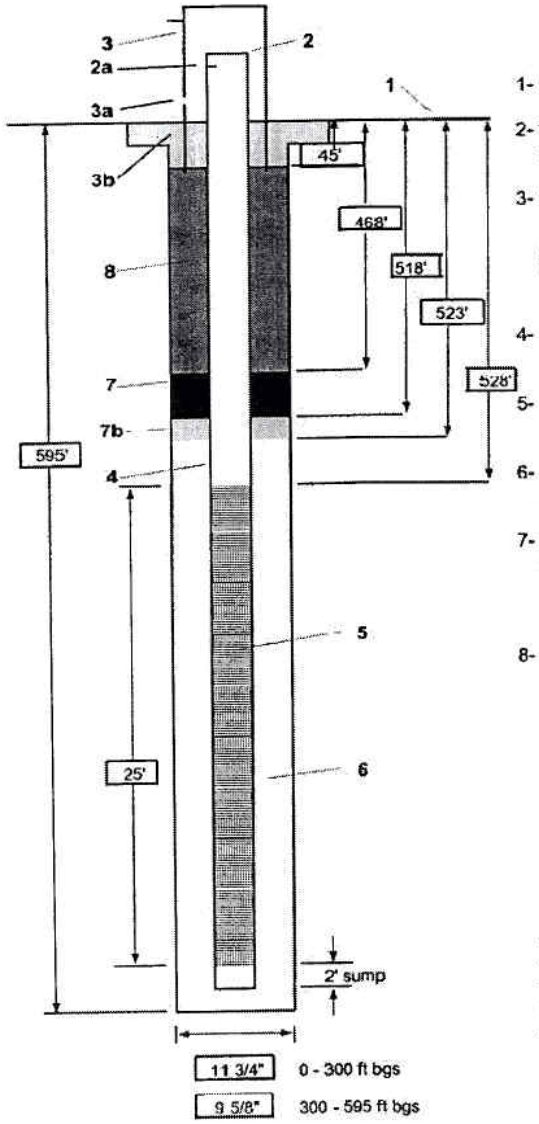
KAFB-6241

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
335757.03.16.FI	KAFB-6241	SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : SWMU 6-24 RFI LOCATION : Manzano Sewage Treatment Facility, KAFB Driller: Q. Stevens
DRILLING METHOD AND EQUIPMENT USED: Air Rotary Casing Hammer; Speedstar 15K DRILLING CONTRACTOR : WDC Exploration & Wells
TOP OF CASING ELEVATION: 5463.83 in NAVD88 WATER LEVEL 527.15 ft bgs START: 1/12/2007 END: 1/17/2007
COORDINATES: 1,459,643.0694 ft N;1,560,864.0964 ft E, New Mexico State Plane, Central Zone, NAD83 LOGGER : A. Forsberg



Not to scale

1- Ground elevation at well	5460.54'
2- Top of casing elevation	5463.83'
a) vent hole?	no
3- Wellhead protection cover type	locking above ground 8 inch diameter steel monument
a) weep hole?	no
b) concrete pad dimensions	4' x 4' with 4 concrete filled bollards land surface to 45 ft bgs
4- Dia./type of well casing	4" schedule 80 PVC
5- Type/slot size of screen	0.010" schedule 80 PVC 25 ft screen, from 528 ft to 553 ft bgs
6- Type screen filter	10/20 Colorado Silica Sand
a) Quantity used	50 bags; from 523 ft to 558 ft
7- Type of seal	hydrated bentonite chips
a) Quantity used	468 ft to 518 ft bgs
b) Transition Sand	20/40 Colorado Silica Sand 7 bags; 518 ft to 523 ft
8- Grout	
a) Grout mix used	bentonite volclay grout
b) Method of placement	pour
c) Vol. of well casing grout	56.325 cu ft., 45 ft to 468 ft bgs
Development method	bail, swab, bail, pump
Development time	2 days
Development purge volume	550 gallons

Comments Top of grout is 45 ft bgs; bentonite cement from surface to 45 ft bgs; 2 ft sump; borehole backfilled with a mixture of bentonite chips and 10/20 Colorado silica sand from 558 ft to 595 ft bgs.

