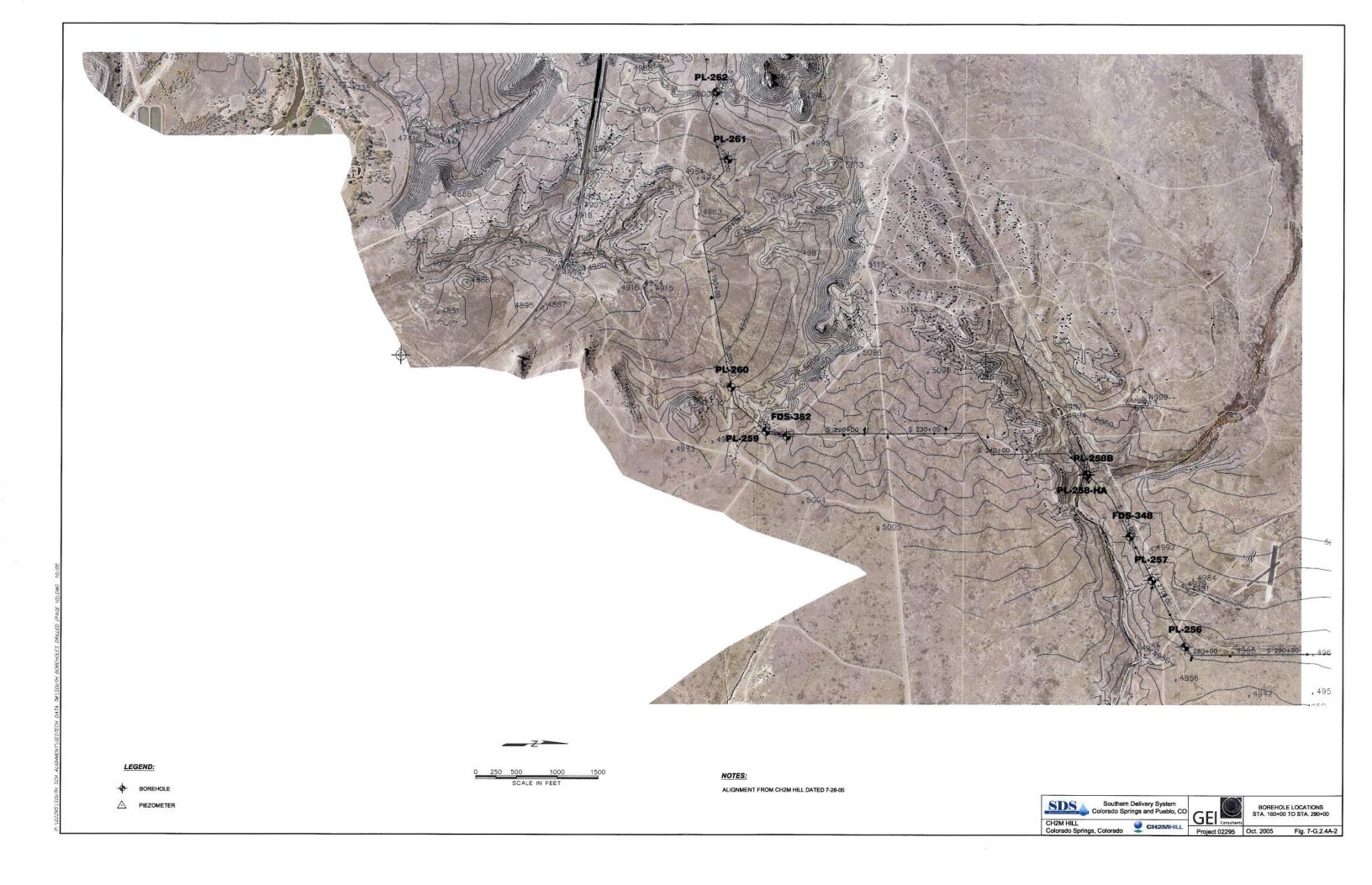


NOTES:
ALIGNMENT FROM CH2M HILL DATED 7-28-05





95\SOUTH SCH ALIGHMENT\GEOTECH DATA TM\SOUTH BOREHOLES DRILLED (PAGE 11).DWG 10



LEGEND: **BOREHOLE**

ALIGNMENT FROM CH2M HILL DATED 7-28-05

NOTES:

Southern Delivery System
Colorado Springs and Pueblo, Co

orings and Pueblo, CO

GEI

Consulums

STA. 290+00 TO STA. 430+00

STA. 290+00 TO STA. 430+00

Oct. 2005

Fig. 7-G.2.4A-3

BOREHOLE LOCATIONS STA. 290+00 TO STA. 430+00

▲ PIEZOMETER

NOTES:

ALIGNMENT FROM CH2M HILL DATED 7-28-05

Southern Delivery System
Colorado Springs and Pueblo, Co

BOREHOLE LOCATIONS STA. 430+00 TO STA. 580+00

ings and Pueblo, CO

CH2MHILL

Project 02295

Oct. 2005

Fig. 7-G.2.4A-4

LEGEND:

→ BOREHOLE

▲ PIEZOMETER

LEGEND: **BOREHOLE**

ALIGNMENT FROM CH2M HILL DATED 7-28-05

Southern Delivery System
Colorado Springs and Pueblo, Co

BOREHOLE LOCATIONS STA. 580+00 TO STA. 720+00 orings and Pueblo, CO

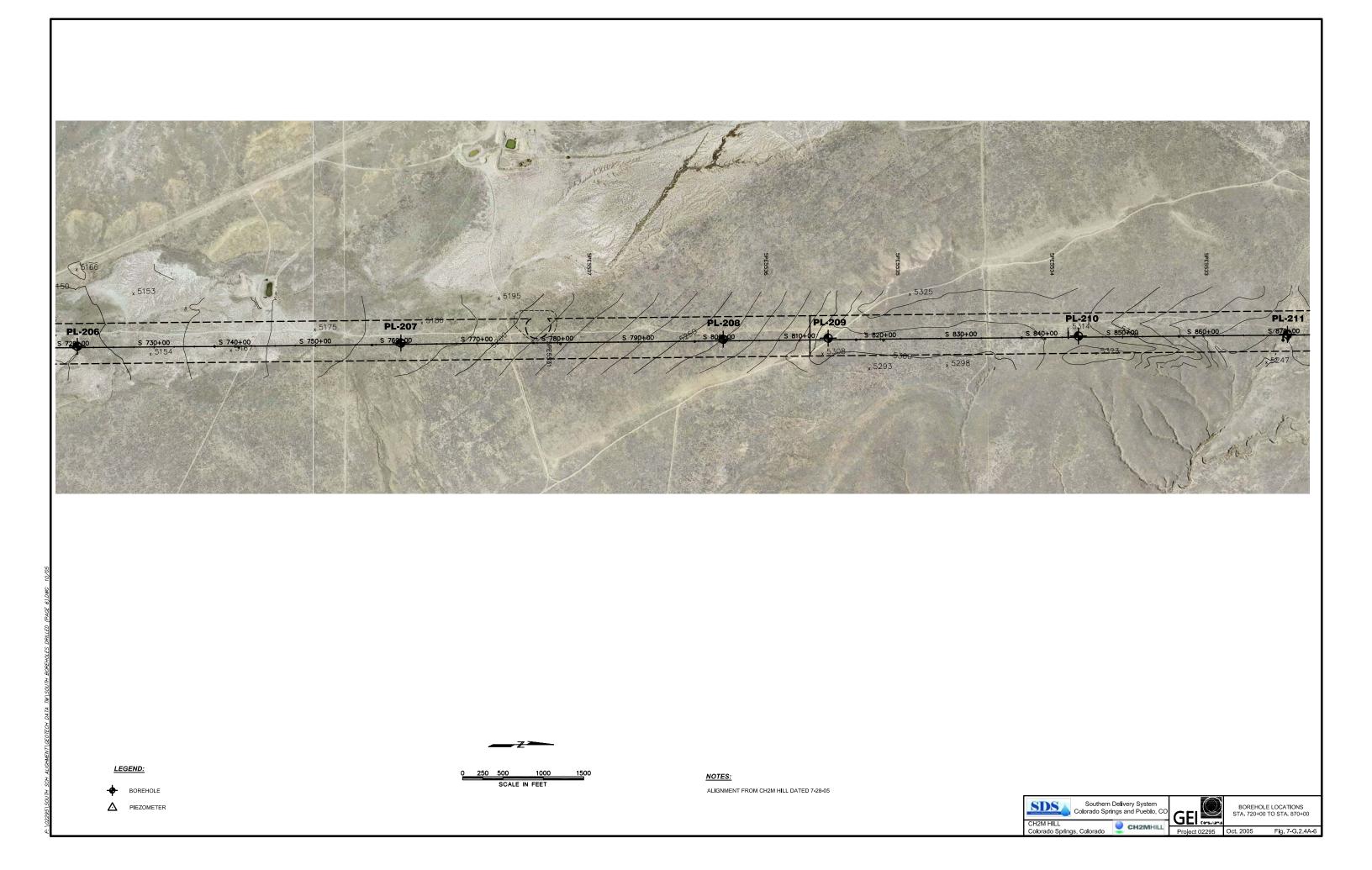
CH2MHILL

Project 02295

Oct. 2005

Fig. 7-G.2.4A-5

▲ PIEZOMETER





<u>LEGEND:</u>

0 250 500 1000 1500

SCALE IN FEET

NOTES:

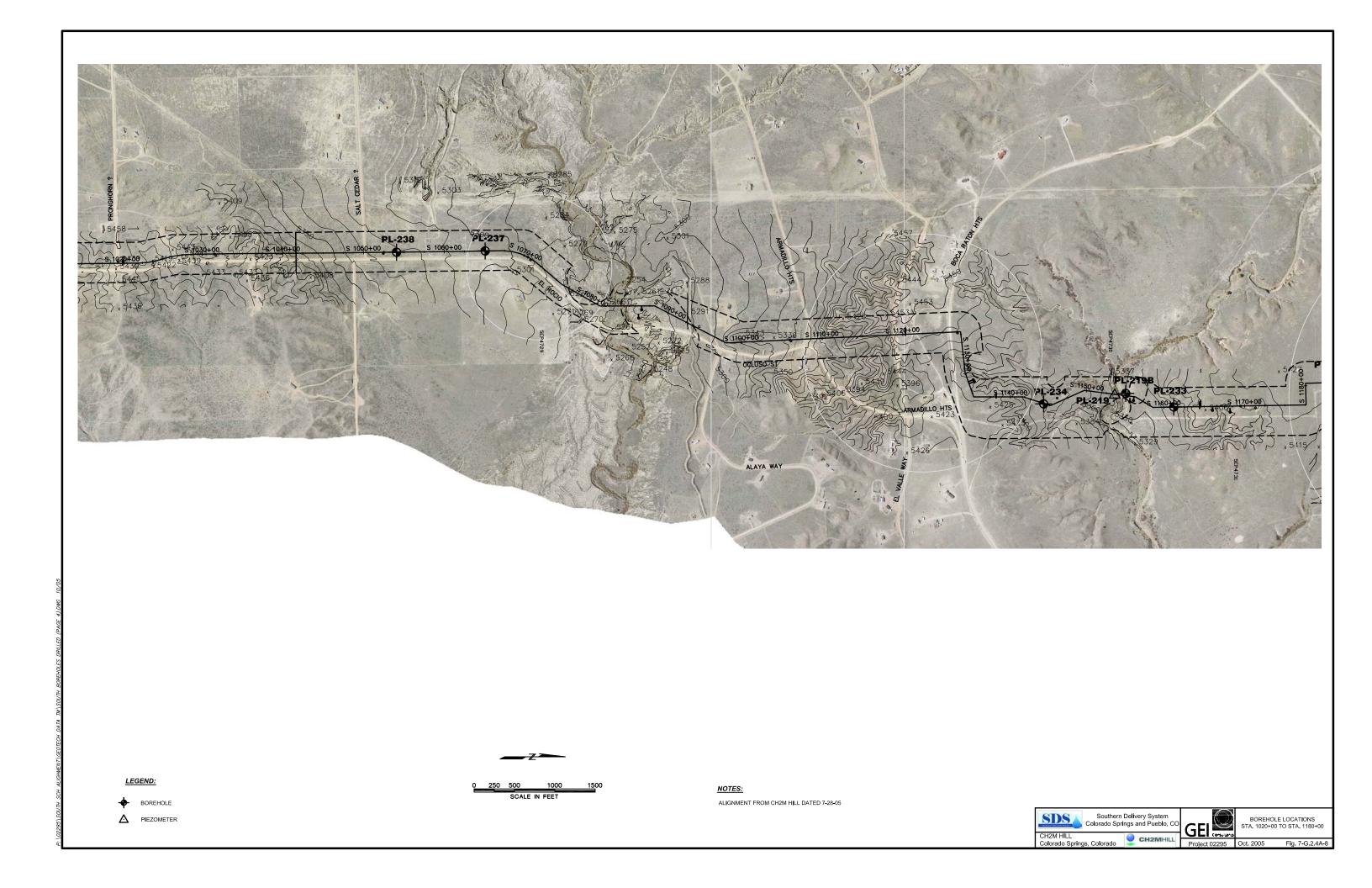
ALIGNMENT FROM CH2M HILL DATED 7-28-05

BOREHOLE

A PIEZOMETER



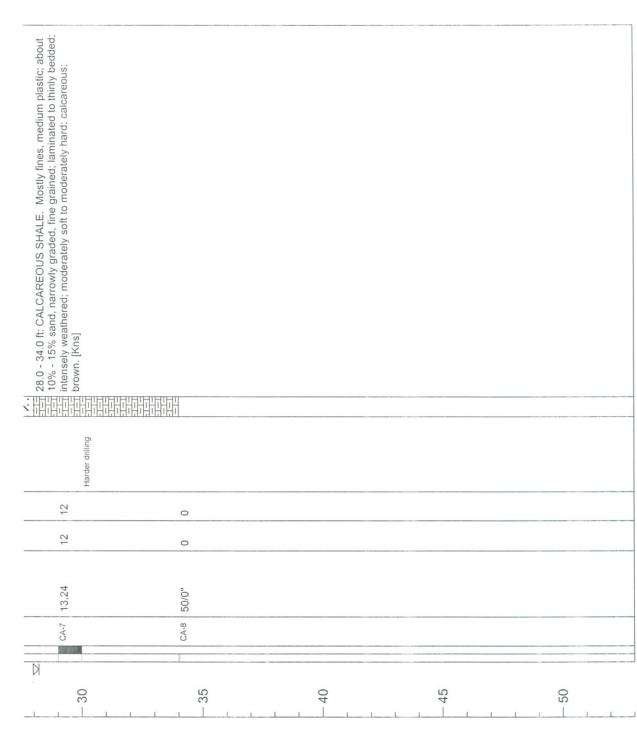




Geotechnical Environmental & Water Resources Engineering PROJECT NAME : Southern Delivery System PROJECT NAME : Southern Delivery System PROJECT NAMBER: 022950 BORING LOCATION: N 1211814.1, E 3232041.4 BORING LOCATION: N 1211814.1, E 3232041.4 BORING LOCATION: SO78 DATE 12/14/04 SAMPLER SAMPL	FALL FALL PLE AMPLE ATED	PL-203 PAGE: 1 OF 2 DATE: 12/14/04 / 12/14/04 LEGEND AMMER FALLING 30 IN. TO DRIVE H OF SAMPLE Tin. dia UF - FIXED PISTON 5 in. dia UF - FIXED PISTON 55 in. dia UF - FIXED PISTON ESTIMATED GROUNDWATER
NOTES: RIG: Truck-mounted CME 75	SAMPLE METHOD: Auto safety hammer	mmer
4-inch diameter solid flight augers	BACKFILL: Drill cuttings	
DEPTH TYPE -123- REMARKS FT. and BLOWS PER PEN REC	HG RFG SOIL AND ROCK DESCRIPTIONS	CRIPTIONS

0.0 - 17.0 ft: CLAY. Mostly fines, medium plastic; about 10% - 25% sand, narrowly graded, fine grained, occasionally present in lenses; very stiff to hard; homogenous; roots present; calcareous; slightly moist; light yellow brown. (CL) [Qp]				17.0 - 24.0 ft: CLAYEY SAND. Mostly sand, narrowly graded, fine to medium grained, subangular to subrounded, predominately quartz and itelaspar, about 45% - 50% fines, medium plastic; dense; homogenous; slightly moist; light yellow brown. (SC) [Qp]	24.0 - 28.0 ft: CLAYEY SAND. Mostly sand, narrowly graded, fine to coarse grained, subangular to subrounded, predominately quartz and feldspar; grained, subangular to subout 35% fines, medium plastic; about 5% - 10% gravel, subangular to subrounded, predominately quartz and feldspar; medium dense; homogenous; slightly moist; light brown. (SC) [Qp]
12	12	12	12	5	12
12	25	12	12	5	2
CA-1 18,19	CA-2 13,17	CA-3 10,14	CA-4 14,22	CA-5 15,20	CA-6 19,19
O	O	O	U	O	U
0	ro -	10	15	- 20	- 25

Geore	Geotechnical Environmental &	al &						PL-203	
Wate	Water Resources Engineering	rces	G Consultants	iltants	POO	LOG OF DRILL HOLE	IOLE	PAGE: 2 OF 2	
A TODI COO	- HARAIN	Southern Delivery System	very System					DATE: 12/14/04 / 12/14/04	1/04
	. JIMPN		manafa fina				LEGEND		
PROJECT N	NUMBE	PROJECT NUMBER: 022950			1) BLOWS PEF	8 6 IN140 LB. I	HAMMER FALL	1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE	
BORING LO	CATIO	BORING LOCATION: N 1211814.1, E 3232041.4	4.1, E 32320	41.4	2) PEN - PENE	TRATION LENG	STH OF SAMPI	SAMPLER 2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL	
GROUND S	SURFAC	GROUND SURFACE ELEVATION (LOCAL - FT) :5106.3	N (LOCAL - F	T) :5106.3	3) REC - RECOVERY LENGTH OF SAMPLE	VERY LENGTH	HOF SAMPLE		
GROUNDW	/ATER E	GROUNDWATER ELEVATION: 5078		TE 12/14/04	DATE 12/14/04 S-SPLIT SPOON SAMPLER 2.0 in. dia	ON SAMPLER	2.0 in. dia	UF - FIXED PISTON	
DRILLED BY: HIGH PLAINS	Y. HIG	SH PLAINS			CA - STELL STOOM SAMITEEN 2.3 III. did:		. 2.3 III. did.	SI - SHELDI IODE	
LOGGED BY	Y: TCI	LOGGED BY: TCM/BAS TOTAL DEPTH (FT): 34.0	ral DEPTH (FT): 34.0	GROUNDWATER	ER ×	ESTIMATED	ESTIMATED GROUNDWATER	
NOTES: RIG	3: Truck	NOTES: RIG: Truck-mounted CME 75	€ 75		SA	SAMPLE METHOD: Auto safety hammer	D: Auto safety h	ammer	
4-in	nch diam	4-inch diameter solid flight augers	nt augers		BA	BACKFILL: Drill cuttings	ttings		
F		SAMPLE			OII				
DEPIH	TYPE	-1-	-23-	REMARKS	9C	SOIL	SOIL AND ROCK DESCRIPTIONS	SCRIPTIONS	
FI.		BLOWS PER PEN REC	PEN REC		A,Si L(
	NO.	6 IN.	Z Z		5				



PL-204 PAGE: 1 OF 1	DATE: 12/14/04 / 12/14/04	ING 30 IN. TO DRIVE	ER OR CORE BARREL		UF - FIXED PISTON	SI - SHELBI TOBE	ESTIMATED GROUNDWATER	ammer			SCRIPTIONS		
LOG OF DRILL HOLE		1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE	SAMPLER 2) PEN - PENETRATION I ENGTH OF SAMPLER OR CORE BARBEL	3) REC - RECOVERY LENGTH OF SAMPLE	S - SPLIT SPOON SAMPLER 2.0 in. dia		GROUNDWATER ▼ ESTIMATED	SAMPLE METHOD: Auto safety hammer	BACKFILL: Drill cuttings	2)	SOIL AND ROCK DESCRIPTIONS	L Services	
Geotechnical Environmental & Water Resources Engineering	DECLET NAME · Southern Delivery System	PROJECT NUMBER: 022950	BORING LOCATION: N 1213495.1, E 3232041.4	GROUND SURFACE ELEVATION (LOCAL - FT) :5123.6	GROUNDWATER ELEVATION: DRY DATE 12/14/04	DRILLED BY: HIGH PLAINS	LOGGED BY: TCM/BAS TOTAL DEPTH (FT): 29.0	NOTES: RIG: Truck-mounted CME 75	4-inch diameter solid flight augers	SAMPLE	H TYPE	FT. and BLOWS PER PEN REC	

0.0 - 12.0 ft: CLAY WITH SAND. Mostly fines, medium plastic; about 10% - 20% sand, narrowly graded, fine grained; homogenous; roots present in upper 3 feet; porous; calcareous; very stiff to hard; slightly moist; brown to yellow-brown. (CL) [Qp]			12.0 - 17.0 ft: CLAYEY SAND. Mostly sand, narrowly graded, fine to coarse grained, subangular to subrounded, predominately quartz and feldspar; about 20% - 25% fines, medium plastic; about 5% - 10% gravel, subangular to subrounded, predominantly quartz and feldspar; homogenous; calcareous; very dense; slightly moist; light yellow-brown. (SC) [Qp]	17.0 - 23.0 ft: CLAY. Moslty fines, low plastic; about 15% - 25% sand, narrowly graded, fine grained; very stiff, homogenous; slightly moist; light yellow-brown. (CL) [Qp]	23.0 - 29.0 ft: CALCAREOUS SHALE. Mostly fines, medium plastic; about 10% - 15% sand, narrowly graded, fine grained; thinly bedded; intensely to moderately weathered; calcareous; moderately soft to moderately hard; slightly moist; brown to dark blue-gray. [Kns]	
1111111			::::::::::::::::::::::::::::::::::::::	(((((((((((((((((((((((((((((((((((((((
					Harder drillino	
12	12	12	\(\tau_{\tau} \)	5	10	0
12	12	12		12	10	0
17,21	14,15	13,17	21,29/5"	14,10	32,50/4"	20/0"
CA-1	CA-2	CA-3	CA-4	CA-5	CA-6	CA-7
0	5	10	15	50	_ 25	30

12/14/04 N LEGEND
1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER
3) REC - RECOVERY LENGTH OF SAMPLE OF UF - FIXED PISTON ST - SHELBY TUBE 12/14/04 **ESTIMATED GROUNDWATER** PL-205 SOIL AND ROCK DESCRIPTIONS PAGE: DATE: SAMPLE METHOD: Auto safety hammer S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia. LOG OF DRILL HOLE BACKFILL: Drill cuttings GROUNDWATER ORAPHIC LOG DATE 12/14/04 REMARKS 24.0 GROUND SURFACE ELEVATION (LOCAL - FT) \$133.9 TOTAL DEPTH (FT): BORING LOCATION: N 1214816.1, E 3232029.6 PROJECT NAME : Southern Delivery System -1-BLOWS PER PEN REC 6 IN. IN. 4-inch diameter solid flight augers GROUNDWATER ELEVATION: DRY NOTES: RIG: Truck-mounted CME 75 SAMPLE PROJECT NUMBER: 022950 DRILLED BY : HIGH PLAINS LOGGED BY: TCM/BAS Geotechnical Environmental & Water Resources Engineering TYPE and NO. DEPTH

Ħ.

