DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
0							SM	
	cement/bentonite grout							
5				8		IRA-1-05		Fine to coarse **SAND** (subangular) with minor gravel; light yellowish brown (10YR 6/4); loose; dry; no odor; HCl negative.
10	steel conductor casing (20 feet)			84		IRA-1-10	CL	Silty **CLAY** with coarse sand (subrounded) and caliche; dark brown (7.5YR 4/4); very dense; damp; no odor; HCl positive.
15						IRA-1-15	CL	Silty **CLAY** with coarse sand (subrounded), and some caliche; reddish yellow (7.5YR 4/4); hard; dry; no odor; HCl positive.
20						IRA-1-20	SM	Silty fine to coarse **SAND** (subangular) with clay; dark brown (7.5YR 4/4); moderately hard; dry; no odor; HCl positive.
						IRA-1-22	GW	Sandy **GRAVEL**, gravel to 2 inches (rounded); sand fine to coarse, (subangular); pinkish gray (7.5YR 7/2); moist. HCl positive for finer fraction. Gravel composition primarily extrusive igneous.
25								
						IRA-1-28		
30	PVC blank casing							
35								
						IRA-1-38		
40								

File #:	1010-02	Ground surface elevation (feet):	2280.6	Drilling method:	Dual Wall Percussion
Logged by:	W. Golightly	Total depth (feet):	230.0	Screen slot size:	0.02"
Date drilled:	10-23-90	Diameter of boring:	10 inch	Casing diameter:	4 inch

KLEINFELDER

PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
Miracle Mile Interim Remediation
Tucson, Arizona

LOG OF BORING IRA-1

PLATE A-1

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
40						IRA-1-40		
						IRA-1-42	GP	Sandy **GRAVEL** with traces of silt and clay; gravel to 1 inch (rounded); sand (subangular); light brown (7.5YR 6/4); damp. Gravel composition primarily extrusive igneous.
45							SC	Clayey medium to coarse **SAND** (angular); pink (5YR 4/4); moderately dense; moist. Sand composed of quartz and alkali feldspars.
						IRA-1-47		
50	cement/bentonite grout						CL	Silty **CLAY** with trace of sand; brown (7.5YR 5/4); stiff; moist; HCl negative.
55						IRA-1-55	SC	Gravelly fine to coarse **SAND** with clay; pink (5YR 7/4); loose; moist. Gravel primarily intrusive igneous.
						IRA-1-58		
60								
65						IRA-1-65		
						IRA-1-68		
70						IRA-1-70		
75	PVC blank casing							
							SC	Fine to coarse **SAND** and fine to coarse **GRAVEL** with clay; pink (5YR 7/4); loose; moist. Gravel predominantly intrusive igneous. Clay more abundant.
80						IRA-1-79		

KLEINFELDER

PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
Miracle Mile Interim Remediation
Tucson, Arizona

LOG OF BORING IRA-1 (CONT.)

PLATE A-2

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
85							SC	Medium to coarse **SAND** with gravel and clay; pinkish white (5YR 8/2); loose; slightly cohesive; moist.
90	cement/bentonite grout					IRA-1-90		
95						IRA-1-94		
						IRA-1-97	GC	Clayey **GRAVEL** and cobbles with fine to coarse sand (subrounded), gravel (subangular to subrounded), cobbles (subrounded); brown (10YR 5/3); cohesive; moist. Cobbles primarily extrusive and intrusive igneous.
100						IRA-1-101		
							SC	Clayey medium to coarse **SAND** with gravel (angular); brownish yellow (10YR 6/6); cohesive (firm); moist. Gravel primarily extrusive igneous.
105								
110	PVC blank casing					IRA-1-110		
115						IRA-1-115		
120	#60 Colorado silica sand (3.5 ft)					IRA-1-120		
125	#3 Lonestar sand							

KLEINFELDER

PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
Miracle Mile Interim Remediation
Tucson, Arizona

LOG OF BORING IRA-1 (CONT.)

PLATE A-3

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
130						IRA-1-130		
	PVC screen							
135								
						IRA-1-137		
140	Static water level							
							GC	Clayey **GRAVEL** (angular) with fine to coarse sand and some cobbles; reddish brown (5YR 4/4); cohesive; dense; saturated. Cobbles extrusive igneous.
145						IRA-1-145		
150						IRA-1-150		
155								
						IRA-1-158		
160	#3 Lonestar sand							
						IRA-1-163		
165								
						IRA-1-167	GC	Clayey **GRAVEL** (angular) with fine to coarse sand and some cobbles; reddish brown (5YR 4/4); cohesive; dense; saturated. Cobbles extrusive igneous.
170						IRA-1-170		

KLEINFELDER

PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
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Tucson, Arizona

LOG OF BORING
IRA-1 (CONT.)

PLATE A-4

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
						IRA-1-173		
175							GC	Clayey **GRAVEL** (angular) with fine to coarse sand and some cobbles; reddish brown (5YR 4/4); cohesive; dense; saturated. Cobbles extrusive igneous.
						IRA-1-177		
180	PVC screen							
						IRA-1-184		
185								
						IRA-1-188		
190								
						IRA-1-192		
195	#3 Lonestar sand							
						IRA-1-197		
200								
205						IRA-1-205		
210	PVC blank casing						GC	Clayey **GRAVEL** (angular) with fine to coarse sand and some cobbles; reddish brown (5YR 4/4); cohesive; dense; saturated. Cobbles extrusive igneous.
215						IRA-1-215		

KLEINFELDER

PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
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Tucson, Arizona

LOG OF BORING IRA-1 (CONT.)

PLATE A-5

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	PVC blank casing							
220								
225	#3 Lonestar sand							
					X	IRA-1-227	GC	Clayey **GRAVEL** (angular) with fine to coarse sand and some cobbles; reddish brown (5YR 4/4); cohesive; dense; saturated. Cobbles extrusive igneous.
230								Boring terminated at 230 feet.
235								
240								
245								
250								
255								
260								

KLEINFELDER

PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
Miracle Mile Interim Remediation
Tucson, Arizona

LOG OF BORING
IRA-1 (CONT.)

PLATE
A-6

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
0							SM	
5	cement/bentonite grout				X	IRA-2-05	SM	Fine to coarse SAND (subangular) with minor gravel; reddish brown (5YR 5/4); loose; damp; no odor; HCl positive.
10					X	IRA-2-10	SM	Silty fine to medium SAND (subangular to subrounded) with clay, some caliche; reddish yellow (7.5YR 6/8); dense; damp; no odor.
15	steel conductor casing (20 feet)				X	IRA-2-13	SM	Silty very fine to medium SAND (subangular with trace of clay; pink (7.5YR 7/4); loose; damp; HCl positive.
20	PVC blank casing				X	IRA-2-18	SM	Silty very fine to medium SAND (subangular with trace of clay; brown (7.5YR 5/4); loose; damp; HCL positive.
25					X	IRA-2-25		
30					X	IRA-2-30		
35					X	IRA-2-35	SM	Silty fine to coarse SAND (subangular); strong brown (7.5YR 5/8); loose; damp; HC negative.
40								

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File #:	1010-02	Ground surface elevation (feet):		Drilling method:	Dual Wall Percussion
Logged by:	W. Golightly	Total depth (feet):	251.0	Screen slot size:	0.02"
Date drilled:	10-25-90	Diameter of boring:	10 inch	Casing diameter:	4 inch

KLEINFELDER

Arizona Department of Environmental Quality
Miracle Mile Interim Remediation
Tucson, Arizona

LOG OF BORING IRA-2

PLATE A-7

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
40						IRA-2-40		
						IRA-2-42	SP	Fine to medium **SAND** with fine gravel; pinkish white (7.5YR 8/2); loose; dry. Gravel mixed intrusive and extrusive igneous; some muscovite present.
45								
50	PVC blank casing					IRA-2-50		Gravel increases in abundance and size.
55						IRA-2-55		
60						IRA-2-60	GW	Sandy **GRAVEL** and **COBBLES**; sand fine to coarse, (subangular); gravel and cobbles (rounded); strong brown (7.5YR 5/8); loose; damp. Gravel and cobbles igneous intrusive and extrusive; sandstone gravel and cobbles also noted.
						IRA-2-63	SC	
65						IRA-2-65		Clayey medium to coarse **SAND** (angular); pink (5YR 7/4); moderately dense; slightly cohesive; moist. Sand composed of alkali feldspars and quartz.
						IRA-2-67		
70						IRA-2-70		
						IRA-2-74		
75	cement/bentonite grout					IRA-2-76		
								Variable clay content composition, ranging from clayey sand to sandy clay. Sand composed of alkali feldspars and quartz; angular.
80								

KLEINFELDER

PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
Miracle Mile Interim Remediation
Tucson, Arizona

LOG OF BORING IRA-2 (CONT.)

PLATE A-8

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
85								
90	cement/bentonite grout					IRA-2-90		Variable clay content composition, ranging from clayey sand to sandy clay. Sand composed of alkali feldspars and quartz; angular.
95								
						IRA-2-98		
100								
105								
110						IRA-2-110		
115	PVC blank casing							
120						IRA-2-120		
						IRA-2-123		More abundant gravel of extrusive igneous origin.
125								

KLEINFELDER

PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
Miracle Mile Interim Remediation
Tucson, Arizona

LOG OF BORING
IRA-2 (CONT.)

PLATE A-9

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
130	cement/bentonite grout					IRA-2-130		
135	#60 Colorado silica sand (5ft)					IRA-2-136	GC	Clayey **GRAVEL** and **COBBLES** with sand; gravel and cobbles (rounded to subrounded); pink (5YR 7/4); cohesive; moist. Sand is composed of quartz and feldspars; gravel and cobbles intrusive igneous.
140						IRA-2-140		
	#3 Lonestar sand							
145						IRA-2-145	SC	Clayey medium to coarse **SAND** with fine gravel (angular); reddish brown (5YR 4/4); cohesive; moist. Gravel primarily extrusive igneous.
150						IRA-4-150		
155	PVC screen					IRA-2-155	SC	Clayey fine to coarse **SAND** with gravel (angular); reddish brown (5YR 4/4); cohesive; moist. Gravel primarily extrusive igneous.
	Static water level							
160								
165						IRA-2-165	GC	Clayey **GRAVEL** (angular) with fine to coarse sand and some cobbles; reddish brown (5YR 4/4); cohesive; dense; moist to saturated. Gravel and cobbles primarily extrusive igneous.
170						IRA-2-170		

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Tucson, Arizona

LOG OF BORING IRA-2 (CONT.)

PLATE A-10

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
175								
180	#3 Lonestar sand					IRA-2-180	GC	Clayey **GRAVEL** (angular) with fine to coarse sand and some cobbles; reddish brown (5YR 4/4); cohesive; dense; moist to saturated. Gravel and cobbles primarily extrusive igneous.
185								
190								
195						IRA-2-195		
200								
205	PVC screen					IRA-2-205	GC	Clayey **GRAVEL** (angular) with fine to coarse sand and some cobbles; reddish brown (5YR 4/4); cohesive; dense; moist to saturated. Gravel and cobbles primarily extrusive igneous.
210								
215						IRA-2-215		

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Tucson, Arizona

LOG OF BORING IRA-2 (CONT.)

PLATE A-11

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
220	PVC screen							
225						IRA-2-225	GC	Clayey **GRAVEL** (angular) with fine to coarse sand and some cobbles; reddish brown (5YR 4/4); cohesive; dense; moist to saturated. Gravel and cobbles primarily extrusive igneous.
230								
235	PVC blank casing							
240						IRA-2-240		
245	#3 Lonestar sand							
250						IRA-2-250		Boring terminated at 250 feet.
255								
260								

KLEINFELDER

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Arizona Department of Environmental Quality
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Tucson, Arizona

LOG OF BORING
IRA-2 (CONT.)

PLATE A-12

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
0							SM	
	cement/bentonite grout							
5						IRA-3-05		
10	steel conductor casing (20 feet)					IRA-3-10	SM	Silty fine **SAND** (subangular) with caliche; strong brown (7.5YR 5/6); cohesive; firm; damp; no odor.
15						IRA-3-15	SM	Silty fine to medium **SAND** (subangular) with trace of clay and caliche layers (white); strong brown (7.5YR 5/6); moderately hard; cohesive; no odor.
20						IRA-3-20	SW	Medium to coarse **SAND** (subangular) with fine gravel (subangular to subrounded); reddish yellow (7.5YR 7/8); loose; damp; HCl positive.
25						IRA-3-25	SW	Medium to coarse **SAND** (subangular to subrounded) with fine gravel (subrounded), and trace of clay; reddish yellow (7.5YR 7/8); soft; moderately cohesive; HCl negative.
30	PVC blank casing					IRA-3-30	CL	**CLAY** with silt, trace of coarse sand (subrounded); reddish yellow (7.5YR 6/6); hard; cohesive; HCl negative.
35						IRA-3-35	CL	Medium to coarse sandy **CLAY**; sand (subangular to subrounded); reddish yellow (7.5YR 6/6); cohesive; hard; HCl negative.
40								

File #:	**1010-02**	Ground surface elevation (feet):	**2303.2**	Drilling method:	**Dual Wall Percussion**
Logged by:	**W. Golightly**	Total depth (feet):	**251.0**	Screen slot size:	**0.02"**
Date drilled:	**10-27-90**	Diameter of boring:	**10 inch**	Casing diameter:	**4 inch**

KLEINFELDER

PROJECT NUMBER **52-1010-02(IRA)**

Arizona Department of Environmental Quality
Miracle Mile Interim Remediation
Tucson, Arizona

LOG OF BORING IRA-3

PLATE A-13

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
40						IRA-3-40		
45						IRA-3-45	SW	Medium to coarse **SAND** (subangular to subrounded); reddish yellow (7.5YR 7/8); loose; damp.
50	cement/bentonite grout					IRA-3-50	SW	Medium to coarse **SAND** (subangular) with gravel; brownish yellow (10YR 6/6); loose; damp.
55						IRA-3-55		
60						IRA-3-60	SP	Clayey fine to coarse **SAND** (subangular to subrounded) with gravel; reddish brown (5YR 5/4); soft; cohesive; moist. Sand predominantly alkali feldspars and quartz.
65						IRA-3-65	SP	Medium to coarse **SAND** (angular) with clay and gravel (angular). Sand primarily alkali feldspars and quartz; gravel primarily intrusive igneous.
70						IRA-3-70		
75	PVC blank casing					IRA-3-75		
80						IRA-3-80		

KLEINFELDER

PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
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Tucson, Arizona

LOG OF BORING IRA-3 (CONT.)

PLATE A-14

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
85								
							SP	Medium to coarse **SAND** (angular) with clay and gravel (angular). Sand primarily alkali feldspars and quartz; gravel primarily igneous intrusive.
90	cement/bentonite grout							
95						IRA-3-95		
100						IRA-3-100		
105						IRA-3-105		
110						IRA-3-110	CL	Fine to medium sandy **CLAY**; pink (7.5YR 7/4); firm; cohesive; moist. Sand (angular), primarily alkali feldspars and quartz.
115	PVC blank casing					IRA-3-115	SC	Clayey fine to coarse **SAND** (angular) with gravel (angular to subangular); pink (7.5YR 7/4); soft; cohesive; moist. Sand predominantly alkali feldspars and quartz; gravel primarily intrusive igneous.
120						IRA-3-120		
125						IRA-3-125		

KLEINFELDER

PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
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Tucson, Arizona

LOG OF BORING IRA-3 (CONT.)

PLATE A-15

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
130	# 60 silica sand					IRA-3-130	SC	Clayey fine to coarse **SAND** (angular) with fine gravel (angular); strong brown (7.5YR 5/6); soft; cohesive; moist. Sand and gravel predominantly extrusive igneous.
135						IRA-3-135		
140	#3 Lonestar sand					IRA-3-140		
145						IRA-3-145		
150	PVC screen					IRA-3-150	SC	Clayey fine to coarse **SAND** (angular) with fine gravel (angular); strong brown (7.5YR 5/6); soft; cohesive; moist. Sand and gravel predominantly extrusive igneous.
155						IRA-3-155		
160	Static water level					IRA-3-160		
165						IRA-3-165		
170						IRA-3-170		

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LOG OF BORING
IRA-3 (CONT.)

PLATE
A-16

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY	FLD vapor PID	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
		mg/kg	ppm					
175						IRA-3-175		
180	#3 Lonestar sand					IRA-3-180		
185						IRA-3-185	GC	Clayey fine to coarse sandy **GRAVEL** (subangular) and **COBBLES**; sand (angular); strong brown (7.5YR 5/6); soft; cohesive; moist. Gravel predominantly extrusive igneous.
190								
195						IRA-3-195		
200						IRA-3-200		
205	PVC screen					IRA-3-205		
210						IRA-3-210		
215						IRA-3-215		

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LOG OF BORING IRA-3 (CONT.)

PLATE A-17

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
220	PVC screen					IRA-3-220		
225						IRA-3-225	GC	Clayey fine to coarse sand **GRAVEL** (subangular) and **COBBLES** (sand is angular); strong brown (7.5YR 5/6); soft; cohesive; moist. Gravel predominantly extrusive igneous.
230						IRA-3-230		
235	PVC blank casing							
240	#3 Lonestar sand							
245								
250						IRA-3-250		Boring terminated at 250 feet.
255								
260								

KLEINFELDER

PROJECT NUMBER 52-1010-02(IRA)

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Tucson, Arizona

LOG OF BORING
IRA-3 (CONT.)

PLATE A-18

PAGE 6 of 6

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
0							SM	
	cement/bentonite grout							
5						IRA-4-05	SM	Silty fine **SAND** (subangular); light brown (7.5YR 6/4); loose; dry; no odor; HCl positive.
10	steel conductor casing (20 feet)					IRA-4-10	SM	Silty fine **SAND** (subangular) with some caliche; light brown (7.5YR 6/4); loose to dense; dry; no odor; HCl positive.
15						IRA-4-15	SM	Silty fine **SAND** (subangular) with some caliche; pink (7.5YR 7/4); loose to dense; dry; no odor; HCl positive.
20						IRA-4-20	SP	Fine to coarse **SAND** (subangular to subrounded) with gravel; pink (7.5YR 7/4); loose; dry; no odor; HCl positive.
25						IRA-4-25	SP	Fine to coarse **SAND** (subangular) with gravel and silt; reddish brown (7.5YR 5/4); loose; damp; no odor; HCl positive.
30	PVC blank casing					IRA-4-30	SP	Fine to coarse **SAND** (subangular to subrounded) with gravel; pink (7.5YR 7/4); loose; dry; no odor; HCl positive.
35						IRA-4-35		
40								

File #:	**1010-02**	Ground surface elevation (feet):	**2290.1**	Drilling method:	**Dual Wall Percussion**
Logged by:	**W. Golightly**	Total depth (feet):	**232.0**	Screen slot size:	**0.02"**
Date drilled:	**10-30-90**	Diameter of boring:	**10 inch**	Casing diameter:	**4 inch**

KLEINFELDER

PROJECT NUMBER **52-1010-02(IRA)**

Arizona Department of Environmental Quality
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Tucson, Arizona

LOG OF BORING IRA-4

PLATE A-19

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
40						IRA-4-40		
45						IRA-4-45	SP	Fine to coarse **SAND** (subangular to subrounded) with gravel and cobbles (rounded); pink (7.5YR 5/4); loose; damp; no odor.
50	cement/bentonite grout					IRA-4-50	SC	Clayey fine to coarse **SAND** (angular); reddish brown (7.5YR 5/4); firm; cohesive; no odor; HCl negative. Abundant muscovite.
55						IRA-4-55	SC	Fine to coarse **SAND** (angular) with trace of gravel; pink (7.5YR 7/3); loose; damp; no odor; HCl negative. Sand composed of alkali feldspars and quartz with muscovite.
60						IRA-4-60		
65						IRA-4-65		
70						IRA-4-70		
75	PVC blank casing					IRA-4-75		
80						IRA-4-80		Fine to coarse **SAND** continued; Gravel and cobbles were more abundant.

KLEINFELDER

PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
Miracle Mile Interim Remediation
Tucson, Arizona

LOG OF BORING IRA-4 (CONT.)

PLATE A-20

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
85						IRA-4-85		
90	cement/bentonite grout					IRA-4-90	SC	Clayey fine to coarse **SAND** (angular) with gravel (angular); pink (7.5YR 8/3); soft; cohesive; moist; no odor. Sand composed of alkali feldspars and quartz with muscovite.
95						IRA-4-95		
100	PVC blank casing					IRA-4-100		
105						IRA-4-105		
110	#60 Colorado silica sand (2ft)					IRA-4-110	GC	Clayey **GRAVEL** (angular) with fine to coarse sand (angular); light brown (7.5YR 6/4); soft; cohesive; moist; no odor. Abundant volcanic clasts.
115						IRA-4-115		
120	#3 Lonestar sand					IRA-4-120		
125						IRA-4-125	GC	Sandy **GRAVEL** (angular) with clay and cobbles, sand fine to coarse (angular), cobbles rounded; brown (7.5YR 5/4); soft;

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LOG OF BORING IRA-4 (CONT.)

PLATE A-21

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
								cohesive; moist. Abundant volcanic clasts.
130						IRA-4-130	GC	Gravelly fine to coarse **SAND** (angular to subangular) with clay; brown (7.5YR 5/4); soft; cohesive; moist. Gravel composed of angular volcanic clasts.
135	PVC screen					IRA-4-135		
140						IRA-4-140		Gravelly fine to coarse **SAND** continued; Cobbles were more abundant.
145						IRA-4-145		
	Static water level							
150						IRA-4-150		
155								
160	#3 Lonestar sand					IRA-4-160		Gravelly fine to coarse **SAND** continued.
165						IRA-4-165		
170						IRA-4-170		

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LOG OF BORING IRA-4 (CONT.)

PLATE A-22

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
175						IRA-4-175		
								Gravelly fine to coarse **SAND** continued.
180	#3 Lonestar sand					IRA-4-180		
185						IRA-4-185		
190						IRA-4-190		
195								
200	PVC screen					IRA-4-200	GC	Clayey **GRAVEL** (angular) with fine to coarse sand (angular); strong brown (7.5YR 5/8); firm; cohesive; moist. Abundant volcanic clasts.
205						IRA-4-205	SP	Gravelly fine to coarse **SAND** (angular to subangular) with clay; brown (7.5YR 5/4); soft; cohesive; moist. Abundant volcanic clasts (angular).
210						IRA-4-210	GC	Clayey **GRAVEL** (angular) with fine to coarse sand (angular); strong brown (7.5YR 5/8); firm; cohesive; moist. Abundant volcanic clasts.
	PVC blank casing							
215						IRA-4-215		

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Tucson, Arizona

LOG OF BORING IRA-4 (CONT.)

PLATE A-23

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	PVC blank casing							
220						IRA-4-220	GC	Clayey **GRAVEL** (angular) with fine to coarse sand (angular); strong brown (7.5YR 5/8); firm; cohesive; moist. Abundant volcanic clasts.
225	#3 Lonestar sand					IRA-4-225		
230								
								Boring terminated at 232 feet.
235								
240								
245								
250								
255								
260								

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Tucson, Arizona

LOG OF BORING
IRA-4 (CONT.)

PLATE
A-24

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
0							SM	Fine silty **SAND**, light brown (7.5YR 6/4); loose; dry; no odor; caliche from 10 to 15 feet.
5	Cement/bentonite grout							
10	Steel conductor casing (20 feet)				X	IRA-5-10		
15								
20								
25					X	IRA-5-23	SW	Fine to coarse **SAND** (subangular) with some fine gravel; light brown (7.5YR 6/4); loose; dry; no odor. Gravel abundance and size increases downward to cobbles.
30	PVC blank casing				X	IRA-5-30		
35								
40								

File #:	1010-02	Ground surface elevation (feet):	2275.9	Drilling method:	Dual Wall Percussion
Logged by:	W. Golightly	Total depth (feet):	225.0	Screen slot size:	0.02"
Date drilled:	4-15-91	Diameter of boring:	10 inch	Casing diameter:	4 inch

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PROJECT NUMBER 52-1010-02(IRA)

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LOG OF BORING IRA-5

PLATE A-25

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
40						IRA-5-40		
45								
50	Cement/bentonite grout					IRA-5-50	CL	**CLAY** with silt; brown (7.5YR 4/6); medium stiff; moist; no odor.
55								
60						IRA-5-60	SC	Fine to coarse **SAND** (angular) with clay and some fine gravel; light brown (7.5YR 6/4); soft; moist; no odor. Sand composed primarily of alkali feldspars and quartz.
65								
70						IRA-5-70		
75	PVC blank casing					IRA-5-75	CL	**CLAY**; brown (7.5YR 5/4); very stiff; moist; no odor.
80								
						IRA-5-82	SC	

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PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
Miracle Mile Interim Remediation
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LOG OF BORING IRA-5 (CONT.)

PLATE A-26

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
85								Fine to coarse **SAND** (angular) with clay and some fine gravel; light brown (7.5YR 6/4); soft; moist; no odor. Sand composed primarily of alkali feldspars and quartz. Gravel, cobbles, and boulders vary in abundance.
90	Cement/bentonite grout					IRA-5-90		
95								
100						IRA-5-100		
105							SC	Fine to coarse **SAND** (angular) with clay and some fine gravel; light brown (7.5YR 6/4); soft; moist; no odor. Sand composed primarily of alkali feldspars and quartz. Gravel, cobbles, and boulders vary in abundance.
110	PVC blank casing					IRA-5-110		
115								
	#60 California silica sand							
120						IRA-5-120	SW	Fine to coarse **SAND** with fine gravel and some clay; brown (7.5YR 5/4); medium dense; moist; no odor.
125	#3 Lonestar sand							

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PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
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Tucson, Arizona

LOG OF BORING IRA-5 (CONT.)

PLATE A-27

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
130	PVC screen					IRA-5-130		
135	#3 Lonestar sand							
140	Static water level					IRA-5-140		
145								
150						IRA-5-150		
155								
160	PVC screen					IRA-5-160	SW	Fine to coarse **SAND** with fine gravel and some clay; brown (7.5YR 5/4); medium dense; moist; no odor.
165								
170						IRA-5-170		

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PROJECT NUMBER 52-1010-02(IRA)

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Tucson, Arizona

LOG OF BORING IRA-5 (CONT.)

PLATE A-28

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
175								
180	PVC screen					IRA-5-180		
185								
190						IRA-5-190		
195								
200	#3 Lonestar sand					IRA-5-200		
205								
210	PVC blank casing					IRA-5-210	GC	GRAVEL with some clay and coarse sand, brown (7.5YR 5/4); moist, no odor.
215								

KLEINFELDER

PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
Miracle Mile Interim Remediation
Tucson, Arizona

LOG OF BORING
IRA-5 (CONT.)

PLATE
A-29

DEPTH (feet)	WELL CONSTRUCTION	CHEMICAL ANALYSES LABORATORY (mg/kg)	FLD vapor PID (ppm)	BLOWS/FOOT	SAMPLE INTERVAL	SAMPLE NUMBER	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	PVC blank casing							
220	#3 Lonestar sand				Y	IRA-5-220	SW	Fine to coarse **SAND** with fine gravel and some clay; brown (7.5YR 5/4); medium dense; moist; no odor.
225								Boring terminated at 225 feet.
230								
235								
240								
245								
250								
255								
260								

KLEINFELDER

PROJECT NUMBER 52-1010-02(IRA)

Arizona Department of Environmental Quality
Miracle Mile Interim Remediation
Tucson, Arizona

LOG OF BORING IRA-5 (CONT.)

PLATE A-30

Project Name: ADEQ – MIRACLE MILE	Log of Well No: IR–6	Page 1 of 5
Well Location: R.E. DARLING	ADWR Registration No: 55–547953	
Logged/Checked by: CCR/BFJ	Depth of Wellbore Below LS: 208	Well Casing: 4–INCH, SCH40
Date Started: 03/20/95	WL Datum: GROUND SURFACE	Well Screen: 4–INCH, SCH40, 0.020" SLOT
Date Completed: 03/23/95	Datum Elev: UKNOWN	Filter Pack: 8–12 COLORADO SILICA
Contractor: LAYNE ENVIRONMENTAL	WL Below Datum	Well Seal: BENTONITE
Drilling Equipment: AP1000 PERCUSSION HAMMER	ATD/Time: –	Cond Casing: N/A
	Static/Date: 147.21'B.T.O.C.–3/28/95	Well Cover: FLUSH – TRAFFIC VAULT

Depth (Ft)	Geologic Log	Material Description	PID	Sample Interval	Sample Number	Well Construction
		Dry, light brown, SILTY SANDY fill with Gravel				
5		Moist, light reddish–brown (2.5YR 6/3) SILT with Clay/fine Sand				
10			0			
		Moist, reddish–brown (2.5YR 5/4) CLAY with Silt/fine Sand	0			
15						Cement Grout
20		Moist, reddish–brown (5YR 5/4) fine to medium SAND, little fines	0			4–inch, SCH40 blank PVC casing
25						
		Moist, reddish–brown (5YR 5/4) well graded SAND with Gravel, little fines	0			
30						
		Moist, reddish–brown (5YR 5/4) well graded SAND with Gravel, little fines	0			
35						
		Moist, reddish–brown (5YR 5/4) Gravely well graded SAND	0			
40						
45						
		Moist, light reddish–brown (5YR 6/4) poorly–graded fine SAND with silt	0			
50						

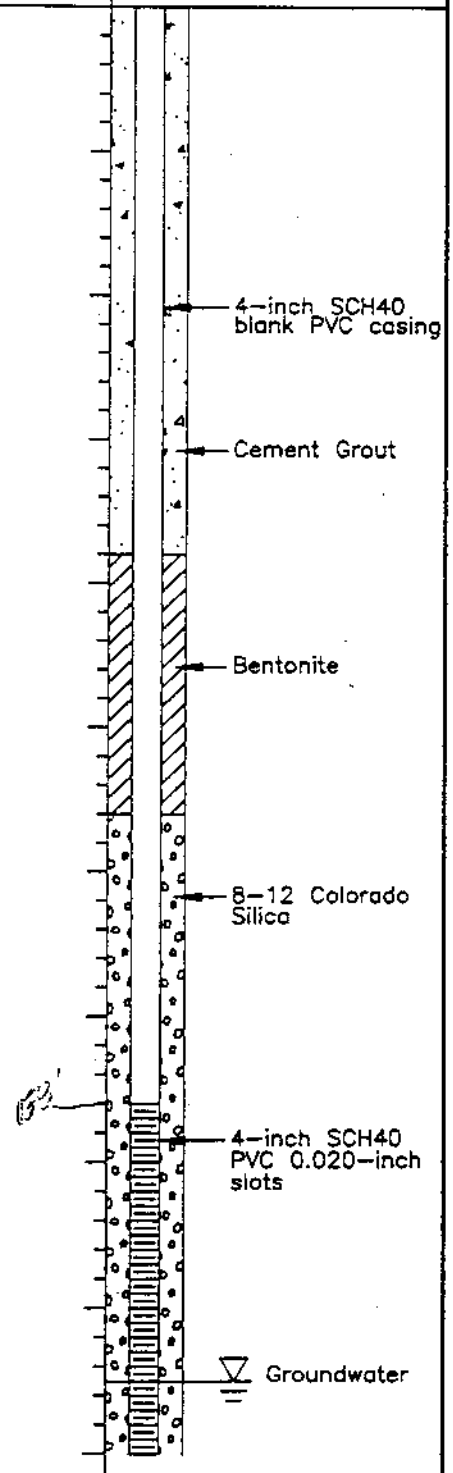
Project Name: ADEQ – MIRACLE MILE	Log of Well No: IR–6	Page 2 of 5
Well Location: R.E. DARLING	ADWR Registration No: 55–547953	
Logged/Checked by: CCR/BFJ	Depth of Wellbore Below LS: 208	Well Casing: 4–INCH, SCH40
Date Started: 03/20/95	WL Datum: GROUND SURFACE	Well Screen: 4–INCH, SCH40, 0.020" SLOT
Date Completed: 03/23/95	Datum Elev: UKNOWN	Filter Pack: 8–12 COLORADO SILICA
Contractor: LAYNE ENVIRONMENTAL	WL Below Datum	Well Seal: BENTONITE
Drilling Equipment:	ATD/Time: –	Cond Casing: N/A
AP1000 PERCUSSION HAMMER	Static/Date: 147.21'B.T.O.C.–3/28/95	Well Cover: FLUSH – TRAFFIC VAULT

Depth (Ft)	Geologic Log	Material Description	PID	Sample Interval	Sample Number	Well Construction
		Moist, weak red (10YR 5/4) well graded SAND, some Gravel and Clay	0			Cement Grout
			0			
55		Moist, reddish–gray (5YR 5/2) fine to medium SAND with Silt				4–inch, SCH40 blank PVC casing
		Moist, reddish–brown (5YR 5/4) well graded SAND with clay (fat) some Gravel	0			
60						
		Moist, reddish–brown (5YR 5/3) well graded SAND with Clay, some Gravel	0			
65						
		Moist, reddish–brown (5YR 5/3) well graded SAND with Clay and Gravel	0			Slight increased moisture; no water in borehole
70						
75		Moist, reddish–brown (5YR 5/4) well graded SAND, little Fines	0			
80			0			
		Moist, reddish–brown (5YR 5/4) SAND with Clay				
85		Gravel/Cobble lense	0			
90		Moist, reddish–brown (5YR 5/4) poorly graded fine SAND with Clay				
95		Moist, reddish–brown (5YR 5/4) Clayey SAND with Gravel, some Cobbles	0			
100						

Project Name: ADEQ – MIRACLE MILE	Log of Well No: IR–6	Page 3 of 5
Well Location: R.E. DARLING	ADWR Registration No: 55–547953	
Logged/Checked by: CCR/BFJ	Depth of Wellbore Below LS: 208	Well Casing: 4–INCH, SCH40
Date Started: 03/20/95	WL Datum: GROUND SURFACE	Well Screen: 4–INCH, SCH40, 0.020" SLOT
Date Completed: 03/23/95	Datum Elev: UKNOWN	Filter Pack: 8–12 COLORADO SILICA
Contractor: LAYNE ENVIRONMENTAL	WL Below Datum	Well Seal: BENTONITE
Drilling Equipment: AP1000 PERCUSSION HAMMER	ATD/Time: –	Cond Casing: N/A
	Static/Date: 147.21'B.T.O.C.–3/28/95	Well Cover: FLUSH – TRAFFIC VAULT

Depth (Ft)	Geologic Log	Material Description	PID	Sample Interval	Sample Number
		Moist, light reddish–brown (5YR 6/4) Clayey fine SAND	0		
			0		
105		Moist, reddish–brown (5YR 5/3) Gravelly/cobblely SAND with Clay			
			0		
110		Moist, reddish–brown (5YR 5/3) Gravelly/cobblely SAND with Clay			
115					
120		Moist, light reddish–brown (5YR 6/4) Gravelly/cobblely SAND with Clay	0		
125		Moist, light reddish–brown (5YR 6/4) well graded SAND with Gravel, some Fines	0		
130					
135		Moist, light reddish–brown (5YR 6/4) well graded SAND with Gravel, some Fines	0		
140					
145		Moist, reddish–brown (5YR 5/4) Gravelly SAND with Clay	0		
150					

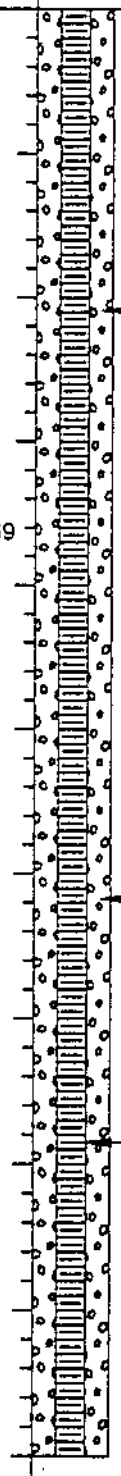
Well Construction



Project Name: ADEQ – MIRACLE MILE	Log of Well No: IR-6	Page 4 of 5
Well Location: R.E. DARLING	ADWR Registration No: 55-547953	
Logged/Checked by: CCR/BFJ	Depth of Wellbore Below LS: 208	Well Casing: 4-INCH, SCH40
Date Started: 03/20/95	WL Datum: GROUND SURFACE	Well Screen: 4-INCH, SCH40, 0.020" SLOT
Date Completed: 03/23/95	Datum Elev: UKNOWN	Filter Pack: 8-12 COLORADO SILICA
Contractor: LAYNE ENVIRONMENTAL	WL Below Datum	Well Seal: BENTONITE
Drilling Equipment:	ATD/Time: –	Cond Casing: N/A
AP1000 PERCUSSION HAMMER	Static/Date: 147.21'B.T.O.C.-3/28/95	Well Cover: FLUSH – TRAFFIC VAULT

Depth (Ft)	Geologic Log	Material Description	PID	Sample Interval	Sample Number
		Moist, reddish-brown (5YR 5/4) gravelly SAND with Clay			
155					
		Moist, dark reddish-gray (5YR 4/2) clayey SAND			
160					
165		Wet, dark reddish gray (5YR 4/2) well graded SAND with Fines			
			0		167-169
170					
175		Wet, dark reddish gray (5YR 4/2) well graded SAND with Fines			
180					
		Wet, dark reddish-gray (5YR 4/2) well graded SAND with Gravel and Fines			
185					
190					
		Wet, dark reddish-gray (5YR 4/2) sandy CLAY/clayey Sand, some Gravel			
195					
200					

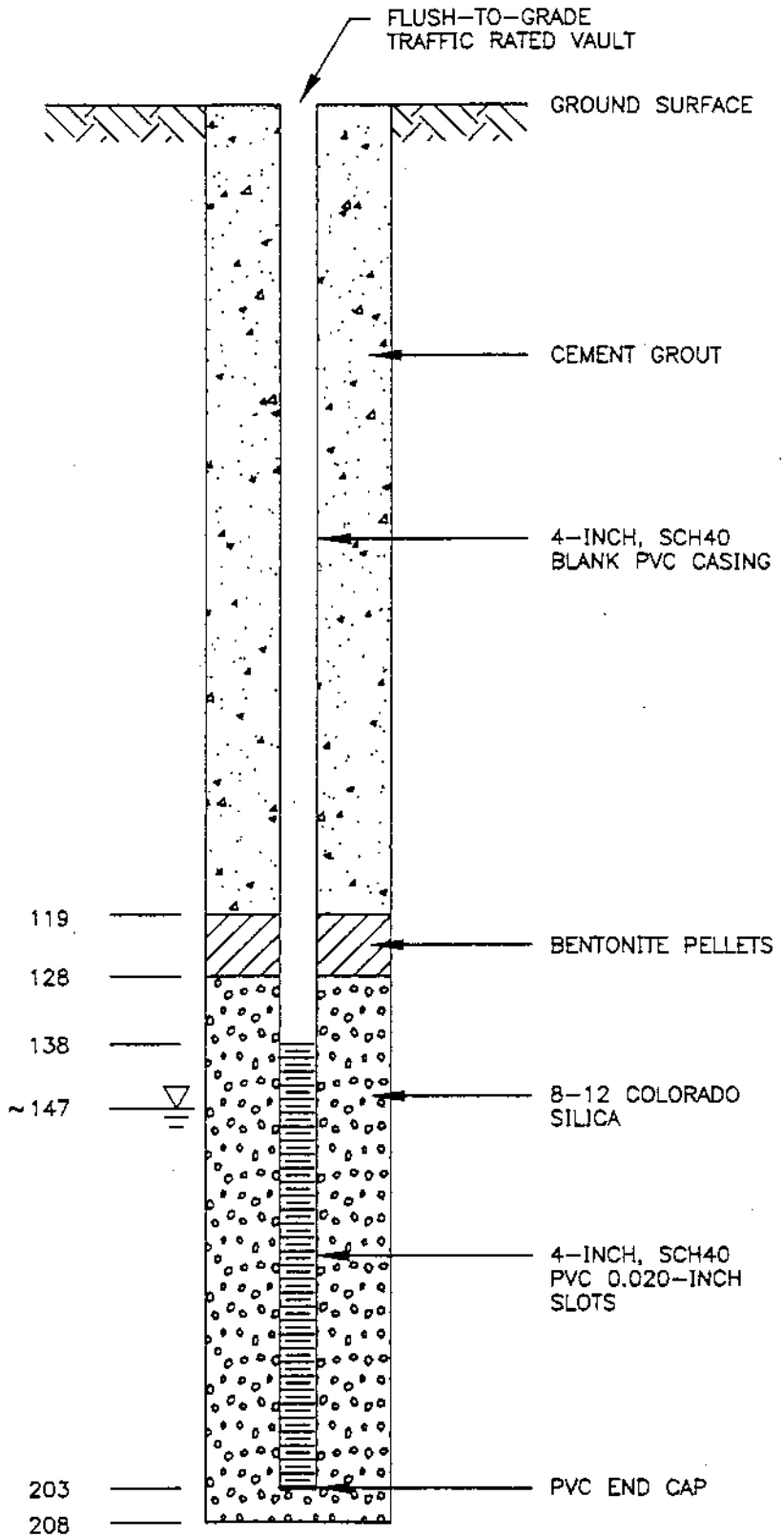
Well Construction



Project Name: ADEQ – MIRACLE MILE	Log of Well No: IR–6	Page 5 of 5
Well Location: R.E. DARLING	ADWR Registration No: 55–547953	

Logged/Checked by: CCR/BFJ	Depth of Wellbore Below LS: 208	Well Casing: 4–INCH, SCH40
Date Started: 03/20/95	WL Datum: GROUND SURFACE	Well Screen: 4–INCH, SCH40, 0.020" SLOT
Date Completed: 03/23/95	Datum Elev: UKNOWN	Filter Pack: 8–12 COLORADO SILICA
Contractor: LAYNE ENVIRONMENTAL	WL Below Datum	Well Seal: BENTONITE
Drilling Equipment:	ATD/Time: –	Cond Casing: N/A
AP1000 PERCUSSION HAMMER	Static/Date: 147.21'B.T.O.C.–3/28/95	Well Cover: FLUSH – TRAFFIC VAULT

Depth (Ft)	Geologic Log	Material Description	PID	Sample Interval	Sample Number	Well Construction
		Wet, dark reddish–gray (5YR 4/2) sandy CLAY/clayey Sand, some Gravel				4–inch SCH40 PVC 0.020–inch slots; PVC end cap; 8–12 Colorado Silica
205						
		Bottom of wellbore IR6 at 208 feet				
210						
215						
220						
225						
230						
325						
240						
245						
250						



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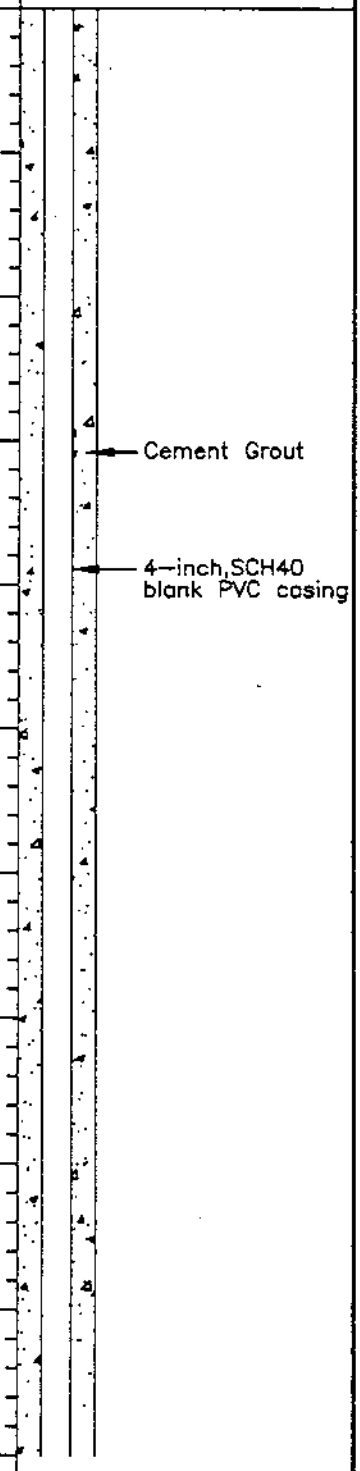
SCS ENGINEERS

IR-6 AS-BUILT

Project Name: ADEQ – MIRACLE MILE	Log of Well No: IR–7	Page 1 of 5
Well Location: DESERT AUTOMOTIVE	ADWR Registration No: 55–547954	
Logged/Checked by: CCR/BFJ	Depth of Wellbore Below LS: 206	Well Casing: 4–INCH, SCH40
Date Started: 03/22/95	WL Datum: GROUND SURFACE	Well Screen: 4–INCH, SCH40, 0.020" SLOT
Date Completed: 03/24/95	Datum Elev: UNKNOWN	Filter Pack: 8–12 COLORADO SILICA
Contractor: LAYNE ENVIRONMENTAL	WL Below Datum	Well Seal: BENTONITE
Drilling Equipment:	ATD/Time: –	Cond Casing: N/A
AP1000 PERCUSSION HAMMER	Static/Date: 145.93'B.T.O.C.–3/28/95	Well Cover: FLUSH – TRAFFIC VAULT

Depth (Ft)	Geologic Log	Material Description	PID	Sample Interval	Sample Number	Well Construction
		Dry, brown (7.5YR 4/3) poorly graded fine SAND				
		Becomes moist				
5			0			
		Moist, brown (7.5YR 5/2) SILT with fine Sand				
10			0			
15		Moist, light reddish brown (5YR 6/4) poorly graded medium SAND, some Gravel				Cement Grout
			0			
20						4–inch, SCH40 blank PVC casing
25		Moist, light reddish brown (5YR 6/4) well graded SAND, little Fines	0			
30						
35		Moist light reddish brown (5YR 6/4) well graded SAND, some Gravel, little Fines	0			
40						
45		Moist, reddish–brown (5YR 5/3) well graded SAND with Gravel, some Cobbles	0			
50						

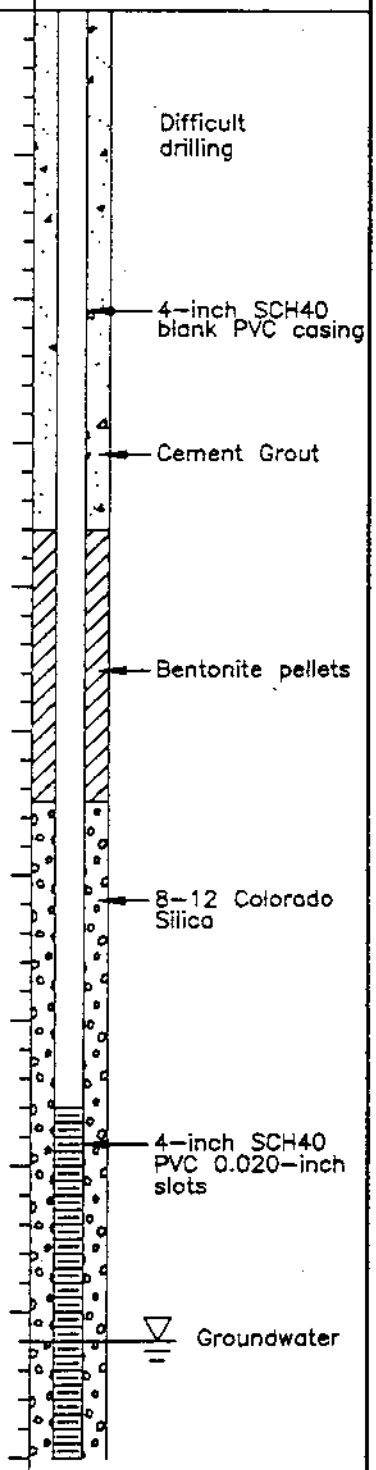


Project Name: ADEQ – MIRACLE MILE	Log of Well No: IR–7	Page 2 of 5
Well Location: DESERT AUTOMOTIVE	ADWR Registration No: 55–547954	
Logged/Checked by: CCR/BFJ	Depth of Wellbore Below LS: 206	Well Casing: 4–INCH, SCH40
Date Started: 03/22/95	WL Datum: GROUND SURFACE	Well Screen: 4–INCH, SCH40, 0.020" SLOT
Date Completed: 03/24/95	Datum Elev: UNKNOWN	Filter Pack: 8–12 COLORADO SILICA
Contractor: LAYNE ENVIRONMENTAL	WL Below Datum	Well Seal: BENTONITE
Drilling Equipment:	ATD/Time: –	Cond Casing: N/A
AP1000 PERCUSSION HAMMER	Static/Date: 145.93'B.T.O.C.–3/28/95	Well Cover: FLUSH – TRAFFIC VAULT

Depth (Ft)	Geologic Log	Material Description	PID	Sample Interval	Sample Number	Well Construction
		Moist, reddish–brown (5YR 5/4) SAND with Clay				
55			0			
60		Moist, reddish–brown (5YR 5/4) SAND with Clay and Gravel, some Cobbles				
65			0			Cement Grout
		Moist, light reddish–brown (5YR 6/4) poorly graded medium SAND				Perched water
70		Wet, reddish–brown (2.5YR 5/4) CLAY				4–inch, SCH40 blank PVC casing
			0			
75		Moist, light reddish–brown (5YR 6/4) Clayey SAND	0			
80		Moist, light reddish–brown (5YR 6/4) Clayey SAND with gravel, some Cobbles	0			
85						
90						
		Moist, reddish–brown (5yr 4/3) well graded SAND with Clay and Gravel				
95			0			
100						

Project Name: ADEQ – MIRACLE MILE	Log of Well No: IR–7	Page 3 of 5
Well Location: DESERT AUTOMOTIVE	ADWR Registration No: 55–547954	
Logged/Checked by: CCR/BFJ	Depth of Wellbore Below LS: 206	Well Casing: 4–INCH, SCH40
Date Started: 03/22/95	WL Datum: GROUND SURFACE	Well Screen: 4–INCH, SCH40, 0.020" SLOT
Date Completed: 03/24/95	Datum Elev: UNKNOWN	Filter Pack: 8–12 COLORADO SILICA
Contractor: LAYNE ENVIRONMENTAL	WL Below Datum	Well Seal: BENTONITE
Drilling Equipment: AP1000 PERCUSSION HAMMER	ATD/Time: –	Cond Casing: N/A
	Static/Date: 145.93'B.T.O.C.–3/28/95	Well Cover: FLUSH – TRAFFIC VAULT

