED SAND with gravel, brown, sub-angular to round, moderate HCl, null plasticity, null cementation, wet.	
300		SRECD-MW40-310 0.0	0.0				
305							
310							
315							



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SHEET 9 of 11

BORING LOG: MW-40

PROJECT: MW-40
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 23444555

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 05/12/2006 01:17 PM
FINISH DATE/TIME: 05/23/2006 12:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
320				SW			
325							
330		SRECDC-MW40-330 0.0					
335						335.0'	
				SP		GRAVELLY SAND with few fines, brown with colorful clasts, sub-angular to sub-round, null HCl, null plasticity, null cementation, wet.	
340							
345						345.0'	
				GP		SANDY GRAVEL, with few fines, brown with colorful clasts, angular to sub-round, weak HCl, null plasticity, null cementation, wet.	
350							
355						355.0'	



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SHEET 10 of 11

BORING LOG: MW-40

PROJECT: MW-40
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 23444555

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 05/12/2006 01:17 PM
FINISH DATE/TIME: 05/23/2006 12:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
360		SREDCD-MW40-360 0.0				GRAVELLY SAND with few fines, brown with colorful clasts, sub-angular to sub-round, moderate to strong HCl, null plasticity, null cementation, wet.	
365				SP			
370							
375							
375.0'						WELL GRADED SAND with little gravel and few fines, brown, sub-angular to round, weak HCl, null plasticity, null cementation, wet.	
380				SW			
385							
385.0'						GRAVELLY SAND with few fines, brown, angular to sub-round, weak HCl, null plasticity, null cementation, wet.	
390							
395							






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SHEET 11 of 11

BORING LOG: MW-40

PROJECT: MW-40
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 23444555

DRILLING CONTRACTOR: Yellow Jacket Drilling
DRILLER: Jacob Lagana
LOGGED BY: PAP
START DATE/TIME: 05/12/2006 01:17 PM
FINISH DATE/TIME: 05/23/2006 12:00 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
400		SREDCD-MW40-400 0.0		SP			
405							
410							
415							
420							
425							
430							
435							

WELL BORING DETAILS:

Drilling Method ARCH
 Hammer Total Depth 200-feet bgs
 Nominal Borehole Diameter . . 9"

WELL CONSTRUCTION DETAILS:

Surface Completion 0 - 5'
 Material Concrete
 Casing Protection 5' - 20'
 Material Neat Cement Grout

Blank Casing

Material Blank Schedule 40 PVC
 Diameter 4"
 Well Casing Length . . . ~121.5'
 Blank Interval 0'-121.5'

Screened Interval

Material . . . 0.040" Slotted Schedule 40 PVC
 Diameter 4"
 Screen Length 75'
 Screened Interval . . . 121.5'-196.5'
 Threaded End Cap Length 6"

Well Backfill

Top Seal Interval 20' - 108'
 Seal Material Bentonite Grout
 2nd Seal Interval 108' - 114.5'
 Seal Material Bentonite Chips
 Top Transition Interval . . 114.5'-116'
 Transition Material . . . #30 Sand
 Gravel Pack Interval . . . 116' - 197'
 Gravel Pack Material . . #8 - 12 Sand
 Bottom Transition Interval . 197' - 199'
 Transition Material . . . #30 Sand
 Bottom Seal Interval . . . 199' - 201'
 Seal Material Bentonite Chips

Sounding Tube

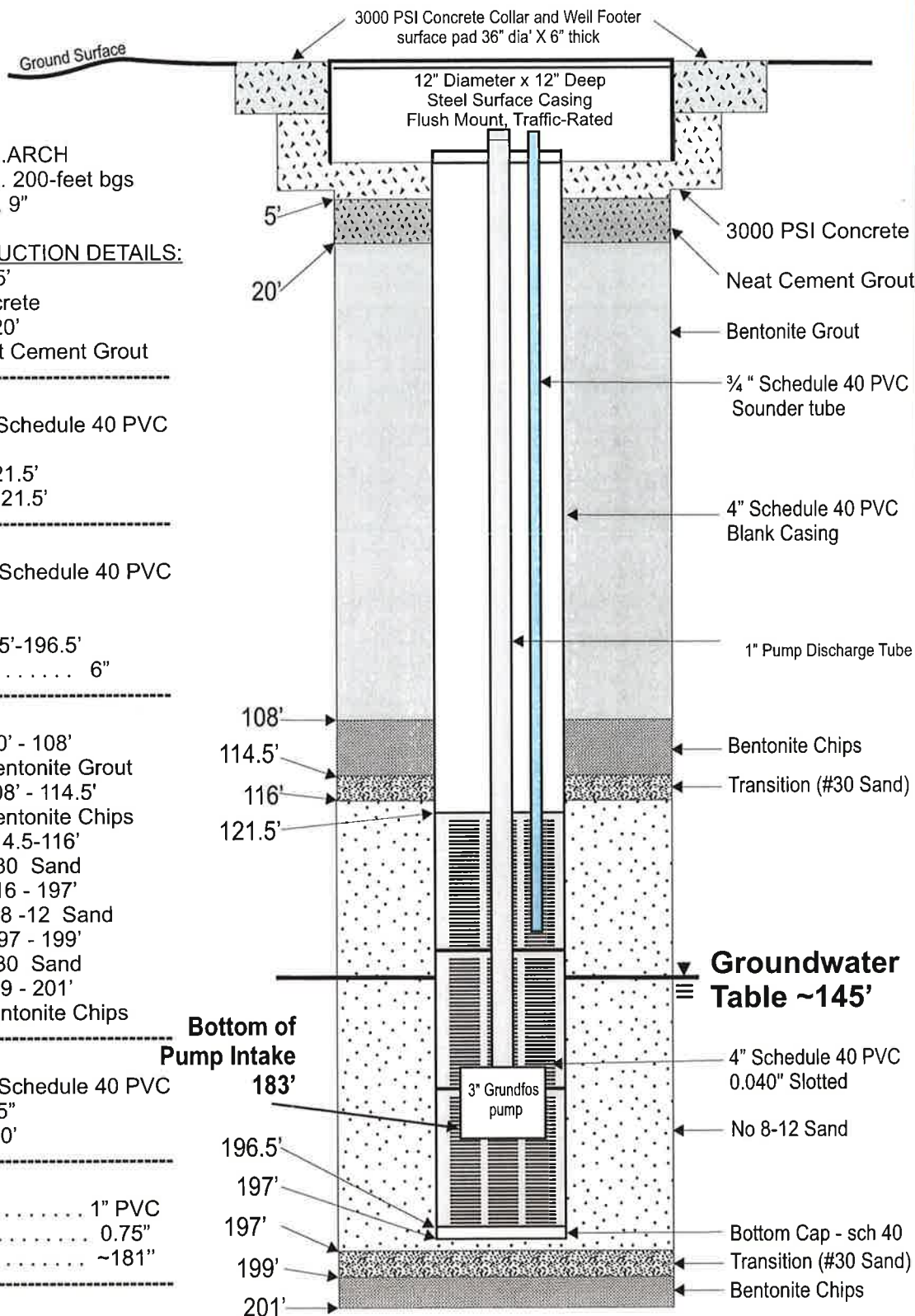
Material Blank Schedule 40 PVC
 Diameter 0.75"
 Tube Casing Length . . ~180'

Riser Tube

Material 1" PVC
 Diameter 0.75"
 Length ~181"

WELL EQUIPPING:

Pump Make Grundfos
 Pump Size Nominal 3"
 Model 15 SQ10C-250
 Pump Capacity 15-20 gpm
 Pump Intake 183' bgs



MW-41

MONITOR WELL AS-BUILT SCHEMATIC

Shannon Road - Rillito Creek & El Camino Del Cerro WQARF Sites



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SHEET 1 of 6

BORING LOG: MW-41

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

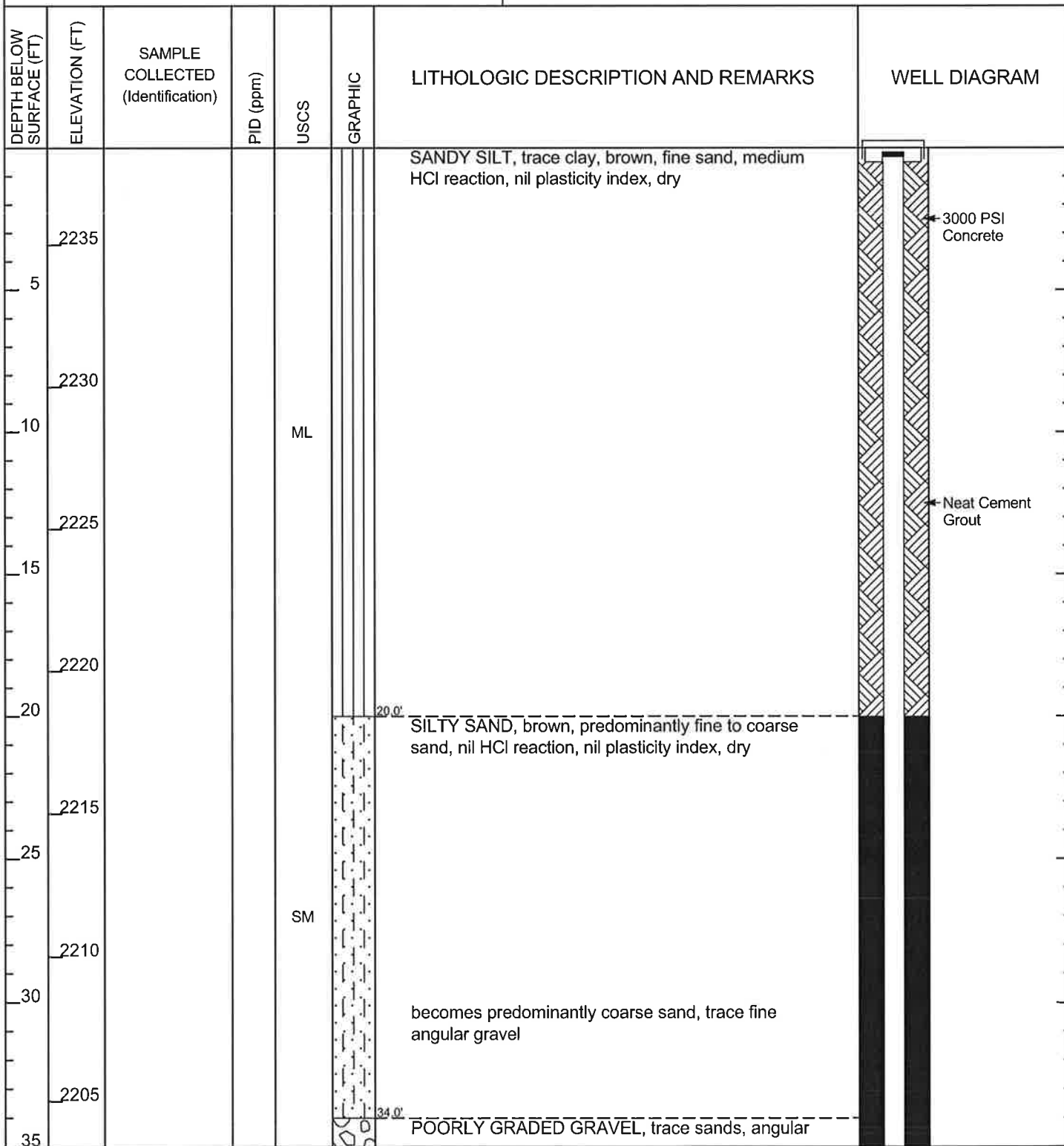
DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/09/2006 10:00 AM
FINISH DATE/TIME: 11/09/2006 01:45 PM

LATITUDE (NAVD27): 32.180882998
LONGITUDE (NAVD 27): -111.015850979

TOP OF GROUND ELEVATION: 2238.415 A.S.L.
TOP OF CASING ELEVATION: 2238.135 A.S.L.
SCREENED INTERVAL: 121.5 - 197

COMMENTS: Approximate WL: 146.3 feet bgs

RIG TYPE: ARCH
DRILLING METHOD: 7.5" tricone bit
SAMPLING METHOD:





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SHEET 2 of 6

BORING LOG: MW-41

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/09/2006 10:00 AM
FINISH DATE/TIME: 11/09/2006 01:45 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
						to subrounded, dry	
40	2195			GP			
45	2190					44.0'	
						POORLY GRADED SAND, few silts, brown, fine to predominantly coarse sand, nil plasticity index, nil HCl reaction, dry-slightly moist	
50	2185			SP-SM			
55	2180						
						56.0'	
						CLAYEY GRAVEL, with sand, brown, low plasticity index, fine to predominantly coarse gravel	
60	2175						
							4" Schd 40 PVC Blank Casing
65	2170			GC			Bentonite Grout
70	2165						
75	2160						
						75.0'	

BORING LOG: MW-41

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/09/2006 10:00 AM
FINISH DATE/TIME: 11/09/2006 01:45 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80	2155					SILTY SAND/POORLY GRADED SAND, with gravel, brown, fine to coarse sand and fine gravel, nil plasticity index, nil HCl reaction, angular to subangular	
85	2150			SP-SM		Water added to drill stem, for dust suppression, masks in-situ water content	
90	2145						
95	2140						
95.0'						CLAYEY SAND, with few gravel, brown, fine to coarse sand and gravel, low to medium plasticity index, nil HCL reaction, angular to subrounded	
100	2135						
105	2130						
110	2125			SC			
115	2120						



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SHEET 4 of 6

BORING LOG: MW-41

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/09/2006 10:00 AM
FINISH DATE/TIME: 11/09/2006 01:45 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
120	2115						
125	2110						
130	2105			SC-GC		CLAYEY SAND/CLAYEY GRAVEL, with sand, brown, fine to predominantly coarse sand and gravel, low plasticity index, angular to subrounded	
135	2100						
140	2095						
145	2090			GP-GC		CLAYEY GRAVEL, with sand, brown, fine to predominantly coarse sand and fine to coarse gravel, low to nil plasticity index, angular to subrounded	
150	2085						
155	2080						



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SHEET 5 of 6

BORING LOG: MW-41

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/09/2006 10:00 AM
FINISH DATE/TIME: 11/09/2006 01:45 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160	2075					CLAYEY SAND/CLAYEY GRAVEL, with sand, brown, fine to predominantly coarse sand and gravel, low plasticity index, angular to subrounded	
165	2070					Clay and in-situ water binds in drill casing forcing drillers to add water to free cuttings. This process washes fines out of the cuttings limiting the accuracy of the lithological classification. See area boring logs for soils classification.	#8-12 Filter Pack Sand 4" Schd 40 PVC 0.040" Slotted
170	2065						
175	2060						
180	2055			GC		drill cuttings below watertable are washed gravels with fine to predominantly coarse sand	
185	2050						
190	2045						
195	2040						



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SHEET 6 of 6

BORING LOG: MW-41

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/09/2006 10:00 AM
FINISH DATE/TIME: 11/09/2006 01:45 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
200	2035						
205	2030					Total depth at 201'	
210	2025						
215	2020						
220	2015						
225	2010						
230	2005						
235	2000						

WELL BORING DETAILS:

Drilling Method ARCH
 Hammer Total Depth 200-feet bgs
 Nominal Borehole Diameter . . 9"

WELL CONSTRUCTION DETAILS:

Surface Completion 0 - 4.5'
 Material Concrete
 Casing Protection 4.5' - 106'
 Material Neat Cement Grout

Blank Casing

Material Blank Schedule 40 PVC
 Diameter 4"
 Well Casing Length . . . ~119'
 Blank Interval 0'-119'

Screened Interval

Material . . . 0.040" Slotted Schedule 40 PVC
 Diameter 4"
 Screen Length 75'
 Screened Interval . . . 119'-195'
 Threaded End Cap Length 6"

Well Backfill

and Seal Interval 106' - 111'
 Seal Material Bentonite Chips
 Top Transition Interval . . 111-113'
 Transition Material . . . #30 Sand
 Gravel Pack Interval . . . 113 - 195.5'
 Gravel Pack Material . . #8 -12 Sand
 Bottom Transition Interval. 195.5'-197.5'
 Transition Material . . . #30 Sand
 Bottom Seal Interval 197.5'-200'
 Seal Material Bentonite Chips