 $\overline{}$

0.0 - 6.0 ft: CLAY WITH SAND. Mostly fines, low plastic; about 15% - 25% sand, narrowly graded, fine to coarse grained, subangular to subrounded, quartz and feldspar; trace of gravel, up to about 1/4-inch; very stiff to hard; homogenous; roots present in upper 3 feet; calcareous; slightly moist, light brown. (CL) [Qcr]		6.0 - 24.0 ft: SANDSTONE. Mostly sand, narrowly graded, fine grained; trace of fines; moderately to well cemented; thinly bedded; moderately weathered; hard; calcareous; light brown to blue-gray. [Kns]			Color change to blue-gray (based on cuttings).
//////					
			guilling		
			Harder drilling		
12	2	4	0		0
12	2	4	es es		0
5,20	13,14	50/4"	50/3"		25/0"
CA-1	CA-2	CA-3	CA-4		CA-5
0	-2	- 10	- 15	- 20	- 25

Geotechnical Environmental & Water Resources

PROJECT NAME : Southern Delivery System

LOG OF DRILL HOLE

PL-206

12/14/04 OF 12/14/04 PAGE: DATE:

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

BORING LOCATION: N 1215795.3, E 3232013.9

PROJECT NUMBER: 022950

UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia. CA - SPLIT SPOON SAMPLER 2.5 in. dia. 12/14/04 GROUND SURFACE ELEVATION (LOCAL - FT) :5146.0

GROUNDWATER

ESTIMATED GROUNDWATER

DATE

GROUNDWATER ELEVATION: DRY

DRILLED BY : HIGH PLAINS

25.0

N

SAMPLE METHOD: Auto safety hammer BACKFILL: Drill cuttings TOTAL DEPTH (FT) : 4-inch diameter solid flight augers NOTES: RIG: Truck-mounted CME 75 LOGGED BY: TCM/BAS

SIH9ARD -3-REC PEN-BLOWS PER F 6 IN. TYPE and NO.

SOIL AND ROCK DESCRIPTIONS

FOC

REMARKS

SAMPLE

DEPTH Ħ.

8.0 - 19.5 ft: CLAY. Mostly fines, medium to highly plastic; about 15% - 25% sand, narrowly graded, fine grained; very stiff to hard; homogenous; calcareous; slightly moist; light brown. (CL) [Qp] 19.5 - 25.0 ft: CALCAREOUS SHALE. Moslty fines, medium plastic; about 10% - 15% sand, narrowly graded, fine grained; thinly bedded; intensely weathered; moderately hard; calcareous; slightly moist; light brown. [Kns] 0.0 - 8.0 ft: CLAY. Mostly fines, medium plastic; less than 5% sand, narrowly graded, fine grained; very stiff; homogenous; roots present; calcareous; slightly moist; light brown. (CL) [Qp] Harder drilling 12 12 12 12 12 12 12 12 12 12 12 12 12,16 13,17 18,32 11,18 20,50 21,29 CA-3 CA-1 CA-2 CA-4 CA-5 CA-6 10 15 20 25 0 2

PROJECT NAME : Southern Delivery System

PROJECT NUMBER: 022950

GROUND SURFACE ELEVATION (LOCAL - FT) :5185.0 BORING LOCATION: N 1219803.7, E 3231973.6

DATE 12/14/04 GROUNDWATER ELEVATION: DRY DRILLED BY : HIGH PLAINS

TOTAL DEPTH (FT): LOGGED BY: TCM/BAS

LOG OF DRILL HOLE

12/14/04 OF PL-207 PAGE: DATE:

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

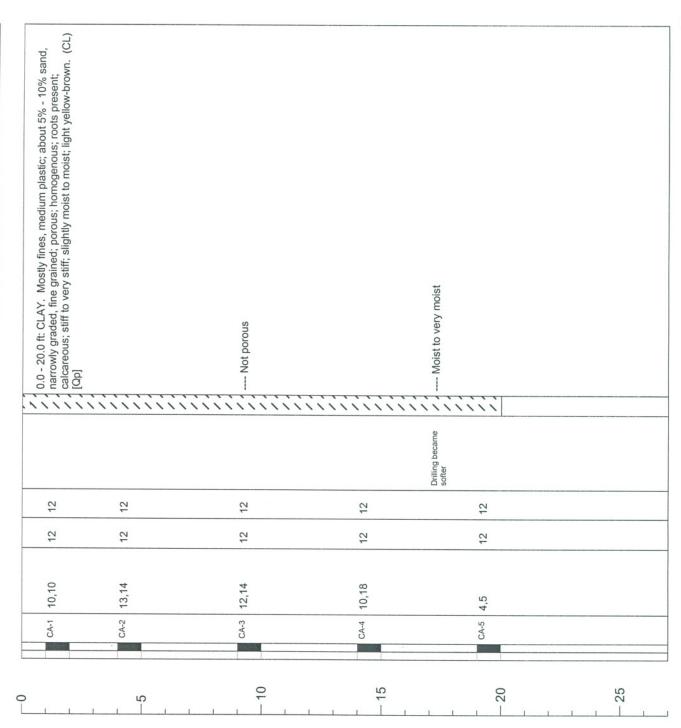
UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

N

ESTIMATED GROUNDWATER SAMPLE METHOD: Auto safety hammer BACKFILL: Drill cuttings GROUNDWATER 20.0 4-inch diameter solid flight augers NOTES: RIG: Truck-mounted CME 75

SOIL AND ROCK DESCRIPTIONS 507 **SRAPHIC** REMARKS -2- -3-PEN REC IN. IN. BLOWS PER F 6 IN. SAMPLE TYPE and NO. DEPTH

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PL-208	PAGE: 1 OF 1	DATE: 12/14/04 / 12/14/04	ING 30 IN. TO DRIVE	ER OR CORE BABEI		UF - FIXED PISTON	SI - SHELBY IUBE	ESTIMATED GROUNDWATER	ammer			SCRIPTIONS		
	LOG OF DRILL HOLE		1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE	SAMPLER 2) PEN - PENETRATION ENGTH OF SAMPLER OR CORE BABBEL	3) REC - RECOVERY LENGTH OF SAMPLE	DATE 12/14/04 S - SPLIT SPOON SAMPLER 2.0 in. dia		GROUNDWATER ▼ ESTIMATED	SAMPLE METHOD: Auto safety hammer	BACKFILL: Drill cuttings	01	SOIL AND ROCK DESCRIPTIONS	1 1	
Geotechnical Environmental & Water Decourage	Engineering Consultants	PROJECT NAME - Southern Delivery System	PROJECT NUMBER: 022950	BORING LOCATION : N 1223797.4, E 3231926.9	GROUND SURFACE ELEVATION (LOCAL - FT) 5260.0	GROUNDWATER ELEVATION: DRY DATE 12/14/04	DRILLED BY: HIGH PLAINS	LOGGED BY : TCM/BAS TOTAL DEPTH (FT) : 24.3	NOTES: RIG: Truck-mounted CME 75	4-inch solid flight augers	SAMPLE	ET and DIOWS DED DEN DES	NO.	

	3.0 - 24.3 ft: SHALE. Mostly fines, medium to highly plastic; about 10%	Less sand and more gypsum	Iron staining present	More sand; slightly weathered; color change to dark gray	
12	72	12	12	10	0
12	72	12	2	10	4
CA-1 10,12	CA-2 25,37	CA-3 28,48	CA-4 27,45	CA-5 28,50/4"	CA-6 50/4"
0	.	10	15		_ 25

LOG OF DRILL HOLE

12/15/04 OF 12/15/04 PL-209 DATE: PAGE:

> PROJECT NAME : Southern Delivery System PROJECT NUMBER: 022950

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE GROUND SURFACE ELEVATION (LOCAL - FT) :5307.9 BORING LOCATION : N 1225097.4, E 3231913.7

DATE 12/15/04 GROUNDWATER ELEVATION: DRY DRILLED BY : HIGH PLAINS

25.0 TOTAL DEPTH (FT) : LOGGED BY: TCM/BAS

NOTES: RIG: Truck-mounted CME 75

S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia. N GROUNDWATER

UF - FIXED PISTON ST - SHELBY TUBE **ESTIMATED GROUNDWATER**

SAMPLE METHOD: Auto safety hammer

N

SOIL AND ROCK DESCRIPTIONS BACKFILL: Drill cuttings ORAPHIC DOJ REMARKS BLOWS PER PEN REC 6 IN. IN. IN. 4-inch solid flight augers SAMPLE TYPE and NO. DEPTH Ħ.

0.0 - 1.0 ft: CLAYEY SAND. (SC) [Qcr]	staining. [Kpa] staining. [Kpa] Moetly finds and place. Staining. [Kpa]	35% sand, narrowly graded, fine to medium grained; thinly bedded;	12.0 - 25.0 ft: SHALE. Similar to 1.0 - 6.0 feet. [Kpa]	Slightly weathered	Black mafic minerals present
12	12	10	4	72	72
12	15	10	φ	5	72
10,12	19,32	49,50/4"		20,22	16,21
CA-1	CA-2	CA-3	CA-4	CA-5	CA-6
0	2	- 10	15	- 20	- 25

PROJECT NAME : Southern Delivery System

PROJECT NUMBER: 022950

BORING LOCATION : N 1228198.9, E 3231886.8

DATE 12/15/04 GROUND SURFACE ELEVATION (LOCAL - FT) :5315.5 GROUNDWATER ELEVATION: DRY

DRILLED BY : HIGH PLAINS

LOGGED BY: TCM/BAS

GROUNDWATER TOTAL DEPTH (FT):

LOG OF DRILL HOLE

OF PL-210 PAGE: 12/15/04

12/15/04

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE DATE:

UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

ESTIMATED GROUNDWATER N

N

25.0

SOIL AND ROCK DESCRIPTIONS SAMPLE METHOD: Auto safety hammer BACKFILL: Drill cuttings GRAPHIC 200 REMARKS BLOWS PER PEN REC 6 IN. IN. IN. NOTES: RIG: Truck-mounted CME 75 4-inch solid flight augers SAMPLE TYPE and NO. DEPTH

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12 12 12 12 12 12 12 12 12 12 12 12 12 1	7 0.0 - 0.5 ft: CLAY WITH SAND. Mostly fines, medium plastic; about 25% 53% sand, narrowly graded, fine to medium grained; calcareous; light brown. (CL) [Qcr]	10% sand, narrowly graded, fine grained; thinly bedded; slightly to moderately weathered; moderately hard; occasional gypsum; occasionally waxy; slightly moist; light brown to dark gray with occasional iron staining. [Kp] About 20% - 30% sand	Gypsum present; slightly weathered; no iron staining	Very little sand; highly plastic; no iron staining	Waxy	Abundant gypsum; iron staining
5 5 5 5	12	5	2	12		12
	12	12	12	12	12	2
CA-2 7,10 CA-3 16,22 CA-5 17,39 CA-6 16,31			~		17	

LOG OF DRILL HOLE

PL-211

12/15/04 _ OF 12/15/04 PAGE: DATE:

PROJECT NAME : Southern Delivery System

PROJECT NUMBER: 022950

GROUND SURFACE ELEVATION (LOCAL - FT) :5259.8 BORING LOCATION : N 1230788.0, E 3231866.6

DATE 12/15/04 GROUNDWATER ELEVATION: DRY DRILLED BY : HIGH PLAINS

24.3 LOGGED BY: TCM/BAS TOTAL DEPTH (FT):

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

N GROUNDWATER

SAMPLE METHOD: Auto safety hammer

BACKFILL: Drill cuttings

ESTIMATED GROUNDWATER

N

NOTES: RIG: Truck-mounted CME 75

4-inch solid flight augers

REMARKS BLOWS PER PEN REC 6 IN. IN. IN. SAMPLE TYPE and NO.

> DEPTH Ħ.

ORAPHIC 200

0.0 - 8.0 ft: CLAY WITH SAND. Mostly fines, medium plastic; about 15% - 25% sand, narrowly graded, fine to coarse grained, subangular to subrounded, predominantly quartz and feldspar; about 5% - 10% gravel, subangular to subrounded, predominantly quartz and feldspar; very stiff; porous; homogenous; roots present; calcareous; slightly moist; light brown. (CL) [Qcr]	 8.0 - 13.0 ft: SANDY CLAY. Mostly fines, medium plastic; about 40% - 45% sand, narrowly graded, fine to coarse grained, subangular to subrounded, predominantly quartz and feldspar; less than 5% gravel, subangular, up to about 1/2-inch; very stiff, homogenous; calcareous; slightly moist; light brown. (CL) [Qcr] 	7.: 13.0 - 24.3 ft: SHALE. Mostly fines, medium to highly plastic; about 10% - 25% sand, narrowly graded, fine grained; thinly bedded; slightly to moderately weathered; moderately hard; gypsum present; slightly moist; brown to dark gray with occasional iron staining. [Kp]		
		Stiffer drilling		
12 12	12	12	м	0
12 12	12	12	ю	4
CA-2 15,15	CA-3 11,13	CA-4 19,43	CA-5 50/3"	CA-6 50/4"
0	10	5		- 25

LOG OF DRILL HOLE

PL-212

12/15/04 OF 12/15/04 PAGE: DATE:

PROJECT NAME : Southern Delivery System

BORING LOCATION : N 1235390.7, E 3231799.9 PROJECT NUMBER: 022950

DATE 12/15/04 GROUND SURFACE ELEVATION (LOCAL - FT) :5344.4 GROUNDWATER ELEVATION: DRY

DRILLED BY : HIGH PLAINS

24.6 TOTAL DEPTH (FT): LOGGED BY: TCM/BAS

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

GROUNDWATER

SAMPLE METHOD: Auto safety hammer

BACKFILL: Drill cuttings

ESTIMATED GROUNDWATER

N

NOTES: RIG: Truck-mounted CME 75

4-inch solid flight au

TYPE and NO.

DEPTH Ħ.

		DOJ LOG
	31	REMARKS
		-3- REC IN.
		-23- PEN REC IN. IN.
d flight augers	SAMPLE	-1- BLOWS PER 6 IN.

0.0 - 13.0 ft. CLAY. Mostly fines, medium to highly plastic; about 5% - 15% sand, narrowly graded, fine to coarse grained, subangular to subrounded, predominantly quartz and feldspar; trace gravel, subrounded to subangular; very stiff, homogenous; roots present; calcareous; slightly moist; light brown.	Porous		13.0 - 24.6 ft. SHALE. Mostly fines, medium to highly plastic; up to about 30% sand, narrowly graded, fine grained, predominantly quartz and feldspar; occasional gravel sized particles observed, subangular to subrounded; laminated; slightly to intensely weathered; moderately hard; gypsum present; calcareous; occasional iron concretions observed up to 1/4-inch, angular; slightly moist; light brown to dark gray with some iron staining. [Kp]		Mineral filled fractures; slightly weathered; dark gray
72	12	12	12	5	۲
12	12	12	75	5	۷
CA-1 9,10	CA-2 10,11	CA-3 9,13	CA-4 15,28	CA-5 11,26	CA-6 42,22/1"
0	2	10	5	20	25

Geotechnical Environmental & Water Resources

PROJECT NAME : Southern Delivery System

LOG OF DRILL HOLE

PL-21

12/15/04 OF 12/15/04 DATE: PAGE:

LEGEND
1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

DATE 12/15/04

GROUND SURFACE ELEVATION (LOCAL - FT) :5466.2

GROUNDWATER ELEVATION: DRY

DRILLED BY : HIGH PLAINS

BORING LOCATION: N 1238959.8, E 3231784.1

PROJECT NUMBER: 022950

ESTIMATED GROUNDWATER GROUNDWATER

24.5

N

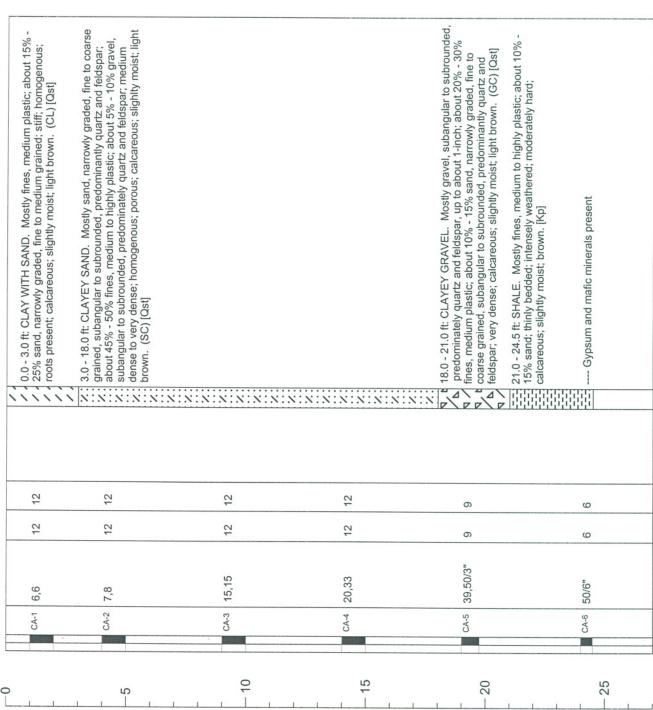
T00 **SIH4AA** REMARKS TOTAL DEPTH (FT): BLOWS PER PEN REC NOTES: RIG: Truck-mounted CME 75 4-inch solid flight augers SAMPLE LOGGED BY: TCM/BAS TYPE

DEPTH Ħ.

SAMPLE METHOD: Auto safety hammer

BACKFILL: Drill cuttings

5	
ż	
=	
Ż	
6 IN.	
NO.	



Geotechnical Environmental & Water Resources

PROJECT NAME : Southern Delivery System

LOG OF DRILL HOLE

-214 PL

/ 8/3/05 OF 8/3/05 DATE: PAGE:

LEGEND

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

GROUND SURFACE ELEVATION (LOCAL - FT) 5438.1

GROUNDWATER ELEVATION: DRY

BORING LOCATION : N 1242524.0 E 3232252.0

PROJECT NUMBER: 022950

DATE 8/3/05

UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

ESTIMATED GROUNDWATER GROUNDWATER

N

30.0 TOTAL DEPTH (FT): DRILLED BY: HIGH PLAINS

SAMPLE METHOD: Automatic safety hammer BACKFILL: Drill cuttings NAPHIC LOG NOTES: RIG: Truck Mounted CME - 75 4" Diameter solid flight auger SAMPLE LOGGED BY: NDM

	_
R SOIL AND ROCK DESCRIPTIONS	
REMARKS	
REC N	
PEN-2	
-1- BLOWS PER 6 IN.	
TYPE and NO.	
DEPIH FT.	