Depth (Ft)	Geologic Log	Material Description	PID	Sample Interval	Sample Number
105		Moist, reddish–brown (5YR 5/3) well graded SAND with Clay and Gravel, some Cobbles	0		
110					
115		Moist, reddish–brown (5YR 5/3) Gravelly SAND with Clay, some Cobbles			
120					
125					
130		Moist, reddish–brown (5YR 5/3) well graded SAND with Clay, some Gravel	0		
135		Moist, reddish–brown (5YR 5/3) well graded SAND with Clay, some Gravel	0		
140					
145		Moist, reddish–brown (5YR 5/3) well graded SAND with Clay, some Gravel	0		
150					

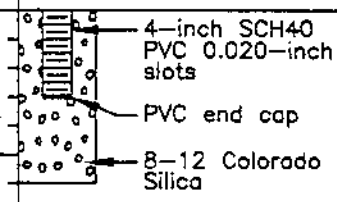


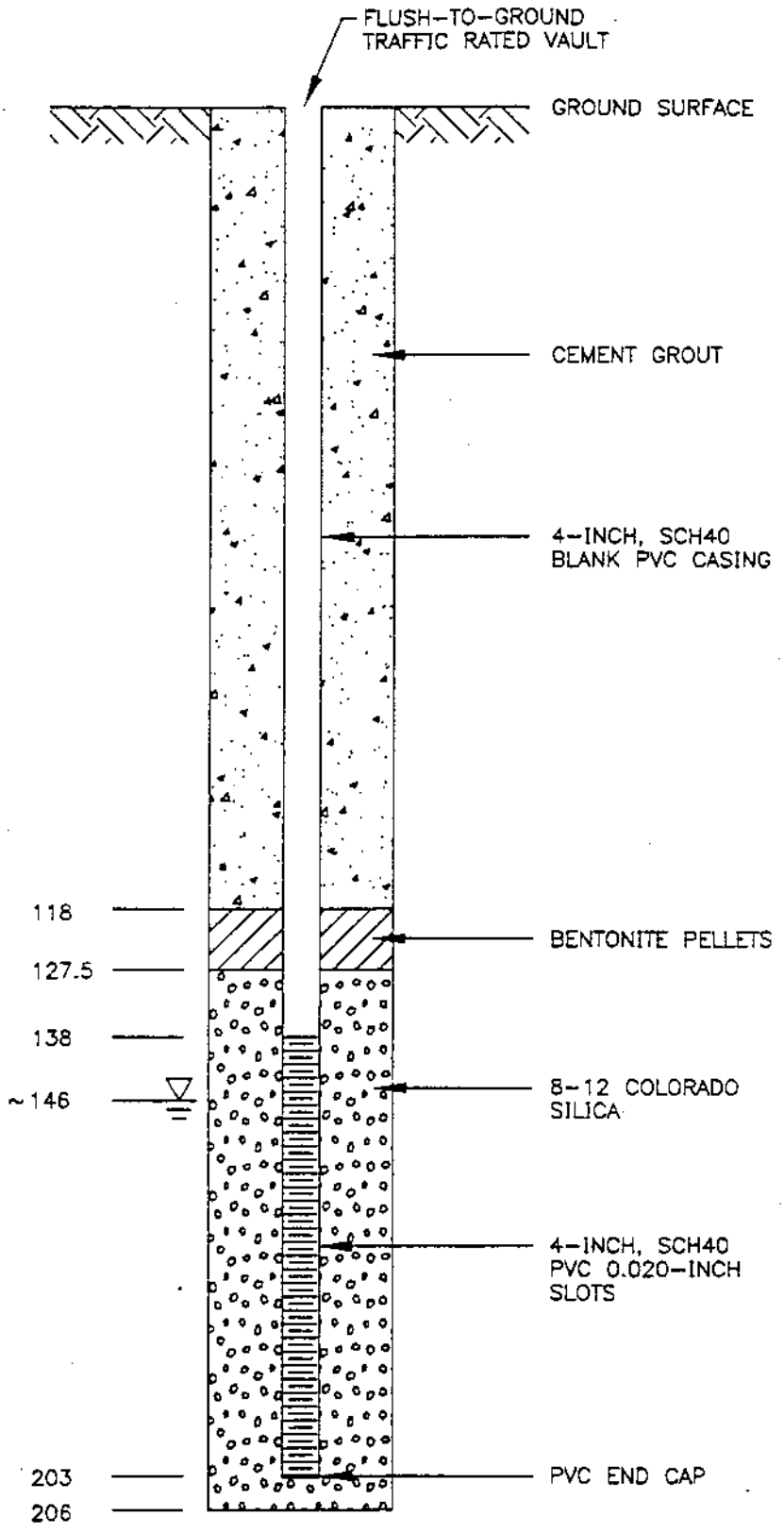
Project Name: ADEQ – MIRACLE MILE	Log of Well No: IR–7	Page 4 of 5
Well Location: DESERT AUTOMOTIVE	ADWR Registration No: 55–547954	
Logged/Checked by: CCR/BFJ	Depth of Wellbore Below LS: 206	Well Casing: 4–INCH, SCH40
Date Started: 03/22/95	WL Datum: GROUND SURFACE	Well Screen: 4–INCH, SCH40, 0.020" SLOT
Date Completed: 03/24/95	Datum Elev: UNKNOWN	Filter Pack: 8–12 COLORADO SILICA
Contractor: LAYNE ENVIRONMENTAL	WL Below Datum	Well Seal: BENTONITE
Drilling Equipment:	ATD/Time: –	Cond Casing: N/A
AP1000 PERCUSSION HAMMER	Static/Date: 145.93'B.T.O.C.–3/28/95	Well Cover: FLUSH – TRAFFIC VAULT

Depth (Ft)	Geologic Log	Material Description	PID	Sample Interval	Sample Number	Well Construction
		Moist, dark reddish gray (5YR 4/2) well graded SAND with Clay				
155						
			0			
160		Moist, dark reddish gray (5YR 4/2) well graded SAND with Clay				
165						
170		Moist, dark reddish gray (5YR 4/2) well graded SAND with Clay				
175						
			0			
180		Wet, dark reddish–gray (5YR 4/2) Sandy CLAY/Clayey Sand, some Gravel				8–12 Colorado Silica
185						
190						4–inch SCH40 PVC 0.020–inch slots
		Wet, dark reddish–gray (5YR 4/2) Sandy CLAY/Clayey Sand, with Gravel	0			
195						
200						

Project Name: ADEQ – MIRACLE MILE	Log of Well No: IR–7	Page 5 of 5
Well Location: DESERT AUTOMOTIVE	ADWR Registration No: 55–547954	
Logged/Checked by: CCR/BFJ	Depth of Wellbore Below LS: 206	Well Casing: 4–INCH, SCH40
Date Started: 03/22/95	WL Datum: GROUND SURFACE	Well Screen: 4–INCH, SCH40, 0.020" SLOT
Date Completed: 03/24/95	Datum Elev: UNKNOWN	Filter Pack: 8–12 COLORADO SILICA
Contractor: LAYNE ENVIRONMENTAL	WL Below Datum	Well Seal: BENTONITE
Drilling Equipment:	ATD/Time: –	Cond Casing: N/A
AP1000 PERCUSSION HAMMER	Static/Date: 145.93' B.T.O.C.–3/28/95	Well Cover: FLUSH – TRAFFIC VAULT

Depth (Ft)	Geologic Log	Material Description	PID	Sample Interval	Sample Number	Well Construction
		Wet, dark reddish–gray (5YR 4/2) Clayey SAND/Sandy Clay with Gravel				4–inch SCH40 PVC 0.020–inch slots; PVC end cap; 8–12 Colorado Silica
205		Bottom of wellbore IR–7 at 206 feet				
210						
215						
220						
225						
230						
325						
240						
245						
250						





94042L

SCS ENGINEERS

IR-7 AS-BUILT

GROWTH
Growth Resources, Inc.

BORING NUMBER IRA-8

CLIENT/SITE: ADEQ/R. E. Darling Industries
LOCATION: 3749 North Romero Road, Tucson, Arizona
FIELD GEOLOGIST: JRB
DRILLING COMPANY: Southwest Environmental
TOTAL DEPTH: 210 FEET
SURFACE ELEVATION: Unknown FEET AMSL

PROJECT NUMBER: ADEQ6001
DATE STARTED: 5-13-96
DATE COMPLETED: 5-15-96
DRILLING EQUIP.: Failing F-8, Air-Rotary
ANGLE FROM VERTICAL: 0
WATER TABLE: 151.81 FEET

DEPTH (feet)	SAMPLE	SAMPLE NO.	TIME COLLECTED	BLOWS/6 in.	PID (PID Units)	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS
5		NA	12:58	NA	0.00		GM	Silty-Gravel with minor sands. Fine to coarse-grained and pea gravels. Brown, low plasticity, no odor.
10		NA	13:00	NA	0.00			
15		NA	13:15	NA	0.00		ML	Clayey-silt with minor pea gravel. Light brown, low plasticity, no odor.
20		NA	15:51	NA	0.00			
25		NA	16:04	NA	0.00		SM	Silty-sand. Light brown, low silts, no plasticity, no odor
30		NA	07:32	NA	0.00			
35		NA	08:00	NA	0.00		GP	Sandy-gravel. Very coarse sand with pea gravel. No plasticity, no odor.
40		NA	08:10	NA	0.00			
45		NA	08:25	NA	0.00			
50		NA	08:45	NA	0.00			

NOTES: NA = Not Applicable (Sampling not included in this scope-of-work)

GROWTH
Growth Resources, Inc.

BORING NUMBER IRA-8

CLIENT/SITE ADEQ/R. E. Darling Industries
LOCATION 3749 North Romero Road, Tucson, Arizona
FIELD GEOLOGIST JRB
DRILLING COMPANY Southwest Environmental
TOTAL DEPTH 210 FEET
SURFACE ELEVATION Unknown FEET AMSL

PROJECT NUMBER ADEQ6001
DATE STARTED 5-13-96
DATE COMPLETED 5-15-96
DRILLING EQUIP. Failing F-8, Air-Rotary
ANGLE FROM VERTICAL 0
WATER TABLE 151.81 FEET

DEPTH (feet)	SAMPLE	SAMPLE NO.	TIME COLLECTED	BLOWS/6 in.	PID (PID Units)	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS
							GP	
55		NA	10:40	NA	0.00			
60		NA	10:49	NA	0.00			
65		NA	11:06	NA	0.00			
							SC	Sandy-clay. Light brown, fine to coarse grained angular sands, moist, no odor.
70		NA	11:18	NA	0.00			
75		NA	11:30	NA	0.00			
80		NA	11:51	NA	0.00			
85		NA NA	13:10 13:11	NA NA	0.00 0.00		SW	Sand. Fine to medium-grained. Light brown, no plasticity, no odor.
90		NA	13:29	NA	0.00		SC	
95		NA	13:43	NA	0.00			Clayey-sand. Gray, medium plasticity, moist, no odor.
100		NA	13:56	NA	0.00			

NOTES: NA = Not Applicable (Sampling not included in this scope-of-work)

FILE NAME: ADEQ6001 / IRA-8

GROWTH
Growth Resources, Inc.

BORING NUMBER IRA-8

CLIENT/SITE ADEQ/R. E. Darling Industries
LOCATION 3749 North Romero Road, Tucson, Arizona
FIELD GEOLOGIST JRB
DRILLING COMPANY Southwest Environmental
TOTAL DEPTH 210 FEET
SURFACE ELEVATION Unknown FEET AMSL

PROJECT NUMBER ADEQ6001
DATE STARTED 5-13-96
DATE COMPLETED 5-15-96
DRILLING EQUIP. Failing F-8, Air-Rotary
ANGLE FROM VERTICAL 0
WATER TABLE 151.81 FEET

DEPTH (feet)	SAMPLE	SAMPLE NO.	TIME COLLECTED	BLOWS/6 in.	PID (PID Units)	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS
105		NA	14:09	NA	0.00			
110		NA	14:24	NA	0.00		SC	Clayey-sand. Gray, medium plasticity, moist, no odor.
115		NA	14:50	NA	0.00			
120		NA	15:20	NA	0.00			
125		NA	08:32	NA	0.00			
130		NA	08:47	NA	0.00			
135		NA	08:58	NA	0.00		GP	Gravely-sands. light brown, little fines, no plasticity, no odor.
140		NA	09:04	NA	0.00			
145		NA	09:13	NA	0.00			
150		NA	09:24	NA	0.00		UNK	

NOTES: NA = Not Applicable (Sampling not included in this scope-of-work)

GROWTH
Growth Resources, Inc.

BORING NUMBER IRA-8

CLIENT/SITE: ADEQ/R. E. Darling Industries
LOCATION: 3749 North Romero Road, Tucson, Arizona
FIELD GEOLOGIST: JRB
DRILLING COMPANY: Southwest Environmental
TOTAL DEPTH: 210 FEET
SURFACE ELEVATION: Unknown FEET AMSL

PROJECT NUMBER: ADEQ6001
DATE STARTED: 5-13-96
DATE COMPLETED: 5-15-96
DRILLING EQUIP.: Failing F-8, Air-Rotary
ANGLE FROM VERTICAL: 0
WATER TABLE: 151.81 FEET

DEPTH (feet)	SAMPLE	SAMPLE NO.	TIME COLLECTED	BLOWS/6 in.	PID (PID Units)	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS
								∇ Static Water Level
155		NA	09:31	NA	0.00			
160		NA	09:53	NA	0.00		UNK	No retrieval of cuttings.
165		NA	09:59	NA	0.00			
170		NA	10:06	NA	0.00			
175		NA	10:17	NA	0.00			
180		NA	10:24	NA	0.00			
185		NA	10:35	NA	0.00		GP	Gravely-sands. Light brown, little fines, no plasticity, no odor.
190		NA	10:46	NA	0.00			
195		NA	10:57	NA	0.00			
200		NA	11:09	NA	0.00			

NOTES: NA = Not Applicable (Sampling not included in this scope-of-work)

FILE NAME: ADEQ6001 / IRA-8

GROWTH
Growth Resources, Inc.

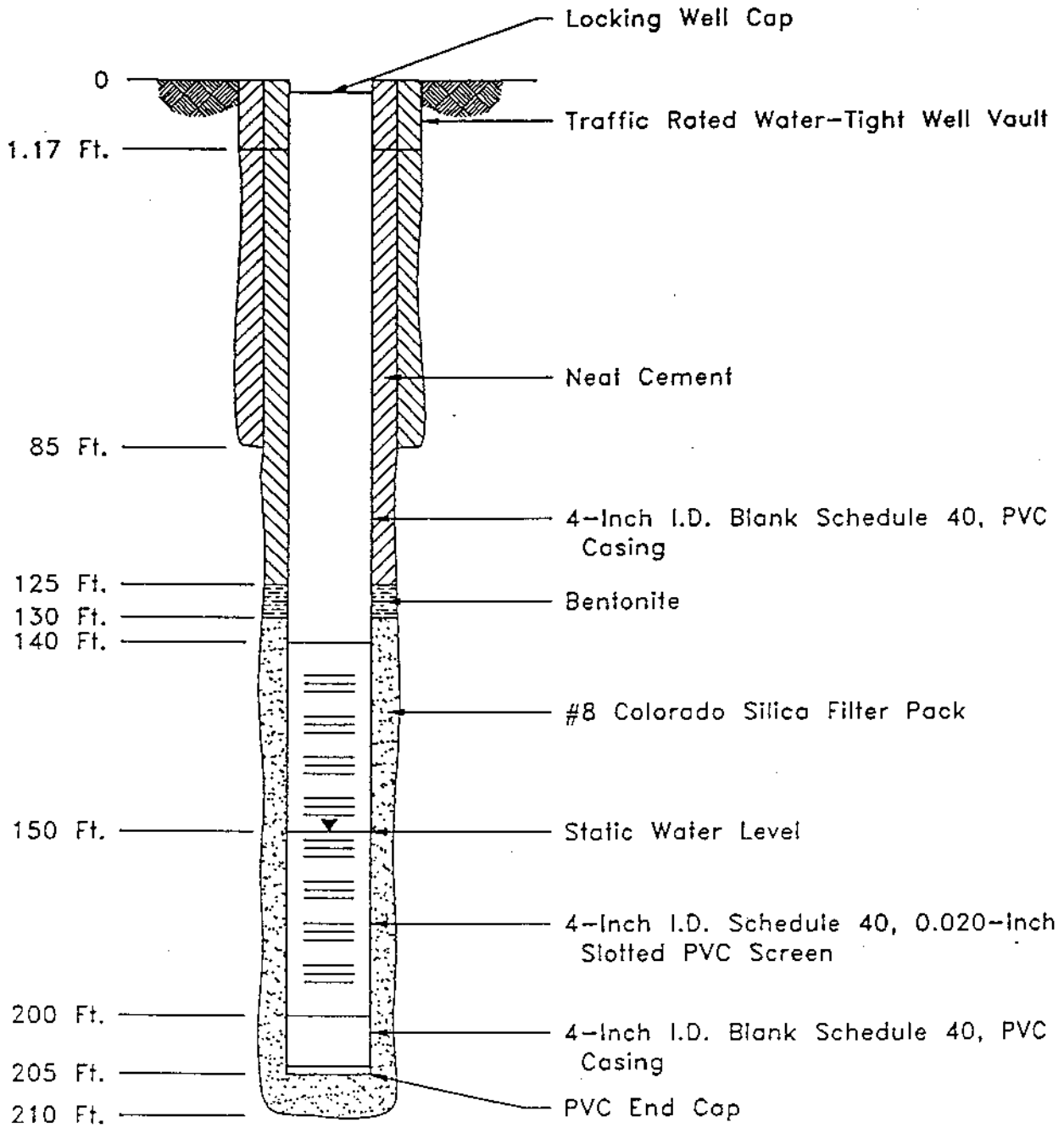
BORING NUMBER IRA-8

CLIENT/SITE: ADEQ/R. E. Darling Industries
LOCATION: 3749 North Romero Road, Tucson, Arizona
FIELD GEOLOGIST: JRB
DRILLING COMPANY: Southwest Environmental
TOTAL DEPTH: 210 FEET
SURFACE ELEVATION: Unknown FEET AMSL

PROJECT NUMBER: ADEQ6001
DATE STARTED: 5-13-96
DATE COMPLETED: 5-15-96
DRILLING EQUIP.: Failing F-8, Air-Rotary
ANGLE FROM VERTICAL: 0
WATER TABLE: 151.81 FEET

DEPTH (feet)	SAMPLE	SAMPLE NO.	TIME COLLECTED	BLOWS/6 in.	PID (PID Units)	GRAPHIC LOG	SOIL CLASS	DESCRIPTION AND REMARKS
205		NA	11:31	NA	0.00		GP	Gravely-sands. Light brown, little fines, no plasticity, no odor.
210		NA	11:49	NA	0.00			
215								
220								
225								
230								
235								
240								
245								
250								

NOTES: NA = Not Applicable (Sampling not included in this scope-of-work)



NOT TO SCALE

IRA - 8

Growth Growth Environmental Services, Inc.	DESCRIPTION AS-BUILT WELL DIAGRAM R.E. DARLING INDUSTRIES	FIGURE FIGURE 3	PROJECT NUMBER ADEQ6001
	PROJECT\LOCATION WQARF MIRACLE MILE INTERCHANGE AREA TUCSON, ARIZONA	PROJECT MANAGER J. BISHOP	DRAWING DATE MAY 28, 1996
		FILE NAME ACAD\ADEQ\6001-03.DWG	

DATE DRILLED: 03-27-1997

DRILL RIG TYPE: IR-TH-60

BORING TYPE/SIZE: Air Rotory-Direct Circ.

BORING NO. IRA-9

LOCATION: Tucson, Arizona

ELEVATION: Not Determined

FIELD GEOLOGIST: C. Moody

SAMPLE: OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
						ML		CLAYEY SILT; trace sand, tan, firm, damp, some cementation
					5			
					10	SM		SAND; trace silt, tan, damp, well sorted, fine, sub-angular to sub-rounded
					15			
					20	SW		GRAVELLY SAND; tan, dry to damp, hard angular grains, well graded, max size 1 inch
					25			
					30			
					35	ML		SILT; some sand and gravel, tan, well sorted, dry to damp
					40			

(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 192' DATE: 03-28-1997

NOTES Mill tooth, tri-cone, rotor bit

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

Job No.: 2187JF016 Plate: A4

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATE DRILLED: 03-27-1997

DRILL RIG TYPE: IR-TH-60

BORING TYPE/SIZE: Air Rotory-Direct Circ.

BORING NO. IRA-9

LOCATION: Tucson, Arizona

ELEVATION: Not Determined

FIELD GEOLOGIST: C. Moody

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						ML		SILT; some sand and gravel, tan, well sorted, dry to damp
					45			clay balls in cyclone cuttings, damp
					50	SW		SAND; some gravel, tan, dry to damp, well graded
					55			
					60			more gravel, max. size 1/2 inch
95	N		IRA-9-65		65	SC		SILTY SAND, TRACE CLAY; reddish-tan, moist, angular sands, well graded
					70			
					75	CH		CLAY; some gravel, brown, wet, plastic
					80			(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 192' DATE: 03-28-1997

NOTES Mill tooth, tri-cone, rotor bit

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

Job No.: 2187JF016 Plate: A4

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATE DRILLED: 03-27-1997

DRILL RIG TYPE: IR-TH-60

BORING TYPE/SIZE: Air Rotory-Direct Circ.

BORING NO. IRA-9

LOCATION: Tucson, Arizona

ELEVATION: Not Determined

FIELD GEOLOGIST: C. Moody

SAMPLE: OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
						CH		CLAY; some gravel, brown, wet, plastic sand present in clay
					85	CL		SANDY CLAY; brown, damp to moist, angular sand
					90			
					95	SM		SILTY SAND, TRACE CLAY; tan, damp, angular to sub angular sands, fines plastic.
					100			
					105			dry to damp
					110			
					115	SC		SANDY CLAY; some silt, reddish-brown, moist
					120			**(this soil will be continued on the next page)**

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 192' DATE: 03-28-1997

NOTES **Mill tooth, tri-cone, rotor bit**

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

Job No.: 2187JF016 | Plate: A4

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATE DRILLED: 03-27-1997

DRILL RIG TYPE: IR-TH-60

BORING TYPE/SIZE: Air Rotory-Direct Circ.

BORING NO. IRA-9

LOCATION: Tucson, Arizona

ELEVATION: Not Determined

FIELD GEOLOGIST: C. Moody

SAMPLE								SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT	DEPTH (FT.)	USCS	GRAPHIC	
						GC		CLAYEY GRAVEL, SOME SAND; brown, moist
					125			
					130	CL		SANDY CLAY, TRACE GRAVEL; brown, moist, sand and gravel angular, fines plastic
					135			
					140			moist
					145			
					150			
					155			
					160			(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 192' DATE: 03-28-1997

NOTES Mill tooth, tri-cone, rotor bit

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

Job No.: 2187JF016 | Plate: A4

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATE DRILLED: 03-27-1997

DRILL RIG TYPE: IR-TH-60

BORING TYPE/SIZE: Air Rotory-Direct Circ.

BORING NO. IRA-9

LOCATION: Tucson, Arizona

ELEVATION: Not Determined

FIELD GEOLOGIST: C. Moody

SAMPLE								SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT	DEPTH (FT.)	USCS	GRAPHIC	
						CL		SANDY CLAY, TRACE GRAVEL; brown, moist, sand and gravel angular, fines plastic
					165			
					170			more sand, less clay
					175			
					180			(driller notes hard drilling)
					185			
					190			
					195	GP		GRAVELY SAND; tan, saturated, well sorted
					200			(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 192' DATE: 03-28-1997

NOTES Mill tooth, tri-cone, rotor bit

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

Job No.: 2187JF016 | Plate: A4

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATE DRILLED: 03-27-1997

DRILL RIG TYPE: IR-TH-60

BORING TYPE/SIZE: Air Rotory-Direct Circ.

BORING NO. IRA-9

LOCATION: Tucson, Arizona

ELEVATION: Not Determined

FIELD GEOLOGIST: C. Moody

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						GP		GRAVELLY SAND; tan, saturated, well sorted
					205			
					210	GM		SILTY GRAVEL, TRACE SAND; tan, saturated
					215			
					220			
					225	SM		SILTY SAND AND GRAVEL; tan, saturated, sub-angular grains
					230			
					235			
								236
					240			

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 192' DATE: 03-28-1997

NOTES Mill tooth, tri-cone, rotor bit

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

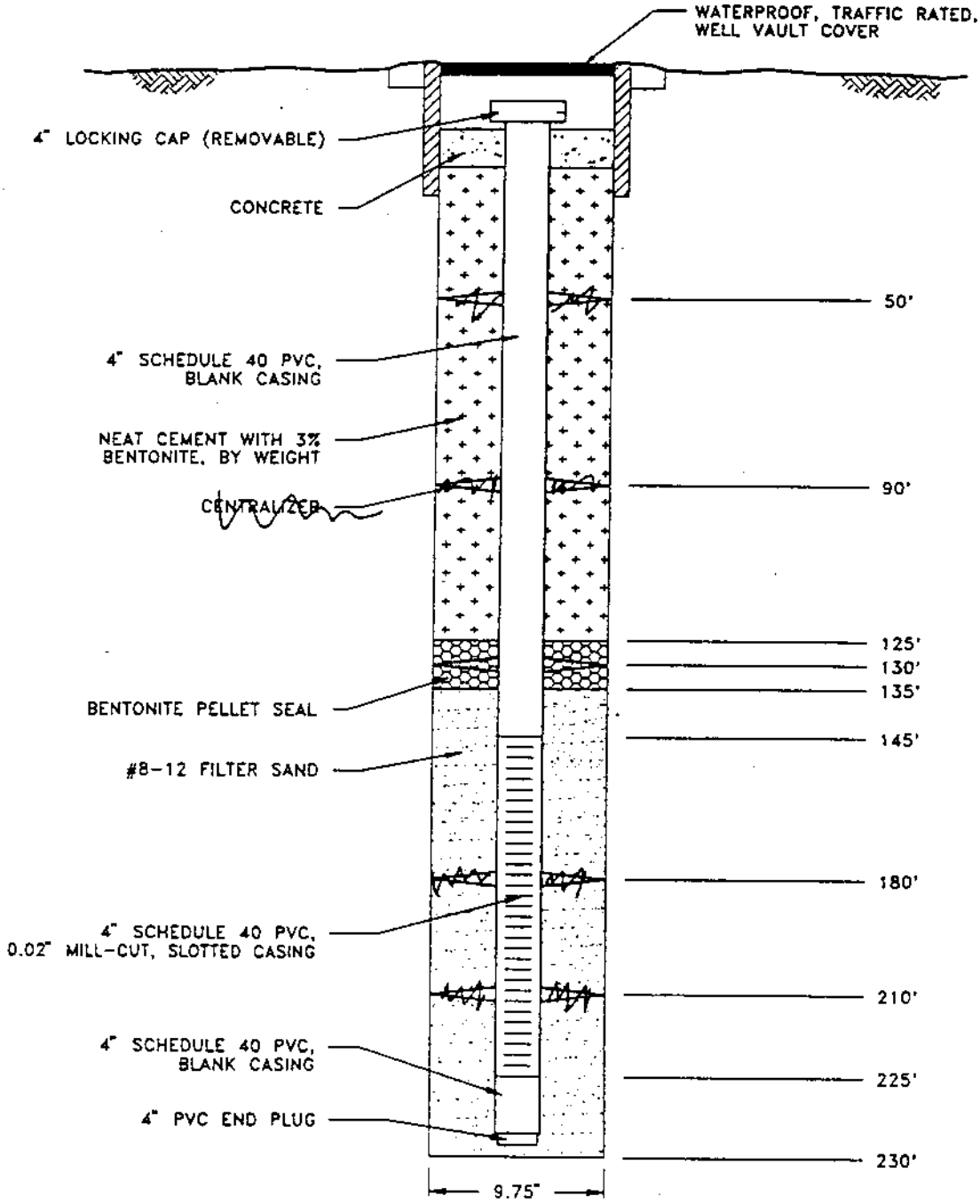
Job No.: 2187JF016 Plate: A4

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

IRA-9 – Asbuilt Well Diagram

ADEQ – Tucson Miracle Mile

Monitoring Well Installation



NOT TO SCALE

Reviewed: L. Gardiner	Review Date: 02/21/97
Client: ADEQ	Prepared: K. Fewell
Western Technologies Inc.	
Job No. 2187JF016	Figure: 2

DATE DRILLED: 04-01-1997

LOCATION: Tucson, Arizona

DRILL RIG TYPE: IR-TH-60

BORING NO. IRA10-100

ELEVATION: Not Determined

BORING TYPE/SIZE: Air Rotory-Direct Circ.

FIELD GEOLOGIST: C. Moody

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						SM		SILTY SAND; with gravel, tan, damp to moist, well graded
					5			
					10	ML		SILT; with sand, trace clay, well sorted fine sand, slightly plastic fines
					15			
					20	SC		CLAYEY SAND; tan, damp, well sorted
					25			
					30			
					35	SM		SILTY SAND, WITH GRAVEL; tan, dry to moist, well graded, small percentage of clay
					40			

(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 95' DATE: 04-02-1997

NOTES Mill tooth, tri-cone, rotor bit

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

Job No.: 2187JF016 | Plate: A5

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATE DRILLED: **04-01-1997** LOCATION: **Tucson, Arizona**

DRILL RIG TYPE: **IR-TH-60** **BORING NO. IRA10-100** ELEVATION: **Not Determined**

BORING TYPE/SIZE: **Air Rotory-Direct Circ.** FIELD GEOLOGIST: **C. Moody**

SAMPLE: OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
						SM		(this soil has been continued from the previous page)
					45	GM		SANDY GRAVEL, TRACE SILT; tan, damp to moist, 1/2" max. size
					50	SM		SILTY SAND WITH CLAY; reddish brown, moist
					55	CH		CLAY, TRACE SAND; brown, moist, plastic, medium stiff
					60	SC		CLAYEY SAND, TRACE SILT; brown, moist, well graded, fines med. plastic
					65			
					70	SM		SILTY SAND WITH GRAVEL; brown, moist, well graded, 1/2"-3/4" max. size
					75			
					80			**(this soil will be continued on the next page)**

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 95' DATE: 04-02-1997

NOTES **Mill tooth, tri-cone, rotor bit**

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

Job No.: 2187JF016 Plate: A5

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATE DRILLED: 04-01-1997

LOCATION: Tucson, Arizona

DRILL RIG TYPE: IR-TH-60

BORING NO. IRA10-100

ELEVATION: Not Determined

BORING TYPE/SIZE: Air Rotory-Direct Circ.

FIELD GEOLOGIST: C. Moody

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						CH		clay, brown, moist,
					85	CL		SANDY CLAY; brown, moist, medium sand
					90	SC		CLAYEY SAND; brown, moist to wet, well graded sand
					95			wet
					100	CL		CLAY, WITH SILT; brown, moist to wet, medium plastic
					105			
								106.5
					110			
					115			
					120			

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 95' DATE: 04-02-1997

NOTES Mill tooth, tri-cone, rotor bit

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

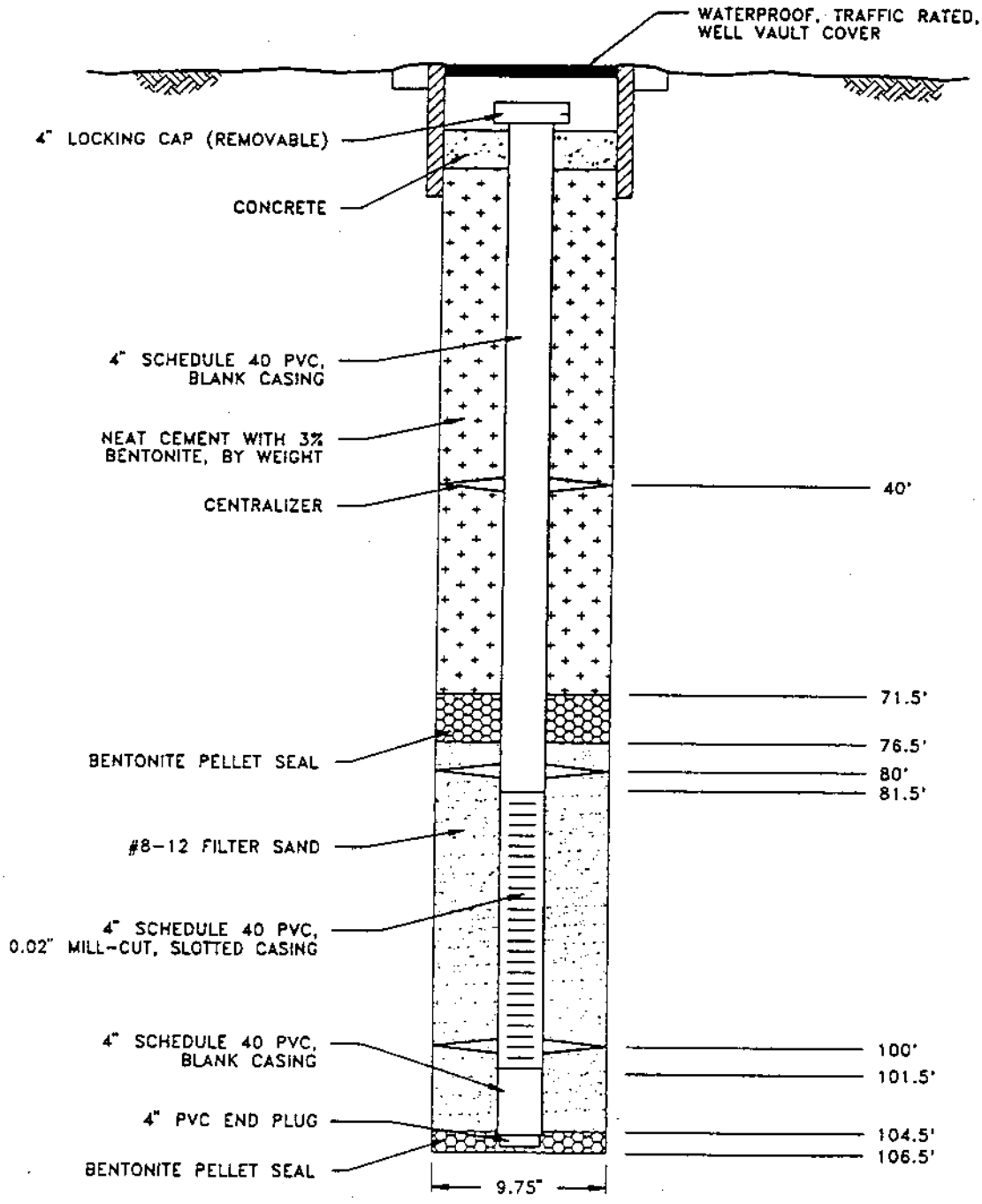
Job No.: 2187JF016 | Plate: A5

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

IRA-10(Shallow) – Asbuilt Well Diagram

ADEQ – Tucson Miracle Mile

Monitoring Well Installation



NOT TO SCALE

Reviewed: L. Gardiner	Review Date: 02/21/97
Client: ADEQ	Prepared: K. Fewell
Western Technologies Inc.	
Job No. 2187JF016	Figure: 2

DATE DRILLED: 04-04-1997

LOCATION: Tucson, Arizona

DRILL RIG TYPE: IR-TH-60

BORING NO. IRA10-230

ELEVATION: Not Determined

BORING TYPE/SIZE: Air Rotory-Direct Circ.

FIELD GEOLOGIST: C. Moody

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						SM		SILTY SAND; with gravel, tan, damp to moist, well graded, 1/2" max size
					5			
					10			
					15	ML		SILT; with sand, tan, damp, well sorted, v. fine sand
					20	SC		CLAYEY SAND; tan, damp, well sorted, v. fine sand, fines plastic
					25			
					30	CL		CLAY WITH SILT; tan, damp to moist, fines plastic, soft
					35			
					40			(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 187' DATE: 04-07-1997

NOTES Mill tooth, tri-cone, rotor bit

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

Job No.: 2187JF016 | Plate: A6

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATE DRILLED: 04-04-1997 LOCATION: Tucson, Arizona

DRILL RIG TYPE: IR-TH-60

BORING NO. IRA10-230

ELEVATION: Not Determined

BORING TYPE/SIZE: Air Rotory-Direct Circ. FIELD GEOLOGIST: C. Moody

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						SM		SILTY SAND, WITH GRAVEL; tan, damp, well graded, 1/4" max. size, angular
					45			
					50			some clay sizes present in cyclone
					55	CL		CLAY WITH SILT; brown, moist, soft
					60	SM		SILTY SAND WITH GRAVEL; tan, moist, 1/4" max size, hard angular to subangular gravel,
					65			
					70			
					75			
					80			(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 187' DATE: 04-07-1997

NOTES Mill tooth, tri-cone, rotor bit

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

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DATE DRILLED: 04-04-1997

LOCATION: Tucson, Arizona

DRILL RIG TYPE: IR-TH-60

BORING NO. IRA10-230

ELEVATION: Not Determined

BORING TYPE/SIZE: Air Rotory-Direct Circ.

FIELD GEOLOGIST: C. Moody

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						SM		(this soil has been continued from the previous page)
					85			
					90	CL		SANDY CLAY; brown, moist, soft to med. stiff
					95			
					100			
					105			
					110	CH		CLAY; brown, moist, soft
					115	SC		CLAYEY SAND; brown, damp to moist, well graded sands
					120			(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 187' DATE: 04-07-1997

NOTES Mill tooth, tri-cone, rotor bit

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATE DRILLED: 04-04-1997

LOCATION: Tucson, Arizona

DRILL RIG TYPE: IR-TH-60

BORING NO. IRA10-230

ELEVATION: Not Determined

BORING TYPE/SIZE: Air Rotory-Direct Circ.

FIELD GEOLOGIST: C. Moody

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						SC		(this soil has been continued from the previous page)
					125	SW		SAND WITH SILT AND GRAVEL; tan, damp to moist
					130	SM		SILTY SAND; tan, moist, small percentage of clay, well graded
					135			
					140	SC		CLAYEY SAND; tan, moist, small percentage of gravel
					145			
					150	CL		CLAY WITH SAND AND GRAVEL; brown, moist, med. plastic, max. size 1/4"
					155			
					160			(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 187' DATE: 04-07-1997

NOTES Mill tooth, tri-cone, rotor bit

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

Job No.: 2187JF016 | Plate: A6

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATE DRILLED: 04-04-1997 | LOCATION: Tucson, Arizona

DRILL RIG TYPE: IR-TH-60 | **BORING NO. IRA10-230** | ELEVATION: Not Determined

BORING TYPE/SIZE: Air Rotory-Direct Circ. | FIELD GEOLOGIST: C. Moody

SAMPLE: OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
						CL		(this soil has been continued from the previous page)
					165			
					170			
					175	GP		GRAVEL AND SAND; light and dark gravel, moist to wet, angular to subangular, 1/4" max. size, well sorted
					180	GC		GRAVEL WITH SAND; trace clay, tan, wet angular to subangular, 1/2" max. size
					185			
					190			wet to saturated
					195			
					200			(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 187' DATE: 04-07-1997

NOTES Mill tooth, tri-cone, rotor bit

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

Job No.: 2187JF016 | Plate: A6

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATE DRILLED: **04-04-1997** LOCATION: **Tucson, Arizona**

DRILL RIG TYPE: **IR-TH-60**

BORING NO. IRA10-230

ELEVATION: **Not Determined**

BORING TYPE/SIZE: **Air Rotory-Direct Circ.** FIELD GEOLOGIST: **C. Moody**

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						GC		(this soil has been continued from the previous page)
					205	SW		GRAVELY SAND, TRACE CLAY; tan, wet to saturated, well graded, med. sands to 1/2" max. size gravels
					210			
					215			
					220			
					225			
					230			
					235			
								238
					240			

GROUNDWATER ENCOUNTERED NO:____ YES: X DEPTH: 187' DATE: 04-07-1997

NOTES **Mill tooth, tri-cone, rotor bit**

ADEQ-MMIA WQARF STUDY AREA

Boring Log

Western Technologies Inc.

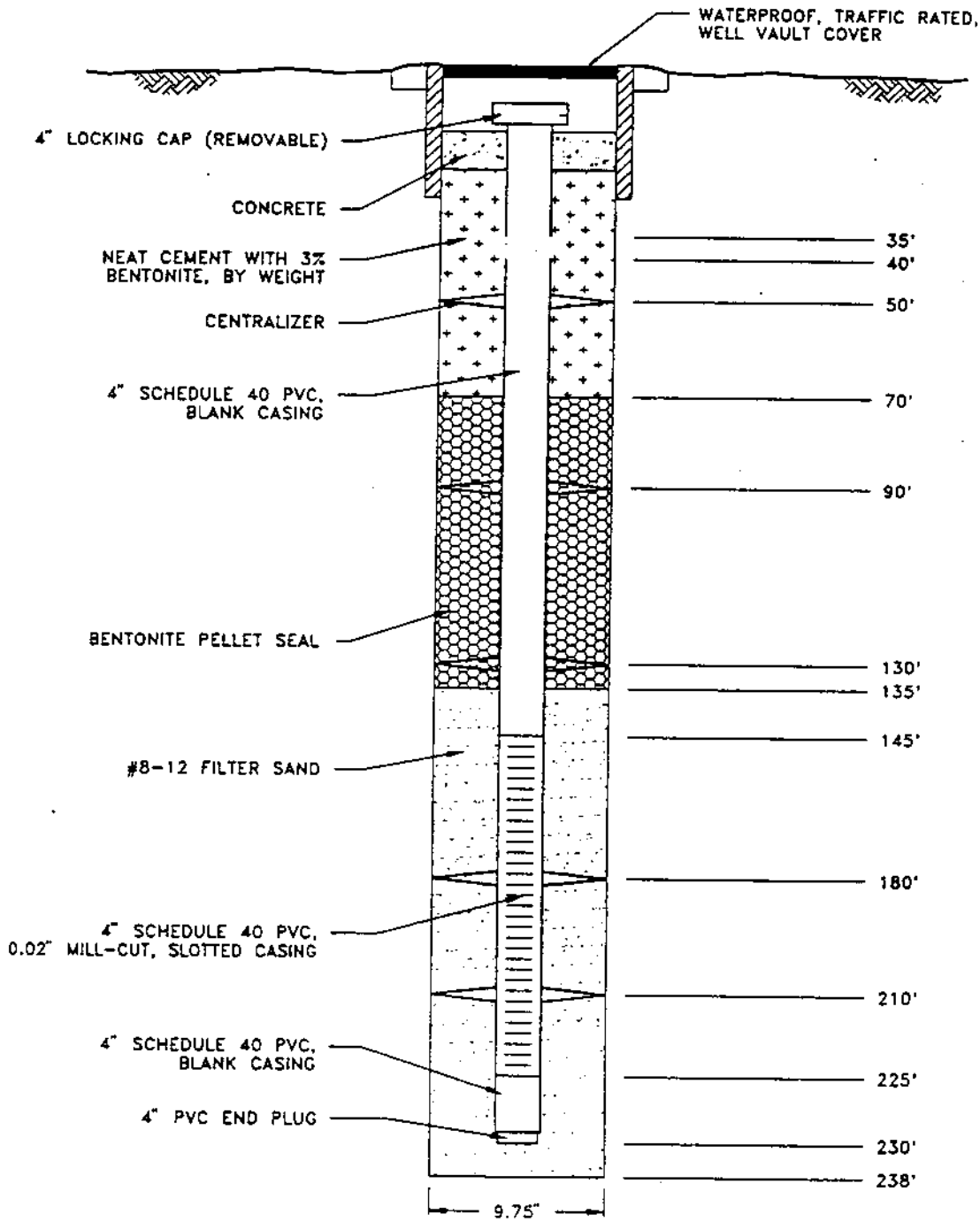
Job No.: 2187JF016 Plate: A6

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

IRA-10(230) – Asbuilt Well Diagram

ADEQ – Tucson Miracle Mile

Monitoring Well Installation



NOT TO SCALE

Reviewed: L. Gardiner	Review Date: 02/21/97
Client: ADEQ	Prepared: K. Fewell
Western Technologies Inc.	
Job No. 2187JF016	Figure: 2

DRILLING LOG FOR: IRA-11

ADWR No: 55-586372

Site Location: Friedman Recycling Co.

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 17 June 01

Date Hole Completed: 21 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 212

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
1	SC-CL		SANDY CLAY(fine-medium grain), brown, Weak HCl, Med PI, trace nodes of weak cementation, stiff, dry	0.7	
2				0.7	
3				0.5	
4				0.6	
5				1.1	
6				1.0	
7				0.4	
8				0.9	
9				0.8	
10				0.7	
11	SC		CLAYEY SAND with silt and trace gravel (angular), light brown, Weak HCl, Low PI, Med dense, dry	0.9	
12				1.4	
13				1.3	
14	SM		SILTY SAND (fine-medium grain), brown, Nil HCl, Nil PI, moist	1.2	
15	CL		CLAY with sand (fine-medium grain) and silt, yellowish red, Weak HCl, Med PI, firm, moist	1.0	
16				1.2	
17				1.3	
18	SM		SILTY SAND (fine grain) with clay, brown, Nil-Weak HCl, Low PI, moist	1.0	
19				1.3	
20	CL		CLAY with sand, brown, Weak HCl, Low PI, stiff, dry	1.8	
21				1.0	
22				1.0	
23				1.7	
24				0.4	
25				0.3	
26	SC		CLAYEY SAND with silt, brown, Weak HCl, Low PI, dense, moist	0.4	
27				1.0	
28				1.8	
29				0.6	
30				1.5	
31				1.0	
32				0.9	
33	SP		SAND, brown, Nil HCl, Nil PI, dry	2.5	
34	CL		CLAY, trace sand, yellowish red, Nil HCl, Med PI, firm, moist	0.9	
35				2.7	
36	SP		SAND, trace silt and gravel (rounded to angular), brown, Nil HCl, Nil PI, dense, moist	1.3	
37				1.9	
38				1.0	
39				0.9	
40				0.8	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-11

ADWR No: 55-586372

Site Location: Friedman Recycling Co.

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 17 June 01

Date Hole Completed: 21 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 212

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
41	SP		SAND, trace silt and gravel (rounded to angular), brown, Nil HCl, Nil PI, dense, moist	1.4	
42				2.9	
43				0.7	
44				0.5	
45				0.1	
46				23.7	
47				2.3	
48				0.9	
49				1.3	
50				2.1	
51				3.4	
52				5.4	
53	SM		SILTY SAND with gravel and trace cobbles, brown, Weak HCl, Low PI, dense, moist	4.8	
54				6.8	
55				0.4	
56				0.2	
57	GM		SILTY GRAVEL with cobbles and sand, Brown, Nil HCl, Nil PI, dense, moist	0.7	
58	SC			0.9	
59			CLAYEY SAND (medium-coarse grain), trace gravel, brown, Nil HCl, Med PI, dense, wet	1.9	
60				0.1	
61				0.8	
62				0.6	
63				2.5	
64				1.5	
65				8.7	
66				3.5	
67	CL		SANDY CLAY (fine-medium grain) brown, Nil HCl, Low-Med PI, firm-stiff, moist	4.5	
68				1.6	
69				0.7	
70				2.1	
71				0.4	
72	SC		CLAYEY SAND (medium-coarse grain) with gravel (sub-angular to sub-rounded) and trace cobbles, light brown, Nil HCl, Low PI, moist	2.2	
73				1.6	
74				1.6	
75				2.8	
76				0.8	
77				0.8	
78				2.2	
79				2.1	
80				2.8	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-11

ADWR No: 55-586372

Site Location: Friedman Recycling Co.

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 17 June 01

Date Hole Completed: 21 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 212

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
81	SC		CLAYEY SAND (medium-coarse grain) with gravel (sub-angular to sub-rounded) and trace cobbles, light brown, Nil HCl, Low PI, moist	0.1	
82				1.1	
83				0.3	
84				1.0	
85				1.5	
86				1.6	
87				1.4	
88	GC		CLAYEY GRAVEL (rounded) with sand (angular), brown, Nil HCl, Med PI, very stiff, moist	0.9	
89	SC			0.8	
90			CLAYEY SAND with gravel (angular to rounded) and cobbles, brown, Nil HCl, Low PI, moist	1.0	
91				1.4	
92				1.9	
93				0.3	
94				0.7	
95				0.5	
96				1.2	
97				0.4	
98				1.7	
99				2.0	
100				0.1	
101				2.3	
102				0.6	
103				0.6	
104				0.1	
105	GC		CLAYEY GRAVEL (sub-rounded) with sand (coarse grain), mottled (light brown-brownish yellow-yellowish red), Nil HCl, Med PI, very dense, moist	0.9	
106				0.5	
107				1.8	
108				3.8	
109				0.5	
110				2.7	
111				0.6	
112				0.3	
113				0.1	
114				0.3	
115				0.4	
116				0.3	
117	SC		CLAYEY SAND (medium-coarse grain), trace gravel (sub-angular to rounded), brown, Nil HCl, Low PI, dense, moist	0.5	
118				2.5	
119				0.3	
120	GC		CLAYEY GRAVEL, with sand, brown, Nil HCl, Med PI, moist	0.1	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-11

ADWR No: 55-586372

Site Location: Friedman Recycling Co.

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 17 June 01

Date Hole Completed: 21 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 212

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
121	GC		CLAYEY GRAVEL with sand, brown, Nil HCl, Med PI, moist	0.1	
122	SC		CLAYEY SAND, trace gravel, brown, Nil HCl, Low PI, dense, moist	1.0	
123				0.1	
124	GC		CLAYEY GRAVEL wtih sand, brown, Nil HCl, Med PI, moist	0.1	
125				0.8	
126				0.1	
127	SC		CLAYEY SAND, brown, Nil HCl, Med PI, very dense, moist	10.5	
128				4.5	
129				2.9	
130				2.7	
131				1.2	
132				0.8	
133				2.1	
134				1.5	
135				7.1	
136				3.8	
137				11.1	
138				3.0	
139				4.9	
140				12.7	
141				19.8	
142				3.2	
143				2.2	
144				1.8	
145				2.8	
146				1.5	
147	GC		CLAYEY GRAVEL (angular to sub-angular) with sand, brown, Nil HCl, Low-Med PI, dense, moist	3.1	
148				1.1	
149				0.4	
150				0.2	
151	SC		CLAYEY SAND with silt and few gravel (angular to sub-rounded), brown, Nil HCl, Low-Med PI, dense, moist	0.5	
152				2.0	
153				1.9	
154				0.1	
155				0.1	
156				1.1	
157				2.0	
158				4.8	
159				1.0	
160				0.4	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-11

ADWR No: 55-586372

Site Location: Friedman Recycling Co.