Sounding Tube

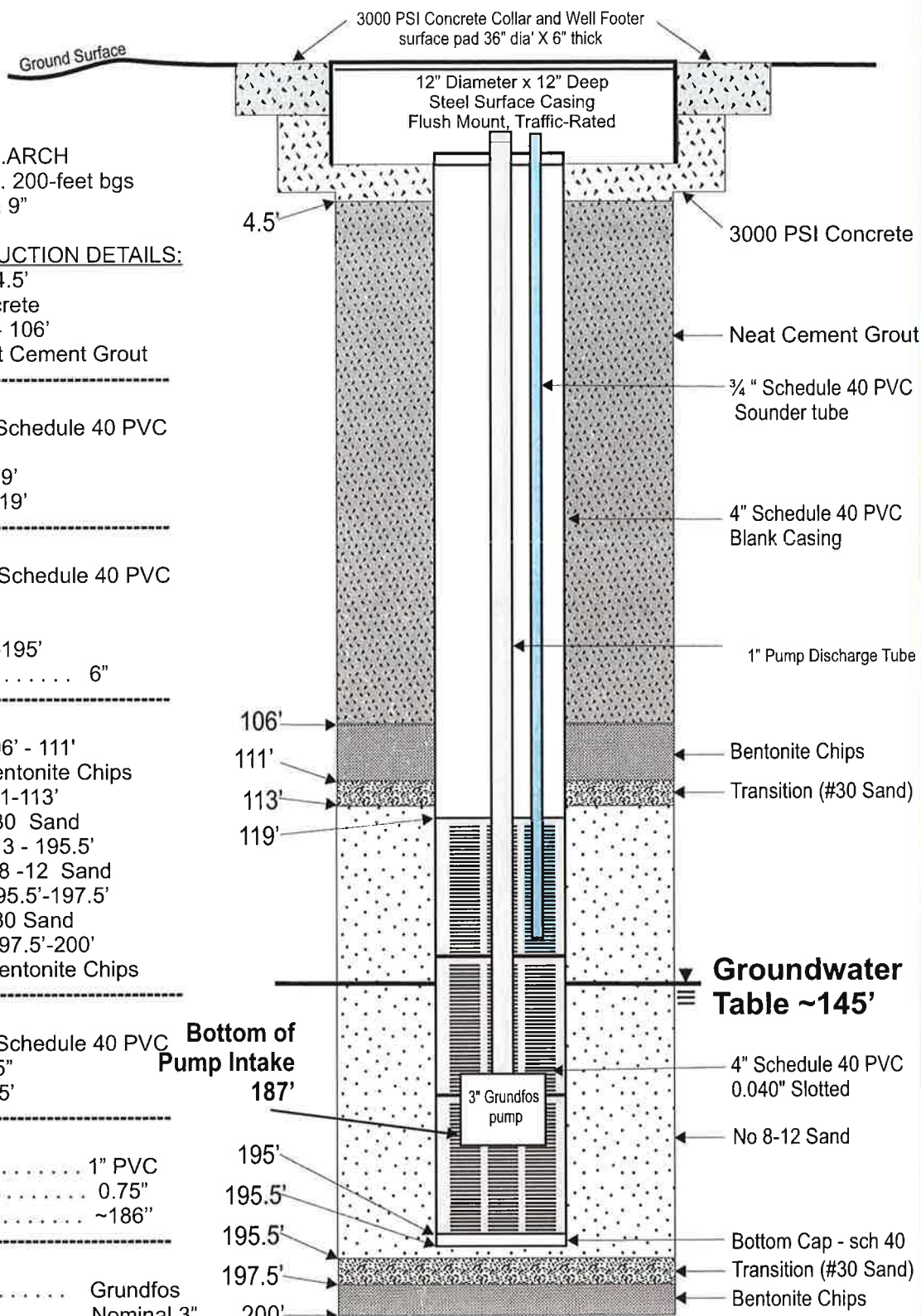
Material Blank Schedule 40 PVC
 Diameter 0.75"
 Tube Casing Length . . ~185'

Riser Tube

Material 1" PVC
 Diameter 0.75"
 Length ~186"

WELL EQUIPPING:

Pump Make Grundfos
 Pump Size Nominal 3"
 Model 15 SQ10C-250
 Pump Capacity 15-20 gpm
 Pump Intake 187' bgs



MW-42

MONITOR WELL AS-BUILT SCHEMATIC

Shannon Road - Rillito Creek & El Camino Del Cerro WQARF Sites

BORING LOG: MW-42

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819






DRILLING CONTRACTOR: WDC Exploration
DRILLER: Ryan Reynolds
LOGGED BY: DMC
START DATE/TIME: 04/10/2006 10:42 AM
FINISH DATE/TIME: 04/10/2006 02:24 PM

LATITUDE (NAVD27): 32.18983378
LONGITUDE (NAVD 27): -111.02047668

TOP OF GROUND ELEVATION: 2236.772 A.S.L.
TOP OF CASING ELEVATION: 2236.657 A.S.L.
SCREENED INTERVAL: 119 - 195.5

COMMENTS: Approximate WL: 150 feet bgs

RIG TYPE: ARCH
DRILLING METHOD: 7.5" tricone bit
SAMPLING METHOD:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
2235				NONE		FILL: 1.5" minus AGGREGATE BASE COARSE material	
5				CL		SANDY CLAY, with silt, dark brown, fine sand, moist, strong HCl reaction, low to medium plasticity	
2230							
10							
2225							
15				ML		CLAYEY SILT, with sand brown slightly moist to dry, low plasticity index, fine to medium sand, weak HCl reaction	
2220							
20							
2215							
25				GM		SILTY GRAVEL, with sand, brown, dry, nil HCl reaction	
2210							
30							
2205							
35							



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SHEET 2 of 6

BORING LOG: MW-42

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Ryan Reynolds
LOGGED BY: DMC
START DATE/TIME: 04/10/2006 10:42 AM
FINISH DATE/TIME: 04/10/2006 02:24 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
40	2195			SC-SM		SILTY SAND, brown, fine to coarse sand, nil to low plasticity, nil HCl reaction	
45	2190						
50	2185						
55	2180			GP-GM		SILTY GRAVEL, with sand, brown, nil plasticity index, dry, nil HCl reaction	
60	2175						
65	2170						
70	2165						
75	2160						
						CLAYEY SAND/CLAYEY GRAVEL, with sand, brown, fine to predominantly coarse sand and gravel, low plasticity index, nil HCL reaction, slightly moist to moist	



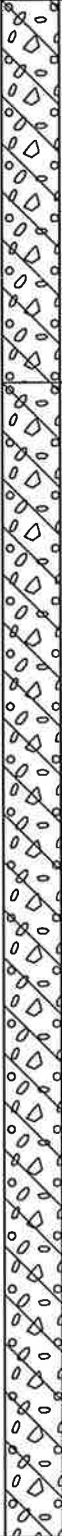
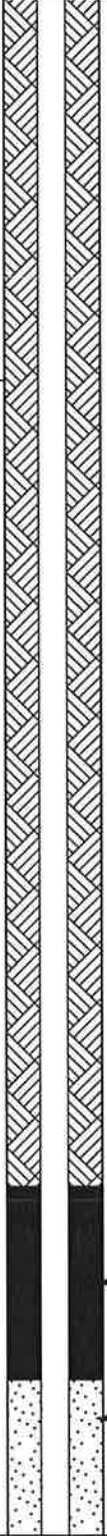
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SHEET 3 of 6

BORING LOG: MW-42

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Ryan Reynolds
LOGGED BY: DMC
START DATE/TIME: 04/10/2006 10:42 AM
FINISH DATE/TIME: 04/10/2006 02:24 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80	2155			SC-GC			
85	2150					CLAYEY GRAVEL, with sand, brown, low plasticity index, moist, nil HCl reaction	
90	2145						
95	2140						
100	2135						
105	2130						
110	2125						
115	2120						



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SHEET 4 of 6

BORING LOG: MW-42

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Ryan Reynolds
LOGGED BY: DMC
START DATE/TIME: 04/10/2006 10:42 AM
FINISH DATE/TIME: 04/10/2006 02:24 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
120	2115						
	2110						
125							
	2105						
130							
	2100						
135							
	2095						
140							
	2090						
145							
	2085						
150							
	2080						
155							

GC

decrease in clay, mostly coarse gravel, becomes
borderline GC/GM

Clay and in-situ water binds in drill casing forcing

#8-12 Filter



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SHEET 5 of 6

BORING LOG: MW-42

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Ryan Reynolds
LOGGED BY: DMC
START DATE/TIME: 04/10/2006 10:42 AM
FINISH DATE/TIME: 04/10/2006 02:24 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160	2075					drillers to add water to free cuttings. This process washes fines out of the cuttings limiting the accuracy of the lithological classification. See area boring logs for soils classification.	
165	2070					drill cuttings below watertable are washed gravels with fine to predominantly coarse sand	
170	2065						
175	2060						
180	2055						
185	2050						
190	2045						
195	2040						




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SHEET 6 of 6

BORING LOG: MW-42

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Ryan Reynolds
LOGGED BY: DMC
START DATE/TIME: 04/10/2006 10:42 AM
FINISH DATE/TIME: 04/10/2006 02:24 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
2035							
200						Total depth at 200'	
2030							
205							
2025							
210							
2020							
215							
2015							
220							
2010							
225							
2005							
230							
2000							
235							

WELL BORING DETAILS:

Drilling Method ARCH
 Hammer Total Depth 200-feet bgs
 Nominal Borehole Diameter . . 9"

WELL CONSTRUCTION DETAILS:

Surface Completion 0 - 5'
 Material Concrete
 Casing Protection 5' - 20'
 Material Neat Cement Grout

Blank Casing

Material Blank Schedule 40 PVC
 Diameter 4"
 Well Casing Length . . . ~ 127'
 Blank Interval 0' - 127'

Screened Interval

Material . . . 0.040" Slotted Schedule 40 PVC
 Diameter 4"
 Screen Length 75'
 Screened Interval . . . 127'-201.5'
 Threaded End Cap Length 6"

Well Backfill

Top Seal Interval 25' - 107'
 Seal Material Bentonite Grout
 2nd Seal Interval 107' - 111.5'
 Seal Material Bentonite Chips
 Top Transition Interval . . . 111.5'-114'
 Transition Material . . . #30 Sand
 Gravel Pack Interval 114 - 202'
 Gravel Pack Material . . . #8 -12 Sand
 Bottom Transition Interval . 202'-203'
 Transition Material . . . #30 Sand
 Bottom Seal Interval 203'-205'
 Seal Material Bentonite Chips

Sounding Tube

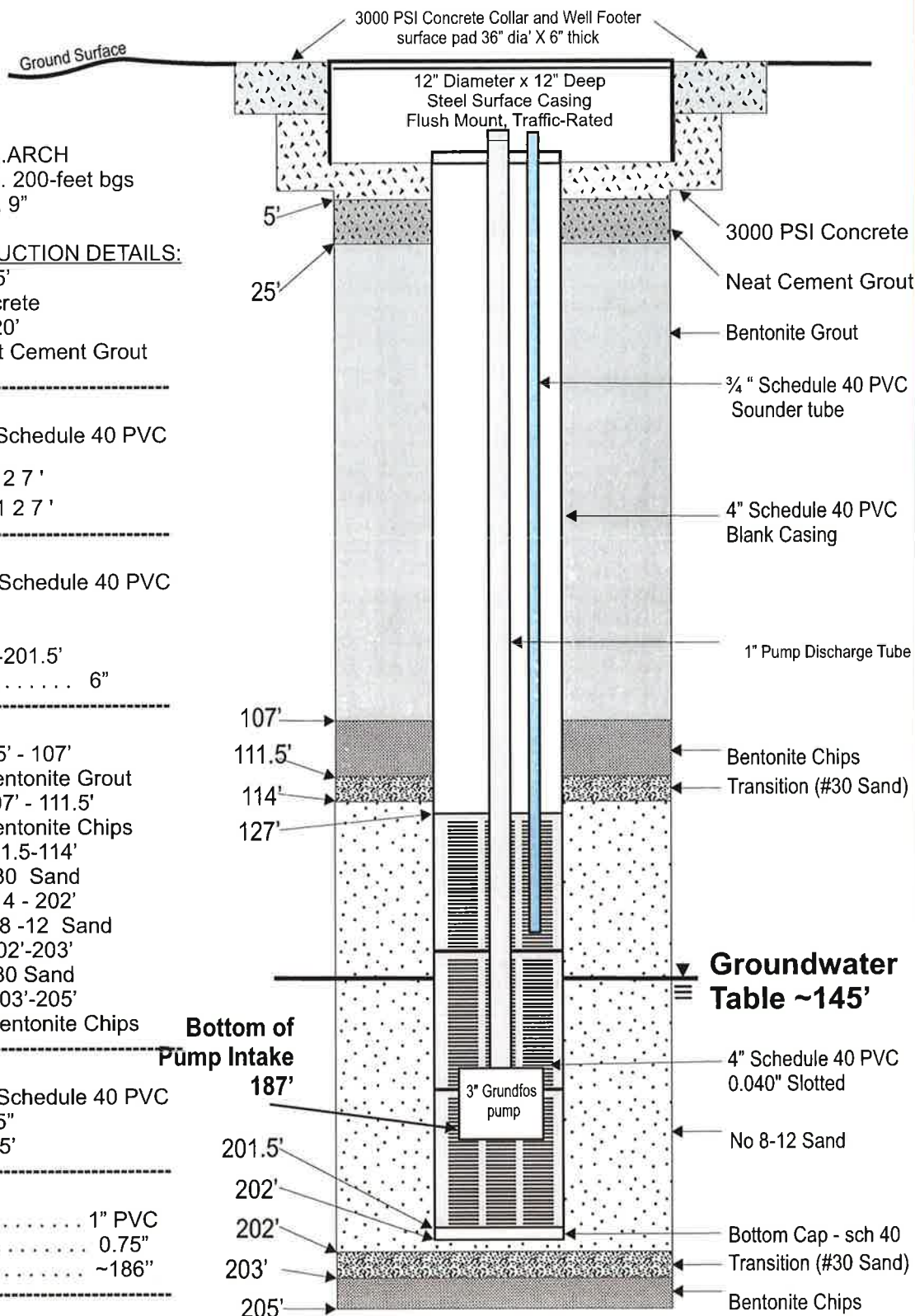
Material Blank Schedule 40 PVC
 Diameter 0.75"
 Tube Casing Length . . ~185'

Riser Tube

Material 1" PVC
 Diameter 0.75"
 Length ~186"

WELL EQUIPPING:

Pump Make Grundfos
 Pump Size Nominal 3"
 Model 15 SQ10C-250
 Pump Capacity 15-20 gpm
 Pump Intake 187' bgs





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SHEET 1 of 6

BORING LOG: MW-43

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: A. Chavez, J. Check
LOGGED BY: DMC/PP
START DATE/TIME: 03/13/2006 01:50 AM
FINISH DATE/TIME: 03/24/2006 09:40 PM

LATITUDE (NAVD27): 32.181191761
LONGITUDE (NAVD 27): -111.020649102

TOP OF GROUND ELEVATION: 2236.187 A.S.L.
TOP OF CASING ELEVATION: 2235.852 A.S.L.
SCREENED INTERVAL: 127 - 202

COMMENTS: Approximate WL: 147.8 feet bgs

RIG TYPE: Rotasonic
DRILLING METHOD: Rotasonic
SAMPLING METHOD:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
0	2235		0	SC		SANDY CLAY, with gravel and silt, brown, subrounded to subangular, strong HCl reaction, nil cementation, medium to strong plasticity index, dry	
5.9	2230		5.9	ML		CLAYEY SILT, brown, strong HCl reaction, nil cementation, low plasticity	
9.0			12	SM		Water added to drill stem to 90' below ground surface, for dust suppression, masks in-situ water content	
13.0				CL		SILTY SAND, light brown, nil HCl reaction, nil plasticity	
	2225					SILTY CLAY, brown, strong HCl reaction, nil cementation, low to medium plasticity	
25			25			CLAY, with silt, brown, strong HCl reaction, nil cementation, medium plasticity	
4	2220		4	CL		becomes black with white spots, moderate HCl reaction, weak cementation, medium plasticity	
14			14				
22.0	2215		22.0				
25.0			136.6	GC		CLAYEY GRAVEL, with sand, few silt, brown, medium HCl reaction, moderate cementation, low plasticity	
28.0	2210		51.2	GP		SANDY GRAVEL, with silt, brown, subangular to subrounded sand, subrounded gravel, nil HCl reaction, low-nil cementation, nil plasticity	
30.0			7.8	SP		GRAVELLY SANDY, trace silt, brown, subangular to subrounded, nil HCl reaction, nil cementation, nil plasticity	
35.0	2205		7.8	SM		SILTY SAND, with gravel, light brown, nil HCl reaction, nil plasticity, angular to subangular sand, subrounded to rounded gravel	



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SHEET 2 of 6

BORING LOG: MW-43

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: A. Chavez, J. Check
LOGGED BY: DMC/PP
START DATE/TIME: 03/13/2006 01:50 AM
FINISH DATE/TIME: 03/24/2006 09:40 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2195		15.5			SILTY - SANDY GRAVEL, light brown, angular to subrounded gravel, nil HCl reaction, nil cementation, nil plasticity	<p>4" Schd 40 PVC Blank Casing</p> <p>Bentonite Grout</p>
40	2190		17	GM		Black CLAY layer @ 40'	
			4.6			increase in sand	
45	2185		16.3	GP		SANDY GRAVEL, with silt and clay, light brown, angular to subrounded sand, subrounded gravel, nil HCl reaction, nil cementation, nil to low plasticity	
			19			CLAYEY GRAVEL, brown to dark brown, subangular to subrounded sand, subrounded gravel, nil HCl reaction, nil cementation, low to medium plasticity	
50	2180		72			cobble layer @ 57'	
			45	GC		SANDY GRAVEL, with silt, brown, angular to subrounded sand and gravel, nil HCl reaction, nil cementation, nil plasticity, decomposed gravel	
55	2175		36			CLAYEY GRAVEL, with sand and silt, brown, subangular to subrounded sand, subrounded gravel, nil HCl reaction, nil cementation, low-nil plasticity	
			75	GP		cobble layer @ 70'	
60	2170		53	GC		interbedded CLAYEY SAND with gravel, low plasticity	
			27				
65	2165		22.7			CLAYEY-SANDY GRAVEL, brown, subangular to subrounded, nil HCl reaction, low - nil cementation, low to medium plasticity	
			70.2				
70	2160		27				
			51.8				
75							