DEPTH

: graded, fine to coarse grained, subrounded to subangular, predominately: quartz and feldspar; about 5%-15% fines, low plastic; about 5% gravel;: loose to medium dense; slightly moist; brown. (SW-SC) [Qp]		7.0 - 22.0 ft: SANDY CLAY. Mostly fines, medium plastic; about 35%-40% 7.1 sand, fine to coarse grained, predominately quartz and feldspar, subangular 7.1 to subrounded; about 5% - 10% gravel, subangular to subrounded, up to 7.2 about 1/2-inch; stiff; slightly moist to moist, brown. (CL) [Qp] 7.3 constants.	Orange iron staining, more sand, about 25%	 Widely graded gravel lenses, similar to 0.0 - 7.0 feet, except about 15% fines. 	22.0 - 30.0 ft: WIDELY GRADED SAND WITH CLAY AND GRAVEL. Similar to 0.0 - 7.0 feet, except about 15% fines; about 20%-25% gravel up to 1/2-inch; iron staining. (SW-SC) [Qp]	
12	12		- 12			
12	5	72	27	12	25	5
CA-1 10,12	CA-2 5,3	CA-3 4,6	CA-4 6,9	CA-5 6,7	CA-6 11,12	CA-7 7,14
0	2	0	1 1 2	_ 20	_ 25	30

PL - 237	SILL HOLE PAGE: 1 OF 1	DATE: 8/2/05 / 8/2/05	LEGEND	 BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE 	SAMPLER 2) PEN - PENETRATION I ENGTH OF SAMPI ER OR CORE RARREI	ENGTH OF SAMPLE		WIPLEK 2.3 III. dla. 31 - 3HELBY 1UBE	■ ESTIMATED GROUNDWATER	SAMPLE METHOD: Automatic safety hammer
	LOG OF DRILL HOLE			1) BLOWS PER 6 IN1	SAMPLER - 2) PEN - PENETRATIO	3) REC - RECOVERY LENGTH OF SAMPLE	S - SPLIT SPOON SAMPLER 2.0 in. dia	CA - OPEII OPOON OF	GROUNDWATER	SAMPLE
Geotechnical Environmental & Water Resources	Engineering	PRO IECT NAME · Southern Delivery System		PROJECT NUMBER: UZZSSU	BORING LOCATION: N 1250033.9, E 3232068.1	GROUND SURFACE ELEVATION (LOCAL - FT) :5305.4	GROUNDWATER ELEVATION: DATE 8/2/05	DRILLED BY: HIGH PLAINS	LOGGED BY: NDM TOTAL DEPTH (FT): 25.0	NOTES: RIG: Truck Mounted CME - 75

SOIL AND ROCK DESCRIPTIONS

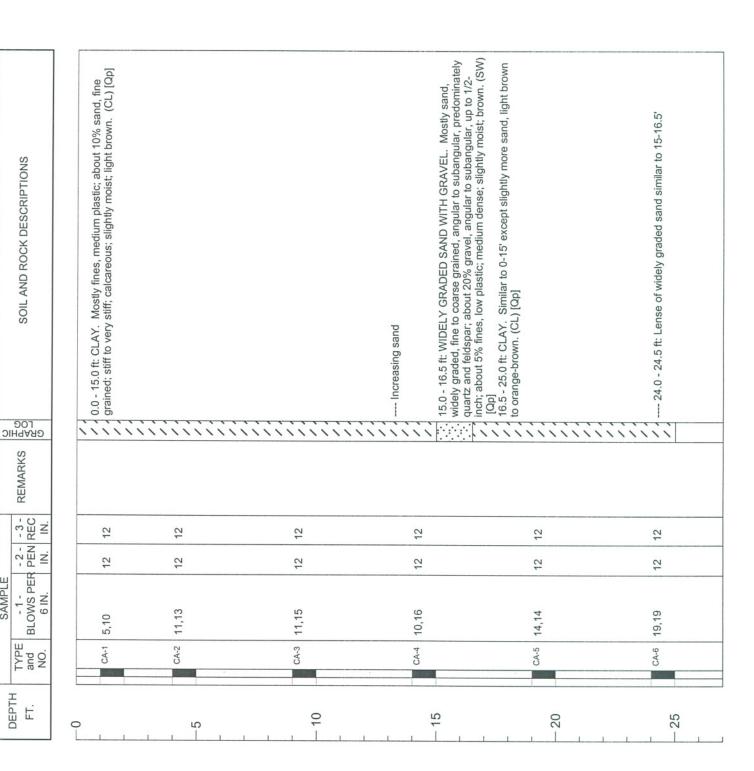
REMARKS

BACKFILL: Drill cuttings

4-inch diameter solid flight auger

SAMPLE

DEPTH Ħ.



Geotechnical Environmental & Water Resources

PROJECT NAME : Southern Delivery System

8/3/05 $\overline{}$

8/3/05

DATE: PAGE:

OF

238

Ы

LOG OF DRILL HOLE

PROJECT NUMBER: 022950

BORING LOCATION: N 1248935.8 E 3232083.7

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

GROUND SURFACE ELEVATION (LOCAL - FT) :5321.7 DATE 8/3/05 GROUNDWATER ELEVATION: DRY

DRILLED BY: HIGH PLAINS

TOTAL DEPTH (FT): LOGGED BY: NDM

24.5 NOTES: RIG: Truck Mounted CME - 75

SAMPLE METHOD: Automatic safety hammer GROUNDWATER

BACKFILL: Drill cuttings

ESTIMATED GROUNDWATER

UF - FIXED PISTON ST - SHELBY TUBE

S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

N

4-inch diameter solid flight auger

REMARKS -3-REC PEN F -1-BLOWS PER SAMPLE TYPE and NO.

> DEPTH Ħ.

ORAPHIC 200

SOIL AND ROCK DESCRIPTIONS

0.0 -7.0 ft: CLAY WITH SAND. Mostly fines, medium plastic; about 25% - 30% sand, fine to medium grained, narrowly graded, subrounded to subangular; stiff to hard; calcareous; slightly moist; brown. (CL) [Qcr] *****

12

12

19,16

CA-1

0

Less sand, about 15%

12

12

5,6

CA-2

2

7.0 - 12.0 ft: CLAY. Mostly fines, low to medium plastic; about 10% sand, narrowly graded, fine to coarse grained; medium stiff to stiff; calcareous; slightly moist; brown. (CL) [Qcr] 111111111

12

12

2,6

CA-3

10

12.0 - 24.5 ft; SHALE. Mostly fines, medium to highly plastic; less than 10% sand, fine grained; laminated; intensely weathered; soft; brown to dark brown with orange iron staining. [Kp]

4

4

50/4"

CA-4

15

---- Dark gray to light gray; no iron staining; about 10% fine grained sand; gypsum present.

4

4

50/4"

CA-5

20

Slightly iron stained, gypsum present.

9

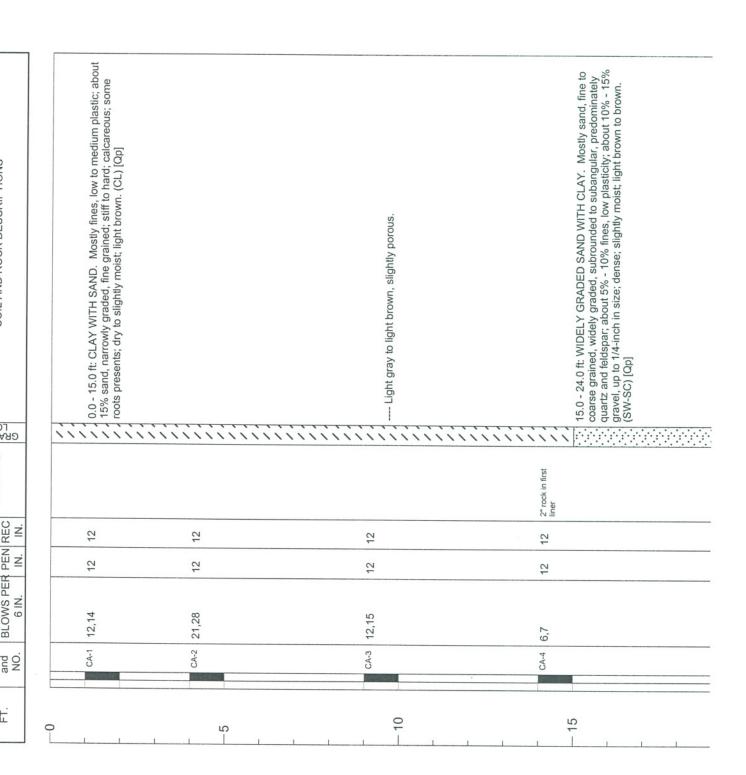
9

19/09

CA-6

25

PL - 242	PAGE: 1 OF 2	DATE: 8/4/05 / 8/4/05	ING 30 IN. TO DRIVE	ED OD COBE BABBEI	EN ON CONE BANKEL	UF - FIXED PISTON	SI - SHELBY IUBE	ESTIMATED GROUNDWATER	ety hammer			CRIPTIONS
	LOG OF DRILL HOLE		1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE	SAMPLER 2) PEN - PENETRATION ENGTH OF SAMPLED OF CODE BARDER	3) REC - RECOVERY LENGTH OF SAMPLE	S - SPLIT SPOON SAMPLER 2.0 in. dia		GROUNDWATER ▼ ESTIMATED	SAMPLE METHOD: Automatic safety hammer	BACKFILL: Drill cuttings	01	REG SOIL AND ROCK DESCRIPTIONS
Geotechnical Environmental &	Water Resources Engineering	PBO IECT NAME · Southern Delivery System	PROJECT NUMBER: 022950	BORING LOCATION : N 1210038.0 E 3232096.1	GROUND SURFACE ELEVATION (LOCAL - FT) \$092.7	GROUNDWATER ELEVATION: DRY DATE 8/4/05	DRILLED BY: HIGH PLAINS	LOGGED BY: NDM TOTAL DEPTH (FT): 33.2	NOTES:RIG: Truck Mounted CME - 75	4" Diameter solid flight auger	SAMPLE	FT. and BLOWS PER PEN REC NO. 6 IN. IN.



PL - 242	LOG OF DRILL HOLE PAGE: 2 OF	DATE: 8/4/05 / 8/4/	LEGEND 1) BLOWS PER 6 IN -140 LB. HAMMER FAITING 30 IN TO DRIVE	SAMPLER 9) DEN - DENETDATION ENCTUDE SAMPLED OF CORP.	3) REC - RECOVERY LENGTH OF SAMPLE 3) REC - RECOVERY LENGTH OF SAMPLE	S - SPLIT SPOON SAMPLER 2.0 in. dia UF - FIXED PISTON	CA - SPLIT SPOON SAMPLER 2.5 In. dia. ST - SHELBY TUBE	GROUNDWATER ➤ ESTIMATED GROUNDWATER	SAMPLE METHOD: Automatic safety hammer
Geotechnical Environmental & Water Resources	Engineering GEI consultants	PROJECT NAME · Southern Delivery System		BORING LOCATION: N 1210038.0 E 3232096.1	092.7	GROUNDWATER ELEVATION: DRY DATE 8/4/05	DRILLED BY :_ HIGH PLAINS	LOGGED BY: NDM TOTAL DEPTH (FT): 33.2	NOTES: RIG: Truck Mounted CME - 75

/ 8/4/05 7

N

SOIL AND ROCK DESCRIPTIONS

REMARKS

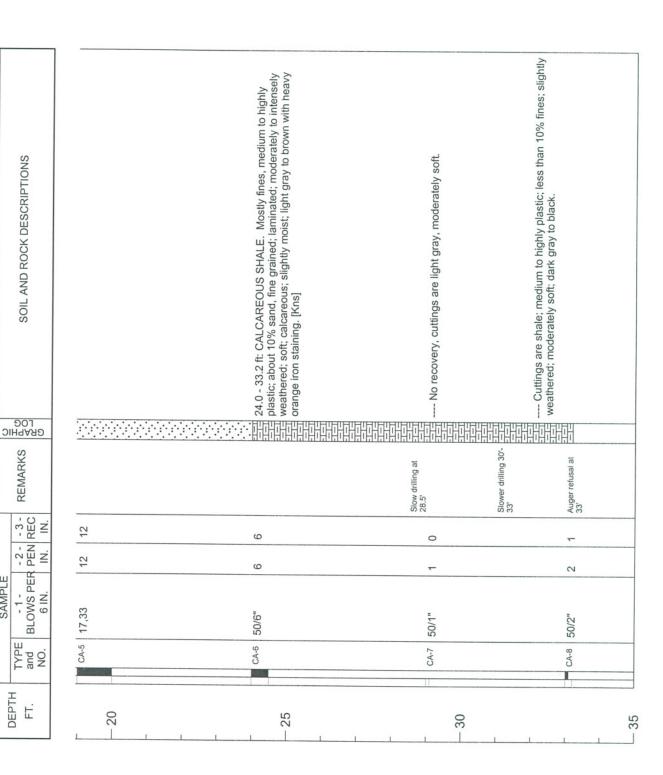
BACKFILL: Drill cuttings

Diameter solid flight auger

4

SAMPLE

DEPTH Ħ.



LOG OF DR			1) BLOWS PER 6 IN14	SAMPLER 2) PEN - PENETRATION	3) REC - RECOVERY LE	S - SPLIT SPOON SAME
GEI Consultants	un Delivery System		2950	207329.1, E 3232123.1	GROUND SURFACE ELEVATION (LOCAL - FT) :5067.3	GROUNDWATER ELEVATION: DRY DATE 7/14/05
Geotechnical Environmental & Water Resources Engineering	Southern Delivery System	PROJECT NAME:	PROJECT NUMBER: 022950	BORING LOCATION: N 1207329.1, E 3232123.1	GROUND SURFACE ELEY	SROUNDWATER ELEVA

PL - 243	PAGE: 1 OF 1	DATE: 7/14/05 / 7/14/05	ING 30 IN. TO DRIVE	ER OR CORE BARREI		UF - FIXED PISTON	SI - SHELBI IOBE	ESTIMATED GROUNDWATER	lammer			SCRIPTIONS		
	LOG OF DRILL HOLE		LEGEND 1) BLOWS PER 6 IN - 140 LB. HAMMER FALLING 30 IN . TO DRIVE	SAMPLER 2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARBEL	3) REC - RECOVERY LENGTH OF SAMPLE	S - SPLIT SPOON SAMPLER 2.0 in. dia		GROUNDWATER ▼ ESTIMATED	SAMPLE METHOD: Auto Safety Hammer	BACKFILL: Drill cuttings	01	SOIL AND ROCK DESCRIPTIONS	7)
	Engineering	Southern	PROJECT NUMBER: 022950	BORING LOCATION: N 1207329.1, E 3232123.1	GROUND SURFACE ELEVATION (LOCAL - FT) :5067.3	GROUNDWATER ELEVATION: DRY DATE 7/14/05	DRILLED BY: HIGH PLAINS	LOGGED BY: NDM TOTAL DEPTH (FT): 29.0	NOTES: RIG: Truck mounted CME - 75	4-inch diameter solid flight auger	SAMPLE	H TYPE	œ	NO. 6IN. IN. IN.

S-3 8,9,10 18 18 18 14.0 - 18 (A-5 50)6" 6 6 8 S-4 (Ars)	0.0 - 14.0 ft: CLAY. Mostly fines, low to medium plastic; less than 10% sand, fine to medium grained, widely graded; medium stiff to stiff; calcareous; slightly moist; light brown to brown. (CL) [Qp] grained; calcareous; iron staining. (CL) [Qp] (CL) (Qp] (Qp) (Qp) (Qp) (Qp) (Qp) (Qp) (Qp) (Qp)
CA-7 EO/O	

PL - 244	ILL HOLE PAGE: 1 OF	DATE: 7/14/05 / 7/1	OHLO L	LEGEND 0 LB. HAMMER FALLING 30 IN. TO DRIVE	THOUSE THE STATE OF THE STATE O	N LENGTH OF SAMPLES ON CONE BARKEL SINGTH OF SAMPLE			ESTIMATED GROUNDWATER S
	LOG OF DRII			1) BLOWS PER 6 IN140	SAMPLER 2) DENI DENIETDATION		5 S - SPLIT SPOON SAMP	CA - SPEII SPOON SAIM	GROUNDWATER T
Geotechnical Environmental &	·	Southern Delivery System	COECH INAIME . COCCUSTO COCCUS	DJECT NUMBER: 022950	RING LOCATION: N 1204751.8 E 3232141.0	OUND SURFACE ELEVATION (LOCAL - FT) 5041.0	DUNDWATER ELEVATION: 5014 DATE 7/14/05	LLED BY: HIGH PLAINS	LOGGED BY: NDM TOTAL DEPTH (FT): 34.1
		res GEI consultants LOG OF DRILL HOLE PAGE: 1	LOG OF DRILL HOLE	rcs GEI consultants Southern Delivery System	LOG OF DRILL HOLE LOG OF DRILL HOLE 1) BLOWS PER 6 IN140 LB. HAMMER FALLII	LOG OF DRILL HOLE 1) BLOWS PER 6 IN140 LB. HAMMER FALLII SAMPLER 3 SAMPLER 4 SAMPLER 5 SAMPLE	LOG OF DRILL HOLE LEGEND 1) BLOWS PER 6 IN140 LB. HAMMER FALLII SAMPLER SAMPLER 2) PEN - PENETRATION LENGTH OF SAMPLE 3) REC - RECOVERY LENGTH OF SAMPLE	APLE I	LOG OF DRILL HOLE LEGEND 1) BLOWS PER 6 IN140 LB. HAMMER FALLII SAMPLER 2) PEN - PENETRATION LENGTH OF SAMPLE 2) PEN - PENETRATION LENGTH OF SAMPLE 3) REC - RECOVERY LENGTH OF SAMPLE 414/05 CA - SPLIT SPOON SAMPLER 2.5 in. dia. S

/ 7/14/05

N

SOIL AND ROCK DESCRIPTIONS

SRAPHIC 200

REMARKS

BLOWS PER PEN REC 6 IN. IN.

TYPE and NO.

DEPTH Ħ.

4-inch diameter solid flight auger

SAMPLE

NOTES: RIG: Truck mounted CME - 75

Completed as a groundwater observation well

SAMPLE METHOD: Auto Safety Hammer

6,8	6,8,10	18	16		0.0 - grad	0.0 - 13.0 ft: SILT. Mostly fines, low plastic: less than 5% sand, narrowly graded, fine to medium grained; medium stiff, calcareous lenses; iron staining; slightly moist to moist; light brown to brown. (ML.) [Qp]
8,9,7	7,7	18	18			
6,	3,4,4	8	200			Moist, iron staining.
20	50/1"	-	-		mode mode	13.0 - 34.1 ft: CALCAREOUS SHALE. Mostly fines, low to medium plasticity; less than 10% sand, fine grained, narrowly graded; laminated; moderately weathered; soft, calcareous; moist; brown to dark brown. [Kns]
20	50/2"	7	0			Dark brown.
20	50/1"	-	_	Glower drilling		Moist to wet, dark gray.
20	50/1"	-	0.5	from 25' to 29'		Moist to wet, dark gray to black.
20	50/1"	-	-			Wet, dark gray to black.

40

LOG OF DRILL HOLE

- 245 PL

/ 8/4/05 $\overline{}$ OF 8/4/05 ~ PAGE: DATE:

> PROJECT NAME : Southern Delivery System PROJECT NUMBER: 022950

GROUND SURFACE ELEVATION (LOCAL - FT) 5048.8 DATE 8/4/05 BORING LOCATION: N 1203061.7 E 3232173.7 GROUNDWATER ELEVATION: DRY

DRILLED BY : HIGH PLAINS

27.0 TOTAL DEPTH (FT):

GROUNDWATER

LEGEND
1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

ESTIMATED GROUNDWATER

N

SAMPLE METHOD: Automatic safety hammer BACKFILL: Drill cuttings ORAPHIC 200 REMARKS BLOWS PER PEN REC 6 IN. IN. IN. NOTES: RIG: Truck Mounted CME - 75 4" Diameter solid flight auger SAMPLE LOGGED BY: NDM TYPE and NO. DEPTH

Ħ.

LOG OF DRILL HOLE

246 Ы

7/15/05 $\overline{}$ OF 7/15/05 PAGE: DATE:

PROJECT NAME : Southern Delivery System

GROUND SURFACE ELEVATION (LOCAL - FT) \$055.9 E 3232226.1 BORING LOCATION: N 1197784.1 PROJECT NUMBER: 022950

DATE 7/15/05 GROUNDWATER ELEVATION: DRY DRILLED BY : HIGH PLAINS

LOGGED BY: NDM

NOTES: RIG: Truck mounted CME - 75

LEGEND

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

GROUNDWATER

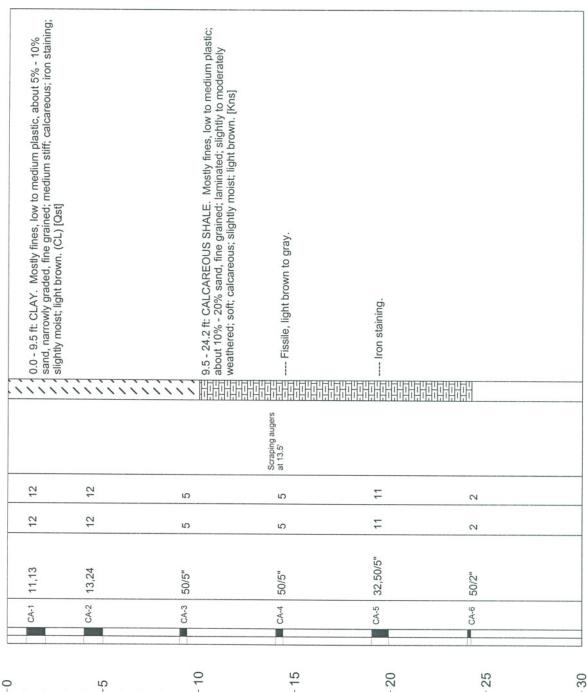
ESTIMATED GROUNDWATER

N

24.2 TOTAL DEPTH (FT):

SAMPLE METHOD: Auto Safety Hammer

SOIL AND ROCK DESCRIPTIONS BACKFILL: Drill cuttings/bentonite chips ORAPHIC 200 REMARKS -3-REC 4-inch diameter solid flight auger PEN F -1-BLOWS PER SAMPLE e IN. TYPE and NO. DEPTH Ħ.



PL - 247 PAGE: 1 OF 1	DATE: 8/4/05 / 8/4/05	LLING 30 IN. TO DRIVE	PLER OR CORE BARREL	ш	UF - FIXED PISTON		ESTIMATED GROUNDWATER	safety hammer			ESCRIPTIONS))	
LOG OF DRILL HOLE		1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE	SAMPLER 2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL	3) REC - RECOVERY LENGTH OF SAMPLE	S - SPLIT SPOON SAMPLER 2.0 in. dia		GROUNDWATER ▼ ESTIMATE	SAMPLE METHOD: Automatic safety hammer	BACKFILL: Drill cuttings	2)[SOIL AND ROCK DESCRIPTIONS		9
Geotechnical Environmental & Water Resources Engineering	Southern Delivery System	PROJECT NUMBER: 022950	BORING LOCATION: N 1196325.1 E 3232238.0	GROUND SURFACE ELEVATION (LOCAL - FT) :5035.5	GROUNDWATER ELEVATION: DRY DATE 8/4/05	DRILLED BY: HIGH PLAINS	LOGGED BY: NDM TOTAL DEPTH (FT): 24.6	NOTES: RIG: Truck Mounted CME - 75	4" Diameter solid flight auger	SAMPLE	DEPIH TYPE -123- REMARKS	BLOWS PER PEN REC	NO. 6 IN. IN.