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 17 June 01

Date Hole Completed: 21 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 212

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
161	SC		CLAYEY SAND with silt and few gravel (angular to sub-rounded), brown, Nil HCl, Low-Med PI, dense, moist	0.1	
162				0.9	
163				0.1	
164				1.3	
165				0.1	
166				0.1	
167				0.6	
168				0.1	
169				0.1	
170				0.9	
171				0.6	
172				3.0	
173				0.2	
174				2.4	
175				1.7	
176				0.5	
177				0.8	
178				0.3	
179				0.4	
180				0.6	
181				2.9	
182				4.3	
183				0.1	
184				2.1	
185				1.5	
186				0.1	
187				0.1	
188				1.6	
189				9.9	
190				6.1	
191				4.3	
192				0.2	
193				1.9	
194				7.5	
195				1.7	
196				1.7	
197				1.3	
198				1.7	
199				0.8	
200				3.5	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-11

ADWR No: 55-586372

Site Location: Friedman Recycling Co.

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 17 June 01

Date Hole Completed: 21 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 212

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
201	SC		CLAYEY SAND with silt and few gravel (angular to sub-rounded), brown, Nil HCl, Low-Med PI, dense, moist	0.3	
202				0.8	
203				0.8	
204				4.9	
205				0.9	
206				1.6	
207				0.4	
208				2.0	
209				0.1	
210				0.3	
211				0.8	
212				4.2	
213			END OF BORING		
214					
215					
216					
217					
218					
219					
220					
221					
222					
223					
224					
225					
226					
227					
228					
229					
230					
231					
232					
233					
234					
235					
236					
237					
238					
239					
240					

Client: ADEQ

Project: Miracle Mile WQARF

URS

WELL BORING DETAILS:

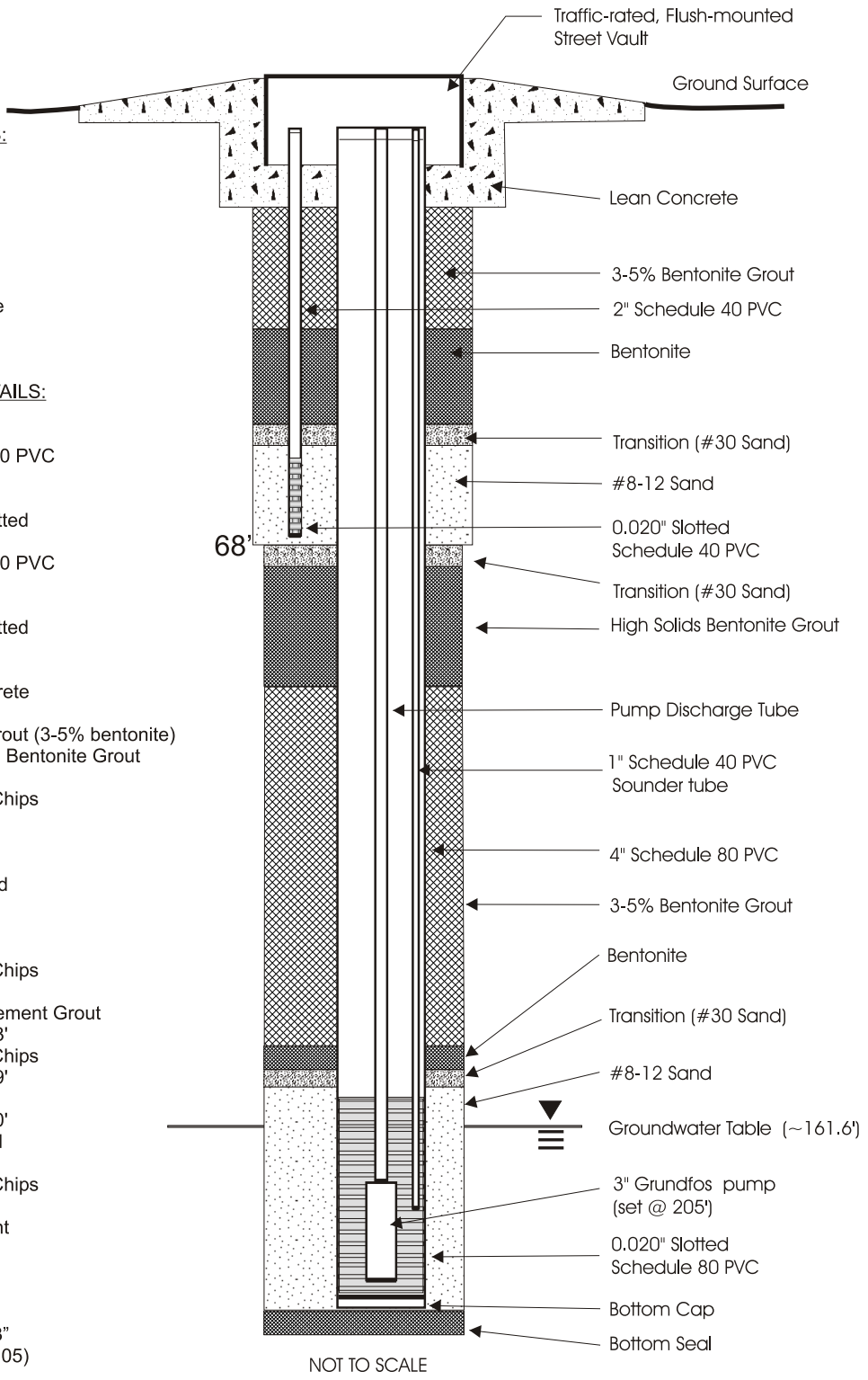
Total Depth	212'
Nominal Borehole Diameter	11"
Depth Interval	0' - 68'
Nominal Borehole Diameter	8"
Depth Interval	68' - 212'
Seal at Reduction	5' Bentonite
Drilling Method	Rotosonic

WELL CONSTRUCTION DETAILS:

Regional Well Casing Length	210'
Material	Schedule 80 PVC
Diameter	4"
Screened Interval	150'-210'
Perforations	0.020", Slotted
Companion Well Casing Length	68'
Material	Schedule 40 PVC
Diameter	2"
Screened Interval	58'-68'
Perforations	0.020", Slotted
Surface Seal	0 to 15'
Seal Material	Lean Concrete
Upper Backfill	15' to 38'
Backfill Material (15' - 22')	Portland Grout (3-5% bentonite)
Backfill Material (22' - 38')	High Solids Bentonite Grout
Upper Seal Interval	38' - 41'
Seal Material	Bentonite Chips
Upper Transition Interval	41' - 43'
Transition Material	#30 Sand
Upper Gravel Pack Interval	43' - 68'
Gravel Pack Material	#8-12 Sand
Middle Transition Interval	68' - 70'
Transition Material	#30 Sand
Middle Seal Interval	70' - 84'
Seal Material	Bentonite Chips
Lower Backfill	84' - 138.7'
Backfill Material	Portland Cement Grout
Lower Seal Interval	138.7' - 143'
Seal Material	Bentonite Chips
Lower Transition Interval	143' - 144.9'
Transition Material	#30 Sand
Lower Gravel Pack Interval	144.9' - 210'
Gravel Pack Material	#8-12 Sand
Bottom Seal Interval	210' - 212'
Seal Material	Bentonite Chips
Surface Completion	Flush Mount

WELL EQUIPPING:

Pump Make	Grundfos
Model	Redi Flo - 3"
Horsepower	3/4 HP (JS 05)
Pump Intake	205' bgs



IRA-11 70/210 MONITOR WELL SCHEMATIC

Remedial Investigation/Feasibility Study

Miracle Mile WQARF Site

ADWR # 55-586372

Project:/17564/Remedial Investigation/Figures/IRA-11Schematic.cdr E2-17564022. /9-01

DRILLING LOG FOR: IRA-12

ADWR No: 55-586370

Site Location: R.E. Darling

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 13 June 01

Date Hole Completed: 17 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 212

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
1–3	SM		SILTY SAND with little gravel and trace cobbles, brown, Weak HCl, Nil PI, loose, dry		
4–11	CL		CLAY with sand, brown, Weak HCl, Med PI, stiff, moist		
12–13	SM		SILTY SAND (fine-medium grain), brown, Nil HCl, Nil PI, Med dense, dry		
13–32	SP		SAND, trace silts and gravel (rounded to angular), light brown, Nil HCl, Nil PI, dry		
32–35	GP		SANDY GRAVEL with cobbles, trace silts, light brown, Nil HCl, Nil PI, moist		
35–40	SP		SAND with gravel (rounded to angular) and silt, light brown, Nil HCl, Nil PI, dry		

Client: ADEQ

Project: Miracle Mile WQARF

Sheet: 1 of 6

DRILLING LOG FOR: IRA-12

ADWR No: 55-586370

Site Location: R.E. Darling

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 13 June 01

Date Hole Completed: 17 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 212

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
41	SP		SAND with gravel (rounded to angular) and silt, light brown, Nil HCl, Nil PI, dry		
42					
43					
44					
45					
46					
47					
48	GC		CLAYEY GRAVEL (sub-angular) with sand, silt, and cobbles, brown, Nil HCl, Med PI, dense, moist		
49					
50	SC		CLAYEY SAND with gravel, brown, Nil HCl, Med PI, dense, moist		
51					
52					
53					
54	CL		SANDY CLAY (fine to medium grain) with silt, brown, Nil HCl, Med PI, stiff, moist		
55					
56	SC		CLAYEY SAND (fine to medium grain), trace gravel, brown, Nil HCl, Low PI, dense, moist	3.8	
57				1.7	
58				3.0	
59				2.6	
60				1.5	
61				3.2	
62				2.8	
63				3.5	
64				0.9	
65				0.8	
66				2.9	
67				4.4	
68				0.1	
69				2.3	
70	CL		CLAY with sand and silt, brown, Nil HCl, Med PI, stiff to very stiff, moist	2.8	
71				0.1	
72				3.5	
73				2.5	
74	SC		CLAYEY SAND, trace gravel, light brown to brownish yellow, Nil HCl, Low-Med PI, moist	2.6	
75				0.7	
76				0.6	
77				1.2	
78				0.6	
79				2.6	
80				0.6	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-12

ADWR No: 55-586370

Site Location: R.E. Darling

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 13 June 01

Date Hole Completed: 17 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 212

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
81	SC		CLAYEY SAND, trace gravel, light brown to brownish yellow, Nil HCl, Low-Med PI, moist	2.3	
82				7.4	
83				6.0	
84	GC		CLAYEY GRAVEL with sand few cobbles, brown Nil HCl, Med PI, moist	11.6	
85				2.2	
86					
87				2.9	
88				2.6	
89				7.3	
90	SC		CLAYEY SAND with gravel (sub-angular to sub-rounded), brown, Nil HCl, Med PI, dense, moist	0.1	
91				0.9	
92				1.9	
93				0.5	
94				0.1	
95				3.5	
96				0.5	
97				2.0	
98				0.1	
99				3.3	
100				1.4	
101				3.4	
102				3.9	
103	GC		CLAYEY GRAVEL (sub-rounded to rounded) with sand, cobbles, and boulders, brown, Nil HCl, Med PI, moist	2.7	
104				2.6	
105				0.7	
106				0.1	
107				0.2	
108	SC		CLAYEY SAND, brown, Nil HCl, Med PI, dense, moist	4.0	
109				0.1	
110				4.5	
111				2.6	
112				0.7	
113				2.6	
114				2.0	
115				1.6	
116				2.9	
117				2.6	
118				3.3	
119				4.7	
120				3.6	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-12

ADWR No: 55-586370

Site Location: R.E. Darling

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 13 June 01

Date Hole Completed: 17 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 212

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
121	SC		CLAYEY SAND, brown, Nil HCl, Med PI, dense, moist	0.6	
122				2.5	
123				0.1	
124				0.1	
125				2.2	
126				1.5	
127				2.0	
128				0.1	
129				0.7	
130				1.0	
131				2.7	
132				1.1	
133				4.5	
134				0.1	
135				2.0	
136				3.0	
137				1.6	
138				9.7	
139				7.4	
140				2.9	
141				3.1	
142				1.6	
143				2.8	
144				0.1	
145				0.2	
146				10.4	
147				6.0	
148				5.0	
149				4.4	
150				6.4	
151				14.2	
152				4.5	
153				2.5	
154				4.1	
155				3.6	
156				10.6	
157				1.6	
158				0.6	
159				4.5	
160				0.7	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-12

ADWR No: 55-586370

Site Location: R.E. Darling

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 13 June 01

Date Hole Completed: 17 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 212

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
161	SC		CLAYEY SAND, brown, Nil HCl, Med PI, dense, moist	1.2	
162				1.0	
163	SP		SAND (medium-coarse grain), trace silts and gravel, brown, Nil HCl, Nil PI, wet	1.1	
164				0.5	
165				0.1	
166	SC		CLAYEY SAND, brown, Nil HCl, Med PI, dense, moist	0.4	
167				0.2	
168	SP		SAND (medium-coarse) with gravel, brown, Nil HCl, Nil PI, moist	0.4	
169				0.1	
170				0.1	
171	SC		CLAYEY SAND, brown, Nil HCl, Low-Med PI, very dense, moist	0.8	
172				0.1	
173				0.1	
174				0.1	
175				0.2	
176				0.4	
177				0.7	
178				3.9	
179				0.6	
180				0.4	
181				0.1	
182				2.3	
183				4.3	
184				0.8	
185				0.7	
186				0.5	
187				0.5	
188				0.3	
189				0.3	
190				4.1	
191				2.8	
192					
193					
194					
195					
196				0.3	
197					
198				0.1	
199				0.1	
200				0.3	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-12

ADWR No: 55-586370

Site Location: R.E. Darling

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 13 June 01

Date Hole Completed: 17 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 212

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
201	SC		CLAYEY SAND, brown, Nil HCl, Low-Med PI, very dense, moist	0.7	
202				1.7	
203				0.7	
204				1.1	
205				0.1	
206				0.1	
207				1.3	
208				1.2	
209				2.7	
210				4.7	
211				0.1	
212				1.6	
213			END OF BORING		
214					
215					
216					
217					
218					
219					
220					
221					
222					
223					
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239					
240					

Client: ADEQ

Project: Miracle Mile WQARF

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WELL BORING DETAILS:

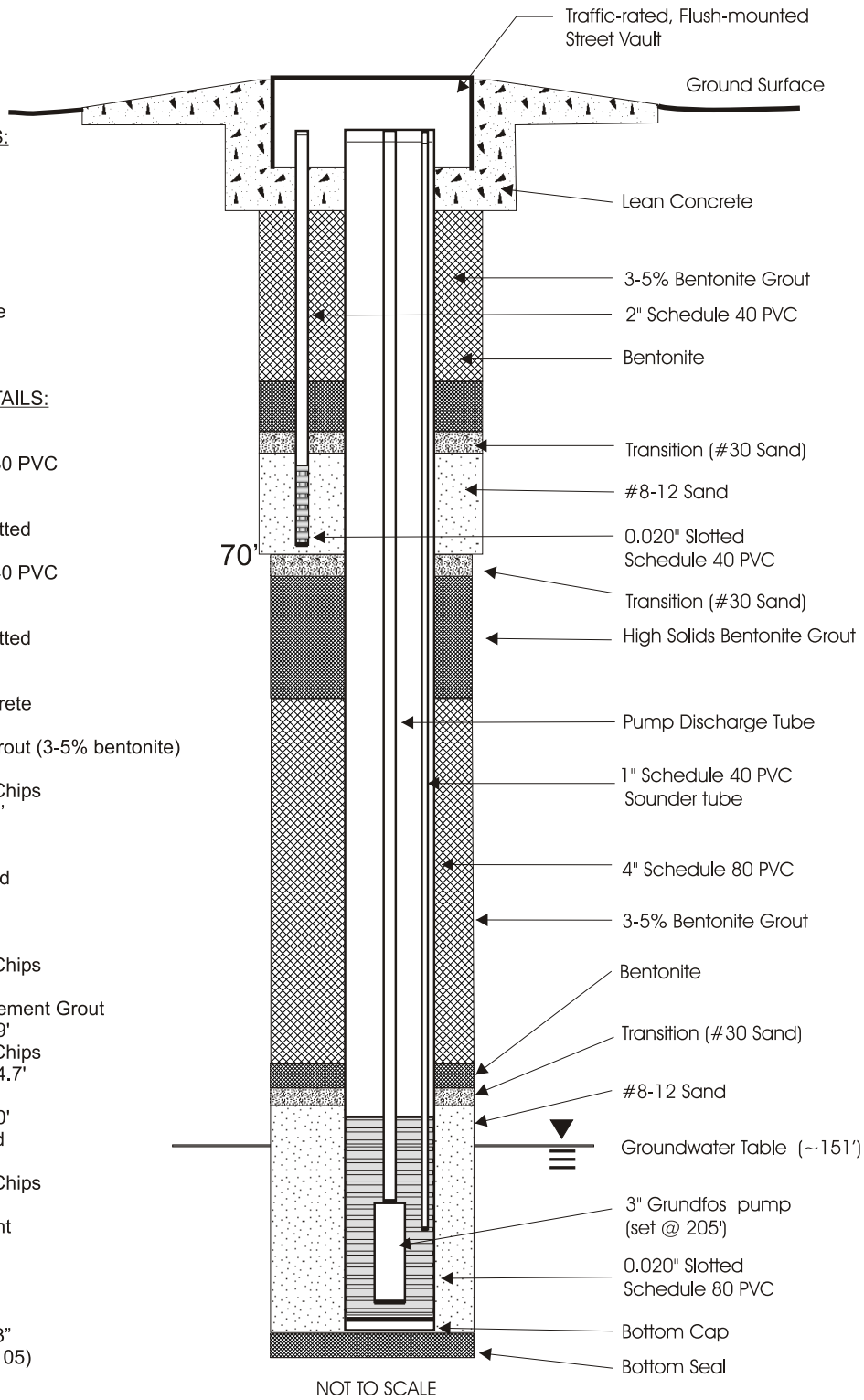
Total Depth	212'
Nominal Borehole Diameter	11"
Depth Interval	0' - 70'
Nominal Borehole Diameter	8"
Depth Interval	70' - 212'
Seal at Reduction	5' Bentonite
Drilling Method	Rotosonic

WELL CONSTRUCTION DETAILS:

Regional Well Casing Length	210'
Material	Schedule 80 PVC
Diameter	4"
Screened Interval	140'-210'
Perforations	0.020", Slotted
Companion Well Casing Length	70'
Material	Schedule 40 PVC
Diameter	2"
Screened Interval	60'-70'
Perforations	0.020", Slotted
Surface Seal	0 to 8'
Seal Material	Lean Concrete
Upper Backfill	8' to 37'
Backfill Material	Portland Grout (3-5% bentonite)
Upper Seal Interval	37' - 42.6'
Seal Material	Bentonite Chips
Upper Transition Interval	42.6' - 44.9'
Transition Material	#30 Sand
Upper Gravel Pack Interval	44.9' - 70'
Gravel Pack Material	#8-12 Sand
Middle Transition Interval	70' - 71.5'
Transition Material	#30 Sand
Middle Seal Interval	71.5' - 78'
Seal Material	Bentonite Chips
Lower Backfill	78' - 127'
Backfill Material	Portland Cement Grout
Lower Seal Interval	127' - 132.9'
Seal Material	Bentonite Chips
Lower Transition Interval	132.9' - 134.7'
Transition Material	#30 Sand
Lower Gravel Pack Interval	134.7' - 210'
Gravel Pack Material	#8-12 Sand
Bottom Seal Interval	210' - 212'
Seal Material	Bentonite Chips
Surface Completion	Flush Mount

WELL EQUIPPING:

Pump Make	Grundfos
Model	Redi Flo - 3"
Horsepower	3/4 HP (JS 05)
Pump Intake	205' bgs



IRA-12 70/210 MONITOR WELL SCHEMATIC

Remedial Investigation/Feasibility Study

Miracle Mile WQARF Site

ADWR # 55-586370

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DRILLING LOG FOR: IRA-13

ADWR No: 55-586430

Site Location: San Raphael Street

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 4 June 01

Date Hole Completed: 12 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 210

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
1	SC		CLAYEY SAND with silt, few gravels, brown, Weak HCl, Low PI, Med dense, dry	0.6	
2	CL		SANDY CLAY with silt, trace gravels (sub-angular), brown, Weak HCl, Med PI, dry	0.5	
3				0.4	
4				0.3	
5				0.9	
6				0.4	
7	SM		SILTY SAND (fin grain) with clay, brown, Weak HCl, Nil PI, Med dense, dry	0.1	
8				0.1	
9				0.1	
10				0.4	
11				0.4	
12				0.9	
13	SC		CLAYEY SAND, brown, Weak HCl, Med PI, dense, moist	0.9	
14				1.5	
15	CL		CLAY with few sands (fine-medium grain), Weak HCl, Med PI, moist	1.0	
16				0.9	
17				0.7	
18	SC		CLAYEY SAND with silt, Weak HCl, Low PI, Med dense, dry	0.3	
19	SP		SAND (fine-medium grain) few silts, brown, Nil HCl, Nil PI, dense, dry	1.0	
20				0.1	
21				0.5	
22				0.6	
23				0.9	
24				0.8	
25				0.9	
26				0.7	
27				0.1	
28				0.9	
29				1.1	
30	CL		CLAY, trace silts, brown, Nil HCl, High PI, hard, moist	0.3	
31				0.8	
32				0.8	
33	SM		SILTY SAND (fine grain), brown, Nil HCl, Nil PI, dry	1.6	
34				0.8	
35				3.9	
36	SC		CLAYEY SAND with silt (fine-medium grain), brown, Nil HCl, Low PI, moist	2.8	
37				1.1	
38				2.1	
39				1.1	
40				1.5	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-13

ADWR No: 55-586430

Site Location: San Raphael Street

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 4 June 01

Date Hole Completed: 12 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 210

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
41	CL		CLAY with few sands, brown, Nil HCl, Med PI, very stiff, moist	0.9	
42				1.5	
43				1.0	
44	SP		SAND trace gravel (angular to rounded), light brown Nil HCl, Nil PI, moist	1.1	
45				0.2	
46				0.2	
47				0.5	
48				0.3	
49				0.3	
50				1.4	
51				0.9	
52				0.8	
53	SM		SILTY SAND (fine-coarse grain) with gravel (angular to sub-angular), light brown, Nil HCl, Nil PI, dry	1.4	
54				0.9	
55				2.7	
56				4.7	
57				3.9	
58				0.2	
59				0.6	
60					
61				0.1	
62				0.4	
63				0.1	
64				0.3	
65				1.5	
66				0.1	
67	SC		CLAYEY SAND, trace gravel, brown, (DG), Nil HCl, Nil PI, wet	0.9	
68				0.4	
69				1.6	
70				1.7	
71				1.0	
72				0.3	
73	CL		SANDY CLAY with silt, brown, Nil HCl, Med PI, very stiff, moist	0.9	
74				3.3	
75				0.5	
76				0.4	
77				1.2	
78				0.7	
79	SC		CLAYEY SAND (fine-coarse grain), brown, Nil HCl, Low-Med PI, dense-very dense, moist	0.6	
80				2.7	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-13

ADWR No: 55-586430

Site Location: San Raphael Street

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 4 June 01

Date Hole Completed: 12 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 210

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
81	SC		CLAYEY SAND (fine-coarse grain), brown, Nil HCl, Low-Med PI, dense-very dense, moist	3.6	
82				3.0	
83				0.8	
84				0.5	
85	SP		SAND (fine grain), light brown, Nil HCl, Nil PI, dense, moist	0.7	
86				0.9	
87				1.1	
88				0.8	
89				0.1	
90				0.5	
91				2.7	
92				2.3	
93				2.6	
94	SC		CLAYEY SAND, brown, Nil HCl, Low-Med PI, dense-very dense, moist	0.7	
95				0.9	
96				2.0	
97				0.6	
98	CL		SILTY CLAY, few sands, brown, Nil HCl, Med PI, hard, moist	0.4	
99	SM		SILTY SAND (fine grain) with clay, brown Nil HCl, Nil -Low PI, dense, moist	1.3	
100				1.3	
101				3.9	
102				4.7	
103				4.9	
104				1.0	
105	SC		CLAYEY SAND, yellowish red, Nil HCl, Low-Med PI, very dense, moist	2.4	
106				1.9	
107				1.8	
108				1.8	
109				1.4	
110				2.0	
111				3.1	
112				2.3	
113				3.1	
114				4.7	
115				1.8	
116				1.7	
117				1.2	
118				1.2	
119				0.4	
120				1.2	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-13

ADWR No: 55-586430

Site Location: San Raphael Street

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 4 June 01

Date Hole Completed: 12 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 210

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
121	SC		CLAYEY SAND, yellowish red, Nil HCl, Low-Med PI, very dense, moist	1.4	
122				3.5	
123	GL		CLAYEY GRAVEL with sand, brown, Nil HCl, Med PI, dense, moist	1.5	
124				2.4	
125				1.6	
126				2.9	
127				1.0	
128				1.5	
129				1.3	
130				0.4	
131				0.8	
132	SC		CLAYEY SAND (med grain), brown, Nil HCl, Med PI, dense, wet	0.6	
133	CL		CLAY with silts, trace sand, brown, Nil HCl, Med PI, stiff, moist	0.7	
134	SC		CLAYEY SAND with gravel (sub-angular to sub-rounded), brown, Nil HCl, Med PI, moist	2.3	
135				1.2	
136				1.3	
137				1.0	
138				1.0	
139				2.6	
140				4.2	
141				2.9	
142				3.7	
143				2.9	
144				1.2	
145				1.4	
146				1.5	
147				1.4	
148				1.5	
149				1.3	
150				1.0	
151				1.1	
152				0.8	
153				1.2	
154				0.9	
155				2.1	
156				1.2	
157				1.2	
158				1.2	
159				1.2	
160				2.9	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-13

ADWR No: 55-586430

Site Location: San Raphael Street

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 4 June 01

Date Hole Completed: 12 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 210

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
161	SC		CLAYEY SAND with gravel (sub-angular to sub-rounded), brown, Nil HCl, Med PI, moist	1.1	
162				3.9	
163				3.4	
164				3.8	
165				0.5	
166				0.6	
167				0.5	
168				0.7	
169				0.3	
170				0.2	
171				0.3	
172				0.4	
173				0.4	
174				0.7	
175				0.5	
176				0.6	
177				1.7	
178				1.5	
179				1.2	
180				1.1	
181				1.0	
182				0.9	
183				0.8	
184				0.9	
185				1.0	
186				1.0	
187				1.0	
188				1.0	
189				2.0	
190				1.1	
191				1.1	
192				1.2	
193				1.2	
194				2.6	
195				1.1	
196				1.4	
197				0.8	
198				1.3	
199				2.8	
200				1.0	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-13

ADWR No: 55-586430

Site Location: San Raphael Street

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 4 June 01

Date Hole Completed: 12 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 210

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
201	SC		CLAYEY SAND with gravel (sub-angular to sub-rounded), brown, Nil HCl, Med PI, moist	1.5	
202				0.9	
203				0.8	
204				1.3	
205				1.0	
206				2.3	
207				1.0	
208				2.2	
209				1.4	
210			END OF BORING	1.2	
211					
212					
213					
214					
215					
216					
217					
218					
219					
220					
221					
222					
223					
224					
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239					
240					

Client: ADEQ

Project: Miracle Mile WQARF

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WELL BORING DETAILS:

Total Depth . . . . . 210'

Nominal Borehole Diameter . . . . . 11"
Depth Interval . . . . . 0' - 75'
Nominal Borehole Diameter . . . . . 8"
Depth Interval . . . . . 75' - 210'
Seal at Reduction . . . . . 5' Bentonite

Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

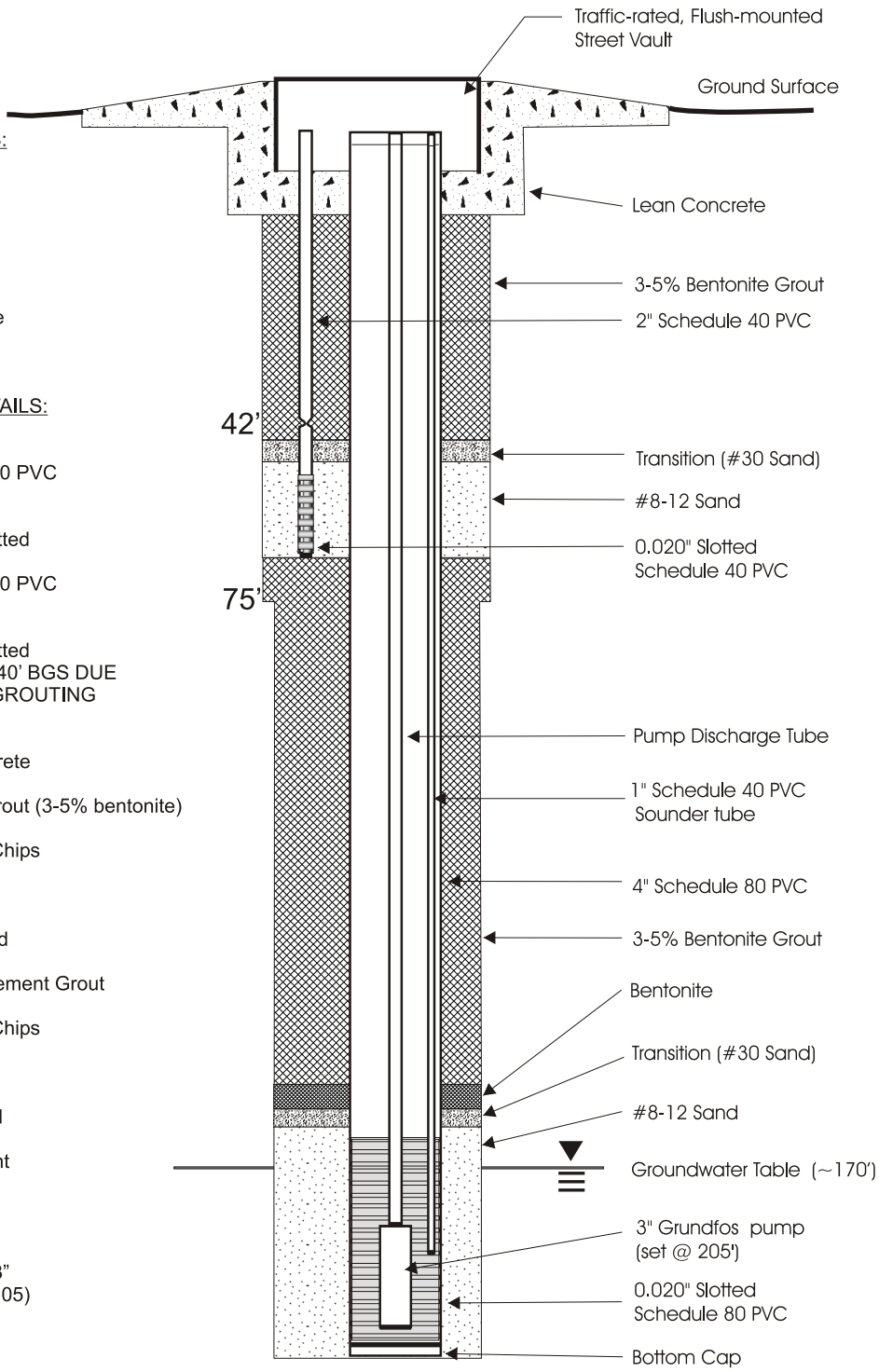
Regional Well Casing Length. . . . . 210'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"
Screened Interval . . . . . 150' - 210'
Perforations . . . . . 0.020", Slotted
Companion Well Casing Length . . . 74'
Material . . . . . Schedule 40 PVC
Diameter . . . . . 2"
Screened Interval . . . . . 64' - 74'
Perforations . . . . . 0.020", Slotted
COMPANION WELL WAS PINCHED OFF AT ~ 40' BGS DUE TO EXCESS HEAT OF HYDRATION DURING GROUTING

Surface Seal . . . . . 0 to 10'
Seal Material . . . . . Lean Concrete
Upper Backfill . . . . . 10' to 42.5'
Backfill Material . . . . . Portland Grout (3-5% bentonite)
Upper Seal Interval . . . . . 42.5' - 47'
Seal Material . . . . . Bentonite Chips
Upper Transition Interval. . . . . 47' - 49'
Transition Material. . . . . #30 Sand
Upper Gravel Pack Interval. . . . . 49' - 74'
Gravel Pack Material. . . . . #8-12 Sand
Lower Backfill . . . . . 74' - 138'
Backfill Material . . . . . Portland Cement Grout
Lower Seal Interval . . . . . 138' - 143'
Seal Material . . . . . Bentonite Chips
Lower Transition Interval . . . . . 143' - 145'
Transition Material. . . . . #30 Sand
Lower Gravel Pack Interval. . . . . 145' - 210'
Gravel Pack Material . . . . . #8-12 Sand

Surface Completion. . . . . Flush Mount

WELL EQUIPPING:

Pump Make . . . . . Grundfos
Model . . . . . Redi Flo - 3"
Horsepower . . . . . 3/4 HP (JS 05)
Pump Intake . . . . . 205' bgs



NOT TO SCALE

IRA-13 70/210 MONITOR WELL SCHEMATIC
Remedial Investigation/Feasibility Study
Miracle Mile WQARF Site

ADWR # 55-586430

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DRILLING LOG FOR: IRA-14

ADWR No: 55-586502

Site Location: A-Atlas

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 8 May 01

Date Hole Completed: 18 May 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 307.5

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
1	CL-SC		SANDY CLAY with silts, trace gravels (sub-angular), brown, High HCl, Dry, Med PI	1.3	
2				1.4	
3				0.4	
4				0.2	
5				0.3	
6				0.1	
7				0.1	
8	CL		CLAY with sand, yellowish red, mottled weak cementation, High HCl, Med PI, stiff to very stiff, moist	0.1	
9				0.8	
10				2.0	
11				0.8	
12	SM-SC		SILTY SAND trace clays, brown, High HCl, Med dense, Low-Nil PI, (interbedded clayey sands, and silty sands), moist	0.7	
13				0.1	
14				0.1	
15				0.3	
16				0.2	
17				1.4	
18	CL		CLAY with sand, yellowish red, mottled weak cementation, High HCl, Med PI, stiff, moist	0.1	
19				0.1	
20				0.1	
21				1.2	
22				0.1	
23				0.1	
24	SC		CLAYEY SAND, few silts trace gravel (sub-rounded), nodules of moderate to strong cementation, Med-High PI, brown, moist, Med dense	0.1	
25				0.3	
26					
27	SM		SILTY SAND trace gravels (sub-angular), brown, Nil HCl, very soft, Nil PI, moist	0.8	
28					
29					
30	CL		CLAY little silts, few sands, brown, Nil HCl, firm, moist, Low PI, (trace veins of cementation)		
31					
32					
33					
34					
35					
36				5.0	
37					
38	SP		GRAVELY SAND (sub-rounded to angular) trace silt, brown, Nil HCl, Nil PI, moist		
39				0.1	
40					

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-14

ADWR No: 55-586502

Site Location: A-Atlas

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 8 May 01

Date Hole Completed: 18 May 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 307.5

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
41	SP		GRAVELY SAND (sub-rounded to angular), trace silt, brown, Nil HCl, Nil PI, moist		
42				4.2	
43	SM		SILTY SAND trace gravels (angular to sub-angular), brown, Nil HCl, Nil PI, dense, moist		
44					
45				4.8	
46					
47					
48				3.1	
49	SP		SAND with interbedded GRAVELLY SAND (sub-rounded), light-brown to brown, Nil HCl, Nil PI, moist		
50					
51				4.6	
52	SC		CLAYEY SAND, brown Nil HCl, Nil PI, moist, dense	9.6	
53	SM		SILTY SAND with gravel and cobbles, brown, Nil HCl, Nil PI, moist, dense		
54				8.8	
55	GP		SANDY GRAVEL trace clays, silts, and cobbles (sub-rounded to sub-angular),Nil HCl, Nil PI, moist		
56					
57				3.9	
58					
59				1.1	
60	SC		CLAYEY SAND, brown Nil HCl, Low PI, very dense, moist, weathered to very weathered decomposed granite(DG), fine to medium grain sand		
61				4.5	
62					
63				0.5	
64				0.2	
65					
66				0.7	
67					
68				2.1	
69					
70					
71				0.3	
72					
73					
74				1.1	
75					
76				1.6	
77					
78				1.0	
79				0.3	
80					

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-14

ADWR No: 55-586502

Site Location: A-Atlas

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 8 May 01

Date Hole Completed: 18 May 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 307.5

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
81	SC		CLAYEY SAND, brown, Nil HCl, Low PI, very dense, moist, weathered to very weathered decomposed granite(DG), fine to medium grain sand	0.3	
82				0.2	
83					
84					
85					
86					
87	SP		GRAVELLY SAND (sub-rounded), trace silt, brown, Nil HCl, Nil PI, dense, moist, with interbedded CLAYEY SANDS and clay clasts	0.2	
88				0.2	
89				0.9	
90					
91				3.2	
92				2.3	
93					
94					
95				1.0	
96					
97				0.7	
98					
99	GP-SP		SANDY GRAVEL few clays,trace cobbles, brown, Nil HCl, Low PI, dense, moist	0.5	
100					
101					
102	CL		SILTY CLAY trace sands, brown to yellowish red, Nil HCl, Low PI, hard, moist	0.1	
103				1.6	
104				0.3	
105	SP		SAND with few gravel and silt, brown, Nil HCl, Nil PI, soft, moist	1.3	
106	CL		SANDY CLAY, yellowish red, Nil HCl, Med PI, hard, moist		
107	SC			1.5	
108			CLAYEY SAND with gravel (sub-rounded), brown, Nil HCl, Med PI, dense, moist	0.9	
109					
110				1.6	
111	GC		CLAYEY GRAVEL with sand and cobbles, brown to yellowish red, Nil HCl, Med PI, dense/firm, moist	0.8	
112					
113				0.6	
114				0.3	
115				0.3	
116	GP		GRAVELY SAND with cobbles (sub-rounded) few clays, light brown to brown, Nil HCl, Low PI, very dense, moist	0.9	
117				2.1	
118				2.1	
119				0.1	
120	GC			1.4	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-14

ADWR No: 55-586502

Site Location: A-Atlas

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 8 May 01

Date Hole Completed: 18 May 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 307.5

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
121	GC		CLAYEY GRAVEL (sub-rounded) with sand and cobbles, brown to yellowish red, Nil HCl, Med PI, dense/firm, moist	0.1	
122				1.3	
123				0.3	
124				0.2	
125	SP		SAND, few clays, little gravels (sub-rounded), brown to yellowish red, Nil HCl, Low PI, dense, moist	0.4	
126				2.6	
127				2.3	
128				4.2	
129				0.4	
130				6.3	
131	SC		CLAYEY SAND little gravel (sub-angular to angular), brown, Nil HCl, Low PI, dense, moist	0.5	
132				3.3	
133				4.3	
134				3.6	
135				1.0	
136				1.4	
137				1.5	
138				1.9	
139				2.1	
140				1.2	
141				1.2	
142				3.5	
143				2.2	
144				1.0	
145				2.3	
146				2.3	
147				4.9	
148				3.3	
149				4.3	
150				0.3	
151					
152				5.0	
153					
154				0.8	
155				0.1	
156				0.9	
157				0.6	
158				2.2	
159				2.5	
160					

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-14

ADWR No: 55-586502

Site Location: A-Atlas

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 8 May 01

Date Hole Completed: 18 May 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 307.5

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
161	SC		CLAYEY SAND little gravel (sub-angular to angular), brown, Nil HCl, Low PI, dense, moist	0.3	
162				0.2	
163				0.6	
164				1.0	
165				9.0	
166				1.0	
167				0.8	
168				0.4	
169				0.2	
170				0.3	
171				0.2	
172				0.2	
173				0.1	
174				0.2	
175				0.1	
176				0.2	
177				0.2	
178				0.1	
179				0.2	
180				0.1	
181				0.3	
182				0.1	
183				0.2	
184				0.1	
185				2.2	
186				1.6	
187				3.6	
188				0.6	
189				0.1	
190				0.4	
191					
192				0.3	
193				0.7	
194				5.1	
195				3.3	
196				0.9	
197				0.1	
198				4.7	
199				4.7	
200				2.5	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-14

ADWR No: 55-586502

Site Location: A-Atlas

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 8 May 01

Date Hole Completed: 18 May 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 307.5

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
201	SC		CLAYEY SAND little gravel (sub-angular to angular), brown, Nil HCl, Low PI, dense, moist	3.3	
202				2.1	
203				2.1	
204				19.8	
205				2.3	
206				3.9	
207				8.8	
208				9.5	
209				1.8	
210				2.3	
211				3.2	
212				1.5	
213				1.2	
214				3.7	
215				1.2	
216				0.3	
217				2.3	
218				3.4	
219				1.6	
220				8.0	
221				1.7	
222				2.1	
223				1.0	
224				2.6	
225				2.2	
226				0.5	
227				2.3	
228				0.9	
229				1.2	
230	SP		SAND trace to few gravels, brown Nil HCl, Nil PI, dense, wet	1.1	
231				0.1	
232				0.2	
233				0.5	
234					
235				0.1	
236				1.0	
237				1.2	
238				1.0	
239				0.4	
240				0.8	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-14

ADWR No: 55-586502

Site Location: A-Atlas

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 8 May 01

Date Hole Completed: 18 May 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 307.5

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
241	SP		SAND trace to few gravels, brown, Nil HCl, Nil PI, dense, wet	2.7	
242	SC		CLAYEY SAND , brown, Nil HCl, Low-Med PI, dense, wet	3.0	
243				2.5	
244				0.8	
245				2.2	
246				2.4	
247				2.7	
248				10.4	
249				0.4	
250				0.1	
251				2.5	
252				0.6	
253				9.8	
254				3.1	
255				2.5	
256				4.6	
257				9.0	
258				11.0	
259				8.0	
260				6.3	
261				4.0	
262				0.1	
263				1.3	
264				2.4	
265				2.4	
266				7.2	
267				7.7	
268				0.4	
269				0.5	
270				1.1	
271				0.9	
272				1.0	
273				0.3	
274				0.5	
275				3.7	
276				2.4	
277				3.0	
278				0.2	
279				0.6	
280				0.5	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-14

ADWR No: 55-586502

Site Location: A-Atlas

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 8 May 01

Date Hole Completed: 18 May 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 307.5

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
281	SC		CLAYEY SAND, brown, Nil HCl, Low-Med PI, dense, wet	1.4	
282				0.6	
283				0.3	
284				0.1	
285				1.1	
286				0.3	
287				0.1	
288				0.1	
289				0.1	
290				0.3	
291				0.1	
292				0.1	
293				0.8	
294				2.6	
295				2.1	
296				1.6	
297				1.4	
298				2.4	
299				1.6	
300				1.3	
301				0.1	
302				0.2	
303	SP		SAND few gravels (angular to sub-angular), brown, Nil HCl, Nil PI, dense, wet	1.5	
304				1.0	
305	SC		CLAYEY SAND few gravels (sub-angular), brown, Nil HCl, Nil PI, dense	0.8	
306	SP			0.1	
307	SC			1.5	
308			SAND few gravels (angular to sub-angular), brown, Nil HCl, Nil PI, dense, wet		
309					
310			CLAYEY SAND few gravels (sub-angular), brown, Nil HCl, Nil PI, dense		
311					
312					
313			END OF BORING		
314					
315					
316					
317					
318					
319					
320					

Client: ADEQ

Project: Miracle Mile WQARF

Sheet: 8 of 8

URS

WELL BORING DETAILS:

Total Depth	307.5'
Borehole Diameter	18"
Depth Interval	0'-20'
Drilling Method	Auger Bucket
Nominal Borehole Diameter	11"
Depth Interval	20'-104'
Nominal Borehole Diameter	9"
Depth Interval	104'-190'
Nominal Borehole Diameter	8"
Depth Interval	190'-307.5'
Seal at Reductions	5' Bentonite
Drilling Method	Rotosonic

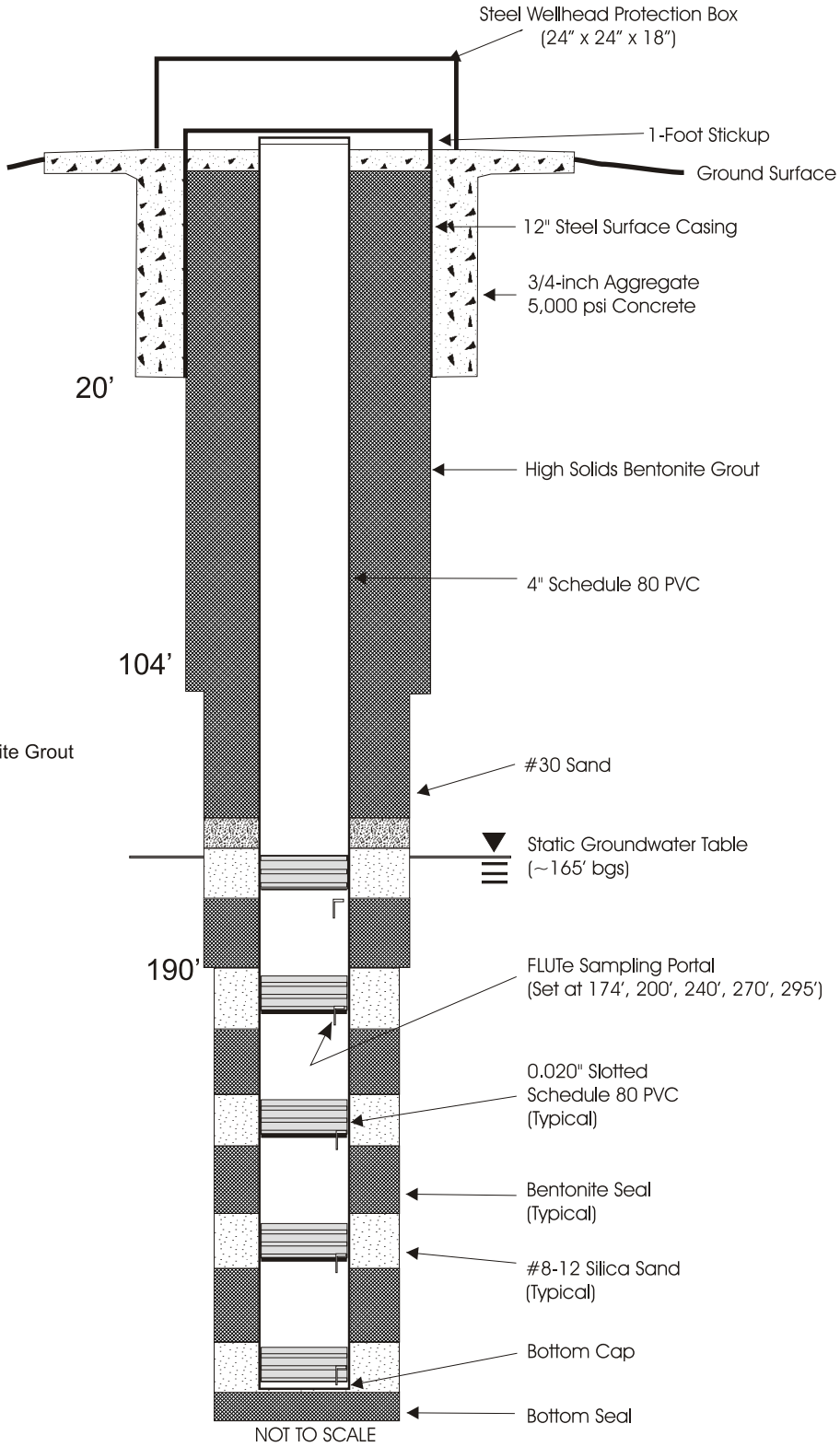
WELL CONSTRUCTION DETAILS:

Conductor Casing	+1' to 20' bgs
Material	Low Carbon Steel
Diameter	12"
Surface Seal	0 to 20'
Seal Material	Concrete
Well Casing length	300'
Material	Schedule 80 PVC
Diameter	4"
Backfill	0' to 155.5'
Backfill Material	High Solids Bentonite Grout
Seal Intervals	172.6' - 186.9' 202.5' - 227.2' 242.3' - 257.2' 272.1' - 286.9'
Bottom Seal	302'-307.5"
Seal Material	Bentonite Pellets
Transition Interval	155.5' - 156.8'
Transition Material	#30 Tacna Sand
Gravel Pack Intervals	156.8 ' -172.6' 186.9' - 202.5' 227.2' - 242.3' 257.2' - 272.1' 287.9' - 302'
Gravel Pack Material	#8-12 Silica Sand
Depth to Top of Perforation Zone	160'
Screened Intervals	160' - 170' 190' - 200' 230' - 240' 260' - 270' 290' - 300'
Perforations	0.020", Slotted
Surface Completion	Above Grade

WELL EQUIPPING:

FLUTe Water Sampling Liner with Five Portals

Sampling Intervals/Portal Depths	160' - 175'/174' 190' - 200'/200' 230' - 240'/240' 260' - 270'/270' 290' - 300'/295'



IRA-14 MONITOR WELL SCHEMATIC
Remedial Investigation/Feasibility Study
Miracle Mile WQARF Site

ADWR # 55-586502

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DRILLING LOG FOR: IRA-15

ADWR No: 55-586501

Site Location: A-Atlas

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 29 May 01

Date Hole Completed: 31 May 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 105