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SHEET 3 of 6

BORING LOG: MW-43

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: A. Chavez, J. Check
LOGGED BY: DMC/PP
START DATE/TIME: 03/13/2006 01:50 AM
FINISH DATE/TIME: 03/24/2006 09:40 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2155		59.7			CLAYEY-SANDY GRAVEL, brown, subangular to subrounded sand and gravel, nil HCl reaction, nil cementation, low plasticity	
80			23				
	2150		17.3				
			42.6				
85			69.7				
	2145						
			49.2				
90							
	2140		49.7				
95						moist	
	2135		19.9				
			32.1				
100			18.6				
	2130						
			75.5				
105						interbedded CLAYEY SAND with fine gravel @ 105'	
	2125		19.6				
			37.4				
110							
	2120		16.6				
115			40				

← Bentonite Chips

← #30 Transition Sand



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SHEET 4 of 6

BORING LOG: MW-43

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: A. Chavez, J. Check
LOGGED BY: DMC/PP
START DATE/TIME: 03/13/2006 01:50 AM
FINISH DATE/TIME: 03/24/2006 09:40 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
118	2115		26.3			interbedded SILTY GRAVEL with sand @ 118'	
120			9.3				
121	2110		28.9			interbedded SILTY SAND with gravel	
125			28.1				
126	2105		6.9				
129			4.3				
130			1.2				
131	2100		10.9				
135			52.6				
136	2095		20.2			137.0'	
137			22.7	GM		SILTY GRAVEL with interbedded CLAYEY GRAVEL, brown, angular to subangular sand gravel, nil HCl reaction, nil cementation, nil plasticity	
140			17.5				
141	2090		2.1			144.0'	
142			12.2			SANDY GRAVEL, brown, angular to subangular sand gravel, nil HCl reaction, nil cementation, nil plasticity	
145	2085		7.1				
150			22.5			interbedded CLAYEY GRAVEL @ 150'	
151	2080						
155							



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SHEET 5 of 6

BORING LOG: MW-43

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: A. Chavez, J. Check
LOGGED BY: DMC/PP
START DATE/TIME: 03/13/2006 01:50 AM
FINISH DATE/TIME: 03/24/2006 09:40 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160	2075		1			wet	
			3.8				
	2070		0.3	GP			
165			13.4				
	2065		50.9			becomes dark brown and black	
170			6.7				
	2060		4.6			becomes brown	
175			9.4				
	2055		0.7			interbedded GRAVELLY SAND @ 178', few to trace silt, wet	
180			4.7				
	2050		16.9			CLAYEY GRAVEL, with sand, brown, coarse sand, fine to coarse gravel, angular to subangular sand and gravel, nil HCl reaction, low plasticity, moist	
185			9.1			sample is disturbed- washed at 185 to 188'	
	2045		14.2	GC			
190			25.7				
	2040						
195							



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SHEET 6 of 6

BORING LOG: MW-43

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: A. Chavez, J. Check
LOGGED BY: DMC/PP
START DATE/TIME: 03/13/2006 01:50 AM
FINISH DATE/TIME: 03/24/2006 09:40 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
2035			6.7			interbedded CLAYEY SAND @ 196', low plasticity, angular	
						becomes medium plasticity @ 197'	
200			10.6			becomes brown/black	
2030							
205							
2025							
210							
2020							
215							
2015							
220							
2010							
225							
2005							
230							
2000							
235							

#30 Transition Sand
Bentonite Chips

WELL BORING DETAILS:

Drilling Method ARCH
 Hammer Total Depth 200-feet bgs
 Nominal Borehole Diameter . . 9"

WELL CONSTRUCTION DETAILS:

Surface Completion 0 - 5'
 Material Concrete
 Casing Protection 5' - 20'
 Material Neat Cement Grout

Blank Casing

Material Blank Schedule 40 PVC
 Diameter 4"
 Well Casing Length . . . ~121.5'
 Blank Interval 0'-121.5'

Screened Interval

Material . . . 0.040" Slotted Schedule 40 PVC
 Diameter 4"
 Screen Length 75'
 Screened Interval . . . 121.5'-196.5'
 Threaded End Cap Length 6"

Well Backfill

Top Seal Interval 20' - 106'
 Seal Material Bentonite Grout
 2nd Seal Interval 106' - 113'
 Seal Material Bentonite Chips
 Top Transition Interval . . . 113'-116'
 Transition Material #30 Sand
 Gravel Pack Interval 116 - 202'
 Gravel Pack Material . . . #8 -12 Sand

Sounding Tube

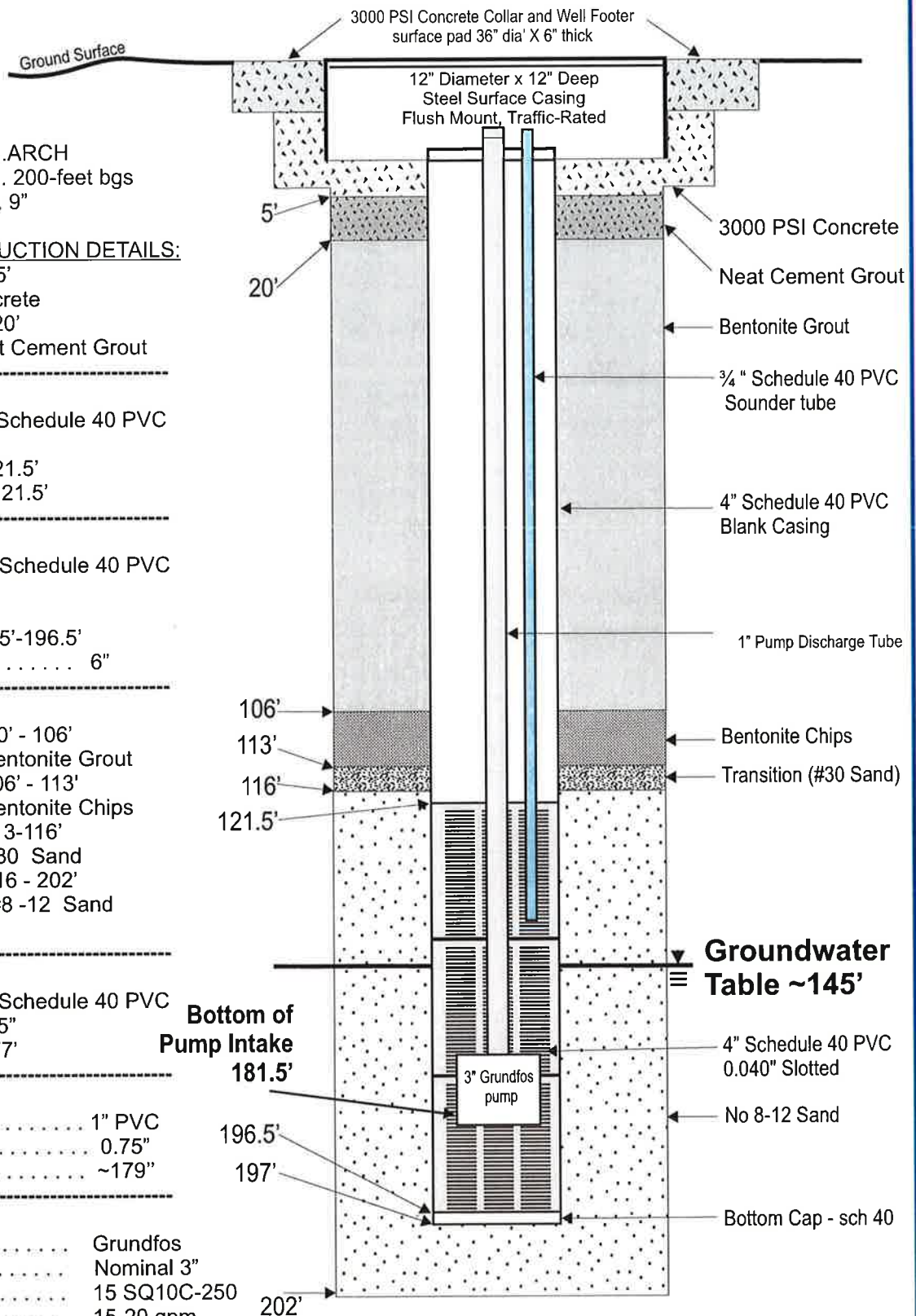
Material Blank Schedule 40 PVC
 Diameter 0.75"
 Tube Casing Length . . . ~177'

Riser Tube

Material 1" PVC
 Diameter 0.75"
 Length ~179'

WELL EQUIPPING:

Pump Make Grundfos
 Pump Size Nominal 3"
 Model 15 SQ10C-250
 Pump Capacity 15-20 gpm
 Pump Intake 181.5' bgs



MW-44

MONITOR WELL AS-BUILT SCHEMATIC

Shannon Road - Rillito Creek & El Camino Del Cerro WQARF Sites



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SHEET 1 of 6

BORING LOG: MW-44

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/16/2006 08:45 AM
FINISH DATE/TIME: 11/16/2006 11:45 PM

LATITUDE (NAVD27): 32.181480771
LONGITUDE (NAVD 27): -111.020748391

TOP OF GROUND ELEVATION: 2235.977 A.S.L.
TOP OF CASING ELEVATION: 2235.712 A.S.L.
SCREENED INTERVAL: 121.5 - 197

COMMENTS: Approximate WL: 145.6 feet bgs

RIG TYPE: ARCH
DRILLING METHOD: 7.5" tricone bit
SAMPLING METHOD:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
5	2235					CLAYEY SAND, with silt, brown, dry, low plasticity index, predominantly fine to coarse sand, strong HCl reaction	
10	2230			SC			
15	2225						
20	2220						
25	2215			CL			
30	2210						
35	2205						
				SP-SM			

14.0'

30.0'

3000 PSI Concrete

Neat Cement Grout

SANDY CLAY, trace silt, brown/dark brown, moist, medium plasticity index, fine sand, hard, weak HCl reaction

SILTY SAND, trace gravel, brown/light brown, fine to predominantly coarse sand, predominantly fine to coarse gravel, angular, nil HCl reaction, slightly moist



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SHEET 2 of 6

BORING LOG: MW-44

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/16/2006 08:45 AM
FINISH DATE/TIME: 11/16/2006 11:45 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
40	2195						
45	2190					SANDY GRAVEL, brown, fine gravel, nil plasticity index, nil HCl reaction, angular, wet, possible perched water table	
50	2185					Water added to drill stem, for dust suppression, masks in-situ water content	
55	2180			SP-GP		becomes tan/light brown	
60	2175						
65	2170					CLAYEY GRAVEL, with sand, brown, fine to predominantly coarse sand, fine to coarse gravel, low plasticity index, angular, slightly moist	4" Schd 40 PVC Blank Casing Bentonite Grout
70	2165						
75	2160						



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SHEET 3 of 6

BORING LOG: MW-44

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/16/2006 08:45 AM
FINISH DATE/TIME: 11/16/2006 11:45 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80	2150			GC			
85	2145						
90	2140			SC		CLAYEY SAND, with gravel, brown, fine to predominantly coarse sand, fine gravel, low to medium plasticity index, angular, nil HCl reaction, slightly moist	
95	2135						
100	2130			SM		SILTY SAND, with gravel, trace clay, brown, fine to coarse sand, fine gravel, nil plasticity index, angular to subrounded, nil HCl reaction, slightly moist	
105	2125						
110	2120			GC		CLAYEY GRAVEL, with sand, brown, fine to predominantly coarse sand, fine to coarse gravel, low plasticity index, angular, slightly moist	
115						CLAYEY SAND, with gravel, brown, fine to	



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SHEET 4 of 6

BORING LOG: MW-44

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/16/2006 08:45 AM
FINISH DATE/TIME: 11/16/2006 11:45 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2115					predominantly coarse sand, fine gravel, low plasticity index, angular, nil HCl reaction, slightly moist	Sand
120	2110					increasing silt with depth	
125	2105						
130	2100						
135	2095			SC			
140	2090						
145	2085						
150	2080					decrease in silt, increase in clay, low to medium plasticity, wet/moist	
155							



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SHEET 5 of 6

BORING LOG: MW-44

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/16/2006 08:45 AM
FINISH DATE/TIME: 11/16/2006 11:45 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160	2070						
165	2065						
170	2060						
175	2055						
180	2050			GC			
185	2045						
190	2040						
195							

159.0'

CLAYEY GRAVEL, with sand, brown, fine to predominantly coarse sand, fine to coarse gravel, low plasticity index, angular, slightly moist drill cuttings are washed gravels with fine to predominantly coarse sand

#8-12 Filter Pack Sand
4" Schd 40 PVC
0.040" Slotted



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SHEET 6 of 6

BORING LOG: MW-44

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/16/2006 08:45 AM
FINISH DATE/TIME: 11/16/2006 11:45 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
2035	2035					drill cuttings are mostly washed coarse gravel,	
200	2030					Total depth at 202'	
205	2025						
210	2020						
215	2015						
220	2010						
225	2005						
230	2000						
235							

WELL BORING DETAILS:

Drilling Method ARCH
 Hammer Total Depth 200-feet bgs
 Nominal Borehole Diameter . . 9"

WELL CONSTRUCTION DETAILS:

Surface Completion . . . 0 - 5'
 Material Concrete
 Casing Protection 5' - 20'
 Material Neat Cement Grout

Blank Casing

Material Blank Schedule 40 PVC
 Diameter 4"
 Well Casing Length . . . ~120'
 Blank Interval 0'-120'

Screened Interval

Material . . . 0.040" Slotted Schedule 40 PVC
 Diameter 4"
 Screen Length 75'
 Screened Interval . . . 120'-195'
 Threaded End Cap Length 6"

Well Backfill

Top Seal Interval 20' - 106'
 Seal Material Bentonite Grout
 2nd Seal Interval 106' - 113'
 Seal Material Bentonite Chips
 Top Transition Interval . . . 113'-116'
 Transition Material #30 Sand
 Gravel Pack Interval 116 - 195.5'
 Gravel Pack Material . . . #8 -12 Sand
 Bottom Transition Interval . 195.5'-197.5'
 Transition Material #30 Sand
 Bottom Seal Interval 197.5'-200'
 Seal Material Bentonite Chips

Sounding Tube

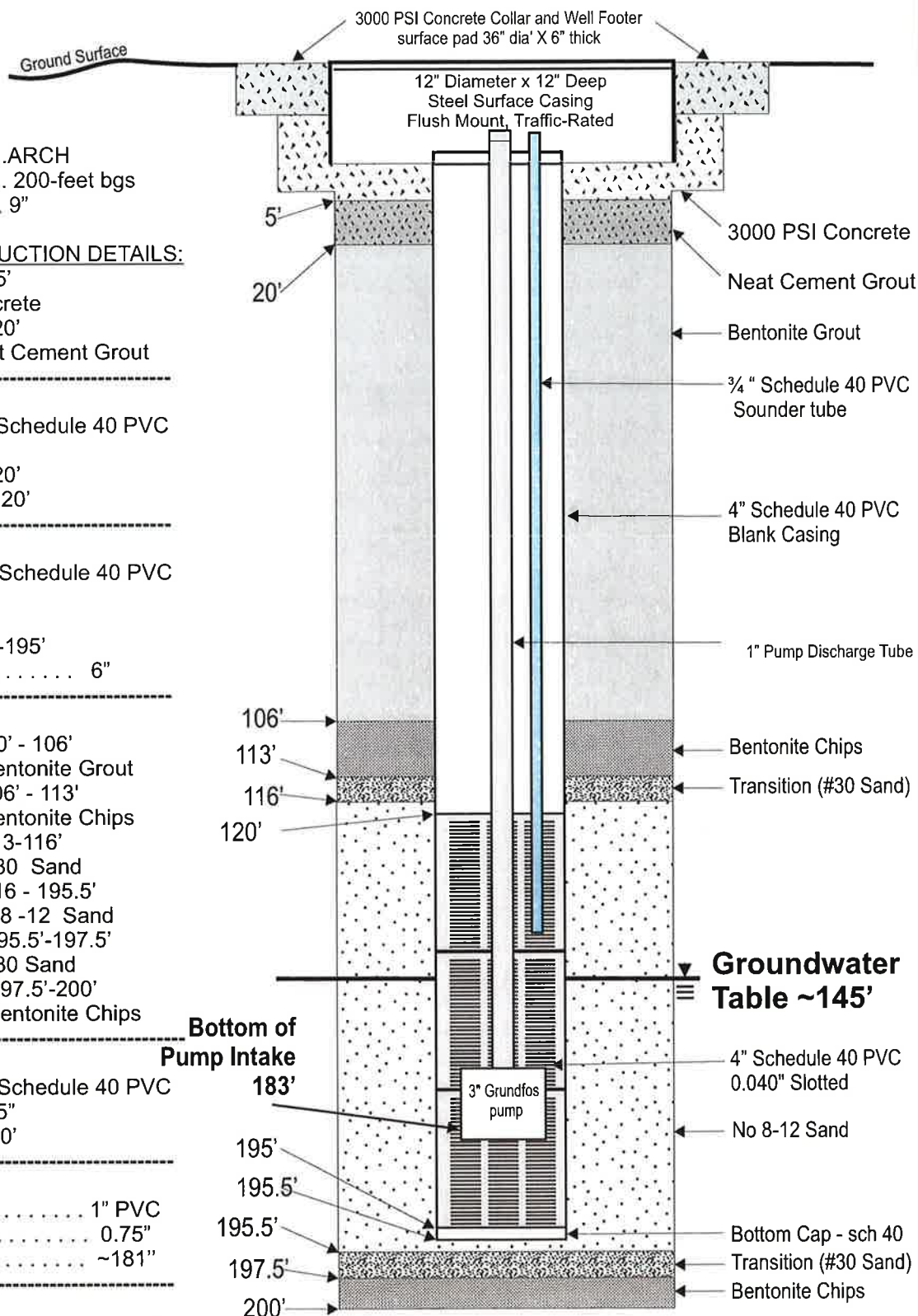
Material Blank Schedule 40 PVC
 Diameter 0.75"
 Tube Casing Length . . . ~180'