AR3192

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
335757.01.16.FI	KAFB-6241	SHEET 1 OF 8

SOIL BORING LOG

PROJECT : SWMU 6-24 RFI
LOCATION : 1,459,643.0894 ft N; 1,560,864.0964 ft E
ELEVATION : 5460.54 ft
DRILLING CONTRACTOR : Water Development Corporation/Quentin Stevens
DRILLING METHOD AND EQUIPMENT USED : Air Rotarty Casing Hammer; Speedstar 15K
WATER LEVEL : 527.15' bgs
START : 1/8/2007 END: 1/12/2007
LOGGER : M.Brislen, A.Forsberg

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	2	NA	CT	NA	Silt (MH), dark reddish brown (5YR 3/4), moist, med plasticity	PID = 0.1 ppm, WP16-SB-6241-002 collected at 1245
	5	NA	CT	NA	Fine sand with gravel (SW), reddish brown (5YR 5/4), dry, low plasticity	PID = 0.1 ppm, WP16-SB-6241-005 collected at 1250
10	10-12	NA	CT	NA	Poorly graded sand (SP), reddish brown (5YR 5/4), dry, low plasticity	PID = 0.1 ppm, WP16-SB-6241-010 collected at 1320
20	20-22	NA	CT	NA	As above for 10' bgs	PID = 0.1 ppm, WP16-SB-6241-020 collected at 1340
30	30	NA	CT	NA	As above for 10' bgs with fine gravel	PID = 0.1 ppm
40	40	NA	CT	NA	Silty gravel (GM), light reddish brown (5YR 5/3), dry, low plasticity	PID = 0.1 ppm
50	50	NA	CT	NA	Poorly graded sand (SP), reddish brown (5YR 5/3), dry, low plasticity	PID = 0.1 ppm END 1/9/07 - START 1/10/07
60	60-61.5	18	SS	20,20,30	As above for 50' bgs	WP16-SB-6241-060 collected at 0745, WP16-SB-6241-060DUP collected at 0750. Three split spoons needed for sample - poor recovery
70	70	NA	CT	NA	As above for 50' bgs, with 15 percent gravel	PID = 0.0 ppm
80	80	NA	CT	NA	Poorly graded gravel with sand (SP), pink (5YR 7/4), dry, low plasticity	PID = 0.2 ppm * - All PID readings in headspace unless otherwise noted - PID -- photoionization detector - ppm -- parts per million

AR3192

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
335757.01.16.FI	KAFB-6241	SHEET 2 OF 8

SOIL BORING LOG

PROJECT : SWMU 6-24 RFI
LOCATION : 1,459,643.0894 ft N; 1,560,864.0964 ft E
ELEVATION : 5460.54 ft
DRILLING CONTRACTOR : Water Development Corporation/Quentin Stevens
DRILLING METHOD AND EQUIPMENT USED : Air Rotarty Casing Hammer; Speedstar 15K
WATER LEVELS : 527.15' bgs
START : 1/8/2007
END: 1/12/2007
LOGGER : M.Brislen, A.Forsberg

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
90						
	94	NA	CT	NA	As above for 50' bgs, light reddish brown (5YR 6/4)	PID = 0.1 ppm
100	100-100.75	9	SS	40,25	Well graded sand with gravel (SW), reddish brown (5YR 5/4), dry, low plasticity	PID = 0.0 ppm, WP16-SB-6241-100 collected at 0930
110	110	NA	CT	NA	Well graded sand (SW), reddish brown (5YR 4/4), dry, low plasticity	PID = 0.0 ppm
120	120	NA	CT	NA	As above for 110' bgs	PID = 0.0 ppm
130	130	NA	CT	NA	Well graded gravel (GW), pink (7.5YR 7/3), dry	PID = 0.0 ppm
140	140	NA	CT	NA	Well graded sand with gravel (SW), light brown (7.5YR 6/4), dry, low plasticity	PID = 0.0 ppm
150	150	NA	CT	NA	Well graded sand with fine gravel (SW), light brown (7.5YR 6/3), dry, low plasticity	PID = 0.1 ppm
160	160	NA	CT	NA	Well graded gravel with sand (GW), pink (7.5YR 6/4), dry, low plasticity	PID = 0.1 ppm

* - All PID readings in headspace unless otherwise noted
- PID – photoionization detector
- ppm – parts per million

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
335757.01.16.FI	KAFB-6241	SHEET 3 OF 8

SOIL BORING LOG

PROJECT : SWMU 6-24 RFI
LOCATION : 1,459,643.0894 ft N, 1,560,864.0964 ft E
ELEVATION : 5460.54 ft
DRILLING CONTRACTOR : Water Development Corporation/Quentin Stevens
DRILLING METHOD AND EQUIPMENT USED : Air Rotarty Casing Hammer; Speedster 15K
WATER LEVELS : 527.15' bgs
START : 1/8/2007 END: 1/12/2007
LOGGER : M.Brislen, A.Forsberg

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
170	170	NA	CT	NA	As above for 130' bgs	PID = 0.1 ppm
180	180	NA	CT	NA	As above for 150' bgs	PID = 0.1 ppm
190	190	NA	CT	NA	Well graded sand with silt (SW-SM), brown (7.5YR 5/4), dry, low plasticity	PID = 0.1 ppm
200	200	NA	CT	NA	Poorly graded fine sand with silt (SP-SM), light brown (7.5YR 6/4), dry, low plasticity	PID = 0.2 ppm
210	210	NA	CT	NA	As above for 200' bgs	PID = 0.2 ppm
220	220	NA	CT	NA	As above for 200' bgs with 5 percent fine gravel	PID = 0.0 ppm
230	230	NA	CT	NA	As above for 220' bgs	PID = 0.0 ppm
240	240	NA	CT	NA	Well graded sand with silt and gravel (SW-SM), brown (7.5YR 5/4), dry low plasticity	PID = 0.0 ppm