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
1	CL-SC		SANDY CLAY with silts trace gravels (sub-angular), brown, High HCl, Med PI, dry	1.3	
2				1.4	
3				0.4	
4				0.2	
5				0.3	
6				0.1	
7				0.1	
8	CL		CLAY with sand, yellowish red, mottled weak cementation, High HCl, Med PI, stif to very stiff, moist	0.1	
9				0.8	
10				2.0	
11				0.8	
12	SM-SC		SILTY SAND trace clays, brown, High HCl, Low-Nil PI, (interbedded CLAYEY SANDS and SILTY SANDS), moist	0.7	
13				0.1	
14				0.1	
15				0.3	
16				0.2	
17				1.4	
18	CL		CLAY with sand, yellowish red, mottled weak cementation, High HCl, Med PI, stiff to very stiff, moist	0.1	
19				0.1	
20				0.1	
21				1.2	
22				0.1	
23				0.1	
24				0.2	
25				0.1	
26	SP		SAND, brown, Nil HCl, Nil PI, moist	0.2	
27				0.9	
28				0.7	
29				0.2	
30				0.1	
31				2.6	
32	CL		CLAY with sand, yellowish red, Weak HCl, Med PI, moist	0.1	
33				1.3	
34				0.5	
35	SM		SILTY SAND, brown, Weak HCl, Nil PI, moist	0.1	
36				0.1	
37				0.3	
38				0.1	
39				1.9	
40				0.8	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-15

ADWR No: 55-586501

Site Location: A-Atlas

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 29 May 01

Date Hole Completed: 31 May 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 105

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
41	SP		SAND with gravels (sub-rounded to rounded), trace silts, brown Nil HCl, Nil PI, moist	0.2	
42				0.3	
43				0.1	
44				0.3	
45				2.0	
46				1.2	
47				0.1	
48				0.3	
49				0.2	
50				0.2	
51				0.1	
52				0.1	
53				0.1	
54				2.4	
55				0.3	
56				0.2	
57				0.2	
58	SC		CLAYEY SAND with silt and gravel, brown, Nil HCl, Low PI, dense, moist, (DG)	2.9	
59				3.4	
60				4.0	
61				5.8	
62				0.2	
63				0.4	
64				0.7	
65				1.9	
66				2.8	
67				12.7	
68				2.0	
69				4.2	
70				4.3	
71				0.8	
72				1.1	
73				0.1	
74				0.2	
75				0.2	
76	CL		CLAY few sands, trace gravels, brown, Nil HCl, Med PI, moist	0.2	
77				0.1	
78	SC		CLAYEY SAND, redish brown, Nil HCl, Low PI, moist	0.1	
79				0.1	
80				0.1	

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-15

ADWR No: 55-586501

Site Location: A-Atlas

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 29 May 01

Date Hole Completed: 31 May 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 105

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
81	SC		CLAYEY SAND, reddish brown, Nil HCl, Low PI, moist	0.9	
82				0.1	
83				0.1	
84				0.1	
85				0.1	
86				0.1	
87	SP		SAND few silts, trace gravel, brown, Nil HCl, Nil PI, moist	0.1	
88				0.1	
89					
90				1.0	
91				0.2	
92	SC		CLAYEY SAND with gravel (sub-rounded to rounded), brown, Nil HCl, Low-Med PI, moist	1.5	
93				0.1	
94				0.1	
95				0.1	
96				0.1	
97				0.1	
98				0.1	
99				0.1	
100				0.1	
101				0.1	
102				0.2	
103	CL		SANDY CLAY with silt, brown Nil HCl, Med PI, hard, moist	0.8	
104	SC		CLAYEY SAND with silt, brown, Nil HCl, Low-Med PI, moist	0.3	
105			END OF BORING	0.1	
106					
107					
108					
109					
110					
111					
112					
113					
114					
115					
116					
117					
118					
119					
120					

Client: ADEQ

Project: Miracle Mile WQARF

URS

WELL BORING DETAILS:

Total Depth . . . . . 105'
Casing Diameter . . . . . 8"
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Casing length . . . . . 101'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Surface Seal . . . . . 0 to 5'
Seal Material . . . . . Lean Concrete

Backfill . . . . . 5' to 75.6'
Backfill Material . . . . . Portland Grout (3-5% bentonite)

Seal Interval . . . . . 75.6' - 83.7'
Seal Material . . . . . Bentonite

Transition Interval . . . . . 83.7' - 85.9'
Transition Material . . . . . #30 Sand

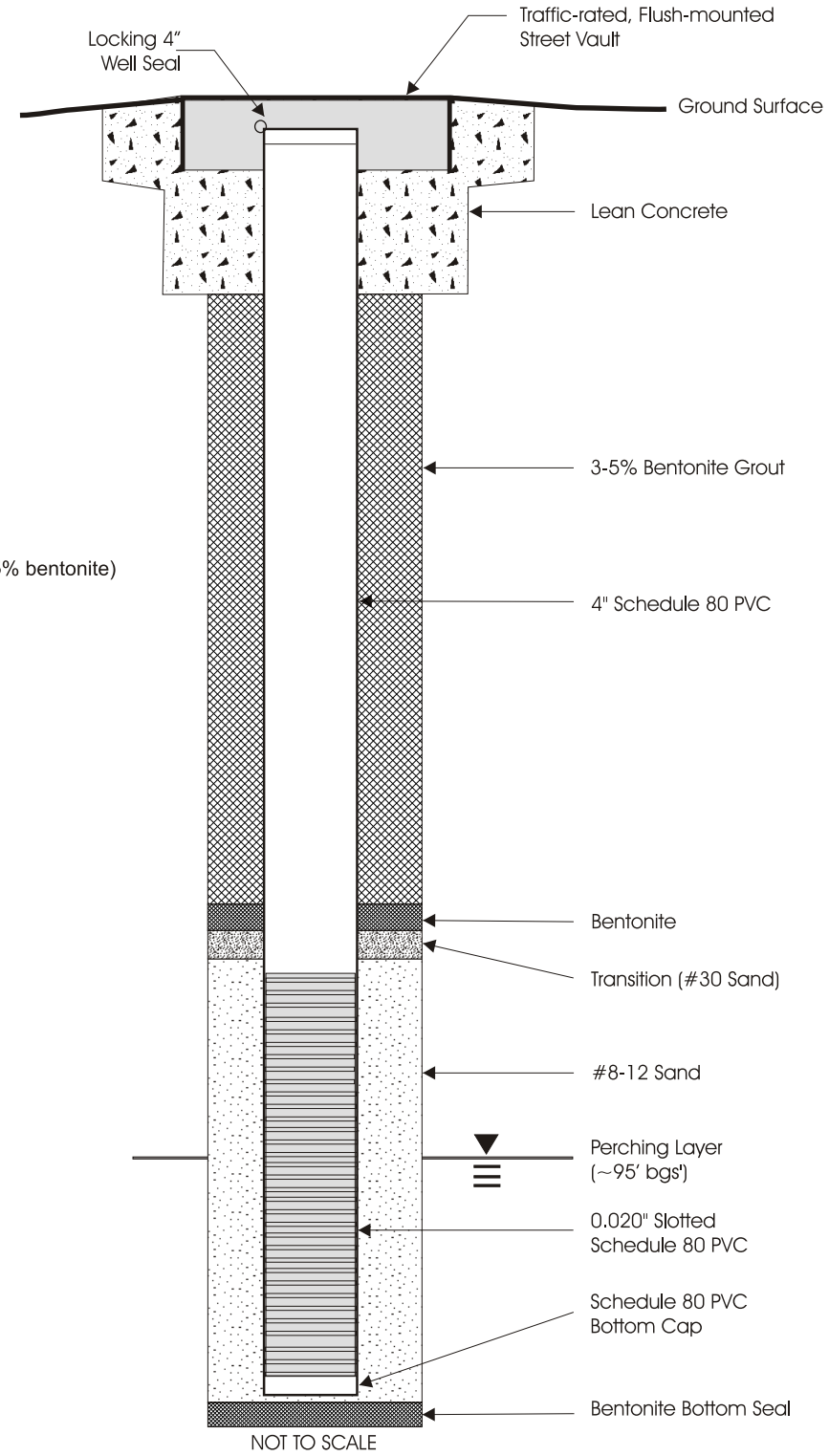
Gravel Pack Interval . . . . . 85.9' - 102'
Gravel Pack Material . . . . . #8-12 Sand

Depth to Top of Perforation Zone . . . 91'

Screened Interval . . . . . 91' - 101'
Perforations. . . . . 0.020", Slotted

Bottom Seal Interval. . . . . 102' - 105'
Seal Material . . . . . Bentonite

Surface Completion. . . . . Flush Mount



IRA-15 MONITOR WELL SCHEMATIC
Remedial Investigation/Feasibility Study
Miracle Mile WQARF Site

ADWR # 55-586501

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DRILLING LOG FOR: IRA-16

ADWR No: 55-586371

Site Location: R.E. Darling

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 1 June 01

Date Hole Completed: 3 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 76.5

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
1	SC		CLAYEY SAND, yellowish red to brown, Weak HCl, Low-Med PI, very stiff, moist	1.2	
2				0.1	
3	CL		SANDY CLAY, brown Weak HCl, Med PI, stiff, moist	0.8	
4				0.7	
5				0.8	
6				0.5	
7	SM		SILTY SAND with clay, trace gravel, brown, Nil HCl, Nil-Low PI, Med dense, moist	0.6	
8				0.1	
9				0.3	
10				0.1	
11				0.1	
12	CL		SANDY CLAY, mottled light brown to brown, Weak HCl, Med PI, very stiff, moist	0.2	
13				0.1	
14				0.2	
15				0.1	
16	SC-SM		CLAYEY SILTY SAND (fine grain), brown, Nil HCl, Low PI, Med dense, moist	0.8	
17				1.5	
18				0.6	
19				1.4	
20				1.6	
21	SP		SAND (fine to coarse grain), trace silts, cobbles, and gravel, brown, Nil HCl, Nil PI, moist	0.2	
22				0.8	
23				0.4	
24					
25				6.6	
26					
27				1.9	
28				0.6	
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

Client: ADEQ

Project: Miracle Mile WQARF

DRILLING LOG FOR: IRA-16

ADWR No: 55-586371

Site Location: R.E. Darling

Drilling Contractor: Boart-Longyear

Geologist's Name: Dennis Carlson

Date Hole Started: 1 June 01

Date Hole Completed: 3 June 01

Rig Type: Rotosonic

Drilling Method: Rotosonic

Depth of Borehole: 76.5

Depth (ft)	Class	USCS Symbol	Narrative Lithologic Description	VOC Concentration (ppm)	Lab Analysis
41	SP		SAND (fine to coarse grain), trace silts, cobbles and gravel, brown, Nil HCl, Nil PI, moist	2.3	
42				2.0	
43				0.3	
44				0.9	
45				4.4	
46				0.7	
47				0.8	
48				2.3	
49				1.1	
50				1.6	
51				12.1	
52	SC		CLAYEY SAND with gravel (sub-rounded to angular), brown, Nil HCl, Low PI, moist	4.4	
53				5.0	
54				4.9	
55				7.4	
56				12.4	
57				17.2	
58				17.0	
59				9.1	
60				21.5	
61	SP		SAND (medium coarse), few gravel, trace silts, brown, Nil HCl, Nil PI, Med dense, moist-wet	20.1	
62				50.8	
63	SC		CLAYEY SAND, few gravels, trace silts, brown, Nil HCl, Low PI, dense, moist	24.6	
64				24.5	
65				18.6	
66				55.4	
67				37.6	
68				26.7	
69				12.7	
70	SP		SAND (fine grain), trace silts, light brown-brown, Nil HCL, Nil PI, moist-wet	33.9	
71				35.7	
72				4.2	
73				12.9	
74				9.1	
75				2.6	
76	CL		SILTY CLAY, trace sand, brown, Nil HCl, Med PI, very stiff, moist	10.9	
77					
78			END OF BORING		
79					
80					

Client: ADEQ

Project: Miracle Mile WQARF

Sheet: 2 of 2

URS

WELL BORING DETAILS:

Total Depth . . . . . 76.5'
Casing Diameter . . . . . 8"
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Casing length . . . . . 75.9'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Surface Seal . . . . . 0 to 5'
Seal Material . . . . . Lean Concrete

Backfill . . . . . 5' to 53.6'
Backfill Material . . . . . Portland Grout (3-5% bentonite)

Seal Interval . . . . . 53.6' - 59.3'
Seal Material . . . . . Bentonite

Transition Interval . . . . . 59.3' - 61.1'
Transition Material . . . . . #30 Sand

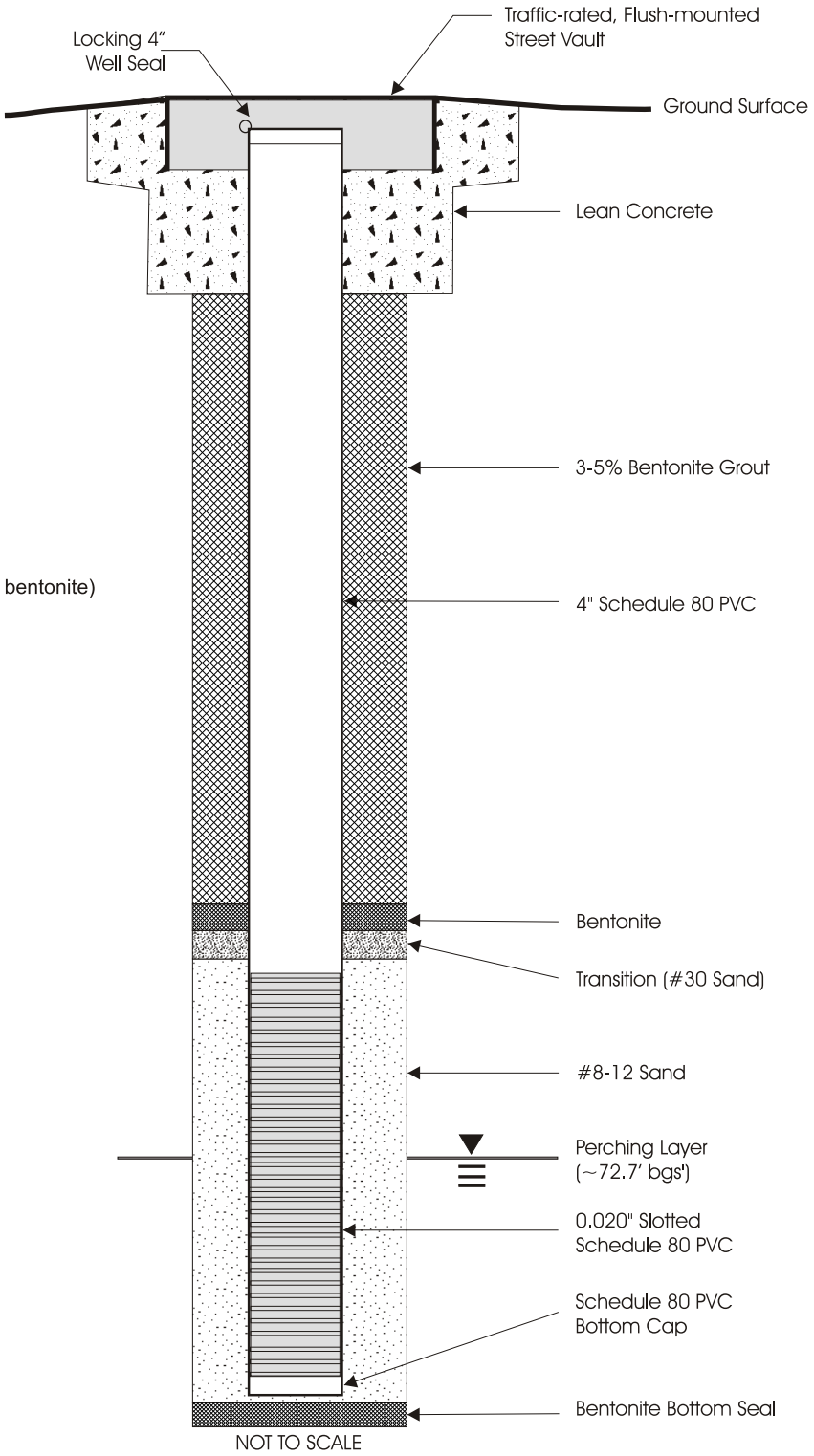
Gravel Pack Interval . . . . . 61.1' - 76'
Gravel Pack Material . . . .#8-12 Sand

Depth to Top of Perforation Zone . . . 65.9'

Screened Interval . . . . . 65.9' - 75.9'
Perforations. . . . . .0.020", Slotted

Bottom Seal Interval. . . . . 76' - 76.5'
Seal Material . . . . . Bentonite

Surface Completion. . . . . Flush Mount



IRA-16 MONITOR WELL SCHEMATIC
Remedial Investigation/Feasibility Study
Miracle Mile WQARF Site

ADWR # 55-586371

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URS BORING LOG

BORING LOG: IRA-17
SHEET 1 of 3
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

LOCATION:
COORDINATES. N:
E:

RIG TYPE:
DRILLING METHOD: Rotosonic
HAMMER TYPE: Continous Coring

REF. ALIGNMENT:
STATION:
OFFSET:

COMMENTS: Surface Conditions: Chip Seal. SM= Slightly Moist, M= Moist

SURFACE ELEV.:
DATUM:

START DATE: 2/6/2003 TIME: 1500
FINISH DATE: 2/7/2003 TIME: 1100

	Casing	Split Spoon	Split Spoon	Shelby Tube	Ring Sample	Core Barrel
Type/Symbol		S	S2	U	R	C
I.D.		1.375"	0.87"		1.5"	
O.D.		2"	1.50"		2"	
Length		18"	18"		22"	
Hammer WT.	140 lbs.		Drill Rod Size			
Hammer Fall	30 in.		I.D. (O.D.)			

GROUNDWATER DATA

Date	Time	Water Depth (ft.)	Casing Depth (ft)	Hole Depth (ft)
		73.5		77.5

DEPTH BELOW SURFACE (FT)	USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
	CL							SM	3.5											CLAY with sand, dark brown, slightly moist, medium plasticity, dense and 20% fine sands.	
5	SM							SM	6.9											SILTY CLAY, with few sands, tan to brown and 15% fine to medium sands.	
	SM																			Decreased in cementation, interbedded clayey silt.	
10								SM	3.4											Interbedded clayey silts and silty clays, weak cementation.	
	SM							SM	10.6												
15								SM	13.7												
	ML																			SILT with few clays and sands, slightly moist, light brown, dense, medium plasticity index, 10% fine sands and 10% clays.	
20								SM	6.5											SAND with trace of silts, light brown, slightly moist, fine to medium sands and trace silts.	
																				Gravel layer.	
25																				Gravel layer.	

PID Q:\MIRACLE MILE\2003 MONITOR WELLS\BORING LOGS\MONITOR WELLS.GPJ TEMPLAT1.GDT 09/12/03

URS BORING LOG

BORING LOG: IRA-17
SHEET 2 of 3
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	0/6	6/12	12/18	N	REC. (in.)	RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
	SP							SM	4.0												
30																					
								SM	13.4											SANDY GRAVELS and GRAVELLY SANDS, brown, slightly moist, 40% gravels, 10% cobbles, and trace silts.	
35																				Interbedded cobbles.	
	SP-GP																			Interbedded cobbles.	
40								SM	13.5												
45																					
	GP																			SANDY GRAVEL, with cobbles and silt, light brown, slight moist, dense, 35% medium to coarse sands and trace cobbles. Thin silty gravel layer, dry.	
50								SM	10.4											4 inch cobbles.	
								SM	19.8											CLAYEY SAND, trace cobbles, and silt, reddish brown, moist, very dense, 15% sand and silts, 10% gravels, and trace cobbles.	
55	SC							SM	4.7												
								SM	35.0											CLAYEY GRAVEL, with sand, trace cobbles, reddish brown, moist, low plasticity, dense to very dense.	
								SM	15.0												
	GC							SM	14.3												
60								SM	10.5												
								SM-M	55.6											CLAYEY SAND, reddish brown, slightly moist to moist, low plasticity, dense, 20% silt and clay, and 5% gravels.	
	SC							SM	54.5												
								SM	37.3												
65								SM	33.0												

URS

BORING LOG

BORING LOG: IRA-17

SHEET 3 of 3

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
	GP							SM	17.9											CLAYEY GRAVEL with sand, few cobbles, reddish brown, slightly moist to moist, low plasticity, dense, 25% sand, 20% silt and clay and 20% cobble.	
								SM	14.2												
								SM	32.8												
70								SM	30.9												
								SM	31.5												
								SM-M	9.3												
								SM	4.7												
75	CL							SM	5.8											CLAY, few silts and sands, dark brown, moist, medium plasticity, hard, trace to 10% fine sand.	
								SM	2.1												
80																					
85																					
90																					
95																					
100																					
105																					

WELL BORING DETAILS:

Total Depth . . . . . 77.7'
Casing Diameter . . . . . 8”
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Casing length . . . . . 75'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Surface Seal . . . . . 0 to 5'
Seal Material . . . . . Concrete

Backfill/Seal Interval. . . . . 5' to 58'
Backfill Material . . . . . Bentonite Grout

Transition Interval . . . . . 58’ to 60’
Transition Material . . . . . #30 Sand

Gravel Pack Interval . . . . . 60’ to 75.5’
Gravel Pack Material . . . .#8-12 Sand

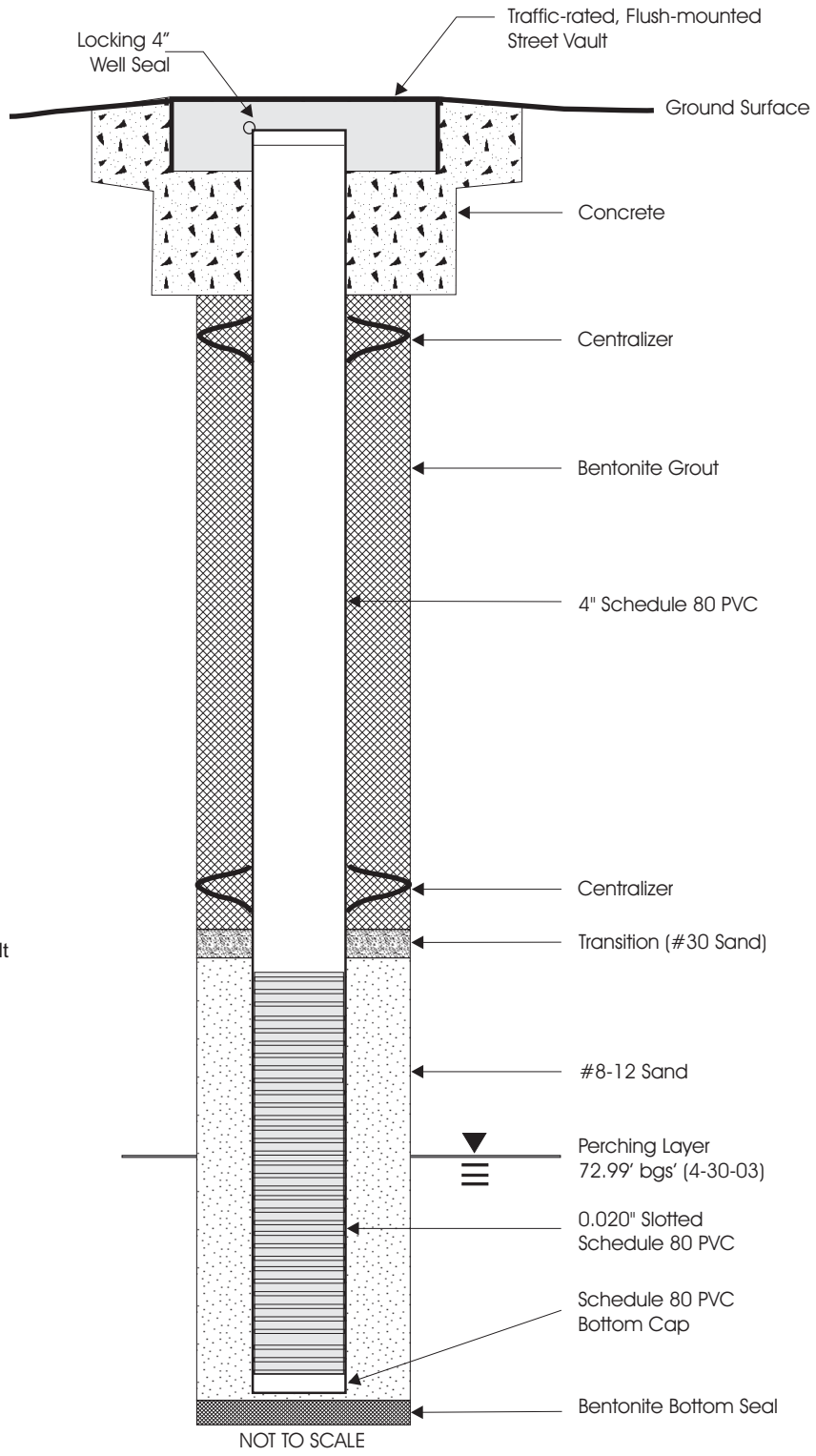
Depth to Top of Perforation Zone . . . 65'

Screened Interval . . . . . .65’ to 75'
Perforations. . . . . .0.020", Slotted

Bottom Seal Interval. . . . . 75.5’ to 77.7'
Seal Material . . . . . Bentonite

Surface Completion. . . . . 12” Flush Mount Vault

Centralizers. . . . . .15’ & 65’



PERCHED MONITOR WELL SCHEMATIC - IRA-17

Remedial Investigation/Feasibility Study

Miracle Mile WQARF Site

P:\Miracle Mile\2003 Monitor Wells \ Perched MW Installation\Figures\Completed Perched Well Schematic IRA-17.cdr

URS BORING LOG

BORING LOG: IRA-18
SHEET 1 of 3
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

LOCATION:
COORDINATES. N:
E:

RIG TYPE:
DRILLING METHOD: Rotosonic
HAMMER TYPE: Continous Coring

REF. ALIGNMENT:
STATION:
OFFSET:

COMMENTS: SM= Slightly Moist, M= Moist

SURFACE ELEV.:
DATUM:

START DATE: 2/5/2003 TIME: 1013
FINISH DATE: 2/6/2003 TIME: 130

	Casing	Split Spoon	Split Spoon	Shelby Tube	Ring Sample	Core Barrel
Type/Symbol		S	S2	U	R	C
I.D.		1.375"	0.87"		1.5"	
O.D.		2"	1.50"		2"	
Length		18"	18"		22"	
Hammer WT.	140 lbs.		Drill Rod Size			
Hammer Fall	30 in.		I.D. (O.D.)			

GROUNDWATER DATA

Date	Time	Water Depth (ft.)	Casing Depth (ft)	Hole Depth (ft)
				85

DEPTH BELOW SURFACE (FT)	USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
																				CLAY with few sand, dark brown, slightly moist, medium plasticity, dense and 20% fine sands, 80% silty clay.	
								SM	3.9												
5								SM	5.1											Brown to tan, weak cementation	
								SM	11.4												
	CL																			Nill cementation	
10																					
								SM	8.2											Molted cementation, few nodules of hard cementation, 30% fine to medium sands and 20% silts. 6 inch layer of interbedded silts and clayey silts.	
15								SM	4.4											Mostly silty clay, few fine sands, low plasticity.	
																				SILT with fine sands, brown, slightly moist, nill plasticity, 20% fine sands.	
	ML																				
20																					
								SM	3.3											SAND, trace gravels, light brown, slightly moist, dense, less than 5% fine to coarse silts.	
25																					

URS BORING LOG

BORING LOG: IRA-18
SHEET 2 of 3
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
								VM	1.9												
30																				Thin gravel layer.	
35								SM	12.7												
								SM	4.0											2 inch layer of sandy clay.	
	SP																				
40								M	1.4												
																				Increase in gravels and cobbles.	
45																				Very moist sands and gravels.	
								VM-M	3.6												
																				Wet silty clay layer, medium plasticity.	
																				6 inch gravel layer of sub-rounded with sand.	
50																					
																				Coarse cobbles, subrounded.	
55																					
								SM	17.5												
								SM	18.7											CLAYEY SAND with gravels, few cobbles, brown, slightly moist, low plasticity, very dense, 35% cobbles, 25% gravels, 10-25% clays, and fine to coarse sands.	
60								M	29.5												
								SM	24.5												
								SM	40.0												
65																					

URS BORING LOG

BORING LOG: IRA-18
SHEET 3 of 3
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.): 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING: RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
								SM	62.9												
	SC								44.9												
									31.3												
									27.6												
								SM	39.5												
70																					
								SM	2.5												
																				Fine clayey sand.	
																				gravel-cobble layer.	
75								SM	8.6												
	CL																			CLAY, dark brown, slightly moist, low to medium plasticity, hard, and 5% fine to coarse sands.	
	SC																			CLAYEY SAND with gravel, brown, moist to very moist, low to medium plasticity, 20% sand and clays.	
80								VM	8.0												
	CL																			CLAY, dark brown, slightly moist, low to medium plasticity. 4 inch layer of sand. Interbedded clay, silt.	
								M	4.3												
85																					
90																					
95																					
100																					
105																					

WELL BORING DETAILS:

Total Depth . . . . . 85'
Casing Diameter . . . . . 8"
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Casing length . . . . . 75.5'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Surface Seal . . . . . 0 to 5'
Seal Material . . . . . Concrete

Backfill/Seal Interval. . . . . 5' to 58.5'
Backfill Material . . . . . Bentonite Grout

Transition Interval . . . . . 58.5' to 60.5'
Transition Material . . . . . #30 Sand

Gravel Pack Interval . . . . . 60.5' to 75.5'
Gravel Pack Material . . . .#8-12 Sand

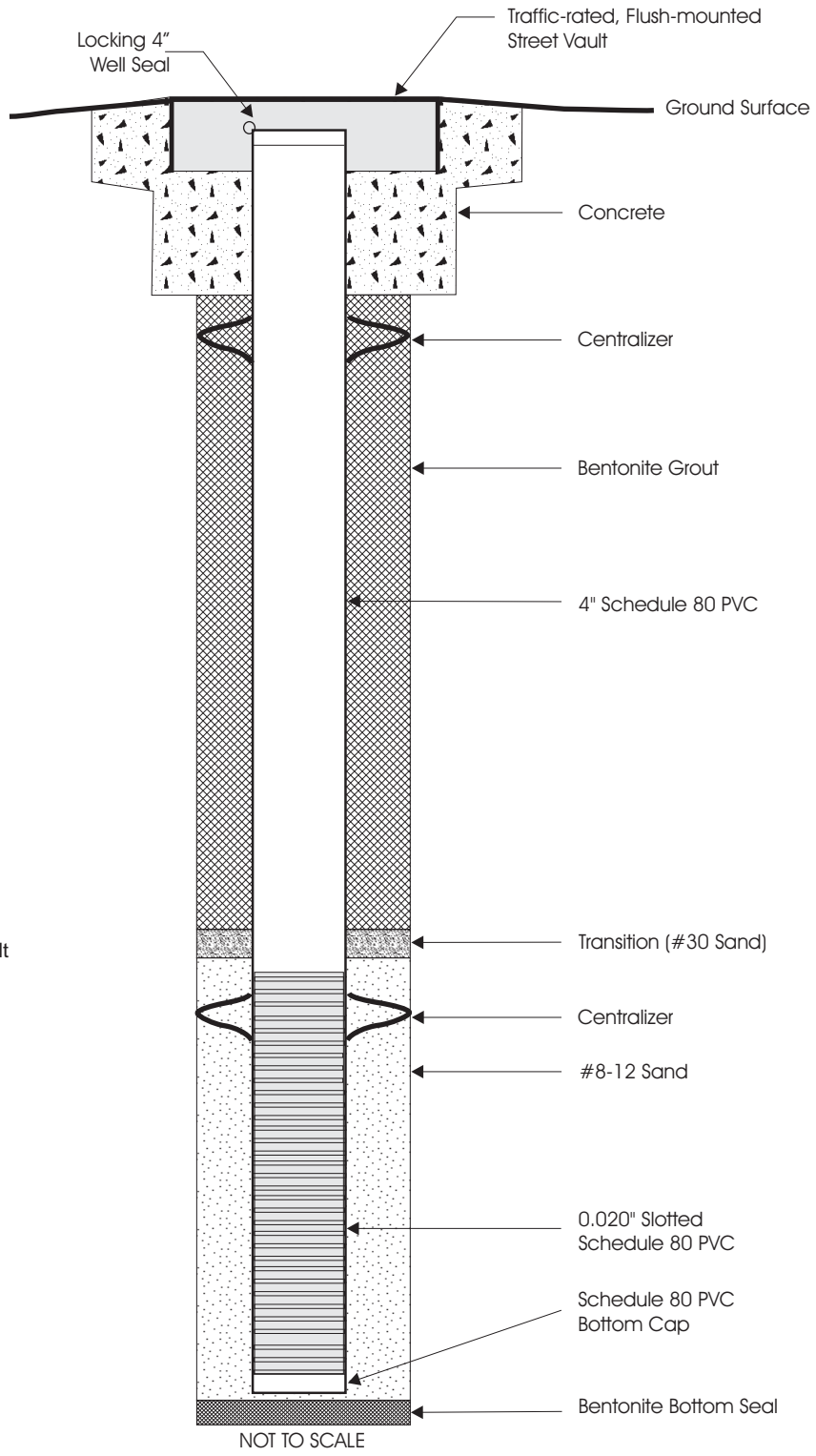
Depth to Top of Perforation Zone . . . 65.5'

Screened Interval . . . . . .65.5' to 75.5'
Perforations. . . . . .0.020", Slotted

Bottom Seal Interval. . . . . 75.5' to 85'
Seal Material . . . . . Bentonite

Surface Completion. . . . . 12" Flush Mount Vault

Centralizer. . . . . 15' & 65'



PERCHED MONITOR WELL SCHEMATIC - IRA-18

Remedial Investigation/Feasibility Study

Miracle Mile WQARF Site

P:\Miracle Mile\2003 Monitor Wells \ Perched MW Installation\Figures\Completed Perched Well Schematic IRA-18.cdr

URS BORING LOG

BORING LOG: IRA-19
SHEET 1 of 3
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

LOCATION:
COORDINATES. N:
E:

RIG TYPE:
DRILLING METHOD: Rotosonic
HAMMER TYPE: Continous Coring

REF. ALIGNMENT:
STATION:
OFFSET:

COMMENTS: SM= Slightly Moist, M= Moist

SURFACE ELEV.:
DATUM:

START DATE: 2/9/2003 TIME: 1540
FINISH DATE: 2/10/2003 TIME: 1650

	Casing	Split Spoon	Split Spoon	Shelby Tube	Ring Sample	Core Barrel
Type/Symbol		S	S2	U	R	C
I.D.		1.375"	0.87"		1.5"	
O.D.		2"	1.50"		2"	
Length		18"	18"		22"	
Hammer WT.	140 lbs.		Drill Rod Size			
Hammer Fall	30 in.		I.D. (O.D.)			

GROUNDWATER DATA

Date	Time	Water Depth (ft.)	Casing Depth (ft)	Hole Depth (ft)
				85

DEPTH BELOW SURFACE (FT)	USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
	SC							SM	29											CLAYEY SAND with few silts, trace gravels, brown, slightly moist, low plasticity, 35% silt and clay, fine and coarse sand, and trace gravels.	
								SM	28.5												
								SM	4.1												
5																				SILTY SAND with clay, trace gravels, slight moist, tan, nill to low plasticity, 35% silt and clay, fine to coarse sand and 5% gravel.	
	SC-SM							SM	1.2											Weak to strong nodule of cementation.	
10								SM	10.9											8 inch layer of clayey silt.	
																				CLAY with few sands, brown, slightly moist, medium plasticity.	
								SM	20.4												
	CL																			Increase in sands.	
15																					
								SM	27.6												
								SM	20.2												
	ML							SM	51.3											SILT with few sands, brown slightly moist, 80% silts, fine to coarse and trace clay.	
20								SM	23.9												
																				SAND trace gravels and silt, brown, slightly moist, fine to coarse sands, trace to 5% silts, and trace gravels.	
								SM	2.3												
25																				2 inch clayey sand clast.	

URS

BORING LOG

BORING LOG: IRA-19

SHEET 2 of 3

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
								SM	2.3											6 inch layer slightly moist to moist.	
	SP																				
30																				6 inch layer slightly moist to moist. 3 inch layer of gravel.	
																				3 inch layer clayey sand, slightly moist.	
																				Increase fine gravel.	
35																					
								SM	1.9											SANDY GRAVEL trace to few cobbles, trace silts, light brown, moist, medium to coarse sand, 5% cobbles and trace silt.	
40																					
								SM	4.7												
																				Fine gravels and coarse sands.	
45	GP																				
																				8 inch layer silty sand	
								SM	7.6												
50																				Cobble layer. Interbedded sand with fines and gravels.	
								M	8.1											CLAYEY SAND with gravels, trace cobbles, reddish brown, moist, low plasticity, very dense, 30% silty and clay, 20% gravel, fine and coarse sand.	
55																					
								M	9.9												
60																				Decrease in gravel.	
								M	57												
	SC							M	5.6												
65																					

URS

BORING LOG

BORING LOG: IRA-19

SHEET 3 of 3

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
								M	77.1											Decrease in gravels, become pinkish brown.	
								M	335.1												
								M	275.8												
								M	83.9												
								M	49.1												
70																				6 to 8 inch layer of moist.	
								M	181.2											Poorly-graded sand, with gravel and few silt, 20% gravel, 10% silt, clay and coarse sand.	
	CL							M	136.6												
								M	34.9											CLAY, SANDY CLAY, SILTY CLAY, (interbedded), brown, slightly moist, low to medium plasticity, 15% sand and 30% silt.	
75	SC							M	115.5											CLAYEY SAND, brown, moist, low to medium plasticity, very dense, 30% gravel, 20% cobble and silt. Cobble layer.	
								M	44.9											SANDY CLAY, CLAYEY SAND, interbedded, brown, moist, low to medium plasticity, very dense, 25% sand and 30% silt.	
	SC-CL																				
80																					
	GC							M	18.9											CLAYEY GRAVEL with sand, light brown, moist, low to medium plasticity, 30% sand and silt.	
								M	1.3												
85																					
90																					
95																					
100																					
105																					

WELL BORING DETAILS:

Total Depth . . . . . 85'
Casing Diameter . . . . . 8"
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Casing length . . . . . 72'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Surface Seal . . . . . 0 to 5'
Seal Material . . . . . Concrete

Backfill/Seal Interval. . . . . 5' to 55'
Backfill Material . . . . . Bentonite Grout

Transition Interval . . . . . 55' to 67'
Transition Material . . . . . #30 Sand

Gravel Pack Interval . . . . . 57' to 72'
Gravel Pack Material . . . .#8-12 Sand

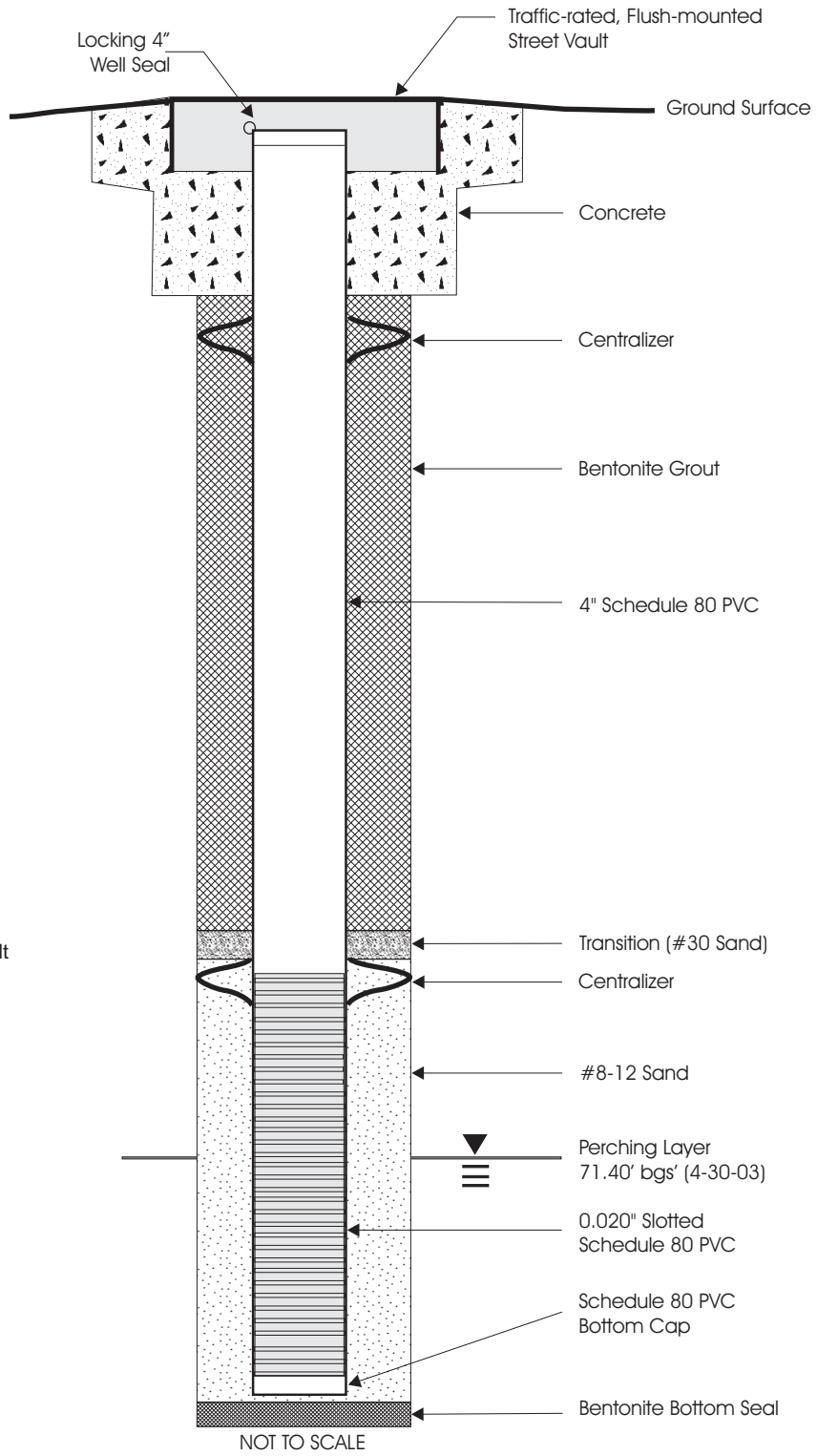
Depth to Top of Perforation Zone . . . 62'

Screened Interval . . . . . .62' to 72'
Perforations. . . . . .0.020", Slotted

Bottom Seal Interval. . . . . 72' to 85'
Seal Material . . . . . Bentonite

Surface Completion. . . . . 12" Flush Mount Vault

Centralizers. . . . . .12' & 62'



PERCHED MONITOR WELL SCHEMATIC - IRA-19

Remedial Investigation/Feasibility Study

Miracle Mile WQARF Site

P:\Miracle Mile\2003 Monitor Wells \ Perched MW Installation\Figures\Completed Perched Well Schematic IRA-19.cdr

URS BORING LOG

BORING LOG: IRA-20
SHEET 1 of 3
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

LOCATION:
COORDINATES. N:
E:

RIG TYPE:
DRILLING METHOD: Rotosonic
HAMMER TYPE: Continous Coring

REF. ALIGNMENT:
STATION:
OFFSET:

COMMENTS: Surface Conditions: Lawn. SM= Slightly Moist, M= Moist

SURFACE ELEV.:
DATUM:
START DATE: 2/11/2003 TIME: 0900
FINISH DATE: TIME:

	Casing	Split Spoon	Split Spoon	Shelby Tube	Ring Sample	Core Barrel
Type/Symbol		S	S2	U	R	C
I.D.		1.375"	0.87"		1.5"	
O.D.		2"	1.50"		2"	
Length		18"	18"		22"	
Hammer WT.	140 lbs.		Drill Rod Size			
Hammer Fall	30 in.		I.D. (O.D.)			

GROUNDWATER DATA

Date	Time	Water Depth (ft.)	Casing Depth (ft)	Hole Depth (ft)
				90

DEPTH BELOW SURFACE (FT)	USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	ROCK CORING REC (in.)	ROCK CORING REC (%)	ROCK CORING L>4" (in.)	ROCK CORING RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
	CL							M	3.6											CLAY, few sand and silt, dark brown, moist, low to medium plasticity, very stiff and 5 to 10% fine sand.	
5								SM	0.3												
	SM																			SANDY CLAY SILT, brown, slightly moist, nill to low plasticity, dense, 20% of sand and clay.	
	CL																			SILTY CLAY, trace to few sands, brown to tan, slightly moist, low plasticity, very stiff, weak cementation and 5% sand.	
10	SM																			SILTY SAND, light brown, slightly moist, fine to medium sands and 20% silt. 4 inch layer of gravel, 3/4" size.	
								SM	2.2											CLAY with few sand, brown, slightly moist to moist, low plasticity, hard, few weak cementation, and 5 to 15% fine sand. Decline in sand, low to medium plasticity.	
15	CL ML																			Increase in silts.	
20																				Decrease in cementation.	
								SM	0.0											SANDY SILT, brown, slightly moist and 30% fine sand. 6 inch layer of clayey sand.	
	SC-SM																				
	SM																				
25																					

PID Q:\MIRACLE MILE\2003 MONITOR WELLS\BORING LOGS\MONITOR WELLS.GPJ TEMPLAT1.GDT 09/12/03

URS BORING LOG

BORING LOG: IRA-20
SHEET 2 of 3
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
																				8 inch layer of very moist soil.	
								SM	1.9											SAND, trace to few gravels, trace silts, light brown, slightly moist, fine to coarse sands and 20% gravels. Thin layer of interbedded gravels.	
30								M	0.0											Soil becomes brown and slightly moist to moist.	
																				6 inch layer of silty sand.	
35																				6 inch layer of silty sand. Gravel layer.	
	SP																			Dark gravel layer.	
40																				Trace of cobbles.	
45																				Slightly moist. Becomes tan color.	
								SM	1.6											2 inch layer of clayey sand.	
50																				Cobble layer	
																				2 inch layer of silty clay, wet.	
								M	1.6											CLAYEY SAND with gravels, trace cobbles, brown, moist, low plasticity, medium dense, 25% silt and clay, 20% sand and 10% cobble.	
55																				Decrease in fine sands.	
60																				Increase in clay, slightly moist, and very dense.	
																				Decrease in sand, moist and dense.	
65	SC																				

URS

BORING LOG

BORING LOG: IRA-20

SHEET 3 of 3

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
								SM	4.9											Gravel and cobbel layer, 50% gravels, 15% cobbles, silts and fine to coarse sands.	
70																				Poorly-graded sand with clay, 10% silts, fine to coarse sands, and trace cobbles.	
																				Gravel and cobbel layer, 35% gravels.	
								SM	8.4												
75																				Gravel and cobbel layer, 30% gravels.	
																				SAND and CLAYEY SAND, light brown, moist, low to medium plasticity, 5 to 15% silts, fine to coarse sands and trace cobbles.	
80																					
	SP-SC																			Gravel layer.	
																				An inch and a half layer of clayey sand, slightly moist, and hard.	
								M	10.1											8 inch layer of clayey sand with gravels.	
85																				Interbedded clay, slightly moist to moist.	
	CL																			CLAY with few silts, trace sands, dark brown, slightly moist, medium plasticity, hard, 10% silts and trace sands.	
								SM	11.1												
	SC																			CLAYEY SAND, light brown, slightly moist to moist, low plasticity, very dense, 20% clays, and 10% sands.	
90								M	25.1											8 inch layer of silty sand, light brown, moist.	
95																					
100																					
105																					

WELL BORING DETAILS:

Total Depth . . . . . 90'
Casing Diameter . . . . . .8"
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Casing length . . . . . 85.5'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Surface Seal . . . . . 0 to 5'
Seal Material . . . . . Concrete

Backfill/Seal Interval. . . . . 5' to 58'
Backfill Material . . . . . Bentonite Grout

Transition Interval . . . . . 68.5' to 70.5'
Transition Material . . . . . #30 Sand

Gravel Pack Interval . . . . . 70.5' to 85.5'
Gravel Pack Material . . . .#8-12 Sand

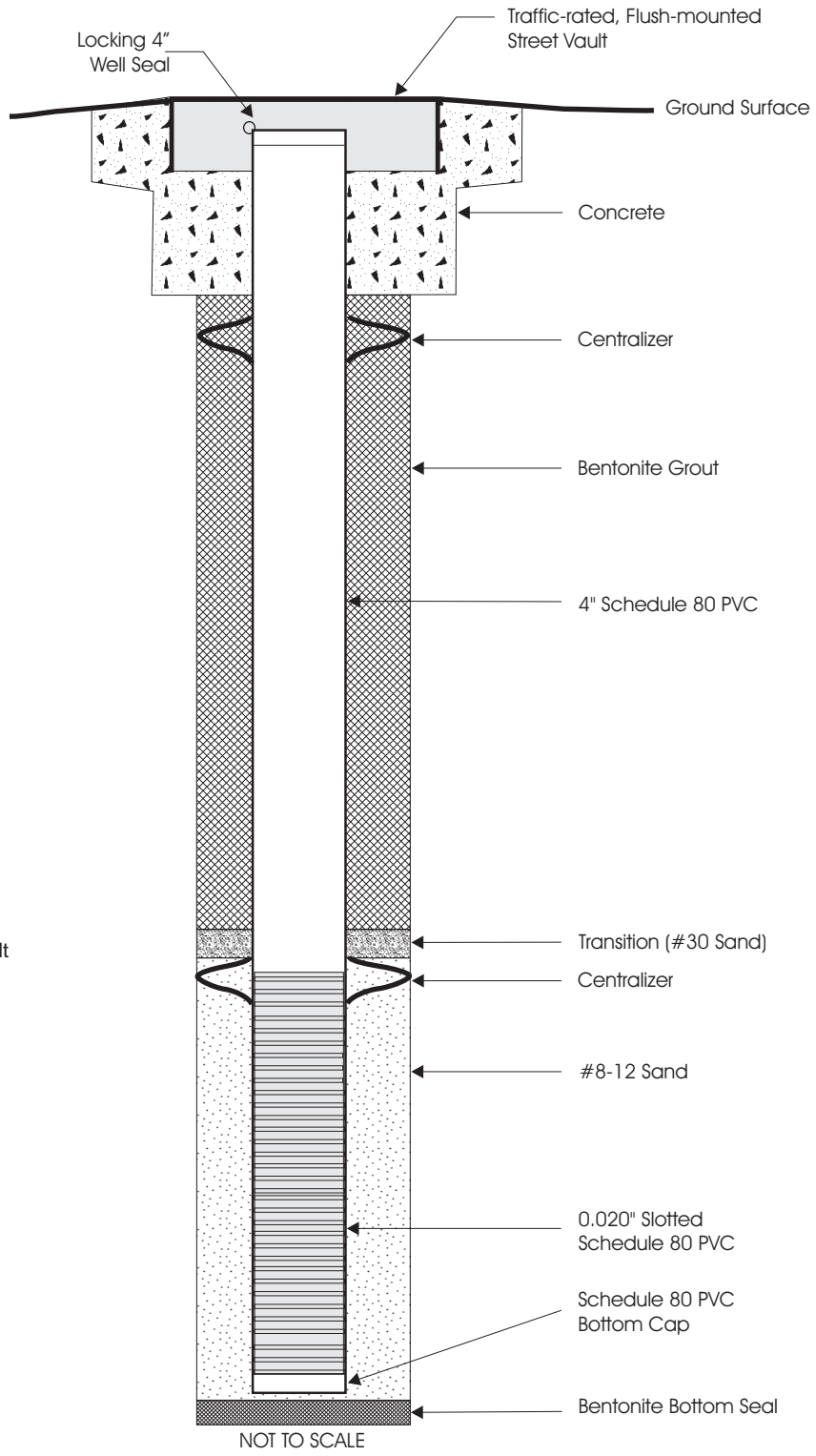
Depth to Top of Perforation Zone . . . 75'

Screened Interval . . . . . .75' to 85'
Perforations. . . . . .0.020", Slotted

Bottom Seal Interval. . . . . 85.5' to 90'
Seal Material . . . . . Bentonite

Surface Completion. . . . . 12" Flush Mount Vault

Centralizers. . . . . .15' & 75'



PERCHED MONITOR WELL SCHEMATIC - IRA-20

Remedial Investigation/Feasibility Study

Miracle Mile WQARF Site

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URS BORING LOG

BORING LOG: IRA-21
SHEET 1 of 3
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

LOCATION:
COORDINATES. N:
E:

RIG TYPE:
DRILLING METHOD: Rotosonic
HAMMER TYPE: Continous Coring

REF. ALIGNMENT:
STATION:
OFFSET:

COMMENTS: SM= Slightly Moist, M= Moist

SURFACE ELEV.:
DATUM:

START DATE: 2/17/2003 TIME: 0805
FINISH DATE: 2/18/2003 TIME: 1000

	Casing	Split Spoon	Split Spoon	Shelby Tube	Ring Sample	Core Barrel
Type/Symbol		S	S2	U	R	C
I.D.		1.375"	0.87"		1.5"	
O.D.		2"	1.50"		2"	
Length		18"	18"		22"	
Hammer WT.	140 lbs.		Drill Rod Size			
Hammer Fall	30 in.		I.D. (O.D.)			