Riser Tube

Material 1" PVC
 Diameter 0.75"
 Length ~181"

WELL EQUIPPING:

Pump Make Grundfos
 Pump Size Nominal 3"
 Model 15 SQ10C-250
 Pump Capacity 15-20 gpm
 Pump Intake 183' bgs



**Groundwater
Table ~145'**

MW-45

MONITOR WELL AS-BUILT SCHEMATIC

Shannon Road - Rillito Creek & El Camino Del Cerro WQARF Sites



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SHEET 1 of 6

BORING LOG: MW-45

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

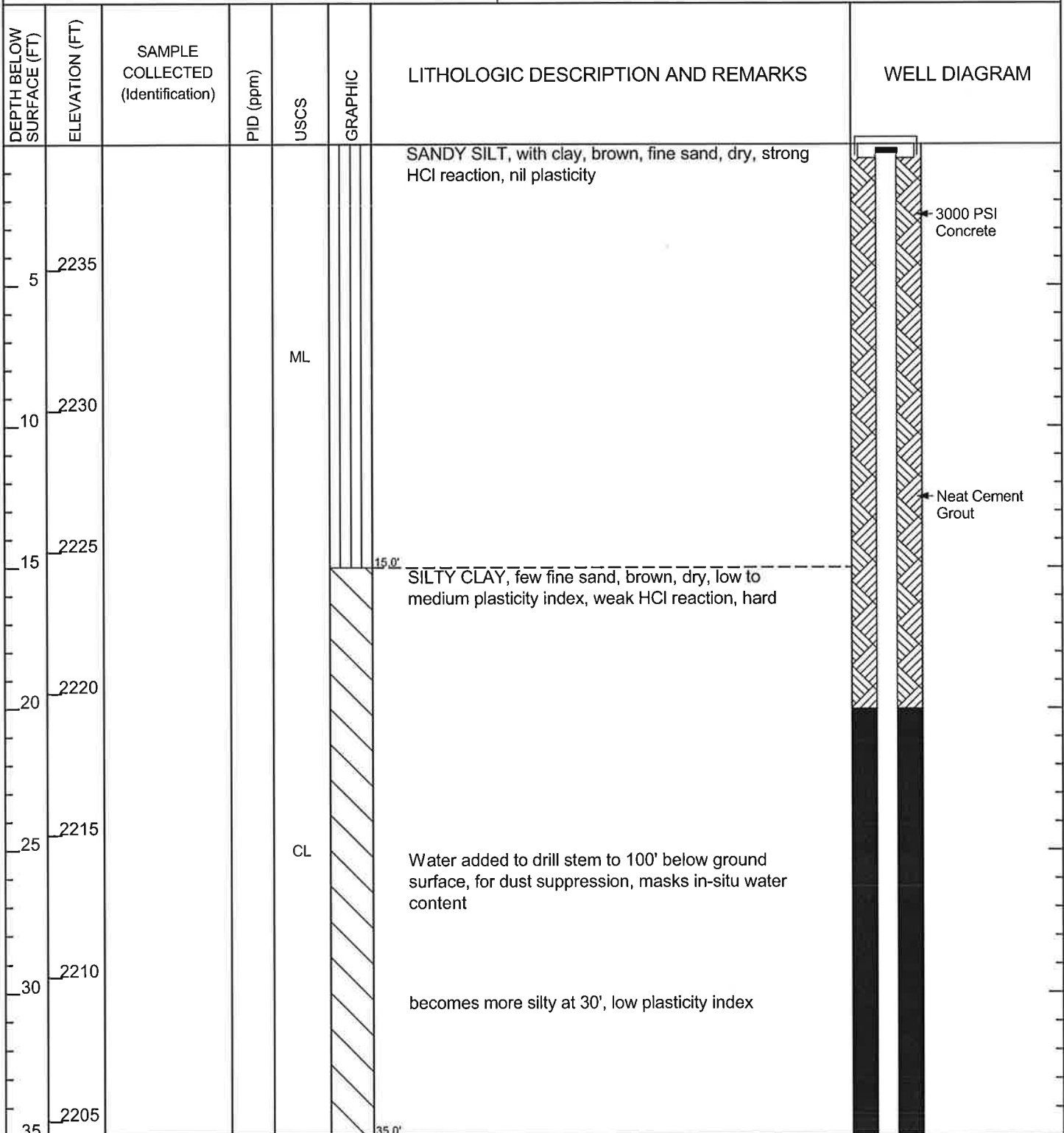
DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/14/2006 01:05 PM
FINISH DATE/TIME: 11/14/2006 04:30 PM

LATITUDE (NAVD27): 32.181485017
LONGITUDE (NAVD 27): -111.020150394

TOP OF GROUND ELEVATION: 2239.45 A.S.L.
TOP OF CASING ELEVATION: 2236.091 A.S.L.
SCREENED INTERVAL: 120 - 195.5

COMMENTS: Approximate WL: 145.8 feet bgs

RIG TYPE: ARCH
DRILLING METHOD: 7.5" tricone bit
SAMPLING METHOD:





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SHEET 2 of 6

BORING LOG: MW-45

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/14/2006 01:05 PM
FINISH DATE/TIME: 11/14/2006 04:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
40	2195			GC		CLAYEY GRAVEL, with sand, brown, fine to coarse sand gravel, medium plasticity index, angular	
45	2190					POORLY GRADED GRAVEL, few sand, trace silt, brown, dry, angular to subangular, nil HCl reaction	
50	2185						
55	2180			GP			
60	2175					increase in sand	
65	2170					CLAYEY GRAVEL, with sand, brown, fine to coarse sand gravel, medium plasticity index, angular	
70	2165			GC			
75	2160						



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SHEET 3 of 6

BORING LOG: MW-45

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/14/2006 01:05 PM
FINISH DATE/TIME: 11/14/2006 04:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80	2155			SP		POORLY GRADED SAND, trace gravel and silt, brown, fine to predominantly coarse sand and fine gravel, nil plasticity index, nil HCl reaction	
85	2150						
90	2145			GP-GM			
95	2140						
100	2135						
105	2130						
110	2125						
115	2120						

85.0'

SILTY GRAVEL, few sand, brown, fine to coarse sand and gravel, angular to subrounded, nil HCl reaction

95.0'

CLAYEY SAND, with silt and few fine gravel, brown, dry, low plasticity index, fine to coarse sand, angular to subrounded

Bentonite Chips

#30 Transition




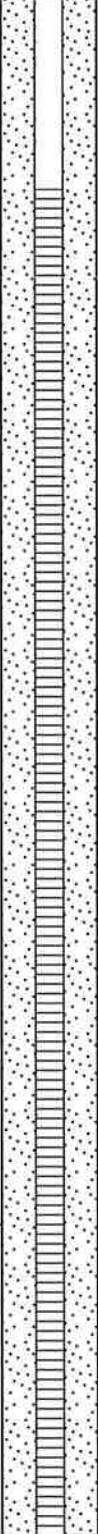
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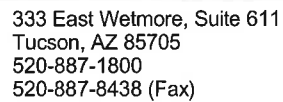
SHEET 4 of 6

BORING LOG: MW-45

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/14/2006 01:05 PM
FINISH DATE/TIME: 11/14/2006 04:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
120	2115			SC		decrease in clay and gravel, increase in silt	
125	2110						
130	2105						
135	2100						
140	2095						
145	2090						
150	2085					drill cuttings below water table are washed gravels with fine to predominantly coarse sand	
155	2080						



BORING LOG: MW-45

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160	2075						<p>#8-12 Filter Pack Sand</p> <p>4" Schd 40 PVC 0.040" Slotted</p>
165	2070						
170	2065						
175	2060						
180	2055						
185	2050						
190	2045						
195	2040						




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SHEET 6 of 6

BORING LOG: MW-45

PROJECT: ECDC Wells 41-45
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23444819

DRILLING CONTRACTOR: WDC Exploration
DRILLER: Arnold Lamon
LOGGED BY: DMC
START DATE/TIME: 11/14/2006 01:05 PM
FINISH DATE/TIME: 11/14/2006 04:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
200	2035					Total depth at 201'	
205	2030						
210	2025						
215	2020						
220	2015						
225	2010						
230	2005						
235	2000						

WELL BORING DETAILS:

Drilling Method ARCH
 Hammer Total Depth 230-feet bgs
 Nominal Borehole Diameter . . 10"

WELL CONSTRUCTION DETAILS:

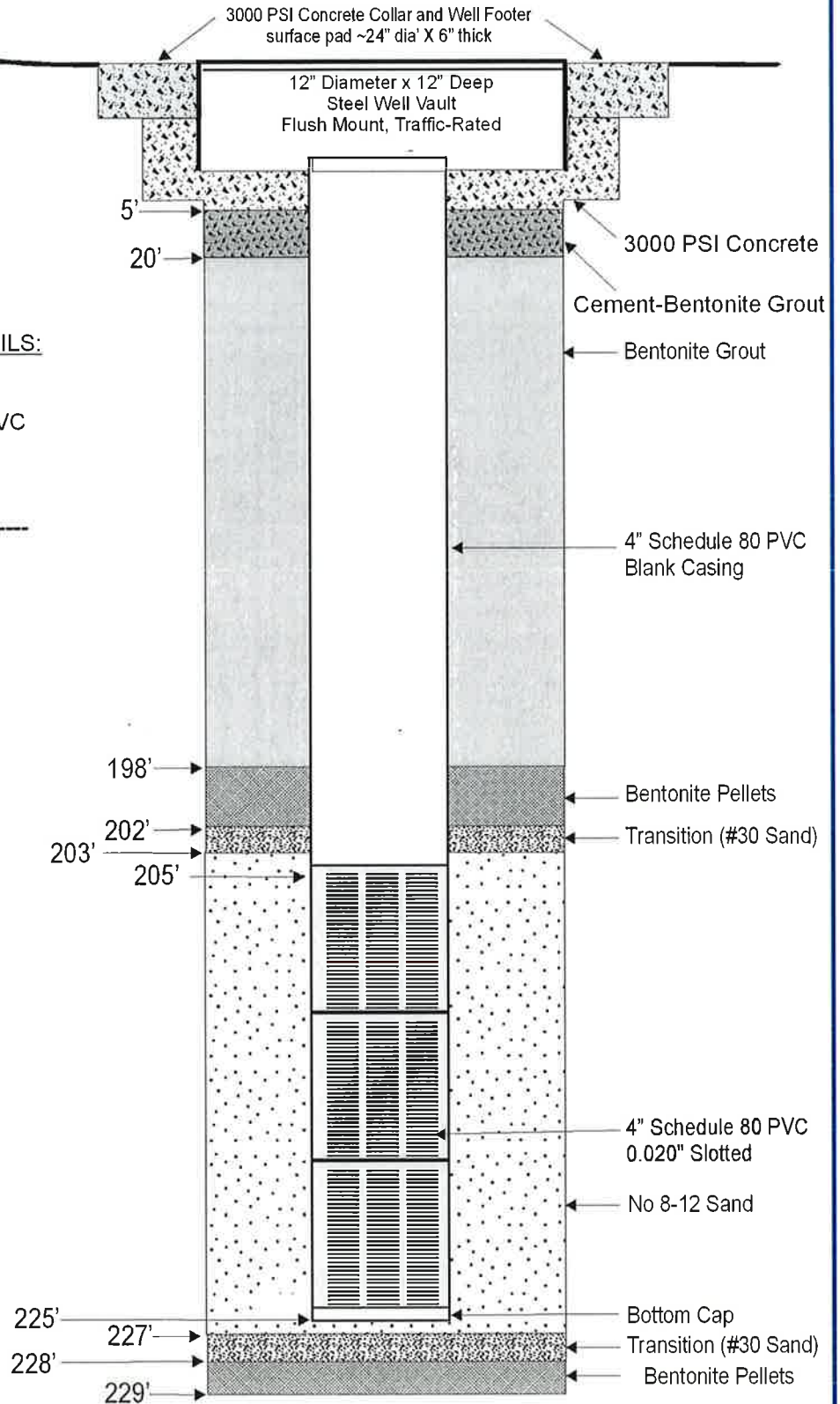
Blank Casing

Material Blank Schedule 80 PVC
 Diameter 4"
 Well Casing Length . . . ~205'
 Blank Interval 0'-205'

Screened Interval

Material . . . 0.020" Slot Schedule 40 PVC
 Diameter 4"
 Screen Length 20'
 Screened Interval . . . 205-225'

Threaded End Cap Length 6"



SRC-W46M Monitor Well Construction



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SHEET 1 of 6

BORING LOG: MW-46

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/18/2008 01:15 PM
FINISH DATE/TIME: 02/20/2008 05:30 PM

LATITUDE (NAVD27):
LONGITUDE (NAVD 27):

TOP OF GROUND ELEVATION: A.S.L.
TOP OF CASING ELEVATION: A.S.L.
SCREENED INTERVAL: 205-225

COMMENTS: Approximate WL: 142.90 feet bgs

RIG TYPE: ARCH
DRILLING METHOD: 8.5" tricone bit
SAMPLING METHOD:

REPORT TUCSON-ENVIRONMENTAL | PROJECT PIADEQ_SRECCECDC 2008 TASK 2 - MONITOR WELL INSTALLATION GROUNDWATER WELL INSTALLATION REPORT WELLS MW-46 THROUGH MW-50 KAW1.GPJ 02/24/2008 TUCSON VA 1 GJB | PRINTED 01/20/08

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
5				ML		SILT with sand.	
10							
15							
20							
25							
30							
35							



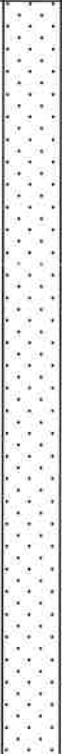


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SHEET 2 of 6

BORING LOG: MW-46

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/18/2008 01:15 PM
FINISH DATE/TIME: 02/20/2008 05:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
40				SP			
45							
50							
55						55.0'	
						Poorly graded GRAVEL with sand.	
60				GP			
65						65.0'	
						Poorly graded GRAVEL with clay and sand.	
70				GP-GC			
75						75.0'	



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SHEET 3 of 6

BORING LOG: MW-46

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/18/2008 01:15 PM
FINISH DATE/TIME: 02/20/2008 05:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80				SW-SM		Well graded SAND with silt and gravel.	
85						Silty SAND with gravel. Wet at 90 ft bgs.	
90				SM			
95							
100							
105						Poorly graded GRAVEL with silt and sand.	
110				GP-GM			
115							



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SHEET 4 of 6

BORING LOG: MW-46

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/18/2008 01:15 PM
FINISH DATE/TIME: 02/20/2008 05:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
120				GM		Well graded GRAVEL with silt and sand.	
125						Silty SAND.	
130				SM			
135						Poorly graded SAND with silt.	
140				SP-SM			
145						Well graded GRAVEL with silt and sand.	
150				GW-GM			
155							



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SHEET 5 of 6

BORING LOG: MW-46

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/18/2008 01:15 PM
FINISH DATE/TIME: 02/20/2008 05:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160				ML		Sandy SILT.	
165						165.0'	
						Poorly graded GRAVEL with silt and sand.	
170				GP-GM			
175						175.0'	
						Silty GRAVEL with sand.	
180				GM			
185						185.0'	
						Silty SAND with gravel.	
190				SM			
195						195.0'	



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SHEET 6 of 6

BORING LOG: MW-46

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/18/2008 01:15 PM
FINISH DATE/TIME: 02/20/2008 05:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
200				GM		Silty GRAVEL with sand.	
205						Well graded GRAVEL.	
210							
215				GW			
220							
225						Well graded SAND with gravel.	
230				SW			
235							

WELL BORING DETAILS:

Drilling Method ARCH
 Hammer Total Depth 210-feet bgs
 Nominal Borehole Diameter . . 10"

WELL CONSTRUCTION DETAILS:

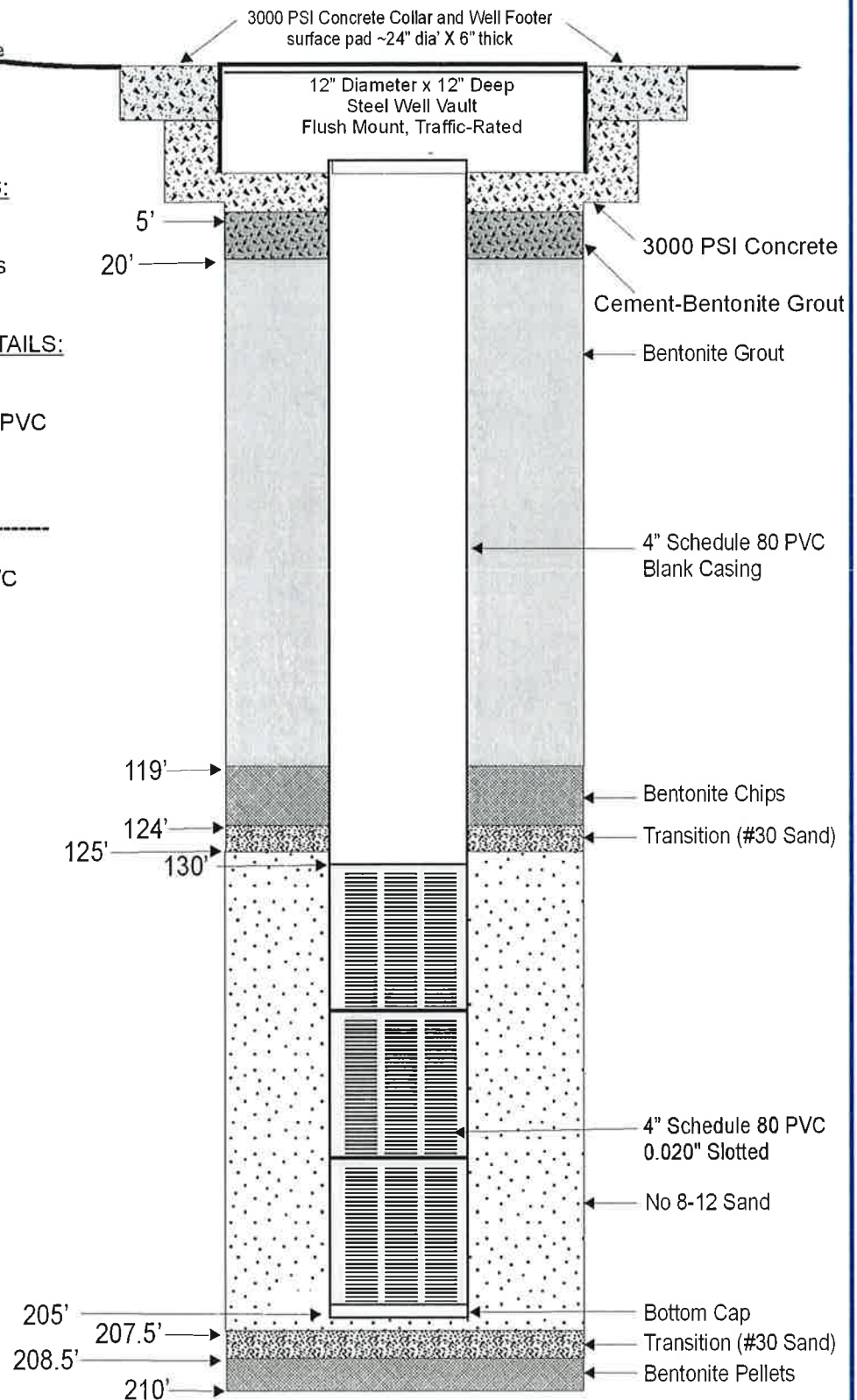
Blank Casing

Material Blank Schedule 80 PVC
 Diameter 4"
 Well Casing Length . . . ~130'
 Blank Interval 0'-130'

Screened Interval

Material . . . 0.020" Slot Schedule 40 PVC
 Diameter 4"
 Screen Length 75'
 Screened Interval . . . 130-205'

Threaded End Cap Length 6"





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SHEET 1 of 6

BORING LOG: MW-47

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

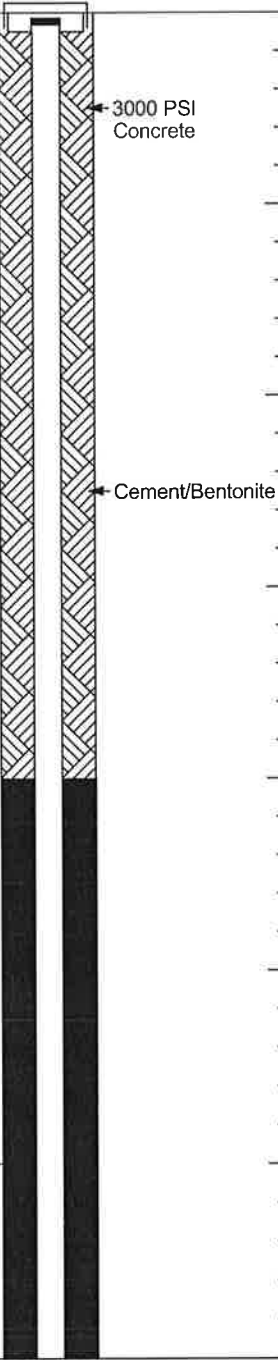
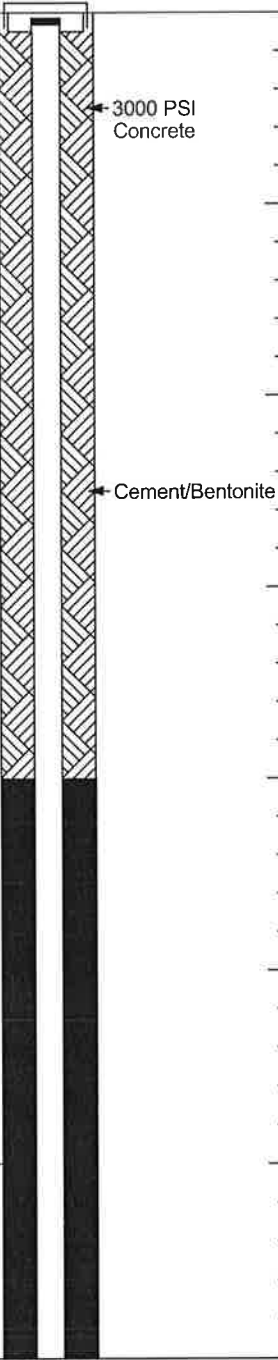
DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/11/2008 08:00 AM
FINISH DATE/TIME: 02/15/2008 02:30 PM

LATITUDE (NAVD27):
LONGITUDE (NAVD 27):

TOP OF GROUND ELEVATION: A.S.L.
TOP OF CASING ELEVATION: A.S.L.
SCREENED INTERVAL: 130-205

COMMENTS: Approximate WL: 143.27 feet bgs

RIG TYPE: ARCH
DRILLING METHOD: 8.5" tricone bit
SAMPLING METHOD:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
5						CLAY: sandy gravelly.	
10							
15				ML			
20							
25							
30						30.0' Sandy GRAVEL: light brown with multi-colored gravels.	
35							



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SHEET 2 of 6

BORING LOG: MW-47

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/11/2008 08:00 AM
FINISH DATE/TIME: 02/15/2008 02:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
40				GP			
45							
50							
55							
60						60.0' Silty SAND: light brown, dry.	4" Schd 40 PVC Blank Casing
65				SM			
70						70.0' Silty GRAVEL: light brown with colored gravels.	Bentonite
75							



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SHEET 3 of 6

BORING LOG: MW-47

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/11/2008 08:00 AM
FINISH DATE/TIME: 02/15/2008 02:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80							
85				GM			
90							
95							
100							
105				CL			
110							
115							







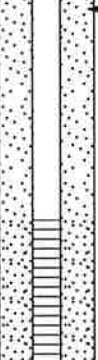


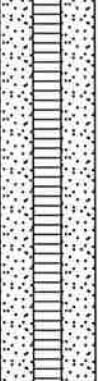
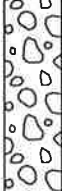
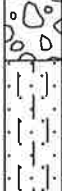
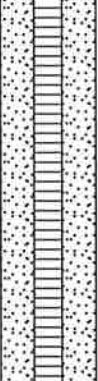

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SHEET 4 of 6

BORING LOG: MW-47

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/11/2008 08:00 AM
FINISH DATE/TIME: 02/15/2008 02:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
120				GP		120.0' GRAVEL: poorly sorted, multi-colored gravels.	
125				GP			
130				CL		130.0' Gravelly SILT: light brown, very angular.	
135				CL			
140				GW		140.0' GRAVEL: light brown, well sorted.	
145				GW			
150				GW		150.0' Driller not using water, water table encountered. SAND: light brown.	
155				GW			






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SHEET 5 of 6

BORING LOG: MW-47

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/11/2008 08:00 AM
FINISH DATE/TIME: 02/15/2008 02:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160				SM		160.0'	
165				ML			
170						170.0'	
175							
180							
185				GP			
190							
195							

← #8-12 Filter
Pack Sand
4" Schd 40 PVC
0.040" Slotted



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SHEET 6 of 6

BORING LOG: MW-47

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

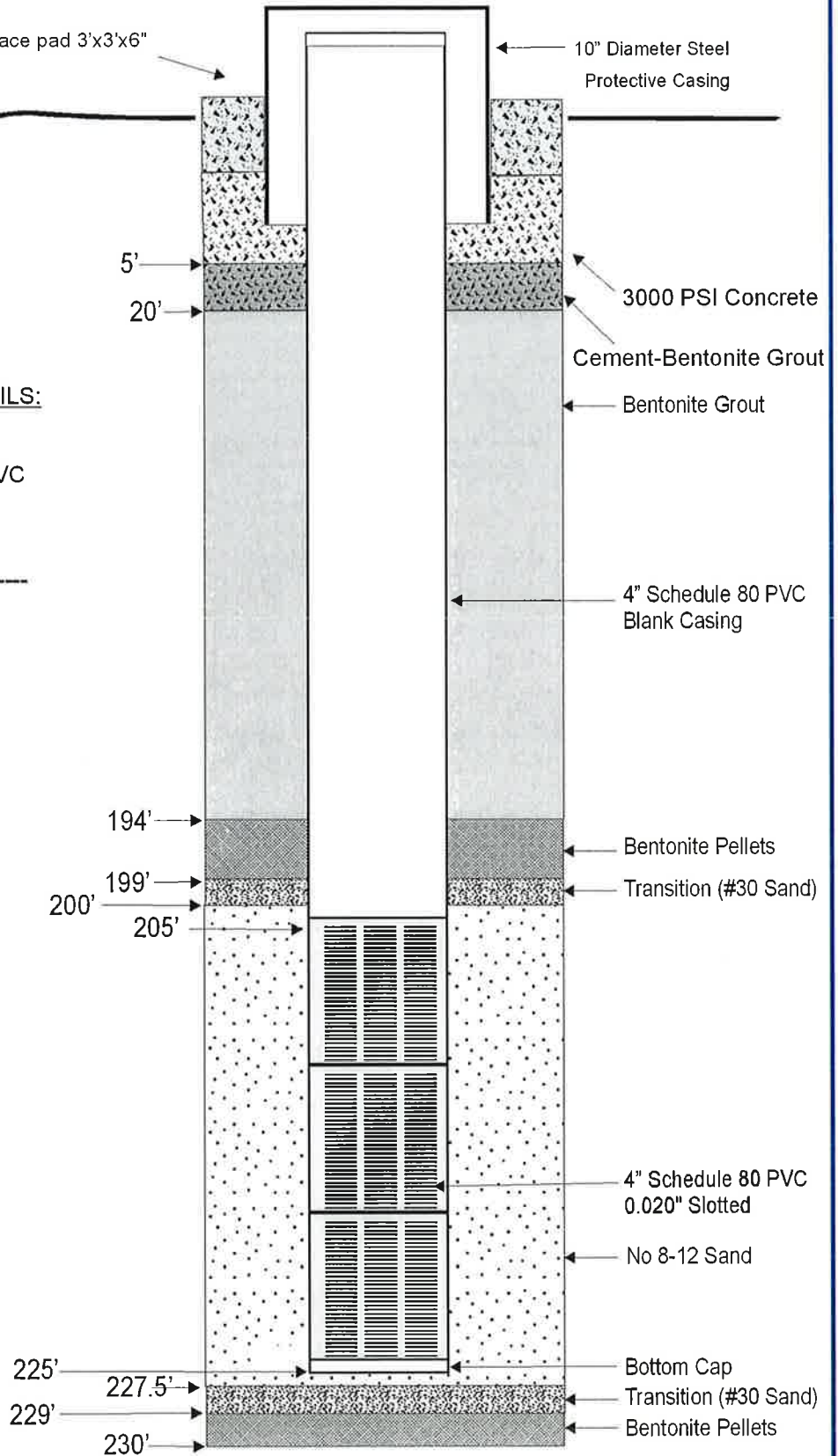
DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/11/2008 08:00 AM
FINISH DATE/TIME: 02/15/2008 02:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
200							
205				SW		Gravelly SAND. Angular.	
210							#30 Transition Sand
215							
220							Bentonite Chips
225							
230							
235							

WELL BORING DETAILS:
 Drilling Method ARCH
 Hammer Total Depth 230-feet bgs
 Nominal Borehole Diameter . . 10"

WELL CONSTRUCTION DETAILS:
Blank Casing
 Material Blank Schedule 80 PVC
 Diameter 4"
 Well Casing Length . . . ~205'
 Blank Interval. 0'-205'

Screened Interval
 Material . . . 0.020" Slot Schedule 40 PVC
 Diameter 4"
 Screen Length. 20'
 Screened Interval. . . . 205-225'
 Threaded End Cap Length. 6"



SRC-W48M Monitor Well Construction



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SHEET 1 of 6

BORING LOG: MW-48

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 01/17/2008 11:00 AM
FINISH DATE/TIME: 01/24/2008 05:20 PM

LATITUDE (NAVD27):
LONGITUDE (NAVD 27):

TOP OF GROUND ELEVATION: A.S.L.
TOP OF CASING ELEVATION: A.S.L.
SCREENED INTERVAL: 205-225

COMMENTS: Approximate WL: 151.31 feet bgs

RIG TYPE: ARCH
DRILLING METHOD: 8.5" tricone bit
SAMPLING METHOD:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
0			0			Clayey SILT: brown.	
5			5.9				
10			12				
15			25	ML			
20			4				
25			14				
30			136.6				
			51.2				
35			7.8				
			7.8				
						Sandy GRAVEL with silt: light brown, angular.	

3000 PSI Concrete

Cement/Bentonite

30.0'



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SHEET 2 of 6

BORING LOG: MW-48

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 01/17/2008 11:00 AM
FINISH DATE/TIME: 01/24/2008 05:20 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
40			15.5	GM			
			17			40.0'	
			4.6	GP		GRAVEL: poorly sorted, angular/sub-angular, light brown with multi-colored gravels.	
45			16.3				
			19			50.0'	
50			72			Silty GRAVEL with sand.	
			45	GC			
55			36				
			75			60.0'	
60			53			Sandy GRAVEL.	
			27	GP			
65			22.7				
			70.2			70.0'	
70			27			Silty GRAVEL: brown with pink gravels, wet.	
			51.8				
75							



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SHEET 3 of 6

BORING LOG: MW-48

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 01/17/2008 11:00 AM
FINISH DATE/TIME: 01/24/2008 05:20 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			59.7	GM			
			23				
80			17.3			80.0'	
						Clayey GRAVEL: light brown, subangular.	
			42.6				
			69.7				
85							
			49.2				
90				GC			
			49.7				
95			19.9				
100			32.1			100.0'	
						Silty GRAVEL: light brown with multi-colored gravels, very wet. Water table encountered at 150 feet bgs.	
			18.6				
105			75.5				
			19.6				
110			37.4				
			16.6				
115			40				

4" Schd 40 PVC
Blank Casing

Bentonite Grout



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SHEET 4 of 6

BORING LOG: MW-48

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 01/17/2008 11:00 AM
FINISH DATE/TIME: 01/24/2008 05:20 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
120			26.3				
			9.3				
			28.9				
125			28.1				
			6.9				
			4.3				
130			1.2				
			10.9				
135			52.6				
			20.2				
140			22.7	GM			
			17.5				
145			2.1				
			12.2				
150			7.1				
			22.5				
155							



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SHEET 5 of 6

BORING LOG: MW-48

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 01/17/2008 11:00 AM
FINISH DATE/TIME: 01/24/2008 05:20 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160			1				
			3.8				
			0.3				
165			13.4				
			50.9				
170			6.7				
			4.6				
175			9.4				
			0.7				
180						180.0'	
			4.7			Poorly sorted GRAVEL: multi-colored, very coarse.	
			16.9				
185			9.1				
			14.2				
190			25.7				
195							



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SHEET 6 of 6

BORING LOG: MW-48

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 01/17/2008 11:00 AM
FINISH DATE/TIME: 01/24/2008 05:20 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
200			6.7	GP			
205			10.6				
210							
215							
220							
225				SP			
230							
235							

210.0'

Poorly sorted SAND with gravels.
Angular/Subangular, multi-colored gravels. Coarse sand.