* - All PID readings in headspace unless otherwise noted
- PID -- photoionization detector
- ppm -- parts per million

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
335757.01.16.FI	KAFB-6241	SHEET 4 OF 8

SOIL BORING LOG

PROJECT: SWMU 6-24 RFI — LOCATION: 1,459,643.0894 ft N; 1,560,864.0964 ft E

ELEVATION: 5460.54 ft — DRILLING CONTRACTOR: Water Development Corporation/Quentin Stevens

DRILLING METHOD AND EQUIPMENT USED: Air Rotarty Casing Hammer; Speedstar 15K

WATER LEVELS: 527.15' bgs — START: 1/8/2007 — END: 1/12/2007 — LOGGER: M.Brislen, A.Forsberg

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
250	250	NA	CT	NA	Silt (MH), brown (7.5YR 5/4), dry, medium to low plasticity	PID = 0.0 ppm
260	260	NA	CT	NA	Well graded sand with fine gravel (SW), light brown (7.5 YR 6/3), dry, low plasticity	PID = 0.0 ppm
270	270	NA	CT	NA	Well graded gravel with sand (GW), pink (7.5 YR 6/4), dry, low plasticity	PID = 0.0 ppm
280	280	NA	CT	NA	As above for 240' bgs, medium to low plasticity	PID = 0.0 ppm
290	290	NA	CT	NA	As above for 250' bgs, with 5 percent medium gravel	PID = 0.0 ppm
	295	NA	CT	NA	Silt with clay	
300	300	NA	CT	NA	As above for 250' bgs, strong brown (7.5YR 5/6)	PID = 0.0 ppm END 1/10/07 - START 1/11/07
310						
	315	NA	CT	NA	As above for 250' bgs, with 15 percent medium gravel	PID = 0.1 ppm
320	320	NA	CT	NA	As above for 250' bgs, with 10 percent medium gravel	PID = 0.0 ppm

* - All PID readings in headspace unless otherwise noted
- PID -- photoionization detector
- ppm -- parts per million

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
335757.01.16.FI	KAFB-6241	SHEET 5 OF 8

SOIL BORING LOG

PROJECT : SWMU 6-24 RFI — LOCATION : 1,459,843.0894 ft N; 1,560,864.0964 ft E

ELEVATION : 5460.54 ft — DRILLING CONTRACTOR : Water Development Corporation/Quentin Stevens

DRILLING METHOD AND EQUIPMENT USED : Air Rotarty Casing Hammer; Speedstar 15K

WATER LEVELS : 527.15' bgs — START : 1/8/2007 — END: 1/12/2007 — LOGGER : M.Brislen, A.Forsberg

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
330	330	NA	CT	NA	As above for 250', with 5 percent coarse sand	PID = 0.0 ppm
340	340	NA	CT	NA	Silt (ML), reddish yellow (7.5YR 6/6), dry, medium to low plasticity	PID = 0.0 ppm
350	355	NA	CT	NA	Poorly graded sand (SP), brown (7.5YR 5/4), dry, low plasticity	PID = 0.0 ppm
360	365	NA	CT	NA	As above for 290', strong brown (7.5YR 5/6)	PID = 0.0 ppm
370	370	NA	CT	NA	As above for 355'	PID = 0.0 ppm
380	380	NA	CT	NA	As above for 250', with 5 percent fine gravel	PID = 0.0 ppm
390	390	NA	CT	NA	Well graded gravel (GW), light brown (7.5YR 6/3), dry, low plasticity	PID = 0.0 ppm
400	400	NA	CT	NA	Silty gravel with sand (GM-ML), light brown (7.5YR 6/4), dry, low plasticity	PID = 0.0 ppm

* - All PID readings in headspace unless otherwise noted
- PID -- photoionization detector
- ppm -- parts per million

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
335757.01.16.FI	KAFB-6241	SHEET 6 OF 8

SOIL BORING LOG

PROJECT : SWMU 6-24 RFI — LOCATION : 1,459,643.0894 ft N; 1,560,864.0964 ft E

ELEVATION : 5460.54 ft — DRILLING CONTRACTOR : Water Development Corporation/Quentin Stevens

DRILLING METHOD AND EQUIPMENT USED : Air Rotarty Casing Hammer; Speedstar 15K

WATER LEVELS : 527.15' bgs — START : 1/8/2007 — END: 1/12/2007 — LOGGER : M.Brislen, A.Forsberg

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	405	NA	CT	NA	As above for 390' bgs	PID = 0.1 ppm
410	410	NA	CT	NA	Well graded sand with gravel (SW), pink (7.5YR 7/4), dry, low plasticity	PID = 0.0 ppm
420	420	NA	CT	NA	Silt (ML), light brown (7.5YR 6/4), dry, low-medium plasticity	PID = 0.0 ppm
430	430	NA	CT	NA	As above for 420' bgs, brown (7.5YR 5/4), slightly moist	PID = 0.0 ppm
440	440	NA	CT	NA	As above for 430' bgs, with 5 percent medium gravel	PID = 0.0 ppm
450	450	NA	CT	NA	As above for 430' bgs	PID = 0.0 ppm
	455	NA	CT	NA	As above for 430' bgs, brown (7.5YR 4/4), moist	PID = 0.0 ppm
460	460	NA	CT	NA	As above for 455' bgs	PID = 0.0 ppm
470	470	NA	CT	NA	Silt with 5 percent fine to medium gravel (ML), brown (7.5YR 5/4), dry, low-medium plasticity	PID = 0.0 ppm
480	480	NA	CT	NA	As above for 430' bgs, dry	PID = 0.0 ppm

* - All PID readings in headspace unless otherwise noted
- PID -- photoionization detector
- ppm -- parts per million

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
335757.01.16.FI	KAFB-6241	SHEET 7 OF 8

SOIL BORING LOG

PROJECT :	SWMU 6-24 RFI	LOCATION :	1,459,643.0894 ft N; 1,560,864.0964 ft E
ELEVATION :	5460.54 ft	DRILLING CONTRACTOR :	Water Development Corporation/Quentin Stevens
DRILLING METHOD AND EQUIPMENT USED :	Air Rotarty Casing Hammer; Speedstar 15K		
WATER LEVELS :	527.15' bgs	START : 1/8/2007	END: 1/12/2007 LOGGER : M.Brislen, A.Forsberg

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
490	490	NA	CT	NA	As above for 480' bgs, brown (7.5YR 4/4)	PID = 0.0 ppm
500	500	NA	CT	NA	Silt with gravel (ML), strong brown (7.5YR 4/6), moist, medium to low plasticity	PID = 0.0 ppm
510	510	NA	CT	NA	Silt (ML), strong brown (7.5YR 4/6), moist, medium plasticity	PID = 0.0 ppm **END 1/11/07 - START 1/12/07**
520	520	NA	CT	NA	Well graded sand with silt (SW-SM), reddish brown (5YR 4/4), dry, low to medium plasticity	PID = 0.0 ppm
530	530	NA	CT	NA	Silt with sand (ML), brown (7.5YR 5/4), slightly moist, medium plasticity	PID = 0.0 ppm
540	540	NA	CT	NA		Clay layer near 540' clogged hose to cyclone, no cuttings available for description
550	550	NA	CT	NA	Well graded gravel with sand and clay (GW-GC), light brown (7.5YR 6/4)	PID = 0.0 ppm, NOTE - cuttings well due to driller adding water
560						

* - All PID readings in headspace unless otherwise noted
- PID -- photoionization detector
- ppm -- parts per million

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
335757.01.16.FI	WP-16 KAFB-6241	SHEET 8 OF 8

SOIL BORING LOG

PROJECT : SWMU 6-24 RFI — LOCATION : 1,459,643.0894 ft N; 1,560,864.0964 ft E

ELEVATION : 5460.54 ft — DRILLING CONTRACTOR : Water Development Corporation/Quentin Stevens

DRILLING METHOD AND EQUIPMENT USED : Air Rotarty Casing Hammer; Speedstar 15K

WATER LEVELS : 527.15' bgs — START : 1/8/2007 — END: 1/12/2007 — LOGGER : M.Brislen, A.Forsberg

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	565	NA	CT	NA	Well graded gravel (GW), various colors, non-plastic	PID = 0.0 ppm, NOTE - cuttings wet due to driller adding water
570						
	575	NA	CT	NA	Silt with sand (ML), reddish yellow (7.5YR 6/6), wet	PID = 0.0 ppm, NOTE - cuttings wet due to driller adding water
580	580	NA	CT	NA	As above for 575' bgs, with 10 percent fine-medium gravel, 1" diameter globs of fine gravel, sand and clay	PID = 0.0 ppm, NOTE - cuttings wet due to driller adding water
590						
	593	NA	CT	NA	Silt with 5 percent fine sand (ML), brown (7.5YR 5/4), wet	PID = 0.0 ppm, NOTE - cuttings wet due to driller adding water
	595				**TOTAL DEPTH - 595' bgs**	
600						
610						
620						
630						
640						

* - All PID readings in headspace unless otherwise noted
- PID -- photoionization detector
- ppm -- parts per million