GROUNDWATER DATA

Date	Time	Water Depth (ft.)	Casing Depth (ft)	Hole Depth (ft)
				75

DEPTH BELOW SURFACE (FT)	USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
	SC																			CLAYEY SAND with silt, light brown, slightly moist, dense to very dense, 40% silt and clay.	
5																					
								SM	1.1											SANDY CLAY, light brown, tan, slightly moist, medium plasticity, hard, and 35% sand.	
10	CL																			Silty sandy clay, brown, 20% silts, 10% sands. 6 inch layer of clay, trace sands, increase in cementation. 8 inch layer of silt with clay, brown, slightly moist.	
15								SM	5.3											SANDY SILT, trace clays, 30% fine sands.	
	ML																				
								SM	3.3											SAND with trace gravels and silt, light brown, slightly moist, fine to coarse sands, trace of gravels and slits.	
20																				Trace of coarse gravels. Fine gravel layer, 15% gravels, medium to coarse sands.	
25																					

URS BORING LOG

BORING LOG: IRA-21
SHEET 2 of 3
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	0/6	6/12	12/18	N	REC. (in.)	RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
	SP																			2 inch layer of clayey sand. Trace of cobbles.	
30								SM	3.2											Trace of cobbles. Moist to slightly moist.	
35	GP							SM	2.6											SANDY GRAVEL trace of silts, light brown, slightly moist, dense, 60% gravels, and 40% sand. Interbedded fine and coarse gravels.	
40	SP																			GRAVELLY SAND, light brown, slightly moist, 75% sand, 20% gravel and trace silt.	
45								M	10.0											Thin wet gravel layer.	
50								M	29.4											CLAYEY SAND with gravel, brown to light brown, moist, 15% gravel and clay, 5% silt.	
								M	3.9											Becomes reddish brown, moist, decrease in gravels.	
55								M	5.8											1 inch layer of gravels.	
								M	11.3											Cobble layer.	
60	SC							M	19.8											Cobble layer. Trace to 5% silts, fine to coarse sands and brown. Gravel layer.	
65								M	4.8												

URS

BORING LOG

BORING LOG: IRA-21

SHEET 3 of 3

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
								M	17.8												
								M	17.0												
70								M	7.4												
								M	16.2											CLAY with few sand, brown, slightly moist to moist, 10-20% silt, trace to 10% fine sands.	
	CL																				
75								M	4.6												
80																					
85																					
90																					
95																					
100																					
105																					

WELL BORING DETAILS:

Total Depth . . . . . 75'
Casing Diameter . . . . . 8"
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Casing length . . . . . 73.5'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Surface Seal . . . . . 0 to 5'
Seal Material . . . . . Concrete

Backfill/Seal Interval. . . . . 5' to 56.5'
Backfill Material . . . . . Bentonite Grout

Transition Interval . . . . . 56.5' to 58.5'
Transition Material . . . . . #30 Sand

Gravel Pack Interval . . . . . 58.5' to 73.5'
Gravel Pack Material . . . .#8-12 Sand

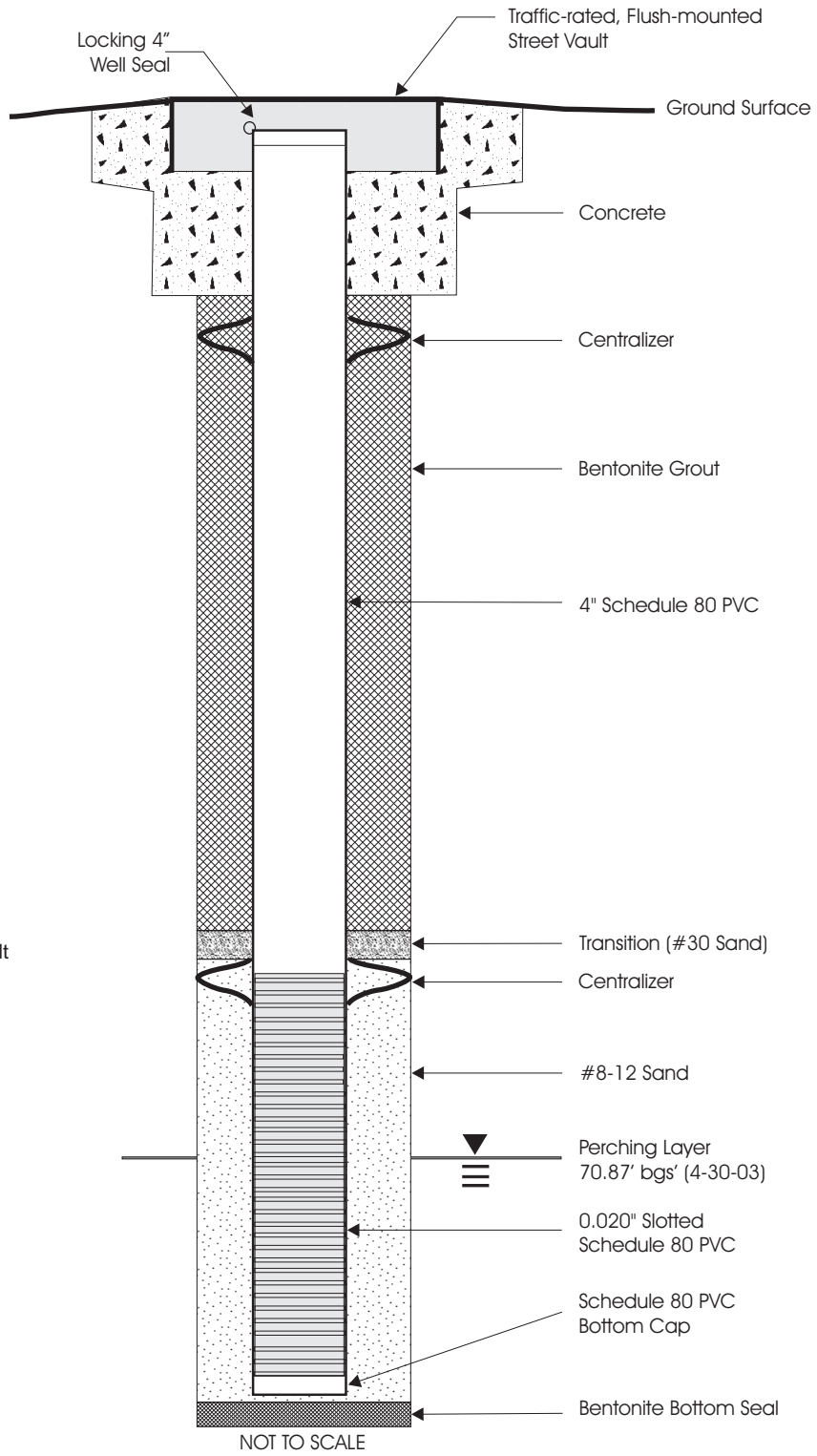
Depth to Top of Perforation Zone . . . 63.5'

Screened Interval . . . . . .63.5' to 73.5'
Perforations. . . . . .0.020", Slotted

Bottom Seal Interval. . . . . 73.5' to 757'
Seal Material . . . . . Bentonite

Surface Completion. . . . . 12" Flush Mount Vault

Centralizers. . . . . .13.5' & 63.5'



PERCHED MONITOR WELL SCHEMATIC - IRA-21

Remedial Investigation/Feasibility Study

Miracle Mile WQARF Site

P:\Miracle Mile\2003 Monitor Wells \ Perched MW Installation\Figures\Completed Perched Well Schematic IRA-21.cdr

URS BORING LOG

BORING LOG: IRA-22
SHEET 1 of 3
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

LOCATION:
COORDINATES. N:
E:

RIG TYPE:
DRILLING METHOD: Rotosonic
HAMMER TYPE: Continous Coring

REF. ALIGNMENT:
STATION:
OFFSET:

COMMENTS: SM= Slightly Moist, M= Moist, VM= Very Moist, W= Wet

SURFACE ELEV.:
DATUM:

START DATE: 2/18/2003 TIME: 1220
FINISH DATE: 2/19/2003 TIME:

	Casing	Split Spoon	Split Spoon	Shelby Tube	Ring Sample	Core Barrel
Type/Symbol		S	S2	U	R	C
I.D.		1.375"	0.87"		1.5"	
O.D.		2"	1.50"		2"	
Length		18"	18"		22"	
Hammer WT.	140 lbs.		Drill Rod Size			
Hammer Fall	30 in.		I.D. (O.D.)			

GROUNDWATER DATA

Date	Time	Water Depth (ft.)	Casing Depth (ft)	Hole Depth (ft)
				75

DEPTH BELOW SURFACE (FT)	USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
																				Material was jetted.	
5																					
	SC							W	0.8											CLAYEY SAND with silt, brown, wet, low plasticity, 45% clay and silt, fine sand.	
	SP-SM							SM	2.0											SILTY SAND few gravels, light brown, slightly moist, 10% to 15% silts, fine to medium sand, 5% gravels.	
10																					
	CL							SM	2.1											SANDY CLAY with silt, brown, slightly moist to moist, low plasticity, fine to coarse sand, 5% silts.	
15																				SAND few gravels and silts, brown to light brown, slightly moist to moist, 5% to 20% silts, trace to 25% gravels. 6 inch layer of interbedded silty sands, fine to coarse sands. 6 inch layer of interbedded gravels and gravelly coarse sands.	
								SM	0.5											Mostly silty sand layer.	
20																					
25	SP																				

URS BORING LOG

BORING LOG: IRA-22
SHEET 2 of 3
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
								M	1.0											Becomes moist.	
																				Moist to very moist, coarse sands and gravels.	
30																				Slightly moist, coarse sands and silts.	
								SM	2.8											6 inch layer of sand.	
35																				Cobbles in fine sand.	
																				SANDY GRAVEL trace cobbles, brown, slightly moist, 30% to 90% sand, 5% to 20% silt, trace cobbles.	
40																				2 inch layer of sand, silty sand, silty gravel, and clayey gravel.	
	SP							SM	6.0											Mostly sandy.	
																				2 inch layer of clayey sand.	
45																					
								M	10.8											CLAYEY SAND with few gravels, brown to dark brown, moist, low plasticity, 35% silt and clay, fine to coarse sand, 10% gravels.	
								M	4.5												
50																				Cobble layer.	
								M-VM	3.5											Interbedded gravels and cobbles.	
55																					
								SM	15.5											8 inch layer of silty sand with gravel, brown, slightly moist.	
	SC							M	27.6												
60																					
								VM	14.5											Decrease in gravels, moist to very moist. 20% silt and clay, fine to coarse sands, trace gravels.	
65																				Cobble layer and moist.	

URS

BORING LOG

BORING LOG: IRA-22

SHEET 3 of 3

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
								M	11.5											Increase in gravels.	
70																				~12 inches of interbedded clayey sand and clay.	
								SM	3.7											SILTY CLAY with few fine sand, brown, slightly moist, 80% of silt and clay, 20% sands, 10% gravels.	
	CL							SM	11.5											Veins of cementation.	
75								SM	4.3											Becomes clay with few silt and sands. 2 inch nodules of cementation, trace weak.	
80																					
85																					
90																					
95																					
100																					
105																					

WELL BORING DETAILS:

Total Depth . . . . . 75'
Casing Diameter . . . . . 8"
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Casing length . . . . . 71'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Surface Seal . . . . . 0 to 5'
Seal Material . . . . . Concrete

Backfill/Seal Interval. . . . . 5' to 54'
Backfill Material . . . . . Bentonite Grout

Transition Interval . . . . . 54' to 56'
Transition Material . . . . . #30 Sand

Gravel Pack Interval . . . . . 56' to 71'
Gravel Pack Material . . . .#8-12 Sand

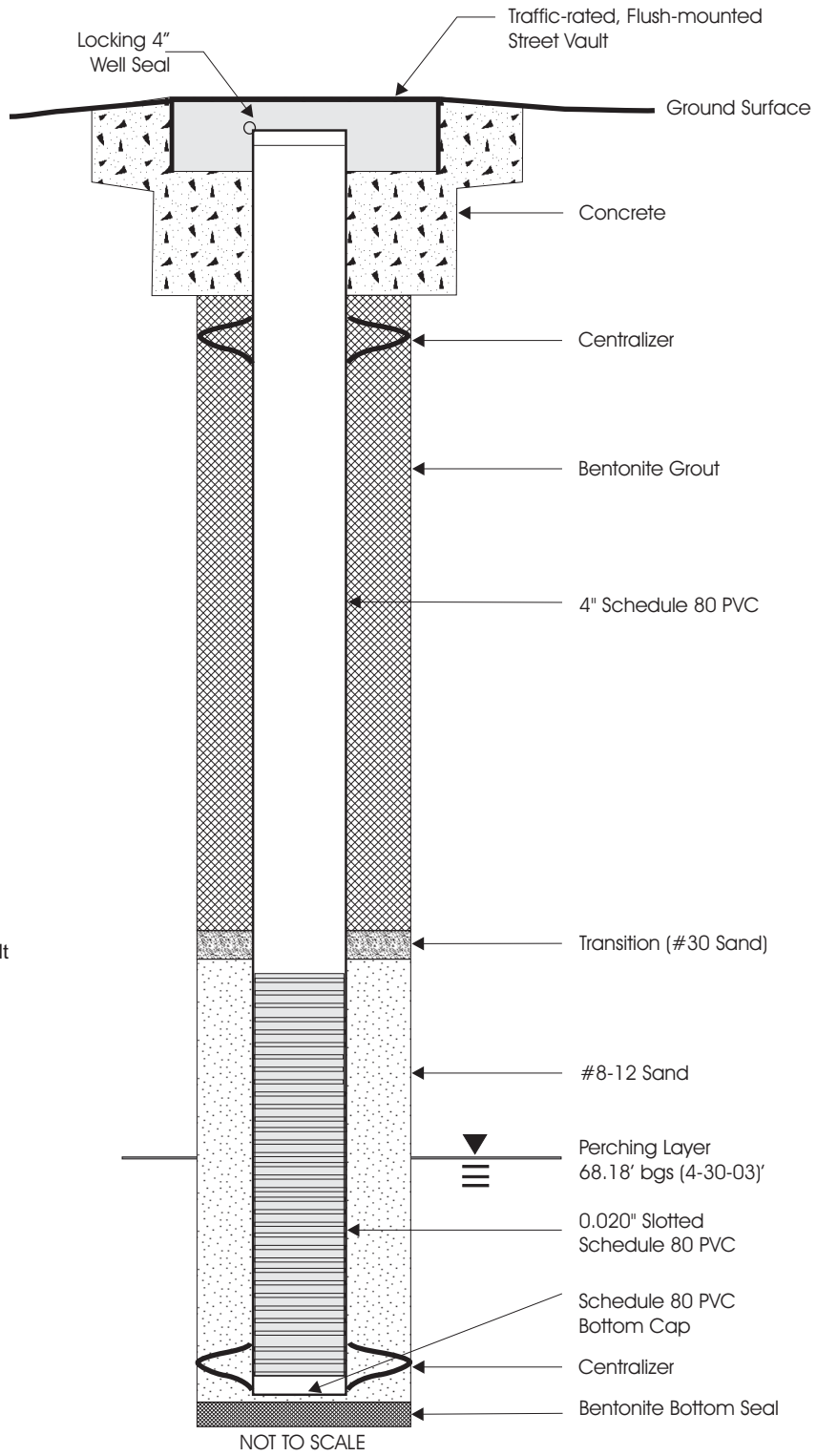
Depth to Top of Perforation Zone . . . 61'

Screened Interval . . . . . .61' to 71'
Perforations. . . . . .0.020", Slotted

Bottom Seal Interval. . . . . 71' to 75'
Seal Material . . . . . Bentonite

Surface Completion. . . . . 12" Flush Mount Vault

Centralizers. . . . . .11' & 71'



PERCHED MONITOR WELL SCHEMATIC - IRA-22

Remedial Investigation/Feasibility Study

Miracle Mile WQARF Site

P:\Miracle Mile\2003 Monitor Wells \ Perched MW Installation\Figures\Completed Perched Well Schematic IRA-22.cdr

URS BORING LOG

BORING LOG: IRA-23
SHEET 1 of 3
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

LOCATION:
COORDINATES. N:
E:

RIG TYPE:
DRILLING METHOD: Rotosonic
HAMMER TYPE: Continous Coring

REF. ALIGNMENT:
STATION:
OFFSET:

COMMENTS: SM= Slightly Moist, M= Moist, VM= Very Moist, W= Wet

SURFACE ELEV.:
DATUM:

START DATE: 2/8/2003 TIME: 0840
FINISH DATE: TIME:

	Casing	Split Spoon	Split Spoon	Shelby Tube	Ring Sample	Core Barrel
Type/Symbol		S	S2	U	R	C
I.D.		1.375"	0.87"		1.5"	
O.D.		2"	1.50"		2"	
Length		18"	18"		22"	
Hammer WT.	140 lbs.		Drill Rod Size			
Hammer Fall	30 in.		I.D. (O.D.)			

GROUNDWATER DATA

Date	Time	Water Depth (ft.)	Casing Depth (ft)	Hole Depth (ft)
				85

DEPTH BELOW SURFACE (FT)	USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	ROCK CORING REC (in.)	ROCK CORING REC (%)	ROCK CORING L>4" (in.)	ROCK CORING RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
																				SILTY SANDY CLAY, dark brown, very moist, medium plasticity, 25% silt, 20% fine to medium sand.	
								VM	1.2												
5	CL																				
								SM	2.8											Decrease in sand and silt, weak cementation, light brown to tan, very stiff, 10% sand and 10% silt.	
10																				Increase in sands, light brown to brown, hard, 25% fine to coarse sands and 20% silts.	
	ML																			SANDY SILT with trace clay, brown, slightly moist, 30% fine to medium sands, trace clay.	
								SM	1.8											Thin interbedded clay layer.	
15																				Thin interbedded clay layer.	
																				SAND with few gravels, trace silts, light brown, slightly moist, 10% gravels, trace to 5% silts, fine to coarse sands.	
20																					
								SM	2.4											Thin gravel layer. Thin silty sand layer.	
	SP																			Slightly moist to moist.	
25																					

PID Q:\MIRACLE MILE\2003 MONITOR WELLS\BORING LOGS\MONITOR WELLS.GPJ TEMPLAT1.GDT 09/12/03

URS BORING LOG

BORING LOG: IRA-23
SHEET 2 of 3
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.): 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING: RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
																				Gravel layer and slightly moist.	
																				Thin silty sand layer.	
30								SM	2.3												
	GPS																			SANDY GRAVEL with few cobbles, trace silts, light brown, slightly moist, 45% gravels, 10% cobbles, trace to 10% silts.	
																				Moist.	
35																					
								M	4.0											SANDY SILTY GRAVEL, light brown, slightly moist, 15% silt, 35% fine sand, trace cobbles.	
	GM																				
40																					
	SP																			SAND with few gravels, trace silts, light brown, slightly moist, 5% gravels, coarse sands, trace cobbles.	
45																					
																				CLAYEY SAND, trace gravels and cobbles, pinkish brown, moist, low plasticity, dense to very dense, 20% silt, fine to coarse sands, trace cobbles and gravels.	
								SM	3.2												
50																					
	SC																				
								SM	0.5												
55																					
	SM																			SILTY SAND with gravel, light brown, slightly moist, 20% silt, 10% gravel, trace cobbles.	
60								SM	2.8												
	SC																			CLAYEY SAND with gravels, trace cobbles, pinkish brown, moist, low plasticity, very dense, 20% clay and gravels, trace cobbles.	
	SP-SM																			SILTY SAND trace clays, light brown, slightly moist, nill to low plasticity, 10% to	
65																					

URS

BORING LOG

BORING LOG: IRA-23

SHEET 3 of 3

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
								M	0.1											15% silts, trace cobbles, fine to coarse sands.	
	SM																			SILTY SAND light brown, moist, very dense, 15% to 20% silt, fine to medium sands.	
70																				CLAYEY SAND with few gravels, light brown, moist, low plasticity, very dense, 20% silt, 15% gravel.	
																				3 to 6 inch layer of clayey sand and clay.	
	SC																			Sandy clay layer transition to clay.	
75																					
								M	4.4											6 inch layer of poorly-graded sand. Clay layer and moist.	
																				3 inch layer of sand, wet.	
80	CL																			CLAY with few sand, dark brown, slightly moist, hard.	
	SP							SM	0.5											SAND with few gravels, trace cobbles (interbedded), trace silts, tan, slightly moist, 20% gravel, 5% silt, fine to coarse sand, trace cobbles.	
85																					
90																					
95																					
100																					
105																					

WELL BORING DETAILS:

Total Depth . . . . . 85'
Casing Diameter . . . . . 8"
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Casing length . . . . . 79.5'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Surface Seal . . . . . 0 to 5'
Seal Material . . . . . Concrete

Backfill/Seal Interval. . . . . 5' to 62.5'
Backfill Material . . . . . Bentonite Grout

Transition Interval . . . . . 62.5' to 64.5'
Transition Material . . . . . #30 Sand

Gravel Pack Interval . . . . . 64.5' to 79.5'
Gravel Pack Material . . . .#8-12 Sand

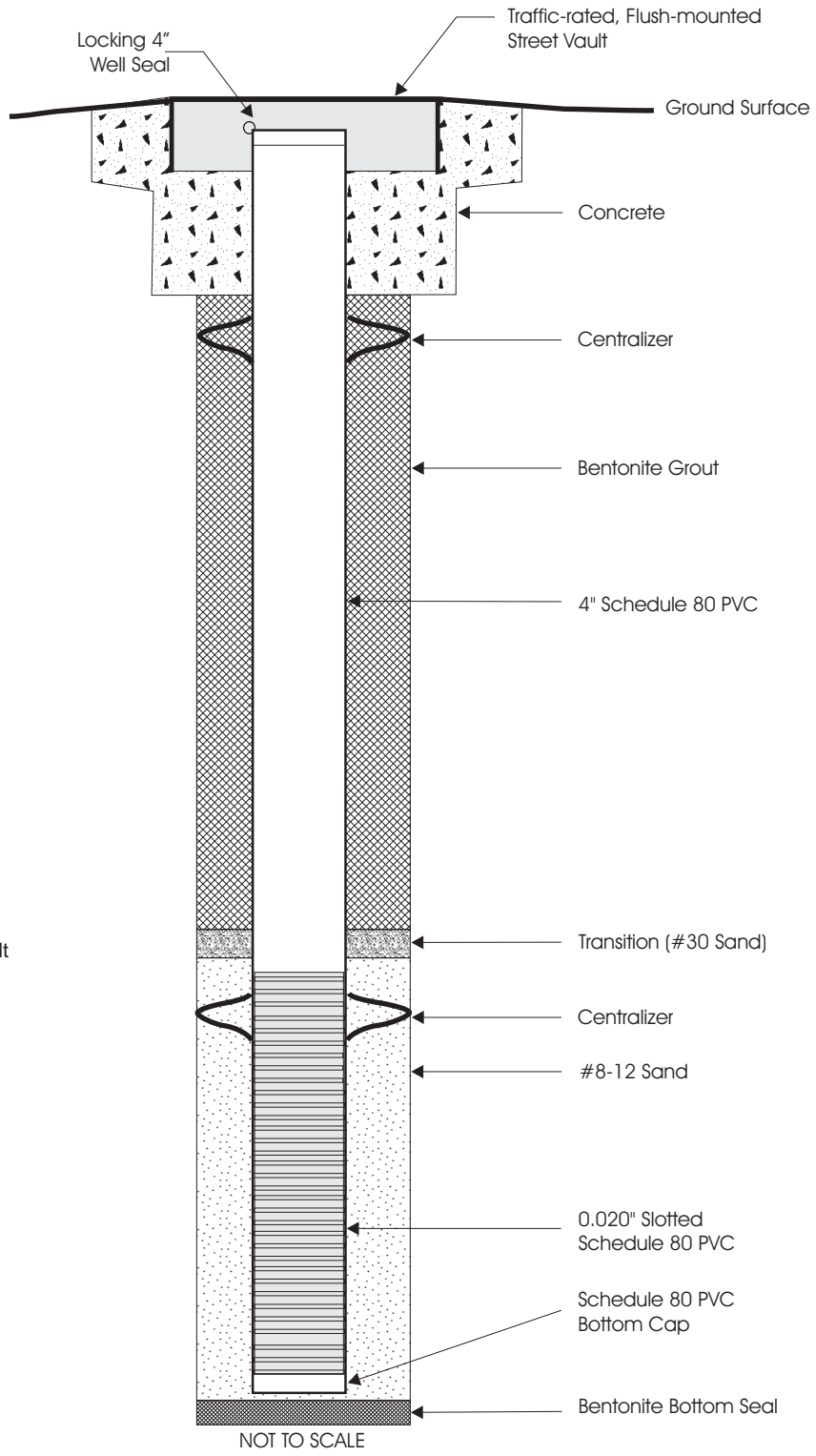
Depth to Top of Perforation Zone . . . 69.5'

Screened Interval . . . . . .69.5' to 79.5'
Perforations. . . . . .0.020", Slotted

Bottom Seal Interval. . . . . 79.5' to 85'
Seal Material . . . . . Bentonite

Surface Completion. . . . . 12" Flush Mount Vault

Centralizers. . . . . .15.5' & 69.5'



PERCHED MONITOR WELL SCHEMATIC - IRA-23

Remedial Investigation/Feasibility Study

Miracle Mile WQARF Site

P:\Miracle Mile\2003 Monitor Wells \ Perched MW Installation\Figures\Completed Perched Well Schematic IRA-23.cdr

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

BORING LOG: IRA - 24

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION: Wetmore Road and La Cholla
URS PROJECT #: 23443628.40000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: D Carlson
START DATE/TIME: 06/01/2004 04:10 PM
FINISH DATE/TIME: 06/04/2004 09:40 AM

LATITUDE (NAD27): 32° 17' 14.22"
LONGITUDE (NAD 27): 111° 00' 41.12"

TOP OF GROUND ELEVATION: 2281.61 A.S.L.
TOP OF CASING ELEVATION: 2281.13 A.S.L.
SCREENED INTERVAL: 168-218 bgs.

COMMENTS:

RIG TYPE: Boart Longyear 1100 Sonic
DRILLING METHOD: Rotosonic
SAMPLING METHOD: continious core

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2280					CLAYEY SAND, with few gravel, brown, angular, low plasticity, strong HCl reaction, slightly moist,	
5			6.8	SC		becomes moist	
	2275		7.1				
10			21.9		10.0'	trace weak veins of weak cementation, mottled tan/brown @ 9.5'	
	2270		0.0			SAND, trace silt & coarse gravel, tan, angular to subangular, moderate HCl reaction, dry	
15			0.6	SP		tannish brown	
	2265		1.1			brown, interbedded fine gravel layer	
20			0.4		20.0'		
	2260		0.0	CL		SILTY CLAY, trace fine sand, mottled brown & tan, low to moderate plasticity, strong HCl reaction, weak cementation, slightly moist	
25			1.0		25.0'		
	2255			SM		SANDY SILT, light brown, angular, strong HCl reaction, weak to nil cementation, dry nodules of hard cementation at 26'	
30			2.7		30.0'		
	2250		7.8	CL		SILTY CLAY, trace sand, tan to brown, hard, 1/2" nodules weak cementation, low to medium plasticity, slightly moist	
					33.5'	6" layer CLAYEY SAND, brown, Strong HCl reaction, angular, medium plasticity, moist @ 33'	
35							

REPORT TUCSON-ENVIRONMENTAL | PROJECT P:\MIRACLE MILE\IRA-24 INSTALLATION\FINAL REPORT PDFS\BACK-UP DATA\IRA 31 & 24.GPJ | LIBRARY URS TUCSON V4.0.GLB | PRINTED 01/14/05

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BORING LOG: IRA - 24

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION: Wetmore Road and La Cholla
URS PROJECT #: 23443628.40000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: D Carlson
START DATE/TIME: 06/01/2004 04:10 PM
FINISH DATE/TIME: 06/04/2004 09:40 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			0.4	SM		SILTY SAND, trace clay, light brown, nil to low plasticiy, angular to sub-rounded slightly moist	
	2245		0.0				
40			0.0		40.0'		
	2240		0.2	CL-ML		SANDY SILTY/SILTY CLAY, brown, nil to medium plasticity, nil to strong HCl reaction, moist interbedded SILTY CLAY, SILTY SAND and CLAYEY SILT @ 42' to 44'	
45			5.1				
	2235		6.8		49.0'		
50			2.8	GP		SANDY GRAVEL, trace silt, light brown, angular to subangular sand, subrounder to rounded gravel, slightly moist to dry	
	2230		4.7				
55			3.3		56.0'		
	2225		9.3	CL	59.0'	CLAY, with little sand, trace silt, brown, medium plasticity, moist	
60			4.6	ML	61.0'	CLAYEY SILT, trace sand, brown, low plasticity, very still, slightly moist low to nil plasticity	
	2220		3.4	CL		CLAY, few to some silt, brown, medium plasticity, hard, moist	
65			9.4		67.0'		
	2215		5.4	SM	68.0'	SILTY SAND, trace angular gravel, brown, angular sand, slightly moist to moist	
70			1.1	CL		CLAY, with some sand, brown, medium plasticity, stiff, moist, possibly cold	
	2210		8.9			becomes very stiff	
75			3.3		75.0'	low plasticity	

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BORING LOG: IRA - 24

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION: Wetmore Road and La Cholla
URS PROJECT #: 23443628.40000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: D Carlson
START DATE/TIME: 06/01/2004 04:10 PM
FINISH DATE/TIME: 06/04/2004 09:40 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2205		2.5	GM		SILTY GRAVEL, with some sand, little cobbles, brown and white, angular to subrounded sand and gravel, subrounded to rounded cobbles, slightly moist to moist	
			1.3				
80			0.2				
	2200		7.9		83.0'	3" SANDY CLAY @ 82'	
85			8.5	SP-SC		CLAYEY SAND/SAND, with few subrounded gravel, brown, subangular sand, dense, wet, cool	
	2195		1.3				
90			2.4		90.0'		
	2190		1.1	CL	93.0'	CLAY, with few silt, trace fine sand, brown, medium plasticity, slightly moist	
95			0.6	SC	96.0'	CLAYEY SAND/SAND, brown, nil to low plasticity, dense, wet cool @ 94'	
	2185		1.0	GC	99.0'	CLAYEY GRAVEL, with few sand and silt, light brown, some black stain, angular sand, subrounded gravel, very dense, low plasticity, wet	
100			3.9	SP-SC	102.0'	SAND/CLAYEY SAND, light brown, nil to low plasticity, dense, wet	
	2180		5.6	GC	103.0'	CLAYEY GRAVEL, with few sand and silt, trace cobble, light brown, subangular to subrounded, low plasticity, wet	
105			6.6	SP-SC	106.0'	SAND/CLAYEY SAND, with few subrounded gravel, light brown, nil to low plasticity, dense, wet	
	2175		4.8			CLAYEY GRAVEL, with little sand and few silt, light brown, subangular to subrounded, low plasticity, slightly moist to moist	
110			2.4	GC			
	2170		5.5		114.0'		
115				SC	115.0'	CLAYEY SAND, trace gravel, light brown,	

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BORING LOG: IRA - 24

PROJECT: Miracle Mile
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LOCATION: Wetmore Road and La Cholla
URS PROJECT #: 23443628.40000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: D Carlson
START DATE/TIME: 06/01/2004 04:10 PM
FINISH DATE/TIME: 06/04/2004 09:40 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			4.1			subangular, low plasticity, dense, wet	
	2165		3.9			CLAYEY GRAVEL, with little sand and few silt, light brown, subrounded, low plasticity, slightly moist to moist	
						CLAY layer at 118.5'	
120			2.0	GC			
	2160		3.7				
125			1.1			SAND, trace silt layer at 124'	
					126.0'		
	2155		7.9	SC		CLAYEY SAND, trace gravel, brown, angular to subangular, low plasticity, dense, moist to wet	
					128.0'		
			10.8			CLAYEY GRAVEL, with sand, brown, low plasticity, subrounded, wet	
130			5.2	GC			
	2150		4.9				
					133.5'		
				SC		CLAYEY SAND,trace gravel, brown, angular to subangular, low plasticity, sl moist to moist	
135			9.7		135.0'		
	2145		0.0	SP		SAND, trace gravel and silt, tan, angular to subrounded, slightly moist	
					139.0'		
140			11.6	GM	140.5'	SILTY GRAVEL, with some sand, trace clay, brown, angular, slightly moist	
	2140		6.0			CLAYEY GRAVEL, with sand, brown, angular to subangular, medium plasticity, moist, interbeds with some SILTY GRAVEL	
145			0.0			becomes slightly moist	
	2135		4.8				
150			11.3			low plasticity	
	2130		7.8				
						4" SILTY GRAVEL, with sand @ 153' and 155'	
155							

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BORING LOG: IRA - 24

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION: Wetmore Road and La Cholla
URS PROJECT #: 23443628.40000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: D Carlson
START DATE/TIME: 06/01/2004 04:10 PM
FINISH DATE/TIME: 06/04/2004 09:40 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			7.1				
	2125		4.1				
			2.0				
160			7.7				
	2120		6.4			8" SILTY GRAVEL, with sand @ 162' AND 164'	
165			2.4				
	2115		7.2				
170			5.9	GC		water at 169.41' 3" SILTY GRAVEL, with sand @ 170', core is hot	
	2110		10.6			4" SILTY GRAVEL, with sand @ 172' & 174'	
			9.6				
175			11.3				
	2105		8.3			2" SILTY GRAVEL, with sand @ 176', core is hot	
180			9.1				
	2100		0.0			becomes very dense	
185			11.3				
	2095		11.6			9" SILTY GRAVEL,with sand, dense @ 186.5'	
			7.7				
190			8.2			7" SILTY GRAVEL, with sand @ 190.5' and 193'	
	2090		5.7				
195							

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BORING LOG: IRA - 24

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION: Wetmore Road and La Cholla
URS PROJECT #: 23443628.40000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: D Carlson
START DATE/TIME: 06/01/2004 04:10 PM
FINISH DATE/TIME: 06/04/2004 09:40 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			5.7				
	2085		0.5				
			1.3			199.0'	
200			3.7	GM		SILTY GRAVEL, with some sand, brown, angular to subangular, moist 200.0' CLAYEY GRAVEL, with sand, brown, angular to subangular, low plasticity, moist	
	2080						
			2.1			8" SILTY GRAVEL, with sand @ 201'	
205			1.4	GC		6" SILTY GRAVEL, with sand @ 204'	
	2075						
			5.4				
210			9.2			210.0' SILTY SAND, with some gravel, brown, angular to subangular, wet	
	2070			SM			
			3.0			2" CLAYEY GRAVEL, with sand @ 212.5' 6" SILTY GRAVEL, with sand @ 213' 214.0' SILTY GRAVEL, with some sand, brown, angular to subangular, moist	
215			1.3			becomes moist to wet	
	2065		0.0	GM		becomes wet	
			0.0			4" CLAYEY GRAVEL at 217.5' Total Depth at 218.1'	
220			0.6				
	2060						
225							
	2055						
230							
	2050						
235							

WELL BORING DETAILS:

Total Depth . . . . . 220'

Nominal Borehole Diameter . . . . . 9"
Depth Interval . . . . . 0' - 92'
Nominal Borehole Diameter . . . . . 8"
Depth Interval . . . . . 92' - 220'
Seal at Reduction . . . . . 5' Bentonite

Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Regional Well Casing Length. . . . . 218'

Material . . . . . Schedule 80 Steel
Interval . . . . . 0' - 20'
Diameter . . . . . 4"

Material . . . . . Schedule 80 PVC
Interval . . . . . 20' -168'
Diameter . . . . . 4"

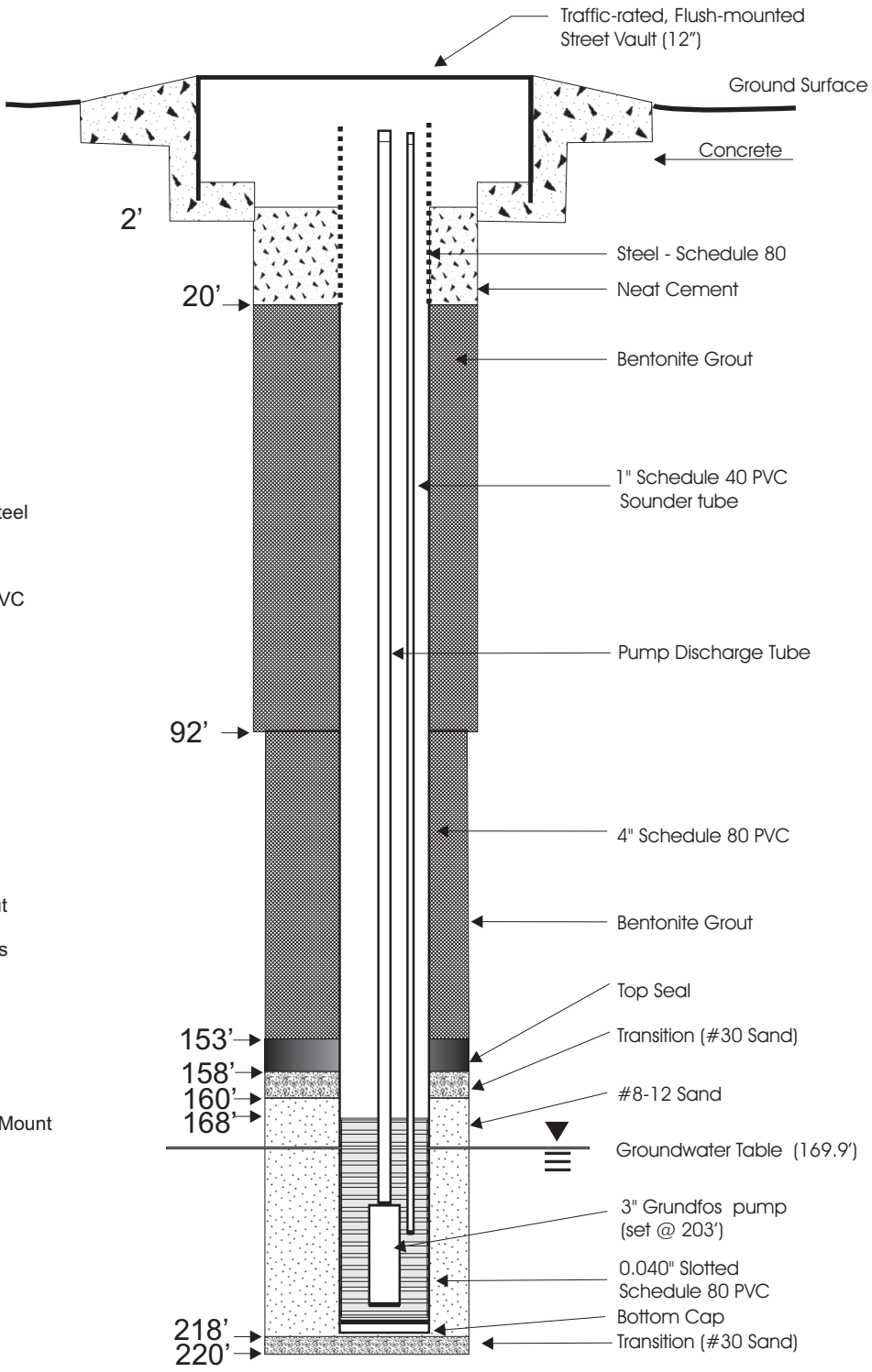
Screened Interval . . . . . 168 '- 218'
Perforations . . . . . 0.040", Slotted
Diameter . . . . . 4"

Surface Seal Interval. . . . . .0' to 2'
Seal Material . . . . . Concrete
1st Seal Interval.. . . . . 2' to 20'
Seal Material . . . . . Neat Cement
2nd Seal Interval. . . . . 20' to 153'
Seal Material . . . . . Bentonite Grout
3rd Seal Interval. . . . . .153' to 158'
Seal Material . . . . . Bentonite Chips
Transition Interval. . . . . 158' - 160'
Transition Material. . . . . #30 Sand
Gravel Pack Interval. . . . . 160' - 218'
Gravel Pack Material. . . . . #8-12
Transition Interval. . . . . 218' - 220'
Transition Material. . . . . #30 Sand

Surface Completion. . . . . 12" Dia. Flush Mount

WELL EQUIPPING:

Pump Make . . . . . .Grundfos
Model . . . . . Redi Flo - 3"
Horsepower . . . . . 3/4 HP (JS 05)
Pump Intake . . . . . .203' bgs



NOT TO SCALE

AS-BUILT MONITOR WELL IRA-24 SCHEMATIC FLUSH MOUNT

Remedial Investigation/Feasibility Study
Miracle Mile WQARF Site

P:/1Miracle Mile/IRA-24 Installation/IRA-24 Site Plans/As built IRA-24 Well Schematic

URS BORING LOG

BORING LOG: IRA-25

SHEET 1 of 7
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

LOCATION:
COORDINATES. N: 468,886
E: 982,168

RIG TYPE: Sonic
DRILLING METHOD: Rotosonic
HAMMER TYPE: Continous Coring

REF. ALIGNMENT:
STATION:
OFFSET:

COMMENTS: SM= Slightly Moist, M= Moist, VM= Very Moist, W= Wet, PI= Plasticity

SURFACE ELEV.: 2303.96
DATUM: NAVD 88

START DATE: 5/13/2003 TIME: 1410
FINISH DATE: 5/16/2003 TIME: 1500

	Casing	Split Spoon	Split Spoon	Shelby Tube	Ring Sample	Core Barrel
Type/Symbol		S	S2	U	R	C
I.D.		1.375"	0.87"		1.5"	
O.D.		2"	1.50"		2"	
Length		18"	18"		22"	
Hammer WT.	140 lbs.		Drill Rod Size			
Hammer Fall	30 in.		I.D. (O.D.)			

GROUNDWATER DATA

Date	Time	Water Depth (ft.)	Casing Depth (ft)	Hole Depth (ft)
5/15/2003	1453	183.4		244

DEPTH BELOW SURFACE (FT)	USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
	SM																			SILTY SAND, brown, slightly moist, trace gravels.	
5	SC																			CLAYEY SAND, light brown, , slightly moist, weak cementation, medium PI, approximately 2" SP layer at 5'.	
	CL																			CLAY, brown, slighlty moist, hard, slight inclusion of silty sand at 9'.	
10	SP																			Sand, brown, slightly moist, tract silts.	
	SM																			SILTY SAND, brown, slightly moist, trace gravels.	
15																				SAND with trace to few silts, brown, slightly moist. 8" thick silty sand at 15.	
20	SP																			Rounded cobbles at 20'.	
25																				Becomes gravelly sand at 23'; some interbedded silty gravelly sands.	