Bentonite Chips

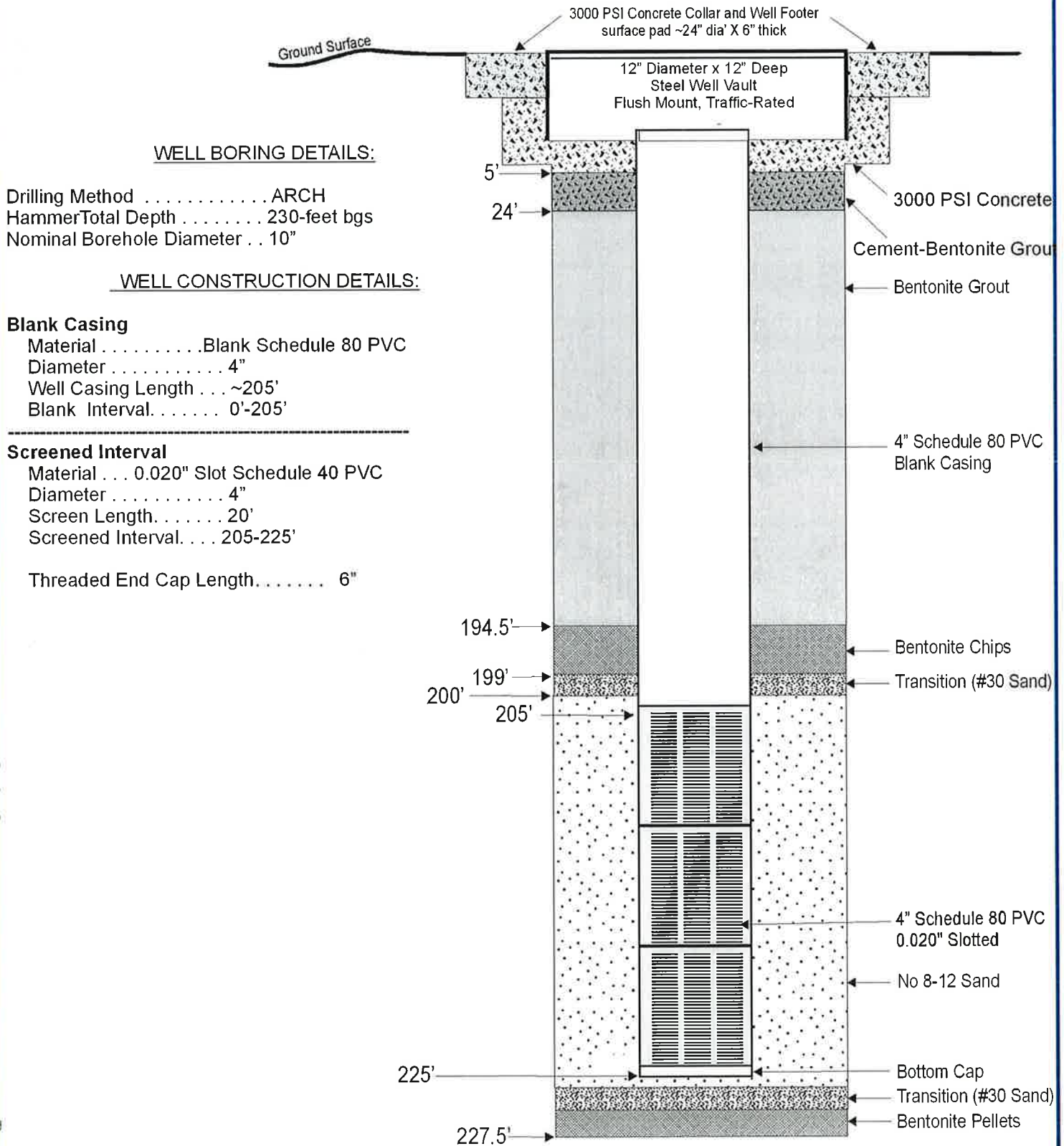
#30 Transition Sand

#8-12 Filter Pack Sand

4" Schd 40 PVC 0.040" Slotted

#30 Transition Sand

Bentonite Chips



SRC-W49M Monitor Well Construction



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SHEET 1 of 6

BORING LOG: MW-49

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 01/25/2008 01:00 PM
FINISH DATE/TIME: 02/04/2008 09:00 AM

LATITUDE (NAVD27):
LONGITUDE (NAVD 27):

TOP OF GROUND ELEVATION: A.S.L.
TOP OF CASING ELEVATION: A.S.L.
SCREENED INTERVAL: 205-225

COMMENTS: Approximate WL: 144.46 feet bgs

RIG TYPE: ARCH
DRILLING METHOD: 8.5" tricone bit
SAMPLING METHOD:

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
5				SP		Poorly sorted SAND with gravel.	
10						10'0" Silty SAND: light brown, dry.	
15				SM			
20						20'0" Silty SAND with gravel: light brown, coarse sand, medium gravel, sub-angular.	
25							
30				SP			
35							

3000 PSI Concrete

Cement/Bentonite










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SHEET 2 of 6

BORING LOG: MW-49

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 01/25/2008 01:00 PM
FINISH DATE/TIME: 02/04/2008 09:00 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
40				SM		40.0' Silty SAND: light brown, medium grained sand.	
45							
50						50.0' Sandy SILT	
55				ML			
60						60.0' CLAY: light brown, very fine, high plasticity.	
65				CH			
70						70.0' Gravelly SILT: light brown, some plasticity, sub-angular.	
75							



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SHEET 3 of 6

BORING LOG: MW-49

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 01/25/2008 01:00 PM
FINISH DATE/TIME: 02/04/2008 09:00 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80				GM			
85							
90						490.0'	
95				CL		Sandy SILT: light brown, fine to very fine grained.	
100						100.0'	
105				CH		SILT: light brown, very fine grained, some sands.	4" Schd 40 PVC Blank Casing
110						110.0'	Bentonite Grout
115						Sandy CLAY with gravel.	



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SHEET 4 of 6

BORING LOG: MW-49

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 01/25/2008 01:00 PM
FINISH DATE/TIME: 02/04/2008 09:00 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
120							
125							
130							
135							
140							
145				GM			
150							
155							



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SHEET 5 of 6

BORING LOG: MW-49

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 01/25/2008 01:00 PM
FINISH DATE/TIME: 02/04/2008 09:00 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160							
165							
170						Gravelly SILT: light brown with dark colored gravels.	
175				CL			
180						Poorly sorted GRAVEL: multi-colored, angular, coarse to very coarse grained.	
185							
190							
195							



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SHEET 6 of 6

BORING LOG: MW-49

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 01/25/2008 01:00 PM
FINISH DATE/TIME: 02/04/2008 09:00 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
200							
205				GP			
210							
215							
220							
225							
230							
235							

• Bentonite Chips
• #30 Transition Sand
• #8-12 Filter Pack Sand
• 4" Schd 40 PVC 0.040" Slotted
• #30
• Bentonite

WELL BORING DETAILS:

Drilling Method ARCH
 Hammer Total Depth 210-feet bgs
 Nominal Borehole Diameter . . 10"

WELL CONSTRUCTION DETAILS:

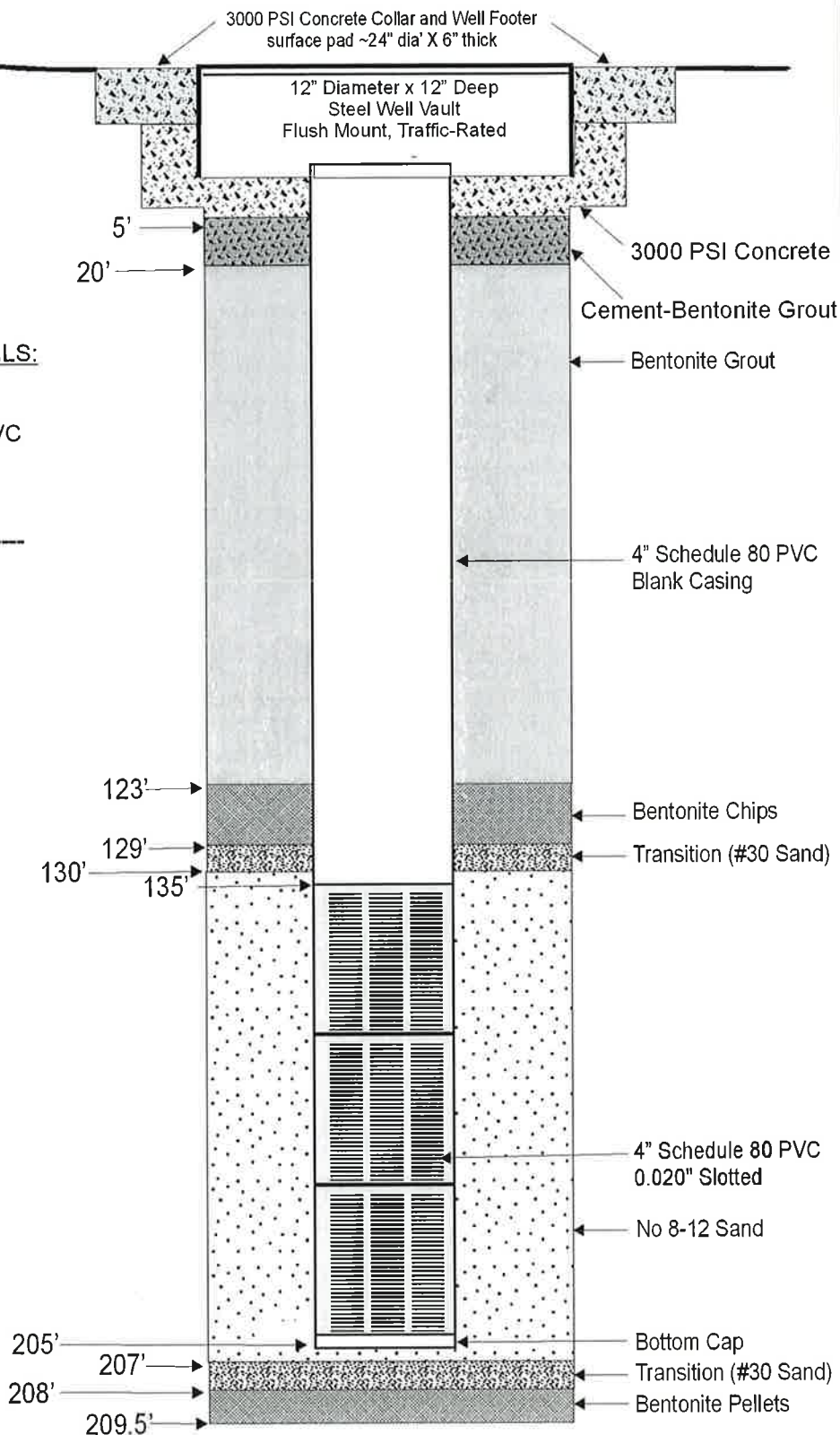
Blank Casing

Material Blank Schedule 80 PVC
 Diameter 4"
 Well Casing Length . . . ~135'
 Blank Interval 0'-135'

Screened Interval

Material . . . 0.020" Slot Schedule 40 PVC
 Diameter 4"
 Screen Length 70'
 Screened Interval . . . 135-205'

Threaded End Cap Length 6"



SRC-W50S Monitor Well Construction



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SHEET 1 of 6

BORING LOG: MW-50

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

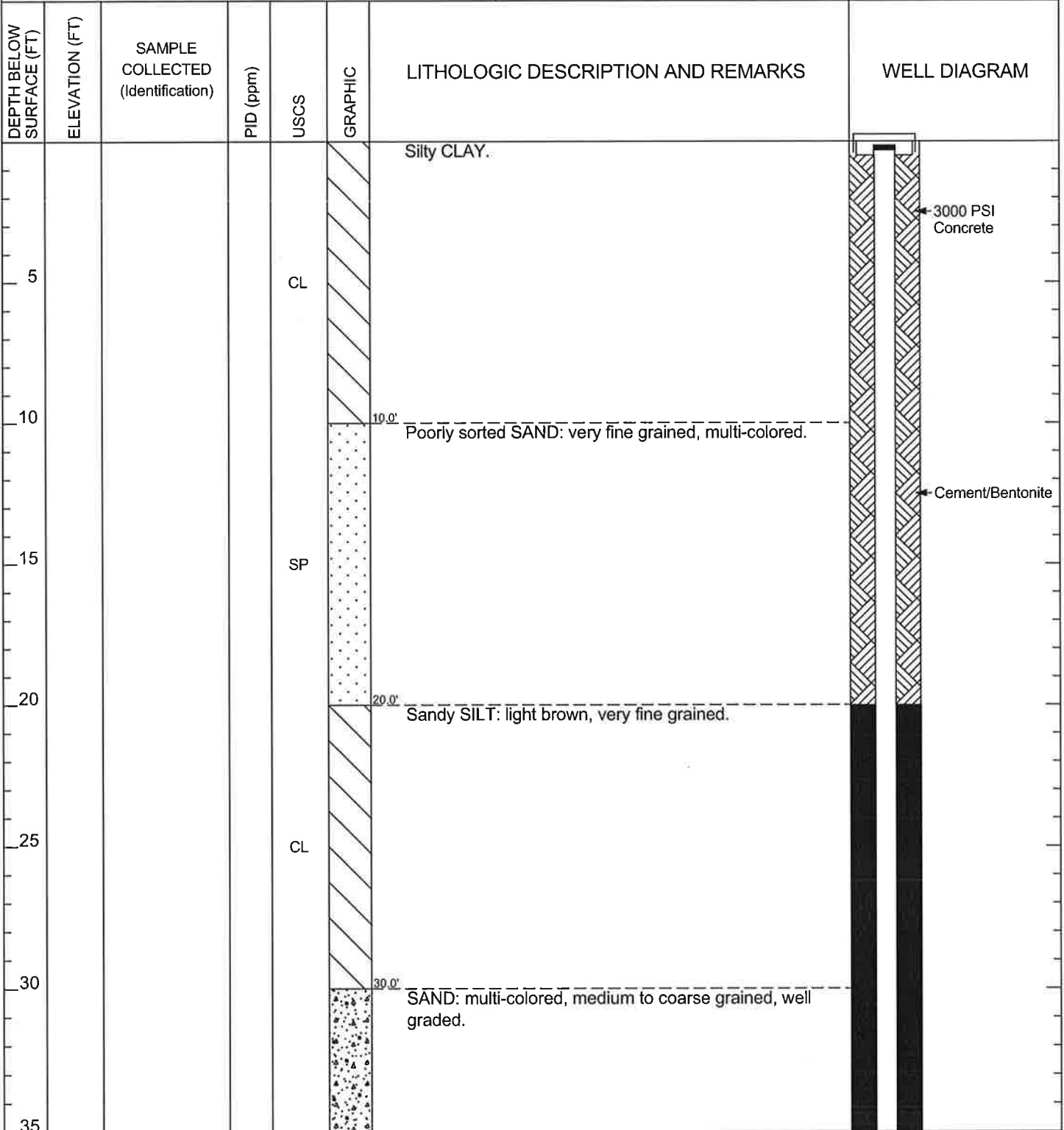
DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/05/2008 11:00 AM
FINISH DATE/TIME: 02/07/2008 08:45 AM

LATITUDE (NAVD27):
LONGITUDE (NAVD 27):

TOP OF GROUND ELEVATION: A.S.L.
TOP OF CASING ELEVATION: A.S.L.
SCREENED INTERVAL: 135-205

COMMENTS: Approximate WL: 144.00 feet bgs

RIG TYPE: ARCH
DRILLING METHOD: 8.5" tricone bit
SAMPLING METHOD:









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SHEET 2 of 6

BORING LOG: MW-50

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/05/2008 11:00 AM
FINISH DATE/TIME: 02/07/2008 08:45 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
40				SW		GRAVEL with sand and silt: light brown, medium gravels.	
45				GM		Gravelly SILT with clay: light brown with multi-colored gravels. Very fine silt to medium grained gravels, angular. Water encountered at 160 feet bgs.	
50							
55							
60							
65							
70							
75							



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SHEET 3 of 6

BORING LOG: MW-50

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/05/2008 11:00 AM
FINISH DATE/TIME: 02/07/2008 08:45 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
80							
85							
90							
95							
100							
105							
110				CL			
115							



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SHEET 4 of 6

BORING LOG: MW-50

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/05/2008 11:00 AM
FINISH DATE/TIME: 02/07/2008 08:45 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
120							
125							
130							
135							
140							
145							
150							
155							

← Bentonite Chips

← #30 Transition
Sand



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SHEET 5 of 6

BORING LOG: MW-50

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/05/2008 11:00 AM
FINISH DATE/TIME: 02/07/2008 08:45 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
160							
165							
170						170.0'	
175						Poorly sorted GRAVEL: light brown with multi-colored gravels, angular to sub-angular particles.	#8-12 Filter Pack Sand 4" Schd 40 PVC 0.040" Slotted
180							
185							
190				GP			
195							