D Lý	CA-1	8,13	12	9	/ , 0.0 - 4.5 ft: CLAY. Mostly fines, medium to highly plastic; less than 10%
2				72	 sand, narowly graded, fine to medium grained; very stiff; homogenous; dry to slightly moist; light brown. (CL) [Qst]
	CA-2	17,39	12	27	4.5 - 9.0 ft: CLAY. Mostly fines, medium to high plastic; less than 10% sand, fine grained; calcareous veins and lenses; strong reaction with HCL; slightly moist; brown. (CL) [Qst]
10	CA-3	50/10"	10	10	9.0 - 18.0 ft: CLAY WITH SAND. Similar to 0.0 - 4.5 ft, except about 25% - 30% sand; hard. (CL) [Qst]
12	CA-4	50/10"	10	10	
50	CA-5	16,18	2	5	18.0 - 24.6 ft: CLAYEY SAND. Mostly sand, fine to coarse grained, widely graded, predominately quartz and feldspar, subrounded to subangular; about 30% - 35% fines, low plastic; about 5% - 10% gravel, up to 1/4-inch; dense to very dense; calcareous; slightly moist; light brown to brown. (SC)
25	CA-6				···· iron stained shale fragments

7/14/05 N 1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE OF UF - FIXED PISTON ST - SHELBY TUBE **ESTIMATED GROUNDWATER** 7/14/05 - 248 SOIL AND ROCK DESCRIPTIONS PAGE: DATE: SAMPLE METHOD: Auto Safety Hammer PL S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia. LOG OF DRILL HOLE BACKFILL: Drill cuttings GROUNDWATER ORAPHIC 200 REMARKS DATE 7/14/05 34.1 GROUND SURFACE ELEVATION (LOCAL - FT) 5017.9 TOTAL DEPTH (FT): BORING LOCATION: N 1195487.8 E 3232246.8 PROJECT NAME : Southern Delivery System -1-BLOWS PER PEN REC 6 IN. IN. IN. 4-inch diameter solid flight auger GROUNDWATER ELEVATION: DRY NOTES: RIG: Truck mounted CME - 75 SAMPLE PROJECT NUMBER: 022950 DRILLED BY : HIGH PLAINS Geotechnical Environmental & Water Resources Engineering LOGGED BY: NDM TYPE and NO. DEPTH Ë

2

				Gray to brown.
			Sampler bouncing	
18	8	Ø	τ-	r
8	18	Ø	-	es es
7,14,18	14,28,34	20,50/3"	50/1"	50/3"
Ď	8-5	ς, γ	φ. 4.	ς, υ
0			7 2	- 20

Geotechnical Environmental &				PL - 248
Engineering			LOG OF DRILL HOLE	PAGE: 2 OF 2
S - BAME . S	PBO IECT NAME · Southern Delivery System	System		DATE: 7/14/05 / 7/14/05
PROJECT NUMBER: 022950	. 022950		LEGEND 1) BLOWS PER 6 IN -140 I B HAMMER EALLING 30 IN TO DRIVE	AG 30 IN TO DRIVE
NG LOCATION	BORING LOCATION : N 1195487.8 E 3232246.8	3232246.8	SAMPLES 3) DEN DENETDATION LENGTH OF SAMPLED OF COMPLETED OF SAMPLED OF COMPLETED	
JND SURFACE	ELEVATION (LC	GROUND SURFACE ELEVATION (LOCAL - FT) \$017.9	3) REC - RECOVERY LENGTH OF SAMPLE	EN UN CORE BARREL
INDWATER EL	EVATION: DRY	GROUNDWATER ELEVATION: DRY DATE 7/14/05		UF - FIXED PISTON
DRILLED BY : HIGH PLAINS	H PLAINS		CA - SPLIT SPOON SAMPLER 2.5 in. dia.	I - SHELBY TUBE
LOGGED BY: NDM	TOTALD	TOTAL DEPTH (FT) : 34.1	GROUNDWATER ▼ ESTIMATED C	ESTIMATED GROUNDWATER 🖂
S:RIG: Truck n	NOTES: RIG: Truck mounted CME - 75		SAMPLE METHOD: Auto Safety Hammer	mmer
4-inch diame	4-inch diameter solid flight auger	jer	BACKFILL: Drill cuttings	
	SAMPLE		21	
Ш	-1-	-23- REMARKS	SOIL AND ROCK DESCRIPTIONS	RIPTIONS
and NO.	BLOWS PER PEN REC	REC		

	on odor.		
	Dark brown to black; hydrocarbon odor.		
Dark brown.	orown to blac		
논	×		
		-	
		-	

Environmental & Water Resources

LOG OF DRILL HOLE

249 1 P

7/14/05 ~ OF 7/14/05 PAGE: DATE:

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

DATE 7/14/05

GROUND SURFACE ELEVATION (LOCAL - FT) \$020.4

GROUNDWATER ELEVATION: DRY

DRILLED BY : HIGH PLAINS

LOGGED BY: NDM

BORING LOCATION: N 1193006.2 E 3232268.3

PROJECT NUMBER: 022950

PROJECT NAME : Southern Delivery System

ESTIMATED GROUNDWATER GROUNDWATER

4-inch diameter solid flight auger NOTES: RIG: Truck mounted CME - 75

SAMPLE METHOD: Auto Safety Hammer 29.4 TOTAL DEPTH (FT):

BACKFILL: Drill cuttings

N

SOIL AND ROCK DESCRIPTIONS 507 SIHAAAS REMARKS -2- -3-PEN REC IN. IN. BLOWS PER SAMPLE e IN TYPE and NO. DEPTH H.

0.0 - 9.0 ft: CLAY. Mostly fines, low to medium plastic; about 5%-10% sand, fine to medium grained, sub-angular, predominately limestone; medium stiff; calcareous; slightly moist; light brown. (CL) [Qst] 9.0 - 19.0 ft: CLAYEY SAND WITH GRAVEL. Mostly sand, widely graded, fine to coarse grained, subangular, predominately limestone; about 20% - 25% gravel, up to 3/4-inch in size; about 10% - 15% fines, low to medium plastic; medium dense to dense; calcareous; slightly moist; light brown. (SC) [Qst] 19.0 - 29.4 ft: CALCAREOUS SHALE. Mostly fines, medium to highly plastic; less than 10% sand, fine grained, narrowly graded; laminated; intensely weathered; moderately hard; calcareous; iron staining; slightly moist; gray to dark gray. [Kns] 111111111111111 15 9 12 9 7 7 2 18 18 19 18 7 7 2 18,29,14 18,50/5" 36,50/5" 6,7,10 6,4,8 8,8,6 50/5" CA-6 CA-7 S-2 S-1 8-3 8-4 5-5 10 15 20 25 30 0 2

LOG OF DRILL HOLE

- 251 PL.

7/15/05 $\overline{}$ OF 7/15/05 DATE:

PAGE:

PROJECT NAME : Southern Delivery System

BORING LOCATION : N 1181745.2 E 3232378.8 PROJECT NUMBER: 022950

DATE 7/15/05 GROUND SURFACE ELEVATION (LOCAL - FT) 4971.5 GROUNDWATER ELEVATION: DRY

DRILLED BY : HIGH PLAINS

24.5 TOTAL DEPTH (FT): LOGGED BY: NDM

LEGEND
SAMPLER
2) PEN - 140 LB. HAMMER FALLING 30 IN. TO DRIVE
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

UF - FIXED PISTON ST - SHELBY TUBE

ESTIMATED GROUNDWATER

D

NOTES: RIG: Truck mounted CME - 75

GROUNDWATER

SOIL AND ROCK DESCRIPTIONS SAMPLE METHOD: Auto Safety Hammer BACKFILL: Drill cuttings ORAPHIC LOG REMARKS BLOWS PER PEN REC 6 IN. IN. IN. 4-inch diameter solid flight auger SAMPLE TYPE and NO. DEPTH Ħ.

)	CA-1	5,7	12	12	N:N:N:N	0.0 - 8.0 ft: CLAYEY SAND. Mostly sand, widely graded, fine to coarse grained; about 45% - 50% fines, low to medium plastic; less than 5% gravel; medium dense; calcareous; slightly moist; light brown. (SC) [Qst]
	CA-2	6,8	12	12	::N:N:N	
10	CA-3	50/3"	ю	ю		8.0 - 24.5 ft: CALCAREOUS SHALE. Mostly fines, low to medium plastic; about 5%-10% sand, fine grained; laminated; slightly to moderately weathered; moderately hard; calcareous; slightly moist; light brown to gray. [Kns]
15	S-4	20/5"	υ	ω	Scraping augers 12.5° at 12.5°	Iron staining.
- 20	S-5-	9/09	9	9	Loud scraping augers between 15' and 24'	More weathered; stronger iron staining.
25	φ φ	9/09	9	9		More calcareous.
30						

PL - 252	PAGE: 1 OF 2	DATE: 7/15/05 / 7/15/05		ING 30 IN. TO DRIVE	FR OR CORE BARREI		UF - FIXED PISTON	SI - SHELBY TUBE	ESTIMATED GROUNDWATER	lammer
	LOG OF DRILL HOLE		LEGEND	1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE	2) PEN - PENETRATION LENGTH OF SAMPI FR OR CORE BARREI	3) REC - RECOVERY LENGTH OF SAMPLE		CA - SPEIT SPOON SAMPLER 2.5 In. dia.	GROUNDWATER ▼ ESTIMATED	SAMPLE METHOD: Auto Safety Hammer
Geotechnical Environmental & Water Resources	Engineering GEI Consultants	PROJECT NAME · Southern Delivery System	DBO IECT NI MPED - 022950	TIOSEOT NOIMBEN . CEESOS	BORING LOCATION: N 1180438.4 E 3232402.0	GROUND SURFACE ELEVATION (LOCAL - FT) :4980.7	GROUNDWATER ELEVATION: DRTE 7/15/05 SPLIT SPOON SAMPLER 2.0 in. dia	DRILLED BY : HIGH PLAINS	LOGGED BY: NDM TOTAL DEPTH (FT): 31.5	NOTES:RIG: Truck mounted CME - 75

SOIL AND ROCK DESCRIPTIONS

SRAPHIC 201

REMARKS

SAMPLE -2- -3- BLOWS PER PEN REC 6 IN. IN.

TYPE and NO.

DEPTH FT.

4-inch diameter solid flight auger

BACKFILL: Drill cuttings

ess than 10% sand, (CL) [Qst]	m to highly plastic; athered; moderately	1 9.0 and 31.5 feet.			
7. 0.0 - 4.5 ft: CLAY. Mostly fines, low to medium plastic; less than 10% sand, / fine grained; stiff; calcareous; slightly moist; light brown. (CL) [Qst]	4.5 - 9.0 ft. CALCAREOUS SHALE. Mostly fines, medium to highly plastic; less than 10% sand, fine grained; laminated; slightly weathered; moderately soft; calcareous; fissile; slightly moist; light brown. [Kns]	Convert to NX core with air rotary at 9.0 feet. See Geological Log of Drill Hole for descriptions between 9.0 and 31.5 feet.			
		Scraping augers at 9.0'			
12	12	7			
12	12	7			
4,5	-2 7,30	3 50/2"			
CA-1	CA-2	CA-3			
>		- 10	- 15	-20	25

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GEOLOGICAL LOG OF DRILL HOLE

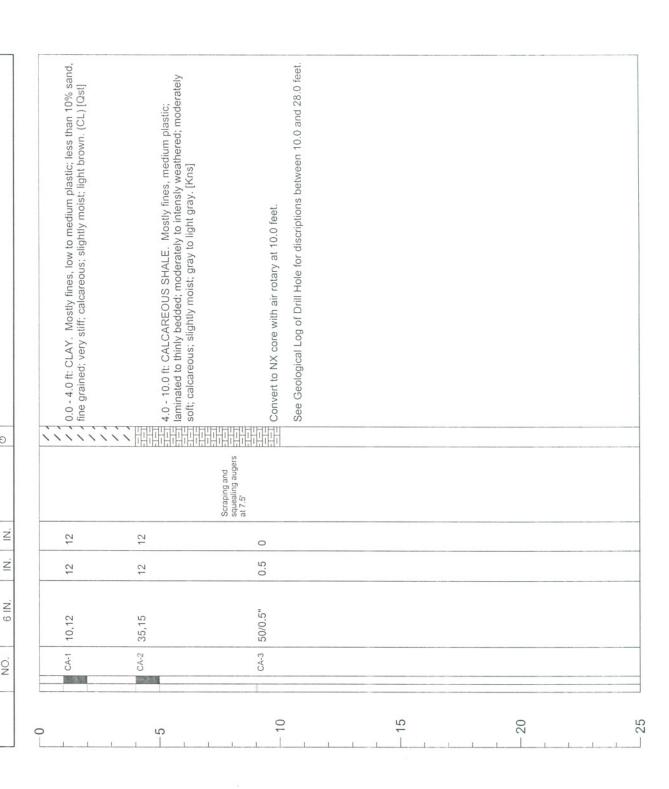
HOLE NO

PL-252

TOTAL DEPTH (FT) 31.5 2 NDM DESCRIPTION AND CLASSIFICATION OF ENGINEERING AND GEOLOGICAL LOGGED BY 2 PLUNGE SHEET 4.5 OVERBURDEN DEPTH (FT) 022950 DRILLED BY HIGH PLAINS PROJECT NO. РЕКСЕИТ RQD TREND PERCENT RECOVERY GRAPHIC LOG **JOINT SYMBOL** GROUND SURFACE ELEV. (FT) 4980.7 7/15/05 (SEE LEGEND) 7/15/05 JOINT DESCRIPTION INSITU TESTING **SS**BNGRAH DATE Southern Delivery System SHORTEST (FT) LONGEST (FT) (SEE LEGEND) 7/15/05 NO. OF PIECES CORING TIME (MIN) RQD (FT) PROJECT NAME Sou LOCATION N 1180438.4 E 3232402.0 DATE STARTED/FINISHED DRY RECOVERY (FT) (ТЧ) ИОІТАЯТЭИЭЧ GROUNDWATER EL. JAVABTNI CONDITIONS DRILLING CONDITIONS NOTES **GROUNDWATER** DEPTH (FT) **ELEVATION**

NX 25 1.0 0 4 9 0.3 <1.1 H4 1	9.0 - 31.5 ft: LIMESTONE. Mostly calcite, reacts vigorously with HCl; some fines and fine sand present; thinly bedded: slightly weathered; moderately fractured.	ractures are mostly mechanical preaks of nortzontal fractures between bedding planes; moderately hard; dry; light brown to light gray. [Kns]		Soft lense at 23 feet.	Interbedded with calcareous shale; laminated to thinly bedded; dry; gray to dark gray.	
XX	0	φ	0	0	0	
XX X X X X X X X X X X X X X X X X X X	04	40	09	50	50	
NX 2.5 1.0 0 4 9 0.3 <.1 H4 NX 5.0 2.0 0.33 6 14 0.3 <.1 H4 NX 5.0 1.0 0 6 5 0.3 <.1 H4 NX 5.0 1.0 0 6 5 0.2 <.1 H4 NX 5.0 1.0 0 4 6 0.1 <.1 H4 5 6 0.1 <.1 H4	HHH	- H H H H H H H	THHHHH		HHHHHH	H
NX 2.5 1.0 0 4 9 0.3 < 1.1			10 deg			
NX 2.5 1.0 NX 2.5 1.0 0 4 9 0.3	4	4	4	4	4	
NX 2.5						
XX						
XX						
XX 1 1						
XX 1.0 XX 2 XX 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	4		9	9	4	
X1 X X X X X X X X X X X X X X X X X X						
X- Xu Xu Xu Xu	-	7	6	-	-	
	ž-	×× ×	××	× 4	××	
Lou drill in the correction of		Loud drilling; core rattling at 15	Loud drilling; core rattling at 21; brown dust		Loud drilling; core rattling at 29; brown dust; soft lense	recovery; problems with drill rig gear box

		PL - 253
Water Resources Engineering	LOG OF DRILL HOLE	
PRO IECT NAME - Southern Delivery System		DATE: 7/13/05 / 7/13/05
	LEGEND 1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE	IG 30 IN. TO DRIVE
BORING LOCATION: N 1178323.5 E 3232325.1	SAMPLER 2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL	R OR CORE BARREL
GROUND SURFACE ELEVATION (LOCAL - FT) :4940.7	3) REC - RECOVERY LENGTH OF SAMPLE	
GROUNDWATER ELEVATION: DATE 7/13/05	S - SPLIT SPOON SAMPLER 2.0 in. dia	UF - FIXED PISTON
DRILLED BY : HIGH PLAINS		- Sherbi lobe
LOGGED BY: NDM TOTAL DEPTH (FT): 28.0	GROUNDWATER ▼ ESTIMATED	ESTIMATED GROUNDWATER
NOTES: RIG: Truck mounted CME - 75	SAMPLE METHOD: Auto Safety Hammer	mmer
4-inch diameter solid flight auger	BACKFILL: Drill cuttings	
SAMPLE	01	
DEPIH TYPE -123- REMARKS	SOIL AND ROCK DESCRIPTIONS	RIPTIONS
	1	



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Sc	5	er	neel
103	Z	att	50
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HOLE NO. **PL-253**

TOTAL DEPTH (FT) 28.0 2 NDM DESCRIPTION AND CLASSIFICATION OF ENGINEERING AND GEOLOGICAL LOGGED BY 2 PLUNGE 4.0 OVERBURDEN DEPTH (FT) 022950 DRILLED BY HIGH PLAINS PROJECT NO. РЕРСЕИТ РОД TREND PERCENT RECOVERY GRAPHIC LOG **JOINT SYMBOL** GROUND SURFACE ELEV. (FT) 4940.7 7/13/05 (SEE LEGEND) 7/13/05 **TOINT DESCRIPTION** INSITU TESTING HARDNESS DATE Southern Delivery System SHORTEST (FT) LONGEST (FT) 7/13/05 (SEE LEGEND) NO. OF PIECES CORING TIME (MIN) RQD (FT) PROJECT NAME Sou LOCATION N1178323.5 E 3232325.1 DATE STARTED/FINISHED 16.0 RECOVERY (FT) PENETRATION (FT) GROUNDWATER EL. JAVABTNI CONDITIONS CONDITIONS NOTES **ABTAWGNUORD** (TA) HT930 **ELEVATION**

10.0 - 28.0 ft: LIMESTONE Mostly calcite, reacts vigorously with HCl; some fines and fine sand present; thinly bedded; shale lenses; slightly to moderately weathered; moderately fractured, fractures are mostly mechanical breaks or horizontal fractures between bedding planes; moderately hard; slightly moist; light gray to gray. [Kns]	Samples moist	Samples more moist Horizontal fractures contain shale and limestone pieces.	Caved in at 27'
23	36	62	88
40	89	82	89
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2		2	7
0.7	0.5	8.0	4.0
_	13	o	62
т	ιΩ	9	10
0.7	8.	2.7	0.
3.4		2.4	4.
3.0	0.0	5.0	0.0
××-	××α	××ω	X 4
			Loud config with rattling
	H 13		

Geotechnical Environmental &		PL - 254	
Engineering Consultants	LOG OF DRILL HOLE	PAGE: 1 OF 1	_
BPO IECT NAME · Southern Delivery System		DATE: 6/28/05 / 6/28/05	90,
	-		
PROJECT NUMBER: 022950	1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE	JG 30 IN. TO DRIVE	
BORING LOCATION: N 1177945.3 E 3232343.5	SAMPLER 2) PEN - PENETRATION I ENGTH OF SAMPI ER OR CORE BABBEI	R OR CORE BARBEI	
GROUND SURFACE ELEVATION (LOCAL - FT) 4931.5	3) REC - RECOVERY LENGTH OF SAMPLE		
GROUNDWATER ELEVATION: 4930.5 DATE 6/28/05	S - SPLIT SPOON SAMPLER 2.0 in. dia	UF - FIXED PISTON	
DRILLED BY: HIGH PLAINS	CA - SPEIT SPOON SAMPLER 2.5 In. dia.	- SMELBY TUBE	
LOGGED BY : TCM/NDM TOTAL DEPTH (FT): 10.0	GROUNDWATER ▼ ESTIMATED (ESTIMATED GROUNDWATER	
NOTES: RIG: Truck mounted CME - 45	SAMPLE METHOD: Rope and cathead to drive safety hammer	ead to drive safety hamme	<u> </u>

SOIL AND ROCK DESCRIPTIONS

GRAPHIC 200

REMARKS

BLOWS PER PEN REC 6 IN. IN. IN.

TYPE and NO.

DEPTH FT.