URS

BORING LOG

BORING LOG: IRA-25

SHEET 2 of 7

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
																				CLAYEY SAND, brown, slightly moist, low to medium PI.	
30	SC																				
																				6" CL, medium PI at 33'.	
35	SM																			SILTY SAND with trace clay, brown, slightly moist, low PI.	
																				SAND with trace silt, brown, slightly moist.	
40	SP																			transition to SM at 40' (interbedded).	
																				SILTY SAND, brown, slightly moist, trace to fine SR gravels at 44'. Interbedded CL, SP, SC in 2-6" layers.	
45																				Decrease in gravels at 45'.	
50	SM																			Increase in gravels, decrease in silts.	
55																				CLAYEY SAND with trace silt, brown, slightly moist, low PI, very dense.	
																				Becomes dark brown and reddish brown.	
60	SC																			Becomes slightly moist and moist.	
65																					

URS

BORING LOG

BORING LOG: IRA-25

SHEET 3 of 7

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
																				Six inch cobbles	
70	CL																			CLAY with few sand, brown, moist, medium PI, stiff. 3 inch layer of Interbedded few to with silts and moist to wet.	
75																					
80																				Becomes very stiff.	
85	SC																			CLAYEY SAND with few silt, brown, slightly moist, low to medium PI. Some interbedded increases in silt and decrease in clay.	
90	SM																			SILTY SAND few gravels, brown, slightly moist, dense. 10-inch layer of poorly graded sand with gravel. 8-inch layer of clayey sand. 8-inch layer of poorly graded sand and silty sand.	
95	SC																			CLAYEY SAND with few gravels, brown, slightly moist, medium PI, dense. Becomes moist to wet.	
100	SP-SM																			SILTY SAND with few gravels, brown, slightly moist.	
105																				CLAYEY SAND with trace silt, brown, sightly moist to moist, medium PI, very	

URS

BORING LOG

BORING LOG: IRA-25

SHEET 4 of 7

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
																				dense.	
																				6-inch layer of clay.	
110																				Dense and moist.	
115	SC																				
120																					
125																				8-inch layer of silty sand.	
																				8-inch layer of poorly graded sand.	
																				5-inch rounded cobbles.	
130	SM																			SILTY SAND with gravel, brown, slightly moist, dense.	
																				CLAYEY SAND with few gravels, brown, slightly moist, low PI, very dense.	
135	SC																			Clasts up to one and a half inches, many lithologic types.	
																				CLAYEY GRAVEL with sand, brown, moist, medium PI, very dense.	
140																					
145																					

URS

BORING LOG

BORING LOG: IRA-25

SHEET 5 of 7

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
150	GC																				
155																					
160																				10-inch layer silty gravel.	
165																					
170																					
	SM																			SILTY SAND with gravel, brown, slightly moist, dense.	
175																				CLAYEY GRAVEL with sand and silt, brown, slightly moist to moist, low PI.	
180																				8-inch layer of silty sand.	
185																				Sample IRA-184-51503	

URS

BORING LOG

BORING LOG: IRA-25

SHEET 6 of 7

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.): 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING: RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
190	GC																			A thin clayey sand with gravels.	
195																					
200																					
205	GM																			SILTY GRAVEL with sand, brown, wet.	
210	GC																			CLAYEY GRAVEL brown, moist, medium PI, moist, dense to very dense.	
215																					
220																				4 to 8-inch layers interbedded clayey gravel, fine gravels and wet.	
225																					

URS

BORING LOG

BORING LOG: IRA-25

SHEET 7 of 7

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
230	GM																			SILTY GRAVEL with sand, brown, wet. Interbedded silty sand, poorly graded gravel, few clayey gravel.	
235																					
240																				6-inch layer of interbedded clayey gravels. Large gravels 7-inch layer of interbedded clayey gravels. 10-inch layer of interbedded clayey gravels.	
245																					
250																					
255																					
260																					
265																					

WELL BORING DETAILS:

Total Depth . . . . . 244'
Nominal Borehole Diameter . . . . . 10”
Depth Interval . . . . . .0-56’
Nominal Borehole Diameter . . . . . 8”
Depth Interval . . . . . 56-244’
Seal at Reduction . . . . . 5’ Bentonite
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Casing length . . . . . 170’
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Surface Seal . . . . . 0 to 2'
Seal Material . . . . . Concrete

Upper Seal Interval. . . . . 2-20’
Seal Material . . . . . Cement Grout

Backfill/Seal Interval. . . . . 20’- 163’
Backfill Material . . . . . Bentonite Grout

Upper Transition Interval . . . . . 163-165’
Transition Material . . . . . #30 Sand

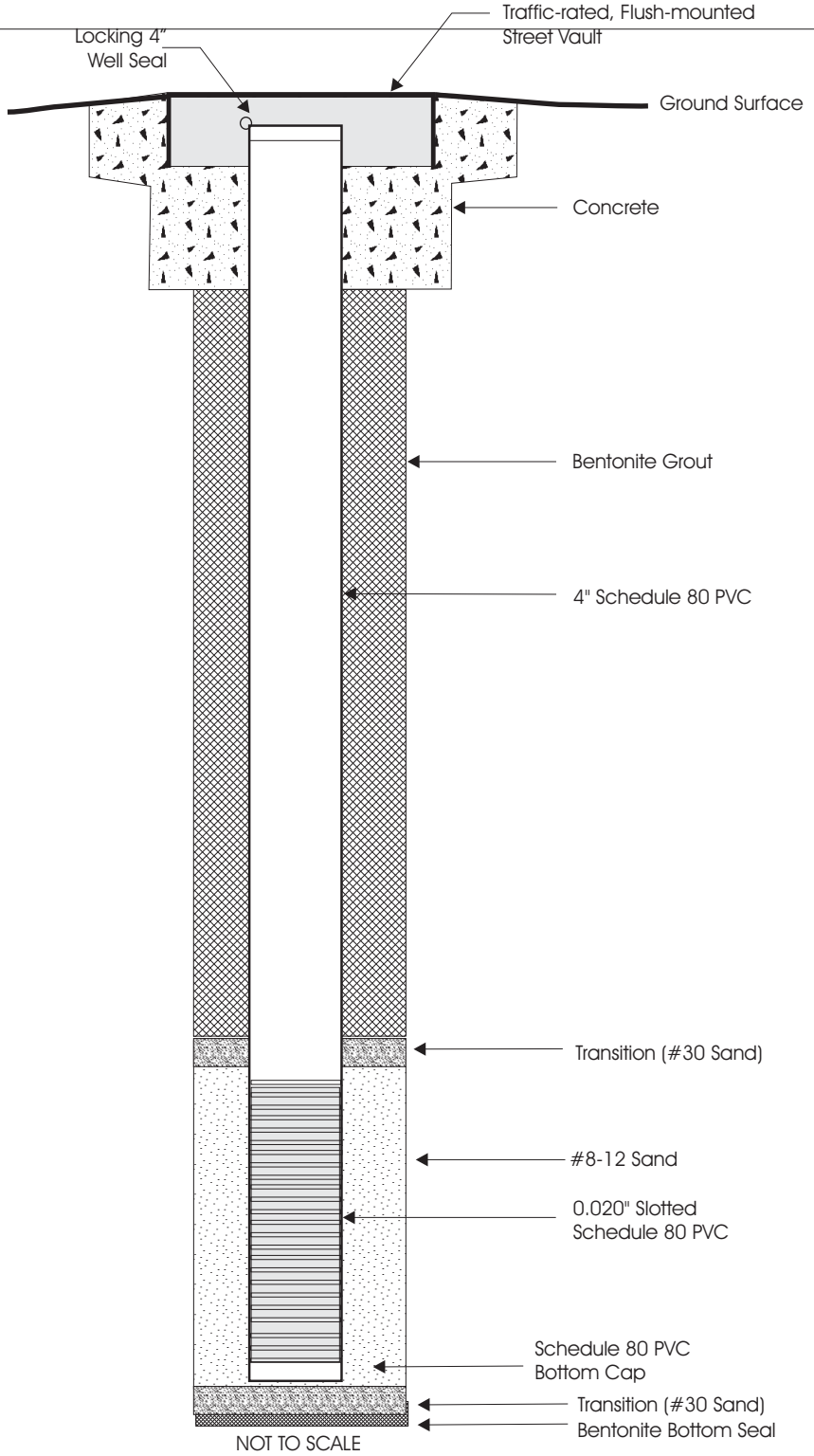
Gravel Pack Interval . . . . . 165-240’
Gravel Pack Material . . . .#8-12 Sand

Bottom Transition Interval . . . . . 240-242’
Transition Material . . . . . #30 Sand

Bottom Seal Interval. . . . . 242-244’
Seal Material . . . . . Bentonite Chips

Depth to Top of Perforation Zone . . . 170'

Screened Interval . . . . . .170-240’
Perforations. . . . . .0.020", Slotted



REGIONAL MONITOR WELL SCHEMATIC - IRA-25

Remedial Investigation/Feasibility Study

Miracle Mile WQARF Site

P:\Miracle Mile\2003 Monitor Wells \ Perched MW Installation\Figures\Completed Perched Well Schematic IRA-19.cdr

URS BORING LOG

BORING LOG: IRA-26
SHEET 1 of 7
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

LOCATION:
COORDINATES. N: 468,365
E: 983,486

RIG TYPE: Sonic
DRILLING METHOD: Rotosonic
HAMMER TYPE: Continous Coring

REF. ALIGNMENT:
STATION:
OFFSET:

COMMENTS: SM= Slightly Moist, M= Moist, VM= Very Moist, W= Wet, PI= Plasticity

SURFACE ELEV.: 2309.72
DATUM: NAVD 88

START DATE: 4/9/2003 TIME: 1220
FINISH DATE: 4/13/2003 TIME:

	Casing	Split Spoon	Split Spoon	Shelby Tube	Ring Sample	Core Barrel
Type/Symbol		S	S2	U	R	C
I.D.		1.375"	0.87"		1.5"	
O.D.		2"	1.50"		2"	
Length		18"	18"		22"	
Hammer WT.	140 lbs.		Drill Rod Size			
Hammer Fall	30 in.		I.D. (O.D.)			

GROUNDWATER DATA

Date	Time	Water Depth (ft.)	Casing Depth (ft)	Hole Depth (ft)
4/12/2003	1030	187.7		244

DEPTH BELOW SURFACE (FT)	USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
	SC																			CLAYEY SAND with silt, brown, slightly moist, medium PI, medium dense, weak cementation.	
	CL																			SANDY CLAY brown to tan, slightly moist to dry, medium PI, weak cementation.	
5	SC																			CLAYEY SAND brown, low PI.	
	CL																			CLAY brown, moist, medium PI.	
10	SP																			SAND with trace to few silt, brown, slightly moist. Interbedded silty sand. 6 to 14-inch layer of clayey sand. 2-inch layer of silty sand.	
15																				A layer of gravel.	
20																				SILTY SAND with gravel, brown, moist. Interbedded an increase gravel and trace of cobbles.	
25																					

PID Q:\MIRACLE MILE\2003 MONITOR WELLS\BORING LOGS\MONITOR WELLS.GPJ TEMPLAT1.GDT 09/12/03

URS BORING LOG

BORING LOG: IRA-26
SHEET 2 of 7
PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
	SM																				
30																				6-inch layer of clayey sand.	
	SC																			CLAYEY SAND, brown, moist, low PI.	
35																				SAND with few gravels, trace silts, brown, slightly moist.	
	SM																			An increase in silts.	
40																				SANDY CLAY, brown slightly moist, medium PI.	
	CL																				
45																				SILTY GRAVEL with sand and trace cobbles, light brown, slightly moist.	
	GM																				
50																					
																				CLAYEY SAND with trace gravel, light brown, slightly moist, low PI, very dense.	
55																				Very weathered rock.	
	SC																				
60																					
																				SANDY CLAY, brown, moist, low to medium PI.	
	CL																				
65																					

URS

BORING LOG

BORING LOG: IRA-26

SHEET 3 of 7

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
	SM																			SILTY SAND with trace gravels, brown, slighty moist.	
70	SC																			CLAYEY SAND with silt, brown, low PI, very dense.	
75																					
80	SM																			SILTY SAND, brown, slightly moist.	
85	SC																			CLAYEY SAND, brown, slightly moist, low PI.	
90	SM																			SILTY SAND, brown, slightly moist to moist.	
95																					
	SC																			CLAYEY SAND brown, moist, low PI.	
100	SP-SM																			SILTY SAND, light brown, wet.	
	SC-SM																			CLAYEY SAND with silt, brown, moist, low PI.	
	CL																			CLAY with few sands and silt, brown, moist, low PI.	
	SC-SM																			CLAYEY SAND with silt, brown, moist, low PI.	
105	SP																				

URS

BORING LOG

BORING LOG: IRA-26

SHEET 4 of 7

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
	SC																			SAND with trace silt, light brown, slightly moist.	
																				CLAYEY SAND with trace silt, brown, slightly moist.	
	SP																			SAND with trace silt, light brown, slightly moist.	
110																				4 to 6-inches of transitional between to silty sand, clay and silt.	
	SC																			CLAYEY SAND with trace silt, light brown, slightly moist, low PI.	
	SM																			SILTY SAND with few gravels, slight brown, slightly moist.	
115	SC																			CLAYEY SAND with gravels, brown, moist, low PI.	
	CL																			CLAY with trace sand, brown, slightly moist to moist, low PI.	
120																				CLAYEY SAND with gravels, brown, moist, low PI.	
	CL																			Decrease in silts and sand.	
125																				Becomes greenish brown.	
	SP																			SAND with few gravels, tan to white, slightly moist.	
130																				Decrease in gravels.	
	GM																			SILTY GRAVEL with sand, tan, slightly moist.	
135	SM																			SILTY SAND, light brown, slighty moist.	
																				Increase in gravel.	
140																				Increase in gravel.	
145																				CLAYEY SAND with few gravel, light	

URS

BORING LOG

BORING LOG: IRA-26

SHEET 5 of 7

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.): 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING: RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
																				brown, moist, low PI, very dense.	
																				8 inch-layer of silty sand.	
150																					
155	SC																			8 inch-layer of silty sand.	
																				10 inch-layer of poorly graded sand with silt.	
160																					
165																				4-inch layer of poorly graded sand with silt.	
																				CLAYEY GRAVEL with sand, brown, moist, medium PI.	
170																					
175																				7-inch layer of silty gravel with sand.	
180																					
185	GC																				

URS

BORING LOG

BORING LOG: IRA-26

SHEET 6 of 7

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.): 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING: RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
																				4-inch layer silty gravel.	
190																					
195																				Low to medium PI. Sample ID: IRA-26-195-41203	
200																				Medium PI.	
205	GM																			SILTY GRAVEL with sand, brown, wet.	
																				CLAYEY GRAVEL, brown, moist.	
210																					
215																					
220	GC																				
225																					

URS

BORING LOG

BORING LOG: IRA-26

SHEET 7 of 7

PROJECT #: 23442955

PROJECT: Miracle Mile
LOCATION: Tucson, AZ
CLIENT: ADEQ

CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
INSPECTOR: Dennis Carlson

DEPTH BELOW SURFACE (FT)	SAMPLE: USCS	GRAPHIC	TYPE	NUMBER	SYMBOL	DEPTH (FT) FROM	DEPTH (FT) TO	MOISTURE	PID (ppm)	SOIL (Blows/6 in.) 0/6	6/12	12/18	N	REC. (in.)	ROCK CORING RUN (in.)	REC (in.)	REC (%)	L>4" (in.)	RQD (%)	VISUAL MATERIAL CLASSIFICATION AND REMARKS	SAMPLES SENT TO LAB
230																					
	GP-GM																			Poorly graded sand with silt.	
																				CLAYEY GRAVEL with sand, brown, moist, medium PI, very dense.	
235																				6-inch layer of poorly graded gravel with clay.	
	GC																			6-inch layer of poorly graded gravel with clay.	
240																				Sample ID: IRA-26-242-41303	
																				6-inch layer of silty gravel.	
245																					
250																					
255																					
260																					
265																					

WELL BORING DETAILS:

Total Depth . . . . . 244'
Nominal Borehole Diameter . . . . . 10”
Depth Interval . . . . . 0-70’
Nominal Borehole Diameter . . . . . 8”
Depth Interval . . . . . 70-244’
Seal at Reduction . . . . . 5’ Bentonite
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Casing length . . . . . 170’
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4”

Surface Seal . . . . . 0 to 2'
Seal Material . . . . . Concrete

Upper Seal Interval. . . . . 2-20’
Seal Material . . . . . Cement Grout

Backfill/Seal Interval. . . . . 20’- 163’
Backfill Material . . . . . Bentonite Grout

Upper Transition Interval . . . . . 163-165’
Transition Material . . . . . #30 Sand

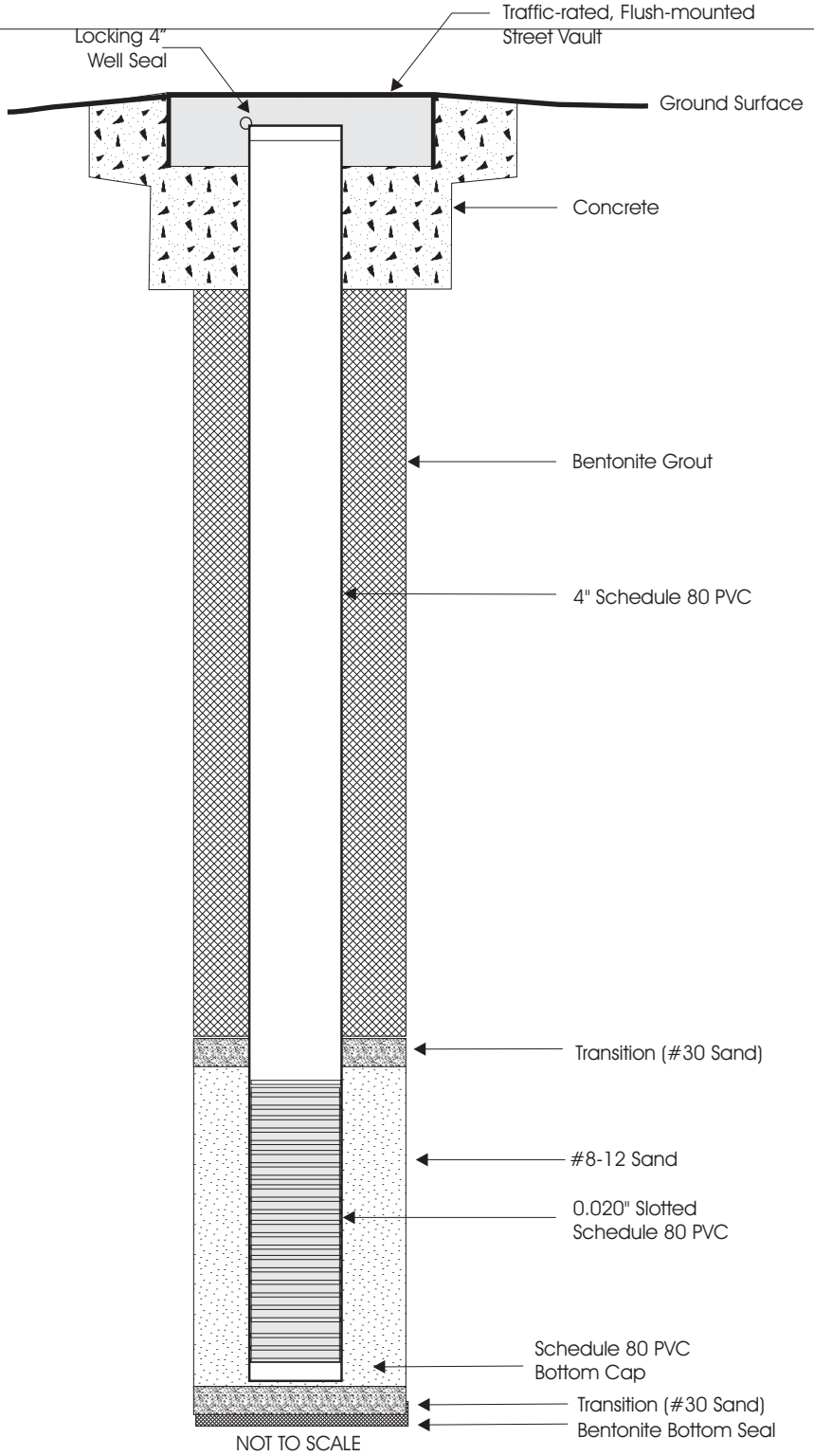
Gravel Pack Interval . . . . . 65-240’
Gravel Pack Material . . . . #8-12 Sand

Bottom Transition Interval . . . . . 240-242’
Transition Material . . . . . #30 Sand

Bottom Seal Interval. . . . . 242-244’
Seal Material . . . . . Bentonite Chips

Depth to Top of Perforation Zone . . . 170'

Screened Interval . . . . . 170-240’
Perforations. . . . . 0.020", Slotted



REGIONAL MONITOR WELL SCHEMATIC - IRA-26

Remedial Investigation/Feasibility Study

Miracle Mile WQARF Site

P:\Miracle Mile\2003 Monitor Wells \ Perched MW Installation\Figures\Completed Perched Well Schematic IRA-19.cdr

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

BORING LOG: AAM-S-20 (IRA - 27)

PROJECT: Miracle Mile RI/FS
CLIENT: ADEQ
LOCATION: 3735 N. Romero Rd, Tucson, AZ
URS PROJECT #: 23444045.24000 & .23000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 06/30/2004 10:25 AM
FINISH DATE/TIME: 07/01/2004 11:00 AM

LATITUDE (NAD27): 32° 16' 29.7"
LONGITUDE (NAD 27): 111° 00' 22"

TOP OF GROUND ELEVATION: 2281.39 A.S.L.
TOP OF CASING ELEVATION: 2280.2 A.S.L.
SCREENED INTERVAL: 55-65 bgs

COMMENTS:

RIG TYPE: Boart Longyear 1100 Sonic
DRILLING METHOD: Rotosonic
SAMPLING METHOD: Grab Sample and Encore of Continuous Core

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2280					SILTY SAND, trace clay, brown, angular to subangular, strong HCl reaction, dry to slightly moist	
			2.2	SM			
5		S-20-5 10:30	2.5				
	2275				7.0'		
			0.4			SANDY CLAY, with some silt, tan/ brown, strong HCl reaction, 1/4" weak cementation nodules, low to medium plasticity, dry to slightly moist, interbeds gradually to SILTY SAND	
10		S-20-10 10:50	1.9	CL			
	2270				11.0'	SILTY SAND, trace gravel, brown, subangular, strong HCl reaction, dry	
			1.7				
			2.3	SM			
15		S-20-15 11:10	2.7		15.5'		
	2265					SILTY SAND, trace gravel, brown, angular to subangular, strong HCl reaction, dry	
			1.8				
20		S-20-20 11:30	1.7	SW-SM		2" SANDY CLAY low plasticity layer at 19', nil HCl reaction at 20'	
	2260					4 to 8" interbeded layers of SM, SP, SC, GP, SP, GP respectively at 21'. becomes moist	
			1.8				
25		S-20-25 11:50 S-DUP-001 11:50	0.6		24.5'	SANDY GRAVEL, trace silt, light brown to brown, moist	
	2255					5" rounded cobbles at 27' and 30'	
30		S-20-30 13:40	0.8			4" yellow orange in brown matrix at 30'	
	2250						
			4.7	GP			
35		S-20-35 14:00	2.8				

REPORT TUCSON-ENVIRONMENTAL | PROJECT P:\MIRACLE MILE\ABRAMS AIRBORNE ES\BUILDING BORINGS\PRINTED BORING LOGS 121404\IRA 27 TO 30.GPJ | LIBRARY URS TUCSON V4.0.GLB | PRINTED 12/20/04

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

BORING LOG: AAM-S-20 (IRA - 27)

PROJECT: Miracle Mile RI/FS
CLIENT: ADEQ
LOCATION: 3735 N. Romero Rd, Tucson, AZ
URS PROJECT #: 23444045.24000 & .23000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 06/30/2004 10:25 AM
FINISH DATE/TIME: 07/01/2004 11:00 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2245		4.6			coarse gravels at 37'	
40		S-20-40 14:10	0.3		40.0'		
	2240		2.2	SC		CLAYEY SAND, trace fine gravel and silt, light brown, subangular to subrounded, low plasticity, slightly moist to moist	
45		S-20-45 14:45	1.9		44.5'		
	2235		5.8	GM		SILTY GRAVEL, with some coarse sand, light brown, subangular to subrounded, slightly moist	
50		S-20-50 15:15	1.2		49.5'	8" cobble at 49'	
	2230		4.8			CLAYEY SAND,with some gravel and trace silt, light brown, subangular to subrounded, low plasticity, slightly moist 6" CLAY layer at 51', decrease in clay at 53'	
55		S-20-55 15:30 S-MS-001 15:40 S-MSD-001 15:50	2.1				
	2225		7.0	SC		cobble at 57', 6" layer of SILTY GRAVEL at 57.5'	
60		S-20-60 16:25	4.5			gravel layer at 58.5'	
	2220		2.8			6" cobble at 61' 5" cobble at 62'	
65		S-20-65 17:00	2.0		64.5'		
	2215		1.0	CL		SILTY CLAY, little fine sand, brown, low to medium plasticity, slightly moist	
70		S-20-70 17:40	3.5		68.5'	SANDY GRAVEL, trace to few silt and clay, light brown with trace yellow orange, subangular to subrounded, slightly moist 6" SAND layer at 69'	
	2210		14.9				
75		S-20-75 07:35	0.3	GP		interbedded silt and clays	

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

BORING LOG: AAM-S-20 (IRA - 27)

PROJECT: Miracle Mile RI/FS
CLIENT: ADEQ
LOCATION: 3735 N. Romero Rd, Tucson, AZ
URS PROJECT #: 23444045.24000 & .23000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 06/30/2004 10:25 AM
FINISH DATE/TIME: 07/01/2004 11:00 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2205		8.8				
80		S-20-80 08:10	4.7			Total Depth 79'	
	2200						
85							
	2195						
90							
	2190						
95							
	2185						
100							
	2180						
105							
	2175						
110							
	2170						
115							

WELL BORING DETAILS:

Total Depth . . . . . 79'
Casing Diameter . . . . . 8"
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Top Casing length . . . . . 20.'
Material . . . . . Schedule 80 Steel
Diameter . . . . . 4"

Lower Casing length . . . . . .35'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Surface Vault . . . . . .0 to 2'
Seal Material . . . . . Concrete

Near Surface Seal . . . . . .2 to 20'
Seal Material . . . . . Lean Concrete

Middle Seal Interval.. . . . . 20' to 45.5'
Seal Material . . . . . Bentonite Grout

Lower Seal Interval.. . . . . 45.5' to 48'
Seal Material . . . . . 3/8" Bentonite Chips

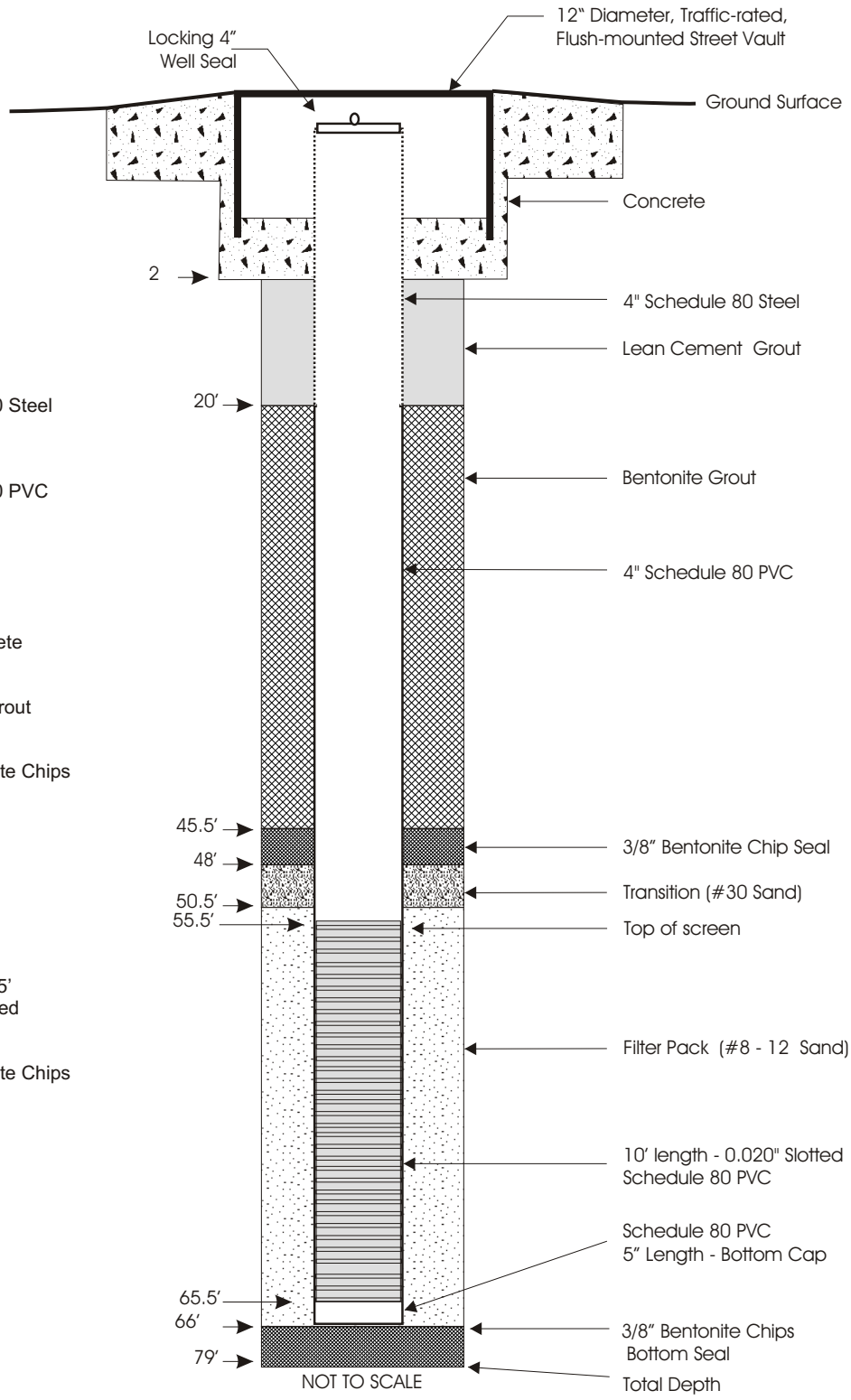
Transition Interval . . . . . 48' to 50.5'
Transition Material . . . . . #30 Sand

Gravel Pack Interval . . . . . 50.5' to 66'
Gravel Pack Material . . . .#8-12 Sand

Depth to Top of Perforation Zone . . . 55.5'

Screened Interval . . . . . .55.5' to 65.5'
Perforations. . . . . .0.020", Slotted

Bottom Seal Interval. . . . . 66' to 79
Seal Material . . . . . 3/8" Bentonite Chips



MONITOR WELL IRA-27 SCHEMATIC
Abrams Airborne Expanded Site Inspection
Miracle Mile WQARF Site

Figure 27

P:\Miracle Mile\2004 Abrams~\Abrams Invest ~\As Built Monitor Well Schematic (IRA-27 to 30).cdr

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

BORING LOG: AAM-S-21 (IRA - 28)

PROJECT: Miracle Mile RI/FS
CLIENT: ADEQ
LOCATION: 3735 N. Romero Rd, Tucson, AZ
URS PROJECT #: 23444045.24000 & .23000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 07/01/2004 01:30 PM
FINISH DATE/TIME: 07/06/2004 10:45 AM

LATITUDE (NAD27): 32° 16' 28.6"
LONGITUDE (NAD 27): 111° 00' 20"

TOP OF GROUND ELEVATION: 2284.2 A.S.L.
TOP OF CASING ELEVATION: 2283.81 A.S.L.
SCREENED INTERVAL: 56-66 bgs

COMMENTS:

RIG TYPE: Boart Longyear 1100 Sonic
DRILLING METHOD: Rotosonic
SAMPLING METHOD: Grab Sample and Encore of Continuous Core

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
						2" Asphalt pavement on 10" aggregate base coarse (1.0')	
			2.6	SM		SANDY SILT, trace gravel, clay, dark brown, angular to subangular, strong HCl reaction, slightly moist	
	2280	S-21-5 13:35	5.5			(4.5')	
5				CL-ML		CLAYEY SILT, dark brown, strong HCl reaction, low plasticity, slightly moist 2" CLAY, few silt at 6' (7.0')	
			10.1			CLAYEY SAND, trace silt, dark brown to light brown, medium to low plasticity, slightly moist	
	2275	S-21-10 13:50 S-DUP-002 14:00	9.4	SC		3" mottled lt brown weak cementation (12.0')	
10							
			3.7			SAND, trace gravel and silt, light brown, angular to subangular sand, subrounded gravels, dry	
	2270	S-21-15 14:20	0.6			interbedded gradation changes	
15							
			2.1				
	2265	S-21-20 14:45	0.4			increase in silt and gravel @ 18.5'	
20							
			7.9				
	2260	S-21-25 15:05	2.8				
25				SP		gravels and trace cobbles	
			5.2			interbedded gravels	
	2255	S-21-30 15:35	5.5				
30							
			4.0			predomianently SANDS, increase in interbedded gravels	
	2250	S-21-35 16:00	3.2				
35							

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

BORING LOG: AAM-S-21 (IRA - 28)

PROJECT: Miracle Mile RI/FS
CLIENT: ADEQ
LOCATION: 3735 N. Romero Rd, Tucson, AZ
URS PROJECT #: 23444045.24000 & .23000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 07/01/2004 01:30 PM
FINISH DATE/TIME: 07/06/2004 10:45 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			2.2				
	2245	S-21-40 16:40	2.1		39.0'	SANDY GRAVEL, trace cobble and silt, light brown, angular to subrounded sand, subrounded to rounded gravel	
40				GP			
			8.9				
	2240	S-21-45 08:15	6.9		45.0'		
45						CLAYEY SAND, with gravel, light brown, low plasticity, angular to subangular sand, subrounded gravel, slightly moist	
			11.3				
	2235	S-21-50 08:35	12.2	SC			
50						cobble at 51', decrease in gravel	
			6.0				
	2230	S-21-55 09:15 S-DUP-003 09:25	9.6		55.0'		
55						CLAYEY SAND, with little gravel, light brown, low plasticity, angular to subangular sand, subrounded gravel, slightly moist	
			12.3				
	2225	S-21-60 09:30 S-MS-002 09:35 S-MSD-002 09:40	8.4	SP-SC			
60							
			12				
	2220	S-21-65 09:55	20.1				
65					65.5'		
				CL		SILTY CLAY, trace sand, brown, medium plasticity, slightly moist to moist	
			1.7		67.5'		
	2215	S-21-70 10:15	5.8			SANDY GRAVEL, little silt, light brown to brown, angular to subrounded sand, subrounded gravel, slightly moist	
70				GP			
			13.0			2" CLAY at 72', 4" medium slightly moist light brown SAND, 6" brown slightly moist SILTY CLAY at 72.5'	
	2210	S-21-75 10:50	5.9		74.0'		
75						SILTY GRAVEL, with sand, light brown with mottled	

URS
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Tucson, AZ 85705
520-887-1800
520-887-8438 (Fax)

BORING LOG: AAM-S-21 (IRA - 28)

PROJECT: Miracle Mile RI/FS
CLIENT: ADEQ
LOCATION: 3735 N. Romero Rd, Tucson, AZ
URS PROJECT #: 23444045.24000 & .23000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 07/01/2004 01:30 PM
FINISH DATE/TIME: 07/06/2004 10:45 AM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			7.6	GM		yellow orange, moist interbedded SANDY SILY at 74.8', GM interbeddes to GC	
80	2205	S-21-80 11:15	8.3			Wet at 78.8' cobble at 79', interbedded GC, Gm and GP	
			14.6			Total depth at 82.5'	
85	2200						
90	2195						
95	2190						
100	2185						
105	2180						
110	2175						
115	2170						

WELL BORING DETAILS:

Total Depth . . . . . 82.5'
Casing Diameter . . . . . 8"
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Top Casing length . . . . . 20.'
Material . . . . . Schedule 80 Steel
Diameter . . . . . 4"

Lower Casing length . . . . . .35'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Surface Vault . . . . . .0 to 2'
Seal Material . . . . . Concrete

Near Surface Seal . . . . . .2 to 20'
Seal Material . . . . . Lean Concrete

Middle Seal Interval.. . . . . 20' to 46.5'
Seal Material . . . . . Bentonite Grout

Lower Seal Interval.. . . . . 46.5' to 49'
Seal Material . . . . . 3/8" Bentonite Chips

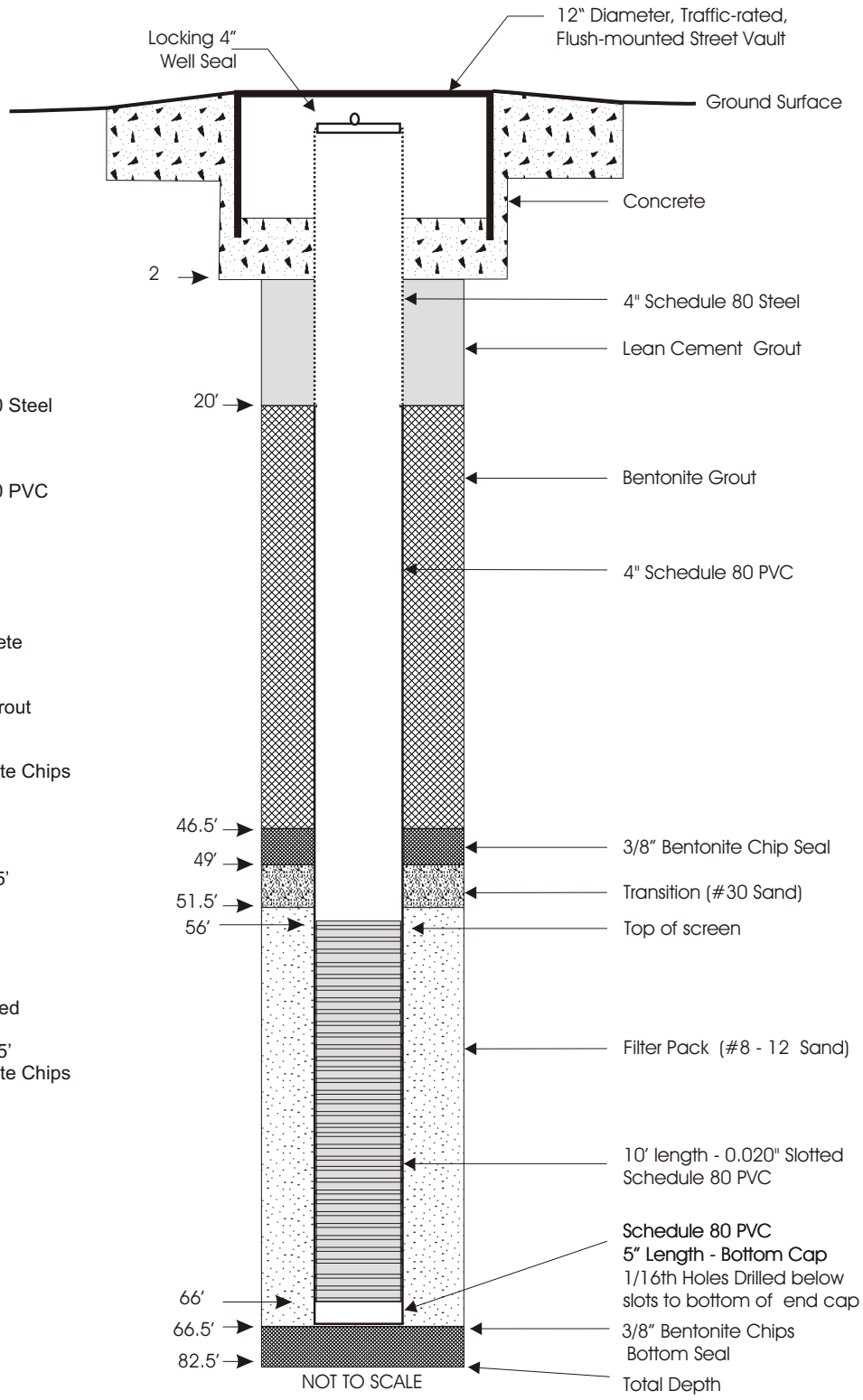
Transition Interval . . . . . 49' to 51.5'
Transition Material . . . . . #30 Sand

Gravel Pack Interval . . . . . 51.5' to 66.5'
Gravel Pack Material . . . .#8-12 Sand

Depth to Top of Perforation Zone . . . 55'

Screened Interval . . . . . .55' to 65'
Perforations. . . . . .0.020", Slotted

Bottom Seal Interval. . . . . 66.5' to 82.5'
Seal Material . . . . . 3/8" Bentonite Chips



MONITOR WELL IRA-28 SCHEMATIC
Abrams Airborne Expanded Site Inspection
Miracle Mile WQARF Site

Figure 28

P:\Miracle Mile\2004 Abrams~\Abrams Invest ~\As Built Monitor Well Schematic (IRA-27 to 30).cdr

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

BORING LOG: AAM-S-22 (IRA - 29)

PROJECT: Miracle Mile RI/FS
CLIENT: ADEQ
LOCATION: 3735 N. Romero Rd, Tucson, AZ
URS PROJECT #: 23444045.24000 & .23000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 07/07/2004 09:10 AM
FINISH DATE/TIME: 07/08/2004 01:30 PM

LATITUDE (NAD27): 32° 16' 27.3"
LONGITUDE (NAD 27): 111° 00' 17"

TOP OF GROUND ELEVATION: 2284.37 A.S.L.
TOP OF CASING ELEVATION: 2283.83 A.S.L.
SCREENED INTERVAL: 56.5-66.5 bgs

COMMENTS:

RIG TYPE: Boart Longyear 1100 Sonic
DRILLING METHOD: Rotosonic
SAMPLING METHOD: Grab Sample and Encore of Continuous Core

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
						Asphalt paved parking lot	
			5.6	CL		SANDY CLAY, with some silt, beige, subangular to subrounded, low plasticity, strong HCl reaction, weak mottled cementation, slightly moist	
	2280	S-22-4 09:15	7.7			Pothole refusal, probable asphalt layer at 3.5', black to brown	
5					5.5'		
				SC		CLAYEY SAND, with little silt, brown, subangular to subrounded, low plasticity. strong HCl reaction, slightly moist	
					9.0'	trace 1/2" gravel at 8'	
	2275	S-22-10 09:39	9.9	SP-SM		SILTY SAND, light brown, angular to subangular, weak HCl reaction, slightly moist-dry	
10		S-DUP-004 09:49					
			5.8		13.0'		
	2270	S-22-15 10:05	3.6	SP		GRAVELLY SAND/SANDY GRAVEL, little silt, light brown, subangular to subrounded sand, angular to subrounded gravel, light brown, slightly moist,	
15							
			5.6			grades to SAND, with gravel	
			3.9				
	2265	S-22-20 10:15	1.9				
20					20.0'		
			6.8	GW		WELL GRADED SANDY GRAVEL, trace to little silt, light brown, subangular to subrounded sand, angular to subrounded gravel, light brown, slightly moist	
	2260	S-22-25 12:45	4.9				
25					27.0'		
		S-22-28 13:30	2.1	SP		POORLY GRADED SAND, trace silt, light brown with some yellow orange, subangular to subrounded sand, angular to subrounded gravel, light brown, slightly moist,	
	2255	S-22-30 13:15	0.6				
30					30.0'		
			13.8			POORLY GRADED SANDY GRAVEL, trace to little silt, light brown, subangular to subrounded sand, angular to subrounded gravel, light brown, slightly moist	
	2250	S-22-35 13:35	9.8				
35							

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

BORING LOG: AAM-S-22 (IRA - 29)

PROJECT: Miracle Mile RI/FS
CLIENT: ADEQ
LOCATION: 3735 N. Romero Rd, Tucson, AZ
URS PROJECT #: 23444045.24000 & .23000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 07/07/2004 09:10 AM
FINISH DATE/TIME: 07/08/2004 01:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			7.0	GP		coarse gravel at 37'	
40	2245	S-22-40 13:50 S-DUP-005 13:55	13.8				
			17.9				
					44.0'		
45	2240	S-22-45 14:20	3.6			CLAYEY GRAVEL, little sand, silt and cobble, brown, low pasticity, very dense, moist/dry	
						decrease in cobble, gravel becomes more fine	
			13.8			6"+ cobble at 47.5'	
50	2235	S-22-50 14:48	12.7			interbedded GM and GP in predomanently GC	
						2" wet medium plasticity	
			7.5	GC			
55	2230	S-22-55 15:25	10.5				
			9.6			gradual transition to GM at 56', then SM at 57'	
						grades to GM	
60	2225	S-22-60 15:55	3.1				
					62.0'		
			13.6			CLAYEY SAND, light brown, low to nil plasticiy, dense, moist, grade to SILTY CLAY	
65	2220	S-22-65 16:20	13.7	SP-SC			
					66.0'		
			16.9	CL		SILTY CLAY, fine sand, brown with trace yellow orange, medium plasticiy, slightly moist	
					69.0'		
70	2215	S-22-70 17:00	5.6			CLAYEY GRAVEL, with some sand, trace silt and cobble, brown, low pasticity, moist 8" SC layer at 70' 6" cobble at 71'	
				GP-GC			
			13.2				
					73.0'		
75	2210	S-22-75 07:55	8.0	SW		WELL GRADED SAND, little coarse subrounded gravel, trace cobble, tan, dry	
					75.0'		

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

BORING LOG: AAM-S-22 (IRA - 29)

PROJECT: Miracle Mile RI/FS
CLIENT: ADEQ
LOCATION: 3735 N. Romero Rd, Tucson, AZ
URS PROJECT #: 23444045.24000 & .23000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 07/07/2004 09:10 AM
FINISH DATE/TIME: 07/08/2004 01:30 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
			6.6	GP-GC		CLAYEY GRAVEL, with some sand, little silt, trace cobble, light brown, low to nil pasticity, slightly moist to moist	
80	2205	S-22-80 08:15	6.6			become slightly moist	
						Total depth at 80'	
85	2200						
90	2195						
95	2190						
100	2185						
105	2180						
110	2175						
115	2170						

WELL BORING DETAILS:

Total Depth . . . . . 80'
Casing Diameter . . . . . 8"
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Top Casing length . . . . . 20.'
Material . . . . . Schedule 80 Steel
Diameter . . . . . 4"

Lower Casing length . . . . . .35'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Surface Vault . . . . . .0 to 2'
Seal Material . . . . . Concrete

Near Surface Seal . . . . . .2 to 20'
Seal Material . . . . . Lean Concrete

Middle Seal Interval.. . . . . 20' to 47'
Seal Material . . . . . Bentonite Grout

Lower Seal Interval.. . . . . 47 ' to 49.5'
Seal Material . . . . . 3/8" Bentonite Chips

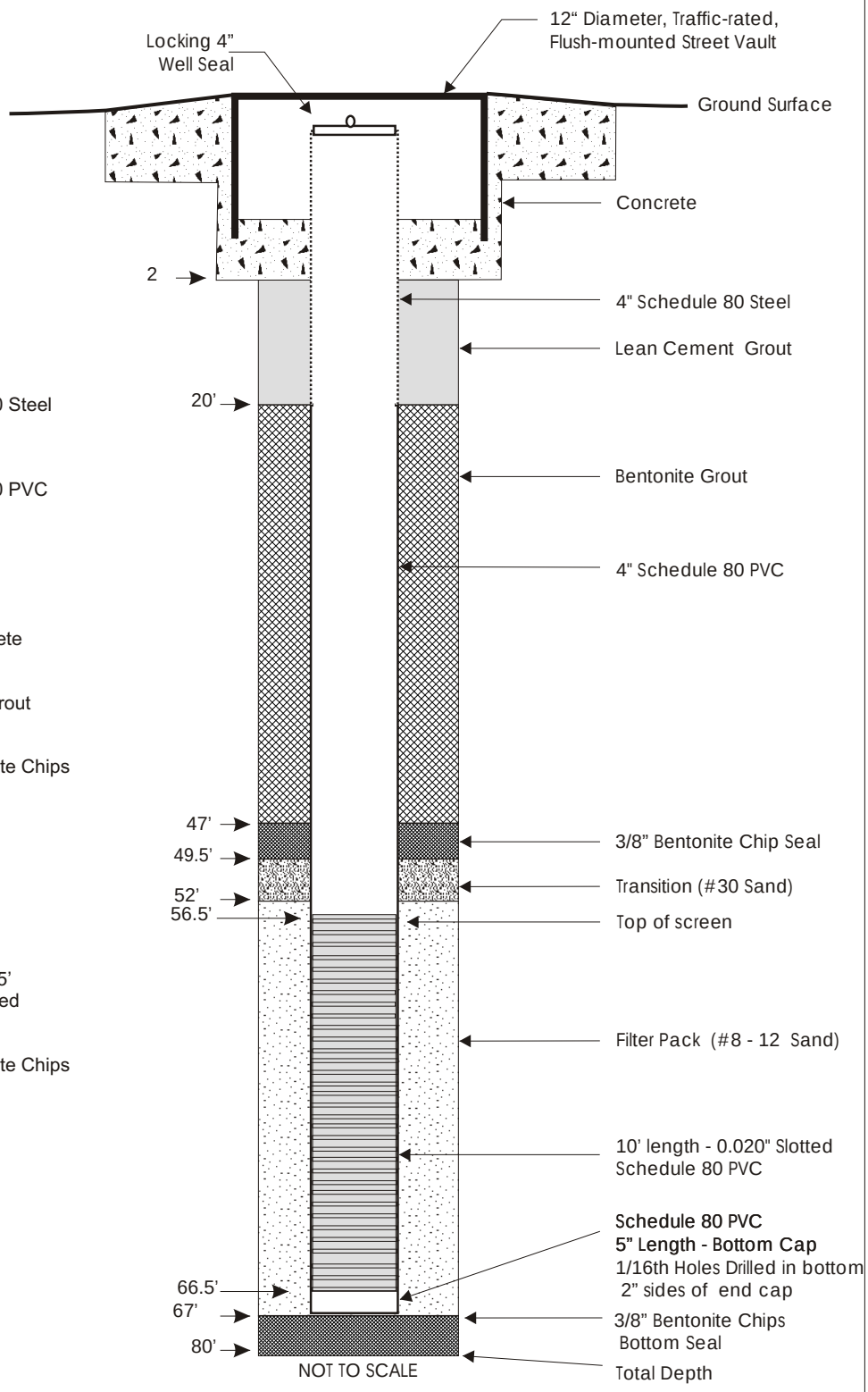
Transition Interval . . . . . 49.5' to 52'
Transition Material . . . . . #30 Sand

Gravel Pack Interval . . . . . 52 to 67'
Gravel Pack Material . . . .#8-12 Sand

Depth to Top of Perforation Zone . . . 56.5'

Screened Interval . . . . . .56.5' to 66.5'
Perforations. . . . . .0.020", Slotted

Bottom Seal Interval. . . . . 67' to 80'
Seal Material . . . . . 3/8" Bentonite Chips



MONITOR WELL IRA-29 SCHEMATIC
Abrams Airborne Expanded Site Inspection
Miracle Mile WQARF Site

Figure 29

P:\Miracle Mile\2004 Abrams~\Abrams Invest ~\As Built Monitor Well Schematic (IRA-27 to 30).cdr

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

BORING LOG: AAM-S-23 (IRA - 30)

PROJECT: Miracle Mile RI/FS
CLIENT: ADEQ
LOCATION: 3735 N. Romero Rd, Tucson, AZ
URS PROJECT #: 23444045.24000 & .23000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 07/10/2004 08:00 AM
FINISH DATE/TIME: 07/11/2004 12:25 PM

LATITUDE (NAD27): 32° 16' 27.3"
LONGITUDE (NAD 27): 111° 00' 14"

TOP OF GROUND ELEVATION: 2288.28 A.S.L.
TOP OF CASING ELEVATION: 2287.77 A.S.L.
SCREENED INTERVAL: 59-69 bgs

COMMENTS:

RIG TYPE: Boart Longyear 1100 Sonic
DRILLING METHOD: Rotosonic
SAMPLING METHOD: Grab Sample and Encore of Continuous Core

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
						Asphalt paved parking lot	
	2285		3.2	SC		CLAYEY SAND, trace silt and gravel, reddish brown, subangular to subrounded, strong HCl reaction, medium density, low plasticity, slightly moist	
5		S-23-005 08:05 S-MS-003 08:15 S-MSD-003 08:20	3.2		6.0'		
	2280		9.2	SM	8.5'	SILTY SAND, trace gravel, light brown, subrounded, strong HCl reaction, slightly moist	
10		S-23-010 08:35 DUP-006 08:40	3.2	SP	14.0'	SAND, trace gravel and silt, light brown to brown, subangular, strong HCl reaction, dry	
	2275		0.4				
15		S-23-015 08:50	0.1			SANDY GRAVEL,trace silt, light brown, angular to subrounded, predominantley fine gravel and coarse sand	
	2270	S-23-018 09:25	0.4 0.7			4" black/brown stain at 17.5' 4" black/brown stain at 18'	
20		S-23-020 09:20	1.1			becomes brown, interbedded, predomanently coarse grained SANDY GRAVEL, with few POORLY GRADED SANDS, SILTY SANDS and SILTY GRAVEL	
	2265		6.3				
25		S-23-025 09:45	10.4				
	2260		7.0			4" fine POORLY GRADED SANDED	
30		S-23-30 10:25	6.2	GP		2" yellowish layer @ 29', rounded 2" gravel, angular fractures	
	2255		1.7				
35		S-23-35 10:35	1.2				

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URS
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Tucson, AZ 85705
520-887-1800
520-887-8438 (Fax)

BORING LOG: AAM-S-23 (IRA - 30)

PROJECT: Miracle Mile RI/FS
CLIENT: ADEQ
LOCATION: 3735 N. Romero Rd, Tucson, AZ
URS PROJECT #: 23444045.24000 & .23000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 07/10/2004 08:00 AM
FINISH DATE/TIME: 07/11/2004 12:25 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
						increase in gravels	
	2250		2.8			8" cobbles at 37', 40', 42-43'	
40		S-23-40 11:00	3.1				
	2245		10.4				
						44.0'	
45		S-23-45 11:30	12.1	GP-GC		CLAYEY GRAVEL, with some sand, light brown, subangular to subrounded, low to medium plasticity, slightly moist to moist	
			5.4			4" moist to wet coarse sand/gravel at 45.5	
	2240		8.8			coarse sand at 46.5	
50		S-23-50 13:05	7.7				
						51.0'	
						SANDY CLAY, brown, hard, low plasticity, slightly moist	
	2235		8.5	CL			
55		S-23-55 13:50	7.1				
						55.0'	
			13.9			CLAYEY SAND, light brown, low plasticity, slightly moist	
	2230						
60		S-23-60 14:20	6.7	SP-SC			
	2225		7.0				
65		S-23-65 14:50	15.1				
						66.0'	
						SANDY CLAY, brown, hard, low to medium plasticity, slightly moist, decrease in sand, becomes CLAY, little sand	
	2220		6.8				
70		S-23-70 15:15	3.2	CL			
			10.4			becomes brown mottled tan, strong HCl reaction @ 71'	
	2215					thin SANDY CLAY/CLAYEY SAND @ 73.5'	
75		S-23-75 16:00	5.0				

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Tucson, AZ 85705
520-887-1800
520-887-8438 (Fax)

BORING LOG: AAM-S-23 (IRA - 30)

PROJECT: Miracle Mile RI/FS
CLIENT: ADEQ
LOCATION: 3735 N. Romero Rd, Tucson, AZ
URS PROJECT #: 23444045.24000 & .23000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: Dennis Carlson
START DATE/TIME: 07/10/2004 08:00 AM
FINISH DATE/TIME: 07/11/2004 12:25 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
						Total Depth 75' (in clay layer)	
	2210						
80							
	2205						
85							
	2200						
90							
	2195						
95							
	2190						
100							
	2185						
105							
	2180						
110							
	2175						
115							

WELL BORING DETAILS:

Total Depth . . . . . 75'
Casing Diameter . . . . . 8"
Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Top Casing length . . . . . 20.'
Material . . . . . Schedule 80 Steel
Diameter . . . . . 4"

Lower Casing length . . . . . .35'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Surface Vault . . . . . .0 to 2'
Seal Material . . . . . Concrete

Near Surface Seal . . . . . .2 to 20'
Seal Material . . . . . Lean Concrete

Middle Seal Interval.. . . . . 20' to 49'
Seal Material . . . . . Bentonite Grout

Lower Seal Interval.. . . . . 49' ' to 51.5'
Seal Material . . . . . 3/8" Bentonite Chips

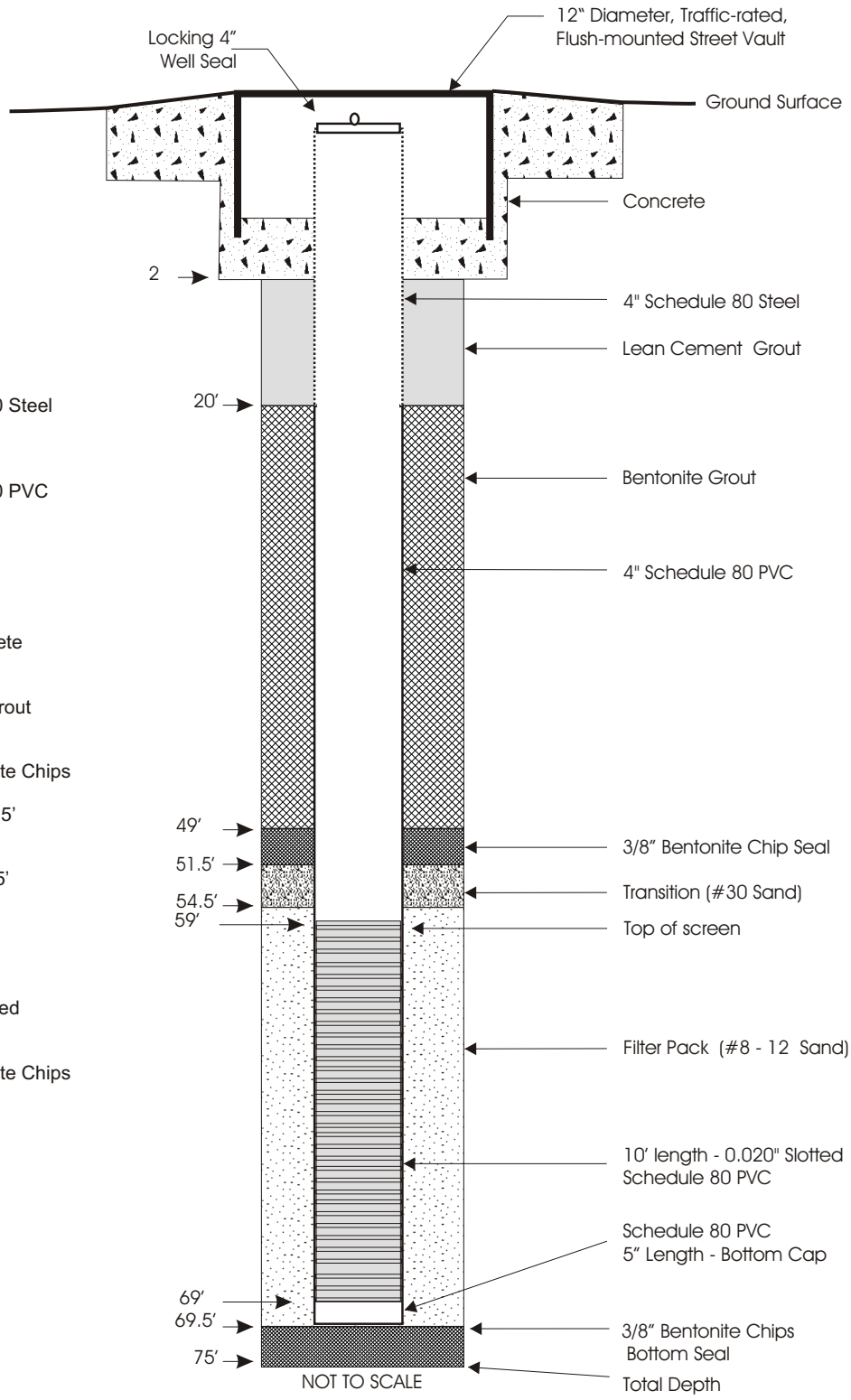
Transition Interval . . . . . 51.5 ' to 54.5'
Transition Material . . . . . #30 Sand

Gravel Pack Interval . . . . . 54.5' to 69.5'
Gravel Pack Material . . . .#8-12 Sand

Depth to Top of Perforation Zone . . . 59'

Screened Interval . . . . . 59' to 69'
Perforations. . . . . .0.020", Slotted

Bottom Seal Interval. . . . . 69.5' to 75'
Seal Material . . . . . 3/8" Bentonite Chips



MONITOR WELL IRA-30 SCHEMATIC
Abrams Airborne Expanded Site Inspection
Miracle Mile WQARF Site

Figure 30

P:\Miracle Mile\2004 Abrams~\Abrams Invest ~\As Built Monitor Well Schematic (IRA-27 to 30).cdr

URS
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Tucson, AZ 85705
520-887-1800
520-887-8438 (Fax)

BORING LOG: IRA - 31

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION: Wetmore Road and La Cholla
URS PROJECT #: 23443628.40000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: D Carlson
START DATE/TIME: 06/18/2004 02:15 PM
FINISH DATE/TIME: 06/23/2004 04:10 PM

LATITUDE (NAD27): 32° 16' 26"
LONGITUDE (NAD 27): 111° 00' 09"

TOP OF GROUND ELEVATION: 2291.39 A.S.L.
TOP OF CASING ELEVATION: 2291.13 A.S.L.
SCREENED INTERVAL: 158.4-208.4 bgs.

COMMENTS:

RIG TYPE: Boart Longyear 1100 Sonic
DRILLING METHOD: Rotosonic
SAMPLING METHOD: Continious Core

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
	2290			CL		SILTY CLAY, trace fine sand, dark brown, strong HCl reaction, low plasticity, slightly moist	
5		IRA-31-5 14:20	0.5				
	2285					7.0'	
			0.7	ML		SILT, with sand, brown, angular to subangular, hard, strong HCl reaction, slightly moist to dry tan 1/4" nodules of weak cementation @ 8' to 9'	
10		IRA-31-10 14:20	0.8			interbedded SANDY CLAY @ 10'	
	2280						
			1.1			nil HCl reaction, becomes CLAYEY SILT, low plasticity, slightly moist to moist,	
15		IRA-31-15 14:25	4.4			interbedded SILTY CLAY @ 15'	
	2275					17.0'	
			1.1	SP		SAND. few silt and gravel, light brown, angular to subrounded, slightly moist	
20		IRA-31-20 15:05	2.9			fine gravel layer @ 19'	
	2270						
			2.2				
25		IRA-31-25 15:15	1.5			coarse subrounded gravel @ 24.5'	
	2265						
			1.4			some interbedding of medium sands with coarse sands/fine gravel	
30		IRA-31-30 15:45	0.3				
	2260					31.0'	
			1.7			WELL GRADED GRAVEL, with sand, trace silt, light brown to brown, angular to rounded, slightly moist	
35							

REPORT TUCSON-ENVIRONMENTAL | PROJECT P:\MIRACLE MILE\IRA-24 INSTALLATION\FINAL REPORT PDFS\BACK-UP DATA\IRA 31 & 24.GPJ | LIBRARY URS TUCSON V4.0.GLB | PRINTED 01/21/05

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BORING LOG: IRA - 31

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION: Wetmore Road and La Cholla
URS PROJECT #: 23443628.40000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: D Carlson
START DATE/TIME: 06/18/2004 02:15 PM
FINISH DATE/TIME: 06/23/2004 04:10 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
		IRA-31-35 15:55	1.4				
	2255						
			2.3			thin layer coarse gravel, rounded to subrounded @ 38'	
40		IRA-31-40 08:15	5.0	GW			
	2250					10" layer of WELL GRADED SAND, few gravels, subangular to subrounded @ 40.5'	
			2.8				
			2.1			layer of coarse gravels, subangular to rounded at 44'	
45		IRA-31-45 08:50					
	2245		4.1			11" layer SILTY GRAVEL, with sand at 46'	
						cobbles @ 48.5'	
					49.5'	becomes wet @ 49'	
50		IRA-31-50 10:05	4.5			CLAYEY GRAVEL, with some sand, little cobbles, light brown, subangular to subrounded, low plasticity, slightly moist	
	2240			GC			
			6.2				
					54.0'		
				CL		SANDY CLAY, with silt, brown, low plasticity, very dense, slightly moist,	
55		IRA-31-55 11:10	1.0		55.0'		
				SM	56.0'	SILTY SAND, with little gravel, brown, subangular, slightly moist	
	2235			SC			
			4.3		57.5'	CLAYEY SAND, trace fine gravel, brown, low plasticity, subangular, low plasticity, slightly moist to moist	
60		IRA-31-55 11:10	5.8			WELL GRADED SAND, with little fine gravel, trace silt, light brown	
	2230						
			2.5	SW			
						2" CLAYEY SAND at 63.5'	
65		IRA-31-65 11:45	4.7			4" WELL SORTED SAND without gravel at 64'	
	2225						
					67.0'		
			6.9	CL		SANDY CLAY, with silt, brown, low plasticity, hard, slightly moist	
					68.0'		
				ML		SILT, little fine sand, light brown, slightly moist	
70		IRA-31-70 13:30	0.9		70.0'		
	2220			SP		SAND, with little gravel, light brown, angular to subrounded, slightly moist	
			0.0		72.5'		
				GP-GC		SANDY GRAVEL, with little clay, trace subrounded cobbles, light brown, nil plasticity, angular to subrounded, slightly moist	
75							

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BORING LOG: IRA - 31

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION: Wetmore Road and La Cholla
URS PROJECT #: 23443628.40000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: D Carlson
START DATE/TIME: 06/18/2004 02:15 PM
FINISH DATE/TIME: 06/23/2004 04:10 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
		IRA-31-75 14:15	4.5			75.5'	
	2215					SANDY CLAY, with little silt, brown, hard medium plasticity, slightly moist to moist, interbedded % sand, 10 to 40%	
			3.6				
80		IRA-31-80 07:40	6.4	CL			
	2210						
			7.4			predomenantly SILTY-SANDY CLAY, thin 1/2" to 2" SILTY SANDS	
						yellow-green water in boring casing at 86'	
85		IRA-31-85 9:40	0.9	SC		85.0' CLAYEY SAND, trace silt and gravel, brown, low plasticity, slightly moist	
	2205					86.0'	
			4.7	SW-SM		SILTY SAND, with gravel, light brown, angular to subrounded, moist	
						89.0'	
90		IRA-31-90 9:50	5.2	ML		CLAYEY SILT, with little fine sand, light brown, nil to low plasticity, slightly moist	
	2200					92.0'	
			4.8			SILTY SAND,with little gravel, trace to little clays, light brown, slightly moist	
95		IRA-31-95 11:00	5.2				
	2195						
			2.9			interbedded CLAYEY SAND, brown, little gravel, low plasticity, moist @ 99 to 101.5', 103' and 105	
				SP-SM		4" rounded cobbles at 99' & 105'	
100		IRA-31-100 11:30	0.1				
	2190						
			3.2				
105		IRA-31-105 11:40	5.4				
	2185					106.0'	
			3.9			CLAYEY GRAVEL, with some sand, little silt, subangular to subrounded, low plasticity, moist 2" reddish brown SANDY CLAY with gravel @ 107'	
110		IRA-31-110 13:35	7.3			4" to 8" interbedded SILTY GRAVELS, with sand @ 108.5', 112', 113.5'	
	2180					4" CLAYEY SAND @ 111'	
			3.2				
115							

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BORING LOG: IRA - 31

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION: Wetmore Road and La Cholla
URS PROJECT #: 23443628.40000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: D Carlson
START DATE/TIME: 06/18/2004 02:15 PM
FINISH DATE/TIME: 06/23/2004 04:10 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
		IRA-31-115 13:50	6.5			becomes brittle, nil HCl reaction, no visable cementation, very hard, interbedded CLAYEY and SILTY GRAVEL	
	2175		4.3				
			6.1				
120		IRA-31-120 15:35	6.2	GC			
	2170					non brittle CLAYEY GRAVEL 3" subrounded cobble @ 121.5'	
			8.2				
125		IRA-31-125 16:00	1.2			1" to 2" nil HCl, brittle zones @ 124' & 126' interbedded CLAYEY GRAVEL/ SILTY GRAVEL @ 124.5' to 129'	
	2165						
			0.6				
130		IRA-31-130 16:04	3.2				
	2160						
			7.6		133.0'		
						SILTY GRAVEL, with sand, brown, angular to subrounded, slightly moist	
135		IRA-31-135 17:20	12.2			SILTY SAND @ 135'	
	2155		3.1				
			2.2				
140		IRA-31-140 17:25	3.5			gravel becomes coarse	
	2150					4", 10", 8" interbedded CLAYEY GRAVEL, with sand and silt @ 141', 144', 146' respectively	
			8.6				
			3.9				
145		IRA-31-145 17:45					
	2145		0.9				
			2.5				
150		IRA-31-150 18:05	1.1				
	2140						
			2.5			3" CLAYEY SAND, with gravel @ 152'	
						6" CLAYEY GRAVEL, with sand @ 153.5'	
155				GM			

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BORING LOG: IRA - 31

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION: Wetmore Road and La Cholla
URS PROJECT #: 23443628.40000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: D Carlson
START DATE/TIME: 06/18/2004 02:15 PM
FINISH DATE/TIME: 06/23/2004 04:10 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
		IRA-31-155 07:45	7.7				
	2135		14.2			5" coarse angular SAND, trace silt @ 156'	
			5.5			6" CLAYEY GRAVEL, with sand, med plasticity, sl moist to moist @ 157', 161', 163, 165, cobbles @ 162 & 163'	
160		IRA-31-160 08:00	9.6				
	2130					brown mottled black @ 161' to 161.5'	
			7.6				
165		IRA-31-165 08:30	23.5				
	2125						
			2.9			becomes moist, angular to subangular	
						becomes wet	
170		IRA-31-170 09:30	3.1			interbedded GRAVEL/SILTY GRAVEL, SILTY GRAVEL	
	2120					3" SAND, trace silt	
		IRA-31-173 10:00	6.4			2" & 3" layers black soil @ 173', 174' respectively, trace black to 175'	
175		IRA-31-175 10:55	4.2				
	2115				176.5'		
			2.5			SANDY GRAVEL, little silt, brown, angular to subangular, moist to wet	
180		IRA-31-180 11:00	5.2				
	2110		0.7	GP		interbedded GRAVEL/SAND @ 182'	
			5.1				
185		IRA-31-185 13:30				CLAYEY GRAVEL, with sand @ 185'	
	2105		4.0				
					187.0'		
			7.2			interbedded CLAYEY GRAVEL some sand, trace silt, brown, low to medium plasticity,and SILTY GRAVEL, some sand, brown, angular to subrounded, moist to sl moist	
190		IRA-31-190 14:20	1.9				
	2100						
			4.2				
195							

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BORING LOG: IRA - 31

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION: Wetmore Road and La Cholla
URS PROJECT #: 23443628.40000

DRILLING CONTRACTOR: Boart Longyear
DRILLER: Shawn Cain
LOGGED BY: D Carlson
START DATE/TIME: 06/18/2004 02:15 PM
FINISH DATE/TIME: 06/23/2004 04:10 PM

DEPTH BELOW SURFACE (FT)	ELEVATION (FT)	SAMPLE COLLECTED (Identification)	PID (ppm)	USCS	GRAPHIC	LITHOLOGIC DESCRIPTION AND REMARKS	WELL DIAGRAM
		IRA-31-195 15:00	6.0	GC		8" GRAVEL, trace sand & silt, wet @ 194.5' subrounded 4" cobbles @ 196' interbedded 4" to 8" CLAYEY GRAVEL & SILTY GRAVEL	
	2095		0.6				
200		IRA-31-200 15:05	0.8			200' to 210' predomimantly CLAYEY GRAVEL, with thin 2" to 4" SAND, CLAYEY SAND, SILTY GRAVEL dry, strong HCl reaction @ 201'	
	2090		2.9				
205		IRA-31-205 16:05	7.8				
	2085		4.2				
210		IRA-31-210 16:10	7.2				
	2080						
215							
	2075						
220							
	2070						
225							
	2065						
230							
	2060						
235							

WELL BORING DETAILS:

Total Depth . . . . . 210'

Nominal Borehole Diameter . . . . . 10"
Depth Interval . . . . . 0' - 54'
Nominal Borehole Diameter . . . . . 9"
Depth Interval . . . . . 54' - 76'
Nominal Borehole Diameter . . . . . 8"
Depth Interval . . . . . 76' - 220'
Seal at Reductions . . . . . 5' Hydrated Bentonite

Drilling Method . . . . . Rotosonic

WELL CONSTRUCTION DETAILS:

Regional Well Casing Length. . . . . 158.4'
Material . . . . . Schedule 80 PVC
Diameter . . . . . 4"

Screened Interval . . . . . 158.4 '- 208.4'
Perforations . . . . . 0.040", Slotted

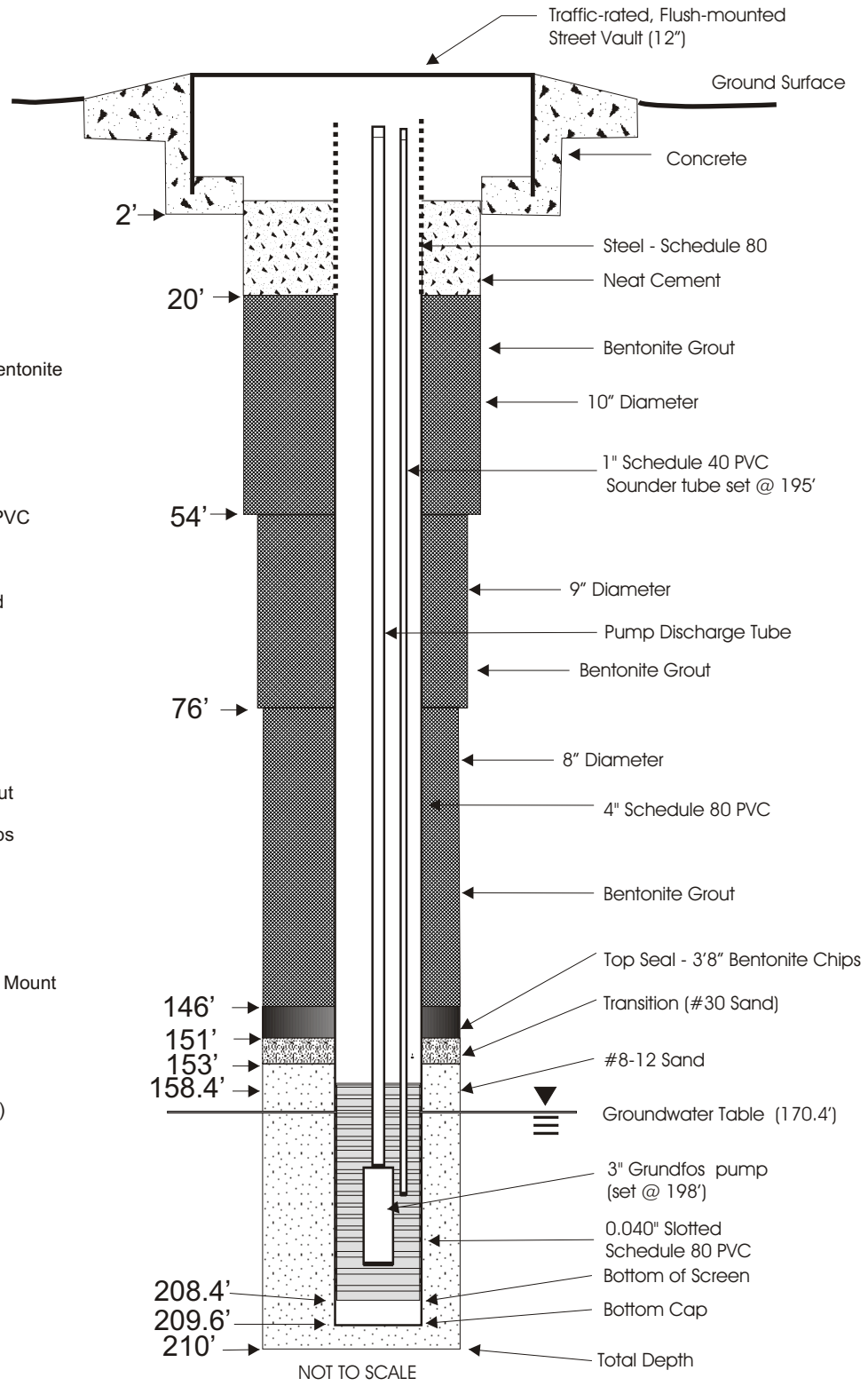
Bottom of Well . . . . . .209.2'

Surface Seal Interval. . . . . .0 to 2'
Seal Material . . . . . Concrete
1st Seal Interval.. . . . . 2' to 20'
Seal Material . . . . . Neat Cement
2nd Seal Interval. . . . . 20' to 146'
Seal Material . . . . . Bentonite Grout
3rd Seal Interval. . . . . .146' to 151'
Seal Material . . . . . Bentonite Chips
Transition Interval. . . . . 151' - 153'
Transition Material. . . . . #30 Sand
Gravel Pack Interval. . . . . 153' - 210'
Gravel Pack Material. . . . . #8-12

Surface Completion. . . . . 12" Dia. Flush Mount

WELL EQUIPPING:

Pump Make . . . . . Grundfos
Model . . . . . Redi Flo - 3"
Horsepower . . . . . 3/4 HP (JS 05)
Pump Intake . . . . . .198' bgs



AS-BUILT MONITOR WELL IRA-31 SCHEMATIC FLUSH MOUNT

Remedial Investigation/Feasibility Study
Miracle Mile WQARF Site

P:/1Miracle Mile/Spring Joint/IRA-31 Installation/As-Built IRA-31 Well Schematic

DATE DRILLED: **01-14-2004**

DRILL RIG TYPE: **GP24-300RS**

BORING TYPE/SIZE: **Rotosonic/8" OD**

BORING NO. MW-1
(SJ-MW-1)

LOCATION: **See Location Diagram**

ELEVATION: **Not Determined**

FIELD GEOLOGIST: **David Wagner**

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
								6" concrete
						CL		SILTY CLAY; dark brown clay with silt
						CL		increasing silt
					5			
						ML		SILT; light brown, trace clay, trace sand, trace subrounded gravel 1" or less
					10			
0	C				15			
						SW		WELL GRADED SAND; v.f.-v.c. angular sand, 10% gravel 1" or less, loose
						SW		numerous gravel lenses
					20			

(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 01-14-2004

NOTES

SPRING JOINT SPECIALIST

Boring Log

Western Technologies Inc.

Job No.: 2923JC020 | Plate: C-6

DATE DRILLED: **01-14-2004**

DRILL RIG TYPE: **GP24-300RS**

BORING TYPE/SIZE: **Rotosonic/8" OD**

BORING NO. MW-1
(SJ-MW-1)

LOCATION: **See Location Diagram**

ELEVATION: **Not Determined**

FIELD GEOLOGIST: **David Wagner**

SAMPLE								SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT	DEPTH (FT.)	USCS	GRAPHIC	
0	C					SW		(this soil has been continued from the previous page)
0	C				25	SW		chromium yellow stained gravel at 25 feet
0	C				30	SW		chromium yellow stained gravel at 29.5 feet
						SW		chromium staining, numerous gravel lenses, subangular gravel to cobble from 31.5 feet to 33 feet
0	C				35	SW		angular gravel, trace chromium stain
						SW		chromium yellow stained gravel
			(this soil will be continued on the next page)		40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 01-14-2004

NOTES

SPRING JOINT SPECIALIST

Boring Log

Western Technologies Inc.

Job No.: 2923JC020 | Plate: C-6

DATE DRILLED: **01-14-2004**

DRILL RIG TYPE: **GP24-300RS**

BORING TYPE/SIZE: **Rotosonic/8" OD**

BORING NO. MW-1
(SJ-MW-1)

LOCATION: **See Location Diagram**

ELEVATION: **Not Determined**

FIELD GEOLOGIST: **David Wagner**

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
0	C					SW		(this soil has been continued from the previous page)
0	C				45	SW		cobbles
						GW		WELL GRADED GRAVEL; 70% quartzite gravel, 30% sand
						SC		CLAYEY SAND; 50% sand, 50% sand with chromiun staining throughout, trace gravel 2" or less
0	C				50			
						ML		SILT: DARK BROWN SILT; lenses, fine grained clayey sand and clay, 20% moist
0	C				55			
						ML		cobble
						SC		SANDY CLAY; chromium stained
						SW		WELL GRADED SAND; fine to cobble, some chromium stains
					60			

(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 01-14-2004

NOTES

SPRING JOINT SPECIALIST

Boring Log

Western Technologies Inc.

Job No.: 2923JC020 | Plate: C-6

DATE DRILLED: 01-14-2004

DRILL RIG TYPE: GP24-300RS

BORING TYPE/SIZE: Rotosonic/8" OD

BORING NO. MW-1
(SJ-MW-1)

LOCATION: See Location Diagram

ELEVATION: Not Determined

FIELD GEOLOGIST: David Wagner

SAMPLE								SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT	DEPTH (FT.)	USCS	GRAPHIC	
1	C					SW		(this soil has been continued from the previous page)
						SW		distinct chromium staining from 60 to 61 feet
						SC		CLAYEY SAND; 60% v.f.-v.c. angular sand 40% clay, dense, non plastic
3	C				65			
						ML		SILT; loose gradational to
						CL		CLAY; with sand, 15% fine sand
						SC		CLAYEY SAND; 50% sand, 50% clay, trace chromium stain
1	C				70	CL		CLAY; brown, very dense, plastic, moist
						SP		POORLY GRADED SAND; medium grained angular sand, loose, at 72 feet
								Bottom Of Boring At 72.5 Feet
					75			
					80			

GROUNDWATER ENCOUNTERED NO: X YES: ____ DEPTH: ____ DATE: 01-14-2004

NOTES

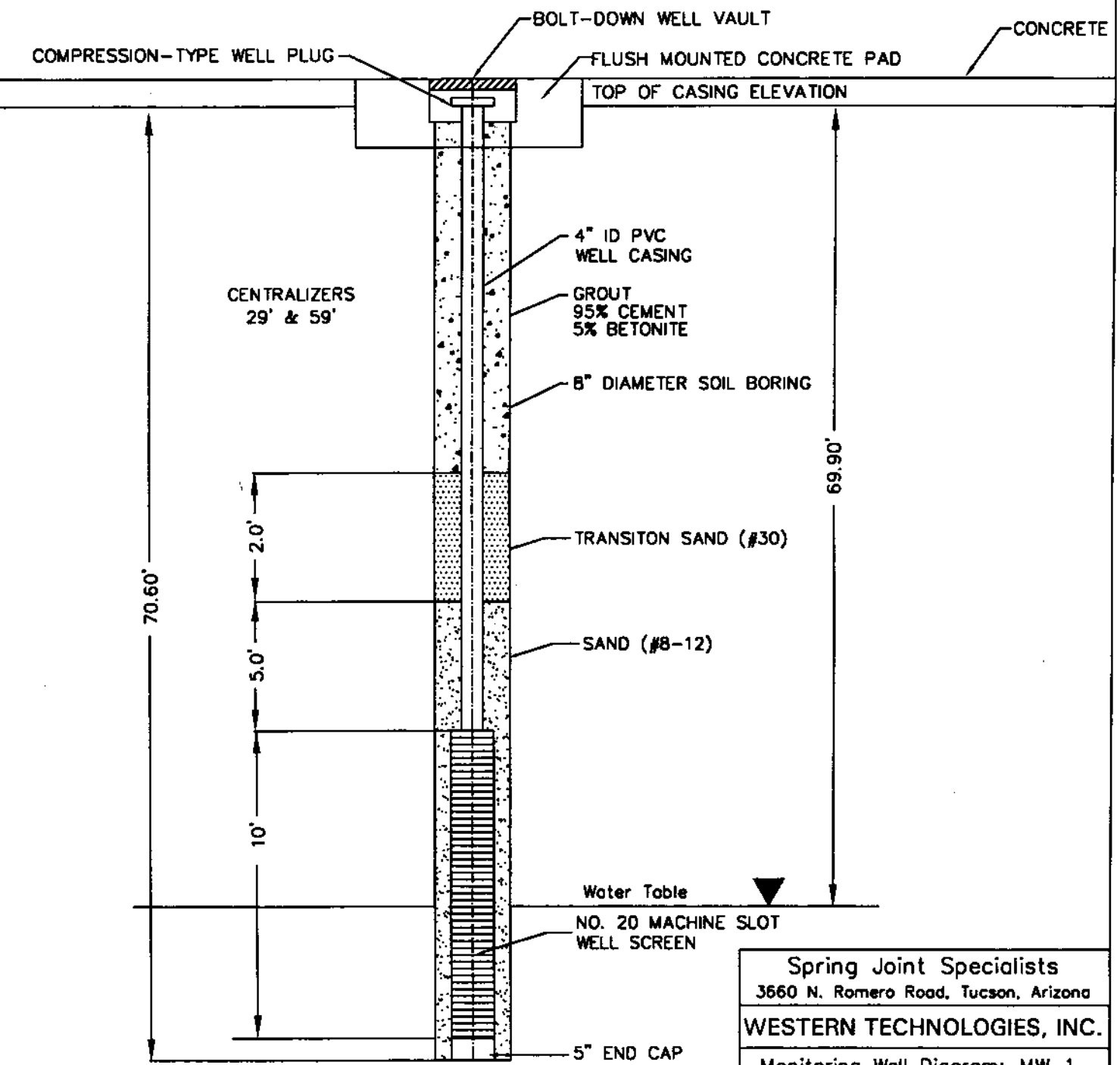
SPRING JOINT SPECIALIST

Boring Log

Western Technologies Inc.

Job No.: 2923JC020 | Plate: C-6

Monitoring Well Diagram: MW-1
(Not to Scale) (SJ-MW-1)



Spring Joint Specialists 3660 N. Romero Road, Tucson, Arizona	
WESTERN TECHNOLOGIES, INC.	
Monitoring Well Diagram: MW-1	
Job No.: 2983JC020	Plate: C-1

DATE DRILLED: **01-13-2004**

DRILL RIG TYPE: **GP24-300RS**

BORING TYPE/SIZE: **Rotosonic/8" OD**

BORING NO. MW-2

(SJ-MW-2)

LOCATION: **See Location Diagram**

ELEVATION: **Not Determined**

FIELD GEOLOGIST: **David Wagner**

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
								3" asphalt at ground surface fill: dark brown angular gravel 60%, sand
						ML		SILT; dark brown silt 70%, clay 30%
					5			
						ML		SILT; very light brown/caliche, 10% clay or less
					10			decreasing caliche increasing clay
						SP		POORLY GRADED SAND; brown, medium grained angular
					15	SC		CLAYEY SAND; with gravel, 70% v.f.g. angular-subangular sand, 30% clay
						SW		WELL GRADED SAND; light brown, v.f. grained to very course sand, 10% subangular sand to angular gravel 3" or less, loose
			(this soil will be continued on the next page)		20			

GROUNDWATER ENCOUNTERED NO: X YES: ____ DEPTH: ____ DATE: 01-13-2004

NOTES

SPRING JOINT SPECIALIST

Boring Log

Western Technologies Inc.

Job No.: 2983JC020 Plate: C-7

DATE DRILLED: **01-13-2004**

DRILL RIG TYPE: **GP24-300RS**

BORING TYPE/SIZE: **Rotosonic/8" OD**

BORING NO. MW-2
(SJ-MW-2)

LOCATION: **See Location Diagram**

ELEVATION: **Not Determined**

FIELD GEOLOGIST: **David Wagner**

SAMPLE									
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION	
						SW		(this soil has been continued from the previous page)	
						SW		thin clay layer	
					25				
						SW		increasing gravel	
						SW		WELL GRADED SAND; with gravel, 30% subround-subangular gravel 3" or less, loose	
					30				
						SW		30% gravel loose	
						GW		WELL GRADED GRAVEL; 50% gravel, 10% cobbles, 40% angular sand loose	
					35	SW		WELL GRADED SAND; with gravel, same as above	
						GW		WELL GRADED GRAVEL; same as above	
					40				

(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 01-13-2004

NOTES

SPRING JOINT SPECIALIST

Boring Log

Western Technologies Inc.

Job No.: 2983JC020 | Plate: C-7

DATE DRILLED: **01-13-2004**

DRILL RIG TYPE: **GP24-300RS**

BORING TYPE/SIZE: **Rotosonic/8" OD**

BORING NO. MW-2

(SJ-MW-2)

LOCATION: **See Location Diagram**

ELEVATION: **Not Determined**

FIELD GEOLOGIST: **David Wagner**

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						SW		WELL GRADED SAND; with gravel, trace cobbles, loose
					45			
						GW		WELL GRADED GRAVEL; with sand, loose
						SC		CLAYEY SAND; 60% fine to very course angular sand, 40% clay
					50			
						GW		WELL GRADED GRAVEL; 50% angular-subangular gravel, 40% v.f.-v.c. sand, 10% clay
						CL		CLAY; brown with 10% sand, 10% angular quartzite gravel
					55			
						SC		CLAY SAND; 50% sand, 50% clay
						SW		WELL GRADED SAND WITH GRAVEL; 80% v.f-v.c. angular sand, 20% gravel to cobbles, loose
			(this soil will be continued on the next page)		60			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 01-13-2004

NOTES

SPRING JOINT SPECIALIST

Boring Log

Western Technologies Inc.

Job No.: 2983JC020 | Plate: C-7

DATE DRILLED: **01-13-2004**

DRILL RIG TYPE: **GP24-300RS**

BORING TYPE/SIZE: **Rotosonic/8" OD**

BORING NO. MW-2

(SJ-MW-2)

LOCATION: **See Location Diagram**

ELEVATION: **Not Determined**

FIELD GEOLOGIST: **David Wagner**

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						SC		CLAYEY SAND; 60% fine to medium angular sand, 40% clay, moist
						GC		CLAYEY GRAVEL; gravel to cobble
						SC		CLAYEY SAND; same as above, moist
					65			
						CL		SANDY CLAY; 40% sand, 60% clay
						ML		SILT; light brown, loose
					70	SC		CLAYEY SAND; 70% fine to v.c. angular sand, 30% clay, trace angular gravel 1"-1/2" or less
						CL		CLAY; brown, very dense, high plasticity, trace fine sand
					75			**Bottom Of Boring At 75 Feet**
					80			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 01-13-2004

NOTES

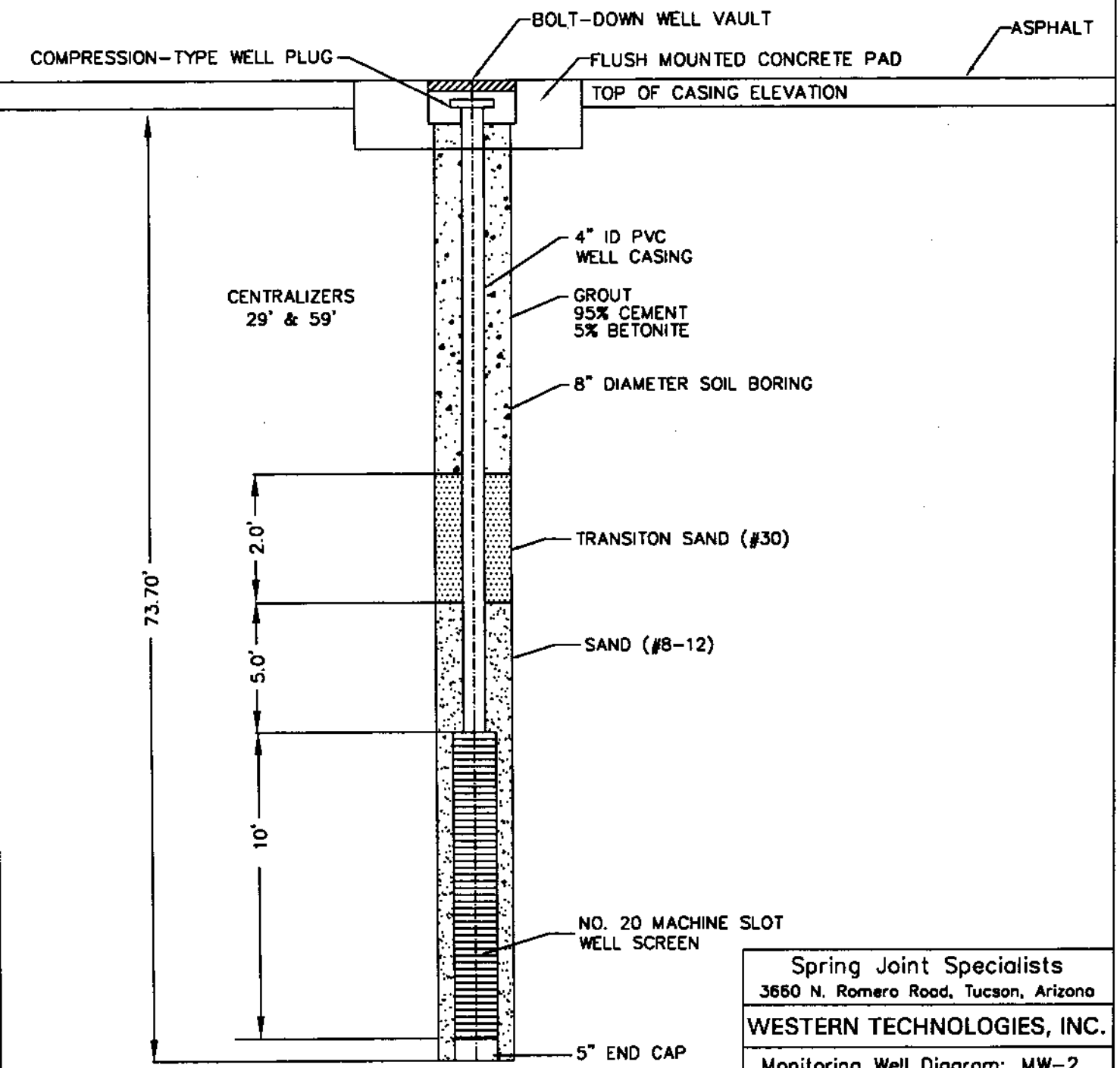
SPRING JOINT SPECIALIST

Boring Log

Western Technologies Inc.

Job No.: 2983JC020 | Plate: C-7

Monitoring Well Diagram: MW-2
(Not to Scale) (SJ-MW-2)
(Dry as of January 21, 2004)



Spring Joint Specialists 3660 N. Romero Road, Tucson, Arizona	
WESTERN TECHNOLOGIES, INC.	
Monitoring Well Diagram: MW-2	
Job No.: 2983JC020	Plate: C-2

DATE DRILLED: **01-14-2004**

DRILL RIG TYPE: **GP24-300RS**

BORING TYPE/SIZE: **Rotosonic/8" OD**

BORING NO. MW-3
(SJ-MW-3)

LOCATION: **See Location Diagram**

ELEVATION: **Not Determined**

FIELD GEOLOGIST: **David Wagner**

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						ML		SILT; brown, medium dense with clay, 50% silt, 50% clay
								decreasing clay
					5			
					10			clay 10%
								trace subangular gravel 3" or less
					15			silt, brown, loose, gradational to
						SW		WELL GRADED SAND; v.f.-v.c. angular sand, < 10% angular-subangular gravel 2 1/2" or less, loose
					20			

(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 01-14-2004

NOTES

SPRING JOINT SPECIALIST

Boring Log

Western Technologies Inc.

Job No.: 2983JC020 | Plate: C-8

DATE DRILLED: **01-14-2004**

DRILL RIG TYPE: **GP24-300RS**

BORING TYPE/SIZE: **Rotosonic/8" OD**

BORING NO. MW-3

(SJ-MW-3)

LOCATION: **See Location Diagram**

ELEVATION: **Not Determined**

FIELD GEOLOGIST: **David Wagner**

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						SW		(this soil has been continued from the previous page)
					25			
						SW		gravel to cobble 4" or less
						SW		gravel to cobble 5" or less
					30			
						SW		numerous gravel lenses
						SW		3" thick iron stained sand
					35			
						SW		grey, v.f. medium sand
						SW		1" thick white lense
						GW		WELL GRADED GRAVEL; trace clay, loose
						SW		WELL GRADED SAND;
			(this soil will be continued on the next page)		40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 01-14-2004

NOTES

SPRING JOINT SPECIALIST

Boring Log

Western Technologies Inc.

Job No.: 2983JC020 | Plate: C-8

DATE DRILLED: **01-14-2004**

DRILL RIG TYPE: **GP24-300RS**

BORING TYPE/SIZE: **Rotosonic/8" OD**

BORING NO. MW-3
(SJ-MW-3)

LOCATION: **See Location Diagram**

ELEVATION: **Not Determined**

FIELD GEOLOGIST: **David Wagner**

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						SW		(this soil has been continued from the previous page)
						GW		WELL GRADED GRAVEL; 50% subangular gravel to cobbles 6" or less, 40% silt to v.c. sand, 10% or less, clay
					45			
						SC		CLAYEY SAND; 60% medium grained angular sand, 40% clay, trace angular gravel 1" or less
					50			
						GC		CLAY GRAVEL;
						SC		CLAYEY SAND; as above
					55	GW		WELL GRADED GRAVEL TO COBBLE; 4" or less
						SC		CLAYEY SAND; with gravel, 60% angular sand, 30% clay 10% gravel 3" or less
			(this soil will be continued on the next page)		60			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 01-14-2004

NOTES

SPRING JOINT SPECIALIST

Boring Log

Western Technologies Inc.

Job No.: 2983JC020 Plate: C-8

DATE DRILLED: 01-14-2004

DRILL RIG TYPE: GP24-300RS

BORING TYPE/SIZE: Rotosonic/8" OD

BORING NO. MW-3
(SJ-MW-3)

LOCATION: See Location Diagram

ELEVATION: Not Determined

FIELD GEOLOGIST: David Wagner

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						SC		(this soil has been continued from the previous page)
						GW		WELL GRADED GRAVEL TO COBBLE; driller reports boulders
					65			
						SC		CLAYEY SAND; brown, moist
						GW		WELL GRADED GRAVEL; to boulder 60%, 30% angular sand, 10% or less, clay moist
						SC		CLAYEY SAND; 70% v.f.-v.c. angular to subrounded sand, 20% clay, 10% angular gravel 2" or less
					70			
					75	CL		CLAY; with sand, brown, dense, non plastic, up tp 20% silt and sand
						SW-GW		WELL GRADED SAND WITH GRAVEL; light brown to grey with variable amounts of gravel and 10% or less clay
					80			

(this soil will be continued on the next page)

GROUNDWATER ENCOUNTERED NO: X YES: ____ DEPTH: ____ DATE: 01-14-2004

NOTES

SPRING JOINT SPECIALIST

Boring Log

Western Technologies Inc.

Job No.: 2983JC020 Plate: C-8

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME.

DATE DRILLED: **01-14-2004**

DRILL RIG TYPE: **GP24-300RS**

BORING TYPE/SIZE: **Rotosonic/8" OD**

BORING NO. MW-3

(SJ-MW-3)

LOCATION: **See Location Diagram**

ELEVATION: **Not Determined**

FIELD GEOLOGIST: **David Wagner**

SAMPLE					DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
OVM READING (PPM)	TYPE	INTERVAL	IDENTIFIER NUMBER	BLOW COUNT				
						SW-GW		(this soil has been continued from the previous page)
						GW		WELL GRADED GRAVEL; cobbles and boulders
						SW-GW		WELL GRADED SAND WITH GRAVEL; 10% or less clay
					85			
								angular
								gravel 3" or less
					90	SC		CLAYEY SAND; 75% clay and silt, moist, 25% medium to course angular sand
						GC		CLAYEY GRAVEL; 50% gravel, 30% sand, 20% clay, moist
						CL		CLAY; dark brown, very dense high plasticity
					95			**Bottom Of Boring At 95 Feet**
					100			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 01-14-2004

NOTES

SPRING JOINT SPECIALIST

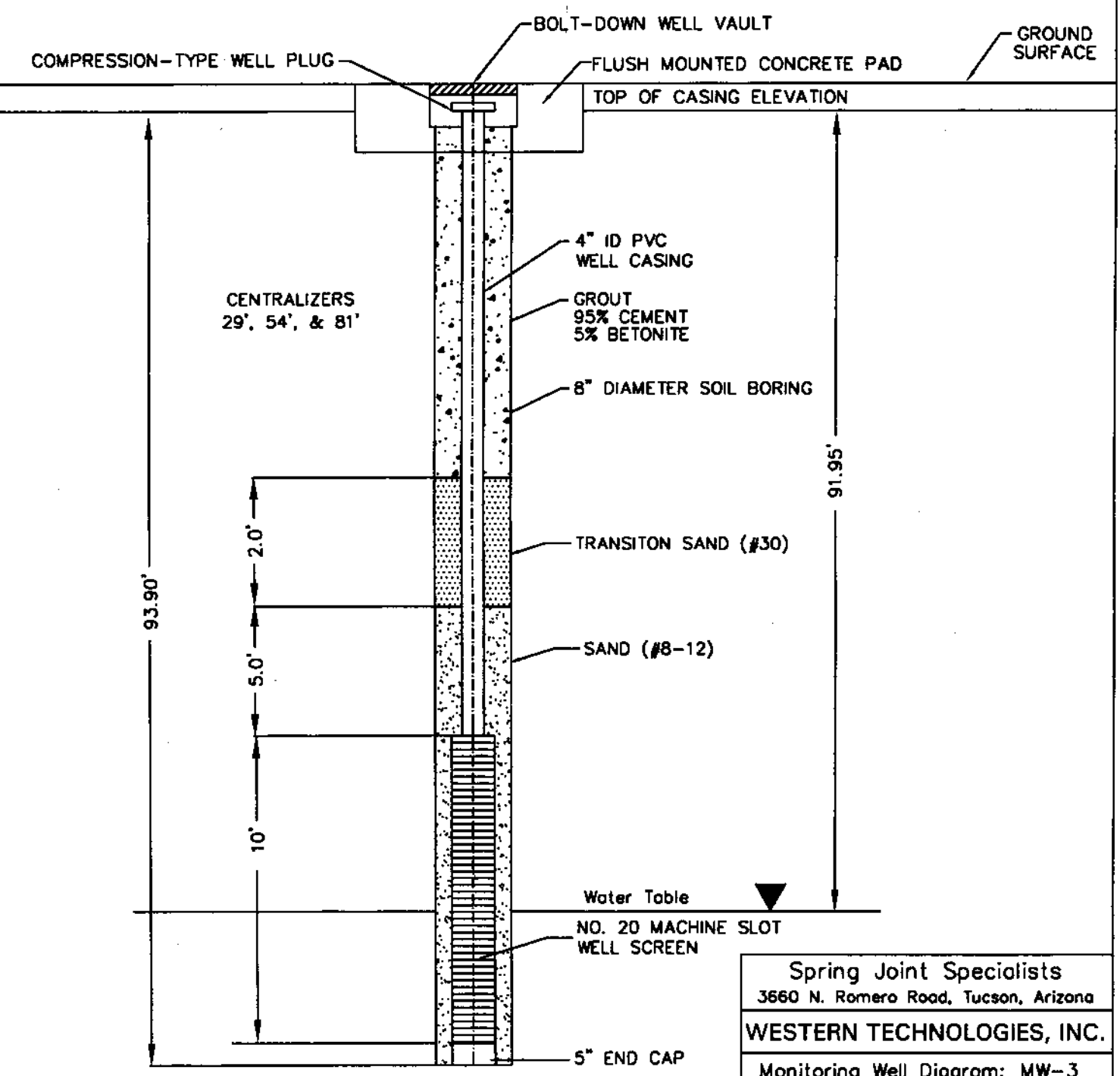
Boring Log

Western Technologies Inc.

Job No.: 2983JC020 | Plate: C-8

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLE IDEALIZATION.

Monitoring Well Diagram: MW-3
(Not to Scale) (SJ-MW-3)



Spring Joint Specialists 3660 N. Romero Road, Tucson, Arizona	
WESTERN TECHNOLOGIES, INC.	
Monitoring Well Diagram: MW-3	
Job No.: 2983JC020	Plate: C-3

URS
333 E Wetmore Rd. Suite 400
Tucson, Az 85705
520-887-1800
520-887-8348

Borehole: IRA-32

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 4/17/2011 8:20:00 AM
FINISH DATE/TIME: 4/19/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
0	GP		7.0	POORLY GRADED GRAVEL WITH SAND, (GP) light brown (5YR 5/6), subrounded to rounded, medium to coarse grained, dry, non plastic, no dry strength, weak cementation, strong HCL reaction	70	30	0	
10, 20	SM		21.0	SILTY SAND WITH GRAVEL, (SM) light brown (5YR 5/6), subrounded, coarse grained, dry, low plasticity, no dry strength, weak cementation, weak HCL reaction	25	55	20	
	ML		25.0	SANDY SILT, (ML) light brown (5YR 5/6), fine grained, dry, low plasticity, no dry strength, weak cementation	0	20	80	
30, 40	GC			CLAYEY GRAVEL WITH SAND, (GC) light brown (5YR 5/6), subrounded, medium grained, dry, non plastic, low dry strength, weak cementation	55	30	15	
50	GM		50.0	SILTY GRAVEL WITH SAND, (GM) very pale orange (10YR 8/2), subangular to angular, fine to coarse grained, dry, non plastic, low dry strength, weak cementation	60	30	10	
	ML		54.0	SANDY SILT, CLAYEY, (ML) brown (5YR 4/4), angular, fine grained, moist, low plasticity, low dry strength, moderate cementation	0	10	90	
	GM		58.0	SILTY GRAVEL, SANDY, (GM) very pale orange (10YR 8/2), dry, non plastic, no dry strength, weak cementation	60	30	10	
60	ML		69.0	SANDY SILT, CLAYEY, (ML) brown (5YR 4/4), subangular to subrounded, fine to medium grained, moist, low plasticity, low dry strength, moderate cementation	0	20	80	
70	SC		73.0	CLAYEY SAND WITH GRAVEL, (SC) light brown (5YR 5/6), subrounded, medium to coarse grained, dry, non plastic, low dry strength, weak cementation	20	65	15	
	SM		77.0	SILTY SAND, CLAYEY, (SM) light brown (5YR 4/4), subrounded, fine to medium grained, moist, low plasticity, low dry strength, moderate cementation	0	70	30	
80	SC		80.0	CLAYEY SAND, SILTY, (SC) light brown (5YR 5/6), subangular, fine to medium grained, dry, non plastic, low dry strength, moderate cementation	0	80	20	
	CL		89.0	SANDY LEAN CLAY, GRAVELLY, (CL) brown (5YR 4/4), angular, fine to coarse grained, moist, low plasticity, medium dry strength, moderate cementation Less cementation	10	30	60	Cement/Grout Seal
90	SC		94.0	CLAYEY SAND WITH GRAVEL, (SC) brown (5YR 4/4), subangular, coarse grained, moist, low plasticity, medium dry strength, moderate cementation	10	70	20	
	CL		98.0	SANDY LEAN CLAY, (CL) brown (5YR 4/4), angular, fine grained, moist, high plasticity, medium dry strength, moderate cementation	0 10	20 30	80 60	
100	SC			SANDY LEAN CLAY WITH GRAVEL, (CL) brown (5YR 4/4), angular,	10	60	30	

REPORT ADEQ-MIRICLE MILE (TUSCON TEMPLATE) | PROJECT L:\GINT6\WRES GINT\PROJECTS\ADEQ-MIRICLE MILE.GPJ | LIBRARY TUSCON TEMPLATE 2012.GLB | PRINTED 3/9/12

URS
333 E Wetmore Rd. Suite 400
Tucson, Az 85705
520-887-1800
520-887-8348

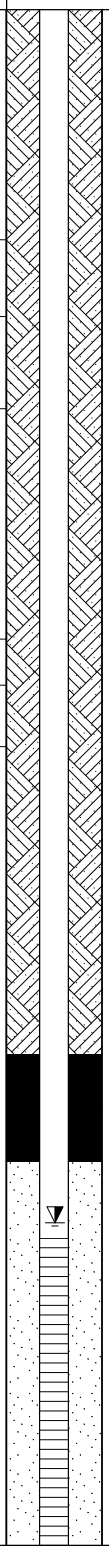
Borehole: IRA-32

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 4/17/2011 8:20:00 AM
FINISH DATE/TIME: 4/19/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines
100	SC			fine to coarse grained, moist, low plasticity, medium dry strength, moderate cementation	10	60	30
110			115.0	CLAYEY SAND WITH GRAVEL, (SC) light brown (5YR 5/6), subrounded, fine to coarse grained, moist, low plasticity, medium dry strength, moderate cementation *(continued)* Higher cementation, more clay (102'-110')			
120	CL		120.0	SANDY LEAN CLAY, (CL) brown (5YR 3/4), subangular, fine grained, moist, medium plasticity, high dry strength, strong cementation	0	20	80
	ML		126.0	SANDY SILT, (ML) light brown (5YR 6/4), subrounded, medium grained, moist, low plasticity, low dry strength, weak cementation	0	30	70
130	SC			CLAYEY SAND WITH GRAVEL, (SC) light brown (5YR 6/4), subrounded, coarse grained, dry, non plastic, low dry strength, weak cementation, gravel is angular, some black modeling (approx. 128')	10	75	15
	SC			CLAYEY SAND WITH GRAVEL, (SC) grayish black, subrounded, coarse grained, dry, non plastic, low dry strength, weak cementation	10	75	15
140	SC		141.0	CLAYEY SAND WITH GRAVEL, (SC) light brown (5YR 6/4), subrounded, coarse grained, moist, low plasticity, medium dry strength, moderate cementation	15	55	30
	ML		144.0	SANDY SILT, (ML) light brown (5YR 6/4), angular, fine grained, moist, low plasticity, low dry strength, weak cementation	0	10	90
	SC		148.0	CLAYEY SAND WITH GRAVEL, (SC) light brown (5YR 6/4), subangular to angular, medium to coarse grained, moist, non plastic, medium dry strength, moderate cementation	30	55	15
150	GC			CLAYEY GRAVEL WITH SAND, (GC) reddish brown (10R 4/6), subangular, coarse grained, moist, low plasticity, high dry strength, strong cementation	55	15	30
160							
170	GC			CLAYEY GRAVEL WITH SAND, (GC) reddish brown (10R 4/6), subangular, coarse grained, moist, low plasticity, high dry strength, strong cementation, more dense	55	10	35
180	GC			CLAYEY GRAVEL WITH SAND, (GC) grayish brown (5YR 3/2), subangular, fine to coarse grained, moist, non plastic, medium dry strength, moderate cementation, permiable	55	20	25
	GC			CLAYEY GRAVEL WITH SAND, (GC) grayish brown (5YR 3/2), subangular, fine to coarse grained, moist, non plastic, medium dry strength, moderate cementation, more clay, less permiable than above	50	20	30
190	GC			CLAYEY GRAVEL WITH SAND, (GC) grayish brown (5YR 3/2), subangular, fine to coarse grained, moist, low plasticity, medium dry strength, moderate cementation, permiable (approx. 176'-181')	55	20	25
200							

WELL DIAGRAM



URS
333 E Wetmore Rd. Suite 400
Tucson, Az 85705
520-887-1800
520-887-8348

Borehole: IRA-32

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 4/17/2011 8:20:00 AM
FINISH DATE/TIME: 4/19/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
200								
	GC			CLAYEY GRAVEL WITH SAND, (GC) grayish brown (5YR 3/2), subangular, fine to coarse grained, moist, low plasticity, medium dry strength, moderate cementation, permiable (approx. 176'-181') *(continued)*	55	20	25	Filter Pack Slot Screen
210								
220								
230	GC		230.0	CLAYEY GRAVEL WITH SAND, (GC) grayish brown (5YR 3/4), subangular, fine to coarse grained, moist, low plasticity, medium dry strength, strong cementation, less permiable than above	50	20	30	

Total Depth of borehole = 230.0 feet.

URS
333 E Wetmore Rd. Suite 400
Tucson, Az 85705
520-887-1800
520-887-8348

Borehole: IRA-33

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 4/12/2011 10:05:00 AM
FINISH DATE/TIME: 4/15/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
0	SM		7.0	WELL GRADED SAND WITH SILT AND GRAVEL, (SM) light brown (5YR 6/4), subangular to angular, fine to coarse grained, dry, non plastic, no dry strength, weak cementation, strong HCL reaction	20	65	15	
10	SM		10.0	SILTY SAND WITH GRAVEL, (SM) light brown (5YR 6/4), subrounded, medium grained, dry, non plastic, low dry strength, weak cementation, strong HCL reaction	15	65	20	
	SC		13.0	CLAYEY SAND WITH GRAVEL, (SC) subangular, medium grained, dry, non plastic, low dry strength, weak cementation	20	70	10	
	SP		15.0	POORLY GRADED SAND WITH GRAVEL, (SP) very pale orange, subrounded to rounded, medium to coarse grained, dry, non plastic, no dry strength, weak cementation	20	80	0	
20	SP-SC		27.0	POORLY GRADED SAND WITH CLAY AND GRAVEL, (SP-SC) brown (5YR 4/4), subangular, fine to coarse grained, dry, non plastic, low dry strength, weak cementation	35	55	10	
30	SP-SM		29.0	POORLY GRADED SAND WITH SILT AND GRAVEL, (SP-SM) light brown (5YR 6/4), subangular to angular, medium grained, dry, non plastic, no dry strength, weak cementation, strong HCL reaction	20	70	10	
	SM		31.0	SILTY SAND WITH GRAVEL, (SM) light brown (5YR 6/4), subangular to subrounded, medium grained, dry, non plastic, no dry strength, weak cementation	20	60	20	
40	GP		40.0	POORLY GRADED GRAVEL WITH SAND, (GP) light brown (5YR 6/4), subangular to subrounded, medium grained, dry, non plastic, no dry strength, weak cementation	55	40	5	
	GP-GM		48.0	POORLY GRADED GRAVEL WITH CLAY AND SAND, (GP-GM) (10R 4/6), subangular to subrounded, coarse grained, moist, non plastic, low dry strength, weak cementation	50	40	10	
50	CL		61.0	LEAN CLAY, SILTY, (CL) brown (5YR 3/4), subangular, fine grained, moist, non plastic, low dry strength, weak cementation	0	10	90	
60	ML		65.0	SILT, CLAYEY, (ML) brown (5YR 3/4), subangular, fine grained, dry, low plasticity, low dry strength, weak cementation	0	10	90	
	SM		69.0	SILTY SAND, (SM) brown (5YR 3/4), subangular, fine to medium grained, dry, non plastic, low dry strength, weak cementation	10	75	15	
70	CL		72.0	LEAN CLAY, SILTY, (CL) brown (5YR 3/4), subangular, fine grained, moist, low plasticity, low dry strength, weak cementation	0	10	90	
80	SP-SC		85.0	POORLY GRADED SAND WITH CLAY AND GRAVEL, (SP-SC) brown (5YR 3/4), subangular, fine to medium grained, dry, non plastic, low dry strength, weak cementation	20	70	10	
90	CH		97.0	FAT CLAY WITH SAND, SILTY, (CH) brown (5YR 3/4), angular, medium grained, moist, high plasticity, medium dry strength, moderate cementation	0	15	85	
100	SC				0	75	25	

URS
333 E Wetmore Rd. Suite 400
Tucson, Az 85705
520-887-1800
520-887-8348

Borehole: IRA-33

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 4/12/2011 10:05:00 AM
FINISH DATE/TIME: 4/15/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
100	SC			CLAYEY SAND, SILTY, (SC) light brown (5YR 6/4), subangular, fine to coarse grained, moist, non plastic, low dry strength, weak cementation *(continued)*	0	75	25	Cement/Grout Seal
110				Increase in gravel	5	70	25	
			113.0					
	CH		118.0	FAT CLAY, (CH) grayish brown (5YR 3/2), moist, high plasticity, very high dry strength, strong cementation	0	0	100	
120	CL			LEAN CLAY, SILTY, (CL) pale brown (5YR 5/2), moist, medium plasticity, medium dry strength, moderate cementation	0	0	100	
			125.0	Perched water int eh interval 113 feet to 125 feet, water out of core barrel, did not obtain water level sounder would not read				
	SM			SILTY SAND, (SM) very pale orange (10YR 8/2), subangular, fine to coarse grained, dry, non plastic, no dry strength, weak cementation	10	70	20	
130			131.0	Similar to layer above, only black				
	SC			CLAYEY SAND, (SC) light brown (5YR 5/6), subrounded, medium to coarse grained, moist, non plastic, low dry strength, weak cementation	10	75	15	
140								
	SC			CLAYEY SAND WITH GRAVEL, (SC) light brown (5YR 5/6), subrounded, fine to coarse grained, moist, low plasticity, medium dry strength, moderate cementation	15	55	30	
150								
160			160.0					
	CH			FAT CLAY, (CH) brown (5YR 3/4), angular, medium grained, moist, medium plasticity, medium dry strength, moderate cementation	0	10	90	
	CH		168.0	FAT CLAY, (CH) brown (5YR 3/4), angular, medium grained, moist, medium plasticity, medium dry strength, moderate cementation	0	10	90	
170	CL			LEAN CLAY WITH SAND, (CL) brown (5YR 3/4), subangular to subrounded, moist, low plasticity, high dry strength, strong cementation	20	20	60	
180								
			189.0					
190	GC			POORLY GRADED GRAVEL WITH CLAY AND SAND, (GC) brown (5YR 3/4), subangular, coarse grained, wet, non plastic, medium dry strength, moderate cementation	60	20	20	
200								

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520-887-8348

Borehole: IRA-33

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 4/12/2011 10:05:00 AM
FINISH DATE/TIME: 4/15/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
200	GC			POORLY GRADED GRAVEL WITH CLAY AND SAND, (GC) brown (5YR 3/4), subangular, coarse grained, wet, non plastic, medium dry strength, moderate cementation *(continued)*	60 55	20 20	20 25	
				Low plasticity, medium dry strength, moderate cementation, increase in clay	60	20	20	
				Non plastic, medium dry strength, moderate cementation, decrease in clay	55 60	20 20	25 20	
210				Low plasticity, medium dry strength, moderate cementation, increase in clay				
				Non plastic, medium dry strength, moderate cementation, decrease in clay				
220				Low plasticity, medium dry strength, moderate cementation, increase in clay	55	20	25	
				Non plastic, medium dry strength, moderate cementation, decrease in clay	60	20	20	
230								
240	GC			(GC) brown (5YR 3/4), subangular, wet, low plasticity, medium dry strength, moderate cementation, increase in clay	55	20	25	
250								
260				Wet, non plastic, medium dry strength, moderate cementation, decrease in clay	60	20	20	Bentonite Seal
								Transition Sand
270				Moist				
280								Filter Pack Slot Screen
290	GC			(GC) brown (5YR 3/4), subangular, moist, low plasticity, medium dry strength, moderate cementation, increase in clay	55	20	25	
				Non plastic, medium dry strength, moderate cementation, decrease in clay	60	20	20	
				Increase in clay				Transition Sand
300								Bentonite Seal

URS
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520-887-1800
520-887-8348

Borehole: IRA-33

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 4/12/2011 10:05:00 AM
FINISH DATE/TIME: 4/15/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
300	GC			POORLY GRADED GRAVEL WITH CLAY AND SAND, (GC) brown (5YR 3/4), subangular, coarse grained, wet, non plastic, medium dry strength, moderate cementation *(continued)*	60	20	20	
				Non plastic, low dry strength, weak cementation, decrease in clay	60	20	20	Transition Sand
310	GC			(GC) brown (5YR 3/4), angular, wet, non plastic, low dry strength, weak cementation, very permiable	60	20	20	
320			322.0					Filter Pack Slot Screen
	CL			SANDY LEAN CLAY WITH GRAVEL, (CL) brown (5YR 3/4), angular, coarse grained, moist, low plasticity, very high dry strength, strong cementation	20	30	50	
330	GC		328.0	CLAYEY GRAVEL WITH SAND, (GC) brown (5YR 3/4), angular, coarse grained, moist, low plasticity, medium dry strength, moderate cementation	55	20	25	
	GC			(GC) brown (5YR 3/4), angular, moist, non plastic, low dry strength, weak cementation, more permiable than the layer above	60	20	20	Transition Sand Bentonite Seal Transition Sand
340				Low plasticity, medium dry strength, moderate cementation, increase in clay	55	20	25	
				Non plastic, low dry strength, weak cementation, decrease in clay, permiable	60	20	20	Slot Screen
350			350.0					

Total Depth of borehole = 350.0 feet.

URS
333 E Wetmore Rd. Suite 400
Tucson, Az 85705
520-887-1800
520-887-8348

Borehole: IRA-34

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 4/6/2011 10:20:00 AM
FINISH DATE/TIME: 4/8/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
0	CL			LEAN CLAY, SILTY, (CL) light brown (5YR 5/6), subangular, fine to medium grained, dry, medium plasticity, medium dry strength, moderate cementation, strong HCL reaction	0	5	95	
10	CL		10.0	LEAN CLAY WITH SAND, (CL) light brown (5YR 5/6), angular, fine to coarse grained, dry, medium plasticity, medium dry strength, moderate cementation, strong HCL reaction	0	15	85	
	SC		15.0	CLAYEY SAND WITH GRAVEL, (SC) light brown (5YR 5/6), subangular, fine to coarse grained, dry, low plasticity, low dry strength, weak cementation	20	70	10	
20	SM		21.0	SILTY SAND, CLAYEY, (SM) reddish brown (5YR 6/1), subangular, fine to coarse grained, moist, non plastic, low dry strength, weak cementation	0	85	15	
	SM		25.0	SILTY SAND, (SM) light brown (5YR 6/1), subangular, fine to coarse grained, dry, non plastic, low dry strength, weak cementation, weak HCL reaction	10	60	30	
	ML		29.0	SILT, (ML) light brown (5YR 5/6), subrounded, fine to coarse grained, moist, non plastic, low dry strength, weak cementation, strong HCL reaction	0	5	95	
30	CH		36.0	FAT CLAY WITH SAND, (CH) brown (5YR 3/4), angular, medium grained, moist, medium plasticity, medium dry strength, moderate cementation, weak HCL reaction	0	15	85	
	GM		40.0	WELL GRADED GRAVEL WITH SILT AND SAND, (GM) light brown (5YR 5/6), subangular, fine to coarse grained, dry, non plastic, no dry strength, weak cementation	65	25	10	
40	SC		45.0	CLAYEY SAND WITH GRAVEL, (SC) brown (5YR 4/4), subangular, fine to coarse grained, moist, low plasticity, medium dry strength, weak cementation	25	60	15	
	SM			SILTY SAND WITH GRAVEL, (SM) brown (5YR 4/4), subangular, fine to coarse grained, dry, non plastic, low dry strength, weak cementation	25	60	15	
50	SC			CLAYEY SAND, (SC) light brown (5YR 5/6), angular, fine to coarse grained, moist, low plasticity, low dry strength, moderate cementation	0	85	15	
60			61.0					
70	CL		70.0	SANDY LEAN CLAY, (CL) reddish brown (10R 4/6), subangular, fine to coarse grained, moist, medium plasticity, medium dry strength, moderate cementation	5	30	65	
	SM		75.0	SILTY SAND, (SM) reddish brown (10R 4/6), angular, medium to coarse grained, dry, non plastic, no dry strength, weak cementation	0	75	25	
	SM		76.0	SILTY SAND, CLAYEY, (SM) reddish brown (10R 4/6), angular, medium to coarse grained, dry, non plastic, no dry strength, weak cementation	5	70	25	
	CL			LEAN CLAY WITH SAND, (CL) dark reddish brown (10R 3/4), subangular, medium grained, moist, medium plasticity, low dry strength, moderate cementation	0	20	80	
80	SM			SILTY SAND WITH GRAVEL, (SM) reddish brown (10R 4/6), angular, fine to coarse grained, moist, low plasticity, low dry strength, weak cementation	30	50	20	Cement/Grout Seal
90			93.0	Decrease in the amount of gravel and gravel size (fine gravel)	20	60	20	
	CL		94.0	LEAN CLAY WITH SAND, (CL) dark reddish brown (10R 3/4), angular, medium grained, moist, low plasticity, low dry strength, moderate cementation	0	20	80	
	SM		96.0	SILTY SAND WITH GRAVEL, (SM) reddish brown (10R 4/6), angular,	20	60	20	
100	CL				0	20	80	

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URS
333 E Wetmore Rd. Suite 400
Tucson, Az 85705
520-887-1800
520-887-8348

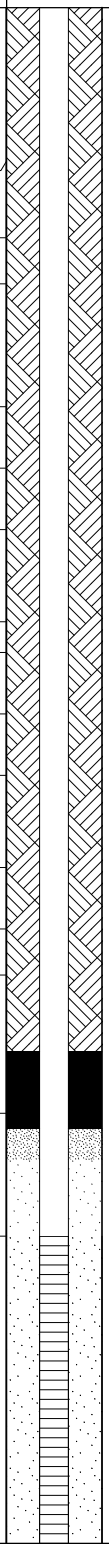
Borehole: IRA-34

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 4/6/2011 10:20:00 AM
FINISH DATE/TIME: 4/8/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines
100							
	CL			fine to coarse grained, dry, low plasticity, low dry strength, weak cementation	0	20	80
	CL			LEAN CLAY WITH SAND, (CL) brown (5YR 3/4), angular, medium grained, moist, medium plasticity, medium dry strength, moderate cementation *(continued)*	0	0	100
					0	0	100
					0	0	100
110			110.0	(CL) brown (5YR 3/4), moist, high plasticity, medium dry strength, moderate cementation	0	0	100
	SW-SM			High plasticity, high dry strength, moderate cementation, decrease in silt	10	85	5
			115.0	Medium plasticity, low dry strength, moderate cementation, increase in silt	0	80	20
	SC		118.0	High plasticity, high dry strength, moderate cementation, decrease in silt	0	0	100
120	CL			Medium plasticity, low dry strength, moderate cementation, increase in silt	0	0	100
	CL			WELL GRADED SAND, (SW-SM) grayish orange (10YR 7/4), angular, fine to coarse grained, dry, non plastic, no dry strength, weak cementation, gravel is fine to coarse and subangular, trace cobbles of granite	0	30	70
			126.0				
	SP				10	85	5
130			130.0				
	SM			CLAYEY SAND, (SC) light brown (5YR 5/6), subangular, fine to coarse grained, moist, low plasticity, no dry strength, weak cementation	10	60	30
			134.0	LEAN CLAY, SILTY, (CL) brown (5YR 3/4), moist, medium plasticity, medium dry strength, moderate cementation			
	CL			Medium plasticity, high dry strength, moderate cementation, decrease in silt	0	0	100
140			140.0		0	10	90
	SP		142.0	LEAN CLAY WITH SAND, (CL) brown (5YR 4/4), angular, fine grained, moist, low plasticity, low dry strength, weak cementation	10	85	5
	ML			WELL GRADED SAND, (SP) grayish orange (10YR 7/4), subangular, fine to coarse grained, dry, non plastic, no dry strength, weak cementation	0	0	100
			146.0				
	SW-SM			SILTY SAND, (SM) (5YR 3/4), moist, low plasticity, medium dry strength, moderate cementation	15	75	10
150			150.0				
	ML			LEAN CLAY, SILTY, (CL) brown (5YR 3/4), moist, high plasticity, medium dry strength, moderate cementation	0	0	100
	ML			Increase in sand	0	5	95
			156.0				
	SP			POORLY GRADED SAND, (SP) grayish orange (10YR 7/4), subangular, fine to medium grained, dry, non plastic, no dry strength, weak cementation	20	75	5
160			160.0				
	GP			SILT, CLAYEY, (ML) brown (5YR 3/4), moist, low plasticity, low dry strength, weak cementation	75	20	5
			163.0				
	SC			POORLY GRADED SAND WITH SILT AND GRAVEL, (SW-SM) light brown (5YR 5/6), subangular, fine to coarse grained, moist, non plastic, no dry strength, weak cementation	15	55	30
170				SILT, CLAYEY, (ML) brown (5YR 3/4), moist, low plasticity, low dry strength, weak cementation			
			172.0				
	GC			SILT, (ML) brown (5YR 3/4), angular, fine grained, moist, low plasticity, low dry strength, weak cementation	55	15	30
				POORLY GRADED SAND WITH GRAVEL, (SP) light brown (5YR 5/6), angular, medium grained, moist, non plastic, no dry strength, weak cementation			
180			180.0				
	SC			POORLY GRADED GRAVEL WITH SAND, (GP) grayish orange (10YR 7/4), subangular to subrounded, medium grained, moist, non plastic, no dry strength, weak cementation	15	55	30
				CLAYEY SAND WITH GRAVEL, (SC) reddish brown (10R 4/6), subrounded, coarse grained, moist, low plasticity, medium dry strength, moderate cementation			
190				CLAYEY GRAVEL WITH SAND, (GC) reddish brown (10R 4/6), subrounded, coarse grained, moist, medium plasticity, very high dry strength, strong cementation			
				CLAYEY SAND WITH GRAVEL, (SC) reddish brown (10R 4/6), subrounded, medium grained, moist, medium plasticity, very high dry strength, strong cementation			
200							

WELL DIAGRAM



URS
333 E Wetmore Rd. Suite 400
Tucson, Az 85705
520-887-1800
520-887-8348

Borehole: IRA-34

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 4/6/2011 10:20:00 AM
FINISH DATE/TIME: 4/8/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
200								
210	SC			Similar to sample above, less gravel, very dense CLAYEY SAND, (SC) reddish brown (10R 4/6), subrounded to rounded, medium grained, moist, low plasticity, very high dry strength, strong cementation Used hammer to get sample out of the core	10	60	30	Filter Pack Slot Screen
220								
230			235.0					

Total Depth of borehole = 235.0 feet.

URS
333 E Wetmore Rd. Suite 400
Tucson, Az 85705
520-887-1800
520-887-8348

Borehole: IRA-35

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 3/28/2011 9:40:00 AM
FINISH DATE/TIME: 4/4/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
0	CL		8.0	LEAN CLAY, (CL) light brown (5YR 5/6), subangular, fine to medium grained, dry, medium plasticity, medium dry strength, moderate cementation, strong HCL reaction	0	5	95	
10	CL		12.0	LEAN CLAY WITH SAND, (CL) light brown (5YR 5/6), angular, fine to coarse grained, dry, medium plasticity, medium dry strength, moderate cementation, strong HCL reaction	0	15	85	
	SW-SC		15.0	WELL GRADED SAND WITH CLAY AND GRAVEL, (SW-SC) light brown (5YR 5/6), subangular, fine to coarse grained, dry, low plasticity, low dry strength, weak cementation	20	70	10	
	SM		18.0		0	85	15	
20	SM		21.0	SILTY SAND, (SM) reddish brown (10R 4/6), subangular, fine to coarse grained, moist, non plastic, low dry strength, weak cementation	10	60	30	
	ML		25.0	SILTY SAND WITH GRAVEL, (SM) light grayish brown (5YR 6/1), subangular, fine to coarse grained, dry, non plastic, low dry strength, weak cementation, weak HCL reaction	0	5	95	
	CH		29.0	SILT, (ML) light brown (5YR 5/6), subrounded, fine to coarse grained, moist, non plastic, low dry strength, weak cementation, strong HCL reaction	0	15	85	
30	SM			FAT CLAY WITH SAND, (CH) brown (5YR 3/4), angular, medium grained, moist, medium plasticity, medium dry strength, moderate cementation, weak HCL reaction	25	60	15	
40			42.0	SILTY SAND WITH GRAVEL, (SM) light brown (5YR 5/6), subrounded, fine to coarse grained, dry, non plastic, low dry strength, weak cementation				
	SW-SC		44.0	WELL GRADED SAND WITH CLAY, (SW-SC) brown (5YR 4/4), subrounded, fine to coarse grained, moist, high plasticity, medium dry strength, moderate cementation	0	90	10	
	CL		48.0		0	90	10	
50	SC			LEAN CLAY WITH SAND, (CL) brown (5YR 4/4), subrounded, fine to coarse grained, moist, medium plasticity, low dry strength, moderate cementation	0	85	15	
60			61.0	CLAYEY SAND, (SC) light brown (5YR 5/6), angular, fine to coarse grained, moist, medium plasticity, low dry strength, moderate cementation				
	SW		63.0	WELL GRADED SAND, (SW) light brown (5YR 5/6), subangular, fine to coarse grained, moist, non plastic, low dry strength, weak cementation	5	90	5	
	CL			LEAN CLAY WITH SAND, (CL) reddish brown (10R 4/6), subangular, fine to medium grained, moist, medium plasticity, medium dry strength, moderate cementation	5	30	65	
70	SM		70.0	SILTY SAND, (SM) light brown (5YR 6/4), subrounded, fine to coarse grained, dry, non plastic, no dry strength, weak cementation	0	75	25	
	CL		76.0	LEAN CLAY WITH SAND, (CL) reddish brown (10R 4/6), subangular, fine to coarse grained, moist, medium plasticity, low dry strength, moderate cementation	5	20	75	
80	SM		80.0		15	70	15	
	SP-SC		83.0	SILTY SAND WITH GRAVEL, (SM) light brown (5YR 6/4), subangular, fine to coarse grained, dry, non plastic, low dry strength, weak cementation	0	80	10	
	SW		85.0		30	65	5	
	SM			POORLY GRADED SAND WITH CLAY, (SP-SC) light brown (5YR 6/4), subrounded, fine to medium grained, moist, non plastic, low dry strength, weak cementation	0	80	20	
90	SM			WELL GRADED SAND WITH GRAVEL, (SW) light brown (5YR 6/4), angular, fine to coarse grained, dry, non plastic, low dry strength, weak cementation	10	75	15	
	CL		96.0	SILTY SAND, (SM) reddish brown (10R 4/6), subangular to subrounded, fine to medium grained, moist, non plastic, low dry strength, weak cementation	0	20	80	
100								

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URS
333 E Wetmore Rd. Suite 400
Tucson, Az 85705
520-887-1800
520-887-8348

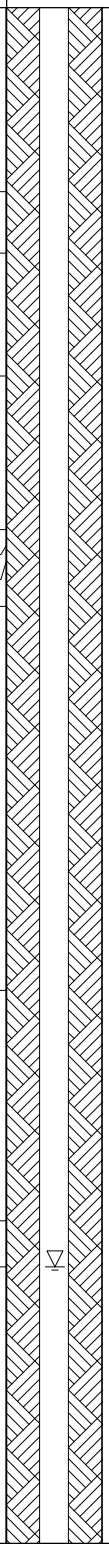
Borehole: IRA-35

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 3/28/2011 9:40:00 AM
FINISH DATE/TIME: 4/4/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines
100	CL			SILTY SAND, (SM) light brown (5YR 6/4), subangular to angular, fine to coarse grained, moist, medium plasticity, low dry strength, weak cementation	0	20	80
				LEAN CLAY WITH SAND, (CL) reddish brown (10R 4/6), angular, fine to coarse grained, moist, high plasticity, medium dry strength, moderate cementation *(continued)*			
110				Changed to 9 inch Casing			
			112.0				
	SW-SC			WELL GRADED SAND WITH CLAY, (SW-SC) light brown (5YR 6/4), subangular, fine to coarse grained, moist, low plasticity, low dry strength, weak cementation	0	90	10
			116.0				
	CL			SANDY LEAN CLAY, (CL) reddish brown (10YR 4/6), subrounded, fine to coarse grained, moist, medium plasticity, low dry strength, weak cementation	0	30	70
120							
			124.0				
	SW			WELL GRADED SAND WITH GRAVEL, (SW) light brown (5YR 6/4), subangular to subrounded, fine to coarse grained, dry, non plastic, no dry strength, weak cementation	15	80	5
130							
			134.0				
	CL		135.0	LEAN CLAY WITH SAND, (CL) reddish brown (10YR 4/6), subrounded, fine to medium grained, moist, high plasticity, low dry strength, moderate cementation	0	20	80
	SW		136.0		15	80	5
	CL		139.0		0	20	80
140	SW-SC			WELL GRADED SAND WITH GRAVEL, (SW) light brown (5YR 6/4), subangular to subrounded, fine to coarse grained, dry, non plastic, no dry strength, weak cementation	15	75	10
				LEAN CLAY WITH SAND, (CL) reddish brown (10YR 4/6), subrounded, fine to medium grained, moist, high plasticity, low dry strength, moderate cementation			
150				WELL GRADED SAND WITH CLAY AND GRAVEL, (SW-SC) light brown (5YR 6/4), subangular, fine to coarse grained, moist, medium plasticity, low dry strength, weak cementation			
				Added 4 Gallons of water to Help get sample to come out			
160							
			164.0				
	CL			SANDY LEAN CLAY WITH GRAVEL, (CL) reddish brown (10R 4/6), subrounded to rounded, medium to coarse grained, moist, medium plasticity, low dry strength, moderate cementation	15	25	60
170							
			179.0				
180	GP-GC			POORLY GRADED GRAVEL WITH CLAY AND SAND, (GP-GC) light brown (5YR 5/6), subangular to angular, fine grained, moist, low plasticity, medium dry strength, moderate cementation	75	15	10
			182.0				
	SW-SC			WELL GRADED SAND WITH CLAY AND GRAVEL, (SW-SC) brown (5YR 3/4), subrounded, fine to coarse grained, wet, low plasticity, high dry strength, strong cementation	15	75	10
190							
200							

WELL DIAGRAM



URS
333 E Wetmore Rd. Suite 400
Tucson, Az 85705
520-887-1800
520-887-8348

Borehole: IRA-35

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 3/28/2011 9:40:00 AM
FINISH DATE/TIME: 4/4/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
200	SW-SC				15	75	10	
	SW-SC			WELL GRADED SAND WITH CLAY AND GRAVEL, (SW-SC) reddish brown (10R 4/6), angular, medium grained, moist, low plasticity, very high dry strength, strong cementation	20	70	10	
210								
220								
230								
240								
250			252.0					
	SW-SM			WELL GRADED SAND WITH SILT AND GRAVEL, (SW-SM) brown (5YR 4/4), subangular to angular, fine to coarse grained, wet, non plastic, low dry strength, weak cementation	25	65	10	
260								
270								
280								
290								Bentonite Seal Transition Sand
			296.0					
	GW				60	35	5	
300								

URS
333 E Wetmore Rd. Suite 400
Tucson, Az 85705
520-887-1800
520-887-8348

Borehole: IRA-35

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 3/28/2011 9:40:00 AM
FINISH DATE/TIME: 4/4/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
300	GW		305.0	WELL GRADED GRAVEL WITH SAND, (GW) pale brown (5YR 5/2), angular, fine to coarse grained, wet, non plastic, low dry strength, weak cementation *(continued)*	60	35	5	
310	SM		310.0	POORLY GRADED SAND WITH SILT AND GRAVEL, (SM) brown (5YR 3/4), subangular to angular, fine to medium grained, moist, low plasticity, low dry strength, moderate cementation	15	55	30	
320	GW		322.0	WELL GRADED GRAVEL WITH SILT AND SAND, (GW) brown (5YR 3/4), angular, fine to coarse grained, moist, non plastic, low dry strength, weak cementation	70	25	5	Filter Pack Slot Screen
330 340 350	SM		350.0	SILTY SAND WITH GRAVEL, (SM) brown (5YR 3/4), subangular to subrounded, fine to coarse grained, moist, medium plasticity, high dry strength, strong cementation	15	70	15	

Total Depth of borehole = 350.0 feet.

URS
333 E Wetmore Rd. Suite 400
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520-887-1800
520-887-8348

Borehole: IRA-36

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 5/1/2011 4:40:00 PM
FINISH DATE/TIME: 5/3/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
0								
	SM		11.0	SILTY SAND, (SM) brown (5YR 4/4), rounded, fine to medium grained, dry, non plastic, no dry strength, weak cementation, weak HCL reaction	0	70	30	
10								
	SP-SM		13.0	POORLY GRADED SAND WITH SILT AND GRAVEL, (SP-SM) light brown (5YR 6/4), subangular to subrounded, fine to coarse grained, dry, non plastic, no dry strength, weak cementation	15	75	10	
	SM		22.0	SILTY SAND WITH GRAVEL, (SM) reddish brown (10R 4/6), subangular to subrounded, fine to coarse grained, dry, non plastic, no dry strength, weak cementation	15	65	20	
20								
	GC		28.0	CLAYEY GRAVEL WITH SAND, (GC) reddish brown (10R 4/6), subrounded, medium to coarse grained, dry, non plastic, no dry strength, weak cementation	50	30	20	
30	GM		30.0	SILTY GRAVEL WITH SAND, (GM) light brown (5YR 6/4), subangular, medium to coarse grained, dry, non plastic, no dry strength, weak cementation	15	35	50	
	ML		35.0	SILT, CLAYEY, (ML) brown (5YR 4/4), dry, medium plasticity, low dry strength, moderate cementation	0	0	100	
	SM			SILTY SAND WITH GRAVEL, (SM) light brown (5YR 6/4), subangular, dry, non plastic, no dry strength, weak cementation	30	50	20	
40	SM		45.0	SILTY SAND, CLAYEY, (SM) light brown (5YR 6/4), subrounded, fine to coarse grained, dry, low plasticity, low dry strength, weak cementation	0	70	30	
	ML		48.0	SILT, CLAYEY, (ML) light brown (5YR 6/4), dry, medium plasticity, low dry strength, moderate cementation	0	0	100	
50	CL		50.0	LEAN CLAY, SILTY, (CL) light brown (5YR 6/4), moist, high plasticity, medium dry strength, moderate cementation	0	0	100	
	SM		55.0	SILTY SAND, (SM) light brown (5YR 6/4)	0	70	30	
60	SM		63.0	SILTY SAND WITH GRAVEL, (SM) light brown (5YR 5/6), subangular to subrounded, fine to coarse grained, dry, non plastic, no dry strength, weak cementation	30	55	15	
	CL			SANDY LEAN CLAY, (CL) brown (5YR 3/4), subangular, coarse grained, moist, high plasticity, medium dry strength, moderate cementation	0	20	80	
70	CL		71.0	LEAN CLAY, SILTY, (CL) brown (5YR 3/4), moist, high plasticity, medium dry strength, moderate cementation	0	0	100	
	SM		75.0	SILTY SAND, (SM) light brown (5YR 5/6), subrounded, moist, non plastic, low dry strength, weak cementation	10	70	20	
80	CL		94.0	LEAN CLAY, SILTY, (CL) brown (5YR 3/4), moist, high plasticity, high dry strength, strong cementation	0	0	100	Cement/Grout Seal
90								
	SM		100.0	SILTY SAND, CLAYEY, (SM) light brown (5YR 6/4), angular, medium to coarse grained, moist, non plastic, low dry strength, weak cementation	0	80	20	
100								

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URS
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520-887-1800
520-887-8348

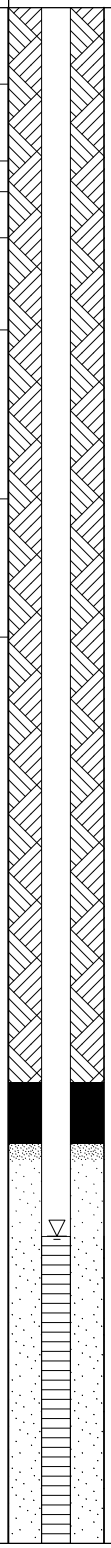
Borehole: IRA-36

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 5/1/2011 4:40:00 PM
FINISH DATE/TIME: 5/3/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines
100	SC		105.0	CLAYEY SAND, (SC) reddish brown (10R 4/6), subrounded, fine to coarse grained, moist, medium plasticity, medium dry strength, moderate cementation	0	70	30
110	SM		110.0	SILTY SAND, (SM) light brown (5YR 3/4), subangular to subrounded, fine to medium grained, dry, low plasticity, low dry strength, weak cementation	10	60	30
	ML		112.0	SILT, CLAYEY, (ML) brown (5YR 4/4), moist, high plasticity, high dry strength, moderate cementation	0	0	100
	GM		115.0	SILTY GRAVEL WITH SAND, (GM) light brown (5YR 3/4), subrounded, fine to coarse grained, dry, non plastic, no dry strength, weak cementation	50	30	20
120	GC		121.0	CLAYEY GRAVEL WITH SAND, (GC) reddish brown (10R 4/6), subrounded, fine to coarse grained, moist, low plasticity, low dry strength, weak cementation	50	30	20
130	SC		132.0	CLAYEY SAND WITH GRAVEL, (SC) brown (5YR 4/4), subangular, fine to coarse grained, moist, medium plasticity, medium dry strength, moderate cementation	10	50	40
140	SC		141.0	CLAYEY SAND WITH GRAVEL, (SC) brown (5YR 4/4), subangular, fine to coarse grained, moist, medium plasticity, medium dry strength, moderate cementation, Similar to layer above but more gravel, broke through some large cobbles	20	50	30
150	GC			CLAYEY GRAVEL WITH SAND, (GC) brown (5YR 3/4), subangular to subrounded, medium to coarse grained, moist, medium plasticity, medium dry strength, moderate cementation	55	10	35
160							
170							
180							
190	GC			CLAYEY GRAVEL WITH SAND, (GC) brown (5YR 3/4), subangular to subrounded, medium to coarse grained, moist, low plasticity, medium dry strength, moderate cementation	50	25	25
200				Core looks more dense than it is Core looks more dense than it is Permeable Permeable			

WELL DIAGRAM



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Borehole: IRA-36

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 5/1/2011 4:40:00 PM
FINISH DATE/TIME: 5/3/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
200	GC			CLAYEY GRAVEL WITH SAND, (GC) brown (5YR 3/4), subangular to subrounded, medium to coarse grained, moist, low plasticity, medium dry strength, moderate cementation *(continued)*	50	25	25	
				Wet Wet				
				More dense, less permeable, sand is finer More dense, less permeable, sand is finer				
210								Transition Sand
				More dense, even than above, less permeable More dense than above, less permeable				Bentonite Seal Transition Sand
220								
				Less dense, more permeable Less dense, more permeable				
230								Filter Pack Slot Screen
				More permeable, less sand, large sand grains too. More permeable, less sand, large sand grains too	50	20	30	
				More dense, less permeable, smaller sand grains More dense, less permeable, smaller sand grains				
240			241.0					

Total Depth of borehole = 241.0 feet.

URS
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Borehole: IRA-37

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 4/26/2011 9:15:00 AM
FINISH DATE/TIME: 4/29/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines
0	SM		11.0	SILTY SAND, (SM) brown (5YR 4/4), rounded, fine to medium grained, dry, non plastic, no dry strength, weak cementation, strong HCL reaction	0	70	30
10	GW-GM		17.0	POORLY GRADED GRAVEL WITH SILT AND SAND, (GW-GM) light brown (5YR 6/4), subangular to subrounded, fine to coarse grained, dry, non plastic, no dry strength, weak cementation	60	30	10
20	SP-SC		30.0	POORLY GRADED SAND WITH CLAY AND GRAVEL, (SP-SC) reddish brown (10R 4/6), subrounded to rounded, coarse grained, dry, low plasticity, low dry strength, moderate cementation	40	50	10
30	ML		35.0	SILT, CLAYEY, (ML) brown (5YR 4/4), dry, low plasticity, medium dry strength, moderate cementation	0	0	100
	SM		38.0	SILTY SAND WITH GRAVEL, (SM) light brown (5YR 6/4), subangular, fine to coarse grained, dry, non plastic, no dry strength, weak cementation	30	50	20
40	CL			LEAN CLAY, SILTY, (CL) brown (5YR 5/6), moist, medium plasticity, medium dry strength, moderate cementation	0	0	100
	SM		43.0	SILTY SAND, (SM) light brown (5YR 5/6), dry, non plastic, no dry strength, weak cementation	0	80	20
50	ML		53.0	SILT WITH SAND, (ML) light brown (5YR 5/6), subrounded, fine to coarse grained, dry, low plasticity, low dry strength, weak cementation	0	20	80
60	SM		63.0	SILTY SAND, (SM) light brown (5YR 5/6), subrounded, medium to coarse grained, dry, non plastic, no dry strength, weak cementation	0	70	30
	SM			SILTY SAND WITH GRAVEL, (SM) light brown (5YR 5/6), subrounded to rounded, medium to coarse grained, dry, non plastic, no dry strength, weak cementation	15	65	20
	GC		68.0	CLAYEY GRAVEL WITH SAND, (GC) light brown (5YR 5/6), subangular, coarse grained, moist, non plastic, medium dry strength, moderate cementation	65	15	20
70	CL		73.0	LEAN CLAY, SILTY, (CL) light brown (5YR 5/6), moist, medium plasticity, medium dry strength, moderate cementation	0	0	100
				possible perched water			
80	CL			LEAN CLAY WITH SAND, (CL) brown (5YR 3/4), angular, fine to medium grained, moist, medium plasticity, high dry strength, strong cementation	0	25	75
90							
	CL		98.0	SANDY LEAN CLAY, (CL) brown (5YR 3/4), angular, medium to coarse grained, moist, low plasticity, low dry strength, weak	0	40	60
100	SM				0	80	20

WELL DIAGRAM

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URS
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Tucson, Az 85705
520-887-1800
520-887-8348

Borehole: IRA-37

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 4/26/2011 9:15:00 AM
FINISH DATE/TIME: 4/29/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
100								
	SM			cementation	0	80	20	
			103.0	SILTY SAND, CLAYEY, (SM) light brown (5YR 6/4), angular, medium to coarse grained, moist, non plastic, low dry strength, weak cementation *(continued)*	0	70	30	
	SC		106.0					
	SW-SM		107.0	CLAYEY SAND, (SC) reddish brown (10R 4/6), subrounded, medium to coarse grained, moist, medium plasticity, medium dry strength, moderate cementation	20	70	10	
110	SM		110.0		0	70	30	
	ML		112.0		0	0	100	
	SM		115.0	WELL GRADED GRAVEL WITH SILT AND SAND, (SW-SM) light brown (5YR 6/4), dry, non plastic, no dry strength, weak cementation	0	70	30	
	ML		118.0	SILTY SAND, (SM) brown (5YR 4/4), subangular, fine to coarse grained, moist, low plasticity, low dry strength, weak cementation	0	0	100	
120	GC			SILT, CLAYEY, (ML) brown (5YR 4/4), moist, medium plasticity, medium dry strength, moderate cementation	50	30	20	
				SILTY SAND, (SM) brown (5YR 4/4), subangular, fine to coarse grained, moist, low plasticity, low dry strength, weak cementation				
				SILT, CLAYEY, (ML) brown (5YR 4/4), moist, medium plasticity, medium dry strength, moderate cementation				
130				CLAYEY SAND WITH GRAVEL, (GC) brown (5YR 4/4), subrounded, fine to coarse grained, moist, non plastic, medium dry strength, moderate cementation				Cement/Grout Seal
	GC			CLAYEY GRAVEL, (GC) light brown (5YR 6/4), subangular, medium to coarse grained, moist, medium plasticity, high dry strength, strong cementation	55	10	35	
140								
	GC			broken rock, gneiss	55	25	20	
	GC			CLAYEY GRAVEL WITH SAND, (GC) reddish brown (10R 4/6), subangular to subrounded, medium to coarse grained, moist, low plasticity, low dry strength, weak cementation	55	10	35	
150				CLAYEY GRAVEL, (GC) light brown (5YR 6/4), subangular, medium to coarse grained, moist, medium plasticity, high dry strength, strong cementation				
160								
170								
180	GC			CLAYEY GRAVEL, (GC) brown (5YR 3/4), subangular to subrounded, medium grained, moist, low plasticity, medium dry strength, moderate cementation	60	10	30	
				Sample looks more dense than it is, center of core less dense and permeable				
190								
				Sample was wet Moist, Sample still looks dense, but inside breaks easily, permeable				
200								

URS
333 E Wetmore Rd. Suite 400
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520-887-1800
520-887-8348

Borehole: IRA-37

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 4/26/2011 9:15:00 AM
FINISH DATE/TIME: 4/29/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines	WELL DIAGRAM
200	GC			CLAYEY GRAVEL, (GC) light brown (5YR 6/4), subangular, medium to coarse grained, moist, medium plasticity, high dry strength, strong cementation *(continued)*	55	10	35	
210								
				Sample is more dense than above, possibly a higher amount of sand, less permeable, finer sand	50	20	30	
220			223.0					
230								
240								
250								
	SC		258.0	CLAYEY SAND WITH GRAVEL, (SC) brown (5YR 3/4), subangular to angular, medium to coarse grained, moist, low plasticity, medium dry strength, moderate cementation	20	65	15	
260	GC			CLAYEY GRAVEL, (GC) brown (5YR 3/4), subangular to angular, medium grained, moist, low plasticity, medium dry strength, moderate cementation	60	10	30	
				Increase in sand	45	25	30	Bentonite Seal
270								Transition Sand
280								Filter Pack Slot Screen
290								Transition Sand Bentonite Seal Transition Sand
300								

URS
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Tucson, Az 85705
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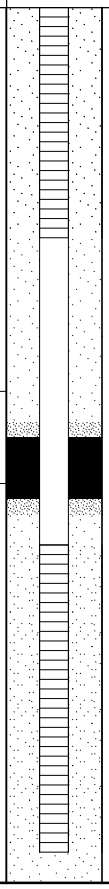
Borehole: IRA-37

PROJECT: Miracle Mile
CLIENT: ADEQ
LOCATION:
URS PROJECT #: 24097013

DRILLING METHOD: Roto Sonic
LOGGED BY: Anna Steele
START DATE/TIME: 4/26/2011 9:15:00 AM
FINISH DATE/TIME: 4/29/2011

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	Percent Gravel	Percent Sand	Percent Fines
300	GC			(GC) Increase in sand	45	25	30
	GC			(GC)	60	10	30
310							
320	GC		325.0	CLAYEY GRAVEL, (GC) brown (5YR 3/4), subrounded, medium grained, moist, low plasticity, very high dry strength, strong cementation	50	10	40
330	SC		331.0	CLAYEY SAND WITH GRAVEL, (SC) brown (5YR 3/4), angular, medium to coarse grained, moist, medium plasticity, high dry strength, moderate cementation	20	50	30
340	GC			CLAYEY GRAVEL WITH SAND, (GC) brown (5YR 3/4), subangular to subrounded, medium to coarse grained, wet, medium plasticity, medium dry strength, moderate cementation	50	20	30
350				More dense, less permeable			
			357.0	Less dense, more permeable			



Total Depth of borehole = 357.0 feet.