333 East Wetmore, Suite 611
Tucson, AZ 85705
520-887-1800
520-887-8438 (Fax)

SHEET 6 of 6

BORING LOG: MW-50

PROJECT: ECDC Wells 46-50
CLIENT: ADEQ
LOCATION: ECDC
URS PROJECT #: 23445137

DRILLING CONTRACTOR: Yellow Jacket
DRILLER: M. Stockton
LOGGED BY: KAW
START DATE/TIME: 02/05/2008 11:00 AM
FINISH DATE/TIME: 02/07/2008 08:45 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
200							
205							
210							
215							
220							
225							
230							
235							

• #30 Transition
Sand
• Bentonite Chips

Location of Boring						LOG OF WELL NO. SRC-W51		
						Job No. 24097087	Client URS	Sheet 1 of 10
						Drilling Contractor Boart Longyear	Drilling Method Roto Sonic	Date/Time Start 1031 4-18-13
						Drilling Equipment	Sampling Method	Date/Time Stop 1435 4-19-13
						Depth to Water		Logged By BL
						FIRST:		SECOND:
Depth (feet)	Graphic Log	Lithology (USCS)	% fines	% sand	% gravel	DESCRIPTION Formation name, color, roundness, grain size distribution, plasticity, cementation, etc.	COMMENTS Penetration rate, water, etc.	
0								
2.5								
5								
6		SP/sw	0	95	5	sand; brown, fine-coarse sand, predominantly fine-med, moist		
7.5								
8.5		SP	0	100	0	sand, brown, fine-med sand, some coarse, moist		
10								
11		Sw	0	90	10	sand w/ some gravel, fine-coarse sand, predominantly med, brown, moist, sub- angular - sub rounded gravel		
						Same as above		
12.5						↓ description on next page		

Job No.		Client		Sheet 2 of 10		LOG OF WELL NO.	
Depth (feet)	Graphic Log	Lithology (USCS)	% fines	% sand	% gravel	DESCRIPTION Formation name, color, roundness, grain size distribution, plasticity, cementation, etc.	COMMENTS Penetration rate, water, etc.
13.5		ML	60	30	10	Sandy silt w/ some gravel, brown, moist, non elastic, sub angular - sub rounded gravel,	
15		SW	75 or	60	25	Silty sand	
16		ML	60	75	25	Sandy silt, tan, fine-med grained sand (predom fine),	
17.5		SW	75	60	25	or sandy silt, tan, fine-med grained sand (predom fine),	
18.5		CL	90	10	0	clay, dry, weak-med cementation, brown (dark), non elastic, clay "chunks" med-toughness (stiff) high	
20		CL	90	10	0	Same as above	
21		SP	15	80	5	(Silty) sand, grayish brown, fine-med sand, moist	
22.5 2' 4"						gray dust brown clay, same as 10-18.5 interval	
23.5		ML	75	25	0	silt, light brown, slight elastic breaks & forms easily, slightly moist	
25		SW	40	60	30	sand, reddish brown, fine-coarse sand gravelly	
26						subangular - sub rounded fine & coarse gravel, moist	
27.5		SW	0	65	35	gravelly sand, brown, moist, some cobbles (small), fine-coarse sand, subangular - sub rounded, fine-coarse gravel	
28.5		SP				well graded sand, fine-med grade sand (predominantly fine), brown/tan moist	
30							

Job No.		Client		Sheet 3 of 10		LOG OF WELL NO.	
Depth (feet)	Graphic Log	Lithology (USCS)	% fines	% sand	% gravel	DESCRIPTION Formation name, color, roundness, grain size distribution, plasticity, cementation, etc.	COMMENTS Penetration rate, water, etc.
31						Same as a	
32.5		SP	15	45	40	gravelly sand, brown, fine- coarse sand, fine-coarse gravel, cobbles (2-3" dia, 6" long) subangular- sub rounded, moist	
33.5		GW	0	30-40	70-60	sandy gravel, fine-coarse sand (predom med-coarse), fine-coarse gravel, subangular-subrounded, some cobbles, brown, moist (more than previous)	
35							
36		SP	0	65	35	gravelly sand gravelly sand, brown, fine- med sand, fine-coarse gravel, subangular-subrounded, moist (some rounded)	
37.5							
38.5		SP	0	65	35	Same as above, some cobbles, more fine gravel	
40							
41		SW-SM	10	60	30	Same as above, cobbles (5-6" dia), slightly wet, some fines	
42.5							
43.5		SW-SM	20	50	30	gravelly, clayey (silty), sand, brown, slightly wet, subangular-subrounded soft, fine-coarse sand, fine- coarse gravel	
45							
46		SPSC	30	55-45	15-25	gravelly, clayey, sand, brown/tan/ peachy, med to coarse sand, fine- coarse gravel, subangular-subrounded, soft, elastic, moist	
47.5							

Job No.		Client		Sheet 4 of 10		LOG OF WELL NO.	
Depth (feet)	Graphic Log	Lithology (USCS)	% fines	% sand	% gravel	DESCRIPTION Formation name, color, roundness, grain size distribution, plasticity, cementation, etc.	COMMENTS Penetration rate, water, etc.
50		SC	20-25 25	70-65 65	10	Clayey sand w/ some gravel brown, moist, fine-med sand, soft, elastic, breaks & firms easily fine gravel	
52.5		SC	25	65	10	clayey sand w/ gravel, brown/peachy moist, med-coarse sand, fine gravel, soft, elastic, firms & breaks easily,	
55		SC	25	50	25	Same as above	
57.5		SC	20-25	55-50	25	Same as above	
60		SW	10	55	35	gravelly dry sand, white/grayish, fine-coarse gravel, subangular- subrounded (some rounded), some cobbles (small), fine-coarse sand (mainly fine-med), moist	} 1 bag
60		SC	25	50	25	Same as 50-52.5 interval	
62.5			20	60	20	clayey sand w/ gravel, brown, some pale white/grayish, fine-coarse sand, fine to coarse gravel, angular-subrounded, moist	
63.5						Black clay (fat) like substance in sand and gravel (see pic), no odor very moist	PID = 0.3
64.75							
65							

→ on back

Job No.		Client		Sheet 5 of 10			LOG OF WELL NO.	
Depth (feet)	Graphic Log	Lithology (USCS)	% fines	% sand	% gravel	DESCRIPTION Formation name, color, roundness, grain size distribution, plasticity, cementation, etc.		COMMENTS Penetration rate, water, etc.
66		SC	25	70	5	light brown/peachy ^{clayey} silty sand, mainly med. grained sand, clumps & breaks easily, moist, some fine gravel		
67.5		SC	35	50	15	Same as above, more fines, more gravel/cobbles		
68								
68		CL	50	35	15	sandy clay w/ gravel, one large cobble (dia = 6"), some smaller cobbles, soft, elastic, med. fine sand, brown/tan, moist		
70		CI	50	35	15	Same as above, coarse sand to fine sand		
		SC	30	40	30	gravelly clayey sand, pale white/brown fine-med sand, fine gravel, subangular, sub rounded, clumps & breaks easily		
72.5		SC	15	55	30	gravelly sand, pale white/light brown, fine-med sand, fine gravel, moist		
73.5								
		MH	60-65	30-25	10	sandy silty with some gravel, fine-coarse sand, elastic, soft, moist, some cobbles, brown		
75								
76		SC	20	60	20	gravelly sand, brown, very moist, ^{clayey} fine-coarse sand, mostly fine-med, fine gravel		
77.5								
78.5								
		SC	20	65-60	15-20	Same as above, finer gravel, finer sands		
80								
81		SC	35	45	20	clayey gravelly sand, med-coarse sand, fine-coarse gravel (mainly fine) brown, very moist, soft, elastic		
82.5								

→ on back

Job No.		Client		Sheet 6 of 10		LOG OF WELL NO.	
Depth (feet)	Graphic Log	Lithology (USCS)	% fines	% sand	% gravel	DESCRIPTION Formation name, color, roundness, grain size distribution, plasticity, cementation, etc.	COMMENTS Penetration rate, water, etc.
83.5		SC	35	45	20	Same as above	
85							
86		SC	30	45	25	Same as above, more coarse gravel, weak cementation, pale brown	
87.5							
88.5		SC	25	50- 45	25- 30	Pale brown silty gravelly sand, moist, fine-med sand, fine- coarse gravel, sub angular - sub rounded	
90							
91		SC	25	50- 40	25- 30	Same as above	
92.5		SC	35	50	15	clayey sand w/ gravel, pale brown, soft, elastic, moist, fine-coarse sand, fine gravel (mainly fine-med)	
94		CL	50	35	15	Sandy clay w/ gravel, pale brown/grayish moist, med-fine sand, some cobbles,	
95							
		SC	35	50	15	clayey sand with gravel, pale brown/grayish, moist, fine-coarse sand, fine gravels, some cobbles	
96.5						Same as above	
97.5			30- 25	50 65	20		
99							
100							

Sheet 7 of 10

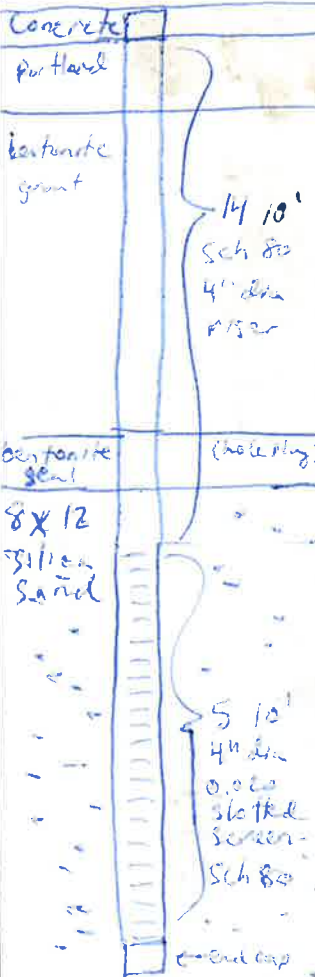
99-101.5	415	750	35	gravelly sand w/ silt, fine-coarse sand, fine gravel (all mainly about thumb size) moist, brown	SC
101.5-104	15	60	25	gravelly sand w/ silt, fine-med sand, fine-coarse gravel, slightly moist-moist brown, angular-subrounded	SC
104-106	15-20	60	25-20	same as above	SC
106-108	25	50	25	same as above	SC
108-110	15	65	20	same as above	SC
	10	70			
110-112.5	10	65	25	gravelly sand, fine-med sand, coarse, slightly moist, fine-coarse gravel, subangular-subrounded	SC
	5	30			
112.5-115	25	60	15	silty sand w/ gravel, fine-med sand, some coarse sand, fine gravel, weak cementation, brown, slightly moist,	SW-SM
115-115.5	30	40	30	silty sand w/ gravel, no cementation , no cementation	SW-SM
	35	40	25	no coarse sand, fine-coarse gravel, fine-med sand, angular-subrounded, brown, slightly moist	
115.5-118	20	60	20	silty sand w/ gravel, brown, slightly moist, fine gravel, subangular-subrounded, fine-med sand	SC
118-120.5	35	40	25	silty sand w/ gravel, weak cementation, slightly moist, fine-med sand, fine gravel, angular-subrounded	SW-SM
120.5-123	30	60	10	silty sand w/ gravel, weak cementation, slightly moist, fine-med sand (mostly fine) fine gravel	SP-SM
	25	15			

123-125.5	30	45	25	silty sand w/ gravel, brown, slightly moist, fine-course sand, fine-course gravel, subangular - subrounded	SW-SM	
125.5-128	30 35	55 50	15	silty sand w/ gravel, brown, moist - v moist, fine-med sand, fine gravel, angular - sub rounded, weak cementation	SP-SM	sample too hot to get a good feel
128-129	35 40	40 35	25 25	gravelly sandy silt or gravelly silty sand fine med sand, fine-course gravel, cobble or two, soft, elastic, brown, slightly moist	SP-SM ML	
129-131	20	65	15	silty sand with gravel, fine-course sand, fine-course gravel, brown, slightly moist, some weak cementation	SM	
131-133.5	25	65	10	silty sand, fine-med sand (mostly fine), brown, moist, some weak cementation	SM	
133.5-136	25	70	5	silty sand, fine sand (some med-course), brown, moist, to be , weak cementation	SM	
136-138.5	20	60	20	silty sand w/ gravel, brown, moist, fine- med sand, fine-course gravel, subangular- subrounded	SM	
138.5-141	20	60	20	same as above, more coarse sand, more coarse gravel	SM	
141-143.5	10	70 65	20 25	same as above gravelly sand, brown, moist, fine-course sand, fine gravel, subangular-subrounded (some coarse gravel)	SW-SM	
143.5-146.0	10	70	20	gravelly sand, brown, moist, fine-med sand (mostly fine), fine gravel, subangular- subrounded	SW-SM	
146-148				clayey silty sand w/ gravel, brown, moist, fine-med sand, soft, elastic		
146-148.5	30	60 55	10 15	clayey sand w/ some gravel, fine-course grade sand (mostly fine-med), fine gravel, soft, elastic, brown, wet	SC	

148.5 - 151	30	65	5	Same as above, less gravel	SC
151 - 153.5	50	35	15	Sandy clay/silt w/ gravel brown, moist-wet, elastic soft, med cementation, med-coarse sand, fine gravel, angular - subrounded	CL
153.5 - 156	20	60	20	Silty gravelly sand, med-coarse sand, fine gravel, subangular - subrounded, brown, wet	SPSm
156 - 158.5	20	75	5	Silty sand, med-fine sand (mostly med) wet, brown, occasional fine gravel	SM
158.5 - 161	20	60	20	Silty sand w/ gravel, med-coarse sand, wet-saturated, brown/tanish, fine-coarse gravel, subangular - rounded	SPSm
161 - 161.5	70	30	0	sandy silt, elastic, soft, brown, wet, fine sand	MH
161.5 - 162	20	60	20	Same as, some cobbles	
162 - 163.5	0	95	5	Sand, coarse sand, mostly homogeneous (1/8" dia) (C), saturated/wet	SP
163.5 - 164.5	25	25	50	Silty sandy gravel, fine gravel, some coarse, fine-med sand, soft, elastic (clayey sand in chunks large)	GM
164.5 - 166	30	55	15	clay Silty sand with gravel, med-coarse sand, fine gravel, brown, wet, slightly elastic	SPSm
166 - 168.5	20	65	15	same as above	SPSm
168.5 - 171	35	40	25	Clayey sand w/ gravel, brown (dark), moist-wet, fine-coarse gravel, angular, sub rounded, fine - some coarse sand, soft elastic	SPSc
171 - 173.5	35	50	15	Clayey sand w/ gravel, med-coarse sand, brown (dark), wet, fine gravel, soft, elastic	SPSc


172.5 - 176	35	55 60	10 15	clayey sand w/ gravel, fine-med sand, fine gravel, soft, elastic, brown (dark), wet	SC
176 - 178	55	60 30	10 15	gravelly sandy clay, med-coarse sand (some fine), fine to coarse gravel, sub angular - sub rounded, soft, elastic, brown (dark), moist-wet	CL
178 - 180	25	50	25	gravelly clayey sand, fine-med sand w/ some coarse, fine-coarse gravel (mainly fine) subangular - subrounded, brown (dark), moist	SC
180 - 182.5	25	60	15	silty sand w/ gravel, fine-med sand, fine gravel, brown, moist, (dark)	SM
182.5 - 185	20	55 60	25 20	gravelly silty sand, fine-med sand, fine-coarse gravel, subangular sub- rounded, brown (dark), moist-wet,	SM
185 - 187.5	25 30	70 65	5	silty sand, brown (dark), moist, some weak cementation, fine-coarse sand,	SM
187.5 - 190	20 25	75 70	5	silty sand, brown (dark), moist-wet, fine-med sand,	SM

Well Materials Tally

BLANK CASING						WELL NO.: SRL-051	
Type:		Diameters		Total Length Required:	Delivery	Job No.:	
Manufacturer:		I.D.: 4 3/16"		140'	Date:	Client:	
Vendor:		O.D.: 4 1/2"			Time:	Project:	
		Thickness: 5/16"				Driller:	
Actual Length	Diameter OK 4	Installed Date/Time	Connection OK 4	Comments		AS-BUILT DIAGRAM	
60" (5')	✓	4-19-13 1505	✓	not used			
120" (10')	✓						
SCREENED CASING							
Type: Sch 80 0.020 inch		Diameters		Total Length Required:	Delivery		
Manufacturer:		I.D.: 4 3/16"		50'	Date:		
Vendor:		O.D.: 4 1/2"			Time:		
		Thickness: 5/16"					
Actual Length	Diameter OK 4	Installed Date/Time	Connection OK 4	Comments			
60" (5')	✓	4-19-13 1505	✓	not used			
120" (10')	✓						
ANNULAR MATERIALS							
Borehole Diameter (D):		Casing O.D. (d):		Annular volume per foot; ft³ = 0.005454 x (D² - d²):			
Material Description	Estimated Volume Required	Volume per Container	Quantity Required	Quantity Delivered	Quantity Installed	Installed Date/Time	Comments
8x12 silica sand					35	4-14-13 1815	
bentonite seal					2	4-19-13 1830	
bentonite grout					33 1/2	4-20-13 0925	
Portland					12	4-20-13 1130	
concrete					5	4-20-13 1350	surface complete