4-inch diameter solid flight auger

SAMPLE

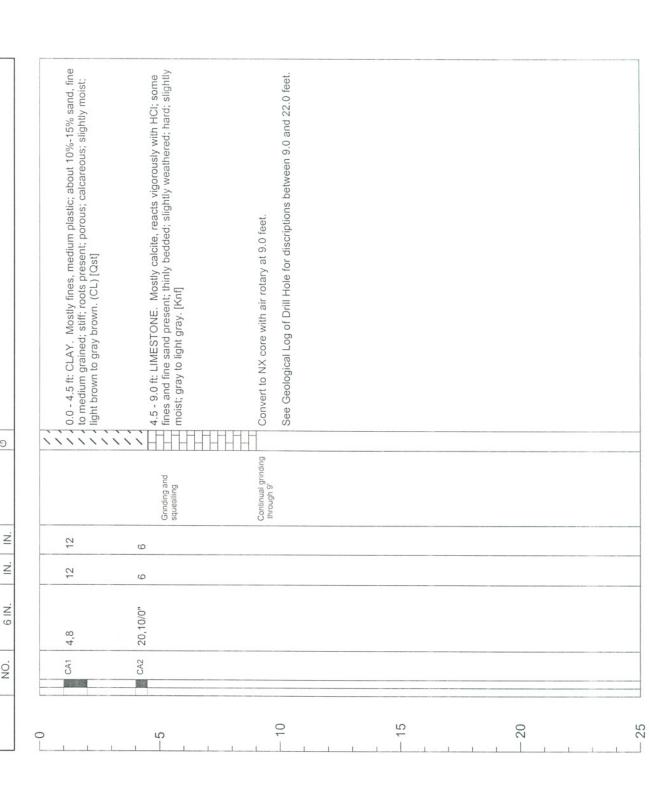
Completed as a groundwater observation well

	# # # # # # # # # # # # # # # # # # #			ight		 		 			 7
	0.0 - 1.0 ft: CLAY WITH SAND. Mostly fines, low to medium plastic, about 15% - 20% sand, narrowly graded, fine grained, subangular; moist to wet; strong reaction to HCL; calcareous; brown. (CL) [Qp]	1.0 - 4.0 ft: NARROWLY GRADED SAND WITH CLAY AND GRAVEL. Mostly sand, coarse grained, angular, predominately quartz & feldspar; about 30%-40% gravel, angular, fragments of limestone; about 5%-10% fines, low plastic; medium dense; wet; gray to brown. (SP-SC) [Qp]	4.0.8.0 ft-11MESTONE Macety realistic reacts wherever the LICH series	fines and fine sand present; slightly weathered; hard; dry; light brown to light gray. [Knf]							
	edium pla gular; mo	AND GRuartz & fee; about SP-SC)	1	ry; light b							
	ow to me d, suban L) [Qp]	H CLAY inately qu limeston brown. (\$; hard; d							
	ly fines, le graine rown. (C	AND WIT predom nents of gray to	200	eathered							
	ID. Most raded, fir reous; b	ADED S, angular, ilar, fragr nse; wet	oleo vita	slightly w							
	ITH SAN irrowly gr CL; calca	MLY GR. grained, vel, angu	Щ	oresent; se lense.	10 feet.						
	CLAY W sand, na tion to Ho	NARRO\ 1, coarse 40% gra lastic; me	IMEST	ne sand p	efusal at						
	0.0 - 1.0 ft: CLAY WITH SAND. Mostly fines, low to m 15% - 20% sand, narrowly graded, fine grained, subal strong reaction to HCL; calcareous; brown. (CL) [Qp]	1.0 - 4.0 ft: NARROWLY GRADED SAND WITH CLAY AND GRAVEL. Mostly sand, coarse grained, angular, predominately quartz & feldspar, about 30%-40% gravel, angular, fragments of limestone; about 5%-10% fines, low plastic; medium dense; wet; gray to brown. (SP-SC) [Qp]	# C & -	fines and fine sand present; gray. [Knf] 6-inch thick shale lense.	Auger refusal at 10 feet.						
	st 35.0		THHE	F⊊ 5 HHH	HH H			 			 -
-	<u> </u>	<u> </u>	ННН	пнн							+
			7 min per foot	8.0' Soft drilled faster for 6"	8.5' Back to hard drilling, squealing 8:36 start, 8:46 end, 5.5 inch						
	0	0		ω τ	w o w w						1
											 +
-		0									 +
	12,13	20/0"									
	CA-1	CA-2									
-	N										
			10		10		15		20		25
0			2	1 1	i	 1 1	<u> </u>			1	 1

PL - 255		DATE: 6/28/05 / 6/28/05	LING 30 IN. TO DRIVE	PLER OR CORE BARREL		UF - FIXED PISTON	SI - SHELBT TUBE	ESTIMATED GROUNDWATER	athead to drive safety hammer	te chips		SCRIPTIONS		
	LOG OF DRILL HOLE		LEGEND 1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE	SAMPLER 2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL	3) REC - RECOVERY LENGTH OF SAMPLE	S - SPLIT SPOON SAMPLER 2.0 in. dia	CA - STEIL STOOM SAMPLEN 2.3 III. dia.	GROUNDWATER ▼ ESTIMATE	SAMPLE METHOD: Rope and cathead to drive safety hammer	BACKFILL: Drill cuttings/bentonite chips	2)	P.G. SOIL AND ROCK DESCRIPTIONS		9
Geotechnical Environmental &	Water Resources Engineering Consultants	PRO IECT NAME · Southern Delivery System	PROJECT NUMBER: 022950	BORING LOCATION: N 1177840.4 E 3232327.6	GROUND SURFACE ELEVATION (LOCAL - FT) :4938.4	GROUNDWATER ELEVATION: DRY DATE 6/28/05	DRILLED BY: HIGH PLAINS	LOGGED BY: TCM/NDM TOTAL DEPTH (FT): 19.0	NOTES: RIG: CME - 45	4-in. DIAMETER SOLID STEM AUGER	SAMPLE	DEPIH TYPE -123- REMARKS	BLOWS PER PEN REC	NO. 6 IN. IN.

CA-2 3.5 12 12 12 12 2 200° 0 0 Stow drilling These approximately 0.3 inches thick Table about 30° some drilling the same deproximately 0.3 inches thick Table about 0.4 inches thick Table and the same deproximately 0.3 inches thick Table about 0.4 inches thick Table about 0.5 inches about 0.5 inches thick Table about 0.5 inches the table about 0.5 inches thick Table about 0.5 inches the table about 0.5 inches thick Tab
S-1 5.6.7 18 12.5 CA-2 3.5 12 12 CA-3 20/0" 0 0 Slow drilling Easier drilling CA-4 10/0" 0 0 Auger Refusal
S-1 5.6.7 18 CA-2 3.5 12 CA-3 20/0" 0 CA-4 10/0" 0
S-1 5,6,7 CA-2 3,5 CA-4 10/0"
CA-3

	OF 2	5 / 7/13/05	SIVE	A B B B B B B B B B B B B B B B B B B B		NO		N						
PL - 256	PAGE: 1	DATE: 7/13/05	LING 30 IN. TO DI	HER OR CORE B		UF - FIXED PISTON	SI - SHELDI IC	ESTIMATED GROUNDWATER	Hammer			SCRIPTIONS		
	L HOLE		LEGEND LB. HAMMER FAL	FNGTH OF SAMP	GTH OF SAMPLE	ER 2.0 in. dia	LEN 2.3 III. dia.	ESTIMATE	SAMPLE METHOD: Auto Safety Hammer	III cuttings		SOIL AND BOCK DESCRIPTIONS		
	LOG OF DRILL HOLE		LEGEND 1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE	SAMPLER 2) PEN - PENETRATION FNGTH OF SAMPI FR OR CORE BARBEI	3) REC - RECOVERY LENGTH OF SAMPLE	S - SPLIT SPOON SAMPLER 2.0 in. dia	OPELL SPOON SAMI	GROUNDWATER	SAMPLE MET	BACKFILL: Drill cuttings		S	5	
			1) BI	S S			()	1 1			OI	REMARKS PRO		9
	Consultants	vstem		3232265.1	3AL - FT) :49	DATE 7/		TOTAL DEPTH (FT): 22.0		JE.		- 3 -		Z
	GE	ern Delivery S	2950	1171555.0 E	VATION (LOC	TION: DRY	AINS	TOTAL DI	ed CME - 75	olid flight auge	SAMPLE	-12-	BLOWS PER PEN REC	6 IN.
Geotechnical Environmental &	water Kesources Engineering	PRO IECT NAME · Southern Delivery System	PROJECT NUMBER: 022950	BORING LOCATION : N 1171555.0 E 3232265.1	GROUND SURFACE ELEVATION (LOCAL - FT) :4960.2	GROUNDWATER ELEVATION: DRY DATE 7/13/05	DRILLED BY: HIGH PLAINS	3Y: NDM	NOTES: RIG: Truck mounted CME - 75	4-inch diameter solid flight auger	SA	TYPE -	and BLOW	NO.
Georg	Engi	PRO IECT	PROJECT	BORING L (GROUND 8	GROUNDV	DRILLED B	LOGGED BY: NDM	NOTES: RIC	4-ii	i i	DEFIH	FT.	



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HOLE NO. **PL-256**

PROJECT NAME LOCATION N 1171555.0 GROUND SURFACE ELEV. (FT) 4960.2 TREND DATE STARTED/FINISHED 7/13/05 DRILLED BY HIGH GROUNDWATER EL. DRY NOTES NOTES NOTES RECELEGEND NOTES RECELEGEND REC	C	SHEET 2 OF 2	PLUNGE 90	LOGGED BY NDM	TOTAL DEPTH (FT) 22.0		ENGINEERING AND GEOLOGICAL DESCRIPTION AND CLASSIFICATION				
PROJECT NAME LOCATION N 1171555.0 GROUND SURFACE ELEV. (FT) 4960.2 T DATE STARTED/FINISHED 7/13/05 / 7/13/05 GROUNDWATER EL. DRY NOTES (SEE LEGEND) NOTES (SEE LEGEND) RECORDING OF THE				BY HIGH PLAINS	URDEN DEPTH (FT) 4.5			Id			
PROJECT NAME LOCATION N 1171555.0 GROUND SURFACE ELEV. (FT) 4960.2 T DATE STARTED/FINISHED 7/13/05 / 7/13/05 GROUNDWATER EL. DRY NOTES (SEE LEGEND) NOTES (SEE LEGEND) RECORDING OF THE		PROJECT TREND		RILLED	OVERB			_			
PROJECT NAME Southern Delivery System		1					_				
PROJECT NAME LOCATION N 1171555.0 LOCATION E 3232265.1 DATE STARTED/FINISHED GROUNDWATER EL. DRY NOTES NOTES REVENDE STARTED/FINISHED GROUNDWATER EL. DRY NOTES REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER FRANCE GROUNDWAT						DINT SYMBOL)(
PROJECT NAME LOCATION N 1171555.0 LOCATION E 3232265.1 DATE STARTED/FINISHED GROUNDWATER EL. DRY NOTES NOTES REVENDE STARTED/FINISHED GROUNDWATER EL. DRY NOTES REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER FRANCE GROUNDWAT			. (FT) 496(/05			(SEE FEGEND)				
PROJECT NAME LOCATION N 1171555.0 LOCATION E 3232265.1 DATE STARTED/FINISHED GROUNDWATER EL. DRY NOTES NOTES REVENDE STARTED/FINISHED GROUNDWATER EL. DRY NOTES REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER FRANCE GROUNDWAT				. (FT)	. (FT)	. (FT)	. (FT)	. (FT)	7/13	7/13/05	NC
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PROJECT NAME LOCATION N 1171555.0 LOCATION E 3232265.1 DATE STARTED/FINISHED GROUNDWATER EL. DRY NOTES NOTES REVENDE STARTED/FINISHED GROUNDWATER EL. DRY NOTES REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER FRANCE GROUNDWAT		50	URF		1		ONGEST (FT)	Γ			
PROJECT NAME LOCATION N 1171555.0 LOCATION E 3232265.1 DATE STARTED/FINISHED GROUNDWATER EL. DRY NOTES NOTES REVENDE STARTED/FINISHED GROUNDWATER EL. DRY NOTES REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER FRANCE GROUNDWAT		IIver	S	3/05		Q.	O. OF PIECES	N			
PROJECT NAME LOCATION N 1171555.0 LOCATION E 3232265.1 DATE STARTED/FINISHED GROUNDWATER EL. DRY NOTES NOTES REVENDE STARTED/FINISHED GROUNDWATER EL. DRY NOTES REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER EL. DRY REVENDE STARTED/FINISHED GROUNDWATER FRANCE GROUNDWAT	0	n De	OU	7/13		RING	CORING TIME (MIN)				
PROJECT NAME LOCATION N 1171555.0 LOCATION E 3232265.1 DATE STARTED/FINISHE GROUNDWATER EL. D GROUNDWATER EL. D ONDES DELLIER COUNTING ON TES CONTING ON TES		mer	GR	1		SPE	QD (FT)	Я			
PROJECT NAME LOCATION N 1171555 LOCATION R 3232265 DATE STARTED/FINISH GROUNDWATER EL. NOTES NOTES COUNDING ON SCHLIGHT ON THE COUNTY ON THE C		Sou		Q	NRY NRY	(S)	ECOVERY (FT)	18			
PROJECT N DATE STAF		71555.0	555.0				(TT) NOITARTENE	Ь			
PROJECT N DATE STAF			171	FIN	REL		JAVA∃TI	VI			
		JECT NAME	ATION N1	E STARTED	UNDWATE	NOTES	ONDITIONS	D C			
		PRO	LOC	DAT	GRC		(тч) нтчэа				
							NOITAVAJA				

9.0 - 22.0 ft: LIMESTONE. Mostly calcile, reacts vigorously with HCl; some fines and fine sand present; thinly bedded; slightly weathered; moderately fractured, fractures are mostly mechanical breaks or horizontal fractures between bedding planes; moderately hard; dry; light brown to light gray. [Knf]	09	Darker gray; thinly bedded; more shaley Several thinly bedded shale layers throughout core Transition to calcareous shale lense.		
23	8	99		
	<u> </u>	<u>HHHHHHHHH</u>		
0 deg. strale filled 90 deg. 4" 10 deg	90 deg. 2*, black mineral 0 deg 0 deg 0 deg 0 deg	0 deg 0 deg		
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5.0	9.0	5.		
2.2	6. 4	හ භ		
3.0	0.0	5.0		
×	X 2	××ε		
		Loud coring; ratting; problem with drill rig.		
9	ις.	0	L)	0

al	ntal &	urces	20
Geotechnic	Environme	Water Resc	Engineerin

HOLE NO. **PL-257**

SHEET 1 OF 1	PLUNGE 90	LOGGED BY NDM	TOTAL DEPTH (FT) 25.5		ENGINEERING AND GEOLOGICAL DESCRIPTION AND CLASSIFICATION			
NO. 022950	,	DRILLED BY HIGH PLAINS	OVERBURDEN DEPTH (FT) 0		ENGINEERIN			
PROJECT NO.	9	LED E	RBUF	ERCENT RQD				
PRO,	TREND	DRIL	OVE	РЕРСЕИТ РЕСОУЕРУ				
_			1		JOINT SYMBOL			
	GROUND SURFACE ELEV. (FT) 4963.7	7/12/05	7/12/05		INSITU TESTING JOINT DESCRIPTI(
	ELE	_			HARDNESS			
tem	ACE		DATE		SHORTEST (FT)			
Sys	URF				LONGEST (FT)			
ivery	ID S	90/		(Q	NO. OF PIECES			
Del n	OUN	7/12/05		CORING EE LEGEN	совисе тіме (міи)			
Southern Delivery System	GR	1		CORING (SEE LEGEND	КОП (FT)			
Sou	10 0		DRY	(S)	RECOVERY (FT)			
	1149.5	NISHED	i		(ТЧ) ИОІТАЯТЭИЭЧ			
ш	1171	17 17 17 17 17 17 17 17 17 17 17 17 17 1			JAVA∃TNI			
JECT NAM	PROJECT NAME LOCATION E 32314 DATE STARTED/FIN	LOCATION E 3231 DATE STARTED/FIN GROUNDWATER E		NOTES	GROUNDWATER CONDITIONS DRILLING CONDITIONS			
PRC	007	DAT	GRC		NOITAVƏJƏ (T국) HTGƏD			

0.0 - 14.0 ft: LIMESTONE. Mostly calcite, reacts vigorously with HCl; some fines and fine sand present;	thinly bedded; slightly weathered; moderately fractured, fractures are mostly mechanical or are horizontal fractures between bedding planes; moderately hard; dry; light brown to light gray. [Knf]		14.0 - 25.5 ft: SANDSTONE. Mostly sand, very fine grained; less than 5% fines; non plastic; well cemented; moderately bedded; thinly bedded; intensely to moderately weathered; moderately fractured; moderately	Closed and filled calcite fracture at 24.7' to 25.0'		
50	20	12	46	100	72	
25	99	40	64	100	100	
HHH	HHHHHH		HHHI			
70 deg	0 deg 0 deg 0 deg 0 deg, shale 0 deg, shale	90 deg. 2". 90 deg. 2", mafic	6ap 0	Gap o	8ap 0 8ap 0 8ap 0 8ap 0 8ap 0	
¥ .	Ţ.	4	Ţ.	¥	T T	
<u>.</u>	<u>^</u>	<u>^</u>	.25 H	E. O	H H	
4.0	0.	4.0	0.	0 0.1	2.	
2	55	8	2	2	01	
2	Ω	2	9		ω	
4.0	5.5	0.75	2.3	3.5	9.00	
0.5	ю 6	2.0	3.2		0.00	
2.0	5.0	5.0	5.0	3.5	5.0	
××-	2 X S	3 X X	X 4	S X	X o	
		2	2	Bottom 1.5 feet recovered in NX - 5.	2-	

PL - 258-HA	PAGE: 1 OF 1	DATE: 7/12/05 / 7/12/05	NG 30 IN. TO DRIVE	ER OP COPE BABBEI		UF - FIXED PISTON	ol - SHELBY IUBE	GROUNDWATER				SNOITGIAS		
	LOG OF DRILL HOLE		1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER 2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL 3) REC - RECOVERY LENGTH OF SAMPLE		3) REC - RECOVERY LENGTH OF SAMPLE	S - SPLIT SPOON SAMPLER 2.0 in. dia UF CA - SPLIT SPOON SAMPLER 2.5 in. dia. ST					2)	E.O. SOIL AND BOCK DESCRIPTIONS		Ð
Geotechnical Environmental &	Engineering C E Consultants	PRO IECT NAME · Southern Delivery System	PROJECT NUMBER: 022950	BORING LOCATION: N 1170350, E 3230128	GROUND SURFACE ELEVATION (LOCAL - FT): ~4960	GROUNDWATER ELEVATION: DRY DATE 7/12/05	DRILLED BY: HIGH PLAINS	LOGGED BY: NDM TOTAL DEPTH (FT): 1.0	NOTES: 2-inch diameter hand auger	BACKFILL: Cuttings	SAMPLE	DEPIH TYPE -123- REMARKS	BLOWS PER PEN REC	NO. 6 IN. IN.

0.0 - 1.0 ft: CLAYEY SAND WITH GRAVEL. Mostly sand, widely graded, fine to coarse grained; about 35% - 40% fines, low plastic; about 15%-20% gravel, subangular to angular, prodominately limestone; contains some organics; soft; slightly moist; brown to dark brown. [Qp]			
0.0 - 1.0 fine to cos gravel, su organics;			
:			

Geotechnical Environmental & Water Resources

LOG OF DRILL HOLE

258B Ы

7/12/05 $\overline{}$ OF 7/12/05 PAGE: DATE:

PROJECT NAME : Southern Delivery System

PROJECT NUMBER: 022950

GROUND SURFACE ELEVATION (LOCAL - FT) :4964.8 BORING LOCATION: N 1170349.9, E 3230117.7

DATE 7/12/05 GROUNDWATER ELEVATION: DRY DRILLED BY : HIGH PLAINS

TOTAL DEPTH (FT): LOGGED BY: NDM

LEGEND
1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia. GROUNDWATER

ESTIMATED GROUNDWATER

N

25.0

SOIL AND ROCK DESCRIPTIONS SAMPLE METHOD: Auto Safety Hammer BACKFILL: Drill cuttings ORAPHIC DOJ REMARKS -3-REC 4-inch diameter solid flight auger -2-PEN NOTES: RIG: Truck mounted CME - 75 ż -1-BLOWS PER SAMPLE 9 IN TYPE and NO. DEPTH H.

0

0.0 - 4.0 ft: CLAYEY SAND. Mostly sand, widely graded, fine to coarse grained, subangular; about 40% - 45% fines, low to medium plastic; about 5% - 10% gravel, angular to subangular, predominately limestone; medium dense; calcareous; slightly moist; brown to dark brown. (SC) [Qp]

4.0 - 8.5 ft. SANDY CLAY. Mostly fines, low to medium plastic; about 10% sand, widely graded, fine to coarse grained, subangular; about 5% - 10% gravel, angular to subangular, predominately limestone; soft; calcareous; slightly moist; brown to dark brown. (CL) [Qp] Stiffer at 7.0' 12 15 12 12 18 18 12 12 9,7,6 2,2,2 20,42 50/5" CA-3 CA-4 S-1 S-2 10 2

8.5 - 24.3 ft: SHALE. Mostly fines, medium to highly plastic; about 5% - 10% sand, very fine grained; laminated to thinly bedded; slightly to intensely weathered; moderately soft; gypsum crystals; slightly moist; dark gray to yellow brown. [Kc]

15

3

3

50/3"

8-5

20

3

3

50/3"

9-8

		D D
Geotechnical Environmental &	Water Resources	Engineering

LOG OF DRILL HOLE

259 Ы

7/12/05 2 OF _ 7/12/05 PAGE: DATE:

PROJECT NAME : Southern Delivery System

PROJECT NUMBER: 022950

BORING LOCATION: N 1166405.0 E 3229589.9

7/12/05 GROUND SURFACE ELEVATION (LOCAL - FT) :5037.7 DATE GROUNDWATER ELEVATION: DRY DRILLED BY: HIGH PLAINS

TOTAL DEPTH (FT): NDM LOGGED BY:

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

ESTIMATED GROUNDWATER M GROUNDWATER

N

32.0

SAMPLE METHOD: Auto Safey Hammer BACKFILL: Drill cuttings ORAPHIC 200 REMARKS -2- -3-PEN REC 4-inch diameter solid flight auger NOTES: RIG: Truck mounted CME - 75 ż BLOWS PER F SAMPLE TYPE and NO. DEPTH Ħ.

SOIL AND ROCK DESCRIPTIONS

0 - 0.5 ft: LIMESTONE COBBLES WITH CLAY. Mostly cobbles; about 10% - 15% gravel; subangular to angular, thin shards; strong reaction with HCL; about 35% - 40% fines, low plastic; slightly moist; light brown. [Qcr] 0.5 - 2.0 ft; LIMESTONE. Mostly calcite, reacts vigorously with HCl; some fines and fine sand present; thinly bedded; slightly weathered; hard; slightly moist; gray to light gray. [Knf] See Geological Log of Drill Hole for discriptions between 2.0 and 32.0 feet. Convert to NX core with air rotary at 2.0 feet 1 No samples were taken between 0' and 2'; too hard 10 0 5

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nical	nenta	esourc	ing
otechi	/ironi	ter R	gineer
Gec	En	Wa	Eng

HOLE NO. PL-259	SHEET 2 OF 2	PLUNGE 90	LOGGED BY NDM	TOTAL DEPTH (FT) 32.0		ENGINEERING AND GEOLOGICAL DESCRIPTION AND CLASSIFICATION					
GEOLOGICAL LOG OF DRILL HOLE	NO. 022950		DRILLED BY HIGH PLAINS	OVERBURDEN DEPTH (FT) 0.5		ENGINEERING DESCRIPTION					
CAL LOG OF	G O	LOG OF D	9	LED E	ERBU		ЕВСЕИТ ВОД				
	PRO	TREND	DRIL	OVE	Α.	SERCENT RECOVER					
		7				JOHA SYMBOL					
EOLOG			7/12/05	7/12/05		JOINT DESCRIPTION					
0							GROUND SURFACE ELEV. (FT) 5037.7		7/12		NSITU TESTING
			stem		_	111		SSANDAA			
	stem	Southern Delivery System				DATE		(T4) TS3TROH			
2	y Sy	SURF		1		ONGEST (FT)					
Consultants	liver	ND (S	7/12/05		(QN	10' OF PIECES					
Con	n De	300	7/1		RING	совис тіме (міи)					
C)	uther	5	'		(SEE LEGEND)	30D (FT)					
9	So	0.0	ED	DRY		SECOVERY (FT)					
		3405.0	NSH NSH	;		(TT) NOITARTENS					
al &	Ā	N 1166	D/FII	ERE		JAVA∃TN					
Geotechnical Environmental & Water Resources Engineering	Environmental Water Resourc Engineering PROJECT NAME		Engineering PROJECT NAME LOCATION E 322958		DATE STARTED/FINISHED	GROUNDWATER EL	NOTES	SOUNDWATER CONDITIONS SOULLING SUDITIONS			
	PRO	LOC	DAT	GRC		(TA) HT930					
						NOITAVAJA					

2.0 - 12.0 ft: LIMESTONE. Mostly calcite, reacts vigorously with HCl; some fines and fine sand present; thinly bedded; slightly weathered; moderately fractured, fractures are mostly mechanical breaks or horizontal fractures between bedding planes; hard; dry; light gray. [Knf]			12.0 - 32.0 ft: SANDSTONE. Mostly sand, narrowly graded, fine grained; about 10% fines, non-plastic; well cemented; thinly bedded; slightly weathered; hard; calcareous; slightly moist; light brown to light gray. [Knf]	Color change to light gray at 19.1 ft			
30	84	0	64	09	58	48	
92	63	33	80	100	100	48	
HHHHHH	HHH	+HHI					
70 deg	0 deg	0 deg 20 deg	6ap 06	0 deg 20 deg, calcite 0 deg	0 deg 0 deg 0 deg 0 deg 0 deg 20 deg 20 deg	Gap O	
	m	m	m				
H3	3 H3	H H3	H H	H 3	H H	8 H3	
0.6	0.8 0.3	0.3 <.1	1.7 0.1	<u>^.</u>	0.9 0.1	2.6 0.8	
				м	Ö	7,	
41	60	m	10	м	ω	м	
74	2 42	9	4	4	4	Θ.	
1.5.	1.2	0	3.2	3.0	2.9	2,4	
8. 8.	1.6	0.8	0.4	5.0	5.0	2.7	
5.0	2.5	2.5	5.0	5.0	5.0	5.0	
× –	× ×	žπ	X 4	×Σω	X 9	Ž~	
	į	Change from carbide core bit to diamond	5			Loud grinding near bottom of core	
20		10	15	20	25	30	

PL - 260	PAGE: 1 OF 1	DATE: 7/11/05 / 7/11/05		ING 30 IN. TO DRIVE	FR OR CORF BARREI		UF - FIXED PISTON	SI - SHELBY IUBE	ESTIMATED GROUNDWATER	ammer
	LOG OF DRILL HOLE		LEGEND	1) BLOWS PER 6 IN:-140 LB. HAMMER FALLING 30 IN. 10 DRIVE	SAMPLER 2) PEN - PENETRATION LENGTH OF SAMPI FR OR CORE BARBEI	3) REC - RECOVERY LENGTH OF SAMPLE	S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia S		GROUNDWATER ▼ ESTIMATED	SAMPLE METHOD: Auto Safey Hammer
Geotechnical Environmental & Water Because	Engineering CP Consultants	DRO IECT NAME · Southern Delivery System	DD ICOT NIMBED . 022050	TROSECT NOMBER.	BORING LOCATION : N 1165975, E 3229036	GROUND SURFACE ELEVATION (LOCAL - FT) 4965	GROUNDWATER ELEVATION: DATE 7/11/05 S. SPLIT SPOON SAMPLER 2.0 in. dia	DRILLED BY :_ HIGH PLAINS	LOGGED BY : NDM/KGA TOTAL DEPTH (FT) : 24.4	NOTES: RIG: Truck mounted CME - 75

BACKFILL: Drill cuttings

SOIL AND ROCK DESCRIPTIONS

SRAPHIC 200

REMARKS

BLOWS PER PEN REC 6 IN. IN. IN.

TYPE and NO.

DEPTH Ħ.

4-inch diameter solid flight auger

SAMPLE

10% sand, widely graded, fine to medium grained; about 15% - 20% gravel, angular, predominately limestone; hard; slightly moist; brown to gray brown. (CL) [Qcr] 4.0 - 24.4 ft: SHALE. Mostly fines, medium to highly plastic; trace of fine sand; thinly bedded; moderately weathered; soft; calcareous veins; waxy;	iron staining; slightly moist; gray to orange brown. [Kc]	More iron staining; gypsum observed in sample.	Bentonite present; less calcareous; waxy; slighty moist.	No iron staining; darker gray; absence of calcareous veins, dry.
7 2	12	72	2	2
5 5	15	2	22	2
CA-1 14,18 CA-2 14,17	CA-3 20,30	CA-4 27,50	CA-5 50/5"	CA-6 50/5"
2		- 15	-20	- 25

Geotechnical Environmental & Water Resources

LOG OF DRILL HOLE

261 Ы

7/11/05 2 OF DATE: PAGE:

PROJECT NAME : Southern Delivery System

BORING LOCATION : N 1165928.9, E 3226188.8 PROJECT NUMBER: 022950

DATE 7/11/05 GROUND SURFACE ELEVATION (LOCAL - FT) :4959.0 GROUNDWATER ELEVATION: DRY

DRILLED BY: HIGH PLAINS

24.5 TOTAL DEPTH (FT): LOGGED BY: NDM/KGA

UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

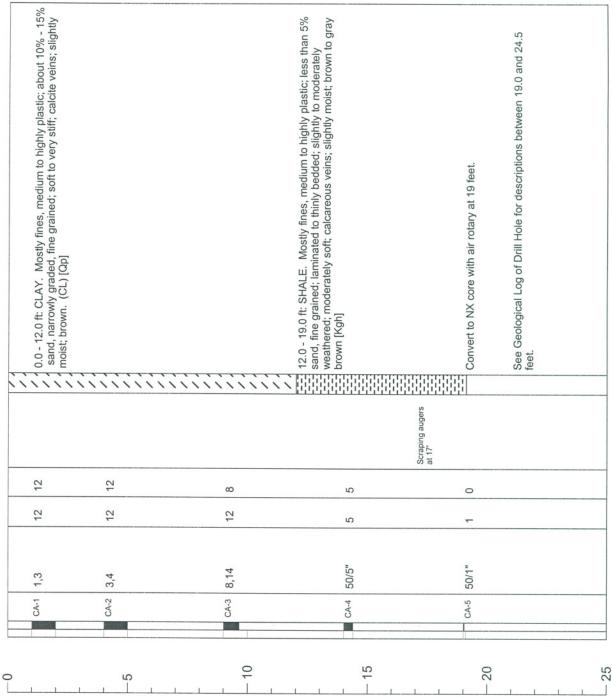
GROUNDWATER

ESTIMATED GROUNDWATER

N

SOIL AND ROCK DESCRIPTIONS SAMPLE METHOD: Auto Safey Hammer BACKFILL: Drill cuttings ORAPHIC LOG REMARKS -2- -3-PEN REC IN. IN. 4-inch diameter solid flight auger NOTES: RIG: Truck mounted CME - 75 BLOWS PER F 6 IN. SAMPLE TYPE and NO. DEPTH

Ħ.



GEOLOGICAL LOG OF DRILL HOLE

PL-261

HOLE NO

SHEET 022950

PROJECT NO.

TREND

4959.0

GROUND SURFACE ELEV. (FT)

Southern Delivery System

7/11/05

7/11/05

DATE STARTED/FINISHED

PROJECT NAME N 1165928.9 LOCATION E 3226188.8

7/11/05

DATE

DRY

GROUNDWATER EL.

NOTES

CORING (SEE LEGEND)

2

P

2

PLUNGE

90

TOTAL DEPTH (FT) 24.5 LOGGED BY 12.0

NDM/KGA

OVERBURDEN DEPTH (FT) DRILLED BY HIGH PLAINS

DESCRIPTION AND CLASSIFICATION ENGINEERING AND GEOLOGICAL

PERCENT RQD PERCENT RECOVERY

IOINT SYMBOL

INSITU TESTING

SHORTEST (FT)

LONGEST (FT)

NO. OF PIECES

RECOVERY (FT)

PENETRATION (FT)

ELEVATION

RQD (FT)

INTERVAL

DBILLING CONDITIONS GROUNDWATER DEPTH (FT)

CONDITIONS

CORING TIME (MIN)

SSBNGRAH

(SEE FEGEND)

JOINT DESCRIPTION

GRAPHIC LOG

19.0 - 24.5 ft: CALCAREOUS SHALE. Mostly fines, medium to highly plastic; trace fine sand; thinly to moderately bedded; slightly weathered; moderately hard; no apparent fracturing; calcareous; dry; gray to dark gray [Kgh] 0

7

·.

0.2

15

32

0

8.

2.5

Coring with carbide bit

20

ž-

13 100 72

7

·.

0.4

28

35

0.4

3.0

3.0

≥ ~

30

25

PROJECT NAME : Southern Delivery System PROJECT NUMBER: 022950 Geotechnical Environmental & Water Resources Engineering

LOG OF DRILL HOLE

7/11/05 2 PF PAGE:

7/11/05 - 262 DATE: Ы

LEGEND

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE DATE 7/11/05 GROUND SURFACE ELEVATION (LOCAL - FT) 4969.9 BORING LOCATION: N 1165781.7, E 3225346.5 GROUNDWATER ELEVATION: DRY

S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia. GROUNDWATER 25.0

N UF - FIXED PISTON ST - SHELBY TUBE **ESTIMATED GROUNDWATER** SOIL AND ROCK DESCRIPTIONS SAMPLE METHOD: Auto Safety Hammer BACKFILL: Drill cuttings ORAPHIC LOG REMARKS LOGGED BY: NDM/KGA TOTAL DEPTH (FT) -3-REC 4-inch diameter solid flight augers PEN I NOTES: RIG: Truck mounted CME - 75 BLOWS PER F SAMPLE DRILLED BY : HIGH PLAINS TYPE and NO. DEPTH Ħ.

GEOLOGICAL LOG OF DRILL HOLE

HOLE NO.

PL-262

SHEET 2 OF 2	PLUNGE 90	LOGGED BY NDM/	TOTAL DEPTH (FT) 25.0		ENGINEERING AND GEOLOGICAL DESCRIPTION AND CLASSIFICATION				
NO. 022950		DRILLED BY HIGH PLAINS	OVERBURDEN DEPTH (FT) 0.0		ENGINEERING DESCRIPTION A				
PROJECT NO.	ND	LED	ERBU	ERBU	ERBU	ERBU		РЕКСЕИТ КОД	
PRO	TREND	DRIL	0	^	PERCENT RECOVER				
	6		-		JOINT SYMBOL GRAPHIC LOG				
	GROUND SURFACE ELEV. (FT) 4969.9	7/11/05	1/05	7/11/05	NO	10INT DESCRIPTIO			
	EV.		7/1		INSITU TESTING				
٦	Ë			H H	DATE _		HARDNESS		
yster	FAC		DAT	DAT		DAT	DAT	DAT	
ry Sy	SUR		1		LONGEST (FT)				
elive	N N	7/11/05		(DI)	NO. OF PIECES				
Southern Delivery System	ROL	1/1	A	CORING (SEE LEGEND)	CORING TIME (MIN)				
nthe	Ð	Ι΄	NDM/KGA	SEE	КДР (FT)				
So	2.7	SHED	NDN		RECOVERY (FT)				
	5781.7	6) 7			(т з) иоітаятаизч				
E E	N 11657 E 32253	D/FI	ER E		JAVA∃TNI				
PROJECT NAME	LOCATION N 116578 E 322534	DATE STARTED/FIN	GROUNDWATER EL	NOTES	GROUNDWATER CONDITIONS CONDITIONS				
PRO	700	DAT	GRC		DELEVATION (TT)				

14.0 - 25.0 ft: SHALE. Mostly fines, medium to highly plastic; trace fine sand; thinly to moderately bedded; slightly weathered; moderately hard to moderately soft; no anoment fractures; occasionally calcareages fractures.	to dark gray. [Kc]		
	1		
	\$ \$		
	H4-		
	7	,	
1	1		
1	,		
9	28	31	
0	0.5		
3.0	5.0	3.0	
X-	2 X	××ε	
Coring with carbide bit Hard at 15.5° Compressor at 125 psi	Softer at	Compressor at 200 psi 3	
	70	22	30 32 30

263	DATE: 6/28/05 / 6/28/05	ING 30 IN. TO DRIVE	ER OR CORE BARREL	UF - FIXED PISTON ST - SHELBY TUBE	ESTIMATED GROUNDWATER	ammer		CRIPTIONS
LOG OF DRILL HOLE		1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE	SAMPLER 2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL 3) REC - RECOVERY LENGTH OF SAMPLE	S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.	GROUNDWATER ▼ ESTIMATED	SAMPLE METHOD: Auto Safety Hammer	BACKFILL: Drill cuttings	SOIL AND ROCK DESCRIPTIONS
al & rces	DEO IECT NAME : Southern Delivery System	PROJECT NUMBER: 022950	BORING LOCATION : N 1165658.1, E 3224006.9 GROUND SURFACE ELEVATION (LOCAL - FT) 4982.8	GROUNDWATER ELEVATION: DRY DATE 6/20/05 DRILLED BY: HIGH PLAINS	LOGGED BY: KGA TOTAL DEPTH (FT): 29.0	NOTES: RIG: Truck mounted CME - 75	4-inch diameter solid flight augers	DEPTH TYPE -123- REMARKS FT. and BLOWS PER PEN REC NO. 6 IN. IN. IN.

	1.0 - 29.0 ft: SHALE. Mostly fines, medium plastic; trace fine sand; laminated to thinly bedded; slightly to moderately weathered; calcareous nodules present; soft; dry; gray to brown to dark gray. [Kc]	Fissile.				
× 1999			Hard drilling	Hard scraping	Easier drilling Hard at 22-23' Hard scraping 24-25'	Interbedded harder and softer (relatively) drilling
12	2	4	0	0	0	0
12	2	4	0	~	0	0
CA-1 14,18	CA-2 13,11	CA-3 50/4"	CA-4 30/0"	CA-5 50/1"	CA-6 10/0"	
0	2	10	15	- 20	- 25	30

PROJECT NAME : Southern Delivery System

PROJECT NUMBER: 022950

DATE 6/28/05 GROUND SURFACE ELEVATION (LOCAL - FT) :4881.7 BORING LOCATION: N 1164258.3, E 3224131.1 GROUNDWATER ELEVATION: DRY DRILLED BY : HIGH PLAINS

TOTAL DEPTH (FT): LOGGED BY: KGA

NOTES: RIG: Truck mounted CME - 75

LOG OF DRILL HOLE

PL - 265

6/28/05 $\overline{}$ OF 6/28/05 _ PAGE: DATE:

LEGEND
1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

ESTIMATED GROUNDWATER

SAMPLE METHOD: Auto Safety Hammer

N

GROUNDWATER 29.0

SOIL AND ROCK DESCRIPTIONS BACKFILL: Drill cuttings ORAPHIC 200 REMARKS -1- -2- -3-BLOWS PER PEN REC 6 IN. IN. 4-inch diameter solid flight augers SAMPLE TYPE and NO. DEPTH Ħ.

0.0 - 10.0 ft: CLAY. Mostly fines, medium plastic, about 10%-15% sand, fine grained, narrowly graded; very stiff; calcareous; voids present; slightly moist; brown. (CL) [Qcr]	Pieces of shale & limestone in samples.	10.0 - 25.6 ft: CALCAREOUS SHALE. Mostly fines, medium to highly plastic; trace fine sand; laminated to thinly bedded; slightly weathered; soff; calcareous; fissile; dry; dark gray. [Kgh]			Dark gray; calcareous veins.	
	Pieces	, , , , , , , , , , , , , , , , , , , ,			Dark gr	
22	12	Z	9			
12	75		9			
CA-1 8,12	CA-2 11,13	CA-3 50/7"	CA-4 50/6"	CA-5 50/8"	CA-6 50/7"	
0	2	10	15		- 25	

Geotechnical Environmental & Water Dear Dear Dear Dear Dear Dear Dear De		PL - 266
Engineering Consultants	LOG OF DRILL HOLE	PAGE: 1 OF 1
PROJECT NAME · Southern Delivery System		DATE: 6/28/05 / 6/28/05
PROJECT NUMBER: 022950	1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE	NG 30 IN. TO DRIVE
BORING LOCATION : N 1162553.9, E 3223800.8	SAMPLER 2) PEN - PENETRATION I ENGTH OF SAMPLED OF CODE BARBET	
GROUND SURFACE ELEVATION (LOCAL - FT) ;4804.7	3) REC - RECOVERY LENGTH OF SAMPLE	EN ON CONE BANNEL
GROUNDWATER ELEVATION: DATE 6/28/05	S - SPLIT SPOON SAMPLER 2.0 in. dia	UF - FIXED PISTON
DRILLED BY :_ HIGH PLAINS		I - SHELBY IUBE
LOGGED BY: KGA TOTAL DEPTH (FT): 24.4	GROUNDWATER ▼ ESTIMATED	ESTIMATED GROUNDWATER
NOTES:RIG: Truck mounted CME - 75	SAMPLE METHOD: Auto Safety Hammer	ammer
4-inch diameter solid flight auger	BACKFILL: Drill cuttings	

SOIL AND ROCK DESCRIPTIONS

SRAPHIC 20J

REMARKS

SAMPLE
-1-2- -3BLOWS PER PEN REC
6 IN. IN.

TYPE and NO.

DEPTH FT.

0						
	CA-1	9,6	12	12	Surface moisture	0.0 - 1.5 ft: NARROWLY GRADED SAND WITH SILT. Mostly sand, narrowly graded, fine to coarse grained, subangular to subrounded, predominately quartz and feldspar; less than 10% fines, non plastic, more fines in upper foot; loose; moist to wet; brown. (SP - SM) [Qp]
-5	CA-2	11,12	12	12		Calcareous veins in shale.
						1.5 - 24.4 ft: SHALE. Mostly fines, medium to highly plastic; up to 15% fine sand; laminated to thinly bedded; slightly weathered; soft, fissile; slightly moist; gray to dark gray. [Kg]
10	CA-3	20,30	12	12		Gypsum present; iron staining; more fissile and darker gray in color.
15	CA-4	50/3"	ю	ю	Harder drilling, add water to hole	No observed gypsum; very fissile.
20	CA-5	.20/2"	Ŋ	Ŋ		
25	CA-6	20/2"	2	22		Trace of gypsum observed.

Cocycle Dring and Environmental & Water Resources Capta Consultants															_
T): ~4750 E 7/21/05 = T): 26.2	PL-267	-		LING 30 IN. TO DRIVE	I FR OR CORF BARREI		UF - FIXED PISTON	SI - SHELBY IUBE		afety hammer			SCRIPTIONS		
T): ~4750 E 7/21/05 = T): 26.2		LOG OF DRILL HOLE		LEGEND 3LOWS PER 6 IN140 LB. HAMMER FALI	LEGENI 1) BLOWS PER 6 IN140 LB. HAMMER F SAMPLER 2) PEN - PENETRATION LENGTH OF SA				M	SAMPLE METHOD: Automatic sa	BACKFILL: Cuttings				
	al &		CT NAME · Southern Delivery System			T):~4750			DEPTH (FT) : 26.2	:RIG: Track Mounted CME - 55	4-inch diameter solid flight auger	SAMPLE	TYPE -123- REMARKS	BLOWS PER PEN REC	O IIV.

0	N.Y.Y.Y.	(no samples obtained). (SC) [Qst]
	Augers scraping	2.5 - 4.4 ft: SANDSTONE. Mostly sand, narrowly graded, fine to medium grained, subangular to subrounded, predominantly quartz; well cemented; intensely to moderately weathered; hard; moist to wet; light gray to tan white with iron staining. [Kd]
-5		Convert to HQ core with air rotary at 4.4 feet.
		See Geological Log of Drill Hole for descriptions between 4.4 and 26.2 feet.
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otech	iron	ter R	ginee
Gec	Env	Wa	Eng

HOLE NO. **PL-267**

	2			6.2				
	OF	1	KGA	TOTAL DEPTH (FT) 26.2		٦	NOI	
		90		PTH		ENGINEERING AND GEOLOGICAL	DESCRIPTION AND CLASSIFICATION	
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	SHEET	PLUNGE	OGGED BY	OTA		ND GI	CLA	
I	S	L I				IG AN	AND	
l			DRILLED BY Spectrum Exploration	2.5		ERIN	TION	
l	022950		oldx	OVERBURDEN DEPTH (FT) 2.5		GINE	CRIP	
l			rum	PTH		ВN	DES	
l		'		N DE				
l	PROJECT NO.		ВУ	JRDE	_			
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l	PRO,	TREND	JRIL	OVE	٨	07.7510.0575.27	NT REC	
l	_		آ	1			IC FOG SAWBO	
l		4750	5			CEND)		70)
l		ELEV. (F		/ 7/21/05	JOINT DESCRIPTION (SEE LEGEND)			
						1G	TESTIN	
	E			DATE				NDAAH
l	yste			DA			TS3	
	sry S	Southern Delivery System GROUND SURFACE 7/21/05	10	//21/05			TA) TS:	
	elive		21/0		END)		PIECE	
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	So			~4736		(T:	H) YAH	3ECO
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	AAM	PROJECT NAME LOCATION E 32		'ATE	ES		SNOIT	
	CT	ON	TAF	MOI	NOTES		SNOIT	DBIFFI CONDI
	OJE	CAT	DATE STARTED/FIN	GROUNDWATER EL	_		LAWQN	
	PR	0	DA.	GR			HT430]
						NOIT	AV3J3	

4 6/ 6/ 2 6 /	to moderately open, rough with no infilling to partially filled with iron and carbon; carbonaceous seams present along bedding planes; moist to wet; light gray to white. [Kd]	65 black Thin shale lenses, discontinous, dark gray to black Thin carbonaceous seam, woody texture, soft, black.	Thin carbonacous seam Slight color change to more red Coarse sand sized voids about 2 mm deep	subangular, somewhat elongated Thin carbonaceous seam.	Thin carbonacous seam Thin carbonacous seam.	Thin carbonacous seam Begin thin lenses of sand, coarse grained.	Color change to dark brown, wet.
0	38		CONTRACTOR OF THE PERSON NAMED IN COLUMN 1		06	06	
100	100	100	100		100	100	
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0	8.0	- -	0.7		5.	8.	
6.	2.1	1.7	1.0		5.0	2.0	
6.	2.1	1.7	1.0		5.0	2.0	
욧-	2 B	8 ج م	å 4		5 5	g «	0
Core not going through bit, stop twice to break pieces out	ti.	Put in 5' casing (H.S.A.)	•	Changed bit	Groundwater at 14.4'	14	Changed bit to Series 8
ιλ		10			1.5		

GEOLOGICAL LOG OF DRILL HOLE

HOLE NO. **PL-267**

SHEET 2 OF 2	PLUNGE 90	OGGED BY KGA	TOTAL DEPTH (FT) 26.2		ENGINEERING AND GEOLOGICAL DESCRIPTION AND CLASSIFICATION					
022950		γ Spectrum Exploration	DRILLED BY Spectrum Exploration OVERBURDEN DEPTH (FT) 2.5		ENGINEERING A DESCRIPTION AN					
PROJECT NO.	Q	ED B	RBUF		РЕКСЕИТ RQD					
PRO.	TREND	DRILL	OVE	٨	РЕКСЕИТ RECOVER					
			-	_	JOINT SYMBOL GRAPHIC LOG					
	(FT) ~4750	7/21/05	7/21/05	NO	JOINT DESCRIPTIO					
	GROUND SURFACE ELEV. (FT) ~4750	E ELEV. (I	.EV. (, , 	1/2		INSITU TESTING			
Е			1	DATE		HARDNESS				
yster			DAT		(тт) тезтяоне					
ry Sy		ROUND SURF		1		LONGEST (FT)				
elive			S GNUOS	IND S	ND S	ND S	1/05		(DN)	NO. OF PIECES
Southern Delivery System				7/21/05		CORING SEE LEGENI	CORING TIME (MIN)			
uthe	G	'	9	SEE	КДД (ЕТ)					
Sol		ISHED	~4736	99	RECOVERY (FT)					
	535		1		(ТЧ) ИОІТАЯТЭИЭЧ					
Ш	11605	DATE STARTED/FIN	RE		JAVA∃TNI					
JECT NAM	PROJECT NAME LOCATION E 32239		GROUNDWATER EL	NOTES	GROUNDWATER CONDITIONS DRILLING CONDITIONS					
PRO	LOC	DAT	GRC		(TA) HT930					
					NOITAVAJA					

Thin carbonacous seam.	Thin carbonacous seam.		Many small carbonaceous seams to 25.0 feet.	Coal seam.	Coal seam.	
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10 deg			£			
10 deg						
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10 deg			6 1.8 0.2 H3			
3.1 2.5 8 5 1.4 0.1 H3			0 4.2 8 6 1.8 0.2 H3			
3.1 2.5 8 5 1.4 0.1 H3			5.0 4.2 8 6 1.8 0.2 H3			
2.5 8 5 1.4 0.1 H3			0 4.2 8 6 1.8 0.2 H3			

Environmental & Water Resources Engineering

LOG OF DRILL HOLE

268 1 Ы

7/21/05 ~ OF 7/21/05 PAGE: DATE:

PROJECT NAME : Southern Delivery System

BORING LOCATION: N 1160219, E 3224062 PROJECT NUMBER: 022950

DATE 7/21/05 GROUND SURFACE ELEVATION (LOCAL - FT) 74745 GROUNDWATER ELEVATION: ~4735

DRILLED BY: Spectrum Exploration

TOTAL DEPTH (FT): LOGGED BY: KGA

LEGEND
1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

ESTIMATED GROUNDWATER

N

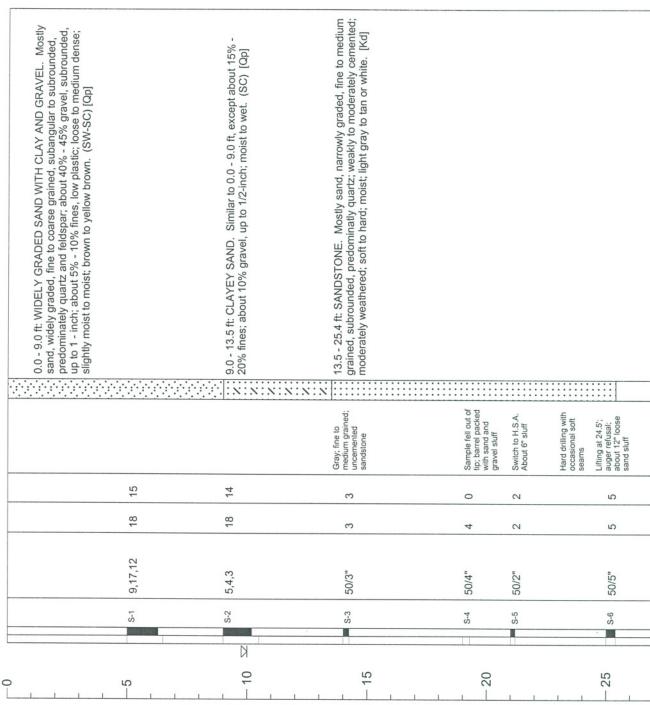
NOTES: RIG: Track Mounted CME 55

SAMPLE METHOD: Automatic safety hammer

GROUNDWATER 25.4

SOIL AND ROCK DESCRIPTIONS BACKFILL: Cuttings 4 1/4" I.D. H.S.A. with center bit ORAPHIC DOJ REMARKS -3-REC PEN IN. 4-inch dia. solid flight auger, -1-BLOWS PER SAMPLE TYPE and NO. DEPTH Ħ.

N 9



_							-	-			_	_	_
PL - 269	PAGE: 1 OF 2	DATE: 7/22/05 / 7/22/05	ING 30 IN. TO DRIVE	ER OR CORE BARREL		UF - FIXED PISTON	1	ESTIMATED GROUNDWATER	DRILLING METHOD: ODEX downhole hammer air percussion system	ety hammer		SCRIPTIONS	
	LOG OF DRILL HOLE		LEGEND 1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE	SAMPLER 2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL	3) REC - RECOVERY LENGTH OF SAMPLE	S - SPLIT SPOON SAMPLER 2.0 in. dia		GROUNDWATER ESTIMATED	DRILLING METHOD: ODEX down	SAMPLE METHOD: Automatic safety hammer	01	SOIL AND ROCK DESCRIPTIONS	T 68%
	Water Resources Engineering	DRO IECT NAME · Southern Delivery System	PROJECT NUMBER: 022950	BORING LOCATION: N 1159141 E 3222948	GROUND SURFACE ELEVATION (LOCAL - FT) :~4758	GROUNDWATER ELEVATION: Dry DATE 7/22/05	DRILLED BY : Spectrum Exploration	LOGGED BY: KGA TOTAL DEPTH (FT): 25.0	NOTES: RIG: Track Mounted CME - 55	BACKFILL: Bentonite chips	SAMPLE	TYPE -123- REMARKS	FT. and BLOWS PER PEN REC NO. 6 IN. IN.

Parking Area: Gravel and sand, rounded to subrounded (igneous, metamophic) on surface. 0.5 - 3.0 ft: CLAY WITH SOME GRAVEL. Based on driller's description, no sample obtained.	3.0 - 7.0 ft: CLAYEY SAND WITH GRAVEL. Mostly sand, widely graded, fine to coarse grained, angular to subangular, predominantly quartz and feldspar; about 30% - 40% gravel, angular to subangular; about 20% - 30% fines, low to medium plastic; medium dense; dry; brown. (SC) [Fill]		7.0 - 9.3 ft: SANDSTONE. Mostly sand, narrowly graded, fine to medium grained, subangular to subrounded, predominantly quartz; well cemented; intensely to moderately weathered; hard; slightly moist; light gray to tan white with iron staining. [Kd]	Convert to HQ air core rotary at 9.3 feet with 10 feet ODEX casing.	See Geological Log of Drill Hole for descriptions between 9.3 feet and 25.0 feet.
<u> </u>	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		×		
	More sandy at 3 feet.		More clayey matrix in tip.		
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		8			
		5-1 24, 14, 13			
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otec	Viro	ater	gine
3	E	3	E

HOLE NO.

PL-269

TOTAL DEPTH (FT) 25.0 2 KGA DESCRIPTION AND CLASSIFICATION ENGINEERING AND GEOLOGICAL 90 LOGGED BY \sim PLUNGE SHEET DRILLED BY Spectrum Exploration OVERBURDEN DEPTH (FT) 2.5 022950 PROJECT NO. PERCENT RQD TREND PERCENT RECOVERY GRAPHIC LOG JOINT SYMBOL -4758 7/22/05 (SEE LEGEND) 7/22/05 GROUND SURFACE ELEV. (FT) JOINT DESCRIPTION NSITU TESTING HARDNESS DATE Southern Delivery System SHORTEST (FT) LONGEST (FT) 7/22/05 CORING (SEE LEGEND) NO. OF PIECES совис тіме (міи) RQD (FT) PROJECT NAME Sou LOCATION N 1159141 E 3222948 DATE STARTED/FINISHED RECOVERY (FT) Dry (TT) NOITARTENEY GROUNDWATER EL. INTERVAL CONDITIONS DRILLING CONDITIONS NOTES **GROUNDWATER** DEPTH (FT) NOITAVAJA

7.0 - 25.0 ft: SANDSTONE. Mostly sand, narrowly graded, fine to medium grained, occasional coarse grained sand in lenses, subrounded, predominately quartz; well cemented; moderately bedded; moderately weathered; slightly fractured, fractures are slightly open districts.	to open, singuly rough to rough, and with no minimity to filled or partially filled with carbon and occasionally iron; interbedded thin carbon seams; no reaction with HCL; hard; dry; light gray to light tan to white with orange brown iron stains. [Kd]	Carbon lenses present between 10 and 15 feet.	15.7 ft: Orange-brown iron staining.	16.6 - 21.0 ft: Many thin carbon lenses and orange- brown iron stained lenses, closely spaced.								23.2 - 24.3 ft: Many thin carbon lenses and orange- brown iron stained lenses, closely spaced.		
7.0 - 25 graded, grained quartz; weather	filled or interbec hard; dr brown ii	Carl	15.7	16.6 brown ir	SOURCE AND A	ole, alternati					NO. 100	23.2 brown ir		
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100	100					100						ω ω		
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2.1	3.8					4.3						3.2		
2.4	4.4					8.4						4.		
2.4	4.4					8.			\top			4. L		
Ğ -	9.	٧				g e			+			Ž 4		
Series 8 bit				Adding water										
	1 1	- 15	1					- 20					22	

PL-270	PAGE: 1 OF 1	DATE: 7/21/05 / 7/21/05	ING 30 IN. TO DRIVE	ER OR CORE BARREI	113300000000000000000000000000000000000	UF - FIXED PISTON	SI - SHEEDI TOBE	ESTIMATED GROUNDWATER	lammer			SCRIPTIONS		
	LOG OF DRILL HOLE		LEGEND 1) BLOWS PER 6 IN -140 LB HAMMER FALLING 30 IN TO DRIVE	SAMPLER 3) DEN - DENETRATION ENGTH OF SAMPLEP OR CORE RABBE	3) REC - RECOVERY LENGTH OF SAMPLE		CA - STEIL STOON SAMITEEN 2.3 III. dia.	GROUNDWATER ▼ ESTIMATED	SAMPLE METHOD: Auto Safety Hammer	BACKFILL: Drill cuttings	OI	SOIL AND ROCK DESCRIPTIONS		Ð
	Water Resources Engineering	DRO IECT NAME · Southern Delivery System	PROJECT NUMBER: 022950	BORING LOCATION: N 1164088 E 3224190	GROUND SURFACE ELEVATION (LOCAL - FT) :~4860	GROUNDWATER ELEVATION: DATE 7/21/05	DRILLED BY: SPECTRUM EXPLORATION	LOGGED BY: KGA TOTAL DEPTH (FT): 30.75	NOTES: RIG: Truck mounted CME - 55	4-inch diameter solid flight auger	SAMPLE	DEPIH TYPE -1- -2- -3- REMARKS	BLOWS PER PEN REC	NO. 6 IN. IN. IN.

0-						/ Pieces of limestone and lime shale on surface. dry.
	CA-1	10,12	12	12	Angular 1 1/2 inch piece of calcareous shale in top of drive	
10	CA-2	8,10	12	12	Slightly darker More calcareous veins	Coarse sand sized pieces of rock
15	8. 8.	7,7,8	18	16	Scaping augers Hard	Coarse sand sized pieces; calcareous veins
-20	CA-4	5,7	12	12		More sand, about 40%; fine to coarse gravel.
- 25	S,	12,23,37	18	~	Scaning augers Stiff at 23'	23.0 - 30.75 ft: SHALE. Mostly fines, medium to highly plastic; thinly bedded; moderately to intensely weathered; soft; slightly moist; calcareous; waxy; dark gray with some orange brown iron staining. [Kg]
30	CA-6	32,50/3"	Ø	O	Scaping augers	

	Ī.	1 T T	1000
Geotechnical Environmental &	er R	dineering	

LOG OF DRILL HOLE

FDS-348

7/12/05 2 P 7/12/05 DATE: PAGE:

PROJECT NAME : Southern Delivery System

PROJECT NUMBER: 022950

N 1170881.9 E 3230893.4 BORING LOCATION:

DATE 7/12/05 GROUND SURFACE ELEVATION (LOCAL - FT) :4965.4 GROUNDWATER ELEVATION: DRY

DRILLED BY: HIGH PLAINS

TOTAL DEPTH (FT): NDM/TCM LOGGED BY:

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREI
3) REC - RECOVERY LENGTH OF SAMPLE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

M GROUNDWATER

UF - FIXED PISTON ST - SHELBY TUBE

ESTIMATED GROUNDWATER

N

SAMPLE METHOD: Auto Safety Hammer

BACKFILL: Drill cuttings

28.0

NOTES: RIG: Truck mounted CME - 75

4-inch diameter solid flight auger

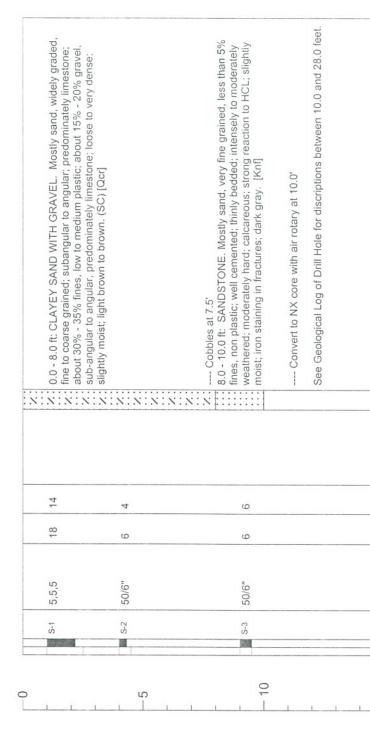
REMARKS -3-REC -2-PEN ż -1-BLOWS PER SAMPLE 6 IN

TYPE and NO.

DEPTH Ħ.

SRAPHIC 200

SOIL AND ROCK DESCRIPTIONS



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jeot	invii	Nate	ingni

NDM/TCM TOTAL DEPTH (FT) 28.0 FDS-348 2 HOLE NO. DESCRIPTION AND CLASSIFICATION ENGINEERING AND GEOLOGICAL LOGGED BY 7 PLUNGE SHEET 8.0 OVERBURDEN DEPTH (FT) GEOLOGICAL LOG OF DRILL HOLE 022950 DRILLED BY HIGH PLAINS PROJECT NO. РЕРСЕИТ РОД TREND PERCENT RECOVERY **GRAPHIC LOG** JOINT SYMBOL 4965.4 7/12/05 (SEE FEGEND) 7/12/05 **JOINT DESCRIPTION** GROUND SURFACE ELEV. (FT) INSITU TESTING HARDNESS DATE Southern Delivery System SHORTEST (FT) LONGEST (FT) 7/12/05 (SEE LEGEND) NO. OF PIECES CORING TIME (MIN) RQD (FT) PROJECT NAME Sou LOCATION N 1170881.9 E 3230893.4 DATE STARTED/FINISHED DRY RECOVERY (FT) (ГТ) ИОІТАЯТЭИЭЧ GROUNDWATER EL. INTERVAL CONDITIONS CONDITIONS NOTES **SEOUNDWATER** (TA) HT930

NOITAVEJE

10.0 - 16.0 ft: SANDSTONE. Mostly sand, very fine grained, less than 5% fines, non plastic; well cemented; thinly bedded; moderately to intensely weathered; moderately hard; iron staining in fractures; calcareous; strong reaction to HCL; slightly moist; dark gray. [Knf]	16.0 - 28.0 ft: LIMESTONE. Mostly calcite, reacts vigorously with HCl; some fines and fine sand present; thinly bedded; slightly weathered; slightly fractured, fractures are mostly mechanical breaks or horizontal fractures between bedding planes; moderately hard; dry;	gray to dark gray. [Knf]		
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7	4	4	4	
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Air rotary core with diamond bit				

Geotechnical	Water Resources
Environmental &	Engineering

FDS-352 HOLE NO.

SHEET 1 OF 1	PLUNGE 90	LOGGED BY NDM	TOTAL DEPTH (FT) 25.0		ENGINEERING AND GEOLOGICAL DESCRIPTION AND CLASSIFICATION				
NO. 022950		DRILLED BY HIGH PLAINS	OVERBURDEN DEPTH (FT) 9.5		ENGINEERING DESCRIPTION A				
PROJECT NO.	9	LED E	RBU		БЕВСЕИТ ВОД				
PRO.	TREND	DRIL	OVE	Α.	ERCENT RECOVER				
	GROUND SURFACE ELEV. (FT) 5036.7 T				OINT SYMBOL				
			7/12/05		JOINT DESCRIPTIO				
	EV.	LEV.	7		USITU TESTING				
п	E E		Щ		REDNESS				
/ster	FAC		DATE		(TA) TS3TROH				
ry S)	SUR		1		ONGEST (FT)				
elive	N	7/12/05		(QNI	IO. OF PIECES				
Southern Delivery System	300	7/1		CORING (SEE LEGEND)	овіис тіме (міи)				
uther	5	'		SEE	(FT)				
Sol	- o	DRY		ECOVERY (FT)					
	661.	ISH			(T4) NOITARTENE				
ш	1166	O/FIN	RE		JAVA∃TN				
JECT NAM	PROJECT NAME LOCATION P 3229649 9		GROUNDWATER EL.	NOTES	SROUNDWATER SONDITIONS SONDITIONS				
PRC	LOC	DATE STARTED/FINISHED	GRC		(T4) HT930				
					ELEVATION				

ELEVATION

0.0 - 9.5 ft: SANDY CLAY. Mostly fines, low plastic, about 30%-35% sand, widely graded, fine to coarse grained, subrounded to subangular, predominately limestone; calcareous; slightly moist; light brown to brown. (CL) [Qcr]		9.5 - 25.0 ft: SANDSTONE. Mostly sand, fine grained; less than 5% fines, non plastic; well cemented; thinly bedded; moderately fractured; moderately hard; moderately to intensely weathered; calcareous; dry; light yellow to brown. [Knf]		
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0	50	499	98	92
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	H4	0 deg 0 deg 0 deg 0 deg 0 deg 0 deg	0 deg 0 deg	H4 20 deg 0 deg 0 deg 0 deg
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	H	4H	4	<u> </u>
	4	1. 4H	0.2 H4	6.0 4.H
1	0.2 <.1 H4	0.0 × .1 H4	1.6 0.2 H4	1.5 0.3 H4
1	2 0.2 ×.1 H4	2 7 0.6 <.1 H4	3 5 1.6 0.2 H4	3 6 1.5 0.3 H4
	0 1 2 0.2 <.1 H4	2.0 2 7 0.6 <.1 H4	3.6 3 5 1.6 0.2 H4	2.7 3 6 1.5 0.3 H4
	1.0 0 1 2 0.2 <.1 H4	3.2 2.0 2 7 0.6 <.1 H4	4.3 3.6 3 5 1.6 0.2 H4	3.1 2.7 3 6 1.5 0.3 H4
	0 1 2 0.2 <.1 H4	2.0 2 7 0.6 <.1 H4	3.6 3 5 1.6 0.2 H4	2.7 3 6 1.5 0.3 H4

Geotechnical Environmental & Water Resources

LOG OF DRILL HOLE

FDS-357

9/15/05 $\overline{}$ OF 9/15/05 PAGE: DATE:

PROJECT NAME : Southern Delivery System

E 3223552.0 BORING LOCATION: N 1163454.0 PROJECT NUMBER: 022950

DATE 9/15/05 GROUND SURFACE ELEVATION (LOCAL - FT) 4837.5 GROUNDWATER ELEVATION: DRY

DRILLED BY : High Plains

24.25 TOTAL DEPTH (FT): LOGGED BY: NDM

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia.

BACKFILL: Cuttings

ESTIMATED GROUNDWATER

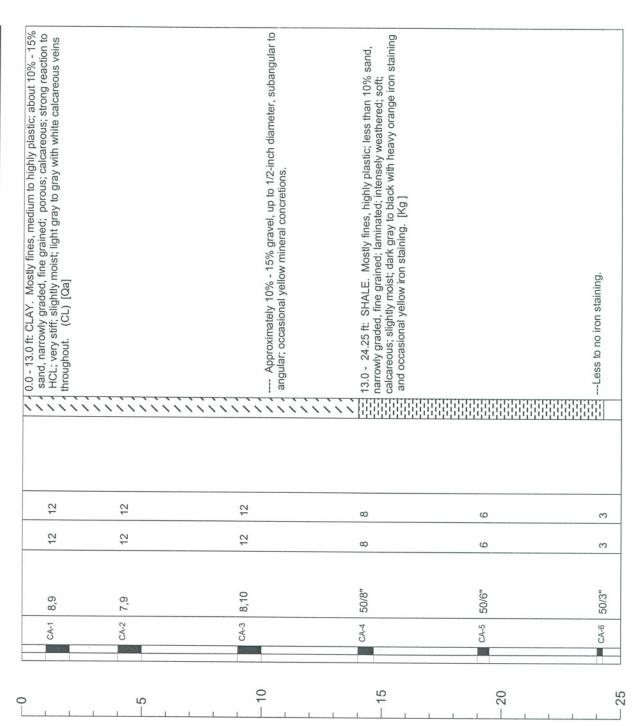
NOTES: RIG: Truck mounted CME-75

AUGER: 4-inch-dia. solid stem auger

N

SAMPLE METHOD: Automatic Safety Hammer GROUNDWATER

	SOIL AND ROCK DESCRIPTIONS							
OI	GRAPH 20G							
	REMARKS							
Г	REC IN.							
SAMPLE	BLOWS PER PEN 6 IN.							
	TYPE and NO.							
i i	PEPIH FT.							



LOG OF DRILL HOLE

FDS-358

9/16/05 OF 9/16/05 PAGE: DATE:

PROJECT NAME : Southern Delivery System

GROUND SURFACE ELEVATION (LOCAL - FT) 4798.7 BORING LOCATION: N 1162206.9 E 3223854.9 PROJECT NUMBER: 022950

DATE 9/16/05 GROUNDWATER ELEVATION: 4776 DRILLED BY: High Plains

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

UF - FIXED PISTON ST - SHELBY TUBE S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia. GROUNDWATER

ESTIMATED GROUNDWATER

N

NOTES: RIG: Truck mounted CME-75

LOGGED BY: NDM

TOTAL DEPTH (FT):

AUGER: 4-inch-dia. solid stem auger

SAMPLE METHOD: Automatic Safety Hammer 27.0

BACKFILL: Cuttings	SOIL AND ROCK DESCRIPTIONS				
	OI	BOJ DOJ			
		REMARKS			
n auger		Z -3 Z REC			
lid ster		R PEN			
AUGER: 4-inch-dia. solid stem auger	SAMPLE	BLOWS PER PEN 6 IN.			
UGER: 4		TYPE and NO.			
Al	i House	FT.			

CA-3 50/7" 7 7 7 —— Slightly weather CA-5 50/7" 7 7 7 —— Slightly weather cA-5 50/7" 7 7 7 7 —— Bentanite layer i gray to white.	sand, narrowly graded, fine grained; very stiff; porous; calcareous; contains roots; slightly moist, light brown to light gray with occasional orange iron staining. (CL) [Qcr] 4.0-26.0 ft: SHALE. Mostly fines, high plastic; less than 10% sand, fine grained; laminated; intensely weathered; soft, gypsum present; slightly moist; dark gray with orange iron staining and occasional yellow staining. Fightly weathered; orange iron staining. Slightly weathered; orange iron staining. No iron staining. Bentanite layer in sample, mostly fines, high plastic; slightly moist; light gray to white.
Grinding at 26 ft 26.0 - 27.0 than 10% ft [Kd]	26.0 - 27.0 ft: SANDSTONE. Mostly sand; fine to medium grained; less than 10% fines, non plastic; moderately hard; moist; light gray to dark gray. [Kd]

	LOG OF DRILL HOLE PAGE: 1 OF 1 DATE: 9/16/05 / 9/16/05		1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER 2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL 3) REC - RECOVERY LENGTH OF SAMPLE		0 in. dia UF - FIXED PISTON 2.5 in. dia. ST - SHELBY TUBE ESTIMATED GROUNDWATER ⊠			SAMPLE METHOD: Automatic Safety Hammer			
					3) REC - RECOVERY LENGTH OF	S - SPLIT SPOON SAMPLER 2.5 in. dia.		GROUNDWATER ▼ ES	SAMPLE METHOD: Au		
	Geotechnical Environmental & Water Becourses	Engineering Consultants	PBO IECT NAME · Southern Delivery System	TOOLO INDING	PROJECT NUMBER: 022950	BORING LOCATION: N 1161129.0, E 3223931.0	GROUND SURFACE ELEVATION (LOCAL - FT) :4802.9	GROUNDWATER ELEVATION: DRY DATE 9/16/05 S. SPLIT SPOON SAMPLER 2.0 in. dia	DRILLED BY: High Plains	LOGGED BY: NDM TOTAL DEPTH (FT): 24.3	NOTES: RIG: Truck mounted CME-75

SOIL AND ROCK DESCRIPTIONS

SRAPHIC 200

REMARKS

-1- -2- -3-BLOWS PER PEN REC 6 IN. IN.

TYPE and NO.

DEPTH FT.

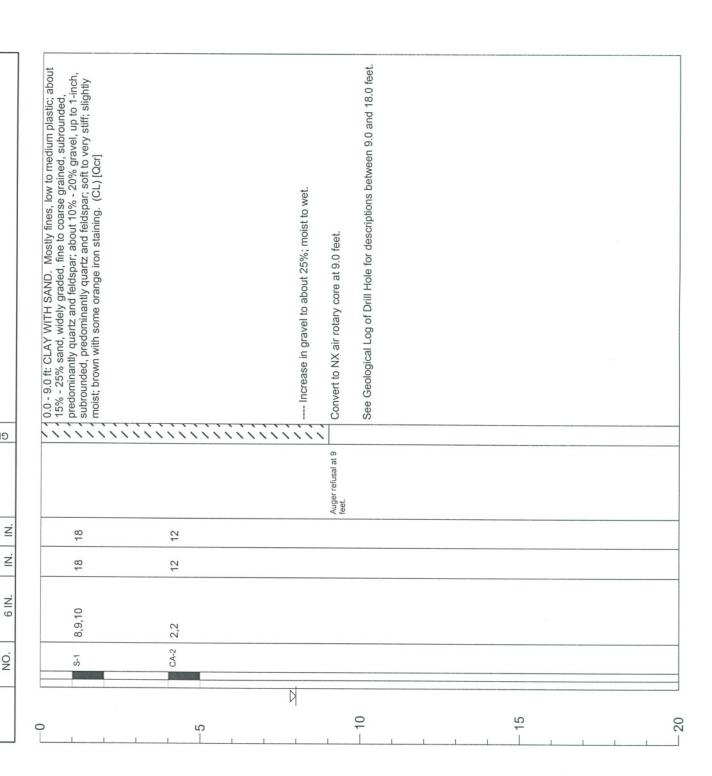
BACKFILL: Cuttings

AUGER: 4-inch-diameter flight stem auger

SAMPLE

0.0 - 3.0 ft: WIDELY GRADED SAND WITH CLAY. Mostly sand, widely graded, fine to coarse grained; about 10% - 15% fines, low plastic; about 10% - 15% gravel, up to 1 1/2 inches; about 10% - 15% cobbles; slightly moist; light brown to brown. (SW-SC) [Qst]	3.0 - 24.3 ft. SHALE. Mostly fines, highly plastic; less than 10% sand, narrowly graded, fine grained; laminated; intensely weathered; soft; slightly moist; dark gray to black with heavy yellow and orange iron staining throughout. [Kg]			- Less to no iron staining.	- Slight orange iron staining, some gypsum crystals.
::::::::::::::::::::::::::::::::::::::					99999
No sample taken					
	12	7	_	ø	4
	72	-	~	9	4
	13,15	50/11"	50/7"	.9/09	50/4"
	CA-1	CA-2	CA-3	CA-4	CA-5
0	2		15	20	- 25

FDS-360	HOLE PAGE: 1 OF 2	DATE: 9/15/05 / 9/15/05	LEGEND	1) BLOWS PER 6 IN140 LB. HAMMER FALLING 30 IN. TO DRIVE	SAMPLER 2) PEN - PENETRATION I ENGTH OF SAMPIER OR CORE BARBEI	TH OF SAMPLE	3.2.0 in. dia UF - FIXED PISTON		ESTIMATED GROUNDWATER	SAMPLE METHOD: Automatic Safety Hammer	sbu	SOIL AND ROCK DESCRIPTIONS
	LOG OF DRILL HOLE		1	1) BLOWS PER 6 IN140 LB	SAMPLER 2) PFN - PENETRATION E1	3) REC - RECOVERY LENGTH OF SAMPLE	S - SPLIT SPOON SAMPLER 2.0 in. dia	CA - SPLII SPOON SAMPLE	GROUNDWATER	SAMPLE METHO	BACKFILL: Cuttings	SOT
Geotechnical Environmental & Water Recourses	Engineering	PRO JECT NAME · Southern Delivery System		PROJECT NUMBER: 022950	BORING LOCATION : N 1159810.9, E 3223786.1	GROUND SURFACE ELEVATION (LOCAL - FT) 4746.9	GROUNDWATER ELEVATION: ~4739 DATE 9/15/05	DRILLED BY : High Plains	Y: NDM TOTAL DEPTH (FT): 18.0	NOTES: RIG: Truck mounted CME-75	AUGER: 4-inch-diameter solid flight auger	TYPE -123- REMARKS and BLOWS PER PEN REC
Geote Envir	Engir	PRO IECT N		PROJECT N	BORING LC	GROUND S	GROUNDW	DRILLED BY	LOGGED BY: NDM	NOTES: RIG	AUC	DEPTH FT.



TOTAL DEPTH (FT) 18.0 FDS-360 7 NDM HOLE NO. DESCRIPTION AND CLASSIFICATION OF ENGINEERING AND GEOLOGICAL 8 LOGGED BY 7 PLUNGE SHEET 9.0 OVERBURDEN DEPTH (FT) GEOLOGICAL LOG OF DRILL HOLE DRILLED BY High Plains PROJECT NO. РЕКСЕИТ RQD TREND РЕЯСЕИТ ВЕСОУЕЯУ **GRAPHIC LOG JOINT SYMBOL** GROUND SURFACE ELEV. (FT) 4746.9 9/15/05 (SEE FEGEND) 9/15/05 JOINT DESCRIPTION INSITU TESTING RESS DATE Southern Delivery System SHORTEST (FT) LONGEST (FT) 9/15/05 (SEE LEGEND) NO. OF PIECES CORING TIME (MIN) (ТЧ) ОДЯ ~4739 PROJECT NAME Sout
LOCATION R 1159810.9
E 3223786.1
DATE STARTED/FINISHED RECOVERY (FT) (ТЧ) ИОІТАЯТЭИЭЧ GROUNDWATER EL. INTERVAL CONDITIONS CONDITIONS NOTES **GROUNDWATER**

(TA) HT930 **NOITAVAJA**

9.0 - 18.0 ft: SANDSTONE. Mostly sand, narrowly graded, fine to medium grained; less than 10% fines, non to low plastic; moderately to well cemented; thinly to moderately bedded; slightly to moderately weathered; moderately hard; intensely to moderately fractured, fracture filled with black mineral; slightly moist to moist; light gray to gray and black. [Kd]		
29	35	
96	40	
69 O6		
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₹	0.1	
6.	0.7	
50	7	
27	16	
ත ෆ්	0.7	
6.7	8.0	
2.0	2.0	
Хr	× × ×	
-10		20 core

Environmental & Water Resources

LOG OF DRILL HOLE

FDS-361

9/15/05 2 P 9/15/05 PAGE: DATE:

PROJECT NAME : Southern Delivery System

PROJECT NUMBER: 022950

GROUND SURFACE ELEVATION (LOCAL - FT) :4750.3 BORING LOCATION: N 1159362.9, E 3223391.0

GROUNDWATER ELEVATION: N/M DRILLED BY: High Plains 22.0 TOTAL DEPTH (FT): NDM LOGGED BY:

S - SPLIT SPOON SAMPLER 2.0 in. dia CA - SPLIT SPOON SAMPLER 2.5 in. dia. DATE 9/15/05

LEGEND

1) BLOWS PER 6 IN.-140 LB. HAMMER FALLING 30 IN. TO DRIVE SAMPLER
2) PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL
3) REC - RECOVERY LENGTH OF SAMPLE

UF - FIXED PISTON ST - SHELBY TUBE

ESTIMATED GROUNDWATER

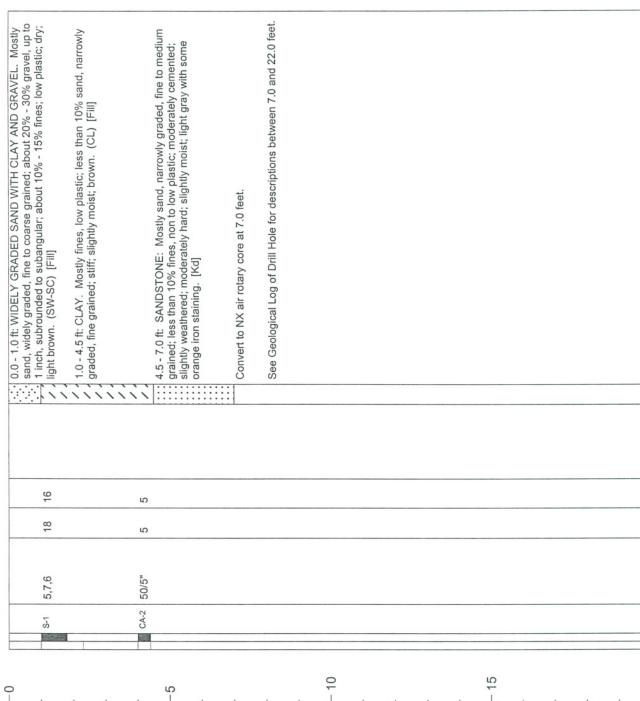
K

NOTES: RIG: Truck mounted CME-75

GROUNDWATER

SAMPLE METHOD: Automatic Safety Hammer

SOIL AND ROCK DESCRIPTIONS BACKFILL: Cuttings **SIHAAA**9 REMARKS AUGER: 4-inch-diameter solid flight auger REC . PEN IN. -1-BLOWS PER 6 IN. SAMPLE TYPE and NO. DEPTH Ħ.



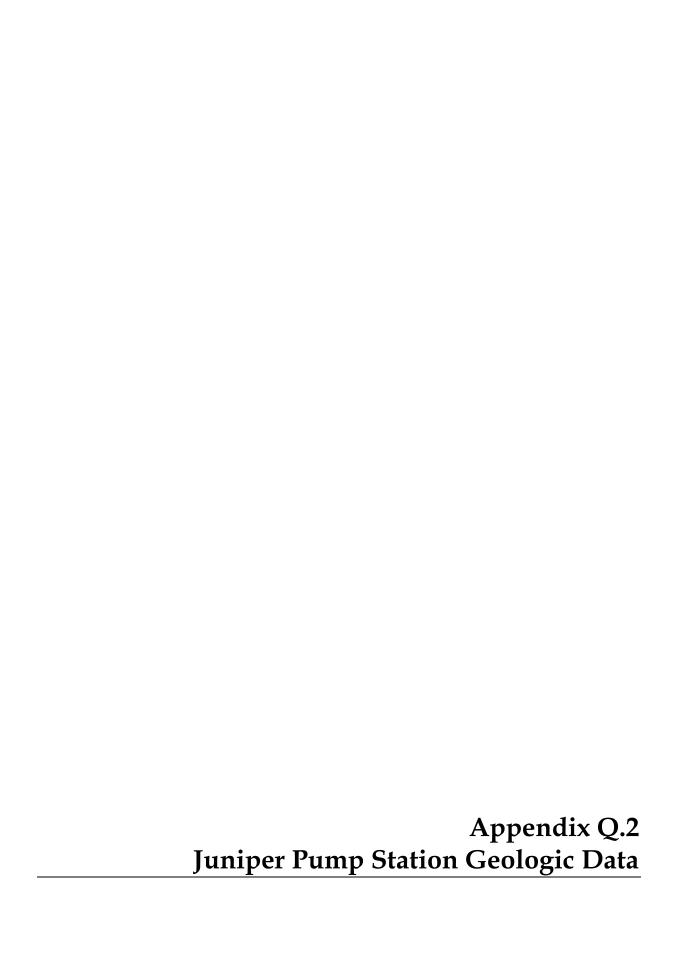
GEOLOGICAL LOG OF DRILL HOLE

FDS-361

HOLE NO.

	SHEET 2 OF 2	PLUNGE 90	LOGGED BY NDM	TOTAL DEPTH (FT) 22.0		ENGINEERING AND GEOLOGICAL DESCRIPTION AND CLASSIFICATION		
	NO. 022950	•	DRILLED BY High Plains	OVERBURDEN DEPTH (FT) 4.5		ENGINEERING DESCRIPTION A		
	PROJECT NO.	9	LED E	ERBUF		ЕВСЕИТ ВО	Ь	
	PRO B	TREND	DRIL	OVE	Y	PERCENT RECOVERY		
			P. D.	1		DINT SYMBOL RAPHIC LOG	_	
		GROUND SURFACE ELEV. (FT) 4750.33	9/15/05	9/15/05		JOINT DESCRIPTIO		
		EV.		1/6		SITU TESTING	NI	
		日日	1	Ш		ARDNESS	Ή	
	stem	ACE		DATE		(TT) TS3TROH	IS	
,	y Sys	URF		1		ONGEST (FT)	ГС	
	liver	SON	9/15/05		(QN	O. OF PIECES	N	
2	n De	SOU	9/1		CORING SEE LEGEND)	ORING TIME (MIN)	C	
i	then	GR	1		SEE L	QD (FT)	Я	
	Sou	South	E	N/N	(S)	ECOVERY (FT)	В	
		362.9	-11			(тч) иоітаятаиз	Ь	
	ш	N 115936	/FIN	REL		JAVABTI	VI	
	PROJECT NAME	ATION N1	DATE STARTED/FINIS	GROUNDWATER EL	NOTES	ROUNDWATER ONDITIONS RILLING ONDITIONS	D	
	PRO	LOC	DATE	GRO		DEPTH (FT)		
J				_				

7.0 - 22.0 ft: SANDSTONE. Mostly sand, narrowly graded, fine to medium grained; less than 10% fines, non to low plastic; moderately to well cemented; thinly bedded; slightly to moderately weathered; moderately hard; moderately fractured; slightly moist; light gray to gray. [Kd]	Similar to above; except thinly to moderately bedded.	21.0 - 22.0 ft: Iron staining; dark gray with black mineral stains; transitioning into Shale.	
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98	95		
dəp 06			
<u>‡</u>	¥	ia i	
	H		
v %	V 7.0		
6	0 84		
17	82		
8.00	7.1		
6.4	9.5		
	0 0		
7 X 5.0	XX.	N	
		Loud rattling 17.0-19.0 ff. Water in hole.	
10	1.5	20	25



10/04

P:\02295\JUNIPER PUMP STATION\CORRIDOR ROUTE.DWG

CH2IVIHILL

Project 02295

STRATIGRAPHIC COLUMN

Fig. 7-B.1.5E-2

January 2005

STATION\JUNIPER STRAT COLUMN.DWG

Colorado Springs, Colorado

1. PIPELINE ALIGNMENT PROVIDED BY CH2MHILL, FILES DATED 2-23-05 AND 2-25-05.

Project 02295 January 2005 Fig. 7-B.1.5E-3