URS

Job No.		Client		Sheet		LOG OF WELL NO. SRC-W52	
24097087		ADEQ		2 of 4			
Depth (feet)	Graphic Log	Lithology (USCS)	% fines	% sand	% gravel	DESCRIPTION Formation name, color, roundness, grain size distribution, plasticity, cementation, etc.	COMMENTS Penetration rate, water, etc.
50		GW-cl	40	30	30	Clayey Sandy Gravel, Brown. Moist No Odor, No staining, 0.5"-1" clasts	
55		SM-GM	20	60	20	Silty Sand ^{us} and Gravel, Brown. Moist, Fine to Coarse Sand, 1" to 4" Gravel, Sub Angular to Sub Round Sand	
60		SM	20	75	5	Same, less gravel	
70		SW	10	75	15	Same, More Gravel, Fewer Fines Gravel Clasts 0.5" to 2" Layer of Clay, Some Cementation same as above, Low plasticity	Cementation is weak
80		SM	50	45	5	Silty Sand, Brown, Moist, Fine to Coarse Sand, Sub Round Grains	
90		SC	40	55	5	Clayey Sand, Brown, Very Moist but Not Saturated. No odor, Fine to Med. Grain, Sub Round Sand	
						Same, less Moist, Not Dry	
		ML	60	40		Silt w/ sand, Brown, Moist	
100						Same	
						Same	
110		SM	15	80	5	Silty Sand, Brown, Moist	
		SW	5	90	5	Well graded Sand, Brown, Moist, Some Gravel Clasts 0.5"-2", Fine to Med. Grained Sand, Sub Round	
		SW	5	75	20	Same, More Gravel	
120						Same	

Job No. 24097087		Client ADEQ		Sheet 3 of 4		LOG OF WELL NO. 52S	
Depth (feet)	Graphic Log	Lithology (USCS)	% fines	% sand	% gravel	DESCRIPTION Formation name, color, roundness, grain size distribution, plasticity, cementation, etc.	COMMENTS Penetration rate, water, etc.
125	SW		5	70	25	Well Graded Sand, Brown, Moist, Gravel Clasts 0.5" - 3" Fine to medium Grain, Sub Round Grains	
130	SC		30	60	10	Clayey Well Graded Sand w/ Gravel,	
						fine to coarse grained sand, Gravel Clasts up to 2", Brown, Moist, No odor, Fine to Coarse , Sub-Round to Sub-Angular	Mostly Coarse Sand
140						Same	
						Same	
150	SC		15	60	15	Gravelly Sand, Moist Brown, Moist,	
						No odor, Coarse sand, Sub Angular	
			30	60	10	Clayey Gravelly Sand, Fine to Coarse grained Sand, 0.5" - 1" Gravel, Angular to Sub Angular Sand	
160							Ground Water at ~165 ft bgs
						Same, Saturated Wet	
170							
			35	60	5	Same, Wet	
180							
			30	55	15	Same, Wet,	
190							

Job No.		Client		Sheet		LOG OF WELL NO.	
24097087		ADEQ		4 of 4		SRC W52S	
Depth (feet)	Graphic Log	Lithology (USCS)	% fines	% sand	% gravel	DESCRIPTION Formation name, color, roundness, grain size distribution, plasticity, cementation, etc.	COMMENTS Penetration rate, water, etc.
200	SC		30	50	20	Clayey Sand with Gravel, Brown, Wet, No odor, Fine to Coarse sand, 0.5"-1" Gravel, Sub Angular Sand	
						Same	
210			35	50	15	Same	
						Same	
220							TD @ 230 Ft logs DTW:
						Same	
230							

Well Materials Tally

[illegible]

MONITORING WELL COMPLETION RECORD

W52M

DRILLING INFORMATION

DRILLING BEGAN:
 DATE 3/14/13 TIME 1340
 WELL INSTALLATION BEGAN:
 DATE 3/17/13 TIME 0950
 WELL COMPLETION FINISHED:
 DATE 3/18/13 TIME 0930
 DRILLING CO. Bart Longyear
 DRILLER Justin Maples
 LICENSE _____
 DRILL RIG GP24-300BS

DRILLING METHOD:
☐ HOLLOW STEM AUGER
☐ AIR ROTARY
☒ Rotasonic
 DIAMETER OF AUGERS:
 ID _____ OD 10 1/8"

BENTONITE SEAL

AMOUNT CALCULATED 1.3 ft³
 AMOUNT USED ~0.7
☐ PELLETS, SIZE _____
☒ CHIPS, SIZE _____
☐ _____
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED:
☒ POURED ☐ TREMIE
 AMOUNT OF WATER USED _____

FILTER PACK

AMOUNT CALCULATED 15.19 / 14.82 ft³
 AMOUNT USED 11.9
☒ SAND, SIZE 8-12
☐ FORMATION COLLAPSE:
 FROM _____ TO _____
 PRODUCT Colorado Silica Sand
 MFG. BY Premier Silica
 METHOD INSTALLED:
☒ POURED ☐ TREMIE

SURVEY INFORMATION

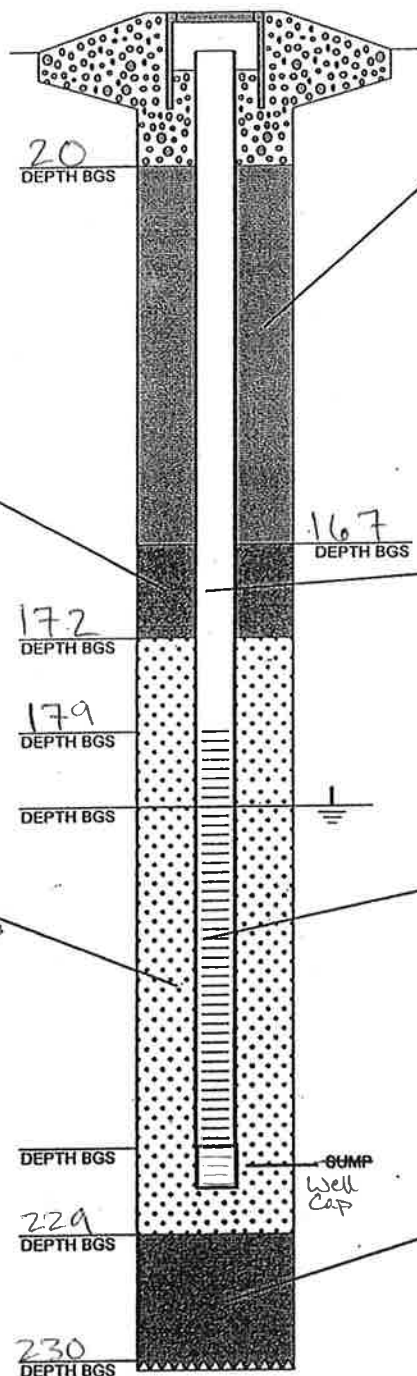
TOC ELEVATION _____
 GROUND ELEVATION _____
 NORTHING CORD. _____
 EASTING CORD. _____
 DATE SURVEYED _____
 SURVEY CO. _____

CENTRALIZERS USED?

☐ YES ☐ NO;
 CENTRALIZER DEPTHS: _____

SURFACE COMPLETION

☒ FLUSH MOUNT
☐ ABOVE GROUND W/BUMPER POST
☒ CONCRETE ☐ ASPHALT



MONITORING WELL

MONITORING WELL NO. 52M
 PROJECT 24097087 ABED HME DC
 SITE Dartmouth Dr / Leafwing Dr
 BOREHOLE NO. SCC-52M
 WELL PERMIT NO. 5.5-915342
 TOC TO BOTTOM OF WELL 229'

ANNULAR SEAL

AMOUNT CALCULATED 49.28 ft³
 AMOUNT USED 61.6 ft³
☐ GROUT FORMULA
 PORTLAND CEMENT _____
 BENTONITE _____
 WATER _____
☒ PREPARED MIX
 PRODUCT Aqua Guard
 MFG. BY Baroid

METHOD INSTALLED:
☐ POURED ☐ TREMIE

CASING

☐ SCHEDULE 40 PVC
☒ Sch 80 PVC
 PRODUCT _____
 MFG. BY Empire Container Corp
 CASING DIAMETER:
 ID 4" OD 4.5"
 LENGTH OF CASING 179'

WELL SCREEN

☐ SCHEDULE 40 PVC
☒ Sch 80 pvc
 PRODUCT _____
 MFG. BY Empire Container Corp
 CASING DIAMETER:
 ID 4" OD 4.5"
 SLOT SIZE 0.020
 LENGTH OF SCREEN 50'

BOREHOLE BACKFILL

AMOUNT CALCULATED 0.37
 AMOUNT USED _____
☐ BENTONITE CHIPS, SIZE _____
☐ BENTONITE PELLETS, SIZE _____
☐ SLURRY _____
☐ FORMATION COLLAPSE
 PRODUCT 8-12 Silica
 MFG. BY Premier Silica
 METHOD INSTALLED:
☒ POURED ☐ TREMIE



Boart Longyear Company

DAILY DRILL REPORT

Date: 3/14/13

Job #: 108635

Client: URS ECDC

Drilling Summary

Hole Information			Footage Summary			Casing Summary		Equipment Onsite	
Hole Number	Angle	Bit Size	From	To	Total Drilled	From	To	Equipment	Unit Number
52m	90	7x10	0	55'	55'	0	45'	Drill Rig	1703
								Support Truck	7964
								Pick Up Truck	9244
								Trailer 1	
								Trailer 2	

Hourly Break Down

Description	Quantity
Drilling	4
Well Installation	
Permits / Completions	
Lit Spoon Sampling	
Water Sampling	
Moving - Hole to Hole	
Rigging Up / Rigging Down	0.5
Well Abandonment	
Contamination / IDW	
Mobilization / Demobilization	2.5
Pre-Shift Inspections	0.25
Safety Meetings	0.25
Daily Travel to Field	0.5
Equipment Repairs	0.5
Water Haul	
Site Clean Up	
Food / Shop Time	0.5
Hand By (Explain)	
Other (Explain) Blue Stake	2
Moving To 52m Site Prep	1
for SIS	
Total Shift Hours	12

Notes: Moved To SIS Site Not
Available To Drill (Utilities) moved to
52m 2hrs for Cox Blue Stake
and Augered To 4' Drilled 7x10" to
15' 10" to 45'

Materials Used

Description	Size	Weight	Quantity	Notes
PVC Riser	4"	Sch 80		
PVC Screen	4"	.020 slot		
Bottom Cap	4"	Sch 80		
Compression Cap	4"	Sch 80		
Sand	8-12 sand	50lbs		
Hole Plug	3/8"	50lbs		
Cement		94lbs		
Vaults	12"	Flush		
Sacrete		80 lbs		
Barrels / Drums		55 Gallon		
Volclay Grout	30%	50lbs		
Quik Gel		50lbs		

Billable Items

Item Number	Description	Quantity
	Mobilization & Demobilization (lump sum)	1
	Per well cost to install 4" Sch 80 PVC well to 170'	
	Per well cost to install 4" Sch 80 PVC well to 225'	
	Additional/reduction cost per foot (Drilling)	
	Additional/reduction cost per foot (Well construction)	
	Night security/Day	
	Standby	

Crew Information

Driller	Justen Maples
Driller Assistant	Dave Lund
Driller Assistant	Randy Newman
Supervisor	

Driller Signature:

[Signature]

Client Signature:



Boart Longyear Company

DATE: 3/15/13

Date: 3/15/13

Job #: 108635

Client: URS ECDC

Drilling Summary								Equipment Onsite	
Hole Information			Footage Summary			Casing Summary		Equipment	Unit Number
Hole Number	Angle	Bit Size	From	To	Total Drilled	From	To		
52m	90°	7x10	55'	122'	67	45	100'	Drill Rig	1703
								Support Truck	7964
								Pick Up Truck	9244
								Trailer 1	
								Trailer 2	

Hourly Break Down	
Description	Quantity
Drilling	7
Well Installation	
Perforations / Completions	
Split Spoon Sampling	
Water Sampling	
Moving - Hole to Hole	
Rigging Up / Rigging Down	
Hole Abandonment	
Contamination / IDW	
Mobilization / Demobilization	
Pre-Shift Inspections	.25
Safety Meetings	.25
Daily Travel to Field	.5
Equipment Repairs	2
Water Haul	1
Site Clean Up	
Stand / Shop Time	
Stand By (Explain)	
Other (Explain)	
Total Shift Hours	11

Notes: Drilled 52m To 122' 10" To
100' SHUT DOWN TO OFFLOAD WELL MAT.
WATER HOPPER AND WATER HAUL FOR AN HR
IN 80' OF 9" THEN BLEW HYD LINE
2 HR REPAIR

Crew Information	
Driller	Justen Maples
Driller Assistant	Dave Lund
Driller Assistant	Randy Newman
Supervisor	

Materials Used				
Description	Size	Weight	Quantity	Notes
PVC Riser	4"	Sch 80		
PVC Screen	4"	.020 slot		
Bottom Cap	4"	Sch 80		
Compression Cap	4"	Sch 80		
Sand	8-12 sand	50lbs		
Hole Plug	3/8"	50lbs		
Cement		94lbs		
Vaults	12"	Flush		
Sacrete		80 lbs		
Barrels / Drums		55 Gallon		
Volclay Grout	30%	50lbs		
Quik Gel		50lbs		

Billable Items		
Item Number	Description	Quantity
	Mobilization & Demobilization (lump sum)	
	Per well cost to install 4" Sch 80 PVC well to 170'	
	Per well cost to install 4" Sch 80 PVC well to 225'	
	Additional/reduction cost per foot (Drilling)	
	Additional/reduction cost per foot (Well construction)	
	Night security/Day	1
	Standby	

Driller Signature:

Client Signature:



Boart Longyear Company

"DAILY DRILL REPORT"

Date: 3/16/13

Job #: 108635

Client: URS ECDC

Drilling Summary

Hole Information			Footage Summary			Casing Summary		Equipment Onsite	
Hole Number	Angle	Bit Size	From	To	Total Drilled	From	To	Equipment	Unit Number
52m	90°	7 1/2"	122'	230'	107'	80	230	Drill Rig	1703
								Support Truck	7964
								Pick Up Truck	9244
								Trailer 1	
								Trailer 2	

Hourly Break Down

Description	Quantity
Drilling	8.5
Well Installation	
Vaults / Completions	
Split Spoon Sampling	
Water Sampling	
Moving - Hole to Hole	
Rigging Up / Rigging Down	
Hole Abandonment	
Decontamination / IDW	
Mobilization / Demobilization	
Pre-Shift Inspections	.25
Safety Meetings	.25
Daily Travel to Field	.5
Equipment Repairs	
Water Haul	
Site Clean Up	
Yard / Shop Time	
Stand By (Explain)	
Other (Explain)	
Well Prep (Load TRIR AT LAYDOWN)	1
Total Shift Hours	10.5

Materials Used

Description	Size	Weight	Quantity	Notes
PVC Riser	4"	Sch 80		
PVC Screen	4"	.020 slot		
Bottom Cap	4"	Sch 80		
Compression Cap	4"	Sch 80		
Sand	8-12 sand	50lbs		
Hole Plug	3/8"	50lbs		
Cement		94lbs		
Vaults	12"	Flush		
Sacrete		80 lbs		
Barrels / Drums		55 Gallon		
Volclay Grout	30%	50lbs		
Quik Gel		50lbs		

Billable Items

Item Number	Description	Quantity
	Mobilization & Demobilization (lump sum)	
	Per well cost to install 4" Sch 80 PVC well to 170'	
	Per well cost to install 4" Sch 80 PVC well to 225'	
	Additional/reduction cost per foot (Drilling)	5'
	Additional/reduction cost per foot (Well construction)	
	Night security/Day	1
	Standby	

Notes: DRILLED 52m FROM 122'
TO 230' 9" CASING FROM 80' TO 230'
CLEANED OUT HOLE, TOOK TRIR TO
LAYDOWN AND LOADED WITH ALL WELL
MATERIALS

Crew Information

Driller	Justen Maples
Driller Assistant	Dave Lund
Driller Assistant	Randy Newman
Supervisor	

Driller Signature: _____

Client Signature: _____



Date: 3/17/13

Client: URS ECDC

[illegible]

Notes: CLEANED OUT Hole To 230'
Set 4" To 230' SCRIP 0.000 To 180'
8-12 SAND To 172.7' 3/8 CHITS To
167.1 GROUT To 80' CEMENT GROUT To
0' RIGGED DOWN AND CLEANED SITE

Crew Information	
Driller	Justen Maples
Driller Assistant	Dave Lund
Driller Assistant	Randy Newman
Supervisor	

Driller Signature:

Client Signature:



Client: URS ECDC

[illegible]

Description	Quantity
Drilling	
Well Installation	
Vaults / Completions	2
Split Spoon Sampling	
Water Sampling	
Moving - Hole to Hole	
Rigging Up / Rigging Down	
Hole Abandonment	
Decontamination / IDW	3
Mobilization / Demobilization	
Pre-Shift Inspections	.25
Safety Meetings	.25
Daily Travel to Field	.5
Equipment Repairs	
Water Haul	
Site Clean Up	
Yard / Shop Time	
Stand By (Explain)	
Other (Explain)	
Total Shift Hours	6

[illegible][illegible]

Driller	Justen Maples
Driller Assistant	Dave Lund
Driller Assistant	Randy Newman
Supervisor	

Client Signature: